

# Emergency response guide

## **DAF CF ELECTRIC**



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## **PREFACE**

This handbook consists of sections which describe the driving and care of the truck.

At the end of the handbook, there is a general alphabetical index, so that you can locate quickly what you are looking for.

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## 1.1 INTRODUCTION

This manual has been created to assist the first responders in identifying and responding to vehicles equipped with a DAF electrical driveline.

The DAF electrical vehicle uses high-voltage AC to power an electric motor. High-voltage battery packs stores energy until it is required to power the vehicle.

The DAF electrical driveline has been designed with many features for user protection, to ensure safe access to and from the vehicle under various conditions. It is important to read and understand the 'Emergency high-voltage shutdown procedures'.



**WARNING!** *Always assume the vehicle is powered up.*

## 1.2 WARNINGS & CAUTIONS



**WARNING!** *Not observing the following safety regulations can seriously jeopardise one's health and safety and can damage the vehicle and lead to hazardous situations:*

- *Always observe the safety instructions in this manual and do not ignore them.*
- *Also read the instructions and warnings on the labels and stickers on the various components of the vehicle and comply with them. They have been put there for your health and safety, so do not ignore them.*



**WARNING!** *The Electric Vehicle is equipped with high-voltage components and wiring. Not following these instructions can result in severe personal injury or death.*

- *Always observe the safety instructions in this manual and do not ignore them.*
- *Only work on an EV when the high-voltage circuit is shut down. See 'Emergency shutdown procedure'.*
- *Avoid touching the high-voltage components, identifiable by a warning sticker, before the high-voltage circuit is shut down.*
- *Avoid touching the orange high-voltage wiring and connectors, before the high-voltage circuit is shut down.*



**WARNING!** *This vehicle is also equipped with two battery packs, each containing two high-voltage batteries. Exposure to high voltage can result in severe personal injury or death.*

- *Never open the high-voltage battery packs.*



**WARNING!** The battery cells inside the high-voltage batteries contain electrolyte.

*Electrolyte is a toxic fluid. Physical contact can lead to serious health problems.*

- Avoid physical contact with electrolyte leaking from the batteries.
- If there is contact with the eyes: rinse with plenty of water for at least 15 minutes and consult a doctor.
- Avoid skin contact. If there is skin contact: wash the skin with water and soap.



**WARNING!** Sparks and open flames in the vicinity of a battery can lead to an explosion which can cause serious injury.

- Always charge batteries in a properly ventilated area.
- Avoid sparks and open flames in the vicinity of batteries.



**WARNING!** Charging frozen batteries can lead to an explosion which can cause serious injury.

- Always thaw out batteries before charging them.



**WARNING!** Never operate an emergency stop button while driving.

- Operating an emergency stop button while driving switches off all electrical systems including hydraulic steering pump and air compressor. This can lead to very dangerous situations with regards to steering and braking and can lead to damage of the high-voltage system.



**WARNING!** Towing a fully loaded vehicle can result in unstable vehicle behaviour for the towing and/or towed vehicle during critical driving situations. This can lead to very dangerous situations. High forces and tensions in the chassis and driveline can also damage the vehicle.

- Do not tow the vehicle when it is fully loaded.



**WARNING!** The towed vehicle can be located asymmetrically (left or right) behind the towing vehicle. Towing at an angle larger than 20° with the vehicle centre line can result in unstable vehicle behaviour for the towing and/or towed vehicle during critical driving situations. This can lead to very dangerous situations. High forces and tensions in the chassis and driveline of the vehicles can also damage the vehicle.

- Towing at an angle larger than 20° with the vehicle centre line is not allowed.



**WARNING!** When the high-voltage circuit isn't in operating mode and no additional measures are taken, there is no power steering and no air is supplied to the brake system. This results in difficult steering and

1

*increased brake pedal force and ultimately leads to automatic engagement of the park brake. This can lead to very dangerous situations.*

- *Release the park brake and adapt the driving style of the towing combination.*



## 2.1 IDENTIFICATION

2

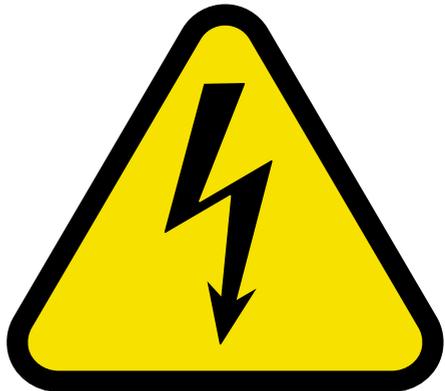
### Vehicle

The (Battery) Electric Vehicle is identified by a badge, 'Electric', on the outside of the vehicle.



### High-voltage components

All high-voltage components are labelled with the 'high-voltage' symbol.



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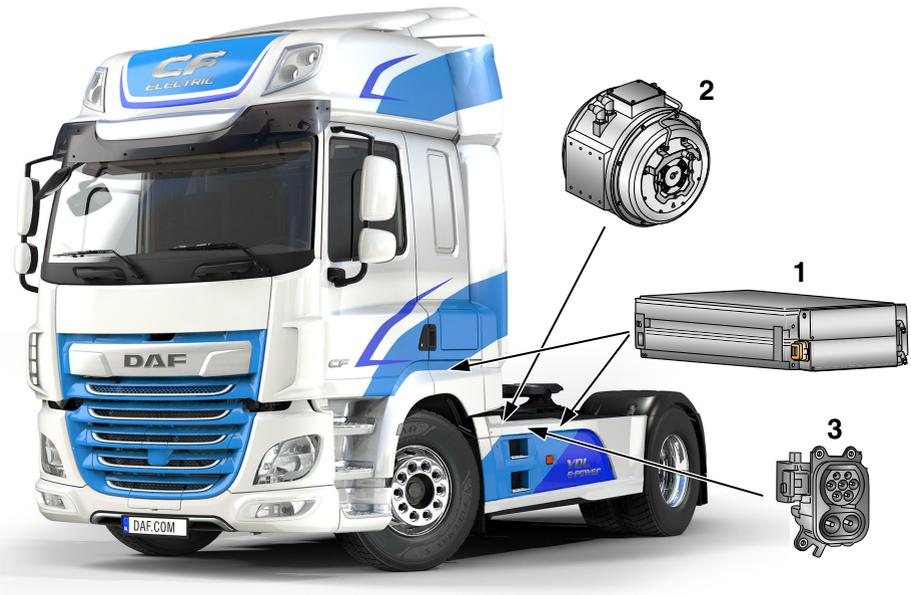


**WARNING!** The Electric Vehicle is equipped with high-voltage components and wiring. Not following these instructions can result in severe personal injury or death.

- Only work on an Electric Vehicle when the high-voltage circuit is isolated. See procedure 'Shutting down high-voltage circuit'.



**WARNING!** Avoid contact with the high-voltage components and the orange cables with their connectors until the high-voltage circuit has been shut down.



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- 1
- 2
- 3

Battery string  
Electric motor  
Charge plug



**WARNING!** Next to these components the vehicle is also equipped with a high-voltage box containing high-voltage components. The high-voltage box is located under the cabin. Exposure to high voltage can result in serious personal injury or death.

