ETV 214i - 325i

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Operating instructions

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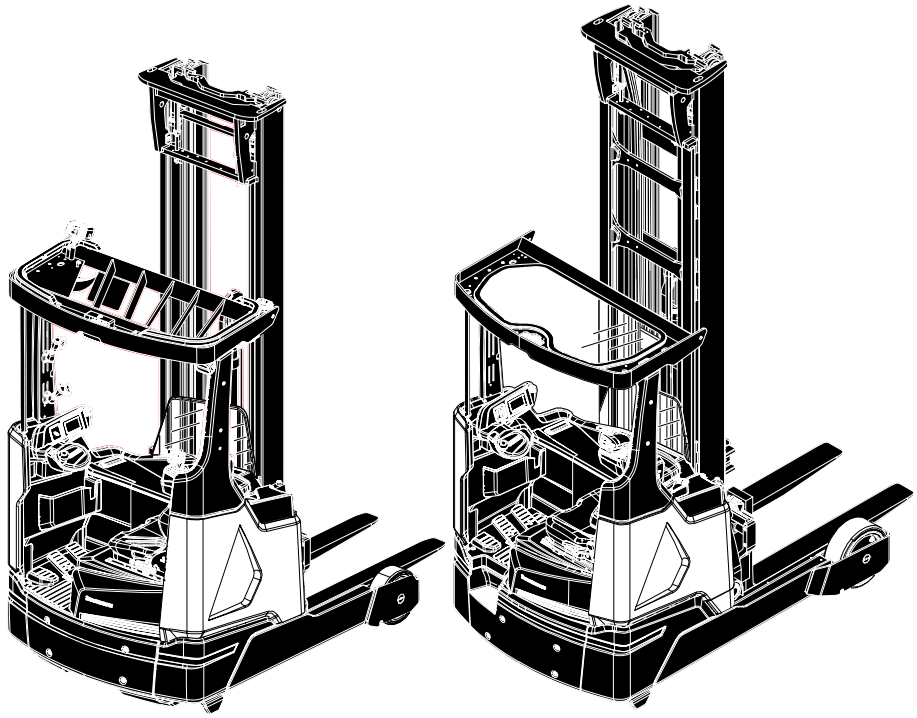
ETV 214i -325i



JUNGHEINRICH

Declaration of Conformity

CE

Manufacturer

Jungheinrich AG, 22039 Hamburg, Germany

Description
Industrial truck

Type	Option	Serial no.	Year of manufacture
ETV 214i ETV 216i ETV 314i ETV 316i ETV 318i ETV 320i ETV 325i			

On behalf of

Date

EU DECLARATION OF CONFORMITY

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

UK CA

JUNGHEINRICH

Declaration of Conformity (○)

Product:	ETV 214i - 325i Serial number/type number
Manufacturer:	Jungheinrich Aktiengesellschaft 22039 Hamburg, Germany
UK representative:	Jungheinrich UK Ltd Sherbourne House Sherbourne Drive Tilbrook Milton Keynes MK7 8HX

Authorised to compile documentation:

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

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

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

Supply of Machinery (Safety) Regulations 2008 No. 1597

and

Electromagnetic Compatibility Regulations 2016 No. 1091

Signed for and on behalf of:

Jungheinrich Aktiengesellschaft

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Foreword

Notes on the operating instructions

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

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

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

Safety notices and text mark-ups

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

⚠ DANGER!

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

⚠ WARNING!

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

⚠ CAUTION!

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

NOTICE

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

➔ Used before notices and explanations.

●	Indicates standard equipment
○	Indicates optional equipment

Copyright

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Contents

A Correct Use and Application 11

1 General 11
1.1 Personnel 12
2 Correct application 12
3 Approved application conditions 14
3.1 Instructions for trucks with lithium-ion batteries 15
3.2 Internal Operation Combined with Brief External or Cold Store Operation 15
3.3 Indoor Application in Deep-Freeze Store Including Alternating Applications with Cold-Store Equipment (○) 16
4 Residual risk 18
5 Proprietor responsibilities 18
6 Adding attachments and/or optional equipment 19
7 Removal of components 19

B Truck Description 21

1 Application 21
2 Truck models and rated capacity 21
3 Travel direction definition 22
4 Assembly description 23
5 Functional Description 26
6 Technical Specifications 29
6.1 Performance data 29
6.2 Dimensions 32
6.3 Dimensions 40
6.4 Tyre type 42
6.5 Battery 42
6.6 Hydraulics 42
6.7 Mast weights 43
6.8 EN norms 44
6.9 Conditions of use 45
6.10 Electrical Requirements 46
7 Identification Points and Data Plates 47
7.1 Overview of marking points 47
7.2 Data plate 50
7.3 Truck capacity plate 51
8 Stability 54
8.1 driveCONTROL during Mast Lift Operations 54
8.2 Wind loads 54
9 Voltage State 55

C Transport and Commissioning 57

1 Transport 57
2 Lifting by crane 60
2.1 Lifting the truck by crane 61
3 Securing the truck during transport 64
4 Using the Truck for the First Time 67

D Battery ... 69

1 General safety regulations for batteries ... 69
2 Lithium-Ion Battery ... 70
2.1 Safety regulations for handling lithium-ion batteries ... 71
2.2 Lithium-ion battery data plate ... 74
2.3 Battery types ... 76
2.4 Charge Status Indicator ... 77
2.5 Removing or installing the battery ... 77
2.6 Charging the battery with a stationary battery charger ... 78
2.7 Charging the battery with an on-board charger ... 82
3 Battery lifetime and maintenance ... 89

E Operation ... 91

1 Safety Regulations for the Operation of Forklift Trucks ... 91
2 Displays and Controls ... 94
2.1 Display unit ... 97
2.2 Armrest Control Panel Buttons ... 110
2.3 Options keypad ... 110
2.4 Pilots ... 112
2.5 Function symbols for the Pilots ... 114
3 Preparing the Truck for Operation ... 115
3.1 Checks and Operations to Be Performed Before Starting Daily Work ... 115
3.2 Entering or exiting ... 118
3.3 Setting up the operator position ... 119
4 Starting up the truck ... 132
4.1 Safety regulations for travel mode ... 132
4.2 Emergency Disconnect ... 135
4.3 Emergency stop ... 137
4.4 Travel ... 138
4.5 Brakes ... 140
4.6 Steering ... 143
4.7 Forks ... 145
4.8 Lifting, transporting and depositing loads ... 147
4.9 Operating attachments ... 154
4.10 Fitting additional attachments ... 162
4.11 Emergency lowering ... 163
4.12 Parking the truck securely ... 165
5 Troubleshooting ... 166
5.1 Recovering the truck ... 166
5.2 Warning messages ... 171
6 Keyless Access System ... 171
7 General Information about the Use of Keyless Access Systems ... 173
8 Commissioning the keypad and the transponder reader ... 174
8.1 Activating the keypad ... 175
8.2 Activating the transponder reader ... 176
9 Using the Display: ... 177
9.1 Switching on the truck with an access code ... 177
9.2 Switching off the truck ... 177
9.3 Changing the Set-up Code ... 178
9.4 Adding a new access code ... 179
9.5 Deleting an access code ... 180

9.6 Displaying the log-in history ... 181
10 Using the Keypad ... 182
10.1 Switching on the truck with an access code ... 182
10.2 Switching off the truck ... 182
10.3 Changing the set-up code ... 183
10.4 Adding a new access code ... 184
10.5 Deleting an access code ... 185
10.6 Displaying the log-in history ... 186
11 Optional Equipment ... 187
11.1 Operating the transponder reader ... 187
11.2 Assistance systems ... 192
11.3 Work lights ... 195
11.4 Strobe light ... 196
11.5 Lift Height Cut-off (○) ... 197
11.6 Electric lift limit ... 198
11.7 Weigher ... 202
11.8 LED work lights on load handler ... 203
11.9 Removable load backrest ... 204
11.10 operationCONTROL ... 205
11.11 Floor-Spot ... 211
11.12 Integrated Fork Positioner with Telescopic Forks and Hold-down Device ... 214
11.13 Integrated Fork Positioner with Telescopic Forks ... 216
11.14 SmartStripe ... 218
11.15 Floor-Stripes ... 219
11.16 Floor-Bow ... 219
11.17 USB power supply ... 219

F Truck maintenance ... 221

1 Spare Parts ... 221
2 Operational Safety and Environmental Protection ... 221
2.1 Protective conductor resistor (○) ... 222
2.2 Storage, Disposal and Transport ... 222
3 Shipping functional batteries ... 225
4 Shipping faulty batteries ... 226
5 Maintenance Safety Regulations ... 227
5.1 Cleaning ... 227
5.2 Working on the electrical system ... 228
5.3 Consumables and used parts ... 228
5.4 Tyre type ... 229
5.5 Lift Chains ... 229
5.6 Hydraulic system ... 229
6 Lubricants and Lubrication Schedule ... 232
6.1 Handling consumables safely ... 232
6.2 Lubrication Schedule ... 234
6.3 Consumables ... 237
7 Maintenance and repairs ... 238
7.1 Preparing the truck for maintenance and repair work ... 238
7.2 Lifting and jacking up the truck safely ... 239
7.3 Removing or installing the seat cover ... 240
7.4 Checking the hydraulic oil level ... 242
7.5 Checking the electrical fuses ... 245

7.6 Checking the attachment of the wheels ... 248
7.7 Check the mast lift chains ... 248
8 Decommissioning the Industrial Truck ... 250
8.1 Prior to decommissioning ... 250
8.2 During decommissioning ... 250
8.3 Restoring the truck to service after decommissioning ... 251
9 Safety tests to be performed at intervals and after unusual incidents ... 252
10 Final de-commissioning, disposal ... 252
11 Human vibration measurement ... 252

G Maintenance, Inspection and Changing of Maintenance Parts Requiring Replacement ... 253

1 Maintenance Contents ETM/V 214i/216i ... 254
1.1 Owner ... 254
1.2 Customer Service ... 255
2 Maintenance Contents ETV 314i-325i ... 264
2.1 Owner ... 264
2.2 Customer Service ... 265

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.

1.1 Personnel

1.1.1 Specially trained specialists

Personnel specifically trained for a task and possessing certifiable qualifications. For example, setting up and configuring safety devices.

1.1.2 Qualified person

A qualified person possesses the necessary specialist knowledge to execute a task through their vocational training, professional experience and recent occupational activity. In addition to work equipment, qualified persons can also inspect systems that require monitoring when the system's risk potential is rated as low.

1.1.2.1 Maintenance personnel

Maintenance work must only be performed by knowledgeable, authorised and trained employees or other contractors with similar qualifications who are fit to carry out the maintenance operations.

1.1.2.2 Qualified electricians

Electrical work must only be undertaken by qualified electricians or under their guidance and supervision.

The professional requirements for a qualified electrician are:
– Technical training (electrical engineering)
– Knowledge and experience in the relevant field of activity
– Understanding of the applicable standards
– Evaluation of the assigned work
– Identifying hazards

1.1.3 Owner

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 operating company is considered to be the person who is to carry out the specified operational duties in accordance with existing contractual agreements between the proprietor and operator of the industrial truck.

2 Correct application

NOTICE

The maximum load and load distance are indicated on the capacity plate and must not be exceeded.
The load must rest on the load handler or be lifted by an attachment approved by the manufacturer.
The load must be fully raised, see page 147.

⚠ WARNING!

Loss of operational stability can cause accidents

Extended mast sections when the truck is travelling with or without load will reduce the truck's operational stability.

▶ Always travel with the mast holder retracted, the mast tilted back, the load centre in the middle of the truck's longitudinal axis and the load handler lowered.

▶ Position the fork arms as far apart as possible. The load centre must lie centrally between the fork arms.

The following operations are permitted:
– Lifting and lowering loads.
– Transporting lowered loads.

The following operations are prohibited:
– Travelling with a raised load (during travel, the load must be raised to the smallest possible distance above the ground/the load wheels or the support arms)
– Transporting hanging loads. If the truck is to be operated with hanging loads, proof of sufficient safety distance under local operating conditions must be obtained from a specialist assessor.
– Carrying and lifting passengers [a)].
– Pushing or pulling load units on the floor.

a) Lifting passengers with a work cage may be permitted in some countries; this must be verified by the operating company.

→ Germany: DGUV information 208-031 (BGI/GUV- 5183) Use of Working Platforms on Industrial Trucks with Mast

→ Australia: AS 2359.1 Powered Industrial Trucks, General Requirements; AS 2359.2 Powered Industrial Trucks, Operations

3 Approved application conditions

⚠ DANGER!

Do not exceed the permissible surface and point loading on the travel lanes.
At blind spots get a second person to assist.
The driver must ensure that the loading dock /dock leveller cannot be removed or come loose during loading/unloading.

⚠ 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.

⚠ WARNING!

Danger due to lifting sequence disturbances

If operating below the permissible temperature range, lifting sequence disturbances may occur, altering the height of the truck.

▶ Operate the truck only within the permissible temperature range.

⚠ WARNING!

Hazard from sudden movements

If used above the permissible temperature range, sudden changes in speed may occur during the lifting process. The load may fall from the load carrier

▶ Operate the truck only within the permissible temperature range.

– Operation in industrial and commercial environments.
– Operation only on secure, level surfaces with sufficient capacity.
– Do not exceed the permissible surface and point load limits on the travel routes.
– Operation only on routes that are visible and approved by the operating company.
– Read the instructions in these operating instructions before travelling on slopes and inclines:
  • Truck gradeability – see page 29.
  • Notes on travelling on slopes and inclines – see page 132.

Changing the application areas and thawing

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

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

Ground conditions

The ground conditions must satisfy the following requirements:

- The supporting floor must comply with relevant regulations.
- The ground must be resistant to oil and grease.
- The floor insulation resistance RE must not exceed 10^6 Ω (according to DIN EN1081).
- The capacity data specified on the industrial truck applies to floors that comply with DIN 18202 Table 3, Row 3 and have a mast height ≤ 10 m.
- The capacity data specified on the industrial truck applies to floors that comply with DIN 18202 Table 3, Row 4 and have a mast height > 10 m.

3.1 Instructions for trucks with lithium-ion batteries

⚠ WARNING!

Danger of accidents due to regenerative braking fault

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

▶ Keep all persons out of the hazardous area during travel operations.

▶ Instruct other people to move out of the hazardous area of the truck. Stop working with the truck if people do not leave the hazardous area.

▶ In emergencies, use the service brake for braking.

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

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

A notification symbol appears on the display unit when the temperature of the lithium-ion battery is outside the permissible range – see page 101.

3.2 Internal Operation Combined with Brief External or Cold Store Operation

The industrial truck may be operated under the permitted operating conditions – see "Truck in General" in chapter 3.2.1.

3.2.1 Truck in General

Operating and ambient conditions	
Permissible temperature range	0 °C to +30 °C
Permissible temperature combined with outdoor use in dry conditions for < 15 min.	Down to -20°C
Permissible temperature combined with outdoor use in dry conditions for < 60 min.	Up to +40°C
Temperature range for secure parking	+5 °C to +40 °C
Maximum relative air humidity	95%
Altitude above sea level	Up to 2000 m

3.3 Indoor Application in Deep-Freeze Store Including Alternating Applications with Cold-Store Equipment (○)

NOTICE

Cold store trucks

▶ Trucks designed for use in cold stores have a cold store hydraulic oil and a protective frame instead of a mast guard on the mast.

▶ If a truck with cold store oil is used outside the cold store, the lowering speeds may increase.

NOTICE

Battery damage at low state of charge and at low temperatures

If the battery charge is low (heater cut-out), the battery can be damaged as the temperature decreases:

▶ If the battery charge is low, do not use the truck in temperatures from -28°C to -5°C.

▶ If the battery charge is low, avoid using the truck in temperatures from -5°C to +5°C where possible.

▶ Charge the battery – see page 86.

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

– In cold store areas below 0 °C, the truck must be operated **continuously** and must not be parked securely for more than 15 minutes.

3.3.1 Truck in General

Operating and ambient conditions	
Permissible temperature range for continuous operation with short-term load transfer outside the cold store	-28°C to +5°C
Temperature range for long-term secure parking	-20°C to +25°C
Temperature range for secure parking for < 72 hours	Down to -28°C
Maximum relative air humidity	95%
Altitude above sea level	Up to 2000 m

4 Residual risk

⚠ WARNING!

Risk of accident and injury due to incorrect behaviour in the case of unavoidable residual risks

Incorrect behaviour or failure to observe the operating instructions can lead to accidents and injuries.

- ▶ The operator must be instructed in the operation of the truck, optional equipment and attachments, specifically with regard to appropriate behaviour in hazardous areas as well as in situations where unavoidable residual risks exist or implemented safety measures cannot be fully effective.
- ▶ The operator must be familiar with the contents of the operating instructions and must observe these at all times.

Residual risks are particular hazards that arise when working with the truck but cannot be eliminated despite the safety-compliant design of the system. Residual risks are not immediately apparent and are a potential cause of accidents, injuries or health problems.

The transport, setup, operation and maintenance of the truck, optional equipment and attachments – as well as any other reasonably foreseeable use of thereof– can take place under the designated conditions without exposing persons to specific hazards.

Risks are eliminated or minimised to as great an extent as possible. Improper use is prevented if it entails specific risks. Appropriate safety measures are implemented to counter unavoidable risks.

Residual risks that cannot be eliminated by means of risk mitigation are highlighted explicitly in the operating instructions.

Residual risks can be further reduced by trained and technically qualified personnel as well as responsible, safety-conscious conduct during operation and maintenance.

5 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.

➔ All components subsequently fitted to the truck must be connected to the discharge path.

6 Adding attachments and/or optional equipment

⚠ WARNING!

Risk of injury due to subsequently fitted optional equipment for equipment with on-board charger (○)

Incorrectly fitted optional equipment can result in over temperature, fire or explosion and cause serious injury due to burns.

▶ Connect subsequently fitted optional equipment to the protective conductor system.

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.

➔ When fitting an attachment, the corresponding sticker must be applied to the control element. The sticker can be obtained from the manufacturer's customer service department.

7 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 ETV 214i - 325i is a three-wheel electric side seat, clear view reach truck. It is designed to lift and transport goods on level surfaces. Open bottom pallets or pallets with transverse boards can be lifted inside or outside the area of the load wheels or roll cage. Loads can be stacked, unstacked and transported over long distances.

The ETV 214i - 325i is designed to transport and pick goods on level surfaces in accordance with the VDMA guideline.

2 Truck models and rated capacity

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

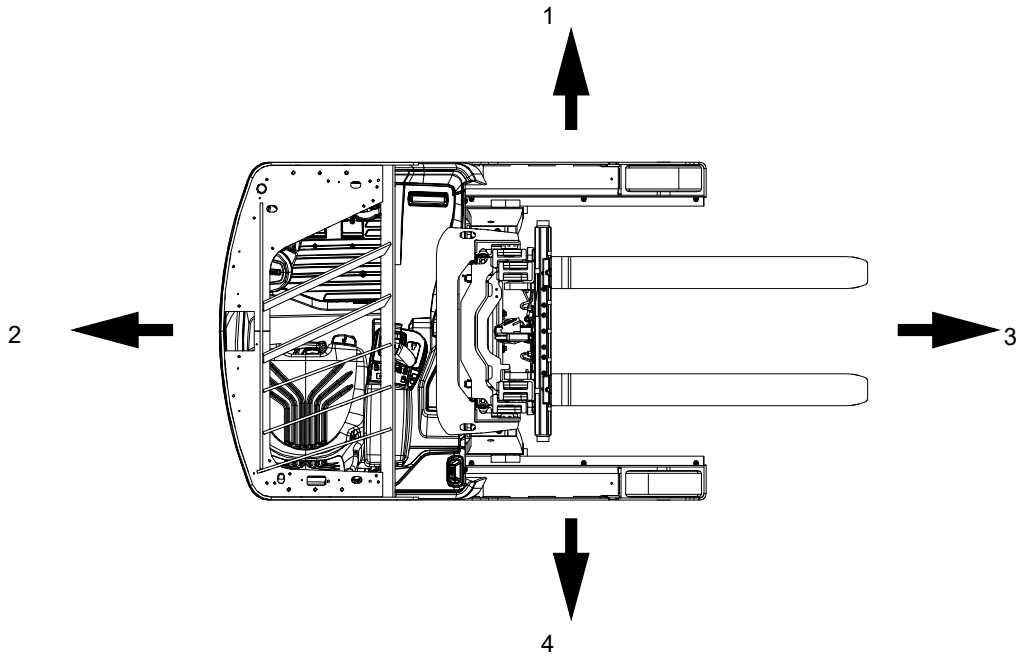
ETV 216i

ETV	Model name
2	Series
16	Rated capacity x 100 kg
i	Lithium-Ion Battery

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

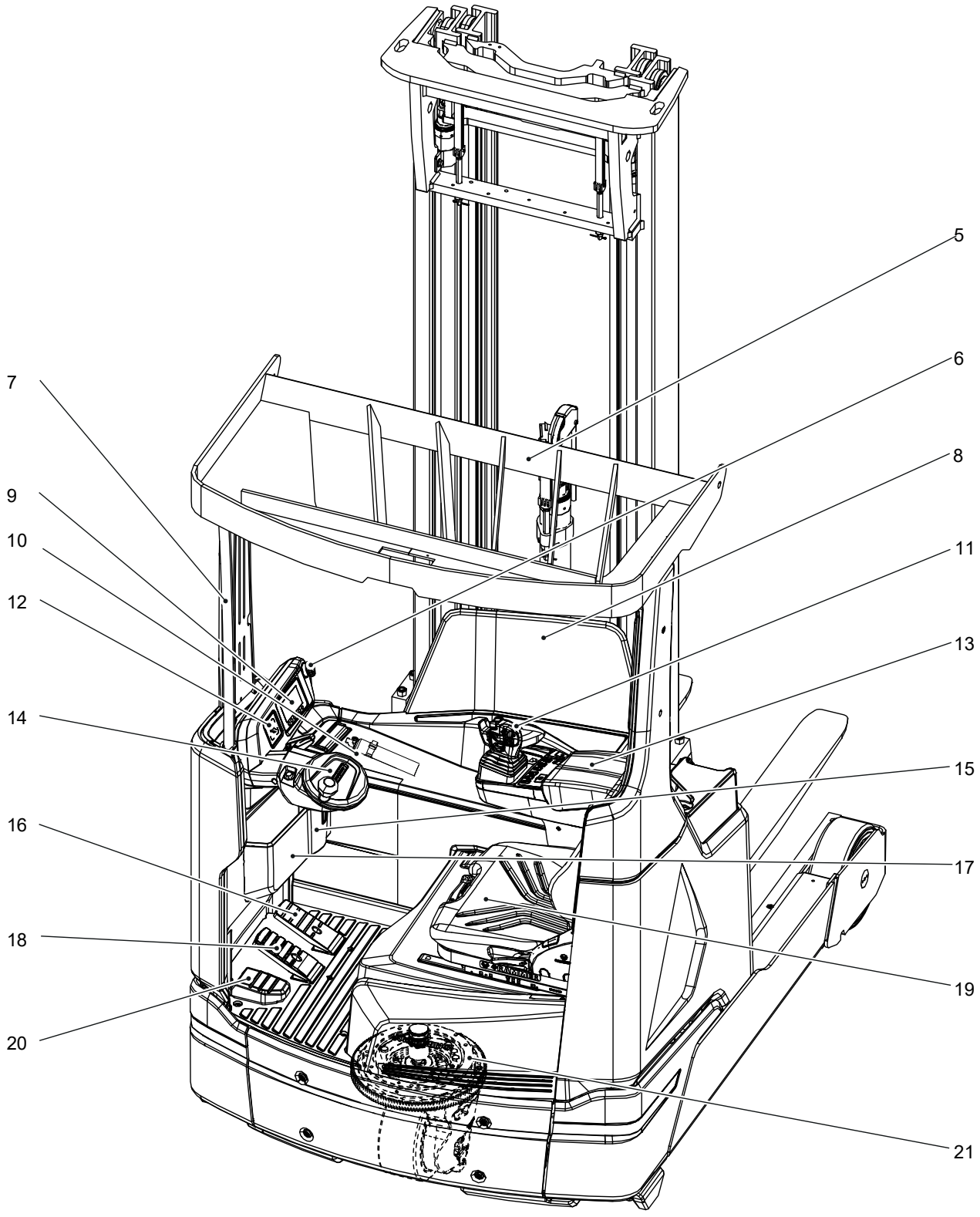
3 Travel direction definition

The following determinations have been made for travel direction specification:

