

Original instructions

STILL
ELECTRONIC
DOCUMENTATION
SYSTEM

Reach trucks

FM-X, FM-X N, FM-X W,
FM-X EW

FM-X-10
FM-X-12
FM-X-14
FM-X-17
FM-X-20
FM-X-22
FM-X-25

1900 1901 1902 1903 1904
1905 1906 1907 1908 1909
1910 1914 1915 1916 1917
1918 1919 1920 1921 1922



first in intralogistics



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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-the-art technology. All that remains is to handle the truck safely and maintain its functionality.

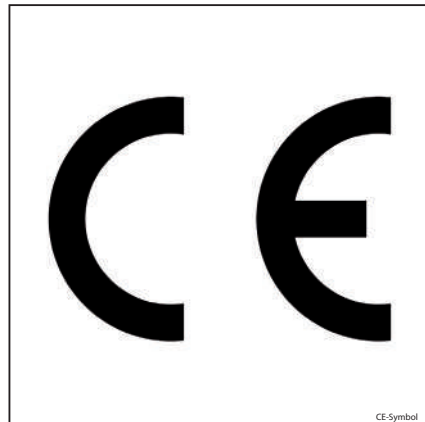
These operating instructions provide the necessary information to do this. Read and observe the information provided before commissioning the truck. This will prevent accidents and ensure that the warranty remains valid.

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

Information about the documentation

Information about the documentation

Documentation scope

- Operating instructions
- Operating instructions for attachments (variant)
- Spare parts list
- VDMA rules for the proper use of industrial trucks

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

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

Production number

.....

Year of manufacture

.....

Please quote the production number during 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 any time. The storage location is specified in the "Overviews" chapter.

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

The operating instructions are included in the spare parts list and can be reordered there 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 instructions.

 **NOTE**

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

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

Issue date and topicality of the operating instructions

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

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

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

Copyright and trademark rights

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

Explanation of information symbols used

 **DANGER**

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

 **WARNING**

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

Information about the documentation

CAUTION

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

NOTE

For technical requirements that require special attention.

ENVIRONMENT NOTE

To prevent environmental damage.

List of abbreviations

NOTE

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

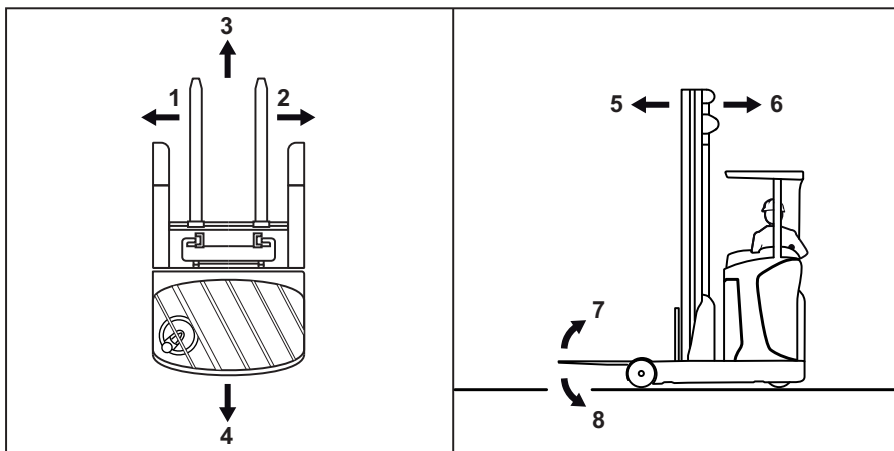
Abbreviation	Meaning
°C	Degrees Celsius
°F	Degrees Fahrenheit
A	Amperes
ABE	Display operating unit
ArbSchG	German labour protection law
BetrSichV	German Ordinance on Industrial Safety and Health
BG	Employers' liability insurance association
BGG	Employers' liability insurance association act
BGR	Employers' liability insurance association rule
BGV	Employers' liability insurance association regulation
Approx.	Approximately
CE	Symbol that confirms conformity with the valid product-specific European directives
CEE	International Commission on the Rules for the Approval of Electrical Equipment
cm	Centimetres
cm ³	Cubic centimetres

Abbreviation	Meaning
dB	Decibels
DFÜ	Remote data transmission
DIN	German standard
EG	European Community
EN	European standard
FEM	Fédération Européene de la Manutention
F _{max}	Maximum power
g	Grams
GAA	Industrial inspectorate
If applicable	If applicable
GPRS	General Packet Radio Service
h/d	Hours per day (time driven each day in hours)
ID no.	ID number
ISO	International standard
kg	Kilograms
kg/m ³	Kilograms per cubic metre
km/h	Kilometres per hour
km/d	Kilometres per day (kilometres driven each day)
kN	Kilonewtons
kW	Kilowatts
kWh/h	Energy consumption
l	Litres
l/h	Litres per hour
l/min	Litres per minute
LAN	Local area network
LED	Light emitting diode
L _p	Sound pressure level
L _{pAZ}	Continuous sound pressure level in driver's compartment
LSP	Load centre of gravity
o.s.	Or similar
m	Metres
m/s	Metres per second

Information about the documentation

Abbreviation	Meaning
m/s ²	Metres per second squared
MAK	Maximum workplace concentration
Max.	Maximum
Min.	Minimum
min	Minutes
rpm	Revolution(s) per minute
mm	Millimetres
N	Newtons
Nm	Newton metres
PIN	Personal identification number
SE	Superelastic
SIT	Snap-in tyre for simplified assembly
StVZO	German Road Traffic Licensing Regulations
t	Tonnes
TRGS	Technical Regulations for Hazardous Substances
a.s.	And similar
V	Volts
VDE	Association for Electrical, Electronic & Information Technologies
VDI	Association of German Engineers
VDMA	German Engineering Federation
W	Watts
WLAN	Wireless local area network
e.g.	For example

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.

Information about the documentation

Schematic views

View of functions and operating procedures ▷

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

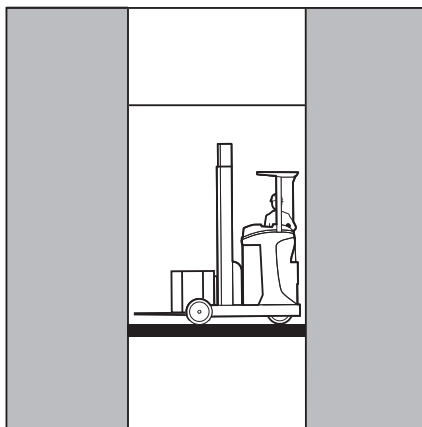
NOTE

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

View of the display and operating unit

NOTE

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



Environmental considerations

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.

2

Introduction

Using the truck

Using the truck

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".

Impermissible use

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

NOTE

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

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



DANGER

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

- It is prohibited to carry passengers on the truck.

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

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

Place of use

The truck is only approved for indoor use.

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

Driving on upward and downward gradients is permitted provided the defined data and specifications are observed; see the chapter entitled "Roadways".

The truck is suitable for indoor use in many different countries, ranging from those situated in the Tropics to those in Nordic regions (temperature range: -10°C to $+40^{\circ}\text{C}$).

If the truck is to be used in a cold store, it must be configured accordingly and, if necessary, approved for such an environment; see the chapter entitled "Cold store application".

The operating company (see the chapter entitled "Definition of terms used for responsible persons") must provide sufficient fire protection in the area surrounding the truck in accordance with its application. Depending on the application, additional fire protection must be provided on the truck. If in doubt, contact the relevant authorities.

Parking in temperatures below -10°C

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 the truck

Using working platforms

⚠ WARNING

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

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

Residual risk

Residual dangers, residual risks

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

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

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

WARNING

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

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

The risks can include:

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

Residual risk

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

Stability

The stability of the truck has been tested to the latest technological standards and is guaranteed if the truck is used properly and according to its intended purpose. These standards only take into account the static and dynamic tipping forces that can arise during specified use in accordance with the operating rules and intended purpose. The risk of exceeding the moment of tilt that arises from improper use or incorrect operation cannot be excluded in extreme cases, and will impact stability.

The risks can include:

- loss of stability due to unstable or sliding loads etc.
- cornering at excessive speeds,
- moving with the load raised,
- moving with a load that is protruding to the side (e.g. sideshift),
- turning and driving diagonally across slopes,
- driving on slopes with the load on the downhill side,
- loads that are too wide,
- swinging loads,
- ramp edges or steps.

Special risks associated with using the truck and attachments

Approval from the manufacturer and attachment manufacturer must be obtained each time the truck is used in a manner that falls outside the scope of normal use, and in cases where the driver is not certain that he can use the truck correctly and without the risk of accidents.

Residual risk

Overview of hazards and counter-measures

 NOTE

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

 NOTE

Observe the national regulations for your country!

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

Hazard	Measure	Check note ✓ actioned - not applicable	Notes
Impermissible usage (improper usage)	Issuing of operating instructions	○	BetrSichVO (Workplace Safety Ordinance) and ArbSchG (Health and Safety at Work Act)
	Written notice of instruction to driver	○	BetrSichVO (Workplace Safety Ordinance) and ArbSchG (Health and Safety at Work Act)
	Observe BetrSichVO (Workplace Safety Ordinance), operating instructions and VDMA (German Engineering Federation) rules	○	
When fuelling			
a) Diesel	Observe BetrSichVO (Workplace Safety Ordinance), operating instructions and VDMA (German Engineering Federation) rules	○	
b) LPG	Observe BGV D34, operating instructions and VDMA rules	○	
When charging the traction battery	Observe BetrSichVO (Workplace Safety Ordinance), operating instructions and VDMA (German Engineering Federation) rules	○	VDE 0510: In particular - Ensure ventilation - Insulation value within permissible range
When using battery chargers	Observe BetrSichVO (Workplace Safety Ordinance), BGR 104 and operating instructions	○	BetrSichVO (Workplace Safety Ordinance) and BGR 104
When parking LPG trucks	Observe BetrSichVO (Workplace Safety Ordinance), BGR 104 and operating instructions	○	BetrSichVO (Workplace Safety Ordinance) and BGR 104

Residual risk

Hazard	Measure	Check note ✓ actioned - not applicable	Notes
With driverless transport systems			
Roadway quality inadequate	Clean/clear driveways	○	BetrSichVO (Workplace Safety Ordinance)
Load carrier incorrect/slipped	Reattach load to pallet	○	BetrSichVO (Workplace Safety Ordinance)
Drive behaviour unpredictable	Employee training	○	BetrSichVO (Workplace Safety Ordinance)
Driveways blocked	Mark driveways Keep driveways clear	○	BetrSichVO (Workplace Safety Ordinance)
Driveways intersect	Announce right-of-way rule	○	BetrSichVO (Workplace Safety Ordinance)
No person detection during depositing and retrieval	Employee training	○	BetrSichVO (Workplace Safety Ordinance)

Danger to employees

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



NOTE

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

The construction and equipment of the truck correspond to the Machinery Directive 2006/42/EC and are therefore marked with CE labelling. These elements are therefore not included in the hazard assessment. At-

tachments 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.

3

Safety

Definition of terms used for responsible persons

Definition of terms used for responsible persons

Operating company

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

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

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

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

We recommend that the national performance specifications are adhered to.

Specialist

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

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

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

Drivers

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

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

Driver rights, duties and rules of behaviour

The driver must be trained in his rights and duties.

The driver must be granted the required rights.

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

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

The driver must:

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

Definition of terms used for responsible persons

DANGER

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

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

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.

Changes and retrofitting

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

You should therefore contact your service centre beforehand.

Changes that will adversely affect stability, load capacity, 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.

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.

Basic principles for safe operation

Only restraint systems (variants) that have been specifically approved by STILL may be installed and used.



⚠ DANGER

Risk of injury if truck tips over!

Even if the driver has fastened the seat belt (variant), there is still a residual risk of injury if the truck tips over. In addition, the seat belt protects against the consequences of rear-end collisions and falling off a ramp.

- The seat belt (variant) must always be used.

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

DANGER

The overhead guard or the weather protection cab/cold store cab may fail. A falling load or the truck tipping over could result in fatal consequences for the driver. There is a risk of fatal injury!

Work on the overhead guard or on the weather protection cab/cold store cab reduces its stability. Excessive forces caused by falling loads or the truck tipping over may result in buckling of the modified chassis, bodywork and fittings. This could mean that the driver is no longer protected.

- 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.



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

To ensure the stability of the chassis, bodywork and fittings at all times, do not mount any additional roof loads on the truck.

Basic principles for safe operation

⚠ CAUTION

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

- Do not mount any additional roof loads on the truck.

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

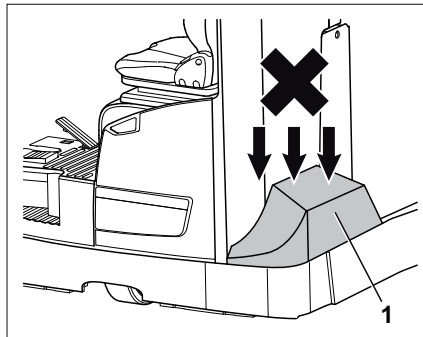
The W (Wide) and EW (Extra Wide) versions differ from the standard truck by having additional cover sheets (1) between the overhead guard and the widened chassis. These sheets are located on each side of the truck. They are not designed to be walked on by people.

⚠ 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.

⚠ CAUTION

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

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

Damage, defects and misuse of safety systems

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

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

Do not remove or deactivate safety systems and switches.

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

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

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

Tyres

DANGER

Using different tyres has a negative effect on the stability of the truck. There is a risk of accident!

Only original tyres may be fitted to the truck.

- Make sure that only original tyres are fitted.

Tyre quality affects the stability and handling of the truck. Changes must only be made in consultation with the manufacturer. When changing wheels or tyres, 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).

Basic principles for safe operation

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.

Safety tests

Regular safety inspection of the truck ▷

Safety inspection based on time and extraordinary incidents

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, a complete check of the technical condition of the truck must be performed with regard to accident safety. In addition, the truck must be thoroughly checked for damage that could potentially have been caused by improper use. A test log must be created. The results from the inspection must be retained until a further two inspections have been carried out.

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

- Arrange for the service centre to perform periodic safety inspections on the truck.
- Observe guidelines for checks carried out on the truck in accordance with FEM 4.004.

The operator is responsible for ensuring any defects are remedied without delay.

- Contact your service centre.



NOTE

Observe the national regulations for your country!

Insulation testing

The truck insulation 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 a year.



NOTE

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



Safety regulations for handling consumables

Measuring the battery's insulation resistance

 **NOTE**

Nominal battery voltage < test voltage < 500 V.

- Measure the insulation resistance with a suitable measuring device.

The insulation resistance can be considered sufficient if it measures at least $500 \Omega/V$ for the nominal battery voltage against ground.

- Contact the authorised service centre.

Measuring the insulation resistance of the electrical system

 **NOTE**

Nominal battery voltage < test voltage < 500 V.

- Ensure that all voltage sources have been disconnected from the circuit to be tested.
- Measure the insulation resistance with a suitable measuring device.

The insulation resistance can be considered sufficient if it measures at least $1000 \Omega/V$ for the nominal battery voltage against ground.

- Contact the authorised service centre.

Safety regulations for handling consumables

Permissible consumables

 **DANGER**

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

- Observe the safety regulations when handling 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!



⚠ 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.

Safety regulations for handling consumables



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, always wear a protection suit and eye protection.
- When working with battery acid, never wear a watch or any 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.

Safety regulations for handling consumables

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.

⚠ 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.

⚠ 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.

Emissions

The values specified apply to a standard truck (see technical datasheet). Different tyres, lift masts, additional units etc. may produce different values.

Noise emissions

The values were determined using the measuring procedures from the EN 12053 stan-

Emissions

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 _{pAZ}	< 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 specified noise levels in the truck cannot be used to determine the noise emissions occurring in workplaces in accordance with the most recent version of **Directive 2003/10/EC** (daily personal noise pollution). If necessary, these values must be determined directly at the workplace in the actual conditions present there (additional noise sources, special application conditions, sound reflections).

Vibrations

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

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



⚠ 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.

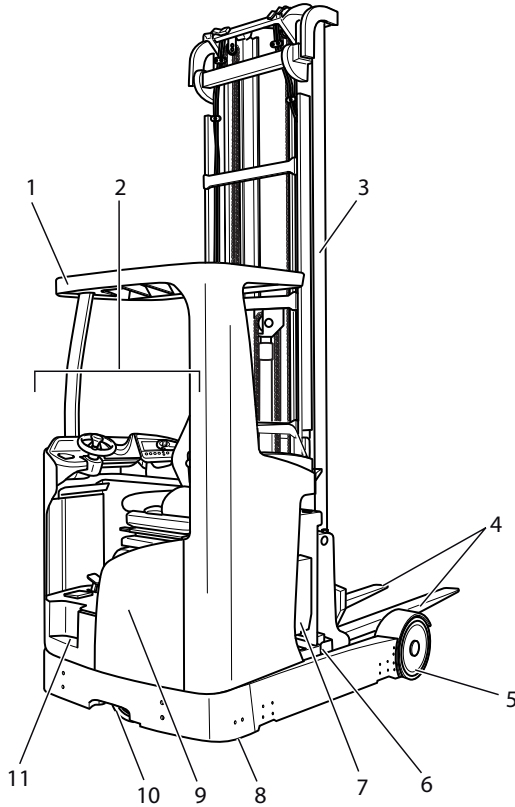
- Make sure that there is always sufficient ventilation in working areas that are entirely or partially enclosed.
 - Keep away from open flames and flying sparks.
 - Observe the safety regulations for handling the battery.
-

4

Overviews

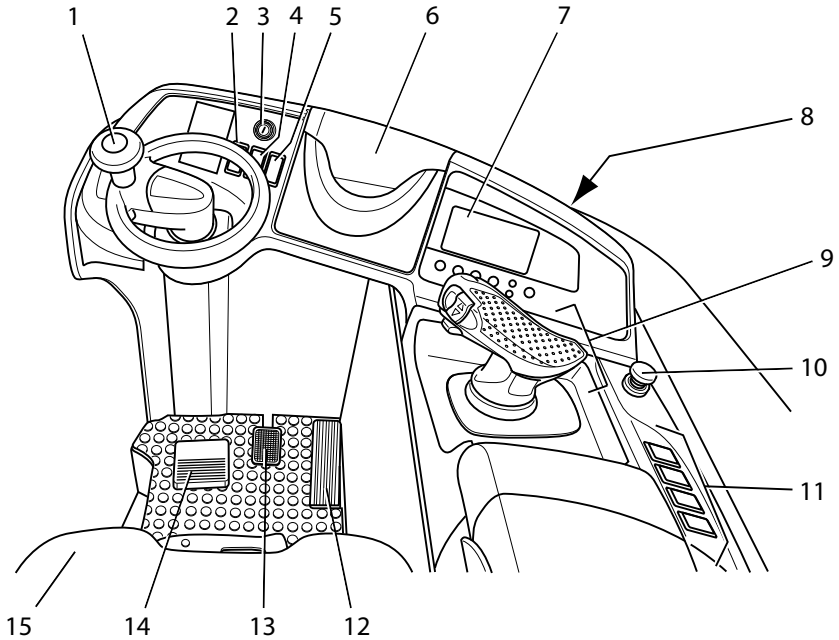
Overview

Overview



- | | | | |
|---|----------------------|----|--------------------------------|
| 1 | Overhead guard | 7 | Battery |
| 2 | Driver's compartment | 8 | Side support (tilt protection) |
| 3 | Lift mast | 9 | Control compartment |
| 4 | Fork arms | 10 | Drive wheel |
| 5 | Load wheel | 11 | Step |
| 6 | Battery frame | | |

Overview of the driver's compartment

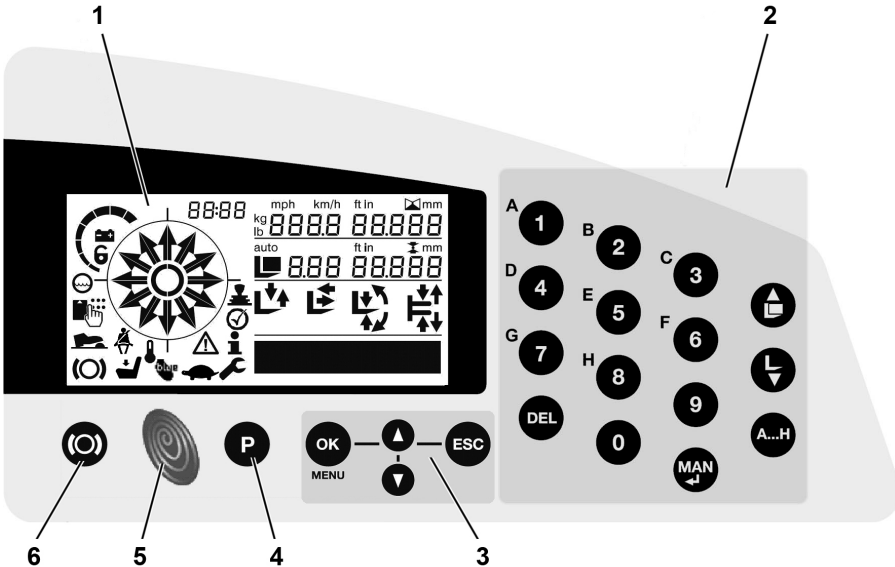


- | | | | |
|---|--|----|--|
| 1 | Steering wheel | 9 | Operating devices for hydraulic and traction functions |
| 2 | Working spotlight push button (variant) | 10 | Emergency off switch |
| 3 | Key switch or push button (variant) | 11 | Push button for additional hydraulic functions |
| 4 | Reserved | 12 | Accelerator pedal |
| 5 | Electrical seat adjustment push button (variant) | 13 | Brake pedal |
| 6 | Compartment (reserved for add-on systems) | 14 | Foot switch |
| 7 | Display and operating unit | 15 | Driver's seat |
| 8 | Cup holder for max. 1.5-l bottles | | |

Operating devices and display elements

Operating devices and display elements

Display and operating unit



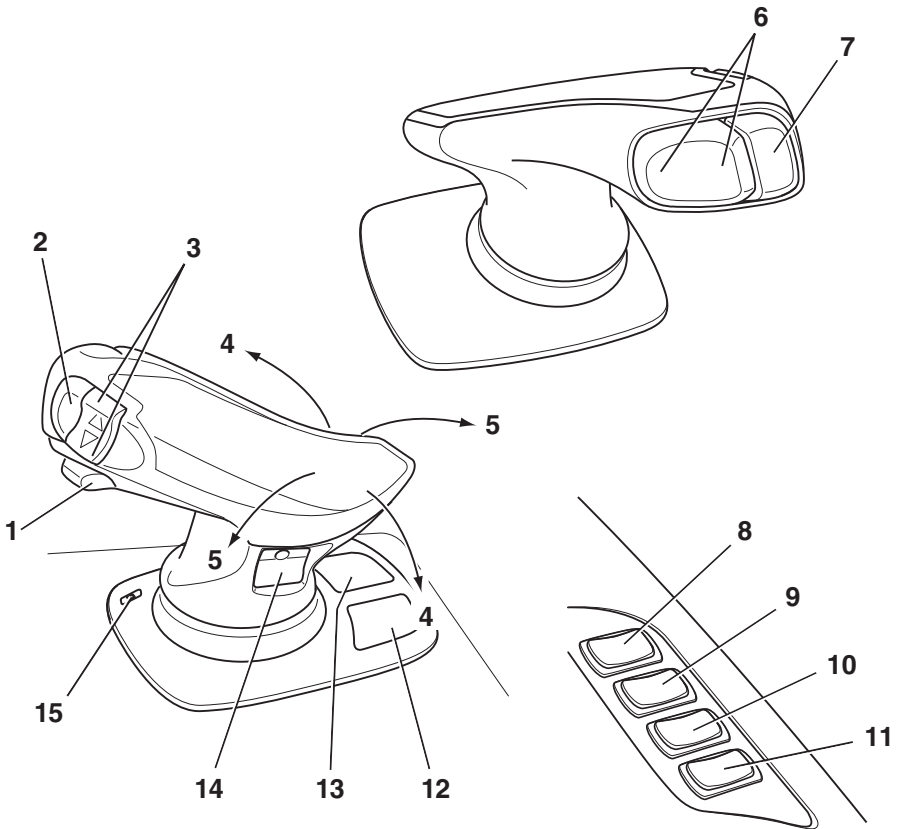
- 1 Display of the operating statuses
- 2 Keypad for lift height preselection (variant) or PIN code access (variant)
- 3 Keypad for onboard diagnostics, parameterising
- 4 Drive programme button (P1-P4)
- 5 Blue-Q button
- 6 Parking brake button

Operating devices 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

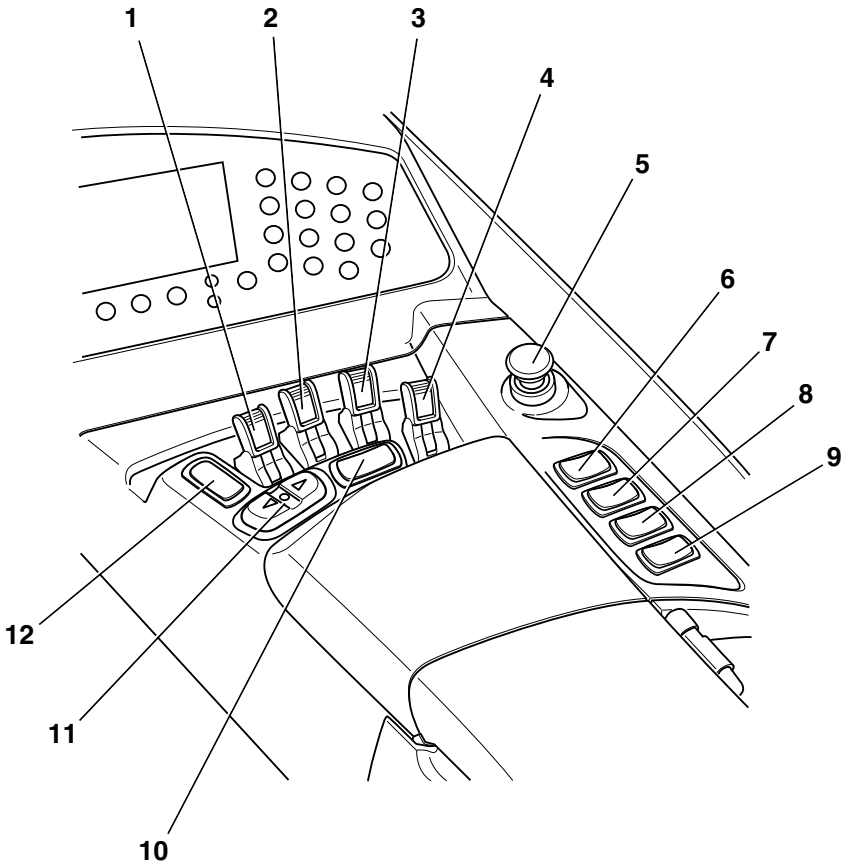
Joystick 4Plus



- | | | | |
|---|--|----|--|
| 1 | "Transition shift" slider | 10 | "Transition shift/tilt centre position" push button (variant) |
| 2 | Shift button "F" (auxiliary hydraulics controller) | 11 | Reserve |
| 3 | Drive direction switch | 12 | Pictograms for operation of the 5th and 6th hydraulic function (variant) |
| 4 | Joystick, "lifting/lowering" function | 13 | Pictograms for operation of the basic hydraulic functions |
| 5 | Joystick, "shifting" function | 14 | Pictograms for operation of the 3rd and 4th hydraulic function |
| 6 | "Tilt" rocker button | 15 | LED indicator light for clamp locking mechanism (variant) |
| 7 | Signal horn button | | |
| 8 | "Enable" push button (variant) | | |
| 9 | "Load measurement" push button (variant) | | |

Operating devices and display elements

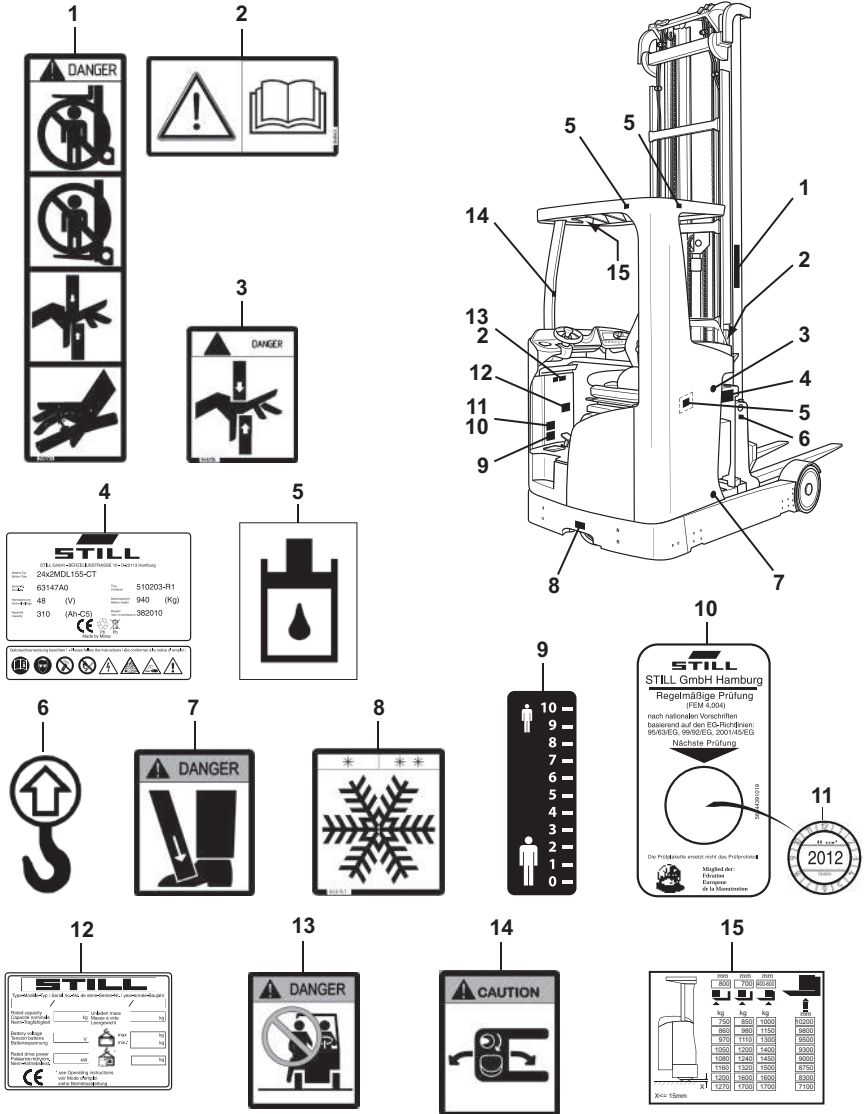
Fingertip



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

Identification points

Overview

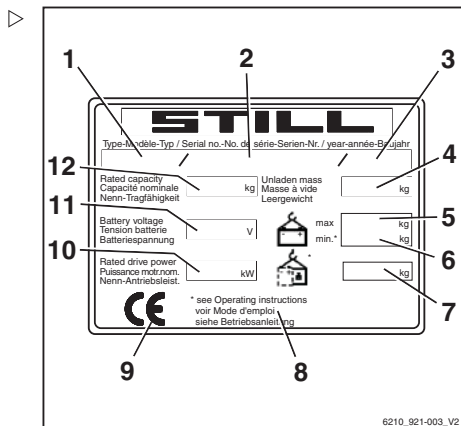


Identification points

- | | | | |
|---|--|----|---|
| 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 | 9 | Decal information: Electrical seat adjustment (variant) |
| 2 | Decal information: Caution/read the operating instructions | 10 | Decal information: FEM test |
| 3 | Warning sign: Danger due to shearing | 11 | Decal information: FEM test (inspection sticker) |
| 4 | Decal information: Battery version | 12 | Decal information: Nameplate |
| 5 | Decal information: Hydraulic oil tank | 13 | Warning sign: Passengers prohibited |
| 6 | Decal information: Lifting point | 14 | Warning sign: Reverse steering |
| 7 | Warning sign: Crushing and shearing points for feet | 15 | Decal information: Load capacity diagram, load capacity diagram for attachments (example) |
| 8 | Decal information: Cold store version (variant) | | |

Nameplate

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



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

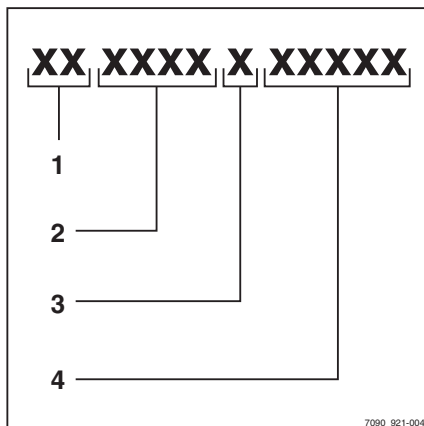
Production number

NOTE

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



Identification points

5

Operation

Checks and tasks to be carried out prior to commissioning

Checks and tasks to be carried out prior to commissioning

Visual inspections

⚠ 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.

