2010 GMC T-Series Owner Manual

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This manual describes features that may or may not be on your specific vehicle either because they are options that you did not purchase or due to changes subsequent to the printing of this owner manual. Please refer to the purchase documentation relating to your specific vehicle to confirm each of the features found on your vehicle. For vehicles first sold in Canada, substitute the name “General Motors of Canada Limited” for GMC wherever it appears in this manual.

Keep this manual in the vehicle for quick reference.

Canadian Owners

Propriétaires Canadiens

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

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

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

1-800-551-4123

Numéro de poste 6438 de langue française

www.helminc.com

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

Litho in the U.S.A.
Part No. 25901007 A First Printing

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Safety Warnings and Symbols

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

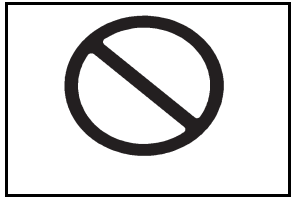
Danger indicates a hazard with a high level of risk which will result in serious injury or death.

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

⚠ WARNING:

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

Notice: **This means there is something that could result in property or vehicle damage. This would not be covered by the vehicle's warranty.**



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 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.

: This symbol is shown when you need to see your owner manual for additional instructions or information.

: This symbol is shown when you need to see a service manual for additional instructions or information.

Vehicle Symbol Chart

Here are some additional symbols that may be found on the vehicle and what they mean. For more information on the symbol, refer to the index.

: Airbag Readiness Light

: Air Conditioning

: Antilock Brake System (ABS)

: Audio Steering Wheel Controls or OnStar®

: Brake System Warning Light

: Charging System

: Cruise Control

: Engine Coolant Temperature

: Exterior Lamps

: Fog Lamps

: Fuel Gage

: Fuses

: Headlamp High/Low-Beam Changer

: LATCH System Child Restraints

: Malfunction Indicator Lamp

: Oil Pressure

: Outside Power Foldaway Mirrors

: Power

: Remote Vehicle Start

: Safety Belt Reminders

: Tire Pressure Monitor

: Traction Control

: Windshield Washer Fluid

Section 1 Seats and Restraint System

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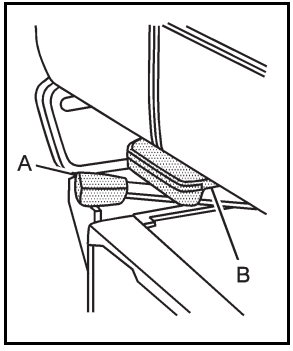
Front Seats

Manual Seats



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

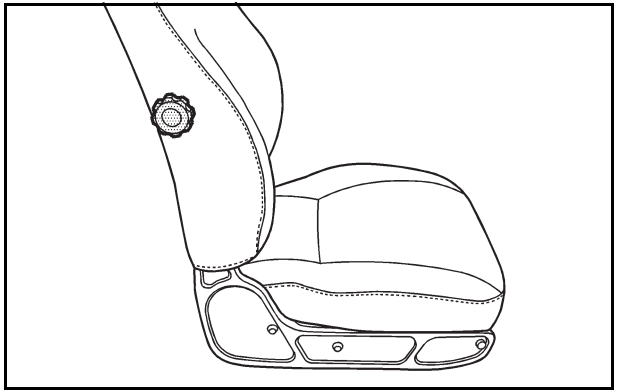
⚠ WARNING:

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

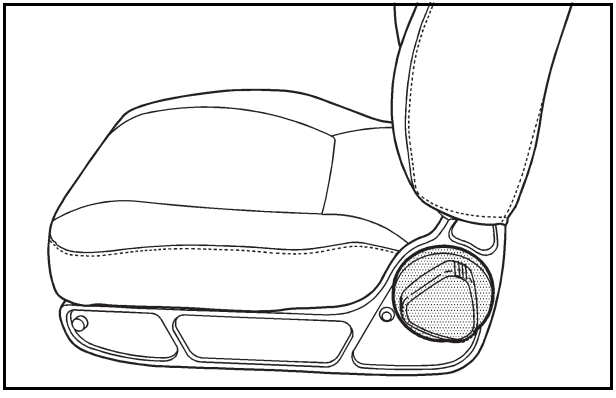


To get more support in the lumbar area of your back, turn the lumbar adjustment knob. The knob is located on the inboard side of the driver's seatback and the outboard side of the passenger's seatback.

Reclining Seatbacks

⚠ WARNING:

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.

⚠ WARNING:

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.

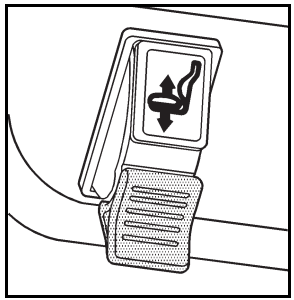
For proper protection when the vehicle is in motion, have the seatback upright. Then sit well back in the seat and wear your safety belt properly.

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.

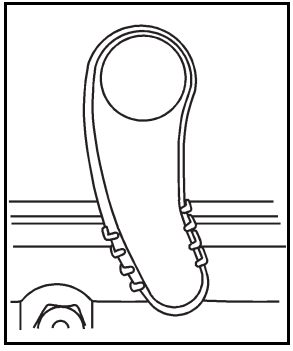
Height Adjustment



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



Lever shown in the Locked Position

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

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.

⚠ WARNING:

If either 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 seatbacks to be sure they are 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.

⚠ WARNING:

Do not let anyone ride where a safety belt cannot be worn properly. In a crash, if you or your passenger(s) are not wearing safety belts, the injuries can be much worse. You can hit things inside the vehicle harder or be ejected from the vehicle. You and your passenger(s) 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 passenger(s) are restrained properly too.

⚠ WARNING:

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 indicators as a reminder to buckle your safety belts. See *Safety Belt Reminders on page 3-23*.

In most states and in all Canadian provinces, the law requires wearing safety belts. Here is why:

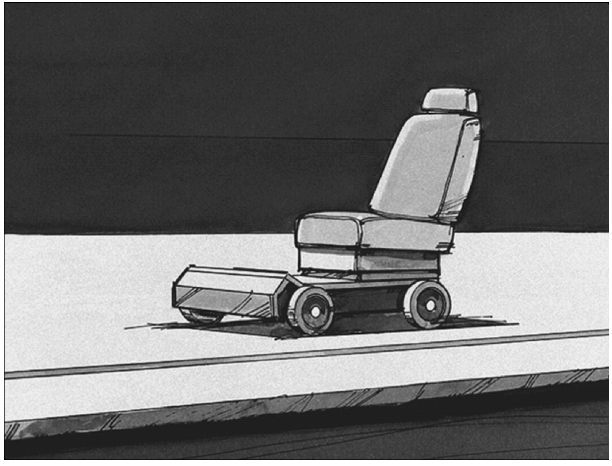
You never know if you will be in a crash. If you do have a crash, you do not know if it will be a serious one.

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.

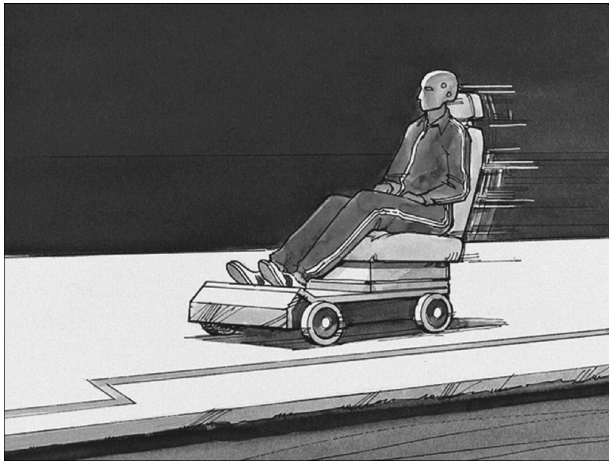
After more than 40 years of safety belts in vehicles, the facts are clear. In most crashes buckling up does matter ... a lot!

Why Safety Belts Work

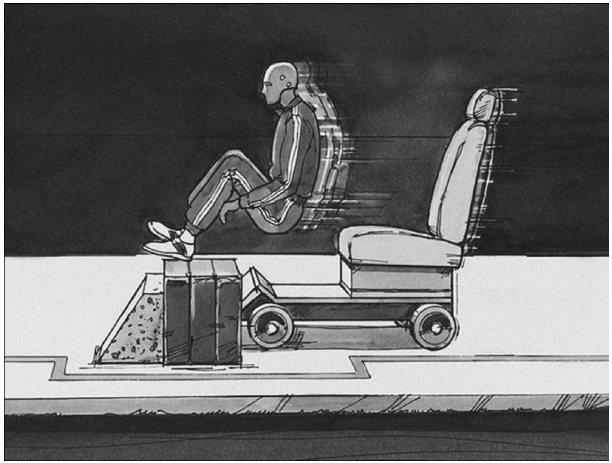
When you ride in or on anything, you go as fast as it goes.



Take the simplest vehicle. Suppose it is just a seat on wheels.

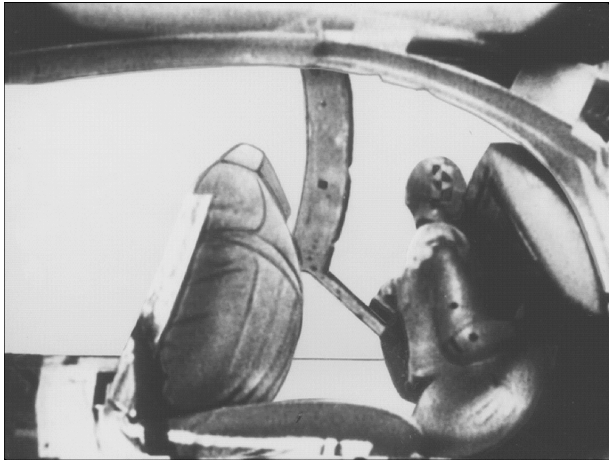


Put someone on it.

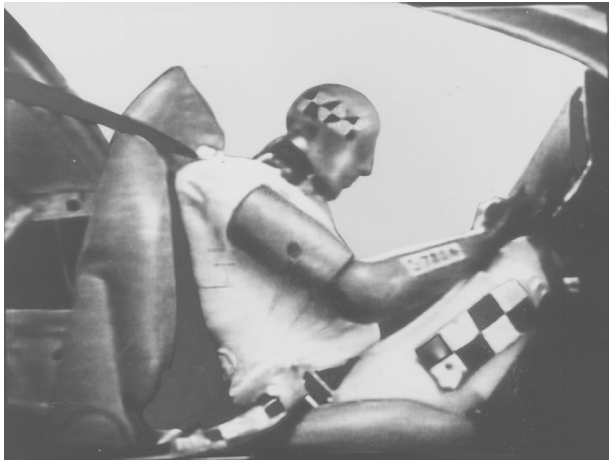


Get it up to speed. Then stop the vehicle. The rider does not stop.

The person keeps going until stopped by something. In a real vehicle, it could be the windshield...



or the instrument panel...



or the safety belts!

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. That is why safety belts make such good sense.

Questions and Answers About Safety Belts

Q: Will I be trapped in the vehicle after a crash 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 a crash — even one that is not your fault — you and your passenger(s) 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

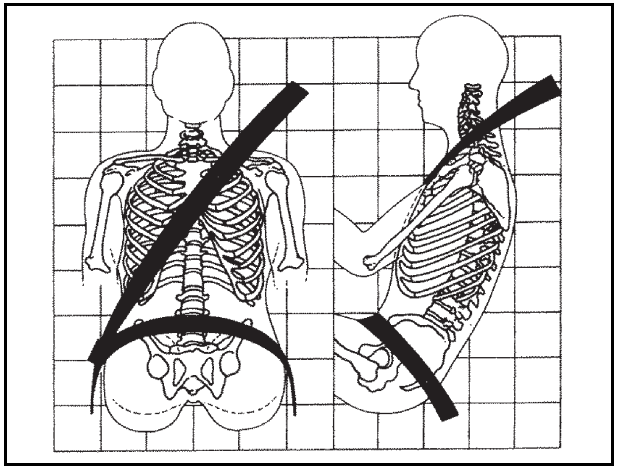
This section is only for people of adult size.

Be aware that there are special things to know about safety belts and children. And there are different rules for smaller children and infants. If a child will be riding in the vehicle, see *Older Children on page 1-25* or *Infants and Young Children on page 1-28*. Follow those rules for everyone's protection.

It is very important for all occupants to buckle up. Statistics show that unbelted people are hurt more often in crashes than those who are wearing safety belts.

Occupants who are not buckled up can be thrown out of the vehicle in a crash. And they can strike others in the vehicle who are wearing safety belts.

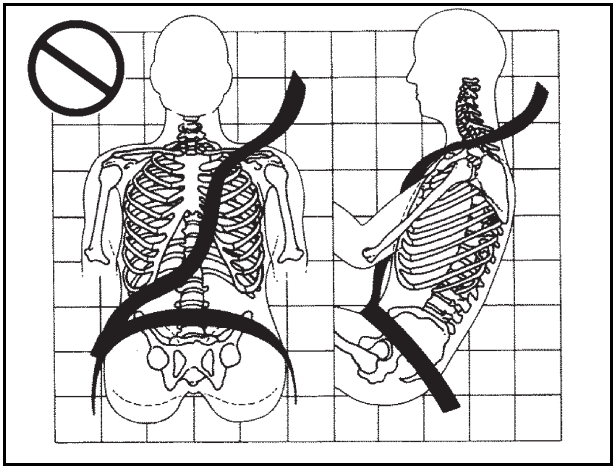
First, before you or your passenger(s) wear a safety belt, there is important information you should know.



Sit up straight and always keep your feet on the floor in front of you. 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 on 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 shoulder belt locks if there is a sudden stop or crash.

Q: What is wrong with this?

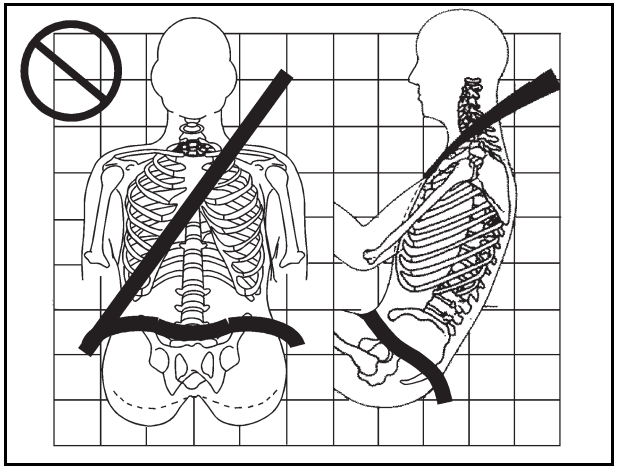


A: The shoulder belt is too loose. It will not give as much protection this way.

⚠ WARNING:

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 snugly against your body.

Q: What is wrong with this?

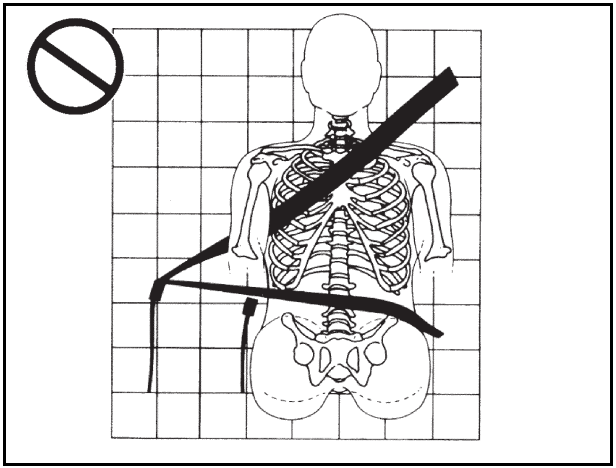


A: The lap belt is too loose. It will not give nearly as much protection this way.

⚠ WARNING:

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 on 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?

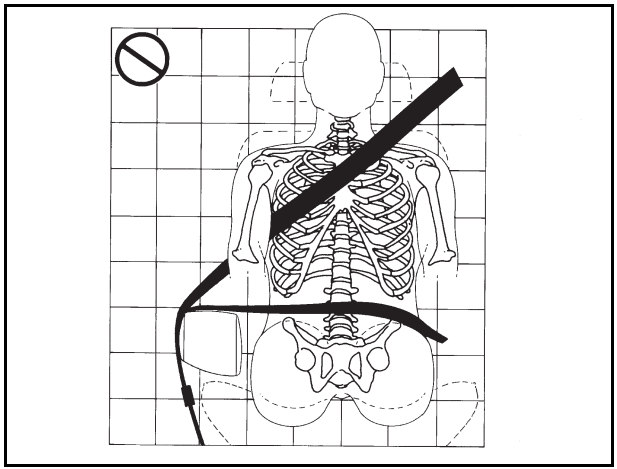


A: The belt is buckled in the wrong buckle.

⚠ WARNING:

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 on the pelvic bones. This could cause serious internal injuries. Always buckle your belt into the buckle nearest you.

Q: What is wrong with this?

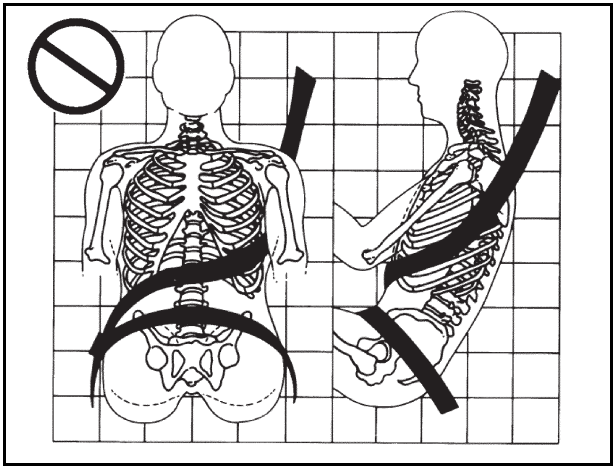


A: The belt is over an armrest.

⚠ WARNING:

You can be seriously injured if your belt goes over an armrest like this. The belt would be much too high. In a crash, you can slide under the belt. The belt force would then be applied on the abdomen, not on the pelvic bones, and that could cause serious or fatal injuries. Be sure the belt goes under the armrests.

Q: What is wrong with this?

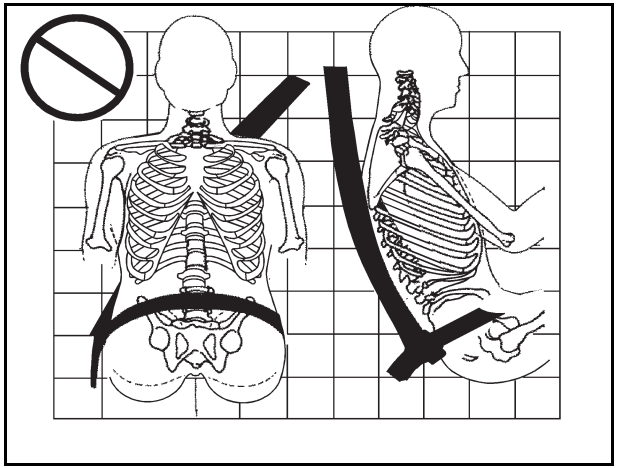


A: The shoulder belt is worn under the arm. It should be worn over the shoulder at all times.

⚠ WARNING:

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. The shoulder belt should go over the shoulder and across the chest.

Q: What is wrong with this?

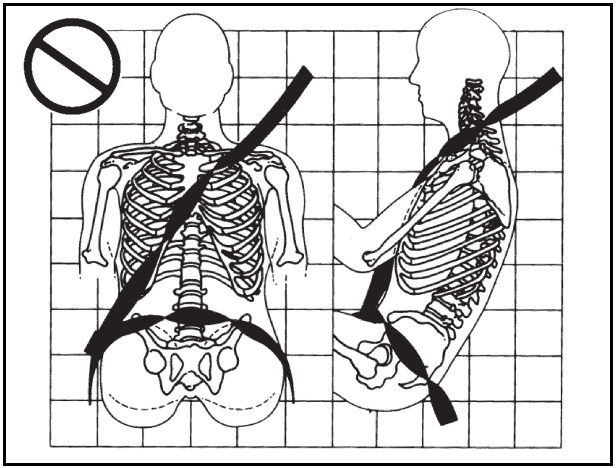


A: The belt is behind the body.

⚠ WARNING:

You can be seriously injured by not wearing the lap-shoulder belt properly. In a crash, you would not be restrained by the shoulder belt. Your body could move too far forward increasing the chance of head and neck injury. You might also slide under the lap belt. The belt force would then be applied right on the abdomen. That could cause serious or fatal injuries. The shoulder belt should go over the shoulder and across the chest.

Q: What is wrong with this?



A: The belt is twisted across the body.

⚠ WARNING:

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.

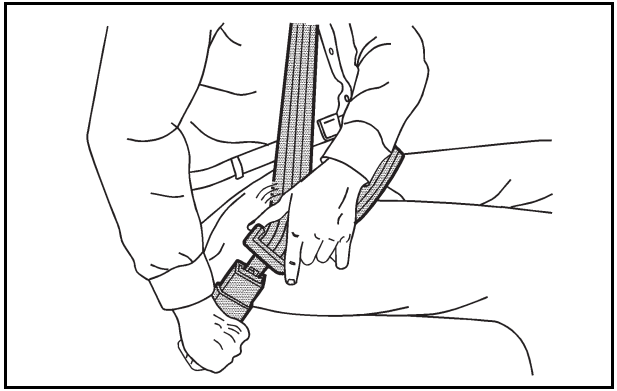
Lap-Shoulder Belt

All seating positions in the vehicle have a lap-shoulder belt except for the center passenger positions (if equipped), which have a lap belt. See *Lap Belt on page 1-24* for more information.

The following instructions explain how to wear a lap-shoulder belt properly.

1. Adjust the seat, if the seat is adjustable, so you can sit up straight. To see how, see “Seats” in the Index.
2. Pick up the latch plate and pull the belt across you. Do not let it get twisted.

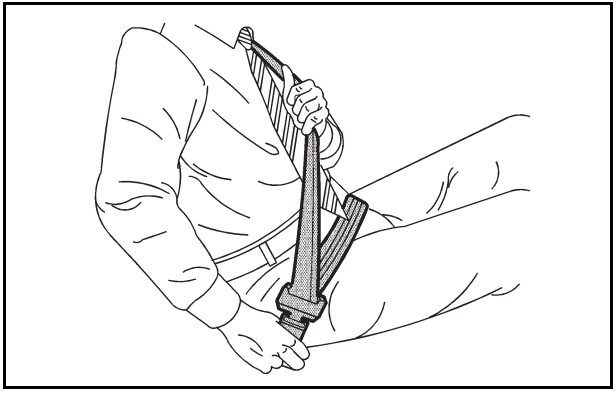
   The lap-shoulder belt may lock if you pull the belt across you very quickly. If this happens, let the belt go back slightly to unlock it. Then pull the belt across you more slowly.

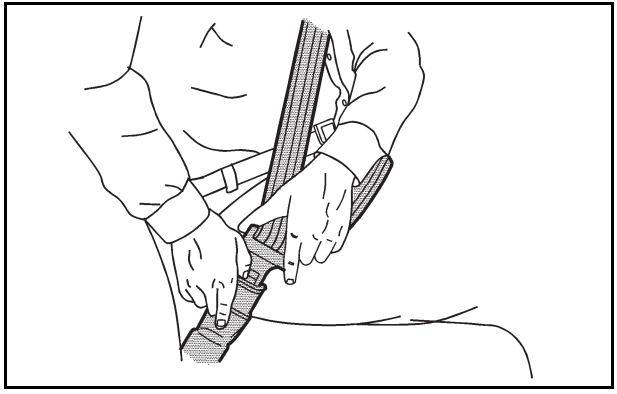


3. Push the latch plate into the buckle until it clicks.

   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 1-25*.

   Position the release button on the buckle so that the safety belt could be quickly unbuckled if necessary.
4. If equipped with a shoulder belt height adjuster, move it to the height that is right for you. See “Shoulder Belt Height Adjustment” later in this section for instructions on use and important safety information.





5. 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.

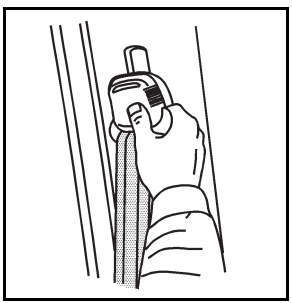
To unlatch the belt, push the button on the buckle. The belt should return to its stowed position.

Before a door is closed, be sure the belt is out of the way. If a door is slammed against a safety belt, damage can occur to both the belt and the vehicle.

Shoulder Belt Height Adjustment

The vehicle has a shoulder belt height adjuster for the driver and front passenger seating positions.

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

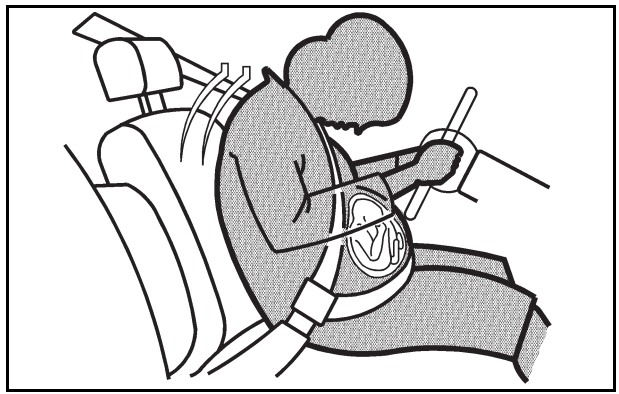


To move it down, press in at the top of the arrows and move the height adjuster to the desired position. The adjuster can be moved up by pushing up on the shoulder belt guide.

