SCANIA

00:01-06

Issue 9 **en-GB**

Product information for the rescue services

Trucks and buses

P, G, R, T and K, N, F series

308 626

Before starting to read

Note:

Check that this is the latest issue of Scania’s product information for the rescue services.

Note:

The information in Scania's product information for emergency services applies to vehicles in the P, G, R and T series and K, N and F series that have been ordered in the ordinary order system.

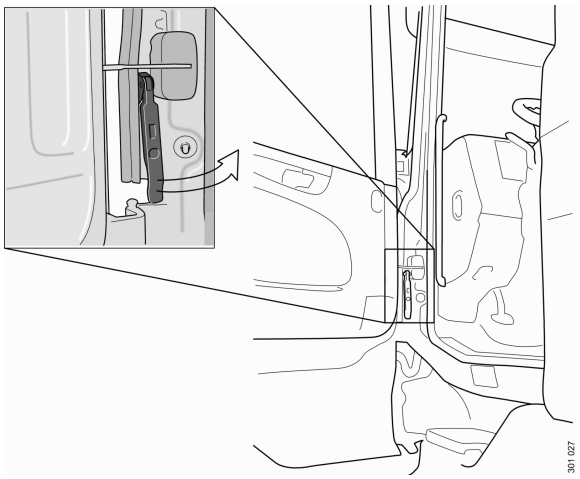
Opening the vehicle front grille panel

Non-lockable front grille panel

The non-lockable front grille panel can be opened from outside by pulling on the lower edge of the front grille panel.

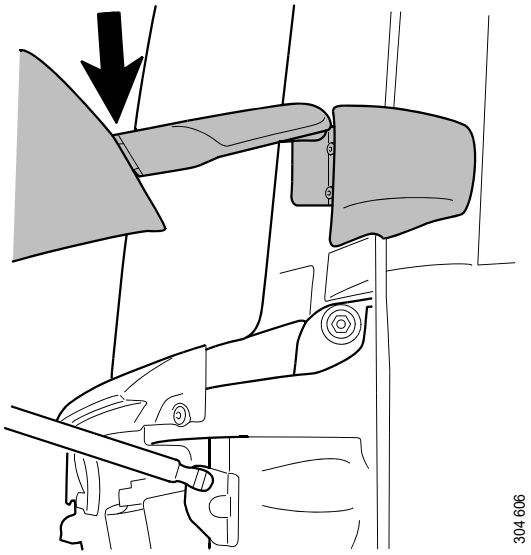
Lockable front grille panel

If the front grille panel is lockable, it can be opened with a handle in the door pillar. Grasp the handle at the arrow and pull up forcibly. If the front grille panel is stuck, ask someone else to pull up forcibly on the lower edge of the front grille panel at the same time.

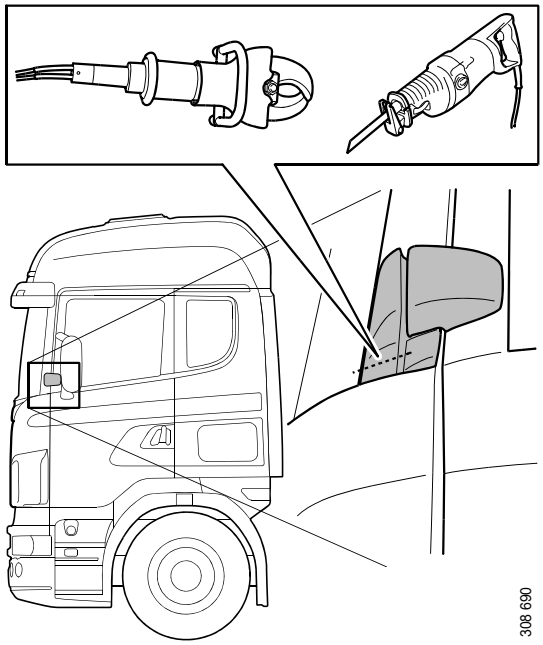


If the front grille panel of the vehicle cannot be opened

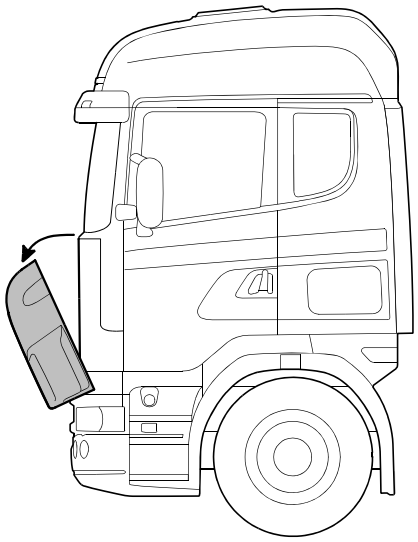
The front grille panel of the vehicle is attached by a hinge in the upper part.



1. Cut or saw off the hinges on the grille panel's left and right side.



2. Fold down the front grille panel.

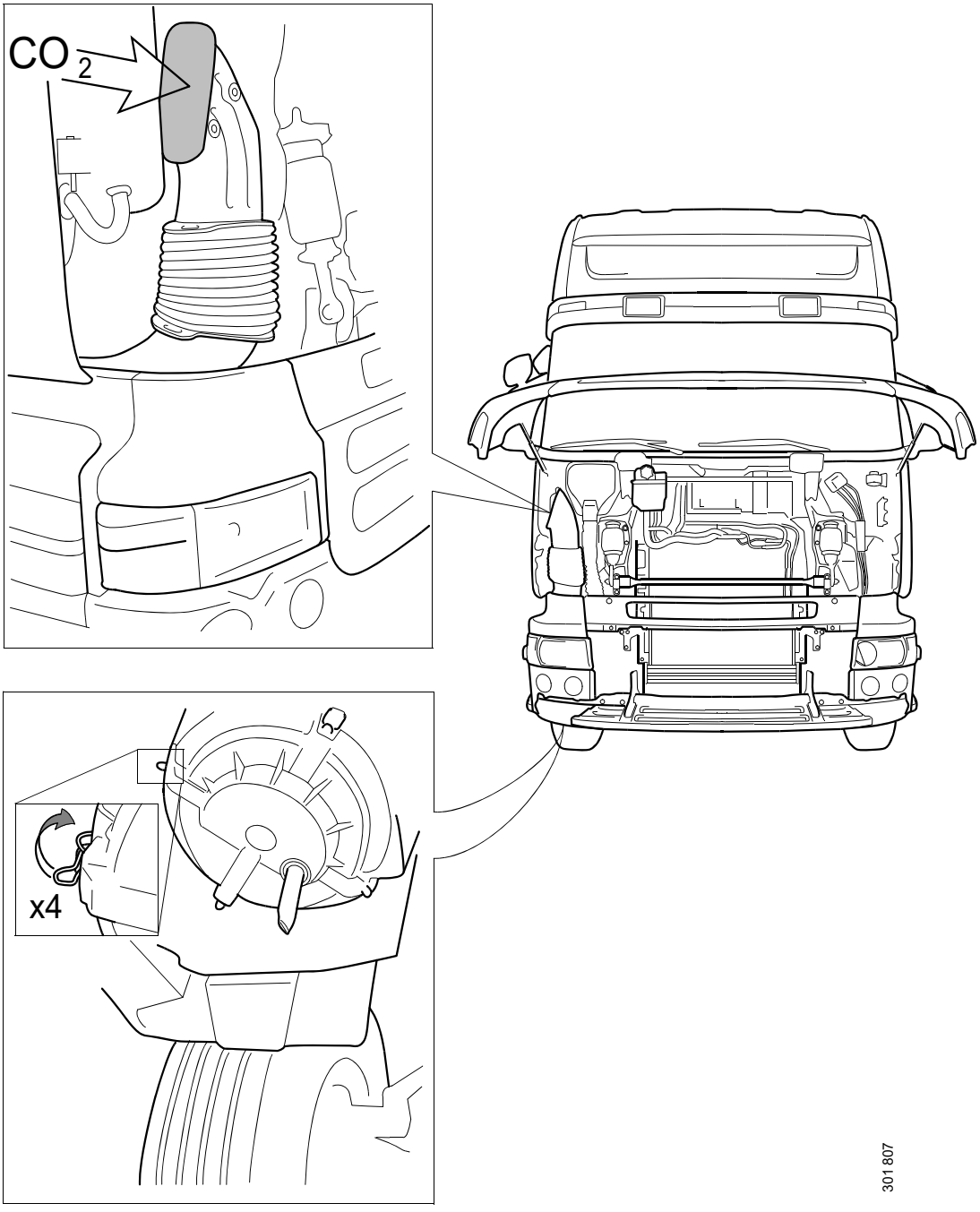


Engine air intake

Front air intake

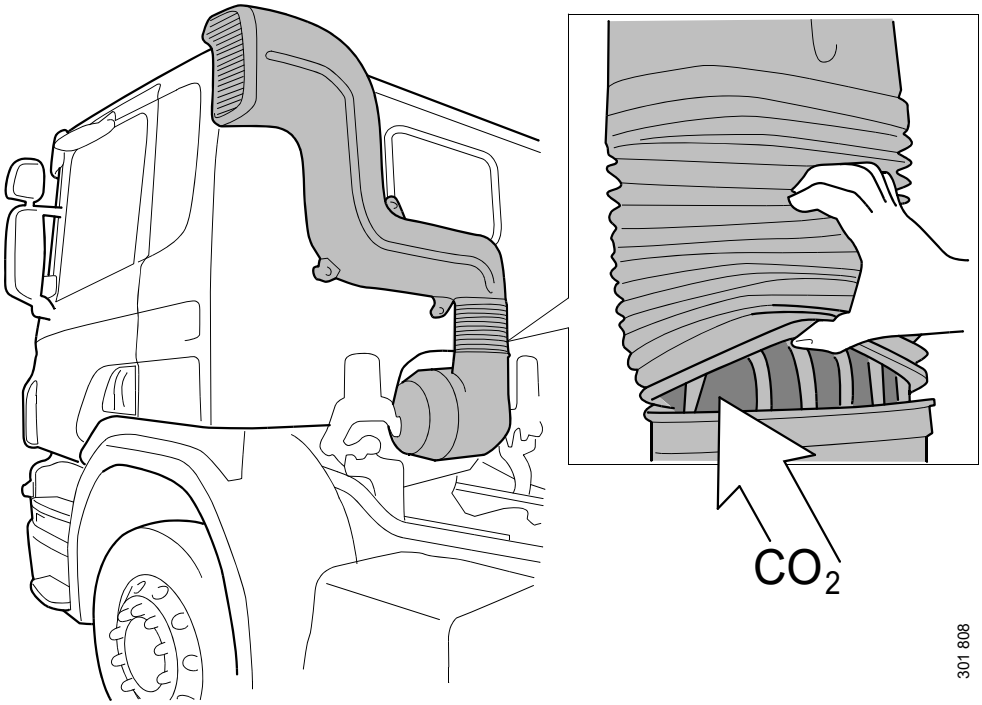
The vehicle engine can be shut off by spraying carbon dioxide into the air intake. The air intake can be accessed with the front grille panel open.

The air intake can also be accessed from the underside of the vehicle. First loosen the cover in order to spray carbon dioxide into the air intake.



High air intake

On vehicles with high air intake, the air intake can be accessed behind the cab.



Air suspension

Cab with air suspension

On vehicles with a cab with air suspension, the air can be released from the air suspension to stabilise the cab.

WARNING!

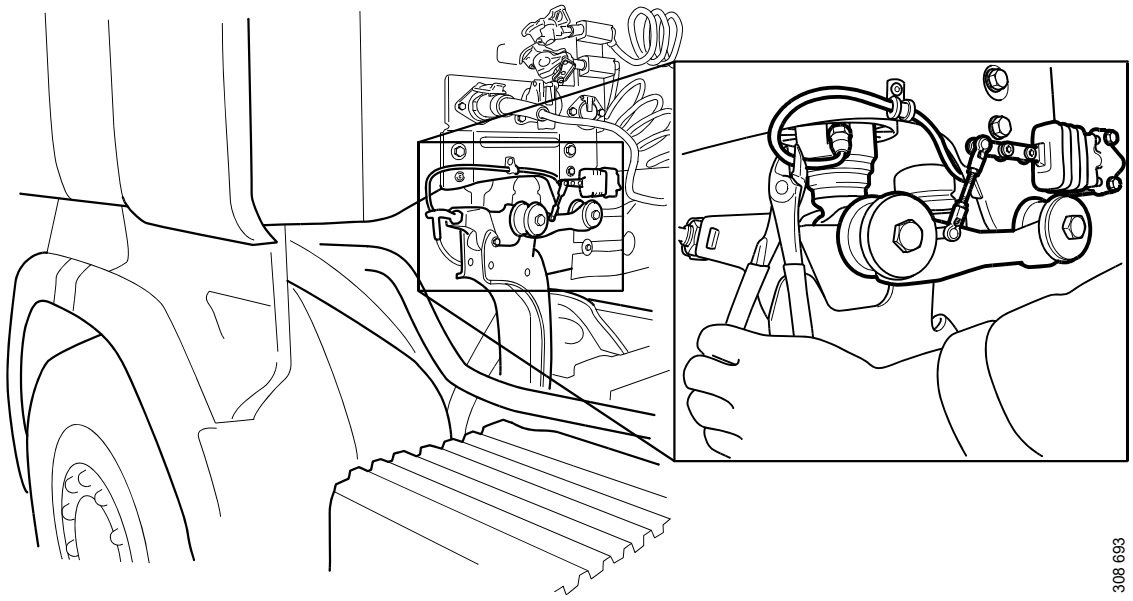
Risk of hearing impairment! A loud noise occurs when the air flows out of the cut hose.

WARNING!

Risk of crush injuries when the cab air suspension is emptied!

Rear cab suspension

- Cut off the air hose to the rear cab suspension.



