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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.
The vehicles covered by this handbook consist of various types and models. Individual vehicles are furthermore constructed in accordance with the legal regulations in the country concerned and in accordance with the expected operating conditions. Certain descriptions or illustrations in this handbook may therefore not correspond entirely to the situation on your own vehicle. However, this has practically no influence on its operation or maintenance.

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 maintenance"** and **"Driving"** sections.

Warnings and Safety Regulations

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WARNING SYMBOLS

To ensure the highest level of safety in the operation of your vehicle, various warnings are included in this handbook. Each warning is indicated by a special warning symbol.

When text is accompanied by the adjacent warning symbol, this indicates that the information in question is very important for the health and/or safety of those concerned.

Disregarding this information may result in serious damage, injury or even death.

D000501

When text is accompanied by the adjacent warning symbol, this indicates that the information in question is very important for the operating safety of the vehicle.

Disregarding this information may result in the loss of directional stability, steering problems or the vehicle otherwise getting out of control, causing serious damage, injury and other life-threatening situations.

WARNINGS AND SAFETY REGULATIONS

To prevent damage to the vehicle and in order not to jeopardise 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

Modifications to the vehicle or the vehicle configuration may require the reprogramming of electronic units by an approved an authorized dealer.

Engine

Do not run the engine in an enclosed or unventilated area.

Make sure exhaust gases are properly extracted.

Components

Remain at a safe distance from rotating and/or moving components.

Cooling system filler cap

Do not remove the filler cap of the cooling system when the engine is at operating temperature. Do not loosen the filler cap of the cooling system when the cab is tilted.

Warning triangle

Ensure that you are always in possession of a hazard warning triangle (obligatory in certain countries), possibly in combination with other marking equipment.

In the event of a breakdown en route, wear reflective clothing when outside the vehicle.

Fire extinguisher

Ensure that you are always in possession of a fire extinguisher (obligatory in certain countries). 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. Therefore do not touch any fire extinguisher fluid on the vehicle without protective gloves.

Cab

Make sure there are no loose objects on the floor on the driver's side. Bottles, cans etc. may get stuck under the brake pedal while driving, giving rise to extremely dangerous situations.

While driving, do not use the clutch pedal as a footrest since this may cause excessive wear of the clutch.

First aid kit

Ensure that you are always in possession of a first aid kit (obligatory in certain countries). Replace first aid items as soon as possible after use to make the kit complete again.

Winter conditions

When winter driving conditions are expected (especially if the vehicle is operated in mountainous areas), make sure that your vehicle is fitted with winter tires or that you have snow chains with you. Also refer to "Maintenance operations before the winter season" in "Inspections and maintenance".

Load

The load should always be properly secured so that it cannot move, not even during an emergency stop. Remember that sidewalls, partitions, etc. are often not designed to withstand high forces.
Loads must not project more than is permitted by local regulations.
Bear in mind that the stability of the vehicle may be impaired by the load and that you may also need a larger turning circle.
Make sure when loading that the following values are not exceeded:

- maximum permissible gross combination weight (GCW)
- maximum permissible gross vehicle weight (GVW)
- maximum permissible axle load

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, windscreen 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.

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.

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.

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.)

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

Maintenance of air conditioning system

The air conditioning system contains coolant under high pressure. Removal of any parts of the air conditioning system is not permitted. Work on the air conditioning system may only be carried out by qualified personnel.

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

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 to optimise 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, gearbox or differential has been installed. Therefore, for the first 1,500 km (932 miles): drive carefully and avoid accelerating sharply.

The following technical items of special importance apply 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 and 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.

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.

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 vehicle is equipped with a **24-Volt** electrical system.
When replacing or fitting electrical or electronic components, always verify that they are suitable for this system voltage.

Batteries

Never disconnect the battery leads while the engine is running!

Always charge batteries in a properly ventilated area and avoid sparking and naked flames due to the danger of explosion.

Always disconnect the battery earth lead before carrying out repairs or service on the electrical system.
Never place tools on a battery. This may cause a short circuit and may even cause the battery to explode.

Charging

Thaw out frozen batteries before charging them. Remove all the filler caps before charging.

Connect the positive lead (+) of the battery charger to the positive terminal (+) of the battery first and then the negative lead (–) to the negative terminal (–).
After charging, switch off the battery charger and then disconnect the negative terminal (–) and subsequently the positive terminal (+).
For normal charging, the battery leads may remain in place.
Fast charging should only be used in an emergency. For "fast charging" **both** battery leads must be disconnected, otherwise the electronics may become defective.

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

If the larger consumers, such as the cab heater, refrigerator, coffee percolator, microwave oven or tail-lift are used, it is recommended that you obtain batteries of a higher capacity in consultation with your dealer.

Welding

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

Starting with auxiliary batteries

The engine may be started with the aid of jump leads using the power from separate auxiliary batteries (approx. 24 V) or from another vehicle with the engine running (approx. 28 V). **When this starting procedure is followed, the battery leads must not be disconnected.** Connect the jump leads first to the positive terminal (+) and then to the negative terminal (–). To disconnect, first release the negative terminal (–) and then the positive terminal (+).
In the event that the batteries are **fully** discharged and the engine is running, it is important that the jump leads are **not immediately** disconnected. The engine must be allowed to run for at least 2 to 3 minutes before the jump leads are disconnected to prevent damage to the electrical system (peak voltage!).

Proceed as follows as soon as the engine starts running:

- switch on as many power consumers as possible (for example: headlights, fog lamps, heater fan, etc.);
- remove the jump leads after the engine has run for 2 to 3 minutes;
- switch off the consumers again.

Never start the engine using a fast charger!

Mobile telephones and transmitters

If mobile telephones and transmitting equipment are used, the following points must be taken into account:

- Mobile telephones or transmitters must not be used in the vehicle without a separate outside aerial!

The use of mobile telephones or transmitters without a separate outside aerial may cause excessively high electromagnetic fields in the cab interior (resonance effect). In this case, there may be interference to the operation of the vehicle electronics.

- Moreover, an outside aerial is necessary in order to achieve the maximum range of the equipment.

Note:

It is important to observe the instructions for use of mobile telephones and transmitters!

Original components

In order to meet the warranty conditions and guarantee the service life, safety and reliability, the use of **non** original components, sensors and engine management units/software is not permitted. The application of engine management software that has not been approved will adversely affect critical systems in terms of the safety of the vehicle, the braking system for instance.

AIRBAG SAFETY INSTRUCTIONS

Vehicles equipped with an airbag and seat belt tensioner system can be identified by a sticker with the airbag symbol on the windscreen and the word "AIRBAG" on the airbag unit on the steering wheel. A vehicle equipped with an airbag also has an automatic seat belt tensioner.

Equipment or objects using strong electromagnetic radiation in the vicinity of the airbag or seat belt tensioner system may cause this system to fail or, in extreme cases, may cause the system to be activated. The use of such equipment or objects in the vicinity of airbag/seat belt tensioner systems is therefore not recommended.

Work

- The safety precautions laid down must be observed when repairing, removing or replacing the airbag or seat belt tensioner system or parts thereof. For this reason, have this work carried out by an approved Service dealer or workshop only.
- Do not make any modifications to the airbag and seat belt tensioner system or parts thereof. This would cause an injury hazard and correct activation can then no longer be guaranteed.
- Safety precautions regarding the airbag and seat belt tensioner system must be observed when the vehicle is scrapped or dismantled.
- Retrofitting of accessories is only permitted if the accessories have been approved for vehicles with an airbag and seat belt tensioner. Installation must take place at the position indicated and according to the procedure specified by.

- When replacing the windscreen, observe a longer drying time for the windscreen sealant. This longer drying time is usually stated on the windscreen sealant packing/tube. If in doubt, contact an authorized dealer or the windscreen sealant supplier.
- If any welding is required, observe safety precautions for welding jobs.

Operation

- The airbag and seat belt tensioners are activated in the event of a (nearly) head-on collision when a specific vehicle deceleration is exceeded. The airbag and seat belt tensioners will not be activated when:
  - the ignition is switched off.
  - the vehicle is involved in a minor head-on collision.
  - the vehicle is involved in a lateral collision.
  - the vehicle is involved in a tail collision.
  - the vehicle overturns.
- The system only provides optimal protection when the seat belt is correctly worn and the seat, seat belt and steering wheel are well adjusted to the driver.

Do not keep any parts of the body (trunk, hand, head, foot) unnecessarily close to the airbag cover.

The space between the driver and airbag must be free. Do not place any animals, objects or persons between the driver and the airbag.

Hold the steering wheel by the outer rim as much as possible to allow unimpeded deployment of the airbag.

Activation

- If the airbag is activated in a collision, a white powder/gas will be released. This is in no way an indication of fire. The powder itself is not health-damaging.
- The airbag and seat belt tensioners can be activated only once. After activation of the system the parts must be replaced by an authorized Service dealer to provide the same protection.
- In the event of a minor collision not causing the airbag and seat belt tensioner system to be activated, it is recommended to have the system checked as yet by an authorized Service dealer.

The airbag fabric could cause slight injury because of the rapid movement of the airbag during activation. People wearing spectacles and persons smoking when driving run an increased risk of facial injury in a collision involving deployment of the airbag. Usually the injuries are by no means as serious as the injuries that may occur in a collision without airbag and seat belt tensioners.

Avoid touching parts of the airbag shortly after deployment of the airbag unit because they may be hot.

Inspections

- The system is only functioning correctly if:
  - after turning the ignition on, an airbag message appears on the master display which disappears after approx. 5 to 10 seconds.
- The system is not functioning correctly if:
  - after turning the ignition on, no airbag message appears on the master display.
  - the airbag message on the master display has still not disappeared after approx. 10 seconds after turning on the ignition.
  - the airbag message appears on the master display when driving.
- If the system signals a fault, it will be unable to activate the airbag and/or seat belt tensioners and will therefore not provide extra protection in the event of a collision. Have the fault remedied by an approved Service dealer as soon as possible.

Maintenance

- Clean the airbag cover only with a dry or damp cloth. If it is heavily fouled, ask an authorized Service dealer for an approved cleaning agent.

Do not stick anything to the airbag cover. Do not treat the cover with a cleaning agent, solvent, grease, paint, lacquer or other substance.

Check that the cover of the airbag unit is not damaged. Do not damage the tear seams or the cover of the airbag unit.

- After a maximum of 15 years the main components of the airbag and seat belt tensioner system must be replaced by an authorized Service dealer. This does not apply to the electronic unit, which must be replaced after 10 years.

Sales

- If ownership of the vehicle is transferred, the previous owner must make the new owner aware of the above instructions.

Alarm System

THE SYSTEM

The theft protection system consists of several forms of protection, which each protect the vehicle in a different way:

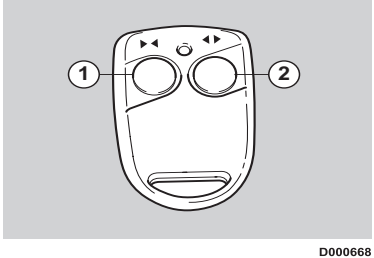
- The immobiliser (electronic drive-off lock) prevents the engine from being started without the correct key.

Note:

If a vehicle does not have an alarm system but it does have an immobiliser, there will always be a system LED. This LED will flash at a low frequency when the ignition is switched off.

- The acoustic and visual alarms ensure that, as soon as unauthorised persons gain access to the vehicle, this can be seen and heard from outside.

USE OF THE HAND-HELD TRANSMITTER



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The alarm system is activated by pressing the button (1) on the hand-held transmitter. The warning lights will come on for 3 seconds.

Do not press the hand-held transmitter buttons unnecessarily hard. Check whether the system is working with the warning lights.

The doors, cab tilting mechanism, interior and loadspace (if this has an alarm system) are now protected.
In addition, the starting option is now locked.

The system LED will flash at a slow rate after approx. 50 seconds.

The system is now fully operational.

Ensure that there is nothing in the interior that can cause a false alarm, e.g. moving objects in the cab.

Pressing the button (2) on the hand-held transmitter results in the system deactivating itself. This is indicated visually by the warning lights lighting up 3 times.

SELF-DIAGNOSIS

The electronic anti-theft system has an extensive self-diagnostic function. Following activation, all detection circuits (for the interior, grille, cab tilting mechanism and doors) are automatically tested.

If a fault is found in one or more of these detection circuits, the affected circuit(s) is (are) switched off. This is made noticeable by a short signal from the siren immediately after activation of the alarm system.

If this signal is heard, first of all check whether the windows and/or doors are closed properly.
Turn the alarm system off, close everything carefully and switch on the alarm system again. If the short signal is heard once again, this means that the system is (partially) defective. You should then have the system looked at by your authorized Service dealer.

USE WHEN STAYING IN THE CAB

If people remain in the vehicle, the system may only be activated if the interior protection is switched off. This avoids unnecessary sounding of the alarm.
The interior protection is deactivated as follows:

1. Deactivate the alarm system.
2. Press the "Switch off interior detection" switch. See "Cab, instruments and controls". The system LED will come on for approx. 2 seconds.
3. Then activate the alarm system with button (1) on the hand-held transmitter. The interior protection has now been switched off. It is then possible to stay in the cab while retaining the other detection options.

If you want to leave the cabin from time to time, you must turn off the entire system using button (2) on the hand-held transmitter.

Outside the vehicle, you can now make the choice between:
- not activating the alarm system, or
- Activating the alarm system.

On returning to the cabin, you must carry out the procedure once again, to deactivate the interior protection.

Note:

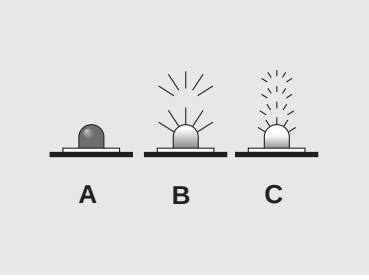
If the interior protection is **not** activated, the alarm **still works** on the doors and the cab lock. The start lock is also activated.

DEACTIVATION LOADSPACE DETECTION SUPERSTRUCTURE/TRAILER

If you need to access the loadspace of the superstructure/trailer while retaining the remaining detection options, the system can only be activated if the loadspace detection is switched off. This avoids unnecessary sounding of the alarm.
The loadspace detection is deactivated as follows:

1. Deactivate the alarm system.
2. Press the "Switch off loadspace detection superstructure/trailer" switch. See "CAB, INSTRUMENTS AND CONTROLS". The system LED will come on for approx. 2 seconds.
3. Then activate the alarm system with button (1) on the hand-held transmitter. The loadspace detection has now been switched off. It is then possible to stay in the loadspace while retaining the other detection options.

To protect the loadspace again, the alarm system should first be switched off and then back on again.



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THE SYSTEM LED

If the LED is off (A), the vehicle may be started.
If the LED flashes slowly (B), the alarm system has been activated.
If the LED flashes quickly (C), a self-test will be carried out or an error message is given by means of a flashing code.

If the system raised an alarm, the cause can be determined via the system LED by reading the flashing code (C).
This indication is displayed for 30 seconds after the system has been deactivated with button (2) of the hand-held transmitter.

Flashing code	Circuit
2	Ultrasonic, interior detection
3	Detection, driver's door
4	Cab detection approximation switch
5	Power supply after contact
6	Superstructure/trailer loadspace detection
8	Superstructure/trailer loadspace detection
9	Interrupted wire
10	Detection, co-driver's door
11	Radar sensor, interior detection

LOSS OF HAND-HELD TRANSMITTER

If you lose a hand-held transmitter, you must replace it as soon as possible. When replacing it, the lost transmitter can be rendered unusable by erasing the code from the central door locking memory.
Without hand-held transmitters, the alarm system can only be switched off by turning on the ignition.

SYSTEM DOES NOT RESPOND TO HAND-HELD TRANSMITTER

If the system does not respond to the hand-held transmitter, the following tips may provide a solution:

1. Check whether the battery of the hand-held transmitter is still working. This is indicated by whether or not the LED on the hand-held transmitter lights up.
2. If there is a strong radio transmitter in the area, the range of the hand-held transmitter can be considerably less. Operate the hand-held transmitter as close as possible to the electronic unit. It is located at the front of the vehicle, on the driver's side.
3. If the system does not respond to the transmitter at all, you can switch off the alarm system by opening the vehicle with the ignition key and then starting it. The alarm system cannot be activated with the ignition key.

BATTERY, HAND-HELD TRANSMITTERS

Recommendation: Ensure that two spare batteries (type CR 1620, 3V) are available at all times. Depending on the use, the battery life is between 3 and 12 months.

MAINTENANCE

Have the alarm system checked at least once per year by your authorized Service dealer. This guarantees optimum protection.

Watch the ultrasound sensors on both sides of the roof box. Make sure that they do not come loose or are pointed in a different direction. Ensure that the sensors have an "unrestricted view"; they must not be blocked by objects that might interfere with their operation.
Prevent the sensors from coming into contact with moisture or dirt.

DISCONNECTING THE VEHICLE BATTERY

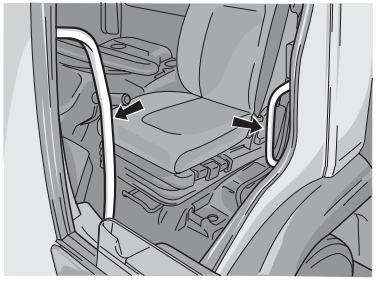
If the battery has to be disconnected without activating the signal horn, the alarm system should first be switched off using button 2 on the hand-held transmitter.

Cab, Instruments and Controls

CAB

The LF series has two cab versions:

D cab.	Day cab
S-cab.	Sleeper Cab



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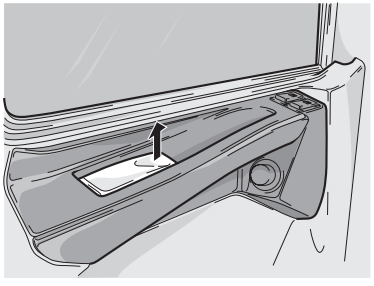
ENTERING AND LEAVING THE VEHICLE

To get into and out of the cab, use the grab handles on the left and right-hand door pillars and not the steering wheel. Also use all the steps and always face the cab when getting in or out.

DOORS

Do not drive the vehicle if the doors are not properly closed and locked!



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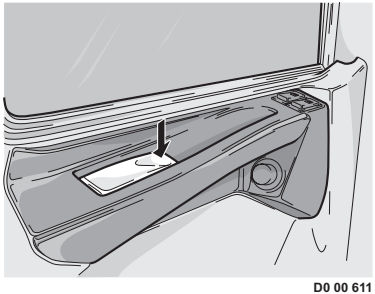
Opening the door

Pull the handle to open the door from the inside.



D0 00 611

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.

Central door locking

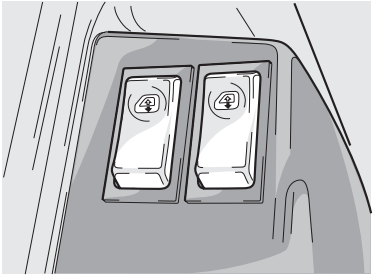
Unlocking

To open the doors of a vehicle with central door locking, use the same procedure as described above.

The door on the co-driver's side can be locked/unlocked using the switch on the centre console.