After the adjuster is set to the desired position, try to move it down without pressing the release button 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.



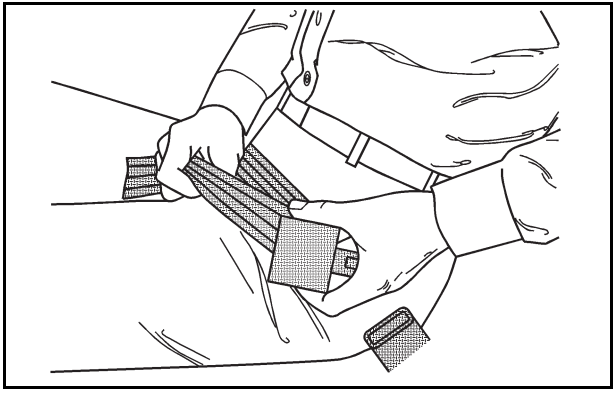
A pregnant woman should wear a lap-shoulder belt, and the lap portion should be worn as low as possible, below the rounding, throughout the pregnancy.

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.

Lap Belt

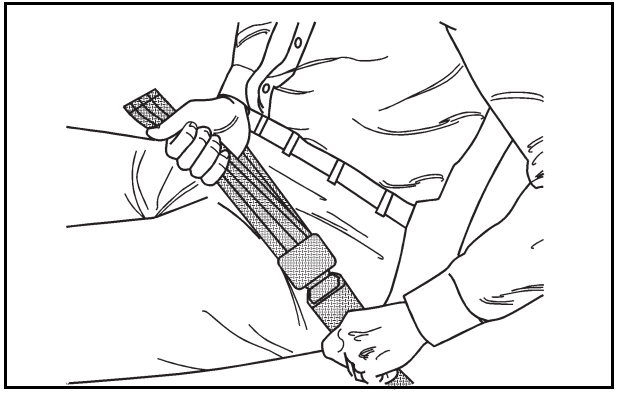
This section is only for the lap belt. To learn how to wear a lap-shoulder belt, see *Lap-Shoulder Belt on page 1-21*.

The vehicle may have a center seating position. When you sit in the center front 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.

Buckle, position, and release it the same way as the lap part of a lap-shoulder belt.



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

If the belt is not long enough, see *Safety Belt Extender on page 1-25*.

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

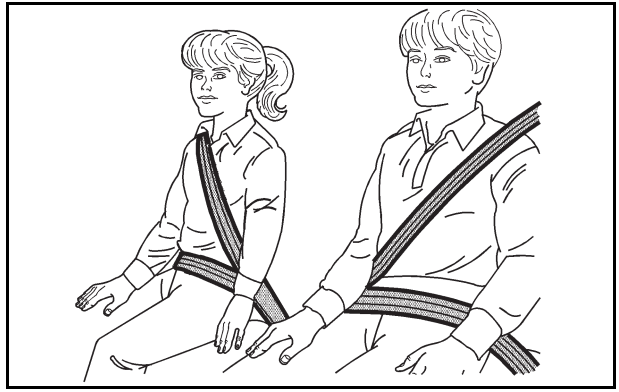
Safety Belt Extender

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.

The manufacturer's instructions that come with the booster seat, state the weight and height limitations for that booster. Use a booster seat with a lap-shoulder belt until the child passes the below fit test:

- Sit all the way back on the seat. Do the knees bend at the seat edge? If yes, continue. If no, return to the booster seat.
- Buckle the lap-shoulder belt. Does the shoulder belt rest on the shoulder? If yes, continue. If no, then return to the booster seat.
- Does the lap belt fit low and snug on the hips, touching the thighs? If yes, continue. If no, return to the booster seat.
- Can proper safety belt fit be maintained for length of trip? If yes, continue. If no, return to the booster seat.

If you have the choice, a child should sit in a position with 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: 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. This applies belt force to the child's pelvic bones in a crash. It should never be worn over the abdomen, which could cause severe or even fatal internal injuries in a crash.

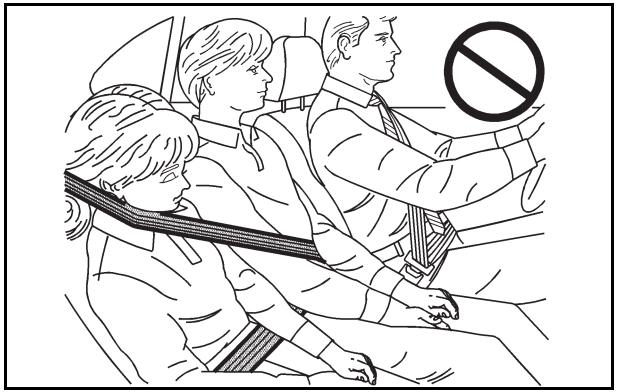
According to accident statistics, children and infants are safer when properly restrained in the rear seating positions than in the front seating positions.

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.

⚠ WARNING:

Never do this.

Never allow two children to wear the same safety belt. The safety belt can not properly spread the impact forces. In a crash, the two children can be crushed together and seriously injured. A safety belt must be used by only one person at a time.



⚠ WARNING:

Never do this.

Never allow a child to wear the safety belt with the shoulder belt behind their back. A child can be seriously injured by not wearing the lap-shoulder belt properly. In a crash, the child would not be restrained by the shoulder belt. The child could move too far forward increasing the chance of

(Continued)

WARNING: (Continued)

head and neck injury. The child might also slide under the lap belt. The belt force would then be applied right on the abdomen. That could cause serious or fatal injuries. The shoulder belt should go over the shoulder and across the chest.

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.

⚠ WARNING:

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.

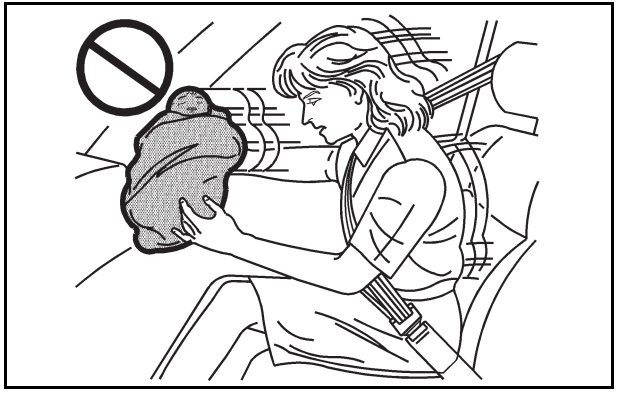
Airbags plus lap-shoulder belts offer protection for adults and older children, but not for young children and infants. Neither the vehicle's safety belt system nor its airbag system is designed for them. Every time infants and young children ride in vehicles, they should have the protection provided by appropriate child restraints.

Children who are not restrained properly can strike other people, or can be thrown out of the vehicle.

⚠ WARNING:

Never do this.

Never hold an infant or a child while riding in a vehicle. Due to crash forces, an infant or a child will become so heavy it is not possible to hold it during a crash. For example, in a crash at only 40 km/h (25 mph), a 5.5 kg (12 lb) infant will suddenly become a 110 kg (240 lb) force on a person's arms. An infant should be secured in an appropriate restraint.



⚠ WARNING:

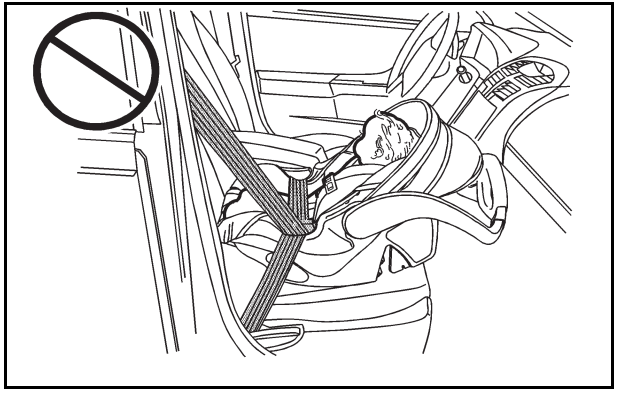
Never do this.

Children who are up against, or very close to, any airbag when it inflates can be seriously injured or killed. Never put a rear-facing child restraint in the right front seat. Secure a rear-facing child restraint

(Continued)

WARNING: (Continued)

in a rear seat. It is also better to secure a forward-facing child restraint in a rear seat. If you must secure a forward-facing child restraint in the right front seat, always move the front passenger seat as far back as it will go.



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.

⚠ WARNING:

To reduce the risk of neck and head injury during a crash, infants need complete support. This is because an infant's neck is not fully developed

(Continued)

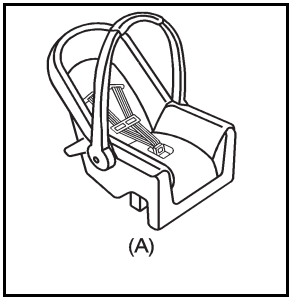
WARNING: (Continued)

and its head weighs so much compared with the rest of its body. In a crash, an infant in a rear-facing child restraint 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 should always be secured in rear-facing child restraints.

⚠ WARNING:

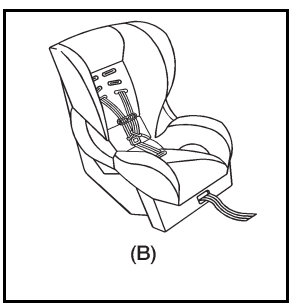
A young child's hip bones are still so small that the vehicle's regular safety belt may not remain low on the hip bones, as it should. Instead, it may settle up around the child's abdomen. In a crash, the belt would apply force on a body area that is unprotected by any bony structure. This alone could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

Child Restraint Systems

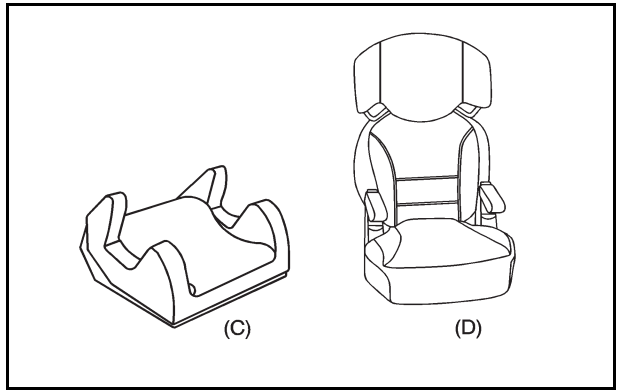


A rear-facing infant seat (A) provides restraint with the seating surface against the back of the infant.

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 (B) provides restraint for the child's body with the harness.



A booster seat (C-D) is a child restraint designed to improve the fit of the vehicle's safety belt system. A booster seat can also help a child to see out the window.

Securing an Add-on Child Restraint in the Vehicle

⚠ WARNING:

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

⚠ WARNING:

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

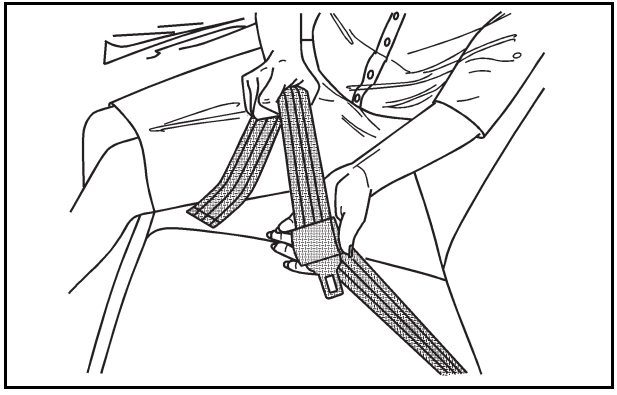
Securing a Child Restraint in Your Medium Duty Vehicle

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 the protection they need.

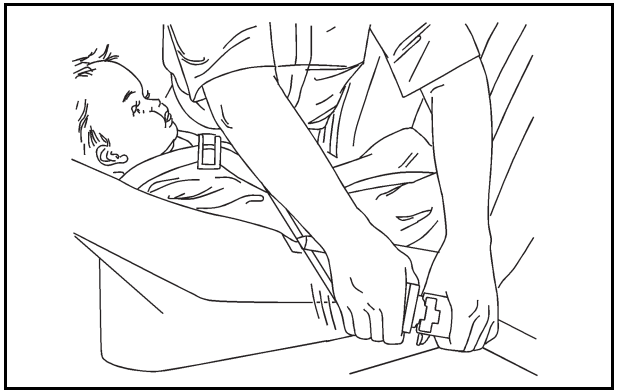
You will be using the lap belt. Be sure to follow the instructions that came with the child restraint. Secure the child in the child restraint when and as the instructions say. But do not use this position if the child restraint interferes with shifting gears.

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 1-33* if the child restraint has one.

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



1. Make the belt as long as needed 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. Push the latch plate into the buckle until it clicks.

   Make sure the release button is positioned so you would be able to unbuckle the safety belt quickly if necessary.

5. Tighten the belt by pulling 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, unbuckle the vehicle's safety belt.

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. 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.

Make sure the safety belt reminder light is working. See *Safety Belt Reminders on page 3-23* for more information.

Keep safety belts clean and dry. See *Care of Safety Belts on page 5-71*.

Replacing Restraint System Parts After a Crash

⚠ WARNING:

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 crash, nothing may be necessary. But the belt assemblies that were used during any crash may have been stressed or damaged. See your dealer/retailer to have your safety belt assemblies inspected or replaced.

New parts and repairs may be necessary even if the belt system was not being used at the time of the crash.

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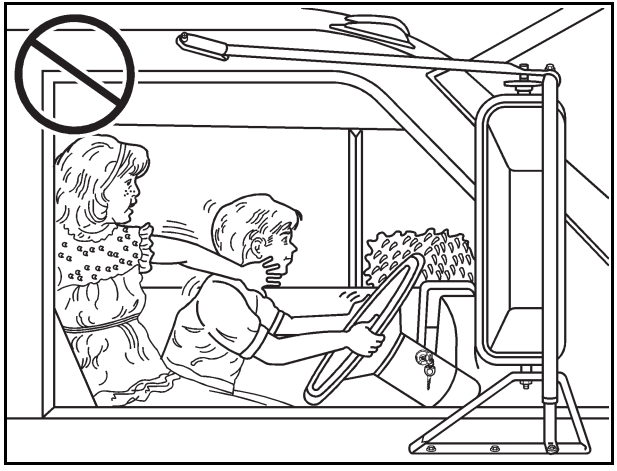
Keys

⚠ WARNING:

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 children 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 the vehicle, you may have to damage the vehicle to get in. Be sure you have spare keys.**

Doors and Locks

Door Locks

⚠ WARNING:

Unlocked doors can be dangerous.

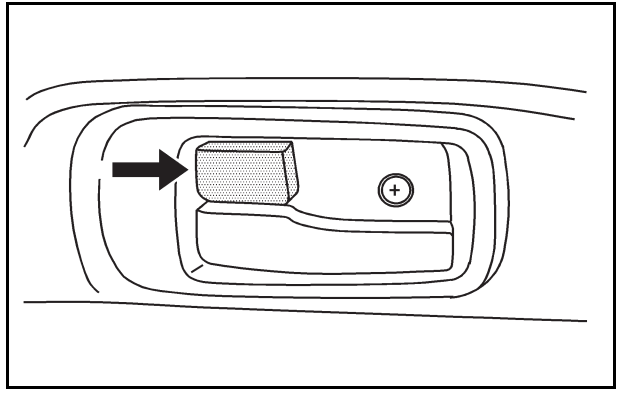
- Passengers, especially children, can easily open the doors and fall out of a moving vehicle. When a door is locked, the handle will not open it. The chance of being thrown out of the vehicle in a crash is increased if the doors are not locked. So, all passengers should wear safety belts properly and the doors should be locked whenever the vehicle is driven.
- 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 the vehicle whenever leaving it.

(Continued)

WARNING: (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.



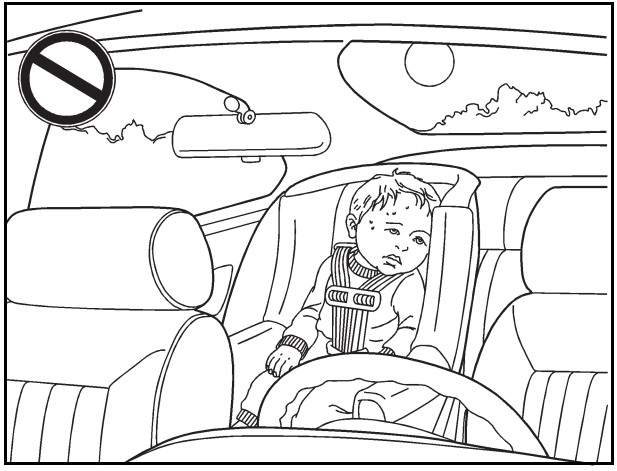
To lock your door from the inside, push the manual lock in. To unlock the door, pull the manual lock out.

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

Windows

⚠ WARNING:

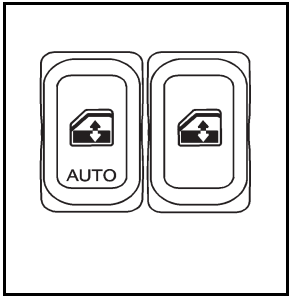
Leaving children, helpless adults, or pets in a vehicle with the windows closed is dangerous. They can be overcome by the extreme heat and suffer permanent injuries or even death from heat stroke. Never leave a child, a helpless adult, or a pet alone in a vehicle, especially with the windows closed in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



Manual Windows

Turn the hand crank on each door to raise or lower the window.

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/ACCESSORY or ON/RUN.

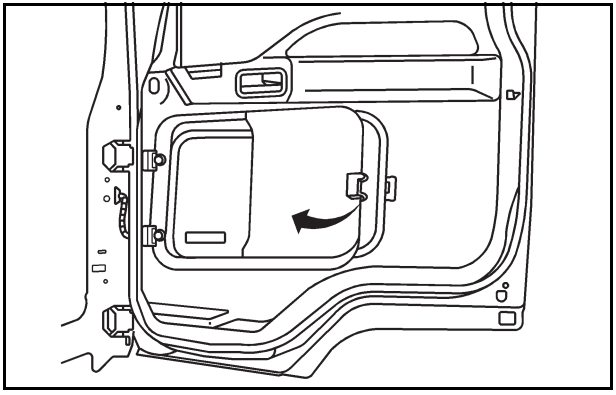
Power Window Lock Switch

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.

⚠ WARNING:

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.

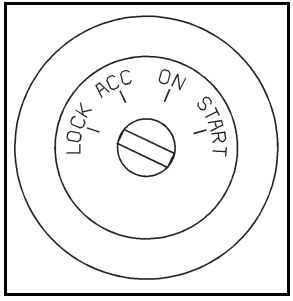
Starting and Operating Your Vehicle

New Vehicle Break-In

Notice: **The 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 the 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 2-26*****.**

Ignition Positions



The ignition switch has four different positions.

LOCK/OFF : This position locks the ignition. The key can only be removed in LOCK/OFF.

ACC (ACC/ACCESSORY) : This is the position in which you can operate the electrical accessories. Use this position if the vehicle must be pushed or towed.

ON/RUN : This position can be used to operate the electrical accessories and to display some instrument panel cluster warning and indicator lights. The switch stays in this position when the engine is running.

If you leave the key in the ACC/ACCESSORY or ON/RUN position with the engine off, the battery could be drained. You may not be able to start the vehicle if the battery is allowed to drain for an extended period of time.

START : This is the position that starts the engine. When the engine starts, release the key. The ignition switch returns to ON/RUN for driving.

A warning tone will sound when you park the vehicle, the driver door is opened and the key is in the ignition.

Starting the Diesel Engine

Automatic Transmission

Move the shift lever to P (Park) or N (Neutral). The engine will not start in any other position. To restart the engine when the vehicle is already moving, use N (Neutral) only.

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

Manual Transmission

Move the shift lever to N (Neutral) and hold the clutch pedal to the floor while starting the engine. The vehicle will not start if the clutch pedal is not all the way down.

Starting Procedure

1. Turn the ignition key to ON/RUN.

   Observe the wait to start light. See *Wait to Start Light on page 3-30*.

   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 the key in START for longer than 15 seconds at a time will cause the battery to be drained much sooner. And the excessive heat can damage the 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/OFF. Wait one minute for the starter to cool, then try the same steps again.

When the engine is cold, let it run for a few minutes before you move the vehicle. This lets oil pressure build up. The 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 the vehicle. Do not let the engine run when you are not in the vehicle.**

Cold Weather Starting

The following tips will help with cold weather starting.

Use the recommended engine oil when the outside temperature drops below freezing. See *Engine Oil on page 5-16*. When the outside temperature drops below −18°C (0°F), use of the engine coolant heater is recommended.

See *Engine Coolant Heater on page 2-15* for more information.

See *What Fuel to Use in The U.S. on page 5-7* or *What Fuel to Use in Canada and Mexico on page 5-9* for information on what fuel to use in cold weather.

If the Engine Will Not Start

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

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

If the light does not go off, wait a few seconds, then try starting the 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 the batteries are charged, but the engine still will not start, the vehicle needs service.

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

If the batteries do not have enough charge to start the engine, see *Battery on page 5-41* for more information.

Be sure you have the right oil for the engine, and that you have changed the oil at the proper times. If you use the wrong oil, the engine may be harder to start. See *Engine Oil on page 5-16* for more information.

Be sure you are using the proper fuel for existing weather conditions. See *What Fuel to Use in The U.S. on page 5-7* or *What Fuel to Use in Canada and Mexico on page 5-9*.

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

⚠ WARNING:

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

Engine Alarm and Automatic Shutdown

For vehicles 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 3-37* 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 3-30* for more information.

The alarm means that your engine will shut down. See *Engine Shutdown Warning Light on page 3-35* 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. In this condition, the engine speed remains at idle, and will not increase even if the accelerator pedal is pressed. 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 the vehicle repaired as soon as possible.**

Idle Shutdown

If the vehicle has a diesel engine it could have an engine idle shutdown feature.

This feature automatically shuts down the engine after it idles continuously for five minutes and if the following conditions are met:

- The parking brake is set.
- The vehicle is at a complete stop.
- The automatic transmission is in N (Neutral) or P (Park).

If the parking brake is not engaged, then the engine shuts down after 15 minutes of continuous idling operation.

The driver can reset the engine shutdown timer by momentarily changing the position of the accelerator, brake, or clutch pedal or by shifting the transmission out of P (Park) or N (Neutral). Once reset, the engine idle shutdown will restart the shutdown sequence described above, and will continue to do so until the engine shuts down or the vehicle is driven.

The engine will not go into idle shutdown mode if:

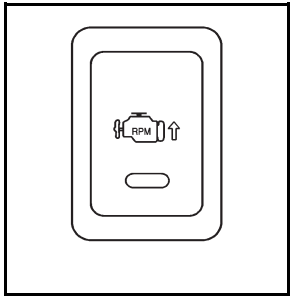
- The Power Take-Off (PTO) equipment is operating. See *Power Take-Off (PTO) on page 2-20* for more information.
- The engine coolant temperature is below 60°F. The engine idle shutdown will be activated once the vehicle coolant reaches 60°F or above.
- The Diesel Particulate Filter (DPF) is in regeneration mode and the green DPF lamp is illuminated to notify the driver that DPF is regenerating. The engine idle shutdown mode will be overridden for the time necessary to complete the regeneration process, up to a maximum of 30 minutes.
- Service or maintenance is being performed on the engine. The engine idle shutdown mode may be deactivated, by using a diagnostic scan tool, for a period of up to a maximum of 60 minutes.

The ENGINE SHUTDOWN WARNING LIGHT will come on and a continuous chime will alert the driver 30 seconds before the engine goes into idle shutdown mode. The engine shutdown warning light and chime will stay on for the entire duration of the idle shutdown event to inform the driver that the engine is in idle shutdown mode. See *Engine Shutdown Warning Light on page 3-35* for more information.

After the engine shutdown occurs, the engine is no longer running, and the ignition is still in the ON/RUN position, all accessories can be used. Turn the ignition switch to START to restart the engine or turn it to LOCK/OFF to prevent the battery from draining.

High Idle System

Manual High Idle System



If the vehicle has this feature, the manual high idle button is located in the instrument panel. See *Instrument Panel Overview on page 3-4* Instrument Panel Overview for more information.

This system can be used to increase 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 N (Neutral) or P (Park).

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 the 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 shifter is in N (Neutral) or P (Park) 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 2-16* 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 3-35* 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 the engine, let it run for 20 to 30 seconds before you put a load on it. 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 the 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 3-33* 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 3-29* 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 3-25* 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 3-39* for more information.
- The charging system light should come on when the ignition key is turned to ON/RUN 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 3-24* for more information.
- The voltmeter charge indicator gage tells you the condition of the 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 3-24* 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

The engine coolant heater can provide easier starting and better fuel economy during engine warm-up in cold weather conditions at or below 0°F (−18°C). Vehicles with an engine coolant heater should be plugged in at least four hours before starting. An internal thermostat in the plug-end of the cord may exist which will prevent engine coolant heater operation at temperatures above 0°F (−18°C).

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.

⚠ WARNING:

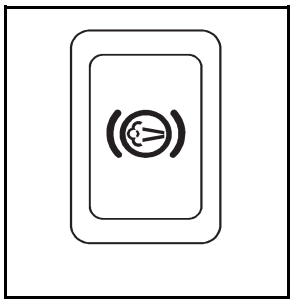
Plugging the cord into an ungrounded outlet could cause an electrical shock. Also, the wrong kind of extension cord could overheat and cause a fire. You could be seriously injured. Plug the cord into a properly grounded three-prong 110-volt AC outlet. If the cord will not reach, use a heavy-duty three-prong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

The length of time the heater should remain plugged in depends on several factors. Ask a dealer/retailer in the area where you will be parking the vehicle for the best advice on this.