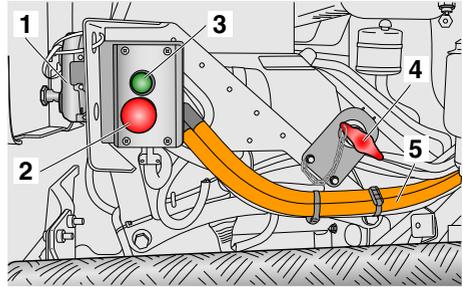
## High-voltage wiring

2

- The vehicle has orange high-voltage cables (5), which is connected to the high-voltage components.



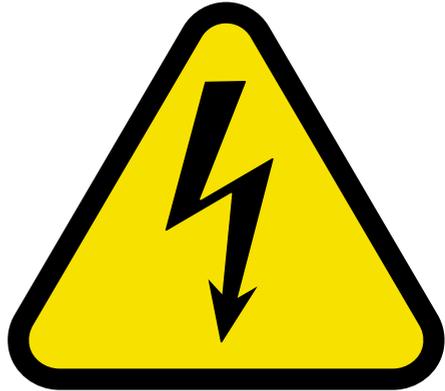
**NOTE:** Avoid contact with the orange high-voltage cables (5) and connectors. Do not touch the orange high-voltage cables (5) and connectors unless the high-voltage circuit is shut down.



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**WARNING!** Avoid contact with the high-voltage components, the orange cables with their connectors until the high-voltage circuit has been shut down.



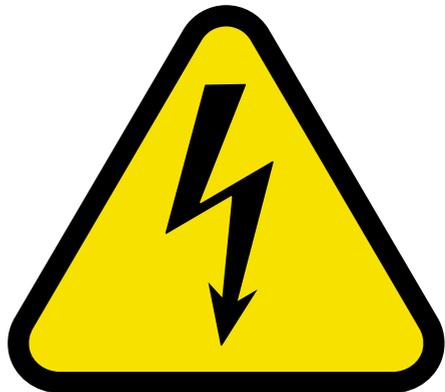
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## High-voltage battery



**WARNING!** This vehicle is also equipped with four high-voltage battery strings, containing high-voltage components. Exposure to high voltage can result in serious personal injury or death.

- Never open the high-voltage battery box.
- Never remove or touch any of the orange high-voltage cables or their



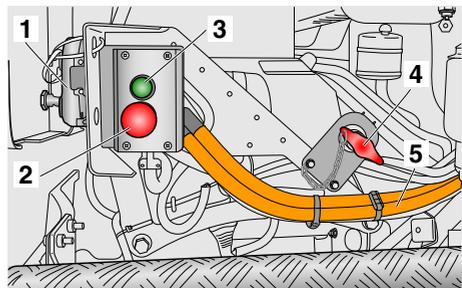
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**connectors until the high-voltage circuit has been shut down.**

If an emergency occurs (accident, fire), the high-voltage power supply of the high-voltage system must be shut OFF. **It takes up to ten minutes before the high voltage has dropped to a harmless level** after an emergency shutdown procedure has been carried out.

## 2.2 BUILT-IN SAFETY FEATURES

All high-voltage cables which are connected to the high-voltage components are covered in orange insulation.

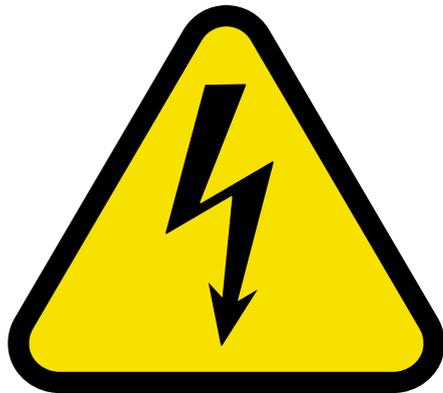


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The high-voltage components are labelled with a high-voltage warning label (sticker).

All positive and negative high-voltage cables are isolated from the metal chassis to prevent shock when touching the metal chassis.

If a malfunction is detected the high-voltage system shuts off.



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## 3.1 EMERGENCY SITUATIONS

### General warnings

3



**WARNING!** *The electric vehicle is equipped with high-voltage components and wiring. Not following these instructions can result in severe personal injury or death.*

- *Always observe the safety instructions in this manual and do not ignore them.*
- *Only work on an electric vehicle when the high-voltage circuit is shut down. See 'Emergency shutdown procedure'.*
- *Avoid touching the high-voltage components, identifiable by a warning sticker, before the high-voltage circuit is shut down.*
- *Avoid touching the orange high-voltage wiring and connectors, before the high-voltage circuit is shut down.*



**WARNING!** *The battery cells inside the high-voltage batteries contain electrolyte.*

*Electrolyte is a toxic fluid. Physical contact can lead to serious health problems.*

- *Avoid physical contact with electrolyte leaking from the batteries.*
- *If there is contact with the eyes: rinse with plenty of water for at least 15 minutes and consult a doctor.*
- *Avoid skin contact. If there is skin contact: wash the skin with water and soap.*



**WARNING!** *If not wearing protective gear (face protection, breathing apparatus), stay well clear from the smoke emitted by a damaged or burning high-voltage battery.*

*This smoke is extremely harmful when inhaled.*

### In case of an accident or breakdown

#### Do's

- Always assume the vehicle is powered up when you approach the electric vehicle.
- In case the electric vehicle is damaged, wear electric insulating gloves until it has been determined that the high voltage has been shut down.
- Always perform the 'Emergency shutdown procedure' and allow the vehicle to set for ten minutes before work on the electric vehicle.



**NOTE:** *These ten minutes are needed to avoid contact with possible residual high voltage.*

- Always be aware of a chemical reaction resulting in a fire of the high-voltage batteries when they are damaged and/or leaking. In these cases, wear face protection.



*NOTE: Damage to the high-voltage batteries (which is extremely dangerous) can be recognised from the following criteria:*

- *deformation and/or leaks of the high-voltage battery housing.*
- *the high-voltage battery becomes excessively warm;*
- *the presence of smoke, noises or sparks;*

3

### Don't

- Never work on the vehicle if you haven't performed the "Emergency shutdown procedure" and allowed the vehicle to set for ten minutes.
- If at all possible, never cut or remove the orange high-voltage cables.
- If at all possible, never cut into or open the Inverter, electric motor/generator or the battery packs or any of the other high-voltage components.

### In case of a fire

#### Do's

- Always assume the vehicle is powered up when you approach the electric vehicle.
- In case the electric vehicle is damaged, wear electric insulating gloves until it has been determined that the high voltage has been shut down.
- Always perform the 'Emergency shutdown procedure' and allow the vehicle to set for ten minutes before work on the electric vehicle.
- Always be aware of a chemical reaction resulting in a fire of the high-voltage batteries when they are damaged and/or leaking.

In these cases, wear face protection.



*NOTE: Once ignited a high-voltage battery burns with great intensity and high temperatures.*

*As a result of the materials used and the high temperature, a burning high-voltage battery is difficult to extinguish. As long as the temperature is high the high-voltage battery tends to re-ignite.*

*To extinguish a high-voltage battery fire extreme amounts of water or special fire extinguish equipment are needed. This to get down the temperature and prevent the high-voltage battery from re-igniting.*

### Don't

- Never work on the vehicle if you haven't performed the "Emergency shutdown procedure" and allowed the vehicle to set for ten minutes.
- If at all possible, never cut or remove the orange high-voltage cables.
- If at all possible, never cut into or open the Inverter, electric motor/generator or the battery packs or any of the other high-voltage components.

