

Original instructions

Reach trucks FM-X SE, Li-ion

FM-X-14 FM-X-17 FM-X-20



first in intralogistics

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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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Foreword

1 Foreword

Your truck

Your truck

General

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

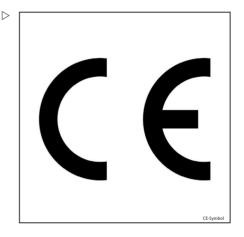
The trucks have been fitted with state-of-theart technology. All that remains is to handle the truck safely and maintain its functionality. These operating instructions provide the necessary information to do this. Read and observe the information provided before commissioning the truck. This will prevent accidents and ensure that the warranty remains valid

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 according to these operating instructions Model according to these operating instructions 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

1

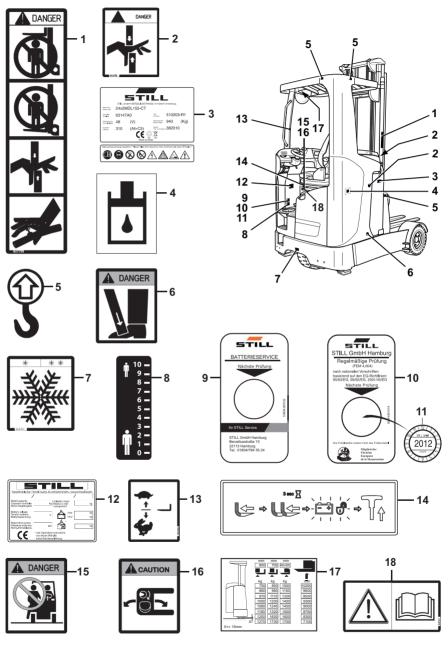
Your truck

Accessories

- Key for key switch (2 pieces), not for trucks with the FleetManager[™] or "PIN code" variants
- Key for cab (variant)
- Hexagon socket wrench for emergency lowering (in the driver's compartment below the steering wheel)
- Battery change frame (variant)



Overview



Foreword

Your truck

1	Warning sign: Do not stand underneath the
	fork/Do not stand on the fork/Danger due to
	shearing/Danger due to high fluid pressure

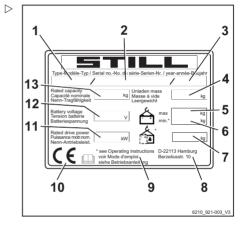
- 2 Warning sign: Danger due to shearing
- 3 Decal information: Battery version 4 Decal information: Hydraulic oil tank
- 5 Decal information: Lifting point
- 6 Warning sign: Crushing and shearing points on base
- 7 Decal information: Cold store version (variant)
- 8 Decal information: Electrical seat adjustment (variant)
- 9 Decal information: Battery test

- 10 Decal information: FFM test
- Decal information: FEM test (inspection 11 sticker)
- 12 Decal information: Nameplate
- 13 Decal information: Speed limitation based on lift height
- 14 Decal information: Unlock the battery
- 15 Warning sign: Passengers prohibited
- Warning sign: Reverse steering 16
- 17 Decal information: Load capacity diagram, load capacity diagram for attachments (example)
- 18 Decal information: Caution/Read the operating instructions

Nameplate

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

The information for the battery weights (5, 6) and the ballast weight (7) only applies to electric forklift trucks



- Type 1
- 2 Production number
- 3 Year of manufacture
- 4 Tare weight in kg
- 5 Max. permissible battery weight in kg
- 6 Min. permissible battery weight in kg
- 7 Ballast weight in kg
- 8 Address of manufacturer
- 9 Refer to the technical data listed in these operating instructions for more detailed information
- 10 CE labelling
- 11 Nominal drive power in kW
- 12 Battery voltage in V
- 13 Rated capacity in kg



Your truck

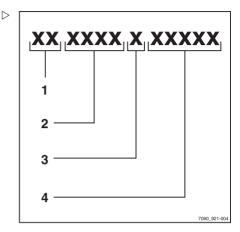
Production number



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



Nameplate of a lithium-ion battery



i NOTE

The CE labelling confirms compliance with the EC machinery directive and with all regulations applicable to the lithium-ion battery.

- 1 Nameplate
- 2 Manufacturer
- Address of manufacturer 3
- 4 Data/technical data
- 5 Safety information
- 6 CE labelling
- Data matrix code

Transport information

- 8 "Do not lift in a manner that allows the battery to tilt to one side"
- 9 "Use a lifting traverse"

General operating notes

- "Read the operating instructions"
- "Do not stack"
- 12 "Do not climb on the battery"
- 13 "Do not force open"
- 14 "Do not immerse in water"
- "Do not throw into fire"





1 Foreword

Using the truck

- 16 "Do not dispose with household waste"
- 17 "Recycling recyclable material"

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".

Intended use of the lithium-ion battery (variant)

The lithium-ion battery must only be operated in accordance with these operating instructions and the manufacturer's operating instructions for the battery.



Using the truck

Only lithium-ion batteries approved by STILL for use with this truck may be used. The dimensions of the battery must precisely correspond to the dimensions of the battery frame in the truck. The installation of a smaller battery or a larger battery poses a risk to the stability of the truck.

Only lithium-ion battery chargers approved by STILL for use with this battery may be used.

Impermissible use

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



i 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.



A 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 is approved for indoor and outdoor use. For outdoor use, the truck must be equipped with a closed weather-protection cab

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



Foreword

Using the truck

in these operating instructions; refer to the chapter entitled "Roadways".

Driving on upward and downward gradients is permitted as long as the defined data and specifications are observed; refer to the chapter entitled "Roadways".

The truck is suitable for use in many different countries, ranging from those situated in the tropics to those in Nordic regions (temperature range: -10°C to +40°C).

The operating company must ensure that sufficient fire protection is available 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.



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

Parking in temperatures below -10°C

A CAUTION

Batteries can freeze!

If the truck is parked in an ambient temperature below -10°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°C, only park the truck for short periods of time.

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.



Documentation scope

- · Original operating instructions
- Original operating instructions for attachments (variant)
- · Spare parts list
- Depending on the truck equipment, "UPA" operating instructions may also be provided



Refer to the additional information in the section entitled "Rules for the operating company of industrial trucks".

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, please contact your authorised service centre.

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

Production number:

Year of manufacture:

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 chapter entitled "Overviews".

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.

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 observe 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

Unlike the standard equipment and the variants, this truck may be fitted with unplanned equipment (UPA).

This UPA may be, for example:

- Special sensors
- Special attachments
- · Towing devices
- · Customer-specific attachments

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

The original operating instructions for this 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

A 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.

A CAUTION

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





i NOTE

For technical requirements that require special attention.



ENVIRONMENT NOTE

To prevent environmental damage.

List of abbreviations



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.

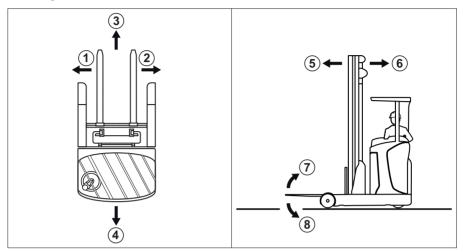
Abbrevi- ation	Meaning	Explanation
ABE	Display operating unit	
ArbSchG	Arbeitsschutzgesetz	German implementation of EU occupational health and safety directives
Betr- SichV	Betriebssicherheitsverordnung	German implementation of the EU working equipment directive
BG	Berufsgenossenschaft	German insurance 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 Européene de la Manutention	European Federation of Materials Handling and Storage Equipment
F _{max}	maximum Force	Maximum power



Abbrevi- ation	Meaning	Explanation
GAA	Gewerbeaufsichtsamt	German authority for monitoring/issuing regulations for worker protection, environmental protection, and consumer protection
GPRS	General Packet Radio Service	Transfer of data packets in wireless networks
ID no.	ID number	
ISO	International Organization for Standard- ization	International standardisation organisation
LAN	Local Area Network	Local area network
K _{pA}	Uncertainty of measurement of sound pressure levels	
LED	Light Emitting Diode	Light emitting diode
Lp	Sound pressure level at the workplace	
LpAZ	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



Defining directions



General:

- left (1)
- right (2)

Drive directions:

- Travelling in the load direction (backwards)
 (3)
- Travelling in the drive direction (forwards)
 (4)

Movements of the reach carriage:

- Extending the reach carriage (in the load direction) (5)
- Retracting the reach carriage (in the drive direction) (6)

Tilting the lift mast or fork:

- · Backward tilt (7)
- Forward tilt (8)

The driver sits crosswise to the drive direction.



Schematic views

View of functions and operating procedures

At many points in this documentation, the operation of certain functions or operating procedures is explained. To illustrate these operations, schematic views of a reach truck are used.

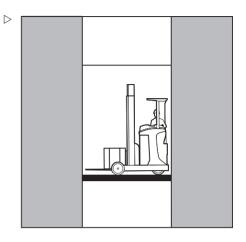


These schematic views are not representative of the structural state of the documented truck. The views are used solely for the purpose of clarifying procedures.

View of the display-operating unit



Views of operating statuses and values on the display-operating unit are examples and partly dependent on the equipment on the truck. 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.



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



2

Definition of responsible persons

A 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.

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.

Special notes when using lithium-ion batteries (variant)

If this truck is equipped with a lithium-ion battery (variant) rather than a conventional lead acid battery, the following special notes apply for the operating company and driver.



A DANGER

Risk of explosion!

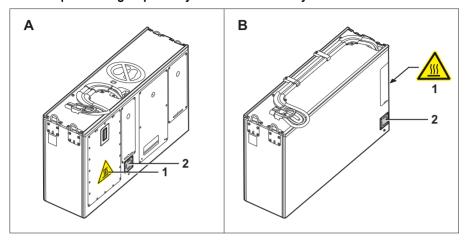
Heating to over 80°C, mechanical stress and incorrect use may cause the battery to explode.

- Never heat the battery to over 80°C or expose it to a naked 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



Basic principles for safe operation

Product-specific dangers posed by the lithium-ion battery



Lithium-ion battery

- A Battery group 4.1
- B Battery group 4.2, 4.3
- Hot area on the brake resistor (position depends on the battery group; observe the warning sign (A))
- Safety valve (position depends on the battery group)



▲ 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 for the brake resistor to cool down to a safe temperature.

- Do not touch the hot area (1).

The position of the brake resistor depends on the battery model. Observe the position of the warning sign.

WARNING

Risk of injury!

Risk of injury if the safety valve (2) trips!

Leave the area around the battery immediately.
 Maintain a minimum distance of 5 m.





The brake resistor (1) is installed differently depending on the battery group. The build-up of heat in the area around 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 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 or to the housing cracking. As a result, the electrolyte fluid may leak out, the electrode material may react with humidity/water, or battery venting/a fire/or an explosion can occur, depending on the surrounding circumstances. The position of the safety valve (2) on the battery depends on the battery group.

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

- Use only lithium-ion batteries that have been approved by STILL for use with this truck. The dimensions of the battery must precisely correspond to the dimensions of the battery frame in the truck. The installation of a smaller battery or a larger battery poses a risk to the stability of the truck.
- In addition, follow the operating instructions provided by the battery manufacturer. The lithium-ion battery must only be operated



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Basic principles for safe operation

in accordance with the manufacturer's operating instructions for the battery.

Declaring the use of lithium-ion batteries

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

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

Hazard assessment

In accordance with §3 of the German Ordinance on Industrial Safety and Health (Betr-SichV), 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

The following qualification requirements for the driver are in addition to the conditions described in the chapter entitled "Definition of responsible persons" ("Driver" section):

- The driver must be trained in the operation of the lithium-ion battery
- · Only trained 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 way to cool the 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

Transportation

Transporting the lithium-ion battery outside the premises may require a special transportation container.

Contact your authorised service centre for more information.

Changes and retrofitting

If the truck is to be used for work that is not listed in the directives or in these instructions, the truck can be converted or retrofitted for this purpose. Please note that any structural modification may impair the driving behaviour and stability of the truck, and can result in accidents.

You must therefore contact your authorised service centre prior to making any modifications or engaging in any such work.

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

The truck may only be converted with written approval from the manufacturer. Approval from the relevant authority must be obtained where applicable.

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

A DANGER

There is a risk of accident due to restricted visibility. Additional attachments (e.g. terminals, printers, mirrors) in the driver's compartment area can restrict the driver's field of vision.

 Only install attachments (variants) that have been specifically approved by STILL in accordance with the safety regulations.



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Basic principles for safe operation

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.

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:

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

The capacity rating plate, decal information, hazard warnings and the operating instructions must be checked to ensure they are consistent with the changes and modified if required.

The modification 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 modification is made.

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

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



Modifications to the overhead guard and cabs

A DANGER

Work on the overhead guard or on the weather protection cab/cold store cab reduces its stability. A falling load or the truck tipping over can cause the modified chassis, bodywork and fittings to fail. There is a risk of fatal injury!

- Do not weld on the overhead guard or the weather protection cab/cold store cab.
- Do not drill on the overhead guard or the weather protection cab/cold store cab.
- Do not make any incisions on the overhead guard or the weather protection cab/cold store cab.



A DANGER

Risk of explosion from additional bores on the truck chassis, weather protection cab or cold store cab!

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

 Do not drill any additional holes in the truck chassis, weather protection cab or cold store cab.

Roof loads

A CAUTION

Additional roof loads impair the overhead guard or the weather protection cab/cold store cab.

Do not mount any additional roof loads on the truck

Seat belt

The truck may be equipped with a safety belt for the driver only after consultation with the authorised service centre.



Basic principles for safe operation

A CAUTION

Trucks with an electrical adjustment mechanism for the driver's compartment (variant) must not be equipped with a safety belt for the driver.

Safety information for FM-X Wide, Extra Wide (W, EW)

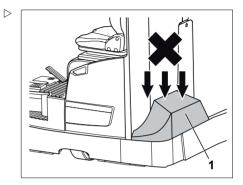
The W (Wide) and EW (Extra Wide) versions differ from the standard truck by having additional cover sheets (1) between the overhead guard and the widened chassis. These sheets are located on each side of the truck. They are not designed to be walked on by people.

▲ WARNING

Risk of accident if a person steps on to the lateral cover sheets

If a person steps on to the cover plates, the plates can be damaged by the weight of the person, who may also slip and suffer injury.

Do not step on the lateral cover sheets



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.

A 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.

Wheels and tyres

A 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**:

- · Wheels not approved by the manufacturer
- · Excessive wear to the tyres
- · Tyres of inferior quality
- · Changes to the wheel rims
- Combination of wheels from different manufacturers

The following rules must be observed to ensure stability:

- Only use wheels with equal and permitted levels of wear to the tyres.
- · Only use tyres of the original tyre type.



Basic principles for safe operation

- Only use wheels approved by the manufacturer.
- · Only use high-quality products.

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

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

Contact your authorised service centre regarding 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

A 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



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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 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



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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



Safety

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Residual risk

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.



Overview of hazards and countermeasures



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	0	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)	0	BGG 925 VDI 3313 driver permit
Usage by unauthorised persons	Access with key only for authorised persons	0	
Truck not in a safe condition	Recurrent testing and rectification of defects	0	German Ordinance on Industrial Safety and Health (BetrSichV)
Risk of falling when using working platforms	Compliance with national regulations (different national laws)	0	German Ordinance on Industrial Safety and Health (BetrSichV) and employer's liability insurance associations
Impaired visibility due to load	Resource planning	0	German Ordinance on Industrial Safety and Health (BetrSichV)
Contamination of respiratory air	Assessment of diesel exhaust gases	0	Technical Regulations for Hazardous Substances (TRGS) 554 and the German Ordinance on Industrial Safety and Health (BetrSichV)
	Assessment of LPG exhaust gases	0	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	0	German Ordinance on Industrial Safety and Health (BetrSichV) and German Health and labour protection law (ArbSchG)
	Written notice of instruction to driver	0	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	0	
When fuelling	1.0	1	
a) Diesel	Note the German Ordinance on Industrial Safety and Health (BetrSichV), the operating instructions and the German Engineering Federation (VDMA) rules	0	
b) LPG	Note German Social Accident Insurance (DGUV) regulation D34, the operating instructions and the German Engineering Federation (VDMA) rules	0	



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	O	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	0	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	0	German Ordinance on Industrial Safety and Health (BetrSichV) and employers' liability insurance association regulation 104
With driverless transpo	ort systems		•
Roadway quality inadequate	Clean/clear driveways	0	German Ordinance on Industrial Safety and Health (BetrSichV)
Load carrier incorrect/slipped	Reattach load to pallet	0	German Ordinance on Industrial Safety and Health (BetrSichV)
Drive behaviour unpredictable	Employee training	0	German Ordinance on Industrial Safety and Health (BetrSichV)
Driveways blocked	Mark driveways Keep driveways clear	0	German Ordinance on Industrial Safety and Health (BetrSichV)
Driveways intersect	Announce right-of-way rule	0	German Ordinance on Industrial Safety and Health (BetrSichV)
No person detection during depositing and retrieval	Employee training	0	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.



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 Arb-SchG). 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.



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.



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

Test values for the drive battery

Component	Recommended test voltage	Measu	rements	Nominal voltage U _{Batt}	Test values
	50 VDC			24 volts	> 1200 Ω
Battery	100 VDC	Batt+ Batt-	Battery tray	48 volts	> 2400 Ω
	100 VDC	Dun		80 volts	> 4000 Ω

Test values for the entire truck

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

Safety regulations for handling consumables

Permissible consumables

A 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 these materials.

Refer to the maintenance data table for information regarding the permissible substances that are necessary for operation (refer to the chapter entitled "Maintenance data table").



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!



A 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.



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.



Brake fluid



WARNING

Brake fluid is poisonous!

- Avoid swallowing. In the event of swallowing, do not induce vomiting. Rinse out your mouth thoroughly with water and ask a doctor for advice.
- Avoid aerosolisation and inhalation. In the event of inhalation, seek fresh air. Ask a doctor for advice if necessary.



WARNING

Brake fluid is hazardous to your health!

Brake fluid irritates the eyes and can dry out the skin upon prolonged contact.

- Coat your hands with a protective skin cream prior to starting work.
- Avoid prolonged or intensive skin contact. In the event of skin contact, clean the wetted skin with water and soap, and subsequently apply a skin care product.
- Prevent contact with the eyes. In the event of contact with the eyes, wash out the affected eye(s) with clean water for ten minutes and then ask a doctor for advice.
- Change clothing soiled with brake fluid as soon as possible.

A CAUTION

Brake fluid is flammable!

- Do not allow brake fluid to come into contact with hot motor parts.
- Smoking, fires and naked flames are prohibited.

A CAUTION

Brake fluid has strong dissolving and colour-changing properties.

 Immediately rinse off any brake fluid that has splashed on paint, clothing, and shoes with plenty of water





ENVIRONMENT NOTE

Brake fluid is a water pollutant!

- Always store brake fluid in containers complying with the regulations..
- Do not spill brake fluid.
- Spilt brake fluid must be removed immediately using an oil binding agent and disposed of in accordance with regulations
- Dispose of old brake fluid according to the regulations.
- Observe the national regulations for the country in which the truck is being used.

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 the purpose. Care must be taken to minimise any environmental pollution.

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



Commissioning the FleetManager™ (variant)

Activating the access control after delivery of the truck

A CAUTION

Danger associated with use by unauthorised persons

The FleetManager™ regulates the access authorisation to the truck. To activate the access control, the FleetManager must be put into operation immediately following delivery. This ensures that only persons authorised by the operating company have access to the truck.

If the FleetManager is not put into operation immediately after delivery, the operator must convert the truck to a different access control.

- Put the FleetManager™ into operation immediately after delivery. Make the truck accessible only to people who are authorised by the operating company.
- In order to convert the truck to a different access control, contact your authorised service centre.

The FleetManager™ regulates the access authorisation to the truck via a PIN code, access chip or access card. This means that the truck is effectively protected against unauthorised access. The system can only be activated at the customer's premises, as it uses essential customer data. Therefore, at the time of delivery, the truck is not protected against unauthorised use.

In order to guarantee protection, the Fleet-Manager™ must be put into operation immediately after delivery. The operating company is responsible for ensuring that only authorised personnel use the truck.

If the operating company decides not to use the FleetManager™ at a later date, the operating company is responsible for the conversion of the truck to a different access control.

Emissions

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



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Emissions

additional units etc. may produce different values.

Noise emissions

The values were determined using the measuring procedures from the EN 12053 standard (noise measurement for industrial trucks based on EN 12001 and 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 _p AZ	
< 69.5 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 noise levels indicated on 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).



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



Emissions

"Mechanical vibration - Declaration and verification of vibration emission values".

Weighted effective value of acceleration to which the body (feet or seat base) is subjected.	Uncertainty of measurement K	
0.39m/s^2	0.117 m/s ²	

Tests have indicated that the amplitude of the hand and arm vibrations on the steering wheel or the operating devices in trucks is less than 2.5 m/s². There are therefore no measurement guidelines for these measurements.

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

Battery



A 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

In accordance with the guidelines DIN EN 62471:2009-03 (VDE 0837-471:2009-03), the STILL SafetyLight (variant) is assigned to risk group 2 (medium risk) due to its photobiological hazard potential.



2

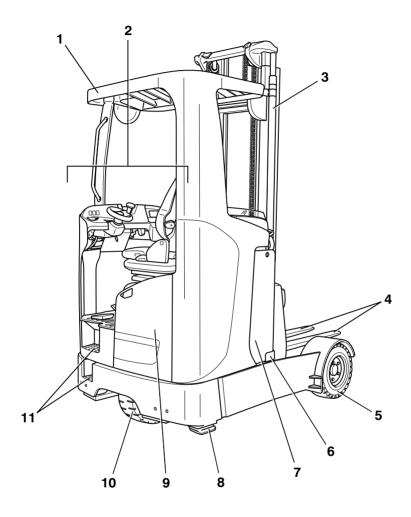
Emissions



Overviews

Overview

Overview



- 1
- Overhead guard Driver's compartment 2
- Lift mast
- 4 Fork arms
- 5 Load wheel
- 6 Battery frame

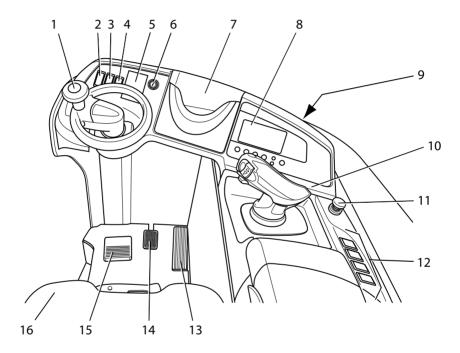
- 7 Battery
- Side support (tilt protection) 8
- 9 Control compartment
- 10 Drive wheel
- 11 Step





The truck equipment may differ from the equipment shown.

Overview of the driver's compartment



- Steering wheel
- 2 Button for speed limitation, creep speed (variant)
- 3 Electrical seat adjustment push button (variant)
- 4 Working spotlight push button (variant)
- 5 Card reader or keypad for enabling the truck (variant)
- 6 Key switch or push button (variant)
- Compartment (reserved for add-on systems)

- B Display and operating unit
- 9 Cup holder for max. 1.5-l bottles
- 10 Operating devices for hydraulic and traction functions
- 11 Emergency off switch
- 12 Push button for additional hydraulic functions
- 13 Accelerator pedal
- 14 Brake pedal
- 15 Foot switch
- 16 Driver's seat



The truck equipment may differ from the equipment shown.



Shelves and cup holders

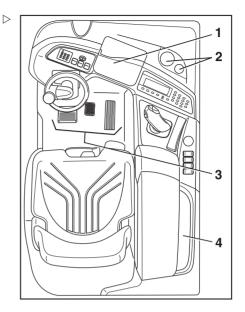
Shelves and cup holders

WARNING

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

Objects to be stored must be of the correct size so that they do not fall from the shelves (1, 4) or out of the cup holder (2). Objects that fall into the footwell during travel as a result of steering or braking can slip between the pedals (3) and stop them working correctly. Subsequently, it may not be possible to brake the truck when necessary.

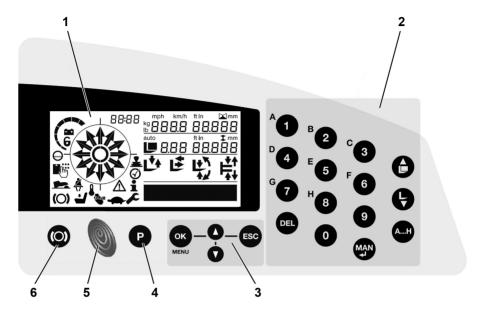
- Bottles of 1.5 I or smaller may be stored in the cup holder.
- Make sure that stored objects cannot fall from the shelves when the truck is started up, steered or braked.





Operating devices and display elements

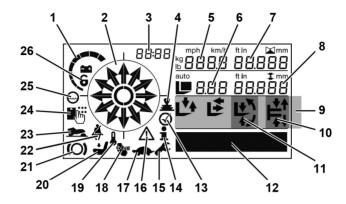
Display and operating unit



- 1 Display of the operating statuses
- 2 Keypad for lift height preselection (variant) or PIN code access (variant)
- 3 Keypad for onboard diagnostics, parameterising
- 4 Drive programme button (P1-P4)
- 5 Blue-Q button
- 6 Parking brake button

Operating devices and display elements

Operating status displays on the display and operating unit



Item no.	Display	Comment
1	Battery charging state	As the capacity decreases, the individual segments go out one after the other. If the permissible discharge level is reached so that the battery's residual capacity is 20% of the nominal capacity, only the last segment will still flash. A hydraulic limitation and/or driving limitation can be implemented as an option. The hydraulic limitation and/or driving limitation must be activated by the authorised service centre.
2	Steering angle display combined with drive direction	-
3	Time display (digital)	-
4	Joystick 4Plus (operating error)	-
5	Multifunction indicator	Display is dependent on truck parameters (e.g. driving speed, reach position, lift height)
6	Display field for the selected default setting for the lift height preselector	Display is only active in the "lift height preselector" variant
7	Display field for the current height in the main lift	Display is only active in the "lift height preselector" variant or "lift height display" variant
8	Display field for the "target difference" or display of the stored lift height value during teach-in for the lift height preselector	"Target difference" is only active in the "lift height preselector" variant or "lift height display" variant
9	Function assistant	Relevant only for the "lift height preselector" variant



Operating devices and display elements

Item no.	Display	Comment
10	Function assistant, centre position for transition shift	-
11	Function assistant, centre position for tilting	-
12	Operating hours, error messages, drive profile, information text	The meter displays up to 99,999.9 operating hours.
13	Acknowledge button	Actuation required for further functioning
14	Information	-
15	Maintenance expired	-
16	Caution	Displayed together with an error message (FE)
17	Creep speed activated	-
18	Blue-Q activated	-
19	Overtemperature	-
20	Driver's seat not occupied during operation of the truck (seat switch)	-
21	Parking brake activated	-
22	Seat belt on driver's seat not fastened (not series production truck)	-
23	Foot switch required	-
24	Symbol for FleetManager variant or PIN code access variant	-
25	Battery water level display too low (variant)	-
26	Battery not locked	-

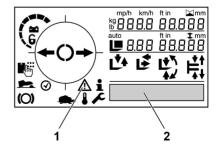
Display messages

Event-related operating information and malfunctions are shown in the display field (2). In addition, the "Caution" symbol (1) lights up if there is a malfunction.

Messages are always shown periodically and for a certain period of time, according to the event.

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 operating display and the message.





 \triangleright

3

Operating devices and display elements

If a message appears, follow these operating instructions.

Once the event is remedied, the message will disappear.

Messages for the driver appear in the display botogether with the symbol "i" for information.



General messages

Text message/error number	Description	Remedy
CLEAN HEIGHT SENSOR	Contamination will affect the measuring signal between the LED height sensor and reflector.	Clean the sensor glass and the reflector. Observe the information in the chapter entitled "Cleaning the optical height measuring system". Check the light signal path between the sensor and the reflector. Remove obstacles. Then fully lower the fork to reference the system. If the message is still displayed after cleaning, contact your authorised service centre.
EMERGENCY SWITCH	Emergency off switch of the truck is actuated All truck functions are disabled	Switch off the truck. Unlock the emergency off switch. Switch the truck on again.
EMERGENCY OPERATION	Only for trucks with FleetManager™ (variant) Truck functions are restricted	Check the FleetManager™ documentation. The truck can be operated in emergency operation without access authorisation. To eliminate the cause, contact the authorised service centre.
BATTERY CARRIER MODE ACTIVE	The driver has activated the battery carrier.	If the battery carrier has been accidentally actuated: Fully push in the reach carriage with the battery.
i 0300/0301	Intermediate lift or end lift limitation is active after switching on "Lift" truck function is disabled	Execute the "Lower" truck function.



Text message/error number	Description	Remedy
1 0640	Shock recognition of the FleetManager™ (variant) has detected a shock event (e.g. collision of the truck).	Reset the shock recognition with the FleetManager master chip.
1 3009	The driver actuates the brake pedal and accelerator pedal simultaneously.	Do not actuate the brake pedal and accelerator pedal at the same time.
A3035	 Brake fluid level is too low The truck only drives at creep speed (1.6 km/h) Brake fluid leaks may cause failure of the hydraulic brake 	Contact your authorised service centre.

Messages relating to the lithium-ion battery

Text message/error number	Description	Remedy	
	Short-term overload of the lithium-ion battery Traction dynamics and hydraulic speed are restricted	Move the joystick 4Plus / fingertip switch to the inactive position for 2 seconds	
1 801	Lithium-ion battery is in emergency operation Driving speed and hydraulic speed may be restricted	Switch off the truck If the message is still displayed after restarting, contact your authorised service centre	
1 802	Messages relating to the lithium-ion battery Battery service required Driving speed and hydraulic speed may be restricted	Contact your authorised service centre.	
1 803	Overtemperature of the lithium-ion battery Driving speed and hydraulic speed may be restricted In the event of severe overtemperature, the battery switches off	Switch off the truck Allow the battery to cool down If the message is still displayed after restarting, contact your authorised service centre	
S5950	Messages relating to the lithium-ion battery All truck functions are disabled	Contact your authorised service centre.	



Text message/error number	Description	Remedy
S5951	No communication with the lithium-ion battery All truck functions are disabled	Check the battery cable and battery plug Restart the truck If the message is still displayed after restarting, contact your authorised service centre
S5961	Overtemperature of the lithium-ion battery All truck functions are disabled	Switch off the truck Allow the battery to cool down If the message is still displayed after restarting, contact your authorised service centre
S5962	Insufficient temperature of the lithium-ion battery All truck functions are disabled	Observe the permissible ambient temperature for the battery Switch off the truck If the message is still displayed after restarting, contact your authorised service centre
S6620	Internal error in the lithium-ion battery All truck functions are disabled	Restart the truck If the message is still displayed after restarting, contact your authorised service centre
S5970	Lithium-ion battery reports a shock event (vibration) All truck functions are disabled	Restart the truck If the message is still displayed after restarting, contact your authorised service centre



Entering truck operating data via the display and operating unit

Authorisation levels

The authorisation levels determine which operating data and functions the user can access. The higher the authorisation level, the more comprehensive the access to truck operating data.

The display and operating unit is used to access operating data at three authorisation levels:

- · Level 1 (driver)
- · Level 2 (fleet manager)
- · Level 3 (authorised service centre)

The access rights are predefined ex works within the different authorisation levels. Individual access rights can be moved to a higher authorisation level.

Level 1 (driver)

Access: Press the OK button for two seconds

Authorisations: Set the time (can be moved to a higher authorisation level)

Set the date (can be moved to a higher authorisation level)

Set the language (can be moved to a higher authorisation level)

Level 2 (fleet manager)

Access: Press OK and ESC for 4 seconds and enter the password for level 2

Authorisations: Battery

- Type

- Capacity

Read out the software and hardware status

Read out the error memory

Toggle the units

Teach-in the lift height preselector (can be moved to a higher authorisation level)



3

Operating devices and display elements

Level 3 (authorised service centre)

Access:

Authorisations:

Press OK and ESC for 4 seconds and enter the password for level 3

Maintenance interval

PIN for remote data transfer via SIM card

Delete error list

Accessing the main menu without a password (authorisation level 1)

First of all, press the OK button to open the main menu at authorisation level 1.

- Press OK for two seconds

The main menu for authorisation level 1 appears on the display and operating unit.

Accessing the main menu with a password (authorisation levels 2 and 3)

First of all, press the OK and ESC buttons to open the input screen for the password at the required authorisation level.

- Press OK and ESC for four seconds

The display and operating unit shows the input screen for the password. The first input position flashes.

PASSWORD

A valid password consists of four digits from 0 to 9.

 Edit the digits one at a time using the arrow buttons. Press the OK button to confirm each of the individual digits and access the next digit

Once the last digit has been confirmed by pressing the OK button, the password is checked.

If the password is correct, the main menu for the required authorisation level appears on the display and operating unit.



If the password is invalid, a corresponding message appears on the display and operating unit.

PASSWORD

NOT VALID

The message appears for three seconds and then the display and operating unit shows the input screen for the password again. The password can be entered again.

If the password is entered incorrectly a third time, the input screen is locked for five minutes. A corresponding message appears on the display and operating unit.

PASSWORD

DENIED 5 min

The message appears for three seconds and then the display and operating unit shows the input screen for the password again. If the password is entered again during the locked period, the password is always rejected. The remaining time for the locked period is displayed.

