

EJC 112z

08.16

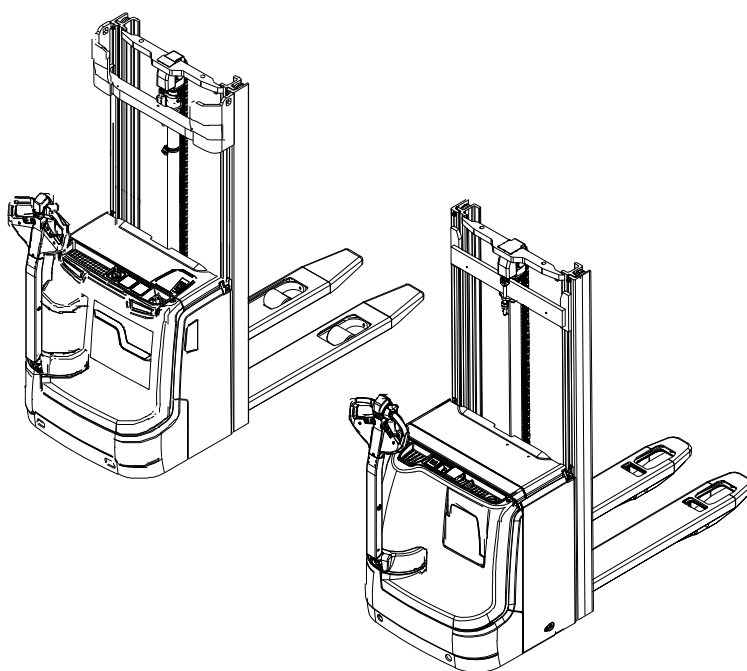
Operating instructions

en-GB

51554526

07.25

EJC 112z



Declaration of Conformity



Manufacturer

Jungheinrich AG, 22039 Hamburg, Germany

Description
Industrial truck

Type	Option	Serial no.	Year of manufacture
EJC 112z			

On behalf of

Date

EU DECLARATION OF CONFORMITY

The undersigned hereby declare that the powered truck described in detail complies with the current versions of European Directives 2006/42/EG (Machinery Directive) and 2014/30/EU (Electromagnetic Compatibility - EMC). The manufacturer is authorised to compile the technical file.

Declaration of Conformity (○)

Product: EJC 112z
Serial number/type number

Manufacturer: Jungheinrich Aktiengesellschaft
22039 Hamburg, Germany

UK representative: Jungheinrich UK Ltd
Sherbourne House
Sherbourne Drive
Tilbrook
Milton Keynes
MK7 8HX

Authorised to compile documentation:

The manufacturer is authorised to compile the technical documentation and its representative is authorised to make documentation available upon reasoned request for a period of at least 10 years from the date of first placement of the product on the UK market.

The manufacturer bears sole responsibility for issuance of this Declaration of Conformity.

The subject of the Declaration as outlined above satisfies the applicable UK legislation:

Supply of Machinery (Safety) Regulations 2008 No. 1597

and

Electromagnetic Compatibility Regulations 2016 No. 1091

Signed for and on behalf of:

Jungheinrich Aktiengesellschaft

Foreword

Notes on the operating instructions

The present ORIGINAL OPERATING INSTRUCTIONS are designed to provide sufficient instruction for the safe operation of the industrial truck. The information is provided clearly and concisely. The chapters are arranged by letter and the pages are numbered continuously.

The operator manual details different industrial truck models. When operating and servicing the industrial truck, make sure that the particular section applies to your truck model.

Our trucks are subject to ongoing development. We reserve the right to alter the design, equipment and technical features of the system. No guarantee of particular features of the truck should therefore be assumed from the present operating instructions.

Safety notices and text mark-ups

Safety instructions and important explanations are indicated by the following graphics:

DANGER!

Indicates an extremely hazardous situation. Failure to comply with this instruction will result in severe irreparable injury and even death.

WARNING!

Indicates an extremely hazardous situation. Failure to comply with this instruction may result in severe irreparable injury and even death.

CAUTION!

Indicates a hazardous situation. Failure to comply with this instruction may result in slight to medium injury.

NOTICE

Indicates a material hazard. Failure to comply with this instruction may result in material damage.



Used before notices and explanations.

●	Indicates standard equipment
○	Indicates optional equipment

Copyright

Copyright of these operating instructions remains with JUNGHEINRICH AG.

Jungheinrich Aktiengesellschaft

Friedrich-Ebert-Damm 129
22047 Hamburg - Germany

Tel: +49 (0) 40/6948-0

www.jungheinrich.com

Contents

A	Correct Use and Application	11
1	General	11
2	Correct application	11
3	Approved application conditions	12
3.1	Instructions for trucks with lithium-ion batteries	14
3.2	Internal Operation Combined with Brief External or Cold Store Operation (●)	15
3.3	Internal Operation in Cold Stores with Cold Store Equipment (○)	16
3.4	Wind loads	17
4	Proprietor responsibilities	18
5	Adding attachments and/or optional equipment	18
6	Removal of components	18
B	Truck Description	19
1	Application	19
1.1	Truck models and rated capacity	19
2	Facelift 2022	20
3	Travel direction definition	21
4	Assemblies and Functional Description	22
4.1	Assembly Overview	22
4.2	Functional Description	29
5	Technical Specifications	32
5.1	Performance data	32
5.2	Gradeability	32
5.3	Dimensions	33
5.4	Weights	35
5.5	Tyre type	35
5.6	EN norms	36
5.7	Specifications according to RED guideline (Radio Equipment Directive) for radio units	37
5.8	Electrical Requirements	38
5.9	Power supply of on-board charger (○)	38
5.10	Safety of trucks	38
6	Identification Points and Data Plates	39
6.1	Indication Points	39
6.2	Data plate	40
6.3	Capacity plate	41
6.4	Capacity plate for stacking and transport operation	44
6.5	Capacity plate for stacking, transport and double-deck operation	45
C	Transport and Commissioning	47
1	Lifting by crane	47
2	Transport	49
3	Using the Truck for the First Time	51
D	Battery - Servicing, Recharging, Replacement	53
1	Notes on types of battery technology	53

2	General safety regulations for batteries.....	54
3	Lead-acid batteries.....	55
3.1	Safety instructions for handling lead-acid batteries.....	55
3.2	Battery types.....	57
3.3	Exposing the battery.....	58
3.4	Charging the battery.....	59
3.5	Removing or installing the battery.....	67
4	Replaceable Lithium-Ion Battery.....	71
4.1	Battery types.....	71
4.2	Battery charge status.....	72
4.3	Exposing the battery.....	72
4.4	Removing or installing the battery.....	72
4.5	Charging the battery.....	73
5	Integrated Modular Lithium-Ion Battery.....	78
5.1	Safety regulations for handling lithium-ion batteries.....	79
5.2	Lithium-ion battery data plate.....	83
5.3	Battery types.....	85
5.4	Battery charge status.....	86
5.5	Exposing the battery.....	86
5.6	Removing or installing the battery.....	86
5.7	Charging the battery.....	87
E	Operation.....	95
1	Safety Regulations for the Operation of Forklift Trucks.....	95
2	Displays and Controls.....	97
2.1	Model up to 2022.....	97
2.2	Facelift model from 2022 onwards.....	100
2.3	Available display elements and controls.....	103
3	Preparing the Truck for Operation.....	107
3.1	Checks and Operations to Be Performed Before Starting Daily Work.....	107
3.2	Preparing the truck for operation.....	108
3.3	Visual inspections and activities to be performed after establishing operational readiness.....	110
3.4	Parking the truck securely.....	111
4	Working with the truck.....	113
4.1	Safety regulations for travel mode.....	113
4.2	Emergency Disconnect.....	118
4.3	Automatic braking.....	120
4.4	Travel.....	121
4.5	Steering.....	124
4.6	Brakes.....	125
4.7	Raising or Lowering the Load Handler.....	127
4.8	Lifting, transporting and depositing loads.....	131
4.9	Use as a Lift Work Table.....	139
5	Troubleshooting.....	140
5.1	Model up to 2022.....	141
5.2	Facelift model from 2022 onwards.....	143
6	Moving a truck without its own drive system.....	146
6.1	Release and activate the drive wheel brake.....	146
7	Load handler emergency lowering.....	148
8	Optional Equipment.....	150
8.1	Display unit (2 inch display).....	150
8.2	Keyless Access System.....	168

8.3	Parameters.....	182
F	Truck maintenance.....	187
1	Spare Parts.....	187
2	Operational Safety and Environmental Protection	188
3	Maintenance Safety Regulations.....	189
3.1	Working on the electrical system.....	190
3.2	Consumables and used parts.....	190
3.3	Wheels.....	190
3.4	Hydraulic system	191
3.5	Lift Chains.....	192
4	Lubricants and Lubrication Schedule.....	193
4.1	Handling consumables safely.....	193
4.2	Lubrication Schedule	195
4.3	Consumables	196
5	Maintenance and repairs.....	197
5.1	Preparing the truck for maintenance and repair work.....	197
5.2	Disassembling or assembling the front panel.....	198
5.3	Lifting and jacking up the truck safely.....	199
5.4	Cleaning.....	200
5.5	Checking the hydraulic oil level.....	202
5.6	Checking the attachment and wear of the wheels.....	203
5.7	Checking the electrical fuses.....	205
5.8	Restoring the truck to service after maintenance and repairs	207
6	Decommissioning the Industrial Truck.....	208
6.1	Prior to decommissioning.....	208
6.2	Action to be taken during decommissioning.....	209
6.3	Restoring the truck to service after decommissioning	210
7	Safety tests to be performed at intervals and after unusual incidents.....	211
8	Final de-commissioning, disposal.....	211
9	Human vibration measurement	211
G	Maintenance, Inspection and Changing of Maintenance Parts Requiring Replacement.....	213
1	Maintenance Contents EJC 112z	213
1.1	Owner.....	213
1.2	Customer Service.....	215

A Correct Use and Application

1 General

The truck must be used, operated and serviced in accordance with these operating instructions. All other types of use are beyond its scope of application and may result in damage to persons, material assets and/or the truck.

2 Correct application

NOTICE

The maximum load and load distance are indicated on the capacity plate and must not be exceeded.

The load must rest on the load handler or be lifted by an attachment approved by the manufacturer.

The load must be fully raised, see page 131.

Permissible activities

- Lifting and lowering loads
- Stacking and retrieving loads
- Transporting lowered loads

Prohibited activities

- Travelling with a raised load (>500 mm)
In double-deck operation, the load handler must not be raised higher than 1800 mm. The bottom load must be heavier than the top.
- Carrying and lifting passengers
- Pushing or pulling loads

3 Approved application conditions

WARNING!

Use under extreme conditions

Using the truck under extreme conditions can result in malfunctions and accidents.

- ▶ Special equipment and authorisation are required if the truck is to be constantly used in extreme conditions, especially in dusty or corrosive atmospheres.
- ▶ The truck cannot be used in areas at risk of explosion.
- ▶ In adverse weather conditions (thunder, lightning) the industrial truck must not be operated outside or in endangered areas.

-
- Operation in industrial and commercial environments.
 - Operation only on secure, level surfaces with sufficient capacity.
 - Do not exceed the permissible surface and point load limits on the travel routes.
 - Operation only on routes that are visible and approved by the operating company.
 - Read the instructions in these operating instructions before travelling on slopes and inclines:
 - Truck gradeability – see page 32.
 - Notes on travelling on slopes and inclines – see page 115.

Ground conditions

The condition of the ground on which the truck is used must satisfy the following requirements:

- The ground must be level, secure and have sufficient capacity.
- The ground must be free from oil and grease.
- In accordance with EN 1081, the earthing resistance of the ground must not exceed 1 MΩ.
- The following also applies for stacking:
 - The capacity data specified on the truck applies to horizontal ground that meets the specifications in the table below.

Limit values for deviations from level

Reference	Limit values (mm) for measuring point distances (m) ¹				
	≤ 0.1 m	1 m	4 m	10 m	≥15 m
Finished floors e.g. screed on its own, screed for accommodating floor coverings, floor coverings, tile coverings, smoothed and bonded surfaces	2 mm	4 mm	10 mm	12 mm	15 mm
¹⁾ Specifications in accordance with DIN 18202:2019-07 - Table 3 - row 3 - limit values for deviations from level					

Changing the application areas and thawing

- The application areas can be changed, but in general this should be minimised due to thawing and possible corrosion.
- Thawing is permissible only if the truck can be subsequently dried thoroughly.

- Special equipment and authorisation are required if the truck is to be used continually in conditions of extreme temperature fluctuations or condensing air humidity.

3.1 Instructions for trucks with lithium-ion batteries

WARNING!

Danger of accidents due to regenerative braking fault

Regenerative braking faults can result in extended stopping distances and accidents, particularly when travelling on inclines. Other persons can be injured in the truck's hazardous area.

- ▶ Keep all persons out of the hazardous area during travel operations.
 - ▶ Instruct other people to move out of the hazardous area of the truck. Stop working with the truck if people do not leave the hazardous area.
 - ▶ In emergencies, use the service brake for braking.
-

Equipping the truck with a lithium-ion battery can affect the permissible operating conditions. The operating conditions of the truck and the various battery types are listed in this section.

- Travel and hydraulic functions: The usable battery capacity and power are reduced at low temperatures. If the lithium-ion battery is in the low-temperature range, the lift function may be impaired and regenerative braking with the coasting brake may not function correctly.
- High ambient temperatures increase the charging time of the lithium-ion battery.
- The permissible application range of the lithium-ion battery does not increase the permissible application range of the truck.



A notification symbol appears on the display unit when the temperature of the lithium-ion battery is outside the permissible range – see page 155.

3.2 Internal Operation Combined with Brief External or Cold Store Operation (●)

In addition to the permissible operating conditions in industrial and commercial environments, the truck can also be used in outdoor environments, cool stores and fresh food areas. Secure parking is only permissible indoors or in a cold store environment.

- Use in a cold store (below -10 °C) is prohibited.

3.2.1 Truck in General

Operating and ambient conditions	
Permissible temperature range	-10 °C to +40 °C
Temperature range for secure parking	+5 °C to +40 °C
Maximum relative air humidity	95% non-condensing

3.2.2 Trucks with Lead-Acid Battery

Operating and ambient conditions	
Permissible temperature range	-10 °C to +40 °C
Minimum temperature for charging	+5 °C
Maximum relative air humidity	95% non-condensing

3.2.3 Integrated Modular Lithium-Ion Battery

Operating and ambient conditions	
Permissible temperature range	-10 °C to +40 °C
Minimum temperature for charging	+5 °C
Maximum relative air humidity	95% non-condensing

3.2.4 Replaceable Lithium-Ion Battery

- See the separate operating instructions for the lithium-ion battery.

3.3 Internal Operation in Cold Stores with Cold Store Equipment (○)

NOTICE

Cold store trucks

- ▶ Trucks designed for use in cold stores have a cold store hydraulic oil and a protective frame instead of a mast guard on the mast.
- ▶ If a truck with cold store oil is used outside the cold store, the lowering speeds may increase.

NOTICE

Battery damage at low state of charge and at low temperatures

A low state of charge and increasing cooling can damage the battery. To avoid damage, observe the following:

- ▶ If the battery charge is low, do **not** use the truck in temperatures from -28 °C to -5 °C.
- ▶ If the battery charge is low, avoid using the truck in temperatures from -5 °C to +5 °C **where possible**.
- ▶ Charge the battery – see page 53.

In addition to the permissible operating conditions in industrial and commercial environments, the truck remains primarily in cold stores. The truck should only leave the cold store briefly to hand over a load.

- In cold store areas below -10 °C, the truck must be operated **continuously** and must not be parked securely for more than 15 minutes.

3.3.1 Truck in General

Operating and ambient conditions	
Permissible temperature range	-28 °C to +25 °C
Temperature range for secure parking	+5 °C to +40 °C
Maximum relative air humidity	95% non-condensing

3.3.2 Trucks with Lead-Acid Battery

Operating and ambient conditions	
Permissible temperature range	-28 °C to +25 °C
Minimum temperature for charging	+5 °C
Maximum relative air humidity	95% non-condensing

3.3.3 Integrated Modular Lithium-Ion Battery

Operating and ambient conditions	
Permissible temperature range	-28 °C to +25 °C
Minimum temperature for charging	+5 °C
Maximum relative air humidity	95% non-condensing

3.3.4 Replaceable Lithium-Ion Battery

 See the separate operating instructions for the lithium-ion battery.

3.4 Wind loads

Wind forces can affect the stability of a truck when lifting, lowering and transporting loads with large surface areas.

Light loads must be especially secured when they are subjected to wind forces. This will prevent the load from sliding or falling.

Stop the truck in both cases.

4 Proprietor responsibilities

For the purposes of the present operating instructions the “operating company” is defined as any natural or legal person who either uses the industrial truck himself, or on whose behalf it is used. In special cases (e.g. leasing or renting) the proprietor is considered the person who, in accordance with existing contractual agreements between the owner and user of the industrial truck, is charged with operational duties.

The proprietor must ensure that the industrial truck is used only for the purpose it is intended for and that danger to life and limb of the user and third parties are excluded. Furthermore, accident prevention regulations, safety regulations and operating, servicing and repair guidelines must be followed. The operating company must ensure that all users have read and understood these operating instructions.

NOTICE

Failure to comply with the operating instructions invalidates the warranty. The same applies if improper work is carried out on the truck by the customer or third parties without the permission of the manufacturer.

5 Adding attachments and/or optional equipment

The mounting or installation of additional equipment which affects or enhances the performance of the industrial truck requires the written permission of the manufacturer. Local authority approval may also need to be obtained.

Local authority approval however does not constitute the manufacturer's approval.

6 Removal of components

It is forbidden to modify or remove truck components, particularly protective and safety equipment.

→ If in doubt, contact the manufacturer's customer service department.

B Truck Description

1 Application

The EJC 112z is a four-wheel, tiller-operated electric stacker with a steered drive wheel.

It is designed for use on level floors to lift and transport goods. Open bottom pallets or roll cages can be lifted. The rated capacity is shown on the data plate. The capacity with respect to lift height and load centre of gravity is indicated on the capacity plate.

1.1 Truck models and rated capacity

The rated capacity depends on the model. The rated capacity can be derived from the model name.

EJC 112z

EJC 112z	Model name
1	Series
12	Rated capacity x 100 kg
z	Initial lift

The rated capacity is not generally the same as the permissible capacity. The permissible capacity can be found on the capacity plate attached to the truck.

2 Facelift 2022

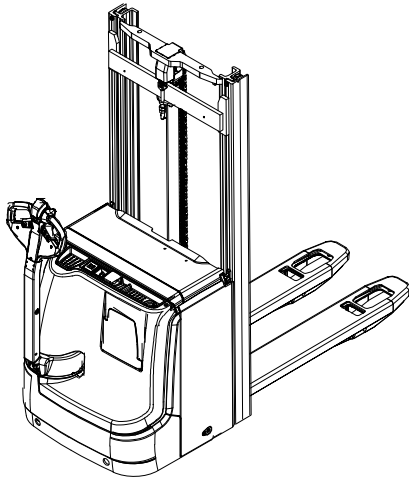
A facelift of the truck will be introduced with model year 2022. Unless otherwise stated, the contents of these operating instructions apply to both model variants.

Sections where differentiation is required are indicated as follows:

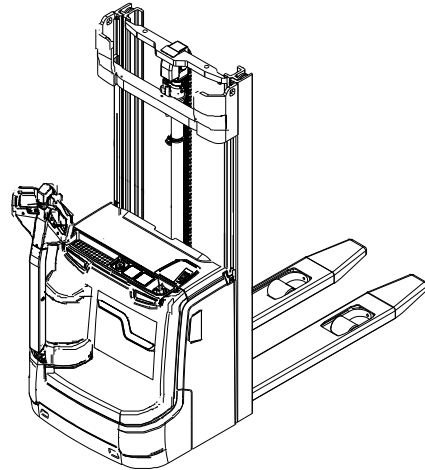
- Model up to 2022
- Facelift model from 2022 onwards

Model differentiation

Model up to 2022



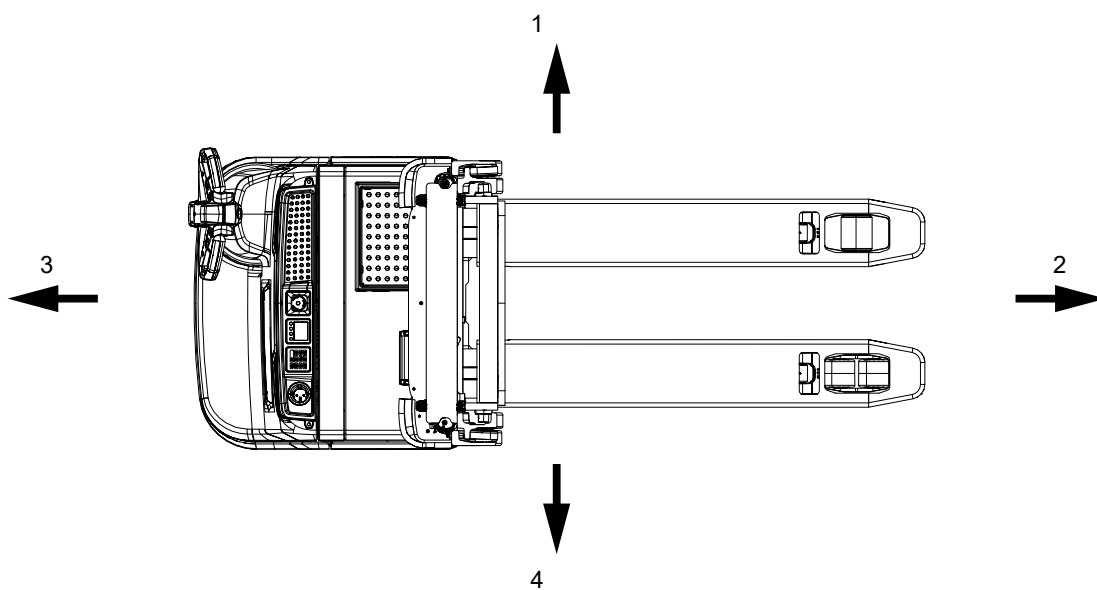
Facelift model from 2022 onwards



The characteristic reflectors in the dashboard panel area can be used to determine whether a truck is the Facelift model: The Facelift model from 2022 onwards has reflectors; the model up to 2022 has no reflectors.

3 Travel direction definition

The following determinations have been made for travel direction specification:

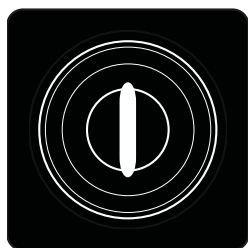
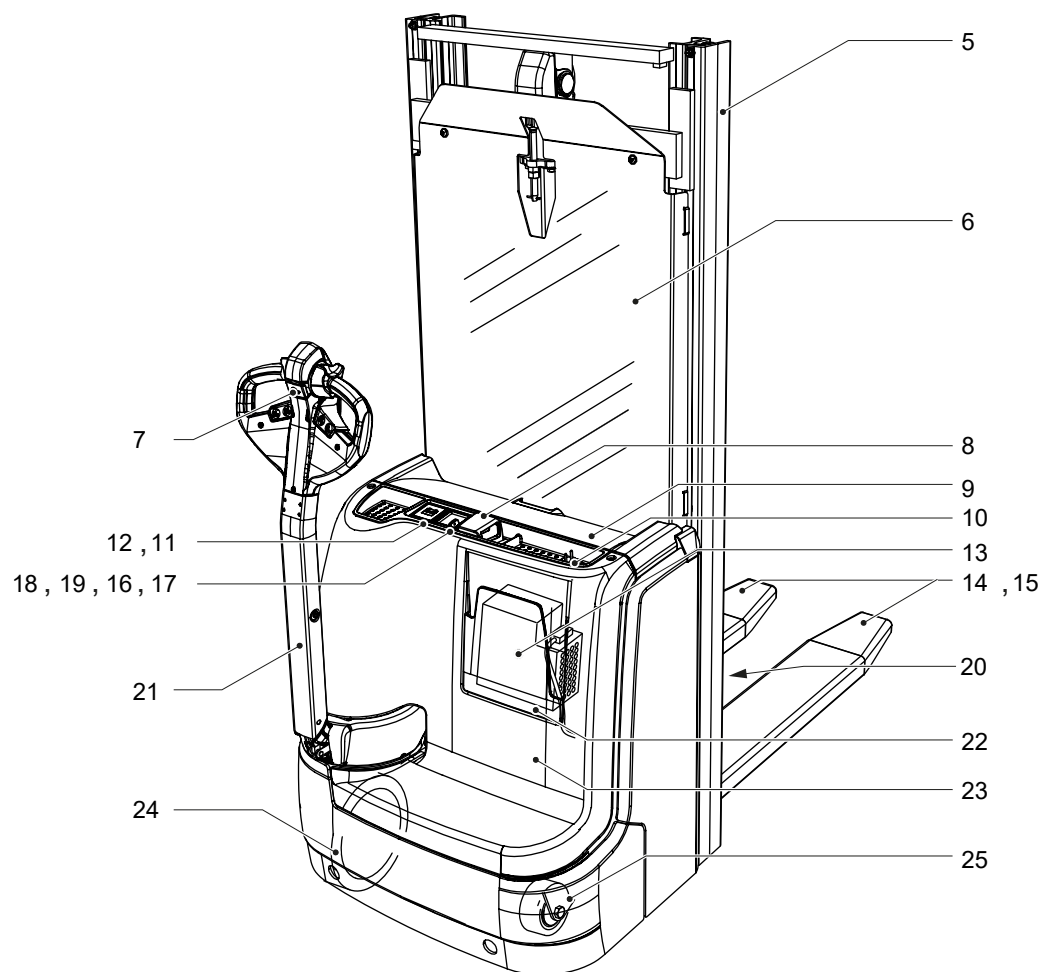


Item	Travel Direction
1	Left
2	Load direction
3	Drive direction
4	Right

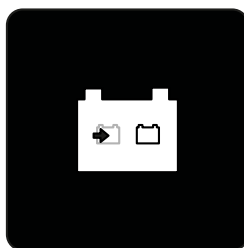
4 Assemblies and Functional Description

4.1 Assembly Overview

4.1.1 Model up to 2022



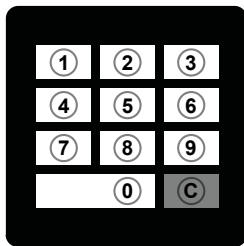
19



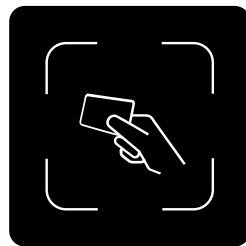
11



12



18



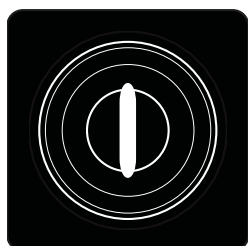
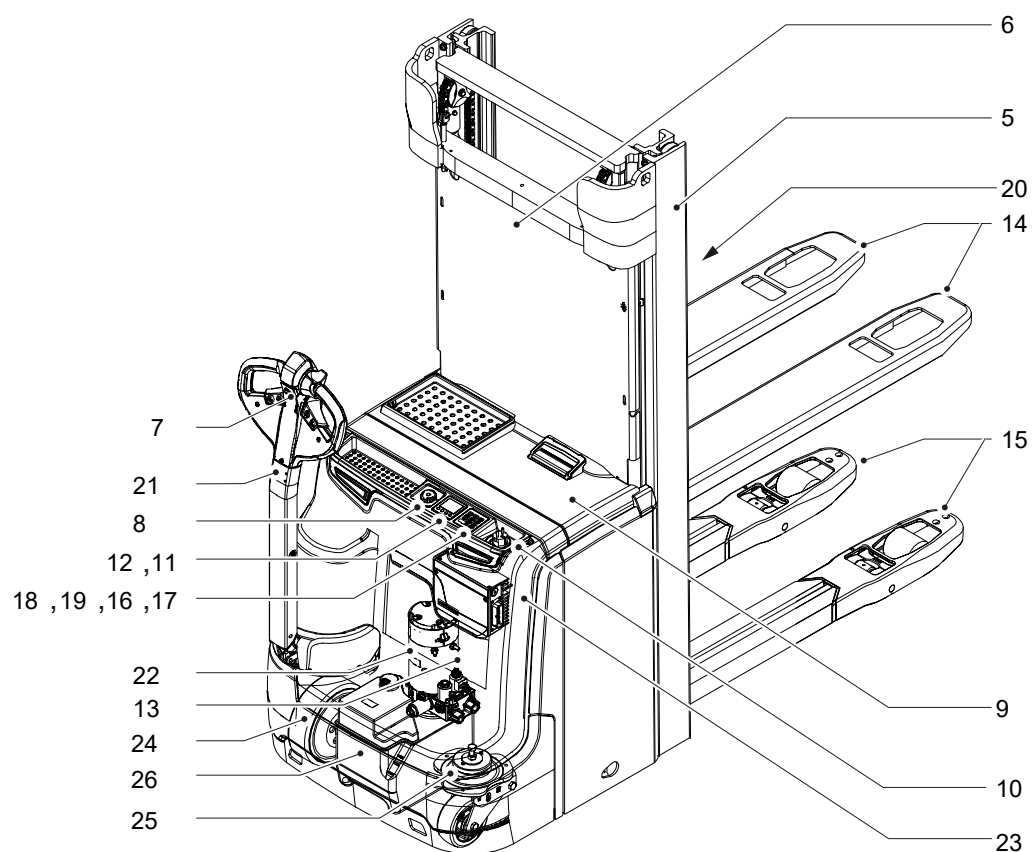
16



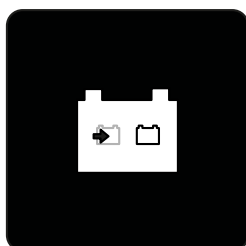
17

Item		Description
5	●	Mast
6	● ○	Protective screen panel (not suitable for cold store operation) Protective grille
7	●	Slow-travel button
8	●	Emergency disconnect switch
9	●	Battery panel
10	○	Mains plug (on-board charger)
11	●	Charge status indicator
12	○	Display unit with 2-inch display
13	○	On-board charger
14	●	Load fork
15	●	Support arms
16	○	Transponder reader
17	○	Transponder reader Plus
18	○	Keypad
19	●	Key switch
20	○	Load backrest
21	●	Tiller
22	●	Document storage compartment
23	●	Front panel
24	●	Drive wheel
25	●	Support wheel

4.1.2 Facelift model from 2022 onwards



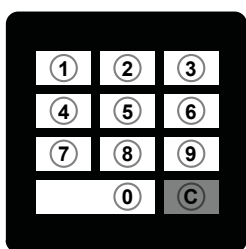
19



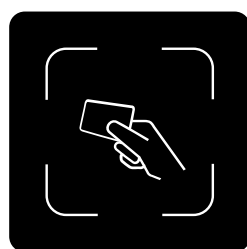
11



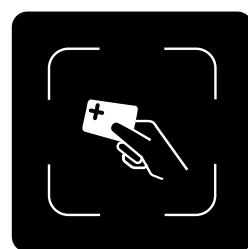
12



18



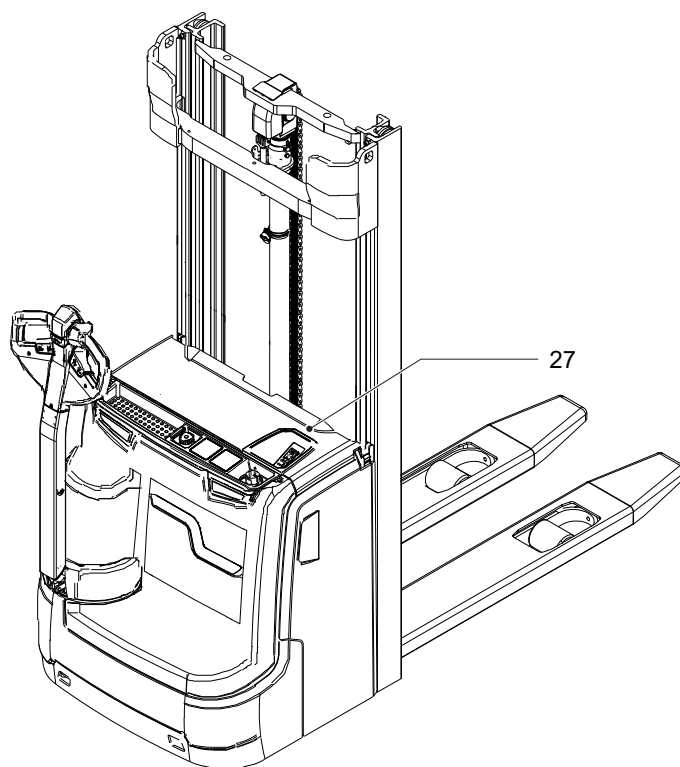
16



17

Item		Description
5	●	Mast
6	● ○	Protective screen panel (not suitable for cold store operation) Protective grille
7	●	Slow-travel button
8	●	Emergency disconnect switch
9	●	Battery panel
10	○	Mains plug (on-board charger)
11	●	Charge status indicator
12	○	Display unit with 2-inch display
13	○	On-board charger
14	●	Load fork
15	●	Support arms
16	○	Transponder reader
17	○	Transponder reader Plus
18	○	Keypad
19	●	Key switch
20	○	Load backrest
21	●	Tiller
22	●	Document storage compartment
23	●	Front panel
24	●	Drive wheel
25	●	Support wheel
26	●	Hydraulic unit

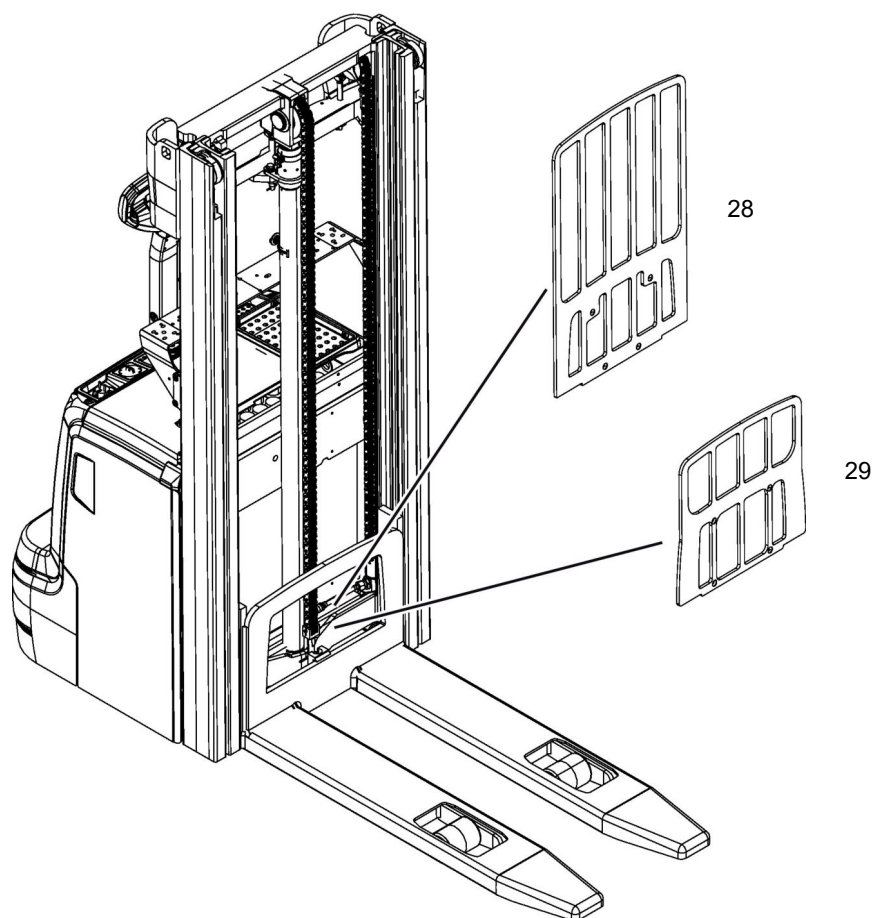
4.1.2.1 Comfort Charging Socket for the Lithium-Ion Battery



Item		Description
27	○	Comfort charging socket for the lithium-ion battery

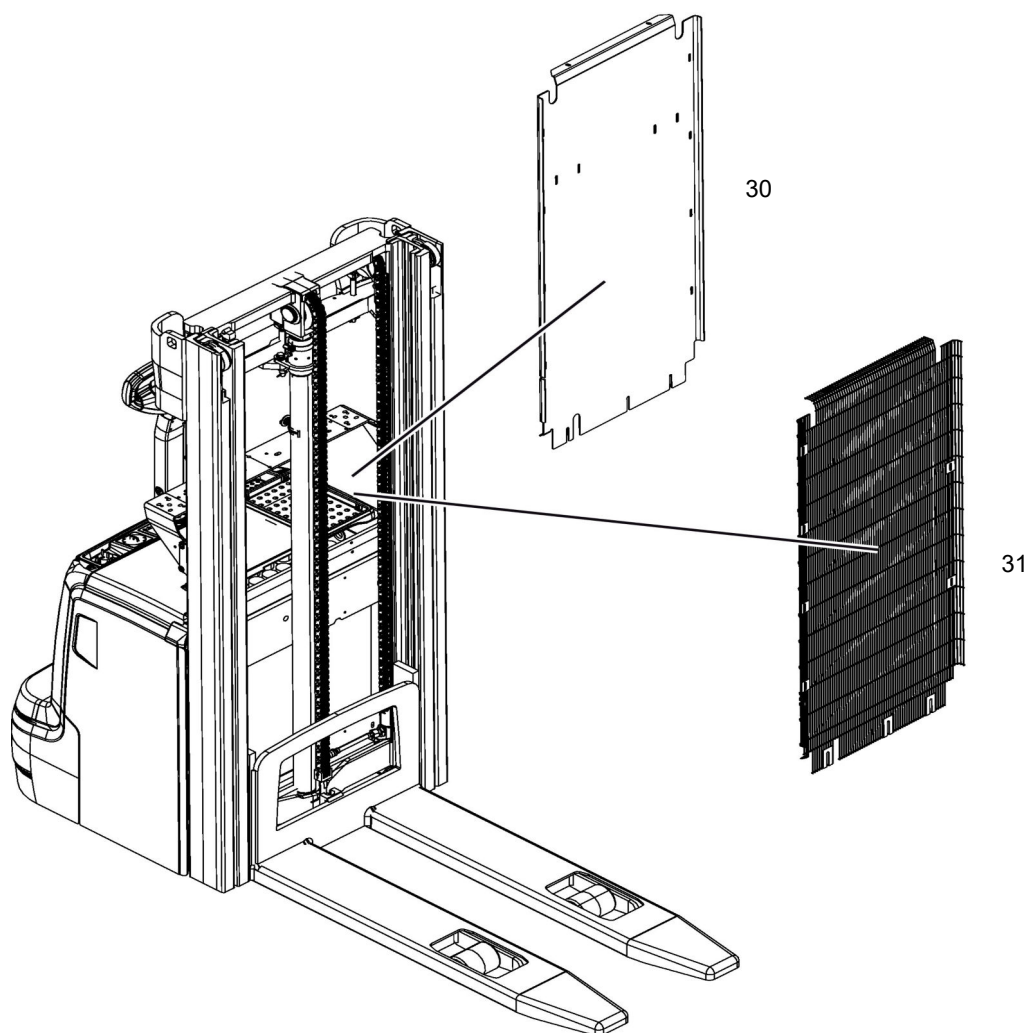
4.1.3 All Models

Load backrest



Item		Description
28	☐	Load backrest, large
29	☐	Load backrest, small

Mast cover



Item		Description
30	●	Protective screen panel (not suitable for cold store operation)
31	○	Protective grille

4.2 Functional Description

Safety mechanisms

An enclosed, smooth truck geometry with rounded edges ensures safe handling of the truck. The wheels are surrounded by a solid skirt.

The long tiller provides a maximum safety distance to the truck. When it is released and in hazardous situations, a gas strut forces the tiller up into the brake position. The collision safety switch in the tiller head responds to body contact, the travel direction changes and the truck moves away from the operator.

Activating the Emergency Disconnect switch rapidly cuts out all electrical functions in hazardous situations.

The mast protection pane or grille (○) protect the operator from moving mast parts and the load.

Emergency stop safety concept

The emergency stop is activated by the traction controller. Each time the truck is switched on, the system carries out a self-diagnosis.

If an error is detected, the truck automatically brakes to a halt. Control displays on the display unit (2-inch display) (○) indicate the emergency stop.

CAUTION!

Automatic braking can cause accidents

If the truck detects that signals which are required have not been received, or if it detects an error, the system reacts by triggering an emergency stop, either by braking the truck to a halt or until a valid signal status has been reached.

► Remain at a suitable distance from the truck during operation.

Hydraulic system

"Lifting" and "lowering" are activated via the "lift" and "lower" buttons. Pressing the "lift" button starts the pump unit, supplying hydraulic oil from the hydraulic reservoir to the lift cylinder.

Free lift

When equipped with a triple telescopic mast (DZ) (●) a short, centre-mounted free lift cylinder initially lifts the load handler (free lift) without changing the overall height of the truck.

Automatic lower sequence of support arm lift (○)



Only available with: Facelift model from 2022 onwards

With the support arm lift raised, loads can be stacked and retrieved with the load fork up to a lift height of 2200 mm. For higher lift heights, the support arm lift must be lowered.

On trucks with the "automatic lower sequence of support arm lift" function (○), the support arms are automatically lowered as of a load fork lift height of 2200 mm when the "fork lift" button remains depressed.

Drive system

A fixed AC three-phase motor actuates the drive wheel via a bevel spur gearbox. The electronic traction controller ensures smooth drive-motor-speed control and hence smooth starting, powerful acceleration and electrically controlled braking with energy regeneration. The driver can choose from 3 travel programs depending on the load and the environment: from high-performance to energy-saving.

Tiller

The driver steers with an ergonomic tiller. All travel and lift operations can be performed sensitively without having to reach. The tiller has a steer angle of 180°.



Electric steering (○) is easier to operate due to less activation force required.

Electrical system

The truck has an electronic traction controller. The truck electrical system operates with a rated operating voltage of 24.

Controls and displays

Ergonomic controls ensure fatigue-free operation for sensitive application of the travel and hydraulic operations. The display unit (2-inch display) (○) shows the operator key information such as travel program, service hours, battery capacity and event messages.

