

Original instructions

Order picking truck

MX-X



 ϵ

2332 2334

first in intralogistics

Table of contents

1	Foreword	
	General	2
	EC declaration of conformity	3
	Safety instructions	4
	Standard design and optional equipment	4
	Truck identification, Factory nameplate	5
	Product documentation	6
	Accessories accompanying the product	6
	Rules for the operating company of industrial trucks	6
	Safe-keeping and passing on	7
	Copyright and proprietary rights	8
	Operator, Form of address	9
2	Safety	
	Working safely	12
	Vibrations	13
	Medical equipment, implants	13
	Special safety information about load pick up	14
	Safe handling of operating media	15
	Risk assessment	17
	Residual risks	17
	Regular testing	17
	Application area	18
	Narrow aisle vehicles	19
	Original parts	19
	Directives and guidelines	20
	Driver's licence.	20
	Alterations to industrial trucks	20



21

3 Overview

	Industrial-truck view	24
	Standard design of labelling	25
	Labelling for special equipment	27
	Intended use	29
	Description of truck	29
	Operating panel	30
	Displays	32
	Operating the display	33
	Operating instructions	40
	Swivel shift fork	41
	Other attachments	41
4	Operation	
	General commissioning	44
	Initial commissioning	44
	Weights of the units	44
	Transporting and loading	46
	Support screws	51
	Safe handling of the traction battery	52
	Battery compartment cover, Service flap.	54
	Installing the battery	54
	Permitted batteries	56
	Battery commissioning	56 57
	Replacing the battery Function checking	5 <i>1</i>
	Daily commissioning	59
	Checklist before starting work	59
	Driver's compartment	61
	Access to the driver's compartment	61
	Operating devices	63
	Initial driving exercises	63
	Adjusting the position of the operating panel	64
	Driver's seat	65
	Switching on	67
	Switching on the controller	67



Table of contents

	Driving Braking, driving and steering Types of guidance Mechanical guidance MZF	70 70 73 74
	Load pick up Moving the load Load capacity diagram Fork arms, adjustable	76 76 80 81
	Emergency operation. Emergency lowering via the operating panel. Emergency lowering Securing the load support Emergency operation Emergency abseil system	82 82 82 85 85
	Parking, decommissioning. Parking and leaving the truck Decommissioning.	94 94 94
5	Regular care and maintenance	
	Regular care and maintenance	96
	Special versions, special equipment	98
	Regular maintenance.	98
	1000-hour maintenance schedule	99
	2000-hour maintenance schedule	103
	Battery maintenance	104
	Lubricants	105
	General information about fuses	106
	Removing the control compartment hood	106
6	Technical data	
	Technical data	108
7	Special equipment	
	Additional documentation	110
	Enabling options	110



Optispeed versions	111
Split operating panel	113
Inductive guidance IZF	115
Automatic Floor Compensation AFC	118
Lift cut-out	120
Traction cut-out	120
Aisle entry assistant	120
Battery on a roller channel	122
Electronic access control	125
Automatic braking systems	128
Personal protection system (MPSE)	132
Safety laser scanner	133
Personal protection system, preparation	134
Tilt barrier	135
Mirror and lighting module	136
Camera system	137
Lift height preselection	138
Driver's cabs, special versions	139
Wind deflector cab	140
Intercom system	142
Warm-air heating system	142
Protective roof cover	143
Radio installation	143
Overhead guard switch	144
Working spotlights	144
Safety Light safety headlight	145
Acoustic alarm	147
Antistatic version	148
Guard plate on rack rail	149
Telescopic table	149
Other attachments	150
Trucks for use in cold storage	151



Table of contents

Nounting system for auxiliary components	
USB charging station	152
MMS interface	153
Two-person cab	154
Working platforms	158



Foreword

1

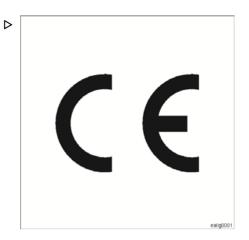
General

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 Model according to these operating instructions according to these operating instructions

conforms to the most recent version of EC Machinery Directive 2006/42/EC and the most recent version of EMC Directive 2014/30/EU for industrial trucks implemented in accordance with harmonised standard EN 12895:2015. Furthermore, we declare that any radio equipment contained in this machine conforms with the most recent version of Radio Equipment Directive 2014/53/EU. The manufacturer is solely responsible for exhibiting this declaration of conformity

Notified body in accordance with Annex

IX:

EU notified body no. 2140

Personnel authorised to compile the technical documents:

See EC compliance declaration

STILL GmbH



Safety instructions

Safety instructions

Explanations of the terms used in this manual:

A 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.

A 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 design and optional equipment

These instructions describe the

- intended use
- · regular maintenance
- and prescribed maintenance

for industrial trucks in the standard design and for the optional equipment available at the time of going to print.

Special versions and special equipment (UPA)

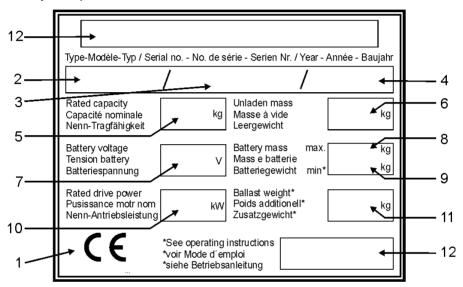
For industrial trucks in a customer-specific special version or with special equipment, additional order-related documentation is created and supplied if required.



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.
- 2 Truck type
- 3 Truck serial number. This serial number must be given in the event of any queries.
- 4 Year of manufacture

- 5 Nominal loading capacity
- 6 Unladen weight
- 7 Battery voltage
- 8 Maximum battery weight
- 9 Minimum battery weight
- 10 Rated drive power
- 11 Ballast weight
- 12 Name of manufacturer

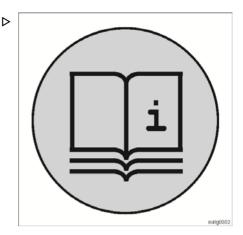


Product documentation

Product documentation

This includes:

- · Spare parts list
- · Operating and maintenance manual
- 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.

Rules for the operating company of industrial trucks

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



Safe-keeping and passing on

This guide provides information for handling industrial trucks:

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

Internet address and QR code

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



Safe-keeping and passing on

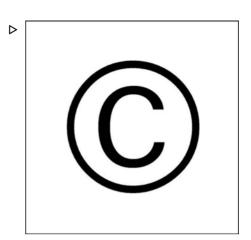
- These operating and maintenance instructions must be kept safely so that the operator always has access to them.
- Documents can be ordered retrospectively. Please give the ID or the order number.
- If the truck is sold on, the complete documentation should be passed on along with the truck.



Copyright and proprietary rights

Copyright and proprietary rights

This manual - and any excerpts thereof - may not be reproduced, translated or tansmitted in any form to third parties without the express written permission of the manufacturer.





Operator, Form of address

Our products are suitable for use by male or female operators. However, these instructions use only the masculine form of address, hereinafter "operator", to simplify the text.

Dimensions of the operator's compartment

The dimensions of the operator's compartment on our industrial 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. EN ISO 3411 specifies 114.1 kg for the maximum body weight for a large operator.

A CAUTION

Reduction in the load capacity. Negative effect on stability.

If the actual body weight of the operator exceeds 114.1 kg, the maximum load weight must be reduced by the difference compared with the information on the load capacity diagram.

Example

The actual body weight of the operator is 160 kg. In this case, the maximum load weight must be reduced by approx. 46 kg compared with the information on the load capacity diagram.

If these industrial trucks are operated by persons who do not meet the criteria specified in EN ISO 3411, the following effects must be expected:

- The ergonomic conditions may be less favourable
- It may not possible for the operator to reach the pedals and foot switches
- The useable height below the overhead guard may be too low
- The adjustment ranges for the steeringwheel and operating panel adjuster may no longer be sufficient
- The adjustment ranges for adjustable drivers' seats may no longer be sufficient
- There could be a negative effect on the load-bearing capacity of the industrial truck

Please be sure to consult your responsible authorised service partner.



1

Operator, Form of address



Safety

Working safely

Working safely

- The industrial truck must be operated exclusively from the driver's compartment
- If industrial trucks are equipped for pedestrian mode or with external operating panels, the industrial trucks may be operated using these features; for further safety information for this purpose, refer to the relevant additional descriptions
- When driving without a load, lower the fork to floor height
- 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 doing this is highly dangerous
- Aside from the driver, there must be no other person present on the industrial truck unless the industrial truck has additional equipment to enable operation with two persons
- 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.
- When cornering and driving past parts of buildings that restrict visibility, use the horn to warn others that the industrial truck is approaching.
- When driving through doorways and under ceiling joists, take the height of the industrial 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 industrial truck but also uncontrolled movements and are therefore prohibited
- The driver must secure the industrial truck against unauthorised use by removing and taking the switch key or by clearing the access information on the electronic access control system when leaving the industrial truck.

Safe working environment

- People must not encroach into the working area (danger area) of the industrial truck; If a person does enter the danger area, all movements of the industrial truck must be stopped immediately and the person must be directed away from the area
- If there are marked roadways, the industrial truck must 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.
- The condition of the floor surface influences the braking distance of the industrial truck.
 The driver must take account of this in his driving and braking style.
- If the area of application and work situation so require, the operating company must evaluate the potential hazards and provide appropriate personal protective equipment such as safety shoes, a safety helmet, safety gloves or protection goggles: responsibility for the selection and provision lies with the operating company; responsibility for use of the equipment lies with the operator

Safe machine

- Essentially, all safety information located on the industrial truck must be observed
- Missing or illegible safety information must be replaced
- The openings in the area of the battery where gas may be released must not be covered or sealed. To prevent the formation of potentially explosive gas mixtures, an unrestricted air supply is required.
- 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.

Operational safety takes priority over working speed!



Vibrations

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

Weighted effective value of acceleration to which the body (feet or seat base) is subjected.	< 0.6 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 on the operating devices in the truck is less than 2.5 m/s². There are therefore no measurement guidelines for these measurements.

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

Medical equipment, implants

A DANGER

Electromagnetic interference may occur on medical devices!

Only use equipment that is sufficiently protected against electromagnetic interference.

Medical equipment, such as pacemakers or hearing aids, may not work properly when the truck is in operation. Individuals with active or non-active implanted medical devices must take it upon themselves to ensure that they are not exposed to dangerous electromagnetic radiation. Ask your doctor or the manufacturer of the medical equipment to confirm that the medical equipment is sufficiently protected against electromagnetic interference.

It is the responsibility of the company that operates the industrial truck to explain these dangers to employees in detail.



Special safety information about load pick up

 \triangleright

Special safety information about load pick up

Recognising danger is half the battle!

- Before every load pick up, make sure that the load to be picked up does not exceed the load capacity of the truck (refer to the load capacity diagram) or the maximum permissible dimensions as specified on the datasheet. This also includes, of course, the accumulated weight of the picked goods
- Loads that are to be transported and stored must be packed securely
- The centre of gravity of the load must not change during acceleration, braking or during transport
- · No parts must be allowed to fall
- If loads cannot be transported with the necessary level of safety, an appropriate container or means of securing the load must be employed to ensure safety
- Loads must always be transported in suitable containers or secure packaging
- Loads comprising loose packages may not be stacked higher than the top edge of the cab rail
- If very high loads that block the view of the roadway have to be transported, appropriate safety measures must be put in place; if necessary, a guide and traffic supervisor must be used
- Hanging or swinging loads must not be attached to and transported on the lifting accessories





Safe handling of operating media

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

A 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.

(L)

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.





Safe handling of operating media

For battery acid

A 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

Within the scope of validity of the CE guidelines, the operating company must create **operating instructions** on the basis of a risk assessment. The purpose of the risk assessment is to identify dangers and the associated risks that could occur due to the product or the application of the product in the specific place of use and under the application conditions at this place of use. We can help you to complete the risk assessment. The operating instructions are intended to warn against the identified dangers and provide information on possible remedial actions.

We recommend integrating these operating instructions into the operating procedures for the specific place of use.

Residual risks

Despite observation of all pertinent safety regulations for the design and construction of our trucks and despite proper use by the operating company, residual risks can occur during operation. We refer to this specifically in the individual chapters.

Please heed all provided safety warnings.

Regular testing

This industrial truck must be tested in accordance with our specifications by a specialist (expert) at least once per year or after any unusual incidents.

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 log must be created for the tests.

If defects are found, they must be rectified before the truck is next commissioned. If serious repairs are required (e.g. after an accident), it



Application area

may be necessary for another test to be carried out.

The operating company is responsible for checking whether the country in which this industrial truck is used requires regular safety checks to be carried out on the industrial truck by a specialist.

Application area

The area of application must have sufficient floor load capacity. Ask the responsible sales representative about the relevant wheel loads and specific floor loads for your industrial truck. The floor must meet the guidelines specified by us. The condition of the floor surface influences the braking distance of the industrial truck. The driver must take account of this in his driving and braking style.

The industrial trucks described here are designed for the following application conditions (VDI 2695 category 1):

- Smooth, level roadways without major gradients up to a maximum of 3%
- normal work load, 50% capacity utilization; full load and half shift or half load and full shift

Ambient temperature in accordance with EN 1175-1

Series products in continuous operation are designed for an average ambient temperature range of +5°C to +25°C.

The maximum ambient temperature may increase briefly (for up to one hour) to up to +40°C.



WARNING

Restrictions in the applicational area.

The industrial 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 road traffic
- In the cold store (see cold store special equipment)
- On surfaces that are not horizontal

Observe the applicable national regulations.

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



Directives and guidelines

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



Personal protective equipment

- 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.



2

Personal protective equipment

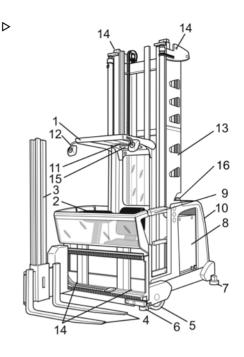


Overview

Industrial-truck view

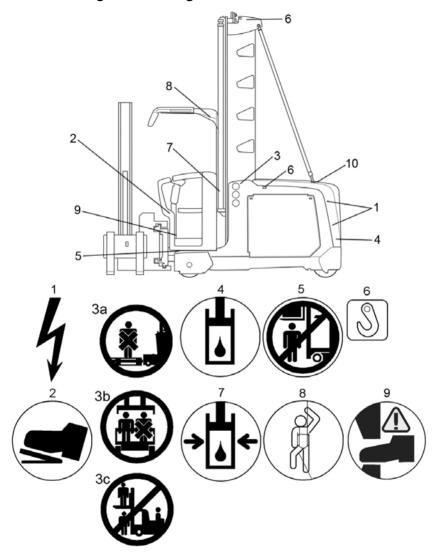
Industrial-truck view

- (1) Overhead guard
- (2) Operating panel
- (3) Auxiliary lift mast
- (4) Load forks
- (5) Load wheel
- (6) Front guide rollers
- (7) Rear guide roller and support screws
- (8) Battery compartment or battery compartment doors*
- (9) Barrier or cab doors*
- (10) Control compartment
- (11) Portable lamp*
- (12) Rear-view mirror*
- (13) Lift mast
- (14) Lifting points for crane-loading
- (15) Abseil system
- (16) Hazard warning light
- * Option





Standard design of labelling



- 1 Danger! High voltage
- 2 Foot switch
 - a. Do not transport people on the load or on the load support.
 - b. The driver's compartment is approved for use by one person only
- 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. Oil tank
- It is not permitted for people to sit or stand underneath a raised load, or underneath a raised driver's platform.



3

Standard design of labelling

- 6 Lifting point for crane loading
- 7 The container is under hydraulic pressure, hydraulic cylinder.
- 8 Storage space for the abseil system

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

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



NOTE

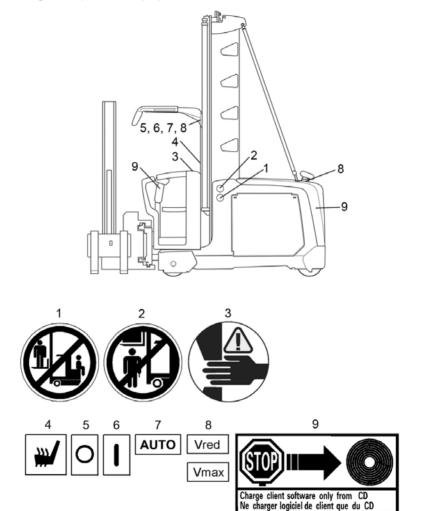
The section entitled "Labelling for special equipment" provides details of further information signs that may also be required based on the order.

- 9 Risk of crushing feet
- 10 Disconnect the battery male connector before removing the control compartment hood. (Only for the 80-V version)



Labelling for special equipment

Labelling for special equipment



- 1 It is not permitted for people to sit or stand on the load or the load support, or to be carried as passengers
- 2 It is not permitted for people to sit or stand underneath a raised load, or underneath a raised driver's compartment
- 3 Risk of crushing hands

- Seat heater on/off switch
- Switch in "switched off" position Switch in "switched on" position 5
- 6
- 7 Switch in "automatic mode" position

Laden der Kunden-Software nur von der CD

The speed of the truck is limited based on the order.



3

Labelling for special equipment

9 Truck with customised software. Only the customer's special version and not the

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

standard software may be installed in the truck control unit.



Intended use

The order picker truck is designed for narrow aisle operation. It permits pallets to be entered into and removed from storage, as well as order picking from the rack compartments.

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.

Use for other purposes is prohibited.

If this truck is to be used for work which is not described in these instructions or does not appear in the guidelines for the specified and proper use of industrial trucks, and if it has to be converted and retrofitted for this purpose, it is necessary to be aware that modifications to the original construction can impair the driving behaviour and stability of the truck and are therefore not permitted without our agreement.

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.

Description of truck

Instructions on operation of the individual functions are provided in the respective chapters.

General information

The operator can put himself and the load suspension device (swivel fork) into the most suitable working height by raising the operator's cabin. The auxiliary lift can be used to serve the highest rack level and to set a favourable deposit height when carrying out



3 Overview

Operating panel

order picking work. The auxiliary lift must always remain in the lowest position when travelling.

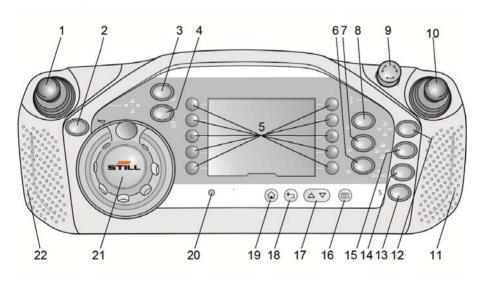
Outside the aisles (transfer aisle), the industrial trucks can be driven freely with the load lowered (transportation mode). The load must be lifted only sufficiently high (clear of the ground) that no part of the load touches the ground.