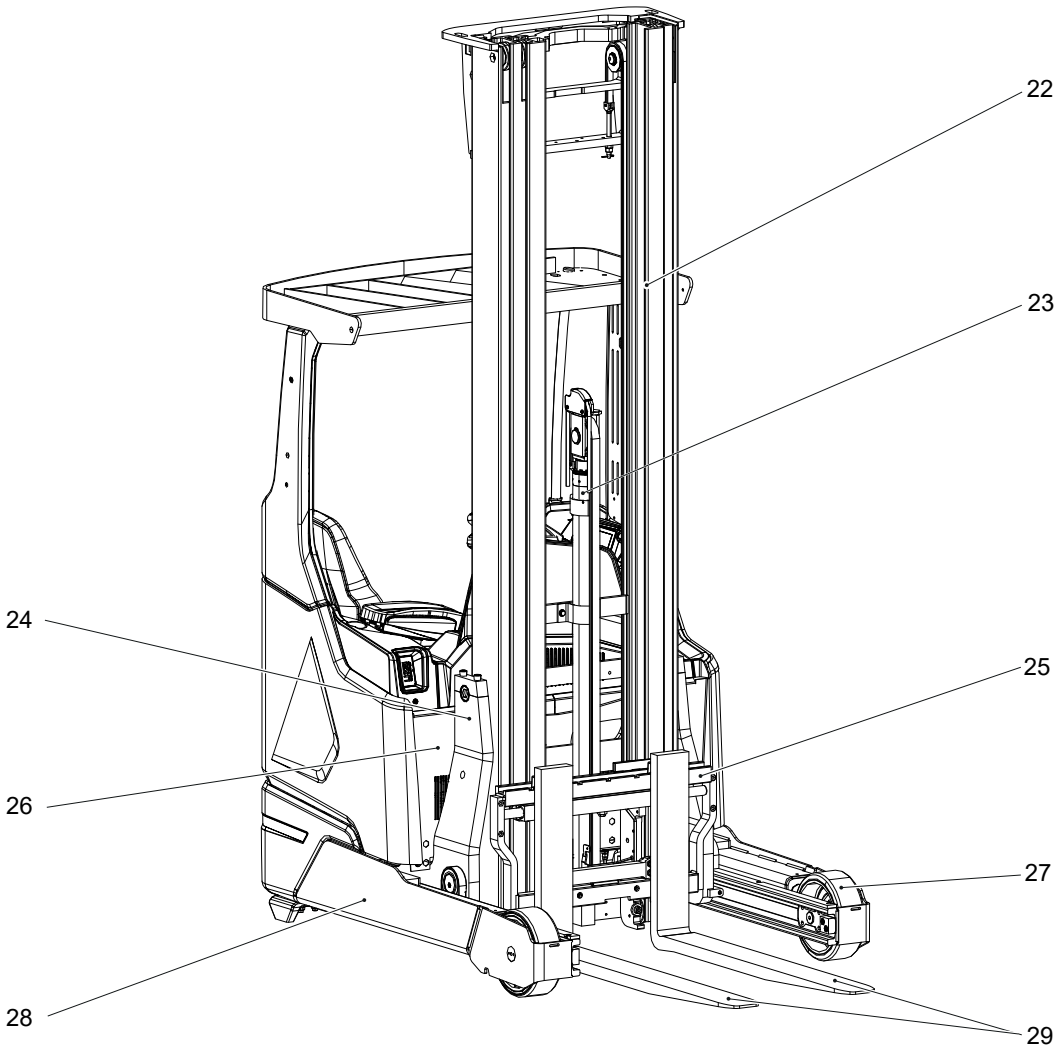


Item	Travel direction
1	Right
2	Drive direction
3	Load direction
4	Left

4 Assembly description



Item	Controls and displays		Function
6	Emergency disconnect switch	●	Switches the power supply on and off
7	Grab handle	●	
9	Control and display unit	●	Displays steering modes, warning indicators, incorrect operation notes and service displays
		○	Switches on the truck using EasyAccess with PinCode
10	Fire extinguisher	○	
11	multiPILOT	○	Functions: – Fwd / rev. travel direction – Picking up / lowering load – Tilt the mast forwards / backwards – Horn button – Side shift left / right – Auxiliary hydraulics (○) – Mast reach forward / back – Acknowledgement key (○)
12	Key switch Transponder	○	Switches control current on and off. Removing the key prevents the truck from being switched on by unauthorised personnel.
		○	Switches the truck on
14	Steering wheel	●	Sets the travel direction
16	Accelerator pedal	●	Provides infinitely variable travel speed control
18	Brake pedal	●	Infinitely variable braking control
20	Deadman switch	●	– Not applied: Travel and hydraulic functions inhibited, truck decelerates – Applied: Travel and hydraulic functions enabled



Item		Model	Item		Model
22	●	Lift mast	24	●	Mast holder
23	●	Free lift cylinder	27	●	Load wheels
26	●	Battery compartment	28	●	Support arms
25	●	Fork carriage	29	●	Forks
	●	Standard equipment		○	Optional equipment

5 Functional Description

Safety mechanisms

An enclosed truck perimeter with rounded edges ensures safe handling of the ETV 214i - 325i. The driver is protected by the overhead guard (5). The drive wheel (21) and load wheels (27) are protected by a solid skirt.

➔ A slight danger remains for third parties, even when a drive wheel cover is used.

Pressing the EMERGENCY DISCONNECT switch (6) rapidly disconnects all electrical functions in hazardous situations.

Line brake safety devices in the lift cylinders limit the load lowering speed in the event of a hydraulic system failure.

Emergency Stop safety feature

If a fault is identified the Emergency Stop automatically brakes the truck until it comes to a halt. Control displays on the control and display unit indicate the Emergency Stop. Whenever the truck is switched on, the system performs a self-diagnosis which only releases the parking brake (emergency stop) if the functional test is positive.

Deadman switch

The deadman switch (20) in the left leg well must be depressed to allow the driver to operate the truck. Lifting and travel are inhibited if the driver takes his foot off the deadman switch (20). Steering and braking remain enabled. The deadman switch can be adjusted so that when the deadman switch (20) is released the parking brake applies after a set time (prevents the truck from accidentally rolling away).

Operator position

The operator position is ergonomically designed with ample legroom. To achieve the correct seated position, the driver’s seat and steering head can be adjusted by the driver. The accelerator pedal and brake pedal (16, 18) are of “automotive” design.

Drive system

The entire drive unit is screwed into the truck chassis. A fixed AC three-phase motor actuates the drive wheel via a bevel spur gearbox. The electronic traction controller ensures a smooth drive-motor speed and hence smooth starting, powerful acceleration and electrically controlled braking with energy recovery.

Controls and displays

Controls and displays are clearly arranged in the driver’s cab. The logically designed SOLO-PILOT (11) enables single handed operation of travel direction, lift/lowering, forward / reverse reach, mast tilt, sideshift left or right and auxiliary hydraulics HF5 (○).

EasyAccess PinCode enables the industrial truck to be switched on via the control and display unit.

Displays

Control and display unit (9) with integrated residual time display, battery discharge indicator, lift and travel profile setting and steer angle display. The battery discharge indicator and hour meter (9) are combined on the control and display unit. The discharge indicator is designed as a battery discharge monitor which disables lifting when the battery is discharged in order to avoid deep discharge.

In cold store application from -20°C, a delay of up to 3 minutes can be expected when switching on the display.

Braking system

The electric braking system consists of up to three independent braking systems. Applying the brake pedal (18) results in inversion braking (plugging) in the drive motor. Where required, the load wheel brakes are applied via the brake control system.

The parking brake is electrically released and actuated through spring pressure. The parking brake acts on the drive system. It is also used for emergency braking. A warning indicator lights up when the parking brake is applied. Faults in the steering and brake systems (which trigger an emergency stop) are shown on the control and display unit.

Steering

Electric steering, which rotates the drive system via a transmission. The continuously adjustable steering wheel functions as the steering sensor. The steering can be operated in two modes.
- 180° (●)
- 360° continuous (○)

Switching between 180° and 360° can be accomplished via a button (○).

Steering with defined knob position

When the truck is travelling straight ahead, the defined knob position always fixes the steering wheel knob at the "9 o'clock" position. The function is independent of the 180°/360° operating mode.

Electrical system

48 volt, twin cable system. Standard electronic drive, lift and steering control system. The electronic drive controller provides infinite travel speed control and allows the truck to plug when changing direction. Travel and lift parameters can be set as required via the control and display unit (9). Warning displays, operator errors and service functions can also be shown on the control and display unit.
Battery types see page 42.

Mast

The trucks are equipped with fork tilt devices or tilting telescopic clear-view masts mounted in the mast holder. Adjustable side rollers and slide pieces take up the lateral pressure exerted on the load section if the load is positioned on one side. The fork arms are fitted to the load section and are adjustable. With the two-stage triplex mast (DZ), a free lift cylinder (23) initially lifts the load section (free lift) without changing the overall height of the truck.

Hydraulic system

The hydraulic system is driven by a pump unit with a threephase motor and a quiet running precision high pressure pump. The hydraulic system is controlled via the Solo-Pilot (11).

Mast support

The mast support is mounted on support rollers. A single telescopic reach cylinder extends and retracts the support. The mast support rails are bolted on to the outriggers (28).

Attachments

The truck can be optionally fitted with mechanical and hydraulic attachments.

6 Technical Specifications

6.1 Performance data

	Designation	ETV 214i (S battery)	ETV 214i	
Q	Capacity	1400	1400	kg
	Travel speed with / without load	11 / 11	11 / 11	km/h
	Lift speed with/without load	0.40/0.68	0.40/0.68	m/s (±10%)
	Lowering speed with/without load	0.55/0.52	0.55/0.52	m/s
	Traverse speed with/without load	0.20/0.20	0.20/0.20	m/s
	Gradeability with/without load	7/10		%
	Max. gradeability (5 min on time rating) with/ without load	10/15		
	Acceleration with/without load	5.2/4.8		s
	Drive motor, output S2 60 min	7.5		kW
	Lift motor, output at S3 15%	10.5		kW

	Designation	ETV 216i	
Q	Capacity	1600	kg
	Travel speed with / without load	11 / 11	km/h
	Lift speed with/without load	0.38/0.68	m/s (±10%)
	Lowering speed with/without load	0.55/0.52	m/s
	Traverse speed with/without load	0.20/0.20	m/s
	Gradeability with/without load	7/10	%
	Max. gradeability (5 min on time rating) with/ without load	10/15	%
	Acceleration time with/without load (10 m)	5.2/4.8	s
	Drive motor, output S2 60 min	7.5	kW
	Lift motor, output at S3 15%	10.5	kW

	Designation	ETV 314i	ETV 316i	
Q	Capacity	1400	1600	kg
	Travel speed with / without load	14 / 14	14 / 14	km/h
	Lift speed with/without load	0.59/0.81	0.59/0.81	m/s (±10%)
	Lowering speed with/without load	0.55/0.55	0.55/0.55	m/s
	Traverse speed with/without load	0.20/0.20	0.20/0.20	m/s
	Gradeability with/without load	9/13	8/12	%
	Max. gradeability (5 min on time rating) with/ without load	10/15	10/15	
	Acceleration with/without load	4.6/4.3	4.6/4.3	s
	Drive motor, output S2 60 min	9.5		kW
	Lift motor, output at S3 15%	15.5		kW

	Designation	ETV 318i	ETV 320i	
Q	Capacity	1800	2000	kg
	Travel speed with / without load	14 / 14	14 / 14	km/h
	Lift speed with/without load	0.38/0.64	0.38/0.64	m/s (±10%)
	Lowering speed with/without load	0.55/0.55	0.55/0.55	m/s
	Traverse speed with/without load	0.20/0.20	0.20/0.20	m/s
	Gradeability with/without load	7/11	7/11	%
	Max. gradeability (5 min on time rating) with/ without load	9/13	10/15	
	Acceleration with/without load	5.2/4.7	5.3/4.7	s
	Drive motor, output S2 60 min	9.5		kW
	Lift motor, output at S3 15%	15.5		kW

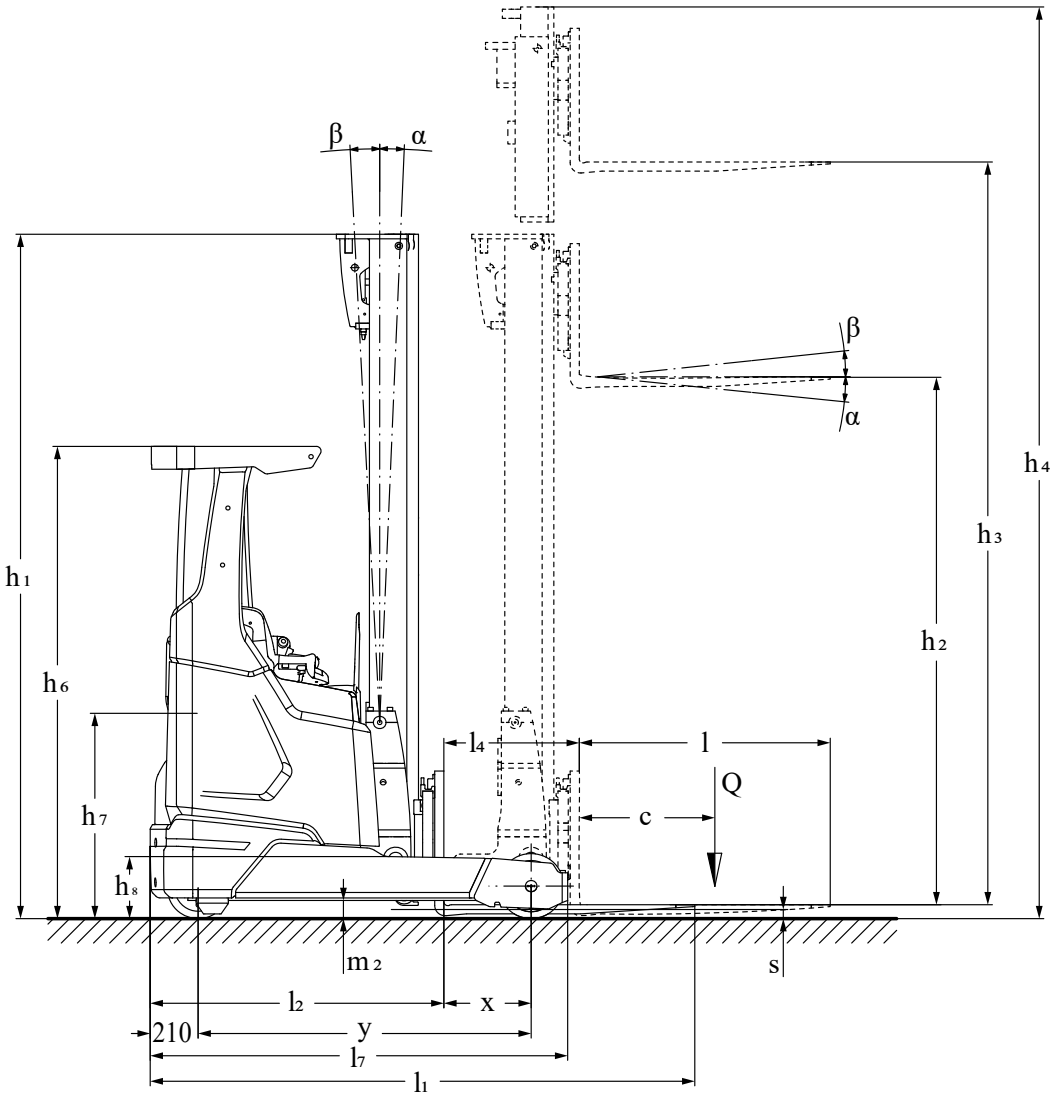
	Designation	ETV 325i	
Q	Capacity	2500	kg
	Travel speed with / without load	14 / 14	km/h
	Lift speed with/without load	0.35/0.64	m/s (±10%)
	Lowering speed with/without load	0.55/0.55	m/s
	Traverse speed with/without load	0.20/0.20	m/s
	Gradeability with/without load	7/11	%
	Max. gradeability (5 min on time rating) with/ without load	10/15	%
	Acceleration time with/without load (10 m)	5.4/5.7	s
	Drive motor, output S2 60 min	9.5	kW
	Lift motor, output at S3 15%	15.5	kW

6.2 Dimensions

	Designation	ETV 214i (S battery)	ETV 214i	
s / e / l	Fork arm dimensions	40 / 120 / 1150	40 / 120 / 1150	mm
c	Load centre distance	600	600	mm
x	Load distance, mast back	433	333	mm
x_1	Load distance, mast extended	205	205	mm
y	Wheelbase	1410	1410	mm
h_6	Overhead guard height (cabin)	2072	2072	mm
h_7	Seat height / standing height	947 / 867		mm
h_8	Height of support arms	272		mm
l_1	Overall length	2287	2387	mm
l_2	Length incl. fork shank	1187	1287	mm
l_4	Forward reach	638	538	mm
l_7	Length across support arms Chassis length	1780	1780	mm
b_1/ b_2	Overall width	1270 / 1270	1270 / 1270	mm
b_3	Fork carriage width	830	830	mm
b_4	Width between support arms / loading platforms	940	940	mm
b_5	Width across forks (min / max)	335 / 730	335 / 730	mm
b_{11}	Track width, rear	1148	1148	mm
Wa	Turning radius	1620	1620	mm
Ast	Aisle width [1]for pallets 1000 x 1200 lengthways	2646	2717	mm
Ast	Aisle width [1]for pallets 800 x 1200 crossways	2685	2775	mm
m_2	Ground clearance at lowest point / centre of wheelbase	60 / 75	60 / 75	mm
	Mast tilt α/β[1]	1 / 3	1 / 3	°
	Net weight see truck data plate			

[1] Mast-dependent

	Designation	ETV 216i	
s / e / l	Fork arm dimensions	40 / 120 / 1150	mm
c	Load centre distance	600	mm
x	Load distance, mast back	383	mm
x_1	Load distance, mast extended	205	mm
y	Wheelbase	1410	mm
h_6	Overhead guard height (cabin)	2072	mm
h_7	Seat height / standing height	947 / 867	mm
h_8	Height of support arms	272	mm
l_1	Overall length	2437	mm
l_2	Length incl. fork shank	1287	mm
l_4	Forward reach	588	mm
l_7	Length across support arms Chassis length	1830	mm
b_1/ b_2	Overall width	1270 / 1270	mm
b_3	Fork carriage width	830	mm
b_4	Width between support arms / loading platforms	940	mm
b_5	Width across forks (min / max)	335 / 730	mm
b_{11}	Track width, rear	1148	mm
Wa	Turning radius	1670	mm
Ast	Aisle width [1]for pallets 1000 x 1200 lengthways	2731	mm
Ast	Aisle width [1]for pallets 800 x 1200 crossways	2780	mm
m_2	Ground clearance at lowest point / centre of wheelbase	60 / 75	mm
	Mast tilt α/β[1]	1 / 3	°
	Net weight see truck data plate		
1) Mast-dependent			


β
α
β
α
h4
h3
h2
h1
h6
h7
h8
l4
l
Q
c
m2
s
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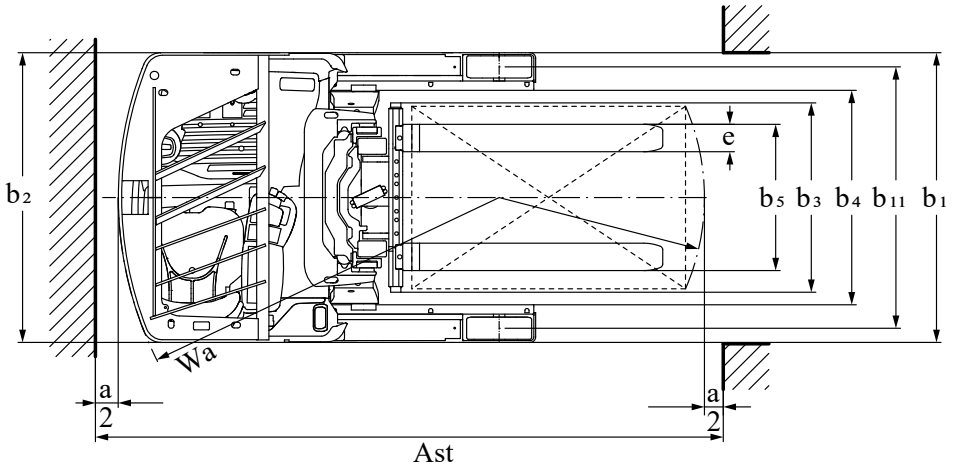
x
210
y
l7
l1


b2
e
b5
b3
b4
b11
b1
Wa
a
2
a
2
Ast

	Designation	ETV 314i	ETV 316i	
s / e / l	Fork arm dimensions	40 / 120 / 1150	40 / 120 / 1150	mm
c	Load centre distance	600	600	mm
x	Load distance, mast retracted	304	354	mm
x_1	Load distance, mast extended	205	205	mm
y	Wheelbase	1400	1450	mm
h_6	Overhead guard height (cabin)	2091	2091	mm
h_7	Seat height / standing height	1067 / 987	1067 / 987	mm
h_8	Height of support arms	282	282	mm
l_1	Overall length	2466	2466	mm
l_2	Length incl. fork shank	1316	1316	mm
l_4	Forward reach	506	556	mm
l_7	Length across support arms	1837	1837	mm
b_1/ b_2	Overall width	1270	1270	mm
b_3	Fork carriage width	830	830	mm
b_4	Width between support arms / loading platforms	940	940	mm
b_5	Width across forks (min / max)	335 / 730	335 / 730	mm
b_{11}	Track width, rear	1148	1148	mm
Wa	Turning radius	1620	1670	mm
Ast	Aisle width [1]for pallets 1000 x 1200 lengthways			mm
Ast	Aisle width [1]for pallets 800 x 1200 crossways	2786	2790	mm
m_2	Ground clearance at lowest point / centre of wheelbase	60 / 80		mm
	Mast tilt α/β[1]	1 / 3		°
	Net weight see truck data plate			

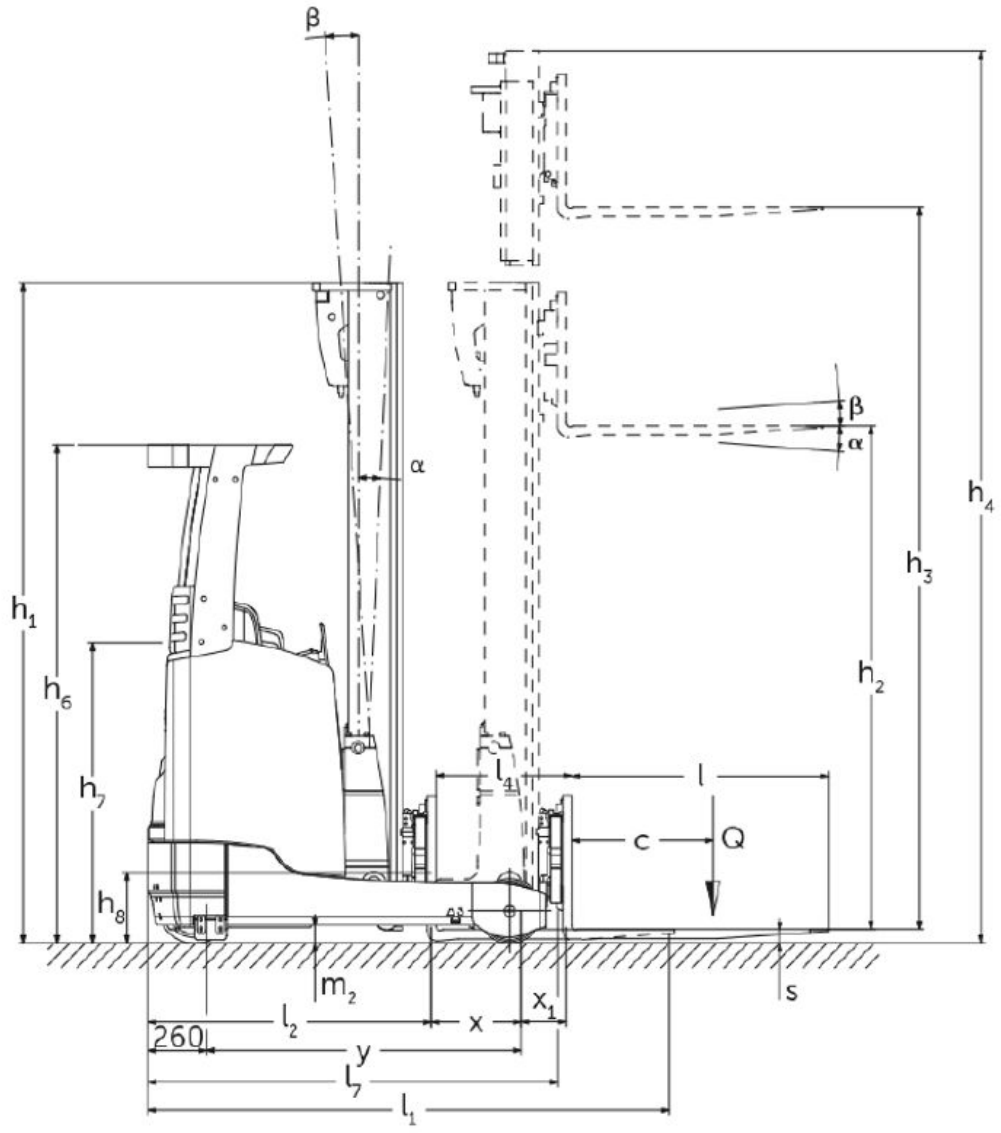
[1] Mast-dependent

	Designation	ETV 318i	ETV 320i	
s / e / l	Fork arm dimensions	40 / 120 / 1150	50 / 140 / 1150	mm
c	Load centre distance	600	600	mm
x	Load distance, mast retracted	363	401	mm
x_1	Load distance, mast extended	205	230	mm
y	Wheelbase	1460	1508	mm
h_6	Overhead guard height (cabin)	2091	2091	mm
h_7	Seat height / standing height	1067 / 987	1067 / 987	mm
h_8	Height of support arms	283	283	mm
l_1	Overall length	2467	2477	mm
l_2	Length incl. fork shank	1317	1327	mm
l_4	Forward reach	565	629	mm
l_7	Length across support arms	1837	1837	mm
b_1/ b_2	Overall width	1290 / 1270	1290 / 1270	mm
b_3	Fork carriage width	830	830	mm
b_4	Width between support arms / loading platforms	940	940	mm
b_5	Width across forks (min / max)	335 / 730	356 / 750	mm
b_{11}	Track width, rear	1172	1155	mm
Wa	Turning radius	1680	1728	mm
Ast	Aisle width [1]for pallets 1000 x 1200 lengthways			mm
Ast	Aisle width [1]for pallets 800 x 1200 crossways	2790	2794	mm
m_2	Ground clearance at lowest point / centre of wheelbase	60 / 80		mm
	Mast tilt α/β[1]	1 / 3		°
	Net weight see truck data plate			

