

**SCANIA**

**00:01-06**

Utgåva 3

**sv-SE**

# **Product information for the rescue services**

**Trucks and buses**

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



308 626

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# Before starting to read

**Obs!**

Check that this is the latest issue of Scania's product information for emergency services. The latest issue can be found on:

[www.scania.com](http://www.scania.com).

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**Obs!**

The information in Scania's product information for emergency services applies to vehicles in the P, G and R series that have been ordered in the ordinary order system.

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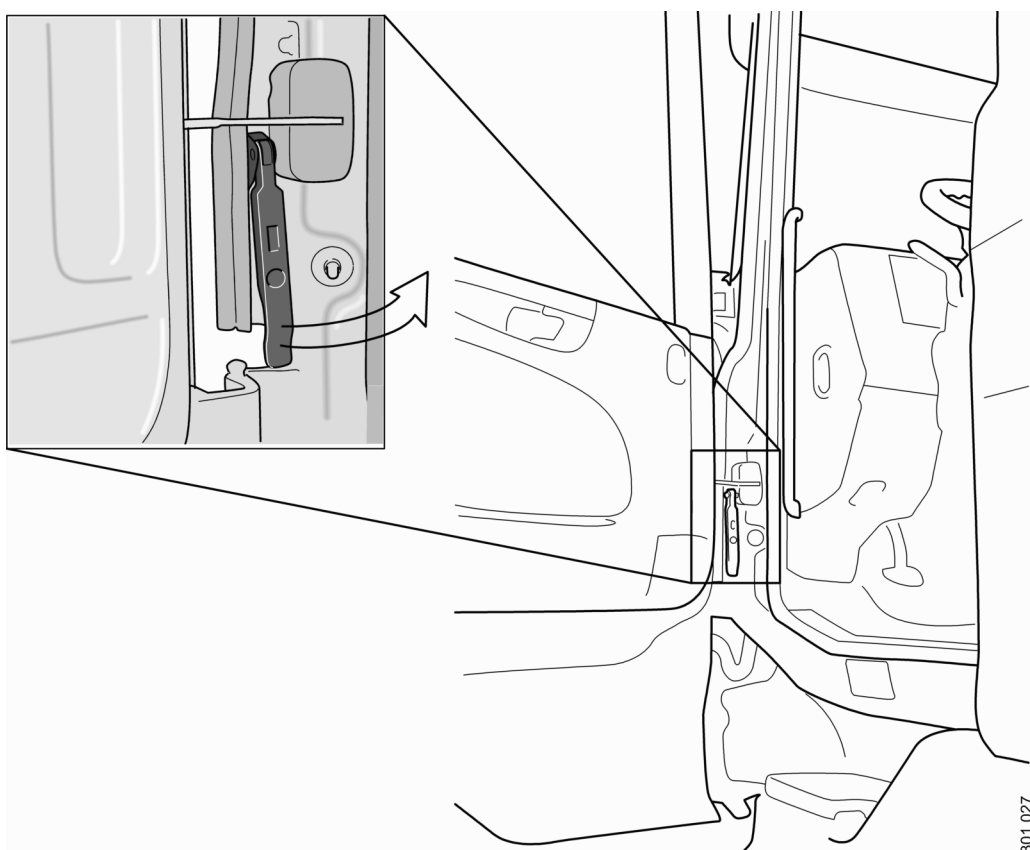
# Open the vehicle's front grille panel

## Non-lockable front grille panel

If the front grille panel is not lockable it can be opened from outside by jerking the lower edge of the front grille panel.

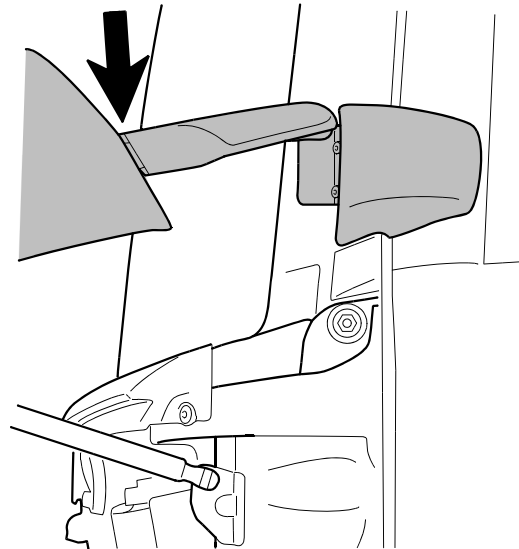
## Lockable front grille panel

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.



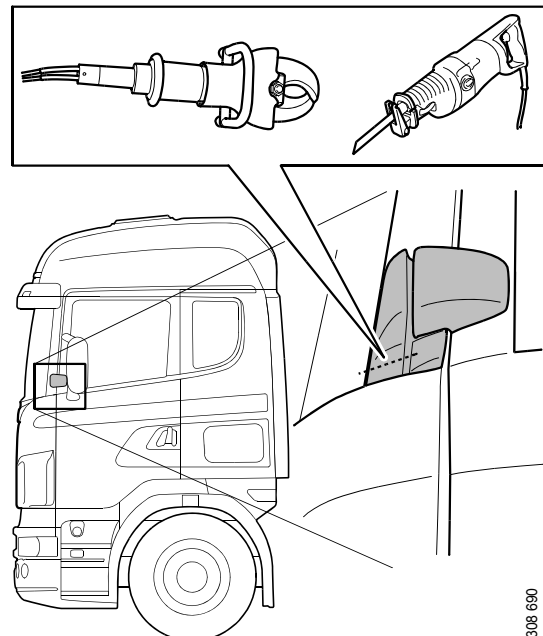
## If the front grille panel of the vehicle cannot be opened

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



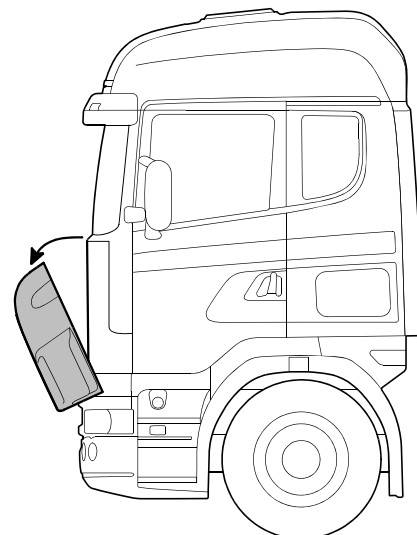
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1. Cut or saw off the hinges on the grille panel's left and right side.



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2. Fold down the front grille panel.



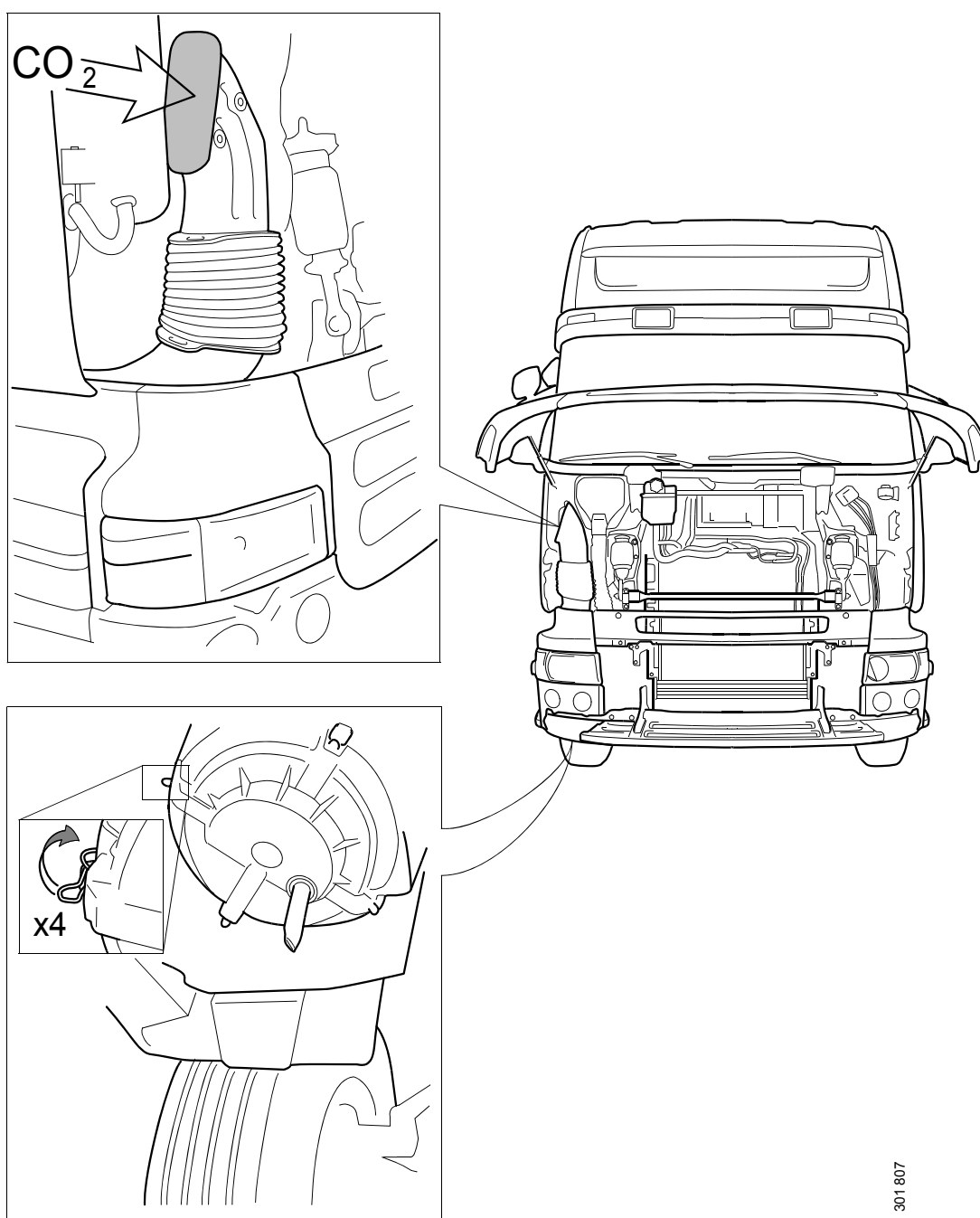
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# Engine air intake

## Front air intake

The vehicle engine can be stopped 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 release the cover so that you can spray carbon dioxide into the air intake.

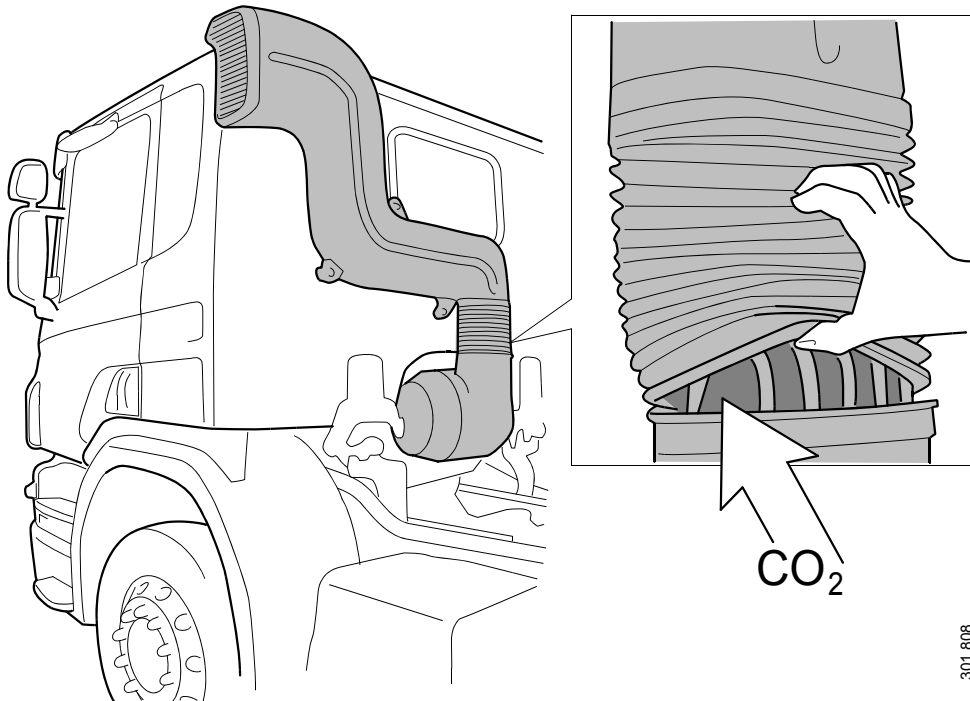


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## High air intake

On a vehicle with high air intake the air intake can be accessed behind the cab.



