Original instructions

Platform tractor and tow tractor

LXT 120
LXT 180
LXT 250
LXT 350
LXW 20
LXW 30



0748 0749 0750 0751 0752 0753
0754 0770 0771

first in intralogistics

50078078001 EN - 10/2025 - 08

Address of manufacturer and contact details ▷

STILL GmbH
Berzeliusstraße 10
22113 Hamburg, Germany
Telephone: +49 (0) 40 7339-0
Fax: +49 (0) 40 7339-1622
Email: info@still.de
Website: www.still.de

Spare parts list ▷

You can request to download the spare parts list by copying and pasting the address **https://sparepartlist.still.eu** into a web browser or by scanning the QR code shown to the side.

On the web page, enter the following password: **Spareparts24!**

On the next screen, enter your email address and truck serial number to receive an email with the link and download the spare parts list.


2511

Rules for the operating company of industrial trucks

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

This guide provides information for handling industrial trucks:

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

Internet address and QR code

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

1 Preface

Your industrial truck . . . 2
Technical description . . . 2
Accessories . . . 4
General . . . 4
Conformity marking . . . 5
Declaration that reflects the content of the declaration of conformity . . . 6
Information about the industrial truck . . . 7
Labelling points . . . 9
Truck variants . . . 15
Nameplate . . . 15

Using the industrial truck . . . 17
Intended use . . . 17
Improper use . . . 17
Place of use . . . 18

Information about the documentation . . . 19
Scope of the documentation . . . 19
Digital operating instructions . . . 20
Explanation of signal terms used . . . 21
Supplementary documentation . . . 21
Issue date and topicality of the operating instructions . . . 22
List of abbreviations . . . 22
Copyright and trademark rights . . . 24

Environmental considerations . . . 25
Packaging . . . 25
Disposing of components and batteries . . . 25

2 Safety

Definition of responsible persons . . . 28
Operating company . . . 28
Specialist . . . 28
Drivers . . . 29

Basic principles for safe operation . . . 31
Insurance cover on company premises . . . 31
Modifications and retrofitting . . . 31
Non-original parts . . . 32
Damage, defects and misuse of safety systems . . . 33
Tyres . . . 33
Medical devices . . . 34
Exercise caution when handling gas springs and accumulators . . . 35

Residual risk 36
Residual dangers, residual risks 36
Danger to employees 37
Special risks associated with using the truck and attachments 38
Overview of hazards and countermeasures 38

Safety tests 41
Carrying out regular testing on the industrial truck 41
Insulation testing 41
Regularly testing the electrical safety 43

Safety regulations for handling consumables 44
Permissible consumables 44
Battery 44
Oils 45
Hydraulic fluid 46
Disposal of consumables 47

Emissions 48

3 Overviews

Driver's compartment 52

Display/control unit 53

4 Operation

Checks and tasks before daily use 56
Visual inspections and function checking 56
Checking the condition of the wheels and tyres 58
Checking the wheel-fastening screws 58
Checking tyre pressures 59
Check the service brake for correct function 59
Checking the regenerative brake 60
Checking the parking brake 61
Checking the emergency off switch 62
Checking the functions of the interlock 62
Check the hydraulic oil level 63
Checking the manual tow coupling (variant) 65
Checking the automatic tow coupling (variant) 65
Lubricating the automatic tow coupling (variant) 66
Adjusting the steering column 66

Driver's seat . . . 68
Adjusting the driver's seat . . . 68
Seat belt (variant) . . . 72

Switching on . . . 75
Switching on the key switch . . . 75
Switching on via push button (variant) . . . 76
FleetManager — logging in and logging off . . . 77

Display-operating unit . . . 78
Operating the display-operating unit . . . 78
Access authorisation with PIN code (variant) . . . 80
Access authorisation for the fleet manager (variant) . . . 81

Pre-Shift Check . . . 86
Description of the Pre-Shift Checks (variant) . . . 86
Process . . . 87
All questions . . . 88
Defining the question sequence . . . 90
Displaying the history . . . 92
Defining the shift start . . . 93
Resetting the truck restrictions . . . 97

Driver profiles . . . 100
Driver profiles (variant) . . . 100
Creating driver profiles . . . 100
Selecting driver profiles . . . 102
Renaming driver profiles . . . 102
Deleting driver profiles . . . 104

Lighting . . . 106
Switching the lighting on and off . . . 106
Switching the turn indicators on and off . . . 107
Rotating beacon . . . 107
Turning the hazard warning system on and off . . . 108
STILL SafetyLight (variant) . . . 108
StVZO equipment . . . 109

Efficiency modes and drive modes . . . 111
Blue-Q efficiency mode . . . 111
Configuring Blue-Q . . . 112
Drive modes . . . 113

Cab . . . 115
Cab doors . . . 115
Heating system (variant) . . . 119
Air conditioning (variant) . . . 122

Actuating the front windscreen wiper and washer . . . 124
Heatable windows . . . 126
Push-up roof window (variant) . . . 126
Interior lighting . . . 127
Topping up the washer fluid . . . 127

Protective devices . . . 129
Collision protection (variant) . . . 129

Driving . . . 132
Safety regulations when driving . . . 132
Roadways . . . 134
Visibility when driving and manoeuvring . . . 135
Operating the service brake . . . 136
Operating the horn . . . 137
Selecting drive programmes 1 to 3 . . . 137
Selecting drive programme A or B . . . 138
Configuring drive programmes A and B . . . 138
Actuating the parking brake . . . 140
Malfunctions in the electric parking brake . . . 144
Starting drive mode . . . 148
Speed limitation (variant) . . . 150
Display for uphill and downhill gradients . . . 152
Parking the industrial truck securely and switching it off . . . 152
Wheel chock (variant) . . . 153

Auxiliary equipment . . . 155
FleetManager (variant) . . . 155
SVI STILL Vehicle Interface (variant) . . . 155

Assistance systems . . . 158
Descent Speed Regulation (DSR) (variant) . . . 158
Calibrating Descent Speed Regulation (DSR) . . . 161
Entering the truck weight . . . 161
Calibrating the idle position . . . 164
Calibration run . . . 167
Rear view camera (variant) . . . 170

Trailer and load . . . 175
Opening and closing the platform panels . . . 175
Loading a platform . . . 178
Loading trailers . . . 180
Towing guidelines . . . 181
Reverse inching function . . . 182
Warnings for trailer operation . . . 184
Coupling and uncoupling trailers . . . 186

Operating the manual 3-level tow coupling (variant) . . . 188
Important information . . . 188
Coupling the trailer . . . 190
Maximum support load . . . 191
Uncoupling the trailer . . . 191
Operating the manual 2-level tow coupling (variant) . . . 191
Important information . . . 191
Coupling the trailer . . . 193
Maximum support load . . . 193
Maximum towed load . . . 193
Uncoupling the trailer . . . 194
Ro*244 automatic tow coupling (variant) . . . 194
HSM 2140 automatic tow coupling (variant) . . . 198
RO230B tow coupling (variant) . . . 202
Towing trailers . . . 204
Compressed air supply system for trailer brakes . . . 205
Tugger train trailers . . . 206

Procedure in emergencies . . . 212
Emergency shutdown . . . 212
Emergency operation of the parking brake in the event of a malfunction . . . 214
Emergency hammer . . . 217

Side charging access . . . 219
Side charging access at the rear (variant) . . . 219

On-board charger . . . 226
General information about the on-board charger (variant) . . . 226
Configuring the on-board charger . . . 227
Changing the battery type used . . . 231
Charging the battery . . . 232
Compatible batteries . . . 242
Performance data . . . 243

Handling the lead-acid batteries . . . 244
Safety regulations for handling the battery . . . 244
Charging the lead-acid battery . . . 247
Equalising charging to preserve the battery capacity . . . 252
Checking the battery charge status and calibrating the battery charge indicator . . . 254
Maintaining the battery . . . 257
Checking the battery condition, acid level and acid density . . . 258

Handling the gel batteries . . . 260
Handling the gel battery . . . 260

Handling the lithium-ion batteries . . . 265
Safety regulations for handling the lithium-ion battery . . . 265
80 V lithium-ion batteries . . . 268
Regulations for storing lithium-ion batteries . . . 269
Checking the battery charge status . . . 270
Charging the lithium-ion battery . . . 273

Replacing and transporting the battery . . . 277
Changing to a different battery type . . . 277
Opening and closing the battery hood (variant) . . . 278
Opening the battery hood . . . 278
Closing the battery hood . . . 278
Opening the battery hood in an emergency . . . 279
Replacing the battery using a truck or hand pallet truck . . . 280
Replacing the battery using a crane . . . 286

Display messages . . . 290
Messages . . . 290
Messages about operation . . . 290
Messages about the industrial truck . . . 294

Cleaning . . . 296
Cleaning the industrial truck . . . 296
Cleaning the electrical system . . . 298
Cleaning the windows . . . 299
After cleaning . . . 299

Transporting the industrial truck . . . 300
Determining the total actual weight . . . 300
Securing the industrial truck for transport . . . 301
Loading the industrial truck by crane . . . 302

Decommissioning . . . 306
Decommissioning the industrial truck . . . 306
Scrapping the industrial truck . . . 307

5 Maintenance

Safety regulations for maintenance . . . 310
Lifting and jacking up . . . 310

General maintenance information . . . 311
Personnel qualifications . . . 311
Information for carrying out maintenance . . . 311
Information for carrying out maintenance . . . 313
Setting up and adjusting the due date counter for maintenance and safety checks . . . 315
Maintenance - 1000 hours/annually . . . 317

Maintenance - 3000 hours/every two years 320
Ordering spare parts and wearing parts 320
Quality and quantity of the required operating materials 320
Maintenance data table 321

Maintaining operational readiness 324
Maintaining the seat belt 324
Checking the driver's seat 325
Replacing the fresh-air filter mat of the heating system 326
Servicing wheels and tyres 327
Checking the battery 328
Replacing the fuses 328
Checking the hydraulic system for leak tightness 328

6 Technical data

Tow tractor dimensions 332

VDI datasheet LXT120 0748 332

VDI datasheet LXT180 0749 337

VDI datasheet LXT250 0750/0751 342

VDI datasheet LXT350 0752 347

Dimensions of the platform tractor 352

VDI datasheet LXW 20 0753 352

VDI datasheet LXW 30 0754 357

Battery specifications for lead-acid batteries 362

Battery specifications for Li-Ion Plus lithium-ion batteries 363

Eco-design requirements for electric motors and variable speed drives 364

1

Preface

Your industrial truck

Technical description

General

The LXT 120, 180, 250 and 350 four-wheel tow tractors and the LXW 20 and 30 platform tractors are suitable for indoor and outdoor use. The LXT models pull trailers up to a total weight of 35 t. The LXW models carry loads up to 3 t. The maintenance-free 80-V AC motor accelerates the tow tractors and the platform tractors up to a maximum speed of 25 km/h.

A maximum of one additional person can ride on the passenger seat.

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

There are four LXT models and two LXW models:

Tow tractors

- 12-t/18-t tow tractor with very short wheelbase (VSWB)
- 25-t tow tractor with short wheelbase (SWB)
- 25-t tow tractor with long wheelbase (LWB)
- 35-t tow tractor with very long wheelbase (VLWB)

Platform tractor

- 2-t platform tractor with long wheelbase (LWB)
- 3-t platform tractor with long wheelbase (LWB)

Assistance functions

Various assistance functions are available as variants. They assist the driver in carrying out their work.

- Descent Speed Regulation (DSR) actively assists the driver when driving on gradients. It is available in three different versions: "DSR Basic", "DSR Eco" and "DSR Premium".

Brake system

The brake system is comprised of three different brakes:

- Service brake
- Regenerative brake
- Electrically actuated parking brake

The truck control unit prevents the wheels from locking completely during braking. This system works in a similar way to an anti-lock braking system in a passenger car.

Hydraulic system

The hydraulic system supplies the hydraulic steering and the two independent hydraulic circuits of the braking system.

Drive

The LTX/LXW 120/ 350 is driven via both rear wheels by maintenance-free 80-V AC drives in the rear axle.

The energy supply is provided by lead-acid or, optionally, lithium-ion batteries, which can be accessed and replaced from the side.

The driver can help to influence the energy consumption and performance of the truck using the "Blue-Q" efficiency mode. The required setting for the current application can be selected via the display-operating unit.

Steering

The kickback-free, hydrostatic front-wheel steering system means that the truck has a small turning circle.

Operation

The reverse inching controls (variant) at the rear of the tow tractor and the platform tractor can be used to safely approach a trailer, with the tractor controlled by a user outside the driver's cab.

The "STILL Easy Control" display-operating unit simplifies daily use of the truck by providing personally configurable favourites. The display-operating unit also monitors the functions of the industrial truck.

Accessories

- Two keys for the driver's cab door locks and the key switch
- "FleetManager"-Access card (variant)
- RFID access chip (variant)
- Tool for releasing the parking brake in an emergency
- Warning card stating that the parking brake has been released due to an emergency

General

The industrial truck described in these operating instructions conforms with the applicable standards and safety regulations.

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

The industrial truck is fitted with state-of-the-art technology. Following these operating instructions will allow the industrial truck to be handled safely. If the specifications of these operating instructions are adhered to, the functional capability and the promised properties of the industrial truck will be maintained.

Familiarise yourself with the technology, understand it and use it safely. These operating instructions provide the necessary information and help to avoid accidents and to keep the truck ready for operation even beyond the warranty period.

Therefore:

– Before commissioning the industrial truck, read the operating instructions and follow the instructions.

– Always follow all the safety information contained in the operating instructions and on the industrial truck.

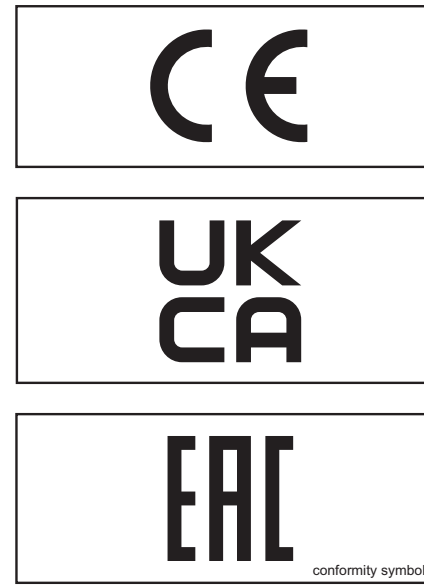
Conformity marking

The manufacturer uses the conformity marking to document the conformity of the industrial truck with the relevant directives at the time of placing on the market:

- CE: in the European Union (EU)
- UKCA: in the United Kingdom (UK)
- EAC: in the Eurasian Economic Union

The conformity marking is applied to the nameplate. A declaration of conformity is issued for the EU and UK markets.

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



conformity symbols

Declaration that reflects the content of the declaration of conformity

Declaration

STILL GmbH
Berzeliusstraße 10
22113 Hamburg Germany

We declare that the machine specified below conforms to the most recent valid versions of the stated standards.

Truck type[3)]	**corresponding to these operating instructions**
Model	**corresponding to these operating instructions**

– "Machinery Directive 2006/42/EC" [1)]
– "Supply of Machinery Safety Regulations 2008, 2008 No. 1597" [2)]

Person authorised to compile the technical file:

See declaration of conformity

STILL GmbH

[1)] For the markets of the European Union, the EU candidate countries, the EFTA States and Switzerland.
[2)] For the United Kingdom market.
[3)] Tow tractor, platform tractor or trucks for use at airports: aircraft ground support equipment

The declaration of conformity document is supplied with the industrial truck. The declaration shown explains the conformity with the provisions of the EC Machinery Directive and the Supply of Machinery Safety Regulation 2008, 2008 No. 1597.

An unauthorised structural change or addition to the industrial truck can compromise safety in an inadmissible manner, thus invalidating the Declaration of Conformity.

The declaration of conformity must be carefully stored and made available to the responsible authorities if necessary. It must also be handed over to the new owner if the industrial truck is sold on.

Information about the industrial truck

Your industrial truck offers optimum efficiency, safety and driving convenience. However, it is primarily down to the operating company and the driver to maintain these characteristics for a long time and to take advantage of the resulting benefits.

These operating instructions contain everything you need to know about commissioning, driving, maintaining and repairing the industrial truck.

Follow the operating instructions and carry out the work specified regularly and at the due times, in accordance with the overviews for maintenance and preservation of operational readiness.

To keep your warranty valid, and to ensure safety, all maintenance work must be performed by competent persons authorised by the authorised service centre.

Reference standards

This industrial truck complies with standard EN ISO 3691-1 (Safety of industrial trucks – Self-propelled trucks up to and including 10,000 kg capacity and tow tractors with a pulling force up to and including 20,000 N – Part 1: General requirements), which meets with the specific essential requirements of the EU Machinery Directive 2006/42/EC.

It also complies with standard EN 12895 for electromagnetic compatibility and subsequent amendments for power-driven industrial trucks in accordance with Directive 2004/108/EEC.

Sound pressure level tests are performed in accordance with standard EN 12053.

Vibration level tests are performed in accordance with standards EN 13059 and EN 12096.

Technical notes

Please submit all enquiries concerning orders for spare parts to the authorised service centre, making sure that you give the correct delivery address.

Use only genuine spare parts when conducting repairs. This is the only way to guarantee that your industrial truck maintains its original technical standard.

When ordering spare parts, please specify the part number and the following truck data:

Truck type:

Serial number/year of manufacture:

Delivery date:

When taking over the truck, transfer the data from the identification plates on the tow tractor into these operating instructions for future use. This information can be found on the identification plate on the operating console. We recommend that you transfer this information to this manual for ease of future reference.

Taking delivery of the industrial truck

Each industrial truck undergoes a thorough inspection before leaving the factory. This guarantees that it is in a flawless condition and fully equipped at transfer.

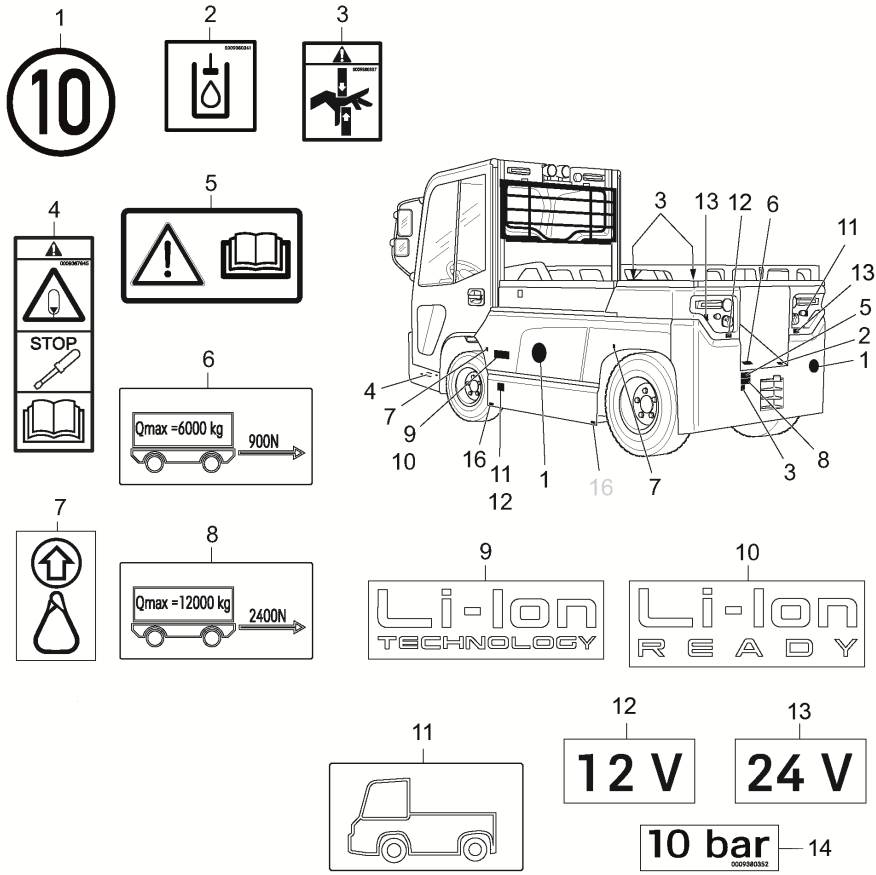
To avoid subsequent complaints and defects, we ask that you carefully check the functional ability of the truck and the completeness of the equipment at the time of transfer.

The following technical documents come with each industrial truck:

- Operating instructions
- If necessary, further operating instructions for attachments, additional devices or a Customer Option (CO)
- EC declaration of conformity

Labelling points

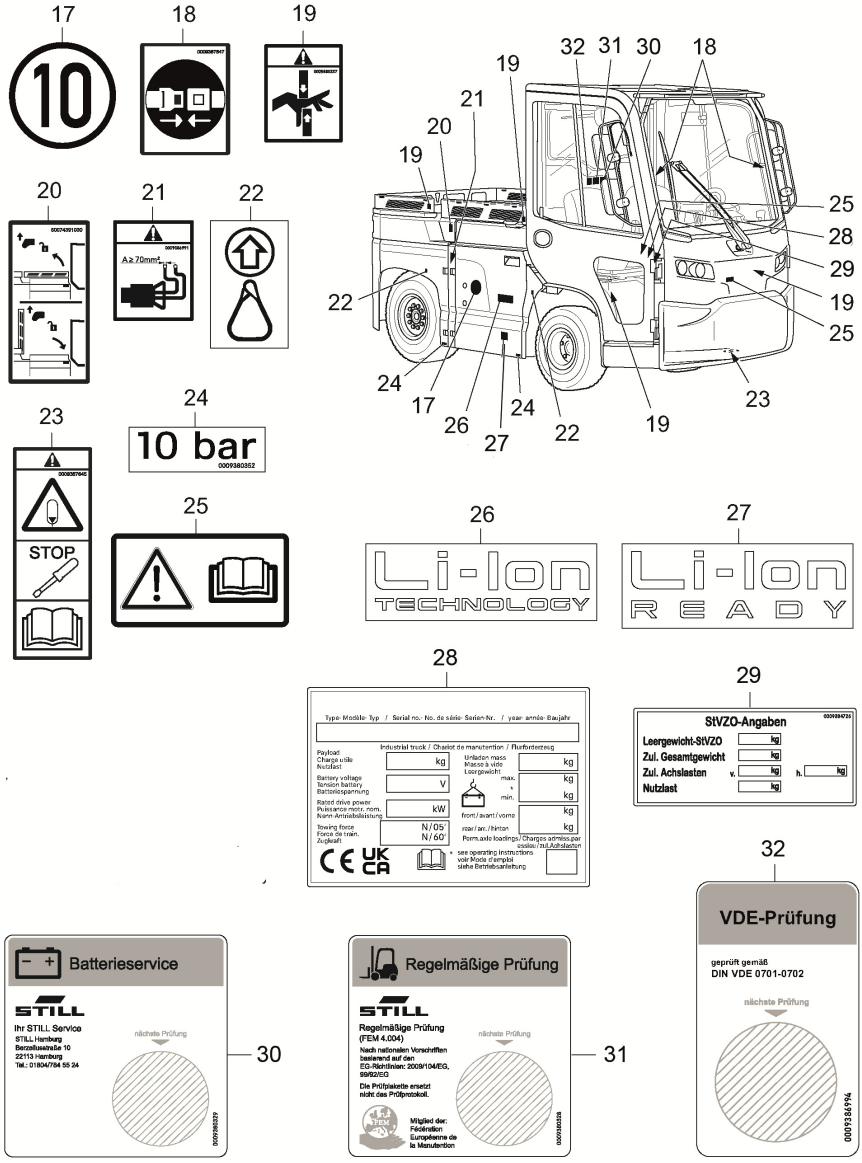
Rear of the tow tractor



1 Marking as per German traffic regulations: Maximum speed
2 Decal information: Hydraulic oil tank
3 Warning sign: Risk of crushing
4
5 Decal information: Caution/Read the operating instructions
6 Decal information: Maximum towing load
7 Decal information: Lifting-gear fixing point
8 Decal information: Maximum towing load
9 Information sign: Li-Ion Technology

10 Information sign: Li-Ion Ready
11 Information sign: Reverse inching
12 Decal information: 12-V socket
13 Decal information: 24-V socket
14 Decal information: Tyre pressure

Front of the tow tractor



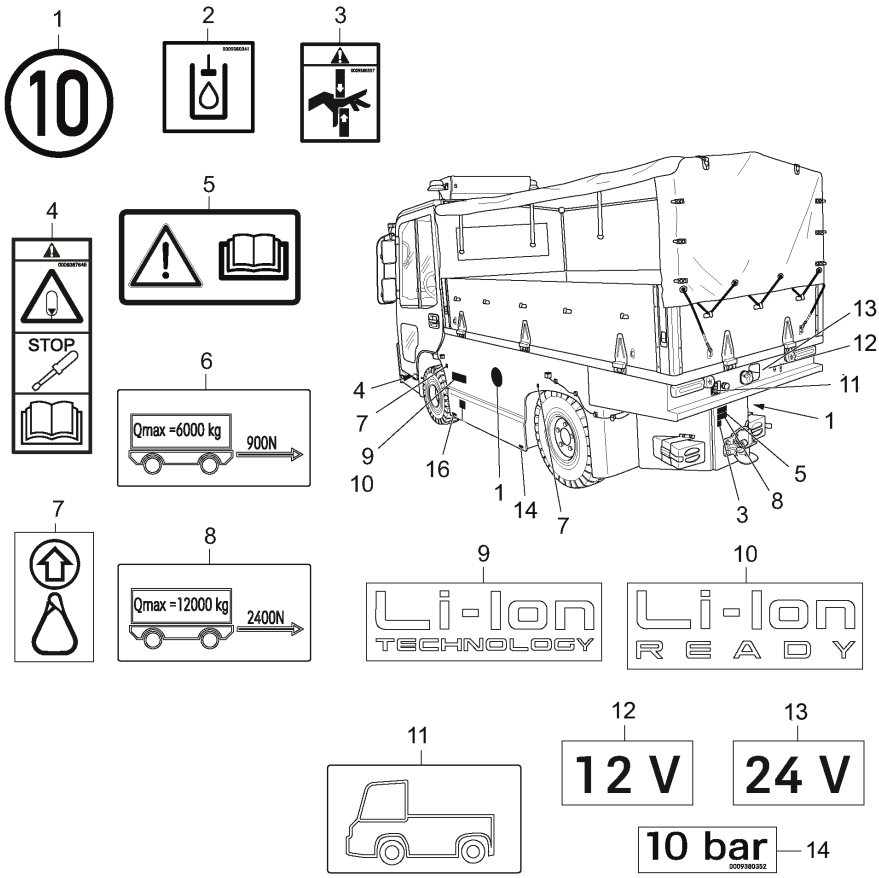
17 Marking as per German traffic regulations: Maximum speed

18 Decal information: Close the seat belt (for aircraft ground support equipment)

19 Warning sign: Risk of crushing

20 Decal information: Battery hood interlock
21 Decal information: Cable cross-section of battery cable
22 Decal information: Lifting-gear fixing point
23
24 Decal information: Tyre pressure
25 Decal information: Caution/Read the operating instructions
26 Information sign: Li-Ion Technology
27 Information sign: Li-Ion Ready
28 Nameplate
29 Decal information: Information as per German traffic regulations
30 Sticker panel: Battery service
31 Sticker panel: Regular testing
32 Sticker panel: VDE test

Rear of the platform tractor

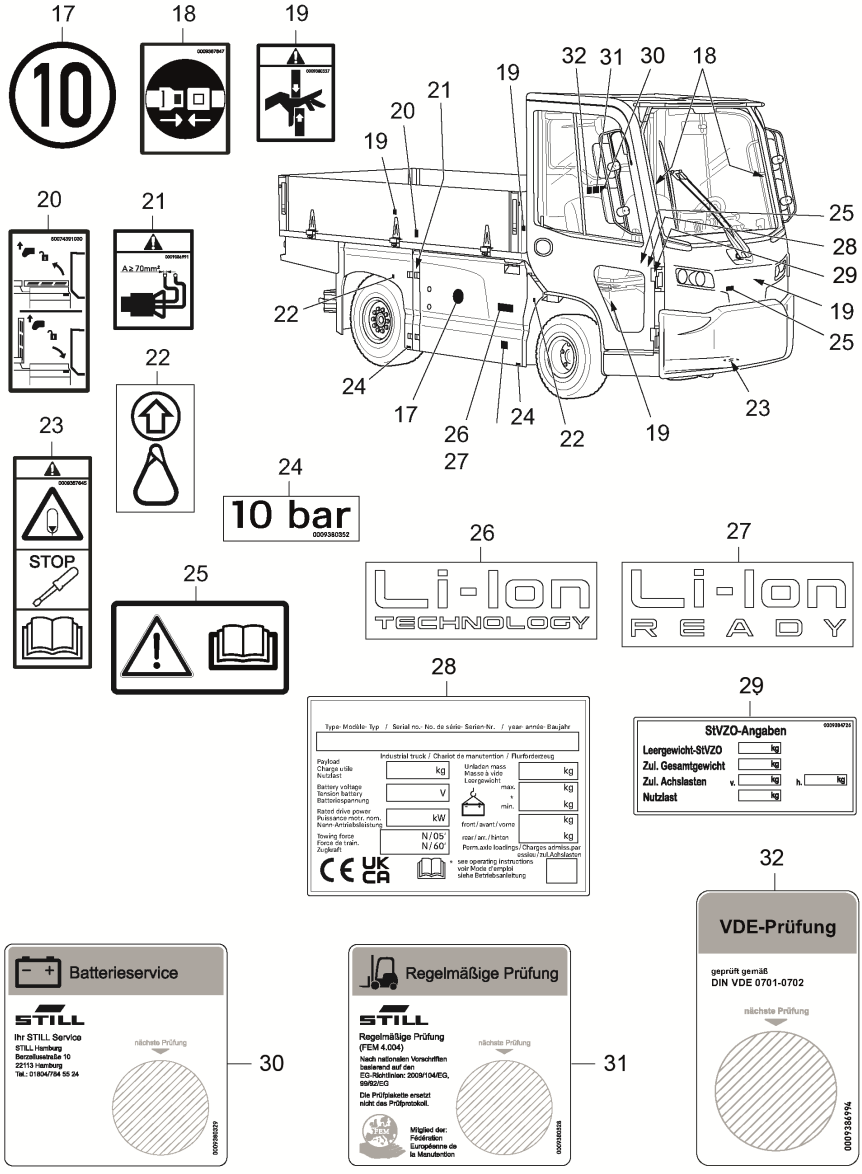


1 Marking as per German traffic regulations: Maximum speed
2 Decal information: Hydraulic oil tank
3 Warning sign: Risk of crushing
4
5 Decal information: Caution/Read the operating instructions
6 Decal information: Maximum towing load
7 Decal information: Lifting-gear fixing point
8 Decal information: Maximum towing load
9 Information sign: Li-Ion Technology
10 Information sign: Li-Ion Ready
11 Information sign: Reverse inching
12 Decal information: 12-V socket

13 Decal information: 24-V socket

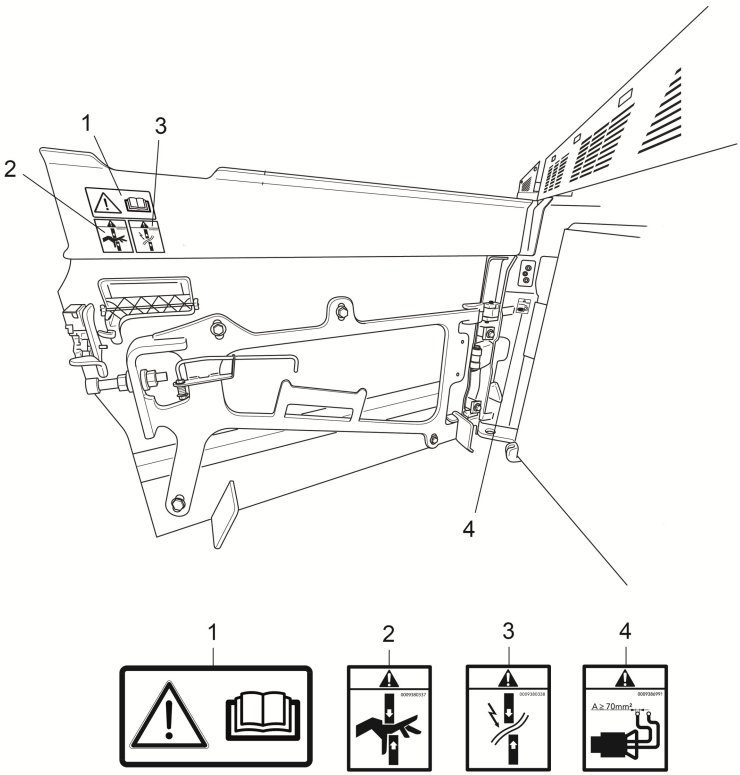
14 Decal information: Tyre pressure

Front of the platform tractor



17 Marking as per German traffic regulations: Maximum speed
18 Decal information: Close the seat belt (for aircraft ground support equipment)
19 Warning sign: Risk of crushing
20 Decal information: Battery hood interlock
21 Decal information: Cable cross-section of battery cable
22 Decal information: Lifting-gear fixing point
23
24 Decal information: Tyre pressure
25 Decal information: Caution/Read the operating instructions
26 Information sign: Li-Ion Technology
27 Information sign: Li-Ion Ready
28 Nameplate
29 Decal information: Information as per German traffic regulations
30 Sticker panel: Battery service
31 Sticker panel: Regular testing
32 Sticker panel: VDE test

Battery door/battery



1 Decal information: Caution/Read the operating instructions
2 Warning sign: Risk of crushing
3 Warning sign: Risk of shearing
4 Decal information: Cable cross-section of battery cable

Truck variants

Tow tractors

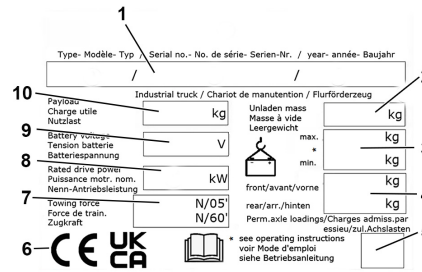
- 12 t / 18 t very short wheelbase
- 25 t short wheelbase
- 25 t long wheelbase
- 35 t very long wheelbase

Platform tractor

- 2 t long wheelbase
- 3 t long wheelbase

Nameplate

Variant 1: Platform tractors/tractors built up to 10/2025 ▷

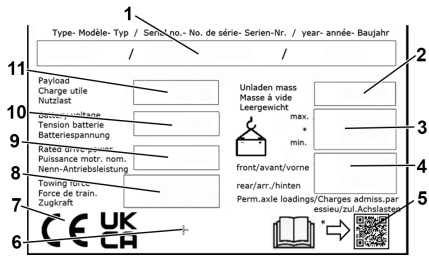


1 Model/serial no./year of manufacture
2 Tare weight
3 Max. battery weight/min. battery weight
4 Permissible front/rear axle loads
5 Data matrix code (contains the factory number of the industrial truck)
6 Conformity mark: CE mark for the markets of the EU, the EU candidate countries, the EFTA states and Switzerland. UKCA mark for the United Kingdom market. EAC mark for the Eurasian Economic Union market
7 Tractive force
8 Rated drive power
9 Battery voltage
10 Payload

NOTE

- *It is possible for there to be multiple conformity markings on the nameplate.*
- *The EAC mark may also be located in the immediate vicinity of the nameplate.*

Variant 2: Platform tractors/tractors built after 10/2025 ▷



1 Model/serial no./year of manufacture
2 Tare weight
3 Max. battery weight/min. battery weight
4 Permissible front/rear axle loads
5 QR code for digital operating instructions (contains the Internet address for the customer portal and the factory number of the industrial truck)*
6 Data matrix code (for logistics processes in the plant)
7 Conformity marking: CE mark for the markets of the EU, the EU candidate countries, the EFTA States and Switzerland; UKCA mark for the United Kingdom market; EAC mark for the Eurasian Economic Union market
8 Tractive force
9 Rated drive power
10 Battery voltage
11 Payload

*: Scan the QR code or enter the address **still-smart.com/QR/ms/XXXXXXXXXXXX** in an Internet browser.

XXXXXXXXXXX is a placeholder for the serial number.

NOTE

- *It is possible for there to be multiple conformity markings on the nameplate.*
- *The EAC mark may also be located in the immediate vicinity of the nameplate.*

Special case when used at airports

If the industrial truck is used at an airport, the vehicle designation on the nameplate reads:

"Aircraft groud equipment / Matériel au sol pour Aéroport / Luftfahrt-Bodengerät".

Using the industrial truck

Intended use

The industrial truck described in these operating instructions is suitable for towing and transporting loads.

The industrial truck must only be used for its intended purpose as set out and described in these operating instructions.

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

Improper use

The operating company or driver, and not the manufacturer, is liable for any hazards caused by inadmissible use; see the chapter entitled "Definition of terms used for responsible persons".

It is prohibited to use the truck for purposes other than those described in these operating instructions.

The industrial truck must not be operated in:

- Areas where there is a risk of explosion
- Areas that may cause corrosion
- Areas that are very dusty

Aside from the driver, a maximum of one additional person can ride on the passenger seat.

It is prohibited to carry people on the loading area.

Never carry passengers on a trailer if it has not been specifically designed for such a purpose.

Place of use

⚠ CAUTION

Batteries may freeze!

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

– When the ambient temperature is below -10 °C, park the industrial truck only for short periods of time.

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

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

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

Driving on uphill and downhill gradients is permitted as long as the defined data and specifications are observed; refer to the chapter entitled "Roadways". The industrial truck is suitable for indoor and outdoor use in countries ranging from the Tropics to Nordic regions (temperature range: -20°C to +40°C).

If the industrial truck is used in a cold store, it must be configured accordingly and, if necessary, approved for that environment.

The operating company must ensure that suitable fire protection is available for the relevant application in the surroundings of the industrial truck. Depending on the application, the operating company must ensure that additional fire protection is provided on the industrial truck. If in doubt, seek advice from the relevant supervisory authorities.

Information about the documentation

Scope of the documentation

- Original operating instructions (digital) for the industrial truck
- Original operating instructions for the display-operating unit
- Original operating instructions of the lithium-ion battery (variant)
- Operating instructions of the installed variants that are not mentioned in these original operating instructions
- "CO"-Operating instructions if a special version was ordered according to customer requirements (CO)

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

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

Serial no. .....

Year of manufacture.....

Please quote the serial number in all technical enquiries.

Each industrial truck is accompanied by a operating manual in digital form, which can be accessed via a QR code on the nameplate of the industrial truck. See the following chapter on the digital operating instructions.

If the operating instructions are lost, the operating company must obtain a replacement immediately. It is possible to obtain a replacement digitally. See the following chapter on the digital operating instructions.

These operating instructions must be known to the personnel who are tasked with operating and maintaining the industrial truck.

The operating company must ensure that all operators of the industrial truck have received, read and understood these instructions.

Store all documentation safely. If the industrial truck is passed on or sold, hand over all the documentation to the next operating company.

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

Digital operating instructions

According to the latest revision of the guidelines for the application of machinery directive 2006/42/EC, the original operating instructions no longer have to be supplied in paper form.

The operating instructions for the industrial truck and other relevant documents (e.g. spare parts catalogue) are available in the customer portal.

Procedure:

- Scan the QR code on the nameplate of the industrial truck, or
- Enter the address **still-smart.com/QR/ms/XXXXXXXXXXX** in an Internet browser.

NOTE

XXXXXXXXXXX is a placeholder for the serial number.

NOTE

To locate the QR code, see the section entitled "Nameplate".

Explanation of signal terms used

⚠ DANGER

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

⚠ WARNING

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

⚠ CAUTION

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

NOTE

For technical requirements that require special attention.

ENVIRONMENT NOTE

To prevent environmental damage.

Supplementary documentation

This industrial truck can be fitted with a **C**ustomer **O**ption (**CO**) that deviates from the standard equipment and the variants.

This CO may consist of:

- Special sensors
- A special attachment
- A special towing device
- Customised attachments

When fitted with a CO, the industrial truck is provided with additional documentation. This may take the form of an insert or separate operating instructions.

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

countermanded in this additional documentation.

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

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

Issue date and topicality of the operating instructions

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

We are constantly engaged in the further development of the industrial trucks. These operating instructions are subject to change, and no claims may be asserted on the basis of the information and/or illustrations contained in them.

If you require technical support for the industrial truck, please contact your authorised service centre.

List of abbreviations

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

Abbreviation	Meaning	Explanation
ArbSchG	Arbeitsschutzgesetz	German implementation of EU occupational health and safety directives
BetrSichV	Betriebssicherheitsverordnung	German implementation of the EU working equipment directive
BG	Berufsgenossenschaft	German insurance company for the company and employees
BGG	Berufsgenossenschaftlicher Grundsatz	German principles and test specifications for occupational health and safety
BGR	Berufsgenossenschaftliche Regel	German rules and recommendations for occupational health and safety
DGUV	Berufsgenossenschaftliche Vorschrift	German accident prevention regulations

Abbreviation	Meaning	Explanation
CE	Communauté Européenne	Confirms conformity with product-specific European directives (CE labelling)
CEE	Commission on the Rules for the Approval of the Electrical Equipment	International commission on the rules for the approval of electrical equipment
DC	Direct Current	Direct current
DFÜ	Datenfernübertragung	Remote data transfer
DIN	Deutsches Institut für Normung	German standardisation organisation
EG	European Community	
EN	European standard	
FEM	Fédération Européene de la Manutention	European Federation of Materials Handling and Storage Equipment
F_{max}	maximum Force	Maximum power
GAA	Gewerbeaufsichtsamt	German authority for monitoring/issuing regulations for worker protection, environmental protection, and consumer protection
GPRS	General Packet Radio Service	Transfer of data packets in wireless networks
ID no.	Identification number	
ISO	International Organization for Standardization	International standardisation organisation
K_{pA}	Uncertainty of measurement of sound pressure levels	
LAN	Local Area Network	Local area network
LED	Light Emitting Diode	Light emitting diode
L_p	Sound pressure level at the workplace	
L_{pAZ}	Average continuous sound pressure level in the driver's compartment	
LSP	Load centre of gravity	Distance of the centre of gravity of the load from the front face of the fork backs
MAK	Maximum workplace concentration	Maximum permissible air concentrations of a substance at the workplace
Max.	Maximum	Highest value of an amount
Min.	Minimum	Lowest value of an amount
PIN	Personal Identification Number	Personal identification number
PPE	Personal protective equipment	
SE	Super-Elastic	Superelastic tyres (solid rubber tyres)

Abbreviation	Meaning	Explanation
SIT	Snap-In Tyre	Tyres for simplified assembly, without loose rim parts
StVZO	Straßenverkehrs-Zulassungs-Ordnung	German regulations for approval of vehicles on public roads
TRGS	Technische Regel für Gefahrstoffe	Ordinance on hazardous materials applicable in the Federal Republic of Germany
UKCA	United Kingdom Conformity Assessed	Confirms conformity with the product-specific directives that apply in the United Kingdom (UKCA labelling)
VDE	Verband der Elektrotechnik Elektronik Informationstechnik e. V.	German technical/scientific association
VDI	Verein Deutscher Ingenieure	German technical/scientific association
VDMA	Verband Deutscher Maschinen- und Anlagenbau e. V.	German Mechanical Engineering Industry Association
WLAN	Wireless LAN	Wireless local area network

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Environmental considerations

Packaging

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

ENVIRONMENT NOTE

The packaging material must be properly disposed of after commissioning of the industrial truck.

Disposing of components and batteries

The industrial truck is made of different materials. With regard to replaced components or batteries, regional or national regulations of the country of use must be observed in the following situations:

- Disposal
- Handling
- Recycling

NOTE

Observe the battery manufacturer documentation when disposing of batteries.

ENVIRONMENT NOTE

We recommend working with a waste management company for disposal requirements.

2

Safety

Definition of responsible persons

Operating company

The operating company must ensure that the integrated attachment is only used for its intended purpose and in compliance with the safety regulations in these operating instructions.

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

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

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

We recommend that the national performance specifications are observed.

Specialist

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

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

industrial truck to be tested and the risk being assessed

Drivers

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

If the industrial truck is used in only internal traffic, the training of the driver according to BGG (German Employers' Liability Insurance Association principles) 925 meets the training requirements under §3 of the German Health and Safety at Work Act and §9 of the German Ordinance on Industrial Safety and Health. Observe national regulations for your country where applicable.

If the industrial truck is to be used with a German StVZO permit on public roads, the driver requires a C1 driving licence. In other countries, observe the national regulations.

Rights, duties and rules of behaviour for the driver

The driver must be trained in their rights and duties.

The driver must be granted the required rights.

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

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

The driver must:

- Have read and understood the operating instructions;
- Have familiarised themselves with safe operation of the industrial truck in traffic
- Be physically and psychologically able to drive the industrial truck safely in traffic

⚠ DANGER

Taking drugs, alcohol or medications that affect the responses of an individual limits the ability of that individual to drive the industrial truck!

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

Prohibition of use by unauthorised persons

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

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

Basic principles for safe operation

Insurance cover on company premises

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

NOTE

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

Modifications and retrofitting

If the industrial truck is used for work not listed in the directives or in these instructions and has to be converted or retrofitted accordingly, be aware that any modification to its structural state can affect the handling of the industrial truck, which in turn can cause accidents.

You must therefore contact your service centre in advance.

Changes that will adversely affect the handling or safety systems must not be made without approval from the manufacturer.

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

Changes to the brakes, steering, control elements, circumferential view, special equipment and attachments etc. must also not be made without prior written approval from the manufacturer.

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

In the event of the manufacturer going into liquidation and the company not being taken over by another legal entity, the operating

company can make changes to the industrial truck.

The operating company must also fulfil the following prerequisites:

- Design documents, test documents and assembly instructions associated with the modification must be permanently archived and remain accessible at all times.
- The capacity rating plate, the decal information, the hazard warnings and the operating instructions must be checked to ensure that they are consistent with the modifications and must be amended if required.
- The modification must be designed, checked and implemented by a design office that specialises in industrial trucks in accordance with the standards and directives valid at the time the modification is made.

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

- Type of modification
- Date of modification
- Name and address of the company that performed the modification

Non-original parts

Original parts, attachments and accessories are specially designed for this industrial truck. Please note that parts, attachments and accessories not supplied by the manufacturer have also not been tested or approved by the manufacturer.

⚠ CAUTION

Danger of damage to the industrial truck if non-original parts are used!

Installation and use of non-original parts may adversely affect the design features of the industrial truck and thus impair active and/or passive driving safety.

– Only use products that have been tested and approved by the manufacturer.
– The approval of the manufacturer and, if necessary, the relevant regulatory authorities must be obtained before installing non-original parts.

The manufacturer accepts no liability for any damage caused by the installation and use of non-original parts and accessories without approval.

Damage, defects and misuse of safety systems

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

Industrial trucks that are not safe for operation or for use on the road must not be used until they have been properly repaired.

Do not remove or deactivate safety systems and switches.

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

Work on the electrical system (e.g. connecting a radio, additional headlights etc.) is only permitted with the manufacturer's written approval. All work carried out on the electrical system must be documented. Contact the authorised service centre.

Tyres

The following factors can have a negative effect on the handling of the industrial truck and are therefore **prohibited**:

- Different tyres on the same axle, e.g. pneumatic tyres and superelastic tyres
- Tyres not approved by the manufacturer
- Excessive tyre wear

- Tyres of inferior quality
- Changing rim wheel parts
- Combining rim wheel parts from different manufacturers

The following rules must be observed to ensure safe handling:

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

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

– Contact the authorised service centre regarding this matter.

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

– Contact the authorised service centre regarding this matter.

Medical devices

⚠ WARNING

Electromagnetic interference may occur on medical devices!

Only use equipment that is sufficiently protected against electromagnetic interference.

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

– If a driver of the industrial truck or persons who regularly work in the vicinity of industrial trucks use such medical devices, a doctor or the manufacturer of the medical devices should confirm that these devices are

adequately protected from electromagnetic interference.

Exercise caution when handling gas springs and accumulators

⚠ WARNING

Danger of serious injury due to high gas spring pressure!

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

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

⚠ WARNING

Danger of serious injury from high accumulator pressure! In addition to the accumulator, parts of the brake system, such as the brake valve, are subject to high pressure.

– Depressurise the accumulator before starting work on it.
– Before working on the brakes, release the pressure from the brake system.
– Contact your service centre.

Residual risk

Residual dangers, residual risks

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

The industrial truck complies with the safety regulations currently in force. Nevertheless, some residual risk cannot be excluded, even when the truck is used for its intended purpose and all instructions are observed.

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

⚠ WARNING

Risk of accident due to non-observation of safety information!

All personnel working in the vicinity of the industrial truck must be instructed regarding the dangers that can arise through use of the industrial truck.

– Observe safety regulations in these operating instructions.

Risks can include:

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

The manufacturer shall not be liable for accidents involving the industrial truck caused by the failure of the operating company to comply with these regulations either intentionally or due to negligence.

Danger to employees

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

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

The result must be documented (§ 6 ArbSchG). In the case of applications involving similar hazard situations, it is permitted to summarise the results. This overview is designed to help to meet the requirements of this regulation. The overview specifies the primary hazards that, in the event of non-compliance, are the most frequent causes of accidents. If other major hazards are present as a result of the specific operating conditions, these hazards must also be taken into consideration.

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

Special risks associated with using the truck and attachments

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

Overview of hazards and countermeasures

NOTE

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

NOTE

Observe the national regulations for your country!

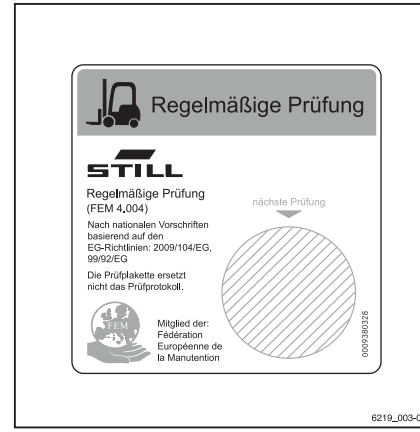
Hazard	Course of action	Notes	Check note √ done - Not applicable
Industrial truck equipment does not comply with local regulations	Testing	If in doubt, consult the responsible factory inspectorate or employers' liability insurance association	O
Driver's lack of skills or qualifications	Driver training (sit-on and stand-on)	DGUV principle 308-001 VDI 3313 driver's licence	O
Usage by unauthorised persons	Access with key only for authorised persons		O
Industrial truck not in safe operating condition	Periodic inspection and rectification of defects	German Ordinance on Industrial Safety and Health (BetrSichV)	O
Risk of falling when using working platforms	Compliance with national regulations (different national laws)	German Ordinance on Industrial Safety and Health (BetrSichV) and employer's liability insurance associations	O

Hazard	Course of action	Notes	Check note √ done - Not applicable
Impaired visibility due to load	Application planning	German Ordinance on Industrial Safety and Health (BetrSichV)	O
Contamination of breathable air	Assessment of diesel exhaust gases	Technical Regulations for Hazardous Substances (TRGS) 554 and the German Ordinance on Industrial Safety and Health (BetrSichV)	O
	Assessment of LPG exhaust gases	German threshold limit values list (MAK-Liste) and the German Ordinance on Industrial Safety and Health (BetrSichV)	O
Impermissible usage (improper usage)	Provide operating instructions	German Ordinance on Industrial Safety and Health (BetrSichV) and German Health and labour protection law (ArbSchG)	O
	Written notice of instruction to driver	German Ordinance on Industrial Safety and Health (BetrSichV) and German Health and labour protection law (ArbSchG)	O
	German Ordinance on Industrial Safety and Health (BetrSichV), observe the operating instructions		O
When fuelling			
a) Diesel	German Ordinance on Industrial Safety and Health (BetrSichV), observe the operating instructions		O
b) LPG	DGUV regulation 79, observe the operating instructions		O

Hazard	Course of action	Notes	Check note √ done - Not applicable
When charging the drive battery	German Ordinance on Industrial Safety and Health (BetrSichV), observe the operating instructions	VDE 0510-47 (= DIN EN 62485-3): In particular - Ensure adequate ventilation - Insulation value within the permissible range	O
When using battery chargers	German Ordinance on Industrial Safety and Health (BetrSichV), DGUV rule 113-001 and observe the operating instructions	German Ordinance on Industrial Safety and Health (BetrSichV) and DGUV rule 113-001	O
When parking LPG trucks	German Ordinance on Industrial Safety and Health (BetrSichV), DGUV rule 113-001 and observe the operating instructions	German Ordinance on Industrial Safety and Health (BetrSichV) and DGUV rule 113-001	O
When operating driverless transport systems			
Roadway quality inadequate	Clean/clear roadways	German Ordinance on Industrial Safety and Health (BetrSichV)	O
Loading equipment incorrect/slipped	Reposition load on pallet	German Ordinance on Industrial Safety and Health (BetrSichV)	O
Unpredictable driving behaviour	Employee training	German Ordinance on Industrial Safety and Health (BetrSichV)	O
Roadways blocked	Mark roadways Keep roadways clear	German Ordinance on Industrial Safety and Health (BetrSichV)	O
Roadways intersect	Announce right-of-way rule	German Ordinance on Industrial Safety and Health (BetrSichV)	O
No person detection when placing goods into stock and removing goods from stock	Employee training	German Ordinance on Industrial Safety and Health (BetrSichV)	O

Safety tests

Carrying out regular testing on the industrial truck ▷



The operating company must ensure that the industrial truck is checked by a competent person at least once a year or following unusual incidents.

As part of this testing, a complete check of the technical condition of the industrial truck must be performed with regard to accident safety. Furthermore, the industrial truck must be thoroughly checked for damage that could have been caused by improper use. A test log must be created. The results of the testing must be retained at least until a further two inspections have been carried out.

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

– Arrange for the authorised service centre to perform regular testing on the industrial truck.

– Observe the guidelines regarding inspection work on industrial trucks as specified by FEM 4.004.

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

– Notify the authorised service centre.

NOTE

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

Insulation testing

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

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

– For insulation testing, contact the authorised service centre.

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

NOTE

The electrical system of the industrial truck and the drive batteries must be checked separately.

Test values for the drive battery

Component	Recommended test voltage	Measurements		Nominal voltage U_{Batt}	Test values
Battery	50 VDC	Batt+ Batt-	Battery tray	24 V	> 1200 Ω
	100 VDC			48 V	> 2400 Ω
	100 VDC			80 V	> 4000 Ω

Test values for the industrial truck

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

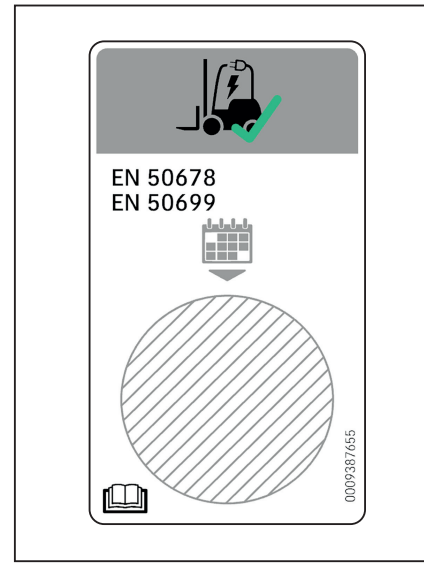
Regularly testing the electrical safety

The on-board charger and the associated charging cable must be tested at least once a year. This test must be carried out in accordance with the national regulations for the country of use (e.g. DIN EN 50678 & DIN EN 50699 in Germany). Contact the authorised service centre regarding this matter.

The test sticker is glued to the sticker panel by the testing technician. The due date for the next testing is always at the top of the sticker.

– Before each use, check the charging cable for damage.

– Do **not** use a damaged charging cable.



Safety regulations for handling consumables

Permissible consumables

⚠ DANGER

Risk of death or injury or damage to the environment due to disregard of safety regulations!

– Always observe safety regulations when handling consumables.

Refer to the maintenance data table for the permissible consumables that are necessary for operation (see the chapter "Recommended lubricants").

Battery

Battery acid



⚠ WARNING

Battery acid contains dissolved sulphuric acid. This is toxic.

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



⚠ WARNING

Battery acid contains dissolved sulphuric acid. This is corrosive.

– When working with battery acid, always wear a protection suit and eye protection.
– When working with battery acid, never wear a watch or any jewellery.
– Do not allow any acid to get onto clothing or skin or into the eyes; if this does happen, rinse immediately with plenty of clean water.
– In case of injury, seek medical advice immediately.
– Immediately rinse away any spilled battery acid with plenty of water
– Follow the statutory regulations.

ENVIRONMENT NOTE

– Dispose of used battery acid in line with regulations.

Flammable gases



⚠ GEFAHR

Risk of explosion due to flammable gases!

During charging, the battery releases a mixture of oxygen and hydrogen (explosive gas). This gas mixture is explosive and must not be ignited.

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

Oils



⚠ DANGER

Oils are flammable!

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



⚠ DANGER

Oils are toxic!

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



⚠ WARNING

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

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

⚠ WARNING

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

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

ENVIRONMENT NOTE

Oil is a water-polluting substance!

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

Hydraulic fluid



⚠ WARNING

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

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



⚠ WARNING

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

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

ENVIRONMENT NOTE

Hydraulic fluid is a water-polluting substance.

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

Disposal of consumables

ENVIRONMENT NOTE

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

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

Emissions

Vibration

The vibrations of the industrial truck must be determined on a machine in accordance with the standard EN 13059 "Safety of industrial trucks — Test methods for measuring vibration". The highest effective value of the weighted acceleration of whole-body vibration transmitted over the seat surface is:

Tow tractor (Continental RV20 pneumatic tyres)	0.21 m/s^2
Tow tractor (Continental SC20 SE tyres)	0.26 m/s^2
Platform tractor (Michelin pneumatic tyres, MSG 65 seat)	0.19 m/s^2
Platform tractor (Michelin pneumatic tyres, MSG 75 seat)	0.22 m/s^2
Platform tractor (SE tyre, MSG 65 seat)	0.17 m/s^2
Platform tractor (SE tyre, MSG 75 seat)	0.21 m/s^2
Uncertainty	Value was not yet available at the time of printing

The individual vibration load on the driver over the course of a working day must be determined in accordance with **Directive 2002/44/EC** by the operating company, see the chapter entitled "Responsible persons", at the actual place of use to ensure that all additional factors, such as the driving route, intensity of use etc., are considered. Observe the applicable national regulations in non-EU countries.

Noise emissions

The values were determined on the basis of measuring procedures from the EN 12053 standard (noise measurement for industrial trucks based on EN 12001 and EN ISO 3744 and the requirements of EN ISO 4871).

This industrial truck emits the following sound pressure level:

The A-weighted averaged emission sound pressure level at the driver's position is as follows:

Tow tractor	62 dB (A)
Platform tractor	59.8 dB (A)
Uncertainty	

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

However, the indicated noise levels at the industrial truck cannot be used to determine the noise emissions at workplaces according to the most recent version of Directive 2003/10/EC (daily personal noise exposure level). If necessary, these values should be determined directly at the workplace in the actual conditions that are present there (additional noise sources, special application conditions, sound reflections).

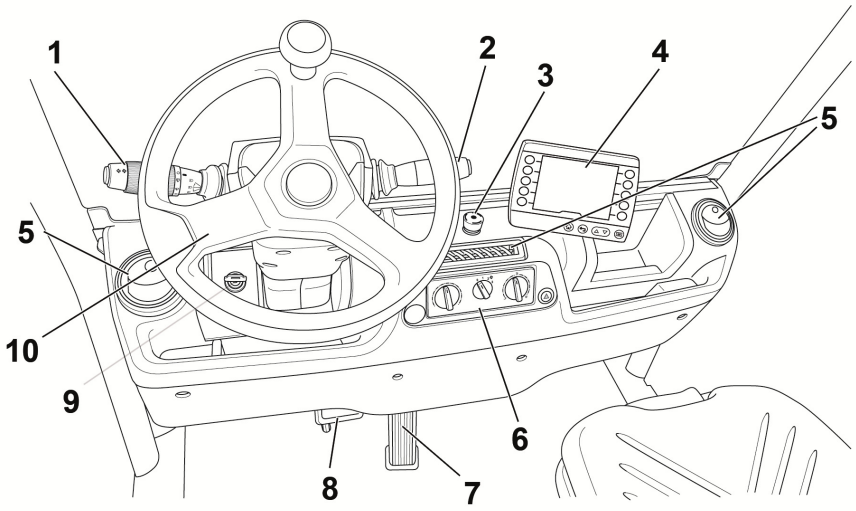
NOTE

Due to environmental conditions, the above figures may vary during operation of the truck.