Locking

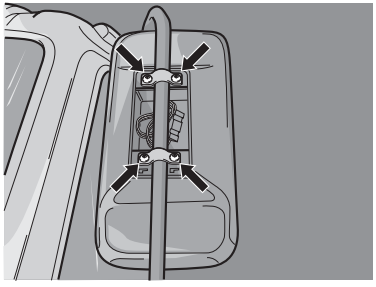
- Both doors are locked when one of the doors is closed with the key.
- To lock the doors from the inside, press button (B).
- If an alarm system has been installed, it will be activated if the doors are locked using the hand-held transmitter.
- Avoid locking yourself out!



D0 00 585

ELECTRICALLY OPERATED WINDOWS

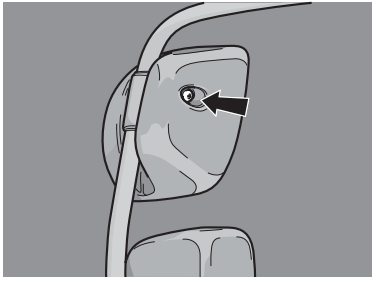
The switches only work when the ignition is switched on.
The driver's and co-driver's windows can be opened and closed with the switches in the driver's door. The switch in the co-driver's door can only open and close the co-driver's window.



D0 00 586

MIRRORS

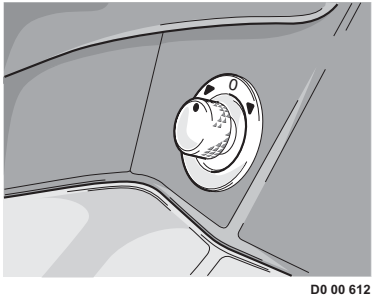
To adjust the mirrors, the cover must first be removed.



D0 00 577

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

On some models there is an extra wide angle mirror on the co-driver's side, in addition to the kerb view mirror, which gives the driver a better view of the drawn vehicle.



D0 00 612

ELECTRICAL MIRROR ADJUSTMENT

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

Select the right or left mirror by turning the button either to the right or left position.

Move the switch forwards, backwards, left or right, to adjust the mirror.

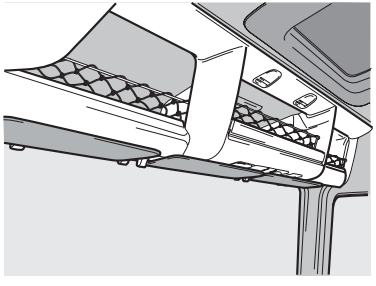
WINDSCREEN WIPER BLADES

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

Clean the wiper blades regularly with water and dry them with a soft cloth.

BUNKS

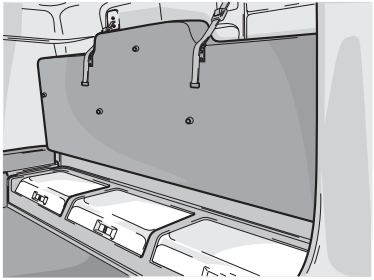
Depending on the cab type, there is a bunk behind the seats. This bunk can fold down or can be stored with the belts provided on the sides of the cab. There are three lockable storage compartments under the bunk.



D000565

ROOF CONSOLE - ODDMENTS SHELVES

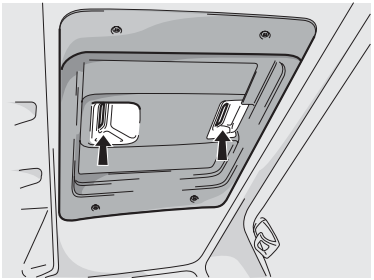
In the roof console there are three pigeon holes, which are protected by a half-high safety net. Do not place any heavy objects in these pigeon holes and ensure that any objects are constrained and unable to move freely.



D0 00 603

TOOL BOXES/STORAGE COMPARTMENTS

Under the bunk or behind and between the seats (depending on the cab type), there are storage compartments that can be closed with a covering flap.



D0 00 582

ROOF HATCH

Manual control

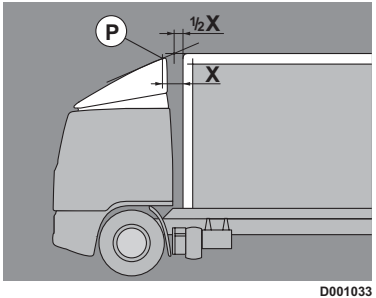
The manually operated roof hatch can be opened on both sides by countering the resistance met.

Electrical operation (optional)

The electrically operated roof hatch is opened and closed using a switch on the roof console.

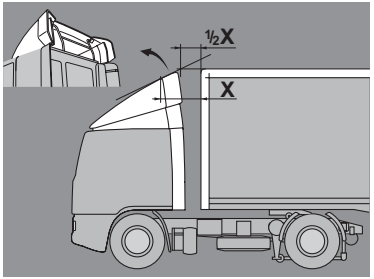
ADJUSTING ROOF SPOILER

Note:
Correct adjustment of the roof spoiler is essential to minimise fuel consumption.



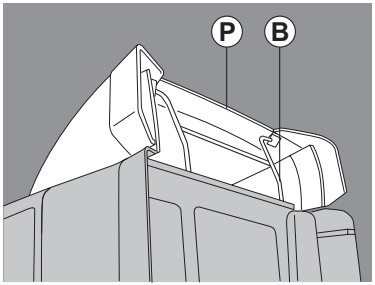
D001033

1. Place the vehicle on a level and horizontal surface. Make sure that in the case of a tractor/semi-trailer combination the tractor is straight in front of the semi-trailer.
2. Determine the centreline of the vehicle and put a slat on the superstructure roof protruding into the cab direction.



D001032

3. Both slats should cross at half the distance (½ X) between the roof spoiler edge and the start of the superstructure.
   The roof spoiler height can be adjusted using adjusting mechanism (B).



D001031

4. Put another slat (as a tangent) onto the outer roof spoiler edge (P) pointing into the direction of the superstructure.

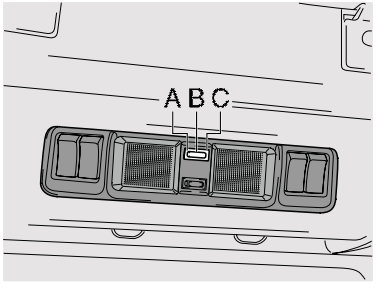
SUN VISORS

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



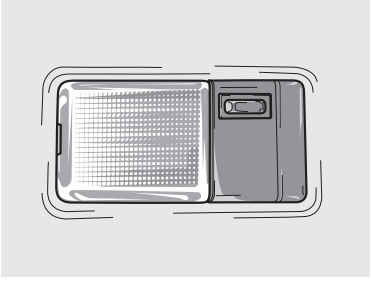
A The lights come on when a door is opened.

B Lights switched off.

C Lights on all the time.

The interior lighting operates independently of the position of the ignition key.

The cab lighting also includes a map reading lamp. It can be switched on by operating the bottom on/off switch.

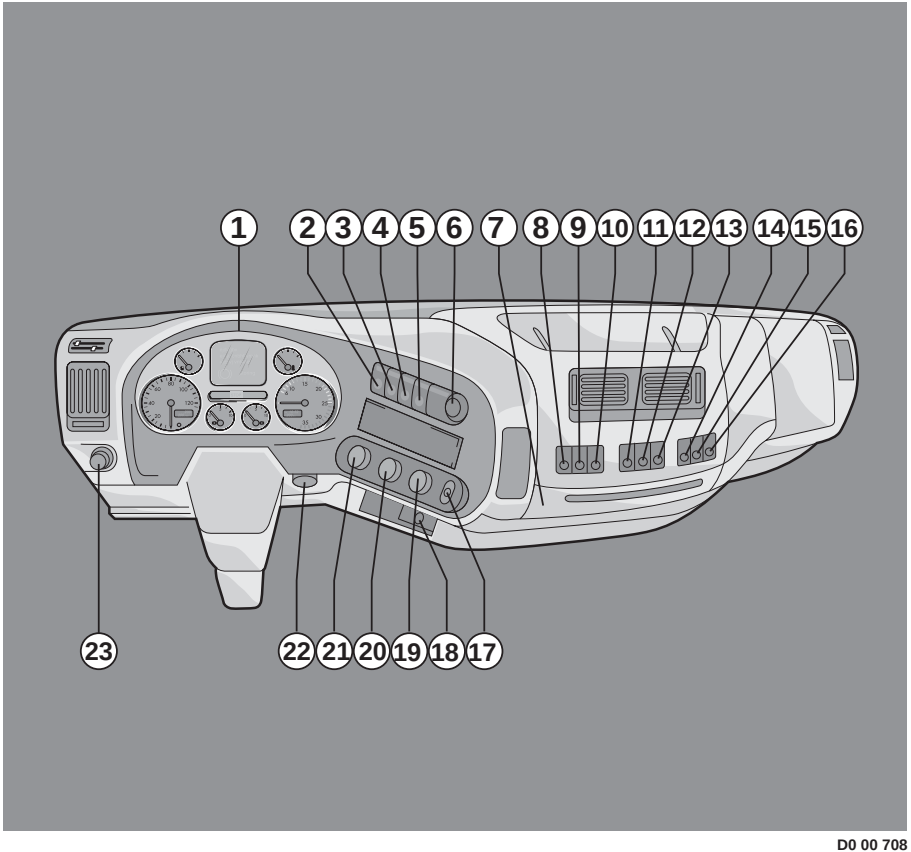


D0 00 573

BUNK LAMP

If the vehicle is equipped with a sleeper cab, there is a bunk lamp over each seat, each with its own on/off switch.

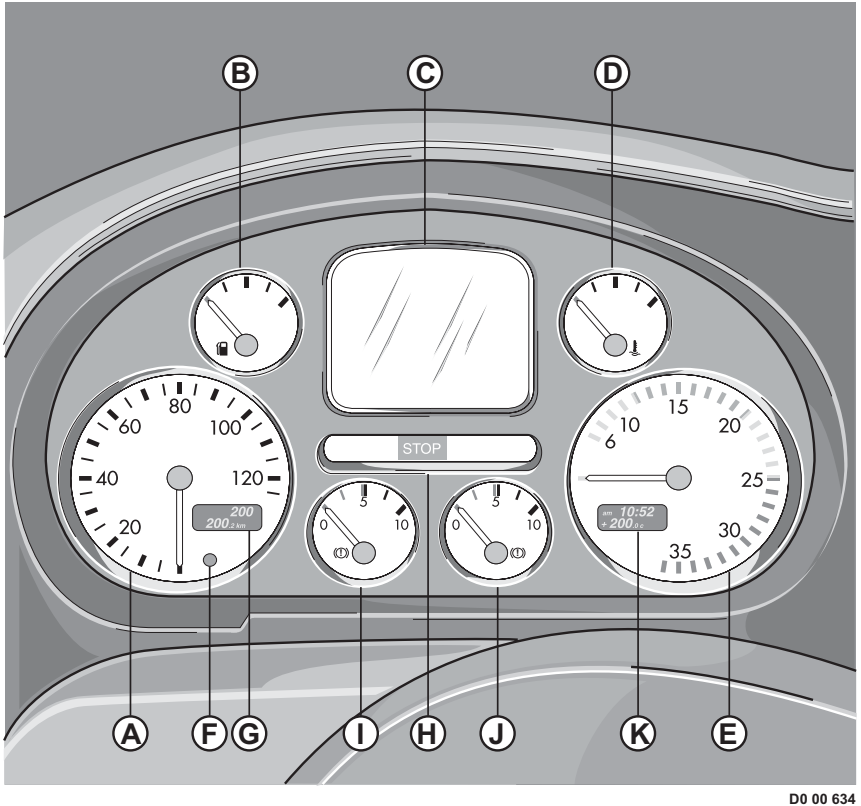
DASHBOARD



D0 00 708

1	Instrument panel
2	Dimmer, dashboard lighting
3	Differential lock
4	Vehicle speed limiter
5	Front/rear fog lights
6	Menu selection switch
7	Ashtray with 24V lighter
8	Hazard warning lights
9	Work lamp/loadspace lighting
10	Mirror/windscreen heating
11	Suppression switch, reversing alarm
12	Electrical master switch, transport of hazardous materials
13	Door lock, co-driver's side
14	Not in use
15	PTO operation
16	Switching off loadspace detection, superstructure/trailer
17	Air conditioning
18	12-V connection
19	Heater, fan speed selector switch in fresh air position or re-circulation position
20	Heater, temperature control
21	Heater, air distribution selector switch
22	Headlamp height adjuster
23	Lighting switch

INSTRUMENT PANEL



D0 00 634

A	Speedometer
B	Fuel gauge
C	Master display
D	Coolant temperature gauge
E	Rev counter
F	Reset button, trip odometer
G	Odometer and trip meter
H	Warning indicators
I	Air pressure gauge, circuit 1
J	Air pressure gauge, circuit 2
K	Outside temperature and clock

A. SPEEDOMETER

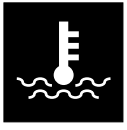
Depending on the vehicle model, the speedometer has a single scale division in km/h or a double scale division in km/h and mph.

B. FUEL GAUGE

The fuel gauge only operates when the contact is on.
Factor in the delay on the gauge when the contact is turned on.

C. MASTER DISPLAY

See "MASTER DISPLAY".



D. COOLANT TEMPERATURE GAUGE

The engine should not be operated under full load if the temperature is in the blue field.
The engine is at operating temperature when the temperature gauge is vertical, or slightly further.
If the coolant temperature suddenly rises and/or the pointer is in the red field, the following points should be checked:

- the coolant level (caution – danger of scalding; see "Topping up coolant" in "INSPECTIONS AND MAINTENANCE");
- the poly V-belt and water hoses;
- the fan clutch.

E. REV COUNTER

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

F. TRIP METER RESET BUTTON

The trip meter is set to zero with the reset button.

G. ODOMETER AND TRIP METER

The total distance is displayed in "km" or "mls" in the top section of the display.

H. WARNING INDICATORS

See section concerned.

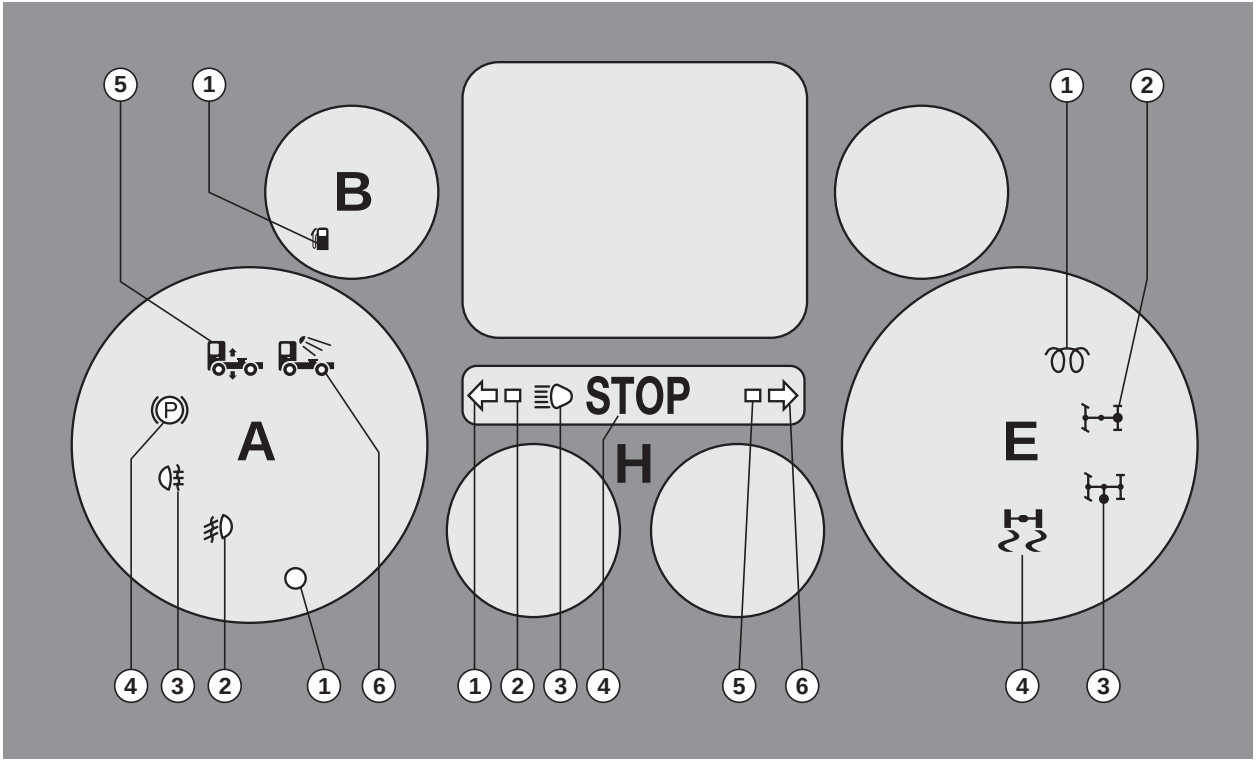
I. and J. AIR PRESSURE GAUGE, CIRCUITS 1 AND 2

Each 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 approx. 5 bar, an acoustic signal is generated and the warning symbol "Air system pressure too low" will illuminate in the master display. When the pressure is higher than 7 bar, the brakes can be released with the parking brake lever. The acoustic signal and warning symbol are only generated when the contact is on. The gauges also operate when the contact is off.
The vehicle must not be driven when the acoustic signal sounds or when the pressure in one of the circuits is lower than approx. 5 bar.

K. OUTSIDE TEMPERATURE AND CLOCK

The display is activated when the contact is on.
The clock is shown in the top section of the display.
The outside temperature is displayed in the bottom section in °C or °F.

WARNING INDICATORS



D0 00 786

A1	Tachograph fault
A2	Front fog light
A3	Rear fog light
A4	Parking brake
A5	Chassis not at normal driving level
A6	Work lamp/loadspace lighting
B1	Fuel level low
E1	Glow system
E2	Differential lock
E3	PTO
E4	ASR
H1	Left direction indicator, prime mover
H2	Left direction indicator, trailer
H3	Main beam
H4	Central "STOP" warning indicator
H5	Right direction indicator, trailer
H6	Right direction indicator, prime mover

A1. Tachograph fault
See "Messages" in "Tachograph" operating manual.

A2. Front fog light
This warning indicator lights up if the front fog lights are switched on.

A3. Rear fog light
This warning indicator lights up if the rear fog lights are switched on.

A4. Parking brake
This warning indicator lights up if the parking brake is applied, or when the pressure in the air system is too low to enable the parking brake to be released.

A5. Chassis not at normal driving level
This warning indicator stays on continuously if the chassis is not at normal driving height or when traction control is in operation.

A6. Work lamp/loadspace lighting
The warning indicator lights up when the work lamp/loadspace lighting is switched on.

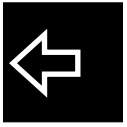
B1. Fuel level low
This warning indicator lights up when the reserve fuel level is reached. The fuel reserve then is about 10% of the tank capacity. Refuel as soon as possible.

E1. Glow system operating
If the contact is on, the electronic unit automatically determines the necessary preglowing and afterglowing times.
The necessary preglowing and afterglowing times depend on the temperature that is measured by the electronic unit of the engine management system.
If the preglowing or afterglowing function is activated by the electronic unit, this warning indicator lights up.

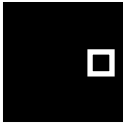
E2. Differential lock switched on
This warning indicator lights up when the differential lock is switched on.