301 808

# Air suspension

## Cab with air suspension

On a vehicle with a cab with air suspension the air can be released from the air suspension to stabilise the cab



### **VARNING!**

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

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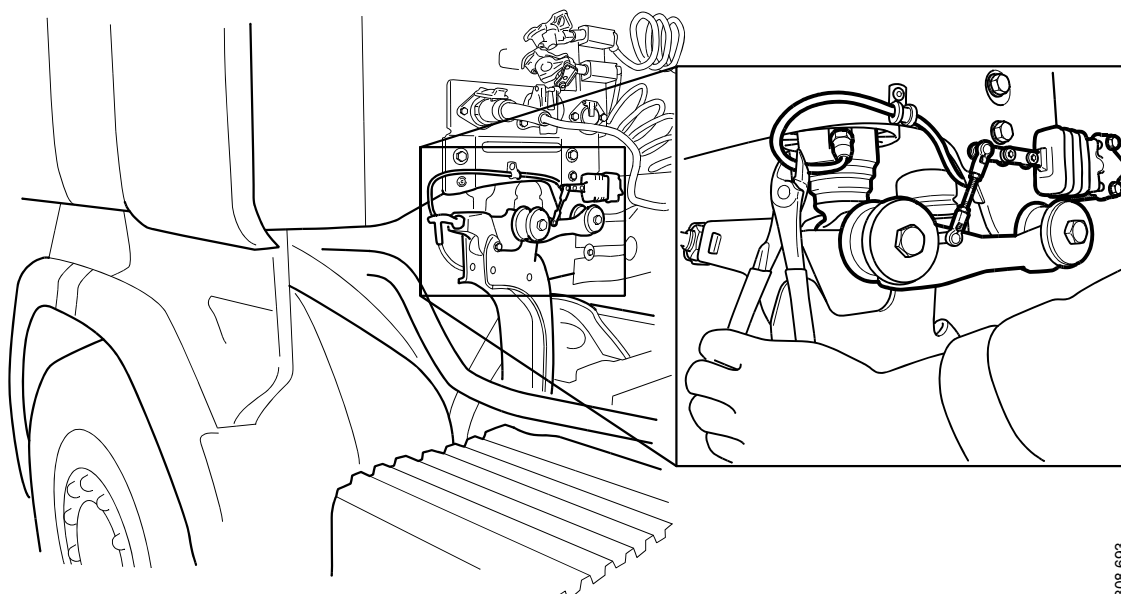
### **VARNING!**

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

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## Rear cab suspension

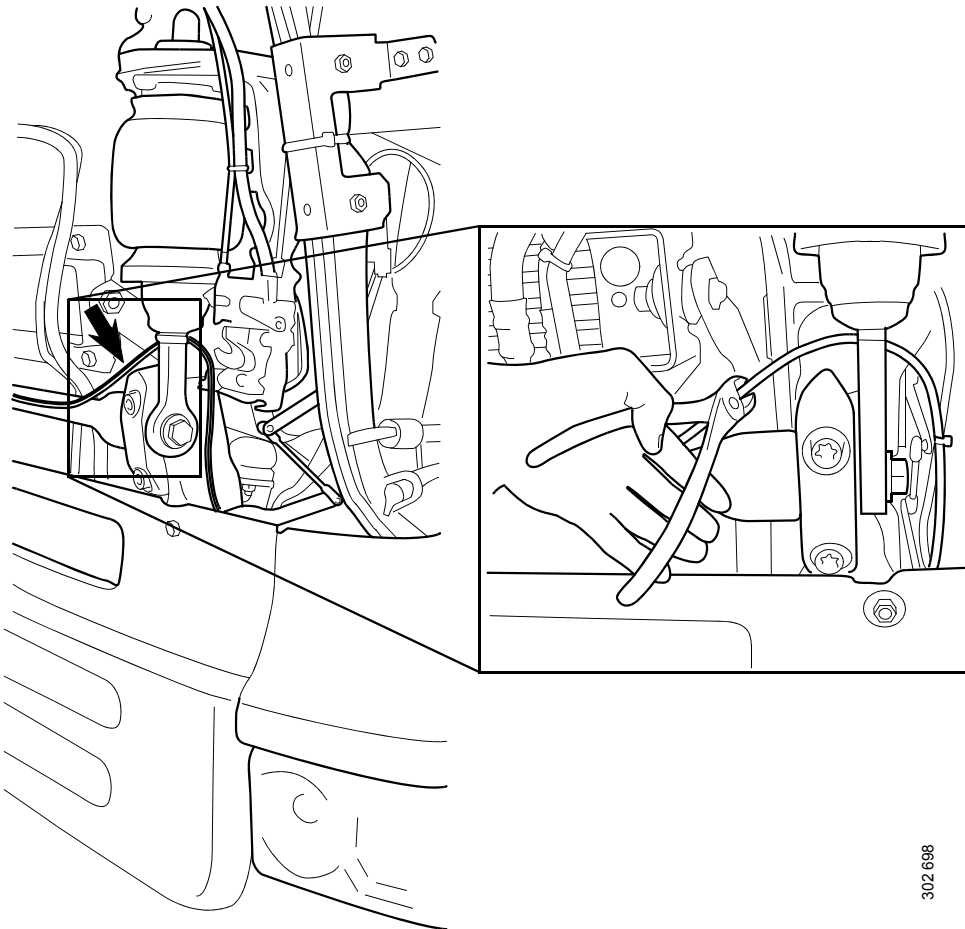
- Cut air hose to the rear cab suspension.



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## Front cab suspension

- Cut air hose to the front cab suspension.



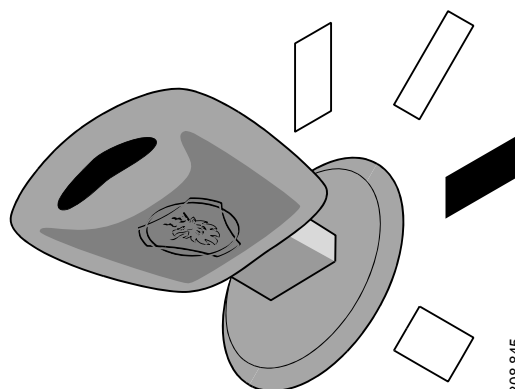
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## Air suspension chassis

### The operation unit

A vehicle with air suspension chassis is 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.

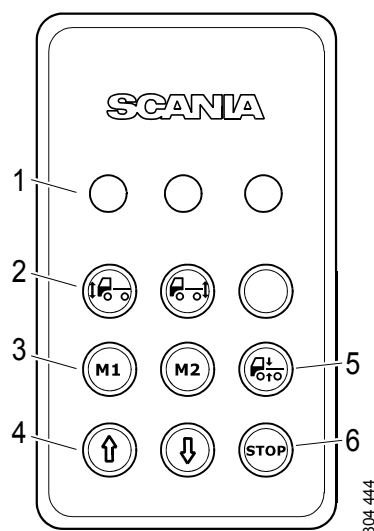
For the operation unit to operate the starter key must be in the drive position and the vehicle power must be connected.



*The starter key is in drive position.*

The operation unit is located 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



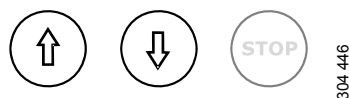
## Select axle

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 comes on.



## Changing the level

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



## Stop button

The stop button always cancels the current function. 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.



# Security of cab

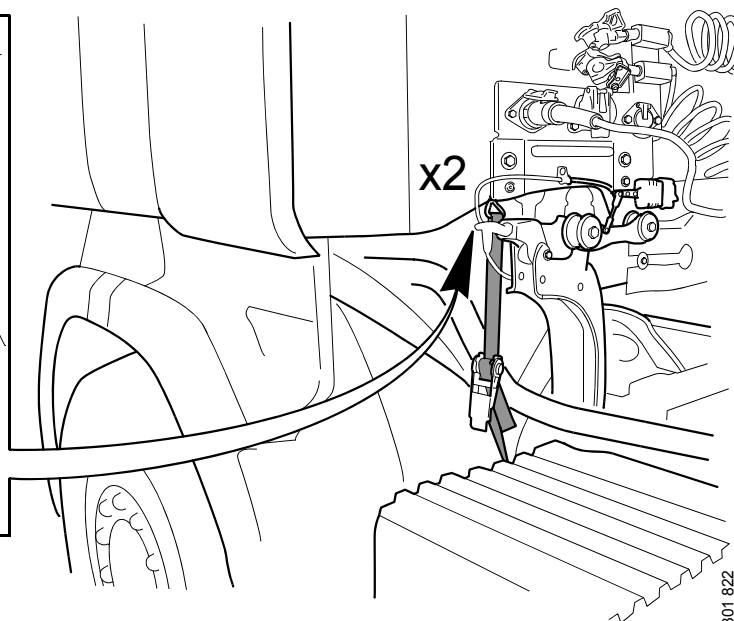
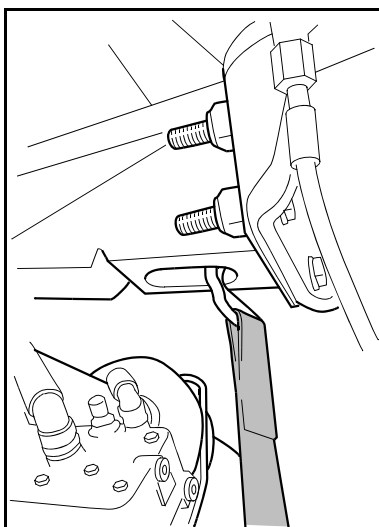
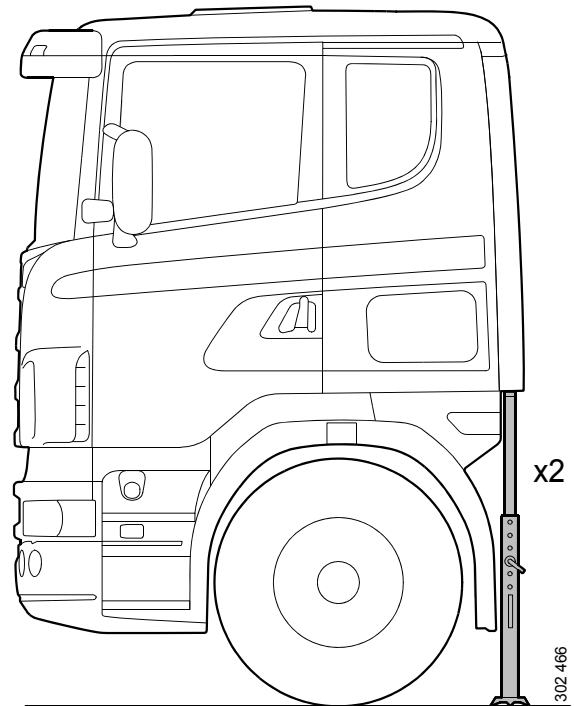
Supports on each side at the rear of the cab prevent the cab dropping down.