Once the locked period has elapsed, the password may be entered a further three times.



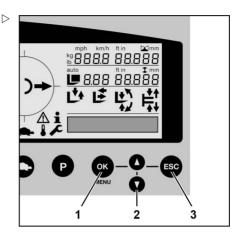
Entering operating data in the main menu

The menus on the display and operating unit are controlled using the OK button (1), ESC button (3) and arrow buttons (2).

- Press the arrow buttons to navigate through the menus
- Press the OK button to select a menu item
- Press the ESC button to move up the menu structure

If a displayed value or status can be edited, the corresponding display flashes.

- Press the arrow buttons to edit a value or status
- Briefly press the ESC button to return to the previous input position (to make a correction)
- Press and hold the ESC button for two seconds to cancel the current entry
- · Press the OK button to confirm the entry



Overview of the menu structure

Authori- sation (level))	Main menu	Submenu			Edit/select	Comment
1	2	3	CONFIGU- RATION	1	2	3		
			LANGUAGE				List of available languages	Language selection for the display and operating unit
			TIME				HH : MM	
			DATE				YY:MM:DD	
			BATTERY	TYPE			LEAD CSM GEL GEL_SO SPEC. 1 SPEC. 2	
				CAPACITY			XXX Ah	
			VERSION	DEVICE			Х	
					COMPUTER		х	



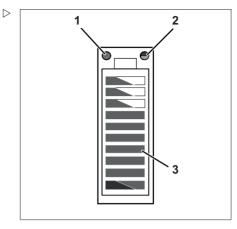
Authori- sation (level)		1	Main menu	Submenu			Edit/select	Comment
1	2	3	CONFIGU- RATION	1	2	3		
						HW1 HW2 SW1 SW2 SW3	vx.xx	
			UNITS	DISTANCE			km miles	
				LOAD			kg lb	
			ERROR LIST	MODE			CUSTOMER SERVICE	
					DEVICE		Х	A–Z, *: all devices
						TYPE	Х	0: current error 1: since reset 2: since deletion
							x xx xx	Error e.g. A 12 12
			ADJUST					Teach-in Lift heights
			SERVICE IN				XXX h	
			ERROR RESET					A–Z, *: all devices



Lithium-ion battery display

The lithium-ion battery has its own display. The display shows information about the error status (1), the temperature (2) and the charging status (3) of the lithium-ion battery.

 See the "Display" chapter in the operating instructions provided by the battery manufacturer, "BMZ".



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

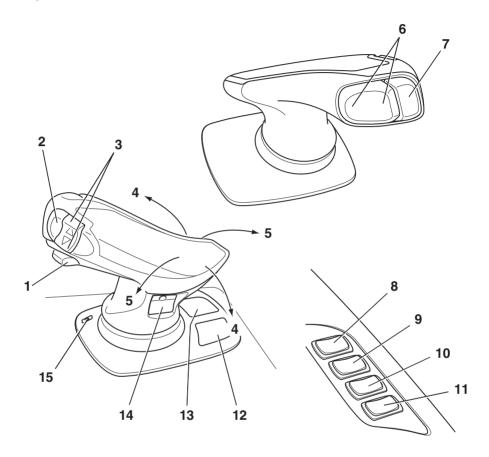
Operating devices for hydraulic and traction functions

Different versions of the operating devices are available for operating the truck's hydraulic and traction functions. The truck can be equipped with the following operating devices:

- Joystick 4Plus
- Fingertip



Joystick 4Plus



- 1 "Transition shift" slider
- 2 Shift button "F" (auxiliary hydraulics controller)
- 3 Drive direction switch
- 4 Joystick, "lifting/lowering" function
- 5 Joystick, "shifting" function
- 6 "Tilt" rocker button
- 7 Signal horn button
- 8 "Enable" push button (variant)
- 9 "Load measurement" push button (variant)

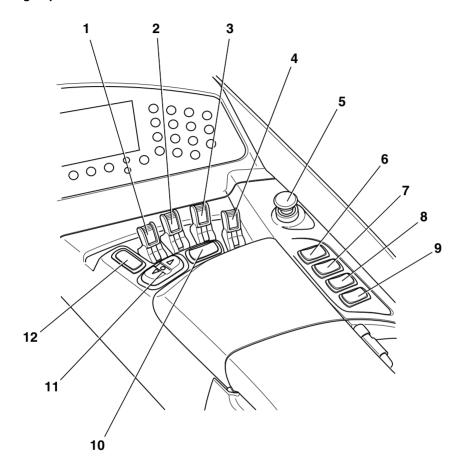
- 10 "Transition shift/tilt centre position" push button (variant)
- 11 Reserve
- 12 Pictograms for operation of the 5th and 6th hydraulic function (variant)
- 13 Pictograms for operation of the basic hydraulic functions
- 14 Pictograms for operation of the 3rd and 4th hydraulic function
- 15 LED indicator light for clamp locking mechanism (variant)



3

Operating devices and display elements

Fingertip



- 1 "Lift/lower" operating lever
- 2 "Shift" operating lever
- 3 "Tilt" operating lever
- 4 "Transition shift" operating lever
- 5 Emergency off switch
- 6 "Enable" push button (variant)
- 7 "Load measurement" push button (variant)
- 8 "Transition shift/tilt centre position" push button (variant)
- 9 Reserve
- 10 "Auxiliary hydraulics" push button (variant)
- 11 Drive direction switch
- 12 Signal horn button



Operation

Testing and activities before daily use

Visual inspections and function checking



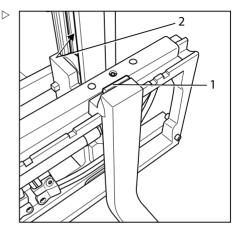
▲ DANGER

Risk of explosion if hydrogen builds up in the cab!

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

There must be no unsealed bores in the cab wall. Sealing bores with plugs is not sufficient to prevent gas from entering.

 Have unused bores in the cab wall 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.



A 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 ensure that the truck is operated safely, the visual inspections and function checking must be carried out before daily use. The components that must be checked and their check points are listed in the following table.

If damage or other defects are identified on the truck or the attachment (variant) during the following inspections, the truck must not be used until it has been properly repaired. 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.

Ensure that the truck is safe for operation each day before it is used:

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 fuses (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.
Load measurement	Perform the load measurement once for testing purposes.
Lift and tilt cylinders, tank, valve block, hoses, pipes, connections	Perform a visual inspection for damage and leakages. Have damaged components replaced by the authorised service centre.
Underside	Check the area under the truck for leaking consumables.



Component	Course of action
Wheels, tyres	Perform a visual inspection for wear and damage. Make sure that only approved tyre types are used (see the chapter entitled "Technical data/Wheels and tyres"). In the event of uneven tyre wear on the load wheels, change both tyres. Observe the safety regulations in the chapter entitled "Tyres".
Overhead guard, guard grille (variant)	Perform a visual inspection for integrity. Check for secure mounting.
Weather protection cab, cold store cab	Perform a visual inspection for integrity. Check for secure mounting.
Steps	Make sure they are clean (free of ice, not slippery).
Panes of glass	Perform a visual inspection for integrity. Make sure they are clean (also free of ice).
Handholds	Check for secure mounting.
Battery lock	Check the battery lock on the internal roller channel (variant) for condition and function. Close the battery lock.
Battery frame	Perform a visual inspection for integrity (e.g. cracks or breaks). Check that the battery frame is fully retracted towards the drive side and is securely locked in this position.
Battery connection assembly	Perform a visual inspection for integrity and deformation. Check the contacts. Inspect the battery male connector and the plug connection for foreign objects that may have become lodged and for moisture. Remove such deposits, for example with compressed air. Have damaged battery male connectors replaced by the authorised service centre.
Covers	Visual inspection: all covers must be fitted and closed.
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".
Lighting, warning units (e.g. signal horn)	Check the integrity and function.



Component	Course of action
Antistatic belt, corona electrode	Perform a visual inspection for integrity. Ensure cleanliness. Make sure that the antistatic belt is still long enough to touch the ground. The discharge wires of the corona electrode must not touch the ground. The wires discharge the energy to the air.
Slide tracks of the reach carriage	Make sure that a film of grease is present on the slide tracks of the reach carriage.
Gearbox	Make sure that no consumables are escaping from the gearbox.

- 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.

Climbing into and out of the truck

WARNING

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

If the footwell cover is very dirty, smeared with oil or iced over, there is a risk of slipping. There is a risk of getting caught by your clothing when climbing out of the truck.

- Make sure that the step and the footwell of the driver's compartment have a non-slip surface and are not iced over.
- Do not wear loose-fitting workwear.
- Do not jump into or out of the truck.
- Ensure that you have a secure grip on the truck.



WARNING

Risk of injury when jumping out of the truck!

If the driver jumps out the truck while it is moving, he or she could fall under the truck or be crushed by an obstacle.

If the driver's clothing or jewellery (watch, ring etc.) become stuck on components, this can lead to serious injuries, e.g. from falling, loss of fingers.

- Only climb into or out of the truck when the truck is at a standstill.
- Do not jump out of the truck.
- Do not wear jewellery at work.
- Do not wear loose-fitting workwear.

A 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.

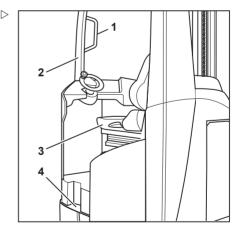
The truck must be at a standstill when climbing into or out of the truck. To assist with climbing into and out of the truck, the footwell must be used as a step (4) and the handle (1) must be used for support. The post of the overhead guard (2) can also be used for support.

Always climb into the truck forwards:

- Grip the handle (1) with your left hand and hold on.
- Put your left foot on the step (4).
- Climb into the truck with your right foot first 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 hold on.
- Stand up from the driver's seat and place your left foot on the step (4).
- Climb out of the truck right foot first.





Adjusting the MSG 65/MSG 75 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 of the 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.



Observe any separate operating instructions for the seat.

WARNING

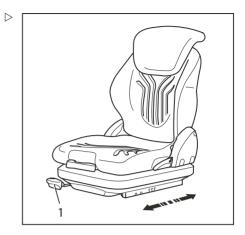
To obtain optimum seat cushioning, you must adjust the seat suspension to your own body weight. This course of action is better for your back and protects your health.

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



Moving the driver's seat

- Lift the lever (1) and hold.
- Push the driver's seat into the desired position.
- Release the lever.
- Ensure that the driver's seat is securely engaged.



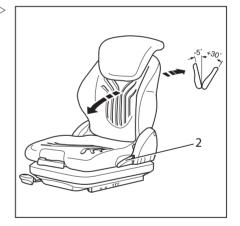
Adjusting the seat backrest

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

- Lift the lever (2) and hold.
- Push the seat backrest into the desired position.
- Release the lever.
- Ensure that the seat backrest is securely engaged.



The backwards tilt angle of the seat backrest can be restricted by the structural condition of the truck.



Adjusting the seat suspension



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

The driver's seat can be adjusted to suit the weight of the individual driver. To achieve the best seat suspension setting, the driver must perform the adjustment whilst sitting on the seat.

- Fully extend the weight adjusting lever (3).
- Pump it up or down to set the driver's weight.

The correct driver's weight has been selected when the arrow (4) is in the centre of the inspection window. If the seat does not move any further when you pump the weight adjusting lever, the minimum or maximum weight setting has been reached.

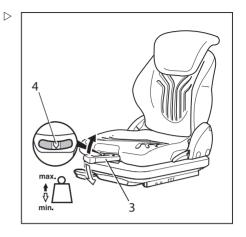
- Return the weight adjusting lever to the initial central position before each new lift (a click can be heard).
- Fully fold in the weight adjusting lever once adjustment is complete.

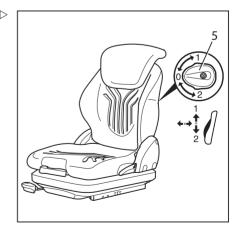
Adjusting the lumbar support (variant)



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 desired position.



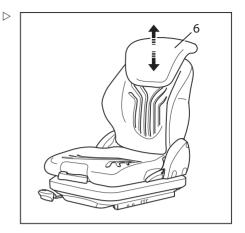




Adjusting the backrest extension (variant)

- 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 jolting it upwards.



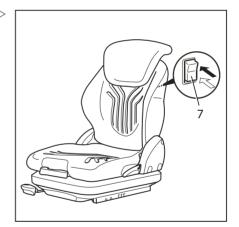
Switching the seat heater (variant) on and off



NOTE

The seat heater only functions 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.



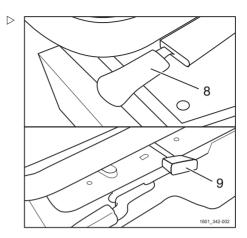


Adjusting the horizontal suspension (variant)

 Push the lever (8) in sideways and slide the driver's seat to the locked position. To release, push the lever outwards.

Using the lever (9), the driver can adjust the hardness in several levels.

 Move the lever (9) to the corresponding notch.



Adjusting the steering column

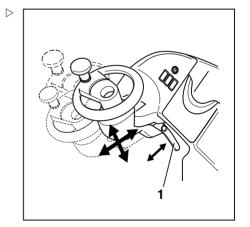
A DANGER

Risk of accident!

Ensure that the steering column is securely attached.

Never adjust the steering column while driving.

- Push the steering column adjustment lever (1) forwards to release the steering column lock. The lever can be moved back if it interferes with the panelling in front during adjustment.
- Move the steering column horizontally and vertically into the desired position.
- Tighten the locking lever (1). Make sure that the steering column is locked securely.





Filling the washer system (variant)

The washer reservoir is located behind the driver's seat in the weather protection cab. The filling opening is accessible from above.

- Open the washer system filler cap (1).
- Fill the washer reservoir with washer fluid and anti-freeze according to the maintenance data table (see the chapter entitled "Maintenance data table").

A CAUTION

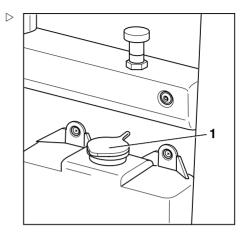
Components may become damaged due to the effects of frost!

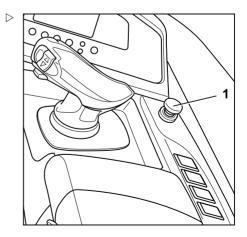
Water expands when it freezes. If there is no antifreeze in the washer system (variant), the system may become damaged due to the accumulation of ice in freezing conditions.

- Always use washer fluid containing anti-freeze.
- Observe the maximum fill level of the reservoir (approx. 10 mm below the filler neck).
- Close the filler cap.
- Operate the washer system until washer fluid is discharged from the spray nozzles.

Unlocking the emergency off switch Unlocking the emergency off switch

 Pull the emergency off switch (1) upwards until it is unlocked.







Switching on the key switch

▲ WARNING

Before switching on the key switch, all tests prior to commissioning must be performed without any defects being detected.

- Carry out checks prior to commissioning (refer to the chapter entitled "Checks and tasks to be carried out prior to commissioning").
- Do not operate the truck if defects have been identified.
- If defects are detected, notify the authorised service centre.
- Insert switch key (1) into the key switch and turn to position "I".

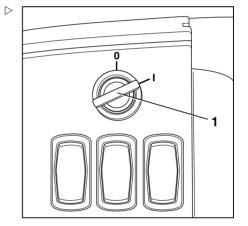
This initiates a self-test. All symbols on the display and operating unit are displayed briefly until the truck controllers have started up completely.

When the truck is switched on, the fork carriage and the reach carriage must initially be in the basic position. In the basic position, the fork carriage is fully lowered, and the reach carriage is fully retracted. This ensures that the electronic support systems which prevent the truck from tipping over with a raised load are recalibrated.

 If the lifting forks and the reach carriage are not in the basic position when the truck is switched on, fully lower the load once and fully retract the reach carriage.

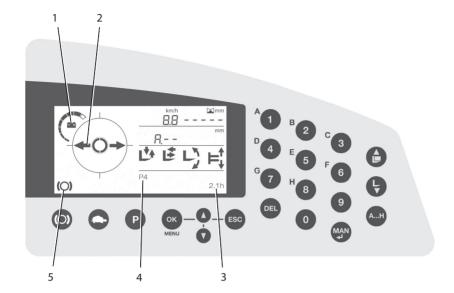


The switch key, FleetManager card (variant), FleetManager transponder chip (variant) or FleetManager PIN code (variant) must not be passed to others unless explicit instructions to this effect have been given.





Displays after the switch-on process (for trucks with default options)





Depending on the truck equipment, further information may be visible on the display and operating unit.

Battery charge(1)

The usable battery charge is shown in the display field.



After connecting a partially charged battery:

 If the current battery charge level is higher than the value stored most recently by the truck, the most recently stored value is initially displayed. The correct battery charge level is not displayed until the current value drops below the most recently stored value

Steering position(2)

The symbol for the neutral steering position is shown in the display field. The actual drive



direction is only selected when the drive direction switch has been actuated once.

Operating hours(3)

The current value of the hour meter is shown in the display field.

Drive programme(4)

The current drive programme (1-4) is shown in the display field.

Parking brake status(5)

The display field indicates that the parking brake has been applied.



If malfunctions are displayed, refer to the information in the chapter entitled "Display messages".

Access authorisation with PIN code (variant)

The truck functions can be activated using a five-digit PIN code. A button is used in place of the key switch. Press the button to activate the truck. After the button is pressed, a message appears in the display and the symbol flashes. The five-digit numerical code must now be entered via the keypad.

If the PIN code is entered incorrectly three times, an acoustic signal sounds.

Press the button again to switch off the truck.



Operating the signal horn

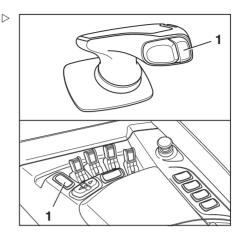


i NOTE

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

- Push the signal horn button (1).

The signal horn sounds.



Checking the brake system for correct function

A DANGER

If the brake system fails, the truck will be braked insufficiently or not braked at all, posing a risk of accident!

Do not commission the truck with a defective brake system.

Checking the service brake

There must be a distance of at least 60 mm between the pressure point and the brake pedal stop.

- Accelerate the truck without a load in a clear area; see "Driving" chapter.
- Press the brake pedal firmly; see the chapter entitled "Operating the service brake".

The truck must decelerate noticeably.

Checking the generator brake

- Accelerate the truck without a load in a clear area; see "Driving" chapter.
- Release the accelerator pedal; see the chapter entitled "Starting drive mode".



The truck must decelerate slightly.

Checking the reverse brake

- Accelerate the truck without a load in a clear area; see "Driving" chapter.
- Change the drive direction in inching mode; see the chapter entitled "Selecting the drive direction".

The braking and subsequent acceleration processes in the opposite direction must be gentle and not subject to jerking movements.

Checking the electromagnetic parking brake

A 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 with wedges on the side facing downhill.
- Only leave the truck once the parking brake has been applied.
- Accelerate the truck to walking speed.
- Ensure that you have a secure grip on the truck; hold onto the steering wheel with your left hand.
- Apply the parking brake; see the chapter entitled "Applying the electromagnetic parking brake".

The parking brake is applied. The truck must be braked to a standstill with a noticeable delay.

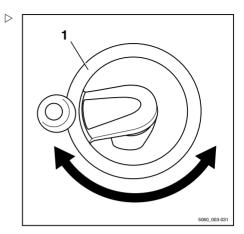


Checking the steering system for correct function

Operate the steering wheel (1). The steering must be continuous and move freely.



In the "180° steering" variant, the drive's maximum steering angle is ±90°.

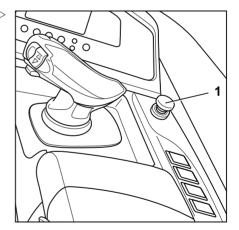


Checking the emergency off function ▷

- Accelerate the truck to walking speed.
- Ensure that you have a secure grip on the truck; hold onto the steering wheel with your left hand.
- Press the emergency off switch (1).

The parking brake is applied. The truck must be braked to a standstill with a noticeable delay.

 Pull the emergency off switch (1) upwards until it is unlocked. The truck performs an internal self-test and is then ready for operation again.





Checking the "automatic tilting centre position" (variant) for correct function



Perform the "Automatic tilt to centre position" function check each time before using the truck.

The driver can use the "automatic tilt to centre position" function to change the tilt of the fork arms to 0° automatically. Depending on the truck version, either only the fork carriage (fork tilter) or the entire lift mast (mast tilter) is positioned. To do this, the pushbutton must be actuated until the function switches off automatically.

 Tilt the fork carriage or the entire lift mast towards the drive side.

The fork carriage or the entire lift mast must tilt fully to the drive side and move gently as far as the end stop.

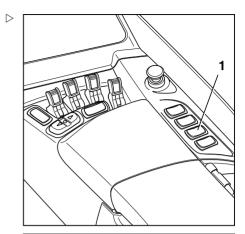
 Push the transition shift/tilt centre position push button (1) on the right-hand side.

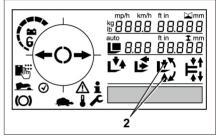
In the display-operating unit, the arrows (2) on the "transition shift" symbol must flash until the centre position is reached.

Once the function has switched off automatically, the tilt of the fork arms must be in the 0° position.

 Tilt the fork carriage or the entire lift mast towards the load side.

The fork carriage or the entire lift mast must tilt fully to the load side and move gently as far as the end stop.







Lighting

Lighting

STILL SafetyLight (variant)

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.

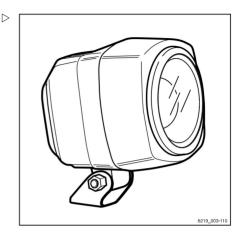
STILL SafetyLight is mounted on a support on the overhead guard such that it is not affected by jolts and vibrations. It projects one or more light blue light spots approximately 5 meters in front of or behind the truck and thus warns others about the approaching truck.



▲ WARNING

Danger of damage to eyes when looking into the STILL SafetyLight.

Do not look into the STILL SafetyLight.





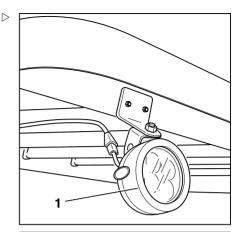
Switching the working spotlights (variant) on and off

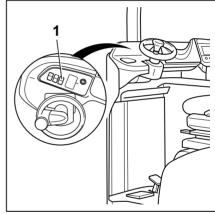
There is an option to have the truck fitted with one or several working spotlights (1) to improve illumination of the working area.

- Switch on the truck.
- Push the button (2) for the working spotlights.

The working spotlights (1) are switched on.

 Push the button (2) again to switch the working spotlights off again.







Efficiency and drive modes

Efficiency and drive modes

Blue-Q efficiency mode

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.

Blue-Q has no influence on:

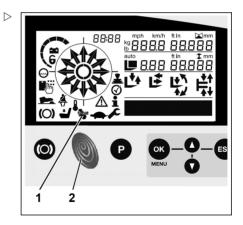
- Maximum speed
- · Climbing capability
- · Pulling force
- · Braking characteristics

Switching the Blue-Q efficiency mode on and off

- Press the Blue-Q button (2).

The Blue-Q symbol (1) appears in the display and operating unit, which means that the Blue-Q efficiency mode is switched on.

Pressing the Blue-Q button once again turns the Blue-Q efficiency mode off again.



OPTISPEED - Continuously variable reduction in driving speed or hydraulic functions (variant)

The OPTISPEED variant assists the driver by providing two additional functions:

- Reduction of driving speed when turning (Curve Speed Control)
- · Reduction in speed of hydraulic functions



Depending on the truck equipment, the two functions may be present either individually or together.

Reduction of driving speed when turning (Curve Speed Control)

This variant optimises the speed of the truck as the steering angle increases. This assists the driver in handling the truck.

A DANGER

The stability limits defined by the laws of physics are still in effect even when the "reduction of speed when turning" function is active. There is a risk of tipping!

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

A DANGER

Risk of tipping if cornering speed is too high!

If the controller is switched off or fails while driving, the driving speed will no longer be reduced on cornering.

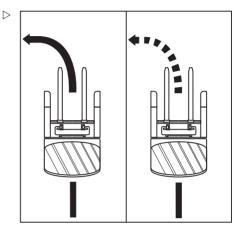
- Do not switch off the truck while driving.
- Actuate the emergency off switch in emergencies only.
- Always adapt your driving style to the conditions.
- Do not take risks with safety.

In the following situations, the truck may overturn in extreme cases:

- 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.

Reduction in speed of hydraulic functions

This variant optimises the speed of the hydraulic functions, taking the lift height and load weight into account. The reduced load vibrations assist the driver when handling the truck.



Driving

A DANGER

Risk of tipping due to change in vibration characteristics of the load!

If the controller is switched off or fails, the speed of the hydraulic functions will no longer be reduced.

- Always adapt the use of the hydraulic functions to suit the situation.
- Do not take risks with safety.

The optimisation of the hydraulic functions affects the following functions:

- · Shifting the reach carriage
- · Tilting the lift mast
- · Transition shift of the lift mast

This variant can also be equipped with the following additional functions:

- · Lift height indicator
- · Lift height preselector
- · Transition shift centre position
- · Tilting centre position

Driving

Safety regulations when driving

Driving conduct

The driver must comply with the highway code when driving within the plant.

The speed must be appropriate to the local conditions.

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

The driver must always maintain a safe braking distance from trucks and persons in front, and must always have the truck under control. He must avoid stopping suddenly, turning at speed and overtaking in dangerous places or in blind spots.

Before driving with or without a load, the forks must be lowered as far as possible.



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

The following are forbidden when 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
- · Disabling the restraint system
- Raising the load higher than 500 mm above the ground (with the exception of manoeuvring processes when placing loads into stock/removing loads from stock)
- Using electronic devices, for example radios, mobile phones etc.

▲ WARNING

The driver's attention is adversely affected by operating multimedia and communication devices or listening to these devices at an excessive volume during travel or when handling loads. 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 the use of mobile phones is prohibited, it is absolutely not permitted to use a mobile phone or radio telephone.

- Switch off the devices.

Visibility when driving

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

In a reach truck, the driver's visibility may be restricted by the lift mast or the load in particular. The driver must be sure that the route is clear, particularly when travelling in the load direction.

Loads that impair visibility must be transported in the truck's drive direction.



Driving

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.

Additional rear-view mirrors may only be used for observing the road area on the load side of the truck and not for travelling in the load direction. If visual aids (mirror, monitor) are required to achieve sufficient visibility, it is necessary to practise using them. Extra care should be taken when travelling in the load direction if you are using visual aids.

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

Any glass and mirrors must always be clean and free of ice.

Panoramic mirror

The panoramic mirror (1) may only be used for observing the road area on the load side of the truck and not for travelling in the load direction. Extra care should be taken when travelling in the load direction if you are using visual aids.

The panoramic mirror must always be clean and free of ice.

Any damage to the panoramic mirror that could restrict the driver's visibility must be rectified immediately.

The position of the panoramic mirror may only be changed in such a way that the area behind the lift mast remains visible.

1

Roadways

Dimensions of roadways and aisle widths

Within the EU, Directive 89/654/EEC (minimum safety and health requirements for the workplace) must be observed. The respective national guidelines apply for areas outside of the EU. In each case, it must be checked whether a larger aisle width is necessary, e.g. in the case of different load dimensions.



 \triangleright

The truck may only be used on roadways that do not have excessively sharp bends, excessively steep gradients or excessively narrow or low entrances.

Driving on ascending and descending gradients

▲ WARNING

Driving up and down longer gradients may result in the drive unit overheating or the minimum specified braking values being exceeded.

- Do not drive up or down longer gradients
- Do not exceed the maximum permissible gradients for roadways (refer to table below)

The truck is designed for normal operation on smooth, even roadways without major gradients, up to a maximum of 3%.

The following gradients (e.g. on ramps) must not be exceeded under any circumstances when using the truck:

Truck type	Max. permissible gradient in %		
Truck type	With load	Without load	
FM-X 14 SE, FM-X 17 SE, FM-X 20 SE	10	10	

Picking up a load, putting down a load, stacking or unstacking is only permitted on a horizontal, level surface.

Condition of the roadways

Roadways must be sufficiently firm, smooth and even. The surface must be free from dirt 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.

Ensure that manhole covers, drain covers etc. offer a sufficient load capacity.

The permitted area load and point load of the roadways must not be exceeded. 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 truck's lift mast and the dimensions of the load.

Rules for roadways and the working area

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

Hazard areas

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



Side chassis supports

Side chassis supports (1) on the rear left and right of the truck support the truck if it tips to the side.

The permissible distance "X" for the ground clearance of the chassis supports (2) is noted on the load capacity diagram on the truck. It must be observed at all times.

The size of this distance depends on following factors:

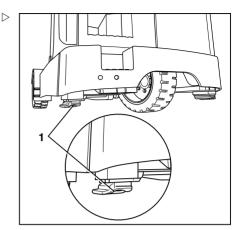
- · Height of the lift mast
- · Load capacity of the truck
- · Size of the battery tray

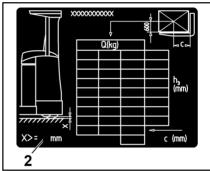
▲ WARNING

Risk of accident due to limited residual load capacity of the truck.

The side chassis supports have an important impact on the residual load capacity of the truck.

 If the truck frequently bottoms out, check the support distance "X" regularly and have it adjusted by the authorised service centre if necessary





Enabling truck functions using the foot switch and seat switch

The foot switch and seat switch are there for safety purposes during operation of the truck. The complete range of truck functions is available only when the driver is sitting on the driver's seat and then actuates the foot switch.



Enabling the truck functions using the foot switch

The truck's drive function and hydraulic functions are enabled only when the driver actuates the foot switch (1). The left foot is therefore protected within the contour of the truck.

Trucks with one accelerator pedal

The hydraulic functions are only enabled if:

- The seat switch and the foot switch have been actuated
- The required hydraulic function is then selected
- · The switches are all functioning correctly

The drive function is only enabled if:

- · The parking brake has been released
- The seat switch and the foot switch have been actuated but the accelerator pedal has not
- · The accelerator pedal is then actuated
- The switches are all functioning correctly

If the switch malfunctions during operation, the truck is braked to a standstill or to a speed of 2.5 km/h, according to truck type, and a corresponding message appears in the display and operating unit.



NOTE

Once the truck has been switched on, the parking brake must first be released one time. The parking brake will only be released once the accelerator pedal is activated slightly.

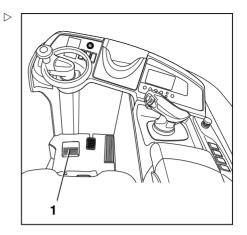
Trucks with two accelerator pedals (variant)

The hydraulic functions are only enabled if:

- · The seat switch has been actuated
- The switch is functioning correctly

The drive function is only enabled if:

- · The parking brake has been released
- The seat switch has been actuated but the accelerator pedals have not





- One of the accelerator pedals is then actuated
- The switches are all functioning correctly



The parking brake is released once one of the accelerator pedals is actuated slightly.

Enabling the truck functions using the seat switch

The seat switch monitors whether or not a driver is seated on the driver's seat. The seat switch must always be actuated first, and then the foot switch. Only then can the driver select the drive function or the hydraulic functions.

If the switch malfunctions during operation, the truck is braked to a standstill or to a speed of 2.5 km/h, according to truck type, and a corresponding message appears in the display and operating unit.

If the seat switch is defective or if the switch was not actuated at least once within an eight-hour period, the controller also assumes that there is a malfunction.

 If the problem persists after the driver's seat has been occupied once and then vacated, please contact the authorised service centre.



If the truck remains switched on for longer than eight hours in total, the switch status of the seat switch must change at least once. As a rule, this does happen during normal operation. If this has not happened, the seat switch must be released and then re-actuated once while the truck is switched on.



Setting the drive programme

Setting

The driving and braking characteristics of the drive can be set on the display and operating unit.

Four different drive programmes can be set. Depending on the drive programme selected, different driving characteristics are applied in relation to the maximum speed, acceleration behaviour* and deceleration behaviour**. Essentially, the higher the number of the drive programme, the greater the driving dynamics.

When a truck is delivered, it is set to drive programme 4 (P4).

The factory-set parameters are shown in the table

Code	1	2	3	4
V _{max} (km/h)	10	12	14	14
*m/s ²	0.6	1.1	1.4	1.8
**m/s ²	0.8	1.0	1.0	1.2



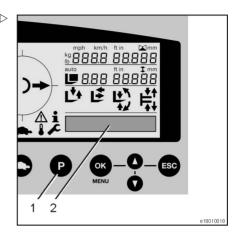
Only the drive programme can be changed. The characteristic for the relevant drive programme can only be changed by authorised service personnel.

Adjustment process

- The drive profile changes each time the "P" button (1) is pressed (P1 - 4).
- The selected drive programme is indicated on the display (2).

Creep speed drive programme

- Push the "tortoise" button on the display and operating unit.
- The "tortoise" symbol appears on the display and the "creep speed" drive programme is selected.





Selecting the drive direction

The desired drive direction of the truck must be selected using the drive direction switch before attempting to drive. When the truck is switched on, there is initially no drive direction selected. The drive direction indicator on the display and operating unit shows the "neutral position" symbol (1).

Actuation of the drive direction switch depends on which operating devices are fitted on the truck.