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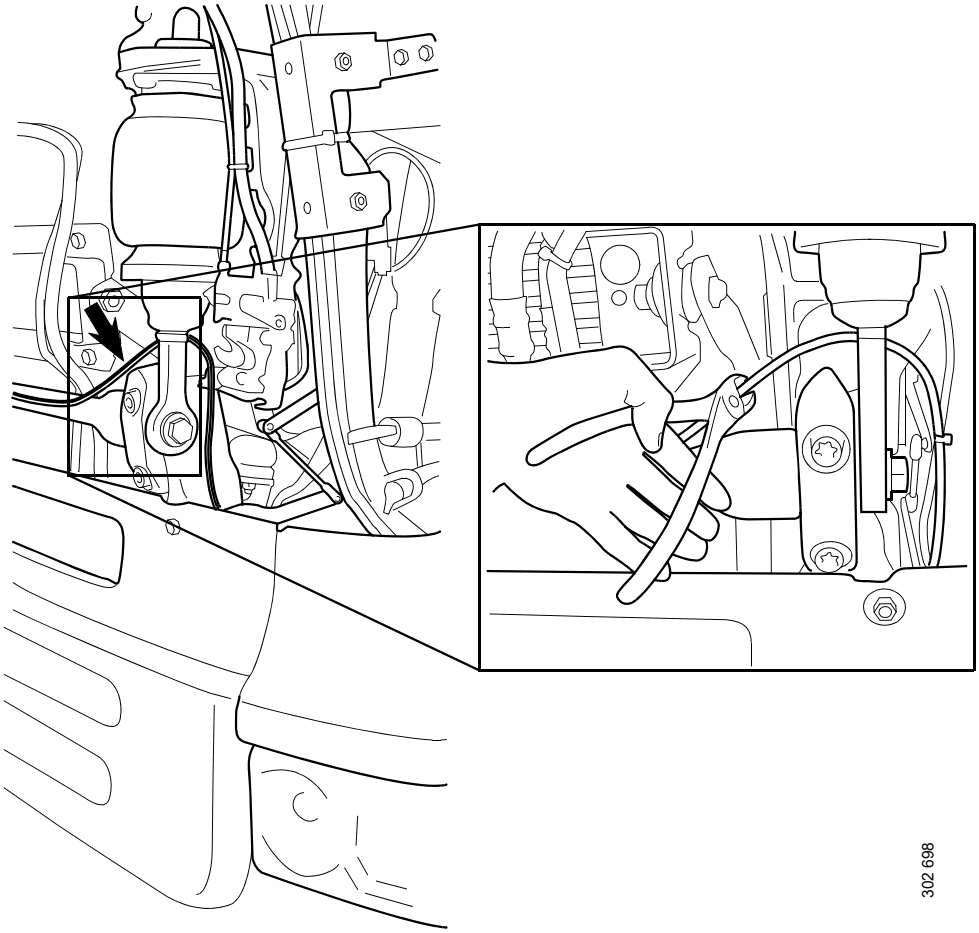
Front cab suspension

- Cut off the air hose to the front cab suspension.

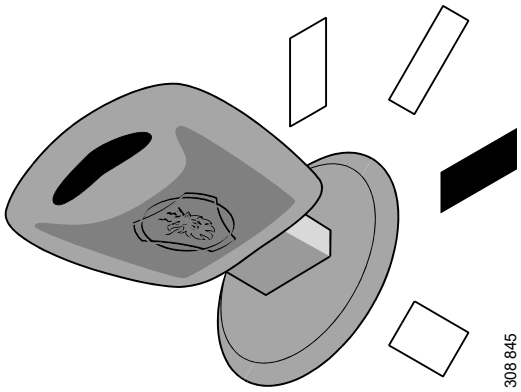


Chassis air suspension

The operation unit

Vehicles with air suspension chassis are raised and lowered using the operation unit. Raising the chassis can be carried out as long as there is pressure in the system's compressed air tanks.

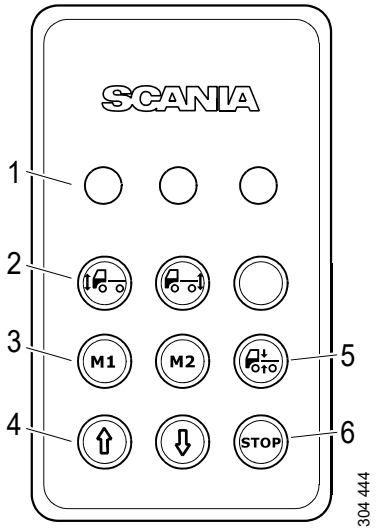
To operate the operation unit, the starter key must be in drive mode and the vehicle voltage must be connected.



The starter key is in drive mode.

The operation unit is positioned at the side of the driver's seat.

1. Indicator lamps
2. Axle selection buttons.
3. Memory buttons
4. Level change buttons.
5. Normal level restore button.
6. Stop button

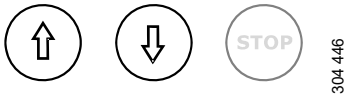


Selecting the axle

Press the button for the axle on which you wish to change the level. You can also press both buttons to change both axles at the same time. When you have selected an axle the relevant indicator lamp illuminates.

Change level

Hold down the buttons to raise or lower to the desired level. Release the button to cancel.



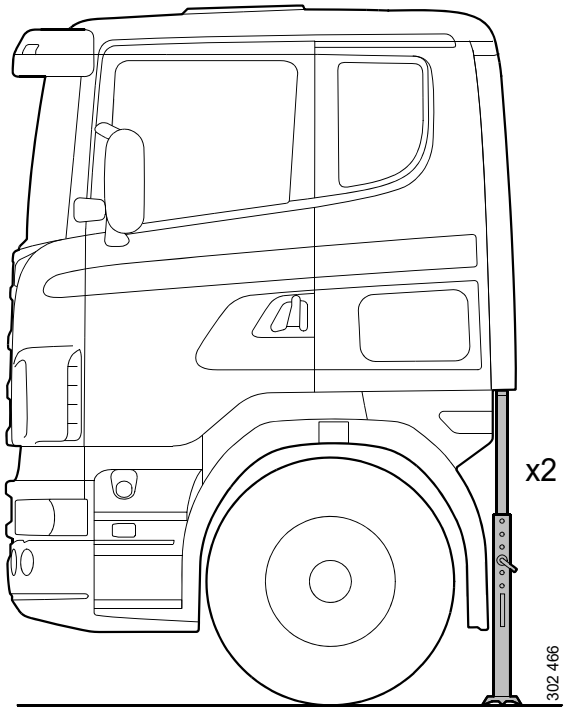
Stop button

The stop button always cancels the function in progress. Press the stop button if you need to cancel, e.g. “the return to normal level function” if something is in the way.

The stop button can always be used as an emergency stop even if the operation unit is not active.

Securing the cab

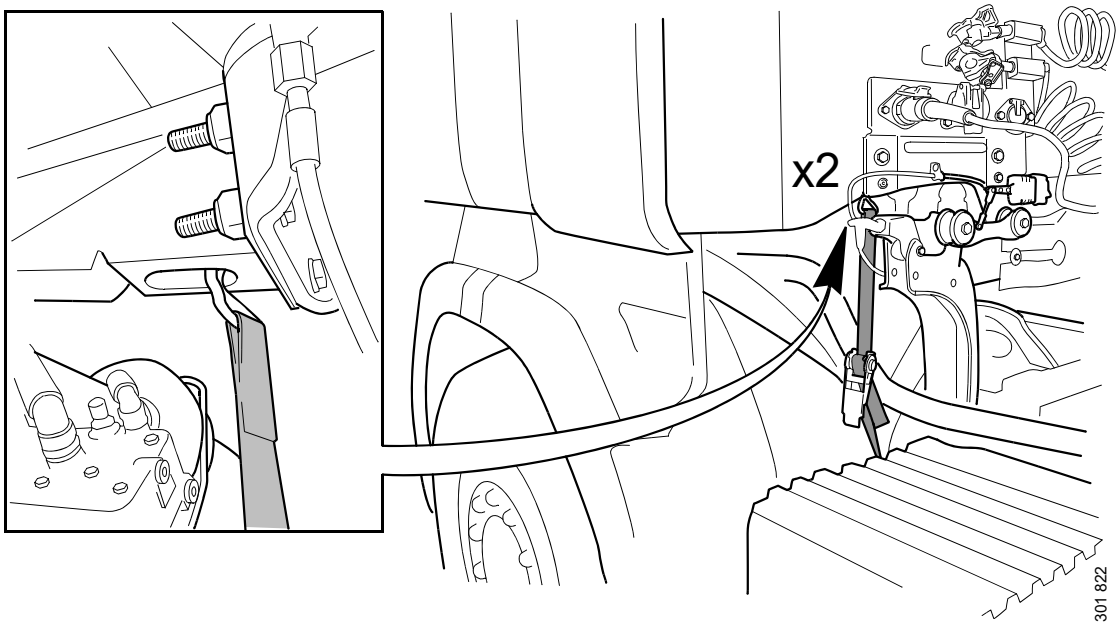
Supports on each side at the rear of the cab prevent the cab from moving downwards.



By anchoring the cab in the frame on each side the cab is prevented from moving upwards. The brackets under the cab can be used as illustrated.

WARNING!

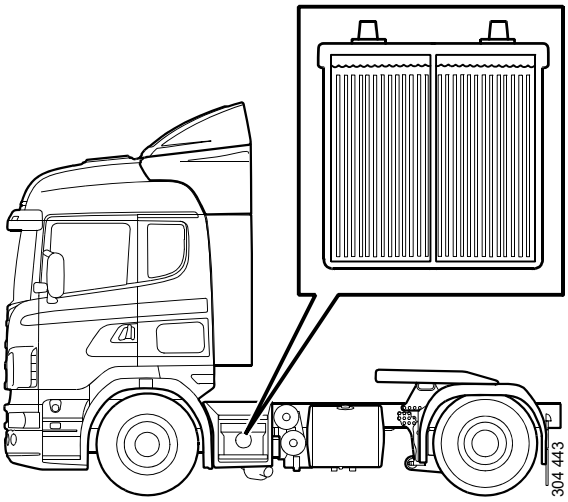
Beware of hot exhaust system mounted on the right-hand side of the vehicle!



Electrical system

Battery

The location of the battery box varies depending on the vehicle equipment. The illustration shows a normal location. If the vehicle does not have a battery master switch then the battery must be disconnected to switch off the voltage.



Normal location of battery

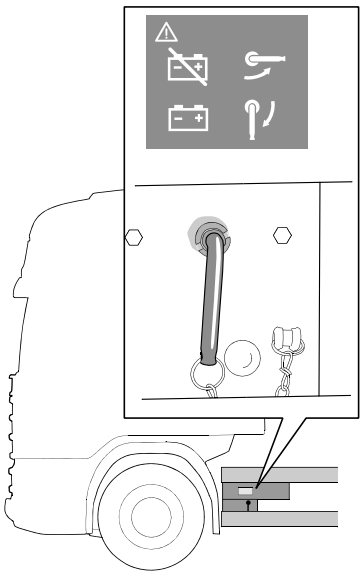
Battery master switch

The vehicle may be fitted with a battery master switch. In most vehicles only the tachograph and the vehicle alarm are supplied with voltage when the battery master switch is activated.

Depending on how the vehicle bodywork is connected, the bodywork may be supplied with voltage even when the battery master switch is activated.

Vehicles with a battery at the rear are fitted with a jump socket that is supplied with voltage even when the battery master switch is activated.

Depending on the vehicle equipment, the battery master switch can be activated in different ways. The battery master switch can be activated with the battery master switch handle, an external switch or a switch in the instrument panel.



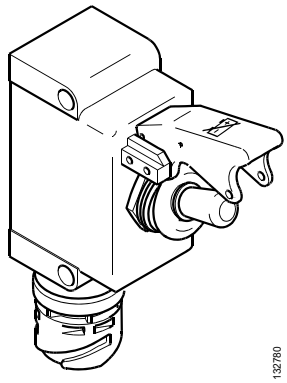
Battery master switch handle

Battery master switch handle

The battery master switch handle is positioned next to the battery box.

External switch for battery master switch

The vehicle may be fitted with an outer switch for the battery master switch instead of a battery master switch handle. The outer switch for the battery master switch is positioned behind the vehicle cab on the left-hand side.



External switch for battery master switch

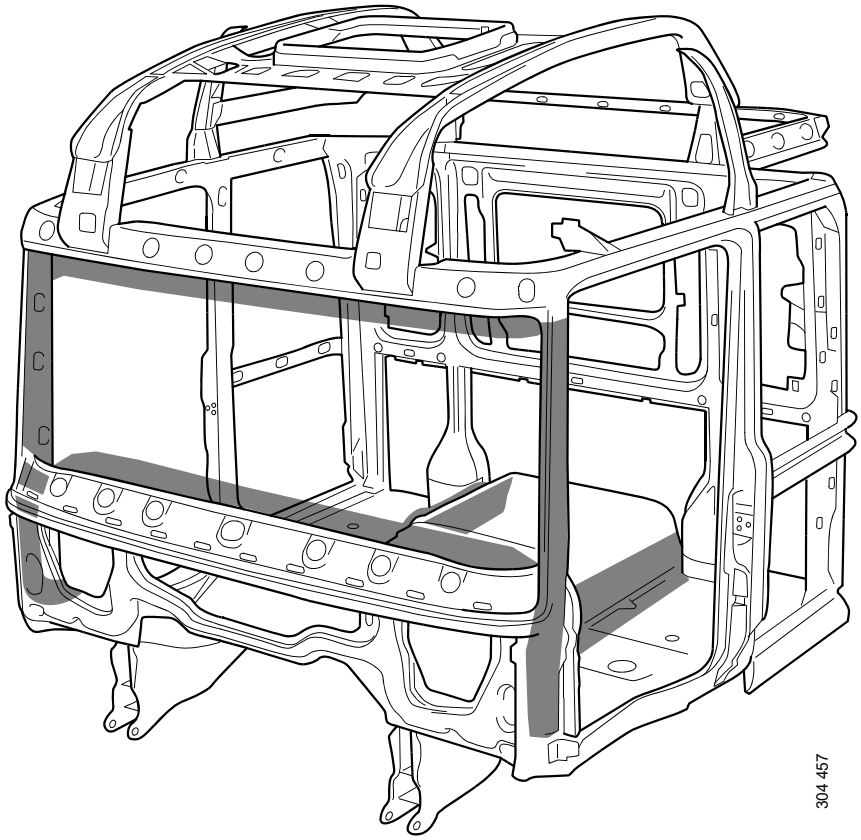
Switch for battery master switch in the instrument panel

Some vehicles are also fitted with switches for the battery master switch in the instrument panel. This applies, for example, to the ADR adapted vehicle.

Switch for battery master switch in the instrument panel

Cable harness

The illustration shows the routing of the largest cable harnesses in the cab.