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

- 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.

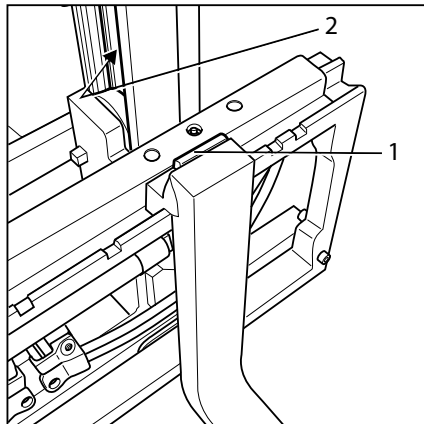
⚠ WARNING

There is a risk of falling when working on high parts of the truck.

- Use only the steps provided on the truck.
- Do not stand on truck components or use them to help you climb onto the truck.
- Use suitable equipment.

Prior to commissioning, ensure that the truck is safe for operation: ▷

- All covers must be fitted and closed
- The fork arms must be secured against lifting and shifting
- The locking devices (1) of the fork arms must not be damaged or deformed
- Fork arms and other lifting accessories must not show any noticeable damage (e.g. bends, cracks, significant wear)
- The roller tracks (2) must be lubricated with a visible grease film
- The slide tracks of the reach carriage must be lubricated with a visible film of grease
- The chains must not be damaged and must be evenly and adequately tensioned
- Check the area under the truck for leaking consumables
- The guard grille (variant) and overhead guard or weather protection cab/cold store



- cab (variant) must be undamaged and securely mounted
- Attachments (variant) must be properly attached and function according to their operating instructions
 - All decal information signs must be in place and legible. Replace damaged or missing adhesive labels in accordance with the overview in the "Identification points" chapter
 - Any warning units (e.g. signal horn) must be in perfect condition and function correctly
 - Check the visible areas of the hydraulic system for damage and leakages. Damaged hoses must be replaced
 - The battery frame must be fully retracted towards the drive side and must be locked securely in this position
 - Check the battery male connector for damage (e.g. cracks, breaks or deformation of the housing, and whether the contacts are bent or damaged). If necessary, have the battery male connector replaced by the authorised service centre
 - With an internal roller channel (variant), the swing bolt of the battery lock must be closed and must not be damaged or deformed
 - The battery frame must show no noticeable damage (e.g. cracks or breaks)
 - Steps must be clean and free of ice
 - Any panes of glass (even for the weather protection cab/cold store cab variant) must be clean and free of ice
 - Depending on the tyres, the truck is fitted with an earthing strap. The earthing strap must not be damaged. It must also be clean and long enough to touch the ground
 - Damage or other defects on the truck or attachment (variant) must be reported to the supervisor or responsible fleet manager immediately so that they can arrange for the defect to be rectified.

Checks and tasks to be carried out prior to commissioning

⚠ WARNING

Risk of component damage!

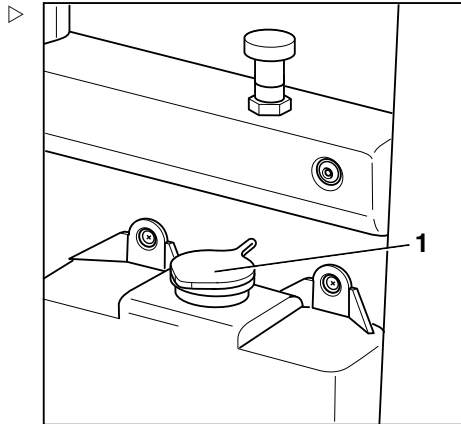
A deformed or damaged battery male connector can cause overheating and related consequential damage.

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

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").



⚠ CAUTION

Components may become damaged due to the effects of frost!

Water expands when it freezes. If there is no anti-freeze 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.

Checking the condition of the wheels and tyres

⚠ WARNING

Risk of accident! Uneven wear reduces the stability of the truck and increases the braking distance.

- If the tyres are worn or damaged, inform the authorised service centre immediately

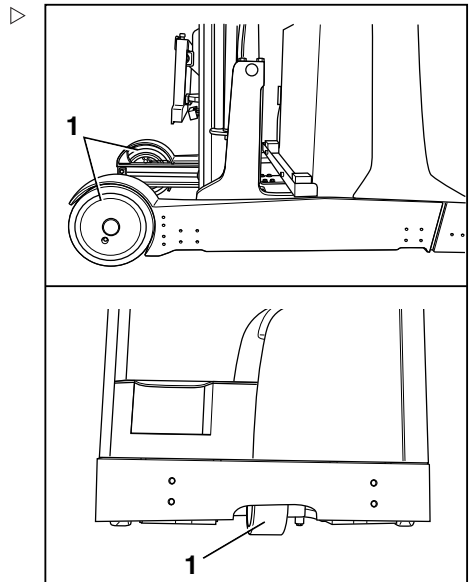
i NOTE

- *Only approved tyre types may be used; see the chapter entitled Technical data, "Wheels and tyres".*
- Check the tyres (1) on the drive wheel and load wheels for wear and damage.

Tyres must not be damaged or excessively worn. They must be worn evenly on both sides.

i NOTE

Observe the safety principles for tyres; refer to the chapter entitled "Basic principles for safe operation/Tyres".



Checks and tasks to be carried out prior to commissioning

Adjusting the MSG 65/MSG 75 driver's seat

⚠ DANGER

There is a risk of accident if the seat or seat backrest shifts suddenly, which could cause the driver to move in an uncontrolled manner. This can result in unintentional actuation of the steering or the operating devices and thus cause uncontrolled movements of the truck or load.

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

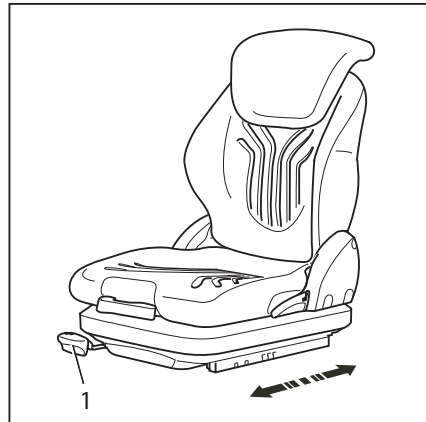
⚠ WARNING

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

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

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.



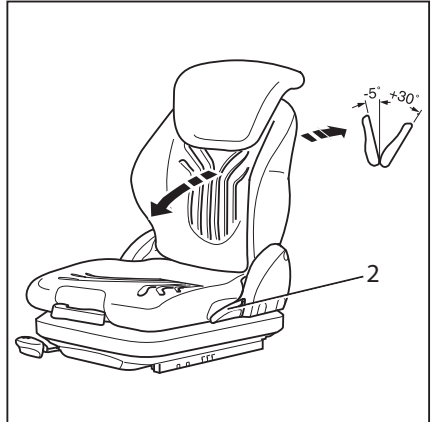
Adjusting the seat backrest

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.

NOTE

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



Adjusting the seat suspension

NOTE

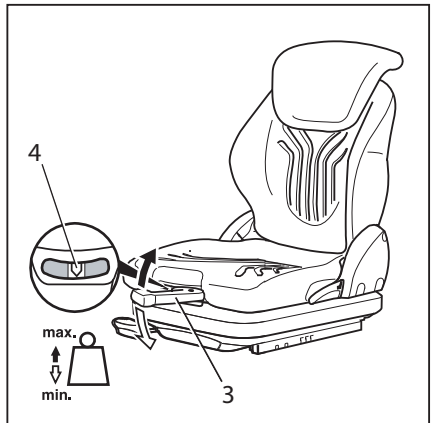
The MSG 75 seat is equipped with electric air suspension that is activated using an electric switch instead of a lever (3).

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.



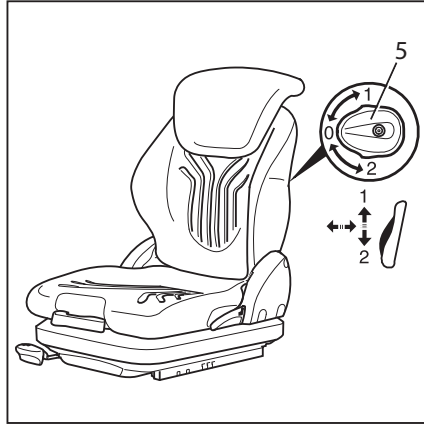
Checks and tasks to be carried out prior to commissioning

Adjusting the lumbar support (variant) ▷

 NOTE

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

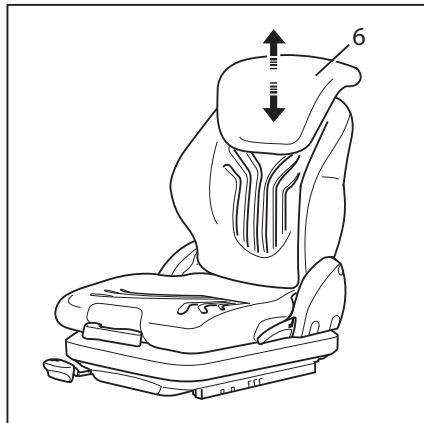
- Turn the turning knob (5) up or down until the lumbar support is in the desired position.



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.

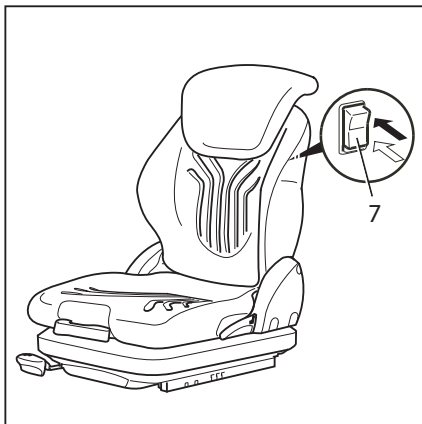


Switching the seat heater (variant) on and off

i 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.

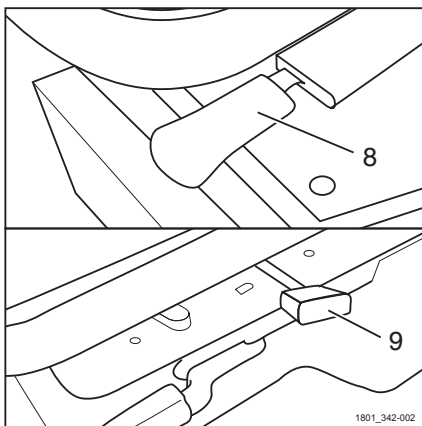


Adjusting the horizontal suspension (variant)

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

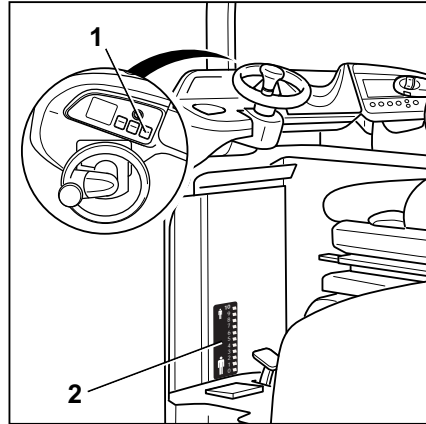
Using the lever (9), the driver can adjust the hardness in several levels.

- Move the lever (9) to the corresponding notch.



Checks and tasks to be carried out prior to commissioning

Electrical driver's compartment adjustment (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, place your right hand on the joystick and operate the rocker switch with your left hand.
- Make sure that there are no objects in the vicinity of the moving parts. They could become trapped and damage the mechanics. Only remove trapped objects when adjustment of the driver's compartment has stopped.

⚠ CAUTION

Risk of component damage.

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

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

The electrical driver's compartment adjustment, together with the seat and steering column adjustment, 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 can be adjusted together electrically to suit the size of the driver.



NOTE

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

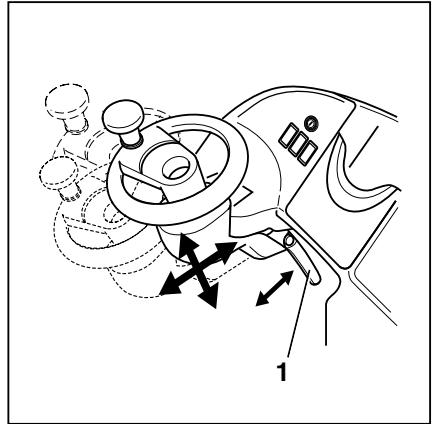
A scale (2) in the footwell of the driver's compartment gives an indication of the setting to help you remember it.

Adjusting the steering column

⚠ 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.



Commissioning

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.

Commissioning

⚠ 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.

⚠ 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.

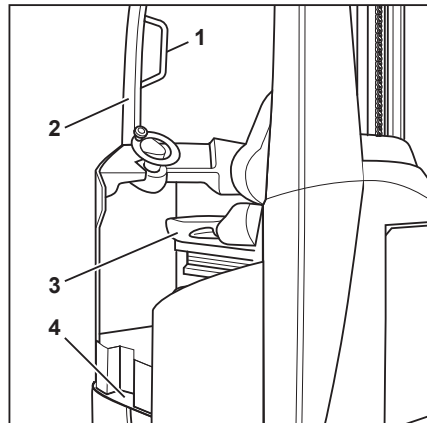
The truck must be at a standstill when climbing into or out of the truck. To assist with climbing into and out of the truck, the footwell must be used as a step (4) and the handle (1) must be used for support. The post of the overhead guard (2) can also be used for support.

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.



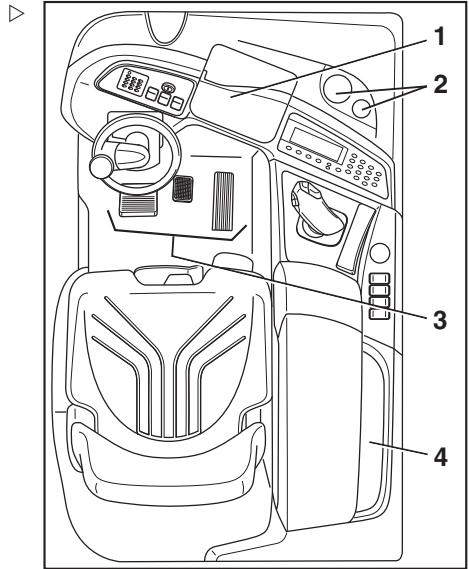
Shelves and cup holders

⚠ 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 l 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.



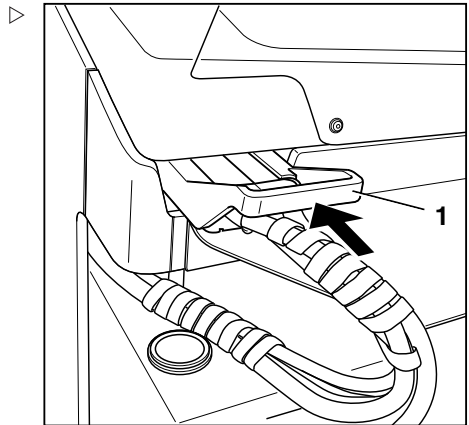
Connecting the battery male connector

⚠ CAUTION

Risk of component damage!

If you connect the battery male connector when the truck is switched on (under load), an arc will be produced. This can cause the contacts to erode, which considerably shortens their service life.

- Never connect the battery male connector when the truck is switched on.
- Insert the battery male connector (1) fully into the plug connection on the truck.



⚠ 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.

Commissioning

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:

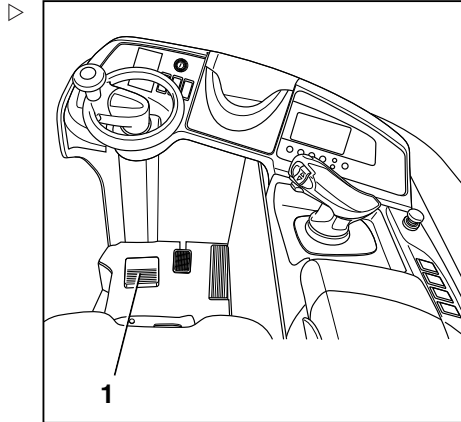
- The parking brake has been released
- The seat switch and the foot switch have been actuated but the accelerator pedal has **not**
- The accelerator pedal is then actuated
- The switches are all functioning correctly

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



NOTE

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.



NOTE

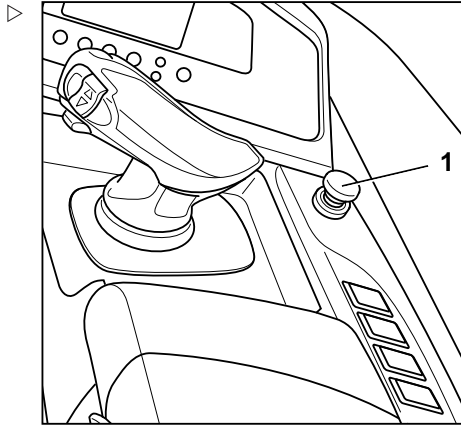
If the truck remains switched on for longer than eight hours in total, the switch status of the seat switch must change at least once. As a rule, this does happen during normal operation. If this has not happened, the seat switch must be released and then re-actuated once while the truck is switched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

Commissioning

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.

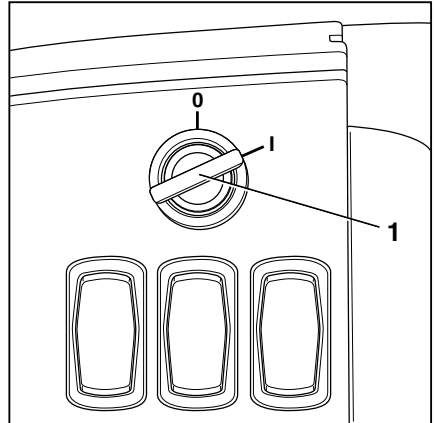
- Carry out tests before the commissioning, see the chapter "Checks and tasks to be carried out prior to commissioning".
- Do not operate the truck if defects have been identified.
- Notify your authorised service centre.

- 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.

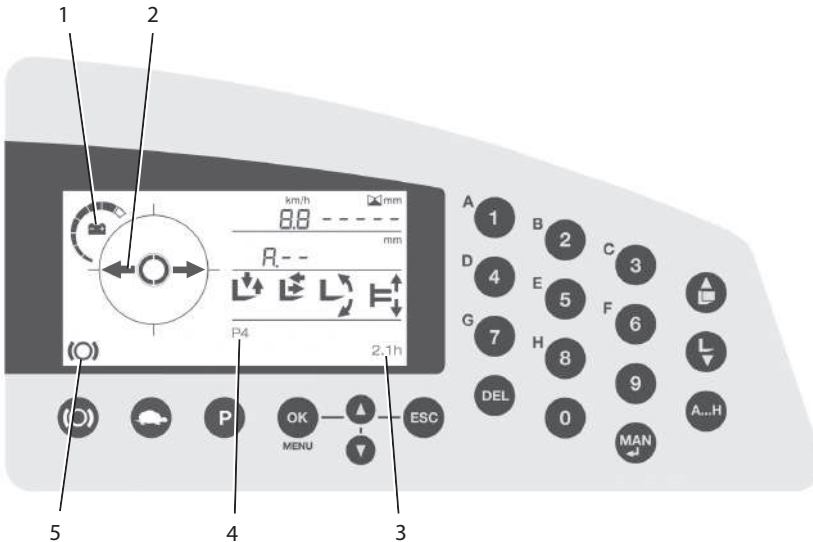


i NOTE

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.

Commissioning

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



i NOTE

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.

i NOTE

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 will initially be displayed. The battery charge level will not be displayed correctly again 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.



NOTE

In the event of fault displays, observe the information in the corresponding chapter; see the chapter entitled "Fault displays".

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.

Commissioning

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)

Level 3 (authorised service centre)

Access:

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

Authorisations:

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.

Commissioning

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.

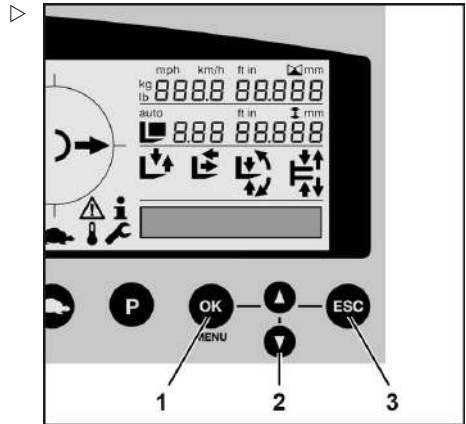
Entering operating data in the main menu

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

Authorisation (level)			Main menu	Submenu			Edit/select	Comment
1	2	3	CONFIGURATION	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			X	
					COM-PUTER		X	

Commissioning

Authorisation (level)			Main menu	Submenu			Edit/select	Comment
1	2	3	CONFIGURATION	1	2	3		
						HW1 HW2 SW1 SW2 SW3	VX.XX	
			UNITS	DISTANCE			km miles	
				LOAD			kg lb	
			ERROR LIST	MODE			CUSTOMER SERVICE	
					DEVICE		X	A-Z, *: all devices
						TYPE	X	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

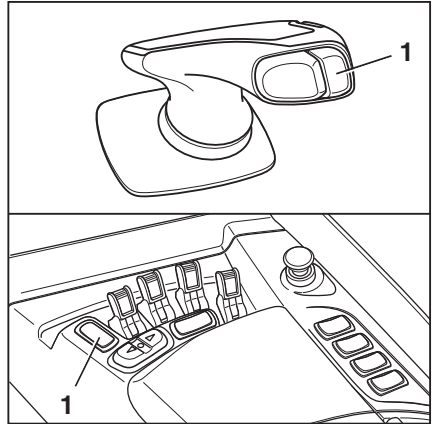
Operating the signal horn

NOTE

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

- Push the signal horn button (1).

The signal horn sounds.



Checking the brake system for correct function

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.

Commissioning

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

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".

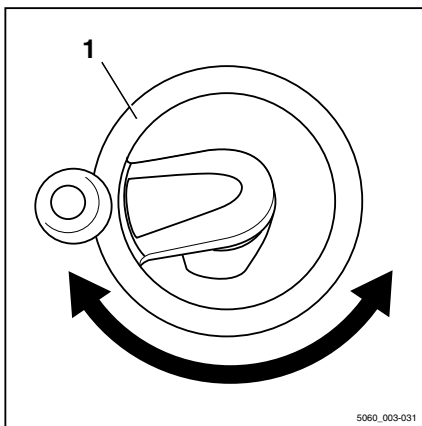
The parking brake is applied. The truck must be braked to a standstill with a noticeable delay.

Checking the steering system for correct function

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

NOTE

In the "180° steering" variant, the drive's maximum steering angle is $\pm 90^\circ$.

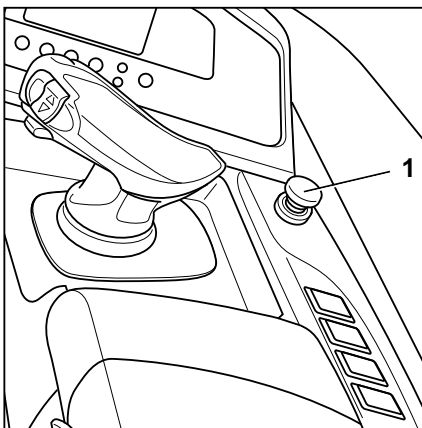


Checking the emergency off function

- 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.



Commissioning

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

NOTE

The "automatic tilting centre position" lift mast function (variant) must be executed whenever the truck is commissioned.

The driver can use the "automatic tilting centre position" function to position the tilt of the fork arms to 0° automatically. Depending on the truck version, either the fork carriage (fork tilt device) alone or the entire lift mast (mast tilt device) is positioned. In order to do this, the push button must be pushed 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.

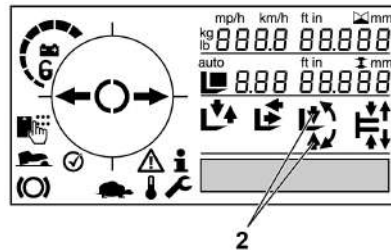
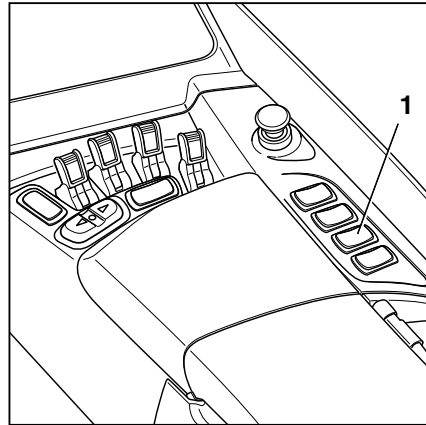
- Push the transition shift/tilt centre position push button (1) on the **right-hand** side.

In the display and operating unit, the arrows (2) pointing toward 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.



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



NOTE

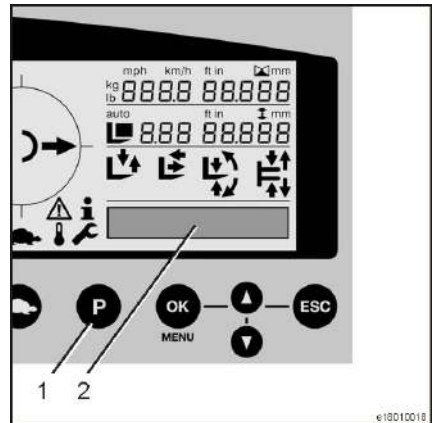
Only the drive programme can be changed. The characteristic for the relevant drive programme can only be changed by authorised service personnel.

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.



Commissioning

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.

⚠ 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.

⚠ DANGER

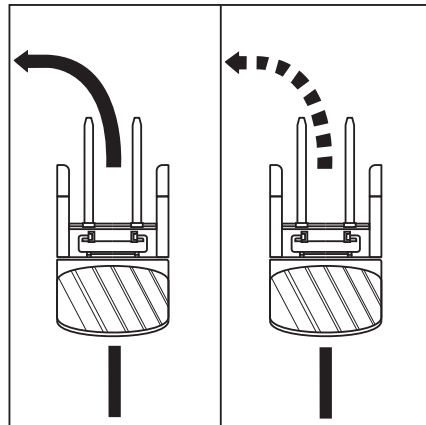
Risk of tipping if cornering speed is too high!

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.

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 passage-

Driving

ways, when driving through swing doors, at blind spots or on uneven roadways.

The driver must always maintain a safe braking distance from vehicles 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.

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.

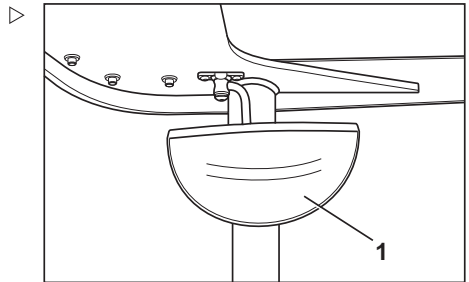
Panoramic mirror

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.



Driving

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.

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 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 (see 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 when using the truck under any circumstances:

Max. permissible gradient in %	With load	Without load
FM-X 10, FM-X 12, FM-X 14, FM-X 17, FM-X 20, FM-X 25	15	20
FM-X 10N, FM-X 12N, FM-X 14N, FM-X 17N, FM-X 20N	15	20

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

Warning in the event that components project beyond the truck contour

Trucks are often required to drive through very narrow or very low spaces such as aisles or containers. The dimensions of the trucks are

designed for this purpose. However, movable parts may project beyond the truck contour and be damaged or torn off. Examples of such components include:

- Extended lift mast
- Additional attachments (mirrors, monitors etc.)
- Cab doors

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 (see chapter "Responsible persons") or its representatives. Traffic routes must be free of obstacles. The load must 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.

