



## Original instructions

## Electric forklift trucks

RX20 14–20



6219 6220 6221 6222 6223  
6224 6225 6226 6227 6228  
6229 6230 6231

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first in intralogistics



## Address of manufacturer and contact details ▷

STILL GmbH  
Berzeliusstraße 10  
22113 Hamburg, Germany  
Tel. +49 (0) 40 7339-0  
Fax: +49 (0) 40 7339-1622  
Email: [info@still.de](mailto:info@still.de)  
Website: <http://www.still.de>



## Rules for the operating company of industrial trucks

In addition to these operating instructions, a code of practice containing additional information for the operating companies of industrial trucks is also available.

This guide provides information for handling industrial trucks:

- Information on how to select suitable industrial trucks for a particular area of application
- Prerequisites for the safe operation of industrial trucks
- Information on the use of industrial trucks
- Information on transport, initial commissioning and storage of industrial trucks

## Internet address and QR code ▷

The information can be accessed at any time by pasting the address <https://m.still.de/vdma> in a web browser or by scanning the QR code.





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1

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## Foreword

## Your truck

# Your truck

## Description of the truck

### General

The STILL RX20 14-20 is an electrically driven counterbalanced truck with a steering turntable or rear swing axle and has a load capacity of up to 2 tonnes with a load centre of gravity of 500 mm. In this case, the truck can reach speeds of up to 20 km/h without a load.

It is suitable for interior use and for outdoor use.

The driver's compartment has an ergonomic design with the steering column and driver's seat offset to one side.

The third-generation display-operating unit manages all functions that are not called up by the operating devices for drive and hydraulic functions. All messages and driving condition information are issued via a large colour display. The display-operating unit uses the current battery charge state and the selected drive program to calculate the remaining available time until the battery has to be recharged and displays this information. It also supports all FleetManager 4.x functions.

### Brake system

The brake system of the truck is comprised of three different brakes:

- Service brake
- Regenerative brake
- Mechanically actuated parking brake
- Electrically actuated parking brake (variant)

The service brake is based on a wear-free, oil-immersed multi-disc brake. This multi-disc brake is used as the service brake for heavy braking or emergency braking with the brake pedal. In the normal working mode, the regenerative brake of the electric traction motor takes effect. The regenerative brake converts the acceleration energy of the truck into electrical energy. This causes the truck to decelerate as soon as the accelerator pedal is released. Completely removing your foot from the accelerator pedal causes the truck to

brake until it comes to a standstill. A parking brake ensures that the truck remains securely in place when parked.

## Hydraulic system

The steering system and the lift and tilt cylinders in the lift mast are supplied with power by a hydraulic pump operated by an electric motor.

The proportional valve technology provides particularly sensitive movements and safe handling of the load. The hydraulic functions can be parameterised individually by the authorised service centre.

Up to three hydraulic circuits can be used to activate attachments (variant). Depending on the equipment, a hydraulic accumulator is also available in the lifting circuit for the purpose of dampening pressure peaks in the hydraulic system.

## Drive

Both front wheels of the STILL RX20 14-20 are driven by a maintenance-free three-phase drive in the front axle with 48-volt technology.

Lead-acid batteries and lithium-ion batteries that can be replaced from the side are available as a power supply source. In both cases, the trucks can be supplied as a cold store variant.

The driver can help to determine the energy consumption and performance of the truck using the "Blue-Q" efficiency mode, which allows the required setting for each current application to be called up via the display-operating unit.

## Steering

The kickback-free, hydraulic rear-wheel steering with "Curve Speed Control" (CSC) ensures driving stability when cornering, allowing the truck to achieve a small turning circle and negotiate narrow aisle widths.

## Your truck

### Operation

A multi-lever, mini-lever and the Joystick 4Plus are available as operating devices for the hydraulic functions. These operating devices enable precise operation and smooth control of the lifting speed thanks to directly-controlled valves and proportional valve technology.

The acceleration behaviour and braking behaviour can be selected individually using different drive programmes.

For drive mode, the truck features either single-pedal or dual-pedal operation. Acceleration and braking (electric brake) via the accelerator pedal or dual-pedal operation. One pedal for the "forwards" drive direction and one pedal for the "reverse" drive direction. Acceleration and braking behaviour can be individually selected from three different drive programmes.

The display-operating unit makes daily use of the truck easier with personally configurable favourites. The display-operating unit also monitors the truck functions, including each individual cell in the lithium-ion battery.

### General

The truck described in these operating instructions corresponds to the applicable standards and safety regulations.

If the truck is to be operated on public roads, it must conform to the existing national regulations for the country in which it is being used. The driving permit must be obtained from the appropriate office.

The truck has been fitted with state-of-the-art technology. Following these operating instructions will allow the truck to be handled safely. By complying with the specifications in these operating instructions, the functionality and the approved features of the truck will be retained.

Get to know the technology, understand it and use it safely - these operating instructions provide the necessary information and help to



avoid accidents and to keep the truck ready for operation beyond the warranty period.

Therefore:

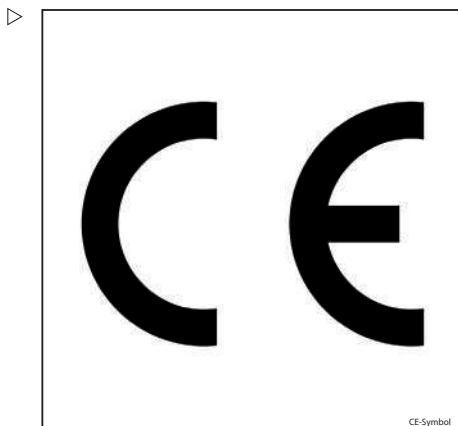
- Before commissioning the truck, read the operating instructions and follow the instructions.
- Always follow all of the safety information contained in the operating instructions and on the truck.

## CE labelling

The manufacturer uses CE labelling to indicate that the truck complies with the standards and regulations valid at the time of marketing. This is confirmed by the issued EC declaration of conformity. The CE labelling is attached to the nameplate.

An independent structural change or addition to the truck can compromise safety, thus invalidating the EC declaration of conformity.

The EC declaration of conformity must be carefully stored and made available to the responsible authorities.



**EC declaration of conformity in accordance with Machinery Directive****Declaration**

STILL GmbH  
Berzeliusstraße 10  
D-22113 Hamburg Germany

We declare that the

Industrial truck	<b>according to these operating instructions</b>
Model	<b>according to these operating instructions</b>

conforms to the latest version of the Machinery Directive 2006/42/EC.

Personnel authorised to compile the technical documents:

See EC compliance declaration

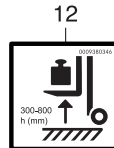
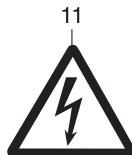
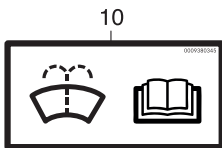
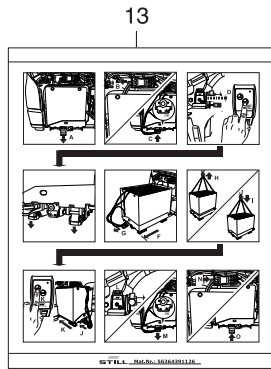
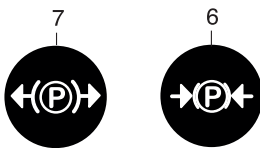
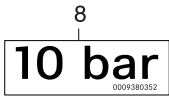
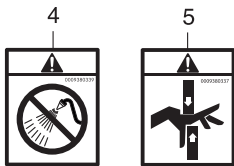
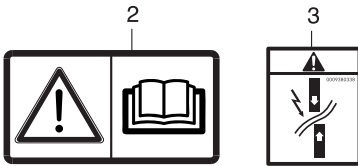
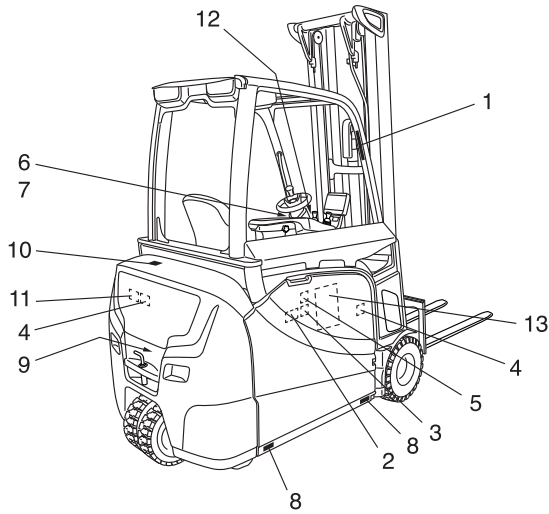
STILL GmbH

## Accessories

- Key for key switch (two pieces; not for trucks with the "switch on via push button" variant)
- Key for cab (variant)
- Hexagon socket wrench for emergency lowering (in the compartment)
- Battery change frame (not for trucks with the hydraulic battery carrier variant)

Your truck

Labelling points



6219\_003-010

- |   |   |    |  |
|---|---|----|--|
| 1 | Decal information: Caution / Read the operating instructions / Fasten seat belt / Apply parking brake when leaving the truck / Passengers are not allowed / Do not jump off if the truck is tipping over / Lean in the opposite direction to which the truck is tipping | 4  | Warning sign: Cleaning electrical system parts with water is forbidden |
| 2 | Decal information: Caution/Read the operating instructions  | 5  | Warning sign: Danger due to shearing                                   |
| 3 | Warning sign: Risk of short circuit due to shearing   | 6  | Decal information: Parking brake applied                               |
|   |   | 7  | Decal information: Parking brake released                              |
|   |   | 8  | Decal information: Tyre filling pressure                               |
|   |   | 9  | Decal information: Lifting gear attachment point                       |
|   |   | 10 | Decal information: Washer system filling                               |
|   |   | 11 | Warning sign: Dangerous electrical voltage                             |
|   |   | 12 | Decal information: Load measurement                                    |
|   |   | 13 | Decal information: Battery carrier                                     |

Your truck

14 15

16 17

18 19 27

20

21

22

23

24

25

26

27

28

10 bar

SIVZO-Angaben

Leergewicht-SIVZO

Zul. Gesamtgewicht

Zul. Achslasten

Nutzlast

STILL

STILL GmbH  
Bergakademie 10  
D-22113 Hamburg

Type-Modell-Typ / Serial no.-No. de série-Serien-Nr. / year-nomme-Baujahr

Rated capacity  
Capacité nominale  
Nenn-Tragfähigkeit

Uplifted mass  
Masse à vide  
Leergewicht

Battery voltage  
Tension batterie  
Batteriespannung

Rated drive power  
Puissance mot./nom.  
Nenn-Antriebsleist.

see Operating instructions  
voir Mode d'emploi  
siehe Betriebsanleitung

CE

Regelmäßige Prüfung

STILL

Regelmäßige Prüfung  
(FEM 4.004)

Nach nationalen Vorschriften  
basierend auf den  
EG-Richtlinien 2006/104/EG,  
90/269

Die Prüfetikette ersetzt  
nicht das Prüfprotokoll.

Mitglied der  
Fédération  
Européenne de  
la Manutention

Batterieservice

STILL

Ihr STILL Service  
STILL Hamburg  
Bergakademie 10  
22113 Hamburg  
Tel.: 01804784 55 24

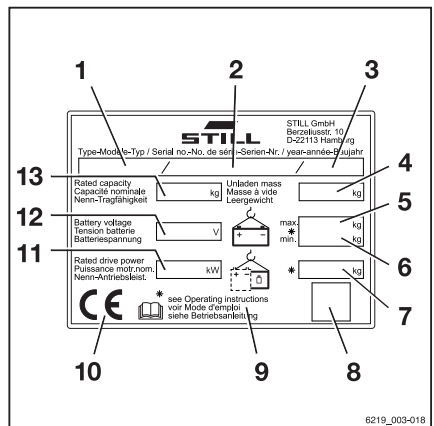
6219\_003-011

- |    |   |    |  |
|----|---|----|--|
| 14 | Decal information: Hydraulic oil tank                                     | 21 | Decal information: StVZO (German Road Traffic Licensing Regulations) information |
| 15 | Decal information: Speed reduction  | 22 | Nameplate  |
| 16 | Warning sign: Do not stand underneath the fork / Do not stand on the fork | 23 | Decal information: Load capacity: Attachment                                     |
| 17 | Warning sign: Danger due to shearing / Danger due to high fluid pressure  | 24 | Decal information: Load capacity: Basic table                                    |
| 18 | Decal information: Cold store application (variant)                       | 25 | Decal information: Regular testing   |
| 19 | Decal information: Check head clearance                                   | 26 | Decal information: Battery service   |
| 20 | Decal information: Tyre filling pressure                                  | 27 | Decal information: Caution/Read the operating instructions                       |

## Nameplate

The truck can be identified from the information on the nameplate.

- 1 Type
- 2 Production number
- 3 Year of manufacture
- 4 Tare weight in kilograms
- 5 Maximum permitted battery weight in kilograms (only for electric trucks)
- 6 Minimum permitted battery weight in kilograms (only for electric trucks)
- 7 Ballast weight in kilograms (only for electric trucks)
- 8 Data matrix code
- 9 For more detailed information, refer to the technical data in the operating instructions
- 10 CE labelling
- 11 Nominal drive power in kilowatts
- 12 Battery voltage V
- 13 Rated capacity in kilograms



6219\_003-018

## Using the truck

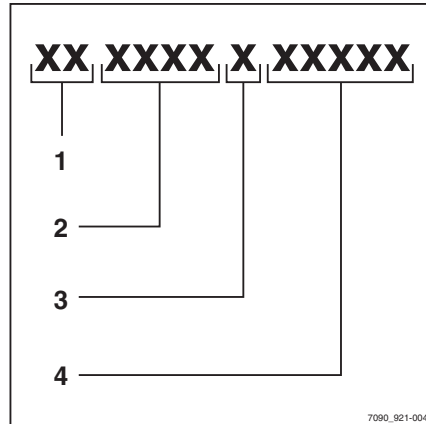
### Production number



The production number is used to identify the truck. It can be found on the nameplate and must be referred to in all technical questions.

The production number contains the following coded information:

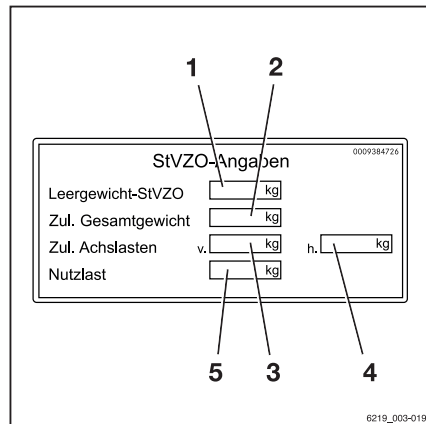
- (1) Production location
- (2) Model
- (3) Year of manufacture
- (4) Sequential number



### StVZO (Road Traffic Licensing Regulations) information

This label includes information on the weight and load distribution of the truck in kg.

- 1 Tare weight
- 2 Total permissible weight
- 3 Permitted front axle load
- 4 Permitted rear axle load
- 5 Payload



## Using the truck

### Commissioning

Commissioning is the initial intended use of the truck.

The necessary steps for the commissioning vary depending on the model and equipment of the truck. These steps require preparatory work and adjustment work that cannot be performed by the operating company. See also



the chapter entitled "Definition of responsible persons".

- To commission the truck, contact the authorised service centre.

## Proper usage

The truck described in these operating instructions is suitable for lifting, transporting and stacking loads.

The truck may only be used for its proper purpose as set out and described in these operating instructions.

If the truck is to be used for purposes other than those specified in the operating instructions, the approval of the manufacturer and, if applicable, the relevant regulatory authorities must be obtained beforehand to prevent hazards.

The maximum load to be lifted is specified on the capacity rating plate (load diagram) and must not be exceeded; see also the chapter entitled "Before picking up a load".

## Proper use during towing

This truck is suitable for the occasional towing of trailers and is equipped with a towing device for this purpose. This occasional towing may not exceed 2% of the daily operating time. If the truck is to be used for towing on a more regular basis, the manufacturer should be consulted.

The regulations regarding trailer operation must be observed; see chapter "Trailer operation".

## Impermissible use

The operating company or driver, and not the manufacturer, is liable for any hazards caused by improper use.

## Using the truck

### NOTE

*Please observe the definition of the following responsible persons: "operating company" and "driver".*

Use for purposes other than those described in these operating instructions is prohibited.



### DANGER

**There is a risk of fatal injury from falling off the truck while it is moving!**

- It is prohibited to carry passengers on the truck.

The truck may not be operated in areas where there is a risk of fire, explosion or corrosion, or in areas that are particularly dusty.

Stacking or unstacking is not permissible on inclined surfaces or ramps.

## Place of use

The truck can be used both outside and in buildings. Operation on public roads is only permitted if the "StVZO" (German Road Traffic Licensing Regulations) equipment variant is installed.

If the truck is to be operated on public roads, the truck must conform to the national regulations for the country in which it is being used.

The ground must have an adequate load capacity (concrete, asphalt) and a rough surface. Roadways, working areas and aisle widths must conform to the specifications in these operating instructions; see the chapter entitled "Roadways".

Driving on upward and downward gradients is permitted provided the specified data and specifications are observed, see the "Routes" chapter.

The truck is suitable for indoor and outdoor use in countries ranging from the Tropics to Nordic regions (temperature range: -20°C to +40°C).

If the truck is to be used in a cold store, it must be configured accordingly and, if necessary,

approved for such an environment; see the chapter entitled "Cold store application".

#### CAUTION

Batteries can freeze!

If the truck is parked in an ambient temperature of below  $-10^{\circ}\text{C}$  for an extended period, the batteries will cool down. The electrolyte may freeze and damage the batteries. The truck is then not ready for operation.

- At ambient temperatures of below  $-10^{\circ}\text{C}$ , only park the truck for short periods of time.

The operating company must ensure suitable fire protection for the relevant application in the truck's surroundings. Depending on the application, additional fire protection must be provided on the truck. If in doubt, contact the relevant authorities.

#### NOTE

*Please observe the definition of the following responsible person: "operating company".*

## Parking in temperatures below $-10^{\circ}\text{C}$

#### CAUTION

Batteries can freeze!

If the truck is parked in an ambient temperature below  $-10^{\circ}\text{C}$  for an extended period, the batteries will cool down. The electrolyte may freeze and damage the batteries. The truck is then not ready for operation.

- When the ambient temperature is below  $-10^{\circ}\text{C}$ , only park the truck for short periods of time.

## Using the truck

### Using working platforms

#### **WARNING**

The use of working platforms is regulated by national law. The use of working platforms is only permitted by virtue of the jurisdiction in the country of use.

- Observe national legislation.
  - Before using working platforms, consult the national regulatory authorities.
-

## Information about the documentation

### Scope of the documentation

- Original operating instructions of the truck
- Original operating instructions of the display-operating unit
- Operating instructions of the installed variants that are not mentioned in the aforementioned original operating instructions
- "UPA" operating instructions or insert (depending on the truck equipment)
- DVD with the spare parts list of the truck

These operating instructions describe all measures necessary for the safe operation and proper maintenance of the truck in all possible variants available at the time of printing. Special versions to meet customer requirements (UPA) are documented in separate operating instructions. If you have any questions, contact your authorised service centre.

Enter the production number and year of manufacture from the nameplate in the space provided:

<b>Production number</b>	
<b>Year of manufacture</b>	

Please quote the production number in all technical enquiries.

Each truck comes with a set of operating instructions. These instructions must be stored carefully and must be available to the driver and operating company at all times. The storage location is specified in the section entitled "Overview of the driver's compartment".

If the operating instructions are lost, the operating company must obtain a replacement from the manufacturer immediately.

The operating instructions are included in the spare parts list and can be reordered as a spare part.

The personnel responsible for operating and maintaining the equipment must be familiar with these operating instructions.

## Information about the documentation

The operating company must ensure that all users have received, read and understood these operating instructions.

Safely store the complete documentation and pass on to the subsequent operating company when transferring or selling the truck.



### NOTE

*Please note the definition of the following responsible persons: "operating company" and "driver".*

Thank you for reading and complying with these operating instructions. If you have any questions or suggestions for improvements, or if you have found any errors, please contact the authorised service centre.

## Supplementary documentation

This industrial truck can be fitted with unplanned equipment ( ) that deviates from the standard equipment and/or the variants. UPA

The UPA may be, for example:

- Special sensors
- Special attachments
- Towing devices
- Customised attachments

In this case, the industrial truck has additional documentation. This may be in the form of an insert or separate operating instructions.

The original operating instructions for this industrial truck are valid for the operation of standard equipment and variants without restriction. The operational and safety information in the original operating instructions continues to be valid in its entirety unless it is countermanded in this additional documentation.

The requirements for the qualification of personnel as well as the time for maintenance may vary. This is defined in the additional documentation.

- If you have any questions, please contact your authorised service centre.

## Issue date and topicality of the operating instructions

The issue date of these operating instructions can be found on the title page.

STILL is constantly engaged in the further development of trucks. These operating instructions are subject to change, and any claims based on the information and/or illustrations contained in them cannot be asserted.

Please contact your authorised service centre for technical support relating to your truck.

## Copyright and trademark rights

These instructions must not be reproduced, translated or made accessible to third parties—including as excerpts—except with the express written approval of the manufacturer.

## Explanation of information symbols used

### DANGER

Indicates procedures that must be strictly adhered to in order to prevent the risk of fatalities.

---

### WARNING

Indicates procedures that must be strictly adhered to in order to prevent the risk of injuries.

---

### CAUTION

Indicates procedures that must be strictly adhered to in order to prevent material damage and/or destruction.

---

### NOTE

*For technical requirements that require special attention.*

## Information about the documentation

 ENVIRONMENT NOTE

To prevent environmental damage.

## List of abbreviations

 NOTE

This list of abbreviations applies to all types of operating instructions. Not all of the abbreviations that are listed here will necessarily appear in these operating instructions.

Abbreviation	Meaning	Explanation
ABE	Display operating unit	
ArbSchG	Arbeitsschutzgesetz	German implementation of EU occupational health and safety directives
BetrSichV	Betriebssicherheitsverordnung	German implementation of the EU working equipment directive
BG	Berufsgenossenschaft	German insurance company for the company and employees
BGG	Berufsgenossenschaftlicher Grundsatz	German principles and test specifications for occupational health and safety
BGR	Berufsgenossenschaftliche Regel	German rules and recommendations for occupational health and safety
DGUV	Berufsgenossenschaftliche Vorschrift	German accident prevention regulations
CE	Communauté Européenne	Confirms conformity with product-specific European directives (CE mark)
CEE	Commission on the Rules for the Approval of the Electrical Equipment	International commission on the rules for the approval of electrical equipment
DC	Direct Current	Direct current
DFÜ	Datenfernübertragung	Remote data transmission
DIN	Deutsches Institut für Normung	German standardisation organisation
EG	European Community	
EN	European standard	
FEM	Fédération Européenne de la Manutention	European Federation of Materials Handling and Storage Equipment
F <sub>max</sub>	maximum Force	Maximum power
GAA	Gewerbeaufsichtsamt	German authority for monitoring/issuing regulations for worker protection, environmental protection, and consumer protection

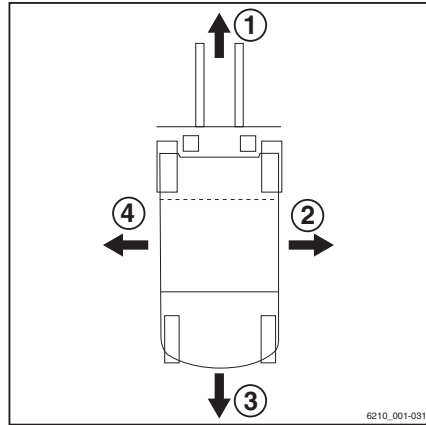


Abbreviation	Meaning	Explanation
GPRS	General Packet Radio Service	Transfer of data packets in wireless networks
ID no.	ID number	
ISO	International Organization for Standardization	International standardisation organisation
LAN	Local Area Network	Local area network
K <sub>pA</sub>	Uncertainty of measurement of sound pressure levels	
LED	Light Emitting Diode	Light emitting diode
L <sub>p</sub>	Sound pressure level at the workplace	
L <sub>pAZ</sub>	Average continuous sound pressure level in the driver's compartment	
LSP	Load centre of gravity	Distance of the centre of gravity of the load from the front face of the fork backs
MAK	Maximum workplace concentration	Maximum permissible air concentrations of a substance at the workplace
Max.	Maximum	Highest value of an amount
Min.	Minimum	Lowest value of an amount
PIN	Personal Identification Number	Personal identification number
PPE	Personal protective equipment	
SE	Super-Elastic	Superelastic tyres (solid rubber tyres)
SIT	Snap-In Tyre	Tyres for simplified assembly, without loose rim parts
StVZO	Straßenverkehrs-Zulassungs-Ordnung	German regulations for approval of vehicles on public roads
TRGS	Technische Regel für Gefahrstoffe	Ordinance on hazardous materials applicable in the Federal Republic of Germany
VDE	Verband der Elektrotechnik Elektronik Informationstechnik	German technical/scientific association
VDI	Verein Deutscher Ingenieure	German technical/scientific association
VDMA	Verband Deutscher Maschinen- und Anlagenbau e.V.	German Mechanical Engineering Industry Association
WLAN	Wireless LAN	Wireless local area network

## Information about the documentation

### Definition of directions

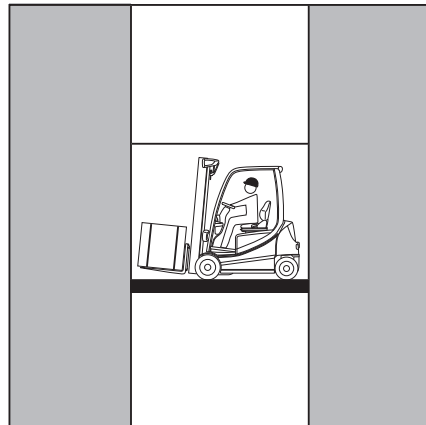
The directions "forwards" (1), "backwards" (3), "right" (2) and "left" (4) refer to the installation position of the parts as seen from the driver's compartment; the load is to the front.



### Schematic views

#### View of functions and operating procedures

At many points in this documentation, the (mostly sequential) operation of certain functions or operating procedures is explained. Schematic diagrams of a counterbalance truck are used to illustrate these procedures.



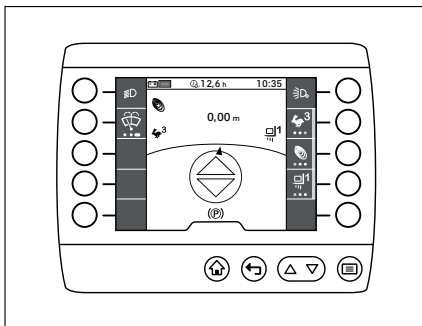
#### NOTE

*These schematic views are not representative of the structural state of the documented truck. The views are used solely for the purpose of clarifying procedures.*

## View of the display-operating unit

### NOTE

*Views of operating statuses and values in the display of the display and operating unit are examples and partly dependent on the truck equipment. As a result, the displays shown of the actual operating statuses and values may vary.*



## Environmental considerations

# Environmental considerations

## Packaging

During delivery of the truck, certain parts are packaged to provide protection during transport. This packaging must be removed completely prior to initial start-up.



### ENVIRONMENT NOTE

*The packaging material must be disposed of properly after delivery of the truck.*

## Disposal of components and batteries

The truck is composed of different materials. If components or batteries need to be replaced and disposed of, they must be:

- disposed of,
- treated or
- recycled in accordance with regional and national regulations.



### NOTE

*The documentation provided by the battery manufacturer must be observed when disposing of batteries.*



### ENVIRONMENT NOTE

*We recommend working with a waste management company for disposal purposes.*

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**Safety**

## Definition of responsible persons

# Definition of responsible persons

## Operating company

The operating company is the natural or legal person or group who operates the truck or on whose authority the truck is used.

The operating company must ensure that the truck is only used for its proper purpose and in compliance with the safety regulations set out in these operating instructions.

The operating company must ensure that all users read and understand the safety information.

The operating company is responsible for the scheduling and correct performance of regular safety checks.

We recommend that the national performance specifications are adhered to.

## Specialist

A qualified person is defined as a service engineer or a person who fulfils the following requirements:

- A completed vocational qualification that demonstrably proves their professional expertise. This proof should consist of a vocational qualification or a similar document.
- Professional experience indicating that the qualified person has gained practical experience of industrial trucks over a proven period during their career. During this time, this person has become familiar with a wide range of symptoms that require checks to be carried out, such as based on the results of a hazard assessment or a daily inspection.
- Recent professional involvement in the field of the industrial truck test in question and an appropriate further qualification are essential. The qualified person must have experience of carrying out the test in question or of carrying out similar tests. Moreover, this person must be aware of the latest technological developments.

regarding the industrial truck to be tested and the risk being assessed

## Drivers

This truck may only be driven by suitable persons who are at least 18 years of age, have been trained in driving, have demonstrated their skills in driving and handling loads to the operating company or an authorised representative, and have been specifically instructed to drive the truck. Specific knowledge of the truck to be operated is also required.

The training requirements under §3 of the Health and Safety at Work Act and §9 of the plant safety regulations are deemed to have been satisfied if the driver has been trained in accordance with BGG (General Employers' Liability Insurance Association Act) 925. Observe the national regulations for your country.

### Driver rights, duties and rules of behaviour

The driver must be trained in his rights and duties.

The driver must be granted the required rights.

The driver must wear protective equipment (protection suit, safety footwear, safety helmet, industrial goggles and gloves) that is appropriate for the conditions, the job and the load to be lifted. Solid footwear should be worn to ensure safe driving and braking.

The driver must be familiar with the operating instructions and have access to them at all times.

The driver must:

- have read and understood the operating manual
- have familiarised himself with safe operation of the truck
- be physically and mentally able to drive the truck safely

## Definition of responsible persons

### DANGER

**The use of drugs, alcohol or medications that affect reactions impair the ability to drive the truck!**

Individuals under the influence of the aforementioned substances are not permitted to perform work of any kind on or with the truck.

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### **Prohibition of use by unauthorised persons**

The driver is responsible for the truck during working hours. He must not allow unauthorised persons to operate the truck.

When leaving the truck, the driver must secure it against unauthorised use, e.g. by pulling out the key.



## Basic principles for safe operation

### Insurance cover on company premises

In many cases, company premises are restricted public traffic areas.



#### NOTE

The business liability insurance should be reviewed to ensure that, in the event of any damage caused in restricted public traffic areas, there is insurance cover for the truck in respect of third parties.

## Basic principles for safe operation

## Special features when using lithium-ion batteries (variant) ▷

The following special features apply for the operating company and drivers when this truck is equipped with a lithium-ion battery (variant) in place of a conventional lead-acid battery.



### **⚠ DANGER**

#### **Risk of fire!**

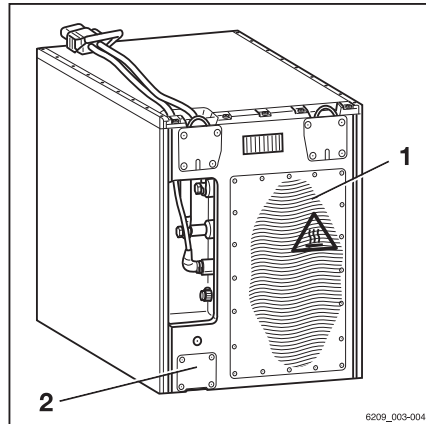
Install a class "D" fire extinguisher in areas in which lithium-ion batteries are used.



### **⚠ DANGER**

#### **Risk of explosion!**

Heating to over 80°C, mechanical stress and incorrect use may lead to the battery exploding.



- Never heat the battery to over 80°C or expose it to an open flame.
- Do not subject the battery to excessive mechanical loads.
- Do not climb on the battery.
- Avoid impacts.
- Do not open the battery.
- Never short-circuit the battery connectors.
- Do not connect the battery with the polarity reversed.

## Product-specific dangers of the 13.1-kWh & 49-kWh lithium-ion battery



### **⚠ WARNING**

Risk of burns due to hot surfaces!

The battery has an integrated brake resistor that can heat up to over 100°C during operation.

It can take several hours of cooling down before a safe temperature is reached.

- Do not touch the hot area (1).

**⚠ WARNING**

Risk of injury!

If the safety valve (2) trips, there is a risk of injury!

- Exit the area around the battery immediately, retreating to a minimum distance of 5 m.

**i NOTE**

*The brake resistor (1) is installed differently depending on the battery group. The build-up of heat in the area of the brake resistor is harmless. The safety valve (2) opens when the battery is subjected to over pressure or catches fire.*

All lithium-ion batteries are essentially associated with the risk of a fire starting, of the battery exploding and of the battery causing chemical burns.

When used as intended, no hazardous substances escape from the closed tray and contact with toxic substances will not occur. There is a risk of contact only in the event of incorrect use (mechanical, thermal, electrical) that leads to activation of the safety valve (2) or to the housing cracking. As a result, the electrolyte fluid may leak out, the electrode material may react with moisture/water or battery discharge/a fire/or an explosion can occur, depending on the surrounding circumstances.

Touching live components can lead to an electric shock, which can have thermal or paralysing effects. The latter can cause ventricular fibrillation, cardiac arrest or respiratory paralysis, leading to death.

If a battery combusts, the resulting smoke or vapours can cause irritation of the eyes, skin and respiratory system.

**Permissible lithium-ion batteries**

- Only use lithium-ion batteries that have been approved by STILL for use with this truck.

## Basic principles for safe operation

### Declaring the use of lithium-ion batteries

We recommend that the operating company informs the local fire brigade of the planned use of trucks fitted with lithium-ion batteries.

The health and safety representative and the workforce must also be informed that trucks with lithium-ion batteries are being used.

### Hazard assessment

In accordance with §3 of the German Ordinance on Industrial Safety and Health (BetrSichV), the operating company is obliged to perform a separate hazard assessment in order to assess the risks posed to the company by lithium-ion batteries.

- Observe the national regulations for the country in which the truck is being used.

### Driver qualification

In addition to the prerequisites set out in the chapter entitled "Definition of responsible persons", in the section entitled "Driver", please observe the following:

- The driver must be instructed in how to operate the lithium-ion battery
- Only instructed drivers may drive these trucks

### Procedure in the event of a fire

Damaged lithium-ion batteries pose an increased fire hazard. In the event of a fire, large quantities of water are the best option to cool the battery.

- Extinguish the fire itself with class "D" metal-fire extinguishing powder (dry powder) or with sand.
- A safety zone of 5 m must be established around a burning battery.
- Evacuate the location of the fire as quickly as possible.
- Ventilate the location of the fire well, as the resulting combustion gases can cause damage to health if inhaled.

- Inform the fire brigade that lithium-ion batteries are affected by the fire.
- Observe the information provided by the battery manufacturer regarding the procedure in the event of a fire.

Water can be used to cool down an incipient fire.

### Transporting

In certain circumstances, transport of the lithium-ion battery outside the premises may require a special transport container.

- Contact the authorised service centre for more information.

### Changes and retrofitting

If the truck is used for work that is not listed in the guidelines or in these instructions and has to be converted or retrofitted accordingly, you must note that any change to its structural state can affect the handling and stability of the truck, which in turn can lead to accidents.

You should therefore contact your service centre beforehand.

Changes that will adversely affect stability, load capacity and safety systems, among other things, must not be made without the manufacturer's approval.

The truck can only be converted with written approval from the manufacturer. Approval from the responsible authority must be obtained if necessary.

Changes to the brakes, steering, control elements, circumferential view, equipment variants (e.g. attachments) must also not be made without the prior written approval of the manufacturer.

We warn against the installation and use of restraint systems not approved by the manufacturer.

## Basic principles for safe operation



### **⚠ DANGER**

#### **Risk of injury if truck tips over!**

Even when using an approved restraint system, there is some residual risk that the driver might be injured if the truck tips over. This risk of injury can be reduced through the combined use of a restraint system and the seat belt. In addition, the seat belt protects against the consequences of rear-end collisions and falling off a ramp.

- Use the seat belt too.

When carrying out welding work on the truck, it is essential that the battery and all connections to the electronic control cards are disconnected. Contact the authorised service centre on this matter.



### **⚠ DANGER**

#### **Risk of explosion from additional holes in the battery hood!**

Explosive gases can escape and lead to potentially fatal injuries if they explode. Sealing holes with plugs is not sufficient to prevent gas from escaping.

- Do not drill any holes in the battery hood.

### **⚠ DANGER**

#### **Risk of accident from additional holes in the battery hood!**

The rigidity of the battery hood is impaired and the battery hood may fracture. The driver's seat may collapse, leading to a risk of accident due to uncontrolled steering movements whilst driving.

- Do not drill any holes in the battery hood.

**⚠ DANGER****Risk to life from falling load!**

If the truck is not equipped with an overhead guard, there is a risk to the driver's life, as he may be struck by a load falling from a lift height of 1800 mm or greater.

Operation of the truck without an overhead guard at a lift height of over 1800 mm is prohibited.

- For lift heights of 1800 mm and above, only use trucks with an overhead guard.

In the event of the manufacturer going into liquidation and the company not being taken over by another legal person, the operating company can make changes to the truck.

To do so, the operating company must fulfil the following prerequisites:

Construction documents, test documents and assembly instructions associated with the change must be archived and remain accessible at all times.

Check that the capacity rating plate, decal information, hazard warnings and the operating instructions are consistent with regard to the changes and modify if necessary.

The change must be designed, checked and implemented by a design office that specialises in industrial trucks in accordance with the standards and directives valid at the time the changes are made.

Decal information with the following data must be permanently affixed to the truck so it is clearly visible:

- Type of change
- Date of change
- Name and address of the company implementing the change.

## Basic principles for safe operation

### Changes to the overhead guard and roof loads

#### **⚠ DANGER**

**In the event of the overhead guard failing due to a falling load or the truck tipping over, there are potentially fatal consequences for the driver. There is a risk to life!**

Welding and drilling on the overhead guard changes the material characteristics and the structural design of the overhead guard. Excessive forces caused by falling loads or the truck tipping over may result in buckling of the modified overhead guard and no protection for the driver.

- Do not perform welding on the overhead guard.
- Do not perform drilling on the overhead guard.

#### **⚠ CAUTION**

Heavy roof loads damage the overhead guard!

To ensure the stability of the overhead guard at all times, a roof load may only be mounted on the overhead guard if the structural design has been tested and the manufacturer has given approval.

- Seek advice from the authorised service centre for the mounting of roof loads.

### Warning regarding non-original parts

Original parts, attachments and accessories are specially designed for this truck. We specifically draw your attention to the fact that parts, attachments and accessories supplied by other companies have not been tested and approved by STILL.

#### **⚠ CAUTION**

Installation and/or use of such products may therefore have a negative impact on the design features of the truck and thus impair active and/or passive driving safety.

We recommend that you obtain approval from the manufacturer and, if necessary, from the relevant regulatory authorities before installing such parts. The manufacturer accepts no liability for any damage caused by the use of non-original parts and accessories without approval.



## Damage, defects and misuse of safety systems

Damage or other defects on the truck or attachment must be reported to the supervisor or responsible fleet manager immediately so that they can have the defect rectified.

Trucks and attachments that are not functional or safe to drive may not be used until they have been properly repaired.

Do not remove or deactivate safety systems and switches.

Fixed set values may only be changed with the approval of the manufacturer.

Work on the electrical system (e.g. connecting a radio, additional headlights etc.) is only permitted with the manufacturer's written approval. All electrical system interventions must be documented.

Even if they are removable, roof panels may not be removed, as they are designed to protect against small falling objects.

## Tyres

### DANGER

#### **Risk to stability!**

Failure to observe the following information and instructions can lead to a loss of stability. The truck may tip over, risk of accident!

The following factors can lead to a loss of stability and are therefore **prohibited**:

- Different tyres on the same axle, e.g. pneumatic tyres and superelastic tyres
- Tyres not approved by the manufacturer
- Excessive tyre wear
- Tyres of inferior quality
- Changing rim wheel parts
- Combining rim wheel parts from different manufacturers

## Basic principles for safe operation

The following rules must be observed to ensure stability:

- Only use tyres with equal and permitted levels of wear on the same axle
- Only use wheels and tyres of the same type on the same axle, e.g. only superelastic tyres
- Only use wheels and tyres approved by the manufacturer
- Only use high-quality products

Wheels and tyres approved by the manufacturer can be found on the spare parts list. If other wheels or tyres are to be used, authorisation from the manufacturer must be obtained beforehand.

- Contact the authorised service centre on this matter.

When changing wheels or tyres, always ensure that this does not cause the truck to tilt to one side (e.g. always replace right-hand and left-hand wheels at the same time). Changes must only be made following consultation with the manufacturer.

If the type of tyre used on an axle is changed, for example from superelastic tyres to pneumatic tyres, the load diagram must be changed accordingly.

- Contact the authorised service centre on this matter.

## Medical equipment

### WARNING

Electromagnetic interference may occur on medical devices!

Only use equipment that is sufficiently protected against electromagnetic interference.

Medical equipment, such as pacemakers or hearing aids, may not work properly when the truck is in operation.

- Ask your doctor or the manufacturer of the medical equipment to confirm that the medical equipment is sufficiently protected against electromagnetic interference.

## Exercise caution when handling gas springs and accumulators

### WARNING

Gas springs are under high pressure. Improper removal results in an elevated risk of injury.

For ease of operation, various functions on the truck can be supported by gas springs. Gas springs are complex components that are subject to high internal pressures (up to 300 bar). They may under no circumstances be opened unless instructed to do so, and may be installed only when not under pressure. If required, the authorised service centre will depressurise the gas spring in accordance with the regulations before removal. Gas springs must be depressurised before recycling.

- Avoid damage, lateral forces, buckling, temperatures over 80°C and heavy contamination.
- Damaged or defective gas springs must be changed immediately.
- Contact the authorised service centre.

### WARNING

Accumulators are under high pressure. Improper installation of an accumulator results in an elevated risk of injury.

Before starting work on the accumulator it must be depressurised.

- Contact the authorised service centre.

## Length of the fork arms

### DANGER

**Risk of accident due to the incorrect selection of fork arms!**

- The fork arms must match the depth of the load.

If the fork arms are too short, the load may fall off the arms after it has been picked up. In addition, be aware that the load centre of gravity may shift as a result of dynamic forces, such as braking. A load that is otherwise resting safely on the fork arms may move forwards and fall.

If the fork arms are too long, they can catch on loading units behind the load that is to be

## Basic principles for safe operation

picked up. These other loading units then fall over when the load is raised.

- For help with selecting the correct fork arms, contact the authorised service centre.

## Residual risk

### Residual dangers, residual risks

Despite careful working and compliance with standards and regulations, the occurrence of other risks when using the truck cannot be entirely excluded.

The truck and all other system components comply with current safety requirements. Nevertheless, even when the truck is used for its proper purpose and all instructions are followed, some residual risk cannot be excluded.

Even beyond the narrow danger areas of the truck itself, a residual risk cannot be excluded. Persons in this area around the truck must exercise a heightened degree of awareness, so that they can react immediately in the event of any malfunction, incident or breakdown etc.

#### **WARNING**

All persons that are in the vicinity of the truck must be instructed regarding these risks that arise through use of the truck.

In addition, we draw attention to the safety regulations in these operating instructions.

Risks can include:

- Escape of consumables due to leakages, rupture of lines and containers etc.
- Risk of accident when driving over difficult ground such as gradients, smooth or irregular surfaces, or with poor visibility etc.
- Falling, tripping etc. when moving on the truck, especially in wet weather, with leaking consumables or on icy surfaces
- Fire and explosion risks due to batteries and electrical voltages
- Human error resulting from failure to observe the safety regulations,
- Unrepaired damage or defective and worn components,
- Insufficient maintenance and testing
- Use of incorrect consumables
- Exceeding test intervals

## Residual risk

The manufacturer is not held responsible for accidents involving the truck caused by the failure of the operating company to comply with these regulations either intentionally or carelessly.

### Stability

The stability of the truck has been tested to the latest technological standards and is guaranteed provided that the truck is used properly and according to its intended purpose. These standards only take into account the dynamic and static tipping forces that can arise during specified use in accordance with the operating rules and intended purpose. However, the danger of exceeding the moment of tilt due to improper use or incorrect operation and losing stability can never be excluded.

The loss of stability can be avoided or minimised by the following actions:

- Always secure the load against slipping, e.g. by lashing.
- Always transport unstable loads in suitable containers.
- Always drive slowly when cornering.
- Drive with the load lowered.
- Even with sideshifts, align the load as centrally as possible with the truck and transport in this position.
- Avoid turning and diagonally driving across slopes or gradients.
- Never have the load facing downhill when travelling on slopes or gradients.
- Pick up only loads of the approved width.
- Always take great care when transporting suspended loads.
- Do not drive over ramp edges or steps.

### Special risks associated with using the truck and attachments

Approval from the manufacturer and attachment manufacturer must be obtained each

time the truck is used in a manner that falls outside the scope of normal use, and in cases where the driver is not certain that he can use the truck correctly and without the risk of accidents.

## Residual risk

## Overview of hazards and counter-measures

### NOTE

*This table is intended to help evaluate the hazards in your facility and applies to all drive types. It does not claim to be complete.*

- Observe the national regulations for the country in which the truck is being used.

Hazard	Measure	Check note ✓ Complete - Not applicable	Notes
Truck equipment does not comply with local regulations	Test	○	If in doubt, consult competent factory inspectorate or employers' liability insurance association
Lack of skills and qualification of driver	Driver training (sit-on and stand-on)	○	BGG 925 VDI 3313 driver permit
Usage by unauthorised persons	Access with key only for authorised persons	○	
Truck not in a safe condition	Recurrent testing and rectification of defects	○	German Ordinance on Industrial Safety and Health (BetrSichV)
Risk of falling when using working platforms	Compliance with national regulations (different national laws)	○	German Ordinance on Industrial Safety and Health (BetrSichV) and employer's liability insurance associations
Impaired visibility due to load	Resource planning	○	German Ordinance on Industrial Safety and Health (BetrSichV)
Contamination of respiratory air	Assessment of diesel exhaust gases	○	Technical Regulations for Hazardous Substances (TRGS) 554 and the German Ordinance on Industrial Safety and Health (BetrSichV)
	Assessment of LPG exhaust gases	○	German threshold limit values list (MAK-Liste) and the German Ordinance on Industrial Safety and Health (BetrSichV)



Hazard	Measure	Check note √ Complete - Not applicable	Notes
Impermissible usage (improper usage)	Issuing of operating instructions	○	German Ordinance on Industrial Safety and Health (BetrSichV) and German Health and labour protection law (ArbSchG)
	Written notice of instruction to driver	○	German Ordinance on Industrial Safety and Health (BetrSichV) and German Health and labour protection law (ArbSchG)
	Note the German Ordinance on Industrial Safety and Health (BetrSichV), the operating instructions and the German Engineering Federation (VDMA) rules	○	
When fuelling			
a) Diesel	Note the German Ordinance on Industrial Safety and Health (BetrSichV), the operating instructions and the German Engineering Federation (VDMA) rules	○	
b) LPG	Note German Social Accident Insurance (DGUV) regulation D34, the operating instructions and the German Engineering Federation (VDMA) rules	○	

## Residual risk

Hazard	Measure	Check note ✓ Complete - Not applicable	Notes
When charging the traction battery	Note the German Ordinance on Industrial Safety and Health (BetrSichV), the operating instructions and the German Engineering Federation (VDMA) rules	○	Association for Electrical, Electronic and Information Technologies (VDE) regulation 0510: In particular - Ensure adequate ventilation - Insulation value within the permissible range
When using battery chargers	Note the German Ordinance on Industrial Safety and Health (BetrSichV), employers' liability insurance association regulation 104 and the operating instructions	○	German Ordinance on Industrial Safety and Health (BetrSichV) and employers' liability insurance association regulation 104
When parking LPG trucks	Note the German Ordinance on Industrial Safety and Health (BetrSichV), employers' liability insurance association regulation 104 and the operating instructions	○	German Ordinance on Industrial Safety and Health (BetrSichV) and employers' liability insurance association regulation 104
With driverless transport systems			
Roadway quality inadequate	Clean/clear driveways	○	German Ordinance on Industrial Safety and Health (BetrSichV)
Load carrier incorrect/slipped	Reattach load to pallet	○	German Ordinance on Industrial Safety and Health (BetrSichV)
Drive behaviour unpredictable	Employee training	○	German Ordinance on Industrial Safety and Health (BetrSichV)
Driveways blocked	Mark driveways Keep driveways clear	○	German Ordinance on Industrial Safety and Health (BetrSichV)
Driveways intersect	Announce right-of-way rule	○	German Ordinance on Industrial Safety and Health (BetrSichV)
No person detection during depositing and retrieval	Employee training	○	German Ordinance on Industrial Safety and Health (BetrSichV)

## Danger to employees

According to the German Ordinance on Industrial Safety and Health (BetrSichV) and labour protection law (ArbSchG), the operating company must determine and assess hazards during operation, and establish the labour protection measures required for employees (BetrSichVO). The operating company must therefore draw up appropriate operating instructions (§ 6 ArbSchG) and make them available to the driver. A responsible person must be appointed.



### NOTE

*Please observe the definition of the following responsible persons: "operating company" and "driver".*

The construction and equipment of the truck correspond to the Machinery Directive 2006/42/EC and are therefore marked with CE labelling. These elements are therefore not included in the hazard assessment. Attachments possess their own CE labelling and likewise are not included for that reason. The operating company must, however, select the type and equipment of the trucks so as to comply with the local provisions for deployment.

The result must be documented (§ 6 ArbSchG). In the case of truck applications involving similar hazard situations, the results may be summarised. This overview (see chapter "Overview of hazards and countermeasures") provides help on complying with this regulation. The overview specifies the main hazards that are the most frequent cause of accidents in the event of non-compliance. If other major operational hazards are involved, they must also be taken into consideration.

The conditions of use for trucks are broadly similar in many plants, so the hazards can be summarised in one overview. Observe the information provided by the relevant employers' liability insurance association on this subject.

## Safety tests

### Safety tests

#### Carrying out regular inspections on the truck ▷

The operating company must ensure that the truck is checked by a specialist at least once a year or after particular incidents.

As part of this inspection, the technical condition of the truck must be completely tested with regard to accident safety. In addition, the truck must be thoroughly checked for damage that may have been caused by improper use. A test log must be created. The results of the inspection must be retained at least until a further two inspections have been carried out.

The inspection date is indicated by an adhesive label on the truck.

- Arrange for the authorised service centre to perform regular testing on the truck.
- Observe the guidelines for tests carried out on the truck in accordance with FEM 4.004.

The operating company is responsible for ensuring that any defects are remedied without delay.

- Notify your authorised service centre.



#### NOTE

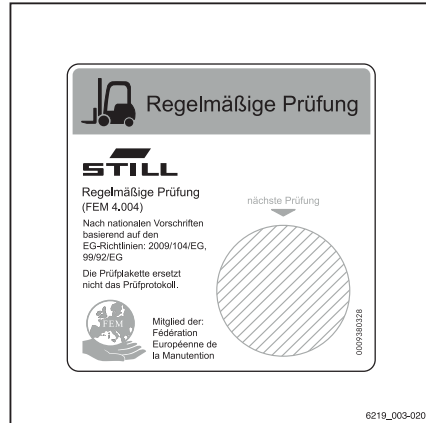
*In addition, observe the national regulations for the country of use.*

### Insulation testing

The insulation of the truck must have sufficient insulation resistance. For this reason, insulation testing in accordance with DIN EN 1175 and DIN 43539, VDE 0117 and VDE 0510 must be conducted at least once yearly as part of the FEM testing.

The insulation testing results must be at least the test values given in the following two tables.

- For insulation testing, contact the authorised service centre.



The exact procedure for this insulation testing is described in the workshop manual for this truck.

 **NOTE**

*The truck's electrical system and drive batteries must be checked separately.*

### Test values for the drive battery

Component	Recommended test voltage	Measurements		Nominal voltage $U_{\text{Batt}}$	Test values
Battery	50 VDC	Batt+ Batt-	Battery tray	24 volts	> 1200 $\Omega$
	100 VDC			48 volts	> 2400 $\Omega$
	100 VDC			80 volts	> 4000 $\Omega$

### Test values for the entire truck

Nominal voltage	Test voltage	Test values for new trucks	Minimum values over the duration of the service life
24 volts	50 VDC	Min. 50 k $\Omega$	> 24 k $\Omega$
48 volts	100 VDC	Min. 100 k $\Omega$	> 48 k $\Omega$
80 volts	100 VDC	Min. 200 k $\Omega$	> 80 k $\Omega$

## Safety regulations for handling consumables

## Safety regulations for handling consumables

### Permissible consumables

**⚠ DANGER**

Failure to observe the safety regulations relating to consumables may result in a risk of injury, death or damage to the environment.

- Observe the safety regulations when handling such materials.

Refer to the maintenance data table for the permissible substances that are necessary for operation (see ⇒ Chapter "Maintenance data table", P. 5-331).

### Oils

**⚠ DANGER****Oils are flammable!**

- Follow the statutory regulations.
- Do not allow oils to come into contact with hot engine parts.
- No smoking, fires or naked flames!

**⚠ DANGER****Oils are toxic!**

- Avoid contact and consumption.
- If vapour or fumes are inhaled, move to fresh air immediately.
- In the event of contact with the eyes, rinse thoroughly (for at least 10 minutes) with water and then consult an eye specialist.
- If swallowed, do not induce vomiting. Seek immediate medical attention.

**⚠ WARNING**

Prolonged intensive contact with the skin can result in dryness and irritate the skin!

- Avoid contact and consumption.
- Wear protective gloves.
- After any contact, wash the skin with soap and water, and then apply a skin care product.
- Immediately change soaked clothing and shoes.

**⚠ WARNING**

There is a risk of slipping on spilled oil, particularly when combined with water!

- Spilt oil should be removed immediately with oil-binding agents and disposed of according to the regulations.

**ENVIRONMENT NOTE**

*Oil is a water-polluting substance!*

- *Always store oil in containers that comply with the applicable regulations.*
- *Avoid spilling oils.*
- *Spilt oil should be removed immediately with oil-binding agents and disposed of according to the regulations.*
- *Dispose of old oils according to the regulations.*

**Hydraulic fluid****⚠ WARNING**

These fluids are pressurised during operation of the truck and are hazardous to your health.

- Do not spill the fluids.
- Follow the statutory regulations.
- Do not allow the fluids to come into contact with hot engine parts.

## Safety regulations for handling consumables



### ⚠ WARNING

These fluids are pressurised during operation of the truck and are hazardous to your health.

- Do not allow the fluids to come into contact with the skin.
- Avoid inhaling spray.
- Penetration of pressurised fluids into the skin is particularly dangerous if these fluids escape at high pressure due to leaks in the hydraulic system. In case of such injury, immediate medical assistance is required.
- To avoid injury, use appropriate personal protective equipment (e.g. protective gloves, industrial goggles, skin protection and skin care products).



### ENVIRONMENT NOTE

*Hydraulic fluid is a water-polluting substance.*

- *Always store hydraulic fluid in containers that comply with regulations*
- *Avoid spills*
- *Spilt hydraulic fluid should be removed immediately with oil-binding agents and disposed of according to the regulations*
- *Dispose of old hydraulic fluid according to the regulations*

## Battery acid



### ⚠ WARNING

Battery acid contains dissolved sulphuric acid. This is toxic.

- Avoid touching or swallowing the battery acid at all costs.
- In case of injury, seek medical advice immediately.



**⚠ WARNING**

Battery acid contains dissolved sulphuric acid. This is corrosive.

- When working with battery acid, use appropriate PSA (rubber gloves, apron, protection goggles).
- When working with battery acid, never wear a watch or jewellery.
- Do not allow any acid to get onto clothing or skin or into the eyes. If this does happen, rinse immediately with plenty of clean water.
- In case of injury, seek medical advice immediately.
- Immediately rinse away spilt battery acid with plenty of water.
- Follow the statutory regulations.

**ENVIRONMENT NOTE**

- Dispose of used battery acid in line with the applicable regulations.

**Disposal of consumables****ENVIRONMENT NOTE**

*Materials that accumulate during repair, maintenance and cleaning must be collected properly and disposed of in accordance with the national regulations for the country in which the truck is being used. Work must only be carried out in areas designated for that purpose. Care must be taken to minimise any environmental pollution.*

- Soak up any spilt fluids such as hydraulic oil or gearbox oil immediately using an oil-binding agent.
- Neutralise any spilt battery acid immediately.
- Always observe national regulations concerning the disposal of used oil.

## Emissions

## Emissions

The values specified apply to a standard truck (compare the specifications in the "Technical data" chapter). Different tyres, lift masts, additional units etc. may produce different values.

## Noise emissions

The values were determined based on measuring procedures from the standard EN 12053 "Safety of industrial trucks - Test methods for measuring noise emissions", based on EN 12001, EN ISO 3744 and the requirements of EN ISO 4871.

This machine emits the following sound pressure level:

**Continuous sound pressure level in the driver's compartment**

L <sub>pAZ</sub>	Measurement uncertainty K <sub>pA</sub>
< 66.3 dB(A)	4 dB(A)

The values were determined in the test cycle on an identical machine from the weighted values for operating statuses and idling.

Time proportions:

- Lifting 18%
- Idling 58%
- Driving 24%

However, the indicated noise levels at the truck cannot be used to determine the noise emissions at workplaces according to the most recent version of **Directive 2003/10/EC** (daily personal noise pollution). If necessary, these noise emissions must be determined by the operating company directly at the workplaces under the actual conditions there (additional noise sources, special application conditions, sound reflections).



## NOTE

*Please observe the definition of the following responsible person: "operating company".*

## Vibrations

The vibrations of the machine have been determined on an identical machine in accordance with the standards DIN EN 13059 "Safety of industrial trucks - Test methods for measuring vibration" and DIN EN 12096 "Mechanical vibration - Declaration and verification of vibration emission values".

### Frequency-weighted effective value of acceleration on the seat

MSG 65 driver's seat	Measurement uncertainty
< 0.6 m/s <sup>2</sup>	K = 0.18

Tests have indicated that the amplitude of the hand and arm vibrations on the steering wheel or on the operating devices in the truck is less than 2.5 m/s<sup>2</sup>. There are therefore no measurement guidelines for these measurements.

The individual vibration load on the driver over the course of a working day must be determined by the operating company in accordance with **Directive 2002/44/EC** at the actual place of use in order to consider all additional influences, such as driving route, intensity of use etc.



#### NOTE

*Please observe the definition of the following responsible person: "operating company".*

## Emissions

### Battery



#### **⚠ DANGER**

#### **Risk of explosion due to flammable gases!**

During charging, lead-acid batteries release a mixture of oxygen and hydrogen (oxyhydrogen gas). This gas mixture is explosive and must not be ignited.

- Make sure that there is always sufficient ventilation in working areas that are entirely or partially enclosed.
- Keep away from open flames and flying sparks.
- Do not smoke.
- Observe the safety regulations for handling the battery.

### Radiation

According to the guidelines DIN EN 62471:2009-03 (VDE 0837-471:2009-03), the STILL Safety-Light (variant) is assigned to risk group 2 due to its photobiological hazard potential.

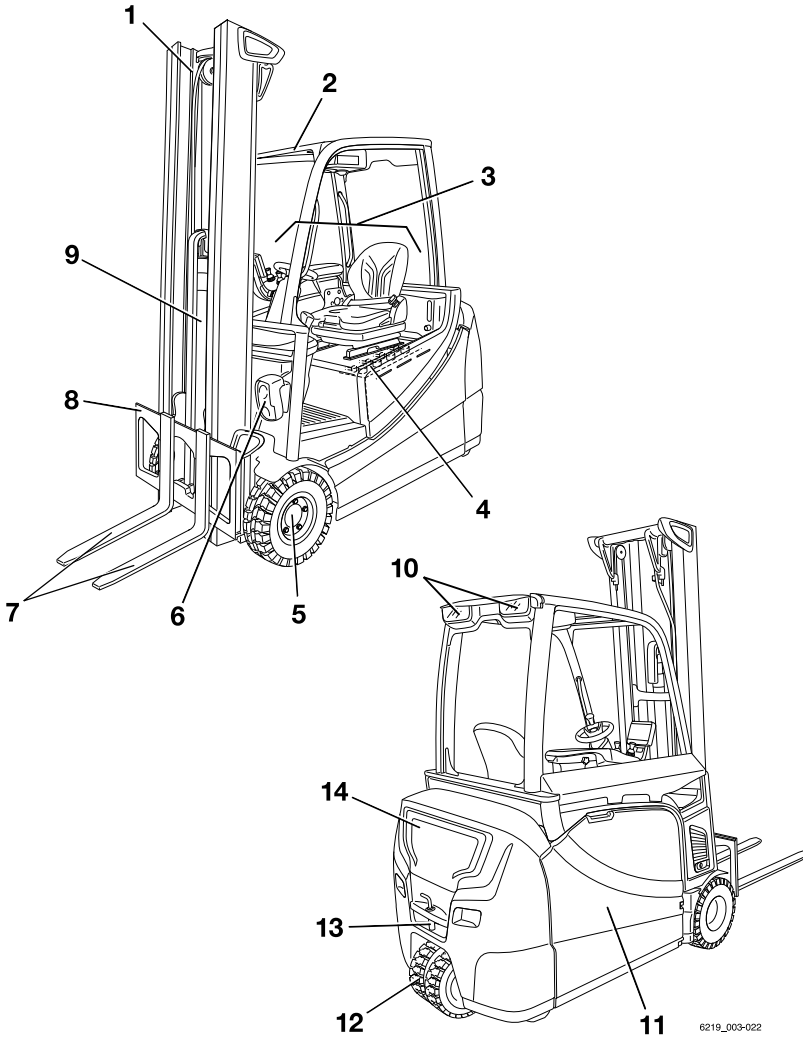
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## Overviews

## Overview of the truck

## Overview of the truck



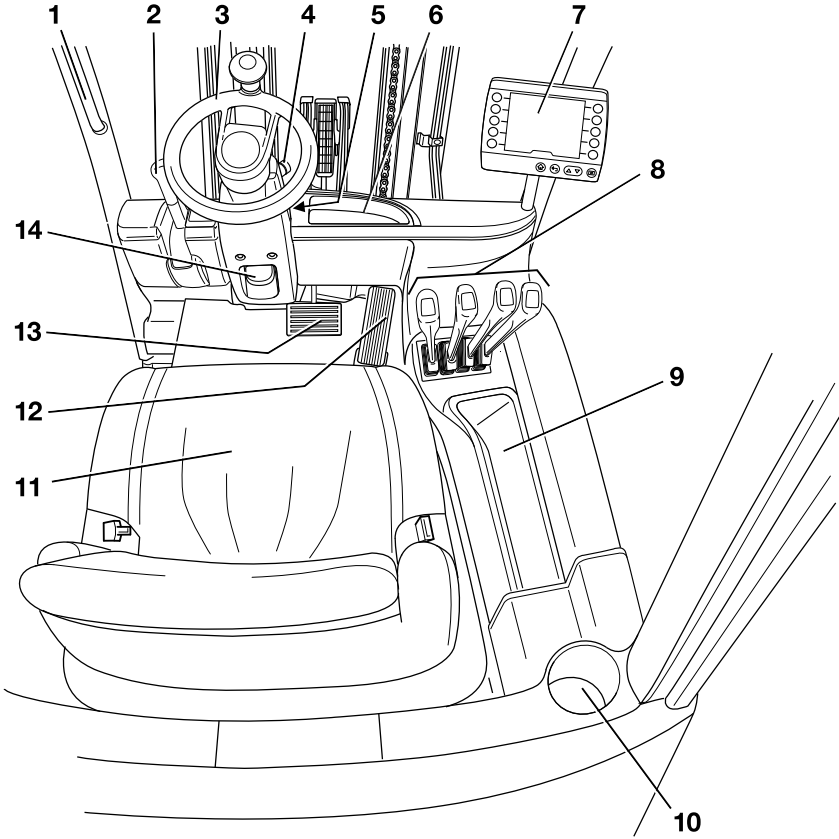
1	Lift mast	8	Fork carriage
2	Overhead guard	9	Lift cylinder
3	Driver's compartment	10	Rear lighting
4	Battery (in the battery compartment)	11	Battery door
5	Drive axle	12	Steering axle
6	Front lighting	13	Towing device
7	Fork arms	14	Counterweight

 **NOTE**

*The truck equipment may differ from the equipment shown.*

Driver's compartment

Driver's compartment



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- |   |   |    |   |
|---|---|----|---|
| 1 | Handle  | 9  | Compartment for storing the operating instructions and the hexagon socket wrench for emergency lowering |
| 2 | Parking brake lever                                   | 10 | Cup holder for max. 1.5-litre bottles   |
| 3 | Steering wheel  | 11 | Driver's seat   |
| 4 | Emergency off switch                                  | 12 | Accelerator pedal   |
| 5 | Key switch  | 13 | Brake pedal   |
| 6 | Compartment   | 14 | Steering column adjustment lever  |
| 7 | Display-operating unit                                |    |   |
| 8 | Operating devices for hydraulic and driving functions |    |   |

**i** NOTE

*The truck equipment may differ from the equipment shown.*

## Shelf and cup holder

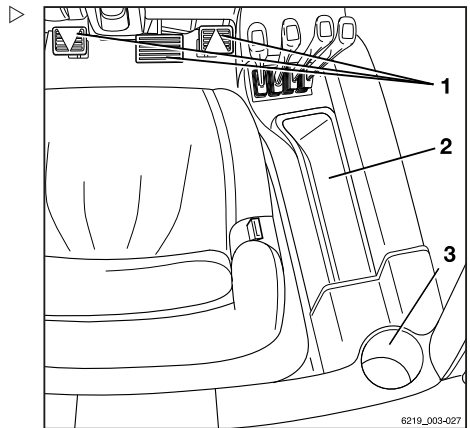
**⚠ WARNING**

Objects may fall into the footwell and obstruct the pedals, which poses a risk of accident!

Objects that fall into the footwell during travel as a result of steering or braking may slip between the pedals (1) and prevent them from working correctly. It may then not be possible to brake the truck when necessary.

- Objects to be stored must be of the correct size so that they cannot fall from the shelf (2) or out of the cup holder (3).
- Bottles with a maximum size of 1.5 litres may be stored in the cup holder.
- Make sure that stored objects cannot fall from the shelves when the truck is started up, steered or braked.

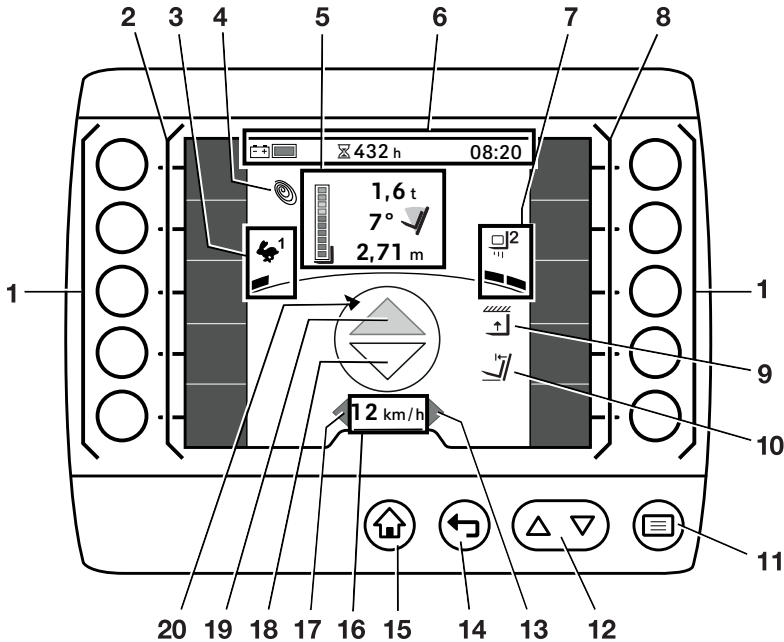
The truck is equipped with a compartment (2) for the operating instructions and the hexagon socket wrench for emergency lowering. The cup holder (3) holds bottles up to 1.5 litres in size.