3

Overviews

Driver's compartment

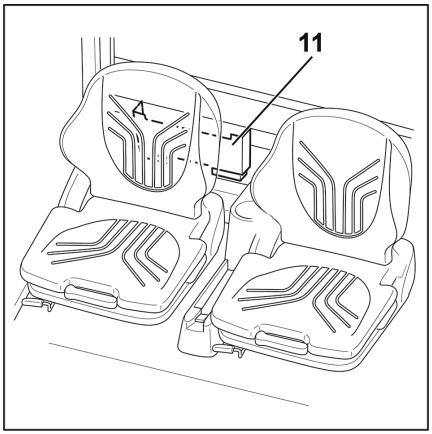


1	Operating lever for the lighting/windscreen wiper	6	Operating devices for the heating system and blower/air conditioning (variant)
2	Drive direction selection lever	7	Accelerator pedal
3	Emergency off switch	8	Brake pedal
4	Display-operating unit	9	Key switch
5	Air outlets for the heating system and blower/air conditioning (variant)	10	Steering wheel

NOTE

In the right-hand drive variant, the steering wheel (10) and the pedal group (7 und 8) are mounted on the right-hand side of the driver's cab. Parts (1), (2) and (4) are mounted in a mirror image.

▷

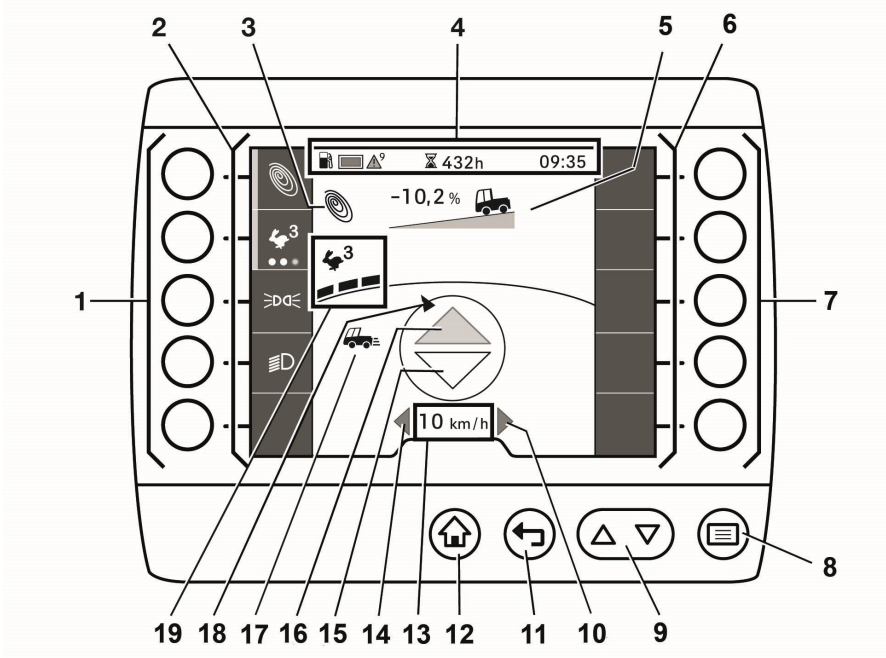


NOTE

The industrial truck equipment may differ from the equipment shown.

11 Storage compartment for the operating instructions

Display/control unit



1 Left softkey bar
2 Left-hand favourites bar
3 Blue-Q symbol, appears when the Blue-Q function is activated
4 Status bar: battery charge, operating hours, time
5 Display of uphill/downhill gradients with actual value of the uphill/downhill gradient travelled in %. A negative sign stands for downhill gradients, a positive sign stands for uphill gradients.
6 Right-hand favourites bar
7 Right softkey bar
8 Menu button
9 Scrolling buttons
10 "Right" turn indicator display
11 Back button
12 Main-display button
13 Driving speed or parking brake display Ⓟ
14 "Left" turn indicator display
15 "Reverse" drive direction indicator
16 "Forward" drive direction indicator
17 Energy mode display, here "sprint mode"
18 Display for direction of movement of the industrial truck
19 Selected drive programme with driving dynamics display

4

Operation

Checks and tasks before daily use

Visual inspections and function checking

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

Component	Action
Chassis, bodywork and fittings	Check the industrial truck for any loose panelling and covers. Remove any loose items left on the industrial truck. If the platform tractor is equipped with a tarpaulin cover, remove any water and ice from the tarpaulin before driving. Remove any snow from the roof of the driver's cab, the loading surface and the rear flap. **Do not** remove any snow that has penetrated the technical compartment under the rear flap. When attempting to clean with a bucket or broom, lines or contacts may be damaged or broken off. Wait for the snow to melt.
Tow coupling	Check the function of the tow coupling. If the coupling is engaged and disengaged more than 2 - 3 times per shift, the coupling must be relubricated at the lubricating nipple. When doing so, observe the manufacturer's operating instructions. Perform a visual inspection for deformation and wear (for example: bent, torn, broken). Check the function of the automatic coupling (variant).
Underside	Check the area under the industrial truck for leaking consumables.
Brakes	Check the function of the parking brake and service brake.
Steering	Check the function of the steering system.
Wheels, tyres	Perform a visual inspection for wear and damage. Make sure that only rims of the same type from the same manufacturer are fitted. In the event of uneven tyre wear, replace tyres in pairs. Observe the safety regulations in the section entitled "Tyres". Check the wheel nuts. If necessary, check the tyre pressures.

Component	Action
Cab	Perform a visual inspection for integrity. Ensure cleanliness (also free of ice). Clean fogged, dirty or icy windows before driving. Check that the handholds are securely mounted. Check the doors for damage and functionality. Check the condition and function of the driver's seat and seat belt. The entire footwell must be clean and free of ice. Remove dangerous and slippery substances before driving. Remove any objects from the footwell that may wedge behind the pedals and block them. Check that the operating devices of the heating system (blower control and air flap control) are working correctly.
Steps	Make sure that they are clean (free of ice, not slippery).
Operating devices	Check that the steering column is in the correct position and is secure.
Battery male connector and plug connection	Inspect the battery male connector and the plug connection for moisture or any foreign objects that may have become lodged and remove as necessary, e.g. using compressed air. Perform a visual inspection for integrity and deformation. Check the contacts. Have damaged battery male connectors replaced by the authorised service centre.
Battery	Check the charge state of the battery. Check that the battery interlock is in good condition and is working correctly.
Emergency off switch	Check for correct function.
Seat switch	Check for correct function.
Lighting	Check the function of the lighting: driving lights, turn indicators and all additional lights such as working spotlights or rotating beacons
Hydraulics	Check the hydraulic oil level.
Protective devices, guard grilles and brackets	Visually check for integrity and correct operation.
Corona electrode (for "non-marking" tyres). Position: on the left of the rear axle.	Check for integrity. Remove any dirt. The discharge wires of the corona electrode should touch the floor if possible. They can then discharge energy most effectively.

Checking the condition of the wheels and tyres

⚠ WARNING

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

– Worn or damaged tyres (left or right) must be replaced immediately.

NOTE

Only the tyre types approved for this industrial truck may be used, see the chapter entitled "Technical data".

– Check the tyres for wear and damage.
– Make sure that only rims of the same type from the same manufacturer are fitted.
– In the event of uneven tyre wear, replace both tyres.
– Observe the safety regulations in the section entitled "Tyres".

Checking the wheel-fastening screws

⚠ WARNING

Risk of accident from loose wheel-fastening screws!

Within the first 50 operating hours of receiving the industrial truck or after changing a wheel, it is imperative to check the tightening torques of the wheel-fastening screws and to check that they are complete and securely fitted.

– Check that the wheel-fastening screws are complete and securely fitted.
– Tighten the wheel-fastening screws crosswise. Use the following tightening torques:

Steering axle: 195 Nm

Drive axle: 425 Nm

NOTE

If the wheel-fastening screws need to be re-tightened to the correct tightening torque, they must be checked again after 50 hours. Repeat this procedure every 50 hours until the correct tightening torque is consistently maintained.

Checking tyre pressures

If the industrial truck is equipped with pneumatic tyres, the tyre pressures at the front and rear must be checked before each shift starts.

Tow tractor (very short wheelbase)	Front / rear: 10 bar
Tow tractor (short wheelbase)	
Tow tractor (long wheelbase)	
Tow tractor (very long wheelbase)	
Platform tractor (long wheel base)	

NOTE

Depending on the application, tyre pressures may differ from those stated above. Please refer to the tyre pressure labels on the truck.

Check the service brake for correct function ▷

⚠ DANGER

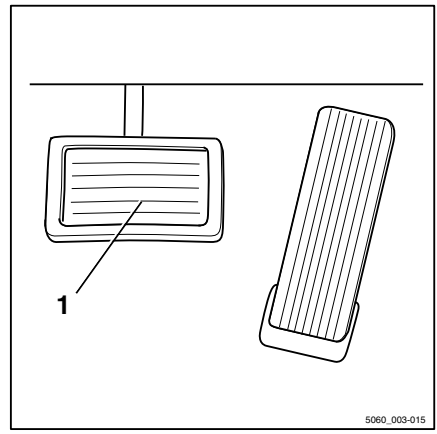
If the brake system fails, the industrial truck will be insufficiently braked. Risk of accident!

– **Do not** operate the industrial truck with a defective brake system.

Checking the service brake

– Release the parking brake.

– Press the brake pedal (1).



The pedal must have a slight pedal clearance. The brake must then have a noticeable pressure point.

– Accelerate the unladen industrial truck in a clear area.

– Press the brake pedal (1) firmly.

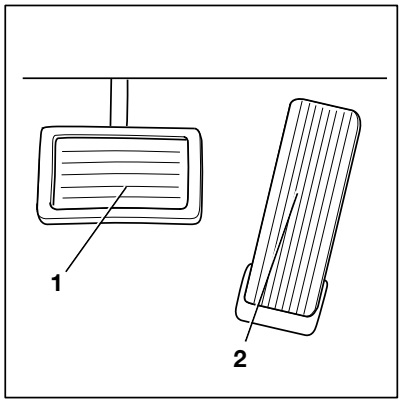
The industrial truck must decelerate noticeably.

⚠ CAUTION

If the pressure point of the service brake is felt with a noticeable delay, the brake pipe probably has a leakage or contains air.

– Do not move the industrial truck; call the authorised service centre.

Checking the regenerative brake ▷



⚠ DANGER

Risk of accident!

The regenerative brake may not be sufficient for emergency braking.

– Always actuate the brake pedal (1) for emergency braking.

⚠ DANGER

Risk of accident due to excessive speed!

Depending on the charging state of the battery, regenerative braking may be insufficient for downhill driving, meaning that the permissible maximum speed of the truck is exceeded.

In this case, an acoustic and a visual alarm in the display of the display unit indicates that the permissible maximum speed has been exceeded.

– Actuate the brake pedal (1).

The industrial truck is braked electrically if the driving speed is lowered or the opposite drive direction is selected.

– Release the accelerator pedal (2).

– The industrial truck must brake immediately until it comes to a standstill.

Checking the parking brake

On an uphill gradient or a ramp

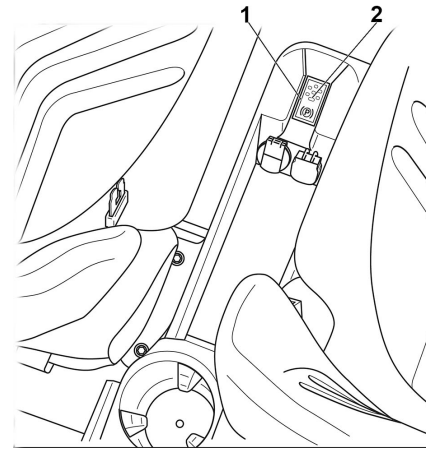


⚠ DANGER

Risk of fatal injury from being run over if the industrial truck rolls away.

– Do not exit the industrial truck during the following check.

– Stop the industrial truck on a steep uphill gradient (e.g. a ramp) and actuate the parking brake. To do this, actuate the push button (1) in the centre console. The parking brake engages audibly and the LED (2) in the push button starts to light up.



The parking brake must hold the industrial truck on the incline.

– If the industrial truck rolls back despite the parking brake being applied, notify the authorised service centre.

On level ground

– Find a sufficiently large, open area in which no other traffic will be obstructed.

– Accelerate the industrial truck to walking speed.

– Press the emergency off switch. The parking brake is applied.

The industrial truck must decelerate and remain stationary.

⚠ WARNING

Risk of accident!

The industrial truck can slow down jerkily.

– Use the restraint systems.

– If the industrial truck only coasts and does not decelerate or decelerates only slightly, unlock the emergency off switch and stop the industrial truck using the service brake.

– Secure the industrial truck with wedges so that it cannot roll away.

– Contact the authorised service centre.

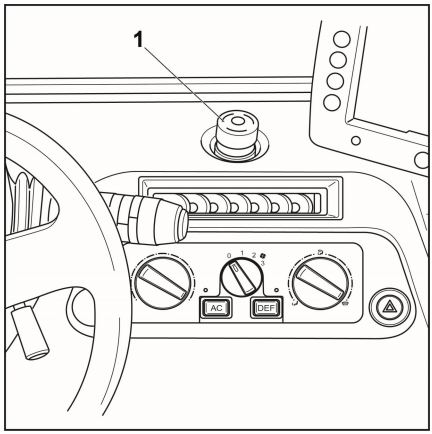
Checking the emergency off switch

⚠ WARNING

If the emergency off switch is pressed, the service brake will not operate. The parking brake is applied automatically and brakes the truck to a standstill.

- Do **not** actuate the emergency off switch to stop the truck.
- Only actuate the emergency off switch to disconnect the power supply in an emergency.

- Drive the industrial truck forward slowly.
- Push the emergency off switch (1). ▷



The parking brake is applied. The industrial truck brakes to a standstill.

The warning light for the active parking brake in the display unit lights up.

- Turn the emergency off switch clockwise to unlock it.
- Release the parking brake.

Checking the functions of the interlock

⚠ DANGER

Risk of accident in case of malfunction!

Interlock changes impair truck safety.

- Never make changes to interlocks.
- Always check that the interlock is operating correctly before starting your shift or taking over a truck.

Before starting your shift or taking over a truck from someone else, a visual inspection and function check must be conducted on the following interlock functions:

- Key switch
- Emergency off switch
- Parking brake switch
- Seat switch
- Interlock switch of the battery door

If one of the interlock switches does not function correctly or safely, report it to a superior or the responsible fleet manager immediately so that they can have the defect rectified.

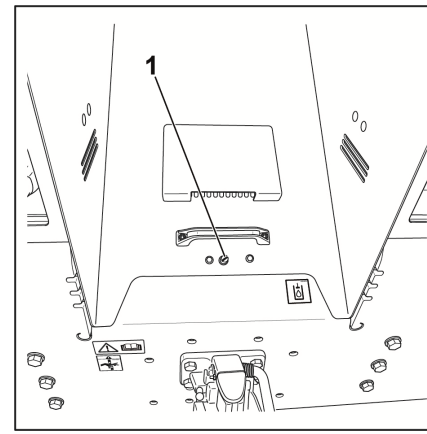
NOTE

Additional interlock switches may be fitted for any attachments. These switches must be checked for correct and safe operation.

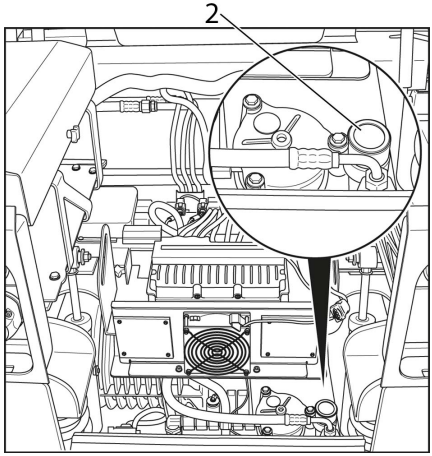
Check the hydraulic oil level

Tow tractors

– Open the rear flap. To do this, turn the slotted screw (1) anti-clockwise and pull the rear flap upwards. ▷



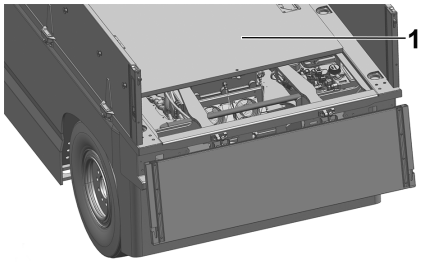
– Pull out the breather filter with the dipstick (2) and check the hydraulic oil level. ▷



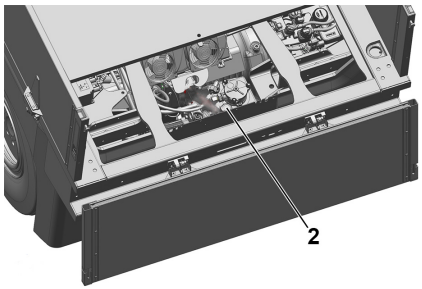
Platform tractor

– Open and fold down the rear folding platform panel of the load platform. See the chapter entitled "Opening and closing the platform panels".

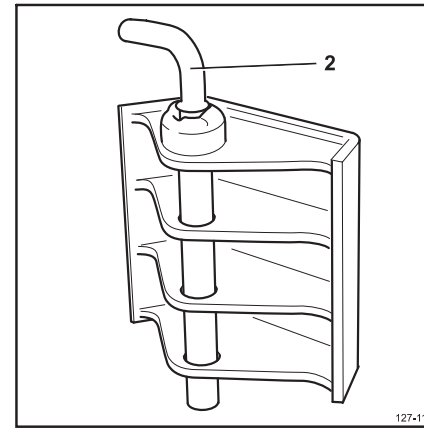
– Lift the rear platform cover (1) and move it in the drive direction. ▷



– Pull out the breather filter with the dipstick (2) and check the hydraulic oil level. ▷



Checking the manual tow coupling (variant)



⚠ WARNING

Risk of trapping or crushing!

– Do not reach into the open coupling.

NOTE

If the coupling is engaged and disengaged more than 2-3 times per shift, the coupling must be relubricated.

– Push the towing pin (2) downwards, turn the pin by 90° and pull the pin out.
– Check towing pin for damage.
– Clean any debris from the locating hole.
– Insert towing pin, push it downwards against the pressure of the locking spring, rotate 90° and lock it in place.

Checking the automatic tow coupling (variant)

⚠ WARNING

Risk of trapping or crushing.

– Ensure that the coupling is closed before carrying out any maintenance work on the coupling.
– Do not reach into the open coupling.

NOTE

If the coupling is engaged and disengaged more than 2–3 times per shift, the coupling must be relubricated using the lubricating nipple.

– Check the coupling pin (1) for damage.
– Clean any dirt from the coupling.
– Make sure that the closed coupling pin is engaged in the mounting hole (2).

Lubricating the automatic tow coupling (variant) ▷

⚠ WARNING

Risk of trapping or crushing.

- Always close the coupling before carrying out any maintenance work on the coupling. See the sections on automatic tow couplings in the chapter "Trailer and load".
- Do not reach into the open coupling.

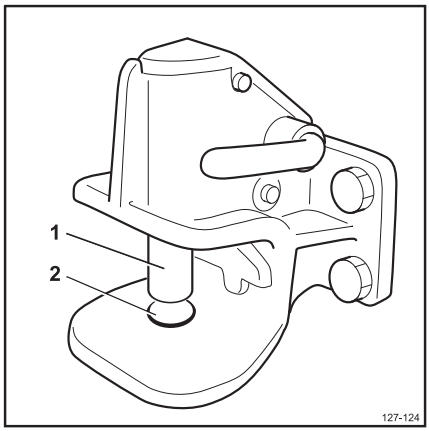
NOTE

If the coupling is engaged and disengaged more than 2–3 times per shift, the coupling must be relubricated using the lubricating nipple every day.

NOTE

Always grease the tow coupling after cleaning it. Use lubricating grease as specified in the chapter entitled "Maintenance data table". It is better to apply a little grease to the tow coupling frequently than to apply a lot of grease infrequently.

- Re-lubricate the coupling using the lubricating nipples. The number of lubricating nipples may vary depending on the type of tow coupling. When doing so, observe the manufacturer's operating instructions.
- Grease the coupling pin (1) and the area around the mounting hole (2).



This is a schematic view of a tow coupling. Details of the tow coupling actually installed may differ.

Adjusting the steering column

⚠ DANGER

Increased risk of accident from sudden adjustment of the steering column!

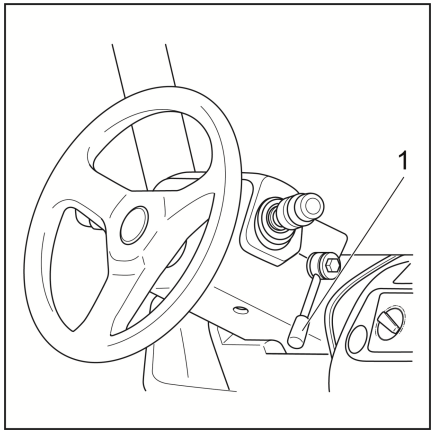
Adjustment while driving can lead to uncontrolled movements of the truck.

- Never make adjustments while driving.
- Always adjust the steering column so that all operating devices can be actuated safely.
- Ensure that the adjusted steering column is engaged.

- Sit in the driver's seat.

– Loosen the adjustment lever (1) for the steering column. Hold the steering wheel firmly while doing so.
– Raise the steering column to the desired height and adjust the tilt as desired.
– Secure the adjustment lever (1) again.
– Ensure that the steering wheel is securely engaged.
– Check the steering play. If the steering has too much play, contact the authorised service centre to have the steering adjusted.

▷



Driver's seat

Adjusting the driver's seat

⚠ WARNING

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

The inadvertent adjustment of the seat or of the seat backrest can lead to uncontrolled movements by the driver. The steering or the operating devices can then be actuated unintentionally. This can cause the industrial truck to move in an uncontrolled manner.

- **Do not** move the seat or the seat backrest while the truck is in motion.
- Adjust the seat and the seat backrest so that all operating devices can be reached and actuated safely.
- Ensure that the seat and the seat backrest are securely engaged.



⚠ WARNING

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

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

NOTE

Observe any separate operating instructions for the seat.

⚠ WARNING

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

- To avoid injuries, keep the swivel area of the seat clear of objects.

BF8-4 driver's seat

NOTE

The BF8-4 driver's seat is approved for persons weighing up to 160 kg.

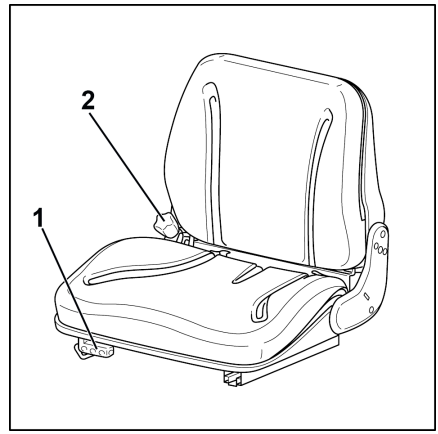
Moving the seat

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

Adjusting the seat backrest

Do not load the seat backrest while it is being adjusted.

– Turn the turning knob (2) to the left or right to move the seat backrest forwards or backwards into the desired position.



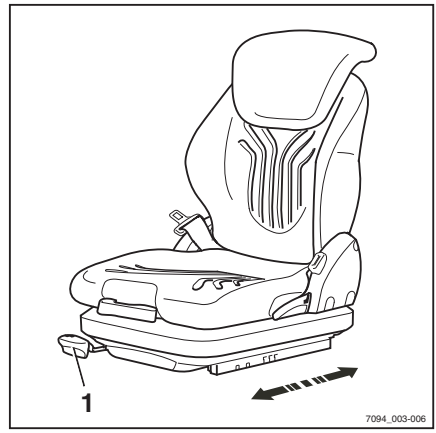
MSG 65/MSG 75 driver's seat

Moving the seat

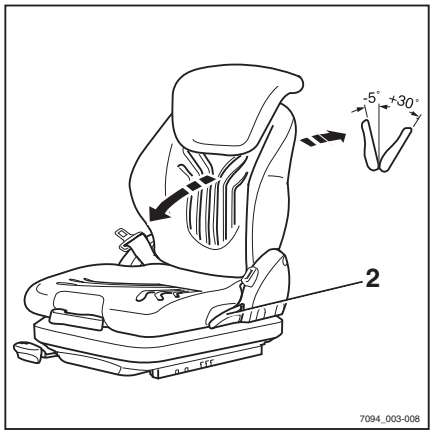
– Raise the lever (1) and hold it in position. ▷
– Push the driver's seat into the required position.
– Release the lever.
– Ensure that the driver's seat is securely engaged.

Adjusting the seat backrest

Do not load the seat backrest while it is being adjusted.



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



NOTE

The backwards tilt angle of the seat backrest can be restricted due to the structure of the industrial truck.

Adjusting the seat suspension

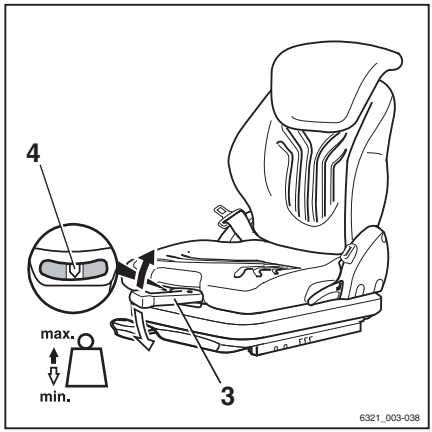
NOTE

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

NOTE

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

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



NOTE

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

Adjusting the MSG 75 E seat suspension

NOTE

The MSG 75 E driver's seat is designed for persons weighing between 45 kg and 160 kg. It is equipped with electrical air suspension that automatically adjusts to the driver's weight.

– Sit on the driver's seat.

– Turn the key switch to the "I" position.

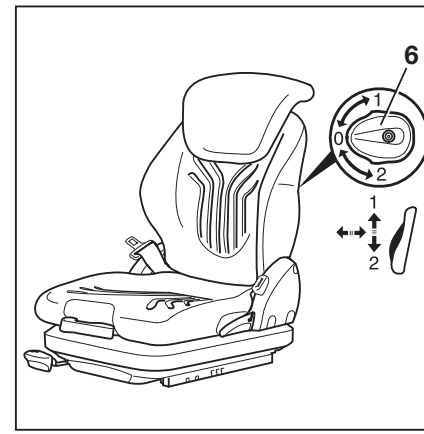
The seat automatically adjusts to the driver's weight.

Adjusting the lumbar support (variant) ▷

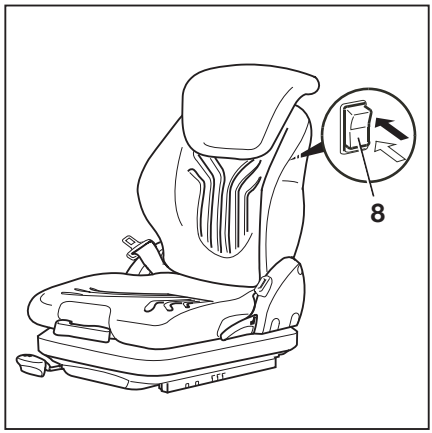
NOTE

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

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



Switching the seat heater (variant) on and off



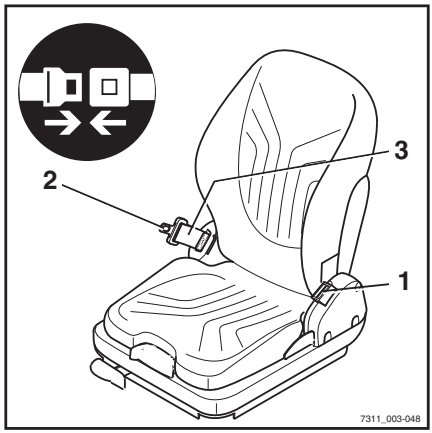
NOTE

The seat heater only works if the driver is sitting on the driver's seat.

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

Seat belt (variant)

Fastening the seat belt



CAUTION

A fastened seat belt provides additional safety in the event of an accident. If the industrial truck hits an obstacle, an unsecured person can be thrown out of the vehicle.

Therefore, you are advised as follows:

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

NOTE

Operating in airports

- *If the industrial truck is used on an airport site, the law requires drivers and passengers to wear a seat belt at all times.*

NOTE

The buckle has a buckle switch. If the belt has not been fastened, the following will occur:

- *The message* `Close seat belt` *appears on the display-operating unit.*
- *The industrial truck will not drive faster than 4 km/h.*

– Pull the seat belt (3) smoothly out of the belt retractor and fasten closely around the body over the thighs.

NOTE

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

– Click the belt tongue (2) into the buckle (1).

– Check the tension of the seat belt. The belt should fit closely around your body.

Fastening the belt on a steep slope

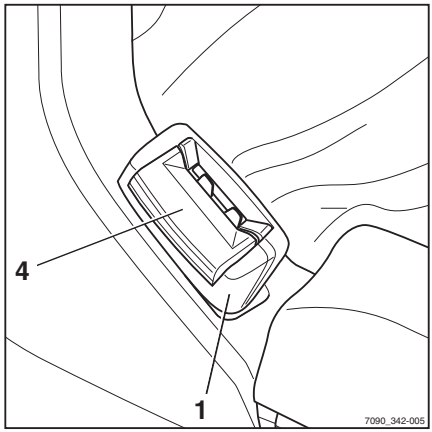
The automatic blocking mechanism prevents the belt from being extended whenever the truck is positioned on a steep slope. It is no longer possible to pull the seat belt out of the belt retractor.

– Move away from the slope carefully.

– Fasten the seat belt.

Releasing the seat belt

– Push the red button (4) on the buckle (1). ▷
– Slowly guide the belt tongue back to the retractor by hand.



NOTE

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

– Pull the seat belt sharply out of the retractor by around 10 to 15 mm to disengage the blocking mechanism.
– Slowly allow the seat belt to retract again.
– Protect the seat belt from dirt, for example, by covering it.

Malfunction due to cold conditions

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

⚠ CAUTION

The seat belt can be damaged by heat.

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

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

Switching on

Switching on the key switch

⚠ WARNING

Automatic brake function test.

When the industrial truck is switched on, the service brake performs an automatic self test. The brake is applied without the driver depressing the brake pedal.

– Therefore, the brake system must **not** be opened before the truck is switched on, e.g. to bleed it.

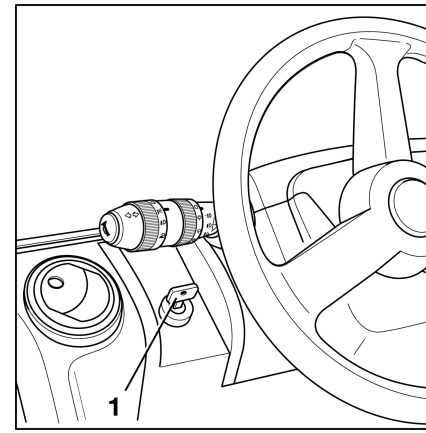
⚠ WARNING

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

– Perform the visual inspections and function checking.

– Do not operate the industrial truck if defects have been detected; contact the authorised service centre.

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



NOTE

If the industrial truck is equipped with the "Access authorisation with PIN code" variant, the display initially changes to the input menu for access authorisation. See the chapter entitled "Access authorisation with PIN code".

Once the industrial truck is ready for operation, the main display appears on the display of the display-operating unit. See the chapter entitled "Overviews".

Switching on via push button (variant)

⚠ WARNING

Automatic brake function test.

When the industrial truck is switched on, the service brake performs an automatic self test. The brake is applied without the driver depressing the brake pedal.

– Therefore, the brake system must **not** be opened before the truck is switched on, e.g. to bleed it.

⚠ WARNING

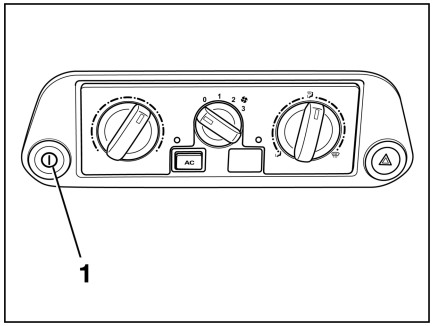
Before switching on the industrial truck, all checks and tasks required before daily use must have been performed without any defects being identified.

– Perform the visual inspections and function checking.

– Do not operate the industrial truck if defects have been detected; contact the authorised service centre.

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

– To switch on the truck, press the push button (1) or sit on the driver's seat. A message on the display-operating unit asks the operator to place the "FleetManager" card in position or to enter the PIN code. See the chapter entitled "Access authorisation with PIN code" or the "FleetManager" operating instructions. ▷



Authorisation via the "FleetManager" card or the PIN code must take place within a specified period of time:

- If you are not sitting in the driver's seat, within 30 seconds.
- If you are sitting in the driver's seat, within 60 seconds.

If this does not happen, the industrial truck switches off again.

If authorisation was successful, the industrial truck is ready for operation. The main screen is shown on the display.

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

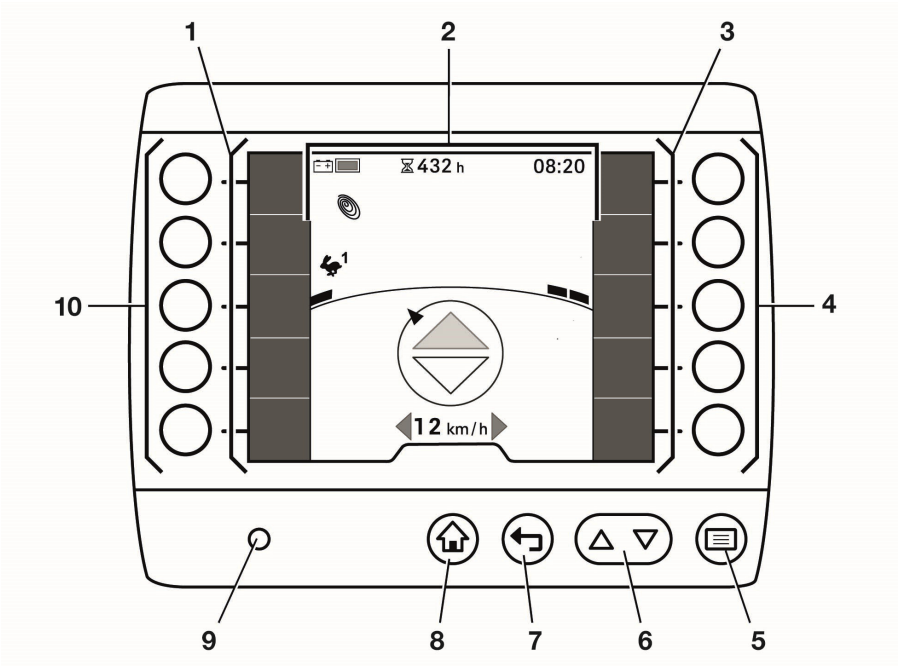
FleetManager — logging in and logging off

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

* Variant

Display-operating unit

Operating the display-operating unit



The display-operating unit is operated using the control and enter keys (5...8) and the soft-keys (4, 10). The display (2) shows information about the current driving programme, load programme and the configuration of the favourites bars (1, 3). The brightness sensor (9) automatically adjusts the brightness of the display based on the truck's surroundings.

Functions of the control and enter keys

Designation	Position	Functions
Softkeys	4, 10	The softkeys correspond to the adjacent functions or input options. If functions have been stored in the favourites bars (1, 3), these functions can be switched on and off by pressing the adjacent softkey. In addition to switching functions on and off, the soft keys on the right (3) navigate through the menu structure. These soft keys are also used to select actions.
Menu button	5	The menu button opens the first level of the menu. If a deeper navigation level is currently selected, this button takes you back to the first menu level. When using the settings menus, the menu button saves input.
Scrolling buttons	6	The scrolling buttons allow you to scroll up and down menu items within a menu level. This button clears input entered in the settings menus. This button switches between upper case and lower case for alphanumeric entries.
Back button	7	When the back button is pressed, the display switches to the next menu level up. This button cancels input entered in the settings menus.
Main display button	8	Pressing the main display button at any menu level takes you directly back to the main display.
Brightness sensor	9	Adjusts the display brightness to suit the ambient lighting conditions.

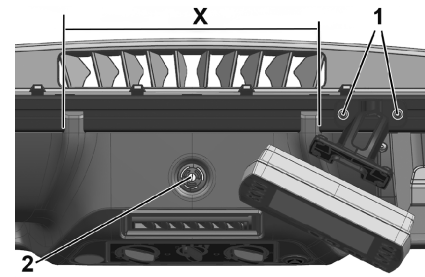
Adjusting the position

The display-operating unit is mounted on a rail and can be moved to the right and left. To do this, proceed as follows:

– Loosen the two socket head screws (1) and move the display-operating unit into the desired position. The display-operating unit must **not** cover the area (X) above the emergency off switch (2).

– Retighten the two socket head screws (1).

▷



Access authorisation with PIN code (variant)

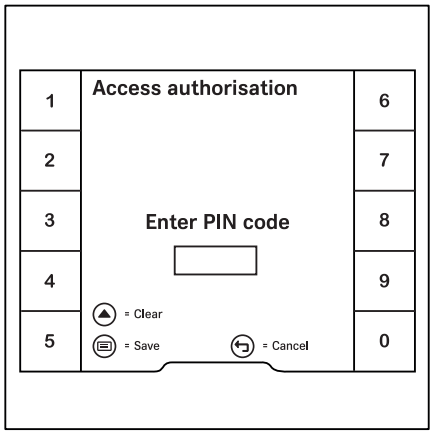
Industrial trucks equipped with the "Access authorisation with PIN code" variant are protected against unauthorised use by a PIN code. Individual PIN codes can be specified so that the same industrial truck can be used by different drivers.

An initial PIN code of "11111" is preset at the factory for the first use.

NOTE

We recommend that the fleet manager changes this PIN code using their access authorisation. See also the section entitled "Access authorisation for the fleet manager (variant)".

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



All hydraulic functions and drive functions of the industrial truck are blocked. In the StVZO (German Road Traffic Licensing Regulations) variant, the function of the hazard warning system (variant) is guaranteed.

– To activate the blocked functions, use the softkeys to enter the PIN code.

– To confirm, press the ☰ button.

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

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

NOTE

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

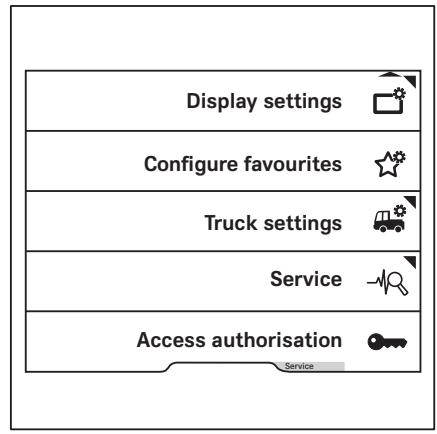
When the driver's seat is occupied again, the message `Log in` 🔒 appears. The display then changes to the "Access authorisation" input menu.

Changing the PIN codes

The fleet manager can change the PIN codes. See also the following section entitled "Access authorisation for the fleet manager (variant)".

– Activate the "Access authorisation for the fleet manager".

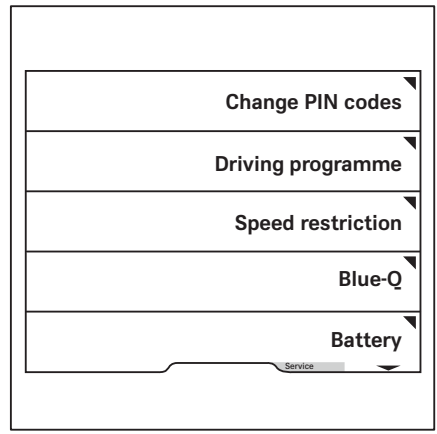
– Press the `Service` softkey. ▷



– Press the scroll keys △ ▽ until the `Change PIN codes` menu appears. ▷

– Press the `Change PIN codes` softkey.

– Follow the instructions on the display.



Access authorisation for the fleet manager (variant)

Industrial trucks equipped with the "Access authorisation for the fleet manager" variant can be configured by the users themselves.

Access to these settings is protected by a fleet manager password.

Three options are available for the "Access authorisation for the fleet manager" variant:

1 **No fleet manager password**

Access to the configuration menus is not enabled. If access is required at a later date, the authorised service centre must set up a fleet manager password.

2 **Standard fleet manager password**

The standard fleet manager password is "1111".

For safety reasons, this standard fleet manager password must be changed after the first use. See also the section entitled "Changing the fleet manager password".

3 **Individual fleet manager password**

The individual fleet manager password is noted on the order confirmation and on the industrial truck invoice.

NOTE

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

– Stop the industrial truck.

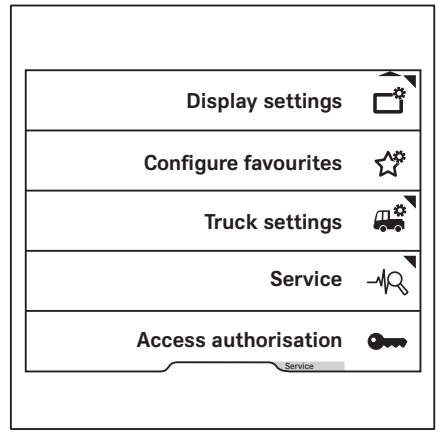
– Apply the parking brake.

– Press the ☰ button.

– Press the ⚙ softkey.

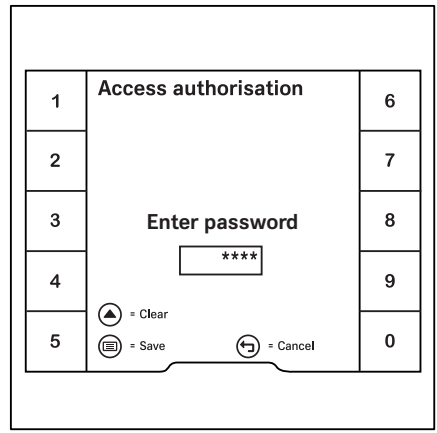
The first menu level appears.

– Press the `Access authorisation` softkey.

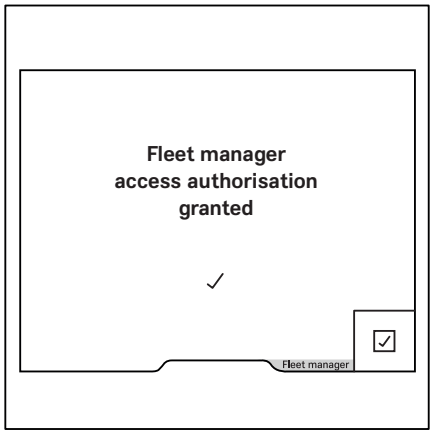


The display changes to the `Access authorisation` menu.

– Enter the fleet manager password using the softkeys.
– To confirm, press the button.



The message `Fleet manager access authorisation granted` ✓ appears. ▷



– To confirm, press the ✓ softkey.

The display returns to the settings menu.

If the password entered was incorrect, the message `Password incorrect` is displayed.

– If this happens, enter the password again.

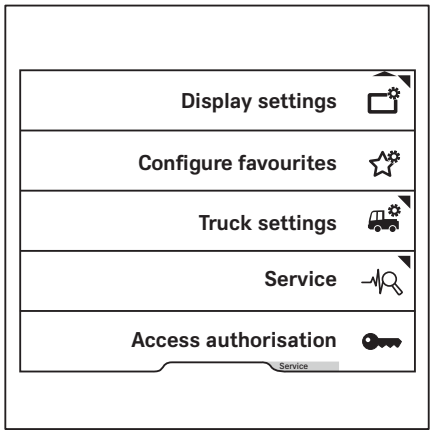
NOTE

While the "Access authorisation for the fleet manager" is activated, `Fleet manager` *is displayed in an orange bar at the bottom of the screen. When the users switches to the main display, the access authorisation expires again.*

Changing the fleet manager password

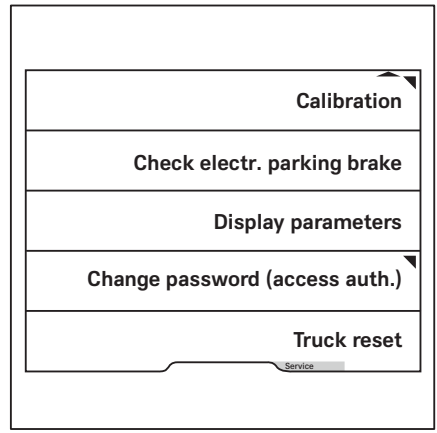
– Activate the "Access authorisation for the fleet manager".

– Press the `Service` softkey. ▷



– Press the scroll buttons △ ▽ until the `Change password (access auth.)` menu appears.
– Press the `Change password (access auth.)` softkey.
– Follow the instructions on the display.

▷



Pre-Shift Check

Description of the Pre-Shift Checks (variant)

The Pre-Shift Check is a guided dialogue in the display-operating unit. It also helps the driver conduct the necessary "visual inspections and function checking" before everyday use. After the industrial truck has been switched on, the driver must answer `Yes` or `No` to questions about the condition of the industrial truck.

In the meantime, the functions of the industrial truck are restricted. The driving speed and hydraulic functions are restricted.

To commission the industrial truck, the authorised service centre can compile the Pre-Shift Check from a question catalogue in consultation with the fleet manager. If a question catalogue has not been compiled, the only question stored by default is `Truck ready for operation?`

If the question is answered with No, an entry is made in the history. No restrictions to the functions of the industrial truck are stored by default for this scenario. The authorised service centre can replace this question with a question from the question catalogue.

In addition, the fleet manager has the following options:

- The fleet manager can view the results of all checks via the `History`.
- The fleet manager can define the shift start for three different shifts. The Pre-Shift Check must be performed when these shifts start.

  If the industrial truck is equipped with "FleetManager", the shifts are defined on the FleetManager interface. See the relevant operating instructions.
- If industrial truck functions are restricted due to a negative test result, the fleet manager can reset these restrictions.
- The fleet manager can specify the question sequence.

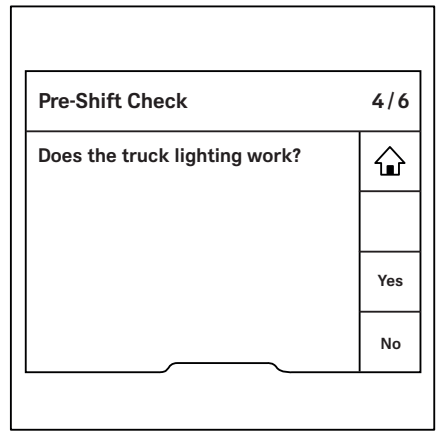
Process

– Switch on the industrial truck.

– The question "Truck ready for operation?" appears by default. This question is not associated with any restrictions on the functions of the industrial truck. The authorised service centre can replace this question with a question from the question catalogue.

The next question appears.

Some of the questions require a functional test, such as the functional test of the lighting. ▷



NOTE

The main display symbol ⌂ appears only when it is required for the test.

– To access the main display, press the main display button ⌂ or the softkey ⌂.

The main display contains the message `To complete Pre-Shift Check, press ⮌`.

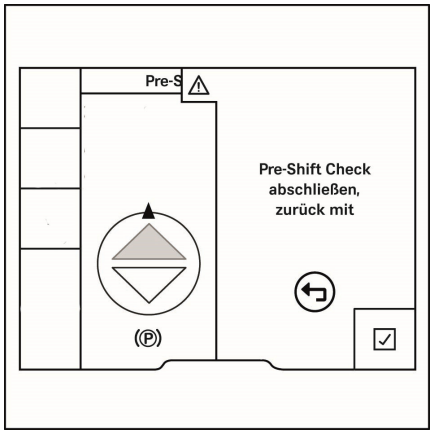
This means that the Pre-Shift Check is still active and the industrial truck functions are restricted.

– To acknowledge the message, press the ☑ softkey.

– Switch on and check the function to be tested, e.g. lighting.

– Press the back button ⮌ to go back to the Pre-Shift Check. ▷
– Answer the question based on the result of the function check.

The next question appears.



NOTE

If no questions regarding the Pre-Shift Check have been compiled, the question `Truck ready for operation?` *is displayed..*

If the industrial truck has to be moved for a test, e.g. for a brake test, the parking brake can easily be released. The message `To complete Pre-Shift Check, press` ⮌ is displayed. The industrial truck can be moved at reduced speed. When the parking brake is applied again, the view returns to Pre-Shift Check.

At the end of the check, the industrial truck functions are restricted if this has been selected as the response to a negative check result. The message `Pre-Shift Check truck restrictions active` shows that the industrial truck functions are restricted. As long as the functions are restricted, no further Pre-Shift Check is requested at the start of a new shift. The check is only requested again after the fleet manager has reset the restrictions.

All questions

NOTE

This question catalogue contains questions about different types of industrial trucks. It may therefore also contain questions that are not applicable to your industrial truck.

The authorised service centre can use this question catalogue to put together the Pre-Shift Check during commissioning:

`Are the fork arms damaged (e.g. bent or cracked)?`
`Are the fork arms securely mounted and the locking devices undamaged?`
`Are the roller tracks on the lift mast and lift chassis sufficiently greased?`

Are the load chains damaged?
Are the load chains sufficiently tensioned and loaded equally.?
Are all attachments securely mounted and undamaged? Are they in working order?
Are operating fluids (e.g. oil, water, fuel) visibly leaking?
Are the wheels damaged? Are they worn beyond permissible limits?
Is the tyre pressure correct?
Is the overhead guard visibly damaged?
Is the entry area or footwell dirty or slippery?
Are the windows clean, free of ice and undamaged?
Are the maintenance lids securely closed?
Is the battery door/hood undamaged and securely closed?
Is the battery lock present, undamaged and closed?
Is the battery connection assembly dirty or damaged (e.g. housing deformed, contacts corroded)?
Is the towing device damaged?
Is the capacity rating plate present, undamaged, and legible?
Is the driver restraint system damaged?
Does the horn work?
Does the truck lighting work?
Do the warning lights work?
Is the antistatic belt present and does it have sufficient contact with the floor?
Is the corona electrode present and clean?
Does the parking brake work properly?
Does the service brake work properly?
Does the steering work properly?
Does the emergency off work?
Is the battery dirty or obviously damaged?
Are all decal information and adhesive labels present and legible?
Is the load backrest undamaged?
Does the accelerator pedal work properly?
Is the engine compartment dirty or does it contain foreign objects?
Are the lift mast or the fork carriage obviously damaged?
Do the working hydraulics work properly according to the labelling?
Are the mirrors dirty or damaged?
Is the gas tank or its mounting obviously damaged?
Can unusual noises be heard when the industrial truck is used?
Is there any other obvious damage to the truck?

Does the washer system work?
Is the bonnet undamaged and securely closed?

If no Pre-Shift Check questions have been compiled, the initial configuration as at the time of delivery appears.

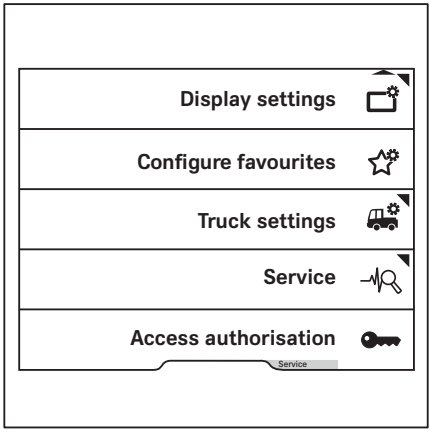
Defining the question sequence

The questions for the Pre-Shift Check can be defined in a random sequence or in a fixed sequence.

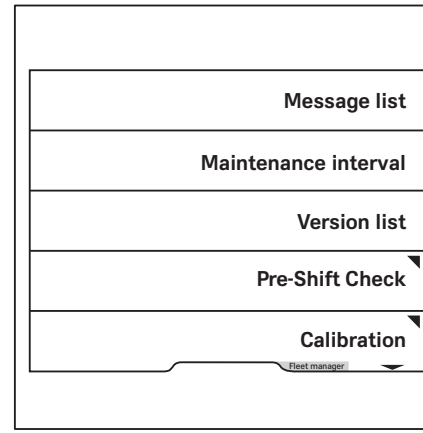
The random sequence is advisable, because the questions are then read more consciously by the driver. This means that there is no routine aspect.

– Activate the "Access authorisation for the fleet manager".

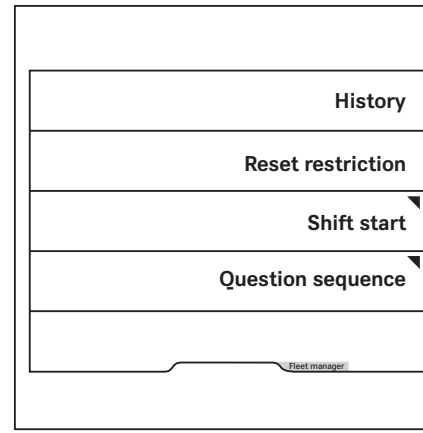
– Press the Service softkey. ▷



– Press the scroll keys △ ▽ until the `Pre-Shift Check` menu appears. ▷
– Press the `Pre-Shift Check` softkey.



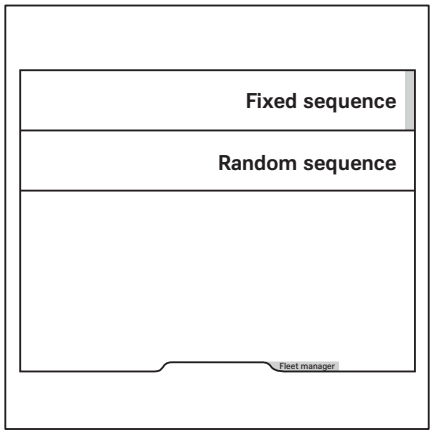
The `Pre-Shift Check` menu appears. ▷
– Press the `Question sequence` softkey.



Pressing the softkey allows fixed or random question sequences to be selected. ▷

The orange activation bar displays the current selection.

– To access the main display, press the main display button ⌂.

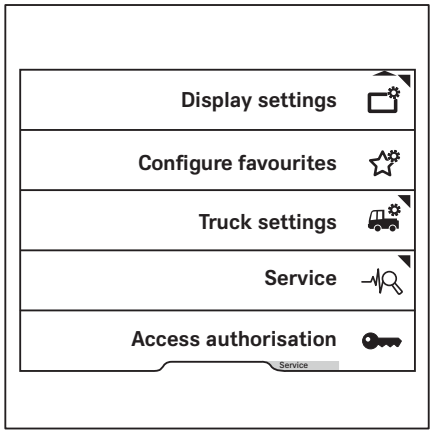


Displaying the history

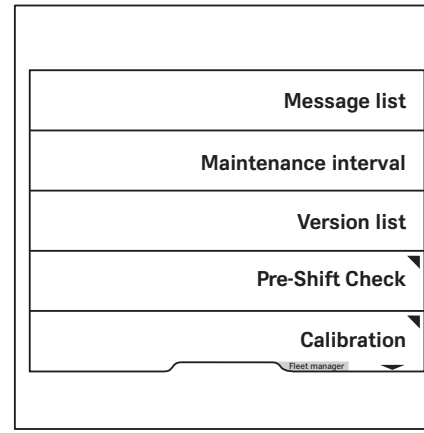
The fleet manager can display a Pre-Shift Check history.

– Activate the "Access authorisation for the fleet manager".

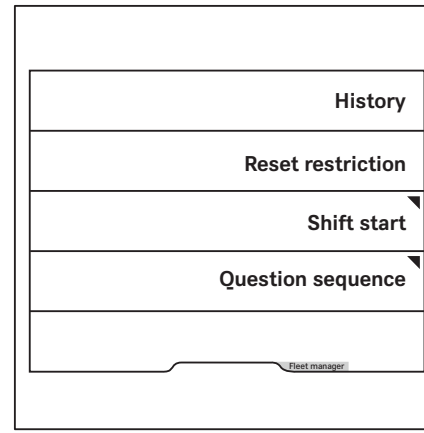
– Press the `Service` softkey. ▷



– Press the scroll keys △ ▽ until the `Pre-Shift Check` menu appears. ▷
– Press the `Pre-Shift Check` softkey.



The `Pre-Shift Check` menu appears. ▷
– Press the `History` softkey.



Defining the shift start

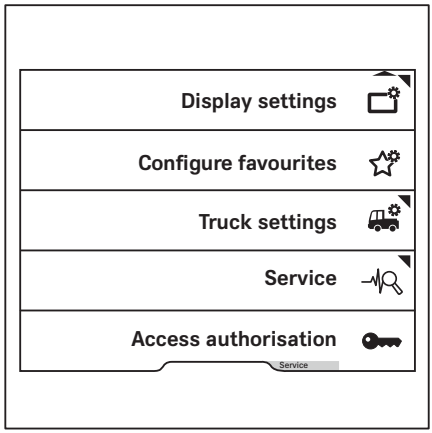
As a standard setting after commissioning, the Pre-Shift Check is always requested 24 hours after the last check was performed. The fleet manager can define up to three shifts and their start times. The Pre-Shift Check is then always requested at this time.

NOTE

If the industrial truck is equipped with the "FleetManager" variant, the shifts are defined on the FleetManager interface. See the relevant operating instructions.

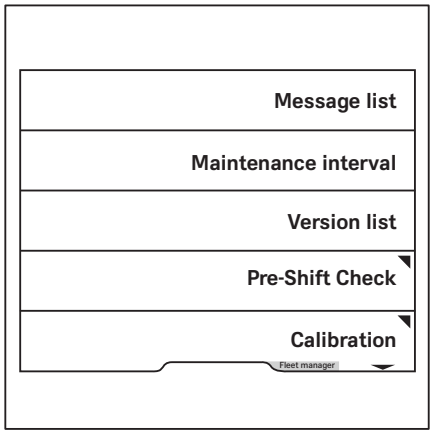
– Activate the "Access authorisation for the fleet manager".

– Press the `Service` softkey. ▷



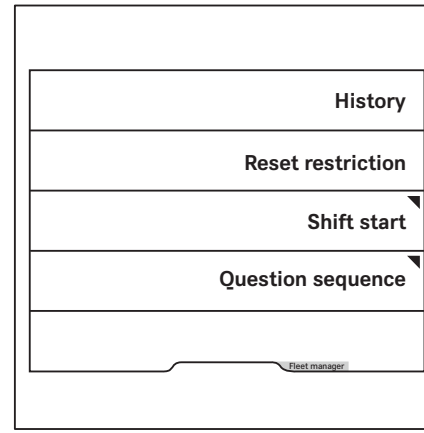
– Press the scroll keys △ ▽ until the `Pre-Shift Check` menu appears. ▷

– Press the `Pre-Shift Check` softkey.



The `Pre-Shift Check` menu appears. ▷

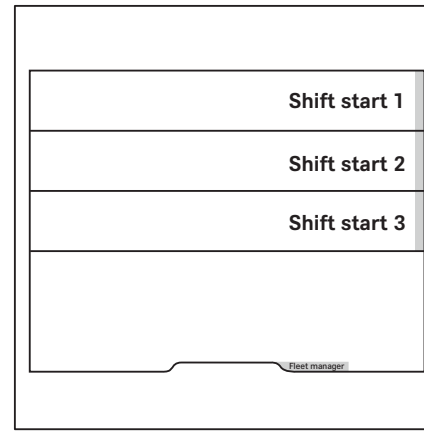
– Press the `Shift start` softkey.



In this menu, you can call up the shift to be defined and its start time. ▷

The orange activation bar indicates which shifts are activated.

– To edit a shift, press the corresponding softkey.



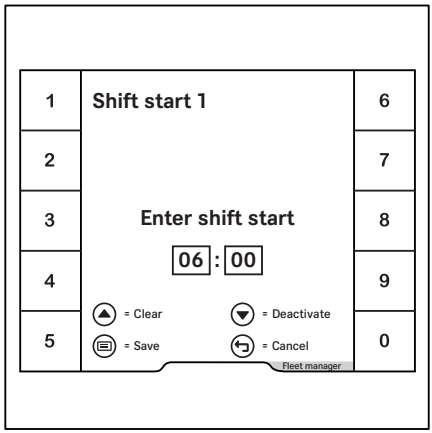
In this menu you can define the shift start. ▷

– Enter the time using softkeys `0 to 9`.

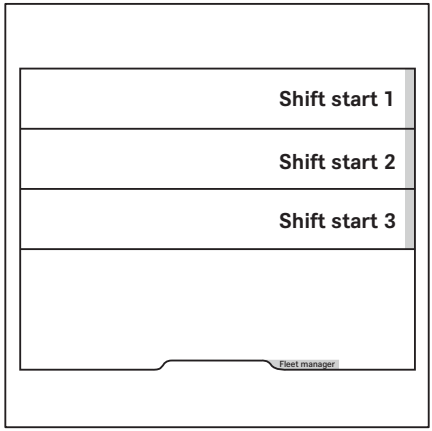
– To `save`, press the ☰ button.

The shift start is now defined. The Pre-Shift Check is always requested from this shift start time.

The display reverts to the previous menu.