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 3-35* for more information.

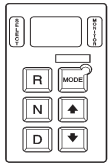
When using the exhaust brake, the proper gear range selection is important. The exhaust brake will be most effective if the gear range selected is the lowest possible range that does not allow the engine rpm to exceed 2500 rpm.

If you have an automatic transmission and press this button, the transmission will downshift to a factory default setting of 4 (Fourth) gear. To change the default setting, or for more information on factory default settings, contact your dealer/retailer for assistance.

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

Automatic Transmission Operation

This part of the manual covers the basics of automatic transmissions. With these transmissions, you will find an Allison® Transmission Operator's Manual in the 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 the vehicle. Make sure you follow the instructions on this label.



Vehicles equipped with an Allison® 3000 Series transmission come with a push button shift selector that will display transmission information. Refer to the Allison® Transmissions Operator's Manual for more information on transmission diagnostics and shift selector operation.

⚠ WARNING:

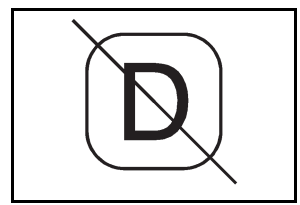
It can be dangerous to get out of the vehicle without the parking brake firmly set. The vehicle can roll. If you have left the engine running, the vehicle can move suddenly. You or others could be injured. To be sure the vehicle will not move, even when you are on fairly level ground, always set the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

⚠ WARNING:

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

Overdrive Defeat

If the 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.



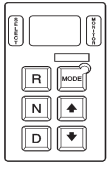
The overdrive defeat button is located in the instrument panel to the right of the steering column. See *Instrument Panel Overview on page 3-4* for more information.

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 the vehicle has this feature, the range selector has a 2-3 position. You cannot shift up to the next higher gear when the transmission is in this position unless the 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 the vehicle for more information about this.



If the vehicle is equipped with a push button shift selector, refer to the Allison® Transmission Operator's Manual for shift selector operating instructions.

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 the 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 N (Neutral) while the vehicle is moving.
- Never make a range shift while moving in R (Reverse).

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)

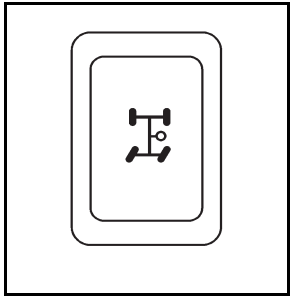
A clutch brake is used to stop transmission input shaft turning so that 1 (First) or R (Reverse) gear selection can be initiated when the vehicle is at a standstill and the engine is idling.

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 R (Reverse). 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 1 (First) or R (Reverse) gear.

Notice: **Using the clutch brake for shifting into any gear other than 1 (First) or R (Reverse) 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 1 (First) or R (Reverse).**

Power Take-Off (PTO)



The 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

⚠ WARNING:

If you do not park the 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 the 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 brake pedal down.
3. Apply the parking brake. See *Parking Brake (With Hydraulic Brakes) on page 2-23* or *Parking Brake (With Air Brakes) on page 2-24* for parking brake apply procedure.
4. Shift the transmission to N (Neutral) for manual transmission or P (Park) for automatic transmission.

Two-Speed Rear Axle

The Two-Speed rear axle lets the driver select Low Range and High Range. Low Range provides good starting torque and pulling power. When selecting High Range the axle allows for higher road speed and fuel economy.

For better performance during off-road or under a heavy load, shift the axle into Low Range and then operate the transmission normally.

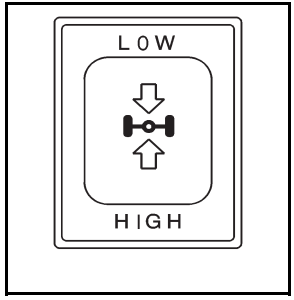
For better performance on the highway, shift the axle to High Range and operate the transmission normally.

High or Low Range can be used when additional shifts between transmission gears is needed while driving on grades and for better fuel economy.

Notice: **Driving in Low Range above 50 mph (80.5 kph) will damage driveline components. Drive below 50 mph (80.5 kph) in Low Range.**

If the vehicle has this feature, there is a label on the headliner above the windshield or in another place near the driver that shows how to use it. Be sure to follow the directions carefully.

Two-Speed Rear Axle Shift Control Operation



The rear axle shift control switch for automatic and manual transmissions is located in the instrument panel switchbank.

Press the bottom of the switch for High Range and the top of the switch for Low Range.

Always start the vehicle in motion with the two-speed axle in low range.

Shifting on a Downgrade

Do not shift the two-speed axle when driving on a downgrade. The speed of the vehicle moving downhill may make it hard to shift the axle into either Low or High Range.

Shifting

Upshifting the Axle

To shift from Low to High Range:

1. Press the bottom of the switch to shift the axle control from Low to High.
2. Release the accelerator pedal until the shift applies.
3. Then push the accelerator pedal.

Axle upshift can be abrupt, causing the vehicle to jerk. Release the accelerator slowly for a smooth shift. For manual transmissions, use the clutch while pressing the accelerator for a smooth shift.

Downshifting the Axle

To shift from High to Low Range:

1. Press the top of the switch to shift from High to Low Range.
2. Release the accelerator pedal.
3. Then push the accelerator pedal slowly until the axle shifts.

Split Upshift (Manual Transmissions Only)

To downshift the axle with a transmission upshift:

1. Push the clutch.
2. Shift the Transmission to a higher gear.
3. Shift the axle control from High to Low Range.
4. Release the clutch.
5. Push the accelerator pedal until the axle shifts.

Split Downshift (Manual Transmission Only)

To upshift the axle with a transmission downshift:

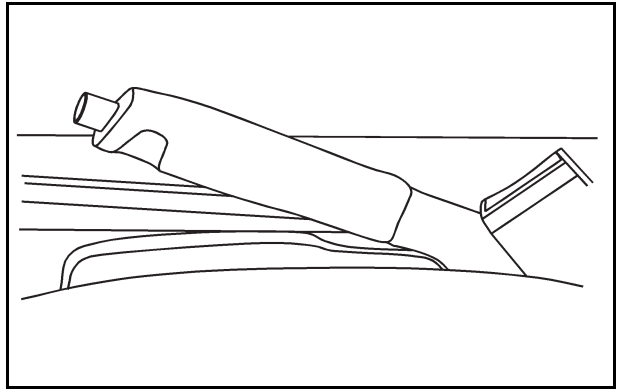
1. Shift the axle control from Low to High Range.
2. Push the clutch.
3. Shift the transmission to a lower gear.
4. Release the clutch.
5. Push the accelerator pedal until the axle shifts.

Parking Brake (With Hydraulic Brakes)

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

The vehicle may also be equipped with an automatic transmission which has a center console shift lever. This lever will have a P (Park) position on the shift indicator. Even when P (Park) 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 3-25* for more information. Then shift the transmission to N (Neutral) for a manual transmission or P (Park) 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 2-26* for more information.



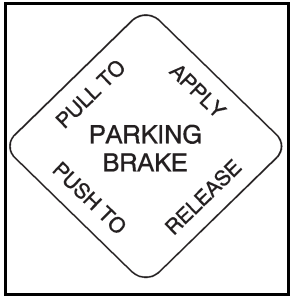
Once the parking brake is applied, slowly remove your foot from the regular brake pedal, while checking to see if the vehicle moves. If the vehicle does start to move, press the regular brake pedal and follow the parking brake burnish procedures. See *Parking Brake Burnish Procedure on page 2-26* for more information.

If the parking brake still does not set, take the vehicle to your 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 N (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.**

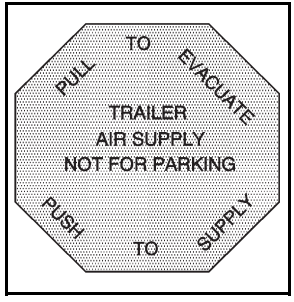
Parking Brake (With Air Brakes)



If the 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:



⚠ WARNING:

When the yellow PARKING BRAKE and the red TRAILER AIR SUPPLY knobs are both pushed in, the 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 the rig from moving.

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

1. Move the 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 the 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 3-39* 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.

⚠ WARNING:

If you apply any one of the air brake parking controls while the vehicle is moving, the 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 low air warning light and 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 the 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 4-20*.

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).

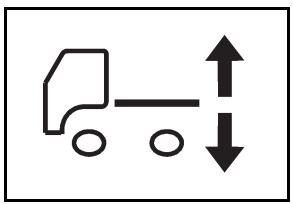
Notice: **Driving with the parking brake on can damage the transmission and brake system parts. Verify that the parking brake is fully released and the brake warning light is off before driving.**

Air Suspension

The 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 the 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 dump position.

Parking Over Things That Burn

⚠ WARNING:

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

Engine Exhaust

⚠ WARNING:

Engine exhaust contains Carbon Monoxide (CO) which cannot be seen or smelled. Exposure to CO can cause unconsciousness and even death.

Exhaust may enter the vehicle if:

- The vehicle idles in areas with poor ventilation (parking garages, tunnels, deep snow that may block underbody airflow or tail pipes).

(Continued)

WARNING: (Continued)

- The exhaust smells or sounds strange or different.
- The exhaust system leaks due to corrosion or damage.
- The vehicle's exhaust system has been modified, damaged or improperly repaired.
- There are holes or openings in the vehicle body from damage or after-market modifications that are not completely sealed.

If unusual fumes are detected or if it is suspected that exhaust is coming into the vehicle:

- Drive it only with the windows completely down.
- Have the vehicle repaired immediately.

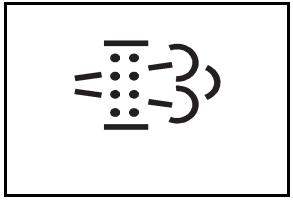
Never park the vehicle with the engine running in an enclosed area such as a garage or a building that has no fresh air ventilation.

Diesel Particulate Filter

The 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 to lower the temperature before it leaves the tailpipe.

The DPF, the tailpipe, or other exhaust system components must not be altered. Inspect regularly and clean any mud or dirt from the exhaust cooler, especially where the exhaust cooler connects to the tailpipe and the openings where fresh air enters the cooler. See “Exhaust System Inspection” under *At Least Twice a Year on page 6-24*.

The DPF will clean itself as part of normal operation. Several factors including fuel consumed, hours of engine operation and miles driven are monitored by the Engine Control Module (ECM). The self-cleaning occurs approximately once per tank of fuel.



During cleaning, the green DPF indicator light will come on. See *Diesel Particulate Filter Warning Light on page 3-38*.

Extended idling can cause exhaust parts and gases to become very hot. Keep the exhaust area clear of material that could ignite or burn. See *Parking Over Things That Burn on page 2-27* for more information.

⚠ WARNING:

During DPF self cleaning or during extended idling in P (Park), the exhaust system and exhaust gases are very hot. Things that burn could touch hot exhaust parts under the vehicle and ignite. You or others could be burned. Do not park, or idle for an extended period of time, near or over papers, leaves, dry grass, or other things that can burn. Keep the exhaust area clear of material that could ignite or burn. See *Parking Over Things That Burn on page 2-27* for more information.

Notice: **Extended idle should be avoided because the DPF system is not capable of self cleaning at idle. During extended idle operation, monitor the instrument panel telltale lights and Driver Information Center for messages and take appropriate indicated action. 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 the vehicle warranty.**

When the yellow DPF indicator comes on, the filter is dirty and needs cleaning. You will also notice a change in the exhaust sound and engine idle speed. This is normal. If you continue to drive and the exhaust filter is not cleaned as required, the DPF indicator will change from yellow to red. Continuing to drive the vehicle with the red indicator can cause filter damage.

Vehicles with DPF have specific fuel and engine oil requirements. See *What Fuel to Use in The U.S. on page 5-7* or *What Fuel to Use in Canada and Mexico on page 5-9* and *Engine Oil on page 5-16* for more information on those requirements.

Notice: **Permanent damage can occur to the DPF or related components if the required Ultra Low Sulfur Diesel (15 ppm sulfur maximum) or low ash CJ-4 engine oil is not used. This damage would not be covered by the vehicle warranty.**

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. Ash is the by-product of engine oil consumption. The ash will become trapped in the DPF over the life of the vehicle. Eventually, the buildup of ash will restrict the exhaust gases and the DPF will need to be cleaned or replaced.

See *Accessories and Modifications on page 5-3* for important information if you are considering adding accessories or modifying the vehicle.

Manual Cleaning Procedure

⚠ WARNING:

During DPF self cleaning, 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 the vehicle could catch fire. See *Parking Over Things That Burn on page 2-27*.

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

When it is safe to do so, stop the vehicle. Perform DPF manual cleaning in a well ventilated area. DPF Manual cleaning must be performed outdoors, as follows. Once manual cleaning is started, complete the cleaning in a single operation if possible. If manual cleaning is not completed, as indicated by the green DPF indicator going off, and the yellow or red indicator light remains on, self cleaning might not be allowed until the vehicle is stopped and manual cleaning 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 manual cleaning, 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 P (Park) or N (Neutral).
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 2-20*.
8. Press the DPF switch on the instrument panel. See *Instrument Panel Overview on page 3-4*. The green DPF indicator light comes on, the exhaust gas control valve operates, engine idle speed automatically increases, and DPF manual cleaning begins. Do not leave the vehicle unattended during manual cleaning.
9. When both the green and the yellow or red DPF indicator lights go off, manual cleaning is completed. Manual cleaning is normally completed in about 30 minutes.

Under certain operating conditions, manual cleaning might not be able to be performed, even if the soot level in the DPF requires cleaning. This can occur because of low coolant temperature, low battery voltage, high exhaust temperature or immediately after starting the vehicle. When manual cleaning is requested and coolant temperature is low, engine warm-up is started, the green DPF indicator light will come on, the exhaust gas control valve operates, and engine rpm increases to help raise engine coolant temperature. When operating conditions allow, cleaning will begin.

Running the Vehicle While Parked

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

⚠ WARNING:

Idling a vehicle in an enclosed area with poor ventilation is dangerous. Engine exhaust may enter the vehicle. Engine exhaust contains Carbon Monoxide (CO) which cannot be seen or smelled. It can cause unconsciousness and even death. Never run the engine in an enclosed area that has no fresh air ventilation. For more information, see *Engine Exhaust on page 2-27*.

⚠ WARNING:

It can be dangerous to get out of the vehicle if the automatic transmission shift lever is not fully in P (Park) with the parking brake firmly set. The vehicle can roll. Do not leave the 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 the 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 P (Park), or the manual transmission shift lever to Neutral.

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

Mirrors

Manual Rearview Mirror

Hold the inside rearview mirror in the center to move it for a clearer view of behind your vehicle. Adjust the mirror to avoid glare from the headlamps behind you. Push the tab forward for daytime use and pull it for nighttime use.

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.

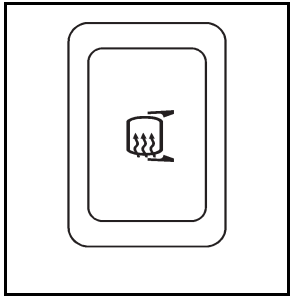
Outside Convex Mirrors

⚠ WARNING:

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 the regular outside mirrors (or the inside mirror, if you have one) before changing lanes.

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

Outside Heated Mirrors

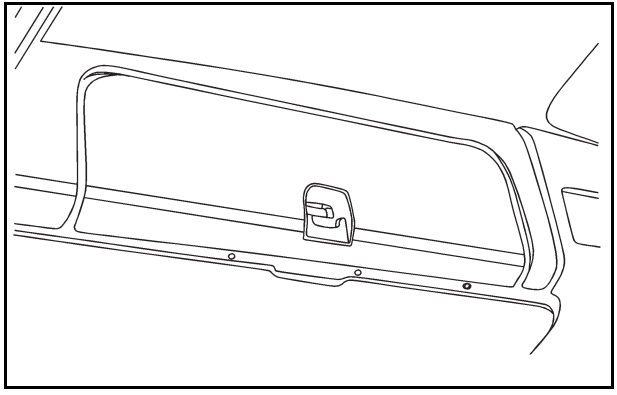


Vehicles with outside heated mirrors have the control switch located on the instrument panel.

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.

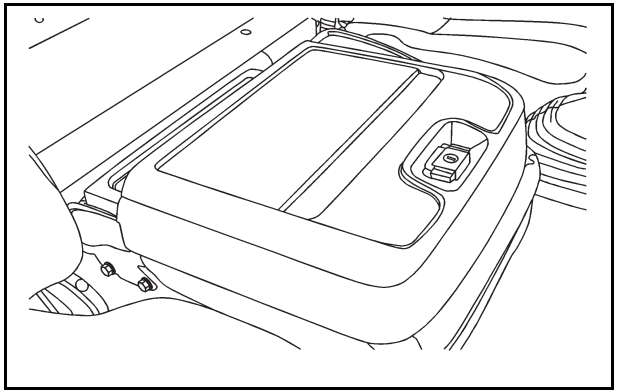
Storage Areas

Overhead Storage

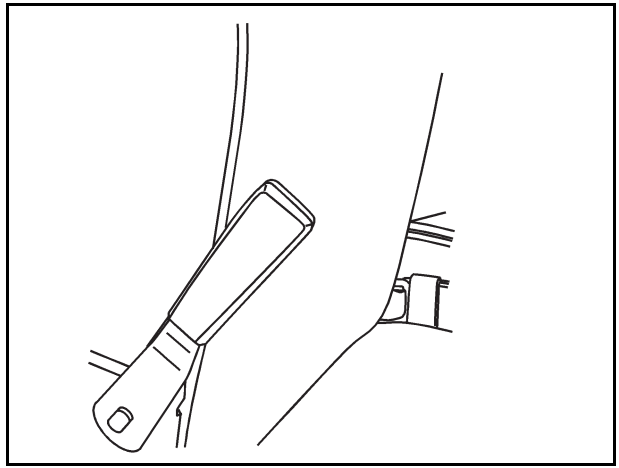


An overhead storage compartment is provided above each of the driver and passenger seats. To open push down on the inner button and lift the compartment doors all the way up to lock in position. Be sure the doors are securely closed before moving the vehicle.

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

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

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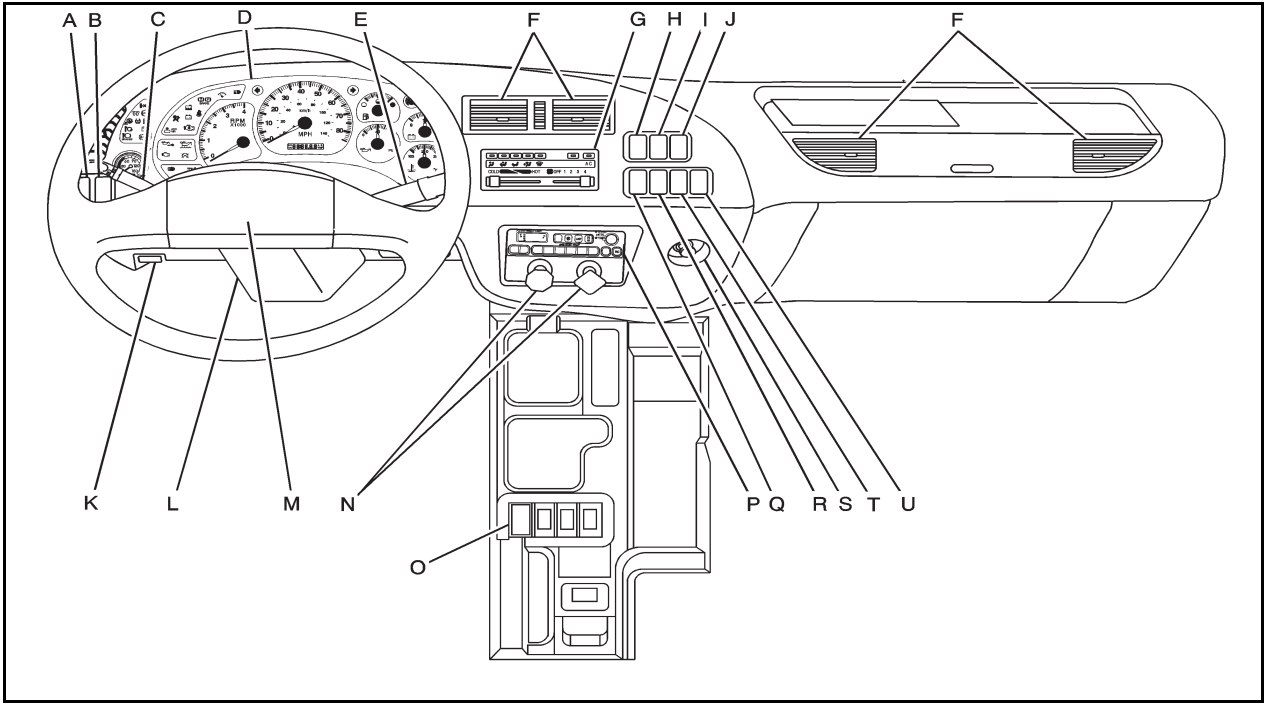
✍ NOTES

Instrument Panel Overview



The main components of the instrument panel are the following:

A. *Rear Reading Lamps on page 3-15*.

B. *Cruise Control on page 3-10*.

C. *Turn Signal/Multifunction Lever on page 3-7*.

D. *Instrument Panel Cluster on page 3-21*.

E. *Windshield Wipers on page 3-9* and *Windshield Washer on page 3-10*.

F. *Outlet Adjustment on page 3-18*.

G. *Climate Control System on page 3-17*.

H. *Diesel Engine Exhaust Brake on page 2-16*.

I. *Outside Heated Mirrors on page 2-34* (If Equipped).

J. High Idle Button. See “Manual High Idle System” under *Starting the Diesel Engine on page 2-8*. *Power Take-Off (PTO) on page 2-20* (If Equipped).

K. Front Panel Release. See *Lifting the Front Panel on page 5-53*.

L. Tilt Steering Column. See *Tilt Wheel on page 3-6*.

M. *Horn on page 3-6*.

N. Air Brake Controls (If Equipped). See *Parking Brake (With Hydraulic Brakes) on page 2-23* or *Parking Brake (With Air Brakes) on page 2-24*.

O. Two-Speed Rear Axle Button. See *Two-Speed Rear Axle on page 2-21*. Air Suspension Indicator (If Equipped). See *Air Suspension on page 2-26*. Air Suspension Button (If Equipped). See *Air Suspension on page 2-26*. Differential Lock Button (If Equipped). See *Rear Axle Differential Lock Control on page 4-6*.

P. *Audio System(s) on page 3-40*.

Q. Marker and Clearance Lamp Button. See *Marker Lamps on page 3-14*.

R. Overdrive Defeat Button. See “Overdrive Defeat” under *Automatic Transmission Operation on page 2-16*.

S. Cigarette Lighter. See *Ashtray(s) and Cigarette Lighter on page 3-16*.

T. *Traction Control System (TCS) on page 4-7*.

U. *Diesel Particulate Filter on page 2-28*.

Hazard Warning Flashers

The hazard warning flashers are controlled by the lever located to the right of the steering column.

⚠ **(Hazard Warning Flasher):** Move the lever up to make the front and rear turn signal lamps flash on and off. This warns others that you are having trouble. Move the lever down again to turn the flashers off.

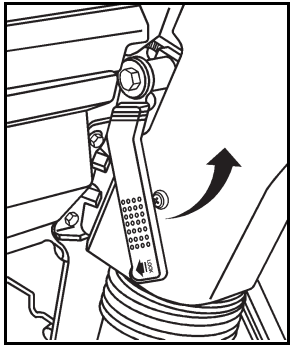
When the hazard warning flashers are on, the turn signals will not work. The hazard warning flashers will not flash if the brakes are applied.

Horn

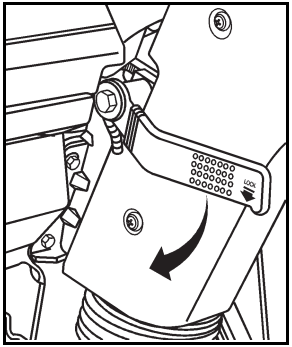
Sound the horn by firmly pressing the pad in the center of the steering wheel.

Tilt Wheel

A tilt steering column lets the steering wheel be adjusted.



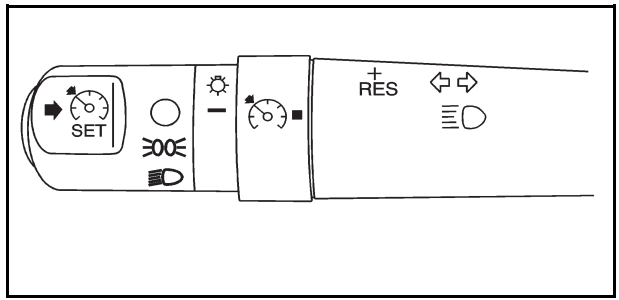
To tilt the column, hold the steering wheel and pull the lever on the left side of the column to unlock the steering column.



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

Do not adjust the tilt steering column while driving.

Turn Signal/Multifunction Lever



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

: Turn and Lane-Change Signals

: Headlamps

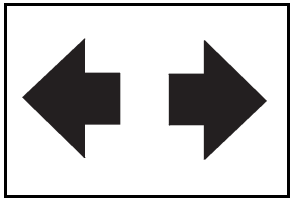
: Cruise Control (if equipped)

Headlamp High-Beam/Low-Beam Changer.

Flash-to-pass.

Information for these features is on the pages following.

Turn and Lane-Change Signals



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

Move the lever all the way up or down to signal a turn.

Raise or lower the lever until the arrow starts to flash to signal a lane change. Hold it there until the lane change is complete.