## Operating devices and display elements

## Operating devices and display elements

## Display-operating unit

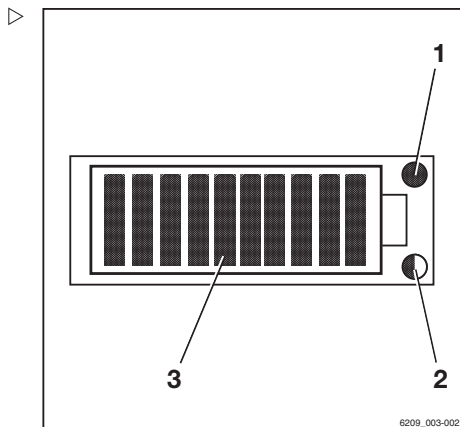


- |   |  |    |                                    |
|---|--|----|------------------------------------|
| 1 | Softkeys   | 8  | Right-hand favourites bar          |
| 2 | Left-hand favourites bar   | 9  | Lift height restriction            |
| 3 | Selected drive programme with driving dynamics display   | 10 | Lift mast vertical position        |
| 4 | Blue-Q symbol  | 11 | Menu button                        |
| 5 | Load information (variants):<br>Load measurement<br>Lift-mast tilt angle<br>Lift height<br>Tipping-stability indicator | 12 | Scrolling buttons                  |
| 6 | Status bar: battery charge, operating hours, time  | 13 | Right-hand turn indicator display  |
| 7 | Selected load programme with load dynamics display   | 14 | Back button                        |
|   |  | 15 | Main-display button                |
|   |  | 16 | Driving speed or parking brake (®) |
|   |  | 17 | Left-hand turn indicator display   |
|   |  | 18 | Reverse travel direction indicator |
|   |  | 19 | Forward travel direction indicator |
|   |  | 20 | Steering angle display             |

### Lithium-ion battery display

The lithium-ion battery display is located on the side of the battery tray. In addition to the display operating unit, it also shows the charging status and information relating to the lithium-ion battery.

- Refer to the chapter entitled "Display" in the operating instructions of the battery manufacturer, "BMZ".



- 1 Service LED (red)
- 2 Temperature LED (yellow/red)
- 3 Charging state LEDs (red/green)

## Operating devices and display elements

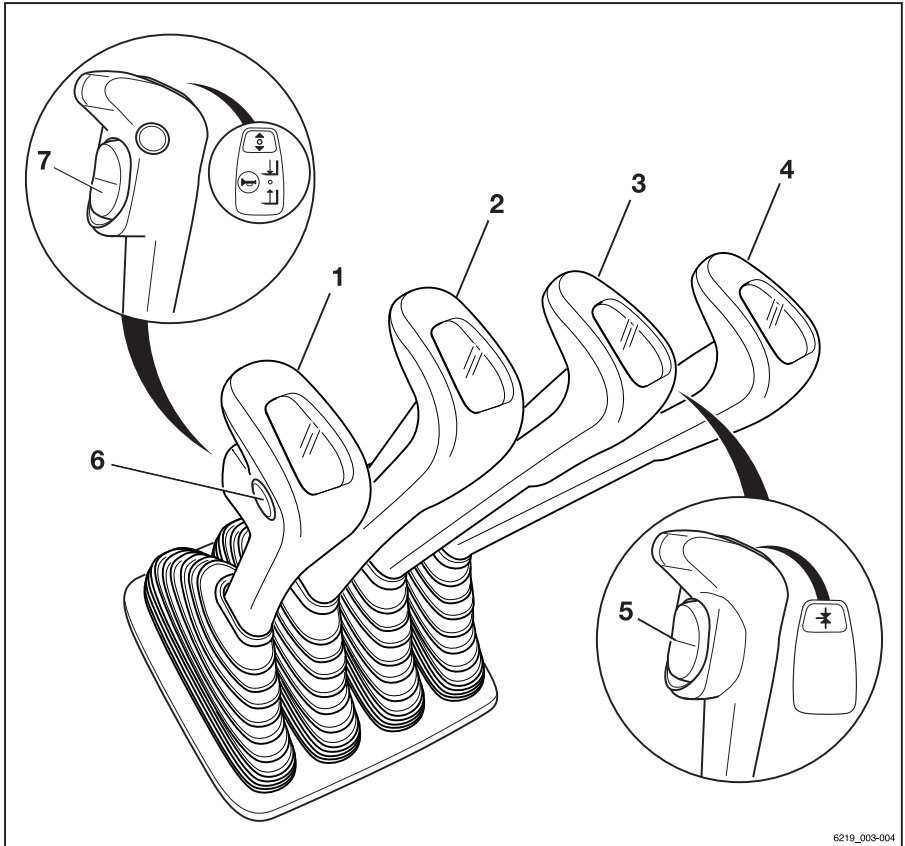
### Operating devices for hydraulic and driving functions

Different versions of the operating devices are available for operating the truck's hydraulic functions and drive functions.

The truck can be equipped with the following operating devices:

- **Multi-lever operation**
- **Double mini-lever**
- **Triple mini-lever**
- **Quadruple mini-lever**
- **Joystick 4Plus**

### Multi-lever operation



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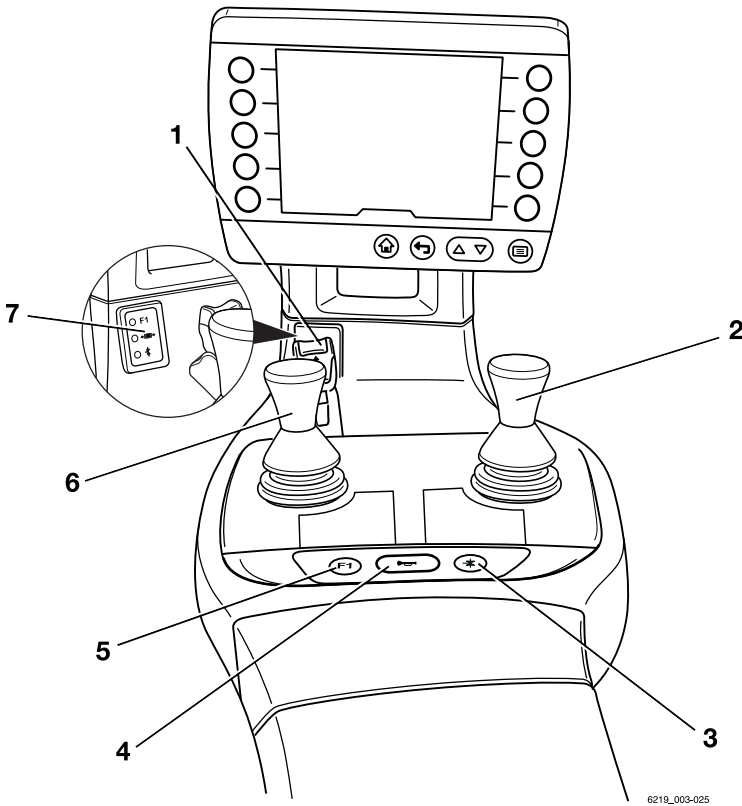
- |   |   |   |  |
|---|---|---|--|
| 1 | "Lift/lower" operating lever                                | 5 | Function switch for the "5th function" (variant) |
| 2 | "Tilt" operating lever                                      | 6 | Signal horn button                               |
| 3 | Operating lever for attachment (variant)                    | 7 | Drive direction switch                           |
| 4 | Operating lever for attachments with 5th function (variant) |   |  |

**i** NOTE

*The drive direction switch (7) does not function in the dual-pedal version (variant).*

## Operating devices and display elements

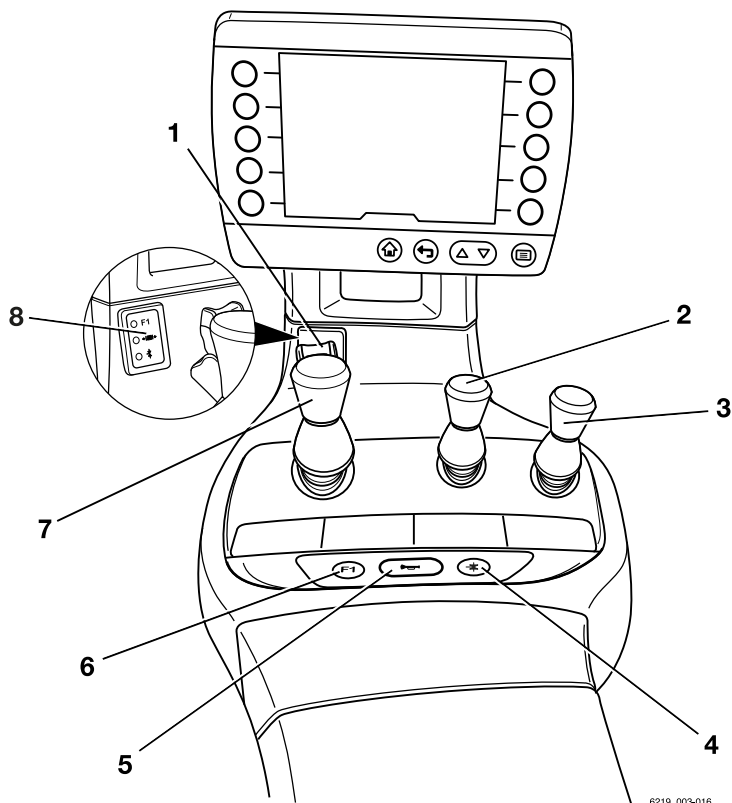
## Double mini-lever



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- 1 Drive direction switch
- 2 "Attachments" cross lever
- 3 Function key for the "5th Function"
- 4 Signal horn button
- 5 "F1" function key
- 6 "Lift mast" 360° lever
- 7 Display field for the hydraulic functions

### Triple mini-lever

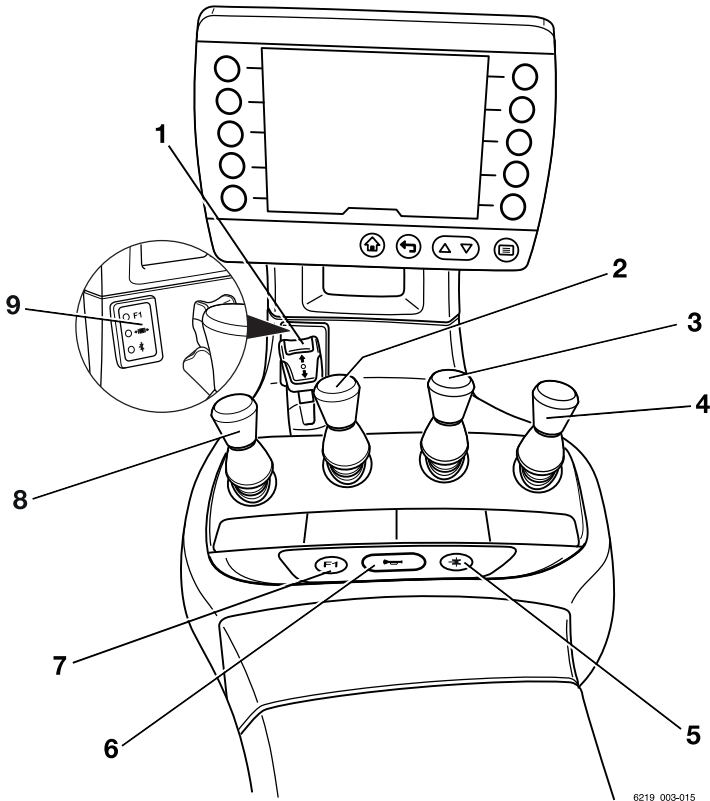


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- |   |  |   |   |
|---|--|---|---|
| 1 | Drive direction switch                   | 5 | Signal horn button                        |
| 2 | "Auxiliary hydraulics 1" operating lever | 6 | "F1" function key                         |
| 3 | "Auxiliary hydraulics 2" operating lever | 7 | "Lift mast" 360° lever                    |
| 4 | Function key for the "5th Function"      | 8 | Display field for the hydraulic functions |

## Operating devices and display elements

## Quadruple mini-lever

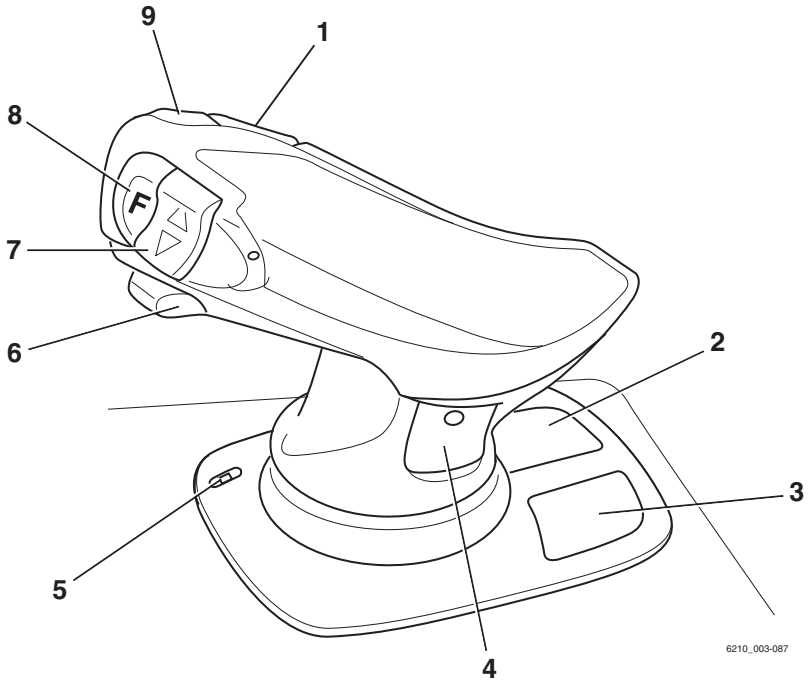


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- |   |  |   |   |
|---|--|---|---|
| 1 | Drive direction switch                   | 6 | Signal horn button                        |
| 2 | "Tilt" operating lever                   | 7 | "F1" function key                         |
| 3 | "Auxiliary hydraulics 1" operating lever | 8 | "Lift/lower" operating lever              |
| 4 | "Auxiliary hydraulics 2" operating lever | 9 | Display field for the hydraulic functions |
| 5 | Function key for the "5th Function"      |   |   |



### Joystick 4Plus



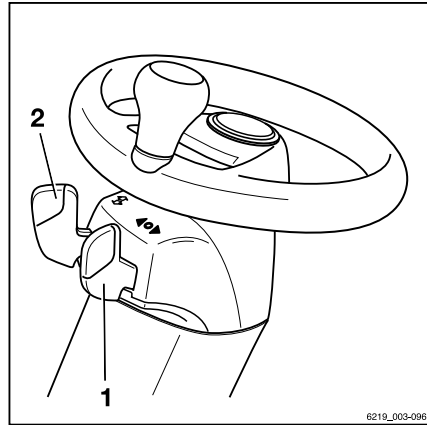
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- |   |   |   |  |
|---|---|---|--|
| 1 | Horizontal rocker button for "3rd hydraulic function", tilt the lift mast           | 5 | LED for clamp locking mechanism (variant)                                    |
| 2 | Pictograms for the basic hydraulic functions  | 6 | Slider for the "4th hydraulic function", e.g. reach frame forwards/backwards |
| 3 | Pictograms for the 5th hydraulic function and the clamp locking mechanism (variant) | 7 | Vertical rocker button for the "drive direction"                             |
| 4 | Pictograms for the 3rd & 4th hydraulic functions                                    | 8 | Shift key "F"  |
|   |   | 9 | Signal horn button   |

## Operating devices and display elements

**Mini-console**

The mini console is located on the steering column below the steering wheel.



- 1 Drive direction switch
- 2 Turn indicator switch

4

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## Operation

## Testing and activities before daily use

## Testing and activities before daily use

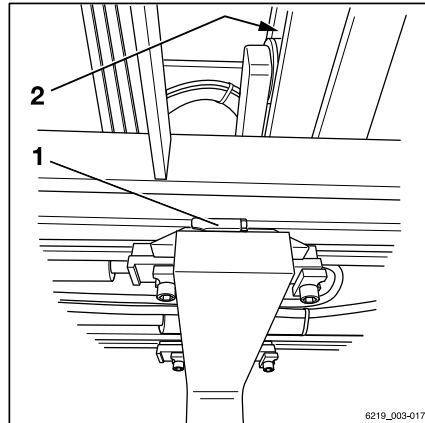
## Visual inspections and function checking

**⚠ DANGER****Risk of explosion if hydrogen builds up in the cab!**

If the truck is equipped with a cab, hydrogen from the battery compartment can penetrate the cab through unsealed bores in the battery hood. A build-up of hydrogen can lead to an explosion.

There must be no unsealed bores in the battery hood. Sealing bores with plugs is not sufficient to prevent gas from escaping.

- Have unused bores in the battery hood sealed by the authorised service centre.



Load lift system unit

**⚠ WARNING**

Risk of accident due to damage or other defects on the truck or on the attachment (variant)!

Damage to the truck or the attachment (variant) can lead to unpredictable and dangerous situations.

- Do not remove or deactivate safety systems or switches.
- Do not change any predefined set values.
- Do not use the truck until it has been properly repaired.

**⚠ WARNING**

Risk of falling when working on high parts of the truck.

- Use only the steps provided on the truck.
- Do not use any truck components as mounting aids or platforms.
- Use suitable equipment.

**⚠ CAUTION**

Risk of component damage!

A deformed or damaged battery male connector can cause overheating and related consequential damage.

- Check the battery male connector for damage.
- If necessary, have the battery male connector replaced by the authorised service centre.

To be able to operate the truck safely, visual inspections and function checking must be carried out before daily use. The components that must be checked and their checkpoints are listed in the following table. If damage or other defects are identified on the truck or the attachment (variant) during the following checks, do not use the truck until it has been repaired properly. Damage or other defects must be reported to the supervisor or the responsible fleet manager immediately so that repairs by the authorised service centre can be arranged.

**Before the truck is used each day, ensure that it is safe to be operated:**

Component	Course of action
Fork arms, general lifting accessories	Perform a visual inspection for deformation and wear (for example, bent, broken, significant wear). Check the condition and function of safety devices (1) to prevent lifting and shifting.
Roller tracks (2)	Make sure that there is a film of grease.
Load chains	Perform a visual inspection to ensure that the chains are intact and have adequate and even tension.
Attachments (variant)	Ensure correct mounting in accordance with the operating instructions of the manufacturer. Perform a visual inspection to ensure the attachments are intact and not leaking. Perform checks to ensure the attachments are working correctly.
Lift and tilt cylinders, tank, valve block, hoses, pipes, connections	Perform a visual inspection for damage and leaks. Have damaged components replaced by the authorised service centre.
Underside	Check the area under the truck for leaking consumables.

## Testing and activities before daily use

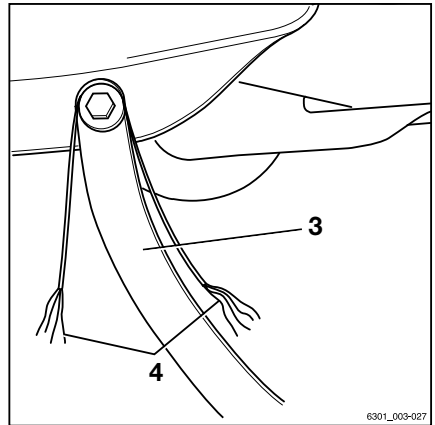
Component	Course of action
Wheels, tyres	Perform a visual inspection for wear and damage. Make sure that only rims of the same type from the same manufacturer are fitted. In the event of uneven tyre wear, replace both tyres. Observe the safety regulations in the chapter entitled "Tyres".
Axle	Make sure that no consumables are escaping from the axle.
Overhead guard, guard grille (variant)	Perform a visual inspection for integrity. Check for secure mounting.
Steps	Make sure they are clean (free of ice, not slippery).
Panes of glass (variant)	Perform a visual inspection for integrity. Make sure they are clean (also free of ice).
Handholds	Check for secure mounting.
Maintenance lids	Check the close function and close the lids.
Battery hood	Make sure that there are no unused bores in the battery hood.
Battery door	Perform a visual inspection for integrity and deformation. Check that the lock is in good condition and is working correctly. Check the close function. Close.
Battery	Check that the lock is in good condition and is working correctly. Lock the battery.
Battery male connector	Perform a visual inspection for integrity and deformation. Check the contacts. Have damaged battery male connectors replaced by the authorised service centre.
Coupling pin, tow coupling (variant)	Perform a visual inspection for deformation and wear (for example, bent, torn, broken). Check the securing bush in the counterweight for integrity and that it is working correctly. Check that the linchpin is present and working correctly (chain, rope, split pin).
Labelling, adhesive label	Check that labels are present and intact/legible. Replace damaged or missing adhesive labels in accordance with the chapter entitled "Labelling points".
Driver's seat, seat belt	Check the integrity and function.

Component	Course of action
Lighting, warning units	Check the integrity and function.
Antistatic belt (1), corona electrode (2) (See the following illustration.)	Perform a visual inspection for integrity. Ensure cleanliness. Make sure that the antistatic belt (3) is still long enough to touch the ground in all situations. The discharge wires of the corona electrode (4) must not touch the ground. The wires discharge the energy to the air.

Depending on the tyres used, the truck is fitted with one or more antistatic belts (3) and/or with a corona electrode (4). These components ensure that the truck cannot charge statically. ▷

- Do not use the truck if there is any damage or defects.
- In this case, contact your authorised service centre.

Any other necessary tasks are summarised under their own headings, e.g. adjusting the driver's seat.



Antistatic belt and corona electrode

## Climbing into and out of the truck

### ⚠ WARNING

Risk of injury when climbing into and out of the truck due to slipping, striking parts of the truck or becoming stuck!

If the footwell cover is very dirty or smeared with oil, there is a risk of slipping. There is a risk of hitting your head on the overhead guard post or of your clothes becoming stuck when climbing out of the truck.

- Ensure that the footwell cover is not slippery.
- Do not jump into or out of the truck.
- Ensure that you have a secure grip on the truck.

## Testing and activities before daily use

**⚠ WARNING**

Risk of injury when jumping out of the truck!

If your clothing or jewellery (e.g. watch, ring etc.) becomes stuck on a component while you are jumping onto or out of the truck, this can lead to serious injuries (from falling, loss of fingers etc.). It is forbidden to jump out of the truck.

- Do not jump out of the truck.
- Do not wear jewellery at work.
- Do not wear loose-fitting workwear.

**⚠ CAUTION**

Components may become damaged through incorrect use!

Truck components, such as the driver's seat, steering wheel, parking brake lever etc., are not designed to be used for climbing in and out of the truck and may be damaged due to misuse.

- Only use the fittings specifically designed for the purpose of climbing into and out of the truck.

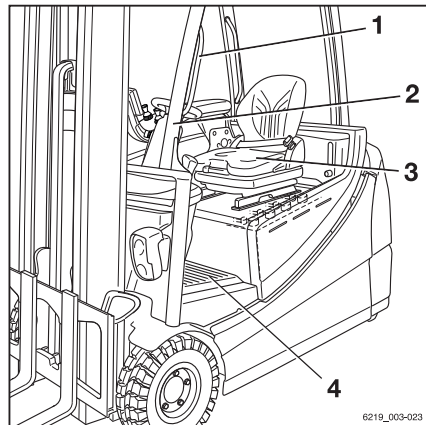
To assist with climbing into and out of the truck, the footwell (4) must be used as a step and the handle (1) must be used for support. The post of the overhead guard (2) can also be used for support.

Always **climb into** the truck facing forwards:

- Grip the handle (1) with your left hand and do not let go.
- Place your left foot into the footwell (4).
- Climb into the truck with your right foot and sit down on the driver's seat (3).

Always **climb out** of the truck backwards:

- Grip the handle (1) with your left hand and do not let go.
- Stand up from the driver's seat and place your left foot in the footwell (4).
- Climb out of the truck right foot first.





## Adjusting the MSG 65/MSG 75/MSG 75 E driver's seat

### WARNING

Risk of accident from sudden adjustment of the seat or of the seat backrest!

If the seat or the seat backrest is adjusted unintentionally, it can lead to uncontrolled movements by the driver. This may result in unintentional actuation of the steering or operating devices, thereby causing the truck or load to move in an uncontrolled fashion.

- Do not adjust the seat or the seat backrest while driving.
- Adjust the seat and the seat backrest so that all operating devices can be actuated safely.
- Ensure that the seat and the seat backrest are securely engaged.



### WARNING

On some equipment variants, the amount of head clearance on the truck may be restricted.

On these specific equipment variants, the distance between the head and the lower edge of the roofing sheet must be at least 40 mm.

### NOTE

*Observe any separate operating instructions for the seat.*

### WARNING

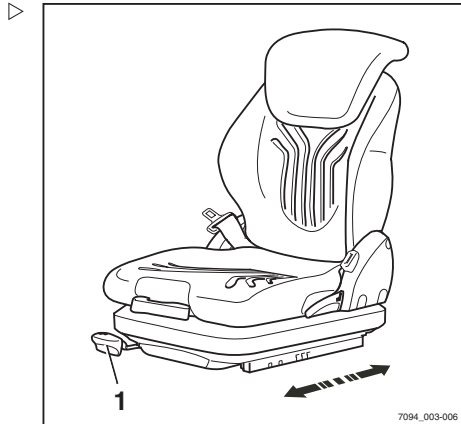
To obtain optimum seat cushioning, you must adjust the seat suspension to your own body weight. This course of action is better for your back and protects your health.

- To prevent injury, make sure that there are no objects within the swivel area of the seat.

## Testing and activities before daily use

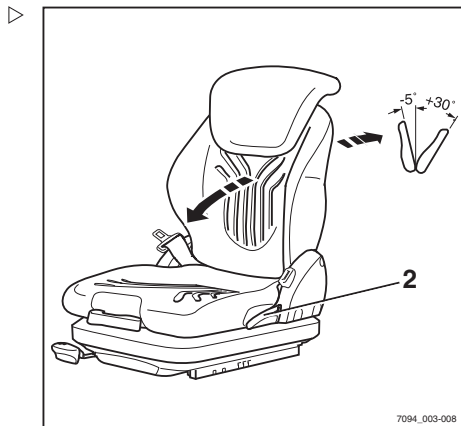
**Moving the driver's seat**

- Raise the lever (1) and hold it in position.
- Push the driver's seat into the required position.
- Release the lever.
- Ensure that the driver's seat is securely engaged.

**Adjusting the seat backrest**

Do not put pressure on the seat backrest while disengaging it.

- Raise the lever (2) and hold it in position.
- Push the seat backrest into the required position.
- Release the lever.
- Ensure that the seat backrest is securely engaged.

**NOTE**

*The backwards tilt angle of the seat backrest can be restricted by the structural conditions in the truck.*

### Adjusting the MSG 65/MSG 75 seat suspension

#### **i** NOTE

The MSG 65/MSG 75 driver's seat is designed for people weighing between 45 kg and 170 kg. The driver's seat can be adjusted to suit the weight of the individual driver. To obtain optimal settings for the seat suspension, the driver must perform the adjustment whilst sitting on the seat.

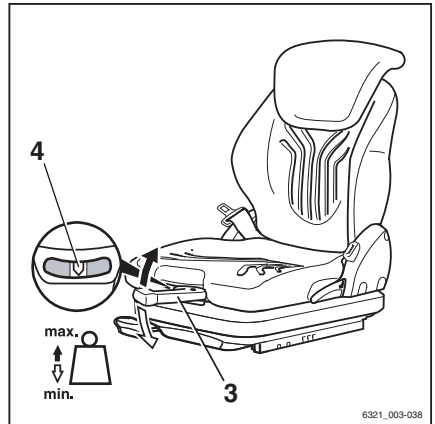
#### **i** NOTE

The MSG 75 seat is equipped with electric air suspension that is activated using an electric switch instead of the lever (3).

- Fully fold out the weight-adjusting lever (3).
- Pump the lever up or down to set the driver's weight.
- Return the weight-adjusting lever to the initial central position each time before raising it again (a click can be heard when this position is reached).
- Fully retract the weight-adjusting lever once the adjustment is complete.

#### **i** NOTE

The correct driver's weight has been selected when the arrow (4) is in the centre position in the inspection window. If there is a noticeable empty stroke when you pump the weight-adjusting lever, the minimum or maximum weight setting has been reached.



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### Adjusting the MSG 75 E seat suspension

#### **i** NOTE

The MSG 75 E driver's seat is designed for persons weighing between 50 kg and 160 kg. It is equipped with electric air suspension, which automatically adjusts to the driver's weight.

- Sit on the driver's seat.
- Turn the key switch to the "I" position.

## Testing and activities before daily use

The seat automatically adjusts to the driver's weight.

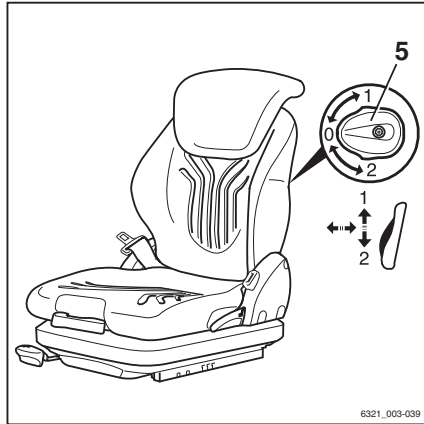
### Adjusting the lumbar support (variant) ▷



#### NOTE

*The lumbar support can be adjusted to suit the contours of the individual driver's spine. Adjusting the lumbar support moves a convex support cushion into the upper or lower part of the backrest.*

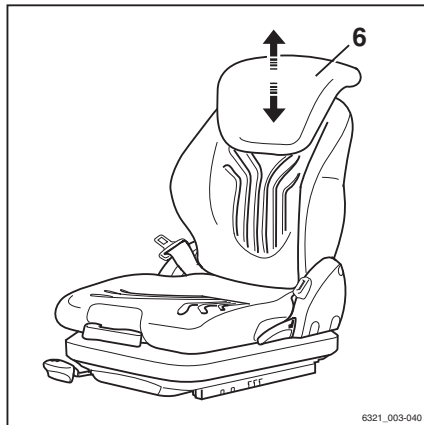
- Turn the turning knob (5) up or down until the lumbar support is in the required position.



### Adjusting the backrest extension (variant) ▷

- Adjust the backrest extension (6) by pulling it out or pushing it into the desired position.

To remove the backrest extension, move it past the end stop by firmly pushing it upwards.



### Switching the seat heater (variant) on and off

#### NOTE

The seat heater functions only if the seat contact switch is active, i.e. when the driver is sitting on the driver's seat.

- Switch the seat heater (7) on or off using the switch.



### Swivelling the driver's seat to the right for reverse travel (variant)

#### WARNING

Risk of accident due to the seat swivelling.

If the driver's seat swivels while the truck is in motion, the seat position is unstable. There is a risk of accident.

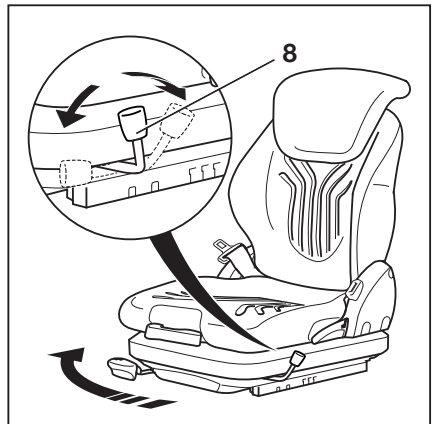
- Swivel the driver's seat only when the truck is at a standstill.

The driver's seat can be swivelled to the right to make reverse travel easier. The optimised seat position means that it is not necessary to turn your upper body as far. This makes it easier to look backwards.

To swivel the seat to the right for reverse travel:

- Sit on the driver's seat.
- To swivel the driver's seat, pull the lever (8) back and hold it in position.
- Swivel the driver's seat to the right until it reaches the stop.
- Move the lever (8) forwards again.
- Make sure that the driver's seat is securely engaged.

Swivelling the driver's seat to the right is intended only for reverse travel. The driver's seat must be swivelled back for forward travel.



## Testing and activities before daily use

To swivel the driver's seat back for forward travel:

- To swivel the driver's seat back to its original position, pull the lever (8) back and hold it in position.
- Swivel the driver's seat to the left until it reaches the stop.
- Move the lever (8) forwards again.
- Make sure that the driver's seat is securely engaged.

## Seat belt



### **⚠ DANGER**

**Even when using an approved restraint system, there is some residual risk of the driver being injured if the truck tips over.**

This risk of injury can be reduced through the combined use of the restraint system and the seat belt.

In addition, the seat belt protects against the consequences of rear-end collisions and falling off a ramp.

- We therefore recommend that you also use the seat belt.

### **⚠ DANGER**

**Only bracket doors (variant) and the driver's cab (variant) with closed, fixed doors constitute driver restraint systems. Plastic doors (weather protection) do not constitute a restraint system!**

If the doors are open or have been removed, you must use an alternative suitable restraint system (e.g. a seat belt)!

## Fastening the seat belt

### **⚠ DANGER**

#### **Risk to life when driving without a seat belt!**

If the truck tips over or crashes into an obstacle and the driver is not wearing the seat belt, the driver may be thrown from the truck. The driver could slide under the truck or collide with an obstacle.

There is a risk of fatal injury!

- Fasten the seat belt before every trip.
- Do not twist the seat belt when fastening it.
- Only use the seat belt to secure one person!
- Have any malfunctions repaired by the authorised service centre.

### **i NOTE**

*The buckle has a buckle switch. When the belt was not fastened, the following occurred:*

- *The message Close safety belt appears in the display-operating unit.*
- *The truck will not drive at speeds faster than 4 km/h.*
- Pull the seat belt (3) smoothly out of the belt retractor and fasten closely around the body over the thighs.

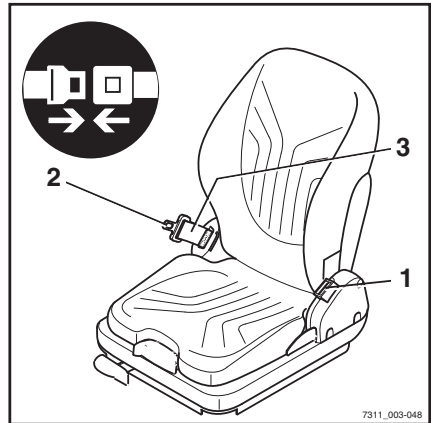
### **i NOTE**

*Sit as far back as possible so that your back is leaning against the seat backrest. The automatic blocking mechanism permits sufficient freedom of movement on the seat.*

- Click the belt tongue (2) into the buckle (1).
- Check the tension of the seat belt. The belt should fit closely around your body.

## Special feature for trucks with a cab (variant)

If the truck is equipped with a cab (variant), it will have a cab door sensor. If the seat belt is not fastened and the cab door is not closed, the driving speed is limited to 4 km/h. The message *Close the cab door or fasten belt* appears in the display.



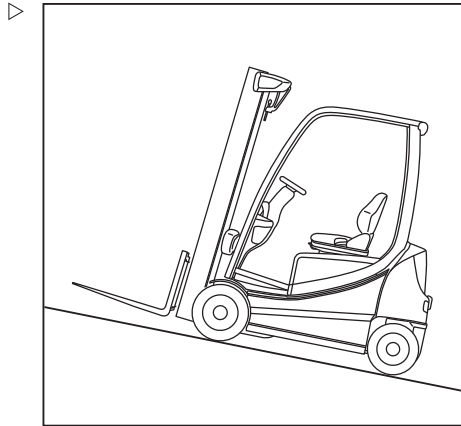
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## Testing and activities before daily use

### Fastening on a steep slope

The automatic blocking mechanism prevents the belt from being extended whenever the truck is on a steep gradient. It is no longer possible to pull the seat belt out of the belt retractor.

- Move away carefully from the slope.
- Fasten the seat belt.



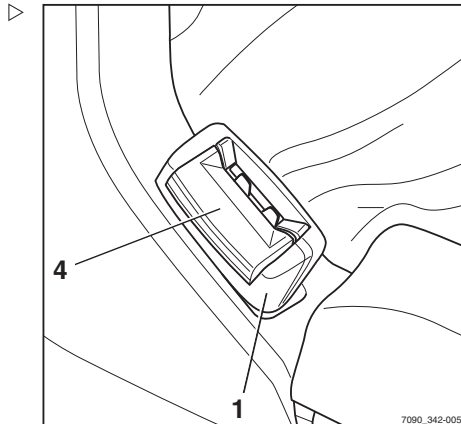
### Releasing the seat belt

- Press the red button (4) on the buckle (1).
- Slowly guide the belt tongue back to the retractor by hand.

#### NOTE

*Do not allow the seat belt to retract too quickly. The automatic blocking mechanism may be triggered if the belt tongue strikes the housing. It will then no longer be possible to pull the seat belt out with the usual force.*

- Using increased force, pull the seat belt around 10 to 15 mm out of the retractor to disengage the blocking mechanism.
- Slowly allow the seat belt to retract again.
- Protect the seat belt from dirt, for example, by covering it.



### Malfunction due to cold weather conditions

- If the buckle or belt retractor are frozen, thaw the buckle and the belt retractor and dry the parts to prevent them from refreezing.



**⚠ CAUTION**

The seat belt may be damaged by heat!

Do not subject the buckle or belt retractor to excessive heat when thawing.

- Do not use air warmer than 60°C when thawing.

**Adjusting the armrest****⚠ DANGER**

**There is a risk of accident if the armrest lowers suddenly, causing the driver to move in an uncontrolled manner.**

This may result in unintentional actuation of the steering or operating devices and thus cause the truck or load to move in an uncontrolled fashion.

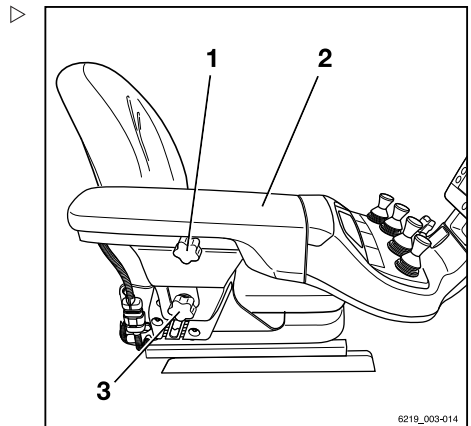
- Do not adjust the armrest while driving.
- Adjust the armrest so that all operating devices can be actuated safely.
- Ensure that the armrest is securely tightened.

**Adjusting the length of the armrest**

- Release the star-grip handle (1) by turning to the left.
- Shift the armrest (2) into the desired position.
- Tighten the star-grip handle by turning to the right.
- Check that the armrest is firmly attached.

**Adjusting the height of the armrest**

- Release the hand wheel (3) by turning to the left.
- Shift the armrest (2) into the desired position.
- Tighten the hand wheel by turning to the right.
- Check that the armrest is firmly attached.



## Testing and activities before daily use

**Adjusting the steering column**

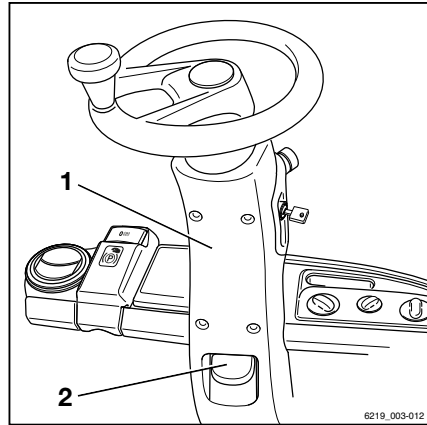
- Pull up and hold the lever (2) for steering column adjustment.
- Position the steering column (1), then push the lever down again and allow the steering column to engage.

**⚠ DANGER****Risk of accident!**

- Ensure that the steering column is positioned securely.

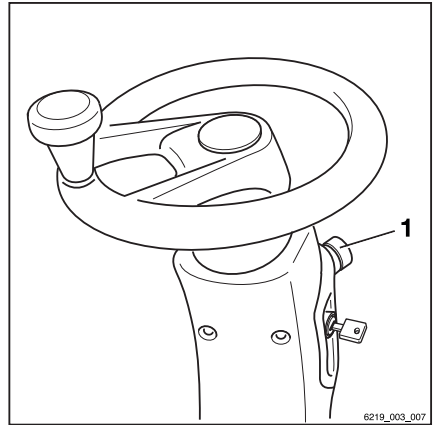
The steering column must click into place.

Never adjust the steering column while driving.



### Unlock the emergency off switch

- Turn the emergency off switch (1) clockwise until it pops out.



### Switching on the key switch

#### ⚠ WARNING

All checks and tasks required before daily use must have been performed without any defects being identified before switching on the truck.

- Perform the visual inspections and function checking.
- Do not operate the truck if defects have been detected; contact the authorised service centre.

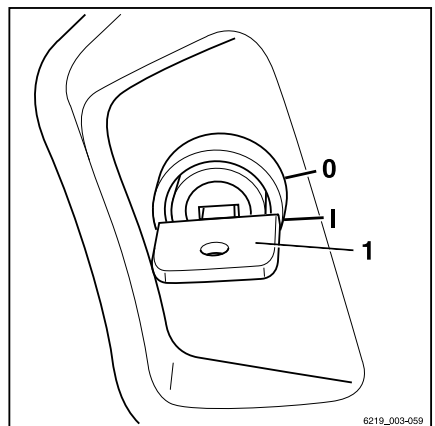
- Insert the switch key (1) into the key switch and turn to the "I" position.

#### **i** NOTE

*If the truck is equipped with the "access authorisation with PIN code" variant, the display initially changes to the input menu for access authorisation.*

- For information about the "access authorisation with PIN code" variant, refer to the original operating instructions for the display-operating unit.

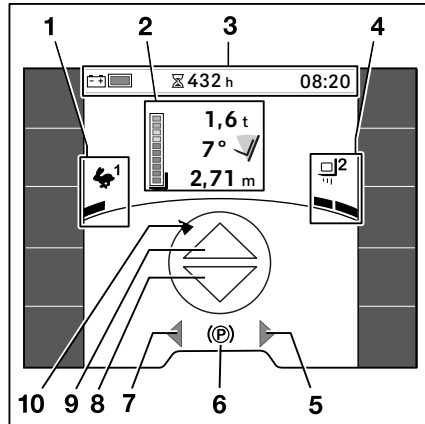
Once the truck is ready for operation, the main display appears on the display.



## Testing and activities before daily use

## Main display

- 1 Selected drive programme with dynamics bar
- 2 Load parameters display
- 3 Status bar: battery charge, operating hours, time
- 4 Selected load dynamics programme with dynamics bar
- 5 Right-hand turn indicator display
- 6 Driving speed/parking brake
- 7 Left-hand turn indicator display
- 8 Reverse drive direction indicator
- 9 Forward drive direction indicator
- 10 Steering angle display



Additional information may appear on the display.

- For information and in the event of malfunctions, refer to the original operating instructions for the display-operating unit.

**NOTE**

*After connecting the battery, the correct charge state may not be displayed until the battery is placed under load in the form of driving or lifting operations.*

## Switching on via push button (variant)

### WARNING

All checks and tasks required before daily use must have been performed without any defects being identified before switching on the truck.

- Perform visual inspections and function checking.
- Do not operate the truck if defects have been detected; contact the authorised service centre.

The "switch on via push button" variant is available only in conjunction with the "FleetManager" or "access authorisation with PIN code" variants. In place of the key switch, the truck has a push button to switch the truck on and off.

When the push button (1) is actuated or the driver sits in the driver's seat, it is necessary to enter the PIN code or place the FleetManager card in the appropriate position:

- Within 10 seconds if the driver's seat is not occupied
- Within 1 minute if the driver's seat is occupied

If the driver does not log in via "access authorisation with PIN code" or FleetManager, the controller switches the truck off again.

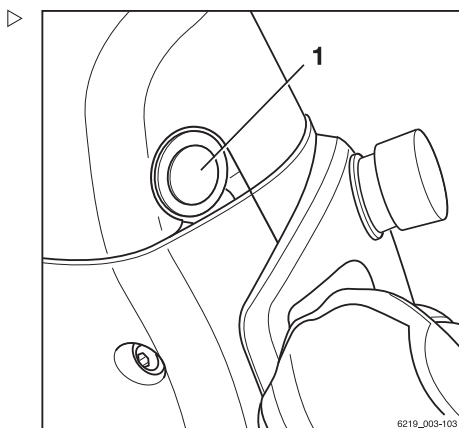
- For information about the "FleetManager" or "access authorisation with PIN code" variants, refer to the original operating instructions for the display-operating unit.
- To switch on the truck, press the push button (1) or sit in the driver's seat.

Once the truck is ready for operation, the main display appears on the display.

- To switch off the truck, press and hold the push button (1) for 1 second.

### Access authorisation with PIN code (variant)


Trucks equipped with the "Access authorisation with PIN code" variant are protected against unauthorised use by a PIN code. So that the same truck can be used by different drivers, individual PIN codes can be specified.



## Testing and activities before daily use

When the key switch is switched on, the "Access authorisation" input menu appears.

All hydraulic functions and drive functions of the truck are blocked. The function of the hazard warning system (variant) is guaranteed.

- To activate the blocked functions, use the Softkeys to enter the PIN code.
- To confirm, push the  button.


If the input was correct, the display changes to the main display. The truck is ready for use.

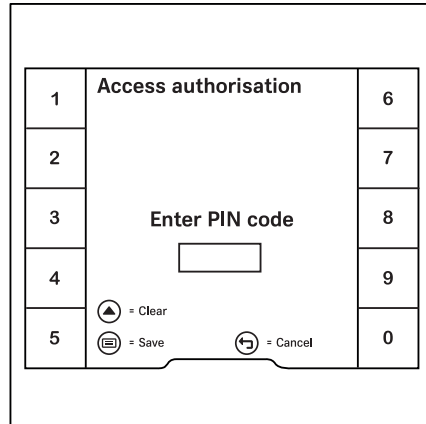
- If the input was incorrect, enter the PIN code again.



### NOTE

*The authorised service centre can configure the access authorisation so that the PIN code has to be re-entered each time someone leaves the truck.*

When the driver's seat is occupied again, the message **Log in**  appears. The display then changes to the "Access authorisation" input menu.

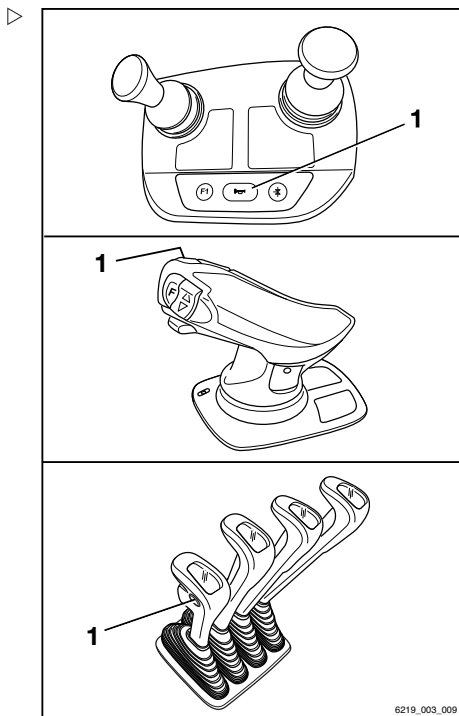


### Operating the signal horn

The signal horn is used to warn people against imminent danger or to announce your intention to overtake.

- Press the signal horn button (1).

The signal horn sounds.



## Testing and activities before daily use

## Driver's cab

**⚠ DANGER****Risk of fatal injury in the event of falling from the truck if it tips over!**

In order to prevent the driver from sliding underneath the truck and being crushed if the truck tips over, a restraint system must be in place and must be used. The restraint system prevents the driver from being thrown from the truck if it tips over. The cab door must be sturdy and be closed in order for the driver's cab to function as a driver restraint system. Fabric-covered cabs (variant) with doors made of plastic or canvas do not constitute a driver restraint system and offer no protection from the consequences of the truck tipping over!

- Close the cab door before use.
- If the door is open or has been removed, use a comparably secure restraint system.
- We recommend that you always use the seat belt.

### Checking the brake system for correct function

**⚠ DANGER****If the brake system fails, the truck will be insufficiently braked. Risk of accident!**

- Do not operate the truck with a defective brake system.

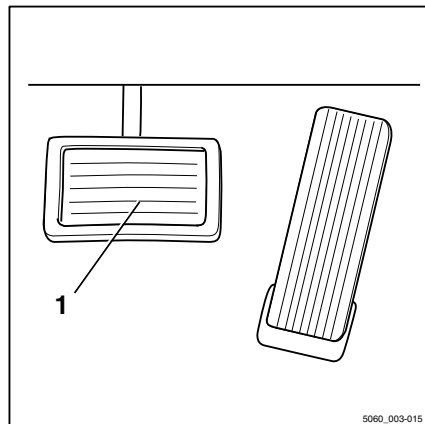
### Checking the foot brake

- Release the parking brake.
- Press the brake pedal (1).

There must be a slight pedal clearance and then a noticeable brake pressure point.

- Accelerate the unladen truck in a clear area.
- Press the brake pedal (1) firmly.

The truck must decelerate noticeably.



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## Checking the parking brake



### **⚠ DANGER**

**There is a risk of fatal injury from being run over if the truck rolls away.**

- Do not park the truck on gradients.
- Do not leave the truck until the parking brake has been applied.
- In an emergency, secure the truck with wedges on the downhill-facing side to prevent it from rolling away.

- Apply the parking brake on a steep gradient (e.g. a ramp).

The truck must stop and remain stationary.

- If the truck rolls despite the parking brake being applied, notify the authorised service centre.
- If there is no gradient available, actuate the emergency off switch while moving at walking speed. Then apply the parking brake.

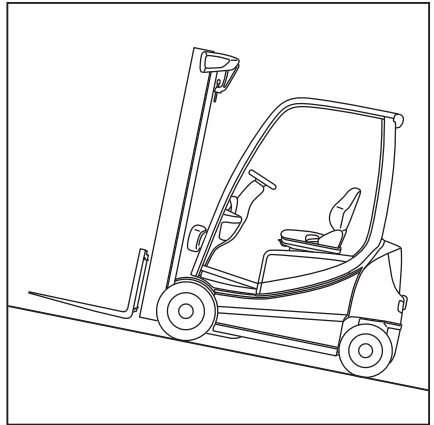
The truck must stop and remain stationary.

### **⚠ WARNING**

Risk of accident!

The truck may decelerate abruptly.

- Use the restraint systems.
- If the truck continues to roll, unlock the emergency off switch and safely bring the truck to a standstill with the service brake.
- Secure the truck with wedges so that the truck does not roll away.
- Contact your authorised service centre.



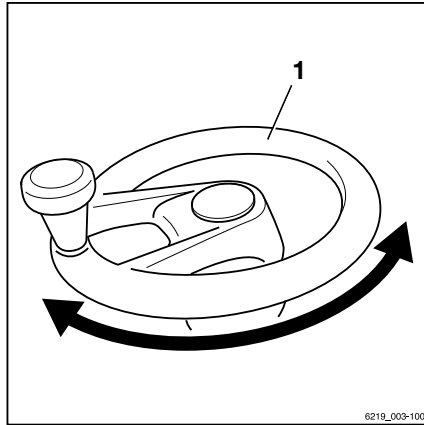
## Testing and activities before daily use

### Checking the steering system for correct function

#### **⚠ DANGER**

If the hydraulics fail, there is a risk of accident as the steering characteristics have changed.

- Do not operate the truck if it has a defective steering system.
- 
- Operate the steering wheel (1). The steering play while stationary must not be more than two finger widths.



### Checking the emergency off function


#### **⚠ WARNING**

No electric braking assistance is available when the emergency off switch is actuated!

Actuating the emergency off switch will disconnect the drives from the power supply.

- To brake, actuate the service brake.
- 
- Drive the truck forwards slowly.
  - Push the emergency off switch (1).

The truck will coast.

The display-operating unit shows the symbol  and the message EMERGENCY OFF active.

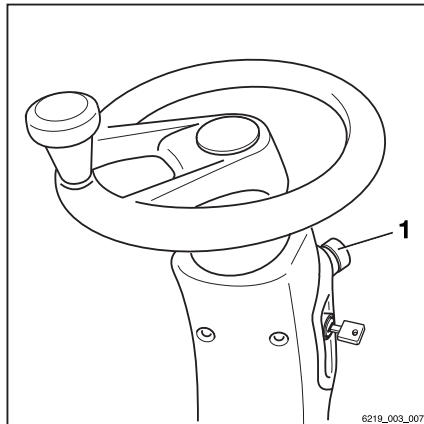
- Brake the truck to a standstill by actuating the brake pedal.

#### **i NOTE**

*In trucks with an electric parking brake, the electric parking brake will be applied as soon as the truck comes to a stop.*

- Turn the emergency off switch (1) clockwise until it pops out.

The truck performs an internal self-test and is then ready for operation again.



## Checking the automatic mast vertical positioning (variant) for correct function ▷

### ⚠ CAUTION

Risk of damage to property due to the lift mast colliding with racks or other objects!

- Before using the "automatic mast vertical positioning" comfort feature, position the truck at a sufficient distance from racks and other objects.

Goods, such as paper rolls, can be lowered vertically with precision using the "automatic mast vertical positioning" comfort feature, thereby avoiding damage when unloading. "Automatic mast vertical positioning" functions when the lift mast is tilted forwards. The tilt cylinders run into the end stops gently to prevent hard vibrations and impacts. Oscillating motions of the truck are minimised, thus increasing work safety. The automatic mast vertical positioning reduces wear on various components and therefore reduces repair costs.


The "automatic mast vertical positioning" comfort feature consists of the following individual functions:

- Display of the "automatic mast vertical positioning"
- Automatic approach towards the "automatic mast vertical position"
- End-stop damping

The truck can also be fitted with the individual functions for "end-stop damping" and display for the "lift-mast tilt angle".

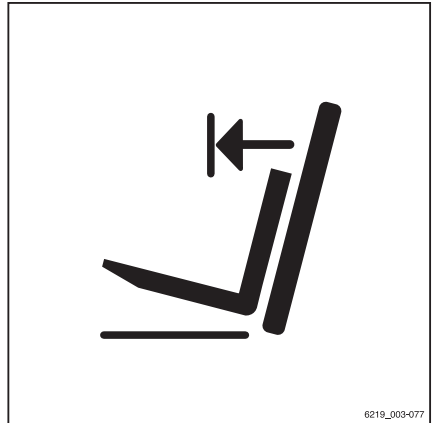
### **i** NOTE

*Function checking for the automatic mast vertical positioning must be carried out whenever the truck is used.*

- Push the "automatic mast vertical positioning" softkey .

The  symbol appears in the display.

- Tilt back the lift mast until it reaches the end stop.



## Testing and activities before daily use

- Tilt the lift mast forwards.

The lift mast must stop in the vertical position.

The automatic mast vertical positioning can be used.

### Zero adjustment of the load measurement (variant)

This function is available only if the truck is equipped with the "load measurement" variant.

To guarantee the accuracy of the load measurement at all times, a zero adjustment must be carried out.

Zero adjustment is required:

- Before daily use
- After changing the fork arms
- After fitting or changing attachments


If zero adjustment is required, the message **Zero adjustment necessary** appears.


#### NOTE

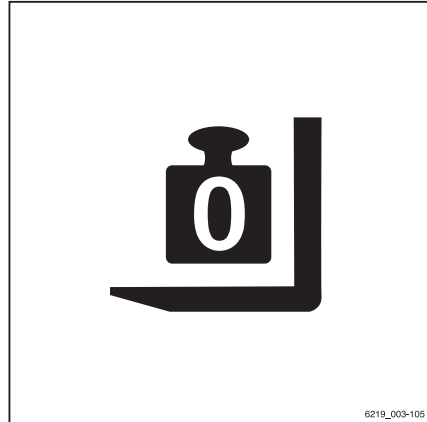
*An accurate zero adjustment is possible only if the fork is not under load and only during the first lifting stage of the lift mast.*

- *Do not take up a load yet*
- *Do not raise the fork to more than 800 mm above the ground*

The way in which the lifting system is operated depends on the operating devices included in the truck's equipment; see the "Lifting system operating devices" section in the chapter entitled "Lifting".

- Set the lift mast to vertical.
- Raise the fork to a height of between 300 mm and 800 mm.
- Push the "Zero adjustment" Softkey .

The "zero adjustment" symbol  appears on the display of the display-operating unit.



**i** NOTE


*During the following process, the fork carriage must be lowered slightly. While doing so, the fork must not touch the ground; otherwise, the zero adjustment will not be accurate.*

The message **Abruptly and slightly lower the fork** appears on the display of the display-operating unit.

- Lower the fork carriage slightly and release the operating device.

The message **Zero adjustment in progress** appears on the display of the display-operating unit.


- If the message **Zero adjustment unsuccessful** appears, repeat the procedure.

When the zero adjustment has been carried out correctly, the value **0 kg** appears on the display of the display-operating unit. The "zero adjustment" symbol  disappears.







## Lighting

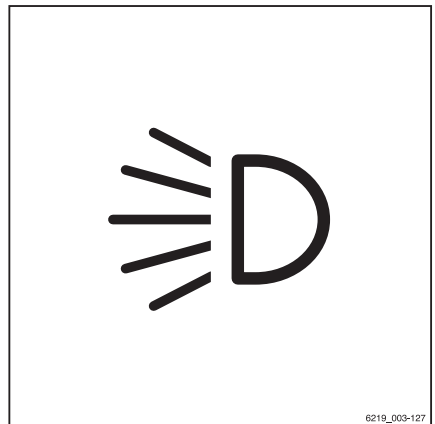
### Meaning of the symbols

Individual lighting devices are switched on and off using the "Lighting" sub-menu.

- To access this sub-menu, push the button .

Symbols for the lighting and their meanings

	Parking light
	Headlights
	Hazard warning system <sup>1</sup>
	Rotating beacon
	Front working spotlights
	Rear working spotlights



6219\_003-127

<sup>1</sup> This function is not available if the truck is equipped with the "StVZO" (German Road Traffic Licensing Regulations) variant. In this case, the hazard warning system is switched on and off via the hazard warning button on the steering column. For more information, refer to the section entitled "Hazard warning system".

## Lighting

Only the symbols of the lighting devices that are installed in the truck can be selected. When one of the lighting devices is switched on, the activation bar next to the relevant symbol lights up orange.

### Driving lights

- To switch on the parking light (1), push the associated Softkey on the display-operating unit.

The front side lights and the rear lights light up.

- To switch on the driving light (2), push the associated Softkey on the display-operating unit.

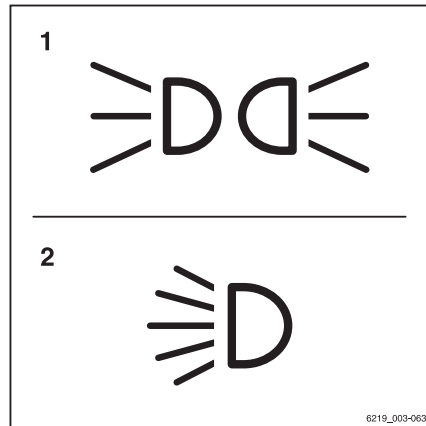
The headlights light up. For the StVZO (Road Traffic Licensing Regulations) equipment (variant), the licence plate lamp also lights up if the truck is equipped with it.

- To switch off the driving light (2), push the Softkey again.

The driving light and licence plate lamp go out.

- To switch off the parking light (1), push the Softkey again.

The front side lights and the rear lights light up.



- 1 Parking light
- 2 Driving light

## Working spotlights

### Front and rear working spotlights

- To switch on the front working spotlights (3), push the associated Softkey on the display-operating unit.

The front working spotlights light up.

- To switch off the front working spotlights (3), push the Softkey again.

The front working spotlights go out.

- To switch on the rear working spotlights (4), push the associated Softkey on the display-operating unit.

The rear working spotlights light up.

- To switch off the rear working spotlights (4), push the Softkey again.

The rear working spotlights go out.



#### NOTE

*For the StVZO (German Road Traffic Licensing Regulations) variant, the parking light is also switched on when the working spotlights are switched on. The licence plate lamp (if present) is also switched on when the forward-facing working spotlights are switched on.*

### Working spotlights on the roof and the side of the lift mast

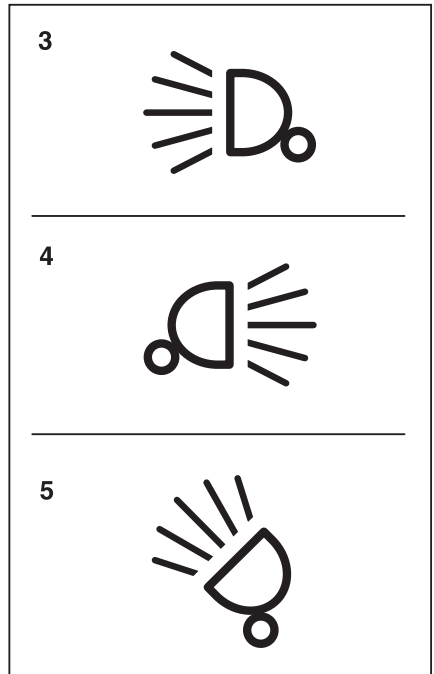
The roof spotlights light up the working area when the fork carriage is raised.

- To switch on the roof spotlights (5), push the associated Softkey on the display-operating unit.

The roof spotlights (5) light up.

- To switch off the roof spotlights (5), push the Softkey again.

The roof spotlights (5) go out.



- 3 Front working spotlights
- 4 Rear working spotlights
- 5 Roof spotlights

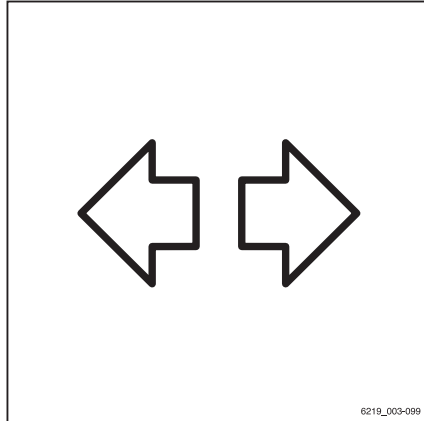
## Lighting

 NOTE

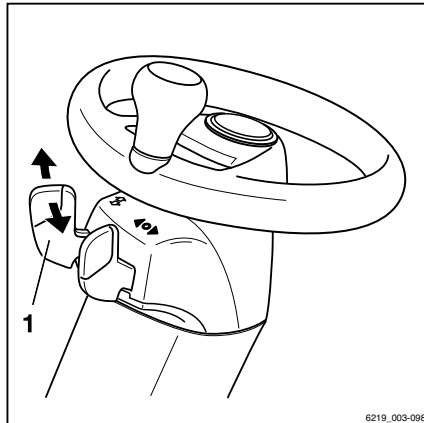
*Depending on the configuration, the roof spotlights automatically switch on when the fork carriage is raised.*

**Direction indicators**

The direction indicators are switched on and off via the mini-console.



- To switch on the left or right direction indicators, move lever (1) to the desired direction.



All direction indicators and the turn indicator displays on the display-operating unit flash.

- To switch off the direction indicators, push the lever (1) back to the centre position.

All direction indicators and the turn indicator displays on the display-operating unit stop flashing.



## Hazard warning system

Switching the hazard warning system on and off is different for trucks with and without the StVZO (German Road Traffic Licensing Regulations) variant.

- To switch on the hazard warning system, push the associated Softkey on the display-operating unit.

All direction indicators and the turn indicator displays on the display-operating unit flash.

- To switch off the hazard warning system, push the Softkey again.

All direction indicators and the turn indicator displays on the display-operating unit stop flashing.

## Specific features of the StVZO (German Road Traffic Licensing Regulations) variant

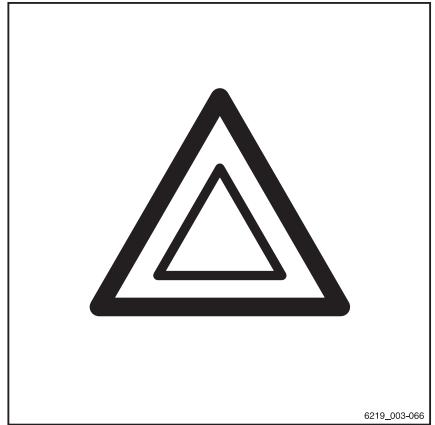
For the StVZO (German Road Traffic Licensing Regulations) variant, the hazard warning system cannot be switched on and off via the display-operating unit. This is done via the hazard warning button on the steering column.

- To switch on the hazard warning system, push and hold the hazard warning button (1) until the hazard warning system is switched on.

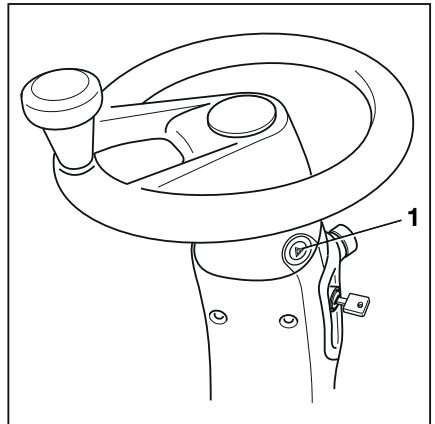
All direction indicators and the turn indicator displays on the display-operating unit flash.

- To switch off the hazard warning system, push the hazard warning button (1) again.

All direction indicators and the turn indicator displays on the display-operating unit stop flashing.



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## Lighting

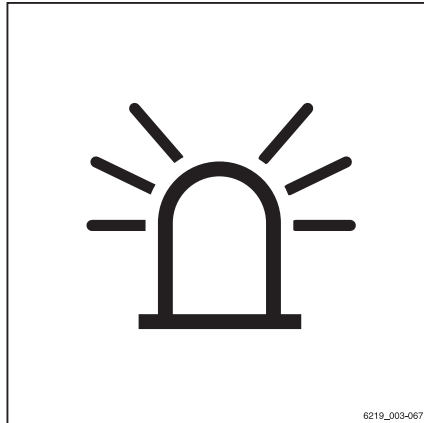
## Rotating beacon

- To switch on the rotating beacon, push the associated Softkey on the display-operating unit.

The rotating beacon is switched on.

- To switch off the rotating beacon, push the Softkey again.

The rotating beacon goes out.



6219\_003-067

## STILL SafetyLight (variant)


**WARNING**

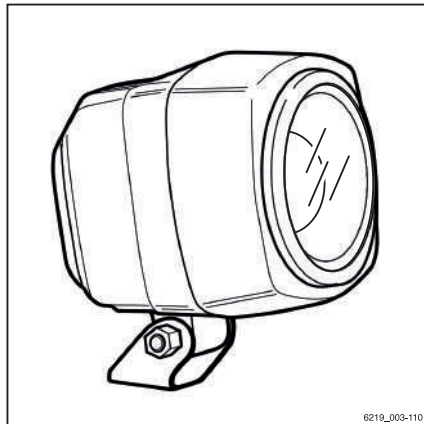
Danger of eye damage if looking into the STILL SafetyLight.