– To deactivate a certain shift start, select the relevant shift. ▷



– Press the ▽ scroll button to deactivate the shift.

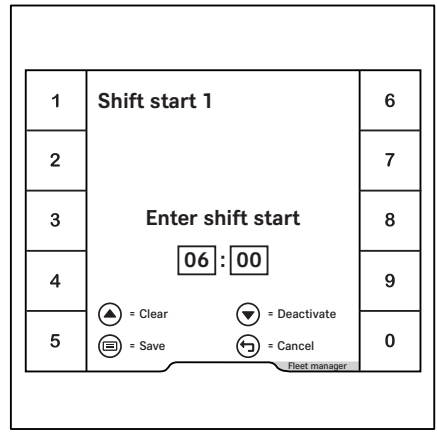
– To confirm, press the ☰ button.

The time is shown in grey.

The shift is deactivated. The display reverts to the previous menu. There is no activation bar next to this shift.

– To `cancel`, press the back button ↩.

– To access the main display, press the main display button ⌂.

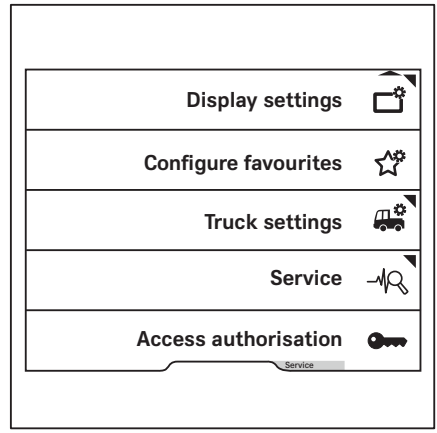


Resetting the truck restrictions

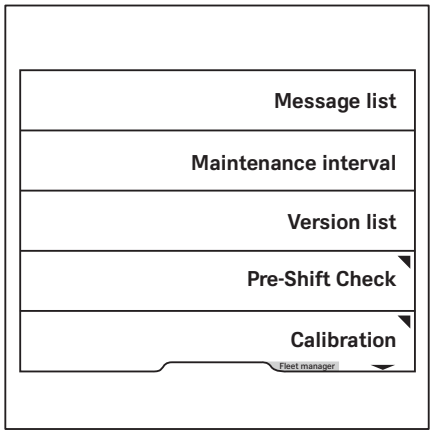
If truck functions are restricted due to checks with a bad result, the fleet manager can reset these restrictions. The fleet manager can also do this if a previously detected problem has been rectified.

– Activate the "Access authorisation for the fleet manager".

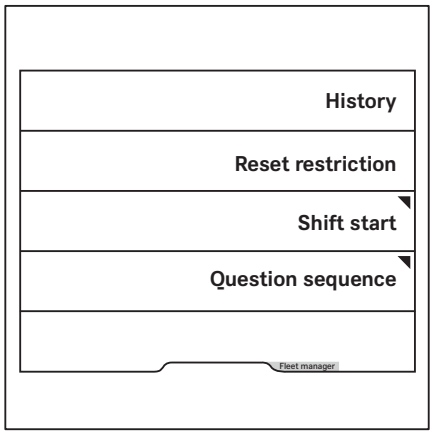
– Press the `Service` softkey.



– Press the scroll keys △ ▽ until the `Pre-Shift Check` menu appears. ▷
– Press the `Pre-Shift Check` softkey.



The `Pre-Shift Check` menu appears. ▷
– Press the `Reset restriction` softkey.



A question pops up asking if you want to reset the truck restrictions. ▷

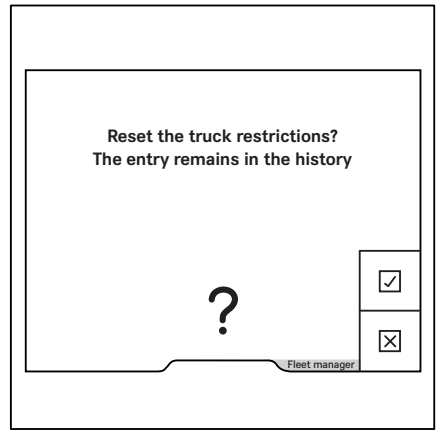
– To confirm, press the ☑ softkey.

The full scope of the truck functions is now available. The display reverts to the previous menu.

– To cancel, press the ☒ softkey.

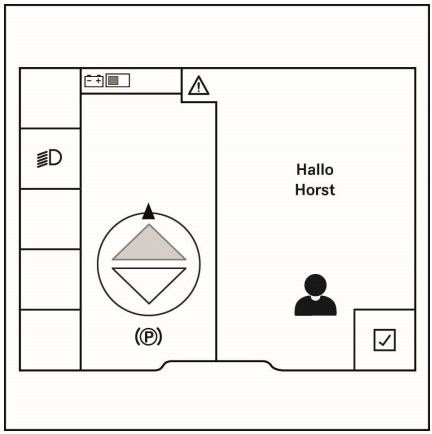
The truck functions remain restricted. The display reverts to the previous menu.

– To access the main display, press the main display button ⌂.



Driver profiles

Driver profiles (variant)



This variant allows up to ten individual driver profiles to be created. The driver is greeted with the selected name after logging in. Once the ✓ softkey is pressed, the main display appears.

If the industrial truck is equipped with the "Access authorisation with PIN code" or "FleetManager" variants, these driver profiles can be linked to the relevant variant.

The driver profile allows the following settings to be saved:

- Language
- Favourites
- Configuration of the status line
- Configuration of drive programmes A and B

In addition, the operating statuses saved for the last selected driver profile are called up again the next time a user logs in with this driver profile:

- Selected drive programme 1 to 3
- Efficiency and drive modes (Blue-Q/sprint mode)

If a driver without an existing driver profile logs in using the "Access authorisation with PIN code" or "FleetManager" variants, a driver profile is generated. This driver profile corresponds to the settings when the industrial truck was delivered.

If the industrial truck is not equipped with these variants, drivers must select their profiles manually.

Any changes that drivers make to the settings while they are logged in are saved. These will then be available the next time that the driver logs in.

Creating driver profiles

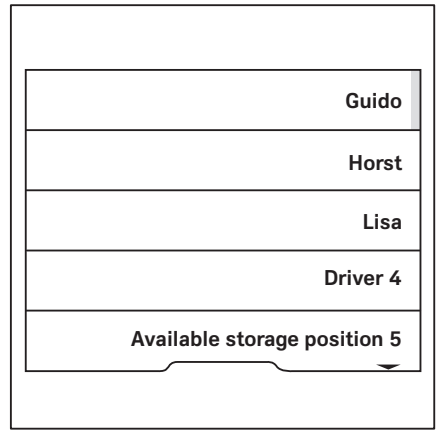
Both the fleet manager and the driver can create up to ten driver profiles.

NOTE

If the industrial truck is equipped with the "Access authorisation with PIN code" or "Fleet-Manager" variants, the driver profile is generated automatically when logging in for the first time.

– Apply the parking brake.
– Press the ☰ button.
– Press the ⚙ softkey.
– Press the `Driver profiles` softkey 👤.

This menu provides storage space for saving ten driver profiles. ▷

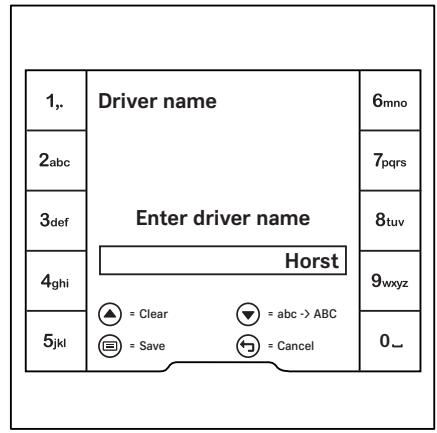


– Press the softkey for the required storage location.

NOTE

Unoccupied storage locations that do not contain a driver profile are indicated by `Available storage position`.

The `Driver name` menu is displayed. ▷



– Use the softkeys to enter the desired name.
– To confirm, press the ☰ button.

The driver profile is active. The driver is greeted with the selected name after the next log-in.

Any changes that drivers make to the settings while they are logged in are saved. These will then be available the next time that the driver logs in.

Selecting driver profiles

If the industrial truck is equipped with the "Access authorisation with PIN code" or "Fleet-Manager" variants, the corresponding driver profile is active after logging in. If the industrial truck is not equipped with these variants, drivers must select their profiles manually.

NOTE

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

– Stop the industrial truck.

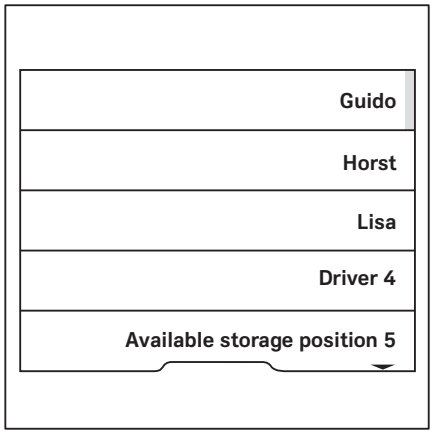
– Apply the parking brake.

– Press the ☰ button.

– Press the ⚙ softkey.

– Press the `Driver profiles` softkey 👤.

The orange activation bar displays the current selection. ▷



– Press the softkey for the required driver profile.

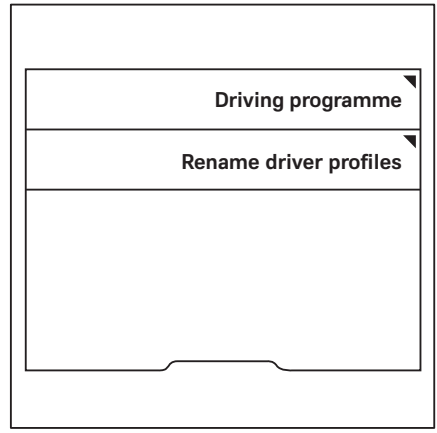
The driver profile is active. The driver is greeted with the selected name the next time that the industrial truck is switched on.

Renaming driver profiles

Driver profiles can be renamed. Drivers can only rename their own driver profile. The fleet manager has access authorisation to rename all driver profiles.

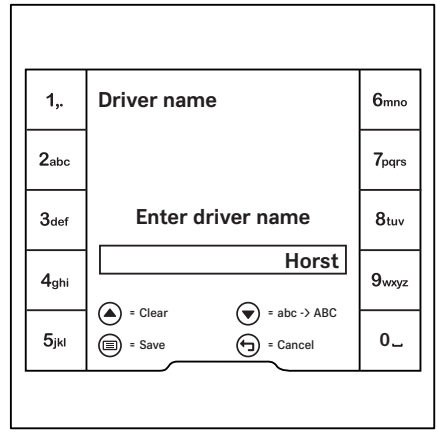
Renaming by the driver

– Apply the parking brake.
– Press the ☰ button.
– Press the ⚙ softkey.
– Press the `Truck settings` 🚚⚙ softkey.
– Press the `Rename driver profiles` ▷ softkey.



The `Driver name` menu is displayed. ▷

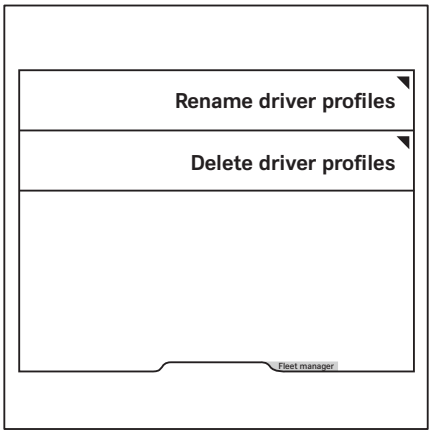
– Use the softkeys to enter the desired name.
– To confirm, press the ☰ button.



Renaming by the fleet manager

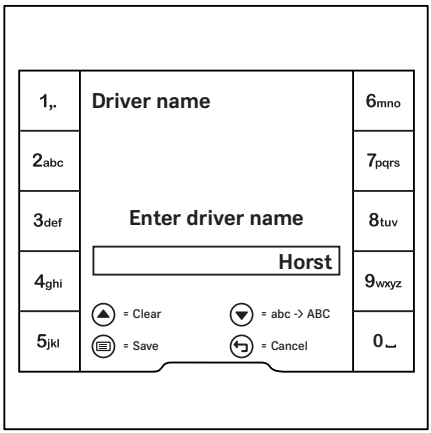
– Activate the "Access authorisation for the fleet manager".
– Press the `Truck settings` 🚚⚙ softkey.
– Press the `Manage driver profiles` softkey.

– Press the `Rename driver profiles` softkey. ▷



The `Driver name` menu is displayed. ▷

– Use the softkeys to enter the desired name.
– To confirm, press the ☰ button.

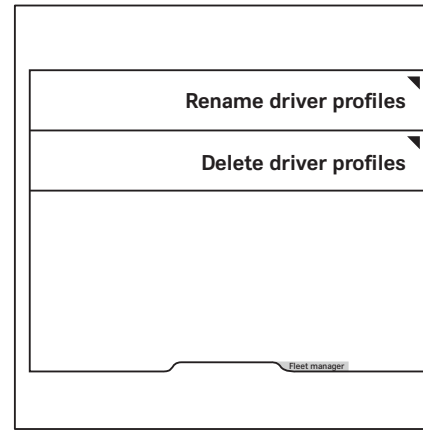


Deleting driver profiles

The fleet manager has access authorisation to delete driver profiles.

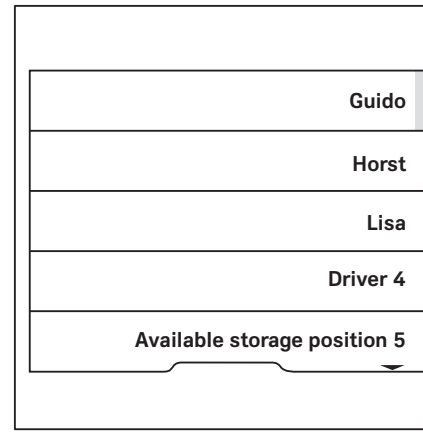
– Activate the "Access authorisation for the fleet manager".
– Press the `Truck settings` softkey.
– Press the `Manage driver profiles` softkey.

– Press the `Delete driver profiles` ▷ softkey.



– Press the softkey for the driver profile to be deleted. ▷

The driver profile is deleted.



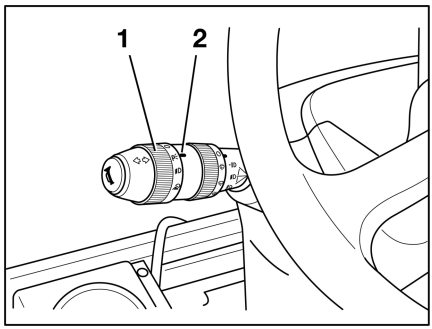
Lighting

Switching the lighting on and off

NOTE

All of the lighting described below can be retrofitted by the authorised service centre.

– Turn the rotating ring (1) on the operating lever on the left-hand side of the steering wheel. In doing so, align the symbol for the desired lighting function with the marking (2) to switch the function on.



NOTE

The operating lever can also be optionally located on the right of the steering wheel. In this case, operation of the turn indicators is reversed.

Symbols for the lighting functions

	Lighting off
P	Parking light
D	Dipped beam
	Still Safety Light. Is not switched on and off via the operating lever, see the chapter entitled "STILL SafetyLight (variant)"

Actuating the main beam and headlight flasher

– With the dipped beam switched on, push the operating lever on the left-hand side of the steering wheel forwards until it engages. The main beam is on.

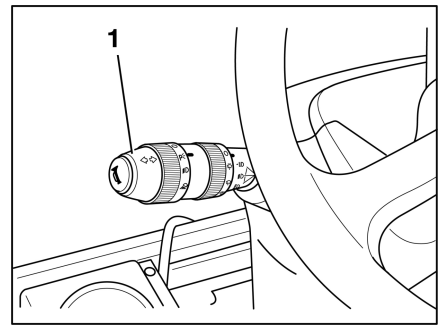
– To switch the main beam off, pull the operating lever engaged in the front position backwards. The main beam is switched off.

– To operate the headlight flasher, briefly pull the operating lever back.

Switching the turn indicators on and off

– To switch the right or left turn indicator on, push the operating lever (1) on the left of the steering wheel up or down such that the lever engages. The right or left turn indicator is switched on and the turn indicator display in the display-operating unit flashes. If a trailer equipped with lighting is coupled to the truck, the turn indicator display for the trailer also flashes.

– To switch the turn indicator off, push the operating lever (1) back to the centre position.



NOTE

The operating lever can also be optionally located on the right of the steering wheel. In this case, operation of the turn indicators is reversed.

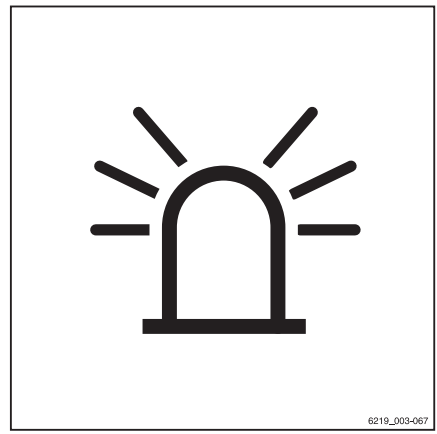
Rotating beacon

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

The rotating beacon is switched on.

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

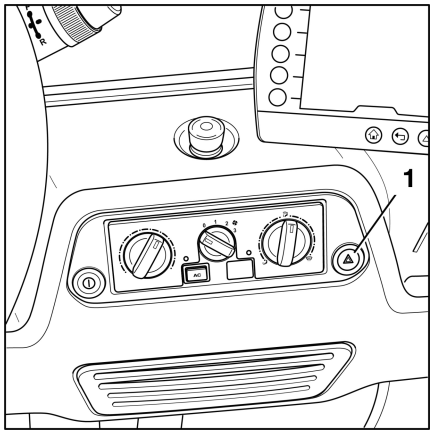
The rotating beacon goes out.



Turning the hazard warning system on and off

– To switch the hazard warning system on, push the push button (1) to the right of the control panel for the heating system. The hazard warning system is switched on and the LED in the push button flashes.

– To switch the hazard warning system off, push the push button (1) again. The hazard warning system is switched off and the LED in the push button goes out.



NOTE

The hazard warning system can also be activated when the ignition switch is off.

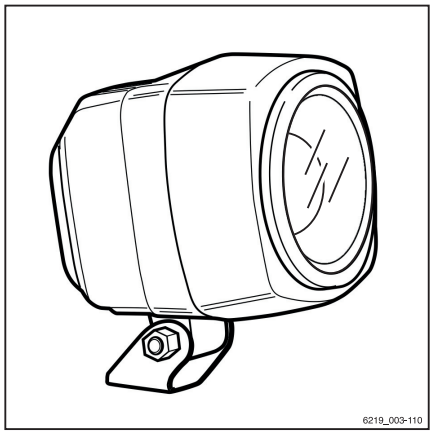
STILL SafetyLight (variant)



⚠ WARNING

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

Do not look into the STILL SafetyLight.



The STILL SafetyLight is a visual warning unit designed to enable early detection of industrial trucks in driving areas with low visibility (such as drive lanes, high racks), as well as at blind junctions. The STILL SafetyLight is mounted on a support on the cab such that it is not affected by jolts and vibrations.

Depending on the version, the STILL SafetyLight projects one or more light-blue light spots in front of or behind the industrial truck and thus warns others about the approaching industrial truck. Several light spots are projected as a chase light. The chase light indicates the location of the industrial truck with its direction of travel.

Depending on the configuration of the industrial truck, the STILL SafetyLight automatically switches itself on when the industrial truck is moving. This means that, during reverse travel

(variant), for example, it can be used as an additional light for the working spotlight for reverse travel. The STILL SafetyLight can also be switched on and off on the display-operating unit.

– To do so, push the Softkey .

NOTE

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

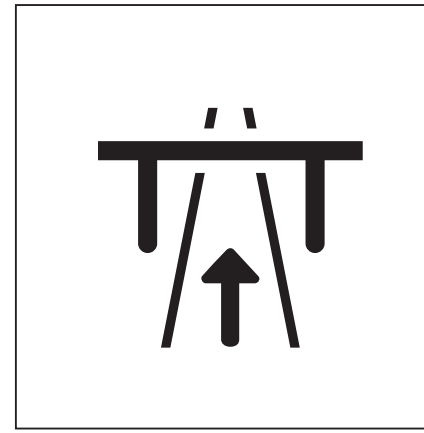
Recommended distance between the light points and the industrial truck

In front of the truck: 4 m ±1 from the fork tips.

Behind the truck: 4 m ±1 from the counterweight.

StVZO equipment

StVZO equipment



If the industrial truck is fitted with German Road Traffic Licensing Regulations (StVZO) equipment, the softkey is stored in the favourites bar. This softkey is used to switch off all lighting devices that are not permitted on roads subject to StVZO.

This relates to the following variants of lighting equipment:

- STILL SafetyLight
- Warning zone light
- Working spotlight
- Rotating beacon

– To switch this lighting equipment off, press the softkey.

The orange activation bar lights up next to the softkey.

– To switch this lighting equipment on, press the softkey again.

The orange activation bar goes out.

NOTE

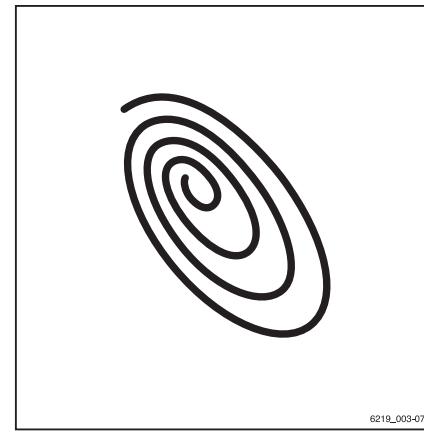
This function is configured for the German StVZO ex works.

- *Outside of Germany, observe the national regulations for the country of use.*
- *The authorised service centre can amend the function so that fewer lighting devices or more lighting devices are switched off.*

The softkey is also located in the `Driving` menu .

Efficiency modes and drive modes

Blue-Q efficiency mode ▷



Functional description

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

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

When travelling at low speeds, normally when manoeuvring, no reduction is noticeable despite the activated efficiency mode. For moderate speeds of at least approx. 7 km/h, acceleration is gentler. Therefore, on distances of up to approx. 40 m, lower speeds are reached than would be the case if the efficiency mode was not activated. As in "STILL Classic" mode, the maximum speed is 25 km/h.

Blue-Q has no influence on:

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

Switching Blue-Q efficiency mode on and off

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

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

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

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

Effects on additional consumers

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

Shut-off	Seat switch	Industrial truck is stationary	Drive direction
Front working spotlight*	X	X	Backwards > 3 km/h
Rear working spotlight*	X	X	Forwards
Roof spotlight*	X	X	> 3 km/h
Headlight*	X	X	-
Front wiper	X	X	Backwards > 3 km/h
Rear wiper	X	X	Forwards
Seat heater	X	-	-
Cab heating	X	-	-
Screen heating	X	-	-
*No shut-off for StVZO (German Road Traffic Licensing Regulations) equipment (variant)			

Configuring Blue-Q

Fleet manager access authorisation allows the fleet manager to activate Blue-Q efficiency mode permanently or to enable it to be switched on and off via softkey.

– Enable `Access authorisation`.

– Press the `Truck settings` softkey.

The menu that opens provides the following selection:

- `Permanent`
  The driver cannot switch Blue-Q on and off. Blue-Q is permanently active. The Blue-Q symbol appears permanently on the display-operating unit.
- `By pressing a button`
  The driver can switch Blue-Q on and off via the softkey.

– Push the required softkey.

The orange activation bar appears next to the pushed softkey.

The main display button takes you to the main display.

Drive modes

The drive modes influence the acceleration and braking characteristics of the electrical drive.

Two different drive modes are available: ▷

1 **"STILL Classic"**: This is the standard drive mode. It ensures a balanced ratio of acceleration and braking characteristics. The maximum speed is 25 km/h. When this mode is active, no symbol is shown on the display.

2 **"Sprint mode"**: If a more agile overall driving behaviour is desired, this drive mode can be switched on. The industrial truck accelerates faster to the maximum speed of 25 km/h. Sprint mode is intended for driving in clear and spacious terrain.

1 

2 

NOTE

If "sprint mode" is used, the energy consumption of the industrial truck is higher. The battery is therefore discharged more quickly. The drive units heat up more quickly.

Switching "sprint mode" on and off

– To switch "sprint mode" on, push the associated softkey.

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

– To switch "sprint mode" off, push the softkey again.

The symbol disappears and the mode is switched off. The industrial truck is in STILL Classic mode again.

Switching "sprint mode" off automatically

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

Efficiency modes and drive modes

The battery voltage and the temperature of the traction drives and energy supply are monitored continuously. If the under voltage becomes too low or if the temperature becomes too high, "sprint mode" is deactivated automatically.

If the truck is switched off automatically, "sprint mode" can then only be switched on again if the following conditions are met:

- The battery is fully recharged
- The industrial truck has been restarted

Cab

Cab doors

Four different door variants are available for the tow tractor and the platform tractor:

- Folding doors
- Sliding doors (tow tractors only)
- Bracket/summer doors
- Fabric doors

Safety information and rules of behaviour

⚠ WARNING

Under no circumstances can the cab be considered an overhead guard. It serves purely as weather protection and does not provide protection against slipping loads.

– Always check that the load is correctly positioned and secured.

⚠ WARNING

Possible serious injury!

– Do not lean out past the door contour while the truck is in motion.

– Do not extend arms or legs out past the door contour.

⚠ WARNING

Risk of injury!

– Open and close doors only when the industrial truck is stationary.

– If any panes have become scratched, faulty or opaque, have them replaced by the authorised service centre.

– Doors must only be replaced by the authorised service centre. This also applies when changing from one door variant to another.

– Open and close doors only when the industrial truck is stationary.

– Only open and close doors using the operating devices or handles provided for this purpose.

– On folding doors, check the door check straps and gas springs regularly.

Folding doors

NOTE

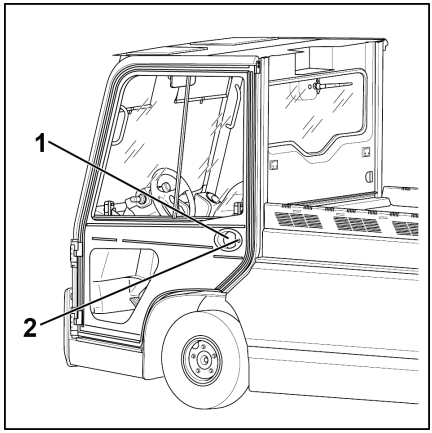
The doors are monitored by a door contact switch. If they are not closed correctly, a corresponding message appears in the display-operating unit. The industrial truck can only be moved at creep speed.

NOTE

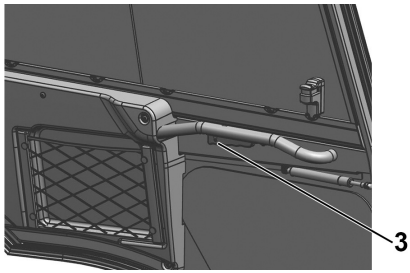
To allow escape in an emergency, there is an emergency hammer in the driver's cab. For information on how to use the emergency hammer, see the chapter entitled "Emergency hammer".

Opening the doors

– **From the outside**: Pull on the door handle (1) until the door lock audibly unlocks. The door can be opened. ▷



– **From the inside**: Pull on the door handle (3) until the door lock audibly unlocks. Open the door. ▷



Closing and locking the door

– Close the door and push or pull it into the door frame until the door lock audibly engages.

Each of the two doors features a door lock (2) that can be used to lock the door. Locked

doors can be opened from the inside at any time.

Sliding doors

NOTE

The doors are monitored by a door contact switch. If they are not fully open or closed, a corresponding message appears on the display-operating unit. The industrial truck can only be moved at creep speed.

NOTE

To allow escape in an emergency, there is an emergency hammer in the driver's cab. For information on how to use the emergency hammer, see the chapter entitled "Emergency hammer".

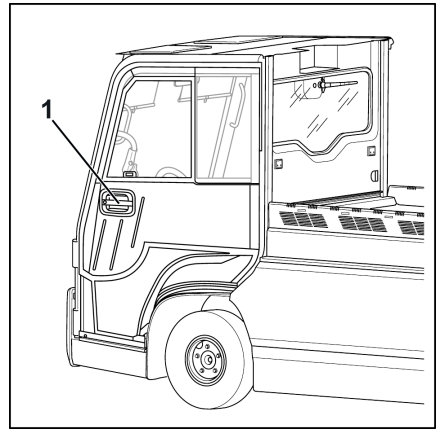
Opening the doors

⚠ CAUTION

Risk of component damage!

- Only open the sliding door on the right-hand side in the drive direction if the battery door is fully closed.
- Do not open or close sliding doors while driving.

– **From the outside**: Pull on the door handle (1) until the door lock audibly unlocks. Pull the door all the way back until it audibly clicks into the open position. ▷

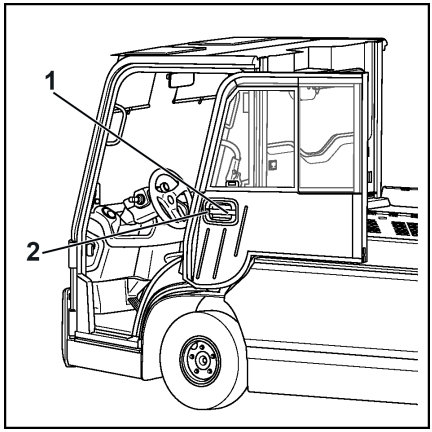


– **From the inside**: Pull on the door handle (3) until the door lock audibly unlocks. Pull the door all the way back until it audibly clicks into the open position.



Closing and locking the door

– Pull on the door handle (1) and pull the door all the way forwards until it audibly clicks into place.



Each of the two doors features a door lock (2) that can be used to lock the door. Locked doors can be opened from the inside at any time.

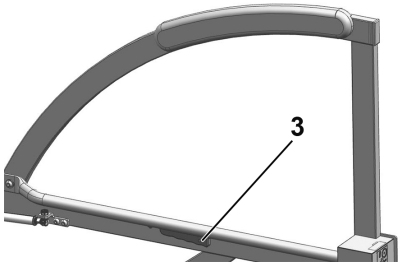
Bracket doors

NOTE

The doors are monitored by a door contact switch. If they are not opened or closed fully, a corresponding message appears in the display-operating unit and the industrial truck can only be moved at creep speed.

Opening the doors

– Pull on the door handle (3) until the door lock audibly unlocks. Open the door.



Closing the doors

– Close the door and push or pull it into the door frame until the door lock audibly engages.

Fabric doors

NOTE

Fabric doors are not a restraint system. They cannot reliably prevent a fall from the driver's cab!

NOTE

If the fabric doors are exposed to UV light for a long time, they can become brittle. This can lead to damage. In this case, have the fabric doors replaced by the authorised service centre.

NOTE

If a piece of fabric is temporarily removed, it must be always be re-attached to the same chassis. Fabric pieces and chassis are assembled together and are therefore unique and cannot be interchanged.

Opening the doors

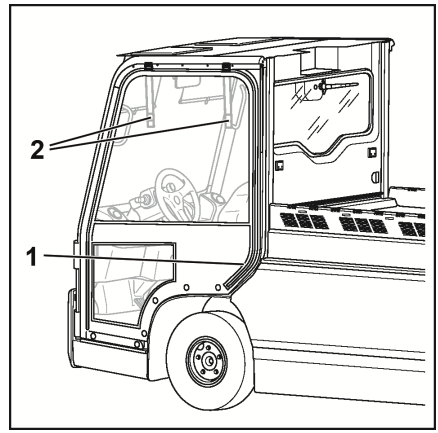
– Open the zip (1) fully.

– Roll up the fabric door and hold it in position with the two straps (2).

Closing the doors

– Release the two straps (2) and roll down the fabric door.

– Close the zip (1) fully.



Heating system (variant)



DANGER

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

– Do not operate the heater in the vicinity of storage areas or similar areas, in which fuel vapours or fine dust (e.g. coal, wood or grain dust) can build up.



⚠ DANGER

The heat can cause gases to expand considerably or to ignite. There is a risk of explosion!

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



⚠ DANGER

The heating system can overheat if the hot air cannot escape from it. Risk of fire!

The heating system may only be switched on if the blower is running and the heating system is not covered by objects (such as a jacket or cover).

– Always switch the blower on first.
– Do not switch the heating system on until the blower is switched on.
– Move any objects away from the heating system or air distributors.

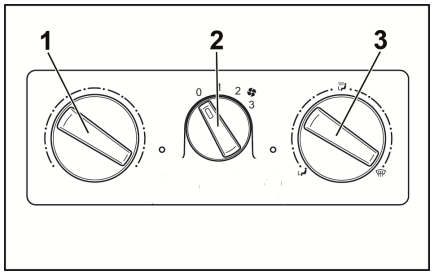


⚠ DANGER

The heating system housing can become very hot during heating operation. There is a risk of burns if it is touched!

– Do not touch the heating system housing during operation.
– Only touch the switches provided.

Operating devices of the heating system



The operating devices of the heating system include:

1 Heating level control knob
2 Fan control knob
3 Air vent control knob

Switching on the blower and heating system

– Turn the fan control knob (2) to the desired blower position.

The blower runs at the speed level selected via the fan control knob (2).

– Turn the heating level control knob (1) to the desired heating level.

The heater warms the air to the heating level selected via the heating level control knob (1)

– Turn the air vent control knob (3) to the desired position.

Selecting blower settings

Using the blower control (2), the blower can be set to three different levels: from "0", which is equivalent to "Off", to "3", which is the maximum speed level.

Setting heating levels

– To set a lower heater power, turn the heating level control knob (1) anticlockwise.

– To set a higher heater power, turn the heating level control knob (1) clockwise.

Setting the air vent control knob

– To direct the air flow to the footwell, turn the air vent control knob (3) in an anticlockwise direction to the position.

– To direct the air flow to the windscreen, turn the air vent control knob (3) in a clockwise direction to the position.

The centre position directs the air flow to the footwell and the windscreen.

Switching off the heating system and blower

– Turn the heating level control knob (1) in an anticlockwise direction until it reaches the stop.

The heating system is shut off.

– Turn the fan control knob (2) in an anticlockwise direction until it reaches the stop.

The blower is shut off.

Adjusting the air distributor and roller nozzle

The air distributors for the driver are always supplied with air. It is not necessary to adjust the heating system using the operating devices. They are located on the far left-hand and right-hand sides of the dashboard.

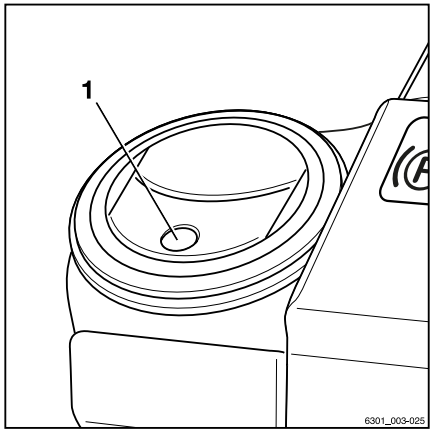
– To open the air distributor, push the indentation (1) on the disc.

The discs open.

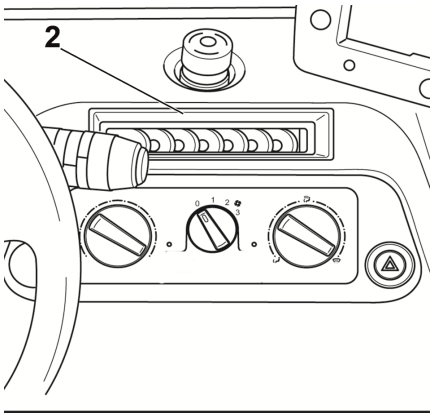
– Grasp the discs to align the air flow:

The discs can be adjusted to the desired angle. The air distributor can be rotated.

– Press down again to close the discs.



In addition, there is a roller nozzle for the air supply above the operating panel of the heating system.

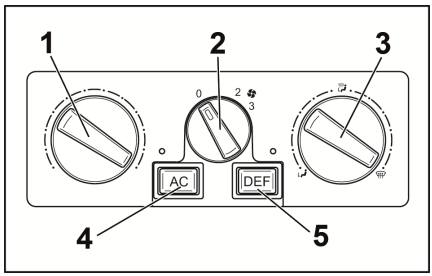


Air conditioning (variant)

The air conditioning cools down the air in the cab. The air conditioning dries the air in the cab to prevent the glass panes misting up.

The operating devices of the air conditioning include:

1 Heating level control knob
2 Fan control knob
3 Air vent control knob



4 "AC"(air conditioning) push button
5 "Defog"push button

⚠ CAUTION

Possible component damage due to the bearings in the compressor seizing up!

– Switch on the air conditioning every 4 weeks for at least 10 minutes.

NOTE

Condensation water in the evaporator can create a musty smell.

- *This can be avoided by switching off the air conditioning 10 minutes before the end of the drive and letting the blower continue to run. This dries the condensation water.*

NOTE

On cool, humid days, the air in the cab can be dehumidified by operating the heating system and the air conditioning simultaneously. The air conditioning dehumidifies the air and the heating system compensates for the cooling. This produces a more pleasant temperature inside the cab and prevents misting of the windows.

NOTE

A significant difference between the internal temperature and the outside temperature increases the physical stress put on the driver. To reduce the risk of illness, the difference between the internal temperature and the outside temperature must not exceed six degrees.

– To adjust the air distributors and to control the blower positions, the heat settings and the air vent control knob, see the section entitled "Heating system (variant)".

Switching the air conditioning on and off

– Switch on the blower. Turn the blower control (2) to the desired blower level.

– Push the on/off switch (4).

The LED on the switch lights up green. The air conditioning is switched on.

– To switch off the air conditioning, press the "on/off switch" (4) again.

The LED on the switch goes out. The air conditioning is switched off.

Controlling the temperature

The degree of cooling can be adjusted via the heating level control (1). If necessary, this control can be used to adjust the heating system so that the air is cooled less intensely by the air conditioning system. The further you turn the heating level control clockwise, the less cold the air flowing out is.

"Defog"function

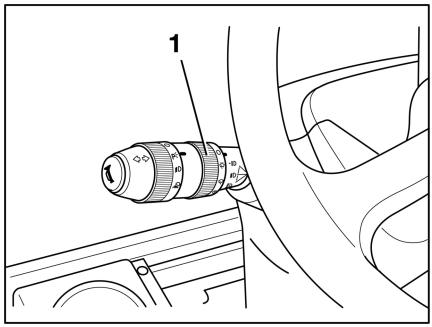
The "Defog" function can be used to quickly restore clear vision when the windscreen is foggy.

– Push the "Defog" push button (5). The LED on the switch lights up green. The LED in the "AC" push button also lights up. The air conditioning and the blower are now operated so as to optimally eliminate the fog on the windscreen.

– To stop the "Defog" function, press the "Defog" push button (5) again. The LEDs in the two push buttons (4) and (5) go out. The air conditioning and the blower return to normal operation.

Actuating the front windscreen wiper and washer

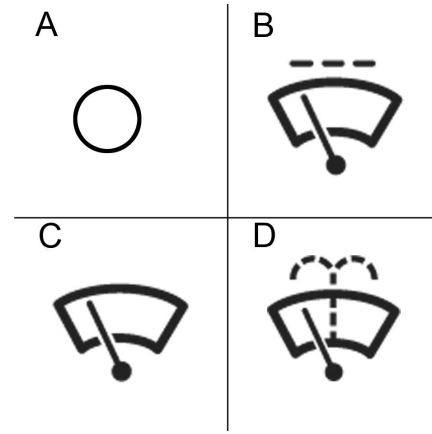
The front windscreen wiper and washer are actuated via the inner set collar (1) of the operating lever on the left of the steering column. ▷



NOTE

As an option, the operating lever can be fitted on the right-hand side of the steering column.

– Turn the set collar (1) and align the symbol for the desired operating stage with the white mark on the operating lever.

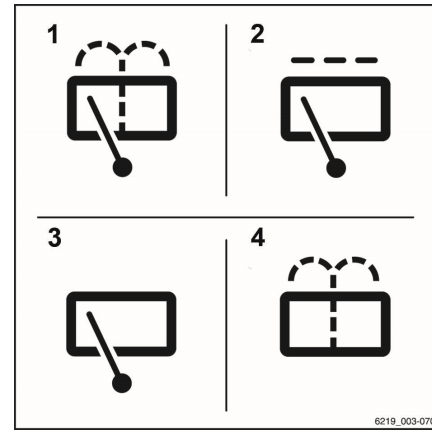


Operating stage	Set collar position (1)
Off	(A)
Interval	(B)
Continuous mode	(C)
Washer	(D)

Actuating the rear window wiper and washer

The rear window wiper and washer are actuated via the display-operating unit.

– To activate the "On" operating stage, push the Softkey for the symbol (1) on the display-operating unit.



The "On" operating stage is activated. The symbol (3) appears and the activation bar appears next to the symbol.

– To activate the "Intermittent mode" operating stage, press the Softkey again.

The symbol (2) is highlighted with a dot.

– To activate the "Washer" operating stage, press and hold the Softkey. This is possible at any operating stage.

The "Washer" operating stage is activated. The symbol (4) is displayed for as long as the Softkey is pressed.

– Once the window is clean, release the Softkey.

The previous operating stage is reactivated.

– To switch this operating stage off, press the Softkey repeatedly until the symbol (1) appears again on the display. The activation bar next to the symbol goes out.

Heatable windows

Rear window heating

– Press the "Rear window heating" softkey on the favourites bar of the display-operating unit.

The rear window heating remains switched on for 10 minutes and then switches off automatically.

Windscreen heating (variant)

The windscreen heating helps to de-ice the window quickly and eliminate fog.

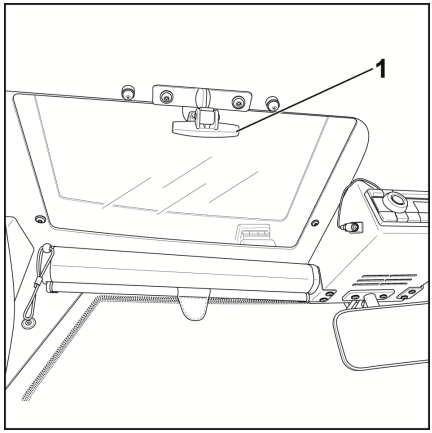
– Press the "Windscreen heating" softkey on the favourites bar of the display-operating unit.

The windscreen heating remains switched on for 15 minutes and then switches off automatically.

Push-up roof window (variant)

– To push up the roof window, push the handle (1) forwards and upwards so that it snaps into the pushed-up position.

– To close the window, pull the handle (1) downwards until the window is closed and the handle snaps into place.

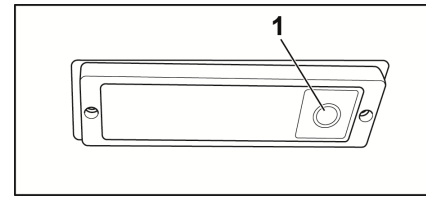


Interior lighting

The cab lighting is located in the centre of the roof lining of the driver's cab. It switches on when you open one of the two doors and switches off when you close the door. When the doors and fabric doors are closed, the cab lighting can be switched on and off as follows.

– Press the knob (1) to switch it on.

– Press the knob (1) again to switch it off.



Topping up the washer fluid

⚠ CAUTION

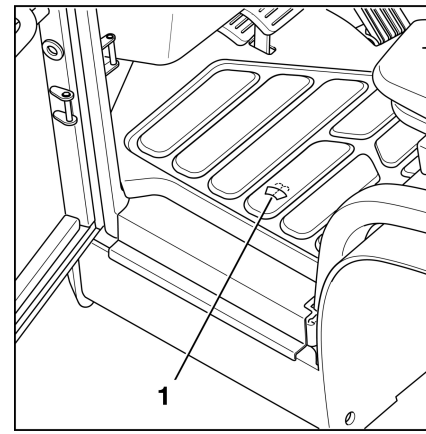
Damage due to the effects of frost!

When water freezes, it expands. If the washer system is not filled with fluid that is suitable for use in winter, ice can form in the washer system and cause damage.

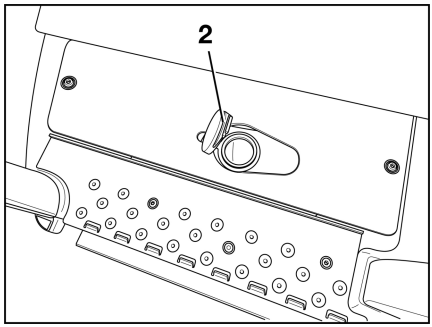
– If there is a risk of frost, use fluid that is suitable for winter use.

The washer fluid reservoir is located in the driver's cab on the left-hand side of the leg room under the floor mat. The floor mat is marked with the symbol for the washer system (1).

– To top up the washer fluid, fold the floor mat to one side.



– Open the cover (2) of the washer fluid reservoir and top up the washer fluid. ▷
– Close the cover (2) firmly again and fold the floor mat back down.



NOTE

When the washer fluid filling level is low, the message "Top up wiper water" and the symbol appear in the display-operating unit.

Protective devices

Collision protection (variant)

Collision protection for important components of the industrial truck is available as a variant in various versions:

- Rear guard grille
- Lamp guard grille
- Front hoop guard
- Collision protection strips

Rear guard grille

The rear guard grille protects the rear window from damage caused by the load. Note the following:

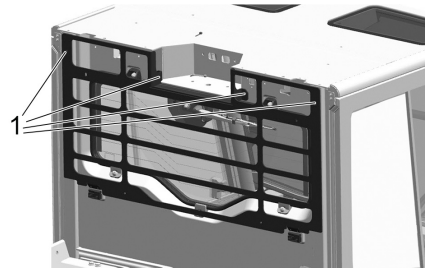
– Always secure the load correctly. See the chapter entitled "Loading a platform" for more information.

– Make sure that the load, for example pipes, cannot enter the spaces between the bars of the grille.

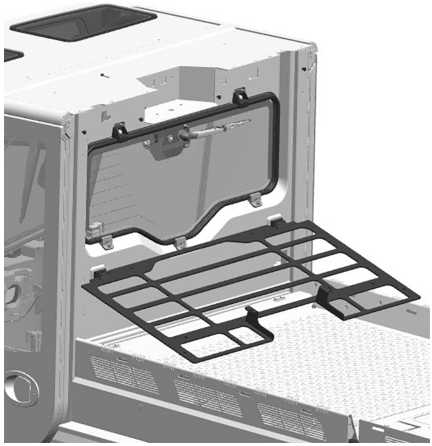
– To clean the rear window or replace the wiper blade of the rear window wiper, fold the guard grille down. Refer to the following section when doing so.

Folding down the rear guard grille

– Loosen the four mounting screws (1). ▷



– Fold down the rear guard grille. ▷



Lamp guard grille

The lamp guard grille protects the front lamps of the industrial truck from damage.

NOTE

If fitted with the lamp guard grille, the industrial truck cannot obtain approval in accordance with the German Road Traffic Licensing Regulations (StVZO), as the lamp guard grille restricts the illumination of the driving area.

In order to change the fresh-air filter of the heating system, the lamp guard grille must be removed. Refer to the following section when doing so.

Removing the lamp guard grille

– Unscrew the two mounting screws (1) on both sides of the lamp guard grille and carefully remove the grille. ▷



– If the fresh-air filter of the heating system is to be changed, see the chapter entitled "Replacing the fresh-air filter mat of the heating system".

Front hoop guard

The front hoop guard protects the windscreen from damage caused by large falling objects, such as baggage. Its height can be adjusted, see the following section.

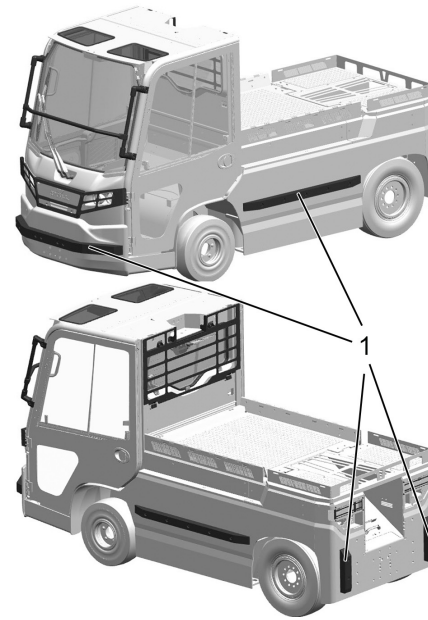
Adjusting the height of the front hoop guard

– Loosen the four socket head screws (1) on the left-hand side and right-hand side of the front hoop guard. ▷
– Move the front hoop guard into the desired position.
– Retighten the four socket head screws (1).



Collision protection strips

Additional collision protection strips (1) made of plastic protect the front, rear and sides of the industrial truck from damage. ▷



Driving

Safety regulations when driving

Driving conduct

– The driver must comply with the rules for driving on public roads when driving within the plant.

– The speed must be appropriate to the local conditions.

– For example, the driver must drive slowly:

- Around corners
- In tight passageways
- When driving through swing doors
- At blind spots

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

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

The following are forbidden when driving:

- Allowing arms and legs to hang outside the truck
- Leaning the body over the outer contour of the industrial truck
- Climbing out of the industrial truck
- Moving the driver's seat
- Adjusting the steering column
- Releasing the seat belt
- Using electronic devices, for example radios, mobile phones etc.

⚠ WARNING

Risk of accident due to objects in the footwell!

Objects that are not properly positioned can fall into the footwell when braking or during steering movements; these objects may then block the pedals.

– Only items that can be safely stored based on their size and that do not fall out may be placed in the shelves provided. Store and secure larger items on the load area outside the cab.
– The cup holder can hold bottles up to a maximum size of 1.5 l.

⚠ WARNING

Risk of accident! The driver's attention is adversely affected by operating multimedia and communication devices or listening to these devices at an excessive volume while driving.

– Do not operate devices while driving.
– Set the volume so that warning signals can still be heard.

⚠ WARNING

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

– Switch off these devices.

Danger area

The danger area is the area in which people are at risk due to the movements of the industrial truck, its working equipment or the goods that are being carried. This also includes the area that can be affected by goods falling from the platform or by falling working equipment.

The danger area is the area where people are at risk from:

- Movements of the industrial truck
- Movement of work equipment on the industrial truck
- Movement of lifting accessories on the industrial truck
- Movements of the load on the industrial truck
- Cargo falling from the platform
- Falling work equipment

Roadways

Condition of the roadways

Roadways must be:

- Sufficiently firm
- Free from contamination and fallen objects

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

Ensure that manhole covers and similar covers have an adequate load capacity.

There must be sufficient distance between the highest points of the industrial truck or the height of the load and the fixed points of the surroundings. The height is based on the height of the driver's cab and the dimensions of the load.

Driving on ramps/platforms

⚠ DANGER

Risk of accident due to the industrial truck crashing!

When driving near edges (e.g. ramps, platforms), particular care must be taken. In the event of powerful steering movements (e.g. evasive manoeuvres) in the direction of the edge, the industrial truck may fall over the edge.

– Closely observe the traffic situation in the area where the truck is being driven.

– If necessary, drive slowly and stop until the traffic situation allows driving to be continued safely.

Driving on slopes

– Drive on slopes at reduced speed. Adjust the speed according to the gradient.

If the industrial truck is frequently used on slopes, the equipment variant "Descent Speed Regulation DSR" can be ordered. See the chapter of the same name under "Assistance systems".

Rules for roadways and the working area

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

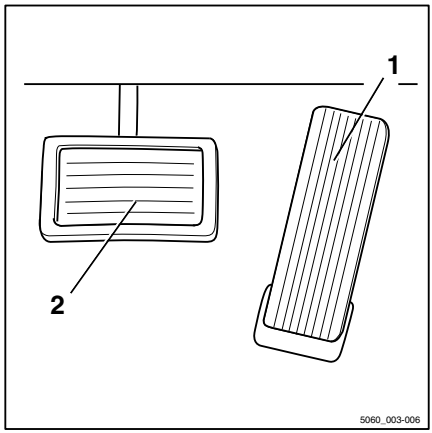
Hazardous areas

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

Visibility when driving and manoeuvring

- The driver must look in the drive direction and have a sufficient view of the driving lane.
- The driver must be sure that the driving lane is clear, particularly for reverse travel. If this is not possible, then a second person acting as a traffic supervisor must walk in front of the industrial truck.
- In such cases, only drive at walking pace and always take extra care. If the driver loses eye contact with the traffic supervisor, the driver must stop the industrial truck immediately.
- Always use the rear-view mirrors when manoeuvring. In areas with very poor visibility, a second person can also be used as a guide. This applies in particular to the platform tractor with a fabric structure, as the view to the rear from this tractor is severely restricted.
- If visual aids (mirrors, monitors) are required to achieve sufficient visibility, carefully practise driving with these aids. Extra care must be taken during reverse travel using visual aids.
- Any glass and mirrors must always be clean and free of mist and ice.

Operating the service brake ▷



The regenerative brake converts the acceleration energy of the industrial truck into electrical energy. This causes the industrial truck to brake.

– To do this, release the accelerator pedal (1).
– If the braking effect is inadequate, use the brake pedal (2) to actuate the service brake. In the first part of the brake pedal travel, both the electric brake on the rear wheels and the mechanical brake on the front wheels have an effect. The mechanical brake on the rear wheels also has an effect when the brake is depressed further.

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

The strength of the electric braking can be adjusted via the ABE.

⚠ DANGER

Risk of accident! If the service brake fails, the industrial truck no longer brakes sufficiently.

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

– Brake the industrial truck to a standstill. Use the parking brake if necessary to assist in this process.
– Notify the authorised service centre.
– Do not operate the industrial truck again until the service brake has been repaired.

⚠ DANGER

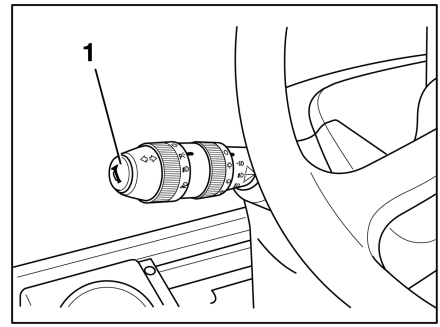
At excessive speeds, there is a danger that the industrial truck could skid or overturn!

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

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

Operating the horn

– Push the knob (1) at the end of the "Lighting" operating lever on the left of the steering column. ▷



NOTE

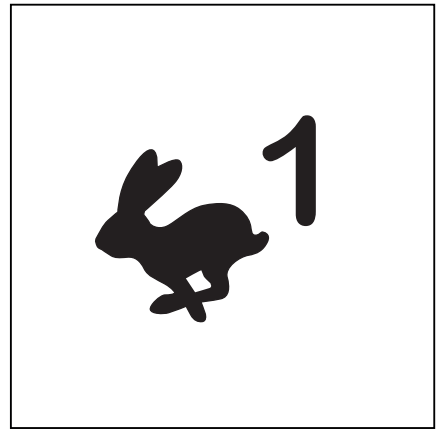
As an option, the "Lighting" operating lever can be fitted on the right-hand side of the steering column.

Selecting drive programmes 1 to 3 ▷

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

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

– Press the 1... softkey to select the desired drive programme. Push 3.



– If the drive programmes are saved as a favourite on a softkey, press the "Drive programme" softkey until the number of the desired drive programme is shown on the display.

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



Selecting drive programme A or B

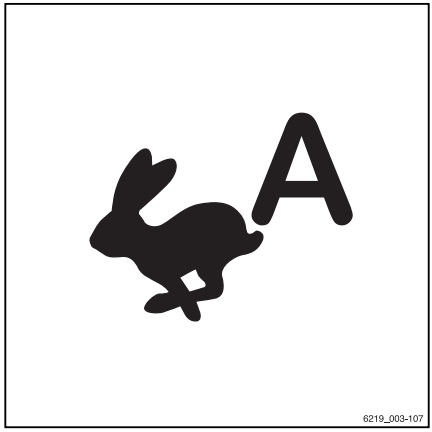
The industrial truck has two driving programmes for different driving and braking characteristics.

Unlike the fixed drive programmes "1 to 3", the programs "A" and "B" can be configured. The procedure for this is described in the following section.

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

– Press the ^{A} or ^{B} softkey to select the desired drive programme.

– If the drive programmes are saved as a favourite on a softkey, press the "Drive programme" Softkey until the letter of the desired drive programme is shown on the display.



Configuring drive programmes A and B

The drivers can configure the driving programmes themselves.

NOTE

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

– Stop the industrial truck.

– Apply the parking brake.

The process for configuring the driving programmes is explained below using "drive programme A".

– Press the ☰ button.

The first menu level appears.

– Press the "Settings" softkey ⚙.

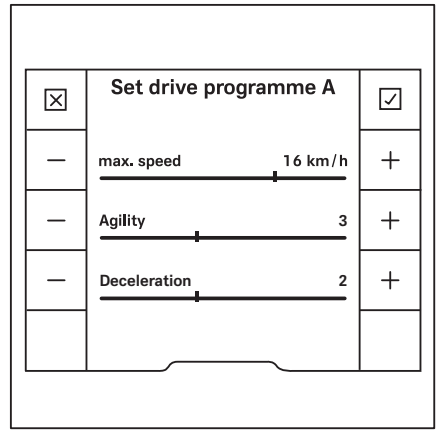
– Press the `Truck settings` softkey 🚚⚙.

– Press the `Drive programmes` softkey.

The "drive programme" menu appears.

– Press the associated softkey for `drive programme A` or `drive programme B`.

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



The following parameters can be set:

- `Max. speed`
  Determines the maximum speed (max. 20 km/h).
- `Agility`
  Determines the acceleration behaviour and the reversing behaviour using five levels.
  "1" indicates the lowest agility and "5" indicates the greatest agility
- `Deceleration`
  Determines the delay using five levels.
  "1" indicates the lowest delay and "5" indicates the greatest delay

– To select a higher level, press the appropriate "plus" ＋ softkey.

– To select a lower level, press the appropriate "minus" － softkey.

– To save the setting, press the "confirm" ☑ Softkey.

The settings are saved.

– To cancel the setting, press the "cancel" ☒ Softkey.

The settings return to the most recently saved value.

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

Actuating the parking brake



⚠ DANGER

Risk of fatal injury from being run over if the industrial truck rolls away.

– The industrial truck must not be parked on a slope.
– In emergencies, secure the truck using wedges on the side facing downhill.
– Do not leave the industrial truck until the parking brake has been applied.

NOTE

*The electric parking brake can be activated or released only if the battery male connector has been connected **and** the key switch is switched on. When the industrial truck is switched off, the parking brake is applied and the industrial truck is braked.*

This industrial truck is equipped with an electric parking brake. It is not necessary to apply the parking brake manually when the driver leaves the industrial truck. The parking brake is applied automatically.

Despite these automatic aids, it is always the driver's responsibility to park the industrial truck safely. The safety information about parking the industrial truck safely is applicable.

If the parking brake is applied, this is indicated by a symbol in the display-operating unit in place of the driving speed.

Symbols for the parking brake in the display-operating unit

Symbol	Description
(Ⓟ)	The parking brake was applied automatically. Actuating the accelerator pedal automatically releases the parking brake.
(Ⓟ)	The parking brake was applied by pressing the push button. Pressing the push button is the only way to release the parking brake.

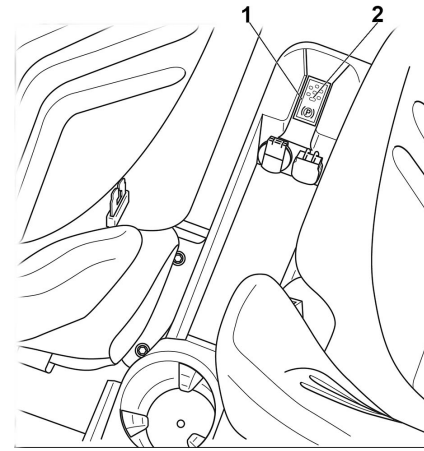
Releasing the electric parking brake after the industrial truck has been switched on

⚠ WARNING

Accidental actuation of the parking brake caused by stored objects!

– Make sure that objects stored in the storage compartment between the seats do **not** slip and thereby unintentionally actuate the push button (1) for the parking brake.

– Press the push button (1) to release the parking brake. ▷



The traction motor keeps the industrial truck at a standstill.

Manual actuation of the electric parking brake when the industrial truck is stationary

Applying the parking brake manually

– Press the push button (1).

The electric parking brake will make a noise when it is applied and the LED (2) lights up continuously. The (Ⓟ) symbol appears in the display.

Releasing the parking brake manually

– Sit on the driver's seat.

– Press the push button (1).

The electric parking brake will make a noise when it releases and the LED (2) goes out.