Mast

The maximum strength steel sections are narrow, allowing for outstanding load handler visibility in particular with the three-stage mast. The lift rails and the fork carriage run on permanently-lubricated and hence maintenance-free angled rollers.

Load backrest (○)

A load backrest is recommended as an additional protective mechanism to move low or small item loads above the mast protection frame or grille (○). The load backrest is mounted on the load handler and protects the operator and truck against falling loads.



The extended mast height (h4) increases according to the load backrest mounted on the load handler.

WARNING!

Risk of injury from falling loads

Low or small item loads moved above the mast protection pane or grille (○) and protruding over the load backrest can fall, endangering the operator and truck.

► Secure low or small item loads protruding over the load backrest, e.g. by wrapping them in film.

Hour meter

Service hours are counted while the truck is operational and one of the following controls is actuated:

- Tiller in travel zone "F", see page 121.
- "Slow travel button", see page 123.
- Button for lifting or lowering the load handler, see page 127.

Double-deck function (○)

The double-deck function allows two pallets to be picked up and transported at the same time.

5 Technical Specifications

- The technical specifications comply with the German "Industrial Truck Data Sheet" Guidelines.
Technical modifications and additions reserved.

5.1 Performance data

- Values for standard mast 290 ZT with battery

Industrial truck with 2-kW hydraulic unit

	Designation	EJC 112z	
Q	Rated capacity	1200	kg
D	Load centre distance	600	mm
	Travel speed with/without load	6.0 / 6.0	km/h
	Lift speed with/without load (ZT HG)	0.13 / 0.22	m/s
	Lower speed w/ w.o. load (ZT mast)	0.49 / 0.39	m/s
	Drive motor, output S2 60 min.	1.0	kW
	Lift motor, output S3 %	2.2/6%	kW
	Energy consumption according to VDI cycle	0.92	kWh/h

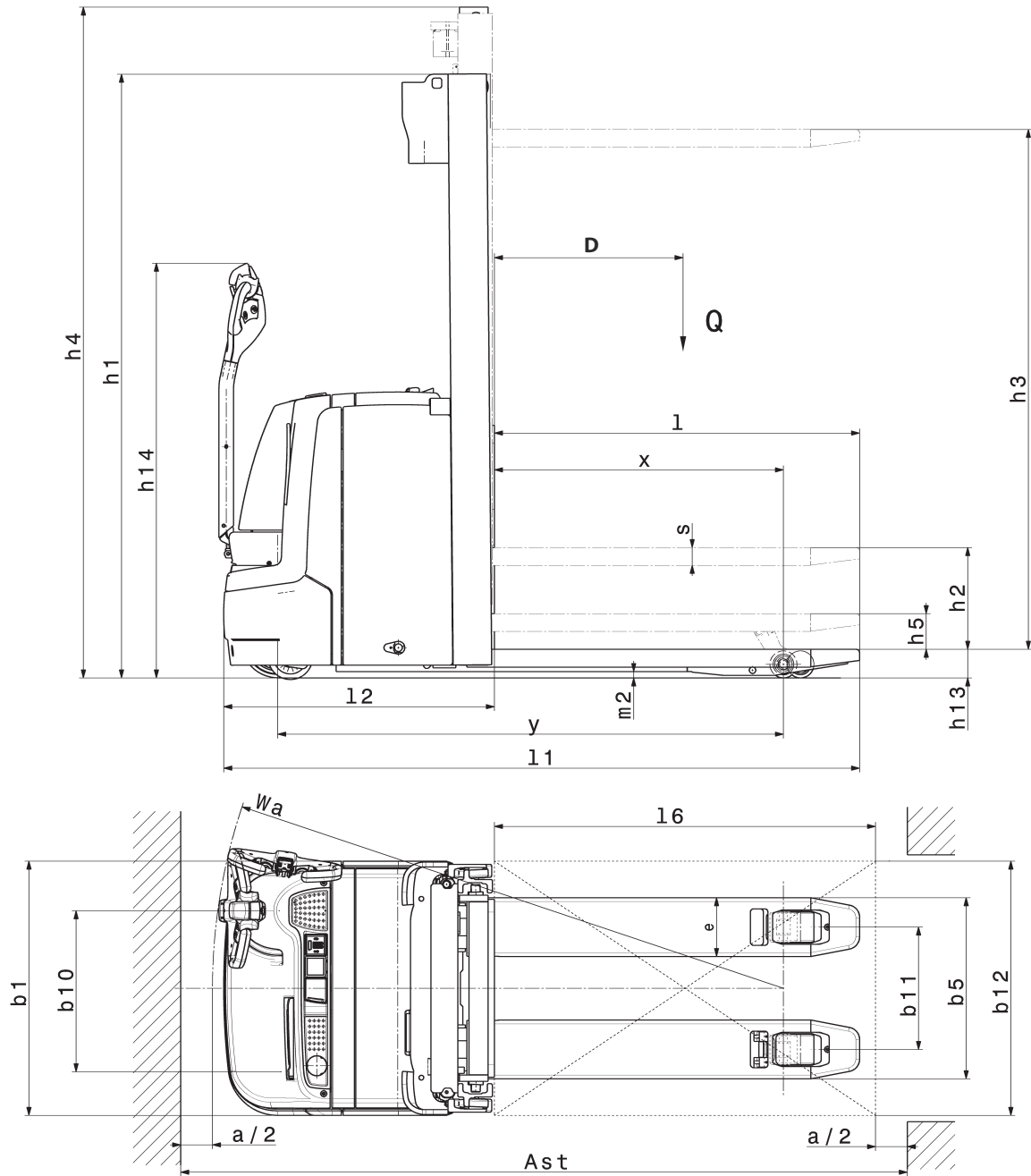
Industrial truck with 3-kW hydraulic unit

	Designation	EJC 112z	
Q	Rated capacity	1200	kg
D	Load centre distance	600	mm
	Travel speed with/without load	6.0 / 6.0	km/h
	Lift speed with/without load (ZT HG)	0.18 / 0.29	m/s
	Lower speed w/ w.o. load (ZT mast)	0.49 / 0.39	m/s
	Drive motor, output S2 60 min.	1.0	kW
	Lift motor, output S3 %	3.0/6%	kW
	Energy consumption according to VDI cycle	0.92	kWh/h

5.2 Gradeability

Designation	EJC 112z
Max. gradeability for unladen travel	16 %
Max. gradeability for transport travel in mast lift (rated load Q)	8 %
Max. gradeability for transport travel in support arm lift (load 2.0 t)	5 %

5.3 Dimensions



	Designation	EJC 112z	
h_1	Overall height	1950	mm
h_2	Free lift	100	mm
h_3	Lift	2880	mm
h_4	Mast height extended	3375	mm
h_5	Initial lift		mm
h_{13}	Load forks lowered	90	mm
h_{14}	Tiller height in travel position (min./max.)	850/1305	mm
x	Load distance raised	910 ^{1 2}	mm
y	Wheelbase raised	1502 ²	mm
l_1	Truck length ¹	1933	mm
l_2	Headlength ¹	783	mm
b_1	Truck width	800	mm
b_5	Width across forks	570	mm
b_{10}	Track width, front	507	mm
b_{11}	Track width, rear	415	mm
m_2	Ground clearance	20	mm
s	Fork-arm dimensions	56	mm
e		185	
l		1150	
Ast	Aisle width ^{3 4} 800 x 1200 lengthways (in accordance with VDI)	2267 ^{5 1}	mm
Ast	Aisle width ^{3 6} 1000 x 1200 crossways (in accordance with VDI)	2168 ^{7 1}	mm
Wa	Turning radius ³ Support arms raised	1728 ²	mm
¹⁾ DZ: x - 42 mm; l1 + 42 mm; l2 + 42 mm ²⁾ Lowered +54 mm ³⁾ Tiller upright (slow travel) ⁴⁾ l6 = 1200; b12 = 800 ⁵⁾ Diagonal in accordance with VDI +368 mm ⁶⁾ l6 = 1150; b12 = 1200 (forks protruding) ⁷⁾ Diagonal in accordance with VDI +204 mm			

5.4 Weights

Designation	EJC 112z	
Net weight incl. battery	980	kg
Axle load, laden, front/rear + battery	965 / 1215	kg
Axle load, unladen, front/rear + battery	707 / 273	kg
Battery weight	185	kg

5.5 Tyre type

Description	EJC 112z	
Tyre size, drive system	230 x 70	mm
Tyre size, load section (single/tandem)	Ø 85 x 95/Ø 85 x 75	mm
Support wheel	140 x 54	mm
Wheels, number front/rear (x = driven)	1 x + 1/2	

5.6 EN norms

WARNING!

Damage to medical equipment due to non-ionising radiation

Electrical equipment on the truck emitting non-ionising radiation (e.g. wireless data transmission) can affect operators' medical equipment (pacemakers, hearing aids etc.) and result in malfunctions.

► Consult a doctor or the manufacturer of the medical equipment to clarify whether the medical equipment can be used near the industrial truck.

Continuous sound pressure level

– EJC 112z: 64 dB(A)

in accordance with EN 12053 as harmonised with ISO 4871.

- The continuous sound pressure level is calculated according to standard procedures and takes into account the sound pressure level when travelling, lifting and idling. The sound pressure level is measured at the operator's ear.

Electromagnetic compatibility (EMC)

The manufacturer confirms that the truck adheres to the limits for electromagnetic emissions and resistance as well as the static electricity discharge test in accordance with EN 12895 as well as the standardised instructions contained therein.

- No changes to electric or electronic components or their arrangement may be made without the written agreement of the manufacturer.

5.7 Specifications according to RED guideline (Radio Equipment Directive) for radio units

- The table contains any components installed according to the European Directive 2014/53/EU. The table shows the affected frequency range and the emitted transmission power for each component.

Component	Frequency range	Transmission power
WMT 110	2.4 GHz (Bluetooth)	≤ 10 mW
WMT 110	2.4 GHz (WLAN)	≤ 100 mW
WMT 110	5 GHz (WLAN)	≤ 100 mW
WMT 115	2.4 GHz (Bluetooth)	≤ 10 mW
WMT 115	2.4 GHz (WLAN)	≤ 100 mW
WMT 115	5 GHz (WLAN)	≤ 100 mW
Transponder reader	13.56 MHz	< 100 mW
Transponder reader (Plus)	125 kHz	≤ 500 mW
Transponder reader (Plus)	13.56 MHz	≤ 500 mW
Telematics box basic 2G EU	2.4 GHz (Bluetooth)	< 20 mW
	900 MHz (2G)	< 2 W
	1800 MHz (2G)	< 1 W
Telematics box basic 3G/2G INT	2.4 GHz (Bluetooth)	< 20 mW
	850/900 MHz (2G)	< 2 W
	1800/1900 MHz (2G)	< 1 W
	800/850/900/1900/2100 MHz (3G)	< 250 mW
Telematics box basic 4G/2G EU	2.4 GHz (Bluetooth)	< 20 mW
	850/900 MHz (2G)	< 2 W
	1800/1900 MHz (2G)	< 1 W
	800/900/1800/2100 MHz (4G)	< 200 mW
Telematics box basic 4G/3G US	2.4 GHz (Bluetooth)	< 20 mW
	800/850/900/1900/2100 MHz (3G)	< 250 mW
	700/850/1700/1900 MHz (4G)	< 200 mW
Telematics box basic 4G/3G AUS	2.4 GHz (Bluetooth)	< 20 mW
	800/850/900/1900/2100 MHz (3G)	< 250 mW
	700/850/900/1800 MHz (4G)	< 200 mW

Component	Frequency range	Transmission power
Telematics box Plus 3G/2G INT	2.4 GHz (WLAN)	< 100 mW
	5 GHz (WLAN)	< 100 mW
	2.4 GHz (Bluetooth)	< 10 mW
	850/900 MHz (2G)	< 2 W
	1800/1900 MHz (2G)	< 1 W
	800/850/900/1900/2100 MHz (3G)	< 250 mW
Telematics box Plus 4G/2G EU	2.4 GHz (Bluetooth)	< 10 mW
	2.4 GHz (WLAN)	< 100 mW
	5 GHz (WLAN)	< 100 mW
	850/900 MHz (2G)	< 2 W
	1800/1900 MHz (2G)	< 1 W
	800/900/1800/2100 MHz (4G)	< 200 mW
Telematics box Plus 4G/3G US	2.4 GHz (Bluetooth)	< 10 mW
	2.4 GHz (WLAN)	< 100 mW
	5 GHz (WLAN)	< 100 mW
	800/850/900/1900/2100 MHz (3G)	< 250 mW
	700/850/1700/1900 MHz (4G)	< 200 mW
Telematics box Plus 4G/3G AUS	2.4 GHz (Bluetooth)	< 10 mW
	2.4 GHz (WLAN)	< 100 mW
	5 GHz (WLAN)	< 100 mW
	800/850/900/1900/2100 MHz (3G)	< 250 mW
	700/850/900/1800 MHz (4G)	< 200 mW

5.8 Electrical Requirements

The manufacturer certifies compliance with the requirements for the design and manufacture of electrical equipment, according to EN 1175 "Industrial Truck Safety - Electrical Requirements", provided the truck is used according to its purpose.

5.9 Power supply of on-board charger (○)

Component	Mains voltage	Mains frequency
ELH on-board charger (○)	230 V (+15 %, -10 %)	50 Hz - 60 Hz (+15 %, -10 %)

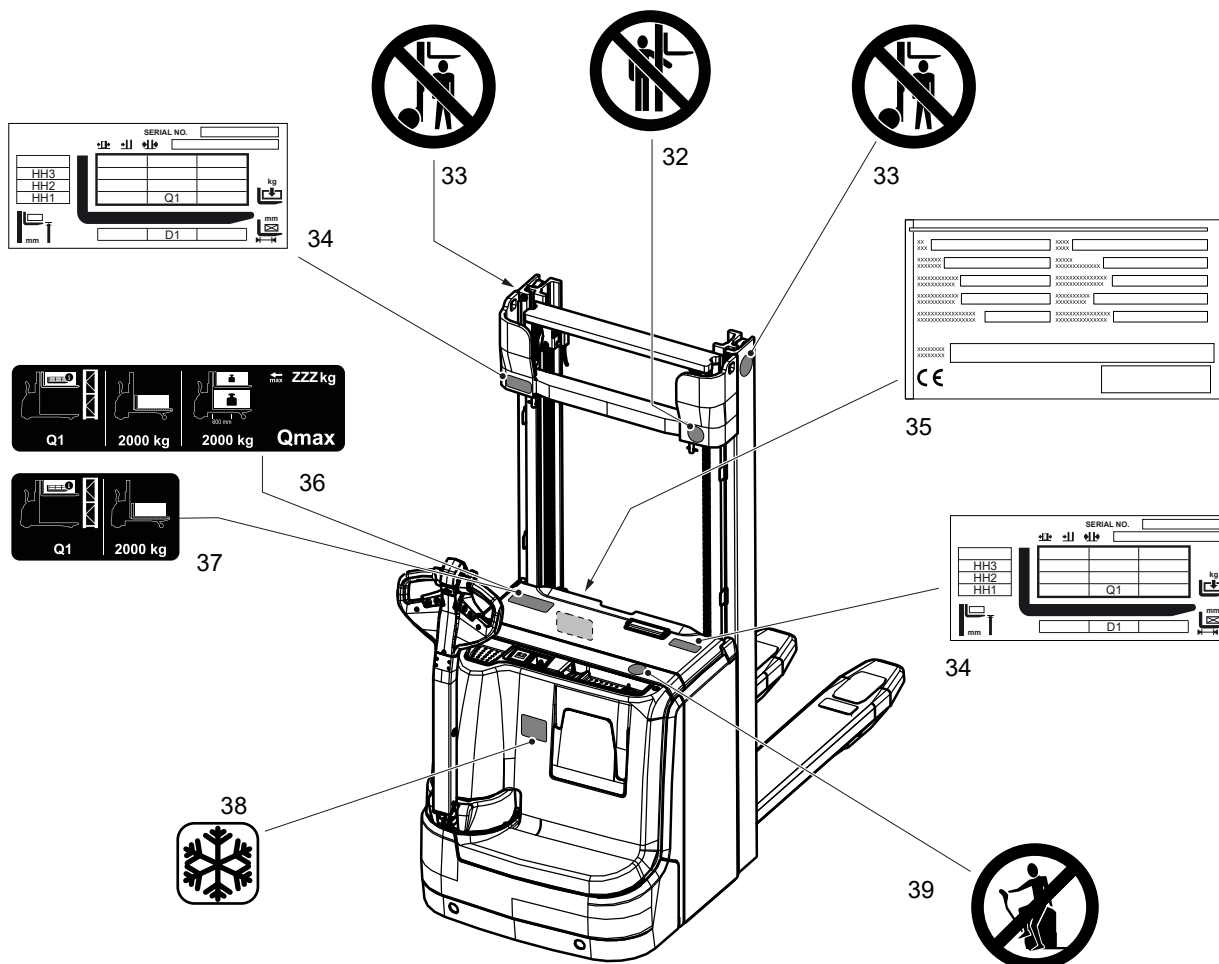
5.10 Safety of trucks

The manufacturer confirms adherence to the requirement for design and manufacture of the truck with regard to the safety requirements specific to intended use in accordance with EN ISO 3691-1.

6 Identification Points and Data Plates

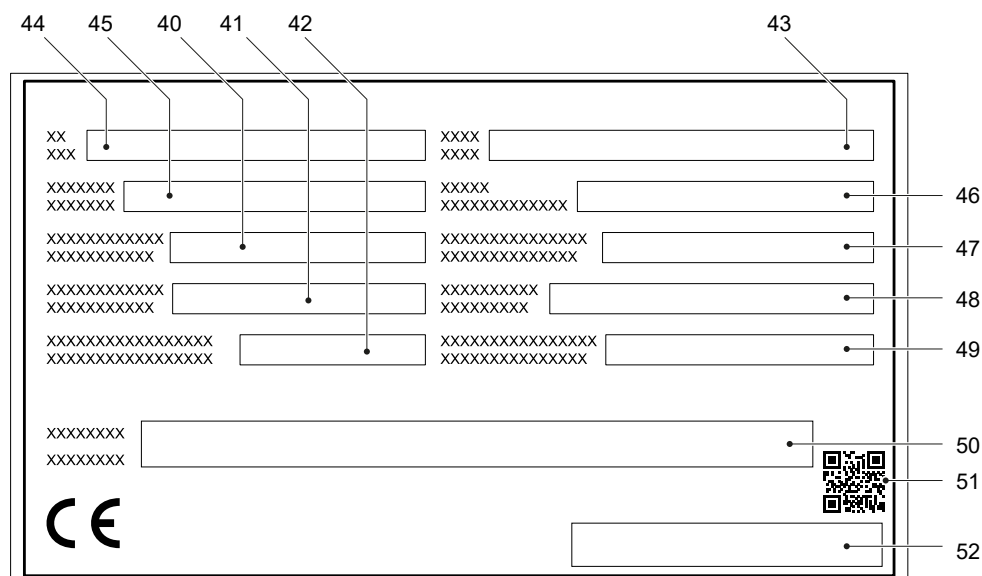
- Warnings and notices such as capacity plates, attachment points and data plates must be legible at all times. Replace if necessary.

6.1 Indication Points



Item		Description
32	●	Prohibition plate: "Do not reach through the mast"
33	●	Prohibition plate: "Do not step under the load handler"
34	●	Truck capacity plate
35	●	Data plate
36	○	Capacity plate for stacking, transport and double-deck operations
37	●	Capacity plate for stacking and transport operations
38	○	"Cold-store equipment" plate
39	●	Prohibition plate: "No passengers"

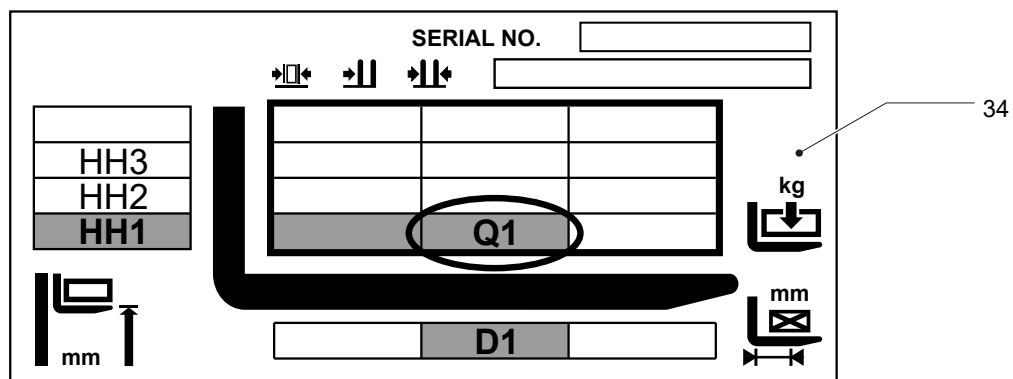
6.2 Data plate



Item	Description	Item	Description
40	Rated capacity (kg)	47	Load centre distance (mm)
41	Battery voltage (V)	48	Output (kW)
42	Net weight without battery (kg)	49	Min./max. battery weight (kg)
43	Option	50	Manufacturer
44	Type	51	QR code
45	Serial number	52	Manufacturer's logo
46	Year of manufacture		

- For queries regarding the truck or when ordering spare parts, always quote the truck serial number (45).
- The illustration shows the standard version for EU member states. The data plate may differ in other countries.
- The battery data plate is described in the relevant section – see page 53.

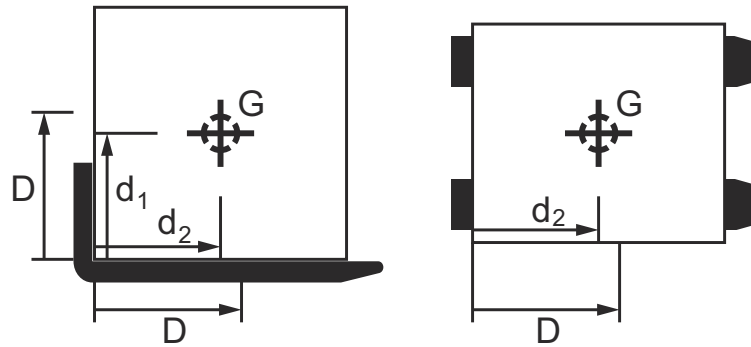
6.3 Capacity plate



The capacity plate (34) indicates the maximum capacity Q (in kg) for a given load centre distance D (in mm) and corresponding lift height H (in mm) for the truck when raising a load.

Example of how to calculate the maximum capacity: The maximum capacity is Q_1 at a load centre G within the load centre distance D_1 and a lift height up to HH_1 .

Load centre distance



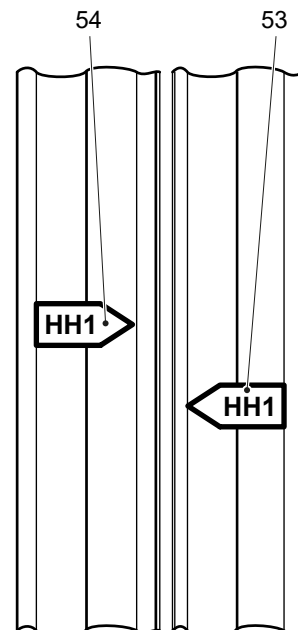
The load centre distance D of the load handler is specified as the horizontal distance from the front face and the vertical distance from the upper edge of the load handler.

- The capacity plate for standard load handlers specifies valid load centre distances of 500 mm, 600 mm and 700 mm.

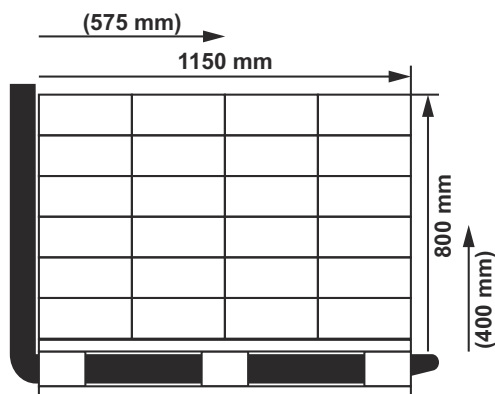
The distances d_1 and d_2 depicted in the illustration between the load handler and the actual centre of gravity G of the load must be smaller or equal to the load centre distance D ($d_1 \leq D$ and $d_2 \leq D$) to avoid the risk of overturning, see page 131.

Lift height limits

The arrow shaped markings on the outer mast (54) and on the inner mast (53) indicate to the operator when the height limits specified on the capacity plate have been exceeded.



6.3.1 Example of Use of Capacity Plate



SERIAL NO.		
3600	850	850
3200	1050	1050
2900	1200	1200
500 600 700		

Example load (palletised):

- several cardboard boxes of the same size and same weight
- Load height: 800 mm
- Load length: 1150 mm
- Distances between the load centre distance and the load handler:
400 mm vertical, 575 mm horizontal

For loads with an even weight distribution, the load centre distance lies in the geometric centre of the volume.

For rectangular loads with an even weight distribution over the entire volume the load centre distance is in the middle, i.e. half the length, half the height and half the width of the load.

Load centre distance of the load handler:

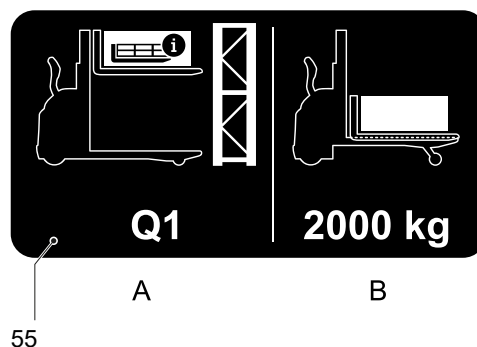
- The capacity plate specifies valid load centre distances for the load handler of 500 mm, 600 mm and 700 mm.
- The second load centre distance suits the example load: At 600 mm it is greater than the distances of 400 mm and 575 mm between the load centre of gravity and the load handler .

Capacities as specified in the capacity plate depending on the lift heights at a load centre distance of 600 mm:

- At a lift height of 2900 mm the maximum capacity is 1200 kg.
- At a lift height of 3200 mm the maximum capacity is 1050 kg.
- At a lift height of 3600 mm the maximum capacity is 850 kg.

6.4 Capacity plate for stacking and transport operation

→ Not for EJC 112z with double-deck function (○)



A	Stacking operations (stacking and retrieving loads): In the mast lift, the rated capacity must be considered according to the lift height, see page 41.
B	Transport operations: Capacity for horizontal transport max. 2000 kg with raised support arms without mast lift.

The stacking and transport operation capacity plate indicates the capacity Q (in kg) of the truck during stacking and transport operation.

→ Do not travel with a raised load (>500 mm).

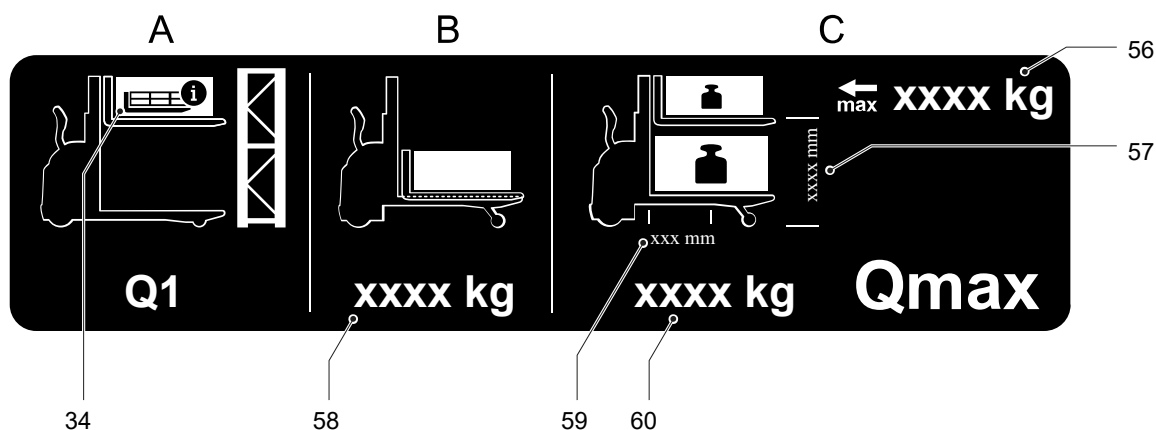
6.5 Capacity plate for stacking, transport and double-deck operation

⚠ CAUTION!

Risk to operational stability

In order not to jeopardize the operational stability, pay attention to the weight when transporting two pallets so that the truck does not tip over.

► In order not to jeopardize the operational stability, the heavier pallet should always be transported underneath.



The capacity plate for stacking, transport and double-deck operations specifies the truck capacity during stacking, transport and double-deck operations.

A	Stacking operations (stacking and retrieving loads) in mast lift – The capacity according to the lift height is specified on the capacity plate (34), see page 41
B	Transport operation in support arm lift – Maximum capacity in support arm lift (58)
C	Double decker mode – Maximum capacity in mast lift (56) – Maximum lift height in mast lift (57) – Maximum combined capacity of mast lift and support arm lift (60) – Load centre distance (59)

→ The maximum lift height in mast lift (57) is specified on the capacity plate as of the beginning of 2022.

C Transport and Commissioning

1 Lifting by crane

WARNING!

All persons involved in loading by crane must be trained

Incorrect crane loading procedures due to untrained personnel can cause the truck to fall. There is a risk of injury to personnel and a risk of material damage to the truck.

- ▶ Loading must only be performed by specialist personnel trained for this purpose. The specialist personnel must be instructed in securing loads on road vehicles and handling load securing devices. In each case correct measurements must be taken and appropriate safety measures applied.

WARNING!

Improper loading by crane can result in accidents

Improper use or use of unsuitable lifting gear can cause the truck to fall when being loaded by crane.

- ▶ Prevent the truck from hitting other objects during lifting, and avoid uncontrolled movements. If necessary, secure the truck with guide ropes.
- ▶ Loading by crane may only be performed by persons who have been trained in the use of the lifting accessories.
- ▶ Wear personal protective equipment (e.g. safety shoes, hard hat, hi-vis jacket, protective gloves) when loading by crane.
- ▶ Do not stand under suspended loads.
- ▶ Do not enter or stand in the hazardous area.
- ▶ Always use lifting gear with sufficient capacity (observed truck weight in accordance with truck data plate – see page 40).
- ▶ Always secure crane lifting gear to the prescribed attachment points and prevent it from slipping.
- ▶ Use the lifting accessories only in the prescribed load direction.
- ▶ Lifting slings should be fastened in such a way that they do not come into contact with any attachments when lifting.

CAUTION!

Lowering of the drive frame when lifting the truck

When lifting the truck, the drive frame can lower in the area of the support arm lift. This can cause the truck to move inadvertently.

- ▶ Raise and set down the truck slowly and carefully.
- ▶ Keep the area around the truck clear.

CAUTION!

Danger of injury from swinging truck

Different battery versions and battery weights can lead to the truck oscillating in a suspended position after being raised.

- ▶ Raise the truck carefully and allow to swing.
- ▶ Keep the hazardous area around the truck clear.

EJC 112z with ZT mast

Loading the truck by crane

Requirements

- Park the truck securely, see page 111.

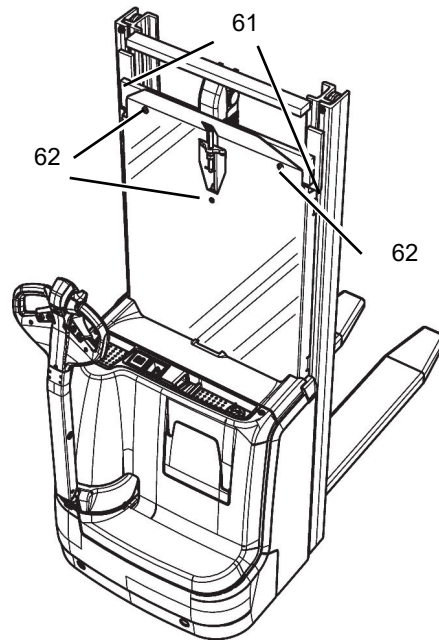
Tools and Material Required

- Lifting gear
- Crane lifting gear
- Spanner

Procedure

- Unscrew the six M 6x12 or M 8x16 bolts (62) and remove the protective screen panel.
- Secure the crane lifting gear to the attachment points (61).

The truck can now be loaded by crane.



Refit the protective screen panel once the truck has been loaded.

EJC 112z with ZZ/DZ mast

Loading the truck by crane

Requirements

- Park the truck securely, see page 111.

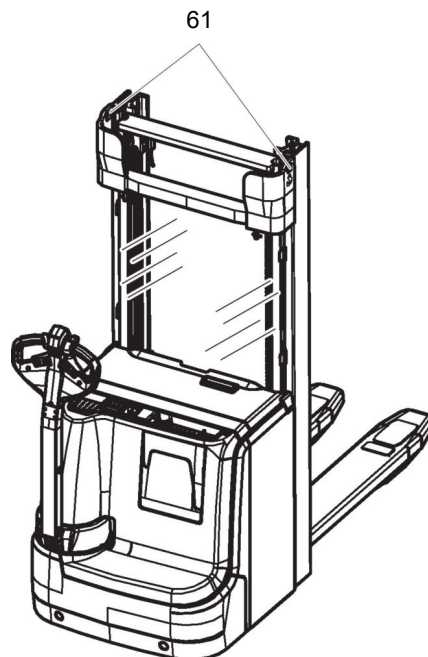
Tools and Material Required

- Lifting gear
- Crane lifting gear

Procedure

- Secure the crane lifting gear to the attachment points (61).

The truck can now be loaded by crane.



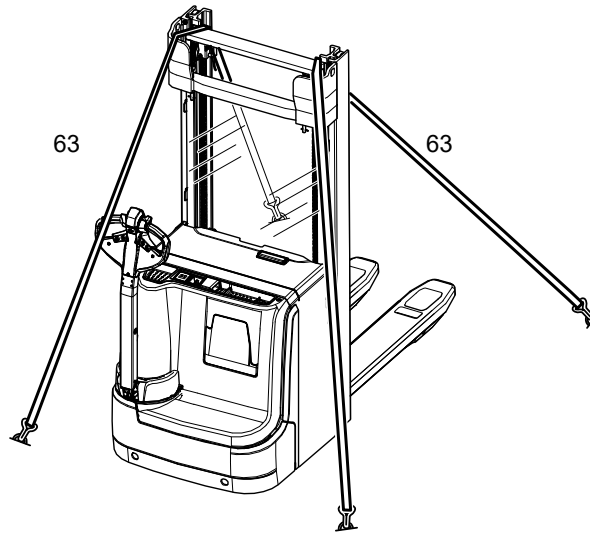
2 Transport

WARNING!

Danger due to uncontrolled movement of the truck or the mast during transport

If the truck and mast are not properly secured during transport, serious accidents can occur. Slipping lashing straps can lead to uncontrolled movements of the truck or mast and even a fall during transport. Accidents caused by this can result in property damage and fatal injuries.

- ▶ Loading must only be performed by specialist personnel trained for this purpose. The specialist personnel must be instructed in securing loads on road vehicles and working with load securing equipment. Correct dimensioning and implementation of load securing measures must be ensured in each individual case.
 - ▶ The truck or mast must be professionally and securely fastened when transported on a lorry or trailer.
 - ▶ The lorry or trailer must be equipped with lashing rings.
 - ▶ Use wedges to prevent the truck from accidentally moving.
 - ▶ Use only lashing straps with sufficient tensile strength. Attach the lashing straps so that they cannot slip.
 - ▶ Use non-slip materials to secure the transport aids (pallet, wedges, etc.), e.g. non-slip mats.
-



Securing the truck for transport

Requirements

- The truck is loaded.
- The truck is parked securely, see page 111.

Tools and Material Required

- Lashing straps

Procedure

- Attach the lashing straps (63) to the industrial truck and the transport vehicle and tension sufficiently.

The truck can now be transported.

3 Using the Truck for the First Time

WARNING!

The use of unsuitable energy sources can be hazardous

Rectified AC current will damage the assemblies (controllers, sensors, motors etc.) of the electronic system.

Unsuitable cable connections (too long, insufficient wire cross-section) to the battery (tow cables) can overheat, setting the truck and battery on fire.

- ▶ The truck must only be operated with battery current.
- ▶ Cable connections to the battery (tow leads) must be less than 6 m long and have a minimum cross-section of 50 mm².

CAUTION!

Poor visibility through the protector

The mast protection pane protector can impair the operator's visibility.

- ▶ Remove the protector (transport retainer) from both sides of the mast protection pane.

NOTICE

Do not lift loads if the truck is operated via a tow lead with an external battery.

NOTICE

Cold store trucks

- ▶ Trucks designed for use in cold stores have a cold store hydraulic oil and a protective frame instead of a mast guard on the mast.
- ▶ If a truck with cold store oil is used outside the cold store, the lowering speeds may increase.

Delivery in several parts

If the truck is delivered in multiple parts, setup and commissioning must only be performed by trained, authorised personnel.

Wheel flattening

If the truck has been parked for a long period, the wheel surfaces may tend to flatten. This flattening has a negative effect on the safety and stability of the truck. Once the truck has covered a certain distance, the flattening will disappear.

Procedure

- Check the equipment is complete.
- If necessary, install the battery, see page 67.
- Charge the battery, see page 59.

The truck can now be started, see page 107.

D Battery - Servicing, Recharging, Replacement

1 Notes on types of battery technology

Lead-acid battery

The truck is fitted with a lead-acid battery as standard.

Integrated modular lithium-ion battery (○)

The truck is optionally fitted with an integrated modular lithium-ion battery. All notes and information concerning lithium-ion batteries can be found in these operating instructions.

Replaceable lithium-ion battery (○)

The truck is optionally fitted with a replaceable lithium-ion battery. In this case, refer to the separate operating instructions for the lithium-ion battery.

2 General safety regulations for batteries

WARNING!

Unsuitable batteries that have not been approved by Jungheinrich for the truck can be hazardous

The design, weight and dimensions of the battery have a considerable effect on the operational safety of the truck, in particular its stability and capacity. The use of unsuitable batteries that have not been approved for the truck by Jungheinrich can lead to a deterioration of the braking characteristics of the truck during energy recovery, causing considerable damage to the electric controller and resulting in serious danger to the health and safety of individuals.

- ▶ Only Jungheinrich-approved batteries may be used on the truck.
 - ▶ Battery equipment may only be replaced with the agreement of Jungheinrich.
 - ▶ When replacing/installing the battery, make sure the battery is securely located in the battery compartment of the truck.
 - ▶ When replacing or installing the battery and placing the battery cable on the battery, make sure that there will be no damage to the battery cable by pinching, squeezing, twisting or rubbing after closing the battery panel.
 - ▶ Do not use batteries that have not been approved by the manufacturer.
-

- Do not physically machine or modify the battery.
- Do not open, damage, penetrate the battery or similar.
- Keep the battery away from radiant sources and strong heat sources.
- Observe the specified charging, operating and storage temperature ranges.

Failure to observe these safety instructions can result in fire.

Maintenance personnel

Batteries may only be charged, serviced or replaced by trained personnel. These operating instructions and the manufacturer's instructions concerning batteries and charging stations must be observed when carrying out the work.

3 Lead-acid batteries

3.1 Safety instructions for handling lead-acid batteries

WARNING!

The gases produced during charging can cause explosions

The battery produces a mixture of nitrogen and hydrogen (electrolytic gas) during charging. Gassing is a chemical process. This gas mixture is highly explosive and must not be ignited.

- ▶ Switch the charging station and truck off first before connecting/disconnecting the charging cable of the battery charging station to/from the battery connector.
- ▶ The charger must be adapted to the battery in terms of voltage and charge capacity.
- ▶ Before charging, check all cables and plug connections for visible signs of damage.
- ▶ Ventilate the room in which the truck is being charged.
- ▶ The battery cover must be open and the battery cell surfaces must be exposed during charging to ensure adequate ventilation.
- ▶ Do not smoke and avoid naked flames when handling batteries.
- ▶ Wherever an industrial truck is parked for charging there shall be no inflammable material or lubricants capable of creating sparks within 2,5 m around the truck.
- ▶ Fire protection equipment must be on hand.
- ▶ Do not lay any metallic objects on battery.
- ▶ It is essential to follow the safety regulations of the battery and charger station manufacturers.

WARNING!

Risk of accidents and injuries when handling acid batteries

Batteries contain dissolved acid, which is toxic and caustic. Above all, avoid any contact with battery acid.

- ▶ Dispose of used battery acid in accordance with regulations.
- ▶ Wear protective clothing and eye protection when working with acid batteries.
- ▶ Do not let battery acid come into contact with skin, clothing or eyes. If necessary, rinse with plenty of clean water.
- ▶ In the event of physical injuries (e.g. skin or eye contact with battery acid), call a doctor immediately.
- ▶ Neutralise spilled battery acid immediately with plenty of water.
- ▶ Use only batteries with a closed battery tray.
- ▶ Follow national guidelines and legislation.

Fire protection measures

WARNING!

Short circuits can result in fire

Damaged cables can cause short circuits, setting the forklift truck and battery on fire.

- ▶ Before closing the battery cover make sure that the battery cables are not damaged.

⚠ CAUTION!

The use of unsuitable fire-protection equipment can result in acid burns

In the event of fire, a reaction with the battery acid can occur if water is used to extinguish the fire. This can lead to acid burns.

- ▶ Use powder extinguishers.
 - ▶ Never extinguish burning batteries with water.
-

Do not smoke and avoid naked flames when handling lead-acid batteries. Wherever an industrial truck is parked for charging, there must be no inflammable material or consumables capable of creating sparks within a minimum distance of 2,5 m from the truck. The room must be ventilated. Fire protection equipment must be on hand.

Battery maintenance

The battery-cell covers must be kept dry and clean. The terminals and cable lugs must be clean, secure and have a light coating of terminal grease.

Battery disposal

Batteries may only be disposed of in accordance with national environmental protection regulations or disposal laws. The manufacturer's disposal instructions must be observed.

Working on the batteries

The truck must be parked securely before all work on the batteries, see page 111.