Getting into the vehicle

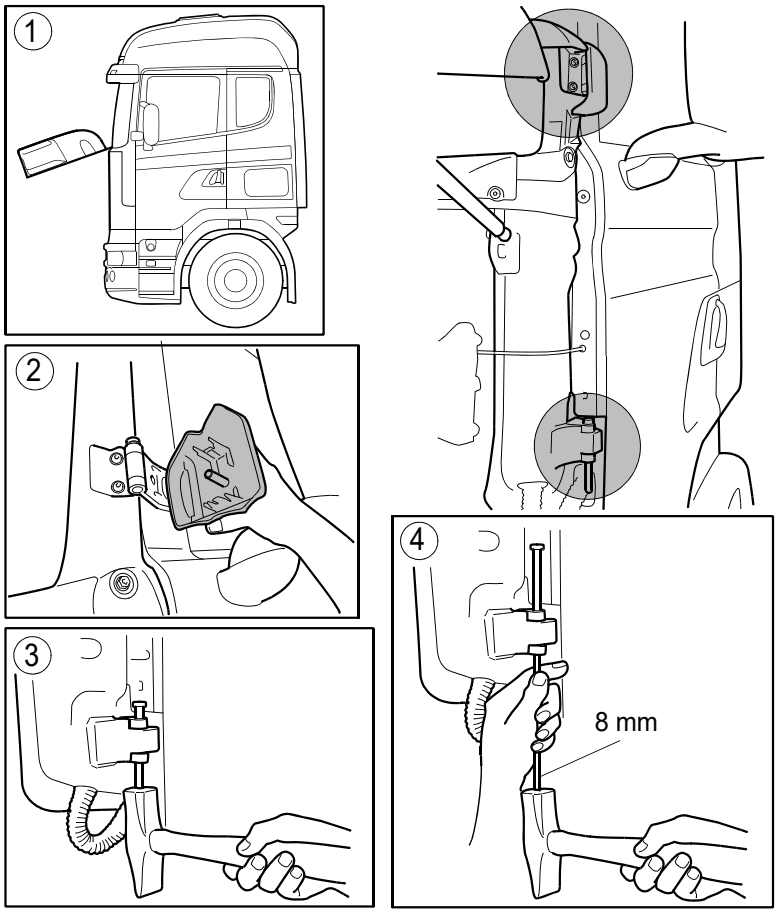
Door

The door can be released from the cab by tapping out the pins in the hinge.

WARNING!

The door can weigh up to 60 kg!

1. Open the front grille panel to access the hinge.
2. Remove plastic cover from the upper hinge
3. Tap out the pins from both hinges.
4. Use a drift to tap out the last bit of the pin



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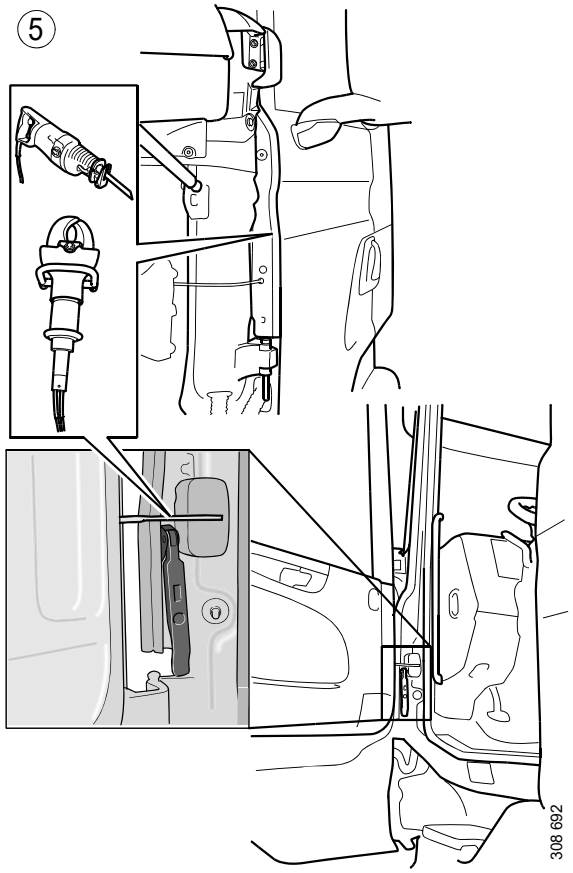
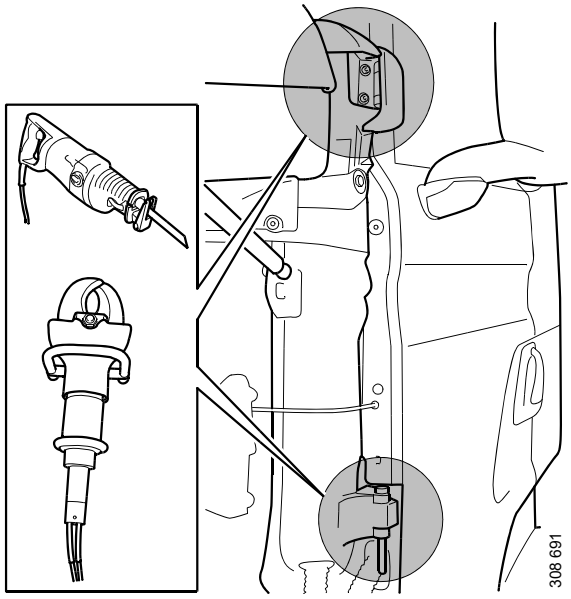
5. When the door is released from the hinges the door stop must be cut before the door can be removed from the cab.



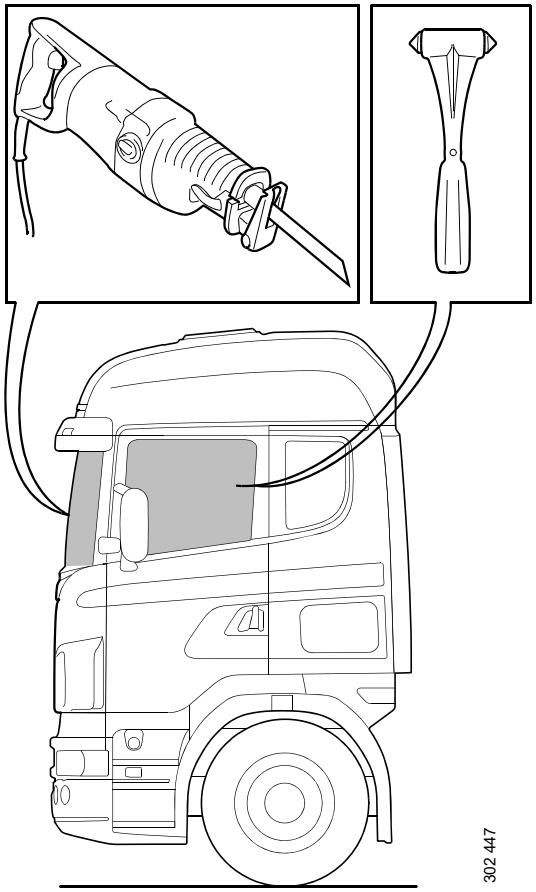
Alternatively, a cutting tool or a tiger saw can be used to cut the hinge.



Windscreen and door window

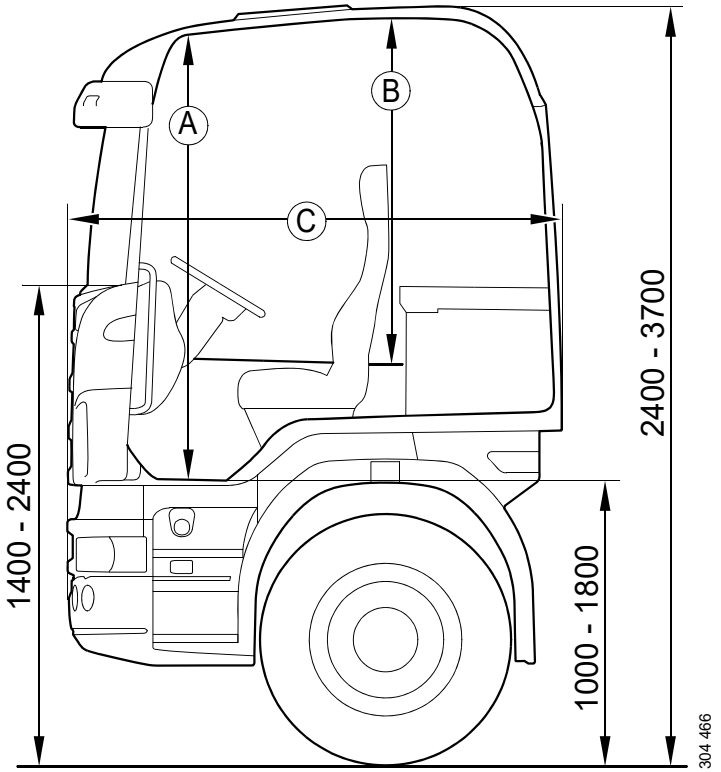
The windscreen is laminated and glued to the cab structure. Use a tiger saw, for example, to saw through the windscreen.

The door window consists of single or double glass and is not laminated. Use an emergency hammer, for example, to smash the door window.



Cab dimensions and weight

The cab can weigh up to 1,200 kg!



The outer dimensions from the ground vary depending on the cab type, roof height, choice of suspension, load and settings.

Table 1: Dimensions A and B (mm)

	Low	Normal	Highline	Topline
P	A = 1,500, B = 1,170	A = 1,670 B = 1,390	A = 1,910 B = 1,590	
G	A = 1,500 B = 1,320	A = 1,700 B = 1,530	A = 1,910 B = 1,740	
R	A = 1,500 B = 1,480	A = 1,700 b = 1,690	A = 1,910 B = 1,900	A = 2,230 B = 2,220

Table 2: Dimension C (mm)

Cab type	
14	C = 1,710
16	C = 1,990
19	C = 2,260

Vehicle safety equipment

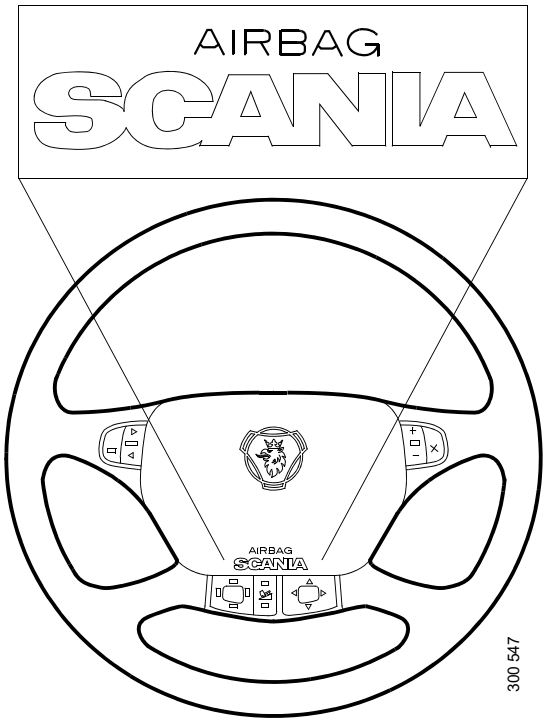
Airbag

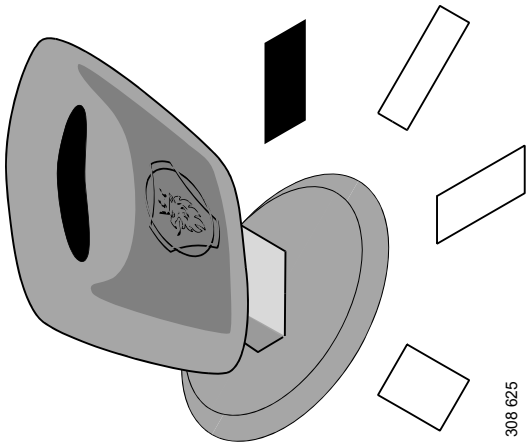
WARNING!

The airbag contains explosive substances!

If the vehicle is fitted with an airbag on the driver's side this is indicated by the text AIRBAG on the steering wheel. The passenger side is never fitted with an airbag.

When the vehicle starter key is in the lock position, or there is no vehicle power, then the airbag is deactivated.





The starter key is in the lock position.

Belt pretensioner

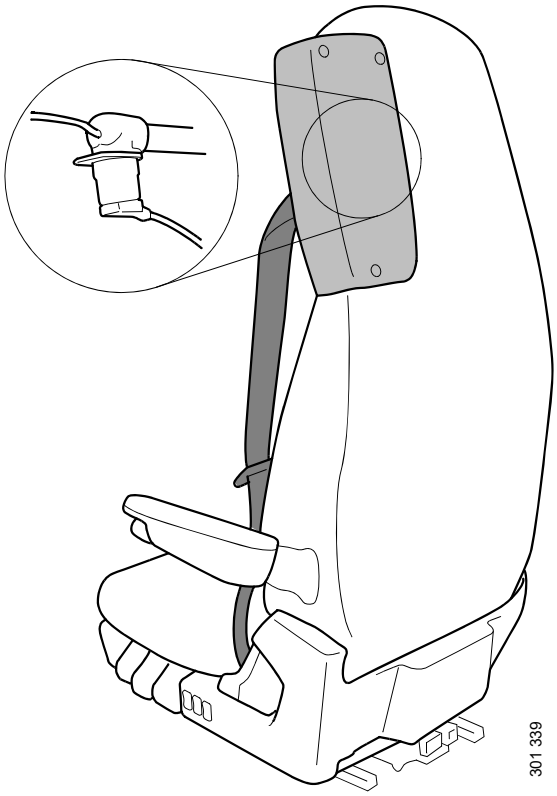
WARNING!

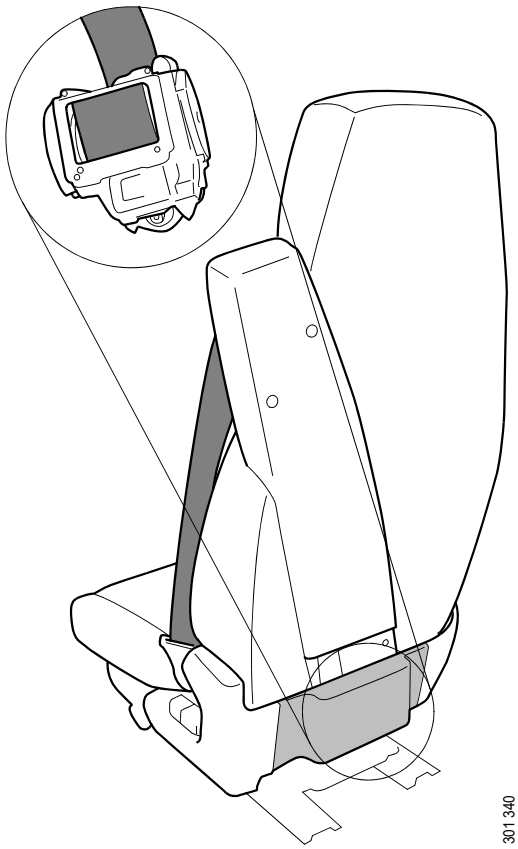
The belt pretensioner contains explosive substances!