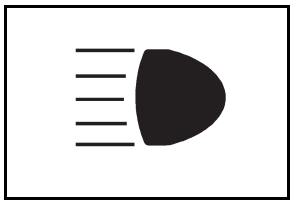
The lever returns to its starting position whenever it is released.

If after signaling a turn or a lane change the arrow flashes rapidly or does not come, a signal bulb may be burned out. Check the turn signal flasher and circuit breaker.

Check for burned out bulbs that may need replacing or a blown fuse to help avoid an accident. See *Fuses and Circuit Breakers on page 5-77*.

Headlamp High/Low-Beam Changer

Push the multifunction lever toward the instrument panel to change the headlamps from low to high beam. To return to low-beam headlamps, pull the multifunction lever toward you. Then release it.



This indicator light on the instrument panel cluster comes on while the high-beam headlamps are on.

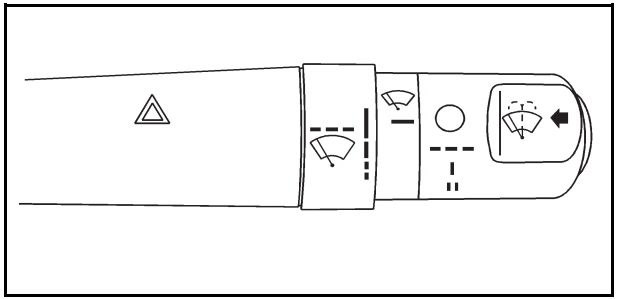
Flash-to-Pass

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 stay on as long as the lever is held 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 wiper lever is located on the right side of the steering column.

Turn to the following positions to control the wipers:

(OFF) : Turns the wipers off.

- - - (Intermittent) : Delays the wiper speed. After selecting the intermittent setting the wiper speed can also be set. 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.

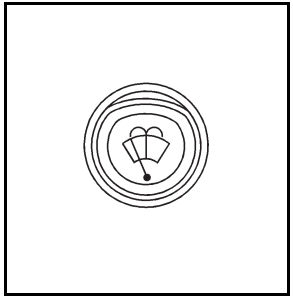
: Slow wipes.

: Fast wipes.

Clear ice and snow from the wiper blades before using them. If the wipers are frozen to the windshield, carefully loosen or thaw them. If they become worn or damaged, get new blades or blade inserts. For more information, see *Windshield Wiper Blade Replacement on page 5-55*.

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.

Windshield Washer



The windshield washer button is located at the end of the multifunction lever on the right side of the steering wheel.

(Washer Fluid) : Press to wash the window. The windshield wipers must be on. Press and hold for continuous spray.

⚠ WARNING:

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

For vehicles with this feature, the cruise 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.

⚠ WARNING:

Cruise control can be dangerous where you cannot drive safely at a steady speed. So, do not use the 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 located at the lower left side of the instrument panel, 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 : Resumes the set speed.

> **⚠ WARNING:**
>
> 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 desired speed.
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

If the cruise control is set at a desired speed and the brake or the clutch is applied, this shuts off the cruise control. But it does not need to be reset.

Using the accelerator pedal, increase the vehicle's speed to 40 km/h (25 mph) 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. The vehicle now cruises 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 goes about 1.6 km/h (1 mph) faster.

Reducing Speed While Using Cruise Control

Press the SET button until the lower speed desired is reached, then release it.

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

Passing Another Vehicle While Using Cruise Control

Use the accelerator pedal to increase your vehicle's 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 the vehicle 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. When the brake or clutch is applied the cruise control is disengaged.

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 again.
- Shift the transmission to N (Neutral).

Erasing Speed Memory

The cruise control set speed memory is erased when the ignition is turned off.

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) : Turns off all lamps, except the daytime running lamps (DRL).

(Parking Lamps) : Turns on the parking lamps, together with the following:

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

(Headlamps) : Turns on all the headlamps, together with the previously listed lamps and lights.

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

Headlamps on Reminder

For vehicles with this feature, an alarm will sound when the headlamps and/or parking lamps are turned on and the ignition is in LOCK/OFF or ACC/ACCESSORY.

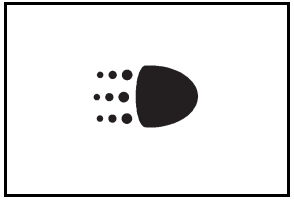
Daytime Running Lamps (DRL)

Daytime Running Lamps (DRL) can make it easier for others to see the front of your vehicle during the day. 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 the 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 the headlamp switch on.

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

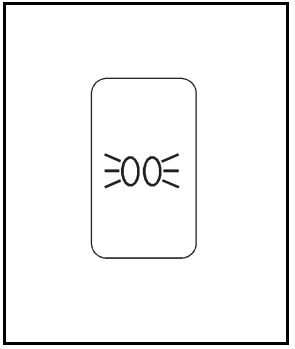
When the headlamp band is turned to OFF, the regular lamps will go off, and the low-beam headlamps will change to the reduced brightness of DRL.

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

Turn the regular headlamp system on when needed.

Marker Lamps

For vehicles designed for trailer towing, this button operates the marker and clearance lamps.

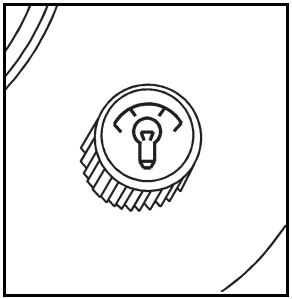


The marker and clearance lamp button is located in the instrument panel. See *Instrument Panel Overview on page 3-4*.

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

The headlamp band will not operate these lamps.

Instrument Panel Brightness



For vehicles with this feature, the knob is located on the lower right of the instrument panel.

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

Dome Lamps

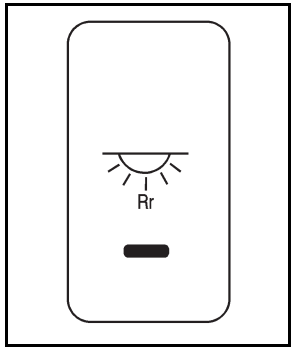
The dome lamp switch can be set to three different positions: DOOR, OFF, and ON.

DOOR : The dome lamp only comes on when the driver's door is open.

OFF : The dome lamp will not turn on, even when the door is opened.

ON : The dome lamp remains on whether or not the door is open.

Rear Reading Lamps

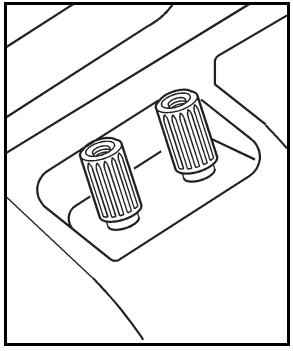


For vehicles with a rear lamp button, it is located on the lower left side of the instrument panel. See *Instrument Panel Overview on page 3-4*.

When pressed in, an indicator light inside the button comes on.

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

Auxiliary Power Jacks



For vehicles with these power jacks, they are on the console to the right of the driver's seat.

These jacks provide 12-volt power to operate things, such as a citizen's band (CB) radio or a cellular phone. There will be 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 the 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

For vehicles with an ashtray and a cigarette lighter, they are located in the center floor console. To open the removable ashtray, flip open the top.

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

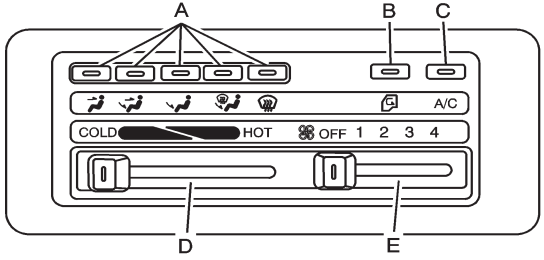
To use the cigarette lighter, push it in all the way and let it go. When it's ready, it will pop back out by itself.

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

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



A. Air Delivery Mode Controls

B. Recirculation

C. A/C (Air Conditioning)

D. Temperature Control

E. Fan Control

Temperature Control : Slide the lever towards COLD for cooler air or towards HOT for warmer air.

(Fan Control) : Slide the lever right or left to increase or decrease the fan speed. Slide the fan lever to OFF to turn the system off. Outside air still comes out of the floor outlets whenever the vehicle is moving.

Air Delivery Mode Control : Press the air delivery mode buttons to change the direction of the airflow inside the vehicle.

To change the current mode, select from the following:

(Vent) : Air is directed to the instrument panel outlets.

(Bi-Level) : Air is divided between the instrument panel and floor outlets. Some air may be directed toward the windshield.

(Floor) : Air is directed to the floor outlets, with some air directed to the outboard outlets for the side windows and windshield.

(Defog) : This mode clears the windows of fog or moisture. Air is directed to the windshield and floor outlets. In 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) : This mode removes fog or frost from the windshield more quickly. Air is directed to the windshield and the side window outlets, with some air directed to the floor outlets. In this mode, the system automatically turns off recirculation and runs the air-conditioning compressor, unless the outside temperature is at or below freezing. Recirculation cannot be selected while in the defrost mode.

A/C (Air Conditioning) : For vehicles with air conditioning, select the fan speed, air delivery mode, and press A/C to use the air conditioning.

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

For quick cool down on hot days:

1. Select .
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 the vehicle to become too dry. To prevent this from happening, after the air in the vehicle has cooled, turn the recirculation mode off. The air-conditioning system removes moisture from the air, so a small amount of water might drip under the vehicle while idling or after turning off the engine. This is normal.

(Recirculation) : Press to turn the recirculation on. The air inside the vehicle will be recirculated. For vehicles with air conditioning, using recirculation helps to quickly cool the air inside the vehicle. It can be used to help prevent outside air and odors from entering the vehicle.

Recirculation is not available in Defog or Defrost modes.

Outlet Adjustment

The air outlets are located in the center and on the sides of the instrument panel. See *Instrument Panel Overview on page 3-4*. The vents can be moved to direct the flow of air or close the outlets altogether. When a vent is closed, it increases the flow of air coming out of any vents that are open.

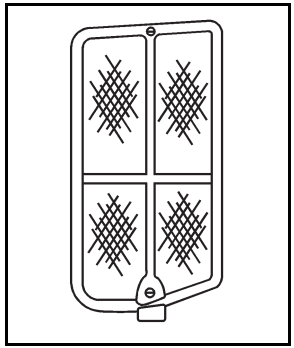
Keep the path under the front seats clear of objects to help circulate the air inside of the vehicle more effectively.

Passenger Compartment Air Filter

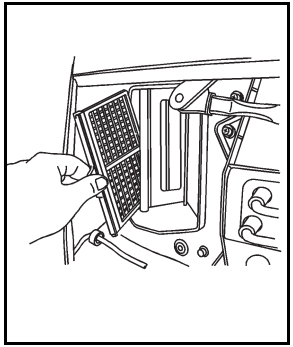
The passenger compartment outside air is routed through a passenger compartment filter. The filter removes certain debris, including dirt and leaves. Reductions in the climate control system performance may indicate that the filter needs to be inspected and cleaned.

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

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 prevent injury.

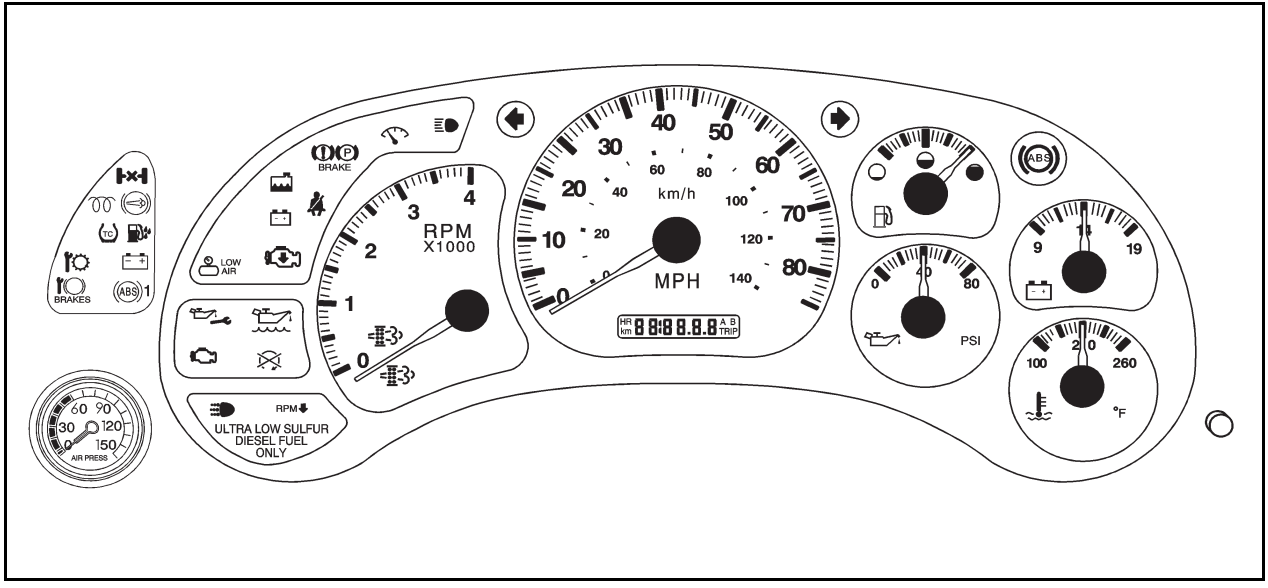
Warning lights come on when there might be or there is a problem with one of the vehicle's functions. Some warning lights come on briefly when the engine is started to indicate they are working.

Gages can indicate when there might be or there is a problem with one of the vehicle's functions. Often gages and warning lights work together to indicate a problem with the vehicle.

When one of the warning lights comes on and stays on while driving, or when one of the gages shows there could be a problem, check the section that explains what to do. Follow this manual's advice. Waiting to do repairs can be costly and even dangerous.

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.



United States version shown, Canada similar

Speedometer and Odometer

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

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

Trip Odometer

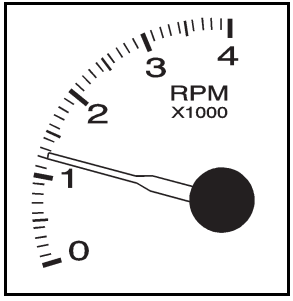
The trip odometer can tell you how far your vehicle has been driven since you last set the trip odometer to zero.

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 3-39*.

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 120 km/h (75 mph) 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 128 to 136 km/h (80 to 85 mph). 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 Reminders

Safety Belt Reminder Light

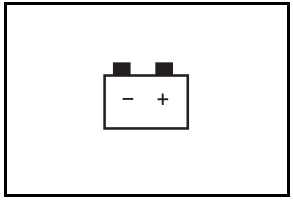
When the engine is started, a light will come on for several seconds to remind people to fasten their safety belts.

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 the engine is started, a tone will sound for several seconds to remind people to fasten their safety belts.

Charging System Light



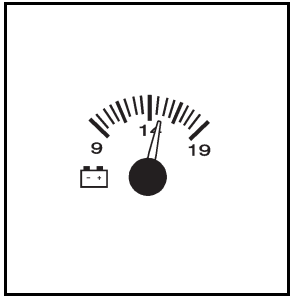
The charging system light may be located in the instrument panel cluster, or with the auxiliary warning lights in the center of the instrument panel.

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.

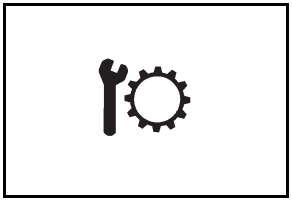
Readings in either warning zone indicate a possible problem in the electrical system.

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.

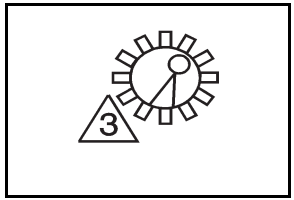


This light is located with the auxiliary warning lights in the center of the instrument panel.

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.

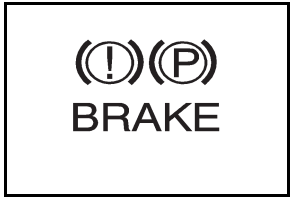
For detailed information on shift inhibit limitations, see the Allison Automatic Transmission Operator's Manual in your vehicle for further information.

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.



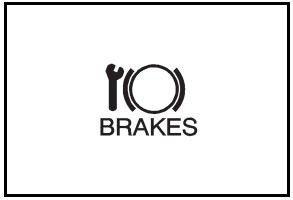
If this light comes on, the fluid level in the master cylinder reservoir is low or there is a problem with the hydraulic brakes.

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.

If the light comes on while driving, pull off the road and stop carefully. The pedal might be harder to push or might go the floor. It can take longer to stop. If the light remains on, have the vehicle towed for service. See *Towing Your Vehicle on page 4-20* for more information.

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 4-4*.



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.

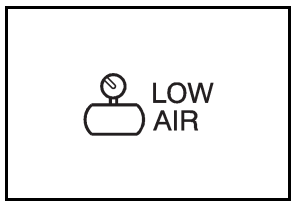
If one or both of these lights come on while you are driving, pull off the road and stop carefully. You may notice that the pedal is harder to push, or the pedal may go closer to the floor. It may take longer to stop. If the brake system warning light is still on, have the vehicle towed for service. See *Towing Your Vehicle on page 4-20*. See “Hydraulic Brake Systems” under *Braking on page 4-4* for further information.

Parking Brake Warning Light

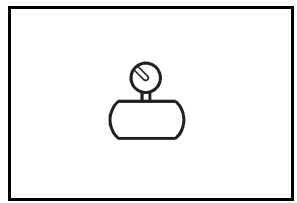
This light will also come on when you set the parking brake. The light will stay on if your parking brake does not release fully.

Air Brake System Warning Light

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



United States



Canada

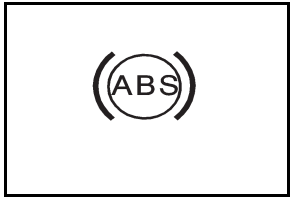
The low air warning light should come on, as a check, whenever you start the engine. However, it is designed to come on, and stay on, when brake reservoir pressure has dropped below 60 psi (410 kPa).

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.

⚠ WARNING:

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.

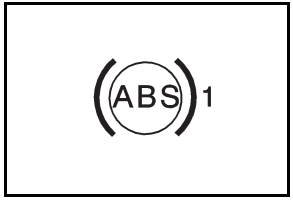
Antilock Brake System (ABS) Warning Light



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 3-25* and *Antilock Brake System (ABS) on page 4-5* for more information.

Trailer Antilock Brake System Warning Light

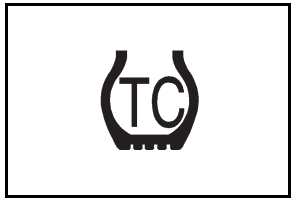


If your vehicle is connected to a trailer with antilock brakes, this light should come on briefly, as a check, when you turn on the ignition.

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 (TCS) Active Light



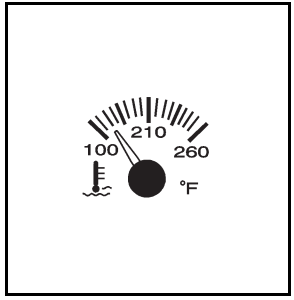
If your vehicle has the Traction Control System (TCS), this light will come on when the system is limiting wheel spin.

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

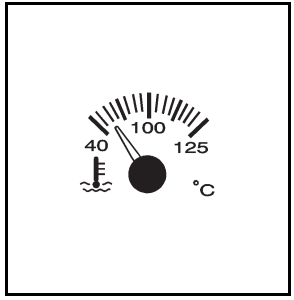
The light will stay on for a few seconds after the system stops limiting wheel spin.

See *Traction Control System (TCS) on page 4-7* for more information.

Engine Coolant Temperature Gage



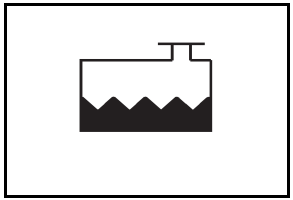
United States



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 5-29* for more information.

Low Coolant Warning Light



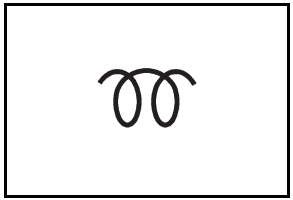
Your vehicle has a low coolant warning light. If this light comes on, the system is low on coolant and the engine may overheat.

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 5-26* and have your vehicle serviced as soon as you can.

This light may also come on if your vehicle has the automatic engine shutdown system and engine shutdown has begun. See *Engine Alarm and Automatic Shutdown on page 2-10* for more information.

Wait to Start Light



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

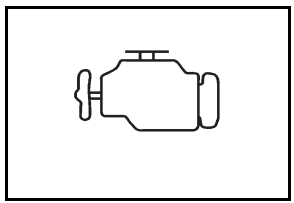
Wait until the indicator turns off before turning the ignition key to START.

When the temperature is below 0°C (32°F), you should wait no more than 10 seconds to start your vehicle. See *Ignition Positions on page 2-8* for more information.

Malfunction Indicator Lamp

Check Engine Light

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



If this light comes on while you are driving, two things can happen.

First, you will not notice any difference in engine performance, but the tail pipe emissions might increase. Second, the engine might not run properly or could stall without warning. If either of these things happen, see your dealer/retailer for service.

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

Notice: **If the vehicle is continually driven with this light on, after a while, the emission controls might not work as well, the 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 the vehicle warranty.**

Notice: **Modifications made to the engine, transmission, exhaust, intake, or fuel system of the vehicle or the replacement of the original tires with other than those of the same Tire Performance Criteria (TPC) can affect the vehicle's emission controls and can cause this light to come on. Modifications to these systems could lead to costly repairs not covered by the vehicle warranty. This could also result in a failure to pass a required Emission Inspection/Maintenance test. See *Accessories and Modifications on page 5-3*.**

If the check engine light comes on and stays on, while the engine is running this indicates that there is an OBD II problem and service is required.

An emission system malfunction might be corrected by doing the following:

- If the vehicle has been driven through a deep puddle of water, the vehicle's electrical system might be wet. The condition is usually corrected when the electrical system dries out. A few driving trips should turn the light off.
- Make sure to fuel the vehicle with quality fuel. Poor fuel quality causes the engine not to run as efficiently as designed and may cause: stalling after start-up, stalling when the vehicle is changed into gear, misfiring, hesitation on acceleration, or stumbling on acceleration. These conditions might go away once the engine is warmed up.

  If one or more of these conditions occurs, change the fuel brand used. It will require at least one full tank of the proper fuel to turn the light off.

  See *Diesel Engine Fuel on page 5-7*.

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

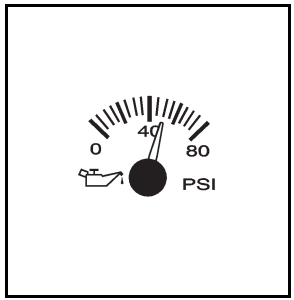
Emissions Inspection and Maintenance Programs

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

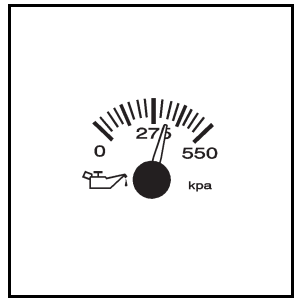
Here are some things to know to help the vehicle pass an inspection:

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

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).

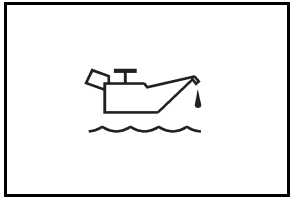
A reading in the low pressure zone may be caused by a dangerously low oil level or other problem. See *Engine Oil on page 5-16* and *Scheduled Maintenance on page 6-5* for more information.

⚠ WARNING:

Do not keep driving if the oil pressure is low. The engine can become so hot that it catches fire. Someone could be burned. Check the oil as soon as possible and have the vehicle serviced.

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

Low Oil Level Light



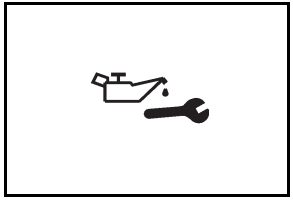
This light comes on briefly when the engine is started. This normal.

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 5-16* for more information.

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

Change Engine Oil Light



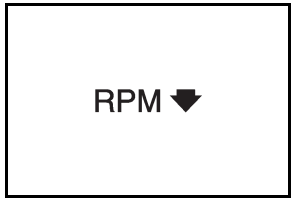
Your vehicle may have a change engine oil light.

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 5-16*. To reset the change engine oil light, see *Engine Oil on page 5-16*.

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.

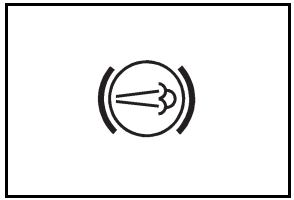
If it comes on when you're driving, reduce your engine speed immediately.

Engine Shutdown Warning Light

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

See *Engine Alarm and Automatic Shutdown on page 2-10* for more information.

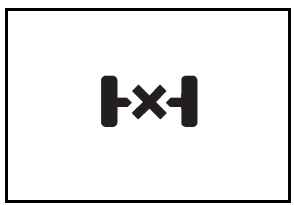
Exhaust Brake Indicator Light



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 2-16*.

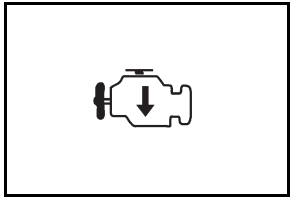
Differential Lock Indicator Light



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

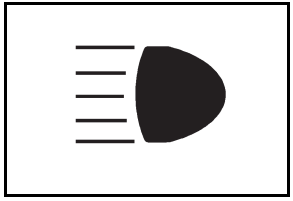


If the check engine and reduced engine power lights are on, the throttle may be disabled, and a noticeable change in the vehicle's performance may occur.