Possible equipment variants include:

- Joystick 4Plus, refer to the chapter entitled "Actuating the drive direction switch, joystick 4Plus"
- **Fingertip**; see the chapter entitled Actuating the drive direction switch, fingertip.



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

After actuating the drive direction switch, the drive direction is shown on the display and operating unit (2).

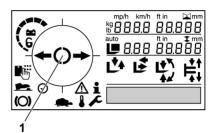
Neutral position

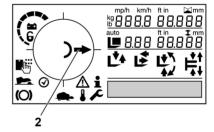
If the truck is stopped for an extended period, select the neutral position to prevent the truck from suddenly starting if the accelerator pedal is pressed inadvertently.

 Lightly actuate the drive direction switch for the drive direction opposite to the current direction.

The drive direction indicator on the display and operating unit changes to show the "neutral position" symbol.

 Actuate the drive direction switch again to select a drive direction.







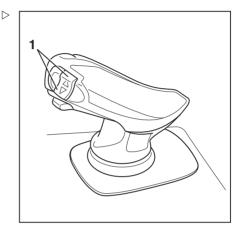


i NOTE

When the driver leaves the seat, the direction switch is set to neutral. To drive, the direction switch must be actuated again.

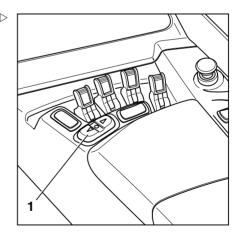
Actuating the drive direction switch, joystick 4Plus

- For "travelling in the load direction", press the drive direction switch (1)up.
- For "travelling in the drive direction", press the drive direction switch (1)down.



Actuating the drive direction switch, fingertip

- For "travelling in the load direction", press the drive direction switch (1) on the righthand side.
- For "travelling in the drive direction", press the drive direction switch (1) on the left-hand side.





Starting drive mode, single-pedal version

A DANGER

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

- Sit down on the driver's seat.
- During work, ensure that you have a secure grip on the truck and a stable seat position. Hold on tight to the steering wheel with your left hand.

Observe the information in the chapter entitled "Safety regulations when driving".

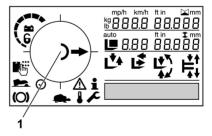
The driver's seat is equipped with a seat switch. In the event of an operating error or malfunction, see the chapter entitled "Enabling truck functions using the foot switch and seat switch".

- 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 selected drive direction is shown on the display and operating unit (1).



Depending on the equipment, an acoustic or visual warning signal is issued in relation to the drive direction (variant).





Actuate the accelerator pedal (2).

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



NOTE

The truck can be held at a standstill briefly on upward or downward gradients without actuating the parking brake (anti-roll brake for slopes). The truck will then begin to creep downhill slowly.

Changing the drive direction

- Remove foot from accelerator pedal.
- Select the desired drive direction.
- Actuate the accelerator pedal.

The truck will travel in the selected drive direction



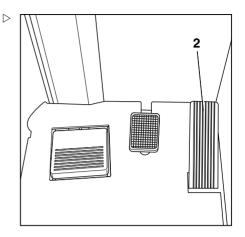
NOTE

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



NOTE

In the event of an electrical fault with the accelerator the drive unit is shut down. The truck is braked by regenerative braking. The truck cannot be driven again until the accelerator pedal has been released and then actuated again. If the truck still cannot be operated, park it securely and contact your authorised service centre.





Starting drive mode, dual-pedal version (variant)

A DANGER

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

- Sit down on the driver's seat.
- During work, ensure that you have a secure grip on the truck and a stable seat position. Hold on tight to the steering wheel with your left hand.

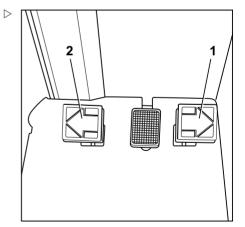
Observe the information in the chapter entitled "Safety regulations when driving".

The driver's seat is equipped with a seat switch. In the event of an operating error or malfunction, see the chapter entitled "Enabling truck functions using the foot switch and seat switch".

- Lift the fork carriage until the necessary ground clearance is achieved.
- Tilt the lift mast backwards.
- Release the parking brake.
- To "travel in the load direction", press the right-hand accelerator pedal (1).
- To "travel in the drive direction", press the left-hand accelerator pedal (2).



In the dual pedal version, any drive direction switches on the operating devices will not function.





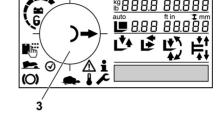
The selected drive direction is shown on the display and operating unit (3).





Depending on the equipment, an acoustic or visual warning signal is issued in relation to the drive direction (variant).

The truck will travel in the selected drive direction. The speed is controlled by the accelerator pedal position. When the accelerator pedal is released, the truck decelerates.



km/h

i NOTE

The truck can be held at a standstill briefly on upward or downward gradients without actuating the parking brake (anti-roll brake for slopes). The truck will then begin to creep downhill slowly.

Changing the drive direction

- Remove foot from actuated accelerator pedal.
- Actuate the accelerator pedal for the opposite direction.

The truck will travel in the selected drive direction



In the event of an electrical fault with the accelerator the drive unit is shut down. The truck is braked by regenerative braking. The truck cannot be driven again until the accelerator pedal has been released and then actuated again, provided that the electrical fault has been corrected. If the truck still cannot be operated, park it securely and contact your authorised service centre.



Operating the service brake

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

The electric brake converts the acceleration energy of the truck into electrical energy as soon as the accelerator pedal is released. This causes the truck to brake

The truck can also be braked with the mechanical brake by actuating the brake pedal (2). When the pedal is pressed gently, the mechanical brake acts on the load wheels in addition to the electric brake. When the pedal is pressed firmly, the braking effect of both brake systems increases.



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

If the driver detects an abnormal decrease in the braking effect, there may be a technical fault.

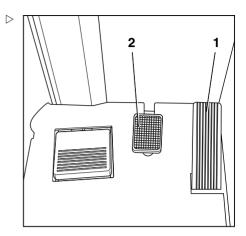
- Press the emergency off switch to bring the truck to a standstill with the electromagnetic parking brake.
- Notify the authorised service centre.
- Do not operate the truck again until the service brake has been repaired.

A 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.

- 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.





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Applying the electromagnetic parking brake

A DANGER

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

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

The parking brake helps the driver to park the truck safely. It is released or applied manually or via additional automatic functions. Despite these automatic aids, the driver is always responsible for parking the truck safely. The safety information about safe parking of the truck applies.

Functions of the parking brake when the truck is at a standstill

Release of the parking brake by the driver

When the truck is ready for operation, the driver can release the parking brake at any time by pushing the button.

- Sit on the driver's seat.
- Push the button (1) to release the parking brake.

The parking brake is released audibly and the symbol (2) on the display and operating unit disappears.

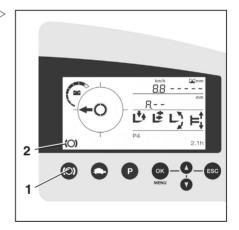
Application of the parking brake by the driver

 Push the push button (1) to apply the parking brake.

The parking brake is applied audibly and the symbol (2) is shown on the display and operating unit.

Automatic release of the parking brake when the driver sets off

The parking brake is released automatically when the driver sets off provided that the parking brake has been manually released once since the truck was switched on.





- Sit on the driver's seat
- Select the drive direction (single-pedal version only).
- Press the foot switch.
- Actuate the accelerator pedal.

The parking brake is released automatically and audibly, and the symbol on the display and operating unit disappears. The truck moves off.

Automatic application of the parking brake

Cause	Effect
If the driver's seat is vacated or the foot switch is released:	After 3 seconds, the parking brake closes audibly. The symbol (2) is shown in the display-operating unit.
If the truck is switched off:	The parking brake is applied immediately and audibly. The symbol (2) is shown briefly on the display and operating unit until the control units switch off.
If the emergency off switch is actuated or as a result of an emergency off function:	The parking brake is applied immediately and audibly, and the symbol (2) is shown on the display and operating unit.

Functions of the parking brake when the truck is moving

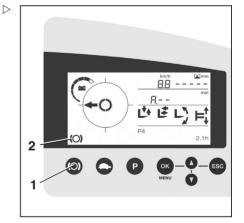
Application of the parking brake by the driver



Braking with the parking brake while the truck is in motion will result in heavy wear of the brake linings. Therefore, always use regenerative braking or the mechanical brake to brake while the truck is in motion. Only use the parking brake while the truck is in motion in the event of an emergency.

- Ensure the truck has a secure grip. Hold on tight to the steering wheel with your left hand.
- Push the push button (1) to apply the parking brake.

The parking brake is applied immediately and audibly, and brings the truck to a standstill.





The symbol (2) is shown in the display and operating unit.

Automatic application of the parking brake

Cause	Effect
	The parking brake is applied immediately and audibly. The symbol (2) is shown briefly on the display and operating unit until the control units switch off.
If the emergency off switch is actuated or as a result of an emergency off function:	The parking brake is applied immediately and audibly, and the symbol (2) is shown on the display and operating unit.



If the driver's seat is vacated or the foot switch is released while the truck is in motion, the parking brake is not applied. The truck is then brought to a standstill by regenerative braking.

Steering



NOTE

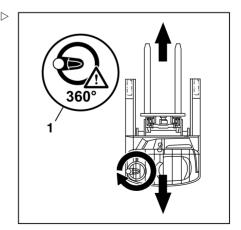
Please do not steer when the truck is at a standstill, as this causes the drive wheel to be put under extreme pressure and therefore increases wear.

360° steering (standard)

The steering wheel has no mechanical stops and can be continuously turned.

Starting in the straight-ahead position, the steered wheel reaches the 90° position after 2, 21/2 or 3 revolutions (can be configured) of the steering wheel. This position corresponds to the truck's smallest turning radius. The steering can be turned further from this position (1), which reverses the drive direction.

The drive direction indicator on the display and operating unit shows the actual drive direction.



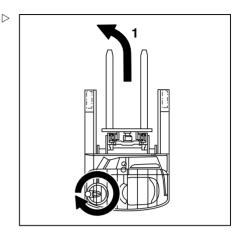


180° steering (variant)

The steering wheel has no mechanical stops and can be continuously turned.

The path of travel (1) is determined by turning the steering wheel. The maximum steering angle of the steered wheel is 90° to each side. To reverse the drive direction, the drive direction switch must be actuated

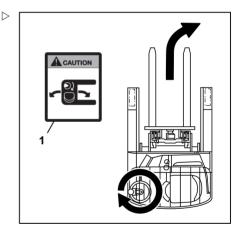
The drive direction indicator on the display and operating unit shows the actual drive direction.



Reverse steering (variant)

If the steering wheel is turned clockwise when travelling in the load direction, the truck will move to the right. If the steering wheel is turned anticlockwise when travelling in the load direction, the truck will move to the left.

Trucks with reverse steering are marked with an adhesive label (1) next to the steering wheel adjustment mechanism.



Emergency operation of the reach measurement system

When driving over bumps or foreign bodies in the reach measurement system, the system can temporarily lose the current shift position. If the reach travel position cannot be measured, the measurement system operates only in emergency operation.



Effects of emergency operation

- The position of the reach carriage is no longer shown in the display
- The "shift" function is performed at a reduced speed
- The reach carriage moves abruptly into the end stops
- The error number A3421 is shown in the display

The driver can correct a temporary malfunction:

- Re-reference the reach measurement system
- Check the reach measurement system for foreign objects

If the malfunction persists after the test, contact your authorised service centre.

Re-referencing the reach measurement system

A temporary malfunction of the reach measurement system can be corrected by approaching the reference points of the system. To do this, the reach carriage must be fully retracted and extended several times.

 Fully retract the reach carriage. Extend the reach carriage again. Retract the reach carriage again.

The reach carriage must then be moved gently into the end stops and the reach travel position must be shown in the display again.



Checking the reach measurement system for foreign objects

A DANGER

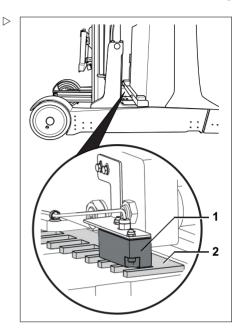
Risk of injury due to movement of the reach carriage during the test

Switch the truck off before the test. Disconnect the battery male connector.

The reach measurement system consists of the reach travel sensor (1) and a reference bar (2). Foreign objects between the sensor and the reference bar may interfere with the reach travel measurement. The driver can perform a visual inspection.

The reach travel measurement is located on the left load wheel support of the reach carriage.

- To gain access to the measurement system, fully extend the truck battery with the reach carriage. To do this, observe the information in the chapter entitled "Operation/Handling the battery/Actuating the battery lock".
- Switch off the truck. Disconnect the battery male connector.
- If necessary, remove any foreign objects between the sensor and the reference bar.
- Connect the battery male connector. Switch the truck on.
- Fully retract the reach carriage with the battery again until the battery lock engages audibly.
- Then re-reference the reach measurement system (see above).





Parking

Parking

Parking the truck securely

A 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 with wedges on the side facing downhill.
- Only leave the truck once the parking brake has been applied.

A DANGER

There is a risk to life caused by a falling load or if parts of the truck are being lowered!

Before leaving the truck, lower the load fully.

A CAUTION

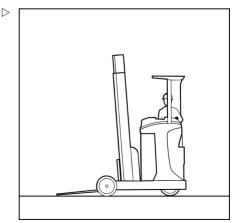
Batteries may freeze!

At an ambient temperature of below –10°C for a prolonged period, the batteries cool down. The electrolyte may freeze and damage the batteries. The truck is then not ready for operation.

- At ambient temperatures of below -10°C, only park the truck for short periods of time.
- Actuate the pushbutton for the parking brake (refer to the chapter entitled "Applying the electromagnetic parking brake").
- Retract the reach carriage fully.
- Lower the fork 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.
- Switch off the truck. If the switch key is present, pull it out (variant).



The switch key, FleetManager card (variant), FleetManager transponder chip (variant) or FleetManager PIN code (variant) must not be passed to others unless explicit instructions to this effect have been given.





Lifting

Lifting system variants

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

- The lift mast fitted on the truck; see the chapter entitled "Lift mast versions"
- The operating device that is used to control the hydraulic functions; see the chapter entitled "Lifting system operating devices"

Regardless of the equipment variants of the truck, the basic specifications and procedures must be observed; see the chapter entitled "Safety regulations for working with loads".

Lift mast versions

A DANGER

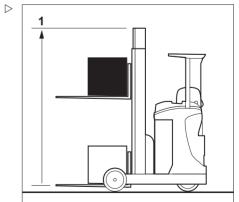
Risk of accident due to collision of the lift mast or load with low ceilings or entrances.

- 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 installed in the truck:

Telescopic lift mast

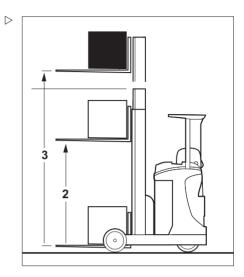
During lifting, the lift mast rises above the outer lift cylinders, bringing the fork carriage with it via the chains (fork carriage rises twice as fast as the inner lift mast). The top edge (1) of the inner lift mast can therefore be higher than the fork carriage.





Triplex lift mast (variant)

During lifting, the inner lift cylinder raises the fork carriage up to the free lift (2) and then the outer lift cylinders raise the inner lift mast straight up to the max. height (3).



Lifting system operating devices

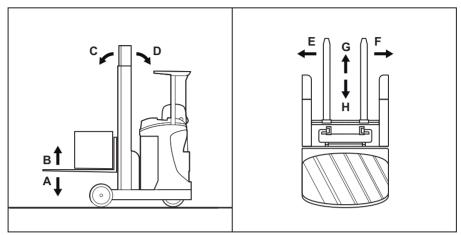
The operation of the lifting system depends on the operating devices that are fitted on the truck.

Possible equipment variants include:

- Joystick 4Plus; refer to the chapter entitled "Joystick 4Plus lifting system"
- Fingertip switch; refer to the chapter entitled "Fingertip switch lifting system"



Joystick 4Plus lifting system



A / B Lowering/lifting the fork carriage C / D Tilting the lift mast (variant)

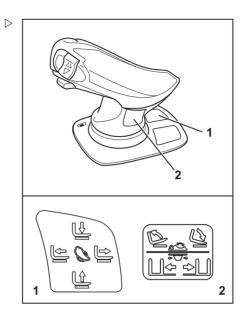
E/F Transition shift (variant)
G/H Shifting

A DANGER

Reaching 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.

- Always observe the safety regulations for handling loads; see ⇒ Chapter "Safety regulations when handing loads", P. 4-136.
- Only operate the lifting system from the driver's seat.

In this version, the hydraulic functions are controlled using the joystick 4Plus. The pictogram (1) shows the basic hydraulic functions and how they are controlled using the joystick. The pictogram (2) shows the 3rd and 4th function and their operation.



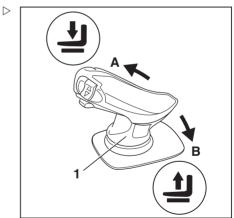
Lifting/lowering the fork carriage

To lift the fork carriage:

- Pull the joystick (1) in the direction of "B".

To lower the fork carriage:

- Push the joystick (1) in the direction of "A".





Tilting the lift mast or fork carriage (variant)

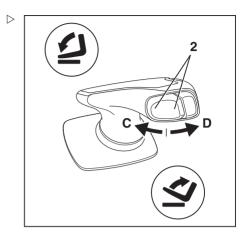
Depending on the truck equipment, either the entire lift mast is tilted or just the fork carriage (fork tilt device).

To tilt the lift mast backwards:

- Push the rocker button (2) towards "D".

To tilt the lift mast forwards:

- Push the rocker button (2) towards "C".



Transition shift (variant)

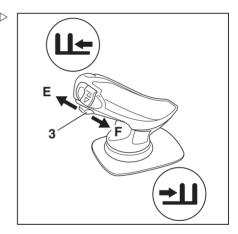
Depending on the truck equipment, either the entire lift mast is shifted to the side or just the fork carriage (fork sideshifter).

Transition shift to the left:

- Slide the slider (3) towards "E".

Transition shift to the right:

- Slide the slider (3) towards "F".





Shifting

To extend the reach carriage:

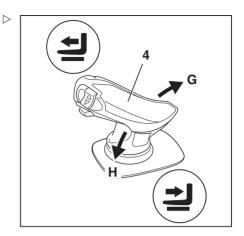
- Push the joystick (4) in the direction of "G".

To retract the reach carriage:

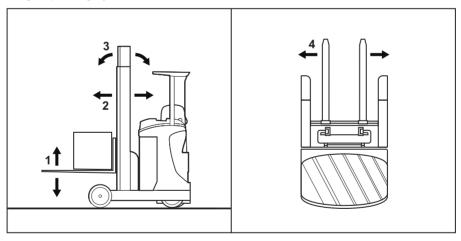
- Push the joystick (4) in the direction of "H".



The pictograms on the base of the joystick show the direction of movement for the corresponding hydraulic function.



Fingertip lifting system



- 1 Lowering/lifting the fork carriage
- 2 Shifting

- 3 Tilting the lift mast or fork carriage (variant)
- 4 Transition shift (variant)



A DANGER

Reaching 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.

- Always observe the safety regulations for handling loads; see ⇒ Chapter "Safety regulations when handing loads", P. 4-136.
- Only operate the lifting system from the driver's

Lifting/lowering the fork carriage

To lift the fork carriage:

Pull the "lift/lower" operating lever (1) backwards.

To lower the fork carriage:

Push the "lift/lower" operating lever (1) forwards.

Shifting

To extend the reach carriage:

- Push the "shift" operating lever (2) forwards.

To retract the reach carriage:

Pull the "shift" operating lever (2) backwards.

Tilting the lift mast or fork carriage (variant)

Depending on the truck equipment, either the entire lift mast is tilted or just the fork carriage (fork tilt device).

To tilt the lift mast forwards:

- Push the "tilt" operating lever (3) forwards.

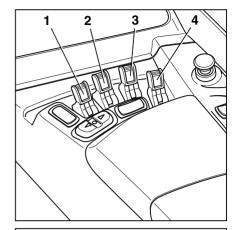
To tilt the lift mast backwards:

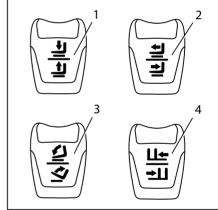
Pull the "tilt" operating lever (3) backwards.

Transition shift (variant)

Depending on the truck equipment, either the entire lift mast is shifted to the side or just the fork carriage (fork sideshifter).

Transition shift to the left:







Push the "transition shift" operating lever
 (4) forwards.

Transition shift to the right:

Pull the "transition shift" operating lever (4) backwards.



The pictograms on the operating levers show the direction of movement for the corresponding hydraulic function.

Automatic lift cut out (variant)

The automatic lift cut-out interrupts the lifting of the load at a certain height. The height must be set by the authorised service centre.

Intermediate lift cut-out (acknowledgeable)

The intermediate lift cut-out makes frequent approaches to a required lift height easier.

The driver can override the lift cut-out by pressing the acknowledge button (1) or by pressing shift key "F"(3). As soon as the fork is lowered below the limit height, the lift cut-out is active again. As a result, the lift cut-out can be used in different hall areas with different lift heights.

Overriding the lift cut out by pressing the acknowledge button:

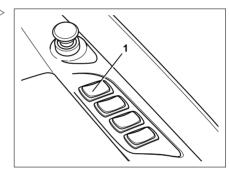
 Press the acknowledge button (1) to override the cut out.

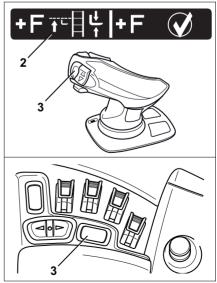
Overriding the lift cut out by pressing the "F button":

 The adhesive label (2) indicates that the "F button" (3) is another option that can be used to acknowledge commands.

Move the joystick or the fingertip switch to the zero position. Within one second, press the "F button" and release it again to override the cut-out.

If the "F button" is not pressed and then released within one second, the default function of the F button is restored automatically.







Lift cut-out limit stop (not acknowledgeable)

The lift cut-out limit stop prevents the lift mast being extended up to the maximum possible lift height. This helps to prevent lift mast collisions, for example, if the ceiling of the hall is lower than the maximum lift height of the truck.

The driver cannot cancel the lift cut-out limit stop.



Reach-lower lock (variant)

The reach/lower lock prevents the load forks from being lowered between the running wheel beams for the entire time that the reach carriage is in the retracted position. As a result, wide loads cannot accidentally come to rest on the running wheel beams during lowering and become unstable. The driver can override the cut out by pressing the acknowledge button (1) or by pressing the "F button"(2).

Placing loads down on the ground

- Lower the fork carriage to the interlock.
- Extend the reach carriage in the load direction to the stop.
- Fully lower the fork carriage.

When the reach carriage is fully extended, the fork carriage can be lowered fully without the lock. It is not then possible to retract the reach carriage. This prevents the load from being "stripped". The driver must first lift the load "free" again (to a height greater than 400 mm) or override the cut-out by pressing the acknowledge button.

Overriding the reach/lower lock by pressing the acknowledge button:

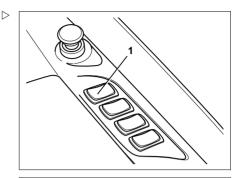
 Press the acknowledge button (1) to override the cut out.

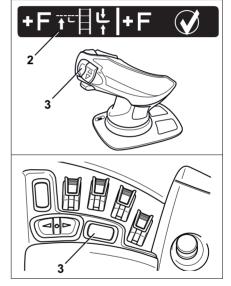
Overriding the reach/lower lock by pressing shift button "F":

 The adhesive label (2) indicates that the "F button" (3) is another option that can be used to acknowledge commands.

Move the joystick or the relevant fingertip switch to the zero position. Within one second, press the "F button" and release it again to override the cut-out.

If the "F button" is not pressed and then released within one second, the default function of the F button is restored automatically.







Automatic centre position (variant)

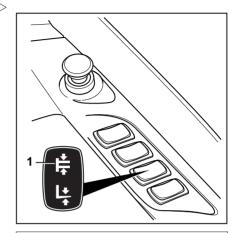
Automatic transition shift centre position >

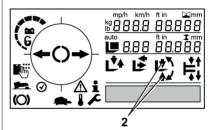
The driver can use the "automatic transition shift centre position" function to position the transition shift in the centre automatically. To do this, the pushbutton must be actuated until the function switches off automatically. Depending on the truck version, either only the fork carriage (sideshift) or the entire lift mast (mast traversing) is positioned.

 Push the "transition shift/tilt centre position" pushbutton (1) on the right-hand side until the function switches off automatically.

The arrows (2) on the display and operating unit flash until the end position is reached.

The truck positions the transition shift in the centre position.







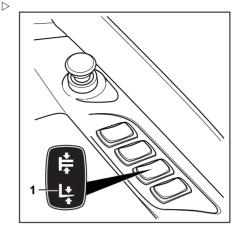
Automatic tilting centre position

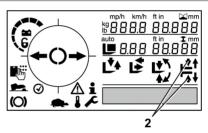
The driver can use the "automatic tilt to centre position" function to change the tilt of the fork arms to 0° automatically. To do this, the pushbutton must be actuated until the function switches off automatically. Depending on the truck version, either only the fork carriage (fork tilter) or the entire lift mast (mast tilter) is positioned.

 Push the "transition shift/tilt centre position" pushbutton (1) on the left-hand side until the function switches off automatically.

The arrows (2) on the display and operating unit flash until the end position is reached.

The truck tilts the fork arms to the 0° position.

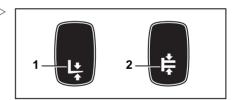




Additional button for automatic centre position (variant)

The automatic centre position transition shift/tilting can be set on two individual buttons as an option. The buttons are labelled with the symbols for the automatic centre position.

 To operate the automatic centre position, observe the symbols (1, 2) of the adjacent buttons.



- 1 "Automatic tilt to centre position" symbol
- 2 "Automatic transition shift centre position" symbol



Speed limitation safety function

▲ WARNING

There is always an increased risk of the truck tipping if it is driven with a raised load.

The system is a support for the driver when placing items into stock and removing items from stock. The responsibility for safe operation and complying with safety regulations remains with the driver.

In main lift load mode, the truck can only accelerate to a maximum of 6 km/h. If the current driving speed is already above this maximum speed, the truck brakes regeneratively to the set maximum speed. The speed limitation is removed as soon as the current lift height is lowered to below the specified value.

The speed limitation cannot be deactivated.

The maximum speed can be set to a value of between 1 km/h and 6 km/h by the authorised service centre.

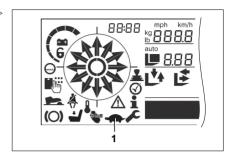
While the maximum speed is being limited, the "tortoise" symbol (1) appears on the display-operating unit.

Changing the fork arms

A DANGER

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

- Do not park the truck on a gradient.
- Apply the parking brake.
- Change the fork arms in a separate, safe location on a level surface.





WARNING

There is a risk of injury when changing the fork arms: the fork arms' weight 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 footwear 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.



- · For installation and removal, a transport pallet is recommended for supporting the fork arms. The pallet size depends on the fork arm size used and should be dimensioned such 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.



Removal

- Extend the reach carriage fully.
- Select a pallet corresponding to the fork arm size.
- 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.
- Switch off the truck.
- 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.

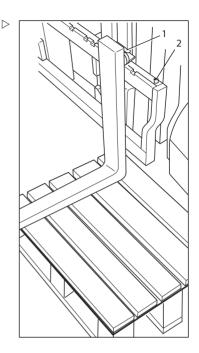
Installation

- Position the fork arms on a pallet to the left or right of the fork carriage.
- Pull the locking lever (1) upwards.
- Push the fork arms onto the fork carriage from the outside towards the centre.
- Move the fork arms into the desired position.
 Ensure that the locking lever snaps into place.
- Fit and tighten the locking screw (2).

A DANGER

There is a risk to life caused by a falling load or fork!

- Tighten the locking screw after every fork replacement.
- It is not permitted to drive or transport loads without the locking screw.





Fork extension (variant)

A DANGER

There is a risk of being run over if the truck rolls away, and therefore a danger to life.

- Do not park the truck on a gradient.
- Apply the parking brake.
- Change the fork extension in a separate, safe location on a level surface.

▲ WARNING

There is a risk of crushing!

The weight of the fork extension can cause crushing or cuts on sharp edges or burrs.

Always wear protective gloves and safety footwear.

▲ 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.

 Observe load capacity, see the "Before picking up a load" chapter.

Attachment

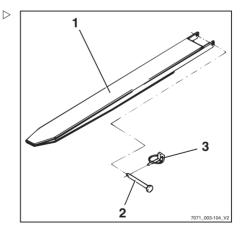
A DANGER

Risk to life from falling load!

At least 60% of the length of the fork extension must lie on the fork arm. A maximum 40% overhang over the fork arm end is permissible. The fork extension must also 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 with the fork extension may fall.

- Push the fork extension completely 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 a securing bolt.
- Always secure the securing bolt with a linch pin.
- Remove the linch pin (3) from the securing bolt (2).





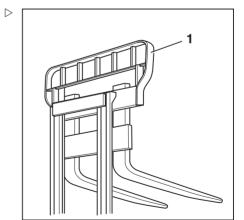
- Remove the securing bolt from the fork extension (1).
- Push the fork extension onto the fork arms until it is flush with the fork back
- Insert the securing bolts located behind the fork back fully into the fork extension.
- Insert the linch pin into the securing bolt and secure.

Removal

- Remove the linch pin (3) from the securing bolt (2).
- Remove the securing bolt from the fork extension (1).
- Pull the fork extension from the fork arms.
- Insert the securing bolt fully into the fork extension.
- Insert the linch pin into the securing bolt and secure.

Load backrest (variant)

The load backrest (1) prevents individual packages from falling backwards when stacking high loads.





Lifting

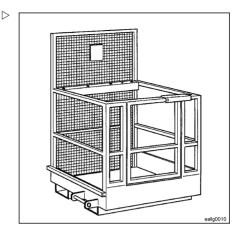
Working platforms

The use of working platforms in conjunction with industrial trucks is regulated by national law.

This legislation should be observed. The use of working platforms is only permitted by virtue of the legislation in the country of use. Before using working platforms, consult your national regulatory authorities.

▲ WARNING

No one should ever stand on the forks to be raised or transported!



Malfunctions in lifting mode

Incorrect extension sequence

A DANGER

Risk of accident!

With triple lift masts (variant), an incorrect extension sequence may occur, i.e. the inner lift mast may extend before the free lift has finished. As a result, the overall height is exceeded and damage can be caused when passing through entrances or in areas with low ceilings.

An incorrect extension sequence can be caused by the following:

- The hydraulic oil temperature is too low
- The fork carriage is blocked in the inner lift mast
- · The free lift cylinder is blocked
- The chain roller for the free lift cylinder is blocked
- 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 the authorised service centre.



Lifting

Load chains not under tension

A DANGER

Danger caused by a falling load!

 Make sure that the chains do not become slack when lowering the load.

Slack chains can be caused by the following:

- The fork carriage or the load is resting on the racking
- The fork carriage rollers are blocked 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 are blocked in the lift mast 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".



Handling loads

Safety regulations when handing loads

The safety regulations for handling loads are shown in the following sections.

A 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!

A 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.

A 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.

Before picking up a load

Load capacity

The load capacity indicated for the truck on the capacity rating plate must not be exceeded. The load capacity is influenced by the load centre of gravity and the lift height as well as by the tyres, if applicable.

The position of the load capacity rating plate can be determined from the identification points; see the chapter entitled "Identification points".



▲ WARNING

The figures show examples.

Only the capacity rating plates on the truck are valid!

The attachment of additional weights to increase load capacity is prohibited.

A DANGER

Risk to life from the truck losing stability!

Never exceed the maximum loads shown! These values apply to compact and homogeneous loads. Otherwise, the stability as well as the rigidity of the fork arms and lift mast cannot be guaranteed.

Improper or incorrect operation or the placement of persons to increase load capacity is prohibited.



Example

Weight of load to be lifted (1)

Permissible lift height (2)

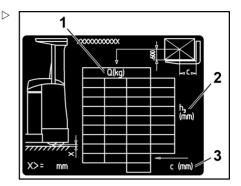
Load distance from fork back (3)

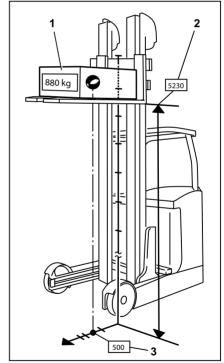
WARNING

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 must be picked up and transported as close to the middle as possible.

If the length of the fork arms is not matched to the depth of the load, this increases the risk of accidents. 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 which is otherwise resting safely on the fork arms may move forward and fall. However, If the fork arms are too long they can catch on loading units behind the load, which then fall over when the load is raised. For help with selecting the correct length of fork arms, contact a qualified service engineer.

A DANGER

Risk of accident from falling load!

When transporting small items, attach a load backrest (variant) to prevent the load from falling on the driver.

A closed roof covering (variant) should also be used.

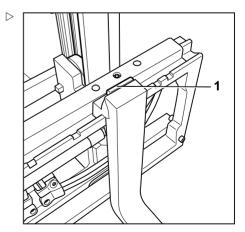
Removable roof panels must not be removed.

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.



A DANGER

Risk of injury!

Do not step on the fork.



A DANGER

Risk of injury!

- Do not step under the raised forks.