By anchoring the cab in the frame on both sides the cab is prevented from moving upwards. The brackets under the cab (as illustrated) are used.



## **WARNING!**

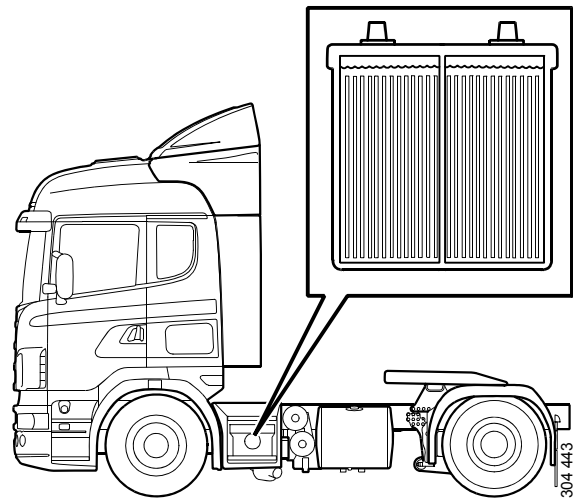
Beware of hot exhaust system mounted on the vehicles right side!



# Electrical system

## Battery

The position of the battery box varies according to the vehicle's equipment. The illustration shows a normal position. If the vehicle does not have a battery master switch the battery must be disconnected to remove the power supply.



*Normal position of battery*

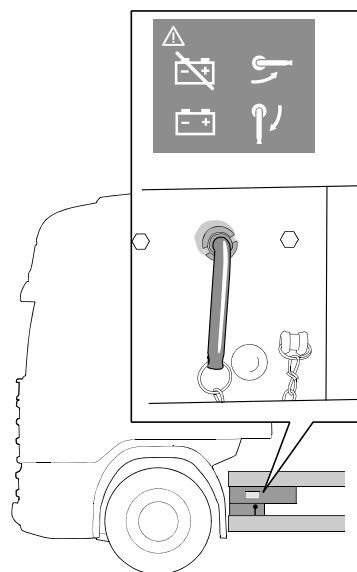
## Battery master switch

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

Depending on how the vehicle bodywork is connected, the bodywork can be live even when the battery master switch is activated.

Vehicles with a battery at the rear is equipped with a jump start socket that is live even when the battery master switch is activated.

The battery master switch can be activated in different ways depending on the vehicle configuration. 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*

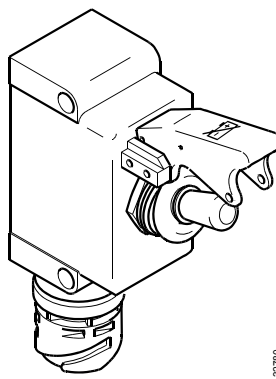
### Battery master switch handle

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



## External switch for battery master switch

The vehicle can be equipped with an external switch for the battery master switch instead of a battery master switch handle. The external switch for the battery master switch is positioned behind the vehicle cab on the left side.



*External switch for battery master switch*

## Switch for battery master switch in the instrument panel

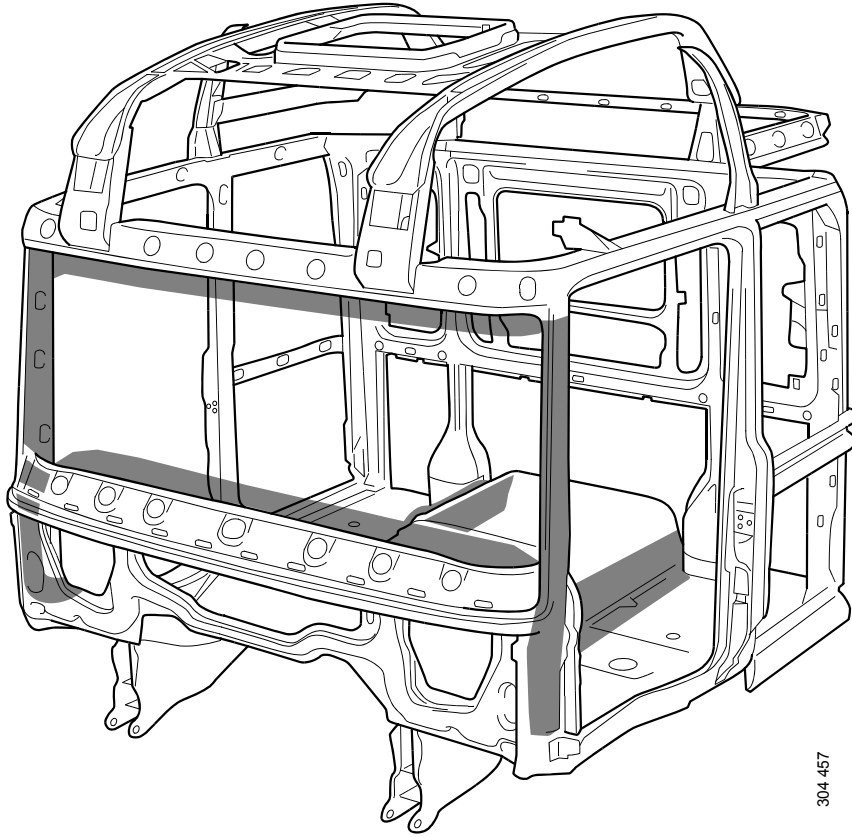
Some vehicles are also equipped with switches for the battery master switch in the instrument panel. This applies for example to the ADR adapted vehicle.



*Switch for battery master switch in the instrument panel*

## Cable harness

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



# Getting into the vehicle

## Door

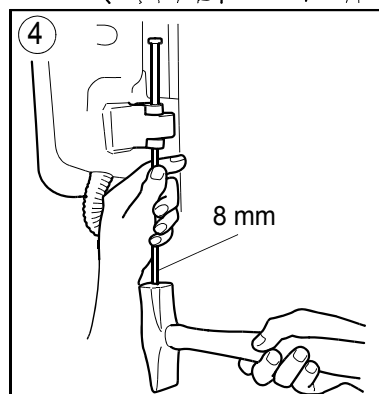
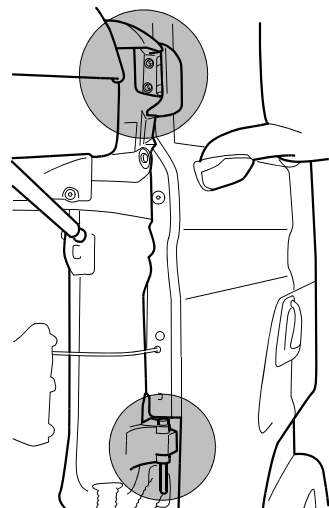
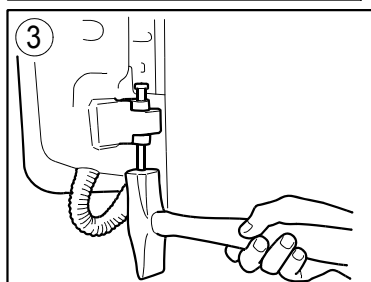
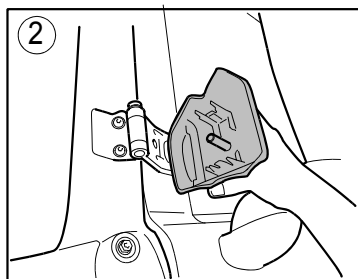
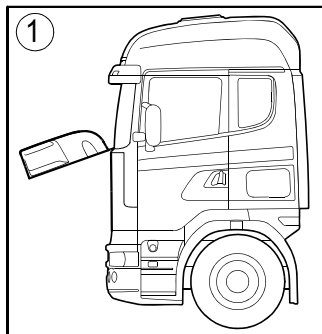
The door can be released from the cab by tapping out the pins in the hinge.



### **WARNING!**

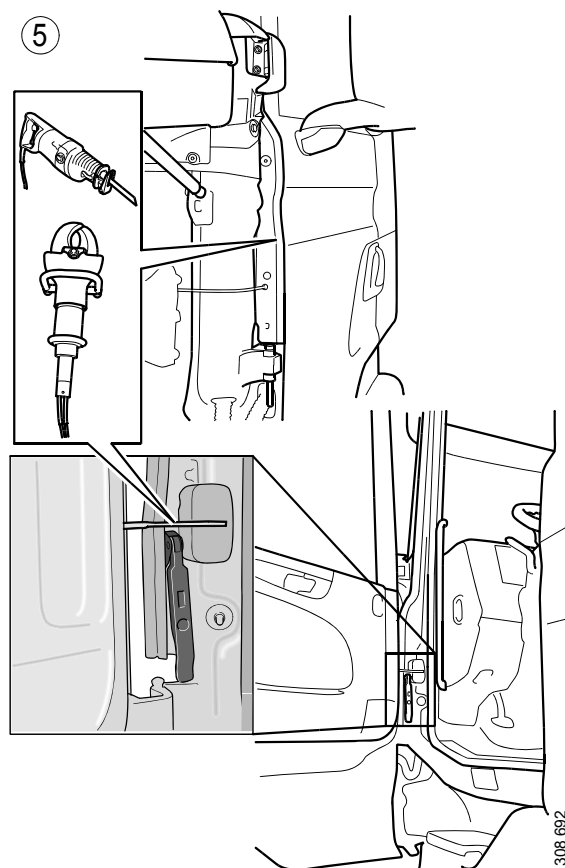
The door can weigh up to 60 kg!

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

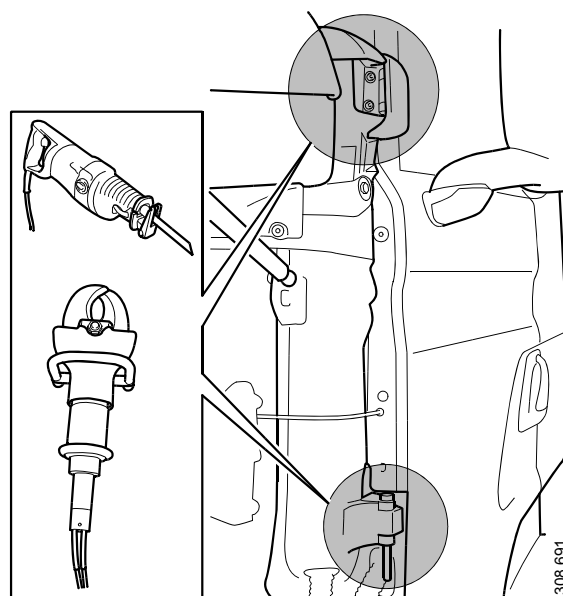


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5. When the door is released from the hinges the door stop must be cut before the door can be removed from the cab.



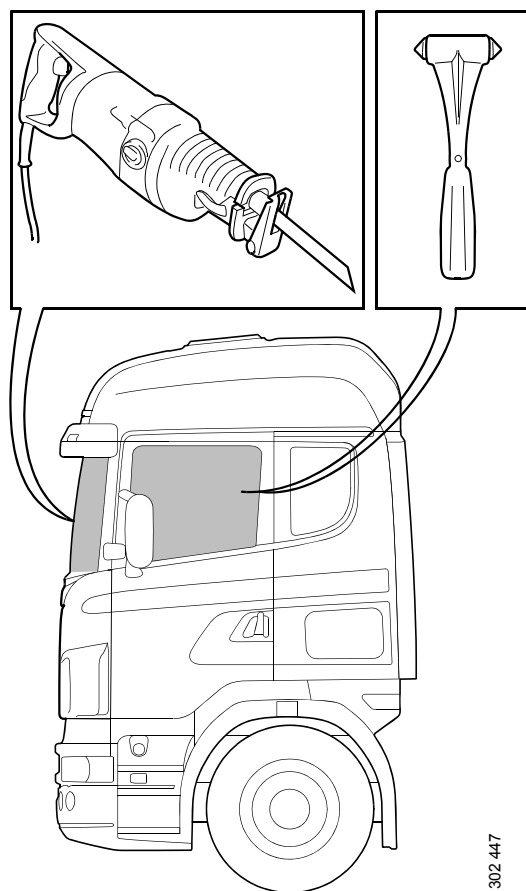
Alternatively a cutting tool or a tiger saw can be used to cut the hinge.