3.2 Battery types

Depending on the model, the truck will be supplied with different battery types. The following table shows which combinations are included as standard:

Battery type	Capacity (Ah)	Min. weight (kg)	Max. dimensions (mm)
24-volt battery	2 PzB 130	133	652x148.5x560
24-volt battery	2 PzV-BS 142 - wf	133	652x148.5x560
24-volt battery	2 PzVB 134	144	662x148.5x592
24-volt battery	2 PzMB 140	144	662x148.5x592
24-volt battery	2 PzB 150	144	662x148.5x592
24-volt battery	2 PzB 150	144	662x148.5x592
24-volt battery	XFC 158	144	622x148.5x592
24-volt battery	2 PzV - BS 170	176	657x148.5x686
24-volt battery	2 PzB 200	176	657x148.5x686
24-volt battery	2 PzVB 162	166	662x148.5x686
24-volt battery	XFC 177	166	662x148.5x686
24-volt battery	2 PzMB 180	166	662x148.5x686
24-volt battery	2 PzB 200	166	662x148.5x686
24-volt battery	3 PzB 225	200	646x207x583
24-volt battery	XFC 158	238	646x207x686
24-volt battery	3 PzVB 243	238	646x207x686
24-volt battery	3 PzV-BS 255	238	646x207x686
24-volt battery	3 PzMB 270	238	646x207x686
24-volt battery	3 PzB 300	238	646x207x686

The battery weights can be taken from the battery data plate. Batteries with non insulated terminals must be covered with a non slip insulating mat.

3.3 Exposing the battery

⚠ WARNING!

An unsecured truck can cause accidents

Parking the truck on an incline or with a raised load handler is dangerous and is strictly prohibited.

- ▶ Park the truck on a level surface. In special cases the truck may need to be secured with wedges.
- ▶ Fully lower the load handler.
- ▶ Select a place to park where no other people are at risk of injury from the lowered load handler.
- ▶ If the brakes are not working, place wedges underneath the wheels of the truck to prevent it from moving.

⚠ CAUTION!

A closing battery panel can pose a trapping hazard

If the battery cover is not opened fully, it can suddenly close on its own and cause bruising. The battery cover is only properly opened at an angle greater than 90°. It is then held by gravity.

- ▶ Open the battery cover as far as the stop.

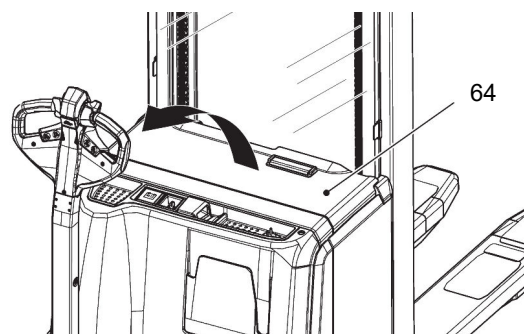
Requirements

- Park the truck on a level surface.
- Park the truck securely, see page 111.

Procedure

- Open the battery panel (64).
- Where necessary remove the insulating mat from the battery.

The battery is now exposed.



3.4 Charging the battery

WARNING!

Risk of electric shock and fire due to insufficient or inappropriate residual current devices

A lack of residual current devices or the use of inappropriate residual current devices can result in fatal injury due to electric shocks or electrical fires in the event of a fault.

- ▶ The owner must conduct an operational risk assessment of the usage location.
- ▶ An RCD switch (residual current device, circuit breaker) of type B or B+ must be used where necessary.

WARNING!

Warning: hazardous electrical voltage!

The charger is an electric component conducting voltages and currents that are hazardous to people.

- ▶ The charger must only be operated by trained technicians.
- ▶ Disconnect the mains supply and the battery connector before carrying out any work on the charger.
- ▶ The charger should only be opened and serviced by trained electricians.

CAUTION!

Trapping hazard

There is a risk of trapping when you close the battery cover.

- ▶ Do not reach between the battery cover and chassis. Hold the battery cover only by the designated recess.
- ▶ Close the battery panel carefully and slowly.

NOTICE

Battery damage

The battery, battery charger (charging characteristic) and battery parameters must match; otherwise, the battery may be damaged during charging.

Simultaneous charging with two battery chargers

Simultaneous charging with two battery chargers (the stationary battery charger and the on-board charger) is not permitted.

Partial charging

Charging can be interrupted on the battery charger and continued as partial charging. The charging process is automatically adapted to the charge status of the battery; see the operating instructions for the battery charger. This keeps battery wear to a minimum.

Trickle charge

The trickle charge starts automatically when charging is complete.

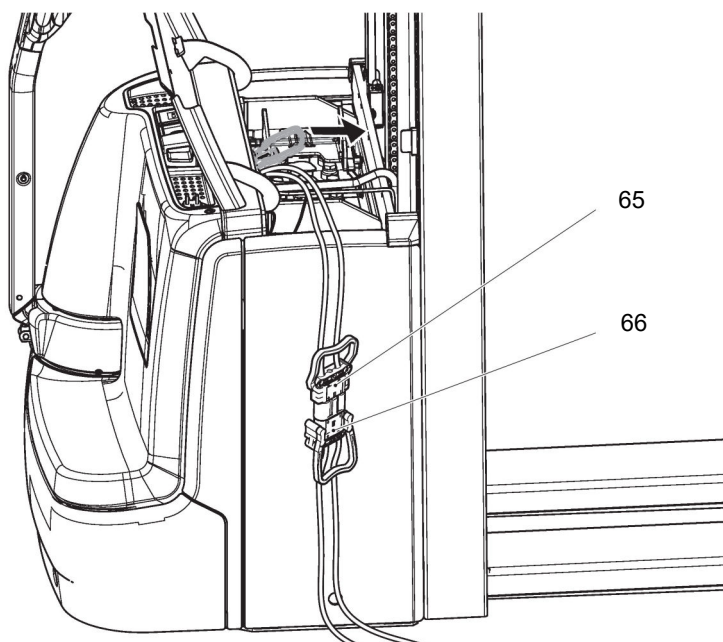
Mains failure

Charging continues automatically after a mains failure.

Charging time

The duration of the charge depends on the battery capacity and charge status.

3.4.1 Charging the battery with a stationary battery charger



Charging the battery

Requirements

- Battery charger operational.
- Battery exposed – see page 58.
- Truck parked securely – see page 111.

Procedure

- Check the battery cable and battery connector on the truck as well as the connector and cable of the stationary battery charger for visible signs of damage before charging.
If damage is identified, mark the affected truck or affected battery charger accordingly and take out of service. Have the truck or battery charger repaired by the manufacturer or by a specialist authorised by the manufacturer.
- Disconnect the battery connector (65) from the truck connector.
- Connect the battery connector (65) to the charger cable (66) of the stationary battery charger.
- Start charging in accordance with the battery charger operating instructions.

The battery is charging.

Ending battery charging

Procedure

- Complete charging in accordance with the battery charger operating instructions.
- Disconnect the battery connector (65) from the battery charger.
- Connect the battery connector(65) to the truck connector.
- If applicable, place the insulating mat back over the battery.
- Securely close the battery panel.

Battery charging is complete.

3.4.2 Charging the battery with an on-board charger

DANGER!

Risk of electric shock and fire

Damaged and unsuitable cables can cause electric shocks and can overheat, resulting in fires.

- ▶ Always use mains cables with a maximum length of 30 m.
Local regulations must be observed.
 - ▶ Unwind the cable reel fully when using it.
 - ▶ Always use original manufacturer's mains cables.
 - ▶ Insulation safety, acid and caustic ratings must comply with the manufacturer's mains lead.
 - ▶ The charging connector must be dry and clean when used.
-

WARNING!

Danger due to damage to the on-board charger or live attachments

Damage to the on-board battery charger or live attachments (mains cable, plug) can cause a short circuit or electric shock.

- ▶ Do not trap the mains cable when closing the battery panel.
 - ▶ Report any defects immediately to your supervisor.
 - ▶ Notify the customer service department.
 - ▶ Mark the defective truck accordingly and take it out of service.
 - ▶ Do not return the truck to service until the fault has been identified and rectified.
-

NOTICE

Material damage due to incorrect use of the on-board charger

- ▶ The on-board charger must not be opened. In the event of faults, contact the manufacturer's customer service department.
 - ▶ The battery charger must only be used for the batteries supplied or other approved batteries provided they have been adapted by the manufacturer's customer service department.
 - ▶ Batteries must never be swapped from truck to truck.
 - ▶ Do not connect the battery to two chargers simultaneously.
-

Immobiliser

WARNING!

Moving of a connected industrial truck with the mains socket switched off

If an industrial truck is being charged at an external mains socket, the automatic immobiliser detects this process and deactivates the truck travel functions. When charging an industrial truck at a mains socket that can be switched off, the industrial truck can start moving when the socket is switched off because the immobiliser detects only live mains sockets. This can cause damage to the electrical building installation as well as electric shocks and electrically induced fires.

- ▶ Before commissioning the truck, disconnect the mains cable from the mains socket and stow away in the designated position on the truck.
 - ▶ If no additional protection measures are taken, the truck must not be charged via the on-board charger using a mains socket that can be switched off.
 - ▶ This warning must be taken into account during the risk analysis performed by the operating company.
-



As long as the mains plug of the on-board charger is connected to the mains, all of the truck's electrical functions are disabled (electrical immobiliser). The truck cannot be operated.

3.4.2.1 Setting the Charging Characteristic (ELH 2415/2425/2435)

NOTICE

- ▶ If parameter 1388 is incorrectly set, the charger will be inhibited and the battery will not charge.
- ▶ With PzS 200-300 Ah wet-cell batteries, both characteristic curve 1 and characteristic curve 2 can be used.
- ▶ If a characteristic curve is set on the ELH 2415 / 2425 that is not supported by the charger, the charge display is lit a steady red.
- ▶ All other characteristic curves (≥ 8) block the charger, and the battery is not charged.

EJC 110 / 112 / 212 with mechanical steering

EJC 212 with electric steering (○) from week 18/2014

The charging characteristics (ELH 2415 / 2425 / 2435) are set via parameter 1388 of the truck software, see page 182.

The CanCode and CanDis option is necessary to set the charging characteristics. Otherwise, the setting may only be performed by the manufacturer's customer service department.

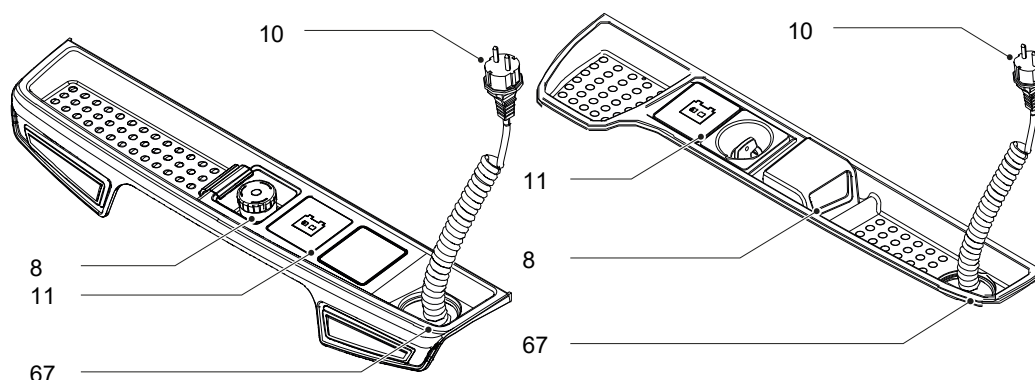
Charging curve parameter assignment (ELH 2415)¹/2425²/2435)

Flashing sequence	Selected charging curves (characteristics)
0	Truck without battery (delivery condition)
1	Wet-cell battery: PzS with 100 - 300 Ah Wet-cell battery: PzM with 100 - 179 Ah
2	Wet cell battery: PzS with pulse characteristic 200 - 400 Ah Wet-cell battery: PzM with pulse characteristic 180 - 400 Ah Wet-cell battery: PzS with pulse characteristic 200 - 414 Ah
3	Maintenance-free: PzV with 100 - 150 Ah
4	Maintenance-free: PzV with 151 - 200 Ah
5	Maintenance-free: PzV with 201 - 300 Ah
6	Maintenance-free: PzV 301 - 330 Ah
7	Cold store
8	XFC temperature ranges 5C - 15C
9	XFC temperature ranges 16C - 29C
10	XFC temperature ranges 30C - 45C
11	Li-ion

3.4.2.2 Charging the battery

Facelift model from 2022 onwards

Model up to 2022



Charging the battery

Requirements

- Truck parked securely – see page 111.
- Battery exposed – see page 53.

Procedure

- Check the cable and mains plug (10) of the on-board charger for visible damage before charging.

If damage is identified, mark the truck accordingly and take it out of service. Have the truck repaired by the manufacturer or by a specialist authorised by the manufacturer.

→ The battery connector remains connected to the truck connector.

- Plug the mains connector (10) into a mains socket.

The battery is being charged. The charge status indicator (11) displays the charge status or a fault – see page 104.

→ On trucks with a display unit, the charge status of the battery is shown on the display unit – see page 150.

For this purpose, the emergency disconnect switch (8) must be released so that the display unit is supplied with voltage – see page 118.

Ending battery charging

Procedure

- Remove the mains plug (10) from the mains socket and store it fully along with the mains cable in the storage compartment (67).
- If applicable, place the insulating mat back over the battery.
- Securely close the battery panel.

Battery charging is complete.

Charging times

The duration of charge depends on the battery capacity.



Charging continues automatically after a mains failure. Charging can be interrupted by removing the mains connector and continued as partial charging.

Partial charging

Charging can be interrupted on the battery charger and continued as partial charging. The charging process is automatically adapted to the charge status of the battery; see the operating instructions for the battery charger. This keeps battery wear to a minimum.

Trickle charge

The trickle charge starts automatically when charging is complete.

3.5 Removing or installing the battery

WARNING!

Accident risk during battery removal and installation

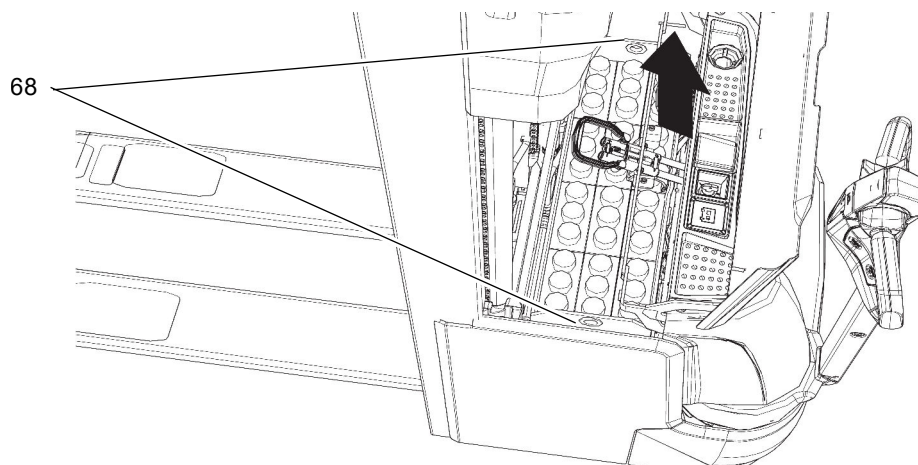
Due to the battery weight and acid there is a risk of trapping or scalding when the battery is removed and installed.

- ▶ Note the safety regulations governing the handling of lead-acid batteries, see page 55.
 - ▶ Wear safety shoes when removing and installing the battery.
 - ▶ Use only batteries with insulated cells and terminal connectors.
 - ▶ Park the truck on a level surface to prevent the battery from sliding out.
 - ▶ Make sure the crane lifting gear has sufficient capacity to replace the battery.
 - ▶ Use only approved battery replacement devices (battery roller stand, replacement trolley etc.).
 - ▶ Make sure the battery is located securely in the truck's battery compartment.
-



After each replacement, check that the battery is properly secured by the battery lock.

3.5.1 Changing the battery from the top



Removing the battery

Requirements

- Truck parked securely – see page 111.
- Battery exposed – see page 58.

Tools and Material Required

- Crane lifting gear

Procedure

- Disconnect the battery connector from the truck connector.
- ➔ Place the battery cable on the battery tray so that it cannot be severed when the battery is extracted.
- Attach the crane lifting gear to the eyelets (68).
- ➔ The hooks must be fitted in such a way that they do not fall onto the battery cells when the crane lifting gear is slackened. The crane lifting gear must exert a vertical pull so that the battery tray is not compressed.
- Slowly pull the battery up out of the battery tray with the crane lifting gear.

The battery is now removed.

Installing the battery

Requirements

- Truck parked securely – see page 111.

Procedure

- ➔ Installation is in the reverse order. When reinstalling the batteries, make sure they are installed in the correct position and properly connected.
- ➔ Place the battery cable on the tray so that it cannot be severed when the battery is inserted.
 - Attach the battery connector to the truck connector.
 - Close the battery panel.

The battery is now installed.

- ➔ After installing the battery again, check all cables and plug connections for visible signs of damage.

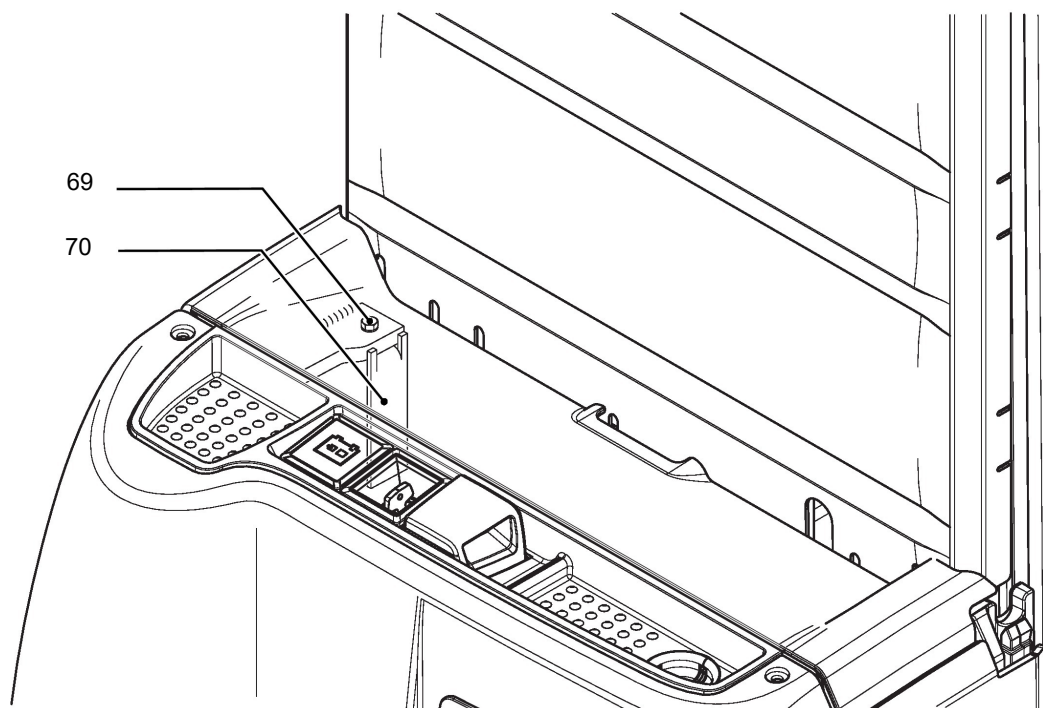
3.5.2 Battery Stop for S Battery Compartment

⚠ CAUTION!

Battery stop

Removing the battery stop can result in trapping and injury. The battery must only be placed on the right-hand side of the truck. The battery stop on the left-hand side serves to prevent the battery from sliding.

- The battery stop on the left-hand side of the truck must not be removed if the battery has a length below 655 mm.



Installing the battery stop

Requirements

- S battery compartment
- Park the truck securely, see page 111.
- Remove the battery, see page 68

Procedure

- Screw on the battery stop (70) with 23 Nm (69).

➞ If the battery is longer than 655 mm, the battery stop (70) can be removed.

- Install the battery, see page 68

The battery stop is now installed.

4 Replaceable Lithium-Ion Battery

The separate operating instructions for the lithium-ion battery contain information on operation and important safety instructions.

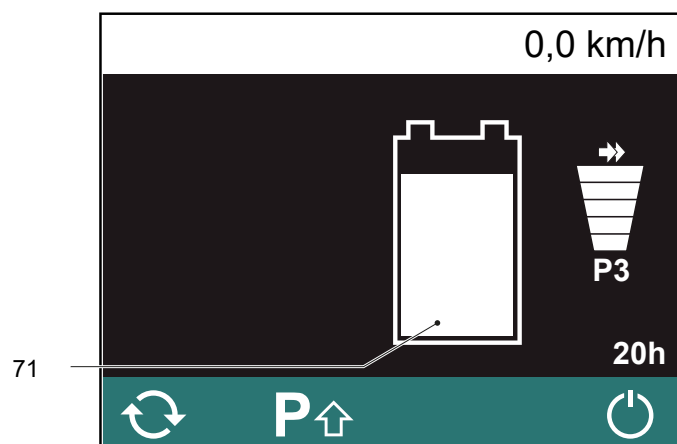
4.1 Battery types

Depending on the version, the truck is equipped with different battery types. The following tables show which combinations are intended as standard, indicating the capacity.

The battery weights can be taken from the battery data plate. Batteries with non insulated terminals must be covered with a non slip insulating mat.

Battery type	Capacity (Ah)	Min. weight	Max. dimensions
24 volt battery Lithium-ion	260	273 kg	624 x 284 x 628 mm
24 volt battery Lithium-ion	390	273 kg	624 x 284 x 628 mm

4.2 Battery charge status



The charge status of the lithium ion battery is shown on the display of the display unit (71). The display of the display unit also indicates important information on the operating condition of the lithium-ion battery as required (e.g. low charge status, excessively high or low temperature) – see page 150.

Cut-out depending on the charge status

Depending on the charge status of the lithium-ion battery, the truck may initiate lift cut-off or travel cut-off:

- Lift cut-off:
The lift cut-off prevents the load handler from lifting.
Lowering of the load handler is still available.
- Travel cut-off:
The travel cut-off locks the travel functions or reduces the truck travel speed.

Deeply discharged batteries

No charging takes place if the battery is deeply discharged. Deeply discharged batteries cannot be charged by the operator (faulty).

- Contact the manufacturer's customer service department.

4.3 Exposing the battery

- Do not expose the lithium-ion battery for charging.

4.4 Removing or installing the battery

The procedure for removing a replaceable lithium-ion battery is analogous to that for removing a lead-acid battery – see page 72.

4.5 Charging the battery

WARNING!

Risk of electric shock and fire due to insufficient or inappropriate residual current devices

A lack of residual current devices or the use of inappropriate residual current devices can result in fatal injury due to electric shocks or electrical fires in the event of a fault.

- ▶ The owner must conduct an operational risk assessment of the usage location.
- ▶ An RCD switch (residual current device, circuit breaker) of type B or B+ must be used where necessary.

WARNING!

Warning: hazardous electrical voltage!

The charger is an electric component conducting voltages and currents that are hazardous to people.

- ▶ The charger must only be operated by trained technicians.
- ▶ Disconnect the mains supply and the battery connector before carrying out any work on the charger.
- ▶ The charger should only be opened and serviced by trained electricians.

WARNING!

Risk of accidents and injuries when handling lithium-ion batteries

Improper use can result in overheating, fire or explosion.

- ▶ Do not expose the lithium-ion battery during charging.
- ▶ Do not use the lithium ion battery cable connected to the truck for charging.
- ▶ Do not place any metallic objects on the lithium-ion battery.

WARNING!

Danger of overheating when charging with an unsuitable battery charger

The use of an unsuitable charger can cause the battery to overheat.

- ▶ Only charge the lithium-ion battery with a battery charger specially designed for this battery. Observe the operating instructions and operating conditions for the battery charger.

NOTICE

Battery damage

The battery, battery charger (charging characteristic) and battery parameters must match; otherwise, the battery may be damaged during charging.

Intermediate charging

NOTICE

Intermediate charging

A lithium-ion battery that is not fully discharged can be recharged at any time either in part or in full. In order to ensure the reliable operation of the lithium-ion battery, the following must be borne in mind:

- ▶ In the event of frequent intermediate charging, charge the lithium-ion battery fully every 4 weeks. If the battery charger has a “balancing” function, ensure that the balancing phase is completed at the end of charging. Further information on “balancing” can be found in the operating instructions for the battery charger.
- ▶ Turn off the battery charger before disconnecting the lithium-ion battery from the battery charger.

The lithium-ion battery can be partially charged (compensation charging) each time there is a break in use, without limiting its service life.

Simultaneous charging with two battery chargers

Simultaneous charging with two battery chargers (the stationary battery charger and the on-board charger) is not permitted.

Activating the lithium-ion battery

If the lithium-ion battery is not used for several hours, it switches to energy-saving mode to protect against deep discharge.

The lithium-ion battery can be reactivated by connecting it to the stationary battery charger, see page 75.

Partial charging

Charging can be interrupted on the battery charger and continued as partial charging. The charging process is automatically adapted to the charge status of the battery; see the operating instructions for the battery charger. This keeps battery wear to a minimum.

Trickle charge

A fully charged lithium-ion battery can be connected to the battery charger for automatic trickle charging.

In the event of an extended period out of use, it is recommended that the trickle charge function of the battery charger be used in order to maintain the available capacity of the battery.

Mains failure

Charging continues automatically after a mains failure.

Charging time

The duration of the charge depends on the battery capacity and charge status.

4.5.1 Charging the battery with a stationary battery charger

➞ See the separate operating instructions for the lithium-ion battery.

4.5.2 Charging the battery with an on-board charger

⚠ DANGER!

Risk of electric shock and fire

Damaged and unsuitable cables can cause electric shocks and can overheat, resulting in fires.

- ▶ Always use mains cables with a maximum length of 30 m.
Local regulations must be observed.
 - ▶ Unwind the cable reel fully when using it.
 - ▶ Always use original manufacturer's mains cables.
 - ▶ Insulation safety, acid and caustic ratings must comply with the manufacturer's mains lead.
 - ▶ The charging connector must be dry and clean when used.
-

⚠ WARNING!

Danger due to damage to the on-board charger or live attachments

Damage to the on-board battery charger or live attachments (mains cable, plug) can cause a short circuit or electric shock.

- ▶ Do not trap the mains cable when closing the battery panel.
 - ▶ Report any defects immediately to your supervisor.
 - ▶ Notify the customer service department.
 - ▶ Mark the defective truck accordingly and take it out of service.
 - ▶ Do not return the truck to service until the fault has been identified and rectified.
-

NOTICE

Material damage due to incorrect use of the on-board charger

- ▶ The on-board charger must not be opened. In the event of faults, contact the manufacturer's customer service department.
 - ▶ The battery charger must only be used for the batteries supplied or other approved batteries provided they have been adapted by the manufacturer's customer service department.
 - ▶ Batteries must never be swapped from truck to truck.
 - ▶ Do not connect the battery to two chargers simultaneously.
-

WARNING!

Moving of a connected industrial truck with the mains socket switched off

If an industrial truck is being charged at an external mains socket, the automatic immobiliser detects this process and deactivates the truck travel functions. When charging an industrial truck at a mains socket that can be switched off, the industrial truck can start moving when the socket is switched off because the immobiliser detects only live mains sockets. This can cause damage to the electrical building installation as well as electric shocks and electrically induced fires.

- ▶ Before commissioning the truck, disconnect the mains cable from the mains socket and stow away in the designated position on the truck.
 - ▶ If no additional protection measures are taken, the truck must not be charged via the on-board charger using a mains socket that can be switched off.
 - ▶ This warning must be taken into account during the risk analysis performed by the operating company.
-



As long as the mains plug of the on-board charger is connected to the mains, all of the truck's electrical functions are disabled (electrical immobiliser). The truck cannot be operated.

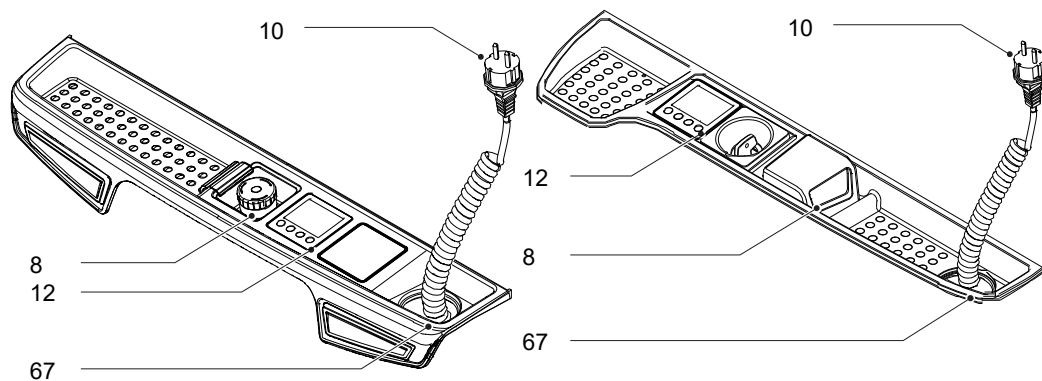
Setting the charging characteristic

The charging characteristic is set via parameters from the truck software.

The setting is made at the factory or by the manufacturer's customer service department.

Facelift model from 2022 onwards

Model up to 2022



Charging the battery

Requirements

- Truck parked securely – see page 111.

Procedure

- Check the cable and mains plug (10) of the on-board charger for visible damage before charging.

If damage is identified, mark the truck accordingly and take it out of service. Have the truck repaired by the manufacturer or by a specialist authorised by the manufacturer.

- Plug the mains connector (10) into a mains socket.
- If the charge status is to be displayed on the truck:
 - Unlock the emergency disconnect switch (8) – see page 118.

The display unit displays the charge status or a fault – see page 150.

The battery is being charged.



Trucks with a lithium-ion battery have a display unit with display as standard – see page 150.

Ending battery charging

Procedure

- Remove the mains plug (10) from the mains socket and store it fully along with the mains cable in the storage compartment (67).
- If applicable, place the insulating mat back over the battery.
- Securely close the battery panel.

Battery charging is complete.

5 Integrated Modular Lithium-Ion Battery

Model variants

- Lithium-ion batteries are available only as of the Facelift model from 2022 onwards.

General information

The truck is optionally fitted with an integrated modular lithium-ion battery. All notes and information concerning lithium-ion batteries can be found in these operating instructions.

The Jungheinrich lithium-ion batteries are maintenance-free batteries with rechargeable high-performance energy cells. The batteries' daily operating time can be extended through intermediate charges.

Battery management system

The lithium-ion battery is continually monitored by the battery management system. The battery management system checks such things as the cell temperature, the voltage and the charge status of the cells, as well as enabling charge and discharge processes.

Faults or messages warning of approaching critical values are displayed, and the truck is switched off if necessary.

The battery management system is attached to the truck via an interface connector.

- The battery management system data can be checked by the manufacturer's customer service department.

5.1 Safety regulations for handling lithium-ion batteries

5.1.1 Correct application

WARNING!

Do not open the battery!

If external influences (e.g. force, fire, flooding) cause unusual conditions or situations, the following instructions must be observed:

- The battery cells inside the lithium-ion battery contain substances that can be flammable if they come into contact with oxygen or water.
- The substances can escape if the battery cells are exposed to high pressure, an external fire or are mechanically damaged by force.
- The amount of these substances is so small that caution is only required in the immediate vicinity of the battery.

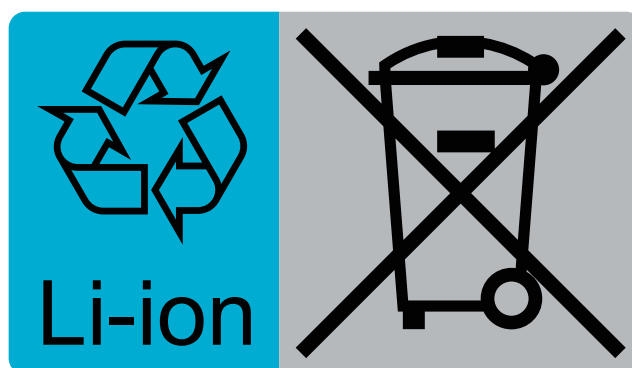
WARNING!

Hazard from liquid or gaseous contents from the battery

In the event of a technical defect or mechanical damage to the lithium-ion battery, as well as an overheated lithium-ion battery, electrolyte fluid can escape in liquid or gaseous form. Electrolyte fluid is hazardous to health. If the electrolyte fluid comes into contact with the skin or eyes, this can result in chemical burns and visual impairment. Inhaling the contents of electrolyte fluid can lead to respiratory illness.

- ▶ Wear personal protective equipment (e.g. safety gloves, safety shoes, respirator mask).
 - ▶ In the case of contact with the skin or eyes, rinse the affected areas with plenty of water and seek medical assistance immediately.
 - ▶ If the contents leak out, do not inhale the fumes.
 - ▶ If contents have been inhaled, seek medical assistance immediately. The affected person should also be taken to the fresh air.
 - ▶ Cordon off the affected area.
 - ▶ Ensure there is adequate ventilation.
 - ▶ Remain upwind of the area.
 - ▶ Keep persons away.
-

5.1.2 Disposal



Used lithium-ion batteries are recyclable commodities. As part of a resource-efficient approach, where possible, lithium-ion batteries should undergo reuse, preparation for reuse, preparation for repurposing, repurposing, or reprocessing.

Lithium-ion batteries are classified as waste requiring special monitoring for recycling. Marked with the recycling symbol and the crossed-out wheeled bin, lithium-ion batteries must not be disposed of with household waste.

Buy back or recycling must be ensured, e.g. in accordance with Battery Directive (EU) 2023/1542 . Buy-back terms and the manner of recycling must be agreed with the manufacturer.



Instructions for disposal

To ensure proper treatment and recycling, the owner is legally obliged to dispose of lithium-ion batteries separately from other waste.

- ▶ Lithium-ion batteries must be disposed of in compliance with applicable national environmental protection regulations or disposal laws.
 - ▶ For disposal of lithium-ion batteries, contact the manufacturer's customer service department, a customer service department authorised by the manufacturer or an approved certified recycling company.
-

5.1.3 Shipping information

The Jungheinrich lithium-ion battery is a hazardous material. The applicable ADR regulations must be observed during transport.



ADR = Accord européen relatif au transport international des marchandises Dangereuses par Route.



If in doubt, contact the manufacturer's customer service department.

A modular lithium-ion battery integrated into the truck can be transported with the truck without special precautions.

5.1.4 Battery lifetime and maintenance

NOTICE

Damage to the lithium-ion battery due to discharge

If the lithium-ion battery is not used for a long period of time, it can become damaged through discharge.

- ▶ Fully charge the battery before extended downtimes.
 - ▶ To ensure a long service life of the lithium-ion battery, it must be fully charged every 4 weeks when not in use.
-

Maintenance

The lithium-ion battery is wear-free.

The components are maintenance-free, and therefore no maintenance intervals are defined for this battery.

The battery is continually monitored by the battery management system.

5.1.5 Dangers and information relating to fire in the vicinity of the lithium-ion battery

Fire-fighting measures may only be carried out on a burning lithium-ion battery by trained and specially equipped fire-fighting personnel (e.g. by a member of the fire brigade).

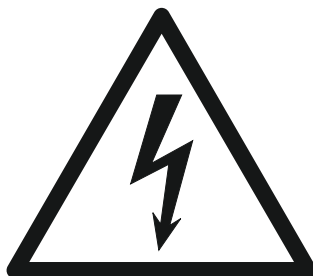
5.1.6 Touch voltage hazard

⚠ WARNING!

Touch voltage hazard

Hazardous touch voltages may occur in the event of a technical or mechanical defect on the battery. Touch voltages also occur on seemingly discharged batteries. Touching the battery terminals or live attachments (battery cable, battery connector etc.) can result in dangerous current flows through the body. There is a risk of serious, irreversible or fatal injuries.

- ▶ Tag out the faulty battery and take out of service.
 - ▶ Do not touch faulty batteries.
 - ▶ Do not place any objects or tools on the lithium-ion battery to avoid short-circuiting the battery.
 - ▶ Do not short-circuit the lithium-ion battery.
 - ▶ Notify the customer service department.
-



With this kind of defect the battery must not be touched and must not come into contact with metal objects see page 79.

5.2 Lithium-ion battery data plate

Lithium Ion Secondary Battery/Lithium-Ionen-Sekundärbatterie 72

Type Typ	73	Month / Year Monat / Jahr	74
Serial No. Serial-Nr.	75	Supplier No. Lieferanten-Nr.	76

Capacity Kapazität	77	Nominal Voltage Nennspannung	78
Nominal Energy Nennenergie	79	Battery No. Batterie-Nr.	80

Battery Service Weight $\pm 5\%$
Batteriebetriebsgewicht $\pm 5\%$ 81

Designation
Bezeichnung 82

Manufacturer
Hersteller 84


83


85







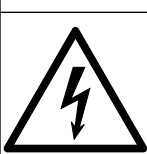
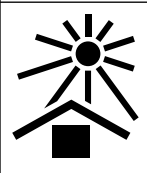





86
87
88

Item	Designation
72	Lithium-ion secondary battery
73	Battery type
74	Production (year/month)
75	Serial number
76	Supplier number
77	Rated capacity in ampere-hours [Ah]
78	Rated voltage in volts [V]
79	Rated energy (C5) in watt-hours [Wh] – Calculation of the rated energy (C5): rated capacity C5 multiplied by the rated voltage
80	Battery material number
81	Battery weight in kilogrammes [kg] – Tolerance range: $\pm 5\%$
82	Designation
83	QR code
84	Manufacturer
85	Manufacturer's logo
86	CE mark (<i>Conformité Européenne</i>)
88	Safety and warning information – see page 84

5.2.1 Safety and warning information

	Avoid fire and short-circuits due to overheating – Do not ignite or position open flames, glowing embers or sparks near the lithium-ion battery. – Keep batteries away from strong heat sources.
	Hot surfaces – Battery cells can generate very high short-circuit currents, causing them to become hot.
	Hazardous electrical voltage – The metal parts of the battery cells are permanently live. Therefore, do not place any foreign objects or tools on the battery. – Observe the accident prevention regulations and DIN EN 62485-3.
	Observe the operating instructions – The operating instructions must be clearly visible at the charging location. – If any faults are identified on the battery, the battery must no longer be used. Immediately tag out the faulty battery and take it out of service. Contact the manufacturer's customer service department. – Do not attempt to rectify faults independently. – Do not open the battery.
	Protect the battery against heat and solar radiation.

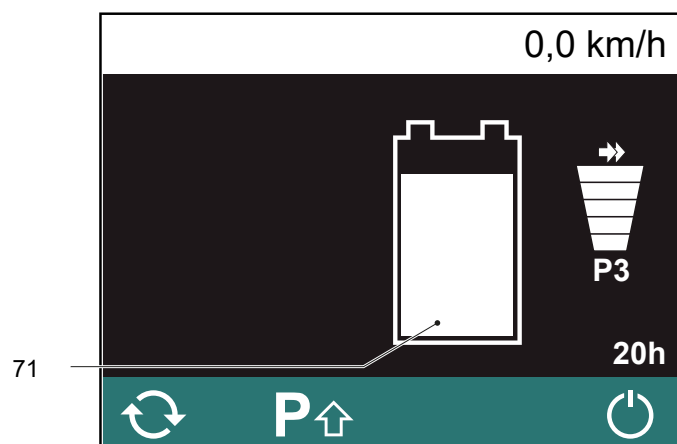
5.3 Battery types

Depending on the version, the truck is equipped with different battery types. The following table shows the different battery types.

Nominal battery data		
Product	Lithium-ion battery 130/260/390 Ah	
Nominal voltage	25.6 V (3.2 V x 8 cells)	
Number of cells	130 Ah	8 (1 unit with 8 cells)
	260 Ah	16 (2 units each with 8 cells)
Electro-chemical system	Lithium ion, LiFeP04 cathode	

Battery type	Nominal voltage	Capacity	Battery weight
Lithium-ion battery	25.6 V	130 Ah	60 kg
Lithium-ion battery	25.6 V	260 Ah	110 kg

5.4 Battery charge status



The charge status of the lithium ion battery is shown on the display of the display unit (71). The display of the display unit also indicates important information on the operating condition of the lithium-ion battery as required (e.g. low charge status, excessively high or low temperature) – see page 150.

Cut-out depending on the charge status

Depending on the charge status of the lithium-ion battery, the truck may initiate lift cut-off or travel cut-off:

- Lift cut-off:
The lift cut-off prevents the load handler from lifting.
Lowering of the load handler is still available.
- Travel cut-off:
The travel cut-off locks the travel functions or reduces the truck travel speed.

Deeply discharged batteries

No charging takes place if the battery is deeply discharged. Deeply discharged batteries cannot be charged by the operator (faulty).

→ Contact the manufacturer's customer service department.

5.5 Exposing the battery

Trucks with comfort charging socket (○):

Do not expose the lithium-ion battery for charging.

Trucks without comfort charging socket (○):

The procedure for exposing the battery is analogous to that for exposing a lead-acid battery – see page 58.

5.6 Removing or installing the battery

→ The lithium-ion battery is permanently installed. Removal and installation are not foreseen in normal operation.

5.7 Charging the battery

WARNING!

Risk of electric shock and fire due to insufficient or inappropriate residual current devices

A lack of residual current devices or the use of inappropriate residual current devices can result in fatal injury due to electric shocks or electrical fires in the event of a fault.

- ▶ The owner must conduct an operational risk assessment of the usage location.
- ▶ An RCD switch (residual current device, circuit breaker) of type B or B+ must be used where necessary.

WARNING!

Warning: hazardous electrical voltage!

The charger is an electric component conducting voltages and currents that are hazardous to people.

- ▶ The charger must only be operated by trained technicians.
- ▶ Disconnect the mains supply and the battery connector before carrying out any work on the charger.
- ▶ The charger should only be opened and serviced by trained electricians.

WARNING!

Risk of accidents and injuries when handling lithium-ion batteries

Improper use can result in overheating, fire or explosion.

- ▶ Do not expose the lithium-ion battery during charging.
- ▶ Do not use the lithium ion battery cable connected to the truck for charging.
- ▶ Do not place any metallic objects on the lithium-ion battery.

WARNING!

Danger of overheating when charging with an unsuitable battery charger

The use of an unsuitable charger can cause the battery to overheat.

- ▶ Only charge the lithium-ion battery with a battery charger specially designed for this battery. Observe the operating instructions and operating conditions for the battery charger.

NOTICE

Battery damage

The battery, battery charger (charging characteristic) and battery parameters must match; otherwise, the battery may be damaged during charging.

