Original instructions

STILL
ELECTRONIC
DOCUMENTATION
SYSTEM

High level order picker

EK-X

CE

2131 2133

first in intralogistics

5213 804 2501 EN - 01/2016

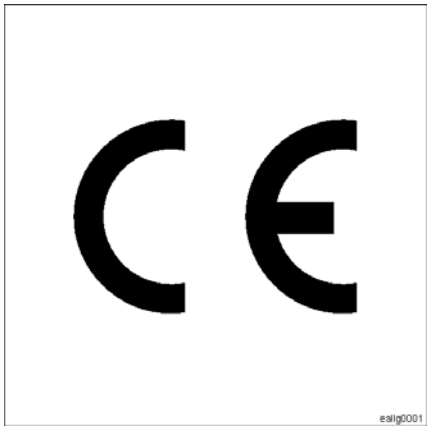
3 Overview

4 Operation

1

Foreword

General



Our industrial trucks comply with applicable European regulations. Any other applicable country-specific regulations or operating conditions for the use of industrial trucks must also be observed.

The aim of this manual is to inform you about how to safely handle your industrial truck and how to keep it operational. It is therefore essential that operators, operating personnel and maintenance personnel familiarise themselves with, understand and adhere to the contents of this manual. The operability, performance and service life of the vehicle are dependent on:

- Proper use
- A daily inspection by the operator and
- Regular, appropriate maintenance work

EC declaration of conformity

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

Safety instructions

Explanations of the terms used in this manual:

⚠ DANGER

There is the risk of fatality to the operator.

The procedures indicated should be complied with in full in order to avoid this danger.

⚠ WARNING

There is a hazard that could cause major damage to property or to the health of the operator.

The procedures indicated should be complied with in full in order to avoid this danger.

⚠ CAUTION

There is a risk of damage to property.

The procedures indicated should be complied with in full in order to avoid this danger.

NOTE

Special attention is drawn to procedures and technical requirements that must particularly be observed.

Standard version and optional equipment

These instructions describe the specified use and the prescribed maintenance work for industrial trucks in the standard version and the supplementary equipment on offer at the time of printing.

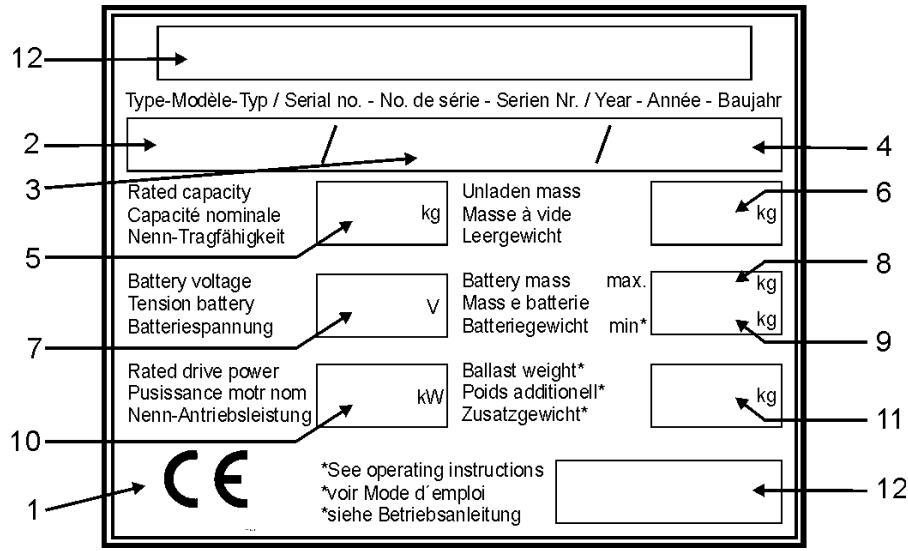
Special versions and special equipment (UPA)

For industrial trucks in special versions or equipped with special equipment, a additional order related documentation will be created and published if advised.

Truck identification, Factory nameplate

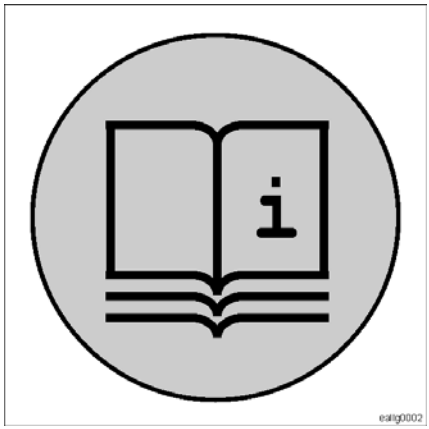
The nameplate is fitted in the area of the driving seat and contains the following details:

Factory nameplate



1	CE symbol. The CE symbol confirms that the EU machine guidelines and all the relevant guidelines, which are valid for this product, have been met.	5	Nominal loading capacity
2	Truck type	6	Unladen weight
3	Truck serial number. This serial number must be given in the event of any queries.	7	Battery voltage
4	Year of manufacture	8	Maximum battery weight
		9	Minimum battery weight
		10	Rated drive power
		11	Ballast weight
		12	Name of manufacturer

Product support documentation



This includes:

- Spare parts list
- Operating and maintenance manual
- VDMA (German Engineering Federation) information booklet on proper usage
- Any additional documentation for the driver's seat
- Any additional documentation for an attachment
- Any additional documentation for the battery
- Any additional order-related documentation

Accessories accompanying the product

Each truck is supplied with a box of accessories upon delivery from the factory.

The contents differ depending on the truck type and the order.

This includes, among other items, an adhesive label that shows how to disable the magnetic brake on the traction motor using mechanical means. This adhesive label can be affixed in a suitable position in the control compartment near the magnetic brake.

This box also contains the documentation to accompany the product, and the screws and wrench that are required to disable the magnetic brake.

Depending on the type, additional lubricating nipples may be included for maintenance.

Safe-keeping and passing on

- These operating and maintenance instructions must be kept safely so that the operator always has access to them.
- Documents can be ordered retrospectively. Please give the ID or the order number.
- If the truck is sold on, the complete documentation should be passed on along with the truck.

Copyright and proprietary rights

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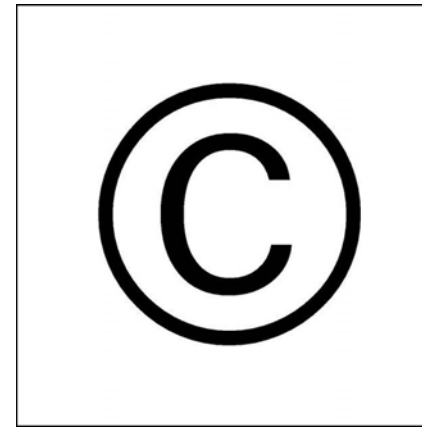


Operator, form of address

Our products are suitable for use by male or female operators. If applicable in your language, however, these instructions use only the masculine form of address to simplify the text"."

The dimensions of the operator's compartment on our trucks are designed in accordance with standard DIN EN ISO 3411 and are accordingly constructed for both female and male operators. This standard also stipulates ranges within which the operator's body weight and dimensions should lie. If these trucks are operated by persons (male or female) who do not meet these criteria, the following effects must be considered:

Operator, form of address

- The ergonomic conditions may be less favourable. For example, it may not be possible to reach pedals such as the accelerator and brake pedals, the overhead guards might be too low or the adjustment ranges for the steering wheel and seat may no longer be sufficient.
- The load-bearing capacity of the industrial truck may be negatively affected.

Please consult your authorised dealer wherever help is required.

2

Safety

General safety information

- People must stay away from the working area (danger area) of the truck. If a person does enter the danger area, all movements of the truck must be stopped immediately and the person must be directed away from the area.
- The truck may only be operated from the operator's cab.
- When travelling without load, lower fork to the floor level.
- When driving with a load, the load must be lifted a few centimetres off the ground (clear of the ground, max. 500 mm).
- The driver must keep all body parts within the contours of the driver's compartment. The driver must refrain from sticking his head out to gain a better view and from reaching into the area of the moving lift mast, because even doing this is highly dangerous.
- Aside from the driver, there must be no other person present on the truck, unless the truck has additional equipment to enable operation with two persons.
- If there are marked roadways, the truck is to be moved only within these markings for safety reasons.
- It is never permitted for anyone to stand beneath a raised load or driver's compartment.
- Basically, it is the driver's duty to adapt his driving speed to the local conditions and the respective situation. When cornering in particular, attention must be paid to the overall height and the centre of gravity, which will be high as a result.
- The condition of the floor surface influences the braking distance of the truck. The driver must take account of this in his driving and braking style.

General safety information

- Essentially, all safety information located on the truck must be observed.
- Missing or illegible safety information is to be changed.
- When cornering and driving past parts of buildings that restrict visibility, use the horn to warn others that the truck is approaching.
- If the driver's view is obstructed, e.g. due to a bulky load, a guide must patrol the route to ensure safety.
- When driving through doorways and under ceiling joists, take the height of the truck into consideration.
- Multiple operations or other types of operations not described here, especially the blocking or disabling of operating devices, can cause damage to the truck but also uncontrolled movements and is therefore prohibited.
- The driver can secure the truck against unauthorised use by removing and taking the switch key or by deleting the access information on the electronic access control system when leaving the truck.
- If required by the area of application and work situation, the operator must use suitable personal protective equipment such as protective shoes, safety helmet, protective gloves or industrial goggles. The operator and operating company are responsible for ensuring this.
- The openings in the gassing area of the battery must not be covered or fully closed. The 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, which could allow the gas created during charging to enter the area of the driver's compartment.

Operating safety is more important than working speed!

Non-ionising radiation

⚠ WARNING

Risk of injury

Persons with active or non-active medically implanted devices must take it upon themselves to ensure that they are not exposed to dangerous electromagnetic radiation. The table below indicates the limit values for the maximum electric field strength of the electromagnetic radiation emitted by this truck.

It is the responsibility of the truck operating company to explain these dangers to the employees in detail.

Maximum limit values for the electromagnetic emitted interference in accordance with EN 12895 at a distance of 10m.

Frequency [MHz]	Electric field strength [dBµV/m]
30 to 75	34
75 to 400	34 to 45 with increasing frequency
400 to 1000	45

Vibrations

The vibrations of the machine must be determined on an identical machine in accordance with the standard EN 13059" Vibration measurements on industrial trucks".

Weighted effective value of the acceleration the body (feet or seat surface) is subjected to	< 1,2 m/s^2
Uncertainty K	0,3 m/s^2

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

The personal vibration load on the driver over a working day shall be determined in

accordance with the **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.

Special safety advices for engaging loads

Discuss this with your contractor.

Recognising danger is half the battle!

- Loads consisting of loose packaged items must not be higher than the upper edge of the cab parapet.
- Loads may only be transported in appropriate containers or safe packaging.
- The load must not change its gravity center position or even fall down when accelerating/ braking or when travelling in curves (centrifugal force).
- If loads cannot be transported with the necessary safety, then the safety has to be brought about by using appropriate containers or fastenings.
- Before engaging any load, ensure that it does not exceed the loading capacity of the truck (diagram of permissible loads) or the maximum permissible dimensions as specified by the data sheet.
- Loads which are to be transported and placed in storage must be securely packaged to ensure that the centre of gravity of the load does not shift during transport, and that no parts are able to drop out. Remember to pay sufficient attention to the safety of your workmates.
- If very high loads have to be transported which block the view of the travel path, the relevant safety measures must be taken.
- The load suspension device must never be used to raise hanging or suspended loads.

Safe handling of operating media

The following operating media are used in this truck:

- Gear oill
- Hydraulic oil
- Battery acid

The handling of these materials is governed by comprehensive safety regulations. The most important points include:

For gear and hydraulic oil

⚠ DANGER

Danger to life or danger of injury from hydraulic fluid escaping under pressure.

If hydraulic fluid escapes under pressure, for example from a damaged pipe or through leaks in a component, it can easily penetrate the skin. By poisoning the surrounding tissue this can lead to the loss of the affected body part or even to death. Even if such injuries do not feel particularly painful or serious, a doctor must be consulted immediately. The cause of the injury must be described exactly and the treatment started promptly.

ENVIRONMENT NOTE

- Oils pose a threat to the water supply, and must accordingly always be transported and collected in regulation containers.
- Do not spill oil. Bind any spillages using suitable materials..
- Take care to dispose of oil-containing wastes correctly.
- Dispose of used oil correctly.

Personal protective gear

- Avoid all skin contact. Pay particular attention to prevent contact with oil emerging under pressure (hose breakage, leaks).
- Do not breathe in oil mist.
- If it is not possible to avoid contact with oils, personal protective gear such as protective gloves, protective goggles etc. must be worn.

For battery acid

⚠ DANGER

Danger of explosion

- When charging batteries, an explosive gas mixture can be generated which can still remain present for a long period after completion of the charging process. Ensure adequate ventilation.
- Within a 2 metre area of charged batteries, smoking, fires and open flames are strictly prohibited.

- Battery acid is poisonous. Always avoid breathing in vapours.
- Battery acid is caustic. Take all necessary precautions to prevent skin contact.
- Rinse off battery acid immediately using plenty of clear water.
- When handling battery acid, wear personal protective gear such as gloves and clothing as well as facial protection.
- Should skin contact still take place, rinse immediately using plenty of clear water and consult a doctor.
- Comply with the additional operating instructions supplied by the battery and the battery charger manufacturer.

Risk assessment

According to the relevant CE Directives, the operator of a business enterprise is required to compile an **Operating instruction document**, based on a risk assessment . The aim of the analysis is to establish those hazards which could arise from the product or the use of the product in the particular environment at the place of use and the conditions of use prevailing there. We can help you to carry out the risk assessment . The operating instruction document should provide a warning of the hazards thus established and point out possible remedial measures.

We recommend that this Operating instructions booklet in your hands be incorporated in the full-scale **Operating instruction document**.

Regular testing

This industrial truck must be checked at least once a year by a specialist (expert) according to our specifications.

Our test instructions summarise all activities that must be performed for the purposes of detecting damage or defects that have an effect on safety. The requirements pursuant to FEM 4.004 are included in these test instructions.

A written report about the inspection has to be created.

Please check whether regular safety inspections of the truck by an authorized expert are a legal requirement in the country this truck will be used. You are responsible for doing so as operating company of the truck.

Residual dangers

Despite adherence to all valid safety regulations relating to the design and construction of our trucks and irrespective of correct operation by the user, a certain danger element does remain. Any such possible hazards are referred to in the individual chapters where relevant.

Please heed all provided safety warnings.

Residual hazards with commissioner trucks

⚠ DANGER

Risk of accident

- During driving, the operator must make sure that all body parts are located within the truck contour at all times, particularly in trucks without barriers and a cab rail.
- Order picking, i.e. reaching outside the truck contour, is only permitted when the truck is stationary.
- When driving past static building and racking parts, make sure that you maintain a sufficient distance and adjust your driving speed.
- In the event of oncoming traffic, always keep a sufficient distance between yourself and the approaching truck and adjust your driving speed.
- The operator must always be securely positioned and have a secure footing on the platform, especially when cornering.

Description of the situations

Depending on their design or the way in which the commissioner trucks described here are used, there may be a risk of severe injury to the operator from static building or racking parts.

The risk exists in trucks:

- Without barriers and a cab rail
- Without rail guidance
- With feed-in rollers on one or both sides
- With a one-sided guide

In versions specified, the above-mentioned risks may occur because second hand operation is not required for the truck type and the modes of operation. In addition, trucks without barriers or a cab rail may be driven with the driver's compartment in the raised position (floor of driver's cab <1.2 m). In trucks with barriers and a cab rail, the barriers may be left open when driving with the driver's compartment in the raised position (floor of driver's cab <1.2 m). If the driver's compartment needs to be raised higher than 1.2 m, the barriers must be closed.

Application area

The floor in the application area must have sufficient strength to bear the weight of the truck. The wheel loads / floor loads specific to your truck will be made available by your responsible sales representative. The condition of the floor surface affects the braking distance of the truck. The operator must take this into consideration when driving and braking.

The trucks described here are designed to be used in areas (according to VDI2695, category 1)

- with flat and even floor without significant slopes (below 3%)
- normal work load, 50% capacity utilization; full load and half shift or half load and full shift.

and ambient temperatures according to EN 1175-1.

⚠ WARNING

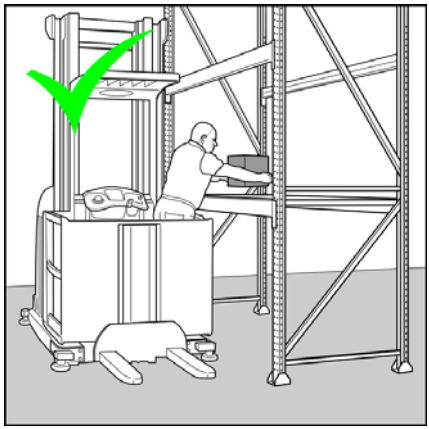
Restrictions in the applicational area.