### In case of a submerged vehicle

Pull the vehicle out of the water. If the high-voltage installation is damaged or disconnected, there is risk of electric shock from touching the body or chassis in or out of the water.

#### Do's

- Always assume the vehicle is powered up when you approach the electric vehicle.

- In case the electric vehicle is damaged, wear electric insulating gloves until it has been determined that the high voltage has been shut down.
- Always perform the 'Emergency shutdown procedure' and allow the vehicle to set for ten minutes before work on the electric vehicle.
- Always be aware of a chemical reaction resulting in a fire of the high-voltage batteries when they are damaged and/or leaking.  
In these cases, wear face protection.

### Don't

- Never work on the vehicle if you haven't performed the "Emergency shutdown procedure" and allowed the vehicle to set for ten minutes.
- If at all possible, never cut or remove the orange high-voltage cables.
- If at all possible, never cut into or open the Inverter, electric motor/generator or the battery packs or any of the other high-voltage components.

## 3.2 HIGH-VOLTAGE SHUTDOWN PROCEDURE

### Introduction

If an emergency occurs (accident, fire), the high-voltage power supply of the high-voltage system must be shut down. **It takes up to ten minutes before the high voltage has dropped to a harmless level** after an emergency high-voltage shutdown procedure has been carried out.



**CAUTION:** *The electric vehicle is equipped with two red emergency switches. One in the cabin, next to the tachograph and one next to the high-voltage charge plug behind the cabin. Using one of these switches during normal vehicle operation can lead to damage to the high-voltage system.*

- *Only use the red emergency switches in case of an emergency or when shutting down the high-voltage circuit for repair and maintenance works.*



**WARNING!** *Never operate an emergency stop button while driving.*

- *Operating an emergency stop button while driving switches off all electrical systems including hydraulic steering pump and air compressor. This can lead to very dangerous situations with regards to steering and braking.*



**WARNING!** The electric vehicle is equipped with high-voltage components and wiring. Not following these instructions can result in severe personal injury or death.

After completing this procedure the high-voltage box, high-voltage batteries and corresponding high-voltage cables are still connected to the high voltage.

- Avoid the high-voltage components, identifiable by a warning sticker.
- Avoid the high-voltage cables, identifiable by their orange colour.
- With the exception of maintenance and emergency repairs described in this manual only a DAF certified mechanic may work on the electric vehicle.
- To avoid getting in contact with residual voltage wait for ten minutes before starting further work such as tilting the cabin.



**WARNING!** The high-voltage batteries will always carry high voltage even after completing the 'High-voltage shutdown procedure'.



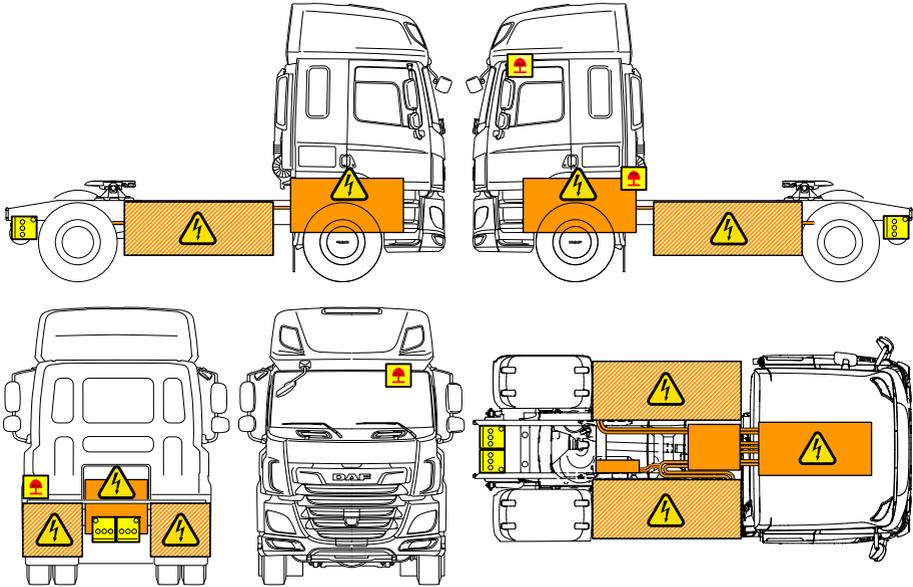
**NOTE:** The 'Shutting down high-voltage circuit' procedure is part of workshop procedures. It is also described in the 'Emergency Response Guide' used by the emergency services.



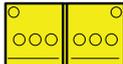
**NOTE:** For towing the vehicle see the corresponding chapter in the driver's manual or the 'Emergency response guide'.

## Overview

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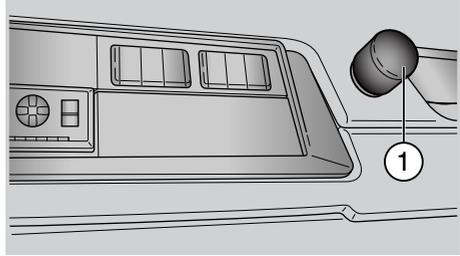


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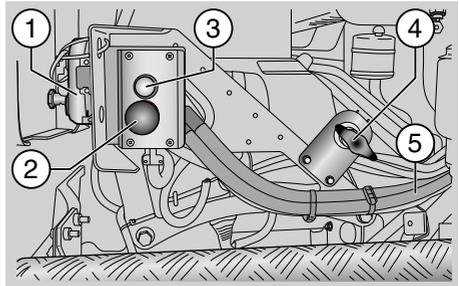
	<p>High-voltage cables (600 VDC)</p>		<p>High-voltage warning</p>
	<p>High-voltage component</p>		<p>Emergency stop button</p>
	<p>High-voltage batteries (four, 2 at the left side and 2 on the right side of the vehicle). Battery type: Lithium batteries with Lp-CO® (Gen II) technology.</p>		<p>24V-batteries</p>

## Emergency high-voltage shutdown procedure

1. Park the vehicle in a safe place.
2. Apply the park brake.
3. Turn the drive mode switch to 'N' (neutral).
4. Remove the ignition key.
5. Press the emergency switch (1) located next to the tachograph.
6. Exit the cabin.
7. Press the emergency switch (2) located next to the high-voltage charge plug behind the cabin.
8. Use the main switch (4) to turn OFF the 24 V circuit.
9. Place the necessary and / or mandatory warnings and wait on a safe distance from the vehicle.



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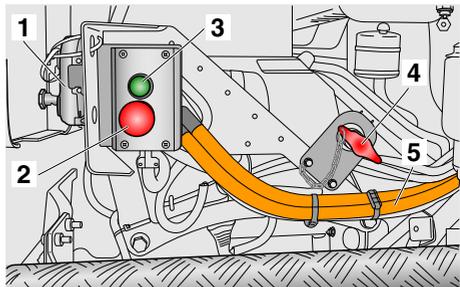
*NOTE: In case it's not possible to enter the cabin perform step 7 till 9 of the emergency high-voltage shutdown procedure.*

## 3.3 24V-BATTERIES

### Location of the 24V-batteries

The 24V-batteries are located on the rear side within the chassis.

### Disconnecting the 24V-batteries



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1. Switch the ignition OFF.
2. Switch OFF the main switch (4).