The belt pretensioner is positioned on the driver's seat and on the passenger seat. If the vehicle is fitted with an airbag there is always a belt pretensioner on the driver's seat.

When the vehicle starter key is in the lock position, or there is no vehicle power, then the belt pretensioner is deactivated.

The belt pretensioner is positioned as illustrated on the 2-seat models that are fitted with a belt pretensioner.



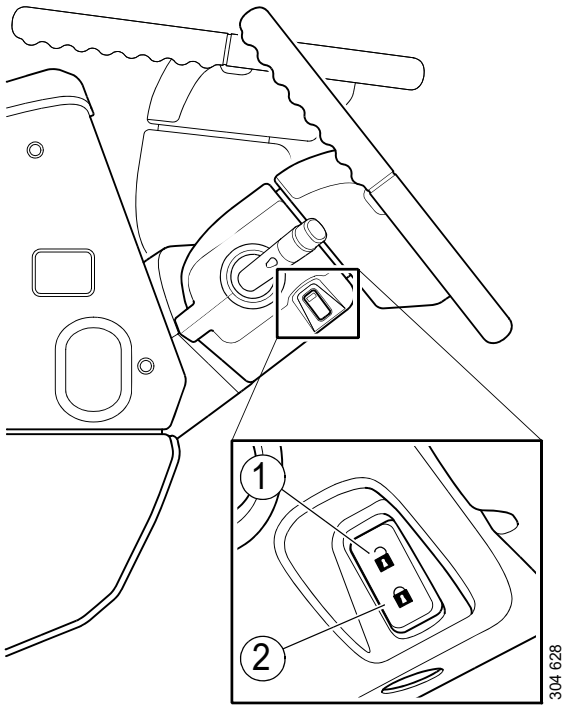


Adjusting steering wheel

Adjusting with button

Proceed as follows to adjust the height and angle:

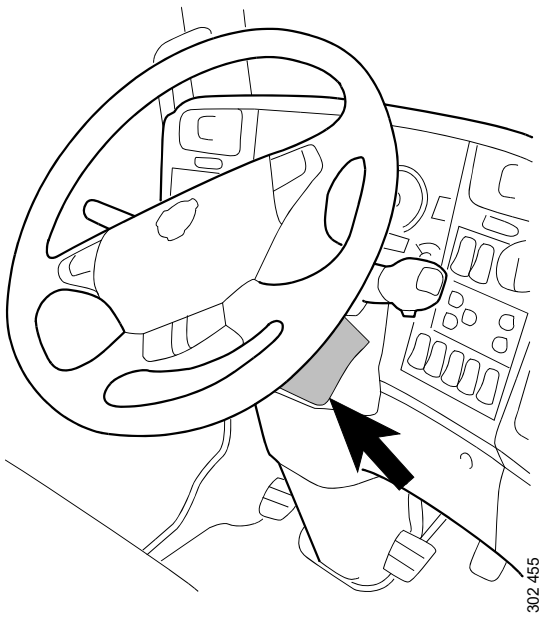
Press button (1). You can then adjust the height and angle for a few seconds. Press button (2) into the locked position to lock the setting. The settings are also locked automatically after a few seconds.



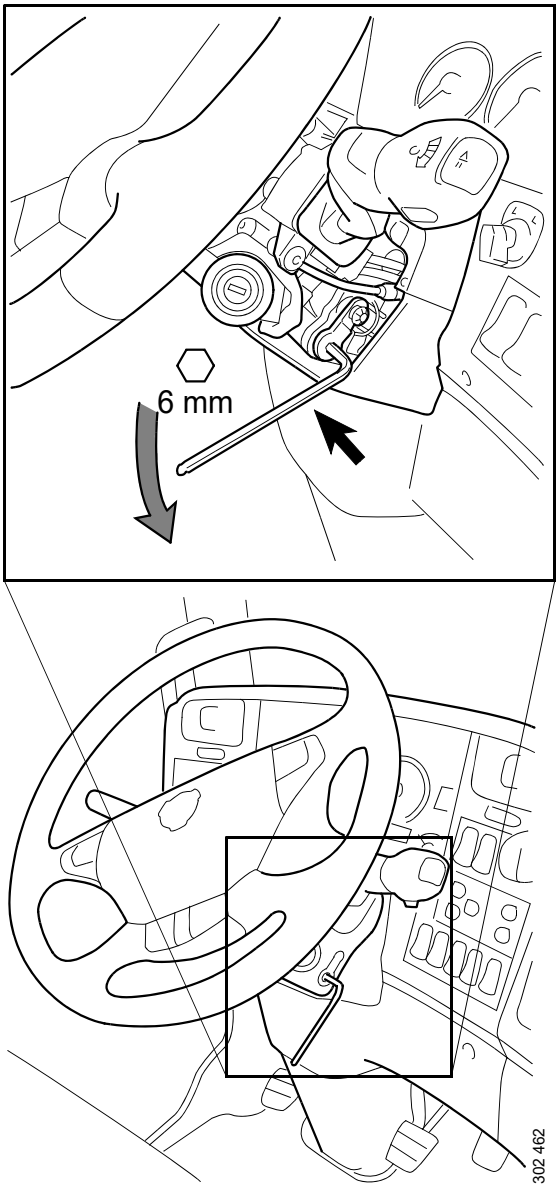
Adjusting with tool

If the adjustment of the steering wheel with the button does not work then the steering wheel can be adjusted with a tool.

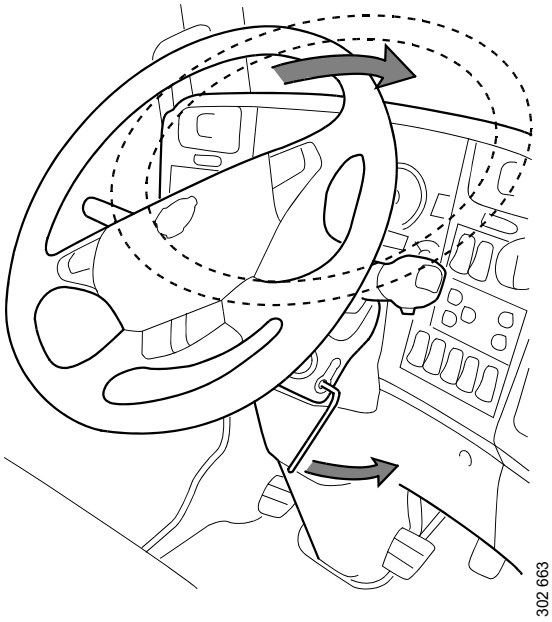
1. Remove the plastic covers from under the steering wheel.



2. Fit and turn the internal hexagon key as illustrated.

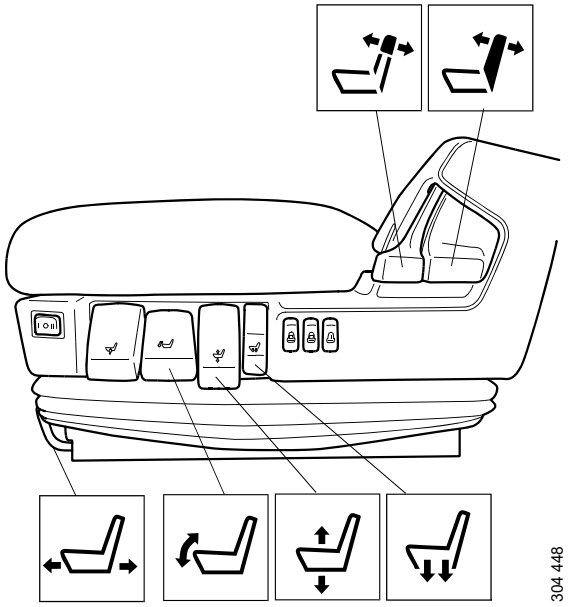


3. Hold the internal hexagon key in the turned position and adjust the steering wheel to the desired position.



Adjusting the seat

The option to adjust the seat depends on the seat type. The illustration shows an example.



Note:

The control for quick lowering of the seat lowers the seat quickly and empties the system of air. This may mean that the seat cannot be adjusted after the control has been used.

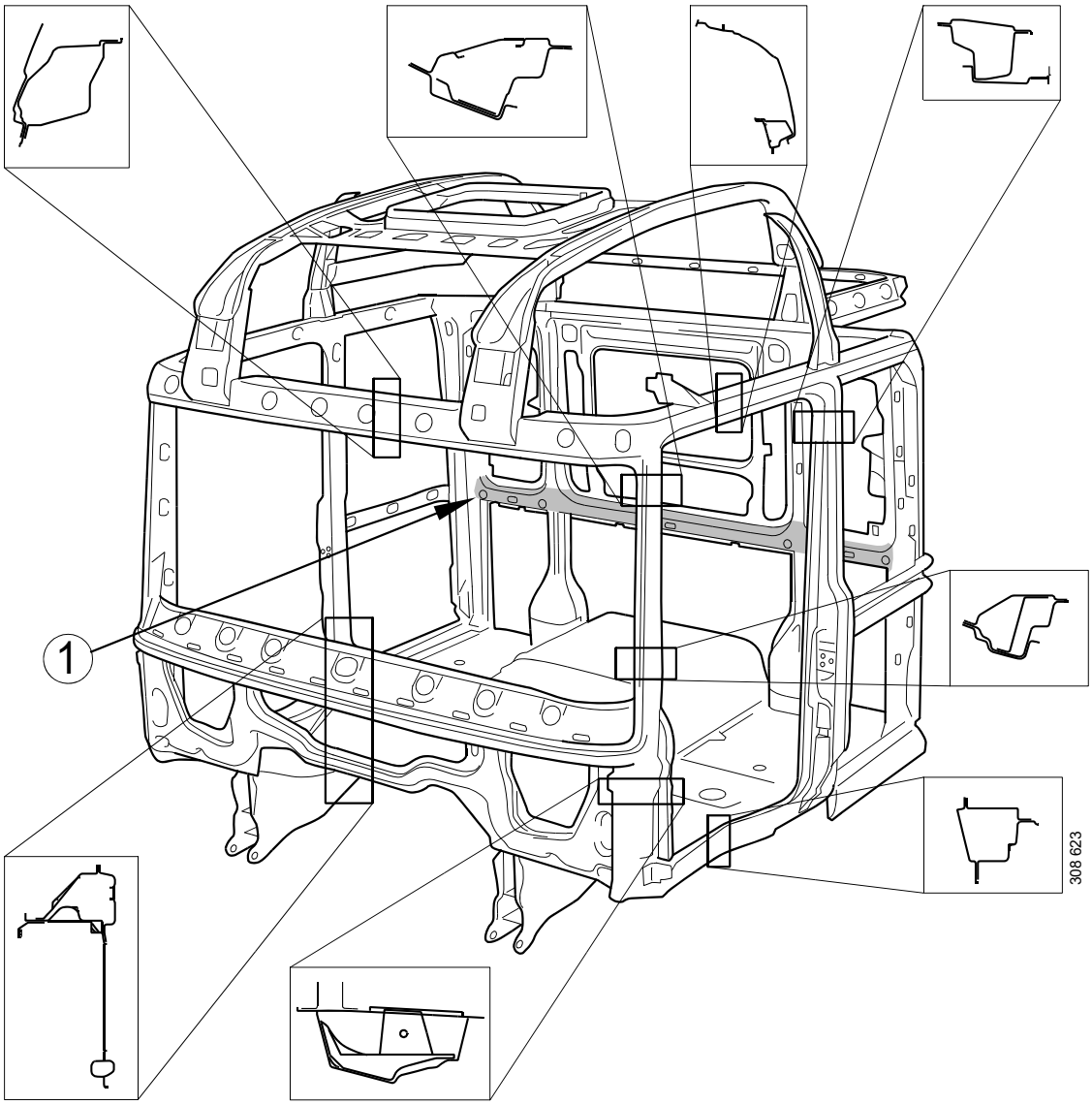
Control for quick lowering of the seat.

WARNING!

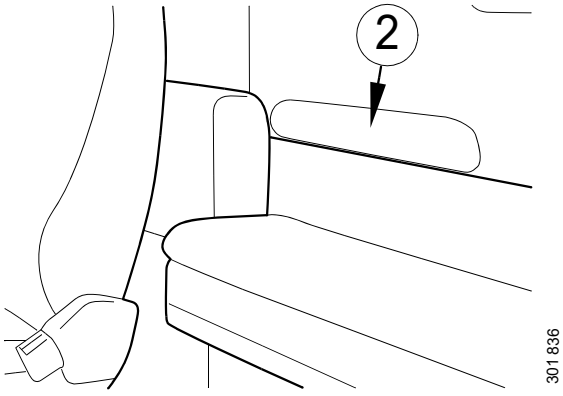
Risk of hearing impairment! A loud noise occurs when the air flows out of the cut or disconnected hose.

Quick lowering of the seat and emptying of air from the system can also occur if the air hose at the rear of the seat is loosened or cut.

Cab structure



The illustration shows which profiles the cab structure is made up of. All beams in the cab structure can be cut with a cutting tool. The centre beam at the rear of the cab (1) is marked on the illustration. It can be located vertically from inside the cab as the wall panel bulge (2) is at the same height.



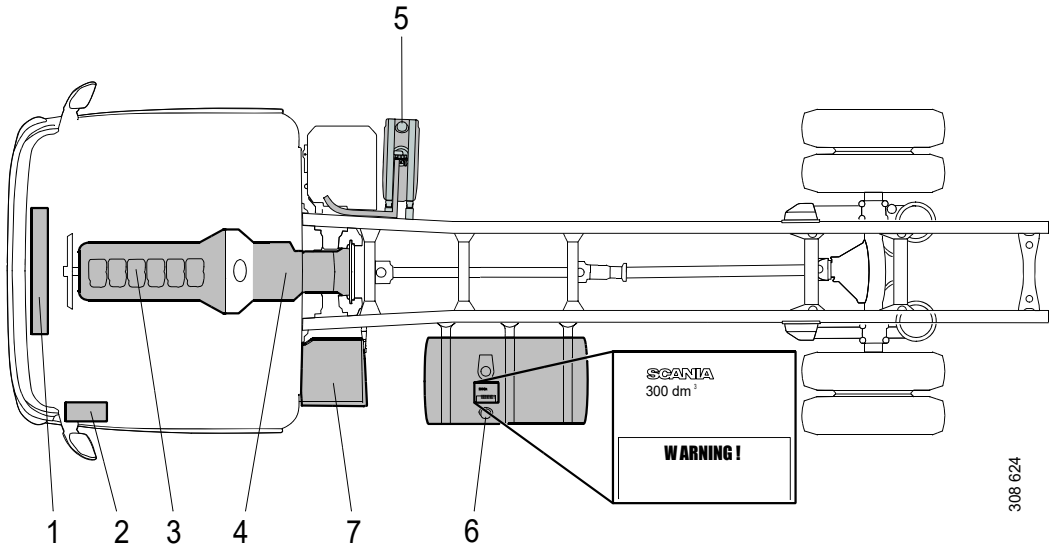
Fluids in the vehicle

WARNING!