Within the aisles, the narrow aisle trucks are guided mechanically or inductively*.

The steering of the truck is realized by a freely programmable controller (CAN BUS). All movements (driving, lifting/lowering the cab lift, lifting/lowering the auxiliary lift, swivelling the fork, pushing the fork) are infinitely adjustable. Operating errors can be prevented to a large extent by means of safety circuits.

* Option

Operating panel



(1) Operating lever for hydraulics (in conjunction with the selection keys)

(2) Horn



Operating panel

- (3) Enable button (e.g. for releasing the brake in an automatic braking system or as bridging for the intermediate lift cut-out and for acknowledging errors that can be acknowledged)*. Flashes red when it needs to be actuated
- (4) Manual-automatic two-way switch for inductive guidance*
- (5) Selection keys for favourites
- (6), (7), (8) Selection keys for additional hydraulic functions*
- (9) Emergency off switch
- (10) Operating lever for driving
- (11) Sensor surface for two-hand operation of the main lift or shifting in the aisle
- (12) Selection key for lifting or lowering the auxiliary lift or swivelling the fork
- (13) Reserved for special functions
- (14) Selection key for automatic functions, e.g. fork cycle

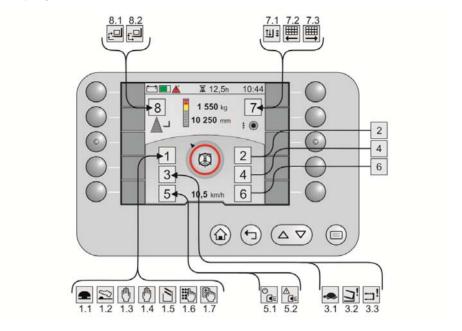
- (15) Selection key for lifting or lowering the cab lift and auxiliary lift together, in connection with pulling or pushing the operating lever (1), or the selection key for swivelling the fork synchronously 180° to the left or right in connection with moving the operating lever (1) to the right or left
- (16) Selection of a menu display
- (17) Selection within a menu
- (18) Go back one step in the menu or cancel a selection
- (19) Return to main page
- (20) Light sensor for automatic control of the display lighting
- (21) Steering knob or steering wheel
- (22) Sensor surface for two-hand driving within the aisle
- * Optional functions



3 Overview

Displays

Displays



1.1	Emergency off switch pressed	4	Not used
1.2	Foot switch required	5.1	*MPSE in operation
1.3	Two-hand operation on the left required	5.2	*MPSE has detected a fault
1.4	Two-hand operation on the right required	6	Not used
1.5	Barrier open	7.1	*Navigation, combination operation
1.6	PIN entry expected	7.2	*Navigation, destination is located on the left-hand side
1.7	RFID entry expected	7.3	*Navigation, located on the right-hand side
2	Not used	8.1	Remove from stock with a fork cycle
3.1	Creep speed active	8.2	Place into stock with a fork cycle
3.2	Turret head not in the end position		
3.3	Telescopic fork not in the end position		

At points marked 1 - 8, the pictograms shown appear depending on the situation and the op-

tions available.



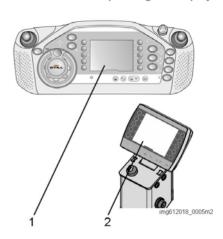
Operating the display

Operating the display



To emphasise the functionality, the following images have been simplified.

 \triangleright



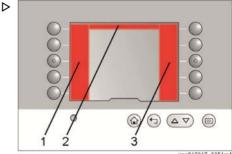
- Display in the operating panel
- 2 Display in the case of split operation

Function

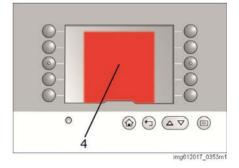
Operating statuses and information relevant for operation are shown on the display. Using the display, it may be possible to switch functions on and off or to switch between defined statuses.

The display is presented in colour and is graphical. The content is divided into four parts:

- · Left-hand menu bar (1)
- Right-hand menu bar (3)
- · Top status bar (2)
- · Central information area (4)



img612017_0351m1





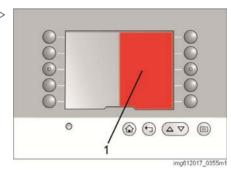
Operating the display

Half of the display can be occupied by a message window (1). This window is automatically inserted from the right-hand side. The information which was previously displayed centrally is then shown in the left-hand section of the display. The elements may sometimes overlap.

This message window has various content:

- · Messages relevant to operation
- · Messages with error numbers
- Target position (drive order) and actual position for navigation

If the settings are modified, a special form of the message window appears. This message informs you that the changed settings are being saved. An acoustic signal accompanies the display of this message. The message disappears after four seconds.

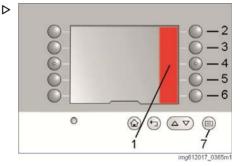


Menu structure

The ten membrane switches can be freely configured to display your favourite functions on the main page. As soon as the button (7) is actuated, the menu bar (1) opens. From this point the structure is always the same. There is also no change to structure when you select a different language. The symbols also remain the same.

The menu levels are as follows:

Industrial truck (2)		
Pow	Power-saving feature	
Nav	Navigation	
Lighting (3	5)	
Life height	preselection (4)	
Use	Used lift heights	
Fans (5)		
Settings (6)		
Truck information		
Production number		
Display settings		
Time		
Date		
	Language	
Status bar		



STILL

		Left field	
		Centre field	
		Right field	
Config	gure fa	vourites	
Truck	Truck settings		
Lift height preselection			
·		Approach lift heights	
		Enter lift heights	
		Clear lift heights	
Service			
Message list			

Top status bar

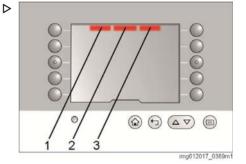
The status bar at the top of the display is divided into three fields:

- Left field (1)
- · Centre field (2)
- Right field (3)

The status bar can display the following information:

Information	Display format
Battery charge level (charge	Graphical
state)	%
Operating hours	h
Time	hh:mm
Date	dd.mm.yy
Next maintenance interval	h

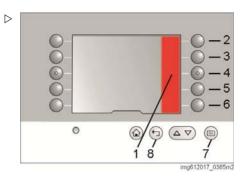
The status bar can be configured individually.



Operating the display

Procedure

- Push button (7). The menu in area (1) opens.
- Press key sequence (6), (3) and (5).
- Select the status bar field using button (2),
 (3) or (4).
- In the list, use buttons (2) to (6) to select the desired information.
- Exit the list by pressing button (8).



Central information area

The central information area simultaneously shows four values that are relevant for operation:

• Weight (1):

The maximum permissible weight for the current lift height. If the optional weight measurement is available, the current weight of the load being lifted.

• Lift height (2):

Current height of the fork arms (upper edge)

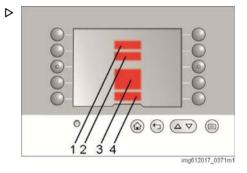
- Type of guidance and steering angle (3)
- Driving speed (4)

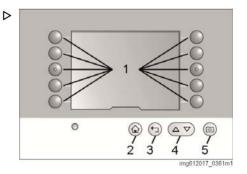
This part of the display cannot be parameterised.

Operation

The display is operated using 15 membrane switches. The function of buttons (2) to (4) is fixed. Button (5) has two functions.

Item number	Function
2	Changes the view back to the main page
3	Changes the view back to the next-highest menu
4	If the arrow is displayed at the upper or lower edge of the right-hand menu bar, the content can be changed using these two push buttons.







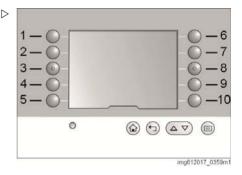
page	Changes the view to the main page with the menu shown in the right-hand menu bar.
	If a settings page is displayed, the current setting can be saved.

The function of membrane keys (1) to (10) is shown directly next to the keys in the display. The function of the buttons changes depending on the menu that is displayed.

The layout of the main page is always the same when the industrial truck is delivered ex works.

Item number	Function
1	The energy-saving mode of the industrial truck is activated or deactivated.
5	The navigation information is shown or hidden. For this, the key switch for the navigation must be set to AUTO. Otherwise, the symbol is greyed out and therefore cannot be selected.*
	If the button is pressed and held when a drive order is active, the drive order is deleted.*
6	The right-hand menu bar with the available data regarding height preselection opens. If the symbol is greyed out, the industrial truck is equipped with the navigation option and the key switch for navigation is set to AUTO.*
9	Switch the work light* on/off
10	Switch the fan* on/off
	* Option

If a function or button is selected, this is indicated with a coloured bars (1) next to the button. If the function is deselected, this coloured bar is no longer present.



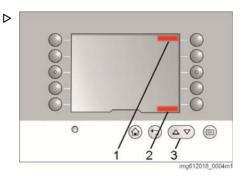




Operating the display

Scrolling through the menu bar

If an arrow appears in area (1) or (2), then the list contains additional entries. The arrow keys (3) can be used to scroll through the menu. If there is no longer an arrow in area (1), the start of the list has been reached. If there is no longer an arrow in area (2), the end of the list has been reached

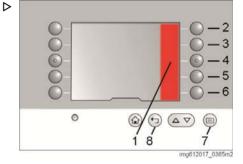


Changing the language

The texts are available in 25 languages. The language can be set using a fixed key combination. This combination is the same for all languages.

Procedure

- Push button (7). The menu in area (1) opens.
- Press key sequence (6), (3) and (4).
- Use buttons (2) to (6) to select the desired language in the list.





NOTE

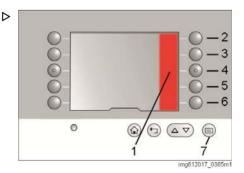
Only five languages are shown here. The other 20 languages can be found by scrolling. See "Scrolling through the menu bar"

- Exit the list by pressing button (8).

Favourites

The ten membrane switches can be freely configured to display your favourite functions on the main page. The following functions are available as favourites:

- · Energy-saving mode
- Navigation
- Lighting
- Life height preselection
 Complete, individual areas or individual heights
- Fans





Operating the display

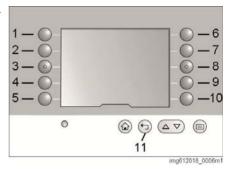
Procedure

- Push button (7). The menu in area (1) opens.
- Press key sequence (6) and (4).
- Select the desired function in the list using buttons (6) to (10).



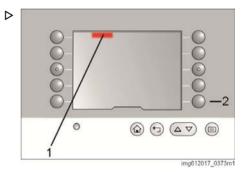
On some buttons there is a sub-menu with additional options.

- Exit the list by pressing button (11).



Message list

Currently displayed error numbers can be hidden using push button (2). A warning symbol (1) remains in the status bar with the number of the current error. The hidden errors can be displayed in the message list. The errors are only displayed in the list until the cause is rectified. All other errors can be read out using the diagnostic software.

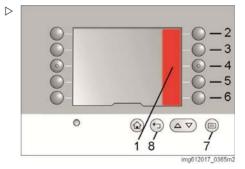


Procedure

- Push button (7). The menu in area (1) opens.
- Press key sequence (6), (6) and (2).

The message list shows all of the current error numbers.

- Exit the list by pressing button (8).





Operating instructions

Brightness setting

The brightness is automatically adjusted by a light sensor (1) below the display.



NOTE

For the automatic brightness feature to function correctly, the sensor must not be covered or contaminated.



Operating instructions

The controller assists the operator in operating the industrial truck effectively.

Operating instructions take the form of:

- · Illuminated buttons
- · Message in plain text
- · Pictogram
- · Error number

If a particular button needs to be actuated in order to continue working, this button is illuminated.

The messages in plain text provide direct information in the configured language.

Pictograms provide self-explanatory, language-neutral information on the necessary operating steps.

In the event of a fault or defect, one or more numbers appear led by a pictogram of a warning triangle. Call the authorised service centre and provide the authorised service centre with these numbers.

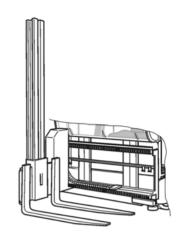


Swivel shift fork

The movements of the turret head are automatically braked before the turret head reaches its mechanical stop. The end positions are signalled to the controller by switches. The industrial truck drives at the maximum speed approved for the lift height only if the turret head is located in the right or left end position. If either the swivel or reach movement does not reach the end position, the industrial truck drives only at positioning speed and the lifting and lowering speed of the main lift is reduced.

The **tortoise** symbol appears in the display.

Once the turret head has reached one of the two end positions, the operator is notified by an acoustic signal.



>

Other attachments

Other attachments* can also be supplied in place of the turret head.

These include:

- · Telescopic tables
- · Accessible pallets
- · Order-picking platforms
- · Customised structures

A DANGER

Impairment of operational safety, danger to the operator

Other than the attachments supplied by the manufacturer, only attachments tested and supplied by the manufacturer are permitted. Unauthorised modifications are prohibited. See also "Alterations to industrial trucks".

Just as is the case with the industrial truck, attachments must be serviced regularly and inspected once a year by a specialist.

Other attachments differ from the standard design in terms of the method of operation as well as in the type of hazards if safety information is not observed. It is therefore important for the operator to be familiar with and to adhere to the instructions for the particular attachment that is fitted



3

Other attachments

Additional operating instructions and maintenance instructions from our suppliers may also apply.

*Option



Operation

General commissioning

Initial commissioning



Observe the section entitled Safe handling of consumables.

Prior to initial commissioning, make sure that the entire industrial truck is properly assembled. All electrical and hydraulic connections must be checked. Mechanical connections that were removed for transportation must be reconnected with particular care. Check all screw connections with the appropriate torque. Commissioning can begin once the filling levels for the hydraulic tank and for the gearbox have been checked. The entire initial commissioning process must be correctly performed by our trained service personnel.



During the daily commissioning process, work through the Checklist before starting work.

Weights of the units

Industrial trucks are mainly transported in a disassembled state and must be assembled on site. You must ascertain the weight of the individual units in order to assemble the truck safely and to select a suitable harness. Our industrial trucks are constructed using a modular system. There are also many customised specifications. For this reason, it is difficult to specify the correct weight for each unit and for each variant. The information and table for the lift masts below provide rough guidelines. For safety reasons, always add a generous margin when rounding up the determined value.



Delivery in units

Specified weights apply only to the standard design. Determine or request the weights of special designs.

Narrow aisle trucks can be disassembled into the following units: attachment, driver's cab including carriage, lift mast, battery and chassis.

When assemblies comprised of multiple complete units are transported, the weights of the individual units must be added together so that a suitable hoist can be selected. When hooking on the units, ensure that the overall centre of gravity can be moved relative to the individual units

Weight of the attachment

A standard attachment (europallet) with a turret head weighs approximately 800 kg.

If another attachment is fitted, determine the weight of the additional attachment, e.g. by weighing the attachment.

Weight of the driver's cab

A standard driver's cab including carriage weighs approximately 660 kg. Take into account the additional weight of attachments, for example the weight of order-picking platforms.

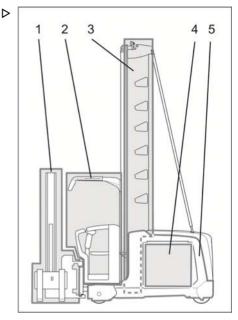
A standard cold store cab including carriage weighs approximately 800 kg.

If another driver's cab is fitted, determine the weight of the additional driver's cab. e.g. by weighing the driver's cab.

Weight of the lift mast

The weight of the lift mast depends on its design and overall height. The following table shows the expected maximum weights depending on the overall height.

Overall mast height	Weight
<3 m	<1600 kg
<4 m	<2,300 kg
<5 m	<2,900 kg



- Attachment
- Driver's cab incl. carriage 2
 - Lift mast
- 4 Battery
- Chassis



Overall mast height	Weight
<6 m	<3,500 kg
>6 m	<4,300 kg

Weight of the battery

The weight of the battery is specified on the nameplate on the battery.



NOTE

The installed battery must as a minimum weigh the value stipulated on the nameplate on the truck. Compare the information on the nameplate on the battery with the information on the nameplate on the truck. If ballast weights are installed, the weight of the ballast weights must be taken into account.

Weight of the chassis

The weight of the chassis depends on its design and the fitted equipment.

Transporting and loading

General

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

 \triangleright



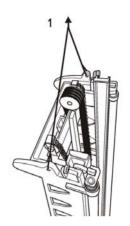
ealig0025



Hooking on the lift mast

To hook the lift mast onto the crane hook, use the bores intended for this purpose at the top end of the lift mast (1). Harnesses suitable for this purpose must be used (shackle or lifting device). If necessary, the individual parts of the lift mast must be lashed to each other during this process to prevent them from separating unintentionally and thus shifting the centre of gravity.

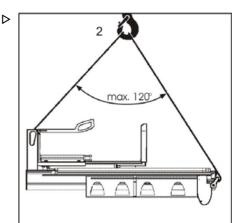
 \triangleright

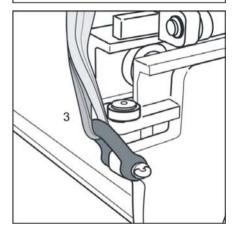




Hooking the lift mast on horizontally

If the lift mast needs to be crane-loaded in a horizontal position (2), suitable shackles must be used in the indicated bores at the top end of the mast (3).





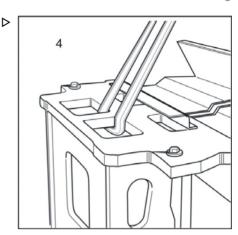


Lift mast, lower lifting point

At the lower end, a textile strap can be wound around the middle crosspiece in the beam support of the cab (4).

Loading the chassis

Electronic elements such as sensors and antennas can be installed at different places in the chassis according to the truck design. The ground clearance of these elements is very low. As a result, particularly when mounting the chassis on a forklift truck fork and when fitting supports, make sure that no pressure is applied to these elements. Before mounting on a forklift truck fork or before fitting a support, perform a visual inspection to determine whether and where such elements should be mounted on the industrial truck in question.



Hooking on the chassis

The cross beams above the battery compartment serve as lifting points for the chassis. To protect the paintwork of your industrial truck, we recommend that you always use textile slings. Shims protect the harnesses against sharp edges.

WARNING

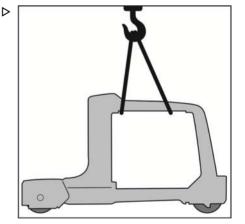
If the chassis is to be moved using the crane, always remove the battery.



The chassis must always be mechanically braked unless the industrial truck is actually in operation.

WARNING

Hydraulic oil can escape through disconnected hydraulic connections.

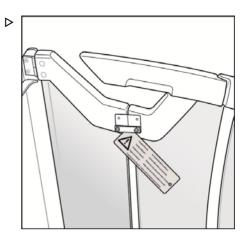




Transportation safety device on glass doors

Cab doors made of glass* are supplied with a transportation safety device. This transportation safety device prevents the glass doors from inadvertently opening during transportation and becoming damaged as a result.

