OPERATOR'S MANUAL

Peterbilt

CLASS PAYS

Chapter 1 | SAFETY

WHY THIS HANDBOOK IS SO IMPORTANT!

This handbook contains the information which you, the driver, will need for optimum efficiency, safety and comfort when operating this vehicle. Besides giving instructions about operation and use, it also pays attention to maintenance and minor repairs which you may be able to carry out yourself.

> **NOTE**
>
> This handbook is based on the chassis with its fittings as it originally left the factory.

Depending upon the required body and equipment, the bodybuilder may have made fundamental changes to various parts or systems, such as the instrument panel, the lighting or the electric wiring.

Every new vehicle is designed to conform to all Federal Motor Vehicle Safety Standards applicable at the time of manufacture. Even with these safety features, continued safe and reliable operation depends greatly upon regular vehicle maintenance. Follow the maintenance recommendations found in Preventive Maintenance. This will help preserve your investment

Important: Make sure this handbook is in the vehicle at all times. Read it carefully before making your first journey, especially the "Warnings and safety precautions", "Cab, instruments and controls", "Inspections" and "Driving" sections.

Safety Alerts

Please read and follow all of the safety alerts contained in this manual. They are there for your protection and information. These alerts can help you avoid injury to yourself, your passengers and help prevent costly damage to the vehicle. Safety alerts are highlighted by safety alert symbols and signal words such as “WARNING”, “CAUTION”, or “NOTE”. Please DO NOT ignore any of these alerts.

Warnings

The safety message following this symbol and signal word provides a warning against operating procedures which could cause death or injury. They could also cause equipment or property damage. The alert will identify the hazard, how to avoid it and the probable consequence of not avoiding the hazard.

Example:

> **WARNING**
>
> Hot engine oil can be dangerous. You could be burned. Let the engine oil cool down before changing it. Failure to comply may result in death, personal injury, equipment or property damage.

Cautions

The safety message following this symbol and signal word provides a caution against operating procedures which could cause equipment or property damage. The alert will identify the hazard, how to avoid it, and the probable consequence of not avoiding the hazard.

Example:

CAUTION

Continuing to operate your vehicle with insufficient oil pressure will cause serious engine damage. Failure to comply may result in equipment or property damage.

Notes

The message following this symbol and signal word provides important information that is not safety related but should be followed. The alert will highlight things that may not be obvious and is useful to your efficient operation of the vehicle.

Example:

NOTE

Pumping the accelerator will not assist in starting the engine.

Warnings and Safety Regulations

WARNING

To prevent damage to the vehicle and in order not to jeopardize your health and/or safety, or that of other people, the following warning and safety regulations must be strictly observed.

First read the instructions and warnings on the labels and stickers on the various components and comply with them!

They have been put there for your health and safety, so do not ignore them!

Modifications to the Vehicle

Modifying your vehicle can make it unsafe. Some modifications can affect your vehicle's electrical system, stability, or other important functions. Before modifying your vehicle, check with your dealer to make sure it can be done safely. Improper modifications can cause death or personal injury.

Environmental Protection

WARNING

CALIFORNIA PROPOSITION 65 WARNING

- Diesel engine exhaust and some of its constituents are known to the State of California to cause cancer, birth defects, and other reproductive harm.
- Other chemicals in this vehicle are also known to the State of California to cause cancer, birth defects or other reproductive harm.
- 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.

A Special Word About Repairs

WARNING

DO NOT attempt repair work without sufficient training, service manuals, and the proper tools. You could be killed or injured, or you could make your vehicle unsafe. Perform only those tasks you are fully qualified to do.

WARNING

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CAUTION

The installation of electronic devices to the On Board Diagnostics (OBD) connector, the vehicle Controller Area Network (CAN), or their associated wiring is not permitted. Doing so can adversely affect vehicle performance and/or cause fault codes to be recorded. The OBD connector is provided for temporary connection of service tools and for diagnostic purposes only.

Your dealer’s service center is the best place to have your vehicle repaired. You can find dealers all over the country with the equipment and trained personnel to get you back on the road quickly—and keep you there.

Your vehicle is a complex machine. Anyone attempting repairs on it needs good mechanical training and the proper tools. If you are sure you have these requirements, then you can probably perform some repairs yourself. However, all warranty repairs must be performed by an authorized service facility. If you aren’t an experienced mechanic, or don’t have the right equipment, please leave all repairs to an authorized service facility. They are the ones equipped to do the job safely and correctly.

Maintenance Manuals

If you do decide to do any complex repair work, you'll need the maintenance manuals. Order them from your authorized dealer. Please provide your Chassis Serial Number when you order, to be sure you get the correct manuals for your vehicle. Allow about four weeks for delivery. There will be a charge for these manuals.

Final Chassis Bill of Material

A complete, non-illustrated computer printout listing of the parts used to custom-build your vehicle is available through the dealer from whom you purchased your vehicle.

Components

Do not work on or near the fan with the engine running. Anyone near the engine fan when it turns on could be seriously injured. If it is set at MANUAL, the fan will turn on any time the ignition key switch is turned to the ON position. In AUTO, it could engage suddenly without warning. Before turning on the ignition or switching from AUTO to MANUAL, be sure no one is near the fan.

Cooling System Filler Cap

WARNING

Do not remove the radiator fill cap while the engine is hot. Scalding steam and fluid under pressure may escape. You could be badly burned. Failure to comply may result in death or personal injury.

Emergency Equipment

It is good practice to carry an emergency equipment kit in your vehicle. One day, if you have a roadside emergency, you will be glad the following items are with you:

- Window scraper
- Snow brush
- Container or bag of sand or salt
- Emergency light
- Warning triangles
- Small shovel
- First aid kit
- Fire extinguisher
- Vehicle recovery hitches. (See *Towing* on page 25 for details).

Fire Extinguisher

Ensure that you are always in possession of a fire extinguisher It should be well secured under the seat, within the driver's reach and easily accessible, also for rescue workers and others providing assistance. Have the fire extinguisher checked for operational readiness each year. If it has been used, have it refilled at the earliest opportunity.

In the Event of Fire

In the event of a fire, certain plastic seals can produce gases which together with water form a corrosive acid. Do not touch any fire extinguisher fluid on the vehicle without protective gloves.

Cab

WARNING

Do not carry loose objects in your cab, it can be dangerous. In a sudden stop, or even going over a bump in the road, they could fly through the air and strike you or a passenger. You could be injured or even killed. Secure all loose objects in the cab before moving the vehicle. Carry any heavy objects such as luggage in the exterior storage compartment and close it securely.

First Aid Kit

Ensure that you are always in possession of a first aid kit and replace first aid items as soon as possible after use to have the kit always ready.

Tire Chains

If you need tire chains, install them on both sides of each driving axle.

CAUTION

Chains on the tires of only one tandem axle can damage the driveline U-joints and the inter-axle differential. Your repairs could be costly and time-consuming.

Approaching your Vehicle

- Check the overall appearance and condition. Are windows, mirrors, and lights clean and unobstructed?
- Check beneath the vehicle. Are there signs of fuel, oil, or water leaks?
- Check for damaged, loose, or missing parts. Are there parts showing signs of excessive wear or lack of lubrication? Have a qualified mechanic examine any questionable items and repair them without delay.
- Check your load. Is it secured properly?

Oils and Lubricants

Various kinds of oil and other lubricants used on the vehicle may constitute a health hazard if they come into contact with the skin. This also applies to engine coolant, windshield washer fluid, refrigerant in air conditioning systems, battery acid and diesel fuel. So avoid direct contact as much as possible.

The engine and the surrounding area must be free of inflammable materials to avoid the risk of fire.

Exercise caution when changing hot oil; it can cause serious bodily injury.

WARNING

Air conditioning refrigerant can be hazardous to your health. Do not expose yourself to leaking refrigerant for prolonged periods near excessive heat, open flames, or without proper ventilation. Failure to do so may result in death or personal injury.

Maintenance Activities

When carrying out maintenance work under the cab, make sure the cab is fully tilted and locked to prevent it from falling back accidentally.

Following a collision, only tilt the cab in an emergency situation. The tilting mechanism may be damaged. (The end stop may no longer be on the lifting cylinder.)

WARNING

Always support the vehicle with appropriate safety stands if it is necessary to work underneath the vehicle. A jack is not adequate for this purpose.

Maintenance of Air Conditioning System

WARNING

Excessive heat may cause the pressurized components of the air conditioning system to explode. Never weld, solder, steam clean, or use a blow torch near any part of the air conditioning system. Failure to comply may result in personal injury, death, equipment or property damage.

WARNING

Air conditioning refrigerant can be hazardous to your health. Do not expose yourself to leaking refrigerant for prolonged periods near excessive heat, open flames, or without proper ventilation. Failure to do so may result in death or personal injury.

WARNING

The air conditioning system is under pressure. If not handled properly during servicing, it could explode. Any servicing that requires depressurizing and recharging the air conditioning system must be conducted by a qualified technician with the right facilities to do the job. Failure to comply may result in personal injury, death, equipment or property damage.

Environment

Pollution constitutes a serious threat to the environment. To keep pollution to a minimum, the following rules should be observed:

- Do not dump used oil, fuel, lubricants, hydraulic fluid or coolants in drains, sewers, in landfills or on the ground. This is illegal. These fluids should be returned to the designated authority or appropriate chemical waste collection company for recycling or destruction. All used fluids should be stored separately.
- Make sure that the vehicle is serviced regularly according to the instructions and recommendations. A properly serviced vehicle helps optimize fuel economy and reduce the level of harmful constituents in the exhaust gases.

Technical Items of Special Importance

To prevent damage to the vehicle, the following instructions must be strictly observed.

Running-in

During the running-in period it is best not to subject the new vehicle to excessive loads. This also applies when an overhauled engine, transmission or differential has been installed. Therefore, for the first 932 miles (1,500 km): drive carefully and avoid accelerating sharply.

The following technical items of special importance applies to both the running-in period and to the period thereafter.

After a cold start continue to drive in a low gear and at a moderate engine speed until the engine coolant temperature is out of the blue zone.

While driving, check **the instrument panel** regularly and take appropriate action if you notice anything unusual, such as strange engine or transmission noises, smoke, or poor performance. Do not let the engine **idle for longer than necessary.** This is harmful to the engine and also causes unnecessary pollution of the environment.

Be aware that **engine stalling** while driving will lead to power steering failure. Consequently, the vehicle will be more difficult to steer.

The engine cooling system is thermostatically controlled.

Removing the thermostat when the coolant temperature is (too) high serves no useful purpose and is strongly advised against, since this will only cause the engine temperature to rise to an even higher level.

The **turbocharger** is a precision component. You should therefore immediately report any abnormal noise that seems to be coming from this component.

Air Leakage

If the pressure in the air reservoirs drops rapidly with the engine switched off, this indicates a leak. Since this affects the safety of the brake system, the leak must be traced and repaired as quickly as possible.

System Voltage

The cab system of this vehicle are on 24-Volt while other areas remain 12-Volt. When replacing or fitting electrical or electronic components, always verify that they are suitable for this system voltage.

Batteries

WARNING

Never disconnect the battery leads while the engine is running!

Always disconnect the battery negative (ground) lead before carrying out repairs or service on the electrical system.

WARNING

Before attempting any work on the batteries or electrical system, remove all jewelry. If metal jewelry or other metal comes in contact with electrical circuits, a short circuit may occur causing you to be injured, as well as causing electrical system failure and damage.

Charging

WARNING

Thaw out frozen batteries before charging them. Inspect the battery case for damage: cracks, swelling of the case, and/or battery acid leakage. If damage is found, replace the battery. Remove all the filler caps before charging.

WARNING

Charger cables must be connected positive to positive (+ to +) and negative to negative (- to -). If connected improperly, batteries could explode. Failure to comply may result in personal injury, death, equipment or property damage.

WARNING

Always make sure the battery charger is OFF before connecting or disconnecting the cable clamps. To reduce the danger of explosions and resulting death or personal injury, do not connect or disconnect charger cables while the charger is operating.

Charging Reminders

- Use protective eyewear.
- Keep all batteries away from children.
- Never reverse battery poles.
- Never attempt to place the vehicle in motion, or run the engine with batteries disconnected.
- Keep the battery clean and dry.
- Look for any signs of damage.
- Battery terminals should not be coated with improper grease. Use petroleum jelly or commercially available, noncorrosive, nonconducting terminal coatings.
- Never use a fast charger as a booster to start the engine. This can seriously damage sensitive electronic components such as relays, radio, and haptic equipped components, as well as the battery charger. Fast charging a battery is dangerous and should only be attempted by a competent mechanic with the proper equipment.

Battery Capacity

Using electrical components, such as the cab heater or refrigerator when the engine is not running, power will be drawn from the batteries.

Approximately half the battery capacity is required to start the engine.

If this is the case over a protracted period, particularly during low temperatures, the result may be that the electrical

components have used so much power that there is not enough to start the engine.

If the high current draw electrical components, such as the cab heater, refrigerator, coffee percolator, microwave oven or tail-lift are used, it is recommended that you obtain batteries of an adequate higher capacity in consultation with your dealer.

Welding

For welding on the vehicle and/or superstructure, see the "Bodybuilders Manual". Not following the welding instructions can cause damage to the electronic components.

Jump Starting Vehicles

How to Jump Start a Battery

Jump starting a vehicle is not a recommended practice due to the various battery installations and electrical options. However, if the vehicle battery is discharged (dead), the vehicle may start by using energy from a good battery in another vehicle. This is termed jump starting.

WARNING

Batteries contain acid that can burn and gases that can explode. Ignoring safety procedures may result in death, personal injury, equipment or property damage.

WARNING

Never jump start a battery near fire, flames, or electrical sparks. Batteries generate explosive gases that could explode. Keep sparks, flame, and lighted cigarettes away from batteries. Failure to comply may result in death, personal injury, equipment or property damage.

WARNING

Never remove or tamper with battery caps. Ignoring this could allow battery acid to contact eyes, skin, fabrics, or painted surfaces. Failure to comply may result in death, personal injury, equipment or property damage Be careful that metal tools (or any metal in contact with the positive terminal) do not contact the positive battery terminal and any other metal on the vehicle at the same time. Remove metal jewelry and avoid leaning over the battery.

WARNING

When jump starting using a battery booster, it is best to jump start with an equivalently powered vehicle. Verify that the booster battery has the same volt and cold cranking amperage specifications as the dead battery before attempting to jump start. Failure to comply may cause an explosion resulting in death, personal injury, equipment or property damage.

CAUTION

Applying a higher voltage booster battery will cause expensive damage to sensitive electronic components, such as relays, and the radio. Failure to comply may result in equipment damage.

CAUTION

Improper hook-up of jumper cables or not following these procedures can damage the alternator or cause serious damage to both vehicles.

WARNING

Heed all warnings and instructions of the jumper cable manufacturer. Failure to comply may result in death, personal injury, equipment or property damage.

1. Remove any jewelry that may come in contact with the battery terminals.
2. Select a jumper cable that is long enough to attach to both vehicles in a way that ensures neither vehicle touches each other.
3. Position the two vehicles together, but do not allow them to touch.
4. Turn OFF all lights, heater, radio, and any other accessory on both vehicles.
5. Set the parking brake (please refer to *Parking* for specific instructions on how to set the parking brake for this vehicle).
6. Shift the transmission into park position or neutral for manual transmissions.
7. If either vehicle is equipped with battery disconnects ensure they are in the OFF position prior to connecting the two vehicles.
8. Attach one end of a jumper cable to the positive (+) terminal of the discharged (dead) battery. This will have a large red + or P on the battery case, post, or clamp.
9. Attach the other end of the same cable to the positive (+) terminal of the good (booster) battery.
10. Attach the remaining jumper cable FIRST to the negative (-) terminal (black or N) of the good battery.
11. Attach the other end of the negative cable to a bare metal part not bolted to the engine block.

NOTE

Always connect positive (+) to positive (+) and negative (-) to negative (-).

12. If either vehicle is equipped with battery disconnects, ensure that they are in the ON position.
13. Start the vehicle that has the good battery first. Let it run for 5 minutes.
14. Start the vehicle that has the discharged (dead) battery.

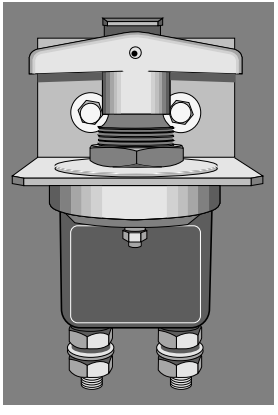
The engine should start. If the engine fails to start, do not continue to crank the starter. Instead, contact the nearest authorized dealer.

WARNING

When disconnecting jumper cables, make sure they do not get caught in any moving parts in the engine compartment. Failure to comply may result in death, personal injury, equipment or property damage.

Reverse the above procedure exactly when removing the jumper cables. With engine running, disconnect jumper cables from both vehicles in the exact reverse order, making sure to first remove the negative cable from the vehicle with the discharged battery.

Disconnect Switch



This vehicle has a disconnect switch. Ensure that your vehicle ignition has been turned off for at least 40 seconds before switching the disconnect switch to the OFF position.

CAUTION

Wait 2 minutes after key-off before disconnecting battery power. Disconnecting battery power sooner can result in damage to vehicle DEF.

Chapter 2 | EMERGENCY

2

Tilting the Cab

General

WARNING

Make sure that the filler caps of the cooling system, the hydraulic clutch and the windshield washer reservoir are tightened. Do not loosen the filler caps when the cab is tilted.

WARNING

Only tilt the cab when the engine has stopped.

WARNING

Make sure there is sufficient clearance around the cab.

WARNING

You can stop tilting the cab forward at any time by turning the valve to position ⇓.

WARNING

If the vehicle has been involved in a collision, the cab must under no circumstances be tilted without due precautions. The internal mechanism of the lifting cylinder may have been damaged to such an extent that the cylinder is no longer locked by the internal stop washer. In that case there is a danger of the cab no longer being held back and falling forward to the ground. Have your authorized Service dealer check the tilting mechanism.

WARNING

Make sure that there is no one in the cab. Also make sure there are no loose objects inside the cab; this includes objects in the refrigerator. Make sure there are no people immediately in front of the cab.

WARNING

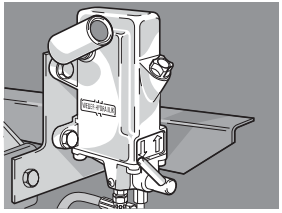
Never work under the cab if the cab has not been tilted fully forward.

NOTE

If a cooler box/refrigerator has been fitted, it should be switched off and if necessary unplugged before tilting (depending on the type). The cooler box/refrigerator should remain switched off at least 30 minutes after the cab has been tilted back.

The cab is tilted hydraulically using a hand pump. This pump is located at the co-driver's side, behind the cab. The pump has a cock which can be moved to two positions:

- position ⇑ to tilt the cab forwards.
- position ⇓ to tilt the cab backwards; this is also the driving position.



Tilting Forward

- Apply the parking brake.
- Put the gear lever in "neutral" position.
- Close the doors.
- Turn the lever fully to the right, against the spring pressure, until it is locked in position ⇑; use the jack rod.
- Operate the pump so that the cab tilts forward. The cab locking mechanism automatically releases. As soon as the cab passes its natural point of balance, the force of gravity will gradually tilt the cab further forward without additional pumping.

Tilting Back

- Turn the lever to position ⇓.
- Tilt the cab back by operating the pump with the jack rod. The last part of tilting-back is effected by the cab's own weight. When the catch engages, the cab is automatically locked.
- Leave the lever in position ⇓.
- Push the gear lever in 1st gear to lock the gearbox control.
- Put the gear lever in neutral.

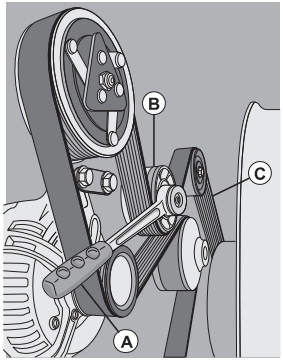
Checking the Cab Locking

When the cab is back in its normal position, the cab lock warning lamp in the master display should be extinguished.

Replacing the Poly-V Belt

Important

Always fit the same type of poly-V belt as the one being replaced.



1. Disconnect the earth lead from the battery.
2. Place a ratchet (A) with a 3/8" socket in the arm of the automatic belt tensioner (B).
3. Slacken the poly-V belt (C) (see arrow in illustration), so that it can be removed from the pulleys.
4. Carefully allow the automatic belt tensioner to spring back to the stop.
5. Push the poly-V belt between the fan and the wind tunnel collar and remove the poly-V belt.
6. Check all pulleys over which the poly-V belt runs for dirt, rust and damage.

7. Fit a new poly-V belt between the fan and wind tunnel collar. Place the poly-V belt over as many pulleys as possible.
8. Tension the automatic belt tensioner and place the poly-V belt over the remaining pulleys. Carefully allow the automatic belt tensioner to spring back against the new poly-V belt.
9. Check that the poly-V belt is in all pulley grooves.
10. Connect the earth lead to the battery.

Replacing the Fuel Line Filter

WARNING

When removing the fuel line filter, a quantity of fuel will escape. Collect the fuel and avoid the risk of fire.

Dirt in the fuel system can lead to significant damage to the fuel system.

Diesel fuel is toxic and can therefore have a damaging effect on your health.