**Do not** look into the STILL SafetyLight.

The STILL SafetyLight is a visual warning unit to enable early detection of trucks in driving areas with low visibility (such as drive lanes, high racks), as well as at blind junctions. The STILL SafetyLight is mounted on a support on the overhead guard such that it is not affected by jolts and vibrations. The STILL SafetyLight projects one or more light-blue light spots in front of or behind the truck and thus warns others about the approaching truck. Several light spots are projected as a chase light. The chase light indicates the location of the truck with its direction of travel.

Depending on the configuration of the truck, the STILL SafetyLight automatically switches itself on when the truck is moving. The STILL SafetyLight can also be switched on and off on the display-operating unit.

- To do so, push the Softkey .



6219\_003-110

 **NOTE**

*If the truck is to be operated on public roads,  
the STILL SafetyLight must be switched off.*

## Efficiency and drive modes

### Efficiency and drive modes

#### Blue-Q efficiency mode

##### Functional description

The Blue-Q efficiency mode affects both the drive unit and the activation of the additional consumers and reduces the truck's energy consumption.

If the efficiency mode has been activated, the acceleration behaviour of the truck changes to make acceleration more moderate.

When travelling at low speeds, normally when manoeuvring, no reduction is noticeable despite the activated efficiency mode. For moderate speeds of at least approx. 7 km/h, acceleration is gentler. Therefore, on distances of up to approx. 40 m, lower speeds are reached than would be the case if the efficiency mode was not activated. As in "STILL Classic" mode, the maximum speed is 16 km/h.

Blue-Q has no influence on:

- Maximum speed
- Climbing capability
- Pulling force
- Braking characteristics

#### Switching Blue-Q efficiency mode on and off

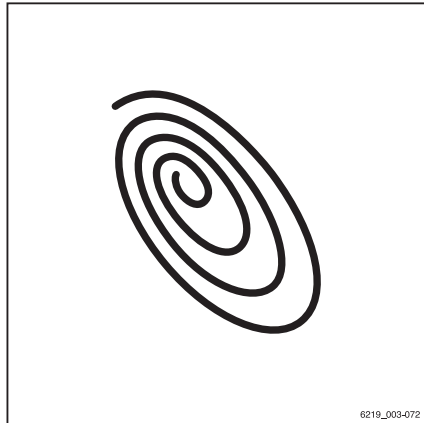
- To switch on Blue-Q efficiency mode, push the associated Softkey.

The Blue-Q symbol appears on the display-operating unit and Blue-Q efficiency mode is switched on.

- To switch off Blue-Q efficiency mode, push the associated Softkey again.

The Blue-Q symbol disappears and Blue-Q efficiency mode is switched off.

#### Effects on additional consumers



The following table shows the specific conditions that cause certain auxiliary devices to shutdown when Blue Q is activated. The additional consumers available depend on the truck equipment.

Shut-off	Seat switch	Truck is stationary	Drive direction
Front working spotlight*	X	X	Backwards > 3 km/h
Rear working spotlight*	X	X	Forwards
Roof spotlight*	X	X	> 3 km/h
Headlight*	X	X	-
Side light	-	-	-
Front wiper	X	X	Backwards > 3 km/h
Rear wiper	X	X	Forwards
Roof wiper	X	X	-
Seat heater	X	-	-
Cab heating	X	-	-
Screen heating	X	-	-

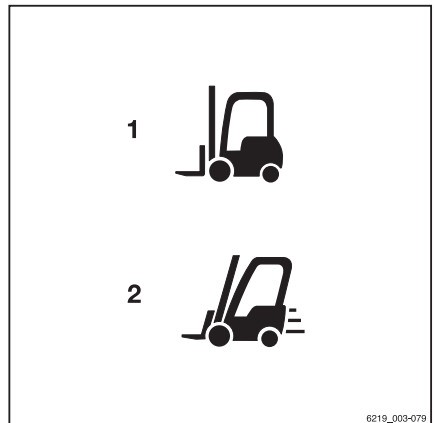
\*No shut-off for StVZO (German Road Traffic Licensing Regulations) equipment (variant)

### Drive modes

The drive modes influence the driving performance and the lifting performance of the electric drive.

The STILL Classic mode (1) is the default setting. This mode guarantees a balance between hydraulic functions and driving functions. The maximum speed is 16 km/h. When this mode is active, no symbol is shown on the display.

In sprint mode (2), the truck accelerates more quickly to a maximum speed of 20 km/h. This mode also increases the lifting speed. Sprint mode is for driving on clear and spacious terrain.




**i** NOTE

*The use of sprint mode increases the trucks energy consumption. The battery is therefore discharged more quickly. The drive units heat up more quickly.*

## Efficiency and drive modes

### Switching sprint mode on and off

- To switch on sprint mode, push the associated Softkey.

The "sprint mode" symbol  (2) appears on the display of the display-operating unit. Sprint mode is switched on.

- To switch off the mode, push the Softkey again.

The symbol disappears and the mode is switched off. The truck is then back in STILL Classic mode.

### Automatic switch off for sprint mode

If the truck is operated in sprint mode at the maximum performance level, the truck will consume more energy. As a result, the battery is discharged faster and the traction drives and energy supply may become too hot.

The battery voltage and the temperature of the traction drives and energy supply are monitored continuously. If under voltage (does not apply to lithium-ion batteries) or overheating occurs, sprint mode is automatically deactivated.

- To release the sprint mode due to under voltage, restart the truck with a fully charged battery.

## Driving

### Safety regulations when driving

#### Driving conduct

The driver must follow the public rules of the road when driving in company traffic.

The speed must be appropriate to the local conditions.

For example, the driver must drive slowly around corners, in tight passageways, when driving through swing-doors, at blind spots, or on uneven surfaces.

The driver must always maintain a safe braking distance from vehicles and persons in front, and must always have the truck under control. Stopping suddenly, turning quickly and overtaking at dangerous or blind spots must be avoided.

- Initial driving practice must be carried out in an empty space or on a clear roadway.

The following are forbidden during driving:

- Allowing arms and legs to hang outside the truck
- Leaning the body over the outer contour of the truck
- Climbing out of the truck
- Moving the driver's seat
- Adjusting the steering column
- Releasing the seat belt
- Disabling the restraint system
- Raising the load higher than 300 mm above the ground (with the exception of manoeuvring processes during the placement into stock/removal from stock of loads)
- Using electronic devices, for example radios, mobile phones etc.

## Driving

### **⚠ WARNING**

The use of multimedia and communication equipment as well as playing these devices at an excessive volume during travel or when handling loads can affect the operator's attention. There is a risk of accident!

- Do not use devices during travel or when handling loads.
- Set the volume so that warning signals can still be heard.

### **⚠ WARNING**

In areas where use of mobile phones is prohibited, use of a mobile phone or radio telephone is not permitted.

- Switch off the devices.

## Visibility when driving

The driver must look in the drive direction and have a sufficient view of the driving lane.

Particularly for reverse travel, the driver must be sure that the driving lane is clear.

When transporting goods that impair visibility, the driver must drive the truck in reverse.

If this is not possible, a second person acting as a guide must walk in front of the truck.

In this case the driver must only move at walking pace and with extra care. The truck must be stopped immediately if eye contact with the guide is lost.

Rear-view mirrors are only to be used for observing the road area behind the truck and not for reverse travel. If visual aids (mirror, monitor) are necessary to achieve sufficient visibility, it is necessary to practise using them. For reverse travel using visual aids, extra care should be taken.

When using attachments, special conditions apply; see the chapter entitled "Fitting attachments".

Any glass (variant, e.g. windscreen) and mirrors must always be clean and free of ice.



## Roadways

### Dimensions of roadways and aisle widths

The following dimensions and aisle width requirements apply under the specified conditions to ensure safe manoeuvring. In each case, a check must be performed to determine whether a larger aisle width is necessary, e.g. in the case of deviating load dimensions, attachments, lift masts and tow couplings.

Within the EU, "Council Directive 89/654/EEC concerning the minimum safety and health requirements for the workplace" must be observed. The respective national guidelines apply for areas outside the EU.

The required aisle widths depend on the dimensions of the load.

### Required aisle widths with pallet

Model	Type	Aisle width [mm]	
		With pallet 1000x1200 crosswise	With pallet 800x1200 lengthwise
RX20-14C	6219	3186	3311
RX20-16C	6220	3186	3311
RX20-16	6221	3269	3394
RX20-16L	6222	3377	3502
RX20-18	6223	3269	3394
RX20-18L	6224	3377	3502
RX20-20L	6225	3390	3516
RX20-16P	6226	3362	3487
RX20-16PL	6227	3470	3595
RX20-18P	6228	3362	3487
RX20-18PL	6229	3470	3595
RX20-20P	6230	3375	3501
RX20-20PL	6231	3483	3609

The truck may only be used on driveways that do not have curves that are too tight, have gradients that are too steep, and entrances that are not too narrow or low.

## Driving

**Driving on ascending and descending gradients****⚠ WARNING**

Risk of accident due to the drive unit switching off!

Driving up and down longer gradients may cause the drive unit to overheat and switch off. The truck will then no longer decelerate when the accelerator pedal is released and will coast.

Driving up and down longer gradients greater than 15% is not permitted due to the minimum specified braking values. The climbing capability values given below only apply to overcoming obstacles on the roadway and to short differences in level, e.g. ramps.

- Consult the authorised service centre before driving on long ascending and descending gradients greater than 15%.

**⚠ CAUTION**

Risk of component damage due to reduced ground clearance with the "hydraulic battery carrier" variant.

Trucks fitted with a hydraulic battery carrier (variant) have a reduced ground clearance, and the permitted climbing capability is therefore reduced. Irregularities in the ground, such as railway sleepers, must also be driven over with caution.

- Please note the following:

- The ground clearance is restricted
- When using worn tyres, the maximum ramp angle is only 7°

** NOTE**

*The values specified in the "Maximum climbing capability" table can be used only to compare the performance of forklift trucks in the same category. The specified values in no way represent the normal daily operating conditions.*

Trucks can theoretically be driven on the ascending and descending gradients in the following table.

**Maximum climbing capability**

Model	Type	Maximum climbing capability [%]	
		With load	Without load
RX20-14C	6219	30.3	27.9
RX20-16C	6220	27.6	26.0
RX20-16	6221	28.0	27.4
RX20-16L	6222	27.4	28.7
RX20-18	6223	25.1	26.0
RX20-18L	6224	25.3	28.3
RX20-20L	6225	23.0	26.9
RX20-16P	6226	27.8	27.8
RX20-16PL	6227	27.6	28.9
RX20-18P	6228	24.8	26.0
RX20-18PL	6229	25.4	28.6
RX20-20P	6230	22.9	25.1
RX20-20PL	6231	23.1	27.2

**Legend for model**

C	Compact
L	Long
P	Swing axle version

The ascending and descending gradients must not exceed the gradients listed above and must have a rough surface.

The top and bottom of the gradient must feature smooth and gradual transitions to prevent the load from falling to the ground or the truck being damaged.

**Warning in the event that components protrude beyond the truck contour**

Trucks are often required to drive through very narrow or very low spaces such as aisles or containers. The dimensions of the trucks are designed for this purpose. However, movable components may protrude beyond the truck

## Driving

contour and be damaged or torn off. Examples of these components are:

- An unfolded roof panel in the driver's cab
- Open cab doors

### Condition of the roadways

Roadways must be sufficiently firm and even. The surface must be free from contamination and fallen objects.

Drainage channels, level crossings and similar obstacles must be evened out and, if necessary, ramps must be provided so that trucks can drive over these obstacles with as few bumps as possible.

Take note of the load capacity of manhole covers, drain covers etc.

There must be sufficient distance between the highest points of the truck or the load and the fixed elements of the surrounding area. The height is based on the overall height of the lift mast and the dimensions of the load; see the chapter entitled "Technical data".

### Rules for roadways and the working area

It is only permitted to drive on routes authorised for traffic by the operating company or its representatives. Traffic routes must be free from obstacles. The load may be set down and stored only in the designated locations. The operating company and its representatives must ensure that unauthorised third parties do not enter the working area.



#### NOTE


*Please observe the definition of the following responsible person: "operating company".*


### Hazard areas

Hazard areas on roadways must be marked by standard traffic signs or, if necessary, by additional warning signs.

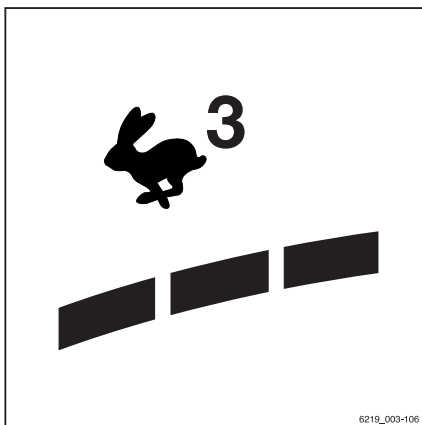
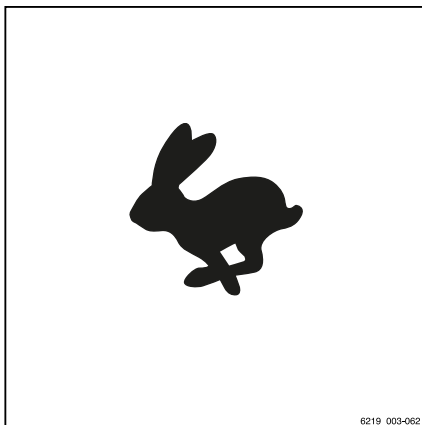
### Selecting drive programmes 1 to 3

The truck has three drive programmes with different characteristics for driving and braking. The basic principle is that the higher the number of the drive programme selected, the greater the driving dynamics.

The drive programme is selected using the display-operating unit under the "Drive"  menu item.

- Push the "drive programme" Softkey  until the number of the required drive programme appears on the display.

The number of dynamic bar segments visualises the driving dynamics of the selected drive programme.




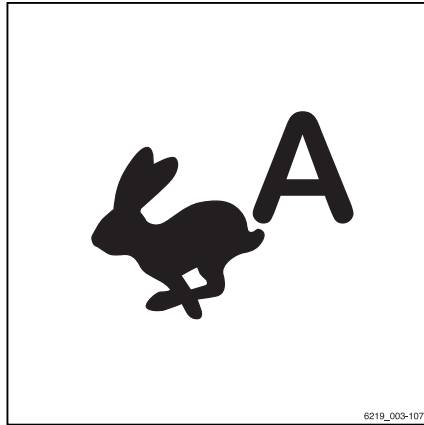
## Driving

**Selecting drive programme A or B** ▷

The truck has two drive programmes that can be configured with different handling and braking characteristics. These drive programmes are marked by the letters "A" and "B".

The handling and braking characteristics of the drive can be selected via the display-operating unit via the Softkey for the drive programmes "A" and "B".


- Push the "drive programme"  Softkey until the letter of the required drive programme appears on the display.

**Configuring drive programmes A and B**



The drive programmes can be configured by the driver.

**NOTE**

*Access to the settings menu is only available if the truck is at a standstill and the parking brake is applied. If the parking brake is released prematurely, the settings menu will close.*

- Stop the truck.
- Apply the parking brake.
- Press the  button.

The first menu level appears.

- Press the "settings"  Softkey.
- Press the Truck settings  Softkey.
- Press the Drive programme Softkey.

The "drive programme" menu appears.

- Press the associated Softkey for Drive programme A or Drive programme B.

Configuring the drive programs using the "drive programme A" is explained here.

The menu **Set drive programme A** appears.


The following parameters can be set:

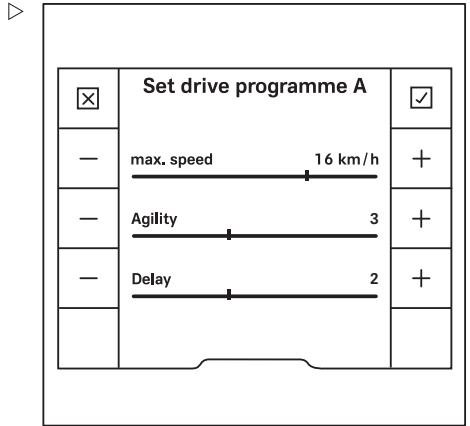
- **Max. speed**  
Determines the maximum speed (max. 20 km/h).
  - **Agility**  
Determines the acceleration in ten stages.
  - **Delay**  
Determines the deceleration in five stages.
- To increase the value of a parameter, press the appropriate "plus" + Softkey.
  - To decrease the value of a parameter, press the appropriate "minus" – Softkey.
  - To save the setting, press the "confirm"  Softkey.

The settings are saved.

- To cancel the setting, press the "cancel"  Softkey.

The settings return to the most recently saved value.

Press the button  once to return to the previous menu level.



### Selecting the drive direction

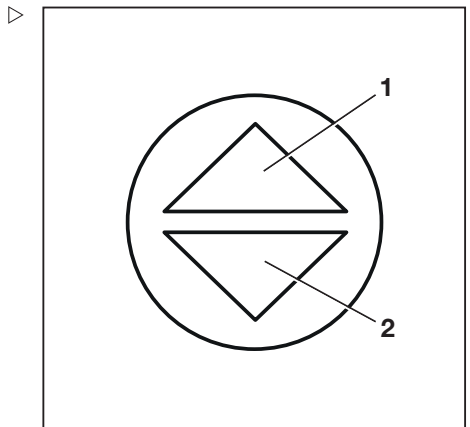
The drive direction of the truck must be selected using the drive direction switch before attempting to drive. The method of actuating the drive direction switch depends on the operating devices included in the truck's equipment.

Possible equipment variants include:

- Multi-lever
- Mini-lever
- Joystick 4Plus
- Mini-console

 **NOTE**

*The drive direction can also be changed during travel. Your foot can remain on the accelerator pedal while doing so. The truck is*



## Driving

*then decelerated and accelerated again in the opposite direction (reversing).*

The indicator for the selected drive direction ("forwards" (1) or "reverse" (2)) lights up on the display-operating unit.

### Neutral position

If leaving the truck for a prolonged period, the neutral position must be selected in order to avoid the truck suddenly moving off due to an inadvertent actuation of the accelerator pedal.

- Briefly select the drive direction switch for the direction opposite to the current drive direction.

The drive direction indicator on the display and operating unit goes out.



#### NOTE

*When leaving the seat, the selected drive direction is set to the "neutral position". To drive, the drive direction switch must be actuated again.*

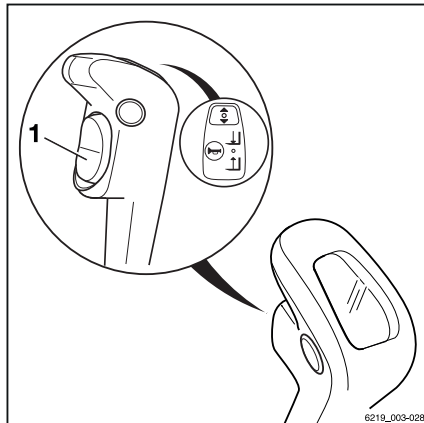
### Actuating the drive direction switch, multiple-lever version



#### NOTE

*Before actuating the drive direction switch refer to the notes about choosing the drive direction, see the section entitled "Selecting the drive direction".*

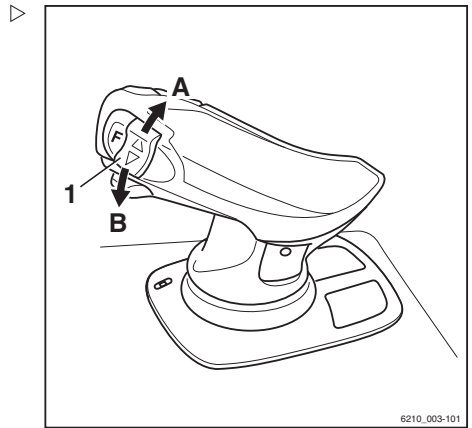
- For the "forwards" drive direction, push the drive direction switch (1) downwards.
- For the "backwards" drive direction, push the drive direction switch (1) upwards.





### Actuating the vertical rocker switch for the "drive direction", joystick 4Plus version

- For the "forwards" drive direction, push the vertical rocker button for the "drive direction"(1) upwards (A).
- For the "reverse" drive direction, push the vertical rocker button for the "drive direction"(1) downwards (B).



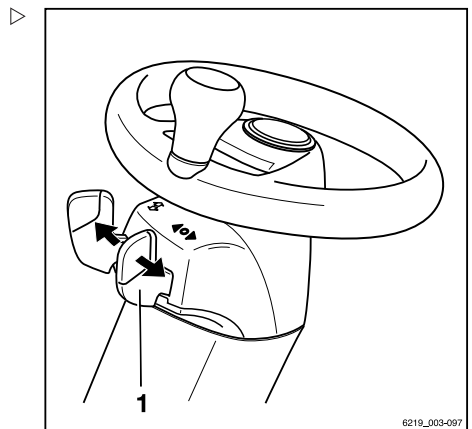
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### Actuating the drive direction switch, mini-console version

- For the "forwards" drive direction, push the drive direction switch (1) forwards
- For the "backwards" drive direction, push the drive direction switch (1) backwards.

#### NOTE

*Alternatively, the drive direction can also be selected using the drive direction switches on the operating devices.*



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### Starting drive mode

#### DANGER

**Being trapped under a rolling or tipping truck could cause fatal injuries!**

- Sit on the driver's seat.
  - Fasten the seat belt.
  - Activate the available restraint systems.
- 
- Observe the information in the chapter entitled "Safety regulations when driving".

## Driving

The driver's seat is equipped with a seat switch. This seat switch checks whether the driver's seat is occupied. If the driver's seat is not occupied or if the seat switch is malfunctioning, the truck cannot be moved and all lifting functions are locked. In these situations, the message *Sit in the driver's seat* appears on the display of the display-operating unit.

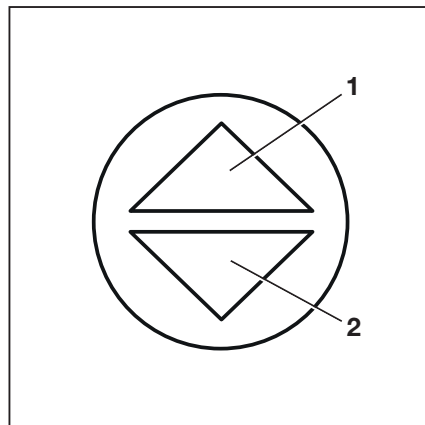
- Sit on the driver's seat. Fasten the seat belt.
- Lift the fork carriage until the necessary ground clearance is achieved.
- Tilt the lift mast backwards.
- Release the parking brake.
- Select the desired drive direction.

The indicator for the selected drive direction ("forwards" (1) or "reverse" (2)) lights up on the display-operating unit.



### NOTE

*Different warning signals can be emitted to indicate reverse travel depending on the equipment; an acoustic signal (variant) may sound, the warning light (variant) may light up or the hazard warning system (variant) may flash.*



- Press the accelerator pedal (3).

The truck will travel in the selected drive direction. The speed is controlled by the accelerator pedal position. The truck brakes when the accelerator pedal is released.

### **i** NOTE

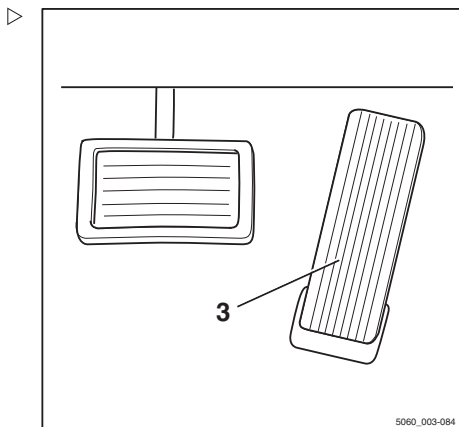
*The truck is also held in place on ascending or descending gradients even if the electric parking brake is not engaged.*

### **⚠ DANGER**

#### **Risk of accident due to brake failure!**

The electric brake only functions if the key switch is switched on, the emergency off switch has not been actuated and the parking brake is released.

- Use the brake pedal if the electric brake malfunctions.
- Engage the parking brake before leaving the truck.



## Changing the drive direction

- Take your foot off the accelerator pedal.
- Select the desired drive direction.
- Press the accelerator pedal.

The truck will travel in the selected drive direction.

### **i** NOTE

*The drive direction can also be changed during travel. Your foot can remain on the accelerator pedal while doing so. The truck is then decelerated and accelerated again in the opposite direction (reversing).*

### **i** NOTE

*If an electrical fault occurs in the accelerator, the drive unit is switched off. In this situation, the truck is not electrically braked. Once the electrical fault has been corrected, it will be possible to drive the truck again by releasing the accelerator pedal and then actuating the accelerator pedal again. If the truck still cannot be operated, park it securely and contact your authorised service centre.*

## Driving

## Starting drive mode, dual pedal version (variant)

### **⚠ DANGER**

**Being trapped under a rolling or tipping truck could cause fatal injuries!**

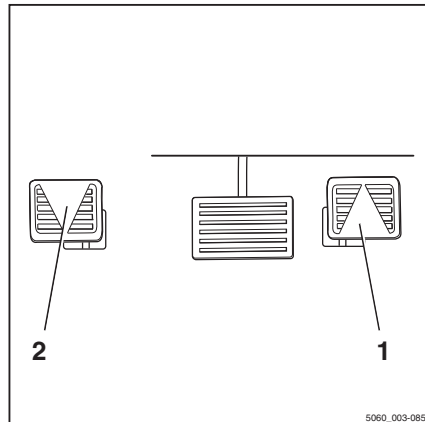
- Sit on the driver's seat.
  - Fasten the seat belt.
  - Activate the available restraint systems.
- 
- Observe the information in the chapter entitled "Safety regulations when driving".

The driver's seat is equipped with a seat switch. This seat switch checks whether the driver's seat is occupied. If the driver's seat is not occupied or if the seat switch is malfunctioning, the truck cannot be moved and all lifting functions are locked. In these situations, the message *Sit in the driver's seat* appears on the display of the display-operating unit.

- Sit on the driver's seat. Fasten the seat belt.
- Lift the fork carriage until the necessary ground clearance is achieved.
- Tilt the lift mast backwards.
- Release the parking brake.
- Press the right accelerator pedal (1) for the "forwards" drive direction and press the left accelerator pedal (2) for the "reverse" drive direction.

### **i NOTE**

*In the dual pedal version, the drive direction switches on the operating devices do not function.*



The indicator for the selected drive direction ("forwards" (1) or "reverse" (2)) lights up on the display-operating unit. ▷

**i NOTE**

*Different warning signals can be emitted to indicate reverse travel depending on the equipment; an acoustic signal (variant) may sound, the warning light (variant) may light up or the hazard warning system (variant) may flash.*

The truck will travel in the selected drive direction. The speed is controlled by the accelerator pedal position. The truck brakes when the accelerator pedal is released.

**i NOTE**

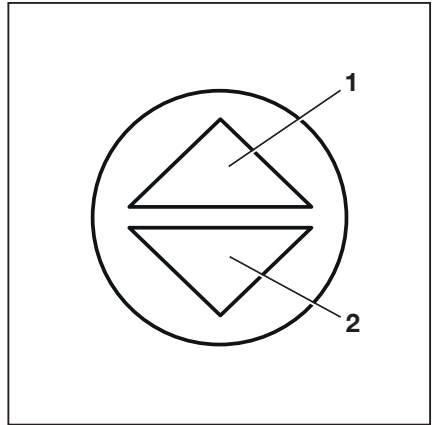
*The truck is also held in place on ascending or descending gradients even if the electric parking brake is not engaged.*

**⚠ DANGER**

**Risk of accident due to brake failure!**

The electric brake only functions while the key switch is switched on, the emergency off switch has not been actuated and the parking brake is released.

- Use the brake pedal if the electric brake malfunctions.
- Engage the parking brake before leaving the truck.



## Changing the drive direction

- Remove your foot from the actuated accelerator pedal.
- Press down the accelerator pedal for the opposite direction.

The truck will travel in the selected drive direction.

**i NOTE**

*If an electrical fault occurs in the accelerator, the drive unit is switched off. In this situation, the truck is not electrically braked. Once the electrical fault has been corrected, it will be*

## Driving

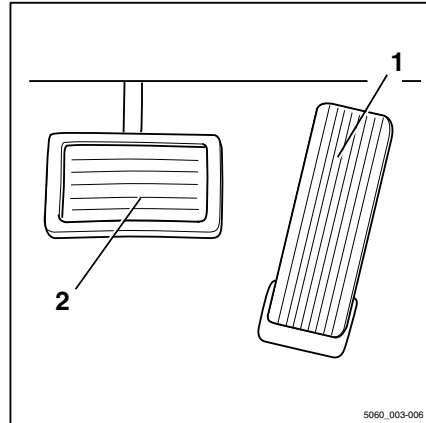
possible to drive the truck again by releasing the accelerator pedal and then actuating the accelerator pedal again. If the truck still cannot be operated, park it securely and contact your authorised service centre.

### Operating the service brake

The electric brake converts the acceleration energy of the truck into electrical energy. This causes the truck to decelerate.

Electrical braking recovers energy for the battery. This results in a longer operating time between charging operations and less wear to the brakes.

The truck can also be braked with the mechanical brake by actuating the brake pedal (2). In the first section of the brake pedal's travel, only the electric brake takes effect. As the pedal is depressed further, the mechanical brake is also activated and acts on the drive wheels



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#### **⚠ DANGER**

**If the service brake fails, the truck cannot brake sufficiently. There is a risk of accident!**

If the driver notices that the electrical braking effect has reduced by 50% and that the drive torque has decreased to 50% of the normal level, a component failure may have occurred.

- Bring the truck to a standstill using the brakes. Use the parking brake if necessary to assist in this process.
- Notify the authorised service centre.
- Do not operate the truck again until the service brake has been repaired.

#### **⚠ DANGER**

**At speeds that are too high, there is a danger that the truck could slip or overturn!**

The braking distance of the truck depends on the weather conditions and the level of contamination on the roadway. Note that the basic braking distance increases with the square of the speed.

- Adapt your driving and braking style to suit the weather conditions and the level of contamination on the roadway.
- Always choose a driving speed that will provide a sufficient stopping distance.

- Brake the truck by releasing the accelerator pedal (1).
- If the braking effect is inadequate, use the brake pedal (2) as well to apply the mechanical brake.

## Parking brake

Operation of the parking brake depends on which parking brake the truck is fitted with.

Possible equipment variants are as follows:

- Mechanical parking brake; see ⇒ Chapter "Applying the mechanical parking brake", P. 4-123
- Electric parking brake; see ⇒ Chapter "Actuating the electric parking brake (variant)", P. 4-126

## Applying the mechanical parking brake



### **⚠ DANGER**

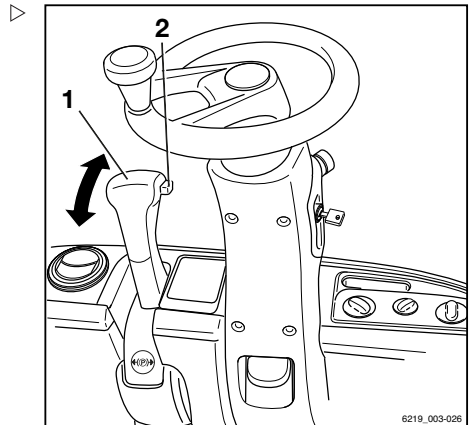
**There is a risk of fatal injury from being run over if the truck rolls away.**

- The truck must not be parked on a slope.
- In emergencies, secure the truck using wedges on the side facing downhill.
- Only leave the truck when the parking brake has been applied.

## Applying the parking brake

- Pull the parking brake lever (1) back fully and release.

The parking brake lever engages. The parking brake is engaged and the wheels of the drive axle are blocked. The message *Parking brake active* appears briefly on the display of the display-operating unit. The "parking brake" symbol (Ⓟ) appears on the display in place of the speed information.



## Driving

### Releasing the parking brake

- Pull the parking brake lever (1) back.
- Push down the knob (2) and hold it down.
- Move the parking brake lever (1) forwards and release both the lever and the knob.

The parking brake is released.



#### NOTE

*The parking brake lever swivels to the forward position automatically by means of spring force and only requires gentle manual movement. If the the movement of the parking brake is stiff, notify the authorised service centre.*

After the parking brake has been released, the previously selected drive direction is retained and is shown on the drive direction indicator.

### "Safe parking" function





This function monitors the braking effect after the truck is parked. If a sensor is fitted on the lift mast (variant), it also checks whether the fork carriage is lowered.

This function alerts the driver with an audible signal if:

- The driver leaves the driver's seat without applying the parking brake
- The driver leaves the driver's seat without lowering the fork carriage (variant)
- The driver attempts to switch off the truck without applying the parking brake
- The truck starts moving approximately 20 seconds after the parking brake is applied



**Activation and intervention of the function**

Cause	Effect
The parking brake has not been applied. The driver's seat is vacated.	The "actuate parking brake manually" symbol  appears on the display. A warning signal sounds. Sitting in the driver's seat silences the warning signal.
The parking brake has not been applied. The truck must be switched off.	The "actuate parking brake manually" symbol  appears on the display. The truck cannot be switched off. A warning signal sounds. Applying the parking brake silences the warning signal.
The parking brake has been applied but has not been applied correctly as a result of a malfunction The driver's seat is vacated.	The "actuate the parking brake manually" symbol  and the message <code>Parking brake error</code> appear in the display. A warning signal sounds. Sitting in the driver's seat silences the warning signal. Use wedges to prevent the truck from rolling away. Notify your authorised service centre.
The parking brake has been applied but has not been applied correctly as a result of a malfunction The truck must be switched off.	The "actuate the parking brake manually" symbol  and the message <code>Parking brake error</code> appear in the display. The truck cannot be switched off. A warning signal sounds. Use wedges to prevent the truck from rolling away. Notify your authorised service centre.

** DANGER****Risk of fatal injury from being run over if the truck rolls away!**

If the parking brake is faulty, park the truck safely and secure it so that it cannot roll away.

- If necessary, use wedges to prevent the truck from rolling away.
- Have the parking brake repaired by an authorised service centre.

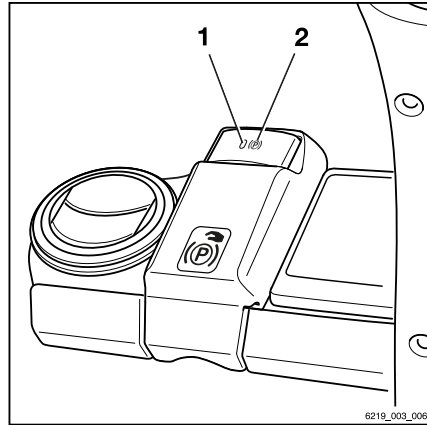
## Driving

## Actuating the electric parking brake (variant) ▷

**⚠ DANGER**

**There is a risk of fatal injury from being run over if the truck rolls away.**

- The truck must not be parked on a slope.
- In emergencies, secure the truck using wedges on the side facing downhill.
- Only leave the truck when the parking brake has been applied.



The electric parking brake is intended for working cycles that require the driver to leave the truck frequently. This means that the parking brake does not need to be applied or released manually. Despite these automatic aids, the driver is always responsible for parking the truck safely. The safety information about parking the truck safely applies.

**NOTE**

*The electric parking brake can be activated or released only if the battery male connector has been connected **and** the key switch is switched on.*

- Stop the truck.

As soon as the driver leaves the seat, the seat switch is released and the parking brake is applied. The LED (1) in the push button (2) for the parking brake lights up continuously.

The electric parking brake is applied automatically in the following situations:

**Automatically triggered actuation when the truck is stationary**

Cause	Effect
The driver's seat is vacated.	After a specifically defined period, the parking brake audibly engages and the LED (1) illuminates with a steady light.
The accelerator pedal is released.	After a specifically defined period, the parking brake audibly engages and the LED (1) illuminates with a steady light. The truck is held on a gradient by the traction motor until the parking brake is applied.
The key switch is switched off.	The parking brake audibly engages immediately and the LED (1) illuminates briefly with a steady light until the control units switch off.
The emergency off switch is actuated following activation of the emergency off function.	The parking brake is applied.

If the electric parking brake is applied, the "parking brake" symbol (P) appears in the display instead of the speed information and the LED (1) lights up.

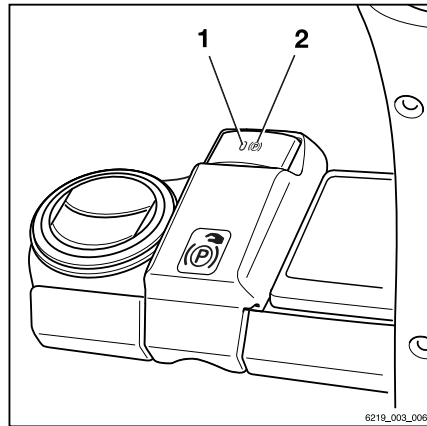
- To release the parking brake again, the driver must sit down again on the driver's seat and press the accelerator pedal. The parking brake audibly releases and the LED (1) in the push button for the parking brake goes out.

If the parking brake has not been applied by the accelerator pedal being released or the driver's seat being vacated, then it is not possible to drive the truck until the parking brake has been released by pressing the button. The "parking brake" symbol (P) appears in the display instead of the speed information.

## Driving

**Releasing the electric parking brake after the truck has been switched on.**

- The parking brake **cannot** be released by pressing the accelerator pedal immediately after switching on the truck. The electric parking brake must be released using the push button (2). The parking brake is then released as normal during operation by pressing the accelerator pedal.

**Actuating the parking brake when the truck is stationary****Applying the parking brake manually**

- Press the button (2).

The parking brake audibly engages, the LED (1) illuminates with a steady light and the "parking brake" symbol (Ⓟ) appears in the display.

**The parking brake is applied automatically**

Once the electric parking brake has been activated, the LED (1) lights up continuously and the "parking brake" symbol (Ⓟ) appears in the display.

**Releasing the parking brake manually****NOTE**

*When the truck is ready for operation, the electric parking brake can be released at any time by pressing the button.*

- Sit on the driver's seat.
- Press the button (2).

The parking brake audibly releases and the LED (1) goes out.

The "parking brake" symbol (Ⓟ) is replaced by the driving speed display.

**NOTE**

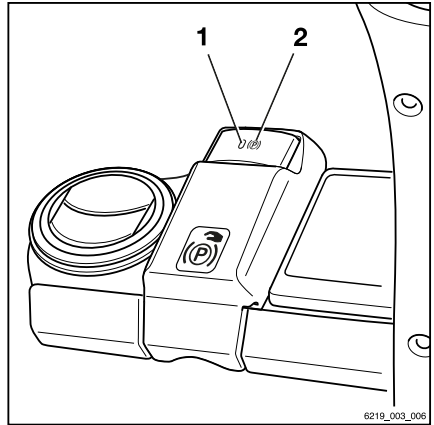
*The electric parking brake can only be released by pressing the accelerator pedal if the parking brake was previously automatically applied. This occurs when the accelerator pedal is released or when the driver gets up from the driver's seat.*

**Functions available when the truck is in motion**

**Actuation by the driver**

- Press the push button (2).

The truck is braked moderately. Depending on the situation, it is possible to drive again after the button has been released. If the truck is at a standstill, the parking brake audibly engages and the LED (1) illuminates with a steady light. In addition, the "parking brake" symbol (P) appears in the display.



**Automatically triggered actuation when the truck is in motion**

Cause	Effect
The driver's seat is vacated.	After a specifically defined period, the truck rolls to a stop or decelerates moderately. When the truck is at a standstill, the parking brake audibly engages, the LED (1) illuminates with a steady light and the "parking brake" symbol (P) appears in the display.
The key switch is switched off.	The truck will coast When the truck is at a standstill, the parking brake audibly engages, the LED (1) illuminates with a steady light and the "parking brake" symbol (P) appears in the display until the control units switch off.
The emergency off switch is actuated following activation of the emergency off function.	The truck will coast When the truck is at a standstill, the parking brake audibly engages, the LED (1) illuminates with a steady light and the "parking brake" symbol (P) appears in the display.
The truck accelerates, even though the driver's seat has been vacated or the accelerator pedal has not been actuated.	The parking brake is applied moderately, the LED (1) illuminates with a steady light and the "parking brake" symbol (P) appears in the display.

**"Safe parking" function**

This function monitors the braking effect after the truck is parked. If a sensor is fitted on the lift mast (variant), it also checks whether the fork carriage is lowered.

## Driving

This function alerts the driver with an audible signal if:

- The driver leaves the driver's seat without applying the parking brake
- The driver leaves the driver's seat without lowering the fork carriage (variant)
- The driver attempts to switch off the truck without applying the parking brake
- The truck starts moving approximately 20 seconds after the parking brake is applied

### Activation and intervention of the function

Cause	Effect
The parking brake has not been applied. The driver's seat is vacated.	The "actuate parking brake manually" symbol (P) appears on the display. A warning signal sounds. Sitting in the driver's seat silences the warning signal.
The parking brake has not been applied. The truck must be switched off.	The "actuate parking brake manually" symbol (P) appears on the display. The truck cannot be switched off. A warning signal sounds. Applying the parking brake silences the warning signal.
The parking brake has been applied but has not been applied correctly as a result of a malfunction The driver's seat is vacated.	The "actuate the parking brake manually" symbol (P) and the message <code>Parking brake error</code> appear in the display. A warning signal sounds. Sitting in the driver's seat silences the warning signal. Use wedges to prevent the truck from rolling away. Notify your authorised service centre.
The parking brake has been applied but has not been applied correctly as a result of a malfunction The truck must be switched off.	The "actuate the parking brake manually" symbol (P) and the message <code>Parking brake error</code> appear in the display. The truck cannot be switched off. A warning signal sounds. Use wedges to prevent the truck from rolling away. Notify your authorised service centre.



### NOTE

*If the parking brake cannot be applied, the truck also cannot be switched off without taking other measures.*

**⚠ DANGER****Risk of fatal injury from being run over if the truck rolls away!**

If the parking brake is faulty, park the truck safely and secure it so that it cannot roll away.

- Apply the parking brake manually. See the section entitled "Manual operation of the electric parking brake".
- If necessary, use wedges to prevent the truck from rolling away.
- Have the parking brake repaired by an authorised service centre.

**i NOTE**

*If it is necessary to switch off a truck with a faulty parking brake, the "Switching off a truck with a faulty electrical parking brake" section must be observed. It is essential that wheel chocks are used to prevent the truck from rolling away.*

**Malfunctions in the electric parking brake**

Before leaving the truck, the driver must make sure that the electric parking brake is applied properly.


If the controller detects a malfunction in the electric parking brake, the truck cannot be switched off.

**i NOTE**

*If it is necessary to switch off a truck with a faulty parking brake, observe the section entitled "Switching off the truck when the electric parking brake is faulty". It is essential to secure the truck to prevent it from rolling away.*

## Driving

**Actuating an electric parking brake with a malfunction**

If the electric parking brake has a malfunction, the LED (1) of the push button (2) flashes, and the symbol  and the message **Apply parking brake** appear on the display-operating unit. A possible cause of the malfunction is that the parking brake cannot determine whether the truck is stationary or still in motion. The following section describes how to actuate the parking brake when it has a malfunction:

**Actuating a parking brake with a malfunction when the truck is stationary**

Apply the parking brake:

- Push and hold the push button (2) for at least 5 seconds and then release the push button.

The parking brake will make a noise when it is applied. After the push button is released, the parking brake will not make any further noise; if you hear the parking brake after release it means that the push button was pushed for less than 5 seconds. In this case, push the push button again to apply the parking brake again. Repeat this process up to four times if necessary.

Then release the parking brake:

- Push the push button (2) then release the push button.

The parking brake will make a noise when it is released. If the malfunction in the parking brake persists, it will not be possible to release the parking brake.

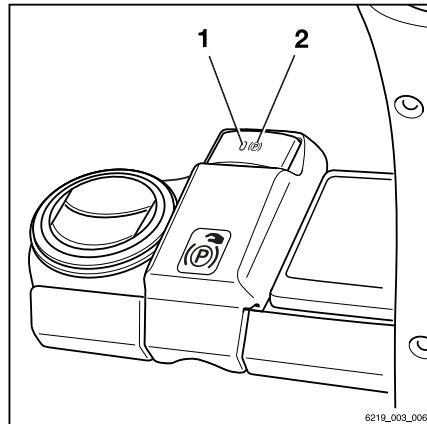
**Actuating a parking brake with a malfunction when the truck is in motion**

- Push the push button.

The parking brake is applied.

** NOTE**

*The truck will brake more sharply if the push button (2) is pushed and held for a long period or if the push button is pushed multiple times.*



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### Switching off the truck when the electric parking brake is faulty

If the electric parking brake cannot be applied and the driver tries to switch off the truck, the truck will not switch off at first. Instead, the truck responds with the following error messages:

The warning symbol (ⓘ) appears on the display-operating unit.

The LED (2) in the push button for the electric parking brake flashes. ▷

The "parking brake emergency actuation" symbol (Ⓟ) appears on the display-operating unit.

If the driver now leaves the truck anyway, a warning sound will be emitted and will stop only when the driver is sitting in the truck once more. To switch off the truck despite the parking brake being faulty (e.g. in order to tow the truck), proceed as follows:

- Switch off the key switch again.

The "parking brake emergency actuation" symbol (Ⓟ) appears on the display-operating unit.

- Push the button ↩.
- The "question" symbol ? appears. Push the button ⏴ to confirm.

The truck will now switch off. The parking brake is not applied. The truck can now be towed.

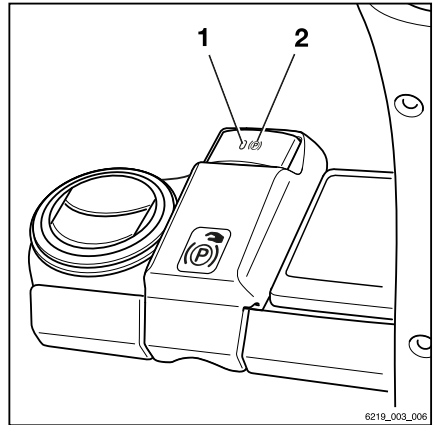
- If the truck is not going to be towed, secure the truck with wheel chocks to prevent it from rolling away.

#### **⚠ DANGER**

##### **Risk of fatal injury from the truck rolling away!**

The truck is not secured against rolling away because the parking brake is not applied.

- Use wedges to prevent the truck from rolling away.
- Notify the authorised service centre so that it can repair the parking brake.



## Driving

## Manual operation of the electric parking brake

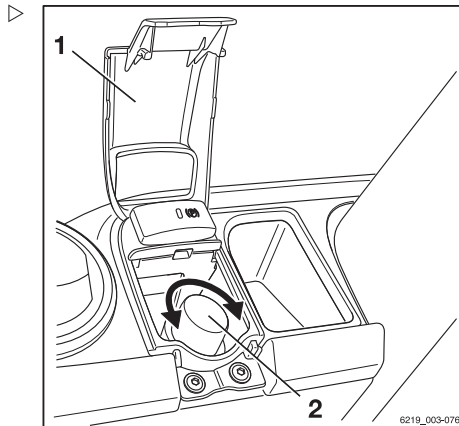
### ⚠ WARNING

The truck can roll away when the parking brake is released!

Manual operation of the parking brake is permitted only when the fork is lowered and the truck is switched off.

In emergency operation or during transport without a battery, the electric parking brake can be operated manually via the hand wheel.

- Lower the fork to the ground.
- Switch off the key switch.
- Lift the cover (1) and fold it up.
- Pull out the hand wheel (2), turn it around and then attach it.
- To tighten the parking brake, turn the hand wheel (2) clockwise until the force required to do so increases significantly and the truck is held securely.
- To release the parking brake, gently turn the hand wheel (2) anti-clockwise until the lower limit stop is reached.
- Remove the hand wheel (2), turn it around and then insert it.
- Push the hand wheel (2) back into its latch position and lower the cover (1).



## Steering

### **⚠ DANGER**

#### **Risk of accident!**

If the hydraulics fail, there is a risk of accident as the steering characteristics have changed.

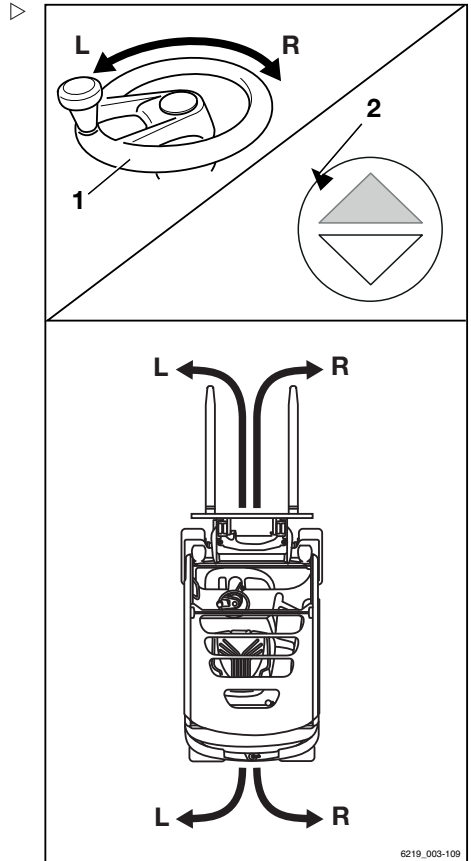
- Do not operate the truck if it has a defective steering system.
- 
- Steer the truck by turning the steering wheel (1) accordingly.

By turning the steering wheel to the left (L), the truck is steered to the left (L).

By turning the steering wheel to the right (R), the truck is steered to the right (R).

The steering direction is indicated by the arrow (2) in the drive direction indicator.

For the turning radius, see the chapter entitled "Technical data".



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## Driving

## Reducing speed when turning (Curve Speed Control)

This function reduces the speed of the truck as the steering angle increases, regardless of the amount to which the accelerator has been actuated. If the steering angle is reduced again upon exiting the curve, the truck accelerates in line with how far the accelerator is depressed.

However, the function does not release the driver from the duty to approach a curve at a speed according to the following factors:

- The carried load
- The roadway conditions
- The radius of the curve

### **⚠ DANGER**

**The Curve Speed Control function cannot override the physical limits of stability. Despite this function, there still is a risk of tipping!**

- Before using this function, familiarise yourself with the change to the driving and steering characteristics of the truck.

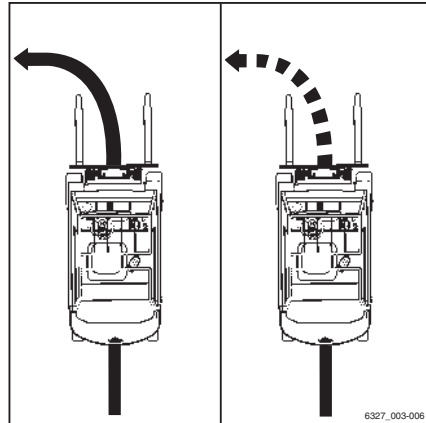
### **⚠ DANGER**

**Increased risk of tipping if the Curve Speed Control function is disabled! If the controller fails while the truck is in motion or if the controller is disabled, the truck will no longer automatically brake when steering.**

- Do not turn off the key switch while driving.
- Actuate the emergency stop switch only in emergencies.
- Always adapt your driving style to the conditions.

Despite the Curve Speed Control function, the truck may overturn in extreme cases within the following situations:

- Cornering too fast on uneven or inclined roadways.
- Turning the steering wheel sharply while driving.
- Cornering with an inadequately secured load.
- Cornering too fast on a smooth or wet roadway.



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## Reducing speed with a raised load (variant)

This variant reduces the speed of the truck when it has a raised load.

## Speed reduction when the cab door is open

### WARNING

Risk of accident from sudden deceleration of the truck

If the cab door is opened while the truck is in motion, the truck brakes automatically.

- Keep the cab door closed when driving.

With the "cab" equipment variant, the truck has a cab door monitoring function via a sensor. The signal from this sensor is linked with the signal from the buckle switch in the control electronics of the truck.

If the cab door is not closed and the seat belt is not fastened, the driving speed is limited to 4 km/h. The message **Close the cab door** or **fasten belt** appears in the display.

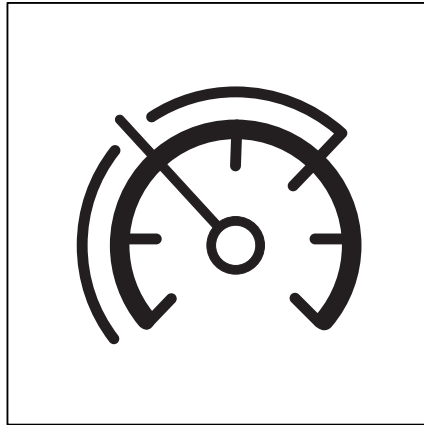
If the cab door is opened while the truck is in motion, the truck brakes automatically to a speed of 4 km/h. The message **Close the cab door** appears in the display.


If the seat belt is released with the cab door closed, no message appears in the display.

## Driving

**Speed limitation (variant)**

The speed limitation (variant) is a function that can be configured by the fleet manager to secure a permanent maximum speed or a maximum speed that can be called up by the driver. The function helps the driver to comply with speed restrictions, e.g. in storage areas or specific areas.


**Switching the speed limitation on and off**

- Press the  button.

The first menu level appears.

- Press the "drive"  Softkey.

The "drive" menu appears.



- Press the "speed limitation"  Softkey.

The activation bar appears next to the symbol.  
The speed limitation is switched on.


- To switch off the speed limitation, press the Softkey again.

**Configuring the speed limitation****NOTE**

*Access to the settings menu is only available if the truck is at a standstill and the parking brake is applied. If the parking brake is released prematurely, the settings menu will close. Access is only granted when the password is entered by the fleet manager.*

- Stop the truck.
- Apply the parking brake.
- Press the  button.
- Press the "settings"  Softkey.


The first menu level appears.

- Press the Access authorisation  Softkey.


The display changes to the "access authorisation" menu.

- Enter the password using the Softkeys.


The Access authorisation fleet manager granted ✓ message appears.

- Press the Truck settings  Softkey.
- Press the Speed limitation Softkey.

The menu that opens offers the following functions:

- Permanent  
Enabling this function limits the speed until the fleet manager disables this function.
  - By pressing a button  
If this function is activated, the driver may switch the speed limitation on and off by pressing the Softkey .
  - Enter the maximum speed  
The maximum truck speed is set in this menu.
- To adjust the maximum speed, press the Enter max. speed Softkey.

The Speed limitation menu opens.

- Set the maximum speed of 5 to 16 km/h using the Softkeys.
- To Save, press the  button.


The maximum speed is entered.

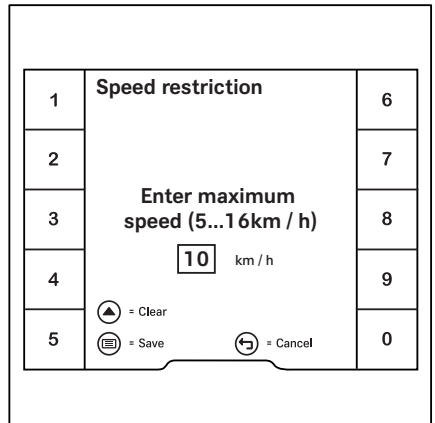
- To Delete, press the  button.

The entry is deleted.

- To Cancel, press the  button.

The display returns to the previous menu.

The  button takes you to the main display.



## Parking

## Parking

## Parking the truck securely and switching it off

**⚠ DANGER**

**There is a risk of fatal injury from being run over if the truck rolls away.**

- Do not park the truck on gradients.
- In emergencies, secure the truck using wedges on the side facing downhill.
- Only leave the truck when the parking brake has been applied.

**⚠ DANGER**

**There is a risk to life caused by a falling load or if truck components are being lowered.**

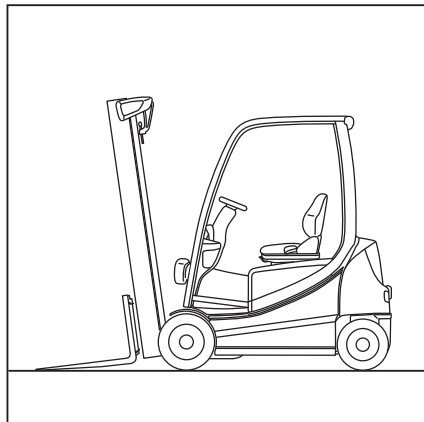
- Lower the load fully before leaving the truck.

**⚠ CAUTION**

Batteries may freeze!

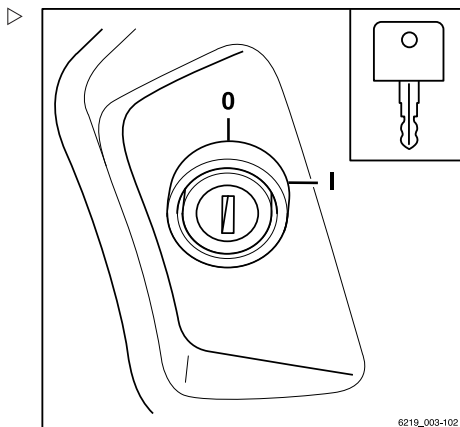
If the truck is parked in an ambient temperature of below  $-10^{\circ}\text{C}$  for an extended period, the batteries will cool down. For lead-acid batteries, the electrolyte can freeze and damage the batteries. The truck is then not ready for operation.

- At ambient temperatures of below  $-10^{\circ}\text{C}$ , only park the truck for short periods of time.
- Apply parking brake.
- Lower the fork carriage to the ground.
- Tilt the lift mast forwards until the tips of the fork arms rest on the ground.
- If attachments (variant) are fitted, retract the working cylinders; see the chapter entitled "General instructions for controlling attachments".





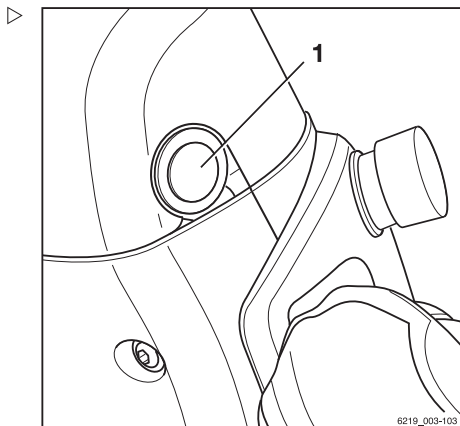
- Turn the switch key to position "0" and remove the key.



- In the "push button ignition" variant, press the button. (1)

**NOTE**

*Switch keys, FleetManager cards (variant), FleetManager transponder chips (variant) and the PIN code for access authorisation (variant) must not be handed over to other persons unless explicit instructions to this effect have been given by the responsible fleet manager.*

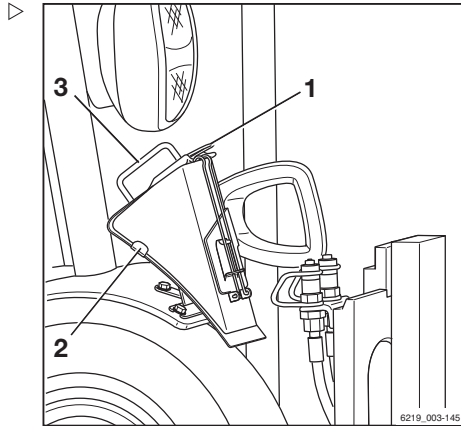


## Parking

**Wheel chock (variant)**

The wheel chock (variant) is used to prevent the truck from rolling away on a slope. It is located on the right-hand mudguard.

- Pull the latch forward (1) and hold it in place.
- Grip the wheel chock by its handle (3). Remove the wheel chock from the support mounting via the guide (2).
- Push the wheel chock under a front axle wheel on the side facing the descending gradient.
- After use, reinsert the wheel chock in the support mounting.
- Make sure that it is correctly seated in the guide (2) and that the latch (1) is holding the wheel chock in place.



## Lifting

### Lifting system variants

The movement of the fork carriage and the lift mast heavily depends on the following equipment:

- The lift mast with which the truck is equipped, see ⇒ Chapter "Lift mast versions", P. 4-143
- The operating device with which the hydraulic functions are controlled, see ⇒ Chapter "Operating devices for the lifting system", P. 4-144

Regardless of the equipment variants of the truck, the basic specifications and procedures must be complied with, see ⇒ Chapter "Safety regulations when handling loads", P. 4-170.

### Lift mast versions

#### **⚠ DANGER**

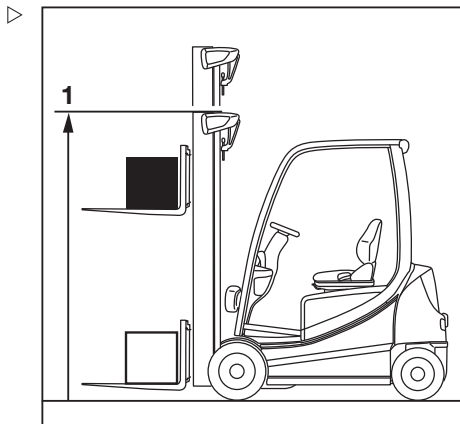
**Risk of accident due to collision of the lift mast or load with low ceilings or entrances.**

- Note that the inner lift mast or load may be higher than the fork carriage.
- Observe the heights of ceilings and entrances.

One of the following lift masts may be attached to the truck:

#### Telescopic lift mast

When lifting, the lift mast rises above the outer lift cylinders. The lift mast takes the fork carriage with it via the chains. In this scenario, the fork carriage rises at twice the speed of the inner lift mast. The top edge (1) of the inner lift mast can therefore be higher than the fork carriage.



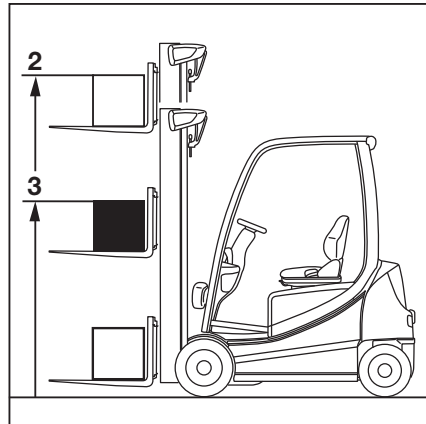
## Lifting

**NiHo lift mast (variant)**

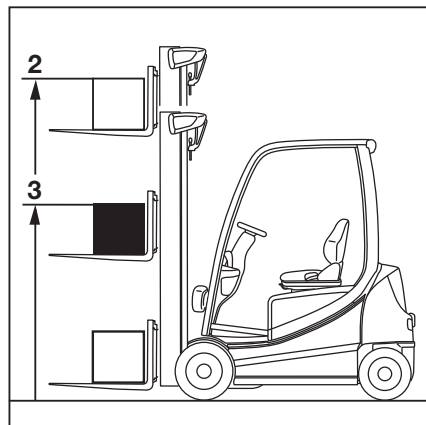
During lifting, the inner lift cylinder moves up to free lift (3) and then the outer lift cylinders raise the inner lift mast up to the maximum height (2).

**NOTE**

*When lifting above the free lift, the fork carriage always remains at the upper edge of the extending lift mast.*

**Triple mast (variant)**

During lifting, the inner lift cylinder moves up to free lift (3) and then the outer lift cylinders raise the inner lift mast up to the maximum height (2).

**Operating devices for the lifting system**

The method of operating the lifting system depends on the operating devices included in the truck's equipment.

Possible equipment variants include:

- **Multi-lever**
- **Double mini-lever**
- **Triple mini-lever**
- **Quadruple mini-lever**
- **Joystick 4Plus**

- The following information must be observed regardless of the equipment variant.

**⚠ DANGER**

**Reaching into or climbing between moving parts of the truck (e.g. lift mast, sideshifts, working equipment, load carrying devices etc.) can lead to serious injury or death and is therefore prohibited.**

- Observe the safety regulations for handling loads.
  - Operate the lifting system from the driver's seat only.
-

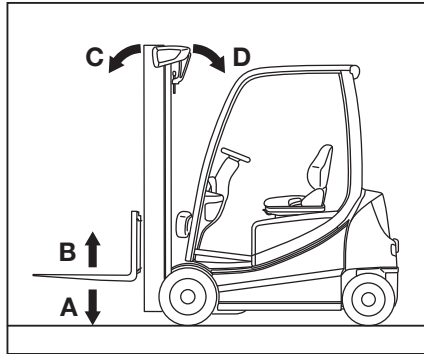
## Lifting

## Controlling the lifting system using multi-lever operation

### **⚠ DANGER**

Reaching into or climbing between moving parts of the truck (e.g. lift mast, sideshifts, working equipment, load carrying devices etc.) can lead to serious injury or death and is therefore prohibited.

- Observe the safety regulations for handling loads.
- Operate the lifting system from the driver's seat only.



#### Movements of the lifting system

- A Lower
- B Lifting
- C Tilting forwards
- D Tilting backwards

## Lifting/lowering the fork carriage

To lift the fork carriage:

- Move the "lift/lower" operating lever (1) in the direction of the arrow (B).

To lower the fork carriage:

- Move the "lift/lower" operating lever (1) in the direction of the arrow (A).

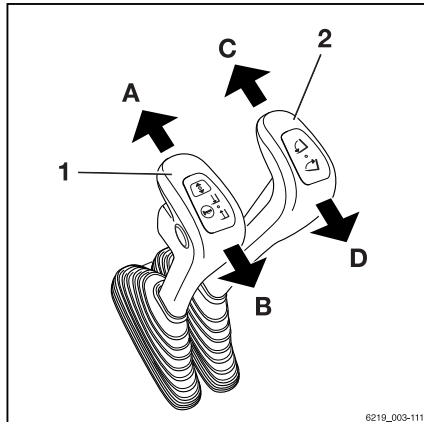
## Tilt the lift mast

To tilt the lift mast forwards:

- Move the "tilt" operating lever (2) in the direction of the arrow (C).

To tilt the lift mast backwards:

- Move the "tilt" operating lever (2) in the direction of the arrow (D).



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### **i** NOTE

The symbols on the operating levers show the direction of movement of the lift mast and fork carriage when the operating lever is moved.

## Controlling the lifting system using a double mini-lever

### **⚠ DANGER**

Reaching into or climbing between moving parts of the truck (e.g. lift mast, sideshifts, working equipment, load carrying devices etc.) can lead to serious injury or death and is therefore prohibited.

- Observe the safety regulations for handling loads.
- Operate the lifting system from the driver's seat only.





The lifting, lowering and tilting movements of the lift mast are controlled using the "lift mast" 360° lever (3). The adhesive label (1) or (2) is applied at the designated point (4). The truck is configured at the factory in accordance with the adhesive label (1).

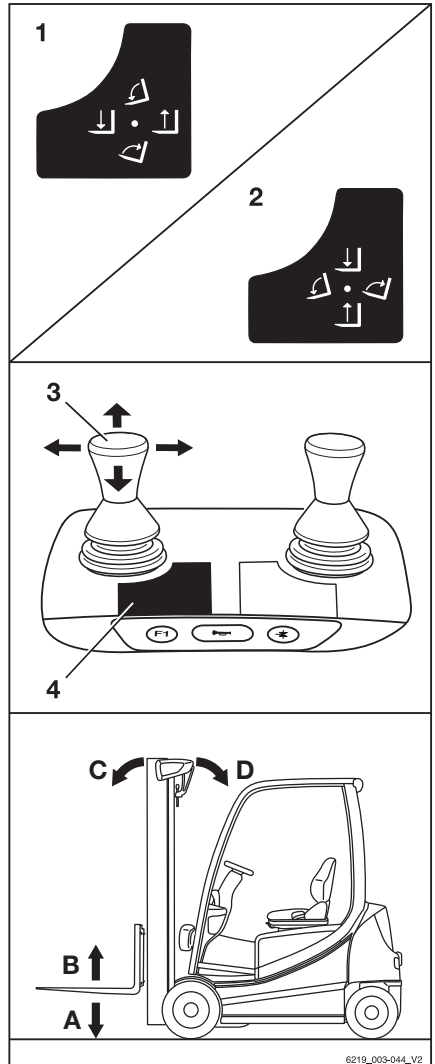
- If the adhesive label becomes illegible or is not present, please contact your authorised service centre.
- Observe the pictograms on the adhesive label (1) or (2).