Driving

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:

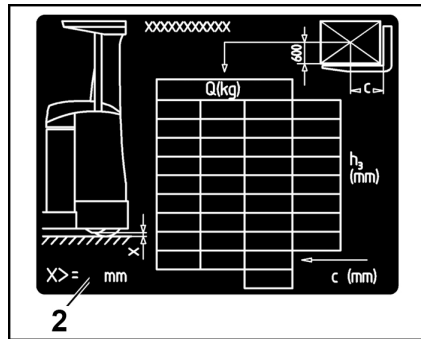
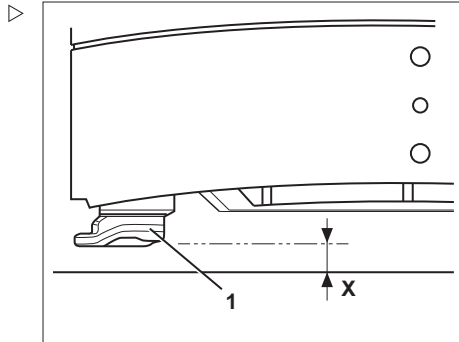
- Height of the lift mast
- Load capacity of the truck
- Size of the battery tray

⚠ 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.



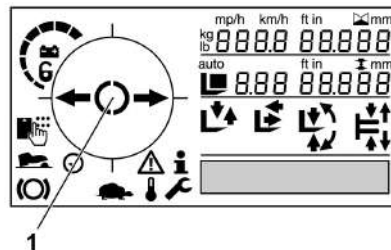
Selecting the drive direction

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"

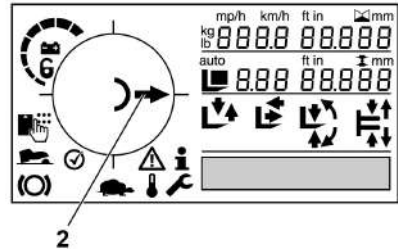


- **Fingertip**; see the chapter entitled Actuating the drive direction switch, fingertip.

i NOTE

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.

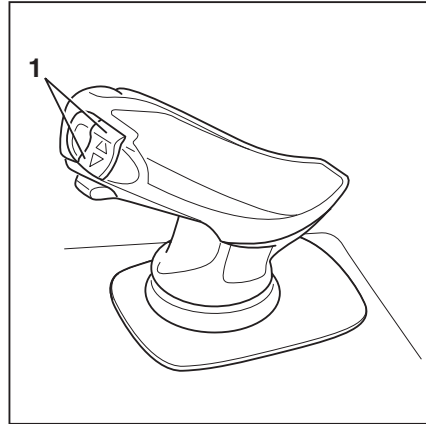
i NOTE

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

Driving

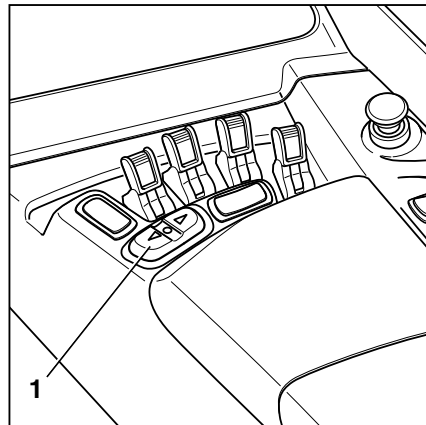
Actuating the drive direction switch, joystick 4Plus

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



Starting drive mode, single-pedal version

⚠ 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".

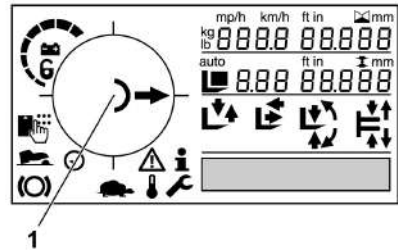
The driver's seat is equipped with a seat switch. In the event of an operating error or malfunction, see the chapter entitled "Enabling truck functions using the foot switch and seat switch".

- 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). ▷

i NOTE

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

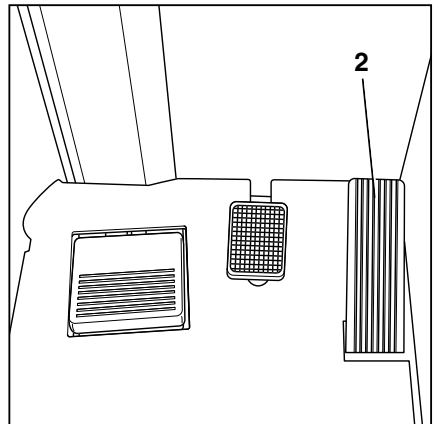


- Actuate the accelerator pedal (2). ▷

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.

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 accelerator pedal.

Driving

- 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)

DANGER

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

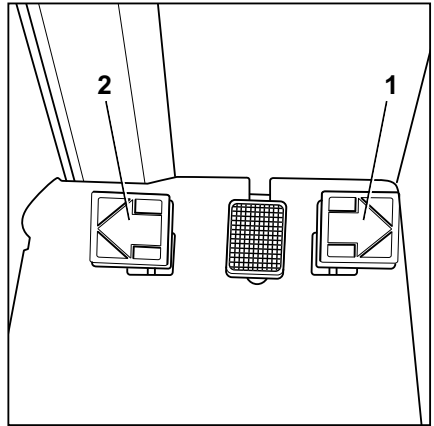
- Sit down on the driver's seat.
- During work, ensure that you have a secure grip on the truck and a stable seat position. Hold on tight to the steering wheel with your left hand.

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).



i NOTE

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

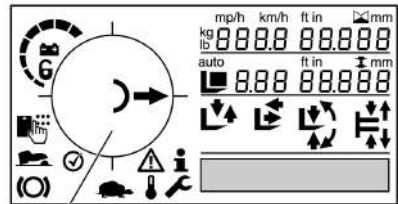
The selected drive direction is shown on the display and operating unit (3).



i NOTE

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.



3

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.

Driving

i NOTE

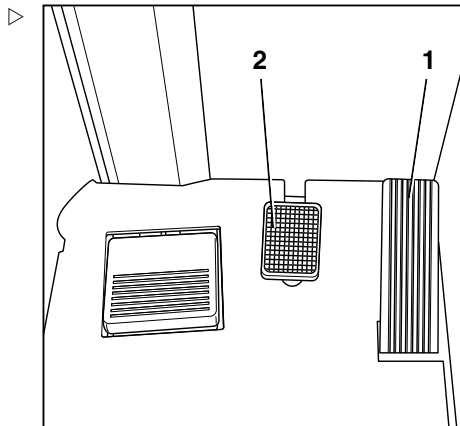
In the event of an electrical fault with the accelerator the drive unit is shut down. The truck is braked by regenerative braking. The truck cannot be driven again until the accelerator pedal has been released and then actuated again, provided that the electrical fault has been corrected. If the truck 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.

**⚠ DANGER**

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.

⚠ 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.

Applying the electromagnetic parking brake

⚠ DANGER

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

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

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.

Driving

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

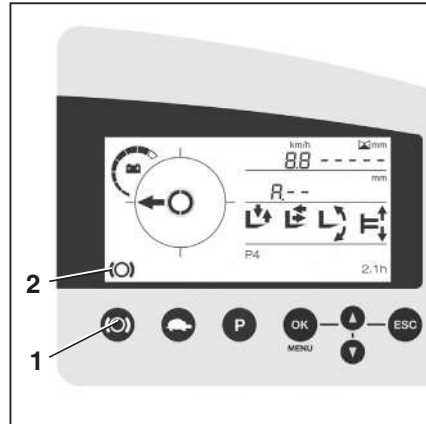
Actuation by the driver

- 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.

Actuation triggered automatically

Cause	Effect
If the driver's seat is vacated or the foot switch is released:	After 3 seconds, the parking brake is applied audibly and the symbol (2) is shown on the display and 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 the truck emergency off function:	The parking brake is applied immediately and audibly, and the symbol (2) is shown on the display and operating unit.



Releasing the parking brake by pushing the button

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

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

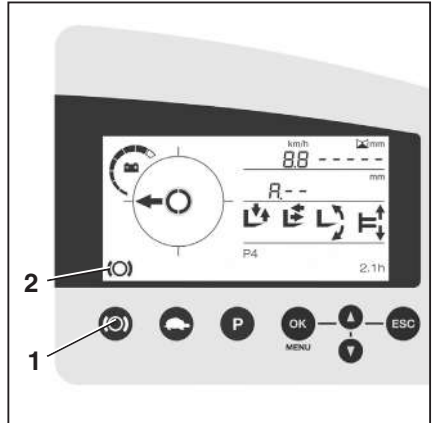
The parking brake is released audibly and the symbol (2) on the display and operating unit disappears.

Releasing the parking brake by starting to drive

The parking brake can only be released by starting to drive if it was applied automatically by releasing the foot switch or vacating the driver's seat.

- Sit down 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.



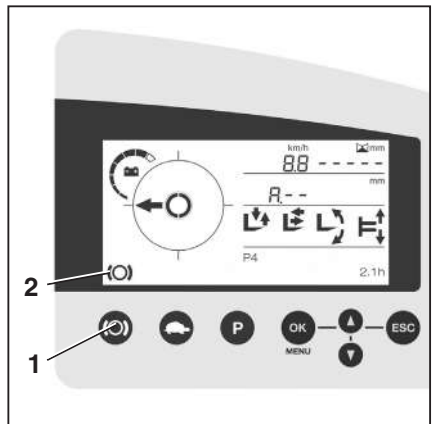
Functions of the parking brake when the truck is moving

Actuation by the driver

NOTE

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 that you have a secure grip on the truck; hold onto the steering wheel with your left hand.



Driving

- 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.

Actuation triggered automatically

Cause	Effect
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 the truck emergency off function:	The parking brake is applied immediately and audibly, and the symbol (2) is shown on the display and operating unit.



NOTE

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

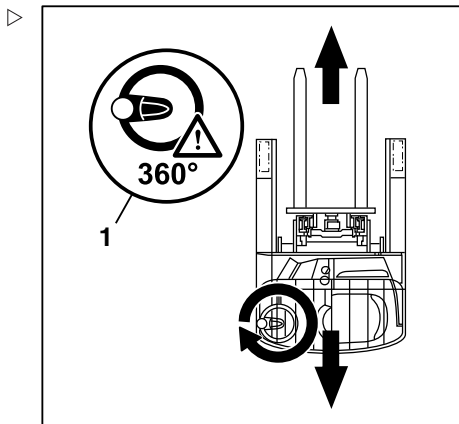
Please do not steer when the truck is at a standstill, as this causes the drive wheel to be put under extreme pressure and therefore increases wear.

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, 2½ 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.

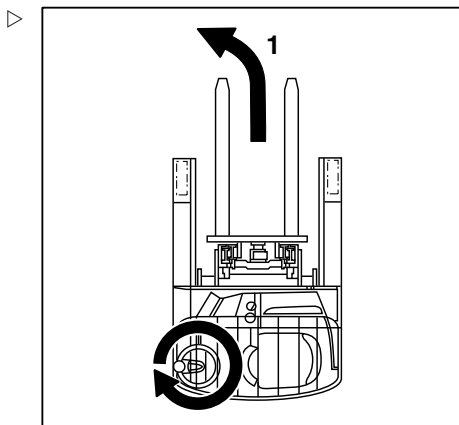


180° steering (variant)

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.

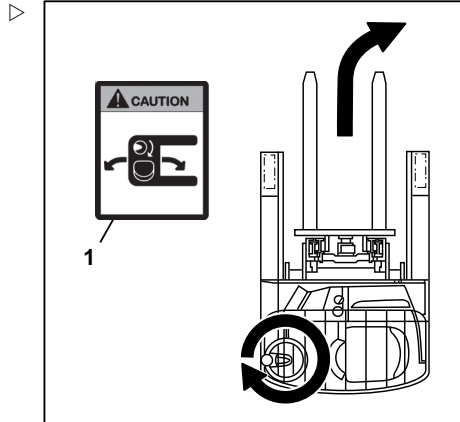


Lifting

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.



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".

Automatic lift cut out (variant)

The automatic lift cut out (variant) means that the load cannot be lifted above a certain height. This height is predefined by a sensor on the lift mast and cannot be changed at a later date.

NOTE

If a load is lifted very quickly, the fork carriage and load are moved to a position approximately 15 cm above the sensor due to inertia. This deviation is already taken into consideration at the factory when determining the position of the sensor.

Free lift/main lift cut out

If the truck is frequently used for stacking at a particular height, working at this height is simplified by the automatic lift cut out. The driver can override the lift cut out by pressing the acknowledge button (1) or by pressing shift button "F" (2). If the sensor on the lift mast is passed again, the lift cut out is reactivated.

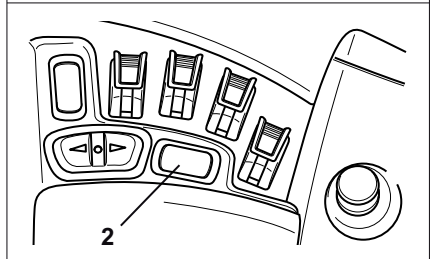
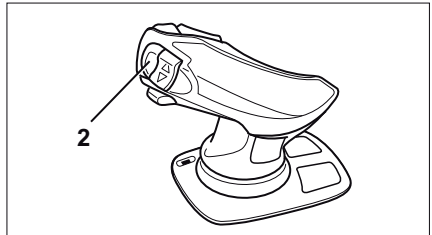
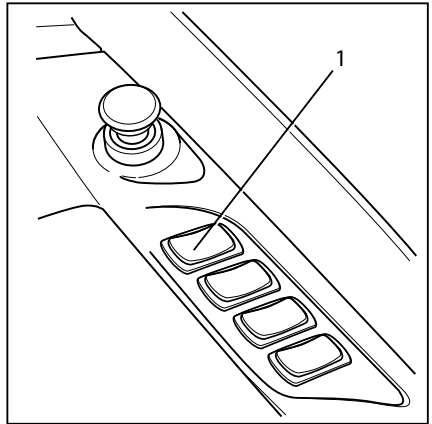
Overriding the lift cut out by pressing the acknowledge button:

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

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

- Move the joystick or the relevant fingertip switch to the zero position. Within one second press shift button "F" (2) and release it again to override the cut out.

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



Lift cut-out limit stop

If the ceiling of the building is lower than the maximum lift height of the truck, the lift cut-out limit stop prevents the lift mast from accidentally hitting the ceiling. The lift cut-out limit stop cannot be overridden by the driver.

Lifting

Reach-lower lock (variant)

The reach-lower lock prevents the load forks from being lowered between the load wheel posts whenever the reach carriage is in the retracted position. As a result, wide loads cannot accidentally come to rest on the load wheel posts during lowering and become unstable. The driver can override the cut out by pressing the acknowledge button (1) or by pressing shift button "F" (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 interlock. 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.

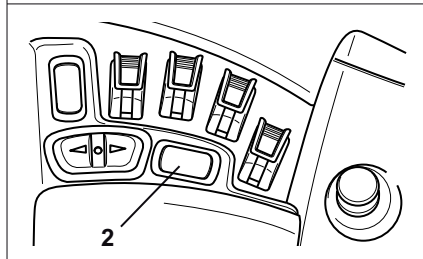
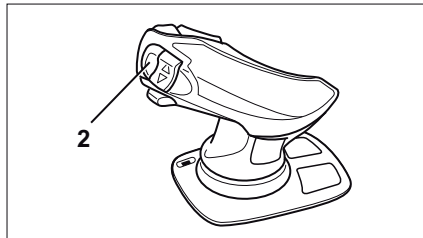
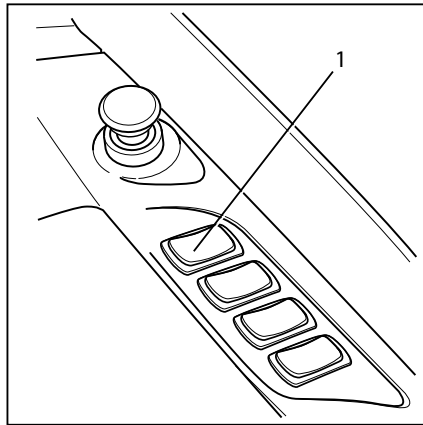
Overriding the reach and lower cut out by pressing the acknowledge button:

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

Overriding the reach and lower cut out by pressing shift button "F":

- Move the joystick or the relevant fingertip switch to the zero position. Within one second press shift button "F" (2) and release it again to override the cut out.

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



Automatic centre position (variant) ▷

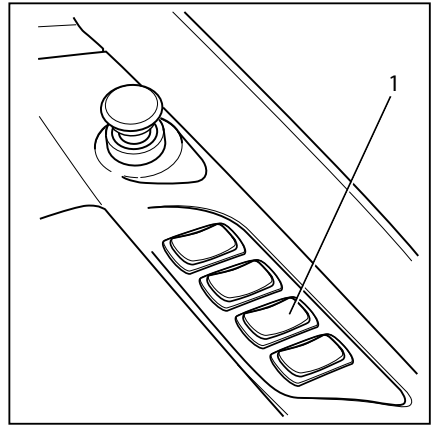
Automatic transition shift centre position (variant)

The driver can use the "automatic transition shift centre position" function to position the transition shift in the centre automatically. In order to do this, the push button must be pushed 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" push button (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.



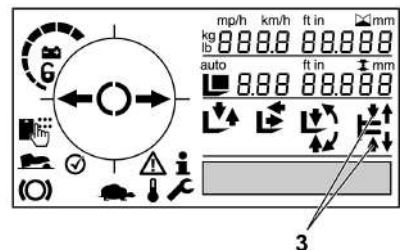
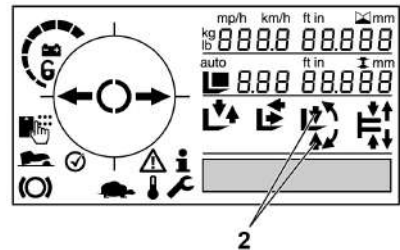
Automatic tilting centre position (variant)

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 push button 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" push button (1) on the left-hand side until the function switches off automatically.

The arrows (3) on the display and operating unit flash until the end position is reached.

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



Lifting

Lift mast versions

One of the following lift masts may be installed in the truck:

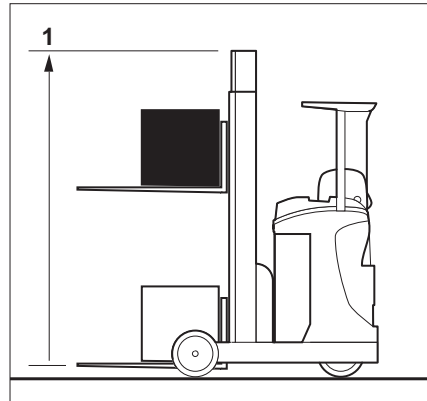
Telescopic lift mast

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.

⚠ 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.
- Note the heights of ceilings and entrances.



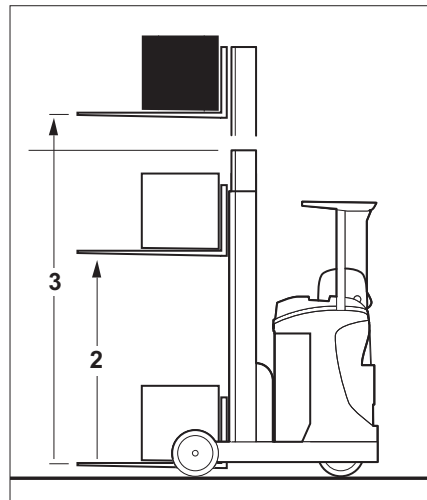
Triplex lift mast (variant)

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).

⚠ 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.
- Note the heights of ceilings and entrances.



Malfunctions in lifting mode

Incorrect extension sequence

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 your service centre.

Load chains not under tension

DANGER

Danger caused by a falling load!

- Make sure that the chain(s) does (do) not become slack when lowering the load.

Slack chains can 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.

Lifting

- 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".

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:

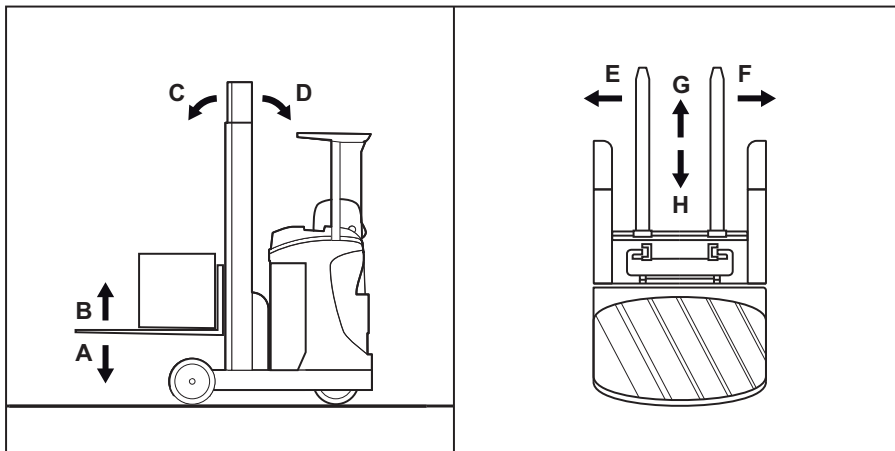
- **Joystick 4Plus**; refer to the chapter entitled "Joystick 4Plus lifting system"
- **Fingertip switch**; refer to the chapter entitled "Fingertip switch lifting system"
- The following information must be observed regardless of the equipment variant:

DANGER

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

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

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

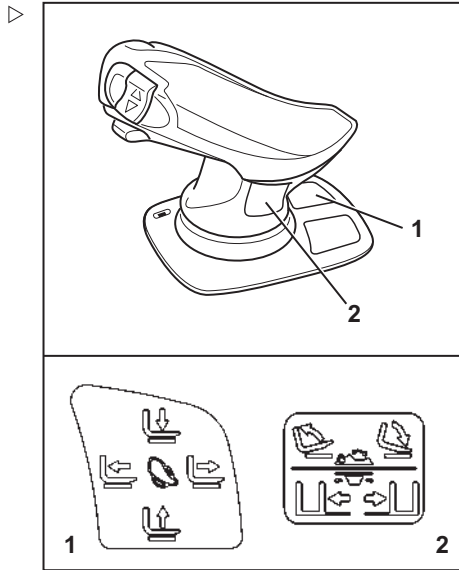
⚠ DANGER

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 handling loads", P. 5-119.
- Only operate the lifting system from the driver's seat.

Lifting

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.



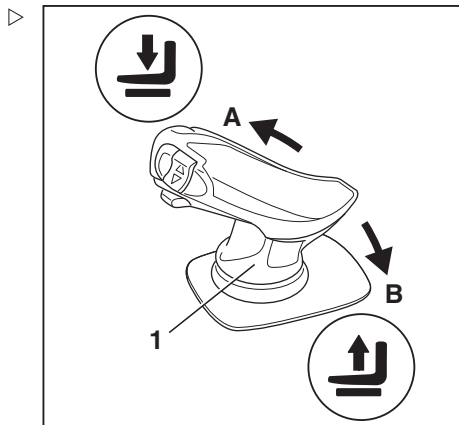
Lifting/lowering the fork carriage

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)

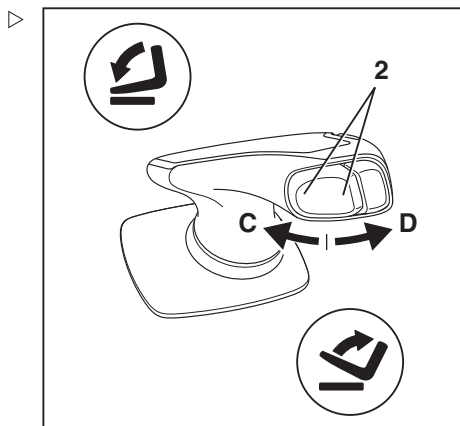
Depending on the truck equipment, either the entire lift mast is tilted or just the fork carriage (fork tilt device).

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)

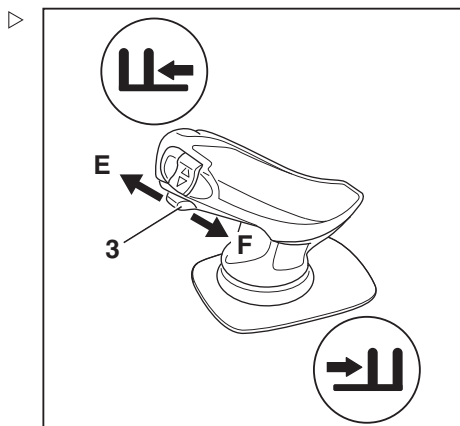
Depending on the truck equipment, either the entire lift mast is shifted to the side or just the fork carriage (fork sideshifter).

Transition shift to the left:

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

Transition shift to the right:

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



Lifting

Shifting

To extend the reach carriage:

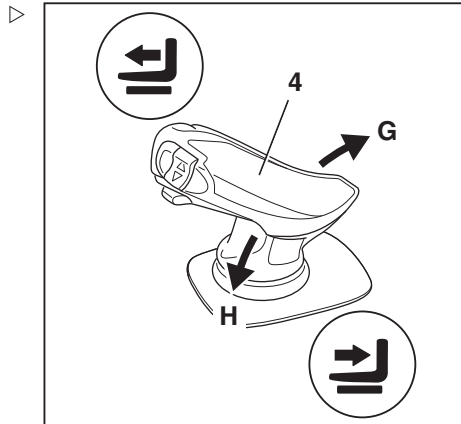
- Push the joystick (4) in the direction of "G".

To retract the reach carriage:

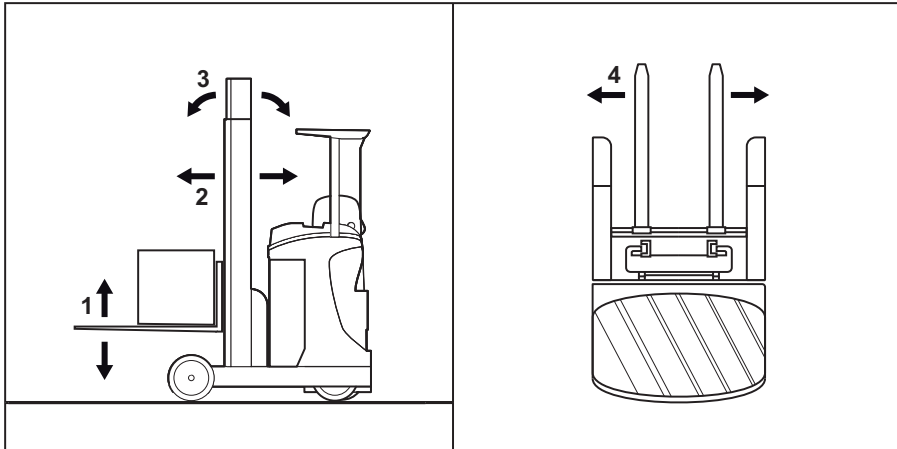
- Push the joystick (4) in the direction of "H".

 **NOTE**

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)

⚠ 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 handling loads", P. 5-119.
- Only operate the lifting system from the driver's seat.

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.

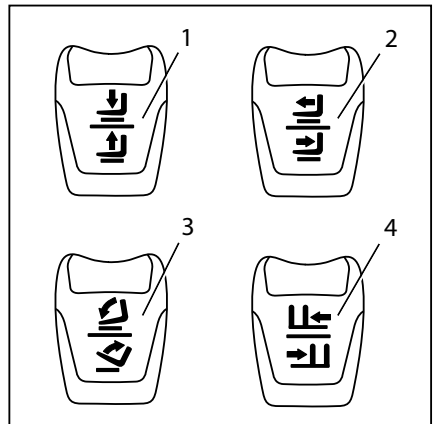
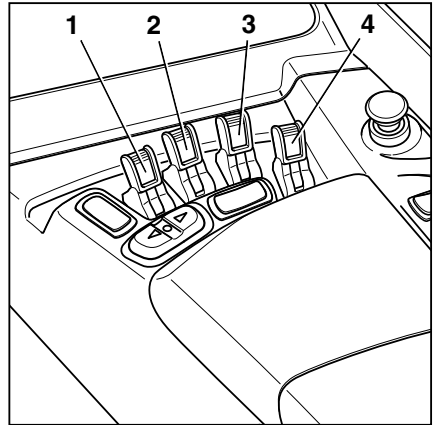
To tilt the lift mast backwards:

- 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:



Lifting

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

Transition shift to the right:

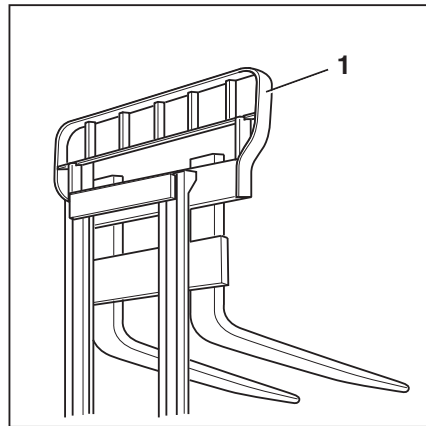
- Pull the "transition shift" operating lever (4) backwards.

NOTE

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

Load backrest (variant)

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



Changing the fork arms

DANGER

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

- Do not park the truck on 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.

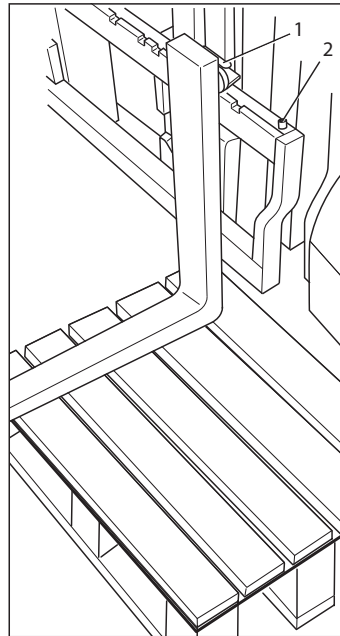
i NOTE

- *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.*

Lifting

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).

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)

⚠ 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

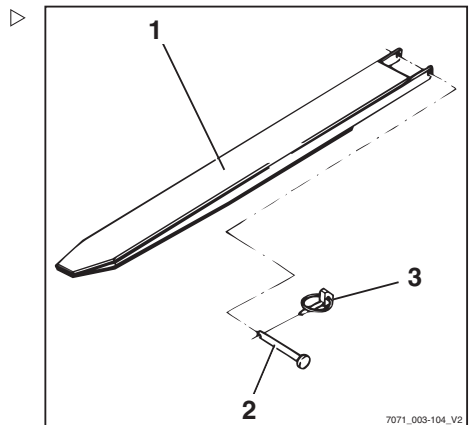
⚠ DANGER

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 lynch 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 lynch pin.
- Remove the lynch pin (3) from the securing bolt (2).