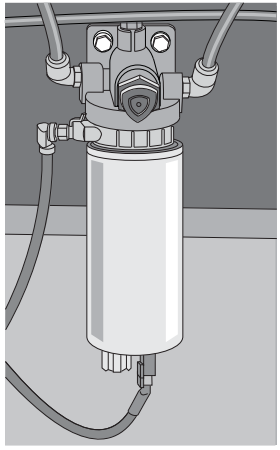
Any direct or indirect physical contact should therefore be avoided.

In the event of contact with the skin: remove with paper or a cloth, wash with soap and water. If irritation persists, consult a doctor.

If swallowed: do NOT induce vomiting. Rinse the mouth, drink two glasses of water and see a doctor.

In the event of inhalation: get some fresh air and rest.

Removing the Fuel Filter



1. Place a receptacle under the filter.
2. Remove the filter by turning it anti-clockwise.

NOTE

The fuel line filter is a disposable filter and, therefore, may not be cleaned and reused.

Fitting the Fuel Filter

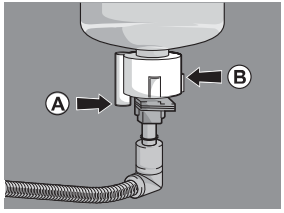
1. Lightly lubricate the sealing ring (see arrow in illustration) with clean engine oil (not diesel fuel).
2. Fit the filter unfilled until the sealing ring abuts and manually rotate it a ½ to ¾ turn further.
3. Bleed the fuel system.
4. Start the engine and check for leaks. If necessary, retighten the filter by hand.

Draining the Water Separator

WARNING

When draining the water separator, an amount of fuel will escape. Collect the fuel and avoid the risk of fire.

Water in the fuel system may lead to significant damage.

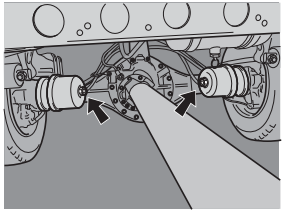


1. Place a container beneath the water separator.
2. Remove the connector.
3. Unscrew the ring-shaped drain cock (B) on the bottom of the water separator in anti-clockwise direction.
4. Drain the filter until pure diesel fuel comes out of the drain cock (A).
5. Turn the drain cock (B) if it abuts, another 1/8 - 1/4 turn.
6. Check the drain cock (B) for leakage.
7. To prevent pollution, the drained water/diesel fuel mixture should be passed to the relevant authorities for reprocessing.

Releasing the Parking Brake

WARNING

Never release the parking brake on an incline.



1. Place wheel chocks in front of and behind the wheels.
2. Turn the release bolt counter-clockwise as far as the stop using a ring spanner.
3. This operation should be carried out for each spring brake cylinder.
4. Bring the parking brake back in operating order as soon as possible

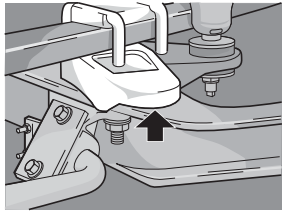
by turning the bolts clockwise as far as possible and tightening them to a torque of 70 Nm (51.6 lb-ft).

Jacking Up the Front Axle

When jacking up the front axle, the jack must be positioned under the jacking point near the shock absorber.

WARNING

Always use stands to support the chassis when carrying out repairs or service under a vehicle which is resting on a jack.



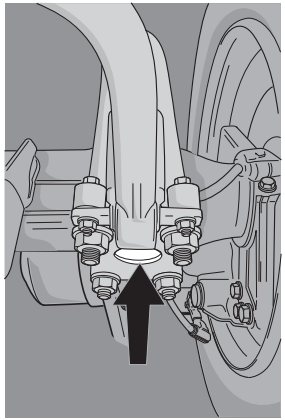
Jacking Up the Rear Axle

When jacking up the rear axle, the jack should always be positioned under the jacking point at the bottom of the spring bracket.

WARNING

Always use stands to support the chassis when carrying out repairs or service under a vehicle which is resting on a jack.

To prevent deformation of the axle housing, the jack must under no circumstances be located directly under the axle housing or the differential casing.



Changing the Wheel

NOTE

After changing a wheel/tire, the difference between the diameters of the various tires on the vehicle may have become too large (for example, as a result of differences in tread depth and/or tire pressure).

WARNING

The ABS system cannot cope with too great a difference in tire diameter and the system will automatically be disengaged. Consequently, the ABS warning symbol will be shown in the master display.

Depending on the tire types on the front and rear axle, this phenomenon may already with a worn tire that is underinflated by 2 bar. So first check the tire pressure if the warning indicator is on after a tire has been replaced.

WARNING

Hence, there will be no ABS control under extreme conditions!

This is the reason why the maximum permitted difference in tire diameter for new tires are 14%.

(This may occur when different tire sizes are fitted on the front or rear axles.)

WARNING

When removing a wheel with a cracked or damaged wheel rim, always deflate the tire (remove the tire valve) in view of possible tensions in the wheel rim.

General

- Only use the original tire wheel rims specified for the vehicle concerned.
- Make sure that tires of the same type are fitted on both sides of the axle.
- Insufficient cleaning of the mating surfaces and/or uneven tightening of the wheel nuts may cause vibrations during driving or braking.

NOTE

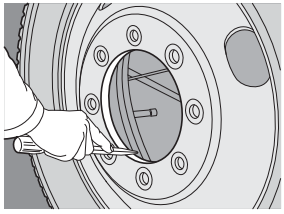
If a wheel stud is renewed, the other wheel studs on the relevant wheel must also be renewed.

Removing the Wheel

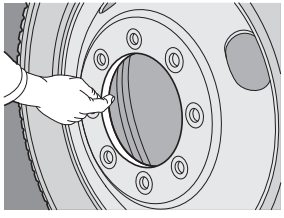
1. Chock the wheels to prevent the vehicle moving off.
2. Clean the screw thread of the wheel studs using a wire brush.
3. Oil the wheel studs sparingly.
4. Unscrew the wheel nuts.
5. Fit a jack under the jacking point at the wheel to be replaced.
6. Jack up the vehicle and place a support under the axle.
7. Remove the wheel nuts and take the wheel off the hub.

Installing the Wheel

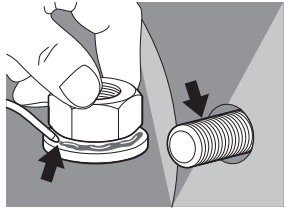
1. Clean the fitting edge of the wheel hub by scraping off dirt and corrosion with a scraper.



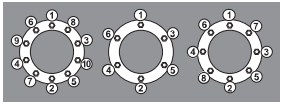
2. Apply a **thin** layer of grease to the fitting edge of the wheel hub.



3. Also apply a **thin** layer of grease to the fitting edge of the wheel rim. This grease layer should prevent the wheel rim and the wheel hub from becoming "rustbound".
4. Check whether the contact surfaces of the wheel rim and the drum brake are clean. Clean if necessary.
5. Clean the wheel nuts and then apply a drop of oil between the thrust washer and the nut.



6. Also apply a drop of oil to the first turn of the wheel-stud screw threads.
7. Fit the wheel nuts and tighten them evenly according to the sequence in the illustration. For the specified tightening torque, see *Wheel Nut Tightening torques* on page 113 .



> **NOTE**
>
> Wheel nuts should always be tightened and retightened in cold condition. However, tightening wheel studs in extreme cold should be avoided.

8. Check the tire pressure.
9. Retorque the wheel nuts after 62 miles (100 km). If new wheel studs are fitted, they need additional retorquing after 310 miles (500 km).

> **NOTE**
>
> When a wheel had to be replaced, have the wheel nuts torqued to the correct tightening torque by a dealer.

Tire Inflating Connection

Next to the brake system air dryer to the left rear of the cab there is a tire inflating connection.

1. Remove the rubber protective cap from the tire inflating connection.
2. Connect the tire inflating hose.

3. Pump up the tire. Inflate the tires while the engine is running and with maximum pressure in the air reservoirs.
4. Refit the protective rubber cap to the tire inflating connection after the tire has been inflated and store the hose.

Check as soon as possible that the tires have the correct pressure using a pressure gauge. See *Tire Pressure Table (Imperial)* on page 113 or *Tire Pressure Table (Metric)* on page 114 .

NOTE

The entire air pressure system of the vehicle can be filled with air from an outside source using the tire inflating connection. When doing this, check that the system pressure is correct using the air pressure gauge.

Towing

It is possible to install a towing eye behind the grille.

Always use a towing bar when towing. Departure from this rule is only allowed in emergencies.

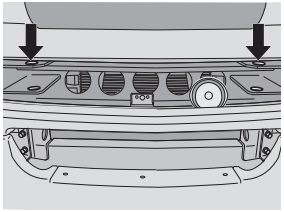
When towing, the fault message "Engine management fault" may appear in the master display when the ignition is turned on.

NOTE

The maximum permissible vehicle speed, weight, and distance vary per country.

WARNING

Do not tow the vehicle when fully loaded or with a drawn vehicle attached.



Being Towed by Another Vehicle

WARNING

When the engine is not running, there is no power steering and no air is supplied to the braking system. If the service brake is applied or in the case of air leakage, the parking brake might be applied.

WARNING

The towed vehicle can be located asymmetrically (left or right) behind the tractor. Towing may not take place at an angle larger than 20° with the vehicle centerline.

Keep in mind the following tips when being towed by another vehicle:

- To clear the towing eyes, the black grid must be removed from the lower grille by turning the attachment screws a quarter turn.
- Always fix the tow rod with its original attachment pin (part of the vehicle tool kit) in the towing eyes.

- Turn the ignition key so that the steering wheel is released (unless the vehicle is in a hoist, see below).
- To prevent damage to the gearbox, the propeller shaft must always be disconnected from the differential.
- If there is insufficient pressure in the air reservoirs, release the parking brake. See *Releasing the Parking Brake* on page 21

If the differential is damaged:

- Hoist the vehicle at the rear and **lock the steering wheel in the straight-ahead position.**

Tow Starting

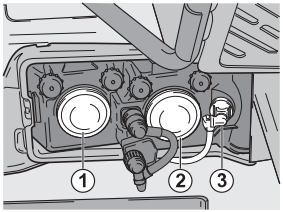
If the vehicle has to be towed, the ignition key must first be turned clockwise to position D of the starter/ignition switch (ignition on).

Long-Distance Towing

If the vehicle is to be moved over a larger distance, this must be done by a recovery vehicle that lifts the vehicle to be towed under its front axle.

Replacing Bulbs

- Do not touch the glass of the halogen lamps with bare fingers. If necessary, this glass can be cleaned with a cloth, which has been dampened with industrial alcohol (methylated spirits).
- When fitting a new bulb, make sure that the lugs on the bulb holder engage in the slots of the reflector.



Dipped Beam

1. Tilt the cab forwards.
2. Detach the rubber cover (2) from the rear of the headlamp unit.
3. Detach the spring clamp and pull the bulb away from the reflector.
4. Detach the double plug from the rear of the bulb.

Parking Light

1. Tilt the cab forwards.
2. Detach the rubber cover (2) from the rear of the headlamp unit.
3. Pull the holder of the parking light from the headlamp unit.
4. Pull the bulb out of the bulb holder.

Main Beam

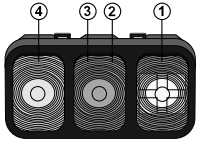
1. Tilt the cab forwards.
2. Detach the rubber cover (1) from the rear of the headlamp unit.
3. Detach the spring clamp and pull the bulb away from the reflector.
4. Detach the spring clamp and pull the bulb away from the reflector.

Direction Indicator

1. Tilt the cab forwards.
2. Detach the plug from the rear of the bulb holder (3).
3. Screw the bulb holder anti-clockwise out of the headlamp unit.
4. Pull the bulb carefully out of the bulb holder.

Rear Lights

1. Unscrew the four Philips screws and remove the lens cap.

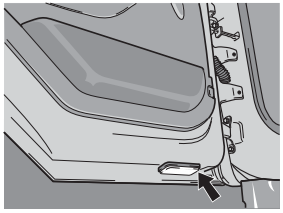


1. Reversing light
2. Stop light
3. Rear light
4. Direction indicator

Direction Indicators

1. Detach the plug on the inside bumper end cap/step molding.
2. Remove the two screws and detach the lamp unit of the direction indicator.
3. Unscrew the bulb holder anti-clockwise out of the indicator lamp unit.
4. Pull the bulb carefully out of the bulb holder.

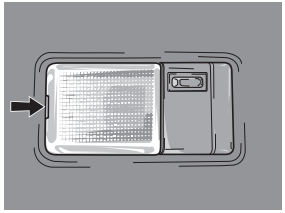
Stepwell Lighting



1. Remove the stepwell lighting housing from the bottom of the door by inserting a screwdriver in the notch.
2. If necessary, remove the plug.
3. Unscrew the bulb holder anti-clockwise out of the stepwell lighting housing.
4. Pull the bulb carefully out of the bulb holder.

Roof Light

The transparent covers of the roof lights have a slot allowing the lens to be tilted out of the housing using a screwdriver.



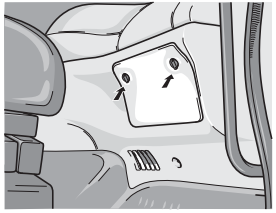
1. Remove the transparent cover of the roof light carefully from the roof upholstery.
2. Pull the bulb carefully out of the bulb holder.

Fuses

WARNING

To prevent overload and the risk of fire you must NEVER replace a burnt-out fuse with a fuse with a higher rating than specified. If a specific fuse repeatedly blows, this means there is a fault in the circuit, which MUST be inspected and remedied. NEVER replace or remove a fuse if

- the contact is on.
- the engine is running.
- it is passing an electrical load.



The fuses are behind a cover in the dashboard on the co-driver's side. Attached to the inside of the cover is a sticker with an overview of the fuses. For replacing fuses there is a special fuse clamp on the fuse board. Each fuse is color-coded to show the rating:

Orange	5 A
Red	10 A
Blue	15 A
Yellow	20 A
Transparent	25 A
Green	30 A

List of Fuses

E004	Fuse, driver's side dipped beam
E005	Fuse, co-driver's side dipped beam
E006	Fuse, driver's side main beam
E013	Fuse, stop lights
E016	Fuse, reversing lights and cross-axle lock control
E018	Fuse, G.O reverse lams
E019	Fuse, horn
E025	Fuse, wiper wash
E026	Fuse, cigar lighter/door switches/electronic unit, converter 24/12 V with power supply for radio memory
E027	Fuse, converter 24/12
E028	Fuse, interior lighting/door locking
E031	Fuse, heater and air conditioner
E035	Fuse, ECU engine ignition
E039	Fuse, seat heating
E044	Fuse, mirror heating/electrical mirror adjustment/electrical window operation/sun roof
E051	(unused)

E052	Fuse, body light
E053	Fuse, diagnostic connector/ ECAS
E058	(unused)
E062	Fuse, ECAS remote
E091	Fuse, Mechanical clutch/air Orer
E108	Fuse, VIC
E114	Fuse, cab heater
E142	Fuse, accessories unswitched power
E143	Fuse, option / various / ABS
E144	Fuse, automatic gearbox AGC
E145	Fuse, gear box
E153	(unused)
E156	Fuse, accessories
E160	Fuse, engine ECU
E163	(unused)
E164	Fuse, fuel heater
E165	Fuse, fuel heater FPH-E, switched power
E190	Fuse, ABS-E / ASR
E198	Fuse, door lock
E277	Fuse, VIC
E279	(unused)
E280	Fuse, VIC
E283	Fuse, side lights
E284	Width marker light
E285	Fuse, fog lights switch
E286	(unused)
E290	Fuse, customer adaption cab
E297	Fuse, airbag and seat belt tensioner system
E299	(unused)
E310	Fuse, instrument panel, DIP-4
E330	(unused)
E349	(unused)
E350	Fuse, remote bat ISO
E354	(unused)
E357	Fuse, dosing unit
E390	Fuse, body builder module
E409	Fuse, dosing module
E434	Fuse, Nox unit

Chapter 3 | CONTROLS

Entering and Leaving the Vehicle

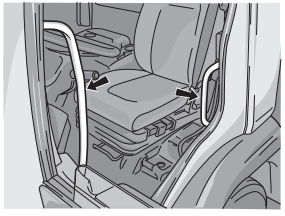
WARNING

Always reinstall steps before entering the cab or accessing the deck plate. Without steps you could slip and fall. Be careful whenever you get into or out of your vehicle's cab. Always maintain at least three points of contact with your hands on the grab handles and your feet on the steps. Failure to comply may result in personal injury or death.

WARNING

Jumping out of the cab or getting into the cab without proper caution is dangerous. You could slip and fall, which could lead to personal injury or death. Keep steps clean. Clean any fuel, oil, or grease off of the steps before entering the cab. Use the steps and grab handles provided, and always keep at least three points of contact between your hands and feet and the truck. Look where you are going.

The picture shows the best way to enter and exit a Cab-Over Engine Cab.



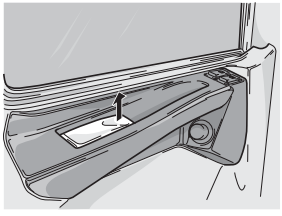
Doors

WARNING

To help lessen the chance and/or severity of death or personal injury in case of an accident, always lock the doors while driving. Along with using the lap shoulder belts properly, locking the doors helps prevent doors from inadvertently opening and occupants from being ejected from the vehicle.

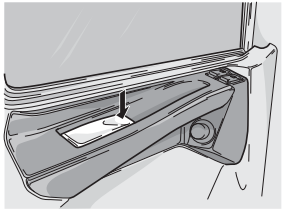
Opening the Door

Pull the handle to open the door from the inside.



Locking the Door from the Inside

Press the door handle downwards.



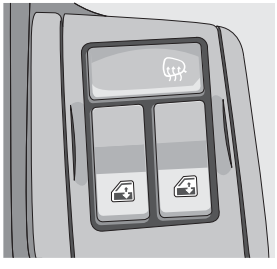
Standard Version

Both doors can be locked and unlocked from the outside using the key.

Electrically Operated Windows

The switches only work when the ignition is switched on.

The driver's and co-driver's windows can be opened and closed with the switches in the driver's door. The switch in the co-driver's door can only open and close the co-driver's window.



Heated Mirrors

With the switch for mirror/windscreen heating, the exterior mirrors (excluding curb mirror) and the windscreen heating, if fitted, can be heated. When you press the switch again, the mirror heating is switched off and the windshield heating remains active for about 12 minutes. If you press the switch again within 12 minutes, the windscreen heating is switched off and the mirror heating is switched on again. Operate the switch once more to switch everything off.

Mirrors

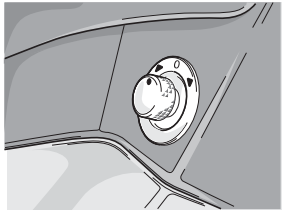
The mirror housing and mounting bracket is fixed to the cab. Only the face of the mirror is adjustable within the mirror housing.

The mirror bracket can be folded back against the cab and will return to its original position once the bracket is swung out again.

All models have Flat glass mirror.

Electrical Mirror Adjustment

The electric mirrors can be adjusted by means of the switch in the driver's door.



1. Select the right or left mirror by turning the button either to the right or left position.
2. Move the switch forwards, backwards, left or right, to adjust the mirror.

Windshield Wiper Blades

To prevent damage to the wiper blades during operation in winter conditions, always check that the blades are not frozen to the windshield. This can be prevented by placing something between wiper blades and windshield. Switch off the windshield wipers before turning off the ignition.

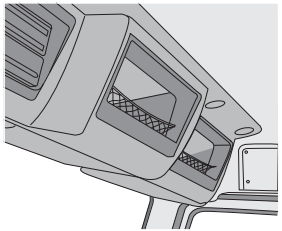
WARNING

Clean blades regularly with a damp cloth to remove road film and wax build-up. Do not drive with worn or dirty wiper blades. They can reduce visibility, making driving hazardous which may lead to an injury accident resulting in personal injury or death.

Roof Console

WARNING

Overhead compartments are not intended for personnel use or for items exceeding their designed weight limits. Exceeding the weight limits may cause the shelf to collapse and or items may fall out in a sudden stop which may lead to personal injury or death.

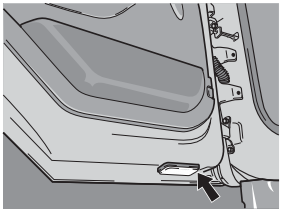


Sun Visors

As a protection against sun glare, the sun visors can be folded down. The sun visor on the driver's side can also serve as a side window shade.

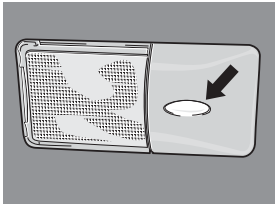
Stepwell Lighting

In both doors, a lamp is fitted at the bottom to light the stepwell. This will light up as soon as the door is opened.

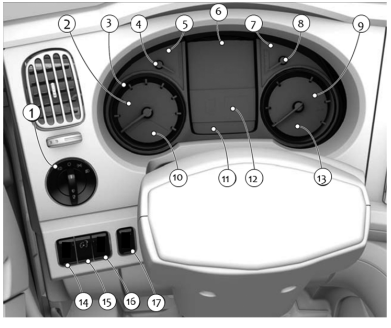


Interior Lighting

The interior lighting operates independently of the position of the contact key. The interior light comes on when the door is opened. When the doors are open for more than 15 minutes, the interior lamps will be extinguished. The lamp stays lit by operating the switch on the lamp.