E3. PTO engaged
This warning indicator lights up when the PTO is switched on.

E4. ASR
This warning indicator lights up if the ASR is active.



H1. Left direction indicator, prime mover
This warning indicator flashes together with the direction indicators on the prime mover.

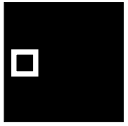


H2. Left direction indicator, trailer
On a truck/trailer or truck/semi-trailer combination, this warning indicator starts flashing as soon as the direction indicators are switched on.

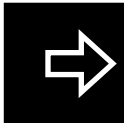
H3. Main beam
This warning indicator lights up if the main beam is switched on or the headlight flash is operated.

H4. Central "STOP" warning indicator
The central **"STOP"** warning light lights up when there is a serious fault in one of the vehicle functions. The master display shows which vehicle function has triggered the warning.

If the "STOP" warning indicator lights up and/or the buzzer is audible while driving, the vehicle must be stopped as soon as possible, parked in a safe place and the engine switched off. Have an authorized Service dealer correct the problem as soon as possible.

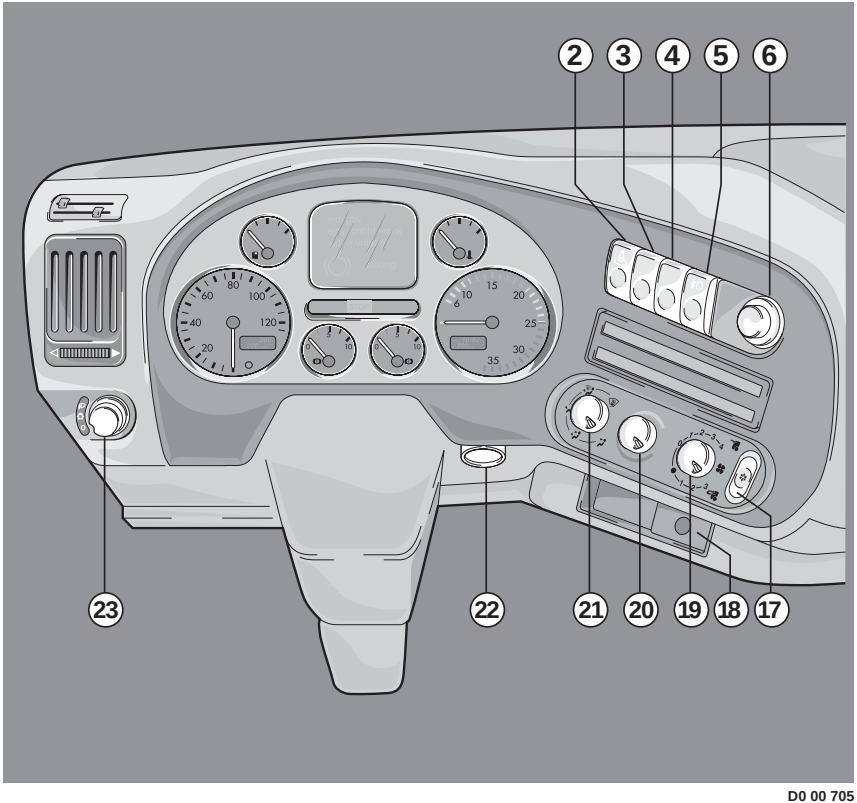


H5. Right direction indicator, trailer
On a truck/trailer or truck/semi-trailer combination, this warning indicator starts flashing as soon as the direction indicators are switched on.



H6. Right direction indicator, prime mover
This warning indicator flashes together with the direction indicators on the prime mover.

CONTROL PANEL



D0 00 705

2	Dimmer, dashboard lighting
3	Differential lock
4	Not in use
5	Depending on the version: - rear fog light - front and rear fog lights
6	Master display menu selection switch
17	Air conditioning
18	12-V connection
19	Heater, fan speed selector switch in fresh air position or re-circulation position
20	Heater, temperature control
21	Heater, air distribution selector switch
22	Headlamp height adjuster
23	Lighting switch

2. DIMMER, DASHBOARD LIGHTING

When the lighting is switched on, the dashboard lighting will also illuminate. The setting wheel enables dimming of the lighting.

3. SWITCH FOR CROSS-AXLE DIFFERENTIAL LOCK

The cross-axle differential lock can be activated with this switch.

Note:

This switch has a lock.

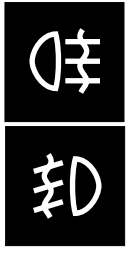
The differential lock should be engaged:

- with the vehicle stationary or moving very slowly;
- with the clutch pedal depressed.

Note:

For vehicles with automatic gearbox, the vehicle must be stationary and the gearbox in Neutral (N).

See also "DRIVING".



5. FOG LAMPS, FRONT/REAR

The switch can be a two or three-position switch. When there are just the rear fog lights, it will be a two-position switch. In case of rear fog lights and front fog lights, it will be a three-position switch. In position 2 only the front fog lights are on. In position 3 both the rear fog lights and the front fog lights are on. The switch springs back from position 3 into position 2. If both are switched on, the relevant warning indicators will light up on the display.

6. MASTER DISPLAY MENU SELECTION SWITCH

See "MASTER DISPLAY".

17. AIR CONDITIONING

See "CONTROL PANEL OF HEATING/VENTILATION SYSTEM"

18. 12V CONNECTION

A 12-V consumer can be hooked up to this connection, for example an inspection lamp. Do not connect any high loads (max. 180 W).

19, 20, 21. HEATER CONTROLS

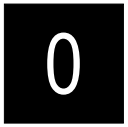
See "CONTROL PANEL OF HEATING/VENTILATION SYSTEM"

22. HEADLAMP HEIGHT ADJUSTER

With this switch, the headlamp beams can be aimed higher or lower as required by the driver.

Note:

Do not dazzle oncoming traffic.



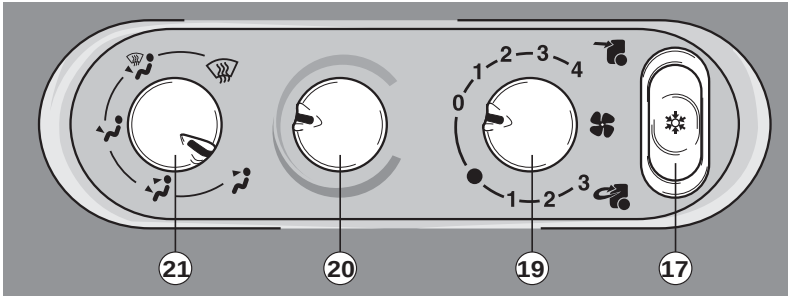
23. LIGHTING SWITCH

The vehicle lighting switch is a rotary switch with three positions:
position "0": lighting switched off

position "1": parking and marker lights on

position "2": headlamps, parking and marker lights on

CONTROL PANEL OF HEATING/VENTILATION SYSTEM



D0 00 672

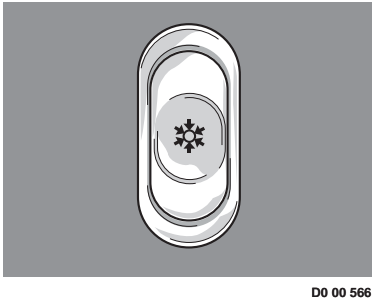
17 Air conditioning
19 Fan speed selector switch in fresh air or re-circulation position
20 Temperature adjustment
21 Air distribution

17. AIR CONDITIONING
See "AIR CONDITIONING SWITCH"

19. FAN SPEED
See "FAN SPEED SELECTOR SWITCH"

20. TEMPERATURE CONTROL
See "TEMPERATURE CONTROL"

21. AIR DISTRIBUTION
SEE "AIR DISTRIBUTION SELECTOR SWITCH"



D0 00 566

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 or draught on your body. Do not aim the air vents directly at your body.
4. Make sure that the temperature difference between the inside and outside of the cab does not exceed 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 prevent serious damage being caused 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 centre 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. Switch off the recirculation.
3. Open the vents on the centre console and at the 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.

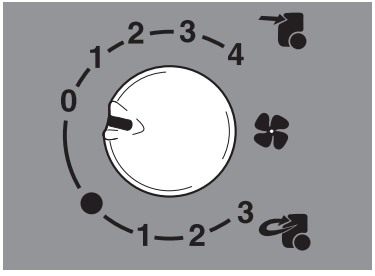
Note:

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

The air conditioning system contains coolant under high pressure. Removal of any parts of the air conditioning system is not permitted. Work on the air conditioning system may only be carried out by qualified personnel.

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.



D0 00 644

FAN SPEED SELECTOR SWITCH

FRESH AIR POSITION OR RE-CIRCULATION POSITION

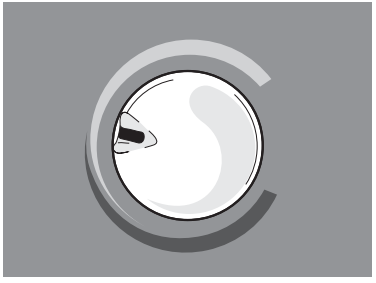
The fan has two speeds: one applies to re-circulation the other to fresh air. The re-circulation position is suited to quickly de-mist or cool the cab with the air conditioning, quickly heat the cab, de-frost the windows with the heater and keep out undesirable odours.

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 degrading and moisture increasing.

Fan speeds with fresh outside air ventilation valve open

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



D0 00 614

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 re-circulation. In damp weather conditions it is recommended to reopen the re-circulation flap after heating to prevent the windows from misting.

AIR DISTRIBUTION SELECTOR SWITCH

D0 00 643

Dashboard

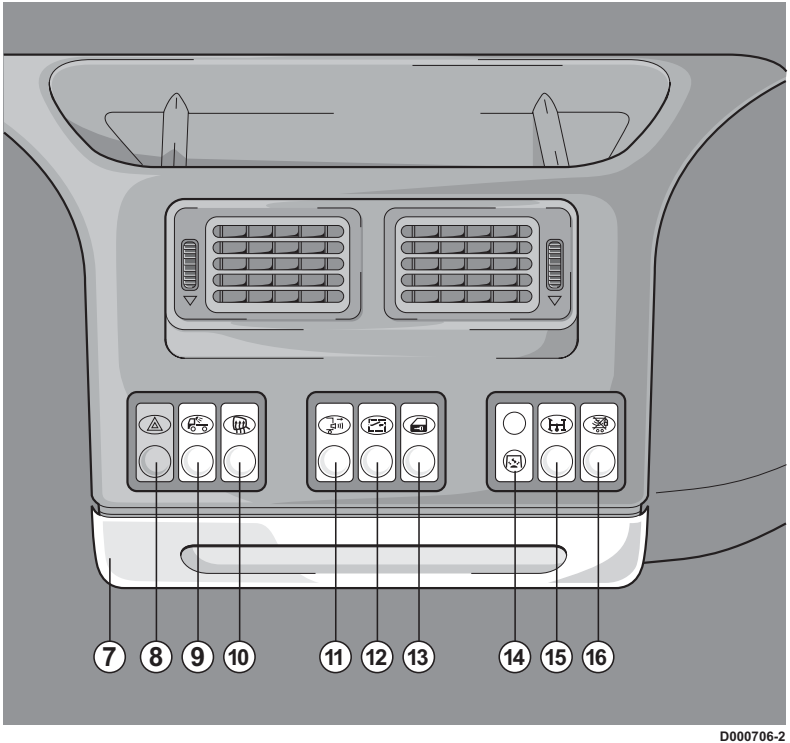
Dashboard vents and footwell

Footwell vent

Footwell and windscreen vents

Windscreen

CENTRE CONSOLE



D000706-2

7	Ashtray with 24V lighter
8	Hazard warning lights
9	Work lamp/loadspace lighting
10	Mirror/windscreen heating
11	Suppression switch, reversing alarm
12	Electrical master switch, transport of hazardous materials
13	Door locking, co-driver's side.
14	Auxiliary heater indicator
15	PTO operation
16	Deactivating the superstructure/drawn vehicle loadspace detection

7. ASHTRAY
In the centre console is an ashtray with lighter for the driver and co-driver.
The lighter plug can also be used as a 24V power supply for a 24V inspection lamp, for example. Do not connect any consumer above 180 Watt.
To remove the ashtray, there are two springs on the top of the tray which should be pressed in, after which the tray can be removed.

8. 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 indicates that the hazard warning is switched on.

9. WORK LAMP/LOADSPACE LIGHTING
This switch operates the lighting at the rear of the cab or in the loadspace.

10. MIRROR/WINDSCREEN HEATING
With the switch for mirror/windscreen heating in the centre console, the exterior mirrors (excluding the kerb mirror) and the windscreen heating, if fitted, can be heated.
When you press the switch again, the mirror heating is switched off while the windscreen 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.

11. SUPPRESSION SWITCH, REVERSING ALARM
With this switch, the reversing alarm can be switched off when reversing. The following time you engage reverse, the alarm will sound again.

12. ELECTRICAL MASTER SWITCH, TRANSPORT OF HAZARDOUS MATERIALS
Depending on the (country) version, this switch **- in combination with the master switch outside the cab** (usually in the area of the battery pack) **-** can deactivate the vehicle's electrical system (with the exception of the tachograph).

Take care not to deactivate the vehicle's electrical system with this switch during NORMAL DRIVING!

Note:

The master switch can be switched on and off with this switch.
The engine must be switched off when the main switch is operated. Avoid inappropriate use.
The master switch outside the cab can always be operated manually to deactivate the vehicle's electrical system. Read the instructions on or near the master switch.
Always deactivate the vehicle's electrical system when the vehicle is parked.

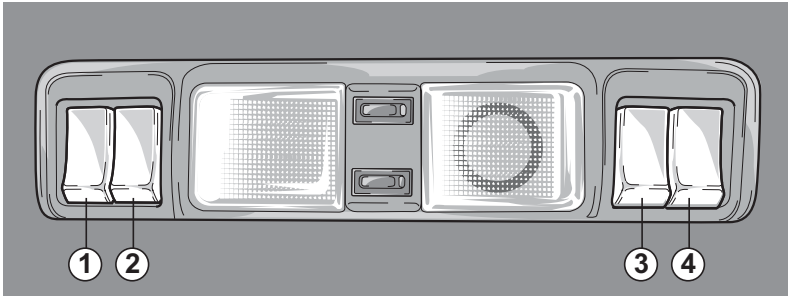
13. DOOR LOCKING AT CO-DRIVER'S SIDE
See "DOORS".

14. AUXILIARY HEATER INDICATOR
See "AUXILIARY CAB HEATER (AIR HEATING)"

15. PTO OPERATION
With this switch, the Power Take Off can be engaged, if necessary in combination with the variable speed engine control. Engage the PTO only when the programmed engaging conditions are met.

16. SWITCHING OFF LOADSPACE DETECTION SUPERSTRUCTURE/TRAILER
See "ALARM SYSTEM".

ROOF CONSOLE



D0 00 589

1 Electric roof hatch
2 Rotating beacon
3 Switch "switch off cab interior detection"
4 Alarm system LED

1. ELECTRIC ROOF HATCH

This switch opens and closes the optional roof hatch (partially).

2. ROTATING BEACON

If fitted, the rotary beacons on the roof of the cab can be operated with this switch.

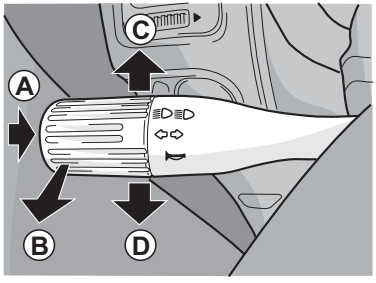
3. SWITCH "SWITCHING OFF THE CAB INTERIOR DETECTION"

For operation of this switch, see "ALARM SYSTEM".

4. ALARM SYSTEM LED

This is where, on a vehicle with built-in vehicle alarm, there is a system LED that shows whether the alarm system is active; see "ALARM SYSTEM".

LEFT-HAND STEERING COLUMN SWITCH



D0 00 600

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

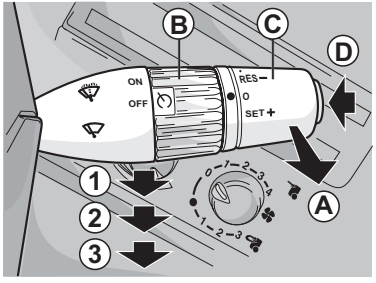
Position C: Right turn signal: on the instrument panel, the right direction indicator will flash and there will also be an audible signal. To briefly operate the direction

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



D0 00 601

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).

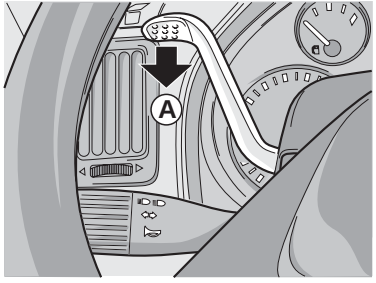
4 Position A: Wipe/wash.

5 Switch B: On/off switch, engine speed control and cruise control.

6 Switch C: Set, Resume, increase/decrease the pre-set value of the vehicle controls.

7 Switch D: Extra Resume function of the engine speed control and cruise control.

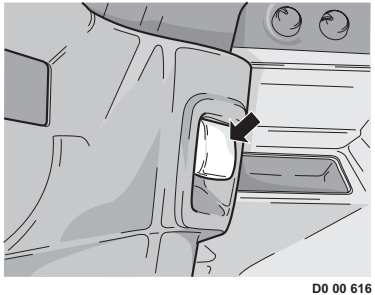
For operation of the engine speed control and cruise control, see "DRIVING".



D0 00 720

STEERING COLUMN SWITCH, ENGINE BRAKE

The engine brake control is activated by placing the stalk in position A.
To apply the engine brake, see "DRIVING".



D0 00 616

ADJUSTABLE STEERING COLUMN

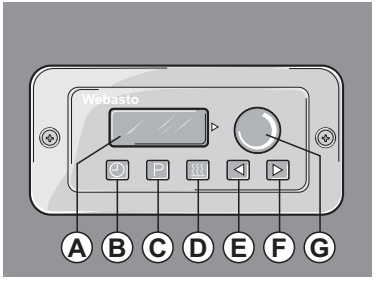
The position of the steering column is adjustable. For adjustment, pull the handle towards you and simultaneously move the steering column to the desired position. The steering column is locked by releasing the handle. A pneumatically adjustable steering column is available as an option. This is operated by a foot/heel switch to the left underneath the driver's seat.

The steering column may only be adjusted while the vehicle is stationary.

AUXILIARY CAB HEATER (AIR HEATING)

The auxiliary heater must be switched off when filling the tanks with fuel. Switch off the auxiliary heater when leaving the cab for a longer period of time. Do not switch on the auxiliary heater if the vehicle is in an enclosed space. Make sure that the pre-programmed switch-on time does not coincide with a period in which the vehicle is in an enclosed space.

The auxiliary heater warms the air in the cab and works independently of the vehicle heating system and contact. The temperature in the cab is thermostatically controlled. This thermostat also controls the speed of the built-in fan. The auxiliary heater has a memory into which three different switch-on times can be programmed. Pre-programming the switch-on time up to seven days in advance is possible.



D0 00 572

The operating panel of the auxiliary cab heater is in the rear wall of the cab.