The driving speed display is replaced by the Ⓟ symbol. If the industrial truck is then not moved, the electric parking brake is reapplied and the Ⓟ symbol is displayed again.

Automatic actuation of the electric parking brake when the industrial truck is stationary

The electric parking brake is applied automatically when the industrial truck is stationary in the following situations:

Automatically triggered actuation when the industrial truck is stationary

Cause	Effect
The driver's seat is vacated.	The electric parking brake will make a noise when it is applied. The LED (2) lights up with a steady light.
The accelerator pedal is released (brake pedal not actuated).	After a specified delay, the electric parking brake is applied with an audible sound. The LED (2) lights up with a steady light. On a gradient, the industrial truck is held in place by the traction motor for 3 seconds. Then the electric parking brake is applied.
The industrial truck is switched off.	The electric parking brake is immediately applied with an audible sound. The LED (2) will light up briefly with a steady light until the control units switch off.
The emergency off switch is actuated.	The electric parking brake is immediately applied with an audible sound. The LED (2) lights up with a steady light.

If the electric parking brake has applied automatically, the Ⓟ symbol appears in the display-operating unit. The LED (2) lights up.

– To release the electric parking brake, the driver must sit down on the driver's seat again.

– Press the accelerator pedal.

The electric parking brake will make a noise when it is released. The LED (2) goes out.

NOTE

If the (P) symbol appears in the display, the truck cannot be driven until the electric parking brake has been released by pressing the push button (1). This is the case after starting the truck or after the parking brake has been applied manually.

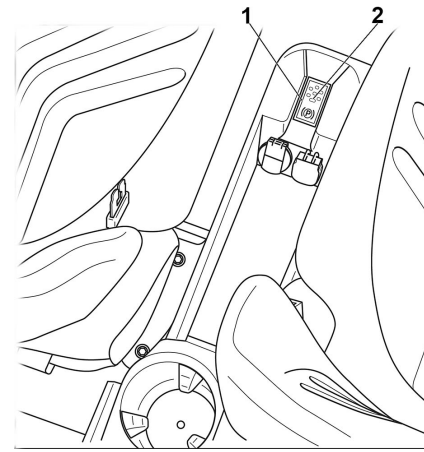
Actuation of the electric parking brake when the industrial truck is in motion

Manual actuation when the industrial truck is in motion

– Press the push button (1).

The industrial truck is braked using the drive unit in accordance with the selected drive programme. Once the industrial truck has come to a standstill, the electric parking brake is applied with an audible sound. The LED (2) lights up with a steady light. The (P) symbol appears in the display-operating unit.

– If the braking effect is insufficient, also use the service brake.



NOTE

If the drive unit fails, the industrial truck automatically brakes using the electric parking brake.

⚠ WARNING

Risk of accident!

The industrial truck can slow down jerkily.

– Fasten the seat belt.

Automatically triggered actuation when the industrial truck is in motion

Cause	Effect
The driver's seat is vacated.	The industrial truck is braked in accordance with the selected drive programme. Once the industrial truck has come to a standstill, the electric parking brake is applied with an audible sound. The LED (2) lights up with a steady light. The Ⓟ symbol appears in the display.
The key switch is switched off.	The parking brake is applied. The industrial truck immediately brakes to a standstill. The LED (2) lights up with a steady light. The Ⓟ symbol appears in the display until the control units switch off.
The emergency off switch is actuated.	The parking brake is applied. The industrial truck immediately brakes to a standstill. The LED (2) lights up with a steady light. The Ⓟ symbol appears in the display.
The industrial truck accelerates rapidly, even though the driver's seat has been vacated.	The electric parking brake is immediately applied with an audible sound. The LED (2) lights up with a steady light. The Ⓟ symbol appears in the display.
The industrial truck accelerates rapidly, even though the accelerator pedal has not been actuated.	The parking brake is immediately applied with an audible sound. The LED (2) lights up with a steady light. The Ⓟ symbol appears in the display.

Malfunctions in the electric parking brake



⚠ DANGER

Risk of fatal injury from being run over if the industrial truck rolls away.

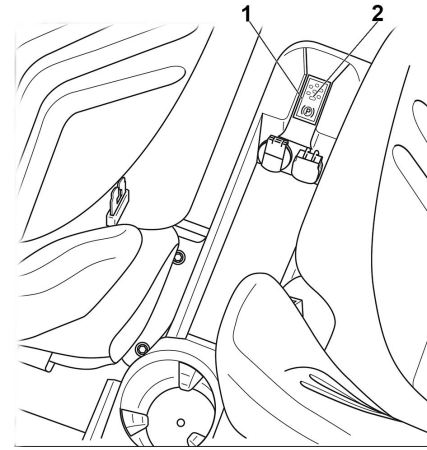
- Do not park the industrial truck on a slope.
- Only leave the industrial truck once the parking brake has been applied.
- In an emergency, secure the industrial truck with wedges on the downhill-facing side to prevent it from rolling away.

– Before leaving the industrial truck, make sure that the parking brake is properly applied.

Message:
Apply parking brake via button

If the truck control unit detects a malfunction in the parking brake, the industrial truck cannot be switched off. ▷

- The ⓘ `Apply parking brake via button` message appears on the display-operating unit.
- The LED (1) on the push button (2) flashes.
- A warning signal sounds.



NOTE

If it becomes necessary to switch off an industrial truck with a faulty parking brake, always secure the industrial truck to prevent it from rolling away.

A possible cause of the malfunction is that the parking brake cannot determine whether the industrial truck is stationary or still in motion. The following section describes how to actuate the parking brake when it is faulty:

Actuating a malfunctioning parking brake when the industrial truck is stationary

There are two ways to apply the parking brake:

– Press and hold the push button (1) for at least five seconds and then release the push button.

Or

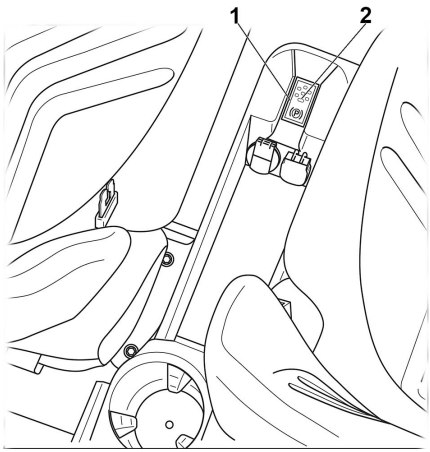
– Press the push button (1) several times in succession so that the push button is actuated for a total of five seconds.

The parking brake is applied with an audible sound. After the push button is released, the parking brake should not make any further sounds; if a sound is heard, this means the push button was pressed for less than five seconds. In this case, press the push button again to apply the parking brake again. Repeat this process as necessary until the parking brake applies and the Ⓟ symbol appears.

Actuating a malfunctioning parking brake when the industrial truck is in motion

– Press the push button (1). ▷

The parking brake is applied.



NOTE

The industrial truck brakes more strongly if the push button (1) is pressed and held down for longer or pressed several times.

"Safe parking" function

This function monitors the braking effect after the industrial truck is parked.

This function alerts the driver with an audible warning signal if:

- The driver leaves the driver's seat and it has not been possible to apply the parking brake
- The driver attempts to switch off the industrial truck and it has not been possible to apply the parking brake
- The industrial truck starts moving within the next 20 seconds after the parking brake is applied

Activation and intervention by the "Safe parking" function

Cause	Effect
The driver's seat is vacated. The electric parking brake cannot be applied or previously could not be applied.	The following message appears in the display: `Parking brake cannot be applied.` - To confirm, press the ☑ softkey. A warning signal sounds when the driver's seat is vacated. Sitting in the driver's seat silences the warning signal again.
The industrial truck is to be switched off. The electric parking brake cannot be applied or previously could not be applied.	The industrial truck cannot be switched off. A warning signal sounds. The following messages appear in the display: `Parking brake cannot be applied.` (!) - To confirm, press the ☑ softkey. `Switch off truck anyway? ?` - To confirm, press the ☑ softkey. `Secure truck against rolling away.` ⚠ - Secure the industrial truck with wedges to prevent it from rolling away. - To confirm, press the ☑ softkey. It is now possible to switch off the industrial truck.

⚠ DANGER

Risk of fatal injury from being run over by the industrial truck as it rolls away!

Park the industrial truck securely if the parking brake is faulty. Secure the truck to prevent it from rolling away.

– To do this, strictly adhere to the following instructions:

– If the parking brake cannot be applied automatically or via the push button, perform an emergency actuation of the parking brake. Refer to the section entitled "Emergency actuation of the parking brake" in the chapter "Procedure in emergencies".

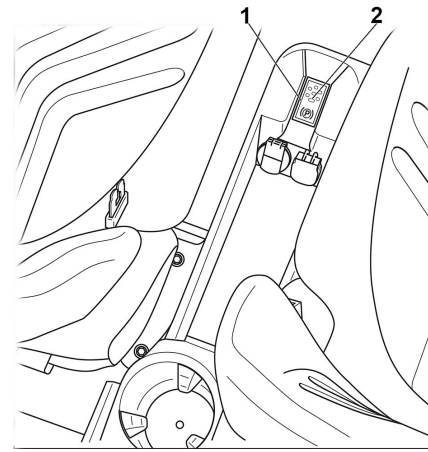
– If the parking brake cannot be applied via the emergency actuation mechanism, secure the industrial truck with wedges to prevent it from rolling away.

– Have the parking brake repaired by an authorised service centre.

Message: Parking brake cannot be applied

If the truck control unit detects a malfunction in the parking brake, the industrial truck cannot be switched off. ▷

- The message `Parking brake cannot be applied` ⓘ appears on the display-operating unit.
- The LED (2) on the push button (1) flashes.
- A warning signal sounds.



NOTE

If it is necessary to switch off an industrial truck with a faulty parking brake, see the section entitled "Switching off the industrial truck when the electric parking brake is faulty". Secure the industrial truck so that it cannot roll away.

NOTE

If the parking brake is released via the emergency actuation mechanism, it is possible to drive the truck at a low speed.

- *The industrial truck can be moved out of the hazardous situation or to the repair location.*
- *Driving with a faulty parking brake requires the driver to be especially vigilant.*

– If the parking brake cannot be applied automatically or via the push button, apply the parking brake via the emergency actuation process. Refer to the section entitled "Emergency actuation of the parking brake" in the chapter "Procedure in emergencies".

– If the parking brake cannot be applied via the emergency actuation mechanism, secure the industrial truck with wedges to prevent it from rolling away.

– Have the parking brake repaired by an authorised service centre.

Starting drive mode

The driver's seat is equipped with a seat switch. This seat switch checks whether the driver's seat is occupied. If the driver's seat is not occupied or if the seat switch is malfunctioning, the industrial truck cannot be moved. In this case, the message `Sit in the driver's seat` appears in the display of the display-operating unit.

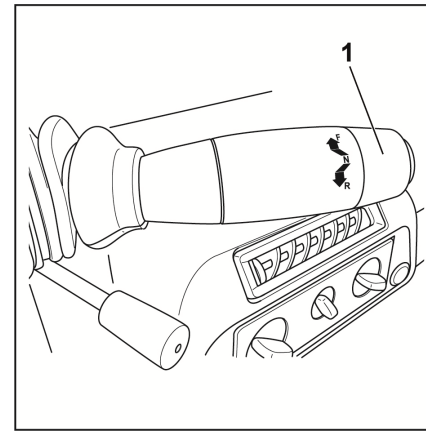
– Sit in the driver's seat.

– Fasten the seat belt.

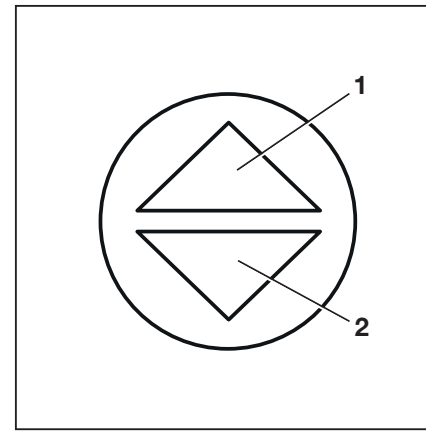
– Release the parking brake.

– Select the desired drive direction using the drive direction selection lever (1) on the right of the steering column. In the neutral position, the drive direction selection lever is blocked and cannot be moved. To engage a drive direction, proceed as follows:

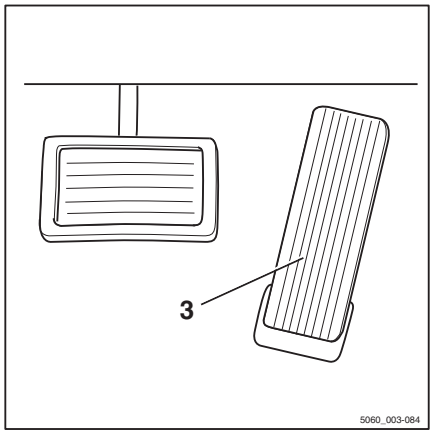
- **Forwards**: Pull the drive direction selection lever from the neutral position (1) towards the steering wheel and move it upwards.
- **Backwards**: Pull the drive direction selection lever (1) towards the steering wheel and move it downwards.



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



– Press the accelerator pedal (3). The industrial truck will travel in the selected drive direction. The speed is controlled by the accelerator pedal position. When the accelerator pedal is released, the industrial truck will decelerate.



NOTE

The industrial truck is also held in place on uphill and downhill gradients even if the electric parking brake is not actuated.

⚠ DANGER

Risk of accident due to brake failure!

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

– Use the brake pedal if the regenerative brake malfunctions.

Changing the drive direction

– Take the foot off the accelerator pedal (3).

– Use the drive direction selection lever (1) to select the desired drive direction.

– Press the accelerator pedal (3). The industrial truck will travel in the selected drive direction.

Speed limitation (variant)

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



Switching the speed limitation on and off

– Press the ☰ button.

The first menu level appears.

– Press the `Drive` softkey.

The `drive` menu appears.

– Press the `Speed restriction` softkey .

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

– To switch off the speed restriction, press the softkey again.

Configuring the speed limitation

NOTE

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

– Stop the industrial truck.

– Actuate the parking brake.

– Press the menu button .

– Press the `Settings` softkey .

The first menu level appears.

– Activate the "Access authorisation for the fleet manager".

– Press the `Truck settings` softkey .

– Press the `Speed restriction` softkey .

The menu that opens offers the following functions:

- `Permanently`
  Enabling this function limits the speed until the fleet manager disables this function.
- `By button click`
  If this function is activated, the driver may switch the speed limitation on and off by pressing the softkey.
- `Enter max. speed`
  This menu can be used to set the maximum speed of the industrial truck when speed limitation is active.

– To adjust the maximum speed, press the `Enter max. speed` softkey.

The `speed limitation` menu opens. ▷

– Using the softkeys, set a maximum speed between 2 km/h and 20 km/h.

The maximum speed is dependent on the industrial truck equipment and may be restricted by a factory setting.

– To save, press the menu button ☰.

The maximum speed is entered.

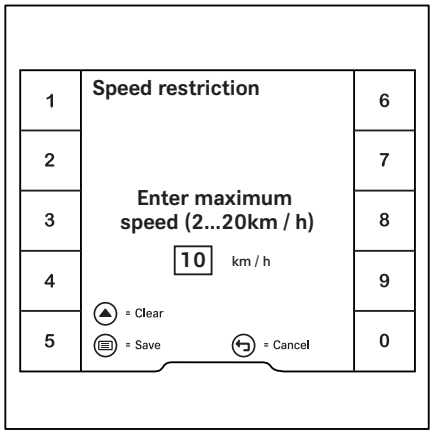
– To clear, press the scroll button △.

The entry is deleted.

– To cancel, press the back button ↩.

The display returns to the previous menu.

The main display button ⌂ takes you to the main display.



Display for uphill and downhill gradients

The main display of the display-operating unit shows the current uphill gradient or current downhill gradient of the route travelled. A downhill gradient is displayed with a negative sign (A) and an uphill gradient is displayed without a sign (B). To the right of this display, the maximum permissible value for an uphill gradient or a downhill gradient for the industrial truck is also displayed. This allows the driver to assess at any time whether they are still within the permissible tolerances with the industrial truck. ▷



Parking the industrial truck securely and switching it off



⚠ DANGER

Risk of fatal injury from being run over if the industrial truck rolls away.

– Do not park the industrial truck on a slope.

– In emergencies, secure the truck using wedges on the side facing downhill.

– Do not leave the industrial truck until the parking brake has been applied.

⚠ CAUTION

Batteries may freeze!

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

– When the ambient temperature is below -10°C, park the industrial truck only for short periods of time.

– Ensure that the industrial truck is parked so as not to cause a danger or obstacle.
– Apply the parking brake.
– Turn the switch key to position "0" and remove the key.
– If the industrial truck is not being used for a prolonged period, pull out the battery male connector.

NOTE

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

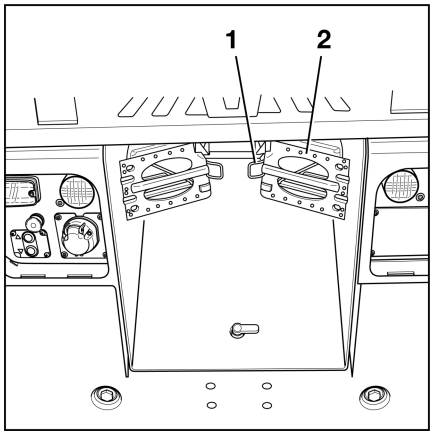
Wheel chock (variant)

The wheel chocks are used to secure the industrial truck against rolling away on a gradient.

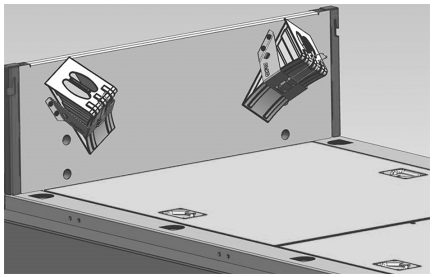
– Pull the latch forwards (1) and hold it in place.

Tow tractor mounting position: at the rear of the truck, between the taillights.

Platform tractor mounting position: on the front platform panel of the loading area.



– Grasp the wheel chock by the handle and pull it out.
– Push the wheel chock under a rear axle wheel on the side facing the descending gradient.
– After use, reinsert the wheel chock in the support mounting.
– Make sure that it is correctly seated in the guide and that the latch is holding the wheel chock in place.



Auxiliary equipment

FleetManager (variant)

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

SVI STILL Vehicle Interface (variant)

Description of SVI

The "SVI STILL Vehicle Interface" is an interface for connecting external fleet management and assistance systems to the industrial truck. On a plug strip, it provides eight connection options for CAN bus, digital connections and a power supply. The SVI can be used to connect fleet management systems in accordance with VDI 4458 and assistance systems in accordance with VDI 4482. Energy and signals can be transferred via this interface.

⚠ CAUTION

The systems that can be connected via the SVI are fleet management systems and assistance systems; they **are not** safety systems. They help the driver to carry out their work with the industrial truck.

The driver remains fully responsible for handling the industrial truck safely.

– Always monitor the working environment of the industrial truck and always operate the industrial truck carefully.

⚠ CAUTION

Risk of component damage due to ingress of moisture.

– Make sure that the connector plugs of the external assistance systems are sealed.

NOTE

The plugs of the SVI are fitted with sealing plugs ex works. Remove the sealing plugs when connecting systems.

SVI installation situation

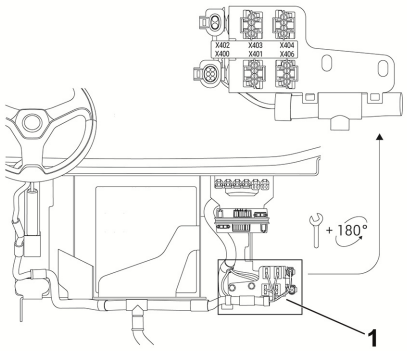
The SVI is installed in the front right of the operator's cab behind the cover under the dashboard. The pin assignment is not visible when the SVI is installed.

– To connect the plugs, remove the SVI and turn it over.

NOTE

The position of the SVI is the same for right-hand and left-hand-drive vehicles.

Position of SVI (1) ▷



Pin assignment for the SVI

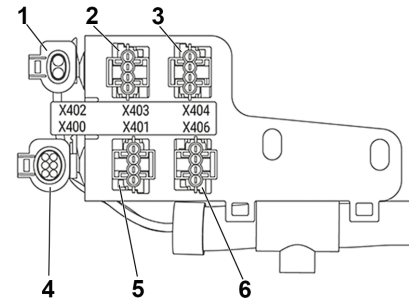
The SVI provides a total of eight connection options:

- Four CAN bus connections
- Three digital inputs
- One 12-V power supply
- 7A fuse

Item	Plug designation	Plug type	Pin assignment
(1)	X402: 12-V supply with 60 W (more on request)	FEP plug 2-pin female, Type 42034000 (page on third-party system, manufacturer FEP)	Pin 1: +12 V Pin 2: GND
(2)	X403: CAN 3 (VDI 4482)	SAAB plug 4-pin (pin) Type 1-965261-1 (page on third-party system, manufacturer TE) Pin assignment in accordance with VDI 4482	Pin 1: CAN H 3 Pin 2: CAN L 3 Pin 3: +12 V (input) Pin 4: GND 3
(3)	X404: CAN 4 (VDI 4482)	SAAB plug 4-pin (pin) Type 1-965261-1 (page on third-party system, manufacturer TE) Pin assignment in accordance with VDI 4482	Pin 1: CAN H 4 Pin 2: CAN L 4 Pin 3: +12 V (input) Pin 4: GND 4
(4)	X400: 3 digital inputs	FEP plug 6-pin female Type 42121700 (page on third-party system, manufacturer FEP)	Pin 1: dig_input1 Pin 2: DGND Pin 3: dig_input2 Pin 4: DGND Pin 5: dig_input3 Pin 6: DGND
(5)	X401: CAN 1 (VDI 4458)	SAAB plug 4-pin (pin) Type 1-965261-1 (page on third-party system, manufacturer TE) Pin assignment in accordance with VDI 4458	Pin 1: CAN-H Pin 2: CAN-L Pin 3: +12 V (output) Pin 4: GND chassis
(6)	X406: CAN 6 (VDI 4482)	SAAB plug 4-pin (pin) Type 1-965261-1 (page on third-party system, manufacturer TE) Pin assignment in accordance with VDI 4482	Pin 1: CAN H 6 Pin 2: CAN L 6 Pin 3: +12 V (input) Pin 4: GND 6

SVI connector locations

▷



NOTE

The plug designations are also marked on an adhesive label next to the plugs. The adhesive labels are not visible when the SVI is installed. Remove the SVI and turn it over to read the adhesive labels.

Assistance systems

Descent Speed Regulation (DSR) (variant)

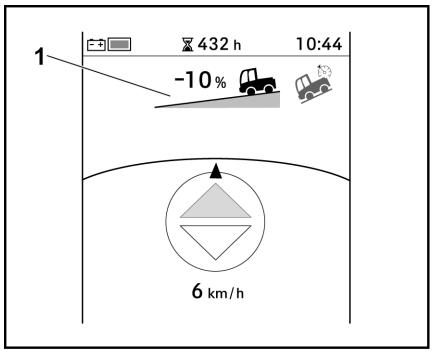
General

Descent Speed Regulation (DSR) is an assistance system that actively assists the driver when driving on gradients. There are three different DSR versions that differ in the level of assistance that they offer the driver:

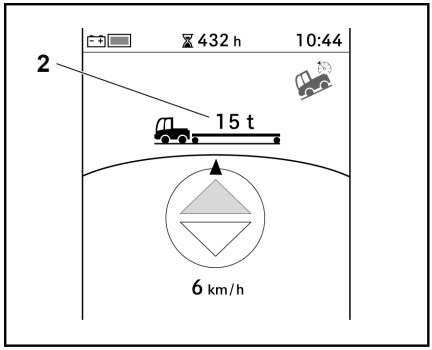
- DSR Basic
- DSR Eco
- DSR Premium

DSR displays in the display-operating unit:

Tilt angle display (1): available with DSR Eco and Premium. Displays the current inclination of the industrial truck in %. If the industrial truck is moving on a downhill gradient, a "-" appears in front of the percentage. For an uphill gradient, a "+" appears in front of the percentage.



Load measurement (2): available with DSR Premium. The system measures the towed load with an accuracy of +/- 5 - 10 %. Depending on the design of the industrial truck, the deviation is approx. 1 t.



Operation and function

The details of the different versions are described below.

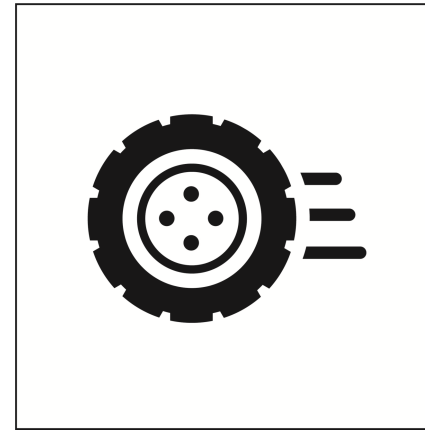
DSR Basic

DSR Basic becomes active as soon as the industrial truck is switched on.

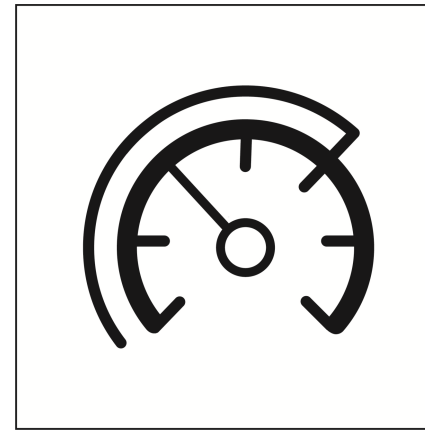
The "Hill descent assistant" symbol appears on the display of the display-operating unit. Initially, the symbol is grey. It turns black as soon as the hill descent assistant actively intervenes in the driving behaviour. For this

to occur, the system must be switched on via the corresponding softkey on the display-operating unit. To do this, proceed as follows:

– Press the softkey to enter the "Driving" function menu. ▷



– Press the "Speed restriction" softkey to activate the hill descent assistant. An orange activation bar appears next to the softkey when the hill descent assistant is activated. ▷



These DSR functions are now active.

- The maximum driving speed is restricted to a previously selected value. This applies to both forward and reverse travel. The value for the maximum speed is either set at the factory or can be changed later by the authorised service centre.
- When driving on a downhill gradient, DSR automatically brakes the industrial truck as soon as the set maximum driving speed is exceeded. The driver does not need to actively brake and can keep the accelerator pedal depressed.
- On level ground, DSR automatically brakes the industrial truck as soon as the set maximum driving speed is exceeded.

DSR Eco

DSR Eco becomes active as soon as the industrial truck is switched on. The "DSR" symbol appears on the display of the display-operating unit. Initially, the symbol is grey. It becomes black as soon as DSR actively intervenes in the driving behaviour.

- The driving speed is not restricted when driving on an uphill gradient or level ground. The symbol is grey. There is also the option to activate a speed restriction for the driving speed when driving on an uphill gradient or level ground.
- The industrial truck uses its sensors to detect whether it is driving uphill, downhill or on level ground.
- The authorised service centre can set a maximum driving speed for driving on a downhill gradient.
- Tilt angle display in the display-operating unit (see description above). When driving on a downhill gradient, DSR automatically brakes the industrial truck as soon as the set maximum driving speed for a downhill gradient is exceeded. The driver does not need to actively brake and can keep the accelerator pedal depressed. The symbol turns black as soon as DSR actively intervenes.
- As soon as the industrial truck reaches level ground, it accelerates again automatically. For this to happen, the accelerator pedal must be depressed. The symbol turns grey again.

DSR Premium

DSR Premium becomes active as soon as the industrial truck is switched on. The "DSR" symbol appears on the display of the display-operating unit. Initially, it is grey. It becomes black as soon as DSR actively intervenes in the driving behaviour. DSR Premium includes the following indicators and assistance functions:

- The driving speed is not restricted when driving on an uphill gradient or level ground. The symbol is grey.
- The industrial truck uses its sensors to detect whether it is driving uphill, downhill or on level ground.
- Tilt angle and load display in the display-operating unit (see description above). DSR adjusts the vehicle speed accordingly. When driving on a downhill gradient, the sensors detect whether a trailer and a load are present. It also determines the size of the load and the degree of gradient. The deceleration and the maximum driving speed are then automatically adjusted to this load and this gradient. If a fixed maximum driving speed has also been set, the

system always chooses the lower of the two speeds.

- When driving on a downhill gradient, DSR automatically brakes the industrial truck as soon as the set maximum driving speed is exceeded. The driver does not need to actively brake and can keep the accelerator pedal depressed. The symbol turns black as soon as DSR actively intervenes.
- As soon as the industrial truck reaches level ground, it accelerates again automatically. For this to happen, the accelerator pedal must be depressed. The symbol turns grey again.

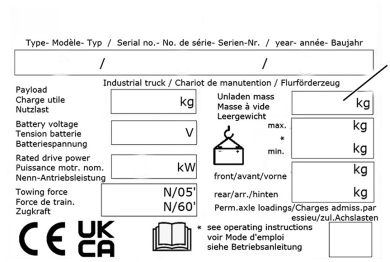
Calibrating Descent Speed Regulation (DSR)

For DSR to function correctly, the truck weight must first be entered. In addition, the idle position of the truck must be calibrated and a calibration run must be performed. At a minimum, fleet manager access authorisation is required for these steps.

Entering the truck weight

First, the total actual weight of the industrial truck must be determined. To do this, proceed as follows:

– Read the tare weight (1) of the truck off the nameplate of the industrial truck. ▷

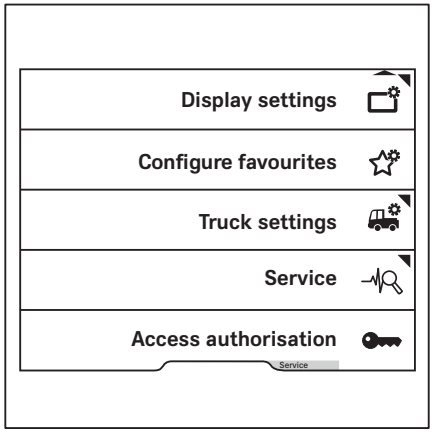


– Read the battery weight off the nameplate of the battery. If it is not indicated there, ask the battery manufacturer for the battery weight.

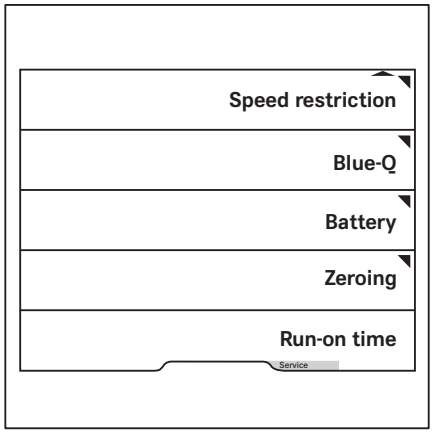
– Add the individual weights listed below to the total actual weight.

Truck tare weight from the nameplate (1)
\+ Battery weight
\+ Weight of the load currently being carried by the industrial truck
\+ Weight of other attachments on the industrial truck, e.g. snow plough or loading crane
\+ 100 kg allowance for driver
= Total actual weight

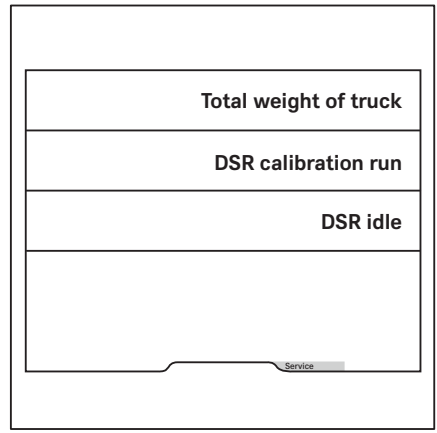
– Activate fleet manager access authorisation via the display-operating unit; see the chapter entitled "Access authorisation for the fleet manager (variant)".
– Press the "Menu" button on the display-operating unit .
– Press the `Settings` softkey .
– Press the `Truck settings` softkey. ▷
– In the `Truck settings`, press the "scroll" button △ ▽ until the `Zeroing` menu appears.



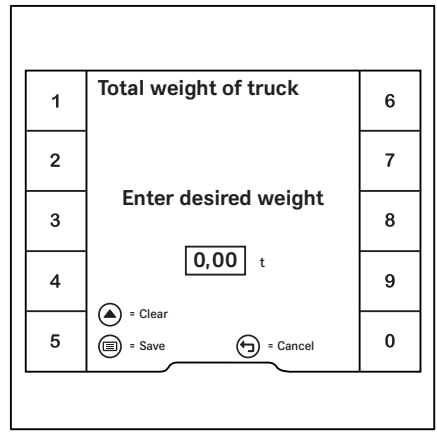
– Press the `Zeroing` softkey. ▷



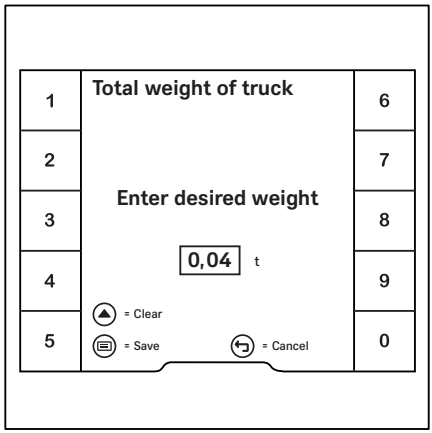
– Press the `Total weight of truck` softkey. ▷



– In the `Total weight of truck` menu, enter the total actual weight in tonnes using the number softkeys. ▷

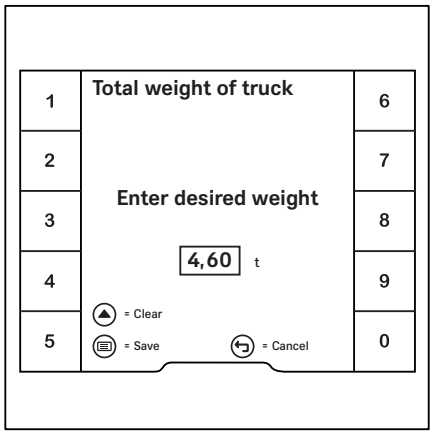


– To do this, enter the desired weight without a decimal separator. For example, if the weight is 4.60 t, press the softkeys "4", "6" and "0". As you enter each digit, the digits move from right to left in the display field. ▷



– Ultimately, the desired value appears in the display field. ▷

– To save the entry, press the ☰ button.



Calibrating the idle position

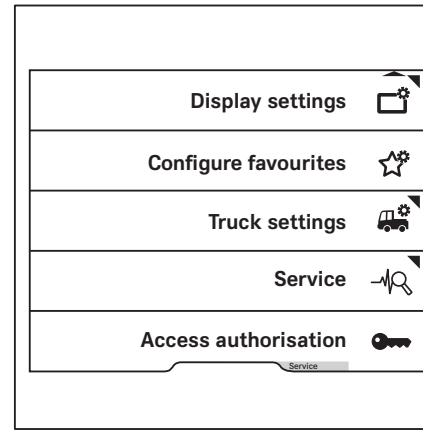
To calibrate the idle position, park the industrial truck on a surface that is as level as possible and apply the parking brake.

– Activate fleet manager access authorisation via the display-operating unit; see the chapter entitled "Access authorisation for the fleet manager (variant)".

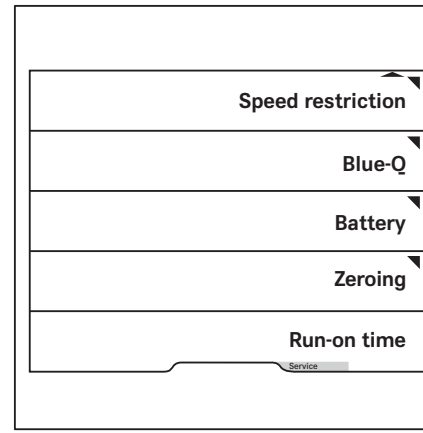
– Press the "Menu" button on the display-operating unit ☰.

– Press the `Settings` softkey ⚙.

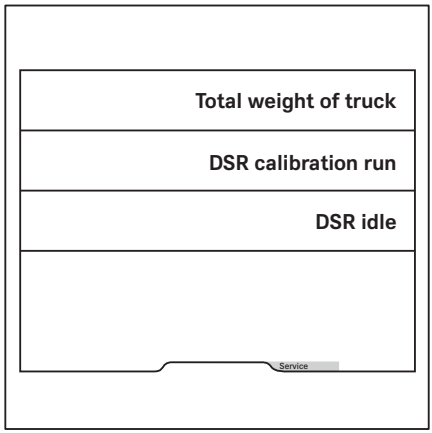
– Press the `Truck settings` softkey. ▷
– In the "Truck settings", press the "scroll" button △ ▽ until the `Zeroing` menu appears.



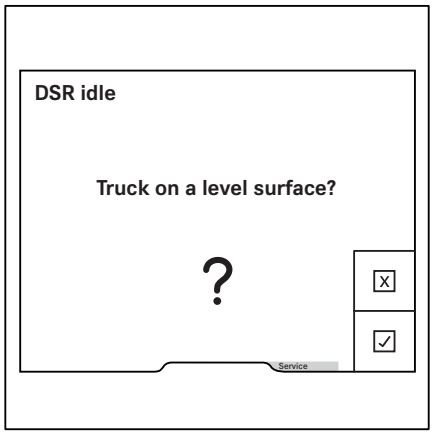
– Press the `Zeroing` softkey. ▷



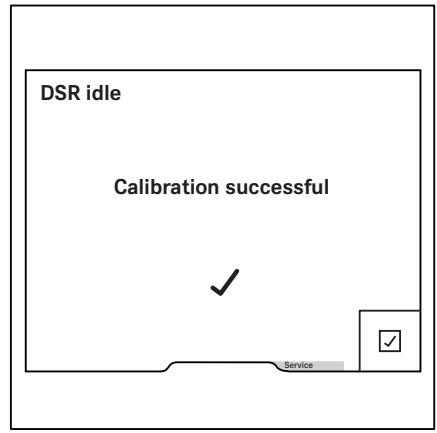
– Press the `DSR idle` softkey. ▷



– A dialogue asking whether the truck is on a level surface opens. If this is the case, confirm with the "Tick" softkey. ▷



– The calibration is performed. If successful, the message `Calibration successful` appears. Confirm with the "Tick" softkey to exit the menu. ▷



If the calibration was unsuccessful, the message `Calibration failed` appears. Confirm with the "Tick" softkey to exit the menu and perform the calibration again.

Calibration run

The calibration run is used to coordinate the sensors of the industrial truck with one another.

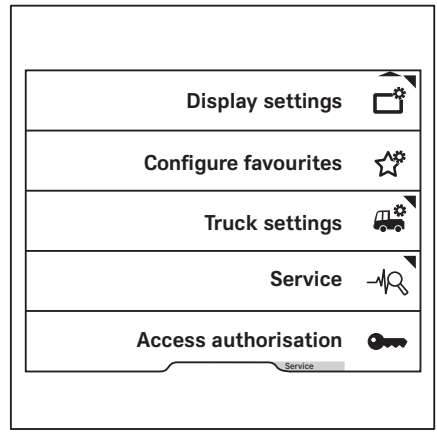
– Activate fleet manager access authorisation via the display-operating unit; see the chapter entitled "Access authorisation for the fleet manager (variant)".

– Press the "Menu" button on the display-operating unit ☰.

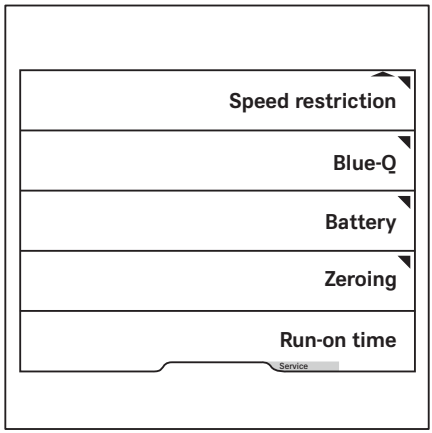
– Press the `Settings` softkey ⚙.

– Press the `Truck settings` softkey. ▷

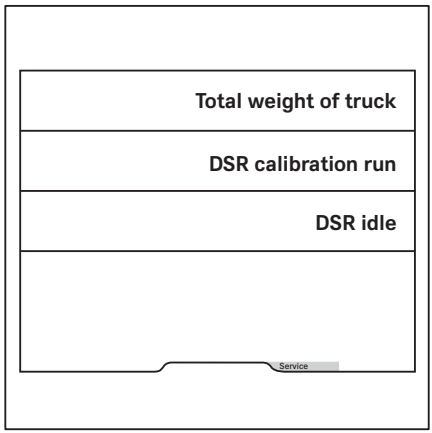
– In the `Truck settings`, press the "scroll" button △ ▽ until the `Zeroing` menu appears.



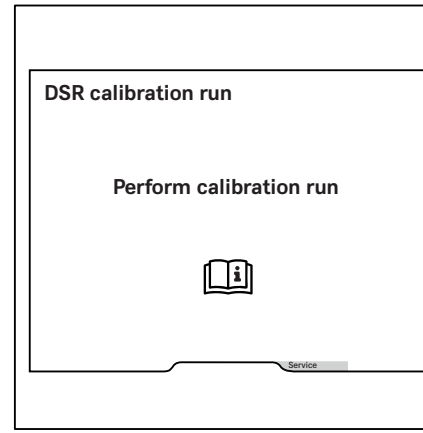
– Press the `Zeroing` softkey. ▷



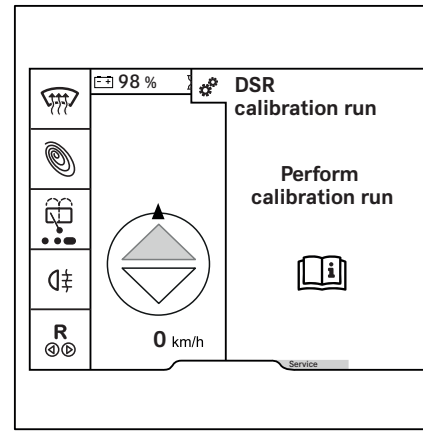
– Press the `DSR calibration run` softkey. ▷



– In the `DSR calibration run` menu, a message prompts you to start the calibration run. ▷

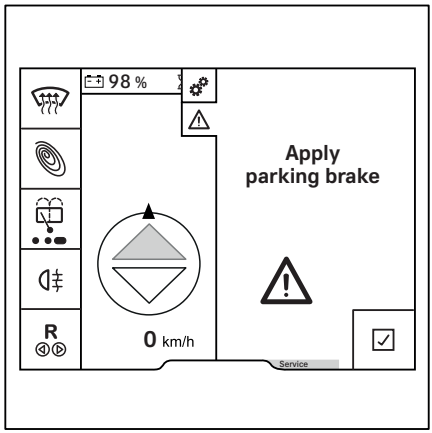


– Release the parking brake and start the calibration run. The display changes and the drive direction indicator, the speed indicator and the left-hand softkey bar appear. ▷
– For the calibration run, drive a slalom and in a circle.



– Stop at the end of the calibration run. The message `Apply parking brake` appears.
– Apply the parking brake. A message informs you whether the calibration run was successful or not.

▷



Rear view camera (variant)

The rear view camera assists the driver with reversing and manoeuvring.

For safe operation of the camera system, it must be sufficiently bright. The camera system is not suitable for poorly lit or dark environments. External influences such as rain, sunlight, headlights etc. can affect the image display.

⚠ DANGER

Risk of accident!

If a camera is misaligned or damaged, a reliable camera view can no longer be guaranteed.

– The driver must always check the area displayed on the monitor by also making direct visual contact.

⚠ CAUTION

The camera system is an aid to the driver.

However, the driver is always responsible for safe operation of the truck.

– **Do not** rely solely on the camera system and always observe the immediate surroundings of the industrial truck.
– To obtain a complete view of the safety-relevant areas, use additional aids such as mirrors.

⚠ CAUTION

Distorted display of the surroundings. Distances and geometric dimensions of obstacles may differ in reality from the representation on the screen.

– Regardless of the cameras, always look in the direction you are driving.

– **Do not** rely solely on the camera system.

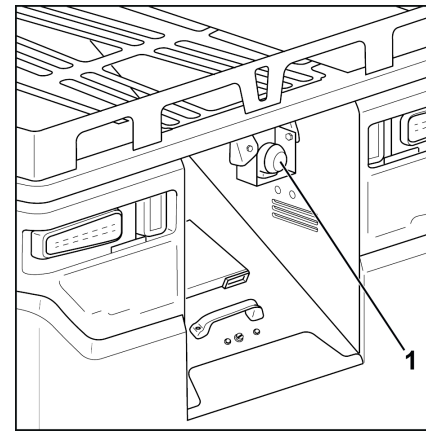
NOTE

- *The monitor is fitted with a cover to protect it from operating errors.*
- *The components of the camera system must not be opened.*
- *Only the authorised service centre may install and maintain the camera system.*

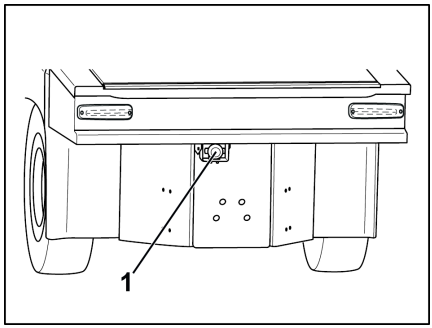
Camera position

The camera is located on the rear of the truck.

Camera position (1) on the tow tractor. ▷



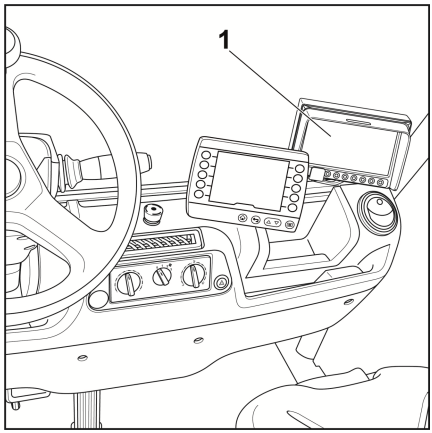
Camera position (1) on the platform tractor. ▷



Function

The images from the camera are projected onto a second monitor (1) in the driver's cab. It is located next to the display-operating unit. ▷

The camera and the monitor switch on automatically when the "reverse" drive direction is selected.



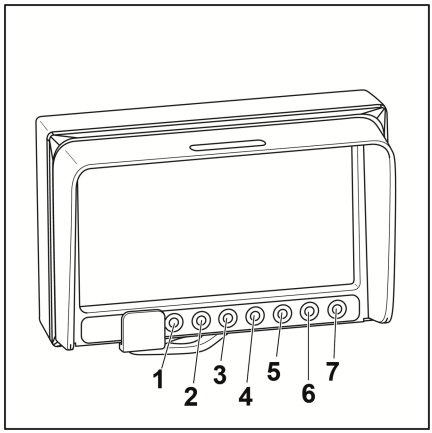
The settings on the monitor are adjusted using the seven function keys: ▷

1 Day/night settings for controlling the automatic background lighting: To switch between day and night settings for the automatic background lighting, press the button.

2 Adjusting the contrast: To activate adjustment mode, press the button once. Then adjust the contrast using the "minus" button (5) and the "plus" button (6).

3 Adjusting the brightness: To activate adjustment mode, press the button once. Then adjust the brightness using the "minus" button (5) and the "plus" button (6).

2 and 3 Adjusting colour saturation: To activate adjustment mode, press the "contrast"



button (2) and the "brightness" button (3) at the same time. Then adjust the colour saturation using the "minus" button (5) and the "plus" button (6).

4 Returning to the previous menu: To return to the previous menu, press the button.

5 Minus button: Adjust contrast, brightness and colour saturation. Go to the next menu item or to the left.

6 Plus button: Adjust contrast, brightness and colour saturation. Go to the previous menu item or to the right.

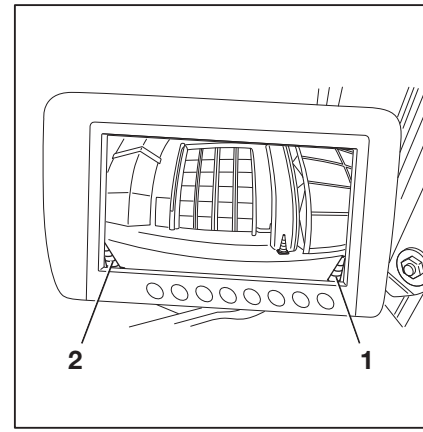
7 Enter button: Switch to "standby" or activate the selected menu option.

Due to the installation position of the camera, a certain area directly behind the industrial truck is not captured in the image. This blind spot should be captured so that the driver can take it into account when using the camera. To do this, proceed as follows:

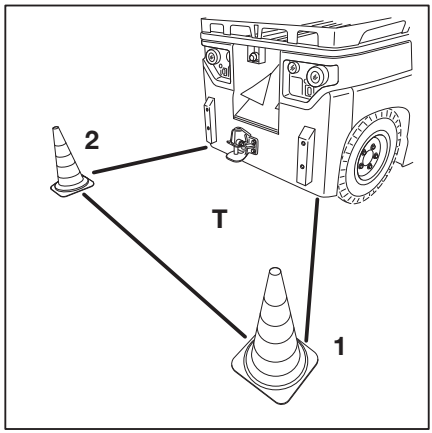
– Park the industrial truck securely.

– Engage the "reverse" drive direction to switch on the camera and the monitor.

– Position two marks (1) and (2), for example marking cones, behind the industrial truck so that they can be seen in the lower right-hand corner and lower left-hand corner of the monitor. ▷



– The area "T", the limits of which are defined by the two marking cones and the rear of the industrial truck, roughly describes the blind spot behind the industrial truck. The camera image **does not** capture this area. ▷



Cleaning

– Clean the camera lens with compressed air or use a small amount of glass cleaner to moisten the lens.

– Then carefully wipe away with a lint-free cloth. Do not use an aggressive cleaning agent or solvents.

– Do not use high-pressure cleaning equipment.

– Carefully wipe the monitor with a lint-free cloth. Do not use an aggressive cleaning agent or solvents.

– Occasionally remove dust from the monitor's ventilation slots with a cloth or brush.

Trailer and load

Opening and closing the platform panels

The platform panels are designed to protect light objects such as tool boxes, lashing equipment, pieces of hand luggage and the like from falling off the loading surface.

– Secure heavier loads in accordance with the applicable national regulations and standards.

Opening the side folding platform panel

⚠ WARNING

Risk of crushing

Do not attempt to open the platform panel when a load is resting against it. In this case, the platform panels could burst open uncontrollably or a load could fall out.

⚠ WARNING

Risk of injury to persons along the route due to unsecured transparent tarpaulin!

– Only drive with properly secured closed or rolled up open transparent tarpaulin.

⚠ CAUTION

Possible component damage!

Do not drive with the side panel open.

– If the platform panels interfere, they may have to be dismantled and the load secured accordingly.

⚠ CAUTION

Possible component damage!

Hold the platform panel securely in place when opening and closing it.

⚠ CAUTION

Possible component damage due to collision of the platform panels with the chassis!

– Do not let the platform panels fall when opening, but fold them down in a controlled manner.

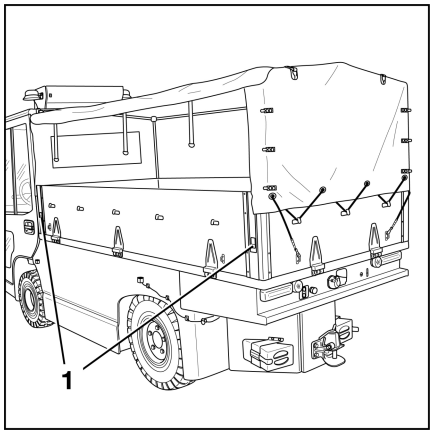
⚠ CAUTION

Possible component damage due to collision of the platform panels with the chassis!

The rear platform panel becomes free when both side platform panels are open. It can then fold down uncontrolled.

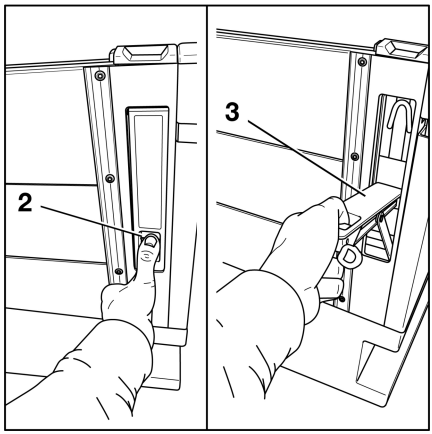
– After opening the first side platform panel, always open the rear platform panel first in a controlled manner before opening the second side platform panel if necessary.

– If the industrial truck has a tarpaulin structure, loosen the lashing straps of the side tarpaulins and push the tarpaulin up. ▷



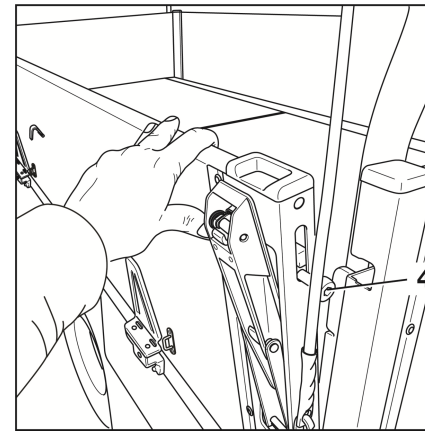
– Open the bars (1) on both sides of the platform panel. To do this, push the knurled button (2) down and push the lever (3) all the way up. The platform panel is noticeably unlocked. ▷

– Gently fold the platform panel down using both hands.

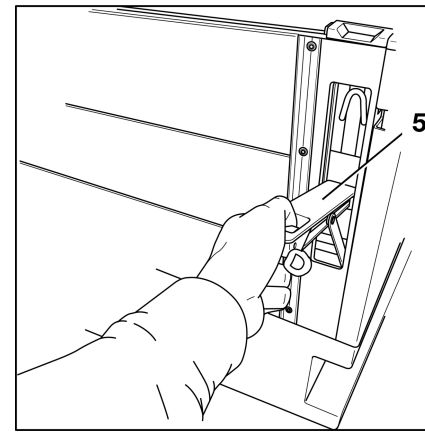


Closing the side folding platform panel

– Fold the platform panel up using both hands. Make sure that the locking bolts (4) are securely engaged in the guides provided for them and can be moved up and down there. ▷



– Pull the lever (5) all the way down and push it firmly into the end position until the interlock engages audibly. ▷

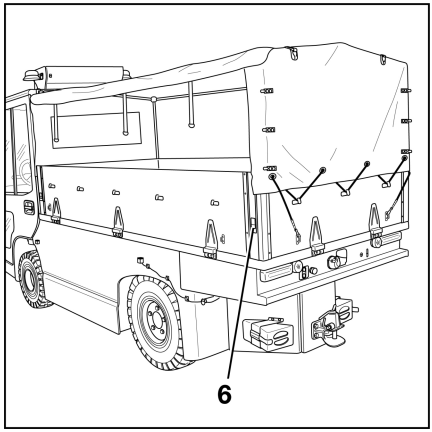


Opening and closing the rear folding platform panel

The rear platform panel is locked via the two rear bars (6) on the platform panels on the right-hand and left-hand side.

– Open and close the two rear bars as described in the previous two chapters. The rear platform panel can be opened or closed.

▷



Loading a platform

⚠ DANGER

Increased risk of accidents due to unauthorised loads and improper use!

– Never exceed the maximum loads shown! These values apply to compact and homogeneous loads.

– Do not transport people on the loading surface.

– Always distribute and secure the load evenly on the platform. A platform tractor with a load capacity of 2 t may be loaded with a maximum of 1 t each on the front and rear load floor. With a load capacity of 3 t, each with a maximum of 1.5 t.

– Transportation of loose bulk material on the loading surface is not permitted. This must be transported in suitable containers. Small parts smaller than 10 mm wide can get into the battery or engine compartment through gaps and cause damage and hazards there.

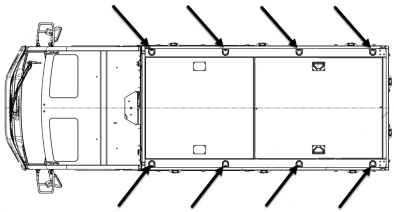
– The load must not exert any point load on the load floors. A surface load distributed over the size of a europallet (1200 mm × 800 mm) is appropriate.

- Place heavy loads at the bottom, light loads on top.
- The centre of gravity of the load must be as low as possible.
- Avoid off-centre/unbalanced load centres of gravity as far as possible.
- Never load platforms in the direction of a gradient or crosswise to a gradient.
- Do not exceed the payload of the industrial truck.
- When loading the platform, ensure that the maximum axle loads according to the nameplate are not exceeded.
- The height of the overall centre of gravity of the load above the loading surface must not exceed 600 mm. This restriction does not apply to very light loads. For a particularly high load with a high load centre of gravity, adjust the driving speed accordingly.
- Very high loads or large chassis, bodyworks and fittings, regardless of weight, can have an influence on the handling due to the susceptibility to wind. Always drive and manoeuvre the industrial truck appropriately.
- If no rear guard grille is fitted, pipes, sheet metal or similar easily displaceable loads may only be loaded up to the lower edge of the rear window. These loads could otherwise puncture the rear window in the event of a collision. Compact loads may be loaded higher. Observe the maximum height of the centre of gravity.
- In general, when driving with heavy loads, a change in the handling is to be expected. Drive with appropriate caution. This is especially true when driving uphill.
- The load should not protrude beyond the loading surface. If this cannot be avoided, mark the load in accordance with national regulations.
- Only transport loads with intact load floors. Replace damaged load floors immediately, otherwise parts may fall into the battery or engine compartment and cause damage.

Securing loads

Platform tractor

The platform tractor has four lashing points on each of the two side edges of the loading area. This is where you can attach tension belts for securing the load. Do not attach tension belts to other parts of the truck.



NOTE

The lashing points may be loaded with a maximum force of 8000 N.

Tow tractors

When transporting loads on the battery cover of the tow tractor, tension belts can be attached to the rail on the battery cover to secure the load.

NOTE

The lashing points may be loaded with a maximum force of 1500 N.

Loading trailers

DANGER

There is increased risk of accidents due to unauthorised loads and improper use!

- Never exceed the maximum loads shown! These values apply to compact and homogenous loads.
- Do not transport people on the loading surface.

- Distribute trailer loads uniformly and ensure they are secure. Do not exceed the payload of the tiller.
- Load heavy loads on the bottom and lighter loads on top.
- The centre of gravity must be as low as possible.
- Never load trailers in the direction of a gradient or across a gradient.
- Do not exceed the payload of the trailer and the truck.

Towing guidelines

⚠ DANGER

Increased risk of accident if used under difficult operating conditions!

When towing trailers under difficult operating conditions, e.g. on gradients or icy or slippery surfaces, the maximum safe load is determined by the braking performance and not the maximum pulling force of the tow tractor.

Rules

– Do **not** use this industrial truck for pulling rail vehicles.

– Always operate the industrial truck in a manner that ensures that safe driving and deceleration of the trailer are guaranteed when performing any manoeuvre.

– Always couple the trailers firmly with the tow coupling.

– Check the nominal pulling force and nominal weight before transporting loads. Refer to the identification plate. Never exceed the nominal capacity of the tow tractor. The maximum payload of the tiller corresponds to the maximum pulling force that the tow tractor can exert in order to overcome the starting resistance of the load being towed. The starting resistance is comprised of the combined total weight of the tow tractor, trailer and load.

Permissible trailers

- **Platform tractor:** It is recommended to use only braked trailers.
- **Tow tractors:** It is recommended to use unbraked trailers only for towing on level ground. The maximum loads for unbraked trailers shown in the following table apply to the various tow tractor versions:

Tow tractor version	12-t tow tractor Very short wheelbase	18-t tow tractor Very short wheelbase	25-t tow tractor Short wheel-base	25-t tow tractor Long wheel-base	30-t tow tractor Long wheel-base	35-t tow tractor Very long wheelbase
Recommended maximum unbraked towed load	4 t	7 t	10 t	10 t	11 t	12 t

Reverse inching function

With the reverse inching function, the driver can move the industrial truck forwards and backwards gradually via the control panel on the rear (2). This makes it easier, for example, to couple and uncouple trailers.

There are two different ways to activate the reverse inching function:

- It is activated automatically as soon as you leave the driver's seat
- It must be activated via the display-operating unit

Automatic activation of the reverse inching function (variant)

NOTE

The reverse inching function is only activated when the front wheels are in the straight position.