Dashboard



1. Light switch
2. Instrument panel
3. Speedometer
4. Fuel level and DEF level gauges
5. Warning indicators
6. Master display
7. Warning indicators
8. Air pressure gauge
9. Tachometer
10. Speedometer display
11. Clock, outside temperature and trip odometer display
12. Warning indicators
13. Tachometer display
14. N/A
15. Dimmed instrument lighting
16. N/A
17. N/A

1. Light switch

The switch is a rotary switch with a spring-loaded position and three static positions.

Position 0: Lighting switched off.

Position 1: Parking lights on.

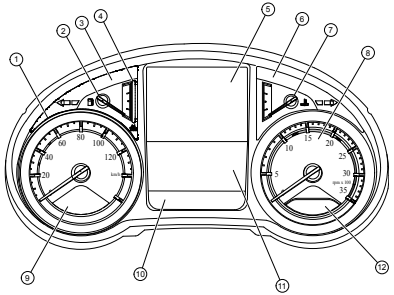
Position 2: Headlights, parking lights on.

Front fog lights

Pull out the light switch one step to switch on the front fog lights. (The light switch must be in position 1 or 2 to activate.)

When the front fog lights are on, the warning indicator on the instrument panel is visible.

2. Instrument panel



1. Speedometer
2. Fuel gauge
3. Warning indicator
4. DEF gauge
5. Master display
6. Warning indicator
7. Coolant temperature gauge
8. Tachometer
9. Speedometer display
10. Outside temperature and clock.
11. Warning indicator
12. Tachometer display

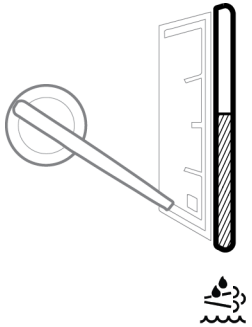
3. Speedometer

This vehicle's speedometer is equipped with double scale divisions. Either major divisions in mph and minor divisions in kph or major divisions in kph and minor divisions in mph.

4. Fuel Level and Def Level Gauges

The Fuel gauge indicates the total (approximate) amount of fuel in the fuel tank. In addition to indicating empty and full, the gauge(s) also indicate the fuel level in graduated increments. When the fuel level for the tank is below 1/4 full, a red warning lamp in the gauge will come on.

Diesel Exhaust Fluid (DEF) Gauge



The diesel exhaust fluid gauge shows the approximate amount of DEF fluid in the DEF tank.

CAUTION

Use Diesel Exhaust Fluid only. Failure to do so may damage components of the Diesel Particulate Filter (DPF).

DEF level is indicated by a vertical blue bar that is next to the indicator. DEF fluid is required to meet certain emission requirements. Do not allow your DEF tank to remain empty. Please refer to your

emission supplemental manual for more details about DEF fluid.

5. Warning Indicators

Indicators for functions that are switched on or off.

6. Master Display

See the chapter *Master Display* on page 59 .

7. Warning Indicators

Indicators for functions that are switched on or off.

8. Air Pressure Gauge

The air pressure gauge indicates the air pressure in the reservoirs of one of the service brake circuits. If the pressure in one of the circuits drops below 65 psi (448.15 kPa), an audible alarm is generated and the warning symbol "Air system pressure too low" will illuminate in the master display. When the pressure is higher than 66.5 psi (458.5 kPa), the brakes can be released with the parking brake lever. The audible alarm and warning symbol are only generated when the ignition key is on. The gauge also operates when the ignition key is off.

The vehicle must not be driven when the audible alarm sounds or when the pressure in one of the circuits is lower than approx. 65 psi (448.15 kPa).

> **NOTE**
>
> The air pressure warning will be activated when primary or secondary air systems drops below 65 psi.

9. Tachometer

- Green area: economical.
- Blue area: only permitted when driving downhill and for optimal use of the engine brake.
- Red area: not permitted.

10. Speedometer Display

When the steering wheel switches are used to activate cruise control or to alter the settings, this is visible on the master display. After three seconds the settings disappear on the master display, but they remain visible in the speedometer display.

11. Clock, outside temperature and trip odometer display

The display is activated when the ignition is switched on.

The clock is shown in the top left-hand section of the display.

The outside temperature is displayed in the bottom left-hand section.

12. Warning Indicators

Indicators for functions that are switched on or off.

13. Tachometer Display

Selected gearbox functions are visible in the tachometer display.

14. N/A

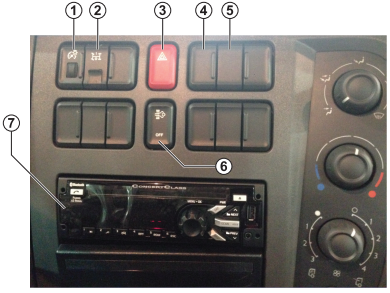
15. Dimmed instrument lighting

Press the switch to dim all instrument lighting to prevent the obstructive reflection of light from the windows at night.

16. N/A

17. N/A

Control Panel



1. Instrument lighting dimmer
2. PTO switch
3. Hazard lights
4. Air suspension dump switch (option)
5. Differential lock switch (option)
6. Diesel particulate filter (DPF)
7. Basic radio and storage

1. Instrument lighting dimmer

When the ignition is switched on, the instrument lighting and the radio display illumination lights up.

2. PTO switch

PTO can be an engine PTO or a gearbox PTO. Use this switch to activate or deactivate PTO 1.

3. Hazard warning lights

When this switch is pressed, all the direction indicator lights flash simultaneously. The hazard warning lights are switched off by depressing the switch again. The warning light in the switch indicated that the hazard warning is switched on.

4. Air suspension switch

Activate air suspension.

5. Differential Lock

Activate differential lock.

6. Diesel particulate filter (DPF)

The DPF switch is a two position switch that can either initiate a parked DPF regeneration (up) or prevent an automatic DPF regeneration (down).

3

Control Panel of Heating/ Ventilation System

1. Air distribution
2. Temperature adjustment
3. Fan speed selector switch in fresh air or re-circulation position
4. Air conditioning

1. Air Distribution

See *Air Distribution Selector Switch* on page 42

2. Temperature Control

See *Temperature Adjustment* on page 42

3. Fan Speed

See *Fresh Air Position or Re-Circulation Position* on page 41

4. Air Conditioning

See *Air Conditioning Switch* on page 40

Air Conditioning Switch

The cab air can be heated, cooled or dehumidified using the air conditioning unit.

The air conditioning unit only functions if:

- the engine is running.
- the fan is running.

Use of the Air Conditioning

1. When the air conditioning is in use, the windows must remain closed.
2. To reduce the temperature quickly, first use maximum air speed. Later, the air speed can be reduced.
3. Avoid direct cold draught on your body.
4. Make sure that the temperature difference between the inside and outside of the cab does not exceed 40°F (5°C) when you leave the cab. You are therefore advised to switch off the air conditioning towards the end of your journey.
5. Air conditioning consumes extra power and increases the fuel consumption.
6. On extreme angles (slopes, ruts and difficult terrain) switch off the air conditioning, to protect the compressor pump against unlubricated operation.
7. Regularly (once a month) switch on the air conditioning briefly, even if cooling is not required (e.g. in winter). This will help prevent serious damage to the system (including compressor blockage).

Cooling

1. Switch the air conditioning on.
2. Switch the recirculation to position 1, 2 or 3.
3. Turn the temperature control switch to the desired position. For maximum cooling set the knob to the far left position in the blue area.
4. Open the side and center vents.

While heating, it is possible to use the air conditioning to remove moisture from the air in the cab. This has the advantage that demisting of the window glass will be quicker.

Dehumidification

1. Switch the air conditioning on.
2. Turn the Fan Speed Switch to the Fresh Air setting.
3. Open the vents on the center console and side windows and set them as desired.
4. Control the temperature as desired.
5. Adjust the volume of air using the fan speed selector switch.

NOTE

The air conditioning system is switched off when the engine coolant temperature becomes too high. This will protect the engine.

WARNING

Excessive heat may cause the pressurized components of the air conditioning system to explode. Never weld, solder, steam clean, or use a blow torch near any part of the air conditioning system. Failure to comply may result in personal injury, death, equipment or property damage.

WARNING

Air conditioning refrigerant can be hazardous to your health. Do not expose yourself to leaking refrigerant for prolonged periods near excessive heat, open flames, or without proper ventilation. Failure to do so may result in death or personal injury.

NOTE

If the air conditioning system fails to work properly, it must be repaired by qualified personnel as soon as possible, to avoid further damage to the system.

Fan Speed Selector Switch

Fresh Air Position or Re-Circulation Position

The fan has two speeds: one applies to recirculation the other to fresh air. The recirculation position is suited to quickly de-mist or cool the cab with the air

conditioning, quickly heat the cab, de-frost the windows with the heater and keep out undesirable odors.

> **NOTE**
>
> You are advised to switch on the re-circulation without air conditioning for short periods only to prevent the air quality inside the cab from degrading and moisture from increasing.

- Fan speeds with fresh outside air ventilation valve open.

- Fan speeds with re-circulation valve closed, hardly any supply of fresh outside air.

Temperature Adjustment

The supply of heat can be smoothly set from 0% (blue) to 100% (red).

To achieve faster heating when the temperature outside is low, switch on the recirculation. In damp weather conditions it is recommended to reopen the recirculation flap after heating to prevent the windows from misting.

Air Distribution Selector Switch

- Dashboard

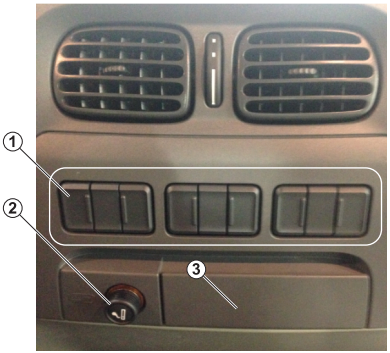
- Dashboard vents and footwell

- Footwell vent

- Footwell and windshield vents

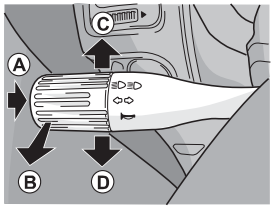
- Defrost

Center Console



1. Automatic Traction Control
2. Cigar lighter 12V
3. Ashtray

Left-Hand Steering Column Switch



A. Horn
B. Main beam
C. Direction indicator, right
D. Direction indicator, left

A. Horn

The horn is operated with button A.

B. Main Beam

Position B: The main beam is activated when the lights are on. The main beam indicator on the instrument panel will also light up. To switch off the main beam, the switch must be turned back through the "click" position towards the steering wheel. If the lights are off, or if the switch has not been pushed through the "click" position, it can be used to give signals.

C. Direction Indicator, Right

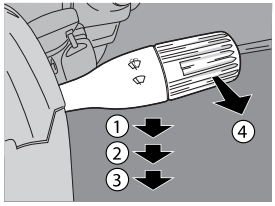
Position C: Right turn signal: on the instrument panel, the right direction indicator will flash and there will also be an audible signal. To briefly operate the direction indicators (changing lanes, etc.), the switch can be pushed slightly against the spring pressure. It will spring back when released.

D. Direction Indicator, Left

Position D: Left turn signal: on the instrument panel, the left direction indicator will flash and there will also be an audible signal. To briefly operate the direction indicators (changing lanes, etc.), the switch can be pushed slightly against the spring pressure. It will spring back when released.

Right-Hand Steering Column Switch

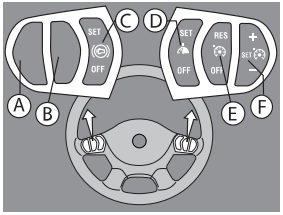
The right-hand steering column switch has the following functions:



1. Position 1: Intermittent wipe.
2. Position 2: Wipe speed (low).
3. Position 3: Wipe speed (high).
4. Position 4: Wipe/wash.

Steering Wheel Switches

Depending on the vehicle version, the steering wheel either has or does not have steering wheel switches.



Left-hand switches

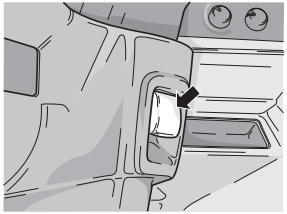
- A - (unused)
- B - (unused)
- C - engine brake

Right-hand switches

- D - Variable speed limiter
- E - Cruise control, resume, off
- F - Cruise control setting/engine speed control

Adjustable Steering Column

The position of the steering column is adjustable. To adjust, pull the handle towards you and simultaneously move the steering column to the desired position. The steering column is locked by releasing the handle. A pneumatically adjustable steering column is available as an option.



WARNING

Make all adjustments to the steering mechanism while the vehicle is stopped. Adjusting the Tilt Steering Wheel while the vehicle is in motion could cause loss of control. You wouldn't be able to steer properly and could have an accident resulting in personal injury or death.

Seats

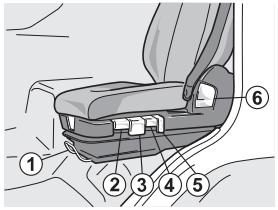
Important Points

WARNING

Make all adjustments to the steering mechanism while the vehicle is stopped. Adjusting the Tilt Steering Wheel while the vehicle is in motion could cause loss of control. You wouldn't be able to steer properly and could have an accident resulting in death or personal injury.

- You must read this section thoroughly and acquaint yourself with the seat controls.
- The vehicle air pressure must be a minimum of 100 psi (7 bar).
- Never operate several controls at once.
- The armrest should be folded away before entering/leaving the vehicle.
- The co-driver's seat is not suitable for a child's seat.
- The seat and its component parts must be checked for wear from time to time.
- The seat may only be repaired by trained personnel.

Driver's Seat



Operation:

1. Seat fore/aft adjustment
2. Shock absorber setting: The suspension characteristics of the seat (in terms of comfort) can be optimized by means of the infinitely adjustable shock absorber (from "hard" to "soft") for each driving situation.
    - Position switch up: minimum damping ("soft" comfort)
    - Position switch down: maximum damping ("hard" comfort)

NOTE

The shock absorber must always be set tight enough to withstand conditions on a poor road surface.

3. Seat squab angle adjustment
4. Seat height adjustment
5. Entry/exit aid
    - Knob down (seat in driving position): seat drops to its lowest position (= entry/exit aid)
    - Knob up (with lowered seat): seat returns to the last set height
6. Backrest angle adjustment.

Seat Belts

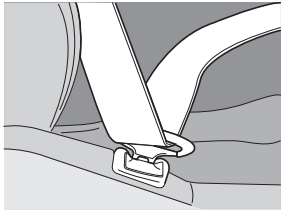
Safety Restraint System - Inspection

The seat belt system, including webbing, buckles, latches, and mounting hardware,

endures heavy use in heavy-duty vehicles, much more than seat belt systems in passenger cars. All users should be aware of the factors contributing to this heavy use and reduced belt life.

WARNING

Failure to properly inspect and maintain restraint systems can lead to injury or loss of life. Without periodic inspection and maintenance to detect unsafe conditions, seat restraint components can wear out or not protect you in an accident.



Factors contributing to reduced seat belt life:

- High mileage heavy trucks, often accumulate mileage in excess of 500,000 total miles (800,000 km) during the vehicle lifetime. This is much greater than a typical passenger car, which frequently will not exceed 125,000 total miles (200,000 km).
- Seat and cab movement in trucks, there is almost constant movement of the belt due to ride characteristics and seat design. The constant movement of the belt inside the restraint hardware and the potential for the belt to come in contact with the cab and other vehicle parts, contributes to the wear of the entire system.
- Environmental conditions, such as dirt and ultraviolet rays from the sun, will reduce the life of the seat belt system.

Due to these factors, the three-point safety belt system installed in your vehicle requires thorough inspection every 20,000 miles (32,000 km). If the vehicle is exposed to severe environmental or working conditions, more frequent inspections may be necessary. Any seat belt system that shows cuts, fraying, extreme or unusual wear, significant discoloration due to UV (ultraviolet) exposure, abrasion to the seat belt webbing, or damage to the buckle, latch plate, retractor hardware or any other obvious problem should be replaced immediately, regardless of mileage.

WARNING

It is important to remember that any time a vehicle is involved in an accident, the entire seat belt system must be replaced. Unexposed damage caused by the stress of an accident could prevent the system from functioning properly the next time it is needed. Failure to comply may result in personal injury or death.

Inspection Guidelines

Follow these guidelines when inspecting for cuts, fraying, extreme or unusual wear of the webbing, and damage to the buckle, retractor, hardware, or other factors. Damage to these areas indicates that belt system replacement is necessary.

WARNING

Replace the entire belt system (retractor and buckle side) if replacement of any one part is necessary. Unexposed damage to one or more components could prevent the system from functioning properly the next time it is needed. Failure to comply may result in personal injury or death.

1. Check the web wear in the system. The webbing must be closely examined to determine if it is coming into contact with any sharp or rough surfaces on the seat or other parts of the cab interior. These areas are typical places where the web will experience cutting or abrasion. Cuts, fraying, or excessive wear would indicate the need for replacement of the seat belt system.
2. The pillar web guide (D-loop) is the area where almost constant movement of the seat belt webbing occurs because of relative movement between the seat and cab.
3. Check the Comfort Clip for cracks or possible damage and check for proper operation.
4. Check buckle and latch for proper operation and to determine if latch plate is worn, deformed, or damaged.
5. Inspect the retractor web storage device, which is mounted on the floor of the vehicle, for damage. The retractor is the heart of the occupant restraint system and can often be damaged if abused, even unintentionally. Check operation to ensure that it is not locked up and that it spools out and retracts webbing properly.
6. If tethers are used, be sure they are properly attached to the seat and, if adjustable, that they are adjusted in accordance with installation instructions. Tethers must also be inspected for web wear and proper tightness of mounting hardware.
7. Mounting hardware should be evaluated for corrosion, and for tightness of bolts and nuts.
8. Check web in areas exposed to ultraviolet rays from the sun. If the color of the web in these areas is gray to light brown, the physical strength of the web may have deteriorated due to exposure to the sun's ultraviolet rays. Replace the system.

Seat Belt Inspection Points

1. Web cut or frayed or extremely worn at latch area.
2. Web cut or frayed at D-loop web guide.
3. Comfort Clip cracked or damaged.
4. Buckle casting broken.
5. Retractor Web Storage for damage. (located behind trim panel)
6. Tethers for web wear and proper tightness of mounting hardware.
7. Mounting hardware for corrosion, proper tightness of bolts and nuts.
8. Web for deterioration, due to exposure to the sun.

WARNING

Failure to adjust tether belts properly can cause excessive movement of the seat in an accident. Tether belts should be adjusted so that they are taut when the seat is in its most upward and forward position. Failure to comply may result in personal injury or death. Once the need for replacement of the seat belt has been determined, be certain it is only replaced with an authorized PACCAR Parts replacement seat belt. If the inspection indicates that any part of the seat belt system requires replacement, the entire system must be replaced. An installation guide is attached to every replacement belt. Utilize the proper guide for your type of seat, and follow the instructions very closely. It is vitally important that all components be reinstalled in the same position as the original components that were removed and that the fasteners are torqued to specification. This will maintain the design integrity of the mounting points for the seat belt assembly. Contact your dealer if you have any questions concerning seat belt replacement.

Wearing Seat Belts

- The belt must be tight against the body and not distorted.
- With a three-point type belt, the shoulder section must be across center of the shoulder, not against the neck. The pelvis section should be as low as possible across the pelvis, not across the abdomen.
- Do not put any hard, sharp or fragile objects such as pens, glasses or phones between your body and the seat belt.

Checking the Seat Belts

- Give a short pull on the seat-belt to test the locking mechanism.
- Repeat this check regularly, for example when putting on the seat belt, in order to check the mechanism.

During this test, the belt must lock. This means that it must not be possible to pull the seat belt out of the retracting unit after locking.

The locking mechanism should be immediately replaced and/or repaired if it is defective.

- Inspect the belts regularly for wear. Have the complete assembly replaced at once if the belt is worn or damaged.

Master Display

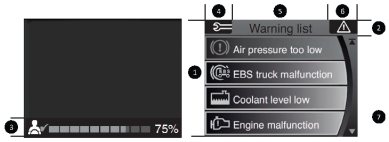
General

The master display is part of the Vehicle Intelligence Centre (VIC-3). The master display consists of two different fields: an indication bar and an interactive and dialogue area.

In the interactive and dialogue area, messages can be displayed to show warnings and information regarding the function and operation of the various systems. These messages are displayed as pop-up screens.

In addition, the system contains a Menu Control Switch (MCS).

Layout of Master Display



1. Interactive and dialogue area.
2. Indication bar.
3. Driver Performance Assistant (DPA) status bar.
4. Symbols of selected menu. See section *Menu Overview* on page 52 .
5. Menu title. If selected via the Menu Control Switch (MCS) or the Steering Wheel Switches (SWS).
6. Warning Indicators. See section *Warning Indicators on Master Display*.
7. Scroll function available.

Depending on the displayed information, the background color of the screen is:

- **Red (danger).**

These messages show information that requires immediate actions by the driver and they cannot be suppressed.

- **Yellow (warning).**

These messages show information that requires action as soon as possible and they can be suppressed.

- **Blue (settings).**

These messages show information about settings and the values of these settings.

- **Grey (information).**

These messages show information about the status (engaged or disengaged) of systems.