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 service engine soon light stays on, the vehicle should be taken to your dealer/retailer as soon as possible for service.

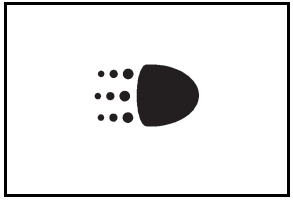
Highbeam On Light



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

See *Headlamp High/Low-Beam Changer on page 3-8* for more information.

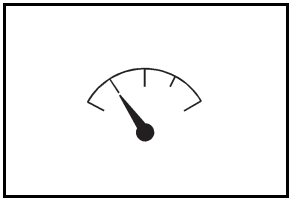
Daytime Running Lamps (DRL) Indicator Light



This light turns on whenever the Daytime Running Lamps are on.

See *Daytime Running Lamps (DRL) on page 3-13* for more information.

Check Gages Warning Light



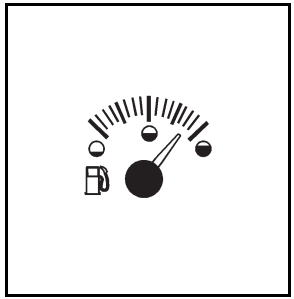
This light will come on briefly when the engine is started.

If this light comes on and stays on while you are driving. It means that either the engine coolant temperature gage or the 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.

This light may also come on if your vehicle is has automatic engine shutdown system and engine shutdown has begun. See *Engine Alarm and Automatic Shutdown on page 2-10*.

Fuel Gage



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

An arrow on the fuel gage indicates the side of the vehicle the fuel door is on.

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:

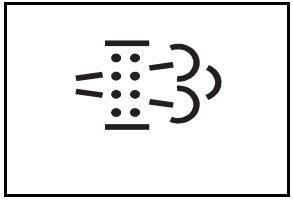
- The gage moves a little when you turn a corner or speed up.
- The gage doesn't go back to empty when you turn off the ignition.
- At the gas station, the pump shuts off before the gage reads full.
- It takes a little more or less fuel to fill up than the gage indicated.

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 5-10*.

Diesel Particulate Filter Warning Light

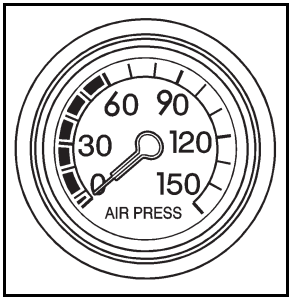


Your vehicle may have two Diesel Particulate Filter (DPF) Warning lights.

These lights will come on briefly when the ignition is turned to ON/RUN. One of these lights will come on green during DPF regeneration. If the other light comes on yellow, perform a manual regeneration or drive the vehicle for automatic regeneration. If the light changes from yellow to red, the DPF requires an immediate regeneration. If the DPF is not regenerated, the service engine soon light will come on and engine power will be reduced.

See *Diesel Particulate Filter on page 2-28* and *Reduced Engine Power Light on page 3-36* 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 415 kPa (60 psi), the low air warning light will come on. An alarm will also sound if this happens.

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

Don't drive until both pointers are showing at least 827 kPa (120 psi), 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)

If the vehicle came without a radio, the wiring provisions for a radio and an antenna were installed at the assembly plant, so that if you want, a radio can be installed at the dealer/retailer.

Determine which radio the vehicle has and read the following pages to become familiar with its features.

⚠ WARNING:

Taking your eyes off the road for extended periods could cause a crash resulting in injury or death to you or others. Do not give extended attention to entertainment tasks while driving.

This system provides access to many audio and non audio listings.

To minimize taking your eyes off the road while driving, do the following while the vehicle is parked:

- Become familiar with the operation and controls of the audio system.
- Set up the tone, speaker adjustments, and preset radio stations.

For more information, see *Defensive Driving on page 4-2*.

Notice: **Contact your dealer/retailer before adding any equipment.**

Adding audio or communication equipment could interfere with the operation of the vehicle's engine, radio, or other systems, and could damage them. Follow federal rules covering mobile radio and telephone equipment.

Setting the Clock

Your radio has buttons for setting the time. To set the time, follow these instructions:

1. Press the HOUR button along with the CLOCK button to increase the hour.
2. Press the MIN (minute) button along with the CLOCK button to increase the minutes.

RESET : Press this button during the clock setting mode to reset the time to the nearest whole hour. More than 30 minutes will increase the hour display to the next hour. Less than 30 minutes will decrease the hour display. Resetting the clock display to the nearest hour, if needed, allows for a quicker and more accurate way of setting the time.

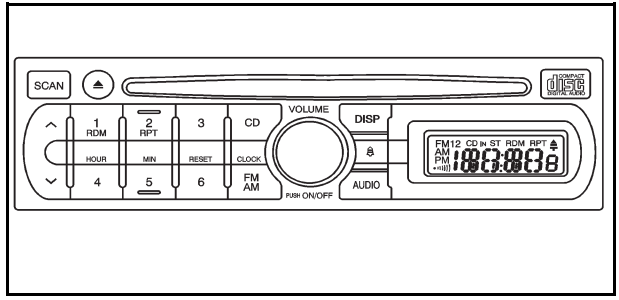
CLOCK : Press this button to enter the clock setting mode.

Press and release this button to toggle between the clock and the function mode.

- While the clock is displayed, the radio and CD player can be used. If a change is made to the radio or CD player settings, the display shows the change for 10 seconds before returning to the clock display.
- When the function mode is displayed, the radio and CD player can be used. Current radio and CD player function information is displayed on the screen.

The alarm time setting works even when a key is in the ACC/ACCESSORY or the LOCK position, but no beep will sound. See “Using the Alarm” under *Radio(s) on page 3-41*.

Radio(s)



Playing the Radio

PUSH ON/OFF (Power) : Push to turn the system on and off.

VOLUME : Turn clockwise or counterclockwise to increase or to decrease the volume.

DISP : Press to toggle between the radio frequency and the clock display.

Finding a Station

FM/AM : Press to switch between FM1, FM2, or AM. The selection displays.

∧ ∨ (Tune): Press either arrow to go to a higher or to a lower frequency.

Press either arrow for less than a second and the station frequency changes by one.

Press either arrow for one second or more to seek stations with a strong signal that are in the selected band in ascending order.

SCAN : Press to scan radio stations in the direction of increasing frequencies. The radio goes to a station, plays for a few seconds, then goes to the next station. The radio display flashes each radio station being scanned. Press again to stop scanning, and the last scanned station plays.

Setting Preset Stations

Up to 18 stations (six FM1, six FM2, and six AM), can be programed on the six numbered pushbuttons, by performing the following steps:

1. Press FM/AM to select FM1, FM2, or AM.
2. Tune in the desired station by pressing the ∧ ∨ arrows.
3. Press and hold one of the six numbered pushbuttons. When that numbered pushbutton is pressed, the station that was set, returns for that pushbutton.
4. Repeat the steps for each pushbutton.

The stored preset stations are deleted if power to the radio is lost, or if the battery is disconnected.

Setting the Tone (Bass/Treble)

AUDIO : Press and release until BASS (BA:0) or TREBLE (TR:0) displays. The display shows the bass or treble level. Each time the AUDIO button is pressed, the audio mode indicator changes. Once the desired tone displays, press either ∧ ∨ arrow to increase or decrease the setting.

If a station is weak or has static, decrease the treble.

If AUDIO is not pressed, after 10 seconds audio mode times out and returns to NORMAL MODE.

Adjusting the Speakers (Fade/Balance)

AUDIO : To adjust the fade between the front and the rear speakers, press and release until FADER (FA:0) displays. Press either ∧ ∨ arrow to move the sound toward the front or the rear speakers.

To adjust the balance between the right and the left speakers, press and release the AUDIO button until BALANCE (BL:0) displays. Press either ∧ ∨ arrow to move the sound toward the right or the left speakers.

The FADER adjust becomes disabled when there are only two speakers available in the vehicle.

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 this button until the alarm symbol displays.
2. Press 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 alarm button.
7. To deactivate the alarm, press the alarm button.

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

Playing a CD

Insert a CD partway into the slot, label side up.
The player pulls it in and the CD should begin playing.

If the ignition or radio is turned off with the CD in the player, it stays in the player. When the ignition or radio is turned on, the CD starts playing where it stopped, if it was the last selected audio source.

When a CD is inserted, the CD symbol displays. As each new track starts to play, the track number displays.

The CD player can play the smaller 3 inch (8 cm) single CDs with an adapter ring. Full-size CDs and the smaller CDs are loaded in the same manner.

Care of Your CDs

If playing a CD-R, the sound quality can be reduced due to CD-R quality, the method of recording, the quality of the music that has been recorded, and the way the CD-R has been handled. Handle them carefully. Store CD-R(s) in their original cases or other protective cases and away from direct sunlight and dust. The CD player scans the bottom surface of the disc. If the surface of a CD is damaged, such as cracked, broken, or scratched, the CD does not play properly or not at all. Do not touch the bottom side of a CD while handling it; this could damage the surface. Pick up CDs by grasping the outer edges or the edge of the hole and the outer edge.

If the surface of a CD is soiled, take a soft, lint free cloth or dampen a clean, soft cloth in a mild, neutral detergent solution mixed with water, and clean it. Make sure the wiping process starts from the center to the edge.

Care of Your CD Player

Do not add any label to a CD, it could get caught in the CD player. If a CD is recorded on a personal computer and a description label is needed, try labeling the top of the recorded CD with a marking pen.

The use of CD lens cleaners for CDs is not advised, due to the risk of contaminating the lens of the CD optics with lubricants internal to the CD player mechanism.

Notice: **If a label is added to a CD, or more than one CD is inserted into the slot at a time, or an attempt is made to play scratched or damaged CDs, the CD player could be damaged. While using the CD player, use only CDs in good condition without any label, load one CD at a time, and keep the CD player and the loading slot free of foreign materials, liquids, and debris.**

If an error displays, see “CD Messages” later in this section.

1 RDM (Random) : Press to hear the tracks in random, rather than sequential, order. Press again to turn off random play.

2 RPT : Press and release it to repeat the track being played.

⋀ ⋁ (Track Up/Down) : Press and release the up arrow to move to the beginning of the next track. If the CD player is in random mode, it goes to the next randomly selected track.

Press and release the down arrow to move to the beginning of the current track. If the button is pressed when the first track is playing, it goes to the last track on the CD. If the CD is in random mode, it goes to the beginning of the current track.

⋀ ⋁ (Fast Forward/Fast Reverse) : Press and hold the up arrow to move forward through the tracks on a CD three times the normal speed for the first three seconds and 30 times thereafter.

Press and hold the down arrow to move backward through the CD three times the normal speed for the first three seconds and 30 times normal thereafter.

SCAN : Press while a CD is playing. The player goes to the next track, plays for 10 seconds, then goes to the next track. Press this button again, to stop scanning.

CD : Press to listen to a CD when the radio is playing.

FM/AM : Press to listen to the radio when a CD is playing. The inactive CD remains inside the radio for future listening.

DISP : While a CD is playing, press to toggle between clock, track number, and play time (P-TIME) display.

If the DISP button is not pressed, after five seconds the display times out and returns to the clock display.

⏏ (Eject): Press to eject a CD. Eject can be activated with either the ignition or radio off. CDs can be loaded with the radio and ignition off if this button is pressed first.

CD Messages

If the CD comes out, it could be for one of the following reasons:

- It is very hot. When the temperature returns to normal, the CD should play.
- You are driving on a very rough road. When the road becomes smoother, the CD should play.
- The CD is dirty, scratched, wet, or upside down.
- The air is very humid. If so, wait about an hour and try again.
- There can have been a problem while burning the CD.
- The label can be caught in the CD player.

If the CD is not playing correctly, for any other reason, try a known good CD.

If any error occurs repeatedly or if an error cannot be corrected, contact your dealer/retailer. If the radio displays an error message, write it down and provide it to your dealer/retailer when reporting the problem.

Radio Reception

Frequency interference and static can occur during normal radio reception 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.

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

Your Driving, the Road, and the Vehicle 4-2
Driving for Better Fuel Economy 4-2
Defensive Driving 4-2
Drunk Driving 4-3
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Your Driving, the Road, and the Vehicle

Driving for Better Fuel Economy

Driving habits can affect fuel mileage. Here are some driving tips to get the best fuel economy possible.

- Avoid fast starts and accelerate smoothly.
- Brake gradually and avoid abrupt stops.
- Avoid idling the engine for long periods of time.
- When road and weather conditions are appropriate, use cruise control, if equipped.
- Always follow posted speed limits or drive more slowly when conditions require.
- Keep vehicle tires properly inflated.
- Combine several trips into a single trip.
- Replace the vehicle's tires with the same TPC Spec number molded into the tire's sidewall near the size.
- Follow recommended scheduled maintenance.

Defensive Driving

Defensive driving means “always expect the unexpected.” The first step in driving defensively is to wear your safety belt — See *Safety Belts: They Are for Everyone on page 1-7*.

⚠ WARNING:

Assume that other road users (pedestrians, bicyclists, and other drivers) are going to be careless and make mistakes. Anticipate what they might do and be ready. In addition:

- Allow enough following distance between you and the driver in front of you.
- Focus on the task of driving.

Driver distraction can cause collisions resulting in injury or possible death. These simple defensive driving techniques could save your life.

Drunk Driving

⚠ WARNING:

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. 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.

Death and injury associated with drinking and driving is a global tragedy.

Alcohol affects four things that anyone needs to drive a vehicle: judgment, muscular coordination, vision, and attentiveness.

Police records show that almost 40 percent 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 17,000 annual motor vehicle-related deaths have been associated with the use of alcohol, with about 250,000 people injured.

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.

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.

Control of a Vehicle

The following three systems help to control the 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 the vehicle.

Braking

See *Brake System Warning Light on page 3-25*.

Braking action involves perception time and reaction time. Deciding to push the brake pedal is perception time. Actually doing it 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 100 km/h (60 mph) travels 20 m (66 feet). That could be a lot of distance in an emergency, so keeping enough space between the 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 with a lot of heavy braking. Keeping pace with the traffic and allowing realistic following distances eliminates a lot of unnecessary braking. That means better braking and longer brake life.

If the engine ever stops while the vehicle is being driven, brake normally but do not pump the brakes. If the brakes are pumped, the pedal could get harder to push down. If the engine stops, there will still be some power brake assist but it will be used when the brake is applied. 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.

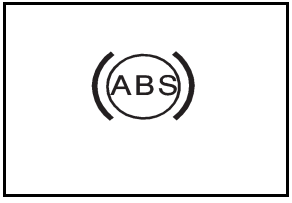
You might find that the steering wheel seems hard to turn when you are turning and braking at the same time. Also, the primary brake warning light might come on and the warning tone might sound. This is normal because the main hydraulic brake system and power steering both use the power steering pump.

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)

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

When the engine is started and the vehicle begins to drive away, ABS checks itself. A momentary motor or clicking noise might be heard while this test is going on. This is normal.



If there is a problem with ABS, this warning light stays on. See *Antilock Brake System (ABS) Warning Light on page 3-28*.

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 the 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 to each wheel, as required, faster than any driver could. This can help the driver steer around the obstacle while braking hard.

As the brakes are applied, the computer keeps receiving updates on wheel speed and controls braking pressure accordingly.

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

Using ABS

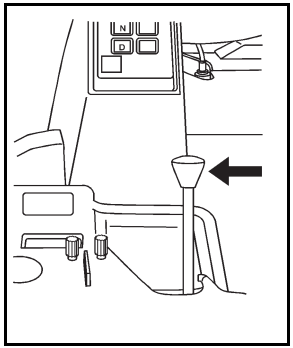
Do not pump the brakes. Just hold the brake pedal down firmly and let antilock work. The brakes might be felt to pulsate, or the sound of air exhausting might be heard if the vehicle has air brakes, but this is normal.

Braking in Emergencies

ABS allows the driver to steer and brake at the same time. In many emergencies, steering can help 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.



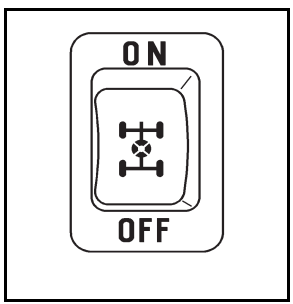
This feature lets you apply the trailer brakes without applying the tractor brakes.

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.

⚠ WARNING:

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

This control is on single rear axle vehicles.

If approaching a slippery surface where one or both wheels may start to slip, press the switch to off. The rear differential locks so power is transmitted equally to both rear wheels.

Let up on the accelerator before turning on the 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)

The 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 TCS on/off button will come on when the TCS is limiting wheel spin. The system may be heard or felt while it is working, but this is normal. TCS will function at speeds up to about 25 mph (42 km/h).

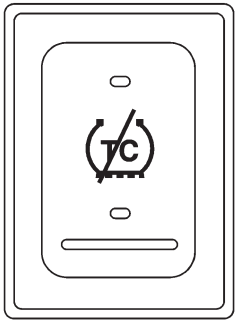
TCS may operate on dry roads under some conditions. When this happens, a reduction in acceleration may be noticed. This is normal and doesn't mean there's a problem with the vehicle. Examples of these conditions include a hard acceleration in a turn, an abrupt upshift or downshift of the transmission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

When the light in the top of the TCS button is on, 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 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 the vehicle is started. To limit wheel spin, especially in slippery road conditions, the system should always be left on. But the traction control system can be turned off if needed. Turn the system off if the 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 4-17* for more information.



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

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

Adding non-dealer/non-retailer accessories can affect the vehicle's performance. See *Accessories and Modifications on page 5-3* for more information.

Steering

Power Steering

If power steering assist is lost because the engine stops or the system is not functioning, the vehicle can be steered but it will take 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 4-4*.

Steering Tips

Driving on Curves

It is important to take curves at a reasonable speed.

Traction in a curve depends on the condition of the tires and the road surface, the angle at which the curve is banked, and vehicle speed. While in a curve, speed is the one factor that can be controlled.

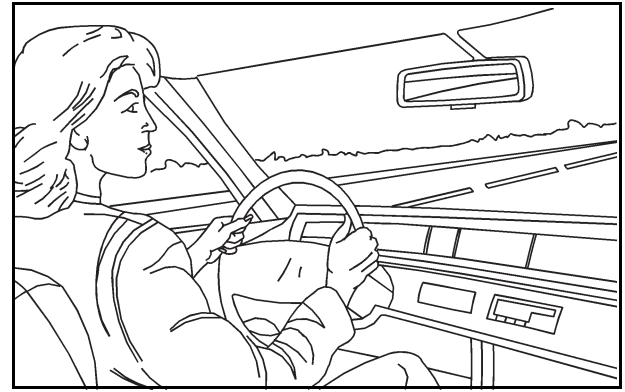
If there is a need to reduce speed, do it before entering the curve, while the front wheels are straight.

Try to adjust the speed so you can drive through the curve. Maintain a reasonable, steady speed. Wait to accelerate until 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. These problems can be avoided by braking — if you can stop in time. But sometimes you cannot stop in time because there is no room. That is the time for evasive action — steering around the problem.

The vehicle can perform very well in emergencies like these. First apply the brakes. See *Braking on page 4-4*. It is better to remove as much speed as possible from a collision. Then steer around the problem, to the left or right depending on the space available.

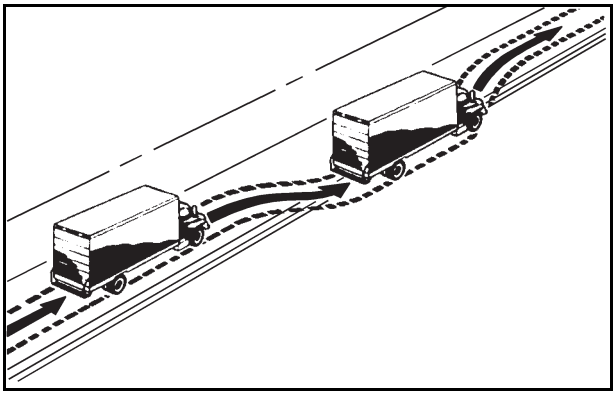


An emergency like this requires close attention and a quick decision. If holding the steering wheel at the recommended 9 and 3 o'clock positions, it can be turned a full 180 degrees very quickly without removing either hand. But you have to act fast, steer quickly, and just as quickly straighten the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

The vehicle's right wheels can drop off the edge of a road onto the shoulder while 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 the vehicle straddles the edge of the pavement. Turn the steering wheel 8 to 13 cm (3 to 5 inches), about one-eighth turn, until the right front tire contacts the pavement edge. Then turn the steering wheel to go straight down the roadway.

Passing

Passing another vehicle on a two-lane road can be dangerous. To reduce the risk of danger while 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.
- Look down the road, to the sides, and to crossroads for situations that might affect a successful pass. If in doubt, wait.
- Watch for traffic signs, pavement markings, and lines that could indicate a turn or an intersection. Never cross a solid or double-solid line on your side of the lane.
- Do not get too close to the vehicle you want to pass. Doing so can reduce your visibility.
- Wait your turn to pass a slow vehicle.
- When you are being passed, ease 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 the 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.

If the vehicle has the Traction Control System (TCS), remember: It helps avoid only the acceleration skid. See *Traction Control System (TCS) on page 4-7*. If the vehicle does not have this system, or if the system is off, then an acceleration skid is 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, 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 the 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 the vehicle has the Antilock Brake System (ABS), remember: It helps avoid only the braking skid. If the vehicle does 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 because some drivers are likely to be impaired — by alcohol or drugs, with night vision problems, or by fatigue.

Night driving tips include:

- Drive defensively.
- Do not drink and drive.
- Reduce headlamp glare by adjusting the inside rearview mirror.
- Slow down and keep more space between you and other vehicles because headlamps can only light up so much road ahead.
- Watch for animals.
- When tired, pull off the road.
- Do not wear sunglasses.
- Avoid staring directly into approaching headlamps.
- Keep the windshield and all glass on your vehicle clean — inside and out.
- Keep your eyes moving, especially during turns or curves.

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 need at least twice as much light to see the same thing at night as a 20-year-old.

Driving in Rain and on Wet Roads

Rain and wet roads can reduce vehicle traction and affect your ability to stop and accelerate. Always drive slower in these types of driving conditions and avoid driving through large puddles and deep-standing or flowing water.

⚠ WARNING:

Wet brakes can cause crashes. They might not work as well in a quick stop and could cause pulling to one side. You could lose control of the vehicle.

After driving through a large puddle of water or a car/vehicle wash, lightly apply the brake pedal until the brakes work normally.

(Continued)

WARNING: (Continued)

Flowing or rushing water creates strong forces. Driving through flowing water could cause your vehicle to be carried away. If this happens, you and other vehicle occupants could drown. Do not ignore police warnings and be very cautious about trying to drive through flowing water.

Hydroplaning

Hydroplaning is dangerous. Water can build up under your vehicle's tires so they 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.

There is no hard and fast rule about hydroplaning. The best advice is to slow down when the road is wet.

Other Rainy Weather Tips

Besides slowing down, other wet weather driving tips include:

- Allow extra following distance.
- Pass with caution.
- Keep windshield wiping equipment in good shape.
- Keep the windshield washer fluid reservoir filled.
- Have good tires with proper tread depth. See *Tires on page 5-59*.
- Turn off cruise control.

Highway Hypnosis

Always be alert and pay attention to your surroundings while driving. If you become tired or sleepy, find a safe place to park your vehicle and rest.

Other driving tips include:

- Keep the vehicle well ventilated.
- Keep interior temperature cool.
- Keep your eyes moving — scan the road ahead and to the sides.
- Check the rearview mirror and vehicle instruments often.

Hill and Mountain Roads

Driving on steep hills or through mountains is different than driving on flat or rolling terrain. Tips for driving in these conditions include:

- Keep the vehicle serviced and in good shape.
- Check all fluid levels and brakes, tires, cooling system, and transmission.
- Going down steep or long hills, shift to a lower gear.

⚠ WARNING:

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.

⚠ WARNING:

Coasting downhill in N (Neutral) or with the ignition off is dangerous. The brakes will have to do all the work of slowing down and 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 the vehicle in gear when going downhill.

- Stay in your own lane. Do not swing wide or cut across the center of the road. Drive at speeds that let you stay in your own lane.
- Top of hills: Be alert — something could be in your lane (stalled car, accident).
- Pay attention to special road signs (falling rocks area, winding roads, long grades, passing or no-passing zones) and take appropriate action.

Winter Driving

Driving on Snow or Ice

Drive carefully when there is snow or ice between the tires and the road, creating less traction or grip. Wet ice can occur at about 0°C (32°F) when freezing rain begins to fall, resulting in even less traction. Avoid driving on wet ice or in freezing rain until roads can be treated with salt or sand.

Drive with caution, whatever the condition. Accelerate gently so traction is not lost. Accelerating too quickly causes the wheels to spin and makes the surface under the tires slick, so there is even less traction.

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.

If the vehicle has the *Traction Control System (TCS) on page 4-7*, it improves the ability to accelerate on slippery roads, but slow down and adjust your driving to the road conditions. When driving through deep snow, turn off the traction control system to help maintain vehicle motion at lower speeds.

The *Antilock Brake System (ABS) on page 4-5* improves vehicle stability during hard stops on a slippery roads, but apply the brakes sooner than when on dry pavement.

Allow greater following distance on any slippery road and watch for slippery spots. Icy patches can occur on otherwise clear roads in shaded areas. The surface of a curve or an overpass can remain icy when the surrounding roads are clear. Avoid sudden steering maneuvers and braking while on ice.

Turn off cruise control, if equipped, on slippery surfaces.