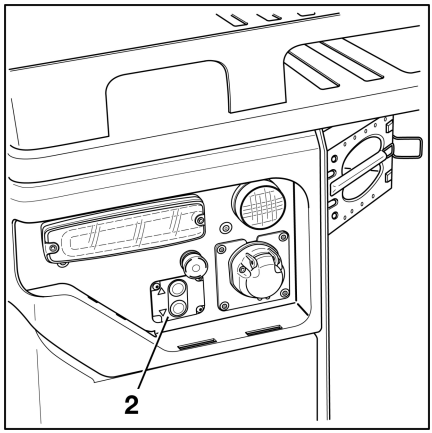
– Stop the industrial truck and activate the parking brake. Pay attention to possible traffic and make sure that the industrial truck does not constitute an obstacle.

– Adjust the front wheels so that they are in the straight position.

– Leave the driver's cab. As soon as the driver's seat is empty, the reverse inching function is active.

The industrial truck can be moved step-by-step via one of the two control panels.

▷



Activating the reverse inching function via the display-operating unit

NOTE

The reverse inching function can only be activated when the front wheels are in a straight position.

– Stop the industrial truck and activate the parking brake. Pay attention to possible traffic and make sure that the industrial truck does not constitute an obstacle.

– Adjust the front wheels so that they are in the straight position.

– On the display-operating unit, push the button.

– Push the "drive" Softkey.

– There, push the "reverse inching function" Softkey. The reverse inching function is active when the Softkey is highlighted in black. If the softkey is greyed out, the reverse inching function is inactive.

Using the reverse inching function

DANGER

Risk of injury from becoming trapped

– Always stand next to and never between the industrial truck and the trailer while driving with the reverse inching function.

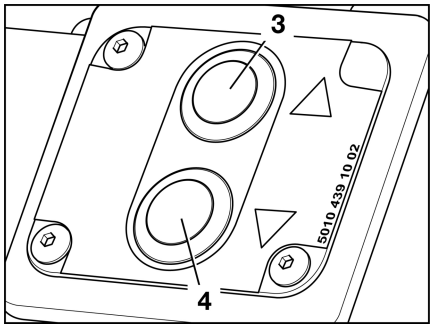
– Keep away from the wheels of the industrial truck.

– Make sure that no other persons stand between the industrial truck and the trailer.

– Stop the industrial truck and activate the parking brake. Pay attention to possible traffic and make sure that the industrial truck does not constitute an obstacle.

– To move the industrial truck forwards or backwards, push the buttons (3) or (4) on the control panels on the front or rear. With each push of a button, the industrial truck moves over a defined short distance and then stops again. To continue, push the button again. The length of the distance travelled is adjustable. Please contact the authorised service centre for this adjustment.

▷



Warnings for trailer operation

Towing trailers poses some dangers for the driver and the surrounding area. The following warnings draw attention to the dangers.

⚠ DANGER

People can become trapped between the industrial truck and the trailer.

– When coupling, ensure that there are no people present between the industrial truck and the trailer.

⚠ DANGER

Never jack up or crane load the industrial truck on the tow coupling. The tow coupling is not designed for this and may become deformed or destroyed. The industrial truck can crash down. There is a risk of fatal injury!

– For jacking up and crane loading, use only the designated lifting points.
– Use the tow coupling only for towing.

⚠ DANGER

Depending on the model, a tow coupling is only designed for limited support loads. Overloading can deform or destroy it. Too high a support load can also damage or destroy parts of the chassis frame. It can also have a dangerous effect on the handling characteristics of the industrial truck.

– Observe the support loads for the different tow couplings specified in these operating instructions! These may differ from the support loads indicated on the identification plate of the tow couplings.

– The tow coupling should be subjected only to horizontal loads; the tiller must be horizontal.

⚠ DANGER

If you briefly leave the industrial truck to couple or uncouple it, there is a risk of fatal injury caused by the truck rolling away and running you over.

– Apply the parking brake.

– Switch off the key switch and remove the key.

⚠ DANGER

If the coupling pin drops out or is damaged during towing, the trailer will become loose and uncontrollable. Risk of accident!

– Use only original coupling pins that have been checked for good condition!

– Ensure that the coupling pin is correctly inserted and secured.

⚠ WARNING

Never reach between the coupling pins and the towing jaws. If the component moves suddenly there is a risk of injury!

– Close the coupling pin with the appropriate lever on the tow coupling or use a suitable aid (e.g. assembly lever).

– Always close the automatic tow coupling when it is not being used.

⚠ WARNING

Risk of damage due to collision.

An industrial truck with tow coupling needs more room for manoeuvring due to its overhang. Racking or the tow coupling itself can become damaged during manoeuvring.

– If there is a collision with the tow coupling, check the tow coupling for damage such as cracks.
– A damaged tow coupling must be taken out of use and must be replaced by authorised service centre.
– Always manoeuvre carefully and with sufficient room.

⚠ WARNING

Risk of component damage if the tiller in the tow coupling is tilted!

The tiller should be kept as horizontal as possible when towing. This ensures that the rotation range is sufficient at the top and bottom. The authorised service centre can adjust the assembly height for the tow coupling to the tiller height if necessary.

– Make sure that the tiller is level.
– To change the coupling height, contact the authorised service centre.

Coupling and uncoupling trailers

Coupling the trailer

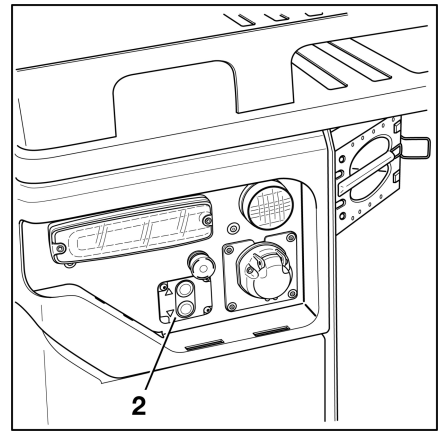
⚠ WARNING

Risk of injury from components moving suddenly!

– Do not reach into the open coupling.

– Slowly reset the industrial truck.
– Stop just in front of the drawbar.
– Apply the parking brake.
– Activate the reverse inching operation, see the following chapter entitled "Reverse inching operation".
– Open the tow coupling. The procedure for doing so can be found in the chapters on the different tow coupling variants.

– Using the reverse inching buttons (2) on the rear of the industrial truck, carefully move the industrial truck towards the drawbar until the drawbar is seated in the coupling jaw of the tow coupling. ▷



– Close the tow coupling. The procedure for doing so can be found in the chapters on the different tow coupling variants.
– Connect the trailer lighting (variant) to the industrial truck via the trailer socket.
– Check that the trailer lights are operating correctly.
– Remove any securing devices used to prevent the trailer from rolling away.

Uncoupling the trailer

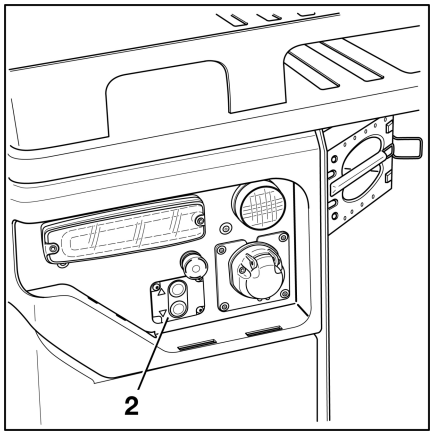
⚠ WARNING

Risk of injury from components moving suddenly!

– Do not reach into the open coupling.

– Take measures to prevent the trailer from rolling away, e.g. using wheel chocks.
– Activate the parking brake of the industrial truck.
– Activate the reverse inching operation, see the following chapter entitled "Reverse inching operation".
– Disconnect trailer lighting (if available) from the trailer socket.
– Open the tow coupling. The procedure for doing so can be found in the chapters on the different tow coupling variants.

– Using the reverse inching buttons (2) on the rear of the industrial truck, carefully move the industrial truck forwards and guide the drawbar completely out of the coupling. ▷
– Put the drawbar down.
– Close the tow coupling. The procedure for doing so can be found in the chapters on the different tow coupling variants.



Operating the manual 3-level tow coupling (variant)

Important information

⚠ DANGER

People can become trapped between the industrial truck and the trailer!

– When coupling, ensure that there are no people present between the industrial truck and the trailer.

⚠ DANGER

Risk of fatal injury from the industrial truck rolling away!

If you briefly leave the industrial truck to couple or uncouple it, there is a risk of fatal injury from being run over if the industrial truck rolls away.

– Apply the parking brake.
– Switch off the industrial truck and secure it against unauthorised use.

⚠ DANGER

Risk of accident due to damaged or lost coupling components!

If the coupling pin comes loose or is damaged during towing, the trailer will work loose and can no longer be controlled.

– If the coupling pin comes loose or is damaged during towing, the trailer will work loose and can no longer be controlled.
– Ensure that the coupling pin is correctly inserted and secured.

NOTE

Only use STILL-approved tow couplings for the tow tractors and the platform tractors.

NOTE

Only the authorised service centre is permitted to mount or replace the tow couplings. The approved fasteners, adapter plates and specified tightening torques must be used for this purpose.

NOTE

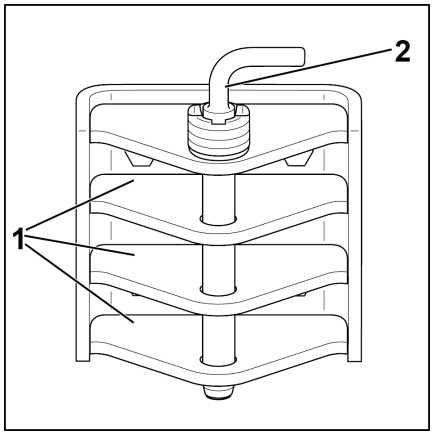
When mounting a different tow coupling, the authorised service centre must check whether this tow coupling is permissible for this industrial truck.

NOTE

Observe the chapter entitled "Towing guidelines" with regard to towed loads with unbraked trailers.

Coupling the trailer

The manual 3-level tow coupling can be mounted on the front or rear of the tow tractor. It has three coupling jaws (1) for different tiller heights. It can only be mounted on the front of the platform tractor.



The manual tow coupling can be used without restriction for the following truck variants:

Tow tractor

- LXT 120
- LXT 180
- LXT 250

Platform tractor

- LXW 20, only front mounting possible
- LXW 30, only front mounting possible

For the following truck variants, the manual tow coupling can only be used with a restricted maximum permissible towed load:

Tow tractor

- LXT 250, with a long wheelbase, **towed load up to a maximum of 16 t**
- LXT 300, **towed load up to a maximum of 16 t**
- LXT 350, **towed load up to a maximum of 12 t**

– Push the coupling pin (2) downwards and turn it 90° so that the handle is perpendicular to the industrial truck. The coupling pin is now unlocked.

– Pull the coupling pin (2) out of the tow coupling.

– Insert the towing eye on the tiller into the corresponding coupling jaw (1) at the desired height.

– Insert the coupling pin through the holes in the tow coupling and the towing eye.

– Turn the handle of the coupling pin so that the handle is perpendicular to the industrial truck.

– Push the coupling pin all the way down against the spring resistance and turn the coupling pin 90° to the right or left. The coupling pin is now locked and can no longer be pulled out.

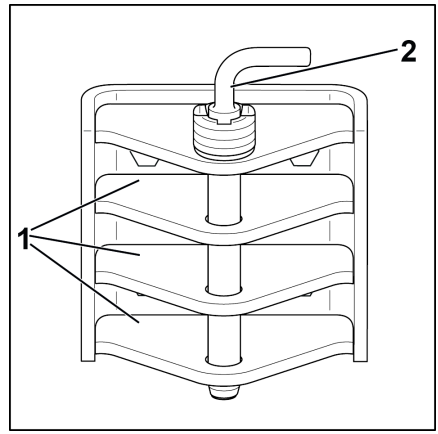
Maximum support load

The maximum permissible support load of the manual trailer coupling is 100 kg.

Uncoupling the trailer

– Take measures to prevent the trailer from rolling away, e.g. using wedges.
– Push the coupling pin (2) down, turn the pin by 90° and pull the pin out. ▷
– Slowly move the industrial truck forwards and guide the towing eye completely out of the coupling jaw (1).
– Insert the coupling pin into the tow coupling, press the pin downwards against the spring pressure and rotate the pin by 90°.

The coupling pin is locked in this position.



Operating the manual 2-level tow coupling (variant)

Important information

⚠ DANGER

Risk of accident due to damaged or lost coupling components!

If the coupling pin comes loose or is damaged during towing, the trailer will work loose and can no longer be controlled.

– Only use original coupling pins that have been checked.
– Ensure that the coupling pin is correctly inserted and secured.

⚠ DANGER

People can become trapped between the industrial truck and the trailer!

– When coupling, ensure that there are no people present between the industrial truck and the trailer.

⚠ DANGER

Risk of fatal injury from the industrial truck rolling away!

If you briefly leave the industrial truck to couple or uncouple it, there is a risk of fatal injury from being run over if the industrial truck rolls away.

NOTE

Only use STILL-approved tow couplings for the tow tractors and the platform tractors.

NOTE

Only the authorised service centre is permitted to mount or replace the tow couplings. The approved fasteners, adapter plates and specified tightening torques must be used for this purpose.

NOTE

When mounting a different tow coupling, the authorised service centre must check whether this tow coupling is permissible for this industrial truck.

NOTE

Observe the chapter entitled "Towing guidelines" with regard to towed loads with unbraked trailers.

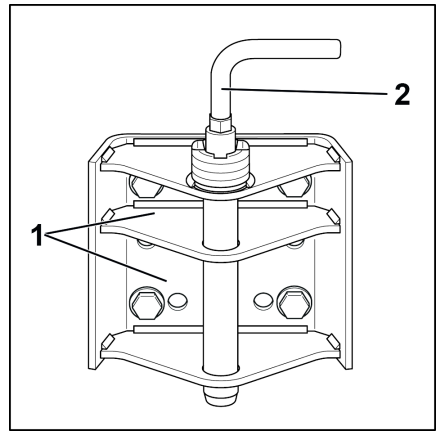
Coupling the trailer

The manual 2-level tow coupling is used in conjunction with tugger trains. It has two coupling jaws (1) for different tiller heights. It is mounted exclusively on the rear and is only available for these truck variants:

- LXT 120
- LXT 180 **(maximum towed load limited to 12t)**

The manual 2-level tow coupling **cannot** be used on the following truck variants:

- LXT 250
- LXT 350
- LXW 20
- LXW 30



– Push the coupling pin (2) downwards and turn it 90° so that the handle is perpendicular to the industrial truck. The coupling pin is now unlocked.

– Pull the coupling pin (2) out of the tow coupling.

– Insert the towing eye on the tiller into the corresponding coupling jaw (1) at the desired height.

– Insert the coupling pin through the holes in the tow coupling and the towing eye.

– Turn the handle of the coupling pin so that the handle is perpendicular to the industrial truck.

– Push the coupling pin all the way down against the spring resistance and turn the coupling pin 90° to the right or left. The coupling pin is now locked and can no longer be pulled out.

Maximum support load

The maximum permissible support load of the manual trailer coupling is 100 kg.

Maximum towed load

The maximum towed load is limited to 12 t for the manual two-stage trailer coupling.

Uncoupling the trailer

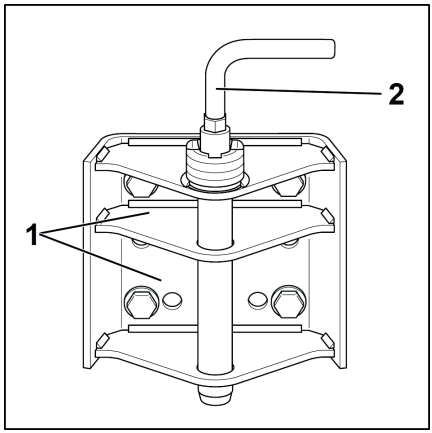
– Take measures to prevent the trailer from rolling away, e.g. using wedges.

– Push the coupling pin (2) down, turn the pin by 90° and pull the pin out. ▷

– Slowly move the industrial truck forwards and guide the towing eye completely out of the coupling jaw (1).

– Insert the coupling pin into the tow coupling, press the pin downwards against the spring pressure and rotate the pin by 90°.

The coupling pin is locked in this position.



Ro*244 automatic tow coupling (variant)

Important information

NOTE

Only use STILL-approved tow couplings for the tow tractors and the platform tractors.

NOTE

Only the authorised service centre is permitted to mount or replace the tow couplings. The approved fasteners, adapter plates and specified tightening torques must be used for this purpose.

NOTE

When mounting a different tow coupling, the authorised service centre must check whether this tow coupling is permissible for this industrial truck.

NOTE

Observe the chapter entitled "Towing guidelines" with regard to towed loads with unbraked trailers.

NOTE

*Also observe the operating instructions supplied with the Ro*244 tow coupling by the manufacturer and the information on the identification plate.*

- ***Warning:** The information in the STILL operating instructions applies in the event that the information about the support load varies.*

Use

The Ro*244 automatic tow coupling can be mounted on the front and rear of the tow tractor and the platform tractor. It can be used with towed loads of up to 25 t.

It is available without restrictions for the following truck variants:

- LXT 120
- LXT 180
- LXT 250, only with a short wheelbase
- LXW 20
- LXW 30

It can be used for the following truck variants under restriction of the maximum permissible towed load:

- LXT 250, with a long wheelbase, **towed load up to a maximum of 16 t**
- LXT 300. **Towed load up to a maximum of 16 t**
- LXT 350, **towed load up to a maximum of 12 t**

Coupling the trailer

NOTE

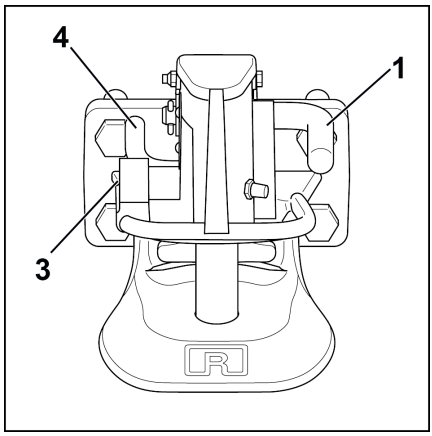
*The Ro*244 tow coupling is intended for a tow-bar eye in accordance with DIN 74054 (hole diameter 40 mm) or DIN 8454 (hole diameter 35 mm). The coupling closes automatically when it makes contact with the tiller.*

– Take measures to prevent the trailer from rolling away, e.g. using wedges.

– Adjust the towing eye of the tiller so that the towing eye is in the middle of the towing jaws.

– Push the hand lever (1) upwards until it engages. ▷

The tow coupling is opened.

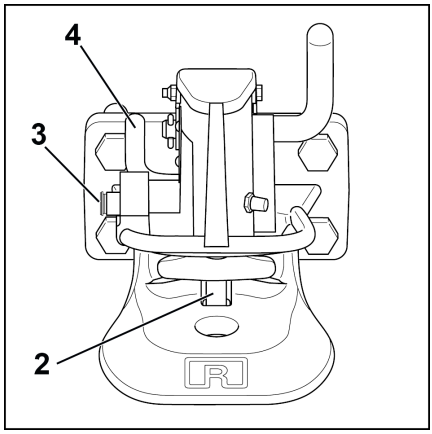


⚠ CAUTION

During coupling, the tow-bar eye must engage with the joining plate (2) in the middle of the coupling jaw. Failure to follow these instructions could result in damage to the coupling jaw or to the tow-bar eye!

– Ensure that the tow-bar eye enters the coupling jaw centrally.

– Slowly reverse the industrial truck using the reverse inching function until the tow-bar eye is centred against the joining plate (2) in the middle of the coupling jaw and the coupling pin snaps down and engages. See the chapter entitled "Reverse inching function". The coupling pin is correctly engaged if the control pin (3) does **not** protrude from its guide. ▷



If the coupling pin does not engage correctly:

This is the case if the coupling pin has snapped closed, but the control pin (3) still protrudes from its guide.

– Remove any items used to prevent the trailer from rolling away.

– Move the industrial truck with the trailer forwards approx. 1 m and then move it back slightly.

– Check again whether the control pin (3) protrudes from its guide. If this is no longer the case, the tow coupling is correctly closed.

– Tow the trailer.

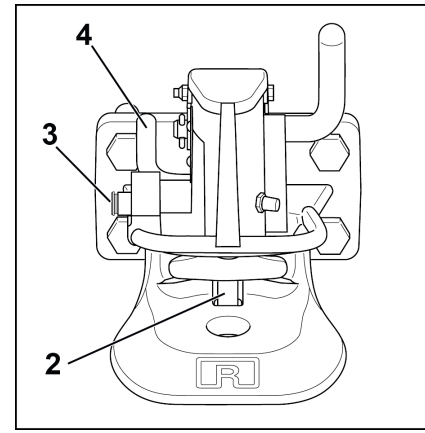
Closing the coupling manually

⚠ DANGER

Risk of injury from hand becoming trapped! The coupling pin snaps down very quickly when the tow coupling is actuated.

Do not reach your hand into the vicinity of the coupling pin if, for example, a tow rope is to be attached to the tow coupling.

– Push the closing lever (4) downwards as far as it will go. The coupling pin snaps down. It is correctly engaged if the control pin (3) does **not** protrude from its guide. ▷

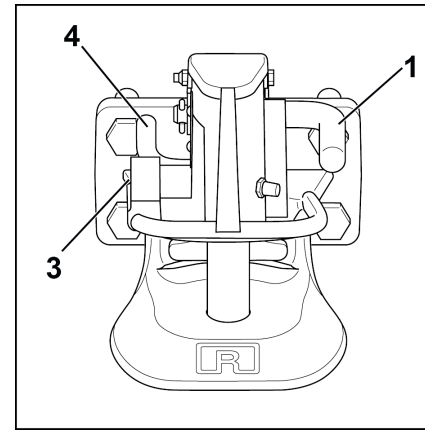


The tow coupling is closed.

Uncoupling the trailer

– Take measures to prevent the trailer from rolling away, e.g. using wedges.

– Push the hand lever (1) upwards until the coupling pin engages. ▷



The tow coupling is opened.

– Slowly drive the industrial truck forwards with the reverse inching function until the tow bar eye and the towing jaws are separated.

– To close the tow coupling again, push the closing lever (4) all the way down. The coupling pin snaps down.

NOTE

To protect the lower coupling pin bush against contamination, always keep the tow coupling closed.

Maximum support load

Depending on the mounting location, the following maximum support loads are permitted for the tow tractor and the platform tractor:

Rear:	Max. 250 kg
Front:	Max. 100 kg (differs from the specification on the identification plate of the tow coupling)

⚠ WARNING

Possible component damage!

If the maximum support loads specified here are exceeded, this may cause damage to the axles, for example.

HSM 2140 automatic tow coupling (variant)

Important information

NOTE

Only use STILL-approved tow couplings for the tow tractors and the platform tractors.

NOTE

Only the authorised service centre is permitted to mount or replace the tow couplings. The approved fasteners, adapter plates and specified tightening torques must be used for this purpose.

NOTE

When mounting a different tow coupling, the authorised service centre must check whether this tow coupling is permissible for this industrial truck.

NOTE

Observe the chapter entitled "Towing guidelines" with regard to towed loads with unbraked trailers.

NOTE

Also observe the operating instructions supplied with the HSM 2140 tow coupling by the manufacturer and the information on the identification plate.

- ***Warning:** The information in the STILL operating instructions applies in the event that the information about the support load varies.*

Use

NOTE

The HSM 2140 tow coupling is compatible with tow-bar eyes with a hole diameter of 40 mm, according to DIN 11026/ISO 5692-2, DIN 11043 and DIN 74054/ISO 8755.

The HSM 2140 automatic tow coupling can be mounted on the front and rear of the tow tractor and the platform tractor. It can be used with towed loads of up to 35 t.

It is available for the following truck variants:

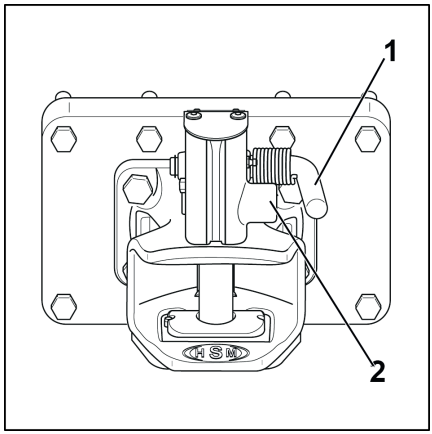
- LXT 120
- LXT 180
- LXT 250
- LXT 350
- LXW 20 with a short loading area (2200 mm), front and rear mounting
- LXW 30 with a short loading area (2200 mm), front and rear mounting
- LXW 20 with a long loading area (2600 mm), front mounting **only**
- LXW 30 with a long loading area (2600 mm), front mounting **only**

Coupling the trailer

– Secure the trailer, for example using wheel chocks, so that it cannot roll away.

– Adjust the towing eye of the tiller so that the towing eye is in the middle of the towing jaws.

– Push the hand lever (1) upwards until the coupling pin engages. The tow coupling is opened. ▷

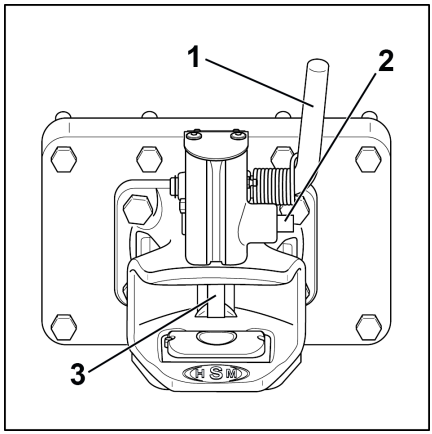


⚠ CAUTION

During coupling, the tow-bar eye must engage with the joining plate (3) in the middle of the coupling jaw. Failure to follow these instructions could result in damage to the coupling jaw or to the tow-bar eye!

– Ensure that the tow-bar eye enters the coupling jaw centrally.

– Slowly reverse the industrial truck using the reverse inching function until the tow-bar eye is centred against the joining plate (3) in the middle of the coupling jaw and the coupling pin snaps down and engages. See the chapter entitled "Reverse inching function". The coupling pin is correctly engaged if the control pin (2) does **not** protrude from its guide. ▷



If the coupling pin does not engage correctly:

This is the case if the coupling pin has snapped closed, but the control pin (2) still protrudes from its guide.

– Remove any items used to prevent the trailer from rolling away.

– Move the industrial truck with the trailer forwards approx. 1 m and then move it back slightly.

– Check again whether the control pin (2) protrudes from its guide. If this is no longer the case, the tow coupling is correctly closed.

– Tow the trailer.

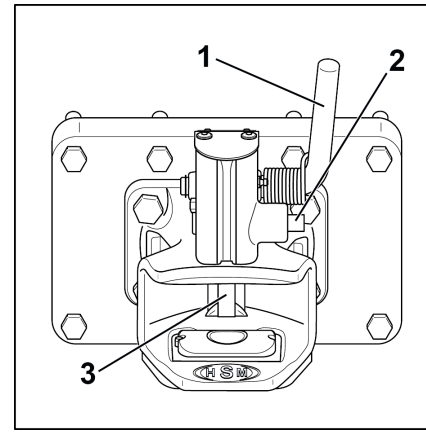
Closing the coupling manually

⚠ DANGER

Risk of injury from hand becoming trapped! The coupling pin snaps down very quickly when the tow coupling is actuated.

Do not reach your hand into the vicinity of the coupling pin if, for example, a tow rope is to be attached to the tow coupling.

– Push the hand lever (1) downwards as far as it will go. The coupling pin snaps down. It is correctly engaged if the control pin (2) does **not** protrude from its guide. ▷

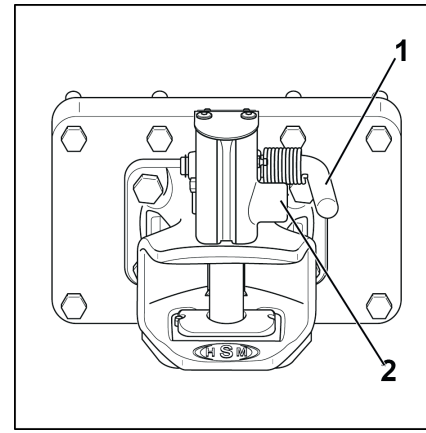


The tow coupling is closed.

Uncoupling the trailer

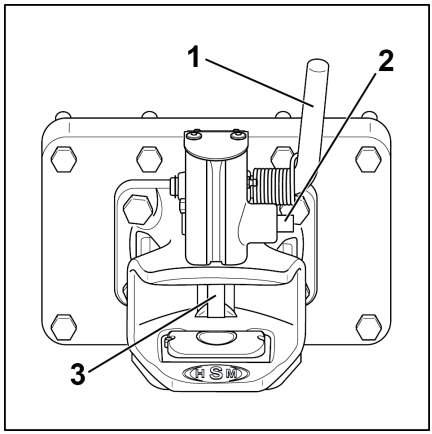
– Secure the trailer, for example using wheel chocks, so that it cannot roll away.

– Push the hand lever (1) upwards until the coupling pin engages. The tow coupling is opened. ▷



– Slowly drive the industrial truck forwards with the reverse inching function until the tow-bar eye and the towing jaws are separated. See the chapter entitled "Reverse inching function".

– Push the hand lever (1) downwards as far as it will go. The coupling pin snaps down. It is correctly engaged if the control pin (2) does not protrude from its guide. ▷



The tow coupling is closed.

NOTE

To protect the lower coupling pin bush against contamination, always keep the tow coupling closed.

Maximum support load

Depending on the mounting location, the following maximum support loads are permitted for the tow tractor and the platform tractor:

Rear:	Max. 700 kg (differs from the specification on the identification plate of the tow coupling)
Front:	Max. 100 kg (differs from the specification on the identification plate of the tow coupling)

⚠ WARNING

Possible component damage!

If the maximum support loads specified here are exceeded, this may cause damage to the axles, for example.

RO230B tow coupling (variant)

Important information

NOTE

Only use STILL approved tow couplings for the tow tractors and the platform tractors.

NOTE

Only the authorised service centre is permitted to mount or replace the tow couplings. The approved fasteners, adapter plates and specified tightening torques must be used for this purpose.

NOTE

When mounting a different tow coupling, the authorised service centre must check whether this tow coupling is permissible for this industrial truck.

NOTE

Observe the chapter entitled "Towing guidelines" with regard to towed loads with unbraked trailers.

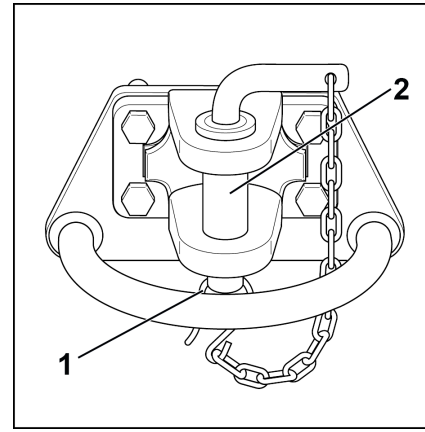
Using the RO230B tow coupling

The RO230B tow coupling can be used to tow an industrial truck that is not operational. In exceptional cases, it is also permitted to use the tow coupling for manoeuvring. Permanent towing operation is not permitted.

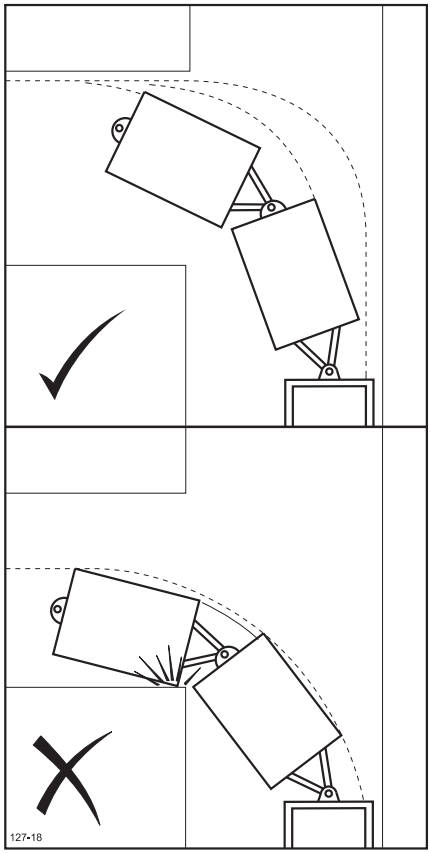
The RO230B tow coupling is only mounted on the truck front. It is approved for all truck variants.

– Remove the locking hook (1) from the pin (2).
– Pull the pin (2) out of the coupling.
– Insert the towing device (e.g. a tow bar) into the coupling using the opening provided for this purpose.
– Insert the pin (2) through the holes in the coupling and through the opening of the towing device.
– To prevent the pin from slipping out of the coupling, re-attach the locking hook (1) to the bottom of the pin.

▷



Towing trailers



⚠ DANGER

Risk of serious injury or death from tipping truck and trailer!

Truck and trailer may tip over when driving on steeply sloping terrain.

– Never negotiate gradients diagonally or crosswise.

⚠ WARNING

Increased risk of accident due to trailers rolling away!

Using a trailer changes the truck handling characteristics.

– When towing, drive in such a manner that the truck can always be braked safely.
– Note the clearance circle and turning circle off the trailer train.
– Note the tractrix of the trailer train.

NOTE

A trailer train with several trailers cannot be manoeuvred backwards. Only manoeuvre trailer trains with single trailers backwards.

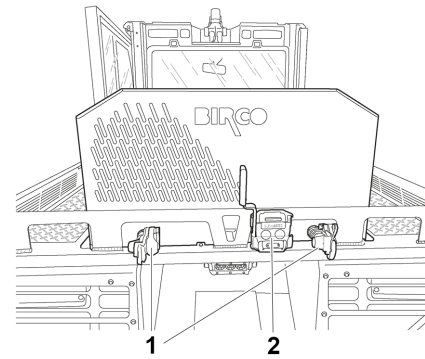
– Ensure that the trailer load is securely lashed.
– Release trailer brake and remove all wheel chocks.
– Determine the width of the widest trailer or its load to ensure unobstructed passage.
– Adjust the mirror so that the driver can see the complete trailer train.
– Move the truck off slowly to equalise the play between the tow couplings.
– Accelerate gently.
– Reduce speed in good time when the destination is reached.
– Brake the truck with the trailers gently. Sudden braking may cause the load to become displaced and the trailers could jack-knife.

NOTE

For information on the towing performance of the industrial truck, such as the possible driving speed and the permissible travel distance per hour, see the "towing performance diagrams" in the chapter entitled "Technical data".

Compressed air supply system for trailer brakes

The compressed air supply system is located on the loading surface of the industrial truck directly above the tow coupling. It generates compressed air for air-braked trailers. For this purpose, it has two different compressed-air connections (1) and (2).



⚠ WARNING

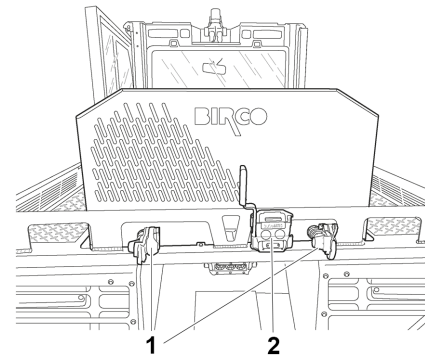
Risk of component damage.

The driver must have received instruction on the operation and handling of the compressed air supply system.

Connect the compressed air system of the trailer

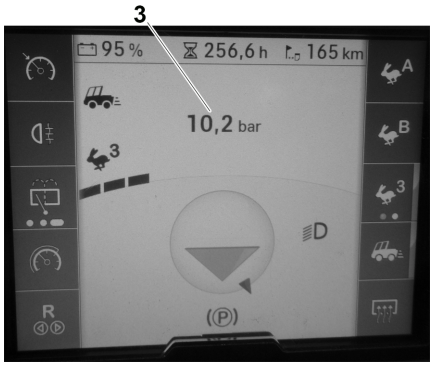
– Connect the trailer to the tow tractor. See the chapter entitled "Coupling and uncoupling the trailer" in these operating instructions.

– Connect the compressed air connection of the trailer to the corresponding connection (1) and (2) on the compressed air supply system.



Towing an air-braked trailer

– Check the brake system pressure before driving. It is shown in the main display (3) of the display-operating unit. ▷



Minimum required system pressure = 6 bar.

The compressed air supply system operates automatically. As soon as the industrial truck is switched on, the compressor fills the system to the cut-out pressure set at the factory.

If the pressure in the system decreases as a result of braking and falls to the set cut-in pressure, the compressor starts automatically and refills the system to the set cut-out pressure.

– Depress the brake pedal to brake the truck. The trailer brake system is triggered automatically. The trailer then brakes to the same extent as the industrial truck.

If the system pressure falls below the required minimum pressure of 6 bar, the warning message `Compressed air level low` appears in the display-operating unit. The current system pressure (4) is also displayed. ▷



Tugger train trailers

General

- Tugger trains can be used with all types of tow tractors.
- Depending on the version of the tugger train, the tow tractor must be equipped with an additional hydraulic or electrical module.
- The tugger train functions are controlled via the display-operating unit. The softkeys required for this purpose are stored as favourites on the main screen of the display-operating unit at the factory.
- When operating tugger trains, also refer to the chapters entitled "Warnings for trailer

operation" and "Towing trailers". In addition, observe the separate tugger train operating instructions for the various trailer versions.

- In tugger train operation, the maximum driving speed of the tow tractor is limited to 15 km/h.
- Drive programme 1 is always active during tugger train operation. The drive programme cannot be changed while tugger train operation is enabled.
- Tugger train operation is possible in either automatic mode or manual mode. When the tow tractor is switched on, automatic mode is always active. To operate in manual mode, automatic mode must be switched off. See the "Manual mode" section.
- A standard tugger train consists of four tugger train trailers. A maximum of six trailers can be attached.

Coupling and uncoupling the tugger train trailers

NOTE

In tugger train mode, the reverse inching function of the tow tractor is not available.

Coupling

– Connect the leading trailer of the tugger train to the tow coupling of the tractor. Observe the chapter entitled "Coupling and uncoupling trailers" in these operating instructions.

– Connect the supply connection of the leading tugger train trailer to the supply unit at the rear of the loading surface on the truck. Depending on the version of the tugger train, this is either a hydraulic or electrical connection. Make sure that the other tugger train trailers are also connected to each other via the corresponding supply lines.

NOTE

If a hose cannot be connected the hydraulic version, disconnect the hose at both ends and reconnect the hose.

– Sit on the driver's seat. In automatic mode, the load carriers of the tugger train trailers are now lifted. In manual mode, the load

carriers must be lifted using the "Lift load carrier" softkey on the display-operating unit. See the "Manual mode" section.

Uncoupling

– Stop the tow tractor.

– Vacate the driver's seat. In automatic mode, the load carriers of the tugger train trailers are now lowered. In manual mode, the load carriers must be lowered using the "Lower load carrier" softkey on the display-operating unit. See the "Manual mode" section.

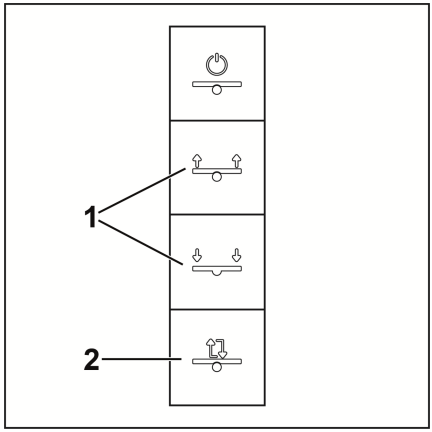
Using tugger train trailers

In order for the tugger train functions to be performed, the following conditions must be met:

- The tow tractor is stationary
- The driver's seat is occupied

When the tow tractor is in motion, the softkeys for the tugger train functions on the display-operating unit are inactive and are greyed out.

The tugger train trailers can be operated in either automatic or manual mode. The softkeys for manual mode (1) and for automatic mode (2) are stored as favourites on the display-operating unit for this purpose. By default, the tow tractor is in automatic mode when it is switched on. An orange activation bar on the automatic mode softkey (2) indicates this. The manual mode softkeys (1) are then greyed out.



To switch to manual mode, press the automatic mode softkey (2) until the orange activation bar goes out. The two manual mode softkeys (1) turn white and are therefore active. Which of these softkeys is active depends on the current position of the load carriers.

For more information on the two operating modes, see the following sections entitled "Automatic mode" and "Manual mode".

Automatic mode

Automatic mode is active when the tractor is switched on.

– Sit on the driver's seat.

– Switch on the tow tractor. The tugger train trailers automatically lift their load carriers from the rest position to the transport position.

– Set off. When the destination is reached, stop the truck and vacate the driver's seat. The load carriers are lowered automatically as soon as the seat switch signals that the driver's seat is not occupied.

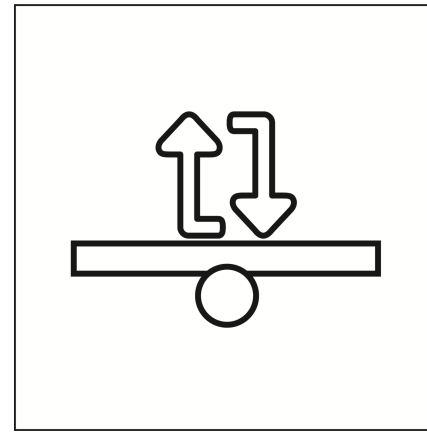
Manual mode

To switch to manual mode, the following conditions must be met:

- The tractor with the tugger train trailers is stationary
- The load carriers of the tugger train trailers are raised
- The driver's seat is occupied

Then proceed as follows:

– Press the automatic mode softkey (2) until the orange activation bar goes out. Automatic mode is switched off. ▷



The "Lower load carrier" and "Lift load carrier" manual mode softkeys (1) reflect the position of the load carriers.

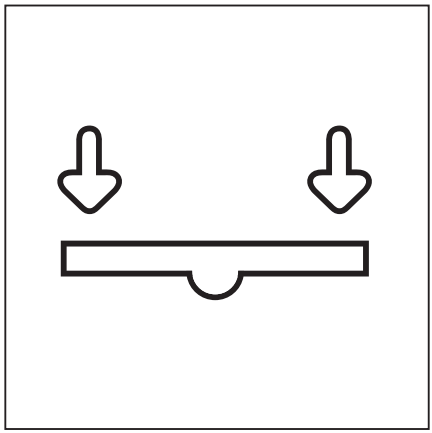
Load carrier lifted:

- The "Lower load carrier" softkey is active and is coloured white.
- The "Lift load carrier" softkey is inactive and is greyed out. The orange activation bar behind this softkey indicates that the load carriers are raised.

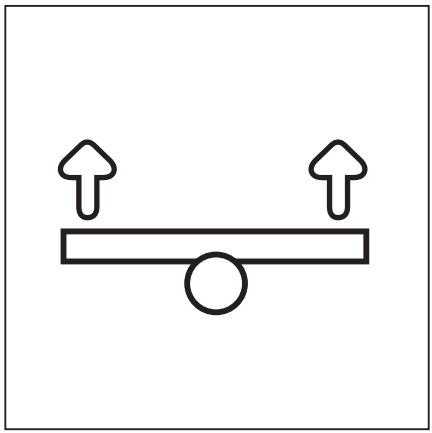
Load carrier lowered:

- The "lift load carrier" softkey is active and is coloured white.
- The "Lower load carrier" softkey is inactive and is greyed out. The orange activation bar behind this softkey indicates that the load carriers are lowered.

– To lower the load carriers of the tugger train trailers, press the "Lower load carrier" softkey. ▷



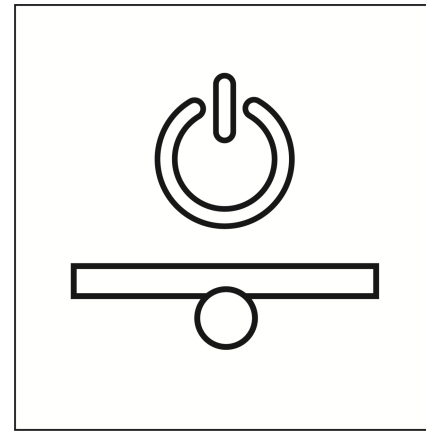
– To lift the load carriers again, press the "Lift load carrier" softkey. ▷



NOTE

It is not possible to move the tow tractor if the load carriers are lowered. If you try to set off despite this, the driving function is blocked and the error message "Truck stop: Tugger train" appears.

Activating/deactivating the tugger train function ▷



If no tugger train trailers are attached and you are moving solely the tow tractor, you should switch off the tugger train function.

– Press the "Tugger train on/off" softkey. The orange activation bar goes out and the function is switched off.

– To switch the tugger train function back on, press the "Tugger train on/off" softkey again. The orange activation bar lights up, the function is switched on.

Procedure in emergencies

Emergency shutdown

⚠ WARNING

When the emergency off switch is actuated, the parking brake is applied automatically.

If the emergency off switch is actuated during travel, the driver must be prepared for the industrial truck to brake strongly if necessary.

This allows the drive wheels to lock when the roadway is wet, slippery or dirty. This can lead to unsafe driving situations such as skidding or oversteer, especially on inclined roadways, such as ramps, and with sliding, possibly unbraked trailers.

– If you press the emergency off switch while driving, be prepared for the drive wheels to lock.
– Do **not** actuate the emergency off switch to stop the truck.
– Only actuate the emergency off switch to disconnect the power supply in an emergency.

⚠ CAUTION

Actuating the emergency off switch (1) disconnects the drives from the power supply. Disconnecting the battery male connector (2) disconnects the entire industrial truck from the power supply.

– Only use this safety system in an emergency or in order to park the industrial truck safely.

⚠ CAUTION

Risk of component damage!

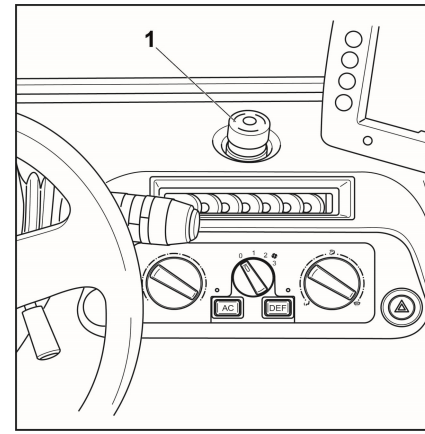
If you disconnect the battery male connector while the key switch is switched on (under load), an arc is generated. This can lead to erosion at the contacts, which considerably shortens the service life of the contacts.

– Switch off the industrial truck before disconnecting the battery male connector.
– Do not disconnect the battery male connector while the industrial truck is switched on, except in an emergency.

– Push the emergency off switch (1). This results in the following: ▷

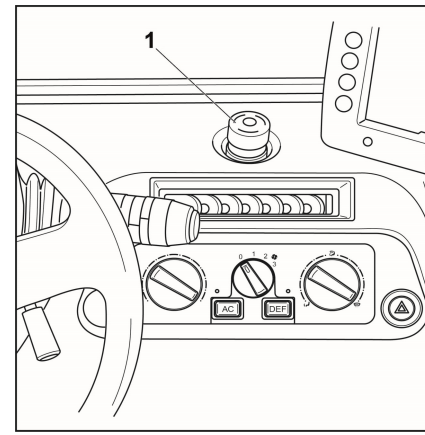
- The drives of the industrial truck are de-energised
- The parking brake is applied
- The service brake does not operate
- Power steering fails

If an emergency off switch cannot be reached in time in an emergency, the battery male connector can also be removed. However, this should be avoided if possible as this leads to an arc in the battery male connector when the key switch is switched on. This can lead to erosion at the contacts, which considerably shortens the service life of the contacts.

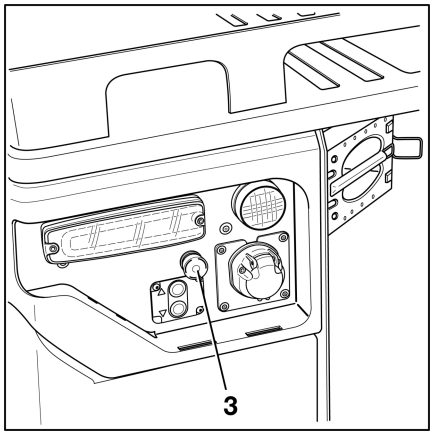


Possible positions of the emergency off switch

(1): Above the operating panel for the heating system ▷



(3): On the rear control panel for inching operation (variant). The control panel can be located either at the rear left-hand side or at the rear right-hand side of the industrial truck. ▷



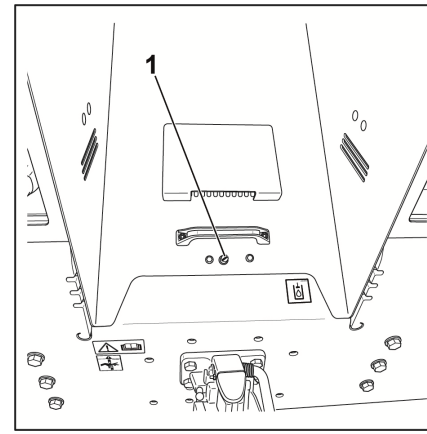
Emergency operation of the parking brake in the event of a malfunction

If the industrial truck will not move due to a malfunction, the parking brake is applied automatically. If the parking brake can then no longer be released in the usual way via the push button, it can be released mechanically using a nut on the drive axle. The industrial truck can then be towed away.

Making the release mechanism accessible

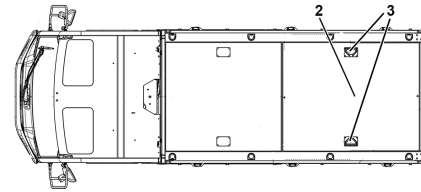
Tow tractors

– Open the rear flap. To do this, turn the slotted screw (1) anti-clockwise and pull the rear flap upwards using the handle. ▷



Platform tractor

– Fold down the rear flap of the loading surface. ▷



– Remove the rearmost cover plate (2) of the loading surface. Use the handles (3) to do so.

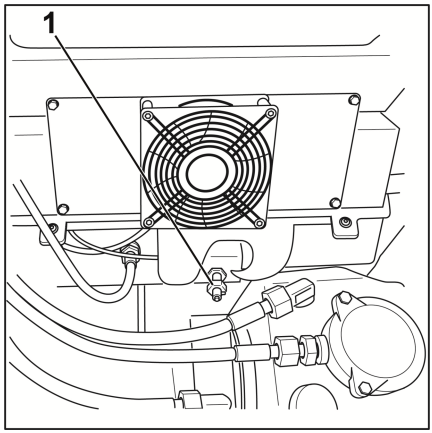
Mechanically releasing the parking brake

⚠ DANGER

Risk of the industrial truck rolling away when the parking brake is released.

– Secure the industrial truck with wheel chocks to prevent it from rolling away. For information on the storage location of the wheel chocks, see the chapter entitled "Wheel chocks".

The nut (1) for releasing the parking brake is located on the drive axle directly below the converter. Use the supplied tool to undo the nut.



The tool can be found in the operating instructions bag. This bag is located in the driver's cab.



– Turn the nut (1) clockwise until the parking brake releases. The industrial truck can now be towed away.
– Remove the wheel chocks before towing.

⚠ CAUTION

The parking brake **cannot** be applied in this condition, even if the malfunction is rectified.

– To return the parking brake to a working condition, perform the steps in the following section.

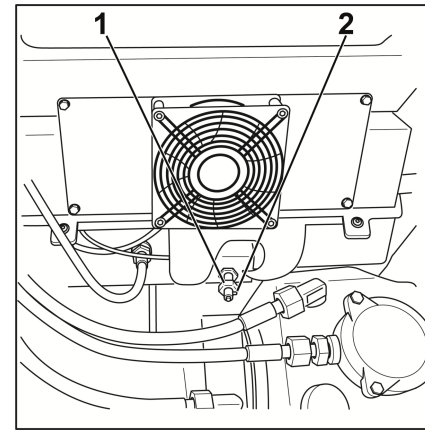
After towing

NOTE

A torque wrench is required to restore the parking brake to its working condition.

When the industrial truck has arrived at the designated parking location, restore the parking brake to its working condition. To do this, proceed as follows.

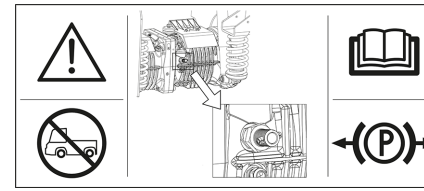
– Tighten the nut (1) against the slotted spring pin (2) to a torque of 30 Nm using a suitable tool.
– On the tow tractor, close the rear flap. On the platform tractor, pull the rear platform cover over the opening again.
– Fold the rear flap of the load bed back up and lock it in place.



Parking an industrial truck with a defective parking brake

If the defect in the parking brake cannot be rectified immediately and the industrial truck must be parked, proceed as follows:

– Secure the industrial truck with wheel chocks to prevent it from rolling away. For information on the storage location of the wheel chocks, see the chapter entitled "Wheel chocks".
– Place the warning card stating that the parking brake is not working on the driver's seat in an easily visible position.

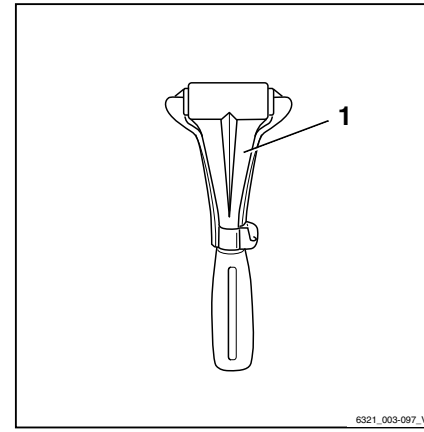


The warning card is intended to warn other employees that the industrial truck is not ready for operation and must not be moved. The card can be found in the operating instructions bag.

Emergency hammer

The emergency hammer is used to rescue the driver if they are shut inside the cab in a hazardous situation, for example if the industrial truck is in an excessively narrow aisle and the cab door can no longer be opened.

Single-pane safety glass can be struck relatively safely using the emergency hammer in order for the driver to escape or be rescued from the danger area.



Using the emergency hammer

⚠ WARNING

When glass is smashed there is a risk of injury caused by glass splinters!

When the cab windows are smashed, this can cause splinters of glass to fly into your face and cut your skin and eyes.

– When smashing a window, turn your face away and cover it with the crook of your free arm.

– Pull the emergency hammer out of its support mounting at the handle.

– Using one of the two metal tips on the head of the emergency hammer, hit the window with force until it breaks.

Side charging access

Side charging access at the rear (variant)

The side charging access (variant) is located at the rear behind a cover flap on the left-hand side when viewed in the drive direction. The charging access enables charging of lead-acid batteries and lithium-ion batteries without having to open the battery door. Charging is **no** faster with this charging access than with conventional charging via the plug connection on the battery. The plug connection for the charging access depends on the equipment fitted on the industrial truck:

- **Battery plug**: If the battery is to be charged using an external battery charger. The maximum possible charging current is limited to 375 A
- **Charger socket**: If the battery is to be charged using an on-board charger

⚠ CAUTION

Component damage due to excessive charging currents.

If the truck is equipped with quick charge access and external battery chargers are used, defined charging currents must not be exceeded:

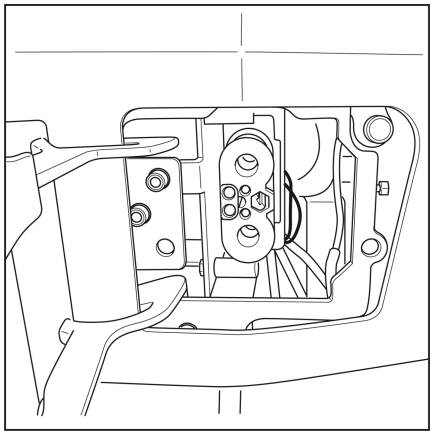
200 A for lead-acid batteries

375 A for lithium-ion batteries

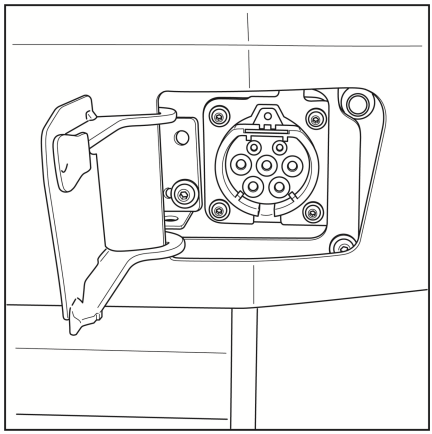
– Limit the charging current according to the installed battery.

Side charging access

Version with a battery male connector for an external battery charger. ▷



Version with a charger socket for the on-board charger. ▷



– Depending on the equipment fitted on the industrial truck, observe the following sections:

- "Charging the lead-acid battery" in the chapter entitled "Handling the lead-acid battery"
- "Charging the lithium-ion battery" in the chapter entitled "Handling the lithium-ion battery"

NOTE

To ensure maximum battery life, always charge lead-acid batteries fully. For intermediate charging during work breaks, use an electrolyte circulation pump (variant). Lithium-ion batteries may be charged intermediately as often as required with no restriction to the battery life.

– Securely park the industrial truck to be charged on a flat surface near the battery charger. Or park near a 400-V CEE 16-A socket if the industrial truck is equipped with an on-board charger.

This chapter describes the charging process using an external charger. For details of the charging process using the on-board charger, refer to the chapter entitled "On-board charger" in these operating instructions.

– Observe the following safety information.

Safety information



⚠ DANGER

Risk of explosion due to flammable gases.

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

There must be no flammable materials or spark-forming operating materials within 2 m of either the truck when it is parked for charging or the battery charger.

– Take the following safety precautions when working with batteries.

– Keep away from naked flames and do not smoke.
– Ensure that work areas are adequately ventilated.
– Disconnect the battery male connector before charging and only disconnect when the industrial truck and the battery charger are switched off.
– Expose the surfaces of the battery cells.
– Do not place any metal objects on the battery.
– Have fire extinguishing equipment ready.



⚠ DANGER

Risk of fire due to overheated connection assemblies!

Plugs that are not fully plugged in can produce excessive heat. They pose a fire hazard.

– Always plug the mains plug and the vehicle plug of the charging cable completely into the respective plug in the socket.



⚠ DANGER

Risk of fire due to overheated connection assembly!

Do not pull out the mains plug under load as this will result in excessive wear and poses a fire hazard.

– If the mains plug needs be pulled out before the end of the charging process, cancel the charging process at the battery charger first.



⚠ DANGER

Risk of explosion from connecting and disconnecting connection assemblies!

Even when the industrial truck and the battery charger are switched off, oxyhydrogen gas in the vicinity can explode if connection assemblies are connected or disconnected.

– Ventilate the charging area sufficiently.

⚠ CAUTION

Possible component damage.

Make sure that the charging cable does not cross any traffic routes. Do not route the charging cable over sharp edges.

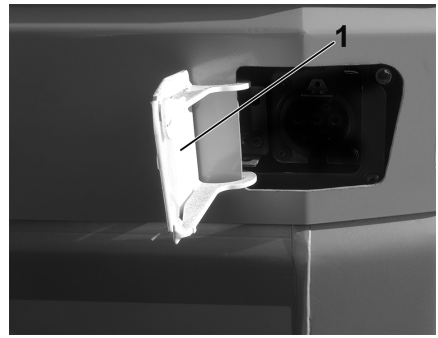
Side charging access with lead-acid batteries

When using side charging access in conjunction with a lead-acid battery on the large tow tractor LXT350, a fan must **always** be installed in the battery compartment. Due to the size of the battery, there is insufficient space in the battery compartment of the LXT350 for the exchange of air to sufficiently dilute the explosive gases generated during charging.

If the side charging access on the LXT350 is to be operated in conjunction with a lead-acid battery and a fan is not yet fitted, a fan must be retrofitted by the authorised service centre.

Opening the lid

Two different versions of the lid (1) are available: Either with a Push-Open closure or with a magnetic closure. ▷



Push-Open closure

– Gently press in the lid (1) and release it.

The lid (1) is partially opened by a spring.

– Then open the lid (1) completely by hand and hold it.

The lid (1) is secured against unintentional opening by a spring.

Magnetic closure

– Manually pull against the holding force of the magnet to open the cover flap (1) and hold the cover flap open.

The lid (1) is secured against unintentional opening by a spring.

Closing the lid

When the charging cable is disconnected from the side charging access (1), the lid (1) closes automatically by spring pull.

NOTE

The lid is monitored by a sensor. If the lid is not completely closed, the truck cannot be switched on again.

Charging using an external charger

Four operating situations are possible for charging with side charging access:

1 Charging the lead-acid battery with the industrial truck switched off
2 Charging the lead-acid battery with the industrial truck switched on
3 Charging the lithium-ion battery with the industrial truck switched off
4 Charging the lithium-ion battery with the industrial truck switched on

The procedure for charging in these operating situations is described below.