 Remove and dispose of the transportation safety device.



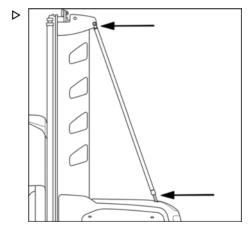
Mast bracing

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 torque.

The screw connection at the upper mounting position on the mast bracing must be tightened to 195 Nm.

The lower mounting position is marked with a label. This label specifies the torque as 50 Nm.







^{*}Option

Wheel nuts

A WARNING

Wheel nuts can loosen after initial commissioning. After the first eight operating hours, tighten the wheel nuts to 210 Nm.



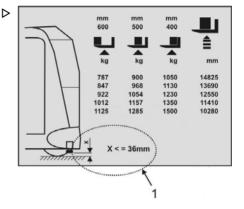
 \triangleright

NACH ACHT STUNDEN AFTER EIGHT HOURS APRES HUIT HEURES DOPO OTTO ORE EFTER ÄTTA TIMMAR DESPUS DE OCHO HORAS

Support screws

The setting of the support screws must be checked during initial commissioning and each time maintenance is performed.

The setting dimension (1) is dependent on the application of the truck and can be taken from the load capacity diagram.





Safe handling of the traction battery

The dangers described below can arise individually or collectively depending on the type of battery in use.

Batteries with liquid electrolyte

the charging process has finished.

A DANGER

Risk of explosion A

- An explosive gas mixture can form when charging batteries. This gas mixture can remain in the atmosphere for a lengthy period of time even after
- The gas mixture formed when charging batteries must not enter the driver's compartment.
- Pay particular attention to the risk of explosion in the void above the battery when the battery has been freshly charged.
- The openings in this void facilitate the exchange of air and these openings must not be covered or be closed.
- Do not create any openings in the battery compartment that allow the explosive gas mixture to enter the driver's compartment.
- Ensure that the room or area in which the battery is being charged is well ventilated.
- Smoking, fire and open flames are forbidden in an area of 2 m around the charged battery.
- Battery acid is toxic. Do not inhale vapours.
- · Battery acid is corrosive. Avoid skin contact.
- Rinse off spilled or splashed battery acid immediately with plenty of clean water.
- When handling battery acid, wear personal protective equipment such as protective gloves and a protection suit as well as face protection.
- If contact with acid is made despite these measures, rinse immediately with plenty of clean water and consult a doctor.
- Observe the additional operating instructions of the battery manufacturer and the battery charger manufacturer.



80-V version

WARNING

In the 80-V version, there is risk of electric shock if the live connections are touched.

Before removing the control compartment cover or the battery compartment cover, disconnect the battery male connector.

VORSICHT: Vor dem Offnen der Abdeckung Batteriestecker ziehen! WARNING: Disconnect the battery plug before opening this cover! MISE EN GARDE: Avant d'ouvrir le captor retirez la prise batterie!

 \triangleright

Handling the battery

The installation, removal and transport of traction batteries always involves the handling of heavy weights.

▲ WARNING

Risk of crushing of fingers, risk of crushing of hands and feet, risk of damage to property

- When heavy weights are being handled, there is a risk of limbs or bodies becoming trapped or crushed. To avoid this, operate lifting gears and changeover frames with the utmost care. Prevent heavy weights from bumping against the machine or equipment.
- Be aware of pinch points and shear points when inserting the battery into or removing the battery from the battery compartment. Ensure that you keep your fingers, hands and feet out of any areas where they could be at risk from one of the abovementioned points of constriction. These points of constriction occur regardless of the tool being used (truck, crane or changeover frame).
- Provide support staff with accurate instructions.
- Remove passers-by and spectators from the danger area.
- Set down the disconnected battery cable on the battery in such a way that prevents the cable from becoming trapped or torn off.

Battery compartment cover, Service flap

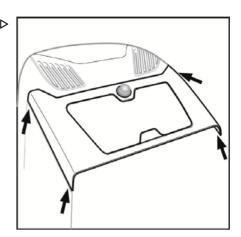
The battery compartment cover covers the entire battery compartment. The cover is held by four clamping holders.

The cover can be removed by applying light pressure from underneath near the corners.



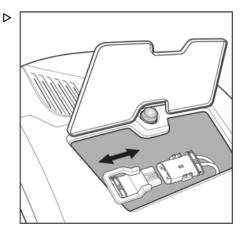
NOTE

As an option, the industrial truck can be equipped with lateral battery compartment doors.



Service flap

All that is needed to operate the battery male connector is to open the service flap.



Installing the battery

The battery must fill the installation space with just a few millimetres of play. This will ensure that the battery does not slip or tip over during travel and that the function of the battery lock is guaranteed. If a lighter battery is used temporarily, you must compensate for the weight difference using a fixed ballast, and the size difference must be equalised using shims. In this case, the specifications on the nameplate of the industrial truck must be changed or



updated. These narrow aisle trucks are equipped with an integrated battery discharge indicator that is set for normal wet lead batteries (PzS) as standard. If a different battery type or different battery capacity is used, the authorised service partner must adapt the battery discharge indicator.



NOTE

The voltage and weight of the battery must satisfy the requirements set out on the truck's nameplate. Therefore, you need to compare the nameplates on the truck and battery.

Battery type and battery charger

Wet lead batteries, gel batteries or lithium-ion batteries can be used as traction batteries. Because the various types have different structures, suitable battery chargers must be used



NOTE

Batteries are subject to special charging, maintenance and handling instructions. Observe the instructions from the respective manufacturer.

A DANGER

Risk to life

- Only use lithium-ion batteries in industrial trucks that have a design and a controller intended for use with such batteries.
- Lithium-ion batteries are lighter than lead-acid batteries with the same capacity. Use an appropriately attached ballast weight to compensate for the reduced weight.
- Check with the authorised service partner before using a lithium-ion battery.

A CAUTION

Danger of damage to property

Incorrect battery chargers can cause total battery failure



Commissioning

If your industrial truck is equipped with a Euro battery male connector, make sure that the voltage index pin is in the correct position. The set voltage can be read through a display window (1).

WARNING

Risk of accident

Risk of injury from crushing zone and shearing zone

WARNING

Risk of short circuit

Do not clamp or crush battery cables.

Before starting each shift, check that the battery lock is in good working order and that it functions correctly.

Before using the battery for the first time, a proper commissioning procedure must be performed. If the battery was obtained separately to the industrial truck, check the following:

- The nominal voltage
- · The minimum required weight
- The model and design of the battery male connector fitted
- The minimum required cross-section and the connection type of the battery cable

A CAUTION

Danger of damage to property

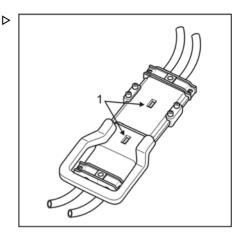
Observe the information and guidelines from the battery manufacturer.

Permitted batteries

Only batteries with trays constructed in accordance with EN1175-1 may be used for operation of the industrial trucks.

Battery commissioning

Proper commissioning must be performed if the industrial truck was ordered without a





battery or if it was supplied with a dry precharged battery because it had to be transported over a long distance (e.g. from overseas). Observe the information and guidelines from the battery manufacturer. If the battery was obtained separately to the industrial truck, the nominal voltage, the required minimum weight and the attached battery male connector must be checked particularly carefully.

WARNING

Observe the safety regulations for handling battery acid.

A CAUTION

Risk of short circuits

Take care not to jam or crush the battery cable.

Replacing the battery

Battery replacement using forklift truck

The battery rests in a recess (1) as standard. The battery is intended to be replaced using a truck. The truck used must be suitable for this purpose.

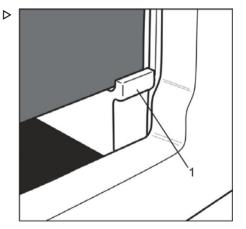
- The fork must be of sufficient length for the prevailing load centre of gravity.
- The load capacity must correspond to the weight of the battery fitted.
- The external width of the fork must be adjusted to the insertion opening.
- Adjust the fork tilt such that the battery does not come into contact with the industrial truck when the battery is removed.
- The battery is not provided with a latch.

A WARNING

Risk of accident, risk of crushing

Observe the information in the section entitled **Safe** handling of the traction battery.

Make sure that all four corners of the battery are within the recess.





Battery replacement with change frame

The industrial truck can be optionally equipped with roller channels so that the battery can be replaced using a crane or battery change frame

When using a battery change frame, observe the corresponding operating instructions for the change frame.



NOTE

If your industrial truck is equipped with roller channels, the battery is secured in position with a battery lock. Observe the information in the section entitled **Battery lock** in particular.

WARNING

Risk of damage to property, risk of crushing

Observe the information in the section entitled **Safe** handling of the traction battery.

Before starting each shift, check that the battery lock is in good working order and that it functions correctly.

Function checking

Before the truck is handed over to its destination, thorough function checking must be carried out. Before starting work, the **Checklist before starting work** must be completed.

If any defects that could influence operational and road safety are determined during this daily check, courses of action must be taken immediately to ensure that appropriate repairs are carried out. It is prohibited to continue operating the industrial truck until the repairs have been completed.

If your industrial truck is equipped with any special equipment (order), this must also be checked carefully. For a functional description and any additional maintenance tasks required, see the chapter entitled **Special equipment** or the additional documentation prepared and provided by our suppliers.



Daily commissioning

Checklist before starting work

Before starting work, the driver must make sure that the truck is in a safe operating condition.

A CAUTION

If any defects that could influence operational and road safety are found during the daily pre-shift check, a course of action must be taken immediately to ensure that appropriate repairs are carried out. It is prohibited to continue operating the truck until repairs have been performed.

Function checking the brake system

- Check the brake function after releasing the foot switch.
- Examine the area around the foot switch for foreign objects.
- Check the brake function after activating the emergency off switch.
- Check the function of the reverse brake.
 The braking and subsequent acceleration processes must be gentle and not subject to jerky movements.
- Check the "end of aisle automatic braking"* system function.
- Perform further order-related brake function checks.

Function checking the steering system

- Check that the steering turns freely.
- Check that the maximum steering angle of approx. 90° to the left and right is achieved.

Checking all operating devices

- Check that the levers and push buttons are in good working order.
- Check that all operating levers and pushbuttons return automatically to the neutral position.
- Check that all the operating devices are in good condition.

Check that all the operating devices are operating correctly.

Checking the access control

- Check that the switch key can be pulled out when it is in the 0 position.
- Check that the industrial truck cannot be operated when the switch key is removed.
- If electronic access control* is fitted: check for correct function.

Checking the lifting accessory

- Visually check the forks for cracks.
- Visually check the forks for deformation.
- Check the function of the fork safety device*.
- Check that the locking pin moves easily and latches automatically.
- Visually check the fork carriage for deformation

_

Visually check the load chains for damage.

Checking the overhead guard

- Visually check the overhead guard for deformation.
- Visually check the overhead guard cover* for condition and contamination.

Checking the wheels

- Examine the wheels for foreign objects.
- Check the condition of the drive wheel and load wheels.

Checking the cab doors, the barriers and the emergency off switch

 Make sure that when the emergency off switch is actuated, neither the traction nor any hydraulic function can be activated.



Daily commissioning

 Make sure that when the barrier or cab door* is open neither the traction nor any hydraulic function can be activated.

Driver's cab with glass doors and front panel glazing or all-rounding glazing:

- Check that there are no chips or cracks in the glazing.
- Check all parts of the glazing for contamination. Clean the glazing if necessary.

Other checks

- Check the function of the horn.
- Check the function of all other warning devices*.

- Check the function of the lighting devices.
- Check that all covers and flaps are closed.
- Check that the battery lock is in perfect condition and operates correctly (shut the truck off if the lock is not correctly latched*).
- Check special equipment and special functions according to the order to make sure they are in perfect condition and operate correctly.
- * Option



Driver's compartment

Access to the driver's compartment

Barriers

A DANGER

Risk of crushing

Only the area of the handle indicated must be used for opening and closing the barriers.

WARNING

Risk of falling

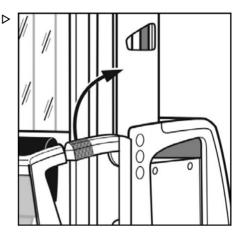
When climbing in and out, it is important to note the difference in height between the floor of the driver's compartment and the ground.



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.

To open and close the barrier, use only the section of the stomach bar that is furthest forward.





Driver's compartment

Doors

A DANGER

Risk of crushing

Only the area of the handle indicated may be used to open and close the glass door.

WARNING

Risk of falling

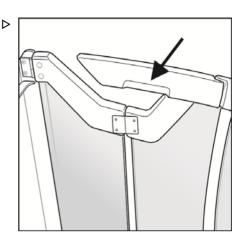
When climbing in and out, it is important to note the difference in height between the floor of the driver's compartment and the ground.

The glass doors feature a recess on the inside of the handle. Use only this area of the handle to open and close the glass doors.

The glass doors feature a folding hinge in the middle. To open the door, push the handle towards the centre of the cab at the point shown. The door is closed by performing the action in the opposite direction.



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





Operating devices

Operating devices

Initial driving exercises

WARNING

Before starting work, the **Checklist before starting work** must be completed.

Observe all safety instructions.

A WARNING

Risk of accident

In order to become familiarised with the driving and braking characteristics of these trucks, driving exercises must first be carried out in a flat, obstacle-free area of the warehouse.

Speeds

The driver must adapt the driving speed according to the 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.



Operating devices

Adjusting the position of the operat- ⊳ ing panel

WARNING

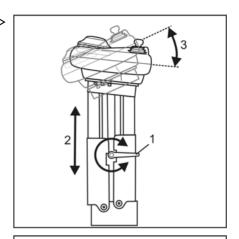
The clamping device that is released for the settings described below must be retightened before starting work.

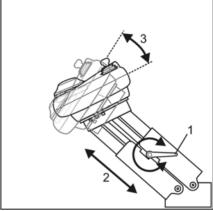
In order to be able to optimally adapt the operating panel to driver requirements, the panel can be adjusted by height, by tilting the console and by tilting the operating panel. The position of the clamp lever can be changed by means of an integrated latching mechanism. To do this, pull out the handle of the clamp lever (1) on its axle, turn it to the required position and allow it to engage again.

Adjustment

Release the clamp lever (1) by turning it to the left. Keep hold of the operating panel with the other hand while doing this. If the clamping device comes loose, move the operating panel into the required position with both hands and hold it there. The setting is continuously variable. Retighten the clamp lever.

- Adjust height (2).
- Adjust tilt (3).







Operating devices

Driver's seat



NOTE

In addition to the standard driver's seat, several other models are available as options. The corresponding original operating instructions from the manufacturer are supplied with each model. Observe these operating instructions.

WARNING

Risk of accident

Only apply settings in a stationary truck.

Adjusting the driver's seat, standard version

Adjusting the seat height

- Place body weight on driver's seat.
- Pull the lever (1) and raise or lower the driver's seat to the required height using your body weight.
- Release the lever.

Adjusting the horizontal position

 Pull the handle (2) and move the seat into the required position. The mechanism must noticeably engage.

Tilting the seat surface

 Pull the handle (3) and move the seat base into the required tilt position. The mechanism must noticeably engage.

Folding up the seat base

If the seat base of the driver's seat (4) is in the way when operating the industrial truck in a standing position, it can be folded up and away. The folded-up seat base is upholstered and can be used to lean on.

Reach under the seat base and fold it upwards.

Driver's seat, option

The driver's seats that are available as different options vary considerably in terms of their





Operating devices

design and operation. Observe the original operating instructions supplied.

Optional versions

- · Folding armrests
- Heatable
- 80 mm longitudinal adjustment
- · Lumbar support
- · Air suspension
- · Leather upholstery



Switching on

Switching on the controller

Battery male connector

To plug in the battery male connector, open the service flap behind the lift mast.

Get into the cab and close the barriers/cab doors.

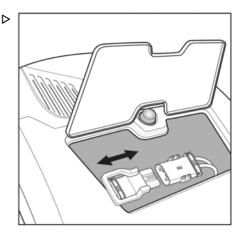


Barriers/cab doors are monitored by monitoring switches to ensure that they are completely and correctly closed.

M WARNING

High risk of injury

Never climb or jump on to a moving truck.





Switching on

Emergency off switch, key switch

Unlock the emergency off switch by turning it clockwise.

Switch on the key switch or activate the electronic access control*.

If the truck is in an error-free state, the indicator for normal operation appears on the operation status display (see "Operating status display").

The working spotlights* are switched on.

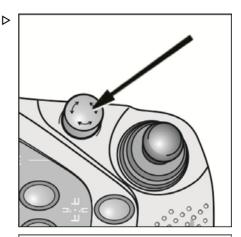


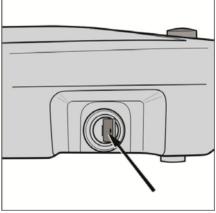
If the controller is switched on when the barriers are closed, the foot switch must be actuated once to enable the functions. To drive, the foot switch must be actuated and held down so that the parking brake is released.

If one of the barriers is opened and then closed again when the controller is switched on, the foot switch must be actuated again once.

This switching ensures that the industrial truck can be operated only if the operator is in the cab and all barriers are closed.

* Option



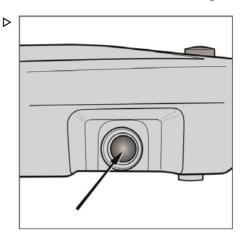




Switching on

Electronic access control

There is also the option to have these industrial trucks equipped with electronic access control (PIN code, RFID chip, magnetic card system). See the section entitled "Special equipment".





Driving

Braking, driving and steering

Releasing the brake

After entering the driver's cab, close the barriers or cab doors. Pressing the foot switch (1) once confirms your presence. If the drive switch is also actuated when the foot switch is actuated, the electromagnetic parking brake is released



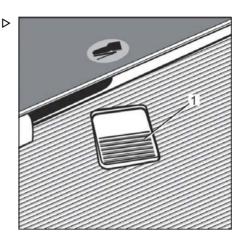
The foot switch must be pressed again after each time the barriers or doors are opened and closed. The ancillary movements can only be used when the industrial truck is at a standstill and the foot switch is not actuated



Releasing the foot switch while driving triggers the electrical reverse current braking. The industrial truck is braked to a standstill. Then the electromagnetic parking brake is activated.

Releasing the operating lever for driving or the left-hand sensor surface while driving triggers the electrical reverse current braking. The industrial truck is braked to a standstill

There are functions that only work when the industrial truck is at a standstill. Therefore, it can be necessary to release the foot switch in order to use these functions. The corresponding pictogram appears on the display.





The drive direction and the driving speed are selected using the right-hand operating lever.