Lifting

- 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.

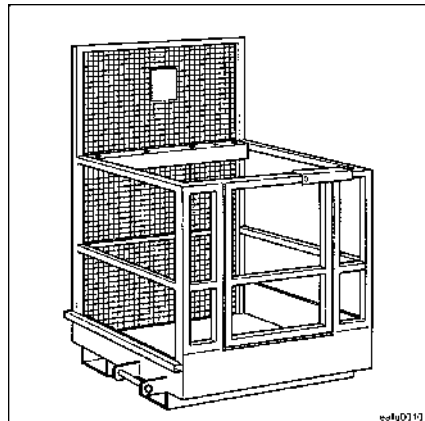
Working platforms

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!



Handling loads

Safety regulations when handling loads

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

⚠ DANGER

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

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

⚠ DANGER

Risk of accident from falling or crushing!

- Do not step onto the forks.
- Do not lift people.
- Never grab or climb on moving parts of the truck.

⚠ DANGER

Risk of accident from a falling load!

- When transporting small items, attach a load safety guard (variant) to prevent the load from falling on the driver.
- Use a closed roof covering (variant) in addition.



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".

Handling loads

⚠ 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.

⚠ 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)

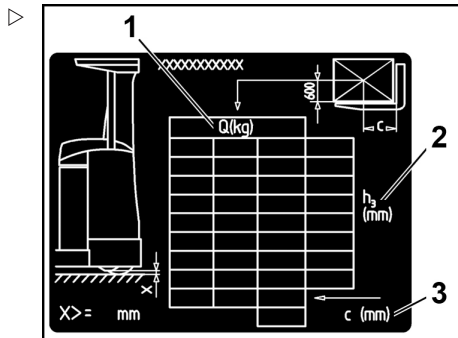
Load distance from fork back (3)

⚠ WARNING

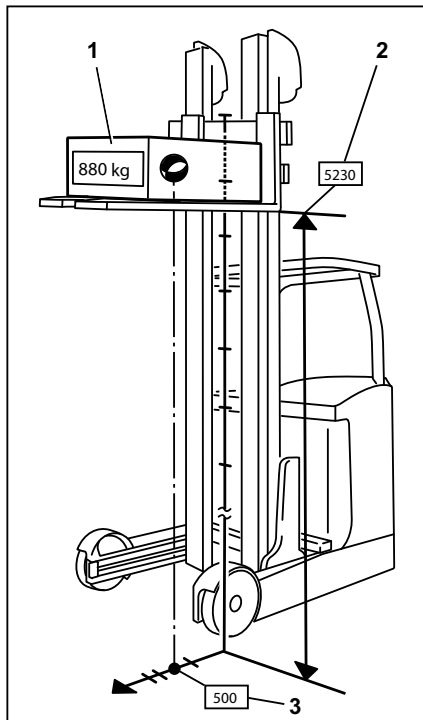
Risk of accident from the truck losing stability!

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 infor-



mation 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

Handling loads

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.

⚠ 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.

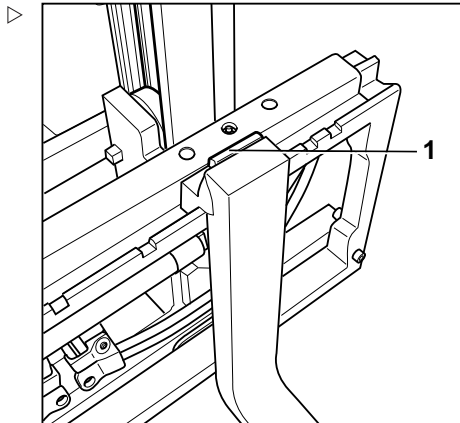
Removable roof panels must not be removed.

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.



⚠ DANGER

Risk of injury!

- Do not step on the fork.



⚠ DANGER

Risk of injury!

- Do not step under the raised forks.

⚠ DANGER

People may be injured in the danger area of the truck!

The danger area of the truck must be completely clear of all personnel, except the driver in his normal operating position. If persons fail to leave the danger area despite warnings:

- Cease work with the truck immediately.
- Secure the truck against use by unauthorised parties.



⚠ DANGER

Danger of death from falling loads!

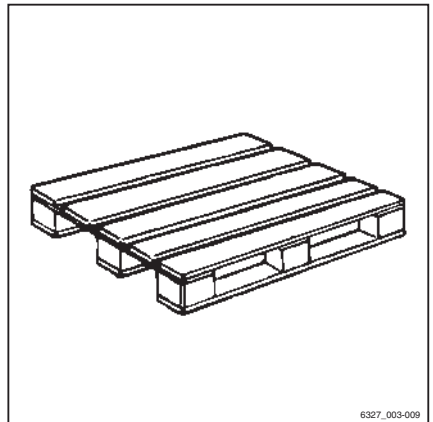
- Never walk or stand underneath suspended loads.

Transporting pallets

As a rule, loads (e.g. pallets) must be transported individually. Transporting multiple loads at the same time is only permitted:

- when instructed by the supervisor and
- when the technical requirements have been met.

The driver must ensure proper condition of the load. Only safely and carefully positioned loads may be transported.



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Handling loads

Transporting swinging loads

Before transporting swinging loads, consult the national regulatory authorities (in Germany, the employer's liability insurance associations).

National regulations may place restrictions on these operations. Contact the relevant authorities.

⚠ DANGER

Swinging loads can result in the following risks:

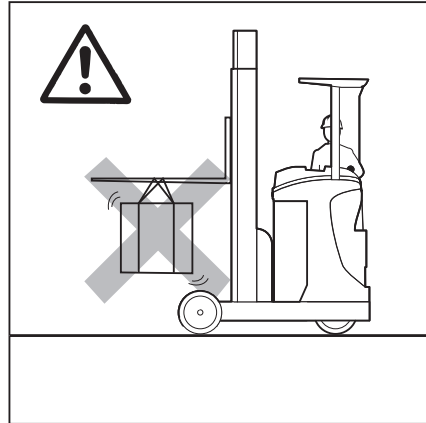
- Impaired braking and steering movement
- Tipping over the load wheels or drive wheels
- Tipping the truck at right angles to the drive direction
- Risk of crushing of guide persons
- Reduced visibility

⚠ DANGER

Loss of stability due to slipped, unstable or, in particular, hanging loads!

The following information should be noted when transporting hanging 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.
- Take particular care to ensure that there is no one in the drive direction in the driving lane.
- Ensure that swinging loads do not put people at risk.
- When transporting hanging loads, suitable devices (e.g. guy wires or hand rails) must be made available and used by guide persons.



⚠ DANGER**Risk of accident!**

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

Never drive on upward or downward gradients with a hanging load!

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

Picking up a load**i NOTE**

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

⚠ DANGER

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

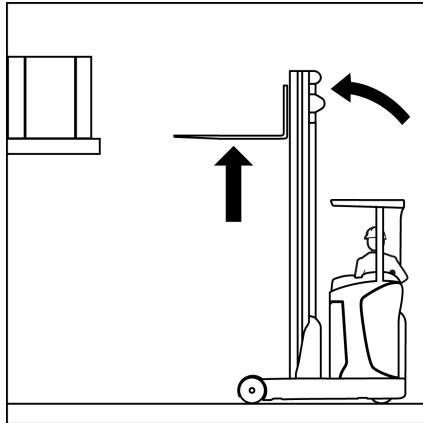
- Never walk or stand underneath suspended loads or raised fork arms.
 - Never exceed the maximum load indicated on the capacity rating plate. Otherwise stability cannot be guaranteed.
-

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 specified aisle width is not reduced by protruding parts.

- Approach the racking carefully, brake gently and stop just in front of the racking.

Handling loads

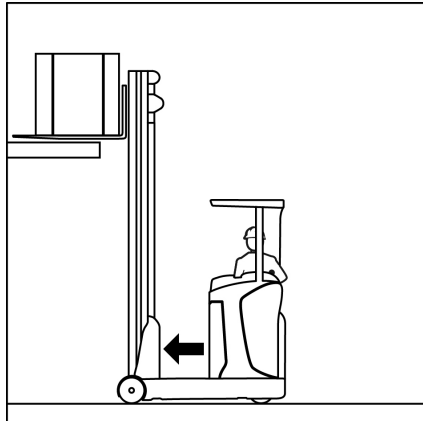
- Tilt the fork arms or lift mast until the fork arms are horizontal. ▷
- Raise the fork carriage to a position for clear entry into the pallet or load.
- Release the brake.
- Drive up to the racking until the truck chassis is as close as possible.
- Brake.



- 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.

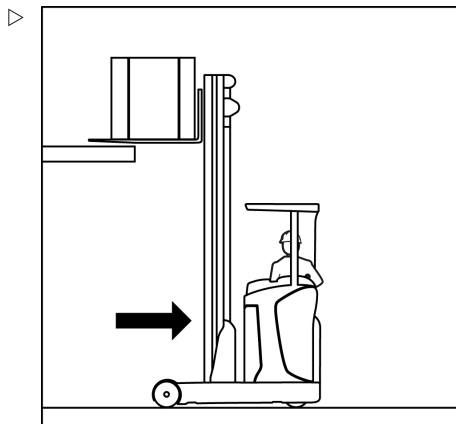
- Slowly raise the fork carriage until the load is lifted clear of the racking.
- Tilt the fork tips or lift mast to the drive side only as far as necessary to stabilise the load.



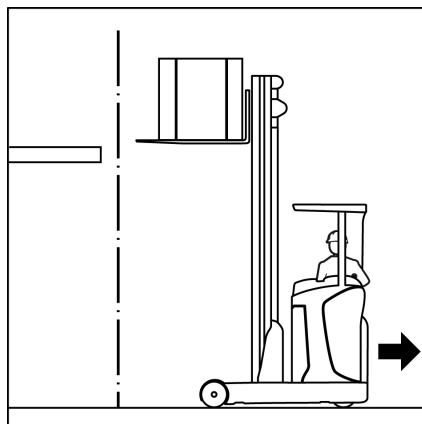
- Retract the reach carriage fully.
- Release the brake.

⚠ DANGER**Risk of accident!**

- Beware of any people in the danger area.

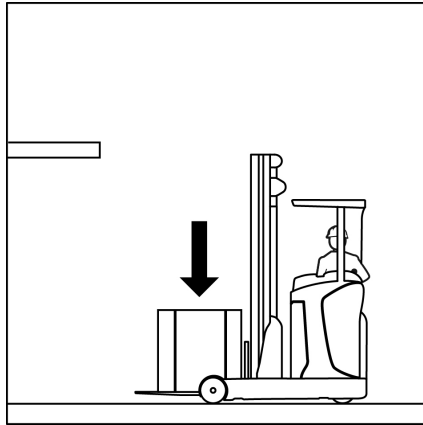


- Ensure that the roadway on the drive side is clear. Move backwards carefully and slowly until the load is clear of the racking.
- Brake.



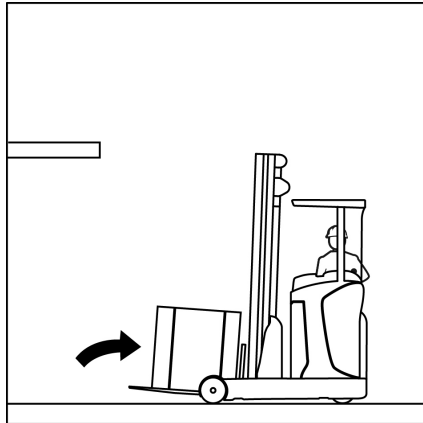
Handling loads

- ▷ – 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

NOTE

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

⚠ DANGER

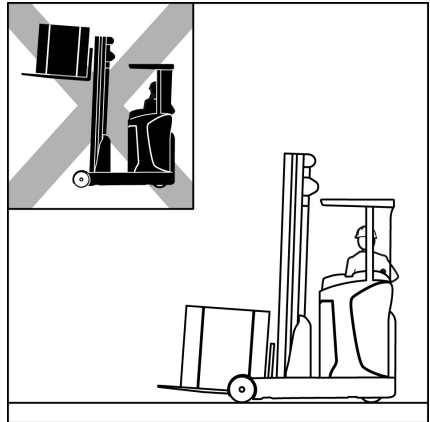
The higher a load is lifted, the less stable it becomes. The truck can tip over or the load can fall, increasing the risk of accident!

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.

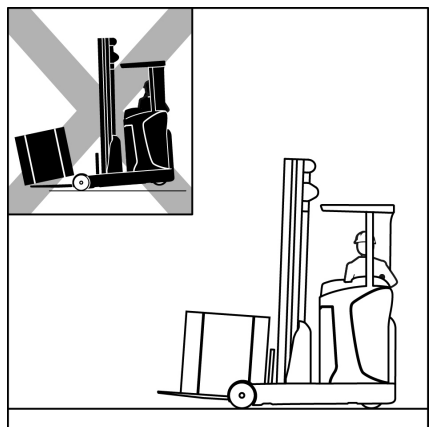
i NOTE

Observe the information in the chapter entitled "Steering".

- Always accelerate and brake gently.

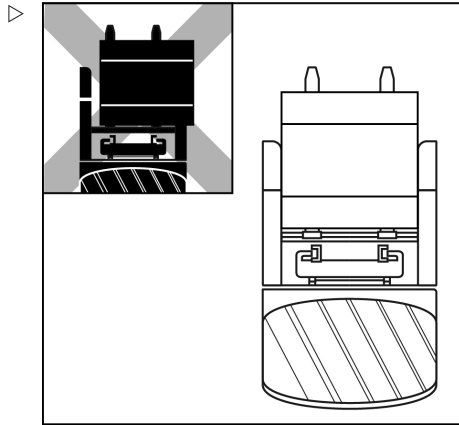
i NOTE

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



Handling loads

- 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

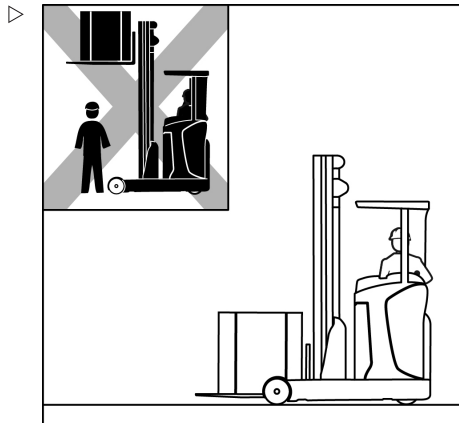
⚠ DANGER

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.

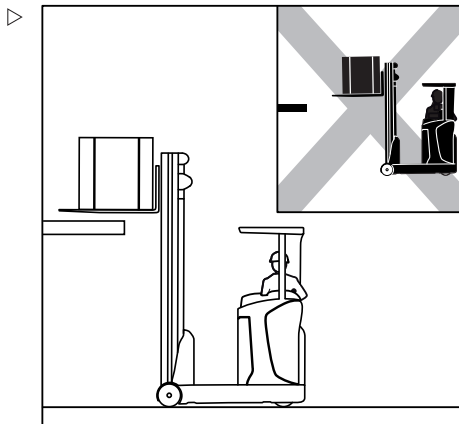
- When removing from stock, move the truck far enough back so that the load and the fork can be lowered freely.

i NOTE

If the truck is to be used to store a raised load with the lift mast tilted forwards, e.g. in a rack with sloping racking channels, an additional

load capacity diagram must be created as the stability will be affected.

- *Contact the authorised service centre on this matter.*
- 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.



Handling loads

Driving on upward and downward gradients

⚠ 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.

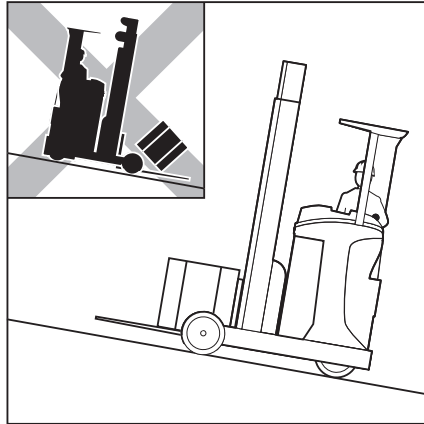
Drive at a reduced speed on downward gradients.

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".



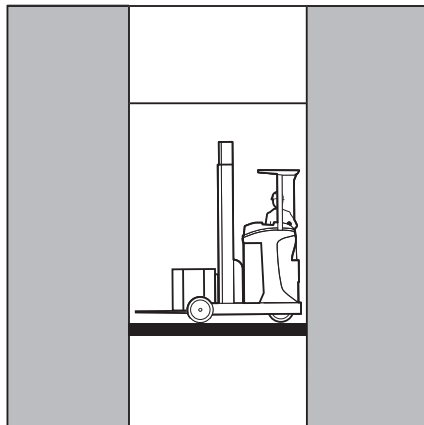
Driving onto lifts

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").

⚠ 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)

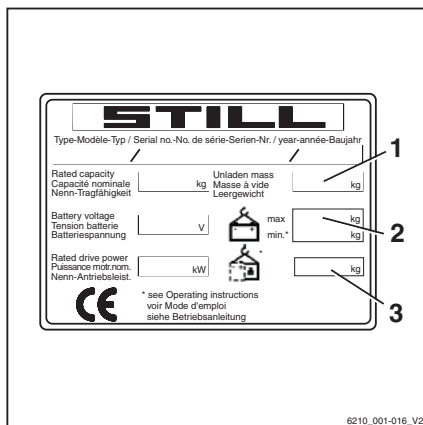
+ Attachment net weight (variant)

+ 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.



Working with attachments

Working with attachments

Fitting attachments

If the truck is equipped with an integrated attachment (variant) at the factory, the specifications in the STILL operating instructions for integrated attachments must be observed.

If attachments are fitted at the place of use, the specifications in the operating instructions of the attachment manufacturer must be observed.

If an attachment is not delivered together with the forklift truck, the specifications and operating instructions of the attachment manufacturer must be observed.

Before initial commissioning, the function of the attachment and the visibility from the driver's position with and without a load must be checked by a competent person. If the visibility is deemed insufficient, visual aids such as mirrors, a camera/monitor system etc. must be used.

**NOTE**

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

⚠ 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.

⚠ DANGER**There is risk to life caused by a falling load!**

Attachments that hold the load by exerting pressure on it (e.g. clamps) must be controlled additionally by a second operating function (lock) that is actuated to prevent an unintentional release of the load.

If such an attachment is retrofitted, a second operating function for actuation must also be retrofitted.

- Make sure that the additional clamp locking mechanism function is available.

⚠ DANGER**There is risk to life caused by a falling load!**

During installation of a clamp with integral sideshift, ensure that the clamp does not open when the sideshift is actuated.

- Notify your authorised service centre before installation.
- Never grab or climb on moving parts of the truck.

Hydraulic connection

- Before installing the attachment, release the pressure from the hydraulic system.

⚠ CAUTION

Risk of damage to components!

Open connections of plug connectors can become dirty. The plug connectors can become stiff and dirt can enter the hydraulic system.

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

Mounting attachments

Mounting an attachment and connecting the energy supply for an attachment must only be performed by competent persons in accordance with the information provided by the manufacturer and supplier of the attachment. After each installation, the attachment must be checked for correct function prior to initial commissioning.

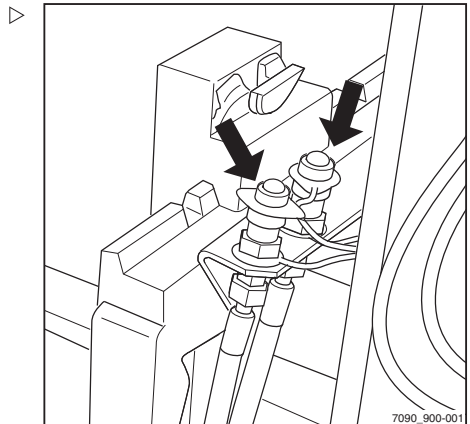
i NOTE

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

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".

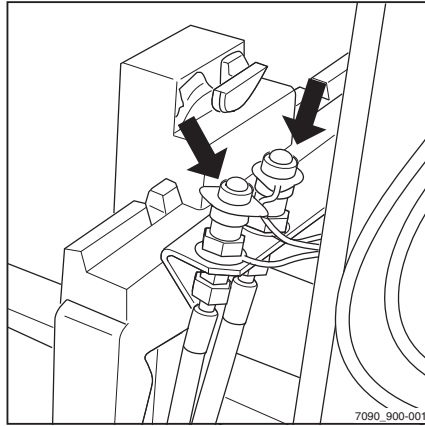


Working with attachments

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.

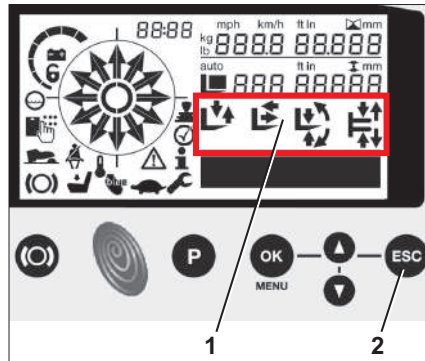
Prior to assembling attachments, the pressure must be released from the plug connectors (arrows).



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 will flash.



⚠ 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)"

Working with attachments

⚠ 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.

i NOTE

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.

i NOTE

All the attachments described fall into the category of equipment variants. An exact description of the respective movements/actions of the attachment fitted can be found in the respective operating instructions.

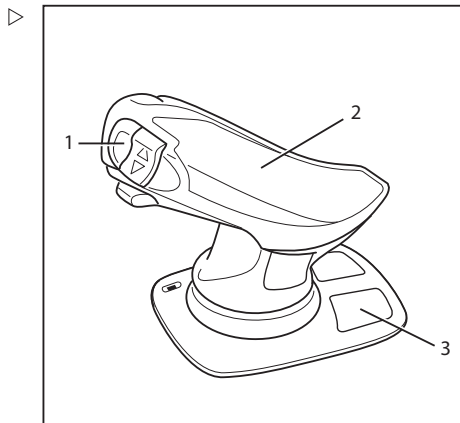
Controlling attachments (variant) using the joystick 4Plus (5th/6th hydraulic function)

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.

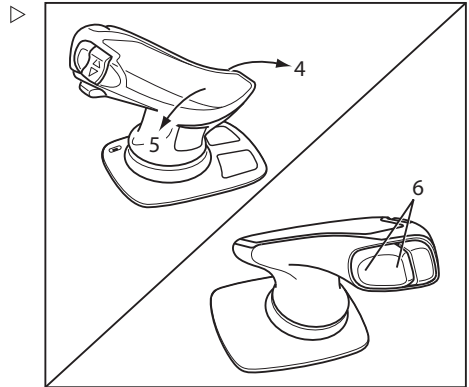
i NOTE

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

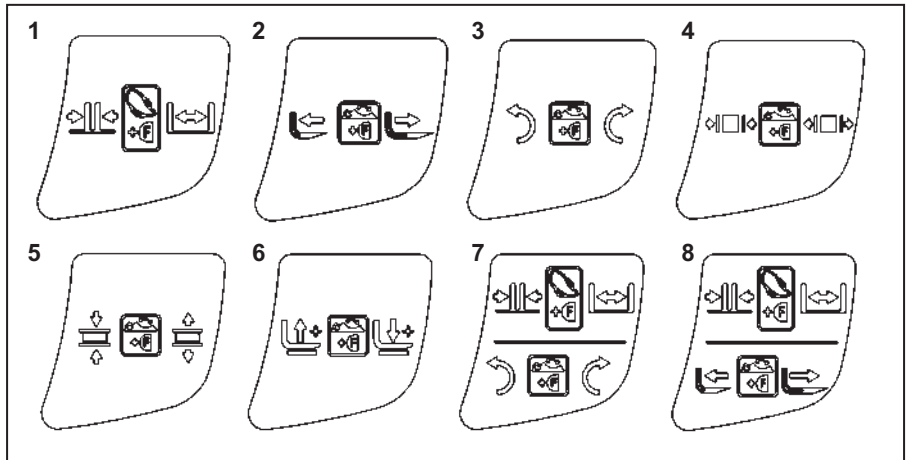
i NOTE

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



Working with attachments

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
7	Joystick + shift button "F"	Fork prong positioner: close/open
	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.

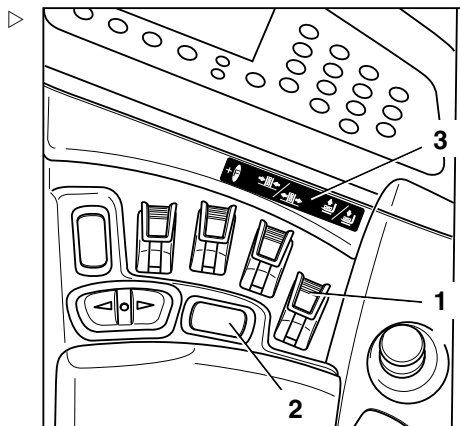
Controlling attachments (variant with the fingertip (5th/6th hydraulic function))

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.

NOTE

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

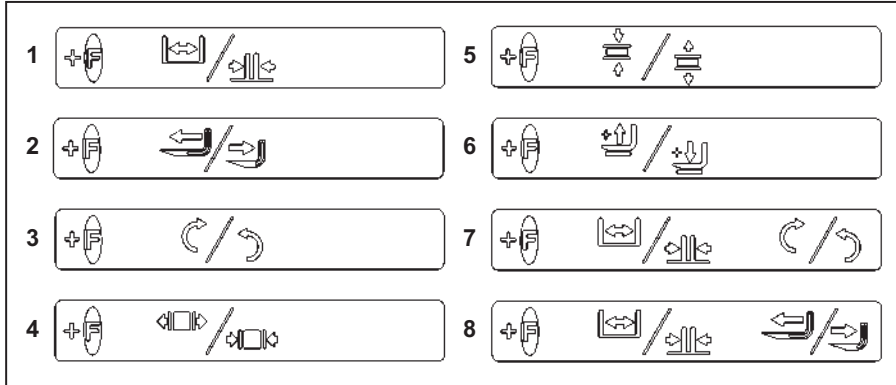
NOTE

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

Working with attachments

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

Overview of the pictograms



– Note the following attachment functions and pictograms!

No.	Function of the attachment
1	Fork prong positioner: close/open
2	Fork positioner: forwards/backwards
3	Rotator: left/right
4	Clamp: close/open
5	Load retainer: close/open
6	Additional fork carriage: lift/lower
7	Fork prong positioner: close/open
	Rotator: left/right
8	Fork prong positioner: close/open
	Turn to the left/right

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.

⚠ DANGER

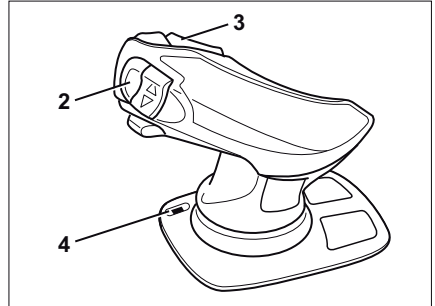
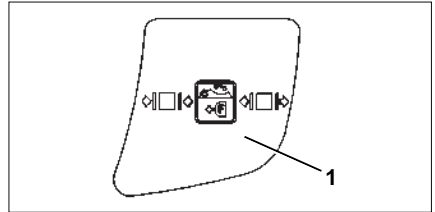
There is a risk of fatal injury from falling loads if the correct function of the clamp locking mechanism is not guaranteed!

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.

Working with attachments

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.



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

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.

⚠ DANGER

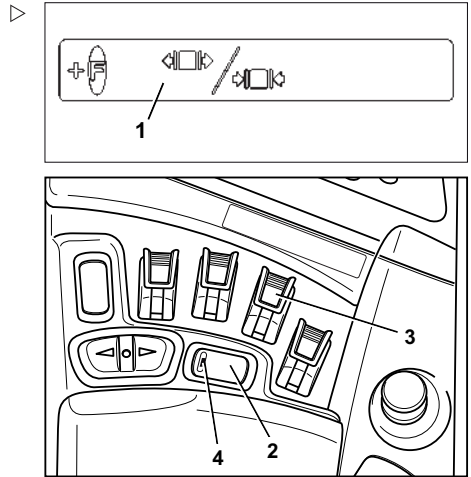
There is a risk of fatal injury from falling loads if the correct function of the clamp locking mechanism is not guaranteed!

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 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.

Working with attachments

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.

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.

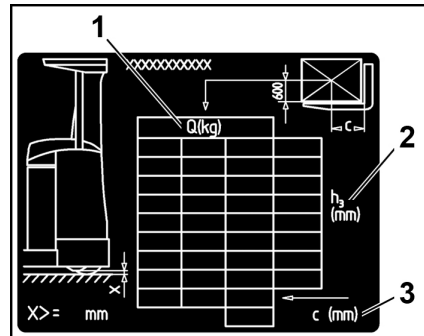
WARNING

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)



Operating auxiliary equipment

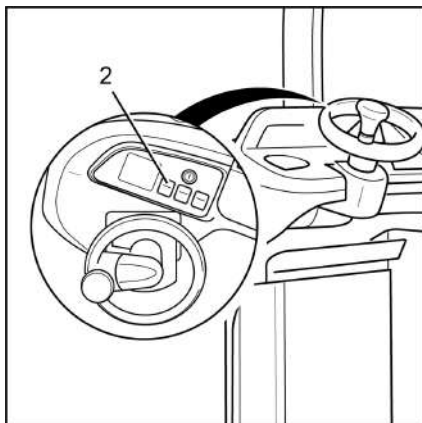
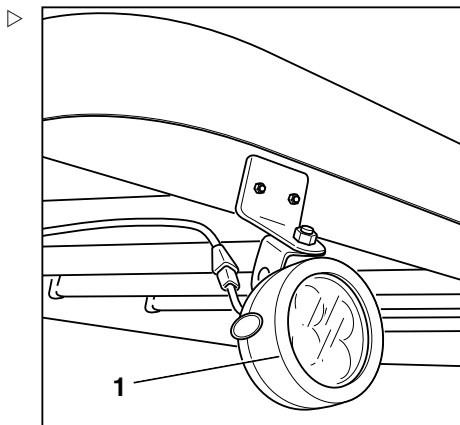
Switching the working spotlights (variant) on and off

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.

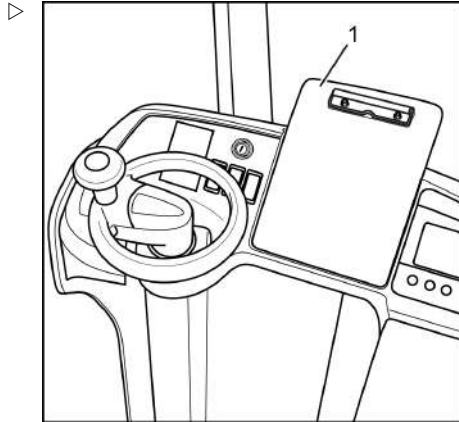
- Push the button (2) again to switch the working spotlights off again.