A Display
B Time setting
C Program selection
D On/off
E Decrease setting
F Increase setting
G. Adjustable thermostat

Activation with vehicle contact off

1. Briefly press button (D). The display (A) and the buttons will light up. The burner symbol and the standard set burning time are shown in display A. The heating is activated; the auxiliary heater indicator in the centre console will light up.
2. The set burning time can be shortened with button (E) to a minimum of 1 minute and increased with button (F) up to a maximum of 120 minutes.
3. The desired temperature can be set using rotary switch (G). The setting range lies between 10 °C and 30 °C.

Switching off

1. Press button (D). The display and button illumination will be switched off.

2. The heater fan remains in operation for approximately 3 minutes to cool the heater.

Adjusting the standard set burner time

1. The heater must not be running.
2. Press and hold button (E) until the set operating time flashes.
3. Release button (E).
4. Set the desired standard operating time using the buttons (E) and (F) (from 10 - 120 minutes). When the set operating time disappears, it has been stored.

Activation with vehicle contact on

1. Briefly press button (D). The display (A) will show the burner symbol with the time and day. The heating is activated; the auxiliary heater indicator in the centre console will light up.
2. The desired temperature can be set using rotary switch (G). The setting range lies between 10 °C and 30 °C.
3. The heating remains in operation as long as the vehicle contact is on.
4. After turning off the vehicle contact, the heating remains operational for 15 minutes. This time can be reduced with button (E) to a minimum of 1 minute and increased with button (F) to a maximum of 120 minutes.
5. The heater fan remains in operation for approximately 3 minutes to cool the heater.

Deactivation with vehicle contact on

1. Press button (D). The display and button illumination will be switched off.
2. The heater fan remains in operation for approximately 3 minutes to cool the heater.

Setting the time/date

1. Press and hold button (B) until the display starts flashing (after approx. 3 sec.).
2. Set the time with the buttons (E) and (F). Once the time has stopped flashing, it has been stored.
3. The day will start flashing.

4. Set the day with the buttons (E) and (F). Once the day has stopped flashing, it has been stored.
5. Press button (B). The setting procedure is complete.

Note:

If the day does not need to be set, press button (B) twice after setting the time.

Programming the switch-on time

It is possible to program three switch-on times in the coming 24-hour period or one switch-on time in the coming 7 days.

Selecting the memory position

1. Press button (C) once for the first memory position. Digit 1 and the default time setting (12.00) will appear in the display.
2. Press button (C) twice for the second memory position. Digit 2 and the default time setting (12.00) will appear in the display.
3. Press button (C) three times for the third memory position. Digit 3 and the default time setting (12.00) will appear in the display.
4. Press button (C) until the memory display disappears.

Programming the switch-on time for the coming 24 hours

1. Select a memory store.
2. Briefly press button (E) or (F). The time will start flashing.
3. Set the desired switch-on time with the buttons (E) and (F). Setting is only possible when the time is flashing. The switch-on time has been stored in the memory when the time is no longer flashing.
4. Press button (C) to select another place in the memory, or wait until the display shows the current time. This completes the programming.
5. The activated memory store is visible in the display. The burner symbol is also flashing as a sign that the switch on-time has been programmed.

Programming the switch-on time for the coming 7 days

1. Select a memory store.
2. Briefly press button (E) or (F). The time will start flashing.
3. Set the desired switch-on time with the buttons (E) and (F). Setting is only possible when the time is flashing. The switch-on time has been stored in the memory when the time is no longer flashing.
4. After approx. 5 seconds, the day begins to flash. Set the desired day with the buttons (E) and (F). Programming is completed when the display shows the current time.
5. The activated memory store is visible in the display. The burner symbol is also flashing as a sign that the switch on-time has been programmed.

Deleting the programmed switch-on time

1. Select the memory store with button (C).
2. Press and hold button (C) until the time has been deleted.

Faults

If there is a fault, the burner symbol will flash and a fault code will be shown. In some cases a fault can be reset by switching the heating off with button (D) and then quickly on again. If the fault is not reset, turn the auxiliary heater off and have the heating inspected by your authorized Service dealer.

Note:

To prevent faults during cold weather, turn the auxiliary heater on for 10 to 15 minutes once a month during the summer. If necessary, install a separate fuel tank for the auxiliary heater.

Note:

On vehicles certified for transportation of hazardous materials, you can only switch on and off the auxiliary heater manually. It is not possible to program the switch-on time.

Seats

IMPORTANT POINTS

The driver's seat must only be adjusted when the vehicle is stationary. All adjustments may only be carried out when the seat is occupied. The seat belt must audibly click shut.

- You must read this section thoroughly and acquaint yourself with the seat controls.
- The vehicle air pressure must be a minimum of 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 fixings and component parts must be checked for wear from time to time.
- The seat may only be repaired and fitted by trained personnel.

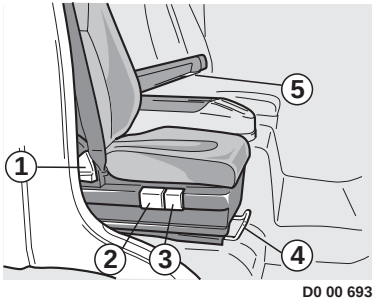
SEAT SETTINGS

Note:

In case of an air-spring seat, ensure that the seat does not rub against the rear cab wall when it has been set.

Co-driver's seat

Operation:

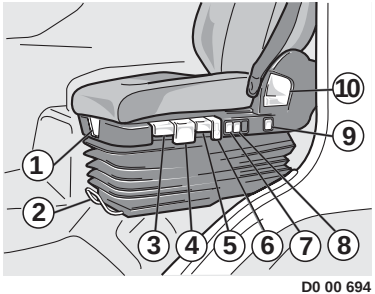


D0 00 693

1 Backrest angle adjustment
2 Seat height adjustment
3 Seat squab adjustment
4 Seat fore/aft adjustment
5 Armrest adjustment (rotary knob at front, at bottom of armrest).

Driver's seat

Operation:



D0 00 694

1 Seat squab adjustment

2 Seat fore/aft adjustment

3 Shock absorber setting: The suspension characteristics of the seat (in terms of comfort) can be optimised 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.

4 Seat squab angle adjustment

5 Seat height adjustment

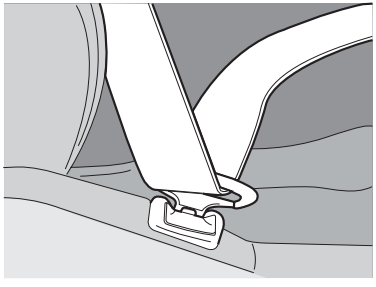
6 Entry/exit aid
- Knob down (seat in driving position): seat drops to its lowest position (= entry/exit aid)
- Knob up (with lowered seat): seat returns to the last set height

7 Backrest lumbar setting low (+/-)

8 Backrest lumbar setting high (+/-)

9 Seat heating

10 Backrest angle adjustment



D000534

SEAT BELTS

The seats are equipped with seat belts; use them. (Mandatory in some countries.) More persons using a single seat belt is not permitted.

Seat belts only work properly when correctly tensioned. For this reason, never use a clip or other device to reduce the seat belt tension.

Always keep seat belts clean and dry. Clean the belts with an all-purpose cleaner, not with caustic substances.

If the seat belts have been subjected to high loading during a collision, the complete assembly must be renewed, even if there is no visible evidence of damage. Have repairs to the seat belts carried out by qualified personnel only. Never modify seat belts yourself.

Wearing seat belts

- The belt must be tight against the body and not be distorted.
- With a three-point type belt, the shoulder section must be across centre 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.

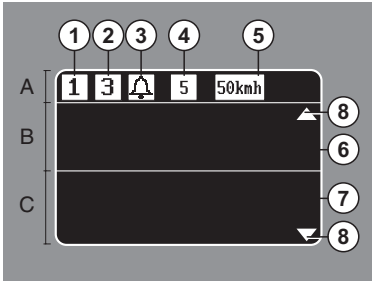
Seats

Master Display

GENERAL

In the master display a menu can be displayed to show the driver all the information regarding the function and operation of the various systems in as useful a way possible.
The master display is a part of the Central Warning System. In addition, the system contains a menu selection switch, a buzzer and a central "STOP" warning lamp under the master display.
The master display consists of three different fields; an indication bar, an information screen (yellow or red) and an information screen (yellow).

LAYOUT OF MASTER DISPLAY



A Indication bar
B Information screen (yellow/red)
C Information screen (yellow)
1 Number of active red warnings
2 Number of active yellow warnings
3 Alarm function engaged
4 Gear engaged(1)
5 Set speed(1)
6 Warning symbols/text
7 Warning symbols/text
8 Scrolling function active

(1) Application of functions 4 and 5 depends on the version of the vehicle.

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.

The following warning symbols, if present, are then displayed:

- Oil pressure (red)
- Alternator voltage (red)
- Steering circuit 1 output (red)
- ABS of prime mover (yellow)
- ABS of drawn vehicle (yellow)
- Airbag (yellow)

Note:

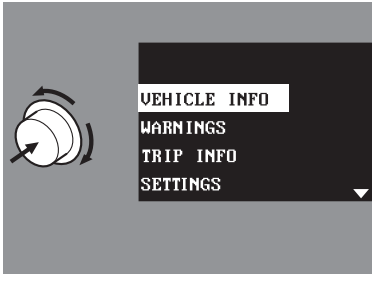
When starting a vehicle equipped with an Allison MD3060 automatic gearbox, the transmission fault warning symbol appears in the main display; this symbol disappears once the engine is started.

During the start-up phase, the "STOP" warning lamp and the acoustic signal are inactive.
Approximately 3 seconds after switching on the ignition, the yellow warning symbols will disappear. During these 3 seconds, no other warnings can be displayed.
The red warning symbols should disappear from the screen approximately 2.5 seconds after the engine has been started.
If the oil pressure, charging voltage or steering circuit 1 output is still too low after these 2.5 seconds, the warning screen will become active, in which the relevant red warning symbol appears with the accompanying text. The "STOP" warning lamp and acoustic signal will also be activated.

If there is a less serious fault, the respective yellow symbol with the accompanying text will appear on the screen and an acoustic signal will be heard for a certain time.

If the indication bar mentions several red and/or yellow warnings, the other warnings can be called up by turning the menu selector switch one step further each time. This takes place in order of priority. This means that the most important warning will be displayed first.

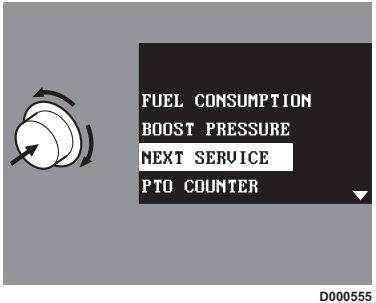
A red warning cannot be removed from the screen when the engine is running.
The red warning symbol can be turned off when the engine is not running. This is so that it is possible to use other menu options (if you return to the main screen, the warnings will re-appear).
Yellow warnings can be switched off at any time.
The message detailing the number of warnings present remains active at all times.
A continuous acoustic signal accompanies a red warning.
A pulsating acoustic signal accompanies a yellow warning and sounds four times.



D000711

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.

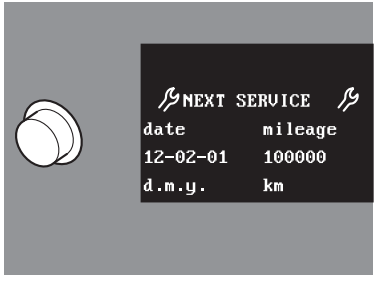


D000555

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.



D000556

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

Main menu	Sub-menu 1	Sub-menu 2
Vehicle information	Fuel consumption	- Current - Average - Average trip
	Turbocharger pressure	
	Oil level	
	Service inspection	- Date - Distance
	PTO counter	- PTO 1 counter - PTO 2 counter - PTO consumption
	Chassis number	
	Back	
Faults	All faults	
	Back	

Main menu	Sub-menu 1	Sub-menu 2
Trip info	Trip info	- Distance - Time - Average speed - Average consumption - Fuel consumption
	Trip reset	
	Close	
Settings	Language 1 or 2	
	Alarm on/off	
	Setting alarm	- Setting alarm: hours - Setting alarm: minutes - Alarm time
	Time, local/home	
	Set local time	
	Clock AM/PM/24H	
	Display miles/km	
	Close	
Close		

FAULTS

Serious fault

A red warning symbol is activated when there is a serious fault.
When a red warning symbol is activated, the "STOP" warning lamp and an acoustic signal are activated at the same time.

If the "STOP" warning lamp lights up and/or the buzzer is audible while driving, the vehicle must immediately be stopped with extra caution, parked in a safe place and the engine switched off. Have an authorized Service dealer correct the problem as soon as possible.

Less serious fault

A yellow warning symbol is activated if there is a less serious fault.
When yellow warnings appear you may continue driving but action must be taken at the first opportunity to remedy the fault. Have an authorized Service dealer correct the problem as soon as possible.

As the vehicle may behave differently from normal, the vehicle must be driven with extra caution.

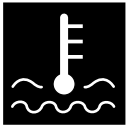
WARNING SYMBOLS

Red warnings

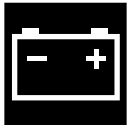
Oil pressure low
Switch the engine off straight away.
Check the engine oil level See also "Daily inspections" in "INSPECTIONS AND MAINTENANCE".

Cab lock open
See "Cab tilting" in "EMERGENCY REPAIRS".

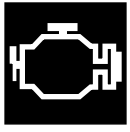
Air pressure low
This warning symbol is active when the pressure in one of the service brake circuits is lower than 5 bar.



Coolant temperature high
This warning symbol will come on when the coolant temperature exceeds the maxi-mum permissible value. Check the following points:
the coolant level (caution – danger of scalding; see "Topping up coolant" in "INSPEC-TIONS AND MAINTENANCE");
the poly V-belt and water hoses; the fan clutch.



Alternator voltage high
If the charging voltage of the alternator rises above 30 V, this symbol will light up. The battery voltage is then too high and the battery may start to boil. In that case, switch on as many electrical consumers as possible.
If the symbol is still not extinguished, under no circumstance continue driving!

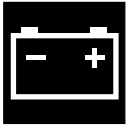


Engine fault
Serious fault in the electronic unit.

Transmission fault
If the vehicle is equipped with an automatic gearbox, see "Faults" in "AUTOMATIC GEARBOX".

Trailing axle fault
Fault in the steering system of the steered trailing axle (RAS-EC)

Yellow warnings



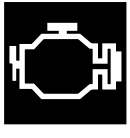
Alternator fault
Alternator charge voltage not correct

Transmission fault
If the vehicle is equipped with an automatic gearbox, see "Faults" in "AUTOMATIC GEARBOX".

Truck ABS fault
This symbol is activated when:
there is a fault in the ABS of the prime mover;

Trailer ABS fault

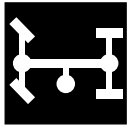
Alarm system fault



Engine fault
Depending on the fault, the engine can switch over to emergency control.

Air suspension fault
Defect or fault on the electronic chassis height control (ECAS). Depending on the type of fault the vehicle may not be driven further. See also "AIR SUSPENSION".

Central vehicle control unit fault
Fault in the (VIC) electronic unit that collects information and controls vehicle functions.



PTO fault
Engine speed control does not meet the conditions. See "Engine speed control" in "DRIVING".

Oil pressure low
Check the engine oil level See also "Daily inspections" in "INSPECTIONS AND MAINTENANCE".

Water separator fuel filter
Check the fuel prefilter/water separator. See "Weekly inspections" in "INSPEC-TIONS AND MAINTENANCE".

Truck brake lining
This symbol will light up if the brake lining on one or more wheels is worn.

Trailing axle fault
Fault in the steering system of the steered trailing axle (RAS-EC).

Airbag warning

No warning

Key to abbreviations

ABS	Anti-lock Braking System
ECAS	Electronically Controlled Air Suspension
PTO	Power Take Off
VIC	Vehicle Intelligence Centre
RAS-EC	Rear Axle Steering - Electronically Controlled

Master Display

Inspections and Maintenance

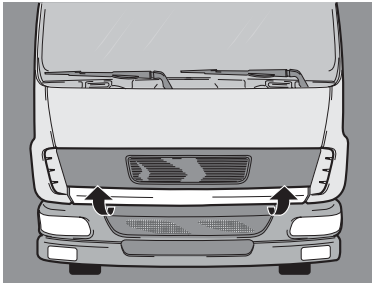
OVERVIEW OF DAILY CHECKS

Overview of the driver's daily checks:
- engine oil level
- coolant level
- fluid level in screen washer reservoir
- air filter indicator
- tires and rims
- lighting and instruments
- driver's seat and mirrors
- trailer

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:

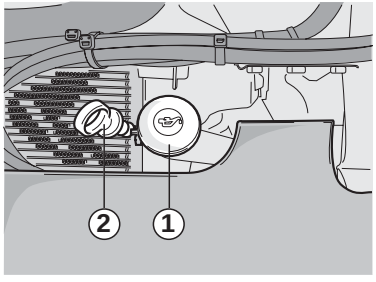
Cleaning rags, flammable materials, accumulated dirt etc. in the vicinity of the exhaust system must be removed as these create a fire hazard.



D000695

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.



D0 00 721

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 "TECHNICAL DATA".

Note:

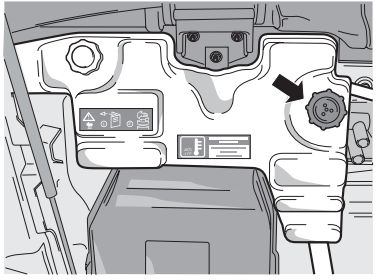
For the difference between the minimum and maximum engine oil level, see "TECHNICAL DATA".

TOPPING UP COOLANT

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" in "TECHNICAL DATA"

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.

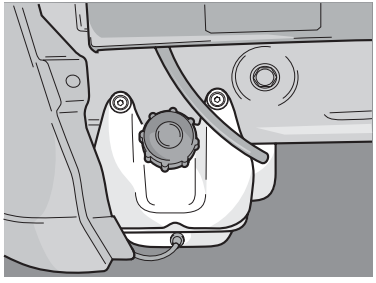
Do not loosen the filler cap of the cooling system when the cab is tilted.



D0 00 593

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 "TECHNICAL DATA".



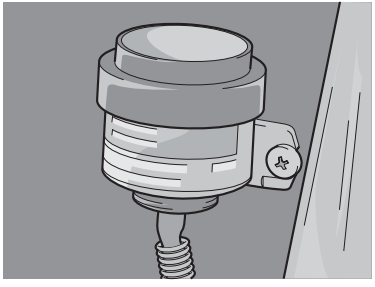
D0 00 608

SCREEN 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 windscreen cleaner to the water in the screen washer reservoir.
During the winter period, add screenwash antifreeze.



D0 00 596

AIR FILTER INDICATOR

The air filter indicator is right above the air filter housing at the cab's rear or 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

- Remove any stones, etc. from the tread and from between the tires (if twin wheels are fitted).
- Check for evidence of wear and damage and for nails or other foreign objects caught in the tires.
- Check the attachment of the wheels.
- Check the tire pressures (do not forget the spare wheel). The tire pressures should be checked and corrected while the tires are cold. See chapter on "Technical data" or the back page of this book for the correct tire pressures.

Note:

If a worn tire is underinflated by 2 bar, the ABS control will be inoperative under extreme conditions! Also see "Changing the wheel" in the "EMERGENCY REPAIRS" section of this manual.

