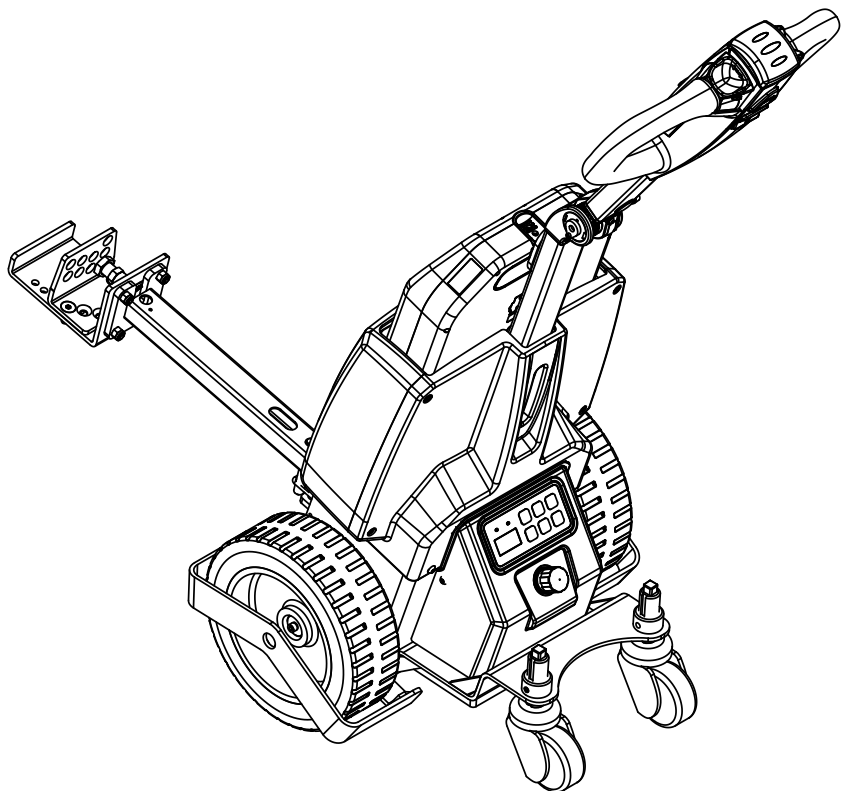




TTE 1.0 Li-Ion

Operating instructions

en-GB



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TTE 1.0 Li-Ion

Declaration of Conformity



Manufacturer

Noblelift Intelligent Equipment Co., Ltd., No. 528 Changzhou Road, 313100 Changxing, Huzhou, Zhejiang, People's Republic of China

Imported by (for all countries except China)/approved by (for China)

Jungheinrich AG, Friedrich-Ebert-Damm 129, 22047 Hamburg, Germany

Type	Option	Serial no.	Year of manufacture
TTE 1.0 Li-Ion			

Additional information

On behalf of

Date

EU DECLARATION OF CONFORMITY

The undersigned hereby declares that the power-operated forklift truck described in detail satisfies the current versions of the applicable European directives 2006/42/EG (Machinery Directive) and 2014/30/EU (Electromagnetic Compatibility Directive (EMC)). The manufacturer is authorised to compile the technical documentation.

Declaration of Conformity (○)

Product: TTE 1.0 Li-Ion
Serial number/type number

Manufacturer: Noblelift Equipment
No. 528 Jingyi Road Economic Development
Zone Changxing
Zhejiang Province, 313100 P.R. China

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 presented in a precise and clear manner. The chapters are arranged by letter and the pages are numbered continuously.

The operating instructions detail different industrial truck models. When operating and checking the industrial truck, make sure that the particular section applies to your truck model.

Our industrial trucks are subject to ongoing development. We reserve the right to alter the design, features and technical aspects of the equipment. No guarantee of particular features of the equipment 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

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Jungheinrich Aktiengesellschaft

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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 tow load is shown on the data plate and must not be exceeded.

The load must be coupled to a trailer coupling or an attachment approved by the manufacturer.

- Towing loads.
- Do not carry passengers.
- Loads can only be pushed with the trailer coupling.

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.
- Permissible temperature range: +5°C to +40°C
- Operation only on secure surfaces with sufficient capacity.
- Read the instructions in these operating instructions before travelling on uphill and downhill slopes:
 - Truck gradeability – see page 21.
 - Notes on travelling on uphill and downhill slopes – see page 62.
- Do not exceed the permissible surface and point loading limits on the travel paths.
- Operation only on travel paths that are visible and approved by the operating company.
- Minimum illuminance of the traffic lanes: 50 Lux.

3.1 Wind loads

Wind forces can affect the operational stability of the truck when 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.

In both cases, cease operations if necessary.

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

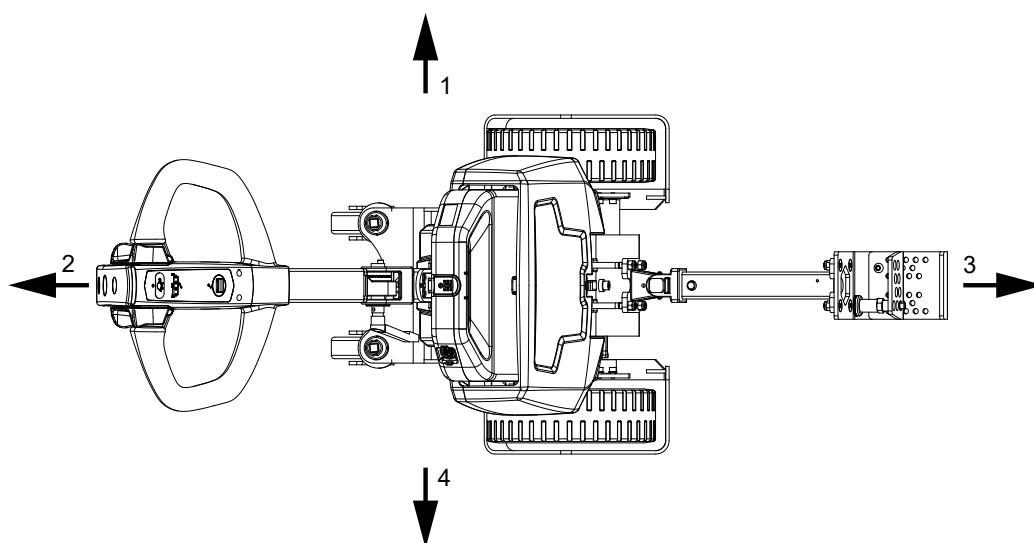
The TTE 1.0 Li-Ion is an electric mini tractor equipped with two drive wheels and two support wheels. It is suitable for pulling/pushing trailers on level surfaces.

The drawbar pull is shown on the data plate.

- The industrial truck is designed for light-duty operations; the maximum continuous operation time is 2,5...3 hours.

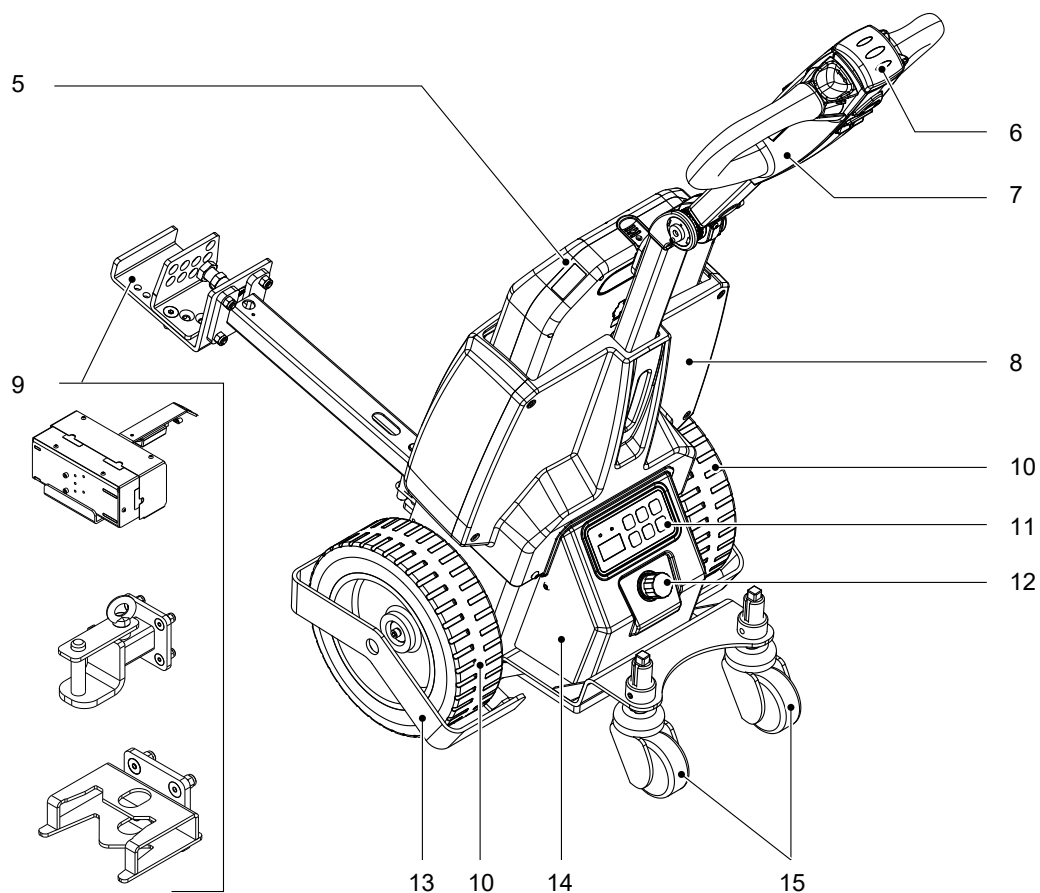
2 Travel Direction Definition

The following determinations have been made for travel direction specification:



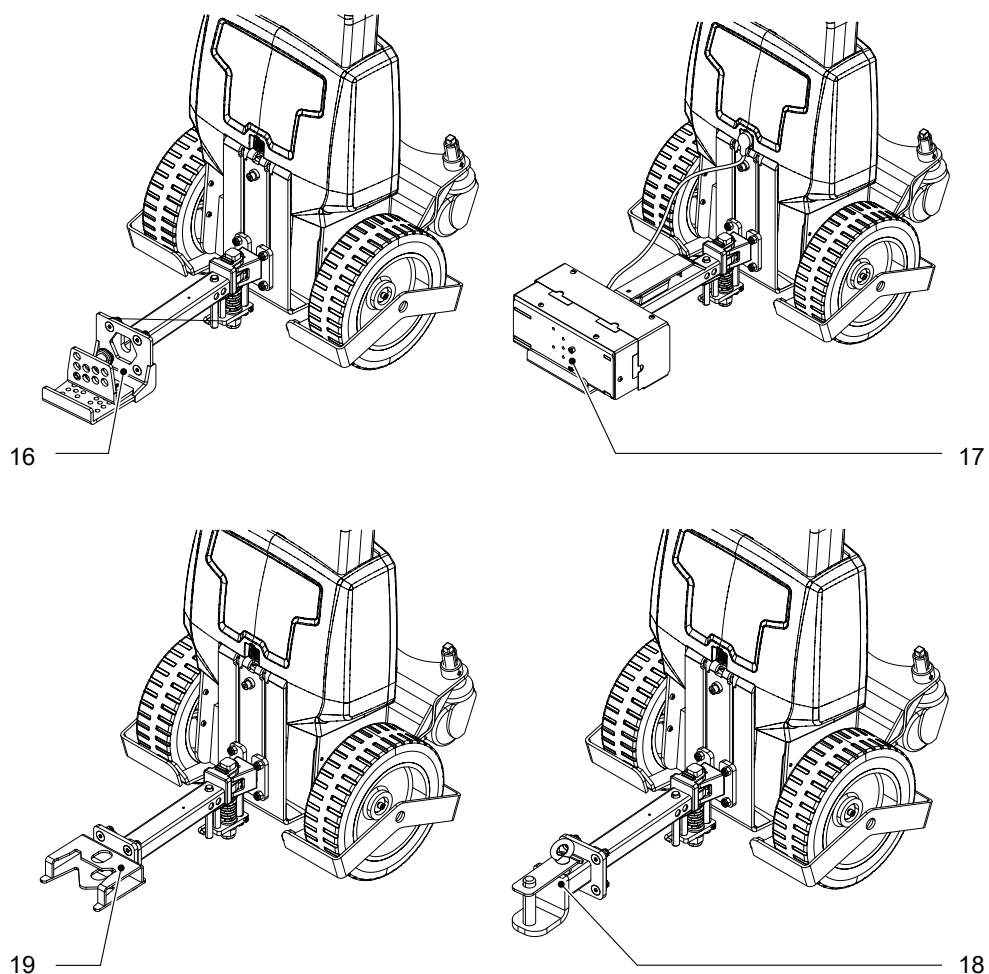
Item	Description
1	Left
2	Drive direction
3	Load direction
4	Right

3 Assembly description



Item		Description
5	●	Battery
6	●	Collision safety switch
7	●	Tiller
8	●	Battery compartment
9	●	Coupling
10	●	Drive wheel
11	●	Display unit
12	●	Emergency disconnect switch
13	●	Foot protection
14	●	Dashboard panel
15	●	Support wheel

Coupling types



Item		Description
16	●	Standard coupling
17	○	Electric coupling
18	○	Pin coupling
19	○	LKE coupling

4 Functional Description

Access systems

The truck is equipped with a keypad. The truck can only be started if the correct access code is entered via the keypad. This prevents any unauthorised use of the truck.

Automatic reset of the travel switch

After releasing the travel switch, it automatically returns to the neutral position (0) and the truck brakes.

Collision safety switch

The collision safety switch changes the travel direction if the truck comes into contact with a person. The truck brakes, travels away from the operator and stops. This prevents the truck driving into the operator.

Emergency disconnect switch

The truck is equipped with an emergency disconnect switch. When pressed, all operations are stopped and the fail-safe electromagnetic brake is activated, see page 65.

Foot protection

The industrial truck is equipped with foot guards above the drive wheels to prevent injury during operation.

Drive system

An electric motor powers the drive wheels directly. The electronic traction controller ensures smooth drive motor speed control and hence smooth travel, powerful acceleration and electrically controlled braking.

Steering

The driver steers with a height adjustable tiller.

Electrical system

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

Controls and displays

Ergonomic controls ensure fatigue-free operation for sensitive travel movements.

The display unit shows the operator key information such as operating hours, battery capacity and event messages.

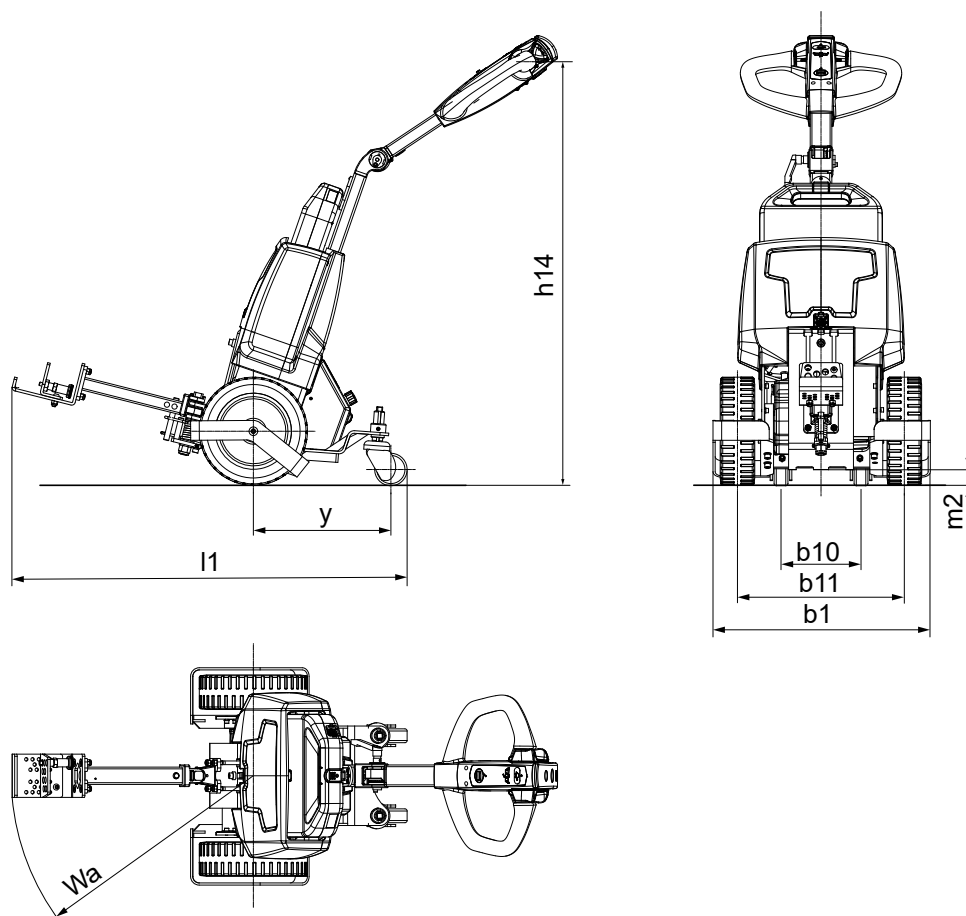
Hour meter

The service hours are counted when the truck is ready for operation.

5 Technical Specifications

→ Technical data specified in accordance with VDI 2198.
Technical modifications and additions reserved.