The pictograms are arranged according to the direction of movement of the "lift mast" 360° lever (3).

- To move the fork carriage or the lift mast, move the "lift mast" 360° lever (3) as indicated by the pictograms.

Movements of the lifting system and meanings of the pictograms

- A  Lower
- B  Lifting
- C  Tilting forwards
- D  Tilting backwards



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## Lifting

## Controlling the lifting system using a triple mini-lever ▷

### **⚠ DANGER**

Reaching into or climbing between moving parts of the truck (e.g. lift mast, sideshifts, working equipment, load carrying devices etc.) can lead to serious injury or death and is therefore prohibited.

- Observe the safety regulations for handling loads.
- Operate the lifting system from the driver's seat only.





The lifting, lowering and tilting movements of the lift mast are controlled using the "lift mast" 360° lever (3). Depending on the configuration, the adhesive label (1) or (2) is applied at the designated point (4). The truck is configured at the factory in accordance with the adhesive label (1).

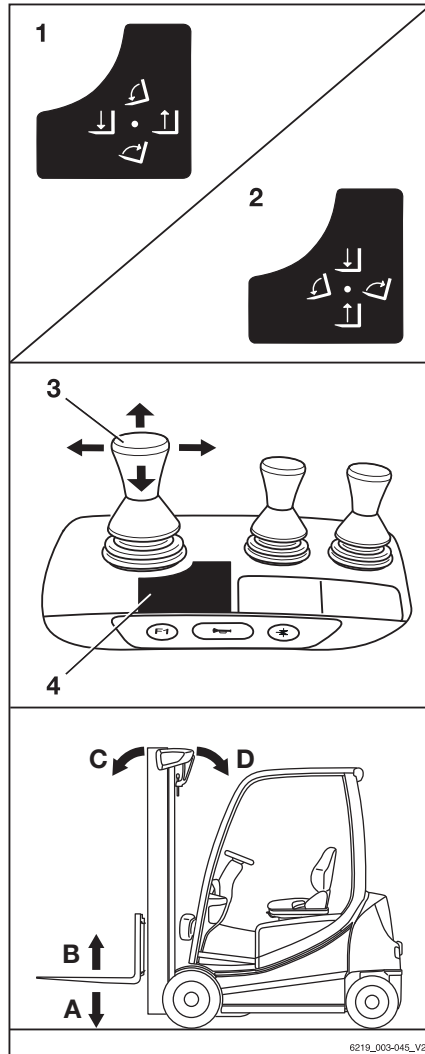
- If the adhesive label becomes illegible or is not present, please contact your authorised service centre.
- Observe the pictograms on the adhesive label (1) or (2).

The pictograms are arranged according to the direction of movement of the "lift mast" 360° lever (3).

- To move the fork carriage or the lift mast, move the "lift mast" 360° lever (3) as indicated by the pictograms.

Movements of the lifting system and meanings of the pictograms

- A  Lower
- B  Lifting
- C  Tilting forwards
- D  Tilting backwards



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## Controlling the lifting system using a quadruple mini-lever

### **⚠ DANGER**

Reaching into or climbing between moving parts of the truck (e.g. lift mast, sideshifts, working equipment, load carrying devices etc.) can lead to serious injury or death and is therefore prohibited.

- Observe the safety regulations for handling loads.
- Operate the lifting system from the driver's seat only.

The lifting, lowering and tilting functions of the lift mast are controlled using the "lift/lower" and "lift mast" operating levers (3) and (4). The adhesive level (1) is attached at the designated point (6). The adhesive level (2) is attached at the designated point (5). The truck is configured at the factory in accordance with the adhesive label (1).

- Observe the pictograms on the adhesive label (1) or (2).

The pictograms are arranged according to the direction of movement of the operating lever (3) or (4).

### Tilt the lift mast

Tilting the lift mast forwards:

- Move the "lift mast" operating lever (4) in the direction of the arrow (A).

Tilting the lift mast backwards:

- Move the "lift mast" operating lever (4) in the direction of the arrow (B).

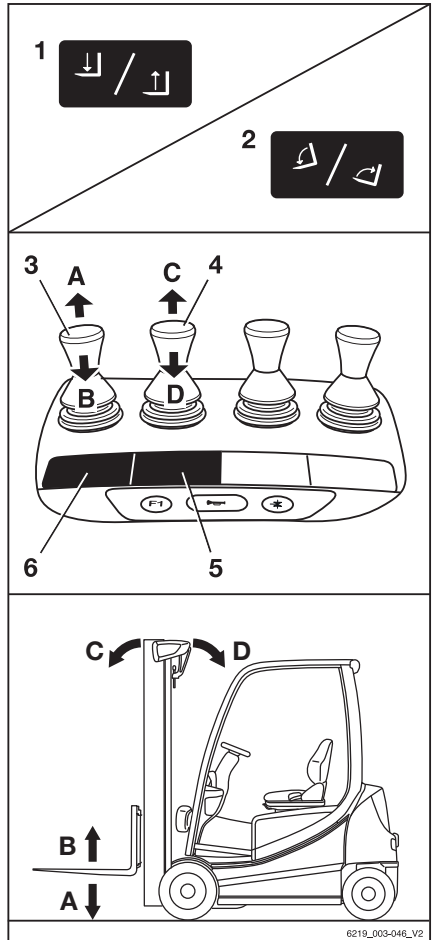
### Lifting/lowering the fork carriage

To lift the fork carriage:

- Move the "lift/lower" operating lever (3) in the direction of the arrow (D).

To lower the fork carriage:





- Move the "lift/lower" operating lever (3) in the direction of the arrow (C).



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## Lifting

Movements of the lifting system and meanings of the pictograms

- A  Lower
- B  Lifting
- C  Tilting forwards
- D  Tilting backwards

## Controlling the lifting system using the Joystick 4Plus

### DANGER

Reaching into or climbing between moving parts of the truck (e.g. lift mast, sideshifts, working equipment, load carrying devices etc.) can lead to serious injury or death and is therefore prohibited.

- Observe the safety regulations for handling loads.
- Operate the lifting system from the driver's seat only.

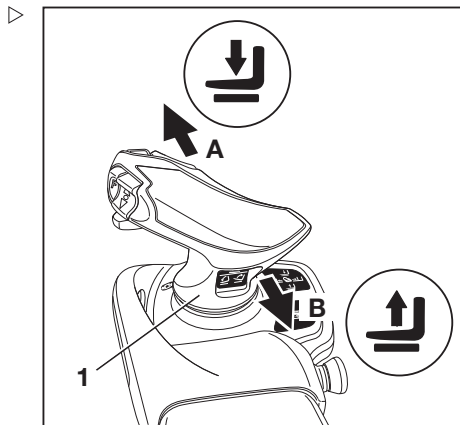
### Lifting/lowering the fork carriage

To lift the fork carriage:

- Pull the Joystick 4Plus (1) backwards (B).

To lower the fork carriage:

- Push the Joystick 4Plus (1) forwards (A).



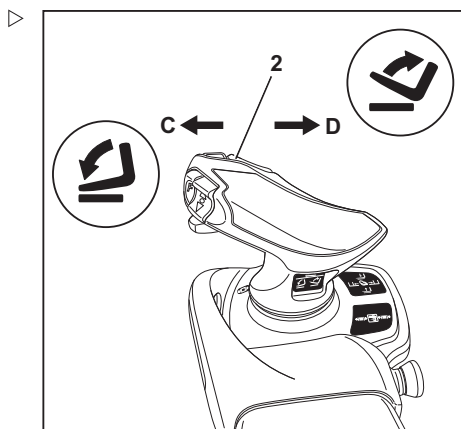
### Tilt the lift mast

To tilt the lift mast forwards:

- Tilt the horizontal rocker button (2) to the left (C).

To tilt the lift mast backwards:

- Tilt the horizontal rocker button (2) to the right (D).



### Fork-carriage sideshift

To move the fork carriage to the left.

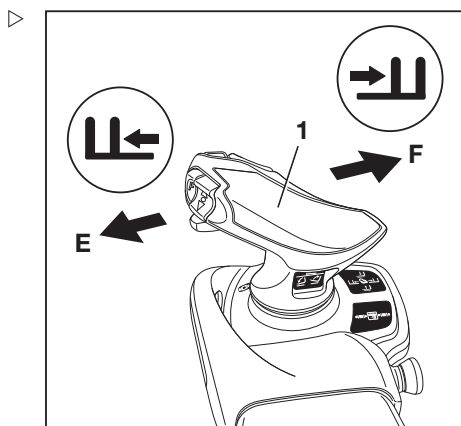
- Push the Joystick 4Plus (1) to the left (E).

To move the fork carriage to the right:

- Push the Joystick 4Plus (1) to the right (F).

#### NOTE


*The pictograms on the Joystick 4Plus indicate the direction of movement of the lift mast and the fork carriage.*







## Lifting

### Selecting load programs 1 to 3

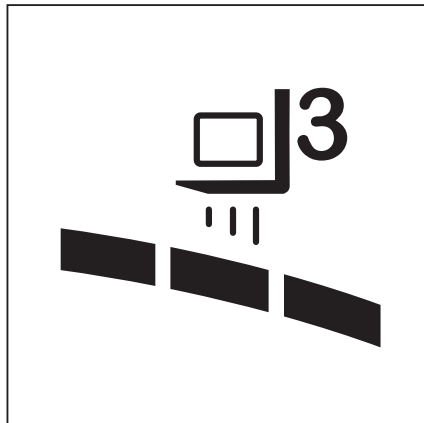
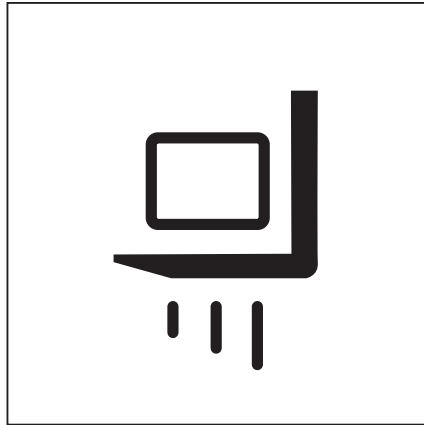
The truck has three load programs for the different lifting behaviours of the fork carriage and the lift mast. The higher the number of the load program selected, the greater the load dynamics.

The lifting behaviour of the truck is selected via the display-operating unit under the "Load"  menu item.

#### Differences between the load programs

- <sup>1</sup> Load program 1  
66% power and 66% pump speed
  - <sup>2</sup> Load program 2  
85% power and 85% pump speed
  - <sup>3</sup> Load program 3  
100% power and 100% pump speed
- Push the "Load dynamics" Softkey  until the number of the required load program appears on the display.

The number of dynamic bar segments shows the driving dynamics of the selected load program.



### Changing the fork arms

#### DANGER

**There is a risk of fatal injury from being run over if the truck rolls away.**

- Do not park the truck on gradients.
- Apply the parking brake.
- Change the fork extension in a cordoned-off, safe location on a level surface.

**⚠ WARNING**

There is a risk of injury when changing the fork arms; the weight of the fork arms could cause them to fall on your legs, feet or knees. The space to the left and right of the fork is a danger area.

- Always wear protective gloves and safety shoes when changing the fork arms.
- Ensure that no one stands in the danger area!
- Do not pull on the fork arms.
- The fork arms must always be carried by two people; if necessary, use a hoist.

**NOTE**

- *It is recommended that a transport pallet is used to supporting the fork arms when they are being installed or removed. The pallet size depends on the size of the fork arms used and must be of sufficient size so that the fork arms do not protrude after being placed on the pallet. This means the fork arms can be safely placed down and transported.*
- *Both fork arms can be pushed over onto one side.*

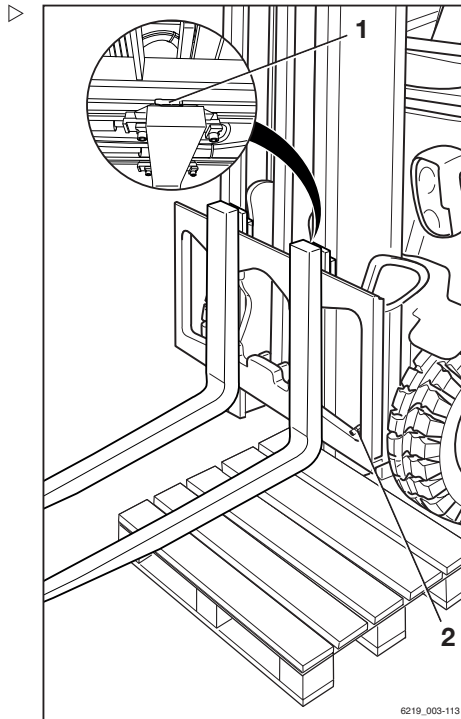
## Lifting

## Removing

- Select the pallet according to the size of the fork arms.
- Position the pallet to the left or right of the fork carriage.
- Raise the fork carriage until the lower edges of the fork arms are approx. 3 cm higher than the height of the pallet.
- Actuate the parking brake and make sure it is applied securely.
- Turn the switch key to the left and remove it.
- Undo the locking screw (2) on the right or left.
- Pull the locking lever (1) upwards and push the fork arms outwards onto the pallet.

## Installing

- Position the fork arms on a pallet to the left or right of the fork carriage.
- Push the fork arms onto the fork carriage from the outside towards the centre.
- Pull the locking lever (1) upwards and push the fork arms into the required position. Ensure that the locking lever snaps into place.
- Fit and tighten the locking screw (2).



**⚠ DANGER**

**There is a risk of fatal injury from a falling load or fork!**

- Tighten the locking screw (2) each time a fork is changed.
- It is not permitted to drive or to transport loads without the locking screw in place.

**i NOTE**

*If the truck is equipped with the "load measurement" comfort feature (variant), a "zero adjustment of the load measurement" must always be performed after the fork arms have been changed. Otherwise, correct load measurement cannot be guaranteed.*

## Fork extension (variant)

### DANGER

**There is a risk of fatal injury from being run over if the truck rolls away.**

- Do not park the truck on gradients.
- Apply the parking brake.
- Change the fork extension in a cordoned-off, safe location on a level surface.

### WARNING

There is a risk of crushing!

The weight of the fork extension can cause crushing and cuts can be caused by sharp edges or burrs.

- Always wear protective gloves and safety shoes.

### WARNING

There is a risk of tipping!

The weight and dimensions of the fork extension affect the stability of the truck. The permissible weights stated on the capacity rating plate must be reduced in proportion to the actual load distance.

If the truck is equipped with a fork extension ex works, then the capacity rating plate will already have been adjusted accordingly.

- Observe the load capacity; refer to the chapter entitled "Before picking up a load".

### NOTE

*If the truck is equipped with the "load measurement" comfort feature (variant), a "zero adjustment of the load measurement" must always be performed after the fork arms have been changed. Otherwise, correct load measurement cannot be guaranteed.*

## Lifting

## Fitting

**⚠ DANGER****Risk of fatal injury from falling load!**

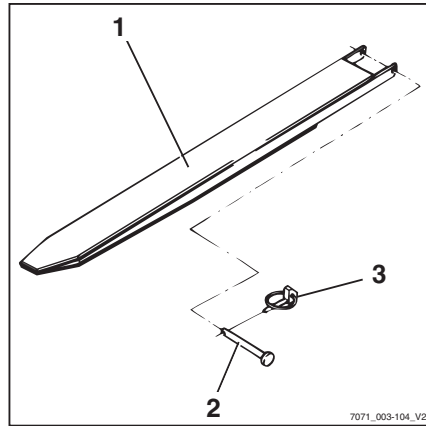
At least 60% of the length of the fork extension must lie on the fork arm. No more than 40% of the length of the fork extension may overhang the end of the fork arms. In addition, the fork extension must be secured against slipping from the fork arm.

If the fork extension (1) is not secured with a securing bolt (2) and linch pin (3), the load may fall, along with the fork extension.

- Push the fork extension all the way to the back of the fork.
  - Make sure that 60% of the length of the fork extension is on the fork arm.
  - Always secure the fork extension with the securing bolt.
  - Always secure the securing bolt with the linch pin.
- 
- Remove the linch pin (3) from the securing bolt (2).
  - Remove the securing bolt from the fork extension (1).
  - Push the fork extension onto the fork arms until the fork extension is flush with the fork back.
  - Insert the securing bolt located behind the fork back fully into the fork extension.
  - Insert the linch pin into the securing bolt and secure.

## Removing

- Remove the linch pin (3) from the securing bolt (2).
- Remove the securing bolt from the fork extension (1).
- Pull the fork extension off the fork arms.
- Insert the securing bolt fully into the fork extension.
- Insert the linch pin into the securing bolt and secure.





## Operation with reversible fork arms (variant) ▷

### ⚠ DANGER

#### Risk of fatal injury from falling load!

Normal fork arms are not structurally designed for reverse operation. If this instruction is not observed, it can lead to material failure and the load falling.

- Only work in reverse operation using reversible fork arms (1).

### ⚠ WARNING

#### Risk of accident from slipping load!

Loads may slip on the reversible fork arms if there is no load support. A fork extension (variant) cannot be secured against slipping.

- **Do not use** a fork extension (variant).

### ⚠ WARNING

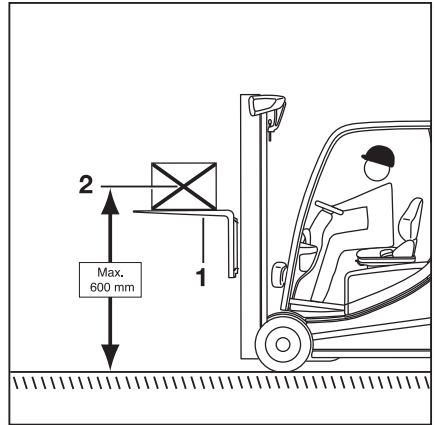
#### Risk of accident from the truck tipping over.

When driving, the centre of gravity of the load (2) must not be more than 600 mm above the ground. The truck may tip forwards when driving or braking.

- Only drive with a load centre of gravity up to a max. of 600 mm above the ground

### **i** NOTE

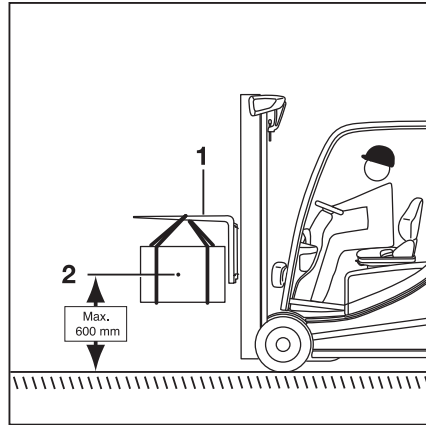
*If the truck is equipped with the "load measurement" comfort feature (variant), a "zero adjustment of the load measurement" must always be performed after the fork arms have been changed. Otherwise, correct load measurement cannot be guaranteed.*



## Lifting

Reversible fork arms (1) can be used to reach an additional lift height. The reversible fork arms are attached to the fork carriage in the same manner as standard fork arms. Loads may be lifted on and beneath the reversible fork arms. The mast is lifted and tilted in the same manner. ▷

- Only work in reverse operation using reversible fork arms.
- Do not use a fork extension (variant).
- If the "load measurement" comfort feature (variant) is available, perform a "zero adjustment of the load measurement".
- To drive, raise the load centre of gravity (2) to a max. of 600 mm above the ground.
- Observe the information in the section entitled "Transporting suspended loads".



## Malfunctions during lifting mode

### Incorrect extension sequence

#### **⚠ DANGER**

##### **Risk of accidents!**

In the case of Hi-Lo lift masts (variant) and triplex lift masts (variant), an incorrect extension sequence may occur, i.e. the inner lift mast may extend before the free lift is complete. As a result, the overall height is exceeded and damage may occur in passageways or from low ceilings.

An incorrect extension sequence may, for instance, result from:

- The hydraulic oil temperature being too low.
  - Blocking of the fork carriage in the inner lift mast.
  - Blocking of the free lift cylinder.
  - Blocking of the chain roller on the free lift cylinder.
- If the hydraulic oil temperature is too low, slowly actuate the lift mast functions several times in order to raise the oil temperature.

In the event that the fork carriage is blocked in the inner lift mast, or the free lift cylinder or chain roller are blocked, the cause of the

blockage must be eliminated before resuming work.

- Notify your service centre

### Load chains not under tension

#### DANGER

##### **Danger caused by a falling load!**

- Make sure that the chain(s) does (do) not become slack when lowering the load.

Slack chains can, for instance, result from:

- Resting the fork carriage or the load on the racking.
- Fork carriage rollers blocking in the lift mast due to contamination.
- If the fork carriage or the load comes to an unexpected stop, lift the fork carriage until the chains are under tension again and lower the load at another suitable location.
- If the fork carriage rollers in the lift mast become blocked due to contamination, lift the fork carriage until the chains are under tension again. Remove the contamination before resuming work.

#### WARNING

Risk of injury!

- Observe the safety regulations for working on the lift mast, see the chapter entitled "Working at the front of the truck".

### Hydraulic blocking function

The hydraulic blocking function ensures that all the functions of the working hydraulics are disabled whenever the seat switch in the driver's seat is unloaded.

If the driver's seat is vacated, the blocking function prevents hydraulic operation for the following functions:

- Lift the load
- Lower the load
- Tilt the lift mast

## Lifting

- Auxiliary hydraulic functions
- Steering

 **NOTE**

*Only the emergency steering function remains available.*

## Optical lift height measuring system (variant)

### Functional description

This truck is equipped with an optical lift height measuring system. The system consists of an LED/sensor unit (2) on the lift mast and a reflector (1) on the fork carriage. A light signal is emitted by the LED/sensor unit and reflected by the reflector. The current lift height is calculated according to the travel time of the light signal. The light emitted by the LED/sensor unit is not dangerous to the human eye. However, due to its brightness, looking directly at the LED may cause short-term dazzling.

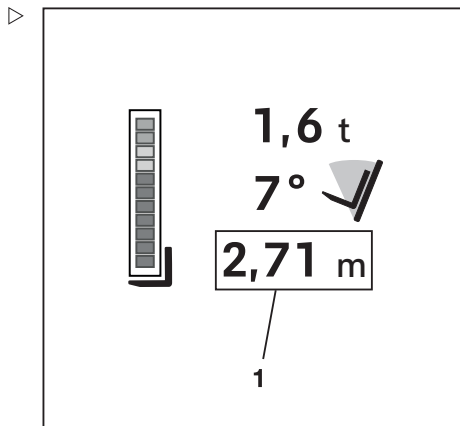
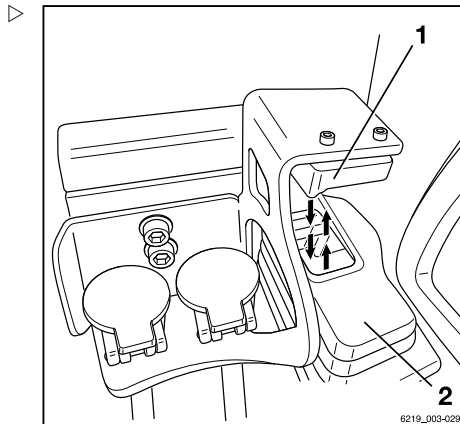
 **NOTE**

*The LED/sensor unit and reflector are adjusted at the factory. Follow-up adjustments are carried out by the authorised service centre.*

The current lift height (1) is displayed on the display-operating unit at all times.

The displayed lift height corresponds to the height of the upper edge of the fork arms. If desired, the authorised service centre can set a different value. If a different attachment is installed, the authorised service centre must adjust this value.

The system functions across the entire lift height, from ground level up to the maximum lift height of the truck. The maximum measurement deviation of the system is  $\pm 5$  cm.



## Cleaning

### ⚠ CAUTION

Risk of component damage.

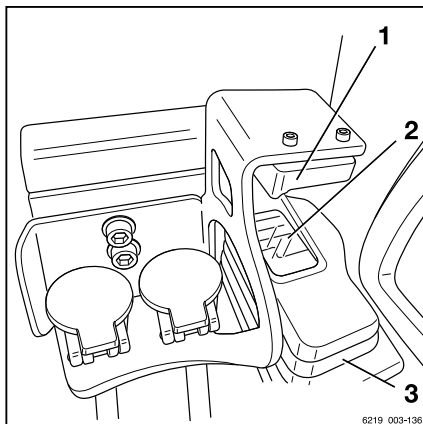
The sensor glass and the reflector can be damaged as a result of incorrect cleaning procedures.

- The components must never be cleaned using dry materials.
- Do not use agents containing hydrocarbons.

Agents containing hydrocarbons include:

- Acetone
- Methanol
- Ethanol
- Propanol

- Clean the dust protection cover (3), the sensor glass (2) and the reflector (1) with a soft cloth and water.



## Malfunctions

The following truck functions rely on the LED lift height measurement and are not available in the event of malfunction:

- Lift height display
- Lift height preselector (also easy target)
- Lift height restriction

If a fault occurs and the lift height is not displayed, cleaning the reflector (1) and the sensor glass (2) will help in most cases.

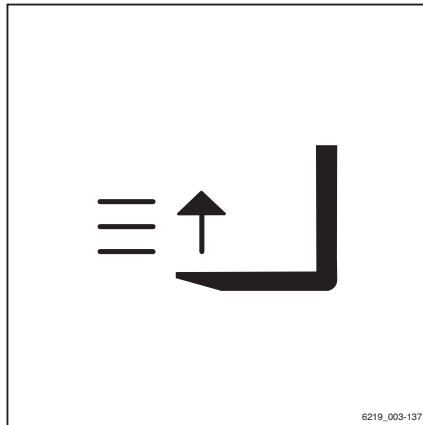
- If the lift height is still not displayed after cleaning, contact the authorised service centre.
- See the table below for information on how truck functions that rely on the lift height are affected.

## Lifting

Effect	Possible cause	Rectifying the error
Lift height display not available Lift height preselector not available Lift height restriction not available	The reflector or sensor is very dirty or fogged up	Clean the sensor glass and reflector.
	Incorrect measurements caused by a reflective object in the light signal path between the LED/sensor unit and reflector	Check the light signal path between the LED/sensor unit and the reflector. Remove obstacles.
	A brief interruption (min. two seconds) of the light signal, for example, by packaging material	
	Bent reflector or misaligned sensor	
	The reflector, sensor or cable is not present or is damaged	Contact your authorised service centre.
Internal error or overheating		
Message Check lift height sensor reflector	Reflector is bent or not present.	

### Lift height preselector (variant) ▷

The lift height preselector is an assistance function used to preselect up to fifteen different lift heights for up to ten different storage areas. This function prevents the fork carriage from being lifted higher than the preselected value. This is helpful when placing loads into stock and removing loads from stock at frequently visited storage locations. Preselected lift heights can be deleted or modified at any time by the fleet manager. The lift heights are preselected using the display-operating unit. Before the "easy target" comfort feature can be used, the lift heights must be preselected.



### Preselecting lift height



#### NOTE

*We recommend that you mark frequently used lift heights as favourites. For information on how to do this, see the original operating instructions for the display-operating unit.*

- Switch on the key switch.

- Apply the parking brake and sit down in the driver's seat.
- To switch on the lift height preselector, press the "Lift height preselection" Softkey for the required lift height, for example  $\begin{matrix} B,2 \\ \rightleftharpoons \downarrow \end{matrix}$ .

The lift height is preselected. The  $\begin{matrix} \rightleftharpoons \downarrow \\ \rightleftharpoons \downarrow \end{matrix}$  symbol appears in the display.




- To switch off the lift height preselector, press the Softkey again.

The  $\begin{matrix} \rightleftharpoons \downarrow \\ \rightleftharpoons \downarrow \end{matrix}$  symbol goes out.


### Configuring lift heights

#### NOTE

*The settings menu is only available if the truck is at a standstill and the parking brake is applied. If the the parking brake is released too early, the settings menu will close. In order to access the menu, the password must be entered by the fleet manager.*

- Bring the truck to a standstill.
- Apply the parking brake.
- Press the  button.
- Press the "Settings"  Softkey.
- Press the Access authorisation  Softkey.

The display changes to the "Access authorisation" menu.

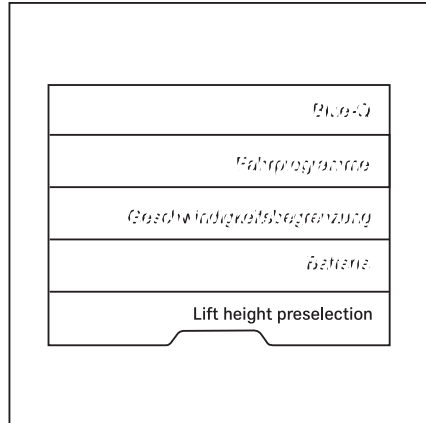
- Enter the password using the Softkeys.
- Press the "Confirm" Softkey .

Once the password has been entered correctly, the Fleet manager message appears. This authorisation level is now accessible.

## Lifting

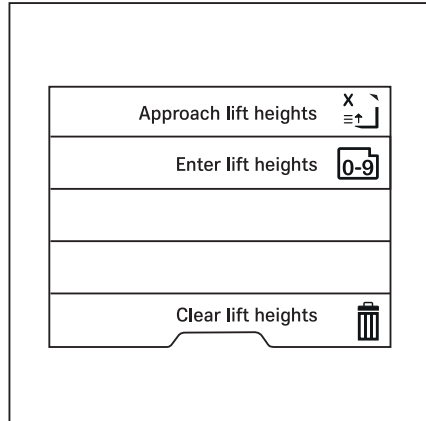
The display changes to the "Settings menu". ▷

- Press the Lift height preselection Softkey.



The "Lift height preselector" menu offers the following options: ▷

- Approach lift heights
  - Enter lift heights
  - Clear lift heights
- Push the Enter lift heights Softkey .



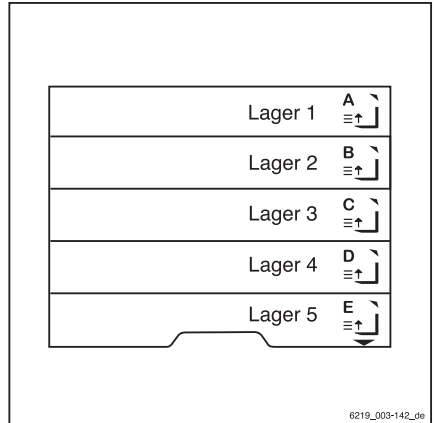


The display changes to the menu for storage locations. ▷

**i NOTE**

*Different names than those displayed can be selected for the storage locations.*

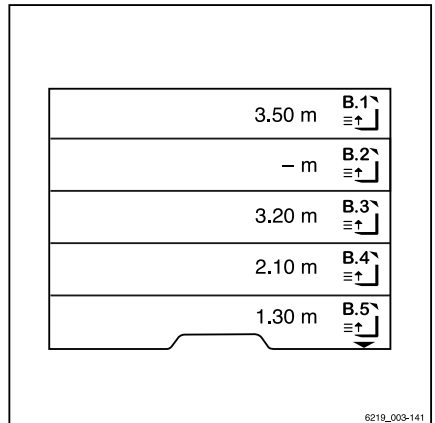
- Press the associated Softkey for the desired storage location, e.g. Warehouse 2 <sup>B</sup><sub>≡↑</sub>.



The preset lift heights are displayed.


The second lift height for "Warehouse 2" <sup>B.2</sup><sub>≡↑</sub> has not yet been entered.

- Press the Softkey for the second lift height for "Warehouse 2" <sup>B.2</sup><sub>≡↑</sub>.



## Lifting

The display changes to the Enter lift heights menu. ▷

- Press the Softkeys corresponding to the digits to enter the corresponding lift height, e.g. 2.40 m.
- To save, press the  button.


The lift height has been entered.

- To delete, press the  button.


The last digit is deleted.


- To cancel, press the  button.

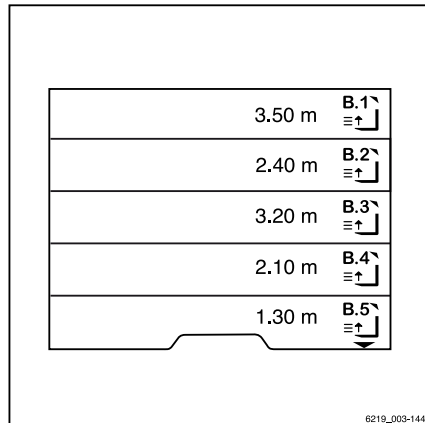
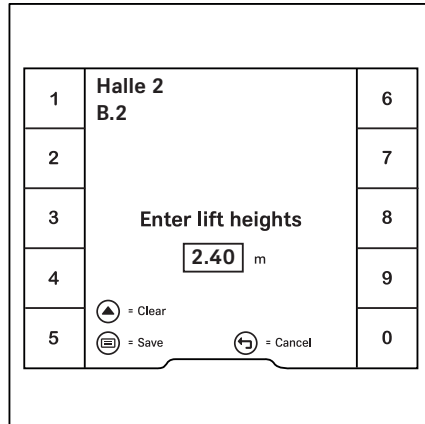
The display returns to the previous menu.

Press the  button to return to the main display.

After saving, the preset lift heights are displayed again. ▷

The second lift height for "Warehouse 2" <sup>B.2</sup>  is saved.

- Press the  button.



## easy Target and easy Target Plus (Varianten)

"easy Target" is an additional comfort feature for the lift height preselector.

"easy Target Plus" simplifies the automatic mast vertical positioning in conjunction with "easy Target".

"easy Target" and "easy Target Plus" function across the entire fork lift range, from ground level up to the maximum lift height of the truck.

"easy Target" and "easy Target Plus" are controlled using the multi-lever and mini-lever control or shift key "F" on the Joystick 4Plus control. For harmonisation, the function key and the shift key "F" are referred to as the "F button" below.

To use the functions, the desired lift heights must be preselected. The automatic mast vertical positioning must be set up.

- See the "Automatic mast vertical positioning" section in the "Testing and activities before daily use" subchapter and the "Lift height preselector" section in this subchapter.

### easy Target

- Press the "Lift height preselector" Softkey  $\equiv \downarrow$ .
- Press the "F button" and hold it down.
- While doing so, raise or lower the fork carriage and monitor the lift height (1).

The "easy Target" function is activated. The  $\equiv \downarrow$  symbol appears in the display.

- Once the target lift height (1) is displayed, release the "F button".

The required lift height is selected.

The fork carriage will now stop at this lift height.

- Repeat the same procedure for other lift heights or reactivate the easy Target Plus function by pressing the "F button".

The lift mast is then set to the vertical position.

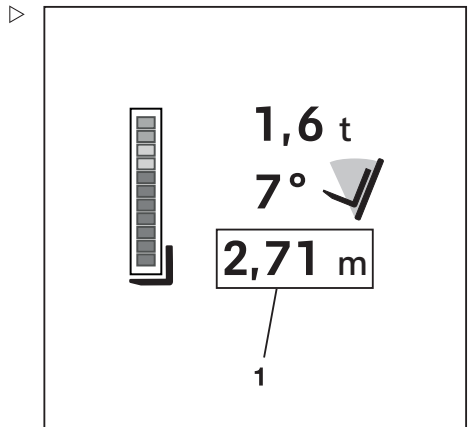
This process can be interrupted at any time by pressing the  $\leftarrow$  button.

### easy Target Plus

#### NOTE


*"easy Target Plus" can **only** be carried out when the lift height preselector is active.*

- Press the Softkey for the lift height preselector  $\equiv \downarrow$ .




## Lifting

- Bring the operating device for the lifting system to the centre position.
- Press the "F button" and hold it down.

The "easy Target Plus" function is activated. The  symbol appears in the display. The lift mast is set to the vertical position.

- Once the lift mast is in the vertical position, release the "F button".

The "easy Target Plus" function is complete.

The process can be interrupted at any time by pressing the  button.


## Lift height restriction (variant)

### WARNING



Risk of accident due to collision of the lift mast or load with low ceilings or entrances.


- Observe the heights of ceilings and entrances.

The "lift height restriction" variant allows a maximum lift height of the fork carriage to be set, e.g. in halls with low ceilings. The function described in this section does not release the driver from the obligation of observing the safety regulations for handling loads.

- Stop the truck.
- Apply the parking brake.
- Press the  button.

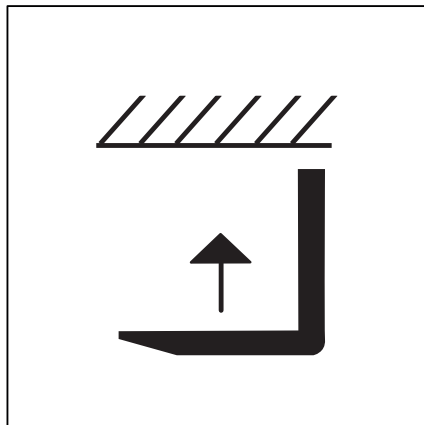
The first menu level appears.

- Press the "load"  Softkey.
- Lift the fork carriage to the desired maximum lift height lift.
- Press the "lift height restriction"  Softkey.

The "lift height restriction" symbol  appears in the display. The function is switched on.

The next time the fork carriage is lifted, it will stop at the previously used lift height.

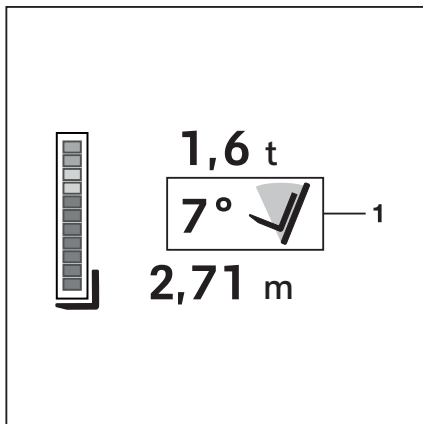
- To switch off the lift height restriction, press the relevant Softkey again.



### Lift mast tilt angle display (variant)

Knowing the actual tilt angle of the lift mast makes it easier to place loads into stock and remove loads from stock. If the truck is equipped with the "lift mast tilt angle display" comfort feature, the lift mast tilt angle is displayed on the display-operating unit (1).

A positive value describes the tilt angle of the lift mast when it is tilted backwards. A negative value describes the tilt angle of the lift mast when it is tilted forwards.



## Handling loads

## Handling loads

## Safety regulations when handling loads

The safety regulations for handling loads are shown in the following sections.

**⚠ DANGER**

**There is a risk to life caused by falling loads or if parts of the truck are being lowered.**

- Never walk or stand underneath suspended loads or raised fork arms.
- Never exceed the maximum load indicated on the capacity rating plate. Otherwise stability cannot be guaranteed!

**⚠ DANGER**

**Risk of accident from falling or crushing!**

- Do not step onto the forks.
- Do not lift people.
- Never grab or climb on moving parts of the truck.

**⚠ DANGER**

**Risk of accident from a falling load!**

- When transporting small items, attach a load safety guard (variant) to prevent the load from falling on the driver.
- Use a closed roof covering (variant) in addition.





## Handling loads

### Example

Weight of load to be lifted: 880 kg (3)

Load distance from fork back: 500 mm (1)

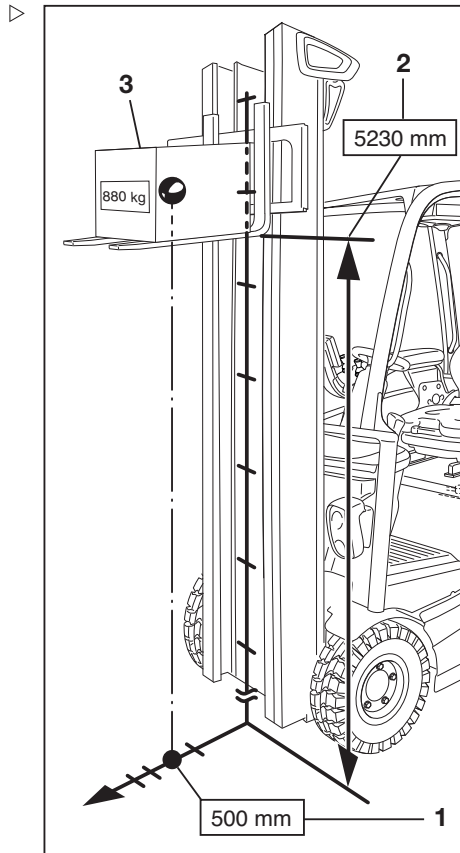
Permitted lift height: 5230 mm (2)

#### **⚠ WARNING**

Risk of accident from the truck losing stability!

The permissible loading of the attachments (variant) and the reduced load capacity of the combination of truck and attachment must not be exceeded.

- Observe the special capacity rating plate information shown on the truck and the attachment.



## Picking up loads

To make sure that the load is securely supported, it must be ensured that the fork arms are sufficiently far apart and are positioned as far as possible under the load.

If possible, the load should rest on the back of the fork.

The load must not protrude too far over the fork tips, nor should the fork tips protrude too far out from the load.

Loads are to be picked up and transported as close to the middle as possible.



**⚠ DANGER**

**Risk of accident from a falling load!**

When transporting small items, attach a load safety guard (variant) to prevent the load from falling on the driver.

A closed roof covering (variant) should also be used.

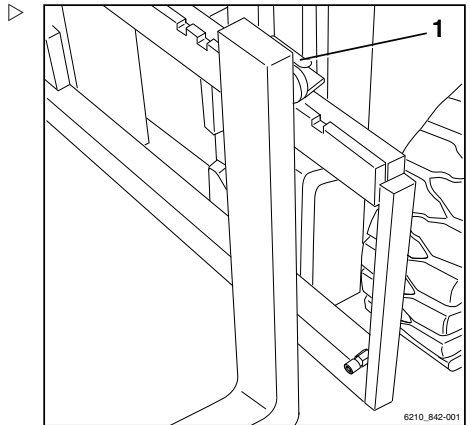
Removable roof panels may not be removed.

**Adjusting the fork**

- Lift the locking lever (1) and move the fork arms to the desired position.
- Allow the locking lever to snap back into place.

The load centre of gravity must be midway between the fork arms.

- Only actuate the fork prong positioner (variant) when the fork is not carrying a load.



**Danger area**

The danger area is the area in which people are at risk due to the movements of the truck, its working equipment, its load-carrying equipment (e.g. attachments) or the load. Also included are the areas where loads could fall or working equipment could fall or be lowered.



**⚠ DANGER**

**Risk of injury!**

- Do not step on the fork.



**⚠ DANGER**

**Risk of injury!**

- Do not step under the raised forks.

## Handling loads

### DANGER

#### **People may be injured in the danger area of the truck!**

The danger area of the truck must be completely clear of all personnel, except the driver in his normal operating position. If persons fail to leave the danger area despite warnings:

- Cease work with the truck immediately.
- Secure the truck against use by unauthorised parties.



### DANGER

#### **Danger of death from falling loads!**

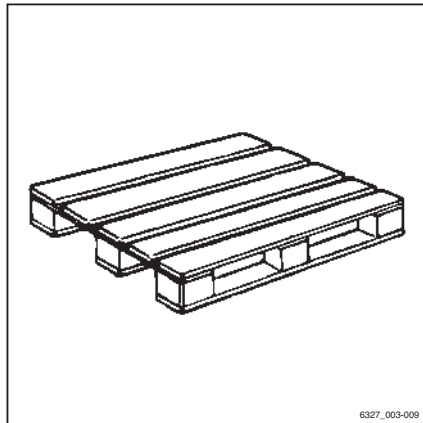
- Never walk or stand underneath suspended loads.

## Transporting pallets

As a rule, loads (e.g. pallets) must be transported individually. Transporting multiple loads at the same time is only permitted:

- when instructed by the supervisor and
- when the technical requirements have been met.

The driver must ensure proper condition of the load. Only safely and carefully positioned loads may be transported.



## Transporting suspended loads

Before transporting suspended loads, consult the national regulatory authorities (in Germany, the employer's liability insurance associations).

National regulations may place restrictions on these operations. Contact the relevant authorities.

### **⚠ DANGER**

**Suspended loads that begin to swing can result in the following risks:**

- Impaired braking characteristics and steering movement
- Tipping over the load wheels or drive wheels
- Tipping the truck at right angles to the drive direction
- Risk of crushing of guide persons
- Reduced visibility

### **⚠ DANGER**

#### **Loss of stability.**

Slipping or swinging suspended loads can lead to a loss of stability and cause the truck to tip over.

- When transporting suspended loads, observe the following instructions

#### **Instructions for transporting suspended loads:**

- Swinging loads must be prevented by using the proper driving speed and driving style (careful steering, braking)
- Hanging loads must be hooked on to the truck in such a way that the harness cannot shift or release unintentionally and cannot be damaged
- When transporting suspended loads, suitable devices (e.g. guy wires or supporting poles) must be available so that accompanying persons can guide suspended loads and prevent the loads from swinging
- Take particular care to ensure that there is no one in the drive direction in the driving lane
- If, despite this, the load begins to swing, ensure that no person is placed at risk



## Handling loads

### **⚠ DANGER**

#### **Risk of accident!**

When transporting suspended loads, never perform or end driving and load movements abruptly.

Never drive on slopes with a suspended load.

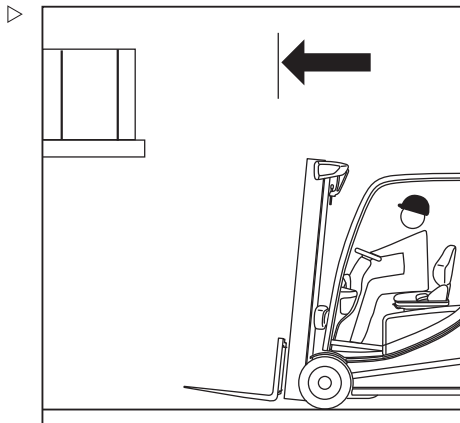
Transporting containers holding fluids as hanging loads is not permitted.

## Picking up a load

### **⚠ DANGER**

**There is a risk to life from a falling load or from truck components being lowered.**

- Never walk or stand underneath suspended loads or raised fork arms.
  - Never exceed the maximum load values specified on the capacity rating plate. Otherwise, stability cannot be guaranteed.
- 
- Only store pallets that do not exceed the specified maximum size. Damaged loading equipment and incorrectly formed loads must not be stored.
  - Attach or secure the load to the lifting accessory so that the load cannot move or fall.
  - Store the load so that the specified aisle width is not reduced by protruding parts.
  - Approach the rack carefully, brake gently and stop just in front of the rack.

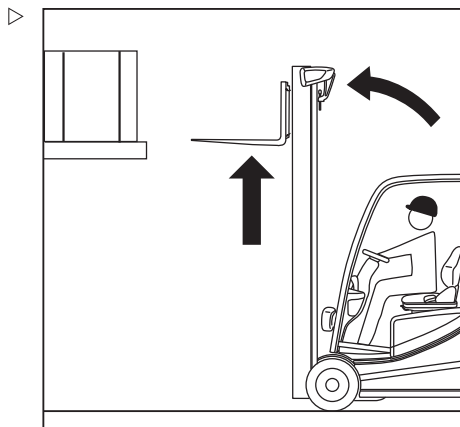


- Position the forks.
- Set the lift mast to vertical.
- Lift the fork carriage to the stacking height.

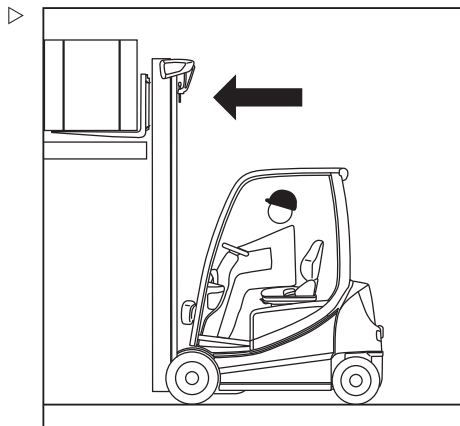
**⚠ CAUTION**

Risk of component damage!

When the fork is inserted into the rack, take care not to damage the rack or the load.



- Insert the fork as far under the load as possible. Stop the truck as soon as the fork back is resting on the load. The load centre of gravity must be midway between the fork arms.



## Handling loads

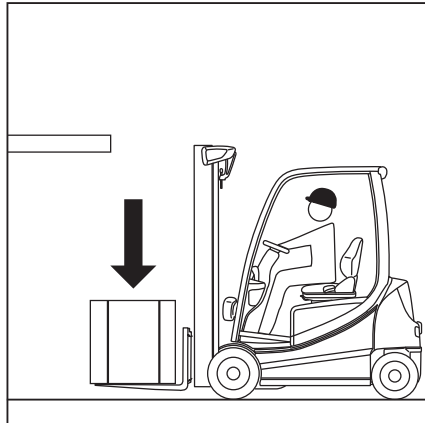
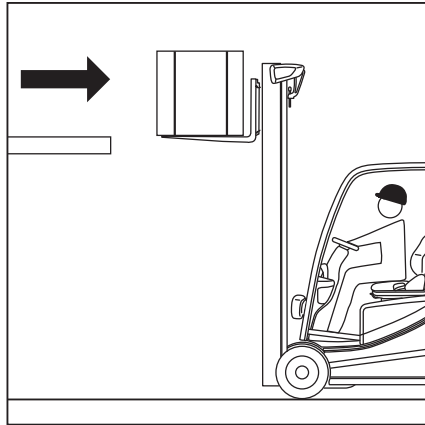
- Lift the fork carriage until the load is resting entirely on the fork. ▷

**⚠ DANGER****Risk of accident!**

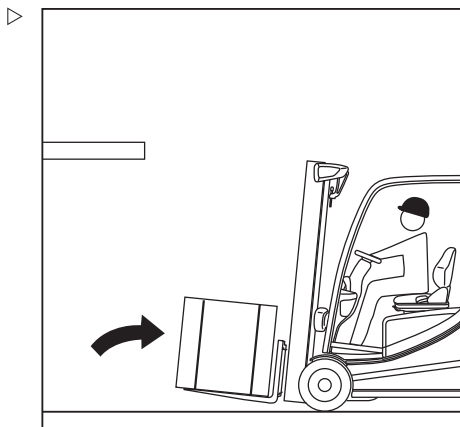
- Beware of any people in the danger area.
- Ensure that the roadway behind you is clear.

**⚠ DANGER****Due to the risk of tipping, never tilt the lift mast with a raised load!**

- Lower the load before tilting the lift mast.
- 
- Reverse carefully and slowly until the load is clear of the rack. Brake gently.
- 
- Lower the load while maintaining ground clearance. ▷



- Tilt the lift mast backwards.
- The load can be transported.



### Transporting loads

#### NOTE

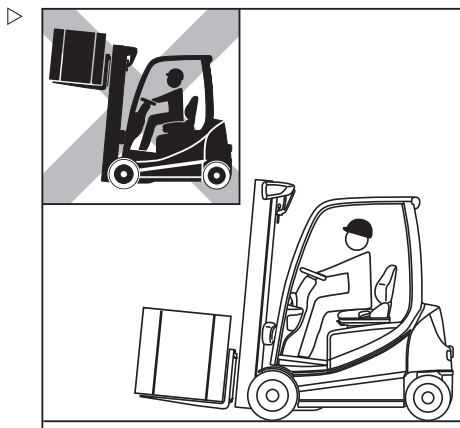
*Observe the information in the chapter entitled "Safety regulations when driving".*

#### DANGER

**The higher a load is lifted, the less stable it becomes. The truck can tip over. The load can fall. There is an increased risk of accidents.**

Driving with a raised load and the lift mast tilted forward is not permitted.

- Only drive with the load lowered.
- Lower the load until ground clearance is reached (not over 300 mm).
- Only drive with the lift mast tilted backwards.



## Handling loads

- Drive slowly and carefully around corners. ▷

### NOTE

*Observe the information in the chapter entitled "Steering".*

- Always accelerate and brake gently.

### NOTE

*Observe the information in the chapter entitled "Operating the service brake".*



- Never drive with a load protruding to the side (e.g. with the sideshift)! ▷
- Also refer to the following section entitled "Tipping stability indicator".



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## Load measurement (variant)

Knowing the weight of the load to be transported gives the driver greater security. If the truck is equipped with the "load measurement" comfort feature, the weight of the lifted load is measured and displayed in the display-operating unit (1).

### NOTE

*In order to ensure accuracy at all times, a zero adjustment of the load measurement must be carried out. A zero adjustment is required:*

- Before daily use
- After changing the fork arms
- After fitting or changing attachments

If a zero adjustment is required, the message Zero adjustment necessary will be displayed.

- For more information, refer to the "Zero adjustment of the load measurement" section in the "Testing and activities before daily use" subchapter.
- Observe the following safety information.

### DANGER

#### Risk of accident from falling load!

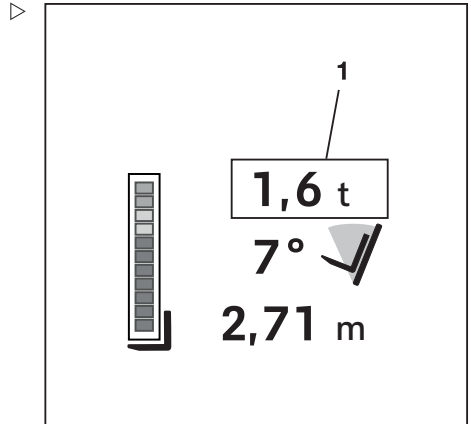
The load may fall if the load centre of gravity has not been taken into account or the load has not been picked up securely.

- Pick up the load securely; see the chapter entitled "Picking up loads".

### CAUTION

If the weight determined by a load measurement exceeds the permissible residual load capacity of the truck, the truck cannot be operated safely.

- Set down and reduce the load immediately.
- If necessary, use another truck with sufficient load-bearing capacity.



## Handling loads

### Precision load measurement (variant)

This function is available only if the truck is equipped with the "load measurement" variant.

The "precision load measurement" variant allows the weight of the load being picked up to be measured and displayed on the display-operating unit accurate to within 10 kg.



#### NOTE

*To avoid erroneous measurements, a zero adjustment must be carried out.*

- Pick up the load safely.
- Stop the truck.
- Apply the parking brake.
- Press the button.

The first menu level appears.

- Press the "load" Softkey.
- Press the "precision load measurement" Softkey.

The Lower fork slightly message appears.

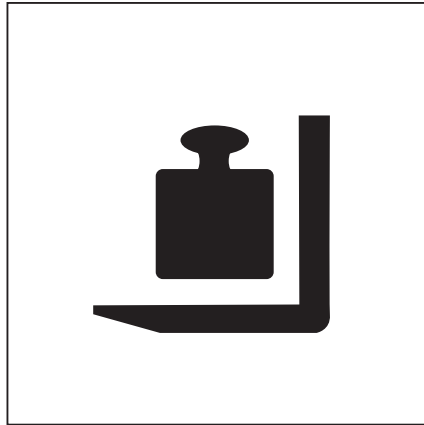
- Lower the fork carriage.



#### NOTE

*Slowly lowering the fork carriage increases the measurement accuracy in trucks with multi-lever operation.*

The weight of the load is displayed only in this menu accurate to within 10 kg.



## Total load (variant)

Use the "total load" variant to calculate the total weight of multiple loads. The "total load" is an additional function of the "load measurement". It records the individual loads and stores up to three total loads.


This allows, for example, three different containers to be laden and their loading weight to be determined. This is useful, for example, if a container has a restricted payload and you want to know when the permissible load weight is reached.

This function is useful for comparing loads indicated on delivery documents to the actual loads, for example.



### ⚠ CAUTION

If the weight determined by a load measurement exceeds the permissible residual load capacity of the truck, the truck cannot be operated safely.

- Set down and reduce the load immediately.
- If necessary, use another truck with sufficient load-bearing capacity.

- Pick up the load safely.
- Stop the truck.
- Apply the parking brake.
- Press the  button.

The first menu level appears.

- Press the "load"  Softkey.
- Press the "total load"  Softkey.

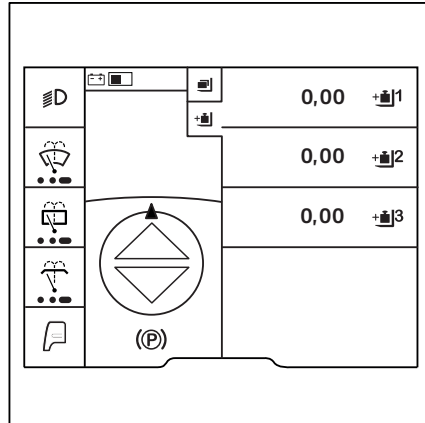


## Handling loads

A total of three load summations can be saved. ▷

The total load is explained here using memory +L1.

- Press the +L1 Softkey.



The "total load" menu +L1 appears. ▷

This menu provides the following functions:

- 0 Zero adjustment
- L Load measurement
- + Add a load
- - Subtract a load
- L Delete load summation

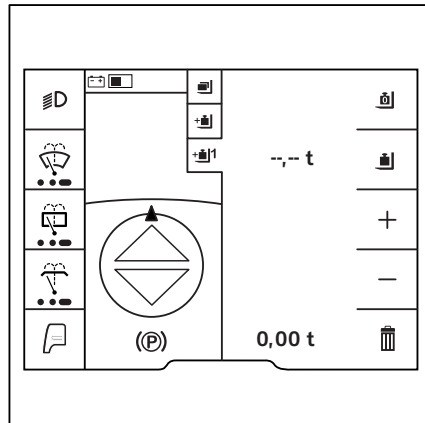
- Press the "load measurement" L Softkey. Measure the load.

The Lower fork slightly L message appears.

- Lower the fork carriage slightly.

The Calc. ongoing L message appears.

After the calculation is carried out, the measured load appears in the display.



### Add a load

To add an additional load, the current load must be set down and the new load picked up.


- Measure the load to be added.
- Press the + Softkey.
- Wait for the calculation.
- To save, press the L button.

### Subtract a load


To subtract a load, the load must first be measured.

- Measure the load to be subtracted.
- To subtract the current load, press the
  - Softkey.
- Wait for the calculation.

The current load is subtracted from the sum.

- To save, press the  button.

### Delete load summation

- To delete the total load, press the  Softkey.

The Clear total load? message ? appears.

- To delete, press the  Softkey.
- To cancel, press the  Softkey.

### Tipping stability indicator

The tipping stability indicator on the display of the display-operating unit is part of the load information. The tipping stability indicator provides information about the current stability.

Stability is calculated from the following factors:

- Lift height
- Tilt of the lift mast
- Load
- Centre of gravity of the load

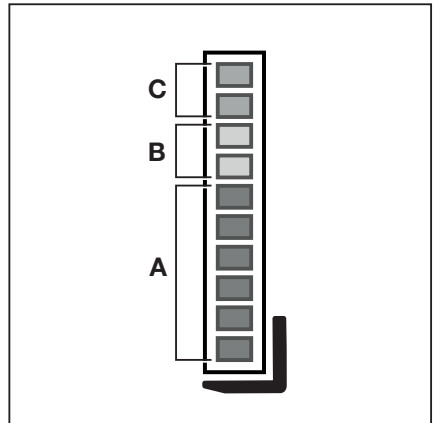
The forward tipping stability is displayed via the number and colour of the bars. More bars indicate a higher risk of the truck tipping.

#### A Grey area

The grey area indicates a non-critical condition.

#### B Yellow area

The yellow area indicates a possible risk of tipping.



- |   |        |
|---|--------|
| A | Grey   |
| B | Yellow |
| C | Red    |

## Handling loads

- Lower the load and tilt the mast back until the display is limited to the grey area (A).

### C Red zone

The red zone indicates an acute risk of tipping.

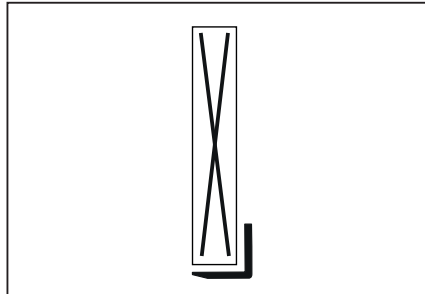
- In this case, lower the load and gently but deliberately break the truck to bring it to a safe stop.

This can occur if:

- The load is too heavy
- The fork carriage has been raised too high
- The load is steered onto a descending gradient facing downhill
- Observe the section "Driving on ascending and descending gradients".
- Before picking up the load again, check whether the load can be repositioned on the fork arms to improve stability.

If information is missing or a value is implausible when calculating stability, a cross appears instead of the bars. ▷

- If the error persists, contact the authorised service centre.



## Overload protection (variant)

The "overload protection" variant alerts the driver as soon as an excessive load is picked up. The **Overload** message appears on the display-operating unit.

The maximum load always refers to the sum of the load picked up plus any attachments present. The authorised service centre can configure the setting for the maximum load. However, the maximum load must not be higher than the nominal load.

The overload protection variant restricts the hydraulic functions as follows:

- If the nominal load is exceeded, the lifting capacity is reduced.
- If the nominal load is exceeded by more than 10%, the "lifting" function is restricted or disabled.

**NOTE**

*The authorised service centre can restrict or disable the "lifting" function.*

## Setting down a load

**⚠ DANGER****Risk of accident due to changed moment of tilt!**

The load centre of gravity and the moment of tilt move due to tilting the lift mast forwards with a raised load or due to the load slipping. The truck may tip forwards.

- Only tilt the lift mast forwards with a raised lifting accessory when it is directly above the stack.
- When the lift mast is tilted forwards, take particular care to ensure that the truck does not tip forwards and that the load does not slip.

**⚠ WARNING**

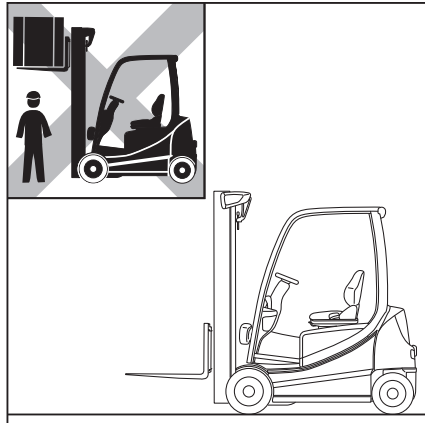
Risk of accident from falling load!

If the fork or the load remains suspended during lowering, the load may fall.

- When removing from stock, move the truck far enough back so that the load and the fork can be lowered freely.

## Handling loads

- Drive up to the stack with the load lowered in accordance with regulations. ▷
- Set the lift mast to vertical.
- Lift the load to the stacking height.
- Drive the truck towards the rack carefully.

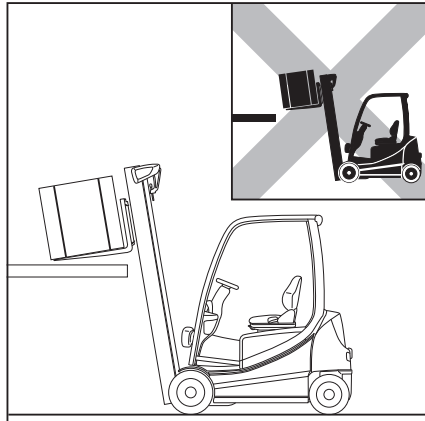


- Lower the load until it rests securely on the rack. ▷

### **⚠ DANGER**

#### **Risk of accident!**

- Beware of any people in the danger area.
  - Ensure that the roadway behind you is clear.
- 
- Move the truck back until the fork arms can be lowered without touching the stack.
  - Lower the fork while maintaining ground clearance.
  - Tilt the lift mast backwards and drive away.





## Driving on ascending and descending gradients

### **⚠ DANGER**

#### **Risk of fatal injury!**

Driving on ascending and descending gradients carries special dangers!

- Always follow the instructions below.
- 
- On ascending and descending gradients, the load must be carried facing uphill.
  - It is only permitted to drive on ascending and descending gradients that are marked as traffic routes and that can be used safely.
  - Ensure that the ground to be traversed is clean and provides a good grip.
  - Do not turn on ascending and descending gradients.
  - Do not drive onto or along ascending and descending gradients at an angle.
  - Do not park the truck on ascending or descending gradients.
  - In case of emergency, secure the truck with wedges so that the truck does not roll away.
  - Reduce the driving speed on descending gradients.

It is not permitted to drive on long ascending and descending gradients greater than 15% due to the specified minimum braking and stability values.

- Before driving on ascending and descending gradients greater than 15%, consult the authorised service centre.

The process of placing loads into stock and removing loads from stock while on an ascending or descending gradient is not permitted!

- Always place loads into stock and remove loads from stock on a horizontal plane.
- Take note of the tipping stability indicator on the display of the display-operating unit; refer to the section entitled "Transporting loads".



## Handling loads

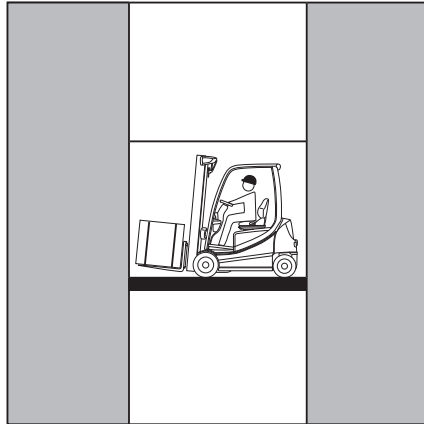
### Driving on lifts

The driver may only use this truck on lifts with a sufficient load capacity and for which the operating company has been granted authorisation (refer to the section entitled "Definition of responsible persons").

#### **⚠ DANGER**

**There is a risk of fatal injury from being crushed or run over by the truck.**

- There must not be any persons already in the lift when the truck is driven into the lift.
- Persons are only permitted to enter the lift once the truck is secure, and must exit the lift before the truck is driven out.



### Determining the total actual weight

- Park the truck safely and switch it off.
- Determine the unit weights by reading the truck nameplate and, if necessary, the attachment (variant) nameplate and/or by weighing the load to be lifted.
- Add together the determined individual weights to obtain the total actual weight of the truck:

Tare weight (1)

+ Max. permissible battery weight (2)

+ Ballast weight (variant) (3)

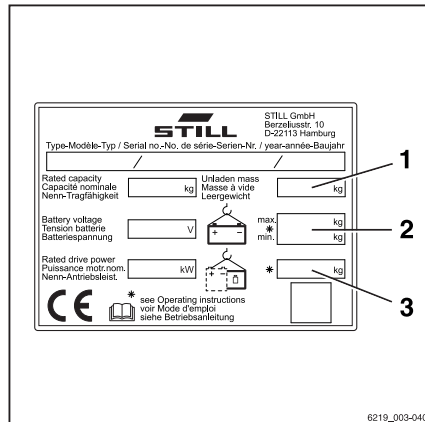
+ Net weight of attachment (variant)

+ Weight of the load to be lifted

+ 100 kg allowance for driver

= Total actual weight

- Drive the truck into the lift with the forks facing forwards. Make sure not to touch the shaft walls.
- Park the truck securely in the lift and switch it off to prevent uncontrolled movements of the load or the truck.