Operating auxiliary equipment

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.



FleetManager (variant)

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

Accident recorder (variant)

The accident recorder is an equipment variant to the FleetManager (variant), which is installed in the truck's acceleration sensor. The acceleration sensor records data in the event of an accident. This data can be electronically read out and evaluated. For further information, contact your STILL service centre.

Active Load Stabilisation ALS (variant)

⚠ 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.

⚠ 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.

Operating auxiliary equipment

Camera/monitor system (variant)

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.

Load measurement

NOTE

Calibration of the load measurement system must be carried out 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 an accuracy of +/- 10% deviation.

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

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, 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.

NOTE

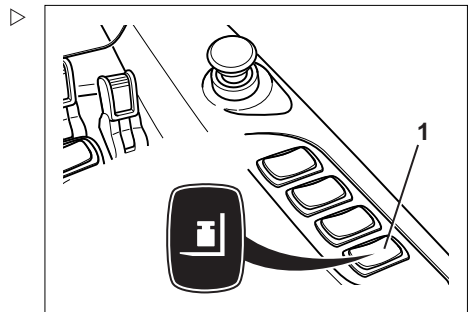
The displayed value of the load measurement is invalid if the fork carriage is positioned exactly between the free lift height and main lift height during the measurement. In this case, the measurement must be repeated at a different position. In addition, the load must be lifted completely off the ground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

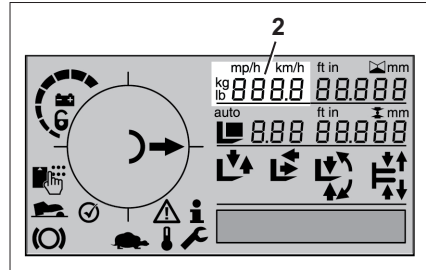
The measurement is performed once the load is in the inactive position.

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.



Battery change frame (variant)

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.



Battery change frame (variant)

General

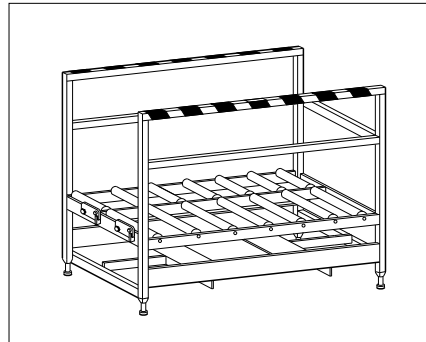
The battery rack is equipped with two adjacent roller channels.

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.

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.



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

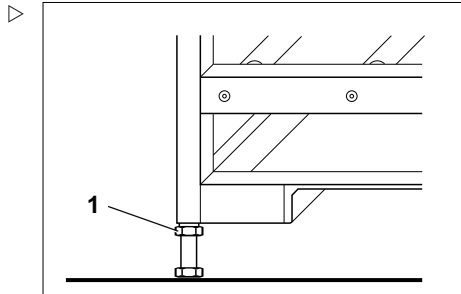
The battery rack for the truck is intended for mobile use only. For mobile use, the empty battery rack is moved to the relevant truck. If

Battery change frame (variant)

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

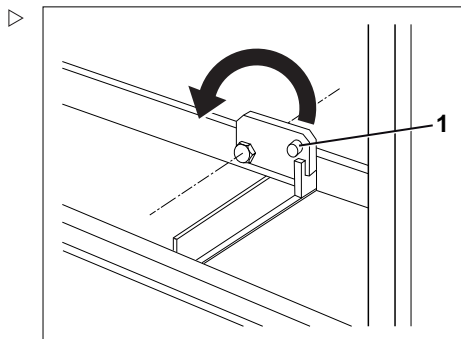
⚠ DANGER

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 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 safely move around the area. 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.

Lift height preselector (variant)

⚠ 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 (variant)

General

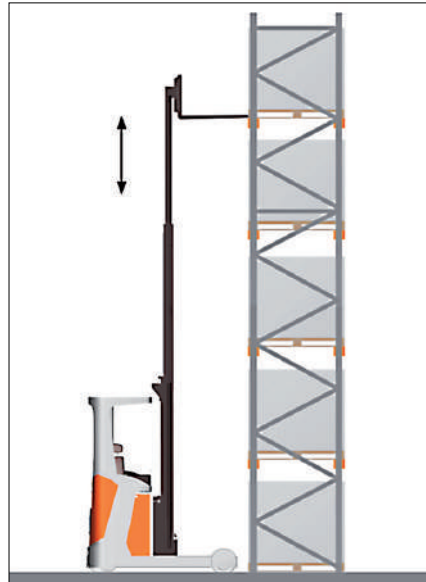
The lift height preselector supports the user when placing loads into stock/removing loads from stock. There are 160 programmable levels grouped into eight areas (A-H), each with 20 levels. After selecting one of these levels, the user can read the following in the display:

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

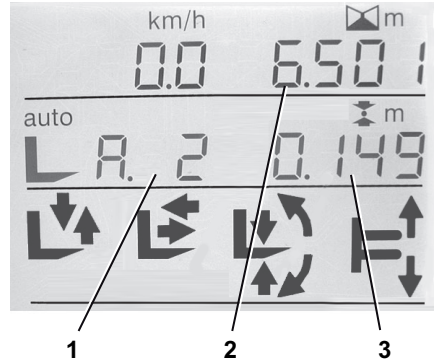


NOTE

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!



Lift height preselector (variant)



Definition of terms

Level

One target height can be assigned to each level. Valid levels can be reached semi-automatically.

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.

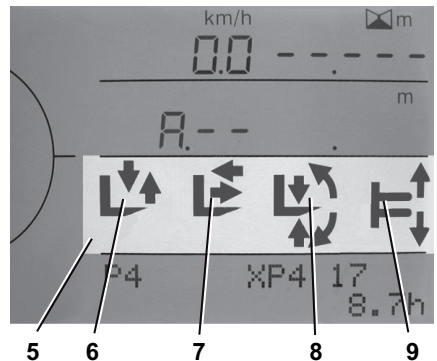
Assistant

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)

- ▷
- 1 Level 1-20
 - 2 Area A-H



Lift height preselector (variant)

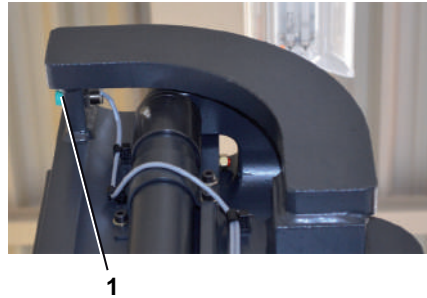
Pallet free lift

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 (1) located on the upper part of the lift mast by lifting is known as referencing. This process sets the reference value for the height position.

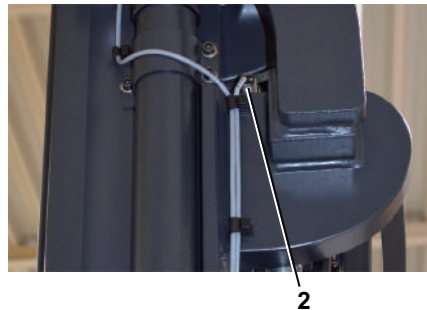
The "Fork in free lift" switch (2) determines whether the load support is in free lift after switching on. If the load support is not in free lift, a reference drive is required. In this process, the load support is lowered until it is below the reference switch, then raised again.



Reference height

The reference height is the distance from the upper edge of the load support to the floor when switching the reference switch (1). 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.

Lift height preselector (variant)

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

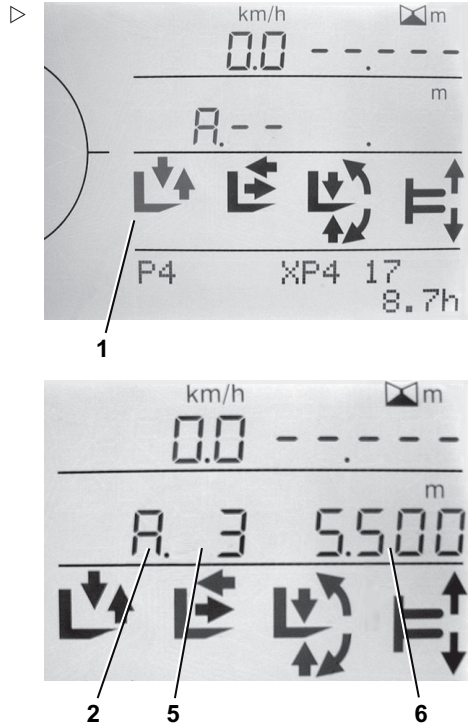
If the load support is tilted there is a risk of collision with the pallet or racking!

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 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.

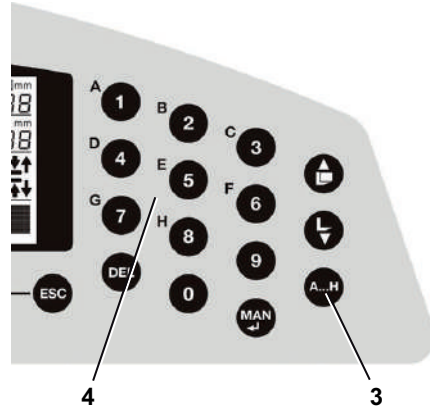


Lift height preselector (variant)

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.

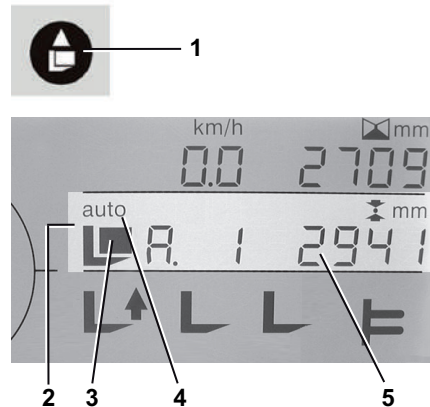


Example: Placing into stock in fully automatic mode

NOTE

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).

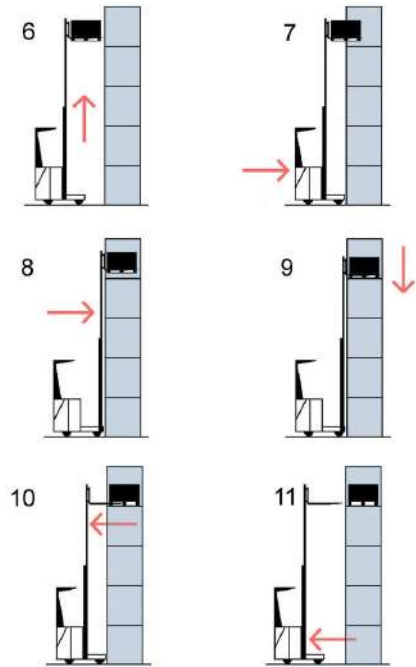


CAUTION

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).



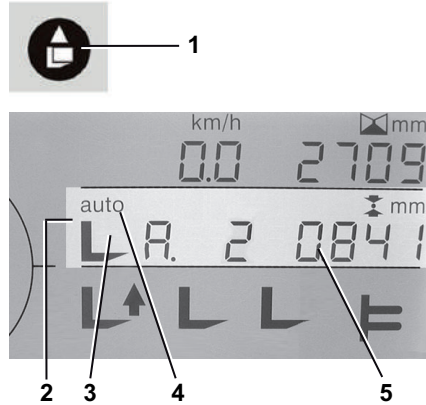
Lift height preselector (variant)

Example: Removing from stock in fully automatic mode ▷

i NOTE

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).



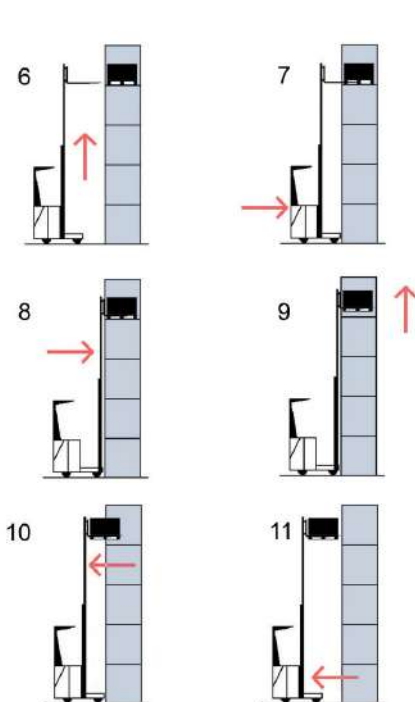
⚠ CAUTION

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".

NOTE

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.

Lift height preselector (variant)

This can only be done using the service software.

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

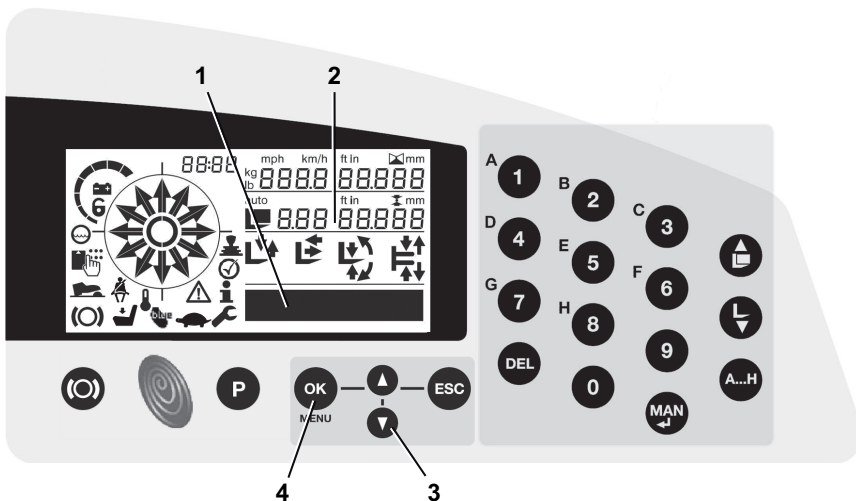
- Pallet free lift height
- Pallet free lowering height
- Accuracy and speed of pallet free lift and pallet free lowering
- Accuracy and speed of homing

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).

Lift height preselector (variant)

Entering and saving lift heights for height preselection

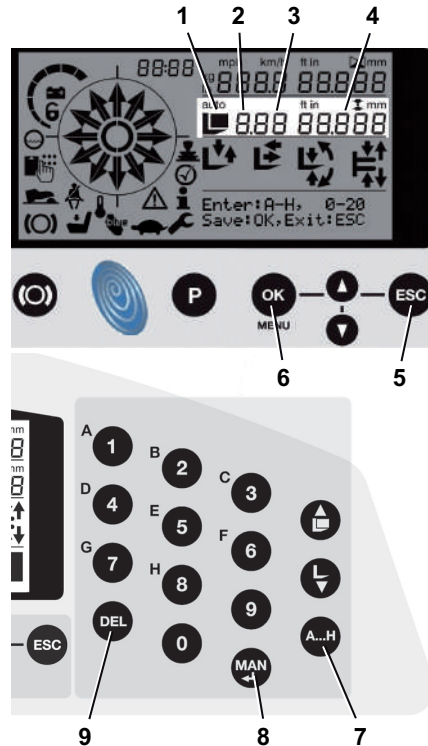
The programmable lift heights are entered using the enter keys on the control panel. The result of each entry is displayed in the display field (1).

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)

NOTE

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

Cab operation (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

Cab operation (variant)

Opening the cab door

⚠ 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.

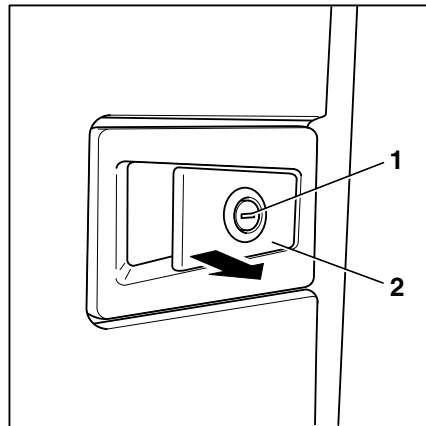
- Always close the cab door before driving off, and keep it closed when driving.

Opening the cabin door from the outside

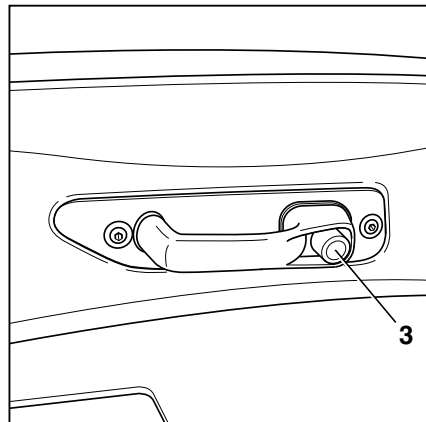
- Insert the key in the door lock (1), unlock and remove the key. ▷
- Pull the door handle (2) and release the door lock.
- Open the cab door by pulling it outwards.

i NOTE

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

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.

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.

Emergency exit window in the cab

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.

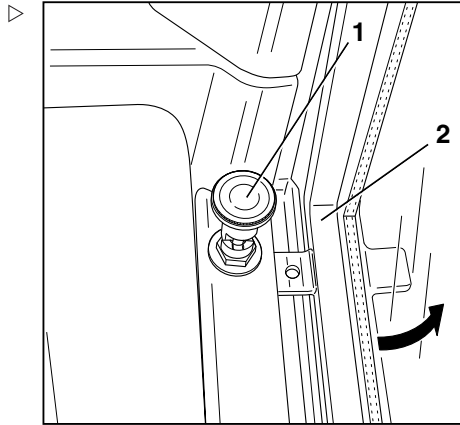
If the window has been opened, make sure that the window is latched securely in the engaged position before driving off again.

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.

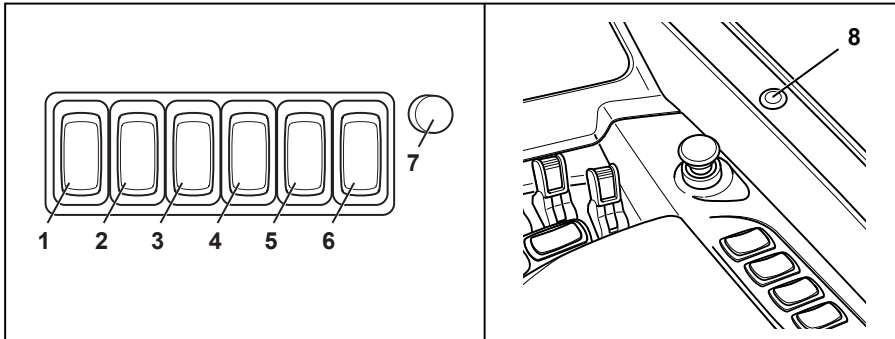
- Switch off the truck.
- To make it easier to climb out, fold down the driver's seat backrest.

Cab operation (variant)

- 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.



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 to 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

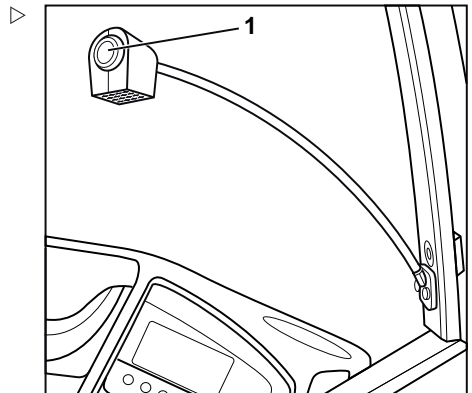
No.	Operating device	Function
1	Heating system rocker switch (door), 2-stage	Selection of two heating levels for the warm air heating system in the door
2	Ventilation fan rocker switch, 2-stage	Selection of two blower speeds
3	Heating system rocker switch (footwell), 2-stage	Selection of two heating 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 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.



Cab operation (variant)

Heating system in the cab (variant)

Switching on the blower and heating system

**⚠ DANGER**

There is a risk of poisoning if heavily polluted surrounding air is aspirated into the closed cab!

The heater must not be operated in the vicinity of storage areas or the like, in which fuel vapours or fine dust (e.g. coal, wood or grain dust) can build up.

**⚠ DANGER**

There is a risk of explosion due to gases expanding or igniting as a result of heat.

- Do not expose spray cans or gas cartridges to the flow of hot air.

**⚠ 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.

**⚠ 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 desired heating function by actuating the relevant rocker switch; see the chapter entitled "Cab operating devices".

Switching off the heating system and blower



⚠ 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 desired heating function by actuating the relevant rocker switch; see the chapter entitled "Cab operating devices".

Changing fuses



⚠ 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.

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 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.

Cold store application

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.
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.

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 (-42°C). This means that 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 of 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 of the cold store.

CAUTION

Depending on the temperature, the charging time of the battery may increase and the available capacity may be reduced.

The lower the temperature at which the battery is used, the longer the charging time and the smaller 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%.

Description of the cold store equipment

Cold store equipment components

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 low-temperature 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

Operating the display and operating unit

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.

Warming up the truck

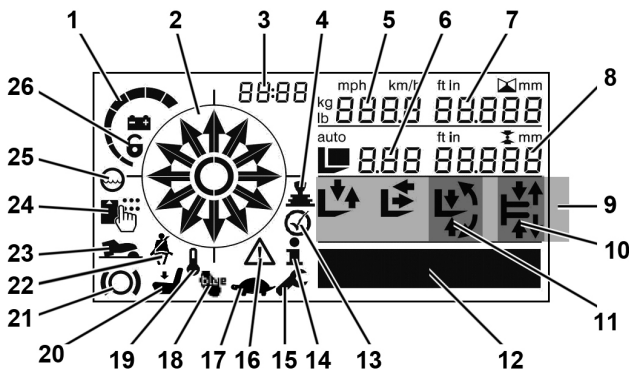
The industrial truck must be warmed up for approx. 5 minutes before it can be put into normal operation in the cold store. To warm the truck up, all possible movements must be carried out several times. This warm-up phase is necessary in order for the oil temperature to increase. Proportional valves 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.

Operating the display and operating unit

Operating status displays on the display and operating unit



Item no.	Display	Comment
1	Battery charging state	-
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	Only relevant for the "lift height preselector" variant
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	-

Blue-Q efficiency mode

Item no.	Display	Comment
25	Battery water level display too low (variant)	-
26	Battery not locked	-

Blue-Q efficiency mode

Functional description

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

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

Blue-Q has no influence on:

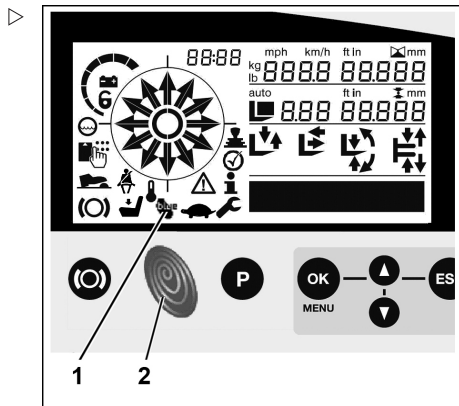
- Maximum speed
- Climbing capability
- Tractive force
- Braking characteristics

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.



Fault displays

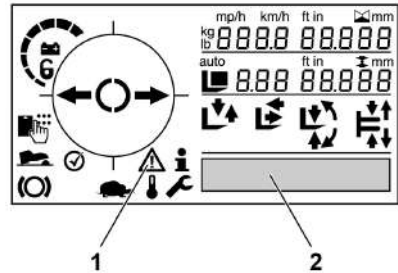
View on the display and operating unit

Error messages

Malfunctions are indicated by error numbers on the display (2). In addition to the error message, symbol (1) lights up.

NOTE

If the error cannot be rectified by switching on and off or by operating the truck correctly, please call the authorised service centre.



Operating in special operating situations

Transportation

CAUTION

Risk of material damage from overloading!

If the truck is driven onto a means of transport, the load capacity of the means of transport, the ramps and loading bridges must be greater than the total actual weight of the truck. Components can be permanently deformed or damaged due to overloading.

- Determine the total actual weight of the truck.
- Only load the truck if the load capacity of the means of transport, the ramps and loading bridges is greater than the total actual weight of the truck.

Operating in special operating situations

Determining the total actual weight

- Park the truck securely; see the chapter entitled "Parking the truck securely".
- Determine the unit weights by reading the truck nameplate and, if necessary, the attachment (variant) nameplate.
- Add the determined unit weights to obtain the total actual weight of the truck:

Tare weight (1)

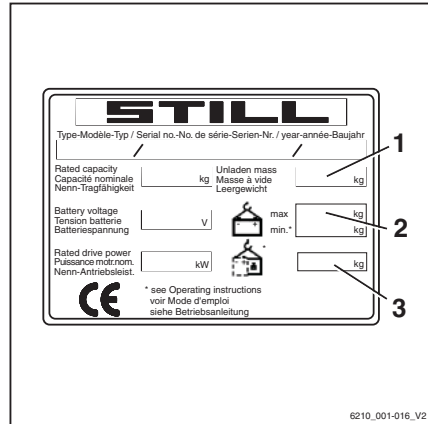
+ Max. permissible battery weight (2)

+ Ballast weight (variant) (3)

+ Attachment net weight (variant)

+ 100 kg allowance for driver

= Total actual weight



⚠ 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 it 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 down the truck

⚠ CAUTION

Abrasive lashing straps can rub against the surface of the truck and cause damage.

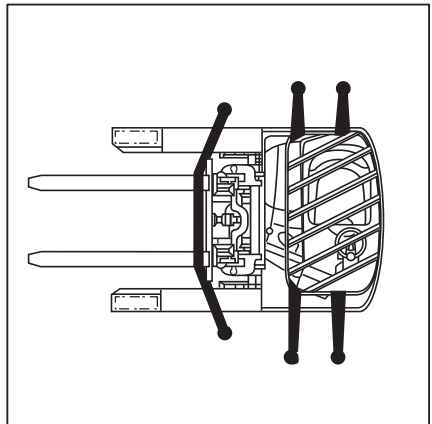
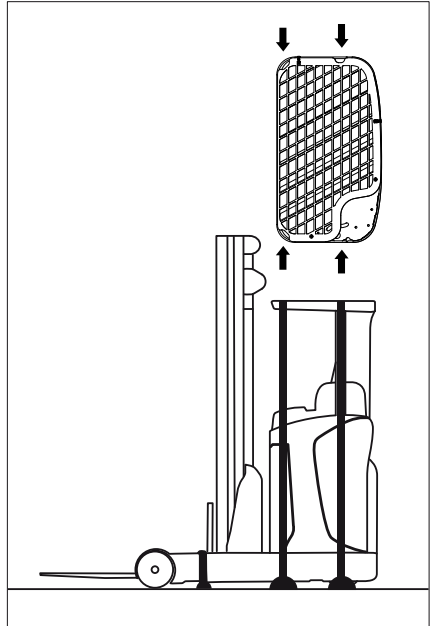
- Position slip-resistant pads underneath the lifting points (3) (e.g. rubber mats or foam).

⚠ DANGER

The load may slip if the lashing straps slide off!

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; see the chapter entitled "Parking the truck securely".
- Disassemble the overhead guard grille and roof panel and prevent these components from being damaged
- Attach lashing straps according to the illustration and lash the truck securely.
- After the truck has been transported and the lashing ropes have been removed, reassemble the overhead guard grille and roof panel



Operating in special operating situations

Towing

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.
-

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.

Towing with operational steering

⚠ 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.

⚠ 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

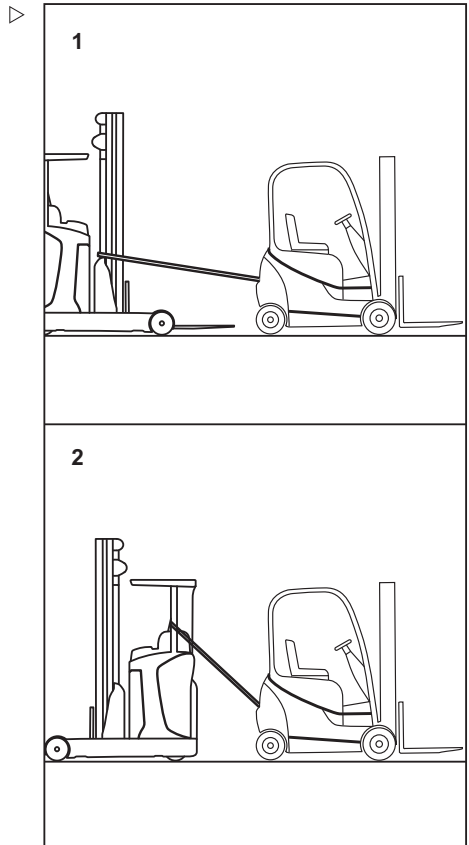
- Wind around lift mast (1).

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,



Operating in special operating situations

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.

⚠ CAUTION

This emergency steering pinion may only be used when the battery male connector is disconnected.

Crane loading

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 total actual weight

- Park the truck securely; see ⇒ Chapter "Parking the truck securely", P. 5-220.
- Determine the unit weights by reading the truck nameplate and, if necessary, the attachment (variant) nameplate.
- 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)
 - = Total actual weight



STILL			
Type-Modèle-Typ / Serial no.-No. de série-Serien-Nr. / year-année-Baujahr			
Rated capacity Capacité nominale Nenn-Tragfähigkeit	kg	Unladen mass Masse à vide Leergewicht	kg
Battery voltage Tension batterie Batteriespannung	V	max. min.*	kg kg
Rated drive power Puissance mot. nom. Nenn-Antriebsleist.	kW		kg
CE		* see Operating instructions voir Mode d'emploi siehe Betriebsanleitung	

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Hooking on the lifting straps

⚠ 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.

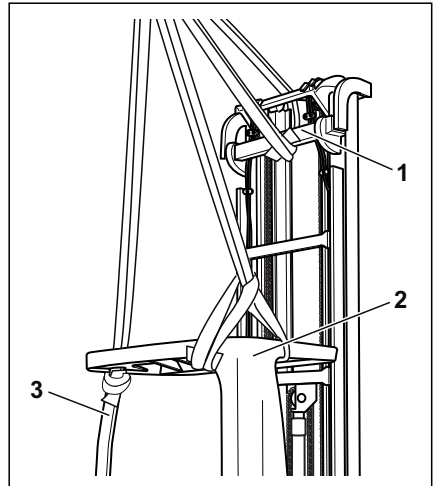
⚠ DANGER

There is a risk of being hit if the hoists and harnesses fail and cause the truck to fall, with potentially fatal consequences!