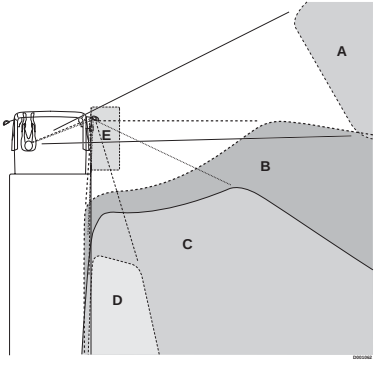
LIGHTING AND INSTRUMENTS

- Check the vehicle lighting, brake lights and instruments for correct operation.
- Also check the operation of the horn, windscreen 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



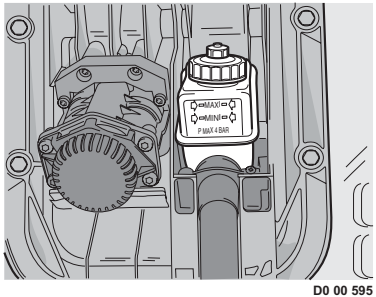
A Side window
B Dead angle mirror
C Wide view mirror
D Main mirror
E Pavement mirror

TRAILER VEHICLE

- Check the trailer coupling or fifth wheel for correct attachment and correct operation.
- Check the connections for lighting and brakes.
- Check the operation of the lighting, brake lights and direction indicators.

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



D0 00 595

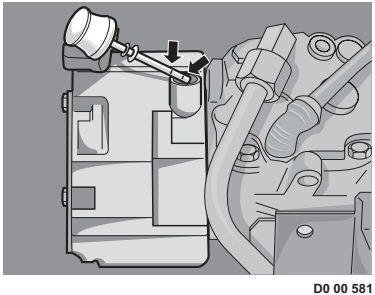
CLUTCH FLUID LEVEL

1. Open the front panel.
2. Check the fluid level in the reservoir. The fluid level must be between the two markings.
3. If necessary, top up brake fluid via the filler opening, brake fluid specification: see "TECHNICAL DATA".

Note:

Brake fluid is highly corrosive. Take appropriate measures to protect yourself and remove any spilt fluid immediately with plenty of water.

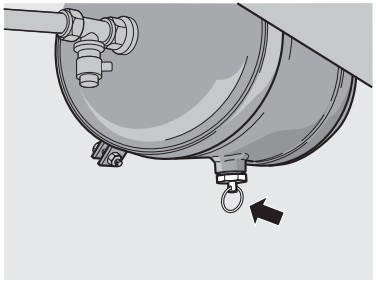
4. If the level is below the minimum mark, this is a sign of leakage. Contact an authorized Service dealer as soon as possible.



D0 00 581

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 "TECHNICAL DATA".
6. If the level is below the minimum mark, this is a sign of leakage. Contact an authorized Service dealer as soon as possible.



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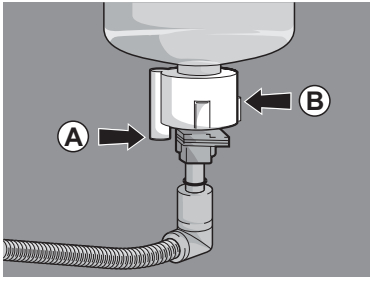
BRAKE SYSTEM AIR DRIER

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.

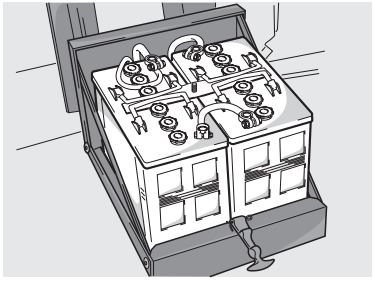


D0 00 620

DRAINING THE WATER SEPARATOR

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.



D0 00 627

BATTERIES

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

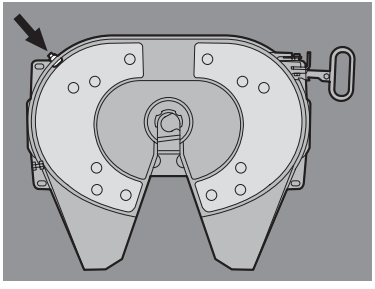
The durability, safety, trade-in value and reliability of your vehicle largely depend on the care you give it. This includes regular service in accordance with the maintenance schedules specified.

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.

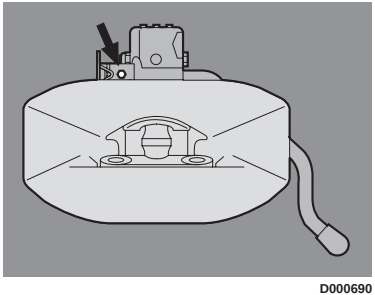
LUBRICATING FIFTH WHEEL/TRAILER COUPLING

The fifth wheel or trailer coupling must be lubricated every 5,000 km (3,170 miles).



D000689

Lubricating the fifth wheel



D000690

Lubricating the trailer coupling

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 sleeper cab is only available with fabric 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 fine 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).

CAB HEATER

If necessary, install a separate fuel tank for the cab heater.

If the tank has been filled up with winter diesel oil because of a cold weather period or a trip to a colder country, allow the cab heater to run on the new fuel for half an hour to ensure that all the old fuel has been used up.

The above recommendations apply for both air and water heating and for all vehicle types.

WINDSCREEN WASHER RESERVOIR

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

MAINTENANCE AFTER THE WINTER SEASON

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

COOLING SYSTEM

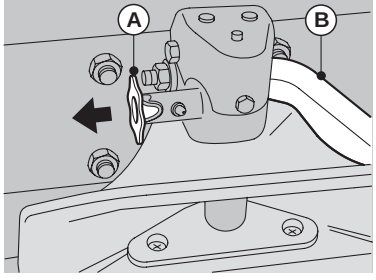
The coolant may be left in the cooling system during the summer.

Coupling and Uncoupling

TRAILER COUPLING

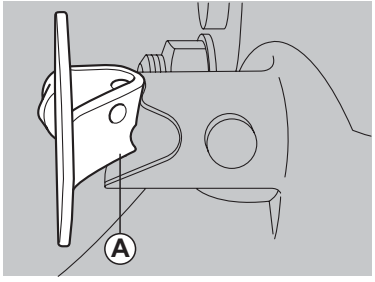
Trailer coupling with manual unlocking

Coupling



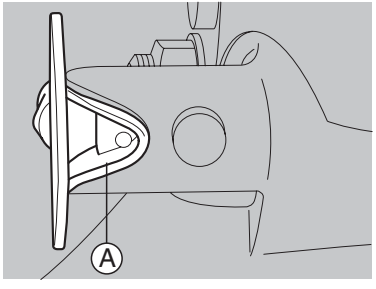
D000678

1. Pull the safety pawl (A) out of the coupling and rotate it 90°.
2. Pull the lever (B) up.
3. Note the drawbar position and reverse the vehicle until the drawbar engages; coupling is effected automatically.
4. After coupling, always check whether the safety pawl (A) is properly locked.



D000424

5. Safety pawl (A) unlocked: **coupling unsafe!**



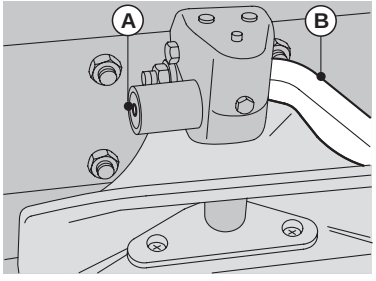
D000425

6. Safety pawl (A) closed: **coupling safe.**
7. If the safety pawl (A) is not locked, the coupling is not safe and you must couple the trailer again.
8. When coupling, check the coupling head rubbers of the air pipes of both the prime mover and the trailer vehicle for any damage.
9. Connect the brake pipes and the cables for the lighting and ABS/EBS.

Uncoupling

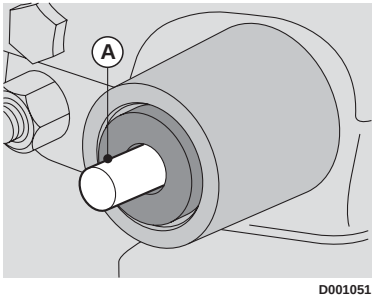
1. Put wheel chocks in front and behind the trailer's rigid axle wheels.
2. Be absolutely certain that the trailer is braked.
3. Detach the brake pipes and cables for lighting and ABS/EBS.
4. Pull the safety pawl from the coupling and turn it 90°. The trailer vehicle coupling can only be opened in the centre position or the two outer positions of the coupling jaw. (If the coupling jaw is crooked, the coupling pin cannot be unlocked!)
5. Pull the lever up and drive the vehicle away.

Trailer coupling with automatic unlocking
Coupling



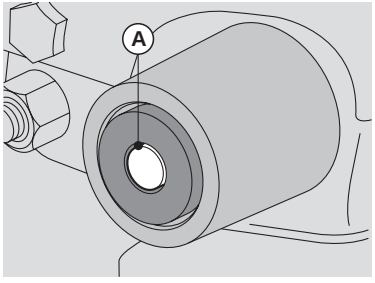
D001050

1. Pull the lever (B) up; the locking indicator pin (A) will shoot out.
2. Note the drawbar position and reverse the vehicle until the drawbar engages; coupling is effected automatically.
3. After coupling, always check that locking is effected properly.



D001051

4. Locking indicator pin (A) in unlocked position: **coupling unsafe!**



D001052

5. Locking indicator pin (A) fully level with the front: **coupling safe.**
6. If the locking indicator pin (A) is not entirely level with the front, the coupling is not safe and you must couple the trailer again.
7. When coupling, check the coupling head rubbers of the air pipes of both the prime mover and the trailer vehicle for any damage.
8. Connect the brake pipes and the cables for the lighting and ABS/EBS.

Uncoupling

1. Put wheel chocks in front and behind the trailer's rigid axle wheels.
2. Be absolutely certain that the trailer is braked.
3. Detach the brake pipes and cables for lighting and ABS/EBS.
4. The trailer vehicle coupling can only be opened in the centre position or the two outer positions of the coupling jaw. (If the coupling jaw is crooked, the coupling pin cannot be unlocked!)
5. Pull the lever up and drive the vehicle away.

FIFTH WHEEL

The following directions for use apply in general to the fifth wheels on your vehicle.

Coupling

1. Pull out the fifth wheel handle. The jaw is now opened and ready for coupling.
2. Drive the tractor close to the semi-trailer and make sure that the coupling pin is in the middle of the V-shaped fifth wheel opening.
3. Check that the coupling pin and the V-shaped opening are at the same height. If necessary, adjust the height of the semi-trailer or tractor.
4. Reverse the tractor **slowly** until the semi-trailer is on the fifth wheel and the jaw is locked by the coupling pin. The handle then springs back into its original position.
5. Check whether the fifth wheel is locked by **slowly** driving a little forward.
6. Lock the handle as shown below (if necessary with a safety catch or a padlock).
7. Check that the semi-trailer is coupled to the fifth wheel without any air gaps and that the automatic locking has in fact taken place.
8. When coupling check the coupling head rubbers of the air pipes of both the prime mover and the semi-trailer for possible damage.
9. Connect the brake pipes and the cables for the lighting and ABS/EBS.
10. Retract the semi-trailer undercarriage.

Uncoupling

1. Ensure that the semi-trailer is braked.
2. Place wheel chocks in front and behind the semi-trailer wheels.
3. Wind down the semi-trailer undercarriage using quick operation until the feet touch the ground. Switch to slow operation and wind down a few turns further. Do not lift the semi-trailer from the fifth wheel.

4. Detach the brake pipes and cables for lighting and ABS/EBS.
5. If fitted, detach the safety hook or padlock.
6. Unlock the fifth wheel by pulling out the handle. The hook is now opened and ready for uncoupling.
7. Slowly drive the tractor from under the semi-trailer.

Note:

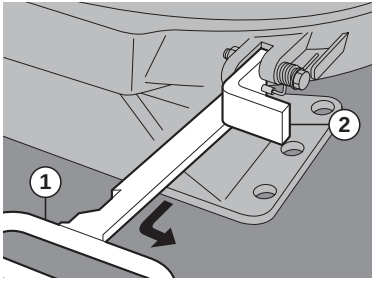
On vehicles with air suspension, the remote control electronic height control is used for coupling/uncoupling the trailer. When coupling, the vehicle can be brought to the correct coupling height, or the semi-trailer can be lifted before the supports are wound down.

Important

After coupling or uncoupling a semi-trailer, always press the remote control key or the appropriate key on the instrument panel for automatic resetting of the correct **driving height**. This will set the correct driving height automatically.

Tractors may be fitted with a small towing hook at the rear end of the chassis. This towing hook must only be used for light shunting work (max. 4300 kg).

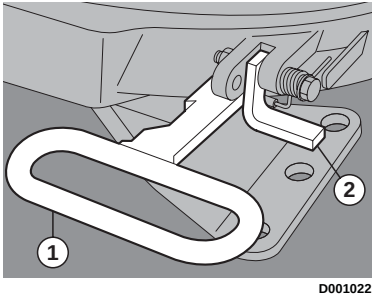
JOST fifth wheel (version 1)



D001023

Unlocking

- Fold up the hook (2), as shown in the illustration.
- Pull the handle (1) forward and outward and hook the extended handle into the fifth wheel.

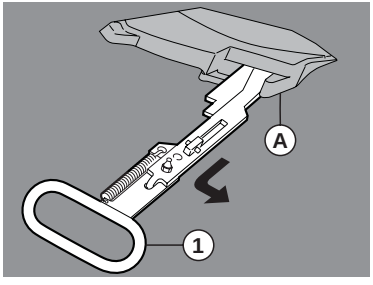


D001022

Locking

- Locking is done automatically during coupling; check that the hook (2) is folded down.

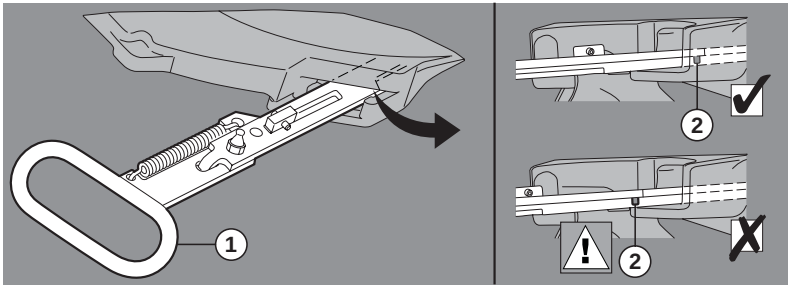
JOST fifth wheel (version 2)



D001021

Unlocking

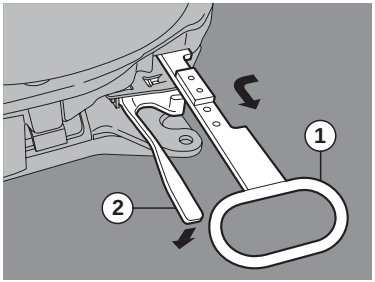
- Pull the handle (1) forward and outward and hook the extended handle into the recess (A).



Locking

- Locking is done automatically during coupling; check that mark (2) is within the fifth wheel.

Georg Fischer fifth wheel (+GF+)

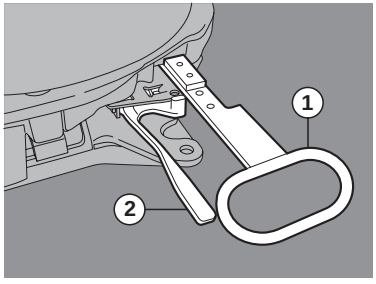


D001025

Unlocking

- Push the lever (2) down.

- Pull the handle (1) backward and outward and hook the extended handle into the fifth wheel.

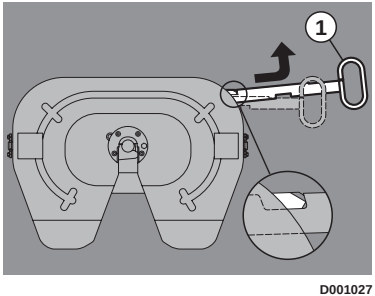


D001024

Locking

- Locking is done automatically during coupling; check that the lever (2) is in its original position.

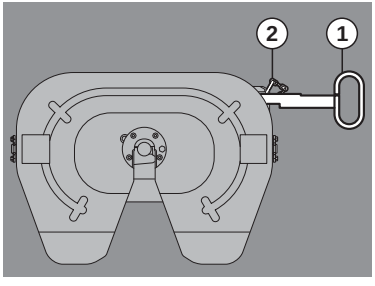
VBG fifth wheel



D001027

Unlocking

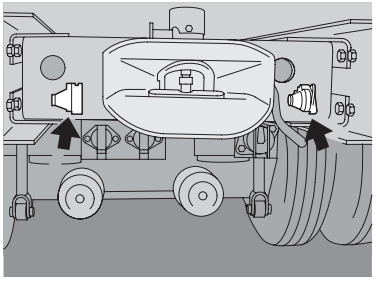
- Remove the spring hook.
- Pull the handle (1) forward and outward and hook the extended handle into the fifth wheel (see detail).



D001026

Locking

- Locking is done automatically during coupling; check that the handle (1) is in its original position and fit the spring hook (2).



D000503

CONNECTING UP THE BRAKE LINES OF A TRAILER

The vehicle has automatic coupling heads which are used to connect up the air pipes.
Connect the air pipes with these connectors. These coupling heads have safety lugs which make it impossible to connect up the air pipes incorrectly. The coupling heads on the trailer vehicle must of course have corresponding safety lugs.
Should a mistake nonetheless be made when connecting up the air lines the air brakes on the trailer vehicle will consequently not be released.

However, an incorrectly connected trailer vehicle with empty air reservoirs will not be braked automatically and this makes it possible to drive away with an unbraked trailer. This can lead to very dangerous situations!

When the red coupling head is properly connected, the brake system of the trailer vehicle will slowly be filled and you will be able to hear this quite clearly. At the same time there will be a marked drop in pressure in the air reservoirs of the tractor.