[1)] Mast-dependent

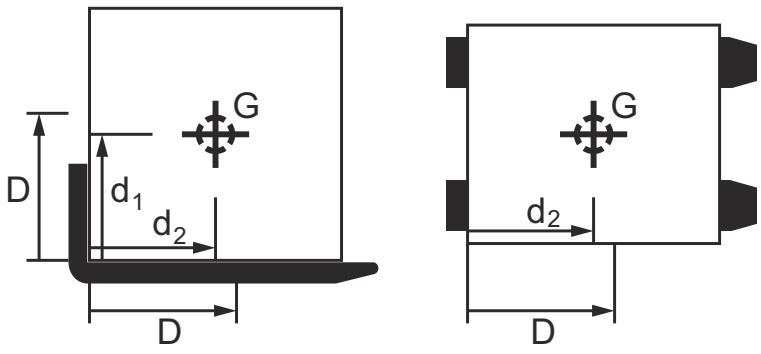
	Designation	ETV 325i	
s / e / l	Fork arm dimensions	50 / 140 / 1150	mm
c	Load centre distance	600	mm
x	Load distance, mast retracted	556	mm
x_1	Load distance, mast extended	230	mm
y	Wheelbase	1663	mm
h_6	Overhead guard height (cabin)	2091	mm
h_7	Seat height / standing height	1067 / 987	mm
h_8	Height of support arms	284	mm
l_1	Overall length	2477	mm
l_2	Length incl. fork shank	1327	mm
l_4	Forward reach	784	mm
l_7	Length across support arms	1837	mm
b_1/ b_2	Overall width	1348 / 1270	mm
b_3	Fork carriage width	830	mm
b_4	Width between support arms / loading platforms	940	mm
b_5	Width across forks (min / max)	356 / 750	mm
b_{11}	Track width, rear	1184	mm
Wa	Turning radius	1883	mm
Ast	Aisle width [1]for pallets 1000 x 1200 lengthways		mm
Ast	Aisle width [1]for pallets 800 x 1200 crossways	2883	mm
m_2	Ground clearance at lowest point / centre of wheelbase	60 / 80	mm
	Mast tilt α/β[1]	1 / 3	°
	Net weight see truck data plate		

[1)] Mast-dependent



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

Load centre distance



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

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

The distances d_1 and d_2 depicted in the illustration between the load handler and the actual centre of gravity G of the load must be smaller or equal to the load centre distance D ($d_1 \leq D$ and $d_2 \leq D$) to avoid the risk of overturning, see page 147.

6.3 Dimensions

	Mast	x (mm) Mast retracted		x1 (mm) Mast extended	
		Battery compartment		Battery compartment	
		S	M	S	M
ETV 214i	DZ G[1]	464	364	205	205
	DZ GE[1]	433	333 333	205	205
	DZ-V G[2]	434	334	205	205
	DZ-V GE[2]	404	304	205	205
	DZ-V GNE[3]	341	241	205	205
ETV 216i	DZ G[1]		414		205
	DZ GE[1]		383		205
	DZ-V G[2]		384		205
	DZ-V GE[2]		354		205
	DZ-V GNE[3]		291		205
	IKEA		261		225

1) Mast tilt
2) Mast tilt reinforced
3) Fork tilt

	Mast	l2 (mm) Including fork shank		l4 (mm) Reach path	
		Battery compartment		Battery compartment	
		S	M	S	M
ETV 214i	DZ G[1]	1156	1256	669	569
	DZ GE[1]	1187	1287	638	538
	DZ-V G[2]	1186	1286	639	539
	DZ-V GE[2]	1216	1316	609	509
	DZ-V GNE[3]	1279	1379	546	446

1) Mast tilt
2) Mast tilt reinforced
3) Fork tilt

	Mast	l2 (mm) Including fork shank		l4 (mm) Reach path	
		Battery compartment		Battery compartment	
		S	M	S	M
ETV 216i	DZ G[1]		1256		615
	DZ GE[1]		1287		588
	DZ-V G[2]		1286		589
	DZ-V GE[2]		1316		559
	DZ-V GNE[3]		1379		496
	IKEA		1409		486

1) Mast tilt

2) Mast tilt reinforced

3) Fork tilt

	Mast	l2 (mm) Including fork shank
		Battery compartment
		M
ETV 314i	DZ-V G[1]	1270
	DZ GE[2]	1299
	DZ-V GNE[3]	1363
ETV 316i	DZ-V G[1]	1270
	DZ GE[2]	1299
	DZ-V GNE[3]	1363
ETV 318i	DZ GE[2]	1306
	DZ-V GNE[3]	1368
ETV 320i	DZ GE[2]	1316
	DZ-V GNE[3]	1378
ETV 325i	DZ GE[2]	1316
	DZ-V GNE[3]	1378

1) Mast tilt reinforced

2) Mast tilt

3) Fork tilt

6.3.1 Standard mast version dimensions

	Description	GE DZ mast tilt	GE DZv mast tilt	GNE DZv fork tilt	
h_1	Mast height retracted	2050 - 3000	2700 - 3540	2200 - 4100	mm
h_2	Free lift	1550 - 2500	1550 - 3040	1700 - 3600	mm
h_3	Maximum lift	4550 - 7400	4550 - 9020	5000 - 10700	mm
h_4	Mast height extended	5204 - 8054	5204 - 9674	5654 - 11354	mm

6.4 Tyre type

Designation	ETV 214i-216i	
Tyre size, front (drive wheel)	270 x 114	mm
Tyre size, rear (load wheels)	285 x 100	mm
Wheels, number front / rear (x = driven)	1x/2	

Designation	ETV 314i / 316i / 318i	
Tyre size, front (drive wheel)	343 x 114	mm
Tyre size, rear (load wheels)	285 x 100	mm
Wheels, number front / rear (x = driven)	1x/2	

Designation	ETV 320i	
Tyre size, front (drive wheel)	343 x 114	mm
Tyre size, rear (load wheels)	355 x 106	mm
Wheels, number front / rear (x = driven)	1x/2	

Designation	ETV 325i	
Tyre size, front (drive wheel)	343 x 140	mm
Tyre size, rear (load wheels)	355 x 135	mm
Wheels, number front / rear (x = driven)	1x/2	

6.5 Battery

Approved battery types see page 76.

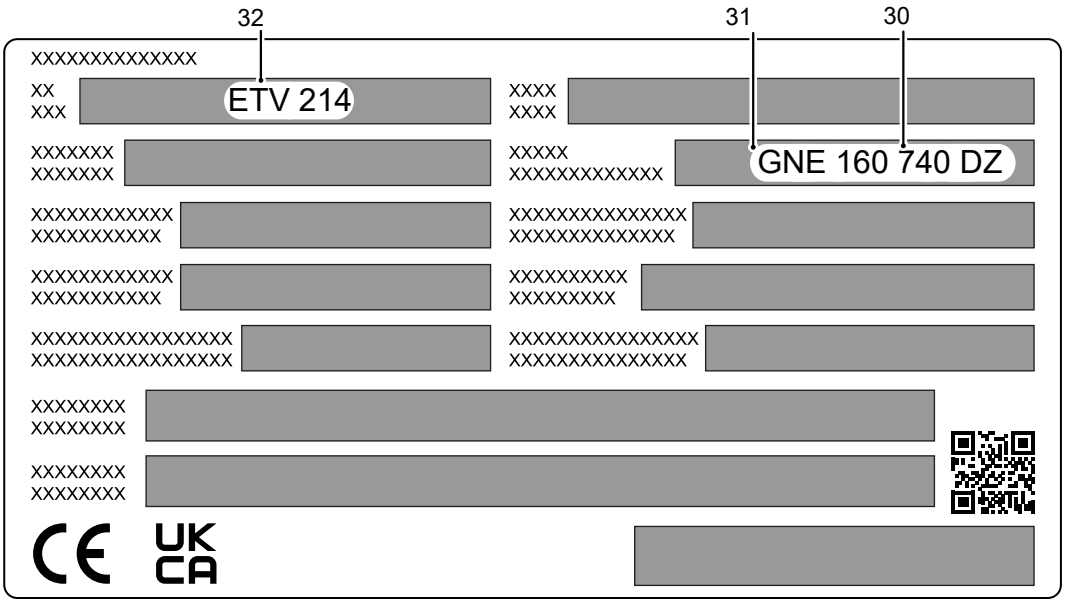
6.6 Hydraulics

Designation	ETV 214i - 325i	
Operating pressure for attachments	150	bar
Oil flow for attachments	20	l/min
Maximum operating pressure	250	bar

6.7 Mast weights

The weight of the mast can be calculated using the formulae given below. The necessary details such as truck name, model and length of the extended mast (lift height) can be taken from the data plate. The weight of the truck and the battery can be found on the data plate.

6.7.1 Example of determining the weight of a mast



– Truck name (32): ETV 214i
– Mast (31): GN E DZ
– Mast weight = 1.0 x lift height (30) + 340 kg
– Mast weight = 1.0 * 740 + 340 kg = 1080 kg

6.7.2 Overview of the applicable formulas

Design	Calculation
GE DZ to 590	Weight = 0.78 x lift height + 339 kg
GE DZ from 620	Weight = 1.00 x lift height + 311 kg
GNE DZ	Weight = 0.94 x lift height + 412 kg

6.8 EN norms

Continuous sound pressure level

– ETV 214i - 325i : 65 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 driving, lifting and idling. The noise level is measured at the driver's ear.

Vibration

Truck designation	Driver's seat	Vibration
ETV 214i - 325i	MSG 65	0,26 m/s²
ETV 214i - 325i	MSG 75G	0,39 m/s²
ETV 214i - 325i	Pilot 23 / EAN60	0,48 m/s²

in accordance with EN 13059

➔ The vibration acceleration acting on the body in its operating position is the linearly integrated, weighted acceleration in the vertical axis according to the standard. It is calculated when travelling over thresholds at constant speed. These recordings were taken on a single occasion for the industrial truck and must not be confused with the human vibrations of the "2002/44/EC/Vibrations" operator directive. The manufacturer offers a special service to measure these human vibrations.

➔ The internal accuracy of the measuring chain for at 21 °C at ± 0,02 m/s². Further deviations may occur in particular through the positioning of the sensor and different driver weights.

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.

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

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

Component	Frequency range	Transmission power
Telematics box basic 2G EU	2.4 GHz (Bluetooth)	< 20 mW
	900 MHz (2G)	< 2 W
	1800 MHz (2G)	< 1 W
Telematics box basic 3G/2G INT	2.4 GHz (Bluetooth)	< 20 mW
	850/ 900 MHz (2G)	< 2 W
	1800/ 1900 MHz (2G)	< 1 W
	800/ 850/ 900/ 1900/ 2100 MHz (3G)	< 250 mW
Telematics box basic 4G/2G EU	2.4 GHz (Bluetooth)	< 20 mW
	850/ 900 MHz (2G)	< 2 W
	1800/ 1900 MHz (2G)	< 1 W
	800/ 900/ 1800/ 2100 MHz (4G)	< 200 mW
Telematics box Plus 3G/2G INT	2.4 GHz (Bluetooth)	< 10 mW
	2.4 GHz (WLAN)	< 100 mW
	5 GHz (WLAN)	< 100 mW
	850/ 900 MHz (2G)	< 2 W
	1800/ 1900 MHz (2G)	< 1 W
	800/ 850/ 900/ 1900/ 2100 MHz (3G)	< 250 mW
Telematics box plus 4G/2G EU	2.4 GHz (Bluetooth)	< 10 mW
	2.4 GHz (WLAN)	< 100 mW
	5 GHz (WLAN)	< 100 mW
	850/ 900 MHz (2G)	< 2 W
	1800/ 1900 MHz (2G)	< 1 W
	800/ 900/ 1800/ 2100 MHz (4G)	< 200 mW
Transponder reader	13.56 MHz	< 100 mW

6.9 Conditions of use

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

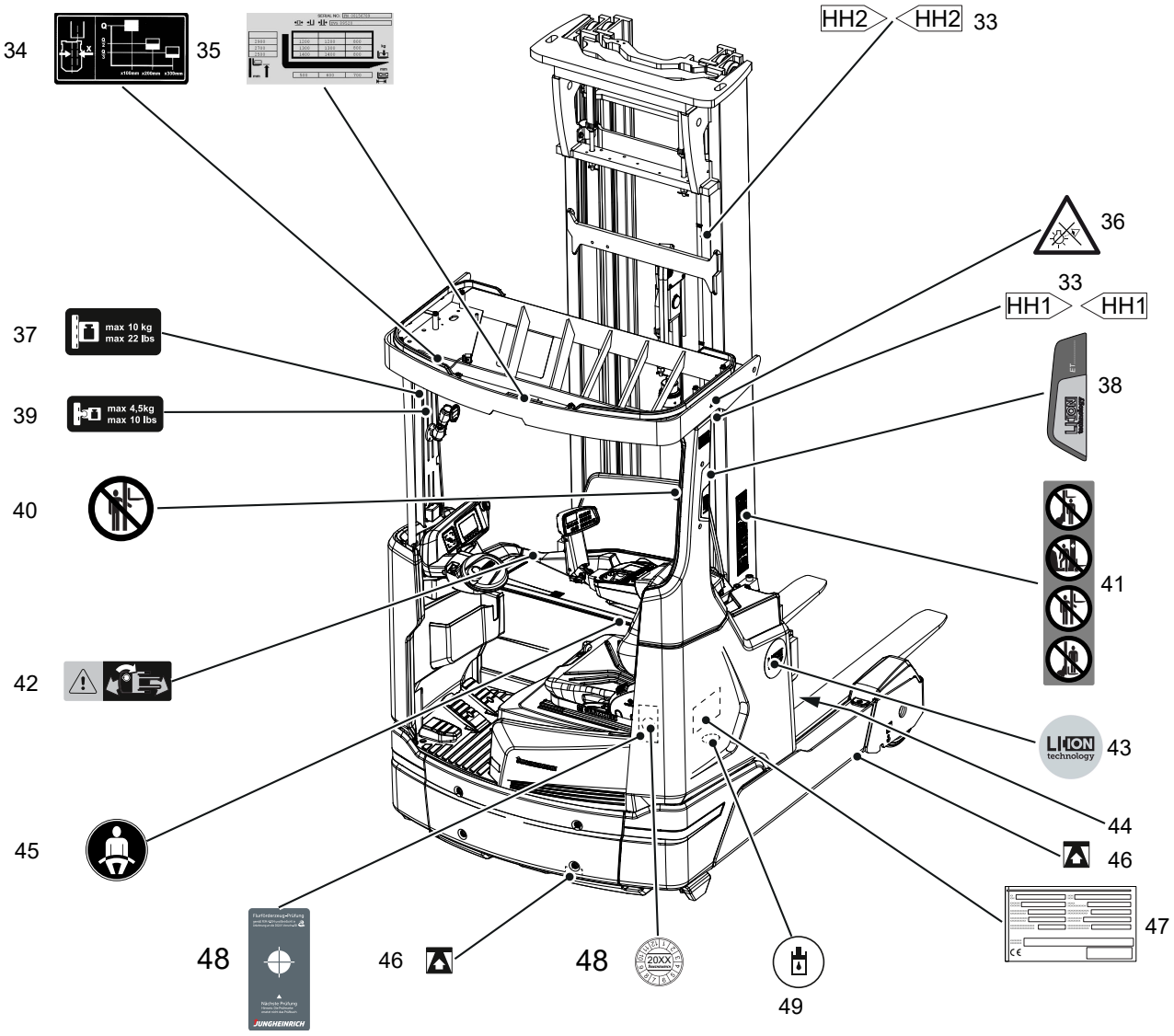
➔ Special equipment and authorisation are required if the truck is to be constantly used in 0 °C.

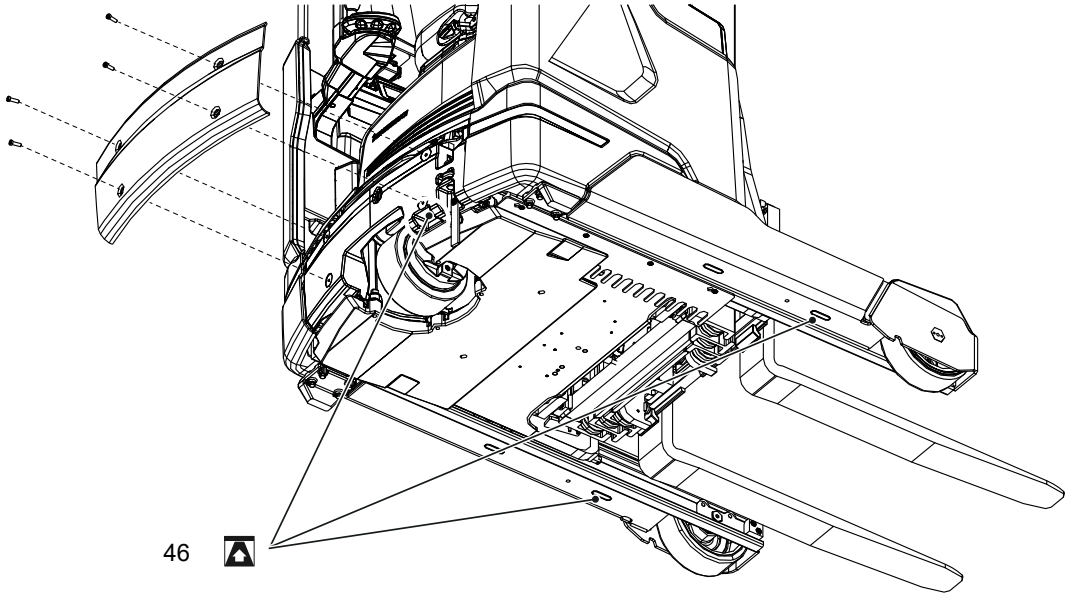
6.10 Electrical Requirements

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

7 Identification Points and Data Plates

7.1 Overview of marking points





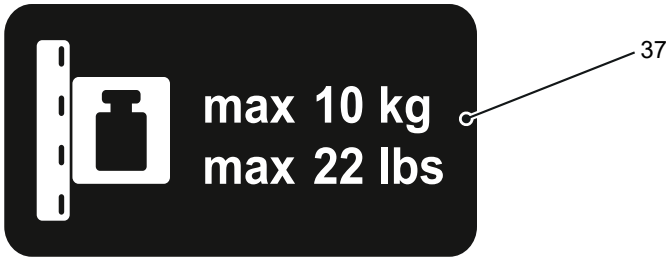
Item	Description
33	Lift height limits
34	Capacity plate for side shift
35	Capacity plate
36	Warning notice: "Optical radiation"
37	Warning notice: “M-Device max. 10 kg (22 lb)” capacity (○)
38	Type designation
39	Warning notice: “Universal joints max. 4.5 kg (10 lb)” capacity (○)
40	Prohibition plate: "Do not reach through the mast"
41	Safety symbols
42	Travel direction, steering wheel angle, synchronous steering (○)
43	Lithium-ion technology
44	Serial number
45	Wear seat belt (○)
46	Attachment point for jack
47	Truck data plate
48	Inspection plaque (○)
49	Information notice: "Add hydraulic oil"

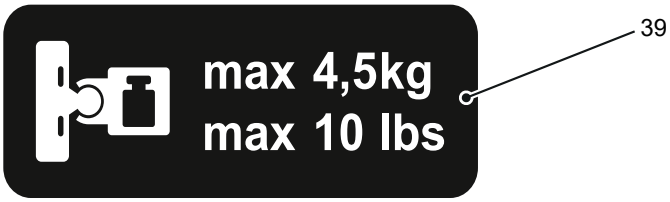
⚠ WARNING!

Overload due to assembled components

M device and universal joints can only withstand the weights indicated on the capacity plates.

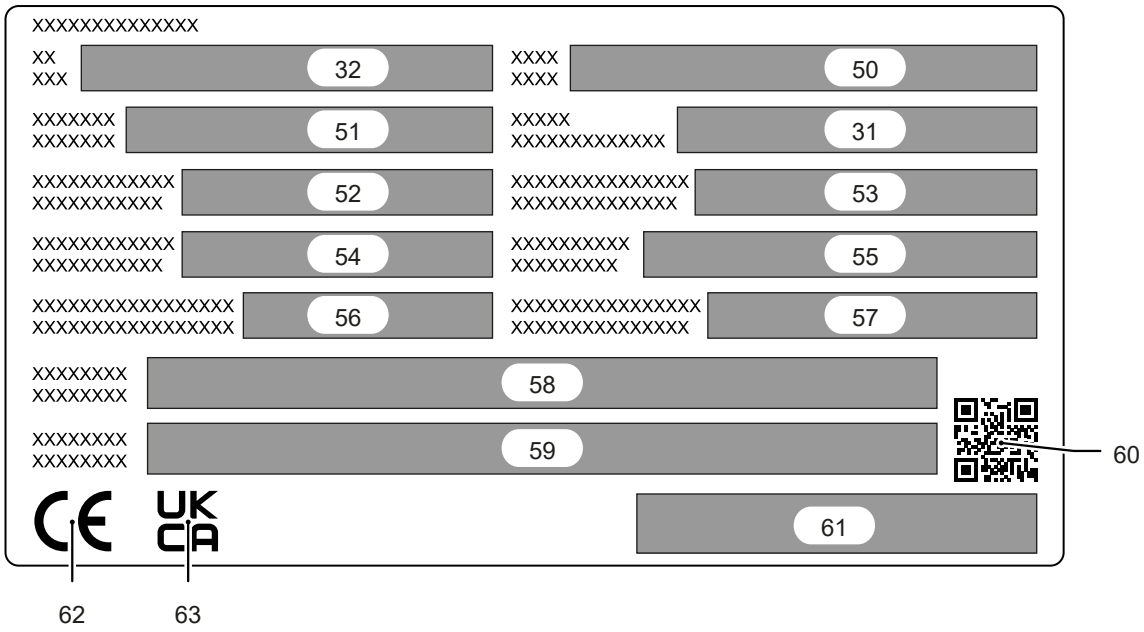
▶Observe permissible weight specifications for M device (37) and ball joints (39).





7.2 Data plate

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



Item	Description	Item	Description
31	Option	56	Unladen weight without battery
32	Type	57	Min./max. battery weight
50	Year of manufacture	58	Manufacturer
51	Serial number	59	Importer - imported by (○)
52	Rated capacity	60	QR code
53	Load centre distance	61	Manufacturer's logo
54	Battery voltage	62	CE marking[1)]
55	Drive output [kW]	63	UKCA marking (○)[2)]

For queries regarding the truck or when ordering spare parts, always quote the truck serial number (51).

QR code

The QR code contains the serial number and product hierarchy of the truck.

7.2.1 Position of serial number

The serial number (44) is located on the cross member of the truck frame, see page 47.