Intermediate charging

NOTICE

Intermediate charging

A lithium-ion battery that is not fully discharged can be recharged at any time either in part or in full. In order to ensure the reliable operation of the lithium-ion battery, the following must be borne in mind:

- ▶ In the event of frequent intermediate charging, charge the lithium-ion battery fully every 4 weeks. If the battery charger has a “balancing” function, ensure that the balancing phase is completed at the end of charging. Further information on “balancing” can be found in the operating instructions for the battery charger.
- ▶ Turn off the battery charger before disconnecting the lithium-ion battery from the battery charger.

The lithium-ion battery can be partially charged (compensation charging) each time there is a break in use, without limiting its service life.

Simultaneous charging with two battery chargers

Simultaneous charging with two battery chargers (the stationary battery charger and the on-board charger) is not permitted.

Activating the lithium-ion battery

If the lithium-ion battery is not used for several hours, it switches to energy-saving mode to protect against deep discharge.

The lithium-ion battery can be reactivated by connecting it to the stationary battery charger, see page 89.

Partial charging

Charging can be interrupted on the battery charger and continued as partial charging. The charging process is automatically adapted to the charge status of the battery; see the operating instructions for the battery charger. This keeps battery wear to a minimum.

Trickle charge

A fully charged lithium-ion battery can be connected to the battery charger for automatic trickle charging.

In the event of an extended period out of use, it is recommended that the trickle charge function of the battery charger be used in order to maintain the available capacity of the battery.

Mains failure

Charging continues automatically after a mains failure.

Charging time

The duration of the charge depends on the battery capacity and charge status.

5.7.1 Charging the battery with a stationary battery charger

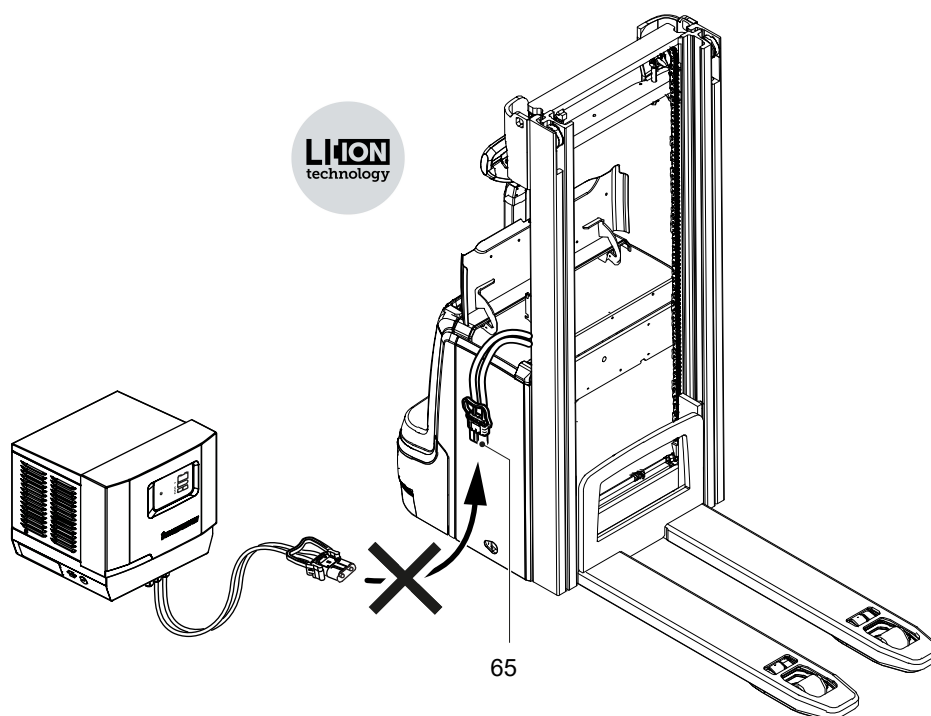
Incorrect charging

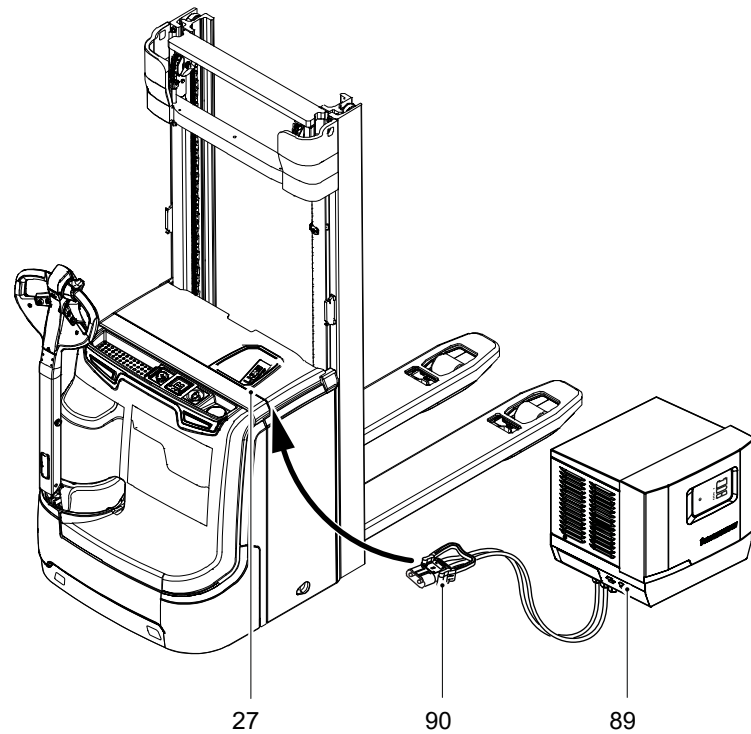
NOTICE

Damage to the lithium-ion battery due to incorrect charging

If a lithium-ion battery is charged directly via the battery connector (65) rather than via the comfort charging socket (27), the battery may be damaged.

- ▶ Never connect an external battery charger directly to the battery connector (65) of the lithium-ion battery.
- ▶ Always connect an external lithium-ion battery charger to the comfort charging socket (27) if the battery or truck has one.





Charging the battery

Requirements

- Battery charger operational.
- Truck parked securely – see page 111.

Procedure

- Check the cable and charge connector (90) of the battery charger (89) for visible damage before charging.

If damage is identified, mark the affected battery charger accordingly and take out of service. Have the battery charger repaired by the manufacturer or by a specialist authorised by the manufacturer.

- Insert the charge connector of the battery charger (90) into the comfort charging socket (27) on the truck.
- Start charging in accordance with the battery charger operating instructions.
- If the charge status is to be displayed on the truck:
 - Unlock the emergency disconnect switch (8) – see page 118.
 The display unit displays the charge status or a fault – see page 150.

The battery is charging.

- ➔ Trucks with comfort charging socket (○) shown. For trucks without a comfort charging socket, the lithium-ion battery must first be exposed to gain access to the charging socket – see page 86.
- ➔ Trucks with a lithium-ion battery have a display unit with display as standard – see page 150.
- ➔ While the charge connector of the stationary charger is connected to the truck, the electrical functions of the truck are disabled (electric immobiliser). The truck cannot be operated in this case.

Ending battery charging

WARNING!

There is a danger of sparks if charging is improperly interrupted

Owing to the high charge currents, there is a risk of spark discharge if the charge connector is removed while charging is active. There is a risk of injury and of damage to the electrical contacts.

- ▶ Stop charging on the battery charger before removing the charge connector.
 - ▶ Do not disconnect the mains cable or charge connector of the battery charger while charging (under load).
-

Procedure

- Complete charging in accordance with the battery charger operating instructions.
- Remove the charge connector of the battery charger (90) from the comfort charging socket (27) on the truck.

Battery charging is complete.

5.7.2 Charging the battery with an on-board charger

DANGER!

Risk of electric shock and fire

Damaged and unsuitable cables can cause electric shocks and can overheat, resulting in fires.

- ▶ Always use mains cables with a maximum length of 30 m.
Local regulations must be observed.
 - ▶ Unwind the cable reel fully when using it.
 - ▶ Always use original manufacturer's mains cables.
 - ▶ Insulation safety, acid and caustic ratings must comply with the manufacturer's mains lead.
 - ▶ The charging connector must be dry and clean when used.
-

WARNING!

Danger due to damage to the on-board charger or live attachments

Damage to the on-board battery charger or live attachments (mains cable, plug) can cause a short circuit or electric shock.

- ▶ Do not trap the mains cable when closing the battery panel.
 - ▶ Report any defects immediately to your supervisor.
 - ▶ Notify the customer service department.
 - ▶ Mark the defective truck accordingly and take it out of service.
 - ▶ Do not return the truck to service until the fault has been identified and rectified.
-

NOTICE

Material damage due to incorrect use of the on-board charger

- ▶ The on-board charger must not be opened. In the event of faults, contact the manufacturer's customer service department.
 - ▶ The battery charger must only be used for the batteries supplied or other approved batteries provided they have been adapted by the manufacturer's customer service department.
 - ▶ Batteries must never be swapped from truck to truck.
 - ▶ Do not connect the battery to two chargers simultaneously.
-

Immobiliser

⚠ WARNING!

Moving of a connected industrial truck with the mains socket switched off

If an industrial truck is being charged at an external mains socket, the automatic immobiliser detects this process and deactivates the truck travel functions. When charging an industrial truck at a mains socket that can be switched off, the industrial truck can start moving when the socket is switched off because the immobiliser detects only live mains sockets. This can cause damage to the electrical building installation as well as electric shocks and electrically induced fires.

- ▶ Before commissioning the truck, disconnect the mains cable from the mains socket and stow away in the designated position on the truck.
- ▶ If no additional protection measures are taken, the truck must not be charged via the on-board charger using a mains socket that can be switched off.
- ▶ This warning must be taken into account during the risk analysis performed by the operating company.

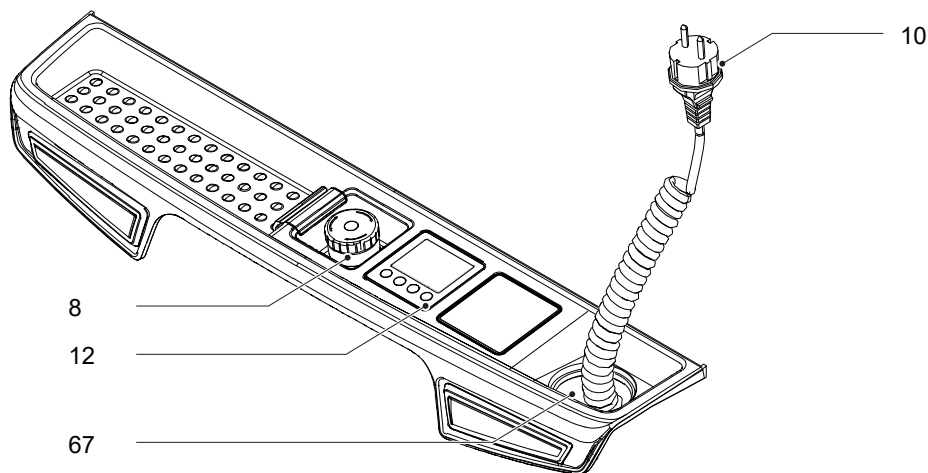


As long as the mains plug of the on-board charger is connected to the mains, all of the truck's electrical functions are disabled (electrical immobiliser). The truck cannot be operated.

Setting the charging characteristic

The charging characteristic is set via parameters from the truck software.

The setting is made at the factory or by the manufacturer's customer service department.



Charging the battery

Requirements

- Truck parked securely – see page 111.

Procedure

- Check the cable and mains plug (10) of the on-board charger for visible damage before charging.

If damage is identified, mark the truck accordingly and take it out of service. Have the truck repaired by the manufacturer or by a specialist authorised by the manufacturer.

- Plug the mains plug (10) into a mains socket.
 - If the charge status is to be displayed on the truck:
 - Unlock the emergency disconnect switch (8) – see page 118.
- The display unit (12) displays the charge status or a fault – see page 150.

The battery is being charged.



Trucks with a lithium-ion battery have a display unit with display as standard – see page 150.

Ending battery charging

Procedure

- Remove the mains plug (10) from the mains socket and store it fully along with the mains cable in the storage compartment (67).

Battery charging is complete.

E Operation

1 Safety Regulations for the Operation of Forklift Trucks

WARNING!

Removing or disabling safety devices can cause accidents

Removing or disabling safety devices such as the Emergency Disconnect switch, key switch, buttons, horn, strobe lights, mast protection pane, mast grille, sensors, panels etc. can result in accidents and injury.

- ▶ Report any defects immediately to your supervisor.
- ▶ Mark defective truck and take out of service.
- ▶ Do not return the industrial truck to service until you have identified and rectified the fault.

Safety devices, warning signs and warning instructions

Safety devices, warning signs (see page 39) and warning instructions in the present operating instructions must be strictly observed.

Hazardous area

WARNING!

Risk of accidents/injury in the hazardous area of the truck

A hazardous area is defined as the area in which people are at risk due to travel or lifting operations of the truck, its load handler or the load. This also includes the area within reach of falling loads or lowering/falling operating equipment.

- ▶ Instruct unauthorised persons to leave the hazardous area.
- ▶ In case of danger to third parties, give a warning signal in good time.
- ▶ If unauthorised persons are still within the hazardous area, stop the truck immediately.

Driver authorisation

The truck may only be used by suitably trained personnel, who have demonstrated to the proprietor or his representative that they can drive and handle loads and have been authorised to operate the truck by the proprietor or his representative.

Operator's rights, responsibilities and rules of conduct

The driver must be informed of his duties and responsibilities and be instructed in the operation of the truck and shall be familiar with the operating instructions. Safety shoes must be worn on pedestrian-operated trucks.

Unauthorised use of truck

The operator is responsible for the truck during the time it is in use. The operator must prevent unauthorised persons from driving or operating the truck. Do not carry passengers or lift other people.

Damage and defects

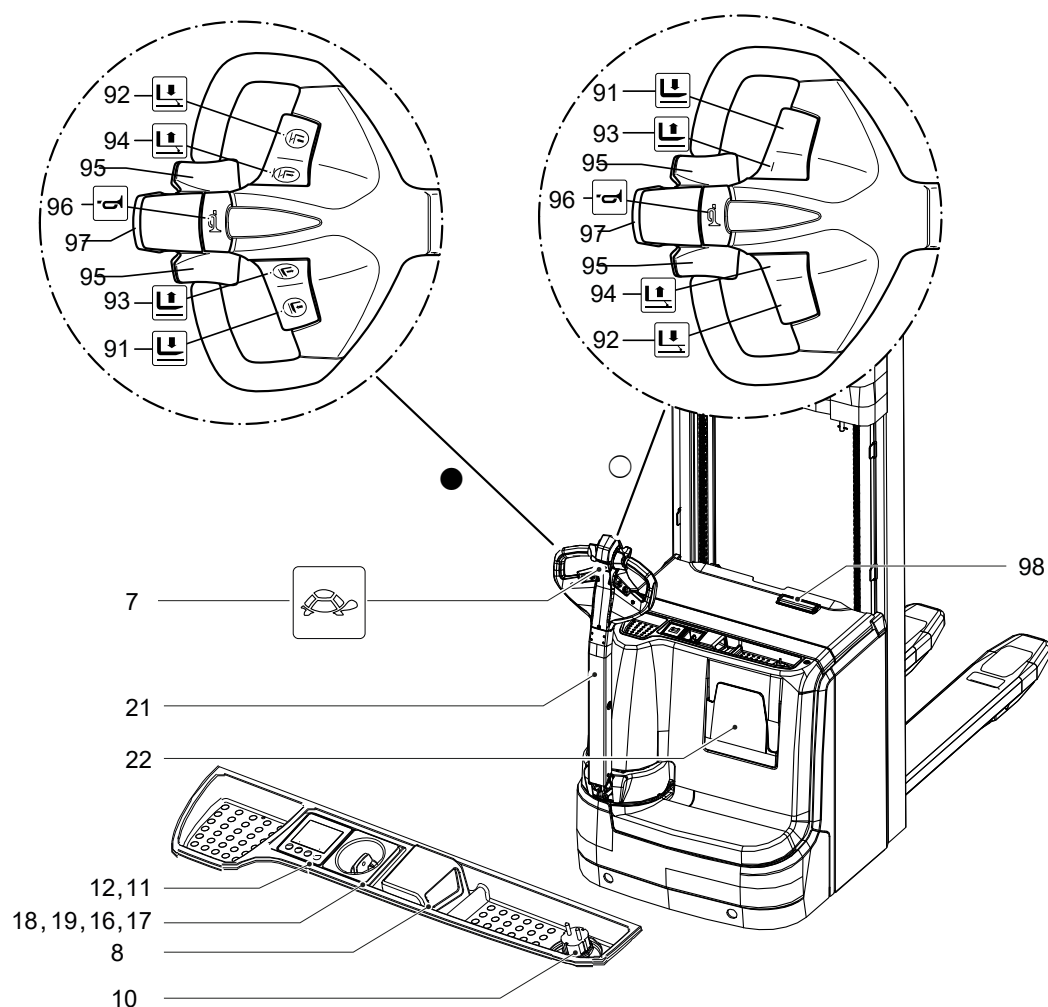
The supervisor must be informed immediately of any damage or faults to the truck or attachment. Trucks which are unsafe for operation (e.g. wheel or brake problems) must not be used until they have been rectified.

Repairs

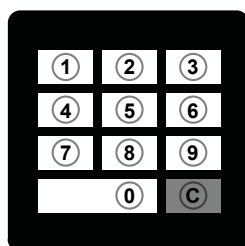
The operator must not carry out any repairs or alterations to the truck without authorisation and the necessary training to do so. The operator must never disable or adjust safety mechanisms or switches.

2 Displays and Controls

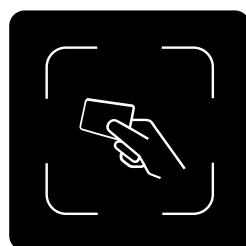
2.1 Model up to 2022



12



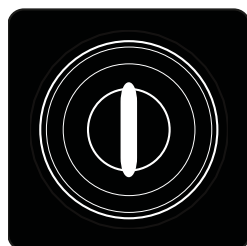
18



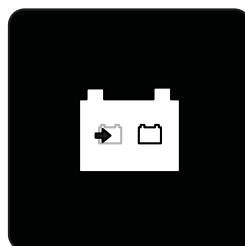
16



17



19

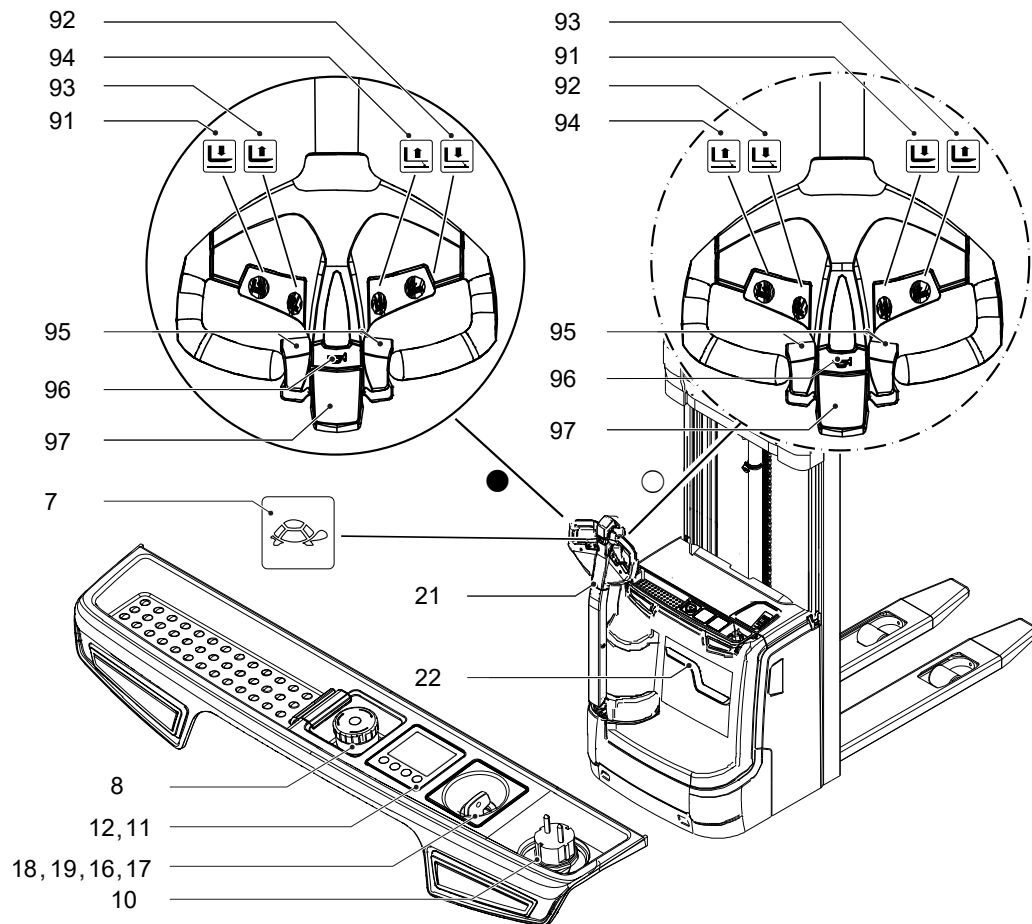


11

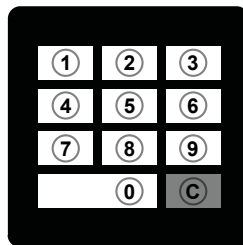
Item	Control/display		Function
7	"Slow travel" button	●	If the tiller is in the upper braking zone, braking can be overridden by pressing the switch, and the truck can move at reduced speed (slow travel), see page 123.
8	Emergency disconnect switch	●	Used to brake the truck with maximum force and to interrupt the truck functions in an emergency. Activating the emergency disconnect switch disables all electrical functions in hazardous situations.
10	Mains plug for on-board charger	○	Used to charge the battery with the on-board charger – see page 53.
11	Charge status indicator	●	Shows the battery charge status.
12	Display unit with 2-inch display	○	Display for: – Battery charge status – Battery capacity – Service hours – Travel program – Warning indicators – Event messages Selection of: – Travel program – Options Replaces the key switch – Releasing the truck by entering master and access codes with EasyAccess Softkey
16	Transponder reader	○	Replaces the key switch. – Solely to expand the display unit – Releasing the truck by card/transponder with EasyAccess Transponder access system
17	Transponder reader Plus	○	Replaces the key switch. – Solely to expand the display unit – Releasing the truck by card/transponder with EasyAccess Transponder access system – The transponder reader Plus supports additional transponder standards
18	Keypad	○	Replaces the key switch. – Solely to expand the display unit – Releasing the truck by entering setup and access codes with EasyAccess PinCode access system
19	Key switch and key	●	Used to switch the truck on and off. – Removing the key can prevent the truck from being switched on by unauthorised personnel.
21	Tiller	●	Controls lift and travel functions.
22	Document storage compartment	●	Used to store the operating instructions.
91	"Lower load fork" button	●	Lowers the load fork at a variable speed.

Item	Control/display		Function
92	"Lower support arms" button	○	Lowers the support arms at a constant speed.
93	"Raise load fork" button	●	Raises the load fork at a variable speed.
94	"Lift support arms" button	○	Raises the support arms at a constant speed.
95	Travel switch	●	Controls travel direction and travel speed.
96	"Warning signal" button (horn)	●	Used to trigger the warning signal (horn).
97	Collision safety switch	●	Safety feature, drive direction travel only: When applied, the truck travels for approx. 3 seconds in the load direction. The parking brake is then applied. The truck remains switched off until the travel switch is returned to neutral.
98	Clip pad	●	Used to hold paper.

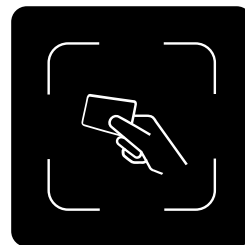
2.2 Facelift model from 2022 onwards



12



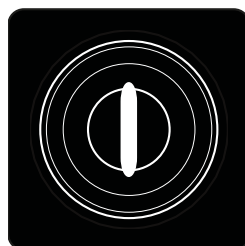
18



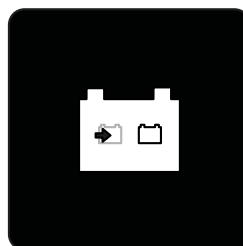
16



17



19



11

Item	Control/display		Function
7	"Slow travel" button	●	If the tiller is in the upper braking zone, braking can be overridden by pressing the switch, and the truck can move at reduced speed (slow travel), see page 123.
8	Emergency disconnect switch	●	Used to brake the truck with maximum force and to interrupt the truck functions in an emergency. Activating the emergency disconnect switch disables all electrical functions in hazardous situations.
10	Mains plug for on-board charger	○	Used to charge the battery with the on-board charger – see page 53.
11	Charge status indicator	●	Shows the battery charge status.
12	Display unit with 2-inch display	○	Display for: – Battery charge status – Battery capacity – Service hours – Travel program – Warning indicators – Event messages Selection of: – Travel program – Options Replaces the key switch – Releasing the truck by entering master and access codes with EasyAccess Softkey
16	Transponder reader	○	Replaces the key switch. – Solely to expand the display unit – Releasing the truck by card/transponder with EasyAccess Transponder access system
17	Transponder reader Plus	○	Replaces the key switch. – Solely to expand the display unit – Releasing the truck by card/transponder with EasyAccess Transponder access system – The transponder reader Plus supports additional transponder standards
18	Keypad	○	Replaces the key switch. – Solely to expand the display unit – Releasing the truck by entering setup and access codes with EasyAccess PinCode access system
19	Key switch and key	●	Used to switch the truck on and off. – Removing the key can prevent the truck from being switched on by unauthorised personnel.
21	Tiller	●	Controls lift and travel functions.
22	Document storage compartment	●	Used to store the operating instructions.
91	"Lower load fork" button	●	Lowers the load fork at a variable speed.

Item	Control/display		Function
92	"Lower support arms" button	○	Lowers the support arms at a constant speed.
93	"Raise load fork" button	●	Raises the load fork at a variable speed.
94	"Lift support arms" button	○	Raises the support arms at a constant speed.
95	Travel switch	●	Controls travel direction and travel speed.
96	"Warning signal" button (horn)	●	Used to trigger the warning signal (horn).
97	Collision safety switch	●	Safety feature, drive direction travel only: When applied, the truck travels for approx. 3 seconds in the load direction. The parking brake is then applied. The truck remains switched off until the travel switch is returned to neutral.

2.3 Available display elements and controls

Depending on the equipment, the truck may be equipped with the following access systems:

Access systems with key

- Charge status indicator and key switch (●)
- Display unit (2-inch display) and key switch (○)

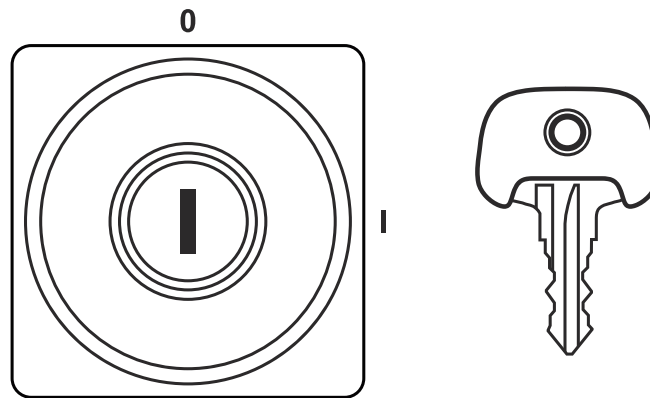
Keyless access systems (○)

- Display unit (2-inch display) with access code (EasyAccess Softkey)
- Display unit (2-inch display) and code entry via keypad (EasyAccess PINCode)
- Display unit (2-inch display) and transponder reader (EasyAccess Transponder)

- Trucks with a lithium-ion battery have a display unit with display as standard – see page 150.
- The charge status indicator and key switch are part of the standard equipment of the truck. Additional controls and display elements are outlined in the section “Optional equipment”, see page 150.
- Trucks that are equipped with the optional fleet management system are released with a transponder. Further information on the transponders and on how to operate the fleet management system can be found in the relevant operating instructions.

2.3.1 Charge Status Indicator and Key Switch

2.3.1.1 Key switch

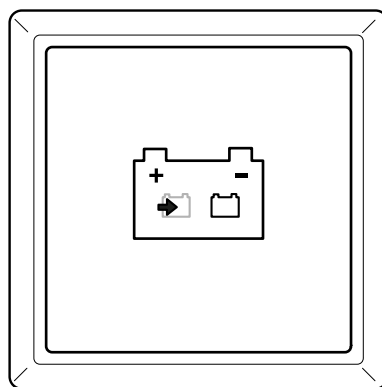


The key switch is used to switch on and off a truck with standard equipment. When the key is removed, this prevents the truck from being switched on by unauthorised personnel.

Key position 0: Truck switched off.

Key position I: Truck switched on and ready for operation.

2.3.1.2 Charge Status Indicator



11

The charge status indicator (11) uses two LEDs to display the battery charge status.

Display on an operational truck

After switching on the truck, the charge status of the battery is displayed. The LED colours represent the following conditions:

LED colour	Charge status
Green	40 – 100%
Orange	30 - 40%
Green/orange Flashes once per second	20 – 30%
red	0 – 20%

→ If the LED is red, the load can no longer be lifted. Lifting is only enabled when the battery connected is at least 70% charged.

If the LED flashes red and the truck is not ready for operation, inform the manufacturer's customer service department. Red flashing is a traction controller code. The flashing sequence indicates the type of fault.

Display during charging

Green LED (charge status)	
Lit	Charging complete, battery fully charged. (Pause in charging, trickle charge or compensation charging).
Slow flash	Charging.
Rapid flash	Displayed when a charge begins or after setting a new characteristic curve. Number of flash pulses corresponds to the characteristic curve set.

Red LED (fault)	
Lit	Overtemperature. Charging is interrupted.
Slow flash	Safety charging time exceeded. Charging is cancelled. Mains interruption required to begin charging again.
Rapid flash	Characteristic-curve setting is invalid.

2.3.2 Battery discharge monitor

NOTICE

Full discharge can damage the battery

Self-discharge can cause the battery to fully discharge. Full discharge shortens the useful life of the battery.

► Charge the battery at least every 2 months.



The standard setting for the battery discharge indicator / discharge monitor is based on standard batteries. When using maintenance-free batteries or special batteries, the display and cut-off points of the battery discharge monitor must be set by the manufacturer's customer service department. If this setting is not configured, the battery may be damaged due to deep discharge.

If the residual capacity falls below the required level, lifting is inhibited. A corresponding display appears. Lifting is not re-enabled until the battery connected is at least 70% charged.

3 Preparing the Truck for Operation

3.1 Checks and Operations to Be Performed Before Starting Daily Work

WARNING!

Damage and other truck or attachment (optional equipment) defects can result in accidents.

If damage or other truck or attachment (optional equipment) defects are discovered during the following checks, the truck must be taken out of service until it has been repaired.

- ▶ Report any defects immediately to your supervisor.
- ▶ Mark defective truck and take out of service.
- ▶ Do not return the industrial truck to service until you have identified and rectified the fault.

Inspection before daily operation

Procedure

- Check the whole of the outside of the truck for signs of damage and leaks. Damaged hoses must be replaced immediately.
- Check the battery attachment and wire connections for damage and make sure they are secure.
- Check the battery connectors are secure.
- Check the load handler for visible signs of damage such as cracks, bent or severe wear.
- Check the drive wheel and load wheels for damage.
- Check that the markings and labels are present, clean and legible, see page 39.
- Check the protection screen / grille and their attachments are secure and undamaged.
- Make sure the drive panels and covers are secure and check for damage.
- With the load handler lowered, check the mast chains are tensioned and secured correctly.
- Check tiller return function.
- Check the controls automatically return to the neutral position after use.
- Safety cutoff height switch (mast), check cable connections and magnet attachment.

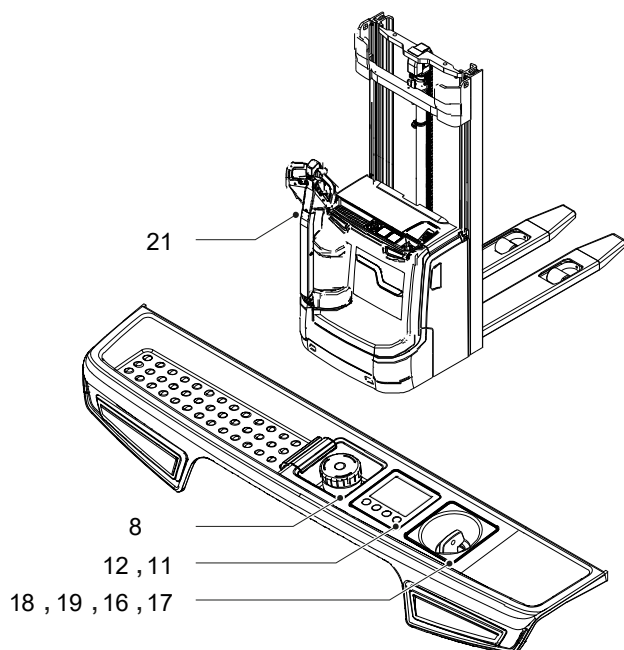
Equipment-specific checks

- Trucks with on-board charger (○): Check the mains cable of the on-board charger for damage.

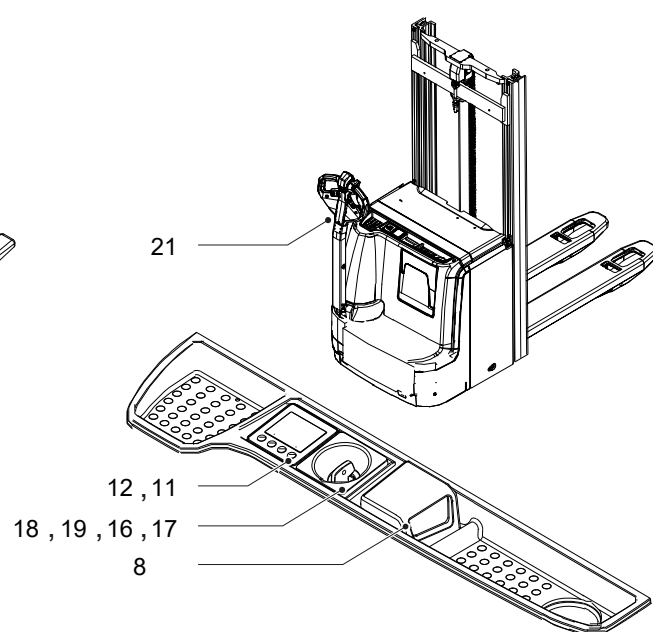
If damage is identified, mark the truck accordingly and take it out of service. Have the truck repaired by the manufacturer or by a specialist authorised by the manufacturer.

3.2 Preparing the truck for operation

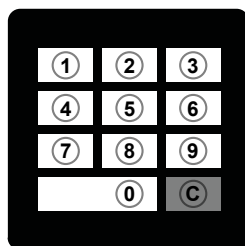
Facelift model from 2022 onwards



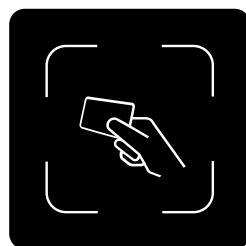
Model up to 2022



12



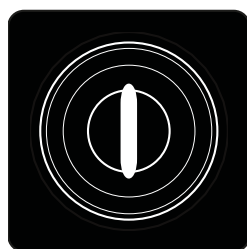
18



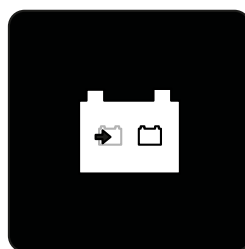
16



17



19



11

Switching on the truck

Requirements

- Checks and operations before starting daily work completed – see page 107.
- Tiller (21) in the upper braking zone – see page 125.

Procedure

- Unlock the emergency disconnect switch (8) – see page 118.
- Perform the necessary action to switch on the truck:
 - Insert the key into the key switch (19) and turn it as far to the right as it will go.
 - On a truck with EasyAccess Softkey access system:
Enter the code in the display unit (2-inch display) (○) (12).
 - On a truck with EasyAccess Transponder access system:
Hold the card or transponder in front of the transponder reader (16).
 - On a truck with EasyAccess PINCode access system:
Enter the code on the keypad (18).

Truck is operational.

- ➔ If the truck cannot be switched on: Read any event messages on the display unit (12) (○) and use the "Troubleshooting" section to identify the cause – see page 140.
- ➔

Operation of transponder reader Plus (17) corresponds to the operation of the standard transponder reader (16).

3.3 Visual inspections and activities to be performed after establishing operational readiness

WARNING!

Risk of accident due to damage to or other defects in the truck and optional features

If damage or other truck or attachment (optional equipment) defects are discovered during the following checks, the truck must be taken out of service until it has been repaired.

- ▶ Report any defects immediately to your supervisor.
- ▶ Mark defective truck and take out of service.
- ▶ Do not return the industrial truck to service until you have identified and rectified the fault.

Procedure

- Test warning indicators and safety equipment:
 - Test the Emergency Disconnect function by pressing the Emergency Disconnect switch. The main circuit is disconnected and no truck operations can be performed. Now unlock the emergency disconnect switch.
 - Test the horn by pressing the "warning signal" button – see page 97.
 - Test the collision safety switch by pressing the switch while travelling in the drive direction.
 - Test the brakes, see page 125.
- Test the travel functions – see page 121.
- Test the steering – see page 124.
- Test the hydraulic functions, see page 127.
- Test the displays and controls and check for damage – see page 97.

3.4 Parking the truck securely

WARNING!

An unsecured truck can cause accidents

Do not leave an unsecured truck.

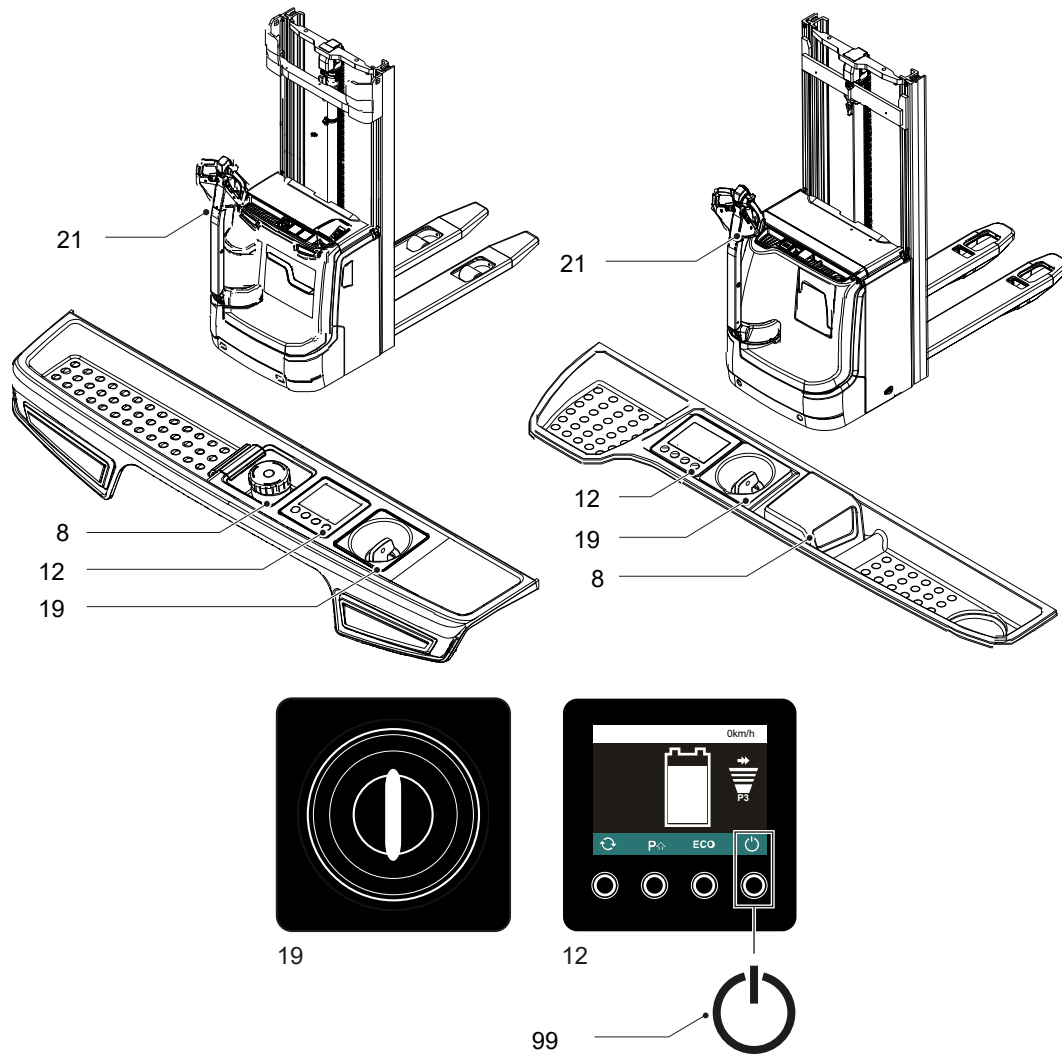
- ▶ Park the truck securely when leaving it.
 - ▶ Exception: If the operator intends to remain in the immediate vicinity and is leaving the truck for only a short while, the applied parking brake is sufficient to hold the truck, see page 126. Immediate vicinity is when the operator is able respond to malfunctions or attempts to use the truck by unauthorised persons immediately.
-

WARNING!

An unsecured truck can cause accidents

Do not park the truck on an incline. Do not park the truck without the brakes engaged. Do not park and leave the truck with the load handler raised.

- ▶ Park the truck on a level surface. In special cases the truck may need to be secured with wedges.
 - ▶ Fully lower the load handler when leaving the truck.
 - ▶ Select a place to park where no other people are at risk of injury from the lowered load handler.
 - ▶ If the brakes are not working, place wedges underneath the wheels of the truck to prevent it from moving.
-



Parking the truck securely

Procedure

- Park the truck on a level surface.
- Fully lower the load handler, see page 127.
- Set the drive wheel to "straightahead travel" using the tiller (21).
- Switch off the truck; to do this,
 - On a truck with a key switch (19):
Turn the key in the key switch anti-clockwise as far as it will go and remove the key.
 - On a truck with a display unit (12):
Press the function button under the "switch on/off" symbol (99) on the display unit.
- Press the emergency disconnect switch (8).