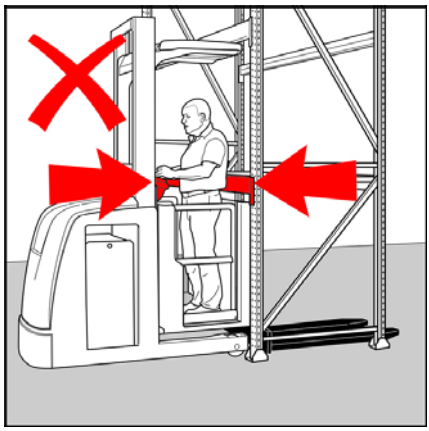
The trucks described here **must not** be used:

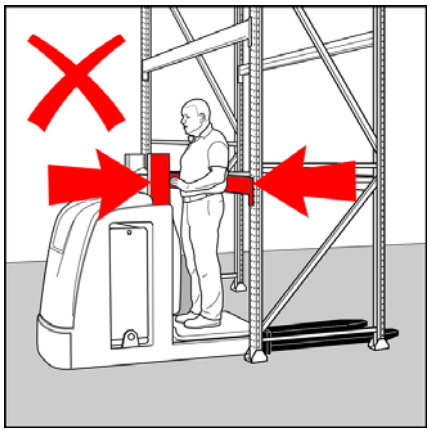
– in areas at risk from fire
– in areas at risk from explosions
– iin areas with atmospheres conducive to corrosion
– in atmospheres containing large amounts of dust
– in public traffic
– in refrigerated warehouses (see „special equipment“**Cold storage).**
– on surfaces which are not horizontal.

The respective national regulations must be observed.

Intended use







These industrial trucks are intended for use in order picking applications, i.e. for collecting parts that are stored in racking systems, for example. This industrial truck is therefore designated as a vertical order picker. The forks must be equipped with suitable load-carrying equipment in order to set down the parts picked for the order. This process is described in the section entitled **Picking up and setting down loads**.

The industrial truck is not suitable for stacking and unstacking unit loads in storage systems.

⚠ DANGER

Risk of serious injury or death

When driving underneath solid structures (e.g. rack bridge pieces, transfer stations or crossbars), there is a risk that the operator may be crushed and fatally injured between the racking and the operating panel. This risk must be countered by taking measures on site, such as using approach rails for the load wheel arms.

It is the responsibility of the operating company to identify and eliminate any danger areas and/or to prohibit any reasonably foreseeable misuse by issuing operating instructions.

The industrial truck is also suitable for raising, lowering and transporting unit loads.

Use for other purposes is prohibited.

NOTE

There are also variants of this order picker that have a walk-in order picking cage or an order-picking platform instead of the fork.

The auxiliary lift can be moved to a height that is ideal for setting down and collecting items for order picking.

Observe the instructions in the paragraph "safety".

The maximum load that can be lifted is specified on the loadbearing information plate (load diagram) and must not be exceeded.

If these industrial trucks are to be used for tasks not listed in these operating instructions or in the guidelines for the intended use of industrial trucks issued by the VDMA (German

Engineering Federation) and therefore need to be converted and retrofitted, please note that any structural modification may impair the performance and stability of the industrial trucks and can result in accidents. It is therefore not permitted to make such changes without our approval

Add-on parts and modifications (e.g. the welding-on of parts or the creation of openings) could weaken the supporting structure and are therefore only permitted after acceptance by our design department. Functional changes through modifications to the electrical system or the software also require our acceptance and release.

Before any such work is done you should therefore make contact with the branch office or the specialist representative in your area.

Narrow aisle vehicles

Narrow aisle vehicles may only be operated in narrow aisles in accordance with the intended use, if suitable precautions have been taken (e.g. mobile or stationary protective equipment to EN 2006/42/EG and EN ISO 13849) which prevent the possibility of collisions occurring between persons and vehicles, or which prevent persons and other vehicles also being present at that time.

In Europe it is the owner's responsibility to ensure that EU guidelines and stipulations are complied with. The owner must conduct a risk analysis to prove that adequate protection is provided. On the basis of our experience, we offer to support the owner in this task.

Original parts

Our original parts and accessories are specially designed for our vehicles. We would specifically point out that parts and accessories not supplied by us have also not been tested and approved by us. The incorporation and/or use of such products can consequently adversely affect the structurally predetermined properties of your vehicle and thus

impair the active and/or passive drivingsafety. The manufacturers are in no way responsible for any damage caused by the use of non-original parts and accessories.

Directives and guidelines

In most countries, the national directives and guidelines for proper usage of these trucks must be observed. We therefore ask you to please contact the relevant authorities or speak to the authorised representatives for more information. You as the operator are responsible for this.

Driver's licence

In most countries, a driver's licence is required to operate these trucks.

Please check whether a driver's licence is required to operate this truck in your country. This driver's licence serves as proof that comprehensive training has been completed. As the operating company, you are responsible for ensuring that this requirement is fulfilled.

We recommend that you contact your branch or specialist representative. They will be able to offer you the relevant training and tests required to obtain your driver's licence.

Alterations to industrial trucks

Operating companies may only make alterations or arrange for alterations to be made to self-propelled industrial trucks if the industrial truck manufacturer has withdrawn from business and there is no business successor. However, operating companies must:

- Ensure that any alterations being made and all associated safety issues are planned, checked and performed by a specialist engineer for industrial trucks
- Have permanent records of the construction, test(s) and execution of the alterations

- Make and approve corresponding alterations to the signs stating the load capacity, information signs and adhesive labels as well as in operating manuals and workshop manuals
- Mount a durable and easily visible label on the industrial truck providing details of the type of alteration or conversion, alteration or conversion date and name and address of the organisation entrusted with this task

Personal protective equipment

For operation of our products, no personal protective equipment is required under normal application conditions.

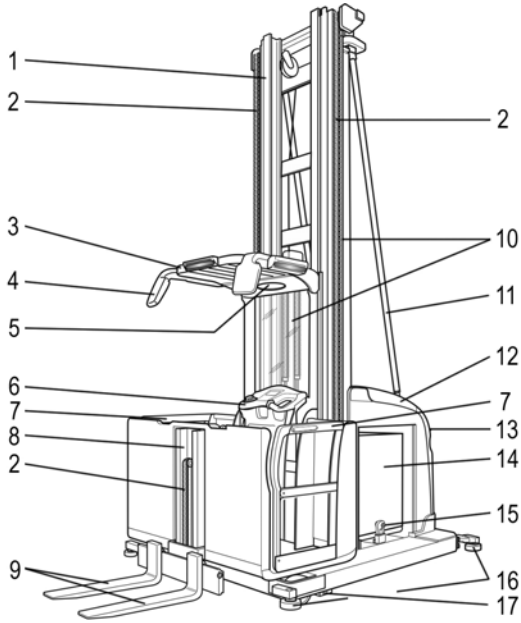
However, it is possible that the use of personal protective equipment is required at the place of use due to the on-site circumstances or local or internal regulations.

The national regulations valid at the place of use must be observed.

3

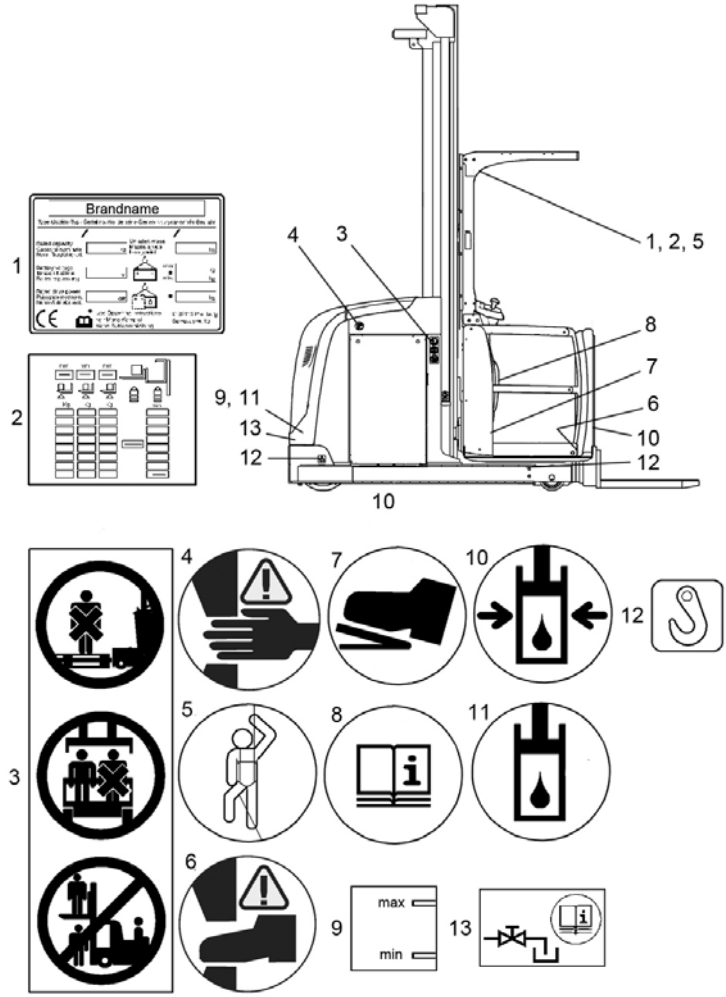
Overview

View of the truck



1	Lift mast	10	Lift cylinder
2	Load chain	11	Lift mast bracing*
3	Overhead guard	12	Battery compartment cover
4	Mirror module*	13	Control compartment cover
5	Abseil system	14	Battery
6	Operating panel	15	Battery lock
7	Barrier	16	Guide rollers*
8	Auxiliary lift	17	Load wheel
9	Load fork	*	Option

Labelling on standard trucks



1 Nameplate
2 Load capacity diagram
3 a. Do not transport people on the load or load support.
b. Driver's compartment only approved for use by a single person.
c. It is not permitted for people to sit or stand on the load, on the load support, underneath a raised load or to be carried as passengers.
4 Risk of crushing hands
5 Storage space for abseil system
6 Risk of crushing feet
7 Foot switch
8 Storage space for product documentation

9	Min./max.
10	Container is under hydraulic pressure, hydraulic cylinder
11	Oil tank
12	Lifting point for crane loading
13	Emergency lowering valve

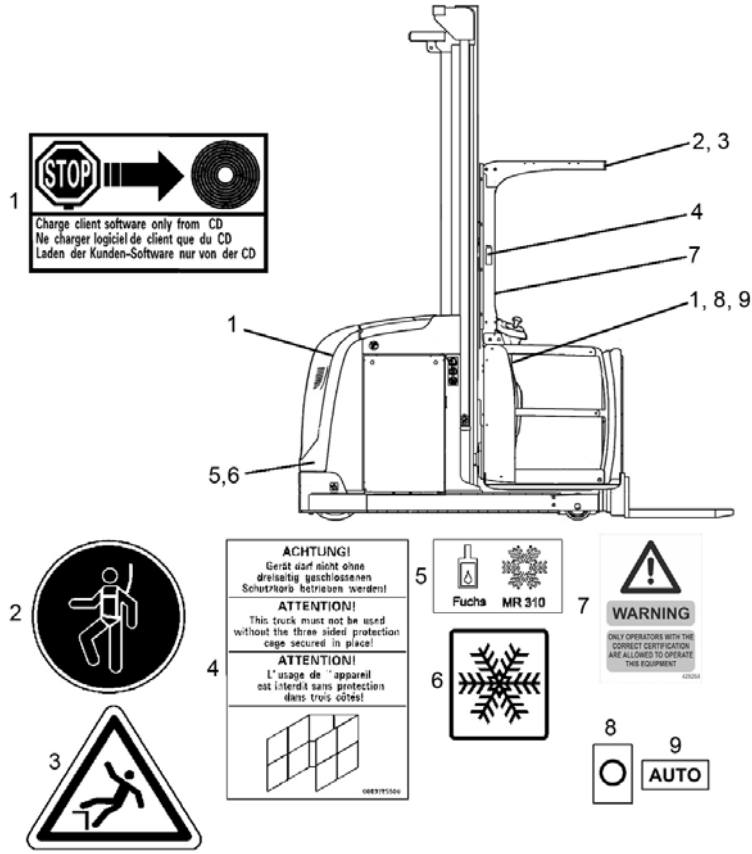
A number of information signs are fitted on every truck depending on the series to draw attention to hazards, technical data or requirements.

These signs must always be present in full and must always be legible.

NOTE

The section entitled "Labelling for special equipment" provides details of further information signs that may also be required based on the order.

Labelling on special equipment



1 Truck with customised software. Only the customer's special version and not the standard software may be installed in the truck control unit.
2 Storage space for the fall protection device
3 Note on risk of falling
4 The industrial truck must not be operated if a safety barrier closed on three sides is not present
5 Lubricants suitable for cold store applications must be used (see lubricants for cold store trucks).
6 Industrial truck with cold store equipment
7 This industrial truck must only be operated by operators with the appropriate training.
8 Switch in "switched off" position
9 Switch in "automatic mode" position

The pictograms shown here replace the pictograms for the standard version or are fitted in addition to the standard pictograms.

Truck description

You can find information about how to operate the individual functions in the corresponding chapters.

General

This order picker is available in a wide range of variants:

- Without auxiliary lift
- With auxiliary lift
- With mechanical guidance
- With inductive guidance
- Without guidance system

The driver can raise himself and the lifting accessory to the required working height by raising the driver's cab.

The auxiliary lift* may be used to adjust to a suitable shelf height when performing order picking tasks. When transporting loads, the auxiliary lift* must always be lowered to such a height that the load is clear of the ground during transportation.

In very narrow aisles, the order pickers are guided either mechanically or inductively (see section entitled "Special equipment").

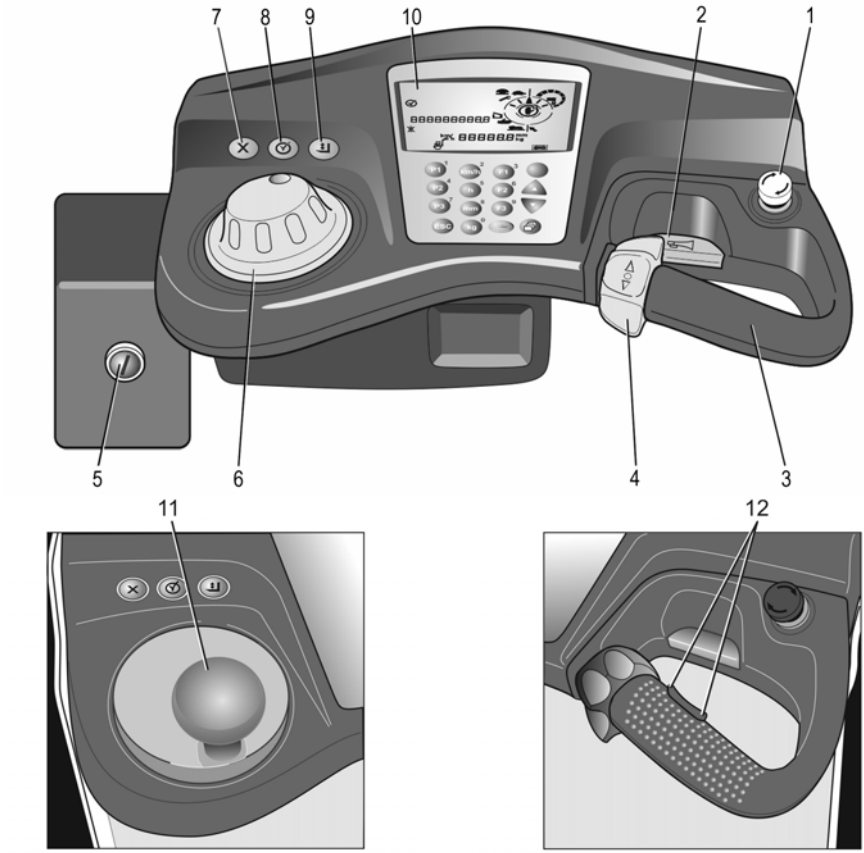
If the aisles are wide enough, the trucks can be driven freely with the load lowered. All movements (driving, lifting/lowering cab lift, lifting/lowering auxiliary lift) are infinitely adjustable.

Operating errors can be prevented to a large extent by means of safety circuits. For lift heights where the floor of the driver's cab is up to a height of 1.2 m (driven freely or guided), the cab barriers may be left open when the truck is being driven. If the truck is driven at a lift height of greater than 1.2 m, the barriers must be closed.

A symbol in the display informs the operator of this requirement.