1) *Conformité Européenne*

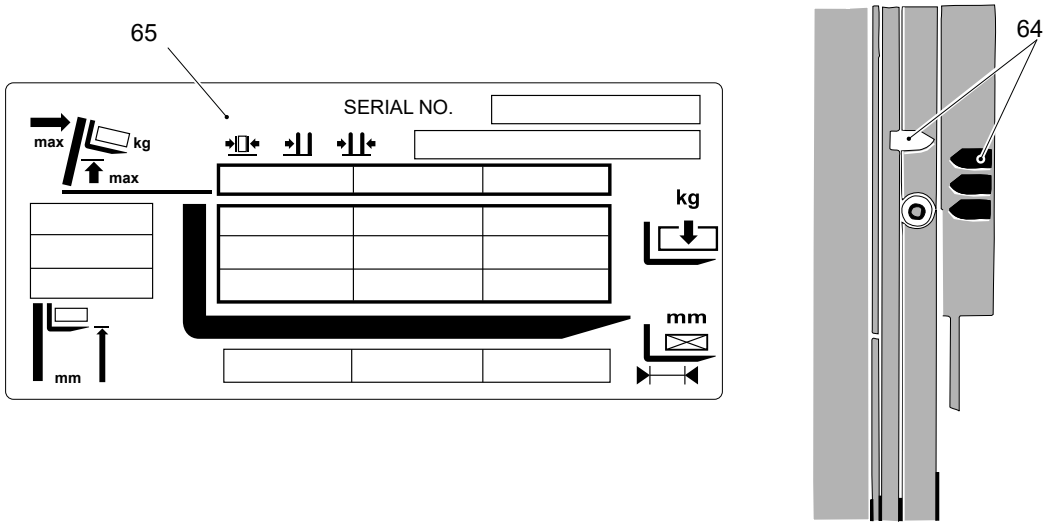
2) *United Kingdom Conformity Assessed*

7.3 Truck capacity plate

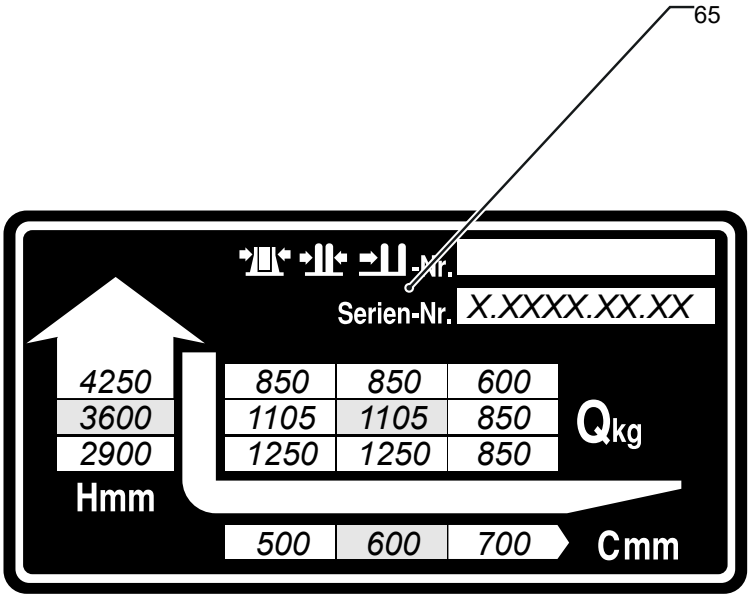
7.3.1 Capacity plate

The capacity plate (65) gives the capacity (Q) of the truck in kg for a vertical mast. The maximum capacity is shown as a table with a standard load centre of gravity distance * C (in mm) and the required lift height H (in mm). The arrow shape markings (64) on the inner and outer masts show the driver when the specified lift limits have been reached.

*) The standard load centre of gravity distance takes into account the width as well as the height of the load.



Capacity plate version in accordance with Australian guidelines (35)



Example of how to calculate the maximum capacity

With a load centre of gravity distance C of 600 mm and a maximum lift height H of 3600 mm the max. capacity Q is 1105 kg.

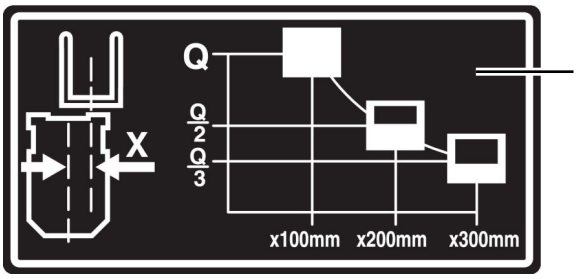
7.3.2 Attachment load chart

The attachment capacity plate is next to the truck's capacity plate and gives the truck’s capacity Q (in kg) in conjunction with the respective attachment. The serial number for the attachment indicated on the capacity plate must match the data plate of the attachment.

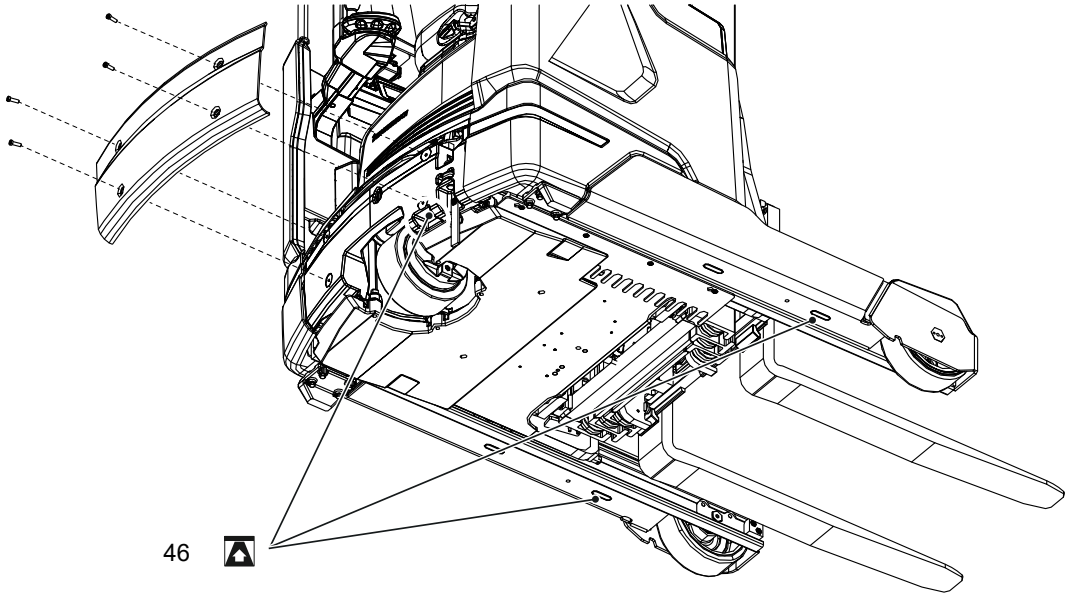
➔ For loads with a centre of gravity above 600 mm (measured from the top of the forks), the capacities are reduced by the difference of the altered centre of gravity.

7.3.3 Capacity plate for side shift

The capacity plate (34) gives the reduced capacity Q (in kg) when the sideshift is extended.



7.3.4 Jacking points for jacks



Attachment points for jack (66).

8 Stability

The truck's stability has been tested according to latest technological standards. These take into account the dynamic and static tipover forces that can occur if used correctly.

The operational stability of the truck can also be affected by factors such as:
– Number of battery modules and additional weights
– Tyres
– Mast
– Attachment
– Transported load (size, weight and centre of gravity)
– Ground clearance, e.g. modification of the support columns
– Position of the mast-holder stops

Changing the components can alter the stability.

If the ground conditions do not comply with DIN 18202 Table 3, Row 3, the truck capacity ratings (see page 14) may differ.

8.1 driveCONTROL during Mast Lift Operations

When the forks are in the mast lift position, slow travel is automatically engaged. This restriction applies to both the maximum travel speed and the acceleration.

8.2 Wind loads

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

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

Stop the truck in both cases.

9 Voltage State

Voltage state	Description	Available functions
PowerON	The industrial truck is switched on and all voltages are available (normal operation).	– Truck is ready for operation. ➔ No power-related functional limitations
Standby	The truck is switched off. Safety supplies are switched off. All standby functions are available at full power.	– Access systems – Battery charge progress indicator including LED light strip control – Battery heater ➔ Depending on the equipment, terminals for warehouse management (Warehouse Management terminal, radio data terminal, or optional devices) are available.
LowStandby	Energy-module contactors are open. The access systems and any cloud devices are active or on standby. Limited CAN bus communication is possible.	– Start the battery management system by pressing a button on the display (9).
PowerOff	Energy-module contactors are open.	– No functions available. ➔ The battery management system can only be started by connecting a battery charger or by pulling the emergency disconnect switch (6).

C Transport and Commissioning

1 Transport

Safety instructions for assembly and commissioning

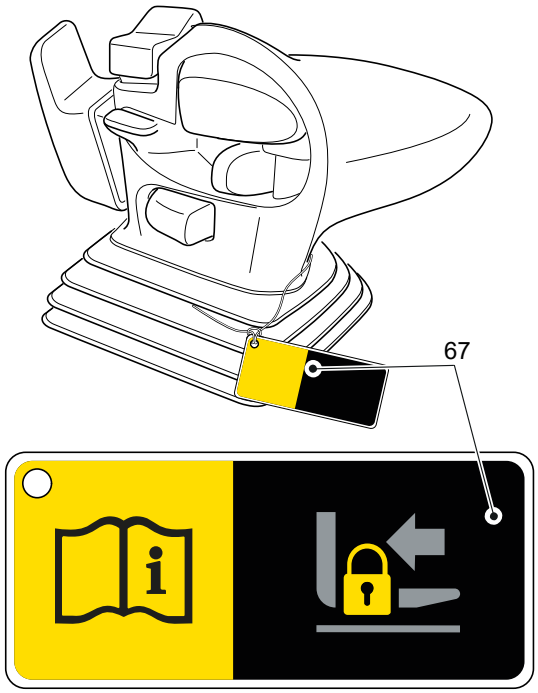
⚠ WARNING!

The assembly of the truck at the application site, commissioning and driver training must only be performed by the manufacturer's customer service representatives who have been specially trained for these tasks.

The hydraulic lines may only be connected to the basic truck / mast interface and the truck commissioned when the mast has been properly assembled.

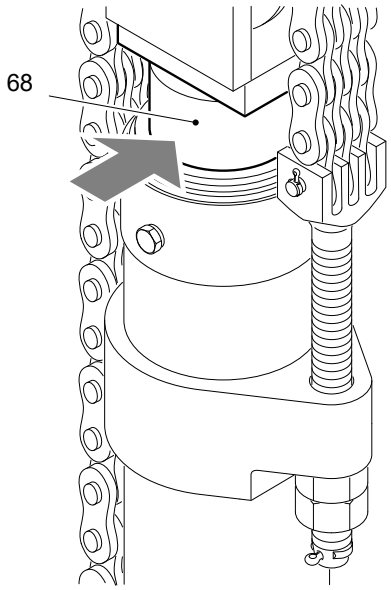
Depending on the height of the mast and local conditions, the truck can be transported in three different ways:

– Vertically, with the mast assembled (for low heights)
– Vertically, with the mast partially assembled and leaning against the overhead guard (for medium heights)
– Horizontally, with the mast disassembled (for large heights); all mechanical connections and all hydraulic lines between the basic unit and the mast disconnected



In the condition where the mast is upright, partially assembled, and tilted against the overhead guard, the multiPILOT is deactivated from the factory.

▶ Remove the marking labels (67) after reactivation of the multiPILOT.



⚠ WARNING!

Possible faults with hydraulic functions on trucks with cold store equipment

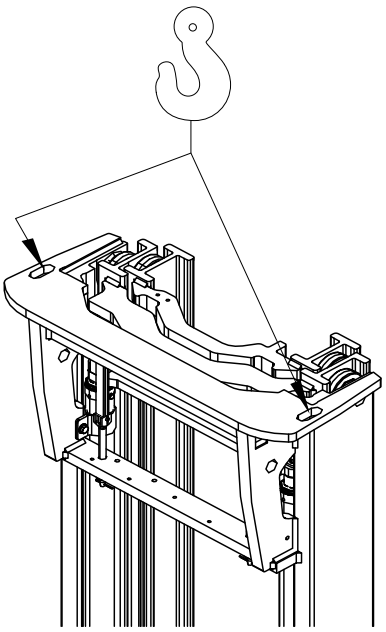
Starting up the truck after a long period of non-use or at ambient temperatures outside the intended cold store range can lead to unusual noise, jerky cylinder movements and damage to the hydraulic system.

▶Execute hydraulic functions only in cold store temperatures.

▶Spray piston rod ends (68) with chain spray after extended periods out of use.

When fitting an attachment, the corresponding sticker must be applied to the control element. The sticker can be obtained from the manufacturer's customer service department.

Attachment points for the mast assembly



2 Lifting by crane

⚠ WARNING!

Improper loading by crane can result in accidents

Improper use or use of unsuitable lifting gear can cause the truck to crash 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.

- ▶ The truck may be loaded only by people who are trained in using lifting accessories and lifting gear.
- ▶ Wear personal protective equipment (e.g. safety shoes, safety helmet, hi-vis jacket, protective gloves) when loading by crane.
- ▶ Do not stand under suspended loads.
- ▶ Do not walk into or stand in a hazardous area.
- ▶ Always use lifting gear with sufficient capacity (for truck weight, see truck data plate).
- ▶ Always attach the crane lifting gear to the prescribed attachment points and prevent them from slipping.
- ▶ Use the lifting accessories only in the prescribed load direction.
- ▶ Crane lifting gear must be fastened in such a way that it does not come into contact with any attachments when lifting.

2.1 Lifting the truck by crane

⚠ CAUTION!

The mast can get damaged

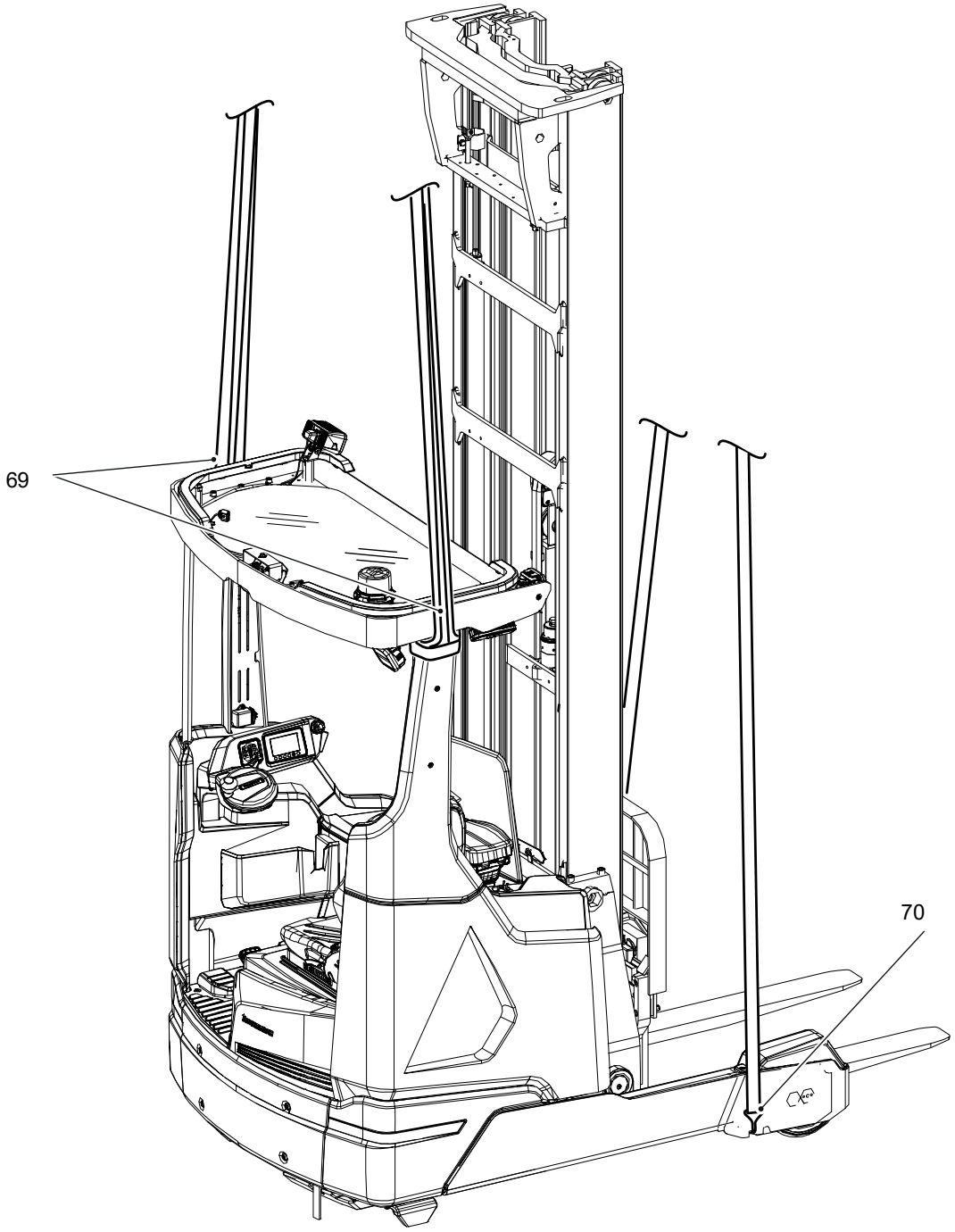
- ▶ Loading by crane is only intended for the initial transport before the truck is used for the first time.
- ▶ Loading must be carried out by specially trained staff in accordance with recommendations contained in Guidelines VDI 2700 and VDI 2703

⚠ DANGER!

Crane lifting gear can tear, resulting in accidents

A tear in the crane lifting gear may result in severe, irreparable accidents or even death if there are persons within the hazardous area.

- ▶ Only use crane lifting gear with sufficient capacity.
- ▶ Loading weight = unladen weight of the truck (+ battery weight for electric trucks).
- ▶ The mast must be tilted back fully.
- ▶ Always secure crane lifting gear to the prescribed attachment points and prevent it from slipping.
- ▶ The crane lifting gear on the mast must have a minimum clear length of 2 m.
- ▶ The lifting accessories of the crane lifting gear should be fastened in such a way that they do not come into contact with any attachments or the overhead guard when lifting.
- ▶ Do not stand under a swaying load.
- ▶ The truck should only be loaded by people who are trained in using lifting accessories and lifting gear.
- ▶ Wear safety shoes when loading by crane.
- ▶ Do not enter or stand in the hazardous area.


69
70

Loading the truck by crane

Requirements

– Truck parked securely, see page 165.

Tools and Material Required

– Crane lifting gear
– Lifting slings
– Wedges

Procedure

- Route rope slings around the two attachment points (69) on the overhead guard strut.
- Attach crane lifting gear to the two attachment points (70) on the support arms.
- Load the truck or lift by crane.
- Park the truck securely – see page 165.
- Secure the truck with wedges to prevent it from rolling away.

The truck is now loaded.

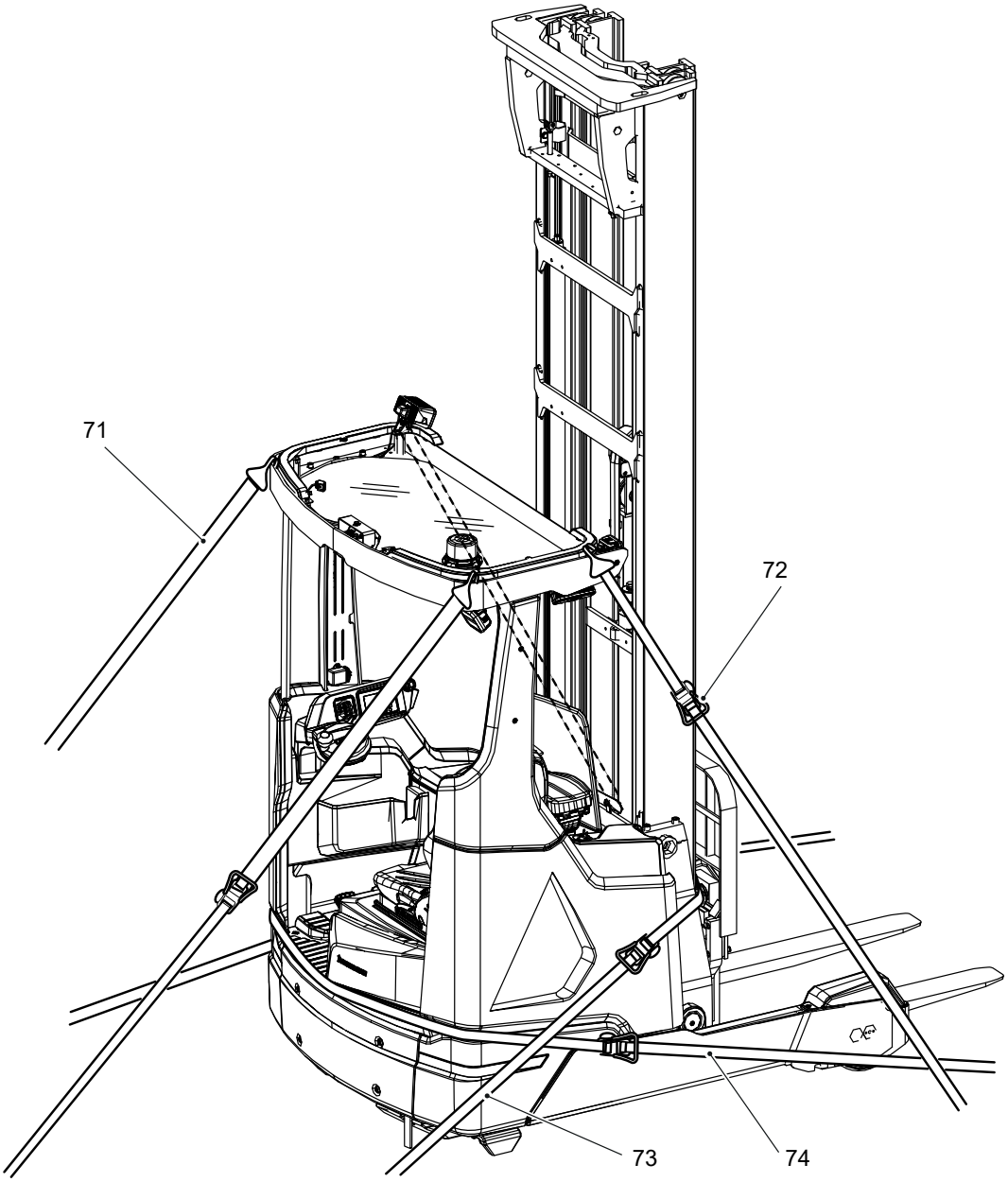
3 Securing the truck during transport

⚠ WARNING!

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

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

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


71
72
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74

Securing the truck for transport

Requirements

– Four polyester lashing straps in accordance with DIN_EN 12195-2 LC 2,500 daN.
– Parking brake activated.

Procedure

- Securely attach polyester lashing straps (71) to the overhead guard.
- Attach the polyester lashing straps (71) to the lashing rings.
- Tighten polyester lashing straps (71) with a tensioning device (72).
- Securely attach polyester lashing straps (71) on the load and drive sides.
- Attach the polyester lashing straps (71) to the lashing rings.
- Tighten polyester lashing straps (71) with a tensioning device (72).

The truck is now secured for transport.

4 Using the Truck for the First Time

⚠ DANGER!

Incorrect assembly can result in accidents

The assembly of the truck at the application site, commissioning and operator training must be performed only by the manufacturer's customer service department who has been specially trained for these tasks.

▶ Once the mast has been properly assembled, the hydraulic lines may be connected to the interface between the basic truck and the mast.

▶ Only then may the truck be put into operation.

▶ If several trucks have been delivered, make sure that the serial numbers of the load handlers, the masts and the basic trucks always match.

Procedure

- Check that the equipment is complete.
- Fully charge the battery – see page 86.

➔ The truck settings must match the battery model (if the customer is inserting the battery).