The truck is parked.

4 Working with the truck

4.1 Safety regulations for travel mode

Travel paths and work areas

DANGER!

Do not exceed the permissible surface and spot load limits on the travel routes.

At blind spots get a second person to assist.

The driver must ensure that the loading ramp / dock cannot move or come loose during loading / unloading.

Only use lanes and routes specifically designated for traffic. Unauthorised third parties must stay away from work areas. Loads must only be stored in places specially designated for this purpose.

The truck must only be operated in work areas with sufficient lighting to avoid danger to personnel and materials. Additional equipment is necessary to operate the truck in areas of insufficient lighting.

Travel conduct

The operator must adapt the travel speed to local conditions. The truck must be driven at slow speed when negotiating bends or narrow passageways, when passing through swing doors and at blind spots. The operator must always observe an adequate braking distance between the forklift truck and the vehicle in front and must be in control of the truck at all times. Abrupt stopping (except in emergencies), rapid U turns and overtaking at dangerous or blind spots are not permitted. Do not lean out or reach beyond the working and operating area.

Travel visibility

The operator must look in the direction of travel and must always have a clear view of the route ahead. If the truck is carrying loads that affect visibility, the truck must travel against the load direction. If this is not possible, a second person must walk alongside the truck as a lookout to observe the travel route while maintaining eye contact with the operator. Proceed only at walking pace and with particular care. Stop the truck as soon as you lose eye contact.

Negotiating lifts, loading ramps and docks

Lifts may only be negotiated if they have sufficient capacity, are suitable for driving on and authorised for truck traffic by the owner. The driver must satisfy himself of the above before entering these areas. The truck must enter lifts with the load in front and must take up a position which does not allow it to come into contact with the walls of the lift shaft. Persons riding in the lift with the forklift truck must only enter the lift after the truck has come to a rest and must leave the lift before the truck. The driver must ensure that the loading ramp / dock cannot move or come loose during loading / unloading.

Type of loads to be carried

WARNING!

Risk of injury from falling loads

Low or small item loads moved above the mast protection pane or grille (○) and protruding over the load backrest can fall, endangering the operator and truck.

- Secure low or small item loads protruding over the load backrest, e.g. by wrapping them in film.

The operator must make sure that the load is in a satisfactory condition. Loads must always be positioned safely and carefully. Use suitable precautions to prevent parts of the load from tipping or falling down. Prevent liquid loads from sloshing out.

Faults due to strong magnets

WARNING!

Electromagnetic influence can result in accidents

Strong magnets can cause electronic components such as Hall sensors to become damaged, resulting in accidents.

- Do not use magnets in the operating area of the truck. Exceptions to this rule are commercial, weak clamping magnets for attaching notices.

4.1.1 Negotiate slopes and inclines

When negotiating slopes and inclines, observe the following:

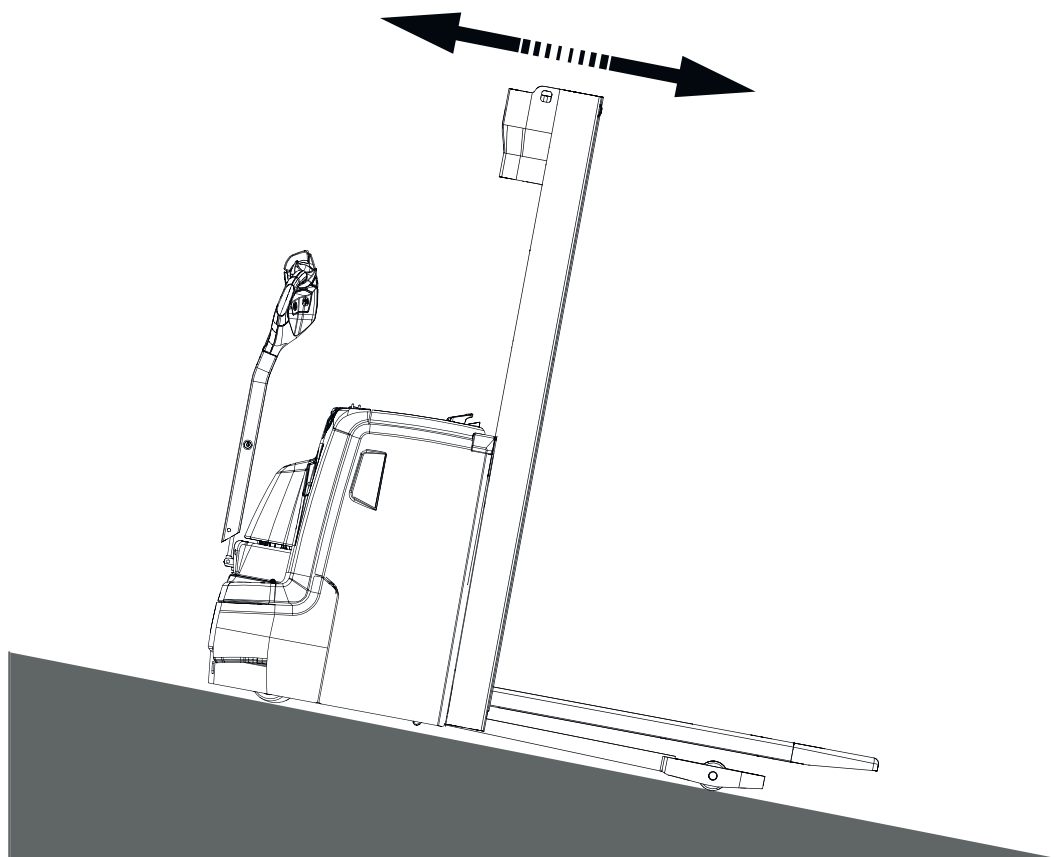
- Negotiating slopes and inclines in accordance with the technical specifications is permissible only if they are marked as traffic lanes.
- Before negotiating slopes, ensure that the truck has sufficient gradeability – see page 32.
- The slopes and inclines must be clean and non-slip and it must be possible to negotiate them safely in accordance with the truck's technical specifications.
- The travel direction must be selected in accordance with the following overview.
- The industrial truck must not be turned, operated at an angle or parked on inclines or slopes.
- Inclines must only be negotiated at slow speed, with the driver ready to brake at any moment.

- ➔ In accordance with the German accident prevention regulations DGUV regulation 68 (as at August 2013), the load must be transported on the upslope when travelling on slopes and inclines.
- ➔ When travelling on slopes and inclines unladen, the load handler must always be oriented towards the downslope.
- ➔ National regulations that deviate from this rule must be treated with priority.

4.1.1.1 Load status

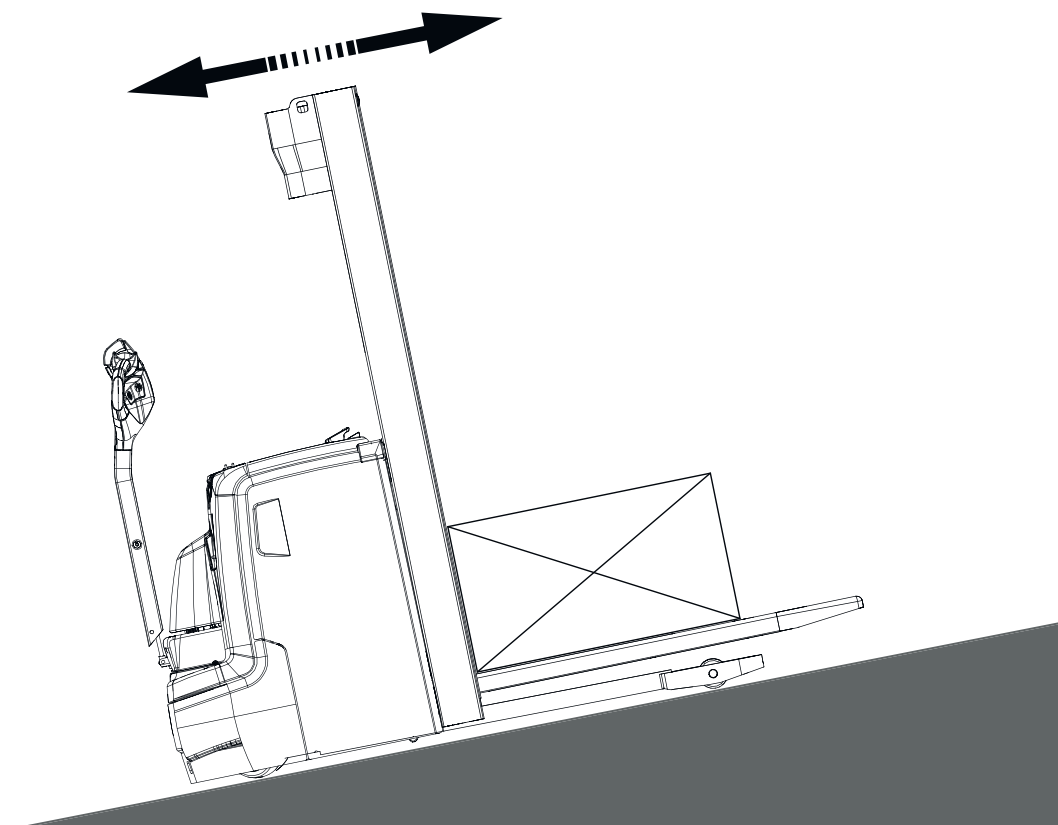
The travel direction that should be selected when driving on slopes and inclines depends on the current load status (transport travel or unladen travel).

4.1.1.2 Empty journey



- When travelling unladen in pedestrian mode, the load handler must be oriented towards the downslope, irrespective of the travel direction.

4.1.1.3 Transport run



- When travelling laden in pedestrian mode, the load handler must be oriented towards the upslope, irrespective of the travel direction.

4.2 Emergency Disconnect

CAUTION!

Applying maximum braking can result in accidents

Applying the Emergency Disconnect switch during travel will cause the truck to decelerate to a halt at maximum force. This may cause the load to slide off the load handler. There is a higher risk of accidents and injury.

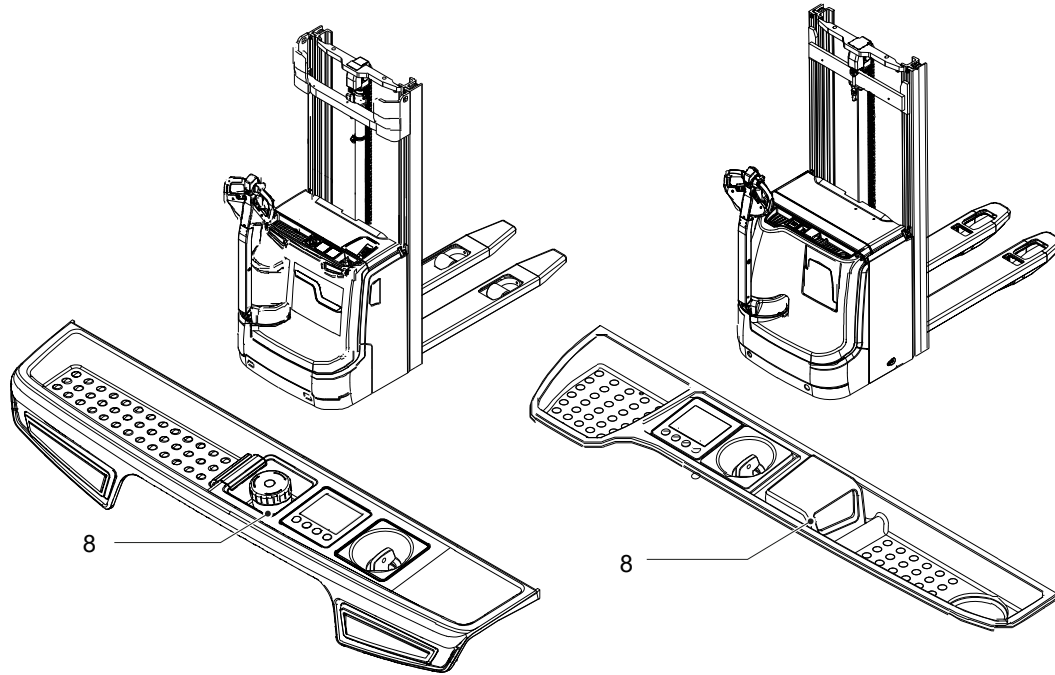
- ▶ Do not use the Emergency Disconnect switch as a service brake.
 - ▶ Use the Emergency Disconnect switch during travel only in emergencies.
-

CAUTION!

Faulty or non-accessible Emergency Disconnect switches can cause accidents

A faulty or non-accessible Emergency Disconnect switch can cause accidents. In dangerous situations the operator cannot bring the truck to a halt in time by applying the Emergency Disconnect switch.

- ▶ The operation of the Emergency Disconnect switch must not be affected by any objects placed in its way.
 - ▶ Report any defects on the Emergency Disconnect switch immediately to your supervisor.
 - ▶ Mark defective truck and take out of service.
 - ▶ Do not return the industrial truck to service until you have identified and rectified the fault.
-



Pressing the emergency disconnect switch

Procedure

- Press the emergency disconnect switch (8).

The industrial truck brakes to a halt and all electrical functions are deactivated.

Unlocking the emergency disconnect switch

Procedure

- Unlock the emergency disconnect switch (8).
 - Model up to 2022: **Pull** the emergency disconnect switch to unlock it.
 - Facelift model from 2022 onwards: **Turn** the emergency disconnect switch to unlock it.

All electrical functions are enabled and the truck is operational again (provided the truck was operational before the emergency disconnect switch was pressed).

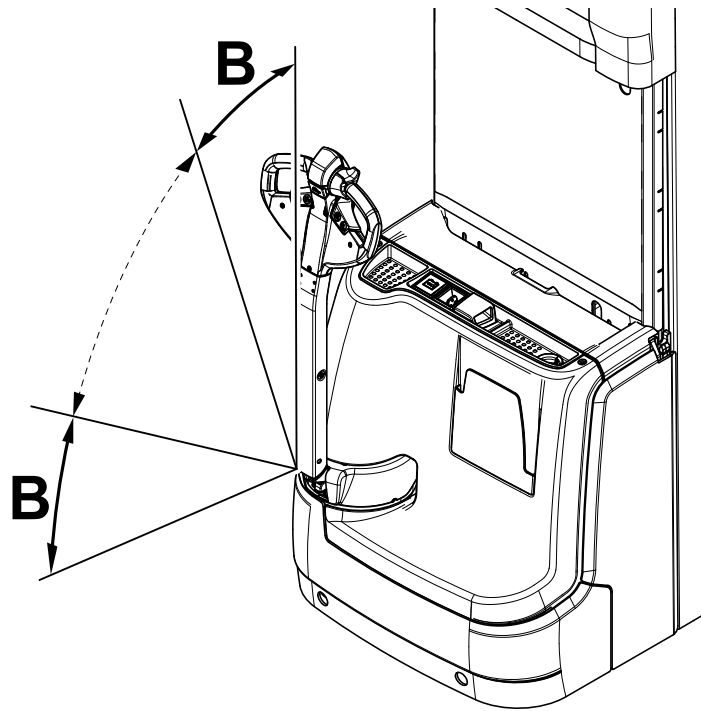
4.3 Automatic braking

⚠ WARNING!

Faulty tillers can result in collisions

Operating the truck with a faulty tiller can result in collisions with other people and objects.

- ▶ If the tiller moves too slowly or not at all to the upper brake zone, the truck must be taken out of service until the cause of this fault is rectified.
- ▶ Notify the manufacturer's customer service department.



Automatic reset of the tiller

When the tiller is released, it returns automatically to the upper brake zone (B) and the brakes are applied automatically.

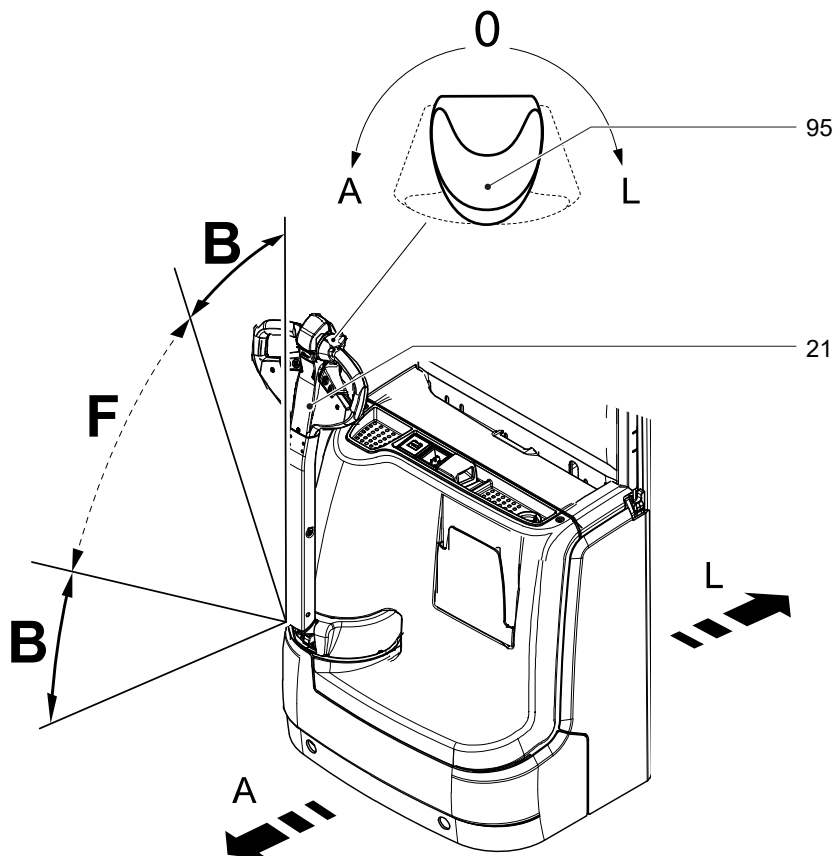
4.4 Travel

⚠ WARNING!

Collision hazard when operating the truck

Collisions with personnel and equipment can result if the truck is operated with open panels.

- ▶ Do not operate the truck unless the panels and covers are closed and properly locked.
- ▶ When travelling through swing doors etc. make sure that the doors do not activate the collision safety button.



Requirements

- Truck is ready for operation – see page 107

Procedure

- Set the tiller (21) to the travel zone (F).
- Control the travel direction with the travel switch (95):
 - Slowly turn the travel switch in the load direction (L):
Travel in load direction.
 - Slowly turn the travel switch in the drive direction (A):
Travel in drive direction.
- Control the travel speed with the travel switch (95):
 - The further the travel switch is turned, the higher the speed.

The brake is released and the truck moves in the selected direction.

Anti-roll back device for slow travel on inclines

If the truck does not have sufficient speed to travel up an incline, it may roll back. Rolling back is detected by the truck's controller and the truck brakes to a halt immediately.

○ Reduced speed when the load handler is fully lowered (EJC 112z only)

When the load handler is fully lowered, the truck can only travel at reduced speed. The load handler must be raised in order to use the maximum available speed.

4.4.1 Changing the direction of travel

CAUTION!

Danger when changing direction during travel

Changing direction during travel causes the truck to decelerate sharply. When the truck changes direction, it can start travelling at high speed in the opposite direction unless the travel switch is released in time.

- ▶ After setting off in the opposite direction, apply the travel switch gently or not at all.
- ▶ Do not perform any sudden steering operations.
- ▶ Always face in the direction of travel.
- ▶ Maintain an adequate overview of the route you are travelling.

Changing direction during travel

Procedure

- Set the travel switch (95) to the opposite direction while travelling.

The truck decelerates until it starts to travel in the opposite direction.

4.4.2 Slow travel

⚠ CAUTION!

Risk of accident if the service brake is deactivated

Particular care and attention is required by the operator during slow travel. The service brake is deactivated during slow travel and is only reactivated after the "slow travel" button is released.

- ▶ In hazardous situations brake by immediately releasing the "slow travel" button and the travel switch.
- ▶ During slow travel you can only brake by coating braking.



The truck can be operated with an upright tiller (21) (e. g. in confined spaces / elevators).

Switch on the slow travel function

Procedure

- Press and hold down the "slow travel" button (7).
- Rotate the travel switch (95) in the required travel direction.

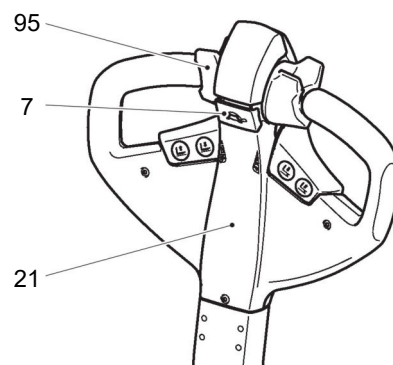
The brake is released. The truck travels at slow speed.

Switching off slow travel

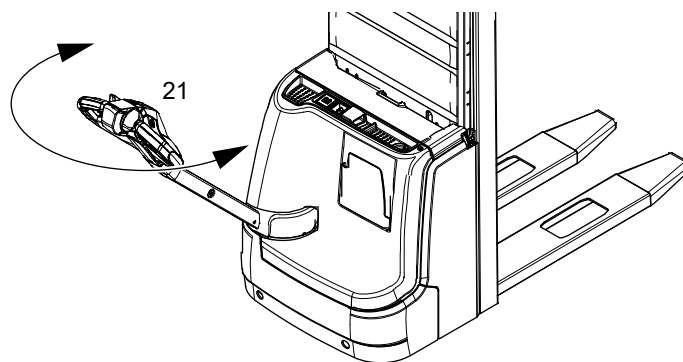
Procedure

- Release the "slow travel" button (7).
If the tiller is in brake zone "B", the brake applies and the truck stops.
If the tiller is in brake zone "F" the truck continues at slow travel speed.
- Release the travel switch (95).

Slow travel ends and the truck can now travel again at normal speed.



4.5 Steering

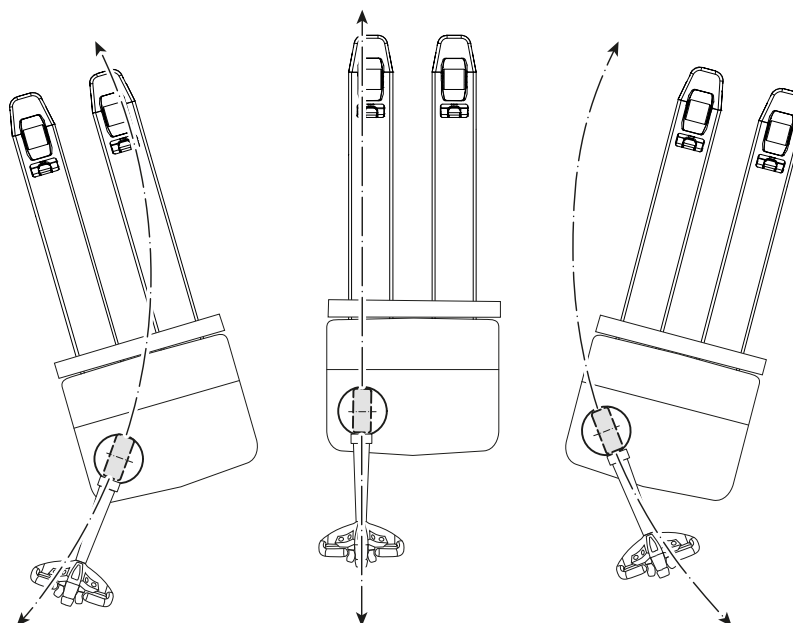


Procedure

- Move the tiller (21) to the left or right.

The truck is steered in the required direction.

Steering direction



The steering direction of the truck corresponds to the swivel direction of the tiller, as shown by the figure.

The curve radius is determined by the swivel angle of the tiller.

4.6 Brakes

⚠ WARNING!

Accident risk

The brake pattern of the truck depends largely on the ground conditions.

- ▶ The operator must take into account the travel route conditions when braking.
- ▶ Brake with care to prevent the load from slipping.
- ▶ During normal operation the truck is to be braked only with the service brake.

⚠ CAUTION!

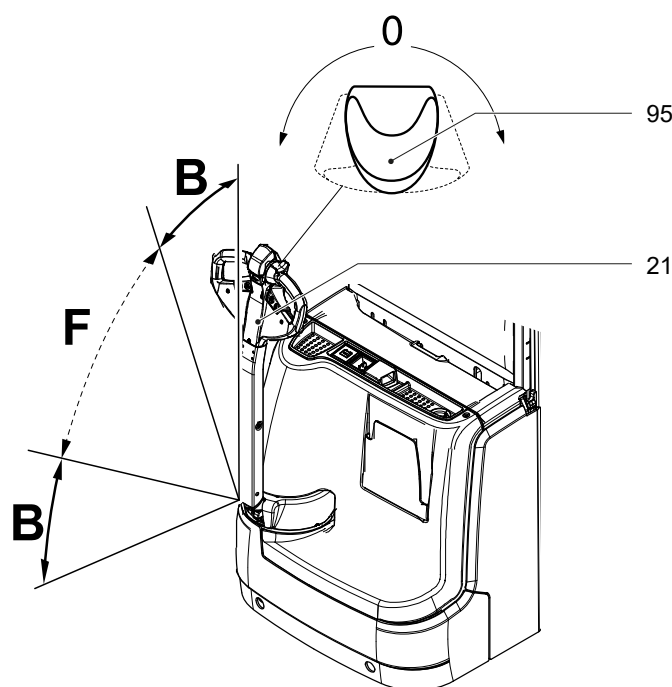
Applying maximum braking can result in accidents

Applying the Emergency Disconnect switch during travel will cause the truck to decelerate to a halt at maximum force. This may cause the load to slide off the load handler. There is a higher risk of accidents and injury.

- ▶ Do not use the Emergency Disconnect switch as a service brake.
- ▶ Use the Emergency Disconnect switch during travel only in emergencies.

⚠ CAUTION!

- ▶ In hazardous situations, swing the tiller to the brake position or press the emergency disconnect switch.



The truck can be braked in the following ways:

- Regeneratively with the service brake (tiller in braking zone B)
- Regeneratively with the coasting brake
- With the inversion brake (by reversing the travel direction via the travel switch)
- In emergencies: with the emergency stop switch – see page 118.

4.6.1 Braking with the service brake

Procedure

- Move the tiller (21) up or down to one of the brake zones (B).

The truck brakes to a halt regeneratively via the service brake.

4.6.2 Braking with the coasting brake

Procedure

- If the travel switch (95) is set to (0), the truck automatically brakes regeneratively.

The truck brakes to a halt regeneratively via the coasting brake.



When braking regeneratively, energy is returned to the battery, ensuring a longer service time.

4.6.3 Inversion braking

⚠ CAUTION!

Danger when changing direction during travel

Changing direction during travel causes the truck to decelerate sharply. When the truck changes direction, it can start travelling at high speed in the opposite direction unless the travel switch is released in time.

- ▶ After setting off in the opposite direction, apply the travel switch gently or not at all.
- ▶ Do not perform any sudden steering operations.
- ▶ Always face in the direction of travel.
- ▶ Maintain an adequate overview of the route you are travelling.

Procedure

- Set the travel switch (95) to the opposite travel direction during travel – see page 122.

The truck decelerates until it starts to travel in the opposite direction.

4.6.4 Parking brake

When the truck has come to a halt the parking brake applies automatically. The parking brake is electrically released and actuated through spring pressure. The parking brake prevents the truck from accidentally rolling away.

4.7 Raising or Lowering the Load Handler

WARNING!

Risk of accidents during lifting and lowering

People can be injured in the hazardous area of the truck.

The hazardous area is defined as the area in which people are at risk from movements of the truck including the load handler etc. This also includes areas which can be reached by falling loads, operating equipment etc.

Apart from the operator (in the normal operating position), no other people are permitted in the hazardous area of the truck.

- ▶ Instruct other people to move out of the hazardous area of the truck. Stop working with the truck if people do not leave the hazardous area.
- ▶ If people do not leave the hazardous area despite the warning, prevent the truck from being used by unauthorised people.
- ▶ Only carry loads that have been secured and positioned in accordance with regulations. Use suitable precautions to prevent parts of the load from tipping or falling off.
- ▶ Never exceed the maximum loads specified on the capacity chart.
- ▶ Never walk or stand underneath a raised load handler.
- ▶ Do not stand on the load handler.
- ▶ Do not lift other people on the load handler.
- ▶ Never reach or climb into moving truck parts.
- ▶ Do not climb onto parts of the building or other trucks.

NOTICE

Lift heights > 1800 mm are only enabled when the support arms have been lowered manually. This ensures the truck remains stable. Above a lift height of 1800 mm, the support arms can no longer be raised (EJC 112z only).



Hydraulic function lock: The default setting of the control enables lifting only when the tiller is in the travel range (F) or when the "slow travel" button is pressed. This does not affect lowering.

The default setting can be changed via a parameter, see page 182.

Automatic lower sequence of support arm lift (○)

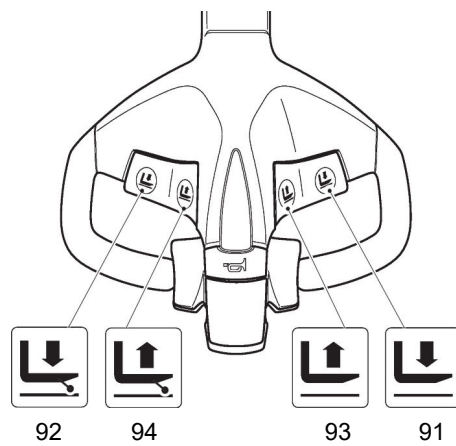


Only available with: Facelift model from 2022 onwards

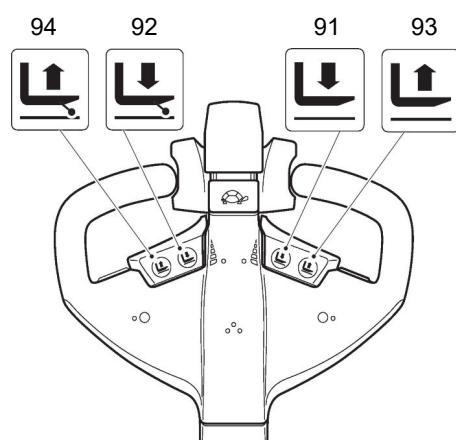
With the support arm lift raised, loads can be stacked and retrieved with the load fork up to a lift height of 2200 mm. For higher lift heights, the support arm lift must be lowered.

On trucks with the "automatic lower sequence of support arm lift" function (○), the support arms are automatically lowered as of a load fork lift height of 2200 mm when the "fork lift" button remains depressed.

Tiller from above



Tiller from below



4.7.1 Raising or Lowering the Load Fork

NOTICE

Risk of material damage to the hydraulic unit

Once you have reached the mechanical limit position, release the button for raising the load handler. Otherwise, the hydraulic unit may suffer material damage.



The lifting/lowering speed can be infinitely controlled via the movement of the button (approx. 8 mm).

Short stroke = slow lift / lower

Long stroke = fast lift / lower

Requirements

- Truck ready for operation and switched on see page 108.

Raising the load fork

- Actuate the "raise load fork" button (93) until the desired lift height is reached.

The load fork is raised.

Lowering the load fork

- Actuate the "lower load fork" button (91) until the desired lift height is reached.

The load fork is lowered.

Use as an elevated work table

The raised load handler can be used as an elevated work table when the truck is switched off, see page 139.

4.7.2 Raising or Lowering the Support Arms

Requirements

- Truck ready for operation and switched on see page 108.

Raising the support arms

- Actuate the "raise support arms" button (94) until the desired support arm lift is reached.

The support arms are raised.

Lowering the support arms

- Actuate the "lower support arms" button (92) until the desired support arm lift is reached.

The support arms are lowered.

4.8 Lifting, transporting and depositing loads

WARNING!

Unsecured and incorrectly positioned loads can cause accidents

Before lifting a load, the operator must make sure that it has been correctly palletised and does not exceed the truck's capacity.

- ▶ Instruct other people to move out of the hazardous area of the truck. Stop working with the truck if people do not leave the hazardous area.
- ▶ Only carry loads that have been correctly secured and positioned. Use suitable precautions to prevent parts of the load from tipping over or falling off the truck.
- ▶ Damaged loads must not be transported.
- ▶ Never exceed the maximum loads specified on the load diagram.
- ▶ Never stand underneath a raised load handler.
- ▶ Do not stand on the load handler.
- ▶ Do not lift other people on the load handler.
- ▶ Insert the load handler as far as possible underneath the load.
- ▶ Cornering should be avoided when stacking and retrieving due to the risk of tipover.

WARNING!

Risk of injury from falling loads

Low or small item loads moved above the mast protection pane or grille (○) and protruding over the load backrest can fall, endangering the operator and truck.

- ▶ Secure low or small item loads protruding over the load backrest, e.g. by wrapping them in film.

CAUTION!

- ▶ Do not lift long loads at an angle.



With the two-stage Duplex mast (ZZ) and three-stage Duplex mast (DZ) a short, centre-mounted free lift cylinder performs the initial lift of the load fork (free lift) without changing the overall height of the truck. From a truck-specific lift height, the travel speed is automatically reduced when lifting and increased again when lowering.



At lift heights > 1800 mm, truck speed is reduced to 2,5 km/h. Truck acceleration is reduced from a lift height of 1800 mm. With a two-stage mast with free lift (ZZ) or three-stage mast with free lift (DZ), reduction takes place from the mast transition point.

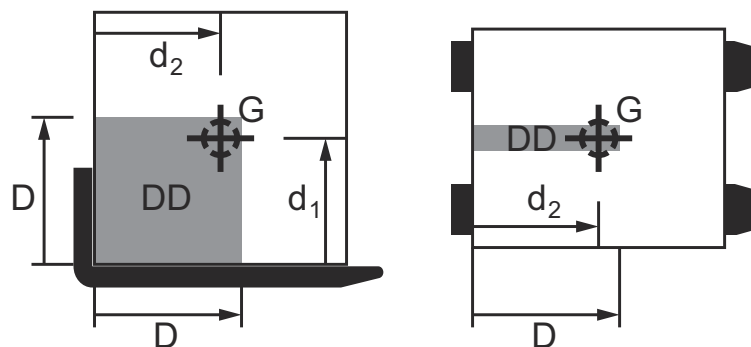
4.8.1 Load Centre

⚠ WARNING!

Risk of accident when the centre of gravity of the load is outside of the load centre distance

If the centre of gravity G of a raised load lies outside the load centre distance D specified for the load handler in the horizontal or vertical planes, under unfavourable conditions the raised load and also the truck can tip over while working.

- ▶ Observe load centre distances and capacities of the load handler, see page 41.
- ▶ Pick up the load so that its centre of gravity lies between the load arms of the load handler.
- ▶ Preferably, the load should be configured and picked up so that its centre distance lies within the load centre distance of the load handler ($d_1 \leq D$ and $d_2 \leq D$, see area DD in the illustration).
- ▶ A load with a centre of gravity outside of the load centre distance of the load handler ($d_1 > D$ and/or $d_2 > D$) should only be moved very carefully, as this load case has not been checked on a truck tested according to the test guideline.



For loads with an even weight distribution, the load centre distance lies in the geometric centre of the volume.

For rectangular loads with an even weight distribution over the entire volume the load centre distance is in the middle, i.e. half the length, half the height and half the width of the load.

4.8.2 Raising a load

NOTICE

Risk of material damage to the hydraulic unit

Once you have reached the mechanical limit position, release the button for raising the load handler. Otherwise, the hydraulic unit may suffer material damage.

Requirements

- Load correctly palletised.
- Capacity of truck sufficient for load, see page 41.
- Load handler evenly loaded for heavy loads.
- Trucks with load centre setting (○):
Load centre set correctly.

Procedure

- Drive the truck carefully up to the pallet.
- Insert the load fork slowly into the pallet until the pallet is resting against the back (see figure).

→ The load must not protrude more than 50 mm beyond the tips of the load fork.

- Raise the load fork until you reach the desired lift height – see page 129.

The load is raised.

→ The lifting/lowering speed can be infinitely controlled via the movement of the button (approx. 8 mm).

Short stroke = slow lift / lower

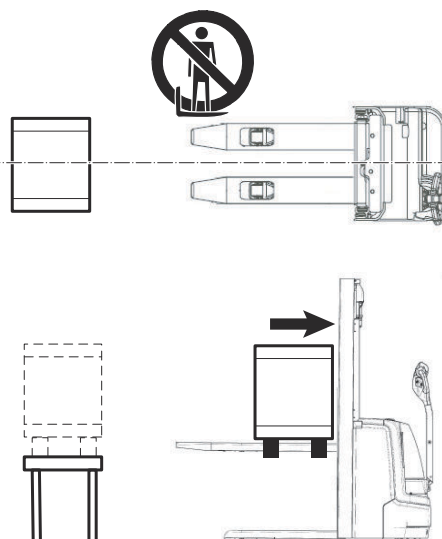
Long stroke = fast lift / lower

With the low-level lift (support arm lift) raised, loads can be stored and retrieved up to a lift height of 1800 mm. For lift heights above 1800 mm, the low-level lift (support arm lift) must be lowered.

→ Two palletised loads can only be raised on top of each other on trucks with double-deck function (○) – see page 134.

Maximum load length

The load to be picked up must not extend more than 50 mm beyond the load handler tips.



4.8.2.1 Picking up the load with the double-decker function (○)

→ Only trucks with double-deck function (○)

⚠ CAUTION!

Danger when travelling with a raised load

Travelling with a raised load on the load fork and no load on the support arms impairs the driving characteristics of the truck and cause it to tip over.

► Travelling with a raised load on the load fork is permitted only when picking up and putting down a second load in double-deck mode.

⚠ CAUTION!

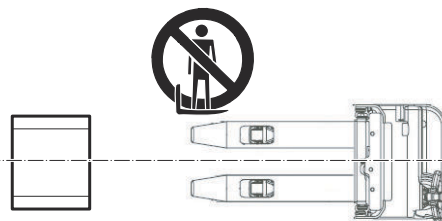
Risk to operational stability

In order not to jeopardize the operational stability, pay attention to the weight when transporting two pallets so that the truck does not tip over.

► In order not to jeopardize the operational stability, the heavier pallet should always be transported underneath.

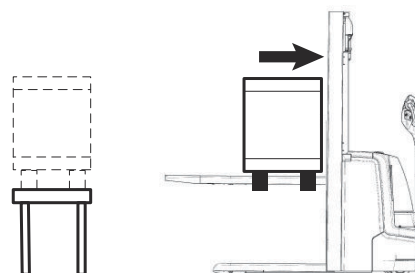
Requirements

- Load is correctly palletised.
- Capacity of the truck is sufficient for the load – see page 41.
- Load handler evenly loaded for heavy loads.



Procedure

- Drive the truck carefully up to the pallet.
- Insert the load fork slowly into the pallet until the pallet is resting against the back (see figure).
- Raise the load fork until you reach the desired lift height – see page 129.
- Drive into the second pallet with the support arms.
- Raise the support arms – see page 130.
- Lower the load fork as far as possible without touching the load on the support arms.



Both pallets are raised.

→ In double-deck operation, the load fork must not be raised higher than 1800 mm.

4.8.3 Transporting a load

Requirements

- Load raised correctly.
- Load fork lowered for correct transport (approx. 150 - 500 mm above the ground).
Do not travel with a raised load (>500 mm).
- Perfect ground conditions.

Procedure

- Accelerate and decelerate with care.
- Adapt your travel speed to the conditions of the route and the load you are transporting.
- Travel at a constant speed.
- Watch out for other traffic at crossings and passageways.
- You must use a lookout at blind spots.
- Do not travel across or at an angle on inclines.
- Observe the information on travelling on slopes and inclines – see page 115.
- Be prepared to brake at all times:
 - Brake gently in normal circumstances.
 - Only stop abruptly in hazardous situations.

Two palletised loads can only be transported on top of each other if the corresponding optional equipment is available, see page 136.

4.8.3.1 Transporting two palletised loads above each other

- Only trucks with double-deck function (○)

⚠ CAUTION!

Risk to operational stability

In order not to jeopardize the operational stability, pay attention to the weight when transporting two pallets so that the truck does not tip over.

- In order not to jeopardize the operational stability, the heavier pallet should always be transported underneath.

Requirements

- Load raised correctly.
- Lower the load forks as far as possible without the load coming into contact with the support arms.
- Perfect ground conditions.

Procedure

- Accelerate and decelerate with care.
- Adapt your travel speed to the conditions of the route and the load you are transporting.
- Travel at a constant speed.
- Watch out for other traffic at crossings and passageways.
- You must use a lookout at blind spots.
- Observe the information on travelling on slopes and inclines – see page 115.

4.8.4 Depositing a load

CAUTION!

Loads must not be deposited on travel or escape routes, in front of safety mechanisms or plant equipment that must be accessible at all times.

NOTICE

Avoid depositing the load suddenly to avoid damaging the load, load handler and the rack.

Requirements

- Storage location suitable for storing the load.

Procedure

- Drive carefully up to the storage location.
- Lower the load handler so that the load handler is clear of the load, see page 127.
- Carefully remove the load handler from the pallet.

The load is deposited.

Soft landing (○)

The "soft landing" feature reduces the lowering speed of the load just before it reaches the ground (approx. 100 - 300 mm).

Two palletised loads transported on top of each other can only be lowered if the corresponding optional equipment is available, see page 138.

4.8.4.1 Depositing a Load with the Double-Deck Function (○)

➞ Only trucks with double-deck function (○)

⚠ CAUTION!

Loads must not be deposited on travel or escape routes, in front of safety mechanisms or plant equipment that must be accessible at all times.

Requirements

- Storage location suitable for storing the load.

Procedure

- Drive the truck carefully up to the first storage location.
- Lower the support arms until the load is set down.
- Carefully move the support arms out of the pallet.
- Lower the support arms.
- Lower the load fork to transport height (150 - 500 mm).
- Drive the truck carefully up to the second storage location.
- Lower the load fork so that it is clear of the load.
- Carefully withdraw the load fork from the pallet.
- Lower the load fork.

Both loads have been set down.

4.8.5 Stacking or unstacking the load

⚠ WARNING!

Increased risk of accidents during stacking and retrieving

When stacking and retrieving, the truck is moved with the load raised, which increases the risk of tipover.