* Option

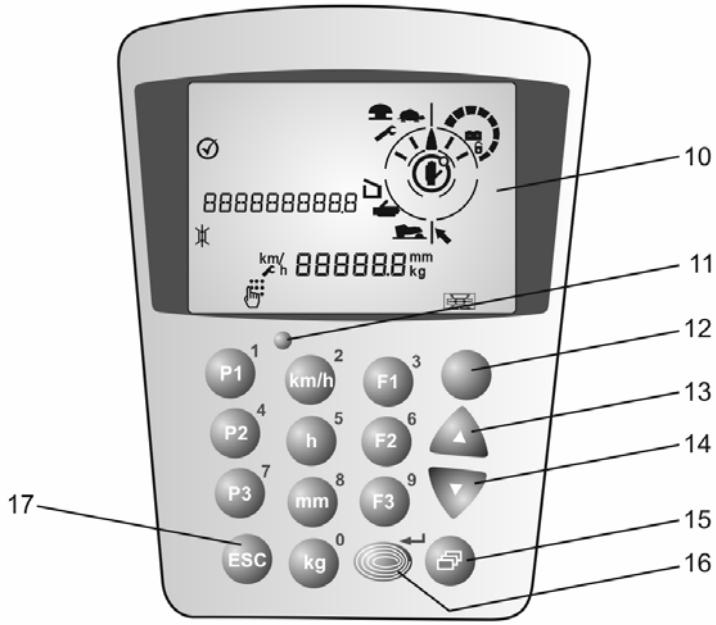
Operator´s console



1	Emergency stop switch
2	Horn button
3	Handhold and sensor surface for two-hand operation
4	Operating lever – forward/reverse drive
5	Key switch
6	Steering knob and sensor surface for two-hand operation
7	Special function preselection button*
8	Override button, e.g. to release the brake following automatic braking or to bridge intermediate lift cut-out*
9	Preselector button additional lift
10	Display field for truck operating status
11	Steering wheel* and sensor surface for two-hand operation
12	Operating rocker switch for cab lift or additional lift - lower

*Option

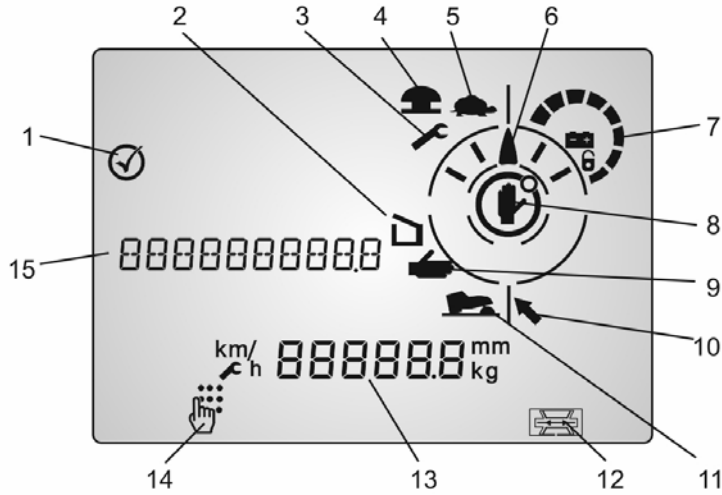
Display unit



0	Entry of the number 0 or switch to weight indicator in kg*
1	Entry of the number 1 or switch to drive programme 1*
2	Entry of the number 2 or switch to speed indicator in km/h
3	Entry of the number 3 or switch to function 1*
4	Entry of the number 4 or switch to drive programme 2*
5	Entry of the number 5 or switch to operating hours display in hrs
6	Entry of the number 6 or switch to function 2*
7	Entry of the number 7 or switch to drive programme 3*
8	Entry of the number 8 or switch to lift height indicator in mm
9	Entry of the number 9 or switch to function 3*
10	LCD display, see chapter **LCD displays**.
11	Brightness sensor
12	Selection and deselection button for IZF*, special function*
13	Arrow button UP
14	Arrow button DOWN
15	Change menu button
16	Blue Q button
17	Cancel entry

*Option

Indicators



1	Confirmation button required	10	Automatic mechanism for inductive guidance
2	Barriers opened	11	Actuation required using foot switch
3	Maintenance interval expired	12	Operating status of inductive guidance
4	Emergency stop active	13	Indicators for operating hours, speed*, lift height*, load weight*. Switch using the keypad.
5	Creep speed active	14	PIN code entry required using keypad
6	Steering angle display	15	Indicators for error messages and information.
7	Battery discharge indicator		
8	Second hand operation required on steering wheel		
9	Second hand operation required on handhold		

*Option

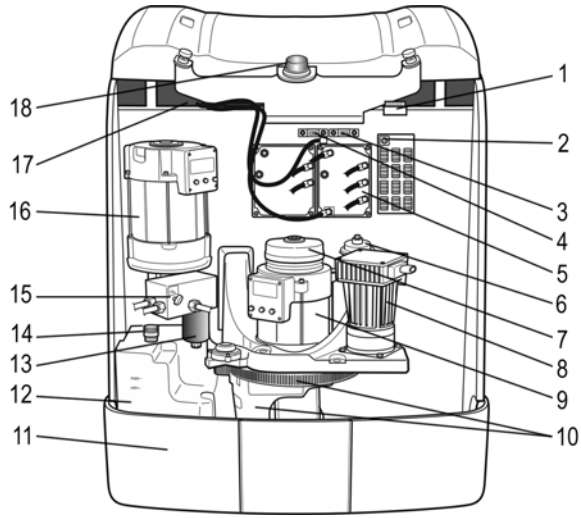
Indicators and information

Operating errors and malfunctions can lead to information being displayed (Info) or error numbers being displayed (Error). As an initial remedial action, the truck should be operated correctly or driven into a neutral area of the warehouse that is not equipped with a sensor system. The truck must then be switched off and on again in this neutral area.

If the information is still displayed or is not included in the list below, the authorised service centre must be contacted in order to remedy the fault. When contacting the authorised service centre, it is very helpful to specify what information is being displayed.

Indicator	Possible cause	Remedy
Info1	Battery discharged, battery voltage too low or battery faulty	Insert the correct charged battery or call battery customer service.
Info2	Emergency off switch pressed	Unlock the emergency off switch
Info3	Truck control unit has triggered the drive stop.	Can be unlocked or bridged as an option in order to continue driving at creep speed.
Info9	Steering knob more than 2° from the **straight-ahead** position within mechanical or inductive guidance.	Move the steering knob into the **straight-ahead** position.
Info12	Slack chain caused by load support resting on it	Lift main lift.
Info13	Accidental shift in the inductive guidance from "Auto" to "Hand".	Switch back to "Auto".
Info14	Selected actuation is not plausible or a key is stuck.	Actuate functions only in accordance with their intended use.
Info15	Incorrect switch-on sequence or switch stuck	When switching on the truck, do not activate any of the operating devices.

View into the control compartment



1	Control current fuses	10	Steering gears and gearbox
2	Programming interface	11	Collision protection
3	Main current fuse for steering	12	Hydraulic oil tank
4	Main current fuse for driving and pump	13	Hydraulic oil filter
5	Truck control unit	14	Hydraulic oil filling opening
6	Horn	15	Emergency lowering valve
7	Electromagnetic brake	16	Pump motor
8	Steering motor	17	Battery connector
9	Traction motor	18	Direction indicator

Safety equipment

Emergency-switch

In an emergency, the current entry can be interrupted by pressing the emergency off switch. This causes the truck to be braked to a standstill.

NOTE

Actuate the emergency off switch only in an emergency.

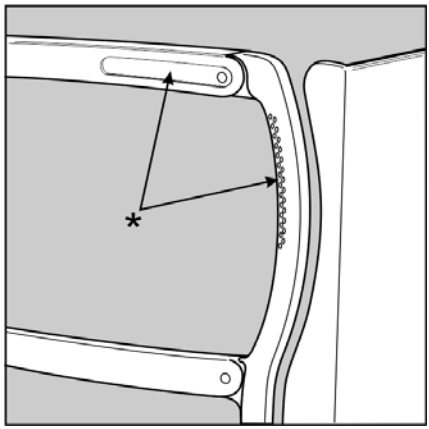
Barrier

WARNING

Danger of crushing

If the barrier is touched at any point other than the points indicated (*) when opened, there is a risk that hands may be crushed.

Only touch the grip areas to open and close the barrier. If the lift height of the cab floor is up to 1.2 m (driven freely or guided), the cab barriers may be left open when the truck is being driven. If the truck is to be driven at lift heights greater than 1.2 m, the barriers must be closed.



Horn

The horn is an acoustic warning unit that the driver can use at blind spots to signal that the truck is approaching. The horn is part of the safety system and must always be in good working order.

Two-hand controls

Inside the rack aisle, operation using both hands is necessary for, every function.

Driver's overhead guard

⚠ WARNING

Danger of injuring

The driver's overhead guard of the vehicle described here is not suitable for protection against particularly small objects, paper rolls or packaged wood. If this type of object has to be transported, the driver's overhead guard must be modified accordingly.

4

Operation

General commissioning

Commissioning

If the vehicle is delivered only partially assembled, ensure before commissioning that the whole truck has been professionally assembled. All hydraulic and electrical connections have to be checked. The connections, which must be disassembled for shipping should be reassembled carefully. All nuts and bolts must be tightened to the appropriate torque. After the oil levels on the hydraulic tank and gear box have been checked, commissioning can begin. This commissioning should be done professionally be our service personnel. Before starting work, work through the **Checklist before starting work**.

Transporting and loading

ENVIRONMENT NOTE

Hydraulic oil can escape through disconnected hydraulic connections.

Depending on the overall height, the truck can be delivered as a complete unit or unassembled. In each case, the weights of the components or the complete unit must be determined (delivery papers) and suitable hoists and harnesses must be available.

Hooking on

NOTE

We always recommend the use of textile straps so as to protect the paintwork of your truck. Shims may be required to protect the harnesses from sharp edges.

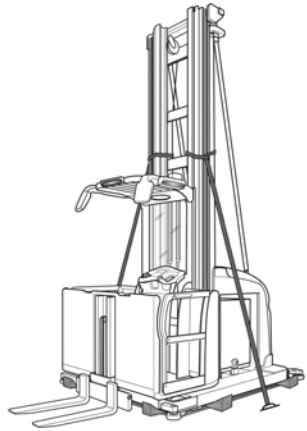
The lifting points for the chassis are located on the right and left in the area of the load wheels, as well as in the chassis area next to the drive unit. The lifting points are indicated by the pictogram opposite.

NOTE

The chassis is always mechanically braked — unless the truck is put into operation.

Loading

To secure the truck to a loading area for transport, a total of eight wooden wedges and suitable tension belts must be used. Position two wooden blocks at the front of the truck and two at the rear, and position the remaining blocks in pairs on the right and left of the truck. The tension belts must be guided over the battery compartment and around the posts to make sure that the truck is firmly on the ground. In addition, the battery compartment cover must be removed. In trucks with high lift masts, these must also be secured at the side with belts.



Hooking on the lift mast

To hook on the lift mast, belts can be wound around the uppermost bridge pieces. Harnesses suitable for this purpose must be used (shackle or lifting device). If necessary, the individual lift mast parts can be lashed to each other during this process, to prevent them from separating unintentionally and thus shifting the centre of gravity.

NOTE

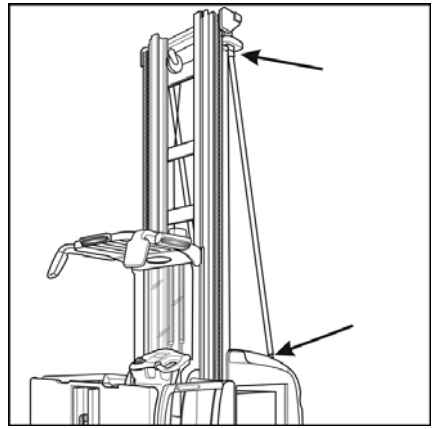
Take care to ensure that neither the cables nor hoses become crushed or torn.

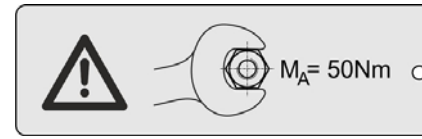
Mast bracing

Mast bracing may be required depending on the configuration of the order picking truck.

Once the mast bracing has been installed, it must be adjusted according to factory specifications and tightened to the specified torques.

The mounting locations are marked with labels. These labels specify the torques of 50 Nm and 195 Nm.





Releasing the load wheel brake transportation safety device*

A power supply is required to release the load wheel brake. If there is no power supply available (e.g. when transporting the industrial truck without a battery), the load wheel brakes must be released mechanically.

A notice regarding transportation is fitted in the driver's compartment:

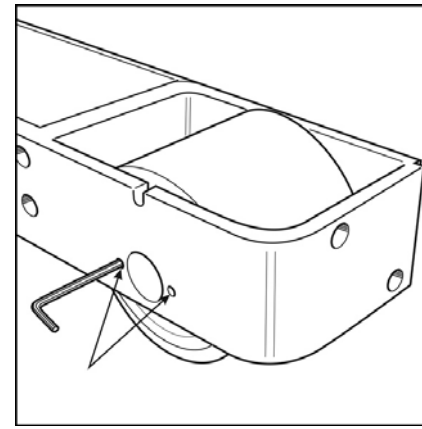
Prior to commissioning, release the load wheel brake transportation safety device

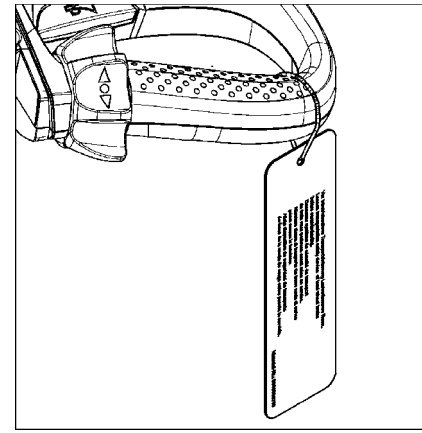
In order to do this, use a suitable hexagon socket wrench to release two screws in each of the load wheel arms. Release the screws far enough to allow the brake function to operate correctly.

⚠ CAUTION

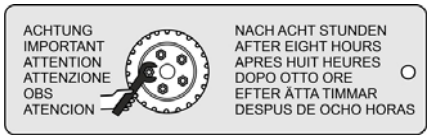
When commissioning, check that the brake function of the load wheel brake is operating correctly.

* Option





Wheel screws

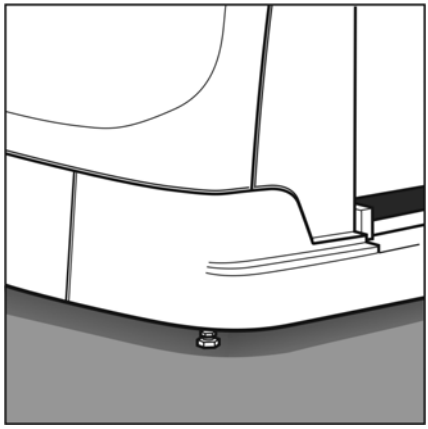


⚠ WARNING

Wheel screws may loosen after initial commissioning.

After the first eight operating hours, tighten the wheel screws to 195 Nm.

Support screws



⚠ CAUTION

Risk of accident as a result of the truck tipping over!

Support screws may only be adjusted by authorised service personnel.

The basic position of the support screws must correspond to the information on the load capacity diagram.

The support screws in the chassis of the truck are used to improve stability.

The support screws may only be adjusted by authorised service personnel.

If problems arise when the truck is operated on uneven surfaces, the stability must be recalculated by the manufacturer. It will then be possible to increase the setting dimensions for the support screws if necessary.

The truck will then be equipped with a new load capacity diagram, on which the new setting dimensions will be indicated.

⚠ WARNING

Risk of accident

The setting dimension for the support screws must be checked every 6 months by authorised service personnel and must be adjusted if necessary.

Drive battery

⚠ WARNING

Risk of injury due to electrolyte-filled batteries

Electrolyte (battery acid) is toxic as well as caustic. When handling battery acid, always adhere to the prescribed safety measures Especially with freshly charged batteries, observe explosion dangers in gasing area.

⚠ DANGER

Risk of accident due to tipping over

A battery that is too light seriously reduces the stability of the truck. As a result, there may be a risk of the truck tipping over.

The voltage and weight of the battery must be in line with the requirements of the truck rating plate. For this reason, compare the rating plates of the vehicle and the battery.

If a lighter battery is used temporarily, make up the weight difference by means of a firmly mounted ballast, and compensate for the different format using shims. If your truck has been fitted with an additional weight to compensate for a lighter battery, this weight must not be removed. Ensure compliance with the information given on the rating plate.

Battery dimensions

The battery must fill the chamber with only a few millimetres clearance. This prevents the battery from slipping or even tilting during operation. Observe the technical data of the battery (number of the battery tray, voltage and capacity of battery) according to order.

Battery type

⚠ CAUTION

Danger of material damage

Using the wrong charger can result in complete failure of the battery.

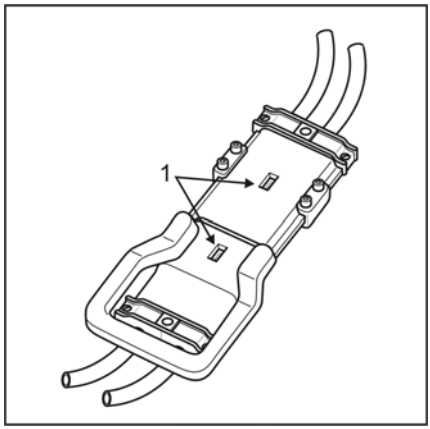
Traction batteries used are lead, gel or dry batteries. As the various types differ in structure, the right chargers must be used without fail in each case.

These order pickers are fitted with an integrated battery discharge display which is set

as standard for normal lead wet batteries (PzS). If a different battery type is used, the battery discharge display must the reset. For details, see **Battery discharge display, setting process**

Commissioning the battery

▷



⚠ CAUTION

Danger of accidents

Before starting work, always check that optional battery latch is in perfect working order.

⚠ CAUTION

Danger of short circuits

Ensure that the battery cable is not crushed or trapped.

Before first using the battery, correctly executed commissioning is imperative. If the battery was procured separately from the truck, pay particular attention to checking the rated voltage, the required minimum weight and the mounted battery plug. This is particularly important if the batteries have been loaded and delivered dry due to long transportation distances (e.g. from overseas). Always precisely observe the instructions and regulations of the battery manufacturer.