## Windscreen and door window

The windscreen is laminated and glued to the cab structure. Use a sabre 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.

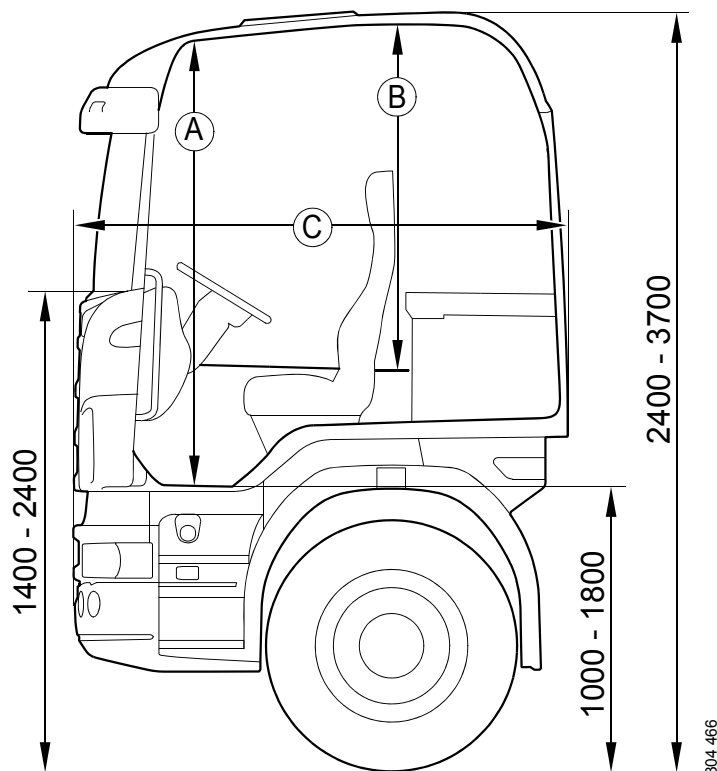


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# Cab dimensions and weight

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

The cab can weigh up to 1 200 kg!



**Table 1: Dimensions A and B (mm)**

	<b>Low</b>	<b>Normal</b>	<b>Highline</b>	<b>Topline</b>
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)**

<b>Cab type</b>	
14	C=1,710
16	C=1,990
19	C=2,260

# Vehicle safety equipment

## Airbag

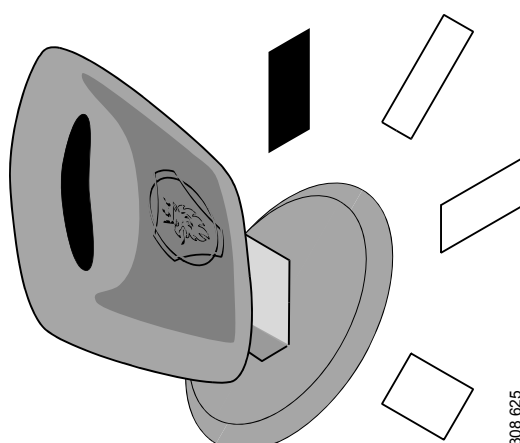
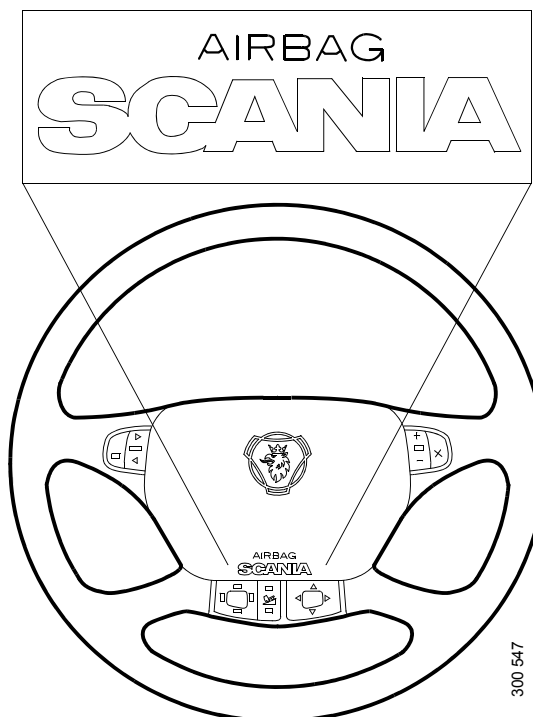


### VARNING!

The airbag contains explosive substances!

If the vehicle is fitted with an airbag on the driver's side this is shown 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, the airbag is deactivated.



*The starter key is in the locking position.*



## Belt pretensioner



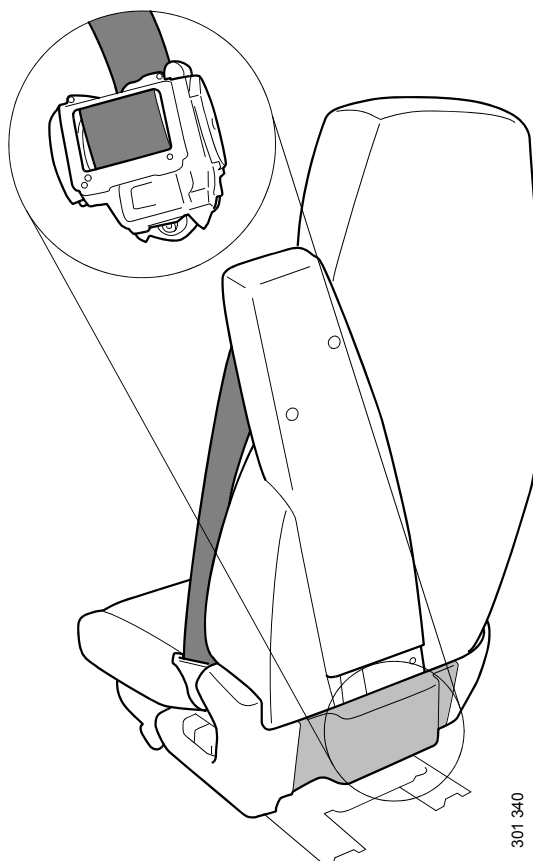
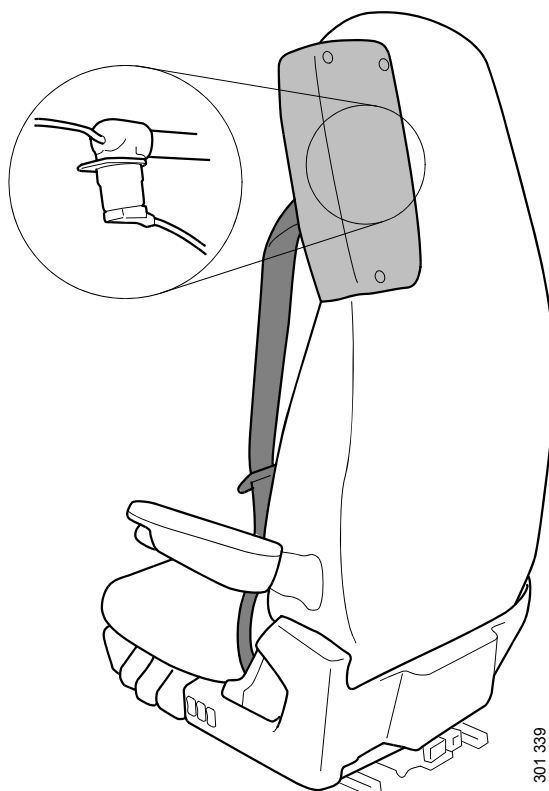
### **VARNING!**

The belt pretensioner contains explosive substances!

The belt pretensioner is found on the driver's seat and on the passenger's 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, the belt pretensioner is deactivated.

The belt pretensioner is located as illustrated on the two seat models that are fitted with a belt pretensioner.

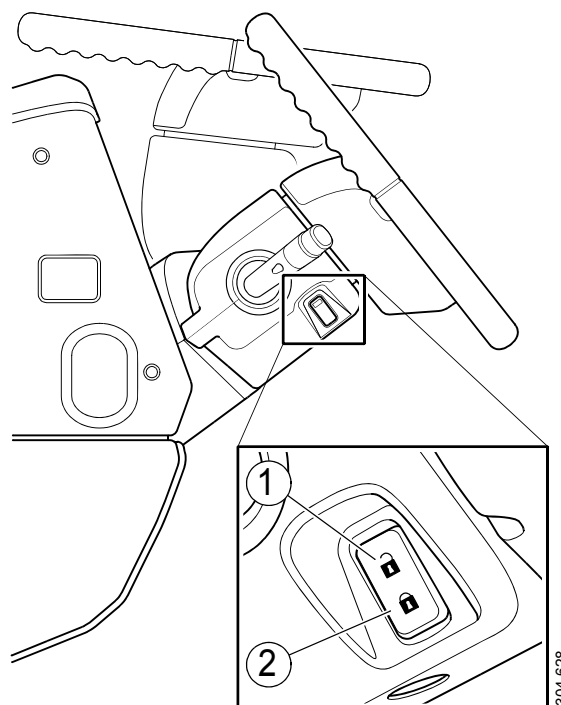


# Adjusting steering wheel

## Adjusting with button

Proceed as follows to adjust the height and rake:

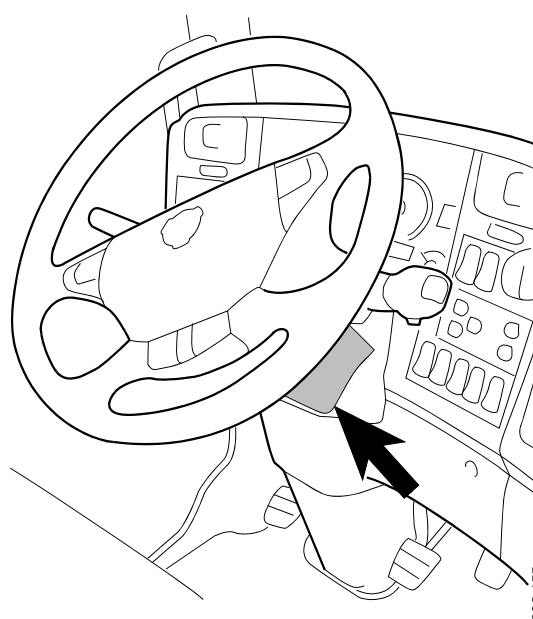
Press button (1). For a few seconds you can then adjust the height and rake. Push the button (2) into the locked position to lock the setting. The settings are also locked automatically after a few seconds.