A 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.



A DANGER

Danger of death from falling loads!

 Never walk or stand underneath suspended loads.

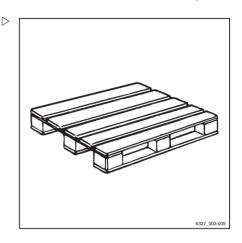


Transporting pallets

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.

A DANGER

Swinging loads can result in the following risks:

- · Impaired braking and steering movement
- · Tipping over the load wheels or drive wheels
- Tipping the truck at right angles to the drive
- · Risk of crushing of accompanying persons
- · Reduced visibility

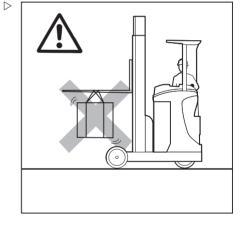
A DANGER

direction

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 of the load is to be prevented by using the proper driving speed and driving manner (careful steering, braking).
- Hanging loads must be coupled 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

A DANGER

Risk of accident!

When transporting suspended loads, never perform or end driving and load movements abruptly.

Never drive on ascending or descending gradients with a suspended load!

It is not permissible to transport containers holding fluids as hanging loads.

Picking up a load



NOTE

Loads may only be picked up and set down on flat surfaces

A DANGER

There is a risk to life caused by a falling load or if parts of the truck are being lowered.

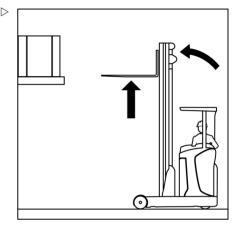
- Never walk or stand underneath suspended loads or raised fork arms.
- Never exceed the maximum load indicated on the capacity rating plate. Otherwise stability cannot be guaranteed.

Only store pallets that do not exceed the permissible measurements. Damaged loading equipment and incorrectly formed loads must not be stored. Store the load so that the spec-



ified aisle width is not reduced by protruding parts.

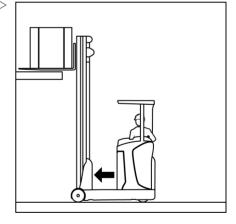
- Approach the racking carefully, brake gently and stop just in front of the racking.
- Tilt the fork arms or lift mast until the fork arms are horizontal.
- Raise the fork carriage to a position for clear entry into the pallet or load.
- Release the brake.
- Drive up to the racking until the truck chassis is as close as possible.
- Brake.



Extend the reach carriage until the fork back > is resting on the load.

The load centre of gravity must be midway between the fork arms.

- Slowly raise the fork carriage until the load is lifted clear of the racking.
- Tilt the fork tips or lift mast to the drive side only as far as necessary to stabilise the load.



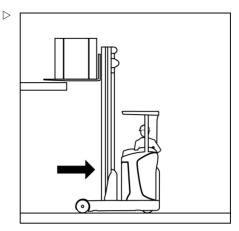


- Retract the reach carriage fully.
- Release the brake.

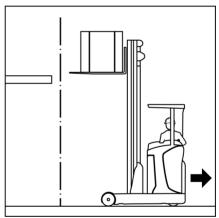
A DANGER

Risk of accident!

- Beware of any people in the danger area.

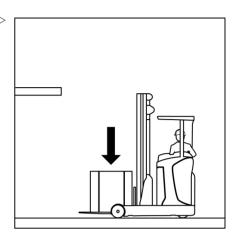


- Ensure that the roadway on the drive side is clear. Move backwards carefully and slowly until the load is clear of the racking.
- Brake.



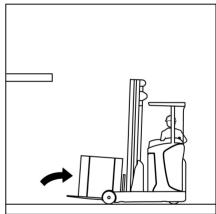


 Lower the load carefully while maintaining ground clearance. Lower wider loads that do not fit between the load wheel posts only until they are not resting on the posts.



- Tilt the fork tips or lift mast fully to the drive side into the driving position.
- Release the brake.

The load can be transported; see the chapter entitled "Transporting loads".



Transporting loads



Observe the information in the chapter entitled "Safety regulations when driving".



DANGER

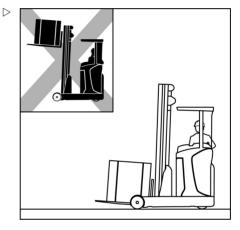
The higher a load is lifted, the less stable it becomes. The truck can tip over or the load can fall. increasing the risk of accident!

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 (lift height below 500 mm).
- Only drive with the lift mast tilted backwards.

When travelling, the reach carriage must be fully retracted and the fork carriage lowered until just above the load wheel legs.

If possible, always travel on roadways in the drive direction, as the load side view is restricted by the lift mast and the load. If visibility is poor, let someone guide you.



- Drive slowly and carefully around corners.

Speed must be reduced on uneven or wet surfaces or when visibility is restricted.



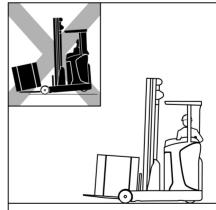
Observe the information in the chapter entitled "Steering".

- Always accelerate and brake gently.



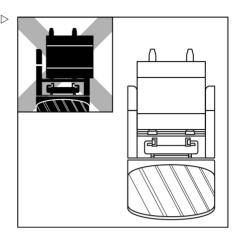
NOTE

Observe the information in the chapter entitled "Operating the service brake".





 Never drive with a load protruding on one side or with a load shifted to the side (sideshift). The centre of gravity of the load must always be positioned on the longitudinal axis of the truck.



Setting down loads

▲ DANGER

Risk of accident due to changed moment of tilt!

Please note that when the load is raised the lift mast can be tilted far enough forward to cause the truck to tip over.

The load centre of gravity and the moment of tilt both change when the load slips. The truck may tip forwards.

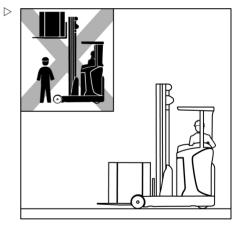
- Only tilt the lift mast forwards with a raised lifting accessory when it is directly above the stack.
- When the lift mast is tilted forwards, take particular care to ensure that the truck does not tip forwards and that the load does not slip.

▲ WARNING

Risk of accident from falling load!

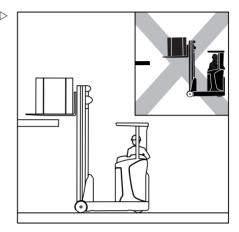
If the fork or the load remains suspended during lowering, the load may fall.

- When removing from stock, move the truck far enough back so that the load and the fork can be lowered freely.
- With the load lowered in accordance with regulations, approach the racking and align the load as accurately as possible.
- Brake.
- Tilt the fork arms or lift mast until the fork arms are horizontal.





- Raise the load to just above the required height.
- If necessary operate the sideshift to position the load centrally.
- Extend the reach carriage fully.
- Release the brake.
- Drive up to the racking so the truck chassis is as close as possible until the load can be lowered into its final position.
- Brake.
- Slowly lower the fork carriage until the load is positioned on the racking.
- Retract the reach carriage fully.
- Ensure that the roadway on the drive side is clear. Move the truck back carefully and slowly until the fork arms can be lowered without touching the racking.
- Lower the fork carriage until the necessary ground clearance is achieved.
- Tilt the fork tips or lift mast fully to the drive side into the driving position.





Driving on upward and downward gradients

A DANGER

Danger to life!

On upward and downward gradients, the load must be carried facing uphill.

It is only permitted to drive on upward and downward gradients if they are marked as traffic routes and can be used safely.

The driver must check that the ground is clean with a good grip.

It is not permitted to perform turns on upward gradients, to approach them diagonally or to park the truck on them.

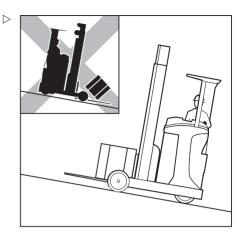
Drive at a reduced speed on downward gradients.

It is not permitted to put items into stock or to remove them from stock while on an upward or downward gradient.

The forklift truck must not be parked on a slope.

 In case of emergency, secure the truck with wedges.

The truck must not be used on upward and downward gradients with values that exceed those specified in the chapter entitled "Roadways".



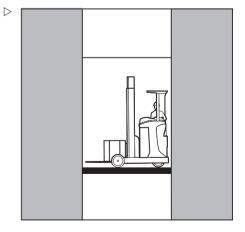
Driving onto lifts

Do not drive the truck into a lift without specific authorisation. 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 chapter entitled "Definition of responsible persons").

A DANGER

There is a risk to life from being crushed or run over by the truck.

- There must be no personnel already in the lift when the truck is driven into the lift.
- Personnel are only permitted to enter the lift once the truck is secure, and must exit the lift before the truck is driven out.



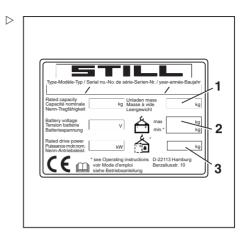


Determining the total actual weight

- Park the truck securely.
- Determine the unit weights by reading the truck nameplate and, if necessary, the attachment (variant) nameplate and, if necessary, by weighing the load to be lifted.
- Add the determined unit weights to obtain the total actual weight of the truck:

Tare weight (1)

- + Max. permissible battery weight (2)
- + Ballast weight (variant) (3)
- + Attachment net weight (variant)
- + Weight of the load to be lifted
- + 100 kg allowance for driver
- = Total actual weight
- Drive the truck with the forks forwards into the lift without touching the shaft walls.
- Park the truck securely in the lift to prevent uncontrolled movements of the load or the truck.





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.

A 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.

A 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.

A 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.

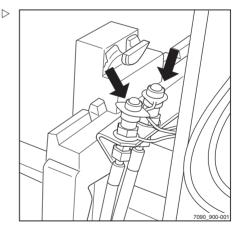
 Once the attachment has been disassembled, attach the protective caps to the plug connectors.

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.



Please observe the definition of the following responsible person: "competent person".





Load capacity with attachment

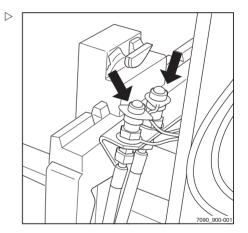
The permissible load capacity of the attachment and the allowable load (load capacity and load moment) of the truck must not be exceeded by the combination of attachment and payload. The specifications of the manufacturer and supplier of the attachment must be complied with.

 Observe the residual load capacity rating plate, see the chapter entitled "Taking up a load using attachments".

Releasing the pressure from the auxiliary hydraulics

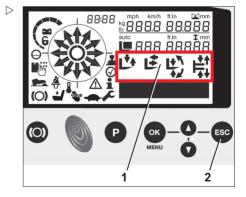
Attachments must only be fitted by competent persons in accordance with the information provided by the manufacturer and supplier of the attachments. After each installation, the attachment must be checked for correct function prior to initial commissioning.

Prior to assembling attachments, the pressure must be released from the plug connectors (arrows).



Performing the truck function "Release the pressure from the hydraulics"

- Fully lower the lift mast and fork carriage.
 In doing so, wait until the lift mast, which is braked by the mast slowdown at the end of the lowering process, is fully lowered.
- Rest the fork tips fully on the ground by tilting.
- Switch off the key switch.
- Wait for five seconds, then switch on the key switch.
- Using your left hand, press and hold the ESC button (2) immediately after switching on the truck.
- If present, operate the foot switch.





After approx. one second, all of the assistance arrows (1) will flash.

A DANGER

When activating the valves for the purpose of depressurising the hydraulic lines, unexpected hydraulic movements may occur.

The "release the pressure from the hydraulics" truck function can be used to depressurise the entire hydraulic system. For example, this means that the fork may lower faster than expected when the "lowering" function is performed.

- Ensure that there are no people or objects in the vicinity of the reach carriage, the lift mast or the fork.
- Using your right hand, activate the auxiliary hydraulics to release the pressure from the hydraulic lines. The control of the auxiliary hydraulics is dependent on the operating devices (joystick, fingertip switch) and their configuration, refer to the chapter entitled "Lifting system operating devices".
- Release the ESC button and foot switch.
 For trucks without a foot switch, releasing the ESC button will suffice.

The assistance arrows will stop flashing. The hydraulic system is switched off and remains deactivated until the next time the truck is started.

 To re-activate the hydraulics, switch the key switch off and on again.

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:

- Joystick 4Plus, refer to the chapter entitled "Controlling attachments using the joystick 4Plus (5th/6th hydraulic function)"
- Fingertip, see the chapter entitled "Controlling attachments using the fingertip (5th/6th hydraulic function)"



WARNING

Use of attachments can give rise to additional hazards such as a change in the centre of gravity. additional danger areas etc.

Attachments must only be used for their intended purpose 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.



Further variants and functions are available in addition to the functions described below. The directions of movement can be seen on the pictograms on the operating devices or battery hood.



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.

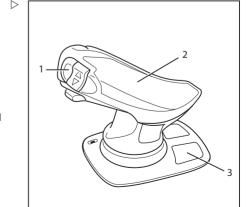
Controlling attachments (variant) using the joystick 4Plus (5th/6th hydraulic function)

The designation "5th/6th function" refers to the fact that the four operating levers control four functions, while additional functions can be controlled by switching functions.

In this version, the attachments are controlled using a joystick.

For operating attachments, the following is generally involved:

The pictogram (3) on the base of the joystick shows the function in each case and how it is controlled using the joystick (2).





- Actuate the shift button "F"(1).
- Move the joystick in the direction of the arrow "4" or "5". Or:
- Move the vertical rocker button (6) to the left or right.

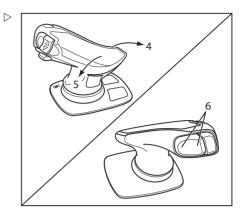


The movement/action of these additional functions can be found in the operating instructions of the fitted attachment.

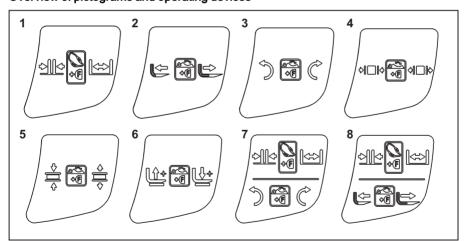


The pictograms on the joystick are applied according to the attachments fitted to this truck at the factory. If an attachment with other functions is fitted, the pictograms must be checked for the correct representation and changed if necessary. Please contact the service centre if necessary.

Note the following attachment functions and pictograms!



Overview of pictograms and operating devices





No.	Operating device	Function of the attachment	
1	Joystick + shift button "F"	Fork prong positioner: close/open	
2	Vertical rocker button + shift button "F"	Fork positioner: forwards/backwards	
3	Vertical rocker button + shift button "F"	Rotator: left/right	
4	Vertical rocker button + shift button "F"	Clamp: close/open	
5	Vertical rocker button + shift button "F"	Load retainer: close/open	
6	Vertical rocker button + shift button "F"	Additional fork carriage: lift/lower	
	Joystick + shift button "F"	Fork prong positioner: close/open	
7	Vertical rocker button + shift button "F"	Rotator: left/right	
8	Joystick + shift button "F"	Fork prong positioner: close/open	
	Vertical rocker button + shift button "F"	Fork positioner: forwards/backwards	

In the pictograms for possible attachments, the outlined graphic in the centre of the pictogram indicates the combination of operating devices required for the particular attachment.



Controlling attachments (variant) with the fingertip (5th/6th hydraulic function)

The designation "5th/6th function" refers to the fact that the four operating levers control four functions, while additional functions can be controlled by switching functions.

In this version, the attachments are controlled using the operating levers (1).

You can also use the switch (2) to switch functions. The operating lever marked with a corresponding pictogram then controls the 5th/6th function.

The left and right parts of the pictogram (3) behind the operating lever show the function that is controlled with this lever.

This essentially involves the following:

Move the operating lever forwards.

 The attachment moves in the direction shown in the left part of the pictogram.

Move the operating lever backwards.

- The attachment moves in the direction shown in the right part of the pictogram.
- Actuate the switch (2).

The additional function of the attachment is activated/deactivated and can be controlled as an additional function using the operating lever.

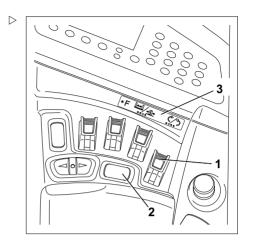
 Actuate the operating lever (1) in order to control the attachment.



The movement/action of these additional functions can be found in the operating instructions of the fitted attachment.

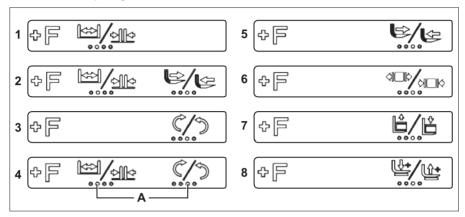


The pictograms for the operating levers are attached according to the attachments fitted to this truck at the factory. If an attachment with other functions is fitted, the pictograms must be checked for the correct representation and



changed if necessary. Please contact the authorised service centre if necessary.

Overview of the pictograms



- A Fingertip switch that performs the indicated function
- Note the following attachment functions and pictograms!

No.	Function of the attachment	
1	Fork prong positioner: close/open	
2	Fork prong positioner: close/open	
2	Fork positioner: forwards/backwards	
3	Rotator: left/right	
4	Fork prong positioner: close/open	
4	Rotator: left/right	
5	Fork positioner: forwards/backwards	
6	Clamp: close/open	
7	Load retainer: close/open	
8	Additional fork carriage: lift/lower	
Α	Fingertip switch that performs the indicated function (1-2-3-4)	



Operating the clamp locking mechanism (variant) with a joystick 4Plus

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.

A 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

The joystick actuation that has the "clamp release" function assigned to it is (1) marked by a pictogram; also refer to the chapter entitled "Working with attachments".

Closing the clamp with the joystick 4Plus

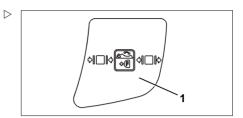
It is not necessary to release the clamp locking mechanism in order to close the clamp. Proceed as follows to close the clamp:

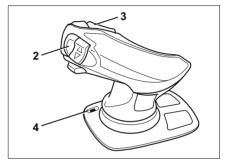
 Press and hold shift button "F" (2) and move the horizontal rocker button (3) to the left.

Opening the clamp with the joystick 4Plus

To open the clamp, the clamp locking mechanism must first have been unlocked. Proceed as follows to unlock the clamp locking mechanism:

- Press and hold shift button "F" (2) and move the horizontal rocker button (3) to the right.
- Keep shift button "F" depressed and move the horizontal rocker button back into the neutral position.







The LED (4) indicating the clamp locking mechanism has been unlocked lights up and the clamp can now be opened. If the clamp locking mechanism is locked again, the LED will go out.

 To open the clamp, press and hold shift button "F" and move the horizontal rocker button to the right again.



The clamp locking mechanism is locked again:

- · as soon as shift button "F" is released
- if the clamp is not opened within a specified period of time



Operating the clamp locking mechanism (variant) with the fingertip switch

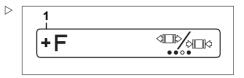
This truck can be fitted with a clamp locking mechanism as a variant. This prevents the clamp from opening unintentionally if the operating function is inadvertently triggered.

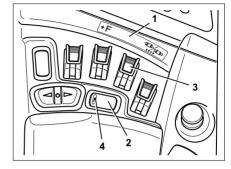
A DANGER

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.





NOTE

The operating lever that has the "clamp release" function assigned to it is (1) marked by a pictogram; also refer to the chapter entitled "Working with attachments".

Closing the clamp with the fingertip switch

It is not necessary to release the clamp locking mechanism in order to close the clamp.

Proceed as follows to close the clamp:

 Press and hold shift button "F" (2) and move the operating lever (3) backwards.

Opening the clamp with the fingertip switch

To open the clamp, the clamp locking mechanism must first have been unlocked. Proceed as follows to unlock the clamp locking mechanism:

 Press and hold shift button "F" (2) and move the operating lever (3) forwards.



- Keep shift button "F" depressed and move the operating lever back into the neutral position.

The LED (4) indicating the clamp locking mechanism has been unlocked lights up and the clamp can now be opened. If the clamp locking mechanism is locked again, the LED will go out.

- To open the clamp, press and hold shift button "F" and move the operating lever forwards again.



i NOTE

The clamp locking mechanism is locked again:

- · as soon as shift button "F" is released
- if the clamp is not opened within a specified period of time

Picking up a load using attachments



▲ WARNING

Risk of accident!

Attachments must only be used for their intended purpose as described in the relevant operating instructions.

Drivers must be taught how to operate the attachments.

0000000000 Q(kg) c (mm)

WARNING

Risk of accident!

Loads may only be picked up and transported with attachments if they 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:
- · Load capacity Q (kg) (1)
- Lift height h (mm) (2)
- · Load distance C (mm) (3)



Auxiliary equipment

Auxiliary equipment

FleetManager (variant)

FleetManager is an equipment variant and can be fitted to the truck in different versions. The description and operating information can be found in the separate operating instructions for the corresponding FleetManager versions.

FleetManager regulates the access authorisation for the truck. To activate the access control, FleetManager must be put into operation immediately following delivery.

 To do this, observe the information in the chapter entitled "Activating the access control after delivery of the truck".

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 the data generated in the event of a shock (e.g. in the case of a collision). This data can be electronically read out and evaluated.

Contact the authorised service centre for more information.

Active Load Stabilisation ALS (variant)

A CAUTION

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

Active vibration damping of the lift mast changes the vibration characteristics of the lift mast and load in comparison to the standard truck.

When handling loads, take the varying vibration characteristics into consideration.



A CAUTION

Risk of accident due to failure of active vibration damping of the lift mast.

If active vibration damping of the lift mast fails, the vibration characteristics of the lift mast and load will change. Even if vibration damping of the lift mast is inactive, the driver can still operate all of the truck's hydraulic functions.

- If active vibration damping fails, take the change in vibration characteristics into consideration.
- Complete the stock placement/removal process without the support of active vibration damping.
- Park the truck securely.
- Notify the authorised service centre.

Active vibration damping of the lift mast helps the driver when placing loads into stock and removing loads from stock at great lift heights. The hydraulic damping system suppresses load vibrations and thus shortens the stock placement and removal times.

The system operates permanently in the truck and can only be enabled or disabled by the authorised service centre.

If the lift mast or the load demonstrates unexpected vibration characteristics, notify the authorised service centre.



Auxiliary equipment

Optical height measuring system (variant)

This truck is equipped with an optical height measuring system. The system is immediately available after the truck is switched on.

The components are located to the side on the lift mast. The system consists of a compact LED/sensor unit on the lift mast frame and a reflector on the fork carriage.

The LED height sensor (1) sends a light signal. The signal is reflected by the reflector (2). The truck calculates the lift height based on the time taken for the light signal to travel.

The current lift height (3) is permanently displayed in the display. The displayed lift height corresponds to the height of the upper edge of the fork. A different value can be set by the authorised service centre.

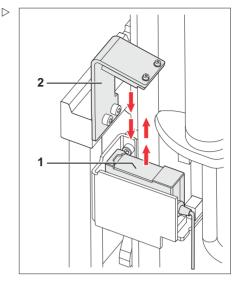
The system functions across the entire fork lift height, from ground level up to the maximum lift height of the truck. When used properly, the measurement accuracy is +/- 5 mm.

The maximum measurement accuracy is +/- 50 mm.

The red light emitted by the LED/sensor unit is not dangerous to the human eye. Due to the level of brightness, the effect of looking directly at the light may be short-term dazzling.



The LED height sensor and reflector are adjusted at the factory. Follow-up adjustments must be performed by the authorised service centre.



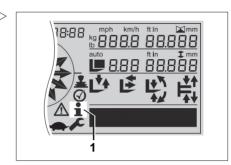
- LED/sensor unit
 Reflector



Cleaning the optical height measuring system

If the light signal is too weak, the reflector sensor glass and reflector must be cleaned. The "CLEAN HEIGHT SENSOR" text message appears in the display along with the 1 (1) symbol. To avoid malfunctions, clean the sensor glass and reflector at the latest when the text message is displayed. It is recommended that the sensor glass and the reflector are checked before starting work and as necessary.

The cleaning frequency depends on the application conditions of the truck. The quality of the light signal may also be reduced as a result of heavy rain or fogging of the sensor.



Text message	Description	Remedy
	measuring signal between the LED height sensor and reflector.	 Clean the sensor glass and reflector. If the message is still displayed after cleaning, contact your authorised service centre.

A CAUTION

Incorrect cleaning can damage the sensor glass and the reflector.

The components must **never be cleaned using dry materials**.

Do not use agents containing hydrocarbons, e.g. acetone, methanol, ethanol or propane.

A CAUTION

Risk of damage to the LED height sensor through pressure cleaning

A high-pressure cleaner can damage the LED height sensor due to the penetration of water. This can result in incorrect measurements.

 Never direct the spray from a high-pressure cleaner at the LED height sensor.



Auxiliary equipment

 Clean the sensor glass of the LED height sensor (1) and reflector (2) with a soft microfibre cloth and water. A small amount of cleaning agent can be added to the water.

Elimination of malfunctions by the driver

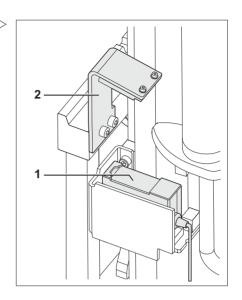


A misaligned sensor or bent reflector must be adjusted only by the authorised service centre.

The driver can resolve a temporary interruption of the light signal due to contamination or foreign objects in the signal path. If the malfunction in the system still exists, please contact the authorised service centre

In the event of a malfunction, an error number is shown in the display. The system is automatically available again as soon as the malfunction is no longer present or has been rectified

Truck functions that are dependent on the lift height are restricted in the event of a malfunction in the height measurement. The malfunctions must therefore be rectified immediately.





Possible cause	Truck response	Rectifying the error		
Error number A3140	Error number A3140			
Incorrect measurements caused by a reflective object in the light signal path between the sensor and reflector (foreign signal)	Lifting functions can only be operated in emergency operation. See the following section "Emergency operation in the event of malfunctions in the height measuring system".	Check the light signal path between the sensor and the reflector. Remove obstacles. Then fully lower the fork to reference the system. If the error persists, contact the authorised service centre.		
Error number A3141				
Sensor failure, e.g. due to a cable break or internal error	Lifting functions can only be operated in emergency operation. See the following section "Emergency operation in the event of malfunctions in the height measuring system".	Contact your authorised service centre.		
Error number A3142	Error number A3142			
Sensor overheating	Lifting functions can only be operated in emergency operation. See the following section "Emergency operation in the event of malfunctions in the height measuring system".	Avoid strong sunlight and proximity to other heat sources. Allow the sensor to cool down. If the error persists, contact the authorised service centre.		
Error number A3143				
The reflector or sensor is very dirty or fogged up or Short interruption (min. 2 seconds) in the light signal, for example, through packaging material The reflector or sensor is very directly sensor in the sensor in the sensor is very directly sensor in the sens	Lifting functions can only be operated in emergency operation. See the following section "Emergency operation in the event of malfunctions in the height measuring system". • Error message received after 2 second interruption • Lift height not displayed • Lift height preselector not available	Clean the sensor glass and the reflector. Observe the information in the section entitled "Cleaning the optical height measuring system". Check the light signal path between the sensor and the reflector. Remove obstacles. Then fully lower the fork to reference the system. If the error persists, contact the authorised service centre.		

Emergency operation in the event of malfunctions in the height measuring system

In the event of a malfunction in the height measurement, the truck switches to emergency operation.



Auxiliary equipment

In emergency operation, features that are dependent on the lift height are not available:

- · Lift height display
- · Lift height preselector
- · Reach/lower lock
- · Active load stabilisation (ALS)
- OPTISPEED
- · Fork wear protection
- · Mast transfer damping

In emergency operation, functions that are dependent on the lift height operate with calculated lift heights rather than measured lift heights due to the missing measured value. For safety reasons, the calculated lift height is always below the actual lift height. This restriction applies to the following functions:

Intermediate lift limitation in emergency operation

- On reaching the calculated intermediate lift limitation, a warning sound signals that there is a malfunction in the height measuring system.
 - After the joystick or fingertip is moved to the zero position, further lifting can continue at a reduced speed.
 - If the intermediate lift limitation is cancelled with the acknowledge button, the lifting process can be continued without restriction.

Final lift limitation in emergency operation

- On reaching the calculated final lift limitation, a warning sound signals that there is a malfunction in the height measuring system.
 - ► WARNING: Once the joystick or fingertip has been moved to the zero position, the lift mast can be moved to the maximum height without limitation.

Height-dependent speed reduction in emergency operation

 The speed reduction activates at a lower lift height than in normal operation.



Load measurement (variant)



After changing the load lift system (fork arms, fork extension, attachments), the load measurement system must be calibrated. Only then is a correct load measurement ensured. Calibration must be performed by the authorised service centre.

General

The "load measurement" variant helps the driver by displaying the weight of the lifted load on the display and operating unit.

The weight is measured by an additional weight sensor at the valve block. The sensor measures the weight with a deviation of +/-10% of the nominal load of the truck.

The calculated data is also evaluated by assistance systems such as OPTISPEED and Active Load Stabilisation (ALS).

To ensure correct functionality, the load measurement must be performed once for testing purposes as one of the daily commissioning tasks for the truck.

Requirements for load measurement

The load must be in the inactive position so that the weight sensor provides accurate results.

For this reason, load measurement is disabled during the following truck activities:

- · Driving
- Lifting
- · Lowering

Once the fork has been in the inactive position for two seconds, load measurement is enabled. Load measurement is now possible.

The measured weight of the load is shown on the display and operating unit.

If the button for load measurement is pressed while load measurement is disabled, "---" is displayed instead of the measured weight. After a maximum of ten seconds,



Auxiliary equipment

the display returns to the speed indicator. If load measurement is possible within ten seconds because the fork has moved into the inactive position, the measured load weight is displayed.



The displayed value of the load measurement is invalid if the fork carriage is positioned exactly between the free lift height and main lift height during the measurement. In this case, the measurement must be repeated at a different position. In addition, the load must be lifted completely off the ground during the measurement.

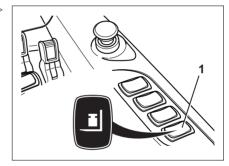
Performing the load measurement

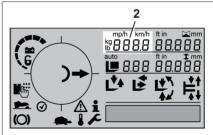
- Slightly lower the fork with the load. This will increase the accuracy of the measurement.
- Press the (1) button to start the load measurement.

The measurement is performed once the load is in the inactive position.

On the display and operating unit (2), the measurement result is now displayed instead of the speed indicator. The displayed value relates only to the completed measurement and is not updated.

After releasing the button, the display switches back to the speed indicator after 2.5 seconds. If the button is pressed for more than two minutes, the display switches back to the speed indicator but message "A3440" also appears.







Speed limitation based on lift height

▲ WARNING

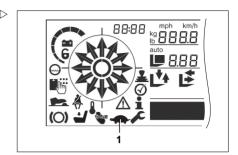
There is always an increased risk of the truck tipping if it is driven with a raised load.

The system is a support for the driver when placing items into stock and removing items from stock. The responsibility for safe operation and complying with safety regulations remains with the driver.

Once a specified lift height has been exceeded, the truck can be accelerated only up to a set maximum speed. If the current driving speed is already above this maximum speed, the truck brakes regeneratively to the set maximum speed. The speed limitation is removed as soon as the current lift height is lowered to below the specified value.

The lift height and the value for the maximum speed can be set by the authorised service centre. The factory setting for the maximum speed is 5 km/h.

While the maximum speed is being limited, the "tortoise" symbol (1) appears on the display and operating unit.





Auxiliary equipment

Button for speed limitation, creep speed (variant)

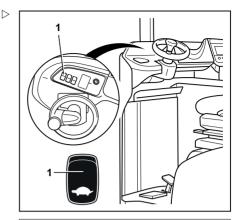
The maximum speed of the truck is temporarily limited by pressing the "speed limitation" button. After pressing the button, the truck can be accelerated only up to the set maximum speed. If the current driving speed is already above this maximum speed, the truck is regeneratively braked to the set maximum speed. The value for the maximum speed can be set by the authorised service centre.

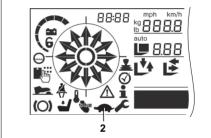
 Press the button (1) to limit the maximum speed to the set value.

The "tortoise" symbol (2) appears on the display and operating unit.

 Press the button (1) again to remove the speed limitation.

The "tortoise" symbol (2) on the display and operating unit disappears.





Camera/monitor system (variant)

A CAUTION

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

- Also, when using the system, always consider the vibration characteristics of the lift mast and the load.
- Note that the camera image only shows a small part of the surrounding area.

The camera/monitor system helps the driver place loads into stock or remove loads from stock at great lift heights. Using the camera image, loads can be picked from and deposited at high levels without having to look up. thus avoiding neck and shoulder strain.

 Refer to the manufacturer's operating instructions for information about operation of the camera/monitor system.



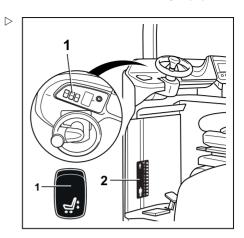
Electrical adjustment mechanism for the driver's compartment (variant)

WARNING

Risk of accident, risk of crushing

The pedal plate and seat console move during adjustment.