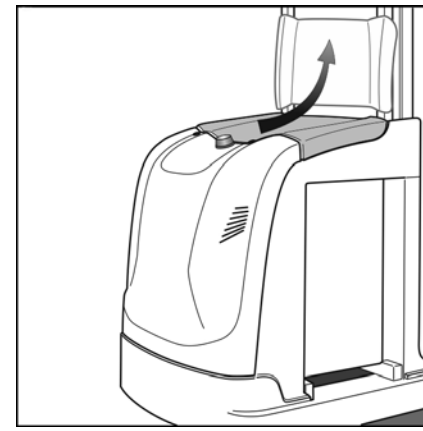
If your truck is equipped with the Euro battery plug, ensure the correct position of the voltage index pin. It is possible to read off the set voltage level through a viewing window (1).

Replacing the battery

Open battery compartment cover

The battery compartment cover can be opened by lifting it sideways against the lift mast. A special hinge system guides the cover.

For maintenance work, the cover can be removed completely.

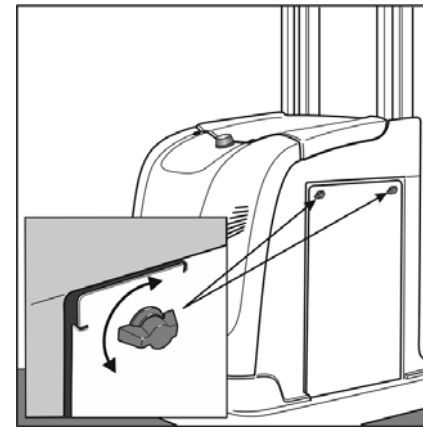


Battery compartment door*

Side battery compartment doors can be built in as an option. To open the doors, turn both latches 90°.

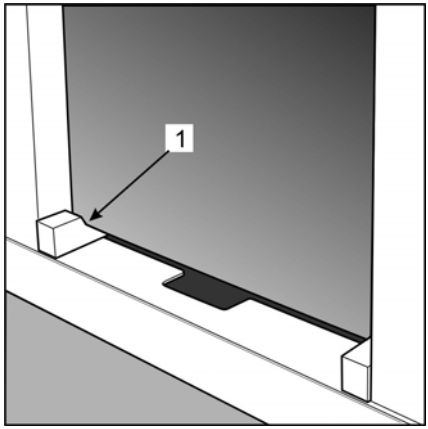
After reinserting the battery compartment doors, lock both latches again securely.

* Option



Replacing the battery using a truck

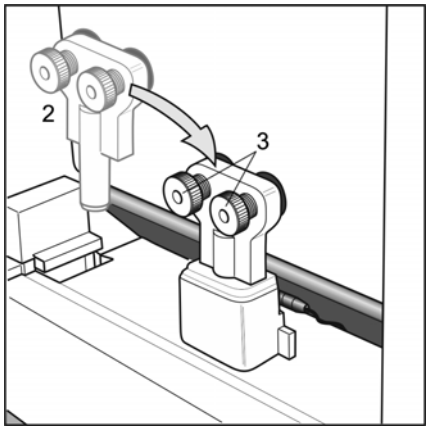
As standard, the battery rests in a recess intended for this purpose in the chassis (1). The battery can be replaced using a truck. In order to do this, lift the battery sideways out of the recess using a truck with sufficient load-bearing capacity and suitable lifting accessories.



Replacing the battery using a battery change frame

Alternatively, the battery rests on roller channels* and can be installed and removed from the side using a battery change frame*. Pre-assembled plates with clamping screws secure the battery against rolling out to the side.

- Pre-assembled plate removed (2)
- Pre-assembled plate inserted and clamping screws tightened (3). Ensure that the clamping screws are tightened symmetrically on both sides.



⚠ CAUTION

Risk of damage to property

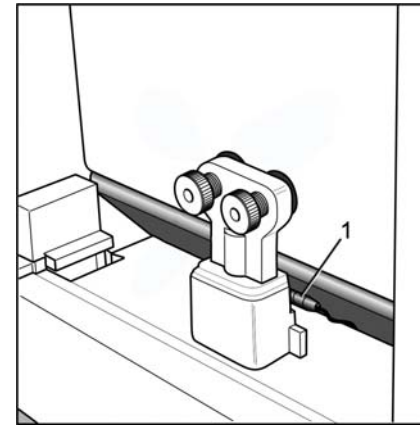
Before each shift, check that the battery lock is in perfect condition and that it functions correctly.

* Option

Battery lock

Battery lock for wide chassis

The battery lock is electronically monitored (1). If this monitoring function detects an error, the driving speed of the truck is limited to 2.5 km/h and an error message appears on the display.

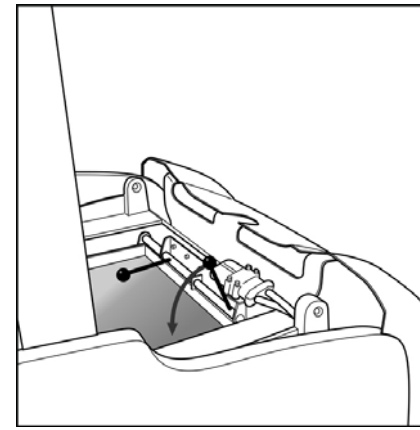


Battery lock for narrow chassis

In trucks with a narrow chassis, the battery is secured with a lock located above the battery. To lock the battery securely, push both levers downwards.

NOTE

Before starting work, check whether the locking plates are pressed against the battery without any play. If this is not the case, the authorised service centre can adjust the locking device.



Daily commissioning

Checklist before starting work

⚠ WARNING

If, after having done the checks before starting work any defects, regarding operating or traffic safety are discovered, then steps have to be taken immediately to properly and professionally repair theses defects.

It is prohibited to continue using the truck until it is repaired.

Before starting work, the driver is required to check that the truck is in correct working order.
General checks:

- Clarify whether a driver's permit is mandatory in the country of application.
- The truck may only be operated with closed lids and flaps and with all covers in place.

Function check of the braking systems

- Check the function of th foot switch braking function.
- Check the reversing brake. The braking and subsequent acceleration must be smooth and without jerking.
- Check the braking function after actuating the emergency STOP switch and
- Check system function on **End of aisle braking***: Automatic braking with release, creep speed switchover and complete stop.

Steering performance test

- The steering must be controllable without jerking.
- Maximum steering angle right/left appr. 90°must be reached. .

Function check of the operating devices

- Check the function of handles, keys and levers.
- The control lever and keys must return to their neutral position automatically.
- All operating elements have to be checked for proper function and condition.

Checking access control

- With the key in the 0 position or when the key is removed, it should not be possible to use the truck.
- For electronic access control*: If access is blocked, the truck must be disabled

Checking the load suspension device and the connecting device

- The forks must not have any fissures.
- The forks must not be bent.
- Forged forks should not be worn by more than 10% due to abrasion.
- The fork locking mechanism* must be in good working order. Locking bolts must be easy-running and self-locking.
- The fork carrier must not be bent or distored.
- The load chains must be checked for condition, wear, tension and lubrication.
- The load chain must not demonstrate any damage!

Other checks

- Check the overhead guard for deformation, damage and cracks at the welded seams.
- Carry out a visual check of the overhead guard cover*.
- Carry out a visual check of the load back-rest*.
- Check the wheels for foreign bodies.
- Drive wheel and load wheels must be checked for their condition.
- Check the barrier and the emergency OFF switch When the barrier is open (higher than 1.2m) or the emergency OFF switch activated, it should not be possible to activate any driving or hydraulic functions.
- Opening the barrier (higher than 1.2m) or actuating the emergency OFF switch must immediately trigger a vehicle braking process.
- If the truck is equipped with a barrier lock, it should not be possible to open the barrier from a defined lifting height.
- The horn and other warning devices must work.

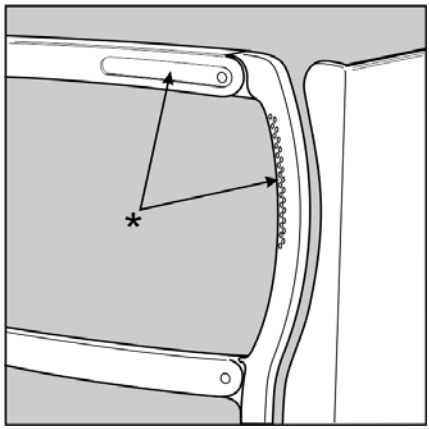
- If lights* are installed, their function has to be checked.
- Check that the battery lock is in perfect condition and functions (locks) properly.

*Option

Access to the driver's compartment

Access to the driver's compartment

Barriers



⚠ WARNING

Risk of crushing

If the barrier is touched at any point other than the points indicated (*) when opened, there is a risk that hands may be crushed.

⚠ WARNING

Risk of falling

When climbing in and out, it is important to note the difference in height between the floor of the driver's compartment and the ground.

NOTE

The barriers are monitored by electrical means. The industrial truck is only ready for operation when the barriers have been correctly closed.

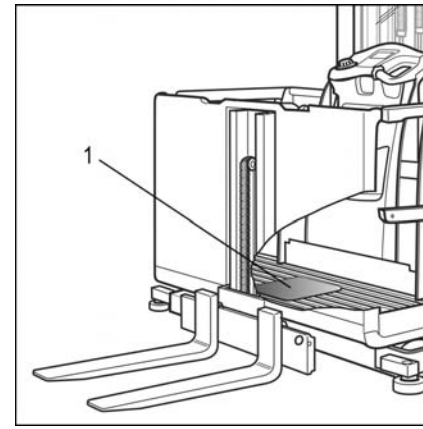
The barriers comprise an upper section (stomach bar), a centre section (knee bar) and a lower section (foot bar). The three sections are connected to each other by mechanical means.

Only the section of the stomach bar that is furthest forward may be used to open and close the barrier.

Operating devices

Brake system

Foot switch



The foot switch is installed in the cab floor. This component must be actuated in order to release the electromagnetic spring loaded brake, and at the same time keeps the driver in the centre of the cab. The foot switch is mounted such that it is concealed under the rubber mat on the cab floor. This area can only be recognised due to a slight elevation in the floor mat. When the foot switch is actuated, this area moves downwards slightly.

⚠ CAUTION

The foot switch must not be actuated during the switch-on process of the truck control unit.

Otherwise, the switch-on process will be interrupted and the information 15 will appear in the display.

If the braking process is initiated by releasing the foot switch, the generator brake is applied first. Towards the end of the braking process, the spring loaded brake also comes into action. The foot switch serves equally as the service brake and the parking brake.

⚠ WARNING

Risk of accident

The floor of the cab must be kept free of objects. Otherwise there is the risk that the foot switch may be actuated and the brake is permanently released as a result.

Service brake

In order to brake in normal operation, the **driving** operating lever can also be released. The truck is then braked electronically

NOTE

The truck braking distance is influenced by the condition of the floor surface. The driver must take this into account when determining his driving and braking style.

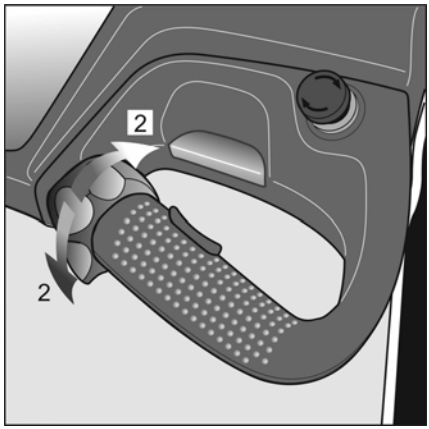
NOTE

As a general rule, the service brake or the reverse brake should be used for normal tasks. This approach protects the brake linings. The foot switch must be used for emergency braking and as a parking brake.

Reverse brake

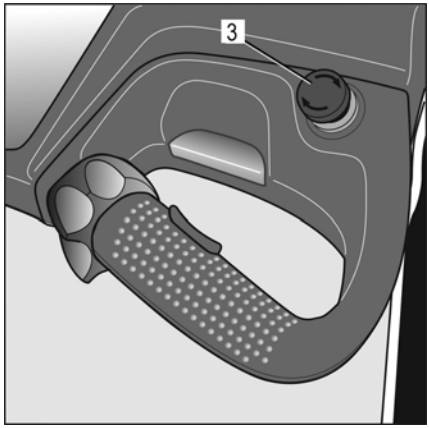
Directly shifting from one drive direction to the other (2) activates the reverse brake. This initiates electronically controlled braking and then acceleration in the opposite direction. In this case, brake linings are not used. This form of braking can be metered precisely through the deflection the drive lever.

If the lever is released at the same time as the drive direction is reversed, the truck remains stationary



Emergency off switch

Pressing the emergency off switch (3) activates mechanical braking and brakes the truck to a standstill in the shortest distance possible.



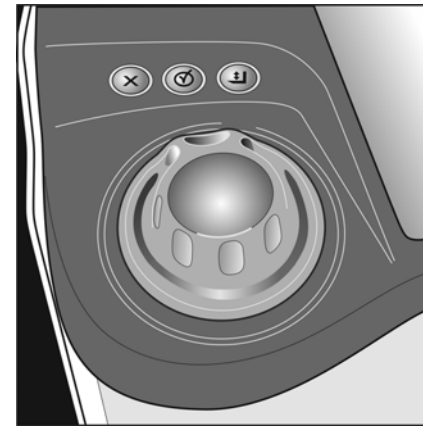
Steering system

The steering system works electrically. The driver rotates the steering knob or steering wheel* to determine the desired steering angle.

*option

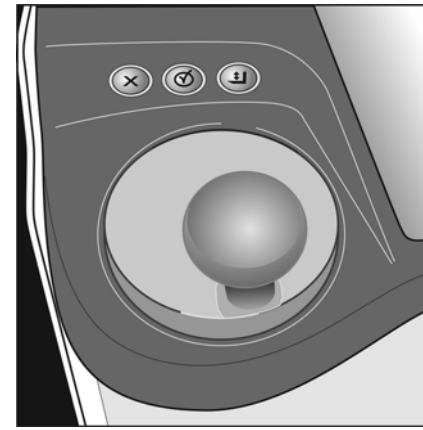
Steering knob

The steering knob has a right and a left stop. The rotation range of the steering knob is approximately 130° to each side. The steering thereby moves a maximum of around 95° to each side.

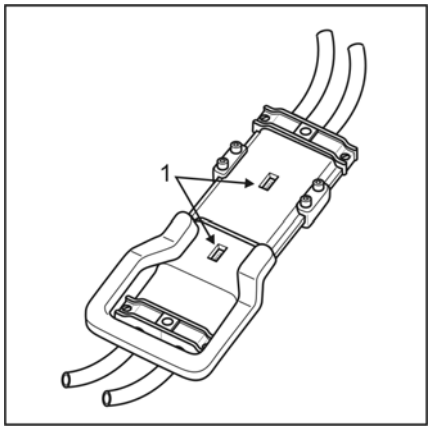


Steering wheel

In trucks with a steering wheel, the steering also moves a maximum of around 90° to each side. You can use parameters to set whether 2, 3 or 4 revolutions of the steering wheel are required. The steering wheel has no end stops.



Switching on the control system



– Open the battery compartment cover and insert the battery male connector (1)

– Climb into the cab and close the barriers, ensuring that you only take hold of the barriers at the designated gripping points (2).

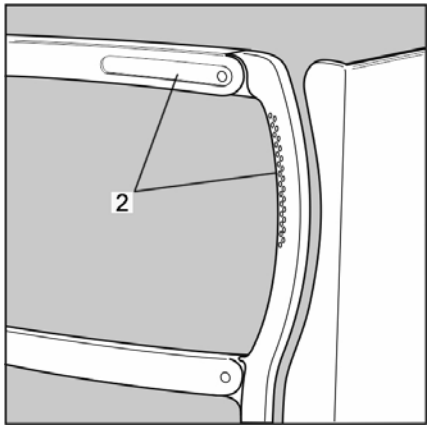
NOTE

For lift heights where the floor of the driver's cab is up to a height of 1.2 m, the cab barriers may be left open when the truck is being driven. If the truck is driven at a lift height of greater than 1.2 m, the barriers must be closed.

DANGER

Danger of accidents

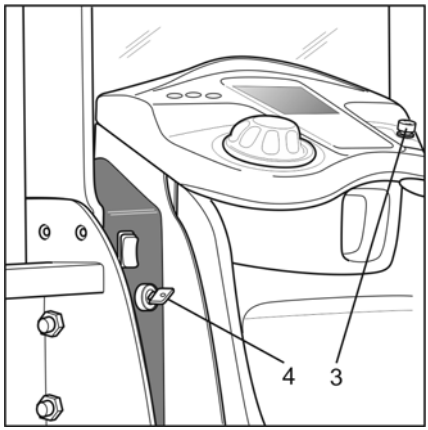
Never mount or jump onto the truck while it is moving. Never step or jump down from a moving truck.



– Release the emergency stop switch (3) by turning.

– Activate the key switch (4).

Provided there are no faults, the relevant displays will now light up in the display unit.



Driving

Types of guidance

As a general rule, a distinction is drawn between three types of guidance:

Driving freely

In standard trucks, the operator's right hand selects the driving speed and drive direction. The operator's left hand is used for steering and thus determines the course the truck takes.

Mechanical rail guidance (MZF)*

The industrial trucks can be guided **mechanically** when travelling within aisles. To achieve this, a rail system is installed on the floor of the warehouse. Two-hand operation is required to make use of the guidance system. The operator's right hand selects the driving speed and drive direction. The operator's left hand is used to actuate a sensor or a function. As a general rule, the truck switches over to using the guidance system automatically.