### Driving on loading bridges

**⚠ DANGER**

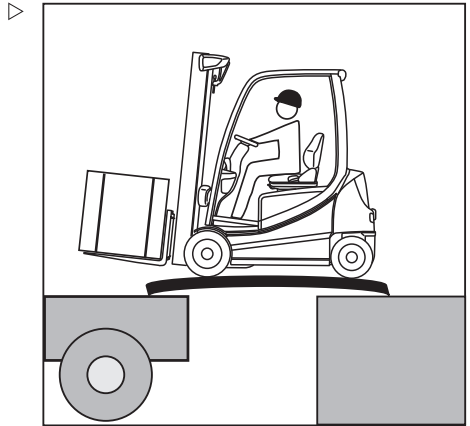
**Risk of accident from the truck falling!**

Steering movements can cause the rear of the truck to veer off the loading bridge towards the edge. This may cause the truck to crash.

For 3-wheel trucks, the useable area of the loading bridge must be enclosed so that the rear drive wheel does not fall through.

The lorry driver and the forklift truck driver must agree on the departure time.

- Establish the departure time of the lorry.
- Determine the total actual weight of the truck.
- Before driving across a loading bridge, ensure that it is properly attached and secured and has a sufficient load capacity (lorry, bridge etc.).
- Ensure that the vehicle onto which you will be driving is secured to prevent it from shifting and that it can support the load of the truck.



### Determining the total actual weight

- Park the truck safely.
- Determine the unit weights by reading the truck nameplate and, if necessary, the attachment (variant) nameplate and/or by weighing the load to be lifted.
- Add together the determined individual weights to obtain the total actual weight of the truck:

Tare weight (1)

+ Max. permissible battery weight (2)

+ Ballast weight (variant) (3)

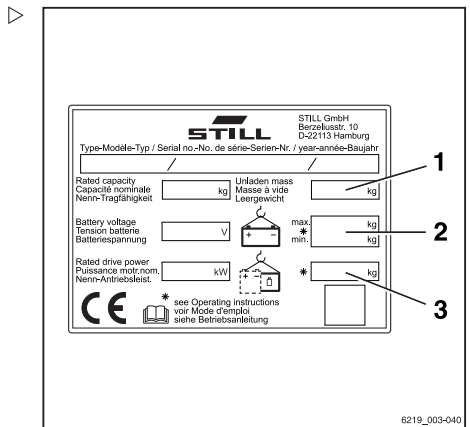
+ Net weight of attachment (variant)

+ Weight of the load to be lifted

+ 100 kg allowance for driver

= Total actual weight

- Drive slowly and carefully on the loading bridge.



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## Attachments

# Attachments

### Fitting attachments

If the truck is equipped with an integrated attachment (variant) at the factory, the specifications in the STILL operating instructions for integrated attachments must be observed.

If attachments are fitted at the place of use, the specifications in the operating instructions of the attachment manufacturer must be observed.

If an attachment is not delivered together with the forklift truck, the specifications and operating instructions of the attachment manufacturer must be observed.

Before initial commissioning, the function of the attachment and the visibility from the driver's position with and without a load must be checked by a competent person. If the visibility is deemed insufficient, visual aids such as mirrors, a camera/monitor system etc. must be used.

In addition, it is essential that the warnings below are observed.

#### CAUTION

Attachments must be CE-certified. If the truck is not fitted with an attachment-specific residual load capacity rating plate and the operating devices are not marked with corresponding pictograms, the truck must not be used.

- Order the residual load capacity rating plate and pictograms from your authorised service centre in good time.
- The authorised service centre must adapt the hydraulic system to the requirements of the attachment (e.g. by adjusting the pump motor speed).

**⚠ DANGER****There is risk to life caused by a falling load!**

Attachments that hold the load by exerting pressure on it (e.g. clamps) must be controlled additionally by a second operating function (lock) that is actuated to prevent an unintentional release of the load.

If such an attachment is retrofitted, a second operating function for actuation must also be retrofitted.

- Make sure that the additional clamp locking mechanism function is available.

**⚠ DANGER****There is risk to life caused by a falling load!**

During installation of a clamp with integral sideshift, ensure that the clamp does not open when the sideshift is actuated.

- Notify your authorised service centre before installation.
- Never grab or climb on moving parts of the truck.

**Hydraulic connection**

- Before installing the attachment, release the pressure from the hydraulic system.

**⚠ CAUTION**

Risk of damage to components!

Open connections of plug connectors can become dirty. The plug connectors can become stiff and dirt can enter the hydraulic system.

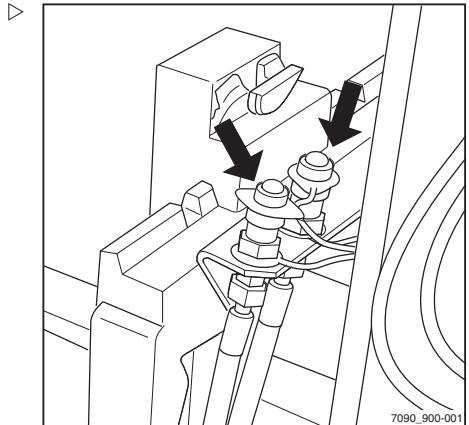
- Once the attachment has been disassembled, attach the protective caps to the plug connectors.

**Mounting attachments**

Mounting an attachment and connecting the energy supply for an attachment must only be performed by competent persons in accordance with the information provided by the manufacturer and supplier of the attachment. After each installation, the attachment must be checked for correct function prior to initial commissioning.

**i NOTE**

*Please observe the definition of the following responsible person: "competent person".*



## Attachments

### Load capacity with attachment

The permissible load capacity of the attachment and the allowable load (load capacity and load moment) of the truck must not be exceeded by the combination of attachment and payload. The specifications of the manufacturer and supplier of the attachment must be complied with.

- Observe the residual load capacity rating plate, see the chapter entitled "Taking up a load using attachments".

### Releasing the pressure from the hydraulic system

#### **▲ WARNING**

The movements of the load lift system present a risk of crushing.

During the process described below, the fork carriage or the lift mast can only be moved slightly.

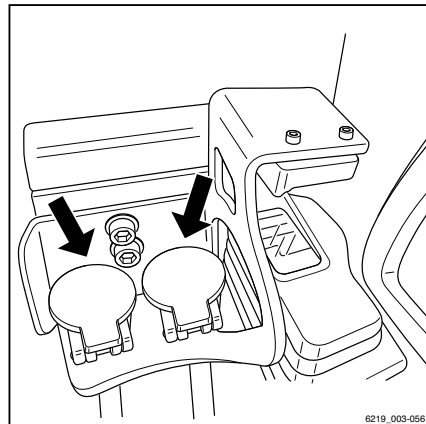
- Do not reach into or stand below the components of the load lift system.

Non-clamping attachments are connected to the third hydraulic circuit via the plug connectors on the fork carriage and are controlled via the "5th hydraulic function".

- Before fitting attachments, the pressure must be released from the plug connectors (arrows) and the other hydraulic circuits.

Attachments must only be installed by competent persons. The specifications provided by the manufacturer and supplier of the attachments must be observed during installation of the attachments.

- Before each use of the attachment, check and ensure the functions of the installed attachment.



**Procedure**

- Park the truck safely and switch it off.
- Press the emergency off switch.
- Switch on the key switch.
- Press the F2 Softkey.

The activation bar next to the symbol F2 is active.

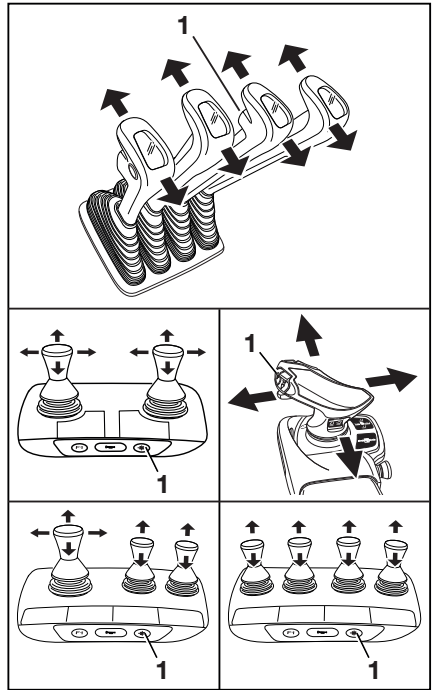
- Repeatedly actuate the operating levers for controlling the hydraulic functions in the directions of the arrows as far as the end positions.

The first four hydraulic function the hydraulic circuits are depressurised.

- Press and hold the function key (1) for the operating devices.
- Repeatedly actuate the operating levers for controlling the hydraulic functions again in the directions of the arrows as far as the end positions.

The hydraulic circuit of the 5th hydraulic function is depressurised. The connections on the lift mast are depressurised.

- Release the function key (1).



**⚠ WARNING**

Unintended movement of the lift mast presents a risk of injury.

The hydraulic pump is inactive. If an operating device for the hydraulic functions is accidentally actuated, it may still cause unintended movements of the lift mast.

- **Do not** touch the controls.

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- Switch off the key switch.
- Install the attachment.
- Switch on the key switch.
- Unlock the emergency off switch.
- Check and ensure all functions of the installed attachment.

## Attachments

### General instructions for controlling attachments

The way in which attachments (variant) are controlled depends on the operating devices included in the truck's equipment.

Essentially, a distinction is drawn between:

- **Multi-lever**
  - **Multi-lever with a 5th function** (variant)
  - **Double mini-lever**
  - **Double mini-lever with a 5th function** (variant)
  - **Triple mini-lever**
  - **Triple mini-lever with a 5th function** (variant)
  - **Quadruple mini-lever**
  - **Quadruple mini-lever with a 5th function** (variant)
  - **Joystick 4Plus**
  - **Joystick 4Plus with a 5th function** (variant)
- For information on controlling attachments with the respective operating devices, see the relevant sections in this chapter.

#### **WARNING**

Use of attachments can give rise to additional hazards such as a change in the centre of gravity, additional hazard areas etc.

Attachments must only be deployed for their intended use as described in the relevant operating instructions. Drivers must be taught how to operate the attachments.

Loads may only be picked up and transported with attachments if the loads are securely grasped and attached. Where necessary, loads must also be secured against slipping, rolling away, falling over, swinging or tipping over. Note that any change to the position of the load centre of gravity will affect the stability of the truck.

- Refer to the capacity rating plate for the attachments being used.

#### **NOTE**

*Further variants and functions are available in addition to the functions described below. The directions of movement can be seen in the pictograms on the operating devices.*



 **NOTE**

*All the attachments described fall into the category of equipment variants. An exact description of the respective movements/actions of the attachment fitted can be found in the respective operating instructions.*

## Attachments

### Controlling attachments using multi-lever operation

In this equipment, the attachments (variant) are controlled via the operating lever (1).

The pictograms on the operating lever show all of the functions that are activated by this lever.

The following applies:

- Move the operating lever (1) forwards.

The attachment moves in the direction of movement shown in the upper part of the pictogram.

- Move the operating lever (1) backwards.

The attachment moves in the direction of movement shown in the lower part of the pictogram.

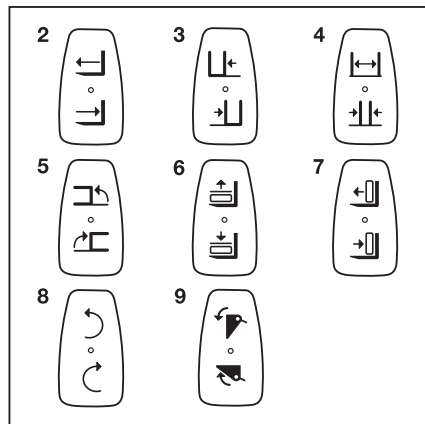
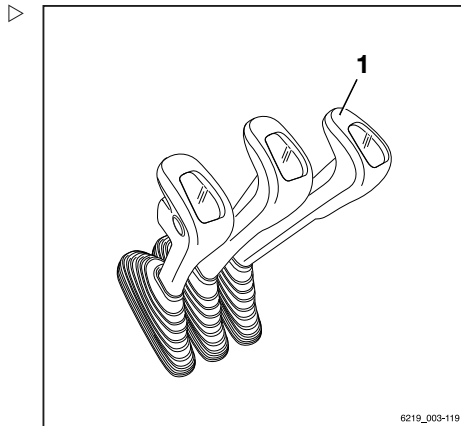
- Note the following attachment functions and pictograms.

2	Move sideshift frame or fork forwards/backwards
3	Move sideshift to the left/right
4	Adjust fork arms: open/close
5	Swivel lift mast or fork to the left/right
6	Release/clamp load retainer
7	Push off/pull in load
8	Turn to the left/right
9	Tip shovel over/tip shovel back

#### NOTE

*The pictograms shown correspond to the attachments fitted to this truck at the factory. If an attachment with other functions is fitted, the pictograms must be checked for the correct representation and changed if necessary.*

- Contact the authorised service centre regarding this matter.



## Controlling attachments with multi-lever operation and the 5th function

### **i** NOTE

*For technical reasons, clamping attachments **must not** be controlled via the "5th function".*

The attachments (variant) are controlled in this version using the operating levers (1) and (2).

On the operating lever (1) you can, with the aid of switch (3), initiate a function changeover so that this operating lever then controls the "5th function".

### **i** NOTE

*The designation "5th function" designation refers to the fact that the four operating levers control four functions, while the "5th function" can be controlled by switching functions.*

The central and bottom parts of the pictograms on the operating levers always show the function that is activated by that lever. The top part of the pictogram shows that the attachment is equipped with the "5th function".

The following applies:

- Move the operating lever (1, 2) forwards.

The attachment moves in the direction of movement shown in the centre part of the pictogram.

- Move the operating lever (1, 2) backwards.

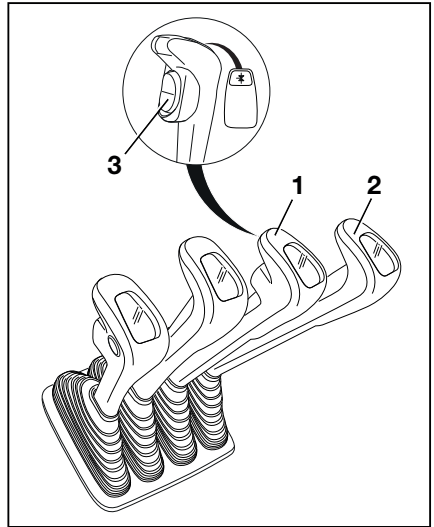
The attachment moves in the direction of movement shown in the lower part of the pictogram.

- Press and hold the switch (3).

The additional function of the attachment is activated and can be controlled as the "5th function" with the operating lever.

### **i** NOTE

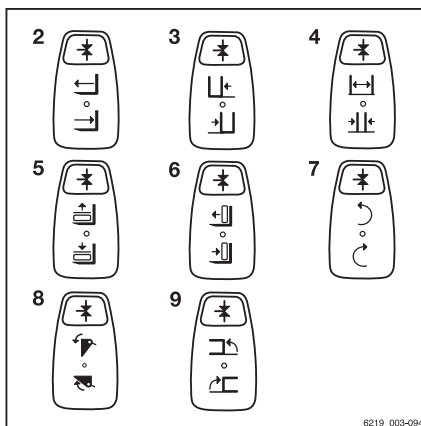
*Please see the operating instructions of the attachment that is fitted for the movements/actions resulting from use of the "5th function".*



## Attachments

- Note the following attachment functions and pictograms ▷

2	Move sideshift frame or fork forwards/backwards
3	Move sideshift to the left/right
4	Adjust fork arms: open/close
5	Release/clamp load retainer
6	Push off/pull in load
7	Turn to the left/right
8	Tip shovel over/tip shovel back
9	Swivel lift mast or fork to the left/right

**NOTE**

*The pictograms shown correspond to the attachments fitted to this truck at the factory. If an attachment with other functions is fitted, the pictograms must be checked for the correct representation and changed by the authorised service centre if necessary. If the attachment is supplied with the truck or if the authorised service centre is aware of this, the corresponding pictogram is attached in front of the lever on the panelling.*

### Controlling attachments using a double mini-lever

The attachments (variants) are controlled in this version using the "attachments" cross lever (1). Depending on the configuration, the adhesive label (2) is affixed at the designated point.

- If the adhesive label becomes illegible or is not present, please contact your authorised service centre.
- Observe the pictograms for the attachment functions on the adhesive label (2).

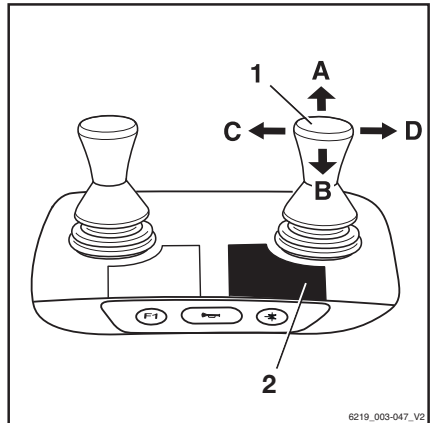
The pictograms on the "attachments" cross lever (1) show the respective functions that are activated by this lever.

The pictograms are arranged according to direction of movement of the "attachments" cross lever (1).

The following applies:



- Move the "attachments" cross lever (1) in the direction of arrow (A), (B), (C) or (D).

The attachment moves accordingly in the directions shown in the pictogram: (A), (B), (C) or (D).



Pictogram	Attachment function
	Move sideshift frame or fork forwards
	Move sideshift frame or fork backwards
	Move sideshift to the left
	Move sideshift to the right
	Adjust fork arms: open
	Adjust fork arms: close
	Release load retainer
	Clamp load retainer
	Open clamps
	Close clamps
	Rotate to the left
	Rotate to the right

## Attachments

Pictogram	Attachment function
	Tip shovel over
	Tip shovel back

**NOTE**

*The pictograms shown correspond to the attachments fitted to this truck at the factory. If an attachment with other functions is fitted, the pictograms must be checked for the correct representation and changed if necessary.*

- Contact the authorised service centre regarding this matter.

## Controlling attachments using the double mini-lever and the 5th function

### NOTE

For technical reasons, clamping attachments **must not** be controlled via the "5th function".

The "lift mast" 360° lever and the "attachments" cross lever control four hydraulic functions. The designation "5th function" refers to the fact that switching functions with the function key for the "5th function" (3) controls the 5th hydraulic function with the cross lever.

Depending on the configuration, the adhesive label (2) is affixed at the designated point.

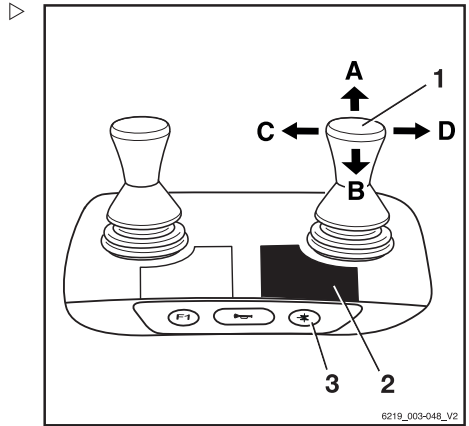
- If the adhesive label becomes illegible or is not present, please contact your authorised service centre.
- Observe the pictograms for the attachment functions on the adhesive label (2).

The pictograms on the "attachments" cross lever show the respective functions that are activated by this lever.

The following applies:

- Actuate the function key for the "5th function" (3) and move the "attachments" cross lever (1) in the direction of the arrow (A), (B), (C) or (D).

The attachment moves accordingly in the directions shown in the pictogram: (A), (B), (C) or (D).

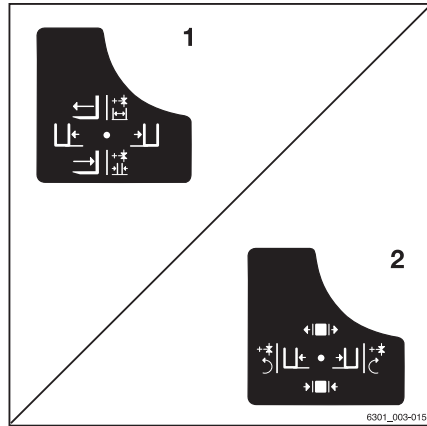


## Attachments

Example using the pictograms for configuration (1): ▷

If the "attachments" cross lever (1) moves in the direction of the arrow (A), the fork is extended.

If the function key for the "5th function" (3) is actuated and the "attachments" cross lever (1) is moved in the direction of the arrow (A), the fork arms open.



Picto-gram	Attachment function
+*	Auxiliary hydraulics "5th Function"
←	Move sideshift frame or fork forwards
→	Move sideshift frame or fork back-wards
←	Move sideshift to the left
→	Move sideshift to the right
←→	Adjust fork arms: open
→←	Adjust fork arms: close
◀▶	Open clamps
▶◀	Close clamps
↶	Rotate to the left
↷	Rotate to the right

**i** NOTE

*The pictograms shown correspond to the attachments fitted to this truck at the factory. If an attachment with other functions is fitted, the pictograms must be checked for the correct representation and changed if necessary.*

- Contact the authorised service centre regarding this matter.



### Controlling attachments using a triple mini-lever

The attachments (variant) are controlled in this version using the operating levers (1) and (2). Depending on the configuration, the adhesive label (3) for the operating lever (2) and the adhesive label (4) for the operating lever (1) are affixed at the designated points.

- If the adhesive labels become illegible or are not present, please contact your authorised service centre.
- Observe the pictograms for the attachment functions on the adhesive labels (3, 4).

The pictograms on the operating levers show the respective functions that are activated by these levers.

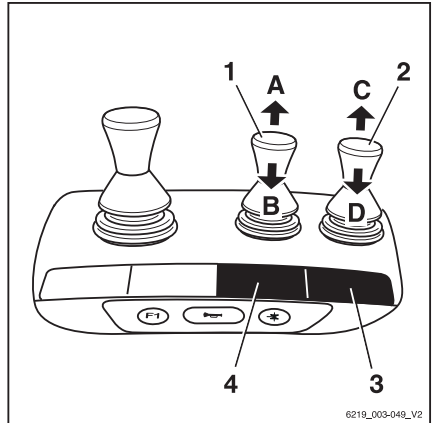
The following applies:

- Move the operating lever (1) in the direction of the arrow (A) or (B).

The attachment moves accordingly in the directions shown in pictogram: (A) or (B).




- Move the operating lever (2) in the direction of the arrow (C) or (D).

The attachment moves accordingly in the directions shown in pictogram: (C) or (D).



Pictogram	Attachment function
	Move sideshift frame or fork forwards
	Move sideshift frame or fork backwards
	Move sideshift to the left
	Move sideshift to the right
	Adjust fork arms: open
	Adjust fork arms: close
	Release load retainer
	Clamp load retainer
	Open clamps
	Close clamps
	Rotate to the left

## Attachments

Pictogram	Attachment function
	Rotate to the right
	Tip shovel over
	Tip shovel back

 NOTE

The pictograms shown correspond to the attachments fitted to this truck at the factory. If an attachment with other functions is fitted, the pictograms must be checked for the correct representation and changed if necessary.

- Contact the authorised service centre regarding this matter.

### Controlling attachments using the triple mini-lever and the 5th function

 NOTE

For technical reasons, clamping attachments **must not** be controlled via the "5th function".

The "lift mast" 360° lever and operating levers (1) and (2) control four hydraulic functions. The designation "5th function" refers to the fact that switching functions with the function key for the "5th function" (3) controls the 5th hydraulic function using the operating lever (1).

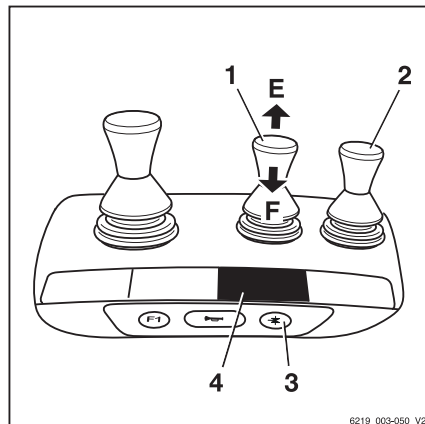
Depending on the configuration, the adhesive label (4) is affixed at the designated point.

- If the adhesive label becomes illegible or is not present, please contact your authorised service centre.
- Observe the pictograms for the attachment functions on the adhesive label (4).

The pictograms on the operating lever show the respective functions that are activated by this lever.

The following applies:

- Actuate the function key for the "5th function" (3) and move the operating lever (1) in the direction (E) or (F).

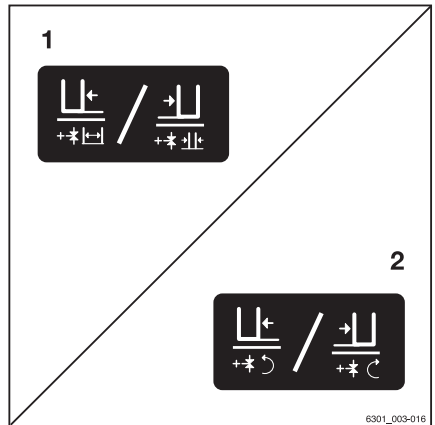


The attachment moves accordingly in the directions shown in pictogram: (E) or (F).

Example using the pictograms for configuration (1):

If the operating lever (1) is moved in the direction of the arrow (E), the sideshift moves to the left.

If the function key for the "5th function" (3) is actuated and the operating lever (1) is moved in the direction of the arrow (E), the fork arms open.



Picto-gram	Attachment function
+*	Auxiliary hydraulics "5th Function"
←	Move sideshift to the left
→	Move sideshift to the right
↔	Adjust fork arms: open
↕	Adjust fork arms: close
↶	Rotate to the left
↷	Rotate to the right

**i NOTE**

*The pictograms shown correspond to the attachments fitted to this truck at the factory. If an attachment with other functions is fitted, the pictograms must be checked for the correct representation and changed if necessary.*

- Contact the authorised service centre regarding this matter.

## Attachments

## Controlling attachments using a quadruple mini-lever

The attachments (variant) are controlled in this version using the operating levers (1) and (2). Depending on the configuration, the adhesive label (3) for the operating lever (2) and the adhesive label (4) for the operating lever (1) are affixed at the designated points.

- If the adhesive labels become illegible or are not present, please contact your authorised service centre.
- Observe the pictograms for the attachment functions on the adhesive labels (3, 4).

The pictograms on the operating levers show the respective functions that are activated by these levers.

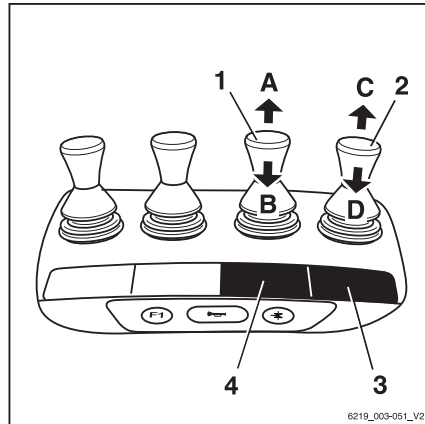
The following applies:

- Move the operating lever (1) in the direction of the arrow (A) or (B).




The attachment moves accordingly in the directions shown in pictogram: (A) or (B).

- Move the operating lever (2) in the direction of the arrow (C) or (D).

The attachment moves accordingly in the directions shown in pictogram: (C) or (D).



Pictogram	Attachment function
	Move sideshift frame or fork forwards
	Move sideshift frame or fork backwards
	Move sideshift to the left
	Move sideshift to the right
	Adjust fork arms: open
	Adjust fork arms: close
	Release load retainer
	Clamp load retainer
	Open clamps
	Close clamps
	Rotate to the left

Pictogram	Attachment function
	Rotate to the right
	Tip shovel over
	Tip shovel back

** NOTE**

*The pictograms shown correspond to the attachments fitted to this truck at the factory. If an attachment with other functions is fitted, the pictograms must be checked for the correct representation and changed if necessary.*

- Contact the authorised service centre regarding this matter.

## Attachments

## Controlling attachments using the quadruple mini-lever and the 5th function

### NOTE

For technical reasons, clamping attachments **must not** be controlled via the "5th function".

The operating levers (1) to (4) are used to control four hydraulic functions. The designation "5th function" refers to the fact that switching functions with the function key for the "5th function" (5) controls the 5th hydraulic function using the operating lever (3).

The pictograms on the operating lever show the respective functions that are activated by this lever.

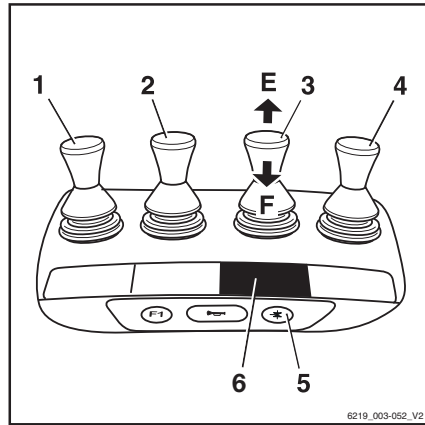
Depending on the configuration, the adhesive label (6) is affixed at the designated point.

- If the adhesive label becomes illegible or is not present, please contact your authorised service centre.
- Observe the pictograms for the attachment functions on the adhesive label (6).

This essentially involves the following:

- Actuate the function key for the "5th function" (5) and move the operating lever (3) in the direction (E) or (F).

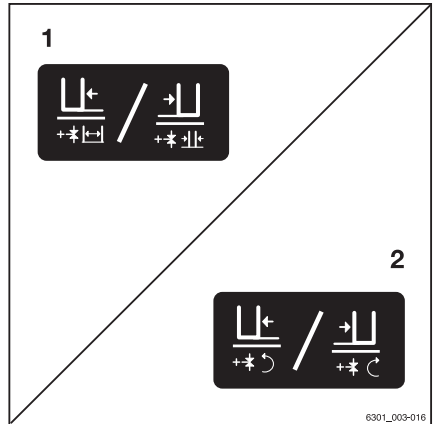
The attachment moves accordingly in the directions shown in pictogram: (E) or (F).



Example using the pictograms for configuration (1):

If the operating lever (3) is moved in the direction of the arrow (E), the sideshift moves to the left.

If the function key for the "5th function" (5) is actuated and the operating lever (3) is moved in the direction of the arrow (E), the fork arms open.



Pictogram	Attachment function
+*	Auxiliary hydraulics "5th Function"
←	Move sideshift to the left
→	Move sideshift to the right
↔	Adjust fork arms: open
↔	Adjust fork arms: close
↶	Rotate to the left
↷	Rotate to the right

**i** NOTE

The pictograms shown correspond to the attachments fitted to this truck at the factory. If an attachment with other functions is fitted, the pictograms must be checked for the correct representation and changed if necessary.

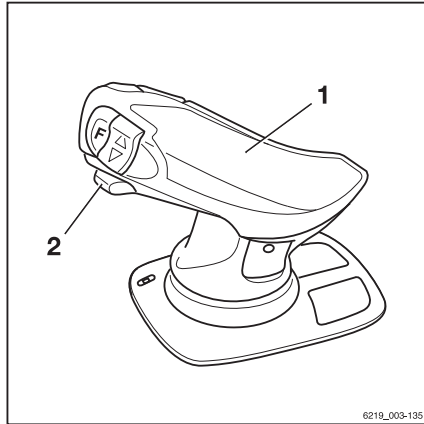
- Contact the authorised service centre regarding this matter.


## Attachments

## Controlling attachments via the joystick 4Plus

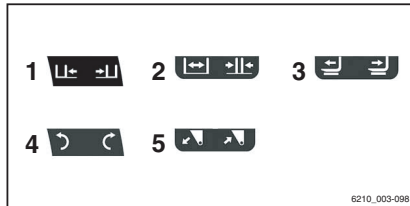
In this equipment, the attachments (variant) are controlled via the joystick 4Plus (1) and the slider (2).

The pictograms on the decal information about operation of the joystick 4Plus show the respective functions that are activated by the individual operating devices of the joystick 4Plus.



– Note the following attachment functions and pictograms. 

	Operating device	Function of the attachment
1	Joystick 4Plus	Move sideshift to the left/right
2	Joystick 4Plus or slider	Adjust fork arms: open/close
3	Slider	Move side shift frame or fork carriage forwards/backwards
4	Joystick 4Plus or slider	Rotate attachment left/right
5	Slider	Tip shovel over/tip shovel back



### NOTE

*The pictograms on the joystick 4Plus are applied according to the attachments fitted to this truck at the factory. If an attachment with other functions is fitted, the pictograms must be checked for the correct representation and changed if necessary.*

– Contact the authorised service centre if required.



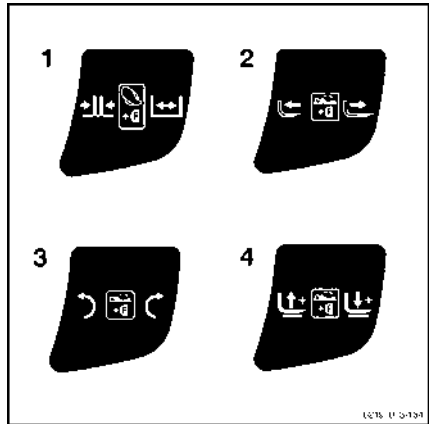
### Controlling attachments using the Joystick 4Plus and the 5th function

- Note the following attachment functions and pictograms. ▷

**i** NOTE

For technical reasons, clamping attachments **must not** be controlled via the "5th function".

	Operating device	Function of the attachment
1	Joystick 4Plus & shift key "F"	Adjust fork arms: close/open
2	Horizontal rocker button & shift key "F"	Adjust fork: backwards/forwards
3	Horizontal rocker button & shift key "F"	Swivel lift mast or fork: left/right
4	Horizontal rocker button & shift key "F"	Additional fork carriage: lift/lower



**i** NOTE

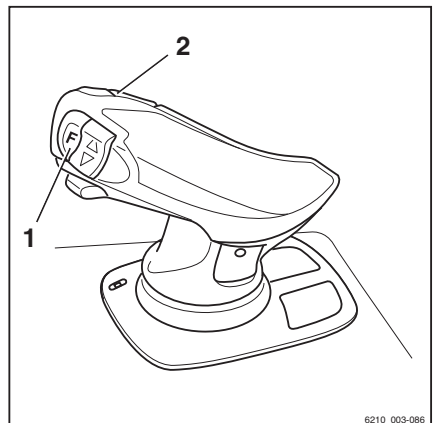
The 5th hydraulic function can be used to control an attachment. The pictograms on the Joystick 4Plus show which attachment functions can be controlled using the "5th function".

For attachments that are controlled using the 5th hydraulic function, the procedures for operation are as follows: ▷

- Press and hold shift key "F" (1) on the Joystick 4Plus.
- At the same time, actuate the horizontal rocker switch (2) in the direction shown in the pictogram so that the attachment moves accordingly.

**i** NOTE

The pictograms on the Joystick 4Plus are applied according to the attachments fitted to this truck at the factory. If an attachment with other functions is fitted, the pictograms must



## Attachments

*be checked for the correct representation and changed if necessary.*

- Contact the authorised service centre if required.

### Clamp locking mechanism (variant)

This truck can be fitted with a clamp locking mechanism as a variant. This prevents the clamp from opening unintentionally if the operating function is inadvertently triggered.

#### **⚠ DANGER**

**There is a risk of fatal injury from falling loads if the correct function of the clamp locking mechanism is not guaranteed!**

If other attachments are used on this truck in addition to the clamp, make sure that the clamp locking mechanism function is reassigned to the corresponding operating device every time the clamp is reassembled; see the chapter entitled "Fitting attachments".

- Make sure that the additional clamp locking mechanism function is available.

#### **i NOTE**

*For technical reasons, clamping attachments **must not** be controlled via the "5th function".*

### Double mini-lever

- To release the clamp locking mechanism, push the operating lever (2) forwards.

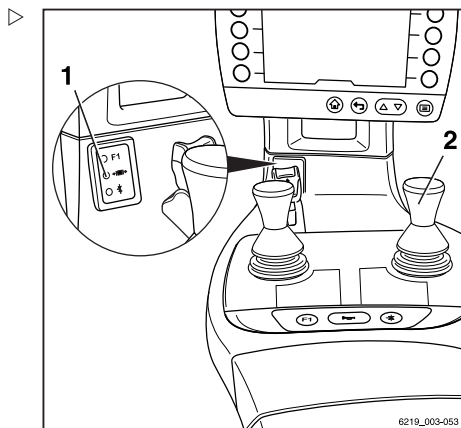
The LED (1) lights up as long as the clamp locking mechanism is released.

#### **i NOTE**

*The hydraulic function for opening the clamp is available for one second after the clamp locking mechanism is released. After one second, the clamp locking mechanism is automatically reactivated.*

- To open the clamp, push the operating lever (2) forwards again.

It is not necessary to release the clamp locking mechanism in order to close the clamp.



- To close the clamp, pull the operating lever (2) backwards.

### Triple mini-lever

- To release the clamp locking mechanism, push the operating lever (2) forwards.

The LED (1) lights up as long as the clamp locking mechanism is released.

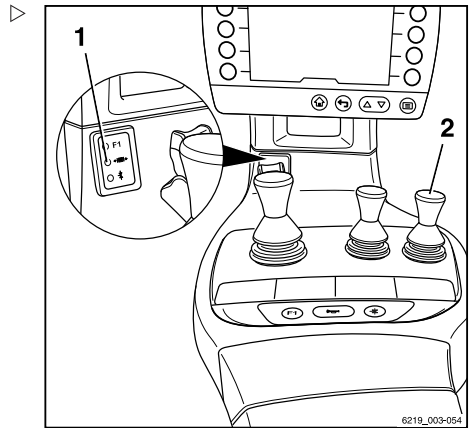
**i** NOTE

*The hydraulic function for opening the clamp is available for one second after the clamp locking mechanism is released. After one second, the clamp locking mechanism is automatically reactivated.*

- To open the clamp, push the operating lever (2) forwards again.

It is not necessary to release the clamp locking mechanism in order to close the clamp.

- To close the clamp, pull the operating lever (2) backwards.



### Quadruple mini-lever

- To release the clamp locking mechanism, push the operating lever (2) forwards.

The LED (1) lights up as long as the clamp locking mechanism is released.

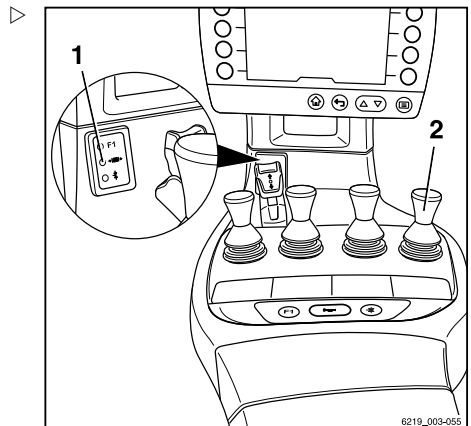
**i** NOTE

*The hydraulic function for opening the clamp is available for one second after the clamp locking mechanism is released. After one second, the clamp locking mechanism is automatically reactivated.*

- To open the clamp, push the operating lever (2) forwards again.

It is not necessary to release the clamp locking mechanism in order to close the clamp.

- To close the clamp, pull the operating lever (2) backwards.



## Attachments

**Joystick 4Plus**

- To release the clamp locking mechanism, press and hold shift key "F" (3) and move the horizontal rocker button (1) to the right.
- Keep shift key "F" (3) pressed and move the horizontal rocker button (1) back to the neutral position.

The LED (2) lights up as long as the clamp locking mechanism is released.

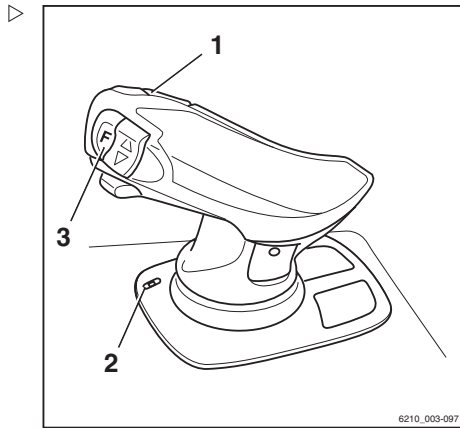
- To open the clamp, press and hold shift key "F" (3) and move the horizontal rocker button (1) to the right.

** NOTE**

*The hydraulic function for opening the clamp is available for one second after the clamp locking mechanism is released. After one second, the clamp locking mechanism is automatically reactivated.*

It is not necessary to release the clamp locking mechanism in order to close the clamp.

- To close the clamp, press and hold shift key "F" (3) and move the horizontal rocker button (1) to the left.



## Picking up a load using attachments

### ⚠ WARNING

Risk of accident!

Attachments must only be deployed for their intended use as described in the relevant operating instructions.

Drivers must be taught how to operate the attachments.

### ⚠ WARNING

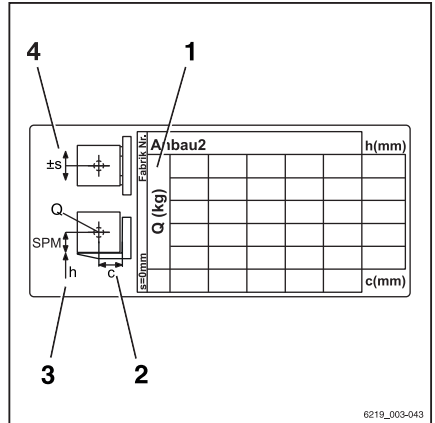
Risk of accident!

Loads may only be picked up and transported with attachments if the loads are securely grasped and attached. Where necessary, loads must also be secured against slipping, rolling, falling over, swinging or tipping over. Note that any change to the position of the load centre of gravity will affect the stability of the truck.

Check the capacity rating plates for the attachments or combination of attachments.

– The rating plates show the permissible values for:

- 1 Load capacity Q (kg)
- 2 Load distance C (mm)
- 3 Lift height h (mm)
- 4 Permissible sideshift s (mm)



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## Auxiliary equipment

### FleetManager (variant)

FleetManager is an equipment variant and can be fitted to the truck in different versions. The description and operation information can be found in the separate operating instructions for the corresponding FleetManager versions.

### Shock recognition (variant)

The shock recognition is an equipment variant of the FleetManager (variant) in which an acceleration sensor is installed in the truck. The acceleration sensor records data arising from rapid accelerations or decelerations of the truck, e.g. in the event of an accident.

## Auxiliary equipment

This data can be electronically read out and evaluated.

- If you have any questions, please contact your authorised service centre.

## Driver restraint systems (variants)

Different driver restraint systems are available as variants for this truck. The description and operation for these systems can be found in the separate "Driver restraint systems" operating instructions.

## Actuating the windscreen wipers and windscreen washers (variant)

Repeatedly pressing the respective button switches between the operating stages in the sequence shown below.

Button actuation	Operating stage
	Off
1 Times	On
2 Times	Intermittent mode
3rd Times	Off
Hold (possible in all operating stages)	Washer

### Front windscreen wiper and washer

- To activate the "On" operating stage, press the corresponding Softkey for the symbol (1) on the display-operating unit.

The "On" operating stage is activated. The symbol (3) appears

- To activate the "Intermittent mode" operating stage, press the Softkey again.

The symbol (2) is highlighted with an orange point.

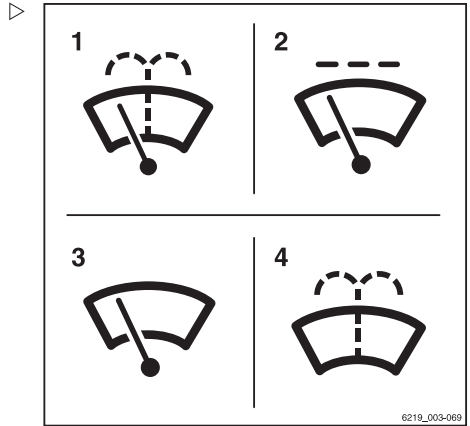
- To activate the "Washer" operating stage, press and hold the Softkey.

The "Washer" operating stage is activated. The symbol (4) is displayed for as long as the Softkey is pressed.

- Once the window is clean, release the Softkey.

The previous operating stage is reactivated.

- To deactivate the operating stage, press the Softkey again.



1 Front windscreen wiper and washer symbol  
 2 Intermittent mode  
 3 On  
 4 Washer

### Rear window wiper and washer

- To activate the "On" operating stage, press the corresponding Softkey for the symbol (5) on the display-operating unit.

The "On" operating stage is activated. The symbol (7) appears

- To activate the "Intermittent mode" operating stage, press the Softkey again.

The symbol (6) is highlighted with an orange point.

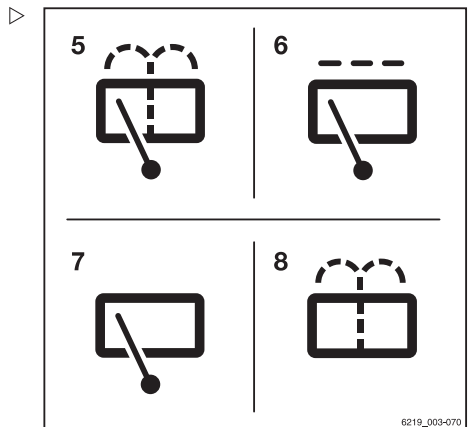
- To activate the "Washer" operating stage, press and hold the Softkey.

The "Washer" operating stage is activated. The symbol (8) is displayed for as long as the Softkey is pressed.

- Once the window is clean, release the Softkey.

The previous operating stage is reactivated.

- To deactivate the operating stage, press the Softkey again.



5 Rear window wiper and washer symbol  
 6 Intermittent mode  
 7 On  
 8 Washer

## Auxiliary equipment

### Roof panel wiper and washer

- To activate the "On" operating stage, press the corresponding Softkey for the symbol (9).

The "On" operating stage is activated. The symbol (10) appears

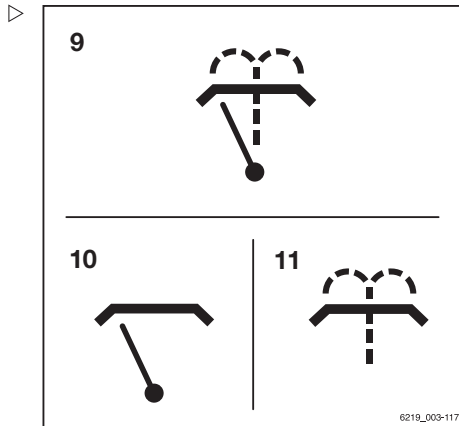
- To activate the "Washer" operating stage, press and hold the Softkey.

The "Washer" operating stage is activated. The symbol (11) is displayed for as long as the Softkey is pressed.

- Once the window is clean, release the Softkey.

The previous operating stage is reactivated.

- To deactivate the operating stage, press the Softkey again.



- 9 Roof panel wiper and washer symbol
- 10 On
- 11 Washer

### Operating the rear window heating

- To switch on the rear window heating, push the associated Softkey on the display-operating unit.

The rear window heating is switched on.

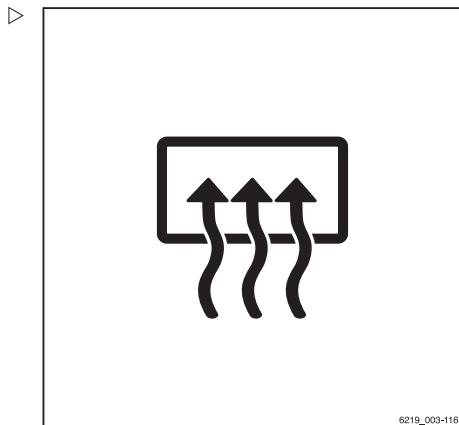
- To switch off the rear window heating, push the Softkey again.

The rear window heating is switched off.



#### NOTE

*The screen heating will switch off automatically after approx. 10 minutes.*





## Ceiling sensor (variant)

### Description

The ceiling sensor (1) on the overhead guard ▷ is an assistance system that automatically reduces the driving speed of the truck within halls. However, this assistance system does not release the driver from the responsibility of observing the speed limits on company premises.

Depending on the system setting, the ceiling sensor can detect overhead structures above the truck at a height of 2 m to 24 m above the sensor.

### Operating the ceiling sensor system

The drivers are to be instructed on the use of the ceiling sensor system by the operating company.

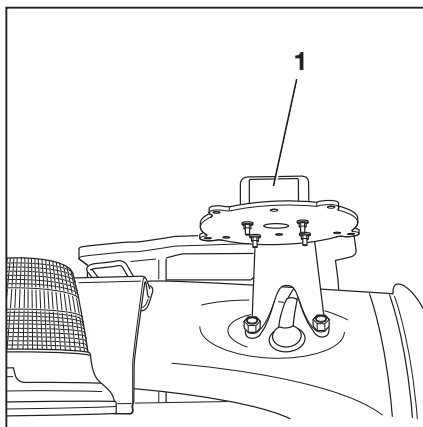
When the driver enters a hall for the first time after starting work, he must be certain that the ceiling sensor system is functioning correctly. Despite the ceiling sensor system being installed, the driver must also check the speed indicator on the display-operating unit on a regular basis to ensure that he does not exceed the maximum speed permitted for the environment.

- **Entering a hall**

The ceiling detector system automatically detects whether the truck enters a hall. The system then automatically slows the truck to the maximum speed that is set for the hall.

- **Leaving a hall**

If the truck leaves the hall again, the ceiling detector system enables the maximum speed set for areas outside the hall. Due to the range of the sensor, this may not happen until the truck is a few metres away from the hall exit. Before the truck is able to accelerate to the maximum speed permitted for outdoor areas, the speed limitation must still be unlocked. To do this, release the



## Auxiliary equipment

accelerator briefly and then operate the accelerator again.

- **Switching on the truck in a hall**

If the truck is switched on inside a hall, the ceiling detector system detects the hall ceiling and reduces the driving speed to the maximum speed that is set for halls.

### Possible limitations for object recognition

- If the truck moves under larger overhead structures outdoors, e.g. a pedestrian bridge, the ceiling sensor system may interpret this overhead structure to be a hall ceiling and reduce the maximum speed.
- In rare cases, it may occur that the ceiling sensor system does not recognize a ceiling and does not then reduce the speed. This can happen if the signals from the ceiling sensor are insufficiently reflected due to the ceiling geometry; for example, if there are large window areas at a 45° angle.

In these cases, the sensitivity and the range of the ceiling sensor system must be adjusted. For more information, refer to the next chapter.

### Changing the sensor settings

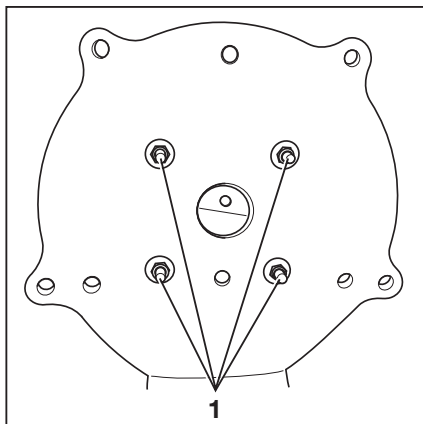
The ceiling sensor system is supplied by STILL with the following factory settings:

Sensitivity: **High**

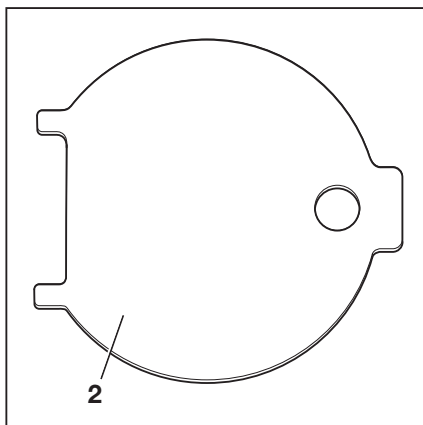
Ceiling height: **24 m**

- Pull out the connecting cable from the sensor.

- On the underside of the assembly baseplate on the overhead guard, loosen the four nuts (1) on the sensor. ▷
- Carefully remove the sensor.



- Using the supplied key (2), open the sensor housing to gain access to the DIP switches. ▷



## Auxiliary equipment

- Using the DIP switches "1" to "5" (3), adjust the range and the sensitivity of the sensor. The DIP switches can be adjusted using a small screwdriver.

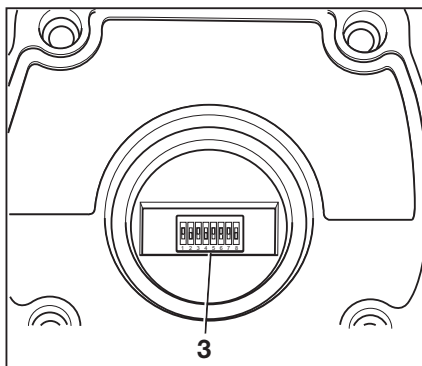
### ⚠ CAUTION

The settings for DIP switches "6" to "8" are the factory settings of the manufacturer.

They must **not** be changed!

Factory settings of the manufacturer - do not change

DIP switch		
6	7	8
1	1	0



The possible settings for DIP switches "1" to "5" are shown in the following tables:

DIP switch			Range
1	2	3	
0	0	0	2 m
0	0	1	3 m
0	1	0	4 m
0	1	1	6 m
1	0	0	8 m
1	0	1	12 m
1	1	0	16 m
1	1	1	24 m

4	5	Sensitivity
0	0	Very high
0	1	High
1	0	Medium
1	1	Low

The sensor has different beam angles depending on the combination of range and

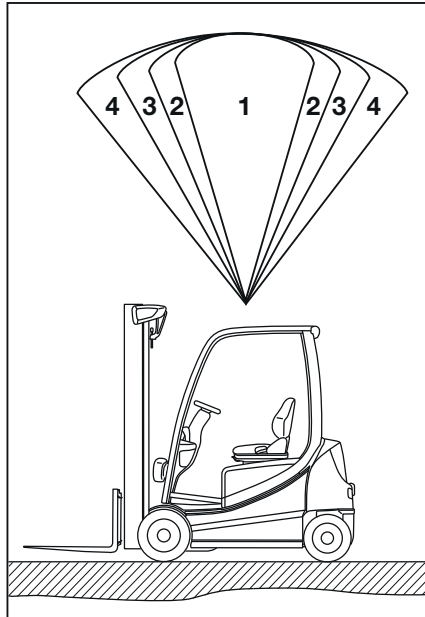
sensitivity that has been set. See the following table:

Sensitivity	Range	Beam angle
Low (1)	2 m	22.5°
	4 m	22.5°
	8 m	20°
	16 m	15°
	24 m	5°
Medium (2)	2 m	35°
	4 m	30°
	8 m	25°
	16 m	22.5°
	24 m	10°

Sensitivity	Range	Beam angle
High (3)	2 m	42°
	4 m	33°
	8 m	22.5°
	16 m	20°
	24 m	15°
Very high (4)	2 m	45°
	4 m	43°
	8 m	30°
	16 m	22.5°
	24 m	18°

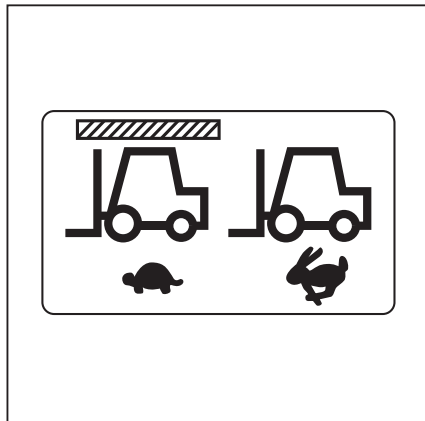
### Auxiliary equipment

Representation of the beam angle depending on the sensitivity of the sensor that has been set, from (1) "low" to (4) "very high".



### Additional labelling

Adhesive label next to the display-operating unit



## Cab

### Opening and closing the cab door

#### **CAUTION**

Risk of component damage.

If the cab door opens while driving, there is risk of damage from a collision.

- The cab door must be latched securely in the engaged position.

The truck has a cab door sensor that is used to monitor the closing of the cab door.

If the seat belt is not fastened and the cab door is not closed, the driving speed is limited to 4 km/h. The message **Close cab door or seat belt** appears in the display.

If the cab door is opened while the truck is in motion and the seat belt is fastened, the truck decelerates and is restricted to a driving speed of 4 km/h. The message **Close cab door** appears in the display.

If the seat belt is released with the cab door closed, no message appears.

#### **Opening the cab door from the outside:**

- Insert the key in the door lock (5), unlock the door and remove the key.
- Pull the handle (4). Unlock the door lock.
- Open the cab door (3) by pulling it outwards.

#### **Opening the cab door from the inside:**

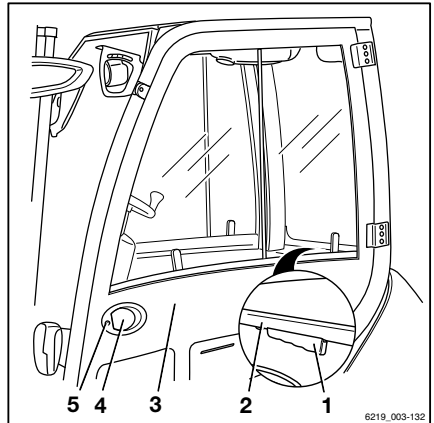
- Take hold of the handle (2) and the latch (1).
- Push in the latch. Push the cab door outwards.

#### **Closing the cab door from the outside:**

- Take hold of the door by the door handle (4). Close the cab door by pushing.

#### **Closing the cab door from the inside:**

- Take hold of the handle (2).
- Pull the cab door inwards and close it.



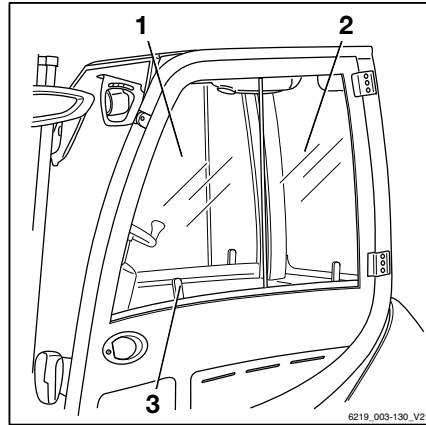
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## Opening and closing the side window ▷

### ⚠ WARNING

There is a risk of crushing between the window frame and side window due to the side windows slipping inadvertently during travel.

- Make sure that the handle engages securely in the corresponding stop slot.



### Opening the front side window:

- Squeeze the handle (3). Slide the front side window (1) backwards.

### Opening the rear side window:

The rear side window (2) can be opened in the same way as the front side window.

### Closing the front side window:

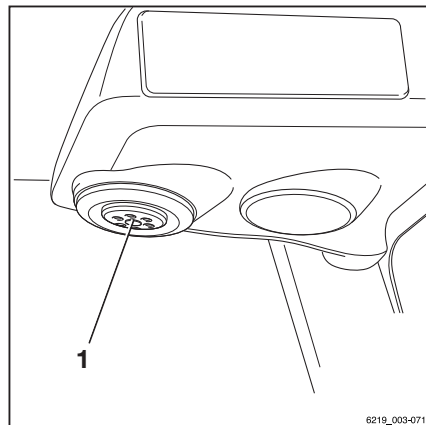
- Slide the front side window (1) forwards using the handle (3) until it snaps into place.

### Closing the rear side window:

The rear side window (2) can be closed in the same way as the front side window.

## Turning the interior lighting on or off (variant) ▷

- To turn the interior lighting on or off, press the push button switch (1) in the middle of the interior lighting.





## Radio (variant)

The radio and the loudspeakers are an equipment variant. If the truck is equipped with a radio and loudspeakers, they are integrated into the roof lining.

The description and operation can be found in the separate operating instructions for the radio.

### WARNING

The driver's attention is adversely affected by operating the radio or listening to it at excessive volumes while driving or handling loads. Risk of accident!

- Do not operate the radio when driving or when handling loads.
- Adjust the radio volume so that you can still hear warning signals.

## Heating system (variant)



### DANGER

**There is a risk of poisoning if heavily polluted surrounding air is aspirated into the closed cab!**

The heater must not be operated in the vicinity of storage areas or the like, in which fuel vapours or fine dust (e.g. coal, wood or grain dust) can build up.



### DANGER

**There is a risk of explosion due to gases expanding or igniting as a result of heat.**

- Do not expose spray cans or gas cartridges to the flow of hot air.

## Cab

**⚠ DANGER**

**The heating system can overheat if the hot air cannot escape from it. Risk of fire!**

The heating system may only be switched on if the blower is running and the heating system is not covered by objects (such as a jacket or cover).

- Always switch the blower on first.
- Do not switch the heating system on until the blower is switched on.
- Move any objects away from the heating system or air distributors.

**⚠ DANGER**

**The heating system housing can become very hot during heating operation. There is a risk of burns if it is touched!**

- Do not touch the heating system housing during operation.
- Only touch the switches provided.

The operating devices of the heating system include:

- 1 Heating level control knob
- 2 Fan control knob
- 3 Air vent control knob

### Switching on the blower and heating system

- Turn the fan control knob (2) to the desired blower position. ▷

The blower runs at the speed level selected via the fan control knob (2).

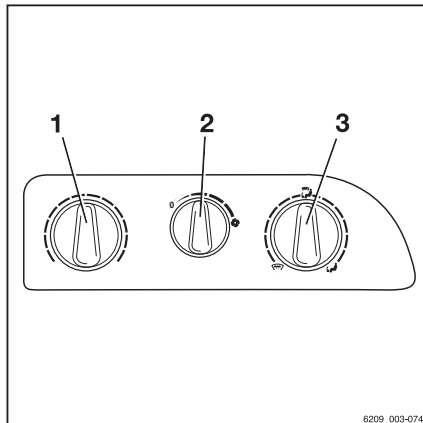
- Turn the heating level control knob (1) to the desired heating level.

The heater warms the air to the heating level selected via the heating level control knob (1)

- Turn the air vent control knob (3) to the desired position.

### Selecting blower settings

- To select a lower fan output, turn the fan control knob (2) anticlockwise.





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- To select a high blower output, turn the fan control knob (2) clockwise.

### Setting heating levels

- To set a lower heater power, turn the heating level control knob (1) anticlockwise.
- To set a higher heater power, turn the heating level control knob (1) clockwise.

### Setting the air vent control knob

- To direct the air flow to the footwell, turn the air vent control knob (3) in an anticlockwise direction to the  position.
- To direct the air flow to the windscreen, turn the air vent control knob (3) in a clockwise direction to the  position.

The  centre position directs the air flow to the footwell and the windscreen.

### Adjusting the air distributors

The air distributors for the driver are always supplied with air. It is not necessary to adjust the heating system using the operating devices.

- To open the air distributor, push the indentation (1) on the disc.

The discs open.

- Grasp the discs to align the air flow:

The discs can be adjusted to the desired angle. The air distributor can be rotated.

- Press down again to close the discs.

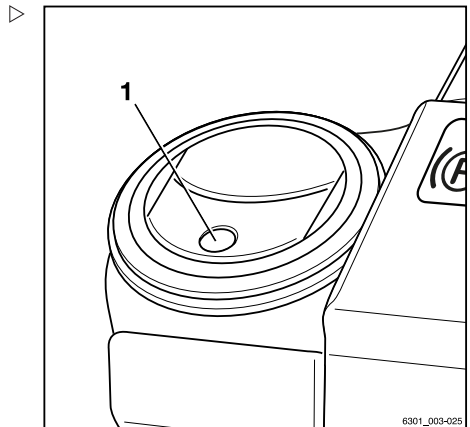
### Switching off the heating system and blower

- Turn the heating level control knob (1) in an anticlockwise direction until it reaches the stop.

The heating system is shut down.

- Turn the fan control knob (2) in an anticlockwise direction until it reaches the stop.

The blower is shut down.



## Changing fuses



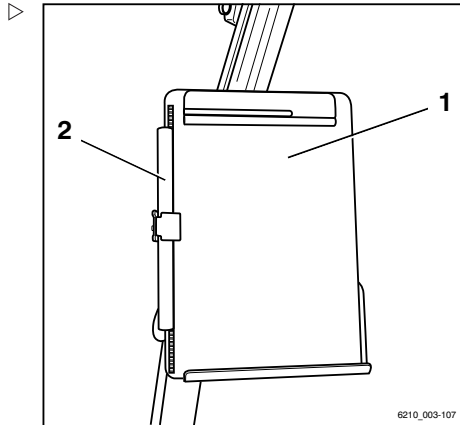
### **⚠ DANGER**

Using the wrong fuses can result in short circuits. Risk of fire!

- Use only fuses with the prescribed nominal current.

## Clipboard (variant)

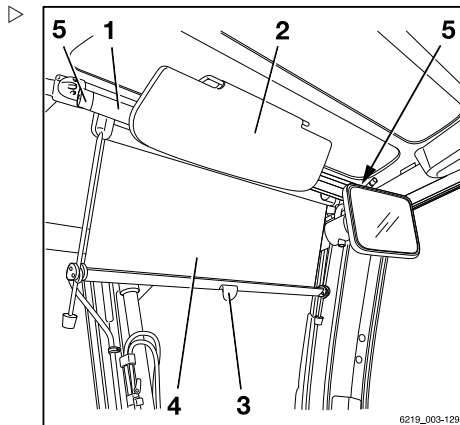
The clipboard (1) with reading lamp (2) is an equipment variant.



## Sun visor and sun blind

The truck can be equipped with a sun visor (2), a sun blind for the roof (1) and a sun blind for the driver's view to the front (4).

- To adjust the sun visor (2), grasp it and move it to the desired position.
- To move the sun blind (4) up and down, grasp the tab (3) and move the sun blind.
- If necessary, fully unroll the sun blind for the roof (1) and attach the ends (5) in the extended position.
- To roll up, slowly roll the blind (1) back up.



## Trailer operation

### Towed load

#### **⚠ DANGER**

**There is an increased risk of accident when using a trailer.**

Using a trailer changes the truck handling characteristics. When towing, operate the truck such that the trailer train can be safely driven and braked at all times. The maximum permissible speed when towing is 5 km/h.

- Do **not** exceed the permissible speed of 5 km/h.
- Do **not** couple the truck in front of rail vehicles.
- The truck must not be used to push any kind of trolley.
- It must be possible to drive and brake at all times.

#### **⚠ CAUTION**

Risk of damage to components!

The maximum towed load for occasional towing is the rated capacity specified on the nameplate. Overloading can lead to component damage on the truck. The sum of the actual towed load and the actual load on the fork must not exceed the rated capacity. If the towed load present corresponds to the rated capacity of the truck, it is not permitted to transport a load on the fork at the same time. The load can be distributed between the fork and the trailer.

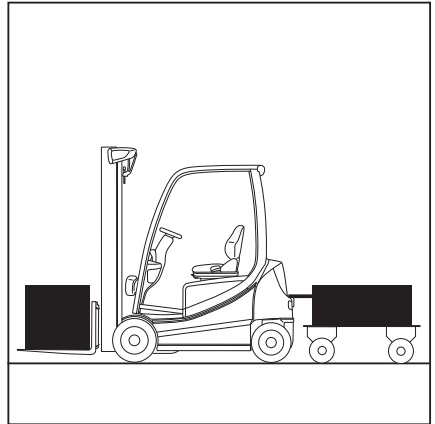
- Check the load distribution and adjust it to correspond to the rated capacity.
- Observe the permissible rigidity value of the tow coupling.

#### **⚠ CAUTION**

Risk of damage to components!

The maximum towed load only applies when towing unbraked trailers on a level surface (maximum deviation +/- 1%) and on firm ground. The towed load must be reduced if towing on gradients. If necessary, notify the authorised service centre of the application conditions. The service centre will provide the required data.

- Inform the authorised service centre.



## Trailer operation

### ⚠ CAUTION

Risk of damage to components!

A support load is not permitted.

- Do not use trailers with tillers supported by the tow coupling.

This truck is suitable for the occasional towing of trailers. If the truck is equipped with a towing device, this occasional towing must not exceed 2% of the daily operating time. The manufacturer must be consulted if the truck is to be used for towing on a more regular basis.