- **Green (Driver Performance Assistant).**

These messages show information about the driver performance.

Start-Up Phase

If the ignition has been switched on and the engine is not yet running, the start –up screen is shown in the master display.

On the start –up, the logo appears in the master display and the following warning indicators on the instrument panel light up:

- MIL (yellow)
- Retarder (green)
- Park brake (red)
- Low brake performance (red)
- Truck EBS (yellow)
- Airbag (yellow)

Approximately 3 seconds after switching on the ignition, all warning indicators disappear except the park brake warning and those indicating a malfunction. At the same time, the Driver Performance Assistant (DPA) status bar appears in the master display.

About 2.5 seconds after starting the engine, if faults are present, the system warnings start popping-up. The red pop-ups appear first, followed by the yellow popups. With the pop-up screens the 'general warning' indicators and an acoustic signal are activated.

After all the pop-ups have been displayed, the master display automatically switches to the warning list in the service info menu.

If there are red as well as yellow pop-ups, a red hazard warning triangle is displayed in the top right-hand corner of the master display.

NOTE

When there are more warnings than fit the display, this is indicated by arrows on the right side of the display. The warnings are displayed in order of priority. This means the most important warning is displayed first.

Turning the Menu Control Switch (MCS) brings up the hidden ones, An arrow with a line attached to it indicated the beginning or end of the list.

NOTE

A red warning cannot be removed from the screen when the engines is running.

The red warning can be suppressed by pressing the Menu Control Switch when the engine is not running. This allows selection of other menu options.

The Warning always reappears after returning to the main screen.

A continuous acoustic signal accompanies a red warning.

NOTE

Yellow warning can be suppressed at any time.

A pulsating acoustic signal accompanies a yellow warning and sounds four times.

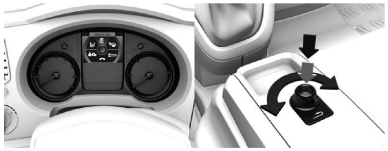
The red hazard warning triangle in the top right hand corner of the master display remains active at all times.

NOTE

If the safety belt or safety belts are not fastened after the engines has been started, the red warning indicator "Seat belt" comes on for 6 seconds and then disappears.

> **NOTE**
>
> The vehicle is equipped with a park brake warning system. If the driver's door is opened while the engine has been switched off and the park brake has not been applied, an acoustic signal is given and a warning symbol is show on the instrument panel.

Menu Control Switch (MCS)



By pressing the Menu Control Switch (MCS) from a black screen, the main menu is opened.

Turn the MCS to switch between options in the main menu.

By pressing the MCS, the selected option is entered and sub menu 1 appears. See section *Menu Overview* on page 52 .

Turn the MCS to browse through the options in sub menu 1.

By pressing the MCS, the option is entered. Depending on the selected option, either sub menu 2 or the information and settings screen appears.

If a second sub menu is present, the information and settings screens are opened by entering one of the displayed options. See section *Menu Overview* on page 52 .

Scroll through the various options in the information screens by turning the MCS.

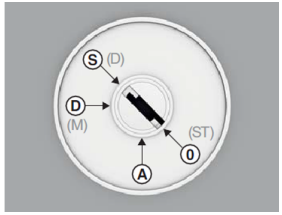
Change the values in the settings screens by turning the MCS.

Select an option or confirm a value by pushing the MCS.

Use the 'Exit' key under the MCS to go back in the menus.

A short press to go back to the main menu and a long press to close the menu.

> **NOTE**
>
> With the ignition key in the accessory position (A) only a limited number of functions are active on the main menu.



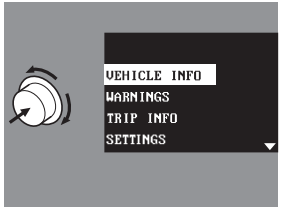
Menu Selector Switch

By pressing the menu selector switch, the main menu will be selected and the selector bar will become visible.

Turning the menu selector switch will switch between screens in the main menu. The triangle on the right-hand side of the display shows the direction in which you can proceed.

By pressing the menu selector switch, the function/information chosen will be

selected, after which sub-menu 1 will appear, if present. If there is no sub-menu 1, the menu function will be turned off.



By turning the menu selector switch you will browse through sub-menu 1.

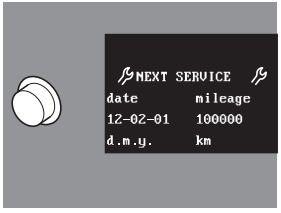
The triangle on the right-hand side of the display shows the direction in which you can proceed.

By pressing in the menu selector switch, the function/information chosen will be selected, after which sub-menu 2 will appear, if present. If there is no sub-menu 2, the menu function will be switched off.

By turning the menu selector switch, sub-menu 2 can be accessed.

The triangle on the right-hand side of the display shows the direction in which you can proceed.

By pressing the menu selector switch, the menu function will be switched off.



Menu Overview

NOTE

To go back to the main menu, briefly press the ‘Exit’ key under the Menu Control Switch. Hold down the ‘Exit’ key for 2 seconds to the exit menu.

Main menu NEW	Sub-menu 1	Sub-menu 2	Information & settings
Vehicle information 	Air supply		Actual air pressure circuit 1 Actual air pressure circuit 2
	Soot filter information	Soot filter	Actual soot level DPF filter Status DPF switch Duration indication of regeneration process
		Safety instructions	Instructions on how to start a regeneration safely

Main menu NEW	Sub-menu 1	Sub-menu 2	Information & settings
Driving support 	Economic driving	Eco performance	Total Anticipation Efficient war Average fuel
		Fuel consumption	Current fuel consumption Recent 15 minutes Average fuel Distance
		Eco settings	Fuel target Reset Eco driving Coaching
		Tips & tricks	Various information accessible by selecting the icon on the picture using the Menu Control Switch (MCS). Opening the information by pushing the MCS.
	Power Take Off (PTO)		Total hours PTO-1 Total hours PTO-2 Fuel consumption PTO

Main menu NEW	Sub-menu 1	Sub-menu 2	Information & settings
Service information 	Warning list		All activate warnings
	Next service		Date Mileage
	VIN number (Vehicle Identification Number)		
	Total fuel		The total amount of fuel used since the vehicle went into service.

Main menu NEW	Sub-menu 1	Sub-menu 2	Information & settings
Settings 	Alarm & clock		Alarm on/off Set alarm time Dip active time (local, home) Clock settings (12h, 24h)
	Language		List of available languages
	Units		Temperature (F, C) Distance (miles, km) Fuel consumption (gallons/62 mile, l/100 km, km/l) Pressure (bar, psi)
	Dim Settings		Coupling the dashboards lights dim function with the reverse gear.
	Speed control		Coupling cruise control with downhill speed control

Main menu NEW	Sub-menu 1	Sub-menu 2	Information & settings
Trip information 	Trip 1		Distance Time Average speed Total fuel consumption Average fuel consumption Reset
	Trip 2		Distance Time Average speed Total fuel consumption Average fuel consumption Reset

System Warnings

General

System warnings are displayed in a pop-up text screen followed by a post-warning indicator.

This post-warning indicator is identical to the information screen selected using the Menu Control Switch (MCS).

Serious Fault

A red warning pop-up is activated on the master display when there is a serious fault.

When a red warning pop-up is activated, it displays:

- A red hazard warning triangle.
- A text explaining the fault.
- The corresponding icon or the word ‘STOP’.

NOTE

The word ‘STOP’ appears when the park brake is not activated.

In this situation the vehicle can move.

The icon appears when the park brake is activated. Therefore the vehicle is stationary.

A red warning pop-up can only be suppressed for the period it takes to look for additional information in the master display menu.

At the same time an acoustic signal is activated.

CAUTION

If the red warning pop-up appears and/or the buzzer is audible while driving, there is a serious fault. Depending on the type of fault, it can result in serious damage to the vehicle. The vehicle may behave differently from normal.

- Stop the vehicle immediately while observing extra caution.
- Park the vehicle in a safe place and switch off the engine.
- Have a service dealer correct the problem as soon as possible.

Less Serious Fault

If there is a less serious fault, a yellow warning pop-up and a short acoustic signal are activated. The yellow warning pop-up displays:

- A yellow hazard warning triangle
- A text explaining the fault.
- The corresponding icon.

When yellow warnings appear on the master display, you may continue driving, but take action at the first opportunity to remedy the fault. Have a service dealer correct the problem as soon as possible.

CAUTION

The vehicle may behave differently than usual with a yellow warning activated.

- Drive the vehicle with extra caution.
- Have a service dealer correct the problem as soon as possible.

NOTE

A yellow warning pop-up can be suppressed.

NOTE

All system warnings can be viewed in the warning list of the master display menu. The warnings are shown starting with the most urgent one. The warning list is opened using the Menu Control Switch (MCS). If there are more warnings than lines in the menu, the scroll function is active.

Together with a system warning, a warning indicator can be activated. See section *Warning Indicators on Master Display*.

Warning Indicators on Master Display

General

These icons are used as warning indicators on the instrument panel and as part of master display screens.

The warning indicators on the instrument panel have a fixed color. See section *Warning Indicators on Instrument Panel* on page 66 .

If an icon is displayed as part of a master display screen its color is defined by the background color of the screen. See section *Layout of Master Display* on page 49 .

Master Display

Warning Indicator	Description
Park brake not applied 	If the driver's door is opened while the engine has been switched off and the park brake has not been applied, an acoustic signal is given and a warning symbol is shown on the master display. NOTE On the master display this warning can be changed from red to yellow by a service dealer. The indicator on the instrument panel remains red.
ABS System Failure 	See section *ABS Brakes*

Warning Indicator	Description
Brake warning 	This warning can give the following text descriptions: • BRAKE AIR. This warning is visible when pressure in one of the service brake circuits is less than 70 psi (5 bar). • Air supply system malfunction • Low brake performance.
Cabin lock is open 	Check if the cabin is fully tilted back. See *Tilting the Cab*.
DPF (soot filter) 	This warning is activated when the soot level in the Diesel Particulate Filter (DPF) is too high or the soot filter is contaminated or the EAS system malfunctions.
High Exhaust System Temperature (HEST) 	This indicator is shown when regeneration is in progress and the exhaust gas temperature reaches levels that can potentially harm bystanders or the surrounding area.

Warning Indicator	Description
Emission failure 	Engine power is derated. A derate is activated or deactivated based on the severity of the derate condition and can result in the truck stopping. The engine is derated under the following conditions: • Emission level is above the legal limits. • Malfunction of the EAS system.
DEF warning 	This warning symbol can give the following text descriptions: • DEF level low or DEF tank empty: Fill up the DEF tank. • Incorrect DEF: Replace the incorrect DEF. • DEF dosing malfunction. **NOTE** When this warning is active, the MIL appears, the engine power is derated and eventually the vehicle speed is limited. After refilling the DEF tank, this warning, the MIL, engine de-rate, and speed limit are switched off. A small quantity of DEF remains in the DEF tank even if the DEF tank empty warning is active.

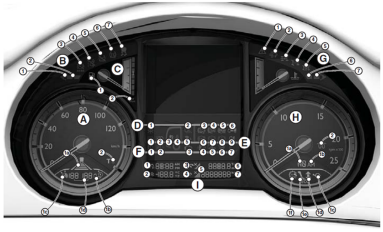
Warning Indicator	Description
EAS system 	This warning symbol is related to the EAS system and can give the following text descriptions: • Speed limit at next standstill. The speed limit is activated the next time the vehicle stops. • Speed limit 12 mph (or 20 km/h). The vehicle speed is limited to 12 mph or 20 km/h
Coolant level too low 	• Coolant level low. See *Topping Up Coolant* on page 103 • Coolant level sensor
Coolant temperature too high 	This warning symbol is visible when the temperature of the coolant exceeds the maximum permissible value. Check the following points: • The coolant level. Caution – danger of scalding. See *Topping Up Coolant* on page 103 . • The poly-V belt and water hoses. • The fan clutch.

Warning Indicator	Description
Alternator warning 	Alternator charge voltage not correct. If the charging voltage of the alternator rises above 30 V, this warning symbol is shown. The battery voltage is then too high and the battery may start to boil. In this case, switch on as many electrical consumers as possible. **If the symbol is still not extinguished, do not continue to drive under any circumstances!** NOTE Depending on the fault, the engine can switch over to emergency control.
Transmission warning 	This warning symbol can give the following text description: When the vehicle has an AS Tronic gearbox, depending on the malfunction, the gearbox can only be shifted manually.
Central vehicle controller error 	This means there is a fault in the electronics of the VIC (Vehicle Intelligence center). The VIC gathers information and actuates vehicle functions.

Warning Indicator	Description
Oil pressure too low. 	Switch off the engine immediately. Check the engine oil level. See *Engine Oil Level* on page 102 .
PTO fault 	Engine speed control does not meet the conditions. See *Engine Speed Control* on page 76 .
Wait to start 	This warning indicator is visible when the grid heater is active.
Fasten seat belt 	Seat belt isn't properly fastened.

Warning Indicator	Description
Body Builder Module malfunction 	Text depends on vehicle configuration.
Water in fuel 	The system has detected fuel quality issues such as water present in the fuel.
Brake information 	This warning symbol indicates Brake release.

Warning Indicators on Instrument Panel



- A1 Speedometer display
- A1a Not used
- A1b Not used
- A1c Cruise control or speed control
- A1d Not used
- A2 Tachograph warning
- B1 Left direction indicator, truck
- B2 Not used
- B3 Not used
- B4 Not used
- B5 Not used
- B6 Not used
- B7 Axle: stability control (optional)
- C1 Fuel level low
- C2 DEF level low
- D1 Bulb failure
- D2 Not used
- D3 Not used
- D4 ABS truck
- D5 Not used
- D6 Not used
- E1 Main beam
- E2 Daytime running lights off
- E3 Not used
- E4 Safety belt reminder
- E5 Not used
- E6 Exhaust brake active
- E7 Park brake
- E8 Stop Engine
- E9 Not used
- F1 Front fog lights
- F2 Not used
- F3 MIL indicator
- F4 Not used
- F5 Not used
- G1 Check Engine
- G2 Diesel Particulate Filter (DPF)
- G3 Not used
- G4 Cross-axle differential lock (Diff lock)
- G5 PTO
- G6 Not used
- G7 Right direction indicator, truck
- H1 Tachometer display
- H1a Selected gear
- H1b Manual/automatic
- H1c Not used
- H1d Gear up/down
- H1e Not used
- H1f Not used
- H2 Grid heater
- I1 Clock/alarm
- I2 Temperature/frost warning
- I3 AM/PM
- I4 Celsius/Fahrenheit
- I5 Not used
- I6 Trip
- I7 Mileage

Warning Indicator	Description
Left direction indicator: truck 	This warning indicator flashes together with the truck's left direction turn signal.
Fuel level low 	This warning indicator is visible when the reserve fuel level is reached.
DEF level low 	This warning indicator turns on when a critical DEF level is reached.
ABS warning 	The yellow warning indicator "ABS fault" is activated when there is a fault in the truck or tractor ABS system.

Warning Indicator	Description
Main beam 	This warning indicator is visible when the main beam is switched on.
Daytime running lights off 	This warning indicator is visible when the daytime running lights are switched off.
Safety belt reminder. 	This warning indicator is visible when safety belt is not used.
Exhaust brake active 	This warning indicator is visible when the exhaust brake is active.

Warning Indicator	Description
Park brake 	This warning indicator is visible when the park brake is applied.
Front fog lights 	This warning indicator is visible when the front fog lights are switched on.
MIL indicator 	This warning indicator is visible when the emission level is above the legal limits.
High exhaust system temperature 	A regeneration is in progress and the exhaust gas temperature reaches values which potentially can be harmful to bystanders or the surrounding area and the vehicle speed is below a certain value.

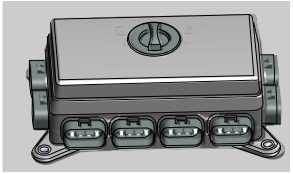
Warning Indicator	Description
Diesel particulate filter 	When the soot level in the DPF or soot filter is too high, or the filter is contaminated, this warning indicator is visible.
PTO 	This warning indicator is visible when the PTO is active.
Cross-axle lock (Diff lock) 	This warning indicator is visible when the PTO is active.
Right direction indicator: truck 	This warning indicator flashes together with the truck's right direction turn signal.

Warning Indicator	Description
Wait to start 	This warning indicator is visible when the grid heater is active.
Axle, Stability Control (Optional) 	Illuminates when the Electronic Stability Control (ESC) system is regulating individual wheel brakes to correct the vehicle's direction of travel.
Engine, Check Engine 	Illuminates when a non-emissions related problem exists but the vehicle can still be safely driven. Vehicle should be serviced to correct the problem but the situation should not be considered an emergency.

PDC and Voltage Display

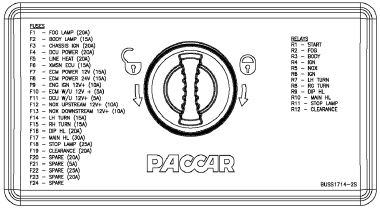
Power Distribution Center (PDC)

The PDC provides a fused 24V/12v to the cab and controls 12V to chassis systems inside of the box, and relays 12V to chassis and cab systems.



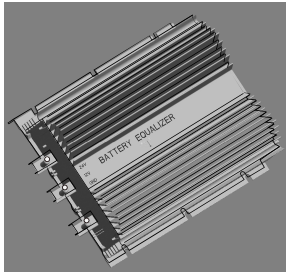
PDC box has the following Specifications:

- 400 amps max output
- 64 I/O pins (color coded)
- 4 power input terminals
- Customer configurable
- PACCAR branded
- Component labeling



Voltage Converter

The Voltage converter provides 24V to cab systems. It is located in the battery box, below the PDC support.



The Voltage converter has the following Specifications

- 12V input - 24V output
- Input current: 80 amps
- Output current: 40 amps
- Temperature range: -40C to +85C

Chapter 4 | DRIVING

General

Before setting out on a journey, always check:

- Vehicle for possible water or oil leaks.
- Engine oil level.
- Fluid level in the screen washer reservoir.
- Air filter indicator.
- Coolant level.
- Drawn vehicle coupling for correct attachment and operation.
- Connection and operation of the drawn vehicle lighting and brakes.
- Wheel attachment and tire pressures.
- Tread depth of tires.
- Tread of each tire for even distribution of wear pattern.
- Correct setting of seat and mirrors.
- Correct operation of lights and instruments.
- Fuel level.

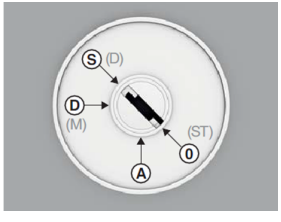
After each journey check that:

- Doors of the vehicle are locked.
- Load is still properly secured.

Steering Lock/Contact/ Starter Switch

WARNING

NEVER turn the ignition key to the rest position (0) or remove it while the vehicle is in motion. This may cause the steering wheel lock to engage.



- **Position 0: rest position**

When the key is removed in this position the steering wheel can be locked. If the steering wheel is turned slightly the steering wheel will lock.

- **Position A: accessories position**

Steering wheel unlocked. The key cannot be removed. Accessories, such as a radio, can be switched on.

- **Position D: ignition turned on**

All power consumers can be switched on.

- **Position S: starting**

When the key is released, it automatically returns to position D.

If the engine is running, the start lock is switched on.

Glow System

If the ignition is on, the electronic unit determines the necessary pre and after glow time.

The necessary pre- and after glow time depends on the temperature that is measured by the electronic unit of the engine management system.

If the pre- or after glow time is activated by the electronic unit, a warning lamp on the instrument panel lights up.

Starting Procedure

WARNING

If you start the engine inside a building, open the doors fully to ensure adequate ventilation. Exhaust gases contain carbon monoxide, an invisible, odorless, but highly toxic gas. Inhalation of these gases may cause unconsciousness and death.

1. Check that the parking brake is engaged.
2. Depress the clutch pedal and put the gear lever in neutral.
3. Switch the ignition to position D.
4. Check that the warning indicator of the parking brake lights up.
5. Check that the oil pressure warning symbol in the master display is lit.
6. Check the operation of the fuel gauge and the coolant temperature gauge.
7. Check that the glow system warning lamp is off.
8. Without pressing the accelerator pedal down, turn the ignition to position S. If the engine does not start; the key must be released after 10 seconds. Then wait 10 seconds and try again.

NOTE

The vehicle is equipped with start protection. The gear must be in neutral otherwise the start protection device will not allow the starter motor to activate.

If the engine is running, the engine speed may not be increased before the oil pressure warning symbol has extinguished.

NOTE

Depending on the coolant temperature measured by the electronic unit, it is possible that, in extremely cold conditions, the maximum engine speed is limited for a specific period of time.

In case of an optional engine speed control, one of various engine speeds can be selected with the right-hand steering column switch, if so desired.

Before driving away, check that the central "STOP" warning light is not illuminated.

Tips to Remember When Starting Vehicle in Cold Weather

In cold weather, fast engine starting helps relieve the loads on the electrical system and cranking motor. Using the special cold starting equipment will help starting.

If you follow a few simple guidelines, you will extend the service life of your engine:

- Keep the electrical system in top condition.
- Use the best quality fuel of the recommended grade.
- Use recommended engine lubricating oil.
- For manual transmissions and auxiliary transmissions, leave the transmission in neutral and allow the transmission lubricating oil to warm up (approximately 3-5 minutes) before operating vehicle.