Blizzard Conditions

Being stuck in snow can be in a serious situation. Stay with the vehicle unless there is help nearby. If possible, use the *Roadside Assistance Program on page 7-5*. To get help and keep everyone in the vehicle safe:

- Turn on the *Hazard Warning Flashers on page 3-6*.
- Tie a red cloth to an outside mirror.

⚠ WARNING:

Snow can trap engine exhaust under the vehicle. This may cause exhaust gases to get inside. Engine exhaust contains carbon monoxide (CO) which cannot be seen or smelled. It can cause unconsciousness and even death.

If the vehicle is stuck in the snow:

- Clear away snow from around the base of your vehicle, especially any that is blocking the exhaust pipe.
- Check again from time to time to be sure snow does not collect there.

(Continued)

WARNING: (Continued)

- Open a window about 5 cm (two inches) on the side of the vehicle that is away from the wind to bring in fresh air.
- Fully open the air outlets on or under the instrument panel.
- Adjust the Climate Control system to a setting that circulates the air inside the vehicle and set the fan speed to the highest setting. See Climate Control System in the Index.

For more information about carbon monoxide, see *Engine Exhaust on page 2-27*.

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, especially any that is blocking the exhaust.

Run the engine for short periods only as needed to keep warm, but be careful.

To save fuel, run the engine for only short periods as needed to warm the vehicle and then shut the engine off and close the window most of the way to save heat. Repeat this until help arrives but only when you feel really uncomfortable from the cold. Moving about to keep warm also helps.

If it takes some time for help to arrive, now and then when you run the engine, push the accelerator pedal slightly so the engine runs faster than the idle speed. This keeps the battery charged to restart the vehicle and to signal for help with the headlamps. Do this as little as possible to save fuel.

If Your Vehicle is Stuck in Sand, Mud, Ice, or Snow

Slowly and cautiously spin the wheels to free the vehicle when stuck in sand, mud, ice, or snow. See *Rocking Your Vehicle to Get It Out on page 4-17*.

If the vehicle has a traction system, it can often help to free a stuck vehicle. Refer to the vehicle's traction system in the Index. If stuck too severely for the traction system to free the vehicle, turn the traction system off and use the rocking method.

⚠ WARNING:

If you let your vehicle's tires spin at high speed, they can explode, and you or others could be injured. The vehicle can overheat, causing an engine compartment fire or other damage. Spin the wheels as little as possible and avoid going above 55 km/h (35 mph) as shown on the speedometer.

Rocking Your Vehicle to Get It Out

Turn the steering wheel left and right to clear the area around the front wheels. Turn off any traction system. Shift back and forth between R (Reverse) 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 shifting, and press lightly on the accelerator pedal when the transmission is in gear. Slowly spinning the wheels in the forward and reverse directions causes a rocking motion that could free the vehicle. If that does not get the vehicle out after a few tries, it might need to be towed out. If the vehicle does need to be towed out, see *Towing Your Vehicle on page 4-20*.

Tow Hooks

⚠ WARNING:

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 itwould 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 the 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.

⚠ WARNING:

Do not load the 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 the 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 the 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 the vehicle may cause damage. Repairs would not be covered by the vehicle warranty. Do not overload the 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.

⚠ WARNING:

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

⚠ WARNING:

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.
- 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.

(Continued)

WARNING: (Continued)

- 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 to have the vehicle towed. They can provide the right equipment and know-how to tow it without damage. See *Roadside Assistance Program on page 7-5*.

Before doing anything, turn on the hazard warning flashers (if they have not been damaged). See *Hazard Warning Flashers on page 3-6* for more information.

When calling, tell the towing service:

- That the vehicle is rear-wheel drive.
- The make, model and year of the vehicle.
- Whether the shift lever can still be moved.
- 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 (All Wheels On the Ground)

The 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 Front (Front Wheels Off the Ground)

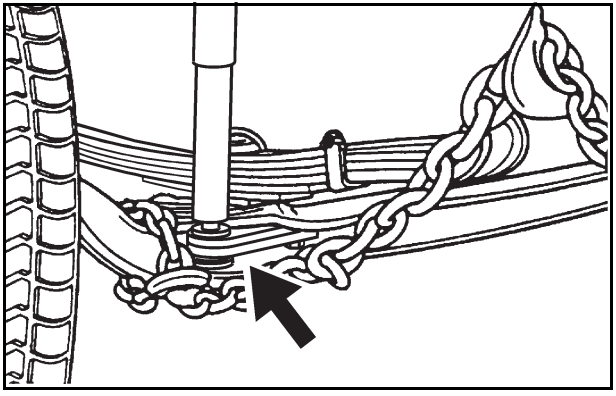
Before Towing

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 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 the Vehicle on page 4-18* for more information.

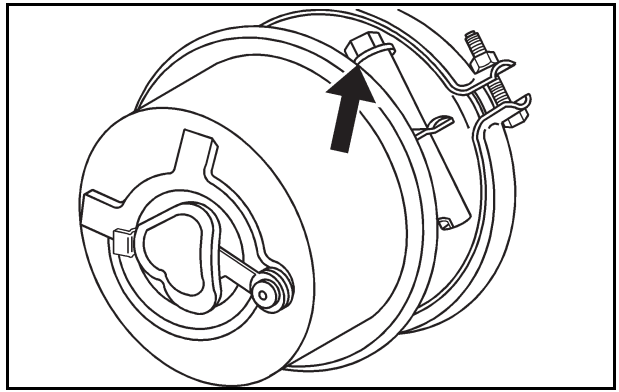
After Towing

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.

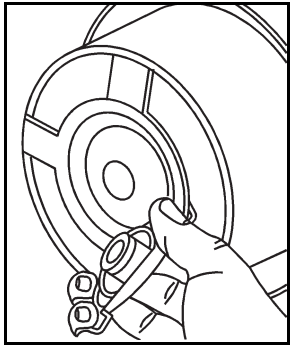
Releasing Air-Operated Parking Brakes

If the vehicle has air brakes, there could be a special towing problem. If the 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 the vehicle can be towed with all wheels or only the rear wheels on the ground.

1. Block the wheels of the vehicle.

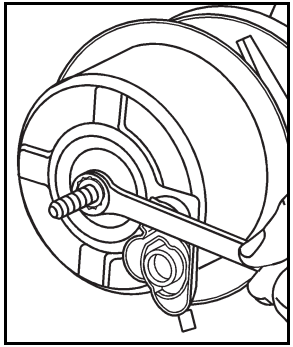


2. Remove the release stud and nut from the side of the brake chamber. Some chambers have studs which are visible at all times.



3. Remove the rubber cap from the rear of the chamber.

4. Put the release stud, nut and flat washer into the chamber.
5. Turn the stud clockwise one quarter of a turn.



6. Turn the stud nut clockwise several turns to release the brakes. Follow the same procedure to release the other brake or brakes.

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 the 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 the trailer air line connections will not be connected 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

The 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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Service

For service and parts needs, visit your dealer/retailer. You will receive genuine GM parts and GM-trained and supported service people.

Genuine GM parts have one of these marks:

Accessories and Modifications

Adding non-dealer accessories to the 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.

Damage to vehicle components resulting from the installation or use of non-GM certified parts, including control module modifications, is not covered under the terms of the vehicle warranty and may affect remaining warranty coverage for affected parts.

GM Accessories are designed to complement and function with other systems on the vehicle. Your GM dealer can accessorize the 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 the 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 might not be covered under the 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, many fluids, and some component wear by-products contain and/or emit these chemicals.

California Perchlorate Materials Requirements

Certain types of automotive applications, such as airbag initiators, seat belt pretensioners, and lithium batteries contained in remote keyless transmitters, may contain perchlorate materials. Special handling may be necessary. For additional information, see www.dtsc.ca.gov/hazardouswaste/perchlorate.

Doing Your Own Service Work

⚠ WARNING:

You can be injured and the 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 attempting any vehicle maintenance task.
- Be sure to wait until the engine and any attaching parts have sufficiently cooled before tilting 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 the wrong fasteners are used, parts can later break or fall off. You could be hurt.

If doing some of your own service work, use the proper service manual. It tells you much more about how to service the vehicle than this manual can. To order the proper service manual, see *Service Publications Ordering Information on page 7-10*.

Keep a record with all parts receipts and list the mileage and the date of any service work performed. See *Part D: Maintenance Record on page 6-30*.

Engine Fan Breakage

⚠ WARNING:

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 might increase stress and the fan could eventually fail. If the fan breaks apart while 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/retailer.

(Continued)

WARNING: (Continued)

Winter Fronts, Grille Covers, or Obstructions:

Winter Fronts, grille covers, or other add-on equipment causing obstructions in front of or behind the fan should not be used on this vehicle. If this causes the fan to eventually break apart while 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 the 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 the engine and emission controls.**
- **We do not test aftermarket diesel fuel additives. Some additives, particularly those which contain alcohol or water emulsifiers, could damage the fuel system. If you believe that unique circumstances call for a fuel additive to be used, consult your dealer/retailer for advice.**
- **If you ever run out of diesel fuel, it can be difficult to restart the engine. To avoid this, never let the tank get empty.**

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

If you run out of fuel, *Running Out of Fuel on page 5-14* tells you how to restart the engine.

What Fuel to Use in The U.S.

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

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

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 −18°C or 0°F); however, it will produce a power and fuel economy loss. Avoid the use of No. 1-D diesel fuel in warm or hot climates. It can result in stalling, poor starting when the engine is hot, and could damage the fuel injection system.

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

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

Diesel fuel can foam when you fill the tank. This can cause the automatic pump nozzle to shut off, even though the tank is not full. If this happens, just wait for the foaming to stop and then try filling the tank more slowly. See *Filling the Tank on page 5-14*.

⚠ WARNING:

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 and Mexico

Notice: **Use of diesel fuel other than Ultra Low Sulfur Diesel (15 ppm sulfur maximum) 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. Ultra Low Sulfur Diesel fuel is available in Canada. In Mexico, Ultra Low Sulfur Diesel fuel is not available in all regions.

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 −18°C or 0°F); 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 −18°C (0°F).

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

Very Cold Weather Operation

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

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

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

Water in Fuel

⚠ WARNING:

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

Notice: **If there is water in the diesel fuel and the weather is warm or humid, fungus and bacteria can grow in the fuel. They can damage the fuel system. A diesel fuel biocide can be used to sterilize the fuel system. However, the fuel system may still need to be cleaned. Your dealer/retailer can advise you of the appropriate solution.**

If the fuel tank needs to be purged to remove water, see your dealer/retailer or a qualified technician. Improper purging can damage the fuel system.

Sometimes, water can be pumped into the fuel tank along with the 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 comes on in the instrument panel. If it does, the water must be drained.

Your dealer/retailer can show you how to do this.

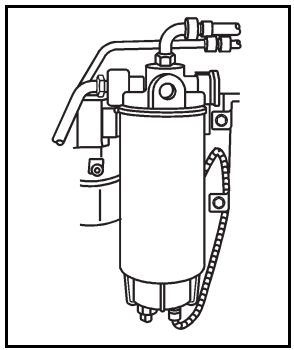
If the light comes on, use this chart to determine what action to take.

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.
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: **Driving when this warning indicator is on, can damage the fuel injection system and the engine. If the indicator comes on right after a refuel, it means water was pumped into the fuel tank. Turn off the 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 6-5* 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.”
10. Start the 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

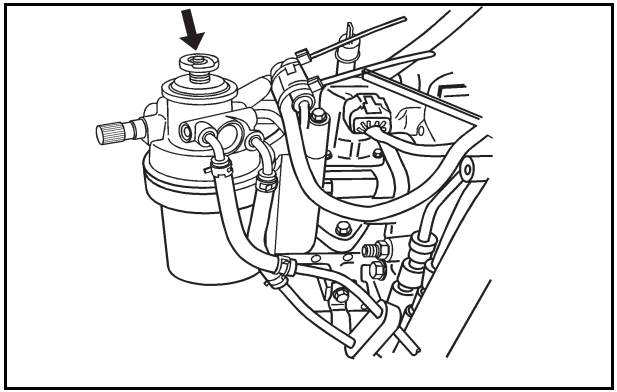
In order for the diesel engine fuel system to work properly, the fuel lines must be full of fuel and contain no air. If air gets into the fuel lines, it will be necessary to prime the fuel lines to eliminate air before operating the vehicle.

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 shows 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 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 left (counterclockwise) several turns to open the breather valve.
8. Use the palm of your hand to repeatedly press and release the plunger 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 to the specified torque, 4.9 N•m (43 in. lbs).
10. Use the palm of your hand to press and release the plunger 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 the engine:

> **⚠ WARNING:**
>
> 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 parked on a level surface, add at least 2 gallons (7.6 liters) of fuel. However, if parked on a slope, up to 5 gallons (18.9 liters) of fuel might need to be added.
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 the 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.

The service engine soon 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

> **⚠ WARNING:**
>
> 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 fuel pump island. Turn off the engine when refueling. Do not smoke near fuel or when refueling the vehicle. Do not use cellular phones. Keep sparks, flames, and smoking materials away from fuel. Do not leave the fuel pump unattended when refueling the 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 the vehicle, depending upon option content.

To remove the cap, turn it slowly counterclockwise.

⚠ WARNING:

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 the 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.

⚠ WARNING:

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 the malfunction indicator lamp to light and may damage the fuel tank and emissions system. See *Malfunction Indicator Lamp on page 3-31*.**

Filling a Portable Fuel Container

⚠ WARNING:

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

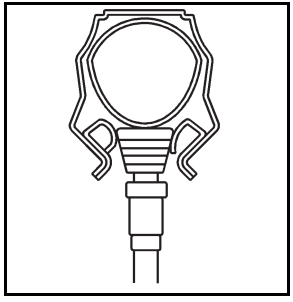
- Dispense fuel only into approved containers.
- Do not fill a container while it is inside a vehicle, in a vehicle's trunk, pickup bed, or on any surface other than the ground.
- Bring the fill nozzle in contact with the inside of the fill opening before operating the nozzle. Contact should be maintained 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 at each fuel fill.



The engine oil dipstick is located behind the cab on the driver side of the vehicle. It can be reached without tilting the cab.

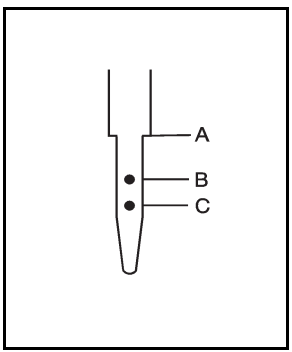
In order to get an accurate reading, the engine should be at normal operating temperature, so that the oil is warm, and the vehicle must be on level ground.

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 this is not done, 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 this is not done, 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.

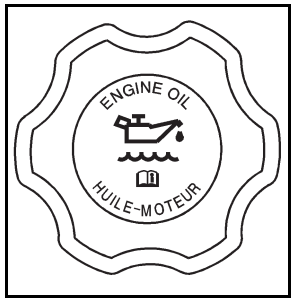
When to Add Engine Oil

Notice: **Do not add too much oil. Keep the oil level between the ADD (C) and FULL (B) marks on the dipstick. Under normal engine operation, the engine oil level can increase above the FULL (B) 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 (C) on the dipstick, add at least one liter/quart of the recommended oil.

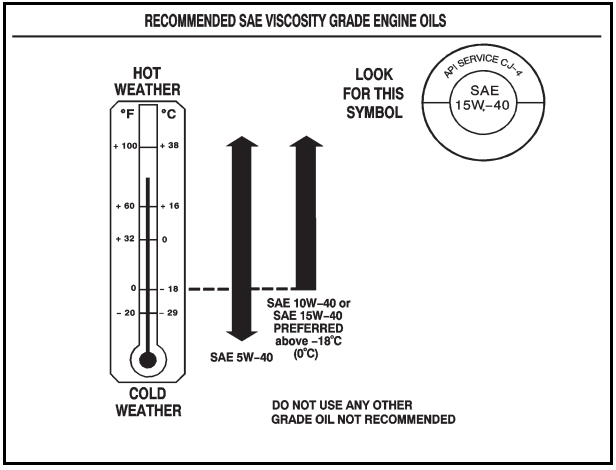
This section explains what kind of oil to use. For engine oil crankcase capacity, see *Capacities and Specifications on page 5-85*.



Add enough oil to put the level somewhere in the proper operating range. Push the dipstick all the way back in when through.

What Kind of Engine Oil to Use

Look for three things:



- CJ-4

  Oils designated as API CJ-4 are required for the 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.

- SAE 10W-40 or SAE 15W-40

  SAE 10W-40 or SAE 15W-40 is best for the vehicle. When it is very cold, below −18°C (0°F), 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.

- American Petroleum Institute (API) symbol

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.

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

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 24 000 km (15,000 miles), or every 12 months, or every 750 hours of engine operation, whichever occurs first. If the vehicle is used primarily for long trip, highway service, change the engine oil and filter every 28 800 km (18,000 miles), or every 12 months, or every 750 hours of engine operation, whichever occurs first. See *Scheduled Maintenance on page 6-5*.

Engine Oil Life System

When to Change Engine Oil

If the vehicle has the Engine Oil Life System, it has a computer system that indicates 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 is indicated can vary considerably. For the oil life system to work properly, the system must be reset every time the oil is changed.

When the system has calculated that oil life has been diminished, indicates that an oil change is necessary. A change engine oil light comes on. See *Change Engine Oil Light on page 3-34*. Change the oil as soon as possible within the next 1 000 km (600 miles) or 30 hours of engine operation, whichever occurs first. It is possible that, if 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, the oil must be changed at 5 000 km (3,000 miles), or 150 hours of engine operation, whichever occurs first, since the 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 the oil is changed 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/RUN with the engine off.
2. Fully press and release the accelerator pedal slowly three times within five seconds.

   If the change engine oil light is turned off, the system is resetting.
3. Turn the key to LOCK/OFF.

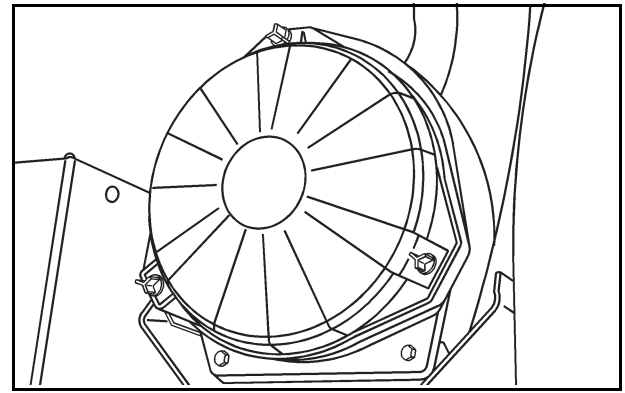
If the change engine oil light comes back on when the vehicle is started, the Engine Oil Life System has not reset. Repeat the procedure.

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.

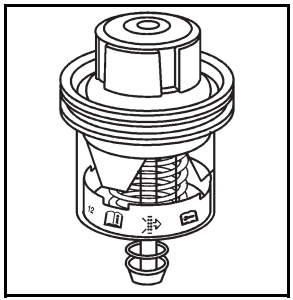
Used oil can be a threat to the environment. If you change your own oil, be sure to drain all the oil from the filter before disposal. Never dispose of oil by putting it in the trash, pouring it on the ground, into sewers, or into streams or bodies of water. Recycle it by taking it to a place that collects used oil.

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



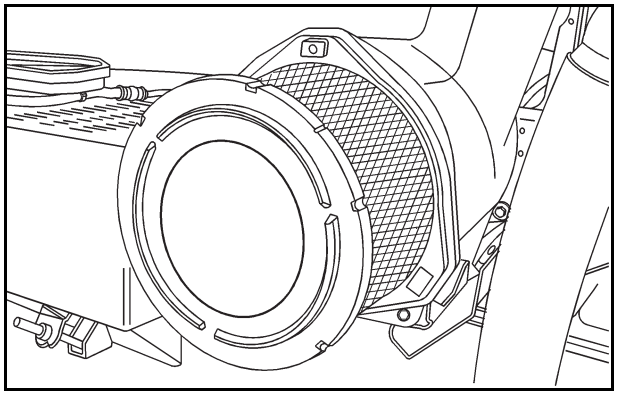
The filter change indicator will let you know when the filter should be replaced. If you are driving in dusty/dirty conditions inspect the filter each oil change.

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.

⚠ WARNING:

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 the 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 6-5*.

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 6-28*.

How to Add Fluid

To add transmission fluid, do the following:

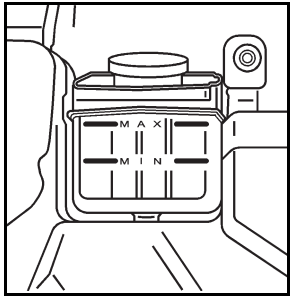
1. Remove the filler plug.
2. Add fluid at the filler plug hole. Add only enough fluid to bring the fluid level up to the bottom of the fill opening. Refer to the Maintenance Schedule to determine the proper fluid to use. See *Part C: Recommended Fluids and Lubricants on page 6-28*.
3. Reinstall the 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 6-23* and *Part C: Recommended Fluids and Lubricants on page 6-28* 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.

Cooling System

The cooling system allows the engine to maintain the correct working temperature.

⚠ WARNING:

An electric engine cooling fan under the hood can start up even when the engine is not running and can cause injury. Keep hands, clothing, and tools away from any underhood electric fan.

⚠ WARNING:

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.

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

Engine Coolant

The cooling system in the vehicle is filled with DEX-COOL® engine coolant. This coolant is designed to remain in the vehicle for five years or 150,000 miles (240 000 km), whichever occurs first.

The following explains the cooling system and how to check and add coolant when it is low. If there is a problem with engine overheating, see *Engine Overheating on page 5-29*.

What to Use

⚠ WARNING:

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

Use a 50/50 mixture of clean, drinkable water and DEX-COOL® coolant. If using this mixture, nothing else needs to be added. This mixture:

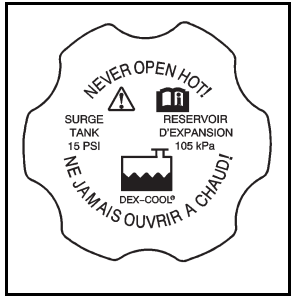
- Gives freezing protection down to −34°F (−37°C), outside temperature.
- Gives boiling protection up to 265°F (129°C), engine temperature.
- Protects against rust and corrosion.
- Will not damage aluminum parts.
- Helps keep the proper engine temperature.

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

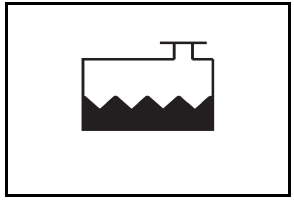
Notice: **If you use extra inhibitors and/or additives in your vehicle's cooling system, you could damage your vehicle. Use only the proper mixture of the engine coolant listed in this manual for the cooling system. See *Part C: Recommended Fluids and Lubricants on page 6-28* for more information.**

Checking Coolant

The vehicle must be on a level surface when checking the coolant level.



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.



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 3-30* for further information.

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

Check to see if coolant is visible in the coolant surge tank. If the coolant inside the coolant surge tank is boiling, do not do anything else until it cools down. If coolant is visible but the coolant level is not at or above the COLD FILL 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 is cool before this is done.

When the engine is cold, the coolant level should be at the COLD FILL mark. If it is not, you may have a leak in the cooling system.

How to Add Coolant to the Surge Tank

⚠ WARNING:

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.

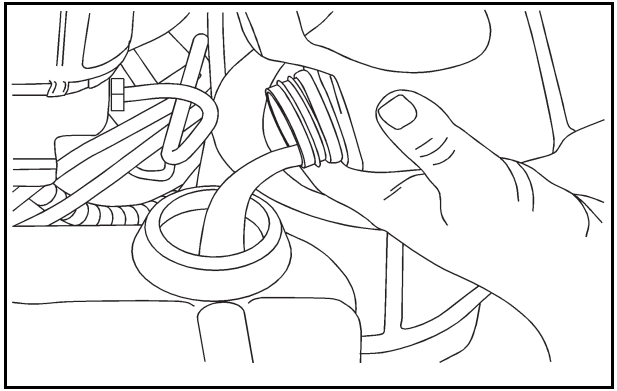
Notice: **This vehicle has a specific coolant fill procedure. Failure to follow this procedure could cause the engine to overheat and be severely damaged.**

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

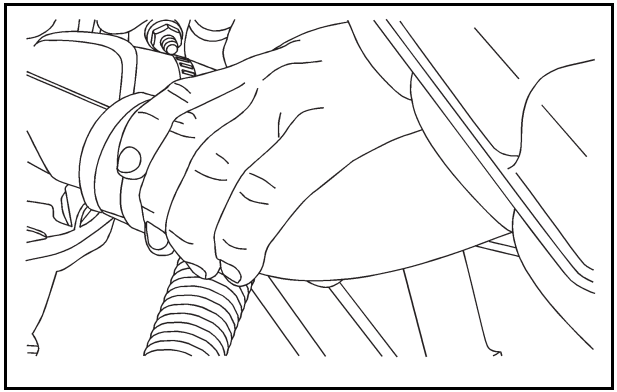
1. You can remove the coolant surge tank pressure cap when the cooling system, including the coolant surge tank pressure cap and upper radiator hose, is no longer hot. Turn the pressure cap slowly counterclockwise about one full turn.

   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.

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 3-29* and *Low Coolant Warning Light on page 3-30* for more information.

Your vehicle also has a check gages warning light on the instrument panel. See *Check Gages Warning Light on page 3-37* for more information.

If Steam Is Coming From Your Engine

⚠ WARNING:

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

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

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

If No Steam Is Coming From Your Engine

An overheat warning, along with a low coolant light, can indicate a serious problem. See *Low Coolant Warning Light on page 3-30* 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 N (Neutral) while stopped. If it is safe to do so, pull off the road, shift to P (Park) or N (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.