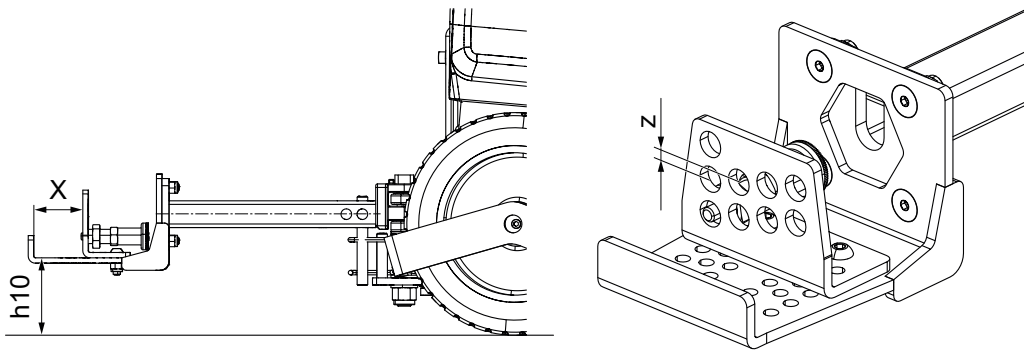
5.1 Dimensions



	Description	TTE 1.0 Li-Ion	
y	Wheelbase	325	mm
b10	Track width, front	185	mm
b11	Track width, rear	385	mm
h14	Tiller height in min./max. travel position.	750 / 1150	mm
l1	Overall length	915	mm
b1	Overall width	503	mm
m2	Ground clearance, centre of wheelbase	35	mm
Wa	Turning radius	560	mm

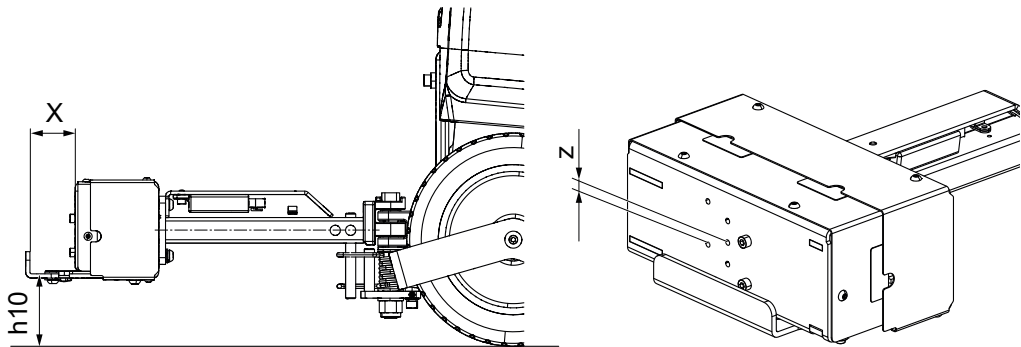
5.2 Couplings

Standard coupling



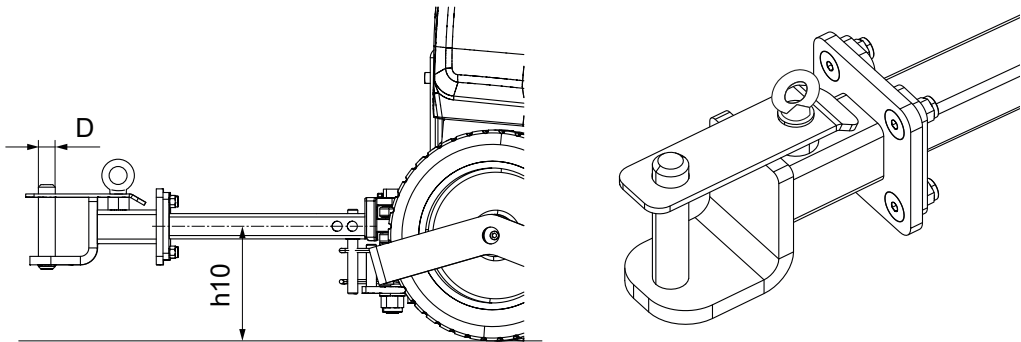
Description		Dimensions
Coupling height	$h10$	85 mm to 235 mm
Adjustment range of the standard coupling	X	5 mm to 60 mm
Increments of the adjustment range	z	5 mm

Electric coupling



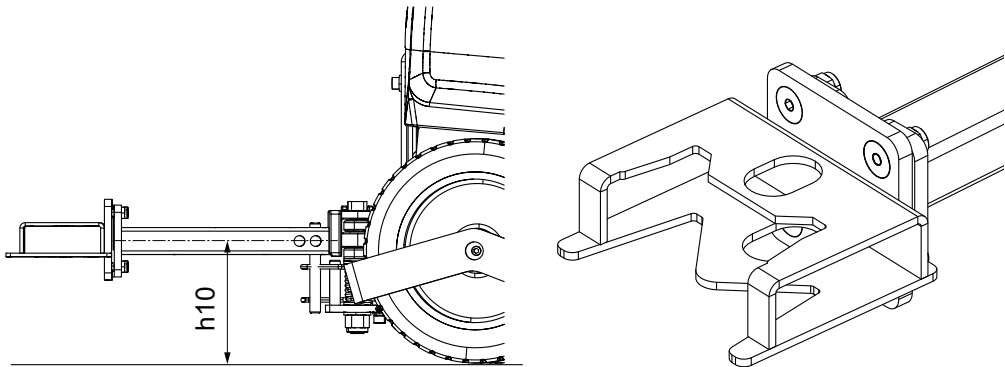
Description		Dimensions
Coupling height	$h10$	85 mm to 235 mm
Adjustment range of the electric coupling	X	5 mm to 60 mm
Increments of the adjustment range	z	5 mm

Pin coupling



Description		Dimensions
Coupling height	h10	150 mm to 250 mm
Pin diameter	D	20 mm

LKE coupling



Description		Dimensions
Coupling height	h10	135 mm to 285 mm

5.3 Performance data

Description	TTE 1.0 Li-Ion	
Rated capacity Q	1000	kg
Rated drawbar pull, with / without rated load	200/-	N
Max. drawbar pull, with / without rated load	550/-	N
Drive motor, output S2 30 min	0.4	kW
Travel speed, with / without rated load	4.5 / 4.9	km/h

5.4 Gradeability

Gradeability as a function of the load:	TTE 1.0 Li-Ion	
with 1000 kg	0 %	
with 500 kg	5 %	
with 250 kg	10 %	

5.5 Battery

The battery used in this truck is a lithium-ion model. This is an environmentally friendly battery without chemical mercury or cadmium.

Battery type	Voltage	Capacity	Weight	Size
Lithium ion	24 V	36 Ah	7,5 kg	380 x 250 x 71 mm

The truck must only be operated with an approved lithium-ion battery.

5.6 Battery charger

Model	Specification	Input	Output
SSLC300V29	24 V 8 A (EU)	180 V AC - 240 V AC ~ 3.0 A max	29.4 V 8.0 A

The permissible temperature range for charging the battery is between + 5° C and +40 °C.

5.7 Weights

Description	TTE 1.0 Li-Ion	
Net weight	67	kg

5.8 Tyre type

Description	TTE 1.0 Li-Ion	
Tyre size, front	ø 250x80	mm
Tyre size, rear	ø 75x32	mm
Wheels Number front / rear (x = driven)	2x +2/-	

5.9 Laws, standards and guidelines

Electrical requirements

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

Continuous sound pressure level

– TTE 1.0 Li-Ion: < 70 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.
- Noise levels can fluctuate depending on the floor composition and wheel lining.

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.

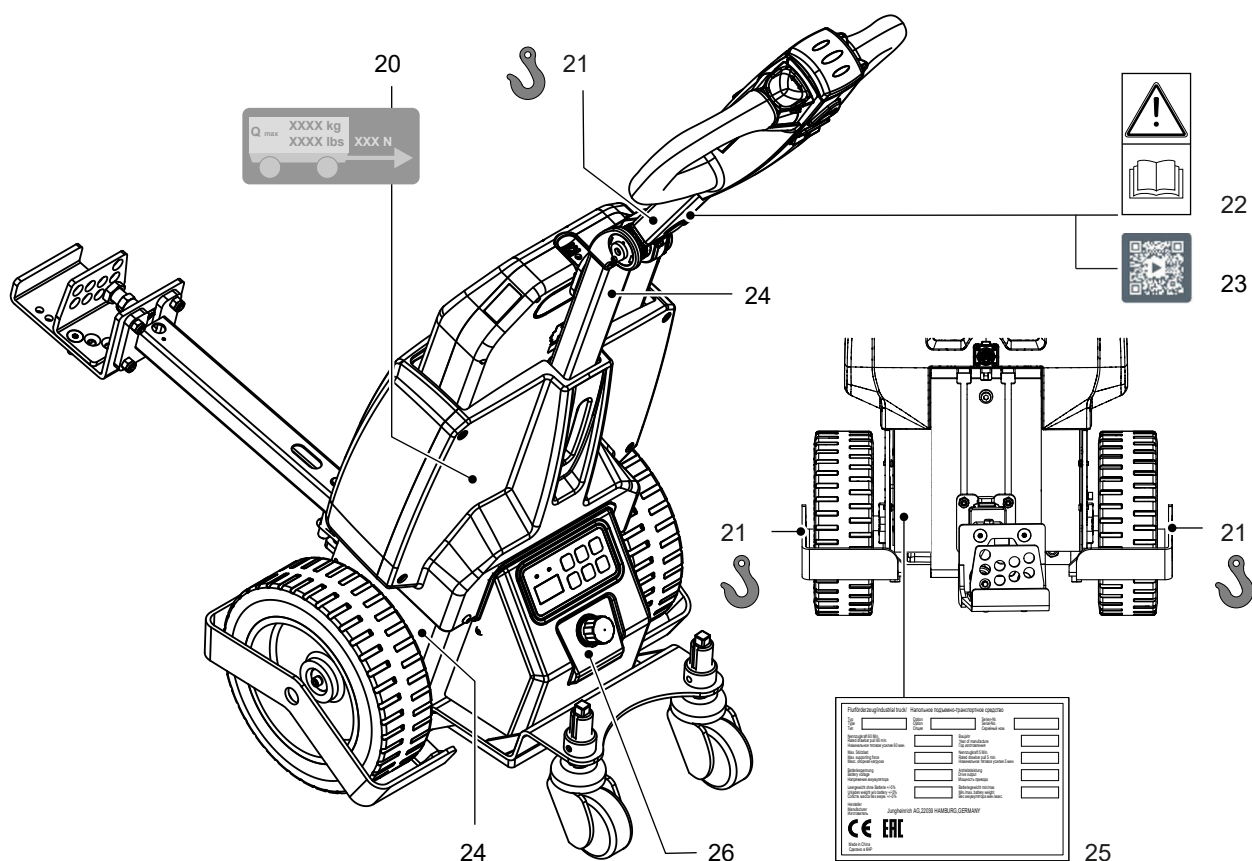
WARNING!

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.

6 Identification Points and Data Plates



Item	Description
20	Information sign: "Permissible drawbar pull"
21	Attachment point for loading by crane
22	Information sign: "Observe operating instructions"
23	Information sign "QR-code" <div> <div>→</div> <div>The QR code contains a short online video on the basic functions of the truck.</div> </div>
24	Punched serial number
25	Data plate
26	"Emergency disconnect switch" marking

6.1 Data plate

Flurförderzeug/industrial truck/ Напольное подъемно-транспортное средство	
27	<div> <div> Typ Type Тип </div> <div>XXX XXX</div> </div> <div> <div>Option Option Опция</div> <div></div> </div> <div> <div>Serien-Nr. Serial-No. Серийный ном.</div> <div>XXXXXXXXXXXX</div> </div>
29	<div> <div> Nennzugkraft 60 Min. Rated drawbar pull 60 min. Номинальное тяговое усилие 60 мин. </div> <div>XXX N</div> </div> <div> <div> Baujahr Year of manufacture Год изготовления </div> <div>mm/yyyy</div> </div>
32	<div> <div> Max. Stützlast Max. supporting force Макс. опорная нагрузка </div> <div>X kg</div> </div> <div> <div> Nennzugkraft 5 Min. Rated drawbar pull 5 min. Номинальное тяговое усилие 5 мин. </div> <div>XXX N</div> </div>
33	<div> <div> Batteriespannung Battery voltage Напряжение аккумулятора </div> <div>XX V</div> </div> <div> <div> Antriebsleistung Drive output Мощность привода </div> <div>X.X kW</div> </div>
35	<div> <div> Leergewicht ohne Batterie +/-5% Unladen weight w/o battery +/-5% Собств. масса без аккумулят. +/-5% </div> <div>XX kg</div> </div> <div> <div> Batteriegewicht min/max Min./max. battery weight Вес аккумулятора мин./макс. </div> <div>X/X kg</div> </div>
37	<div> <div> Hersteller Manufacturer Изготовитель </div> <div>Jungheinrich AG, 22039 HAMBURG, GERMANY</div> </div>
39	<div> <div>   </div> <div> Made in China Сделано в КНР </div> </div> <div>  </div>

Item	Description
27	Type
28	Serial number
29	Rated drawbar pull 60 minutes
30	Year of manufacture
31	Rated drawbar pull 5 minutes
32	Support force
33	Battery voltage (V)
34	Output (kW)
35	Weight without battery
36	Battery weight
37	Manufacturer's details
38	EAC marking
39	CE mark
40	Manufacturer's logo

- ➔ For queries regarding the truck or when ordering spare parts, always quote the serial number (28).
- ➔ The illustration shows the standard version for EU member states. The data plate may differ in other countries.

C Transport and Commissioning

1 Loading the truck

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.

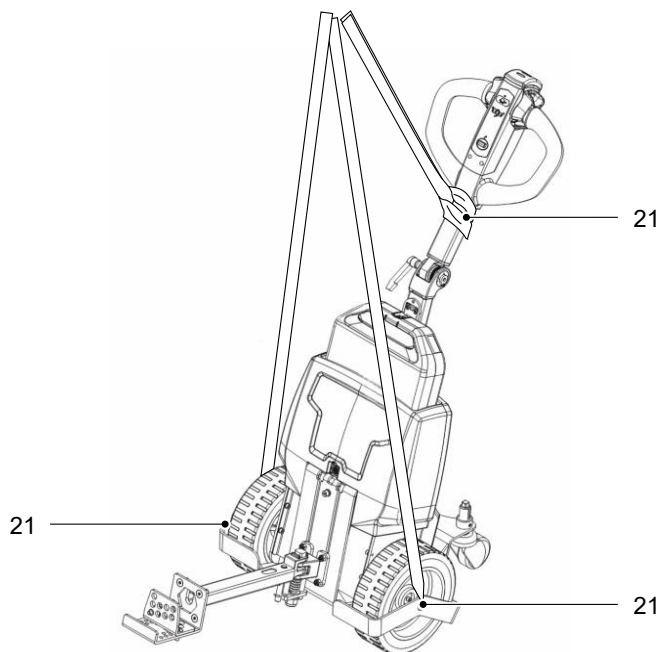
- ▶ Loading must only be performed by specialist personnel trained for this purpose. The specialist personnel must be instructed in securing loads on road vehicles and handling load securing devices. In each case correct measurements must be taken and appropriate safety measures applied.

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 24).
- ▶ 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.



Loading the truck by crane

Requirements

- Truck parked securely, see page 78.

Tools and Material Required

- Lifting gear
- Crane lifting gear

Procedure

- Attach the crane lifting gear to the attachment points (21).

The truck can now be loaded by crane.

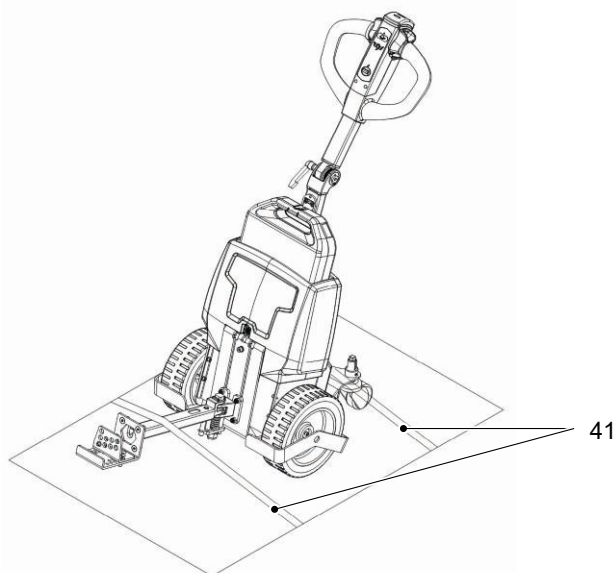
2 Securing the truck during transport

⚠ WARNING!

Uncontrolled movement during transport

Improper fastening of the truck and mast during transport can result in serious accidents.

- ▶ Loading is only to be carried out by specially trained staff. The specialist personnel must be instructed in the securing of loads on road vehicles and in the use of load-securing equipment. When securing the truck, the appropriate measures must be determined and applied for each individual case.
 - ▶ The truck must be securely fastened when transported on a lorry or a trailer.
 - ▶ The lorry or trailer must have lashing rings.
 - ▶ Use wedges to prevent the truck from moving.
 - ▶ Use only lashing straps with sufficient load rating.
 - ▶ Use anti-slip material to secure loading aids (pallets, wedges,...), e. g. anti-slip mats.
-



Securing the truck for transport

Requirements

- The truck is now loaded.
- Truck parked securely – see page 78.