- Change settings only when the truck is at a standstill.
- Keep your fingers away from moving parts during adjustment of the driver's compartment. For safety reasons, place your right hand on the joystick. Actuate the rocker switch with your left hand.
- Make sure that there are no objects in the vicinity
 of the moving parts. Objects could become
 trapped and damage the mechanism. Only
 remove trapped objects when adjustment of the
 driver's compartment has stopped.



A CAUTION

Risk of component damage.

Adjustment of the driver's compartment must only be carried out in the seated position by persons weighing a maximum of 150 kg.

 Observe the total permissible weight during adjustment of the driver's compartment.

i NOTE

Before operating the seat-adjustment mechanism, make sure that there is sufficient clearance between the driver's seat and the side wall. This will ensure that the driver's seat is not damaged when it is raised.

The electrical driver's compartment adjustment mechanism, together with the adjustment mechanisms for the seat and for the steering column, is a system that allows the driver's compartment to be adapted as effectively as possible. The position of the driver's seat and the pedal plate are electrically adjusted in proportion to one another.

 Press the rocker switch (1) in the operating panel up or down until the optimum working position is reached.



Auxiliary equipment

A scale (2) in the footwell of the driver's compartment gives an indication of the setting to help you remember it.

Overhead guard with optimised visibility (variant)

The overhead guard with optimised visibility features a roof panel made of safety glass. The view of the load is not restricted by struts in the field of vision

A DANGER

Risk of fatal injury in the event of a damaged roof panel.

In the event of any damage to the roof panel, particularly cracks, the truck must be switched off immediately. The roof panel must then be replaced (safety-relevant component).

Chips on the top of the panel are permissible if all of the following conditions are satisfied:

- ► The chip is in the area of the screen print around the edge.
- ► The chip only affects the upper pane panel.
- ► The chip is no larger than 15 mm.

Roof panel repairs:

▲ WARNING

A special tool and specialist knowledge is required for this work.

For roof panel repairs, contact the authorised service centre.

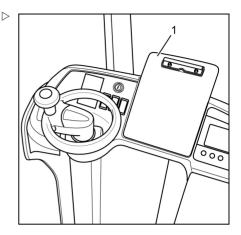
 Check the roof panel for damage every day before starting work.



Battery change frame (variant)

Clipboard (variant)

You have the option of using a clipboard (1) to secure your work papers. This clipboard can be inserted into a slot in the multifunctional panel. To do so, the standard cover of the multifunctional panel must be removed.



Battery change frame (variant)

General

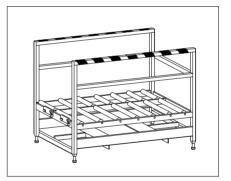
The battery rack is equipped with two adjacent roller channels.

The battery is pulled out of the truck by hand on to the battery rack and is pushed by hand off the battery rack into the battery compartment of the truck.

A DANGER

Risk of injury

Due to the heavy weights to be moved by hand, the operator is subject to an increased risk of trapping and crushing. Always take particular care when working and observe the safety instructions in the individual chapters.





 \triangleright

Battery change frame (variant)

Safe handling

WARNING

Risk of physical injury

Battery racks are used for moving heavy weights. Especially for versions with manual drive, there is always the risk of being trapped or crushing hands or fingers. The greatest possible care must therefore be taken to ensure that the battery is against its stop and that when the battery moves along the guides your fingers or hands are not in the way.

So that the forces arising from the moving battery are kept as small as possible, the horizontal position of the truck and battery rack and the transfer height must be matched as accurately as possible. The speed of movement should be kept as low as possible.

The locking mechanisms on the truck and battery rack should always be used.

Under no circumstances should batteries be moved on battery racks not intended for them.

Load capacity

Each battery rack is intended for a particular battery type. This means that the dimensions and the maximum permissible weight are pre-determined. The dimensions and the tray number of the intended battery are to be taken from the order documentation. The maximum load capacity of the battery rack and its net weight are to be taken from the nameplate.

WARNING

Danger of overloading

For mobile use, it must be ensured that the load bearing capacity of the truck to be used for transportation is sufficient for the weight of the battery and the net weight of the battery rack.

Area of application

Mobile use

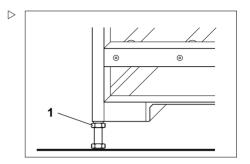
The battery rack for the truck is intended for mobile use only. For mobile use, the empty battery rack is moved to the relevant truck. If a double battery rack is available, a freshly



charged battery can also be carried on the second roller channel.

Adjusting the transfer height

- Use an external spirit level or straight-edge to check the height of the battery rack and that it is level. This is done by matching the upper edge of the roller channel on the battery rack to the roller channel on the truck.
- If necessary, loosen the lock nut (1) on the levelling foot to be adjusted.
- Adjust the levelling foot by turning it clockwise or anti-clockwise. For this purpose, lift the rack slightly to facilitate adjustment.
- Tighten the lock nut.
- On stationary systems, the levelling feet must be bolted to the floor once any adjustments have been made Refer to the information in the original operating instructions from the manufacturer of the change frame



Locking the battery change frame

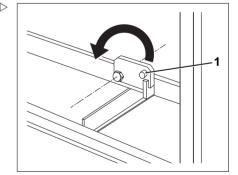
A DANGER

Risk of physical injury

Before unlocking the swing bolt, check that the battery rack is on a horizontal surface and that the floor has a sufficient load capacity. This is the only way to ensure that the battery does not move in an uncontrolled manner and trap or crush parts of the operator's body.

When batteries are transported on battery racks, they must be secured with a swing bolt.

Grasp the swing bolt by the projecting knob (1) and swing the bolt to open or close it. To make it easier to release the swing bolt, push the battery back slightly on the roller.





Battery change frame (variant)

Battery replacement area

Requirements for the battery replacement area

There must be sufficient space to allow the change frames to be positioned and for the truck to be driven through the area.

The battery replacement area must be horizontal, level and have a sufficient load capacity.

There must also be enough space to allow the operator to move safely around the change frames and to operate the change frames.

There must be sufficient room between the truck and the surrounding building or fixed installations so that the operator and passers-by can move around the area safely. This area must be at least 0.5 m wide.

A first aid kit suitable for accidents involving acids must be available. Persons trained in first aid must be available and within calling distance.

Requirements for positioning the change frames

The transfer height of the frame and truck must be aligned with one another; see the chapter entitled "Battery change frame/Adjusting the transfer height"

In order to move the battery in and out easily, the roller channels must be set exactly horizontal. Use a spirit level.

Wear of the truck wheels will change the transfer height. In such instances, change the height setting of the levelling feet.

When the truck and battery rack are positioned relative to each other in accordance with the specifications, the battery replacement can be carried out.



Battery change frame (variant)

A CAUTION

Risk of damage to property

It depends on conditions on site whether or not an extension cable for connecting the battery to the truck is required during battery replacement. If an extension cable is required, only a cable with an appropriate cross-section and approved plugs must be used.

When an extension cable is in use, the operator must take great care when positioning the truck not to pull the cable out of the socket.



Lift height preselector/easy Target (variant)

 \triangleright

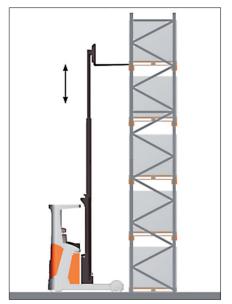
General

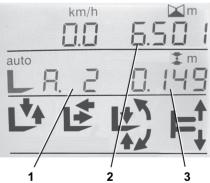
The lift height preselector supports the user when placing loads into stock/removing loads from stock. There are 160 programmable levels grouped into eight areas (A-H), each with 20 levels. After selecting one of these levels, the user can read the following in the display:

- Selected target level and area (1)
- Actual height (2)
- Target height or distance to target (with pallet free lift included in the calculation) (3)



The fork arms must be in the "0° position" to ensure their height position is calculated correctly. The "Automatic tilt to centre position" option is very useful for this!







Definition of terms

Level

One target height can be assigned to each level. Valid levels can be reached semiautomatically.

Area

A warehouse can be divided into eight areas and each area can contain up to 20 levels.

Placing into stock

Placing into stock (3) is the insertion of a pallet into the rack.

Removing from stock

Removing from stock (4) is the removal of a pallet from the rack.

Assistant

The display includes an assistant (5) that shows the possible movements via symbols and corresponding direction arrows. During automatic operation, the display shows only the direction arrows for function symbols that are currently allowed.

The individual symbols mean:

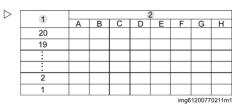
- Main lift lowering/lifting (6)
- Shift to drive side/load side (7)
- Tilt to drive side/load side (8)
- Transition shift left/right (9)

Pallet free lift

The pallet free lift (10) is the difference in height by which the load support is raised or lowered after shifting in order to place a load into stock or remove a load from stock. This value can be individually adjusted for placing into and removing from stock at each level by using the service software. The default setting is 150 mm.

Reference drive

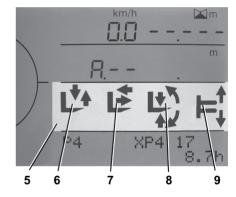
The process of passing the reference switch located on the upper part of the lift mast is known as referencing. This process sets the reference value for the height position.

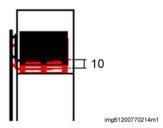


- Level 1-20
- Level 1-20
 Area A-H



img61200770212m1







If the load support is not in free lift, a reference drive is required. In this process, the load support is lowered until it is below the reference switch, then raised again.

Reference height

The reference height is the distance from the upper edge of the load support to the floor when the reference switch is tripped. The reference height differs according to the lift mast height and can be set using the service software.

The set value also determines which basic height is shown in the display if the free lift has ended and the main lift is beginning.

AUTO MODE function

For height preselection, there are four configurations available for selection in the service software. The configuration can only be changed by the authorised service centre.

"Truck options 1" page:

- AUTO MODE height preselection "Basic position"
- AUTO MODE height preselection "Any position"
- AUTO MODE height preselection "Without fork cycle"
- AUTO MODE height preselection "Start only with fork below target height"

AUTO MODE height preselection "Basic position"

In the "Basic position" configuration, the assistant also specifies, in addition to the height preselection, the respective position of the reach carriage.

Once the area and level have been entered, the place into/remove from stock function must be selected to activate height preselection.

 If the reach carriage is not in the basic position, the assistant specifies "retract



- reach carriage" until the basic position is reached.
- If the basic position is reached, only lifting and/or lowering is enabled and is specified by the assistant accordingly. The lifting or lowering procedure stops automatically at the target point. If the target point is reached, then shifting, tilting and transition shifting are enabled.
- The assistant now specifies "extend reach carriage". As soon as the reach carriage is extended to the target point, lifting or lowering is enabled. Depending on the function selected at the start (place into/remove from stock), the assistant specifies the pallet free lift height and/or free lowering height.
- Once this process is complete, the assistant specifies "retract reach carriage" until the basic position is reached.
- When the basic position has been reached, the truck switches back to manual operation.

AUTO MODE height preselection "Any position"

In the "Any position" configuration, the assistant specifies the height preselection without taking the respective position of the reach carriage into account.

Once the area and level have been entered, the place into/remove from stock function must be selected to activate height preselection.

- Regardless of the position of the reach carriage, only lifting or lowering is enabled and is specified by the assistant accordingly.
 The lifting or lowering procedure stops automatically at the target point. If the target point is reached, then shifting, tilting and transition shifting are enabled.
- Lifting or lowering is now enabled regardless of the position of the reach carriage.
 Depending on the function selected at the start (place into/remove from stock), the



- assistant specifies the pallet free lift height and/or free lowering height.
- Once this process is complete, the truck switches back to manual operation.

AUTO MODE height preselection "Without fork cycle" and "Start only with fork below target height"

In the two modes "Basic position" and "Any position", an additional selection can be made between the options "Without fork cycle" and "Start only with fork below target height". The selection specifies whether the target height can be reached directly, or whether the fork carriage must first be lowered to a height lower than the target height.

AUTOMODE height preselection "Without fork cycle"

 The target height can be reached directly, regardless of whether the fork carriage is higher or lower than the target height. The height preselector immediately specifies direct lifting or lowering to the target height. After reaching the target height, height preselection is complete.

AUTOMODE height preselection "Start only with fork below target height"

- The target height can be reached directly only if the fork carriage is lower than the target height.
- If the fork carriage is above the target height, the lift height preselector first specifies lowering until the fork carriage is lower than the target height. The lift height preselector will then specify lifting to the target height.



Operating the lift height preselector General

WARNING

If the load support is tilted there is a risk of collision with the pallet or racking!

The load support must always be in the "0° position" during placement into stock/removal from stock operations!

i NOTE

If height preselection is active, only the arrow symbols for movements that are still possible will light up on the function symbols in the assistant (1). The required movement is identified in each case by a corresponding flashing arrow symbol. Function symbols without arrow symbols mean that the function is blocked. If the load support is above the free lift height, a reference drive must be performed after switching on to activate the height display.

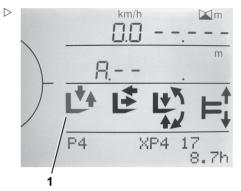
The **initial position** for this description is a retracted reach carriage (shifting measurement system reports DS end position) and a lift mast in free lift. Other combinations are also possible. However, they lead to different displays on the assistant (1). The assistant specifies the function that must be carried out. The following description is intended as an example.

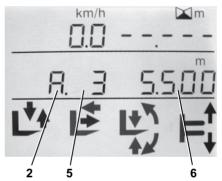
When the truck has been switched ON, area "A" (2) is automatically selected. The area can be changed by pressing the button (3). If "H" is reached, "A" is repeated. This enables area preselection. A level can be selected (1-20) by entering a digit using the alphanumeric keypad (4). The complete selection (level and area) is shown in the display (5). The stored target height is displayed under (6).

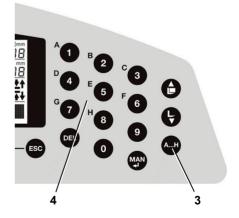


NOTE

During free lift, the difference between the reference height and the target height is shown on the display as the "lift height remaining until target (target difference)" (6). The display does not show the difference between the current lift height and target height until after the









reference switch has been passed. The selection (level and area) can be cancelled using the "DEL" button.

Example: Placing into stock in fully automatic mode



Placing into stock can only be selected if valid heights were assigned to the levels during the teach-in process. Levels that are invalid or that have not had a height assigned to them are not activated in automatic mode. All programmable heights are set at the factory to "5500 mm". Automatic mode can be interrupted at any time using the "MAN" button!

After entering the target level (e.g. A1), press the button for placing into stock (1).
 The symbol for placing into stock (3) and "auto" for automatic operation (4) appear in the assistant (2). The display (5) changes from the target height to the distance to the target (target difference).

A CAUTION

If the placing into stock button (1) is not pressed, all hydraulic functions are available without restriction (= manual operation)!

Pay attention to the symbols in the display!

After entering the target level (e.g. A1), press the button for placing into stock (1).
 The symbol for placing into stock (3) and "auto" for automatic operation (4) appear in the assistant (2). The display (5) changes from the target height to the distance to the target (target difference).



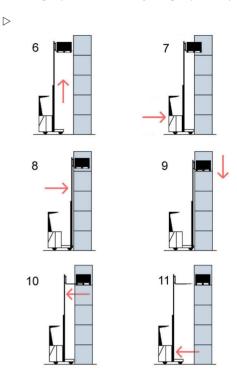




- Activate the lift function (displayed by the assistant). The selected height plus the pallet free lift height is reached and the automatic stop is performed (6). The display (5) shows a distance to the target ≤ 6 mm.
- Drive up to the racking (7).
- Activate the LS shifting function (shown by the assistant) and push the pallet onto the shelf (8).
- Activate the lowering function (shown by the assistant). The forks are lowered by the pallet free lift (9) height.
- Activate the DS shifting function and retract the reach carriage completely (shown by the assistant) (10).

The automatic routine is complete. All functions are available again (= manual operation).

- Back the truck away (11).



Example: Removing from stock in fully automatic mode



Removing from stock can only be selected if valid heights were assigned to the levels during the teach-in process. Levels that are invalid or that have not had a height assigned to them are not activated in automatic mode. All programmable heights are set at the factory to "5500 mm". Automatic mode can be interrupted at any time using the "MAN" button!

After entering the target level (e.g. A2), press the button for removing from stock (1). The symbol for removing from stock (3) and "auto" for automatic operation (4) appear in the assistant (2). The display







(5) changes from the target height to the distance to the target (target difference).

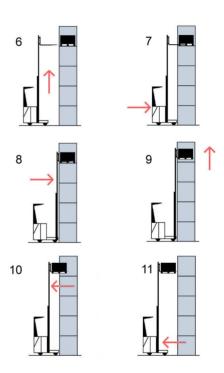
A CAUTION

If the removing from stock button (1) is not pressed, all hydraulic functions are available without restriction (= manual operation)!

Pay attention to the symbols in the display!

- Activate the lift function (displayed by the assistant). The exact selected height is reached and the automatic stop is performed (6). The display (5) shows a distance to the target ≤ 6 mm.
- Drive up to the racking (7).
- Activate the LS shifting function (shown on the assistant) and insert the fork arms all the way into the pallet (8).
- Activate the lift function (displayed by the assistant). The forks are raised by the pallet free lift height; the load is picked up (9).
- Activate the DS shifting function and retract the reach carriage completely (shown by the assistant) (10).
- Back the truck away (11).

The automatic routine is complete. All functions are available again (= manual operation).



Teach-in, general

The teach-in for height preselection is carried out using the truck display.

In order to carry out the teach-in, the user must be logged in to the truck with a PIN code with authorisation level "2" or "3".





Before a new height can be set via the display, a reference drive must be carried out. Heights that are below the reference height can be saved by entering them manually. However, if such a level is selected, automatic operation cannot be used.

Only preset heights can be changed via the display. No other truck-specific height preselection parameters can be changed. This can only be done using the service software.

The following parameters, among others, can be changed using the service software:

- · Pallet free lift height
- · Pallet free lowering height
- Accuracy and speed of pallet free lift and pallet free lowering
- · Accuracy and speed of homing

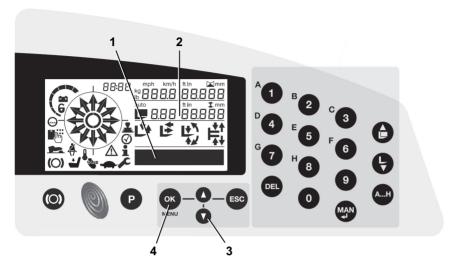
Performing a teach-in

The teach-in for height preselection is carried out using the display and the enter keys for the display and operating unit.

The values for the programmable lift heights must be entered via the enter keys on the numeric keypad. It is not possible to move the fork to a lift height and transfer this value to the height preselection system.



Opening the lift height preselector menu



- For information on the general operation of the truck configuration, as well as entering a password with a specific authorisation level, see the chapter entitled "Onboard truck configuration/General".
- Press the "ESC" (4) and "OK" (6) buttons for three seconds. The following appears on the display field (1):

PASSWORD____

- Using the enter keys (3), enter a password for authorisation level "2" or "3".
- Confirm the entry with the "OK" button. The selection menu appears in the display field (1).
- Press the arrow keys (5) until ADJUST appears in the display field.
- Press the "OK" button. The height currently saved on the system for the first "area" and the lowest "level" is displayed in the display field (2).



Entering and saving lift heights for height preselection

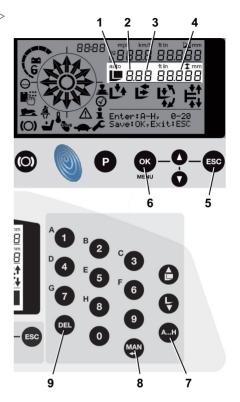
The programmable lift heights are entered using the enter keys on the control panel. The result of each entry is displayed in the display field (1).

To ensure saved lift heights can be selected at a later stage, three items of information must be entered for each lift height:

- A defined (storage) area (A-H) (2)
- A defined (racking) level (1-20) (3)
- The programmed lift height in millimetres
 (4)



Press the "ESC" button (5) to end the input and quit the menu item without saving. Press the "DEL" button (9) to delete the input.



Programming the lift height (example: area A, level 07, lift height 5500 mm)		
Button	Action	Display
Enter the area		
"A-H" button (7)	Press	
Enter the level		
A (0)	Press	A
0	Press	A0
7	Press	A07 XXXXX (the stored value is displayed)
"MAN " button (8)	Press	A07 (X flashes) XXXX
0	Press, the flashing digit is replaced	A07 0 (X flashes) XXX> the cursor advances one place



Programming the lift height (example: area A, level 07, lift height 5500 mm)		
Button	Action	Display
5	Press, the flashing digit is replaced	A07 05 (X flashes) XX> the cursor advances one place
5	Press, the flashing digit is replaced	A07 055 (X flashes) X> the cursor advances one place
0	Press, the flashing digit is replaced	A07 0550 (X flashes) X> the cursor advances one place
0	Press, the flashing digit is replaced	A07 0550 (X flashes)> cursor remains in the last position
"OK" button (6)	Press	Input complete; the value you have entered is displayed

easy Target/easy Target Plus (variants)

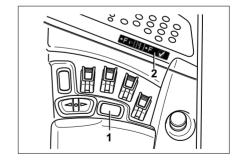
The easy Target and easy Target Plus functions make operating the lift height preselector straightforward and intuitive. The lift height preselector and the "Automatic tilt to centre position" function are simply controlled using the F button (1) on the joystick or on the fingertip console. The adhesive label (2) shows the functions that can be carried out with easy Target or easy Target Plus.

easy Target and easy Target Plus are additional comfort functions for the lift height preselector. The general functionality, setup and operation of the lift height preselector are described in the standard operating instructions for the truck; refer to the chapter entitled "Lift height preselector".

On trucks with a toothed belt for lift height measurement, easy Target and easy Target Plus function only during the main lift because lift height measurement is not active during the free lift.

On trucks with optical lift height measurement, easy Target and easy Target Plus function across the entire fork lift height, from ground level up to the maximum lift height of the truck.







Trucks with easy Target and easy Target Plus are distinguished by the additional decal information on the operating device.

easy Target (variant)

easy Target simplifies the approach to a required target height with the lift height preselector. Instead of entering the target height in the input field using the buttons, the height is selected using the F button on the joystick or on the fingertip console. There is no longer any need to remove your hand from the joystick or from the fingertip console.

The easy Target function is activated by pressing the F button when lifting or lowering the fork. For the entire time that the F button is pressed, the display continuously shows the next attainable target height. If a target height has been passed, the next target height is automatically displayed. When the required target height appears in the display, this height is selected by releasing the F button. The fork stops at the selected lift height.



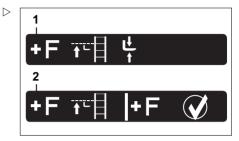
As an alternative to using "easy Target", the target heights for the lift height preselector can also be entered using the buttons for the input field.

easy Target Plus (variant)

In conjunction with easy Target, easy Target Plus makes it easier to perform the "Automatic tilt to centre position" function. This function moves the fork into the horizontal position when placing into stock and removing from stock.

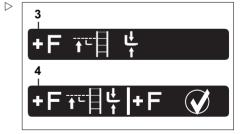
With easy Target Plus, the function is not activated using the "Automatic tilt to centre position" button, but instead using the F button (1) on the joystick or on the fingertip console. There is no longer any need to remove your hand from the joystick or from the fingertip console.

First, a target height for the lift height preselector is selected and reached using the easy



Decal information: "easy Target"

- 1 easy Target
- easy Target (can also be operated with the acknowledge button)



Decal information: "easy Target Plus"

- 3 easy Target Plus
- 4 easy Target Plus (can also be operated with the acknowledge button)



Target function. Once the selected target height has been reached, easy Target Plus is activated by pressing the F button again. For the entire time that the F button is pressed, the "Automatic tilt to centre position" function is executed. If the fork is positioned horizontally, the F button can be released.

After setting down the load on the racking, easy Target Plus is re-activated by pressing the F button again. For the entire time that the F button is pressed, the "Automatic tilt to centre position" function is executed. If the fork is positioned horizontally, the F button can be released.



As an alternative to using "easy Target Plus", the function can also be executed using the "Automatic tilt to centre position" button.

Prerequisites for use

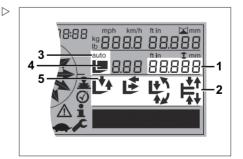
To use the easy Target function, the "Lift height preselector" option must be set up and operational on the truck. The target heights that need to be controlled using the easy Target function must already be stored in the lift height preselector.

To use the easy Target Plus function, the "Automatic tilt to centre position" option must also be set up and operational on the lift mast.

Approaching target heights using "easy Target"



If "easy Target" issues a short warning sound when used, the fork must first be lifted once using the main lift function so that the lift height measurement is referenced.



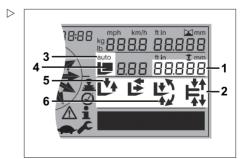


	Result	Display
witch on the lift height reselector (push button AH n the input field)	The lift height preselector is switched on.	The assistant for the lift height preselector (2) is displayed.
ift or lower the fork using the bystick or fingertip console.	The lifting or lowering procedure starts.	The display (1) shows the target height currently set in the lift height preselector.
When lifting or lowering, press nd hold the F button.	easy Target is activated. The lift height preselector detects whether there is a load on the fork and indicates the placing into stock or removing from stock procedure accordingly.	The display (1) changes to the next attainable target height. The symbol (4) for the placing into stock or removing from stock procedure is displayed.
the required target height is isplayed, release the F button.	The new target height is selected.	The AUTO symbol (3) is displayed. The assistance arrows (5) indicate "lifting" or "lowering".
Continue to lift or lower until the arget height is reached.	The process stops automatically at the required target height. easy Target is complete.	The assistance arrows for "lifting" or "lowering" are no longer displayed.
applicable, continue to follow ne assistance arrows from the ft height preselector until the lacing into stock/removing om stock procedure is omplete.	The placing into stock/removing from stock procedure is complete.	The assistant for the lift height preselector (2) indicates the next steps until the placing into stock/removing from stock procedure is complete.
<u> </u>		

Cancel easy Target: Press the **MAN** button in the input field or release the foot switch (dead man's switch).

Positioning the fork horizontally using "easy Target Plus"

easy Target Plus can be executed when the lift height preselector is active. The operating steps for easy Target Plus are highlighted in grey in the table.





Operation	Result	Display
Execute easy Target Plus	(before driving the fork into the ra	acking):
Move the joystick or the fingertip console to the inactive position. Only then press and hold the F button again.	easy Target Plus is activated. The fork is positioned horizontally.	One of the two assistance arrows (6) is visible, indicating that the fork is positioned horizontally.
Once the fork is positioned horizontally, release the F button.	easy Target Plus is complete.	Both assistance arrows (6) are visible. The fork is positioned horizontally.
If applicable, continue to follow the assistance arrows from the lift height preselector until the placing into stock/removing from stock procedure is complete.	The placing into stock/removing from stock procedure is complete.	The assistant for the lift height preselector (2) indicates the next steps until the placing into stock/removing from stock procedure is complete.
Execute easy Target Plus (after driving the fork out of the racking):		
Move the joystick or the fingertip console to the inactive position. Only then press and hold the F button again.	easy Target Plus is activated. The fork is positioned horizontally.	One of the two assistance arrows (6) is visible, indicating that the fork is positioned horizontally.
Once the fork is positioned horizontally, release the F button.	easy Target Plus is complete.	Both assistance arrows (6) are visible. The fork is positioned horizontally.
Cancel easy Target Plus: (dead man's switch).	Press the MAN button in the inpu	t field or release the foot switch

Cab (variant)

General information about the cab

Depending on the area of application, the truck can be equipped with a weather protection cab or a cold store cab.

Operating devices (variants)

The operating devices for the hydraulic functions and driving are positioned and operated in the same way as those on the basic truck.



Possible equipment variants include:

- · Screen heating
- · Washer system
- · Heating system
- · Fan heater
- · Intercom system
- · Working spotlight
- · Interior lighting

Opening the cab door

A DANGER

Risk of fatal injury as a result of driving with the cab door open!

The driver can be injured if he does not keep his entire body within the protective cab, or if he falls off the truck.

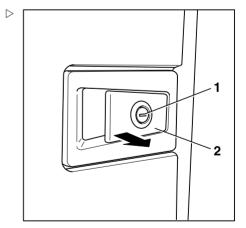
 Always close the cab door before driving off, and keep it closed when driving.

Opening the cabin door from the outside

- Insert the key in the door lock (1), unlock and remove the key.
- Pull the door handle (2) and release the door lock.
- Open the cab door by pulling it outwards.



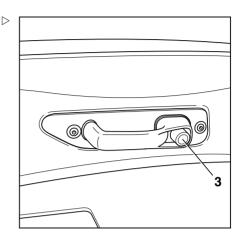
There is no monitoring switch for the cab door. To operate the truck functions, actuate the foot switch, as in the basic truck.





Opening the cabin door from the inside

- Grip the handle, push the locking knob (3) and push the cab door outwards.



Closing the cab door

A DANGER

Risk of fatal injury as a result of driving with the cab door open!

The driver can be injured if he does not keep his entire body within the protective cab, or if he falls off the truck.

 Always close the cab door before driving off, and keep it closed when driving.

A DANGER

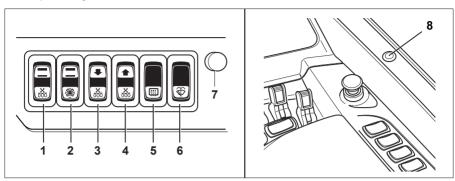
There is a risk of damage caused by collision if the cab door opens while driving.

- The cab door must be latched securely in the engaged position.
- Close the door firmly.

The door must engage in the lock and the rubber seals must line up correctly.



Cab operating devices



▲ WARNING

Risk of accident from actuating the operating devices in the cab while the truck is in motion.

If the driver briefly stands up from the driver's seat in order actuate operating devices, the driver may be injured due to an insecure grip or may lose control of the truck.

Only actuate the operating devices in the cab when the truck is stationary

No.	Operating device	Function
1	Heating system rocker switch (door), 2-stage	Selection of two heating levels for the warm air heating system in the door
2	Ventilation fan rocker switch, 2-stage	Selection of two blower speeds
3	Heating system rocker switch (footwell), 2-stage	Selection of two heating levels for the warm air heating system under the steering wheel
4	Heating system rocker switch (head area), 2-stage	Selection of two heating levels for the warm air heating system in the overhead guard post
5	Screen heating rocker switch, tap mode	Tapping the rocker switch starts the heating phase, which switches off automatically after a few minutes
6	Intercom system rocker switch	Activates the intercom system
7	Intercom system volume controller	Controls the volume of the intercom system
8	Intercom button	While speaking, the operator must keep the intercom button pressed down

The operator switches on the function by pressing the upper half of the relevant rocker switch. Pressing the lower half of the switch switches off the function in question. There



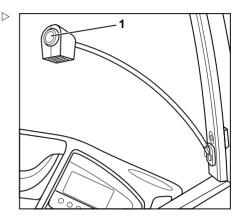
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may, however, be a slight delay between the switch being pressed and the function being switched off.

Cab interior lighting (variant)

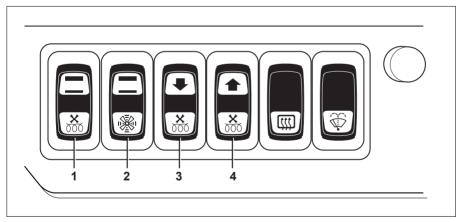
For better illumination of the cab, the truck can be equipped with a pivoting interior light.

- Press switch (1) to switch on the cab light.
- Adjust the reflector until the working area is optimally illuminated.



Heating system in the cab (variant)

Switching on the blower and heating system



- Rocker switch for heating system (door),
 2-stage
- 2 Rocker switch for ventilation fan, 2-stage
- Rocker switch for heating system (footwell),
 2-stage
- 4 Rocker switch for heating system (head area), 2-stage





▲ 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.



A 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.



A DANGER

The heating system overheats if the hot air cannot escape from it. There is a 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 outlets.



A DANGER

The heating system housing can become very hot when the heating system is operating. There is a risk of burns if it is touched!

- Do not touch the heating system housing during operation.
- Only touch the switches provided.
- Switch on the required heating function by actuating the relevant rocker switch.

No.	Operating device	Function
1	•	Selection of two heating levels for the warm-air heating system
	system (door), 2-stage	in the door
2	Rocker switch for	Selection of two blower speeds
	ventilation fan, 2-stage	



No.	Operating device	Function
3	Rocker switch for heating system (footwell), 2-stage	Selection of two heating levels for the warm-air heating system under the steering wheel
4	9	Selection of two heating levels for the warm-air heating system in the post on the overhead guard

Switching off the heating system and blower



A DANGER

The heating system overheats if the hot air cannot escape from it. There is a risk of fire!

The blower may only be turned off if the heating system is turned off.

- Always turn the heating system off first
- Only turn the blower off when the heating system is switched off.
- Switch off the required heating function by actuating the relevant rocker switch.
 For information about the functions of the rocker switches, refer to the chapter entitled "Switching on the blower and heating system".

Changing fuses



A DANGER

Using the wrong fuses can result in short circuits. There is a risk of fire!

 To change the fuses, contact the authorised service centre.