- ▶ Adopt an appropriate, slower speed when stacking and retrieving.
 - ▶ Avoid cornering when stacking and retrieving.
 - ▶ Before driving away, ensure that the load is securely in the rack.
-

Requirements

- Load picked up correctly – see page 133.

Procedure

- Raise the load to the required height.
- Store the load.

4.9 Use as a Lift Work Table

WARNING!

A raised load handler can cause accidents

A stationary truck with a raised load handler is potentially hazardous in work areas.

- ▶ Prevent any risk to personnel and materials.
- ▶ Never load or discharge loads manually with a raised load handler in areas that are hazardous, with limited visibility or insufficient lighting.
- ▶ Park the truck securely when leaving it, see page 111.

WARNING!

Risk of injury from falling loads

Falling loads can cause injuries.

- ▶ Never stand underneath a raised load handler.
- ▶ Never manually load or unload loads that could fall on the operator without additional safety devices at heights greater than 1800 mm.
- ▶ Always load loads so that they cannot fall off or accidentally shift.
- ▶ Secure low or small-item loads e.g. by wrapping them in film.
- ▶ Do not manually load or unload loads that are not correctly packed or have shifted as well as loads with damaged pallets or damaged stacking containers.

CAUTION!

Risk of accident when the raised load handler slowly lowers of its own accord

The raised load handler can lower independently due to internal leakage. According to EN ISO 3691-1 the load handler may lower by up to 100 mm during the first 10 minutes at the rated capacity with the hydraulic oil at normal operating temperature.

- ▶ Never stand underneath a raised load handler.

Presence of the operator

The load handler can remain in a raised position to be used as a lift work table when the truck is switched off, provided the operator is close to the truck.



Immediate vicinity of the truck is when the operator is able to respond to malfunctions or attempts to use the truck by unauthorised persons immediately.

Observe national regulations and local operating conditions.

Use as an elevated work table

Requirements

- Storage space suitable for manual loading or discharging of loads.

Procedure

- Drive the truck carefully up to the storage location.
- Raise the load handler to the desired lift height.
- Switch off the truck.

Loads can be loaded or discharged manually with the load handler raised.

5 Troubleshooting

This chapter enables the operator to localize and rectify basic faults or the results of incorrect operation himself. When trying to locate a fault, proceed in the order shown in the remedy table.



If, after carrying out the following remedial action, the truck cannot be restored to operation or if a fault in the electronics system is displayed with a corresponding error code, contact the manufacturer's service department.

Troubleshooting must only be performed by the manufacturer's customer service department. The manufacturer has a service department specially trained for these tasks.

In order for customer services to react quickly and specifically to the fault, the following information is essential:

- Truck serial number
- Event message from the display unit (if applicable)
- Error description
- Current location of truck.

5.1 Model up to 2022

5.1.1 Truck does not start

Event message	Possible cause	Action
-	Battery connector not inserted	– Check the battery connector and plug it in if necessary
-	Emergency disconnect switch pressed	– Unlock the emergency disconnect switch – see page 118
-	Truck switched off at key switch	– Switch on truck at key switch, see page 104
-	Battery charge too low	– Check the battery charge and charge battery, if necessary, see page 53
-	Faulty fuse	– Check fuses, see page 205
-	Incorrect transponder used on ISM access module (○)	– Use correct transponder
-	Incorrect code entered using the soft keys under the display unit (2-inch display) (○)	– Enter correct code, see page 168
E-0914	Tiller not in brake position when the truck is switched on	– Swing the tiller into the top or the bottom brake zone, see page 121
E-2951	Button for lifting or lowering a load handler when switching on a truck not in the home position	– Do not press the button – see page 97
E-1901	Travel switch not in home position when truck switched on	– Do not operate the travel switch
E-1914	Collision safety switch pressed when truck switched on	– Do not press collision safety switch
E-1925.1	Slow travel button pressed when truck switched on	– Do not press the button

5.1.2 Load cannot be lifted

Event message	Possible cause	Action
-	Truck not operational	– Carry out all measures listed under “Truck does not start”
-	Hydraulic oil level too low	– Check the hydraulic oil level, see page 202
-	Battery discharge monitor has switched off	– Charge the battery, see page 106
-	Faulty fuse	– Check fuses, see page 205
-	Excessive load	– Note maximum capacity, see page 40
E-0914	Tiller not in brake position when the truck is switched on	– Swing the tiller into the top or the bottom brake zone, see page 121
E-2951	Button for lifting or lowering a load handler when switching on a truck not in the home position	– Do not press the button – see page 97
E-1901	Travel switch not in home position when truck switched on	– Do not operate the travel switch
E-1914	Collision safety switch pressed when truck switched on	– Do not press collision safety switch
E-1925.1	Slow travel button pressed when truck switched on	– Do not press the button
E-2124	Switch in mast implausible	– Lowering and travelling possible up to 1.5 km/h – Park the truck securely, see page 111 – Contact the manufacturer's customer service department

5.2 Facelift model from 2022 onwards

5.2.1 Truck does not start

Event message	Possible cause	Action
-	Battery connector not inserted	– Check the battery connector and plug it in if necessary
-	Emergency disconnect switch pressed	– Unlock the emergency disconnect switch – see page 118
-	Truck switched off at key switch	– Switch on truck at key switch, see page 104
-	Faulty fuse	– Check fuses, see page 205
-	Incorrect transponder used on ISM access module (○)	– Use correct transponder
-	Incorrect code entered using the soft keys under the display unit (2-inch display) (○)	– Enter correct code, see page 168
E-2951	Button for lifting or lowering a load handler when switching on a truck not in the home position	– Do not press the button – see page 97
E-1901	Travel switch not in home position when truck switched on	– Do not operate the travel switch
E-1914	Collision safety switch pressed when truck switched on	– Do not press collision safety switch

Event message	Possible cause	Action
E-1925.1	Slow travel button pressed when truck switched on	– Do not press the button
E-0914	Tiller not in brake position when the truck is switched on	– Swing the tiller into the top or the bottom brake zone, see page 121
E-1953	Travel switch actuated for more than 0.5 seconds with the tiller folded up, without release via the tiller switch or the "slow travel" button. The operating sequence has not been observed.	Follow the operating sequence: – 1. Move the tiller into the travel zone (F) or press the "slow travel" button. – 2. Actuate the travel switch.
E-2124	Switch in mast implausible	– Lowering and travelling possible up to 1.5 km/h – Park the truck securely, see page 111 – Contact the manufacturer's customer service department

5.2.2 Truck Operates Only in Slow Travel Mode

Event message	Possible cause	Actions
E-2124.21 or E-2124.22	During the set time, the control unit has not received any valid signals from the KoStaS sensor in the mast (default 5 hours).	With the industrial truck stationary, raise the mast to a load-fork lift height of more than 2200 mm. The yellow flashing "lift limit reached" icon goes out – see page 156.

5.2.3 Load cannot be lifted

Event message	Possible cause	Action
-	Truck not operational	– Carry out all measures listed under “Truck does not start”
-	Hydraulic oil level too low	– Check the hydraulic oil level, see page 202
-	Battery discharge monitor has switched off	– Charge the battery, see page 106
-	Faulty fuse	– Check fuses, see page 205
-	Excessive load	– Note maximum capacity, see page 40
E-1908	The operating sequence has not been observed	– Step onto the platform. – Actuate the travel switch and move the tiller into the working position if necessary.
E-2951	Button for lifting or lowering a load handler when switching on a truck not in the home position	– Do not press the button – see page 97
E-1901	Travel switch not in home position when truck switched on	– Do not operate the travel switch
E-1914	Collision safety switch pressed when truck switched on	– Do not press collision safety switch
E-2124	Switch in mast implausible	– Lowering and travelling possible up to 1.5 km/h – Park the truck securely, see page 111 – Contact the manufacturer's customer service department

6 Moving a truck without its own drive system

6.1 Release and activate the drive wheel brake

⚠ WARNING!

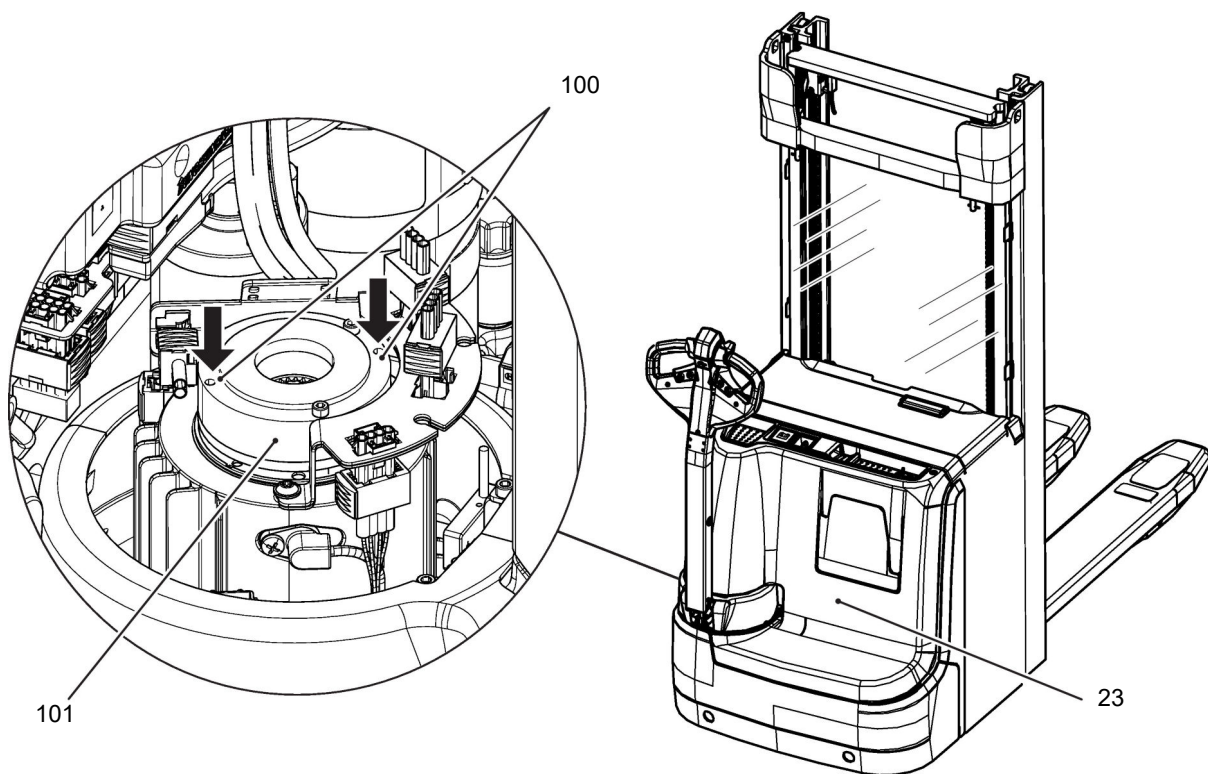
Accidental truck movement

When the brakes are de-activated the truck must be parked on a level surface, since the brakes are no longer effective.

- ▶ Do not release the brake on slopes or inclines.
- ▶ Do not park the truck with the brake released.
- ▶ Apply the brake again when you reach your destination.

⚠ WARNING!

Only return the truck to service when you have identified and rectified the fault.



Releasing the brake

Tools and Material Required

- Two M5x35 screws
- Spanner

Procedure

- Switch off the truck. To do this:
 - Turn the key in the key switch (19) anti-clockwise as far as it will go. Remove the key from the key switch (19).
 - Press the red button on the ISM access module (○).
- Press the emergency disconnect switch (8).
- Open the battery panel, see page 58.
- Disconnect the battery.

- Remove the front panel (23), see page 198.
- Use chocks (for example) to prevent the truck from moving.
- Fully screw two M5x35 screws (100) into the brake (101) and lift up the anchor plate.

→ The two M5x35 screws (100) are used to tension (unlock) the compression springs that activate the parking brake, so that the truck does not brake when de-energised.

- Remove the chocks.

The brake is now released. The truck can be moved.

Activating the brake

Procedure

- Use wedges to prevent the truck from moving.
- Remove the two M5x35 screws (100) from the brake (101).

⚠ CAUTION!

Open covers can cause injury and accidents

- ▶ The covers (battery cover, side panels, drive compartment cover etc.) must be closed during operation.
-

Install the front panel (23), see page 198.

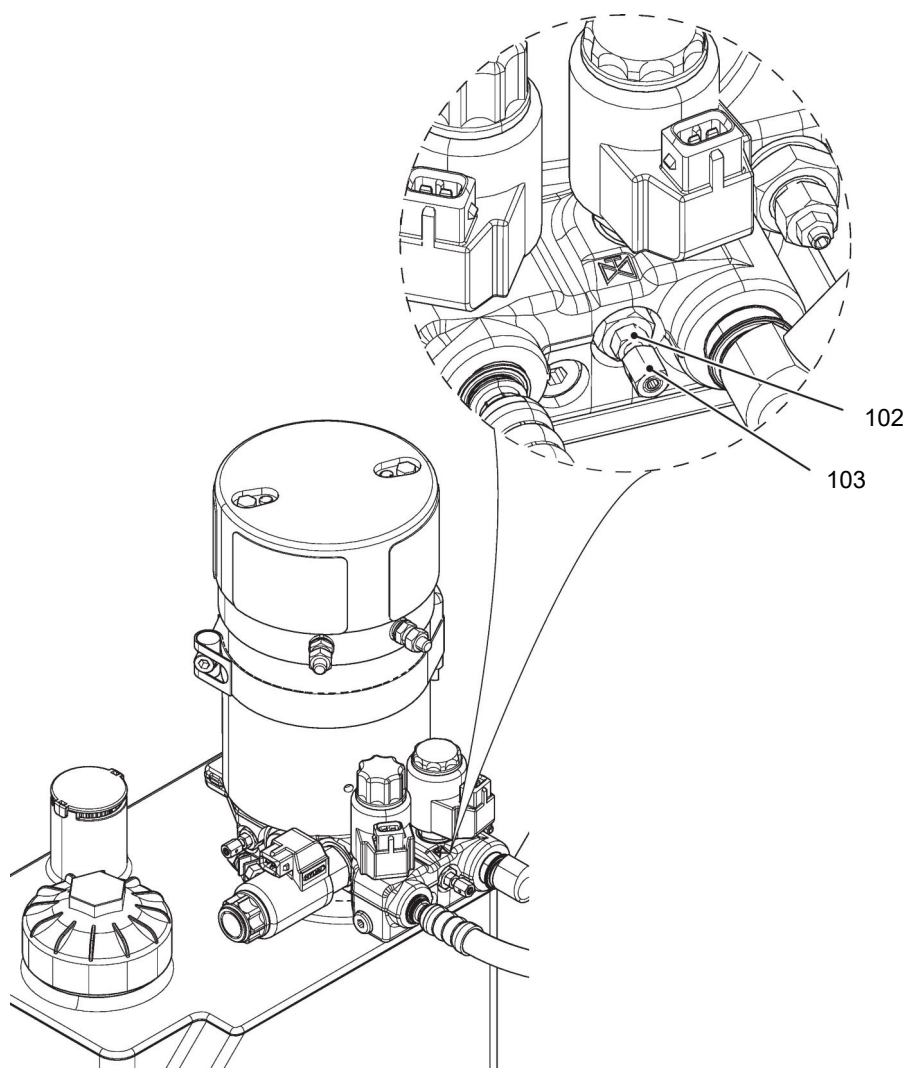
The brake has been reactivated. The brake is now be applied without current.

7 Load handler emergency lowering

⚠ WARNING!

Load handler emergency lowering

- ▶ Instruct other people to move out of the hazardous area of the truck during emergency lowering.
 - ▶ Never step or stand underneath a raised load handler.
 - ▶ Only operate the emergency lowering valve when standing next to the truck.
 - ▶ When the load handler is in the racking, emergency lowering is not permitted.
 - ▶ Report any defects immediately to your supervisor.
 - ▶ Mark defective truck and take out of service.
 - ▶ Do not return the industrial truck to service until you have identified and rectified the fault.
-



Load handler emergency lowering

Requirements

- Load handler is not in the rack.

Tools and Material Required

- Key (SW8)
- Torque wrench setting range 1-4 Nm

Procedure

- Park the truck securely, see page 111.
- Open the front panel, see page 198.
- Loosen the lock nut (102) on the valve block.
- Remove the valve screw (103) in stages (anti-clockwise).

The load handler is lowered.

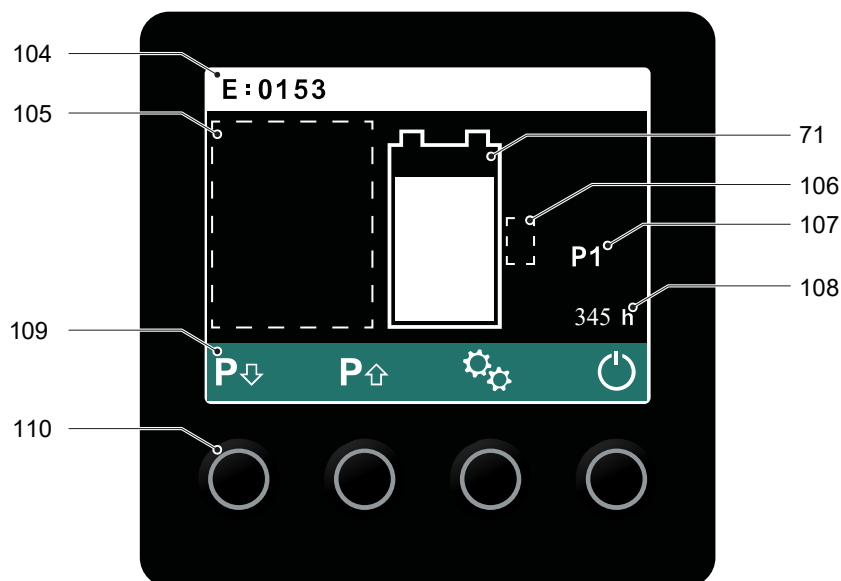


After the emergency lowering insert the valve screw (103) as far as the stop (1.5 Nm +0.5 Nm) and secure with the lock nut (102).

8 Optional Equipment

8.1 Display unit (2 inch display)

8.1.1 Model up to 2022



Item	Display or control element	Function
71	Battery charge status	The higher the fill level on the charge status indicator, the higher the residual capacity of the battery.
104	Information field	Displays event messages and optional information such as speed – see page 162.
105	Area for display symbols	Area for information concerning operation of the truck. The symbols shown depend on the operating situation and the truck status – see page 153.
106	Battery type (characteristics)	Shows the set battery type or characteristics ¹ 1 = Maintenance-free gel/dry-cell battery 2 = Special battery, for example XFC
107	Travel-program display	Displays the current travel program. The selected travel program is also shown in text form (P1, P2, P3) under the bar display.
108	Service-hours display	Displays the current number of service hours.
109	Function symbols	The functions shown as function symbols are operated using the function key located underneath, see page 151.
110	Function keys	Selection buttons for the corresponding functions.
¹⁾ If the setting is for normal or high-performance wet batteries or batteries for special options, no battery type is shown.		

8.1.1.1 Button allocation of the display

Button allocation within the main menu

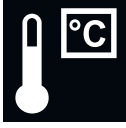
Symbol	Meaning
	Travel program: To change the travel program
	Settings (○): To change to the menu to administer the codes or transponders
	Shutdown (○): Allows the truck to be switched off Shutdown is only on the display if the truck is switched on with an access code.

Key allocation in menu for managing codes or transponders (○)

Symbol	Meaning
	Change Set-Up Code: To change the set-up code and to activate the keypad or the transponder reader.
	Edit access code / transponder: To add or delete access codes and transponders.
	Up selection: To select access codes or transponders.
	Down selection: To select access codes or transponders.
	Clear: To delete selected access codes.
	Add: To add new access codes.
	Back: Cancels the current procedure and returns to the previous menu.
	Confirm: To confirm an entry or a transponder code.

8.1.1.2 Symbols in the display

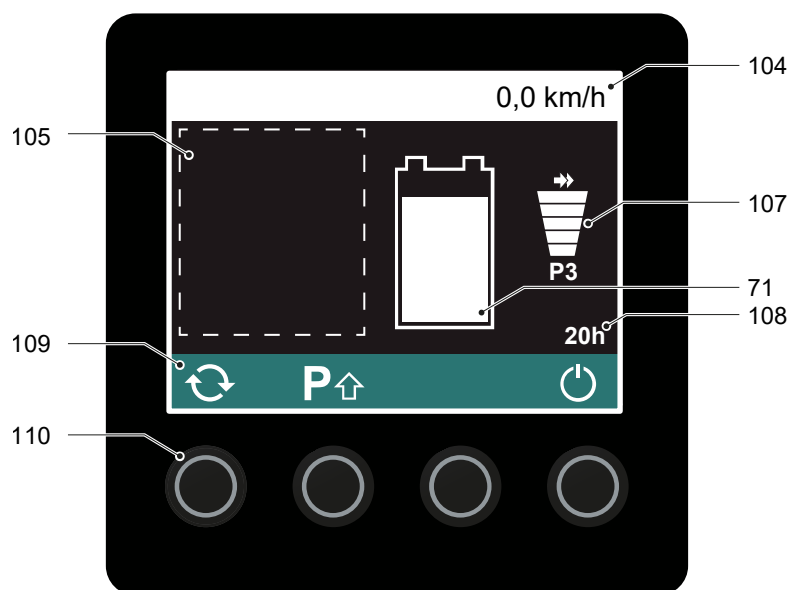
Any number of pictograms can be displayed in the pictogram field (105). The pictograms shown in the pictogram field during operation depend on the operating situation and truck situation.

Symbol	Meaning	Colour	Function
	Emergency stop	Red	Functions deactivated due to truck malfunction
	Warning	Yellow	Operating error
		Red	Truck malfunction detected. Travel is restricted to slow travel or lift, lower and travel functions are reduced.
	Battery indicator, low residual capacity	Yellow	Residual capacity $\leq 30\%$ The battery must be charged soon.
		Red	Residual capacity $\leq 20\%$ The battery must be charged immediately.
	Overtemperature	Yellow	Overtemperature detected. Lifting, lowering and travel functions are reduced.
		Red	Overtemperature detected. Lifting, lowering and travel functions are deactivated.
	Lithium-ion battery low temperature (○)	Yellow	Lithium-ion battery low temperature detected – Discharge currents and energy recovery are reduced at low temperatures.
		Red	Lithium-ion battery below permissible temperature range – The truck is switched off via the battery contactor.
	Lift deactivated	Yellow	Illuminates if the lifting functions are shut off due to insufficient battery capacity.
	Tiller position	Yellow	Lights up on power-up with tiller in travel zone. Illuminates with travel switch operated and tiller in braking zone.

Symbol	Meaning	Colour	Function
	Support arm lift lifting limit	Yellow	Illuminates if the "lift support arms" button is pressed when the lifting limit of the support arm lift has been reached.
	Support arm lift lowering limit	Yellow	Illuminates if the "lower support arms" button is pressed when the lowering limit of the support arm lift has been reached.
	Charging process	Green	Battery charge display (on-board charger only): – Flashing: Charging in progress – Steady light: Charging complete
		Red	Charging interrupted

8.1.2 Facelift model from 2022 onwards

8.1.2.1 Display unit with 2-inch display

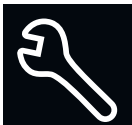
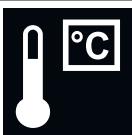


Item	Display or control element	Function
71	Battery charge status	The higher the fill level on the charge status indicator, the higher the residual capacity of the battery.
104	Information field	Displays event messages and optional information such as speed – see page 162.
105	Area for display symbols	Area for information concerning operation of the truck. The symbols shown depend on the operating situation and the truck status – see page 156.
107	Travel-program display	Displays the current travel program. The selected travel program is also shown in text form (P1, P2, P3) under the bar display.
108	Service-hours display	Displays the current number of service hours.
109	Function symbols	The functions shown as function symbols are operated using the function key located underneath, see page 160.
110	Function keys	Selection buttons for the corresponding functions.

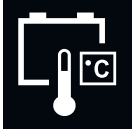
The indicator lamps that appear on the display unit are dependent on the truck equipment.

8.1.2.2 Display symbols

Any number of symbols can be shown in the display area. The symbols shown during operation depend on the operating and truck status.

Symbol	Meaning	Colour	Function
	Emergency stop	Red	Lights up in the case of automatic function deactivation due to truck malfunctions.
	Login with additional equipment	White	Lights up when waiting for user authentication on additional equipment (○).
		Green	
		Yellow	
		Red	
	Warning	Yellow	Lights up in the case of an operating error.
		Red	Lights up in the case of a truck fault. Travel is restricted to slow travel or lift, lower and travel functions are reduced.
	Truck disabled	Yellow	Lights up when the truck has been disabled due to a serious event. Possible causes: – Error in the drive system – Error in the hydraulic system – Shock event (truck with fleet management system)
	Tiller position	Yellow	Lights up on power-up with tiller in travel zone. Illuminates with travel switch operated and tiller in braking zone.
	Service note	Yellow	Lights up when maintenance is due.
	Assistance system not ready	Yellow	Lights up when an assistance system of the truck is not ready.
	Truck overtemperature	Yellow	Lights up when the temperature of the truck exceeds the permissible range. – Lifting, lowering and travel functions are reduced.
		Red	Lights up when the temperature of the truck exceeds the permissible range. – Lifting, lowering and travel functions are deactivated.

Symbol	Meaning	Colour	Function
	Double-click lifting: Continuous lifting up to intermediate height or lift limit	Green	Lights up to indicate operational readiness of the automatic lift function.
		Yellow	Flashes when the load handler is raised via the automatic lift function.
	Lithium-ion battery low temperature	Yellow	Lights up to indicate a low temperature of the lithium-ion battery – Discharge currents and energy recovery are reduced.
		Red	Lights up to indicate a low temperature of the lithium-ion battery – The truck is switched off via the battery contactor. – The display unit switches off.
	Eco mode	Green	Lights up when the energy-saving travel program is active.
	Touch mode	Yellow	Lights up when a travel request from touch mode is present. (Also displayed if the steer angle is outside the permissible range)
		Green	Lights up when touch mode is ready. (Steer angle in permissible range)
	Indicator lamp	Green	Illuminated when at least one indicator lamp is switched on.
	Lift end, load fork	yellow	Illuminates if the “Raise load fork” button is pressed when the lift limit in the mast lift has been reached.
		green	
	Lowering end, load fork	yellow	Illuminates if the “Lower load fork” button is pressed when the lowering limit in the mast lift has been reached.
	Lift limit, support arm lift	Yellow	Illuminates if the “Raise support arm lift” button is pressed when the lift limit in the support arm lift has been reached.
	Lowering limit, support arm lift	Yellow	Illuminates if the “Lower support arm lift” button is pressed when the lowering limit in the support arm lift has been reached.

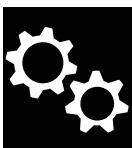
Symbol	Meaning	Colour	Function
	"Automatic support arm lift lowering" function active	Green	Lights up green when the function for automatic lowering of the support arm lift is active.
	The support arms are lowered.	Flashes yellow	Flashes yellow while the support arms are being lowered by the "automatic support arm lift lowering" function.
	Charging process	Green	Shows information on battery charging (trucks with on-board charger). – Flashing: Charging process, readiness for charging – Lit: Charging complete
		Red	Shows information on battery charging (trucks with on-board charger). – Charging interrupted
	Battery indicator, low residual capacity	Yellow	Lights up when residual capacity $\leq$ 30% Charge the battery soon.
		Red	Lights up when residual capacity $\leq$ 20 % Charge the battery immediately.
	Impact display (equipment with fleet management system)	Yellow	Lights up when a moderate shock event has occurred. – Craw speed is triggered.
		Red	Lights up when a serious shock event has occurred. – Lifting, lowering and travel functions are deactivated.
	Collision switch deactivated	Yellow	Illuminates when the collision safety switch is deactivated for ride-on mode.
	Lithium-ion battery overtemperature	Red	Lights up to indicate an overtemperature of the lithium-ion battery
	Overload at pressure sensor	Yellow	Lights up when the carried load exceeds the permissible weight (overload).
		Red	Lights up when the lift function of the truck is deactivated due to the overload.
	Lift deactivated	Yellow	Lights up if the lift functions are deactivated due to insufficient battery capacity or if the lift function has not been released.

Symbol	Meaning	Colour	Function
	Slow travel	Yellow	Lights up when the travel speed is reduced by the control unit of the industrial truck (e.g. optional when the load handler is completely lowered)
			Lights up when the operator reduces the travel speed ("slow travel" button pressed).
	Slow travel	Green	Lights up when slow travel is activated via an external interface (e.g. by the fleet management system).
		Yellow	
		White	
	Mute	Yellow	Illuminates when the transmitter is muted. No warnings or signals are sounded.
	Soft lifting and lowering	Green	Lights up when the "Soft lifting and lowering" function is active.
	Lift height limit reached	Yellow	The mast-lift lift limit has been reached. The lift limit cannot be circumvented.
	Lift height limit reached	Flashing green	The mast-lift lift limit has been reached. The lift limit can be circumvented.
	Missing lift height signals	Flashing yellow	Flashes when sensor signals from the mast time out (monitoring function) – see page 140.

8.1.2.3 Function Symbols

Functions and operator menus that can be operated via the icons and keys of the display unit depend on the operating situation as well as the scope and settings of the truck.

General

Symbol	Meaning	Function
	Function selection	Switches through the various functions and displays of the display unit.
	Travel program	Switches through the various travel programs of the truck.
	Soft lifting and lowering	Activates or deactivates the "Soft lifting and lowering" function.
	ON/OFF	Switches the truck on and off.
	Fine weighing	Press briefly: Activates or deactivates the "fine weighing" function.
		Hold down (approx. 3 seconds): Activates tare mode.
	ECO mode	Activates or deactivates ECO mode.
	Settings	Opens the Settings menu.
	Transmitter	Mutes the transmitter or restores sound.
	Collision safety switch	Deactivates the collision safety switch for rider mode until the next time the truck is started. A deactivated collision safety switch can also be reactivated by pressing the function button once more.

Settings menu

Symbol	Meaning	Function
	Back	Cancels the current operation and returns to the previous menu.
	Edit access code/ transponder	To add or delete access codes or transponders.
	Changing the Set-up Code	To change the set-up code and to activate the keypad or the transponder reader.
	Log-in History	Shows the log-in history in chronological order.

Submenus

Symbol	Meaning	Function
	Confirm	To confirm an entry or a transponder code.
	Adding	To add new access codes.
	Delete	To delete selected access codes.
	Selection up	For selecting the access codes or transponders and to scroll back during the log-in process.
	Selection down	For selecting the access codes or transponders and to scroll forward during the log-in process.

8.1.3 Information field

Display of event messages

Current event messages are shown in the left section of the information line (104).

- Further information on the event messages shown: see page 140.

Speed display (○)

The right section of the information line shows the truck speed in km/h or mph.

- The setting for the displayed units can be configured by the manufacturer's customer service department.

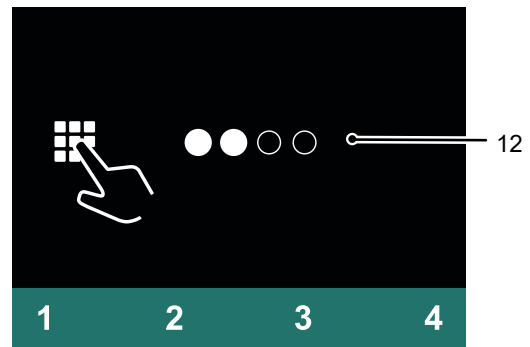
8.1.4 Using the Display:

8.1.4.1 Switching on the truck with an access code

Procedure

- Release the emergency disconnect switch, see page 118.
- Enter the access code with the buttons below the display (12).

The truck is switched on.

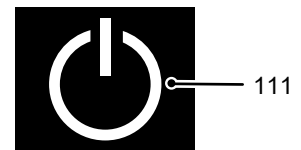


8.1.4.2 Switching off the truck

Procedure

- Press the key under the "Switch off" symbol (111) in the display unit.
- Press the Emergency Disconnect switch, see page 118.

The truck is switched off.



8.1.4.3 Changing the set-up code

Requirements

- The truck is switched on, see page 163.

Procedure

- Press the key below the "Settings" symbol (112).
- Press the key below the "Change set-up code" symbol (113).
- Enter the set-up code using the keys below the display unit (12).

The set-up code entered is shown as filled-in circles.

- Press the key below the "Delete" symbol (114).

The set-up code is deleted.

- Enter the new set-up code using the keys below the display unit (12).

→ The new set-up code must be different from existing access codes.

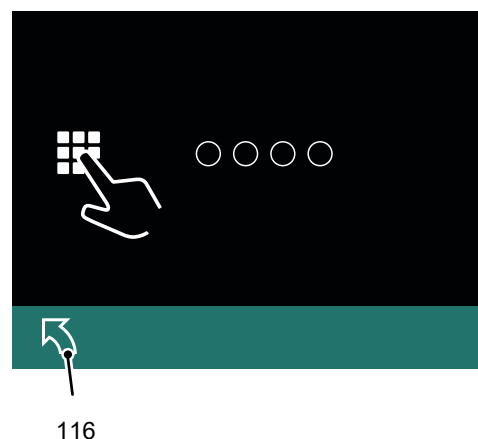
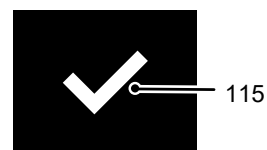
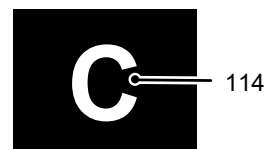
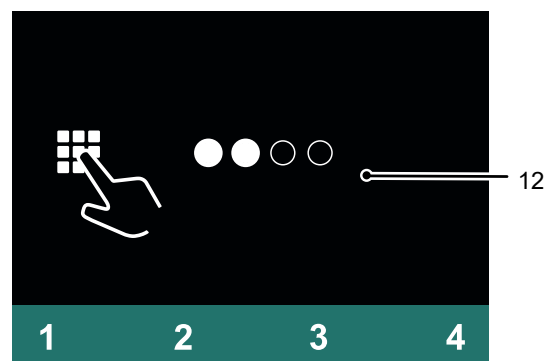
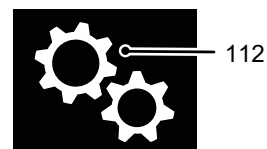
- Press the key below the "Confirm" symbol (115).

The new set-up code is displayed.

→ If the new set-up code has been entered incorrectly, delete it and add a set-up code again.

To return to the main menu, press the key below the "Back" symbol (116).

The set-up code has been changed.



8.1.4.4 Adding a new access code

Requirements

- The truck is switched on, see page 163.

Procedure

- Press the key below the "Settings" symbol (112).
- Press the key below the "Edit access code" symbol (117).

The set-up code is requested.

- Enter the set-up code using the keys below the display unit (12).

All the access codes are displayed.

- Press the key below the "Add" symbol (118).
- Enter the new access code using the keys below the display unit (12).

→ The new access code must be different from existing access codes.

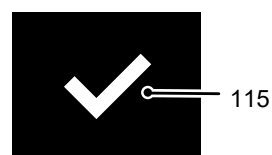
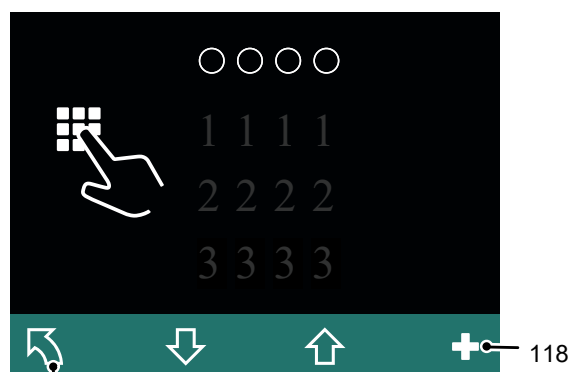
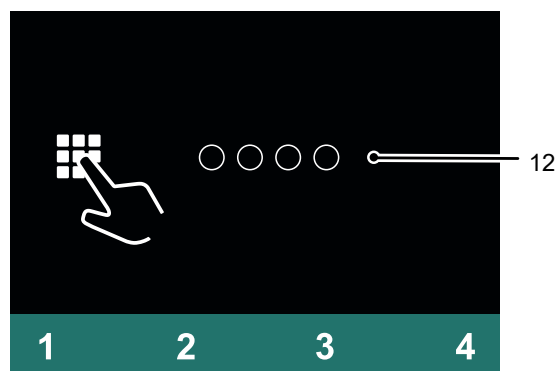
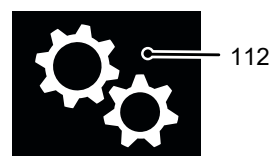
- Press the key below the "Confirm" symbol (115).

The new access code is displayed.

→ If the new access code has been entered incorrectly, delete it, see page 166, and add an access code again.

To return to the main menu, press the key below the "Back" symbol (116).

A new access code has been added.



8.1.4.5 Deleting an access code

Requirements

- The truck is switched on, see page 163.

Procedure

- Press the key below the "Settings" symbol (112).
- Press the key below the "Edit access code" symbol (117).

The set-up code is requested.

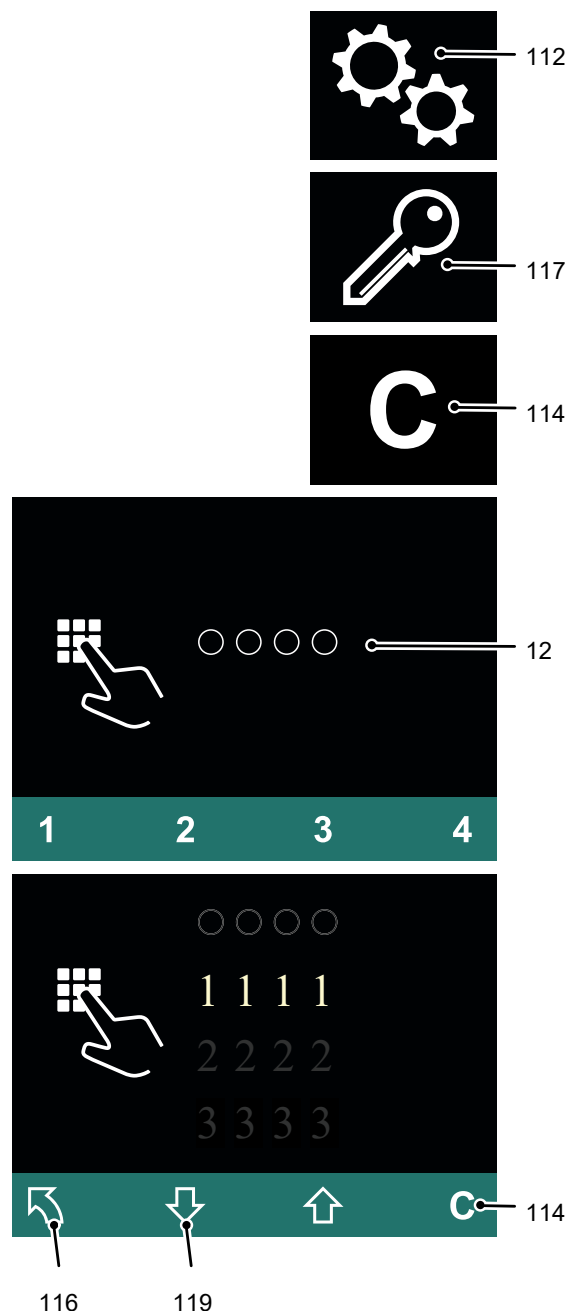
- Enter the set-up code using the keys below the display unit (12).

All the access codes are displayed.

- Select the access code to be deleted using the key below the "Down selection" symbol (119).
- Press the key below the "Delete" symbol (114).

The access code has been deleted.

- To return to the main menu, press the key below the "Back" symbol (116).



8.1.4.6 Displaying the log-in history

The use of the last different access codes is displayed during the log-in process. The last log-in is displayed first.

- If multiple access codes are logged as being displayable simultaneously, the display area can be moved by scrolling forward or back.

Requirements

- The truck is switched on, see page 163.

Procedure

- Press the key below the "Settings" symbol (112).
- Press the key below the "Log-in process" symbol (120).
- Enter the set-up code using the keys below the display unit (12).

The set-up code entered is shown as filled-in circles.

- To scroll forward, press the button under the "Down selection" symbol (119) as many times as necessary.

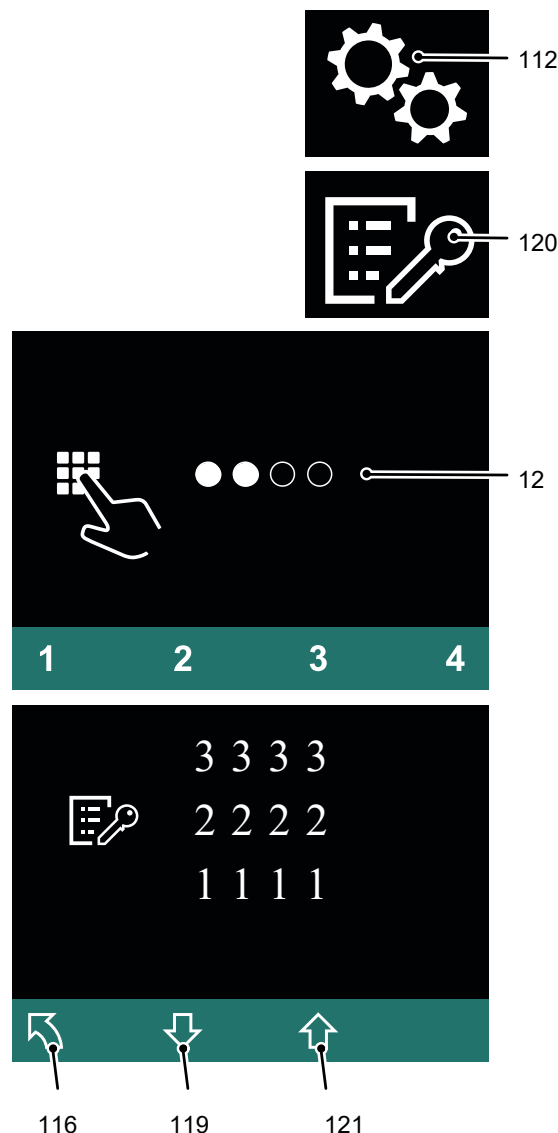
The display area moves: Additional earlier log-ins are displayed.