Tools and Material Required

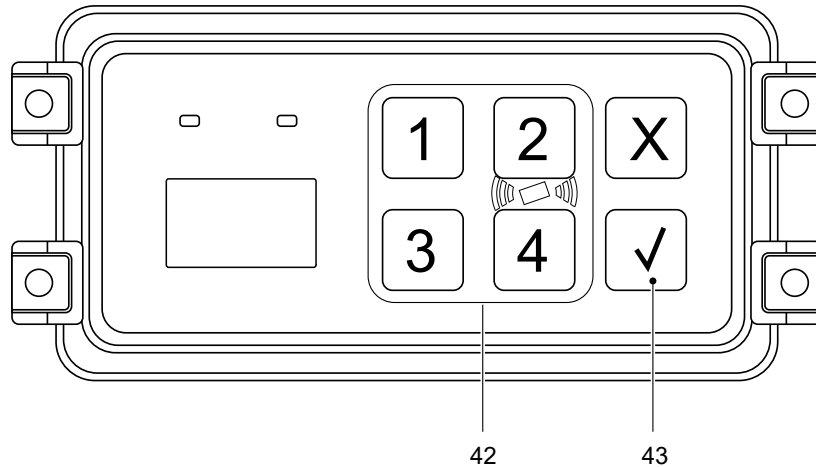
- Lashing straps

Procedure

- Attach the lashing straps (41) to the truck, strap them to the transport vehicle and tension sufficiently.

The truck can be transported.

3 Adjusting the access code



→ The truck can only be started with the correct access code.

The truck is delivered with the access code 1234, which can be used for immediate start. A new access code can be generated using the administrator password 3232. The code is entered via the keypad (42).

Changing the access code

Requirements

- The truck is parked securely, see page 78.

Procedure

- Enter access code 3232 and press the RETURN key (43).
- Enter the previous access code and press the RETURN key.
- Enter the new access code and press the RETURN key.

The access code has been changed.

Resetting the access code

Requirements

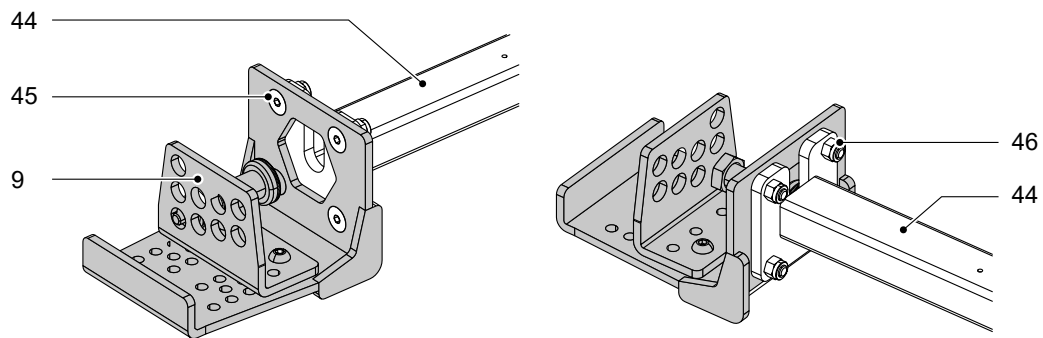
- The truck is parked securely, see page 78.

Procedure

- Enter access code 123 and press the RETURN key.
- Enter access code 123 once more and press the RETURN key.

The access code has been reset to 1234.

4 Coupling assembly



The industrial truck can be equipped with different types of couplings, see page 14. The assembly is shown using the standard coupling as an example. The other couplings are assembled in the same way.

Coupling assembly

Requirements

- Truck parked securely, see page 78.

Tools and Material Required

- Torque wrench
- Allen key, A/F 5 mm
- Hexagon socket, spanner size 13 mm

Procedure

- Attach the coupling (9) to the coupling arm (44) as shown.
- Assemble the coupling (9) with 4 countersunk screws (45) and 4 hex. nuts (46) with a tightening torque of 25 Nm.

The coupling has been assembled.

5 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.

Procedure

- Check the truck for completeness, see page 14.
- Check the tiller.
- Insert the battery, see page 52.
- Check the battery charge status – see page 48.
- Perform the necessary visual inspections and activities before starting daily work – see page 60.

The truck can now be started, see page 60.

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.

D Battery - Servicing, Recharging, Replacement

1 Description of the lithium-ion battery

The lithium-ion battery is a battery with rechargeable high-performance energy cells.

The battery is designed for industrial trucks and can withstand heavy vibrations and knocks.

The battery features special connections for charging and discharging in order to prevent the use of incorrect batteries and chargers.

The battery has an intelligent battery management system, which includes safety functions such as voltage, temperature detection, undervoltage, overvoltage, overtemperature, overcurrent and short-circuit.

The internal resistance of the battery is very low, which minimises heat generation and maximises the power available to the truck.

Temperatur range for using the battery

Optimum battery useful life is achieved at the battery temperatures of +5°C to +40°C.

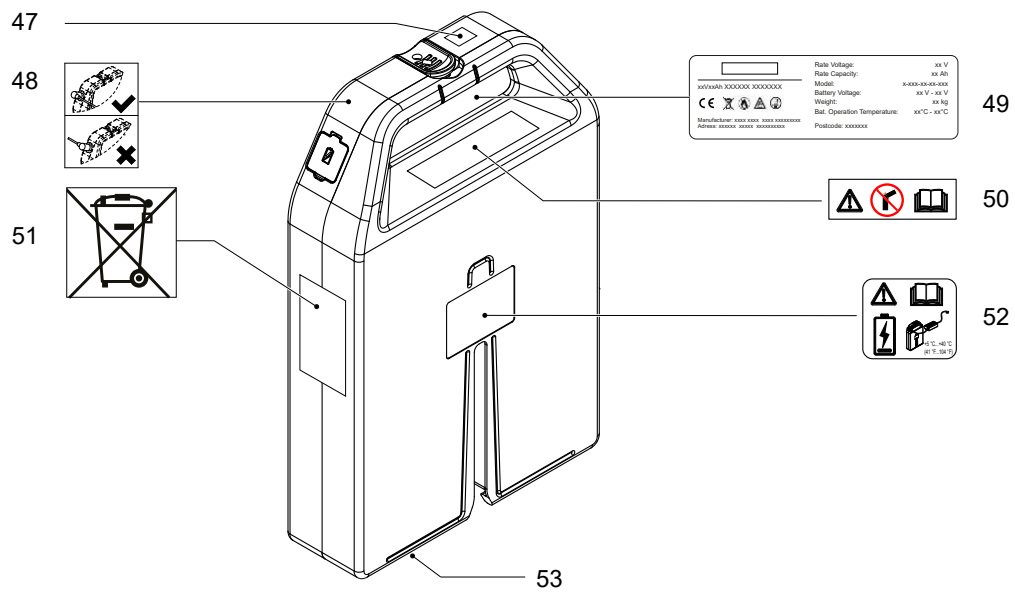
Low temperatures reduce the available battery capacity, high temperatures reduce the batteries useful life.

Temperature differences on both sides of the battery must not exceed 5 °C.

Battery chargers

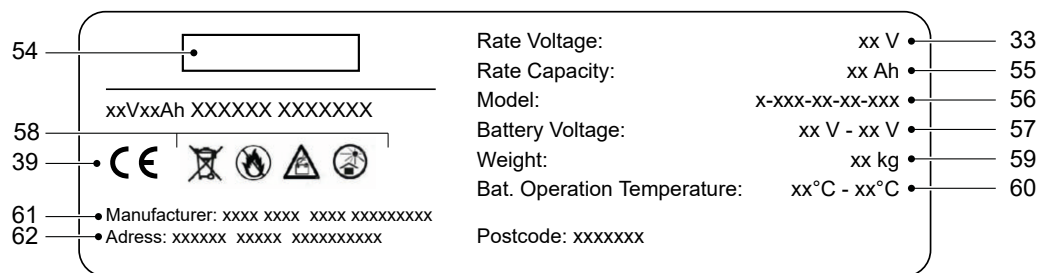
Only approved battery chargers must be used to charge the lithium-ion battery, see page 21.

2 Battery Decals



Item	Description	Item	Description
47	Sign: "Capacity and nominal voltage"	50	Safety information
48	Connector orientation	52	General information
49	Data plate	53	Serial number

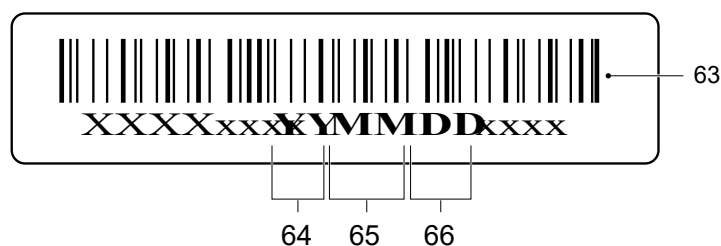
2.1 Battery data plate



Item	Description	Item	Description
33	Rated voltage	57	Voltage range
39	CE mark	59	Battery weight
54	Manufacturer logo and type designation	60	Operating temperature range
55	Battery capacity	61	Battery manufacturer
56	Model designation	62	Manufacturer address

→ The illustration shows the standard version for EU member states. The data plate may differ in other countries.

2.2 Battery serial number



Item	Description	Item	Description
63	Barcode	65	Month of manufacture
64	Year of manufacture	66	Day of manufacture

3 Safety Instructions, Warning Indications and other Notes

3.1 Safety regulations for handling lithium-ion batteries



Do not carry out any repairs on the lithium-ion battery.

Replace defective lithium-ion battery by customer service.

⚠ WARNING!

Risk of electric shock and burning

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!

Unsuitable batteries that have not been approved by the manufacturer 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 the manufacturer, 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 manufacturer-approved batteries may be used on the truck.
- ▶ Battery equipment may only be replaced with the agreement of the manufacturer.
- ▶ When replacing/installing the battery make sure the battery is securely located in the battery compartment of the truck.
- ▶ Do not use batteries that have not been approved by the manufacturer.

⚠ WARNING!

Any damage and other defects to the charger can result in accidents.

If any safety-related modifications, damage or other defects are discovered on the charger or during operation, the charger must be taken out of service until it has been repaired.

- ▶ Report any defects immediately to your supervisor.
- ▶ Tag out and decommission a faulty charger.
- ▶ Only return the charger to service when you have identified and rectified the fault.

NOTICE

Risk of material damage due to improper charging

Improper use of external charger can cause material damage

- ▶ It is necessary to apply the lithium-ion charger of our company.
 - ▶ The operation voltage of the charger is 24 V; the maximum charging voltage is 29,2 V, the charging current is 8,0 A.
 - ▶ The charger must only be used for batteries supplied by the manufacturer or other approved batteries provided it has been adapted by the manufacturer's service department.
 - ▶ Reverse charge of the battery is prohibited.
 - ▶ If the battery is heated obviously during charging, stop charging immediately. Charge again after it has been cooled down.
 - ▶ Hold the puller when pulling the connectors. It is not allowed to pull the wires directly.
-

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 6 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.
-

3.2 Potential hazards

No hazards are anticipated if the equipment is used correctly.

Hazards due to improper use

Mechanical damage:

- Damage to the battery housing due to mechanical effects (e.g. the battery falling)
- Cracks, fractures, splinters or holes in the battery housing

Short circuit:

- Short circuit due to cracks, fractures, splinters or holes in the battery housing
- Emission of harmful substances, battery fire or explosion
- Short-circuit caused by connecting both battery terminals, e.g. if the battery is immersed in water

Temperature damage:

- Emission of harmful substances, battery fire or explosion due to high solar radiation or storage in a hot environment (e.g. near ovens)

Storing damaged batteries

A damaged battery must be stored safely until the customer service department arrives.








To avoid hazards due to emission of harmful substances, fire or explosion, the following must be observed:

- Do not store in places often frequented by personnel
- Do not store in places where valuable objects (e.g. vehicles) are stored
- An automatic fire detection system should trigger only in case of danger (e.g. open fire)
- Good ventilation of the storage location
- No connection of the storage location with a ventilation system, so that any escaping harmful substances are not distributed within a building

Examples of where to store a non-functional battery:

- Roofed outdoor position
- Ventilated container
- Closed box with pressure and smoke discharge option

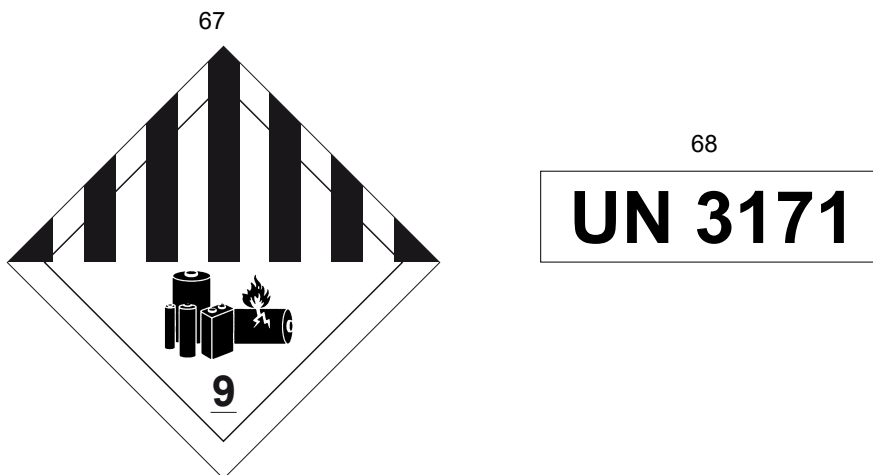
3.2.1 Symbols - Safety and Warnings

	<p>Used lithium-ion batteries must be treated as hazardous waste. Lithium-ion batteries marked with the recycling symbol and the sign showing a crossed-out waste bin must not be disposed of with ordinary household waste. Buy-back terms and type of recycling are to be agreed with the manufacturer in accordance with the Battery Directive 2006/66/EG, for example.</p>
	<p>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 lithium-ion batteries away from strong heat sources.</p>
	<p>Hot surfaces. Battery cells can generate very high short-circuit currents, causing them to become hot.</p>
	<p>Dangerous electrical voltage! Battery cells can generate very high short-circuit currents, causing them to become hot. Caution! The metal parts of the battery cells are constantly under voltage, so do not place any foreign objects or tools on the lithium-ion battery. Observe the accident prevention regulations and DIN EN 62485-3.</p>
	<p>Wear personal protective equipment (e.g. safety goggles and safety gloves) when handling damaged battery cells and lithium-ion batteries. Use only insulated tools. If the contents leak out, do not inhale the fumes. Always wash your hands after completing the work. Do not mechanically machine the lithium-ion battery, strike, crush, compress, notch, dent or modify it in any way. Do not open, damage, penetrate, bend, heat the lithium-ion battery or allow it to become hot, do not throw it into a fire, short circuit it or immerse it in water. Do not store it or operate it in pressurised containers.</p>
	<p>Follow the operating instructions and keep them in a visible position in the charging area. If any faults are found on the lithium-ion battery, contact the manufacturer's customer service department immediately. Do not attempt to rectify faults independently. Do not open the lithium-ion battery.</p>
	<p>Protect the lithium-ion battery from solar radiation or other forms of heat radiation. Do not expose the lithium-ion battery to heat sources.</p>

3.2.2 Marking of packages with lithium-ion batteries

The 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



Item	Description
67	Danger label class 9A for lithium-ion batteries
68	Marking of packages with lithium-ion batteries in accordance with the dangerous goods regulations GGVS/ADR appendix 9 for the transport of hazardous goods

3.2.3 Explosion and fire hazard

⚠ WARNING!

Physical damage, thermal effects or incorrect storage in the event of a defect can result in explosions or fire.

The battery materials can be flammable.



3.2.3.1 Particular hazard from combustion products

The lithium ion battery may be damaged by a fire in the vicinity of the lithium ion battery. When fighting a lithium-ion battery fire, the following dangers and information must be taken into consideration.

⚠ WARNING!

Risk due to contact with combustion products

Combustion is a chemical process by which a flammable material combines with oxygen under heat and light (fire). The resulting combustion products can occur in the form of smoke, through leaking fluids, escaping gases, debris as well decomposition products of certain chemicals. These combustion products are substances that enter the body through the respiratory tract or skin, where they can produce adverse effects such as choking.

► Avoid contact with combustion products.

► Use protective equipment.

- Hydrogen fluoride (HF) Hydrofluoric acid = extremely corrosive
- Risk of toxic substances produced by pyrolysis
- Risk of highly flammable gas mixtures
- Other combustion products: carbon monoxide and carbon dioxide as well as manganese oxide, nickel oxide and cobalt oxide

3.2.3.2 Special fire fighting protective equipment

- Use self-contained breathing apparatus.
- Wear protective overalls.

3.2.3.3 Additional fire fighting instructions

To prevent secondary fires from occurring, the lithium-ion battery must be cooled from the outside. Fluids or solids must never be directed into the lithium-ion battery.

Suitable extinguishing agents

- Carbon dioxide extinguisher (CO₂)
- Water (not on mechanically opened or damaged batteries!)

Unsuitable extinguishing agents

- Foam
- Grease fire extinguishing agents
- Powder extinguishers
- Metal fire extinguishers (PM12i extinguishers)
- Metal fire powder PL-9/78 (DIN EN 3SP-44/95)
- Dry sand

3.2.3.4 Instructions for cooling an overheated, non physically damaged battery

This type of damage may be caused by a short circuit inside the battery, which may result in harmful materials leaking, fire or battery explosion.

Endangered unopened batteries can be cooled using a water jet.

3.2.4 Material discharge

⚠ 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.
-



3.2.4.1 Precautionary measures for personnel

- Keep personnel away and facing the wind.
- Block off the affected area.
- Ensure there is adequate ventilation.
- Wear personal protective equipment.
- If vapours / dust / aerosols are present, use self-contained breathing apparatus.

3.2.4.2 Precautionary measures for the environment

Do not allow spilled fluids to enter the water system, drainage system or the underground water.

3.2.4.3 Cleaning measures

The leaked fluid must be removed professionally by the operating company on the basis of a risk assessment and disposed of in the correct manner. The fire brigade, the Agency for Technical Relief or similar institutions must be used. Absorb residues with liquid-absorbent material (such as vermiculite, sand, universal binders and pebble grain).