- red = emergency line coupling head
- yellow = service line coupling head

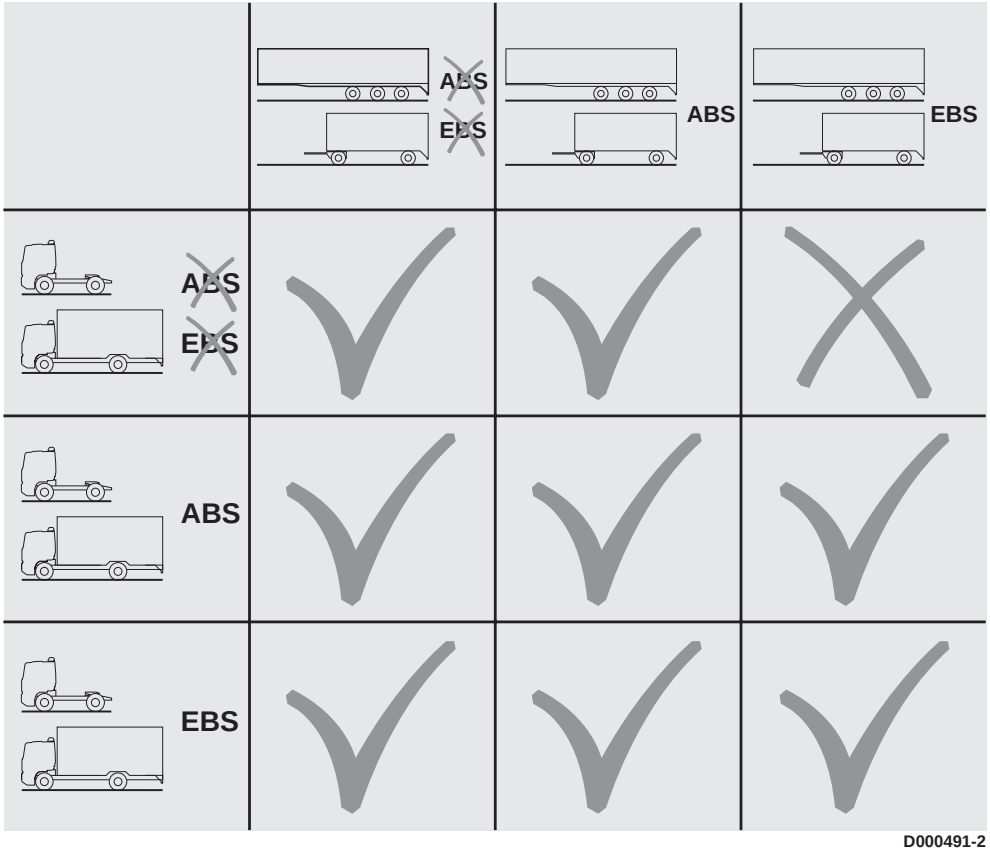
If the yellow and/or red air lines have not been connected, the trailer vehicle will not be able to brake, which could lead to very dangerous situations.

CONNECTING UP THE BRAKE LINES OF A TRAILER WITH ABS OR EBS

ABS: Anti-lock Braking System
EBS: Electronically controlled Braking System

A trailer with ABS is fitted with an anti-lock braking system.
A trailer with EBS is fitted with an electronically controlled braking system, which incorporates ABS.

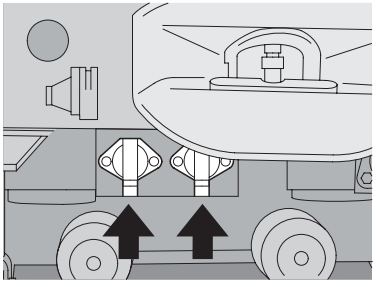
Both versions are connected by means of a special plug to the extra socket of the ABS/EBS system on the prime mover.
If this plug is not connected, a yellow warning will appear on the master display.


ABS
EBS
ABS
EBS
ABS
EBS
ABS
EBS
D000491-2

Consequences of not connecting a trailer EBS to a prime mover EBS via the ABS/EBS plug:
no load-dependent brake control;
no ABS (depending on trailer EBS system version);
no EBS control;
full brake action always maintained, regardless of load.

Overview of combination possibilities

	Trailer without ABS (properly connected)	**Trailer with ABS (properly connected)**	**Trailer with EBS (properly connected)**	**Trailer with EBS (5-pin ABS wiring harness connected instead of 7-pin EBS wiring harness)**
Prime mover without ABS	- Load-dependent brake control (mechanical) active - No ABS control	- Load-dependent brake control (mechanical) active - No ABS control	- No load-dependent brake control - No ABS control **Note:** **Forbidden by law**	- No load-dependent brake control - No ABS control **Note:** **Forbidden by law**
Prime mover with ABS	- Load-dependent brake control (mechanical) active - No ABS control	- Load-dependent brake control (mechanical) active - ABS control active	- Load-dependent brake control (electrical) active - ABS control active	- Load-dependent brake control (electrical) active - ABS control active
Prime mover with EBS	- Load-dependent brake control (mechanical) active - No ABS control	- Load-dependent brake control (mechanical) active - ABS control active	- Load-dependent brake control (electrical) active - ABS control active - CAN communication	- Load-dependent brake control (electrical) active - ABS control active



D000505

CONNECTING UP THE TRAILER VEHICLE LIGHTS (24V ELECTRICAL SYSTEM)

A 7-pin socket is provided for connecting up the lighting of the trailer vehicle. Furthermore, there is an additional 7-pin socket on the prime mover which can be used for connecting up accessories which are fitted on the trailer vehicle. The two sockets have different designs to rule out the possibility of making incorrect connections. If the trailer vehicle has a 24V electrical system, it can be connected to the electrical system of the tractor without any special measures having to be taken.

Driving

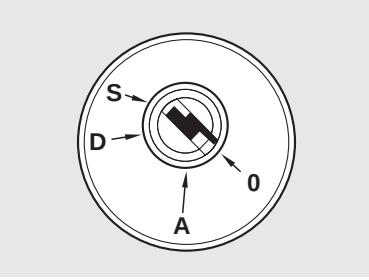
GENERAL

Before setting out on a journey, always check:

- the vehicle for possible water or oil leaks
- the engine oil level
- the fluid level in the screen washer reservoir
- the air filter indicator
- the coolant level
- the drawn vehicle coupling for correct attachment and correct operation
- the connection and operation of the drawn vehicle lighting and brakes
- the wheel attachment and tire pressures
- the tread depth of tires
- the tread of each tire for even distribution of wear pattern
- the correct setting of seat and mirrors
- the correct operation of lights and instruments
- the fuel level

After each journey check that:

- the doors of the vehicle are locked
- the load is still properly secured



D000970

STEERING LOCK/CONTACT/STARTER SWITCH

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, this warning lamp on the instrument panel lights up.

STARTING PROCEDURE

If you start the engine inside a building, open the doors fully to ensure adequate ventilation. Exhaust gases contain carbon monoxide, an invisible, odourless, 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. If the gear lever is in neutral, the starter motor will not function.

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.

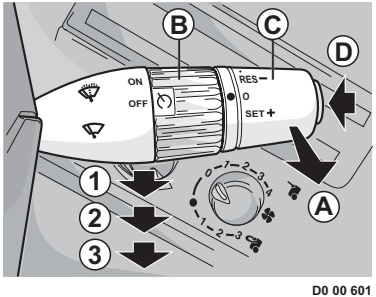
In case of an optional engine speed control, one of various engine speeds can be selected with the right-hand steering column switch, if so desired.

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

IMMOBILISER FAULT

If the engine management system detects a problem with the immobiliser, the "STOP" light on the instrument panel lights up continuously when the ignition is switched on.
A warning is also activated on the instrument panel display.
Fuel will not be injected and consequently the engine will not start.

If you have a problem with the immobiliser, contact your authorized Service dealer or International Truck Service (ITS).



D0 00 601

ENGINE SPEED CONTROL

The minimum and maximum engine speeds that can be set are limited by a pre-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/deactivation of the engine speed control can be modified by an authorized Service dealer on request.

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

Activating the engine speed control

1. Turn the ON/OFF switch (B) to the "ON" position.
2. Turn switch (C) briefly to the "RES -" or "SET +" position. The "RES -" and "SET +" positions have two different programmed engine speeds.
   If the rotating switch (C) is held in "RES -" or "SET +" position for over 1 second, the engine speed control will be activated at the lowest programmable speed. If this speed is below idling speed, the speed will not fall below the idling speed.
3. Adjust the engine speed using switch (C): "SET+" position to increase speed, "RES-" position to decrease 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 will be reduced to the set value once the accelerator pedal is released.
If the vehicle can be driven, the electronic unit will limit the maximum vehicle speed to a programmed value. If the vehicle exceeds the programmed speed, the engine speed control will be interrupted until the vehicle speed is once more below the programmed maximum value.

Note:

The function of key (D), if activated, is equal to the "RES -" position of switch (C).

Deactivating the engine speed control

- Turn the ON/OFF switch (B) 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.
- Turn the ON/OFF switch (B) to the "OFF" position
- if the vehicle speed exceeds the programmed speed.
- if the engine speed control is active via the superstructure.
- if the external speed limiter on the superstructure is active.
- when the ASR control is being activated.

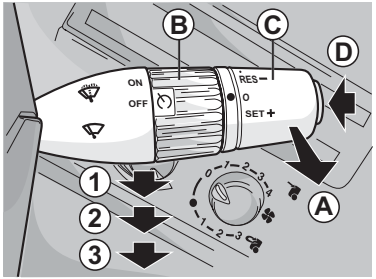
Check whether the stated conditions for deactivation of the engine speed control apply to the vehicle.

Re-activating the engine speed control after interruption

1. Re-activate the engine speed control by turning switch (C) briefly to the "SET +" or "RES -" position.

Note:

The function of key (D), if activated, is equal to the "RES -" position of switch (C).



D0 00 601

CRUISE CONTROL

The cruise control can be activated at a pre-programmed minimum vehicle speed. This speed is 36 km/h (22 mph) as standard.

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

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

Engaging the cruise control

1. Put the ON/OFF switch (B) to the "ON" position.
2. Turn the SET +/RES - switch (C) briefly to the "SET +" position. Cruise control will be engaged and the vehicle will keep to the current speed.
3. The speed can be increased and decreased using the SET +/RES - switch (C): "SET+" position to increase speed, "RES-" position to decrease speed.

Note:
The function of key (D) is equal to the "RES -" position of switch (C).

Note:
The accelerator pedal is still active. When, after accelerating, the accelerator pedal is released, the vehicle speed will return to the last pre-set speed.

Deactivating the cruise control

- Turn the ON/OFF switch (B) to the "OFF" position.

Interrupting the cruise control

- Operation of the clutch pedal.
- Operation of the service brake.
- Operation of the parking brake.
- Operation of the engine brake.
- Turn the ON/OFF switch (B) to the "OFF" position
- if the ABS/ASR system starts operating.
- if the speed drops below 36 km/h (22 mph) or exceeds the maximum speed.
- if the engine speed drops below the minimum or exceeds the maximum speed.

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

Re-activating the cruise control after an interruption

1. Turn the SET +/RES - switch (C) briefly to the "RES -" position to return to the vehicle speed set last.
2. Turn the SET +/RES - switch (C) briefly to the "SET +" position to fix the current vehicle speed.

Note:
The function of key (D) is equal to the "RES -" position of switch (C).

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 pre-programmed 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.

Driving style in general

Some tips:

- 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**.
- With low engine loads, try to stay in the green low-rev range whenever possible. At low engine loads in this rev range the engine has the lowest fuel consumption per kW output.
- At full load and at full throttle, the engine has the lowest consumption per kW in the green area.

Note:

In the event of extreme acceleration to 30 to 40 km/h (19 to 25 mph) , 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.

DIFFERENTIAL LOCK

The rear axle can optionally be equipped with a differential lock which can be activated from the cab.

Directions for use

The differential lock may only be used when driving on soft ground or on a slippery road surface, and never on firm ground.

The differential lock should be engaged:

- with the vehicle stationary or moving very slowly
- with the clutch pedal depressed.

The differential lock must never be engaged if one of the wheels is spinning; always wait until the wheel has stopped spinning before engaging the differential lock. Disengage the differential lock as soon as you reach firm ground. If the warning indicator on the instrument panel stays on, drive forwards and then reverse a short distance in order to release the locking mechanism.

Failure to follow the above directions may cause damage to the differential lock and/or the differential.

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.

RAS-EC SYSTEM

The RAS-EC system is an electronically controlled, speed dependent steering system for the trailing axle. This steering system reduces the turning circle and tire wear to a minimum.
In contrast to the mechanically steered axle, the RAS-EC system has no steering linkage, but speed dependent, electronic-hydraulic steering by means of a steering cylinder.

Speed-dependent

At speeds of up to 15 km/h (9mph), the trailing axle co-steers with the front axle, both in forward and reverse direction. Above 15 km/h (9mph) the steering effect is gradually reduced until 38 km/h (23 mph) is reached. Above 38 km/h (23 mph) the trailing axle is fixed exactly in the centre position. This means that at higher speeds optimum direction stability is ensured.

Faults

If a less serious fault occurs, the trailing axle is fixed in the centre position. The trailing axle will no longer co-steer.

If a serious fault occurs, the complete RAS-EC system will be switched off. The trailing axle is no longer activated but is forced to co-steer.

Note:

In the event of a serious fault, reversing is impossible. Due to friction between tire and road surface the trailing axle will steer maximum in an uncontrolled manner.

In the event of a serious fault, the driving properties of the vehicle will be affected.
A serious fault is indicated by an acoustic signal and the "STOP" warning indicator will light up. Stop as soon as possible, park the vehicle in a safe place and turn off the engine.
Have an authorized Service dealer correct the problem as soon as possible.

ASR (ANTI SLIP CONTROL)

The vehicle can optionally be fitted with ASR control. ASR is an electronic, air pressure controlled anti-slip system designed to prevent the driven wheels from slipping when accelerating. This ensures that the vehicle remains stable when pulling away on critical road surfaces (especially accelerating when cornering). Accelerating with ASR gives more traction in comparison to accelerating with slipping wheels. ASR is an addition to the ABS system. ASR is only located on the driven wheels. When there is a danger of slipping on one or both wheels, the relevant wheel(s) will be braked via a magnet valve and/or the engine torque decreased, using a specific control. This means that one or both wheels are maintained within a narrow slipping range close to the maximum frictional coefficient, through which an optimum traction is achieved. If the ASR system is active, the ASR warning indicator will light up.

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.
Bear in mind that when the prime mover is equipped with ABS but not the drawn vehicle, or vice versa, the directional stability and steering characteristics will not be as good as when both units are equipped with ABS.

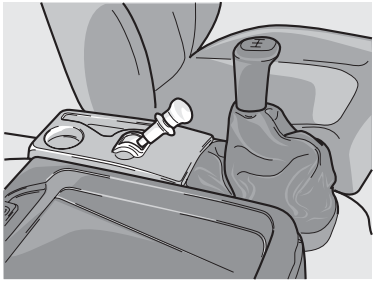
The ABS does not release the driver from his obligation to adapt his driving style to the traffic and road surface conditions.
The anti-lock protection cannot offset the results of driving too close to the vehicle in front or taking a bend at too high a speed.

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.

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.



D0 00 587

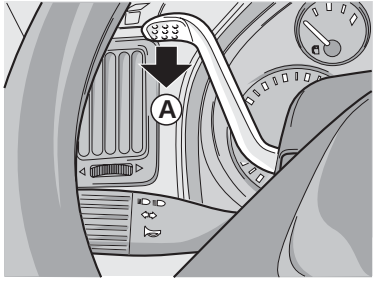
PARKING BRAKE AND SERVICE BRAKE

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. See "Stopping". 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.



D0 00 720

By moving the operating lever on the steering column in direction A and releasing the accelerator pedal, the engine brake control will be activated.

Note:

- The engine cannot be turned off with the engine brake.
- In order 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.

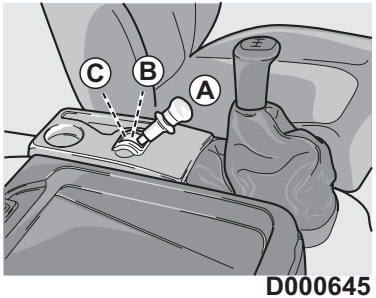
The most appropriate area of use for the engine brake is in the blue area of the rev counter. The engine brake delivers the highest braking effect in this area.

When using the engine brake, adjust your gear selection so that the engine speed remains in the most favourable range.

The engine brake is automatically switched off:

- when the engine speed drops below 1000 rpm.
- when the ABS/ASR system has established a tendency for the wheels to lock.
- when the accelerator pedal is depressed.
- when the vehicle speed control or engine speed control has been engaged.

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.



D000645

STOPPING

Parking

- Move the parking brake lever (from position A) backwards past the locking cam (position B). The parking brake is now engaged.

- When driving a vehicle combination, check whether the parking brake lever can be moved even further backwards from position B against the pressure of the spring. Press in the parking brake lever and pull it further back (to position C). This is the test position, the drawn vehicle's brakes are not applied in this position. Check that the vehicle combination remains in place.
- Let the parking brake spring back to position B.
- 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.

If the vehicle combination does not remain in place in the test position, find a flatter place to park the vehicle. Always carry out this test if the vehicle is parked in unfavourable circumstances (gradient, slippery road surface, etc.). In this way, the combination will remain safely parked, even if air leakage should make the drawn vehicle brakes ineffective.

Switch off the engine.

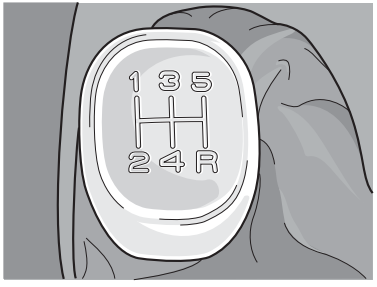
Put the gear lever in neutral when the vehicle is stationary.

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).

Manual Gearbox

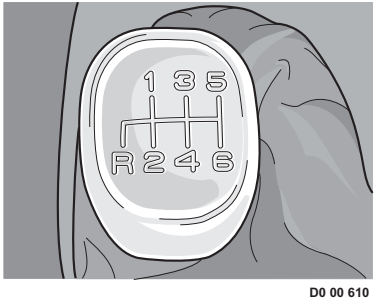
ZF GEARBOX



D0 00 609

ZF S5-42 gearbox

The ZF S5-42 gearbox has five fully synchronised forward gears and one non-synchronised reverse gear.



D0 00 610

ZF 6S-850 gearbox

The ZF 6S-850 has six fully synchronised forward gears and one non-synchronised reverse gear.

Shifting gears

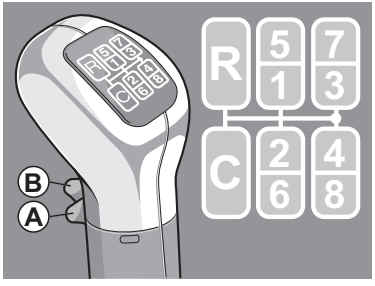
- To avoid excessive and unnecesssary clutch wear, always engage the first gear when driving away. This applies to both laden and unladen vehicles.
- Always depress the clutch fully when shifting gears.
- Push the gear lever smoothly when shifting until the gear is engaged.
- Wait until the vehicle is at a standstill before engaging reverse. Failure to do so may result in serious damage to the clutch, gearbox and engine.

Driving

- Select the highest possible gear while at the same time keeping the engine speed in the green zone of the rev counter.
- When speeding up, keep the engine speed within the green area of the rev counter as much as possible.

The reverse gear may only be selected 5 seconds after the vehicle has come to a stop. When shifting down, you must always ensure that the speed is not too high for the gear you are selecting.

EATON GEARBOX



D0 00 584

Eaton 6309 gearbox

The Eaton 6309 gearbox has eight synchronised forward gears, one crawler gear (position C) and one reverse gear. The gearbox has a low speed range (1st to 4th gear) and a high speed range (5th to 8th gear).

Shifting gears

- To avoid excessive and unnecessary wear of the clutch, always engage the first gear when driving away. This applies to both a laden and an unladen vehicle.
- Always depress the clutch fully when shifting gears.
- Push the gear lever smoothly when shifting until the gear is engaged.
- Shifting from the low to the high speed range is done with a range-change switch on the front of the gear lever. With the switch down (position A), the low range (1st to 4th gear) is engaged and with the switch up (position B), the high range (5th to 8th gear) is engaged.

- Pre-selection is permitted. Actual shifting from the low to the high range or vice versa takes place as the gear lever passes through neutral.
- Wait until the vehicle is at a standstill before engaging reverse. Failure to do so may result in serious damage to the clutch, gearbox and engine.