Emergency exit window in the cab

A CAUTION

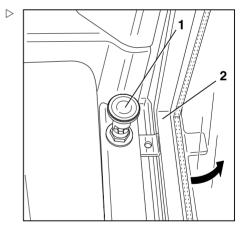
The emergency exit window is only intended for leaving the truck in the event of an emergency. There is a risk of damage caused by collision if the truck is driven with the window open or if the window opens while driving.

Do not drive with the emergency exit window open.

If the window has been opened, make sure that the window is latched securely in the engaged position before driving off again.

The window behind the driver's seat is used to rescue the driver if he or she is shut inside the cab in a hazardous situation, for example if the truck has toppled over and the cab door can no longer be opened. It is labelled EMERGENCY EXIT ONLY.

- Switch off the truck.
- To make it easier to climb out, fold down the driver's seat backrest.
- Pull both locking knobs (1) upwards until the window (2) can be opened outwards.
- Ensure that the surrounding area is safe, push the window outwards and climb out of the truck to the side
- Make sure that the window is latched securely in the engaged position before driving off again.



Cold store application

General

In order to make industrial trucks suitable for use in cold stores, the trucks must be fitted with auxiliary equipment and subjected to technical modifications. As a result of this



Cold store application

change in setup, the operational behaviour, maintenance intervals and maintenance tasks differ to those for standard industrial trucks.

The following section describes the steps that must be taken to ensure your cold store truck retains its functionality in cold-store conditions over a long period of time.

Areas of application

Distinction is drawn between 4 different areas of application, and between various different modes of operation within these areas:

Area of application	Cold store equipment	Temperature range up to	Operating time	Comment
1	Not required	-10°C	Brief	Typical application for trucks that take the load from the cooling truck into the cold store, where the load is handled by storage and retrieval trucks.
2	Required	-30°C	Continuous	Alternating between indoor and outdoor use: time spent outdoors long enough for the condensation to drain off at least (generally min. 30 minutes) or short enough so that no condensation can form (generally max. 10 minutes). Parking outside of the cold area.



Area of application	Cold store equipment	Temperature range up to	Operating time	Comment
3	Required	-30°C	Continuous	Truck is parked outside of the cold store area only for maintenance or repair work or only for max. 10 minutes.
4	Required	-45°C	Brief	Cold store equipment is only designed for continuous use at temperatures down to -30°C.

Description of the cold store equipment

Cold store equipment components

A CAUTION

Only trucks with Vulkollan wheels may be used in cold stores.

- Check Vulkollan wheels before starting to drive.

The cold store equipment for industrial trucks consists essentially of:

- Oil types suitable for the cold store, for use in the hydraulics and gearbox.
- Lubricants suitable for the cold store, for use on moving parts, such as gearing and chains.
- Chains treated with water-repellent lowtemperature grease are fitted.
- The paintwork on the trucks is designed for use at freezing temperatures.
- Heating fans and heating resistors are positioned throughout the industrial truck in order to keep the most important components at operating temperature.
- Precautions are taken to allow any condensation water to drain off without it getting into the electrics.
- The lift cylinders and other hydraulic parts are fitted with special seals where required.



Cold store application

Battery in the cold store

The drive batteries of the industrial trucks may under no circumstances reach the temperature of the cold store (-30°C) or shock cold store (-45°C). They must either be in operation or charging. The batteries must not remain in the cold store overnight without power drain or charging. It is best to charge the battery outside the cold store and to continue to operate the industrial truck in the cold store with replacement batteries. The battery charger must always be operated outside the cold store.

A CAUTION

Depending on the temperature, the charging time of the battery may increase and the available capacity of the battery may be reduced.

The lower the temperature at which the battery is used, the longer the charging time and the lower the available capacity. The standard capacity is reached at 30°C. If the temperature is reduced by 1°C, this capacity is reduced by approximately 1%.

Impermissible use of the lithium-ion battery in the shock cold store (-45°C)

A CAUTION

Risk of component damage.

The lithium-ion battery is not approved for use in shock cold stores (-45°C).

 Do not drive into a shock cold store with the lithium-ion battery (even for a short period).

The "Areas of application" chapter defines four areas of application for cold store applications. The lithium-ion battery is only permitted to be used in application areas "1" to "3". The lithium-ion battery is not approved for application area "4" (shock cold stores, down to -45°C).



Before entering the cold store

Warming up the truck

Before normal operation in the cold store, the truck must be warmed up for approx. 5 minutes. To do this, all traction and lifting actions must be carried out several times. The warm-up phase is necessary in order to raise the oil temperature. Proportional valves and seals will only work perfectly after this warm-up phase has been completed.

Checking the brake system

- The operational safety of the brake system must be checked by actuating the brake several times during the warm-up phase.

Alternating between the normal area and the cold-store area

Before entering the cold store, any condensation water on the truck must be dried off.



In exceptional cases, the truck may also be driven into the cold store with a small amount of condensation. When doing so, prevent the condensation water on the truck from freezing. Water droplets on the sensor system and on the mechanical components must be removed by actuating the lift mast.

- · Before entering the cold store, fully raise the lift mast once and lower it again
- Repeat the operation after entering the cold store



Procedure in emergencies

Procedure in emergencies

Emergency shutdown

A CAUTION

If the battery male connector (1) is disconnected or the emergency off switch (2) is actuated, the truck's electrical functions are switched off.

This safety system must only be used in an emergency or to safely park the truck.

A 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 truck before the battery male connector is disconnected.
- Do not disconnect the battery male connector while the truck is switched on except in the case of an emergency.

A CAUTION

Risk of accident in the event of an emergency shutdown of the truck whilst the load is raised.

In the event of an emergency shutdown of the truck whilst the load is raised, the fork carriage must be fully lowered once and the reach carriage fully retracted once. This ensures that the electronic support systems which prevent the truck from tipping over with a raised load are recalibrated.

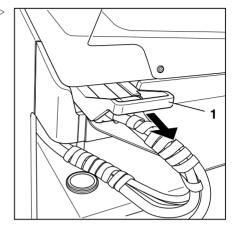
 Before continuing to drive the truck, fully lower the load and fully retract the reach carriage.

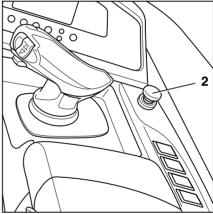
Switching off the truck in an emergency while stationary

In an emergency, all functions of the truck can be shut down.

 Disconnect the battery male connector (1); see the chapter entitled "Disconnecting the battery male connector".

None of the truck functions are now available.







Switching off the truck in an emergency while it is moving

In an emergency, all functions of the truck can be shut down.

- Ensure that you have a secure grip on the truck; hold onto the steering wheel with your left hand.
- Press the emergency off switch (2).

The parking brake is applied and the truck brakes until it comes to a standstill. None of the truck functions are now available.

Procedure if truck tips over

A DANGER

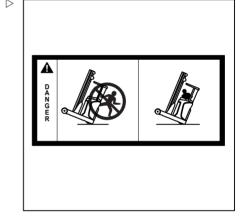
If the truck tips over, the driver could fall out and slide under the truck with potentially fatal consequences. There is a risk to life.

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.

- 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.
- Brace your feet in the footwell.
- Keep your body, in particular your arms and legs, within the driver's compartment in the truck.
- Lean your body away from the direction of the fall.





Procedure in emergencies

Emergency lowering



▲ DANGER

Risk to life if the load drops too quickly!

Do not walk underneath the raised load!

A DANGER

If the truck is operated with the hydraulic controller blocked, there is an increased risk of accident!

- After the emergency lowering procedure, have the malfunction rectified.
- Notify your authorised service centre.

In the event of a power failure, the forks can be lowered manually so that the truck can be moved to a safe position.

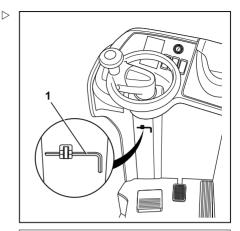
The emergency lowering valve is operated remotely by means of a flexible drive. The handle for operation is located on the reach carriage near the mast fixture.

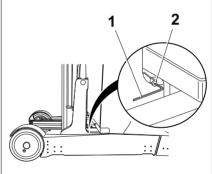
WARNING

The load is lowered!

Control the speed by turning the handle of the flexible drive by a smaller or larger amount:

- Turning by a smaller amount: load is lowered slowly.
- Turning a larger amount: load is lowered quickly.
- After ensuring that no persons are in the vicinity of the truck, use the hexagon key (1) to slowly release the emergency lowering valve (2) so that the fork carriage can be lowered.
- Ensure that the valve is re-tightened once the forks have been lowered
- Notify your authorised service centre.







Towing

A DANGER

The brake system on the towing vehicle may fail. There is a 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.

A DANGER

The truck could drive into the towing vehicle when the towing vehicle brakes. There is a risk of accident!

When towing the truck, do not exceed the maximum recommended speed of 2.5 km/h. When towing on gradients, reduce speed to an absolute minimum and keep wheel chocks at hand.

 Set down the load and lower the fork arms close to the ground.



Procedure in emergencies

Towing with operational steering

A 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 ropes 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 ropes are aware of possible risks.

- Only manoeuvre with a guide.

If the truck's steering still functions and the brake is released, the truck can be towed with ropes.

 Select a towing speed that allows the truck and towing vehicle to be braked and controlled effectively at all times.

A 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.
- Release the parking brake.
- Tow the truck.
- After towing, secure the truck against rolling away (e.g. by activating the parking brake or using wheel chocks).
- Do not remove the tow ropes.

Lifting points for towing

Load-side lifting points

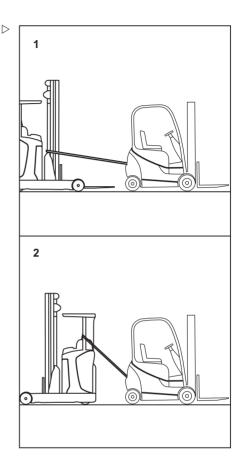
Wind around lift mast (1).

Drive-side lifting points

 Wind around the two drive-side support posts of the overhead guard (2). On the left-hand side, guide the tow rope through the handhold on the support post.

Towing with non-operational steering

If the steering has failed, the truck can be towed using equipment such as steerable heavy-duty rollers. Depending on the design,





the heavy-duty rollers must be placed underneath the drive wheel or underneath the posts on the side of the truck. As the drive wheel does not come into contact with the ground when using this towing method, the brakes can also no longer operate. Therefore, please observe the safety information in the section entitled "Releasing the brakes mechanically".

Emergency steering (variant)

A pinion shaft for turning the steering manually is available as special equipment.

A CAUTION

This emergency steering pinion may only be used when the battery male connector is disconnected.

Connecting and disconnecting the battery male connector

Connecting the battery male connector

A CAUTION

Risk of component damage!

If the battery male connector is connected while the key switch is on (under load), a jump spark will be produced. This can damage the contacts and considerably shorten their service life.

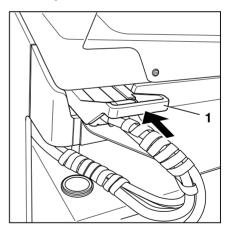
- Do not connect the battery male connector while the key switch is switched on.
- Ensure that the battery male connector and the plug connection are dry, clean and free of foreign objects.
- Insert the battery male connector (1) fully into the plug connection on the truck.



A CAUTION

There is a risk of short circuit if the cables are damaged.

 Ensure that the battery cable is not crushed when inserting the battery tray into the truck.





Connecting and disconnecting the battery male connector



NOTE

The battery male connector of a lithium-ion battery has additional contacts to allow the battery to communicate with the truck control unit. The connection procedure is the same for all battery male connectors.

Disconnecting the battery male connector

A CAUTION

Risk of component damage!

If the battery male connector is disconnected while the key switch is 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.
- Disconnect the battery male connector (1) from the plug connection by pulling in the direction of the arrow.
- Place the battery male connector on the battery.



A CAUTION

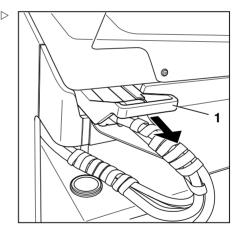
There is a risk of short circuit if the cables are damaged.

Lay the battery cable on the battery. Ensure that the cable is not crushed when either removing or inserting the battery.



NOTE

The battery male connector of a lithium-ion battery has additional contacts to allow the battery to communicate with the truck control unit. The disconnection procedure is the same for all battery male connectors.





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.



A 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.
- Observe the following safety regulations when maintaining, charging and changing the battery.

Maintenance personnel

Batteries may only be charged, maintained or replaced by properly trained personnel 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.
- 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.

There is a risk of serious injury if limbs get crushed between the battery and the truck frame.

- Always wear safety shoes when replacing the battery.
- When handling the battery, always make sure that no limbs get crushed between the battery and the truck frame.

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

A 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 sparkforming 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 safety precautions.

- Keep away from naked flames and do not smoke.
- Ensure that work areas are adequately ventilated
- Fully extend the battery together with the reach carriage to the load side before charging the battery in the truck.
- If fitted, open the door of the driver's cab (variant) fully.



- Disconnect the battery male connector before charging and only when the truck and battery charger are switched off.
- Expose the surfaces of the battery cells.
- Do not place any metal objects on the battery.
- Have fire extinguishing equipment ready.

Lifting accessories

The battery may only be removed with suitable lifting accessories; see the chapter entitled "Replacing the battery using a crane"

A DANGER

Risk of accident!

The battery could fall from the lifting accessory, or the lifting accessory could tip over or become damaged. There is a risk of fatal injury.

- Use a suitable lifting accessory with a load capacity (see operating instructions or nameplate) that at least matches the battery weight (see battery identification plate).
- Only remove the battery when the truck is on level, smooth ground with sufficient load capacity.

Battery weight and dimensions

A 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.

Maintaining 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 screwed on tightly.



- 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

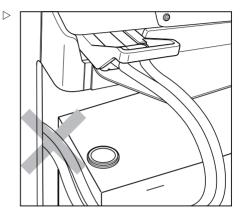


A CAUTION

There is a risk of short circuit if the cables are damaged.

Do not crush the battery cable when retracting the reach carriage with the battery.

- Check the battery cable for damage.
- When removing and installing the battery, ensure that the battery cables are not damaged.



A 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 is 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

A 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.



Battery maintenance is carried out in accordance with the battery manufacturer's operating 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

A DANGER

Danger to life and limb!

 Observe the instructions in the chapter entitled "Safety regulations when handling the battery".



WARNING

Battery acid is toxic and corrosive!

 Observe the safety regulations in the chapter entitled "Battery acid".



A CAUTION

Damage to the battery possible!

- Follow the information in the operating instructions for the battery.
- Extend the battery together with the reach carriage fully to the load side for maintenance



- Keep away from open flames and do not smoke.
- Ensure that work areas are adequately ventilated
- Expose the surfaces of the battery cells.
- Do not place any metal objects on the battery.
- Inspect battery for cracked housing, raised plates and 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.

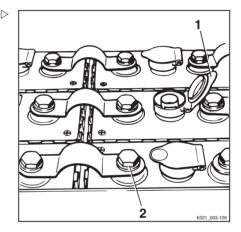
For batteries without "caged cell plugs", the liquid must reach a height of approx. 10 to 15 mm above the lead plates.

- Top up low fluid with distilled water only.
- Rinse away spilt battery acid immediately using plenty of water.
- Clean the battery cell cover and dry if necessary.
- Remove any oxidation residue on the battery terminals and battery-terminal clips and grease them with acid-free grease.
- Tighten the battery-terminal clips (2) to a torque of 22 - 25 Nm (depending on the size of the terminal screws used).
- Check the acid density using an acid siphon.

After charging, this value must be between 1.28 - 1.30 kg/l.

For a discharged battery, the acid density must be **no lower** than 1.14 kg/l.

Close the filler cap (1) again.





Checking the battery charge status

A CAUTION

Deep discharges shorten the service life of the battery.

Avoid a discharge to below 25% of the nominal capacity (0% on the display). This can cause a potential deep discharge of the battery.

 Charge batteries if a residual capacity of 0% is displayed. Never leave batteries in a discharged state. This also applies to partially discharged batteries.

The discharge process is monitored so that the battery is protected against deep discharge. To prevent damage, the battery must be charged when its residual capacity falls below 25%. The recommendation is to drive to the charging station soon. Due to the remaining residual capacity, you do not have to drive to the charging station immediately.



The battery discharge indicator characteristic curve must be set in accordance with the battery installed. See "Setting battery data".

- Press the emergency off switch.
- Switch the truck on.
- Read the charge status on the displayoperating unit.

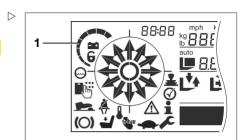
After connecting a fully charged battery:

 All of the display segments (1) light up (100%) after a few moments. As the capacity decreases, the segments go out one after the other. If the permissible discharge level of 25% residual capacity is reached, only the last segment continues to flash. An optional hydraulic limitation or driving limitation can be activated by the operating company or the authorised service centre.

Charging the battery

 Park the truck securely (refer to the chapter entitled "Parking the truck securely").





DANGER

Danger to life and limb!

Observe the instructions in the chapter entitled "Safety regulations when handling the battery".

WARNING

Battery acid is toxic and corrosive!

- Observe the safety regulations in the chapter entitled "Safety regulations for handling consumables/battery acid".



A 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.

A CAUTION

Potential for damage to the male battery connector!

- Before the battery male connector is disconnected or connected, the truck and the battery charger must be switched off.



i NOTE

Battery maintenance is carried out in accordance with the battery manufacturer's operating instructions. The operating instructions of the battery charger used must also be followed. If any of these instructions are missing, they must be requested from the dealer.

Lead or gel batteries are used as traction batteries. Because the various types have different structures, the respective matching battery chargers must be used. Gel batteries are subject to special charging and maintenance provisions. The guidelines from the respective manufacturer must be followed.

- Fully extend the battery together with the reach carriage to the load side before charging the battery in the truck (refer to the chapter entitled "Replacing the battery").
- Switch off the truck.



- Disconnect the battery male connector.
- Ensure that work areas are adequately ventilated.
- If fitted, open the door of the driver's cab (variant) fully.
- Do not place any metal objects or tools on the battery.
- Keep away from naked flames. Do not smoke.
- Before the charging process, check the battery cable and charging cable for damage.
 Change damaged cables.
- Attach the battery male connector to the battery charger plug.
- Start the battery charger. Follow the information in the operating instructions for the battery and the battery charger (equalising charge).



i NOTE

Note the information in the operating instructions for the battery charger (equalising charge).

 After the charging operation is completed, switch off the battery charger.



WARNING

Risk of explosion!

The plug may only be disconnected from the socket when the truck and battery charger are switched off.

- Disconnect the battery male connector from the plug on the battery charger.
- Reconnect the battery male connector to the truck (see the chapter entitled "Commissioning/connecting the battery male connector").
- Fully retract the battery together with the reach carriage to the drive side. Take care not to damage the battery cable when retracting.



 Ensure that the battery is securely locked (see the chapter entitled "Actuating the battery lock").

Equalising charging to preserve the battery capacity

Equalising charges ensure that unevenly charged battery cells are evenly charged again. This preserves the service life of the battery and the battery capacity.

An equalising charge should be carried out in accordance with the battery manufacturer's instructions several times a month after the normal charging process.



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 type of battery charger, the equalising charge starts between 6 and 24 hours after the end of a normal charging process. 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.

A 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

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.
- The handling instruction for the battery and the operating instructions for the battery charger must be followed.
- 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

A 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.



A 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.

- Evacuate the location of the fire as quickly as possible.
- Ventilate the location of the fire well, as the resulting combustion gases are corrosive 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

A 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 even 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 lithiumion batteries correctly.



Approved lithium-ion batteries

A DANGER

Risk of tipping if the truck is operated with an incorrect battery

Installation of an incorrect battery reduces the stability of the truck.

The batteries approved for this truck vary in terms of their size, weight and capacity.

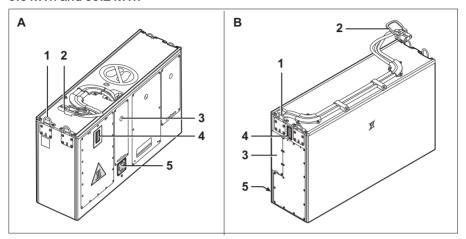
The truck may only be operated with a battery that is approved for its battery tray.

Only use lithium-ion batteries that have been approved by STILL for use with this truck. The dimensions and the weight of the replacement battery must precisely match the dimensions and the weight of the original battery. The truck may only be operated with a battery that is approved for its battery tray. The installation of an incorrect battery poses a risk to the stability of the truck.

 If you have any questions regarding the batteries approved for this type of truck, contact your authorised service centre.



Lithium-ion batteries "GGS Li-ion 48 V (BG4)" 9.8 kWh and 39.2 kWh



- A Battery group 4.1 (9.8 kWh)
- B Battery group 4.2, 4.3 (39.2 kWh)
- 1 Lifting eyes
- 2 Battery male connector
- 3 Technology compartment
- 4 Display
- 5 Safety valve

▲ WARNING

Risk of accident as a result of weakened lifting eyes.

If bent lifting eyes are straightened, they will lose their rigidity. The lifting eyes will then be unable to support the weight of the battery. The battery may fall

- Do **not** straighten bent lifting eyes.
- Have any bent lifting eyes replaced by your authorised service centre.



When changing from lead-acid batteries to lithium-ion batteries, the authorised service centre must adjust the truck electronics.



Regulations for storing lithium-ion batteries



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 $^{\circ}$ C or above 50 $^{\circ}$ 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



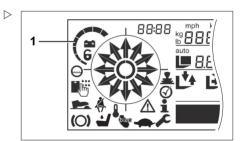
- Store in a way that protects the batteries against short circuits
- Store batteries at a safe distance from flammable materials
- Do not store batteries together with metallic objects
- Store lithium-ion batteries separately from other types of batteries (no mixed storage).
- Maintain a safety margin 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.

Checking the battery charge status (lithium-ion battery)

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. The two displays have different scale gradations and are therefore not identical.

Reading the display-operating unit of the truck

All segments (1) of the display (100%) light up a few moments after a fully charged battery is connected. As the capacity decreases, the segments go out one after the other. If the discharge level of 25% residual capacity is reached, only the last segment continues to flash. An optional hydraulic limitation or driving limitation can be activated by the operating company or your authorised service centre.





Reading the display of the lithium-ion battery

The battery indicator is located on the side of the battery tray. In addition to the display-operating unit, this too shows the charging status of the lithium-ion battery. Warnings are only issued on the 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 green and red.

- A charge state of 0% to 10% 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 > 10% to 30% is indicated by yellow bars
- A charge state of > 30% to 100% is indicated by green bars

When charging, the charging state LEDs (3) light up green as a chaser light.

Service LED

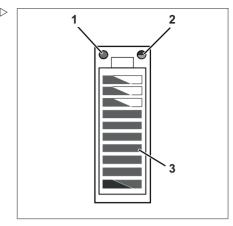
The service LED (1) lights up red if the battery function is significantly restricted or if operation is not possible.

Contact your authorised service centre.

Temperature LED

The temperature LED indicates an increased temperature. Battery power is reduced or switched off.

The LED remains active for the duration of the run-on time or until the temperature falls to within the normal range.



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

LED	Temperature	Consequence
Flashing yellow	Slightly increased (>60°C)	Power reduction
Solid yellow	Increased (>65°C)	Shut-off
Flashing red	Significantly increased (>70°C)	Shut-off
Solid red	Greatly increased (>75°C)	Shut-off

Procedure if a lithium-ion battery has a low charge state

To prevent deep discharge of the lithium-ion battery, truck performance limitations are imposed once the charge state of the battery drops to $\leq 10\%$.

- If the charge state drops below 15%, drive to the charging station and recharge the battery.
- If the battery switches off, tow the truck to the charging station.
- Charge the battery.

Charging the lithium-ion battery upon delivery

The lithium-ion battery may not be fully charged at the time of delivery.

The battery management system for lithiumion batteries remains active even if the battery is in a quiescent state. Therefore, the battery continues to discharge even when the truck is switched off or during storage.

To prevent deep discharge of the battery when it is stored for long periods, fully charge the battery once directly after delivery.



Charging the lithium-ion battery Charging the lithium-ion battery

A CAUTION

Risk of damage to components!

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.

A CAUTION

Risk of damage to components!

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 are from different manufacturers, please contact your authorised service centre.

i NOTE

To prevent deep discharge of the lithium-ion battery, truck performance limitations are imposed once the charge state of the battery drops to a certain level. The battery must be charged before the charge state drops below 15%.

For information on reading the charge state of the battery, see the section on "Checking the battery charge status".

- Fully extend the battery and the reach carriage to the load side before charging the battery in the truck (see the chapter on "Replacing the battery").
- Switch off the truck.
- Disconnect the battery male connector.
- If fitted, open the door of the driver's cab (variant) fully.
- 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.

A DANGER

Risk of damage, short circuit 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 chaser light.

The charger indicates 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 at 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.

After charging

The battery charger will switch off automatically.

- Disconnect the battery male connector from the plug on the battery charger. Do not disconnect the battery male connector while the charger is switched on.
- Fully insert the battery male connector into the plug connection on the truck.





A CAUTION

There is a risk of short circuit if the cables are damaged.

Do not crush the battery cable when retracting the reach carriage with the battery.

- Check the battery cable for damage.
- Fully retract the battery and the reach carriage to the drive side.

Recommissioning the lithium-ion battery following deep discharge

A CAUTION

Damage to the battery from deep discharge!

A deeply discharged battery results in considerable cost and, potentially, an unusable battery due to cell damage.

- Always charge the battery before deep discharge begins.
- When taking the battery out of operation for a prolonged period (e.g. for company holidays), always ensure the battery is charged (30% -100%).

The battery management system remains active even if the battery is in a quiescent state. Therefore, the battery discharges even when the truck is switched off or during storage. When the battery charge drops below a permitted discharge limit, this is known as deep discharging.

The deep discharge begins when the last segment on the battery indicator flashes red. The battery switches off the power supply to the truck. It is no longer possible to drive the truck.



Replacing and transporting the battery

The deep discharge progresses in three phases:

- At the start of the deep discharge, the customer can still charge the battery himself for a limited period
- 2 If the deep discharge continues, only the authorised service centre can put the battery back into service
- 3 If the deep discharge continues beyond the first two phases, the battery is irreparably damaged

Time periods for putting back into service (guide values)				
Battery 4.1 (9.8 kWh)	Battery 4.2, 4.3 (39.2 kWh)	Recommissioning		
Phase 1: Approx. 8 days	Phase 1: Approx. 32 days	Customer (charging the battery)		
Phase 2: Approx. 97 days more	Phase 2: Approx. 97 days more	Authorised service centre		
Phase 3: The battery is irrepara	No longer possible			

Display on the battery indicator during deep discharge		
Phase of the deep discharge	Display on the battery indicator	
Phase 1: Start of the deep discharge. It is no longer possible to drive the truck. In this phase, the customer can still charge the battery himself using the battery charger.	Initially: The last charge state LED flashes red. Later: The battery display is OFF. The service LED lights up red.	
Phase 2: In this phase, the authorised service centre can put the battery back into service. If the battery is not put back into service during this period, it will be irreparably damaged. Phase 3: The battery is irreparably damaged.	The battery display is OFF. The service LED is OFF.	

Replacing and transporting the battery

Commissioning batteries that are delivered separately

Proper commissioning must be performed if the truck was ordered without a battery or if it



was supplied with a dry pre-charged battery (only lead-acid batteries). In this situation, note the information and guidelines from the battery manufacturer.

If the battery was procured separately to the truck, the following must be checked by the authorised service centre:

- · Nominal voltage
- · Required minimum weight
- · Fitted battery male connector
- Characteristic curve for battery discharge (lead acid batteries)
- · Battery approved for this truck by STILL

Alternating between a lead-acid battery and a lithium-ion battery

Before changing from a lead-acid battery to a lithium-ion battery, the authorised service centre must perform a one-off conversion on the truck.



The only intended use of a lead-acid battery in a truck with a lithium-ion battery is in the event of an emergency; for example, if the lithium-ion battery is faulty.

Trucks with lithium-ion-battery ex works

Battery tray	Truck operation ex works	After the conversion	
323	Lithium-ion	Lithium-ion/lead-acid	
324	Lithium-ion	Lithium-ion/lead-acid	
325	Lithium-ion	Lithium-ion (*) / lead-acid (*)	
326	-	-	
	(*)	Also requires a change of battery tray	

Trucks with lead-acid battery ex works

Battery tray	Truck operation ex works	After the conversion
323	Lead-acid	Lithium-ion/lead-acid
324	Lead-acid	Lithium-ion/lead-acid
325	Lead-acid	Lithium-ion (*) / lead-acid (*)



Battery tray	Truck operation ex works	After the conversion
326	Lead-acid	-
	(*)	Also requires a change of battery tray

Only use lithium-ion batteries that have been approved by STILL for use with this truck. Also refer to the chapter entitled "Approved lithium-ion batteries".

 If you have any questions regarding the batteries approved for this type of truck, contact your authorised service centre.

After installation of the battery

If the battery installed is a lithium-ion battery, no settings need to be adjusted using the display-operating unit. The truck automatically detects the new lithium-ion battery.

If the battery installed is a lead-acid battery, the battery capacity and the battery type must be checked via the display-operating unit. Also refer to the chapter entitled "Entering truck operating data via the display-operating unit". If the settings are incorrect, then the battery charge is not displayed correctly. In the worst case, the battery may be damaged by a deep discharge.

General information on battery replacement

A 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.



WARNING

Risk of crushing from moving parts!

Observe the information signs on the truck; see the chapter entitled "Labelling points".

The battery sits in a battery frame. To replace the battery, this frame is extended in the fork direction together with the reach carriage. When retracted, this battery frame is locked mechanically.

The battery can be removed using the following lifting devices:

- · Forklift truck or crane (for standard equipment)
- · Change frame (for variant with roller channel for side battery replacement)

The load capacity of the lifting accessory used must at least match the battery weight (see the battery nameplate).



If the reach system of the truck is not working due to a battery problem, the battery must be removed by your authorised service centre.

Incompatibility of battery connectors from different manufacturers

A CAUTION

Risk of fire from using battery connectors from different manufacturers!

The battery connectors on the truck and on the battery must be from the same manufacturer. Poor contact pairing between battery connectors from different manufacturers can result in overheating.

- Check the manufacturer of the battery connector before replacing the battery.
- Connect battery connectors from this manufacturer only.



Actuating the battery lock

Before the release lever for the battery lock can be pulled, the battery lock must be released. The battery lock is released via the "Retract reach carriage" operating function on the joystick 4Plus or the corresponding fingertip switch.

The battery lock is only released if the truck is stationary.

Releasing the battery lock

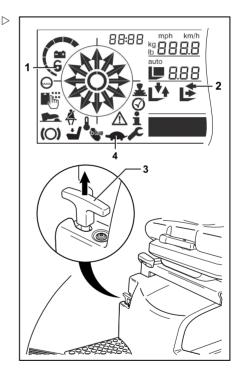
- Bring the truck to a standstill.
- Press and hold the foot switch
- Use the actuating lever (joystick or fingertip switch) to retract the reach carriage to the drive side until the reach carriage stops.
- Continue to actuate the actuating lever. After 5 seconds the "lock"(1) symbol appears in the display.
- Release the actuating lever. After approx.
 2 seconds, the (2) arrow shows that the reach carriage can be retracted further into the end position. If the end position is not reached within 2 minutes, or if the accelerator pedal is pressed, the operation is cancelled. The "lock" symbol is hidden again.
- Retract the reach carriage to the end position to unlock the battery.
- Pull the release lever (3) for the battery lock upwards. The battery is unlocked.

When the battery is unlocked:

- · An acoustic warning signal is heard
- The "creep speed"(4) symbol is displayed
- The driving speed is limited to 1.6 km/h
- The hydraulic functions are restricted
- Eject the battery together with the reach carriage to the load side.

Locking the battery

Press and hold the foot switch





 Use the actuating lever (joystick or fingertip switch) to retract the reach carriage together with the battery to the drive side into the end position.

The battery lock audibly engages. The battery is locked. If the battery lock does not engage, the battery was not extended by at least a third to the load side after unlocking. Extend and retract the battery again to lock the battery.

The acoustic warning signal stops. The driving speed and hydraulic functions are no longer restricted.

 After locking the battery, move the reach carriage to the load side out of the end position. The "lock" and "creep speed" symbols disappear from the display.



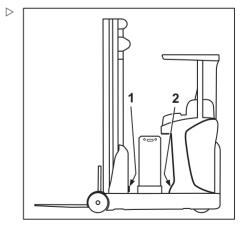
In normal operation, the acoustic warning signal together with the "lock" and "creep speed" symbols indicate that the battery lock sensor has a mechanical defect. Have any defects rectified by the authorised service centre.

Adjusting the battery lock

Adjustment instructions

Battery trays for traction batteries are manufactured with relatively large tolerances. To ensure that the lock of the battery frame in which the battery sits is in good working order, its bump stops must be adjusted. This happens in the factory during commissioning. However, if the customer procures the battery himself or if the battery is replaced, the adjustment must be carried out on site.

- For instructions of how to install and remove the battery, as well as for how to handle the battery, refer to the chapter entitled "Replacing the battery using a crane".
- Unlock the battery frame and slide it out. If necessary, use an extension cable and an adjacent battery.





- Screw both rubber buffers fully into the exterior of the control compartment (1). Do not use flat washers.
- Insert the battery into the changing frame and fasten it to the load-side wall.
- Slide in the battery frame.