3.2.5 Touch voltage hazard

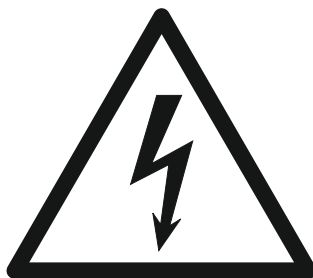
⚠ WARNING!

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 36.



3.3 Battery lifetime and maintenance

The lithium-ion battery is wear-free. The components are maintenance-free, as a result there are no maintenance intervals planned for this battery.

3.4 Charging the battery

DANGER!

Explosion risk when charging unsuitable battery types

Charging a battery that is not suitable for this charger can result in damage to the charger and battery. The battery could expand or burst.

- ▶ The lithium-ion battery must only be charged with the battery charger SSLC300V29 provided for this battery.

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!

The use of a different charger can result in overheating, fire or a battery explosion.

NOTICE

Full discharge can damage the battery

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

- ▶ Before a long period of inactivity, the battery must be fully charged.
- ▶ Charge the battery at least every 6 weeks, see page 43.

→ If the battery is deeply discharged or if the battery temperature is below the permissible level (5 °C), the battery will not charge. Deeply discharged batteries cannot be charged by the operator (faulty). Contact the manufacturer's customer service department.

→ Due to the risk of condensate formation, batteries that have been stored at temperatures below 5 °C must only be charged after spending at least 4 hours in a warm environment.

3.5 Storage / safe handling / faults

3.5.1 Storing the battery

NOTICE

Discharge can damage the battery

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

- ▶ Before a long period of inactivity, the battery must be fully charged.
- ▶ To ensure a long battery life, we recommend checking and charging the battery every 4 weeks when it is not being used.

The temperature range for storing the battery is 5 °C to 40 °C.

3.5.2 Instructions for safe handling

- Do not physically machine or modify the battery.
- Do not open, damage, penetrate or bend the battery.
- Do not throw the battery into a fire.
- Protect the battery from high temperatures and overheating.
- Protect the battery from solar irradiation.
- Keep the battery away from radiant sources and strong heat sources.
- The specified charging, operating and storage temperature ranges must be observed.

Failure to comply with these safety instructions can result in fire and explosion or the leakage of harmful materials.

3.5.3 Faults

⚠ WARNING!

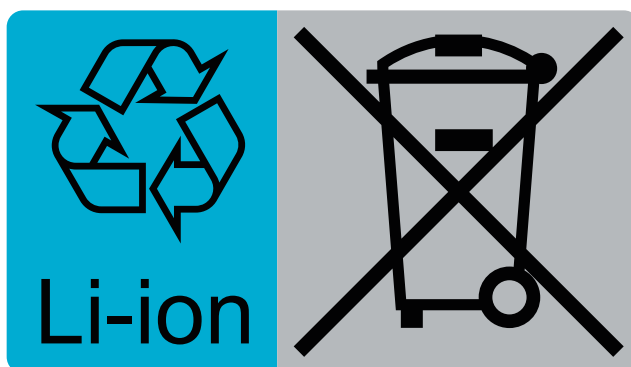
Do not open the battery.

If any damage is found to the battery or battery charger SSLC300V29 contact the manufacturer's customer service department immediately. The operating company must not carry out any remedial work on its own.

Independent attempts to tamper with or repair the battery may invalidate the warranty. A service agreement with the manufacturer will help identify faults.

3.6 Disposal and transport of a lithium-ion battery

3.6.1 Instructions for disposal



Used lithium-ion batteries are recyclable commodities. These lithium-ion batteries must be treated as hazardous waste.

Lithium-ion batteries marked with the recycling symbol and the sign showing a crossed-out waste bin must not be disposed of with ordinary household waste.

Return or recycling of batteries must be ensured, for example, in accordance with the Battery Directive 2006/66/EG. Buy-back terms and the manner of recycling must be agreed with the manufacturer.



Instructions for disposal

Lithium-ion batteries must be disposed of in accordance with the relevant national environmental protection regulations.

- For lithium-ion battery disposal, contact the manufacturer's customer service department.

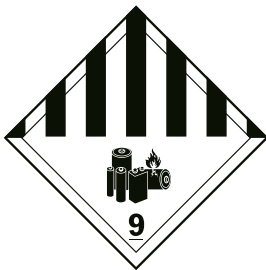
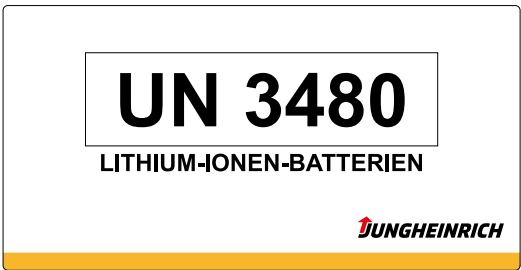
3.6.2 Shipping information

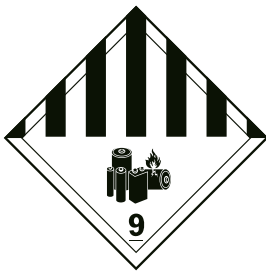
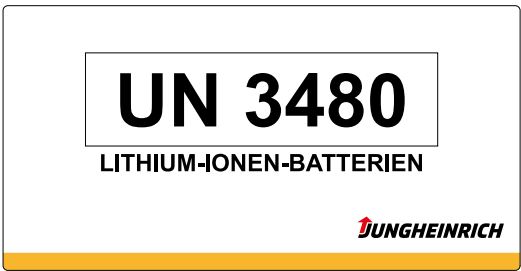
The lithium-ion battery is a hazardous material. The applicable ADR regulations must be observed during transport.

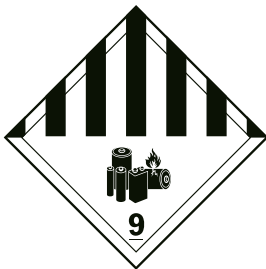
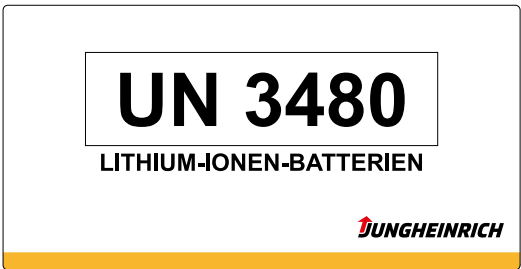
- ADR = Accord européen relatif au transport international des marchandises Dangereuses par Route

3.6.2.1 Shipping functional batteries

Functioning batteries can be shipped in accordance with the following regulations:

Classification according to ADR (road transport)	UN 3480 lithium-ion battery class 9	
- Classification code	M4 lithium battery	
- Danger label		
- ADR limited quantity	LQ:0	

IMDG classification (sea transport)	UN 3480 lithium-ion battery class 9	
- EMS	F-A, S-I	
- Danger label		
- IMDG limited quantity	LQ: -	

IATA classification (air transport)	UN 3480 lithium-ion battery class 9	
- Danger label		

Exposure scenario	Not specified.
Substance safety rating	Not specified.
Marking	Product does not require marking under EC Directive / HazMatR.

3.6.2.2 Shipping faulty batteries

To transport these faulty lithium-ion batteries, contact the manufacturer's customer service department. Faulty lithium-ion batteries must not be transported independently.

4 Charging the battery

4.1 Safety information

The operating instructions are a major component of the charger.

The owner shall ensure that the operating instructions are kept permanently in the vicinity of the charger, and that operating personnel shall be aware of the guidelines mentioned in the instructions.

The owner shall add further instructions regarding national accident prevention and environmental protection regulations to the operating instructions, including information on supervisory and reporting obligations, taking into account particular company practices e.g. in terms of work organization, work processes and the personnel employed.

Apart from the operating instructions and the current accident prevention regulations in force in the country and place of use, generally recognised technical regulations for safe and proper use shall be observed.

Charging the battery

- The lithium-ion battery may only be charged with an approved charger within the permissible temperature range, see page 21.

The truck should not be stored without battery compensation charge for more than 6 weeks.

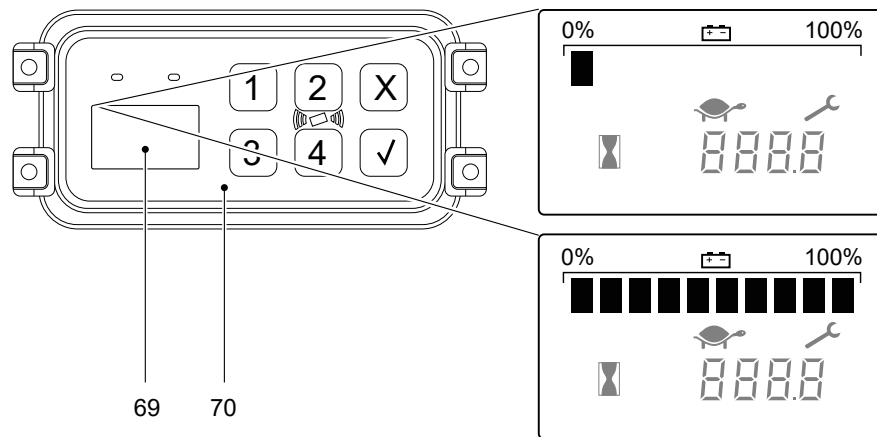
NOTICE

Damage to the lithium-ion battery due to improper connection

Unsuitable connector plugs of industrial trucks or battery chargers used with the lithium-ion battery can damage the battery connector.

► Operate the lithium-ion battery only with appropriate trucks and battery chargers.

4.2 Charge Status Indicator



The charge status of the battery is shown in the display (69) of the display unit (11).

The charge status is displayed in ten increments. Each is represented by a rectangle that corresponds to 10% of the battery charge.

The rectangles gradually disappear as the battery discharges. Special statuses appear in the display unit as error codes.

Code	The error code appears if ...	Effect
0	The battery charge is too low.	Travelling is switched off.
91	Operation of the truck continues without first charging the battery.	Travel speed is reduced.

4.3 Charging the Battery with External Charger

Maintenance personnel

Batteries may only be charged, serviced or replaced by trained personnel. These operating instructions and the battery manufacturer's instructions must be observed when performing these operations.

The truck must be parked securely before all work on the batteries, see page 78.

General information

- The charge status of the battery is indicated by LEDs on the battery charger.
- The charging time depends on the battery charge status. The time it takes to charge an almost fully depleted battery depends both on the battery capacity and the charge current. The approximate duration can be calculated as follows:
Charging time = capacity of battery / charge current of battery charger.
- The lithium-ion battery can also be used when not fully charged. In this case, the remaining operating time is reduced.
- Charging continues automatically after a mains failure. Charging can be interrupted by pulling out the mains connector and continued as a partial charge.

NOTICE

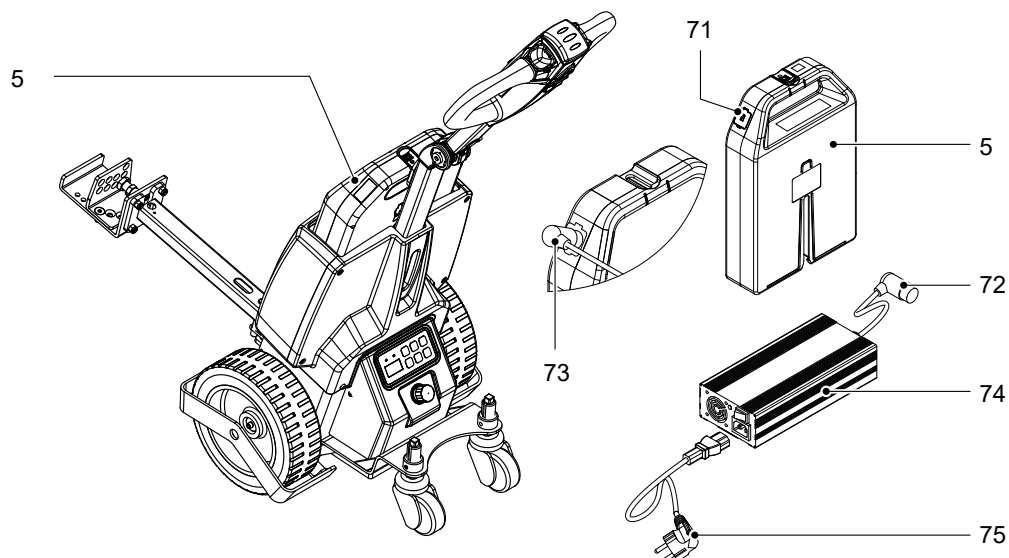
The battery temperature rises by approx. 13 °C during charging. Battery charging should only start when the battery temperature is below 40 °C. The battery temperature before charging should be at least 5 °C as otherwise it will affect the charge.

Meaning of the LEDs on the battery charger

When the battery charger is connected to the battery and to the power supply, the LEDs on the charger indicate the following:

LED lit	Meaning
Green	The battery is fully charged
Red	Battery is charging

If the green LED does not light up or if the red LED lights up permanently or not at all, this indicates a fault, see page 79.



Charging the battery

Requirements

- The truck is parked securely, see page 78.
- The battery charger is approved for the battery type, see page 21.

Tools and Material Required

- Battery charger

Procedure

- Expose the charging socket (71) of the battery and start by connecting it to the charge connector (73) of the battery charger (74).
- Then connect the mains plug (75) of the battery charger (74) to the power supply.

→ The charging process is indicated by the illumination of the red LED.

- Check the charge status; also refer to the instructions on the battery charger (74).

→ The charging process is completed when the green LED lights up.

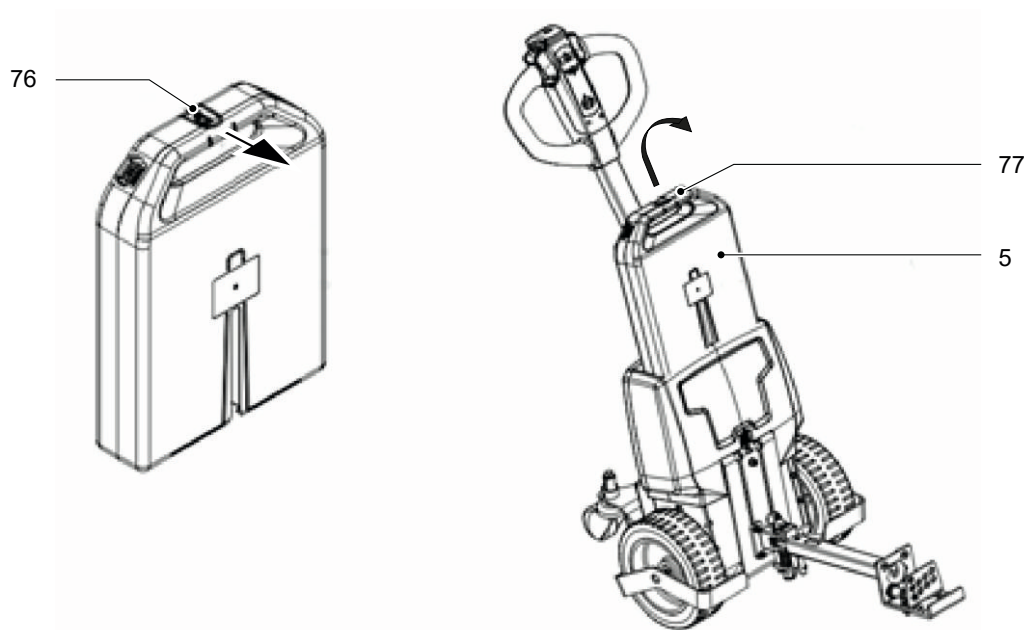
- Once the battery (5) is charged, disconnect the battery charger (74) from the power supply before unplugging it from the battery.
- Close the charging socket (71) with the cap.

Battery is charged.

→ Alternatively, the battery can also be charged outside the truck, see page 52. The process for charging the battery remains the same.

5 Removing or installing the battery

5.1 Removing the battery



Removing the battery

Requirements

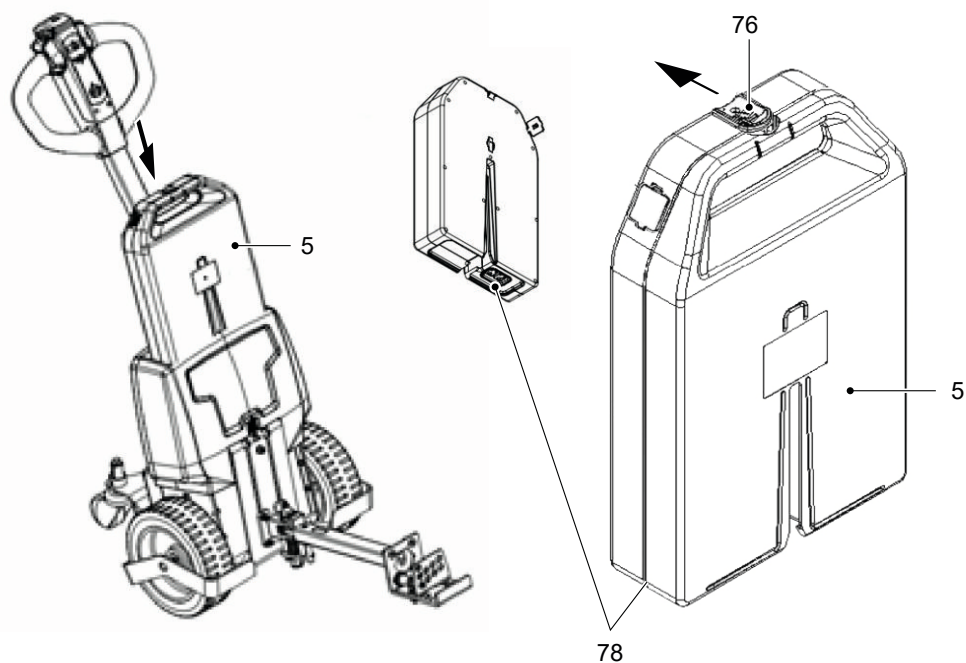
- The truck is parked securely, see page 78.
- The emergency disconnect switch is actuated, see page 65.