Engine Block Heater (Optional)

To preheat the engine before starting, plug the optional engine block heater into a properly grounded AC electrical source. Do not start the engine with the heater plugged in.

WARNING

Engine block heaters can cause fires which may result in death, injury and/or property damage if not properly maintained and operated. Regularly inspect the engine block heater wiring and connector for damaged or frayed wires. DO NOT use the heater if there are any signs of problems. Contact your authorized dealer or the manufacturer of the heater if you are in need of repairs or information.

CAUTION

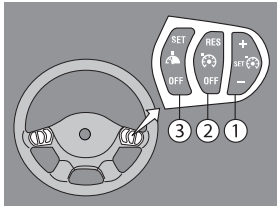
Always unplug heater before starting the engine. Damage to the cooling system could occur if the heater is not turned OFF (unplugged).

Depending on engine make, when the temperature falls below -10°F (-24°C), the block heater is required.

Engine Speed Control

The minimum and maximum engine speeds that can be set are limited by a programmed value in the electronic unit. This value may be below the idling speed. In this case it will, however, not fall below idling speed.

The programmed engine speeds and conditions for activation or deactivation of the engine speed control can be modified by an Authorized Dealership on request.



Activating the Engine Speed Control

Press the 'SET+' or 'SET –' button (1) to immediately increase the engine speed to the set speed value. This value may have been or can be changed within specific limits by an Authorized Dealership to meet the customer's requirements.

Hold down the 'SET+'- or 'SET–' button on the steering wheel switch (1) to gradually increase or decrease the engine speed.

NOTE

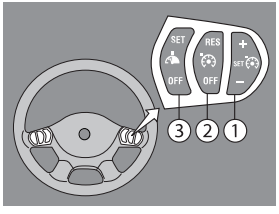
If the engine speed control is active, the engine brake is deactivated.

NOTE

Depending on how the electronic unit is programmed, the accelerator pedal is active or not. When speed is increased via the accelerator pedal, the speed reduces to the set speed value once the accelerator pedal is released.

Deactivating the Engine Speed Control

Press the RES/OFF switch (2) to the 'OFF' position.



Interruption of Engine Speed Control

When the vehicle brake is operated.

When the parking brake is disengaged.

When the clutch is operated.

When the RES/OFF switch (2) is pressed to the 'OFF' position.

When the engine speed control is active via the superstructure.

WARNING

Check whether the stated conditions for deactivation of the engine speed control apply to the vehicle.

Cruise Control

Cruise control is a facility that can be used to have the vehicle maintain a constant vehicle speed. The desired driving speed is set, and the electronics maintain this speed. The driver can overrule the cruise control at any time by pushing the accelerator pedal.

The cruise control can be activated at a programmed minimum vehicle speed. This speed is 21.7 mph (35 km/h) as standard.

The programmed standard speed and the conditions for activation and deactivation of the cruise control can be modified by an authorized dealer upon request.

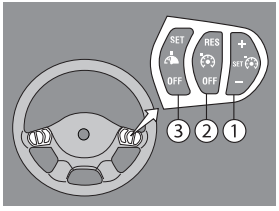
WARNING

Check whether the stated conditions for activation and deactivation of the cruise control apply to the vehicle.

Engaging Conditions

Cruise control can be activated when:

- The vehicle speed exceeds 22.3 mph (36 km/h).
- No braking functions are active.
- There is no current engine management fault.
- The clutch is not operated.
- Adjustable vehicle speed limiting is not active.
- Vehicle speed limiting for special applications below 21.7 mph (35 km/h) is not active.



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Disengaging Conditions

When the cruise control has been engaged, there are various conditions on which it disengages. Cruise control is deactivated when:

- Vehicle speed is outside the programmed limit values.
- Parking brake is operated.
- Clutch is operated.
- Foot brake is operated.
- Position 'OFF' on the steering wheel switch (2) is operated or the adjustable vehicle speed limiting 'SET' is activated using the steering wheel switch (3).
- ABS/ASR system is activated.

Engaging Cruise Control

Activate cruise control by toggling the steering wheel switch (1) once briefly to the 'SET+' position or to the 'SET–' position when the required control speed is reached. Cruise control can be activated when the vehicle speed is 22.3 mph (36 km/h) or more (or another value programmed by the Authorized Dealership).

Modifying Cruise Control Speed

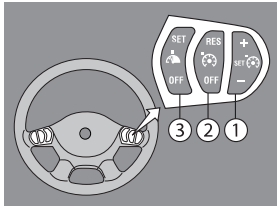
When cruise control is activated, the speed can be increased by pressing 'SET+' or be decreased by pressing 'SET–' on the steering wheel switch (1). Briefly operate the switch to increase or decrease speed in small increments of 0.31 mph (0.5 km/h).

Keep the switch down to gradually increase or decrease speed.

This limits the minimum and maximum adjustable speeds by values programmed in the electronic unit. These values can be modified within specific limits by an authorized Service dealer.

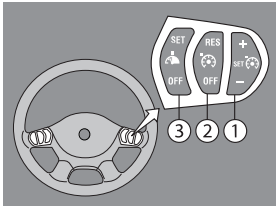
Accelerator Pedal Function during Cruise Control

When cruise control is active, the vehicle speed can be increased above the control speed using the accelerator pedal. When the accelerator pedal is released, the vehicle speed will return to the last valid control speed.



Disengaging Cruise Control

Press the 'OFF' switch (2) on the steering wheel to deactivate cruise control.



Re-engaging Cruise Control (Resume)

When it has been deactivated, cruise control can be resumed, provided the above conditions are met, by pressing the 'RES' button (2) on the steering wheel. This reengages cruise control at the last set speed. If the current vehicle speed is lower than this speed, cruise control accelerates to the programmed speed.

Adaptive Cruise Control (Optional)

This vehicle may be equipped with an Adaptive Cruise Control system that enhances the standard cruise control function. Consult your Adaptive Cruise Control operator's manual for detailed limitations.

WARNING

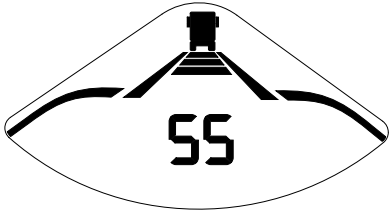
The Adaptive Cruise Control system in this vehicle is not autonomous and requires human interaction. The driver must always remain alert and ultimately is the one still responsible for safe vehicle control. The driver must monitor the driving environment and be ready to intervene at any moment. Failure to comply may result in death, personal injury, equipment or property damage.

Adaptive Cruise Control uses a radar sensor or camera to detect objects in front of the vehicle. The system will adjust the speed of the vehicle to accommodate a slower moving object in front of it. The driver has the option of setting the adjustment to either (1) maintain a certain distance from the object in front or (2) maintain a speed of the forward object.

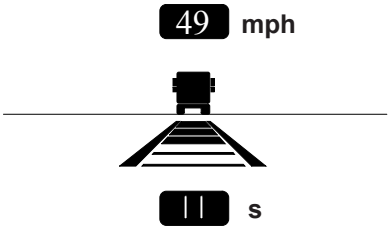
Driver Standard Interface

The Driver Information Display will have the following icons in the display related to Adaptive Cruise Control.

The lower left side of the instrument cluster, the drivers will see the below image of the truck and lanes illuminate above the cruise control icon and cruise set speed to indicate that Adaptive Cruise Control is enabled.



Additional information related to Adaptive Cruise Control is displayed in the center of the instrument cluster.



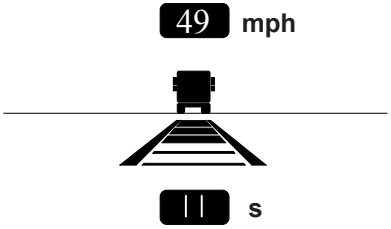
The driver will see the distance to the object in front (measured in seconds) to the bottom of the vehicle icon. The number at the top of the icon represents the speed of the car in front that the radar is locked onto. The truck will adjust speed based on the vehicle being tracked.

Adaptive Cruise Control Alerts

The Driver Information Display will alert the driver with visual and audible cues. A slow beep indicates that something is in the vehicle's path. As the object gets closer, the frequency of the beep increases.

Following Distance Alerts

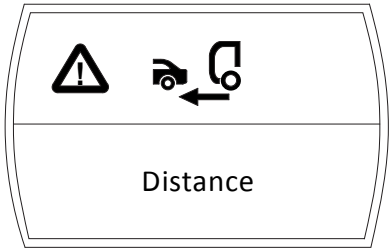
The display will be white on black when the vehicle in front is at a proper distance ahead of the truck. When a target is locked in, the truck icon will appear above the icon of the path, along with the target speed and the time to impact in seconds below the path icon.



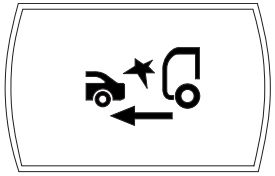
Collision Alert Driver Screens

The driver information display will show these messages with icons if the system detects a collision either from approaching speed or because of a stationary object.

Yellow Warning



Red Warning



Collision Alert

This warning is active when the following distance is less than what is set in the system. A collision alert warning tone is the most severe following distance alert.

The system first displays a yellow alert so that the driver can address the situation

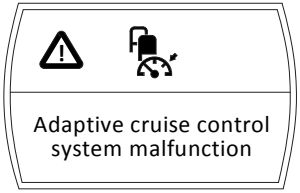
without the system using foundation brakes. If the brakes are not engaged by the driver, the system will attempt to slow the vehicle by applying the brakes to assist the driver in reducing the severity of or potentially avoiding a collision. At this point, the information display will change from yellow to red and the driver must take immediate evasive action by applying more braking power and/or steering clear of the vehicle ahead to avoid a potential collision.

The system can also detect stationary objects in the vehicles path. The operator needs to take control of the vehicle to avoid the stationary object. The icon will be accompanied with a pop-up message but no audible sound.

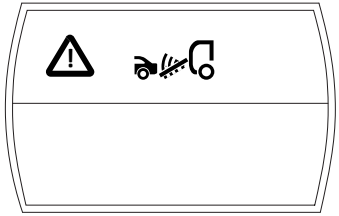
Adaptive Cruise System Malfunction

The following screens will appear when the Adaptive Cruise Control system detects a malfunction.

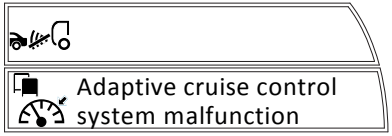
System Malfunction



Front Radar Malfunction



Display with Multiple System Malfunctions



Vehicle Speed Limitation for Special Applications

Speed limitation for special applications consists of a switch which is fitted on the vehicle superstructure. With this switch, the vehicle speed can be limited to a preprogrammed value. The programmed value can be modified by an authorized Service dealer on request.

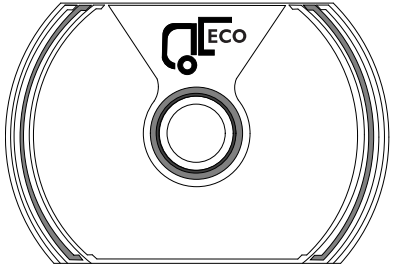
Driving Style

The following recommendations result in improved economy without adversely affecting the vehicle speed (i.e. slowing down). In other words: an efficient driving style. Anticipate traffic and other conditions; release the accelerator pedal in time (zero fuel consumption) and **do not** press down on the accelerator when it is **not necessary**

> **NOTE**
>
> In the event of extreme acceleration to 19 to 25 mph (30 to 40 km/h), and depending on the vehicle and engine type, the engine management system will intervene in the control of the engine to prevent excessive engine noise at high revs and low speeds.

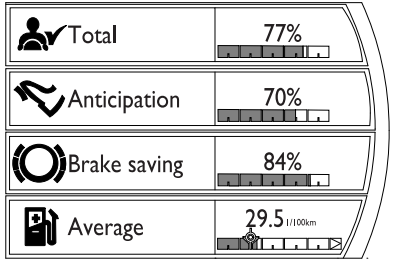
Driver Performance Assistant (DPA)

The *DPA* is a feature made possible by the vehicle's electronic monitoring and guard functions and is activated when the ignition is turned on. It can help the driver gain insight into how the vehicle is used.



It also improves driving performance by providing feedback on topics like anticipation, vehicle brake function use, and fuel consumption.

The *DPA* is shown on the master display in the **ECO performance** screen. Once selected the display shows four graphs. Anticipation and brake saving (efficient wear) show the actual score as a percentage.



The Total score is measured during what is called an *Event*. An "event" is triggered by:

- An anticipation event or a coasting event. This event occurs whenever the vehicle coasting speed decreases by at least 3 mph (5 km/h).
- A brake saving event (efficient wear). This event occurs whenever the vehicle speed decreases by at least 6 mph (10 km/h), including some element of braking under foot.

In both cases, the starting speed must be above 25 mph (40 km/h).

If an *Event* is registered, the system provides feedback by showing a number of check marks. These check marks also appear on the graphs followed by a screen message. The number of check marks and the screen message text depends on how well the driver's actions were performed.

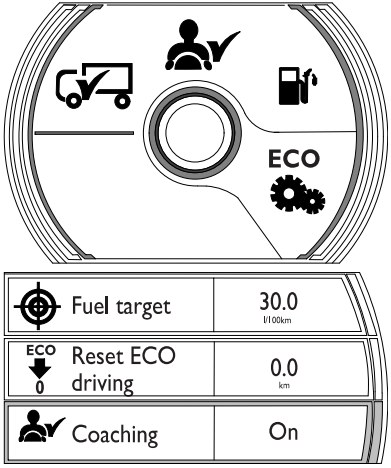
These scores (combined with how efficiently the cruise control is used) are averaged and shown as a percentage in the top graph marked **Total**. The figures in this top graph are also shown at the bottom of the display when the DPA screen is not activated via the MCS.

The bottom graph shows the Average fuel consumption. This figure is not used to calculate the score on the top graph. It is possible to add a target value to the fuel consumption graph. This target is set in the **Eco settings** menu.

The Average fuel consumption graph provides feedback by changing color.

- The graph is green if the average is below target.
- The graph is red if the average is over target.

How to Turn Off Driver Performance Assistant



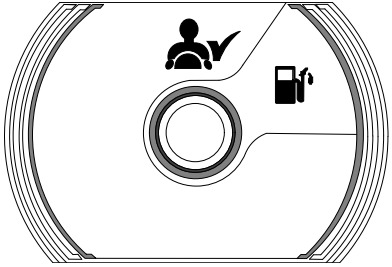
To turn off the DPA:

1. Using the Menu Control Switch (MCS), turn to **ECO settings** and select.
2. Turn the MCS and select **Coaching**.
3. Push the MCS to open the **on/off** option.
4. Select **off**.

   The DPA feedback can be switched off as long as the vehicle ignition stays on. When the ignition is switched off and then back on, the DPA feedback is again active.

Fuel Consumption

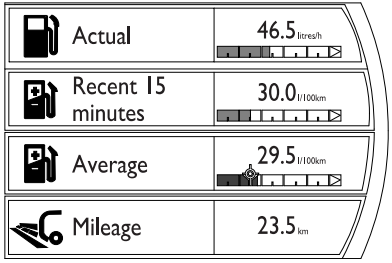
The **Driving support** menu displays relevant information about the fuel consumption and vehicle usage.



Set a fuel consumption target to improve the fuel economy. The fuel consumption display consists of two screens:

- **Fuel consumption screen** This screen is part of the **Economic driving** submenu.
- **Trip info screen** This screen is part of the main menu on the display.

For more information about improving fuel economy without sacrificing vehicle performance, see *Driving Style* on page 81 .



Activation of the fuel consumption screen	Activate the **Fuel Consumption** screen from the **Driving support** menu using the **Menu Control Switch**.
Deactivation of the fuel consumption screen	Deactivate the **Fuel Consumption** screen by pressing the **Menu Control Switch**.

Information on the Fuel Consumption screen

This menu can be activated during driving and displays the information shown in the following sections.

Actual

This is the current fuel consumption displayed in gallons per 62 miles (liters per 100 km). This value can vary considerably and is highly dependent on an instantaneous load on the engine. When the vehicle is at a standstill, the fuel consumption is displayed in gallons per hour (liters per hour).

Recent 15 Minutes

The average fuel consumption over the last 15 minutes is displayed in gallons per 62 miles (liters per 100 km). This value displays a quick result of how the driving style influences fuel consumption.

Every time the ignition is switched on, `--.-` is displayed until a reliable value is calculated by the vehicle's electronics. This can take a short while depending on the load on the engine.

Average

The average fuel consumption over a driving time interval (as measured by DPA since last reset) is displayed in gallons per 62 miles (liters per 100 km).

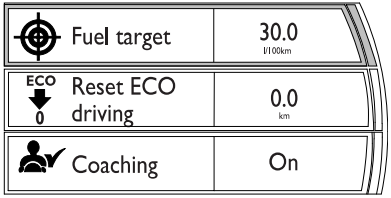
- A driving time interval is not only the current drive. It is the total distance traveled since the last reset of the DPA. See *Driver Performance Assistant (DPA)* on page 82 .
- The average lifespan fuel consumption of the vehicle can be read out in the **Service info** menu on the master display (see *Menu Overview* on page 52).
- A fuel target can be projected on the average fuel graph. The fuel consumption target is displayed in gallons per 62 miles (liters per 100 km). This target can be set in the menu of the master display and is used in order to improve the fuel economy. See *How to Set the Fuel Consumption Target* on page 85 .
- When the driving time interval has been reset, the average fuel displays `--.-` for the first 3.1 miles (5 km). The interval can be reset in the **Eco settings** menu.

Mileage

The total distance covered during a driving time interval is given in miles (km).

How to Set the Fuel Consumption Target

Adjusting the fuel consumption target in the **ECO settings** menu of the Driver Performance Assistant (DPA).



To set the fuel consumption target, turn the Menu Control Switch (MCS) to alter the fuel consumption target on the DPA.

The target might display `--.-` when the vehicle is first taken into service, or if the vehicle's settings have been changed by an authorized dealer. If so, the target must be set again.

Steering

The steering gear is hydraulically assisted. As excessive pressure may damage the hydraulic pump, stop turning the steering wheel when the wheels are at full lock or are blocked by an obstacle. The steering gear may be damaged, if this is ignored.

ABS Brakes

The ABS system is an Anti-lock Braking System.

The ABS ensures good brake stability and good steering in a critical braking situation.

By preventing the wheels from locking, the steering characteristics of the vehicle are retained.

WARNING

The ABS does not release the driver from his obligation to adapt his driving style to the traffic and road surface conditions. The anti-lock protection cannot offset the results of driving too close to the vehicle in front or taking a bend at too high a speed.

WARNING

Do not adapt your driving style to the ABS system! Above all, do not brake later and then harder. This only causes unnecessary tire wear. It may also be hazardous for other road users.

NOTE

Occasionally, but not always, your braking distance will be shorter with ABS.

WARNING

If the yellow warning symbol "ABS truck fault" is activated, there is a fault in the ABS system of the prime mover.

ABS Warning Symbol in Master Display

If the ABS warning symbol in the master display remains illuminated while driving, the ABS system is partly or completely deactivated and the brake system will work as if no ABS is present. The wheels may then lock upon braking.

Axle, Stability Control (Optional)

Calculates the driver's intended path of travel from wheel speed and steering angle sensors, then compares calculations to the actual direction of travel. The system uses individual wheel brakes to re-adjust the path of the vehicle.

- The Stability Control Icon (ESC or Electronic Stability Control) illuminates during the power-on self- test when the ignition is turned ON. It turns off after a few seconds if no system problems are detected. If a problem is detected, the ESC Warning lamp will turn on and stay on.
- Illuminates when the ESC system is regulating individual wheel brakes to correct the vehicle's direction of travel. (Refer to Advanced ABS with Stability Control for more information.)

WARNING

If this chassis is equipped with an Electronic Stability Control (ESC) and is modified (e.g. adding or removing an axle, converting from a truck to a tractor, converting from a tractor to a truck, changing the body, lengthening of the wheelbase and/or frame, relocating frame components, or modifying pneumatic or electrical ABS/ESC harnesses) the ESC must be disabled by a qualified technician. If you have any questions, contact your authorized dealer. Failure to comply may result in death, personal injury, equipment or property damage.

NOTE

For more information about the stability control system installed on your vehicle, please refer to additional material supplied with this operator manual, included in your glove box informational packet.

Advanced ABS with Stability Control

What you need to know about your vehicle's braking, traction, and stability control features.

Advanced ABS with Stability Control is a feature that reduces the risk of rollovers and other loss of control situations.

During operation, the system constantly compares performance models to the vehicle's actual movement, using the wheel speed sensors of the ABS system, as well as lateral, yaw, and steering angle sensors. If the vehicle shows a tendency to leave an appropriate travel path, or if critical threshold values are approached,

the system will intervene to assist the driver.

Electronic Stability Control may reduce the vehicle speed automatically. To minimize unexpected deceleration and reduce the risk of a collision the operator must:

- Avoid aggressive driving maneuvers, such as sharp turns or abrupt lane changes at high speeds, which might trigger the stability system.
- Always operate the vehicle safely, drive defensively, anticipate obstacles and pay attention to road, weather, and traffic conditions. ABS, ATC, and ESC stability systems are no substitute for prudent, careful driving.