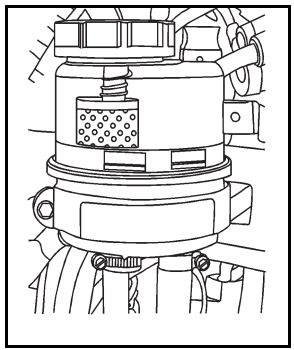
You may decide not to lift the hood but to get service help right away.

Power Steering Fluid

See *Scheduled Maintenance on page 6-5* 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 3-25* for more information.

What to Use

To determine what kind of fluid to use, see *Part C: Recommended Fluids and Lubricants on page 6-28*.

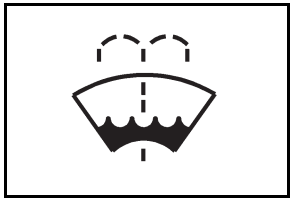
Notice: **When adding power steering fluid or making a complete fluid change, always use the proper fluid. Failure to use the proper fluid can cause leaks and damage hoses and seals.**

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.

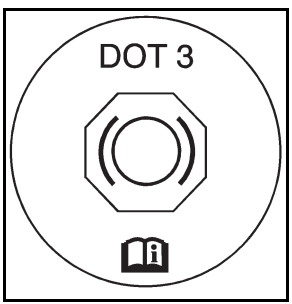
Notice:

- **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 the vehicle has hydraulic brakes, there is a brake master cylinder.

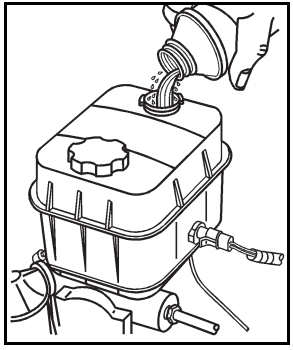
Refer to the Maintenance Schedule to determine when to check the brake fluid.

⚠ WARNING:

Do not add brake fluid before checking the level or there could be too much brake fluid. Brake fluid could spill on the hot engine and it can catch fire. You could be burned and the vehicle could be damaged. See “Checking Brake Fluid” in this section.

Checking Brake Fluid

Apply the brake pedal several times with the ignition off. 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.

⚠ WARNING:

With the wrong kind of fluid in the brake hydraulic system, the brakes might not work well. This could cause a crash. Always use the proper brake fluid.

Notice:

- **Using the wrong fluid can badly damage brake hydraulic system parts. For example, just a few drops of mineral-based oil, such as engine oil, in the brake hydraulic system can damage brake hydraulic 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 brake fluid is spilled on the vehicle's painted surfaces, the paint finish can be damaged. Be careful not to spill brake fluid on the vehicle. If you do, wash it off immediately. See *Washing Your Vehicle on page 5-72*.**

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 the front brakes are 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 brake stop, the brakes adjust for wear.

Brake Adjustment on Air Braked Vehicles

The vehicle has automatic slack adjusters. Every 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)

The 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. The vehicle was designed and tested with top-quality brake parts. When parts of the braking system are replaced — for example, when the brake linings wear down and new ones are installed — be sure to get new approved replacement parts. If this is not done, the brakes might not work properly. For example, if someone puts in brake linings that are wrong for the vehicle, the balance between the front and rear brakes can change — for the worse. The braking performance expected can change in many other ways if the wrong replacement brake parts are installed.

Hydraulic Brake Pads

Brake pad lining life will vary depending on vehicle application, working environment, equipment maintenance, and style of driving. The brake pad lining wear rate has to be monitored for individual driving habits — original equipment linings have mechanical wear indicators to help with this. When down to the last 10% of the brake lining, the brake lining wear indicator rubs on the rotor, causing a scratching or chirping sound. When this sound is heard, service to the brake pads is needed. See *Scheduled Maintenance on page 6-5*.

Aftermarket brake linings might not meet the same stringent requirements as the original equipment linings. Using aftermarket brake linings can affect braking performance, pedal feel, noise, and lining wear.

Air Brake Systems

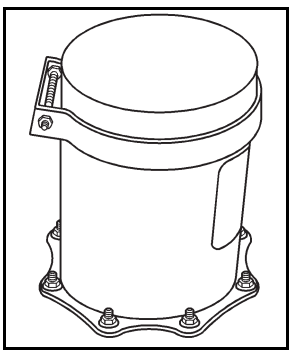
If the vehicle has air brakes, it is important to get rid of moisture in the system. Moisture will damage the system if it is not removed daily.

There are two ways to do this. One is automatic through the air brake vehicle's air dryer with integral 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 of full pressure, check the air pressure gage. It should read at least 692 kPa (100 psi).

Air Dryer

If the 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.

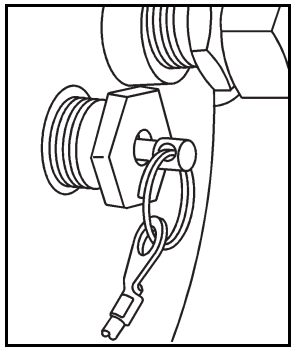


The dryer has a filter that needs changing at intervals. See *Scheduled Maintenance on page 6-5* for more about servicing this filter.

Electric Air Compressor

The vehicle might have an electric air compressor. This compressor is used to run options that require pressurized air, such as air horn or air seat.

The air compressor is used when vehicles do not have an air brake system.



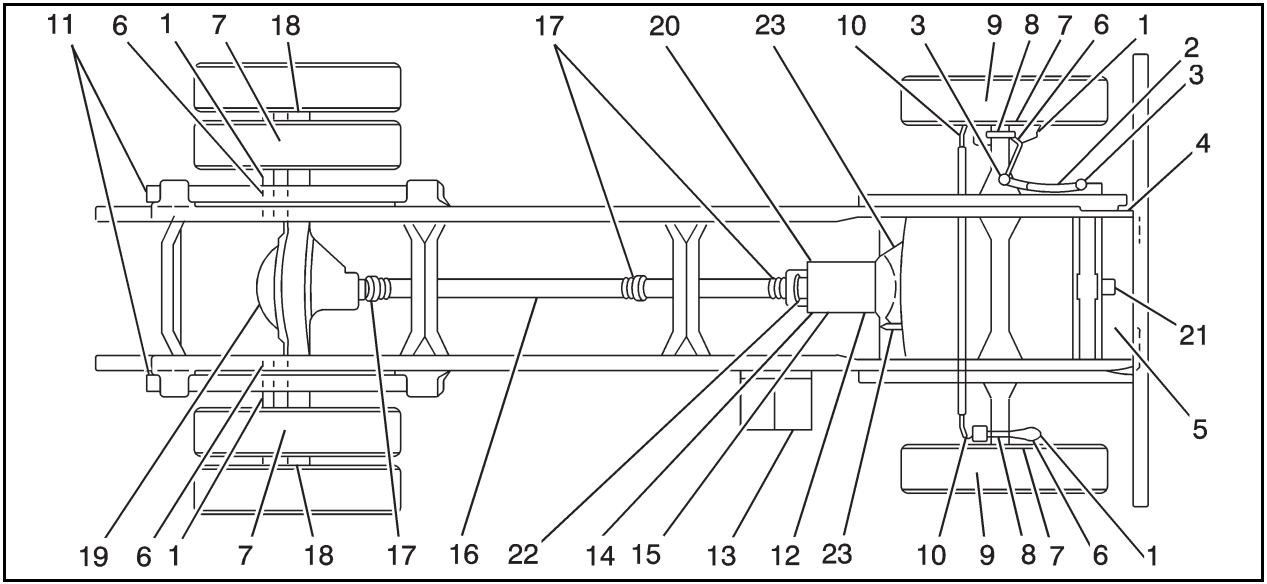
The air supply for this system must be maintained by releasing the drain valve to eject any moisture that could have built up in the system.

It is recommended that this system be drained on a weekly basis.

Clutch Pedal Free Travel

Normal clutch pedal free play is 38 to 51 mm (1.5 to 2 inches) measured from the floorboard. If the free play is less than 32 mm (1.25 inches), 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.
15	Transmission*	Fill to level of filler plug.
15	Transmission-Automatic*,**,†	Check fluid level.

Item Number	Item	Remarks
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 6 mm (1/4 inch) 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

The vehicle has two maintenance free batteries. Refer to the replacement number on the original battery label when a new battery is needed.

⚠ DANGER:

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

⚠ WARNING:

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 5-42* for tips on working around a battery without getting hurt.

Infrequent Usage: Remove the black, negative (−) cable from each battery to keep the batteries from running down.

Extended Storage: Remove the black, negative (−) cable from each battery or use a battery trickle charger.

When ready to use the vehicle again, refer to the engine starting procedure in the Index.

Jump Starting

If the vehicle 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.

⚠ WARNING:

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 the vehicle that would not be covered by the warranty.**

Trying to start the vehicle by pushing or pulling it will not work, and it could damage the 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 P (PARK) or a manual transmission in N (Neutral) before setting the parking brake.

Notice: **If you leave the radio or other accessories on during the jump starting procedure, they could be damaged. The repairs would not be covered by the warranty. Always turn off the radio and other accessories when jump starting the 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.

⚠ WARNING:

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.

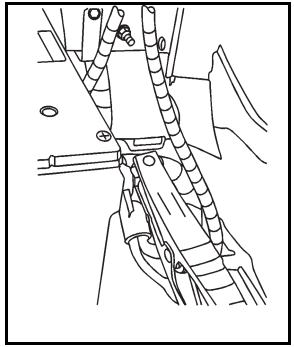
⚠ WARNING:

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.

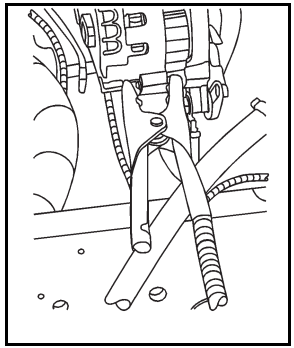


6. Connect the red positive (+) cable to the positive (+) terminal of the dead battery. Use a remote positive (+) terminal if the vehicle has one.

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.

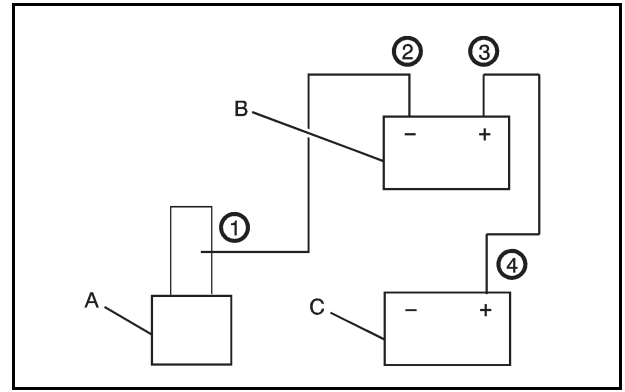


9. Connect the other end of the negative (−) cable at least 18 inches (45 cm) away from the dead battery, but not near engine parts that move.

   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 the vehicle 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

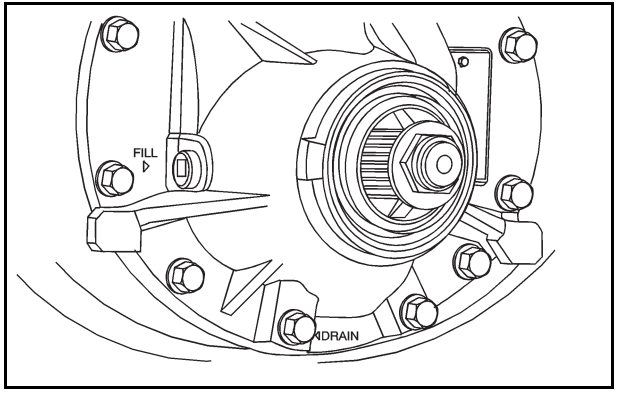
When to Check and Change Lubricant

Refer to the Maintenance Schedule to determine how often to check the lubricant and when to change it. See *Scheduled Maintenance on page 6-5*.

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 6-28*.

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 6-28*.

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.

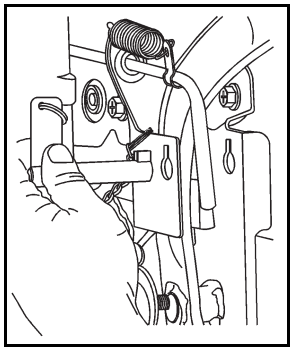
To help prevent the vehicle from moving:

1. Apply the parking brake.
2. Place the automatic transmission in P (Park) or shift the manual transmission to N (Neutral).
3. Turn the engine off.
4. Block the front and rear wheels.

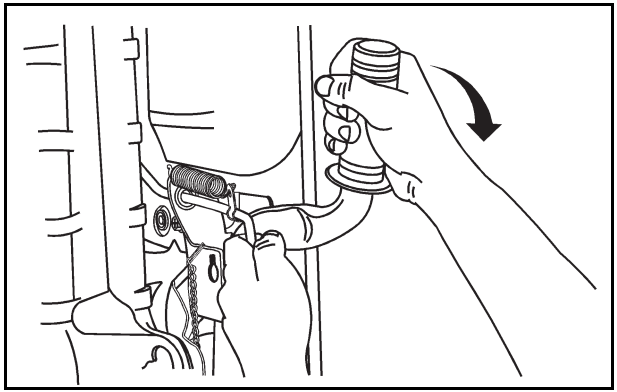
Tilting the Cab

To tilt the cab, do the following:

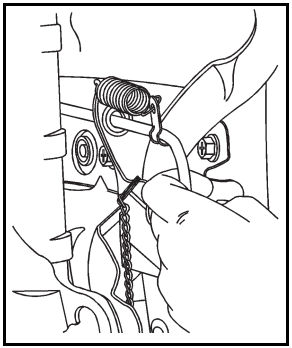
1. Locate the lever pin at the rear of the cab, on the passenger's side.



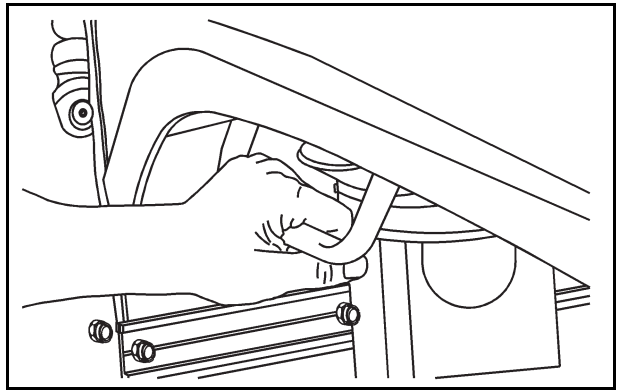
2. Turn the lever pin so that the tab is aligned with the slot. Remove the lever pin.



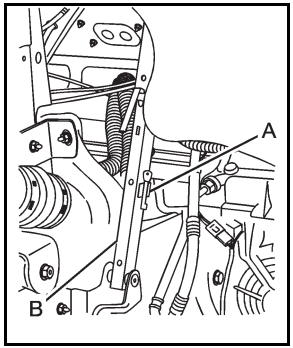
3. Move the primary tilt lever all the way down.



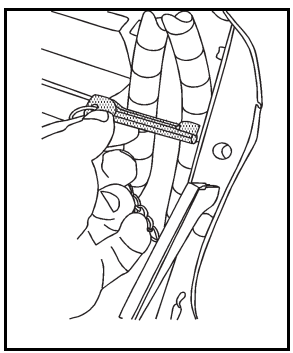
4. Pull the secondary latch lever to release the hook from the catch at the back of the cab.



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.

⚠ WARNING:

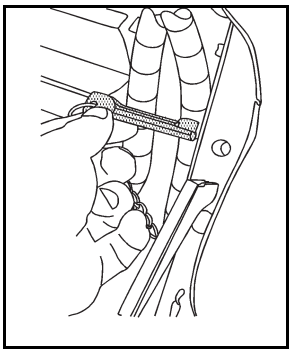
A cab not properly locked in the tilted position could fall, causing serious injury. To ensure that the cab is securely locked in position and will not move, the safety lock pin (A) must always be inserted into the cab support (B) when the cab is in the tilted position.

⚠ WARNING:

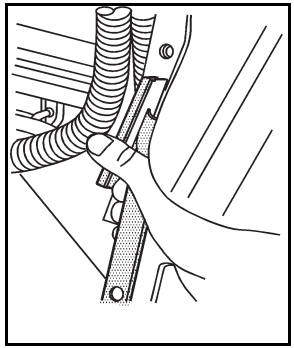
Things that burn can get on hot engine parts and start a fire. These include liquids like fuel, oil, coolant, brake fluid, windshield washer and other fluids, and plastic or rubber. You or others could be burned. Be careful not to drop or spill things that will burn onto a hot engine.

Lowering the Cab

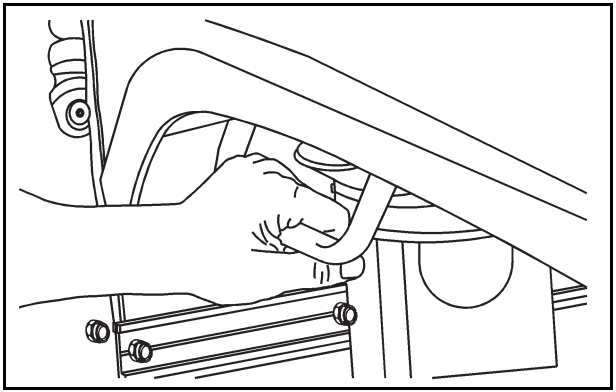
When the cab is ready to be lowered, follow the instructions below carefully. Before lowering the cab, be sure all filler caps are on properly.



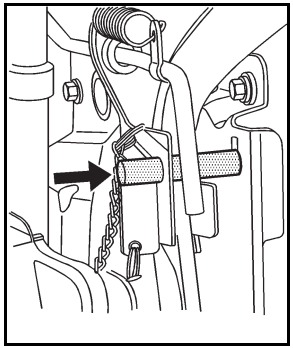
1. Remove the safety lock pin from the cab support by turning it and pulling it out.



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.



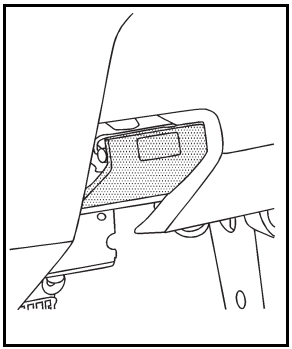
5. Reinstall the pin and turn it to keep the primary tilt lever from moving downward.

⚠ WARNING:

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.

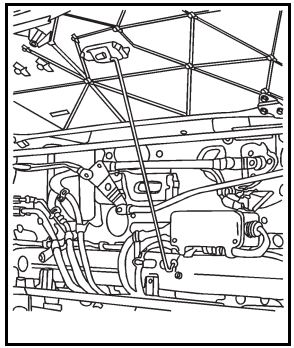
Lifting the Front Panel

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 3-4* 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

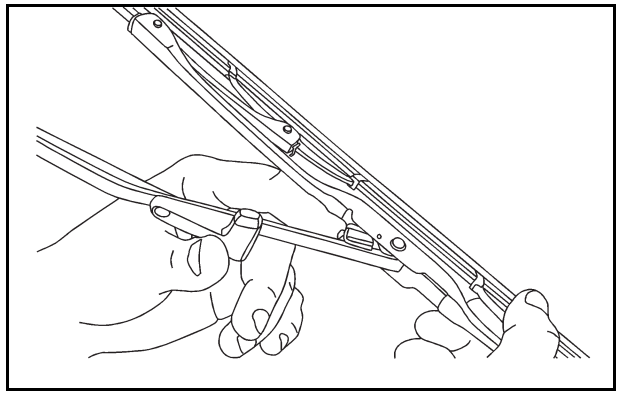
It is recommended that all bulbs be replaced by your dealer/retailer.

Windshield Wiper Blade Replacement

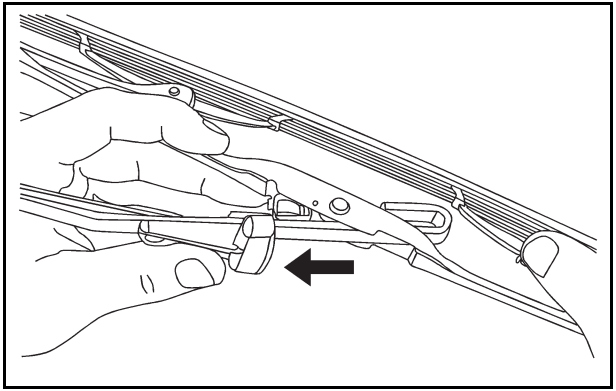
Windshield wiper blades should be inspected at least twice a year for wear or cracking. See “Wiper Blade Check” under *At Least Twice a Year on page 6-24* for more information.

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 side of the vehicle.
3. Install a new blade by reversing Steps 1 and 2.

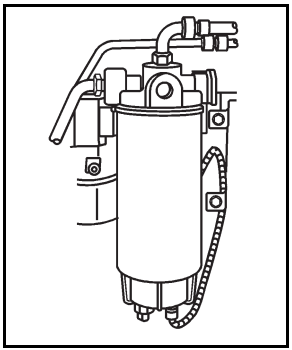
Other Service Items

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 6-5* for recommended service intervals.

Primary Fuel Filter and Water Separator



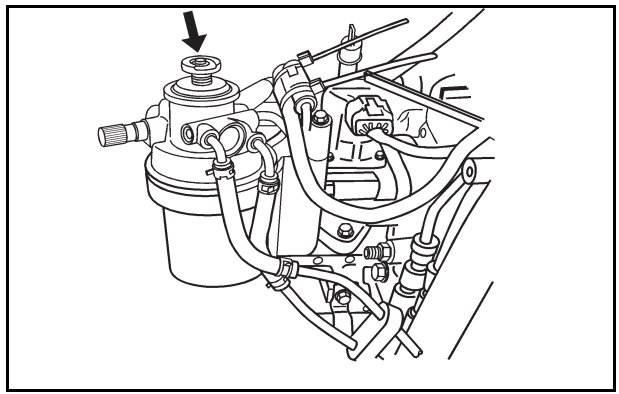
Your vehicle may have this spin-on filter. It is located on the driver's side frame rail.

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 5-10*.

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.



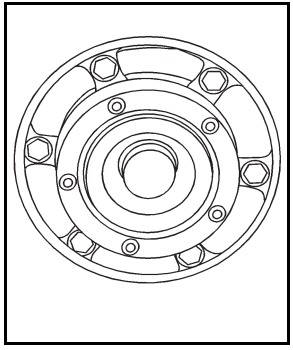
It has a metal drain bowl at the bottom. Occasionally, check the bowl for any water or particles. To check or drain the bowl, shut off the engine.

Then push up on the spring-loaded drain valve until clear fuel is flowing from the valve. The particles or water will drain out first.

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. For additional information refer to the tire manufacturer.

⚠ WARNING:

Poorly maintained and improperly used tires are dangerous.

- Overloading your vehicle's tires can cause overheating as a result of too much flexing. You could have an air-out and a serious accident. See *Loading the Vehicle on page 4-18* .

(Continued)

WARNING: (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 5-60* .
- 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 5-63* for wheel nut tightening information and proper torque values.

⚠ WARNING:

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 5-59* and *Inflation - Tire Pressure on page 5-60* for more information on proper tire inflation.

When It Is Time for New Tires

Various factors, such as maintenance, temperatures, driving speeds, vehicle loading, and road conditions, influence when you need 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.

The rubber in tires degrades over time, even if they are not being used. This is also true for the spare tire, if your vehicle has one. Multiple conditions affect how fast this aging takes place, including temperatures, loading conditions, and inflation pressure maintenance. With proper care and maintenance tires will typically wear out before they degrade due to age. If you are unsure about the need to replace your tires as they get older, consult the tire manufacturer for more information.

Buying New Tires

GM has developed and matched specific tires for your vehicle. If you need replacement tires, GM strongly recommends that you get tires that are the same size, brand, load range, speed rating, and construction type (radial and bias-belted tires) as your vehicle's original tires. This way, your vehicle will continue to have tires that are designed to give the same performance and vehicle safety, during normal use, as the original tires.

GM recommends replacing tires in sets of six or eight as applicable. This is because uniform tread depth on all tires will help keep your vehicle performing most like it did when the tires were new. Replacing less than a full set of tires can affect the braking and handling performance of your vehicle.

⚠ WARNING:

Mixing tires on the same axle could cause you to lose control while driving. If you mix tires of different sizes, tread patterns, or type (radial and bias-belted tires) on the same axle, the vehicle may not handle properly, and you could have a crash. Always use tires of the same size, load range, and type (radial and bias-belted tires) as the vehicle’s original tires.

Using tires that are a different size or type than originally supplied on the vehicle may cause damage to the vehicle.

⚠ WARNING:

If you use bias-ply tires on the vehicle, the wheel rim flanges could develop cracks after many miles of driving. A tire and/or wheel could fail suddenly, causing a crash. Use only radial-ply tires with the wheels on the vehicle.

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.

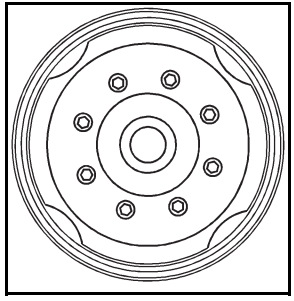
Tightening the Wheel Nuts

⚠ WARNING:

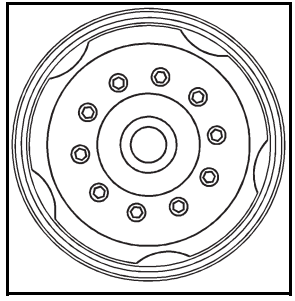
Wheel nuts that are not tight can work loose. If all the nuts on a wheel come off, the wheel can come off the vehicle, causing a crash. All wheel nuts must be properly tightened. Follow the rules in this section to be sure they are.