More detailed information can be found in the relevant dedicated chapter.

Inductive guidance (IZF)*

The industrial trucks can be guided **inductively** when travelling within aisles. To achieve this, a wire is embedded into the floor; this wire is live with current. The magnetic field generated by this wire is detected by sensors in the industrial truck and used to guide the truck. Two-hand operation is required to make use of the guidance system. The operator's right hand selects the driving speed and drive direction. The operator's left hand is used to actuate a sensor or a function. As a general rule, the truck switches over to using the guidance system automatically.

More detailed information can be found in the relevant dedicated chapter.

*Option

Driving without guidance

⚠ WARNING

Danger of accidents

Please observe the **checklist before starting work** and all **safety information**.

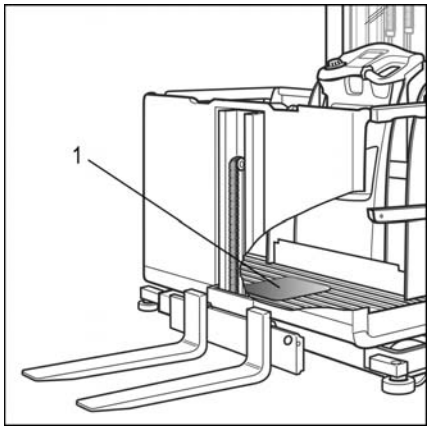
Initial driving exercises

To become familiar with the driving and braking characteristics of this truck, initial driving practice should be taken on a clear, level surface in the warehouse. If you carry out the exercises described in the following, you will soon become familiar with the truck. These exercises are essential in order to maximize on the high performance potential provided by this truck.

Foot switch

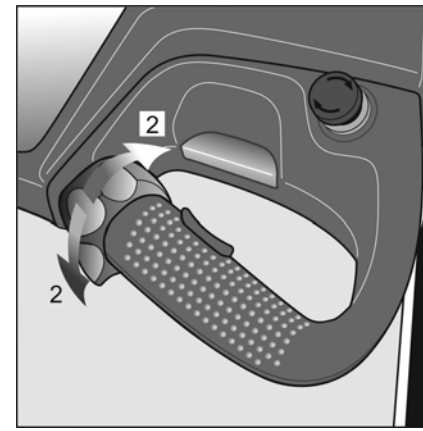
Pressing the foot switch (1) releases the brake and the traction controller receives the release signal for travel.

Releasing the foot switch (1) turns the traction controller off and causes the truck to brake.



Drive switch

The drive direction and speed are selected through decisive movement of the operating lever (2).It is possible to change from one drive direction to another by moving the lever in the opposite direction. The electronically controlled braking and the subsequent acceleration is called reversing. This initiates electronically controlled braking and then acceleration in the opposite direction. In this case, no brake friction linings are used. This form of braking can be precisely metered by moving the drive switch. If the operating lever of the drive switch is released when the drive direction is reversed, the truck will remain stationary. As a rule, reversing should be used as the service brake for regular tasks.



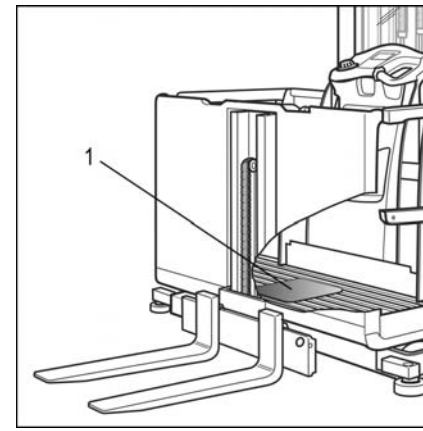
For lift heights where the floor of the driver's cab is up to a height of 1.2 m , the cab barriers may be left open when the truck is being driven.

Handhold sensor

A sensor is integrated into the handhold next to the operating lever which detects contact with the driver's hand. In order to obtain a drive enable status, the foot switch must be actuated **and** contact must be made with the handhold sensor.

Steering

The foot switch (1) must be actuated to enable steering. The left hand controls the steering knob (3) or the steering wheel (4), and thus determines the path of travel. The maximum angle of rotation of the steered wheel is approx. 95° on each side. This enables the truck to be turned on the spot.



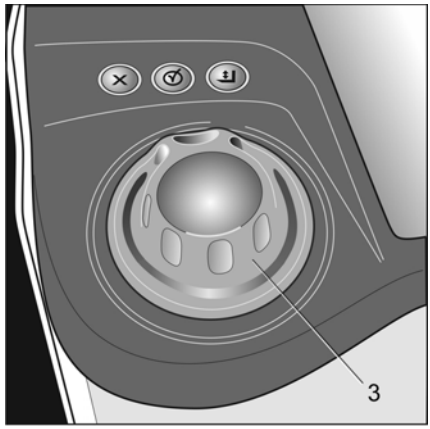
It is possible to move diagonally. This makes it possible to drive the truck with the load raised or lowered.

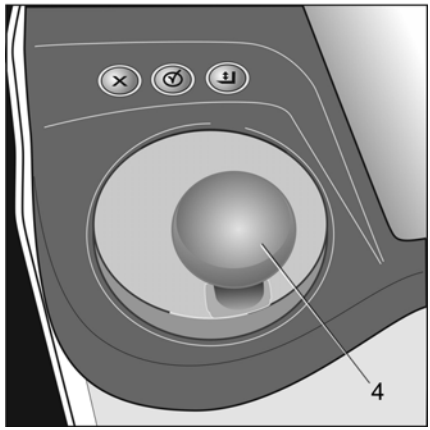
NOTE

- *The **steering knob** (3) has an angle of rotation of approx. 130° on each side*

and stops mechanically. Trucks with this equipment are mainly intended for use in warehouses with guidance for fast switchovers from one aisle to another.

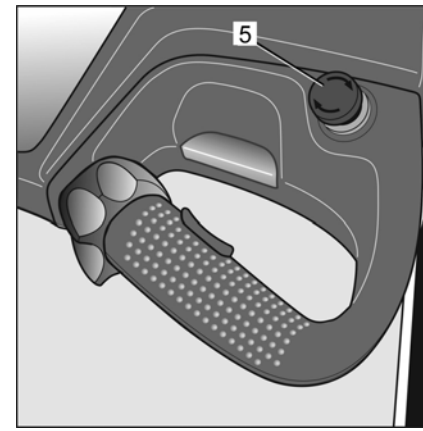
- *Conversely, the **steering wheel** (4) has no stops. To achieve the maximum steering angle of approx. 90° on each side, it is necessary to make approx. 3 turns from the straight ahead position to the left or right. Trucks with this equipment are mainly intended for use in warehouses without guidance due to the sensitive steering.*





Emergency stop switch

Pressing the emergency stop switch (5) activates mechanical braking and brakes the truck to a standstill in the shortest distance possible.



Driving with automatic guidance

There are two types of guidance systems:

- Mechanical guidance
- Inductive guidance

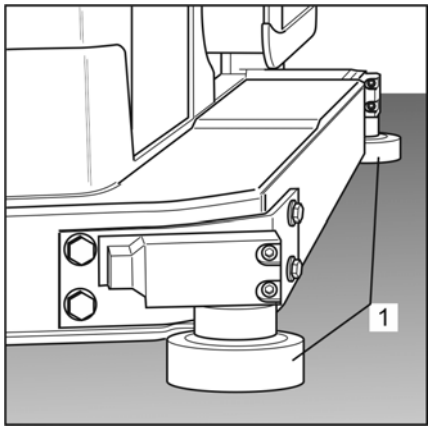
Mechanical guidance

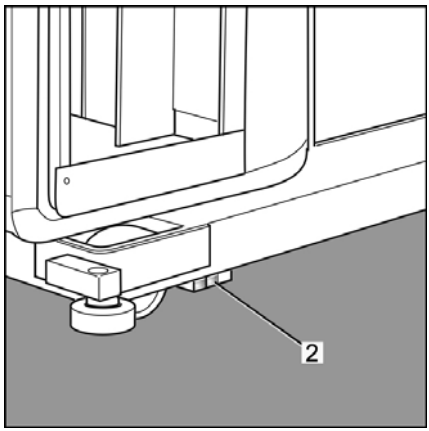
The mechanical guidance consists of one or two rails, along with or in between the truck is guided with permissible variation of 5 mm.

Entering the rack aisle

In order to enter the rail guidance, the truck must be positioned as centrically as possible and in alignment with the rack aisle in front of the entering funnel.

The more carefully this positioning in front of the rack aisle is done, the faster and the gentler the lift truck can be moved into the guidance. After the truck has been moved into the guidance, the lateral rail switches (1) are operated.





Through detection of the rail guide by means of a rail switch (1), steering control is automatically switched over to the new guidance system

- For this, the driver's left hand must make contact with the steering knob / steering wheel. When the controller recognizes the hand contact it enables further functions.
- If you only wish to travel, the two-hand control switch must be activated after pressing the foot switch, and the control lever "travel" deflected in the required direction.
- If travel and raising/lowering are to be done simultaneously, the control lever and the operating rocker switch must be deflected accordingly.
- Example: Pressing the operating rocker switch on the right-hand side and pressing the operating lever upwards results in main lift up combined with forward drive. This operating mode is known as **diagonal travel**.

Cab lift: lift - lower

- Press the two-hand button
- Using the operating rocker switch, select the direction of movement and speed (or see diagonal travel).

Additional lift: lift – lower, operation using the operating console

- Press the preselector button
- Using the operating rocker switch, select the direction of movement and speed.

NOTE

In order to influence the damping control and other transitions, it is necessary to first select the required movement using the relevant "preselection Additional lift" and then to deflect the control lever or the operating rocker switch.

Additional lift: lift – lower, operation using the load side buttons *

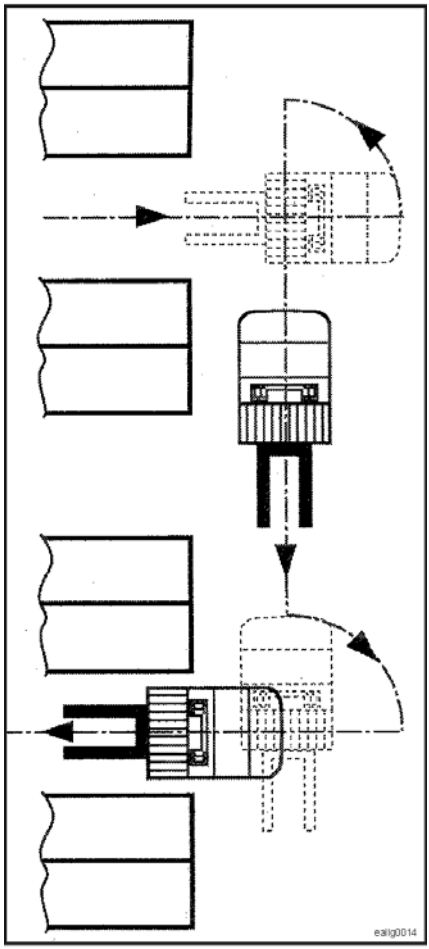
- Press the preselector button.
- Press the Lift button or
- Press the Lower button.

Changing the rack aisles

If the truck is to be moved from one rack aisle to the other, i. e. to be transferred, the following advice has to be observed:

- Before leaving the rack aisle, make sure that the steering knob is set to straight travel.
- The total length of truck must be moved out of the rack.
- Travel out of the rack aisle slowly and pay attention to persons or other vehicles which could be in the transfer aisles.
- Once the truck is located outside of the rail, the steering by the rail switch is again operative - the truck can be turned on the spot through 90 °. Now the truck can be moved to the target aisle.
- If the truck is turned back by 90 ° at the right place, then it is positioned, ready to enter, in front of the new rack aisle.

This driving technique for changing rack aisles - transferring - is illustrated in the adjacent sketch.



Diagonal travel

Diagonal travel is the name given to combination of the functions drive and lift cab / drive and lower cab.

Diagonal travel is also admissible outside the aisle. This means that it is also admissible here to travel and lift or lower the cab at the same time.

- Press the foot switch (release brake)
- By deflecting the control lever and the operating rocker switch in the corresponding direction the movements “Drive forwards/backwards and raise/lower cab lift”
- Both movements can be steplessly controlled.

Load pick-up

Picking up and setting down loads

Picking up a load

NOTE

*On this truck, a load is understood to be when loading equipment is picked up on the fork to collect items for order picking, as described in the section entitled **Intended use**. Loads may only be picked up and set down on flat and horizontal surfaces*

Drive the truck towards the loading equipment and insert the fork into the fork pockets provided. Insert the fork into the loading equipment until the load/loading equipment touches the back of the fork.

⚠ CAUTION

During this process, the load may be moved or even knocked over.

Make sure not to jolt the fork.

Setting down loads

- Carefully approach the place at which the load will be set down.
- Position the load as accurately as possible.
- Lower the load carefully until it rests securely on the supporting surface.
- Lower the fork until there is sufficient free space between the load and the fork.

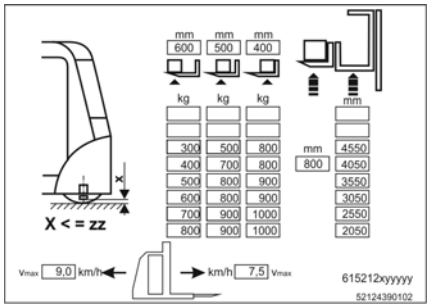
⚠ CAUTION

Risk of damage to property

Do not place the fork on the supporting surface.

- Slowly drive the truck backwards so that the fork is removed from the loading equipment.
- Monitor this process closely. The fork position may be corrected by carefully lifting or lowering the fork.

Diagram of permissible loads



A diagram of permissible loads is attached in the cabine. The diagram of permissible loads (1) and the stipulated load-bearing capacity restrictions to be observed under certain application conditions must be strictly adhered to. Failure to adhere to the stipulated limits can serve to impair the stationary stability of the appliance.

Of course, this applies also to the weight accruing as a result of the goods in the consignment.

Example

Example for a truck with a low single mast

Cabin floor lifting heiht max.4550mm

Auxiliary lift lifting height plus 800mm

The distance of load centre from heel of fork,

400 mm	max load 800 kg
500 mm	max load 500 kg
600 mm	max load 300 kg

Increasing liting height and increasing distance of the loadcentre, reduce the load capacity of the truck

The data refering to the actual situation can be found in the diagram of permissible load.

Load pick-up without guidance

Order pickers are mainly intended for collecting or distributing goods in a container or on a pallet. When transporting loads, the auxiliary lift* must always be lowered.

⚠ DANGER

Risk of tipping in the load direction

During picking work, goods for transport, and therefore weight, accumulates on the load support. Because picking is a manual process, the truck control unit cannot monitor it and therefore also cannot warn of overloading. The operator must ensure that the load capacity of the order picker is not exceeded during picking work.

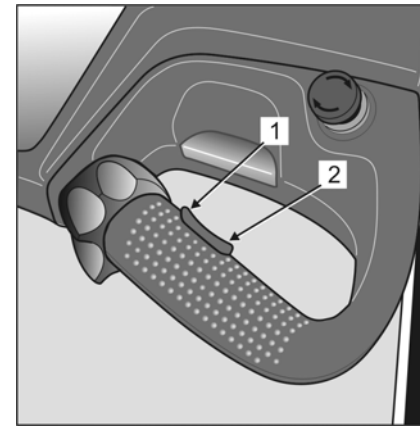
⚠ DANGER

Risk of tipping to the side

Under no circumstances must the truck be driven round corners with a load raised further than just clear of the ground. At greater heights, only positioning movements at creep speed are permitted. The steering must be in a straight-ahead position.

*Option

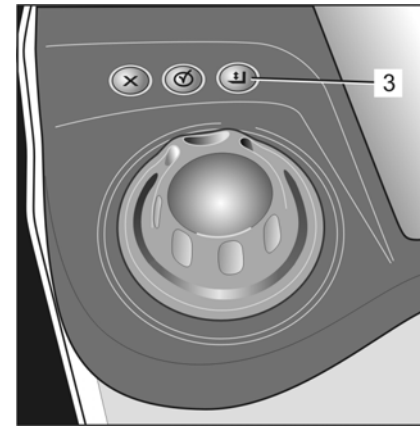
Actuate the right or left control rocker and steplessly raise or lower the driver's compartment.



1 continuously variable lowering
2 continuously variable lifting

Auxiliary lift

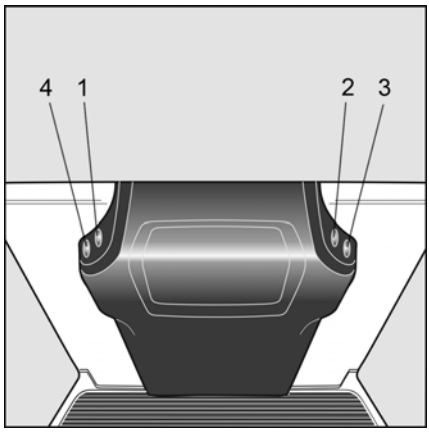
Press button (3) and then actuate control rocker using (1) for lowering or (2) for raising.



3 Auxiliary lift selection button

Auxiliary lift, load-side operation

These trucks can optionally be equipped with load-side operation for the auxiliary lift.