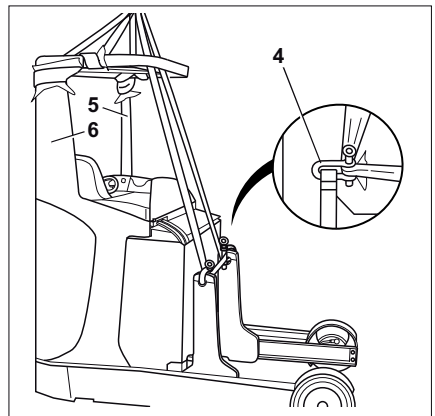
- Only use hoists and harnesses with sufficient load capacity for the total actual weight of the truck.
 - Only use the truck's designated lifting points.
 - Make sure that harness parts such as hooks, shackles, straps and similar items are only used in the indicated load direction.
 - The harnesses must not be damaged by truck parts. Use suitable edge protection.
-
- 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 with a lift mast



Hooking on the lifting straps to a truck without a lift mast

Operating in special operating situations

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 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.

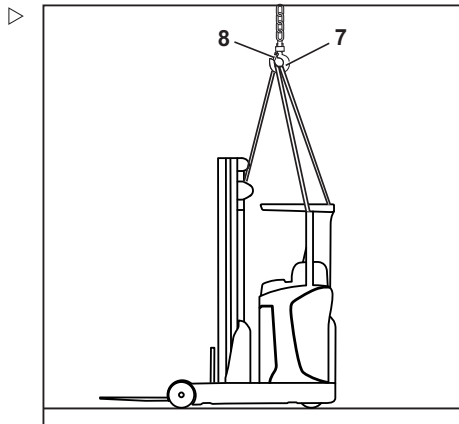
- Connect the lifting straps to the lifting eye and insert the safety device (8).

⚠ 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



⚠ 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.

Procedure in emergencies

Emergency shutdown

⚠ 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.

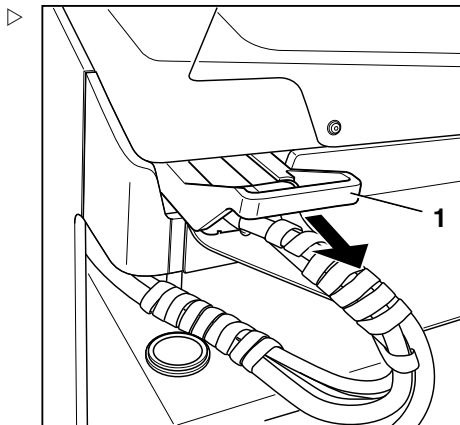
This safety system must only be used in an emergency or to safely park the truck.

⚠ 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



Procedure in emergencies

connector is disconnected.

- Do not disconnect the battery male connector while the truck is switched on except in the case of an emergency.

⚠ 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".

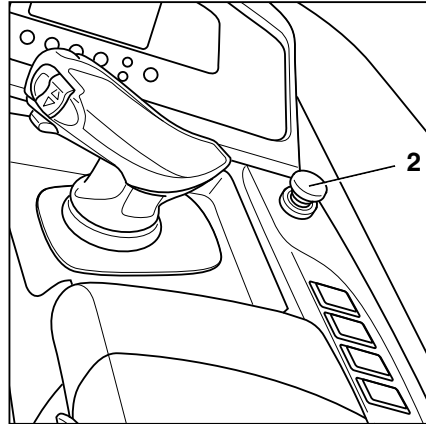
None of the truck functions are now available.

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

⚠ DANGER

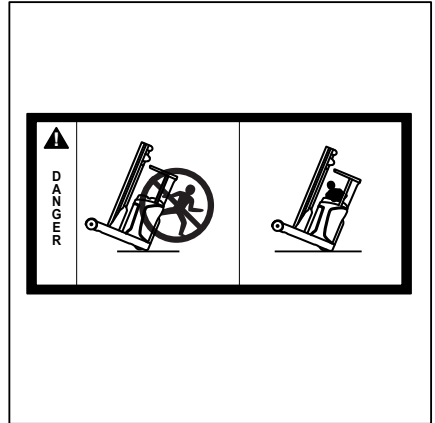
If the truck tips over, the driver could fall out and slide under the truck with potentially fatal consequences. There is a risk to life.

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.



Emergency lowering



⚠ DANGER

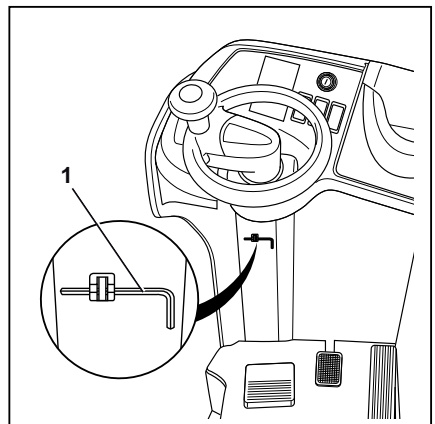
Risk to life if the load drops too quickly!

- Do not walk underneath the raised load!

⚠ 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.



Handling the battery

In the event of a power failure, the forks can be lowered manually so that the truck can be moved to a safe position.

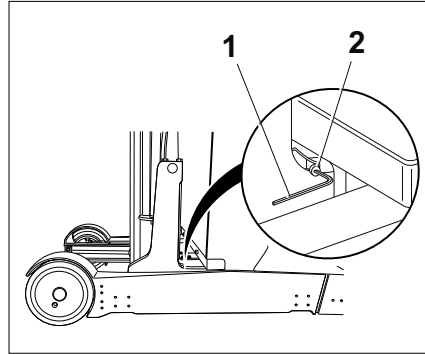
The emergency lowering valve is operated remotely by means of a flexible drive. The handle for operation is located on the reach carriage near the mast fixture.

⚠ 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.



Handling the battery

Safety regulations when handling the battery

National legal provisions must be followed when setting up and operating battery charging stations.

⚠ DANGER

Risk of accident

During removal and installation of the battery, no person other than those involved in the operation may remain in the danger area.

⚠ DANGER**Risk of accident!**

The battery could fall from the lifting accessory, or the lifting accessory could tip over or become damaged. If this happens, there is a risk to life.

The battery must be removed only when the truck is on level, smooth ground with sufficient load capacity. The load capacity of the lifting accessory used (see operating instructions or nameplate) must at least match the battery weight (see battery identification plate).

- Check the load capacity of the lifting accessory.
- Remove the battery on suitable ground.

⚠ DANGER**The battery weight and the dimensions affect the stability of the truck. There is a risk of tipping!**

When changing the battery, the weight ratios must not be changed. The battery weight must remain within the weight range prescribed on the nameplate.

- Do not remove or change the position of ballast weights.
- Note the battery weight on the nameplate.

**⚠ CAUTION**

Incorrect connection or operation of the charging station or battery charger may result in damage to components!

- Follow the operating instructions for the charging station or battery charger and for the battery.

The following safety regulations must be observed when maintaining, charging and changing the battery.

Maintenance personnel

Batteries may only be replaced by properly trained personnel in accordance with the instructions of the manufacturers of the battery, battery charger and truck.

The maintenance guidelines for the battery must be followed.

Handling the battery



⚠️ WARNING

The battery is very heavy. There is a risk of serious injury if any parts of the body remain under the battery. There is a risk of crushing/shearing!

- Always wear safety footwear during battery replacement.

Fire protection measures



⚠️ DANGER

No flammable materials or spark-forming operating materials may be within 2 m of either the truck with the battery to be charged or the battery charger. There is a risk of explosion!

When working with batteries:

- Make sure the room is well ventilated.
- Do not smoke.
- Do not use an open flame.
- Always have fire extinguishing equipment ready.

Parking the truck securely

If the battery is being worked on, the truck must be parked securely; see the chapter entitled "Parking the truck securely".

The truck may only be commissioned if the battery male connector is plugged in again and the battery door is closed.

Battery weight and dimensions

⚠️ DANGER

The battery weight and the dimensions affect the stability of the truck. There is a risk of tipping!

When changing the battery, the weight ratios must not be changed. The battery weight must remain within the weight range prescribed on the nameplate.

- Do not remove or change the position of ballast weights.
- Note the battery weight on the nameplate.

Maintaining the battery

The cell covers of the battery must be kept dry and clean. Any spilt battery acid must be neutralised immediately. Observe the safety regulations for handling battery acid; see the chapter entitled "Battery acid".

Terminals and cable shoes must be clean, lightly coated with battery grease and screwed on tightly.

Charging the battery

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.

- Fully extend the battery together with the reach carriage to the load side before charging the battery in the truck. Doing so prevents any gases produced when charging the battery from building up in the truck
- Always ensure adequate ventilation in the vicinity.
- Disconnect the battery male connector before charging and only when the truck and battery charger are switched off.
- The cab door (variant) must be open when charging.
- Expose the surfaces of the battery cells.
- Do not place any metal objects on the battery.



CAUTION

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.

Handling the battery

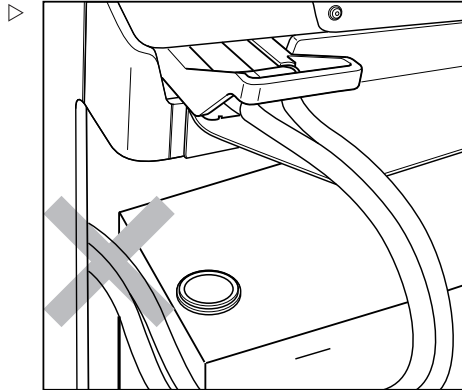
Damage to cables



CAUTION

There is a risk of short circuit if the cables are damaged.

- Check the connecting cable for damage.
- When removing and reinstalling the battery, ensure that the battery cables are not damaged.



General information on battery replacement

CAUTION

Risk of damage!

The battery must be removed on level, even ground with sufficient load-bearing capacity according to the operating instructions for the lifting accessory you are using.

The battery sits in a frame. To replace the battery, the frame is moved in the fork direction by the reach movement of the lift mast. When retracted, this battery frame is locked mechanically.

WARNING

Risk of crushing from moving parts!

Observe the information signs, see the chapter entitled "Identification points".

WARNING

Risk of short circuit!

When moving the battery back and forth, make sure that the battery cable is not crushed.

The battery can be removed using the following lifting accessories:

- Crane (with standard equipment)
- Change frame (with roller channel variant for side battery replacement)

The load capacity of the lifting accessory used must at least match the battery weight (see battery identification plate).

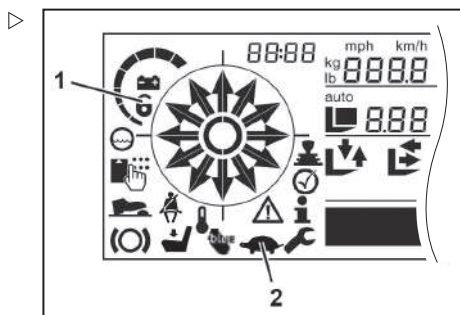
The removal of batteries from trucks without their own devices must be carried out by the authorised service centre.

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 to the drive side" operating function on the joystick 4Plus or via the corresponding fingertip switch.

Releasing the battery lock

- 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 five seconds, the "lock" symbol (1) appears on the display and operating unit. This symbol indicates that the reach carriage can now be retracted into the end position in order to release the battery



Handling the battery

- Move the actuating lever into the zero position once
- Actuate the actuating lever again and retract the reach carriage to the drive side into the end position
- Pull the release lever (3) for the battery lock upwards

The battery is unlocked and can be extended to the load side together with the reach carriage.

While the battery lock is released, an acoustic warning signal sounds. The "creep speed" symbol (2) appears on the display and operating unit. This symbol indicates that the truck can only be driven at walking speed while the battery lock is released and that the hydraulic functions are restricted.

- Once unlocked, extend the battery to the load side by at least one third of the reach travel to complete the unlocking process

NOTE

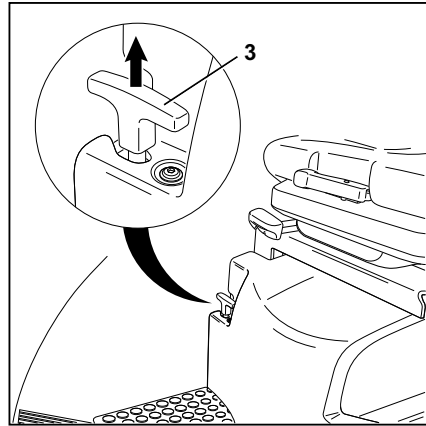
Once unlocked, the battery must be extended to the load side by at least one third of the reach travel to complete the unlocking process. Only then can the battery be locked again by retracting the battery together with the reach carriage.

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.

The acoustic warning signal stops. The "creep speed" symbol on the display and operating unit disappears. The truck can be driven at a normal operating speed again and the hydraulic functions are no longer restricted.



i NOTE

If the acoustic warning signal sounds again and the "creep speed" symbol reappears, the battery was not extended to the load side by at least one third of the reach travel once it was unlocked. Extend and retract the battery again to lock the battery.

- After locking the battery, extend the reach carriage to the load side out of the end position.

The "lock" symbol on the display and operating unit disappears.

i NOTE

During normal operation, the acoustic warning signal and the "lock" and "creep speed" symbols of the truck indicate that a mechanical fault has occurred with the battery lock sensor. The fault must be rectified by the authorised service centre.

Disconnecting the battery male connector

⚠ CAUTION

Risk of component damage!

If you remove the battery male connector while the truck is switched on (under load), an arc will be produced. This can cause the contacts to erode, 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.

Handling the battery

- 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.



CAUTION

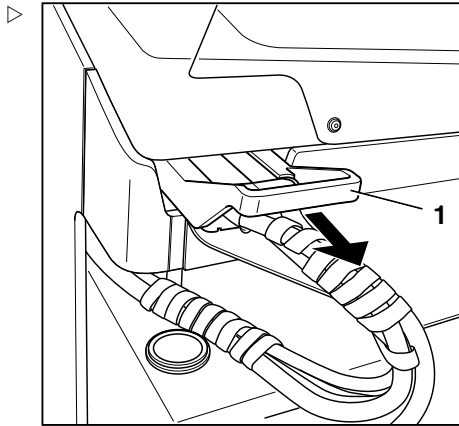
There is a risk of short circuit if the cables are damaged.

- Check the connection cables for damage.

CAUTION

Risk of damage!

- Position the battery cable on the battery in such a way that it cannot be crushed when removing or inserting the battery.



Battery replacement using a crane

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, may only be carried out on horizontal, level ground using suitable devices.

Suitable devices include:

- A crane and suitable harnesses
- A stationary or mobile battery change frame.
You should also refer to the operating instructions for the battery change frame
- A suitable forklift truck with sufficient load capacity

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.

The battery is to be installed or removed with a crane.

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.

Removing the battery

- Retract the reach carriage fully.
- Apply the parking brake.
- Unlock the battery lock (see the chapter entitled "Actuating the battery lock").



NOTE

The bolt must audibly release.

- Press the foot switch.

Handling the battery

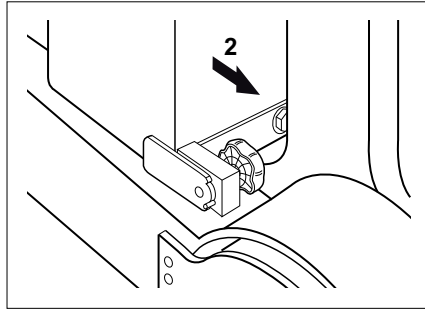
- Extend the reach carriage fully together with the battery (2). ▷
- Switch off the truck.
- Push the emergency off switch.

⚠ CAUTION

Risk of component damage!

If you remove the battery male connector while the truck is switched on (under load), an arc will be produced. This can cause the contacts to erode, 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). ▷

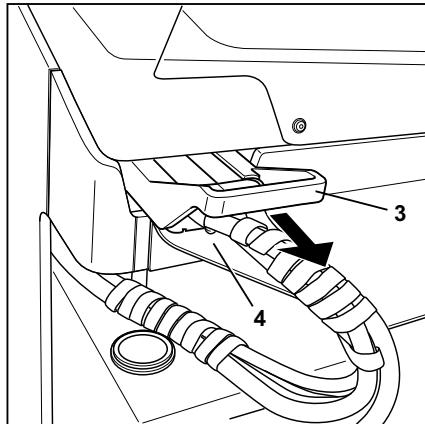


⚠ CAUTION

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.



For batteries with a greater installation depth, the battery cover on the truck must be removed in order to remove the battery. The screws on the battery cover can be loosened using the hexagon key for the emergency lowering mechanism. The hexagon key for the emergency lowering mechanism is located in the driver's compartment underneath the steering wheel (see the chapter entitled "Emergency lowering").

- Remove the three screws from the battery cover and remove the battery cover (4) from the truck
- Use a suitable crane to remove the battery from the battery frame; see the chapter entitled "Battery transport with crane".

Installing the battery

WARNING

Risk of corrosion

The electrolyte (battery acid) is toxic and corrosive on contact. When handling battery acid, the specified safety measures must be observed without fail. For newly charged batteries in particular, be aware of the risk of explosion in the gassing area.

WARNING

Risk of explosion

The openings in the gassing area of the battery must not be covered or fully closed. An unrestricted air supply is required to prevent the formation of potentially explosive gas mixtures.

Under no circumstances should openings be made in the battery's gassing area; these could allow the gas created during charging to enter 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 batteries. The batteries used must conform to the specified dimensional tolerances in accordance with this standard. This is required for the battery lock to function without any problems.

- Insert the battery into the battery frame; see the chapter entitled "Battery transport with crane".

CAUTION

Risk of short circuit

If the battery cover is removed, the battery may be damaged during operation due to the ingress of water or dirt.

Do not operate the truck without the battery cover in place.

If the battery cover on the truck is removed in order to remove the battery, the battery cover must be attached again before operation of the truck in order to protect the battery.

- Attach the battery cover to the truck using the three screws

Handling the battery

- Return the hexagon key for the emergency lowering mechanism to its position in the driver's compartment underneath the steering wheel.

Activities after installation of the battery

⚠ 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

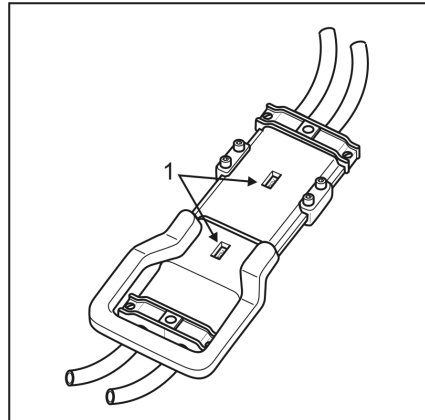
- *The battery must comply with the specifications on the nameplate regarding voltage and weight. Compare the nameplates for the truck and battery.*
- **Gel batteries** are subject to special charging/maintenance/handling instructions. *The guidelines from the respective manufacturer must be observed.*

⚠ CAUTION

Risk of component damage!

If you connect the battery male connector when the truck is switched on (under load), an arc will be produced. This can cause the contacts to erode, which considerably shortens 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.

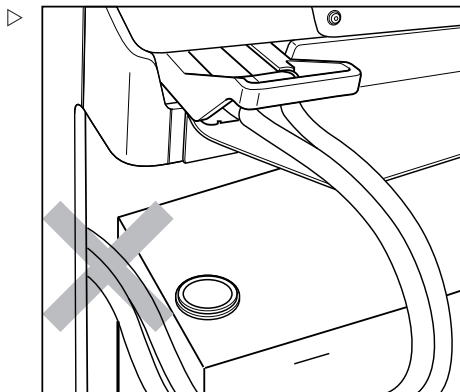


- Make sure that the battery cable cannot become trapped when the reach carriage is retracted with the battery.
- Unlock the emergency off switch.
- Switch on the truck.
- Press the foot switch.
- Retract the reach carriage with the battery fully until the battery lock engages.

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".



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.

⚠ 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.

Handling the battery

⚠ 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

⚠ 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.

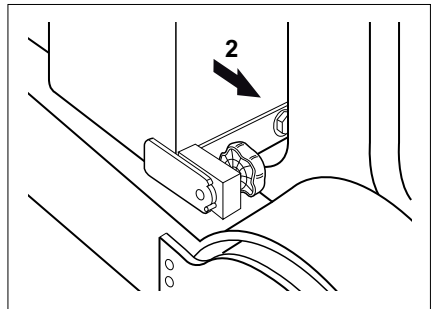
- Retract the reach carriage fully.
- Apply the parking brake.
- Release the battery lock (refer to the chapter entitled "Actuating the battery lock").
- Press the foot switch.
- Extend the reach carriage fully together with the battery (2).
- Switch off the truck.
- Press the emergency off switch.

⚠ CAUTION

Risk of component damage!

If you remove the battery male connector while the truck is switched on (under load), an arc will be produced. This can cause the contacts to erode, 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.



Handling the battery

- Disconnect the battery male connector (3). ▷

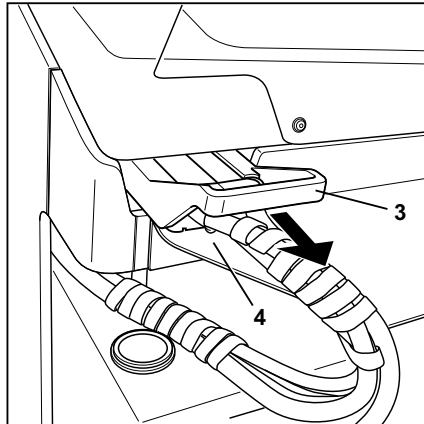


⚠ CAUTION

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

⚠ 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.

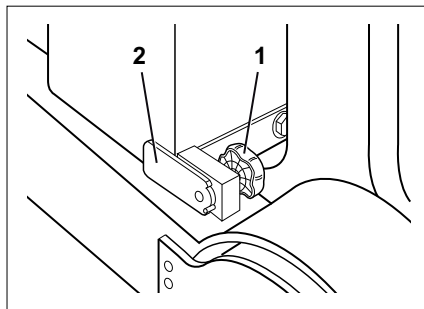
⚠ CAUTION

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). ▷

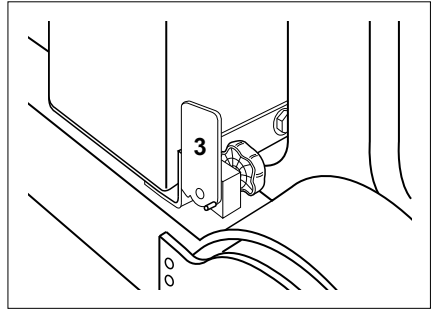
⚠ DANGER

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.

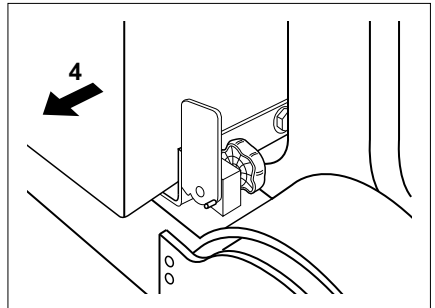
Do not attempt to keep hold of the battery if it rolls away.



- 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.



Activities after installation of the battery

⚠ DANGER

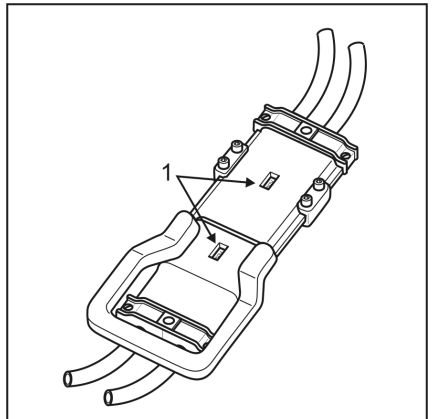
If the battery is not locked correctly, the battery can slide out of the truck, with potentially fatal consequences!

- 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.*



Handling the battery

⚠ CAUTION

Risk of component damage!

If you connect the battery male connector when the truck is switched on (under load), an arc will be produced. This can cause the contacts to erode, which considerably shortens their service life.

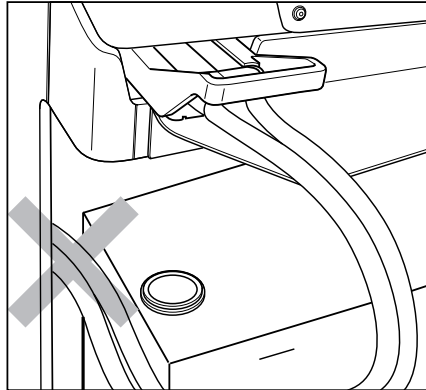
- Do not connect the battery male connector when the truck is switched on.
- Make sure that the truck is switched off before connecting the battery male connector.

- 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".



Battery commissioning

⚠ CAUTION

Risk of accident, risk of injury from crushing and shear points

Before each shift, check that the optional battery lock is in perfect condition and functions correctly.

Always actuate the swing bolts with just one hand and make sure that fingers are kept away from the rotation and clamping range.

A proper commissioning must be performed if you have ordered your truck without a battery or if you are supplied with a dry pre-charged

battery, as it has had to be transported over a long distance (e.g. from overseas). Please follow the information and guidelines from the battery manufacturer precisely.

If the battery was procured separately to the truck, the following must be checked by authorised service personnel:

- Nominal voltage
- Required minimum weight
- Fitted battery male connector
- Battery discharging characteristic curve

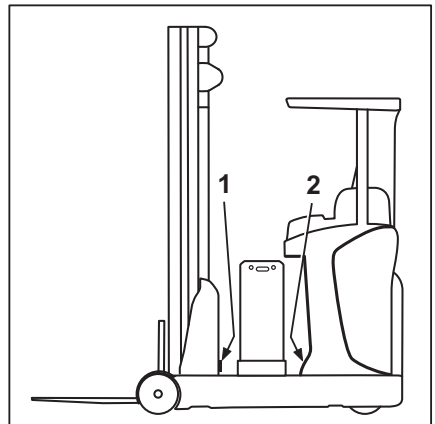
Adjusting the battery lock

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.



Handling the battery

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.

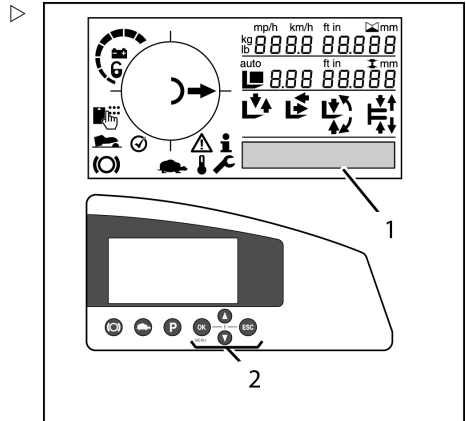
Determine the average value when installing replacement batteries. The battery trays are different sizes to accommodate the different sizes of replacement batteries. In each case, the battery lock must be set to the largest tray.

Setting the battery data

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**

NOTE

*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

Handling the battery

- 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.

Battery transport with crane



⚠ DANGER

If the load is dropped, the consequences could potentially be fatal!

- Never walk or stand underneath suspended loads.
- Observe the load capacity of the crane. Also establish the weight of the battery (nameplate).



⚠ WARNING

Risk of crushing/shearing!

Personnel must not stand directly next to the battery or between the battery and the crane when removing and inserting the battery with a crane.

- Before transporting the battery by crane, establish the weight of the battery (1). Observe the load capacity of the crane.
- Ensure that there is sufficient distance between the truck and any obstacles when setting down so that the truck is not damaged when the crane is used.

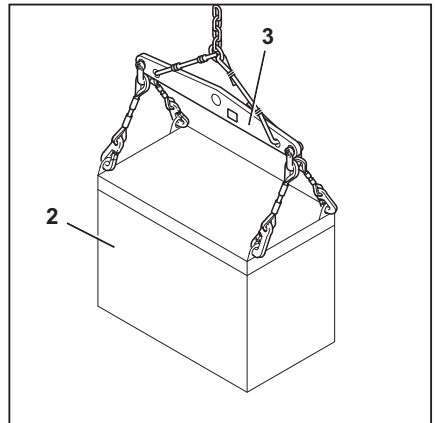
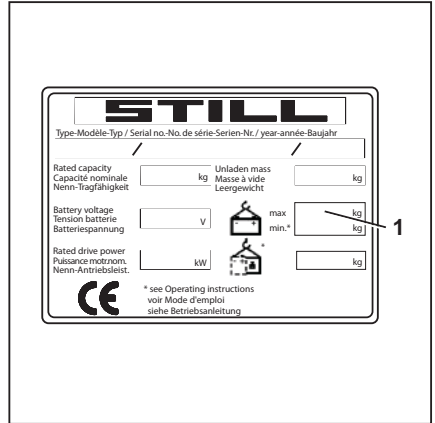
To avoid short circuits, batteries with open terminals or connectors should be covered with a rubber mat.

- Attach battery (2) to suitable lifting gear (3).

Observe the operating instructions for the lifting gear.

The lifting gear should be vertical when lifting, so that no lateral pressure is applied to the tray.

- Slowly and vertically, 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 the chassis of the truck. Avoid any oscillating motions.
- Set the battery down carefully.
- Do not place or allow slack lifting gear to fall on the battery cells.



Handling the battery

Maintaining the battery

⚠ DANGER

Risk of explosion!

- Observe the safety regulations when handling the battery; see the chapter entitled "Safety regulations when handling the battery".

⚠ DANGER

Risk of accident!

If the battery has to be removed for maintenance, this must only be carried out using the specified devices; see the chapter entitled "General information on battery replacement".

i NOTE

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.

Checking the battery charge status

The discharge process should be monitored so that the battery is protected against deep discharge. The hydraulic lifting function is switched off when 20% residual capacity is reached.

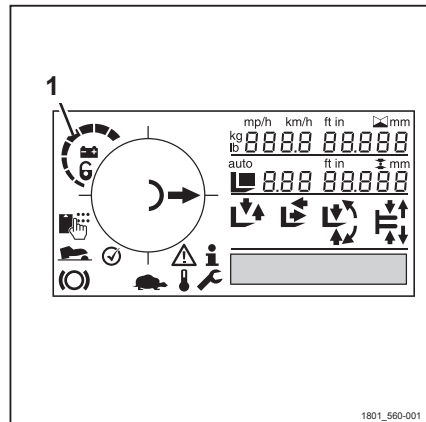
i NOTE

The battery discharge indicator characteristic curve must be set in accordance with the installed battery. See "Setting battery data".