Procedure

- Unlock the battery latch (76).
- Lift the battery (5) up by the battery handle (77).

The battery has been removed.

5.2 Battery installation



Installing the battery

Requirements

- The truck is parked securely, see page 78.

Procedure

- Insert the battery (5) into the battery compartment.

- ➔ The plug connection (78) between the battery and truck must be fully connected.
- Lock the battery latch (76).
 - Release the emergency disconnect switch, see page 65.

The battery is now installed.

E Operation

1 Safety Regulations for the Operation of Forklift Trucks

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.

Hazardous area

WARNING!

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

The hazardous area is defined as the area in which people are at risk from the truck movement or from the load itself. This also includes areas which can be reached by falling loads.

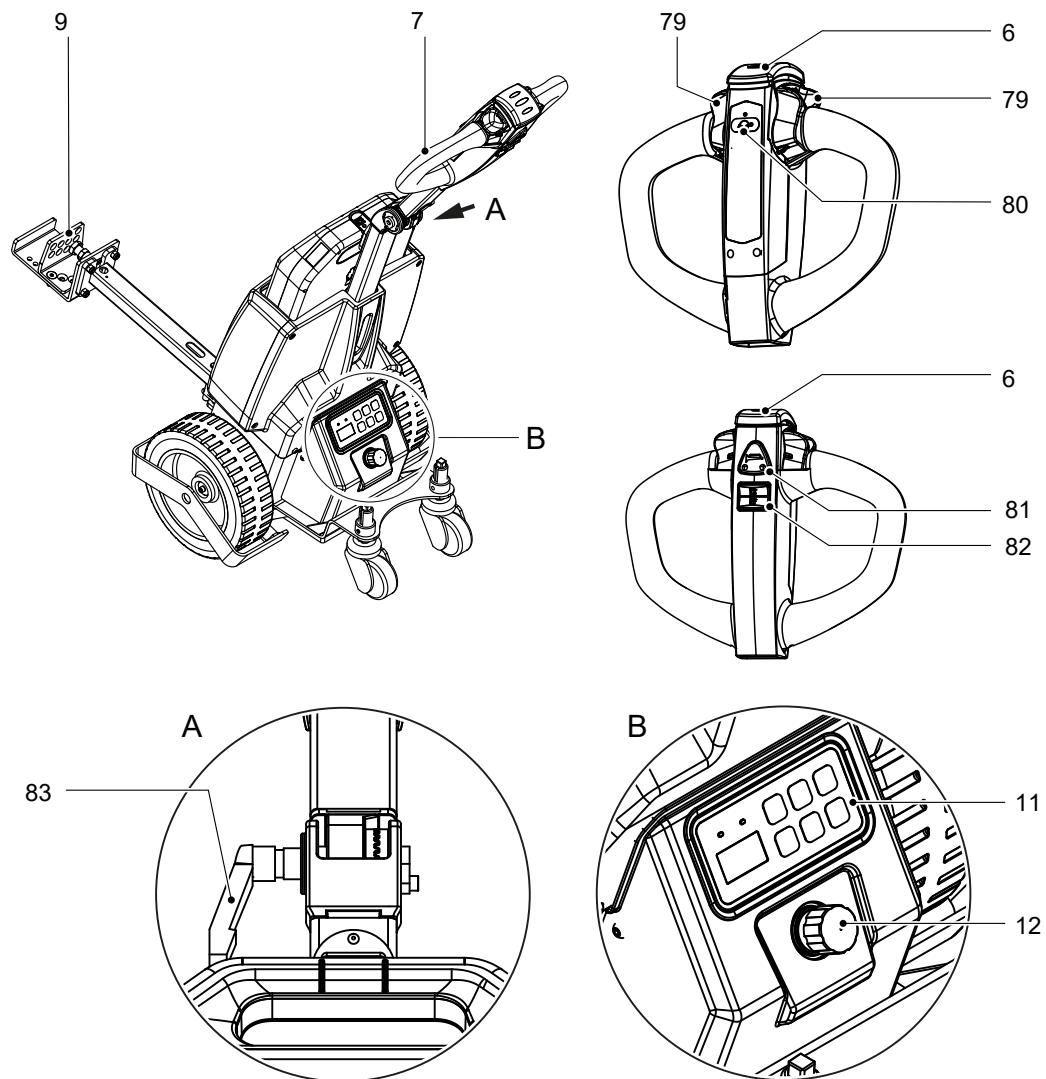
- ▶ Instruct unauthorised people to leave the hazardous area.
 - ▶ Give a warning signal with plenty of time for people to leave.
 - ▶ If unauthorised personnel are still within the hazardous area stop the truck immediately.
-


Safety devices, warning signs and warning instructions

Safety devices, warning signs (see page 23) and warning instructions in the present operating instructions must be strictly observed.

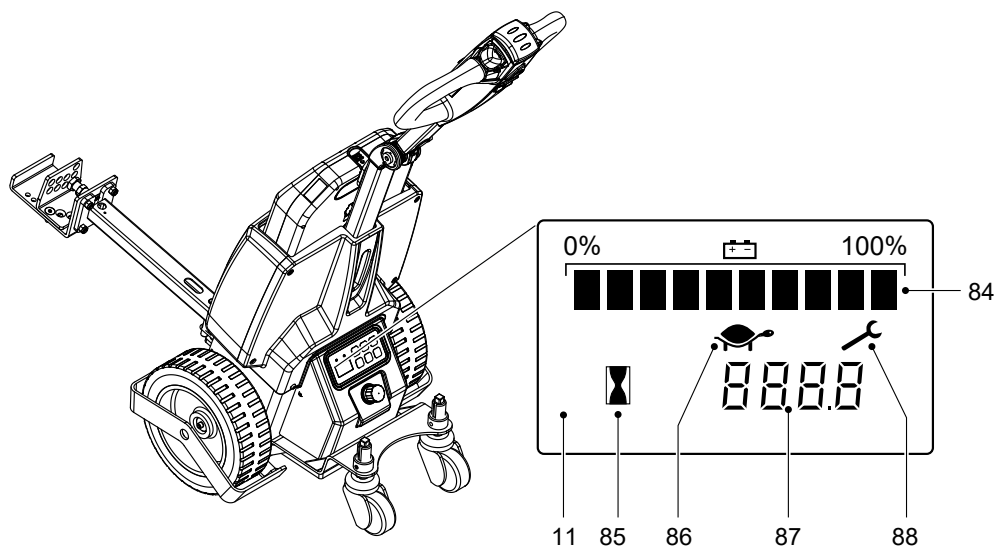
2 Displays and Controls

2.1 Controls



Item	Control/display		Function
6	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.
7	Tiller	●	Used to steer the truck and travel.
9	Coupling	●	Used to connect the trailer to the industrial truck.
11	Display unit	●	Displays: – Battery charge status – Service hours – Error messages – Slow travel – Maintenance Keypad – Enter the access code – Lock the industrial truck – Change the access code
12	Emergency disconnect switch	●	The main circuit is disconnected. All truck movements are braked with maximum deceleration and switched off.
79	Travel switch	●	Controls travel direction and travel speed.
80	"Slow travel" button	●	Toggles between slow travel and travel at normal speed, see page 68.
81	"Warning signal" button (horn)	●	Used to trigger the warning signal (horn).
82	"Release" and "Tension" switches	●	Used to loosen and tighten the tensioning element of the electric coupling (not shown).  With other couplings, this switch has no function.
83	Tiller height adjustment	●	Tiller height adjustment allows the operator to adjust the height of the tiller to suit ergonomic requirements.

2.2 Display symbols



Item	Description	Function
11	Display unit	Displays symbols for: <ul style="list-style-type: none"> - Battery charge status - Slow travel - Hour meter - Service and fault messages.
84	Charge status indicator	Shows the battery charge status – see page 49.
85	Hourglass	Flashes when the hour meter is active.
86	Tortoise	Appears when “slow travel mode” is active, see page 68.
87	Number field	Displays operating hours or fault messages.
88	Service symbol	Only appears when scheduled maintenance is required or if faults exist. Fault messages are displayed in the number field.

3 Preparing the truck for operation

3.1 Checks and operations to be performed before starting daily operation

WARNING!

Truck damage or defects can result in accidents

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

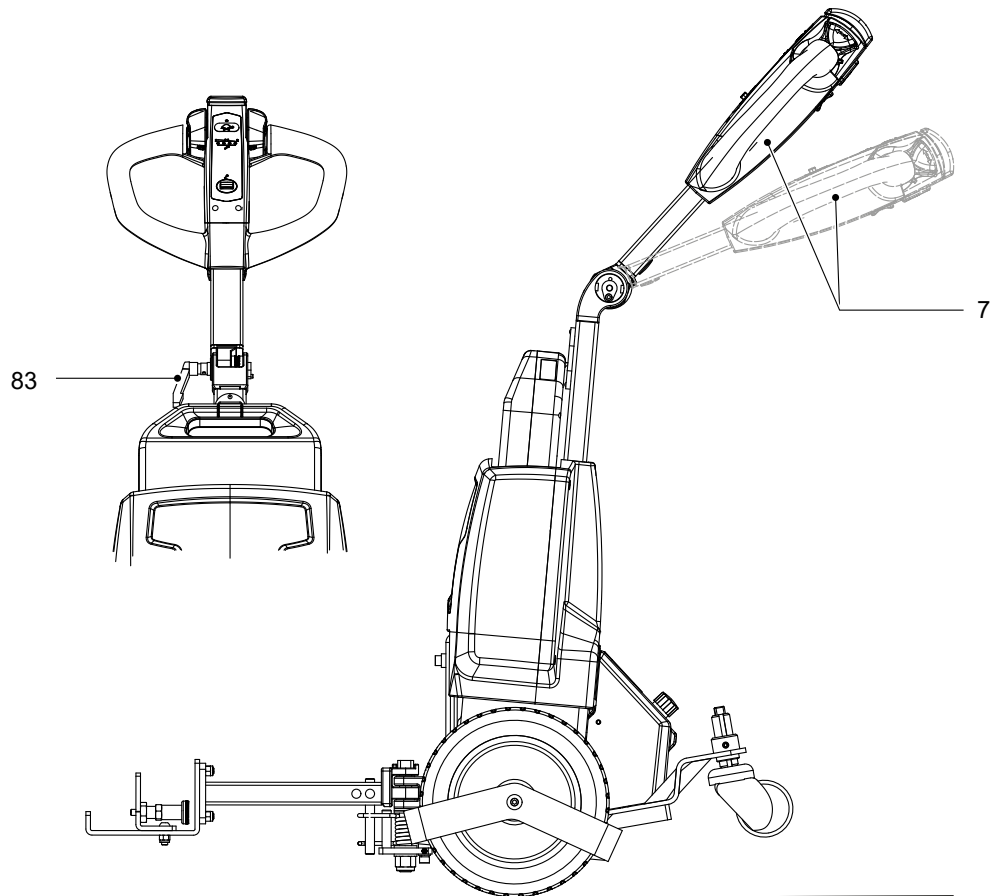
- ▶ Report any defects immediately to your supervisor.
- ▶ Tag out the defective truck and take it out of service.
- ▶ Do not return the truck to service until you have identified and rectified the fault.

Inspection before daily operation

Procedure

- Check the whole of the outside of the truck for signs of damage and leaks.
- Check the battery attachment and cable connections for damage and make sure they are secure.
- Check the charge connector is secure.
- Check the wheels for damage.
- Check that the markings and labels are present, clean and legible, (see page 23).
- Check the panels and covers are secure and check for damage.
- Check the optional equipment for damage and make sure it is secure.

3.2 Tiller Height Adjustment



Adjusting the tiller height

Requirements

- Truck parked on a level surface.
- Trailer is coupled, see page 70.

Procedure

- Release the lever (83) loosen.
- Adjust the tiller (7) to a comfortable operating height.
- Clamp the lever (83).

The tiller height is adjusted.

4 Working with the truck

4.1 Safety regulations for travel mode

Travel routes and work areas

Only use lanes and routes specifically designated for traffic. Unauthorised third parties must stay away from work areas. The load may only be stored in the designated locations.

The truck must only be operated in work areas with sufficient lighting to avoid danger to personnel and materials.

DANGER!

Do not exceed the permissible surface and point loading limits on the travel paths. A second person is required as a lookout at blind spots.

Conduct while travelling

The operator must adapt the travel speed to local conditions. The operator must drive slowly e.g. on corners and in narrow spaces, when driving through swinging doors, in 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.

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.

Travelling on uphill and downhill slopes

Do not negotiate uphill and downhill slopes (permissible slope and incline values see page 21) unless they are marked as traffic lanes. The uphill and downhill slopes must be clean and non-slip and it must be possible to negotiate them safely in accordance with the truck's technical specifications. The truck must not be turned, operated at an angle or parked on uphill and downhill slopes. Downhill slopes must only be negotiated at slow speed, with the driver ready to brake at any moment.

Uphill and downhill slopes may only be driven on when towing trailers if the trailer can be firmly locked in the coupling, see page 70.

Negotiating lifts

Lifts may only be negotiated if they have sufficient capacity, are suitable for driving on and authorised for traffic by the owner. The driver must satisfy himself of the above before entering these areas. The truck must enter lifts with the load facing forward 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.

Types of load to be carried

The operator must make sure that the loads are in a satisfactory condition. Loads must always be positioned safely and carefully. Take appropriate countermeasures if there is a risk of the load or parts of the load tipping or falling down. Prevent liquid loads from sloshing out.

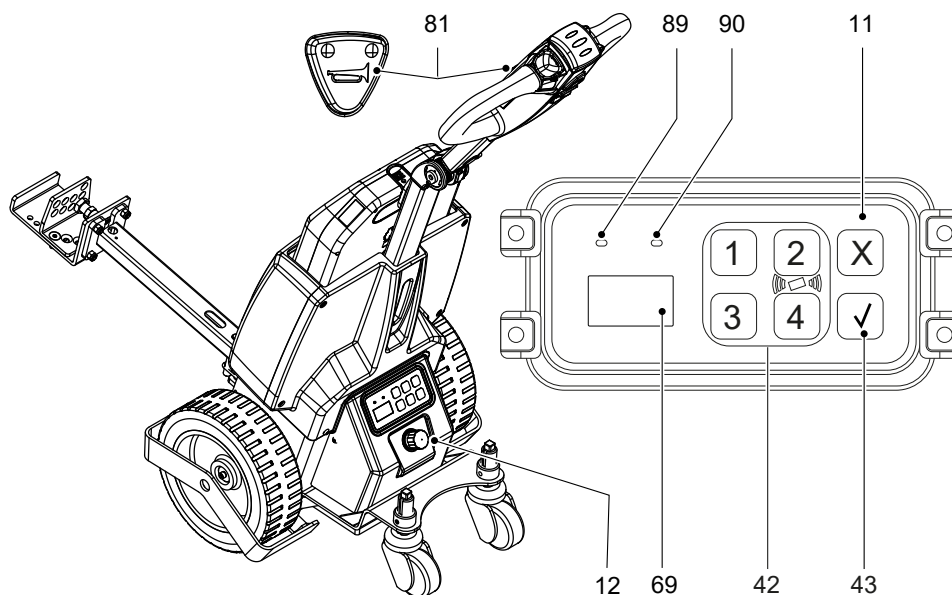
WARNING!

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.
-

4.2 Making the truck operational



Switching on the truck

Requirements

- Checks and operations before starting daily work have been completed – see page 60.
- Trailer is properly coupled and secured, see page 70.

Procedure

- Release the emergency disconnect switch (12), see page 65.



The green LED (89) lights up, the display (69) remains switched off.

- Switch on the truck with the access code. To do this:
 - Enter the access code with the keypad (42), see page 28.
 - Press the RETURN button (43).

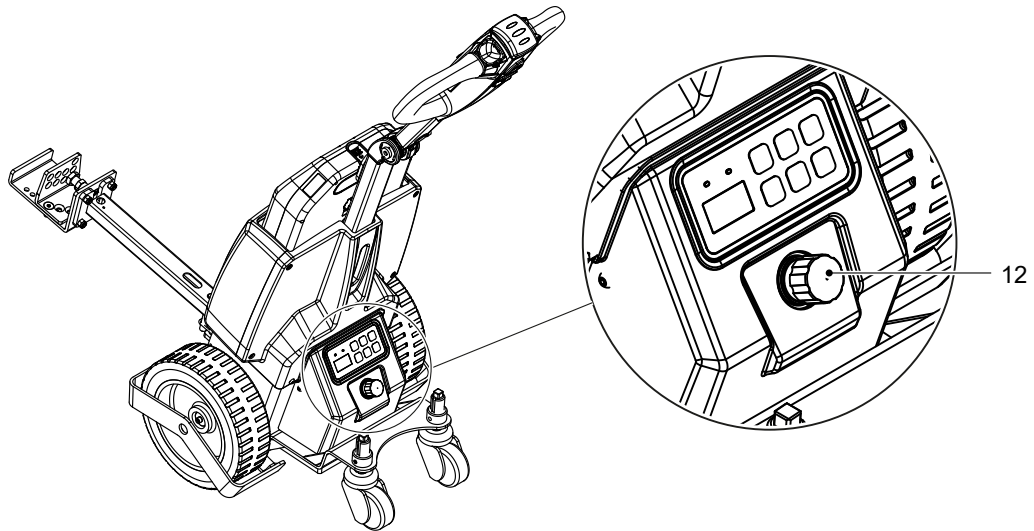


The green (89) and the blue LED (90) light up, the display (69) switches on.