Move the operating lever in the direction of the fork (2) until the required driving speed in the fork direction has been reached

Move the operating lever in the direction of the lift mast (3) until the required driving speed in the direction of the lift mast has been reached

If the operating lever is switched from one drive direction directly to the other, the industrial truck is braked and accelerated in the opposite direction.



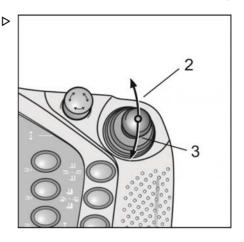
The controller limits the driving speed depending on the driving situation and any options installed. It is always possible to have the speed restricted by the authorised service centre, but not to increase it. The operator can continuously control the speed within the permitted range.

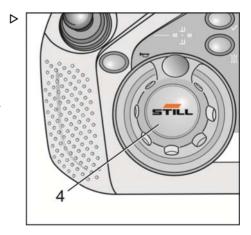
The authorised service centre can configure the acceleration and braking characteristics.

Steering

The operator's left hand is used to actuate the steering knob (4) and thus determines the course the truck takes. The steering knob has a mechanical detent in the straight-ahead position. From there, the steering knob can be turned approx. 135° to the right and to the left. The steering turntable rotates by 90°.

If the industrial truck is being directed by a guidance function (MZF or IZF), the steering knob must be in the straight-ahead position.





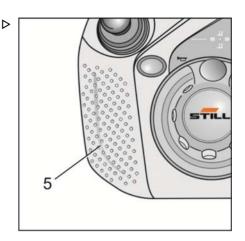


Two-hand driving operation

Operation of the industrial truck with two hands is required within the aisles once the controller has detected the corresponding sensor system. To drive, you also need to touch the sensor surface on the left-hand end of the operating panel (5) with your left hand.

Simultaneous functions

Different functions can be combined. For this purpose, more than two operating devices may need to be actuated at the same time.



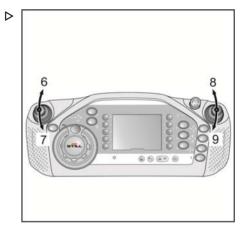
Driving and main lift

In order to execute the two functions driving and main lift simultaneously, both operating levers must be moved accordingly. Moving the left-hand operating lever in the direction of the fork (6) activates lowering of the main lift. Moving this operating lever in the direction of the lift mast (7) activates lifting. The degree of activation is always infinitely variable.

The drive direction and the driving speed are selected using the right-hand operating lever.

Move the operating lever in the direction of the fork (8) until the required driving speed in the fork direction has been reached.

Move the operating lever in the direction of the lift mast (9) until the required driving speed in the direction of the lift mast has been reached.





Driving and auxiliary lift

In order to execute the two functions driving and auxiliary lift simultaneously, both operating levers must be moved accordingly.

Press the button (10) to select the auxiliary lift.

The degree of activation is always infinitely variable.

Driving, main lift and auxiliary lift

In order to execute the functions driving, main lift lifting and auxiliary lift lifting, or driving, main lift lowering and auxiliary lift lowering simultaneously, both operating levers must be moved accordingly.

In addition, press the button (11) to select the combination of main lift and auxiliary lift.

The degree of activation is always infinitely variable

Types of guidance

The industrial trucks can be designed for:

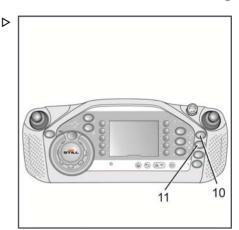
- · Driving without guidance
- Driving with mechanical rail guidance*
- · Driving with inductive guidance*
- · And combinations* of these

Driving without guidance

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.





^{*}Option

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

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

*Option

Mechanical guidance MZF

The mechanical guidance consists of one or two rails on or between which the industrial truck is guided with a maximum permissible play of 5 mm. When guidance is active, the controller automatically adapts the maximum possible driving speed to match the lift height.

Entering the aisle

To enter rail guidance, the industrial truck must be positioned as centrally as possible and aligned with the aisle in front of the entry funnel. The more accurate this positioning, the faster and more precisely the industrial truck will be led into the guide. Once the industrial truck has entered the guide, the side rail switches are activated. When the rail switches detect the rail guidance, the MZF mode of operation is automatically selected.

Instead of the "steering wheel" symbol, the symbol for "guidance" appears in the display.

Exiting the aisle

The industrial truck must be driven completely out of the aisle. The sensor system for the



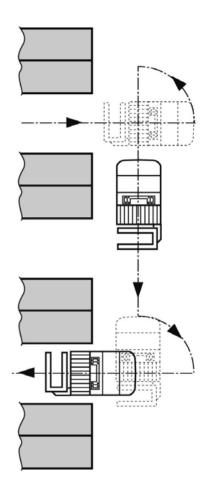
aisle detection recognises the location of truck and re-enables the steering.

Changing the aisle

If the industrial truck needs to be driven out of one aisle and into another, the following notes must be observed:

 \triangleright

- Drive the industrial truck completely out of the aisle.
- Slowly drive out of the aisle and beware of any people or other industrial trucks in the transfer aisle.
- Once the industrial truck is outside the rail, the steering is reactivated by the rail switch.
- The industrial truck can then be turned 90° on the spot and driven to the target aisle.





Load pick up

Moving the load

Main lift and auxiliary lift

The main lift and the auxiliary lift can be lifted and lowered together. The lift height display will be synchronised.

Pressing button (1) and moving the left-hand operating lever in direction (2) or (3) triggers the infinitely joint lifting or lowering of the main lift and auxiliary lift.



This combined hydraulic function can still be combined with the driving function. To do this, move the right-hand operating lever as well.





Ancillary movements

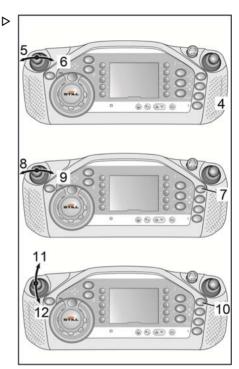
All movements of the load apart from the main lift are categorised as ancillary movements. Standard functions are:

- · Sliding the fork.
- · Swivelling the fork.
- · Lifting the auxiliary lift.

Touch the right-hand sensor surface(4) and move the left-hand operating lever in the direction (5) or (6) to trigger the reach movement to the left or right.

Pressing button (7) and moving the left-hand operating lever in direction (8) or (9) triggers the swivel-shift movement to the left or right.

Pressing button (10) and moving the left-hand operating lever in direction (11) or (12) triggers the lifting or lowering of the auxiliary lift.



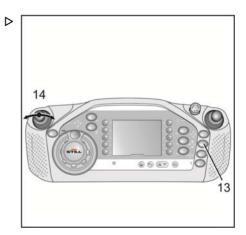
Swivelling and sliding the swivel fork 180° synchronously

Pressing selection key (13) and moving the left-hand operating lever (14) to the right or left triggers the synchronous movement. This movement can be interrupted at any time or continued in the opposite direction. To do this, release the operating lever or the selection key.



NOTE

The synchronous movement only starts when the turret head is in one of its end positions. When the synchronous movement reaches the end, an acoustic signal is sounded. Always carry out the synchronous movement until the end. The swivel fork is then in its right or left end position.





Swivelling and sliding the swivel fork 90° synchronously

This function moves the turret head to the front position through a synchronised movement involving shifting and swivelling. This means that the swivelling function automatically stops at a swivel angle of 90 and the sideshift automatically stops in a central position in front of the cab. This function makes it easier to pick up loads at the front of the truck.

Option

See the chapter entitled "Special equipment".

Fork cycle

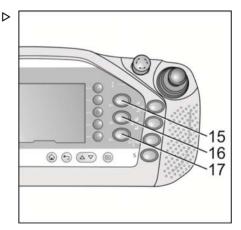
This function enables an increase in handling performance through automation of load pick up and load deposit. The details of the fork cycle function depend on the design of the industrial truck

Option

See the chapter entitled "Special equipment".

Hydraulic special functions

Additional hydraulic functions are available as an optional extras. Buttons (15)(16)(17) are provided for operation of these additional functions. See the chapter entitled "Special equipment".

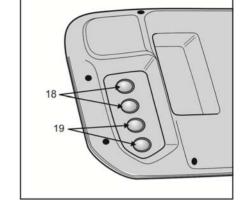




Underside of the operating panel

On the top of the operating panel, there are four buttons on the right-hand end that are operated using the thumb on your right hand. There are also four buttons (18) and (19) on the underside of the operating panel. These buttons can operated using your other fingers on the same hand. The functions of the buttons on the underside of the operating panel are identical to the buttons directly above them on the top of the operating panel. If the button on the underside of the operating panel is pressed, the illuminated ring for the button above it on the top of the operating panel is activated

 \triangleright





The two lower buttons on the right-hand side of the operating panel are primarily assigned on an order-specific basis. If the industrial truck is not equipped with options, the buttons on the top and underside of the operating panel (19) do not have a function.



Load capacity diagram

Depending on the job, a load capacity diagram may be generated and mounted in the cab. To ensure that the stability of the industrial truck is not jeopardised in any way, the load capacity diagram and the load capacity restrictions specified on this diagram for certain application conditions must be observed

This also applies to the increasing weight of the commissioned goods.

Example for an industrial truck with a lift height of 10280 mm (1)

Distance between the load centre of gravity and the fork back

400 mm	Max. load: 1500 kg
500 mm	Max. load: 1285 kg
600 mm	Max. load: 1125 kg

The load capacity of the truck decreases as the lift height increases and the load centre of gravity distance grows larger.

The data for the current situation must be taken from the load capacity diagram.



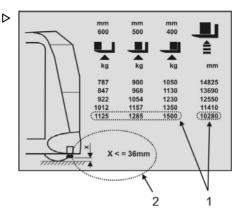
This industrial truck can also be equipped with the intelligent load capacity diagram as an option. Descriptions of this option can be found in the chapter entitled Special equipment

The support screws may only be adjusted by authorised service personnel. The setting dimension X on the load capacity diagram must be observed.



Risk of accident

The specified setting dimension X (2) for the support screws must be checked every 6 months by authorised service personnel and adjusted if necessary



Fork arms, adjustable

The standard design features forged fork arms that are manually adjustable. This allows different pallets and load supports with suitable dimensions to be picked up.

As an option, these industrial trucks can also be equipped with hydraulically adjustable fork arms. The distance between the fork arms must be sufficient so that the load cannot fall and that there is constant support centrally below the load centre of gravity. Adjust the fork arms accordingly and lock in position.

- Lift the locking lever (1).
- Move the fork arms to the desired position and allow the locking lever to engage again.

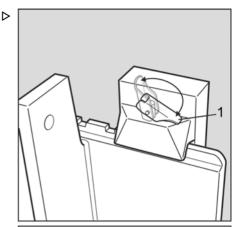


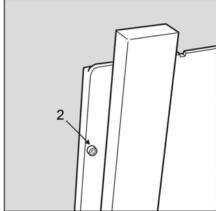
If the locking lever is engaged, it is no longer possible to move the fork arms laterally.

A CAUTION

Risk of accident

- Use the industrial truck only if the side fork arm locking device (2) is present and in perfect working order. Fork arms could slide off the fork carriage and fall down.
- Use only fork arms that are designed and approved for this industrial truck. See the order for specifications.







Emergency operation

Emergency lowering via the operat- ⊳ ing panel

In certain circumstances, the truck control unit prevents further lowering of the cab. (chain breakage or slack chain situation, or faults with chain monitoring, faulty height measuring system, faulty rev sensor on the pump motor).

In these situations, the operator can select the **emergency lowering function** via the operating panel and the cab will lower to the ground without further assistance.

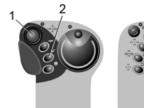
- Do not actuate the foot switch.
- Push the operating lever for hydraulics (1) forwards while touching the right-hand sensor surface (3) (main lift lowering function).
- Wait six seconds. The enable button (2) then flashes in red.
- Leave the main lift lowering function selected while pressing the enable button. The main lift will slowly be lowered.

Emergency lowering

Emergency lowering function for the driver's cab

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







Removing the control compartment hood



A DANGER

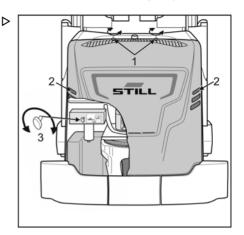
Danger of electric shock (80-V version)

Disconnect the battery male connector before removing the control compartment hood.

- Open the two screw plugs (1).
- Hold the hood at the ventilation openings

 (2), lift it off and then place it to one side.

 The hood is very lightweight and can therefore be removed by hand without using any tools.
- The emergency lowering valve (3) is located in the control compartment and can be accessed once the cowling has been opened.



A DANGER

Risk of physical injury

If the emergency lowering function has to be used because the operator has fallen unconscious, make sure that all parts of the operator's body are fully within the driver's cab so that there is therefore no risk he may be injured 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. This third person must be able to communicate clearly with both the operator of the emergency lowering valve and the operator of the industrial truck.

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. For example, a second turret truck could be used if suitable, or an elevating work platform. The authorised customer service team must determine the cause of the fault and the means of rectifying it.

If, as described above, it is suspected that the lift mast is mechanically jammed, 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 subsequently drop.

- Apart from the emergency lowering valve, it is not permitted to adjust any other screw.
- Close the valve again once the emergency lowering process has been fully completed.



Securing the load support

In order to secure the load support against lowering during maintenance work, the lowering movement can be locked by closing the shut-off valves. A notch in the block section indicates the valve position.

- The notch is pointing in the direction of the connected line = flow open
- The notch is at a right angle to the direction of the connected line = flow blocked

A DANGER

Risk from lowering of the lift mast or driver's cab

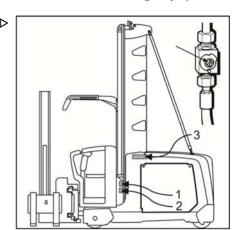
- The pressure in the hydraulic system must be released before any work is carried out on it. The load support must also be lowered to the ground.
- Before a person can go underneath the raised driver's cab, an additional mechanical safety device must be installed. For example, fit a suitably strong brace around the bridge pieces on parts of the lift mast or place a suitably strong jack stand underneath the driver's cab.
- Lock all existing shut-off valves. There is a valve for each main lift cylinder (1), one for each free lift cylinder* (2) and two additional valves for the hydraulic lines for the attachment (3).

Emergency operation

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

WARNING

- Only tow at creep speed
- There must always be an operator in the industrial truck that is being towed.
- 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.





^{*}Option

Removing the control compartment hood

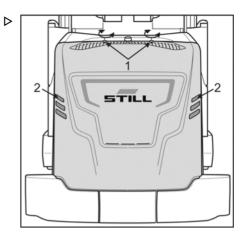


▲ DANGER

Danger of electric shock (80-V version)

Before the control compartment hood is removed, the battery male connector must be disconnected.

- Rotate the two screw plugs (1) in a clockwise direction and remove them.
- Grasp the hood at the ventilation openings
 (2) and lift it off. Put it aside.



Releasing the brake mechanically

WARNING

If the brake (3) has been mechanically disabled as described below, a suitable tow bar must be used for towing or a second industrial truck must be coupled to the industrial truck so that it can take over the braking.

Before the truck is put back into service, restore the brake system to perfect working order.

Traction motor brake

1. option

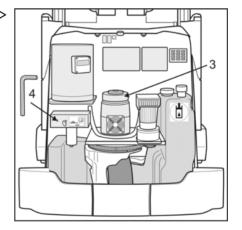
Disassemble the brake blocks. To do this, remove three mounting screws. Place the brake blocks to one side.

2. option

Tighten the brake anchor plate. To do this, screw two screws (M5X20) into the bores provided and tighten them.

Load wheel brake*

To release the load wheel brake, the hydraulic line must be depressurised. To do this, open a threaded pin on the valve block by turning it anti-clockwise (three turns). This threaded pin (4) is wrench size 4 mm.







Once the hydraulic line to the load wheel brake has been depressurised by turning the threaded pin (4), no hydraulic functions may be selected. If any hydraulic functions were to be selected, an error message would appear in the display.

* Option

Towing with operational steering

If the steering of the industrial truck is still operational, once the brake has been released the industrial truck can be towed either with a rope or with the tow bar.



Towing with non-operational steering

WARNING

Emergency steering movements may be carried out only when the truck is at a standstill.

Make sure that the industrial truck is switched off.

These industrial trucks are equipped with a mechanical emergency steering device. A shaft with a pinion gear is provided for this purpose.

- Perform the required steering movement using a socket wrench or box-end wrench.
- Before the industrial truck is recommissioned, the pinion shaft must be fixed back in its original position.

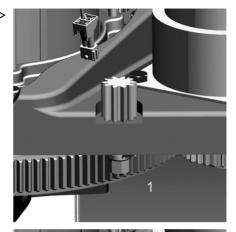
Activating the emergency steering device

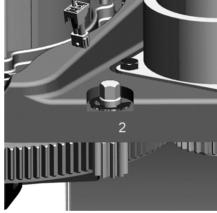
48-V version

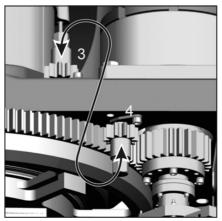
- Using a suitable tool, e.g. a screwdriver, remove the lock washer (1). When doing so, make sure that the lock washer does not jump off.
- Insert the pinion shaft into the same bore
 (2) from below. Insert the lock washer from above into the shaft groove.

80-V version

- Remove the screw and the holding plate (3).
- Insert the pinion shaft into the bore provided from below and hold it in position with the holding plate and screw (4).



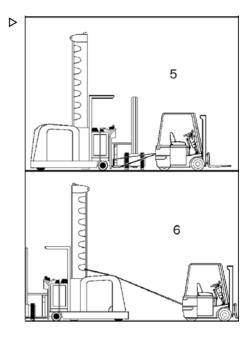






Attachment points

- (5) for towing with the drive unit leading,
- (6) for towing with the fork leading





Emergency abseil system

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



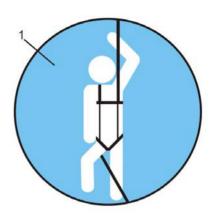
An emergency abseil system is only required if the driver's compartment can be raised higher than 3000 mm above the ground.



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).





A 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 must 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.
- See the operating instructions for the respective abseil system for the maximum permissible service life (replacement state of wear).
- 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

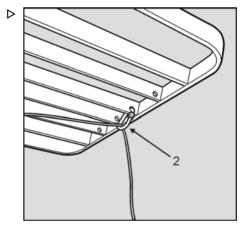
In order to bring the person abseiling into a more favourable position, the rope can be redirected with an additional snap hook in most versions of the overhead guard. This additional carabiner is attached to the safety harness chest eyelet area. To redirect the rope, the snap hook is detached from its 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. During this time, only minimal use is permitted and the system must be stored in optimum conditions. See the operating instructions for the respective abseil





system for the maximum permissible service life (replacement state of wear).

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

Two-person cab

Industrial trucks that 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 lifting 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 lifting points approved by the manufacturer are used.