1 Charging the lead-acid battery with the industrial truck switched off

– Connect the charging cable to the side charging access.

Battery charging is in progress. The display-operating unit shows nothing.

– When the charging process is complete, disconnect the charging cable from the side charging access.

2 Charging the lead-acid battery with the industrial truck switched on

The parking brake is applied automatically or a message appears in the display of the display-operating unit prompting the driver to apply the parking brake.

– Connect the charging cable to the side charging access.

The industrial truck goes into the charging state. The drives are de-energised.

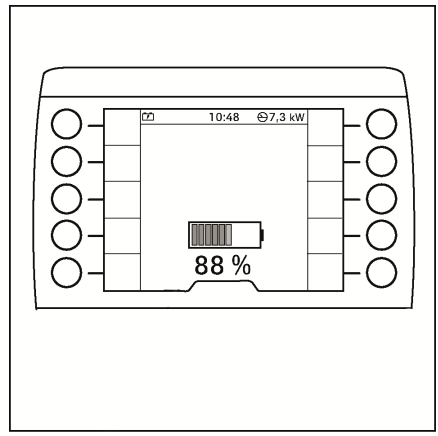
Battery charging is in progress. The screen on the display-operating unit goes dark.

– When the charging process is complete, disconnect the charging cable from the side charging access.

3 Charging the lithium-ion battery with the industrial truck switched off

– Connect the charging cable to the side charging access. Battery charging is in progress. The display-operating unit shows the charging state display (2).

– When the charging process is complete, disconnect the charging cable from the side charging access.



4 Charging the lithium-ion battery with the industrial truck switched on

– Connect the charging cable to the side charging access.

The industrial truck goes into the charging state. The drives are de-energised.

Battery charging is in progress. The display-operating unit shows the charging state display.

– When the charging process is complete, disconnect the charging cable from the side charging access.

Charging state display in the display-operating unit for lithium-ion batteries

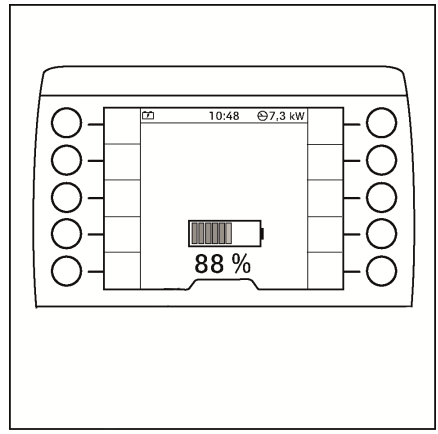
When charging lithium-ion batteries, the charging state display appears in the display-operating unit.

If the charging state display does not appear, there is an error. The side charging access may not detect the charging cable.

– In this case, disconnect the charging cable from the side charging access and re-establish the connection.

If the charging process is running, the charging state display is animated in green.

If the charging process is not running, the charging state display flashes in grey.



On-board charger

General information about the on-board charger (variant)

With an on-board charger (variant), there is no need to keep space for a battery charger on company premises.

This battery charger is suitable for operation using the public 400-V three-phase supply system with a CEE-16-A socket. The socket must meet the following requirements and undergo regular, professional testing:

- Fuse protection rated at 16 A (characteristic B, C, K or equal)
- Fault-current circuit breaker for AC and DC fault currents (RCD-type B), 30 mA
- Protective conductor

NOTE

All messages for the on-board charger are listed in the section entitled "Messages about operation" in the "Display messages" chapter.

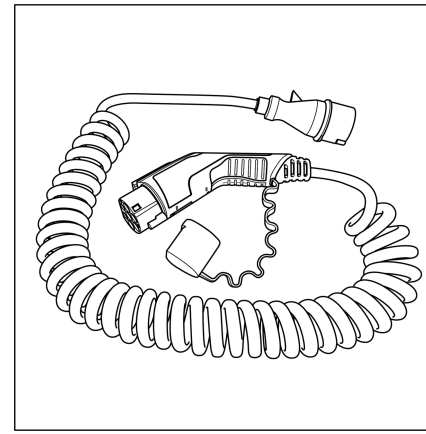
Conditions for operating the on-board charger

The on-board charger must only be used to charge batteries that are located in the same industrial truck as the charger and are connected to the industrial truck.

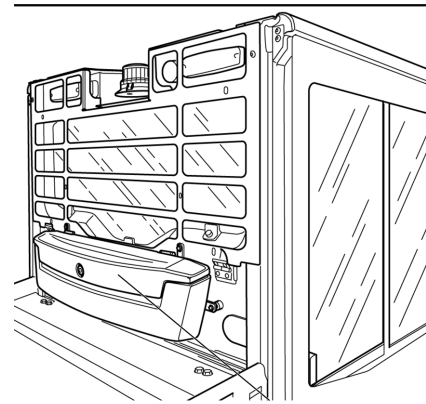
The housing of the on-board charger must not be opened, as the high voltages inside pose a risk to life. Any breach shall invalidate the warranty. If charging multiple industrial trucks with on-board chargers simultaneously, make sure that the electrical installation is designed for this and is adequately cooled.

Charging cable

Use only the included charging cable as a connection between the on-board charger and the mains socket.



The charging cable is housed in a lockable storage box (1) at the rear of the driver's cab.



If the charging cable is used, observe the following:

– Route the charging cable without strong mechanical load, e.g. tension.

– Protect the charging cable from mechanical stress.

Do not allow the charging cable to cross traffic routes. Do not route the charging cable over sharp edges.

– Before you use the charging cable, check the plugs and the connection sockets for damage.

– If any damage is found, do not use the affected components (this applies to the charging cable and the charger socket).

Configuring the on-board charger

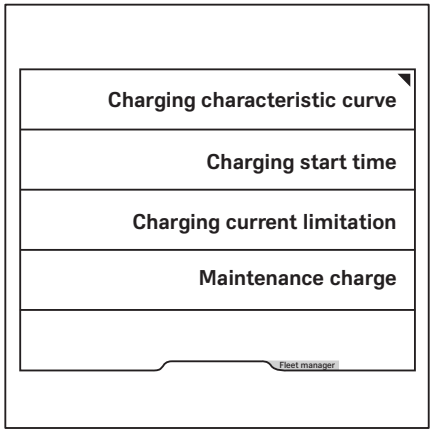
The on-board charger must be configured for the battery type used. Fleet manager access authorisation (variant) allows the fleet manager to do this.

NOTE

The configuration process requires access authorisation for the fleet manager. Access to the settings menu is available only if the industrial truck is at a standstill and the parking brake is applied. If the parking brake is released prematurely, the settings menu will close.

– Apply the parking brake.
– Press the ☰ button.
– Activate the "Access authorisation for the fleet manager".
– Press the ⚙ softkey.
– Press the `Truck settings` softkey.
– Press the `On-board charger` softkey.

`On-board charger` menu ▷



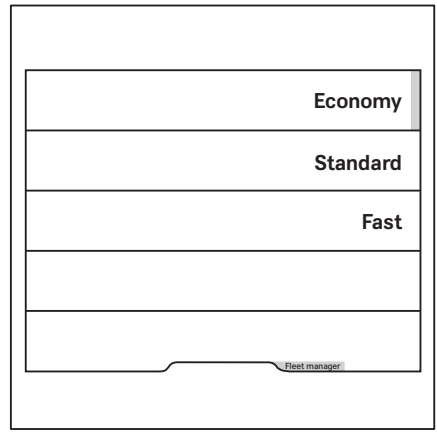
The following functions can be configured or switched on:

- `Charging characteristic curve`
- `Charging start time`
- `Charging current limitation`
- `Maintenance charge`

Charging characteristic curve

– Press the `Charging characteristic curve` softkey.

The possible charging characteristic curves are displayed. ▷



The orange activation bar displays the current selection.

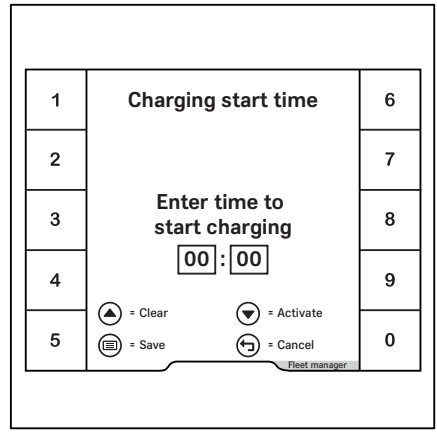
– Press the softkey that corresponds to the selection.

The display reverts to the `On-board charger` menu.

Charging start time

– Press the `Charging start time` softkey.

`Charging start time` menu ▷



– Enter the charging start time using softkeys `0` to `9`.

– To `save`, press the ▤ button.

– To activate the charging start time, press the scroll button ▽.

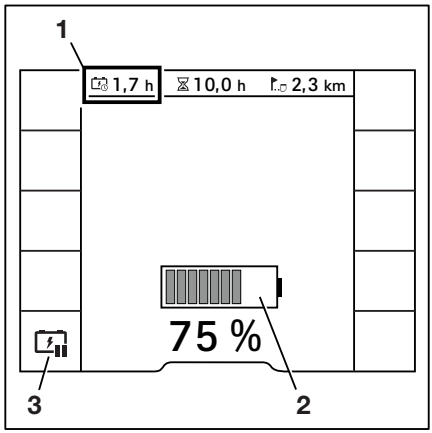
The display reverts to the `On-board charger` menu.

If a charging start time has been specified, an orange activation bar lights up next to the `Charging start time` softkey.

If the charging plug is plugged in outside the specified charging start time, a charging state indicator (2) appears in grey. Battery charging does not take place.

The time remaining (1) until the specified charging start time is displayed in the top-left. The softkey allows you to start charging directly.

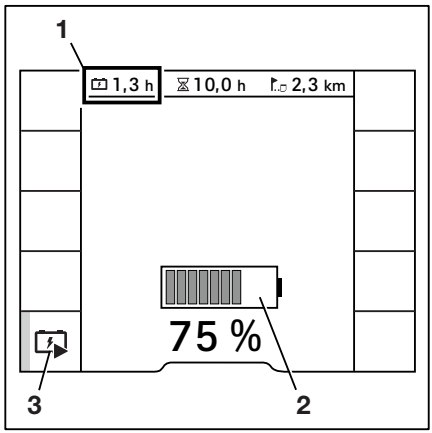
– To do so, press the softkey (3).



The symbol changes to (3). The orange activation bar lights up next to the softkey.

The charging state indicator (2) is animated in green. Battery charging takes place.

The remaining charging time (1) is displayed in the top-left.



Charging current limitation

Charging current limitation is required under the following conditions:

- Insufficiently powerful in-house network
- Power supply is provided via multiple-socket outlets

– Press the `Charging current limitation` softkey.

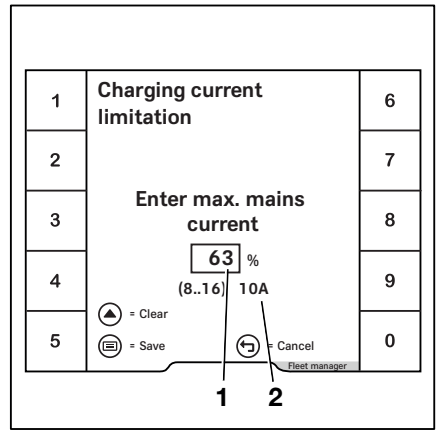
`Charging current limitation` menu ▷

– Enter the charging current as a percentage (1) using softkeys `0` to `9`.

The charging current is displayed under the input window in amperes (2).

– To `save`, press the ☰ button.

The display reverts to the `On-board charger` menu.



Maintenance charge

If the industrial truck remains stationary over a prolonged period and maintenance charge is active, the on-board charger checks the charging state of the battery from time to time and charges it if necessary.

– Press the `Maintenance charge` softkey.

If the maintenance charge is active, the orange activation bar lights up next to the softkey.

– To deactivate the maintenance charge, push the softkey again.

The orange activation bar goes out.

Changing the battery type used

⚠ DANGER

Risk of fire and explosion!

If the battery charger has not been configured for the battery type used and, for example, an excessively high battery capacity has been set, this may result in excessive heating and significant gas emissions. Oxyhydrogen gas and sulphur compounds form as a result.

– Observe the following conditions, which may mean that a reconfiguration of the battery charger is required.

The battery charger must be configured for the battery type used. When changing the battery type used, fleet manager access authorisation (variant) allows the fleet manager to reconfigure the battery charger if necessary.

Reconfiguration not required:

- Changing from a lead-acid battery to a STILL lithium-ion battery
- Changing from one STILL lithium-ion battery to another STILL lithium-ion battery

  The battery charger receives all necessary data directly from the lithium-ion battery.

Reconfiguration required:

- Changing from a STILL lithium-ion battery to a lead-acid battery
- Changing from a large lead-acid battery to a smaller lead-acid battery with a lower battery capacity or vice versa

– Refer to the section entitled "Changing to a different battery type" in the chapter entitled "Replacing and transporting the battery".

Charging the battery

Safety information



⚠ DANGER

Risk of explosion due to flammable gases!

During charging, the battery releases a mixture of oxygen and hydrogen (oxyhydrogen gas). This gas mixture is explosive

There must be no flammable materials or spark-forming operating materials within 2 m of the battery charger and the industrial truck when it is parked for charging.

– Take the following safety precautions when working with batteries.

– Keep away from open flames and do not smoke.

– Ensure that work areas are adequately ventilated.

– Disconnect the battery male connector before charging and only disconnect when the

industrial truck and the battery charger are switched off.

– Expose the surfaces of the battery cells.
– Do not place any metal objects on the battery.
– Have fire extinguishing equipment ready.



⚠ DANGER

Risk of explosion due to static charge!

If the driver is electrostatically charged, touching the battery may produce sparks. These sparks can ignite oxyhydrogen gas that has formed.

– To dissipate a possible electrostatic charge, touch an earthed component that is situated a long way from the battery.



⚠ DANGER

Risk of fire due to overheated connection assemblies!

Plugs that are not fully plugged in can produce excessive heat. They pose a fire hazard.

– Always fully plug the mains plug and the truck plug for the charging cable into the relevant socket.



⚠ DANGER

Risk of fire due to overheated connection assembly!

Do not pull out the mains plug under load as this will result in excessive wear and pose a fire hazard.

– If the mains plug needs be pulled out before the end of the charging process, cancel the charging process manually first (see the section entitled "Stopping the charging process manually").



⚠ DANGER

Risk of explosion due to spark discharge!

If the mains plug is plugged in, sparks may occur. These sparks can ignite any oxyhydrogen gas present in the battery compartment.

– Do not plug in the mains plug unless the battery compartment of the industrial truck and the charging area have been sufficiently ventilated.



⚠ DANGER

Risk of fire due to arcs!

If the charging plug is disconnected during the charging process (under load), an arc will be produced. This can lead to erosion at the contacts, which considerably shortens the service life of the contacts and poses a fire hazard. The electronics on the industrial truck can also be damaged by the excess voltage that arises.

– If the charging plug needs be pulled out before the end of the charging process, cancel the charging process manually first (see the section entitled "Stopping the charging process manually").



⚠ DANGER

Risk of fire from connecting and disconnecting connection assemblies!

Even when the industrial truck and the battery charger are switched off, oxyhydrogen gas in the vicinity can explode if connection assemblies are connected or disconnected.

– Sufficiently ventilate the battery compartment of the industrial truck and the charging area.

⚠ CAUTION

Possible component damage.

Make sure that the charging cable does not cross any traffic routes. Do not route the charging cable over sharp edges.

Procedure

NOTE

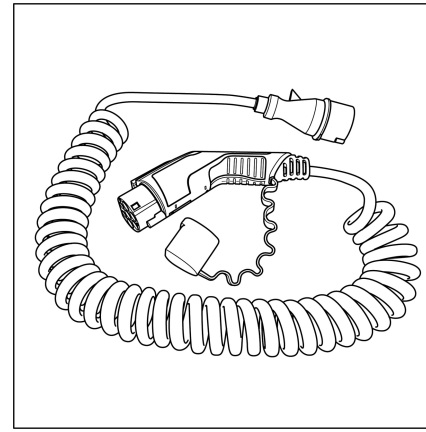
If a charging process has just been stopped manually via the charging button (see the chapter entitled "Stopping the charging process manually"), there is a delay of up to 60 seconds after plugging in the mains plug before a new charging process starts.

NOTE

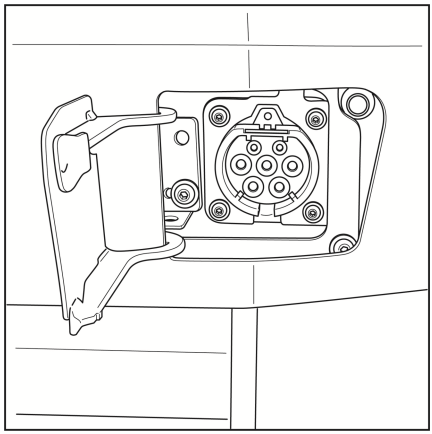
To ensure maximum battery life, always charge lead-acid batteries fully. For intermediate charging during work breaks, use an electrolyte circulation pump (variant). Lithium-ion batteries may be charged intermediately as often as required with no restriction to the battery life.

– Park the industrial truck securely on a flat surface near a suitable CEE 16-A socket and switch off the truck.

– Take the supplied charging cable out of the storage container. ▷

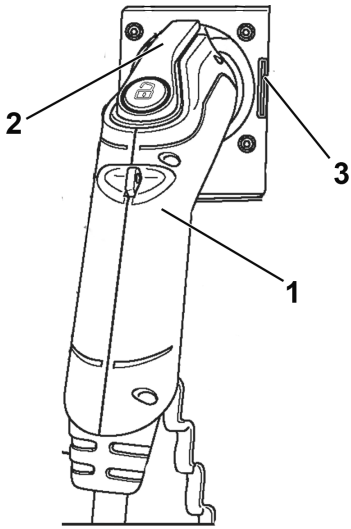


– Open the cover flap for the charger socket at the rear of the industrial truck. ▷

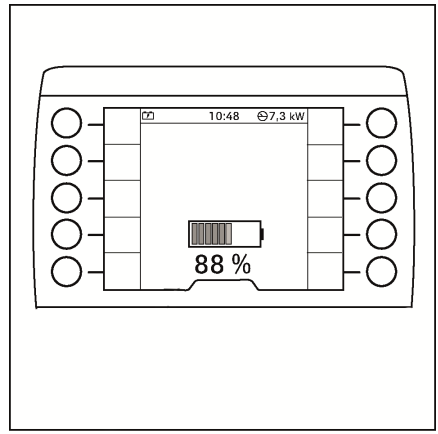


– Plug the truck plug (1) of the charging cable into the charger socket on the industrial truck. ▷
– Make sure that the interlock (2) has closed correctly.

After a self-test, the battery charger automatically begins the charging process. The LED (3) on the charger socket pulses yellow.



At the same time, the charging state display appears on the display-operating unit. ▷



If the charging state display does not appear or the LED (3) lights up permanently in red, there is a fault. It is possible that the charger socket does not detect the truck plug (1).

– In this case, pull out the truck plug (1) and plug it in again.

If the charging process is running, the charging state display is animated in green.

If the charging process is not running, the charging state display flashes in grey.

Charging state display on the charger socket

The LED (3) on the charger socket uses differently coloured flash codes to indicate the current status of the charging process. Only the authorised service centre may rectify malfunctions.

The following flash codes are possible:

Status	Flash code
Main charging phase active	Yellow
Battery voltage detection/start phase	Yellow
Recharging phase active (lead-acid battery)	Yellow
Battery almost fully charged (lithium-ion battery): residual charging with reduced current	Yellow/ green
Battery fully charged	Green
Trickle charging (only for lead-acid batteries)	Green
Deep discharge start possible (press push button for 2 s)	Red

Status	Flash code
Malfunction (e.g. mains supply or battery faulty, internal fault): charging not possible	Red
Malfunction without shut-off: charging is continued at lower power	Yellow/red
Charging process was aborted or no system voltage present.	○
Overtemperature of the connected battery	Yellow/red
Wait for restart after power failure	-
Legend: ○ → LED off ● → LED on ◐ → LED flashing ◐ → LED pulsing ◐|◐ → Pulsing alternately	

Reading the charging status from the tail lights

If desired, the charging process can also be indicated via a flashing signal emitted by the LED tail lights on the industrial truck.

The individual LEDs in the tail lights begin to flash, go out and flash again, one after another, running from one side to the other side. This light signal is displayed over the entire duration of the charging process.

Up to a charging state of 50%, only the LEDs in the left tail light begin to flash. The fewer LEDs that flash, the lower the charging state.

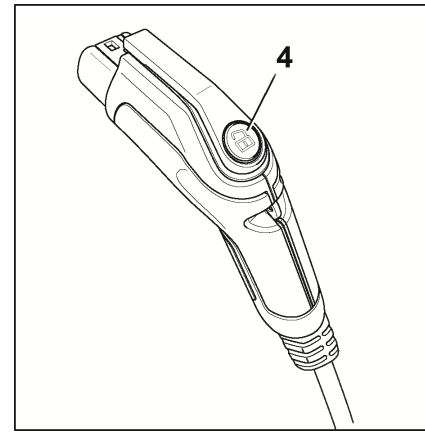
As soon as the charging state exceeds 50%, the LEDs in the right tail light also begin to flash. The more LEDs that flash, the higher the charging state.

– Contact the authorised service centre regarding this matter.

Ending the charging process

When the battery is fully charged, the battery charger automatically stops the charging process. The charging state display on the display-operating unit of the industrial truck shows `100%`.

– To remove the charging cable, push and hold the charging button (4) on the truck plug. ▷



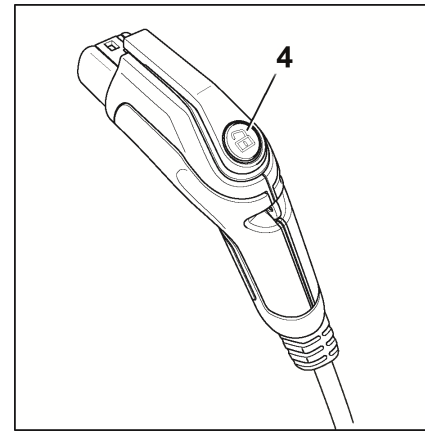
This opens the interlock for the truck plug at the same time.

– Pull the truck plug out of the charger socket.
– Pull the charging cable out of the CEE 16-A socket and attach the protective cap.
– Place the charging cable in the storage container.
– Close the cover of the charger socket.

It is possible to stop the charging process manually at any time. See the following section entitled "Stopping the charging process manually".

Stopping the charging process manually

– Briefly press the charging button (4) on the truck plug. ▷



The charging status display on the display-operating unit goes out. The mains plug can now be disconnected.

– If the charging process needs to be started again, pull out the truck plug and plug it back in after approx. 2 seconds.

The charger starts a new charging process.

NOTE

There may be a delay of up to 60 seconds before a new charging process starts.

Charging with an electrolyte circulation pump

As an option, the on-board charger can be equipped with an electrolyte circulation pump. To adjust the charging characteristic curve to the respective battery type, the authorised service centre must install this pump and configure this pump in the battery charger.

Using an electrolyte circulation pump reduces the charging time of a lead-acid battery and enables intermediate charging.

If the industrial truck is equipped with an electrolyte circulation pump, a battery designed for electrolyte circulation must always be used. The pump can be damaged without the counterpressure from the battery. The charger detects an error as soon as the pressure drops during the pumping process.

If a defect in the electrolyte circulation pump or the air duct is detected, the battery charger continues charging with a standard charging program without the electrolyte circulation pump. The LED on the charger socket flashes yellow/red. This indicates a fault.

NOTE

The electrolyte circulation pump is switched on only periodically to mix the electrolyte in the battery.

Cleaning

Check the on-board charger on a regular basis for contamination, particularly in the area of the fans.

If significant contamination has accumulated on the battery charger, cooling may be impaired. The isolation to the truck chassis may also be compromised.

– Remove contamination with a damp cloth. For significant contamination, use a soft brush or a soft paintbrush.

Charging a deeply discharged lead-acid battery

NOTE

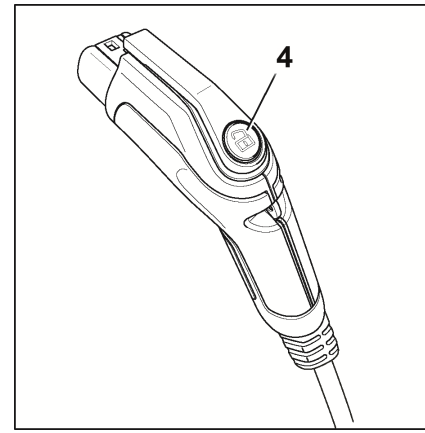
A defective battery may be incorrectly identified as a deeply discharged battery if, for example, a cell short circuit or another fault is present. If the charging process is started in this case, the remaining cells of the battery may be overloaded. Before the charging process is started manually, you must therefore measure all cell voltages in the battery and compare them for any irregularities. If one cell voltage is significantly lower than the others, the battery is probably defective. The charging process must not be started. In addition, the filling quantity of the acid in the cells must be checked and, if necessary, refilled according to the manufacturer's instructions. For this reason, the authorised service centre must always be notified if a battery is deeply discharged.

If the connected battery has a cell voltage in the range of 1.0 V to 1.6 V, it is considered to be deeply discharged.

The battery charger indicates this by means of a flashing red display after the mains plug has been plugged in. The charging process does not start automatically.

– To start the charging process, push and hold the charging button (4) on the truck plug for 2 seconds.

To charge the battery carefully, the battery charger starts a special charging characteristic curve. A full charge in this condition takes longer than a normal charging process. The driver must monitor the charging process at regular intervals (at least every 30 minutes). If the battery heats up to an excessive degree or emits a lot of gas (strong sulphur smell), the driver must cancel the charging process immediately. In this case, the battery is probably defective.



Compatible batteries

⚠ DANGER

Risk of fire and explosion!

If an unapproved or defective battery is used, this can cause overloading as well as excessive gas emissions and overheating of the battery.

– Only use intact batteries approved by STILL.

⚠ CAUTION

Risk of damage to components.

If batteries other than those listed here are used, it is not possible to guarantee that the batteries will not incur damage and will charge correctly.

– Use only the batteries listed here.

In addition to proprietary STILL lithium-ion batteries, only the following batteries may be used:

Manufacturer	Designation	Capacity[1)]
All[2)]	PzS, TCSM wet battery	< 1200 Ah (80 V)
Exide	TCSM gel battery	< 1000 Ah (80 V)
Exide	Sonnenschein PzV (gel)[3)]	< 1000 Ah (80 V)
Hawker	Evolution PzV (gel)[3)]	< 1000 Ah (80 V)

Only the batteries listed here have been tested.

[1)] In order to achieve the full life expectancy of the battery, it is recommended that a minimum charging current of 0.1 C (0.12 C for gel batteries) is maintained. This produces the maximum battery capacity. If larger batteries than specified are charged, over the long term, the batteries can be damaged or may not fully charge. The values shown are for the maximum charging current of 170 A. If the maximum charging current is restricted to a lower value by the truck, correspondingly smaller values are produced.

[2)] The implemented charging characteristic curve is approved by the following battery manufacturers:

- Hoppeke
- Hawker
- MIDAC
- TAB
- Exide

[3] Gel batteries are charged solely in accordance with the standard characteristic curve (IUIa).

– If in doubt, contact the authorised service centre.

Performance data

Input

Mains voltage	400 V AC
Network frequency	45 to 65 Hz
Maximum power consumption	10.7 kW
Maximum current draw	15.5 A

Output

Maximum output power	10 kW
Maximum charging current	120 A[1]
Output voltage	40...108 V DC
Nominal voltage	80 V DC
[1] Depending on the configuration of the truck and the installation situation, the maximum output current can be limited by the software.	

NOTE

From an ambient temperature of 40°C, the on-board charger reduces the charging performance.

Handling the lead-acid batteries

Safety regulations for handling the battery

– National statutory provisions for the country of use must be followed when setting up and operating battery charging stations.



⚠ CAUTION

Possible damage to the battery charger.

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

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

– Observe the following safety regulations when maintaining, charging and changing the battery.

Maintenance personnel

Only personnel trained for this purpose may perform the following tasks in accordance with the instructions of the battery, charger and industrial truck manufacturers:

- Charging batteries
- Maintaining batteries
- Replacing batteries

– Observe the handling instructions of the battery and the operating instructions of the battery charger.

– Observe the following safety regulations when maintaining, charging and changing the battery.



⚠ WARNING

Risk of crushing/shearing.

The battery is very heavy. There is a risk of serious injury if any parts of the body are caught under the battery.

There is a risk of injury if any parts of the body are wedged between the battery door and the edge of the chassis when the battery door is closed.

– Always wear safety shoes when replacing the battery.
– Make sure that there are no parts of the body present between the battery door and the edge of the chassis when closing the battery door.

The battery must only be replaced in accordance with the directions in these operating instructions.

– When charging and maintaining the battery, observe the manufacturer's maintenance instructions for the battery and the battery charger.

Fire protection measures



⚠ DANGER

Risk of explosion due to flammable gases.

During charging, the battery releases a mixture of oxygen and hydrogen (oxyhydrogen gas). This gas mixture is explosive and must not be ignited.

There must be no flammable materials or spark-forming operating materials within 2 m of the battery charger and the industrial truck when it is parked for charging.

– Take the following safety precautions when working with batteries.

– Keep away from open flames and do not smoke.
– Ensure that work areas are adequately ventilated.
– Disconnect the battery male connector before charging and only disconnect when the industrial truck and the battery charger are switched off.

– Lock the battery door in the charging position using the retaining bracket; see chapter "Charging lead-acid batteries".
– Expose the surfaces of the battery cells.
– Do not place any metal objects on the battery.
– Fully open any protective structures (e.g. fabric-covered cab).
– Have fire extinguishing equipment ready.

Maintaining the battery

The cell covers of the battery must be kept dry and clean.

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

– Neutralise any spilt battery acid immediately.
– Observe the safety regulations for handling battery acid; see the chapter entitled "Battery acid".

Damage to cables and battery male connector



⚠ CAUTION

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

Do not crush the battery cable when closing the battery door.

– Check the battery cable for damage.
– When removing and reinstalling the battery, ensure that the battery cables are not damaged.
– Ensure that the battery cable does not come into contact with the battery door.

⚠ CAUTION

Potential for damage to the battery male connector!

If the battery male connector is disconnected or connected while the key switch is switched on or while the battery charger is under load, an arc or a transition spark will be produced at the battery male connector. This can lead to erosion at the contacts and can considerably shorten the service life of the contacts.

– Switch off the key switch or the battery charger before the battery male connector is disconnected or connected.

– Do not disconnect the battery male connector while under load, except in an emergency.

Ventilation gap

These openings are used for forced ventilation of the battery compartment:

- Within the chassis
- In the battery door and battery hood
- In the load platform of platform tractors
- In the gaps between these components

– If these components are deformed, contact the authorised service centre.

– Do not block the ventilation gaps.

Charging the lead-acid battery



⚠ DANGER

Explosive gases are generated during charging.

– Ensure that work areas are adequately ventilated.

– The battery door must be kept in the charging position during the charging process to provide sufficient ventilation.

– If the industrial truck is equipped with a tarpaulin body, open at least one side of the tarpaulin body completely.

⚠ DANGER

Old batteries carry a risk of explosion.

Old and inadequately maintained batteries can de-gas excessively and heat up excessively during charging.

The increased production of explosive gas can lead to an explosion.

– If an increased build-up of heat or a sulphurous odour is detected, stop the charging process immediately.
– Ensure adequate ventilation.
– Inform the authorised service centre so that it can determine the condition of the battery.

⚠ DANGER

Risk of damage, short circuit and explosion!

– Do not place any metal objects or tools on the battery.
– Keep away from naked flames and do not smoke.

⚠ WARNING

Battery acid is toxic and corrosive!

Observe the safety regulations in the chapter entitled "Battery acid".

⚠ CAUTION

Risk of damage to the battery charger!

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

– Observe the operating instructions for the charging station or battery charger and for the battery.

⚠ CAUTION

Risk of damage to the battery female connector.

If you disconnect the battery female connector while the key switch is switched on (under load), an arc will be generated. This can lead to erosion at the contacts, which considerably shortens the service life of the contacts.

– Switch off the key switch before disconnecting the battery female connector.
– Do not disconnect the battery female connector while the key switch is switched on except in an emergency.

⚠ CAUTION

Risk of damage to components.

Damage and contamination of the battery male connector or the plug on the battery charger can lead to premature wear of the counterpart.

– Before each charging process, check both sides of the connection assembly between the battery charger and the battery for damage and contamination.
– Remove contamination immediately.
– Do **not** continue to use a damaged connection assembly. Arrange for the authorised service centre to repair the connection assembly.

NOTE

STILL recommends that you always use components (plug and socket) from the same manufacturer for the connection assembly between the battery charger and the battery. The use of components from different manufacturers can cause increased wear due to the different tolerances in the shape and geometry of the components.

Charging options

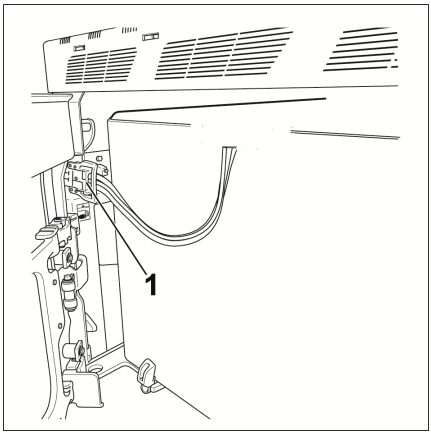
The following three charging options are available for lithium-ion batteries:

1 External battery charger; the procedure is described below
2 Side charging port (variant); see the chapter entitled "Side charging port"
3 On-board charger (variant); see chapter entitled Onboard charger.

Charging the battery

– Park the industrial truck securely.
– Make sure that the external ventilation slots on the industrial truck are unobstructed and are not blocked.
– Ensure that work areas are adequately ventilated.
– Fully open the battery door on the right-hand side of the tow tractor.

– Disconnect the battery female connector (1). ▷



⚠ DANGER

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

– Do not place any metal objects or tools on the battery.
– Keep away from naked flames.
– Do not smoke.

– Check the battery cables for damage. If necessary, have the cables replaced by the authorised service centre.
– Route the charging cable of the battery charger to the truck. Observe the following points to protect the charging cable:

⚠ CAUTION

Possible damage to the charging cable!

Protect the charging cable against possible mechanical damage, e.g. crushing, shearing or being driven over. To do this, follow these points:

– Make sure that the charging cable does not cross traffic routes.
– Do not route the charging cable over sharp edges.
– Route the charging cable as directly as possible from the charger to the battery female connector of the industrial truck.
– Route the charging cable without loops.
– Adapt the length of the charging cable to the requirements. The charging cable should not be longer than absolutely necessary. Longer charging cables have a higher line resistance than shorter ones. This can lead to reduced battery charging performance.
– Provide suitable locating devices for storing the charging cable when not in use.

– Connect the battery female connector (1) to the plug on the battery charger.
– Adjust the settings of the battery charger to the battery capacity of the lead-acid battery.
– Start the battery charger.

NOTE

Observe the information in the operating instructions for the battery and the battery charger.

After charging

⚠ CAUTION

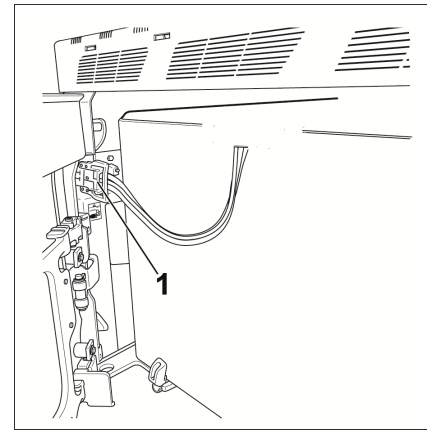
Risk of component damage!

– Switch off the battery charger before disconnecting the charging cable.

– Switch off the battery charger.

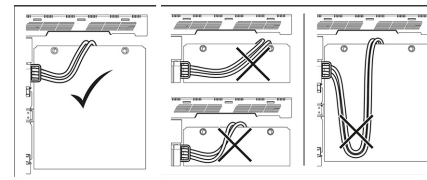
– Disconnect the battery female connector (1) from the plug on the battery charger.

– Insert the battery female connector (1) into the appliance plug on the industrial truck. ▷



The battery cables must be routed as follows:

– Make sure that the battery cables run to the appliance plug in a slight curve. ▷



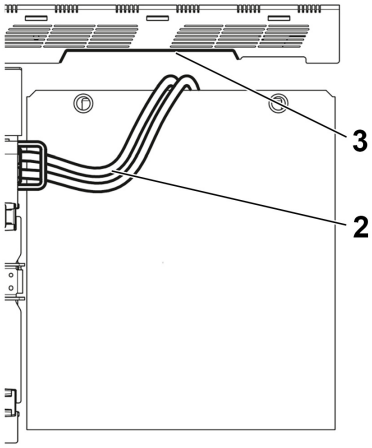
– The battery cables must run parallel and must not cross each other.

– The battery cables must not hang down too far. Otherwise, they may be damaged by sharp edges of the chassis or the road surface. Observe the cable length specifications.

Special consideration for tow tractors

– Route the battery cables (2) over the edge of the battery tray under the spot where the battery hood has a raised contour (3). The battery cables must be routed as follows: ▷

- The battery cables must be positioned at least 5 cm away from either end of the raised contour (3).
- Do not allow the battery cables (2) to cross each other.





⚠ CAUTION

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

Do not crush the battery cable when closing the battery door.

– Ensure that the battery cable does not get in the way of the battery door.

– Close the battery door. When doing so, ensure that no cables are crushed between the chassis and the battery door. The door lock must engage audibly.

Equalising charging to preserve the battery capacity

Equalising charges ensure that unevenly charged battery cells are evenly charged again. This preserves the service life of the battery and the battery capacity.

An equalising charge should be carried out in accordance with the battery manufacturer's instructions several times a month after the normal charging process.

NOTE

Depending on the battery charger used, the equalising charge may not begin until 24 hours have elapsed. A period when no shifts are running, such as the weekend, is therefore ideal for performing the equalising charge.

– Observe the information in the operating instructions of the battery charger regarding how to perform an equalising charge.

Starting the equalising charge

– Charge the battery.

– After charging, leave the battery in the battery charger.

The battery charger remains switched on. Depending on the type of battery charger used, the equalising charge begins between 6 and 24 hours after the end of the actual charging process. The equalising charge takes up to 2 hours.

– Please refer to the operating instructions from the manufacturer of the battery charger.

Ending the equalising charge

The equalising charge ends automatically. If the battery is required during this process, you can interrupt the equalising charge by pressing the "stop button" on the battery charger.

– Please refer to the operating instructions from the manufacturer of the battery charger.

⚠ CAUTION

Risk of component damage!

If the plug for the battery charger is disconnected from the battery male connector while the battery charger is switched on, an arc is produced. This can lead to erosion at the contacts, which considerably shortens the service life of the contacts.

– Switch off the battery charger before disconnecting the charging cable.

– Switch off the battery charger.

– Disconnect the battery male connector from the plug for the battery charger.

– Insert the battery male connector fully into the plug connection on the tow tractor.

Checking the battery charge status and calibrating the battery charge indicator

⚠ CAUTION

Deep discharges shorten the service life of the battery.

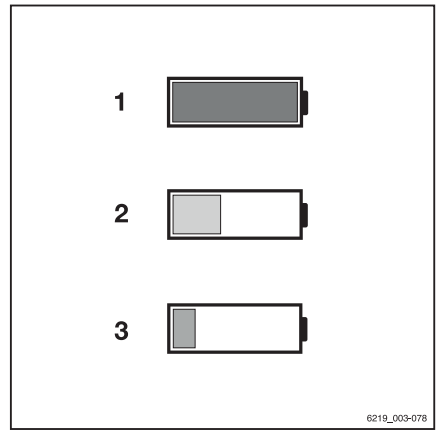
Deep discharge begins when the battery charge display is red (3) (0% of the available battery capacity, i.e. approx. 20% of the nominal capacity).

– Deep discharge must be avoided (see the section entitled "Equalising charge to prevent a deep discharge of the battery").
– Immediately stop working with the industrial truck.
– Charge the battery immediately.
– Do not leave batteries in a discharged or partly discharged state.

An important function of the battery charge indicator is to protect the battery from deep discharge. The battery discharge indicator shows the approximate battery charge status. The accuracy of the display increases as the battery continues to discharge.

– Apply the parking brake.
– Switch on the industrial truck.
– Read the charging state on the display of the display-operating unit.
– Charge a discharged or partly discharged battery.

Meaning of the colours in the display ▷



NOTE

An abrupt change in the charging state display does not indicate a malfunction. The battery charge indicator allows the driver to detect any preliminary damage to the battery. If abrupt changes in the display begin to occur more frequently, have the battery and the charging process checked by the authorised service centre.

1 Green:
The battery is sufficiently charged

2 Yellow:
Charge the battery soon.

3 Red:
Stop working. Charge the battery immediately. The battery is at risk of deep discharge.

The battery charge indicator has a protective function that prevents the displayed charging state from being affected. The charging state of a heavily discharged battery (residual charge < 30%) is not updated in the display until the battery charge indicator detects a fully charged battery.

– Never operate the batteries to the point of full discharge.

As soon as the battery charge indicator detects that the connected battery has been fully charged or a new battery has been connected, the display refreshes.

If the charging state drops to a significantly lower value immediately after the start of use, this indicates a battery problem or a charging error.

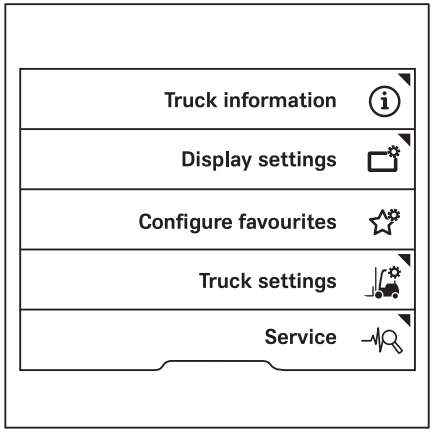
– Contact the authorised service centre if required.

Calibrating the battery charge indicator

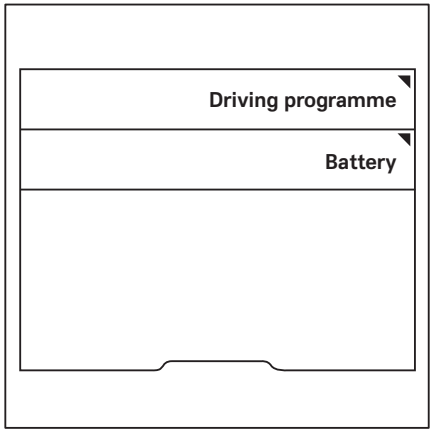
When the battery is replaced, the discharge of the newly inserted battery may be calculated and displayed incorrectly due to different ageing or discharge. This can even occur when the same battery types are used. Therefore, the Access authorisation for the fleet manager allows the battery charge indicator to be

calibrated to the newly inserted battery. The stored battery charge history is then deleted in the display-operating unit.

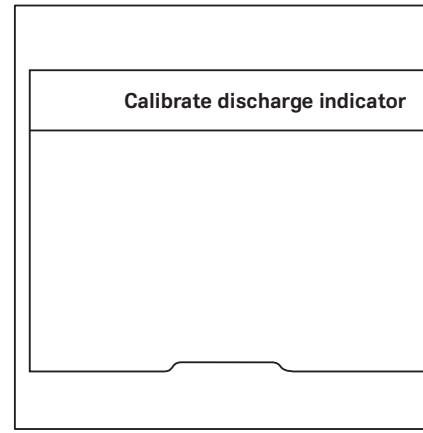
– Activate the "Access authorisation for the fleet manager".
– Press the ☰ button.
– Press the ⚙ softkey.
– Press the `Truck settings` softkey. ▷



– Press the `Battery` softkey. ▷



– Press the `Calibrate discharge indicator` softkey. ▷



After the instruction has been executed, the message `Calibration successful` or `Calibration unsuccessful` is displayed.

– If the calibration failed, try again.

– If the calibration fails repeatedly, contact your authorised service centre.

Maintaining the battery

⚠ DANGER

Danger to life and limb!

– Observe the instructions in the chapter entitled "Safety regulations when handling the battery".

⚠ WARNING

Battery acid is toxic and corrosive!

– Observe the safety regulations in the chapter entitled "Battery acid".

NOTE

Battery maintenance is carried out in accordance with the battery manufacturer's operating instructions. The operating instructions for the battery charger must also be observed. Only the instructions that came with the battery charger are valid. If any of these instructions are missing, request the relevant instructions from the dealer.

Battery maintenance consists of the following steps:

- Checking the battery condition, acid level and acid density
- Checking the battery charge state

- Charging the lead-acid battery
- Equalising charging to preserve the battery capacity

Checking the battery condition, acid level and acid density





⚠ WARNING

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

– Observe safety regulations for handling battery acid; see the chapter entitled "Battery acid".

– Wear personal protective equipment (rubber gloves, apron and protection goggles).

– Rinse away spilt battery acid immediately using plenty of water!

⚠ CAUTION

Risk of damage!

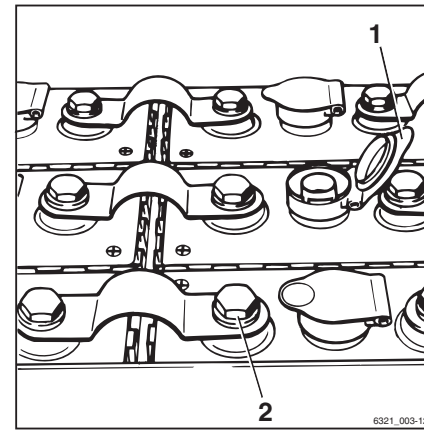
– Note the information in the operating instructions for the battery.

– Remove the battery from the industrial truck.

– Inspect the battery for any cracks in the housing, raised plates and acid leaks.

– Have defective batteries repaired by the authorised service centre.

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



For batteries with "caged cell plugs", the liquid must reach the bottom of the cage.

For batteries without "caged cell plugs", the liquid must reach a height of approx. 10 to 15 mm above the lead plates.

– If the fluid level is too low, top up the fluid with distilled water only.
– Clean the battery cell cover and dry if necessary.
– Remove any oxidation residue on the battery terminals then apply acid-free grease to the terminals.
– Tighten the battery-terminal clips (2) to a torque of 22–25 Nm (depending on the size of the terminal screws used).
– Check the acid density using an acid siphon.

After charging, the acid density must be between 1.28 and 1.30 kg/l.

For a discharged battery, the acid density must be **no lower** than 1.14 kg/l.

Handling the gel batteries

Handling the gel battery

General

In contrast to lead-acid batteries, gel batteries are largely maintenance-free. With gel batteries, there is no need to refill distilled water. The electrolyte is in gel form and, unlike conventional lead acid batteries, is non-liquid. For this reason, gel batteries also do not produce any oxyhydrogen gas during the charging process.

However, these benefits are at the expense of the amount of usable energy in the battery. While a conventional lead-acid battery can use 80% of the energy contained in the battery, the gel battery uses only 60%. On the other hand, a gel battery is safe from deep discharge due to its design (according to DIN 43 539, Part 5).

Identification

Gel batteries are marked with the abbreviation "PzV". It is located on the identification plate of the battery.

Safety regulations for handling the battery

– If a charging station for gel batteries is set up, follow the national regulations of the country of use.

⚠ CAUTION

Risk of damage to the battery charger!

Components may be damaged if the battery charger is connected or operated incorrectly.

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

Requirements for the charger

A gel battery requires a high-frequency charger. This means that the gel battery cannot be charged with a charger for conventional lead-acid batteries. For this reason, the charging socket of the gel battery has a special green

coding pin. This coding pin ensures that it is possible only for a charger for gel batteries to form a connection assembly.

⚠ CAUTION

Possible damage to the gel battery!

Gel batteries may be charged only with chargers that are approved for gel batteries. A different charger may damage or destroy the battery.

– Do **not** remove, replace or convert the coding pin in the battery charging socket.
– Use only chargers that are approved for gel batteries.

Maintenance personnel

Only personnel trained for this purpose may:

- Charge the battery
- Replace the battery

This work must be carried out according to the instructions of the battery manufacturer and of the charger manufacturer.

– Observe the manufacturer's operating instructions for the battery and the charger.
– Observe the following safety information when replacing and charging the battery.

⚠ WARNING

Risk of crushing/shearing!

The battery is very heavy. There is a risk of serious injury if any parts of the body are caught under the battery.

There is a risk of injury if any parts of the body are wedged between the battery door and the edge of the chassis when the battery door is closed.

– Always wear safety shoes when replacing the battery.
– Only close the battery door if there are no parts of the body between the battery door and the edge of the chassis.

– The battery must only be replaced in accordance with the directions in these operating instructions.
– When charging and maintaining the battery, observe the manufacturer's operating instructions for the battery and the battery charger.

Battery weight and dimensions

⚠ DANGER

Risk of tipping due to change in battery weight

The battery weight and dimensions affect the stability of the industrial truck. When replacing the battery, the weight ratios must not be changed. The battery weight must remain within the weight range specified on the nameplate.

– Do not remove or change the position of ballast weights.

– Note the battery weight.

Damage to cables and battery male connector

⚠ CAUTION

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

Do not crush the battery cable when closing the battery door.

– Check the battery cable for damage.

– When removing and reinstalling the battery, ensure that the battery cables are not damaged.

– Ensure that the battery cable does not come into contact with the battery door.

⚠ CAUTION

Potential for damage to the battery male connector!

If the battery male connector is disconnected or connected while the key switch is switched on or while the battery charger is under load, an arc or a transition spark will be produced at the battery male connector. This can lead to erosion at the contacts and can considerably shorten the service life of the contacts.

– Switch off the key switch or the battery charger before the battery male connector is disconnected or connected.

– Do not disconnect the battery male connector while under load, except in an emergency.

Charging the gel battery

The charging procedure is in principle the same as for a lead-acid battery. However, no protective measures are required for the escape of oxyhydrogen gas.

– Park the industrial truck securely.

– Open the battery door completely.
– Disconnect the battery male connector.
– Do not place any metal objects or tools on the battery.
– Check the battery cables for damage. If necessary, have the battery cables replaced by the authorised service centre.
– Connect the battery female connector to the plug on the battery charger.
– Adjust the settings of the battery charger to the battery capacity of the gel battery.
– Start the battery charger.

NOTE

Observe the information in the operating instructions for the battery and the battery charger.

After charging

⚠ CAUTION

Risk of damage to components!

– Switch off the battery charger before you disconnect the charging cable.

– Switch off the battery charger.
– Disconnect the plug of the battery charger from the battery female connector.
– Connect the battery female connector to the industrial truck.

⚠ CAUTION

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

Do not crush the battery cable when closing the battery door.

– Ensure that the battery cable does not come into contact with the battery door.

– Close the battery door. When doing so, ensure that no cables are crushed between the chassis and the battery door.

The battery door must be locked in place.

Handling the gel batteries

The truck has a door contact switch for the battery door. If the battery door is not fully closed, the message Close battery door appears on the display of the display-operating unit. The industrial truck will not move.

Handling the lithium-ion batteries

Safety regulations for handling the lithium-ion battery

First-aid measures

⚠ WARNING

Risk of injury!

Escaping gases can lead to breathing difficulties.

Course of action required if gases or liquids escape

– Immediately ventilate the area or go out into the fresh air; in more serious cases, call a doctor immediately.

Skin irritation can occur in the event of contact with the skin.

– Thoroughly wash the skin with soap and water.

Eye irritation can occur in the event of contact with the eyes.

– Immediately rinse eyes thoroughly with water for 15 minutes, then consult a doctor.

Maintenance personnel

The lithium-ion battery is virtually maintenance-free and can be charged by the driver.

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

– The handling instructions for the battery and the operating instructions for the battery charger must be observed.

– Observe the following safety regulations when maintaining, charging and changing the battery.



⚠ WARNING

Risk of crushing/shearing!

The battery is very heavy. There is a risk of serious injury if any parts of the body are caught under the battery.

If parts of the body are wedged between the battery door and the edge of the chassis when the battery door is closed, this could lead to injuries.

– Always wear safety shoes when replacing the battery.
– Only close the battery door if there is no part of the body between the battery door and the edge of the chassis.

The battery must only be replaced in accordance with the directions in these operating instructions.

– When charging and maintaining the battery, observe the manufacturer's maintenance instructions for the battery and the battery charger.

Fire protection measures

⚠ DANGER

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

– Do not place any metal objects or tools on the battery.
– Keep away from open flames and do not smoke.



⚠ DANGER

Increased risk of fire!

Damaged lithium-ion batteries pose an increased fire hazard.

In the event of a fire, large quantities of water are the best option to cool the battery.

– Evacuate the location of the fire as quickly as possible.
– Ventilate the location of the fire well, as the resulting combustion gases are corrosive if inhaled.
– Inform the fire brigade that lithium-ion batteries are affected by the fire.

– Observe the information provided by the battery manufacturer regarding the procedure in the event of a fire.

General safety regulations for lithium-ion batteries

The following safety regulations generally apply to operating lithium-ion batteries.

– Comply with the specifications stated in the safety data sheets of the battery manufacturer.

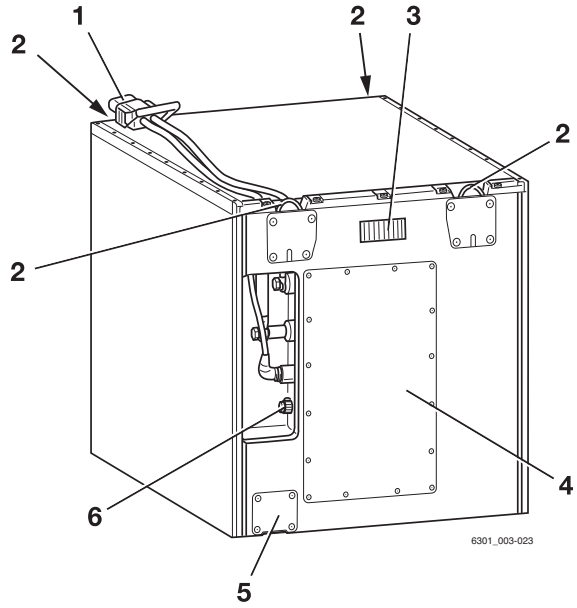
– Protect the battery against mechanical damage to prevent internal short circuits.

– If batteries have even the slightest external damage, dispose of them in accordance with national regulations for the country in which they are being used.

– Do not expose batteries directly to continuously high temperatures or heat sources, such as direct sunlight.

– Train employees in how to handle lithium-ion batteries correctly.

80 V lithium-ion batteries



1	Battery male connector	4	Technology compartment
2	Lifting eyes	5	Safety valve
3	Display	6	Diagnostic connector

⚠ WARNING

Risk of accident due to weakened lifting eyes.

If bent lifting eyes are straightened, they lose their rigidity. The lifting eyes are then no longer able to support the weight of the battery. The battery may fall.

– **Do not** straighten bent lifting eyes.
– Have bent lifting eyes replaced by the authorised service centre.

NOTE

When switching to lithium-ion batteries, have the industrial truck electronics adapted by the authorised service centre.

Regulations for storing lithium-ion batteries

NOTE

Lithium-ion batteries are classified as dangerous goods according to class 9.

The following recommendations apply:

- Wherever possible, store batteries at ground level so that they cannot be damaged by falling
- Store the batteries in a segregated area suitable for fire protection (container or safety cabinet)
- Store the batteries at a temperature between +15°C and +30°C and air humidity from 0% to 80%

Observe the following regulations for safe storage of the batteries:

– Store batteries fixed onto pallets and secured against overturning.

– Observe the floor load capacity of the storage area; refer to the manufacturer's specifications regarding battery weight

– To protect batteries against moisture, do not store them directly on the floor

– Due to the fire risk, store batteries outside buildings

– Store in a cool, dry and well-ventilated area

– Never subject the battery to temperatures below -35°C and above 80°C.

Long-term storage below -10°C or above 50°C has a negative impact on the service life of the battery.

– After three months, check the charge state of the battery and recharge if necessary

– Cordon off the relevant area of the warehouse

– Only persons who are aware of the risks and safety regulations may access this area

– Protect against direct sunlight

– Protect against precipitation

– Store in a way that protects the batteries against short circuits
– Store batteries at a safe distance from flammable materials
– Do not store batteries together with metallic objects
– Store lithium-ion batteries separately from other types of batteries (no mixed storage)
– Maintain a safety margin of at least 2.5 m from other goods
– To avoid a deep discharge, observe the specifications of the battery manufacturer regarding the maximum permissible storage period
– If you have any questions, contact your authorised service centre.

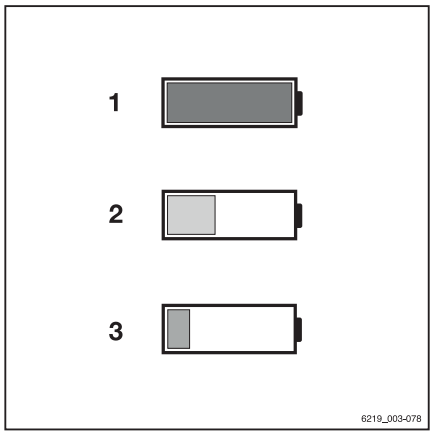
Checking the battery charge status

The charge state of the lithium-ion battery can be read on the display-operating unit of the industrial truck and on the display of the lithium-ion battery.

Reading the display-operating unit

▷

– Apply the parking brake.
– Switch on the key switch.
– Read the charge state from the display.
– Charge a discharged or partly discharged battery.



Meaning of the colours in the display

1 Green:
The charge state is > 10%.
The battery is sufficiently charged

2 Yellow:
The charge state is ≤ 10%.
Charge the battery soon.

3 Red:
Stop working. Charge the battery immediately. The battery is at risk of deep discharge.

Reading from the battery indicator

The battery indicator is located on the side of the battery tray. Like the display-operating unit, the battery indicator shows the charge state of the lithium-ion battery. Warnings are issued only on this battery indicator.

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

Charge state LEDs

When the battery is connected to the industrial truck and the industrial truck is switched on, the charge state LEDs (3) display the charge state in 10% increments. The charge state LEDs can light up green and red.

- A charge state of 0% to 20% is indicated by a red bar.

  If this bar is flashing, the charge state is < 2%.

  The industrial truck can no longer be moved.
- A charge state of > 20% to 30% is indicated by yellow bars.
- A charge state of > 30% to 100% is indicated by green bars

When charging, the charge state LEDs (3) light up green as a chase light.

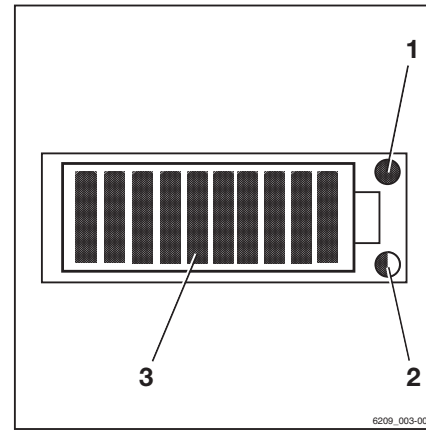
Service LED

The service LED (1) lights up red if the battery function is significantly restricted or operation is not possible.

– Contact the authorised service centre.

Temperature LED

The temperature LED (2) indicates an increased temperature. Battery power is reduced. The LED remains illuminated until the temperature falls to within the normal range. The LED goes out as soon as the temperature falls into the normal range.



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

Colour of LED	Cause	Consequence
Flashing yellow	Slightly increased temperature (> 60°C)	Power reduction
Solid yellow	Increased temperature (> 65°C)	Shut-off
Flashing red	Greatly increased temperature (> 70°C)	Shut-off
Solid red	Greatly increased temperature (> 75 °C)	Shut-off

Procedure if a lithium-ion battery has a low charge state

⚠ WARNING

Risk of component damage or destruction!

Deep discharge can permanently damage a lithium-ion battery or render it unusable.

– Always charge the battery in good time and do not let the charge state drop below 10%.

To prevent deep discharge of the lithium-ion battery, industrial truck performance limitations are imposed once the charge state of the battery drops to ≤ 10%.

– If the charge state drops below 15%, drive to the charging station and recharge the battery.

⚠ WARNING

There is no electric brake assistance when the battery is switched off!

The drives are de-energised when the battery is automatically switched off.

The industrial truck will not be held on a slope by the electric brake.

– To brake, actuate the service brake.

– If the battery switches off, tow the industrial truck to the charging station.

– Charge the battery.

Charging the lithium-ion battery

⚠ CAUTION

Risk of damage to the battery charger!