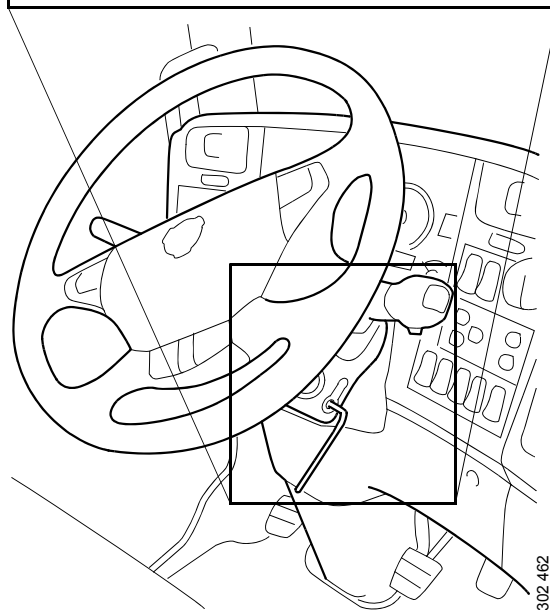
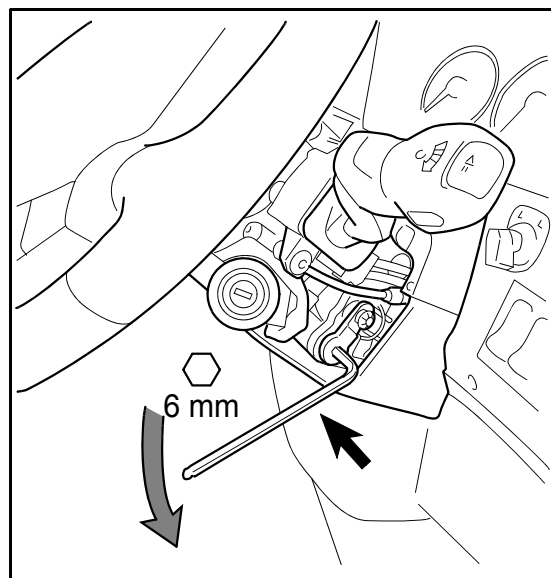
## Adjusting with tool

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

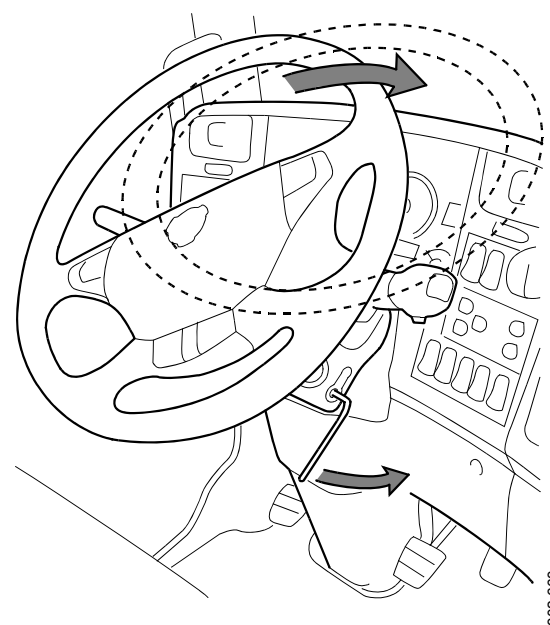
1. Remove the plastic covers from under the steering wheel.



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

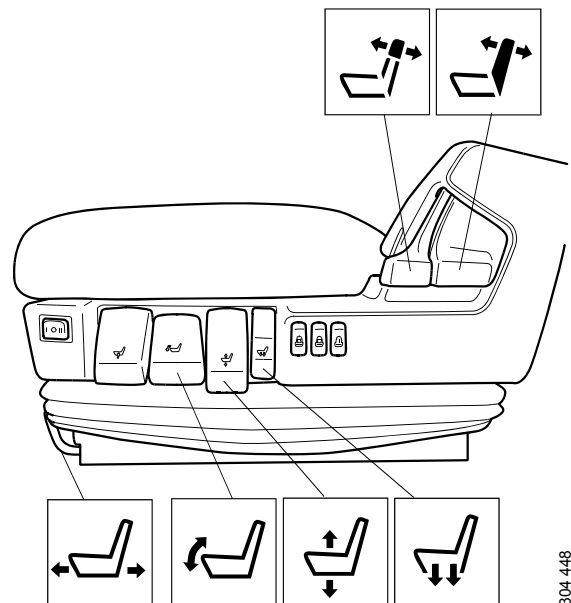


3. Hold the internal hexagon key in the turned position and adjust the steering wheel to the required position.



# Adjusting seat

The possibility of adjusting the seat depends on the seat type. The illustration shows an example.



## Obs!

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.*

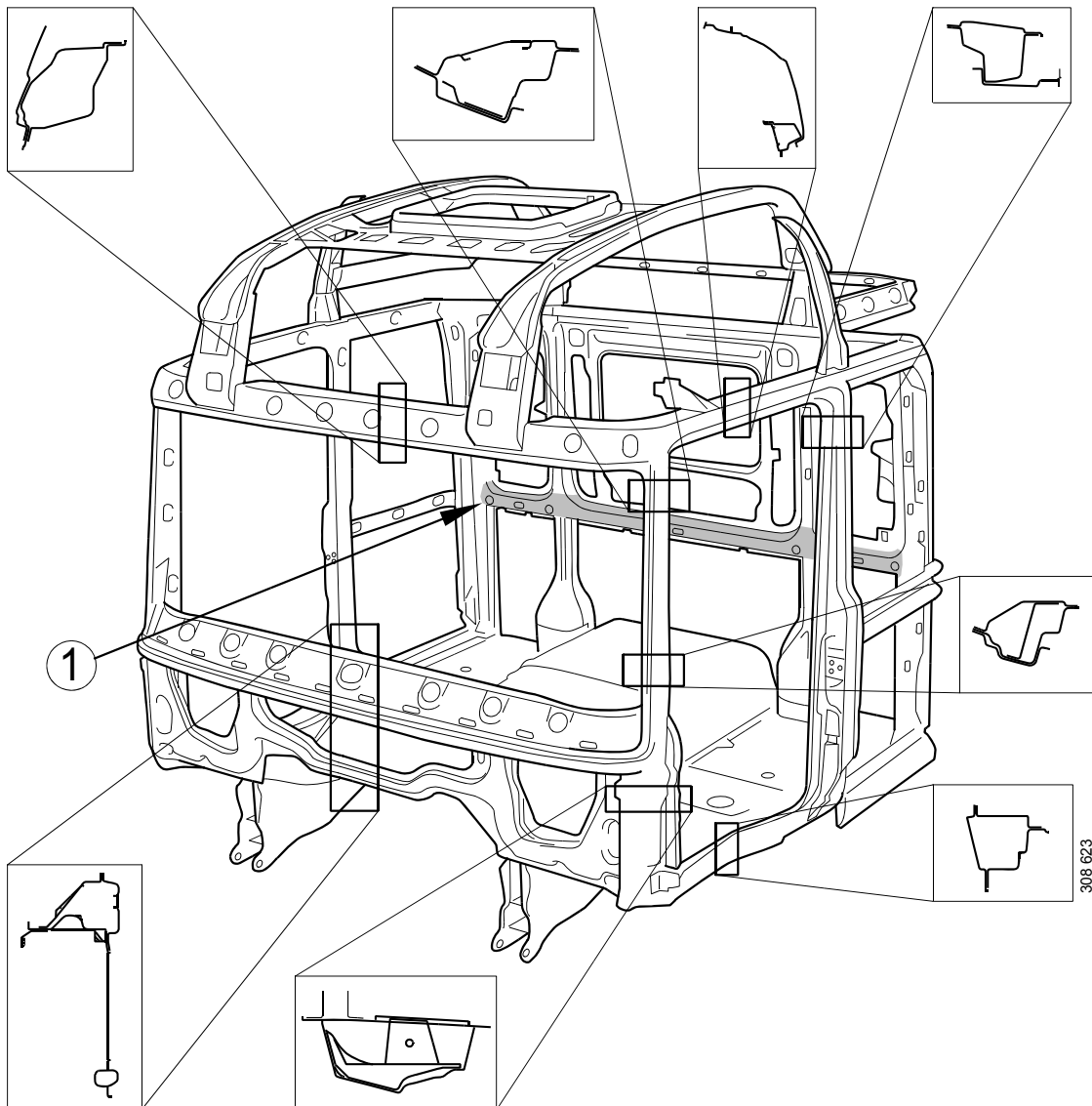


## VARNING!

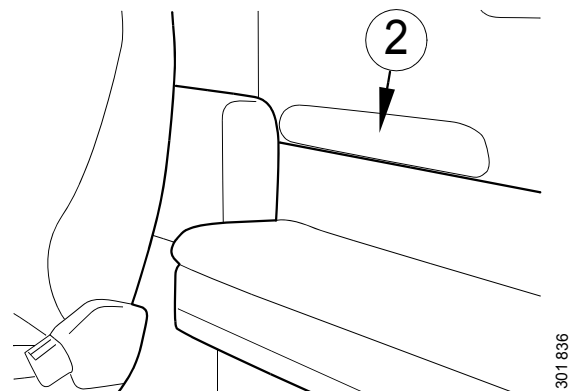
Risk of hearing impairment! A loud noise occurs when the air flows out of the cut or disconnected hose.

Quick lowering of the seat and emptying 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 frame comprises. All the members in the cab frame can be cut with a cutting tool. The centre member at the rear of the cab (1) is marked on the illustration. It can be located vertically from inside the cab because 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 at a temperature of 70 Celsius!

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

1. Coolant: 80 litres

2. Washer fluid: 16 litres

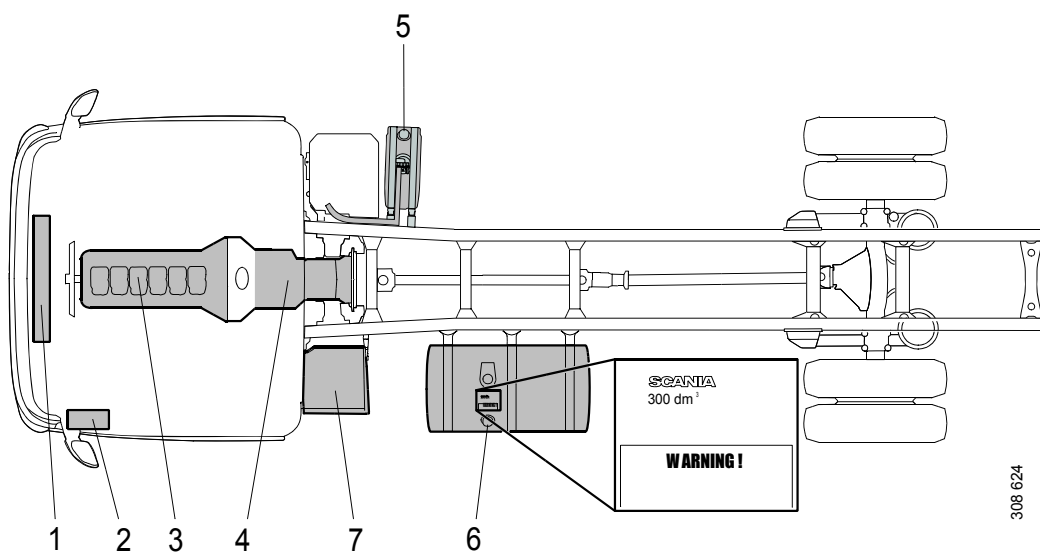
3. Engine oil: 47 litres

4. Transmission oil: 80 litres

5. AdBlue: 75 litres. AdBlue is a solution of urea and water that is added to the exhaust gases upstream of the catalytic converter in SCR engines. The aim is to reduce the emission of nitrogen oxide.

6. Fuel: The capacity is shown on the vehicle's fuel tanks.

7. Battery acid



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# Gas vehicles

Only spark-proof tools and classified electrical tools may be used when handling vehicle gas.

## Vehicle gas

The vehicle gas used in Scania gas vehicles is biogas or natural gas. It is also possible for a mixture of these gases to be used.

Vehicle gas is basically colourless and odourless, but is often mixed with odours to enable leaks to be detected.

Vehicle gas mainly consists of methane and has a methane content of 90–97%.