- Press the warning signal button (81).

The truck is ready for operation.

4.3 Actuating or unlocking the emergency disconnect switch



Pressing the Emergency Disconnect switch

Procedure

- Press the Emergency Disconnect (12).

All electrical functions are deactivated. The truck brakes to a halt at maximum brake force.

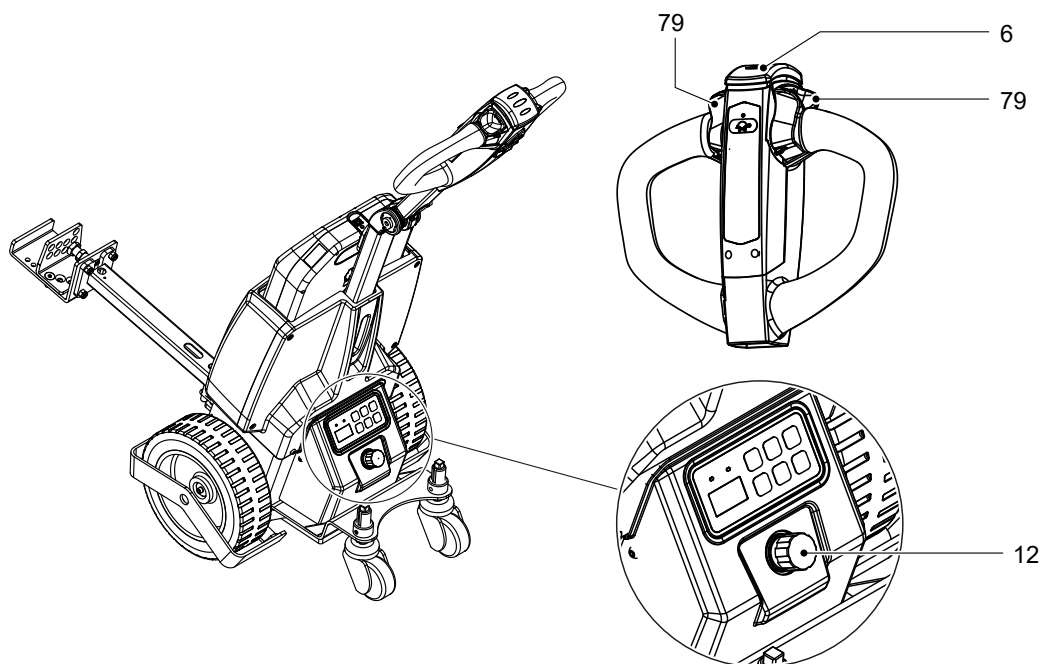
Releasing the emergency disconnect switch

Procedure

- Turn the emergency disconnect switch (12) to unlock it.

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

4.4 Braking the truck



The braking behaviour of the truck largely depends on the ground conditions and the truck load. The operator must take this into account.

The truck can brake in different ways:

Braking type		
	Action	Effect
Service brake		
	Set the travel switch (79) to the neutral "0" position.	The regenerative brake is activated. The truck brakes to a halt.
Travel switch reverse		
	Turn the travel switch (79) to the opposite direction.	The regenerative brake is activated. The truck brakes and begins travelling in the opposite direction.
Emergency brake		
	Apply the collision safety switch (6). → This function is also active when the industrial truck is stationary.	The truck brakes and travels a short distance in the opposite direction to protect the operator.
Emergency brake		
	Activate the emergency disconnect switch (12). → Only do so in an emergency, as this can damaged the drive wheels.	The truck brakes to a halt at the maximum rate.

4.5 Travelling with the truck

4.5.1 Safety information

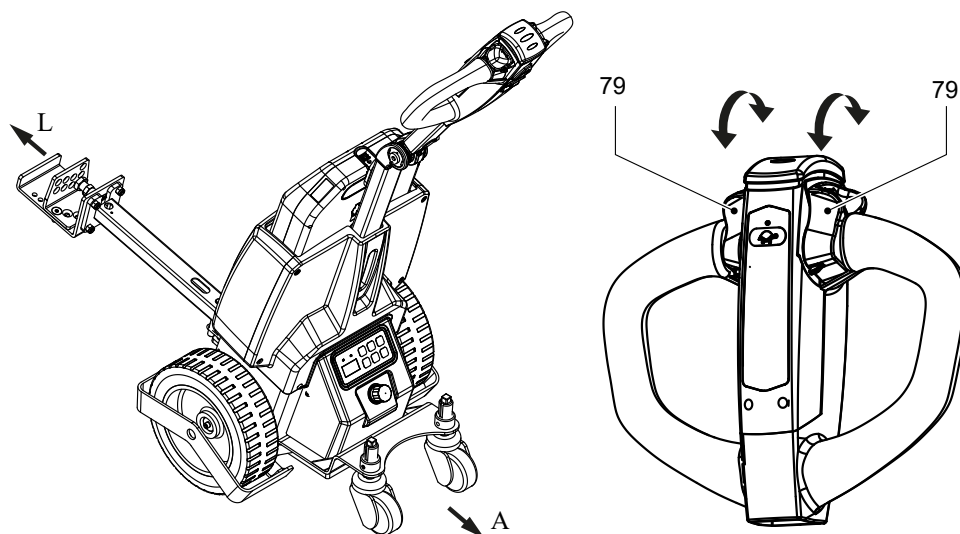
⚠ WARNING!

Risk of injury or trapping from the truck

Be extremely careful when driving and steering, especially if parts of your body extend beyond the truck. The operator's legs and feet could get injured or trapped.

- ▶ Wear personal protective equipment (e.g. safety shoes, ...).
- ▶ In pedestrian mode make sure you have sufficient distance from the truck.
- ▶ Make sure there is nobody between the truck and any obstacles.

4.5.2 Travelling with the truck



Requirements

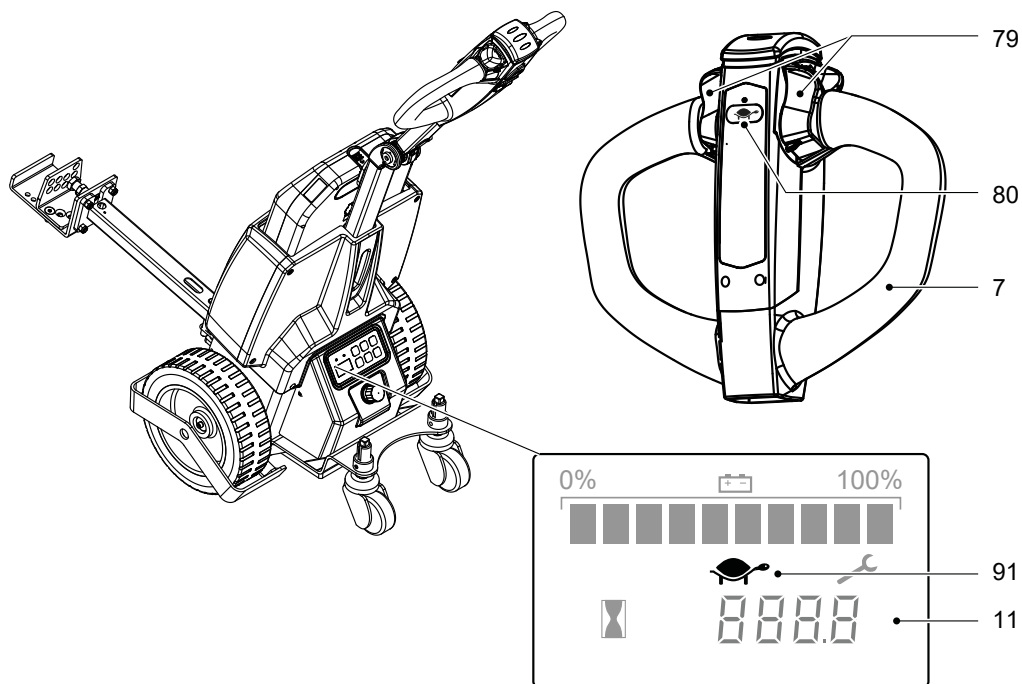
- Truck is ready for operation – see page 60.

Procedure

- Control the travel direction with the travel switch (79):
 - 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 (79):
 - The further the travel switch is turned, the higher the speed.

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

4.5.3 Slow travel



Operating the truck at slow speed

Requirements

- Truck prepared for operation – see page 64.

Procedure

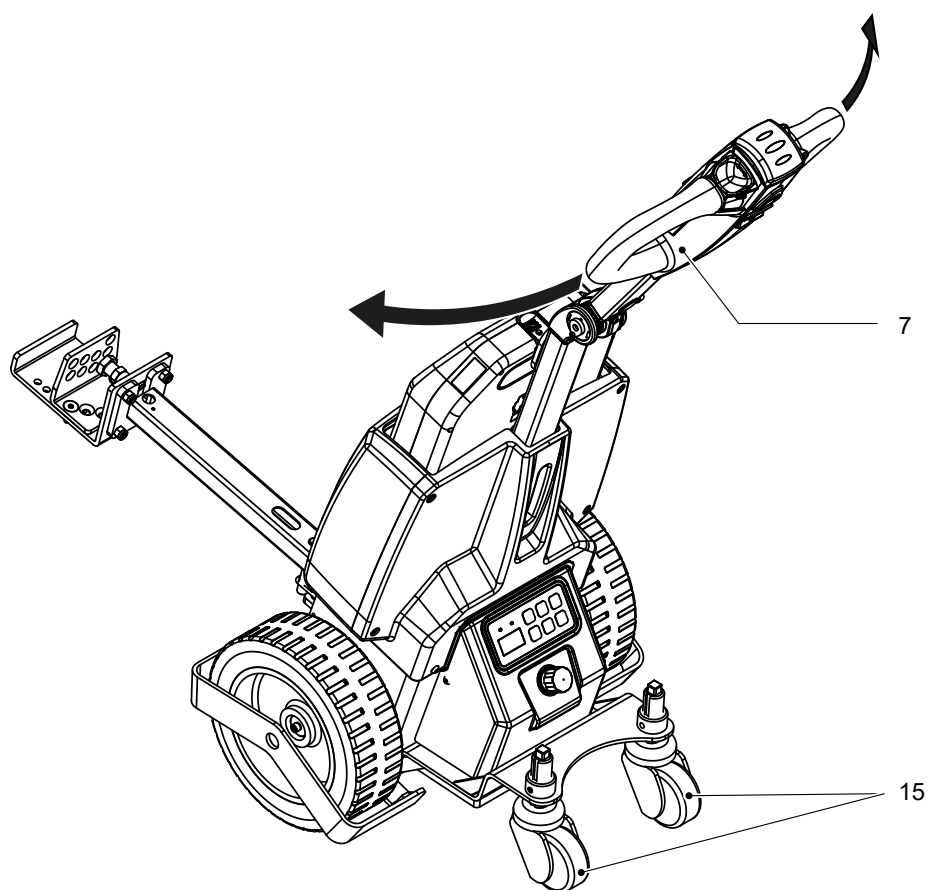
- Press the slow travel button (80).
- Set the travel switch (79) to the desired direction.
- Press the slow travel button again to resume travelling at normal speed.

The truck can be steered with precision at slow speed and in tight spaces.



Slow travel is indicated on the display unit (11) by the tortoise symbol (91).

4.6 Steering



➔ The tiller cannot pivot.

Procedure

- Pull the truck to the left or right using the tiller (7).

The industrial truck is steered in the desired direction with the aid of the support wheels (15).

4.7 Travelling with trailers

CAUTION!

Trapping hazard

There is a trapping risk when you attach a trailer.

- ▶ Follow the instructions of the coupling manufacturer if using special trailer couplings.
 - ▶ Secure the trailer to prevent it from rolling away before coupling it.
 - ▶ The towing tractor and trailer must be on level ground when attaching and uncoupling trailers.
 - ▶ Ensure there is nobody between the towing tractor and the trailer.
 - ▶ All controls must be set to neutral.
-

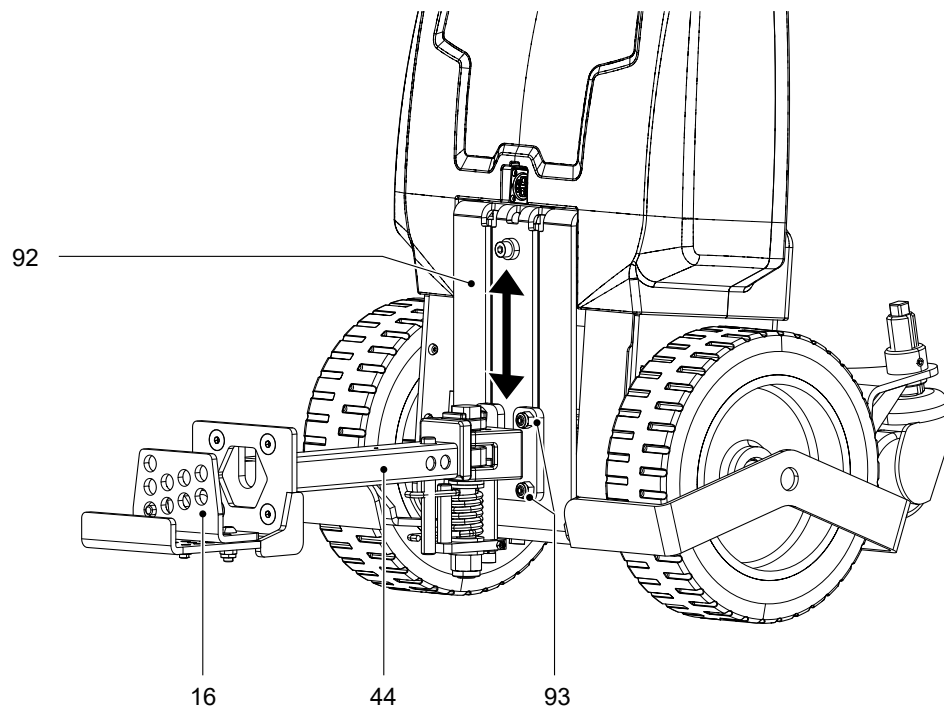
CAUTION!

Using inadmissible couplings on uphill and downhill slopes

Danger from uncontrolled rolling trailers.

- ▶ Only use pin coupling and electric coupling on uphill and downhill slopes.
-

4.7.1 Adjusting the coupling height



Adjusting the coupling height

Requirements

- Truck and trailer parked on a level surface.

Tools and Material Required

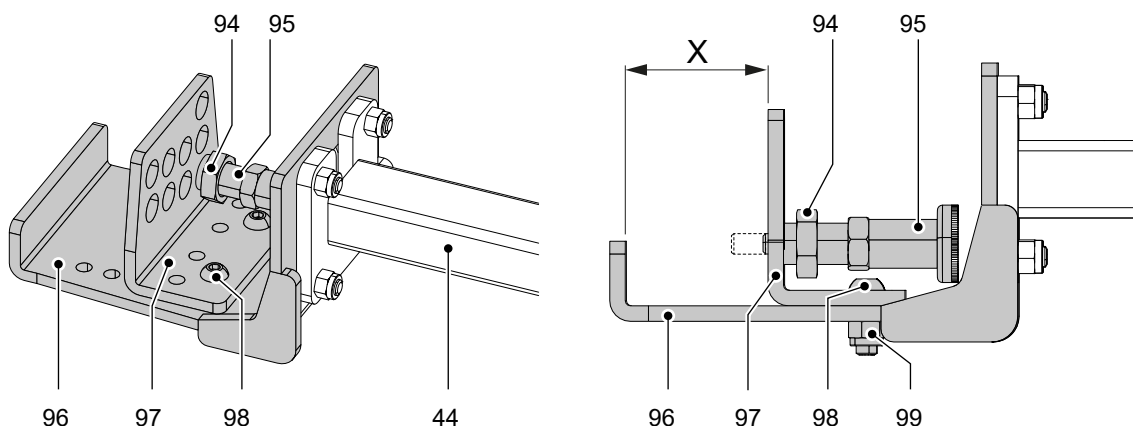
- Torque wrench
- Hexagon socket, spanner size 13 mm

Procedure

- Drive the industrial truck up to the trailer.
- Adjust the coupling height.
 - Loosen the 4 hex bolts (93).
 - Tilt the industrial truck so that the coupling arm (44) is horizontal.
 - Raise or lower the coupling arm (44) in the guidance plate (92) until the coupling (16) of the industrial truck is at the same height as the coupling head of the trailer.
 - Tighten the 4 hex bolts (93) to a torque of 25 Nm.

Coupling height is set.

4.7.2 Connecting the standard coupling to the trailer



Setting the standard coupling

Requirements

- Truck and trailer parked on a level surface.
- Height of coupling arm (44) adjusted, see page 71.

Tools and Material Required

- Allen key, A/F 5 mm
- Open-end spanner, size 24 mm

Procedure

- Set dimension X.¹
 - Remove the flanged button head bolts (98) and hex. nuts (99).
 - Move the adjusting plate (97) until the required dimension X is reached.
 - Assemble the flanged button head bolts (98) and hex. nuts (99) in matching holes in the mounting plate (96).
- Set the retaining bolt (95) to the required height.