Parking, decommissioning

Parking, decommissioning

Parking and leaving the truck



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 industrial truck described here has to be taken out of operation, make sure that all com-

ponents are disposed of in accordance with the valid guidelines. The used consumables in particular are to be recycled or disposed of correctly.



Regular care and maintenance

Regular care and maintenance

Regular care and maintenance



NOTE

 The regular care and maintenance of the industrial truck will ensure that the truck is ready for operation and will maintain its value.

WARNING

Risk of injury and damage to property

- Appropriate precautions for safe working must be taken for all care and maintenance work.
- As well as the usual occupational safety regulations, the safety information specifically outlined in this brochure must also be observed.
- Whenever you are working on the hydraulic system, ensure that the entire system is depressurised. This is particularly important when working on industrial trucks with built-in accumulators.
- For all care and maintenance work (except functional tests), disconnect the battery male connector
- Only electricians from the respective service partner may perform 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 the machine is maintained regularly.

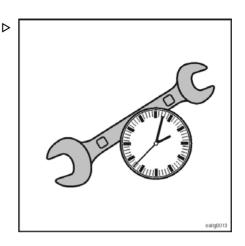
The activities listed in the **maintenance schedule** must be performed thoroughly and correctly at the specified intervals.

Our dedicated service partner will assist you with any queries about care and maintenance. We offer you the opportunity to take out maintenance contracts with us and to engage us to perform **regular testing (FEM)**.

Only regular maintenance and testing will enable you to make full use of the warranty.

Regular maintenance

Care work does not require special prior knowledge or training and can be performed by the operator or the workshop staff at the operating company.





Regular care and maintenance

Maintenance

In contrast, maintenance work must be performed only by appropriately trained personnel. Special tools and the current service software are required. Therefore, these activities are described only briefly in the maintenance schedule.

Original parts

We recommend that you use only genuine spare parts. More information and the order numbers can be found in the spare parts list. The installation of other parts will invalidate the warranty.

Maintenance frequencies and times

The maintenance activities are scheduled at intervals of 1000 hours or 12 months. You can use the maintenance schedule to determine what work is required. The following maintenance schedules are based on 10,000 operating hours. Once this number of operating hours is reached, the cycle starts again from the beginning. The 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.

Type of stress

This maintenance schedule is valid for normal stress for single-shift operation not within a cold store. For heavy-duty and/or multi-shift operation, reduce the intervals. Note the information in the section entitled **Area of application**.



Special versions, special equipment

Replacement interval for lifting chains

A 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. Observe the current applicable guidelines for the cold store version of industrial trucks.

Special versions, special equipment

The technology used in special versions of industrial trucks or in industrial trucks with special equipment may mean that additional care and maintenance work is required. In some cases, the maintenance intervals will shorten as a result.



NOTE

Observe additional operating instructions as well as documentation from suppliers included in the scope of delivery.

Regular maintenance

Maintenance work as required

Go through the checklist before starting work.

Keep the industrial truck clean and dry.

If damage becomes apparent on the industrial truck, have it repaired without delay.

Perform checks on the industrial truck after changes and damage.

Investigate any changes in the noise on the industrial truck.

Perform battery maintenance in accordance with the manufacturer's instructions.



1000-hour maintenance schedule

1000-hour maintenance schedule

At operating ho	urs								Carrie	ed
1000 h	2000 h		3000 h		4000 h		5000 h		out	
6000 h	7000 h		8000 h		9000 h		10000 h		✓	*
Preparatory tas	ks									
Industrial truck: clean or have it cleaned by the operating company.										
Nameplate: ide	ntify the indu	strial	truck.							
Controller: read	out the oper	ating	hours.							
Gearbox										
Gearbox: check	for noise an	d leal	kages.							
Gearbox: check	the oil level	, top i	up if neces	ssary.						
Gearbox: first o thereafter.	il change aft	er 100	00 operating	hour	s and every	4000	operating h	nours		
Drive unit: chec appropriate torc		ss of	the screw c	onnec	tion to the	chassi	s (ensure th	пе		
Traction motor I	bearings: che	eck fo	r operating	noise						
Traction motor I	bearings: rep	lace i	f necessary	<i>'</i> .						
Chassis, bodyv	vork and fitti	ngs								
Bearing points a	and joints: ch	ieck a	nd lubricate	€.						
Doors, flaps and	d covers: che	eck fu	nction.							
Doors, flaps and	d covers: che	ck th	e mounting	and c	ondition.					
All moving parts	s: lubricate w	ith a s	suitable lub	ricant.						
Overhead guard you suspect the	•	•	the weld se	ams;	use a dye p	enetra	ant procedu	re if		
Overhead guard	d: visually ins	pect	for damage	and c	leformation	S.				
Rail switches: c	heck the fun	ction	and condition	on.						
Support screws the nameplate.				ting ac	ccording to	the sp	ecifications	on		
Battery comparessary.	tment door a	nd ba	ttery compa	artmer	nt hood: che	ck an	d adjust as	nec-		
Battery comparessary.	tment door a	nd ba	ttery compa	artmer	nt hood: che	ck an	d adjust as	nec-		
Battery compar stops on the ba		that t	he battery	s seci	urely positio	ned a	ind check si	ide		
Chassis frame										
Drive wheel: ch	eck the cond	lition a	and check f	or wea	ar and any f	oreigr	objects.			



1000-hour maintenance schedule

At operating I	t operating hours 1000 h 2000 h 3000 h 4000 h 5000 h					Carried out	
6000 h	7000 h	8000 h	9000 h	10000 h	→	×	
Drive wheel, whe	wheel nuts or whee	el screws and cu	shion tyre: check	for secure attach	ı-	T	
Load wheels: jects.	check the condition	n and mounting	and check for we	ar and foreign ob	-		
Load wheels:	check for ease of	movement.					
Antistatic belt	: check the conditi	on.					
Antistatic cha	in: check the cond	ition.					
Active load w	heel axle						
Function: che	ck while driving in	the aisle.					
Measurement	t units: check the c	ondition.					
Measurement	t units: clean, remo	ove any foreign o	bjects.				
Measuring rol	llers, sensors, mag	nets: check the	condition.				
Measuring rol	llers, sensors, mag	nets: clean, rem	ove any foreign o	bjects.		T	
Spur gears: c	heck the condition	of the lubrication	and relubricate i	f necessary.		T	
Steering syst	em						
Steering: fund	ction check outside	the aisle.					
Steering: che	ck the steering and	gle (>90° on both	sides).			T	
Steering: che	ck straight line trav	rel.					
Steering gear	s: lubricate with al	-purpose grease					
MZF: function	ı check.						
IZF: check for guide wire.	central positioning	g and accuracy o	f the guidance in	relation to the			
Steering angle	e measurement: cl	neck the level of	play and the cond	dition.		T	
Steering knob	o, steering wheel: o	heck for ease of	movement.				
Live ring bear	ings: check for eas	se of movement	and wear.				
Live ring bear	rings: check the pla	ay of the gears.					
Steering motor	or bearings: check	for operating noi	se.			Ī	
Brake system	1						
Service brake	e: check for correct	function.					
Reverse brak	e: check for correc	t function.					
Drive unit: che if necessary.	eck the thickness of	of the brake lining	g and check the c	ondition. Replace	9	Γ	



1000-hour maintenance schedule

At operating hours								
1000 h	2000 h	3000 h	4000 h	5000 h	out			
6000 h	7000 h	8000 h	9000 h	10000 h	✓	×		
Load wheels:	check the brake c	learance by freev	vheeling.					
Load wheels: essary.	check the condition	n and thickness	of the brake lining	g. Replace if nec-				
Brake lining: b	low out abrasion	with oil-free air.						
Brake retardat measuring de	tion values: check vice).	after each adjust	tment (dynomete	r or retardation				
Automatic bra	king: check the fu	nction as per the	order.					
	or automatic brak the function, sett			magnet-operated				
Components of	of the RFID syster	n: check the func	tion, condition ar	nd setting.				
Operating dev	vices							
Check that the	e service brake is	working correctly						
Operating dev	rices: check the fu	nction and condit	ion.					
Protective dev	vices: check deper	nding on the equi	pment. Repair if	necessary.				
Information sig and legible.	gns, warning signs	s, load capacity d	iagram: check th	at they are preser	nt			
Information siç labels.	gns, warning signs	s, load capacity d	iagram: replace r	missing or illegible)			
Optional and a the order.	additional equipme	ent: check the fun	iction and conditi	on according to				
Electrics, elec	ctronics							
	s, battery connector secure attachmer		connectors: chec	k the condition				
Battery cables	: visually check th	e insulation.						
Battery: meas	ure the battery vo	ltage under load						
Battery: meas	ure the tray for sh	ort circuits.						
Battery: check	the electrolyte le	vel.						
Drive and pun functions.	np controller: chec	k the driving, acc	eleration, brakin	g and reversing				
Plugs and con	nections: check the	nat they are secu	rely attached.					
Openly routed	l cables: visually in	nspect the insulat	ion.					
Contactor con ry.	tacts: check the c	ondition and ched	ck for erosion. Re	eplace if necessa-				
Visually check	the condition of t	he fuses.						



1000-hour maintenance schedule

At operating hours								
1000 h	000 h 2000 h 3000 h 4000 h 5000 h					out		
6000 h	7000 h	8000 h	9000 h	10000 h	✓	×		
Fuses: check t	he values.							
Heat sink and	fan: clean.							
•	ing system for the e and check that							
•	ing system for the	•		•				
•	transducer for the check that the cor			ion, check the				
•	transducer for the dition and check for		•	contamination,				
Hydraulics								
The oil level m	evel in the hydrau ust be between the c oil tank become	ne minimum and	maximum markin	g. The markings				
Hydraulic syste	em: check for leak	tightness.						
Hydraulic oil fil	ter of the hydrauli	c oil tank: replace	е.					
Air filter of the	hydraulic oil tank:	replace.						
Pump motor: c	heck for operating	g noise.						
Hose lines: che	eck the pre-load.							
Load lift syster	m							
Stops and end	lift cut-out: check	the condition an	d function.					
Lift cylinder: ch	eck the mounting	J.						
Lift cylinder: vi	sually check bear	ing points and the	eir weld seams.					
	hains: check the on and damage.	condition, lubricat	tion and tension a	and check for				
	nd chains: check ton and damage.	he condition, lub	rication and tensi	on and check for				
Main lift load c	hains: determine	wear (maximum	permissible wear	is 2%)				
Auxiliary lift loa	nd chains: determ	ine wear (maxim	um permissible w	vear is 3%)				
Load chains: lu	ubricate with chair	n spray.						
Chain rollers: o	check for ease of	movement.						
Mast channels	: check the surfac	es for wear.						
Mast channels	: lubricate the sur	faces with grease	э.					



2000-hour maintenance schedule

At operating hours									Carried			
1000 h		2000 h		3000 h		4000 h		5000 h		out		
6000 h		7000 h		8000 h		9000 h		10000 h		✓	×	
Lift mast rollers: lubricate with all-purpose grease. If necessary, install lubricating nipples.												
Lift mast rollers: check the condition and check the setting.												
Guide elements: check the lateral play.												
Guide elements: lubricate with all-purpose grease.												
Load fork: check the condition and function of the latches.												
Load fork: visually inspect for bends, measure if necessary.												
Load fork: if you suspect there are cracks, check using the dye penetrant procedure.												
Adjustable fork: lubricate sliding surfaces with all-purpose grease.												
Swivel drive: check that the eight screws between the swivel drive and the front end are securely fastened.												

2000-hour maintenance schedule

At operating hours								Carried out				
2000 h		4000 h		6000 h		8000 h		10000	✓	×		
Gearbox												
Gearbox: visually inspect the shaft/hub connection between the traction motor and gearbox and clean the connection if necessary.									nd			
Gearbox: add new lubricant to the shaft/hub connection between the traction motor and gearbox. Refer to the lubricant overview.								tor				
Gearbox: perform an oil change (every 4000 hrs).												
Hydraulics												
Hydraulic system: oil change.												
Chassis, bodywork and fittings												
M24 screw connection between the welded chassis, the rear of the cast and the collision protection: check for secure attachment with a torque of Ma = 660 Nm.												
Final tasks												
Test drive: check all functions and special functions according to the order.												
Service adhesive label: attach.												



Battery maintenance

Battery maintenance

A DANGER

Incorrect handling or incorrect use of batteries and chargers can cause serious damage. This can also lead to serious hazards for the operator.

For each type of battery, the instructions provided by the battery manufacturer regarding proper use, care and maintenance, as well as the possible hazards for the operator, must be followed precisely.

Lead-acid batteries, gel batteries and lithiumion batteries are currently used.



NOTE

- Battery maintenance is not part of the regular maintenance.
- Battery maintenance must be carried out according to the information provided by the relevant battery manufacturer
- If the battery male connector is disconnected while a consumer is switched on, the contacts can combust

Lead-acid batteries

Lead-acid batteries use liquid acid. The acid can be easily accessed and can therefore be dangerous.

A DANGER

The electrolyte (battery acid) is toxic and corrosive on contact. For newly charged batteries in particular, be aware of the risk of explosion in the area of the battery where gas may be released.

When handling battery acid, the specified safety measures must be observed.

Gel batteries

Gel batteries are a particular type of lead-acid battery. The usage instructions and handling

instructions from the respective manufacturer must be observed.

Lithium-ion batteries

To ensure safe operation, industrial trucks that are powered by lithium-ion batteries must be equipped with a battery management system. The operators of such industrial trucks must be instructed in the operation of lithium-ion batteries and the charging systems for these batteries

Battery maintenance

The battery is the energy source for the industrial truck. It must therefore be handled carefully!

General daily maintenance tasks

Keep the battery clean and dry.

Charge the battery regularly.

Avoid deep discharge.

Visually check the insulation on the cable connections and battery female connector.

Check the condition of the battery connection assembly and check that it is working correctly.

Additional maintenance work for lead-acid batteries

Check the electrolyte level. If necessary, top up with demineralised water.

Spilt electrolyte must be siphoned off from the battery tray using a siphon. Rinse the tray if necessary.



Lubricants

Lubricants

A CAUTION

Danger of damage to property

Trucks for cold store operation must be lubricated using different lubricants. Observe the operating instructions for cold-store trucks.

The following lubricants must be used:

Hydraulic system

- Hydraulic oil HLP DIN 51524/T2
- · Mat. no. 7327 400 112

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 marking and the max marking.

The filling quantity depends on the configuration of the industrial truck. Maximum tank size 93 I

Gearbox

- · Castrol alphasyn EP150
- Fuchs Renolin Unisyn CLP150
- · Mat. no. 7326 000 019 (200 I container)
- Mat. no. 7326 000 029 (5 I container)

Filling quantities for gearbox

- 2.9 I (48 V version)
- 7.1 I (80 V version)

Grease lubrication points

- Lithium soap grease multi-purpose grease LITH-EP2
- Mat. no. 7337 500 200
- Mat. no. 0170761 (100 g tube)

Lubricant for load chains

- · Chain spray Stabylan 2100
- Mat. no. 8010100

Lubricant for the shaft-hub connection

- Special grease Klüberplex BEM 34-132
- · Mat. no. 7339 300 003

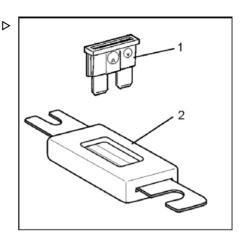


General information about fuses

General information about fuses

If a fuse needs to be replaced:

- Disconnect the system by pulling out the battery male connector
- Only use fuses that are identical in size and type
- The correct fuse values can be found in the truck-specific circuitry documents
- (1) Control current fuse
- (2) Primary current fuse



Removing the control compartment hood



A DANGER

Risk of electric shock

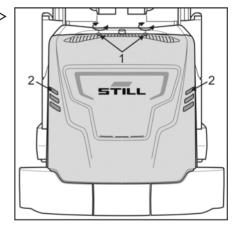
Before the control compartment hood is removed, the battery male connector must be disconnected.

The fuses are installed in the control compartment.

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

- Open the two screw plugs (1).
- Hold the hood at the ventilation openings (2), lift it off and then place it to one side.
 The hood is very lightweight and can therefore be removed by hand without using any tools.

Proceed in the reverse sequence to fit the hood. Place the hood carefully in its guide and latch and tighten the plastic screws until they are hand-tight only.





Technical data

6 Technical data

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 66dB(A)



Special equipment

Additional documentation

Additional documentation

Most of the options that can be ordered according to the price list are described below. Some options are self-explanatory and can be operated intuitively and safely without a description.

Some options, on the other hand, require extensive documentation. If an industrial truck is equipped with such options, the corresponding documentation will also be supplied.

Such extensive options include:

- Navigation (iGo pilot navigation)
- · Aisle safety assistant (GSA)
- · On-board charging system
- · Cold store version
- · etc.

Industrial trucks in customised special versions (CO = customer options) will be supplied with an additional description of these special versions, if necessary.

Enabling options

Certain options can only be permanently activated at a later time by loading a new truck configuration file.

A modified truck configuration file can be made to order, supplied and invoiced by Service Support.

The following options can be enabled:

- All options that generally do not require hardware retrofitting
- Options that can be retrofitted with minimal hardware costs



Optispeed versions

Optispeed versions

"Optispeed" denotes the various versions of the speed optimisation system. To make the work processes more economical and reliable, the industrial truck can be equipped in stages with additional components. The result is a considerable expansion of the range of functions

Version 3.0

Auxiliary equipment

· Advanced software functions

This version represents the basic equipment of the "Optispeed" speed optimisation system.

The "intelligent load capacity diagram" tells the operator what load weight can be lifted to what lift height.

Automatic side shift limitation improves the positioning of the loads on the rack.

Version 3.1

Auxiliary equipment

- · Load weight detection
- · Advanced software functions

The "intelligent load capacity diagram" shows the operator dynamically how high the load that is currently on the load fork may be lifted.

Automatic side shift limitation improves the positioning of the loads on the rack.

Version 3.3

Auxiliary equipment

- · Load weight measurement
- · Physical load detection
- · Advanced software functions

The "intelligent load capacity diagram" shows the operator dynamically how high the load that is currently on the load fork may be lifted.

If the limit values are exceeded, acoustic and visual warnings are issued.

In addition, the driving and lifting functions can be locked.



Optispeed versions

Automatic side shift limitation improves the positioning of the loads on the rack.

Version 3.4

Auxiliary equipment

- · Load weight measurement
- · Physical load detection
- · Advanced software functions

The "intelligent load capacity diagram" shows the operator dynamically how high the load that is currently on the load fork may be lifted.

If the limit values are exceeded, acoustic and visual warnings are issued.

In addition, the driving and lifting functions can be locked.

Automatic side shift limitation improves the positioning of the loads on the rack.

The load is stabilised as it is retrieved and stored, with dynamic adaptation to the lift height and the load weight. This enables sensitive loads in particular to be positioned gently and precisely without jerking. These operator assistance functions accelerate work processes in the storage area.