Methane is lighter than air and therefore rises if there are any leaks. This must be taken into account when leaks occur, e.g. indoors or in a tunnel. The gas can cause suffocation in confined spaces.

Methane is a highly flammable gas and has explosion limits at a 5–16% mixture in air. The gas self-ignites at a temperature of 595°C.

## Gas tank package and gas lines

The gas tank package on Scania trucks is located on the frame. On Scania buses the gas tank package is located on the roof. Gas vehicles are marked at several points with a diamond-shaped symbol with the text CNG.

The gas tank package consists of a number of interlinked gas bottles each with volumes of up to 320 litres. The pressure in the gas bottles can be more than 230 bar when the tank is full.

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. The gas lines can contain vehicle gas at a pressure of more than 230 bar.



*Vehicle gas symbol*



## Gas bottles and valves

Each gas bottle is fitted with a solenoid valve, shut-off valve and pipe break valve. The gas bottles are also equipped with one or more fusible links. The design of the gas bottles and valves varies depending on the manufacturer.

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

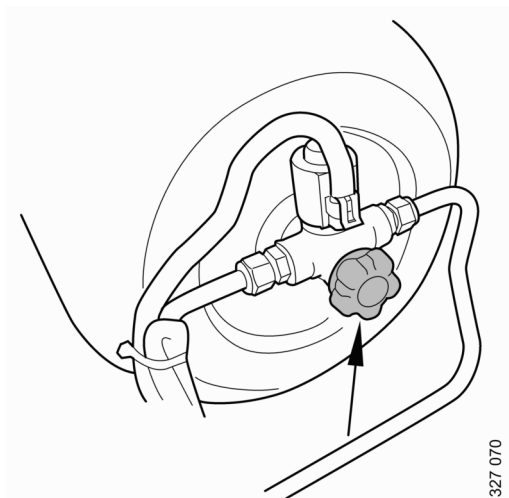
The gas bottles have an inner core made of plastic or aluminium wound in carbon fibre which forms the shell of the gas bottle.

The gas bottles expand with the gas pressure and this is permitted by the design.

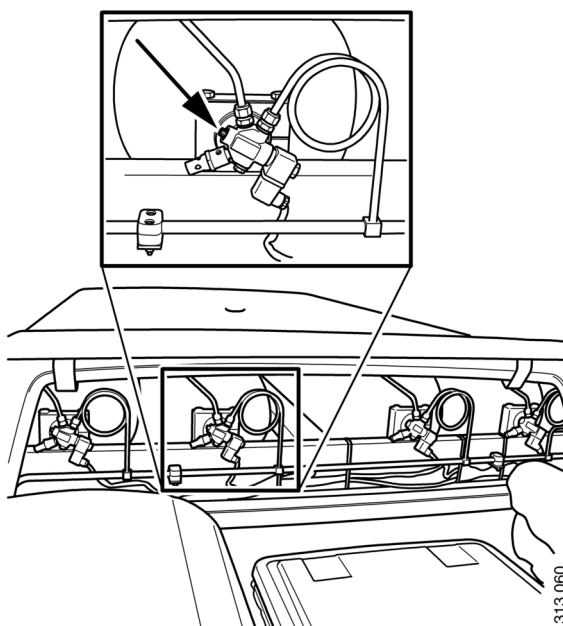
If the outer casing is damaged so the fibres are broken, the structure is weakened and can in time cause the gas bottle to break.

Vehicle gas expands with the temperature and it is therefore important to lower the pressure in a damaged gas bottle as quickly as possible.

A damaged gas bottle can withstand pressure temporarily, but if the pressure is raised, e.g. by the sun, the gas bottle may break. Therefore try to reduce the pressure in a damaged gas bottle as rapidly as possible in a controlled and safe manner.



*Gas bottle shut-off valve on buses and trucks*



*Gas bottle shut-off valve on buses*

## Leaks and fire

If a high-frequency high whining noise is heard, this indicates that the gas system has a leak. Gas leaks can also be identified by an acrid odour if the gas is mixed with odours.

If gas leaks are identified, evacuate the area. The risk of explosion is very small, but if, for example, a fusible link is opened and the gas ignites, flames tens of metres high can occur.

If several fusible links are opened, extremely intense fires can occur.

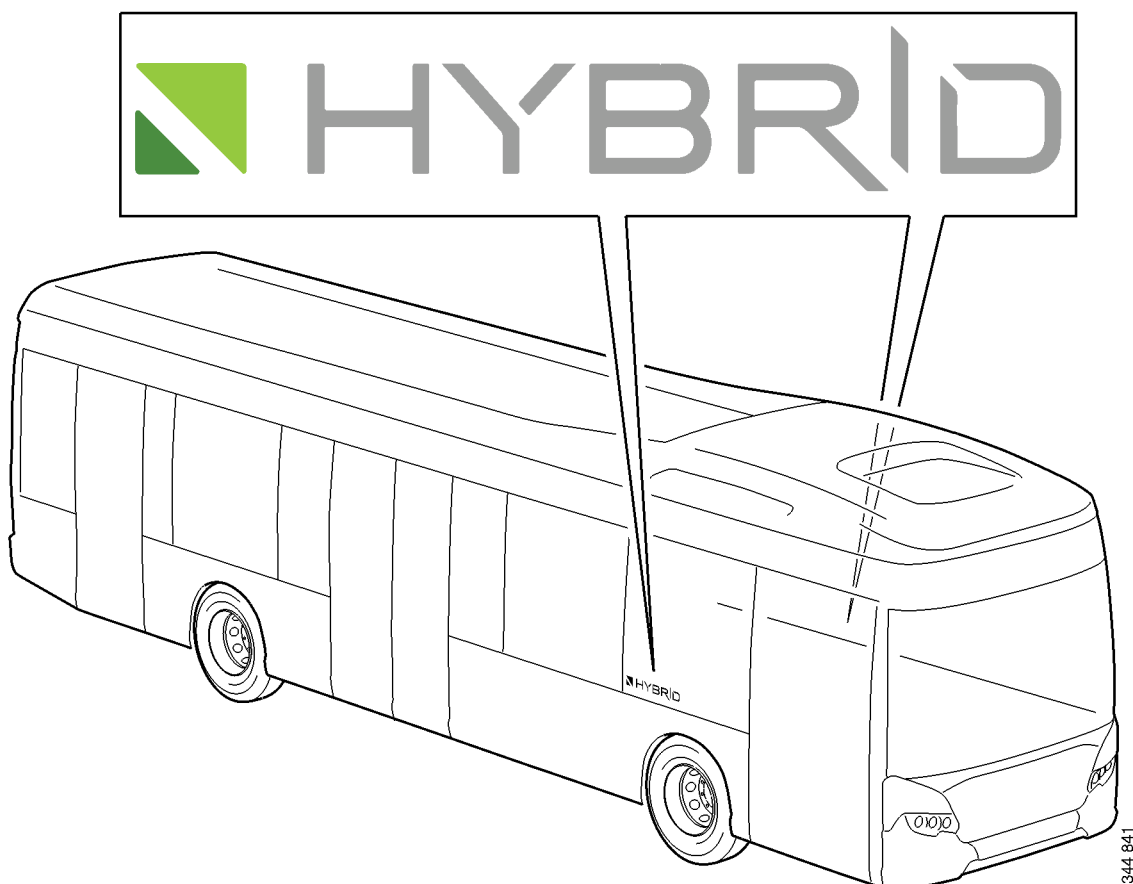
# Hybrid buses

**VARNING!**

Use 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.

## Procedure for extinguishing a fire

### Battery fire

In the event of an evident fire in the battery, use a fire extinguisher for electric fires.

### 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.

Use a large amount of water or foam to cool the battery.

If the battery box is severely damaged, water must not be used as this can initially make the fire worse. Instead, use a fire extinguisher for electric fires.

## Cut all power to the vehicle



### **WARNING!**

Use 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).

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### **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.

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### **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.

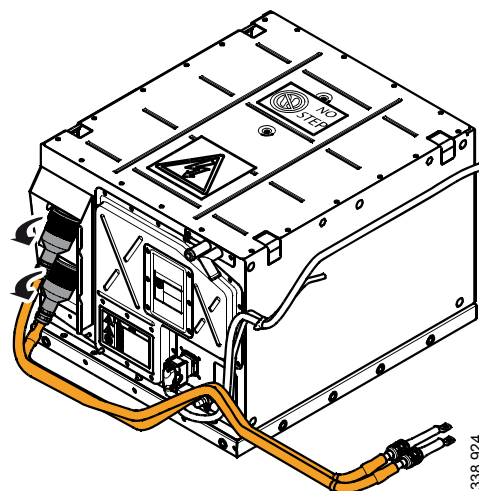
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1. Turn off the ignition.
2. Cut the power of the 24 V system by disconnecting the battery terminals on the 24 V batteries. The 24 V battery is located under the driver area and is accessible from the outside of the vehicle.

Normally, this means that the hybrid 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.

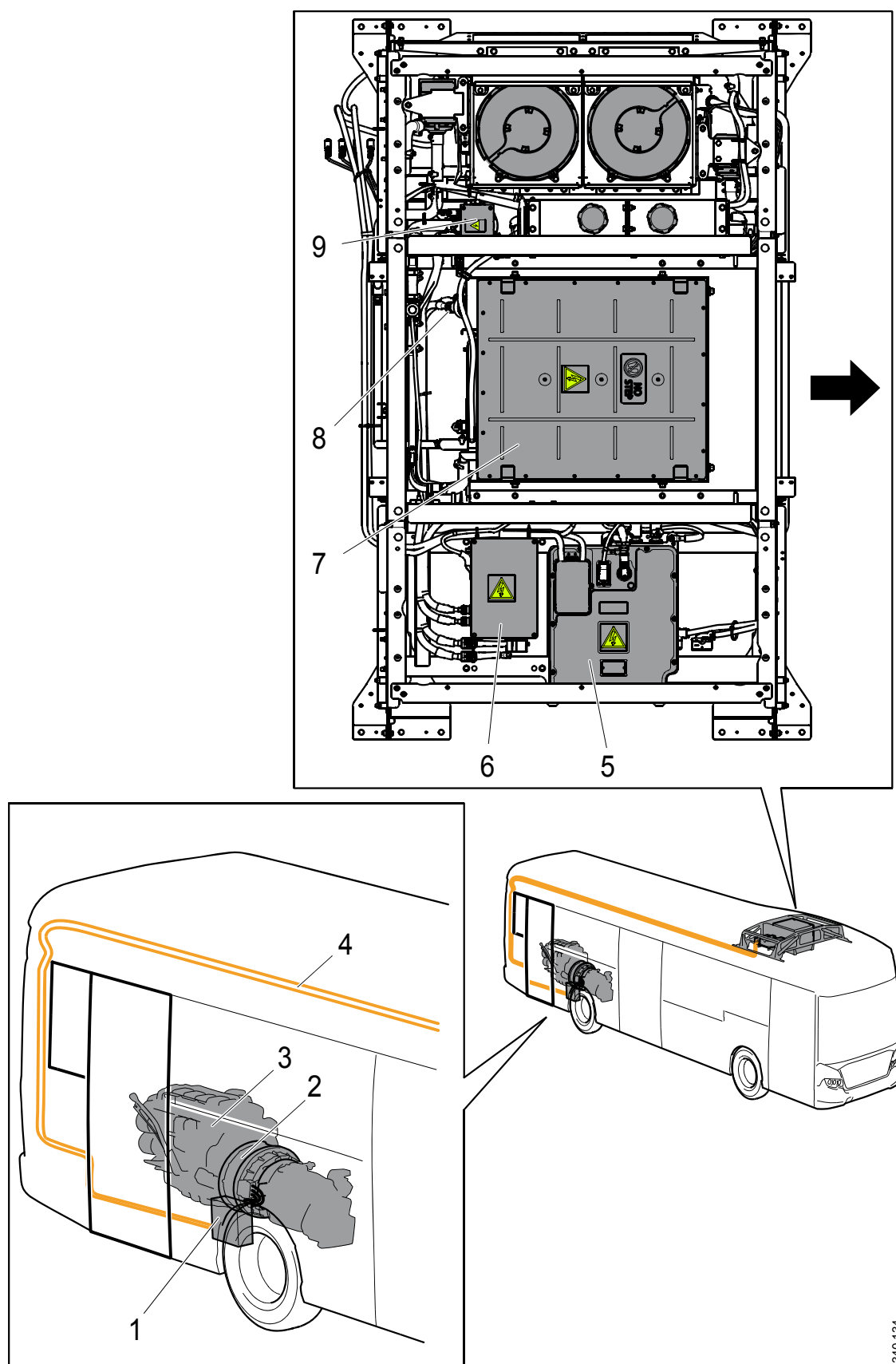
3. If the cable harness for voltage class B must be cut or if it is damaged, and if the 24 V system is not accessible, disconnect the connectors on the hybrid battery. This guarantees that the hybrid system is disconnected.