- To scroll back, press the button under the "Up selection" symbol (121) as many times as necessary.

The display area moves: More recent log-ins are displayed.

- To return to the main menu, press the key below the "Back" symbol (116).

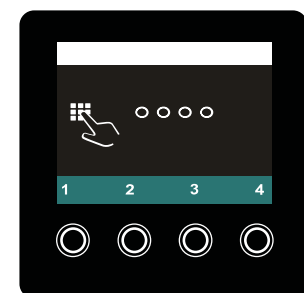
The log-in process is displayed.



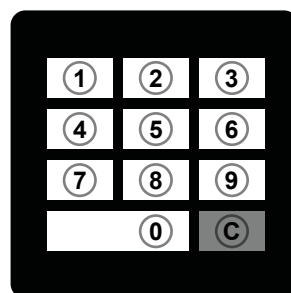
8.2 Keyless Access System

The keyless access systems serve as a replacement for the key switch to release the truck.

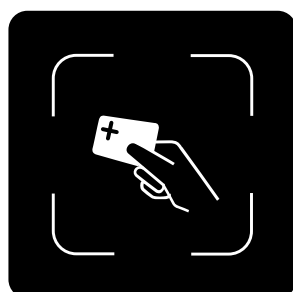
The keyless access system allows an individual code to be allocated to each operator or group of operators.



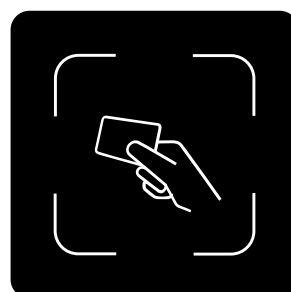
12



18



17



16

Item	Description
12	Display unit (EasyAccess Softkey): – Description see page 150 – Entry of 4-digit set-up and access codes – Up to 10 access codes can be stored – For set-up and access codes with the numbers 1 to 4
16	Transponder reader (EasyAccess Transponder): – Up to 100 transponders can be stored
17	Transponder reader Plus (EasyAccess Transponder): – The transponder reader Plus supports additional transponder standards.
18	Keypad (EasyAccess PinCode): – Consists of keys 0 to 9 and C (clear) – Entry of 4-digit set-up and access codes – Up to 100 access codes can be stored



Operation of transponder reader Plus (17) corresponds to the operation of the standard transponder reader (16).

8.2.1 General Information about the Use of Keyless Access Systems

The default code is to be found on a sticker. When using for the first time, change the set-up code and remove the sticker!

- Default code: 1-2-3-4
- Factory set-up code: 2-4-1-2

- When allocating the codes, ensure the rider trucks are given a different code than pedestrian trucks.
- When a valid code is entered or a valid transponder used, a green tick appears in the display unit.
When an invalid code has been entered or a invalid transponder used, a red cross is displayed, and the entry must be repeated.
- If the truck is not used for a certain length of time, the display unit switches to standby mode. Pressing any key cancels the standby mode.

The following additional settings can be performed by the manufacturer's customer service department.

8.2.2 Commissioning the keypad and the transponder reader

If the truck is equipped with a keypad or a transponder reader, it can only be operated using the keys in the display unit. The keypad and the transponder reader have to be activated by the operating company.

8.2.2.1 Activating the keypad

Procedure

- Release the emergency disconnect switch, see page 118.
- Enter the default code 1-2-3-4 using the keys below the display unit (12).

The truck is switched on.

- Press the key below the "Settings" symbol (112).
- Press the key below the "Change set-up code" symbol (113).
- Enter the set-up code 2-4-1-2 using the keypad (18).

The set-up code entered is displayed.

- When starting the truck for the first time, change the set-up code. The new set-up code must not be the same as the default set-up code or an access code.

Press the key below the "Delete" symbol (114).

The set-up code is deleted.

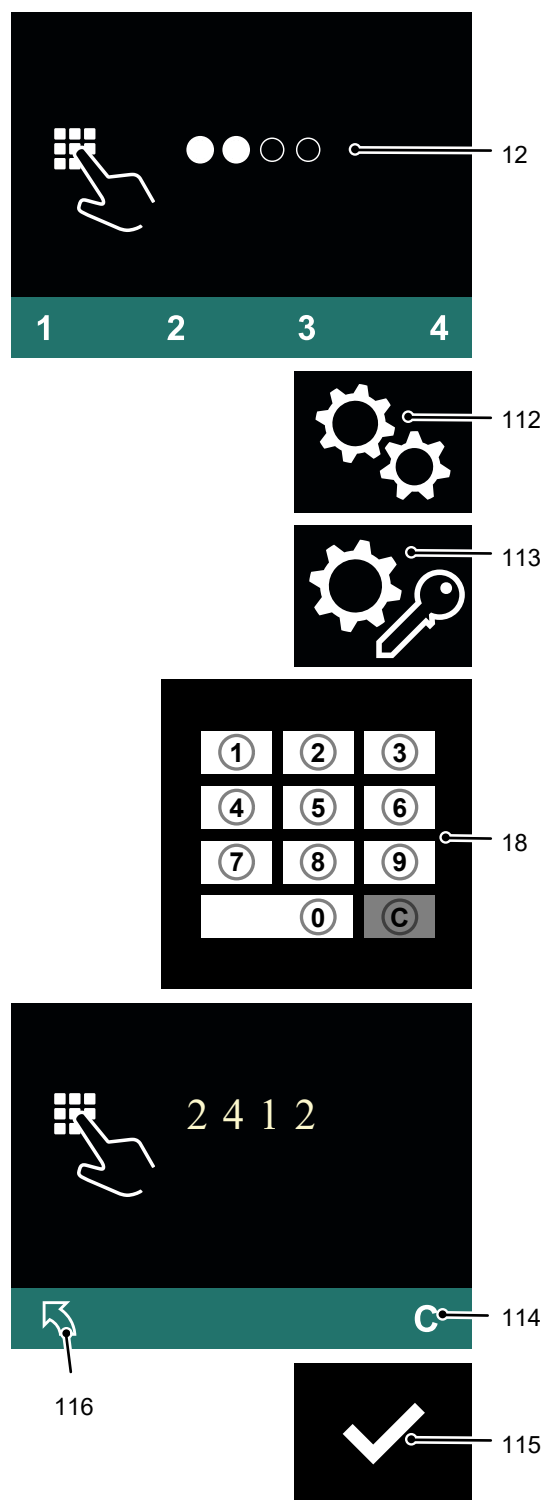
- Enter the new set-up code using the keypad (18).
- Press the key below the "Confirm" symbol (115).

The new set-up code is displayed.

- If the new set-up code was entered incorrectly, the procedure can be repeated using the key below the "Delete" symbol (114).

- To return to the main menu, press the key below the "Back" symbol (116).
- Delete the default code, see page 175.
- Create access codes, see page 174.

The keypad is active.



8.2.2.2 Activating the transponder reader

Procedure

- Release the emergency disconnect switch, see page 118.
- Enter the default code 1-2-3-4 using the keys below the display unit (12).

The truck is switched on.

- Press the key below the "Settings" symbol (112).
- Press the key below the "Change set-up code" symbol (113).
- Enter the set-up code 2-4-1-2 using the keys below the display unit (12).

The set-up code entered is displayed.

- Press the key below the "Delete" symbol (114).

The set-up code is deleted.

- Hold a transponder in front of the transponder reader (16).

This transponder thus becomes the set-up transponder.

- Press the key below the "Confirm" symbol (115).

The code for the set-up transponder is displayed.

→ If the wrong transponder has been used, the procedure can be repeated using the key below the "Delete" symbol (114).

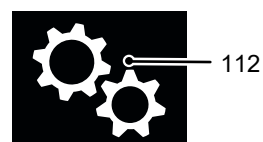
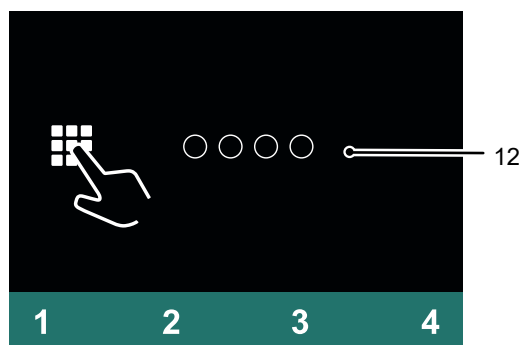
- To return to the main menu, press the key below the "Back" symbol (116).

→ The default code can no longer be used and must be deleted.

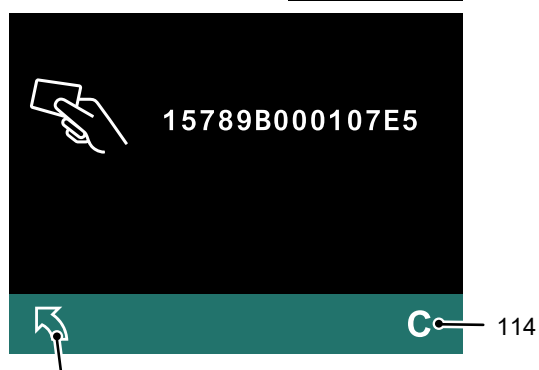
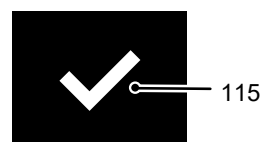
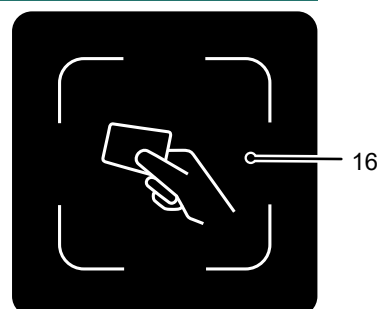
Delete the default code, see page 180.

- Add new transponders, see page 179.

The transponder reader is now active.



116



116

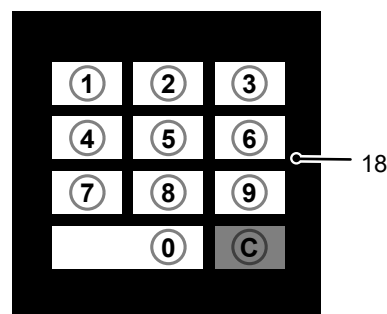
8.2.3 Using the Keypad

8.2.3.1 Switching on the truck with an access code

Procedure

- Release the emergency disconnect switch, see page 118.
- Enter the access code with the keypad (18).

The truck is switched on.



Procedure

- Press the key under the "Switch off" symbol (111) in the display unit.
- Press the Emergency Disconnect switch, see page 118.

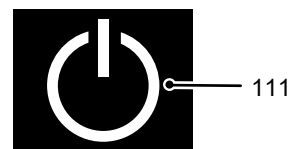
The truck is switched off.

8.2.3.2 Switching off the truck

Procedure

- Press the key under the "Switch off" symbol (111) in the display unit.
- Press the Emergency Disconnect switch, see page 118.

The truck is switched off.



8.2.3.3 Changing the set-up code

Requirements

- The truck is switched on, see page 172.

Procedure

- Press the key below the "Settings" symbol (112).
- Press the key below the "Change set-up code" symbol (113).
- Enter the set-up code using the keypad (18).

The set-up code entered is shown in the display unit (12) as filled-in circles.

- Press the key below the "Delete" symbol (114).

The set-up code is deleted.

- Enter the new set-up code using the keypad (18).

- The new set-up code must be different from existing access codes.

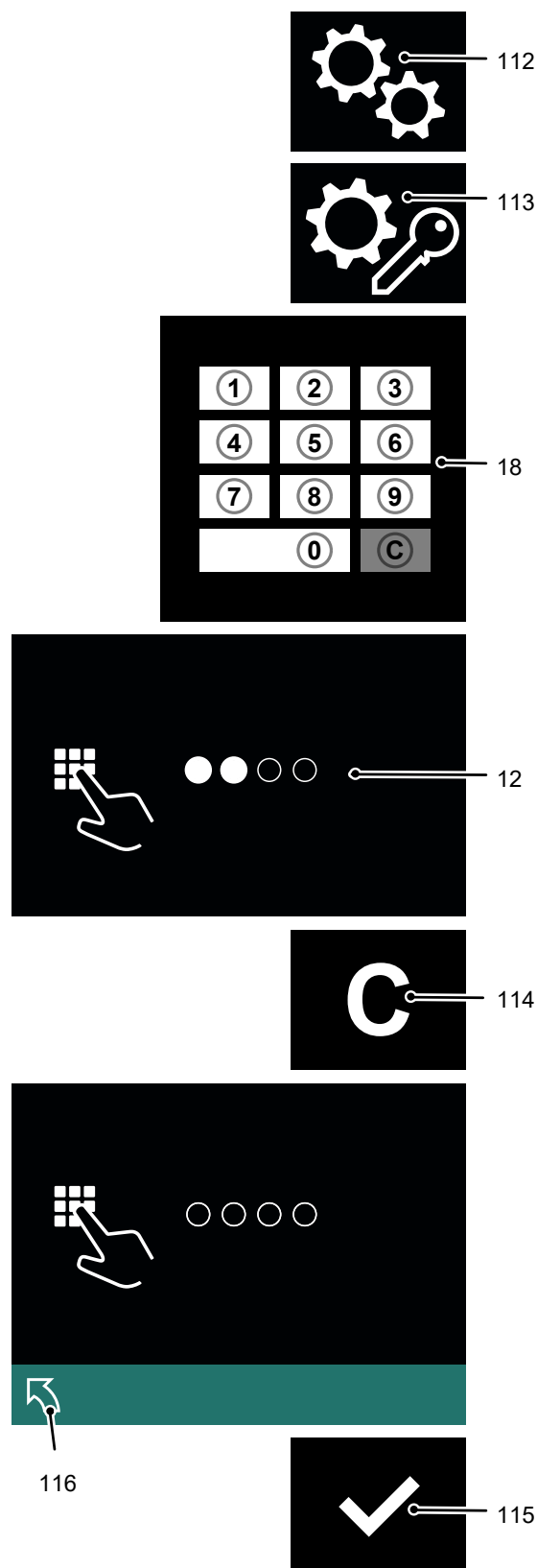
- Press the key below the "Confirm" symbol (115).

The new set-up code is displayed.

- If the new set-up code has been entered incorrectly, delete it and enter the correct set-up code.

To return to the main menu, press the key below the "Back" symbol (116).

The set-up code has been changed.



8.2.3.4 Adding a new access code

Requirements

- The truck is switched on, see page 172.

Procedure

- Press the key below the "Settings" symbol (112).
- Press the key below the "Edit access code" symbol (117).

The set-up code is requested.

- Enter the set-up code using the keypad (18).

All access codes are shown on the display unit (12).

- Press the key below the "Add" symbol (118).
- Enter a new access code using the keypad (18).

→ The new access code must be different from existing access codes.

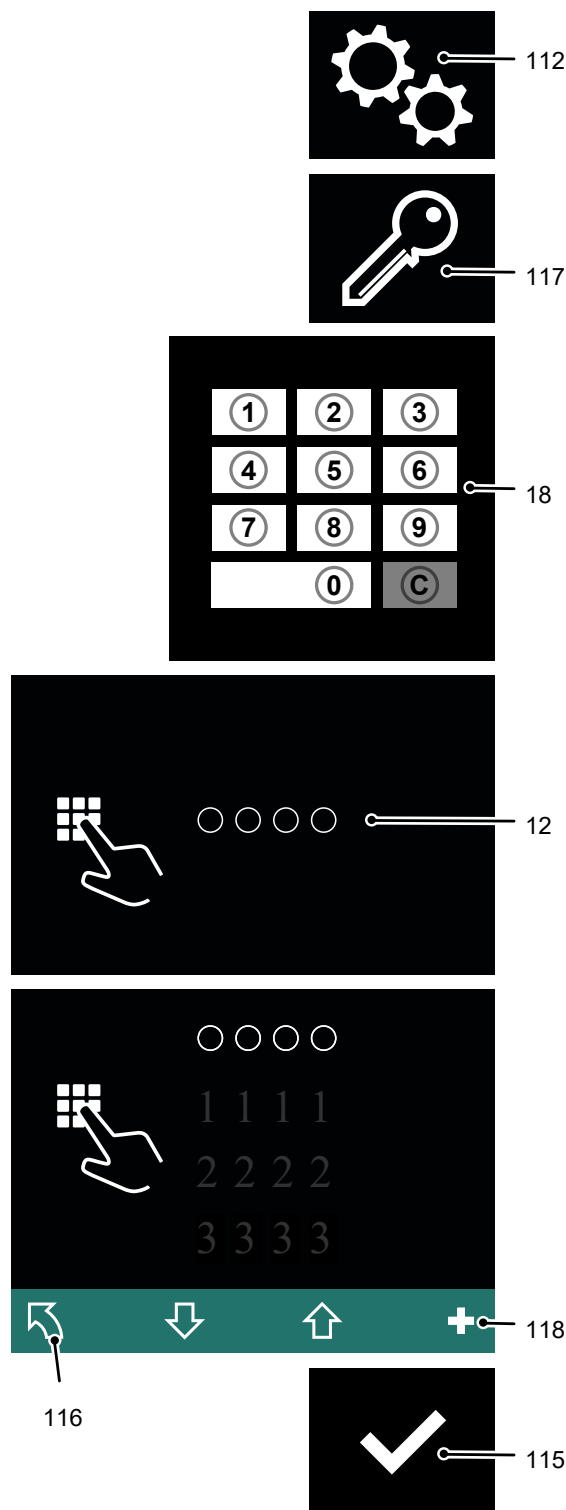
- Press the key below the "Confirm" symbol (115).

The new access code is shown on the display unit (12).

→ If the new access code has been entered incorrectly, delete it, see page 175, and enter the correct access code.

To return to the main menu, press the key below the "Back" symbol (116).

A new access code has been added.



8.2.3.5 Deleting an access code

Requirements

- The truck is switched on, see page 172.

Procedure

- Press the key below the "Settings" symbol (112).
- Press the key below the "Edit access code" symbol (117).

The set-up code is requested.

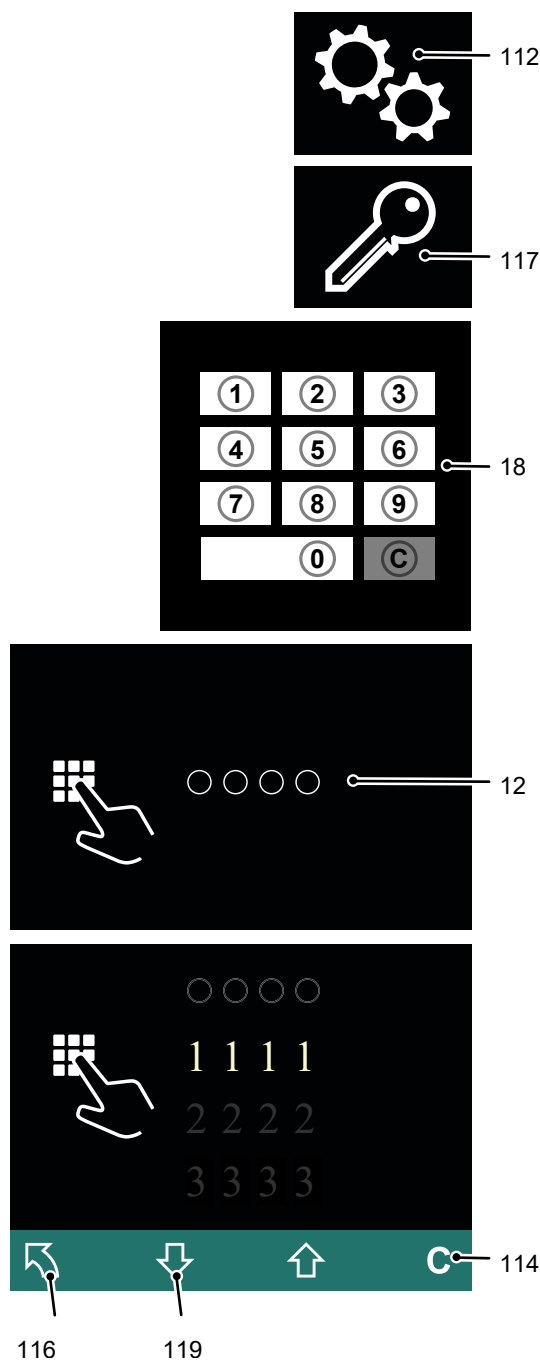
- Enter the set-up code using the keypad (18).

All access codes are shown on the display unit (12).

- Select the access code to be deleted using the key below the "Down selection" symbol (119).
- Press the key below the "Delete" symbol (114).

The access code has been deleted.

- To return to the main menu, press the key below the "Back" symbol (116).



8.2.3.6 Displaying the log-in history

The use of the last different access codes is displayed during the log-in process. The last log-in is displayed first.

- If multiple access codes are logged as being displayable simultaneously, the display area can be moved by scrolling forward or back.

Requirements

- The truck is switched on, see page 172.

Procedure

- Press the key below the "Settings" symbol (112).
- Press the key below the "Log-in process" symbol (120).
- Enter the set-up code using the keypad (18).

The set-up code entered is shown in the display unit (12) as filled-in circles.

- To scroll forward, press the button under the "Down selection" symbol (119) as many times as necessary.

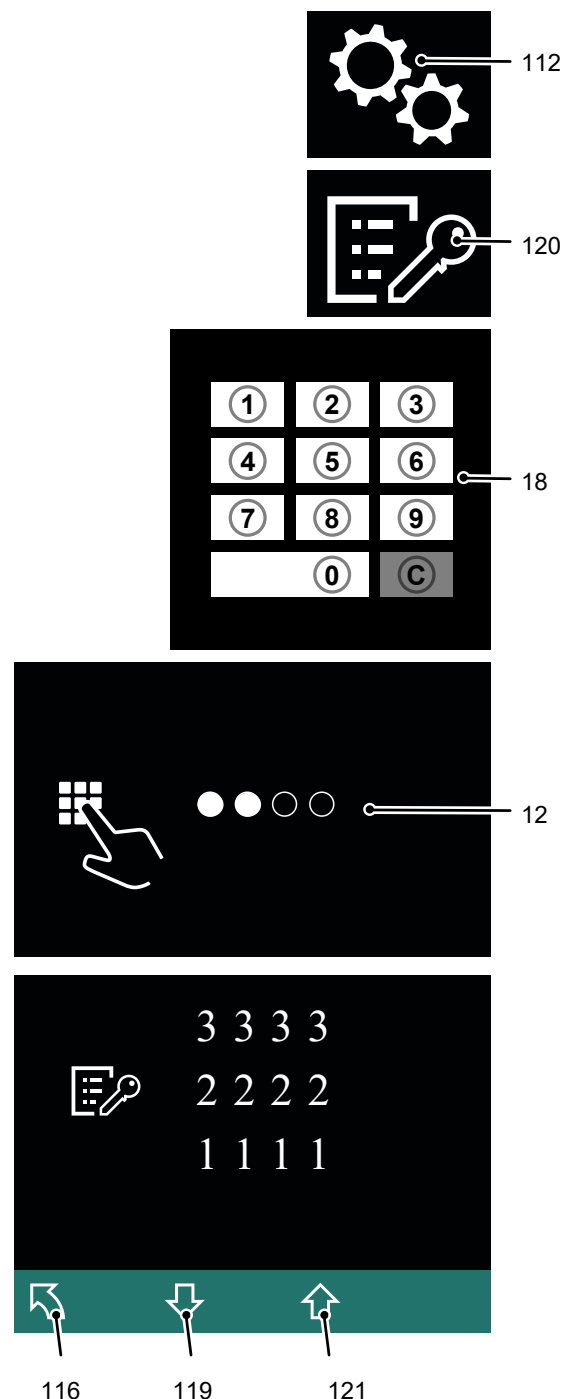
The display area moves: Additional earlier log-ins are displayed.

- To scroll back, press the button under the "Up selection" symbol (121) as many times as necessary.

The display area moves: More recent log-ins are displayed.

- To return to the main menu, press the key below the "Back" symbol (116).

The log-in process is displayed.



8.2.4 Operating the transponder reader

NOTICE

Take care not to damage the transponder. If the transponder is damaged, the truck cannot be switched on.

8.2.4.1 Switching on the truck with a transponder

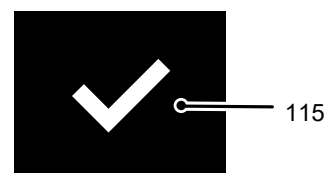
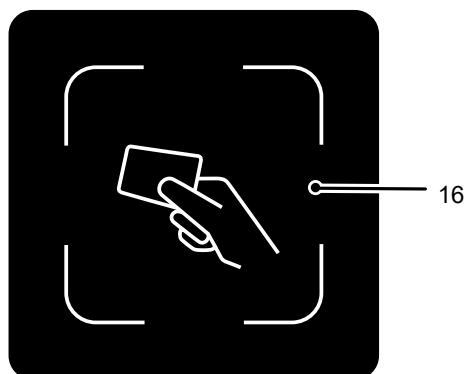
Procedure

- Release the Emergency Disconnect switch, see page 118.
- Hold the transponder in front of the transponder reader (16).

A green tick appears and remains until the transponder has been confirmed. If there is no confirmation within 20 seconds the access prompt appears.

- Press the button below the "Confirm" symbol (115).

The truck is switched on.



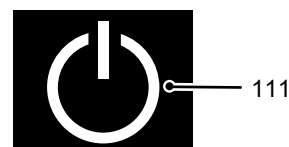
- The truck can only be switched on when the display unit (12) is lit. If the display unit is in standby the code or transponder will not be recognised. Pressing any key cancels standby mode.

8.2.4.2 Switching off the truck

Procedure

- Press the key under the "Switch off" symbol (111) in the display unit.
- Press the Emergency Disconnect switch, see page 118.

The truck is switched off.



8.2.4.3 Changing the set-up transponder

Requirements

- The truck is switched on, see page 177.

Procedure

- Press the key below the "Settings" symbol (112).
- Press the key below the "Change set-up code" symbol (113).
- Place the set-up transponder on the transponder reader (16).

The code of the set-up transponder is shown on the display unit (12).

- Press the key below the "Delete" symbol (114).

A dashed line is shown.

- Place the new set-up transponder on the transponder reader (16).

- ➔ The new set-up transponder code must be different from existing transponder codes.

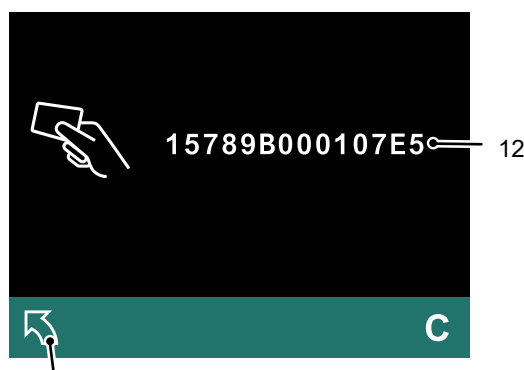
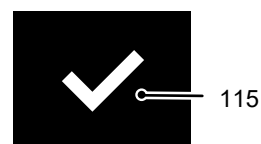
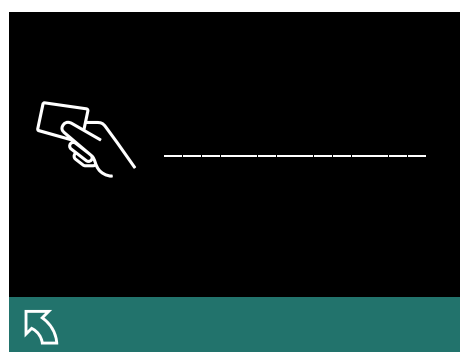
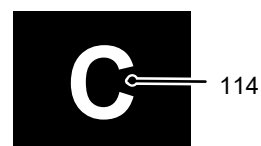
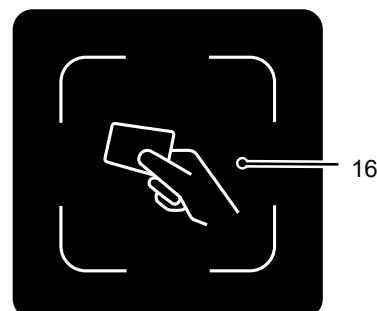
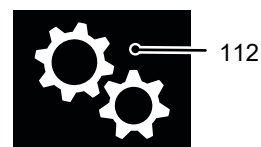
- Press the key below the "Confirm" symbol (115).

The new code for the set-up transponder is displayed.

- ➔ If the wrong transponder has been used, the procedure can be repeated using the key below the "Delete" symbol (114).

To return to the main menu, press the key below the "Back" symbol (116).

The set-up transponder has been changed.



116

8.2.4.4 Adding a new transponder

Requirements

- The truck is switched on, see page 177.

Procedure

- Press the key below the "Settings" symbol (112).
- Press the key below the "Edit transponder" symbol (117).

The set-up transponder is requested.

- Place the set-up transponder on the transponder reader (16).

All transponder codes are shown on the display unit (12).

- Press the key below the "Add" symbol (118).
- Place the new transponder on the transponder reader (16).

→ The new transponder code must be different from existing transponder codes.

- Press the key below the "Confirm" symbol (115).

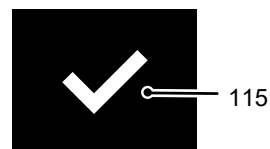
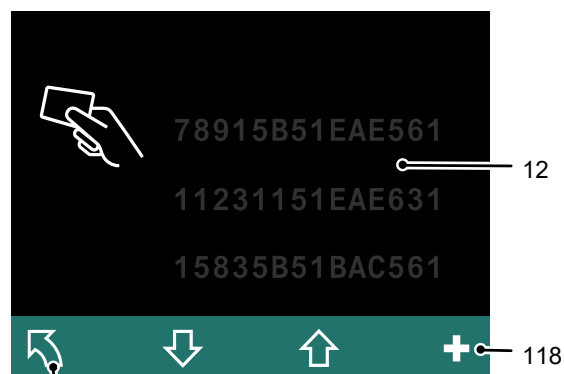
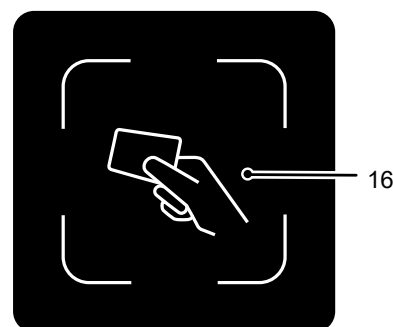
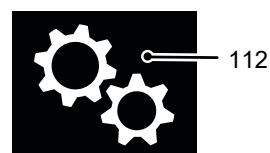
The new transponder code is displayed.

→ If the wrong transponder has been used, delete it, see page 180, and add a correct transponder.

To return to the main menu, press the key below the "Back" symbol (116).

A new transponder has been added.

→ The transponder codes saved are sorted first of all numerically and then alphabetically.



8.2.4.5 Deleting a transponder

Requirements

- The truck is switched on, see page 177.

Procedure

- Press the key below the "Settings" symbol (112).
- Press the key below the "Edit transponder" symbol (117).

The set-up transponder is requested.

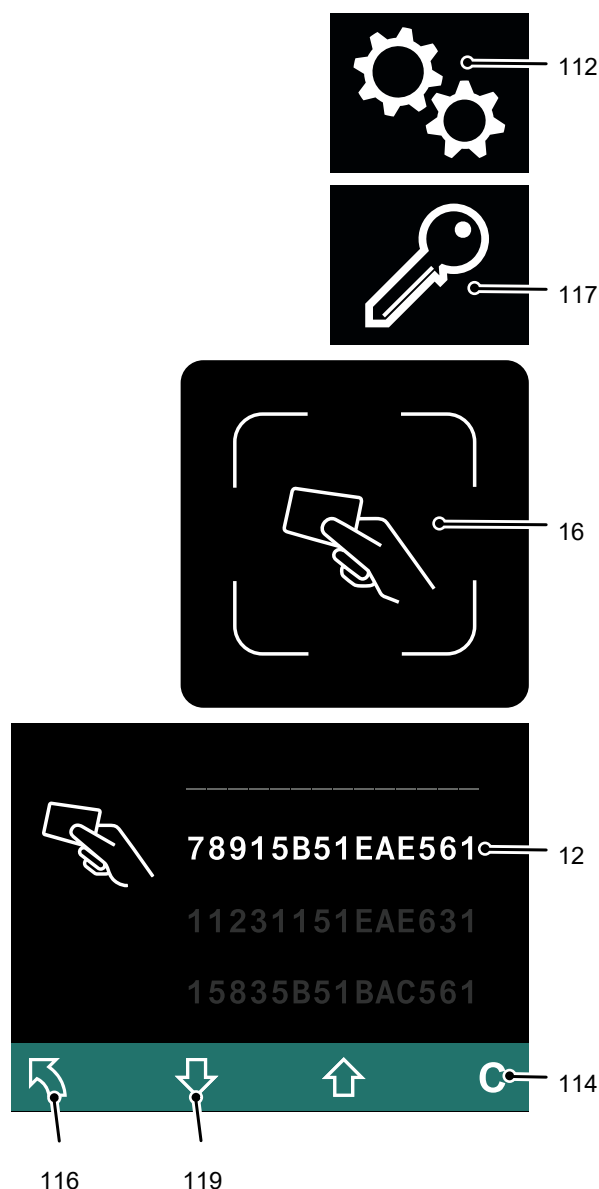
- Place the set-up transponder on the transponder reader (16).

All transponder codes are shown on the display unit (12).

- Select the transponder code to be deleted using the key below the "Down selection" symbol (119).
- Press the key below the "Delete" symbol (114).

The transponder has been deleted.

- To return to the main menu, press the key below the "Back" symbol (116).



8.2.4.6 Displaying the log-in history

The use of the last different transponders is displayed during the log-in process. The last log-in is displayed first.

- If multiple transponders are logged as being displayable simultaneously, the display area can be moved by scrolling forward or back.

Requirements

- The truck is switched on, see page 172.

Procedure

- Press the key below the "Settings" symbol (112).
- Press the key below the "Log-in process" symbol (120).
- Place the set-up transponder on the transponder reader (16).
- To scroll forward, press the button under the "Down selection" symbol (119) as many times as necessary.

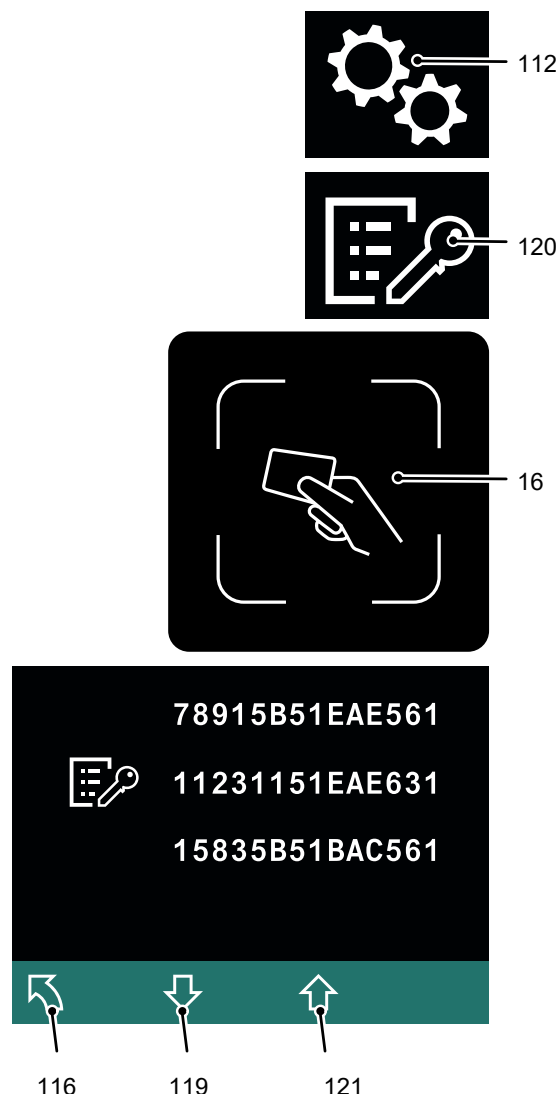
The display area moves: Additional earlier log-ins are displayed.

- To scroll back, press the button under the "Up selection" symbol (121) as many times as necessary.

The display area moves: More recent log-ins are displayed.

- To return to the main menu, press the key below the "Back" symbol (116).

The log-in process is displayed.



8.3 Parameters

8.3.1 Model up to 2022

→ These parameters can be adjusted by the manufacturer's customer service department.

Travel program 1

Function	Setting range	Standard setting
Acceleration	20 - 200 (0.2 - 2.0 m/s ²)	40 (0.4 m/s ²)
Coasting brake	20 - 330 (0.2 - 3.3 m/s ²)	50 (0.5 m/s ²)
Reversing brake	20 - 160 (0.2 - 1.6 m/s ²)	130 (1.3 m/s ²)
Maximum speed in drive direction via travel switch	0 - 60 (0 - 6.0 km/h)	40 (4.0 km/h)
Maximum speed in load direction via travel controller	0 - 60 (0 - 6.0 km/h)	40 (4.0 km/h)

Travel program 2

Function	Setting range	Standard setting
Acceleration	20 - 200 (0.2 - 2.0 m/s ²)	50 (0.5 m/s ²)
Coasting brake	20 - 330 (0.2 - 3.3 m/s ²)	80 (0.8 m/s ²)
Maximum speed in drive direction via travel switch	0 - 60 (0 - 6.0 km/h)	56 (5.6 km/h)
Maximum speed in load direction via travel controller	0 - 60 (0 - 6.0 km/h)	56 (5.6 km/h)

Travel program 3

Function	Setting range	Standard setting
Acceleration	20 - 200 (0.2 - 2.0 m/s ²)	100 (1.0 m/s ²)
Coasting brake	20 - 330 (0.2 - 3.3 m/s ²)	80 (0.8 m/s ²)
Maximum speed in drive direction via travel switch	0 - 60 (0 - 6.0 km/h)	60 (6.0 km/h)
Maximum speed in load direction via travel controller	0 - 60 (0 - 6.0 km/h)	60 (6.0 km/h)

Common parameters

Function	Setting range	Standard setting	Comments
Reduction brake	20 - 120 (0.2 - 1.2 m/s ²)	40 (0.4 m/s ²)	Deceleration for travel switch setting reduction
Service brake	150 - 330 (1.5 - 3.3 m/s ²)	175 (1.75 m/s ²)	Deceleration for tiller in brake position
Body protection brake	50 - 200 (0.5 - 2.0 m/s ²)	200 (2.0 m/s ²)	Speed reduction when body protection switch applied
Standard travel program	0 - 3	2	0 = No travel program 1 = Slow 2 = Medium 3 = Fast

Battery parameters

No.	Function	Range	Standard setting	Comments
1377	Battery type (normal / high-performance / dry-cell)	0 – 5 7 9	1	0 = Normal (wet-cell) 1 = High performance (wet-cell) 2 = Dry (maintenance-free) 3 = US "Flat Plate" type 4 = US "Pallet Pro" type 5 = US "Tubular Plate" type 7 = Exide GF12063Y (Dry battery) 9 = XFC (Special battery)
1388	ELH battery charger charging characteristic	0 – 6	1	0 = No charging function 1 = PzS wet-cell batteries 100 - 300 Ah and PzM batteries from 0 - 179 Ah 2 = PzS wet-cell batteries with pulse characteristic 200 - 414 Ah and PzM batteries from 180 - 400 Ah 3= PzV batteries, maintenance-free 100 - 150 Ah 4= PzV batteries, maintenance-free 151 - 200 Ah 5= PzV batteries, maintenance-free 201 - 300 Ah 6= PzV batteries, maintenance-free 301 - 333 Ah
1389	Discharge monitor function	0 / 1	1	0 = Not active 1 = Active

Hydraulic function lock parameter

No.	Function	Range	Standard setting	Comments ^{1,2}
2338	Lifting, lowering	0 - 15	5	0 = Lifting and lowering always released 1 = Lifting only with release 2 = Lifting only when stationary 3 = Lifting only with release and only when stationary 4 = Lowering only with release 5 = Lifting and lowering only with release 6 = Lifting only when stationary, lowering only with authorisation 7 = Lowering only with authorisation, lowering only with authorisation 8 = Lowering only when stationary 9 = Lifting only with authorisation, lowering only when stationary 10 = Lifting and lowering when stationary 11 = Lifting only with release and when stationary, lowering only when stationary 12 = Lowering only with authorisation and only when stationary 13 = Lifting and lowering only with authorisation, lowering only when stationary 14 = Lifting and lowering only when stationary, lowering only with release 15 = Lifting and lowering only with release and only when stationary
¹⁾ With authorisation = with tiller in travel range (F) or with "slow travel" switch applied ²⁾ Stationary = No travel operations performed				

F Truck maintenance

1 Spare Parts

To ensure safe and reliable operation, use only the manufacturer's original spare parts.

The manufacturer's original spare parts are consistent with the manufacturer's specifications and guarantee the highest possible quality of safety, size accuracy and material.

The installation or use of non-original spare parts can negatively affect the specified properties of the product and impair safety. The manufacturer cannot be held liable for damage caused by the use of non-original spare parts.

The product-related electronic spare parts catalogue can be found at (www.jungheinrich.de/spare-parts-search) by entering the serial number.

→ The serial number can be found on the data plate, see page 40.



2 Operational Safety and Environmental Protection

The inspections and maintenance tasks listed in chapter "Maintenance, Inspection and Changing of Maintenance Parts Requiring Replacement" must be performed according to the defined service intervals – see page 213.

The manufacturer recommends the replacement of the maintenance parts also listed in chapter "Maintenance, Inspection and Changing of Maintenance Parts Requiring Replacement" according to the specified replacement intervals – see page 213.

WARNING!

Risk of accidents and component damage

Any modification to the truck, in particular the safety mechanisms, is prohibited.

Exception: Operating companies should only make changes or have changes made to powered industrial trucks if the manufacturer is no longer operating in the field and there is no successor to the business; operating companies must however:

- Ensure that the changes to be made are planned, tested and performed by a specialist engineer in industrial trucks taking safety into account.
- Keep permanent records of the construction, tests and completion of changes
- Carry out and have authorised the respective changes to the capacity data plates, decals and stickers as well as the operating instructions and workshop manuals
- Attach a permanent and clearly visible marking to the truck indicating the types of changes made, the date of the changes and the name and address of the organisation responsible for the work.