*NOTE: The manual main switch (4) can isolate the 24 Volt power supply of the batteries from the vehicle. Only turn the main switch off, after the ignition switch has been turned off.*

3. Remove the battery cover.

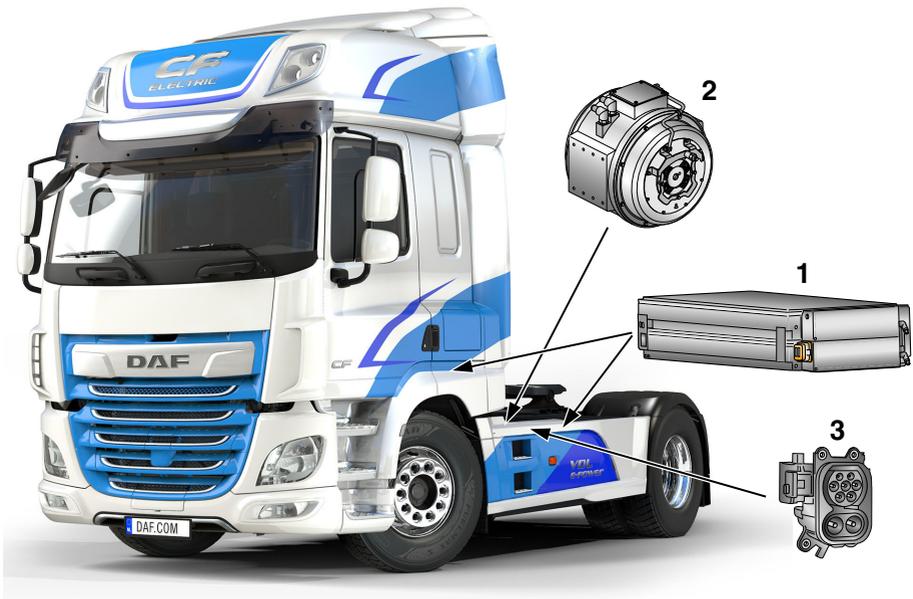


**NOTE:** The 24V-batteries are stacked on top of each other within the chassis, which makes access to the terminals difficult.

3

4. Disconnect the battery clamp from the negative terminal.
5. Disconnect the battery clamp from the positive terminal.
6. Hold the positive and negative cables together to discharge any power that may be stored in the capacitors.
7. Secure the cables; make sure that they cannot come into contact with the terminals.

## 3.4 HIGH-VOLTAGE BATTERIES



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- |   |   |
|---|---|
| 1 | Battery string (also called high-voltage or traction battery) |
| 2 | Electric motor  |
| 3 | Charge plug   |

The CF electric is equipped with two battery strings also referred to as high-voltage batteries. One fitted on each side of the chassis behind the side skirts. Each battery string contains two, in series connected, high-voltage batteries. Each of the battery string is equipped with a so called MSD (Manual Service Disconnect) disconnecting the high-voltage circuit between two high-voltage batteries. The MSD is a safety protection device (Fuse) for the high-voltage circuit. This plug must be removed during the safety lock-out procedure.

Both the upper and lower battery are filled with silicone fluid, used as a medium for temperature exchange within the batteries.

On its turn, the coolant of the vehicles heating and cooling system controls the temperature of this silicon fluid.

The high-voltage batteries can be charged externally by using a plug-in charger.



**WARNING!** *The high-voltage batteries will always carry high voltage even after completing the emergency high-voltage shut-down procedure. It takes up to ten minutes before the high voltage has dropped to a harmless level.*



**WARNING!** *This vehicle is also equipped with four high-voltage battery strings, containing high-voltage components. Exposure to high voltage can result in serious personal injury or death.*

- *Never open the high-voltage battery box.*
- *Never remove or touch any of the orange high-voltage cables unless the high-voltage circuit is shut down.*



**WARNING!** *The battery cells inside the high-voltage battery packs contain electrolyte.*

*Although the change of leakage is small, electrolyte is a toxic fluid. Physical contact can lead to serious health problems.*

- *If exposed, avoid physical contact with electrolyte.*
- *If there is contact with the eyes: rinse with plenty of water for at least 15 minutes and consult a doctor.*
- *Avoid skin contact. If there is skin contact: wash the skin with water and soap.*

## 3.5 AIRBAG



**WARNING!** *Airbag modules and safety belt tensioners are pyrotechnic systems and contain an explosive charge.*



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A sticker with the airbag symbol on the windscreen identifies vehicles equipped with an airbag and safety belt tensioner system.

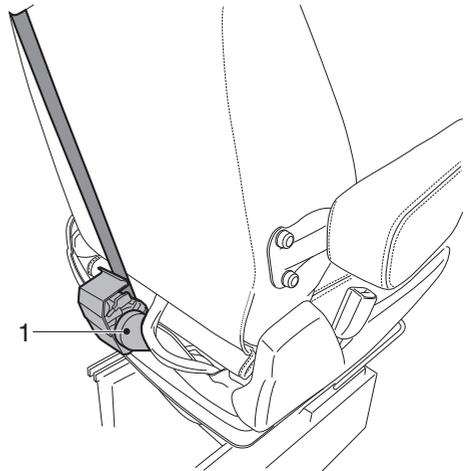
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In addition, there is an identification 'AIRBAG' visible (A) on the steering wheel. A vehicle equipped with an airbag also has an automatic safety belt tensioner.



## 1 Safety belt tensioner

The automatic safety belt tensioner is fitted on the rear side of the driver's and co-driver's seat behind the seat covers.



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## Safety instructions

- Do not place any objects near undeployed airbags.
- Before any work is carried out on an airbag system:
  1. the ignition must be switched off.
  2. the main switch must be turned off.
  3. the battery clamp must be removed from the negative pole.
  4. wait at least 30 seconds.
- Never disconnect an electrical connector in the airbag or safety belt tensioner circuits if the electronic control unit is energised.



## 4.1 SEAT ADJUSTMENT



*NOTE: Before removing the seat, be aware of the safety instructions if the vehicle is equipped with an airbag and therefore an automatic safety belt tensioner.*

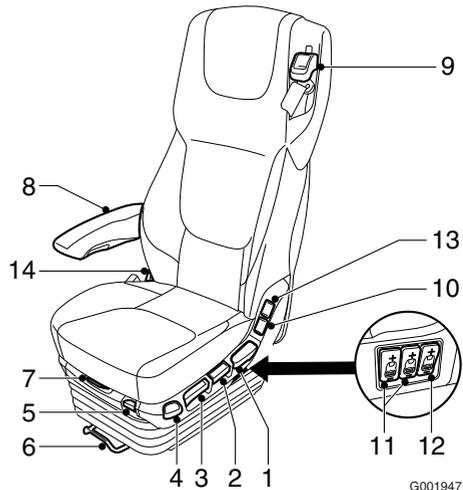
4



*NOTE: The seat can be adjusted if the vehicle air pressure is at least 7 bar.*

### Seat settings

- 1 Backrest angle adjustment.
- 2 Seat height adjustment.
- 3 Seat tilt adjustment
- 4 Quick down.
- 5 Vertical seat damper.
- 6 Seat length adjustment.
- 7 Seat cushion length adjustment.
- 8 Armrest.
- 9 Safety belt height adjustment.
- 10 Seat heater.
- 11 Lumbar support adjustment.
- 12 Lateral support adjustment.
- 13 Seat ventilation
- 14 Shoulder support adjustment.