Version 4.0

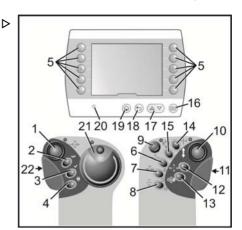
Version 4.0 includes "iGo pilot navigation" features. This extensive set of functions is described in separate documentation.



Split operating panel

Split operating panel

- (1) Operating lever for hydraulics (in conjunction with the selection keys)
- (2) Horn
- (3) Enable button (for example, as a brake release button in an automatic braking system, as an override for the intermediate lift cut out and to acknowledge errors that can be acknowledged)*. Flashes red when it needs to be pressed.
- (4) Manual-automatic two-way switch for inductive guidance*
- (5) Selection keys for favourites
- (6), (7), (8) Selection keys for additional hydraulic functions*
- (9) Emergency off switch
- (10) Operating lever for driving
- (11) Sensor surface for two-hand operation of the main lift or for shifting in the aisle
- (12) Selection key for lifting or lowering the auxiliary lift or for swivelling the forks
- (13) Reserved for special functions
- (14) Selection key for automatic functions, e.g. fork cycle
- (15) Selection key for lifting or lowering the cab lift and auxiliary lift at the same time. Hold this button while pulling or pushing the operating lever (1). The same button is used to select synchronously swivelling the forks 180° to the left or right. Hold this button while simultaneously actuating the operating lever (1) to the left or right.
- (16) Selection of a menu display
- (17) Selection within a menu
- (18) Go back one step in the menu or confirm a selection
- (19) Back to the main menu
- (20) Light sensor for automatically illuminating the display lighting
- (21) Steering knob or steering wheel





Split operating panel

(22) Sensor surface for two-hand driving within the aisle

*Option



Inductive guidance IZF

Inductive guidance IZF

System description

General

If an industrial truck is guided using inductive steering control, the shift button (1) must be pressed before the industrial truck is driven into and out of the aisle. All other operation processes correspond to the standard design.

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 industrial truck, and is used to guide the industrial truck.

The IZF controller calculates a steering angle based on the lateral deviation between the centre of the antennas and the guide wire. The steering angle is used to guide the industrial truck along the wire groove.

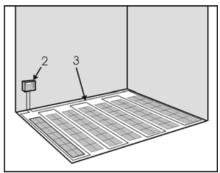
The operating devices for inductive steering control are integrated into the operating panel. The display indicates the current operating status. After the controller is switched on, a self-test runs in the steering control system. Switch (1) on the operating panel is used to switch between manual driving mode and automatic driving mode.

Commissioning

Extensive safety circuits in the controller and a diagnostic program simplify service work on the system. When commissioning the industrial truck, the system must be configured for and calibrated with the customer's guide signal. Afterwards, a function and safety test must be carried out. Our diagnostic program provides the specifications for this purpose.







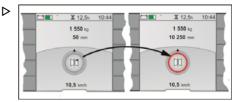


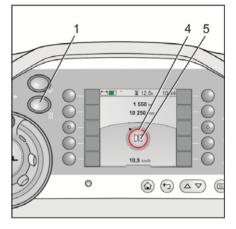
Inductive guidance IZF

Entering the aisle

Guidance procedure

- Drive the industrial truck towards the wire groove (induction track). Stop in front of the wire groove.
- The angle of the industrial truck relative to the wire groove must not be greater than 60°.
- Set the steering to the straight-ahead position.
- Select automatic steering by pressing the "Manual/Automatic" button (1). The wire search starts.
- The coloured ring around the "guidance status" symbol (4) goes red.
- Continue towards the wire groove. The driving speed is automatically reduced.
- When the controller detects the induction track via the first antenna, the controller switches to automatic mode.
- An acoustic signal will be heard.
- The coloured ring around the "guidance status" symbol (4) changes colour from red to yellow.
- Continue driving. The industrial truck is driven automatically along the centre of the wire groove.
- The steering function via the steering wheel is now switched off.
- When both antennas detect the induction track, the wire search is terminated. The coloured ring around the "guidance status" symbol (4) changes colour from yellow to grey.
- Continue driving. After a short distance, the industrial truck is now guided to the guide wire. The coloured ring around the "guidance status" symbol disappears. Now only the guidance symbol (5) is visible.
- The truck can now be driven out of the racking at the permissible speed.









NOTE

The more precisely the driver drives the middle of the industrial truck onto the wire groove, the faster the guidance procedure will be completed. This means that several of the above steps can be skipped.

Entering the aisle

- Guide the industrial truck onto the induction track and drive into the aisle in automatic driving mode.
- When the sensor system of the industrial truck has detected the aisle, the maximum permissible speed within the aisle is possible.

A CAUTION

Risk of collision with the racking

Entering the aisle by steering manually is not permitted. If the industrial truck enters the aisle by manual steering, the industrial truck is stopped immediately. You can continue driving once you switch to automatic mode.

Automatic driving within the aisle

To operate the industrial truck in automatic driving mode, the left-hand sensor surface for two-hand operation (7) and the right-hand operating lever (6) must be actuated. If the cab lift needs to be lifted or lowered at the same time as this, both operating levers must be actuated accordingly. If the steering knob is accidentally turned to its straight-ahead position (middle detent) during automatic driving mode, the industrial truck is automatically braked to a standstill.

Switching from automatic mode to manual mode within the aisle

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

Driving speed adaptation





Automatic Floor Compensation AFC

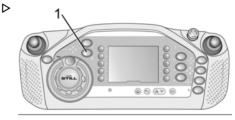
The automatic speed adaptation feature adjusts the maximum possible driving speed according to the current situation. If an unsafe situation arises, for example an error occurs, the driving speed is limited or the driving function is switched off completely.

Leaving the induction track

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

Changing the aisle

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





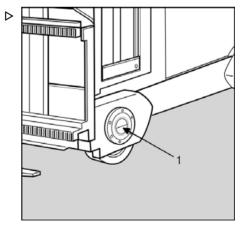


Automatic Floor Compensation AFC

Active load wheel axle

If an industrial truck is equipped with this option, additional sensor systems determine unevenness in the roadway while the truck is in motion. Using these measured values, the controller then actively intervenes in the position of the load wheels and adjusts their axles horizontally via an eccentric. This prevents the lateral tilting response of the lift mast when driving over uneven surfaces. A reduction in the driving speed due to uneven surfaces is not necessary and work safety is increased.

Industrial trucks with an active load wheel axle can be recognised by the special design of the bearing points on the load wheels. When the system is working, the notch in the axle (1) twists while the truck is in motion.





Automatic Floor Compensation AFC



- · The system is active only if the industrial truck moves under quidance
- · Once the industrial truck is switched off, the system goes into a rest position after a short time. Reactions in the load wheel axle can be felt by the operator
- · The system is fully automatic. The operator has no influence over the functions
- The parameterising of this function is based on on-site measurements. If the conditions change compared with these measurements, correct functionality can no longer be quaranteed

Error messages

Error message

In the event of a fault or defect, one or more numbers appear led by a pictogram of a warning triangle. Call the authorised service centre and provide the authorised service centre with these numbers.



See also the section entitled "Operating instructions".

Possible cause

- · Defect in the sensor system
- · Defect in the mechanism

Effect

- · Lift height of less than 3 m -> speed limitation to 1 km/h
- · Lift height of over 3 m -> drive stop, bridging not possible

Remedy

Call the authorised service centre.



Lift cut-out

Lift cut-out

The lifting operation is stopped at a previously determined lift height. The ring around the enable button (1) lights up. This cut-out can be overridden once the enable button has been pressed. This equipment is therefore necessary if the truck is used in two (or three) buildings of different height, for example.



NOTE

As an option, this function can also be modified so that it is necessary to press and hold the enable button in order to continue lifting.







Traction cut-out

The traction cut-out can be combined with the intermediate lift cut-out. The ring around the enable button (1) lights up when the traction function has been cut out. This cut-out can be overridden once the enable button has been pressed.



As an option, this function can also be modified so that it is necessary to press and hold the enable button in order to continue driving. The traction cut-out can also be implemented in designated areas of the storage area regardless of the lift height. However, this requires additional sensor systems. See the order for customer-specific details.

Aisle entry assistant

General

The aisle entry assistant can be used to make it easier to drive into an aisle when using mechanical guidance. To do this, the truck receives electrical and mechanical equipment, like a truck with inductive guidance.

A storage area in which the aisle entry assistant is to be used is therefore fitted with a



guide wire for inductive guidance in the centre of the aisle and with guide rails for mechanical guidance. The induction guide extends approx. 5 m into the aisle. The trucks are also equipped with the **End of aisle slow down and stop (ZAG)** option.

Entering the aisle

The truck is driven along the guide wire outside of the racking, according to the **End of aisle slow down and stop** information in the chapter entitled **Inductive guidance (IZF)**. This means that the truck is aligned precisely so that it can be driven into the guide rails.

Electrical aisle detection only occurs when the truck is completely within the guide rails. Once aisle detection has been successful, inductive guidance is automatically turned off.



NOTE

If the man/auto button is not switched to automatic, the truck behaves like a mechanically guided truck. Switching from "auto" to "manual" within the aisle has no effect.

Exiting the aisle

Switching from mechanical guidance to inductive guidance takes place automatically when exiting the aisle. To leave the guide wire, inductive guide must be deselected by pushing the man/auto button



Battery on a roller channel

Battery on a roller channel

Description

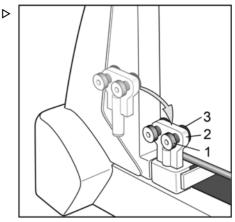
The battery rests on roller channels and can be installed and removed from the side of the truck using a battery change frame*. The battery is secured with clamping devices on both sides and held in position in this way.

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.



- Knurled-head screw 1
 - **Battery lock**
- 2 Rubber buffer



^{*} Option

Battery on a roller channel

Setting the battery lock

A CAUTION

Risk of crushing and damage to property

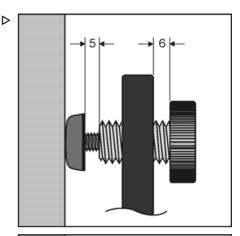
An improperly fixed battery may fall out of the truck when cornering and put people and property at risk. If the battery cannot be clamped securely, the responsible service centre must be called. Further operation with a faultily or improperly clamped battery is dangerous.

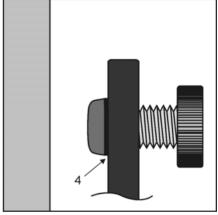
To ensure the operational safety of this truck, the traction battery must be securely fixed in place in the battery compartment by means of clamps. To achieve this, the truck is equipped with an adjustable battery lock. The battery lock can be adjusted by approx. 30 mm on each side. Both locks must be adjusted symmetrically.



When a battery is inserted into a chassis for the first time, it is possible that 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 to further increase the adjustment range. At the same time, the







Battery on a roller channel

rubber buffers must rotate with the knurledhead screws.

- Tension can be increased by screwing one of the two knurled-head screws in further.
 Tighten the knurled-head screws hand tight.
 The battery lock is clamped securely 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 has been inserted.
 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).



Electronic access control

Electronic access control

As an option, these industrial trucks can also be equipped with electronic access control in place of the key switch.

These systems are available as options:

- PIN code input
- · RFID chip
- · RFID card

Switching on the controller

Push the push button for approximately 2 seconds. The controller is switched on. The display is activated and the working spotlights* are switched on.

Once the industrial truck is switched on, all functions are initially disabled. The functions of the industrial truck are enabled only once the electronic access control has been correctly activated.

PIN code

The functions are enabled by entering a valid five-digit number code using the keypad (see also "factory setting").

- Press the F1 (1) button.

Depending on the language, the following display prompts the user to enter the specified PIN code.

- Enter the five-digit code within 8 seconds.
- Press button (2). This confirms the entry.

When the PIN code is entered correctly, a short acoustic signal will sound.

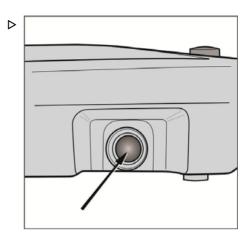
The display returns to the start screen.

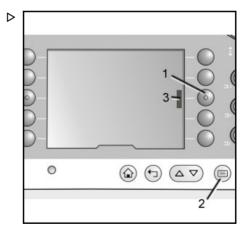
The coloured bar in the display next to the F1 button (3) indicates that the functions of the industrial truck are now enabled.

Incorrect PIN code, input time elapsed

When an incorrect PIN code is entered or if the input time of 8 seconds elapses:

Press the F1 button (1) again.







Electronic access control

- Enter the correct PIN code



- Each time the industrial truck is switched on using the operator panel button, the PIN code must be entered again.
- If the industrial truck cannot be switched on using the PIN code, call the authorised service centre.

Factory setting

The factory setting for this PIN code is "11111".

PINcode change

Up to five different codes can be used. The customer can select codes between 10000 and 99999 and these can then be programmed into the controller by the authorised service centre.

Switching off

- To switch off the industrial truck, push and hold the operator panel button for approx. 2 seconds.

RFID chip, RFID card

If an industrial truck is equipped with this system, a reading device for RFID chips or for RFID cards will be located in the driver's cab in the vicinity of the operating panel, RFID chips and RFID cards are included in the scope of delivery according to the order. However, the authorised service centre does not program the system to the customer's specifications until it is on site. Assignment to different operators is possible using the various RFID chips or cards.

Factory setting

Standard chips and cards are supplied at the factory.

Activating the system

 Switch on the controller by pressing the operator panel button (see above).

An LED illuminates on the reading device.



Electronic access control

 Hold the RFID chip or card in front of the reading device.

The industrial truck is now ready for use.

Configuration levels

Additional configuration levels are available, which are based on the electronic access principle. These systems can be used to evaluate, control and optimise the activities of entire fleets of industrial trucks.

Additional configuration levels can

- · Record the driving and idle times
- · Determine empty runs
- · Count lifting and lowering procedures
- · Use a shock sensor to determine collisions



Fleet management systems are described in a separate set of operating instructions.



Automatic braking systems

Automatic braking systems

Automatic braking systems ensure operational safety. They make it easier for the operator to pay better attention to on-site restrictions and specifications due to the work process. Automatic braking systems therefore also make an important contribution to increasing handling performance.

In principle, the design of the automatic braking systems can be adapted to the customer's requirements. The exact function must therefore be obtained from the order.

A sensor system mounted on the industrial truck forms the basis for reliable detection of the areas (zones) in which the truck must brake or stop. Also see the section entitled **Overview of sensors**

A CAUTION

Automatic braking systems are assistance systems for the operator. They do not exempt the operator from a duty of care.

A DANGER

Danger to life and risk of significant damage to equipment due to malfunctions

Changes to the sensor system must only be carried out by authorised service personnel. Every time the racking is modified, assistance from authorised service personnel is required. It is vital to check whether the planned modifications have a negative impact on the functionality of the automatic braking systems. In particular, this includes changing the geometric dimensions, such as adding or removing uprights. During any repair work, it is vital to check whether the sensor system for aisle detection or zone detection is affected. The sensor system may need to be adapted to the modified dimensions. To maintain the functionality of these systems, it is important to observe the information given in the system descriptions.

Aisle detection,
Zone detection,
Distance measurement

General

Sensors installed in the industrial truck are used for aisle detection, zone detection and



distance measurement. In racking, there may be areas in which the functions of the industrial truck need to be restricted or locked. Such areas include those in which the truck must brake or even stop for occupational safety reasons, e.g.

- In the direction of the open or closed ends of aisles
- Areas in the storage area with lower ceilings (false ceilings, mezzanines)

Zones

A distinction is often made between the following zones with different functions:

- · Outside the aisles (transfer aisle)
- Braking zone before leaving an aisle. In the case of aisles that are open at both sides, there may be one of these zones at both ends
- Braking zone before a wall if the aisles are closed at one end
- Rapid travel zone. The area within an aisle between the braking zones at the ends of the aisles

By means of programming, the driving speed can be limited to a different value in each of the zones mentioned.

A waiting period can be programmed after each braking (time stop).

In principle, enabling can be blocked for each function.

The automatic braking systems are often combined with lift height restrictions.

Zone detection

The zones are identified by a sensor system that is either attached to the rack or embedded in the hall floor. Optical, inductive, magnetic and radio-based systems are used.

In principle, the customer decides which sensor system is best suited for the racking and is therefore used.



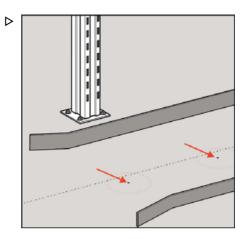
Automatic braking systems

RFID technology

The RFID transponders are embedded in the hall floor. They are located in approx. 10 mm holes slightly outside the centre of the aisle at different intervals. The RFID writing/reading device is mounted to the load wheel axle under the driver's cab. The RFID transponders are maintenance-free.

- Keep the aisle clear of objects.

The RFID system is also used for distance measurement in order to position the industrial truck in the aisle.

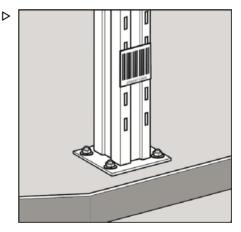


Barcode

Barcode scanners fitted on the industrial truck read the barcode labels in both drive directions while the truck is in motion. The barcode labels are attached to the uprights approx. 50 cm above the floor. The scanners can be attached to the industrial truck and the labels to the rack on one or both sides.

- Do not cover or adjust the barcode scanners.
- Check the barcode scanners for contamination
- Check the barcode labels for contamination and legibility.
- Do not cover barcode labels, e.g. with loose packing material.

The barcode system is also used for distance measurement in order to position the industrial truck in the aisle.





Automatic braking systems

Reflective light switches and reflectors

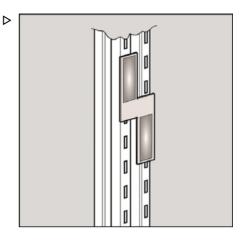
Reflective light switches attached to the industrial truck detect the reflectors in both drive directions while the truck is in motion. The reflectors are attached to the uprights approx. 170 – 200 cm above the floor. The reflective light switches can be attached to the industrial truck and the reflectors to the rack on one or both sides. The number of reflectors is determined by the functionality in the industrial truck.

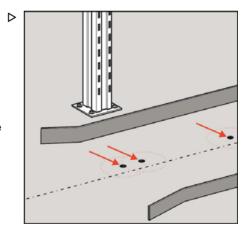
- Do not cover or adjust the reflective light switches
- Check the reflective light switches for contamination.
- Check the reflectors for contamination and damage, such as scratches.
- Do not cover the reflectors, e.g. with loose packing material.