1 Auxiliary lift preselection
2 lifting
3 lowering
4 not assigned

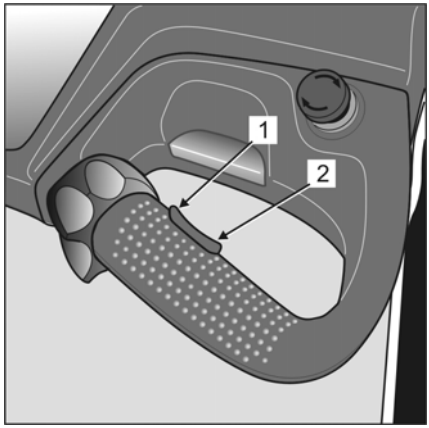
Load pick-up with automatic guidance

Order pickers are designed primarily for the collection or distribution of goods in containers or on pallets. The depositing and removal of loads are not possible in narrow aisles. During transport, the additional lift* must be lowered on principle.

⚠ DANGER

Danger of tilting forward

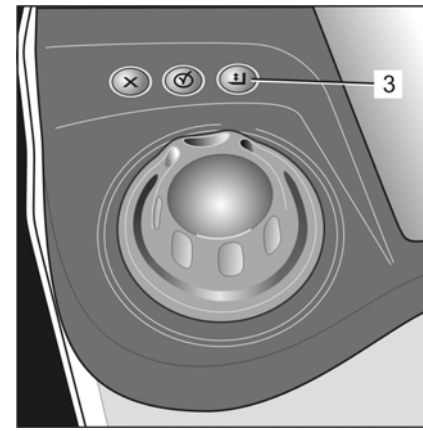
As a result of the order picking process, transported loads are collected and so increasing weight accumulated on the load carrier. As this is a manually performed process, it cannot be monitored by the truck control system, which is consequently not able to issue a warning in case of overloading. The operator is required to ensure that the load bearing capacity of the order picker is not exceeded.



1 Infinitely variable lowering, simultaneous contact with the steering knob or steering wheel
2 Infinitely variable lifting, simultaneous contact with the steering knob or steering wheel.

Additional lift

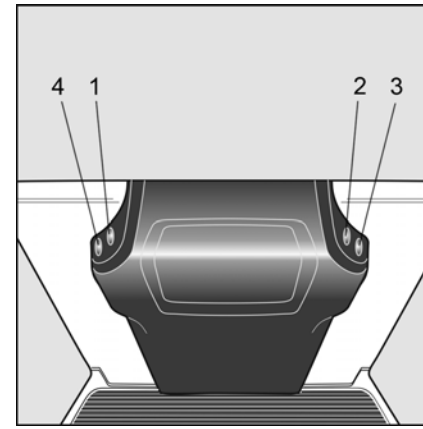
Before actuating the operating rocker switch for (1) or (2), press button (3).



3 Preselector switch, additional lift

Additional lift, load-side operation

This truck can optionally be equipped with load-side operation for the additional lift.



1 Preselection additional lift
2 Lift
3 Lower
4 Not assigned

Parking, decommissioning

Parking and leaving the truck

NOTE

It is the operator's duty to remove the ignition key when he leaves the truck, thus securing the truck against unauthorised use. If the truck is equipped with an electronic access control, it must be reset and/or the device for controlling access must be removed. Where possible, the truck should be parked at the start of a racking aisle or in a loading bay. If there are parking spaces, the truck must be parked there. The fork is to be lowered to the floor as far as possible, and if there is one, the tilt attachment must tilt towards the floor to reduce the risk of stumbling.

Decommissioning

ENVIRONMENT NOTE

If the truck described here has to be decommissioned, pay attention to ensure that all components are disposed of in accordance with the locally applicable regulations. Operating media used must be sent for recycling and/or correct disposal.

Emergency operation

Emergency operation

If the entire truck control unit fails or if part of it fails, the truck can be moved out of the working area by means of the relevant emergency operation.

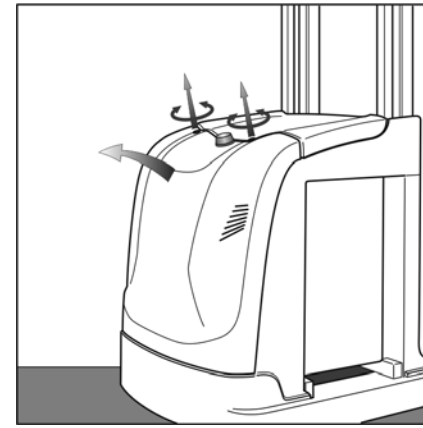
Opening the control compartment cover ▷

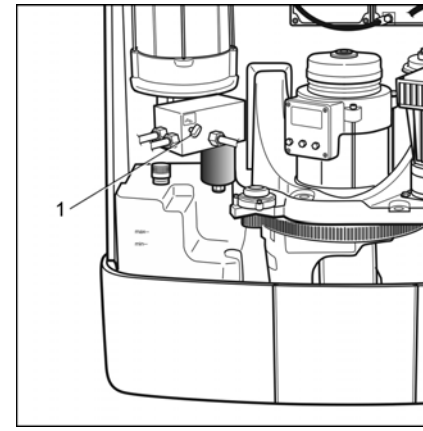
– Rotate the two screw plugs on the cover anti-clockwise and remove them.

– Hold the cover at the ventilation openings, lift it off and then place to one side. The lowering valve is located in the control compartment and can be accessed once the control compartment cover has been opened.

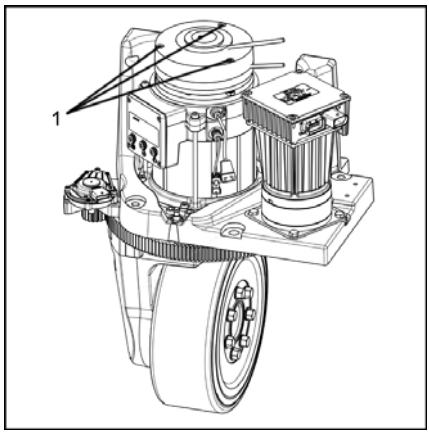
– Rotate the wing screw (1) on the valve block anti-clockwise. The lowering procedure begins.

– Do not adjust any screws other than the wing screw on the emergency lowering valve.





Brake emergency ventilation



⚠ WARNING

Risk of accident

If the brake has been mechanically disabled as described below, a suitable tow bar must be used for towing or a second vehicle must be coupled to the truck so that it can take over the braking. If the brake was released mechanically, it must be checked for correct assembly and function when the truck is recommissioned. The brake lining must also be checked for a clearance of approx. 0.4 mm.

1st option: Disassemble the brake blocks

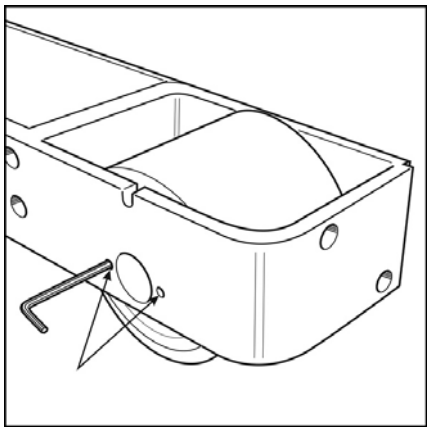
– Remove three mounting screws (1)

– Place the brake blocks to one side.

2nd option: Tighten the brake anchor plate

– Insert and tighten two socket head screws or hexagon head screws (M4X25) and the corresponding nuts M4 and washers M4 into the provided bores in the brake block.

Releasing the load wheel brake*



A power supply is required to release the load wheel brake. If there is no power supply available (e.g. during emergency operation of the industrial truck), the load wheel brakes must be released mechanically.

In order to do this, use a suitable hexagon socket wrench to release two screws in each of the load wheel arms. Release the screws far enough to allow the brake function to operate correctly.

⚠ CAUTION

When commissioning, check that the brake function of the load wheel brake is operating correctly.

* Option

Towing with operational steering

If the truck's steering is still working and the brake is released, the truck can be towed either with a rope or with the tow bar, as long as suitable lifting points can be found for the tow bar.

The following must be taken into consideration when doing this:

- Only tow at creep speed
- There must always be a driver in the towed truck
- There must not be anyone in the danger area of the trailer train
- In order to prevent strong lateral forces and therefore the risk of tipping, always leave plenty of space when driving round corners
- The vehicle used for towing must always be driven carefully and be able to brake gently and in good time

Towing with non-operational steering

If the steering has failed, the truck can be towed using equipment such as steerable heavy-duty rollers. Depending on the design, the heavy-duty rollers must be placed underneath the drive wheel or underneath the chassis. 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 "Brake emergency ventilation".

When hooking on the truck in order for it to be towed with the drive unit leading, a sling or rope that is of the appropriate length and has sufficient load capacity must be guided round the collision protection.

When hooking on the truck in order for it to be towed with the fork leading, a sling or rope that is of the appropriate length and has sufficient load capacity must be looped round the fork carriage.

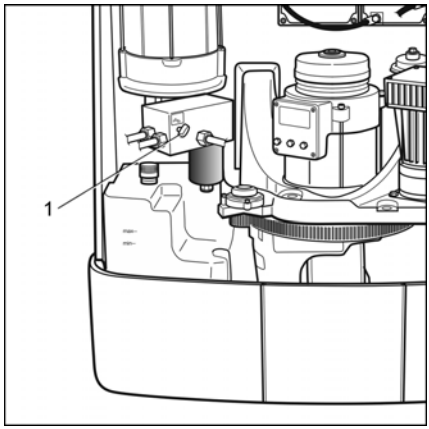
NOTE

The lifting points and methods may vary for special truck versions. If you have any questions, please contact the relevant service station.

Emergency lowering valve

NOTE

For this truck type, a hand-operated valve is installed in trucks with a possible cab lift height of 3m and above. This valve can be used to lower the lifted cab. To do so, rotate the wing screw (1) anticlockwise. When the lowering procedure is complete, rotate the valve clockwise to close it again.



Emergency lowering of the driver's cab

Leaving the driver's cab in an emergency situation

If a technical defect causes the truck to shut down when the driver's cab is raised, or if an operator in the raised cab becomes incapable, e.g. falls unconscious, of operating the truck, the driver's cab can be lowered by a second person on the ground using the hand-operated emergency lowering valve.

⚠ WARNING

Risk of injury

The attachment and load must have enough space from the racking on all sides. Otherwise, safe lowering of the cab cannot be guaranteed.

If the operator falls unconscious, make sure that all parts of the body are completely inside the driver's cab and that there is no risk of injury for the operator during the lowering procedure.

The operator of the emergency lowering valve must be certain that the moving components of the lift mast are immediately set in motion on opening the valve. Special attention must be given to the cab, the chains and the inner masts of the lift mast.

All of the load chains in the lift mast must remain taut throughout the whole of the lowering procedure. If the components of the lift mast are not immediately set in motion after opening the emergency lowering valve, close the valve immediately.

If the view that the operator of the emergency lowering valve has of the lift mast is obstructed, a third person with full view of the lift mast must be involved. Clearly, this third person must be able to communicate readily with the operator of the lowering valve and the truck operator.

If a movement like the one described cannot be detected immediately or if one of the chains has slackened, a mechanical jam at the lift mast is suspected. The emergency lowering procedure must then be stopped immediately by closing the emergency lowering valve.

The operator must then be retrieved some other way. A second turret truck could be used if suitable, or a lifting working platform.

Restarting after emergency lowering

⚠ WARNING

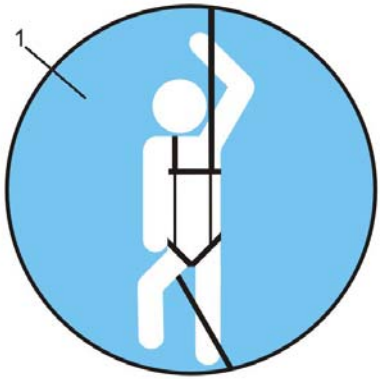
Risk of accident

If the emergency lowering function was required because of a technical defect, the truck may only be put back into operation if the cause of the error has been rectified by a specialist.

If, as described above, a mechanical jam of the lift mast is suspected, the abseil system must not be used. The resulting vibrations could cause the mechanical jam to be released, which could create a further hazard should the cab subside.

Emergency abseil system

Exiting the raised driver's compartment in the event of an emergency ▷



NOTE

An emergency abseil system is only required if the driver's compartment can be raised higher than 3000 mm above the ground.

NOTE

Two versions are available. As standard, a system is supplied that includes a safety harness designed for people up to a height of approximately 2 m. For larger operators, a variant is available as an option that includes a safety harness that can be adjusted up to size XXL.

The storage location for the emergency abseil system is marked with an adhesive label (1).

⚠ DANGER

Risk of falling

- Before using the very narrow-aisle truck, the operator must be instructed in using the abseil system by a technical expert.
- The operating instructions located in the rucksack must be read and followed.
- Before each use, the user has to carry out a visual inspection to make sure that the abseil system is in a perfect condition and is ready to use.
- Before each use, the safety harness must be checked to make sure it is in the initial position. In addition, the free rope length between the lifting point in the overhead guard and the safety harness chest eyelet must be adjusted correctly. Only a little slack rope is permitted between the lifting point and the safety harness chest eyelet.
- If additional bores are created on the front edge of the overhead guard, a redirecting point for the rope can be provided. This redirecting point routes the rope in a more favourable position for the person abseiling. The carabiner, which is also included in the scope of delivery, is hooked into this bore. The rope is then guided through this carabiner. Carabiners must always be closed.
- Abseiling exercises are only permitted under the supervision of an expert.
- In Germany, the abseiling procedure must be practised at least once a year. We recommend these practice exercises for other countries, even if they have not explicitly been made compulsory.
- No changes may be made to the emergency abseil system.
- Only abseil systems that meet the requirements of the standards may be used.
- The emergency abseil system may only be used for its proper purpose of rescuing a person from the cab of a turret truck.
- Once the exercises are complete, the emergency abseil system must be correctly repacked, sealed and stowed away by a technical expert.
- At the end of the maximum permissible service life (replacement state of wear), the abseil system must be disposed of and replaced by a new system.

The emergency abseil system is installed in the driver's cab and is ready for use.

The safety harness, the descender device and the rope are located in the rucksack.

The upper end is attached to the eyelet provided in the overhead guard via a carabiner.

The rucksack itself is sealed using a plastic seal.

The original system must not be used for practice, because this causes a certain amount of wear and the seal no longer serves as a monitoring element.

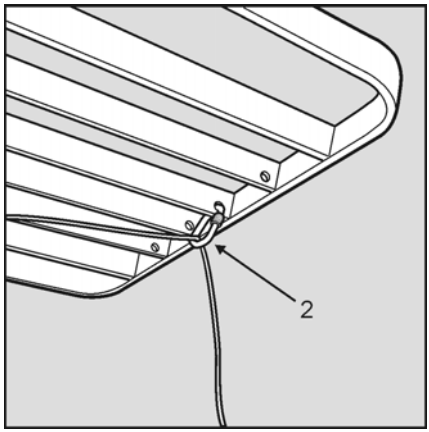
A figure-of-eight knot is tied on the other end to protect it from unthreading. This knot is secured with a cable tie.

Operating instructions

The rucksack contains the operating instructions for the system. These instructions must be observed and must not be removed under any circumstances.

Redirecting point for the rope

In order to bring the person abseiling into a more favourable position, the rope can be redirected with an additional carabiner in most versions of the overhead guard. This additional carabiner is attached to the safety harness chest eyelet area. To redirect the rope, the carabiner is detached from its original position and reattached in a bore provided in a strut on the overhead guard (2).



Testing

A technical expert must check the abseil system at least once a year to confirm that it is in perfect condition and functions correctly. To perform this check, remove the seal to ensure that the system can be removed. Once the check has been successfully performed, seal the rucksack using the next seal. The maximum number of seals required is included in the rucksack.

Replacement state of wear

The maximum permissible service life for this abseil system is restricted to eight years. During this time, only minimal use is permitted

and the system must be stored in optimum conditions.

Once the last numbered seal has been used, the entire system must be replaced.

Two-person cab

Industrial trucks which feature a cab that permits two operators must also be equipped with two abseil systems.

In such trucks, it must be ensured that only the suspension points approved by the manufacturer are used.

Different operators

If an industrial truck is used by multiple persons, e.g. in multi-shift use, it may be indicated that several preset abseil systems must be kept on hand. This is particularly sensible if the different operators are of widely varying heights and/or weights and the safety harness would therefore have to be adjusted to a significant degree.

In such trucks, it must be ensured that only the suspension points approved by the manufacturer are used.

5

Maintenance

Securing the load support

DANGER

Risk of accident

Before carrying out any work on the hydraulic system, it must be depressurised by lowering the load support to the ground.

Before anyone may proceed under the raised cab, a mechanical safety device must be installed, such as a suitably strong brace around the mast traverses or a jack.

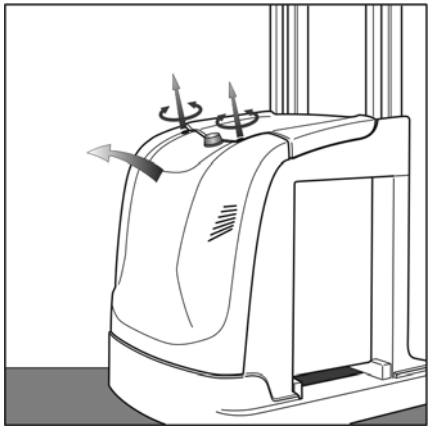
Removing the hood

To gain access to the control compartment, the hood must be removed.