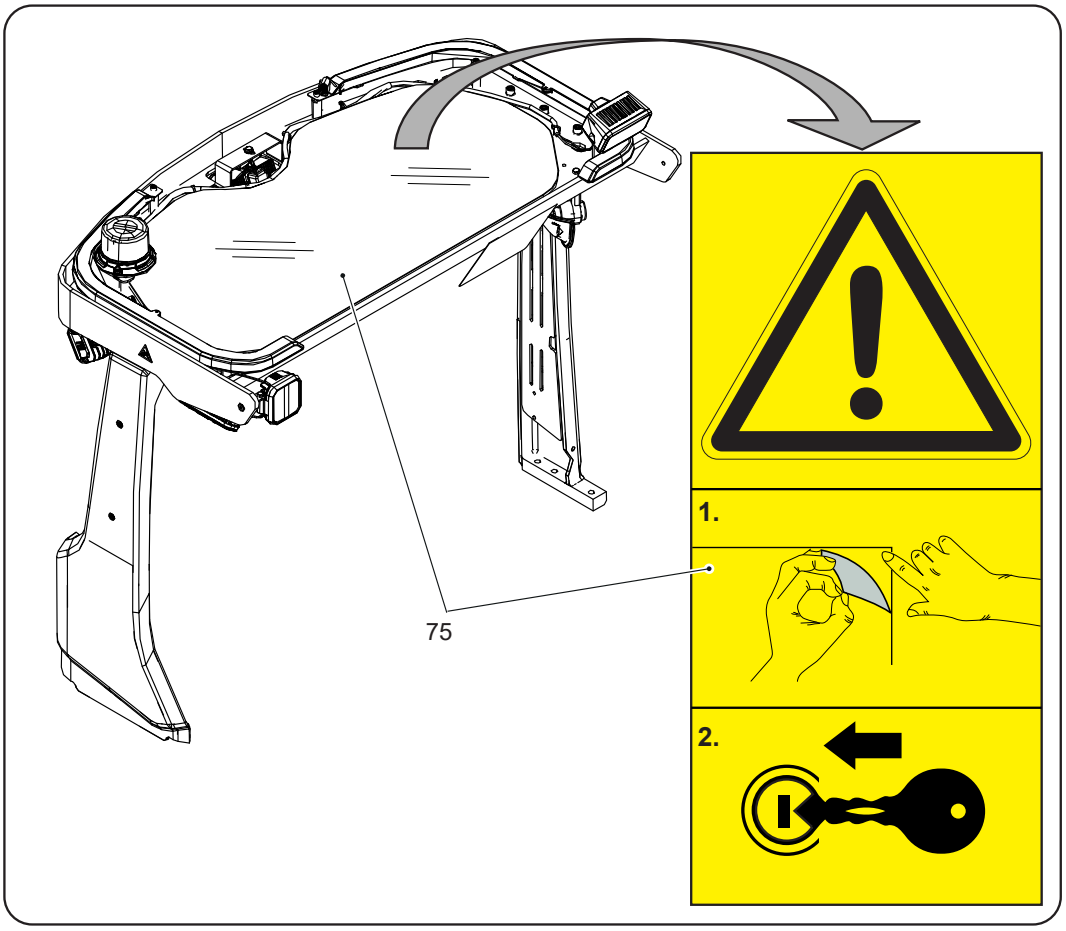
- Check the hydraulic oil level and top up if necessary (see page 242).
- Start up the truck (see page 67).

The truck is ready for use.

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.

➔ When fitting an attachment, the corresponding sticker must be applied to the control element. The sticker can be obtained from the manufacturer's customer service department.



With the optional panoramic window, the protective film (75) must be removed before initial commissioning of the truck.

D Battery

1 General safety regulations for batteries

⚠ WARNING!

Risk of overtemperature, fire or explosion due to incorrect handling

Incorrect handling of the lithium-ion battery can result in over temperature, fire or a battery explosion. Lithium-ion batteries with mechanical damage can cause a short circuit inside the lithium-ion battery. A short-circuited lithium-ion battery can overheat or release gas.

- ▶ Do not open the lithium-ion battery.
- ▶ Do not mechanically machine the lithium-ion battery.
- ▶ Do not mechanically modify the lithium-ion battery (conversion).
- ▶ Do not damage, penetrate, bend, strike, crush, compress the lithium-ion battery or similar.
- ▶ Do not immerse a lithium-ion battery in water.
- ▶ Do not store or operate the lithium-ion battery in pressurised containers.
- ▶ The safety devices (e.g. safety valves) of the lithium-ion battery must never be modified or rendered ineffective.

Maintenance personnel

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

2 Lithium-Ion Battery

General information

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

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

Battery management system

The lithium-ion battery is continually monitored by the battery management system. The battery management system monitors the cell temperature, voltage and charge status of the cells, for example. The charge and discharge processes of the lithium-ion battery are also enabled and monitored by the lithium-ion battery.

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

If critical values are reached or malfunctions occur, messages may be displayed or cut-offs triggered on the truck.

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

2.1 Safety regulations for handling lithium-ion batteries

2.1.1 Correct application

⚠ WARNING!

Do not open the battery!

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

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

⚠ WARNING!

Hazard from liquid or gaseous contents from the battery

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

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

NOTICE

Environmental hazard due to electrolyte fluid escaping from the battery cell

If the stack or battery cell suffers mechanical damage, electrolyte fluid can escape from the damaged battery cell. If the escaped electrolyte fluid flows into the ground or groundwater, this can cause damage to the environment.

▶ Escaped electrolyte fluid must be removed professionally by the operating company on the basis of a corresponding risk assessment and disposed of in the correct manner. The fire brigade or similar institutions must be used where necessary.
▶ Do not allow electrolyte fluid to enter the sewage system (surface water) or groundwater.
▶ Absorb electrolyte fluid with liquid-binding material (e.g. vermiculite, sand, sawdust, universal binders, diatomaceous earth).

2.1.2 Shipping information

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

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

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

➔ A truck with a fixed lithium-ion battery can be transported without special precautions.

2.1.3 Battery lifetime and maintenance

NOTICE

Damage to the lithium-ion battery due to discharge

If the lithium-ion battery undergoes a long period of non-use or storage, damage may occur due to deep discharge of the battery cells. Take the following actions to avoid damage due to deep discharge:

▶ Truck parked securely – see page 165.

▶ Fully charge the lithium-ion battery before extended periods of non-use or storage.

▶ Fully charge the lithium-ion battery every 3 months to protect against deep discharge.

Maintenance

The lithium-ion battery is a wear-free, maintenance-free and gassing-free (emission-free) sealed system.

➔ No maintenance intervals are planned for this lithium-ion battery. For example, no refilling of liquids or other substances is necessary.

The lithium-ion battery is continually monitored by the battery management system.

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

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

▶ If possible, drive the truck outside before fighting the fire.

2.1.5 Touch voltage hazard

⚠ WARNING!

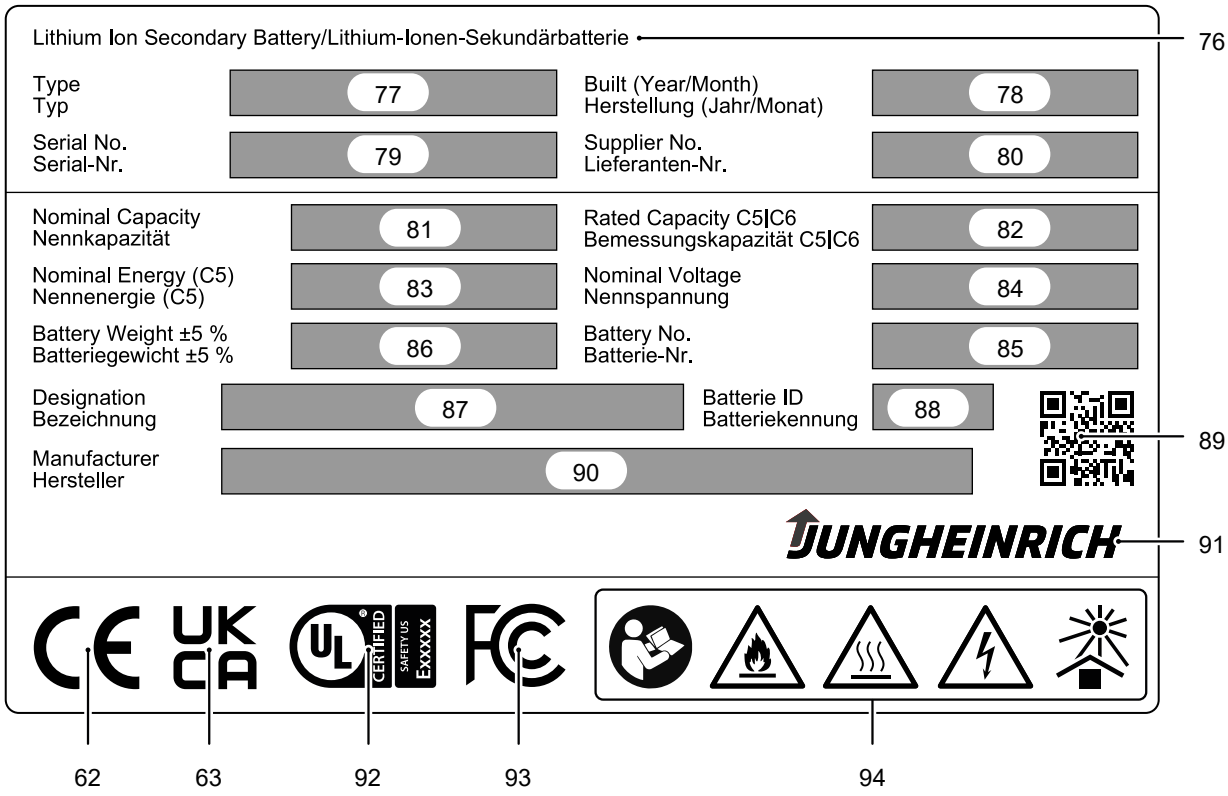
Touch voltage hazard

Hazardous touch voltages may occur in the event of a technical or mechanical defect on a lithium-ion battery. Touch voltages also occur on seemingly discharged lithium-ion 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 faulty lithium-ion batteries and take them out of service.
- ▶ Do not touch faulty lithium-ion batteries.
- ▶ Do not place any objects or tools on the lithium-ion battery to avoid short-circuiting the lithium-ion battery.
- ▶ Do not short-circuit the lithium-ion battery.
- ▶ Contact the manufacturer's customer service department or a customer service department authorised by the manufacturer.

With this kind of defect, the battery must not be touched and must not come into contact with metal objects – see page 71.

2.2 Lithium-ion battery data plate

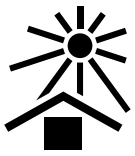


If you have any questions about the lithium-ion battery, supply the serial number (79) to either the manufacturer's customer service department or a customer service organisation authorised by the manufacturer.

Item	Description
62	CE mark (*Conformité Européenne*)
63	UKCA marking (*United Kingdom Conformity Assessed*)
76	Lithium-ion secondary battery
77	Battery type
78	Production (year/month)
79	Serial number
80	Supplier number
81	Rated capacity in ampere-hours [Ah]
82	Rated capacities C5 and C6 in ampere-hours [Ah]
83	Rated energy (C5) in watt-hours [Wh] – Calculation of the rated energy (C5): rated capacity C5 multiplied by the rated voltage
84	Rated voltage in volts [V]
85	Battery material number
86	Battery weight in kilogrammes [kg] – Tolerance range: 5%
87	Designation

Item	Description
88	Battery identifier (Battery Type Identification)
89	QR code
90	Contact details of manufacturer: – Address – Website – E-mail
91	Manufacturer's logo
92	UL mark (*Underwriters Laboratories*)
93	FCC mark (*Federal Communications Commission*)
94	Safety and warning information – see page 75

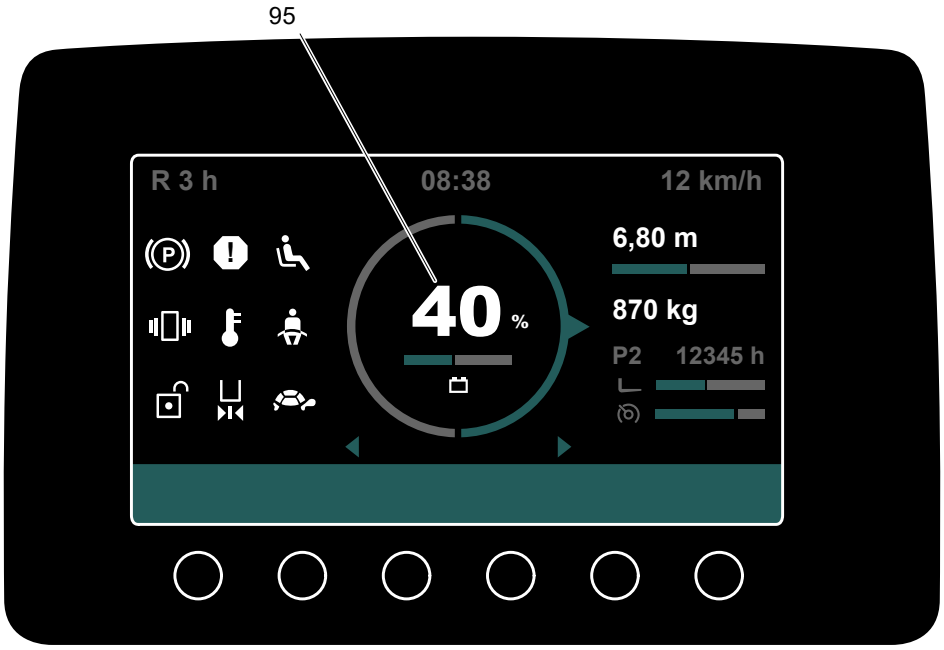
2.2.1 Safety Instructions, Warning Indications and other Notes

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

2.3 Battery types

Battery type	Version	Nominal capacity	Nominal voltage	Nominal energy	Battery operational weight
50 V LIB 230 Ah M11	1x M1	228 Ah	51.2 V	11,673 Wh	95 kg
50 V LIB 460 Ah M12	2x M1	456 Ah	51.2 V	23346 Wh	190 kg
50 V LIB 230 Ah M21	1x M2	228 Ah	51.2 V	11,673 Wh	106 kg
50 V LIB 690 Ah M13	3x M1	684 Ah	51.2 V	35019 Wh	285 kg

2.4 Charge Status Indicator



The charge status of the lithium ion battery is shown on the display of the display unit (95). The display of the display unit also indicates important information on the operating condition of the lithium-ion battery as required (e.g. low charge status, excessively high or low temperature) – see page 114.

Cut-out depending on the charge status

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

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

Deeply discharged batteries

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

➔ Contact the manufacturer's customer service department.

2.5 Removing or installing the battery

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

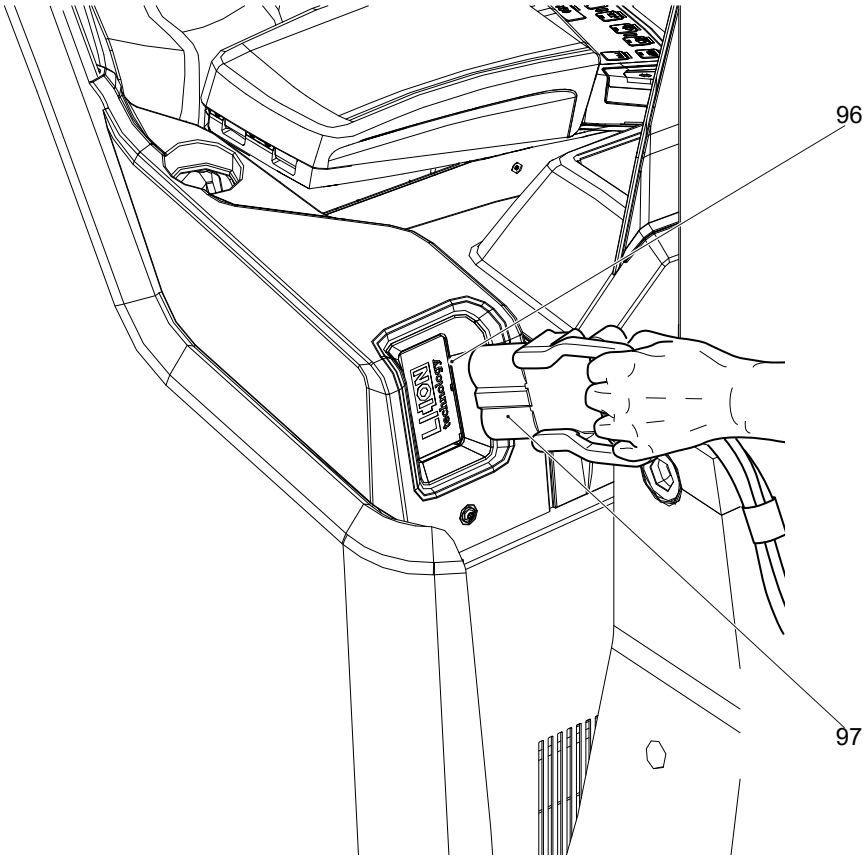
2.6 Charging the battery with a stationary battery charger

The stationary battery charger can only charge suitable lithium-ion batteries with a battery management system, not standard batteries.

➔ Observe the battery charger operating instructions.

➔ Do **not** disconnect the **mains cable** or **charge connector** while charging (under load).

➔ The lithium-ion battery is monitored during charging by the battery management system.



Charging the lithium-ion battery

Requirements

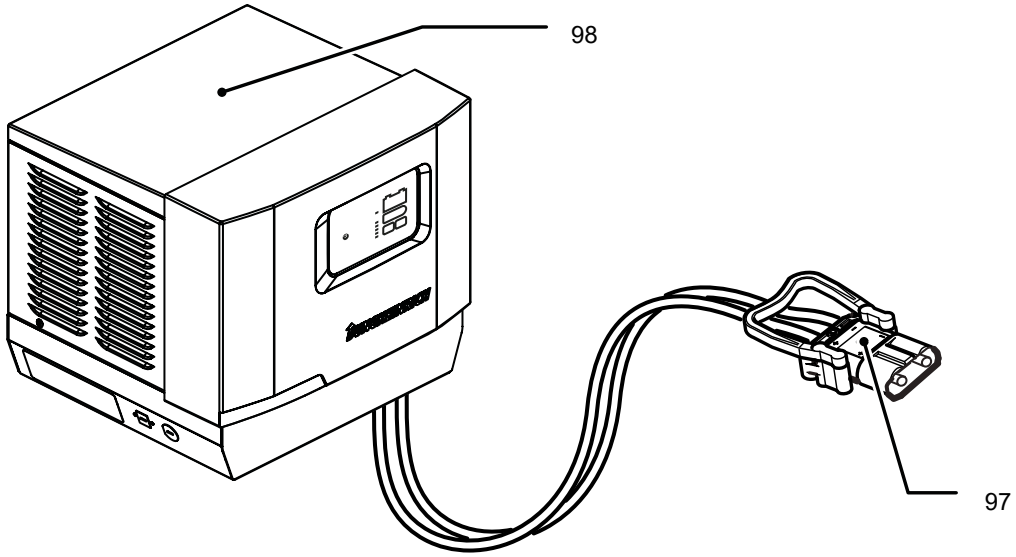
– Battery charger (98) connected to the mains.
– Truck parked securely – see truck operating instructions.

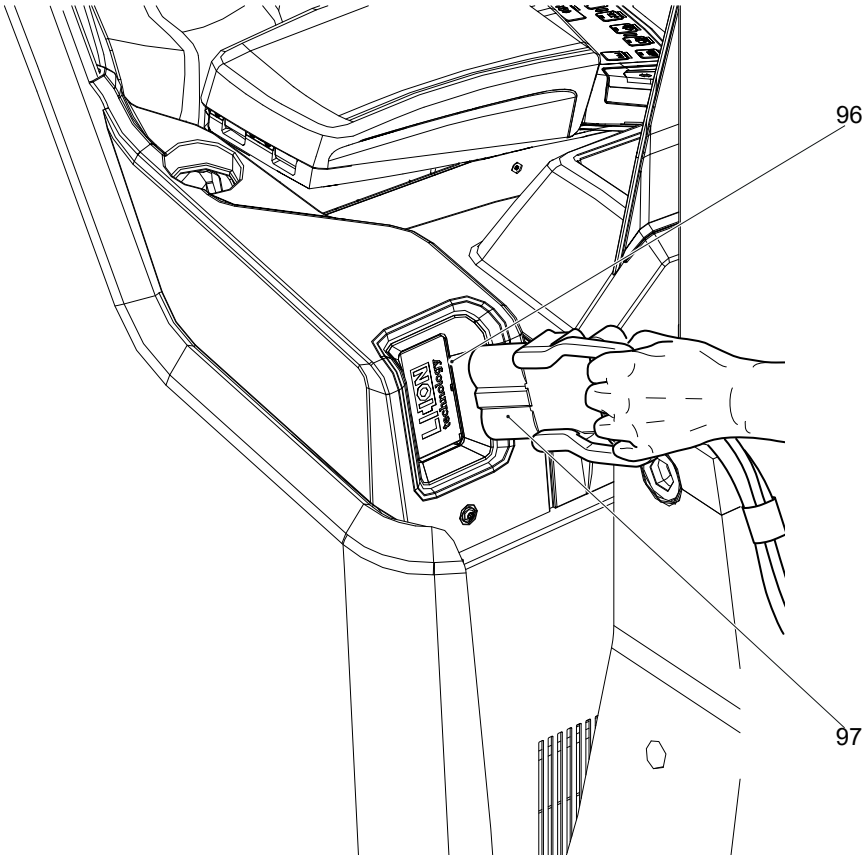
Procedure

- Activities before charging:
  - Check the cable and charge connector (97) of the battery charger (98) for visible damage.

  If damage is identified, mark the damaged battery charger or battery and withdraw from use. Have the damaged battery charger or battery inspected and, if necessary, repaired by the manufacturer or an expert authorised by the manufacturer.
- *The battery charger (98) and truck may only be connected when the battery charger (98) and truck are switched off.*

Charging of the battery commences automatically. If charging is to start with a delay, a delay time can be set by trained personnel (default setting 0 seconds).


98
97



Completing battery charging; restoring the truck to operation

NOTICE

If charging has been interrupted, the full battery capacity will not be available.

Requirements

– The battery is fully charged.

Procedure

- Complete charging in accordance with the operating instructions for the battery charger (98).

➔ To interrupt charging manually, briefly press the start/stop button on the battery charger (98). Alternate flashing of the green and yellow LEDs on the battery charger (98) indicates that charging has been interrupted.

When the battery is fully charged, charging ends automatically.

- Remove the charge connector (97) of the battery charger (98) from the comfort charging socket (96).
- Check all cables and connectors for visible damage.

The truck is now ready for operation.

2.7 Charging the battery with an on-board charger

2.7.1 Safety information

⚠ DANGER!

Risk of electric shock and fire

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

- ▶ Always use mains cables with a maximum length of 30 m. Local regulations must be observed.
- ▶ **Unwind the cable reel fully when using it.**
- ▶ Always use original manufacturer's mains cables.
- ▶ Insulation classes and resistance to acids and alkalis must correspond to those of the manufacturer's mains lead.
- ▶ The mains connector must be dry and clean when used.

⚠ WARNING!

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

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

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

⚠ 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!

Danger of overheating when charging with an unsuitable battery charger

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

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

⚠ WARNING!

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

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

- ▶ Before commissioning the truck, disconnect the mains cable from the mains socket and stow away in the designated position on the truck.
- ▶ If no additional protective measures have been taken [3], do not charge the industrial truck at a mains socket that can be switched off.
- ▶ This warning must be taken into account by the operating company when analysing the risk.

⚠ WARNING!

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

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

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

NOTICE

Improper use of the on-board charger

Material damage to the industrial truck

- ▶ Do not open the on-board charger.
- ▶ Only use the on-board charger to charge the battery installed in the industrial truck.
- ▶ Only use other batteries after installation and approval by the manufacturer's customer service department.
- ▶ Do not install the on-board charger in other industrial trucks.

[3] One possible protective measure is the "mains plug detection, immobiliser" function.

2.7.2 Charge statuses and compensation charging

Intermediate charging of the lithium-ion battery

The lithium-ion battery can be partially charged (intermediate charging) each time there is a break in use, without limiting its service life. The following must be borne in mind when doing so.

– In the event of frequent intermediate charging, charge the lithium-ion battery fully at least once per week.
– Interrupt the charging process with the charging stop function before disconnecting the battery charger from the mains – see page 86. If the battery charger is not disconnected from the mains, charging continues automatically after a waiting time.
– When the battery is fully charged, charging ends automatically.

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

In the event of an extended period where the lithium-ion battery is not in use, it is recommended to use the trickle charge function of the battery charger to maintain the available capacity of the lithium-ion battery.

Charging time

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

Mains failure

Charging continues automatically after a mains failure.