- Push the emergency off switch.
- Switch on the truck.
- Read the charge status on the display and operating unit.

After connecting a fully charged battery:

- All of the display segments (1) light up (100%) after a few moments. As the capacity decreases, these go out one



after another. If the permissible discharge depth of 20% residual capacity is reached, only the last segment will still flash. This indicates that the lift cut out has been reached.

After connecting a partially charged battery:

- If the current battery charge level is lower than the value stored most recently by the truck, the current battery charge is displayed correctly.
- If the current battery charge level is higher than the value stored most recently by the truck, the most recently stored value will initially be displayed. The battery charge level will not be displayed correctly again until the current value drops below the most recently stored value.

CAUTION

Deep discharges shorten the service life of the battery.

Avoid discharging below 20% of nominal capacity (corresponding to 0% on the display), as this is considered deep discharging of the battery.

- Charge discharged batteries immediately if a residual capacity of 0% is displayed. Never leave batteries in a discharged state. This also applies to partially discharged batteries.

Charging the battery

- Park the truck securely; see the chapter entitled "Parking the truck securely".



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.

- Fully extend the battery together with the reach carriage to the load side before charging the battery in the truck. Doing so prevents any gases produced when charging the battery from building up in the truck
- Always ensure adequate ventilation in the vicinity.

Handling the battery

- Fully extend the battery together with the reach carriage to the load side before charging the battery in the truck (see the chapter entitled "Changing the battery")

CAUTION

Risk of component damage!

If you remove the battery male connector while the truck is switched on (under load), an arc will be produced. This can cause the contacts to erode, 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.
 - If fitted, open the driver's cab door (variant) fully.

DANGER

There is a risk of damage, short circuiting and explosions!

- Do not place any metal objects or tools on the battery.
 - Keep away from naked flames; no smoking.
-

WARNING

The electrolyte (diluted sulphuric acid) is poisonous and caustic!

- Observe safety regulations for handling battery acid; see the chapter entitled "Battery acid".
 - Rinse away spilt battery acid immediately using plenty of water!
 - Do not add battery acid before charging!
-

NOTE

Gel batteries are subject to special charging/maintenance/handling instructions. The guidelines from the respective manufacturer must be observed.

Lead or gel batteries are used as traction batteries. As the various types are different in design, the correct battery chargers must always be used.

- Before the charging process, inspect the battery cable and charging cable for damage and change if necessary.

⚠ CAUTION

Risk of component damage!

If you connect the battery male connector while the battery charger is switched on (under load), an arc will be produced. This can cause the contacts to erode, which considerably shortens their service life.

- Do not connect the battery male connector while the battery charger is switched on.
 - Ensure that the battery charger is switched off before the battery male connector is connected.
-
- Attach the battery male connector to the battery charger plug.
 - Start the battery charger.

i NOTE

Note the information in the operating instructions for the battery charger (equalising charge).

Once the charging process is complete:

- Switch off the battery charger.

⚠ CAUTION

Risk of component damage!

If you disconnect the charging cable while the battery charger is switched on, an arc will be produced. This can cause the contacts to erode, which considerably shortens their service life.

- Switch off the battery charger before the charging cable is disconnected.

**⚠ WARNING**

Risk of explosion!

The plug must 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.

Decommissioning

- Reconnect the battery male connector to the truck; see the chapter entitled "Connecting the battery male connector".
- Fully retract the battery together with the reach carriage to the drive side (see the chapter entitled "Changing the battery")

Decommissioning

Parking the truck securely

⚠ 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.

⚠ 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.

⚠ CAUTION

Batteries may freeze!

If the truck is parked in an ambient temperature of below -10°C for an extended period, the batteries will cool down. The electrolyte may freeze and damage the batteries. The truck will then not be ready for operation.

- At ambient temperatures of below -10°C , only park the truck for short periods of time.
- Push the parking brake push button; see 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.
- Turn the switch key (variant) to the left and pull it out.

⚠ CAUTION

Risk of component damage!

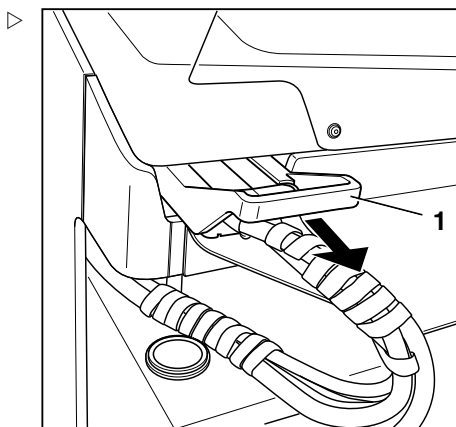
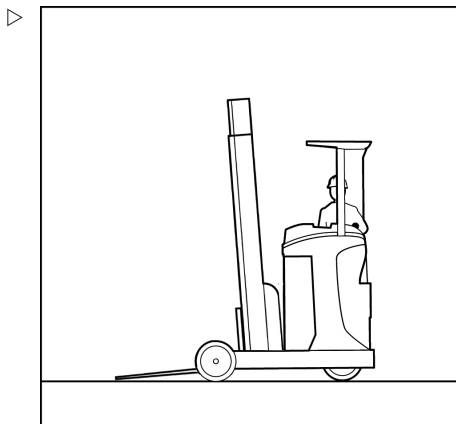
If you remove the battery male connector while the truck is switched on (under load), an arc will be produced. This can cause the contacts to erode, which considerably shortens their service life.

- Switch off the truck before the battery male connector is disconnected.
- Do not disconnect the battery male connector while the truck is switched except in the case of an emergency.

- Disconnect the battery male connector.

i NOTE

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.



Decommissioning

Shutting down and storing the truck

▲ CAUTION

Component damage due to incorrect storage!

If the truck is stored or shut down in an improper manner for more than two months, it may suffer corrosion damage. If the truck is parked in an ambient temperature of below -10°C for an extended period, the batteries will cool down. The electrolyte may freeze and damage the batteries.

- Store the truck in a dry, clean, frost-free and well-ventilated environment.
- Implement the following measures before shutting down.

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 and, if fitted, move attachment repeatedly.
- 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 a thin layer of oil or grease to all untreated moving parts.
- Grease the truck.
- Lubricate the joints and controls.
- Lubricate the battery lock.
- Disconnect the battery male connector.
- Check the condition and acid density of the battery, and service the battery (in accordance with the battery manufacturer's guidelines).
- Service the battery.

 **NOTE**

Only store batteries that are fully charged.

- Spray all exposed electrical contacts with a suitable contact spray.

 **CAUTION**

Danger of tyre deformation by continuously loading on one side!

Jack up the truck so that all wheels are off the ground. This will prevent permanent deformation of the tyres.

- Raise and jack up the truck.

 **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 against dust.

If the truck is to be decommissioned for a long time, we recommend it is decommissioned by the authorised service centre.

Re-commissioning after shutdown

If the truck has been shut down for longer than six months, it must be carefully checked before being re-commissioned. As in the annual inspection, this check should also include all safety items for the truck.

- Clean the truck thoroughly.
- Grease the truck.
- Lubricate the joints and controls.
- Check the battery condition and acid density, and recharge if necessary.
- Check the hydraulic oil for condensation water and replace if necessary.

Cleaning

- 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)

Cleaning

Cleaning the truck

- Park the truck securely

CAUTION

Risk of component damage!

If you remove the battery male connector when the key switch is switched on (under load), an arc will be produced. This can lead to erosion at the contacts, which considerably shortens their service life.

- Switch off the key switch before the battery male connector is disconnected
- 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

Cleaning the truck exterior

- Clean the truck exterior using water-soluble cleaning materials and water (sponge, cloth)
- Clean all accessible areas, the oil filling openings and their surroundings, and clean the lubricating nipples before lubricating

NOTE

The more often the truck is cleaned, the more frequently it must be lubricated.

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

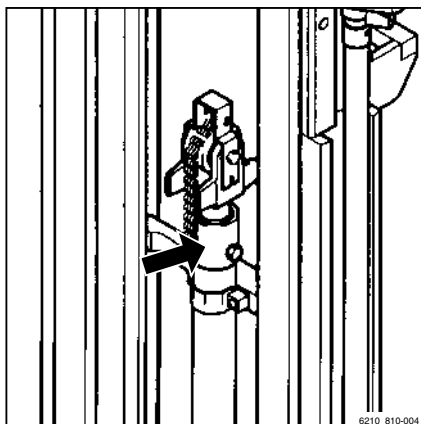
Before spraying the load chains with chain spray, the cleaning agent must have evaporated and the chain must be dry.

- As soon as the chain is dry, 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

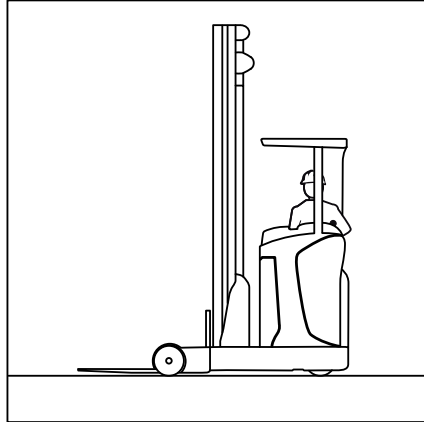
After cleaning

- Carefully dry the truck (e.g. with compressed air).
- Sit in the driver's seat and start up the truck in accordance with the regulations. ▷

⚠ CAUTION

Risk of short circuit!

- If any moisture has penetrated the motors despite the precautionary measures taken, first dry them using compressed air.
- The truck must then be started up to prevent possible corrosion damage.



6

Maintenance

General maintenance information

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 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 pro-

vides 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, 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 hours								Carried out			
1000		2000		4000		5000		7000			
8000		10000		11000		13000		14000			
										✓	*
Chassis, bodywork and fittings											
Examine the chassis, covers, support elements and mast mounting for cracks or damage (visual inspection)											
Check the overhead guard/cab and panes of glass for damage; check the visibility through the glass											
Check the controls, switches and joints for damage, and apply grease and oil											
Check the driver's seat, seat adjustment and protective covers for correct function and for damage											
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 actuators (single and dual pedal) for correct function and for damage Clean dust and dirt from the mechanisms											
Load wheels											
Check the wheels for damage, wear and ease of movement											
Check the wheel mountings for operating noise and play											
Check the wheel fastenings using a torque wrench											
Drive wheel											
Check the drive wheel for damage and wear. Check the support height											
Check the wheel screws and tightening torque											
Gearbox											
Visual inspection for leak tightness, mounting 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											
Steering											
Check that the steering wheel is securely attached and check the turning handle for damage											
Check the function of the steering system											

General maintenance information

At operating hours								Carried out			
1000		2000		4000		5000		7000		✓	✘
8000		10000		11000		13000		14000			
Check the steering turntable bearing for ease of movement and wear											
Check the steering gears for play, and lubricate											
Hydraulic brake system											
Check the condition of all mechanical and hydraulic brake parts, check for correct function and clean											
Check the brake linings and replace if necessary											
Check the brake clearance											
Perform brake test											
Check the brake retardation values after each adjustment											
Check the brake fluid level											
Electric parking brake											
Clean and check the rotor											
Check the brake clearance											
Check the brake retardation values											
Electrical system											
Check the function of the drive and pump controller for driving, acceleration, braking and reversing											
Check the cable connections and plug contacts for secure positioning and corrosion											
Check the electrostatic discharge (ESD) devices											
Check the main fuses and control fuses. Check the contacts of the main contactor											
Check the switch lock and emergency off switch for correct function											
Check all operating and display functions (switches, transmitters)											
Check the lighting, indicator lights, instruments and seat contact switch											
Converters											
Use air to blast dust from the surfaces											
Remove dirt and dust from the heat sinks											
Check the fans for correct function and for damage, and clean											
Battery and accessories											
Check the battery for damage and acid density; observe the manufacturer's maintenance instructions											
Check the battery male connector and cables for damage											

At operating hours									Carried out		
1000		2000		4000		5000		7000		✓	*
8000		10000		11000		13000		14000			
Measure the battery voltage under load											
Perform insulation testing											
Measure the tray for short circuits											
Hydraulic system											
Check the condition of the hydraulic system and check for damage, correct function and leak tightness											
Check the hydraulic pump for leak tightness											
Check the hydraulic oil level											
Check the oil filter (and replace if dirty)											
Test the oil tank for leak tightness											
Clean the breather filter and replace if necessary											
Lift mast											
Check the mast mounting for damage and check the tightening torques. For mast traversing, check and lubricate the sliding faces											
Check the mast profiles for damage and wear. Lubricate 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 cylinders and connections for damage and leaks											
Check the guide pulleys for damage and wear											
Check the mast rollers and chain rollers for damage and wear											
Check the tilt cylinders and connections for damage and leaks											
Check the joints of the tilt attachment for play and ease of movement											
Check the reach cylinder and connections for damage and leaks											
Check the joints of the reach cylinder for play and ease of movement, and lubricate											
Check the fork carriage for damage and wear											
Check the fork height setting and adjust the chain length if necessary											
Check the fork arm interlock for damage and correct function											
Check the fork arms for wear and deformation											
Check that there is a safety screw on the fork carriage or on the attachment											
Special equipment											
Check the heating system for damage; observe the manufacturer's maintenance instructions											

General maintenance information

At operating hours								Carried out			
1000		2000		4000		5000		7000		✓	*
8000		10000		11000		13000		14000			
Check the attachments for wear and damage; observe the manufacturer's maintenance instructions											
Clean excessive dirt from the battery change frame and check it for deformation/damage Check the freedom of movement of the rollers and keep the surface of the rollers free of corrosion using a film of oil											
Lubricating											
Lubricate using approved lubricants in accordance with the lubrication plan											
General											
Read out and check the error numbers and delete list											
Reset the maintenance interval											
Check labelling to ensure it is complete											
Perform a test drive											

Maintenance - 3000 hours/every two years

At operating hours								Carried out		
3000		6000		9000		12000		15000	✓	*
Chassis, bodywork and fittings										
Examine the chassis, covers, support elements and mast mounting for cracks or damage (visual inspection)										
Check the overhead guard/cab and panes of glass for damage; check the visibility through the glass										
Check the controls, switches and joints for damage, and apply grease and oil										
Check the driver's seat, seat adjustment and protective covers for correct function and for damage										
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										
Load wheels										
Check the wheels for damage, wear and ease of movement										
Check the wheel mountings for operating noise and play										
Check the wheel fastenings using a torque wrench										
Drive wheel										
Check the tyres for damage and wear										
Check the drive wheel for damage and wear. Adjust the support height according to wheel wear. Always readjust the supports after a wheel change										
Tighten the wheel screws using a torque wrench (tightening torque: 195 Nm)										
Gearbox										
Visual inspection for leak tightness, mounting and external damage. Check for operating noise.										
Oil change (gearbox)										
Lubricate the shaft stub gearing between the gearbox and traction motor										
Traction motor, steering motor, pump motor										
Visual inspection for mounting and external damage. Check for operating noise. Clean the external fans. Functional test										
Steering										

General maintenance information

At operating hours								Carried out		
3000		6000		9000		12000		15000	✓	*
Check that the steering wheel is securely attached and check the turning handle for damage										
Check the function of the steering system										
Check the steering turntable bearing for ease of movement and wear										
Check the steering gears for play, and lubricate										
Hydraulic brake system										
Check the condition of all mechanical and hydraulic brake parts, check for correct function and clean										
Check the brake linings and replace if necessary										
Check the brake clearance										
Perform brake test										
Check the brake retardation values after each adjustment										
Changing the brake fluid										
Electric parking brake										
Clean and check the rotor										
Check the brake clearance										
Check the brake retardation values										
Electrical system										
Check the function of the drive and pump controller for driving, acceleration, braking and reversing										
Check the cable connections and plug contacts for secure positioning and corrosion										
Check the electrostatic discharge (ESD) devices										
Check the main fuses and control fuses. Check the contacts of the main contactor										
Check the switch lock and emergency off switch for correct function										
Check all operating and display functions (switches, transmitters)										
Check the lighting, indicator lights, instruments and seat contact switch										
Converters										
Use air to blast dust from the surfaces										
Remove dirt and dust from the heat sinks										
Check the fans for correct function and for damage, and clean										
Battery and accessories										

At operating hours								Carried out		
3000		6000		9000		12000		15000	✓	*
Check the battery for damage and acid density; observe the manufacturer's maintenance instructions										
Check the battery male connector and cables for damage										
Measure the battery voltage under load										
Perform insulation testing										
Measure the tray for short circuits										
Hydraulic system										
Check the condition of the hydraulic system and check for damage, correct function and leak tightness										
Check the hydraulic pump for leak tightness										
Change the hydraulic oil										
Replace the oil filter										
Test the oil tank for leak tightness										
Clean the breather filter and replace if necessary										
Lift mast										
Check the mast mounting for damage and check the tightening torques. For mast traversing, check and lubricate the sliding faces										
Check the mast profiles for damage and wear. Lubricate 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 cylinders and connections for damage and leaks										
Check the guide pulleys for damage and wear										
Check the mast rollers and chain rollers for damage and wear										
Check the tilt cylinders and connections for damage and leaks										
Check the joints of the tilt attachment for play and ease of movement										
Check the reach cylinder and connections for damage and leaks										
Check the joints of the reach cylinder for play and ease of movement, and lubricate										
Check the fork carriage for damage and wear										
Check the fork height setting and adjust the chain length if necessary										
Check the fork arm interlock for damage and correct function										
Check the fork arms for wear and deformation										
Check that there is a safety screw on the fork carriage or on the attachment										

General maintenance information

At operating hours								Carried out		
3000		6000		9000		12000		15000	✓	*
Special equipment										
Check the heating system for damage; observe the manufacturer's maintenance instructions										
Check the attachments for wear and damage; observe the manufacturer's maintenance instructions										
Clean excessive dirt from the battery change frame and check it for deformation/damage Check the freedom of movement of the rollers and keep the surface of the rollers free of corrosion using a film of oil										
Lubricating										
Lubricate using approved lubricants in accordance with the lubrication plan										
General										
Read out and check the error numbers and delete list										
Reset the maintenance interval										
Check labelling to ensure it is complete										
Perform a test drive										

Additional maintenance guidelines for using the truck in a cold store - 500 hours or every 12 weeks

At operating hours								Carried out			
500		1000		1500		2000		2500		✓	*
3000		3500		4000		4500					
Truck components											
Perform a function check of the entire truck, including all special equipment, special heating systems, switch-off thermostats etc.											
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 steering play; check the setting of the steering chain if necessary											
Perform a special function check of the brake assemblies											
Check the hydraulic system for leaks											
Check all rollers and wear strips in the lift mast for ease of movement											
Perform a visual inspection of the chains and pinion gears											

At operating hours									Carried out		
500		1000		1500		2000		2500		✓	*
3000		3500		4000		4500					
Perform a visual inspection of the fork arms											
Check the ease of movement of the limit switches											
Lubricating											
Lubricate using approved lubricants in accordance with the lubrication plan											
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

⚠ CAUTION

Risk of damage to property

Trucks for cold store operation must be lubricated using different lubricants; see the chapter entitled "Cold store application".

Unit	Additive/consumable	Specifications	Measurement
General lubrication points	Grease	ESSO Beacon 2 multi-purpose grease ID no. 8010107	As required
Battery	Distilled water	-	As required
Insulation resistance of the battery	-	DIN 43539 VDE 0510	Min. 500 Ω/V against ground
Insulation resistance of the electrical system	-	DIN EN 1175 VDE 0117	Min. 1000 Ω/V against ground
Hydraulic system	Hydraulic oil	HVLP68 DIN 51524/P3 ID no. 0172025 (1 l) / 0172026 (5 l)	Tank volume approx. 25 l Level ex works depends on the type of lift mast fitted.
	Hydraulic oil (cold store variant)	Equivis XLT 15 ID no. 7327400007 (20 l)	
	Hydraulic oil (foodstuffs)	Food-grade oil in accordance with NSFH1 7327400020 (46 grade oil - 10 l) 7327400024 (68 grade oil - 10 l)	
Wheel nuts/screws			
- Drive wheel	Torque wrench	-	195 Nm
- Load wheel (slotted nut)	Torque wrench	-	120 Nm
Drive axle			
- Wheel gear	Gearbox oil	Castrol Alphasyn EP 150 ID no. 7326000022 (20 l)	Approx. 2.9 l
Lift mast			

General maintenance information

Unit	Additive/consumable	Specifications	Measurement
Lift mast	Super-pressure adhesive lubricant	SKD 3400 ID no. 0147873	As required
Load chains	Chain lubrication	Stabylan 2100 ID no. 8010100	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 (1 l)	0.2 l
Steering			
Steering gears	Lubrication	Rivolta S.K.D. 4002	As required

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.:

- Ensuring that unintentional movement or undesired start-up of the truck is prevented (by applying the parking brake, having the truck jacked up by the authorised service centre).
- Only allowing the authorised service centre to secure the raised fork carriage or the extended lift mast against accidental lowering
- Securing the lift mast to prevent it tilting backwards unintentionally
- Observing the maximum lift height of the lift mast to prevent collisions with the ceiling and to avoid damage

Working on the hydraulic equipment

The hydraulic system must be depressurised prior to all work on the system.

Working on the electrical equipment

Work may only be performed on the electrical equipment of the truck when it is in a voltage-free state. Function checks, inspections and adjustments on energised parts must only be performed by trained and authorised persons, taking the necessary precautions into account. Rings, metal bracelets etc. must be removed before working on electric components.

To prevent damage to electronic systems with electronic components, such as an electronic driving regulator or lift control, these components must be removed from the truck prior to the start of electric welding.

Work on the electrical system (e.g. connecting a radio, additional headlights etc.) is only permitted with approval from the authorised service centre.

Safety devices

After maintenance and repair work, all safety devices must be reinstalled and tested for operational reliability.

Set values

The device-dependent set values must be observed when making repairs and when changing hydraulic and electrical components. These are listed in the appropriate sections.

Lifting and jacking up

DANGER

There is a risk to life if the truck tips over!

If not raised and jacked up properly, the truck may tip over and fall off. Only the hoists specified in the workshop manual for this truck are allowed and are tested for the necessary safety and load capacity.

- Only have the truck raised and jacked up by the authorised service centre.
- Only jack the truck up at the points specified in the workshop manual.

The truck must be raised and jacked up for various types of maintenance work. The authorised service centre must be informed that this is to take place. Safe handling of the truck and the corresponding hoists is described in the truck's workshop manual.

Working at the front of the truck

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!

Safety regulations for maintenance

⚠ DANGER

Risk of accident!

- Use only chains with adequate lifting capacity to secure the particular lift mast.

⚠ CAUTION

Potential damage to the ceiling!

- Note the maximum lift height of the lift mast.

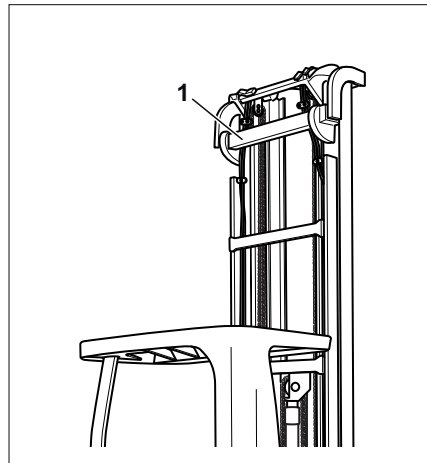
Removing the lift mast

⚠ DANGER

Risk of accident!

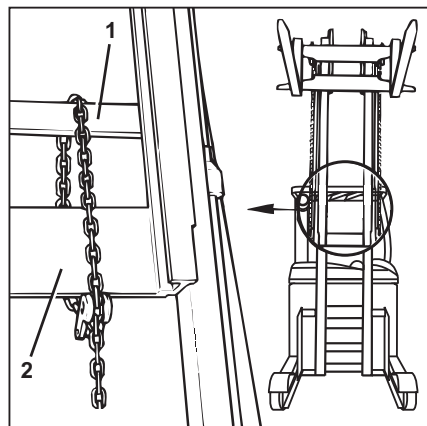
- Attach the lifting gear to the top of the bridge piece (1) on the outer mast of the lift mast.

This work must only be performed by a service technician.



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.



i NOTE

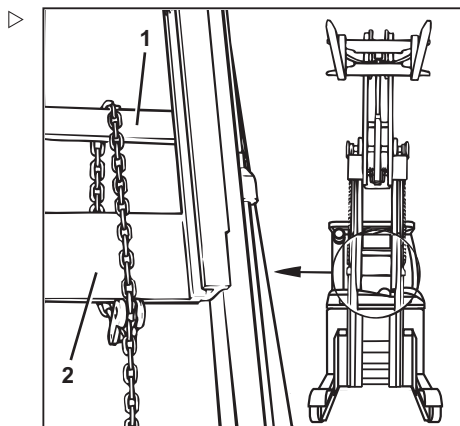
Extend the lift mast to slacken the chain.

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.

i NOTE

Extend the lift mast to slacken the chain.



Servicing

Checking the battery condition, acid level and acid density

⚠ CAUTION

Risk of damage!

- Follow the information in the operating instructions for the battery.
- Remove battery from truck.
- Inspect battery for cracked housing, raised plates and acid leaks.

⚠ WARNING

The electrolyte (diluted sulphuric acid) is poisonous and caustic!

- Observe the safety regulations for handling battery acid.
- Rinse away spilt battery acid immediately using plenty of water!
- Have defective battery overhauled.

Servicing

- Open filler cap (1) and check the acid level. ▷

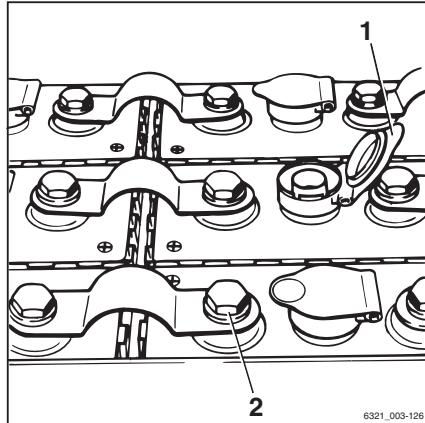
For batteries with "caged cell plugs", the acid must reach the bottom of the cage; for batteries without "caged cell plugs", it must cover the lead plates by about 10–15 mm.

- Top up low fluid with distilled water only.

The battery cell covers must be kept clean and dry.

- Remove any oxidation residue on the battery terminals then apply acid-free grease to the terminals.
- Tighten the battery-terminal clips (2).
- Check the acid density using an acid siphon.

After charging, this value must be between 1.24 and 1.29 kg/l.



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.

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).

NOTE

The wear of the tyres must be approximately the same.

- *Polyurethane tyres can be worn down to the wear mark (3)*

The tyres must be replaced if:

- Large cracks have formed in the tread This can be detected by a "whirring sound" when driving
- The tread has broken away significantly
- The tyre diameter has reduced by approx. 9%

A wear mark (1) in the lateral flank of the lining serves as a visual indication of the wear limit.

Checking the wheel fastenings

- Check the wheel screws (drive wheel) and load wheel nuts (load wheel) are securely seated and tighten them as necessary.
- Comply with the specified torques; refer to the chapter entitled "Maintenance data table"

Servicing

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

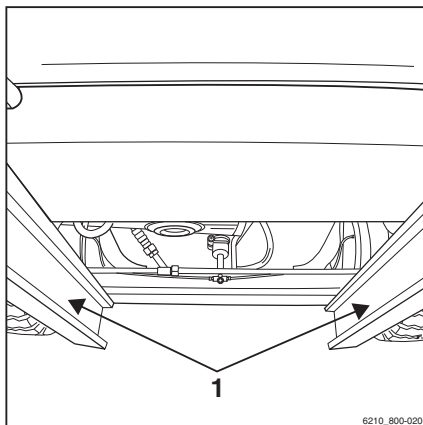
Greasing the lift mast and roller tracks

- 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"



NOTE

Spray the tracks evenly from a distance of approx. 15 - 20 cm. Wait approx. 15 minutes until the device is ready for operation again.



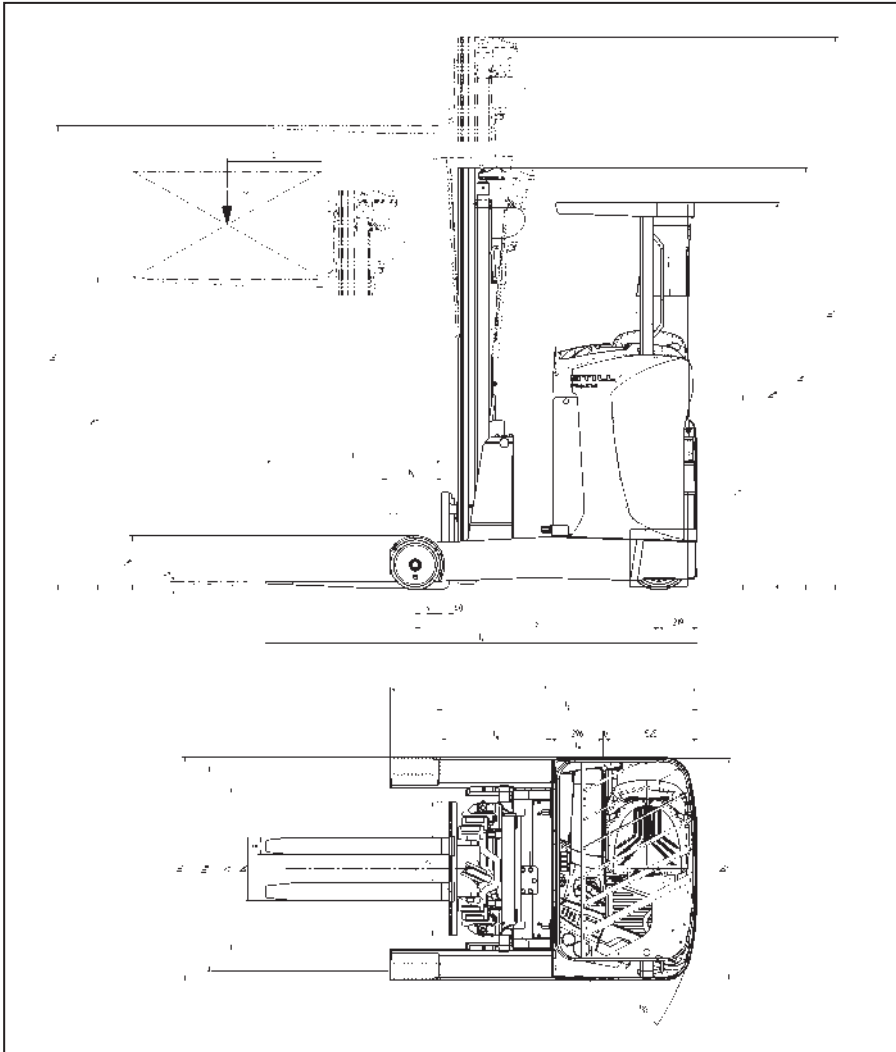
Checking the battery change frame

The screw joints and welded seams of the battery change frame must be subjected to a visual inspection.