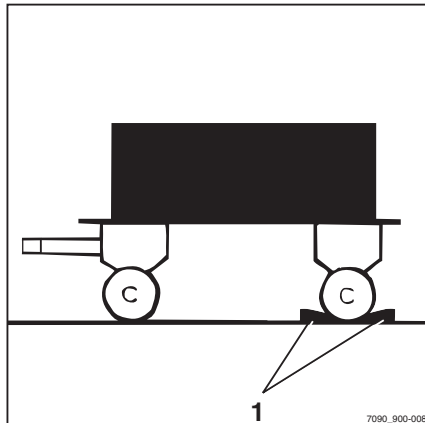
## Coupling pin in the counterweight

### Coupling the trailer

### ⚠ DANGER

**If you briefly leave the truck to couple or uncouple it, there is a risk of fatal injury caused by the truck rolling away and running you over.**

- Apply the parking brake.
  - Lower the fork to the ground.
  - Switch off the key switch and remove the key.
- 
- Take measures to prevent the trailer from rolling away, e.g. using wedges (1).



- Push the coupling pin (1) down, turn by 90° and pull out. ▷

**i NOTE**

*Exceptions for the RX20-14C and RX20-16C: turn the coupling pin (1) by 90° and pull it out.*

- Adjust the tiller height.

**⚠ DANGER**

**People can become trapped between the truck and trailer.**

When coupling, ensure that there are no persons present between the truck and the trailer.

- Slowly move the truck backwards.
- By moving the truck back, introduce the tiller into the recess (2) in the counterweight.

**⚠ DANGER**

**If the coupling pin or securing bush are lost or destroyed during towing, the trailer will work loose and become uncontrollable. This poses a risk of accident!**

- Only use original coupling pins that have been checked.
  - Ensure that the coupling pin is correctly inserted and secured.
- 
- Insert the coupling pin into the counterweight, press downwards against the spring pressure and turn by 90° (the coupling pin is locked in this position).

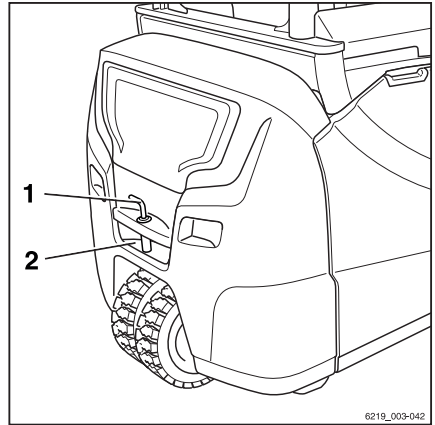
**i NOTE**

*Exceptions for the RX20-14C and RX20-16C: insert the coupling pin (1) into the counterweight and turn by 90° (the coupling pin is locked in this position).*

- Remove any items used to prevent the trailer from rolling away.

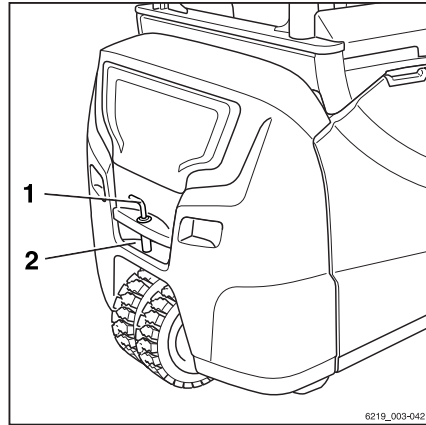
### Uncoupling the trailer

- Take measures to prevent the trailer from rolling away, e.g. using wedges.



## Trailer operation

- Push the coupling pin (2) down, turn by 90° and pull out. ▷
- Slowly move the truck forwards and guide the tow-bar eye completely out of the recess (2) for the counterweight.
- Insert the coupling pin into the counterweight, press downwards against the spring pressure and turn by 90° (the coupling pin is locked in this position).



## Tow coupling RO\*244

### **⚠ DANGER**

**People can become trapped between the truck and trailer.**

When coupling, ensure that there are no persons present between the truck and the trailer.

### **⚠ DANGER**

**Never jack up the truck on the tow coupling or use it for crane lifting. The tow coupling is not designed for this and could be deformed or damaged. This could cause the truck to fall, with potentially fatal consequences!**

- Use the tow coupling only for towing.
- For jacking up and crane loading, use only the designated lifting points.

### **⚠ DANGER**

**The tow coupling is not designed for support loads and could be deformed or destroyed. This could cause the supported load to fall, with potentially fatal consequences!**

- The tow coupling should be subjected only to horizontal loads, i.e. the tiller must be horizontal.



**⚠ DANGER**

If you briefly leave the truck to couple or uncouple the trailer, there is a risk of life caused by the truck rolling away and running you over.

- Apply the parking brake.
- Lower the forks to the ground.
- Switch off the key switch and remove the key.

**⚠ WARNING**

Never reach between the coupling pins and the towing jaws. If the component moves suddenly there is a risk of injury!

- To release the coupling pin, actuate the corresponding lever or use a suitable device (e.g. assembly lever).
- When not in use, close the automatic tow coupling.

**⚠ WARNING**

Risk of damage due to component collision.

A truck with tow coupling needs more room for manoeuvring due to its overhang. The tow coupling can damage the racking or the tow coupling itself when manoeuvring. If there is a collision with the tow coupling, check the tow coupling for damage such as cracks. A damaged tow coupling must not be used again.

- Always manoeuvre carefully and with sufficient room.
- In the case of a collision, check the tow coupling for damage.
- Replace tow coupling if damaged, if necessary contact the authorised service centre.

**⚠ WARNING**

Risk of damage to the tow bar eye or tiller!

Due to the truck's rear wheel steering, the side slewing angle of the tiller may not be adequate. The coupling or the tiller may be damaged! The tow bar eye of the tiller must fit the tow coupling in terms of shape and size.

- Ensure that the tow bar eye and tiller fit correctly.
- Avoid sharp cornering.
- Exercise care when travelling and manoeuvring in reverse.

## Trailer operation

### **⚠ WARNING**

Risk of component damage if the tiller in the tow coupling is tilted!

The tiller should be kept as horizontal as possible when towing. This ensures that the rotation range is sufficient at the top and bottom. The authorised service centre can adjust the assembly height for the tow coupling to the tiller height if necessary.

- Make sure that the tiller is level.
- To change the coupling height, contact the authorised service centre.



### **NOTE**

*When manoeuvring in restricted areas, take into account the projection of the coupling.*

## Coupling the trailer



### **NOTE**

*Tow coupling RO\*244 is intended for a tow-bar eye in accordance with DIN 74054 (bore diameter 40 mm) or DIN 8454 (bore diameter 35 mm).*

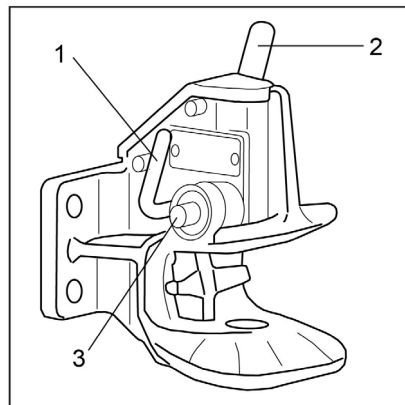
- Take measures to prevent the trailer from rolling away, e.g. using wedges.
- Adjust the tow bar eye of the tiller so that it is at the centre of the towing jaws.
- Push the hand lever (2) upwards until it snaps into place.

The tow coupling is opened.

### **⚠ CAUTION**

When being coupled, the tow-bar eye must engage in the middle of the coupling jaw. Failure to follow these instructions could result in damage to the coupling jaw or to the tow-bar eye!

- Ensure that the tow-bar eye enters the coupling jaw centrally.
- 
- Move the truck back slowly until the tow bar eye is inserted centrally into the coupling jaw of the tow coupling and the coupling pin engages.



**i NOTE**

*The coupling pin is correctly engaged if the control pin (3) does not protrude out of its guide.*

**⚠ DANGER**

**If the coupling pin drops out during towing, the trailer will work loose and can no longer be controlled. Risk of accident!**

The control pin (3) must not protrude out of its guide.

- Ensure that the coupling pin is engaged correctly.
- If the coupling pin is not correctly engaged:
- Remove any items used to prevent the trailer from rolling away.
  - Move the truck with the trailer forwards approx. 1 m and then move it back slightly.
  - On the coupling pin, check again that the control pin does not protrude out of its guide.
- 
- Remove any items used to prevent the trailer from rolling away.
  - Tow the trailer.

**Closing the coupling****⚠ DANGER**

**Risk of injury from hand becoming trapped!**

Do not reach into the coupling pin area. If, for example, a tow rope is to be secured in the tow coupling, only actuate the tow coupling via the closing lever (1).

- Press the closing lever (1) downwards as far as it will go.

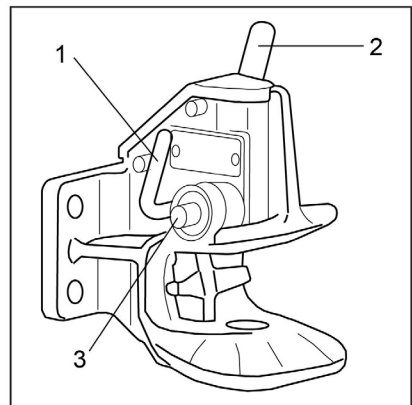
The tow coupling is closed.

**Uncoupling the trailer**

- Take measures to prevent the trailer from rolling away, e.g. using wedges.
- Push the hand lever (2) upwards until it snaps into place.

The tow coupling is opened.

- Slowly drive the truck forwards until the tow-bar eye and towing jaws are disconnected.



## Trailer operation

- Close the tow coupling by actuating the closing lever (1).



### NOTE

*To protect the lower coupling pin bush against contamination, always keep the tow coupling closed.*

## Towing trailers

- Drivers who are towing a trailer for the first time must practise driving with a trailer in a suitable area.
- When passing through narrow road areas (entrances, gates etc.), observe the dimensions of the trailer and load.
- When towing multiple trailers, ensure a sufficient minimum distance to fixed installations when turning and cornering.

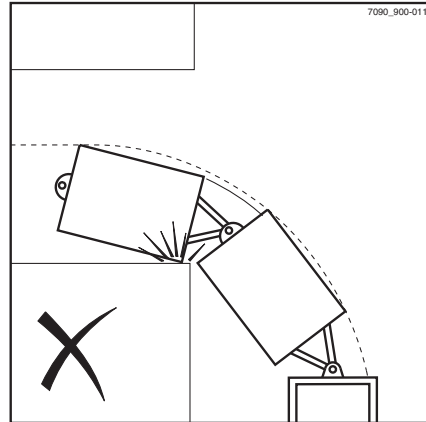
The permissible length of the trailer trains depends on the roadways to be driven and may need to be determined during the test drive.

It is the responsibility of the operating company to instruct the drivers regarding the permissible number of trailers and, where required, any additional speed reductions on individual sections of the route.



### NOTE

*Please observe the definition of the following responsible persons: "operating company" and "driver".*



## Cold store application

The truck features cold store equipment (variant), making it suitable for use in cold stores.

It is equipped for two different types of application and marked with the cold store symbol.

The display-operating unit is heated in this variant.

As another variant, the truck can be equipped with a driver's cab with a heating system.

### Types of application

The cold store application of the truck is divided into two types of application with different temperature ranges.

- 1 Constant deployment in temperature range  $-5^{\circ}\text{C}$ , brief deployment down to  $-10^{\circ}\text{C}$ .
- 2 Alternating between indoor use down to  $-32^{\circ}\text{C}$  and outdoor use to  $+25^{\circ}\text{C}$ , briefly up to  $+40^{\circ}\text{C}$ .

### Operation

#### CAUTION

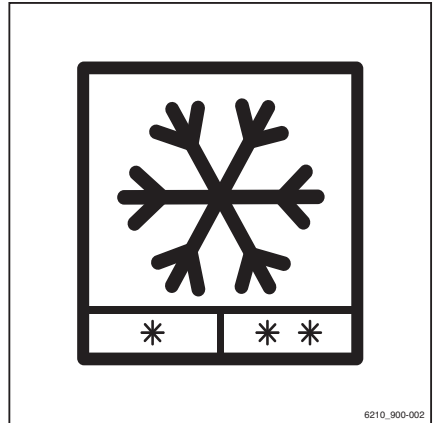
Changing from a cold internal temperature to a warm outside temperature may result in the formation of condensation water. This water may freeze on re-entry to the cold store, blocking moving parts of the truck.

It is essential that close attention is paid to the duration of deployment in the different temperature ranges for both types of application.

Before being used in the cold store, the truck must be dry and warmed up.

The truck should not leave the cold store area for more than 10 minutes. By adhering to this rule, condensation water will not have time to form.

If the truck stays outside for more than 10 minutes, it must remain there at least until the condensation water has drained off and the truck has dried off. Depending on the weather, this will take at least 30 minutes.



## Cold store application

### WARNING

Risk of injury!

If condensation water freezes in the cold store, do not try to free parts that have become stuck with your hands.

### NOTE

*During the warm-up phase, the hydraulic power is limited to load program "1".*

- Drive the truck for approx. 5 minutes and operate the brake several times to ensure operational safety.
- Actuate all hydraulic lifting functions several times.

This warm-up phase is necessary to ensure that the oil reaches the operating temperature.

- Always park the truck outside the cold store.

### CAUTION

Risk of component damage!

The lead-acid batteries should not be left in the cold store overnight without power uptake or charging.

- Charge the battery outside the cold store and operate the truck using a replacement battery.

## Using batteries in the cold store

To compensate for the reduction in capacity at low temperatures, it is advisable to use lead-acid batteries with the maximum nominal capacity in the respective battery dimensions for the truck series.

Electric forklift trucks should not be parked for any longer than necessary in a cold area. This also applies to unused batteries. The charging station and the parking area for trucks and batteries should be at normal room temperature (not below 10°C). Charging is extremely slow at low temperatures. At temperatures below 10°C, the battery cannot be fully charged with the usual charging parameters.

- Charge the battery fully before each shift.

- During the gassing phase, always top up with distilled water.

The distilled water should mix with the battery acid so that it does not freeze.

Water top-up systems must not be used at temperatures below 0°C, as this could cause the systems and the water present in the hose lines to freeze.

On discharge, the battery voltage is therefore generally lower at low temperatures, and the final discharged voltage is reached earlier, i.e. the battery's capacity is lower.

## Display messages

### Messages

On the display of the display-operating unit, event-related messages may appear due to certain truck conditions.

There are messages about operation and messages about the truck. If a message about operation appears, the display-operating unit will prompt you to perform an action. A message about the truck means that the truck control unit has detected a fault.

The following types of message may appear individually or in combination:

- A graphic symbol
- The message
- An error code consisting of a letter and a four-digit number













In the case of successive events, the respective messages are displayed one after another on the display.

After a few seconds, the display will alternate between the last shown display and the message.






### Messages about operation

If messages about operation appear on the display-operating unit, an action must be carried out.





## Display messages











Shown in display	Cause/action
Log in 	The access authorisation (variant) is preventing the use of the truck. - Enable the access authorisation.
Battery empty 	The battery charge state is too low for truck use. - Charge the battery.
Battery: Emergency mode 	The battery charge state is low. The truck experiences a power reduction. - Charge the battery.
Check battery acid level 	The acid level of the lead-acid battery is too low. - Check the acid level of the battery. Correct if necessary.
Battery too cold 	The lithium-ion battery is too cold. - Move the truck to a warmer environment.
Close battery door 	The battery door is open. The truck will only move at a reduced speed. - Close the battery door.
Check battery door sensor 	The battery door sensor does not detect that the battery door is closed. - Make sure that the lock on the battery door is engaged. If the message continues to appear, please contact the authorised service centre.
Release brake pedal 	The desired action is only possible after releasing the brake pedal. - Release the brake pedal.
Curve Speed Control active !	Curve Speed Control reduces the curve speed. - No action is required.
Data transmission required !	If the truck is equipped with this variant, data transmission must be carried out. - See the associated instructions.
Diagnostic mode active 	This message is for the authorised service centre. It is not displayed when in normal operation.
Set revolution speed 	This message is for the authorised service centre. It is not displayed when in normal operation.
Development mode active 	This message is for the authorised service centre. It is not displayed when in normal operation.
Drive unit blocked !	This message follows earlier messages, e.g. overtemperature. It is not possible to drive the truck. - Wait until the message disappears. If necessary, switch the truck off and on again. If the message continues to appear, please contact the authorised service centre.
Sit on driver's seat 	The truck is equipped with a seat contact switch. If the driver's seat is not occupied, the drives are disabled. - Sit on the driver's seat.




Shown in display	Cause/action
Switch off truck? (D)	If the truck is switched off without having first applied the parking brake, this message appears. - Apply the parking brake.
Truck stop: Access system 	The access authorisation (variant) is preventing the use of the truck. This can result from entering an incorrect code or from access by the fleet manager. - Enable the access authorisation.
Fault: Battery 	The truck control unit detects an error in the lithium-ion battery. - Switch the truck off and on again. - If the message continues to appear, please contact the authorised service centre.
Apply parking brake (D)	If the truck control unit detects a movement of the truck without the accelerator pedal being actuated, this message appears. - Apply the parking brake.
Release parking brake (D)	The desired action is only possible after releasing the parking brake. - Release the brake pedal.
Check parking brake 	The truck control unit detects that the braking force of the electric parking brake is reducing. - Secure the truck with wedges so that the truck does not roll away. - Contact your authorised service centre.
Apply parking brake via button (D)	The electric parking brake is not applying automatically. - Apply the parking brake by pressing the button.
Parking brake: Maintenance required 	The truck control unit detects that the electric parking brake needs a service. - Secure the truck with wedges so that the truck does not roll away. - Contact your authorised service centre.
Lower forks !	This message appears e.g. for precision load measurement (variant). - Lower the fork carriage.
Lift height restriction active !	The lift height restriction (variant) is switched on. - Observe the heights of ceilings and entrances.
Close cab door or seat belt !	If the seat belt is not fastened and the cab door (variant) is not closed, the driving speed is limited to 4 km/h and this message appears. - Close the cab door or fasten the seat belt.
Close cab door !	If the cab door is opened while the truck is in motion, the truck brakes automatically to a speed of 4 km/h. - Close the cab door.
Configuration: Please wait 	This message is for the authorised service centre. It is not displayed when in normal operation.

## Display messages

Shown in display	Cause/action
Remove charging cable !	If the truck is equipped with an integrated charger (variant), this message appears as soon as charging is complete. - Disconnect the charger plug from the plug connection on the truck.
Start charging? ?	If the truck is equipped with an integrated charger (variant), this message appears when the truck control unit detects that a charger plug has been connected. - Push the corresponding Softkeys to start charging.
Unsent data will be overwritten !	If the truck is equipped with this variant, data transmission must be carried out. - See the associated instructions.
Emergency off active !	When the key switch is switched on and an operating device is actuated when the emergency off switch is pressed, this message appears. The desired action is only possible once the emergency off switch is unlocked. - Unlock the emergency off switch.
Emergency mode !	If the truck experiences a power reduction, for example due to a battery charge state that is too low, this message appears. - Observe the previous message.
Emerg. direct. via drive direction lever 	If the truck control unit has detected a fault that affects the drive functions, it is possible to activate emergency running. - Set the direction selection lever to the desired direction. - Drive the truck to a safe area and park it safely. - Contact your authorised service centre.
Emerg. direct. via drive direction switch 	If the truck control unit has detected a fault that affects the drive functions, it is possible to activate emergency running. - Set the drive direction switch to the desired direction. - Drive the truck to a safe area and park it safely. - Contact your authorised service centre.
Parameter calibration 	This message is for the authorised service centre. It is not displayed when in normal operation.
Seatbelt sequence !	If the configured sequence for applying the restraint systems is not observed, this message appears. - Fasten the seat belt.
Close restraint system 	If, for example, the truck is equipped with a bracket as a restraint system and the accelerator pedal is actuated, this message appears. The truck will not move. - Close the restraint system.

Shown in display	Cause/action
Shaking blocked – overload 	If the shaking function (variant) is overloaded by an excessive load, this message appears. The shake function will remain unavailable as long as this situation persists.
Switch on switch lock !	If the hazard warning system (variant) is switched on when the truck is switched off, the display-operating unit remains active. Then, when a truck function is called up, this message appears. - Switch on the key switch.
Shock event detected !	If the truck control unit detects a very strong acceleration or deceleration, e.g. in the event of an accident, this message appears.
Service required 	If the maintenance interval has been reached, this message appears. - Contact your authorised service centre.
Service mode active 	This message is for the authorised service centre. It is not displayed when in normal operation.
Close seat belt 	If the seat belt is not fastened, the driving speed is limited to 4 km/h and this message appears. - Fasten the seat belt.
Are you sure? ?	If the display-operating unit is expecting confirmation from the driver, this message appears. - Continue with or cancel the input prompt.
Enable sprint mode !	If the battery is charged after locking sprint mode or a normal temperature is reached, this message appears. Sprint mode can be used again once the truck has been restarted.
Sprint mode blocked – battery 	If the battery experiences under-voltage or too high a temperature, this message appears. Sprint mode is no longer available. - Observe the previous message.
Sprint mode blocked – temperature 	If the temperature at the drive units is too high, this message appears. Sprint mode is no longer available. - Observe the previous message.
Dead man switch 	If the truck is equipped with a foot switch, and a truck function is called up when the foot switch is not actuated, this message appears. - Actuate the foot switch.
Overload 	With the "overload protection" variant, this message appears if too great a load is picked up. - Set down the load.
Overtemp.: Battery 	If the truck control unit detects an excessive battery temperature, this message appears. - Allow the truck to cool down.
Working mode active 	This message is for the authorised service centre. It is not displayed when in normal operation.

## Display messages

Shown in display	Cause/action
Top up wiper water 	If the wiper water level is low, this message appears. - Top up the washer fluid reservoir with washer fluid adapted to the ambient temperature.
Access expired !	If the truck is equipped with this variant, this message might appear. - See the associated instructions.
Access denied !	
Access expires in < 1 month !	
Access expires in < 1 day !	
Access expires in < 1 week !	
Access expires in < 2 days !	
Access expires in < 3 days !	









## Messages about the truck



























If messages with a code appear on the display-operating unit, the truck control unit has detected a fault. The message with a code is stored in the message list until the cause of the message is corrected. The saved messages can be called up from the "message list".

If, for example, the reflector or the lift-height sensor is contaminated, it usually helps to clean these components.

- Switch the truck off and on again.
- If the message still appears, please contact the authorised service centre.

The messages are sorted in ascending order according to their code:

Code	Shown in display	Description/possible solution
A2103	Parameter faulty 	Parameters collective fault
A2305	Fault: Control unit 	Control-unit collective fault
A2801	Monitoring 	Process monitoring, proc 1
A2802	Monitoring 	Process monitoring, proc 2
A2803	Monitoring 	Process monitoring, proc 3
A2804	Monitoring 	Process monitoring, proc 4
A2805	Monitoring 	Process monitoring, proc 5
A2806	Monitoring 	Process monitoring, proc 6

Code	Shown in display	Description/possible solution
A2807	Monitoring 	Process monitoring, proc 7
A2808	Monitoring 	Process monitoring, proc 8
A2809	Monitoring 	Process monitoring, proc 9
A2810	Monitoring 	Process monitoring, proc 10
A2811	Monitoring 	Process monitoring, proc 11
A2899	Monitoring 	Process-monitoring collective fault
A3015	Fault: Brake sensor 	Brake-sensor collective fault
A3027	Fault: Seat switch 	The seat switch does not open - Stand up from the driver's seat and sit down again.
A3035	Fault: Brake fluid 	Brake fluid switch
A3143	Check lift height sensor and reflector 	Lift-height sensor measurement error
A3230	Fault: Monitoring of steering 	Steering collective fault
A3340	Monitoring: Electrics 	Additional electrical installation collective fault
A3345	Monitoring: Electrics 	Powertrain collective fault
A3346	Monitoring: Drive unit 	Drivetrain collective fault
A3347	Monitoring: Hydraulics 	Hydraulics collective fault
A5090	Overtemp.: Drive unit 	Drive unit overtemperature collective fault - Switch off the truck and leave it to cool down.
A5091	Overtemp.: Hydraulic drive 	Hydraulic drive overtemperature collective fault - Switch off the truck and leave it to cool down.
A5934	Fault: Internal charger 	Charging connector detection fault - Disconnect the connection assembly and reconnect.
A5961	Overtemp.: Battery 	Lithium battery overtemperature - Switch off the truck and leave it to cool down.
A5962	Battery too cold 	Insufficient lithium battery temperature - Move the truck to a warmer environment.
A5986	Fault: Control unit 	General battery current measurement
A5993	Fault: Internal charger 	On-board charger collective fault
A6210	Fault: Battery 	Lithium battery collective fault
A6502	Overtemp.: Parking brake 	Electric parking brake detects overtemperature
A6510	Fault: Parking brake 	Electric parking brake detects fatal fault
A6511	Fault: Parking brake 	Brake cannot release

## Procedure in emergencies

Code	Shown in display	Description/possible solution
A6512	Fault: Parking brake (Ⓞ)	Brake cannot apply
A6701	Fault: Monitoring of assistance system ⚠	Assistance systems collective fault
None	Fault ⚠	General fault

## Procedure in emergencies

### Emergency shutdown

#### ⚠ WARNING

No electric braking assistance is available when the emergency off switch is actuated!

Actuating the emergency off switch (1) will disconnect the drives from the power supply. The truck will not be held on a slope by the electric brake.

- To brake, actuate the service brake.

#### ⚠ CAUTION

Actuating the emergency off switch (1) disconnects the drives from the power supply. Disconnecting the battery male connector (2) disconnects the entire truck from the power supply.

- Only use this safety system in an emergency or in order to safely park the truck.

#### ⚠ CAUTION

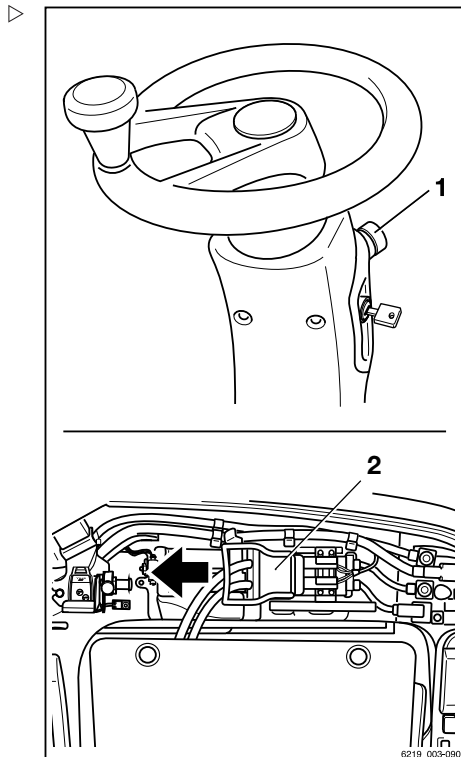
Risk of component damage!

If you disconnect the battery male connector while the key switch is switched on (under load), an arc will be produced. This can lead to erosion at the contacts, which considerably shortens their service life.

- Switch off the key switch before disconnecting the battery male connector.
- Do not disconnect the battery male connector while the key switch is switched on, except in an emergency.

In an emergency, all functions of the truck can be shut down:

- Press the emergency off switch (1) or disconnect the battery male connector (2).



### In drive mode, pressing the emergency off switch (1) has the following effects:

- No reduction in truck speed when the accelerator pedal is released, according to the drive programme selected. The truck will coast
- In trucks with an electric parking brake (variant), the electric parking brake is applied as soon as the truck comes to a stop
- The electric brake does not function during the first part of brake pedal travel. To brake the truck using the mechanical brake, the brake pedal must be pushed down further
- The truck can only be held on a slope using the mechanical brake, not the electric brake
- No power steering effect; the steering forces are increased by the remaining emergency steering function
- The "Curve Speed Control" system (automatic reduction in truck speed when cornering) does not function. The truck must be decelerated with the mechanical brake by pressing the brake pedal
- No hydraulic functions are available

### Procedure if truck tips over

#### **⚠ DANGER**

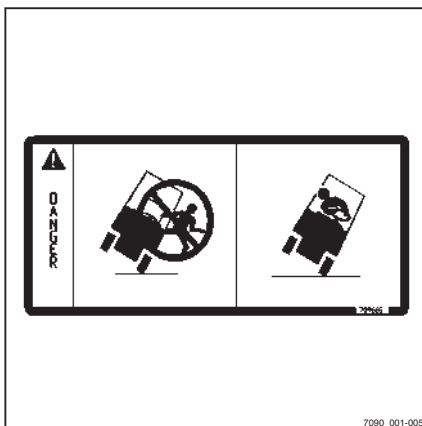
**If the truck tips over, the driver could fall out and slide under the truck with potentially fatal consequences. There is a risk to life.**

Failure to comply with the limits specified in these operating instructions, e.g. driving on unacceptably steep gradients or failing to adjust speed when cornering, can cause the truck to tip over. If the truck starts to tip over, do not leave the truck under any circumstances. This increases the danger of being hit by the truck.

- Do not release your seat belt.
- Never jump off the truck.
- You must adhere to the rules of behaviour if the truck tips over.

#### Rules of behaviour if truck tips over:

- Hold onto the steering wheel with your hands.



## Procedure in emergencies

- Brace your feet in the footwell.
- Bend your upper body over the steering wheel.
- Bend your body against the direction of the fall.

## Emergency hammer

The emergency hammer is used to rescue the driver if he is shut inside the cab in a hazardous situation, for example if the truck has toppled over and the cab door cannot be opened.

Single-pane safety glass can be struck relatively safely using the emergency hammer in order for the driver to escape or be rescued from the danger area.

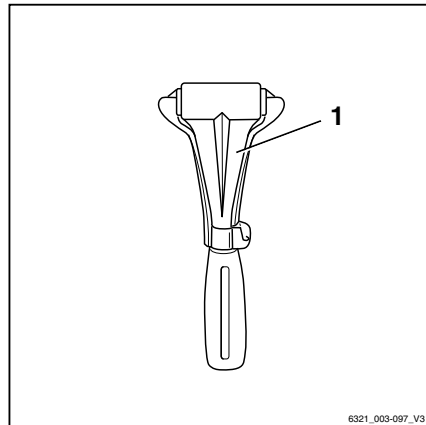
### Using the emergency hammer

#### **WARNING**

When glass is smashed there is a risk of injury caused by glass splinters!

When the cab glass is smashed, splinters of glass can shoot into the face and cause damage to skin and eyes through cuts. When a pane of glass is smashed, the face should be turned away and covered with the crook of the free arm.

- Protect the face when smashing a pane of glass.
- 
- Pull the emergency hammer out of its support mounting at the handle.
  - Using one of the two metal tips on the head of the emergency hammer, hit the pane of glass with force until it breaks.





## Emergency lowering

If the hydraulic controller fails whilst a load is raised, emergency lowering can be performed. An emergency lowering screw is located on the valve block (3) for this purpose.



### **⚠ DANGER**

**There is a risk of fatal injury from falling loads or parts of the truck being lowered.**

- Do not walk beneath the raised load.
- Adhere to the steps detailed below.

- Remove the lid (1) on the right-hand side of footwell panelling near the accelerator pedal.
- Remove the hexagon socket wrench (2) from the compartment on the right next to the driver's seat.
- Using the hexagon socket wrench, turn the emergency lowering screw (3) a maximum of 1.5 revolutions to loosen it.

### **⚠ WARNING**

The load is lowered!

The lowering speed is regulated by unscrewing the emergency lowering screw.

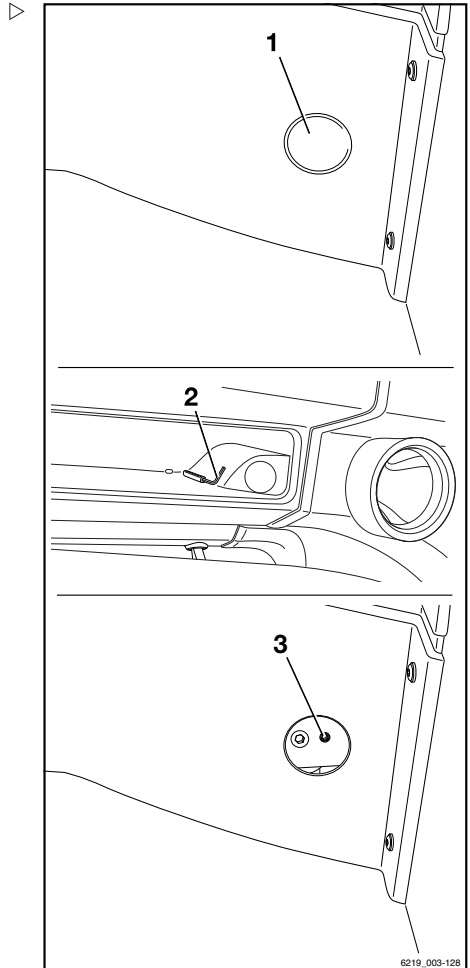
- Note the list of points below.

### **The following applies:**

- Tightening torque:  
Max. 2.5 Nm
- When unscrewed a little:  
The load lowers slowly
- When unscrewed a lot:  
The load lowers quickly

### **After lowering:**

- Screw the emergency lowering screw in again.
- Return the hexagon socket wrench to the support mounting in the compartment.
- Refit the lid.



## Procedure in emergencies

### **⚠ DANGER**

If the truck is operated while the hydraulic controller is blocked, there is an increased risk of accidents.

- After the emergency lowering procedure, have the malfunction rectified.
- Notify your authorised service centre.

## Manual operation of the electric parking brake

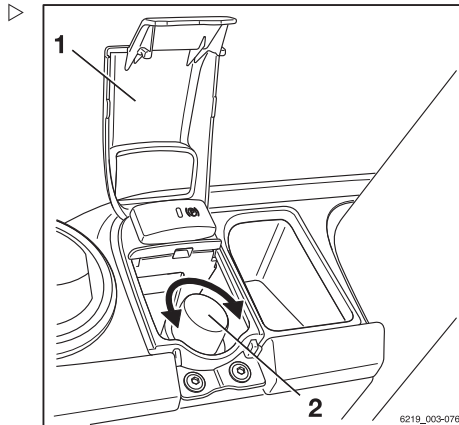
### **⚠ WARNING**

The truck can roll away when the parking brake is released!

Manual operation of the parking brake is permitted only when the fork is lowered and the truck is switched off.

In emergency operation or during transport without a battery, the electric parking brake can be operated manually via the hand wheel.

- Lower the fork to the ground.
- Switch off the key switch.
- Lift the cover (1) and fold it up.
- Pull out the hand wheel (2), turn it around and then attach it.
- To tighten the parking brake, turn the hand wheel (2) clockwise until the force required to do so increases significantly and the truck is held securely.
- To release the parking brake, gently turn the hand wheel (2) anti-clockwise until the lower limit stop is reached.
- Remove the hand wheel (2), turn it around and then insert it.
- Push the hand wheel (2) back into its latch position and lower the cover (1).



## Towing

### **⚠ DANGER**

**The brake system on the towing vehicle may fail. Risk of accident!**

If the brake system of the towing vehicle is not adequately sized, the vehicle may not brake safely or the brakes may fail. The towing vehicle must be able to absorb the tractive and braking forces from the unbraked towed load (total actual weight of the truck).

- Check the tractive and braking forces of the towing vehicle.

### **⚠ DANGER**

**The truck could drive into the towing vehicle when the towing vehicle brakes. Risk of accident!**

If a rigid connection has not been used for power transmission in two directions during towing, the truck may drive into the towing vehicle when the towing vehicle brakes. For safety reasons, only a tested tow bar may be used.

- Use a tested tow bar.

### **⚠ CAUTION**

If the truck drive between the drive motor and the drive axle is not interrupted, the drive may be damaged.

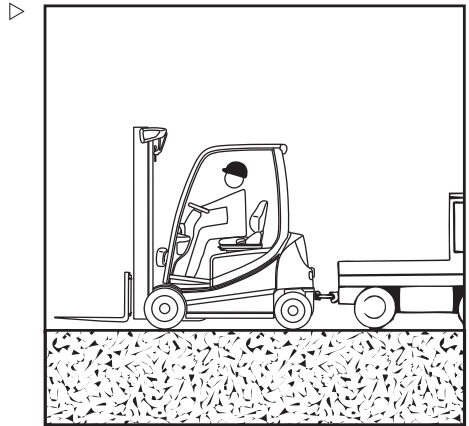
- Place the drive direction switch in the neutral position.

### **⚠ CAUTION**

Risk of component damage!

If you remove the battery male connector when the key switch is switched on (under load), an arc will be produced. This can lead to erosion at the contacts, which considerably shortens their service life.

- Do not disconnect the battery male connector while the key switch is switched on.



## Procedure in emergencies

### **⚠ DANGER**

**People can be crushed between the truck and towing vehicle during manoeuvring. There is a risk of fatal injury!**

The towing vehicle may only be manoeuvred and the tow bar may only be attached using a second person as a guide. This ensures that the driver of the towing vehicle and the mechanic attaching the tow bar are aware of possible risks.

- Only manoeuvre with a guide.
- 

### **⚠ CAUTION**

Steering is stiff! There is no power steering if the hydraulics fail!

- The selected towing speed must allow the truck and towing vehicle to be effectively braked and controlled at all times.
- 

### **⚠ CAUTION**

If the truck is not steered while it is being towed, it may veer out in an uncontrolled manner!

- The truck being towed must also be steered by a driver.
  - The driver of the truck being towed must sit in the driver's seat and fasten the seat belt before towing.
  - Where possible, activate the restraint systems provided.
- 
- Set down the load and lower the fork arms close to the ground.
  - Place the drive direction switch in the neutral position.
  - Apply the parking brake.
  - Switch off the key switch.
  - Disconnect the battery male connector.
  - Check the tractive and braking forces of the towing vehicle.
  - With the help of a guide, move the towing vehicle to the truck.
  - Secure the tow bar to the tow coupling on the towing vehicle and the truck.
  - Sit in the driver's seat in the truck to be towed and fasten the seat belt.

- Where possible, activate the restraint systems provided.
- Release the parking brake.
- Select a towing speed that allows the truck and towing vehicle to be effectively braked and controlled at all times.
- Tow the truck.
- After the truck has been towed, secure it against rolling away (e.g. by applying the parking brake or using wedges).
- Remove the tow bar.

## Connecting and disconnecting the battery male connector

## Connecting and disconnecting the battery male connector

## Connecting the battery male connector ▸

- Open the battery door.

**⚠ CAUTION**

Risk of component damage!

If you connect the battery male connector with the key switch switched on (under load), an arc will be produced. This can lead to erosion at the contacts, which considerably shortens their service life.

- Do not connect the battery male connectors with the key switch switched on.
  - Make sure that the key switch is switched off before connecting the battery male connector.
- 
- Insert the battery male connector (2) fully into the plug connection on the truck.

The orange latch (1) must engage.

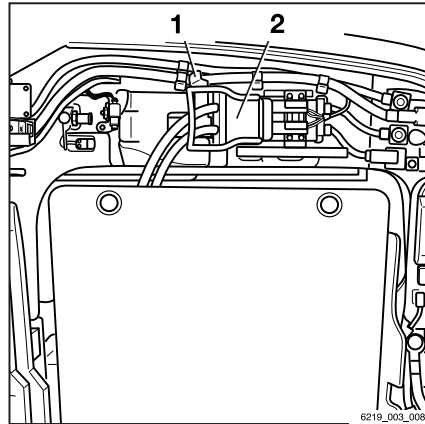


Illustration of a lead-acid battery

**⚠ CAUTION**

There is a risk of short circuit if the cables are damaged.

Do not crush the battery cable when closing the battery door.

- Ensure that the battery cable does not come into contact with the battery door.

**NOTE**

*The appearance of a lithium-ion battery differs from this illustration. The battery male connector also features additional contacts for communication between the battery and the truck control unit. However, the connection procedure is the same.*

- Close the battery door.

## Disconnecting the battery male connector

- Open the battery door.

### ⚠ CAUTION

Risk of component damage!

If you disconnect the battery male connector while the key switch is switched on (under load), an arc will be produced. This can lead to erosion at the contacts, which considerably shortens their service life.

- Do not disconnect the battery male connector with the key switch switched on.
- Make sure that the key switch is switched off before disconnecting the battery male connector.

- Press the orange catch (1).

The battery male connector unlocks.

- Pull out the battery male connector (2) from the plug connection on the truck and place it down safely.

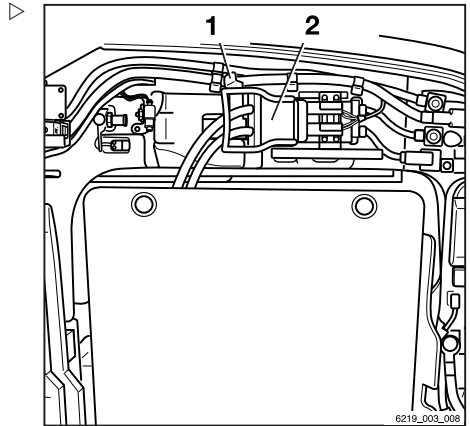


Illustration of a lead-acid battery



### ⚠ CAUTION

There is a risk of short circuit if the cables are damaged.

Do not crush the battery cable when closing the battery door.

- Ensure that the battery cable does not come into contact with the battery door.

### **i** NOTE

*The appearance of a lithium-ion battery differs from this illustration. The battery male connector also features additional contacts for communication between the battery and the truck control unit. However, the disconnection procedure is the same.*

- Close the battery door.

## Handling the lead-acid battery

# Handling the lead-acid battery

## Safety regulations when handling the battery

- National statutory provisions for the country of use must be followed when setting up and operating battery charging stations.



### **CAUTION**

Risk of component damage!

Incorrect connection or operation of the charging station or battery charger may result in damage to components.

- Follow the operating instructions for the charging station or battery charger and for the battery.

- The following safety regulations must be observed when maintaining, charging and changing the battery.

## Maintenance personnel

Batteries may be charged, maintained or changed only by properly trained personnel in accordance with the instructions of the manufacturer of the battery, battery charger or truck.

- The handling instructions for the battery and the operating instructions for the battery charger must be followed.
- The following safety regulations must be observed when maintaining, charging and changing the battery.



**⚠ WARNING**

Risk of crushing/shearing!

The battery is very heavy. There is a risk of serious injury if any parts of the body are caught under the battery.

If parts of the body are wedged between the battery door and the edge of the chassis when the battery door is closed, this could lead to injuries.

- Always wear safety shoes when replacing the battery.
- Only close the battery door if there is no part of the body between the battery door and the edge of the chassis.

The battery must only be replaced in accordance with the directions in these operating instructions.

- When charging and maintaining the battery, observe the manufacturer's maintenance instructions for the battery and battery charger.

**Fire protection measures****⚠ DANGER**

**Risk of explosion due to flammable gases!**

During charging, the battery releases a mixture of oxygen and hydrogen (oxyhydrogen gas). This gas mixture is explosive and must not be ignited.

There must be no flammable materials or spark-forming operating materials within 2 m of either the truck when it is parked for charging or the battery charger.

- When working with batteries, take the following security precautions.
- Keep away from open flames and do not smoke.
- Ensure that work areas are adequately ventilated.
- Disconnect the battery male connector before charging and only when the truck and battery charger are switched off.

## Handling the lead-acid battery

- The battery door must remain open during charging.
- Expose the surfaces of the battery cells.
- Do not place any metal objects on the battery.
- Open any protective structures fully (e.g. fabric-covered cab).
- Have fire extinguishing equipment ready.

## Battery weight and dimensions

### DANGER

#### **Risk of tipping due to change in battery weight!**

The battery weight and dimensions affect the stability of the truck. When replacing the battery, the weight ratios must not be changed. The battery weight must remain within the weight range specified on the nameplate.

- Do not remove or change the position of ballast weights.
  - Note the battery weight.
- 

## Service the battery

The cell covers of the battery must be kept dry and clean.

Terminals and cable shoes must be clean, lightly coated with battery grease and tightly screwed.

- Neutralise any spilt battery acid immediately.
- Observe the safety regulations for handling battery acid; see the chapter entitled "Battery acid".

### Damage to cables and battery male connectors

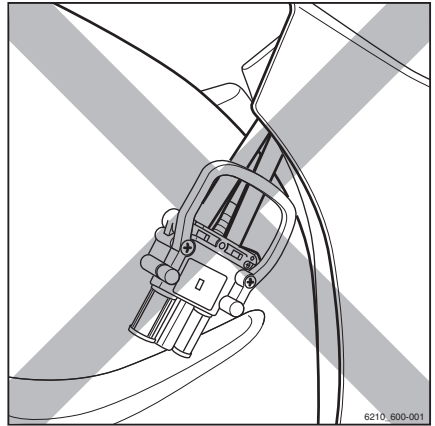


#### ⚠ CAUTION

There is a risk of short circuit if the cables are damaged.

Do not crush the battery cable when closing the battery door.

- Check the battery cable for damage.
- When removing and reinstalling the battery, ensure that the battery cables are not damaged.
- Ensure that the battery cable does not come into contact with the battery door.



#### ⚠ CAUTION

Potential for damage to the male battery connector!

If the battery male connector is disconnected or connected while the key switch is switched on or the battery charger is under load, an arc will be produced at the battery male connector. This can lead to erosion at the contacts, and can considerably shorten the service life of the contacts.

- Switch off the key switch or battery charger before the battery male connector is disconnected or connected.
- Do not disconnect the battery male connector while under load, except in an emergency.

### Maintaining the battery

#### ⚠ DANGER

##### Risk to life!

- Observe the chapter "Safety regulations for handling the battery".

#### ⚠ WARNING

Battery acid is toxic and corrosive!

- Observe the safety regulations in the "Battery acid" chapter.



#### NOTE

*Battery maintenance is carried out in accordance with the battery manufacturer's opera-*

## Handling the lead-acid battery

*ting instructions! The operating instructions for the battery charger must also be followed. Only the instructions that came with the battery charger are valid. If any of these instructions are not available, please request them from the dealer.*

The battery maintenance is composed of the following sections "Checking the battery condition, acid level and acid density", "Checking the battery charge status", "Charging the battery" and "Equalising charge to prevent a deep discharge of the battery" together.

## Checking the battery condition, acid level and acid density



### ⚠ WARNING

The electrolyte (dilute sulphuric acid) is poisonous and caustic!



- Observe safety regulations for handling battery acid; see chapter "Battery acid".
- Wear personal protective equipment (rubber gloves, apron and protection goggles).
- Rinse away spilt battery acid immediately with plenty of water!

### ⚠ CAUTION

Risk of damage!

- Heed the information in the operating instructions for the battery.

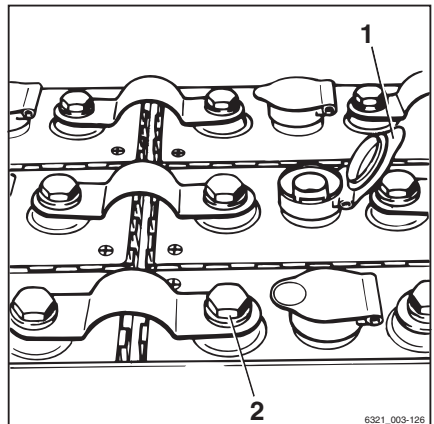
- Remove the battery from the truck.
- Inspect battery for cracked housing, raised plate sand acid leaks.
- Have defective batteries repaired by the authorised service centre.
- Open filler cap (1) and check the acid level. ▷

For batteries with "caged cell plugs", the liquid must reach the bottom of the cage.

For batteries without "caged cell plugs", the liquid must reach a height of approx. 10 to 15 mm above the lead plates.

- Top up missing fluid with distilled water only.
- Clean the battery cell cover and dry if necessary.
- Remove any oxidation residues on the battery terminals and then apply acid-free grease to the terminals.
- Tighten the battery-terminal clips (2) to a torque of 22–25 Nm (depending on the size of the terminal screws used).
- Check acid density with an acid siphon.

After charging, the acid density must be between 1.28 and 1.30 kg/l.



## Handling the lead-acid battery

For a discharged battery, the acid density must be **no lower** than 1.14 kg/l.

## Checking the battery charge status ▷

### ⚠ CAUTION

Deep discharges shorten the service life of the battery.

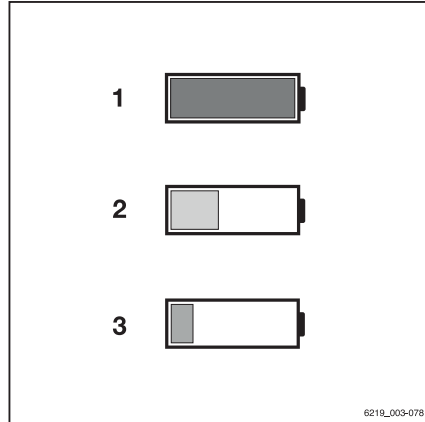
If the battery charge display is red (3) (0% of the available battery capacity, i.e. around 20% of the nominal capacity), deep discharge begins.

- Avoid deep discharges (refer to the section entitled "Equalising charge to prevent a deep discharge of the battery").
- Cease work with the truck immediately.
- Charge the battery immediately.
- Do not leave batteries in a discharged or partly discharged state.

- 
- Apply the parking brake.
  - Switch on the key switch.
  - Read the charge status on the display of the display-operating unit.
  - Charge a discharged or partly discharged battery.

### Meaning of the colours in the display

- 1 Green:  
The battery is sufficiently charged
- 2 Yellow:  
Charge the battery soon.
- 3 Red:  
Stop working. Charge the battery immediately. The battery is at risk of deep discharge.



## Charging the lead-acid battery

### CAUTION

Risk of component damage!

Incorrect connection or incorrect operation of the charging station or battery charger may result in damage to components!

- Follow the operating instructions for the charging station or battery charger and for the battery.

### CAUTION

Risk of component damage!

If you disconnect the battery male connector while the key switch is switched on (under load), an arc will be produced. This can lead to erosion at the contacts, which considerably shortens their service life.

- Switch off the key switch before disconnecting the battery male connector.
  - Do not disconnect the battery male connector while the key switch is switched on, except in an emergency.
- 
- Park the truck safely.
  - Ensure that work areas are adequately ventilated.
  - Fully open any protective structures (e.g. fabric-covered cab).
  - Open the battery door completely.
  - Disconnect the battery male connector.
  - Do not place any metal objects or tools on the battery.
  - Keep away from naked flames and do not smoke.
  - Check the battery cable for damage and have it replaced by the authorised service centre if necessary.

## Handling the lead-acid battery



### **⚠ DANGER**

**Explosive gases are generated during charging.**

- Ensure that work areas are adequately ventilated.
- For trucks with a cab (including fabric-covered cabs), ensure adequate ventilation in the cab (variant).

### **⚠ DANGER**

**There is a risk of damage, short circuiting and explosion!**

- Do not place any metal objects or tools on the battery.
- Keep away from naked flames and do not smoke.

### **⚠ WARNING**

Battery acid is toxic and corrosive!

- Observe the safety regulations in the chapter entitled "Battery acid".
- Connect the battery male connector to the plug on the battery charger.
- Start the battery charger.



### **NOTE**

*Observe the information in the operating instructions for the battery and the battery charger.*



### **⚠ DANGER**

**Risk of explosion!**

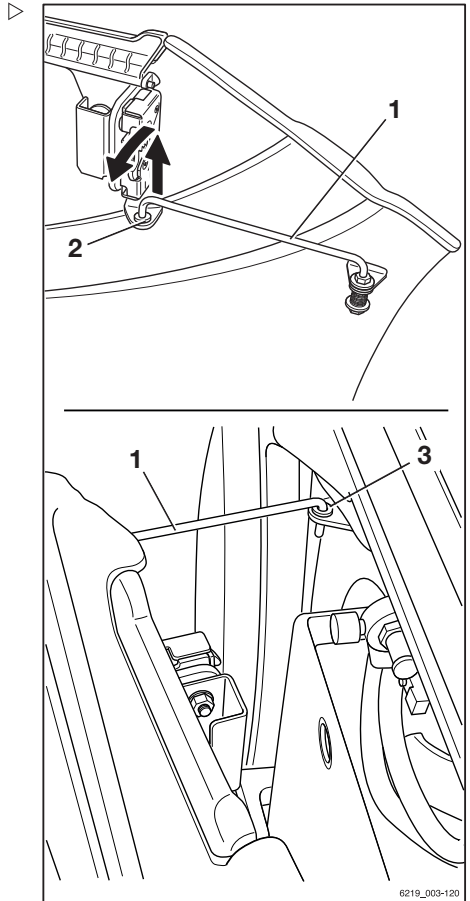
The battery door must be kept slightly open during the charging process to ensure adequate ventilation.



The battery door can be locked in the open position using a support bracket.

- Pull the support bracket (1) up and out of its support eyelet (2) on the battery door.
- Swing the support bracket (1) outwards in an anticlockwise direction.
- Press down on the support bracket (1) to clip it into the support eyelet (3) on the truck.

The battery door will lock into a slightly open position.



### After charging

#### ⚠ CAUTION

Risk of component damage!

- Switch off the battery charger before disconnecting the charging cable.
- Switch off the battery charger.
- Swing the support bracket (1) back into position and lock it into the support eyelet (2) on the battery door.
- Open the battery door and lock it into the open position.
- Disconnect the battery male connector from the plug for the battery charger.
- Insert the battery male connector fully into the plug connection on the truck.



#### ⚠ WARNING

Risk of explosion!

The plug may only be disconnected from the socket when the truck and battery charger are switched off.



#### ⚠ CAUTION

There is a risk of short circuit if the cables are damaged.

Do not crush the battery cable when closing the battery cover.

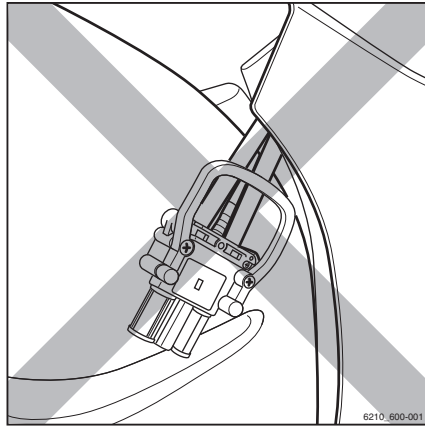
- Ensure that the battery cable does not come into contact with the battery cover.

## Handling the lead-acid battery

- Close the battery door. When doing so, ensure that no cables are crushed between the chassis and the battery door.

The battery door must be locked in place.

If the truck is equipped with a door contact switch for the battery door (variant), the message `Close battery door` appears on the display of the display-operating unit and the truck will not move.



## Equalising charge to prevent a deep discharge of the battery

Lead-acid batteries must be charged at least once per week for equalisation purposes. This is to ensure that all battery cells are evenly charged. This prevents a deep discharge of the battery and extends its life span.



### NOTE

*Dependent on the battery charger used, the equalising charge might not begin until 24 hours have elapsed. Therefore, a period when no shifts are running, such as the weekend, is ideal for performing the equalising charge.*

- Observe the information in the operating instructions of the charger regarding how to perform an equalising charge.

## Starting the equalising charge

- Charge the battery.
- After charging, leave the battery in the charger.

The battery charger remains switched on. Depending on the battery charger used, the equalising charge starts after between 6 and 24 hours. The equalising charge takes up to 2 hours.

- Please refer to the operating instructions from the manufacturer of the battery charger.

### Ending the equalising charge

The equalising charge ends automatically. If the battery is required during this process, you can interrupt the equalising charge by pressing the "stop button" on the battery charger.

- Please refer to the operating instructions from the manufacturer of the battery charger.

#### CAUTION

Risk of component damage!

If the plug for the battery charger is disconnected from the battery male connector while the battery charger is switched on, an arc is produced. This can lead to erosion at the contacts, which considerably shortens their service life.

- Switch off the battery charger before disconnecting the charging cable.
- 
- Switch off the battery charger.
  - Disconnect the battery male connector from the battery charger plug.
  - Insert the battery male connector fully into the plug connection on the truck.

## Handling the lithium-ion battery

# Handling the lithium-ion battery

## Safety regulations for handling the lithium-ion battery

### First-aid measures

#### **⚠ WARNING**

Risk of injury!

Escaping gases can lead to breathing difficulties.

#### **Course of action required if gases or liquids escape**

- Immediately ventilate the area or go out into the fresh air; in more serious cases, call a doctor immediately.

Skin irritation can occur in the event of contact with the skin.

- Thoroughly wash the skin with soap and water.

Eye irritation can occur in the event of contact with the eyes.

- Immediately rinse eyes thoroughly with water for 15 minutes, then consult a doctor.

### **Maintenance personnel**

The lithium-ion battery is virtually maintenance-free and can be charged by the driver.

- If you have any questions, please contact your authorised service centre.
- Follow the handling instructions for the battery and the operating instructions for the battery charger.
- Observe the following safety regulations when maintaining, charging and changing the battery.

**⚠ WARNING**

Risk of crushing/shearing!

The battery is very heavy. There is a risk of serious injury if any parts of the body are caught under the battery.

If parts of the body are wedged between the battery door and the edge of the chassis when the battery door is closed, this could lead to injuries.

- Always wear safety shoes when replacing the battery.
- Only close the battery door if there is no part of the body between the battery door and the edge of the chassis.

The battery must only be replaced in accordance with the directions in these operating instructions.

- When charging and maintaining the battery, observe the manufacturer's maintenance instructions for the battery and battery charger.

**Fire protection measures****⚠ DANGER**

**There is a risk of damage, short circuiting and explosion!**

- Do not place any metal objects or tools on the battery.
- Keep away from naked flames and do not smoke.

**⚠ DANGER**

**Increased risk of fire!**

Damaged lithium-ion batteries pose an increased fire hazard.

In the event of a fire, large quantities of water are the best option to cool the battery.

- Extinguish the fire yourself using sand or a class "D" metal-fire extinguishing powder.
- A safety zone of 5 m must be established around a burning battery.
- Evacuate the location of the fire as quickly as possible.

## Handling the lithium-ion battery

- Ventilate the location of the fire well, as the resulting combustion gases can cause damage to health if inhaled.
- Inform the fire brigade that lithium-ion batteries are affected by the fire.
- Observe the information provided by the battery manufacturer regarding the procedure in the event of a fire.

## Battery weight and dimensions

### DANGER

#### **Risk of tipping due to change in battery weight!**

The battery weight and dimensions affect the stability of the truck. When replacing the battery, the weight ratios must not be changed. The battery weight must remain within the weight range specified on the nameplate.

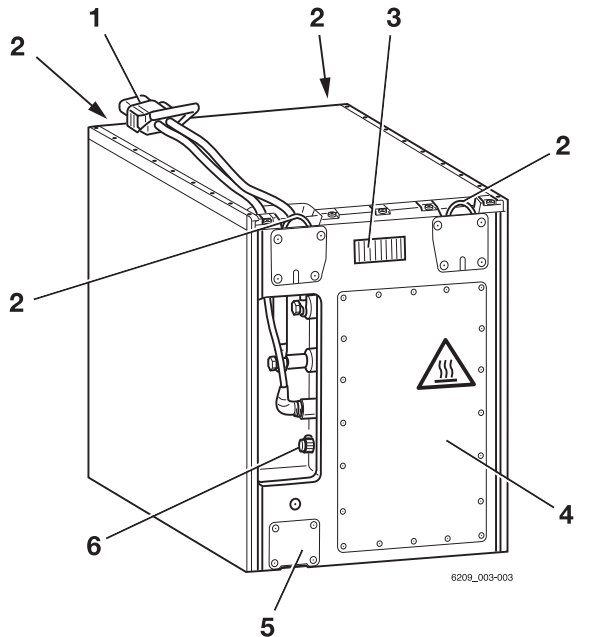
- Do not remove or change the position of ballast weights.
- Observe the battery weight.

## General safety regulations for lithium-ion batteries

The following safety regulations generally apply to operating lithium-ion batteries.

- Comply with the specifications stated in the safety data sheets of the battery manufacturer.
- Protect the battery against mechanical damage to prevent internal short circuits.
- If batteries have the slightest external damage, dispose of them in accordance with national regulations for the country in which they are being used.
- Do not expose batteries directly to continuously high temperatures or heat sources, such as direct sunlight.
- Train employees in how to handle lithium-ion batteries correctly.
- Place class "D" fire extinguishers in the areas in which trucks fitted with lithium-ion batteries are operated.

## Lithium-ion batteries "GGS Li-Ion 48 V (G2)" 13.1 kWh and 49 kWh



- |   |                        |   |                        |
|---|------------------------|---|------------------------|
| 1 | Battery male connector | 4 | Technology compartment |
| 2 | Lifting eyes           | 5 | Safety valve           |
| 3 | Display                | 6 | Diagnostic connector   |

### WARNING

Risk of accident due to weakened lifting eyes.

If bent lifting eyes are straightened, they lose their rigidity. The lifting eyes are then no longer able to support the weight of the battery. The battery may fall.

- **Do not** straighten bent lifting eyes.
- Have bent lifting eyes replaced by the authorised service centre.

### NOTE

*When switching to lithium-ion batteries, have the truck electronics adapted by the authorised service centre.*

## Handling the lithium-ion battery

### Regulations for storing lithium-ion batteries



#### NOTE

*Lithium-ion batteries are classified as dangerous goods according to class 9.*

The following recommendations apply:

- Store batteries at a height between 60 cm and 120 cm so that they are not damaged if they fall
- Store the batteries in a segregated area suitable for fire protection (container or safety cabinet)
- Store the batteries at a temperature between +15°C and +30°C and air humidity from 0% to 80%

Observe the following regulations for safe storage of the batteries:

- Store batteries fixed onto pallets and secured against overturning.
- Observe the floor load capacity of the storage area; refer to the manufacturer's specifications regarding battery weight
- To protect batteries against moisture, do not store them directly on the floor
- Due to the fire risk, store batteries outside buildings
- Store in a cool, dry and well-ventilated area
- Never subject the battery to temperatures below -35°C and above 80°C.

Long-term storage below -10°C or above 50°C has a negative impact on the service life of the battery.

- After twelve months, check the charging state of the battery and recharge if necessary
- Cordon off the warehouse area
- Only persons who are aware of the risks and safety regulations may access this area
- Protect against direct sunlight
- Protect against precipitation



- Store in a way that protects the batteries against short circuits
- Store batteries at a safe distance from flammable materials
- Do not store batteries together with metallic objects
- Store lithium-ion batteries separately from other types of batteries (no mixed storage).
- Maintain a safety margin of at least 2.5 m to other goods
- To avoid a deep discharge, observe the specifications of the battery manufacturer regarding the maximum permissible storage period
- If you have any questions, please contact your authorised service centre.

## Handling the lithium-ion battery

### Checking the battery charge status

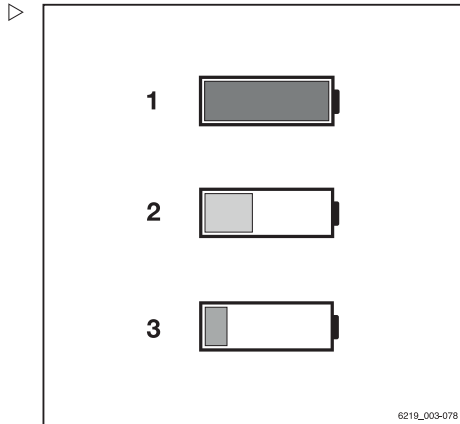
The charge state of the lithium-ion battery can be read on the display-operating unit of the truck and on the display of the lithium-ion battery.

#### Reading the display-operating unit

- Apply the parking brake.
- Switch on the key switch.
- Read the charge state from the display.
- Charge a discharged or partly discharged battery.

#### Meaning of the colours in the display

- 1 Green:  
The charge state is  $> 10\%$ .  
The battery is sufficiently charged
- 2 Yellow:  
The charge state is  $\leq 10\%$ .  
Charge the battery soon.
- 3 Red:  
Stop working. Charge the battery immediately. The battery is at risk of deep discharge.



### Reading from the battery indicator

The battery indicator is located at the side of the battery tray. Like the display-operating unit, the battery indicator shows the charge state of the lithium-ion battery. Warnings are issued only on this battery indicator.

- If you have any questions, contact your authorised service centre.

### Charging state LEDs

When the battery is connected to the truck and the truck is switched on, the charge state LEDs (3) display the charge state in 10% increments. The charge state LEDs can light up in green and red.

- A charge state of 0% to 20% is indicated by a red bar.  
If this bar flashes, the charge state is < 2%.  
The truck can no longer be moved.
- A charge state of > 20% to 30% is indicated by yellow bars
- A charge state of > 30% to 100% is indicated by green bars

When charging, the charge state LEDs (3) light up green as a chase light.

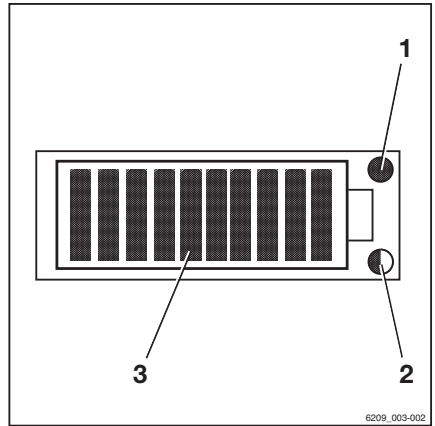
### Service LED

The service LED (1) lights up red if the battery function is significantly restricted or if operation is not possible.

- Contact your authorised service centre.

### Temperature LED

The temperature LED (2) indicates an increased temperature. The power of the battery is reduced. The LED remains lit until the temperature drops to within the normal range. The LED goes out as soon as the temperature drops into the normal range.



- 1 Service LED (red)
- 2 Temperature LED (yellow/red)
- 3 Charge state LEDs (red/green)

Colour of LED	Cause	Consequence
Flashing yellow	Slightly increased temperature (> 60°C)	Power reduction
Solid yellow	Increased temperature (> 65°C)	Shut-off

## Handling the lithium-ion battery

Colour of LED	Cause	Consequence
Flashing red	Greatly increased temperature (> 70°C)	Shut-off
Solid red	Greatly increased temperature (> 75°C)	Shut-off

### Procedure if a lithium-ion battery has a low charge state

To prevent deep discharge of the lithium-ion battery, performance limitations are imposed once the charge state of the battery is  $\leq 10\%$ .

- If the charge state drops below 15%, drive to the charging station and charge the battery.

#### **⚠ WARNING**

No electric brake assistance when the battery is switched off!

The drives are de-energised when the battery is automatically switched off.

The truck will not be held on a slope by the electric brake.

- To brake, actuate the service brake.
- 
- If the battery switches off, tow the truck to the charging station.
  - Charge the battery.

### Charging the lithium-ion battery

#### **⚠ CAUTION**

Risk of component damage!

Incorrect connection or incorrect operation of the charging station or battery charger may result in damage to components.

- Follow the operating instructions for the charging station or battery charger and for the battery.

**⚠ CAUTION**

Risk of component damage!

Battery male connectors and battery charger connectors from different manufacturers are not compatible and may cause damage.

- Use battery male connectors and battery charger connectors produced by the same manufacturer.
- If the connectors from produced by different manufacturers, please contact your authorised service centre.

**i NOTE**

*To prevent deep discharge of the lithium-ion battery, performance limitations are imposed once the charge state of the battery drops to a certain level. Load the battery before the charge state drops below 15%.*

To read the battery charge state; see the section entitled "Checking the battery charge status".