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

– Observe the operating instructions for the charging station or battery charger and for the battery.

⚠ CAUTION

Risk of damage to components!

Using battery male connectors and battery charger plugs from different manufacturers can result in damage. They are not designed to be used together.

– Use battery male connectors and battery charger plugs from the same manufacturer.
– If the connectors are from different manufacturers, please contact your authorised service centre.

⚠ CAUTION

Risk of damage to components

Damage and contamination of the battery male connector or the plug on the battery charger can lead to premature wear of the counterpart.

– Before each charging process, check both sides of the connection assembly between the battery charger and the battery for damage and contamination.
– Remove contamination immediately.
– Do **not** continue to use a damaged connection assembly. Arrange for the authorised service centre to repair the connection assembly.

NOTE

The performance of the truck is limited once the discharge status of the battery drops to a certain level to prevent deep discharge of the lithium-ion battery. Charge the battery before the battery charging status drops below 15%.

- *To read the battery charge state; see the section entitled "Checking the battery charge status"*

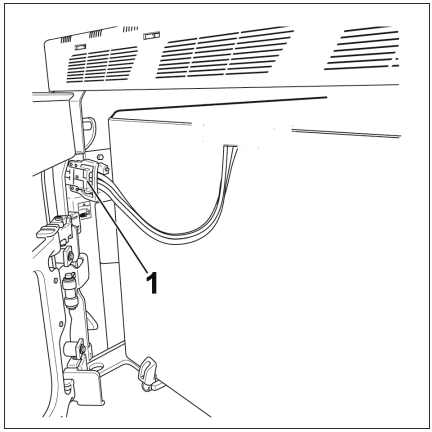
Charging options

The following three charging options are available for lithium-ion batteries:

1 External battery charger; the procedure is described below
2 Side charging access (variant); see the chapter entitled "Side charging access"
3 On-board charger (variant); see the chapter entitled "On-board charger"

Charging the battery

– Park the industrial truck securely.
– Make sure that the external ventilation slots on the industrial truck are unobstructed and are not blocked.
– Ensure that work areas are adequately ventilated.
– Fully open the battery door on the right-hand side of the tow tractor.
– Disconnect the battery female connector (1). ▷



⚠ DANGER

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

– Do not place any metal objects or tools on the battery.
– Keep away from naked flames.
– Do not smoke.

– Check the battery cables for damage. If necessary, have the cables replaced by the authorised service centre.
– Route the charging cable of the battery charger to the truck. Observe the following points to protect the charging cable:

⚠ CAUTION

Possible damage to the charging cable!

Protect the charging cable against possible mechanical damage, e.g. crushing, shearing or being driven over. To do this, follow these points:

- Make sure that the charging cable does not cross traffic routes.
- Do not route the charging cable over sharp edges.
- Route the charging cable as directly as possible from the charger to the battery female connector of the industrial truck.
- Route the charging cable without loops.
- Adapt the length of the charging cable to the requirements. The charging cable should not be longer than absolutely necessary. Longer charging cables have a higher line resistance than shorter ones. This can lead to reduced battery charging performance.
- Provide suitable locating devices for storing the charging cable when not in use.

- Connect the battery female connector (1) to the plug on the battery charger.
- Start the battery charger.

The charging process starts automatically. The display signals the charging process by illuminating the LEDS as a chase light. The battery charger indicates when the battery is fully charged. Only disconnect the battery from the battery charger if no current is flowing.

NOTE

Observe the information in the operating instructions for the battery and the battery charger.

NOTE

The battery has no memory effect. Therefore, it can be charged in any charge status without the capacity of the battery being impaired.

NOTE

At ambient temperatures below 0°C, the charging process will take much longer.

After charging

⚠ CAUTION

Risk of component damage!

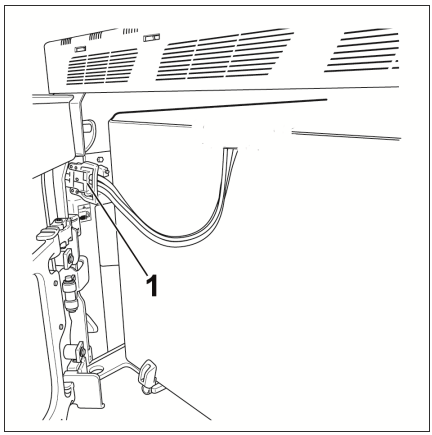
– Switch off the battery charger before disconnecting the charging cable.

The battery charger will switch off automatically.

– Disconnect the battery male connector from the plug on the battery charger.

– Insert the battery male connector into the appliance plug (1) on the industrial truck. Make sure that the battery cables are not twisted.

▷





⚠ CAUTION

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

Do not crush the battery cable when closing the battery door.

– Ensure that the battery cable does not get in the way of the battery door.

– Close the battery door. When doing so, ensure that no cables are crushed between the chassis and the battery door. The door lock must engage audibly.

Replacing and transporting the battery

Changing to a different battery type

The industrial truck can be converted to a different battery type and capacity.

The new battery capacity and new battery type must be set in the display-operating unit.

- If this is not done, the actual battery discharge status cannot be determined. The battery charge level is not displayed correctly.
- In the worst-case scenario, deep discharge can damage the battery.

Using their access authorisation, the fleet manager can set the new battery capacity and the new battery type in the display-operating unit.

– Use only lithium-ion batteries that have been approved by STILL for use with this industrial truck.

In addition, the connectors between the industrial truck and the battery must be replaced if a different battery type is used. Contact the authorised service centre regarding this matter.

Setting the new battery capacity and the new battery type

– Stop the industrial truck.

– Actuate the parking brake.

– Press the button.

– Press the softkey.

The first menu level appears.

– Activate the "Access authorisation for the fleet manager".

– Press the `Truck settings` softkey.

– Press the `Battery` softkey.

– Press the `Battery type` softkey.

The battery types are listed.

– Select the battery type by pressing the appropriate softkey.

– Return to the `Battery` menu.
– Press the `Capacity` softkey.
– Use the softkeys to enter and confirm the battery capacity according to the battery nameplate.
– Switch the industrial truck off and on again.

The changed settings will be active once the truck is switched on.

Opening and closing the battery hood (variant)

Opening the battery hood

⚠ WARNING

Risk of crushing!

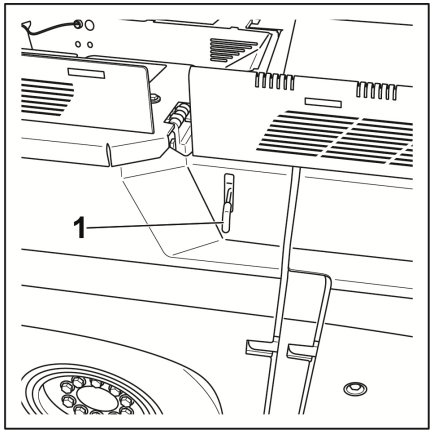
When lifting and closing, limbs could become trapped.

– Do not reach into the area between the covers and the chassis.

NOTE

Close the motor cover before opening the battery hood.

– Pull the interlock handle (1) above the right-hand rear wheel upwards until it audibly unlocks. ▷
– Grasp the battery hood with both hands on the load guard rail and fold the hood upwards until it is vertical. The lock must audibly engage.



Closing the battery hood

⚠ WARNING

Risk of crushing!

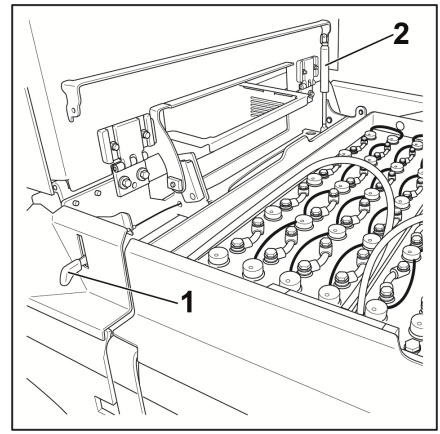
When lifting and closing, limbs could become trapped.

– Do not reach into the area between the covers and the chassis.

– Pull the interlock handle (1) upwards until it audibly unlocks. ▷

– Grasp the battery cover with both hands on the load guard rail and push it downwards. Hold the battery hood firmly while doing so. It is supported by a gas spring (2), but it is very heavy.

– Carefully put the battery cover in place and push down until the interlock audibly engages.

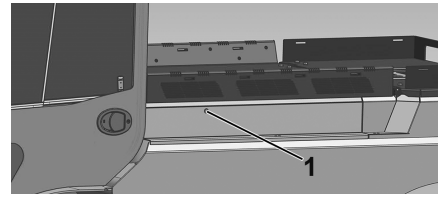


Opening the battery hood in an emergency

If the interlock handle cannot be actuated, the battery hood can also be opened as follows. On the left-hand side in the drive direction, there is an opening in the battery hood cover, just behind the cab door.

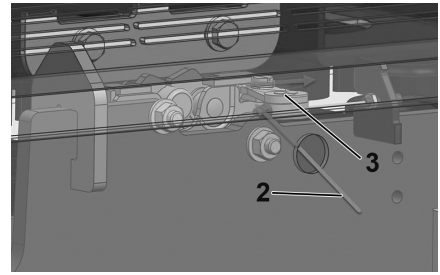
– Remove the lid (1) on the opening. ▷

– Insert a long, narrow tool, such as a screwdriver, through the opening.



– Place the tool (2) on the release lever (3) of the battery hood lock. ▷

– Push the tool to the left so that it pushes the release lever to the right. The lock unlocks and the battery hood can be opened.



Replacing the battery using a truck or hand pallet truck

Preparing

⚠ DANGER

Overloading the selected means of transport carries a risk of accident.

The load capacity of the means of transport used must at least be sufficient for the combined weight of the battery, the tray and, if applicable, the change frame.

– Regarding the respective weights, observe the nameplates of the battery and of the change frame.

⚠ WARNING

Risk of damage to the battery.

– Only place the battery (with or without the change frame) on a firm and stable surface.

– Do **not** place the battery (with or without the change frame) on unpaved ground or on racking.

⚠ CAUTION

Risk of damage to the truck if original batteries are not used.

– The replacement battery must be identical in size and weight to the original battery.

– If the size or weight is different, please contact your authorised service centre.

⚠ CAUTION

Risk of damage to electrical and electronic components due to short circuit.

Connecting or disconnecting the battery with the industrial truck switched on may cause damage to electrical and electronic components.

– Always switch off the industrial truck.

The battery can be replaced using the following means of transport:

- Truck
- Electric hand pallet truck
- Unbraked hand pallet truck. However, this may only be used on level ground. Also use a change frame.

Removing the battery

⚠ DANGER

High risk of crushing and shearing between battery and chassis.

– Do not reach between the battery and chassis.

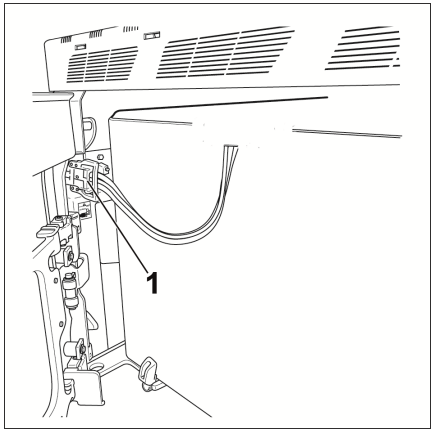
In the following, the vehicle being used to replace the battery is referred to as the means of transport.

– Park the industrial truck on a level surface and secure it.

– Switch off the industrial truck.

– Open the battery door.

– Disconnect the battery male connector (1). ▷



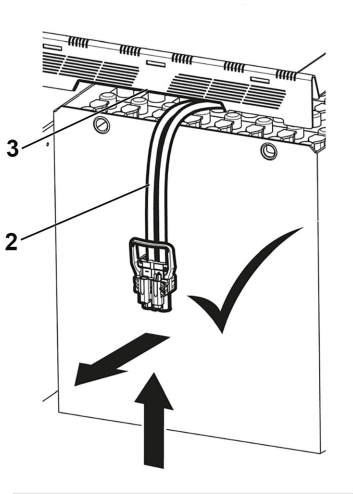
– Lay the battery cables over the edge of the battery tray. Route the battery cables as follows:

- The cables must not cross each other.
- The battery male connector must not hang down too far. Otherwise, it can be damaged on components of the means of transport or on the road surface.

Special consideration for tow tractors

– Route the battery cables (2) over the edge of the battery tray under the spot where the battery hood has a raised contour (3). The battery cables must be routed as follows: ▷

- The battery cables must be positioned at least 5 cm away from either end of the raised contour (3).
- Do not allow the battery cables (2) to cross each other.



– Open the battery latch(es). Trucks with a short wheelbase have one battery latch, trucks with a long wheelbase have two. For the position of the battery latches, see the following section entitled "Battery latches".

– Carefully move the means of transport under the battery.

– Raise the battery just enough to lift it off the chassis.

– Carefully move the means of transport to remove the battery from the battery compartment. Make sure that the battery male connector and battery cables **do not** touch or get caught on any part of the chassis, bodywork or fittings.

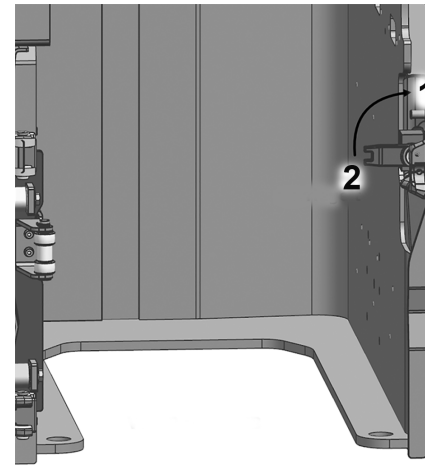
– Carefully transport battery to the intended storage space.

Battery latch

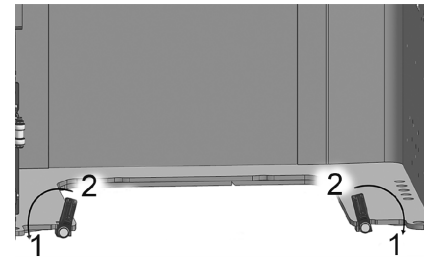
Tow tractors have either one or two battery latches, depending on which wheelbase you have. Platform tractors always have two battery latches. The battery latches prevent the battery from slipping out of the battery compartment. In addition, stops on the latches ensure that the battery door cannot be closed if the latch is open. The industrial truck can then only be driven in emergency mode at a greatly reduced speed.

These are the attachment positions for trucks with long and short wheelbases:

Tow tractor with short wheelbase: (1) Battery latch open. / (2) Battery latch closed. ▷



Tow tractor with long wheelbase and platform tractor: (1) Battery lock open. / (2) Battery latch closed. ▷



Installing the battery

⚠ DANGER

High risk of crushing and shearing between battery and chassis.

– Do not reach between the battery and chassis.

– Carefully drive the means of transport under the battery.

– Transport the battery to the industrial truck.

– Lay the battery cables over the edge of the battery tray. Route the battery cables as follows:

- The cables must not cross each other.
- The battery male connector must not hang down too far. Otherwise, it could be damaged on components of the means of transport or on the road surface.

Special consideration for tow tractors

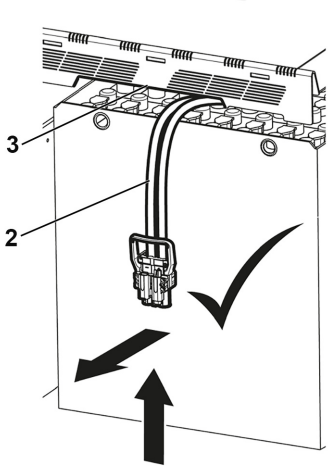
– Route the battery cables (2) over the edge of the battery tray under the spot where the battery hood has a raised contour (3). The battery cables must be routed as follows:

- The battery cables must be positioned at least 5 cm away from either end of the raised contour (3).
- Do not allow the battery cables (2) to cross each other.

– Carefully insert the battery into the battery compartment. Make sure that the battery male connector and battery cables **do not** touch or get caught on any part of the chassis, bodywork or fittings.

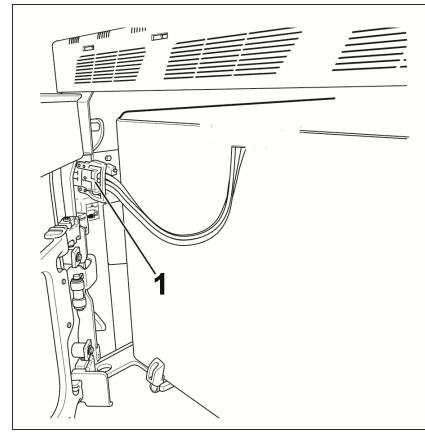
– Carefully lower the battery until it is firmly seated on the support on the chassis.

– Close the battery latch(es).



– Insert the battery male connector (1) into the truck connector. In doing so, make sure that the battery cables are not twisted together.

– Close the battery door. Make sure that the door lock audibly engages.



Replacing the battery using a change frame

If an unbraked hand pallet truck or an electric pallet truck is used to replace the battery, a change frame is always required. This means that, in the event of an emergency, the pallet truck can be braked by simply lowering the change frame, which holds the battery.

Even if other means of transport are used, a change frame is useful. It facilitates the insertion and removal of the battery and reduces the risk of a collision between the battery and components of the industrial truck.

The different tow tractors and platform tractors have different battery sizes, for which different change frames are required. The battery size depends on the wheelbase of the tow tractor or platform tractor.

– Select the change frame according to the wheelbase of the industrial truck used. See

the table in the following chapter, "Change frame types", for more information.

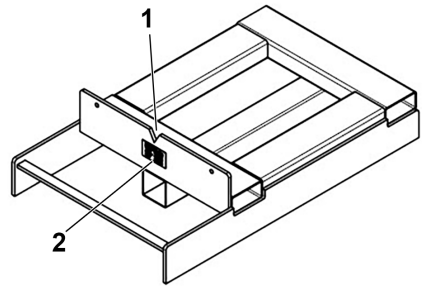
– Ensure that the selected change frame has sufficient load capacity for the combined weight of the battery and tray. This information can be found on the nameplate of the change frame and of the battery.
– Check the change frame for deformation and fractures or cracks before use.

⚠ WARNING

Risk of component damage.

– Do not use a faulty change frame. Faulty change frames must be replaced.

– Place the battery in the centre of the change frame. The change frames have a marking notch (1) at the front stop, which must be aligned with the middle of the tray. ▷



If the battery is positioned in the centre of the change frame, it is easier to insert the battery into the battery compartment of the industrial truck. The risk of a collision with components in the battery compartment is reduced.

Change frame types

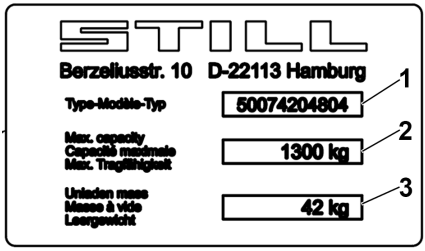
The following table shows which change frame fits which wheelbase and under which material number the frame can be ordered from the authorised service centre:

Material numbers of the change frames

	Tow tractor with very short wheelbase	Tow tractor with short/long wheelbase	Tow tractor with very long wheelbase	Platform tractor with long wheelbase
Material number/model	50074204804	50074204805	50074204806	50074204805

The important data for selecting the correct change frame can be found on the frame nameplate (2). It is attached to the front stop of the change frame.

Nameplate of the change frame ▷



The following information is listed on the nameplate:

1 The change frame model
2 The maximum permissible load capacity (see also the nameplate of the battery)
3 The net weight of the change frame

NOTE

Batteries may only be replaced using a hand pallet truck if the change frame approved for this purpose is also used.

Replacing the battery using a crane

⚠ DANGER

Risk of death from suspended loads.

– Never walk or stand underneath suspended loads.
– The hoist must be designed to carry the weight of the battery (see battery plate or nameplate).

⚠ WARNING

Risk of crushing/shearing.

– Do not reach between the battery and chassis.

⚠ WARNING

Risk of damage to the truck due to uncontrolled swivelling movements.

– Position the crane directly above the battery.
– Prevent the battery from swivelling.

⚠ CAUTION

Risk of damage to the truck if original batteries are not used.

– The replacement battery must be identical in size and weight to the original battery.
– Contact your authorised service centre if there are any differences in height or weight.

⚠ CAUTION

Risk of damage to electrical and electronic components due to short circuits.

Connecting or disconnecting the battery with the industrial truck switched on may cause damage to electrical and electronic components.

– Always turn off the key switch.

Preparing

– Park the industrial truck on a level surface.

– Apply the parking brake.

– Switch off the key switch.

– Open the battery hood; see the chapter entitled "Opening and closing the battery hood" at the beginning of this main chapter.

– Open the battery door.

– Disconnect the battery female connector. Place the battery cables and the battery female connector on top of the battery so that they do not project beyond the battery contour.

– Open the battery latch(es) so that the battery does not catch on the latches when it is lifted out. Trucks with a short wheelbase have one battery latch, trucks with a long wheelbase have two.

– If the battery has open terminals or connectors, these must be covered with a rubber mat to prevent short circuits.

– Adjust the length of the lifting gear so that the hoist is positioned vertically above the battery's centre of gravity.

Removing the battery

⚠ WARNING

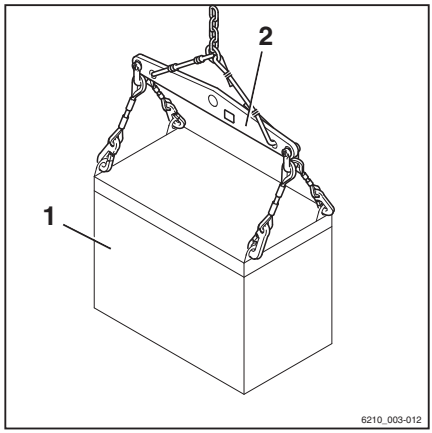
Danger due to falling load.

The load-bearing capacity of the lifting gear must be sufficient for the combined weight of the battery and tray.

– Read the maximum battery weight off the name-plate of the industrial truck.
– Use lifting gear with a load capacity corresponding to the maximum battery weight.
– Read and observe the operating instructions of the lifting gear.

– Fit the lifting gear on the four lifting eyes of the battery tray (1). For transportation by crane, only use appropriately sized lifting gear with a bridge piece (2) and ensure that the lifting gear has a suitable load capacity.
– Lift the battery until it is no longer in contact with the industrial truck. Make sure that the battery is hanging straight on the lifting gear.

The lifting gear must pull vertically to avoid crushing the tray.



⚠ CAUTION

Danger due to heavy battery.

The surface on which the battery is placed must be capable of bearing the weight of the battery.

– Set the battery down carefully.
– Remove the lifting gear after the battery has been set down.
– Do not place the lifting gear on the battery cells or allow it to fall on them.

Installing the battery

– Fit the lifting gear on the replacement battery.
– If the battery has open terminals or connectors, these must be covered with a rubber mat to prevent short circuits.
– Adjust the length of the lifting gear so that it is positioned vertically above the battery's centre of gravity.

– Fit the lifting gear on the four lifting eyes of the battery tray (1). For transportation by crane, only use appropriately sized lifting gear with a bridge piece (2) and ensure that the lifting gear has a suitable load capacity.
– Lift the battery far enough so that it cannot collide with the industrial truck.
– Carefully swivel the battery over the battery compartment and then lower it.
– When the battery is securely in the battery compartment, release the lifting gear and swivel it away from the industrial truck.
– Connect the battery female connector; see the chapter entitled "After charging".
– Close the battery latch(es).
– If necessary, remove the rubber mat on the battery terminals.
– Close the battery hood; see the section entitled "Opening and closing the battery hood" at the beginning of this main chapter.
– Close the battery door.

Display messages

Messages

Certain conditions on the industrial truck may cause event-related messages to be shown on the display of the display-operating unit.

There are messages about operation and messages about the industrial truck. If a message about operation appears, the display-operating unit will prompt you to perform an action. A message about the industrial truck means that the truck control unit has detected a fault.

The following types of message may appear individually or in combination:

- A graphic symbol
- The message
- An error code consisting of a letter and a four-digit number

In the case of successive events, the respective messages are displayed one after another on the display.

After a few seconds, the display will alternate between the last shown display and the message.

Messages about operation

If messages about operation appear on the display-operating unit, an action must be carried out.

Shown in display	Cause/action
Logging in	The access authorisation (variant) is preventing the use of the industrial truck. - Enable the access authorisation.
Battery empty	The battery charge state is too low for the use of the industrial truck. - Charge the battery.
Battery: Emergency mode	The charge state of the battery is low. Power in the industrial truck is reduced. - Charge the battery.
Check battery acid level	The acid level of the lead-acid battery is too low. - Check the acid level of the battery. Correct if necessary.

Shown in display	Cause/action
Battery too cold	The lithium-ion battery is too cold. - Move the industrial truck to a warmer environment.
Close battery door	The battery door is open. The industrial truck moves only at a reduced speed. - Close the battery door.
Check battery door sensor	The battery door sensor does not detect that the battery door is closed. - Make sure that the lock on the battery door is engaged. - If the message continues to appear, please contact the authorised service centre.
Release brake pedal	The desired action is only possible after releasing the brake pedal. - Release the brake pedal.
Data transmission required !	If the industrial truck is equipped with this variant, data transmission must be carried out. - See the associated instructions.
Diagnostic mode active	This message is for the authorised service centre. It is not displayed when in normal operation.
Development mode active	This message is for the authorised service centre. It is not displayed when in normal operation.
Drive unit blocked !	This message follows earlier messages, e.g. overtemperature. It is not possible to drive the truck. - Wait until the message disappears. If necessary, switch the industrial truck off and on again. - If the message continues to appear, please contact the authorised service centre.
Sit on driver's seat	The industrial truck is equipped with a seat contact switch. If the driver's seat is not occupied, the drives are disabled. - Sit on the driver's seat.
Truck stop: Tugger train	The industrial truck is stationary despite the accelerator being actuated. The accelerator has been actuated while the tugger train trailers are still lowered or while they are raising or lowering the load. - Release the accelerator and wait until all the tugger train trailers have fully raised or lowered.
Truck stop: Access system	The access authorisation (variant) is preventing the use of the industrial truck. This can result from entering an incorrect code or from access by the fleet manager. - Enable the access authorisation.
Apply parking brake	If the industrial truck control unit detects a movement of the industrial truck without the accelerator pedal being actuated, this message appears. - Apply the parking brake.

Shown in display	Cause/action
Release parking brake	The desired action is only possible after releasing the parking brake. - Release the brake pedal.
Secure truck against rolling away	The parking brake could not be applied due to a fault and the truck control unit has detected that the driver has left the driver's seat.
Check parking brake	The truck control unit detects that the braking force of the electric parking brake is reducing. - Secure the industrial truck with wedges so that it cannot roll away. - Contact the authorised service centre.
Apply parking brake via button	The electric parking brake is not applying automatically. - Apply the parking brake by pressing the button.
Parking brake: Maintenance required	The truck control unit detects that the electric parking brake needs a service. - Secure the industrial truck with wedges so that it cannot roll away. - Contact the authorised service centre.
Close cab door or seat belt !	If the seat belt (variant) is not fastened and the cab door (variant) is not closed, the driving speed is limited to 4 km/h and this message appears. - Close the cab door or fasten the seat belt.
Close cab door !	If the cab door is opened during travel, the industrial truck brakes automatically to a speed of 4 km/h. - Close the cab door.
Configuration: Please wait	This message is for the authorised service centre. It is not displayed when in normal operation.
Unsent data will be overwritten !	If the industrial truck is equipped with this variant, data transmission must be carried out. - See the associated instructions.
Emergency off active !	When the key switch is switched on and an operating device is actuated when the emergency off switch is pressed, this message appears. The desired action is only possible once the emergency off switch is unlocked. - Unlock the emergency off switch.
Emergency mode !	This message appears if the industrial truck experiences a power reduction, e.g. due to a low battery charging state. - Observe the previous message.

Shown in display	Cause/action
Emerg. direct. via drive direction lever ⚠	If the truck control unit has detected a fault that affects the drive functions, it is possible to activate emergency running. - Set the direction selection lever to the desired direction. - Drive the industrial truck to a safe area. Park the truck securely. - Contact the authorised service centre.
Parameter calibration	This message is for the authorised service centre. It is not displayed when in normal operation.
Close restraint system	If, for example, the industrial truck is equipped with a bracket (variant) as a restraint system and the accelerator pedal is actuated, this message appears. The industrial truck will not move. - Close the restraint system.
Shock event detected !	This message appears if the truck control unit detects very rapid acceleration or deceleration, e.g. in the event of an accident.
Service required	If the maintenance interval has been reached, this message appears. - Contact the authorised service centre.
Service mode active ⚠	This message is for the authorised service centre. It is not displayed when in normal operation.
Close seat belt	If the seat belt (variant) is not fastened, the driving speed is limited to 4 km/h and this message appears. - Fasten the seat belt.
Overtemp.: Battery	If the truck control unit detects an excessive battery temperature, this message appears. - Allow the industrial truck to cool down.
Factory mode active ⚠	This message is for the authorised service centre. It is not displayed when in normal operation.
Top up wiper water	If the wiper water level is low, this message appears. - Top up the washer fluid reservoir with washer fluid adapted to the ambient temperature.
Access expired !	If the industrial truck is equipped with this variant, this message may appear. - See the associated instructions.
Access denied !	
Access expires in < 1 month !	
Access expires in < 1 day !	
Access expires in < 1 week !	
Access expires in < 2 days !	
Access expires in < 3 days !	

Messages about the industrial truck

If messages with a code appear on the display-operating unit, the truck control unit has detected a fault. The message with a code is stored in the message list until the cause of the message is corrected. The saved messages can be called up from the "message list".

– Deal with the error according to the solution described in "Description/Possible solution".

– Switch the industrial truck off and on again.

– If the message still appears, please contact the authorised service centre.

The messages are sorted in ascending order according to their code:

Code	Shown in display	Description/possible solution
A2305	Fault: Control unit	Collective fault on the control unit
A2899	Monitoring	Collective fault with process monitoring
A3027	Fault: Seat switch	The seat switch does not open - Stand up from the driver's seat and sit down again.
A3035	Fault: Brake fluid	Brake fluid switch
A3143	Check lift height sensor and reflector	Lift-height sensor measurement error
A3310/3311	Check tugger train	Lifting the tugger train trailers is too fast or takes too long. Alternatively, the tugger train trailers do not reach the end position when lifting. - Check the hydraulic or electrical connections of the tugger train trailers. - Check whether the trailer load is possibly too heavy. - Contact the authorised service centre if necessary. There is an incorrect hydraulic or electrical connection of one or more tugger train trailers. - Check the hydraulic or electrical connections of the tugger train trailers.
A5934	Re-insert charging plug	Error in the charging connector detection - Disconnect the connection assembly and reconnect it.
A5961	Overtemp.: Battery	Overtemperature of the lithium battery - Switch off the industrial truck and leave it to cool down.
A5962	Battery too cold	Insufficient lithium battery temperature - Move the industrial truck to a warmer environment.

Code	Shown in display	Description/possible solution
A5986	Fault: Control unit ⚠	General battery current measurement
A5993	Fault: Internal charger ⚠	On-board charger collective fault
A6502	Overtemp.: Parking brake (!)	Electric parking brake detects overtemperature
A6510	Fault: Parking brake (!)	Electric parking brake detects fatal fault
A6511	Fault: Parking brake (!)	Brake cannot release
A6512	Fault: Parking brake (!)	Brake cannot apply
None	Error ⚠	General fault

Cleaning

Cleaning the industrial truck



⚠ WARNING

Risk of injury from falling off the industrial truck!

When climbing onto the industrial truck, there is a danger of getting stuck or slipping and falling. Use suitable equipment to reach higher points on the industrial truck.

– Use only the steps provided to climb onto the industrial truck.

– Use equipment such as stepladders or platforms to reach inaccessible areas.



⚠ WARNING

Risk of fire due to flammable cleaning materials!

Flammable cleaning materials can be ignited by hot components.

– Do not use any flammable cleaning materials.



⚠ CAUTION

Risk of fire due to flammable materials!

Deposits and solids can be ignited by hot components, e.g. drive units.

– Remove deposits and solids.

⚠ CAUTION

Risk of damage to the battery male connector when disconnecting!

If the battery male connector is disconnected while the key switch is switched on under load, an arc will be produced. The arc can damage the contacts and considerably shorten the service life of the contacts.

– Switch off the key switch.

– Only disconnect the battery male connector while the key switch is switched off.

⚠ CAUTION

If water penetrates the electrical system, there is a risk of a short circuit occurring!

– Strictly adhere to the following steps.

⚠ CAUTION

Excessive water pressure or water and steam that are too hot can damage industrial truck components!

– Strictly adhere to the following steps.

⚠ CAUTION

Abrasive cleaning materials can damage the surfaces of components!

Using abrasive cleaning materials that are unsuitable for plastics can cause plastic parts to dissolve or become brittle. The screen on the display-operating unit could become cloudy.

– Strictly adhere to the following steps.

– Park the industrial truck securely.
– Switch off the key switch.
– Disconnect the battery male connector.
– Do not spray electric motors and other electrical components or their covers directly with water.
– Use only high-pressure cleaners with a maximum output power of up to 50 bar and 85°C.
– If a high-pressure cleaner is used, maintain a distance of at least 20 cm between the nozzle and the object being cleaned.
– Do not aim the cleaning jet directly at adhesive labels or decal information.
– Remove all deposits and accumulations of foreign materials in the vicinity of hot components.
– Use only non-flammable fluids for cleaning.
– Observe the manufacturer's guidelines for working with cleaning materials.
– Clean plastics only with cleaning materials intended for plastics.
– Clean the exterior of the industrial truck using water-soluble cleaning materials and water. Cleaning with a water jet, a sponge or a cloth is recommended.
– Clean all accessible areas.

– Before lubrication, clean the oil filling openings and the area around the oil filling openings, as well as the lubricating nipples.

Cleaning the electrical system

⚠ WARNING

Danger of electric shocks due to residual capacity!

– Never reach into the electrical system with your bare hands.



⚠ CAUTION

Cleaning electrical system parts with water can damage the electrical system.

Cleaning electrical system parts with water is forbidden!

– Do not remove covers etc.

– Use only dry cleaning materials according to the specifications in the section "Cleaning the industrial truck".

⚠ CAUTION

Possible component damage due to compressed air.

– If components are cleaned with compressed air, the air must have a maximum pressure of 0.15 bar.

This prevents liquids or small solids from being blown through slots or openings inside components and causing damage.

The components of the electrical system on the platform tractor and the tractor are installed in the driver's cab and in the following locations:

- **Platform tractor:** Under the cover plate in the rear of the loading surface.
- **Tractor:** Under the rear flap at the rear of the tractor.

– Clean the electrical system parts with a metal-free brush and blow the dust off with low-pressure compressed air.

– **Do not** remove snow that may have penetrated through the ventilation slots. When attempting to clean with a bucket or broom, lines or contacts may be damaged or broken off. Wait for the snow to melt.

Cleaning the windows

The windows must always be kept clean and free of ice. This is the only means of guaranteeing good visibility.

⚠ CAUTION

Do not damage the heating coils of the rear window heating (inside) or of the windscreen heating (variant).

– Clean the windscreen and rear window very carefully. Do not use sharp objects!

– Clean the windows with a soft cloth and commercially available glass cleaner.

After cleaning

⚠ CAUTION

Risk of short circuit!

Ingress of moisture or dirt into the battery male connector and plug connection can lead to an electrical short circuit.

– Use compressed air to dry the battery male connector and the plug connection before connecting them.

– Use compressed air to remove any foreign objects that may be lodged in the battery male connector and the plug connection.

– Dry the industrial truck carefully, e.g. with compressed air.

– Lubricate the joints and actuators.

– Lubricate the industrial truck. See the chapter entitled "Lubrication plan" in the section entitled "Maintenance".

NOTE

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

Transporting the industrial truck

Determining the total actual weight

⚠ WARNING

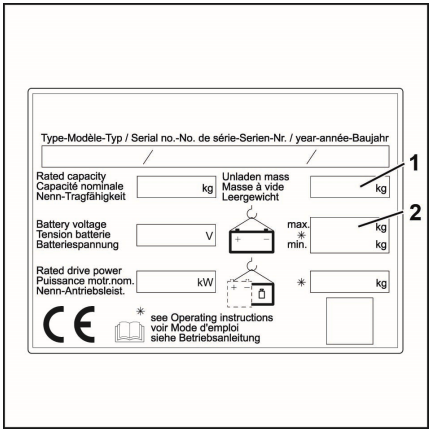
Risk of damage due to overloading of the means of transport!

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

– Determine the total actual weight of the industrial truck.

– Load the industrial truck only if the combined load capacity of the means of transport, ramps and loading bridges is greater than the total actual weight of the industrial truck.

– Read off the individual weights from the nameplate of the industrial truck and add them to the total weight of the industrial truck: ▷



Net weight (1)
\+ Max. permissible battery weight (2)
\+ 100 kg allowance for driver
= Total actual weight

Securing the industrial truck for transport

⚠ DANGER

The industrial truck can tear loose

- Attach harnesses only to the lifting points specified here.
- Only use harnesses with a sufficient traction capacity.
- Only use harnesses with sufficient tensile strength.

Preparing for transport

- Ensure that the key switch is switched off.
- Disconnect the battery male connector.

Lashing down

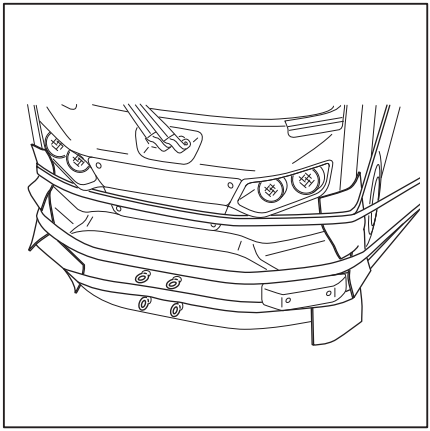
Lash down the industrial truck with tension belts that are routed along both sides and around the truck front and the truck rear. Attach the ends of the tension belts to the lashing points on the transport vehicle.

Lashing down the truck front:

- Guide the tension belts around the truck front as shown in the adjacent diagram.
- Route the tension belts towards the rear on the right-hand and left-hand sides and secure them to the specified lashing points on the transport vehicle.
- Where tension belts are routed over body edges, cushion these areas with protection, such as rubber mats.

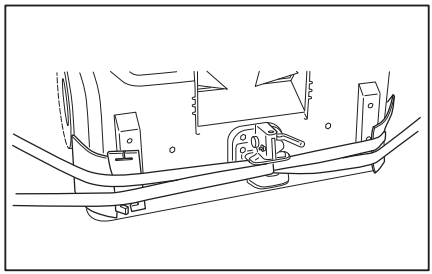
Lashing down the truck rear:

▷



– Guide the tension belts around the truck rear as shown in the adjacent diagram.
– Route the tension belts towards the front on the right-hand and left-hand sides and secure them to the specified lashing points on the transport vehicle.
– Where tension belts are routed over body edges, cushion these areas with protection, such as rubber mats.

▷



Loading the industrial truck by crane

NOTE

Crane loading is intended only for transporting the industrial truck for its initial commissioning. For operating conditions that frequently require crane loading, consult the authorised service centre.

Industrial trucks may only be crane-loaded by persons with sufficient experience of the suitable harnesses and hoists.

⚠ DANGER

Risk of death from suspended loads!

– Never enter the area below the industrial truck suspended from the crane.

⚠ DANGER

Risk to life due to the harnesses snapping!

Sharp edges can damage harnesses.

– Protect harnesses from sharp edges.
– Harnesses must be designed for a load capacity that is sufficient for the weight of the industrial truck. The harnesses must be approved for a single load of at least 4 t.
– Only use harnesses with a sufficient load capacity.

⚠ DANGER

Risk of fatal injury from the falling industrial truck!

– Never crane-load the industrial truck at the tow coupling.

– For crane-loading, only use the lifting points for the harnesses described below.

⚠ WARNING

Component damage due to incorrectly fitted harnesses!

Pressure from the harnesses can damage or destroy attachment parts when the industrial truck is lifted.

– Secure harnesses in such a way that they do not touch any attachment parts.

⚠ WARNING

Harnesses may damage the paintwork on the industrial truck!

Harnesses may damage paintwork by rubbing and pressing on the surface of the industrial truck. Particularly sharp-edged or hard harnesses, such as wires or chains, damage the surface.

– Use textile harnesses, e.g. lifting straps, with edge protectors or similar protective devices where necessary.

Harness requirements

- The harnesses must be approved for a single load of at least 4 t. To avoid damage to the industrial truck, use textile harnesses whenever possible.

Preparing and performing crane-loading

NOTE

Observe the national regulations for loading by crane!

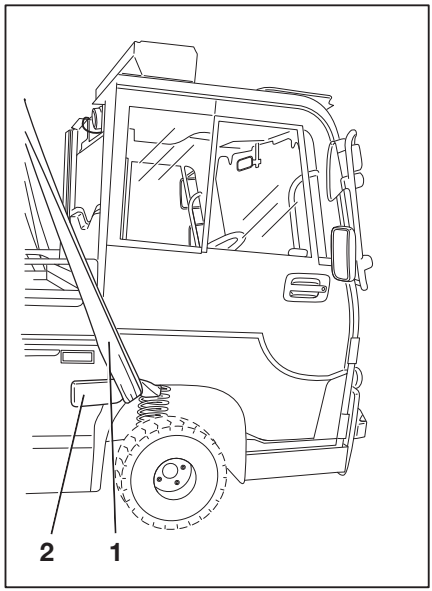
– Remove the battery. See the chapter entitled "Replacing and transporting the battery"..

– Remove any loose objects from the driver's cab.

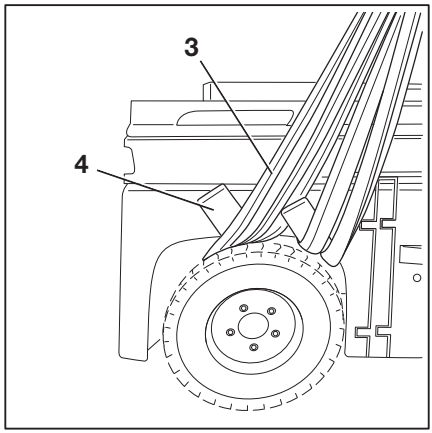
– Close the cab doors securely.

– Make sure that the battery cover and, if necessary, the battery door are securely closed.

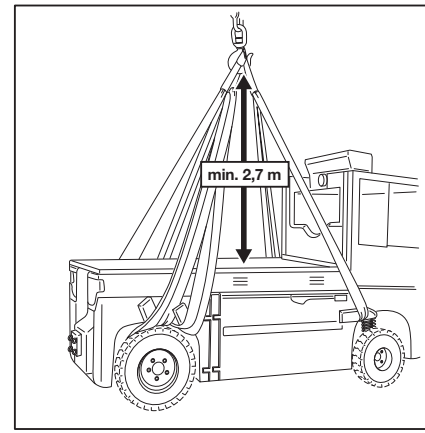
– If fitted, remove the flashing lights on the front wheel arches.
– Pass the lifting strap (1) over the front wheel, under the driver's cab and over the chassis through the industrial truck to the opposite front wheel. ▷
– Using protection such as foam mats (2), protect the lifting strap (1) from sharp edges.



– On both rear wheels, guide the slings of the lifting straps (3) all the way around the drive axle on the wheel side. ▷
– Using protection such as foam mats (4), protect the lifting straps (3) from sharp edges.



– Secure both ends of the lifting straps to the crane hook. To prevent transverse tension on the lifting straps on attachment parts, the crane hook must be at least 2.70 m above the loading area of the industrial truck. ▷
– Crane-load the industrial truck.



Decommissioning

Decommissioning the industrial truck

If the industrial truck is decommissioned for more than two months, it must be parked in a well-ventilated, frost-free, clean and dry room. The following must be taken into consideration when doing so:

Course of action before decommissioning the industrial truck

- Thoroughly clean the industrial truck.
- Check the fill level of the hydraulic oil for the steering and top up if necessary.
- Fully charge the battery.
- Follow the battery manufacturer's instructions for storing the battery.
- Apply a thin film of oil or lubricating grease to all unpainted mechanical parts.
- Lubricate the industrial truck.
- Spray all open electrical contacts with a suitable contact spray.
- Top up the fuel tank of the heating system (if applicable).
- Cover the industrial truck with a cotton sheet to protect it against dust.

NOTE

Do not use a polythene sheet to cover the industrial truck as this encourages the formation of condensation water.

Recommissioning the industrial truck

- Thoroughly clean the industrial truck.
- Lubricate the industrial truck.
- Follow the battery manufacturer's instructions for recommissioning the battery.
- Check the hydraulic oil for condensation water and change the oil if necessary.

– Do the same activities as for commissioning.
– Check the fuel tank of the heating system for condensation water and replace the fuel if necessary.
– Put the industrial truck into operation.

If the industrial truck is to be taken out of operation for more than six months, contact your authorised service centre for the course of action required.

Scrapping the industrial truck

We recommend that this work is carried out by an approved dismantler. However, if you wish to do the work yourself, note the following:

– Dismantle the industrial truck into as many individual parts as possible and separate them according to material for recycling.
– Observe legal regulations regarding the disposal of toxic substances, such as hydraulic oil or batteries.
– Follow the battery manufacturer's instructions for the disposal of old batteries.

NOTE

The operating company is responsible for any breach of the legal regulations before, during and after the dismantling and disposal of parts of the industrial truck.

5

Maintenance

Safety regulations for maintenance

Lifting and jacking up

⚠ DANGER

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

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

– Have the industrial truck raised and jacked up only by the authorised service centre.
– Only jack the industrial truck up at the points specified in the workshop manual.

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

General maintenance information

Personnel qualifications

Only qualified and authorised personnel are allowed to perform maintenance work. Regular safety checks and checks after unusual incidents must be performed by a competent person. The competent person must conduct their evaluation and assessment from a safety standpoint, unaffected by operational and economic conditions. The competent person must have sufficient knowledge and experience to be able to assess the condition of an industrial truck and the effectiveness of the protective devices in accordance with technical conventions and the principles for testing industrial trucks.

Maintenance personnel for batteries

Batteries must only be charged, maintained and replaced by personnel who have received appropriate training in accordance with the instructions from the manufacturers of the battery, battery charger and industrial truck.

– Observe the handling instructions for the battery and the operating instructions for the battery charger.

Maintenance work without special qualifications

Simple maintenance work, such as checking the hydraulic oil level, may be carried out by untrained personnel. A qualification of the type held by a competent person is not required to carry out this work. The required tasks are described in the chapter entitled "Preserving operational readiness".

Information for carrying out maintenance

This section contains all the information required to determine when your industrial truck must be serviced. Carry out maintenance work within the time limits according to the hour

meter and using the maintenance check lists below. This ensures that the industrial truck remains ready for operation and provides optimal performance and service life. It is also a precondition for any warranty claims.

Maintenance timeframe

If maintenance is needed, the message `Service required` appears on the display.

– Arrange for the authorised service centre to perform the maintenance work on the industrial truck.

– The maintenance check lists indicate the maintenance work that is due.

The intervals are defined for standard use. Shorter maintenance intervals can be defined in consultation with the operating company depending on the application conditions of the industrial truck.

The following factors may necessitate shorter maintenance intervals:

- Dirty, poor-quality roadways
- Dusty or salty air
- High levels of air humidity
- Extremely high or low ambient temperatures and extreme changes in temperature
- Multi-shift operation with a high duty cycle
- Specific national regulations for the industrial truck or individual components

Service menu

The date when the industrial truck requires maintenance is stored in the Service menu.

NOTE

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

– Stop the industrial truck.

– Apply the parking brake.

– Press the ☰ button.

– Press the ⚙ softkey.

The first menu level appears.

– Activate the "Access authorisation for the fleet manager".

– Press the `Service` 🔧 softkey.

The "Service menu" opens on the display.

– Press the `Maintenance interval` softkey.

This menu shows the operating hours remaining until the next scheduled maintenance interval or the latest date of the next scheduled maintenance interval.

The next maintenance due date can be set up and adjusted by the fleet manager. See the next section "Setting up and adjusting the due date counter for maintenance and safety checks".

NOTE

The maintenance interval can also be configured in the status line.

Information for carrying out maintenance

This section contains all the information required to determine when the truck requires maintenance. Carry out maintenance work within the time limits according to the hour meter and using the maintenance check lists below. This ensures that the truck remains ready for operation and provides optimal performance and service life. It is also a precondition for any warranty claims.

Maintenance timeframe

If maintenance is needed, the message `Service required` 🔧 appears on the display.

– Arrange for the authorised service centre to perform the maintenance work on the truck.

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The intervals are defined for standard use. Shorter maintenance intervals can be defined in consultation with the operating company, depending on the application conditions of the truck.

The following factors may necessitate shorter maintenance intervals:

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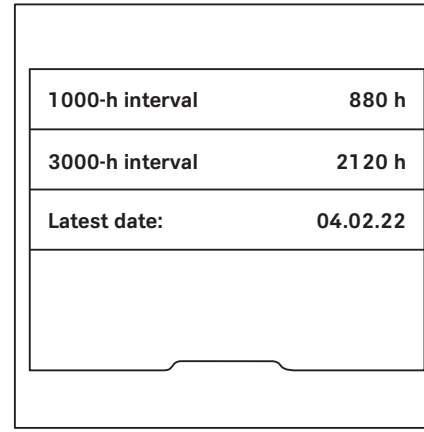
The next maintenance due date can be set up and adjusted by the fleet manager. See the next section "Setting up and adjusting the due date counter for maintenance and safety checks".

NOTE

The maintenance interval can also be configured in the status line.

Setting up and adjusting the due date counter for maintenance and safety checks

On delivery from the factory, the display-operating unit indicates to the driver the number of operating hours until the standard maintenance intervals of 1000 h and 3000 h are due. The display also shows the latest date for maintenance.



To do this, proceed as follows:

– Press the `Service` softkey.

– Press the `Maintenance interval` softkey.

Setup and adjustment by the fleet manager

For the fleet manager, due date counters are also defined for the following checks:

- Regular testing of the truck for electric trucks and IC trucks
- Battery testing for electric trucks
- Exhaust gas testing and LPG testing for IC trucks

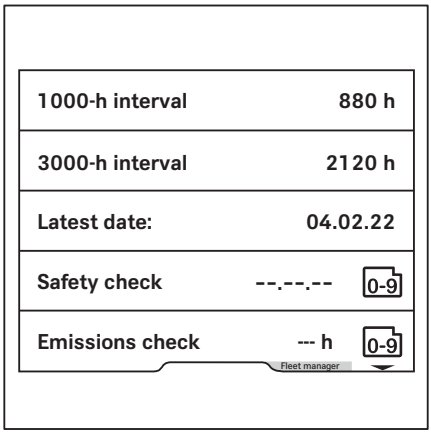
For these tests, the fleet manager can define the corresponding due dates with his access authorisation. To do this, proceed as follows:

– Activate the "Access authorisation for the fleet manager".

– Press the `Service` softkey.

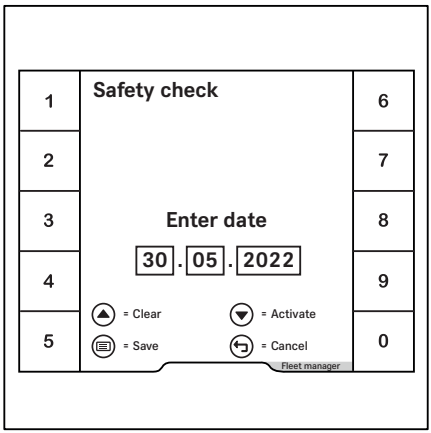
– Press the `Maintenance interval` softkey.

– Press the softkey for the testing whose due date is to be set, e.g. `Safety check`. ▷



`Safety check` menu ▷

– Press the scroll button ▽ to activate the input.
– Enter the desired date using softkeys `0 to 9`.
– To `save`, press the ☰ button.



Due date counter for individual maintenance intervals

The authorised service centre can set up additional due date counters for individual maintenance intervals, e.g. for an attachment. The fleet manager can use his access authorisation to configure these due date counters. The process is then the same as for the due date counters created ex works.

Maintenance - 1000 hours/annually

At operating hours										Carried out	
1000		2000		4000		5000		7000			
8000		10000		11000		13000		14000		✓	✖
Chassis, bodywork and fittings											
Check the chassis for cracks.											
Check the cab and panes of glass for damage.											
Check that the cab door sensors are working correctly and check for damage.											
Lubricate the cab doors.											
Check the door check strap.											
Check that the driver's seat is working correctly and check for damage.											
Check that the driver restraint system is working correctly and check for damage, and clean.											
Check the signal horn.											
Battery compartment											
Check that the battery door and the switch are working correctly and check for damage.											
Check the battery lock for damage.											
Variant: Check the power bolt for damage and adjustment.											
Tyres and wheels											
Check tyres for wear and check the air pressure if necessary.											
Check the wheels for damage and check the tightening torques.											
Drive axle											
Check the hydraulic line connections.											
Check the condition of the chassis bearings.											
Check the motor connections and sensors for damage.											
Check the oil level of the wheel gear.											
Change the gearbox oil in the wheel gear (once after the first 1000 hours).											
Chassis frame											
Check the shock absorbers for damage. Replace if necessary.											
Check the compression springs for corrosion and damage.											
Check the end stops for damage.											
Check the Panhard rod for damage and check the bearings for play.											
Steering axle											

At operating hours										Carried out	
1000		2000		4000		5000		7000			
8000		10000		11000		13000		14000		✓	✖
Check the wheel bearings and track rods for play.											
Grease the track rods.											
Check the hydraulic line connections.											
Check the sensors for damage.											
Steering systems											
Check the steering system for leaks and check that it is working correctly.											
Check that the steering wheel is securely attached and check the rotary handle for damage.											
Brake system											
Check the brake pedal and brake cylinder for damage.											
Check the filling level in the brake reservoir.											
Check that the electrical filling level monitoring function is working correctly.											
Check that the emergency actuation of the parking brake is working correctly.											
Calibrate the brakes.											
Electrical system											
Check all power cable connections.											
Check that the switches, transmitters and sensors are working correctly.											
Check the lighting and indicator lights.											
Cooling system (converter, drive axle)											
Check that the fans and the air ducts are working correctly and check for damage.											
Clean the fans and the air ducts.											
Battery and accessories											
Check the lead-acid battery for damage and check the acid density; observe the manufacturer's maintenance instructions.											
Variant: Replace the non-return valve on lead-acid batteries with electrolyte circulation.											
Variant: Observe the manufacturer's maintenance instructions for lithium-ion batteries.											
Check the appliance plug and the truck harness for damage.											
Check the battery male connector and the battery harness for damage.											
Special equipment											
Check the condition of the antistatic belt or antistatic electrode.											

At operating hours										Carried out	
1000		2000		4000		5000		7000			
8000		10000		11000		13000		14000		✓	✖
Check the filter mat in the heating system or air conditioning, and replace if necessary.											
Check that the heating system is working correctly; observe the manufacturer's maintenance instructions.											
Check that the air conditioning is working correctly; observe the manufacturer's maintenance instructions.											
Check the compressed air supply system for damage; observe the manufacturer's maintenance instructions.											
Check the trailer coupling for wear and for damage; observe the manufacturer's maintenance instructions.											
General											
Read out the error numbers and clear the list.											
Reset the maintenance interval.											
Check that the labelling is complete.											
Perform a test drive.											

Maintenance - 3000 hours/every two years

At operating hours										Carried out	
3000		6000		9000		12000		15000		✓	✖
Note											
Perform all 1000-hour maintenance work.											
Drive axle											
Change the wheel gear oil.											
Steering axle											
Change the brake disc oil.											
Change the bleeder valves on the wheel seats.											
Rear axle brake											
Change the actuation oil.											
Hydraulics											
Check all hydraulic hoses for damage and leak tightness. Change them if necessary.											
Change the hydraulic oil and filter.											
Change the breather filter.											

Ordering spare parts and wearing parts

Spare parts are provided by our spare parts service department. The information required for ordering parts can be found in the spare parts list.

Only use spare parts as per the manufacturer's instructions. The use of unapproved spare parts can result in an increased risk of accidents due to insufficient quality or incorrect assignment. Anyone using unapproved spare parts shall assume unlimited liability in the event of damage or harm.

Quality and quantity of the required operating materials

Only the operating materials specified in the maintenance data table may be used.

– The required consumables and lubricants can be found in the maintenance data table.

Oil and grease types of a different quality must not be mixed. This negatively affects the lubricity. If a change between different manufacturers cannot be avoided, drain the old oil thoroughly.

Before carrying out lubricating work, filter changes or any work on the hydraulic system, carefully clean the area around the part involved.

When topping up working materials, use only clean containers!

Maintenance data table

General lubrication points

Code	Unit	Operating material	Specification	Amount
	Lubrication	Multipurpose grease	DIN 51825 KPF2	As required

Battery

Code	Unit	Operating material	Specification	Amount
	System filling	Distilled water		As required
	Insulation resistance		DIN 43539 VDE 0510	For further information, refer to the workshop manual for the truck in question.

Brake system

Code	Unit	Operating material	Specification	Amount
	System filling for front axle	Mineral oil brake fluid	SHELL SPIRAX S3 TLV ID no. 7326000028	2.4 l each side
	System filling for rear axle	Mineral oil brake fluid	Shell SPIRAX S4 ATF HDX ID no. 7326000001	0.6 l + 0.03 l

Electrical system

Code	Unit	Operating material	Specification	Amount
	Insulation resistance		DIN EN 1175 VDE 0117	For further information, refer to the workshop manual for the truck in question.

Actuators/joints

Code	Unit	Operating material	Specification	Amount
	Lubrication	Multipurpose grease	DIN 51825 KPF2	As required
		Oil	SAE 80 MIL-L2105 API-GL4	As required

Hydraulic system

Code	Unit	Operating material	Specification	Amount
	System filling	Hydraulic oil	FUCHS RENOLIN MR 520 SHELL TELLUS S4 VX 32	Min. 3.75 l, max. 5.75 l

NOTE

When changing to a different type of hydraulic oil, the authorised service centre must adjust the parameters of the truck control unit.

Tugger train hydraulic tank

Code	Unit	Operating material	Specification	Amount
	System filling	Hydraulic oil	HLP 46	Filling quantity 5.5 l

Tyres

Code	Unit	Operating material	Specification	Amount
	Superelastic tyres	Wear limit		To wear mark
	Solid rubber tyres	Wear limit		To wear mark
	Pneumatic tyres	Minimum tread depth		Air pressure: see information on truck Minimum tread depth: 1.6 mm

Steering axle

Code	Unit	Operating material	Specification	Amount
(A)	Axle stub bearing, spherical bearing	Multipurpose grease	DIN 51825 KPF2 ID no. 7337400140	As required
	Wheel-fastening screws	Torque wrench		195 Nm

Drive axle

Code	Unit	Operating material	Specification	Amount
	Wheel-fastening screws	Torque wrench		425 Nm
	Wheel gear	Gearbox oil	SAE 80W-90 API-GL4 ID no. 7326049043/7326049044	0.75 l + 0.03 l

Washer system

Code	Unit	Operating material	Specification	Amount
	System filling	Screen wash	Winter, ID no. 172566	As required

Air conditioning

Code	Unit	Operating material	Specification	Amount
	System filling	Refrigerant	R134a	1.05 kg

Maintaining operational readiness

Maintaining the seat belt

⚠ DANGER

There is a risk to life if the seat belt fails during an accident!

If the seat belt is faulty, it may tear or open during an accident and no longer keep the driver in the driver's seat. The driver may therefore be thrown against the industrial truck components or out of the industrial truck.

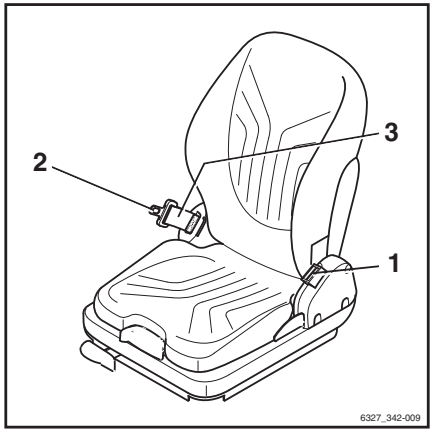
- Ensure operational reliability by continually testing.
- Do not use the industrial truck if the seat belt is faulty.
- A faulty belt must only be replaced by your service centre.
- Only use genuine spare parts.
- Do not make any changes to the belt.

NOTE

Carry out the following checks on a regular basis (monthly). In the case of significant strain, a daily check is necessary.

Checking the seat belt

- Pull out the belt (3) completely and check it for wear. ▷



The belt must not be frayed or cut. The stitching must not be loose.