2.7.3 Setting the Charging Characteristic

NOTICE

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

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

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

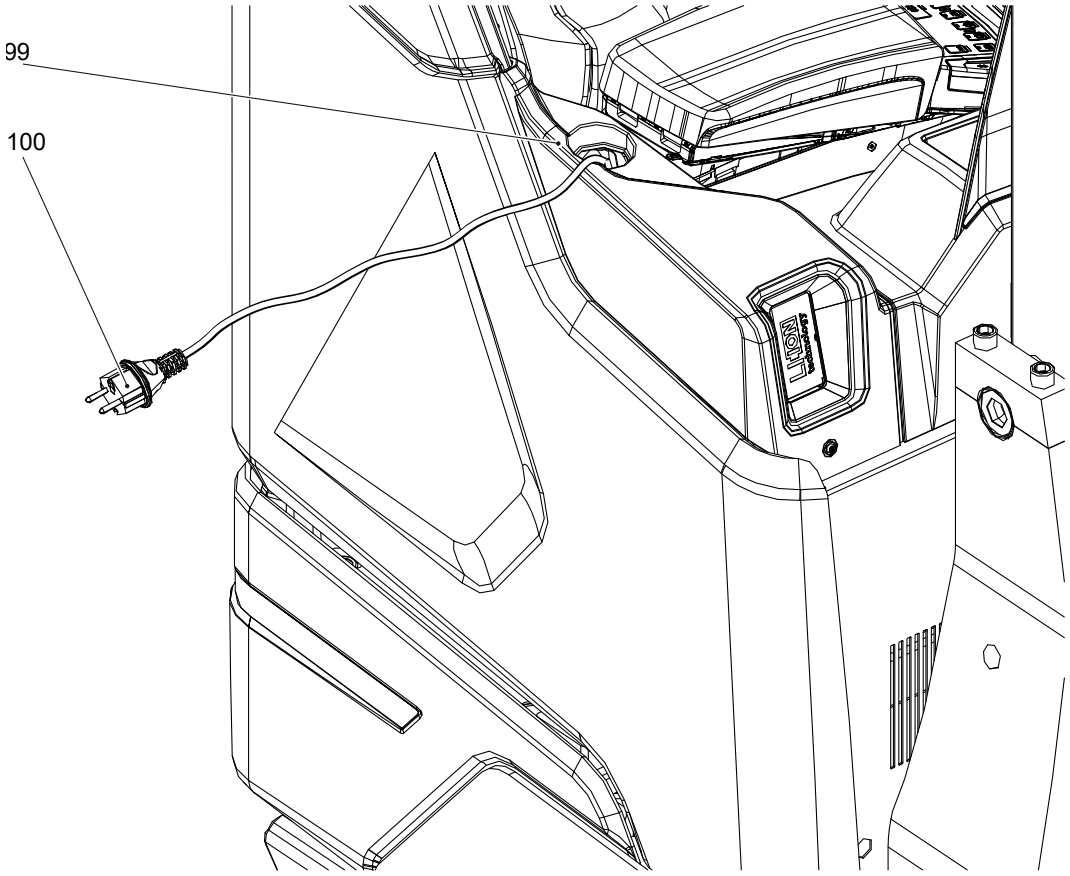
2.7.4 Charging Times

➔ The charging times apply to discharged lithium-ion batteries. Partial charging can be carried out at any time to bring forward the use of the industrial truck.

In the event of ***high*** or ***low*** battery temperature, the charging time of the lithium-ion battery is extended due to a reduction in the charge current.

Configuration			**Max. charge current**	**Duration**
ETV 214i - 325i	1x M1	230 Ah	200 A	1.5 hrs
	2x M1	460 Ah		3 hrs
	1x M2	230 Ah		1.5 hrs

2.7.5 Charging the battery



Charging the battery

Requirements

– Truck parked securely – see page 165.

Procedure

- Check the cable and mains plug (100) of the on-board charger for visible damage before charging.

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

- Plug the mains plug (100) into a mains socket.
- If the charge status is to be displayed on the industrial truck, unlock the emergency disconnect switch (6) – see page 135.

➔ The display unit (181) shows the charge status, symbols in connection with the charging stop or a fault – see page 94.

Charging starts and ends automatically. The battery is charging.

Completing the battery charge

Requirements

– The battery is partially or fully charged.

Procedure

- Press the "charging stop" function button on the display unit to stop charging safely.

➔ The display unit shows the "unplugging main plug allowed" display symbol – see page 97.

- Unplug the mains plug (100) by pulling the plug (not the cable) out of the mains socket.
- **Always** stow the entire charger cable in the storage compartment (99).

➔ Only if equipped with the "mains plug detection, immobiliser" function (○); otherwise, a display symbol will appear on the display unit, see page 97. With this equipment, the truck can be started only when the mains plug is fully stowed in the storage compartment.

- Establish operational readiness.

The truck is operational.

3 Battery lifetime and maintenance

The lithium-ion battery is a wear-free, maintenance-free and gassing-free (emission-free) sealed system.

No maintenance intervals are planned for this lithium-ion battery. For example, no refilling of liquids or other substances is necessary.

The lithium-ion battery is continually monitored by the battery management system.

NOTICE

Damage to the lithium-ion battery due to deep discharge

The charge status of the lithium-ion battery decreases during prolonged periods of non-use or storage. Damage to the lithium-ion battery may occur due to self-discharge.

- ▶ Disconnect the lithium-ion battery from the truck if it is to remain unused for longer than a week (e.g. detach the battery connector / interface connector).
- ▶ To protect against deep discharge, fully charge the lithium-ion battery before prolonged periods of non-use and every 4 weeks.
- ▶ If the battery charger features the "balancing" function, make sure that the balancing phase at the end of charging is completed. For further information on the "balancing" function, refer to the operating instructions for the battery charger.

Intermediate charging of the lithium-ion battery

A lithium-ion battery that is not fully discharged can be partially or fully recharged at any time. Note the following information to ensure reliable function of the lithium-ion battery:

- ▶ In the event of frequent intermediate charging, charge the lithium-ion battery fully every 4 weeks. If the battery charger features the "balancing" function, make sure that the balancing phase at the end of charging is completed. For further information on the "balancing" function, refer to the operating instructions for the battery charger.
- ▶ Turn off the battery charger before disconnecting the lithium-ion battery from the battery charger. Manual interruption of the charging process: see page 84. When the battery is fully charged, charging ends automatically.

The truck must be parked securely before all work on the batteries, see page 165.

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, obligations and responsibilities

The operator 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.

Do not allow unauthorised persons to use the 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.

When leaving the industrial truck, the operator must ensure that the industrial truck is secured against unauthorised use, e.g. remove the key or keep the access code secret.

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

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

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

⚠ WARNING!

Falling objects can cause accidents

Falling objects can injure the operator while the truck is being operated.

- ▶ The operator must remain within the protected area of the overhead guard while the truck is being operated.

⚠ WARNING!

The use of mobile phones can result in lack of attention and ultimately accidents

Using a mobile phone while operating the truck can result in accidents.

- ▶ Observe national regulations on the use of mobile phones while operating the truck.

Safety devices, warning signs and warning instructions

Safety devices, warning signs (see page 47) and warning instructions in the present operating instructions must be strictly observed.

⚠ WARNING!

Accident risk due to removing or disabling of safety devices

Removal or disabling of safety devices such as the Emergency Disconnect switch, deadman switch, horn, warning lights, gates, protective window, covers, etc. may result in accidents and injuries.

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

⚠ CAUTION!

Reduced headroom can cause injuries

Trucks with reduced headroom are equipped with a warning label within the operator's line of sight.

- ▶ The max. recommended body size indicated on this warning sign must be observed.
- ▶ The headroom is also reduced when you wear a protective helmet.

⚠ WARNING!

Loss of operational stability can cause accidents

Extended mast sections when the truck is travelling with or without load will reduce the truck's operational stability.

- ▶ Always travel with the mast holder retracted, the mast tilted back, the load centre in the middle of the truck's longitudinal axis and the load handler lowered.
- ▶ Position the fork arms as far apart as possible. The load centre must lie centrally between the fork arms.

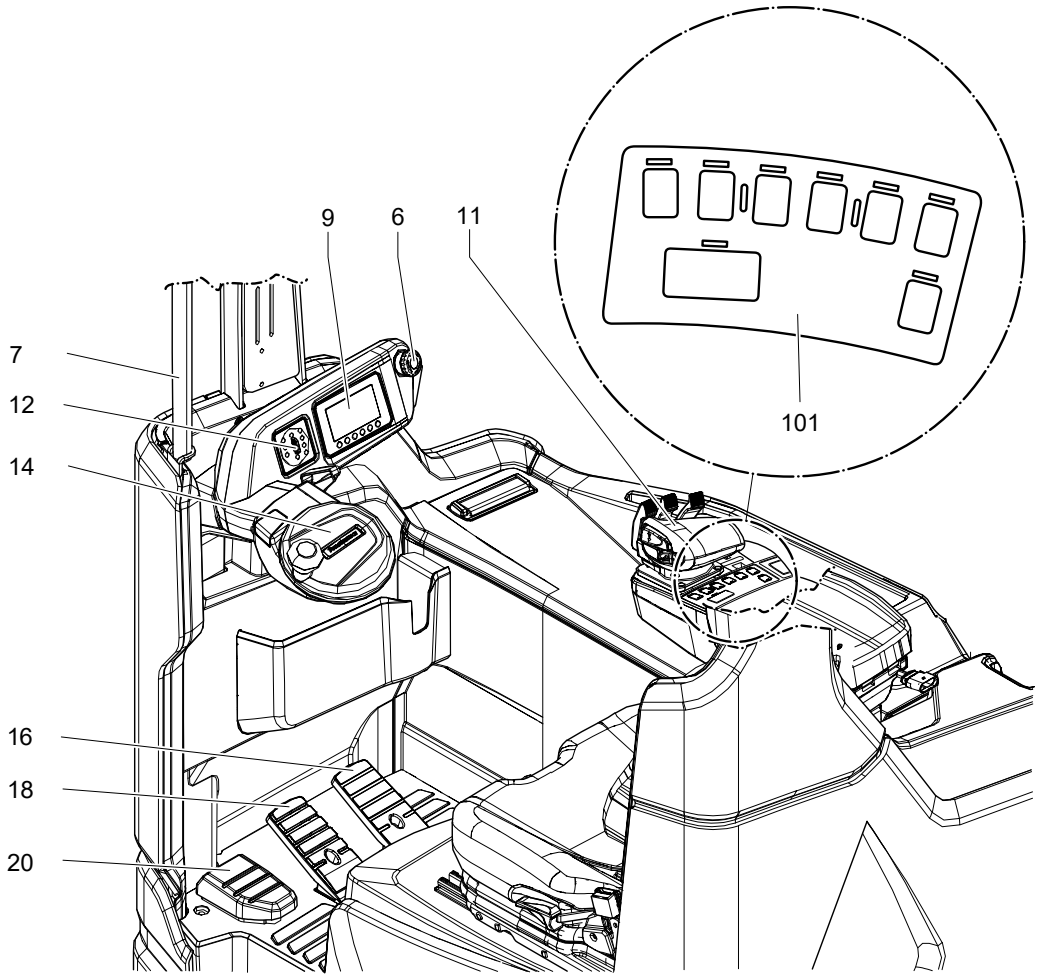
⚠ CAUTION!

Risk of accident due to ceiling installations

Ceiling installations such as cable raceways, piping and sprinkler systems are easy to overlook.

- ▶ Maintain a sufficient safety distance from ceiling installations.

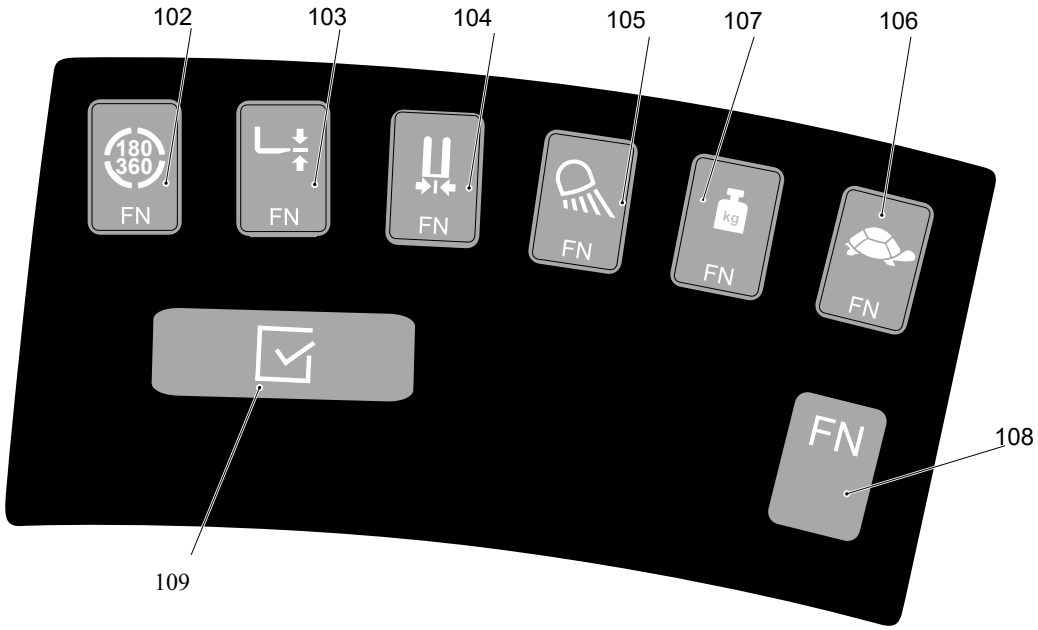
2 Displays and Controls

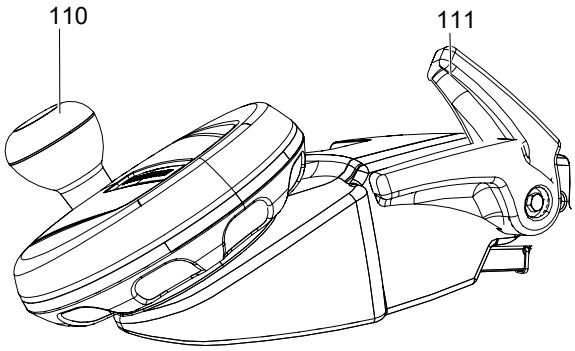


Item	Controls and displays		Function
6	Emergency disconnect switch	●	Switches the power supply on and off
7	Grab handle	●	
9	Control and display unit	●	Displays steering modes, warning indicators, incorrect operation notes and service displays
		○	Switches on the truck using EasyAccess with PinCode
14	Steering wheel	●	Sets the travel direction
16	Accelerator pedal	●	Provides infinitely variable travel speed control
18	Brake pedal	●	Provides infinitely variable braking control.

Item	Controls and displays		Function
12	Key switch	○	Switches control current on and off. Removing the key prevents the truck from being switched on by unauthorised personnel.
	Transponder		
		○	Switches the truck on
20	Deadman switch	●	– Not applied: Travel and hydraulic functions inhibited, truck decelerates – Applied: Travel and hydraulic functions enabled
11	multiPILOT	○	Functions: – Fwd / rev. travel direction – Picking up / lowering load – Tilt the mast forwards / backwards – Horn button – Side shift left / right – Auxiliary hydraulics (○) – Mast reach forward / back – Acknowledgement key (○)
101	Options keypad	○	

Item	Controls and displays		Function
102	Steering mode button	○	Switches the steering mode between 180° and 360°.
103	"Horizontal tilt" button	○	Activates the "horizontal fork tilt" function.
104	Side shift	○	Operates the side shift
105	Work lights button	○	Operates the work lights
106	Slow travel button	○	Activates slow travel.
107	Weighing button	○	Weighs the load.
108	FN button	○	Assignment of buttons display changes to auxiliary options
109	Acknowledgement button	○	Additional means of confirmation for hydraulic functions requiring acknowledgement
111	Steering column lock	●	
139	Basic hydraulic functions lever	●	Operates the basic lift / mast reach hydraulic functions
160	Travel direction switch	●	Selects travel direction / neutral position.

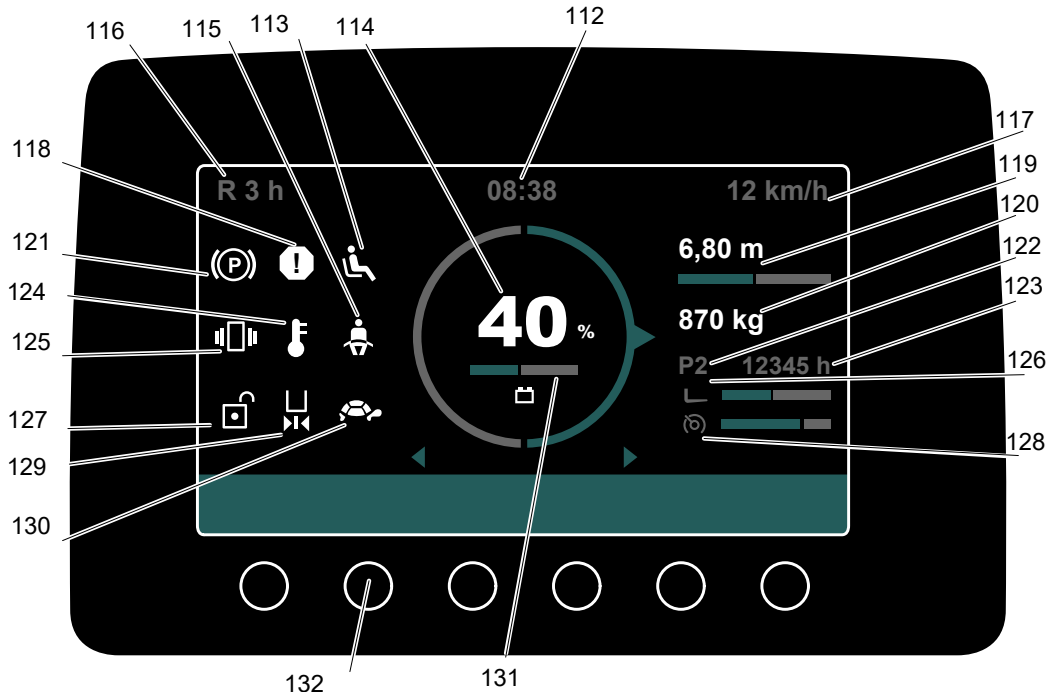




2.1 Display unit

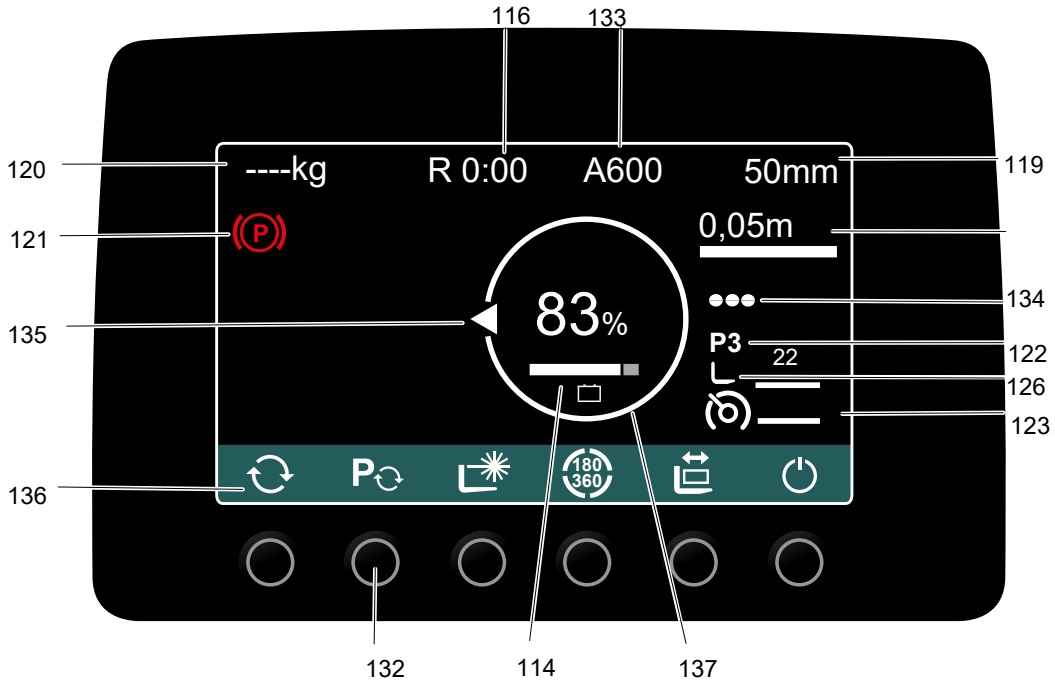
2.1.1 Display

2.1.1.1 4-inch display



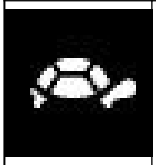
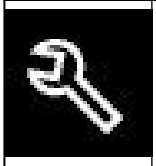
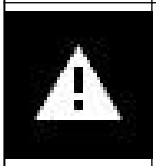
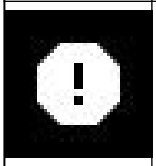
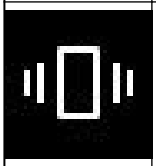
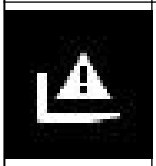
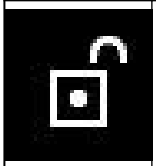
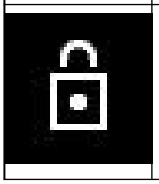
Symbol	Description	Function / meaning
113	Seat switch	Seat switch not actuated
115	Seat belt lock monitoring	Seat belt lock not engaged
118	Warning	Operating error / truck malfunction
121	Automatic parking brake	Activating the automatic parking brake
124	Battery excess temperature	Critical temperature range
125	Shock display	Medium shock due to improper driver actions / severe shock due to improper driver actions
127	Acknowledgement active	Acknowledgement button active
129	Side shift centred	Positioning of the side shift in centre position
130	Slow travel	Slow travel is activated

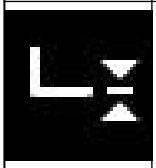
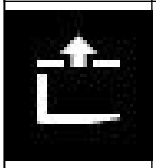
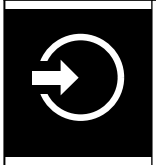
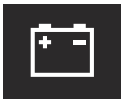
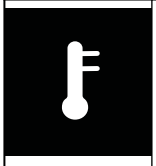
2.1.1.2 4-inch display

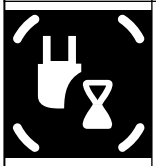
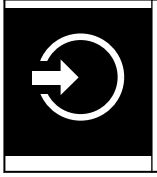


Item	Controls and displays		Function
137	Steering mode		180° steering
			360° steering
135	Arrow to display the travel and steering directions		Shows the current travel direction of the truck and the current wheel position in 15° segments.
112	Time		Shows the time.
126	Power display		Shows the travel / lift speed as a bar value
122	Operating program		Shows the operating program selected.
123	Service hours		Shows the truck operating hours – see page 109.
136	Key allocation		see page 104.
132	Keys		Selection keys for the corresponding functions.
114	Battery capacity display		Battery discharge status
116	Remaining run time		Shows the truck's remaining run time.
133	Load centre display		Shows the current load centre.
119	Lift height display		Shows the lift height
120	Load-weight display		Shows the weight of the raised load.
134	Load weight pending		Indicates that the load weight has not been output yet.