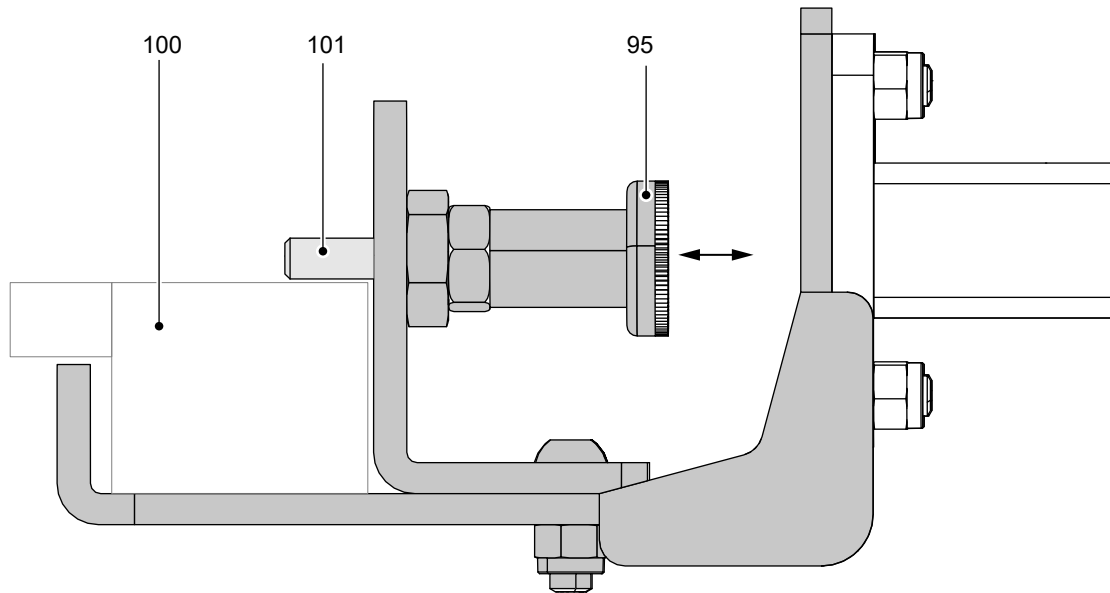


The retaining bolt is to prevent the trailer coupling from jumping out of the standard coupling

- Loosen the hex. nut (94).
- Remove the retaining bolt (95) from the adjusting plate (97).
- Insert the retaining bolt (95) into a hole in the adjusting plate (97) that matches the height of the trailer coupling.
- Lock the retaining bolt (95) with the hex. nut (94).

The standard coupling is set.

¹⁾ The dimension X must be set as small as possible to the counterpart of the trailer so that the retaining bolt can properly secure the trailer. Otherwise, the safe transport of the trailer cannot be guaranteed.



- ➔ The standard coupling is not approved for driving on uphill and downhill slopes.

Attaching the trailer to the standard coupling

Procedure

- Drive the industrial truck up to the trailer.
- Pull back the pin (101) of the retaining bolt (95) and hook the standard coupling into the coupling head of the trailer (100).
- Release the retaining bolt (101).

- ➔ The pin is to prevent the trailer from detaching from the standard coupling.

The trailer is hitched and secured.

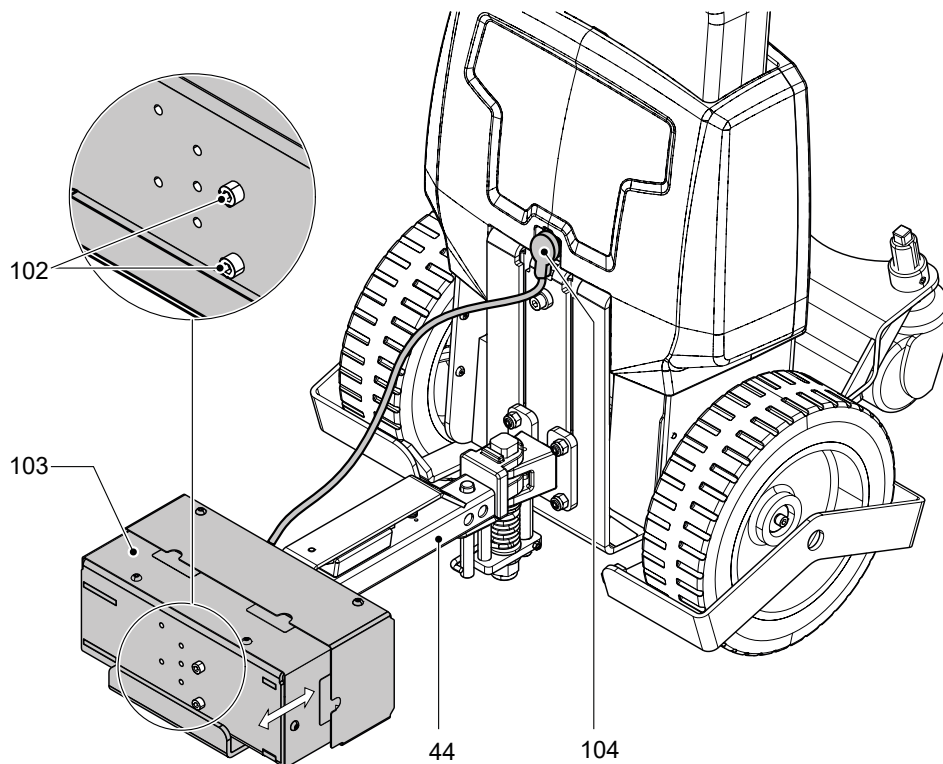
Detaching the trailer from the standard coupling

Procedure

- Park the truck and trailer on a level surface.
- Pull back the pin (101) of the retaining bolt (95).
- Detach the standard coupling from the coupling head of the trailer (100).

The trailer has been uncoupled.

4.7.3 Connecting the electric coupling to the trailer



Preparing the electric coupling

Requirements

- Truck and trailer parked on a level surface.
- Height of coupling arm (44) adjusted, see page 71.

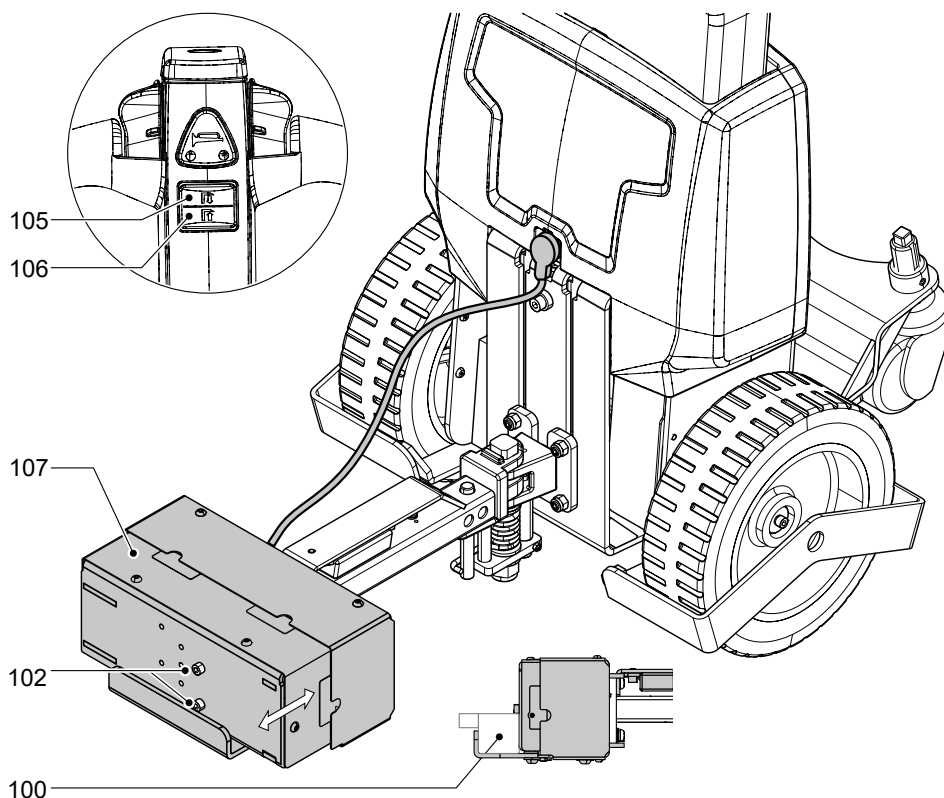
Tools and Material Required

- Allen key

Procedure

- Screw the cylinder head bolts (102) into holes that match the height of the trailer coupling.
- ➔ The cylinder head bolts are to prevent the trailer coupling from jumping out of the electric coupling
- Attach the connector plug (104) of the electric coupling (103) to the industrial truck.

The electric coupling is prepared.



Coupling the trailer to the electric coupling

Procedure

- Switch on the truck – see page 64.
- Drive the industrial truck up to the trailer.
- Retract the clamping element (107) by pressing the “Release” button (106).
- Insert the electric coupling into the coupling head of the trailer (100).
- Make sure that the cylinder head screws (102) are screwed in at the correct height.
- Tension the tensioning element by pressing the "Tension" button (105) against the coupling head of the trailer (100).

- ➔ The cylinder head bolts are to prevent the trailer from disengaging from the electric coupling.

The trailer is hitched and secured.

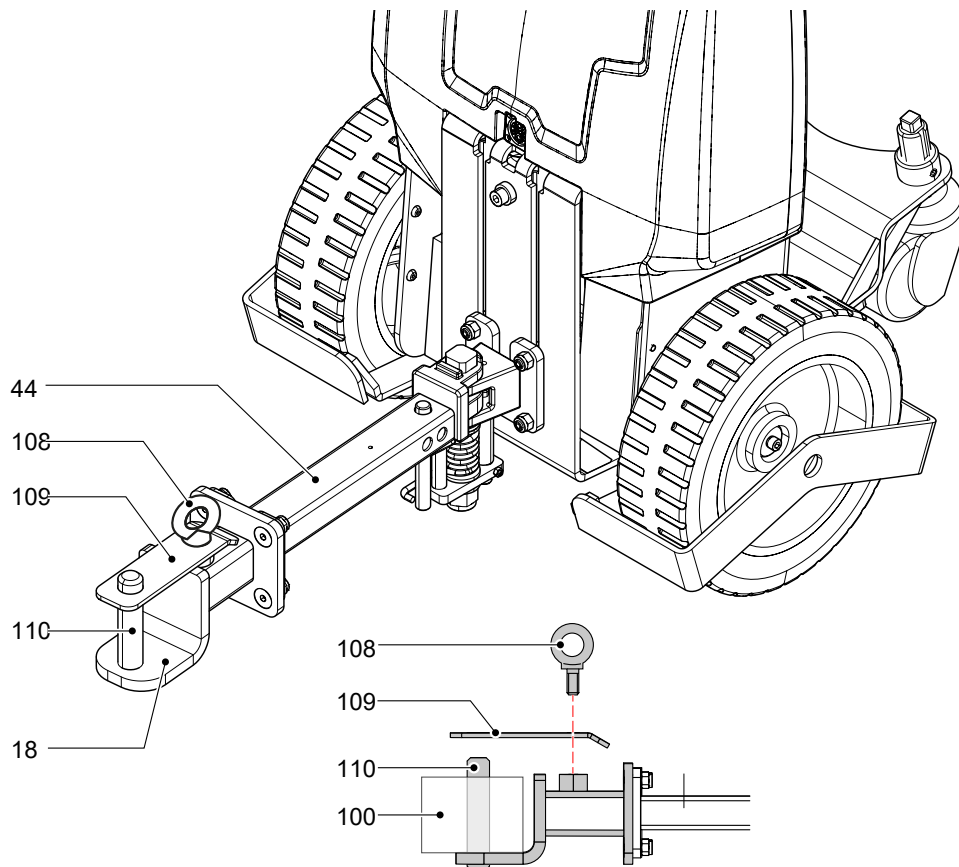
Unhitching the trailer from the electric coupling

Procedure

- Park the truck and trailer on a level surface.
- Release the clamping element (107) by pressing the “Release” button (106) from the coupling head of the trailer (100).
- Disconnect the electric coupling from trailer coupling head.

The trailer has been uncoupled.

4.7.4 Connecting the pin coupling to the trailer



Connecting the trailer to the pin coupling

Requirements

- Truck and trailer parked on a level surface.
- The height of the coupling arm (44) is adjusted, see page 71.

Procedure

- Drive the industrial truck up to the trailer.
- Unscrew the eyebolt (108).
- Lift off the safety bar (109).
- Insert the pin coupling (18) into the coupling head of the trailer (100).
- Apply the safety latch (109).
- Tighten the eyebolt (108)

The trailer has been coupled.

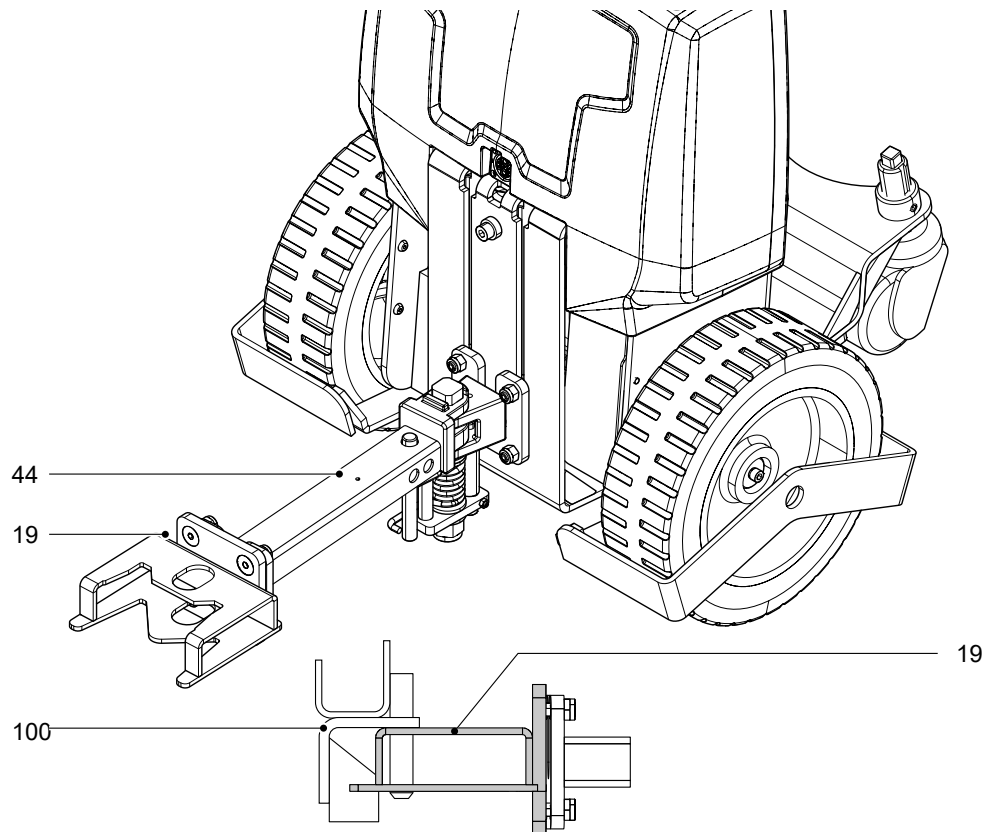
Unhitching the trailer from the pin coupling

Procedure

- Unscrew the eyebolt (108).
- Lift off the safety bar (109).
- Lift off the pin coupling (18) from the coupling head of the trailer (100).
- Apply the safety latch (109).
- Tighten the eyebolt (108).

The trailer has been uncoupled.

4.7.5 Connecting the LKE coupling to the trailer



➔ The LKE coupling is not approved for travelling on uphill and downhill slopes.

Attaching the trailer to the LKE coupling

Requirements

- Truck and trailer parked on a level surface.
- The height of the coupling arm (44) is adjusted, see page 71.

Procedure

- Drive the industrial truck up to the trailer.
- Insert the LKE coupling (19) into the coupling head of the trailer (100).

The trailer has been coupled.

Detaching the trailer from the LKE coupling

Procedure

- Lift the LKE coupling (19) off the coupling head of the trailer (100).

The trailer has been uncoupled.

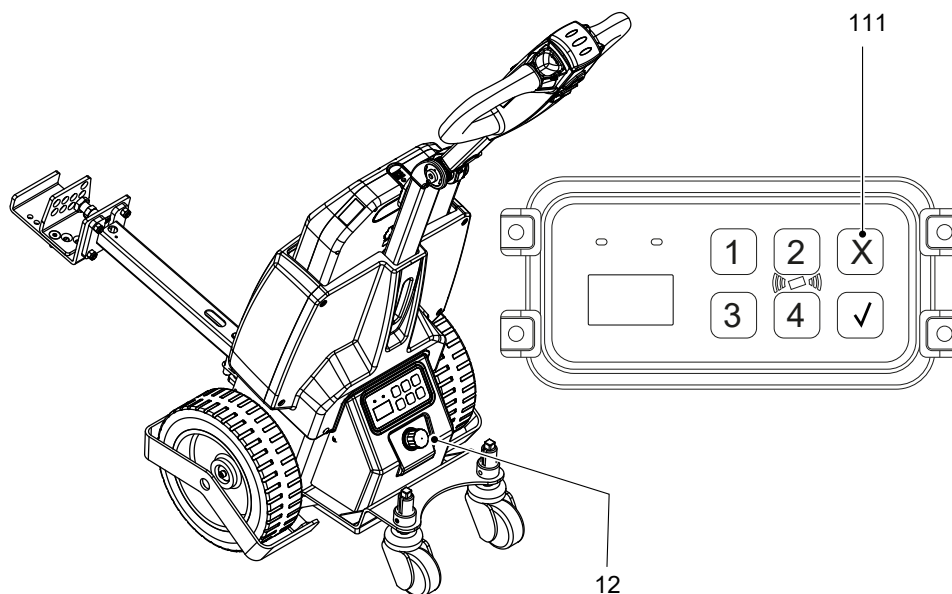
4.8 Parking the truck securely

⚠ WARNING!