G001947



#### 4. Quick down

Knob down (seat in driving position): the seat drops to its lowest position.

Knob up (with lowered seat): the seat rises to the last height adjustment.



#### 3. Seat tilt adjustment



#### 2. Seat height adjustment

## 4.2 AIR SUSPENSION CHASSIS

### General

On vehicles equipped with air suspension, a remote control unit is used to operate the vehicle height.

The remote control unit is located against the console of the driver's seat.



**NOTE:** This control unit can only be operated when the ignition is switched on.

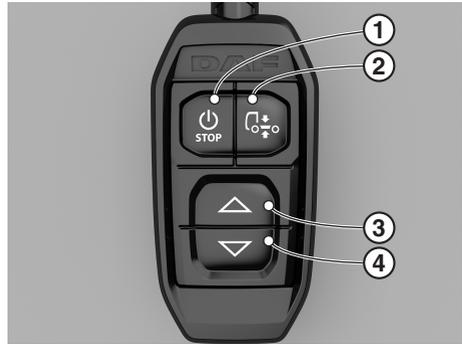
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**NOTE:** Unless stated otherwise, the keys need only be pressed once briefly.

### Basic remote control

- 1 'ON/OFF' and 'STOP' key. See section 'Stop key'.
- 2 Automatic setting of normal driving height.
- 3 Lifting of chassis while the key is pressed.
- 4 Lowering of chassis while the key is pressed.



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**NOTE:** The remote control is (de-) activated by a long press on the 'STOP' key.

After the ignition is switched off, the remote control is always deactivated. The stop function is always active regardless of the remote control being activated or not.

## 4.3 CABIN SUSPENSION

The cabin is equipped with full air suspension.

### Lowering the air suspension

The cabin is lowered by cutting the air hoses.



**WARNING!** When air hoses are cut, the hose ends can fly around and can therefore cause injuries.



**WARNING!** When the air hoses for the cabin suspension are cut, the air supply for steering wheel adjustment is also taken away.

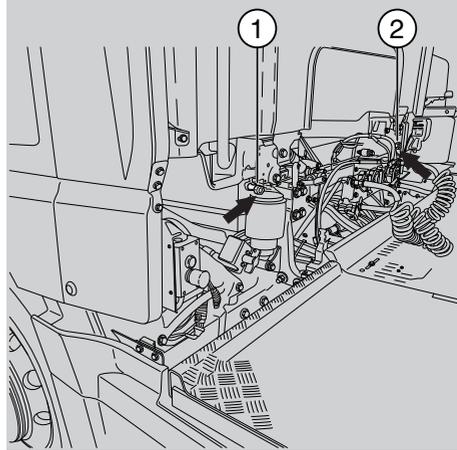


**WARNING!** When the cabin is lowered, the movement may be uncontrolled.

4

## Rear cabin air suspension

Cut the air hose to the rear cabin air suspension bellows. See the arrows at positions 1 and 2.



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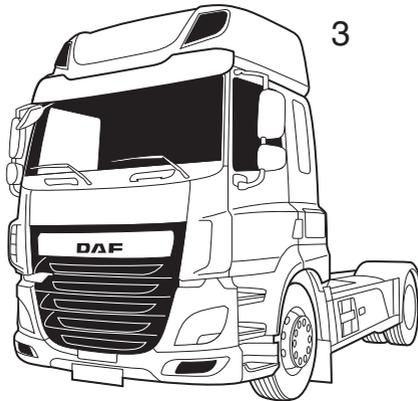
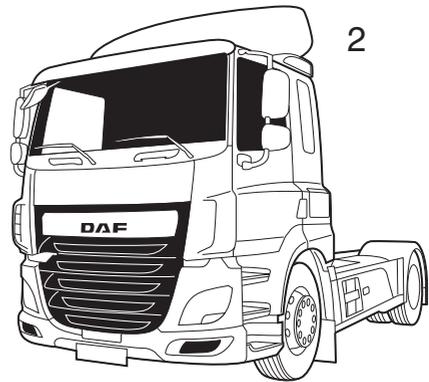
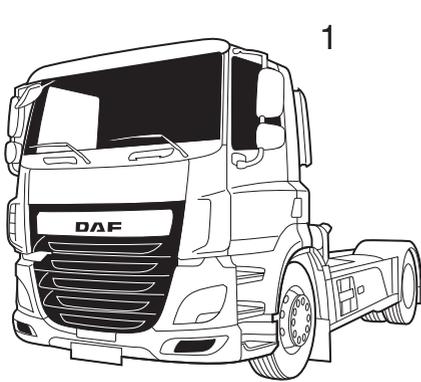
## Front cabin air suspension

Cut the air hose to the front air suspension bellows at the reservoir. The air reservoir can be found under the cabin at the co-driver side.



## 5.1 CABIN TYPES

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- 1 Day Cab
- 2 Sleeper Cab

- 3 Space Cab

## 5.2 CABIN BRACKET COLLISION ABILITY

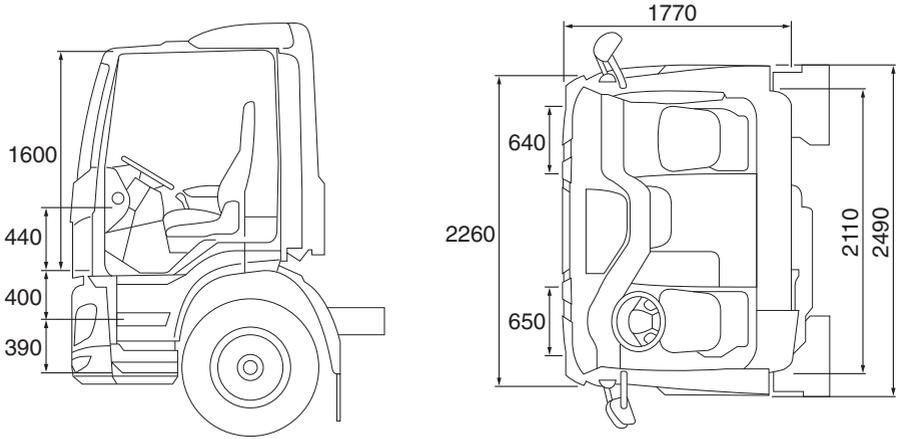
The cabin bracket has a built-in safety feature that enables the cabin to move back 400 mm in case of a collision. Depending on the severity of the collision there are two situations.

- The safety feature is used. This means that the cabin has moved compared to the chassis with a maximum distance of 400 mm. The cabin is still attached to the chassis.
- The safety feature is used fully before the collision stopped. As a result the bolt of the cabin bracket breaks. If this has happened the cabin is loose from the chassis.

### 5.3 CABIN DIMENSIONS

The external dimensions from the ground vary depending on the tyre size, choice of suspension, load and settings.