If the locking mechanism makes contact with the rubber buffers (1) once the lock is engaged, no further adjustment is required.

However, if an air gap remains between these rubber buffers and the battery, the gap must be calculated, e.g. by sliding in metal strips.

- A measurement of 1.5 mm is added to the measured distance, and suitable washers must be fitted between the wall and the rubber buffers (1) to match the size of the gap that has been calculated.
- The battery frame should strike both pads simultaneously. By using different washers for the rubber pads, the angle can be corrected slightly if necessary.
- Check that the lock works correctly and whether it is possible to pull the release lever by hand (refer to the chapter entitled "Actuating the battery lock".

If the lock does not engage or if it is difficult to pull the release lever, the washers must be reduced or the height of the rubber pads must be decreased.

If the lock does not engage, it may also be necessary to increase the insertion distance of the battery frame. This is achieved by placing suitable washers beneath rubber buffers (2) on the load side.

If the lock still does not function properly despite all of these adjustment options, check whether the correct reach cylinder has been installed or whether the stops in the end positions have been set correctly using the reach travel measurement system.

Determine the average value when installing replacement batteries. The battery trays are different sizes to accommodate the different sizes of replacement batteries. In each case, the battery lock must be set to the largest tray.



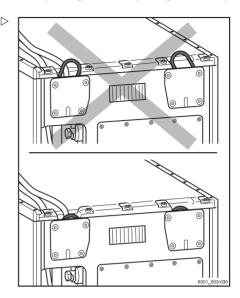
Special notes for installing the lithium-ion battery

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 with the reach carriage. Make sure that the lifting eyes do not protrude.

The lifting eyes may bend in the event of a collision with the truck.

 Lay the battery cable on the battery. Make sure that the cable does not come into contact with the truck during installation.



Replacing the battery using a lifting device

A DANGER

The battery weight and its 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.



▲ WARNING

Risk of crushing if the battery falls out.

The battery lock must only be released on horizontal, level ground using suitable devices.

Suitable devices include:

- Suitable lifting equipment (e.g. forklift truck, crane) with sufficient load capacity for lifting the battery
- Suitable harnesses
- A stationary or mobile battery change frame (follow the operating instructions for the battery change frame)

The battery lock lever may be actuated only when the truck is stationary and the reach carriage is fully retracted

The battery sits in a frame. To replace the battery, this frame is extended in the load direction together with the reach carriage. Before the reach carriage is extended, the battery lock lever must be actuated. When the reach carriage is fully retracted, the battery frame is mechanically locked again.

Removing the battery

- Park the truck on a horizontal, level surface.
- Retract the reach carriage fully.
- Apply the parking brake.
- Unlock the battery lock (see the chapter entitled "Actuating the battery lock").
- Press the foot switch.



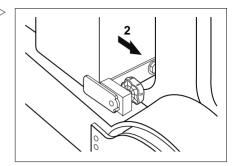
- Extend the reach carriage fully together with battery (2).
- Switch off the truck.
- Push the emergency off switch.

A CAUTION

Risk of component damage!

If the battery male connector is disconnected while the truck 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 truck before the battery male connector is disconnected.
- Do not disconnect the battery male connector while the truck is switched on except in the case of an emergency.



- Disconnect the battery male connector (3).



A CAUTION

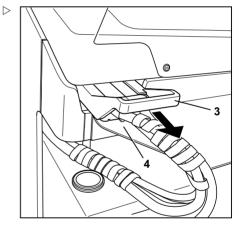
There is a risk of short circuit if the cables are damaged!

Lay the battery cable on the battery. Ensure that the cable is not crushed when removing and inserting the battery.

Check the connection cables for damage.

For batteries with a greater installation depth, the battery cover of the truck must be removed. The screws on the battery cover can be loosened using the hexagon key for the emergency lowering mechanism. The hexagon key is located in the driver's compartment, underneath the steering wheel (see the chapter on "Emergency lowering").

- Remove the three screws on the battery cover (4). Remove the battery cover from the truck.
- Use a suitable lifting device to remove the battery from the battery frame; see the chapter on "Transporting the battery using a lifting device".





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Installing the battery

▲ WARNING

Risk of corrosion

The electrolyte (battery acid) is toxic and corrosive on contact.

- Observe the prescribed safety measures when handling battery acid.
- For newly charged batteries in particular, be aware of the risk of explosion in the area of the battery where gas may be released.

WARNING

Risk of explosion

The openings in the area of the battery where gas may be released must not be covered or sealed. An unrestricted air supply prevents the formation of potentially explosive gas mixtures. Do not create openings in the area of the battery where gas may be released, to ensure that any gases released cannot penetrate the driver's compartment.

The battery must fill the installation space with just a few millimetres of play. This makes it impossible for the battery to slip or tip over while the truck is in motion. The battery frame is intended for use with standard-compliant batteries. The batteries used must conform to the specified dimensional tolerances in accordance with this standard. This is required to ensure that the battery lock functions correctly.

 Use a suitable lifting device to insert the battery into the battery frame; see the chapter on "Transporting the battery using a lifting device".

A CAUTION

Risk of short circuit

If the battery cover is not in place on the truck, water or dirt can damage the battery.

- Only commission the truck once the battery cover is in place.
- Attach the battery cover to the truck using the three screws
- Return the hexagon key for the emergency lowering mechanism to its position underneath the steering wheel in the driver's compartment.



Activities after installation of the battery

A DANGER

If the battery is not locked correctly, it can slide out of the truck.

- Before the truck is commissioned, the battery lock must be checked to ensure that it is in good working order and is locked securely.
- If your truck is equipped with a Euro battery male connector, make sure that the voltage index pin (48 V) is in the correct position.
 The set voltage can be read through a display window (1).



- Compare the nameplates on the truck and the battery. The battery must comply with the specifications on the nameplate regarding the voltage and weight.
- Gel batteries and lithium-ion batteries are subject to special charging/handling instructions. Follow the instructions provided by the respective manufacturer.

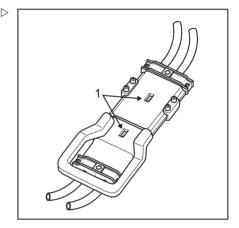


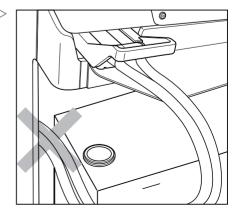
Risk of component damage!

If the battery male connector is connected while the key switch is on (under load), a jump spark will be produced. This can damage the contacts and considerably shorten their service life.

- Do not connect the battery male connector while the key switch is switched on.
- Connect the battery male connector. Make sure that the battery cable cannot become trapped when retracting the reach carriage.
- Unlock the emergency off switch.
- Switch on the truck.
- Press the foot switch.
- Retract the reach carriage with the battery fully until the battery lock engages.

The lock must audibly engage. If necessary, the push down the release lever. If the battery frame is locked incorrectly, the driving speed is reduced and the message **A3405** is shown on the display-operating unit. This situation







can also be caused by a battery that is not standard-compliant or by a technical fault.

If the battery is not included in the scope of delivery, your authorised service centre must adjust the battery lock.

 For lead acid batteries, check the battery data (battery type and battery capacity) on the display-operating unit or re-enter this data; see the chapter on "Setting the battery data".

Changing the battery using the internal roller channel (variant)

As an option, this truck can also be equipped with a roller channel for battery replacement at the side.

A DANGER

The battery weight and its 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.

▲ WARNING

Risk of crushing if the battery falls out.

Releasing the battery lock, as described below, must only be carried out on horizontal, level ground using a suitable battery change frame.

The battery lock lever may be actuated only when the truck is stationary and the reach carriage is fully retracted.

Prerequisites for replacing the battery

 For the correct use of the battery change frame, refer to the information in the chapter entitled "Battery change frame" and the operating instructions, and comply with the manufacturer's safety regulations.

Maintenance personnel for batteries

Batteries may only be charged, maintained or changed by properly trained personnel



in accordance with the instructions of the manufacturers of the battery, battery charger and truck.

 The handling instructions for the battery and the operating instructions for the battery charger must be followed.

Positioning the truck correctly in relation to the battery rack

A CAUTION

Before replacing the battery, ensure that the rollers for the battery transport in the battery rack are aligned with the rollers in the truck. Failure to do so could cause damage to the battery rack rollers and locking mechanism.

The truck must be placed in such a position relative to the battery rack that the transition of the battery between the truck and the battery rack can be performed without mechanical resistance

- Make sure that the transfer height of the battery rack is correctly adjusted to that of the truck, refer to the chapter entitled "Battery change frame/Adjusting the transfer height".
- Position the truck and battery rack parallel to each other.
- Position the truck and the battery rack so that the roller channels of the truck and battery rack are exactly aligned with each other.

Extending the battery

The battery sits in a frame. To replace the battery, this frame is extended in the load direction together with the reach carriage. Before the reach carriage is extended, the battery lock lever must be actuated. When the reach carriage is fully retracted, the battery frame is mechanically locked again.

- Retract the reach carriage fully.
- Apply the parking brake.



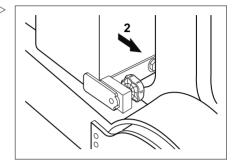
- Release the battery lock (refer to the chapter entitled "Actuating the battery lock").
- Press the foot switch
- Extend the reach carriage fully together with battery (2).
- Switch off the truck.
- Press the emergency off switch.

A CAUTION

Risk of component damage!

If the battery male connector is removed while the truck 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 truck before the battery male connector is disconnected.
- Do not disconnect the battery male connector while the truck is switched on except in the case of an emergency.



Disconnect the battery male connector (3).

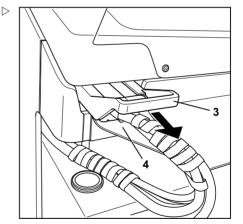


A CAUTION

There is a risk of short circuit if the cables are damaged!

Position the battery cable on the battery in such a way that it cannot be crushed when removing or inserting the battery.

 Check the connection cables for damage.



Releasing the swing bolt

A CAUTION

If the battery rolls out of the battery compartment when no external device is present, this can lead to material damage.

Before removing the battery, always have an external device in position.



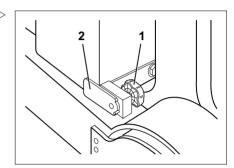
A CAUTION

Risk of injury from crushing and shearing points

Always actuate the swing bolts with just one hand and make sure that fingers are kept away from the rotation and clamping range.

The battery is held in position by a swing bolt.

 To release the tension, rotate the turning handle (1) anti-clockwise to the stop.



- Swing the swing bolt (2) up to the stop (3).

A DANGER

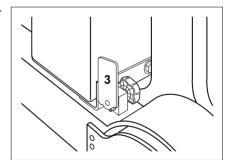
The battery can now move freely and may roll away unimpeded, creating a risk of crushing!

People must not stand directly in the battery's direction of travel.

Do not place objects or any parts of the body between the battery and the truck chassis.

Do not attempt to keep hold of the battery if it rolls away.

 Pull the battery (4) on its roller channel out of the truck and on to a battery change frame.





 For the correct use of the battery change frame, refer to the information in the chapter entitled "Battery change frame" and the operating instructions, and comply with the manufacturer's safety regulations.

The battery is installed and secured in the reverse sequence.



A DANGER

If the battery is not locked correctly, the battery can slide out of the truck, with potentially fatal consequences!

- Before commissioning the truck, the battery lock must be checked for correct operation and secure locking.
- If your truck is equipped with a Euro battery male connector, make sure that the voltage index pin is in the correct position. The set voltage can be read through a display window (1). These trucks are operated with a 48-volt nominal battery voltage.

i NOTE

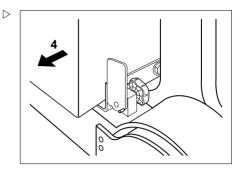
- The battery must comply with the specifications on the nameplate regarding voltage and weight. Compare the nameplates for the truck and battery.
- Gel batteries are subject to special charging/maintenance/handling instructions.
 The guidelines from the respective manufacturer must be observed.

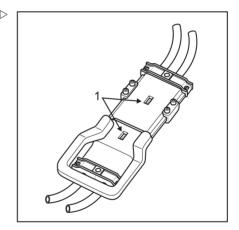
A CAUTION

Risk of component damage!

If the battery male connector is connected when the truck is switched on (under load), a jump spark will be produced. This can damage the contacts and considerably shorten their service life.

- Do not connect the battery male connector when the truck is switched on.
- Make sure that the truck is switched off before connecting the battery male connector.
- Connect the battery male connector.







- Make sure that the battery cable cannot become trapped when the reach carriage is retracted with the battery.
- Unlock the emergency off switch.
- Switch on the truck.
- Press the foot switch.
- Retract the reach carriage with the battery fully until the battery lock engages.

The lock must audibly engage. Push the release lever down if necessary. If the battery frame is locked incorrectly, traction is reduced and the message **A3405** is shown on the display and operating unit. This status can also be caused by the use of a non-standard battery or by a technical fault.

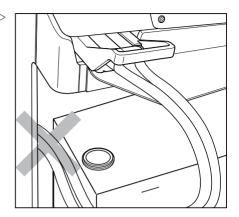
If the battery is not included in the scope of delivery of the truck, the battery lock must be adjusted by the authorised service centre.

 Check or re-enter the battery data (battery type and battery capacity) on the display and operating unit; see the chapter entitled "Setting the battery data".

Setting the battery data (lead acid batteries)



The battery data only needs to be set via the display for lead acid batteries.





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Adjustment instructions

To enable the truck controller to determine the residual capacity of the battery correctly, the technical data for the installed battery must be entered using the following buttons on the display:

- Push the "OK" button on the keypad (2) for approx. 2 seconds. This calls up the onboard diagnostics function.
- The display (1) provides information on the selected menu item.
- Push the arrow buttons on the keypad (2) to scroll within the menus. The selected menu items are highlighted on the display.

The following menu items are available:

- Information
- Parameter
- Diagnosis



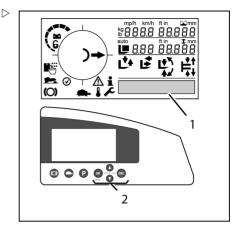
The height preselection option also offers the **Teach in** menu item.

- Select the Parameter menu.
- Push the "OK" button on the keypad (2) to confirm the selection.

The correct battery type (batt_type) and capacity (batt_cap) for the installed battery can now be selected from the six options by entering the number that represents the capacity value.

Value	Battery type
0	Lead-acid battery (wet battery)
1	Performance-enhanced battery
2	Gel battery
3	Special battery/reserve
4	Special battery/reserve
5	Special battery/reserve

 Push the arrow buttons on the keypad (2) to select. Once the correct value is set,





confirm by pushing the "OK" button on the keypad (2).

 The capacity is read from the nameplate on the battery and is input as a column of numbers. The numbers are selected using the arrow buttons on the keypad (2). Confirm that each number in the column is set correctly by pushing the "OK" button on the keypad (2). Exit the settings by pushing the "ESC" button on the keypad (2) for approx. 2 seconds.

Transporting the battery using a lifting device (lead acid batteries)



A DANGER

Risk of fatal injury from falling load

- Never walk or stand underneath suspended loads.
- Determine the weight of the battery (battery identification plate). Note the load capacity of the lifting device.
- Always lift the battery with suitable lifting gear (bridge piece).
- Do not use the methods described here to transport the battery over long distances.

When removing and inserting the battery using a lifting device, always ensure that no one is standing directly next to the battery or between the battery and the lifting device.

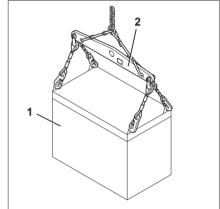
d s tly

▲ WARNING

Risk of crushing/shearing!

The battery must be transported very carefully, i.e. at low speed, using slow steering movement and careful braking.

- Before transporting the battery, determine the weight of the battery (battery identification plate). Note the load capacity of the lifting device.
- To prevent the raised battery from damaging the truck, park the truck at a sufficient distance from any obstacles.





Transportation must always be carried out using lifting gear that is suitable in terms of its size and load capacity, in conjunction with a bridge piece (2).

- To avoid short circuits, use a rubber mat to cover batteries with open terminals or connectors.
- Using suitable lifting gear, hook the battery
 (1) onto a bridge piece (2). Follow the operating instructions for the lifting gear.

To prevent the battery tray being compressed, the lifting gear must lift vertically.

- Slowly and using a vertical movement, lift the battery out of the battery frame or insert it into the battery frame. Ensure that there is sufficient distance from the lift mast and from the chassis of the truck. Avoid any oscillating motions.
- Transport the battery to the intended storage space.

A 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 the battery down carefully.
- Do not place or allow slack lifting gear to fall on the battery cells.



Transporting the battery using a lifting device (lithium-ion batteries)

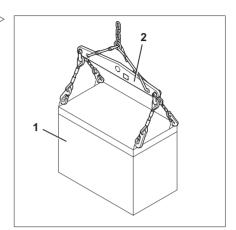


A DANGER

Risk of fatal injury from falling load

- Never walk or stand below suspended loads.
- Determine the weight of the battery (battery identification plate). Note the load capacity of the lifting device.
- Always lift the battery with suitable lifting gear (bridge piece).
- Do not use the methods described here to transport the battery over long distances.

When removing and inserting the battery using a lifting device, always ensure that no one is standing directly next to the battery or between the battery and the lifting device.



WARNING

Risk of crushing/shearing!

The battery must be transported very carefully, i.e. at low speed, using slow steering movement and careful braking.

- Before transporting the battery, determine the weight of the battery (battery identification plate). Note the load capacity of the lifting device.
- To prevent the raised battery from damaging the truck, park the truck at a sufficient distance from any obstacles.

Transportation must always be carried out using lifting gear that is suitable in terms of its size and load capacity, in conjunction with a bridge piece (2).

The lithium-ion battery (1) is equipped with four extendible lifting eyes.



 Pull out the two lifting eyes (3) on each side and tilt them towards each other. The lifting eyes are locked in this position.

Check the lifting eyes for damage (e.g. deformation, corrosion). The battery must only be lifted using undamaged lifting eyes.



Do not straighten any bent lifting eyes; have them replaced by the authorised service centre

 Hook the lifting gear onto the four lifting eyes. Follow the operating instructions for the lifting gear.

To prevent the battery tray being compressed. the lifting gear must lift vertically.

- Slowly and using a vertical movement, lift the battery out of the battery frame or insert it into the battery frame. Ensure that there is sufficient distance from the lift mast and from the chassis of the truck. Avoid any oscillating motions.
- Transport the battery to the intended storage space.

A CAUTION

Risk of damage!

The battery must be stored on a suitable beam support or on suitable racking.

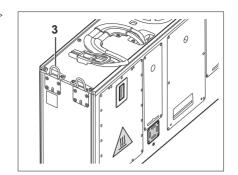
The battery must not be stored on a wooden beam or any similar object.

- Set the battery down carefully.
- After setting down the battery, remove the lifting gear and the lifting eyes by pulling them upwards and releasing.

Cleaning the truck

Cleaning the truck

- Park the truck securely.



A 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
- Do not disconnect the battery male connector while the key switch is switched on, except 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, it is possible to get stuck or slip on components and fall. Higher points on the truck must only be accessed using the appropriate equipment.

- Adhere strictly to the following steps
- Use only the steps provided for this purpose to climb onto the truck.
- Use equipment such as stepladders or platforms to reach inaccessible areas

A CAUTION

If water penetrates the electrical system, there is a risk of a short circuit occurring!

- Adhere strictly to the following steps
- Do not clean the battery, electric motors and other electrical components or their covers with a high-pressure cleaner or spray these components with water.

A 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 that there is a distance of at least



20 cm between the nozzle and the object being cleaned. Do not use high-pressure cleaners on the battery, electric motors and other electrical components or their covers.

 Do not aim the cleaning jet directly at adhesive labels or decal information.



A 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.



A 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.
- Observe the manufacturer's guidelines for working with cleaning materials.

A CAUTION

Abrasive cleaning materials can damage the surfaces of components!

Using abrasive cleaning materials that are unsuitable for plastics may dissolve plastic parts or make them brittle. The screen on the display and operating unit may become cloudy.

- Adhere strictly to the following steps
- Clean plastic parts only with cleaning materials intended for plastic parts.
- Observe the manufacturer's guidelines for working with cleaning materials.

Cleaning the outside of the truck

 Clean the truck exterior using water-soluble cleaning materials and water (with a sponge or cloth).



 Clean all accessible areas, the oil filling openings and their surroundings, and clean the lubricating nipples before lubricating



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.



A 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 cleaning solvents, chemical cleaners or fluids that are corrosive or contain acid or chlorine can damage the chains; use of these items is forbidden!

- Observe the manufacturer's guidelines for working with cleaning materials
- Place a collection vessel under the lift mast
- Clean using paraffin derivatives, such as benzine
- 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, refer to the chapter entitled "Maintenance data table".



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.

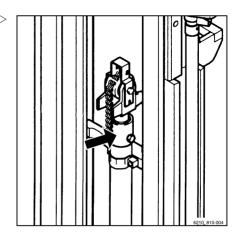
Cleaning panes of glass and mirrors

Any panes of glass and mirrors, e.g. in the cab (variant), must always be kept clean and free of ice. This is the only means of guaranteeing good visibility.

A 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 panes of glass and mirrors.







Cleaning can be performed using a commercially available glass cleaner.

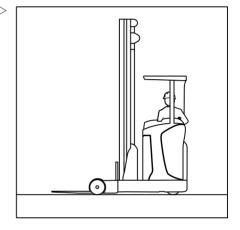
After cleaning

- Carefully dry the truck (e.g. with compressed air).
- Sit on the driver's seat and start the truck in line with applicable regulations.

A CAUTION

Risk of short circuit!

- If any moisture has penetrated the battery male connector despite the precautionary measures taken, first dry the battery male connector using compressed air.



Transporting the truck

Transportation

A CAUTION

Risk of material damage from overloading!

The load capacity/lifting capacity of the means of transport, the ramps and the loading bridges must be greater than the actual total 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 of the means of transport, the ramps and loading bridges is greater than the total actual weight of the truck.



Determining the total actual weight

- Park the truck securely (refer to the chapter entitled "Parking the truck securely").
- Determine the unit weights by reading the truck nameplate and, if necessary, the attachment nameplate (variant).
- Add the determined unit weights to obtain the total actual weight of the truck:

Tare weight (1)

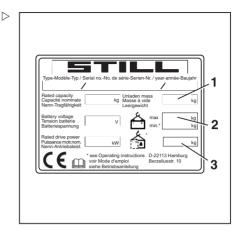
- + Max. permissible battery weight (2)
- + Ballast weight (variant) (3)
- + Attachment net weight (variant)
- + 100 kg allowance for driver
- Total actual weight

A DANGER

Risk of accident from the truck crashing!

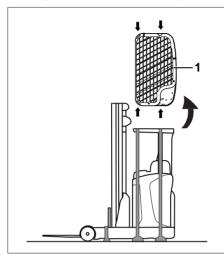
Steering movements can cause the tail end to veer off the loading bridge towards the edge. This may cause the truck to crash.

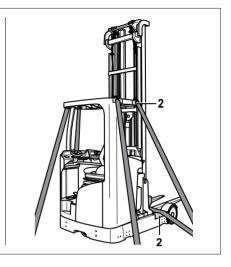
- Before driving across a loading bridge, ensure that the loading bridge is properly attached and secured.
- Ensure that the transport vehicle onto which the truck is to be driven has been sufficiently secured against moving.
- Maintain a safe distance from loading bridges, ramps, working platforms and similar objects.
- Drive slowly and carefully onto the transport vehicle.





Lashing trucks with an overhead guard





A CAUTION

Abrasive lashing ropes may damage the surface of the truck.

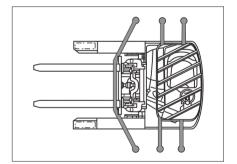
 Position slip-resistant pads underneath the lifting points (e.g. rubber mats or foam).

A DANGER

If the lashing ropes slip, the load can move!

The truck must be lashed securely so that it cannot move during transportation.

- Make sure that the lashing straps are tightened securely and that the pads cannot slip off.
- Park the truck securely (refer to the chapter entitled "Parking the truck securely").
- Disassemble the overhead guard grille or roof panel (1) and prevent these components from being damaged.
- Position slip-resistant pads underneath the lifting points (2) (e.g. rubber mats or foam).
- Attach the lashing ropes in accordance with the illustration. Securely lash the truck.
- After the truck has been transported and the lashing ropes have been removed, reassemble the overhead guard grille or roof panel.





Lashing trucks with a cab

A CAUTION

Abrasive lashing ropes may damage the surface of the truck.

 \triangleright

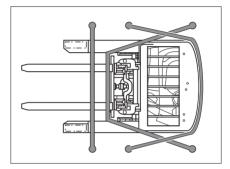
 Position slip-resistant pads underneath the lashing ropes (e.g. rubber mats or foam).

A DANGER

If the lashing ropes slip, the load can move!

The truck must be lashed securely so that it cannot move during transportation.

- Make sure that the lashing straps are tightened securely and that the pads cannot slip off.
- Park the truck securely (refer to the chapter entitled "Parking the truck securely").
- Position slip-resistant pads underneath the lifting points (1) (e.g. rubber mats or foam).
- Attach the lashing ropes in accordance with the illustration. Securely lash the truck.



Crane loading (standard truck with overhead guard)

Crane loading is only intended for transporting the complete truck for its initial commissioning. For application conditions that require frequent loading or that are not presented here, please contact the manufacturer with regard to particular variants.

Trucks may only be laden by persons with sufficient experience with the suitable harnesses and hoists

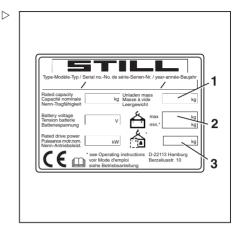


Determining the loading weight

- Park the truck securely; refer to the chapter entitled "Parking the truck securely".
- Determine the unit weights by reading them off the truck nameplate and, if necessary, the attachment (variant) nameplate.
- Add the determined unit weights together to obtain the loading weight of the truck:

Tare weight (1)

- + Max. permissible battery weight (2)
- + Ballast weight (variant) (3)
- + Attachment net weight (variant)
- = Loading weight





Hooking on the lifting straps

A DANGER

There is a risk of being hit if the hoists and harnesses fail and cause the truck to fall, with potentially fatal consequences!

- Only use hoists and harnesses with sufficient load capacity for the total actual weight of the truck.
- Only use the truck's designated lifting points.
- Make sure that harness parts such as hooks, shackles, straps and similar items are only used in the indicated load direction.
- The harnesses must not be damaged by truck parts. Use suitable edge protection.

A CAUTION

Harnesses may damage the truck's paintwork!

Harnesses may damage paintwork by rubbing and pressing on the surface of the truck. Particularly hard or sharp-edged harnesses, such as wires or chains, can quickly damage the surface.

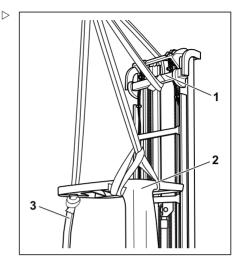
- Use textile harnesses, e.g. lifting straps, with edge protectors or similar protective devices where necessary.
- Retract the reach carriage fully in the drive direction.
- Always use suitable edge protection between the hoist and any sharp edges on the truck to protect the hoist against damage when lifting the truck.

Hooking on the lifting straps to a truck with a lift mast

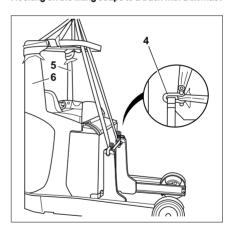
- Loop the lifting strap around the main traverse (1) on the outer mast of the lift mast and guide the lifting strap upwards
- Loop the lifting straps around the two posts of the overhead guard (2), (3) and guide them upwards

Hooking on the lifting straps to a truck without a lift mast

- Attach two suitable shackles (4) in the upper mast bearings of the truck
- Guide the lifting strap upwards through the two shackles and through the struts of the overhead guard. Make sure that no



Hooking on the lifting straps to a truck with a lift mast



Hooking on the lifting straps to a truck without a lift mast



pressure can be exerted on the overhead guard by the lifting strap

- Guide the lifting straps upwards through the two shackles and through the struts of the overhead guard. Make sure that no pressure can be exerted on the overhead guard by the lifting strap Loop another lifting strap around the two posts of the overhead guard (5), (6) and guide the lifting strap upwards
- Adjust the length of the harnesses so that the lifting eye (7) is vertically above the truck's centre of gravity.

This ensures that the truck hangs level when lifting it.

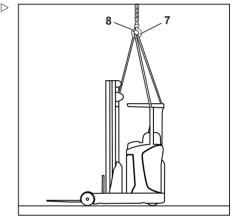
 Connect the lifting straps to the lifting eye and insert the safety device (8).

A CAUTION

Incorrectly fitted harnesses may damage attachment parts!

Pressure from the harnesses can damage or destroy attachment parts when the truck is lifted. If attachment parts are in the way (e.g. lighting etc.), these must be removed before loading. Ask your service centre about this.

 Secure harnesses in such a way that they do not touch any attachment parts.



Loading the truck



A DANGER

If the raised truck swings in an uncontrolled manner, it may crush people. There is a risk of fatal injury!

- Never walk or stand underneath suspended loads.
- Do not allow the truck to bump into anything whilst it is being lifted, or allow it to move in an uncontrolled manner.
- If necessary, hold the truck using guide ropes.
- Carefully lift the truck and take care when setting it down at the intended location.



Crane loading (trucks with a cab)

Crane loading is only intended for transporting the complete truck for its initial commissioning.

 For application conditions that require frequent crane loading or that are not described here, contact the authorised service centre

Trucks may only be loaded by persons with sufficient experience with the suitable harnesses and hoists.

A bridge piece must be used when crane loading a truck with a cab. The dimensions and load capacity of the bridge piece must be suitable for the truck.

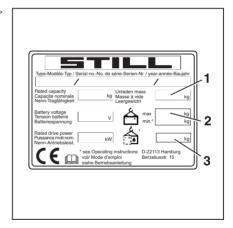
 If you have any questions relating to the suitability of the bridge piece, contact the authorised service centre.

Determining the loading weight

- Park the truck securely (refer to the chapter entitled "Parking the truck securely").
- Determine the unit weights by reading them off the truck nameplate and, if necessary, the attachment nameplate (variant).
- Add the determined unit weights together to obtain the loading weight of the truck:

Tare weight (1)

- + Max. permissible battery weight (2)
- + Ballast weight (variant) (3)
- + Net weight of attachment (variant)
- Loading weight





Safety information for crane loading



▲ DANGER

There is a risk of fatal injury if the hoists and harnesses fail and cause the truck to fall!

- Only use hoists and harnesses with sufficient load capacity for the determined loading weight.
- Only use the truck's designated lifting points.
- Make sure that harness parts such as hooks, shackles, straps and similar items are used only in the indicated load direction.
- The harnesses must not be damaged by truck parts. Use suitable edge protection.

A CAUTION

Harnesses may damage the paintwork on the truck! Harnesses may damage paintwork by rubbing and pressing on the surface of the truck. Hard or sharp-edged harnesses, such as wires or chains, can quickly damage the surfaces.

 Use textile harnesses, e.g. lifting straps, with edge protectors or similar protective devices if necessary.

A CAUTION

Incorrectly fitted harnesses may damage attachment parts!

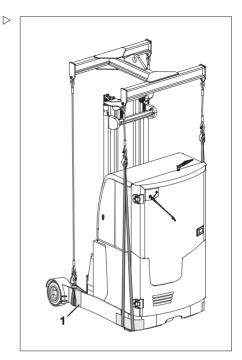
Pressure from the harnesses can damage or destroy attachment parts when the truck is lifted. Attachment parts that are in the way (e.g. lighting etc.) must be removed before crane loading commences. Ask your authorised service centre about this.

Secure harnesses in such a way that they do not touch any attachment parts.



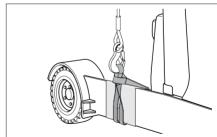
Hooking on the lifting straps

- Before hooking on the lifting straps, park the truck securely (refer to the chapter entitled "Parking the truck securely"). Make sure that the battery male connector is disconnected. Make sure that the emergency off switch is actuated.
- Always use suitable edge protection (1) between the hoist and sharp edges on the truck. The edge protection protects the hoist against damage when the truck is lifted.



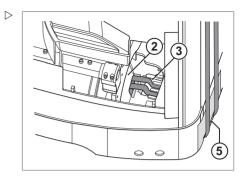
Hook on the lifting straps (load side, on the right/left)

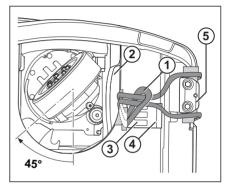
 Loop the lifting straps around the load arms of the truck just behind the load wheels, as shown.



Hook on the lifting straps (drive side, on the right)

- If necessary, remove the engine cover below the driver's seat to make it easier to loop the strap around the strut on the floor of the truck chassis.
- If necessary, remove the bottom plate of the driver's compartment to make it easier to loop the strap around the strut on the floor of the truck chassis.
- If necessary, rotate the drive wheel into the 45° position to make it easier to loop the strap around the strut on the floor of the truck chassis. Before attaching the straps, make sure that the battery male connector is disconnected. Make sure that the emergency off switch is actuated.
- Guide the loop of the lifting strap (1) from below through the opening (2) in the wheel arch.
- Guide the loop of the lifting strap downwards again through the rectangular opening
 (3) below the reach travel measurement system. Ensure that the straps do not put pressure on the teeth of the reach travel measurement system (4).
- Guide the loose ends of the lifting strap through the loop.
- Guide the loose ends of the lifting strap to the right and left of the side chassis support (5) and upwards towards the bridge piece.
- Hook the lifting straps onto the bridge piece and secure the straps in place.