*Disconnect the connectors on the hybrid battery.*

338 924

## Hybrid system components



340 134

1. *Inverter, voltage class B (650 V)*
2. *Electric machine, voltage class B (650 V)*
3. *Engine*
4. *Cable harness for voltage class B (650 V)*
5. *Direct current converter (DCC) (650 - 24 V)*
6. *Central electric unit for voltage class B (650 V)*
7. *Hybrid battery, voltage class B (650 V)*
8. *Connectors for the hybrid battery, voltage class B (650 V)*
9. *Electric heater, voltage class B (650 V)*



## 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 hybrid battery which is connected to an electric machine via an inverter.

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

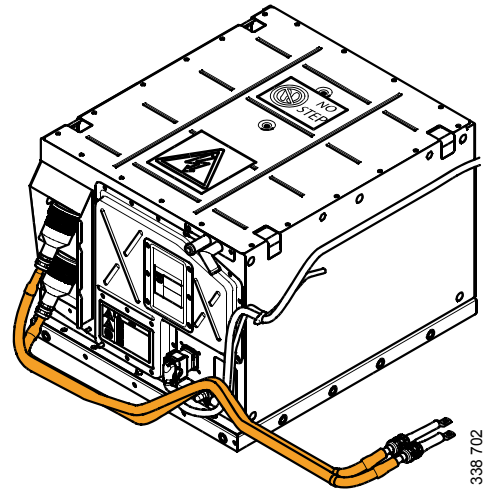
The inverter is cooled with a water cooling system that also cools the direct current converter. The direct current converter supplies the 24 V battery and the vehicle electrical system with 24 V voltage which is transformed from the hybrid battery voltage class B (650 V).

## Components with voltage class B (650 V)

### Hybrid battery

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

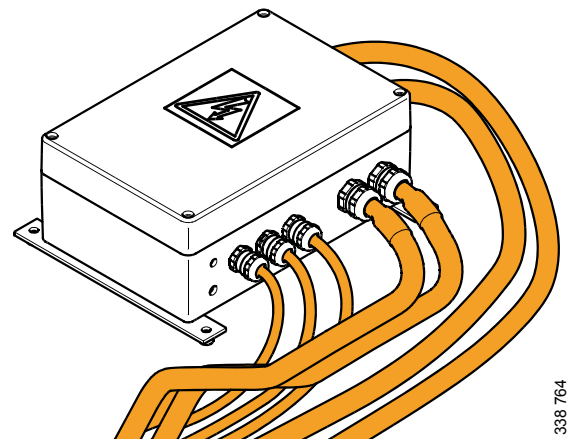
The hybrid battery is located on the roof.



### Central electric unit for voltage class B (650 V)

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

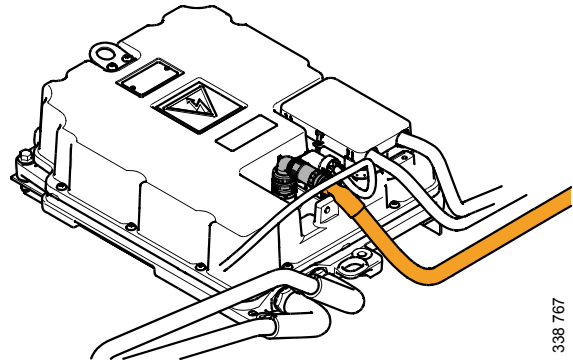
There are two cables for voltage class B (650 V) from the central electric unit along the right-hand side of the roof down to the inverter. The inverter is located behind the right-hand rear wheel.



## 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.

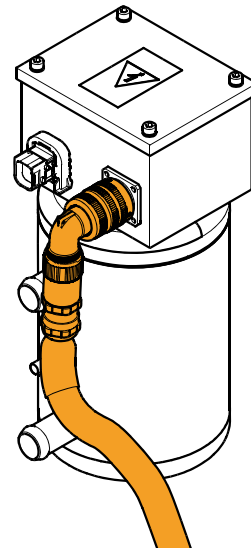


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## Electric heater

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

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



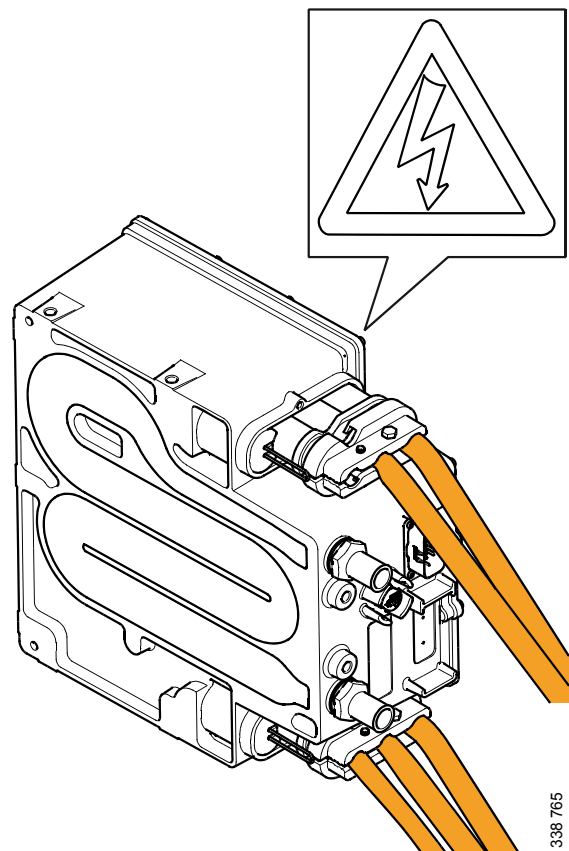
338 766

## The inverter

The inverter converts the hybrid 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 two cooling circuits on the roof.

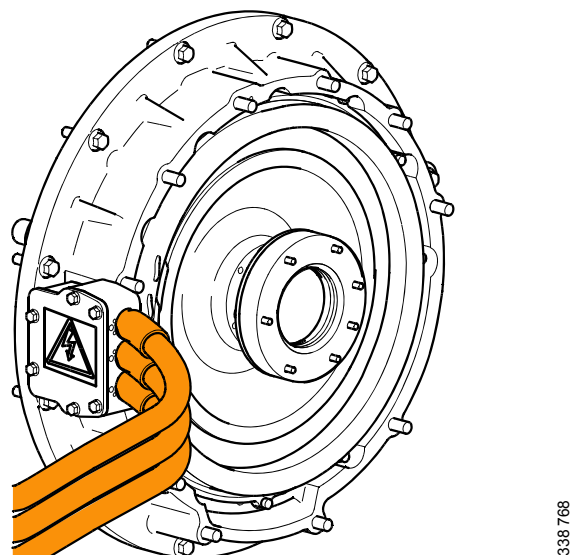
The inverter is connected to the electric machine using three cables for voltage class B.



## The electric machine

The electric machine is electromagnetic and converts electrical 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 hybrid batteries

The chemicals in the hybrid battery are under normal circumstances not dangerous for the environment because the cells are contained in a closed and sealed space with controlled ventilation.

The contents of the cells is normally solid. The risk of contact only occurs in the event of external damage to one or more cells, too high a temperature or overload combined with damage to the seal of the battery. The contents 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 100 degrees Celsius. If the temperature in the cells is greater than 100 degrees Celsius the electrolyte is quickly converted to a gaseous state. This in turn increases the pressure inside it, which causes the pressure relief valves in the battery to break and flammable gas is released via the battery pack ventilation duct.

Normally, gas from the hybrid battery is released via the pressure relief valves.

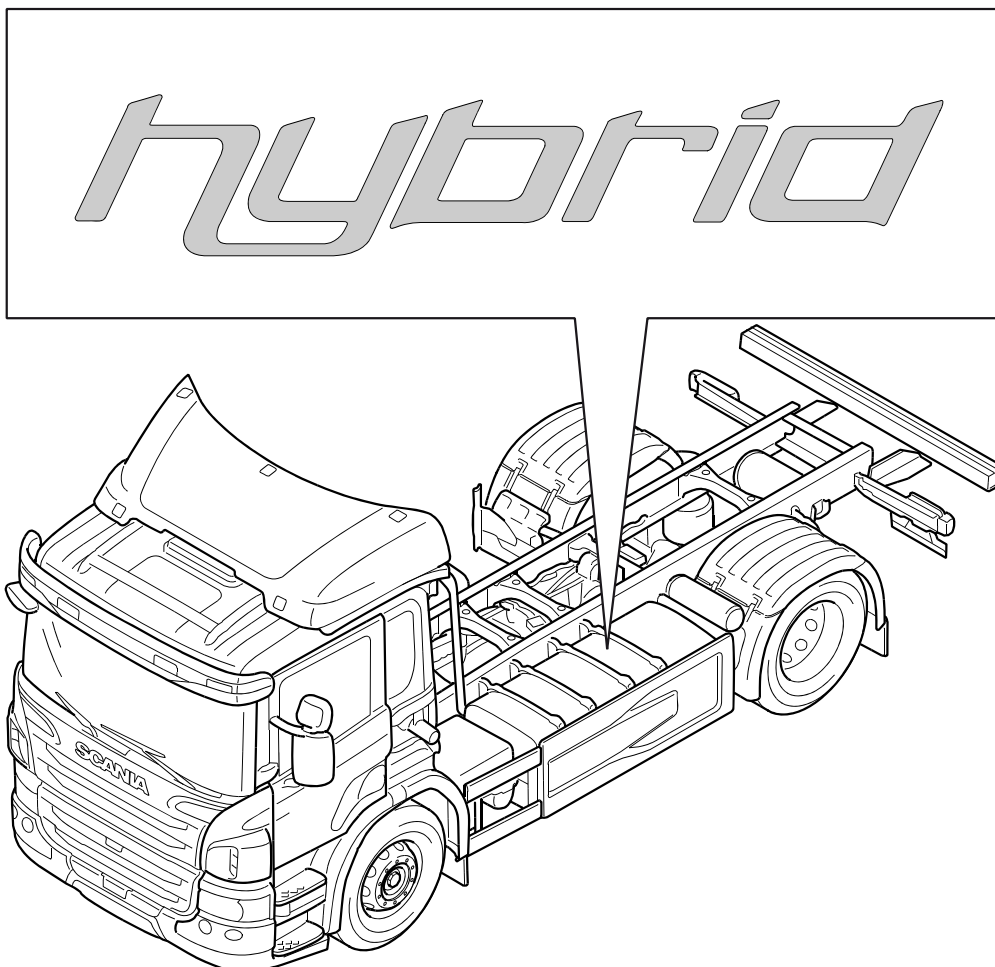
# Hybrid trucks

**VARNING!**

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



358 508

## 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.

## Procedure for extinguishing a fire

### Battery fire

In the event of an evident fire in the battery, use a fire extinguisher for electric fires.