- Park the truck safely.
- Open the battery door completely
- Disconnect the battery male connector.
- Keep away from naked flames and do not smoke.
- Check the battery cable for damage and have it replaced by the authorised service centre if necessary.

**⚠ DANGER**

**There is a risk of damage, short circuiting and explosion!**

- Do not place any metal objects or tools on the battery.
- Keep away from naked flames and do not smoke.
- Connect the battery male connector to the plug on the battery charger.
- Start the battery charger.

The charging process starts automatically. The display signals the charging process by illuminating the LEDs as a chase light.

## Handling the lithium-ion battery

The battery charger will indicate when the battery is fully charged. Only disconnect the battery from the charger if no current is flowing.

The battery has no memory effect. Therefore, it can be charged in any charge state without the capacity of the battery being impaired.

At ambient temperatures below 0°C, the charging process will take much longer.



### NOTE

*Observe the information in the operating instructions for the battery and the battery charger.*

The battery door can be locked in the open position using a support bracket.

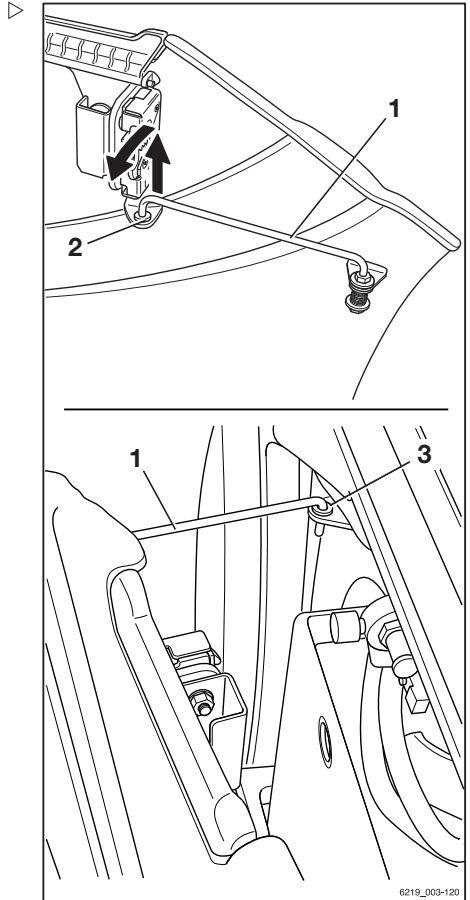
- Pull the support bracket (1) up and out of its support eyelet (2) on the battery door.
- Swing the support bracket (1) outwards in an anticlockwise direction.
- Press down on the support bracket (1) to clip it into the support eyelet (3) on the truck.

The battery door will lock into a slightly open position.

### After charging

The battery charger will switch off automatically.

- Swing the support bracket (1) back into position and lock it into the support eyelet (2) on the battery door.
- Open the battery door and lock it into the open position.
- Disconnect the battery male connector from the plug on the battery charger.
- Fully insert the battery male connector into the plug connection on the truck.



### ⚠ CAUTION

There is a risk of short circuit if the cables are damaged.  
Do not crush the charging cable when closing the battery cover.

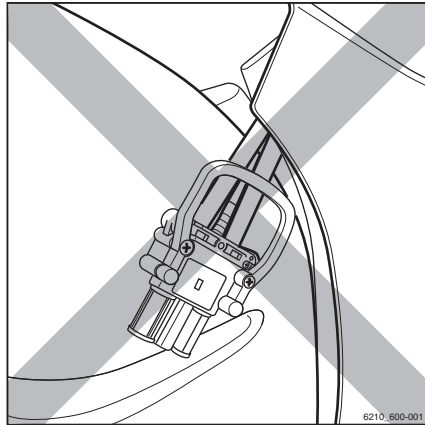
- Make sure that the charging cable does not come into contact with the battery cover.

## Replacing and transporting the battery

- Close the battery door. When doing so, ensure that no cables are crushed between the chassis and the battery door.

The battery door must be locked in place

If the truck is fitted with a door contact switch for the battery door (variant), the message `Close battery door` appears on the display-operating unit. The truck will not move.



## Replacing and transporting the battery

### General information on replacing the battery

#### **⚠ CAUTION**

Risk of components being damaged by the lifting accessory and battery rolling away!

The lifting accessory and battery may roll away in an uncontrolled manner if the battery is not removed on a level, smooth floor with sufficient load capacity.

- Follow the operating instructions for the lifting accessory used.
- Always remove the battery on a level, smooth floor with sufficient load capacity.

Batteries can be removed with a truck and with a lift truck equipped with a battery change frame. A hydraulic battery carrier is also available as a variant.

The load capacity of the lifting accessory used must at least match the battery weight (see the battery nameplate).

### Changing to a different battery type

The authorised service centre can convert the truck to a different battery type and capacity.



Note the following points:

- The new battery capacity and new battery type must be set in the display-operating unit.

If this is not done, the actual battery discharge status cannot be determined. The battery charge level is not displayed correctly.

In the worst case, the battery may be damaged by a deep discharge.

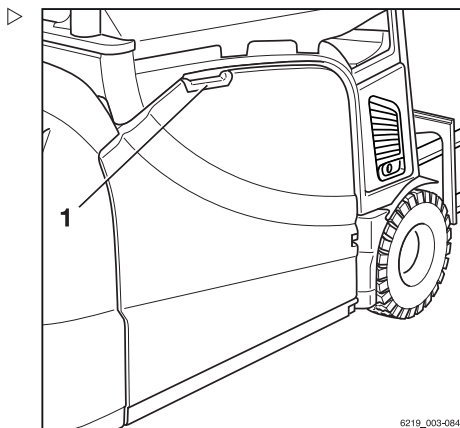
- When changing to TENSOR<sup>®</sup> batteries, the maximum speed of the truck must be limited to 17 km/h for technical reasons.
- Contact the authorised service centre in this situation.
- Only use lithium-ion batteries that have been approved by STILL with this truck.

## Opening/closing the battery door

### Opening the battery door

- Take hold of the door handle (1) of the battery door and open the battery door by pulling it forwards.

The battery door locks into place automatically.

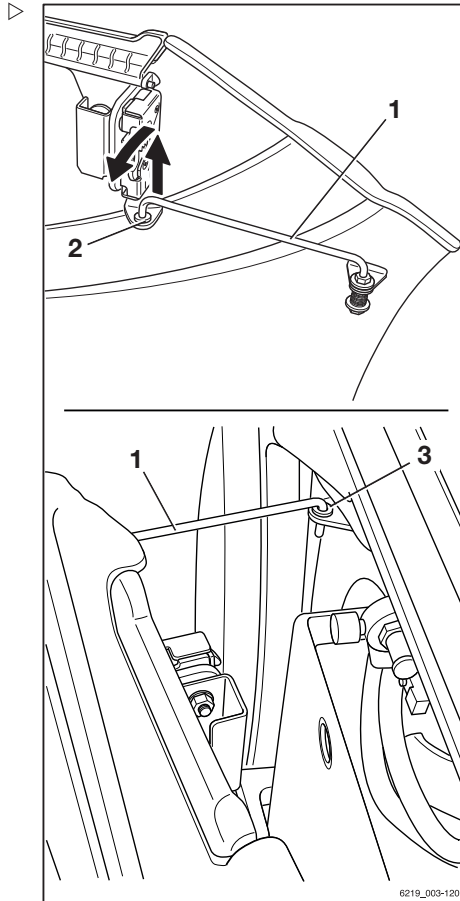


## Replacing and transporting the battery

### Locking the battery door into a slightly open position

The battery door can be locked in the open position using a support bracket.

- Pull the support bracket (1) up and out of its support eyelet (2) on the battery door.
- Swing the support bracket (1) outwards in an anticlockwise direction.
- Press down on the support bracket (1) to clip it into the support eyelet (3) on the truck.
- To close the support bracket (1), swing it back into position and lock it into the support eyelet (2) on the battery door.



### Closing the battery door



#### ⚠ WARNING

When closing the battery door, limbs could become trapped — risk of crushing!

When closing the battery door, nothing should come between the battery door and the edge of the chassis.

- Carefully close the battery door.
- Only close the battery door if there are no parts of the body in the way.



#### ⚠ WARNING

When closing the battery door, there is a risk of trapping the battery cable. If the cable is crushed or sheared off, there is a risk of short circuit!

When closing the battery door, nothing should come between the battery door and the edge of the chassis.

- Carefully close the battery door.
- Only close the battery door if the battery cable is not in the way.

**⚠ WARNING**

Risk of accident due to the battery door opening!

An unlocked battery door may open if the truck decelerates sharply. If the battery door opens while driving, there is risk of damage from a collision.

- Ensure that the battery door is securely shut.
- Drive the truck only when the battery door is locked.

**⚠ DANGER**

**Risk of fatal injury from the battery sliding out!**

The battery may fall out if the battery door is not locked and the truck tips over. The battery could fall on the driver!

- Ensure that the battery door is securely shut.
- Drive the truck only when the battery door is locked.

**NOTE**

*The apertures in the door are necessary for forced ventilation and must not be blocked.*

- If the battery door is fully open, take hold of the battery door by its handle and open it slightly further.

This will release the latch in the hinge.

- Close the battery door by hand until it engages in the lock.

The battery door must be locked in place

The truck is equipped with a door contact switch for the battery door. If the battery door is not fully closed, the message `Close battery door` appears on the display of the display-operating unit. The truck will then only move at a reduced speed.

## Replacing and transporting the battery

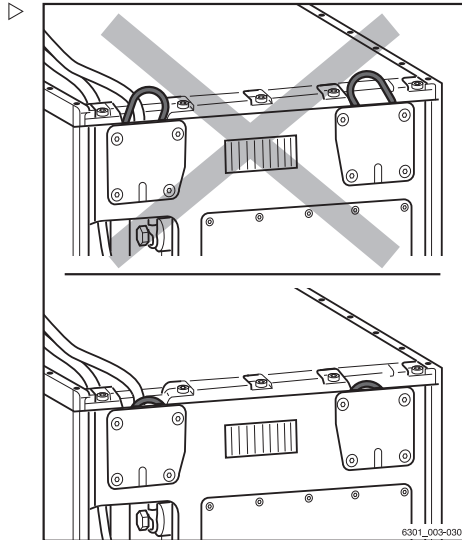
### Special notes for installing the lithium-ion battery

With the exception of the following special notes, lithium-ion batteries are replaced in the same way as lead-acid batteries.

- Push down the lifting eyes before inserting the battery into the battery compartment. Make sure that the lifting eyes **do not** protrude.

The lifting eyes may bend in the event of a collision with the truck chassis.

- Install the lithium-ion battery with the display facing the outside of the truck so that it can be read when the battery door or battery cover is open.
- Lay the battery cable on the battery. Make sure that the cable does not come into contact with the truck chassis during installation.



### Replacing the battery using a truck

#### Preparing

#### **⚠ WARNING**

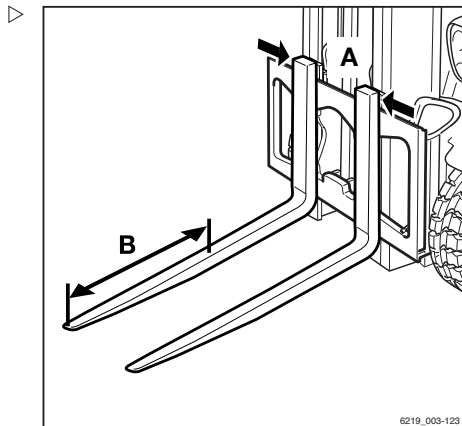
Risk of accident!

The load capacity of the truck in use must at least match the battery weight (see the battery nameplate).

- Observe the nameplates of the battery and of the change frame.
- Before picking up the battery, the fork arms must be adjusted to match the opening in the chassis (A). Push the fork arms together, selecting the maximum possible distance.

The fork arms must not be moved under the battery any further than the length of the chassis opening (B = max. 850 mm).

It is useful to mark this measurement (B) (measured from the fork tips) on the fork arms.



#### Removing the battery

- Park the truck safely and switch it off.

- Open the battery door.

**⚠ CAUTION**

Risk of component damage!

If you disconnect the battery male connector while the key switch is switched on (under load), an arc will be produced. This can lead to erosion at the contacts, which considerably shortens their service life.

- Switch off the key switch before disconnecting the battery male connector.

- Disconnect the battery male connector. ▷



**⚠ WARNING**

Risk of crushing/shearing!

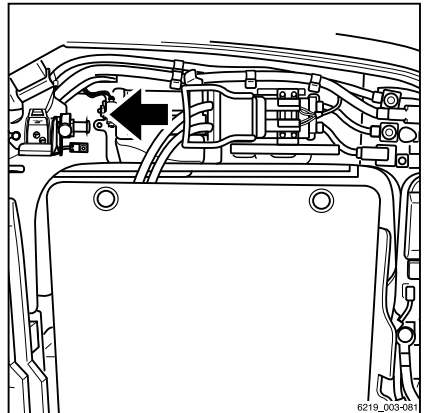
No one must stand directly next to the battery or between the battery and the truck when removing and inserting the battery.



**⚠ CAUTION**

Risk of damage!

- Position the battery cable on the battery in such a way that it cannot be crushed, either when removing or inserting the battery or when closing the battery door.



- Open the battery locks (1). ▷



**NOTE**

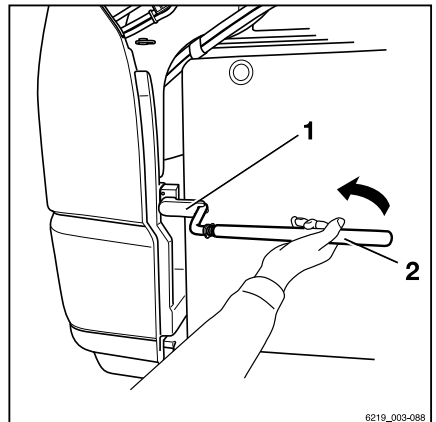
*If the battery locks cannot be opened by hand, the coupling pin (2) from the counterweight can be used as a lever extension.*

- Carefully drive the truck under the battery.
- Carefully lift the battery until it maintains a sufficient distance from the seating and from the chassis above.
- Position the fork arms horizontally.

**⚠ CAUTION**

Risk of damage!

- Lower the battery immediately if it knocks against the chassis above.



## Replacing and transporting the battery

- Slowly remove the battery from the battery compartment.

## Transporting and setting down the battery

### **⚠ WARNING**

Risk of crushing/shearing!

The battery must be transported very carefully, i.e. at low speed, using slow steering movement and careful braking.

- Do not use the methods described above to transport the battery over long distances.

- 
- Transport the battery to the intended storage space.

### **⚠ CAUTION**

Risk of damage!

The battery must be stored on a suitable beam support or on suitable racking.

The battery must not be stored on a wooden beam or any similar object.

- 
- Set down the battery.

### Installing the battery

- Pick up the battery and transport it to the truck.

#### **CAUTION**

Risk of component damage!

If the lifting eyes protrude from the lithium-ion battery (variant), they will strike the truck chassis and bend.

- Before inserting the lithium-ion battery (variant), push the lifting eyes down in the tray and make sure that they do **not** protrude.

#### **NOTE**

Do **not** straighten any bent lifting eyes; have them replaced by the authorised service centre.

- Carefully insert the battery into the battery compartment.

When doing so, ensure that

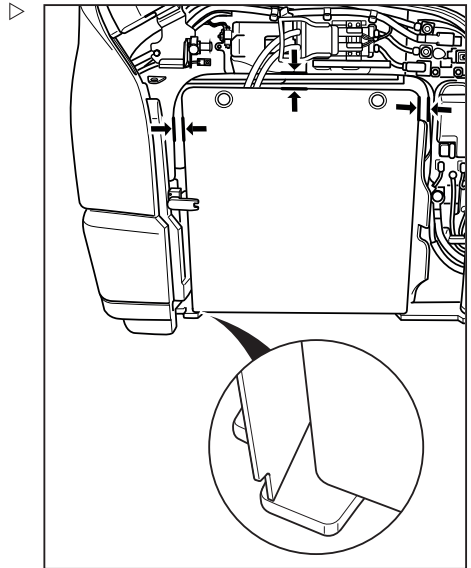
- Before inserting, the battery cable is positioned on the battery in such a way that it will not become trapped when the battery is inserted
- The load-carrying equipment is at a right angle to the truck
- The gaps are maintained for the entire time that the battery is being inserted, and to ensure that the battery is inserted to a sufficient depth,
- the display on the lithium-ion battery (variant) points towards the battery door.



#### **DANGER**

##### **Risk of crushing/shearing!**

While inserting the battery, avoid putting your hands between the battery and the chassis.



## Replacing and transporting the battery



### ⚠ CAUTION

Risk of damage!

- Position the battery cables on the battery in such a way that they cannot be crushed, either when removing or inserting the battery or when closing the battery door.

Once the battery is correctly positioned in the battery compartment:

- Carefully lower the battery.
- Carefully move the lifting accessories out from under the battery.

### ⚠ CAUTION

Risk of component damage!

If you connect the battery male connector with the key switch switched on (under load), an arc will be produced. This can lead to erosion at the contacts, which considerably shortens their service life.

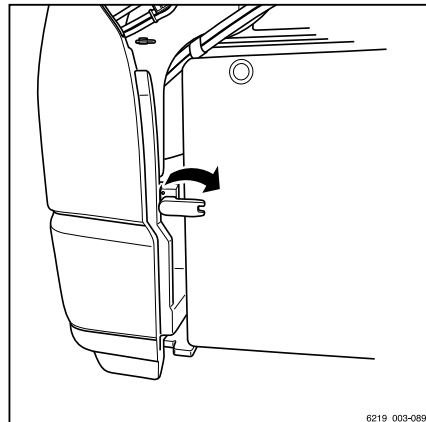
- Do not connect the battery male connectors with the key switch switched on.
- Make sure that the key switch is switched off before connecting the battery male connector.

- Close the battery lock (1).



### NOTE

*The battery door will close only when the battery is locked.*

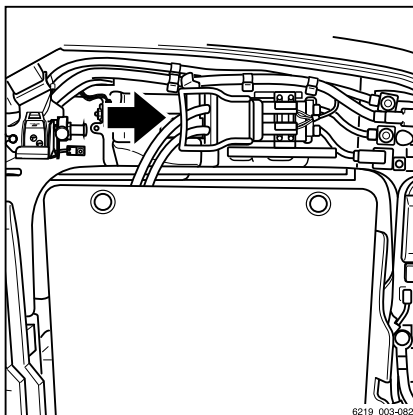


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## Replacing and transporting the battery

- Insert the battery male connector fully into the plug connection on the truck. ▷
- Close the battery door.



## Replacing and transporting the battery

### Replacing the battery using a lift truck and a battery change frame

#### ⚠ WARNING

Risk of accident!

The load capacity of the lift truck used must at least match the weight of the battery and the weight of the change frame.

- Observe the nameplates of the battery and of the change frame.

#### ⚠ CAUTION

Risk of damage!

Place the battery change frame along with the battery only on a firm surface with sufficient load-bearing capacity.

Do not place the battery change frame with the traction battery on a soft surface or in a rack.

Battery replacement using a lift truck is carried out with a change frame. The battery remains on the change frame for charging and storage.

### Preparing

- Check the nameplate (4) of the change frame to ensure that the selected change frame has the required load capacity.
- Check the change frame for deformation and breaks or cracks.

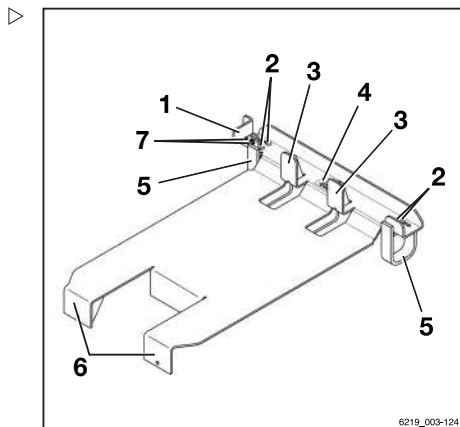
A defective change frame must not be used and must be replaced by the authorised service centre.

To ensure that the change frame picks up the battery precisely, the distance between the feet (5) can be adjusted.

- To adjust the feet (5), loosen the screws (2).
- Adjust the feet (5) of the battery support according to the dimensions of the fork arms.
- Retighten the screws (2).

The side stop (1) must also be adjusted.

- To adjust the stop (1), loosen the screws (7).
- Adjust the stop (1) so that the battery is centred on the change frame later on.



- Position the change frame properly on the lift truck until the fork-arm tips are touching the feet (6).

**i NOTE**

*When the change frame is on the lift truck, the feet (5) must be positioned as close to the fork arms as possible.*

**Types of change frames**

- Observe the nameplate of the change frame.

The following information is listed on the nameplate:

- 1 The type of change frame (observe the following table)
- 2 Maximum permissible load capacity (see battery nameplate)
- 3 The net weight of the change frame

The various battery change frames that are available are designed for specific types of battery.

**i NOTE**

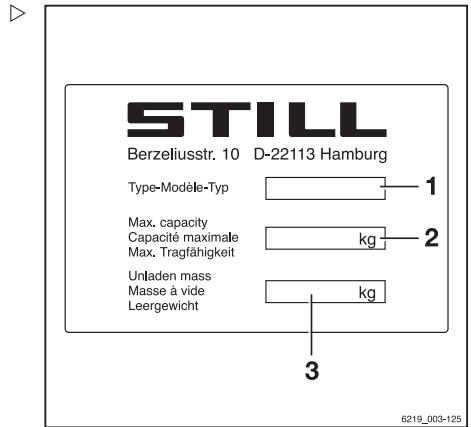
*Battery replacement using a hand pallet truck is allowed only if using the change frame permitted for this purpose.*

- For permitted combinations, observe and comply with the following table.

Battery type	Battery change frame
5 PzS 625 Circuit A	56364206700
5 PzS 625 Circuit B	56364206701
6 PzS 750 Circuit A	56364206705

**Removing the battery**

- Park the truck safely.
- Open the battery door.



**Nameplate of the change frame**

## Replacing and transporting the battery

### ⚠ CAUTION

Risk of component damage!

If you disconnect the battery male connector while the key switch is switched on (under load), an arc will be produced. This can lead to erosion at the contacts, which considerably shortens their service life.

- Switch off the key switch before disconnecting the battery male connector.

- Disconnect the battery male connector. ▷



### ⚠ WARNING

Risk of crushing/shearing!

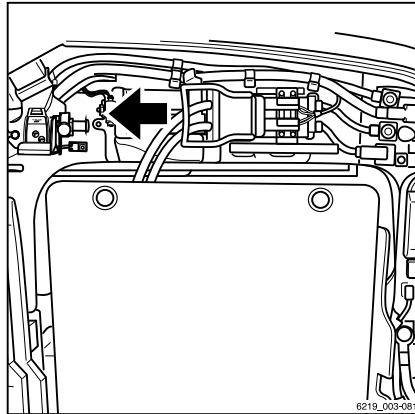
No one must stand directly beside the battery or between the battery and the lift truck when removing or inserting the battery.



### ⚠ CAUTION

Risk of damage!

- Position the battery cable on the battery in such a way that it cannot be crushed, either when removing or inserting the battery or when closing the battery door.

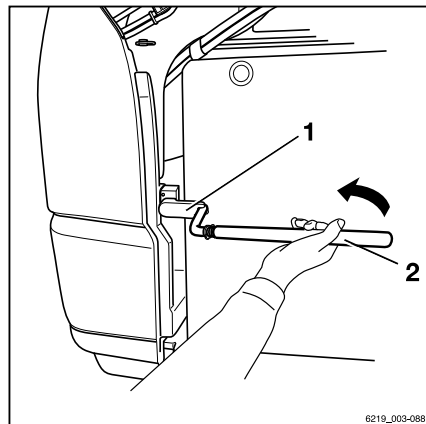


- Open the battery lock (1). ▷



### NOTE

*If the battery lock cannot be opened by hand, the coupling pin (2) from the counterweight can be used as a lever extension.*



## Replacing and transporting the battery

- Carefully drive the lift truck under the battery ▷ until the battery touches (1) and (2).
- Carefully lift the battery until it maintains a sufficient distance from the seating and from the chassis above.

**⚠ CAUTION**

Risk of damage!

- Lower the battery immediately if it knocks against the chassis above.
- Slowly remove the battery from the battery compartment.

**Transporting and setting down the battery****⚠ WARNING**

Risk of injury!

The battery must be transported very carefully, i.e. at low speed, using slow steering movement and careful braking.

- Do **not** use the methods described here to transport the battery over long distances.
- Transport the battery to the intended storage space.

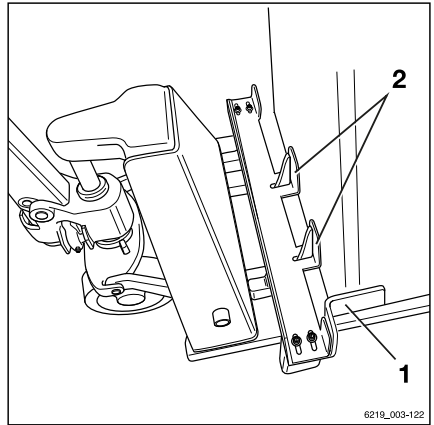
**⚠ CAUTION**

Risk of damage!

The change frame and battery must be stored on a suitable beam support or on suitable racking.

The change frame must not be stored on a wooden beam or any similar object.

- Set down the battery.



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## Replacing and transporting the battery

### Installing the battery

- Pick up the new battery and transport it to the truck.
- Position the battery cable on the battery so that it will not become trapped when the battery is inserted.
- Position the battery at a right angle to the truck.

#### **⚠ CAUTION**

Risk of component damage!

If the lifting eyes protrude from the lithium-ion battery (variant), they will strike the truck chassis and bend.

- Before inserting the lithium-ion battery (variant), push the lifting eyes down in the tray and make sure that they do **not** protrude.

#### **i NOTE**

Do **not** straighten any bent lifting eyes; have them replaced by the authorised service centre.

- Carefully insert the battery into the battery compartment.
- Carefully place the battery onto the battery holding fixtures.



#### **⚠ DANGER**

##### **Risk of crushing/shearing!**

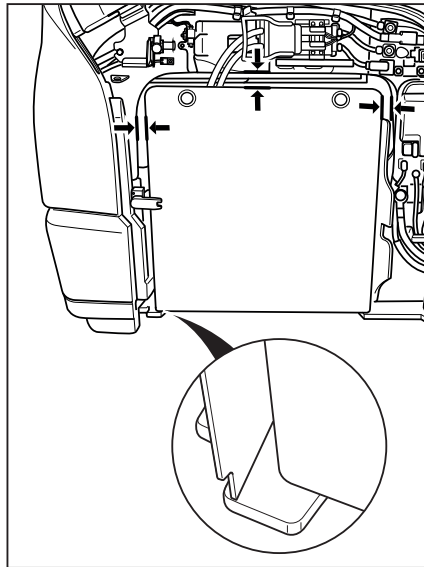
When inserting, do not allow your hands to come between the battery and the chassis.



#### **⚠ CAUTION**

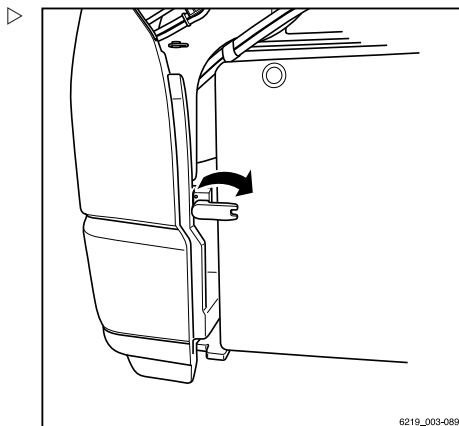
Risk of damage!

- Position the battery cable on the battery in such a way that it cannot be crushed, either when removing or inserting the battery or when closing the battery door.



- When the battery is correctly positioned in the battery compartment, carefully lower the battery.

- Carefully move the lifting accessory out from under the battery.
- Close the battery lock.



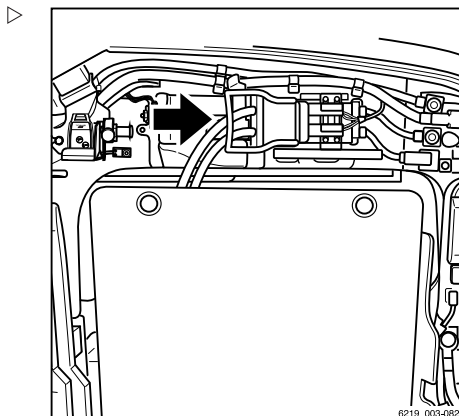
- Insert the battery male connector fully into the plug connection on the truck.

**⚠ CAUTION**

Risk of component damage!

If you connect the battery male connector with the key switch switched on (under load), an arc will be produced. This can lead to erosion at the contacts, which considerably shortens their service life.

- Do not connect the battery male connectors with the key switch switched on.
  - Make sure that the key switch is switched off before connecting the battery male connector.
- 
- Close the battery door.



## Replacing and transporting the battery

### Replacing the battery using a hydraulic battery carrier (variant)

#### **⚠ DANGER**

The battery weight and dimensions affect the stability of the truck.

When replacing the battery, the weight ratios must not be changed. The battery weight must remain within the weight range specified on the nameplate. The location of ballast weights must not be changed.

#### Preconditions

#### **⚠ WARNING**

Risk of injury when ejecting the battery.

The battery ejects into the marked area (1). People must not stand in this area.

The area (1) extends over the width of the battery compartment and the extension range of the battery carrier.

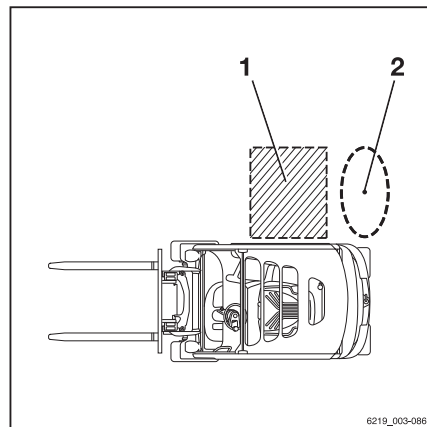
– Only stand in the operator's position (2).

The following prerequisites must be fulfilled when replacing a battery using a hydraulic battery carrier:

- The extension area (1) must be free of obstacles
- The ground must be clean, even and offer sufficient load capacity
- The fork must be safely set down on the ground
- The parking brake must be applied
- The operator must be in the operator's position (2)
- The battery cable must be long enough to connect to the plug connection of the battery carrier without being stretched

#### **i NOTE**

*When the battery is deeply discharged (less than 10% capacity), it cannot be removed. In this case, a reserve battery must be connected or the battery in the truck must be charged.*

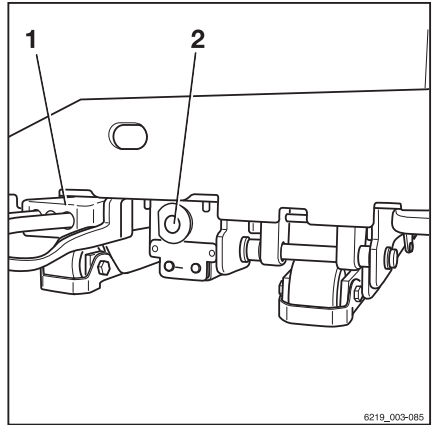




**Emergency off function when moving the battery** ▷

The emergency off switch (2) is located on the carriage next to the connection for the battery male connector (1).

- In the event of an emergency, actuate the emergency off switch (2) or disconnect the battery male connector (1).



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**Extending the battery hydraulically**

- Open the battery door.

**⚠ WARNING**

Risk of injury!

- Open the battery door until the door lock engages and the door cannot close itself.

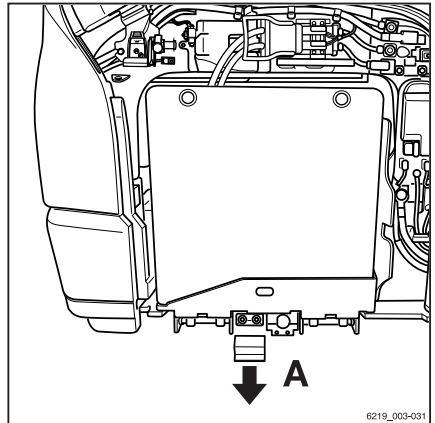
**⚠ CAUTION**

Risk of component damage!

When extending the carriage, the battery cable may collide with components and become damaged.

- Ensure that the battery cable does not become stuck or crushed.
- In the event of a malfunction, release the extension button and correct the malfunction.

- (A) Remove the lid of the battery male connector and store it safely. ▷

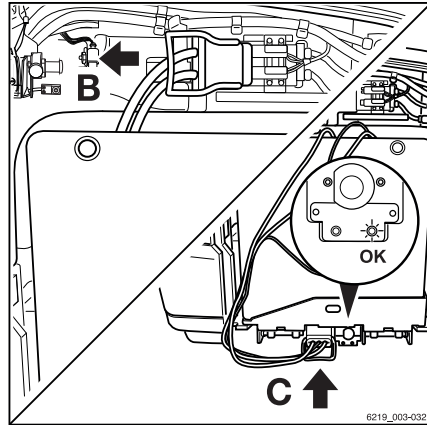


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## Replacing and transporting the battery

- (B) Disconnect the battery male connector from the plug connection of the truck. ▷
- (C) Insert the battery male connector into the plug connection of the battery carrier.

The condition display on the carrier lights up green. The carrier is ready for use.

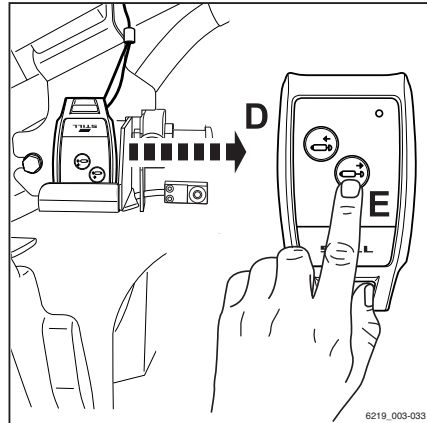


- (D) Remove and pull out the remote control. ▷

The remote control is attached to an extractable cable to prevent loss.

The operation must be carried out outside the extension area.

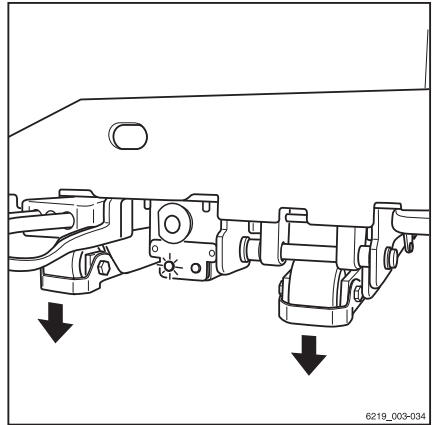
- (E) Push and hold the extend button.



Replacing and transporting the battery

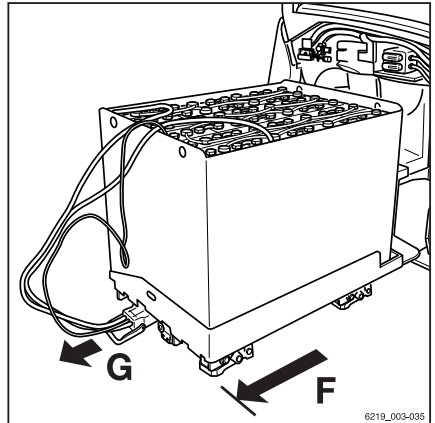
The rollers of the carrier lower and lift the carrier.

The condition display on the carrier now lights up red.



6219\_003-034

- (G) Extend the carrier until the carriage has reached its end position (F).



6219\_003-035

**⚠ WARNING**

Risk of crushing!

Never reach under the battery to remove obstacles.

- Reinsert battery and remove obstacle.

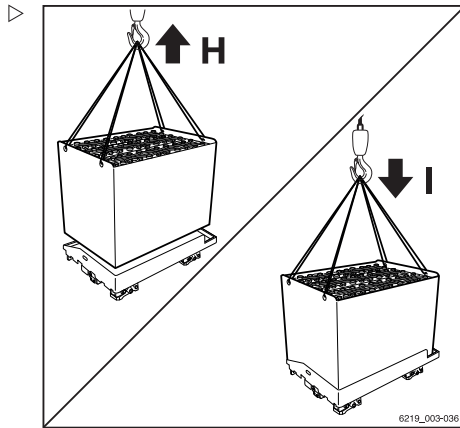
- Ensure that the battery cable is not damaged when the carriage is extended.

**After extending the battery fully**

- To prevent short-circuits, place a rubber mat on batteries with open terminals or connectors.
- Disconnect the battery male connector from the plug connection of the carrier and place it safely on the battery.

## Replacing and transporting the battery

- (H) Remove the battery from the carrier using suitable lifting gear. For more information see the "Transporting the battery by crane" section.
- Ensure that there is sufficient distance between the truck and any obstacles so that the truck is not damaged when the crane is used.
- (I) Position a charged battery securely on the carrier.
- Make sure that the battery does not protrude beyond the contours of the carrier.



## Retracting the battery

### ⚠ CAUTION

Risk of component damage!

If you connect the battery male connector with the key switch switched on (under load), an arc will be produced. This can lead to erosion at the contacts, which considerably shortens their service life.

- Do not connect the battery male connectors with the key switch switched on.
- Make sure that the key switch is switched off before connecting the battery male connector.

- (J) Insert the battery male connector into the plug connection of the battery carrier.
- (K) Push and hold the retract button.

The battery carrier retracts.

### ⚠ WARNING

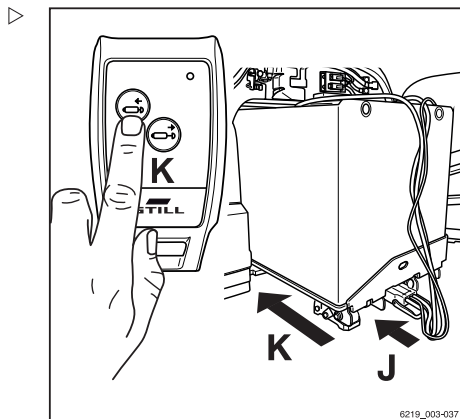
Risk of crushing!

Never reach under the battery to remove obstacles.

- Extend the battery tray again.
- Lift the battery using the crane again, swivel the battery to the side and remove the obstacle.

### NOTE

*If the movement of the carriage is restricted by obstacles, release the push button.*

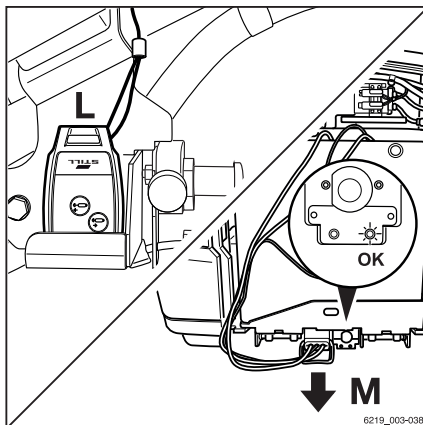


## Replacing and transporting the battery

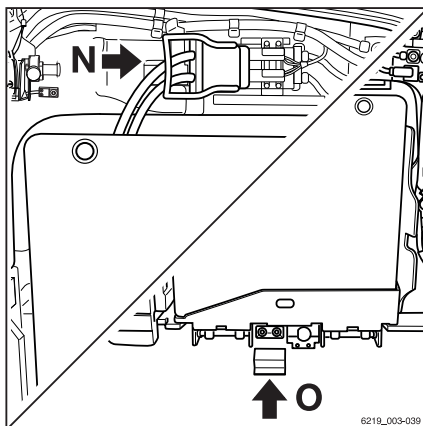
- (L) After retracting, return the remote control to its holder. ▷

The condition display on the carrier lights up green.

- (M) Disconnect the battery male connector from the plug connection of the carrier.
- Refit the lid on the plug connection of the carrier.



- (N) Insert the battery male connector into the plug connection of the truck. ▷
- (O) Refit the lid of the battery male connector.
- Close the battery door.



## Replacing and transporting the battery

## Transporting the lead-acid battery by crane ▷

**⚠ DANGER**

**There is risk of fatal injury from being struck by falling loads!**

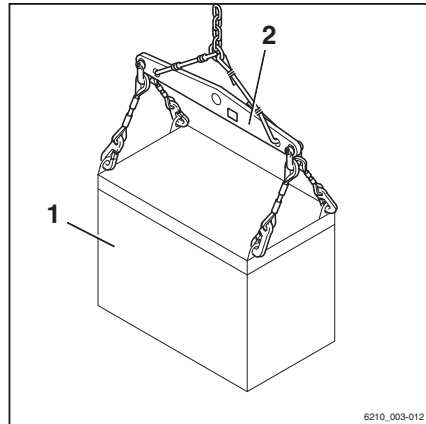
- Never walk or stand underneath suspended loads.

The tray for the lead-acid battery (1) is equipped with four lifting eyes. The battery may only be transported by crane using a lifting gear and bridge piece (2) that are suitable in terms of size and load capacity.

- To avoid short circuits, cover batteries with open terminals or connectors with a rubber mat.
- Observe the operating instructions for the lifting gear.
- Attach the battery (1) to suitable lifting gear (2).
- Lift the battery carefully and ensure that it hangs straight on the lifting gear.

The lifting gear must be vertical when lifting, so that no lateral pressure is applied to the tray.

- Set the battery down carefully.
- Remove the lifting gear after the battery has been set down.
- Do not place slack lifting gear on the battery cells or allow it to fall on the battery cells.



## Transporting the lithium-ion battery by crane



### **⚠ DANGER**

**There is risk of fatal injury from being struck by falling loads!**

- Never walk or stand underneath suspended loads.

### **⚠ WARNING**

Risk of accident due to weakened lifting eyes.

If bent lifting eyes are straightened, they lose their rigidity. The lifting eyes are then no longer able to support the weight of the battery. The battery may fall.

- **Do not** straighten bent lifting eyes.
- Have bent lifting eyes replaced by the authorised service centre.

The lithium-ion battery (1) is equipped with four extendable lifting eyes. The battery may only be transported by crane using a lifting gear and bridge piece (2) that are suitable in terms in size and load capacity.

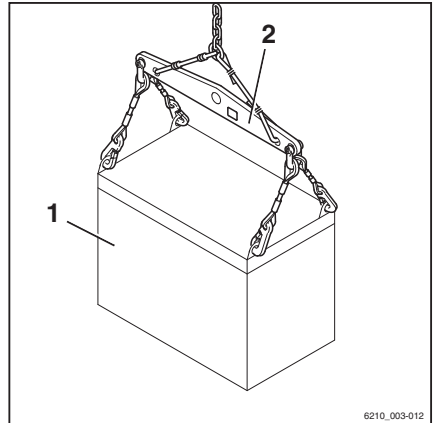
- Pull out the two lifting eyes (1) on each side and tilt them towards each other.

The lifting eyes are locked in this position.

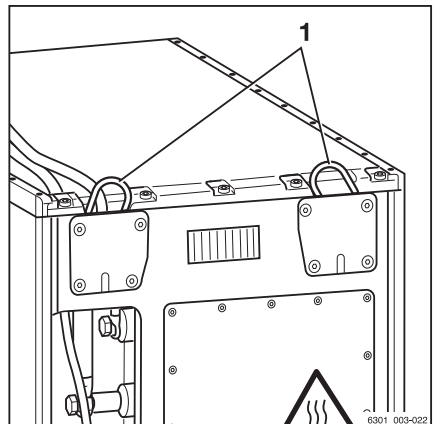
- Observe the operating instructions for the lifting gear.
- Attach the lifting gear to the four lifting eyes.
- Lift the battery carefully and ensure that it hangs straight on the lifting gear.

The lifting gear must be vertical when lifting, so that no lateral pressure is applied to the tray.

- Set the battery down carefully.
- Remove the lifting gear after the battery has been set down. Lift up and release the lifting eyes to lower them.



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6301\_003-022

## Cleaning the truck

### Cleaning the truck

#### Cleaning the truck

- Park the truck securely.

#### ⚠ CAUTION

Risk of component damage!

If you remove the battery male connector with the key switch switched on (under load), an arc will be produced. This can lead to corrosion at the contacts, which considerably shortens their service life.

- Switch off the key switch before the battery male connector is disconnected.
  - Only disconnect the battery male connector with the key switch switched on in an emergency.
- 
- Disconnect the battery male connector.



#### ⚠ WARNING

There is a risk of injury due to falling when climbing onto the truck!

When climbing onto the truck, you can get stuck or slip on components and fall. Higher points on the truck should only be accessed using the appropriate equipment.

- Adhere strictly to the following steps.
- 

- Use only the steps provided to climb onto the truck.
- Use equipment such as stepladders or platforms to reach inaccessible areas.

#### Preparing the truck for cleaning

#### ⚠ CAUTION

If water penetrates the electrical system, there is a risk of short circuit!

- Adhere strictly to the following steps.
- 
- Switch the electrical system off before cleaning.
  - Do not spray electric motors and other electrical components or their covers directly with water.



**⚠ CAUTION**

Excessive water pressure or water and steam that are too hot can damage truck components.

- Adhere strictly to the following steps.
- 
- Only use high-pressure cleaners with a maximum output power of 50 bar and at a maximum temperature of 85°C.
  - When using high-pressure cleaners, make sure there is a distance of at least 20 cm between the nozzle and the object being cleaned.
  - Do not aim the cleaning jet directly at adhesive labels or decal information.

**⚠ DANGER****Risk of fire!**

Deposits/accumulations of combustible materials may ignite in the vicinity of hot components (e.g. drive units).

- Adhere strictly to the following steps.
- 
- Regularly remove all deposits/accumulations of foreign materials in the vicinity of hot components.

**⚠ DANGER**

**Flammable fluids can be ignited by hot components on the truck, causing a risk of fire!**

- Adhere strictly to the following steps.
- 
- Do not use flammable fluids for cleaning.
  - Note the manufacturer's guidelines for working with cleaning materials.

**⚠ CAUTION**

Abrasive cleaning materials can damage component surfaces!

Using abrasive cleaning materials that are unsuitable for plastics may dissolve plastic parts or make them brittle. The screen on the display operating unit may become cloudy.

- Adhere strictly to the following steps.
-

## Cleaning the truck

- Only clean plastic parts with plastic cleaning materials.
- Note the manufacturer's guidelines for working with cleaning materials.

## Washing the truck exterior

- Clean the truck exterior with water-soluble cleaning materials and water (water jet, sponge, cloth).
- Clean all walk-in areas, the oil filling openings and their surroundings, and the lubricating nipples before lubricating.



### NOTE

*Please note: The more often the truck is cleaned, the more frequently it must be lubricated.*

## Cleaning the electrical system

### ⚠ WARNING

Danger of electric shocks due to residual capacity!

- Never reach into the electrical system with your bare hands.



### ⚠ CAUTION

Cleaning electrical system parts with water can damage the electrical system.

Cleaning electrical system parts with water is forbidden!

- Do not remove covers etc.
- Only use dry cleaning materials according to the specifications in the section "Cleaning the truck".

The components of the electrical system are fitted underneath the cover sheet of the counterweight etc.

- Clean the electrical system parts with a metal-free brush and blow the dust off with low-pressure compressed air.

## Cleaning load chains

### ▲ WARNING

Risk of accident!

Load chains are safety elements.

The use of cold/chemical cleaners or fluids that are corrosive or contain acid or chlorine can damage the chains and is forbidden!

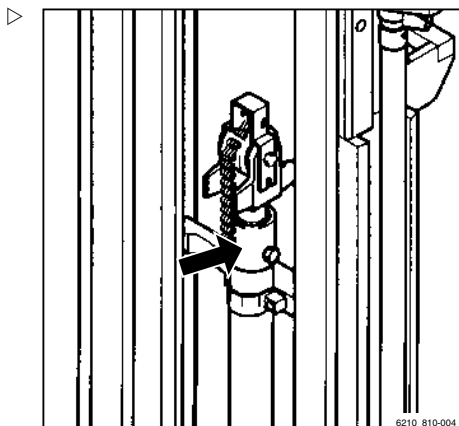
- Observe the manufacturer's guidelines for working with cleaning materials.
- 
- Place a collection vessel under the lift mast.
  - Clean with paraffin derivatives, such as benzene.
  - When using a steam jet, do not use additional cleaning agents.
  - Remove any water in the chain links using compressed air immediately after cleaning. Move the chain several times during this procedure.
  - Immediately after drying the chain, spray it with chain spray. Move the chain several times during this procedure.

For chain spray specifications, see the "Maintenance data table" chapter.



### ENVIRONMENT NOTE

*Dispose of any fluid that has been spilled or collected in the collection vessel in an environmentally friendly manner. Follow the statutory regulations.*



## Cleaning the truck

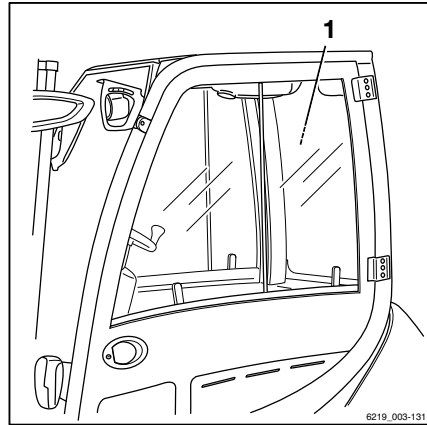
### Cleaning the windows

Any glass, for example cab windows (variant), must always be kept clean and free of ice. This is the only means of guaranteeing good visibility.

#### ⚠ CAUTION

Do not damage the rear window heating (inside).

- Take great care when cleaning the rear window (1) and do not use any objects with sharp edges.
- 
- Clean the windows with a soft cloth and commercial window cleaner.



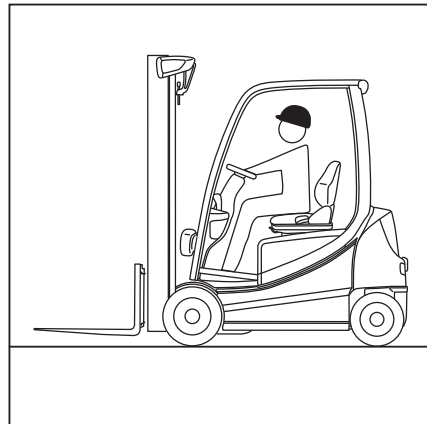
### After washing

- Carefully dry the truck (e.g. with compressed air).
- Sit on the driver's seat and use the truck in accordance with the regulations.

#### ⚠ CAUTION

Risk of short circuit!

- If moisture has penetrated the electrical system despite the precautionary measures having been taken, first dry the motors using compressed air.
- Then use the truck to prevent corrosion damage.



# Transporting the truck

## Transport

**⚠ CAUTION**

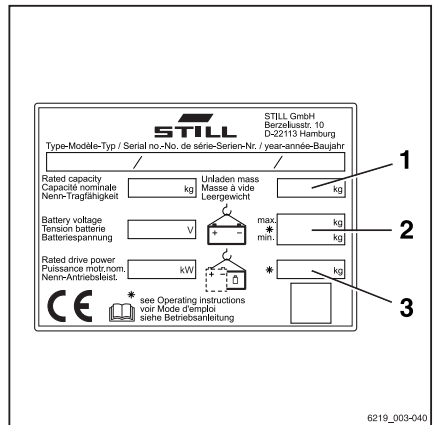
Risk of material damage from overloading!  
 If the truck is driven onto a means of transport, the load capacity of the means of transport, ramps and loading bridges must be greater than the total actual weight of the truck. Components can be permanently deformed or damaged due to overloading.

- Determine the total actual weight of the truck.
- Only load the truck if the load capacity/lifting capacity of the means of transport, ramps and loading bridges is greater than the total actual weight of the truck.

### Determining the total actual weight

- Park the truck safely.
- Determine the unit weights by reading the truck nameplate and, if necessary, the attachment nameplate (variant).
- Add together the determined individual weights to obtain the total actual weight of the truck:

- Tare weight (1)
- + Max. permissible battery weight (2)
- + Ballast weight (variant) (3)
- + Net weight of attachment (variant)
- + 100 kg allowance for driver
- = Total actual weight



## Transporting the truck

### **⚠ DANGER**

#### **Risk of accident from the truck falling!**

Steering movements can cause the rear of the truck to veer off the loading bridge towards the edge. This may cause the truck to crash.

- Before driving across a loading bridge, ensure that the loading bridge is properly attached and secured.
- Ensure that the transport vehicle onto which the truck is to be driven has been sufficiently secured against moving.
- Maintain a safe distance from edges, loading bridges, ramps, working platforms etc.
- Drive slowly and carefully onto the transport vehicle.

### **Wedging the wheels**

- Secure the truck from rolling away by placing a wedge (1) in front of each front wheel and behind each back wheel.
- Park the truck securely.

### **⚠ CAUTION**

Risk of component damage!

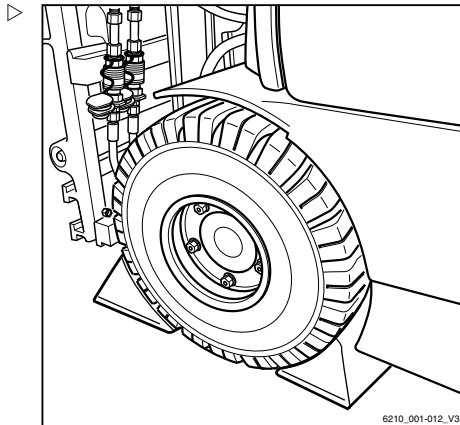
If you remove the battery male connector when the key switch is switched on (under load), an arc will be produced. This can lead to erosion at the contacts, which considerably shortens their service life.

- Switch off the key switch before disconnecting the battery male connector.
- Do not disconnect the battery male connector while the key switch is switched on, except in an emergency.

- Ensure that the key switch is switched off.
- Disconnect the battery male connector.

### **i NOTE**

*If the electric parking brake (variant) cannot be triggered electrically, it must be applied manually; see the section entitled "Manual operation of the electric parking brake".*



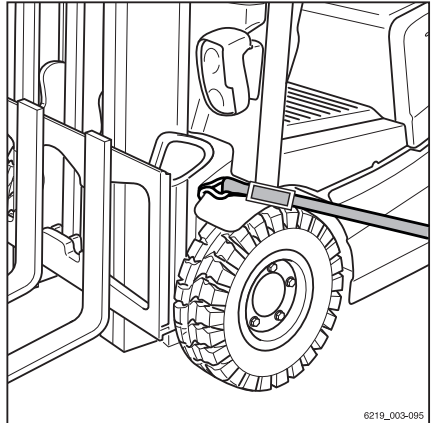
## Lashing down

### ⚠ CAUTION

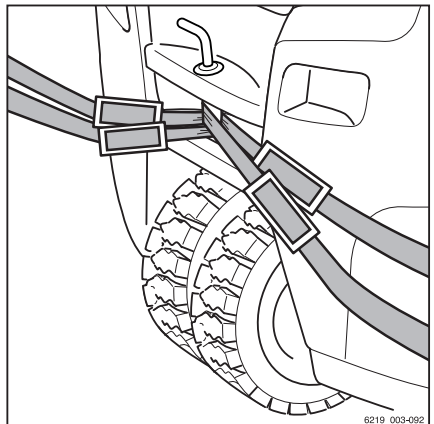
Abrasive lashing straps/tension belts can rub against the surface of the truck and cause damage.

- Position slip-resistant pads underneath the lifting points (such as rubber mats or foam).

- Hook the lashing straps/tension belts onto both sides of the curves in the mudguard and lash the truck towards the rear.



- Position the lashing straps/tension belts for the coupling pin around the coupling pin as shown and lash the truck at an angle towards the front.



### ⚠ DANGER

**The load may slip if the lashing straps/tension belts slip!**

The truck must be lashed securely so that it cannot move during transportation.

- Make sure that the lashing straps/tension belts are tightened securely and that the pads cannot slip off.

## Crane loading

Crane loading is only intended for transporting the complete truck, including the lift mast, for its initial commissioning. This may be performed only by the authorised service

## Standstill

centre with the harnesses expressly provided and approved for this purpose.

- Do not load the truck by crane!

## Standstill

### Decommissioning and storing the truck

#### CAUTION

Component damage due to incorrect storage!

Improper storage or decommissioning for a period of more than two months can result in corrosion damage to the truck. If the truck is parked in an ambient temperature of below -10°C for an extended period, the batteries will cool down. The electrolyte may freeze and damage the batteries.

- Store the truck in a dry, clean, frost-free and well-ventilated environment.
- Implement the following measures before decommissioning.

### Measures to be implemented before decommissioning

- Clean the truck thoroughly, see the chapter entitled "Cleaning the truck".
- Lift the fork carriage to the stop several times.
- Tilt the lift mast forwards and backwards several times and, if fitted, move the attachment repeatedly.
- To relieve the strain on the load chains, lower the fork onto a suitable supporting surface, e.g. a pallet.
- Check the hydraulic oil level. Top the oil up if necessary.
- Apply a thin layer of oil or grease to all uncoated moving parts.
- Lubricate the truck.
- Lubricate the joints and controls.



**⚠ CAUTION**

Risk of component damage!

If you remove the battery male connector when the key switch is switched on (under load), an arc will be produced. This can lead to erosion at the contacts, which considerably shortens their service life.

- Switch off the key switch before disconnecting the battery male connector.
  - Do not disconnect the battery male connector while the key switch is switched on, except in an emergency.
- 
- Disconnect the battery male connector.
  - Check the battery condition, acid level and acid density.
  - Service the battery.

**NOTE**

*Only store batteries that are fully charged.*

- Spray all exposed electrical contacts with a suitable contact spray.

**⚠ CAUTION**

Tyre deformation as a result of continuous loading on one side!

Have the truck raised and jacked up by the authorised service centre so that all wheels are off the ground. This prevents permanent deformation of the tyres.

- Only have the truck raised and jacked up by the authorised service centre.

**⚠ CAUTION**

Risk of corrosion damage due to condensation on the truck!

Many plastic films and synthetic materials are watertight. Condensation water on the truck cannot escape through these covers.

- **Do not** use plastic film as this facilitates the formation of condensation water.
  - Cover with vapour-permeable material, e.g. cotton.
- 
- Cover the truck to protect it from dust.
  - If the truck is to be shut down for even longer periods, contact the authorised service centre to find out about additional measures.

## Standstill

### Use after storage or decommissioning

If the truck has been decommissioned for longer than six months, it must be carefully checked before being re-commissioned. As with the annual safety inspection, this check should also include all safety-related aspects of the truck.

- Clean the truck thoroughly, see the chapter entitled "Cleaning the truck".
- Lubricate the joints and controls.
- Check the battery condition, acid level and acid density.
- Check the hydraulic oil for condensation water. Change the hydraulic oil if necessary.
- Carry out the checks and tasks that are to be performed before the first commissioning.
- Perform "visual inspections and function checking".

The following points must be checked in particular:

- Drive, controller, steering
- Brakes (service brake, parking brake)
- Lifting system (lifting accessories, load chains, mounting)



#### NOTE

*For further information, see the workshop manual for the truck or contact the authorised service centre.*

**5**

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## **Maintenance**

## Safety regulations for maintenance

# Safety regulations for maintenance

### General information

To prevent accidents during maintenance and repair work, all necessary safety measures must be taken, e.g.:

- Apply the parking brake.
- Turn off the key switch and remove the key.
- Disconnect the battery male connector.
- Ensure that the truck cannot move unintentionally or start up inadvertently.
- If required, have the truck jacked up by the authorised service centre.
- Have the raised fork carriage or the extended lift mast secured against accidental lowering by the authorised service centre.
- Insert an appropriately sized wooden beam as an abutment between the lift mast and the cab, and secure the lift mast to prevent it tilting backwards unintentionally.
- Observe the maximum lift height of the lift mast, and compare the dimensions from the technical data with the dimensions of the hall into which the truck is to be driven. These steps are taken to prevent a collision with the ceiling of the hall and to avoid any damage caused as a result.

### Working on the hydraulic equipment

The hydraulic system must be depressurised prior to all work on the system.

### Working on the electrical equipment

Work may only be performed on the electrical equipment of the truck when it is in a voltage-free state. Function checks, inspections and adjustments on energised parts must only be performed by trained and authorised persons, taking the necessary precautions into account. Rings, metal bracelets etc. must be removed before working on electric components.

To prevent damage to electronic systems with electronic components, such as an electronic driving regulator or lift control, these components must be removed from the truck prior to the start of electric welding.

Work on the electrical system (e.g. connecting a radio, additional headlights etc.) is only permitted with approval from the authorised service centre.

## Safety devices

After maintenance and repair work, all safety devices must be reinstalled and tested for operational reliability.

## Set values

The device-dependent set values must be observed when making repairs and when changing hydraulic and electrical components. These are listed in the appropriate sections.

## Lifting and jacking up

### DANGER

#### **There is a risk to life if the truck tips over!**

If not raised and jacked up properly, the truck may tip over and fall off. Only the hoists specified in the workshop manual for this truck are allowed and are tested for the necessary safety and load capacity.

- Only have the truck raised and jacked up by the authorised service centre.
- Only jack the truck up at the points specified in the workshop manual.

---

The truck must be raised and jacked up for various types of maintenance work. The authorised service centre must be informed that this is to take place. Safe handling of the truck and the corresponding hoists is described in the truck's workshop manual.

## Safety regulations for maintenance

### Working at the front of the truck

#### DANGER

##### **Risk of accident due to an unsecured lift mast.**

If the lift mast or fork carriage is raised, no work may be performed on the lift mast or at the front of the truck unless the appropriate safety measures are put in place.

- When securing, only use chains with sufficient load-bearing capacity.
  - Contact the authorised service centre regarding this matter.
- 

#### CAUTION

Possibility of damage to the ceiling!

- Note the maximum lift height of the lift mast.
- 

### Securing the lift mast against tilting backwards

#### DANGER

##### **Risk of accident!**

This work must only be performed by an authorised service technician.

- To secure the lift mast against tilting back, contact the authorised service centre.
- 

### Removing the lift mast

#### DANGER

##### **Risk of accident!**

This work must only be performed by an authorised service technician.

- Commission the authorised service centre to remove the lift mast.
- 

### Securing the lift mast against falling off

#### DANGER

##### **Risk of accident!**

This work must only be performed by an authorised service technician.

- To secure the lift mast against falling, contact the authorised service centre.
-

## General maintenance information

### Personnel qualifications

Only qualified and authorised personnel are allowed to perform maintenance work. Regular safety checks and checks after unusual incidents must be performed by a competent person. The competent person must conduct their evaluation and assessment from a safety standpoint, unaffected by operational and economic conditions. The competent person must have sufficient knowledge and experience to be able to assess the condition of a truck and the effectiveness of the protective devices in accordance with technical conventions and the principles for testing trucks.

### Maintenance personnel for batteries

Batteries may only be charged, serviced, and replaced by personnel who have received appropriate training in accordance with the instructions from the manufacturers of the battery, battery charger and truck.

- Follow the handling instructions for the battery and the operating instructions for the battery charger.

### Maintenance work without special qualifications

Simple maintenance work, such as checking the hydraulic oil level, may be carried out by untrained personnel. A qualification such as those held by a competent person is not required to carry out this work. The required tasks are described in the chapter entitled "Remaining ready for operation".


### Information for carrying out maintenance

This section contains all the information required to determine when the truck requires maintenance. Carry out maintenance work within the time limits according to the hour meter and using the maintenance check lists below. This is the only way to ensure that the truck remains ready for operation and provides

## General maintenance information

optimal performance and service life. It is also a precondition for any warranty claims.

### Maintenance timeframe

- Carry out maintenance work on the truck according to the "service display" .
- The maintenance check lists indicate the maintenance work that is due.

The intervals are defined for standard use. Shorter maintenance intervals can be defined in consultation with the operating company, depending on the application conditions of the truck.

The following factors may necessitate shorter maintenance intervals:

- Dirty, poor-quality roadways
- Dusty or salty air
- High levels of air humidity
- Extremely high or low ambient temperatures and extreme changes in temperature
- Multi-shift operation with a high duty cycle
- Specific national regulations for the truck or individual components



## Maintenance - 1000 hours/annually

At operating hours								Carried out			
1000		2000		4000		5000				7000	
8000		10000		11000		13000		14000		✓	*
<b>Chassis, bodywork and fittings</b>											
Check the chassis for cracks.											
Check the overhead guard/cab and panes of glass for damage.											
Check that the cab door sensor is working correctly and check for damage.											
Check the controls, switches and joints for damage, and apply grease and oil.											
Check that the driver's seat is working correctly and check for damage.											
Check that the driver restraint system is working correctly and check for damage, and clean.											
Check the signal horn.											
<b>Variant:</b> Check the dual-pedal variant for damage and that it is working correctly, and lubricate.											
<b>Tyres and wheels</b>											
Check tyres for wear and check the air pressure if necessary.											
Check the wheels for damage and check the tightening torques.											
<b>Power unit</b>											
Check the mounting of the drive axle, check for leaks and clean the cooling fins.											
Check that the conductor rails between the power modules and the motor connections are mounted correctly.											
Check the oil level in the drive wheel unit and the multi-disc brake.											
Change the gearbox oil (once after the first 1000 hours).											
<b>Steering</b>											
Check the steering system for leaks and check that it is working correctly.											
Check that the steering wheel is securely attached and check the rotary handle for damage.											
Check that the steering axle is securely mounted, check for leaks and apply grease.											
Check the steering stop.											
<b>Brakes</b>											
Check the condition of all mechanical brake parts and check that they are working correctly.											
Check the actuation distance of the foot brake and adjust if necessary.											
Check the manual force required to apply the handbrake and adjust if necessary.											

## General maintenance information

At operating hours								Carried out	
1000	2000	4000	5000	7000					
8000	10000	11000	13000	14000	✓	*			
<b>Variant:</b> Check the play between the fork clevis and the axle lever and adjust if necessary.									
Perform a brake test.									
<b>Electrical system</b>									
Check all power cable connections.									
Check that the switches, transmitters and sensors are working correctly.									
Check the lighting and indicator lights.									
<b>Cooling system (converter and drive axle)</b>									
Check that the fans and the air ducts are working correctly and check for damage.									
Clean the fans and the air ducts.									
Clean the cooling fins on the converter and the traction motors.									
<b>Battery and accessories</b>									
Check the lead-acid battery for damage and check the acid density; observe the manufacturer's maintenance instructions.									
<b>Variant:</b> Replace the non-return valve on lead-acid batteries with electrolyte circulation.									
<b>Variant:</b> Observe the manufacturer's maintenance instructions for lithium-ion batteries.									
Check the appliance plug and the truck harness for damage.									
Check the battery male connector and the battery harness for damage.									
<b>Battery compartment</b>									
Check that the battery door, and the sensor if necessary, is working correctly and check for damage.									
Check the battery lock for damage.									
Grease the battery door hinges.									
<b>Variant:</b> Check the oil level of the hydraulic battery carrier and check for leaks. Check all moving parts for wear and lubricate them.									
<b>Variant:</b> Clean the heat sink and the fan on the on-board charger. Check the filter for the electrolyte circulation pump.									
<b>Hydraulics</b>									
Check the condition of the hydraulic system, check that it is working correctly and check for leaks.									
Check the hydraulics blocking function (ISO valve).									
Check the oil level.									