Note:

If shifting from the high to the low range takes place at too high a vehicle speed, a safety device will prevent shifting to the low range.

The reverse gear may only be selected 5 seconds after the vehicle has come to a stop. When shifting down, you must always ensure that the speed is not too high for the gear you are selecting. There is also a safety device for shifting up from the low speed group to the high speed group. If you forget to turn the range-change switch to the uppermost position (position B), it is possible to switch from 4th gear to 1st gear rather than 5th gear. This may cause serious damage to the clutch, gearbox and engine.

Driving

- Select the highest possible gear while at the same time keeping the engine speed in the green zone of the rev counter.
- When speeding up, keep the engine speed within the green area of the rev counter as much as possible.

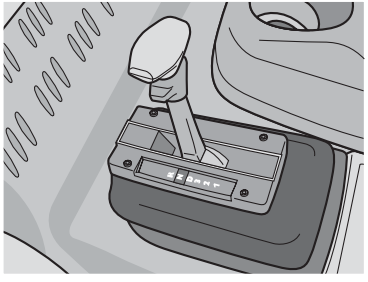
Automatic Gearbox

ALLISON 1000 & 2000 SERIES

General

The automatic gearbox is fully electronically controlled. The automatic gearbox has 5 forward gears and 1 reverse gear.

The automatic gearbox is operated by a selector lever. The selector lever is located next to the driver's seat.



D0 00 789

Shifting gears

The various gears are selected with the selector lever.

Neutral position

No gears are activated in the "N" position. 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" position is selected, the vehicle will immediately begin to move (if the brake system is pressurised and the vehicle is not on the parking brake). It is

therefore advisable to depress the brake pedal before selecting position "D". In this position the gearbox will automatically shift up and down in all forward gears. In the "1", "2" and "3" positions the gearbox shifts up to the selected gear. These positions are used to keep the engine within the proper speed range or to obtain the maximum engine brake performance.

Reverse

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

Faults

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

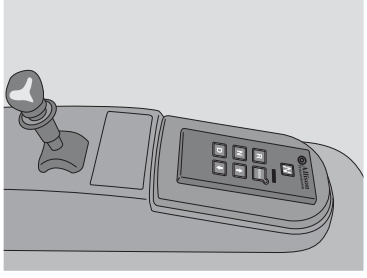
Read the following recommendations first or consult an authorized dealer if necessary.

Gearbox

The ECU will block the functions of the selector lever and 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!**

ALLISON MD3060



D0 00 790

General

The automatic transmission is electronically controlled and has a diagnostics system that saves possible errors in the memory of the ECU (Electronic Control Unit). They can be read out later. The operation and display take place via the selector keypad.

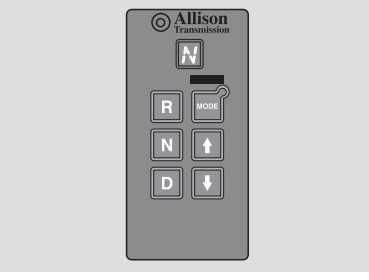
The selector keypad has a display located next to the driver's seat and replaces the gear lever on manual gearboxes.

The selector has the following functions:

- engaging and disengaging the gearbox
- choosing a shift program
- reading the oil level
- reading and deleting fault codes

The selector has the following six keys:

Neutral	Neutral position
Drive	Automatic forward drive
Reverse	Reverse
MODE	Shift program selection
↑	Shifting up
↓	Shifting down



D0 00 791

Shifting gears

Neutral position

No gear is engaged in the "N" position. The vehicle is **not** locked in this position and can therefore roll.

Use the parking brake to lock the vehicle.

The letter **"N"** appears in the display.

Automatic forward drive

If position "D" is chosen, the vehicle will be immediately set in motion. (If the air system is pressurised and if the parking brake is not on.) It is therefore advisable to depress the brake pedal before selecting position "D". In this position the gearbox automatically shifts up to the higher gear.

In the display, the figure of the highest gear to which the gearbox can be shifted appears.

Reverse

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

The letter **"R"** appears in the display.

Shift program selection

By pressing the "MODE" key briefly once, another shift program can be selected from stationary and driving position. Two selections are possible:

Normal program

This program is chosen automatically when the vehicle contact has been turned off. The warning lamp at the "MODE" key is not on.

This program allows the gearbox to shift gears as and when necessary so that driving at higher speeds is possible. This may be advisable on unpaved terrain.

Economy program

The warning lamp at the "MODE" key is on.

This program will, in general, shift gears at somewhat lower engine speeds. This results in more economical fuel consumption.

↓ Shifting down

After selecting the "D" key and when the vehicle is driving, this key can be used to keep the gearbox in a lower gear. The selected gear is shown in the display. The gearbox will not shift up further until the "↑" or "D" key is pressed. The number of gears that can be used will appear in the display.

↑ Shifting up

This key is used to allow the gearbox to shift to a higher gear. This is however only possible after having previously selected to stay in a low gear.

Use of the engine brake

When the engine brake is operated in third or higher gear, the ECU will shift down to second gear as soon as the engine speed permits to do so.

This is in order to allow the engine brake to deliver maximum braking force.

The selector display shows the second gear selected by the ECU.

Using the PTO

If the vehicle is fitted with a PTO, this can be switched on in both neutral and first gear (depending on the version).

PTO operation is, however, not permitted in Drive when the vehicle is being held stationary by the service brake or parking brake. In this case, shift to neutral in order to prevent overheating. Depending on the version, the electronic unit will shift the gearbox to neutral if a command is given to do so.

Faults

If the transmission fault warning symbol in the master display lights up, there is a fault in the gearbox (shifting gears), **or** the temperature of the gearbox oil is too high.

The accompanying fault code can be read in the selector display function.

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

Gearbox

The ECU will block the functions of the selector and the gearbox will select a "safe gear" for the gearbox. It is important to drive the vehicle to a safe place as soon as possible and turn the contact 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.

Air suspension

GENERAL

The remote control unit is used to operate the vehicle height on vehicles equipped with electronically controlled air suspension (ECAS).
The remote control unit is located against the console of the driver's seat and can only be operated with the ignition switched on and when the vehicle speed is lower than 9 km/h (5 mph).
The electronically controlled air suspension system (ECAS) is controlled by a microprocessor. Chassis height parameters are stored in the memory. If the actual chassis height is not in conformity with the set parameters, it will automatically be adjusted. The remote control unit can be used to set the chassis to the most suitable height for coupling/uncoupling a trailer or for loading/unloading the vehicle.

Driving a vehicle that is not at normal driving height, other than for coupling and uncoupling a semi-trailer is not permitted. The driving properties of the vehicle will be adversely affected and the legally permitted driving height could be exceeded.

REMOTE CONTROL

Remote control A

D000427

 vehicle rear end selected

 automatic setting of normal driving height

M1 lifting of chassis to pre-set height

M2 as M1, but for a different, pre-set chassis height

 lifting of selected chassis end(s) until key is released

 lowering of selected chassis end(s) until key is released

Stop all adjustments are stopped

ENGAGING AIR SUSPENSION

- Press the "Vehicle rear" key; the relevant warning lamp on the remote control will come on.

The choice can be cancelled by pressing the same key once again.

If the air suspension continues to regulate during loading/unloading, press the stop button. The vehicle will stop readjusting.

SETTING MEMORY KEYS (M-KEYS)

- Bring the chassis to the required height using the "lower chassis" or "lift chassis" keys.
- Then press the **"stop"** key and keep it depressed. Then press either of the **M**keys briefly. The chassis height at that moment will then be programmed in the ECAS unit.

If this M key is again pressed some time later, the vehicle will adjust itself to this programmed chassis height.
A different chassis height can be programmed with the other M-key in the same way.

STOP BUTTON

When the "Stop" button on the remote control unit is pressed, the system responds as follows, irrespective of the vehicle speed:

- When the chassis height is being changed, the electropneumatic valves are cut out immediately. The current height will now become the desired height.
- If the "stop" key is pressed while switching off the ignition, the delay setting is activated. When this setting is activated, the height adjustment remains active for 60 minutes when the ignition is switched off or until the air supply has become insufficient.

Unless stated otherwise, the buttons only need to be pressed once briefly.

Emergency repairs

VEHICLE TOOL KIT

All vehicles are fitted with a tool bag in the cab and a jack in the storage compartment to the left of the wheel winch.

It is essential that the jack is always carefully stowed after use in the storage space to the left of the wheel winch. If this safety precaution is not observed, this may cause injuries or material damage.

TILTING THE CAB

General

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

Only tilt the cab when the engine has stopped.

Make sure there is sufficient clearance around the cab.

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

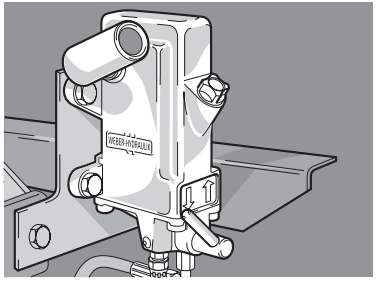
If the vehicle has been involved in a collision, the cab must under no circumstances be tilted without due precautions. The internal mechanism of the lifting cylinder may have been damaged to such an extent that the cylinder is no longer locked by the internal stop washer. In that case there is a danger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

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.

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.



D0 00 623

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 ↓.

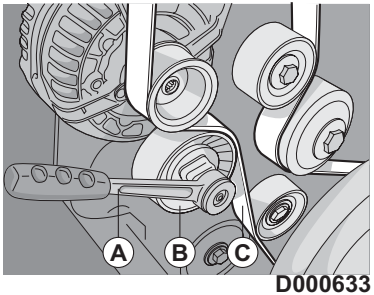
- Tilt the cab back by operating the pump with the jack rod. The last part of tilting-back is effected by the cab's own weight. When the catch engages, the cab is automatically locked.
- Leave the lever in position ↓.
- Push the gear lever in 1st gear to lock the gearbox control.
- Put the gear lever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

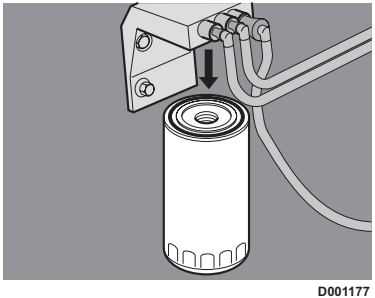
1. Disconnect the earth lead from the battery.



D000633

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.



D001177

REPLACING THE FUEL FINE FILTER

When removing the fuel fine 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

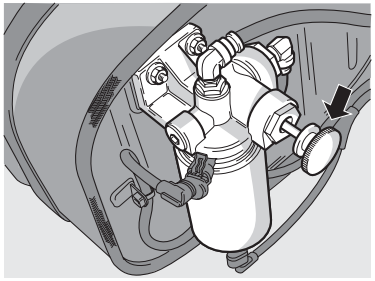
1. Place a receptacle under the filter.
2. Remove the filter by turning it anti-clockwise.

Note:

The fuel fine 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. See "BLEEDING THE FUEL SYSTEM".
4. Start the engine and check for leaks. If necessary, retighten the filter by hand.



D0 00 583

BLEEDING THE FUEL SYSTEM

Note:

When the hand pump is used, the fuel system will be automatically bled. The hand pump is fitted against the back of the fuel tank on the water separator.

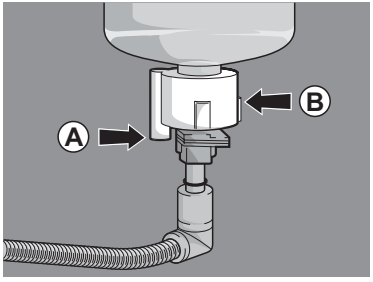
Bleeding

1. Loosen the hand pump knob anti-clockwise.
2. Use the hand pump until a clearly higher resistance is felt.

Note:

Stop pumping as soon as the higher resistance is felt. If you continue pumping, the fuel system may become internally damaged.

3. Secure the hand pump knob by turning it clockwise.

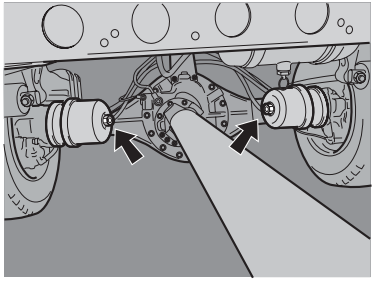


D0 00 620

DRAINING THE WATER SEPARATOR

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.

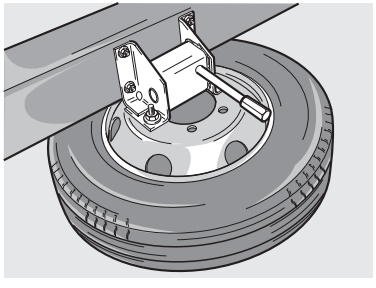


D0 00 606

RELEASING THE PARKING BRAKE

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).



D0 00 569

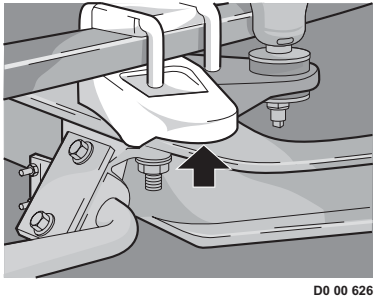
WHEEL WINCH

Self-braking wheel winch

1. Remove the wheel nut covers.
2. Unscrew the spare wheel nuts.

3. Lower the spare wheel.

Note:
Always fit the wheel on the spare wheel bracket with the valve facing outwards.

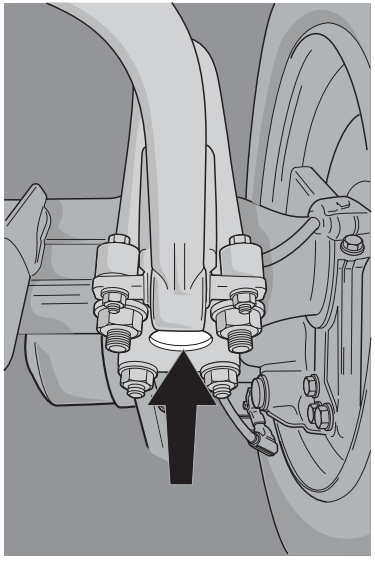


D0 00 626

JACKING UP THE FRONT AXLE

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

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



D0 00 719

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.

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).

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.

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 is 14%.
(This may occur when different tire sizes are fitted on the front or rear axles.)

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.

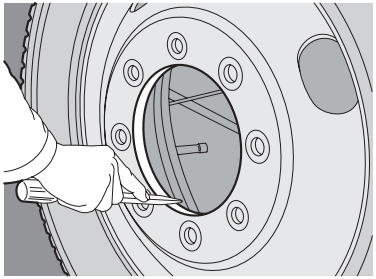
Note:

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

Removing the wheel

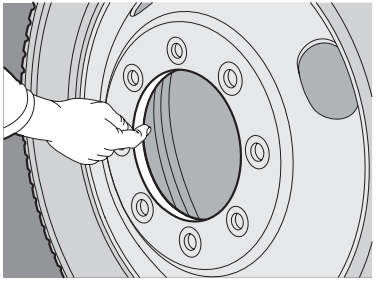
1. Chock the wheels to prevent the vehicle moving off.
2. Clean the screw thread of the wheel studs using a wire brush.
3. Oil the wheel studs sparingly.
4. Unscrew the wheel nuts.
5. Fit a jack under the jacking point at the wheel to be replaced.
6. Jack up the vehicle and place a support under the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

Installing the wheel



D000495

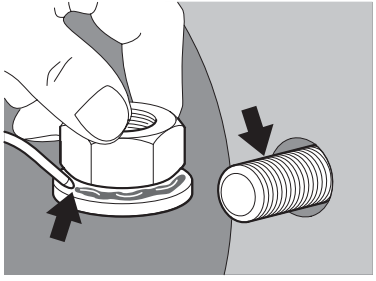
1. Clean the fitting edge of the wheel hub by scraping off dirt and corrosion with a scraper.
2. Apply a **thin** layer of grease to the fitting edge of the wheel hub.



D000496

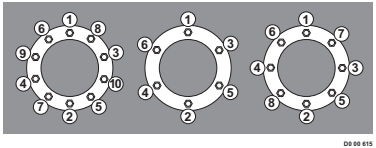
3. Also apply a **thin** layer of grease to the fitting edge of the wheel rim. This grease layer should prevent the wheel rim and the wheel hub from becoming "rust-bound".

4. Check whether the contact surfaces of the wheel rim and the drum brake are clean. Clean if necessary.



D000520

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.



D0 00 615

7. Fit the wheel nuts and tighten them evenly according to the sequence in the illustration.
   For the specified tightening torque, see "TECHNICAL DATA".

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 100 km (62 miles).**
   If new wheel studs are fitted, they need additional retorquing after 500 km (31 miles).

Note:

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

TIRE INFLATING CONNECTION

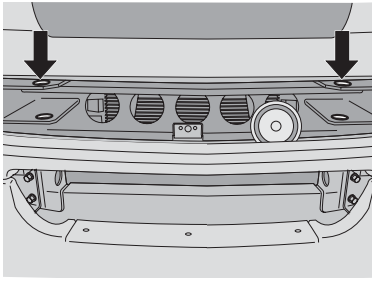
Next to the brake system air dryer to the left rear of the cab there is a tire inflating connection.

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 the tire pressure table under "TECHNICAL DATA".

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.



D0 00 723

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.

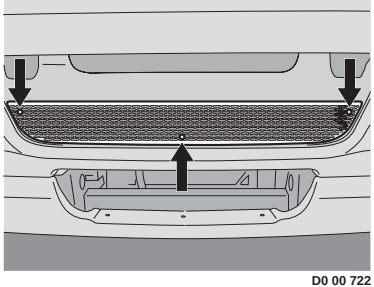
Tractors may be fitted with a small towing hook at the rear end of the chassis. This towing hook must only be used for light shunting work.

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

Being towed by another vehicle

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.

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 centreline.



D0 00 722

- 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".

If the differential is damaged:

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

Tow starting

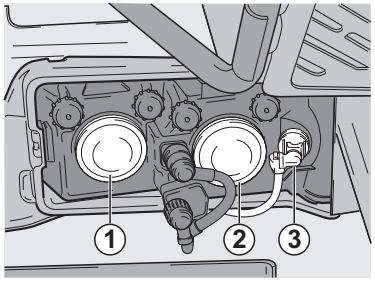
If the vehicle has to be towed to start the engine, the ignition key must first be turned clockwise to position D of the starter/ignition switch (ignition on).

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.



D0 00 594

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

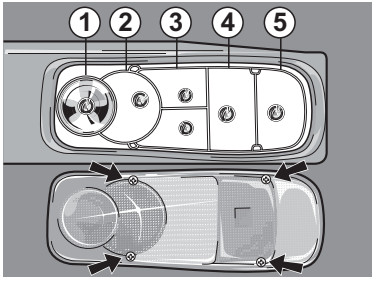
1. Tilt the cab forwards.
2. Detach the rubber cover (1) from the rear of the headlamp unit.
3. Detach the spring clamp and pull the bulb away from the reflector.
4. Detach the spring clamp and pull the bulb away from the reflector.

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.