Roll Stability

Roll Stability, an element of the overall ESC system, addresses rollover conditions. In the case of a potential roll event, the system will override the throttle and quickly apply brake pressure at all wheel ends to slow the vehicle combination. The system will apply proper levels of braking and should be proportional to roll risk.

A Real World Example of How the System Operates

Excessive speed for road conditions creates forces that exceed the threshold at which a vehicle is likely to rollover on a higher-friction surface. The system automatically reduces engine torque and applies the service brakes (based on the projected rollover risk) to reduce the vehicle speed, thereby reducing the tendency to roll over.

Yaw Stability

Yaw stability counteracts the tendency of a vehicle to spin about its vertical axis. During operation, if the friction between the road surface and the tires is not sufficient to oppose lateral (side) forces, one or more of the tires can slide, causing the truck/tractor to spin. These yaw events are referred to as either "under-steer" (where there is a lack of vehicle response to steering input due to tire slide on the steer axle) or "over-steer" (where the tractor's rear end slides out due to tire slide on the rear axle) situation. Generally, shorter wheelbase vehicles (tractors, for instance) have less natural yaw stability, while longer wheelbase vehicles (straight trucks, for instance) have greater natural yaw stability. Factors that influence yaw stability are: wheelbase, suspension, steering geometry, weight distribution front to rear, and vehicle track width.

Yaw Control

Yaw Control responds to a wide range of low- to high-friction surface scenarios including rollover, jackknife and loss of control. In the case of vehicle slide (over-steer or understeer situations), the system will reduce the throttle and then brake one or more of the "four corners" of the vehicle, thus applying a counter-force to better align the vehicle with an appropriate path of travel. For example, in an over-steer situation, the system applies the "outside" front brake; while in an under-steer condition, the "inside" rear brake is applied.

A Real World Example of How Yaw Control Operates

Excessive speed exceeds the threshold, creating a situation where a vehicle is likely to spin and, where applicable, jackknife. The system reduces engine throttle and selectively applies brakes to reduce the vehicle speed, thereby reducing the tendency to jackknife.

Automatic Traction Control

Your truck/tractor ABS has an automatic traction control (ATC) feature. This feature is controlled by a switch. This feature is monitored by a warning lamp located on the switch. The Traction Control warning lamp will briefly illuminate and then go out when the ignition switch is first turned on. The traction control warning lamp will illuminate whenever the ATC system detects drive wheel spin. The lamp will remain illuminated as long as wheel spin is detected and the ATC system is applying the drive wheel brakes or reducing engine torque. Engine torque or vehicle speed should be reduced to eliminate wheel spin and prevent excessive application of the ATC system.

Except for checking for proper illumination of the ABS and traction control warning lamps when first starting the vehicle, and for monitoring these lamps while driving, no special operating procedures are required. For detailed system description, see literature for your specific ABS that was provided with your vehicle.

This feature helps improve traction when vehicles are on slippery surfaces or surfaces with poor traction (i.e. mud or snow) by reducing drive wheel overspin. Automatic traction control works automatically in two different ways:

- If a drive wheel starts to spin, ATC applies air pressure to brake the wheel. This transfers engine torque to the wheels with better traction.
- If all drive wheels spin, ATC reduces engine torque to provide improved traction.

ATC turns itself on and off, you do not have to select this feature. If drive wheels spin during acceleration, the ATC Warning Lamp comes on, indicating wheel spin control is active. Do not allow the ATC Warning Lamp to remain on continuously for an extended length of time. Extended, continuous use of the ATC can cause overheating of the drive wheel brakes.

Deep Snow and Mud Switch

A deep snow and mud switch is included with Automatic Traction Control (ATC). The Deep Snow and Mud feature is helpful during acceleration. This function increases available traction on extra soft surfaces like snow, mud or gravel, by slightly increasing the permissible wheel spin. When this function is in use, the ATC Warning Lamp blinks continuously.

Effectiveness and Limitations

ESC is designed and optimized for trucks and for tractors that tow single trailers. Additionally, the optional Electronic Stability Control system's effectiveness may be greatly reduced if

- The load shifts due to improper retention, accident damage or the inherently mobile nature of some loads (for example, hanging meat, live animals or partially laden tankers).
- The vehicle has an unusually high or offset center of gravity (CG).
- One side of the vehicle drops off the pavement at an angle that is too large to be counteracted by a reduction in speed.
- If very rapidly winding steering inputs are inputted at high speeds.
- The vehicle is maneuvering on a high banked road creating either additional side forces due to the weight (mass) of the vehicle or a deviation between expected and actual yaw rates.
- Gusty winds are strong enough to cause significant side forces on the vehicle and any towed vehicles.

To maximize the effectiveness of ESC

- Loads must be properly secured and evenly distributed at all times.
- Drivers need to exercise extreme caution at all times, avoid sharp turns, sudden steering inputs or abrupt lane changes at high speeds, particularly if the vehicle or load has a high or offset center of gravity (CG) when loaded.

The ESC system was specifically calibrated and validated only for your vehicle's original factory-built configuration. If your vehicle's chassis components are altered (for example; a wheelbase extension or reduction, tag axle addition or removal, tractor to truck conversion or steering system component change) the ESC system must be disabled immediately by a qualified mechanic.

WARNING

Failure to disable ESC "Electronic Stability Control" when modifying a vehicle could result in a loss of vehicle control possibly resulting in an accident involving death or personal injury.

WARNING

For vehicles equipped with ESC" Electronic Stability Control" do not replace the vehicle's steering wheel with an aftermarket or different part number than originally supplied. Using a different steering wheel could cause ESC to malfunction causing a loss of vehicle control possibly resulting in an accident involving death or personal injury.

Whenever maintenance or repair work is performed to the steering mechanism, linkage, gear, adjustment of the wheel track, or if the steering angle sensor is replaced or the steering wheel is changed or re-centered, the Steering Angle Sensor must be re-calibrated.

WARNING

If the Steering Angle Sensor is not re-calibrated, the Yaw Control system will not function properly. An uncalibrated sensor could result in a loss of control of your vehicle which can lead to an accident involving death or personal injury.

Park Brake and Service Brake

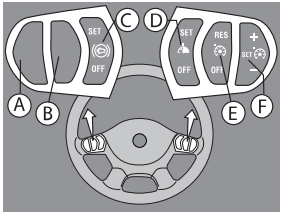
WARNING

Always apply the parking brake when parking the vehicle. Do not release the parking brake while the steering lock is still engaged. The vehicle cannot be steered if the steering lock is still engaged.

The service brake is operated by the foot pedal. If the service brake fails to operate owing to insufficient air pressure, the parking brake can be used as an emergency brake. Moving the parking brake lever slowly backwards as far as the stop will gradually brake the vehicle or combination in a controlled manner. The parking brake is engaged by moving the parking lever back past the locking cam. On a vehicle with a drawn vehicle connection, the parking brake has a test position. The parking brake is disengaged by lifting the locking ring up against the spring pressure and letting the parking brake lever move forwards.

Engine Brake

The engine brake is primarily intended for prolonged braking, for example when decelerating from high speed on a level road or when driving downhill. This reduces service brake wear.



The engine brake is activated by operating steering wheel switch (C).

NOTE

- The engine brake is activated by operating steering wheel switch (C).

- To save the service brakes and to prevent the engine brake valve from becoming stuck, it is wise to regularly use the engine brake.

The braking effect decreases as the engine speed falls.

The most appropriate area of use for the engine brake is in the blue area of the revolution counter. The engine brake delivers the highest braking effect in this area.

When using the engine brake, adjust the gear selection so that the engine speed remains in the most favorable range. In case of an AS Tronic Lite gearbox, gear selection is automatic.

The engine brake is automatically switched off when:

- The engine speed drops below 1000 rpm.
- The ABS/ASR system has established a tendency for the wheels to lock.
- The accelerator pedal is depressed.

- The vehicle speed control or engine speed control has been activated.

WARNING

If the ABS/ASR control is activated, the engine brake will be switched off as long as the control is in operation. On vehicles where the ABS/ASR control fails to function or on vehicles not equipped with ABS/ASR, use of the engine brake may lead to the risk of skidding on slippery surfaces.

Stopping

Parking

- Move the parking brake lever (from position A) backwards past the locking cam (position B). The parking brake is now engaged.
- Place chocks in front of and behind the wheels.
- Angle the front wheels so that the vehicle will not move into the traffic stream if it is accidentally set in motion.

Switch off the Engine

Place the gear in neutral when the vehicle is stationary.

Before switching off the engine after a long trip or when the engine has been subjected to high loading, let it idle for at least 5 minutes. It is important to let the engine run for a while in order to prevent the coolant temperature becoming too high and to allow the turbocharger to cool down.

Switch the engine off by turning the ignition key to 0 position (rest position).

Allison Automatic Gearbox

General

The automatic gearbox is fully electronically controlled. The automatic gearbox has either 5 forward or 6 (the Allison 3000 & 3500) forward gears, and 1 reverse gear.

The automatic gearbox is operated by various buttons located forward of the parking brake next to the driver's seat.

Shifting Gears

The various gears are selected by pushing the button associated with the gear.

Digital Display

The digital display is a two digit indicator: the SELECT digit and the MONITOR digit. During normal operation, if D (Drive) is selected, the SELECT digit shows the highest forward range attainable for the

shift schedule in use. The MONITOR digital display shows the lowest available forward range.

Limited transmission operation can be expected if the selector display shows these conditions:

- All digital display segments are illuminated during initialization. If after 10 seconds communication is not established with the TCM (Transmission Control Module) both digital displays show "cat eyes".
- When the display shows a "cat eyes", a selector-related fault code has been logged.
- When the SELECT display shows R (Reverse), or D has been requested and the display is flashing the selected range, the selected range has not been attained due to an inhibit function.

An inhibited range, shown by a flashing display, does not indicate that a Diagnostic Trouble Code (DTC) has set. An inhibit means there is a vehicle or engine condition that won't allow range selection or a direction change such as

- Too high idle speed in N (Neutral) to allow R or D,
- Too high a throttle signal in N to allow R or D,
- Too high of an output speed in N to allow R, or
- An active vehicle function or I/O function is operating which inhibits range attainment.

The transmission will not shift into range from N if a transmission fault warning is active. If a transmission fault warning is active move vehicle to a safe location before turning off the engine. Conditions which illuminate a transmission fault warning will disable the shift selector and the MONITOR digit will show the actual range attained instead of range selected.

Once D (Drive) is attained, the transmission will shift into the lowest forward range programmed for the D position, usually the first-range.

To display stored codes, do the following:

- Select N and apply the parking brakes.
- Simultaneously press the Up Arrow and Down Arrow buttons once to access oil level information (if an OLS is installed).
- Simultaneously press the Up Arrow and Down Arrow buttons
- Press the Mode button to display the next code. Repeat for code positions d3 through d5.
- Press N to exit the diagnostic code mode.

Neutral Position

No gears are activated when the N button is selected. The vehicle is not locked in this position and can therefore roll.

Use the parking brake to lock the vehicle.

Automatic Forward Drive

If the D button is selected, the vehicle will immediately begin to move (if the brake system is pressurized and the vehicle is not on the parking brake). It is therefore advisable to depress the brake pedal before selecting D. If in Drive the gearbox will automatically shift up and down in all forward gears. In the various drive selections the gearbox shifts up to the selected gear. These gears are used to

keep the engine within the proper speed range or to obtain the maximum engine brake performance.

Reverse

If the R button is chosen, the vehicle will also be immediately set in motion. In this case, too, first depress the brake pedal and then select R.

Mode

The Mode button can allow the driver to enable a secondary shift schedule, PTO enable, or other special functions that have been programmed into the ECU unit at the request of the OEM. For example, a vehicle OEM may have provided a secondary shift schedule for improved fuel economy. The name of the special function (ECONOMY) appears on the MODE ID label adjacent to the Mode button. Pressing the Mode activates the ECONOMY shift schedule and illuminates the Mode indicator LED. When the Diagnostic Display Mode has been entered, the Mode button is used to view and toggle through diagnostic code information. The code displayed is active if the Mode indicator LED is illuminated.

Up Arrow

Press the Up Arrow when in "D" (Drive) to request the next higher range. Continually pressing the Up Arrow will request the highest range available.

Down Arrow

Press the Down Arrow when in "D" (Drive) to request the next lower range. Continually pressing the Down Arrow will request the lowest range available.

Faults

If the transmission fault warning symbol lights up in the master display, a fault has been detected in the gearbox.

Read the following recommendations first or consult an authorized dealer if necessary.

Gearbox

The ECU will block the functions of the selector buttons to ensure that the gearbox will select a "safe gear". It is important to drive the vehicle to a safe place as soon as possible and switch the ignition off. It will no longer be possible to shift the gearbox to neutral. The ECU will prevent this.

After approximately 30 seconds, try starting the engine again and engaging a gear. If the fault is one whereby the gearbox must in no circumstances be shifted, the ECU will no longer shift the gearbox. **Driving is therefore no longer possible!**

If the fault is one whereby the gearbox may still be shifted, the warning in the main display will disappear. The ECU will have recorded the fault as an inactive fault.

It is now possible to drive the vehicle again, though the fault will still need to be remedied.

In this situation, however, it is no longer possible to shift gears.

Gearbox Oil Temperature

If the transmission fault warning symbol in the master display comes on during driving, this could be an indication that the gearbox oil has reached its maximum temperature.

In this situation, the ECU limits gearbox shifting to the first four gears.

It is important to drive to a safe place as soon as possible and let the engine idle in neutral at an increased idling speed.

As a result, the cooling system of the engine will try to cool the gearbox oil.

If after approximately two minutes the warning in the master display has not disappeared, the engine must be turned off and contact made with the nearest authorized Service dealer.

Chapter 5 | MAINTENANCE

Introduction

WARNING

DO NOT attempt to modify, alter, repair or disconnect any component of the air system. Repairs or modifications to the air system, other than what is described in this section, should only be performed by an authorized dealer. Failure to comply may result in death or personal injury.

WARNING

Prior to the removal of any air system component, always block and hold the vehicle by a secure means other than the vehicle's own brakes. Depleting air system pressure may cause the vehicle to roll unexpectedly resulting in an accident causing death or personal injuries. Keep hands away from chamber push rods and slack adjusters, they may apply as system pressure drops.

WARNING

After completing any repairs to the air system, always test for air leaks, and check the brakes for safe operation before putting the vehicle in service. Failure to comply may result in death, personal injury, equipment or property damage.

WARNING

Never connect or disconnect a hose or line containing air pressure. It may whip as air escapes. Never remove a component or pipe plug unless you are certain all system pressure has been depleted. Failure to comply may result in death, personal injury, equipment or property damage.

WARNING

Never attempt to disassemble a component until you have read and understood recommended procedures. Some components contain powerful springs and injury can result if not properly disassembled. Use only proper tools and observe all precautions pertaining to use of those tools. Failure to comply may result in death, personal injury, equipment or property damage.

WARNING

Never exceed recommended air pressure and always wear safety glasses when working with air pressure. Never look into air jets or direct them at anyone. Failure to comply may result in death, personal injury, equipment or property damage.

WARNING

Completely bypassing a Bendix® ADIS air dryer will bypass the system's pressure protection valves. This could lead to loss of air pressure or damage to the vehicle's air system, which could cause an accident involving death or personal injury. Always adhere to the manufacturer's procedure if it is necessary in an emergency to temporarily bypass an ADIS series air dryer. Failure to comply may result in death, personal injury, equipment or property damage.

The operation of the vehicle's braking system and many vehicle accessories depends upon the storage and application of a high-pressure air supply.

Your vehicle's compressor takes outside air and compresses it, usually to 100-120 psi (689-827 kPa). The compressed air then goes to the reservoirs to be stored until needed. When you operate your air brakes, the stored compressed air flows into the chambers where it is used to apply your brakes. That is why, when you push down on your brake pedal, you don't feel the same amount of pressure on the pedal that you do when you apply the brakes on your car. All you are doing on your truck is opening an air valve to allow air to flow into the brake chambers.

Contamination of the air supply system is the major cause of problems in air-operated components such as brake valves, and suspension height control valves. To keep contaminants to the lowest possible level, follow these maintenance procedures.

WARNING

If the air tanks are not drained at the recommended frequency, water could enter the air lines and valves. This could cause corrosion or blockage, which could compromise the brake system safety and potentially cause an accident involving death or personal injury.

Daily	• Drain moisture from the air tanks. • Operate air devices to circulate lubricants within the unit.
Periodically	• Clean filter screens ahead of the valves by removing the screens and soaking them in solvent. Blow them dry with pressurized air before reinstalling them.
Twice a Year	• Maintain the air compressor to prevent excessive oil by-pass. See your maintenance manual for details. • Replace worn seals in valves and air motors as they are needed.

Air Dryer

The function of the air dryer is to collect and remove air system contaminants in solid, liquid and vapor form before they enter the brake system. It provides clean, dry air to the components of the brake system, which increases the life of the system and reduces maintenance costs.

> **NOTE**
>
> Because no two vehicles operate under identical conditions, maintenance and maintenance intervals will vary. Experience is a valuable guide in determining the best maintenance interval for any one particular operation.

Every 900 operating hours or 25,000 miles (50,200 km) or 3 months check for moisture in the air brake system by draining the air tanks and noting the amount of moisture ejected. The air tanks can be drained by the use of drain cocks or pull cords, whichever your vehicle is supplied with. If there is a significant increase in moisture ejected compared to the previous maintenance the air dryer cartridge may need to be replaced. Note that several factors may increase the moisture accumulated in the system including:

Saturated air dryer cartridge

- Higher than normal accessory air demands
- High daily temperature fluctuations (> 30° F)
- Outside air source used to charge truck air system post air dryer

At a minimum, PACCAR recommends changing the air dryer cartridge annually.

> **WARNING**
>
> If a different air dryer brand or model is installed on the vehicle other than what was originally installed, it could cause the air system to not perform correctly unless the full air system design is reviewed and modifications made to comply with Federal Motor Vehicle Safety Standards (FMVSS) 121 AirBrake Systems. Failure to abide by this warning and maintain compliance to FMVSS 121 could cause loss of vehicle control and may lead to death or serious personal injury.

Overhaul

Maintenance intervals typical for on-highway operation would be 2 - 3 years, 350,000 miles or 10,800 hours.

Maintenance intervals typical for high duty cycle usage such as transit bus, refuse hauler, dump truck, cement mixers and off-highway operation would be 1 year, 100,000 miles or 3,600 hours.

NOTE

Review the warranty policy before performing any maintenance procedures. An extended warranty may be voided if unauthorized maintenance is performed during this period.

Air Tanks

To eject moisture from the air system tanks, pull the line that is connected to the moisture ejection valve. Continue pulling until the air comes out free of water.

Daily: The air tanks, must be drained on a daily basis. Operate air devices daily to circulate lubricants within the unit.

Periodically: Clean filter screens ahead of the valves by removing the screens and soaking them in solvent. Blow them dry with pressurized air before reinstalling them.

WARNING

If the supply and service air tanks are not drained at the recommended frequency, water could enter the air lines and valves. This could cause corrosion or blockage, which could compromise the brake system safety and potentially cause an accident. Failure to comply may result in death, personal injury, equipment or property damage.

CAUTION

DO NOT use penetrating oil, brake fluid, or wax-based oils in the air system. These fluids may cause severe damage to air system components.

- Maintain the air compressor to prevent excessive oil bypass.
- Replace worn seals in valves and air motors as they are needed. Your authorized dealer carries rebuild kits for most units.

Air Gauges and Air Leaks

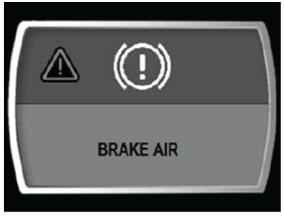
Your vehicle comes with air pressure gauges for two separate systems, Primary and Secondary. The Primary gauge indicates pressure in the rear braking system. The Secondary gauge indicates pressure in the front braking system. Each gauge indicates the amount of air pressure in pounds per square inch (psi).

WARNING

DO NOT operate the vehicle if leakage in the air system is detected. Conduct the following procedure and contact an authorized dealer (or any other properly equipped service center) if a leak is detected. Failure to check the brakes or follow these procedures could cause a system failure, increasing the risk of an accident and may result in death, personal injury,equipment or property damage.

If the light and alarm do not turn off at start-up, do not try to drive the vehicle until the problem is found and fixed. If the pressure

in either or both systems is too low for normal brake operation, i.e., one gauge falls below 65 psi (448 kPa), a 'BRAKE AIR' warning on the main display will be shown and the audible alarm will sound.



> **NOTE**
>
> Park brakes lock up at 60 psi (414 kPa), the audible alarm will sound at 65 psi (448 kPa).

Follow the procedure below to check the compressed air system for leaks:

1. Periodically, or after maintenance or replacement of air system components:
2. Build up air pressure in the system to the governor cutout point or until 120 psi (827 kPa) is reached.
3. Stop the engine and release the service brakes.
4. Without applying the brake pedal, observe the rate of air pressure drop. This rate should not exceed 2.0 psi (14 kPa) per minute.
5. Start the engine and build up the air pressure again.
6. Stop the engine, and apply the brakes fully. Apply the brake pedal and hold it down for five minutes. The pressure drop should not exceed 3.0 psi (21 kPa) per minute.
7. If you detect excessive leakage (air pressure loss greater than 3.0 psi (21 kPa) after two minutes of brake application), a leakage test should be made at the air line connections and at all air brake control units. These tests should determine where air is escaping.