At operating hours								Carried out			
1000		2000		4000		5000				7000	
8000		10000		11000		13000		14000		✓	*
<b>Lift mast</b>											
Check the mast bearings for damage. Lubricate the mast bearings and check the tightening torque.											
Check the mast profiles for damage and wear. Lubricate the mast profiles.											
Check the guide in the lower (load reversal) mast profile for damage and for wear.											
Check the load chains for damage and wear. Adjust and lubricate the load chains.											
Check the lift cylinders and connections for damage and for leaks.											
Check the guide pulleys for damage and for wear.											
Check the support rollers and chain rollers for damage and for wear.											
Check the play between the fork carriage stop and the run-out barrier.											
Check the tilt cylinders and connections for damage and for leaks.											
Check the fork carriage for damage and for wear.											
Check the fork arm interlock for damage and check that it is working correctly.											
Check the fork arms for wear and deformation.											
Check that there is a safety screw on the fork carriage or on the attachment.											
<b>Special equipment</b>											
Check the condition of the antistatic belt or antistatic electrode.											
Check that the heating system is working correctly; observe the manufacturer's maintenance instructions.											
Check the attachments for wear and for damage; observe the manufacturer's maintenance instructions.											
Check the trailer coupling for wear and for damage; observe the manufacturer's maintenance instructions.											
<b>General</b>											
Read out the error numbers and clear the list.											
Reset the maintenance interval.											
Check that the labelling is complete.											
Perform a test drive.											

## General maintenance information

## Maintenance - 3000 hours/every two years

At operating hours							Carried out			
3000		6000		9000		12000		15000	✓	*
<b>Note</b>										
Perform all 1000-hour maintenance work.										
<b>Power unit</b>										
Change the gearbox oil in the drive wheel unit.										
Replace the bleeder screws on the drive wheel units.										
<b>Hydraulics</b>										
Change the hydraulic oil.										
Replace the return line filter and the breather filter.										
<b>Variant:</b> Replace the high-pressure filter.										

## Ordering spare parts and wearing parts

Spare parts are provided by our spare parts service department. The information required for ordering parts can be found in the spare parts list.

Only use spare parts as per the manufacturer's instructions. The use of unapproved spare parts can result in an increased risk of accidents due to insufficient quality or incorrect assignment. Anyone using unapproved spare parts shall assume unlimited liability in the event of damage or harm.

## Quality and quantity of the required operating materials

Only the operating materials specified in the maintenance data table may be used.

- The required consumables and lubricants can be found in the maintenance data table.

Oil and grease types of a different quality must not be mixed. This negatively affects the lubricity. If a change between different

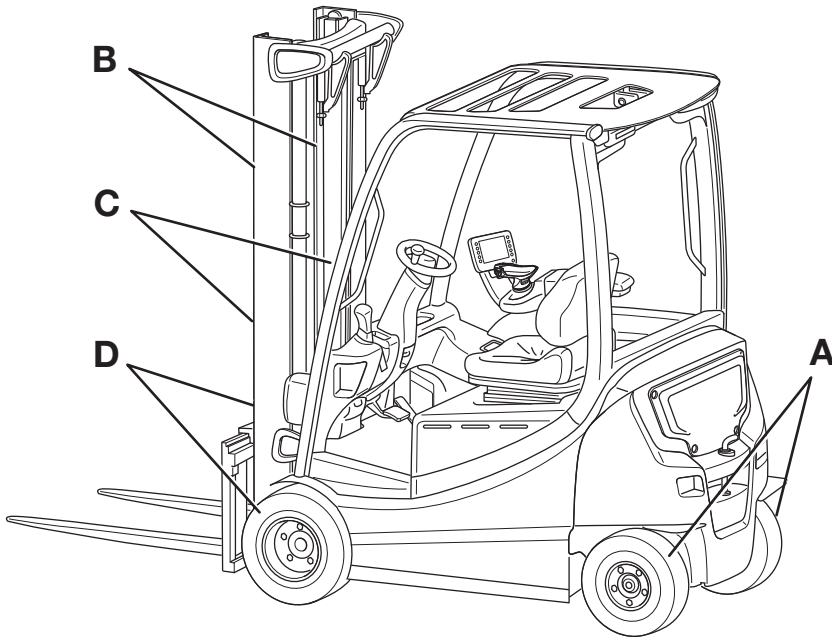
manufacturers cannot be avoided, drain the old oil thoroughly.

Before carrying out lubricating work, filter changes or any work on the hydraulic system, carefully clean the area around the part involved.

When topping up working materials, use only clean containers!

## General maintenance information

## Lubrication plan



Code <sup>1</sup>	Lubrication point
(A)	Swing axle: two lubricating nipples on each side of the steering axle on the steering arm Steering turntable: not present
(B)	Sliding surfaces on the lift mast
(C)	Load chains
(D)	One lubricating nipple on each of the two lift mast bearings
<sup>1</sup> The respective lubricant specification can be found in the "Maintenance data table" section below, under this Code. This lubrication plan describes the series-production truck with standard equipment. For maintenance points on variant trucks, see the relevant chapter and/or instructions provided by the manufacturer.	

## Maintenance data table

### General lubrication points

Code	Unit	Operating materials	Specifications	Quantity/value
	Lubrication	High-pressure grease	ID no. 0147873	As required

### Battery

Code	Unit	Operating materials	Specifications	Quantity/value
	System filling	Distilled water		As required
	Insulation resistance		DIN 43539 VDE 0510	For further information, refer to the workshop manual for the truck in question.

### Electrical system

Code	Unit	Operating materials	Specifications	Quantity/value
	Insulation resistance		DIN EN 1175 VDE 0117	For further information, refer to the workshop manual for the truck in question.

### Controls/joints

Code	Unit	Operating materials	Specifications	Quantity/value
	Lubrication	High-pressure grease	ID no. 0147873	As required
		Oil	SAE 80 MIL-L2105 API-GL4	As required
	Dual-pedal operation	High-pressure grease	ID no. 0147873	As required

## General maintenance information

## Hydraulic system

Code	Unit	Operating materials	Specifications	Quantity/value
	System filling	Hydraulic oil	HVLP 68 DIN 51524, Part 3	23 to 30 l Dependent on the lift mast and lift height
		Hydraulic oil for the food industry (variant)	USDA H1 DIN 51524	
		Hydraulic oil, low flammability	HFC/HFDU	
		Hydraulic oil, biological	HEES	
		Hydraulic oil for cold store application	HVLP 68 DIN 51524, Part 3	

## Hydraulic battery carrier

Code	Unit	Operating materials	Specifications	Quantity/value
	Catch rail	Multi-purpose oil, acid-free, resin-free	Rivolta TRS Plus ID no. 0149847	As required
	Slide elements and guide rails	High-pressure grease	ID no. 0147873	As required
	System filling	Hydraulic oil	HVLP 68 DIN 51524, Part 3	Have the battery carrier filled by the authorised service centre.

## Tyres

Code	Unit	Operating materials	Specifications	Quantity/value
	Superelastic tyres	Wear limit		To wear mark
	Solid rubber tyres	Wear limit		To wear mark
	Pneumatic tyres	Minimum tread depth		Air pressure: see information on truck Min. tread depth: 1.6 mm

## Steering axle

Code	Unit	Operating materials	Specifications	Quantity/value
(A)	Axle stub bearing, spherical bearing	High-pressure grease	ID no. 0147873	As required
	Wheel nuts	Torque wrench	Swing axle	195 Nm
			Steering axle	195 Nm



**Drive axle**

Code	Unit	Operating materials	Specifications	Quantity/value
	Wheel screws	Torque wrench		210 Nm
	Wheel gear	Gearbox oil	SAE 80W-90 API-GL4	0.3 l

**Lift mast**

Code	Unit	Operating materials	Specifications	Quantity/value
(B)	Lubrication	High-pressure grease	ID no. 0147873	As required
	Stop	Play		Min. 2 mm
(D)	Lift mast bearing	Grease	Aralub 4320 DIN 51825-KPF2N20 ID no. 0148659	Fill with grease until a small amount of fresh grease escapes
	Screws for the lift mast bearing	Torque wrench		310 Nm

**Load chains**

Code	Unit	Operating materials	Specifications	Quantity/value
(C)	Lubrication	High-load chain spray	Fully synthetic Temperature range: -35°C to +250°C ID no. 0156428	As required

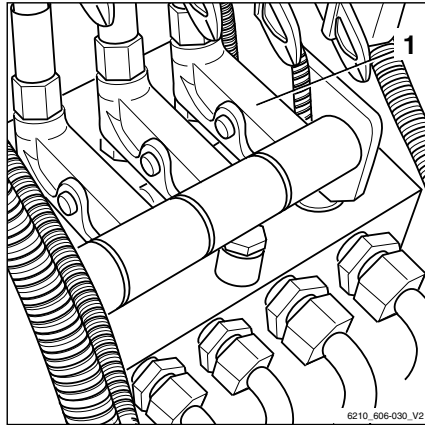
**Washer system**

Code	Unit	Operating materials	Specifications	Quantity/value
	System filling	Screen wash	Winter, ID no. 172566	As required

## Remaining ready for operation

**Remaining ready for operation****Lubricating the joints and controls** ▷

- Oil or grease bearings and joints according to the "maintenance data table".
- Driver's seat guide
- Cab door hinges (variant)
- Battery-door hinges or battery-cover hinges
- Actuating rod (1) for valves (with multi-lever operation)



## Checking the battery interlock and the battery door interlock

### **⚠ DANGER**

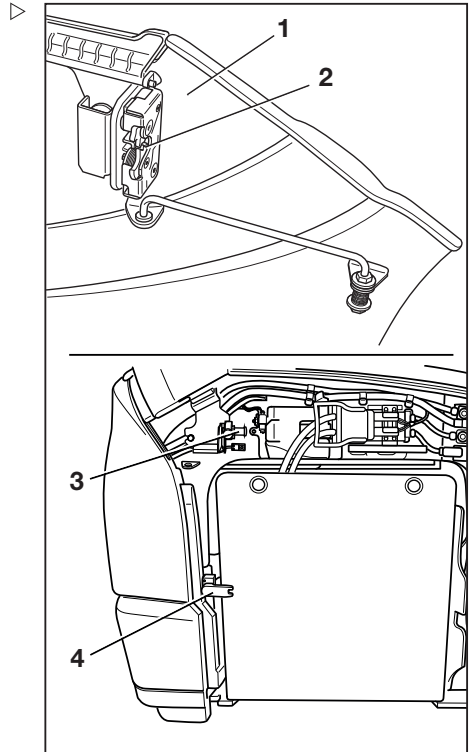
A malfunction of the battery interlock and the battery door interlock can cause the battery door to open and the battery could possibly fall out when the truck is tilted or during sharp deceleration. If the battery falls out, there is a danger of being crushed to death.

- If the interlock is deformed, damaged or difficult to move, inform the authorised service centre immediately. Do not operate the truck.
- Check that the interlocks function correctly.
- The interlocks must be greased and must move easily.
- Always check the interlock after an accident.

### **i NOTE**

*The interval for greasing is influenced significantly by the application conditions and the environmental conditions affecting the truck. Visual inspections and function checking of the interlock must be carried out as required and after every 1000 hours. Grease all moving parts of the interlock as necessary.*

- Open the battery door (1).
- Check that the door lock (2) and the battery lock (4) move easily and that they are not deformed or damaged.
- Check that the indexing bolt (3) on the door lock is seated correctly and that it is not deformed or damaged.
- Grease the mechanisms of the interlocks.
- Close the battery door again.



## Remaining ready for operation

## Maintaining the seat belt

**⚠ DANGER**

**There is a risk to life if the seat belt fails during an accident!**

If the seat belt is faulty, it may tear or open during an accident and no longer keep the driver in the driver's seat. The driver may therefore be hurled against the truck components or out of the truck.

- Ensure operational reliability by continually testing.
- Do not use a truck with a defective seat belt.
- Only have a defective belt replaced by your service centre.
- Only use genuine spare parts.
- Do not make any changes to the belt.

**i NOTE**

*Carry out the following checks on a regular basis (monthly). In the case of significant strain, a daily check is necessary.*

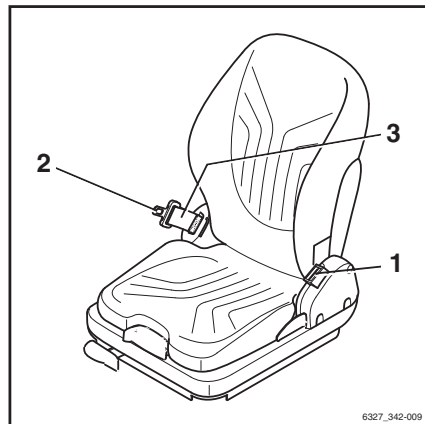
## Checking the seat belt

- Pull out the belt (3) completely and check for wear. ▷

The belt must not be frayed or cut. The stitching must not be loose.

- Check whether the belt is dirty.
- Check whether parts are worn or damaged, including the attachment points.
- Check the buckle (1) to ensure that it locks in properly.

When the belt tongue (2) is inserted, the belt must be held securely.



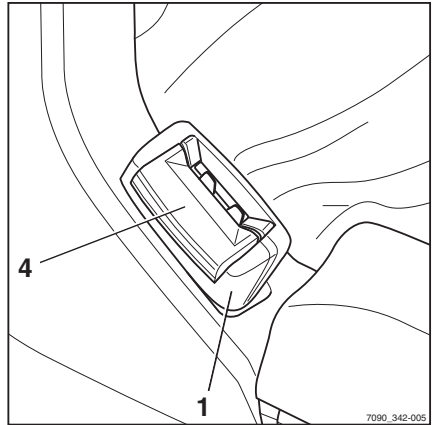
6327\_342-009

- The belt tongue (2) must release when the red button (4) is pressed.
- The automatic blocking mechanism must be tested at least once a year:
- Park the forklift truck on level ground.
- Pull out the belt with a jerk.

The automatic blocking mechanism must block extension of the belt.

- Tilt the seat at least 30 ° (if necessary, remove the seat).
- Slowly extend the belt.

The automatic blocking mechanism must block extension of the belt.



### Cleaning the seat belt

- Clean the seat belt as necessary, but without using chemical cleaning materials (a brush will suffice).

### Replacement after an accident

As a rule, the seat belt must be changed after an accident.

### Checking the driver's seat

#### **⚠ WARNING**

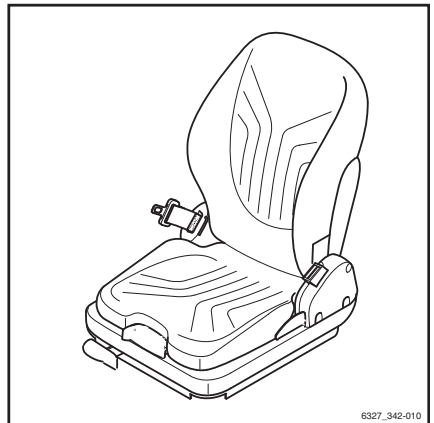
Risk of injury!

- After an accident, check the driver's seat with attached restraining belt and fastening.
- Check the controls for correct operation.
- Check the condition of the seat (e.g. wear on the upholstery) and secure fastening to the hood.

#### **⚠ WARNING**

Risk of injury!

- Have the seat repaired by the service centre if you identify any damage during the checks.



## Remaining ready for operation

### Servicing wheels and tyres

#### WARNING

Risk of accident!

Uneven wear reduces the stability of the truck and increases the braking distance.

- Change worn or damaged tyres without delay.

#### WARNING

Risk of tipping!

Tyre quality affects the stability of the truck.

If you wish to use a different type of tyre on the truck from the tyres approved by the truck manufacturer, or tyres from a different manufacturer, you must first obtain approval from the truck manufacturer.

#### WARNING

Risk to stability!

When using pneumatic tyres or solid rubber tyres, rim wheel parts must never be changed and rim wheel parts from different manufacturers must not be mixed.

### Checking the condition and wear of the tyres

#### WARNING

Tyre quality affects the stability and handling of the truck.

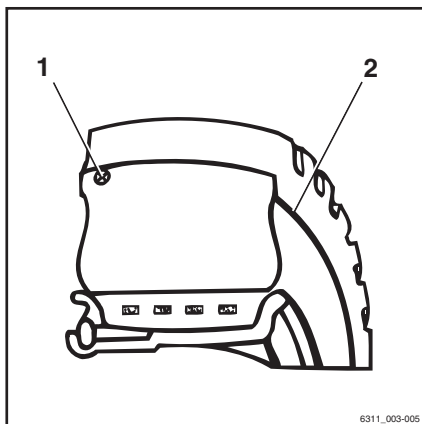
Changes must only be made following consultation with the manufacturer.

When changing wheels or tyres, ensure that this does not cause the truck to tilt to one side (e.g. always replace right-hand and left-hand wheels at the same time).

- If necessary, remove any foreign bodies (1) ▷ embedded in the tyre tread.

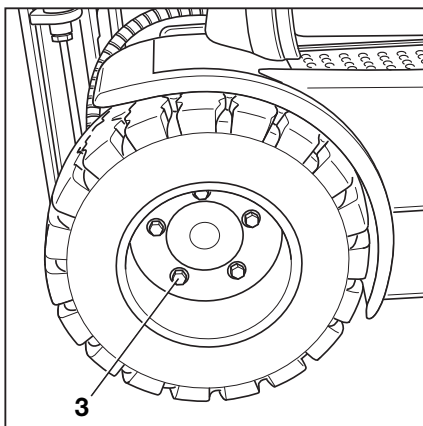
### NOTE

*The level of wear exhibited by tyres on the same axle must be approximately the same. Superelastic tyres and solid rubber tyres can be worn down to the wear mark (2).*



### Checking wheel fastenings

- Check that the wheel-fastening screws (3) of the drive axle and the wheel-fastening nuts of the steering axle are securely in place and re-tighten as necessary.
- Observe the torques specified in the "maintenance data table".



### Servicing the steering axle

- Park the truck safely.

### Lubricate the steering axle

#### ENVIRONMENT NOTE

*Dispose of old grease and contaminated devices in accordance with the national regulations for the country in which the truck is being used.*

## Remaining ready for operation

The steering arms of the steering axle each have two lubricating nipples per side.

- Lubricate the lubricating nipples with grease in accordance with the "maintenance data table".

If, after a few strokes, there is no longer any old grease escaping, actuate the steering.

### WARNING

Risk of crushing!

Do not actuate the steering during lubrication.

- Switch on the truck.
- Actuate the steering.
- Park the truck safely again.
- Repeat the lubrication procedure.

### NOTE

*Please note: the more often the truck is cleaned, the more frequently it must be lubricated.*

## Checking the battery

- For information on checking the battery, see the chapter entitled "Checking the battery condition, acid level and acid density".

## Replacing the fuses



### DANGER

#### **Danger from electrical current!**

High voltages are present in the fuse box. There is a risk of electric shock.

- **Do not** open the fuse box.
- The fuses must be replaced only by the authorised service centre.

## Checking the hydraulic oil level

- Park the truck securely.



**⚠ CAUTION**

Risk of component damage!

If you remove the battery male connector when the key switch is switched on (under load), an arc will be produced. This can lead to erosion at the contacts, which considerably shortens their service life.

- Switch off the key switch before the battery male connector is disconnected.
- Only disconnect the battery male connector with the key switch switched on in an emergency.

- Disconnect the battery male connector.
- Remove maintenance lid or bottom plate.

**⚠ CAUTION**

Hydraulic oils are hazardous to your health and are under pressure during operation.

- Note the safety regulations in the "Hydraulic fluid" chapter.

**⚠ CAUTION**

Risk of damage to components!

Remove connector for drive unit.

- Unscrew breather filter (1).
- Check the oil level on the oil dipstick. The oil level must be between the markings (2).
- If the oil level is too low, pour hydraulic oil of the correct specification as specified in the maintenance data table into the filler neck.
- Fill the hydraulic oil no higher than the upper marking on the oil dipstick.

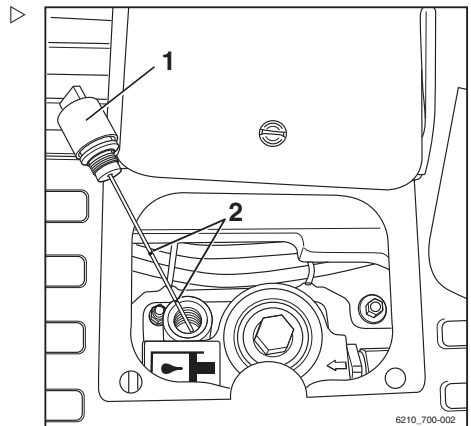
**i NOTE**

Use a funnel.

**♻ ENVIRONMENT NOTE**

Carefully collect up any spilled oil and dispose of it in an environmentally friendly manner.

- Screw in the breather filter with oil dipstick.
- Close maintenance lid or bottom plate.
- Connect the battery male connector.



## Remaining ready for operation

**Checking the hydraulic system for leaks****⚠ WARNING**

Hydraulic oil under pressure can escape from leaking lines and cause injuries to the skin.

Wear suitable protective gloves, industrial goggles etc.

**⚠ WARNING**

Hydraulic hoses become brittle!

Hydraulic hoses should not be used longer than 6 years.

The specifications of BGR 237 should be complied with. Deviating national laws are to be taken into account.

- Check pipe and hose connection screw joints for leaks (traces of oil).

Hose lines must be changed if:

- The outer layer has been breached or becomes brittle with tears
- They are leaking
- There are unnatural deformations (e.g. bubble formation or buckling)
- A fitting is detached from the hose
- A fitting is badly damaged or corroded

Pipes must be changed if:

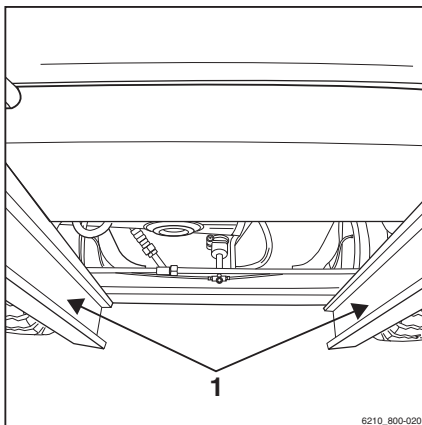
- There is abrasion with the loss of material
- There are unnatural deformations and detectable bending stress
- They are leaking

### Lubricating the lift mast and roller track

- Remove dirt and lubricant residue from the roller track.
- Lubricate the roller tracks (1) of the outside, middle, and inside mast with a super-pressure adhesion lubricant to reduce wear. See ⇒ Chapter "Maintenance data table", P. 5-331.

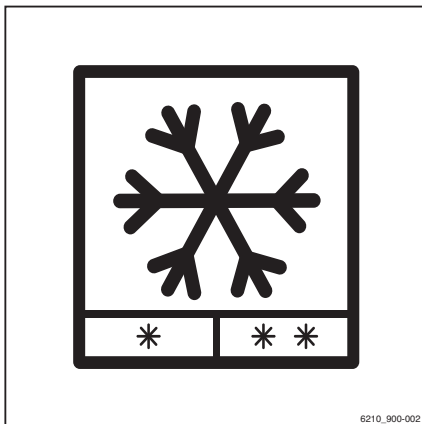
#### NOTE

*Spray the roller track evenly from a distance of approx. 15-20 cm. Wait approx. 15 minutes until the equipment is ready to use again.*



### Maintenance for trucks used in cold stores

- On trucks used in cold stores (variant), check all rollers and chains in the lift mast for ease of movement once a week.





## 1000-hour maintenance/annual maintenance

### Other tasks

- Perform all tasks required to maintain full operability; see the chapter entitled "Remaining ready for operation".

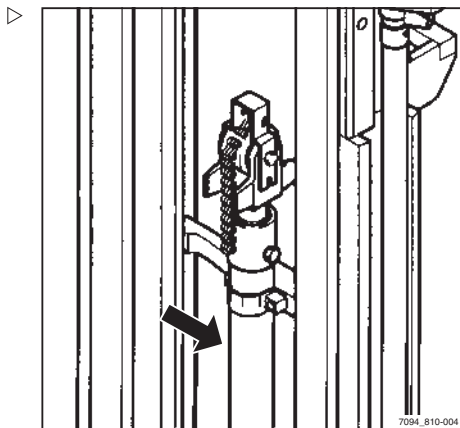
### Checking the lift cylinders and connections for leaks

#### **⚠ WARNING**

Risk of injury

Observe safety regulations for working on the lift mast, see the "Working at the front of the truck" chapter.

- Check the hydraulic connections and lift cylinder for leaks (visual inspection).
- Have leaking screw joints or leaking hydraulic cylinders repaired by the authorised service centre.



## 1000-hour maintenance/annual maintenance

**Checking the fork arms**

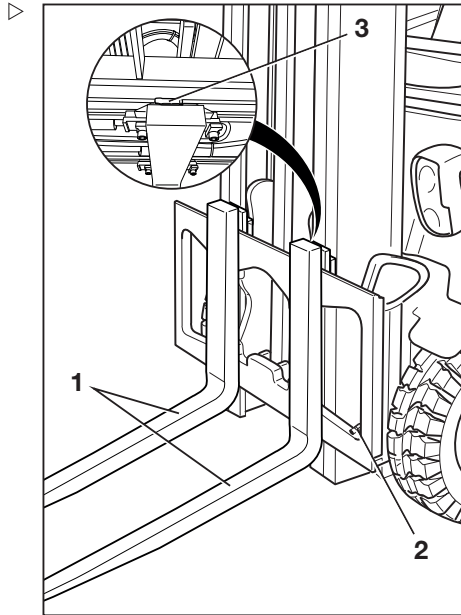
- Check the fork arms (1) for any visible deformation. Wear must not amount to more than 10% of the original thickness.

**⚠ CAUTION**

Risk of component damage!

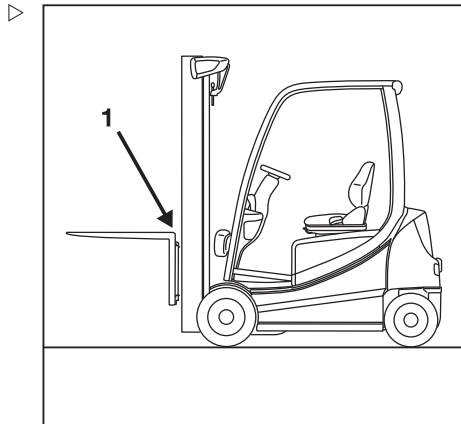
Always replace worn fork arms in pairs.

- Check that the fork latch (3) is functioning correctly.
- Make sure that the locking screw (2) is present and cannot fall out.

**Checking the reversible fork arms****i NOTE**

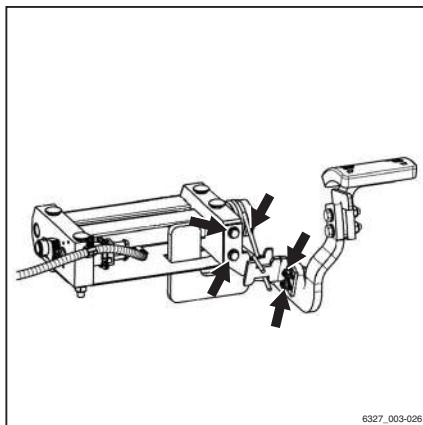
*This check is only required for reversible fork arms (variant).*

- Check the outside of the fork bend (1) for cracks. Contact your service centre.



### Checking the double pedal

- Remove the floorplate.
- Check that the support and springs of the double pedal mechanism are securely positioned.
- Check that all screws are sealed with locking varnish.



### Checking the battery changeover frame

- The screw joints and welded seams of the battery changeover frame must be subjected to a visual inspection.





6

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## Technical data

## Ergonomic dimensions

## Ergonomic dimensions

**⚠ WARNING**

Danger of impact injuries to the head!

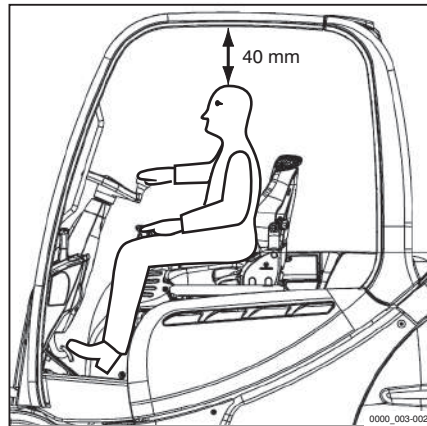
If the head of the operator is located too close to the underside of the roof, the suspension of the driver's seat or an accident may cause the head to strike the overhead guard.

To avoid head injuries, a minimum distance of **40 mm** must be ensured between the underside of the roof and the head of the tallest operator.

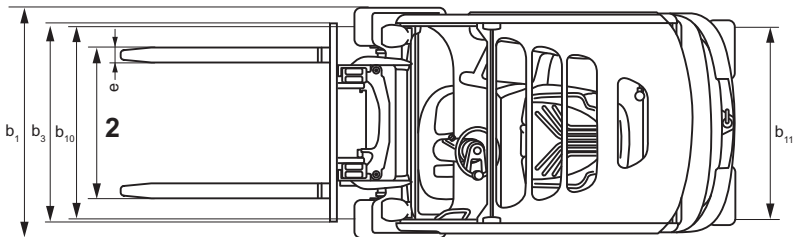
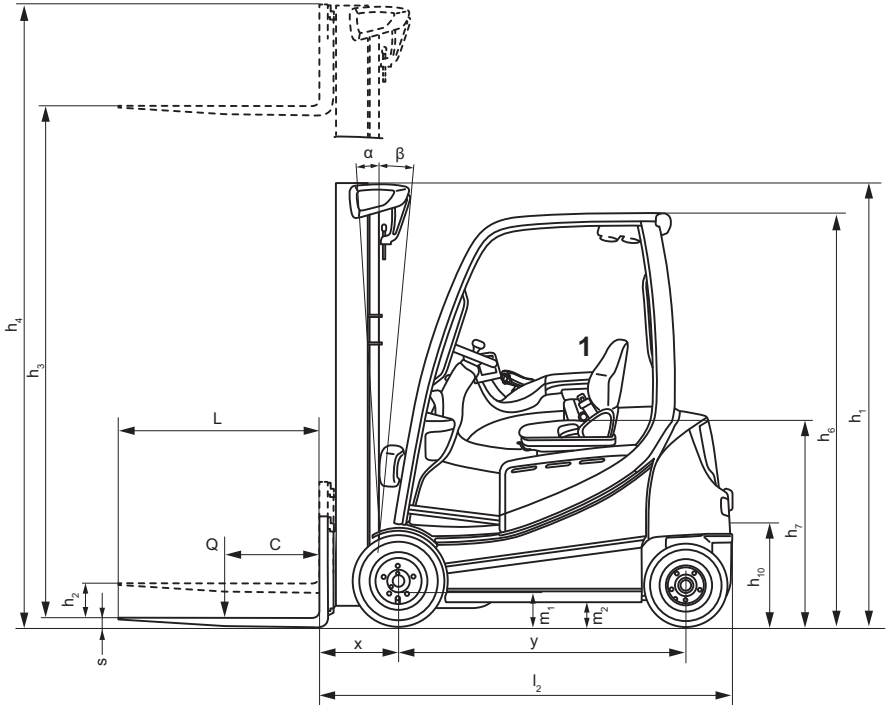
To determine the actual head clearance, the operator must sit in the driver's seat and the seat suspension must be set to this driver's requirements.

Due to the individual nature of height and body weight as well as the wide variety of types of driver's seat and overhead guard, the minimum head clearance must be ensured in every truck.

The driver's compartment has been designed taking ergonomics in the workplace into account and in accordance with EN ISO 3411. In general, from the seat position, the operator has sufficient space to reach the operating devices safely, to operate the truck and to view the outline of the truck. Operators whose body size deviates from the specified dimensions on which EN ISO 3411 is based must be individually considered by the operating company.



# Dimensions



1 Seat is adjustable  $\pm 90$  mm

2 Fork spacing is adjustable

## Dimensions



### NOTE

*Measurements  $h_1$ ,  $h_3$ ,  $h_4$ ,  $h_6$  and  $b_1$  are customised and can be taken from the order confirmation.*

## VDI datasheet: RX20-14C with steering turntable

### NOTE

*This VDI datasheet specifies only the technical values of the truck version with standard equipment. Different tyres, lift masts, additional units etc. may produce different values.*

### Key data

<b>Model</b>		<b>RX20-14C</b>
<b>Type number</b>		<b>6219</b>
Manufacturer		STILL GmbH
Drive		Electric
Operation		Seated
Rated capacity/load	Q (kg)	1400
Load centre of gravity distance	c (mm)	500
Load distance	x (mm)	374
Wheelbase	y (mm)	1319

### Weights

<b>Model</b>		<b>RX20-14C</b>
<b>Type number</b>		<b>6219</b>
Net weight	kg	2926
Front axle load, laden	kg	3826
Rear axle load, laden	kg	500
Front axle load, unladen	kg	1498
Rear axle load, unladen	kg	1428

### Wheels, chassis frame

<b>Model</b>		<b>RX20-14C</b>
<b>Type number</b>		<b>6219</b>
Tyres		Superelastic
Front tyre size		180/70-8

## VDI datasheet: RX20-14C with steering turntable

Model		RX20-14C
Type number		6219
Rear tyre size		125/75-8
Number of front wheels (x = driven)		2x
Number of rear wheels (x = driven)		2
Front track width	b <sub>10</sub> (mm)	932
Rear track width	b <sub>11</sub> (mm)	168

## Basic dimensions

Model		RX20-14C
Type number		6219
Tilt of lift mast/fork carriage, forwards	$\alpha$ (degrees)	5
Tilt of lift mast/fork carriage, backwards	$\beta$ (degrees)	6
Height with lift mast retracted	h <sub>1</sub> (mm)	2160
Free lift	h <sub>2</sub> (mm)	150
Lift	h <sub>3</sub> (mm)	3180
Height with lift mast extended	h <sub>4</sub> (mm)	3742
Height above overhead guard (cab)	h <sub>6</sub> (mm)	2035 (1949)
Seat height/standing height	h <sub>7</sub> (mm)	965
Coupling height	h <sub>10</sub> (mm)	473
Overall length	l <sub>1</sub> (mm)	2661
Length including fork back	l <sub>2</sub> (mm)	1861
Overall width	b <sub>1</sub> (mm)	1099
Fork arm thickness	s (mm)	40
Fork arm width	e (mm)	80
Fork arm length	l (mm)	800
Fork carriage	Standard; class; form	ISO 2328 II A
Fork carriage width	b <sub>3</sub> (mm)	980
Ground clearance with load below lift mast	m <sub>1</sub> (mm)	≥ 90
Ground clearance at the middle of the wheelbase	m <sub>2</sub> (mm)	114

Model		RX20-14C
Type number		6219
Aisle width for pallet 1000 x 1200 crosswise	A <sub>st</sub> (mm)	3186
Aisle width for pallet 800 x 1200 longitudinal	A <sub>st</sub> (mm)	3311
Turning radius	W <sub>a</sub> (mm)	1487
Smallest pivot point distance	b <sub>13</sub> (mm)	—

Performance data

Model		RX20-14C
Type number		6219
Driving speed with load (Blue-Q/STILL Classic/sprint mode)	km/h	16/16/20
Driving speed without load (Blue-Q/STILL Classic/sprint mode)	km/h	16/16/20
Lifting speed with load (Blue-Q/STILL Classic/sprint mode)	m/s	0.54
Lifting speed without load (Blue-Q/STILL Classic/sprint mode)	m/s	0.75
Lowering speed with load	m/s	0.5
Lowering speed without load	m/s	0.5
Pulling force with load	N	5100
Pulling force without load	N	5100
Max. pulling force with load	N	12300
Max. pulling force without load	N	7700
Climbing capability with load	%	20.4
Climbing capability without load	%	24
Max. climbing capability with load	%	30.3
Max. climbing capability without load	%	27.9
Acceleration time with load (Blue-Q/STILL Classic/sprint mode)	s	5.7/5.4/5.1
Acceleration time without load (Blue-Q/STILL Classic/sprint mode)	s	5.4/5.1/4.8
Service brake		Electr./mech.

## VDI datasheet: RX20-14C with steering turntable

**Ascending gradients**

The values specified in the "Performance data" table as the maximum climbing capability can be used only to compare the performance of forklift trucks in the same category. The specified values in no way represent the normal daily operating conditions.

**⚠ WARNING**

To use the truck safely – with or without a load – the maximum ascending or descending gradient permitted for travel is 15%.

- If you have any questions, contact your authorised service centre.

**Electric motor**

Model		RX20-14C
Type number		6219
Traction motor, power rating KB 60 min	kW	2x6.5
Lift motor, power rating at 20% ED	kW	11
Battery	Standard; circuit	DIN 43531 B
Battery voltage	U (V)	48
Battery capacity	K <sub>5</sub> (Ah)	625
Battery weight	kg	856

**Other**

Model		RX20-14C
Type number		6219
Working pressure for attachments	bar	160
Oil flow for attachments	l/min	30
Sound pressure level L <sub>pAZ</sub> (Driver's compartment)	dB (A)	< 66
Human vibration: acceleration according to EN 13059	m/s <sup>2</sup>	< 0.6
Tow coupling, DIN type/model		Bolt



## VDI datasheet: RX20-16 with steering turntable

### NOTE

*This VDI datasheet specifies only the technical values of the truck version with standard equipment. Different tyres, lift masts, additional units etc. may produce different values.*

### Key data

Model		RX20-16C	RX20-16	RX20-16L
Type number		6220	6221	6222
Manufacturer		STILL GmbH	STILL GmbH	STILL GmbH
Drive		Electric	Electric	Electric
Operation		Seated	Seated	Seated
Rated capacity/load	Q (kg)	1600	1600	1600
Load centre of gravity distance	c (mm)	500	500	500
Load distance	x (mm)	374	374	374
Wheelbase	y (mm)	1319	1409	1517

### Weights

Model		RX20-16C	RX20-16	RX20-16L
Type number		6220	6221	6222
Net weight	kg	3125	3057	3127
Front axle load, laden	kg	4160	4112	4133
Rear axle load, laden	kg	565	545	594
Front axle load, unladen	kg	1500	1520	1611
Rear axle load, unladen	kg	1625	1537	1516

### Wheels, chassis frame

Model		RX20-16C	RX20-16	RX20-16L
Type number		6220	6221	6222
Tyres		Superelastic	Superelastic	Superelastic
Front tyre size		180/70-8	180/70-8	180/70-8

## VDI datasheet: RX20-16 with steering turntable

Model		RX20-16C	RX20-16	RX20-16L
Type number		6220	6221	6222
Rear tyre size		125/75-8	125/75-8	125/75-8
Number of front wheels (x = driven)		2x	2x	2x
Number of rear wheels (x = driven)		2	2	2
Front track width	b <sub>10</sub> (mm)	932	932	932
Rear track width	b <sub>11</sub> (mm)	168	168	168

## Basic dimensions

Model		RX20-16C	RX20-16	RX20-16L
Type number		6220	6221	6222
Tilt of lift mast/fork carriage, forwards	α (degrees)	5	5	5
Tilt of lift mast/fork carriage, backwards	β (degrees)	6	6	6
Height with lift mast retracted	h <sub>1</sub> (mm)	2160	2160	2160
Free lift	h <sub>2</sub> (mm)	150	150	150
Lift	h <sub>3</sub> (mm)	3180	3180	3180
Height with lift mast extended	h <sub>4</sub> (mm)	3742	3742	3742
Height above overhead guard (cab)	h <sub>6</sub> (mm)	2035 (1949)	2035 (1949)	2035 (1949)
Seat height/standing height	h <sub>7</sub> (mm)	965	965	965
Coupling height	h <sub>10</sub> (mm)	473	473	473
Overall length	l <sub>1</sub> (mm)	2661	2744	2852
Length including fork back	l <sub>2</sub> (mm)	1861	1944	2052
Overall width	b <sub>1</sub> (mm)	1099	1099	1099
Fork arm thickness	s (mm)	40	40	40
Fork arm width	e (mm)	80	80	80
Fork arm length	l (mm)	800	800	800
Fork carriage	Standard; class; form	ISO 2328 II A	ISO 2328 II A	ISO 2328 II A
Fork carriage width	b <sub>3</sub> (mm)	980	980	980
Ground clearance with load below lift mast	m <sub>1</sub> (mm)	≥ 90	≥ 90	≥ 90
Ground clearance at the middle of the wheelbase	m <sub>2</sub> (mm)	114	114	114

Model		RX20-16C	RX20-16	RX20-16L
Type number		6220	6221	6222
Aisle width for pallet 1000 x 1200 crosswise	A <sub>st</sub> (mm)	3186	3269	3377
Aisle width for pallet 800 x 1200 longitudinal	A <sub>st</sub> (mm)	3311	3394	3502
Turning radius	W <sub>a</sub> (mm)	1487	1570	1678
Smallest pivot point distance	b <sub>13</sub> (mm)	—	—	—

Performance data

Model		RX20-16C	RX20-16	RX20-16L
Type number		6220	6221	6222
Driving speed with load (Blue-Q/STILL Classic/sprint mode)	km/h	16/16/20	16/16/20	16/16/20
Driving speed without load (Blue-Q/STILL Classic/sprint mode)	km/h	16/16/20	16/16/20	16/16/20
Lifting speed with load (Blue-Q/STILL Classic/sprint mode)	m/s	0.53	0.53	0.53
Lifting speed without load (Blue-Q/STILL Classic/sprint mode)	m/s	0.75	0.75	0.75
Lowering speed with load	m/s	0.51	0.51	0.51
Lowering speed without load	m/s	0.5	0.5	0.5
Pulling force with load	N	5100	5100	5100
Pulling force without load	N	5200	5200	5200
Max. pulling force with load	N	12300	12300	12300
Max. pulling force without load	N	7700	7900	8500
Climbing capability with load	%	18.6	18.6	18.6
Climbing capability without load	%	24	24	24
Max. climbing capability with load	%	27.6	28	27.4
Max. climbing capability without load	%	26	27.4	28.7
Acceleration time with load (Blue-Q/STILL Classic/sprint mode)	s	5.7/5.4/5.1	5.7/5.4/5.1	5.7/5.4/5.1
Acceleration time without load (Blue-Q/STILL Classic/sprint mode)	s	5.4/5.1/4.8	5.4/5.1/4.8	5.4/5.1/4.8
Service brake		Electr. / mech.	Electr. / mech.	Electr. / mech.

## VDI datasheet: RX20-16 with steering turntable

**Ascending gradients**

The values specified in the "Performance data" table as the maximum climbing capability can be used only to compare the performance of forklift trucks in the same category. The specified values in no way represent the normal daily operating conditions.

**⚠ WARNING**

To use the truck safely – with or without a load – the maximum ascending or descending gradient permitted for travel is 15%.

- If you have any questions, contact your authorised service centre.

**Electric motor**

Model		RX20-16C	RX20-16	RX20-16L
Type number		6220	6221	6222
Traction motor, power rating KB 60 min	kW	2x6.5	2x6.5	2x6.5
Lift motor, power rating at S3: 15%	kW	11	11	11
Battery	Standard; circuit	DIN 43531 B	DIN 43531 B	DIN 43531 B
Battery voltage	U (V)	48	48	48
Battery capacity	K <sub>5</sub> (Ah)	625	625	750
Battery weight	kg	856	855	1013

**Other**

Model		RX20-16C	RX20-16	RX20-16L
Type number		6220	6221	6222
Working pressure for attachments	bar	160	160	160
Oil flow for attachments	l/min	30	30	30
Sound pressure level L <sub>pAZ</sub> (Driver's compartment)	dB (A)	< 66	< 66	< 66
Human vibration: acceleration according to EN 13059	m/s <sup>2</sup>	< 0.6	< 0.6	< 0.6
Tow coupling, DIN type/model		Bolt	Bolt	Bolt

## VDI datasheet: RX20-18 and RX20-20 with steering turntable

### NOTE

*This VDI datasheet specifies only the technical values of the truck version with standard equipment. Different tyres, lift masts, additional units etc. may produce different values.*

### Key data

Model		RX20-18	RX20-18L	RX20-20L
Type number		6223	6224	6225
Manufacturer		STILL GmbH	STILL GmbH	STILL GmbH
Drive		Electric	Electric	Electric
Operation		Seated	Seated	Seated
Rated capacity/load	Q (kg)	1800	1800	2000
Load centre of gravity distance	c (mm)	500	500	500
Load distance	x (mm)	374	374	388
Wheelbase	y (mm)	1409	1517	1517

### Weights

Model		RX20-18	RX20-18L	RX20-20L
Type number		6223	6224	6225
Net weight	kg	3231	3419	3486
Axle load with front load	kg	4440	4450	4860
Axle load with rear load	kg	590	769	623
Axle load without front load	kg	1524	1612	1689
Axle load without rear load	kg	1707	1806	1794

## VDI datasheet: RX20-18 and RX20-20 with steering turntable

## Wheels, chassis frame

Model		RX20-18	RX20-18L	RX20-20L
Type number		6223	6224	6225
Tyres		Superelastic	Superelastic	Superelastic
Front tyre size		200/50-10	200/50-10	200/50-10
Rear tyre size		140/55-9	140/55-9	140/55-9
Number of front wheels (x = driven)		2x	2x	2x
Number of rear wheels (x = driven)		2	2	2
Front track width	b <sub>10</sub> (mm)	942	942	942
Rear track width	b <sub>11</sub> (mm)	172	172	172

## Basic dimensions

Model		RX20-18	RX20-18L	RX20-20L
Type number		6223	6224	6225
Tilt of lift mast/fork carriage, forwards	α (degrees)	5	5	5
Tilt of lift mast/fork carriage, backwards	β (degrees)	6	6	6
Height with lift mast retracted	h <sub>1</sub> (mm)	2160	2160	2160
Free lift	h <sub>2</sub> (mm)	150	150	150
Lift	h <sub>3</sub> (mm)	3180	3180	3180
Height with lift mast extended	h <sub>4</sub> (mm)	3742	3742	3742
Height above overhead guard (cab)	h <sub>6</sub> (mm)	2035 (1949)	2035 (1949)	2035 (1949)
Seat height/standing height	h <sub>7</sub> (mm)	965	965	965
Coupling height	h <sub>10</sub> (mm)	473	473	473
Overall length	l <sub>1</sub> (mm)	2744	2852	2866
Length including fork back	l <sub>2</sub> (mm)	1944	2052	2066
Overall width	b <sub>1</sub> (mm)	1149	1149	1149
Fork arm thickness	s (mm)	40	40	40
Fork arm width	e (mm)	80	80	80
Fork arm length	l (mm)	800	800	800
Fork carriage	Standard; class; form	ISO 2328 II A	ISO 2328 II A	ISO 2328 II A

VDI datasheet: RX20-18 and RX20-20 with steering turntable

Model		RX20-18	RX20-18L	RX20-20L
<b>Type number</b>		<b>6223</b>	<b>6224</b>	<b>6225</b>
Fork carriage width	b <sub>3</sub> (mm)	980	980	980
Ground clearance with load below lift mast	m <sub>1</sub> (mm)	≥ 90	≥ 90	≥ 90
Ground clearance at the centre of the wheelbase	m <sub>2</sub> (mm)	114	114	114
Aisle width for pallet 1000 x 1200 crosswise	A <sub>st</sub> (mm)	3269	3377	3390
Aisle width for pallet 800 x 1200 longitudinal	A <sub>st</sub> (mm)	3269	3377	3390
Turning radius	W <sub>a</sub> (mm)	1570	1678	1678
Smallest pivot point distance	b <sub>13</sub> (mm)	—	—	—

Performance data

Model		RX20-18	RX20-18L	RX20-20L
<b>Type number</b>		<b>6223</b>	<b>6224</b>	<b>6225</b>
Driving speed with load (Blue-Q/STILL Classic/sprint mode)	km/h	16/16/20	16/16/20	16/16/20
Driving speed without load (Blue-Q/STILL Classic/sprint mode)	km/h	16/16/20	16/16/20	16/16/20
Lifting speed with load (Blue-Q/STILL Classic/sprint mode)	m/s	0.52	0.52	0.45
Lifting speed without load (Blue-Q/STILL Classic/sprint mode)	m/s	0.75	0.75	0.63
Lowering speed with load	m/s	0.52	0.52	0.48
Lowering speed without load	m/s	0.5	0.5	0.41
Pulling force with load	N	4900	4800	4800
Pulling force without load	N	5100	5100	5000
Max. pulling force with load	N	12000	12000	11,900
Max. pulling force without load	N	7900	8500	8700
Climbing capability with load	%	18.6	18.6	15
Climbing capability without load	%	24	24	18.1
Max. climbing capability with load	%	25.1	25.3	23
Max. climbing capability without load	%	26	28.3	27
Acceleration time with load (Blue-Q/STILL Classic/sprint mode)	s	5.8/5.5/5.2	5.8/5.5/5.2	5.8/5.5/5.3

## VDI datasheet: RX20-18 and RX20-20 with steering turntable

Model		RX20-18	RX20-18L	RX20-20L
Type number		6223	6224	6225
Acceleration time without load (Blue-Q/STILL Classic/sprint mode)	s	5.4/5.1/4.8	5.4/5.1/4.8	5.4/5.1/4.8
Service brake		Electr. / Mech.	Electr. / Mech.	Electr. / Mech.

### Ascending gradients

The values specified in the "Performance data" table as the maximum climbing capability can be used only to compare the performance of forklift trucks in the same category. The specified values in no way represent the normal daily operating conditions.

#### **▲ WARNING**

To use the truck safely – with or without a load – the maximum ascending or descending gradient permitted for travel is 15%.

- If you have any questions, contact your authorised service centre.

### Electric motor

Model		RX20-18	RX20-18L	RX20-20L
Type number		6223	6224	6225
Traction motor, power rating KB 60 min	kW	2x6.5	2x6.5	2x6.5
Lift motor, power rating at S3: 15%	kW	11	11	11
Battery	Standard; circuit	DIN 43531 A (B)	DIN 43531 A	DIN 43531 A (B)
Battery voltage	U (V)	48	48	48
Battery capacity	K <sub>5</sub> (Ah)	625	750	750
Battery weight	kg	855	1013	1013

### Miscellaneous

Model		RX20-18	RX20-18L	RX20-20L
Type number		6223	6224	6225
Working pressure for attachments	bar	160	160	160
Oil flow for attachments	l/min	30	30	30



## VDI datasheet: RX20-18 and RX20-20 with steering turntable

Model		RX20-18	RX20-18L	RX20-20L
Type number		6223	6224	6225
Sound pressure level $L_{pAZ}$ (Driver's compartment)	dB (A)	< 66	< 66	< 66
Human vibration: acceleration according to EN 13059	$m/s^2$	< 0.6	< 0.6	< 0.6
Tow coupling, DIN type/model		Bolt	Bolt	Bolt

VDI datasheet: RX20-16 with swing axle

## VDI datasheet: RX20-16 with swing axle

### NOTE

*This VDI datasheet specifies only the technical values of the truck version with standard equipment. Different tyres, lift masts, additional units etc. may produce different values.*

### Key data

Model		RX20-16P	RX20-16PL
Type number		6226	6227
Manufacturer		STILL GmbH	STILL GmbH
Drive		Electric	Electric
Operation		Seated	Seated
Rated capacity/load	Q (kg)	1600	1600
Load centre of gravity distance	c (mm)	500	500
Load distance	x (mm)	374	374
Wheelbase	y (mm)	1429	1537

### Weights

Model		RX20-16P	RX20-16PL
Type number		6226	6227
Net weight	kg	3018	3178
Axle load with front load	kg	4098	4121
Axle load with rear load	kg	520	657
Axle load without front load	kg	1520	1612
Axle load without rear load	kg	1498	1567

### Wheels, chassis frame

Model		RX20-16P	RX20-16PL
Type number		6226	6227
Tyres		Superelastic	Superelastic
Front tyre size		180/70-8	180/70-8

Model		RX20-16P	RX20-16PL
Type number		6226	6227
Rear tyre size		150/75-8	150/75-8
Number of front wheels (x = driven)		2x	2x
Number of rear wheels (x = driven)		2	2
Front track width	b <sub>10</sub> (mm)	932	932
Rear track width	b <sub>11</sub> (mm)	807	807

### Basic dimensions

Model		RX20-16P	RX20-16PL
Type number		6226	6227
Tilt of lift mast/fork carriage, forwards	α (degrees)	5	5
Tilt of lift mast/fork carriage, backwards	β (degrees)	6	6
Height with lift mast retracted	h <sub>1</sub> (mm)	2160	2160
Free lift	h <sub>2</sub> (mm)	150	150
Lift	h <sub>3</sub> (mm)	3180	3180
Height with lift mast extended	h <sub>4</sub> (mm)	3742	3742
Height above overhead guard (cab)	h <sub>6</sub> (mm)	2035 (1949)	2035 (1949)
Seat height/standing height	h <sub>7</sub> (mm)	965	965
Coupling height	h <sub>10</sub> (mm)	537	537
Overall length	l <sub>1</sub> (mm)	2837	2945
Length including fork back	l <sub>2</sub> (mm)	2037	2145
Overall width	b <sub>1</sub> (mm)	1099	1099
Fork arm thickness	s (mm)	40	40
Fork arm width	e (mm)	80	80
Fork arm length	l (mm)	800	800
Fork carriage	Standard; class; form	ISO 2328 II A	ISO 2328 II A
Fork carriage width	b <sub>3</sub> (mm)	980	980
Ground clearance with load below lift mast	m <sub>1</sub> (mm)	≥ 90	≥ 90
Ground clearance at the centre of the wheelbase	m <sub>2</sub> (mm)	114	114

## VDI datasheet: RX20-16 with swing axle

Model		RX20-16P	RX20-16PL
Type number		6226	6227
Aisle width for pallet 1000 x 1200 crosswise	A <sub>st</sub> (mm)	3362	3470
Aisle width for pallet 800 x 1200 longitudinal	A <sub>st</sub> (mm)	3487	3595
Turning radius	W <sub>a</sub> (mm)	1663	1771
Smallest pivot point distance	b <sub>13</sub> (mm)	—	—

## Performance data

Model		RX20-16P	RX20-16PL
Type number		6226	6227
Driving speed with load (Blue-Q/STILL Classic/sprint mode)	km/h	16/16/20	16/16/20
Driving speed without load (Blue-Q/STILL Classic/sprint mode)	km/h	16/16/20	16/16/20
Lifting speed with load (Blue-Q/STILL Classic/sprint mode)	m/s	0.53	0.53
Lifting speed without load (Blue-Q/STILL Classic/sprint mode)	m/s	0.75	0.75
Lowering speed with load	m/s	0.51	0.51
Lowering speed without load	m/s	0.5	0.5
Pulling force with load	N	5000	5000
Pulling force without load	N	5100	5100
Max. pulling force with load	N	12300	12300
Max. pulling force without load	N	7900	8500
Climbing capability with load	%	18.6	18.6
Climbing capability without load	%	24	24
Max. climbing capability with load	%	27.8	27.6
Max. climbing capability without load	%	27.8	28.9
Acceleration time with load (Blue-Q/STILL Classic/sprint mode)	s	5.7/5.4/5.1	5.7/5.4/5.1
Acceleration time without load (Blue-Q/STILL Classic/sprint mode)	s	5.4/5.1/4.8	5.4/5.1/4.8
Service brake		Electr. / Mech.	Electr. / Mech.

### Ascending gradients

The values specified in the "Performance data" table as the maximum climbing capability can be used only to compare the performance of forklift trucks in the same category. The specified values in no way represent the normal daily operating conditions.

#### **⚠ WARNING**

To use the truck safely – with or without a load – the maximum ascending or descending gradient permitted for travel is 15%.

- If you have any questions, contact your authorised service centre.

### Electric motor

Model		RX20-16P	RX20-16PL
Type number		6226	6227
Traction motor, power rating KB 60 min	kW	2x6.5	2x6.5
Lift motor, power rating at S3: 15%	kW	11	11
Battery	Standard; circuit	DIN 43531 A (B)	DIN 43531 A
Battery voltage	U (V)	48	48
Battery capacity	K <sub>5</sub> (Ah)	625	750
Battery weight	kg	855	1013

### Miscellaneous

Model		RX20-16P	RX20-16PL
Type number		6226	6227
Working pressure for attachments	bar	160	160
Oil flow for attachments	l/min	30	30
Sound pressure level L <sub>pAZ</sub> (Driver's compartment)	dB (A)	< 66	< 66
Human vibration: acceleration according to EN 13059	m/s <sup>2</sup>	< 0.6	< 0.6
Tow coupling, DIN type/model		Bolt	Bolt

VDI datasheet: RX20-18 with swing axle

## VDI datasheet: RX20-18 with swing axle

### NOTE

*This VDI datasheet specifies only the technical values of the truck version with standard equipment. Different tyres, lift masts, additional units etc. may produce different values.*

### Key data

Model		RX20-18P	RX20-18PL
Type number		6228	6229
Manufacturer		STILL GmbH	STILL GmbH
Drive		Electric	Electric
Operation		Seated	Seated
Rated capacity/load	Q (kg)	1800	1800
Load centre of gravity distance	c (mm)	500	500
Load distance	x (mm)	374	374
Wheelbase	y (mm)	1429	1537

### Weights

Model		RX20-18P	RX20-18PL
Type number		6228	6229
Net weight	kg	3254	3178
Axle load with front load	kg	4439	4435
Axle load with rear load	kg	616	543
Axle load without front load	kg	1538	1612
Axle load without rear load	kg	1717	1567

### Wheels, chassis frame

Model		RX20-18P	RX20-18PL
Type number		6228	6229
Tyres		Superelastic	Superelastic
Front tyre size		200/50-10	200/50-10

Model		RX20-18P	RX20-18PL
Type number		6228	6229
Rear tyre size		150/75-8	150/75-8
Number of front wheels (x = driven)		2x	2x
Number of rear wheels (x = driven)		2	2
Front track width	b <sub>10</sub> (mm)	942	942
Rear track width	b <sub>11</sub> (mm)	807	807

### Basic dimensions

Model		RX20-18P	RX20-18PL
Type number		6228	6229
Tilt of lift mast/fork carriage, forwards	α (degrees)	5	5
Tilt of lift mast/fork carriage, backwards	β (degrees)	6	6
Height with lift mast retracted	h <sub>1</sub> (mm)	2160	2160
Free lift	h <sub>2</sub> (mm)	150	150
Lift	h <sub>3</sub> (mm)	3180	3180
Height with lift mast extended	h <sub>4</sub> (mm)	3742	3742
Height above overhead guard (cab)	h <sub>6</sub> (mm)	2035 (1949)	2035 (1949)
Seat height/standing height	h <sub>7</sub> (mm)	965	965
Coupling height	h <sub>10</sub> (mm)	537	537
Overall length	l <sub>1</sub> (mm)	2837	2945
Length including fork back	l <sub>2</sub> (mm)	2037	2145
Overall width	b <sub>1</sub> (mm)	1149	1149
Fork arm thickness	s (mm)	40	40
Fork arm width	e (mm)	80	80
Fork arm length	l (mm)	800	800
Fork carriage	Standard; class; form	ISO 2328 II A	ISO 2328 II A
Fork carriage width	b <sub>3</sub> (mm)	980	980
Ground clearance with load below lift mast	m <sub>1</sub> (mm)	≥ 90	≥ 90
Ground clearance at the centre of the wheelbase	m <sub>2</sub> (mm)	114	114

## VDI datasheet: RX20-18 with swing axle

Model		RX20-18P	RX20-18PL
Type number		6228	6229
Aisle width for pallet 1000 x 1200 crosswise	A <sub>st</sub> (mm)	3362	3470
Aisle width for pallet 800 x 1200 longitudinal	A <sub>st</sub> (mm)	3487	3595
Turning radius	W <sub>a</sub> (mm)	1663	1771
Smallest pivot point distance	b <sub>13</sub> (mm)	—	—

## Performance data

Model		RX20-18P	RX20-18PL
Type number		6228	6229
Driving speed with load (Blue-Q/STILL Classic/sprint mode)	km/h	16/16/20	16/16/20
Driving speed without load (Blue-Q/STILL Classic/sprint mode)	km/h	16/16/20	16/16/20
Lifting speed with load (Blue-Q/STILL Classic/sprint mode)	m/s	0.52	0.52
Lifting speed without load (Blue-Q/STILL Classic/sprint mode)	m/s	0.75	0.75
Lowering speed with load	m/s	0.52	0.52
Lowering speed without load	m/s	0.5	0.5
Pulling force with load	N	4800	4800
Pulling force without load	N	5000	5100
Max. pulling force with load	N	11,900	12000
Max. pulling force without load	N	8000	8500
Climbing capability with load	%	18.6	18.6
Climbing capability without load	%	24	24
Max. Climbing capability with load	%	24.8	25.4
Max. climbing capability without load	%	26	28.6
Acceleration time with load (Blue-Q/STILL Classic/sprint mode)	s	5.8/5.5/5.2	5.8/5.5/5.2
Acceleration time without load (Blue-Q/STILL Classic/sprint mode)	s	5.4/5.1/4.8	5.4/5.1/4.8
Service brake		Electr. / Mech.	Electr. / Mech.



### Ascending gradients

The values specified in the "Performance data" table as the maximum climbing capability can be used only to compare the performance of forklift trucks in the same category. The specified values in no way represent the normal daily operating conditions.

#### WARNING

To use the truck safely – with or without a load – the maximum ascending or descending gradient permitted for travel is 15%.

- If you have any questions, contact your authorised service centre.

### Electric motor

Model		RX20-18P	RX20-18PL
Type number		6228	6229
Traction motor, power rating KB 60 min	kW	2x6.5	2x6.5
Lift motor, power rating at S3: 15%	kW	11	11
Battery	Standard; circuit	DIN 43531 A (B)	DIN 43531 A
Battery voltage	U (V)	48	48
Battery capacity	K <sub>5</sub> (Ah)	625	750
Battery weight	kg	855	1013

### Miscellaneous

Model		RX20-18P	RX20-18PL
Type number		6228	6229
Working pressure for attachments	bar	160	160
Oil flow for attachments	l/min	30	30
Sound pressure level L <sub>pAZ</sub> (Driver's compartment)	dB (A)	< 66	< 66
Human vibration: acceleration according to EN 13059	m/s <sup>2</sup>	< 0.6	< 0.6
Tow coupling, DIN type/model		Bolt	Bolt

VDI datasheet: RX20-20 with swing axle

## VDI datasheet: RX20-20 with swing axle

### NOTE

*This VDI datasheet specifies only the technical values of the truck version with standard equipment. Different tyres, lift masts, additional units etc. may produce different values.*

### Key data

Model		RX20-20P	RX20-20PL
Type number		6230	6231
Manufacturer		STILL GmbH	STILL GmbH
Drive		Electric	Electric
Operation		Seated	Seated
Rated capacity/load	Q (kg)	2000	2000
Load centre of gravity distance	c (mm)	500	500
Load distance	x (mm)	388	388
Wheelbase	y (mm)	1429	1537

### Weights

Model		RX20-20P	RX20-20PL
Type number		6230	6231
Net weight	kg	3474	3449
Axle load with front load	kg	4858	4851
Axle load with rear load	kg	616	598
Axle load without front load	kg	1616	1696
Axle load without rear load	kg	1858	1754

### Wheels, chassis frame

Model		RX20-20P	RX20-20PL
Type number		6230	6231
Tyres		Superelastic	Superelastic
Front tyre size		200/50-10	200/50-10

Model		RX20-20P	RX20-20PL
Type number		6230	6231
Rear tyre size		150/75-8	150/75-8
Number of front wheels (x = driven)		2x	2x
Number of rear wheels (x = driven)		2	2
Front track width	b <sub>10</sub> (mm)	942	942
Rear track width	b <sub>11</sub> (mm)	807	807

### Basic dimensions

Model		RX20-20P	RX20-20PL
Type number		6230	6231
Tilt of lift mast/fork carriage, forwards	α (degrees)	5	5
Tilt of lift mast/fork carriage, backwards	β (degrees)	6	6
Height with lift mast retracted	h <sub>1</sub> (mm)	2160	2160
Free lift	h <sub>2</sub> (mm)	150	150
Lift	h <sub>3</sub> (mm)	3180	3180
Height with lift mast extended	h <sub>4</sub> (mm)	3742	3742
Height above overhead guard (cab)	h <sub>6</sub> (mm)	2035 (1949)	2035 (1949)
Seat height/standing height	h <sub>7</sub> (mm)	965	965
Coupling height	h <sub>10</sub> (mm)	537	537
Overall length	l <sub>1</sub> (mm)	2851	2959
Length including fork back	l <sub>2</sub> (mm)	2051	2159
Overall width	b <sub>1</sub> (mm)	1149	1149
Fork arm thickness	s (mm)	40	40
Fork arm width	e (mm)	80	80
Fork arm length	l (mm)	800	800
Fork carriage	Standard; class; form	ISO 2328 II A	ISO 2328 II A
Fork carriage width	b <sub>3</sub> (mm)	980	980
Ground clearance with load below lift mast	m <sub>1</sub> (mm)	≥ 90	≥ 90
Ground clearance at the centre of the wheelbase	m <sub>2</sub> (mm)	114	114

## VDI datasheet: RX20-20 with swing axle

Model		RX20-20P	RX20-20PL
Type number		6230	6231
Aisle width for pallet 1000 x 1200 crosswise	A <sub>st</sub> (mm)	3375	3483
Aisle width for pallet 800 x 1200 longitudinal	A <sub>st</sub> (mm)	3501	3609
Turning radius	W <sub>a</sub> (mm)	1663	1771
Smallest pivot point distance	b <sub>13</sub> (mm)	—	—

## Performance data

Model		RX20-20P	RX20-20PL
Type number		6230	6231
Driving speed with load (Blue-Q/STILL Classic/sprint mode)	km/h	16/16/20	16/16/20
Driving speed without load (Blue-Q/STILL Classic/sprint mode)	km/h	16/16/20	16/16/20
Lifting speed with load (Blue-Q/STILL Classic/sprint mode)	m/s	0.45	0.45
Lifting speed without load (Blue-Q/STILL Classic/sprint mode)	m/s	0.63	0.63
Lowering speed with load	m/s	0.48	0.48
Lowering speed without load	m/s	0.41	0.41
Pulling force with load	N	4700	4800
Pulling force without load	N	5000	5000
Max. pulling force with load	N	11,900	11,900
Max. pulling force without load	N	8200	8800
Climbing capability with load	%	15	15
Climbing capability without load	%	18.1	18.1
Max. climbing capability with load	%	22.9	23.1
Max. climbing capability without load	%	25.1	27.2
Acceleration time with load (Blue-Q/STILL Classic/sprint mode)	s	5.8/5.5/5.3	5.8/5.5/5.3
Acceleration time without load (Blue-Q/STILL Classic/sprint mode)	s	5.4/5.1/4.8	5.4/5.1/4.8
Service brake		Electr. / Mech.	Electr. / Mech.

### Ascending gradients

The values specified in the "Performance data" table as the maximum climbing capability can be used only to compare the performance of forklift trucks in the same category. The specified values in no way represent the normal daily operating conditions.

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### Electric motor

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Traction motor, power rating KB 60 min	kW	2x6.5	2x6.5
Lift motor, power rating at S3: 15%	kW	11	11
Battery	Standard; circuit	DIN 43531 A (B)	DIN 43531 A
Battery voltage	U (V)	48	48
Battery capacity	K <sub>5</sub> (Ah)	625	750
Battery weight	kg	855	1013

### Miscellaneous

Model		RX20-20P	RX20-20PL
Type number		6230	6231
Working pressure for attachments	bar	160	160
Oil flow for attachments	l/min	30	30
Sound pressure level L <sub>pAZ</sub> (Driver's compartment)	dB (A)	< 66	< 66
Human vibration: acceleration according to EN 13059	m/s <sup>2</sup>	< 0.6	< 0.6
Tow coupling, DIN type/model		Bolt	Bolt



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