An unsecured truck can cause accidents

Do not park the truck on uphill or downhill slope. Do not park the truck without the brakes applied.

- ▶ Park the truck on a level surface. In special cases the truck may need to be secured with wedges.
- ▶ 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.
- Uncouple the trailer, see page 70.
- Press the emergency disconnect switch (12). OR
- Press the X button (111).

Truck is parked securely.

5 Troubleshooting

5.1 General information

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.

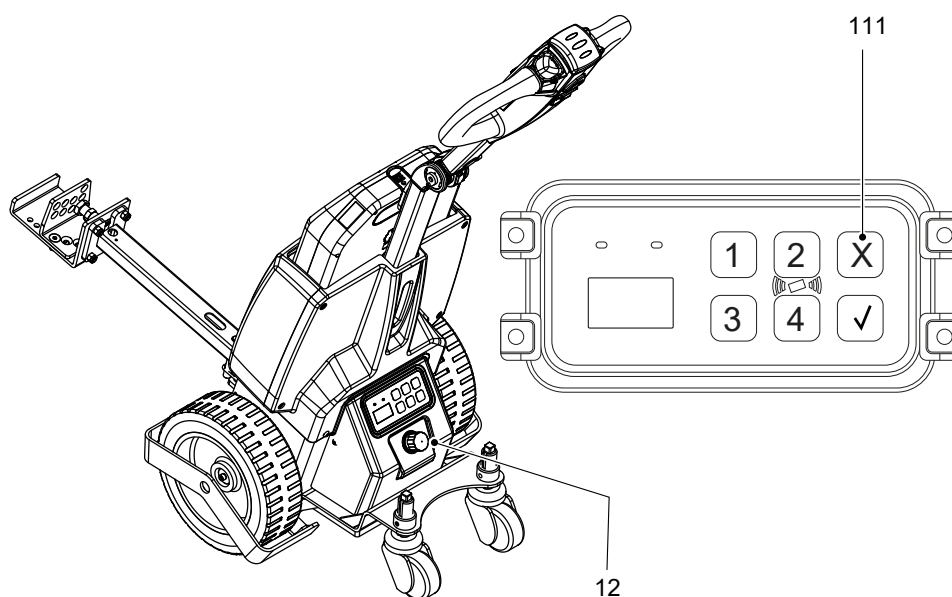
5.2 Troubleshooting

The truck does not start

Cause	Action
Battery still connected to the charger.	Stop charging the battery and disconnect the charger from the battery, see page 48.
Battery is not inserted correctly.	Insert the battery correctly in the truck, see page 52.
Fuse(s) faulty.	Replace fuse(s), see page 89.
Battery charge status too low.	Charge the battery, see page 48.
Emergency disconnect switch activated.	Release the emergency disconnect switch – see page 65.

→ If the industrial truck malfunctions and cannot be moved out of the work area, it must be lifted and moved to a safe area, see page 80.

5.3 Emergency recovery of the truck



⚠ WARNING!

Truck without its own drive system

Industrial truck stops in a hazardous area.



Due to its low net weight, the industrial truck can easily be moved out of a hazardous area even in the event of a malfunction.

- Press the emergency disconnect switch (12) or the X button (111).
- Secure the combination, consisting of industrial truck and trailer, against rolling away.
- Secure the hazardous area.
- Uncouple the trailer from the truck, see page 70.
- Push the trailer out of the hazardous area, park it on a level surface and secure against rolling away.
- Pull the truck away from the hazardous area, park it on a level surface and secure against rolling away.

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 24.



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 93.

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 93.

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.



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 90.

3 Maintenance Safety Regulations

3.1 General information

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 personal 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 81.

3.2 Electrical System

WARNING!

Electrical current can cause accidents

Make sure the electrical system is voltage-free before starting work on it. The capacitors in the controller must be completely discharged. The capacitors are completely discharged after approximately 10 minutes. 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 78).
 - ▶ Disconnect the battery.
 - ▶ Remove any rings, metal wrist bands etc.
-

3.3 Consumables and used parts

CAUTION!

Consumables and used parts represent an environmental hazard

There is a risk of environmental damage due to penetration into the ground and entry into waterways. This risk arises from incorrect transport or improper storage of consumables in unsealed containers.

- ▶ Observe the relevant safety regulations and hazard information for working with consumables and used parts.
 - ▶ Used parts and consumables must be disposed of in accordance with the applicable environmental-protection regulations.
 - ▶ Transport consumables correctly and carefully in suitable containers.
-

3.4 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 81.

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!

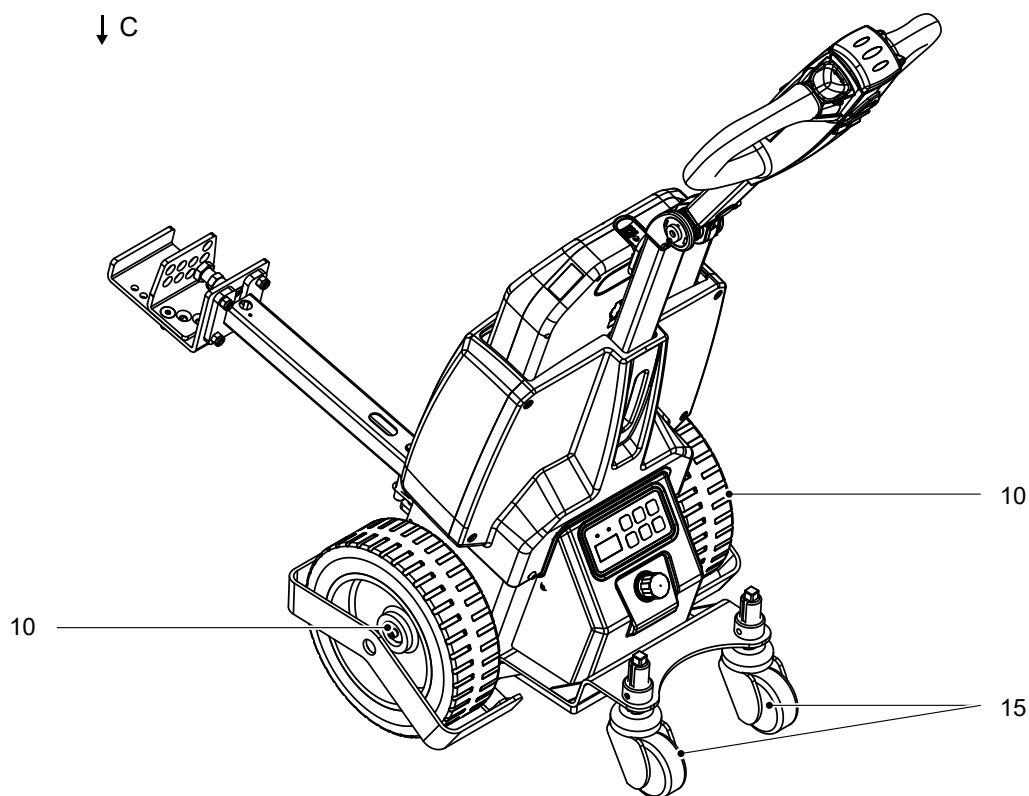
Spilled consumables can cause slipping and endanger the environment

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.
-

4.2 Lubrication Schedule

↓ C



Item	Component	Item	Component
10	Drive wheels (↓)	15	Support wheels (↓)

Lubricate the truck according to the lubrication schedule

Requirements

- The truck is parked securely – see page 78.
- Truck is prepared for maintenance and repair work, see page 87.
- Maintenance interval has been reached, see page 93.

Tools and Material Required

- Lubricants according to lubrication schedule, see page 86

Procedure

- Lubricate the lubrication points (↓) according to the lubrication schedule.
- Start up the truck – see page 90.

Truck is lubricated.

4.3 Consumables

Code	Order no.	Description	Used for	Volume
C	29200430	Lubricating grease DIN 51825	Bearing points	As required

5 Maintenance and repairs

5.1 Preparing the truck for maintenance and repair work

Procedure

- Park the truck securely, see page 78.
- Remove the battery, see page 52, to prevent the truck from being switched on accidentally.

5.2 Cleaning

5.2.1 Cleaning the truck

⚠ CAUTION!

Fire hazard

Do not use flammable liquids to clean the industrial truck.

- ▶ Always disconnect the battery before starting cleaning work.
- ▶ Carry out all necessary safety measures to prevent sparking before cleaning (e.g. by short-circuiting).



Cleaning tasks may only take place in the designated locations, which adhere to the stipulations of the country of use.

Cleaning the truck

Requirements

- Truck prepared for maintenance and repair work, see page 87.

Tools and Material Required

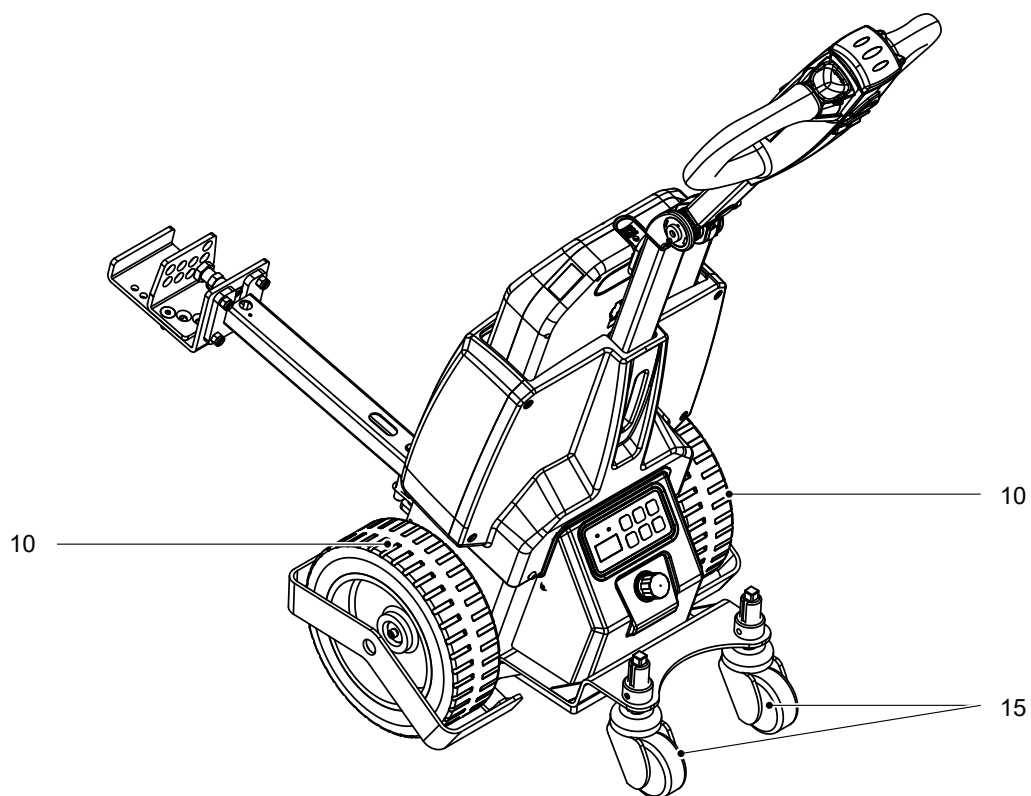
- Water-based solvents
- Sponge or cloth

Procedure

- Clean the surface of the truck with water-based solvents and water. Use a sponge or cloth to clean.
- 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 90).

The truck is now clean.

5.3 Checking the drive wheel and load wheels

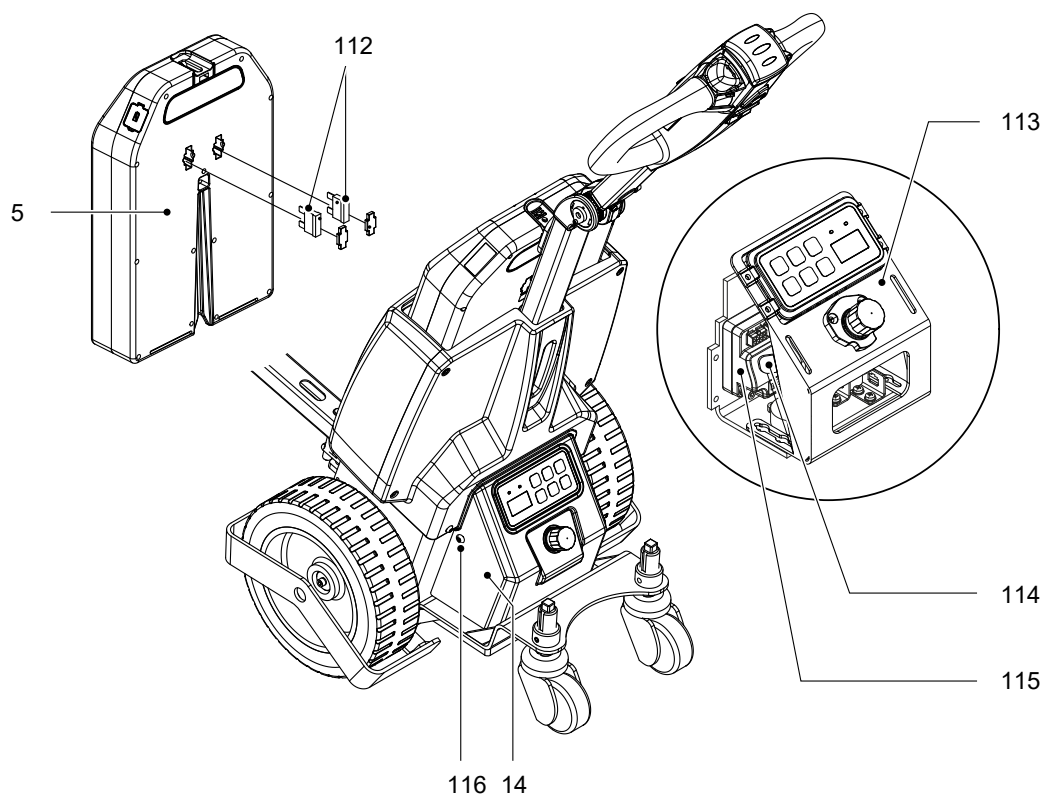


➔ Wheels must only be replaced by authorised service personnel.

Procedure

- Check the drive wheels (10) for wear, damage and freedom of movement.
- Replace drive wheels if they are worn and/or out of round.
- Check the support wheels (15) for wear, damage and freedom of movement.
- Replace support wheels if necessary.

5.4 Checking the electrical fuses



Fuse	Rating	Installation location
FU1 (114) Control circuit	10 A	Control unit (113)
FU 01 (112) Battery	70 A (2x)	Battery (5)

Checking electrical fuses

Requirements

- Truck is prepared for maintenance and repair work, see page 87.

Procedure

- Remove the screws (116) from the dashboard panel (14) and lift off the dashboard panel.
- Check fuse FU1 (114) for correct rating and condition, and replace if necessary.
- Fit the dashboard panel (14)
- Remove the battery (5), see page 52.
- Check fuse FU01 (112) for correct rating and condition, and replace if necessary.
- Install the battery – see page 53.

The fuses have been checked.

6 Restoring the truck to service after maintenance and repairs

Procedure

- Thoroughly clean the truck, see page 87.
- Lubricate the truck according to the lubrication diagram, see page 86.
- Charge the battery, see page 48.
- Start up the truck, see page 60.

- The manufacturer's customer service department is specially trained to carry out this task.

7 Decommissioning the industrial truck

- If the truck is to be out of service for more than a month, e.g. for commercial reasons, 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.

7.1 Prior to decommissioning

Procedure

- Thoroughly clean the truck – see page 87.
- Prevent the truck from rolling away accidentally.
- Apply a thin layer of oil or grease to any non-painted mechanical components.
- Lubricate the forklift truck according to the lubrication schedule – see page 86.
- Charge the battery, see page 48.

- Final de-commissioning or disposal of the truck in 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.

7.2 Action to be taken during decommissioning

NOTICE

Full discharge can damage the battery

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

► Before a long period of inactivity, the battery must be fully charged.

► Charge the battery at least every 6 weeks, see page 48.

7.3 Restoring the truck to service after decommissioning

Procedure

- Thoroughly clean the truck, see page 87.
- Lubricate the truck according to the lubrication diagram, see page 86.
- Charge the battery, see page 48.
- Start up the truck, see page 60.

8 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.

9 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.

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 expert maintenance and inspections are among the most important requirements for the safe operation of the industrial truck.

NOTICE

The application conditions of an industrial 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 more stringent requirements are placed on the equipment, e.g., use in conditions of extreme dust, 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 TTE 1.0 Li-Ion

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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.

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

Travel
Check wheels for wear and damage

Chassis/structure
Industrial truck for damage and leaks
Check labels for legibility, completeness and plausibility

Battery charger
Mains plug and mains cable for damage

1.1.2.2 Optional Equipment

The following points must be checked:

1.2 Customer Service

In accordance with the TTE 1.0 Li-Ion 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 with the tiller in the maximum vertical and horizontal positions.
Measure the air gap of the magnetic brake.
Electrical system
Test the contactors and/or relays.
Perform insulation inspection.
Power supply
Measure the battery voltage.
Chassis/structure
Check that the panels and covers as well as mounting brackets are secure. Ensure they function correctly and are safe.
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.
Battery charger
Test the immobiliser on trucks with an on-board charger.

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 cable for damage

Travel
Transmission for noise and leaks
Check wheels for wear and damage
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

Battery charger
Mains plug and mains cable for damage

1.2.2.2 Optional Equipment

Trailer coupling

Chassis/structure
Test trailer coupling stop or tow mechanism stop and check for damage

Optional electrical equipment

Electrical system
Test optional electrical equipment 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	