Air Compressor

Operation

All compressors, regardless of make or model, run continuously while the engine is running. System pressure is controlled by the governor. The governor acts in conjunction with the unloading mechanism in the compressor cylinder block to start and stop compression of air. The compressor is unloaded when the system pressure reaches 120 psi (827 kPa) and compression is reestablished when system pressure falls to 100 psi (690 kPa).

Overview of Daily Checks

Overview of the driver's daily checks:

- engine oil level
- coolant level, fill cap secure
- fluid level in windshield washer reservoir
- air filter indicator
- tires and rims
- lighting and instruments
- driver's seat and mirrors

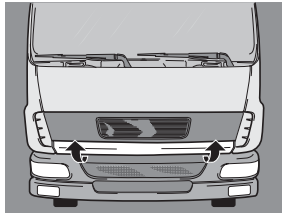
Visual check before starting the trip:

- check that no situation can occur (such as loose objects, improperly attached load etc.) that may put other road users at risk.

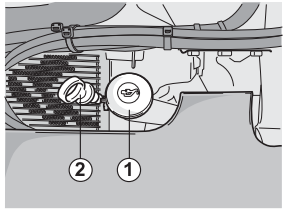
> **NOTE**
>
> Cleaning rags, flammable materials, accumulated dirt etc. in the vicinity of the exhaust system must be removed as these create a fire hazard.

Opening the Front Panel

Open the front panel by gripping it at the bottom and lifting it up. The front panel will tilt upwards and is held in place by two gas struts.



Engine Oil Level



1. Ensure that the vehicle is standing on a flat and level surface.
2. Open the front panel.
3. Pull the dipstick (2) out of the holder.
4. Wipe the dipstick clean with a lint-free cloth.
5. Re-place the dipstick in its holder. Withdraw the dipstick again and check the oil level.

> **NOTE**
>
> It takes approx. 20 minutes for all the oil to run into the sump when the engine is "warm". If the dipstick is checked immediately after switching the engine off or immediately after oil has been added, the level shown on the dipstick will be too low.

6. Fill oil through the filler opening (1) until the oil level reaches the maximum mark. Only use engine oil that meets specifications. See *Engine Oil* on page 117

   For the difference between the minimum and maximum engine oil level, see *Engine* on page 112 .

Topping Up Coolant

WARNING

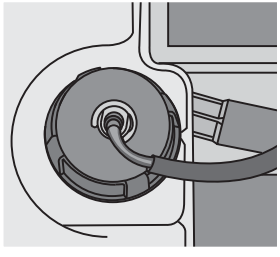
When the coolant is hot, there is an overpressure in the cooling system. If circumstances dictate that it is necessary to top up the coolant when the engine is warm, unscrew the filler cap carefully one turn to relieve the overpressure. Take adequate precautions against burning by, for example, placing a cloth over the cap. Coolant is a toxic fluid. Contact with the skin should therefore be avoided. Also see *Lubricant, Engine Coolant and Fuel Specifications* on page 116

WARNING

To prevent damage to the engine block, topping up with cold coolant when the engine is hot must be done slowly and with the engine running.

WARNING

Do not loosen the filler cap of the cooling system when the cab is tilted. The filler cap houses the coolant level sensor. Take necessary precautions to protect the sensor from damage when removing it.



1. Turn the rotary knob for the heating temperature control to "maximum hot".
2. Open the front panel.
3. Remove the black filler cap from the cooling system reservoir.
4. Run the engine for several minutes.
5. Stop the engine and check the coolant level.
6. If necessary, top up to the bottom of the filler opening.

Always use coolants which meet specifications. See *Coolant According to Specification 74002* on page 117 .

NOTE

Take care not to damage the coolant level sensor when removing and replacing the reservoir filler cap.

Special Coolant Fill Instructions

CAUTION

RADIATOR FILL PROCEDURE REQUIRED FOR THIS VEHICLE

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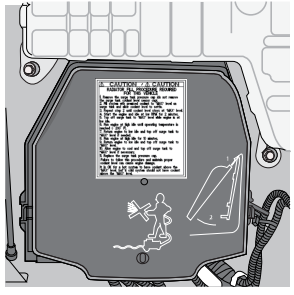


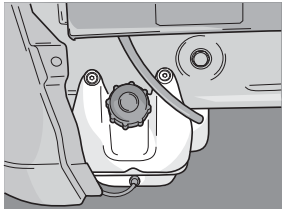
1. Remove the surge tank pressure cap (do not remove the surge tank coolant level sensor cap).
2. Fill system with premixed coolant to “MAX” level on surge tank and allow coolant level to settle.
3. Repeat step 2 until coolant level stays at “MAX” level.
4. Start the engine and idle at low RPM for 2 minutes.
5. Top off surge tank to “MAX” level while engine is at low idle.
6. Run engine at high idle until operating temperature is reached (~ 200° F).
7. Return engine to low idle and top off surge tank to “MAX” level if needed.
8. Run engine at high idle for 10 minutes.
9. Return engine to low idle and top off surge tank to “MAX” level.
10. Allow engine to cool and top off surge tank to “MAX” level if necessary.
11. Replace the surge tank pressure cap.

CAUTION

Failure to follow this procedure and maintain proper coolant level can cause engine damage.

It is OK for a hot system to have coolant above the “MAX” level, but a cold system should not have coolant above the “MAX” level.

Windshield Washer Reservoir Fluid Level



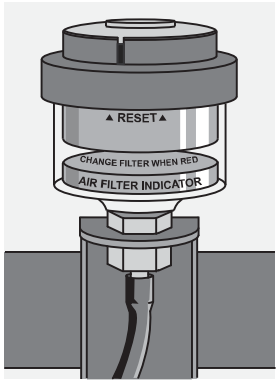
1. Open the front panel.
2. Check the fluid level in the screen washer reservoir.
3. Top up, if necessary, via the filler opening.

NOTE

When topping up, it is recommended to add a windshield cleaner to the water in the windshield washer reservoir. During the winter period, add windshield wash antifreeze.

Air Filter Indicator

The air filter indicator is behind the grille at the front of the cab. If the indicator is in the red area (showing the text "service"), the air filter is seriously fouled and must be replaced. Consult an authorized Service dealer. Clogged air filters lead to increased fuel consumption and loss of power.



Wheels and Tires

1. Remove any stones, etc. from the tread and from between the tires (if twin wheels are fitted).
2. Check for evidence of wear and damage and for nails or other foreign objects caught in the tires.
3. Check the attachment of the wheels.
4. Check the tire pressures (do not forget the spare wheel). The tire pressures should be checked and corrected while the tires are cold. See *Tire Pressure Table (Imperial)* on page 113 or *Tire Pressure Table (Metric)* on page 114 for the correct tire pressures.

NOTE

If a worn tire is underinflated by 30 psi, the ABS control will be inoperative under extreme conditions!

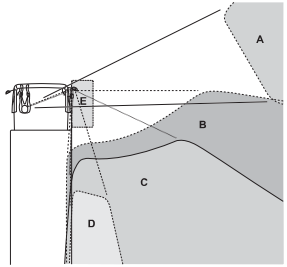
Lighting and Instruments

1. Check the vehicle lighting, brake lights and instruments for correct operation.
2. Also check the operation of the horn, windshield wipers and washers.

Driver's Seat and Mirrors

Set the seat and mirrors to the correct positions.

Mirrors with field of vision projected on the ground.



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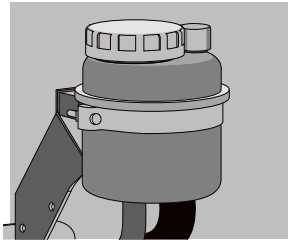
- A - Side window
- B - Dead angle mirror
- C - Wide view mirror
- D - Main mirror
- E - Pavement mirror

Overview of Weekly Checks

Overview of the driver's weekly checks

- Clutch fluid level
- Power steering fluid level
- Brake system air drier
- Draining the fuel system water separator
- Batteries

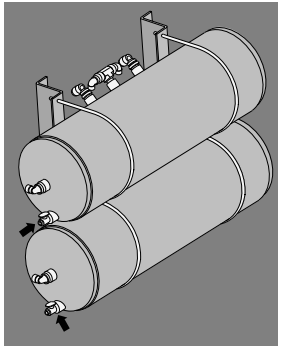
Power Steering Fluid Level



1. Tilt the cab.
2. Clean the dipstick and its immediate surroundings to prevent any dirt from entering the reservoir.
3. Check the fluid level in the reservoir using the dipstick.
4. The fluid level must be between the two marks.
5. Top up oil, if necessary, via the filler opening. Oil type: see *Steering Gear* on page 118 .
6. If the level is below the minimum mark, this is a sign of leakage. Contact an authorized Service dealer as soon as possible.

Brake System Air Drier

The air drier can be checked for correct operation by inspecting the air reservoirs for condensed water.



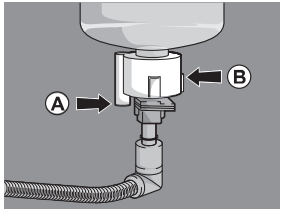
1. Check the air reservoirs for condensed water by pulling on the rings of the drain valves.
2. If repeatedly more than the normal amount of water is drained off, the air drier element will have to be replaced. Consult your Service dealer.

Draining the Water Separator

WARNING

When draining the water separator, an amount of fuel will escape. Collect the fuel and avoid the risk of fire.

Water in the fuel system may lead to significant damage.



1. Place a container beneath the water separator.
2. Remove the connector.
3. Unscrew the ring-shaped drain cock (B) on the bottom of the water separator in anti-clockwise direction.
4. Drain the filter until pure diesel fuel comes out of the drain cock (A).
5. Turn the drain cock (B) if it abuts, another 1/8 - 1/4 turn.
6. Check the drain cock (B) for leakage.
7. To prevent pollution, the drained water/diesel fuel mixture should be passed to the relevant authorities for reprocessing.

Batteries

WARNING

Avoid sparks and open flames in the vicinity of batteries.

Battery acid is an aggressive fluid.

In the event of contact with the skin: rinse the skin profusely with plenty of water.

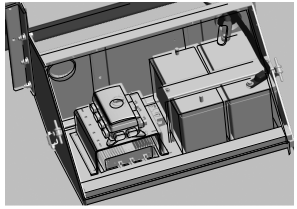
Consult a doctor in the event of persistent redness or pain.

Remove polluted clothing and rinse in water.

In the event of contact with the eyes: rinse with plenty of water for at least 15 minutes and consult a doctor.

If swallowed: do NOT induce vomiting. Rinse the mouth, drink two glasses of water and consult a doctor.

In the event of inhalation: get fresh air, rest and consult a doctor.



- Check the electrolyte level; this should be approx. 10 mm above the plates or up to the level indicator, if present. If necessary, top up the batteries with distilled water.
- Check that the battery poles and terminals are clean and greased. If necessary, coat the posts with an acid-free petroleum jelly.

General Maintenance

The durability, safety, trade-in value and reliability of your vehicle largely depend on the care you give it. This includes regular service in accordance with the maintenance schedules specified.

The driving style of the person at the wheel and the care given to the vehicle will have a direct influence on the condition of the vehicle. The driver can often provide the dealer with information which is very important for correct maintenance.

Prior to the service intervals and the related activities, contact your authorized Service dealer.

Cab Maintenance

In order to keep this quality as high as possible, during vehicle use, regular maintenance should be carried out on the cab surfaces.

To prevent the formation of rust in box sections and other cavities, the cab is protected with corrosion-inhibiting products (ML) in production.

Due to the setting of the structure, minor bare spots may develop in this additional protective coating. For this reason, the manufacturer considers it necessary to have further treatment carried out within a specific period (consult the warranty manual) after the vehicle has been taken into service.

If this does not happen, the warranty will become invalid.

The relevant warranty conditions are listed in the warranty manual.

Cleaning

Cleaning the Vehicle

Before the vehicle is cleaned, check for leaks in the engine, axles, gearbox, etc. This is no longer possible after cleaning the vehicle and carrying out maintenance work.

When a high-pressure cleaner is used, take special note of the following points:

- Make sure that the doors, windows and roof hatch are properly closed.
- Never spray directly on seals. There is a danger of them being forced open so that water can penetrate or grease packed behind them is flushed away. This may happen, for example, with the universal joint on the steering box. As a result, the spider may seize so that the steering will jam.
- Do not spray directly onto steering ball joints.
- The power steering fluid reservoir is fitted with a vent. Water may enter the reservoir via this vent, which will cause damage to the steering gear.
- When cleaning the radiator/ intercooler, take care not to damage the fins.
- Do not direct the high-pressure cleaner/steam cleaner jet too long at the air-conditioning system condenser. As a result of the high temperature, the pressure in the system will rise too high, which may cause damage to the system.

Parts of the air-conditioning must not be cleaned with the aid of a high-pressure/steam cleaner as this can cause damage to the seals.

- Make sure that no water can enter the differential and gearbox via the vents.
- Make sure that no water can enter via the reservoir bleed screws of the clutch, brakes, trailing axle, etc.
- The engine and engine compartments can be cleaned with a high-pressure/ steam cleaner. Avoid spraying directly onto electrical components such as the fuel system pump units, electronic units the starter motor, alternator, air-conditioning compressor, headlights, etc.
- Carefully clean the engine encapsulation and its fittings. Remove any spilled oil and diesel oil to avoid the risk of fire.
- Do not aim the jet of water directly at electrical connections such as connectors, cable plugs in the vehicle lighting system, etc. Also do not aim the jet at the gear lever unit.
- When cleaning the vehicle, make sure that no water can enter the air inlet system via the air intake or its flexible seals.
- When the vehicle has been cleaned, it must be lubricated again with a grease gun or via the automatic lubrication system. This is important because it prevents the penetration of moisture and dirt at the various pivot points.

Cleaning the Cab

Depending on the vehicle's operating conditions, the external paintwork of the cab is subject to attack by corrosive substances, for example road salt, grit and polluted air. For instance, road salt and air pollution.

The paintwork must therefore be cleaned regularly.

When cleaning the cab, make sure that:

- no caustic cleaners are used.
- no hard brushes are used.
- all seams, gaps and door shut-lines are thoroughly cleaned.

Waxing the Cab

The paintwork of new vehicles is waxed to protect it against the elements.

After a time, this wax coating will gradually wear away as a result of cleaning and other external influences.

To give corrosive substances less chance of attacking the paint, it is advisable to protect the paintwork with a new wax coating at least twice a year.

It is advisable to use wax for this.

Your authorized Service dealer can advise you about additional anti-rust treatment and maintenance of the paintwork when the vehicle is in service.

Cleaning the Interior

The day cab can be fitted with fabric or plastic trimming.

The plastic can be cleaned with a household cleaning agent and warm water.

The fabric trimming should be cleaned with a non-aggressive dry-cleaning agent, or an equivalent product.

NOTE

The appearance of your vehicle is your company's face to the world!

Preventative Maintenance before the Winter Season

Your authorized Service dealer can always give you good advice to prepare your vehicle for winter.

Diesel Fuel

If outside temperatures are persistently low, only fill up with winter diesel oil produced by a reputable oil company.

During the winter months the oil companies often use additives, to prevent blockages caused by the precipitation of paraffin crystals (wax deposits).

It is **not** permitted to use **your own** fuel additives.

NOTE

Additives which are used to prevent precipitation of paraffin crystals have a **purely preventative** effect. They can **not** dissolve the paraffin crystals once they have been precipitated.

Always carry a spare fuel line filter in the vehicle so that you can replace it quickly if it becomes blocked in any way (for example, by paraffin crystals).

Always preferably fill up in the evenings to prevent condensation (especially in winter).

Windshield Washer Reservoir

- When topping-up, it is advisable to add a cleaner to the water in the windshield washer reservoir.
- During the winter period, add windshield wash antifreeze.

Maintenance after the Winter Season

Your authorized Service dealer can always give you good advice to prepare your vehicle for summer.

Cooling System

The coolant may be left in the cooling system during the summer.

Chapter 6 | INFORMATION

Type

Model: KW: K270, K370 or PB:210, 220, PX7

Engine

Engine type	B ENGINE
Model	EPA 2017, water-cooled, four-stroke diesel engine with electronically controlled fuel injection system, 4 valves per cylinder and turbo-intercooling
Number of cylinders	6 In Line
Bore x stroke	107 x 124 mm
Total capacity	6.7 liters
Capacity of lubrication system, including filter and oil cooler	4.25 gallons (16.09 liters)
Sump capacity, maximum level	4.75 gallons (18 liters) w/OP9517 Option
Sump capacity, minimum level	4.23 gallons (16 liters) w/OP9517 Option
Capacity of cooling system, including heater	30.5 quarts (28.9 liters)
Capacity of cooling system, including heater (with a dry engine)	43 quarts (40.7 liters)

Output and Torque

Type	Max output P [kW (hp)]	Engine speed at max output n_p (rpm)	Max torque M lb ft	Engine speed at max torque rpm
PX-7 200 hp	150 (200)	2400	520	1600
PX-7 220 hp	164 (220)	2400	520	1600
PX-7 240 hp	179 (240)	2400	560	1600
PX-7 220 hp	164 (220)	2400	600	1600

Type	Max output P [kW (hp)]	Engine speed at max output n_p (rpm)	Max torque M lb ft	Engine speed at max torque rpm
PX-7 250 hp	186 (250)	2400	660	1600
PX-7	260	2400	660	1600

Electrical System

Voltage	12/24 V
Alternator	160 A / 14 V
Batteries	700 / 1000 CCA
Starter motor	3.3 Kw / 12 V

Bulbs

Dipped beam Left/ right	12V/55W
Main beam Left/ right	12V/55W
Auxiliary high beam	12V/55W
Fog lights	12V/55W
Tail light Left/right	12V/45W
Cab interior lighting	24V/15W
Stepwell lighting	24V/5W
Side repeater lights	12V/21W
Roof lights	24V/5W

Wheels

Whenever the wheel nuts have been slackened or removed, they must be retorqued with a torque wrench after 62 miles (100 km).

WARNING

If a wheel stud is renewed, the other wheel studs on the relevant wheel must also be renewed. If new wheel studs are fitted, the nuts must be retorqued after 310 miles (500 km).

Wheel Nut Tightening torques

Model K270 / 370, 210 / 220

Version with 8 M20 wheel nuts	485 Nm (357.7 lb ft)
Version with 10 M22 wheel nuts	644 Nm (475 lb ft)

Tire Pressure Table (Imperial)

Recommended load (lb) at various pressure values (psi) E= single fitting D= twin fitting													
Tire size		70 (psi)	75 (psi)	80 (psi)	85 (psi)	90 (psi)	95 (psi)	100 (psi)	105 (psi)	110 (psi)	115 (psi)	120 (psi)	125 (psi)
245/70 R19.5	E			3525	3750	3860	4080	4190	4300	4540			
	D			3415	3640	3750	3970	4080	4190	4410			
285/70 R22.5	E				4645	4835	5070	6205	5385	5510	5740	6175	6395
	D				4365	4400	4675	4735	4900	5070	5255	5675	6005
75/70 R22.5	E		4850	5050	5250	5480	5705	5945	6195	6450	6720	7000	
	D		4430	4610	4795	5005	5210	5430	5660	5890	6135	6395	
295/75 R22.5	E	4500	4725	4940	5155	5370	5510	5780	5980	6175			
	D	4095	4300	4540	4690	4885	5070	5260	5440	5675			
11 R22.5	E			4990	5220	5510	5730	5950	6175				
	D			4760	4950	5205	5415	5625	5840				

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Tire Pressure Table (Metric)

Recommended load (Kg) at various pressure values (bar) E= single fitting D= twin fitting

Tire size		4.8 (bar)	5.1 (bar)	5.5 (bar)	5.8 (bar)	6.2 (bar)	6.5 (bar)	6.8 (bar)	7.2 (bar)	7.5 (bar)	7.9 (bar)	8.2 (bar)	8.6 (bar)
245/70 R19.5	E			1598.6	1700.6	1750.5	1850.3	1900.2	1950.1	2058.9			
	D			1548.7	1650.7	1700.6	1800.4	1850.3	1900.2	1999.9			
285/70 R22.5	E				2106.5	2192.7	2299.2	2814.0	2442.1	2498.8	2603.1	2800.4	2900.1
	D				1979.5	1995.4	2120.1	2147.3	2222.2	2299.2	2383.1	2573.6	2723.3
75/70 R22.5	E		2199.5	2290.2	2380.9	2485.2	2587.2	2696.1	2809.4	2925.1	3047.5	3174.5	
	D		2009.0	2090.6	2174.5	2269.8	2362.7	2462.5	2566.8	2671.1	2782.2	2900.1	
295/75 R22.5	E	2040.8	2142.8	2240.3	2337.8	2435.3	2498.8	2621.2	2711.9	2800.4			
	D	1857.1	1950.1	2058.9	2126.9	2215.3	2299.2	2385.4	2467.0	2573.6			
11 R22.5	E			2263.0	2367.3	2498.8	2598.6	2698.3	2800.4				
	D			2158.7	2244.8	2360.5	2455.7	2550.9	2648.4				

Checking the Tire Pressures

Tire pressures depend on axle load and tire size.

Tire Pressure Table

- The tire pressures shown in the table apply to cold tires.
- Unnecessary tire wear is frequently caused by vehicle operation with tire pressures which do not match the axle load.
- When twin wheels are fitted:
  - Both tires must be inflated to the same pressure;
  - The tread depth must be practically the same on both tires.