Transporting the truck

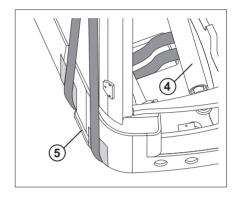
Hook on the lifting straps (drive side, on the left)

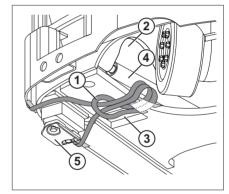
- If necessary, remove the bottom plate of the driver's compartment to make it easier to loop the strap around the strut on the floor of the truck chassis.
- If necessary, rotate the drive wheel into the 45° position to make it easier to loop the strap around the strut on the floor of the truck chassis. Before attaching the straps, make sure that the battery male connector is disconnected. Make sure that the emergency off switch is actuated.
- Guide the loop of the lifting strap (1) from below through the opening (2) in the wheel arch.
- Guide the loop of the lifting strap downwards again under the reach cylinder and through the rectangular opening (3). Ensure that the belts do not put pressure on the reach cylinder (4).

i NOTE

The space under the reach cylinder for the lifting strap can be increased by extending the reach cylinder.

- Guide the loose ends of the lifting strap through the loop.
- Guide the loose ends of the lifting strap to the right and left of the side chassis support (5) and upwards towards the bridge piece.
- Hook the lifting straps onto the bridge piece and secure the straps in place.







Loading the truck



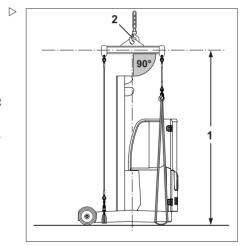
A DANGER

If the raised truck swings in an uncontrolled manner, it may crush people. There is a risk of fatal injury!

- Never walk or stand underneath suspended loads.
- Do not allow the truck to bump into anything whilst it is being lifted, or allow it to move in an uncontrolled manner.
- If necessary, hold the truck using guide ropes.
- Adjust the length of the harnesses (1) so that the bridge piece is in a horizontal position.
- Adjust the length of the harnesses so that the bridge piece is vertically above the centre of gravity of the truck.

This ensures that the truck hangs level when it is being lifted.

- Insert the safety device for the lifting eye (2).
- Visually inspect all belts and pieces of edge protection to check that they are in the correct position.
- Carefully lift the truck. Carefully set down the truck at the intended location.





Decommissioning

Decommissioning

Shutting down and storing the truck

A CAUTION

Component damage due to incorrect storage!

Corrosion damage is possible in the event of incorrect storage or shutdown for more than 2 months. When the ambient temperature is below –10°C for an extended period the batteries 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 shutting down.



Only store batteries that are fully charged.

Measures to be implemented before shutdown

- Clean the truck thoroughly.
- Fully extend and retract the reach carriage several times
- Lift the fork carriage to the stop several times.
- Tilt the lift mast forwards and backwards several times. If an attachment is fitted, move the attachment several times.
- To relieve the strain on the load chains, lower the fork onto a suitable supporting surface, e.g. a pallet.
- Park the truck with all pistons and cylinders fully retracted.
- Apply oil or grease thinly to all uncoated moving parts.
- Grease the truck.
- Lubricate the joints and controls.
- Lubricate the battery lock.
- Fully charge the lead acid battery. Check the condition and acid density of the battery. Maintain the battery (observe the guidelines



from the battery manufacturer). Disconnect the battery male connector.

- Disconnect the battery male connector.
- Fully charge the lithium-ion battery (variant) (follow the battery manufacturer's operating instructions relating to storage). Disconnect the battery male connector.
- Spray all exposed electrical contacts with a suitable contact spray.

A CAUTION

Risk of tyre deformation as a result of continuous strain on one side!

Jack up the truck so that all wheels are off the ground. This prevents permanent deformation of the tyres.

- Raise and jack up the truck.

A CAUTION

Danger of damage from corrosion 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 against dust.

If the truck is to be decommissioned for an extended period, contact the authorised service centre to find out about additional measures necessary.

Re-commissioning after shutdown

If the truck has been decommissioned for longer than 6 months, it must be carefully checked before being used again. As with the annual safety inspection, this check should also include all safety-related aspects of the truck

- Clean the truck thoroughly.
- Grease the truck.
- Lubricate the joints and controls.



Decommissioning

- Check the battery condition and acid density, and recharge if necessary.
- Check the hydraulic oil for condensation water and replace if necessary.
- Carry out checks and operations before the first commissioning.
- Change the brake fluid.
- Put the truck into operation.

During commissioning, the following must be checked in particular:

- · Drive, controller, steering
- Brakes (service brake, parking brake)
- Reach carriage (extension function, retraction function)
- Lifting system (lifting accessories, load chains, mounting)



For further information, see the workshop manual for the truck or contact the authorised service centre.



5

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

A 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.



5

Safety regulations for maintenance

Working at the front of the truck

A DANGER

Risk of accident!

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 following safety measures are observed!

A DANGER

Risk of accident!

 Use only chains with adequate lifting capacity to secure the particular lift mast.

A CAUTION

Potential damage to the ceiling!

- Note the maximum lift height of the lift mast.

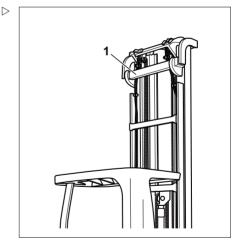
Removing the lift mast

▲ DANGER

Risk of accident!

 Attach the lifting gear to the top of the bridge piece (1) on the outer mast of the lift mast.

This work must only be performed by a service technician.





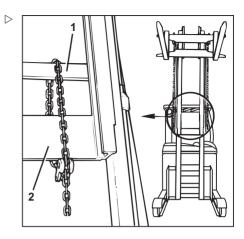
General maintenance information

Securing the telescopic lift mast

- Extend the lift mast.
- Route the chain over the cross beam of the outer mast (1) and under the cross beam of the inner mast (2).
- Lower the inner mast until it strikes the chain.



Extend the lift mast to slacken the chain.

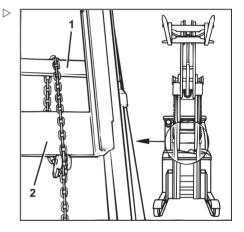


Securing the triple mast

- Extend the lift mast.
- Route the chain over the cross beam of the outer mast (1) and under the cross beam of the middle mast (2).
- Lower the lift mast until it strikes the chain.
- Lower the fork carriage as far as it will go.



Extend the lift mast to slacken the chain.



General maintenance information

Personnel qualifications

Only qualified and authorised personnel are allowed to perform maintenance work. The annual testing must be carried out by a qualified person. The examination and assessment by the qualified person must not be affected by operational and economic conditions and must be conducted solely from a safety perspective. The qualified person must have sufficient knowledge



General maintenance information

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, maintained or changed by properly trained personnel in accordance with the instructions from the manufacturers of the battery, battery charger and truck. The handling instructions for the battery and the operating instructions for the battery charger must be followed.

Maintenance work without special qualifications

Simple maintenance work, such as checking the fluid level in the battery, may be carried out by untrained personnel. A qualification, like that of a specialist, is not required to carry out this work. The required operations are described in sufficient detail in the corresponding sections in these operating instructions.

Information for carrying out maintenance

This section contains all information required to determine when the truck needs maintenance. Maintenance must be carried out within the time limits according to the hour meter and by following the maintenance check lists. This is the only way to ensure that the truck remains ready for operation and provides optimal performance and service life. It is also a precondition for any warranty claims.

Maintenance timeframe

- The maintenance check lists indicate the maintenance work that is due.
- Carry out maintenance work on the truck based on the hour meter.

The intervals are defined for standard use. Shorter maintenance intervals can be defined in consultation with the operating company,



General maintenance information

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, or extreme changes in temperature
- · Multi-shift operation with a high duty cycle
- Specific national regulations for the truck or individual components



General maintenance information



Maintenance - 1000 hours/year

At operating ho	ours							
1000	2000	4000	5	000	7000	Carri	ed out	
8000	10000	11000	13	000	14000	✓	×	
Chassis, bodyv	vork and fittin	gs						
		s, support eleme	ents and mas	t mount	ing for cracks or			
damage (visua		ah and nanes of	f alass for da	made. c	heck the visibility			
through the gla	-		glass for ac	inago, c	THE VISIONITY			
Check the cont	rols, switches	and joints for da	amage, and	apply gre	ease and oil			
Check the drive and for damage		adjustment and	I protective o	overs fo	r correct function			
Check the driver restraint system (option) for correct function and for damage, and clean								
Check the battery tray, lock and sensor for correct function and for damage								
Check the reach carriage guides, rollers and stops, and adjust if necessary								
Check the reach travel measuring system and limit stops								
Check the drive and brake actuations (single and dual pedal) for correct function and for damage Clean dust and dirt from the mechanisms								
		compartment mo			y side (for trucks 9).			
Load wheels								
Check the whe	els for damag	e, wear and eas	e of movem	ent				
Check the whe	el mountings	for operating no	ise and play					
Tighten the who	eel screws us	ing a torque wre	nch (tighten	ng torqu	ie: 195 Nm)			
Adjust the side	chassis supp	orts						
Drive wheel								
Check the drive	e wheel and ty	res for damage	and wear					
If necessary, re	place the driv	ve wheel						
Check the whe	el screws and	l tightening torqu	ıes					
Gearbox								
Perform a visual inspection for leak tightness, secure attachment and external damage. Check for operating noise.								
Check the gearbox oil level								
Traction motor, steering motor, pump motor								
·	Visual inspection for mounting and external damage. Check for operating noise. Clean the external fans. Functional test							



General maintenance information

1000	2000	4000	5000	7000	Carrie	ed out
8000	10000	11000	13000	14000	1	×
Steering					1	
	steering wheel is	s securely attache	ed and check the t	urning handle for		
damage		line line al a Cala				
	ring column for t					
		sm of the steering	g for functionality			
	tion of the steeri					
Check the stee	ring turntable be	earing for ease of	movement and we	ear		
Check the stee	ring gears for pla	ay, and lubricate				
Hydraulic brake	<u> </u>					
Check the cond function and cle		nanical and hydra	ulic brake parts, c	heck for correct		
Check the brak	e linings and rep	place if necessary	<u>'</u>			
Check the brak	e clearance					
Check the brak	e retardation va	lues after each ac	djustment			
Check the brak	e fluid level					
If available, che	eck switch for the	e brake fluid				
Perform brake	test					
Electric parking	g brake					
Clean and che	ck the rotor					
Check the brak	e clearance					
Check the brak	e retardation va	lues				
Electrical syste	m				,	
Check the func and reversing	tion of the drive	and pump control	ler for driving, acc	eleration, braking	1	
Check the cabl	e connections a	nd plug contacts f	or secure position	ing and corrosion	1	
Check the elec	trostatic dischar	ge (ESD) devices	3			
Check the mair	n fuses and cont	rol fuses. Check t	he contacts of the	main contactor		
Check the swite	ch lock and eme	rgency off switch	for correct functio	n.		
Check all opera	ating and display	functions (switch	nes, transmitters)			
Check the light	ing, indicator ligl	hts, instruments a	ınd seat contact sı	witch		
Converters						



At operating hou	ırs							
1000	2000	4000	5000	7000	Carrie	ed out		
8000	10000	11000	13000	14000	1	×		
Use air to blast o	dust from the su	rfaces						
Remove dirt and	d dust from the h	neat sinks						
Check the fans f	or correct funct	ion and for dama	ge, and clean					
Lead acid batter	y and accessor	ies						
Check the batter ance instruction		nd acid density; o	bserve the manuf	acturer's mainten-				
Check the batte	ry male connec	tor and cables for	damage					
Perform insulati	on testing							
Measure the tra	y for short circu	its						
Lithium-ion batte	ery and accesso	ories						
	can therefore	•	igh currents. Min ery plug. Replace	or damage to the the battery male				
Check the batte	ry for damage; f	ollow the manufa	cturer's maintena	nce instructions				
Check the batter sary.	ry male connec	tor, contacts and	cable for damage	; replace if neces-				
Check the batte damage; replace	•	tor, contacts and	cable on the batt	ery charger for				
Perform insulati	on testing							
Hydraulic syster	m							
Check the condi for damage and			ck that it is workin	g correctly, check				
Check the hydra	aulic pump for le	ak tightness						
Check the hydra	ulic oil level							
Check the oil filt	er (visual inspe	ction, replace if co	ontaminated)					
Test the oil tank	for leak tightne	SS						
Clean the breath	ner filter and rep	lace if necessary	i					
Lift mast								
Check the mast traversing, chec	•	•	the tightening to	rques. For mast				
Check the mast	profiles for dam	age and wear. Lu	ubricate the mast	profiles				
	Check the load chains for damage and wear. Adjust and lubricate the load chains. Replace the main lift chains after 5000 operating hours (recommendation)							
Check the lift cy	inders and con	nections for dama	age and check for	leak tightness.				



General maintenance information

At operating h	nours					
1000	2000	4000	5000	7000	Carri	ed out
8000	10000	11000	13000	14000	✓	×
Check the gui	de pulleys for dam	nage and wear				
Check the ma	st rollers and chai	n rollers for dama	age and wear			
Check the tilt	cylinders and conr	nections for dam	age and check for	r leak tightness.		
Check the joir	nts of the tilt attach	ment for play an	d ease of movem	ent		
Check the rea	ch cylinders and c	onnections for d	amage and check	for leak tightness	-	
Check the joir	nts of the reach cyl	inder for play an	d ease of moveme	ent, and lubricate		
Check the forl	k carriage for dam	age and wear				
Check the forl	k height setting an	d adjust the chai	n length if necess	ary		
Check the forl	k arm interlock for	damage and cor	rect function			
Check the forl						
Check that the	ere is a safety scre	w on the fork car	riage or on the at	tachment		
Check the hyd	draulic hoses, re-a	djust, replace if r	necessary			
Lubricate the	fork tilter/sideshift					
Special equip	ment					
Replace the fi	Iter mat for the hea	ating system.				
Check the hea	ating system for da	amage; observe	the manufacture	r's maintenance		
Check the opt reflector	tical height measu	ring system (visu	ual inspection), cle	ean the sensor and	I	
		and damage; ol	oserve the manuf	acturer's mainten-		
Clean excess mation/damag	ive dirt from the ba	dom of moveme	nt of the rollers an	e frame for defor- id keep the surface		
Lubricating						
Lubricate usir	ng approved lubric	ants in accordan	ce with the lubric	ation plan		
General						
Check labellin	ng to ensure it is co	omplete				
Perform a tes	t drive					
Read out and check the error numbers and delete list						
Reset the mai	intenance interval					
					•	•



Maintenance - 3000 hours/every two years

At operating	At operating hours								Carried o	
3000		6000		9000		12000		15000	✓	×
Note										
Perform all	1000	-hour main	tenan	ce work						
Gearbox										
Oil change (gearbox)										
Lubricate the shaft stub gearing between the gearbox and traction motor										
Hydraulic br	rake	system								
Changing th	ne bra	ake fluid								
Hydraulic sy	ysten	1								
Change the hydraulic oil										
Replace the	Replace the oil filter									

Additional maintenance guidelines for using the truck in a cold store - 500 hours or every 12 weeks

At operating hours											
500		1000		1500		2000		2500		Carried out	
3000		3500		4000		4500				1	×
Truck com	poner	nts									
		on check of , switch-off				ing all spec	ial equ	uipment, sp	ecial		
Check all important screw connections for secure attachment											
Check the condition and mounting of the wheels											
Check the function of the steering system											
Check the	steeri	ng play; ch	eck the	e setting of	the st	eering chai	n if ne	cessary			
Perform a	specia	al function o	heck	of the brake	e asse	mblies					
Check the	hydra	ulic system	for le	aks							
Check all i	ollers	and wear s	trips ir	n the lift ma	st for e	ease of mo	vemer	nt			
Perform a visual inspection of chains and pinion gears, lubricate as required.											
Perform a visual inspection of the fork arms											
Check the ease of movement of the limit switches											



General maintenance information

At operating hours								
500	1000	1500	2000	2500	Carri	Carried out		
3000	3500	4000	4500		✓	×		
Lubricating								
Lubricate using	g approved lubrica	ants in accordan	ce with the lubric	ation plan				
Lubricate the fork tilter/sideshift								
In addition, lubricate the lubricating nipple for the door hinges and the door closing mechanism every six weeks								

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.



General maintenance information

When topping up working materials, use only clean containers!

Maintenance data table

A CAUTION

Risk of damage to property

Trucks for cold store operation must be lubricated using different lubricants; refer to the chapter entitled "Cold store application".

Unit	Device/consumable	Specifications	Measurement
General lubrication points	Grease	STILL high pressure lubricating grease ID no. 0170761	As required
Battery	Distilled water	-	As required
Insulation resistance of the battery	-	DIN 43539 VDE 0510	For further information, refer to the workshop manual for the truck
Insulation resistance of the electrical system	-	DIN EN 1175 VDE 0117	For further information, refer to the workshop manual for the truck
Hydraulic system	Hydraulic oil	HVLP68 DIN 51524/P3 ID no. 0172025 (1 I) / 0172026 (5 I)	Tank volume approx. 25 I Filling level ex works depends on the type
	Hydraulic oil (cold store variant)	Equivis XLT 15 ID no. 7327400007 (20 I)	of lift mast fitted
	Hydraulic oil (foodstuffs)	Food-grade oil in accordance with NSFH1 7327400020 (46 grade oil - 10 I) 7327400024 (68 grade oil - 10 I)	
Wheel nuts/screws			
- Drive wheel	Torque wrench	-	195 Nm
- load wheel (wheel screws)	Torque wrench	-	195 Nm



General maintenance information

Unit	Device/consumable	Specifications	Measurement
- Load wheel (slotted nut)	Torque wrench	-	Tighten the slotted nut, initially to 50 Nm. Loosen the slotted nut again and tighten it once more, this time to 20 Nm. During tightening, rotate the load wheel in a clockwise direction,
			so that the bearing is seated securely.
Drive axle	1		•
- Wheel gear	Gearbox oil	Castrol Alphasyn EP 150 ID no. 7326000022 (20 I)	Approx. 6.1 l
Lift mast			
Lift mast	Super-pressure adhesive lubricant	SKD 3400 ID no. 0147873	As required
Load chains	Chain lubrication	Fully synthetic Temperature range: -35°C to +250°C ID no. 0156428	As required
- Setting	Distance to support roller	-	35 mm under the top edge of the inner mast
Brake system	•		
- Container	Brake fluid	ATE SL DOT4 ID no. 7327500020 (11)	0.2
Steering			
Steering gears	Lubrication	Rivolta S.K.D. 4002	As required



Maintaining operational readiness

Checking the driver's seat

▲ WARNING

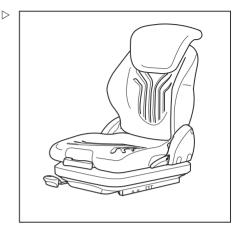
Risk of injury!

- After an accident, check the driver's seat and the mounting.
- Check the operating devices for correct operation.
- Check the condition of the seat (e.g. wear on the upholstery) and check that the seat is securely mounted in the truck.

WARNING

Risk of injury!

 Have the seat repaired by the authorised service centre if you identify any damage during the checks.



Maintaining wheels and tyres

WARNING

Risk of accident!

Uneven wear reduces the stability of the truck and increases the braking distance.

 Worn or damaged tyres (left or right) must be replaced immediately.

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.



5

Maintaining operational readiness

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).

i NOTE

The wear of the tyres must be approximately the same.

- Super-elastic tyres can be worn down to the wear mark (3)
- Check the tread depth on all tyres
- Check the distance between the tyre tread and the wear mark
- Remove any foreign bodies embedded in the tyre tread

Checking wheel fastenings

- Check that the wheel fastening is securely fastened and retighten as necessary
- Comply with the specified torques; refer to the chapter entitled "Maintenance data table"

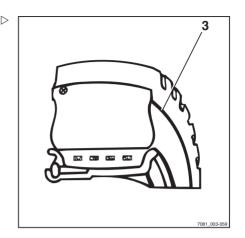
Checking the hydraulic system for leaks



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 over time!

Hydraulic hoses must not be used for a period longer than six years.

The BGR 237 specifications must be complied with. Differing national laws must be taken into account.

 Check pipe and hose connection screw joints for leaks (traces of oil)

Hose lines must be replaced if:

- The outer layer is damaged or becomes brittle and cracks begin to form
- · They are leaking
- There are any unnatural deformations (e.g. bubble formation or buckling)
- · A fitting is detached from the hose
- · A fitting is heavily damaged or corroded

Pipes must be replaced if:

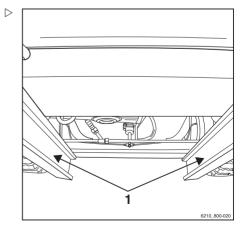
- · There is abrasion and a loss of material
- There are any unnatural deformations and bending stress is detected
- They are leaking
- In the event of a loss of oil, contact the authorised service centre

Greasing the lift mast and roller tracks

- Remove dirt and lubricant residue from the roller tracks
- Lubricate the roller tracks (1) of the outer mast, middle mast and inner mast with a super-pressure adhesive lubricant to reduce wear; refer to the chapter entitled "Maintenance data table"



Spray the tracks evenly from a distance of approx. 15 - 20 cm. Wait approx. 15 minutes until the device is ready for operation again.





5

Maintaining operational readiness

Checking the battery change frame (variant)

The screw joints and welded seams of the battery change frame must be subjected to a visual inspection.

Replacing the heating system filter for the cab (variant)

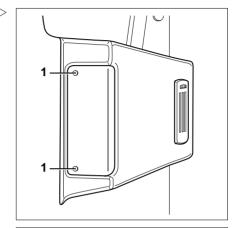
The heating system filter is located in the door panelling beneath the window.

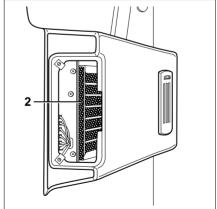
- Unscrew the screws (1) and remove the cover on the heating system.
- Completely remove the filter mat (2) from the filter housing.
- Check the filter mat for contamination and beat out



Replace the filter mat when it is clearly grey, but at least every two months.

- Remove any dirt that has collected in the filter housing and recirculated-air inlet.
- Re-insert the filter mat into the filter housing.
- Make sure that the filter mat sits correctly and accurately in the filter housing.
- Fit the heating system cover and secure using the screws.



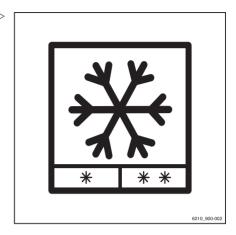




Maintaining operational readiness

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.



Maintenance tasks for lithium-ion batteries



The lithium-ion battery is maintenancefree. However, a few tasks are required for maintenance of the battery and to ensure safe operation.

Regular tasks

- · Cleaning the battery
- Checking the battery connections and cables
- · Visually inspecting the covers
- · Charging the battery

Every 3 months

 Fully charge the battery when the truck is located within or outside the area of the warehouse



Maintaining operational readiness

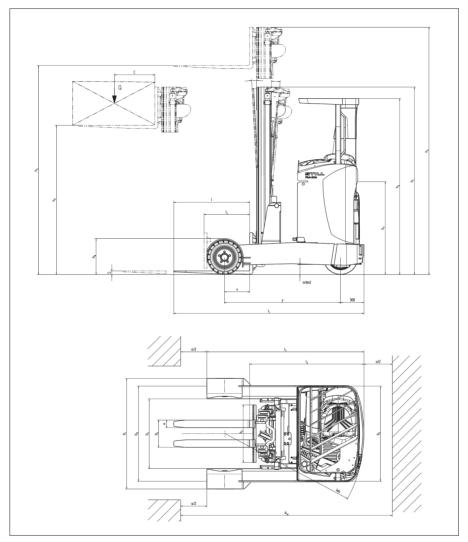


Technical data

6 Technical data

Dimensions

Dimensions



Measurements h₁, h₃, h₄, h₆ and b₁ are specified by the customer and can be taken from the order confirmation.



VDI datasheet for FM-X 14 SE / Li-ion, FM-X 17 SE / Li-ion, FM-X 20 SE / Li-ion¹

VDI datasheet for FM-X 14 SE / Li-ion, FM-X 17 SE / Li-ion, FM-X 20 SE / Li-ion*

This type sheet, in accordance with VDI directive 2198, states only the technical values of the standard device. Different tyres, lift masts, additional units etc. may produce different values.

Legend

- 1) For larger batteries, decreases by 72 mm for each battery size
- 2) For larger batteries, Ast increases by 72 mm for each battery size
- 3) When the cab/weather protection option is selected, the height h6 is 2304 mm
- 4) When the cab option is selected, the length increases by 80 mm
- 5) For larger batteries, increases by 72 mm for each battery size

Characteristics

				FM-X 14 SE / Li-ion	FM-X 17 SE / Li-ion	FM-X 20 SE / Li-ion
1.1	Manufacturer			STILL	STILL	STILL
1.2	Manufacturer's type designation			FM-X 14 SE / Li-ion	FM-X 17 SE / Li-ion	FM-X 20 SE / Li-ion
1.3	Drive			Electric	Electric	Electric
1.4	Operation			Seated	Seated	Seated
1.5	Load capacity/load	Q	kg	1400	1700	2000
1.6	Load centre of gravity	С	mm	600	600	600
1.8	Load distance 1	Х	mm	238	238	388
1.9	Wheelbase	у	mm	1380	1380	1530

Weights

			FM-X 14 SE / Li-ion	FM-X 17 SE / Li-ion	FM-X 20 SE / Li-ion
2.1	Net weight (including battery)	kg	3750	3750	3690
2.3	Axle load without front/rear load	kg	2230/1520	2230/1520	2330/1360



^{*}Subject to change

6 Technical data

VDI datasheet for FM-X 14 SE / Li-ion, FM-X 17 SE / Li-ion, FM-X 20 SE / Li-ion*

			FM-X 14 SE / Li-ion	FM-X 17 SE / Li-ion	FM-X 20 SE / Li-ion
2.4	Axle load with fork forwards with front/rear load	kg	920/4230	730/4720	690/5000
2.5	Front/rear axle load, fork backwards, with load	kg	1870/3280	1790/3660	2060/3630

Wheels, chassis frame

				FM-X 14 SE / Li-ion	FM-X 17 SE / Li-ion	FM-X 20 SE / Li-ion
3.1	Tyres			Full rubber / superelastic	Full rubber / superelastic	Full rubber / superelastic
3.2	Front tyre size		mm	Ø 457 x 203	Ø 457 x 203	Ø 457 x 203
3.3	Rear tyre size		mm	Ø 454 x 160	Ø 454 x 160	Ø 450 x 195
3.5	Number of wheels at front/rear (× = driven)			1x/2	1x/2	1x/2
3.7	Rear track width	b ₁₁	mm	1210	1210	1256

Basic dimensions

				FM-X 14 SE / Li-ion	FM-X 17 SE / Li-ion	FM-X 20 SE / Li-ion
4.1	Lift mast / fork carriage tilt, forwards / backwards 2	a/b (°)	٥	2/4	2/4	1/3
4.2	Height with lift mast retracted	h ₁	mm	2275	2275	2275
4.3	Free lift	h ₂	mm	1640	1640	1630
4.4	Lift	h ₃	mm	5000	5000	4830
4.5	Height with lift mast extended	h ₄	mm	5635	5635	5475
4.7	Height of overhead guard 3	h ₆	mm	2324	2324	2324
4.8	Seat height	h ₇	mm	1264	1264	1264
4.10	Height of load wheel supports	h ₈	mm	473	473	473
4.19	Total length 2, 4, 5	I ₁	mm	2600	2600	2605
4.20	Length including fork back 2, 4, 5	l ₂	mm	1450	1450	1455
4.21	Total width	b ₁ / b ₂	mm	1378 / 1270	1378 / 1270	1458 / 1270
4.22	Fork arm dimensions, DIN ISO 2331	s/e/l	mm	40 / 100 / 1150	40/100/1150	40 / 100 / 1150
4.23	ISO 2328 fork carriage, class/model A, B			2/B	2/B	2/B
4.24	Fork carriage width	b ₃	mm	760	760	760



VDI datasheet for FM-X 14 SE / Li-ion, FM-X 17 SE / Li-ion, FM-X 20 SE / Li-ion*

				FM-X 14 SE / Li-ion	FM-X 17 SE / Li-ion	FM-X 20 SE / Li-ion
4.25	Width across forks, min./max.	b5	mm	316 / 620	316 / 620	316 / 620
4.26	Width between load wheel supports	b4	mm	920	920	920
4.28	Reach forward 1	l 4	mm	501	501	651
4.31	Ground clearance with load under lift mast	m ₁	mm	144	144	144
4.32	Ground clearance at centre of wheelbase	m ₂	mm	144	144	144
4.34 .1	Aisle width for a 1000 × 1200 pallet, crosswise 2	Ast	mm	2861	2861	2896
4.34 .2	Aisle width for a 800 × 1200 pallet, lengthwise 2	Ast	mm	2933	2933	2944
4.35	Turning radius	Wa	mm	1691	1691	1838
4.37	Length across the load wheel supports	17	mm	1920	1920	2070
4.43	Step height		mm	258	258	258

Performance data

			FM-X 14 SE / Li-ion	FM-X 17 SE / Li-ion	FM-X 20 SE / Li-ion
5.1	Driving speed with / without load	km/h	14/14	14/14	14/14
5.11	Reverse driving speed with / without load	km/h	14/14	14/14	14/14
5.2	Lifting speed with / without load	m/s	0.45/0.68	0.45/0.68	0.37/0.58
5.3	Lowering speed with / without load	m/s	0.56/0.52	0.56/0.52	0.53/0.50
5.4	Reach speed with / without load	m/s	0.18/018	0.18/018	0.18/018
5.7	Climbing capability with / without load	%	4.5 / 8.2	4.5 / 8.2	4.5 / 8.2
5.8	Max. climbing capability with / without load	%	15/20	15/20	15/20
5.10	Service brake		Gen./hydr. mech.	Gen./hydr. mech.	Gen./hydr. mech.



6

Wheels and tyres

Electric motor

			FM-X 14 SE / Li-ion	FM-X 17 SE / Li-ion	FM-X 20 SE / Li-ion
6.1	Traction motor, power rating at S2 = 60 min	kW	6.5	6.5	6.5
6.2	Lift motor, power rating at S3 = 15%	kW	14	14	14
6.3	Battery in accordance with DIN 43531 / 35 / 36 A, B, C, no		43531C / 254-2	43531C / 254-2	43531C / 254-2
6.4	Battery voltage / nominal capacity K ₅	V/Ah	48/620, Li-ion: 48/817	48/620, Li-ion: 48/817	48/620, Li-ion: 48/817
6.5	Battery weight (±5% depending on the manufacturer)	kg	940	940	940
6.6	Energy consumption in accordance with VDI cycle	kWh/ h	3.42	3.61	3.58

Other

				FM-X 14 SE / Li-ion	FM-X 17 SE / Li-ion	FM-X 20 SE / Li-ion
	Working pressure for attachment	ba	ır	200	200	200
10.2	Oil flow for attachments	I/m	in	20	20	20
10.7	Sound pressure level L _{pAZ} , driver's compartment	dB(A)	69	69	69

Wheels and tyres

Permissible tyres

A DANGER

The use of non-permissible tyres has a negative effect on the stability of the truck. There is a risk of accident!

- Only use the types of tyre listed below.
- Observe the basic principles of safe operation; see the chapter entitled "Tyres".

It is recommended that you consult your service centre before carrying out any modifications.

Drive wheel

Full rubber/Superelastic



Battery specifications for lithium-ion batteries

Model	Tyres
FM-X 14 SE (standard versions)	Ø 457 x 203
FM-X 17 SE (standard versions)	Ø 457 x 203
FM-X 20 SE (standard versions)	Ø 457 x 203

Load wheels

Full rubber/Superelastic

Model	Tyres
FM-X 14 SE (standard versions)	Ø 454 x 160
FM-X 17 SE (standard versions)	Ø 454 x 160
FM-X 20 SE (standard versions)	Ø 450 x 195

Battery specifications for lithium-ion batteries

 For more information, please refer to the nameplate and the operating instructions for the lithium-ion battery.

Performance characteristics

Battery group	Group 4.1	Group 4.2	Group 4.3
Cell connections	3 x 13s1p	12 x 13s1p	12 x 13s1p
Nominal energy	9800 Wh	39200 Wh	39200
Nominal capacity	201 Ah	804 Ah	804 Ah
Nominal voltage	48 V	48 V	48 V
Max. discharge current	400 A	400 A	400 A
Max. discharge power	18 kW	18 kW	18 kW

Dimensions and weights

Battery group	L x W x H (mm)	Weight (kg)
Group 4.1	1223 x 283 x 784	750
Group 4.2	1223 x 355 x 784	939
Group 4.3	1223 x 385 x 784	1119



6 Technical data

Battery specifications for lithium-ion batteries



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