NOTICE

Only original spare parts are subject to the manufacturer's quality control. To ensure safe and reliable operation, use only the manufacturer's spare parts.

For safety reasons, only components which have been specially agreed by the manufacturer for this truck may be installed near the computer, controllers and wire guidance sensors (antennae). These components (computers, controllers, wire guidance sensors (antennae)) must therefore not be replaced by similar components from other trucks of the same series.



On completion of inspection and service work, carry out the operations listed in the "Recommissioning the truck after cleaning or maintenance work section, see page 207.

3 Maintenance Safety Regulations

Maintenance and repair personnel

- The manufacturer has a customer service department specially trained for these tasks. A maintenance contract with the manufacturer will support trouble-free operation.

Truck maintenance, repair work and changing of parts requiring replacement must only be carried out by specialist personnel. The activities to be carried out are divided into the following target groups.

Customer Services

Customer Services are specially trained in the use of the truck and are able to carry out maintenance and repairs independently. Customer Services are aware of the relevant standards, guidelines and safety regulations as well as potential risks.

Operating company

The maintenance personnel of the operating company has the technical expertise and experience to perform the activities in the maintenance check list for the operating company. The maintenance and repair work to be performed by the operating company are also written down, see page 197.

3.1 Working on the electrical system

WARNING!

Risk of accidents due to electrical current

Make sure the electrical system is voltage-free before starting work on it. The capacitors in the control unit must be completely discharged. The capacitors are fully discharged approx. 10 minutes after disconnecting the electrical system from the battery.

Before starting maintenance on the electrical system:

- ▶ Only suitably trained electricians may operate on the truck's electrical system.
 - ▶ Before working on the electrical system, take all precautionary measures to avoid electric shocks.
 - ▶ Park the truck securely – see page 111.
 - ▶ Disconnect the battery connector.
 - ▶ Remove any rings, metal wristbands etc.
-

3.2 Consumables and used parts

CAUTION!

Consumables and used parts are an environmental hazard

Used parts and consumables must be disposed of in accordance with the applicable environmental-protection regulations. Oil changes should be carried out by the manufacturer's customer service department, whose staff are specially trained for this task.

- ▶ Note the safety regulations when handling these materials.
-

3.3 Wheels

WARNING!

The use of wheels that do not match the manufacturer's specifications can result in accidents

The quality of wheels affects the stability and performance of the truck.

Uneven wear reduces truck stability and increases the stopping distance.

- ▶ After replacing wheels, make sure the truck is not skewed.
 - ▶ Always replace wheels in pairs, i.e. left and right at the same time.
-



When replacing wheels fitted at the factory, only use the manufacturer's original spare parts. Otherwise the truck's rated performance cannot be ensured, see page 187.

3.4 Hydraulic system

WARNING!

Leaky hydraulic systems can result in accidents

Hydraulic oil can escape from leaky and faulty hydraulic systems.

- ▶ Report any defects immediately to your supervisor.
 - ▶ Mark defective truck and take out of service.
 - ▶ Do not return the industrial truck to service until you have identified and rectified the fault.
 - ▶ Remove any spilled hydraulic immediately with an appropriate bonding agent.
 - ▶ The bonding agent / consumable mixture must be disposed of in accordance with regulations.
-

WARNING!

Faulty hydraulic hoses can result in injury and infection

Pressurised hydraulic oil can escape from fine holes or hairline cracks in the hydraulic hoses. Brittle hydraulic hoses can burst during operation. People standing near the truck can be injured by the hydraulic oil.

- ▶ Call for a doctor immediately in the event of an injury.
 - ▶ Do not touch pressurised hydraulic hoses.
 - ▶ Report any defects immediately to your supervisor.
 - ▶ Mark defective truck and take it out of service.
 - ▶ Do not return the industrial truck to service until you have identified and rectified the fault.
-

NOTICE

Checking and replacing hydraulic hoses

Hydraulic hoses can become brittle through age and must be checked at regular intervals. The application conditions of the industrial truck have a considerable impact on the ageing of the hydraulic hoses.

- ▶ Check the hydraulic hoses at least once per year and replace if necessary.
 - ▶ In the case of heavy-duty operation, the inspection intervals must be reduced accordingly.
 - ▶ Under normal operating conditions, preventive replacement of the hydraulic hoses is recommended after 6 years. The owner must carry out a risk assessment to ensure safe, prolonged use. The resulting protection measures must be observed and the inspection interval reduced accordingly.
-

3.5 Lift Chains

WARNING!

Risk of accident from non-lubricated and incorrectly cleaned lift chains

Lift chains are safety-critical parts. Lift chains must not show signs of serious contamination. Lift chains and pivot pins must always be clean and sufficiently lubricated.

- ▶ The lift chains are cleaned by wiping or brushing. Significant contamination can be softened by a paraffin derivative such as petroleum.
 - ▶ Do not clean lift chains with high-pressure steam jets or chemical cleaning agents.
 - ▶ Immediately after cleaning, dry the lift chain with compressed air and apply a chain spray.
 - ▶ Lift chains must be unloaded when lubricated; to do this, fully lower the load handler.
 - ▶ Lubricate a lift chain with particular care around the pulleys.
-

4 Lubricants and Lubrication Schedule

4.1 Handling consumables safely

Handling consumables

Consumables must always be handled correctly. Follow the manufacturer's instructions.

⚠ WARNING!

Improper handling is hazardous to health, life and the environment

Consumables can be flammable.

- ▶ Keep consumables away from hot components and naked flames.
- ▶ Always keep consumables in prescribed marked containers.
- ▶ Always fill consumables in clean containers.
- ▶ Do not mix up different grades of consumable. The only exception to this is when mixing is expressly stipulated in the Operating Instructions.

⚠ CAUTION!

Spilled consumables can cause slipping and endanger the environment

Risk of slipping from spilled consumables. The risk is greater when combined with water.

- ▶ Do not spill consumables.
- ▶ Spilled consumables must be removed immediately with an appropriate bonding agent.
- ▶ The bonding agent / consumable mixture must be disposed of in accordance with regulations.

⚠ WARNING!

Improper handling of oils can be hazardous

Oils (chain spray / hydraulic oil) are flammable and poisonous.

- ▶ Dispose of used oils in accordance with regulations. Store used oil safely until it can be disposed of in accordance with regulations.
- ▶ Do not spill oil.
- ▶ Spilled oils must be removed immediately with an appropriate bonding agent.
- ▶ The mixture consisting of the bonding agent and oil must be disposed of in accordance with regulations.
- ▶ Observe national regulations when handling oils.
- ▶ Wear safety gloves when handling oils.
- ▶ Prevent oil from coming into contact with hot motor parts.
- ▶ Do not smoke when handling oil.
- ▶ Avoid contact and digestion. If you swallow oil do not induce vomiting but seek medical assistance immediately.
- ▶ Seek fresh air after breathing in oil fumes or vapours.
- ▶ If oil has come into contact with your skin, rinse your skin with water.
- ▶ If oil has come into contact with your eyes, rinse them with water and seek medical assistance immediately.
- ▶ Replace oil-soaked clothing and shoes immediately.

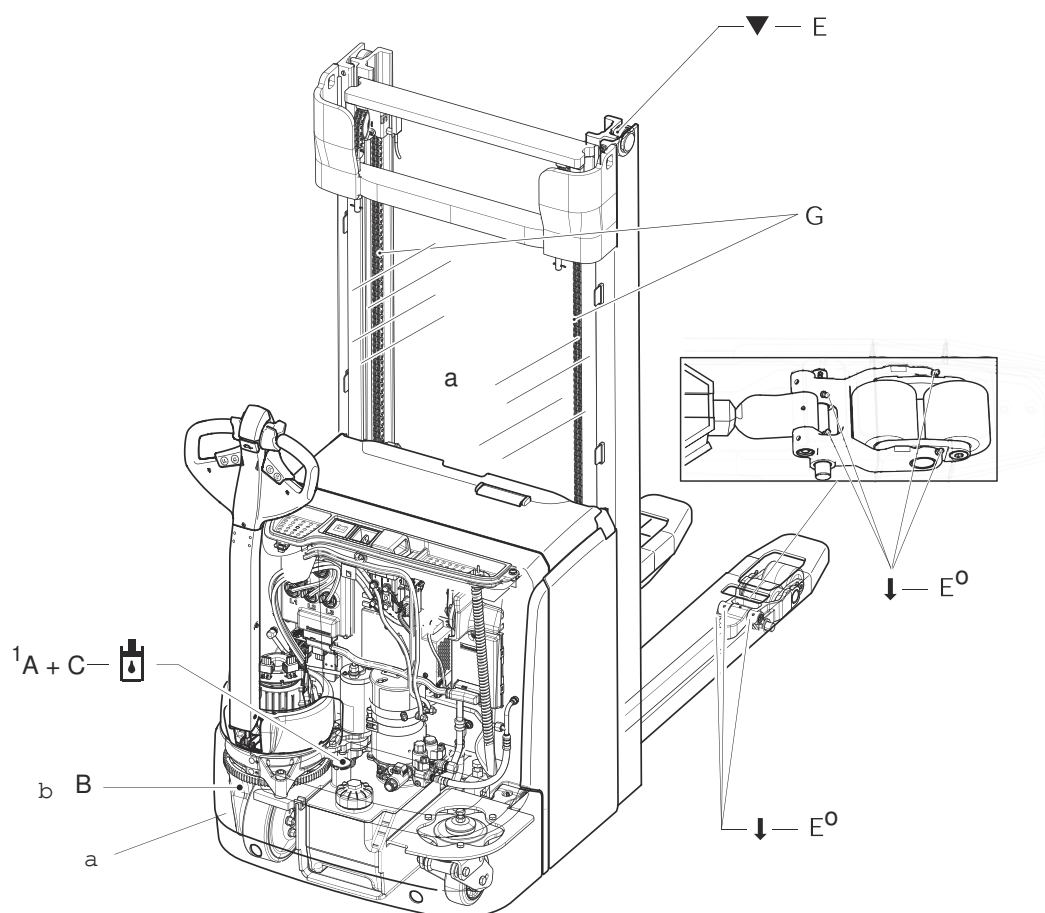
CAUTION!

Consumables and used parts are an environmental hazard

Used parts and consumables must be disposed of in accordance with the applicable environmental-protection regulations. Oil changes should be carried out by the manufacturer's customer service department, whose staff are specially trained for this task.

► Note the safety regulations when handling these materials.

4.2 Lubrication Schedule



▼	Contact surfaces	◇	Transmission oil drain plug
↓	Grease nipple	□	Cold-store application
⬮	Hydraulic-oil filler plug	◆	Transmission oil filler neck
○	Lifting kinematics of initial lift (EJC 112z only)		

1 Mixture ratio for cold-store usage 1:1

2 Transmission oil is a guideline. The spur wheel should be dipped approx. 2 mm into the transmission oil.

4.3 Consumables

Code	Order no.	Supplied quantity	Designation	Used for
A	51132827*	5.0 l	Jungheinrich Hydraulic oil	Hydraulic System
	51132826*	1.0 l		
	29200670	5.0 l	H-LP 46, DIN 51524	
B	50380904	5.0 l	Titan Gear HSY 75W-90	Transmission
C	51081875*	5.0 l	H-LP 10, DIN 51524 Cold-store hydraulic oil	Hydraulic system Additive for use in cold stores
E	29202050	1.0 kg	Polylub GA 352P	Lubrication service
G	29201280	0.5 l	Chain spray	Chains

* *The trucks are delivered ex-works with a special hydraulic oil (the Jungheinrich hydraulic oil with a blue colouration) and the cold-store hydraulic oil (red colouration). The Jungheinrich hydraulic oil is available only from the Jungheinrich service department. The use of named alternative hydraulic oils is not prohibited but may lead to a loss in functionality. The Jungheinrich hydraulic oil may be mixed with the named alternative hydraulic oil.



For cold store applications, the Jungheinrich hydraulic oil (A) and the cold store hydraulic oil (C) must be mixed in a 1:1 ratio.

Grease guidelines

Code	E
Saponification	Lithium
Dew point	>220 °C
Worked penetration at 25 °C	280 - 310
NLG1 class	2
Operating temperature	-35 °C / +120 °C

5 Maintenance and repairs

5.1 Preparing the truck for maintenance and repair work

WARNING!

Risk of accident when working under the load handler or truck when not correctly secured

Failure to secure the raised load handler or truck correctly can result in uncontrolled lowering of the load handler or can cause the truck to tip or slip, which in turn can lead to fatal injuries.

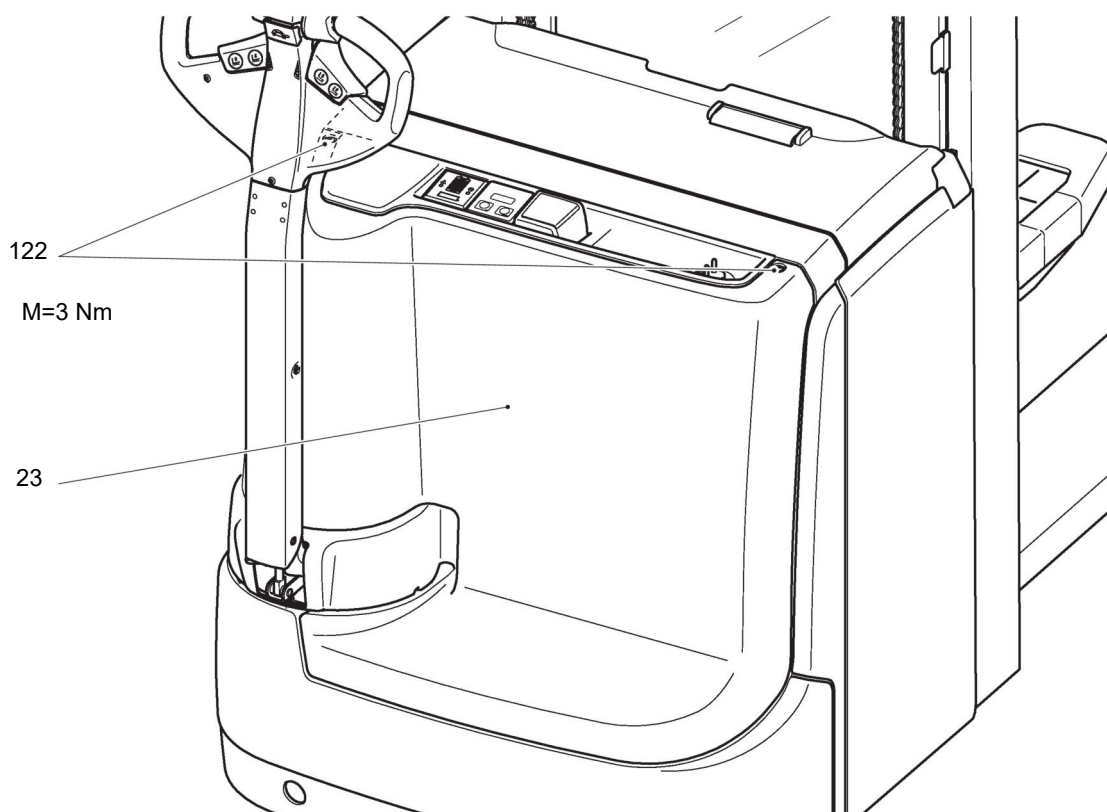
- ▶ Secure the raised load handler or truck such that no lowering, tipping or slipping is possible.
 - ▶ The prescribed instructions must be followed when raising the truck – see page 47.
 - ▶ When working on the parking brake, secure the truck to prevent it rolling away accidentally (e.g. using chocks).
-

All necessary safety measures must be taken to avoid accidents when carrying out maintenance and repairs. The following preparations must be made:

Procedure

- Park the truck securely, see page 111.
- Disconnect the battery to prevent the truck from being switched on accidentally.

5.2 Disassembling or assembling the front panel



Front panel disassembly

Requirements

- Prepare the truck for maintenance and repair work, see page 197.

Tools and Material Required

- Allen key opening 5

Procedure

- Turn or slightly tilt tiller towards the edge of the truck.
- Remove the screws (122) with the Allen key.
- Carefully remove the front panel (23) and put it to one side.

The front cover has been removed.



When installing the front panel (23), tighten the screws (122) to 3 Nm.

5.3 Lifting and jacking up the truck safely

WARNING!

Risk of injury when lifting and jacking up the truck

When lifting and jacking up the truck, there is a risk of the truck unexpectedly tipping or slipping.

- ▶ Jack up the truck on level ground.
 - ▶ Secure the truck against unintentional movement.
 - ▶ Use a jack with sufficient capacity.
 - ▶ When lifting the truck, secure the lifting accessories to the attachment points specially provided for this purpose – see page 47.
 - ▶ When jacking up, use suitable means (chocks, wooden blocks) to prevent the truck from slipping or tipping.
-

5.4 Cleaning

5.4.1 Cleaning the truck

CAUTION!

Risk of fire due to use of flammable cleaning agents

Using flammable cleaning agents increases the risk of fire.

- ▶ Do not use any flammable cleaning agents when cleaning.
- ▶ Disconnect the battery before starting cleaning work.
- ▶ Before cleaning, take necessary safety measures to prevent spark formation (e.g. due to short circuits).

NOTICE

Risk of component damage when cleaning the truck

Cleaning with a high-pressure cleaner can result in malfunctions due to humidity.

- ▶ Cover all electronic system assemblies (controls, sensors, motors etc.) before cleaning the truck with a high-pressure cleaner.
- ▶ Do not hold the jet of the high-pressure cleaner at marking points to avoid damaging them – see page 39.
- ▶ Do not clean the truck with a steam jet.



Cleaning tasks may only take place in the designated locations, which adhere to the stipulations of the country of use.

Requirements

- Truck prepared for maintenance and repair work – see page 197.

Tools and Material Required

- Water-based cleaning agents
- Sponge or cloth

Procedure

- Clean the surface of the truck with water-based solvents and water. Use a sponge or cloth to clean.
- In particular, clean the following areas:
 - Window(s)
 - Oil filler caps and their surroundings
 - Grease nipples (before lubrication)
- Dry the truck after cleaning, e.g. with compressed air or a dry cloth.
- Carry out all the tasks in the section "Recommissioning the truck after cleaning or maintenance work" – see page 207.

The truck is now clean.

5.4.2 Cleaning the electrical system assemblies

NOTICE

Risk of electrical-system damage

Cleaning the electronic system assemblies (controllers, sensors, motors etc.) with water can damage the electrical system.

- ▶ Do not clean the electrical system with water.
- ▶ Clean the electrical system with weak suction or compressed air (use a compressor with a water trap) and a non-conductive, anti-static brush.

Cleaning the electrical system assemblies

Requirements

- Truck prepared for maintenance and repair work – see page 197.

Tools and Material Required

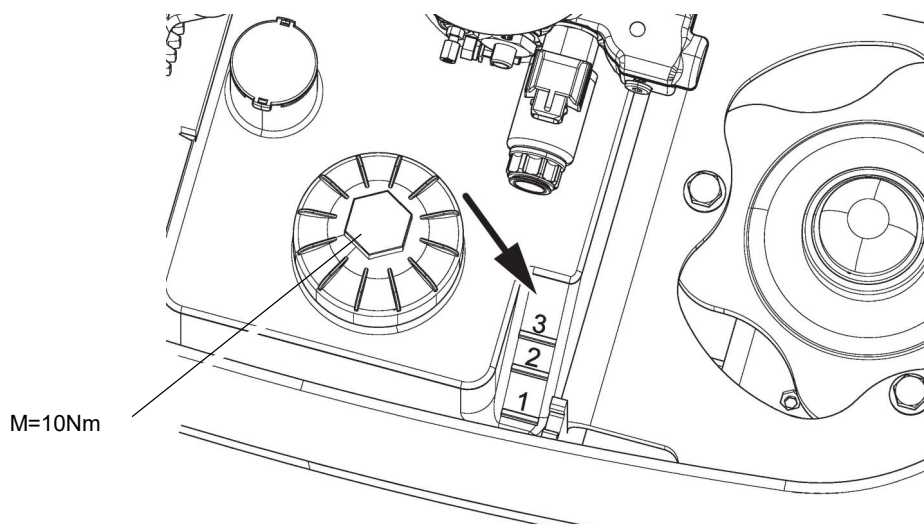
- Compressor with water separator
- Non-conductive, antistatic brush

Procedure

- Expose the electrical system – see page 198.
- Clean the electrical system assemblies with weak suction or compressed air (use a compressor with a water separator) and a non-conductive, anti-static brush.
- Fit the electrical system cover – see page 198.
- Carry out all the tasks listed in the section "Recommissioning the truck after cleaning or maintenance work" – see page 207.

The electrical-system assemblies are now clean.

5.5 Checking the hydraulic oil level



Check oil level

- Observe the safety instructions for maintenance work – see page 189.

Requirements

- Load handler lowered.
- Truck prepared for maintenance and repair work – see page 197.

Procedure

- Remove the front panel – see page 198.
- Check the oil level in the hydraulic reservoir.

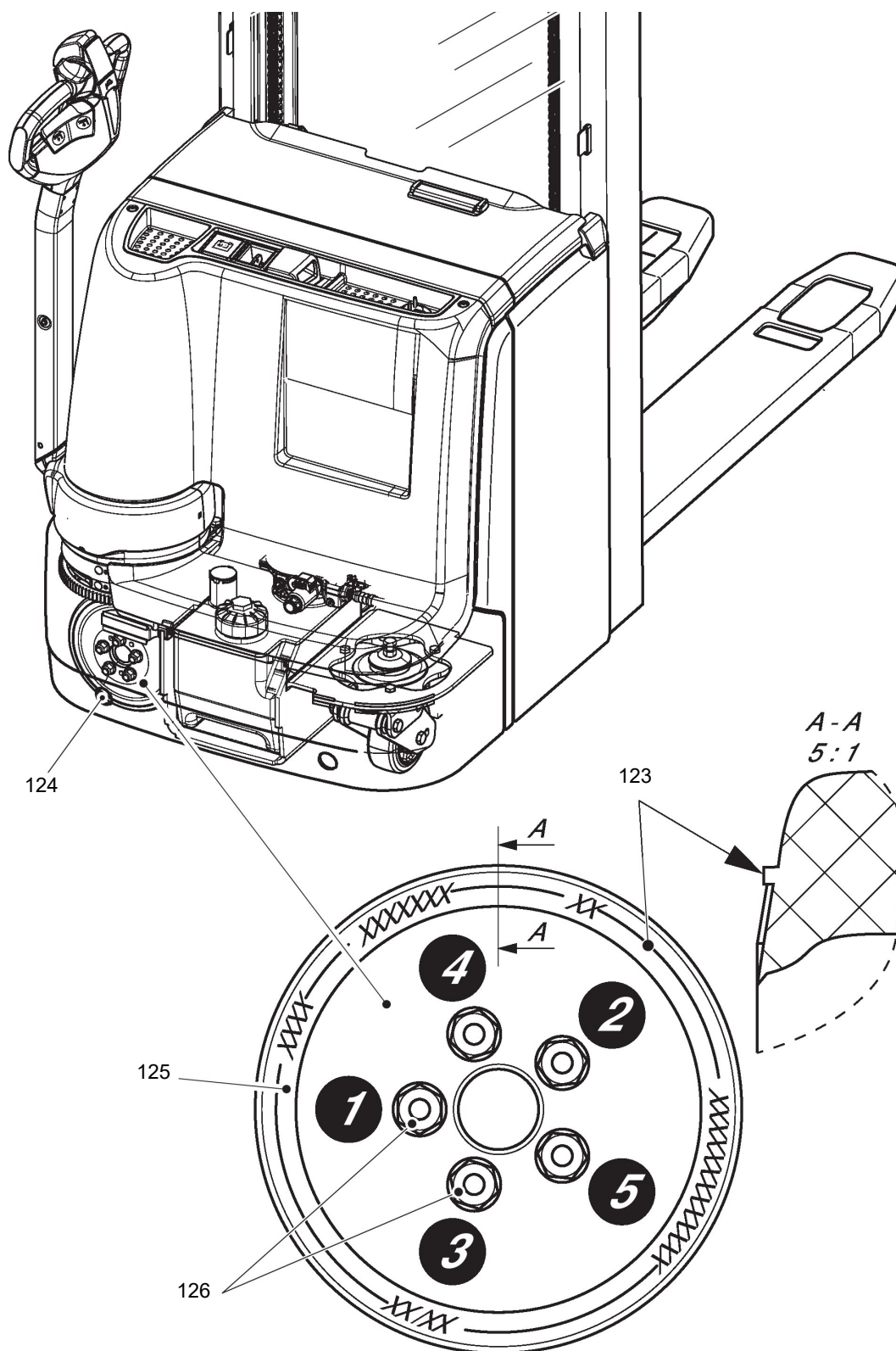
- There are markings on the hydraulic reservoir. The oil level must be read off with the load handler (load forks and support arms, if appl.) fully lowered, see page 127.
- If necessary, add hydraulic oil of the correct grade – see page 196.

Oil level checked.

Marking	Litres	Lift heights (h_3)		
		ZT	ZZ	DZ
3	Approx. 8.3	-	-	-
2	Approx. 7.5	-	-	EJC 112z
1	Approx. 6.5	EJC 112z	EJC 112z	EJC 112z

- After adding hydraulic oil tighten the lock to 10 Nm.

5.6 Checking the attachment and wear of the wheels



- Replace the wheels if the wear limit (123) has been reached.
- The wheel nuts on the drive wheel must be retightened in accordance with the maintenance intervals indicated in the maintenance checklist, see page 213.

Tightening the wheels nuts

Requirements

- Prepare the truck for maintenance and repair work, see page 197.

Tools and Material Required

- Torque wrench

Procedure

- Position the drive wheel (125) such that the wheel nuts (126) can be tightened through the assembly opening (124).
- Tighten all wheel nuts (126) using the torque wrench through the assembly opening (124) in the bumper.

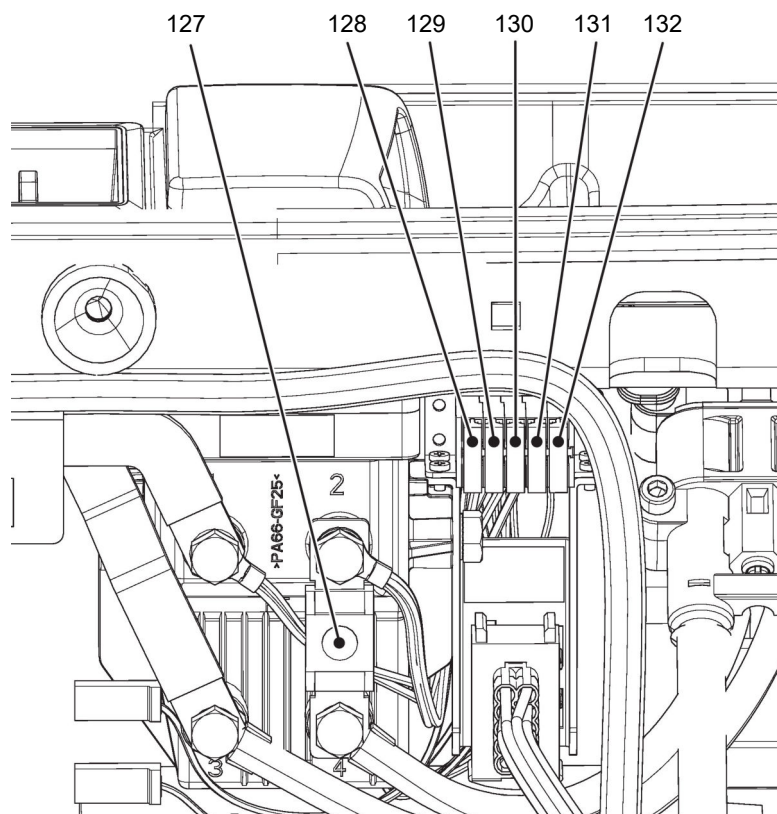
To do this, tighten the wheel nuts in the prescribed order.

- First tighten with 10 Nm.
- Then tighten with 150 Nm.

The wheel nuts have now been tightened.

5.7 Checking the electrical fuses

5.7.1 Model up to 2022



Checking fuses

Requirements

- Truck prepared for maintenance and repair work, see page 197.
- Front panel removed, see page 198.

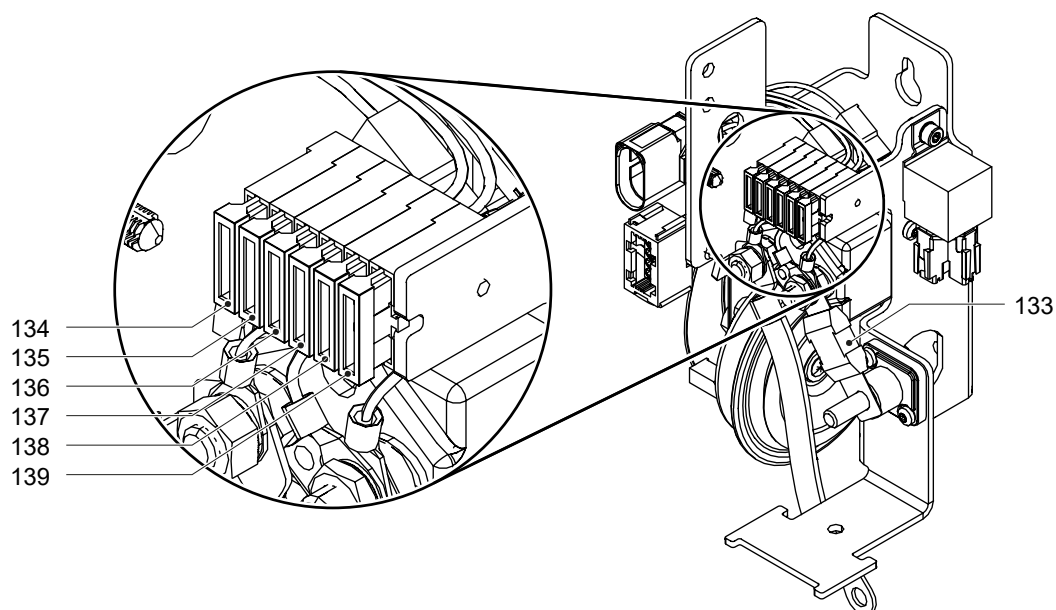
Procedure

- Check the fuse ratings against the table and their condition, and replace if necessary.

The fuses have been checked.

Item	Description	To protect	Rating (A)
127	F15	Drive / lift motor	200
128	F1	Overall control circuit fuse	4
129	6F1	Battery indicator	2
130	9F22	Electromechanical components	4
131	3F6	Steer motor	30
132	F17	Radio data (○)	4

5.7.2 Facelift model from 2022 onwards



Item	Description	Protection	Rating (A)
133	F50	Main fuse (travel/lift motor)	200
134	4F9	Overall control circuit fuse	4
135	9F17	Light and sound options	4
136	9F22	Electric/mechanical components	4
137	6F1	Battery voltage	2
138	F18	Sensor-system protection	4
139	F17	"Radio data" option	4

Checking fuses

Requirements

- Truck prepared for maintenance and repair work, see page 197.
- Front panel removed, see page 198.

Procedure

- Check the fuse ratings against the table and their condition, and replace if necessary.

The fuses have been checked.

5.8 Restoring the truck to service after maintenance and repairs

Procedure

- Thoroughly clean the truck, see page 200.
- Lubricate the truck according to the lubrication diagram, see page 195.
- Clean the battery, grease the terminals and connect the battery.
- Charge the battery, see page 59.
- Start up the truck, see page 107.

6 Decommissioning the Industrial Truck

If the truck is to be out of service for more than a month, it must be stored in a frost-free and dry room. All necessary measures must be taken before, during and after decommissioning as described hereafter.

When the truck is out of service it must be jacked up so that all the wheels are clear of the ground. This is the only way of ensuring that the wheels and wheel bearings are not damaged.

➞ Jack up the truck, see page 199.

If the truck is to be out of service for more than 6 months, agree further measures with the manufacturer's customer service department.

6.1 Prior to decommissioning

6.1.1 Trucks with lead-acid battery

Procedure

- Thoroughly clean the truck – see page 200.
- Prevent the truck from rolling away accidentally.
- Check the hydraulic oil level and replenish if necessary, see page 202.
- Apply a thin layer of oil or grease to any non-painted mechanical components.
- Lubricate the truck according to the lubrication diagram, see page 195.
- Charge the battery, see page 53.
- Disconnect and clean the battery.
- Clean the terminal screws, grease them with terminal grease and screw them into the connection thread to prevent short circuits.

➞ In addition, follow the battery manufacturer's instructions.

6.1.2 Trucks with Lithium-Ion Battery

NOTICE

Damage to the lithium-ion battery due to discharge

If the lithium-ion battery is not used for a long period of time, it can become damaged through discharge.

- ▶ Fully charge the battery before extended downtimes.
- ▶ To ensure a long service life of the lithium-ion battery, it must be fully charged every 4 weeks when not in use.

Procedure

- Thoroughly clean the truck, see page 200.
- Prevent the truck from rolling away accidentally.
- Check the hydraulic oil level and replenish if necessary, see page 202.
- Apply a thin layer of oil or grease to any non-painted mechanical components.
- Lubricate the truck according to the lubrication diagram, see page 195.
- Charge the battery, see page 53.

6.2 Action to be taken during decommissioning

6.2.1 Trucks with lead-acid battery

NOTICE

Full discharge can damage the battery

Self-discharge can cause the battery to fully discharge. Full discharge shortens the useful life of the battery.

► Charge the battery at least every 2 months.

→ Charge the battery, see page 53.

6.2.2 Trucks with Lithium-Ion Battery

NOTICE

Damage to the lithium-ion battery due to discharge

If the lithium-ion battery is not used for a long period of time, it can become damaged through discharge.

► Fully charge the battery before extended downtimes.

► To ensure a long service life of the lithium-ion battery, it must be fully charged every 4 weeks when not in use.

- Charge the battery – see page 53.

6.3 Restoring the truck to service after decommissioning

Procedure

- Thoroughly clean the truck – see page 200.
- Lubricate the forklift truck according to the lubrication schedule – see page 195.
- Equipment with lead-acid battery (●):
Clean the battery, grease the battery terminal screws with terminal grease and connect the battery.
- Equipped with lithium-ion battery (○) without interface converter on the battery:
Insert the truck-side control line into the connection on the battery trough.
- Equipped with lithium-ion battery (○) with interface converter on the battery:
 - Pull the battery forward.
 - Insert the control line into the battery connection at the top of the battery or the inside of the trough.
 - Slide the battery back in.
 - Connect the battery to the truck.
 - Close the battery connector lock: Tighten the bolted bar.
 - Insert the truck control line into the interface converter on the battery.
- Charge the battery – see page 53.
- Commission the forklift truck – see page 107.

7 Safety tests to be performed at intervals and after unusual incidents

The truck must be inspected at least annually (refer to national regulations) or after any unusual event by a qualified inspector. The manufacturer offers a safety inspection service which is performed by personnel specifically trained for this purpose.

A complete test must be carried out on the technical condition of the truck with regard to safety. The truck must also be examined thoroughly for damage.

The operating company is responsible for ensuring that faults are rectified immediately.

8 Final de-commissioning, disposal

- ➔ Final de-commissioning or disposal of the truck must be performed in accordance with the regulations of the country of use. In particular, regulations governing the disposal of batteries, consumables and electronic and electrical systems must be observed.

The truck must only be disassembled by trained personnel in accordance with the procedures as specified by the manufacturer.

9 Human vibration measurement

- ➔ Vibrations that affect the operator over the course of the day are known as human vibrations. Excessive human vibrations will cause the operator long term health problems. The European "2002/44/EC/Vibration" operator directive has therefore been established to protect operators. To help operators to assess the application situation, the manufacturer offers a service of measuring these human vibrations.

G Maintenance, Inspection and Changing of Maintenance Parts Requiring Replacement

⚠ WARNING!

Lack of maintenance can result in accidents

Failure to perform regular maintenance and inspections can lead to truck failure and poses a potential hazard to personnel and equipment.

- Thorough and professionally carried out maintenance and inspection is one of the most important conditions for the safe use of the truck.

NOTICE

The application conditions of a truck have a considerable impact on component wear. The following service, inspection and replacement intervals are based on single-shift operation under normal operating conditions. The intervals must be reduced accordingly if the equipment is to be used in very dusty conditions, sharp temperature fluctuations or multiple shifts.

- To prevent damage due to wear, the manufacturer recommends an on-site application analysis to agree on appropriate intervals.

The following chapter defines the tasks to be performed, the respective intervals to be observed and the maintenance parts for which replacement is recommended.

1 Maintenance Contents EJC 112z

Issued on: 2025-08-07 12:00

1.1 Owner

To be performed every 50 service hours, but at least once a week.

1.1.1 Maintenance contents

1.1.1.1 Standard equipment

Brakes
Test the brake.
Hydraulic operations
Lubricate the load chains.
Correct the hydraulic-oil level.
Steering
Test the tiller return function.

1.1.1.2 Optional Equipment

Lead-acid battery, international

Power supply
Correct the battery-acid level using demineralised water.

Lead-acid battery

Power supply
Correct the battery-acid level using demineralised water.

1.1.2 Inspection contents

1.1.2.1 Standard equipment

The following points must be checked:

Electrical system
Warning and safety equipment in accordance with the operating instructions
Functionality of display and controls
Test emergency disconnect switch and check for damage

Power supply
Check battery and battery components for damage
Battery connector for secure fit, functionality and damage

Travel
Collision safety switch for functionality and damage
Check wheels for wear and damage

Chassis/structure
Industrial truck for damage and leaks
Check labels for legibility, completeness and plausibility
Check doors or covers for damage
Protective screen panel or protective grille for damage

Hydraulic operations
Test hydraulic system
Check fork arms or load handler for wear and damage

1.1.2.2 Optional Equipment

The following points must be checked:

Standard on-board charger

Battery charger
Mains plug and mains cable for damage

Lead-acid battery, international

Power supply
Check the battery cable connections for secure attachment
Check battery and battery components for damage

Lead-acid battery

Power supply
Check the battery cable connections for secure attachment

1.2 Customer Service

In accordance with the EJC 112z service interval, to be performed every 1000 service hours, but at least once a year.

1.2.1 Maintenance contents

1.2.1.1 Standard equipment

Brakes
Test the brake.
Measure the air gap of the magnetic brake.

Electrical system
Test the contactors and/or relays.

Hydraulic operations
Test the function of the cut-out of the initial lift.
Test the lift sensors in the mast lift and initial lift.
Adjust the slide pieces.
Adjust the load chains.
Lubricate the load chains.
Test emergency lowering.
Correct the hydraulic-oil level.
Test and adjust the pressure relief valve.

Agreed services
Carry out a test run with the rated capacity or a customer-specific load.
Lubricate the truck according to the lubrication schedule.
Demonstration after maintenance.

Steering
Test the tiller return function.

1.2.1.2 Optional Equipment

Standard on-board charger

Battery charger
Test the immobiliser on trucks with an on-board charger.
Carry out a potential measurement on the chassis while charging is in progress.

Radio data

System components
Clean the scanner and terminal.

Lead-acid battery, international

Electrical system
Perform insulation inspection.

Power supply
Clean the battery.
Clean and grease the battery terminals.
Measure acid density and battery voltage.
Correct the battery-acid level using demineralised water.

Lead-acid battery

Electrical system
Perform insulation inspection.

Power supply
Clean the battery.
Clean and grease the battery terminals.
Measure acid density and battery voltage.
Correct the battery-acid level using demineralised water.

1.2.2 Inspection contents

The following points must be checked:

1.2.2.1 Standard equipment

Electrical system
Cables and motor for secure fit and damage
Warning and safety equipment in accordance with the operating instructions
Functionality of display and controls
Test emergency disconnect switch and check for damage
Contactors and/or relays for wear and damage
Check electrical wiring for damage (insulation damage, connections) and check whether the fuse ratings are correct
Power supply
Battery latch and battery attachment for correct function and damage
Battery connector for secure fit, functionality and damage
Travel
Drive system bearings for wear and damage
Transmission for noise and leaks
Check wheels for wear, damage and secure mounting
Check wheel bearings and mounting of wheels for wear and damage
Chassis/structure
Industrial truck for damage and leaks
Check chassis connections and screw connections are securely attached and check for damage
Check labels for legibility, completeness and plausibility
Check doors or covers for damage
Check mast is securely attached
Protective screen panel or protective grille for damage
Hydraulic operations
Test hydraulic controls and check their labels for legibility, completeness and plausibility
Lift sensors in the mast lift and initial lift for damage
Check cylinders and piston rods are securely attached and check for damage
Check lateral play of the mast sections and fork carriage
Check slide pieces and stops for wear and damage
Check load chain mounting elements and chain pins for wear and damage
Check mast rollers and their running surfaces for wear and damage
Test hydraulic system
Check fork arms or load handler for wear and damage
Tie/plunger rods for uniform adjustment, wear and damage

1.2.2.2 Optional Equipment

Standard on-board charger

Battery charger
Mains plug and mains cable for damage
Cables and electrical connections for secure fit and damage

Electrolyte recirculation

Power supply
Hose connections and pump for correct function

Aquamatic

Power supply
Aquamatic plug, hose connections and float for functionality and sealing
Flow indicator for functionality and sealing

Battery refill system

Power supply
Refill system for functionality and leaks

Shock sensor/data recorder

Electrical system
Check shock sensor/data recorder is securely attached and check for damage

Radio data

System components
Scanner and terminal for secure fit, functionality and damage
Fuses for correct ratings
Check cables are securely attached and check for damage

Access module

Electrical system
Check access module is securely attached, test and check for damage

Lead-acid battery, international

Power supply
Check battery, battery cables and cell connectors are securely attached and check for damage
Ensure safety labels are present and check for damage

Lead-acid battery

Power supply

Check battery, battery cables and cell connectors are securely attached and check for damage

1.2.3 Maintenance parts

The manufacturer recommends the replacement of the following maintenance parts at the specified intervals.

1.2.3.1 Standard equipment

maintenance part	service hours	months
Gear oil	10000	
Hydraulic system breather filter	2000	12
Hydraulic oil	2000	12
Hydraulic oil filter	2000	12

1.2.3.2 Optional Equipment

Cold store application

maintenance part	service hours	months
Hydraulic oil	1000	12
Hydraulic oil additive	1000	12