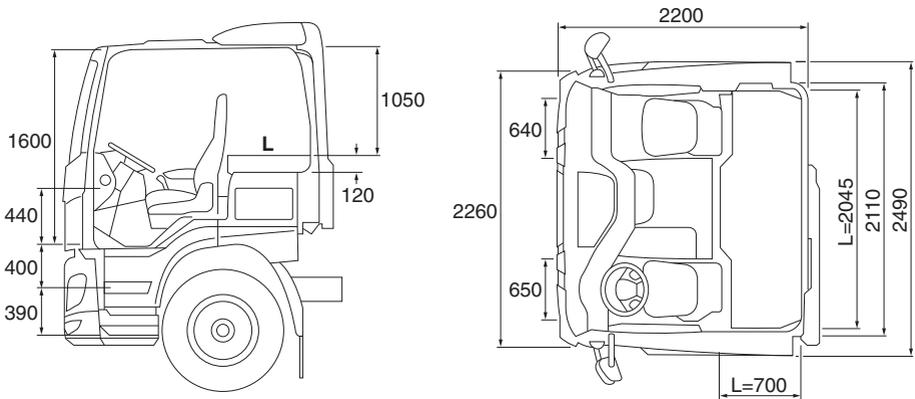
#### Day Cab



5

G002066

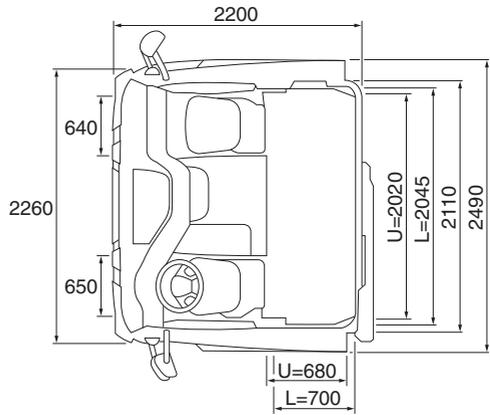
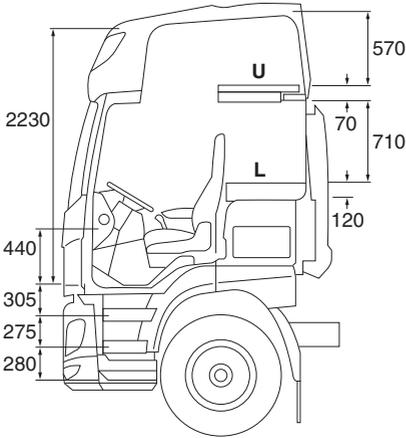
#### Sleeper Cab



G002067

## Space Cab

5



G002069

## 5.4 OPENING THE FRONT PANEL

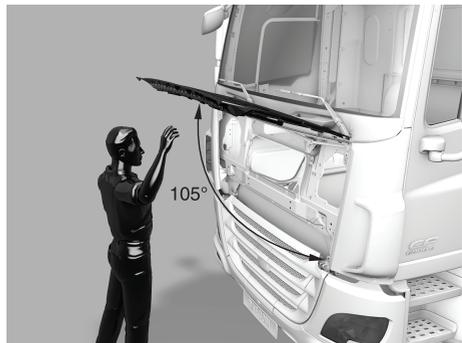
The top section of the front panel can be folded up.

Unlock the front panel by pulling the lever in the top section of the front panel.

When the front panel is open it is held in the raised position by two gas struts.



D001775



D001840-2

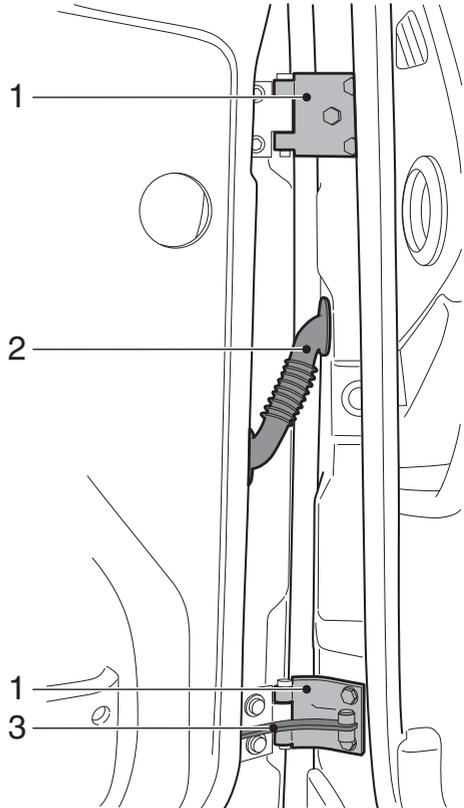


**WARNING!** Always be aware of possible moving or rotating parts. For example the cooling fans while using the steps in the front of the cabin or working with an open front panel.

- Moving or rotating parts can cause serious injury when coming into contact.

## 5.5 DOORS

- 1 Hinge
- 2 Wiring harness
- 3 Door check



G001310

## 5.6 DOOR LOCK

The door lock is installed higher than the door handle. The position is indicated in the image.



G002071

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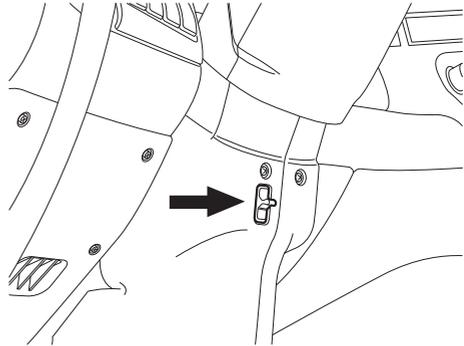
## 5.7 STEERING WHEEL ADJUSTMENT



*NOTE: The steering wheel can be adjusted if the vehicle air pressure (circuit 4) is at least 7 bar.*



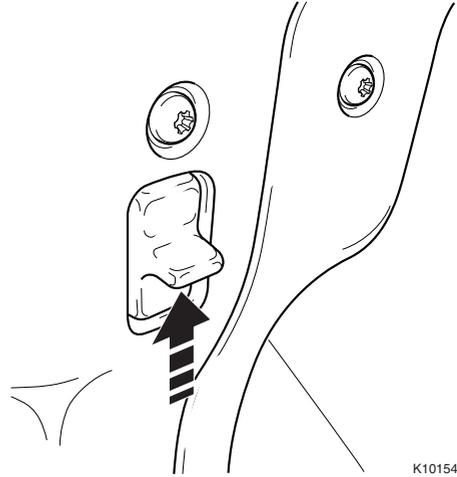
**WARNING!** *When the air hoses for the cabin suspension are cut, the air supply for steering wheel adjustment is also taken away.*



G001293

## Adjusting

Push up the two-position switch. The steering column is temporarily unlocked. The height and angle of the steering wheel can now be adjusted.



K101546

## Locking

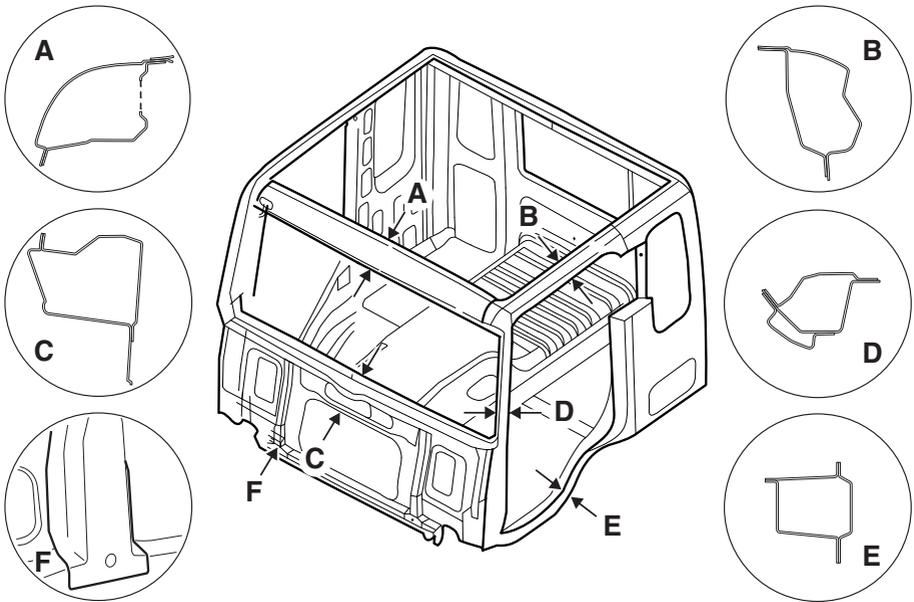
Push down the two-position switch. The steering column is locked.