Technical data

Dimensions

Dimensions



Measurements h_1 , h_3 , h_4 , h_6 and b_1 are customised and can be taken from the order confirmation.

VDI datasheet FM-X 10 (N), FM-X 12 (N)*

*Subject to change

DS = drive side

LS = load side

All dimensions include sideshift/fork tilt; mast sideshift not possible.

- 1) Decreases for larger batteries by 90 mm in each case depending on battery size
- 2) Calculation in accordance with VDI 3597, extended for larger batteries by 90 mm in each case depending on battery size
- 3) Dependent on the lift mast, sideshift/fork tilt: 2°/4°

Characteristics

				FM-X 10	FM-X 10 N	FM-X 12	FM-X 12 N
1.1	Manufacturer			STILL	STILL	STILL	STILL
1.2	Manufacturer's type designation			FM-X 10	FM-X 10 N	FM-X 12	FM-X 12 N
1.3	Drive			Electric	Electric	Electric	Electric
1.4	Operation			Seated	Seated	Seated	Seated
1.5	Load capacity/load	Q	kg	1000	1000	1200	1200
1.6	Load centre of gravity	c	mm	600	600	600	600
1.8	Load distance	x	mm	278	184	278	184
1.9	Wheelbase	y	mm	1275	1275	1275	1275

Weights

				FM-X 10	FM-X 10 N	FM-X 12	FM-X 12 N
2.1	Net weight (including battery)		kg	3250	3220	3250	3220
2.3	Axle load without front/rear load		kg	2130/1120	1980/1240	2130/1120	1980/1240
2.4	Axle load with fork forwards with front/rear load		kg	980/3540	920/3300	840/3610	780/3640
2.5	Axle load with fork backwards with front/rear load		kg	1880/2370	1600/2620	1830/2620	1520/2900

VDI datasheet FM-X 10 (N), FM-X 12 (N)*

Wheels, chassis frame

				FM-X 10	FM-X 10 N	FM-X 12	FM-X 12 N
3.1	Tyres			Polyureth.	Polyureth.	Polyureth.	Polyureth.
3.2	Front tyre size		mm	Ø 360 x 130	Ø 360 x 130	Ø 360 x 130	Ø 360 x 130
3.3	Rear tyre size		mm	Ø 285 x 100	Ø 285 x 100	Ø 285 x 100	Ø 285 x 100
3.5	Number of wheels at front/rear (x = driven)			1x/2	1x/2	1x/2	1x/2
3.7	Rear track width	b11	mm	1167	1037	1167	1037

Basic dimensions

				FM-X 10	FM-X 10 N	FM-X 12	FM-X 12 N
4.1	Lift mast/fork carriage tilt, forwards/backwards	a/b (°)	°	1/3	2/4	1/3	2/4
4.2	Height with lift mast retracted	h1	mm	2450	2450	2450	2450
4.3	Free lift	h2	mm	1890	1890	1890	1890
4.4	Lift	h3	mm	5750	5750	5750	5750
4.5	Height with lift mast extended	h4	mm	6310	6310	6310	6310
4.7	Height of overhead guard (cab)	h6	mm	2270	2270	2270	2270
4.8	Seat height	h7	mm	1140	1140	1140	1140
4.10	Height of load wheel supports	h8	mm	308	308	308	308
4.19	Total length	l1	mm	2366	2462	2366	2462
4.20	Length including fork back	l2	mm	1216	1312	1216	1312
4.21	Total width	b1/b2	mm	1270	1140	1270	1140
4.22	Fork arm dimensions	s/e/l	mm	40 / 80 / 1150	40 / 80 / 1150	40 / 100 / 1150	40 / 100 / 1150
4.23	ISO 2328 fork carriage, class/model A, B			2/A	2/A	2/A	2/A
4.24	Fork carriage width	b3	mm	760	760	760	760
4.25	Width across forks, min./max.	b5	mm	296/600	296/600	316/620	316/620
4.26	Width between load wheel supports	b4	mm	920	790	920	790
4.28	Reach forward	l4	mm	449	364	449	364

				FM-X 10	FM-X 10 N	FM-X 12	FM-X 12 N
4.31	Ground clearance with load under lift mast	m1	mm	70	70	70	70
4.32	Ground clearance at centre of wheelbase	m2	mm	70	70	70	70
4.34	Working width when handling pallets measuring 1000x1200 across forks	Ast	mm	2679	2733	2679	2733
4.34	Working width when handling pallets 800x1200 lengthways on forks	Ast	mm	2745	2812	2745	2812
4.35	Turning radius	Wa	mm	1540	1520	1540	1520
4.37	Length across the load wheel supports	l7	mm	1639	1641	1639	1641
4.43	Step height		mm	345	345	345	345

Performance data

				FM-X 10	FM-X 10 N	FM-X 12	FM-X 12 N
5.1	Driving speed with/without load		km/h	14/14	14/14	14/14	14/14
5.11	Driving speed with/without load when reversing		km/h	14/14	14/14	14/14	14/14
5.2	Lifting speed with/without load		m/s	0.47/0.7	0.47/0.7	0.47/0.7	0.47/0.7
5.3	Lowering speed with/without load		m/s	0.56/0.5	0.56/0.5	0.56/0.5	0.56/0.5
5.4	Reach speed with/without load		m/s	0.18	0.18	0.18	0.18
5.7	Climbing capability with/without load		%	10/15	10/15	10/15	10/15
5.8	Max. climbing capability with/without load		%	15/20	15/20	15/20	15/20
5.9	Acceleration time (over 10 metres) with/without load		s				
5.10	Service brake			Gen./hydr. mech.	Gen./hydr. mech.	Gen./hydr. mech.	Gen./hydr. mech.

VDI datasheet FM-X 10 (N), FM-X 12 (N)*

Electric motor

				FM-X 10	FM-X 10 N	FM-X 12	FM-X 12 N
6.1	Traction motor, power rating, S2=60 min.		kW	6.5	6.5	6.5	6.5
6.2	Lift motor, power rating, S3=15%		kW	14	13	14	14
6.3	Battery in accordance with DIN 43531/35/36 A, B, C, no			43531C / 254-2	43531B / 254-2	43531C / 254-2	43531B / 254-2
6.4	Battery voltage/nominal capacity K5		V/Ah	48/420	48/420	48/420	48/420
6.5	Battery weight (+/-5% depending on the manufacturer)		kg	750	750	750	750
6.6	Energy consumption in accordance with VDI cycle		kWh/h				
6.7	Handling performance		t/h				
6.8	Energy consumption at max. handling performance		kWh in 1 h (kWh/h)				

Other

				FM-X 10	FM-X 10 N	FM-X 12	FM-X 12 N
10.1	Working pressure for attachment		bar	254	254	254	254
10.2	Oil flow for attachments		l/min	20	20	20	20
10.7	Sound pressure level in driver's compartment		dB(A)	69	69	69	69
	Distributed load in accordance with VDI 2199		kg/m ²	2114	2242	2214	2348

VDI datasheet FM-X 14 (N), FM-X 17 (N)*

*Subject to change

DS = drive side

LS = load side

All dimensions include sideshift/fork tilt; mast sideshift not possible.

- 1) Decreases for larger batteries by 90 mm in each case depending on battery size
- 2) Calculation in accordance with VDI 3597, extended for larger batteries by 90 mm in each case depending on battery size
- 3) Dependent on the lift mast, sideshift/fork tilt: 2°/4°

Characteristics

				FM-X 14	FM-X 14 N	FM-X 17	FM-X 17 N
1.1	Manufacturer			STILL	STILL	STILL	STILL
1.2	Manufacturer's type designation			FM-X 14	FM-X 14 N	FM-X 17	FM-X 17 N
1.3	Drive			Electric	Electric	Electric	Electric
1.4	Operation			Seated	Seated	Seated	Seated
1.5	Load capacity/load	Q	kg	1400	1400	1700	1700
1.6	Load centre of gravity	c	mm	600	600	600	600
1.8	Load distance	x	mm	348	335	410	325
1.9	Wheelbase	y	mm	1381	1453	1453	1453

Weights

				FM-X 14	FM-X 14 N	FM-X 17	FM-X 17 N
2.1	Net weight (including battery)		kg	3460	3440	3480	3440
2.3	Axle load without front/rear load		kg	2240/1220	2200/1240	2290/1190	2200/1240
2.4	Axle load with fork forwards with front/rear load		kg	850/4010	880/3960	730/4450	700/4440
2.5	Axle load with fork backwards with front/rear load		kg	1950/2910	1920/2920	2020/3160	1860/3280

VDI datasheet FM-X 14 (N), FM-X 17 (N)*

Wheels, chassis frame

				FM-X 14	FM-X 14 N	FM-X 17	FM-X 17 N
3.1	Tyres			Polyureth.	Polyureth.	Polyureth.	Polyureth.
3.2	Front tyre size		mm	Ø 360 x 130	Ø 360 x 130	Ø 360 x 130	Ø 360 x 130
3.3	Rear tyre size		mm	Ø 285 x 100	Ø 285 x 100	Ø 285 x 100	Ø 285 x 100
3.5	Number of wheels at front/rear (x = driven)			1x/2	1x/2	1x/2	1x/2
3.7	Rear track width	b11	mm	1167	1037	1167	1037

Basic dimensions

				FM-X 14	FM-X 14 N	FM-X 17	FM-X 17 N
4.1	Lift mast/fork carriage tilt, forwards/backwards	a/b (°)	°	1/3	2/4	1/3	2/4
4.2	Height with lift mast retracted	h1	mm	2450	2450	2450	2450
4.3	Free lift	h2	mm	1890	1890	1880	1880
4.4	Lift	h3	mm	5750	5750	5750	5750
4.5	Height with lift mast extended	h4	mm	6310	6310	6320	6320
4.7	Height of overhead guard (cab)	h6	mm	2270	2270	2270	2270
4.8	Seat height	h7	mm	1140	1140	1140	1140
4.10	Height of load wheel supports	h8	mm	308	308	308	308
4.19	Total length	l1	mm	2402	2489	2484	2499
4.20	Length including fork back	l2	mm	1252	1338	1262	1349
4.21	Total width	b1/b2	mm	1270	1140	1270	1140
4.22	Fork arm dimensions	s/e/l	mm	40 / 100 / 1150	40 / 100 / 1150	50 / 100 / 1150	50 / 100 / 1150
4.23	ISO 2328 fork carriage, class/model A, B			2/A	2/A	2/A	2/A
4.24	Fork carriage width	b3	mm	760	760	760	760
4.25	Width across forks, min./max.	b5	mm	316/620	316/620	316/620	316/620
4.26	Width between load wheel supports	b4	mm	920	790	920	790
4.28	Reach forward	l4	mm	529	515	591	505

				FM-X 14	FM-X 14 N	FM-X 17	FM-X 17 N
4.31	Ground clearance with load under lift mast	m1	mm	70	70	70	70
4.32	Ground clearance at centre of wheelbase	m2	mm	70	70	70	70
4.34.1	Working width when handling pallets measuring 1000x1200 across forks	Ast	mm	2726	2787	2751	2794
4.34.2	Working width when handling pallets 800x1200 lengthways on forks	Ast	mm	2781	2844	2795	2853
4.35	Turning radius	Wa	mm	1640	1691	1710	1691
4.37	Length across the load wheel supports	l7	mm	1745	1817	1817	1819
4.43	Step height		mm	345	345	345	345

Performance data

				FM-X 14	FM-X 14 N	FM-X 17	FM-X 17 N
5.1	Driving speed with/without load		km/h	14/14	14/14	14/14	14/14
5.11	Driving speed with/without load when reversing		km/h	14/14	14/14	14/14	14/14
5.2	Lifting speed with/without load		m/s	0.45/0.68	0.45/0.68	0.45/0.68	0.45/0.68
5.3	Lowering speed with/without load		m/s	0.56/0.52	0.56/0.52	0.55/0.52	0.55/0.52
5.4	Reach speed with/without load		m/s	0.18	0.18	0.18	0.18
5.7	Climbing capability with/without load		%	10/15	10/15	10/15	10/15
5.8	Max. climbing capability with/without load		%	15/20	15/20	15/20	15/20
5.9	Acceleration time (over 10 metres) with/without load		s				
5.10	Service brake			Gen./hydr. mech.	Gen./hydr. mech.	Gen./hydr. mech.	Gen./hydr. mech.

VDI datasheet FM-X 14 (N), FM-X 17 (N)*

Electric motor

				FM-X 14	FM-X 14 N	FM-X 17	FM-X 17 N
6.1	Traction motor, power rating, S2=60 min.		kW	6.5	6.5	6.5	6.5
6.2	Lift motor, power rating, S3=15%		kW	14	14	14	14
6.3	Battery in accordance with DIN 43531/35/36 A, B, C, no			43531C / 254-2	43531B / 254-2	43531C / 254-2	43531B / 254-2
6.4	Battery voltage/nominal capacity K5		V/Ah	48/420	48/420	48/420	48/420
6.5	Battery weight (+/-5% depending on the manufacturer)		kg	750	750	750	750
6.6	Energy consumption in accordance with VDI cycle		kWh/h	3.26	3.26		
6.7	Handling performance		t/h	61.28	61.28		
6.8	Energy consumption at max. handling performance		kWh in 1 h (kWh/h)	3.4	3.4		

Other

				FM-X 14	FM-X 14 N	FM-X 17	FM-X 17 N
10.1	Working pressure for attachment		bar	254	254	254	254
10.2	Oil flow for attachments		l/min	20	20	20	20
10.7	Sound pressure level in driver's compartment		dB(A)	69	69	69	69
	Distributed load in accordance with VDI 2199		kg/m ²	2379	2542	2524	2687

VDI datasheet FM-X 20 (N, W, EW)*

*Subject to change

DS = drive side

LS = load side

All dimensions include sideshift/fork tilt; mast sideshift not possible.

- 1) Decreases for larger batteries by 90 mm in each case depending on battery size
- 2) Calculation in accordance with VDI 3597, extended for larger batteries by 90 mm in each case depending on battery size
- 3) Dependent on the lift mast, sideshift/fork tilt: 2°/4°

Characteristics

				FM-X 20	FM-X 20 N	FM-X 20 W	FM-X 20 EW
1.1	Manufacturer			STILL	STILL	STILL	STILL
1.2	Manufacturer's type designation			FM-X 20	FM-X 20 N	FM-X 20 W	FM-X 20 EW
1.3	Drive			Electric	Electric	Electric	Electric
1.4	Operation			Seated	Seated	Seated	Seated
1.5	Load capacity/load	Q	kg	2000	2000	2000	2000
1.6	Load centre of gravity	c	mm	600	600	600	600
1.8	Load distance	x	mm	410	307	400	400
1.9	Wheelbase	y	mm	1525	1525	1525	1525

Weights

				FM-X 20	FM-X 20 N	FM-X 20 W	FM-X 20 EW
2.1	Net weight (including battery)		kg	3810	3780		
2.3	Axle load without front/rear load		kg	2470/1340	2440/1340		
2.4	Axle load with fork forwards with front/rear load		kg	820/4990	860/4920		
2.5	Axle load with fork backwards with front/rear load		kg	2170/3640	2030/3750		

VDI datasheet FM-X 20 (N, W, EW)*

Wheels, chassis frame

				FM-X 20	FM-X 20 N	FM-X 20 W	FM-X 20 EW
3.1	Tyres			Polyureth.	Polyureth.	Polyureth.	Polyureth.
3.2	Front tyre size		mm	Ø 360 x 130	Ø 360 x 130	Ø 360 x 130	Ø 360 x 130
3.3	Rear tyre size		mm	Ø 350 x 100	Ø 350 x 100	Ø 350 x 100	Ø 350 x 100
3.5	Number of wheels at front/rear (x = driven)			1x/2	1x/2	1x/2	1x/2
3.7	Rear track width	b11	mm	1167	1037	1367	1567

Basic dimensions

				FM-X 20	FM-X 20 N	FM-X 20 W	FM-X 20 EW
4.1	Lift mast/fork carriage tilt, forwards/backwards	a/b (°)	°	1/3	2/4	1/3	1/3
4.2	Height with lift mast retracted	h1	mm	2450	2450	2450	2450
4.3	Free lift	h2	mm	1880	1880	1880	1880
4.4	Lift	h3	mm	5580	5580	5580	5580
4.5	Height with lift mast extended	h4	mm	6150	6150	6150	6150
4.7	Height of overhead guard (cab)	h6	mm	2270	2270	2270	2270
4.8	Seat height	h7	mm	1140	1140	1140	1140
4.10	Height of load wheel supports	h8	mm	373	373	373	373
4.19	Total length	l1	mm	2484	2589	2484	2484
4.20	Length including fork back	l2	mm	1334	1439	1334	1334
4.21	Total width	b1/b2	mm	1270	1140	1470	1670
4.22	Fork arm dimensions	s/e/l	mm	50 / 100 / 1150	50 / 100 / 1150	50 / 100 / 1150	50 / 100 / 1150
4.23	ISO 2328 fork carriage, class/model A, B			2/A	2/A	2/A	2/A
4.24	Fork carriage width	b3	mm	760	760	760	760
4.25	Width across forks, min./max.	b5	mm	316/620	316/620	316/620	316/620
4.26	Width between load wheel supports	b4	mm	920	790	1120	1320
4.28	Reach forward	l4	mm	623	520	608	608

				FM-X 20	FM-X 20 N	FM-X 20 W	FM-X 20 EW
4.31	Ground clearance with load under lift mast	m1	mm	70	70	70	70
4.32	Ground clearance at centre of wheelbase	m2	mm	70	70	70	70
4.34.1	Working width when handling pallets measuring 1000x1200 across forks	Ast	mm	2819	2879	2852	2892
4.34.2	Working width when handling pallets 800x1200 lengthways on forks	Ast	mm	2863	2940	2896	2936
4.35	Turning radius	Wa	mm	1778	1762	1810	1850
4.37	Length across the load wheel supports	l7	mm	1922	1924	1922	1922
4.43	Step height		mm	345	345	345	345

Performance data

				FM-X 20	FM-X 20 N	FM-X 20 W	FM-X 20 EW
5.1	Driving speed with/without load		km/h	14/14	14/14	14/14	14/14
5.11	Driving speed with/without load when reversing		km/h	14/14	14/14	14/14	14/14
5.2	Lifting speed with/without load		m/s	0.37/0.58	0.37/0.58	0.37/0.58	0.37/0.58
5.3	Lowering speed with/without load		m/s	0.53/0.5	0.53/0.5	0.53/0.5	0.53/0.5
5.4	Reach speed with/without load		m/s	0.18	0.18	0.18	0.18
5.7	Climbing capability with/without load		%	10/15	10/15	10/15	10/15
5.8	Max. climbing capability with/without load		%	15/20	15/20	15/20	15/20
5.9	Acceleration time (over 10 metres) with/without load		s				
5.10	Service brake			Gen./hydr. mech.	Gen./hydr. mech.	Gen./hydr. mech.	Gen./hydr. mech.

VDI datasheet FM-X 22*

Electric motor

				FM-X 20	FM-X 20 N	FM-X 20 W	FM-X 20 EW
6.1	Traction motor, power rating, S2=60 min.		kW	6.5	6.5	6.5	6.5
6.2	Lift motor, power rating, S3=15%		kW	14	14	14	14
6.3	Battery in accordance with DIN 43531/35/36 A, B, C, no			43531C / 254-2	43531B / 254-2	43531C / 254-2	43531C / 254-2
6.4	Battery voltage/nominal capacity K5		V/Ah	48/560	48/560	48/560	48/560
6.5	Battery weight (+/-5% depending on the manufacturer)		kg	940	940	940	940
6.6	Energy consumption in accordance with VDI cycle		kWh/h				
6.7	Handling performance		t/h				
6.8	Energy consumption at max. handling performance		kWh in 1 h (kWh/h)				

Other

				FM-X 20	FM-X 20 N	FM-X 20 W	FM-X 20 EW
10.1	Working pressure for attachment		bar	254	254	254	254
10.2	Oil flow for attachments		l/min	20	20	20	20
10.7	Sound pressure level in driver's compartment		dB(A)	69	69	69	69
	Distributed load in accordance with VDI 2199		kg/m ²	2744	2910		

VDI datasheet FM-X 22*

*Subject to change

DS = drive side

LS = load side

All dimensions include sideshift/fork tilt; mast sideshift not possible.

- 1) Decreases for larger batteries by 90 mm in each case depending on battery size
- 2) Calculation in accordance with VDI 3597; extended for larger batteries by 90 mm in each case depending on battery size
- 3) Dependent on the lift mast; sideshift/fork tilt: 2°/4°

Key data

				FM-X 22
1.1	Manufacturer			STILL
1.2	Manufacturer's type designation			FM-X 20
1.3	Drive			Electric
1.4	Operation			Seated
1.5	Load capacity/load	Q	kg	2200
1.6	Load centre of gravity	c	mm	600
1.8	Load distance	x	mm	482
1.9	Wheelbase	y	mm	1669

Weights

				FM-X 22
2.1	Net weight (including battery)		kg	5100
2.3	Front/rear axle load without load		kg	3020/2070
2.4	Front/rear axle load with fork forwards and with load		kg	2780/4520
2.5	Front/rear axle load with fork backwards and with load		kg	930/6370

Wheels, chassis frame

				FM-X 22
3.1	Tyres			Polyurethane
3.2	Front tyre size		mm	Ø 360 x 140
3.3	Rear tyre size		mm	Ø 350 x 100
3.5	Number of wheels at front/rear (x = driven)			1x/2
3.7	Track width, rear	b11	mm	1167

VDI datasheet FM-X 22*

Basic dimensions

				FM-X 22
4.1	Lift mast/fork carriage tilt, forwards/backwards	a/b (°)	°	2/4
4.2	Height with lift mast retracted	h1	mm	5200
4.3	Free lift	h2	mm	4578
4.4	Lift	h3	mm	12,500
4.5	Height with lift mast extended	h4	mm	13,122
4.7	Height of overhead guard (cab)	h6	mm	2200
4.8	Seat height	h7	mm	1140
4.10	Height of load wheel supports	h8	mm	373
4.19	Overall length	l1	mm	2556
4.20	Length including fork back	l2	mm	1406
4.21	Overall width	b1/b2	mm	1270
4.22	Fork arm dimensions	s/e/l	mm	50/120/1150
4.23	ISO 2328 fork carriage, class/model A, B			2/A
4.24	Fork carriage width	b3	mm	760
4.25	Width across forks, min./max.	b5	mm	336/640
4.26	Width between load wheel supports	b4	mm	920
4.28	Reach forward	l4	mm	695
4.31	Ground clearance with load under lift mast	m1	mm	70
4.32	Ground clearance at centre of wheelbase	m2	mm	70
4.34.1	Working width when handling pallets measuring 1000x1200 crosswise across forks	Ast	mm	2908
4.34.2	Working width when handling pallets 800x1200 lengthwise across forks	Ast	mm	2937
4.35	Turning radius	Wa	mm	1915
4.37	Length across the load wheel supports	l7	mm	2066
4.43	Step height		mm	345

Performance data

				FM-X 22
5.1	Driving speed with/without load		km/h	14/14
5.11	Driving speed with/without load when reversing		km/h	14/14
5.2	Lifting speed with/without load		m/s	0.34/0.50
5.3	Lowering speed with/without load		m/s	0.52/0.50
5.4	Reach speed with/without load		m/s	0.18
5.7	Climbing capability with/without load		%	10/15
5.8	Max. climbing capability with/without load		%	15/20
5.9	Acceleration time (over 10 metres) with/without load		s	4.5/4.0
5.10	Service brake			Gen./hydr. mech.

Electric motor

				FM-X 22
6.1	Traction motor, power rating, S2=60 min.		kW	6.5
6.2	Lift motor, power rating, S3=15%		kW	14
6.3	Battery in accordance with DIN 43531 / 35 / 36 A, B, C, no			43531C/254-2
6.4	Battery voltage/nominal capacity K5		V/Ah	48/775
6.5	Battery weight (+/-5% depending on the manufacturer)		kg	1120
6.6	Energy consumption in accordance with VDI cycle		kWh/h	
6.7	Handling performance		t/h	
6.8	Energy consumption at max. handling performance		kWh in 1 h (kWh/h)	

Other

				FM-X 22
10.1	Working pressure for attachment		bar	254
10.2	Oil flow for attachments		l/min	20
10.7	Sound pressure level in driver's compartment		dB(A)	69

VDI datasheet FM-X 22*

				FM-X 22
	Distributed load in accordance with VDI 2199		kg/m ²	

VDI datasheet FM-X 25*

*Subject to change

DS = drive side

LS = load side

All dimensions include sideshift/fork tilt; mast sideshift not possible.

- 1) Decreases for larger batteries by 90 mm in each case depending on battery size
- 2) Calculation in accordance with VDI 3597, extended for larger batteries by 90 mm in each case depending on battery size
- 3) Dependent on the lift mast, sideshift/fork tilt: 2°/4°

Characteristics

				FM-X 25
1.1	Manufacturer			STILL
1.2	Manufacturer's type designation			FM-X 25
1.3	Drive			Electric
1.4	Operation			Seated
1.5	Load capacity/load	Q	kg	2500
1.6	Load centre of gravity	c	mm	600
1.8	Load distance	x	mm	482
1.9	Wheelbase	y	mm	1669

Weights

				FM-X 25
2.1	Net weight (including battery)		kg	4240
2.3	Axle load without front/rear load		kg	2860/1380
2.4	Axle load with fork forwards with front/rear load		kg	1030/5710
2.5	Axle load with fork backwards with front/rear load		kg	2640/4100

VDI datasheet FM-X 25*

Wheels, chassis frame

				FM-X 25
3.1	Tyres			Polyureth.
3.2	Front tyre size		mm	Ø 360 x 140
3.3	Rear tyre size		mm	Ø 350 x 100
3.5	Number of wheels at front/rear (× = driven)			1x/2
3.7	Rear track width	b11	mm	1167

Basic dimensions

				FM-X 25
4.1	Lift mast/fork carriage tilt, forwards/backwards	a/b (°)	°	1/3
4.2	Height with lift mast retracted	h1	mm	2450
4.3	Free lift	h2	mm	1828
4.4	Lift	h3	mm	5580
4.5	Height with lift mast extended	h4	mm	6202
4.7	Height of overhead guard (cab)	h6	mm	2270
4.8	Seat height	h7	mm	1140
4.10	Height of load wheel supports	h8	mm	373
4.19	Total length	l1	mm	2556
4.20	Length including fork back	l2	mm	1406
4.21	Total width	b1/b2	mm	1270
4.22	Fork arm dimensions	s/e/l	mm	50 / 120 / 1150
4.23	ISO 2328 fork carriage, class/model A, B			2/A
4.24	Fork carriage width	b3	mm	760
4.25	Width across forks, min./max.	b5	mm	336/640
4.26	Width between load wheel supports	b4	mm	920
4.28	Reach forward	l4	mm	695
4.31	Ground clearance with load under lift mast	m1	mm	70
4.32	Ground clearance at centre of wheelbase	m2	mm	70
4.34.1	Working width when handling pallets measuring 1000x1200 across forks	Ast	mm	2908
4.34.2	Working width when handling pallets 800x1200 lengthways on forks	Ast	mm	2937

				FM-X 25
4.35	Turning radius	Wa	mm	1915
4.37	Length across the load wheel supports	l7	mm	2066
4.43	Step height		mm	345

Performance data

				FM-X 25
5.1	Driving speed with/without load		km/h	14/14
5.11	Driving speed with/without load when reversing		km/h	14/14
5.2	Lifting speed with/without load		m/s	0.34/0.5
5.3	Lowering speed with/without load		m/s	0.52/0.5
5.4	Reach speed with/without load		m/s	0.18
5.7	Climbing capability with/without load		%	10/15
5.8	Max. climbing capability with/without load		%	15/20
5.9	Acceleration time (over 10 metres) with/without load		s	
5.10	Service brake			Gen./hydr. mech.

Electric motor

				FM-X 25
6.1	Traction motor, power rating, S2=60 min.		kW	6.5
6.2	Lift motor, power rating, S3=15%		kW	14
6.3	Battery in accordance with DIN 43531/35/36 A, B, C, no			43531C / 254-2
6.4	Battery voltage/nominal capacity K5		V/Ah	48/700
6.5	Battery weight (+/-5% depending on the manufacturer)		kg	1120
6.6	Energy consumption in accordance with VDI cycle		kWh/h	
6.7	Handling performance		t/h	
6.8	Energy consumption at max. handling performance		kWh in 1 h (kWh/h)	

Wheels and tyres

Other

				FM-X 25
10.1	Working pressure for attachment		bar	254
10.2	Oil flow for attachments		l/min	20
10.7	Sound pressure level in driver's compartment		dB(A)	69
	Distributed load in accordance with VDI 2199		kg/m ²	3088

Wheels and tyres

Permissible tyres

⚠ DANGER

The use of non-permissible tyres has a negative effect on the stability of the truck. Risk of accidents!

- 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

Polyurethane - direct bond

Model	Tyres
FM-X 10 (N) (standard versions)	∅ 360 x 130
FM-X 12 (N) (standard versions)	∅ 360 x 130
FM-X 14 (N) (standard versions)	∅ 360 x 130
FM-X 17 (N) (standard versions)	∅ 360 x 130
FM-X 20 (N, W, EW) (standard versions)	∅ 360 x 130
FM-X 22 (standard versions)	∅ 360 x 140
FM-X 25 (standard versions)	∅ 360 x 140

Load wheels

Polyurethane - direct bond

Model	Tyres
FM-X 10 (N) (standard versions)	Ø 285 x 100
FM-X 12 (N) (standard versions)	Ø 285 x 100
FM-X 14 (N) (standard versions)	Ø 285 x 100
FM-X 17 (N) (standard versions)	Ø 285 x 100
FM-X 20 (N, W, EW) (standard versions)	Ø 350 x 100
FM-X 22 (standard versions)	Ø 350 x 100
FM-X 25 (standard versions)	Ø 350 x 100

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