Fuel in the fuel tank, fuel pipes and fuel hoses may be 70°C!

The following fluids and volumes can be found in the vehicle:

1. Coolant: 80 litres
2. Washer fluid: 16 litres
3. Engine oil: 47 litres
4. Transmission oil: 80 litres
5. Reductant: 75 litres. Reductant is a solution of urea and water that is added to the exhaust gases upstream of the catalytic converter in engines with SCR systems. The aim is to reduce the emissions of nitrogen oxides.
6. Fuel: The capacity is shown on the vehicle's fuel tanks.
7. Battery acid



Gas vehicles

Vehicle gas

The vehicle gas used in Scania gas vehicles is biogas, natural gas, or a mixture of these.

Vehicle gas is primarily made up of methane and has a methane content of 75-97%. Methane is a highly flammable gas and has explosive limits at 5-16% mixture in air. The gas self-ignites at a temperature of 595°C.

Vehicle gas is basically colourless and odourless. Pressurised vehicle gas, CNG, is often mixed with odours to enable leakages to be detected. Liquid vehicle gas, LNG, has no added odour, but major leakages are visible as a mist as the water in the air condenses when it is cooled down by the throttle.

Methane is lighter than air and therefore rises in the event of leakage. This should be taken into account when leakages occur, for example indoors or in a tunnel. The gas can cause suffocation in confined spaces. Liquid and cold methane gas is heavier than air and can run into low points in the event of leakage. Therefore, ensure good ventilation.

Plate

Gas vehicles are marked at several points with a diamond-shaped symbol with the text CNG or LNG.

Pressurised vehicle gas, CNG

CNG stands for Compressed Natural Gas. The gas tank packages consist of a number of gas tanks which are positioned together. A truck with a full tank can hold up to 150 kg of fuel. A bus with a full tank can hold up to 290 kg of fuel.

The pressure in the gas tank and the fuel system can exceed 230 bar when refuelling.

Green symbol for pressurised vehicle gas, CNG

Liquid vehicle gas, LNG

LNG stands for Liquefied Natural Gas. The fuel is cooled to -130 degrees and consists then of liquid and gaseous methane. Leaking LNG boils and expands to 600 times the liquid volume at normal pressure. A vehicle with a full tank can hold up to 180 kg of fuel.

The fuel is kept pressurised in the tanks to 10 bar (g). The pressure in the tanks and gas lines can vary, up to a maximum of 16 bar, provided that the safety valves are intact.

Green symbol for liquid vehicle gas, LNG

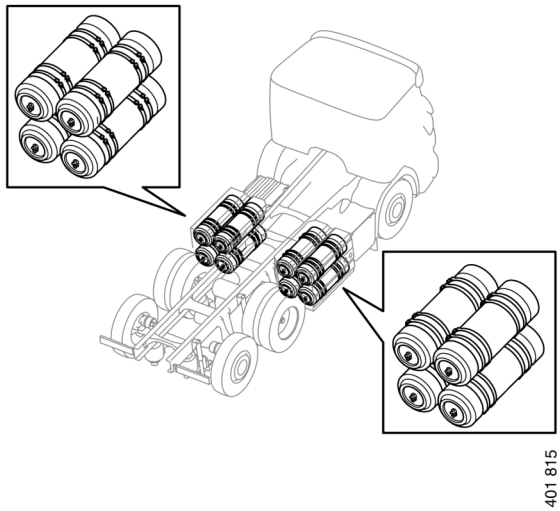
Gas vehicle components in CNG

The design of the gas tanks and valves varies depending on the manufacturer.

Gas tank package

Common positioning of gas tank packages:

- On trucks, the gas tank packages are positioned on the frame.
- On buses the gas tank package is positioned on the roof.

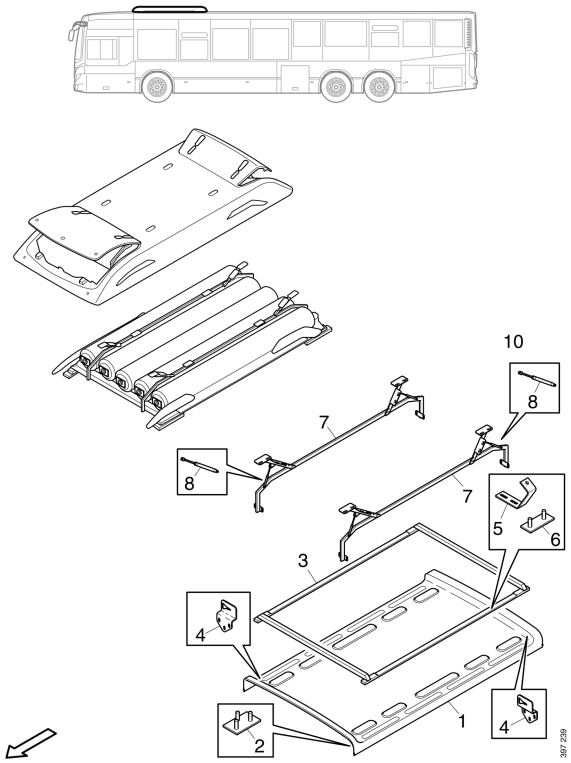


Position of the gas tank packages on trucks.

There are 2 versions of gas tanks: steel or composite. Each gas tank in the gas tank package is fitted with a solenoid valve, shut-off valve and pipe break valve.

Note:

If the outer casing of composite tanks is damaged, the structure is weakened, which over time can cause the gas tank to crack.



Position of the gas tank packages on buses.

Gas lines

The gas lines on trucks are routed along the frame and between the tank package.

On buses, the gas lines are routed in the body from the roof to the engine compartment and filler nipples.

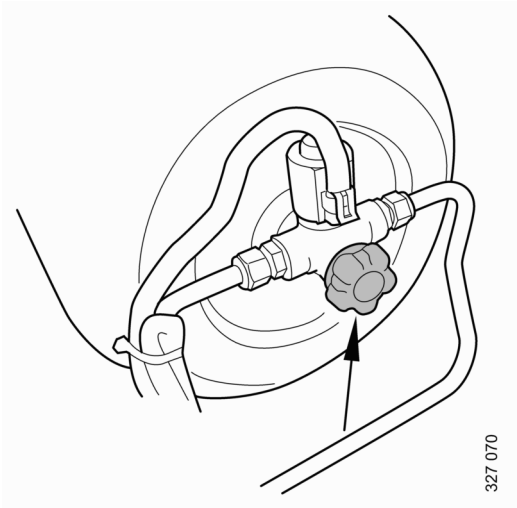
Safety valves

Note:

The solenoid valves are only open when the engine is running.

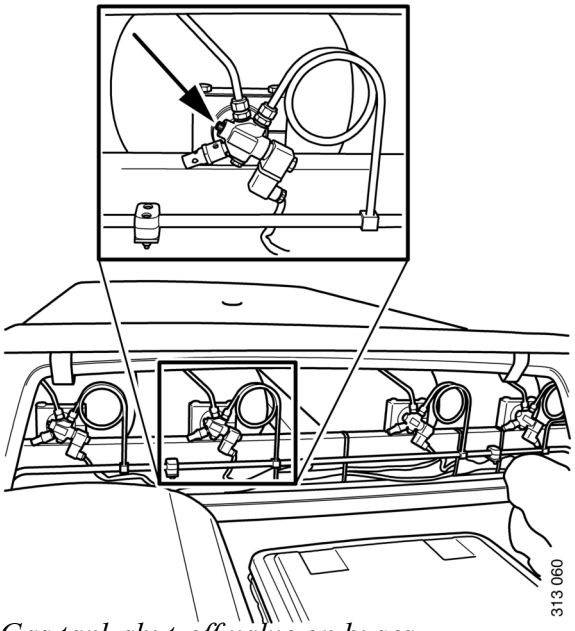
The gas tanks are equipped with one or more temperature-sensitive fuses. Steel tanks also have pressure fuses. There is also a pipe break valve which restricts the flow from the tank if the pressure causes major leakage from a line. If the pressure exceeds 11 bar on the low pressure side, a safety valve in the pressure regulator is also opened.

On trucks, the safety valves are located at the rear of the gas tanks, directed at an inwards angle and a rearwards angle under the truck.



Gas bottle shut-off valve on buses and trucks

On buses, the safety valves are on the roof, facing upwards. Normally, there is one valve at each end of the tanks. If they are long, there may be a valve in the middle of the tank.



Gas tank shut-off valve on buses

Gas vehicle components in LNG

The design of the gas tanks and valves varies depending on the manufacturer.

Gas tanks

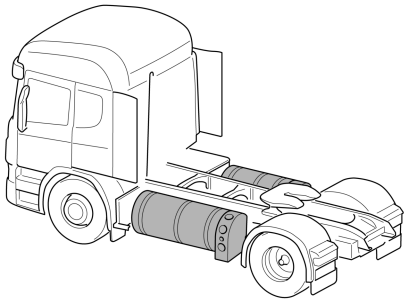
Common positioning of gas tanks:

- On buses, the gas tank is positioned in the cargo area.
- On trucks, the gas tank is positioned on the frame.

The gas tanks are made of steel.

The pressure in the tank can be read on a manometer located on the side of the tank.

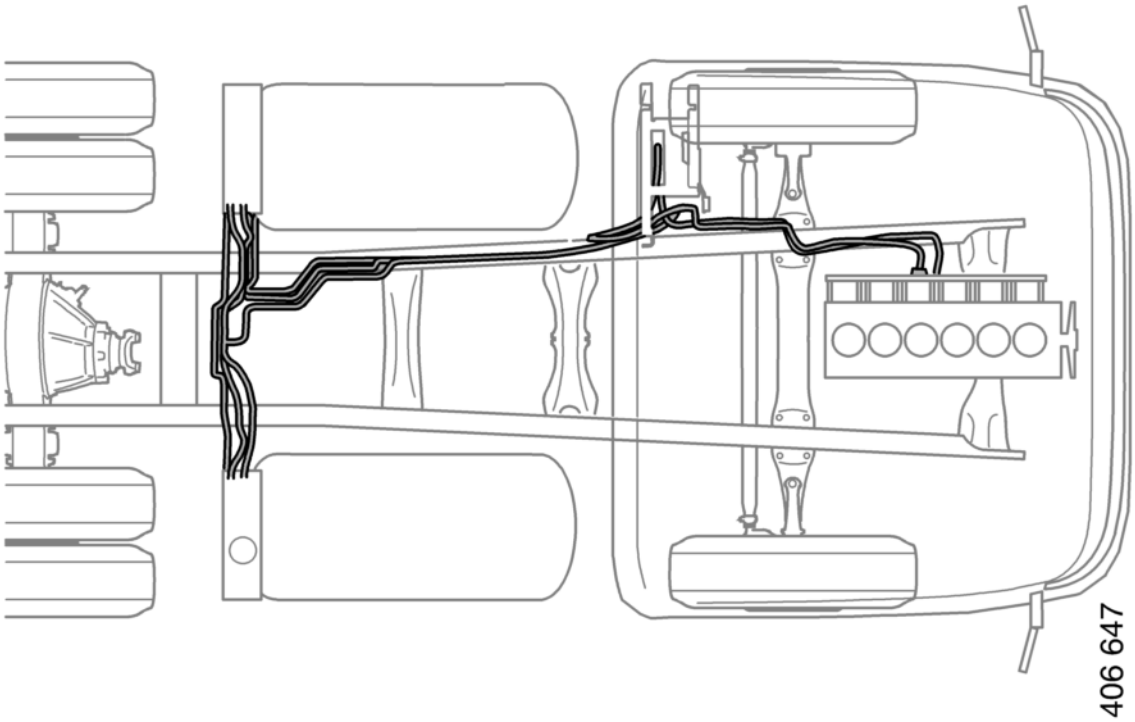
The gas tanks are fitted with a solenoid valve, shut-off valve, pipe break valve, and pressure-activated safety valves.



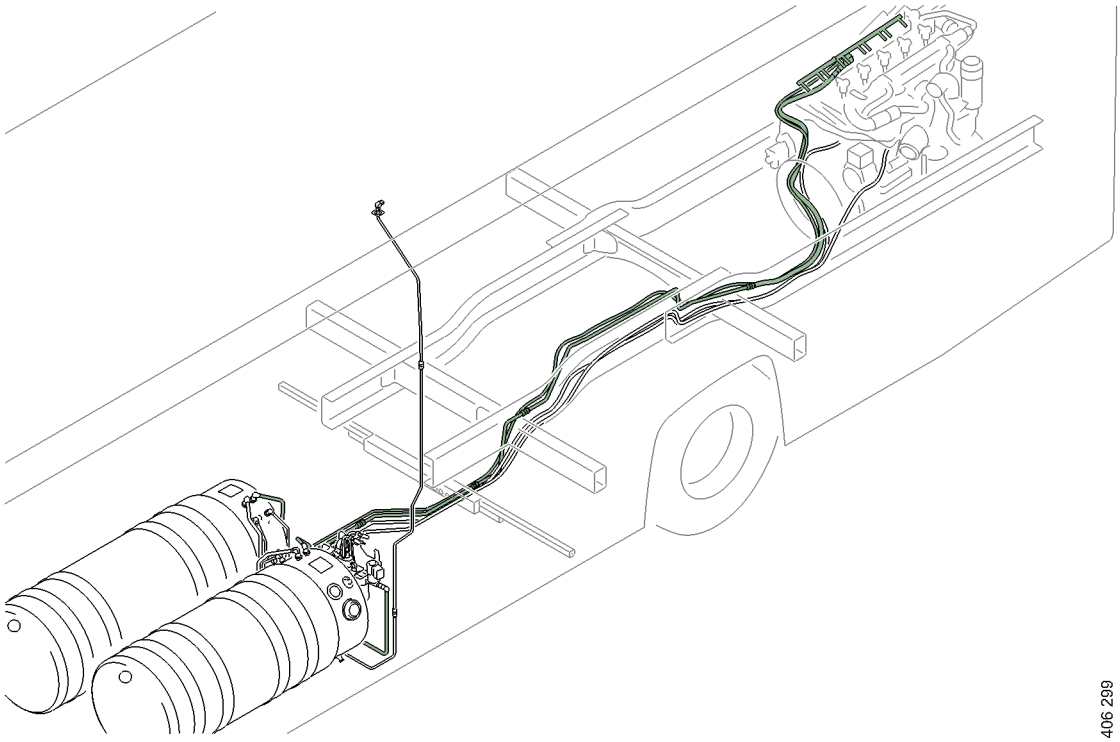
Position of the gas tanks on trucks.