*NOTE: A slight hissing noise, caused by the two-position switch, is audible while the steering wheel is being adjusted. If the steering column has not been locked, this switch locks it automatically after 20 - 30 seconds.*

## 5.8 CABIN STRUCTURE

5



G001283-2



## 6.1 REMOVING THE PROP SHAFT

- Make sure that the park brake is engaged.
- Loosen the prop shaft bolts at the rear axle side, do not remove them.



**NOTE:** *If by accident the prop shaft drops to the floor during towing it is dragged a long. In the other situation dropping of the prop shaft seriously damages both vehicle, road and possibly surroundings.*

- Hold the shaft while removing the bolts.
- Fasten the shaft to the chassis.
- Cover the prop shaft joint with a plastic bag.

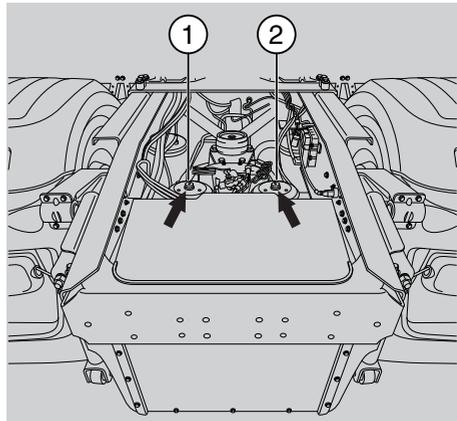
## 6 6.2 RELEASING THE PARK BRAKE



### **WARNING!**

- **Never release the park brake on an incline without precautionary measures.**

**Releasing the park brake on an incline causes the vehicle to move unintentionally. This can lead to serious injury and damage to the vehicle.**



D005291

1. Make sure the driveline is in 'N' neutral.
2. Place wheel chocks in front of and behind the wheels.



**NOTE:** *It is **not** permitted to use a socket wrench to loosen the releasing bolt.*

3. Turn the releasing bolt (see the arrows) anti-clockwise as far as the stop using a ring spanner.
4. Carry out this operation for each spring brake cylinder.



**NOTE:** *Place a no brakes warning label on the steering wheel.*

5. Bring the park brake back in operating order by turning the releasing bolts (1 and 2) clockwise as far as possible and tightening them to a torque of 45 Nm (75 Nm for the releasing bolt with control pin). The pressure in the spring brake cylinder circuit must be at least 6.5 bar.

## 6.3 TYRE INFLATING CONNECTION



**NOTE:** *The tyre inflating connection can also be used as an external inflating connection to fill the air pressure system with air from outside. When doing this, check that the system pressure is correct using the air pressure gauge.*

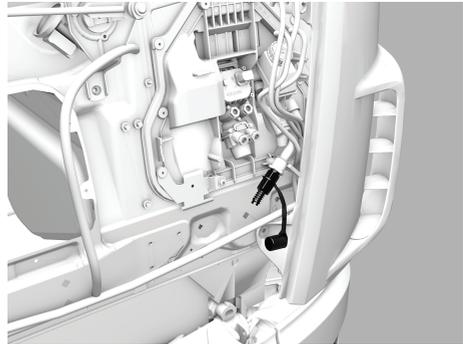
The tyre inflating connection is located:

On the left-hand side of the cabin behind the front panel.



**WARNING!** *Always be aware of possible moving or rotating parts. For example the cooling fans while using the steps in the front of the cabin or working with an open front panel.*

- *Moving or rotating parts can cause serious injury when coming into contact.*



6

Make sure that the supply pressure on the pressure gauges is not at maximum, but at about 8 to 9 bar.

While inflating the tyres, keep the pressure on this value by having the air compressor running.

See chapter 'Technical data and identification' for the correct tyre pressures.

Refit the rubber cap of the tyre inflating connection after the tyre has been inflated.

## 6.4 TOWING



**WARNING!** *Switch off AEBS while towing or while being towed. Engaging of this system during towing actions can result in unwanted and unexpected vehicle behaviour.*



**WARNING!**  
– *Do not tow the vehicle when fully loaded or with a trailer attached.*

*Towing a fully loaded vehicle or a vehicle with trailer attached can result in unstable vehicle behaviour during critical driving situations. This applies to both the towing and/or towed vehicle. This can lead to very dangerous situations. High forces and tensions in the chassis and driveline of the vehicles can also lead to damage to the vehicles.*

## Towing another vehicle

It is allowed to tow another vehicle with an Electric Vehicle.

## Towing by another vehicle

It is possible to tow the Electric Vehicle.

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

- For short distance towing (only a few hundred metres and with a maximum speed of 5 km/h): the vehicle may be towed by another vehicle.
- For long-distance towing: tow the vehicle using a recovery vehicle.

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When towing, error messages may be shown on the master display when the ignition is switched on.



*NOTE: The maximum permissible vehicle speed, weight and distance vary by country.*



### **WARNING!**

- **Towing may not take place at an angle of more than 20° relative to the vehicle centre line.**

***The towed vehicle may be located asymmetrically (left or right) behind the tractor. Towing at an angle of more than 20° relative to the vehicle centre line can result in unstable vehicle behaviour. This can lead to very dangerous situations. High forces and tensions in the chassis and driveline of the vehicles can also lead to damage to the vehicles.***



***WARNING! When the high-voltage circuit isn't in operating mode and no additional measures are taken, there is no power steering and eventually insufficient air pressure for the brake system. This results in difficult steering and ultimately leads to automatic engagement of the park brake. This can lead to very dangerous situations.***

- ***Release the park brake and adapt the driving style of the towing combination.***

- Turn the ignition key so that the steering wheel is released (unless the vehicle is in a hoist).
- If there is insufficient pressure in the air reservoirs, release the park brake. See section 'Releasing the park brake'.
- To prevent damage to the electric driveline, always **disconnect the prop shaft** from the differential.



***CAUTION: If the prop shaft remains connected during towing, the high-voltage components can be damaged seriously.***

- ***Always disconnect the prop shaft before towing the vehicle when the rear axle (drive wheels) is still in contact with the road surface.***

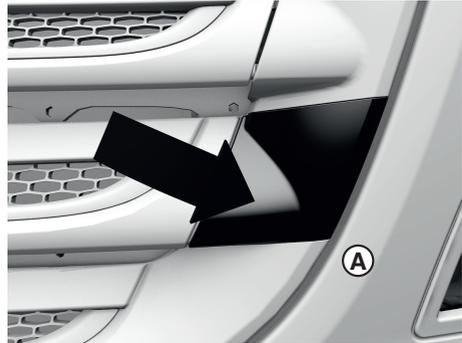


**NOTE:** If the differential is damaged:

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

### Installing the towing eye

Remove the front plate cover plate at the left-hand or right-hand side by pulling it forward (A).