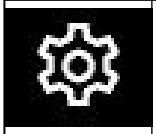
2.1.2 Symbols in the display

Symbol	Designation	Colour	Function / meaning
	Manual parking brake	Red	Actuation of the manual parking brake
	Slow travel	Green	Slow travel is activated
	Service note	Yellow	Attention: SDO request read or write parameters
		Red	Execute service function line-rupture safety valve test
	Warning	Yellow	Operating error
		Red	Truck malfunction
	Stop notice	Red	Functions deactivated due to truck malfunctions
	Shock display (ISM)	Yellow	Medium shock due to improper driver actions
		Red	Severe shock due to improper driver actions
	Deadman switch	Yellow	The yellow symbol illuminates when controls are actuated but the deadman switch is not.
	Overload	Red	The operational stability of the truck is at risk due to overload.
	Acknowledgement active	Green	Acknowledgement button active
	Acknowledgement feature malfunction	Yellow	Acknowledgement button malfunction

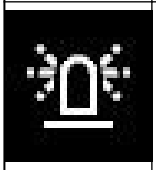
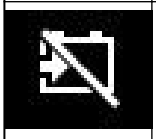
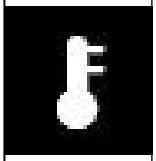
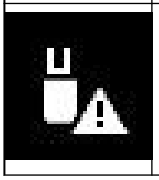
Symbol	Designation	Colour	Function / meaning
	Horizontal tilt	Green	Positioning of the forks in horizontal position
	ESA (limit switch system)	Yellow	Overriding the lift cut-off
	Lowering cut-off (ESA)	Green	Lowering cut-off is overridden
		Yellow	Lowering cut-off is initiated
	Side shift centred	Green	Positioning of the side shift in centre position
	Battery charge status	Yellow	Battery charge status is between 1 and 12%.
		Red	Battery charge status is below 1%. Slow travel and lift cut-off activated.
	Lighting	Green	Lighting on the truck is activated. → Lighting does not include the Floor-Spot option.
	Battery excess temperature	Yellow	Temperature of the lithium-ion battery is above 45°C.
		Red	Temperature of the lithium-ion battery is above 50°C.
	Battery low temperature	Yellow	Temperature of the lithium-ion battery is below 5°C.
		Red	Temperature of the lithium-ion battery is below 0°C.
	Lift deactivated	Yellow	Symbol illuminates when lift functions are cut out due to insufficient battery capacity.
	operationCONTROL	Red	Tilt limit reached
	Seat switch	Yellow	Seat switch not applied or seat switch applied for more than 6 hours uninterrupted
		Red	Error on seat switch

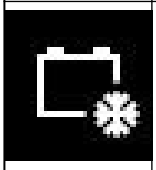
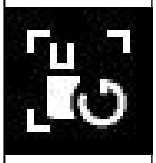
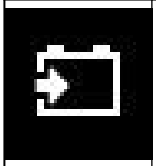
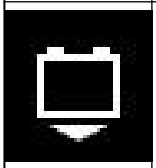
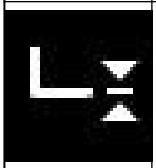
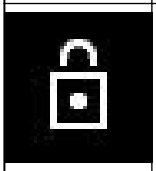
Symbol	Designation	Colour	Function / meaning
	Seat belt lock monitoring	Yellow	Seat belt lock not engaged
		Red	Wrong activation sequence of seat switch, seat belt lock and deadman switch
	Transport mode	Yellow	The symbol lights up when the truck is in transport mode. When in transport mode, the truck enters energy-saving operating states more rapidly. After ten hours of operation, the display automatically turns off. Only specially trained specialists are permitted to activate the transport module.
	Availability of assistance system	Yellow	Assistance system not yet ready.
	Additional Access		Optional access system

2.1.3 Softkeys

Symbol	Meaning	Function
	Button assignment	Switches the operating level
	Manual parking brake	Actuation of the manual parking brake
	Slow travel	Switches to slow travel
	Travel programs menu	Switches to the travel program menu
	Travel program up	Switches the travel program up
	Line laser	Actuation of the line laser (○)
	Free-text display	Switches to the free-text display
	Settings	Settings for the time and access
	Shut-down	Shut-down (○): Allows the truck to be shut down
	operationCONTROL menu	Switches to the operationCONTROL menu (○)
	operationCONTROL load direction	Moves the load centre in the load direction (○)
	operationCONTROL drive direction	Moves the load centre in the drive direction (○)

Symbol	Meaning	Function
	Load chart A	Load centre for the current stacking operation (○)
	Load chart B	
	Load chart C	
	Light menu	Switches to the light menu (○)
	Dim	Adjusts the degree of light (○)
	Fork work lights	Actuates the work lights on the fork (○)
	Drive direction work lights	Actuates the work lights in the drive direction on the overhead guard (○)
	Changing between 180° and 360°	Changes the steer mode between 180° and 360°
	SmartStripe	Turns off the SmartStripe function
	Fork direction work lights	Actuates the work lights in the fork direction on the overhead guard (○)
	Fork empty	Display with unladen fork
	Fork laden	Display with laden fork
	Push empty fork	Allows the unladen fork to be pushed
	Lift empty fork	Allows the unladen fork to be lifted

Symbol	Meaning	Function
	Lower empty fork	Allows the unladen fork to be lowered
	Push fork with load	Allows the laden fork to be pushed
	Lift fork with load	Allows the laden fork to be lifted
	Lower fork with load	Allows the laden fork to be lowered
	Warehouse zone A	Indicates the active rack type preselection
	Warehouse zone B	
	Warehouse zone C	
	Warehouse zone D	
	Beacon on	
	Charging stop	
	DayLED	
	Overtemperature	
	Truck disabled	With the Jungheinrich Fleet Management System (○)

Symbol	Meaning	Function
	Battery low temperature	
	Assistance system not yet ready	
	Charging	
	Battery latch	
	Fork tilt horizontal	
	Acknowledgement feature malfunction	
	Charging flaps open	

2.1.4 Setting the time

Setting the time

Symbol	Procedure
	Press the button under the settings symbol.
	Press the button under the clock symbol.
	Use the arrow up key to change the time digit selected.
	Use the arrow down key to change the time digit selected.
	Press the confirm key to move to the next digit or to confirm the time.

The time is now set.

2.1.5 Battery discharge indicator

The battery charge status is shown on the truck display via a battery symbol (114). When a battery is discharged to the permissible discharge level, the battery symbol (114) is displayed empty. (see page 97)

2.1.6 Battery discharge monitor

If the residual capacity falls below the required level, lifting is inhibited and slow travel is activated. A corresponding display appears (131). Lifting is released only when the battery connected is at least 70% charged.

Colour	Range	Residual capacity	Response
Green	Operating range	>20%	None
Yellow	Warning range 1	20%-5%	Yellow battery pictogram
Orange	Warning range 2	5%-0%	Slow travel, lift cut-off
Red	Cut-off range	0%	Ramp stop, restart via connection of a battery charger
Red	Protection range	0%	Restart by customer service department

2.1.7 Hourmeter

→ Prepare the truck for operation, see page 115 or see page 171.

Service hours are counted while the truck is operational and the deadman button is pressed.

2.2 Armrest Control Panel Buttons

Symbol	Function
	Work lights
FN	FN button Press the FN button. Assignment of buttons display changes to auxiliary options – see page 94.

2.3 Options keypad

Freely programmable function key

The FN keys of the options keypad can be individually programmed with a second function.

Procedure

- Select the desired function in the display.
- Press FN toggle button (108) for 5 seconds.
  All FN keys in the options keypad, except the parking brake, flash.
- Select the desired FN key for the second function on the options keypad by pressing once.
- Touch the desired function in the display.

The desired function is now programmed on the selected FN key and can be executed more quickly.

Programming is only possible when the truck is stationary.

Some functions are not programmable.

Operation of freely programmed function keys

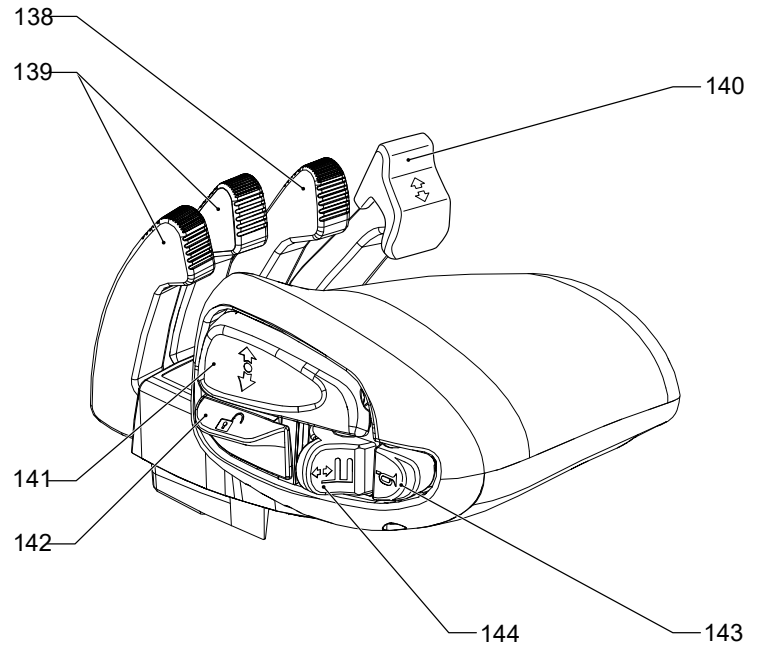
Procedure

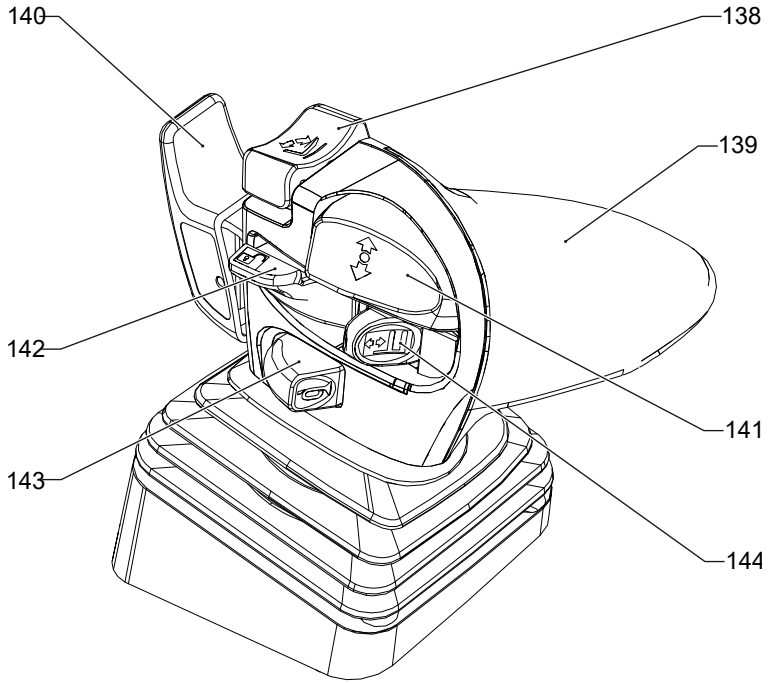
- Briefly press the FN toggle button (108).
  The display shows the pre-programmed functions of all FN keys.
- Press the programmed FN keys within 2 seconds to perform the programmed function.

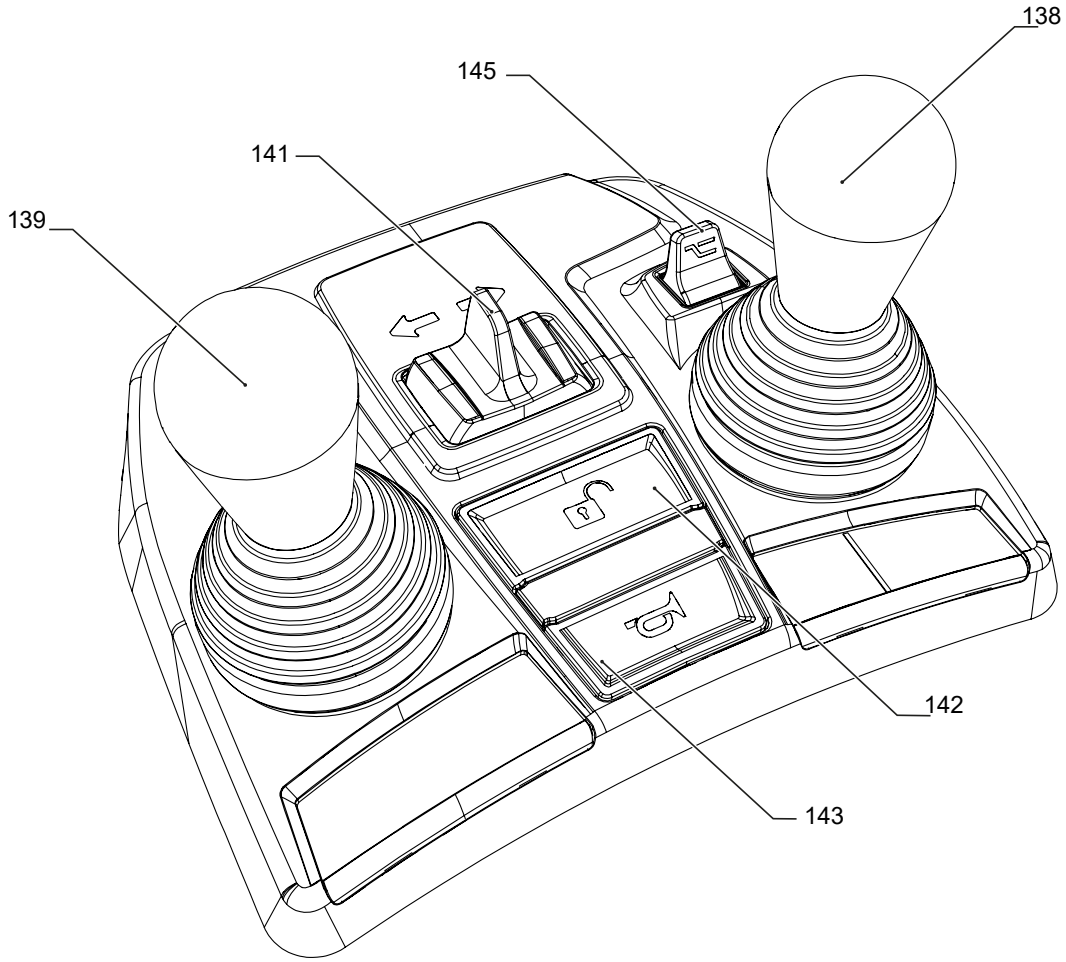
If the FN toggle button or one of the FN keys is not pressed within 2 seconds, the regular key assignment reappears on the display.

➔ The functions of the freely programmed function keys can be overwritten individually at any time.

2.4 Pilots







Item	Control/display element		Function
138	Tilt button / lever	●	Forwards and backwards tilt of the mast
139	Basic hydraulic functions lever	●	Lever for operating the basic lift / mast reach hydraulic functions
140	Fork positioner / auxiliary hydraulics 2 optional button / lever	○	Button for fork positioner or auxiliary hydraulics 2
	Indicator	○	Operation of the indicator
141	Travel direction switch (not available with twin-pedal control)	●	Selects travel direction or neutral position
142	Acknowledgement button	○	Additional operating equipment for hydraulic functions requiring acknowledgement
143	"Horn" button	●	Activates an audible warning signal.
144	Side shift	○	Operates the side shift
145	Toggle switch	○	Switches to the second function of the respective lever / button Switches to the second function of the respective lever / button

2.5 Function symbols for the Pilots

The symbols shown are examples. The actual direction of movement of the hydraulic functions must be determined from the labels on the levers of the Pilots.

Symbol	Meaning
	Lift
	Tilt
	Side shift
	Fork positioner
	Reach fork
	Telescopic fork
	Adapters ZH1 to ZH4 (example symbol ZH1)

3 Preparing the Truck for Operation

3.1 Checks and Operations to Be Performed Before Starting Daily Work

⚠ WARNING!

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

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

▶ Report any defects immediately to your supervisor.

▶ Mark defective truck and take out of service.

▶ Do not return the industrial truck to service until you have identified and rectified the fault.

Checking the truck before daily operation

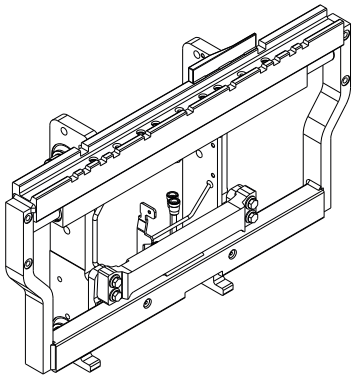
Requirements

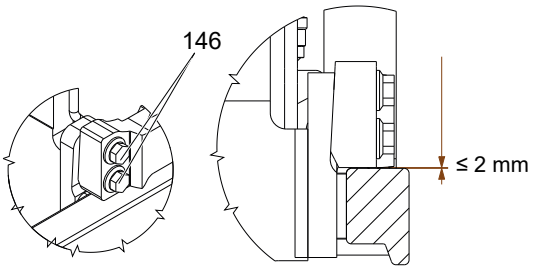
– Truck parked securely with mast holder extended – see page 165.

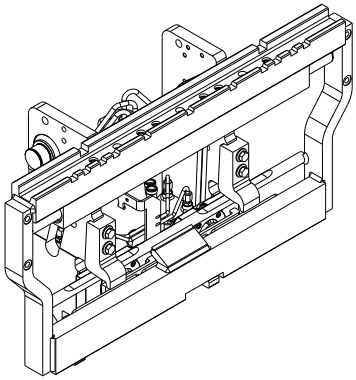
Procedure

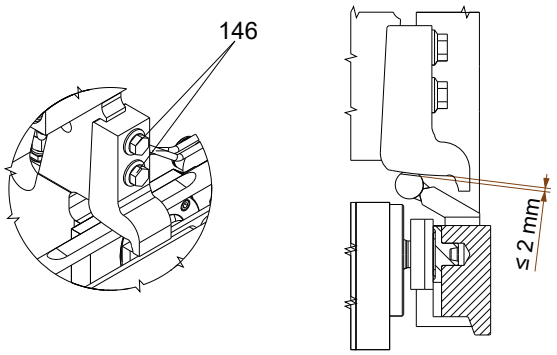
- Visually inspect the entire truck for damage.
- Check the pedal mount for any coarse dirt and clean it if necessary to reduce the likelihood of the pedals becoming jammed.
- Make sure the driver's seat is locked in position.
- Test the seat belt (○). The belt should jam if extracted suddenly.
- Check the horn, and lighting and signalling functions.
- Test the controls and displays.
- Visually inspect the visible area of the hydraulic system for damage and leaks.
- Make sure the load chains are evenly tensioned.
- Check all hydraulic functions and, if applicable, the attachment hydraulic functions.
- Inspect the free lift chains and visually inspect the locking of the nuts (148).
- Test the steering.
- Check the steer angle display, turn the steering wheel in both directions and check that the wheel position is displayed on the control panel.
- Visually inspect the load handler for any visible damage. Possible damage includes: cracks, deformations or severe wear.
- Check the fork arm stop and fork retainer – see page 145.
- Check the fork arms for oil and dirt; clean if necessary.
- Check that the fastening screws (146) on the fork carriage are secure and tighten if necessary. Torque: 169 Nm.
  - The maximum clearance between the components of the restraint system must be no more than 2 mm.

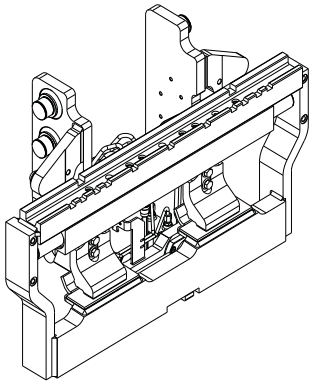
The truck is now checked.

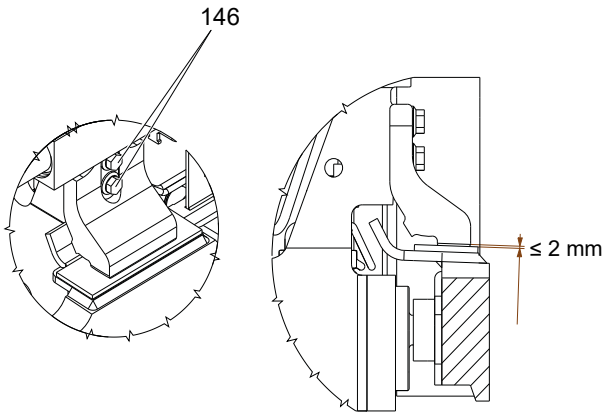


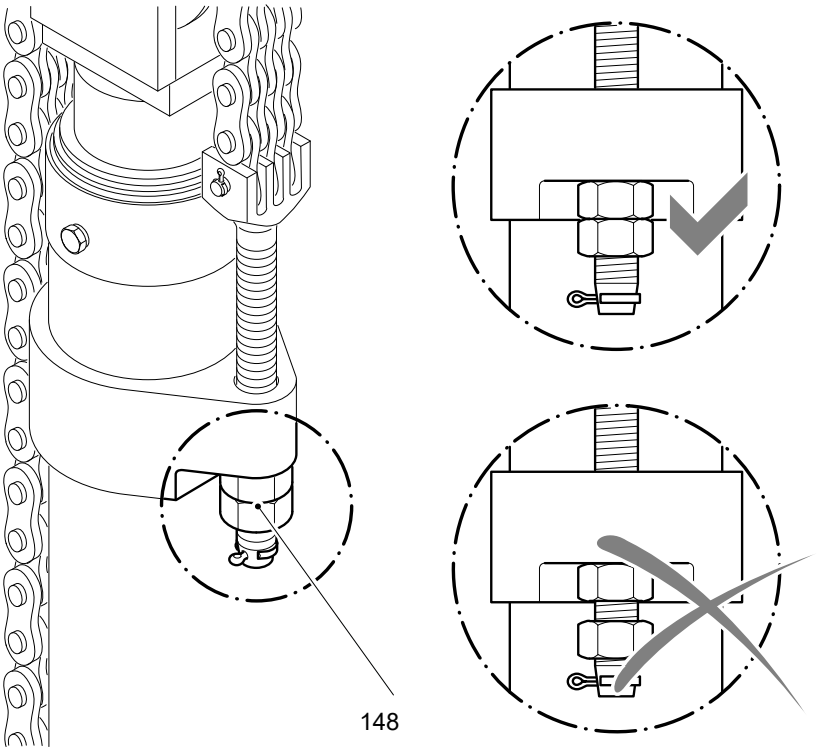

146
≤ 2 mm




146
≤ 2 mm




146
≤ 2 mm


148

3.2 Entering or exiting

Entry and exit

Requirements

– Truck braked to a halt.
– Parking brake symbol lights up continuously.

Procedure

- Grasp the handle (7) with your left hand and hold onto the backrest of the driver's seat with your right hand – see page 94.
- Enter or leave the truck.

3.3 Setting up the operator position

⚠ WARNING!

Accidents can occur if the driver's seat, steering column and armrest are not engaged

The driver's seat, steering column and armrest can accidentally adjust during travel and therefore cannot be operated safely.

▶ Do not adjust the driver's seat, steering column or armrest while travelling.

Procedure

- Before starting to travel, adjust the driver's seat, steering column and armrest (if necessary) so that all the controls are within reach and can be applied without having to strain.
- Adjust the visibility aid equipment (mirrors, camera systems etc.) so that the working environment can be clearly seen.

3.3.1 Adjusting the Driver's Seat

The procedure for adjusting the driver's seat applies to standard models. For other models, follow the manufacturer's setting instructions. When adjusting, ensure that all controls are within easy reach.

⚠ WARNING!

Risk of accidents and damage to health

An unsecured or incorrectly adjusted driver's seat can result in accidents or damage to health.

▶ Do not adjust the driver's seat while travelling.

▶ The driver's seat should lock in position after adjustment.

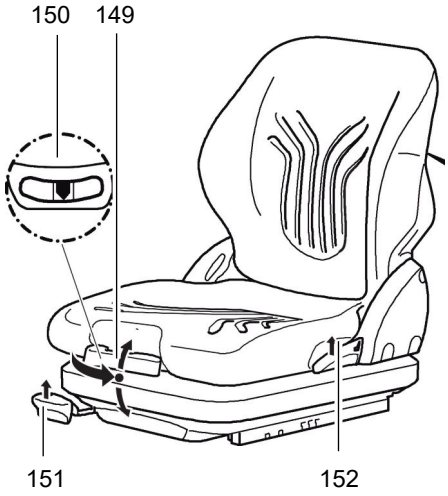
▶ Check and, if necessary, adjust the individual seat setting and driver's weight setting before starting up the truck.

Adjusting the seat position

Procedure

- Sit on the driver's seat.
- Pull up the driver's seat locking lever (151) in the direction of the arrow.
- Push the driver's seat forwards or backwards to the desired position.
- Engage the driver's seat locking lever (151) in position.

The seat position is now correctly set.



Setting the driver's weight

⚠ WARNING!

Incorrectly adjusted seat cushioning can damage your health

To achieve optimal seat damping, the driver’s seat must be adjusted according to the driver’s weight. Set the driver's weight when the seat is occupied.

▶ Hold the weight adjustment lever only by the recess; do not reach through underneath the weight adjustment lever.

Procedure

- Fold out the weight adjustment lever (149) as far as it will go in the arrow direction.
- Move the weight adjustment lever (149) up and down to set the seat to a higher weight.
- Move the weight adjustment lever (149) up and down to set the seat to a lower weight.

➔ The driver's weight is correct when the arrow is in the middle of the display window (150). The minimum or maximum weight setting is reached when you can feel a return stroke on the lever.

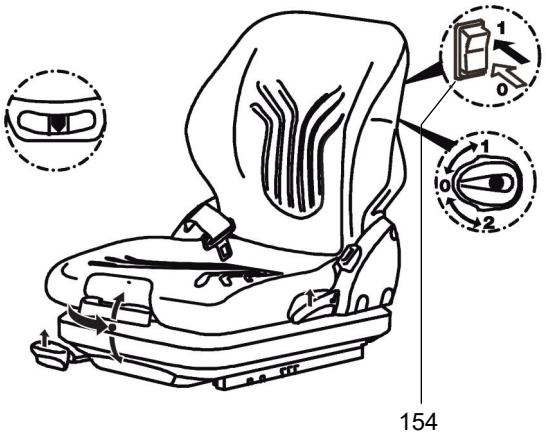
- After setting the weight, move the lever (149) back in full.

The driver’s weight is now set.

Switching the seat heating on and off (○)

Procedure

- Press the seat heating switch (154).
  Switch setting 1 = Seat heating on.
  Switch setting 0 = Seat heating off.