– Remove the two plastic screws. Turn anti-clockwise to open.

– Lift the hood upwards out of the latch and place on one side. The hood is very light and can consequently be removed without using any special aids.

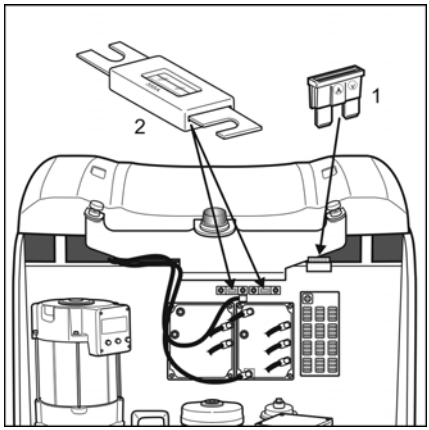
The hood is mounted in reverse sequence. Place the hood carefully into its guide and latch mechanism and hand tighten the plastic screws.



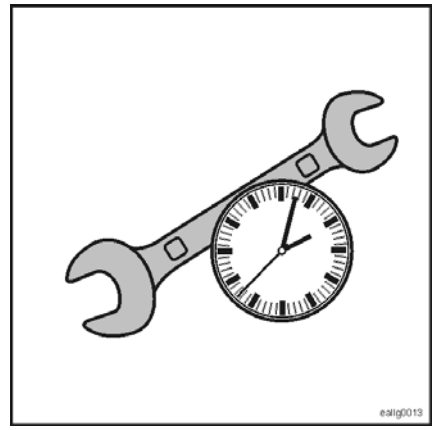
Fuses

(1) Primary current fuses
- 1F1 355A
- 3F1 35A

(2) Control current fuses
- F2 7,5A F3 7,5A, Battery voltage
- F4 10A, Battery voltage
- F5 10A, 24V
- F6 10A, 24V
- F7 5A, 24V
- F8 5A, 24V
- F9 5A, 24V
- F10 5A, 24V



General maintenance information



⚠ WARNING

- Appropriate precautions for safe working must be taken for all maintenance work.
- As well as the usual occupational safety regulations, the safety information specifically outlined in this brochure must also be adhered to.
- Whenever you are working on the hydraulic system, ensure that the entire system is depressurised. This is particularly important when working on trucks with built-in accumulators.
- Unplug the battery male connector before carrying out any maintenance work (except functional tests).
- Only electricians from the appropriate service station may carry out work on the electrical system.

To ensure the safe operation of your industrial truck over a long period of time, it is absolutely essential that you carry out thorough maintenance in a correct manner at the prescribed intervals. The maintenance work is described in the maintenance schedule and must be carried out by trained, specialist personnel. We recommend that you use our original spare parts, which can be found in the spare parts list. The installation of other parts will invalidate the warranty. Our dedicated service team will assist you with any queries about care and maintenance. We offer you the opportunity to take out maintenance contracts with us and can carry out regular testing for you.

Service frequencies and times

Maintenance is carried out at six-month intervals. You can use the maintenance schedule to determine what work is required. The maintenance intervals must be reduced for trucks exposed to high levels of dust and significant temperature fluctuations. A check of the function and condition of the truck must be carried out during each maintenance operation.

NOTE

General maintenance information

Only regular servicing will enable you to make full use of the warranty.

Maintenance schedule

This maintenance schedule is valid for normal loading during single-shift operation. For heavy-duty and/or multi-shift operation, the intervals must be reduced accordingly. Please observe the information in the section entitled **Area of application**.

Maintenance: every six months or every 1000 hours

Drive unit

- Check the gearbox for noise and leakages.
- Check the gearbox oil level; top up if necessary.
- Check the tightness of the screw connection to the drive unit (note the torque).
- Check the condition of the drive wheel and check for wear.
- Check that the drive wheel, wheel screws and cushion tyre are securely attached.
- Check the traction motor bearing for operating noise; replace the bearing if necessary.

Steering

- Check the function of the steering system.
- Check the maximum steering angle. It must be possible to steer 90° to each side.
- Check the level of play and the status of the steering angle measurement (actual value).
- Check the steering wheel for ease of movement (setpoint value).
- Check the straight-ahead travel of the truck; re-adjust the actual value potentiometer (rail) if necessary.
- Check the steering turntable bearing for ease of movement and wear.
- Check the play of the steering gears.
- Check the ease of movement of the steering system.

– Check the steering motor bearings for operating noise; replace the bearings if necessary.

Brake system

– Check that the foot switch is working correctly.

– Check that the reverse brake is working correctly.

– Check the thickness and condition of the brake lining; replace the brake lining if necessary.

– Check the brake clearance; adjust if necessary (0.4 - 1.0 mm).

– Blow out the brake lining with oil-free compressed air (**caution:** abrasion debris is hazardous to your health; use a protective mask).

– Check the brake retardation values after each adjustment (dynometer).

– Check that the automatic braking mechanism* is working correctly. Observe the functional description for the order.

– Check that the inductive transmitter* is working correctly.

– Clean the photo eyes/light barriers and check they are working correctly.

Undercarriage

– Check the condition and ease of movement of the doors, lids and cover.

– Check the function and condition of the rail switches*.

– Visually check the overhead guard.

– Visually check all safety-related welded seams. If in doubt, check the welded seams by carrying out a colour penetration test.

Lifting system

⚠ CAUTION

Risk of accident

The **main lift chains** and the **auxiliary lift chain** must be replaced when the wear limit is reached or if impermissible damage is present. The technical condition of the chains from a safety perspective must be assessed by a competent person using the manufacturer's documentation. Follow the current applicable guidelines for cold store version trucks.

- Check the mounting and bearing points of the lift cylinders for good condition.
- Check the condition of all chains on the main lift and the auxiliary lift, and check for wear, elongation, damage, lubrication and tension. The wear limit of the main lift chains is 2%. The wear limit of the auxiliary lift chain is 3%.
- Check the chain rollers for ease of movement.
- Check the condition of the lift mast guide surfaces, and check for wear and lubrication condition.
- Check the condition of the lift mast rollers, and check the setting.
- Check the condition of the guide elements, and check for lateral play between the lift mast parts; replace if necessary.
- Check the fork latches* and safety devices.
- Visually inspect the forks for cracks and bends.

Load wheels and load castors

- Check the condition, mounting and wear of the load rollers and load castors.
- Check the load wheels and load castors for ease of movement.

Electrical system

- Check the condition of the battery cables, battery connections and battery male connectors, and check for secure attachment.
- Measure the battery voltage under load.
- Check for failure in the insulation between the battery tray and the positive or negative terminal of the battery.

- Check the electrolyte level as far as technically possible.
- Check the driving, accelerating, braking and reversing functions of the traction controller and pump controller.
- Check all connections and plugs for secure attachment.
- Check the condition of the contactors and check for erosion; replace if necessary.
- Check the fuses for correct values and condition.

NOTE

Battery maintenance is not part of the truck maintenance and must be carried out in accordance with the guidelines from the respective battery manufacturer.

Hydraulic system

- Check the main lift cylinder for leakages and function.
- Check the auxiliary lift cylinder for leakages and function.
- Check the oil level in the tank; top up if necessary. Observe the correct oil grade as per the lubricant table.
- Check all hydraulic screw joints for leakages; tighten or replace if necessary.
- Check all lines and hoses for leakages.
- Check the condition of all lines and hoses and check for pinch points.
- Check the condition of the surfaces on all hoses, e.g. porous areas.
- Check the replacement interval for the hydraulic hoses. All hydraulic hoses must be replaced after six years of use. To check this, see the date stamp on the hose or the crimping.
- Check the pump motor bearing for operating noise; replace the bearing if necessary.
- Replace the hydraulics oil filter

– Visually inspect the breather filter of the hydraulic tank or replace if necessary.

Other checks

– Check all operating equipment for function and condition.

– Check the condition of the additional protective equipment* (see order), and check that it works correctly; repair if necessary.

– Check that labels are present and legible. (Nameplate, decal information and warning signs, load capacity diagram). Missing or illegible labels must be replaced.

Lubrication plan

– Lubricate in accordance with the lubrication plan.

Maintenance: annual or every 2000 hours

– Replace the breather filter of the hydraulic tank.

– Regular safety testing must be carried out by a competent person. The relevant national guidelines must be observed.

*Option

Battery check

NOTE

Battery maintenance is not part of the vehicle maintenance routine and must be carried out as specified by the battery manufacturer.

DANGER

Electrolyte (battery acid) is toxic as well as caustic. Especially with freshly charged batteries, observe explosion dangers in gasing area.

When handling battery acid, always adhere to the prescribed safety measures.

The battery, being the energy supply, has to be treated with care! Therefore observe:

- Keep the battery dry and clean.
- Charge regularly and check acid condition.
- Check cable connections and battery plug for proper condition.
- To protect against corrosion, apply acid free pole grease on the battery poles.

In addition, for batteries with liquid electrolyte:

- Check the electrolyte level at regular intervals.
- Suction away spilt electrolyte using a siphon from the battery tray.

NOTE

Gel batteries are subject to special charging/maintenance and treatment regulations. Always obey the instructions issued by the relevant manufacturer.

To protect the battery from becoming exhausted, a discharge display with cut-out function for the main lift is installed as standard.

CAUTION

Is the battery plug pulled out when a consumer is still active, it is possible for all the contacts to burn.

Plug battery plug in or out only when key switch is switched off.

Lubricants

CAUTION

Risk of damage to property

Trucks for cold store operation must be lubricated with different lubricants. Refer to the operating instructions for cold store trucks.

The following lubricants must be used:

Hydraulic system

- HLP DIN 51524/T2
- ID no. 8 036 912

The tanks are labelled with a min-max marking. After the hydraulic oil has been topped up

or changed, the oil level must be between the min and max marking.

Gearbox

- SAE 75W-90 API GL-5
- ID no. 732 600 0007

The gearbox holds 2.9 l of gearbox oil.

Grease lubrication points

- Lithium soap grease LITH-EP2
- ID no. 8 010 107

Chain lubrication

- Stabylan 2100
- ID no. 8 010 100

Lubrication schedule

Every six months or 1000 hours

- Lubricate steering gears with all-purpose grease
- Grease all lift chains with chain spray.
- Lubricate all moving parts with oil.
- Keep sliding surfaces of the mast sections free of corrosion with a film of grease.
- First gear oil change after 1000 h , thereafter every 24 months or every 4000 h.

Every year or 2000 hours

- Change hydraulic oil.

Every two years or 4000 hours

- Change gear oil.

6

Technical data

Technical data

The technical data for this truck depends on the order. You will therefore receive a datasheet specially prepared for your truck when it is delivered. Please use this accompanying datasheet to find all the technical data.

Sound level, driver's ear 61dB(A)

7

Special equipment

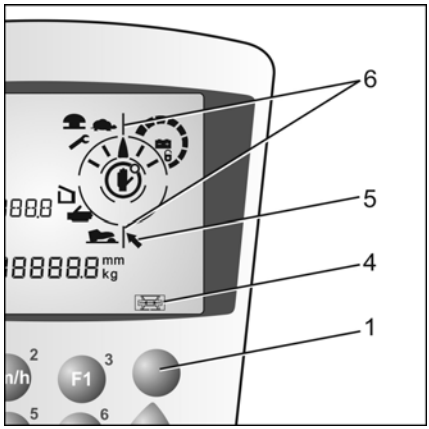
Inductive guidance (IZF)

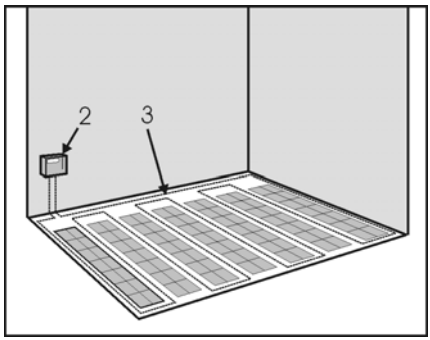
System description

General

If your truck is guided using inductive guidance, the shift (1) button must be pressed before the truck is guided onto the induction track and before leaving the track. This switch in the operating panel is used to switch from manual steering to automatic steering. All other operation processes correspond to the standard truck.

A frequency generator (2) provides an AC supply to a wire installed in the floor (3). This AC supply is registered as a signal by antennas that are installed in the truck, and is used to guide the truck. A computer drives the truck along the wire groove after the signals are analysed. Extensive safety circuits and a diagnostic program simplify system servicing work. The operating devices for inductive guidance are integrated into the operating panel. The operating status display indicates the active operating status (4) of the system. After switching on the control system, a self-test runs in the guidance system.





Entering the aisle

Guidance procedure

- Drive the truck towards the wire groove (induction track) and stop in front of it.
- The angle to the wire groove must not be greater than 60°.
- Set the steering to the straight-ahead position.
- Select automatic steering by pressing the "man/auto" (1) button.
- The "wire search" (5) symbol begins to flash.
- Continue towards the wire groove. The driving speed is automatically reduced.
- When the control system detects the induction track via the first antenna, it switches to automatic mode.

– An acoustic signal sounds.
– Both symbols (6) flash.
– Continue. The truck is driven automatically along the centre of the wire groove.
– When both antennas detect the induction track, the wire search is finished and the symbol (4) is continuously lit.
– The truck can now be driven at the permissible speed within the racking.

NOTE

The more precisely the driver drives the middle of the truck onto the wire groove, the faster the guidance procedure will be completed.

Entering the aisle

– Drive the truck into the aisle in automatic driving mode.
– When the sensor system of the truck has detected the aisle, the maximum permissible speed within the aisle is possible.

Automatic driving within the aisle

If the steering knob is turned accidentally to its straight-ahead position (middle stop) during automatic drive mode, the truck is automatically braked to a standstill.

Switching from automatic to manual operation within the aisle

If the truck is accidentally switched to manual steering within the aisle, it is immediately braked to a standstill. It is then only possible to continue at creep speed.

Driving speed adaptation

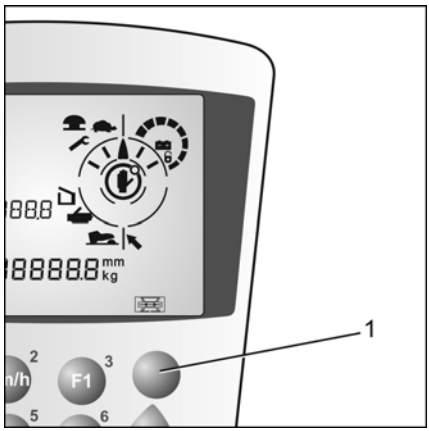
Through automatic speed adaptation, the maximum possible driving speed is adjusted between 2.5 and max. 9 km/h, according to the situation. If an unsafe situation arises, for example an error, the driving speed is limited or driving is switched off completely.

Leaving the induction track

– Drive the entire length of the truck out of the aisle.
– Turn off automatic steering by pushing the "man/auto" (1) button again.
– The truck is braked automatically
– An acoustic signal sounds.
– Drive the truck away from the wire groove using manual steering. The maximum permissible speed outside of the aisle is possible.

Changing the aisle

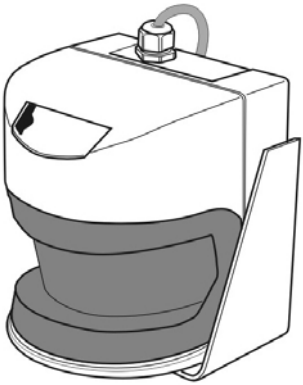
If the truck is driven from one aisle to another, it is essential that the notes in the chapter "Changing the aisle" are observed



Personal protection system (MPSE)

Mobile personal protection systems help to protect people who have entered the braking area of the truck unplanned. One safety laser scanner for each drive direction scans the braking area and triggers braking in the truck as soon as a person or object is detected in this area (protective field).

As a rule, these personal protection systems are active only with the guidance function. Optionally, the functional range can also be expanded to include **front end monitoring**.



⚠ CAUTION

Risk of accident

Even if a personal protection system is used, we do not permit people and very narrow aisle trucks to be in the same aisle at the same time.

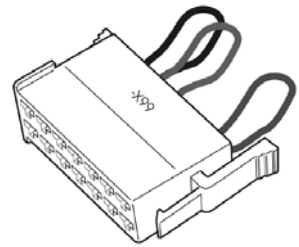
NOTE

The makes of mobile personal protection systems approved by us are not identical as regards functions and options. For all information about operation and maintenance, see the corresponding manufacturer's documents.

Interface X99

The plug X99 represents the interface between the truck control unit and the personal protection system. All signals defined by us are allocated in this plug. The scope of delivery of a very narrow aisle truck includes the **bridging plug X99**, which can be fitted instead of the MPSE connector plug if an internal defect in the MPSE controller has caused truck failure.

The interface X99 is installed on man-down trucks in the vicinity of the operating panel and on man-up trucks in the control compartment



DANGER

Risk of accident

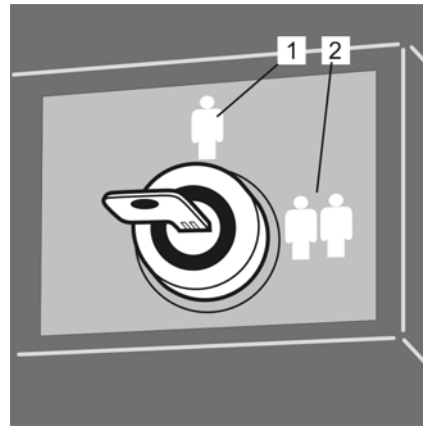
With a fitted bridging plug, all safety functions of the MPSE are suspended and the maximum driving speed of the truck is restricted to 2.5km/h. Operation with a bridging plug is therefore only permitted for the retrieval of a truck. This bridging plug must be kept locked away by the warehouse manager responsible and is only to be used under his instruction.