Gas lines

The gas lines on trucks are routed along the frame and between the tanks.



The gas lines on buses are routed along the frame from the tanks in the cargo area to the engine, and to the roof.



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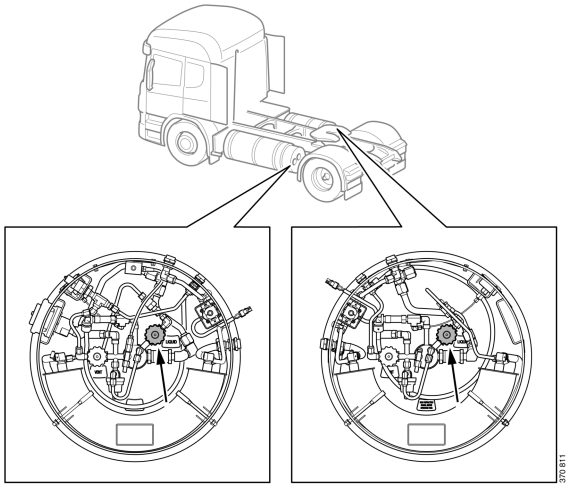
Safety valves

Note:

The solenoid valves are only open when the engine is running.

Each tank is fitted with two overpressure valves at the rear. These are triggered at 16 bar and 24 bar. The safety valves are directed at an inwards angle and a rearwards angle under the truck.

There is no manual shut-off valve on the gas panel, but there is a manual tap on each tank. There is a pipe break valve which restricts the flow from the tank in the event of major leakage from a line. If the pressure exceeds 12 bar on the low pressure side, a safety valve in the pressure regulator is also opened.



Shut-off cock.

Risk management for gas vehicles

The area must always be evacuated in the event of fire, leakage, or a vehicle with a damaged gas tank.

Due to a risk of explosion and suffocation, gas vehicles must be declared to be free of gas before they are taken indoors. If a gas leakage occurs, the gas will be confined, contributing to an unsafe environment.

Explosion

CNG

The risk of explosion is very small. Temperature fuses are automatically triggered at 110°C in order to prevent explosion. If the vehicle is equipped with a pressure fuse, this triggers at 340 bar. Explosive pressure is 450 bar for steel tanks and 470 bar for composite tanks.

LNG

The risk of explosion is very small. Pressure valves are triggered at 16 bar and 24 bar.

Damaged gas tank

Always evacuate the area around a vehicle with a damaged gas tank.

Vehicle gas expands with the temperature and it is therefore important to lower the pressure in a damaged gas tank. A damaged gas tank can withstand pressure temporarily, but if the pressure is raised, e.g. by heat from the sun, the gas tank may break. Therefore, try to reduce the pressure in a damaged gas tank in a safe way by making holes in the tank from a safe distance.

Note:

The pressure displayed on a manometer is the pressure in the pipe system. The gas tanks have solenoid valves, which are closed when power is cut. Therefore, always treat the tank as if it is filled with gas, even if the pressure gauge shows 0 bar.

Leakage

WARNING!

Remove all ignition sources in the vicinity of a gas leakage during evacuation.

WARNING!

The gas can cause suffocation in confined spaces.

WARNING!

Liquid vehicle gas, LNG, is extremely cold. Leakages can lead to personal injury.

If a high-frequency high whining noise is heard, this indicates that the gas system has a leak.

Gas leakage from CNG pressurised vehicle gas can also be identified by an acrid odour if the gas has had an odour added.

Major LNG liquid vehicle gas leakages can be seen as a mist since the cold gas makes the water in the air condense.

If a gas leakage has been identified, evacuate the area until no sound can be heard, no mist can be seen and no odour detected.

Pressurised vehicle gas, CNG, is lighter than air and therefore rises in the event of leakage. Take this into account if leakages occur, for example indoors or in a tunnel.

Liquid vehicle gas, LNG, is initially heavier than air because it is cooled. It rises as the temperature increases.

Fire

If a fire occurs: If possible, cut off the gas supply by switching off the engine.

The area around the vehicle must then be evacuated. Cordon off an area of a radius of at least 300 m around the vehicle. Only then can fire extinguishing activities be carried out, if they can be performed in a safe way. Otherwise, wait until the gas has burnt up.

Water or carbon dioxide must never be used to extinguish LNG vehicles. This can lead to a powerful fire sequence and at worst an explosion. Use a powder fire extinguisher instead.

Do not cool down the temperature-sensitive fuses on CNG tanks, as this can cause the safety valves to close or cease to open. This can lead to a powerful fire sequence and at worst an explosion.

WARNING!

Avoid cooling the tanks or spraying water on the fire. This will result in a more powerful fire.

WARNING!

The safety valve is triggered at abnormally high temperatures or pressure, in order to prevent an explosion. This produces a burst of flame tens of metres long. Evacuate the area in the direction of the safety valve.

Note:

Use a powder fire extinguisher.

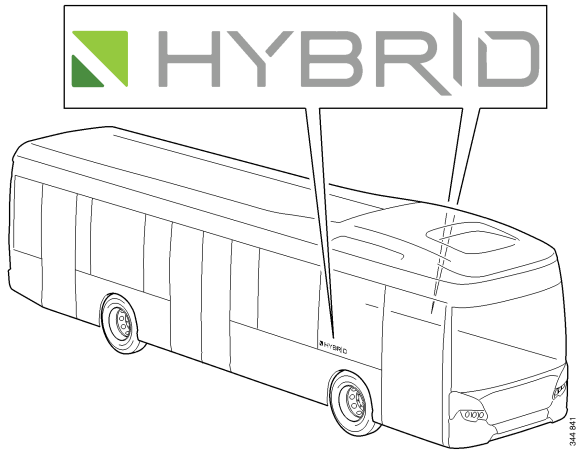
Hybrid buses

WARNING!

Wear eye protection and rubber gloves classified for 1,000 V when carrying out work with a risk of coming into contact with voltage class B.

The hybrid system is driven by voltage class B (650 V), see definition below.

Voltage class A	Voltage class B
0 V-60 V DC	60 V-1,500 V DC
0 V-30 V AC	30 V-1,000 V AC



Built-in safety devices

The hybrid system has the following built-in safety devices:

- The hybrid system cable harness for voltage class B (650 V) is orange. The voltage class B (650 V) cable harness is insulated from chassis ground. This means that there has to be contact with both conductors before there is a risk of personal injury.
- The hybrid system components which involve a risk of electrical hazards are equipped with warning plates warning about voltage class B (650 V).
- The hybrid system monitors the battery temperature, voltage, current intensity and electrical insulation level. The hybrid system disconnects the battery and isolates the power to the cable harness if the results deviate.
- The hybrid system voltage is normally cut off when the 24 V system is cut off.
- The hybrid system is shut off using the control switch located by the central electric unit in the roof panel.

Procedure for extinguishing a fire

In the event of a battery fire

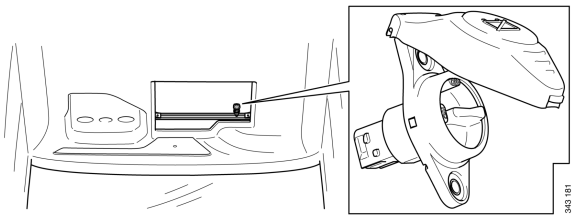
If there is a visible fire in the battery, use large amounts of water to cool the battery.

For other vehicle fires, not battery fire

In the event of a vehicle fire where the battery box is intact and not on fire, we recommend using normal procedures for extinguishing a fire.

The battery must be protected and cooled down with large amounts of water.

If the battery box is significantly damaged, large amounts of water must be used to cool the battery. It is important for the temperature of the battery to be reduced by only using water, to prevent risk of fire and to fight any fire.



The control switch is located by the central electric unit in the roof panel.

Cut all power to the vehicle

WARNING!

Wear eye protection and rubber gloves classified for 1,000 V when carrying out work with a risk of coming into contact with voltage class B (650 V).

WARNING!

Avoid cutting the voltage class B (650 V) cable harness at the same time as voltage is on. There is a risk of personal injury.

Wear eye protection and rubber gloves classified for 1,000 V.

WARNING!

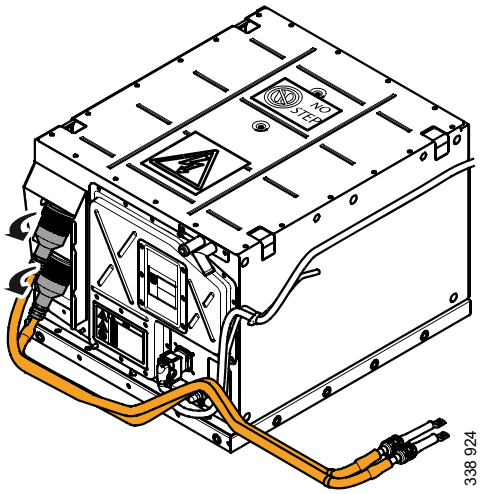
The electric machine always produces power if the combustion engine is in operation, or if it for some other reason starts rotating, even if the hybrid system is otherwise disconnected.

If the vehicle must be towed, detach the propeller shaft to ensure that the electric motor is disconnected.

1. Turn off the ignition.
2. Cut off the 24 V system by disconnecting the battery terminals on the 24 V batteries. The 24 V battery is located under the driver area and is accessible from outside the vehicle.

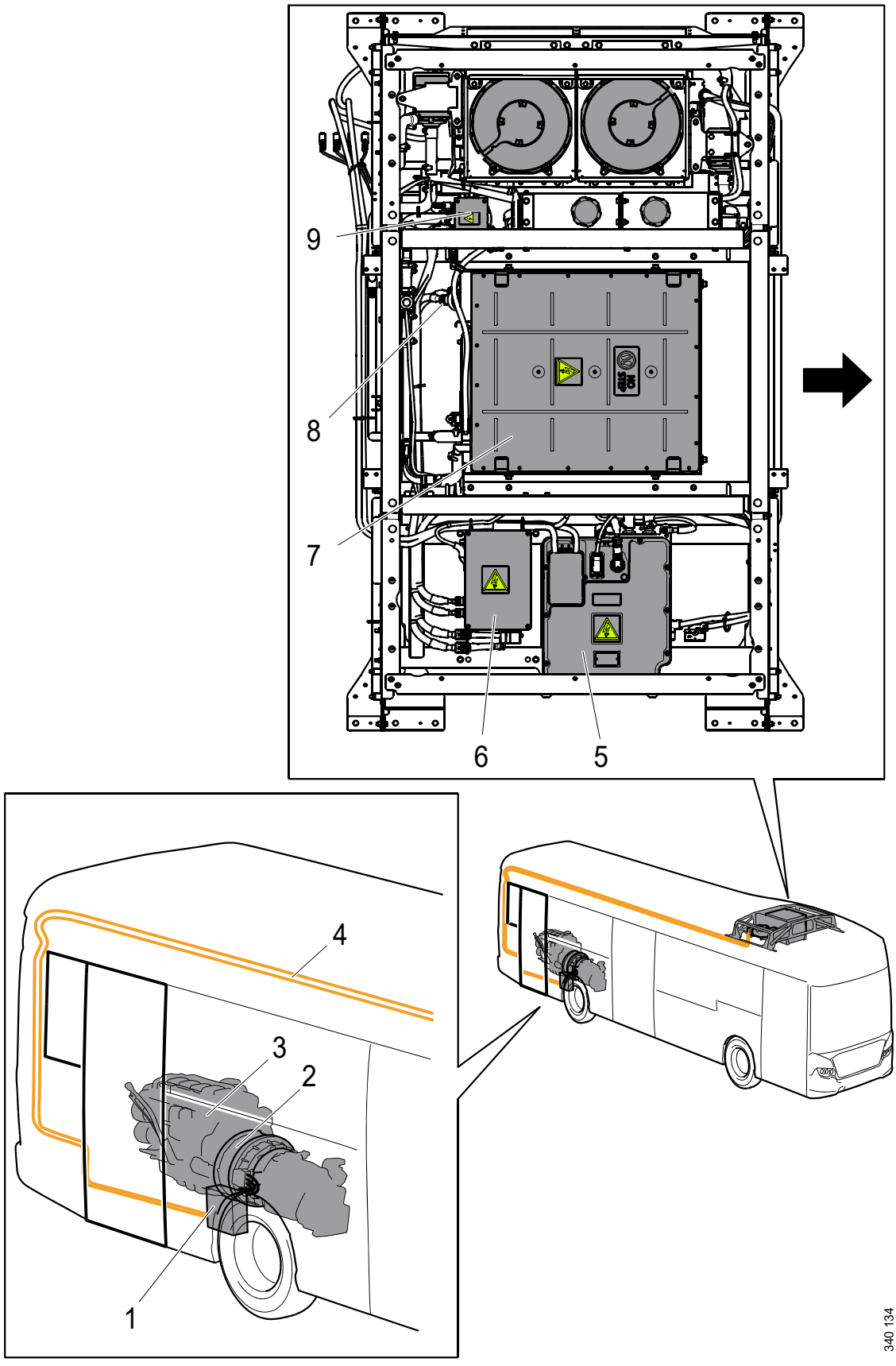
   Normally, this means that the propulsion battery is disconnected and that starting the combustion engine is prevented. This in turn, prevents voltage from the electric machine.

   In order to be sure that there is no residual voltage remaining in the system, wait for 15 minutes.
3. If the cable harness for voltage class B must be cut or if it is damaged, and if the 24 V system is not accessible, disconnect the connectors on the propulsion battery. This guarantees that the hybrid system is disconnected.



Disconnect the connectors on the propulsion battery.

Hybrid system components



1. *E82, Inverter*
2. *M33, Electric machine*
3. *Engine*
4. *Voltage class B cable harness*
5. *E84, Direct current converter*
6. *P7, Voltage class B central electric unit*
7. *E83, Propulsion battery*
8. *Connectors for the propulsion battery, voltage class B*
9. *H32, Heater*

The hybrid system

The hybrid system is a parallel hybrid and comprises a diesel engine assembled with an electric machine. The electric machine is in turn, assembled with the gearbox. The hybrid system is supplied with energy via a propulsion battery which is connected to an electric machine via an inverter.