### 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.

Use a large amount of water or foam to cool the battery.

If the battery box is severely damaged, water must not be used as this can initially make the fire worse. Instead, use a fire extinguisher for electric fires.

## 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).

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### **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.

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### **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.

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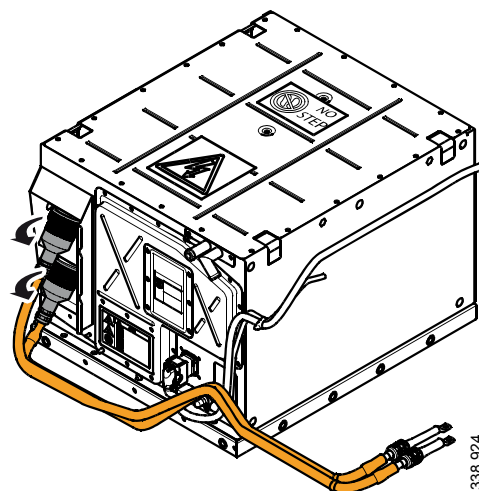


1. Turn off the ignition.
2. Cut the power of the 24 V system by disconnecting the battery terminals on the 24 V batteries. The 24 V battery is located on the battery shelf behind the cab on the left-hand side.

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

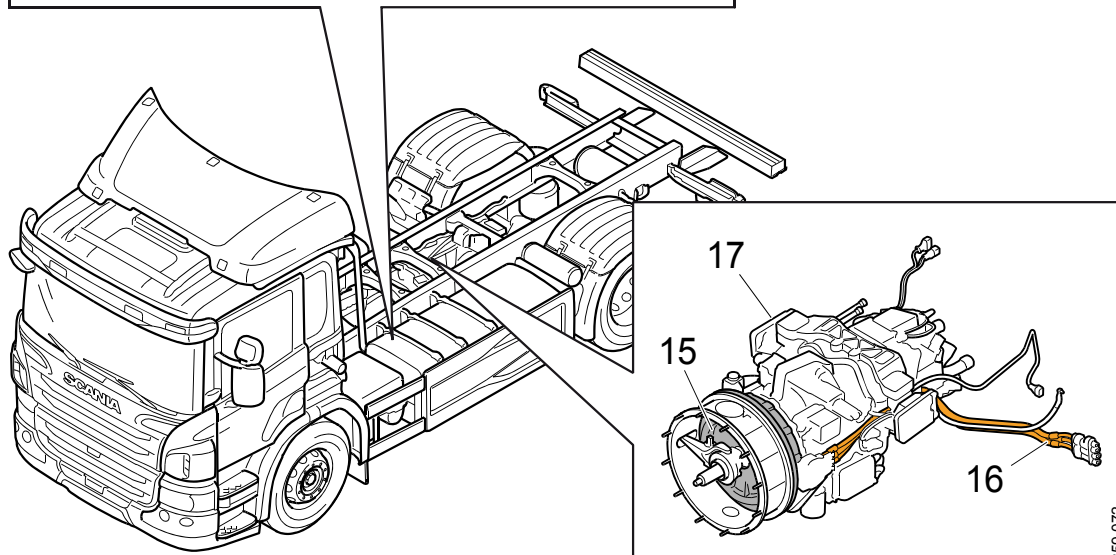
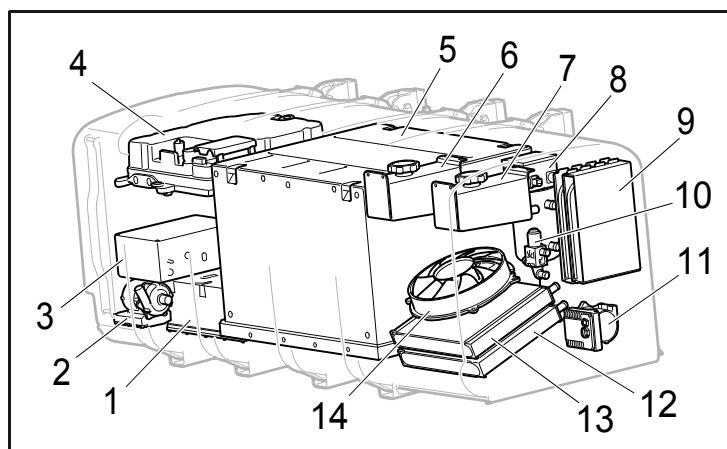
In order to be sure that there is no residual voltage remaining in the system, wait for 15 minutes.

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 hybrid battery. This guarantees that the hybrid system is disconnected.



*Disconnect the connectors on the hybrid battery.*

# Hybrid system components



359 072

1. *Inverter, MGU (E82)*
2. *Coolant pump (M41) for MGU and DCC coolant circuit*
3. *Central electric unit for voltage class B (P7)*
4. *Direct current converter, DCC (E84)*
5. *Hybrid battery*
6. *Expansion tank for hybrid battery coolant circuit*
7. *Expansion tank for MGU and DCC coolant circuit*
8. *Heater (H32)*
9. *Control unit BMU (E81)*
10. *Solenoid valve (V194)*
11. *Coolant pump (M38) for hybrid battery coolant circuit*
12. *Radiator for MGU and DCC coolant circuit*
13. *Cooler for hybrid battery coolant circuit*
14. *Fan (M39)*
15. *Electric machine (M33)*
16. *Cable harness for voltage class B (VCB)*
17. *Gearbox, E-GRS895*

## 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 hybrid battery which is connected to an electric machine via an inverter.

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

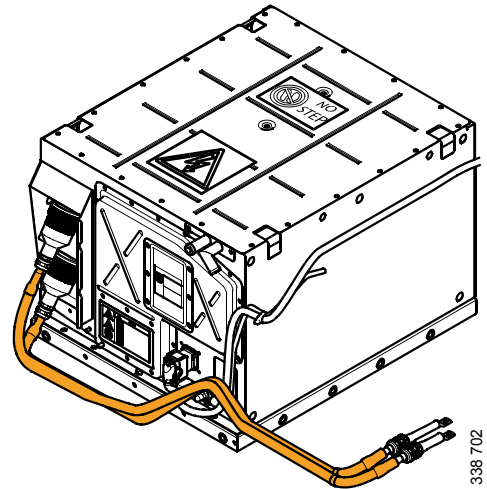
The inverter is cooled with a water cooling system that also cools the direct current converter. The direct current converter supplies the 24 V battery and the vehicle electrical system with 24 V voltage which is transformed from the hybrid battery voltage class B (650 V).

## Components with voltage class B (650 V)

### Hybrid battery

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

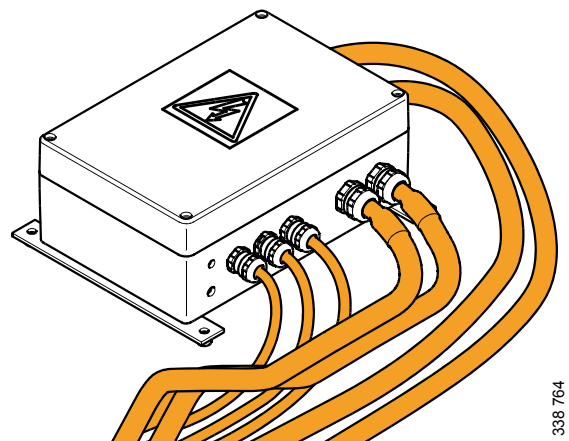
The hybrid battery is located in the hybrid power unit, which is positioned behind the battery shelf on the left-hand side of the frame.



### Central electric unit for voltage class B (650 V)

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

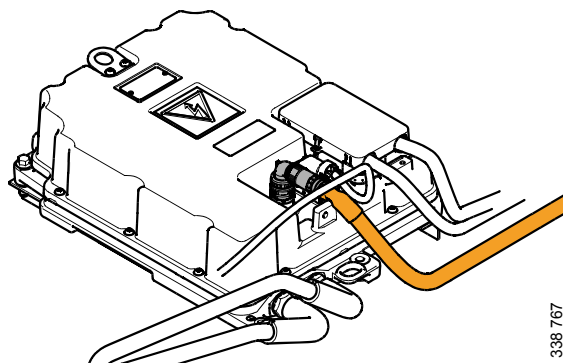
The inverter is located in the hybrid power unit, which is positioned behind the battery shelf on the left-hand side of the frame.



## 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.

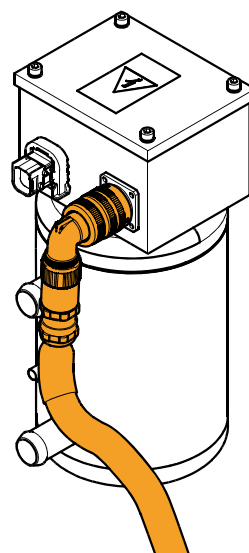


338 767

## Electric heater

The electric heater heats the hybrid battery if the temperature of the hybrid 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.



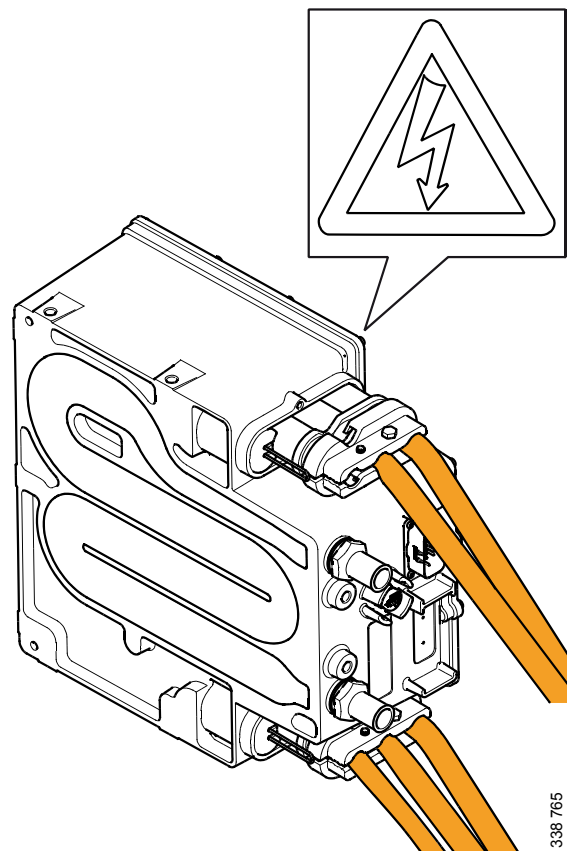
338 766

## The inverter

The inverter converts the hybrid 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 two cooling circuits in the hybrid power unit.

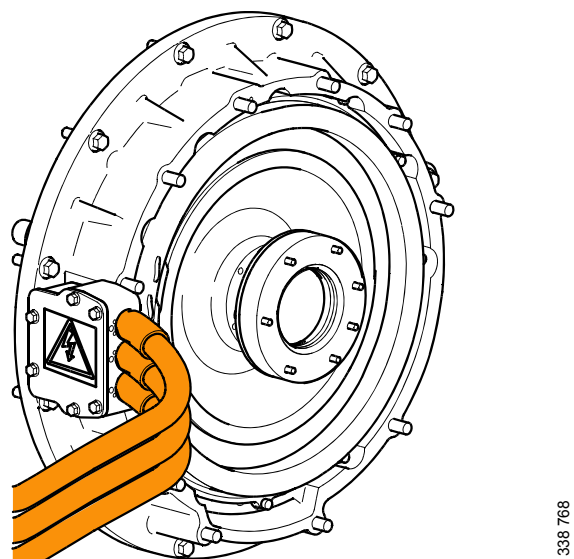
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