Two-person cab

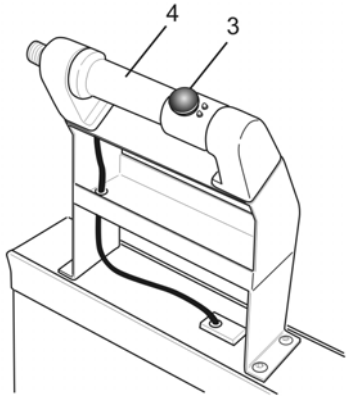
General

With the non-standard equipment “Two-person cab”, it is possible for a second person to travel in the cab while it is moving. Through the use of special equipment features, the passenger is fastened in a position in the cab which ensures that no body parts can project out beyond the contour of the cab and so be at risk of injury. These supplementary equipment features are:

- Key switch to switch over from Driver only (1) to Passenger mode(2).
- One or two additional foot switches in the cab floor.
- Two supplementary coordination switches (3) each combined with a handle (4).



- Where applicable, raising of the barrier to prevent leaning out backwards (depending on the cab dimension)
- Where applicable, additional covers facing the mast side to prevent leaning out to the side (depending on the cab dimension)



⚠ DANGER

The truck operator bears responsibility for the passenger. Allowing the passenger to ride in the can without the operating mode switch having been moved to the correct position presents a potential risk of serious or fatal injury to the passenger.

The operator is obliged to instruct the passenger with regard to correct behaviour while riding. If a passenger refuses to adhere by this code of conduct, he must be refused access to the cab. The operator is also obliged to turn the key switch to the correct position when carrying a passenger.

NOTE

Trucks which feature a cab that permits two operators must also be equipped with two abseil systems.

- *In such trucks, it must be ensured that only the suspension points approved by the manufacturer are used.*

Function

When the operator intends to take a passenger, the relevant operating mode must be set by turning the key switch to the correct symbol. The passenger enters the cab and closes the barrier. One or, if available, both foot switches must be actuated. The passenger is required to hold both handles and at the same time press the coordination switch. The passenger must adopt a position which does not impede the operator.

Check

Before setting off, the equipment features must be checked. In the passenger mode, the truck must not permit any function unless the coordination switch is actuated. If one of the coordination switches is released during a function, all functions must come to an immediate stop.

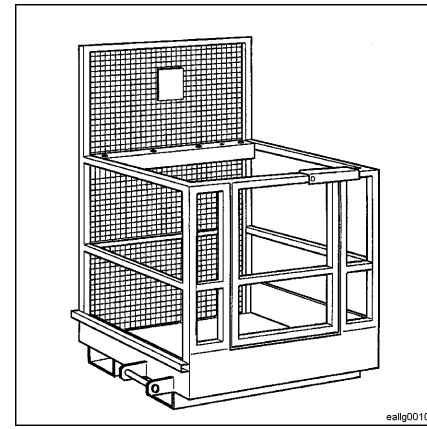
Working platforms

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!



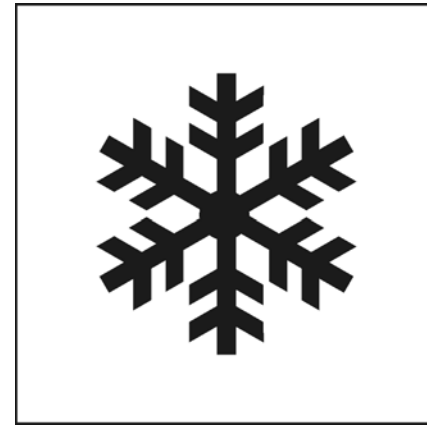
Trucks for use in cold storage

Trucks for use in cold storage are provided with extensive extra equipment, in order to guarantee full functioning at low temperatures (-30°C). Special instructions for the operation of these trucks must be observed, which are not contained in this operating manual Trucks designed for operation in refrigerated environments are marked with the adjacent symbol.

⚠ CAUTION

Icy floors

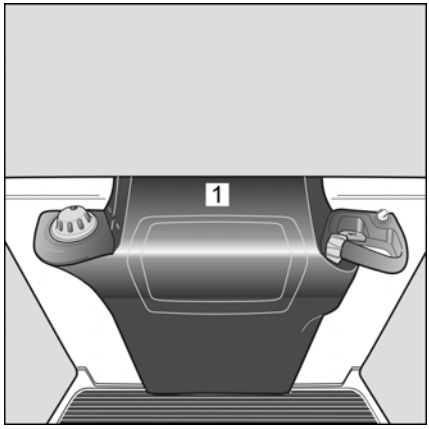
Icy floors have a very negative effect on steering and braking behaviour. In extreme cases steering and braking potential may be lost completely. Therefore the aisles must be kept free of ice at all times.



Load-side operating panel

Second operating panel

A truck can be equipped with a second operating panel on the load side (1) as special equipment. This second operating panel is functionally identical to the standard operating panel on the lift mast side, except for the key switch and the display. It is therefore possible for the truck to be operated either via the operating panel on the lift mast side or the operating panel on the load side. It is guaranteed that only one operating panel can be activated at a time. The truck is switched on via the common key switch on the operating panel at the lift mast side (2). This operating panel is always automatically active when the truck is switched on.



NOTE

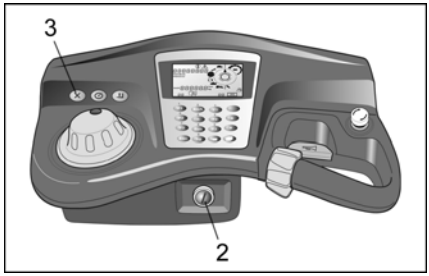
For switching on, follow the notes in the operating instructions in the chapter entitled "Switching on the controller".

Changing the active operating panel

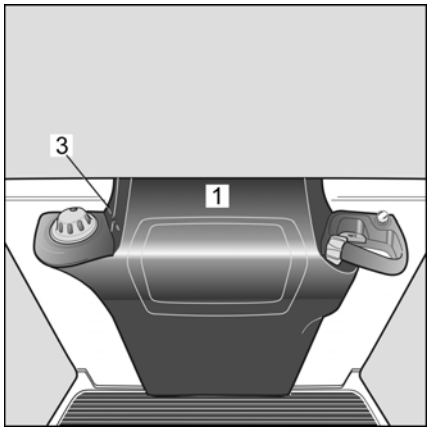
CAUTION

During the operating panel switchover, the steering, in addition to all other functions, can be switched to the other operating panel. As a result, the switchover can cause a major change in the steering angle.

Move the steering to the straight ahead position before each operating panel switchover.



If the active operating panel now needs to be changed, the truck must be brought to a standstill, the foot switch released and the X button (3) in the operating panel that has been passive until now must be pressed. The functions are thus shifted on to this operating panel. The other operating panel is therefore passive and no more truck functions can be triggered.



NOTE

The emergency stop switches in both operating panels are active at all times.

NOTE

If the X button (3) is assigned a special function, this special function is available as usual in the activated operating panel.

Now actuate the foot switch to continue to work. The new steering angle must be checked and corrected as necessary. Check the steering angle display in the display on the lift mast side.

CAUTION

Risk of accident due to lateral movement of the truck.

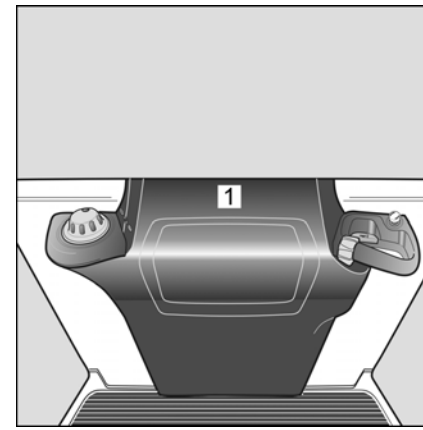
Carefully set off.

Operating panel, load side only

A truck can be equipped with an operating panel **only** on the load side (1) as special equipment. A switchover is not required here.

The key switch (4) and the display (5) remain on the lift mast side. There is no steering knob or operating console on this side.

If trucks are equipped with IZF the selecting and the deselecting of the inductive wire guidance is also possible using the X-keys (load side and mast side). This is not possible if trucks are additionally equipped either with Aisle Safety Assistant or with Navigation System.



Battery on roller tracks

Description

The battery rests on roller tracks and can be installed and removed from the side with the use of a battery changeover frame*. The battery is secured on both sides with clamping devices and is therefore kept in its position.

Monitoring

The battery locks are electrically monitored. If one of the locks is not correctly locked in place an error message appears in the display and the truck will stop.

⚠ WARNING

Every time before starting work the battery locks (2) must be checked for perfect condition and function.

* Option

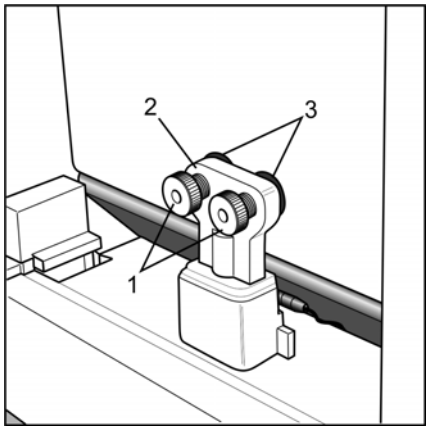
Setting the battery lock

⚠ CAUTION

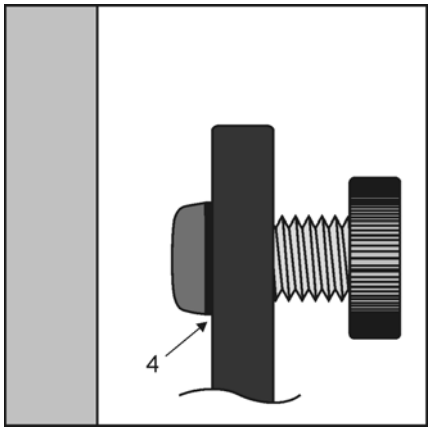
Risk of crushing and damage to property

An improperly fixed battery may fall out of the truck when cornering and put people and property at risk. If the battery cannot be clamped securely, the responsible service centre must be called. Further operation with a faultily or improperly clamped battery is dangerous.

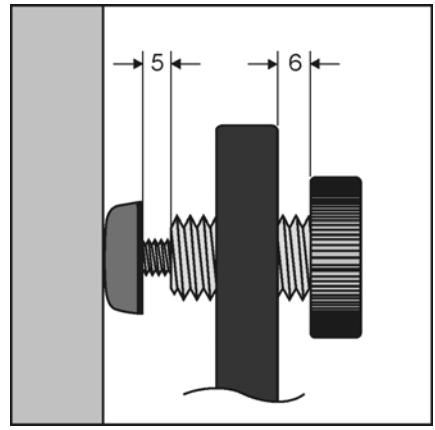
For the operational safety of this truck, the traction battery must be securely fixed in the battery compartment by means of clamping. The truck must also be equipped with an adjustable battery lock . The battery lock



1 Knurled-head screw
2 Battery lock
3 Rubber buffer



adjustment range is approx. 30 mm on each side. Both locks must be adjusted symmetrically.



NOTE

If a battery is being used in a chassis for the first time, the actions described below may need to be repeated in several steps. If the rubber buffer thread (spring element) is not able to move smoothly, this must be rectified before setting.

- Insert the battery approximately in the centre of the battery compartment. In doing so, one of the battery locks will remain as a stop in the truck.
- Rotate the knurled-head screw (1) and the rubber buffer (3) all the way back (4) on both locks (2).
- Insert the second battery lock into the truck.
- Unscrew both rubber buffers until they lie against the battery. The visible thread length should be roughly the same on both sides of the battery. Gently move the battery to the side, if necessary The maximum adjustment range for each rubber buffer is approximately 20 mm.
- If the useable threads on both rubber buffers are not long enough to fasten the buffers to the battery, the knurled-head screws must be screwed in further to increase the adjustment range. At the same time, the rubber buffers must rotate with the knurled-head screws.
- Tension can now be increased by screwing one of the two knurled-head screws in further. Tighten the knurled-head screws hand tight. The battery lock is well clamped if the rubber buffer is clearly deformed.
- If sufficient clamping is not achieved via these steps, it is possible that a battery with incorrect dimensions is being used. The truck must not be used if the battery is not securely locked. Doing so would result in the risk of accidents and damage.
- When the clamping has been carried out, a thread must still be visible at (5) and (6).

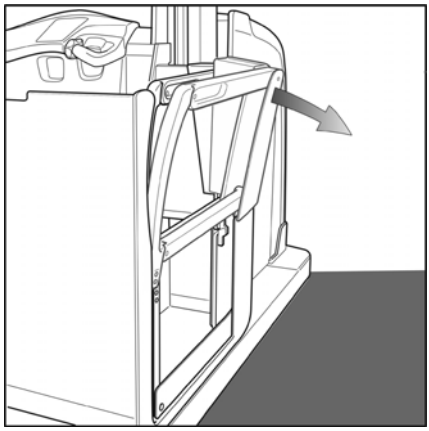
Acoustic warning signal

As an option, these trucks can also be fitted with an acoustic warning system as an additional safety measure.

The signal is given according to the direction of travel or speed.

Tilt barrier

Description



When in a reclined position, the tilt barrier opens out to the side towards the racking. This means that the distance to the racking is reduced, which facilitates order picking. If the operator releases the tilt barrier, it is automatically returned to the initial position by spring force.

The tilt barrier consists essentially of a mobile upper part, a fixed bottom part and a hinge connecting the upper and bottom parts. For safety reasons, the tilt barrier is unlocked only under certain conditions.

Function

The barrier can only be opened if:

- The truck is in an aisle
- The barriers are closed
- The two-hand sensors are not actuated
- The operating levers for driving/hydraulics are in the neutral position
- The foot switch is not actuated
- The driving speed is v < 0.1 km/h

The barrier will be locked if:

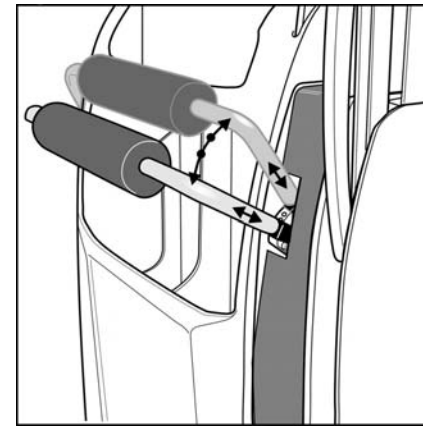
- One of the barriers is opened
- The foot switch and the drive operating lever is actuated
- The main lift function is selected
- The truck is not in an aisle

NOTE

If the truck is in an aisle and one of the two barriers is opened and then closed again, the

tilt barrier is locked. It is unlocked again if the foot switch is briefly actuated once and the remaining conditions are fulfilled for it to be unlocked.

Leaning cushion



When driving in the load direction, the operator is able to lean on this cushion. By doing so, the operator can adopt an ergonomic position.

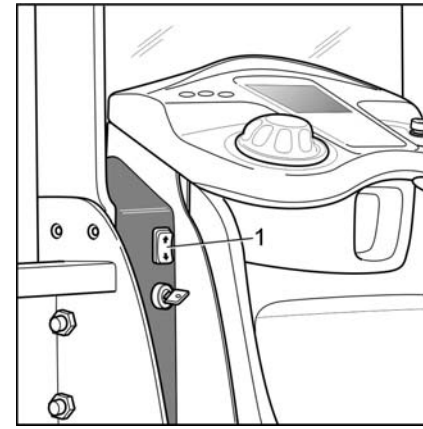
Adjustment

The cushion can be latched into four positions.

– Using both hands, pull out the leaning cushion on the metal bracket against the spring force.

– Latch the leaning cushion back into the required position.

Height-adjustable operating panel



To ensure optimum ergonomics for the operator in going about their work, the height of the operating panel can be electrically adjusted. The adjustment range is 130 mm.

⚠ WARNING

Risk of crushing hands

When adjusting the height of the operating panel, the operator must keep a firm grip of the handhold with their right hand.

⚠ WARNING

Risk of accident

Only adjust the operating panel when the truck is at a standstill

Height adjustment

Push the rocker switch (1) up to raise and down to lower.

End of aisle automatic braking

This unit is used to initiate automatic braking to creep speed when entering the aisle end area. It is intended to help prevent the operator of the truck from unintentionally driving too quickly out of an aisle.

The following devices can be used to detect aisle end areas:

- Proximity switches
- Magnet-operated switches
- Reflective light barriers
- RFID technology

If desired, an absolute stop can be activated at the end of the aisle using an additional transmitter. By using the drive direction detection function, the truck can only be driven in the opposite direction from this stop position. Pressing and holding the enable button allows the truck to be driven at max. 2.5 km/h in the braking direction. The truck is then not shut off before the end of the aisle. If the truck leaves the braking area and drives towards the centre of the aisle, it automatically switches to normal driving mode.

If one of the two signal transmitters fails, the full brake function is retained. However, it is only possible to continue driving if the enable button is pressed and held down. The drive lever must also be actuated.

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