The inverter supplies the electric machine with 3-phase alternating current.

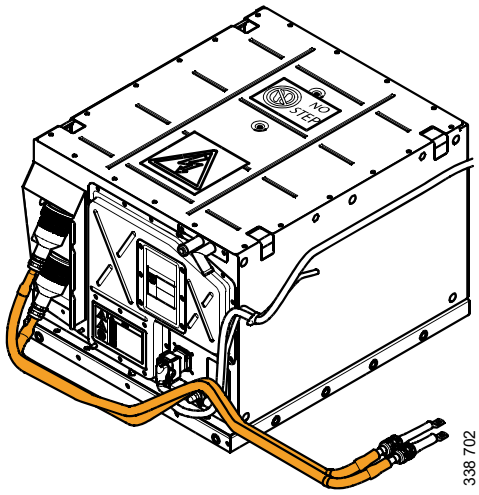
The inverter is cooled with a water cooling system that also cools the direct current converter. The direct current converter supplies the 24 V battery and the vehicle electrical system with 24 V voltage which is transformed from the propulsion battery voltage class B (650 V).

Components with voltage class B (650 V)

E83, Propulsion battery

The propulsion battery is a lithium-ion battery with voltage class B (650 V). The propulsion battery is connected to the electric machine via the inverter and supplies the hybrid system with current.

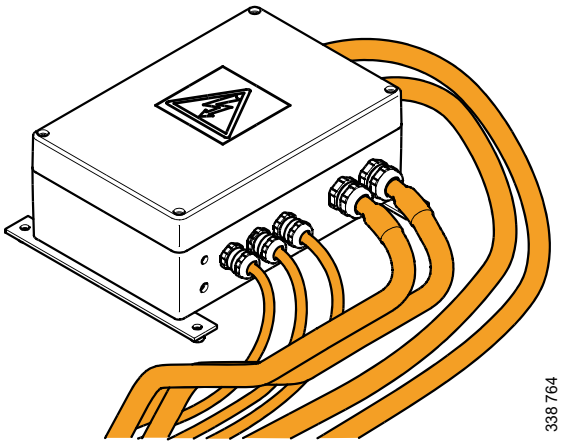
The propulsion battery is located on the roof.



P7, Central electric unit for class B voltage

The central electric unit for voltage class B (650 V) connects the propulsion battery, inverter, heater and the direct current converter. It is located on the roof.

There are 2 cables for voltage class B (650 V) from the central electric unit along the right-hand side of the roof down to the inverter. The inverter is located behind the right-hand rear wheel.



E84, Direct current converter

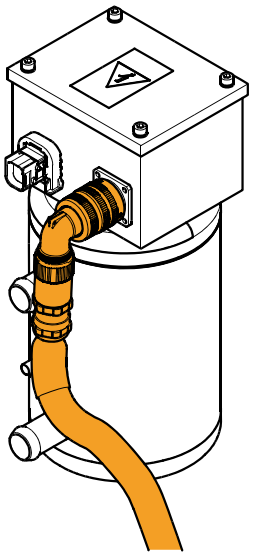
The direct current converter replaces the alternator and converts voltage class B (650 V) to 24 V.

The direct current converter is located on the roof.

H32, Heater

The electric heater heats the propulsion battery if the temperature of the propulsion battery is below 5°C.

The heater is driven by 650 V and it is located on the roof.



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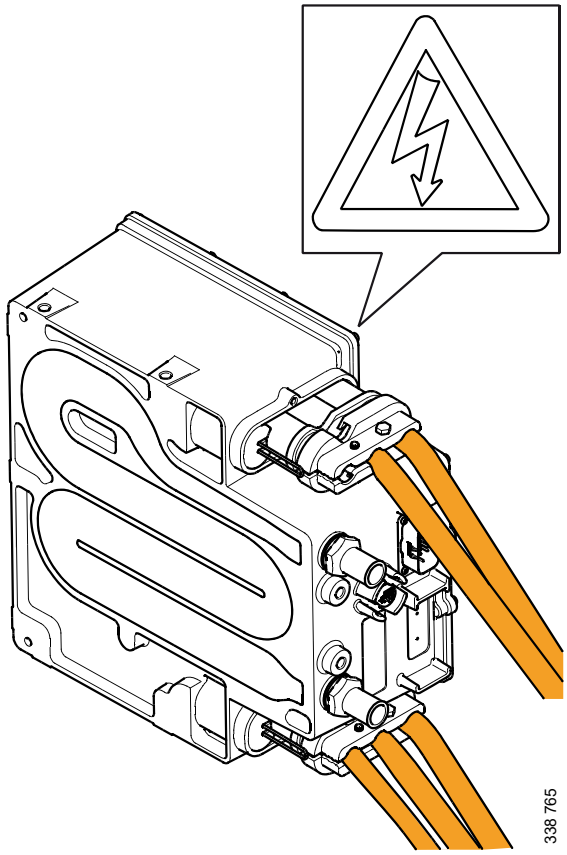
E82, Inverter

The inverter converts the propulsion battery 650 V DC to 3-phase 400 V AC to drive the electric machine and the reverse when the electric machine works as a generator.

The inverter is located behind the right-hand rear wheel. It is liquid-cooled and part of one of the 2 cooling circuits on the roof.

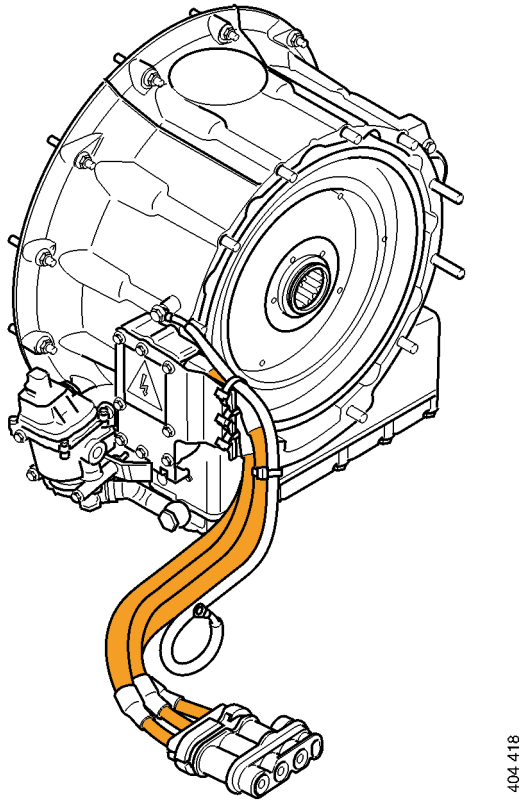
The inverter is connected to the electric machine using 3 cables for voltage class B.



M33, Electric machine

The electric machine is electromagnetic and transforms electric energy into mechanical energy and vice versa.

It is located between the gearbox and diesel engine and used for propulsion and braking of the vehicle.



Chemical information on propulsion batteries

Under normal conditions, the chemicals are enclosed in 'cells' located within the propulsion battery and cannot leak out into the environment. The cells usually contain a combination of a liquid and some solid materials, the liquid being firmly retained by the materials.

The risk of contact occurs when the content changes to a gas. This can happen in the event of external damage to one or more of the cells, too high a temperature or overloading.

The liquid within the cells is flammable and can be corrosive if it comes into contact with moisture. Damage and steam or mist from the battery may cause irritation of mucous membranes, air ways, eyes and skin. Exposure can also cause dizziness, nausea and headache.

The cells in the battery can handle up to 80°C. If the temperature in the cells is greater than 80 degrees Celsius the electrolyte in the cell starts to change to a gas. This may cause the pressure relief value in the cells to break, and flammable and corrosive gas is released via the battery pack ventilation duct.

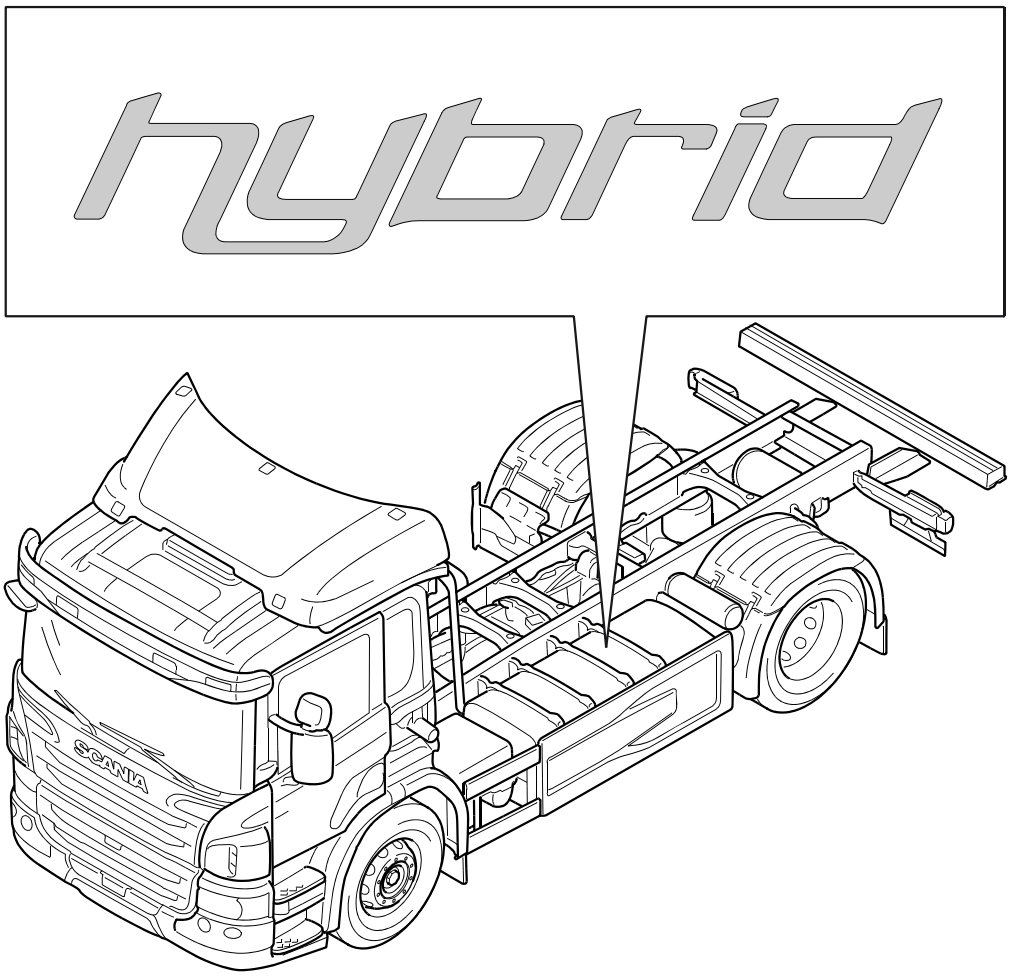
Hybrid trucks

WARNING!

Use protective goggles and rubber gloves classified for 1,000 V when carrying out work with a risk of coming into contact with voltage class B.

The hybrid system is driven by voltage class B (650 V), see definition below.

Voltage class A	Voltage class B
0 V-60 V DC	60 V-1,500 V DC
0 V-30 V AC	30 V-1,000 V AC



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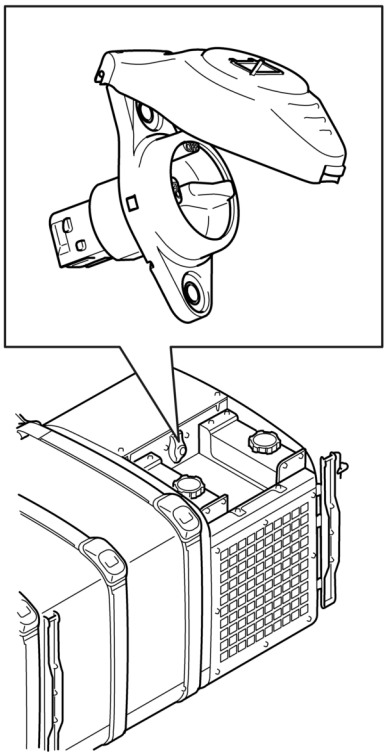
Built-in safety devices

The hybrid system has the following built-in safety devices:

- The hybrid system cable harness for voltage class B (650 V) is orange. The voltage class B (650 V) cable harness is insulated from chassis ground. This means that there has to be contact with both conductors before there is a risk of personal injury.
- The hybrid system components which involve a risk of electrical hazards are equipped with warning plates warning about voltage class B (650 V).
- The hybrid system monitors the battery temperature, voltage, current intensity and electrical insulation level. The hybrid system disconnects the battery and isolates the power to the cable harness if the results deviate.
- The hybrid system voltage is normally cut off when the 24 V system is cut off.
- The hybrid system is shut off using the control switch located in the hybrid power unit.



Location of the control switch in the hybrid power unit.

Procedure for extinguishing a fire

In the event of a battery fire

If there is a visible fire in the battery, use large amounts of water to cool the battery.

For other vehicle fires, not battery fire

In the event of a vehicle fire where the battery box is intact and not on fire, we recommend using normal procedures for extinguishing a fire.

The battery must be protected and cooled down with large amounts of water.

If the battery box is significantly damaged, large amounts of water must be used to cool the battery. It is important for the temperature of the battery to be reduced by only using water, to prevent risk of fire and to fight any fire.

Cut all power to the vehicle

WARNING!

Use protective goggles and rubber gloves classified for 1,000 V when carrying out work with a risk of coming into contact with voltage class B (650 V).

WARNING!

Avoid cutting the voltage class B (650 V) cable harness at the same time as voltage is on. There is a risk of personal injury.

Wear protective goggles and rubber gloves classified for 1,000 V.

WARNING!

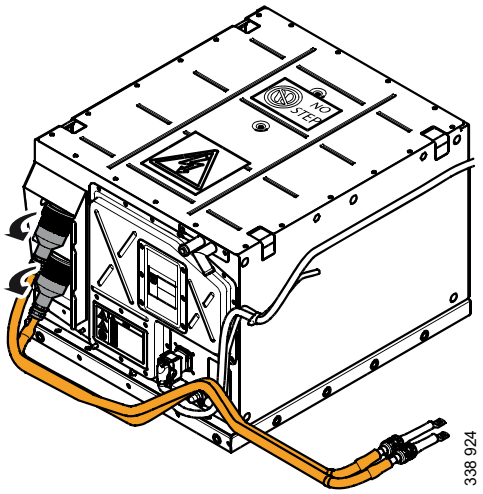
The electric machine always produces power if the combustion engine is in operation, or if it for some other reason starts rotating, even if the hybrid system is otherwise disconnected.