- Check whether the belt is dirty.
- Check whether parts are worn or damaged (including the fixing points).
- Check the buckle (1) to ensure that it locks into place properly.

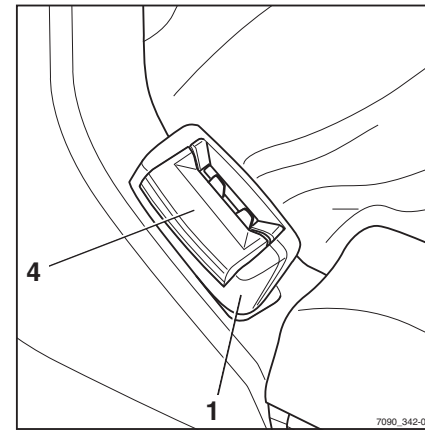
When the belt tongue (2) is inserted, the belt must be held securely.

– The belt tongue (2) must release when the red button (4) is pressed.
– The automatic blocking mechanism must be tested at least once a year:
– Park the industrial truck on level ground.
– Pull out the belt with a jerk.

The automatic blocking mechanism must block the extension of the belt.

– Tilt the seat at least 30° (if necessary, remove the seat).
– Slowly extend the belt.

The automatic blocking mechanism must block the extension of the belt.



Cleaning the seat belt

– Clean the seat belt as necessary, but without using chemical cleaning materials (a brush will suffice).

Replacing after an accident

As a rule, the seat belt must be replaced after an accident.

Checking the driver's seat

⚠ WARNING

Risk of injury!

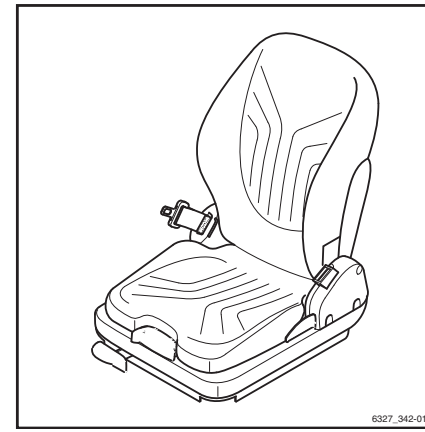
– After an accident, check the driver's seat with attached restraining belt and fastening.

– Check the controls for correct operation.
– Check the condition of the seat (e.g. wear on the upholstery) and secure fastening to the hood.

⚠ WARNING

Risk of injury!

– Have the seat repaired by the service centre if you identify any damage during the checks.



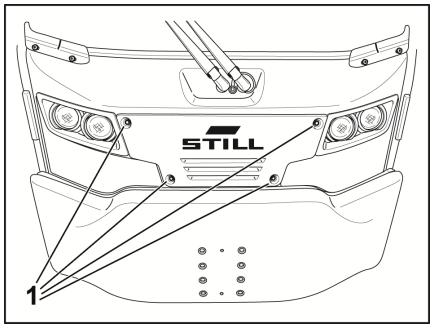
Replacing the fresh-air filter mat of the heating system

Regularly clean or replace the filter mat of the fresh-air inlet for the heating system, especially if the industrial truck is used in dusty environments.

– If necessary, remove the lamp guard grille (variant). To do this, loosen the four screws on the right-hand and left-hand sides of the grille.

– Loosen the four M6 socket head screws (1) of the trademark emblem (2) on the truck front. ▷

– Remove the trademark emblem and set it aside with the four socket head screws.

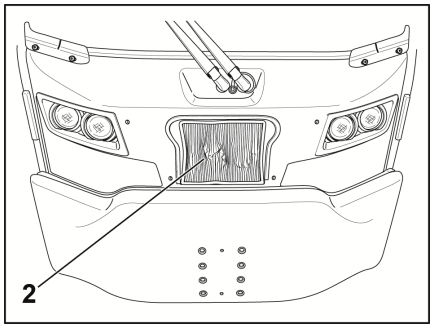


– Remove the filter mat (3) and check it for contamination. Replace the filter mat if it is grey. ▷

Re-attach the trademark emblem (2). Tighten the four socket head screws (1).

NOTE

Replace the filter mat at least every two months.



Servicing wheels and tyres

Checking the condition and wear of the tyres

⚠ WARNING

Risk of accident due to uneven tyre wear!

Uneven wear increases the braking distance. The handling characteristics deteriorate.

– Change worn or damaged tyres without delay.
– When changing wheels or tyres, ensure that this does not cause the industrial truck to tilt to one side (e.g. always replace right-hand and left-hand wheels at the same time).

⚠ WARNING

Risk of accident due to the use of non-approved wheels.

The quality of the tyres and of the rims affects the driving safety of the industrial truck. Changes must only be made following consultation with the manufacturer.

Rim parts must never be changed and rim parts from different manufacturers must not be mixed.

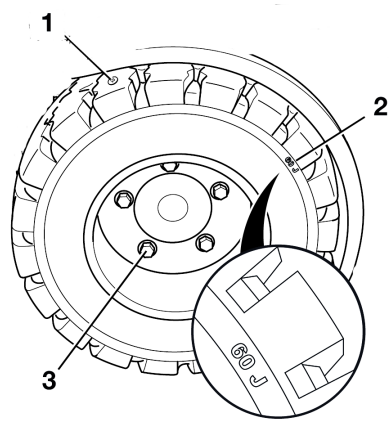
– If you wish to use a type of tyre or tyre manufacturer that has not been approved by STILL, obtain approval from STILL prior to use.
– Do not change rim parts and do not mix rim parts from different manufacturers.

– Remove any foreign bodies embedded in the tyres (1). ▷

The level of wear exhibited by tyres on the same axle must be approximately the same. Superelastic tyres and solid rubber tyres can be worn down to the "60J wear limit" (2).

If the industrial truck is to be used in winter conditions in areas where German Traffic Regulations (StVO) apply, the profile must be at least 4 mm deep.

Superelastic tyres may then only be operated as far as the "60J wear limit" (2) if their profile is re-cut and at least 4 mm deep.



Checking wheel fastenings

– Check that the wheel-fastening screws (3) of the drive axle and the wheel-fastening nuts of the steering axle are securely in place and re-tighten as necessary.

– Observe the torques specified in the "maintenance data table".

Checking the battery

– For information on checking the battery, see the chapter entitled "Checking the battery condition, acid level and acid density".

Replacing the fuses



⚠ DANGER

Danger from electrical current!

High voltages are present in the fuse box. There is a risk of electric shock.

– **Do not** open the fuse box.

– The fuses must be replaced only by the authorised service centre.

Checking the hydraulic system for leak tightness



⚠ WARNING

Risk of injury from hydraulic oil under pressure!

Hydraulic oil under pressure can escape from leaking pipes and lines and cause injuries.

– Before checking, release the pressure from the hydraulic system.

– Wear suitable protective gloves, protection goggles etc.

⚠ CAUTION

Hydraulic hoses become brittle over time!

– Do not store hydraulic hoses for more than two years.
– Do not use hydraulic hoses for more than two years if they are subject to a high level of wear.
– Comply with the specifications of "DGUV Rule 113-020" within Germany.
– Outside of Germany, observe the national regulations for the country of use.

– Check pipe and hose connection screw joints for leaks (traces of oil).

Replace hose lines if they display the following abnormalities:

- Outer layer has been damaged, or is brittle or cracked
- Leakages
- Deformation (e.g. with blisters or kinks)
- A fitting has come loose
- A fitting is badly damaged or corroded

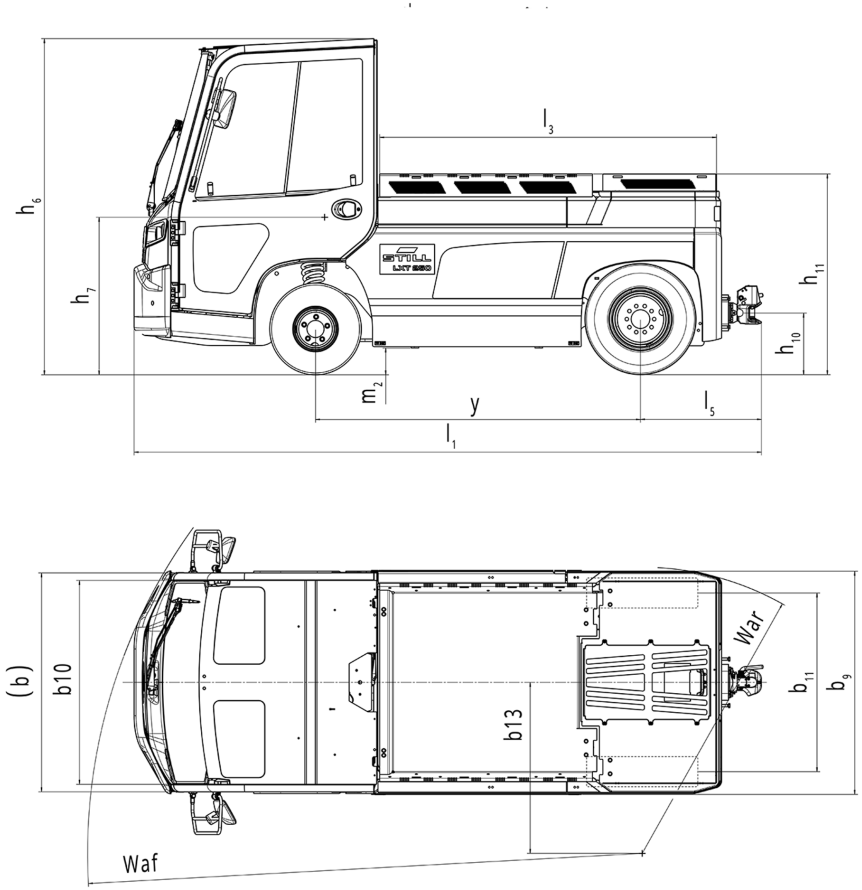
Replace pipes if they display the following abnormalities:

- Abrasion
- Deformation and bending
- Leakages

6

Technical data

Tow tractor dimensions



The numerical values for the dimensions "b", "h", "l", "w" and "y" can be found in the following VDI datasheets.

VDI datasheet LXT120 0748

NOTE

This VDI datasheet specifies only the technical values for industrial trucks with standard equipment. Different tyres, additional units etc. can produce different values.

Characteristics

Model		**LXT120/Li-ion**
Type number		**0748**
Manufacturer		STILL GmbH
Drive		Electric
Operation		Seated
Rated capacity/load	(kg)	300
Towed load	(kg)	12,000
Wheelbase	y (mm)	1401

Weights

Model		**LXT120/Li-ion**
Type number		**0748**
Net weight incl. battery (with heaviest battery)	(kg)	3489
Front axle load, laden (with heaviest battery)	(kg)	1984
Rear axle load, laden (with heaviest battery)	(kg)	1806
Front axle load, unladen (with heaviest battery)	(kg)	1909
Rear axle load, unladen (with heaviest battery)	(kg)	1581

Wheels, chassis frame

Model		**LXT120/Li-ion**
Type number		**0748**
Tyres		Air / SE
Front tyre size		6.00 R 9 / 21x8-9
Rear tyre size		7.00 R 12
Number of front wheels (x = driven)		2

Model		LXT120/Li-ion
Type number		**0748**
Number of rear wheels (x = driven)		2x
Track width front (air/SE)	b_{10} (mm)	1,102/1,112
Track width rear (air/SE)	b_{11} (mm)	1060

Basic dimensions

Model		LXT120/Li-ion
Type number		**0748**
Height of overhead guard (cab)	h_6(mm)	1950
Height of overhead guard low (cab)	h_6 (mm)	1850
Seat height in relation to SIP/standing height	h_7 (mm)	909.5 at MSG65
Entry height	(mm)	400 (middle of the step)
Min./max. height of tiller handle in driving position	(mm)	
Coupling height	h_{10} (mm)	240, 295, 350, 405
Loading height without load	h_{11} (mm)	1060
Length of loading surface	l_3 (mm)	1396
Overhang length	l_5 (mm)	624
Cab overhang	(mm)	1061
Width of loading surface	b_9 (mm)	1106 (front) / 1242 (rear)
Overall length	l_1 (mm)	3086
Overall width	b_1 (mm)	1310
Ground clearance at middle of wheelbase	m_2 (mm)	150
Aisle width at specified load dimensions without safety distance / safety allowance	A_{st} (mm)	4264
Turning radius	W_a (mm)	2724
Smallest pivot point distance	b_{13} (mm)	856

Performance data

Model		LXT120/Li-ion
Type number		**0748**
Driving speed with towed load	(km/h)	15
Driving speed without towed load	(km/h)	22
Nominal tractive force over 60 min.	(N)	2400

Model		LXT120/Li-ion
Type number		**0748**
Max. pulling force without load 5 min.	(N)	12,000
Service brake		Electrical / hydraulic

Gradients

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

⚠ WARNING

To use the industrial truck safely – with or without a load – the maximum uphill or downhill gradient permitted for travel is 25%.

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

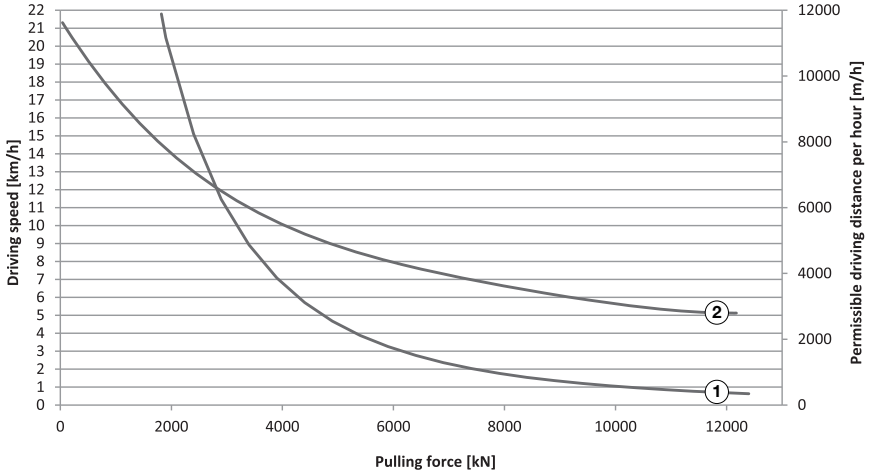
Electric motor

Model		LXT120
Type number		**0748**
Traction motor, power rating S2: 60 minutes	kW	2 x 10.5
Battery	Standard; circuit	DIN 43536 A
Battery voltage	U (V)	80
Battery capacity	K_5 (Ah)	465
Battery weight	kg	1238

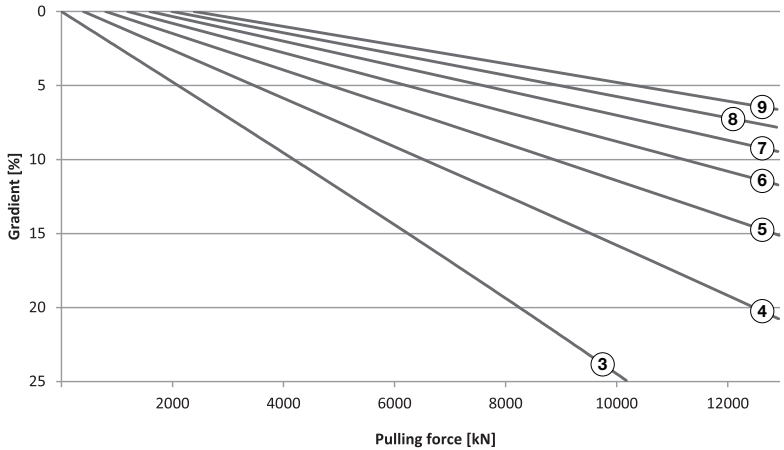
Miscellaneous

Model		LXT120
Type number		**0748**
Sound pressure level L_{pAZ} (Driver's compartment)	dB (A)	
Human vibration: acceleration according to EN 13059	m/s^2	
Tow coupling, DIN type/model		3-level coupling

Towing performance diagram



(1) Permissible driving distance per hour (2) Maximum driving speed



(3) 0t (4) 2t (5) 4t (6) 6t (7) 8t (8) 10t (9) 12t

NOTE

The permissible haul per hour is the total distance travelled, including the return journey and any downhill gradients.

VDI datasheet LXT180 0749

NOTE

This VDI datasheet specifies only the technical values for industrial trucks with standard equipment. Different tyres, additional units etc. can produce different values.

Characteristics

Model		**LXT180**
Type number		**0749**
Manufacturer		STILL GmbH
Drive		Electric
Operation		Seated
Rated capacity/load	(kg)	300
Towed load	(kg)	18000
Wheelbase	y (mm)	1401

Weights

Model		**LXT180**
Type number		**0749**
Net weight incl. battery (with heaviest battery)	(kg)	3489
Front axle load, laden (with heaviest battery)	(kg)	1984
Rear axle load, laden (with heaviest battery)	(kg)	1806
Front axle load, unladen (with heaviest battery)	(kg)	1909
Rear axle load, unladen (with heaviest battery)	(kg)	1581

Wheels, chassis frame

Model		LXT180
Type number		**0749**
Tyres		Air / SE
Front tyre size		6.00 R 9 / 21x8-9
Rear tyre size		7.00 R 12
Number of front wheels (x = driven)		2
Number of rear wheels (x = driven)		2x
Track width front (air/SE)	b_{10} (mm)	1,102/1,112
Track width rear (air/SE)	b_{11} (mm)	1060

Basic dimensions

Model		LXT180
Type number		**0749**
Height of overhead guard (cab)	h_6(mm)	1950
Height of overhead guard low (cab)	h_6 (mm)	1840
Seat height in relation to SIP/standing height	h_7 (mm)	909.5 at MSG65
Entry height	(mm)	400 (middle of the step)
Coupling height	h_{10} (mm)	240, 295, 350, 405
Loading height without load	h_{11} (mm)	1060
Length of loading surface	l_3 (mm)	1396
Overhang length	l_5 (mm)	624
Cab overhang	(mm)	1061
Width of loading surface	b_9 (mm)	1106 (front) / 1242 (rear)
Overall length	l_1 (mm)	3086
Overall width	b_1 (mm)	1310
Ground clearance at middle of wheelbase	m_2 (mm)	150
Aisle width at specified load dimensions without safety distance / safety allowance	A_{st} (mm)	4264
Turning radius	W_a (mm)	2724
Smallest pivot point distance	b_{13} (mm)	856

Performance data

Model		LXT180
Type number		**0749**
Driving speed with towed load	(km/h)	17
Driving speed without towed load	(km/h)	23
Nominal tractive force over 60 min.	(N)	3600
Max. pulling force with load 5 min.	(N)	15,000
Service brake		Electrical / hydraulic

Gradients

The values specified in the "Performance data" table as the maximum climbing capability can be used only to compare the performance of industrial trucks in the same category. The specified values in no way represent the normal daily operating conditions.

⚠ WARNING

To use the industrial truck safely with or without a load, the maximum uphill or downhill gradient permitted for travel is 25%.

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

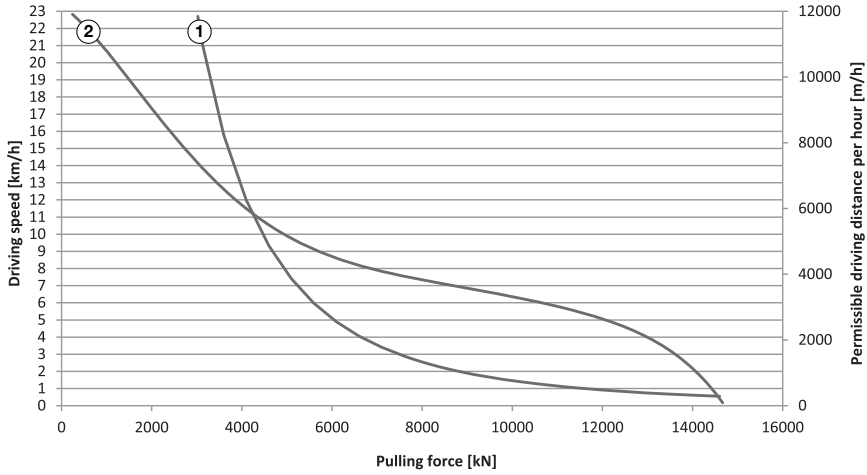
Electric motor

Model		LXT180
Type number		**0749**
Traction motor, power rating S2: 60 minutes	kW	2 x 10.5
Battery	Standard; circuit	DIN 43536 A
Battery voltage	U (V)	80
Battery capacity	K_5 (Ah)	465
Battery weight	kg	1238

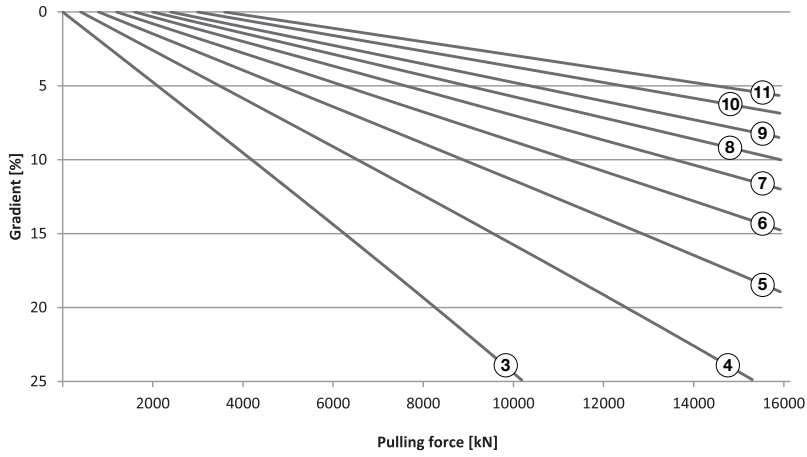
Miscellaneous

Model		LXT180
Type number		**0749**
Sound pressure level L_{pAZ} (Driver's compartment)	dB (A)	
Human vibration: acceleration according to EN 13059	m/s^2	
Tow coupling, DIN type/model		3-level coupling

Towing performance diagram



(1) Permissible driving distance per hour (2) Maximum driving speed



(3) 0t (4) 2t (5) 4t (6) 6t (7) 8t (8) 10t (9) 12t (10) 15t (11) 18t

NOTE

The permissible haul per hour is the total distance travelled, including the return journey and any downhill gradients.

VDI datasheet LXT250 0750/0751

NOTE

This VDI datasheet specifies only the technical values for industrial trucks with standard equipment. Different tyres, additional units etc. can produce different values.

Characteristics

Model		**LXT250/Li-ion**
Type number		**0750/0751**
Manufacturer		STILL GmbH
Drive		Electric
Operation		Seated
Rated capacity/load	(kg)	300
Towed load	(kg)	25000
Pulling force on starting	(N)	18,100 (0750) / 18,600 (0751)
Wheelbase	y (mm)	1465 (0750) / 1900 (LWB)

Weights

Model		**LXT250/Li-ion**
Type number		**0750/0751**
Net weight incl. battery (with heaviest battery)	(kg)	4185 (0750) / 4942 (0751)
Front axle load, laden (with heaviest battery)	(kg)	2192 (0750) / 2542 (0751)
Rear axle load, laden (with heaviest battery)	(kg)	2293 (0750) / 2700 (0751)
Front axle load, unladen (with heaviest battery)	(kg)	2117 (0750) / 2467 (0751)
Rear axle load, unladen (with heaviest battery)	(kg)	2068 (SWB) / 2475 (0751)

Wheels, chassis frame

Model		LXT250/Li-ion
Type number		**0750/0751**
Tyres		Air / SE
Front tyre size		6.00 R 9 / 21x8-9
Rear tyre size		7.00 R 12
Number of front wheels (x = driven)		2
Number of rear wheels (x = driven)		2x
Track width front (air/SE)	b_{10} (mm)	1,102/1,112
Track width rear (air/SE)	b_{11} (mm)	1060

Basic dimensions

Model		LXT250/Li-ion
Type number		**0750/0751**
Height of overhead guard (cab)	h_6(mm)	1950
Height of overhead guard low (cab)	h_6 (mm)	1850
Seat height in relation to SIP/standing height	h_7 (mm)	909.5 at MSG65
Entry height	(mm)	400 (middle of the step)
Min./max. height of tiller handle in driving position	(mm)	
Coupling height	h_{10} (mm)	240, 295, 350, 405
Loading height without load	h_{11} (mm)	1060
Length of loading surface	l_3 (mm)	1540 (0750) / 1895 (0751)
Overhang length	l_5 (mm)	624
Cab overhang	(mm)	1061
Width of loading surface	b_9 (mm)	1106 (front) / 1242 (rear)
Overall length	l_1 (mm)	3230 (0750) / 3585 (0751)
Overall width	b_1 (mm)	1310
Ground clearance at middle of wheelbase	m_2 (mm)	150
Aisle width at specified load dimensions without safety distance / safety allowance	A_{st} (mm)	4459 (0750) / 5021 (0751)
Turning radius	W_a (mm)	2873 (0750) / 3267 (0751)
Smallest pivot point distance	b_{13} (mm)	903 (0750) / 1074 (0751)

Performance data

Model		LXT250/Li-ion
Type number		**0750/0751**
Driving speed with towed load	(km/h)	18 (short, 0750) / 20 (long, 0751)
Driving speed without towed load	(km/h)	25
Nominal tractive force over 60 min.	(N)	5000
Max. pulling force without load 5 min.	(N)	18000
Service brake		Electrical / hydraulic

Gradients

The values specified in the "Performance data" table as the maximum climbing capability can be used only to compare the performance of industrial trucks in the same category. The specified values in no way represent the normal daily operating conditions.

⚠ WARNING

To use the industrial truck safely with or without a load, the maximum uphill or downhill gradient permitted for travel is 25%.

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

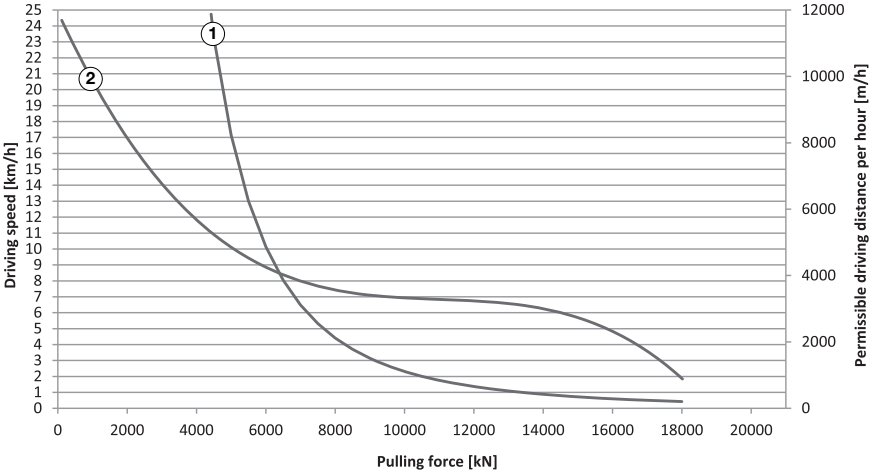
Electric motor

Model		LXT250/Li-ion
Type number		**0750/0751**
Traction motor, power rating S2: 60 minutes	kW	2 x 10.5
Battery	Standard; circuit	DIN 43536 A
Battery voltage	U (V)	80
Battery capacity	K_5 (Ah)	620 / 775/930
Battery weight	kg	1210 (0750) / 1863 (0751)

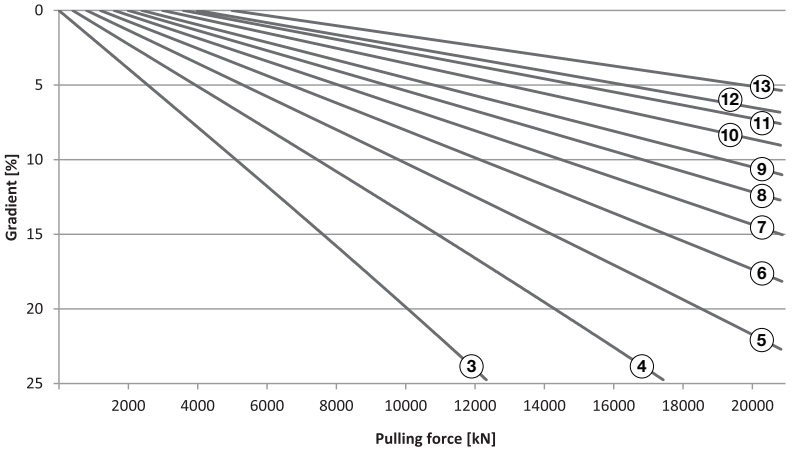
Miscellaneous

Model		LXT250/Li-ion
Type number		**0750/0751**
Sound pressure level L_{pAZ} (Driver's compartment)	dB (A)	
Human vibration: acceleration according to EN 13059	m/s^2	
Tow coupling, DIN type/model		3-level coupling

Towing performance diagram



(1) Permissible driving distance per hour (2) Maximum driving speed



(3) 0t (4) 2t (5) 4t (6) 6t (7) 8t (8) 10t (9) 12t (10) 15t (11) 18t (12) 20t (13) 25t

NOTE

The permissible haul per hour is the total distance travelled, including the return journey and any downhill gradients.

VDI datasheet LXT350 0752

NOTE

This VDI datasheet specifies only the technical values for industrial trucks with standard equipment. Different tyres, additional units etc. can produce different values.

Key data

Model		**LXT350/Li-ion**
Type number		**0752**
Manufacturer		STILL GmbH
Drive		Electric
Operation		Seat
Towed load	(N)	35,000
Wheelbase	y (mm)	2150

Weights

Model		**LXT350/Li-ion**
Type number		**0752**
Net weight incl. battery (with heaviest battery)	(kg)	6000
Front axle load, laden (with heaviest battery)	(kg)	2911
Rear axle load, laden (with heaviest battery)	(kg)	3889
Front axle load, unladen (with heaviest battery)	(kg)	2836
Rear axle load, unladen (with heaviest battery)	(kg)	3165

Wheels, chassis frame

Model		LXT350/Li-ion
Type number		**0752**
Tyres		Air / SE
Tyre size, front		6.00 R 9 / 21x8-9
Tyre size, rear		7.00 R 12
Number of front wheels (x = driven)		2
Number of rear wheels (x = driven)		2x
Track width front (air/SE)	b_{10} (mm)	1.102 / 1.112
Track width rear (air/SE)	b_{11} (mm)	1060

Basic dimensions

Model		LXT350/Li-ion
Type number		**0752**
Height of overhead guard (cab)	h_6(mm)	1950
Height of overhead guard low (cab)	h_6 (mm)	1840
Seat height in relation to SIP/standing height	h_7 (mm)	909.5 at MSG65
Entry height	(mm)	400 (middle of the step)
Coupling height	h_{10} (mm)	240, 295, 350, 405
Loading height without load	h_{11} (mm)	1060
Loading area length	l_3 (mm)	2145
Overhang length	l_5 (mm)	733
Cab overhang	(mm)	1061
Width of loading surface	b_9(mm)	1106 (front) / 1242 (rear)
Overall length	l_1 (mm)	3944
Overall width	b_1 (mm)	1310
Ground clearance at the middle of the wheelbase	m_2 (mm)	150
Aisle width at specified load dimensions without safety distance / safety allowance	A_{st} (mm)	5370
Turning radius	W_a (mm)	3530
Smallest pivot point distance	b_{13} (mm)	1162

Performance data

Model		LXT350/Li-ion
Type number		**0752**
Driving speed with load (nominal load)	(km/h)	20
Driving speed without load	(km/h)	25
Nominal tractive force over 60 min.	(N)	7000
Max. pulling force without load 5 min.	(N)	21500
Service brake		Electrical / hydraulic

Gradients

The values specified in the "Performance data" table as the maximum climbing capability can be used only to compare the performance of industrial trucks in the same category. The specified values in no way represent the normal daily operating conditions.

⚠ WARNING

To use the industrial truck safely with or without a load, the maximum uphill or downhill gradient permitted for travel is 25%.

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

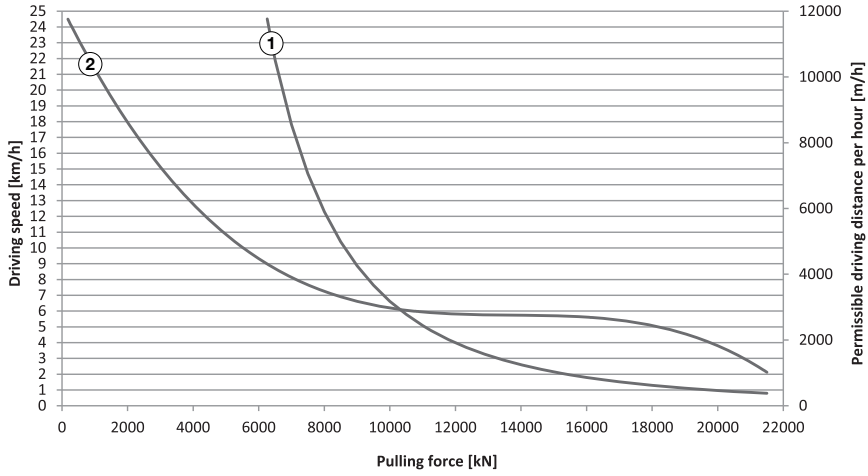
Electric motor

Model		LXT350/Li-ion
Type number		**0752**
Traction motor, power rating S2 60 min	kW	2 x 10.5
Battery	Standard; circuit	DIN 43536 A
Battery voltage	U (V)	80
Battery capacity	K_5 (Ah)	240/500
Battery weight	kg	2736

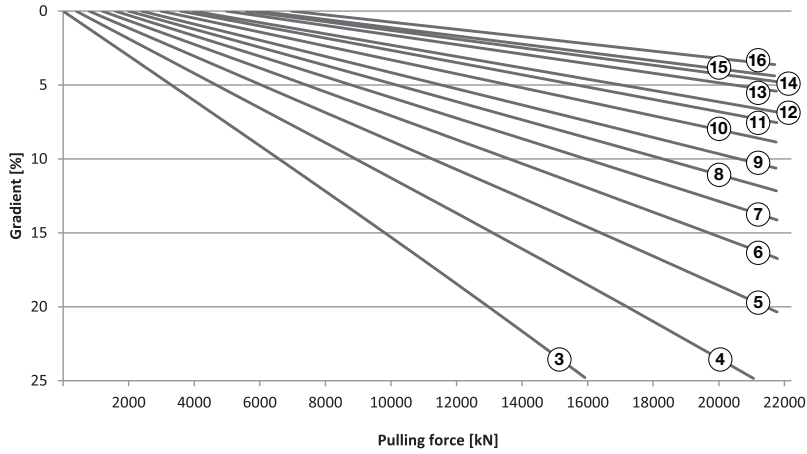
Miscellaneous

Model		LXT350/Li-ion
Type number		**0752**
Sound pressure level L_{pAZ} (Driver's compartment)	dB (A)	
Human vibration: acceleration according to EN 13059	m/s^2	
Tow coupling, DIN type/model		3-level coupling

Towing performance diagram



1 Permissible driving distance per hour 2 Maximum driving speed

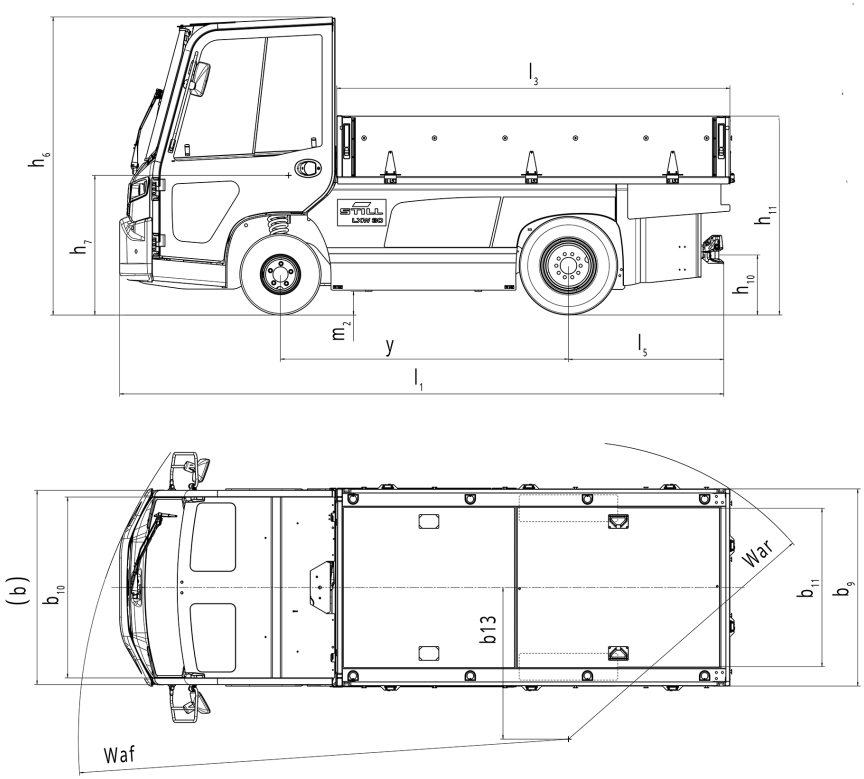


3 0t 4 2t 5 4t 6 6t 7 8t 8 10t 9 12t
10 15t 11 18t 12 20t 13 25t 14 28t 15 30t 16 35t

NOTE

The permissible haul per hour is the total distance travelled, including the return journey and any downhill gradients.

Dimensions of the platform tractor



The numerical values for the dimensions "b", "h", "l", "w" and "y" can be found in the following VDI datasheets.

VDI datasheet LXW 20 0753

NOTE

This VDI datasheet specifies only the technical values for industrial trucks with standard equipment. Different tyres, additional units etc. can produce different values.

Characteristics

Model		**LXW 20/Li-ion**
Type number		**0753**
Manufacturer		STILL GmbH
Drive		Electric
Operation		Seated
Rated capacity/load	(kg)	2000
Towed load	(kg)	6000
Wheelbase	y (mm)	1900

Weights

Model		**LXW 20/Li-ion**
Type number		**0753**
Net weight including battery	(kg)	3581
Front axle load, laden	(kg)	2484
Rear axle load, laden	(kg)	3097
Front axle load, unladen	(kg)	2026
Rear axle load, unladen	(kg)	1555

Wheels, chassis frame

Model		**LXW 20/Li-ion**
Type number		**0753**
Tyres		Air / SE
Front tyre size		6.00 R 9 / 21x8-9
Rear tyre size		7.00 R 12
Number of front wheels (x = driven)		2
Number of rear wheels (x = driven)		2x
Track width, front	b_{10} (mm)	1,102/1,112
Rear track width	b_{11} (mm)	1060

Basic dimensions

Model		LXW 20/Li-ion
Type number		**0753**
Height of overhead guard (cab)	h_6(mm)	1950
Height of overhead guard low (cab)	h_6 (mm)	1850
Seat height in relation to SIP/standing height	h_7 (mm)	909.5 at MSG65
Entry height	(mm)	400 (middle of the step)
Coupling height	h_{10} (mm)	240, 295, 350, 405
Loading height without load	h_{11} (mm)	900
Length of loading surface	l_3 (mm)	2200/2600
Overhang length	l_5 (mm)	665
Cab overhang	(mm)	1061
Width of loading surface	b_9 (mm)	1300
Overall length	l_1 (mm)	3626
Overall width	b_1 (mm)	1310
Ground clearance at middle of wheelbase	m_2 (mm)	150
Aisle width at specified load dimensions without safety distance / safety allowance	A_{st} (mm)	5115
Turning radius	W_a (mm)	3267
Smallest pivot point distance	b_{13} (mm)	1074

Performance data

Model		LXW 20/Li-ion
Type number		**0753**
Driving speed with load (nominal load)	(km/h)	18
Driving speed without load	(km/h)	20
Nominal tractive force over 60 min.	(N)	900/1200
Max. pulling force without load 5 min.	(N)	15,000
Acceleration time without towed load and load (10m)	s	4.3 (13.92 %)
Acceleration time with load (10m)	s	4.8 (13.92 %)
Service brake		Electrical / hydraulic

Gradients

The values specified in the "Performance data" table as the maximum climbing capability

can be used only to compare the performance of industrial trucks in the same category. The specified values in no way represent the normal daily operating conditions.

⚠ WARNING

To use the industrial truck safely with or without a load, the maximum uphill or downhill gradient permitted for travel is 25%.

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

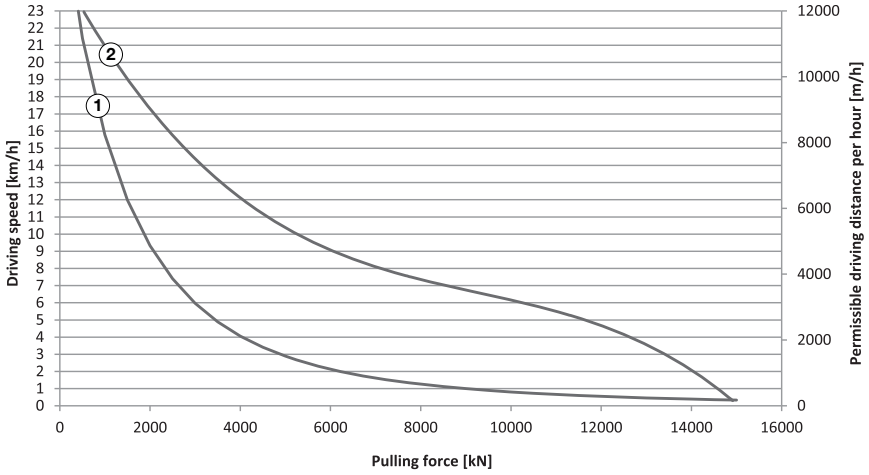
Electric motor

Model		**LXW 20/Li-ion**
Type number		**0753**
Traction motor, power rating S2: 60 minutes	kW	2 x 10.5
Battery	Standard; circuit	DIN 43536 A
Battery voltage	U (V)	80
Battery capacity	K_5 (Ah)	240/500
Battery weight	kg	679/1210

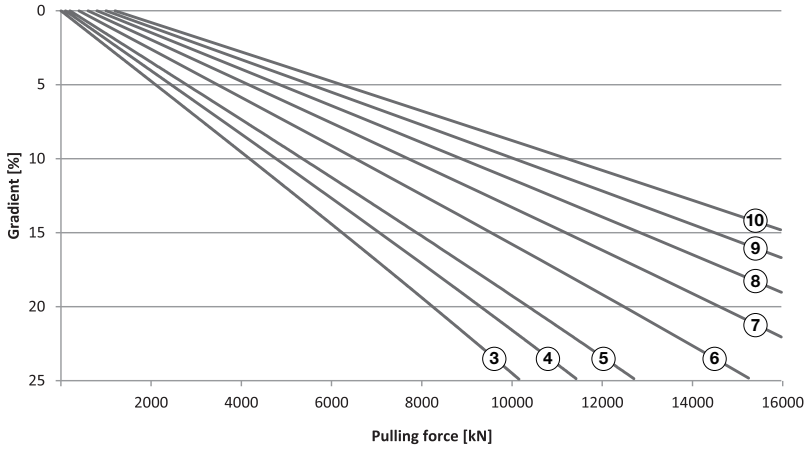
Miscellaneous

Model		**LXW 20/Li-ion**
Type number		**0753**
Sound pressure level L_{pAZ} (Driver's compartment)	dB (A)	< 66
Human vibration: acceleration according to EN 13059	m/s^2	
Tow coupling, DIN type/model		3-level coupling

Towing performance diagram



1 Permissible driving distance per hour 2 Maximum driving speed



3 0t 4 0,5t 5 1t 6 2t 7 3t 8 4t 9 5t 10 6t

NOTE

The permissible haul per hour is the total distance travelled, including the return journey and any downhill gradients.

VDI datasheet LXW 30 0754

NOTE

This VDI datasheet specifies only the technical values for industrial trucks with standard equipment. Different tyres, additional units etc. can produce different values.

Characteristics

Model		**LXW 30/Li-ion**
Type number		**0754**
Manufacturer		STILL GmbH
Drive		Electric
Operation		Seated
Rated capacity/load	(kg)	3000
Towed load	(kg)	6000
Wheelbase	y (mm)	1900

Weights

Model		**LXW 30/Li-ion**
Type number		**0754**
Net weight including battery	(kg)	3581
Front axle load, laden	(kg)	2397
Rear axle load, laden	(kg)	4184
Front axle load, unladen	(kg)	2026
Rear axle load, unladen	(kg)	1555

Wheels, chassis frame

Model		**LXW 30/Li-ion**
Type number		**0754**
Tyres		Air / SE
Front tyre size		6.00 R 9 / 21x8-9

Model		LXW 30/Li-ion
Type number		**0754**
Rear tyre size		7.00 R 12
Number of front wheels (x = driven)		2
Number of rear wheels (x = driven)		2x
Track width, front	b_{10} (mm)	1,102/1,112
Rear track width	b_{11} (mm)	1060

Basic dimensions

Model		LXW 30/Li-ion
Type number		**0754**
Height of overhead guard (cab)	h_6(mm)	1950
Height of overhead guard low (cab)	h_6 (mm)	1850
Seat height in relation to SIP/standing height	h_7 (mm)	909.5 at MSG65
Entry height	(mm)	400 (middle of the step)
Coupling height	h_{10} (mm)	240, 295, 350, 405
Loading height without load	h_{11} (mm)	900
Length of loading surface	l_3 (mm)	2200
Overhang length	l_5 (mm)	1065
Cab overhang	(mm)	1061
Width of loading surface	b_9 (mm)	1300
Overall length	l_1 (mm)	4026
Overall width	b_1 (mm)	1310
Ground clearance at middle of wheelbase	m_2 (mm)	150
Aisle width at specified load dimensions without safety distance / safety allowance	A_{st} (mm)	5294
Turning radius	W_a (mm)	3267
Smallest pivot point distance	b_{13} (mm)	1074

Performance data

Model		LXW 30/Li-ion
Type number		**0754**
Driving speed with load (nominal load)	(km/h)	20
Driving speed without load	(km/h)	23
Nominal tractive force over 60 min.	(N)	900/1200
Max. pulling force without load 5 min.	(N)	15,000
Service brake		Electrical / hydraulic

Gradients

The values specified in the "Performance data" table as the maximum climbing capability can be used only to compare the performance of industrial trucks in the same category. The specified values in no way represent the normal daily operating conditions.

⚠ WARNING

To use the industrial truck safely with or without a load, the maximum uphill or downhill gradient permitted for travel is 25%.

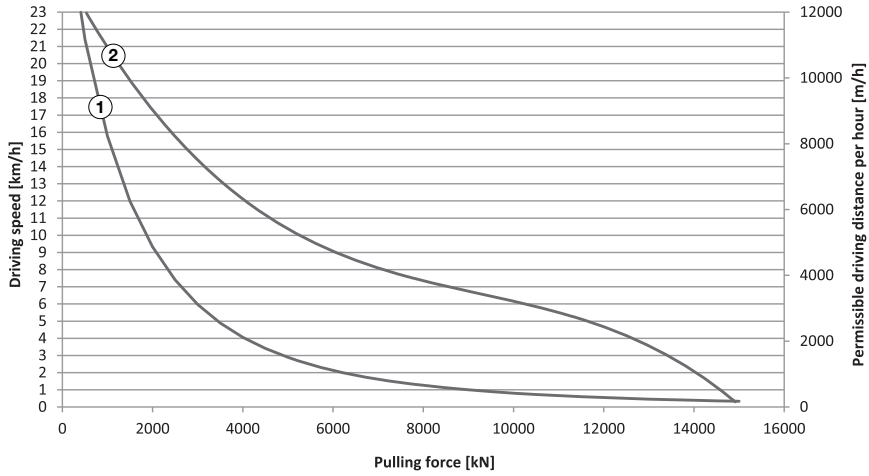
– If you have any questions, contact your authorised service centre.

Electric motor

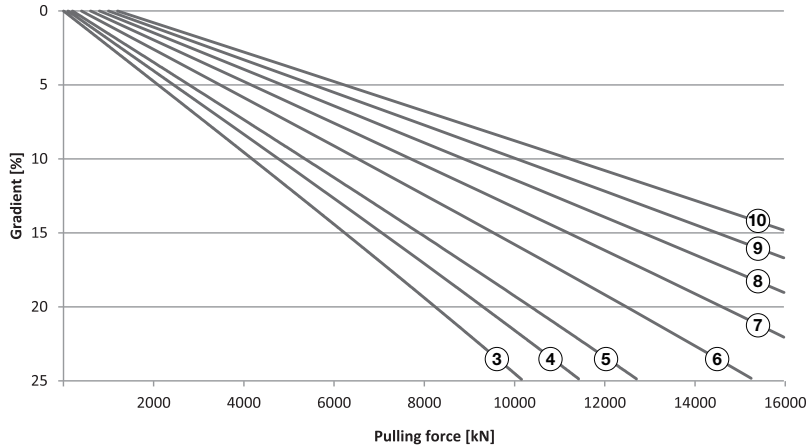
Model		LXW 30/Li-ion
Type number		**0754**
Traction motor, power rating S2: 60 minutes	kW	
Battery	Standard; circuit	DIN 43536 A
Battery voltage	U (V)	80
Battery capacity	K_5 (Ah)	240/500
Battery weight	kg	679/1210

Miscellaneous

Model		LXW 30/Li-ion
Type number		**0754**
Sound pressure level L_{pAZ} (Driver's compartment)	dB (A)	
Human vibration: acceleration according to EN 13059	m/s^2	
Tow coupling, DIN type/model		3-level coupling



1 Permissible driving distance per hour 2 Maximum driving speed



3 0t 4 0,5t 5 1t 6 2t 7 3t 8 4t 9 5t 10 6t

NOTE

The permissible haul per hour is the total distance travelled, including the return journey and any downhill gradients.

Battery specifications for lead-acid batteries

NOTE

Battery specifications according to DIN 43536; cells in accordance with DIN EN 60254-2, 80-V circuit A

– The battery weight can be found on the nameplate of the battery.

Lead-acid batteries

Battery designation	Power [kWh]	Tray	Weight [kg]			Battery compartment dimensions [mm]			Circuit
			Nominal	Min (-5%)	Max (+5%)	Length	Width	Height	
3 PzS 240	19.2	234	679	645	713	1028	711	784	A
3 PzS 465	37.2	233	1238	1176	1300		567		
4 PzS 320	25.6	244	858	815	901	1026	708	462	
4 PzS 500	40	204	1210	1149	1271			627	
4 PzS 620	49.6	234	1558	1480	1636		711		
5 PzS 775	62	235	1863	1769	1957		855		
6 PzS 930	74.4	236	2178	2069	2287		999		
8 PzS 1240	99.2	238	2785	2645	2925	1037	1287		
4 PzV 280		244	858	815	944 (+10%)	1026	708	462	
4 PzV 400		204	1210	1149	1271			627	
4 PzV 480		234	1558	1480	1714 (+10%)	1028	711	784	
5 PzV 600		235	1863	1769	2049 (+10%)		855		
6 PzV 720		236	2178	2069	2396 (+10%)		999		

NOTE

To convert to TENSOR® batteries, contact the authorised service centre.

Battery specifications for Li-Ion Plus lithium-ion batteries

NOTE

For the permissible uses of the various batteries and the temperature ranges in which the batteries can be operated, see the respective battery operating instructions.

Battery group 5, Li-Ion Plus 90 V

Battery group	Installed energy [kWh]	Available energy [kWh]	Weight [kg]	Dimensions [mm] Length/width/height
5.6	52.8	42.3	1210	1028/708/627
5.7	95.1	76.1	1210	1028/708/627
5.11	33.2	29.9	1210	1028/708/627
5.12	49.8	44.8	1210	1028/708/627
5.17	34.1	30.7	1210	1028/708/627
5.19	51.1	46.0	1210	1028/708/627
5.22	85.2	76.7	1210	1028/708/627

Battery group 6, Li-Ion Plus 90 V

Battery group	Installed energy [kWh]	Available energy [kWh]	Weight [kg]	Dimensions [mm] Length/width/height
6.6	52.8	42.3	1558	1028/711/687
6.7	95.1	76.1	1558	1028/711/687
6.12	49.8	44.8	1558	1028/711/692
6.14	82.9	74.7	1558	1028/711/692
6.19	51.1	46.0	1558	1028/711/692
6.20	51.1	46.0	1558	1028/711/692
6.21	85.2	76.7	1558	1028/711/692

Battery group 7, Li-Ion Plus 90 V

Battery group	Installed energy [kWh]	Available energy [kWh]	Weight [kg]	Dimensions [mm] Length/width/height
7.6	74.0	59.2	2178	1028/999/ 720
7.7	126.8	101.5	2178	1028/999/ 720
7.12	66.4	59.7	2178	1028/999/ 724
7.14	74.7	67.2	2178	1028/999/ 724
7.19	68.2	61.3	2178	1028/999/ 724
7.21	119.3	107.4	2178	1028/999/ 724
7.22	119.3	107.4	2178	1028/999/ 724

Battery group 11, Li-Ion Plus 90 V

Battery group	Installed energy [kWh]	Available energy [kWh]	Weight [kg]	Dimensions [mm] Length/width/height
11.6	42.3	33.8	1238	1028/567/ 632

Usage by industrial truck version

Industrial truck version	LXT120 very short wheelbase	LXT180 very short wheelbase	LXT250 short wheelbase	LXT250 long wheelbase	LXT350 very long wheelbase	LXW20	LXW30
Battery group	11	11	5.6	6.6/7.6	7.6	5.6	5.6

Eco-design requirements for electric motors and variable speed drives

All motors in this industrial truck are exempt from Regulation (EU) 2019/1781 because these motors do not meet the description given in Article 2 "Scope", Item (1) (a) and because of the provisions in Article 2 (2) (h) "Motors in cordless or battery-operated equipment" and Article 2 (2) (o) "Motors designed specifically for the traction of electric vehicles".

All variable speed drives in this industrial truck are exempt from Regulation (EU) 2019/1781 because these variable speed drives do not meet the description given in Article 2 "Scope", Item (1) (b).

A

Access authorisation for the fleet manager. 81
Changing the fleet manager password. 84
Changing the PIN code for the driver. . 81
Access authorisation with PIN code. 80
Changing the PIN codes. 81
Address of manufacturer. I
Air conditioning. 122

B

Basic principles for safe operation. 31
Battery. 44
Changing the battery type. 277
Charging. 247
Charging to equalise. 252
Checking. 328
Checking the charging state. 254
Checking the condition, acid level and acid density. 258
Disposal. 25
Replacing the battery using a truck or hand pallet truck. 280
Safety regulations. 244
Servicing. 257
Battery acid. 44
Battery specifications
Lead-acid batteries. 362
Lithium-ion batteries. 363
Blue-Q. 111
Configuring. 112
Effects on additional consumers. 112
Functional description. 111
Switching on and off. 111

C

Changes to the industrial truck. 31
Checking the charge state of the lithium-ion battery. 270
Checking the charging state. 254
Checking the driver's seat. 325
Checking wheel fastenings. 328
Cleaning the electrical system. 298
Cleaning the industrial truck. 296
After cleaning. 299
Cleaning the windows. 299
Conformity marking. 5
Consumables. 44
Disposal. 47
Safety information for handling oils. . . 45
Safety information for hydraulic fluid. . 46
Contact details. I
Copyright and trademark rights. 24

D

Damage. 33
Declaration of conformity. 6
Decommissioning. 306
Defects. 33
Description of the industrial truck. 2
Display-operating unit
Messages. 290
Display/control unit. 53
Disposal
Battery. 25
Components. 25
Drive direction
Changing. 150
Drive modes
Sprint mode. 113
STILL Classic. 113
Drive programme
Configuring A/B. 138
Selecting A/B. 138
Driver profiles
Creating. 100
Deleting. 104
Description. 100
Renaming. 102
Selecting. 102
Drivers. 29
Driver's seat
Adjusting. 68
Adjusting the lumbar support. 71
Adjusting the seat suspension (MSG 75 E). 71
adjustment. 68, 69
Switching the seat heater on and off. . 72
Due date counter for maintenance and safety checks. 315

E

EC declaration of conformity in accordance with the Machinery Directive. 6

Electric parking brake
Symbols in the display-operating unit. 141
Emergencies
Using the emergency hammer. 217
Emergency hammer. 217
Emergency shutdown. 212
Environmental considerations. 25

F

First-aid measures for working with lithium-ion batteries
Maintenance personnel. 265
Flammable gases. 44
Fuses
Replacing. 328

G

General maintenance information. 311

H

Handling gas springs and accumulators. . 35
Heating system. 119
Hydraulic fluid. 46
Hydraulic system
Checking for leak tightness. 328

I

Information about the documentation. . . . 19
Information for carrying out maintenance. 311, 313
Maintenance timeframe. 312, 313
Next maintenance interval. 312, 314
Insulation testing. 41
Drive battery test values. 42
Test values for the industrial truck. . . . 42
Insurance cover on company premises. . . 31

J

Jacking up the truck. 310

L

Lifting. 310
Lighting. 106
STILL SafetyLight. 108
StVZO equipment. 109
List of abbreviations. 22
Lithium-ion batteries
Changing the battery type. 277
Checking the charge status. 270
Fire protection measures. 266
First-aid measures. 265
Maintenance personnel. 265
Regulations for storing. 269
Safety regulations. 267

M

Maintenance. 0
Maintenance data table. 321
Actuators/joints. 322
Air conditioning. 323
Battery. 321
Brake system. 321
Drive axle. 323
Electrical system. 321
General lubrication points. 321
Hydraulic system. 322
Steering axle. 322
Tyres. 322
Washer system. 323
Maintenance personnel for batteries. . . . 311
Maintenance work without special qualifications. 311
Malfunctions in the parking brake. 144
Medical devices. 34
Messages
about operation. 290
About the industrial truck. 294
Introduction. 290
Misuse of safety systems. 33

O

Oils. 45
On-board charger
Changing the battery type. 231
Charging characteristic curve. 228
Charging current limitation. 230
Charging start time. 229
Charging the battery. 232
Compatible batteries. 242
Configuring. 227
General. 226
Maintenance charge. 231
Performance data. 243
Regularly testing the electrical safety. . 43
Operating
Display-operating unit. 78

Operating company. 28
Operating materials
Quality and quantity. 320
Operating the service brake. 136
Operation. 0
Ordering spare parts and wearing parts. 320
Overviews. 0
Display/control unit. 53

P

Packaging. 25
Parking brake
Actuation when the industrial truck is in motion. 143
Actuation when the industrial truck is stationary. 141
Malfunctions. 144
Parking the vehicle safely. 146
Personnel qualifications. 311
Pre-Shift Check
All questions. 88
Description. 86
History. 92
Process. 87
Question sequence. 90
Shift start. 93
Truck restrictions. 97
Preface. 0
Procedure in emergencies. 212
Prohibition of use by unauthorised persons. 30

R

Reference standards. 7
Regular testing. 41
Regulations for storing lithium-ion batteries. 269
Replacing the battery using a truck or hand pallet truck. 280
Residual risk. 36
Retrofitting. 31
Rights, duties and rules of behaviour for the driver. 29
Rotating beacon
Switching on and off. 107
Ro*244 tow coupling
Closing. 197
Coupling. 195
Uncoupling. 197

S

Safety. 0
Safety inspection. 41
Safety regulations
Consumables. 44
Safety regulations for handling lithium-ion batteries. 265
Fire protection measures. 266
Maintenance personnel. 265
Safety regulations for handling the battery. 244
Damage to cables and battery male connector. 246
Fire protection measures. 245
Maintaining the battery. 246
Maintenance personnel. 244
Safety regulations for maintenance. 310
Safety regulations for working with lithium-ion batteries. 267
Safety regulations when driving. 132
Safety tests. 41
Scope of the documentation
CO solutions. 21
Scrapping the industrial truck. 307
Seat belt. 72
Checking. 324
Cleaning. 325
Fastening. 72
Fastening on a steep slope. 73
Maintaining. 324
Malfunction due to cold conditions. . . . 74
Releasing. 74
Replacing after an accident. 325
Signal terms. 21
Spare parts list. I
Speed limitation
Configuring. 151
Switching on and off. 150
Sprint mode
Automatic switch-off. 113
Switching on and off. 113
STILL Classic
Switching on and off. 113
Switching on via push button (variant). . . . 76

T

Taking delivery of the tow tractor. 8

Technical data. 0
Technical notes. 8
Trailer and load. 175
Tyres
Safety principles. 33

V

Variants
Access authorisation for the fleet manager. 81
Access authorisation with PIN code. . . 80
Air conditioning. 122
Driver profiles. 100
Heating system. 119
On-board charger. 226
Pre-Shift Check. 86
Speed limitation. 150
VDI datasheet. 332, 337, 342, 347, 352, 357

W

Wheels and tyres
Checking the condition and wear of the tyres. 327
Checking wheel fastenings. 328
Servicing. 327
Usage in winter weather conditions. . 327

Y

Your truck. 2

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