D001506-3

6

1. Remove the rubber cover.
2. Screw in the towing eye fully so the entire thread is used.
3. Then turn the towing eye anti-clockwise (maximum 90 degrees) so the towing bar can be attached to the towing eye.

The maximum **GVW** the towing eye may pull is **40 tons**.



D001507-2



**NOTE:** To lift the vehicle two towing eyes must be used and both pins must be perpendicular to the lifting cable or chain. Turn the towing eyes anti-clockwise (maximum 180 degrees) to achieve this position.

### Towing by a recovery vehicle

If the vehicle is being towed by a recovery vehicle, the vehicle can only be hoisted under its rear axle. Lock the steering wheel in the straight-ahead position.



**CAUTION:** Do not hoist the vehicle under its front axle with the prop shaft still connected.

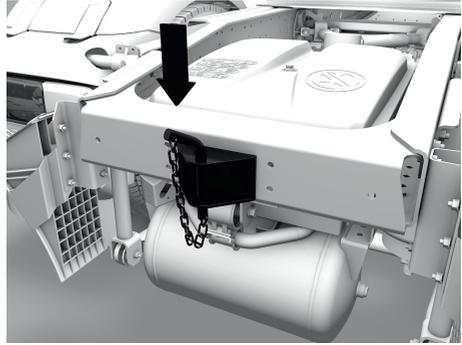
- If the vehicle is being towed by a recovery vehicle and the rear axle (driven axle) is still in contact with the road surface, the high-voltage components can be seriously damaged.

## Tow starting

It is not possible to tow start an Electric Vehicle.

## Towing hook

Tractors may be fitted with a small towing hook at the rear end of the chassis. Use this towing hook only for light shunting work (maximum 10 tons).



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## 6.5 JUMP-STARTING

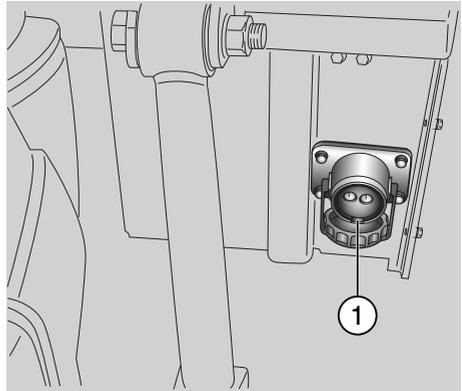
When the high-voltage battery and the 24V-batteries State of Charge is too low, jump-starting is possible to start up the high-voltage system.

Jump-starting is possible via the NATO-connector (1) located at the rear of the vehicle. The 24V-batteries are placed underneath a metal housing.



**CAUTION:** Starting the vehicle using a starting aid with too high a voltage can damage the electrical components.

- Never jump-start the vehicle with a fast charger.
- Never jump-start the vehicle with a voltage higher than 29 V.



## Jump-starting

The vehicle may be started with the aid of starter cables that use voltage from separate auxiliary batteries (approximately 24 V) or from another vehicle with a running engine (approximately 28 V). **When this starting procedure is followed, the starter cables of the vehicle must not be disconnected.**

1. Connect the NATO-connector.
2. Start the vehicle.

When the 24 V batteries were fully discharged, it is important that the NATO-connector is not disconnected immediately. The vehicle must remain in operating mode for at least 2 to 3 minutes before the NATO-connector is disconnected to prevent damage to the electrical system (peak voltage!).

Proceed as follows as soon as the vehicle is in operating mode:

1. Switch on as many power consumers as possible (for example: headlights, fog lamps, heater fan, and so forth).
2. Remove the NATO-connector.
3. Switch OFF the power consumers.

6



## 7.1 LIFTING AT THE FRONT

The front of the truck can be lifted with two towing eyes. To lift the front of the truck:

1. Install two towing eyes with the axle in horizontal position.
2. Attach the lifting equipment to the towing eyes.
3. Carefully lift the truck.



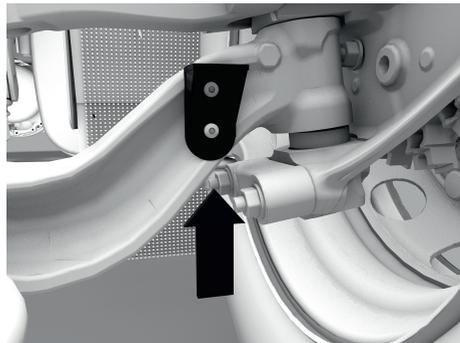
**CAUTION:** *The maximum lifting weight for the towing eyes is 3000 kg per towing eye.*



**NOTE:** *The two towing eyes can also be used to fix the front of the truck to a platform.*

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## 7.2 JACKING UP THE AIR SPRUNG FRONT AXLE



D001505-2



**WARNING!** *Use the indicated jacking points of the vehicle and support the vehicle when jacking up. Otherwise the vehicle can fall off the jack, resulting in the vehicle getting jammed or damaged. This can lead to dangerous situations and serious injury.*

- *Before jacking always secure the vehicle to prevent it from rolling away by applying the park brake and/or using wheel chocks. Never release the park brake while the vehicle is jacked up.*
- *Always position the jack on a firm and level surface. If the surface is not firm, place the jack on a support plate.*
- *When jacking up an air sprung front axle, position the jack only under the special fixing bracket.*



**NOTE:** *Make sure that the top plate falls in to the chamber in the special fixing bracket.*

- *If, as a result of a flat tyre, there is insufficient height to place the jack, roll the wheel on to a solid increase.*
- *Always use stands to support the chassis when working under a vehicle resting on a jack or lifting device.*
- *Do not perform any work underneath a vehicle when the vehicle rests on a jack or lifting device.*



**CAUTION:** *Do not jack up under the protection bar at the front of the vehicle. This is a protection bar made of sheet metal. If you jack up the vehicle under the protection bar it collapses.*

## 7.3 LIFTING AT THE BACK

There are no special facilities to lift the truck at the back.

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## 7.4 JACKING UP THE REAR AXLE



**WARNING!** *Not using the indicated jacking points of the vehicle and supporting the vehicle when jacking up can lead to the vehicle falling off the jack, resulting in getting jammed or damage to the vehicle. This can lead to dangerous situations and serious injury.*

- *Always place the vehicle on a firm and level surface.*
- *Before jacking always secure the vehicle to prevent it from rolling away by applying the parking brake and/or using wheel chocks. Never release the parking brake while the vehicle is jacked up.*
- *Always position the jack on a firm and level surface. If the surface is not firm place the jack on a support plate.*
- *Position the jack only under the spring attachment when the rear axle must be jacked up.*
- *To prevent deformation of the axle housing, the jack must under no circumstances be located directly under the axle housing or the differential casing.*
- *Always use stands to support the chassis when carrying out repairs or service under a vehicle which rests on a jack.*
- *Do not carry out any work underneath a vehicle that is only supported by a jack or lifting gear.*

7



**J**

Jacking

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Towing

Towing hook .....	44
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