If the vehicle must be towed, detach the propeller shaft to ensure that the electric motor is disconnected.

1. Turn off the ignition.
2. Cut off the 24 V system by disconnecting the battery terminals on the 24 V batteries. The 24 V battery is located on the battery shelf behind the cab on the left-hand side.

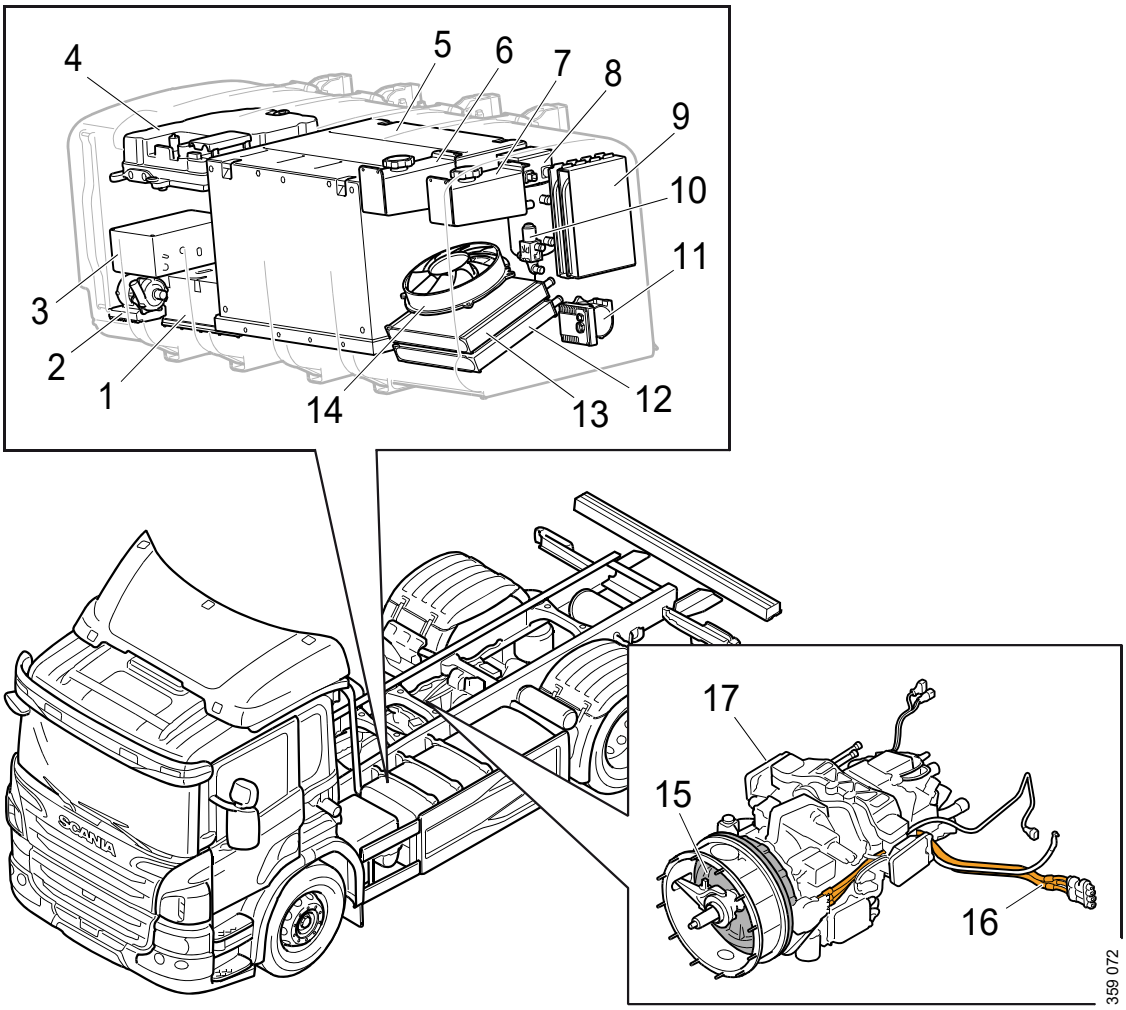
   Normally, this means that the propulsion battery is disconnected and that starting the combustion engine is prevented. This in turn, prevents voltage from the electric machine.

   In order to be sure that there is no residual voltage remaining in the system, wait for 15 minutes.
3. If the cable harness for voltage class B must be cut or if it is damaged, and if the 24 V system is not accessible, disconnect the connectors on the propulsion battery. This guarantees that the hybrid system is disconnected.



Disconnect the connectors on the propulsion battery.

Hybrid system components



1. *E82, Inverter*
2. *M41, Coolant pump for power electronics coolant circuit*
3. *P7, Voltage class B central electric unit*
4. *E84, Direct current converter*
5. *E83, Propulsion battery*
6. *Expansion tank for propulsion battery coolant circuit*
7. *Expansion tank for power electronics coolant circuit*
8. *H32, Heater*
9. *E81, Control unit*
10. *V194, Solenoid valve*
11. *M38, Coolant pump for propulsion battery cooling circuit*
12. *Radiator for power electronics coolant circuit*
13. *Cooler for propulsion battery coolant circuit*
14. *M39, Fan*
15. *M33, Electric machine*
16. *Cable harness for voltage class B (VCB)*
17. *GRS895, Gearbox with electric machine*

The hybrid system

The hybrid system is a parallel hybrid and comprises a diesel engine assembled with an electric machine. The electric machine is in turn, assembled with the gearbox. The hybrid system is supplied with energy via a propulsion battery which is connected to an electric machine via an inverter.

The inverter supplies the electric machine with 3-phase alternating current.

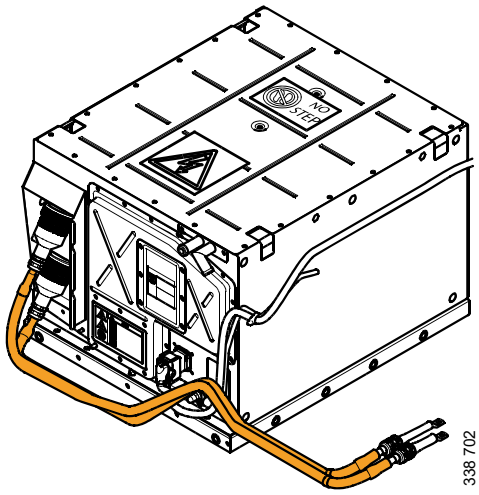
The inverter is cooled with a water cooling system that also cools the direct current converter. The direct current converter supplies the 24 V battery and the vehicle electrical system with 24 V voltage which is transformed from the propulsion battery voltage class B (650 V).

Components with voltage class B (650 V)

E83, Propulsion battery

The propulsion battery is a lithium-ion battery with voltage class B (650 V). The propulsion battery is connected to the electric machine via the inverter and supplies the hybrid system with current.

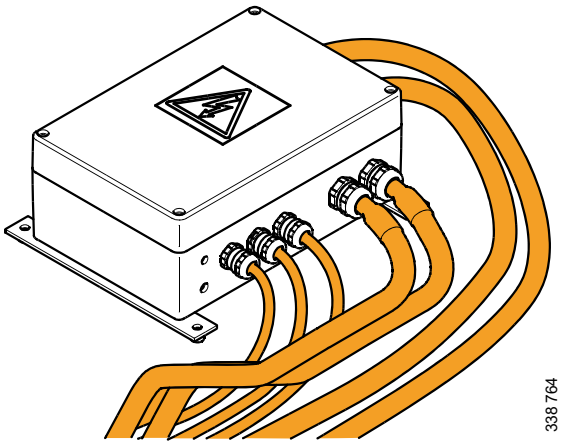
The propulsion battery is located in the hybrid power unit, which is located behind the battery shelf on the left-hand side of the frame.



P7, Central electric unit for class B voltage

The central electric unit for voltage class B (650 V) connects the propulsion battery, inverter, heater and the direct current converter.

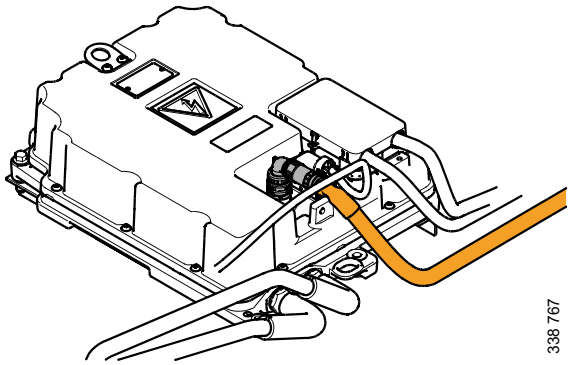
The inverter is located in the hybrid power unit, which is positioned behind the battery shelf on the left-hand side of the frame.



E84, Direct current converter

The direct current converter replaces the alternator and converts voltage class B (650 V) to 24 V.

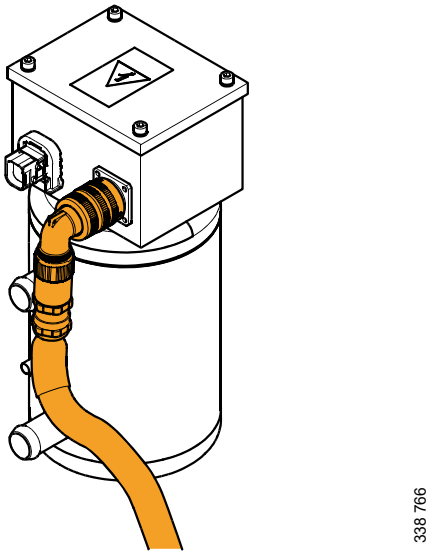
The direct current converter is located in the hybrid power unit, which is positioned behind the battery shelf on the left-hand side of the frame.



H32, Heater

The electric heater heats the propulsion battery if the temperature of the propulsion battery is below 5°C.

The heater is powered by 650 V and is located in the hybrid power unit, which is positioned behind the battery shelf on the left-hand side of the frame.

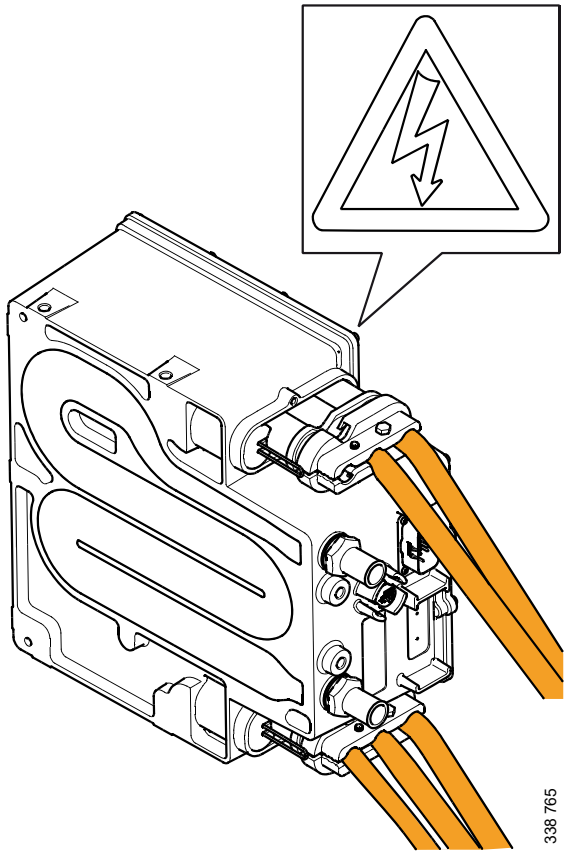


E82, Inverter

The inverter converts the propulsion battery 650 V DC to 3-phase 400 V AC to drive the electric machine and the reverse when the electric machine works as a generator.

The inverter is located in the hybrid power unit, which is positioned behind the battery shelf on the left-hand side of the frame. It is liquid-cooled and part of one of the 2 cooling circuits in the hybrid power unit.

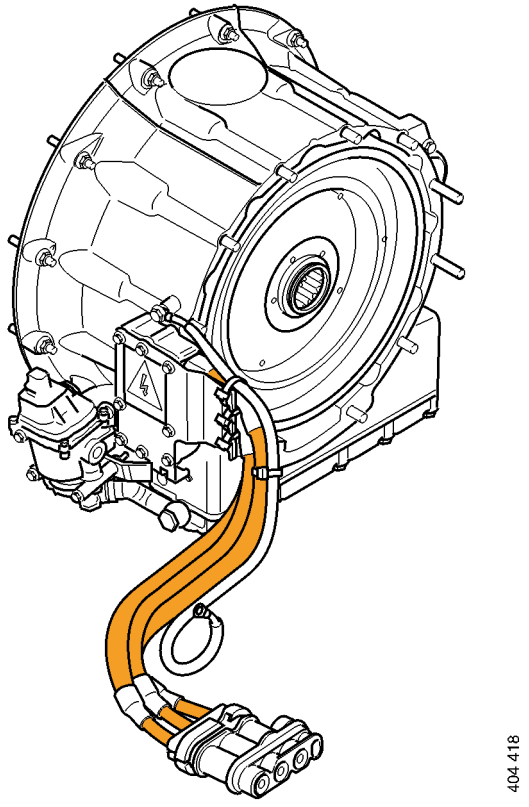
The inverter is connected to the electric machine using 3 cables for voltage class B.



M33, Electric machine

The electric machine is electromagnetic and transforms electric energy into mechanical energy and vice versa.

It is located between the gearbox and diesel engine and used for propulsion and braking of the vehicle.



Chemical information on propulsion batteries

Under normal conditions, the chemicals are enclosed in 'cells' located within the propulsion battery and cannot leak out into the environment. The cells usually contain a combination of a liquid and some solid materials, the liquid being firmly retained by the materials.

The risk of contact occurs when the content changes to a gas. This can happen in the event of external damage to one or more of the cells, too high a temperature or overloading.

The liquid within the cells is flammable and can be corrosive if it comes into contact with moisture. Damage and steam or mist from the battery may cause irritation of mucous membranes, air ways, eyes and skin. Exposure can also cause dizziness, nausea and headache.

The cells in the battery can handle up to 80°C. If the temperature in the cells is greater than 80 degrees Celsius the electrolyte in the cell starts to change to a gas. This may cause the pressure relief value in the cells to break, and flammable and corrosive gas is released via the battery pack ventilation duct.