Magnetic system

The switching magnets are embedded in the hall floor. They are located in approx. 35 mm holes slightly outside the centre of the aisle at different intervals. The magnet operated switches are mounted to the load wheel axle under the driver's cab. The number of switching magnets is determined by the functions in the industrial truck. The switching magnets are maintenance-free.

- Keep the aisle clear of objects.







Personal protection system (MPSE)

Personal protection system (MPSE)

>

The purpose of mobile personal protection systems is to protect people who have entered the braking area of the truck without warning. 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**.



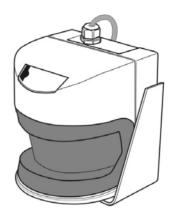
Risk of accident

Even when a personal protection system is in use, ex works we do not permit people and our very narrow aisle trucks to be in the same aisle at the same time in accordance with intended use. The manufacturer provides a maximum of safety category 2.



NOTE

The makes of mobile personal protection systems approved by the truck manufacturer are not identical in terms of functions and options. For all information about operation and maintenance of the personal protection systems, see the corresponding manufacturer's documentation.



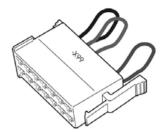


Interface X99

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 failure of the industrial truck

>

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



A CAUTION

Risk of accident

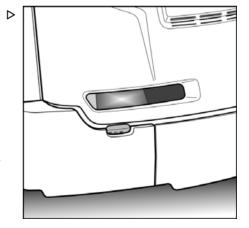
When a bridging plug is fitted, all safety functions of the MPSE are deactivated and the maximum driving speed of the industrial truck limited to 2.5 km/h. Therefore, the truck may only be operated with a bridging plug during retrieval operations. This bridging plug must be kept locked away by the warehouse manager responsible and its use is permitted only by the instruction of this warehouse manager.

Safety laser scanner

The laser scanners that are used in personal protection systems are highly sensitive optoelectronic sensors. They are well protected in the contour of the industrial truck

When the load-side scanner is covered by the driver's cab when in the lowered position. For this reason, the industrial truck drives at a maximum speed of 2.5 km/h when the driver's cab is lowered. Personal protection is ensured by the low speed and the attention of the operator.

The drive-side scanner (picture) is located behind the control compartment hood. The scanner can monitor the roadway through a wide slot. The diagnostic LEDs are visible through the smaller, lower opening.





Personal protection system, preparation

A CAUTION

Functional impairment

- Observe the operating instructions provided by the scanner manufacturer.
- Observe cleaning instructions.
- Do not adjust the scanner or cover the openings.

Personal protection system, preparation

Preparation for immediate installation

With this option, industrial trucks are prepared for installation of a personal protection system. The customer will have already specified the manufacturer of the MPSE. The brand-specific cable harnesses and mechanical support mountings will therefore be installed at the factory. The actual controller and sensor systems must be completed at the customer's site in time for commissioning. Until this point, the driving speed is limited to 2.5 km/h. This limitation is removed once the personal protection system has been installed by the authorised service centre.

A CAUTION

Risk of accident

If the personal protection system is not fully installed and commissioned, the "personal protection" and "collision protection" functions are not enabled. In this condition, the intended use of this industrial truck is not possible or permissible.

Preparation for later installation

With this option, only the mechanical components for installation of laser scanners are included in the scope of delivery. The standard interface in the X99 industrial truck for connecting a personal protection system is also available. However, the functionality of the industrial truck corresponds to the standard version.



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.



The barrier can only be opened if:

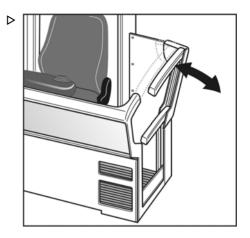
- · The truck is in an aisle
- · The barriers are closed
- · The two-hand sensors are not actuated
- The operating levers for driving/hydraulics are in the neutral position
- · The foot switch is not actuated
- The driving speed is v < 0.1 km/h

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



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.





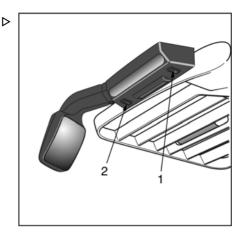
Mirror and lighting module

Mirror and lighting module

If an industrial truck is equipped with this module, additional operating instructions are supplied ex works. These instructions describe in detail how to assemble and configure the module.

This module can be supplied in various versions and combinations:

- As LED workplace lighting for illuminating the racking next to the industrial truck
- With an integrated fan motor for circulating air in the driver's compartment
- With an integrated parabolic mirror as a rear-view mirror



A CAUTION

Risk of accident

The curvature of the mirror surface significantly increases the field of vision. As a result, objects appear further away than they actually are.

Adjusting the mirror

The mirror can be moved into the required position by pushing on the corresponding places.

A CAUTION

Risk of damage to property

The adjustment range is mechanically limited. Pushing too hard on the mirror glass can cause the glass to crack.

Switching on the fan

Press the corresponding push button on the operating panel.



NOTE

Switch to fan level 2 using switch (1). A blind plugs (2) is fitted on the other side of the fan.

Switching on workplace lighting

Press the corresponding push button on the operating panel.



Camera system

Modern video cameras on the industrial truck and colour monitors in the driver's cab provide the operator with a better overview of the working area.

The cameras can only perform the desired function if they are set correctly. To achieve an optimum image display, the cameras must be adjusted individually. The system is activated as soon as the industrial truck is switched on

A CAUTION

Assistance system

Camera systems are passive systems. They do not interfere with the functionality of the industrial truck. The operator is responsible for working in a safe manner.

Before setting the truck in motion, the operator must check that the camera system is functioning properly and has the correct settings. If the camera system is not functioning correctly, the system must be repaired or adjusted before setting off.

Rear view camera

One camera mounted centrally on the lift mast facing towards the drive unit. One monitor in the driver's cab.

This camera should be set in such a way that the field of vision matches the braking area of the industrial truck. If the operator sees an obstacle on the monitor, there is enough time to react and stop.

Rear view camera for entering aisles

Two cameras mounted on the rear of the driver's cab with a view of the guide rollers (MZF) and the roadway in the direction of the drive unit. Two monitors in the driver's cab. This version can also be used as a replacement for rear-view mirrors in closed cabs (wind deflector, cold store).

These cameras should be set so that one of the rail guide rollers (MZF) or the corner contour of the chassis (IZF) is visible in each of



Lift height preselection

the two monitors. This system therefore makes it easier to enter the aisle guidance.

Camera system for monitoring the roadwav

One camera mounted on the load wheel axle under the driver's cab. Shows the roadway in the load direction. The driver's cab must be raised by approximately 50 cm for this purpose. A second camera installed centrally on the lift mast with a view of the drive unit. One monitor in the driver's cab. Switching takes place depending on the drive direction.

Maintenance and cleaning

Camera systems are low-maintenance.

During regular maintenance or after particular events:

- Check that the support mountings for cameras and monitors are in perfect condition.
- Check the clamps for tightness.
- Check the camera settings.
- Clean the camera lenses using lens cloths.

Lift height preselection



The optional "lift height preselection" function is described in detail in separate operating instructions.

This function partially automates the approach to the lift heights. The operator simply has to enter the required lift height with a number. The operator then actuates the operating devices accordingly and the system automatically brings the load fork to the required height.

In a further configuration level, the controller recognises whether or not there is a load on the load fork. Accordingly, the load fork is brought to the correct height for a storage or retrieval process.



Driver's cabs, special versions

Driver's cabs, special versions

Special versions of driver's cab are available for special applications.

There are driver's cabs

- With safety glass all around below the rail height
- With a windscreen made of safety glass or plastic, fitted on the rail
- With a foil wind deflector with integrated foil panels, fitted on the rail above the barriers
- With fixed plastic panels all around, fitted on the rail



Panels that are installed above the rail in the load direction must either be removed or pushed forward for the abseiling process. See the section entitled "Emergency abseil system". Zips and clamping screws that can be opened by hand are used. Any panels that are removed must be placed inside the cab.

Heating system

Driver's cabs can be equipped with a warm-air heating system as an option.



Wind deflector cab

Wind deflector cab

The driver's cab is equipped with a removable plastic panel on the load side. This panel must be removed if the driver needs to abseil from the cage in an emergency; see the section entitled "Emergency abseiling".

The driver's cab has plastic covers at the sides with inspection windows. This side cover features a zip (1) to enable entry. These covers can also be removed completely.



NOTE

The zip must be closed completely before removing and fitting the side covers.

Removing the side covers

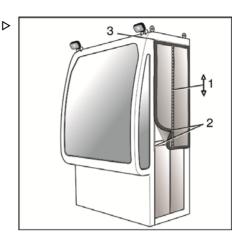
The side covers are held in position on the long sides with Velcro strips (2) and on the top in a keder rail (3). To remove, carefully loosen the Velcro connection and then slide the cover sideways out of the keder rail.

Fitting the side cover

To fit the side covers, follow the removal sequence in reverse order.

Cleaning

Clean plastic panels and plastic foils using only cleaners that are intended specifically for this purpose and special cloths. Dirty and/or scratched panels pose a safety risk.





Wind deflector cab

Emergency abseiling

Removing the windscreen

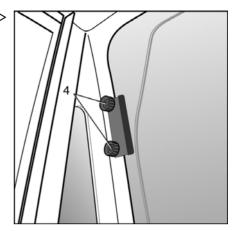
- Remove two knurled nuts (4) on both sides and remove the clamping plates.
- Detach the windscreen from the Velcro strips and bring it inside the cab.
- Stow it at the rear of the cab.
- Remove the abseil system from the storage bag as described in the "Abseiling" section.

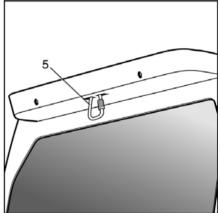
Installing the rope redirection

- An additional snap hook is hooked into the chest eyelet of the safety harness. Remove this snap hook.
- A snap hook is installed at the factory at the front edge of the overhead guard (5).
- Hook the rope of the abseil system into this snap hook. This snap hook thus serves as a redirecting point for the rope.
- Screw on the screw fastening of the snap hook.
- Carry out the abseiling process as described in the "Abseiling" section.
- Only leave the cab once the abseil system is correctly attached.

Inserting the windscreen

- First place the windscreen in the guide at the bottom, align it in the centre and press it into the Velcro strips.
- Fit the clamping plates and hand-tighten the knurled-head screws (4).





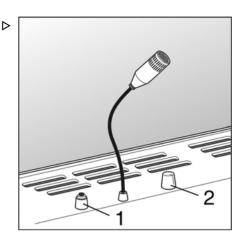


Intercom system

Intercom system

If the ambient conditions in the storage area make it necessary, closed driver's cabs can be equipped with an intercom system.

- Press and hold down the red push button (1) (audio out) on the console while speaking.
- Release the push button in order to hear in the driver's cab what is being said outside.
- Use the turning knob (2) to adjust the volume.



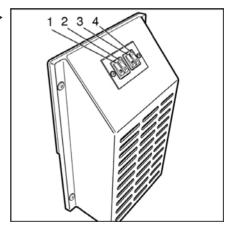
Warm-air heating system

Closed driver's cabs can be equipped with a warm-air heating system to make working in the driver's cab more comfortable. This system also provides a fan for air circulation.

A CAUTION

Risk of overheating

Do not cover the inlets or vents for the heating system.



- 1 Ventilation "On"
- 2 Ventilation blower level "1" or "2"
- 3 Heating system "On"
- Heating level "1" or "2"



Protective roof cover

Protective roof cover

The standard overhead guard meets the current standards in terms of stability and the distance between the roof struts. However, if heavy objects that are small enough to fit through the roof struts of the overhead guard are transported in a storage area, there is a danger that if they fall from a considerable height, they may fall through the overhead guard and injure the operator. To prevent this danger, a cover made of high-strength plastic can be fitted to the overhead guard at the factory.



i NOTE

The protective roof cover must always be clean so as not to obstruct the view upwards.

- Clean regularly.
- Use cleaning materials that are suitable for plastics.
- · Replace defective protective roof covers immediately.



Industrial trucks can be prepared in the factory for the installation of a car radio (1).

The preparation consists of:

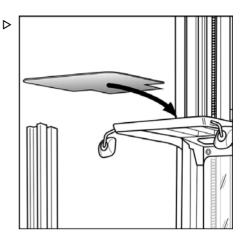
- · Console underneath the overhead guard with two built-in loudspeakers.
- · Standard installation slot for the installation of commercially available car radios
- · Rod antenna on the overhead guard
- 12 V voltage transformer

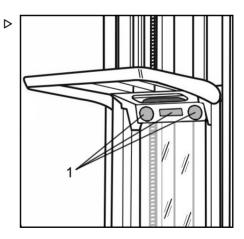
A CAUTION

Risk of accident

The operator's attention may be limited by sound from a radio or playback device, especially if the volume is particularly loud.

The use of sound devices is allowed only if permitted or tolerated by the responsible operating company.







Overhead guard switch

Overhead guard switch

The overhead guard switch fitted on the overhead guard can detect obstacles above the overhead quard using its ultrasonic sensor. If it detects an obstacle, further lifting and thus a collision between the driver's cab and the obstacle is prevented. It is not possible to override this function

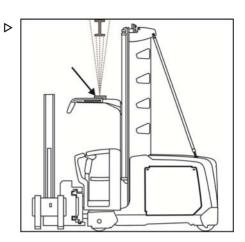
The ultrasonic sensor can be adjusted by the authorised service centre.



Only obstacles that are directly above the overhead quard are detected. Obstacles in the drive direction or to the side are not detected.



The overhead guard switch is one of the operator's assistance systems. The operator is responsible for working safely with the industrial truck.



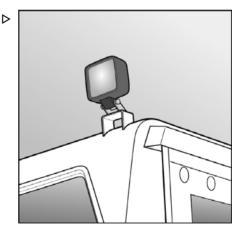
Working spotlights

Working spotlights are used to illuminate the workplace outside the driver's cab. This can include the storage spaces in the racking on the right and left as well as the area in front of the driver's cab where picked goods are stored. This makes working with the very narrow aisle truck more effective and increases occupational safety. The setting of the headlights is customised. The headlights are switched from the operating panel.



Impairment of occupational safety

Defective working spotlights must be repaired immediately, as they help to improve occupational safety.



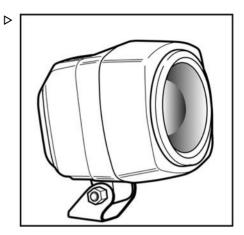


Safety Light safety headlight

Function

The safety headlight is a device that can be fitted to industrial trucks in order to give pedestrians sufficient warning of an approaching industrial truck. This function helps to improve safety in storage areas, as it can prevent industrial trucks from colliding with pedestrians.

To prevent such accidents, the safety headlight is fitted to the lift mast at a suitable height so that it projects a powerful beam of light onto the ground a few metres in front of the industrial truck. If pedestrians notice this beam of light, they have enough time to react accordingly. Safety headlights are available in different colours.



A DANGER

The driver of the industrial truck still has full duty of care in relation to pedestrians and other industrial trucks, regardless of whether this safety headlight is fitted to their truck.

The driver cannot assume that pedestrians will notice the beam of light in good time, interpret it correctly and then react correctly.



NOTE

Industrial truck drivers and pedestrians must be provided with instructions to advise them of the safety headlight function and its use for their protection.

Residual dangers

Due to the functionality and design of the system, the safety headlight cannot provide comprehensive protection for other transport users in the racking system.

The safety headlight cannot illuminate in the direction of crossing traffic.

The customer can choose for the safety headlight to be switched on:

- · Depending on the drive direction
- Only at the point of moving off
- · Only in predefined areas (zones)



Safety Light safety headlight

It is therefore essential that the functionality specified for the place of use is:

- Included in the operating instructions applicable for the storage area
- · Explained to the warehouse staff and
- That the warehouse staff are made aware that they must comply with the operating instructions

Switching on and off

The safety headlight is switched on when the key switch of the industrial truck is switched on.

If the industrial truck is switched off using the key switch, the safety headlight goes out.



NOTE

There is an option available to have the safety headlight switch on or off only in specific areas of the warehouse or during specific work processes. For a description of these special cases, see the order.

Safety



🚺 NOTE

The safety headlight features extremely powerful LEDs. Briefly looking directly into the beam of light does not present a danger to health, but is unpleasant due to the temporary dazzling effect. However, looking into the beam of light for longer periods must be avoided

Maintenance

Before starting work, the driver must check whether the distance between the beam of light and the truck is correct.

Clean the lens of the safety headlight if it is contaminated. Apart from these measures, the safety headlight is maintenance-free.

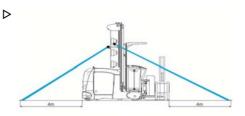


Acoustic alarm

Place of attachment and retrofitting

Attach the safety headlight to the highest possible part of the industrial truck using the assembly material supplied. During installation, ensure that the safety headlight is located within the truck contour. Because this safety headlight can be fitted to industrial trucks with a wide range of different designs, no precise specifications can be provided here regarding the ideal place of attachment. Raising the load or the driver's cab can cause the safety headlight to be temporarily covered. Careful selection of the place of attachment can reduce this sometimes unavoidable situation to a minimum. The supplied supports must be used wherever possible.

The tilting support mounting must be used to adjust the safety headlight so that the light beam is projected onto the ground approximately 4 m in front of or behind the industrial truck. When adjusting the safety headlight, the front edge of the industrial truck or load must be considered. Selecting a place of attachment that is high up on the truck maximises the tilt angle of the safety headlight and ensures that pedestrians and oncoming vehicles are dazzled by the light beam as little as possible.



Technical data

Operating voltage	12 – 100 V
Power consumption	5 W
Current draw	0.2 A at 24 V
Service life	>20,000 hours
Protection class	IP68 - IP69K
Operating temperature	-40°C - +85°C

Acoustic alarm

Acoustic alarms can be issued automatically if dangerous situations may arise between humans and machines during a racking work procedure. This ensures that other people are



Antistatic version

made aware of the industrial truck and can react in good time.

As the work procedures can vary in every storage area, the need for acoustic signals also varies. For this reason, they are configured according to the customer's specifications.

A CAUTION

Risk of accident

When employees become used to certain acoustic signals, they will rely on them more and more. That is why acoustic signals are considered part of the safety systems and must always be in working order. See the "Checklist before starting work".

Antistatic version

Various components can be installed to prevent or minimise static charging of the industrial truck. The customer must ensure that the floor covering and/or racking permit the discharge of electrical charge.

These include:

- Electrically conductive guide rollers for mechanical guidance
- Electrically conductive elements for inductive guidance (chains, brushes)
- · Electrically conductive load wheels

A CAUTION

Danger of damage to property, loss of function

When replacing the elements for dissipating static charge, use only elements that are electrically conductive. We recommend using original parts.

Check the condition and functionality of the elements each time maintenance is performed.