* The axle loads and corresponding tire pressures shown in the table apply to normal operating conditions. For all other cases, refer to the specifications of the tire manufacturer.

Lubricant, Engine Coolant and Fuel Specifications

To comply with the warranty terms and to guarantee the durability of the manufacturers products, it is essential that the correct lubricants, engine coolant and fuel are used and that the oil change intervals are adhered to.

Additives to lubricants, engine coolant and fuel - of whatever type - must not be used except in those circumstances prescribed by the manufacturer.

Always follow the safety instructions below and the instructions that are supplied with the product.

Use Ultra Low Sulfur Diesel Fuel only. Failure to do so may cause exhaust equipment damage.

Ask your lubricant and fuel suppliers whether their products comply with specifications.

The manufacturer is not liable for damage or problems in the following instances:

- If oil has been used of a lower grade than specified.
- If oil has been used of a different viscosity than specified.
- If the specified oil change interval has been exceeded.
- If fuel, lubricants or coolants have been used which do not meet the requirements specified.

WARNING

Avoid physical contact with:

- Lubricants
- Coolants
- Fuel
- Battery acid

In the event of skin contact: remove substance with paper or cloth, wash with soap and water.

Consult a doctor in the event of persistent irritation.

In the event of contact with the eyes: remove substance with soft cloth and rinse with water.

Consult a doctor in the event of persistent irritation.

If any is swallowed: DO NOT induce vomiting. Rinse mouth, drink two glasses of water and consult a doctor.

In the event of inhalation: get some fresh air and rest.

Battery acid:

In the event of skin contact: rinse the skin profusely with plenty of water.

Consult a doctor in the event of persistent redness or pain. Remove polluted clothing and rinse in water.

In the event of contact with the eyes: rinse with plenty of water for at least 15 minutes and see a doctor.

If any is swallowed: do NOT induce vomiting. Rinse the mouth, drink two glasses of water and see a doctor.

In the event of inhalation: get some fresh air, rest and consult a doctor.

Engine Oil

Specification lists refer to international standards, such as ACEA and API. Viscosity is also subject to specific requirements.

Additional information:

PX-7: Synthetic oil

Coolants

WARNING

Coolant is a toxic fluid. Protect skin and eyes. In case of accidental contact with skin and/or eyes, see *Lubricant, Engine Coolant and Fuel Specifications* on page 116 .

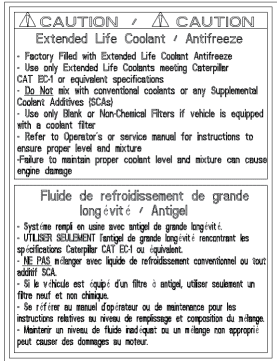
Coolant is harmful to the environment; after use, it should be processed as industrial chemical waste.

The cooling system should preferably be filled with a ready-mixed coolant containing antifreeze and corrosion inhibiting additives.

The coolant present in the cooling system from the factory consists of an ethylene glycol base: Climatech

Coolant Identification

A sticker behind the grille states the information on the coolant used.



Coolant According to Specification 74002

The below table lists the current suppliers that meet specification 74002.

It is not allowed to fill the cooling system with another product than the one specified in this overview.

Brand name	Supplier
Long Life Coolant	N.V.
Havoline XLC/ Havoline Extended Life Antifreeze Coolant	ChevronTexaco
Caltex Extended Life Coolant	Caltex
Total Organifreeze	Total
Maxigel Plus/ Ultracooling Plus	Renault Truck Oils
Bevercool Organic	Beverol
BP Procool	BP

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Brand name	Supplier
Castrol Antifreeze SF Premix	Castrol
Inugel Optimal/ Inugel Optimal Ultra	Motul
Yacco LR Organique	Yacco
Valvoline Antifreeze Extreme	Valvoline
Petrol Antifriz Koncentrat	Petrol
Orvema Protex Long Life/Coolmix LL	Orvema
SB-G12	Sotragel

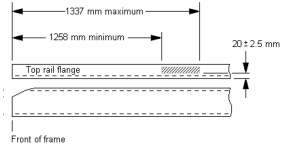
Steering Gear

Hydraulic power steering	ATF DEXRON III with valid approval number

Cab Tilting Mechanism

Cab tilting pump	Oil must meet MIL-H-5606C
The following may be used:	• ESSO Univis J13 • FINA Hydran B5219B • TEXACO Aircraft Hydraulic Oil 5606G • Total Aero-hydraulic 520

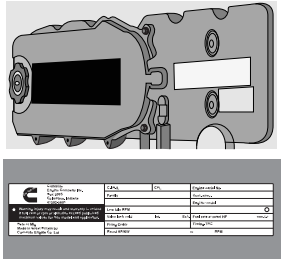
Chassis Number



The chassis number is the last 6 digits of the VIN number. It is stamped on the right chassis side member close to the front axle.

Engine Number

The engine number is located on the data plate located on the top cover of the engine.

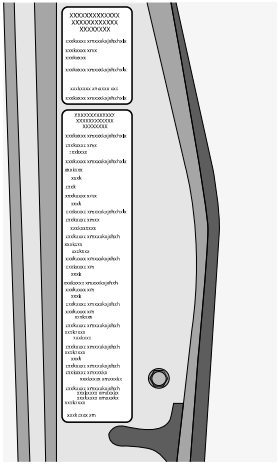


Paint Identification Plate

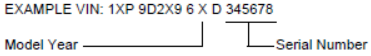
The paint identification plate is attached to the bulkhead behind the front panel.

Vehicle Identification Label

The vehicle identification plate is located on the door jamb.



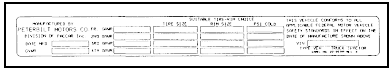
Each vehicle uses a Vehicle Identification Number (VIN) that contains the model year designation of your vehicle. The practice is in compliance with 49 CFR 565, Code of Federal Regulations. The VIN contains 17 digits. The 10th digit is the code for the model year of your vehicle. The example VIN below from a 1999 model shows how this code works:



Consumer Information

Federal Safety Standard Certification Label

The National Highway Traffic Safety Administration regulations require a label certifying compliance with Federal Safety Standards, for United States and U.S. Territories, be affixed to each motor vehicle and prescribe where such label may be located. This certification label, which indicates the date of manufacture and other pertinent information, is located on the left hand cab door post.



How to Order Parts

When you need replacement parts for your Kenworth / Peterbilt vehicles, contact your nearest authorized Kenworth / Peterbilt

dealer, who may be located from the "Kenworth / Peterbilt Authorized U.S. and Canadian Dealers" listing (Cat. No. 5212).

When you order, it is IMPORTANT than you have the following information ready:

- Your name and address.
- Serial number of the truck.
- The name of the part you need.
- The name and number of the component for which the part is required.
- The quantity of parts you need.
- How you want your order shipped.

NHTSA Consumer Information

The National Highway Traffic Safety Administration requires that the following information be included in the owner's manual of motor vehicles manufactured after September 1, 1990:

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 KW/PB Motors Company.

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 get involved in individual problems between you, your dealer, and KW/PB Motors Company.

To contact NHTSA, you may either call the Auto Safety Hotline toll-free at 1-800-327-4236 (TTY 1-800-424-9153), email to nhtsa.webmaster@dot.gov or write to: Office of Defects Investigations, CRD NVS-216, 1200 New Jersey Ave SE, Washington, D.C. 20590. You can also get other information about auto safety from the Hotline.

For additional road safety information, please visit the NHTSA website at http://www.safercar.gov

Canadian Consumer Information

Canadian customers who wish to report a safety-related defect to Transport Canada, Defect Investigations and Recalls, may telephone the toll free hotline 1-800-333-0510, or contact Transport Canada by mail at:

Transport Canada, ASFAD

Place de Ville Tower C

330 Sparks St.

Ottawa ON K1A 0N5.

For additional road safety information, please visit the Road Safety website at http://www.tc.gc.ca/roadsafety/menu.htm

Environmental Protection

WARNING

Diesel engine exhaust and some of its constituents are known to the State of California to cause cancer, birth defects, and other reproductive harm. Other chemicals in this vehicle are also known to the State of California to cause cancer, birth defects or other reproductive harm. This warning requirement is mandated by California law (Proposition 65) and does not result from any change in the manner in which KW/PB trucks are manufactured.

Some of the ingredients in engine oil, hydraulic oil, transmission and axle oil, engine coolant, diesel fuel, air conditioning refrigerant (R12, R134a, and PAG oil), batteries, etc., may contaminate the environment if spilled or not disposed of properly. Contact your local government agency for information concerning proper disposal.

State of California

California Vehicle Code, Section 9951 - Disclosure of Recording Device

Your vehicle may be equipped with one or more recording devices commonly referred to as “event data recorders (EDR)” or “sensing and diagnostic modules (SDM)”. If you are involved in an accident, the device(s) may have the ability to record vehicle data that occurred just prior to and/or during the accident.

For additional information on your rights associated with the use of this data, contact the California Department of Motor Vehicles - Licensing Operations Division or http://www.dmv.ca.gov/pubs/vctop/d03_6/vc9951.htm

California Proposition 65 Warning

Diesel engine exhaust and some of its constituents are known to the State of California to cause cancer, birth defects, and other reproductive harm.

Other chemicals in this vehicle are also known to the State of California to cause cancer, birth defects or other reproductive harm.

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.

Operator's Manual Supplement

Greenhouse Gas Certification Label

Definition of greenhouse gas label identifiers.

This vehicle may be equipped with components that are identified as Greenhouse Gas Certified components (GHG). A label on the door is printed with codes that identify the components manufactured on the vehicle that are part of the GHG certification. The codes are translated in the following table:

Emission Control Identifier	Emissions Related Components
VSL, VSLS, VSLE, or VSLD	Engine Software parameters that affect the Vehicle Speed Limiter
IRT5, IRTE	Engine software parameters that affect the automatic engine shutdown timer
ARFR	Adjustable height aerodynamic roof fairing
TGR	Gap reducing fairing (tractor to trailer)

Emission Control Identifier	Emissions Related Components
LRRA, LRRD, or LRRS	Greenhouse Gas (GHG) Tires

Greenhouse Gas Certified Tires

Verify if your vehicle is equipped with Greenhouse Gas certified tires by checking the Vehicle Emission Control label on the driver's side door frame. If these tires were installed at the factory, Lower Rolling Resistance codes (LRR) identify which tires are certified.

> **NOTE**
>
> The tires installed on this vehicle at the factory as original equipment may be certified for Greenhouse Gas and Fuel Efficiency regulations. Replacement tires must be of equal or lower rolling resistance level (TRRL or Crr). Consult with your tire supplier(s) for appropriate replacement tires.

In order to limit the rolling resistance of the tires and optimize fuel economy, the maintenance procedures specified by the tire manufacture must be followed. Please see Vehicle Emissions Limited Express Warranty for warranty on greenhouse gas certified tires.

Vehicle Emissions Limited Express Warranty

Original Equipment Tires

PACCAR Inc. warrants the tires installed as original equipment on this vehicle only against defects in materials and workmanship which cause the vehicle to fail to comply with applicable U.S. and Canadian greenhouse gas emission limits ("Warrantable Emissions Failures"). This vehicle emissions limited express warranty relating to original equipment tires is valid for two (2) years or 24,000 miles (38,000 km), whichever occurs first. YOUR SOLE AND EXCLUSIVE REMEDY AGAINST PACCAR Inc. IS LIMITED TO THE REPAIR OR REPLACEMENT OF ORIGINAL EQUIPMENT TIRES, SUBJECT TO PACCAR'S TIME AND MILEAGE LIMITATIONS LISTED ABOVE. This Vehicle Emissions Limited Express Warranty relating to original equipment tires begins on the date of delivery of the vehicle to the first purchaser or lessee and accrued time and mileage is calculated when the vehicle is brought in for correction of the Warrantable Emissions Failures relating to the original equipment tires. PACCAR MAKES NO OTHER VEHICLE EMISSIONS WARRANTIES RELATING TO THE ORIGINAL EQUIPMENT TIRES, EXPRESS OR IMPLIED. WHERE PERMITTED BY LAW, PACCAR EXPRESSLY DISCLAIMS ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE RELATING TO VEHICLE EMISSIONS. PACCAR AND THE SELLING DEALER SHALL NOT BE LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES INCLUDING, BUT NOT LIMITED TO: LOSS OF INCOME OR LOST PROFITS; VEHICLE DOWNTIME; COMMUNICATION EXPENSES; LODGING AND/OR MEAL EXPENSES; FINES; APPLICABLE TAXES OR BUSINESS COSTS OR LOSSES; ATTORNEY'S FEES; AND ANY LIABILITY YOU MAY HAVE IN RESPECT TO ANY

OTHER PERSON OR ENTITY RELATING TO WARRANTABLE EMISSIONS FAILURES. This Vehicle Emissions Limited Express Warranty relating to original equipment tires is limited to emissions compliance only. The tires are separately warranted by their manufacturer for defects in materials and workmanship other than those which cause non-compliance with U.S. and Canadian GHG regulations, subject to limitations and conditions contained within the tire manufacturer's warranty agreement. You are responsible for the safe operation and maintenance of the vehicle and its tires. PACCAR does not warrant wear and tear of the tires.

Greenhouse Gas (GHG) Components Other Than Tires

This GHG vehicle Warranty applies to the vehicle (hereafter, vehicle) certified with the US Environmental Protection Agency.

Your Warranty Rights and Obligations

This vehicle is warranted for components that directly impact the manufacturers GHG certification with the US Environmental Protection Agency. PACCAR must warrant these components for the periods of time listed below provided there has been no abuse, neglect or improper maintenance of the vehicle. If a GHG-related part on your vehicle is found to have a defect in material or assembly, the part will be repaired or replaced by PACCAR.

Manufacturer's Warranty Coverage

This warranty coverage is provided for five years or 100,000 miles (160,000 km), whichever first occurs, from the date of delivery of the vehicle to the first purchaser or first lessee. Where a Warrantable Condition exists, PACCAR will diagnose and repair the vehicle, parts and labor included, at no cost to the first purchaser or first lessee and each subsequent purchaser or lessee. This warranty does not override any extended warranty purchased to cover specific vehicle components.

Owner's Warranty Responsibilities

The vehicle owner is responsible for performing required maintenance that is listed in your engine and vehicle Operator's Manuals. The owner is responsible for presenting the vehicle to a service location as soon as a problem exists. Any warranty repairs should be completed in a reasonable amount of time. Retain all receipts covering maintenance on this equipment. PACCAR cannot deny warranty solely for the lack of receipts or for the failure to ensure the performance of all scheduled maintenance. PACCAR may deny warranty coverage if a vehicle component has failed due to abuse, neglect, improper maintenance, unapproved modifications (both physical components and computer programming) or using non-Original Equipment replacement parts. If there are any questions regarding these warranty rights and responsibilities, please contact the vehicle OEM manufacturer at the customer center telephone number provided with the vehicle operating instructions. Prior to the expiration of the applicable warranty, Owner must give notice of any warranted failure to an authorized PACCAR dealer and deliver the vehicle to such facility for repair. Owner is responsible for incidental costs such as: communication expenses, meals, lodging incurred by Owner or employees of Owner as a result of a Warrantable Condition. Owner is responsible for downtime expenses, cargo damage, fines, all applicable taxes, all business costs, and other losses resulting from a Warrantable Condition. Owner is responsible for maintaining all emissions

related engine and vehicle computer program settings in accordance with manufacturer specifications. This responsibility includes GHG specific settings that may not be altered before the GHG-related expiration mileage has been reached for each system. Owner is responsible for maintaining all physical parts related to GHG-regulations in the as-built configuration and in proper working order for the full regulatory useful life of 435,000 miles (700,000 km) for Class 8 vehicles, 185,000 miles (300,000 km) for Class 6-7, and 110,000 miles (177,000 km) for Class 5.

Replacement Parts

PACCAR recommends that any service parts used for maintenance, repair or replacement of GHG components be new or genuine approved rebuilt parts and assemblies. The use of non-genuine engine or vehicle replacement parts that are not equivalent to the PACCAR engine or OEM vehicle manufacturer's original part specification as built from the factory may impair the engine and vehicle emissions control system from working or functioning effectively, and may jeopardize your GHG warranty coverage. In addition, genuine vehicle or engine parts must be replaced with the same material and function as the part assembled on the vehicle from the factory. The owner may elect to have maintenance, replacement or repair of the emission control parts performed by a facility other than an authorized PACCAR dealer and may elect to use parts other than new or genuine approved rebuilt parts and assemblies for such maintenance, replacement or repair; however, the cost of such service or parts and subsequent failures resulting from such service or parts may not be fully warranted if the manufacturer determines that the replacement part is not of similar material and function as the OEM part assembled to the vehicle at the factory.

PACCAR Responsibilities

The warranty coverage begins when the vehicle is delivered to the first purchaser or first lessee. Repairs and service will be performed by any authorized PACCAR dealer using new or genuine approved rebuilt parts and assemblies PACCAR will utilize replacement parts that are selected and installed to support the GHG compliance certification. PACCAR will repair parts found by PACCAR to be defective without charge for parts or labor (including diagnosis which results in determination that there has been a failure of a warranted part).

Warranty Limitations

Sole and exclusive remedy against PACCAR and the Selling Dealer arising from the purchase and use of this vehicle is limited to the repair or replacement of "warrantable failures", for replacement parts that are similar in material and function to OEM specifications and subject to PACCAR's time, mileage, and hour limitations of the greenhouse gas warranty. The maximum time, mileage and hour limitations of the warranty begin with the Date of Delivery to the first purchaser or first lessee. The accrued time, mileage, or hours is calculated when the vehicle is brought in for correction of warrantable failures. PACCAR is not responsible for failures or damage resulting from what PACCAR determines to be abuse, neglect or uncontrollable acts of nature, including, but not limited to: damage due to accident; operation without adequate coolants or lubricants; overfueling; overspeeding; lack of maintenance of cooling, lubricating or intake systems; improper storage, starting, warm-up, run-in or shutdown practices; unauthorized modifications to the vehicle and its components. PACCAR is also not

responsible for failures caused by incorrect oil, fuel or diesel exhaust fluid or by water, dirt or other contaminants in the fuel, oil or diesel exhaust fluid. Failure of replacement parts used in repairs due to the above non-warrantable conditions is not warrantable. This warranty is void if the vehicle is altered with parts that do not meet the material and functional specifications as manufactured from the factory. Any alterations to vehicle or engine computer settings will void GHG warranty and potentially cause the vehicle to become non-compliant with the GHG regulation of the EPA Clean Air Act. Any alterations to GHG specific settings prior to the GHG related expiration mileage for each system will void GHG warranty and potentially cause the vehicle to become non-compliant with the GHG regulation of the EPA Clean Air Act. This warranty is void if certain GHG components are not properly maintained and thus cannot perform to their designed capability. PACCAR is not responsible for failures resulting from improper repair or the use of parts which are not genuine approved parts. PACCAR is not responsible for the material and labor costs of emission control parts and assemblies replaced during Scheduled Maintenance of the engine as specified in PACCAR Operator's Manuals. THIS WARRANTY, TOGETHER WITH THE EXPRESS COMMERCIAL WARRANTIES ARE THE SOLE WARRANTIES MADE BY PACCAR IN REGARD TO THIS VEHICLE. THIS LIMITED GHG WARRANTY IS THE SOLE WARRANTY MADE BY PACCAR AND THE SELLING DEALER. EXCEPT FOR THE ABOVE LIMITED WARRANTY, PACCAR AND THE SELLING DEALER MAKE NO OTHER WARRANTIES, EXPRESS OR IMPLIED. PACCAR AND THE SELLING DEALER EXPRESSLY DISCLAIM ANY WARRANTY OF MERCHANTABILITY OR WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE. PACCAR AND THE SELLING DEALER SHALL NOT BE LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES INCLUDING, BUT NOT LIMITED TO: LOSS OF INCOME OR LOST PROFITS; ENGINE OR VEHICLE DOWNTIME; THIRD PARTY DAMAGE, INCLUDING DAMAGE OR LOSS TO OTHER ENGINES, VEHICLES OR PROPERTY, ATTACHMENTS, TRAILERS AND CARGO; LOSS OR DAMAGE TO PERSONAL CONTENTS; COMMUNICATION EXPENSES; LODGING AND/OR MEAL EXPENSES; FINES; APPLICABLE TAXES OR BUSINESS COSTS OR LOSSES; ATTORNEYS' FEES; AND ANY LIABILITY YOU MAY HAVE IN RESPECT TO ANY OTHER PERSON OR ENTITY.

Glossary

Driver Performance Assistant - A feature made possible by the vehicle's electronic monitoring and guard functions. It can help the driver gain insight into how the vehicle is used.

Menu Control Switch - menu control knob for the instrument cluster system

Event - Events generate scores which are then registered to evaluate driver performance. Events can be:

- An anticipation event or a coasting event. These events are registered whenever the vehicle coasting speed decreases by at least 3 mph (5 km/h).
- A brake saving event (efficient wear). This event is registered whenever the vehicle speed decreases by at least 6 mph (10 km/h), including some element of braking under foot.
- A driving time interval is not only the current drive. It is the total distance traveled since the last reset of the DPA. The average fuel consumption over a driving time interval (as measured by Driver Performance).

GAWR - Gross Axle Weight Rating is the total weight that one axle is designed to transmit to the ground. You will find this number listed on the driver's door edge.

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