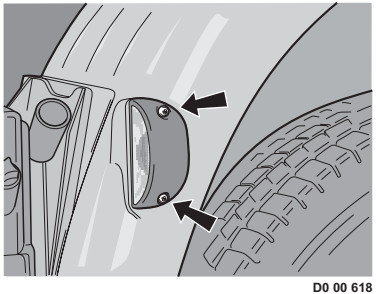
Rear lights

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



D0 00 628

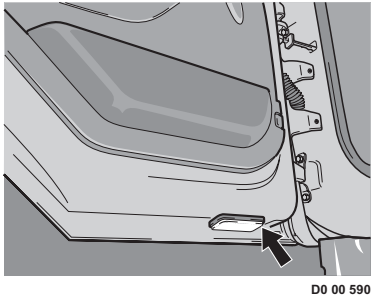
1. Fog light
2. Reversing light
3. Rear light
4. Stop light
5. Direction indicator



D0 00 618

Direction indicators

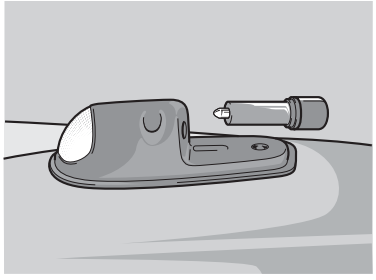
1. Detach the plug on the inside of the wheel arch.
2. Remove the two screws and detach the lamp unit of the direction indicator.
3. Unscrew the bulb holder anti-clockwise out of the indicator lamp unit.
4. Pull the bulb carefully out of the bulb holder.



D0 00 590

Stepwell lighting

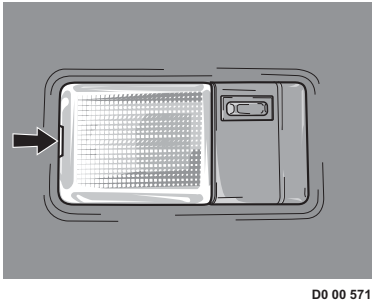
1. Remove the stepwell lighting housing from the bottom of the door by inserting a screwdriver in the notch.
2. If necessary, remove the plug.
3. Unscrew the bulb holder anti-clockwise out of the stepwell lighting housing.
4. Pull the bulb carefully out of the bulb holder.



D0 00 580

Contour lighting

1. Unscrew the bulb holder anti-clockwise from the housing.
2. Pull the bulb out of the bulb holder.

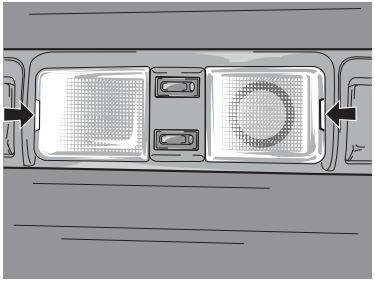


D0 00 571

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.



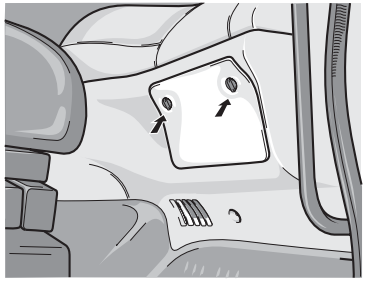
D0 00 591

Interior lighting/reading lamp

The transparent covers of the interior lighting/reading lamp have a slot allowing the cover to be tilted out of the housing using a screw driver.

1. Insert a screwdriver into the groove of the correct lens. Press in the internal attachment slightly. Then pull the lens carefully down and out of the lighting unit.
2. Remove the bulb(s) carefully from the bulb holder.

FUSES AND RELAYS



D0 00 617

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.**
- **a consumer is switched on.**

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 colour-coded to show the rating:

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

Fuses

E004	Fuse, dipped beam, driver's side
E005	Fuse, dipped beam, co-driver's side
E006	Fuse, main beam, driver's side
E009	Fuse, front fog lights
E013	Fuse, brake lights
E018	Fuse, windscreen wiper motor
E019	Fuse, horn
E023	Fuse, tachograph timer switch
E025	Fuse, windscreen wiper/washer motor
E026	Fuse, cigar lighter/door switches/electronic unit converter 24/12 V with power supply for radio memory
E027	Fuse, electronic converter 24/12 V with power supply for radio memory
E028	Fuse, interior lighting, bunk lamps/central door locking
E031	Fuse, heater fan
E035	Fuse, generator voltage regulation/ECS-DC3
E039	Fuse, seat heater
E043	Fuse, trailer ABS
E044	Fuse, mirror heating/adjustment/window control
E048	Fuse, trailer power
E051	Fuse, ECAS
E052	Fuse, work lamp

Fuses

E053	Fuse, diagnostic connector/alarm system/ECAS
E058	Fuse, auxiliary heater
E062	Fuse, ECAS
E091	Fuse, heating element, air dryer/water separator/RAS-EC/engine speed control application connector
E108	Fuse, VIC
E114	Fuse, auxiliary heater/warning lamps
E143	Fuse, tachograph/alarm system/immobiliser/ABS-D/ABS/ASR-E
E144	Fuse, automatic gearbox AGC
E153	Fuse, main switch power supply
E156	Fuse, accessories
E158	Fuse, DIP-4 instrument panel
E160	Fuse, ECS-DC3
E163	Fuse, rotating beacons/roof hatch
E165	Fuse, FPH-E fuel heater, after contact
E190	Fuse, ABS-D/ABS/ASR-E
E198	Fuse, central door lock
E277	Fuse, VIC
E279	Fuse, generator voltage regulation
E280	Fuse, VIC
E282	Fuse, engine brake switch/brake light switch

Fuses

E283	Fuse, headlamp height adjustment/width marker light, 1st, left and right/ tail light, right
E284	Width marker light, 2nd, left and right/tail light, left/search lighting
E285	Fuse, VIC/fog lights switch
E286	Fuse, power supply
E290	Fuse, RAS-EC
E297	Fuse, airbag and seat belt tensioner system
E299	Fuse, windscreen heating
E330	Fuse, main switches "sens" wire
E349	Fuse, cab power supply
E354	Fuse, automatic gearbox, AGC fan

Emergency repairs

Technical Data and Identification

ENGINE

Type

Types	LF 45 SERIES	LF 55 SERIES
	BE 99 C	BE 123 C
	BE 110 C	CE 136 C
	BE 123 C	CE 162 C
	CE 136 C	CE 185 C
	CE 162 C	

Engine

Engine type	BE ... C ENGINE	CE ... C ENGINE
Model	Euro 3, water-cooled, four-stroke diesel engine with electronically controlled fuel injection system, 4 valves per cylinder and turbo-intercooling.	Euro 3, water-cooled, four-stroke diesel engine with electronically controlled fuel injection system, 4 valves per cylinder and turbo-intercooling.
Number of cylinders	4	6
Bore x stroke	102 x 120 mm	102 x 120 mm
Total capacity	3.9 litres	5.9 litres
Capacity of lubrication system, including filter and oil cooler	13.5 litres	19.5 litres
Sump capacity, maximum level	11.5 litres	17.5 litres
Sump capacity, minimum level	9.5 litres	15.5 litres
Capacity of cooling system, including heater	20 litres	22 litres

Output and torque

Type	Maximum output P (kW/hp)	Engine speed at max. output n_p (rpm)	Maximum torque M (Nm)/(lb ft)	Engine speed at max. torque n_m (rpm)
BE 99 C	99/135	2500	500 / 368.7	1200-1600
BE 110 C	110/150	2500	550 / 405.6	1200-1600
BE 123 C	123/170	2500	600 / 442.5	1200-1600
CE 136 C	136/185	2500	700 / 516.3	1200-1700
CE 162 C	162/220	2500	820 / 604.8	1200-1700
CE 185 C	185/250	2500	950 / 700.7	1200-1700

ELECTRICAL SYSTEM

Voltage	24 V
Alternator	80 A / 29 V (extra: 100 A / 29 V)
Batteries	2 x 12 V / 125 Ah (extra: 2 x 12 V / 170 Ah)
Starter motor	4 kW / 24 V

Bulbs

Dipped beam	H7 70 W
Main beam	H1 70 W
Parking light	5 W
Tail light	10 W
Rear fog light	21 W
Reversing light	21 W
Stop light	21 W
Direction indicator	21 W
Registration plate	10 W
Cab interior lighting	10 and 21 W
Bunk light	21 W
Contour marker light	5 W
Stepwell lighting	5 W
Marker light	5 W
Combi-light: fog light	H 70 W
Spotlight	H 70 W
Work light, white	H 70 W
Work light, yellow	35 W

WHEELS

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

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 500 km (310 miles).

Wheel nut tightening torques

LF45

Version with 6 M18 wheel nuts	370 Nm (272.9 lb ft)
Version with 8 M18 wheel nuts	370 Nm (272.9 lb ft)

LF 55

Version with 8 M20 wheel nuts	485 Nm (357.7 lb ft)
Version with 10 M22 wheel nuts	700 Nm (516.3 lb ft)

TIRE PRESSURE TABLE (METRIC)

Recommended pressure (bar) at various loads (kg) E= single fitting D= twin fitting																						
Tires size		2000	2500	3000	3500	4000	4500	5000	5500	6000	6500	7000	7500	8000	8500	9000	10000	11000	12000	13000	Max. axle load (kg)	Pressure at maximum axle load
10 R17.5	E		4.1	5.1	6.1	7.0															4240	7.5
	D								4.9	5.4	6.0	6.5	7.0	7.5							8000	7.5
10 R22.5	E				5.5	6.2	7.0														5000	8
	D											5.7	6.0	6.5	7.0						9200	8
12 R22.5	E							6.0	6.5	7.2	7.7	8.5									7100	8.5
	D														5.6	6.0	6.7	7.5	8.2		12600	8.5
205/75 R17.5	E	4.4	5.6	6.7																	2900	6.8
	D					4.2	5.0	5.5	6.2												5600	6.3
215/75 R17.5	E	4.2	5.2	6.3																	3200	6.8
	D							4.9	5.4	6.0											6200	6.3
225/75 R17.5	E	4.0	5.1	6.2	7.5																3600	7.5
	D							4.7	5.3	5.8	6.4										6600	6.5
235/75 R17.5	E		4.7	5.7	6.5																3800	7.3
	D								5.2	5.5	6.2	6.5									7200	6.8
245/75 R17.5	E	3.3	4.4	5.4	6.4	7.5															4480	8.3
	D							4.4	4.9	5.4	5.8	6.2	6.8	7.3							8000	7.5
245/70 R19.5	E	3.3	4.4	5.5	6.5	7.5															4360	8.3
	D							4.2	4.7	5.2	5.7	6.2	6.7	7.2							8240	7.5
265/70 R19.5	E		3.9	4.7	5.5	6.2															4480	7
	D								3.9	4.6	5.1	5.7	6.2	6.7							8480	7
285/70 R19.5	E		3.5	4.3	5.1	6.1	6.9	7.7	8.6												5600	7
	D										4.6	5.2	5.6	6.0	6.5	7.3					9200	7
275/70 R22.5	E					5.3	6.2	7.0	7.7	8.5											6300	9
	D													5.5	6.0	6.5	7.2	8.2			11600	8.5
275/80 R22.5	E						6.0	6.7	7.5	8.2											6300	8.5
	D														5.7	6.2	7.0	7.7			11600	8
295/80 R22.5	E				3.8	4.5	5.5	6.0	6.5	7.2	7.7	8.5									7100	8.5
	D											4.4	4.7	5.1	5.6	6.0	6.7	7.5	8.2		12600	8.5
305/70 R22.5	E							6.0	6.7	7.4	8.2	8.9									7100	9
	D														5.3	5.7	6.5	7.2	8.0		12600	8.5
315/80 R22.5	E								5.8	6.3	7.0	7.5	8.0	8.5							8000	8.5
	D																6.0	6.5	7.2	7.7	13400	8

TIRE PRESSURE TABLE (US)

Recommended pressure (psi) at various loads (lb) E= single fitting D= twin fitting																						
Tire size		4400	5500	6600	7700	8800	9900	11000	12100	13200	14300	15400	16500	17600	18700	19800	22000	24200	26400	28600	Max. axle load (lb)	Pressure at maximum axle load
10 R17.5	E		59.45	73.95	88.45	101.5															9328	108.75
	D								71.05	78.3	87	94.25	101.5	108.75							9328	108.75
10 R22.5	E				79.75	89.9	101.5														17600	108.75
	D											82.65	87	94.25	101.5						11000	116
12 R22.5	E							87	94.25	104.4	111.65	123.25									20240	116
	D														81.2	87	97.15	108.75	118.9		15620	123.25
205/75 R17.5	E	63.8	81.2	97.15																	27720	123.25
	D					60.9	72.5	79.75	89.9												6380	98.6
215/75 R17.5	E	60.9	75.4	91.35																	12320	91.35
	D							71.05	78.3	87											7040	98.6
225/75 R17.5	E	58	73.95	89.9	108.75																13640	91.35
	D							68.15	76.85	84.1	92.8										7920	108.75
235/75 R17.5	E		68.15	82.65	94.25																14520	94.25
	D								75.4	79.75	89.9	94.25									8360	105.85
245/75 R17.5	E	47.85	63.8	78.3	92.8	108.75															15840	98.6
	D							63.8	71.05	78.3	84.1	89.9	98.6	105.85							9856	120.35
245/70 R19.5	E	47.85	63.8	79.75	94.25	108.75															17600	108.75
	D							60.9	68.15	75.4	82.65	89.9	97.15	104.4							9592	120.35
265/70 R19.5	E		56.55	68.15	79.75	89.9															18128	108.75
	D								56.55	66.7	73.95	82.65	89.9	97.15							9856	101.5
285/70 R19.5	E		50.75	62.35	73.95	88.45	100.05	111.65	124.7												18656	101.5
	D										66.7	75.4	81.2	87	94.25	105.85					12320	101.5
275/70 R22.5	E					76.85	89.9	101.5	111.65	123.25											20240	101.5
	D													79.75	87	94.25	104.4	118.9			13860	130.5
275/80 R22.5	E						87	97.15	108.75	118.9											25520	123.25
	D														82.65	89.9	101.5	111.65			13860	123.25
295/80 R22.5	E				55.1	65.25	79.75	87	94.25	104.4	111.65	123.25									25520	116
	D											63.8	68.15	73.95	81.2	87	97.15	108.75	118.9		15620	123.25
305/70 R22.5	E							87	97.15	107.3	118.9	129.05									27720	123.25
	D														76.85	82.65	94.25	104.4	116		15620	130.5
315/80 R22.5	E								84.1	91.35	101.5	108.75	116	123.25							27720	123.25
	D																87	94.25	104.4	111.65	17600	123.25

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.

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.

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:
ACEA E3: mineral oil
ACEA E5: further developed ACEA E3 mineral oil, geared to possible higher requirements on Euro 3 engines.
ACEA E4: partially or completely synthetic oil, specially developed for extended oil change interval and/or highly loaded engines.

Explanation of overview:
V = may be used

LF 45/55

Engine type	ACEA E3 ..W-40	ACEA E4 ..W-40	ACEA E4 ..W-30	ACEA E5 ..W-40	ACEA E5 ..W-30
BE				**V**	
CE				**V**	

COOLANTS

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".
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: Texaco Havoline XLC.

D001055

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
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

DIESEL FUEL

Diesel fuel must meet the specifications according to EN 590.

Note:
It is prohibited to add petroleum (kerosene), petrol or any other additive to the diesel fuel.

Sulphur content > 0.2%:	Halve engine oil change interval to max. of 25,000 km (15,534 miles)

Fuel should have a lubricity effect according to the requirements below ("lubricity standard"):

test method:	HFFR according to standard CEC-F 06-A96
test value:	< 460 µm

Always contact your authorized dealer to get to know whether it is or is not permitted to use alternative fuels (e.g. biodiesel); the dealer can also tell you whether any consequences are involved in using such fuels.

STEERING GEAR

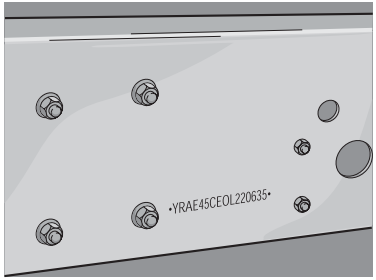
Hydraulic power steering	ATF DEXRON III with valid approval number

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 Aerohydraulic 520

CLUTCH

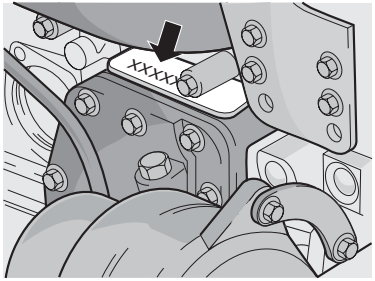
Hydraulic clutch	Brake fluid DOT 3 or DOT 4



D0 00 579

CHASSIS NUMBER

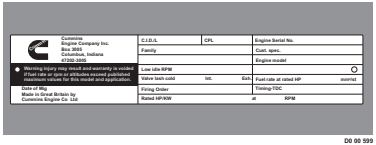
The chassis number is stamped on the right chassis side member close to the front axle.



D0 00 597

ENGINE NUMBER

The engine number is stamped on the front right of the engine.



D0 00 599

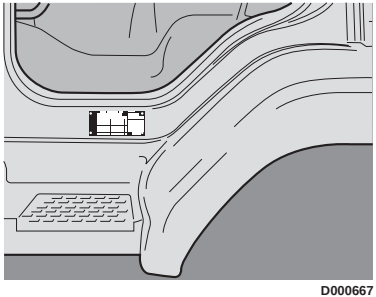
ENGINE IDENTIFICATION PLATE

The engine identification plate is attached to the top of the flywheel housing. The plate shows the engine number and some adjustment data.

D0 00 607

PAINT IDENTIFICATION PLATE

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



D000667

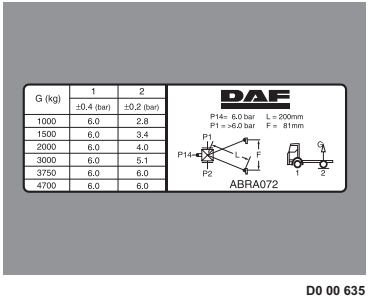
VEHICLE IDENTIFICATION LABEL

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:

EXAMPLE VIN: 1XP 9D2X9 6 X D 345678

Model Year — Serial Number

ALR TYPE PLATE



D0 00 635

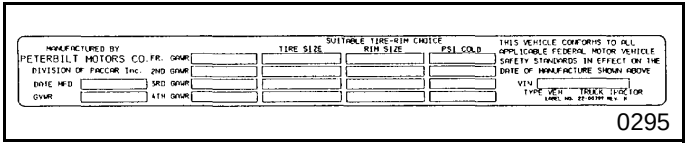
The ALR type plate (load-sensing valve) is on the right-hand door pillar.

The instruction plate contains details of the axle loads and output pressures; these correspond to the order of the axles underneath the vehicle.
So "1" is the front axle, etc.
Therefore, the data on the instruction plate relating to the driven axle is important when checking the load-sensing valve!

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.



0295

How To Order Parts

When you need replacement parts for your Peterbilt vehicles, contact your nearest authorized Peterbilt dealer, who may be located from the “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 Peterbilt 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 Peterbilt Motors Company.
To contact NHTSA, you may either call the Auto Safety Hotline toll-free at 1-800-424-9393 (366-0123 in Washington, D.C.) or write to: Administrator, NHTSA, 400 Seventh Street, S.W., Washington, D.C. 20590. You can also get other information about auto safety from the Hotline.

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 Street
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

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 Peterbilt 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.

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