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

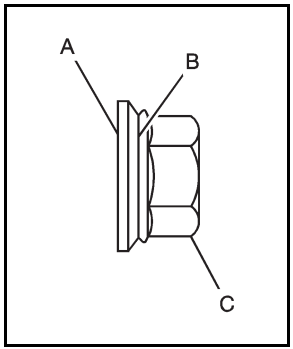
Then, refer to the following steps for the wheels you have.

Hub-Piloted Wheels, 8-Hole or 10-Hole

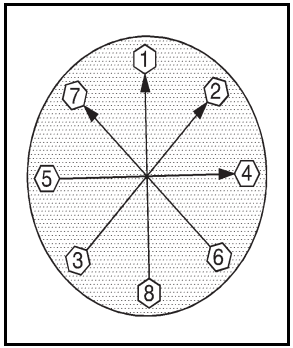
The studs and nuts used with these wheels have right-hand threads.

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.

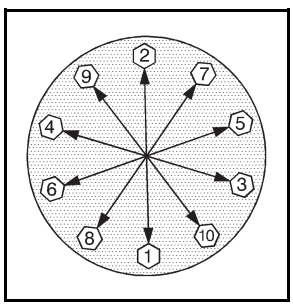


5. Oil the surfaces (B) between the nuts (C) and washers (A). Do not oil the studs or the threads of the nut.

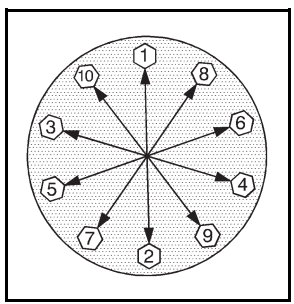


8-Hole

6. Tighten the nuts to 400 lb ft (540 N•m) if an 8-hole stud or 475 lb ft (640 N•m) if a 10-hole stud, using the following diagrams.



10-Hole (Front)



10-Hole (Rear)

⚠ WARNING:

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.

⚠ WARNING:

Wheel nuts that are improperly or incorrectly tightened can cause the wheels to become loose or come off. The wheel nuts should be tightened with a torque wrench to the proper torque specification after replacing. Follow the torque specification supplied by the aftermarket manufacturer when using accessory locking wheel nuts. See *Capacities and Specifications on page 5-85* for original equipment wheel nut torque specifications.

Notice: **Improperly tightened wheel nuts can lead to brake pulsation and rotor damage. To avoid expensive brake repairs, evenly tighten the wheel nuts in the proper sequence and to the proper torque specification. See *Capacities and Specifications on page 5-85* for the wheel nut torque specification.**

⚠ WARNING:

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.

⚠ WARNING:

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

Have a technician 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. Be sure to repeat this service whenever you have a tire removed or serviced. See *Scheduled Maintenance on page 6-5*

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.

⚠ WARNING:

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 GM original equipment parts. This way, you will be sure to have the right wheel, wheel bolts and wheel nuts for your vehicle.

⚠ WARNING:

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.

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 the Vehicle on page 4-18* 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

⚠ WARNING:

Putting a used wheel on the 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 GM 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 3-6*.

⚠ WARNING:

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.

⚠ WARNING:

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 7-5*.

Appearance Care

Interior Cleaning

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 dealer/retailer has a product for cleaning your vehicle's glass. Should it become necessary, you can also obtain a product from your dealer'/retailer 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 any soil, always try to remove it 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:

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 the interior and are not recommended. Do not use silicone or wax-based products, or those containing organic solvents to clean the 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 the 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.

⚠ WARNING:

Do not bleach or dye safety belts. 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 6-28*.

Washing Your Vehicle

The best way to preserve the vehicle's finish is to keep it clean by washing it often.

Notice: **Certain cleaners contain chemicals that can damage the emblems or nameplates on the vehicle. Check the cleaning product label. If it states that it should not be used on plastic parts, do not use it on the vehicle or damage may occur and it would not be covered by the warranty.**

Do not wash the vehicle in direct sunlight. Use a car washing soap. Do not use cleaning agents that are petroleum based or that contain acid or abrasives, as they can damage the paint, metal or plastic on the vehicle. Approved cleaning products can be obtained from your dealer/retailer. Follow all manufacturers' directions regarding correct product usage, necessary safety precautions and appropriate disposal of any vehicle care product.

Rinse the vehicle well, before washing and after to remove all cleaning agents completely. If they are allowed to dry on the surface, 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. Avoid using high pressure washes closer than 12 inches (30 cm) to the surface of the vehicle. Use of power washers exceeding 1,200 psi (8 274 kPa) can result in damage or removal of paint and decals.

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 5-72*.

Finish Care

Occasional waxing or mild polishing of the vehicle by hand may be necessary to remove residue from the paint finish. Approved cleaning products can be obtained from your dealer/retailer.

If the vehicle has a basecoat/clearcoat paint finish, the clearcoat gives more depth and gloss to the colored basecoat. Always use waxes and polishes that are non-abrasive and made for a basecoat/clearcoat paint finish.

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 the 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. To help keep the paint finish looking new, keep 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 may be used on chrome or stainless steel trim, 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 the vehicle 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 the vehicle may damage the paint finish and/or tires. When applying a tire dressing, always wipe off any overspray from all painted surfaces on the 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 vehicle 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/retailer. Larger areas of finish damage can be corrected in your dealer's/retailer'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/retailer or an underbody car washing system can do this.

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 Identification

Vehicle Identification Number (VIN)

This legal identifier is in the front corner of the instrument panel, on the driver side. It can be seen through the windshield from outside. The VIN also appears on the Certification/Tire label and certificates of title and registration.

Engine Identification

The eighth character in the VIN is the engine code. This code identifies the vehicle's engine, specifications, and replacement parts. See “Engine Specifications” under *Capacities and Specifications on page 5-85* for the vehicle's engine code.

Electrical System

Add-On Electrical Equipment

Notice: **Do not add anything electrical to the vehicle unless you check with your dealer/retailer first. Some electrical equipment can damage the vehicle and the damage would not be covered by the vehicle's 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.

The starter and other circuits have fusible links. The size is printed on the insulation. If the insulation is burned beyond recognition, consult your dealer/retailer 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

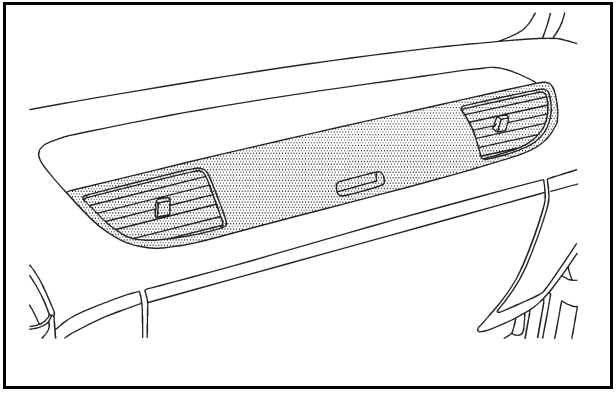
Circuit breakers in the fuse panel protect the power windows and other power accessories. When the current load is too heavy, the circuit breaker opens. This protects the circuit until the current load returns to normal or the problem is fixed.

Fuses and Circuit Breakers

The wiring circuits in the 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



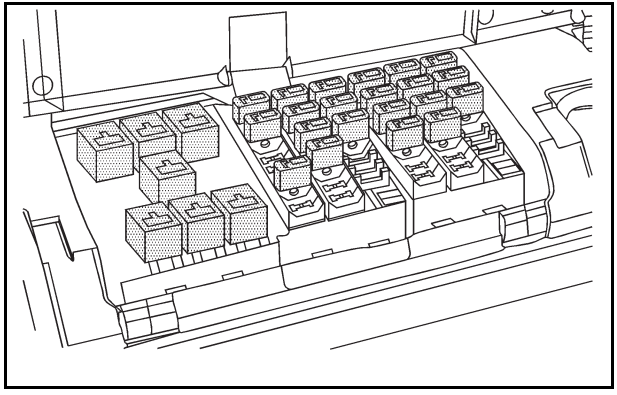
The instrument panel fuse block is located on the top of the instrument panel on the passenger side of the vehicle.

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	Cigar Lighter, Radio, Meter
3	Engine Control Module, Ignition 1
4	Transmission Control Module, Ignition, Chime
5	Assembly Line Data Link Connector
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)

Fuses	Usage
13	Auxiliary (Battery Direct)
14	Driver Side Headlamp
15	Passenger Side Headlamp
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.

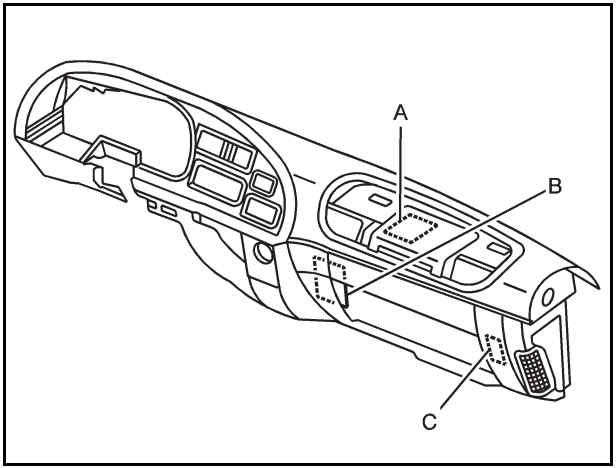
The maxi-fuse block outside of the cab on the driver side of the vehicle. To access the maxi-fuse block, remove the four screws from the front of the box and remove the cover.

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.

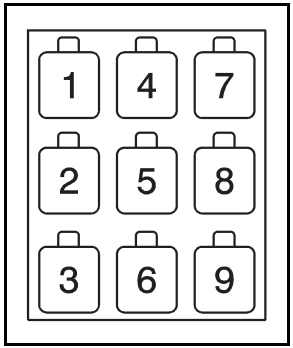
Fuses	Usage
ST/TURN/HAZ	Stoplamp, Turn Signals/Hazard Warning Flashers
IGN SW 3	Air Conditioner, Axle, Chassis
INT/EXT LIGHTS	Parking Lamps, Dome Lamp, Instrument Panel Lights
HEAD LAMP	Headlamps, Daytime Running Lamps
AUX WRG	Auxiliary Wiring, Parking Brake
IGN SW 1	Ignition Switch, Washer/Wiper, Crank, Radio
HYD PUMP	Hydraulic Brake, Brake Pump Motor
ABS	Antilock Brake System Module
ELECT TRANS	Ignition Relay
PARK BRAKE	Parking Brake Motor
BLOWER HORN	Blower, Horn, Cigarette Lighter, Auxiliary Outlets
TRAILER ABS	Trailer Antilock Brake System, Trailer Stoplamps
PWR WDO/ LOCKS	Power Window, Power Door Locks

Relay Center



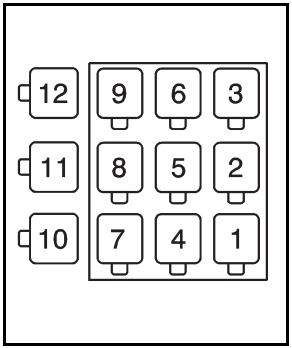
There are four relay blocks in the vehicle:

A. Relay Block A
B. Relay Block B
C. Relay Block C
D. Relay Block D (Not Shown)



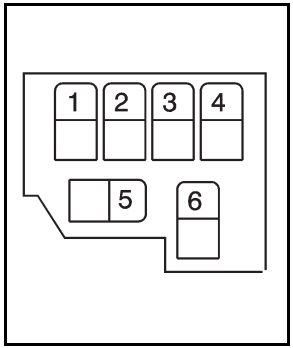
Relay Block A

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)



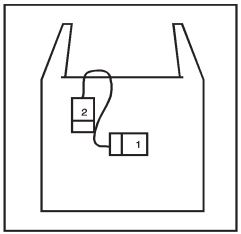
Relay Block B

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	Starter Cut
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 6-28* 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).		
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

Capacities and Specifications (cont'd)

Application	Capacities	
	English	Metric
[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
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*

Capacities and Specifications (cont'd)

Application	Capacities	
	English	Metric
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
Wheel Nut Torque		
8 Bolt Wheels	400 ft lb	540 N•m
10 Bolt Wheels	475 ft lb	640 N•m
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

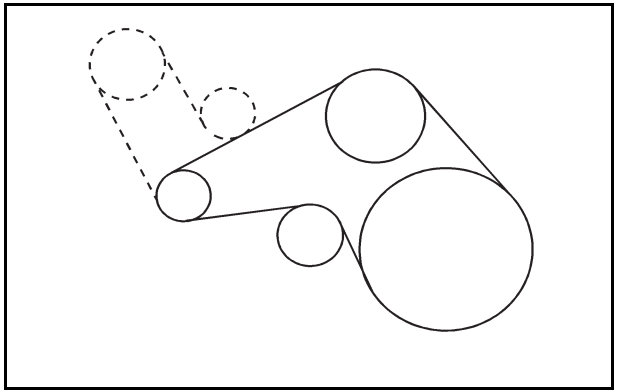
Engine	RPO	Type	Firing Order
Isuzu 6H	LF8	L6	1–5–3–6–2–4

Normal Maintenance Replacement Parts

Maintenance Replacement Parts

Part	Part Number
Air Compressor Filter (Haldex Air Compressor)	100696-E[1]
Engine Air Cleaner/Filter	P533930[2]
Fuel Filter	
Chassis Mounted	15618921
Engine Mounted	98026037
Oil Filter	94037791
[1]Haldex Part Number [2]Donaldson Part Number	

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

Maintenance Schedule 6-2
Introduction 6-2
Maintenance Requirements 6-2
Your Vehicle and the Environment 6-2
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Scheduled Maintenance Supplements 6-5
Scheduled Maintenance 6-5
Part B: Owner Checks and Services 6-23
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At Least Twice a Year 6-24
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Part D: Maintenance Record 6-30

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 the vehicle warranties. See the Warranty and Owner Assistance booklet or your dealer/retailer for details.

Maintenance Requirements

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

Your Vehicle and the Environment

Proper vehicle maintenance not only helps to keep the 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 the vehicle. To help protect the environment, and to keep the vehicle in good condition, be sure to maintain the 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, let your dealer/retailer do these jobs.

Your dealer/retailer has trained and supported service people that will perform the work using genuine parts.

⚠ WARNING:

Performing maintenance work on a vehicle can be dangerous. In trying to do some jobs, you can be seriously injured. Do your own maintenance work only if you have the required know-how and the proper tools and equipment for the job. If you have any doubt, have a qualified technician do the work. See *Doing Your Own Service Work on page 5-5*.

To purchase service information, see *Service Publications Ordering Information on page 7-10*.

"Part B: Owner Checks and Services" tells what should be checked and when. It also explains what can easily be done to keep the vehicle in good condition.

"Part C: Recommended Fluids and Lubricants" lists some recommended products necessary to help keep the 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 to record and keep track of the maintenance performed on the vehicle. Keep the maintenance receipts. They may be needed to qualify the 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 want to help keep this vehicle in good working condition. But we do not know exactly how you will drive it. You might drive very short distances only a few times a week. Or you might drive long distances all the time in very hot, dusty weather. You might use the vehicle in making deliveries or in many other ways.

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

This part tells you the maintenance services that should be done and when to schedule them.

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

The proper fluids and lubricants to use are listed in Part C. Make sure whoever services the 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 on the vehicle's Certification or Tire Information label. See *Loading the Vehicle on page 4-18*.
- are driven on reasonable road surfaces within legal driving limits.
- use the recommended fuel. See *What Fuel to Use in The U.S. on page 5-7* or *What Fuel to Use in Canada and Mexico on page 5-9*.

Scheduled Maintenance Supplements

If the vehicle has an Allison Transmission®, the owner manual is supplemented by an Allison Transmission® Operator's Manual. Always refer to this manual for related maintenance services.

Scheduled Maintenance

The services shown in this schedule up to 166 000 km (100,000 miles) should be repeated after 166 000 km (100,000 miles) at the same intervals for the life of this vehicle. The services shown after 166 000 km (100,000 miles) should be repeated at the same km (miles) 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 7-10*.

160 km (100 Miles)

- ❑ Wheel stud nut service. *(30)*

1 600 km (1,000 Miles)

- ❑ Wheel stud nut service. *(30)*
- ❑ Rear axle air shift motor service. *(9)*

12 000 km (7,500 Miles)

- ❑ 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. *(14)*
- ❑ 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)*

24 000 km (15,000 Miles)

- ❑ 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) (33)*
- ❑ 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 5-19*. *(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 5-21* 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)*

36 000 km (22,500 Miles)

- ❑ 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)*

40 000 km (24,000 Miles)

- ❑ Lubricate U-joints (or every 6 months, whichever occurs first).

48 000 km (30,000 Miles)

- ❑ 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) (33)*
- ❑ 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 5-19*. *(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 5-21* 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)*
- ❑ Check restraint system. *(34)*
- ❑ 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)*

60 000 km (37,500 Miles)

- ❑ 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)*

72 000 km (45,000 Miles)

- ❑ 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) (33)*
- ❑ 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 5-19*. *(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 5-21* 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)*

75 000 km (48,000 Miles)

- ❑ Lubricate U-joints (or every 6 months, whichever occurs first).

80 000 km (50,000 Miles)

- ❑ Inspect air compressor discharge port (or every 6 months or every 1,800 hours, whichever occurs first.)

84 000 km (52,500 Miles)

- ❑ 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)*

96 000 km (60,000 Miles)

- ❑ 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) (33)*
- ❑ 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 5-19*. *(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 5-21* 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.
- ❑ Check restraint system. *(34)*
- ❑ 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)*

108 000 km (67,500 Miles)

- ❑ 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)*

115 000 km (72,000 Miles)

- ❑ Lubricate U-joints (or every 6 months, whichever occurs first).

120 000 km (75,000 Miles)

- ❑ 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) (33)*
- ❑ 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 5-19*. *(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 5-21* 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)*

132 000 km (82,500 Miles)

- ❑ 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)*

144 000 km (90,000 Miles)

- ❑ 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) (33)*
- ❑ 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 5-19*. *(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 5-21* 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.
- ❑ Check restraint system. *(34)*
- ❑ 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)*

152 000 km (96,000 Miles)

- ❑ Lubricate U-joints (or every 6 months, whichever occurs first).

156 000 km (97,500 Miles)

- ❑ 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)*

160 000 km (100,000 Miles)

- ❑ 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 o ccurs first). *(29)*

240 000 km (150,000 Miles)

- ❑ 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 240 000 km (150,000 Miles), or every 4,500 hours, whichever occurs first. *(32)*

320 000 km (200,000 Miles)

- ❑ 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.

480 000 km (300,000 Miles)

- ❑ 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 240 000 km (150,000 Miles), or every 4,500 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 5 000 km (3,000 miles) and 24 000 km (15,000 miles) since your last oil change. Under severe conditions, the indicator may come on before 5 000 km (3,000 miles). Never drive your vehicle more than 24 000 km (15,000 miles) 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 5-19*.

(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 1 600 km (1,000 miles) and 36 000 km (22,500 miles) and then every 36 000 km (22,500 miles) 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 5-59* 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 10 000 km (6,000 miles). Check torque at 800 km (500 miles) and 3 000 km (2,000 miles) 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 6-28*.
- 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 5-58* and *Part C: Recommended Fluids and Lubricants on page 6-28*.

(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 6-28* 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 6-28*.

(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 cab rear bridge. 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 160 km (100 miles). Thereafter, tighten them 1 600 km (1,000 miles) after each time the wheel is removed. See *Tightening the Wheel Nuts on page 5-63*.

(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.

(33) = If the vehicle is used primarily for long trip, highway service, change the engine oil and filter every 28 800 km (18,000 miles), or every 12 months, or every 750 hours of engine operation, whichever occurs first.

(34) = 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.

Part B: Owner Checks and Services

These owner checks and services should be performed at the intervals specified to help ensure vehicle safety, dependability, and emission control performance.

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 10 000 km (6,000 miles), whichever occurs first. Whenever repairs are needed, have them completed before operating the vehicle.

Air brake system reservoirs should be drained daily and any electric air compressor should be drained weekly. See *Brakes on page 5-33*.

At Each Fuel Fill

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

Engine Oil Level Check

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

Check the engine oil level and add the proper oil if necessary. See *Engine Oil on page 5-16*.

Engine Coolant Level Check

Check the engine coolant level and add DEX-COOL® coolant mixture if necessary. See *Engine Coolant on page 5-26*.

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 5-32*.

Tire Inflation Check

Check tire inflation cold. Make sure the tires are inflated to the correct pressures. See *Loading the Vehicle on page 4-18* and *Inflation - Tire Pressure on page 5-60*.

At Least Twice a Year

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 5-55* and *Windshield and Wiper Blades on page 5-73* 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. See *Parking Brake (With Hydraulic Brakes) on page 2-23* or *Parking Brake (With Air Brakes) on page 2-24*.

Starter Switch Check

⚠ WARNING:

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 P (Park) or N (Neutral). 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 2-27* and *Running the Vehicle While Parked on page 2-32*.

Check to be sure that mud or dirt is not caked on the exhaust system, especially in the area of the diesel particulate filter and tailpipe. Clean the area as needed. See *Diesel Particulate Filter on page 2-28*.

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 5-16*.
Engine Coolant	50/50 mixture of clean, drinkable water and use only DEX-COOL® Coolant. See *Engine Coolant on page 5-26*.
Hydraulic Brake System	DOT 3 Hydraulic Brake Fluid (GM Part No. U.S. 12377967, in Canada 89021320).

Usage	Fluid/Lubricant
Windshield Washer Solvent	Optikleen® Washer Solvent.
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).

Usage	Fluid/Lubricant
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.
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.

Maintenance Record

Date	Miles/km Or Hours	Serviced By	Maintenance Record

Maintenance Record (cont'd)

Date	Miles/km Or Hours	Serviced By	Maintenance Record

Maintenance Record (cont'd)

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 the vehicle will be resolved by the 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, call the GM Medium Duty Truck Customer Assistance Center at 1-800-862-4389. In Canada, call GM of Canada Customer Communication Centre in Oshawa at 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. 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.

When contacting GMC, remember that your concern will likely be resolved at a dealer's facility. That is why we suggest following Step One first.

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 can 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.

General Motors 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

GM Medium Duty truck's Roadside Assistance provides stranded owner/operators with towing service for disabled GM Medium Duty trucks, during the base and/or engine warranty period, to the nearest authorized GM Medium Duty dealer. This service combines the efforts of trained telephone representatives with a network of GM Medium Duty truck services.

Call GM Medium Duty truck's Roadside Assistance at 1-800-862-4389 to reach a qualified representative who can assist you in arranging a tow to the nearest GM Medium Duty truck dealer when your vehicle is disabled. We also provide dealer information at no charge, such as location of the nearest authorized GM Medium Duty truck dealer and their hours of operation.

Our Roadside Assistance is available 24 hours a day, 7 days a week, 365 days a year which includes weekends and holidays. Should you have questions about GM Medium Duty truck Roadside Assistance, call the GM Medium Duty Roadside Assistance Center or contact your dealer.

Canadian Roadside Assistance

Whenever a Medium Duty truck owned and operated in Canada becomes disabled, the owner/operator should contact the Canadian Roadside Assistance Center at 1-800-268-6800 for assistance.

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 ensure 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 crashes. In most cases, the parts being recycled are from undamaged sections of the vehicle. A recycled original equipment GM part, may be an acceptable choice to maintain 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

We recommend 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 a Crash Occurs

Here is what to do if you are involved in a crash.

- Check to make sure that 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 emergency services for help. Do not leave the scene of a crash 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 crash. Do not discuss your personal condition, mental frame of mind, or anything unrelated to the crash. This will help guard against post-crash legal action.
- If you need roadside assistance, call GM Roadside Assistance. See *Roadside Assistance Program on page 7-5* 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 crash. 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, you should immediately inform the National Highway Traffic Safety Administration (NHTSA) in addition to notifying General Motors.

If NHTSA receives similar complaints, it may open an investigation, and if it finds that a safety defect exists in a group of vehicles, it may order a recall and remedy campaign. However, NHTSA cannot become involved in individual problems between you, your dealer, or General Motors.

To contact NHTSA, you may call the Vehicle Safety Hotline toll-free at 1-888-327-4236 (TTY: 1-800-424-9153); go to *http://www.safercar.gov*; or write to:

Administrator, NHTSA
1200 New Jersey Avenue, S.E.
Washington, D.C. 20590

You can also obtain other information about motor vehicle safety from *http://www.safercar.gov.*

Reporting Safety Defects to 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 General Motors 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 manual includes the Maintenance Schedule for all models.

In-Portfolio: Includes a Portfolio, Owner Manual, and Warranty Booklet.

RETAIL SELL PRICE: $35.00 (U.S.) plus processing fee

Without Portfolio: Owner Manual only.

RETAIL SELL PRICE: $25.00 (U.S.) plus processing fee

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, 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. on the World Wide Web at: 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 antilock 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 airbag 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. 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.

Radio Frequency Statement

This vehicle has systems that operate on a radio frequency that comply with Part 15 of the Federal Communications Commission (FCC) Rules and with RSS-210/211 of Industry and Science Canada.

Operation is subject to the following two conditions:

1. The device may not cause interference.
2. The device must accept any interference received, including interference that may cause undesired operation of the device.

Changes or modifications to any of these systems by other than an authorized service facility could void authorization to use this equipment.

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