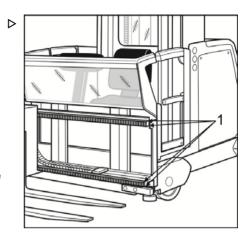
Guard plate on rack rail

Guard plate on rack rail

When goods are transported in sacks or bags. they often protrude from the outer edge of the pallet or load carrier.

There is therefore a danger of these sacks or bags being damaged by the sharp edges of the rack rail, e.g. when the sideshift is extended sideways. The goods may be lost or destroved as a result.

The guard plates on the rack rails minimise this danger by covering the sharp edges of the rack rail at the top and bottom.



Telescopic table

Description



i NOTE

To ensure proper use, the information in the enclosed manufacturer's documents must be observed.

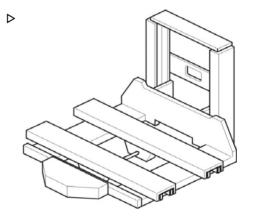
The table unit is made up of two telescopic fork arms, connected by a mechanical coupling, and possibly a third fork, which is connected via a universal drive shaft and an electromagnet disc coupling.

Each fork consists of a top table, middle table and lower table as well as a drive gearbox.

The extending table profiles have a width of 180 mm and a height of only 60 mm (top and middle part). The drive of the top and middle profile is powered via a chain system.

WThe telescopic table has a high stability due to it being maintenance-free and having very large guide rollers and side cable guides. The top table is driven to the middle table via 2 chains.

The telescopic table is a precise machine part. The following information must therefore be considered:





Other attachments

- Do not subject to extreme atmospheric conditions
- The inspection and maintenance intervals are shortened in volatile and very damp environments.
- Do not subject to shear forces, e.g. shifting
 of the load with the fork profile extended in
 a longitudinal and lateral direction.

Maintenance of the telescopic table



NOTE

The information in the enclosed manufacturer's documents must be observed to ensure proper maintenance of the telescopic table.

Other attachments

Other attachments* can also be supplied in place of the turret head.

These include:

- Telescopic tables
- · Accessible pallets
- · Order-picking platforms
- · Customised structures

A DANGER

Impairment of operational safety, danger to the operator

Other than the attachments supplied by the manufacturer, only attachments tested and supplied by the manufacturer are permitted. Unauthorised modifications are prohibited. See also "Alterations to industrial trucks".

Just as is the case with the industrial truck, attachments must be serviced regularly and inspected once a year by a specialist.

Other attachments differ from the standard design in terms of the method of operation as well as in the type of hazards if safety information is not observed. It is therefore important for the operator to be familiar with and to adhere to the instructions for the particular attachment that is fitted.

Additional operating instructions and maintenance instructions from our suppliers may also apply.



Trucks for use in cold storage

*Option

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.

A CAUTION

Icy floors

lcy 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.

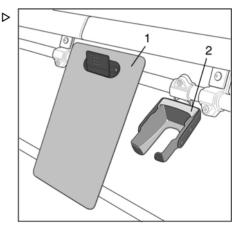


Mounting system for auxiliary ▷ components

The driver's cab can be equipped with a system consisting of rods and support mountings in order to mount additional components.

Additional components may include:

- Writing surface with paper clip (1)
- Storage area for barcode scanner gun (2)
- Support mounting for data terminal
- · Support mounting for printer
- · Support mountings for small load carriers





USB charging station

A CAUTION

Risk of accident due to the foot switch getting stuck (service brake).

If your industrial truck is fitted with auxiliary equipment for handling small load carriers, only the original containers may be used in it. Other containers cannot be held correctly and may fall to the floor. This can result in the foot pedal being applied continuously and the industrial truck no longer responding to this brake signal.

The support mountings and clamping devices must always be in perfect condition so that the auxiliary components can be operated safely and do not move from their positions during travel.

USB charging station

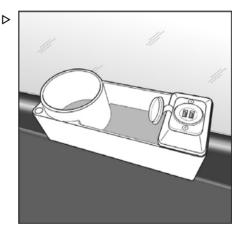
This charging station can be used to charge two consumers with USB charging cables at the same time. Maximum charging power per socket: 2 A.



NOTE

Protect against contamination and damage. When the charging station is not in use, cover the sockets with the hinged cover.

The support mounting also has space for holding drinks, pens and small items.



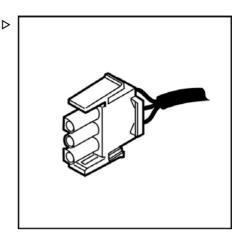


MMS interface

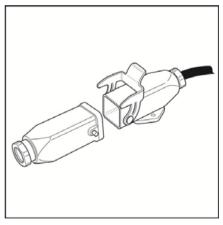
MMS interface

Additional components in the driver's cab require galvanically isolated power supplies. Each power supply has a separate fuse.

The customer's printer or terminals can therefore be supplied with voltage. The mounting position and number, as well as the voltage supplied, are order-specific.



PIN 1 and PIN 2 +24 V PIN 3 + 0 V Max. 5 A



PIN 1 +12 V or +24 V PIN 2 + 0 V Max. 5 A



Two-person cab

Two-person cab

Provided a driver's cab is equipped accordingly, two people may be in it at the same time during normal operation. The additional equipment usually consists of:

- Key switch to switch from one-person operation to two-person operation
- Handholds
- Additional foot switches
- · Lift ram protection against contact
- · Protection against leaning out
- Other safety equipment may be available, depending on the job.

A CAUTION

Risk of accident

The additional safety equipment installed must not be altered in any way. If safety equipment is defective or its function is impaired, the truck must not be operated in ride on mode until it has been repaired by a professional.



NOTE

If a truck is intended and equipped for normal operation with two people (operator and passenger), two abseil systems must also be kept to hand in the driver's cab.

Operator and passenger

The dimensions of the operator's compartment on our industrial 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. EN ISO 3411 specifies 114.1 kg for the maximum body weight for a large operator.



Two-person cab

A CAUTION

Reduction in the load capacity. Negative effect on stability.

If the actual body weight of the operator and passenger combined exceeds 114.1 kg, the maximum load weight must be reduced by the difference compared with the information on the load capacity diagram.

Example

The actual body weight of the operator is 130 kg. The actual body weight of the passenger is also 130 kg. Together, this makes 260 kg. In this case, the maximum load weight must be reduced by approx. 146 kg compared with the information on the load capacity diagram.

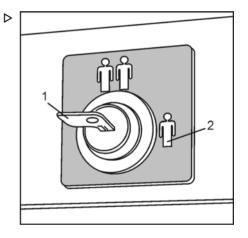
Key switch

A CAUTION

Risk of accident

The truck operator is responsible for ensuring that this key is actually switched to the appropriate position when the truck is operated with two people. The equipment described below is not activated until the switching procedure has been carried out. The truck operator must instruct the passenger regarding the correct operation of the additional equipment and regarding safe conduct when travelling. If the passenger does not comply with these instructions, the passenger must not be transported.

The key for switching from one-person operation to two-person operation is installed in the rear cab wall above the driver's seat. In the illustration, the key switch (1) is set to one-person operation (2).

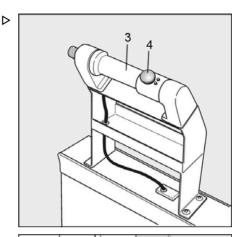


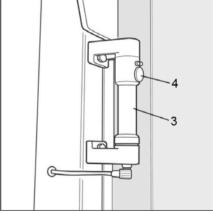


Two-person cab

Handholds

Two handholds (3) are provided so that the passenger is able to hold on with both hands at all times, thus keeping the passenger's body in a safe position. For monitoring purposes, the passenger must always actuate both buttons (4). Only then are the truck functions enabled. If the passenger releases one of the buttons whilst travelling or during a hydraulic movement, this function will stop immediately.







Foot switch

One or two additional foot switches (5) force the passenger to adopt a safe position. If the passenger releases one of the foot switches during travel, the truck will stop immediately.

Further equipment

Depending on the lift mast design and cab dimensions, protection against accidental contact with the lift cylinder situated behind the cab can be installed.

Protection against leaning out towards the rack at the side may also be required. This protection system can be installed on the barrier and is moved with the barrier when it is being opened.

Safety

The sensor system of the two-person cab is monitored electronically. This prevents operating errors and means that any damage should be detected.

Display 813

Cause

- Incorrect switching sequence. When the key switch was set to ride on mode, one of the enabling switches had already been actuated (manipulation of a switch or switch defect)
- One of the foot switches was actuated for longer than 5 seconds before the second foot switch was actuated
- One of the enabling switches in the handholds was actuated for longer than 5 seconds before another switch was actuated

Effect

- Lifting and lowering of the main lift is disabled. No enable possible
- Lifting and lowering of the auxiliary lift is disabled. No enable possible
- Driving disabled. No enable possible

Remedy

Release all switches and actuate them in the correct sequence.



Working platforms

If this does not restore the correct function and the error message disappears, call the authorised service centre.

Working platforms

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

This legislation must 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.

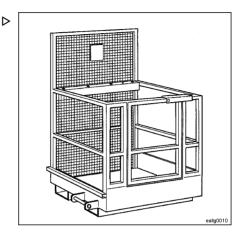
WARNING

High risk of accident

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

Use only work platforms that have been supplied by the manufacturer or approved work platforms from other manufacturers.

If an industrial truck is equipped with a working platform at the factory, this special version is accompanied by additional operating instructions. Detailed safety information can be found within.





Α	Battery discharge indicator 54
Abseil system	Battery lock 57, 122
Acceleration behaviour	Battery lock, setting
Accessible pallet	Battery maintenance 54, 104
Accessories accompanying the product 6	Battery management system 104
Acoustic alarm	Battery on a roller channel 122
Active load wheel axle	Battery type 52, 54, 55
Additional documentation 6, 110	Battery, weight 44
Additional hydraulic functions 30, 113	Blower
Adjusting the driver's seat 65	Body weight
Adjusting the position of the operating pan-	Brakes
el	Braking
AFC	Braking characteristics 12, 70, 76
Aisle	braking distance
Aisle detection, barcode	Braking zone
Aisle detection, magnet operated	Bridging plug X99
switches	
Aisle detection, reflective light switches 128	C
Aisle detection, RFID	Cab doors
Aisle entry assistant	Camera system
Aisle safety assistant	Camera system, maintenance 137
Aisles, closed at one side	Care
Aisles, open at both sides	Care, special equipment 98
Alterations to industrial trucks 20	Care, special versions 98
Ancillary movements	CD player
Antistatic version	Changing the aisle
application area	Checking all operating devices 59
Assistance system	Checking the access control 59
Attachment 6	Checking the cab doors 59
Attachment points	Checking the emergency off switch 59
Attachments	Checking the lifting accessory 59
Attachments, other	Checking the overhead guard 59
Automatic braking systems	Checking the wheels
Automatic driving within the aisle	Checklist before starting work 44, 58, 59
Automatic floor compensation	Climbing in 61
Auxiliary lift	Climbing out 61
Addition 9 Int	Closing the barriers 61
В	Closing the glass doors 61
Ballast weight 54	Cold-store operation
Barriers 61, 70, 76	cold store
Battery acid	Colour monitor
Battery change frame 52, 54	Commissioning 54
Battery charger	Control current fuse
Battery commissioning	Conversions
Battery compartment cover 54	Copyright and proprietary rights 8
Battery compartment doors 54	Correct disposal 94



Counterweight 54	Entering the aisle
Cup holder	Error message 813
Customer option	Error numbers
Customised special versions 4	Exiting the raised driver's compartment in
D	the event of an emergency 82, 90
	Expert
Danger area	F
Declaration of conformity	
Decommissioning	Factory nameplate
Description of truck	Fan
Dimensions	Fan module
Display	FEM 4.004
Distance measurement	Fleet management system
Driver training	Floor height
Driver's cabs, special versions 139	floor load
Driver's cab, closed	Floor structure
Driver's cab, emergency lowering 82	floor surface
Driver's compartment 61	Foot switch
Driver's licence 20	Fork arms, hydraulically adjustable* 81
Driver's seat, option 65	Fork arms, latch 81
Driver's seat, standard version 65	Fork arms, manually adjustable 81
Driving	Fork arms, specification 81
Driving freely	Fork cycle
Drivingsafety	Frequency
Driving speed adaptation	Front end monitoring
E	Function checking
	Function checking the brake system 59
EC declaration of conformity	Function checking the steering 59
Electric field strength	Fuses
Electrolyte	G
Electromagnetic radiation	Gearbox oil
	Gearbox, filling quantities
Emergency absell system	Gearbox, liming quantities
Emergency abseil system for different operators	Gear oil
Emergency lowering 82	Gel batteries
Emergency lowering valve 82	Gel battery
Emergency lowering varve:	General safety information
el	Glass doors 61
Emergency off switch 30, 67, 113	Guard plate on rack rail
Emergency operation	Guidance
Emergency steering device	Guide rollers, electrically conductive 148
Emissions	Saide folicis, electrically colludelive 140
Enable button	Н
Enabling options	Hand and arm vibrations
Energy-saving mode	Lloodlighto 444
	Headlights



Hooking on the chassis	Load stabilisation, dynamic. 111 Load weight detection. 111 Load weight measurement. 111 Load wheel brake. 85 Load wheels, electrically conductive. 148 Loudspeakers. 143 Lubricants. 105 Lubricant, grease. 105 Lubricant, load chains. 105
iGo pilot navigation	Lubricant, shaft-hub connection 105
Implants	М
Inductive guidance	***
Industrial-truck view	Magnetic card system. 67 Main current fuse. 106
Initial driving exercises	Main lift
Installing the battery	Maintenance
Instruction. 90	Maintenance interval, shortened 98
Intelligent load capacity diagram 111	Maintenance schedule, 1000-hr 99
Intended use	Maintenance schedule, 2000-hr 103
Intercom system	Maintenance, special equipment 98
Interface X99	Maintenance, special versions 98
Intermediate lift cut-out	Mast bracing
IZF 70, 73, 76, 115	Maximum driving speed 128
К	Maximum service life 90
• •	Maximum speed
Key switch 67	Mechanical guidance 74
L	Mechanical rail guidance 73
Labelling for special equipment 27	Medical equipment
Laser scanner, Care	Microphone
Laser scanner, Cleaning	Mirror module
Laser scanner, Maintenance 133	MMS interface
Lead-acid batteries 104	Modification
Leaks	Mounting system for auxiliary components
Leaving the induction track	
Lift cut-out	MPSE
Lift height preselection	MZF
Lifting clear of the ground	
Lift mast, lower lifting point 46	N
Lighting	Narrow aisle vehicles 19
Lighting module	Navigation
Lithium-ion batteries	Non-ionising radiation
Lithium-ion battery	normal work load
Load capacity diagram 20, 20	Numerical code
Load capacity diagram	0
Loading the chassis 46	Obligations of the operating company 13
LUGUIIU IIIC UIIGOSIS	ganono or ano operating company It



Occupational safety	144	Plugging in the battery male connector 67
Oil-containing wastes	15	Product documentation
Opening the barriers	61	Programming the display
Opening the glass doors	61	Protection against contact
Operating company	17	Protective roof cover
Operating instruction document	17	PzS 54
Operating instructions	40	R
Operating instructions and maintenance in	-	••
structions	. 6	Rack rail guard
Operating lever for driving	113	Radio installation
	113	Rapid travel zone
Operating media	15	Rear view camera
Operating panel	30	Recycling
Operating the display	33	Reduction in load capacity 154
Operational safety	12	Regular maintenance 4, 96, 98
Operator and passenger	154	Regular testing 17, 96
Operator's compartment, dimensions	. 9	Releasing the brake mechanically 85
Operator, body dimensions	. 9	Removing the control compartment hood.
Operator, body weight	. 9	82, 85, 106
Operator, female	. 9	Replacement interval for lifting chains 96
Operator, form of address		Replacement state of wear 90
Operator, male		Replacing the battery 52, 54, 57
Options 4, 110,	151	Replacing the battery using a change
Optispeed, versions	111	frame
Order-picking platform 41,	150	Replacing the battery using a truck 57
Order-related documentation		Residual risks
Order picking truck	29	Retrieval
Original parts		RFID card
Other checks	59	RFID chip 67, 125
Overhead guard	143	Risk assessment
Overhead guard switch	144	Risk of corrosion
		Risk of explosion 52, 54
P		Roadways
Parking brake), 76	S
Passenger	154	
Pedestrian mode	12	, , ,
Permitted batteries	56	Safety headlight
Personal protection	15	Safety laser scanner
Personal protection system 132,	133	Safety laser scanners
Personal protection system, preparation.	134	Safety light maintanance 145
Personal protective equipment	21	Safety light, maintenance
Personal protective gear	15	Safety light, retrofitting
Pictograms	40	Safety light, switching off
	125	Safety light, switching on
PIN code, a change	125	Safety officer
PIN code, factory setting	125	Scanners, cleaning
Plain text messages	40	Seals 90



Securing the load support 82, 85	Traffic supervisor
Sensor surface 70, 76, 113	Training
Sensor surface for two-hand operation 30	Transfer aisle
Sensor system	Transportation safety device on glass
Service flap	doors
Shut-off valves 85	Transporting and loading 46
Side shift limitation, automatic 111	Transport travel
Small items	Truck configuration file
Sound level	Truck identification 5
Spare parts list 6	Turret head 41, 150
Special equipment	Two-hand operation 30, 70, 76, 113
Special functions	Two-person cab 90, 154
Specialist	Types of guidance
Special safety information about load pick	U
up	~
Special version, customised 110	Unauthorised use
Speed optimisation	Underside of the operating panel 76
Speeds	Unevenness of the floor
Split operating panel	Units
Stability	Units, delivery 44
Standard design 4	Units, weights 44
Standard labelling	USB
Steering	USB charging station
Steering knob	Use in cold storage
Steering wheel	Use in very narrow aisles 29
Support screws	V
Support screws, setting dimension 80	•
Swinging loads	VDE0117
Switch-off functions	12.200011111111111111111111111111111111
Switch-on push button 67	VDMA (German Engineering Federation) information booklet 6
Switching off	Ventilation
Switching on 67, 125	Vibration load
Swivel shift fork 41	Vibrations
Synchronised fork movement	Video camera
_	Voltage transformer
Т	Volume control
Technical data	Volume Control
Technicians	W
Telescopic table 41, 149, 150	Warm-air heating system 142
Tilt barrier	Warranty
Torque for wheel nuts 46	Wear limit for lifting chains 96
Towing	Weights
Towing with non-operational steering 85	Weights, units
Towing with operational steering 85	Weight, attachment
Traction battery	Weight, battery
Traction cut-out	Weight, chassis
Traction motor brake 85	



Weight, driver's cab	44	Working range	12
Weight, lift mast	44	Working spotlights	144
Wet lead battery	54	Work light	33
Wheel nuts	46	Workplace, workplace	144
Wind deflector cab 139,	140	7	
Wind deflector cab, emergency abseiling.		_	
139,	140	Zone detection	128
Working platform	158	Zones	128