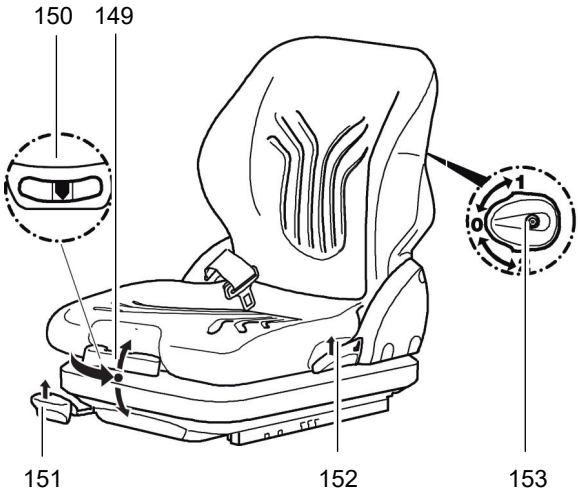


Adjusting the lumbar support (○)

Procedure

- Turn the hand wheel (153) to the required position.
  Position 0 = no bending in lumbar area.
  Position 1 = increasing bending in upper lumbar area.
  Position 2 = increasing bending in lower lumbar area.

The lumbar support is now adjusted.



3.3.1.1 PILOT MN-60-80-100

Setting the driver's weight

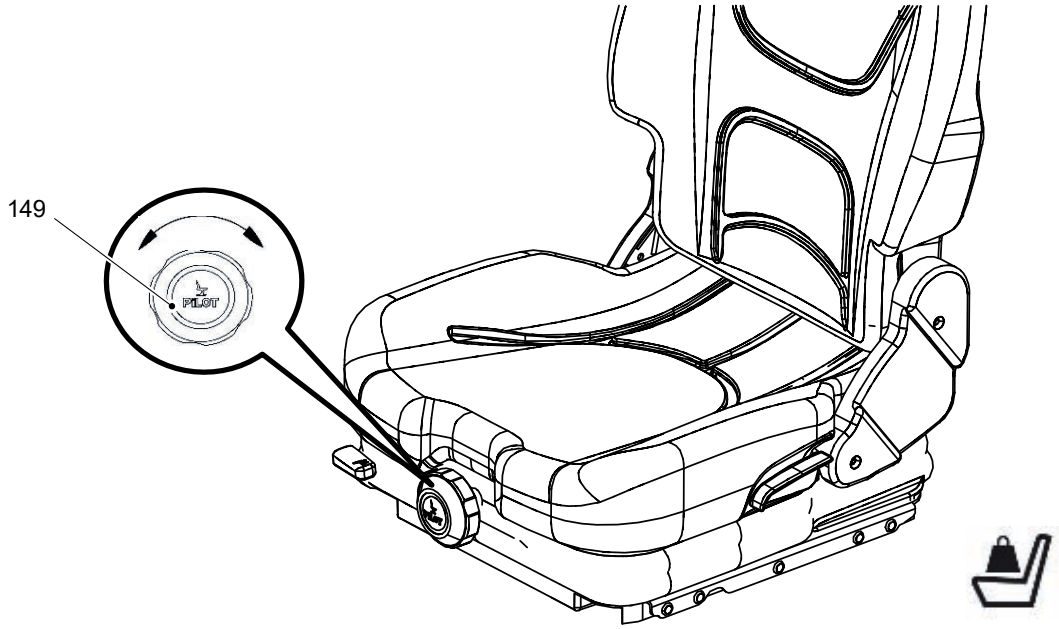
NOTICE

Incorrectly adjusted seat cushioning can damage your health

To achieve optimal seat cushioning, the driver’s seat must be adjusted according to the driver’s weight.

▶Set the driver's weight when the seat is not occupied.

▶Turn the weight adjuster knob (149) to adjust the optimal cushioning.



Adjusting the seat position

⚠ CAUTION!

An unsecured driver's seat can cause injury

An unsecured driver's seat can slide out of its guide during travel, resulting in accidents.

▶The driver's seat must be locked in position.

▶Do not adjust the driver’s seat while travelling.

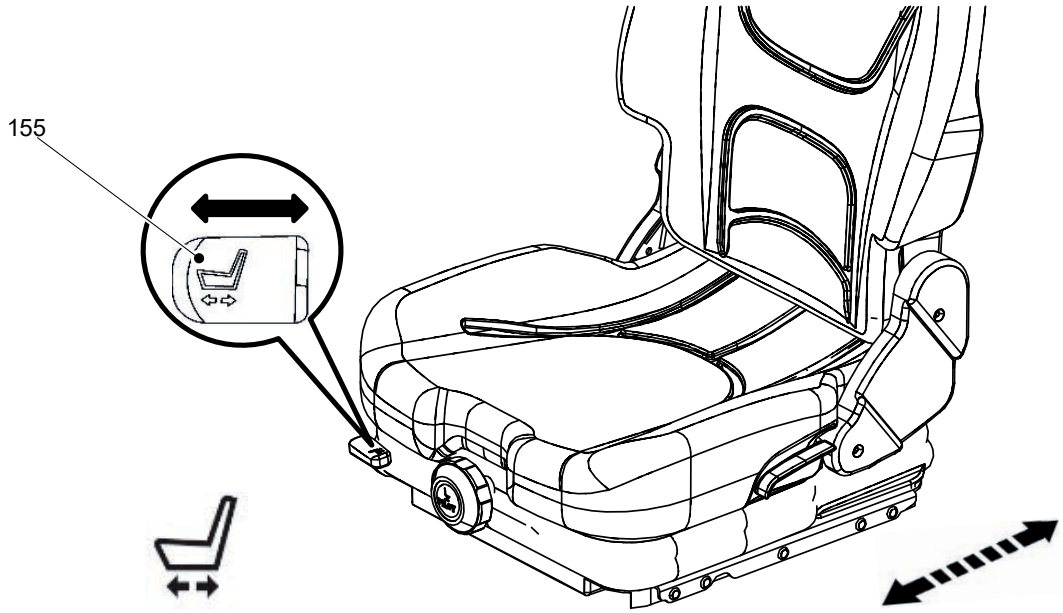
Procedure

- Sit down on the driver's seat.
- Pull up the driver’s seat locking lever (155) in the direction of the arrow.

➔ The adjustment increment is 10 mm.

- Push the driver’s seat forwards or backwards to the desired position.
- Engage the driver’s seat locking lever (155) in position.

The seat position is now correctly set.

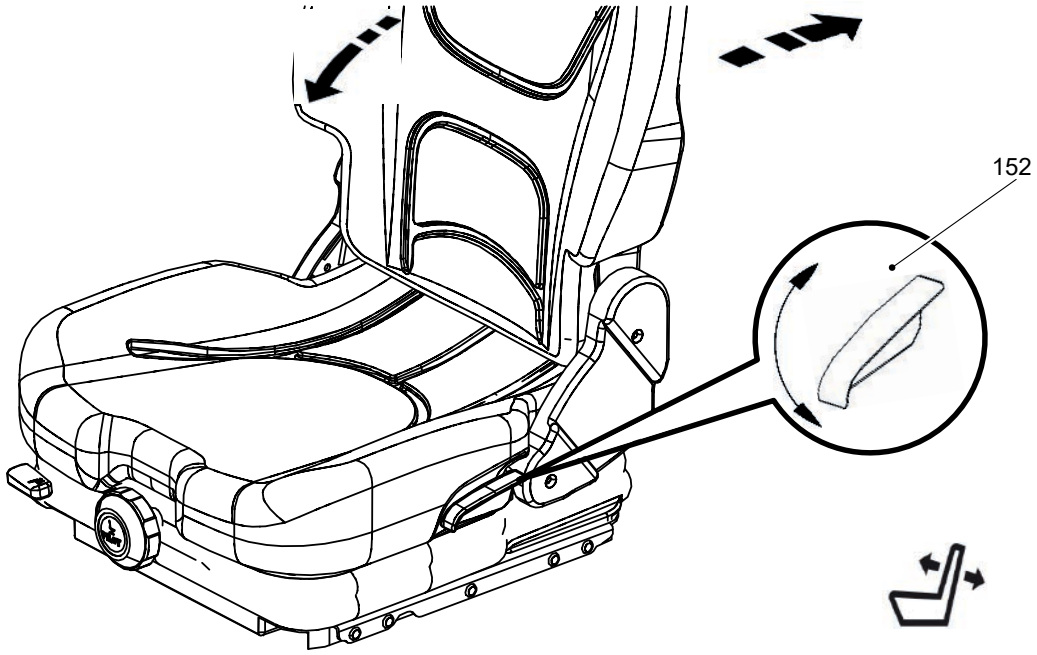


Adjusting the backrest

Procedure

- Sit on the driver’s seat.
- Pull the lever (152) to adjust the backrest.
- Adjust the backrest tilt.
- Release the lever (152) again. The backrest is locked.

The backrest is now set.

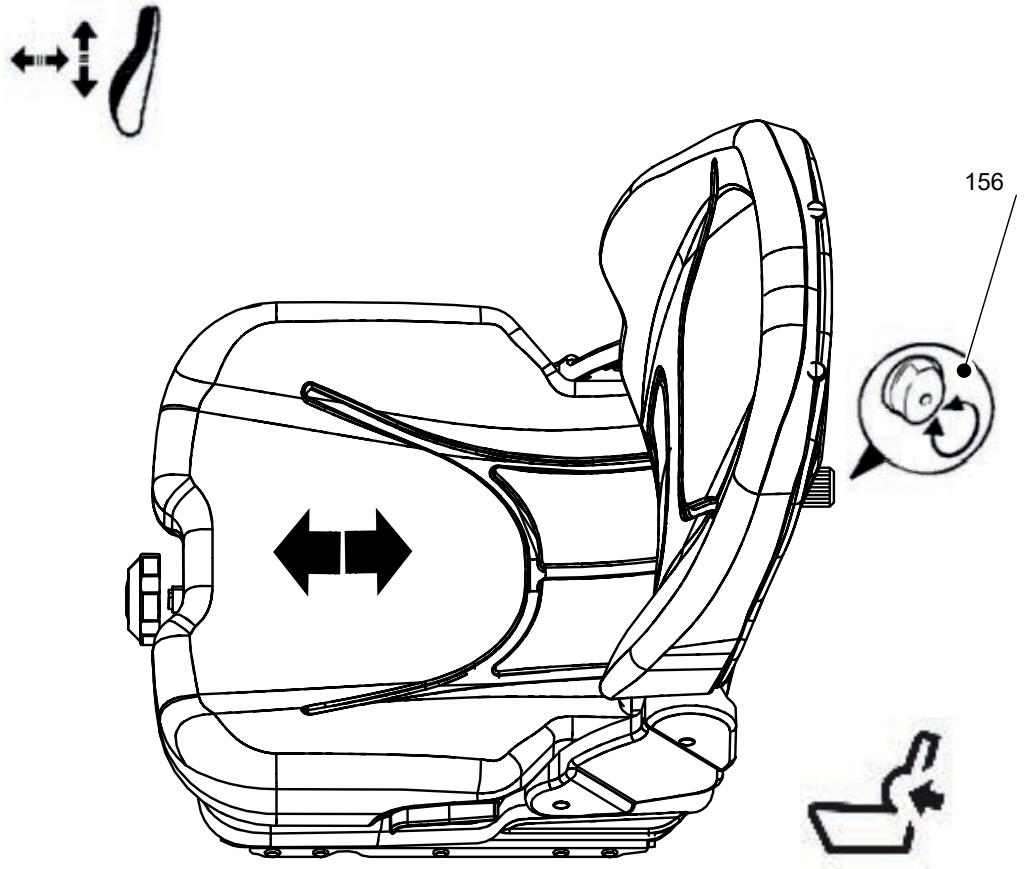


Adjusting the lumbar vertebrae support

Procedure

- The curvature of the lumbar vertebrae support can be adjusted by turning the handwheel (156).

The lumbar vertebrae support is now set.



3.3.2 Adjusting the driver’s seat

⚠ CAUTION!

Moving the driver's seat is a trapping hazard

▶Do not reach between the seat and the side wall or overhead guard when adjusting the seat.

Adjusting the driver's weight

NOTICE

To achieve optimal seat cushioning the driver’s seat must be set to the driver’s weight.
Set the driver's weight when the seat is unoccupied.
Seat cushioning setting range: 50 - 130 Kg.

Procedure

- Pull the weight adjustment lever (149) in the direction of the arrow as far as the stop and then return it.
  The weight setting is set to a minimum value.
- Pull the weight adjustment lever (149) in the arrow direction until you reach the required weight on the scales.
- Restore the weight adjustment lever (149) to its original position.

The driver’s weight is now set.

Adjusting the backrest

Procedure

- Sit on the driver’s seat.
- Pull the lever (152) to adjust the backrest.
- Adjust the backrest tilt.
- Release the lever (152) again. The backrest is locked.

The backrest is now set.

Adjusting the seat position

⚠ CAUTION!

An unsecured driver's seat can cause injury

An unsecured driver's seat can slide out of its guide during travel, resulting in accidents.

▶The driver's seat must be locked in position.

▶Do not adjust the driver’s seat while travelling.

Procedure

- Sit on the driver’s seat.
- Pull up the driver’s seat locking lever (151) in the direction of the arrow.
- Push the driver’s seat forwards or backwards to the desired position.
- Engage the driver’s seat locking lever (151) in position.

The seat position is now correctly set.

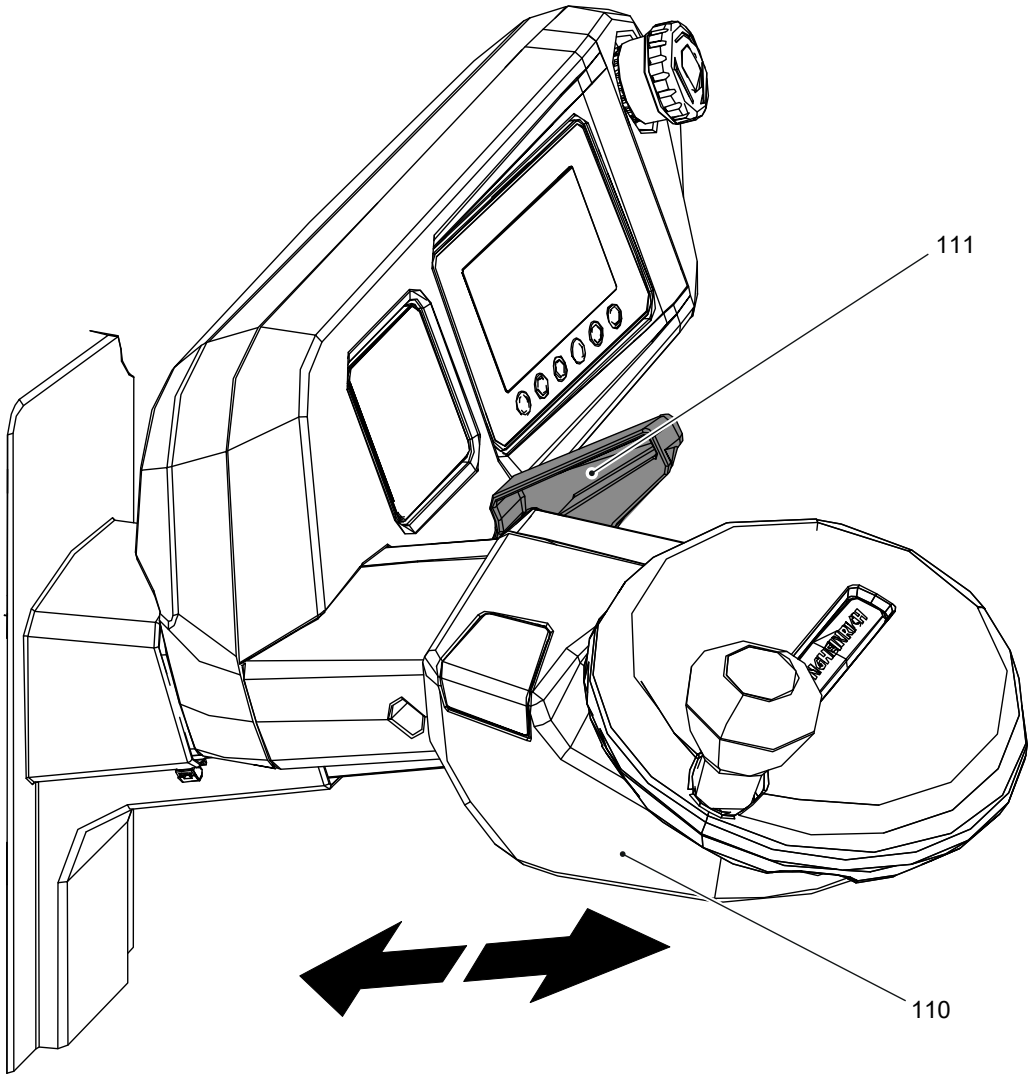
3.3.3 Adjusting the steering column

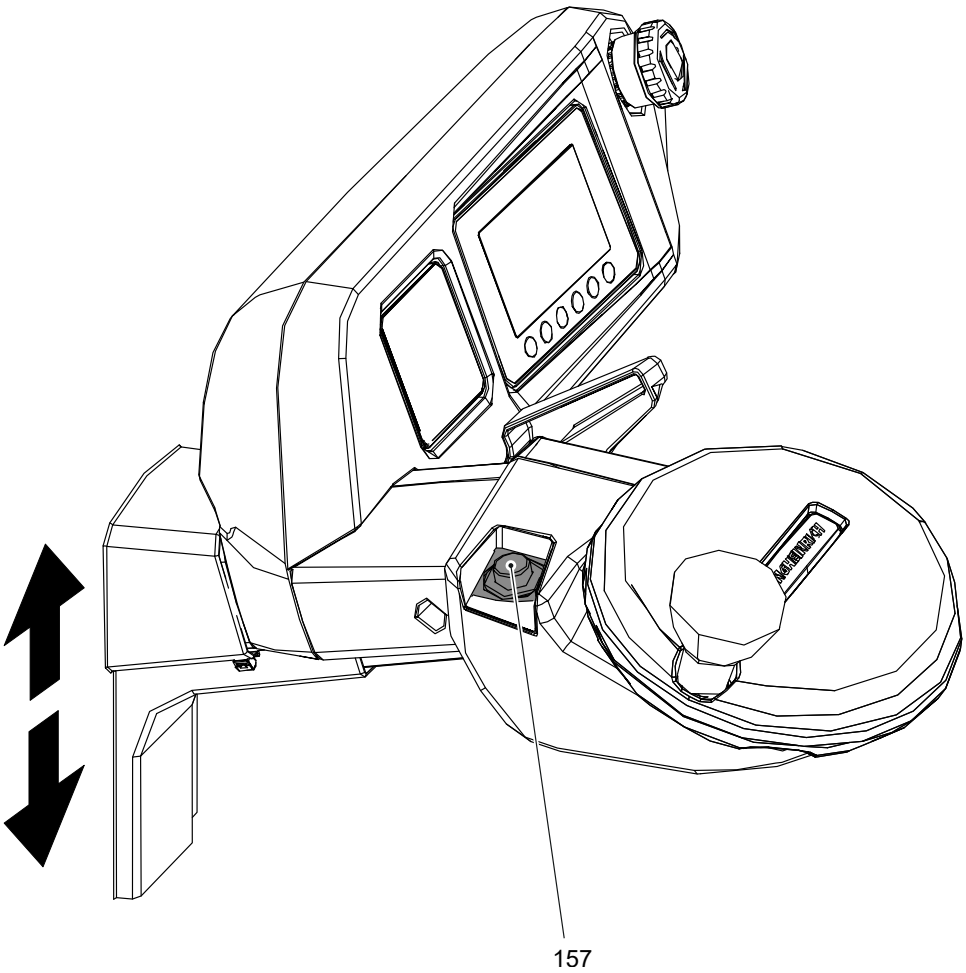
Adjusting the steering column

Procedure

- Release the steering column stop (111).
- Position the steering head (110).
- Fix the steering column stop (111) in position.

The steering column is now positioned.





Adjust the steering head height (○)

Procedure

- Press and hold the release knob (157).
- Lower or raise the steering head to the desired height.
- Release the release knob (157).

Steering head height is set.

3.3.4 Seat belt (○)

⚠ CAUTION!

Optional equipment: seat belt

For special applications, the truck can be equipped with a seat belt at the customer's request.

▶ Always put the seat belt on before moving the truck.

▶ Do not modify the seat belt.

▶ Damaged or non-operational seat belts must be replaced by trained personnel.

▶ Seat belts must always be replaced after an accident.

▶ Only original spare parts must be used for retrofits or repairs.

➔ Protect the seat belt from contamination (e.g. cover it when out of use) and clean it regularly. Frozen seat belt locks or pulleys must be thawed out and dried to prevent them from freezing up again. The warm air temperature must not exceed +60 °C.

Checking the seat belt

Procedure

- Check the attachment points for wear and damage.
- Check the cover for damage.
- Pull the belt out fully from the retractor and check for damage (loose seams, fraying and nicks).
- Test the belt buckle and make sure the belt returns correctly into the retractor.

Check the automatic locking system

Procedure

- Park the truck on a level surface.
- Jerk the seat belt out suddenly.

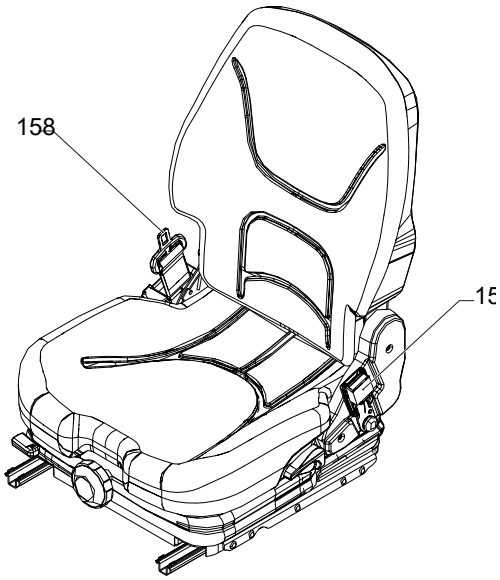
➔ The locking system should prevent the belt from coming out.

The seat belt has now been checked.

Starting the industrial truck on steep slopes

The automatic blocking system locks the belt in the retractor when the truck is positioned on a steep slope. This prevents the belt from being pulled out of the retractor.

➔ Carefully drive the truck off the slope and then put on the belt.



Putting on the seat belt

Procedure

- Sit on the driver's seat so that your back is resting against the backrest.
- Pull the seat belt smoothly out of the retractor.
- Place the seat belt tight against your body. Take care not to twist it.
- Engage the lock tongue (158) in the lock (159).

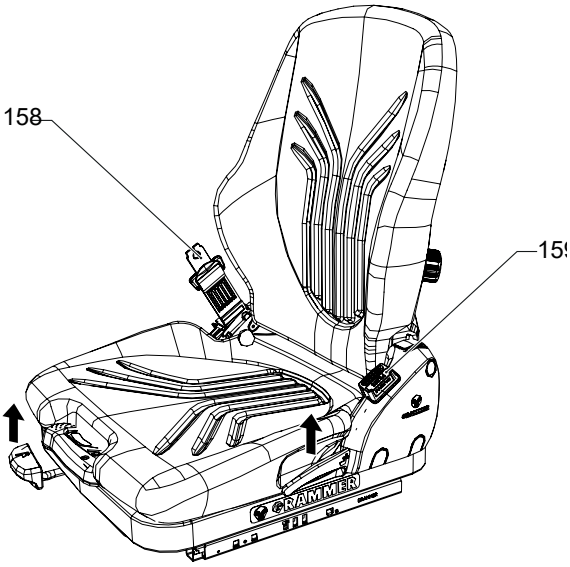
The seat belt is now in place

Taking off the seat belt

Procedure

- Hold onto the lock tongue (158) with one hand.
- Press the red button on the lock (159).
- Guide the lock tongue (158) manually back into the reel.

The seat belt is now removed.



4 Starting up the truck

4.1 Safety regulations for travel mode

Travel routes and work areas

Only use lanes and routes specifically designated for truck traffic. Unauthorised third parties must stay away from work areas. Loads must only be stored in places specially designated for this purpose.
The truck must only be operated in work areas with sufficient lighting to avoid danger to personnel and materials. Additional equipment is necessary to operate the truck in areas of insufficient lighting.

⚠ DANGER!

Do not exceed the permissible surface and point loading on the travel lanes.
At blind spots get a second person to assist.
The driver must ensure that the loading dock /dock leveller cannot be removed or come loose during loading/unloading.

Travel conduct

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

Travel visibility

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

⚠ DANGER!

Danger of death from falling truck

In the event that the truck falls from a loading bridge or ramp, the operator is at risk of serious injuries and death.

- ▶ Do not jump off the truck if it falls.
- ▶ Hold on with both hands.
- ▶ Tilt your body in the opposite direction of the fall.
- ▶ Do not remove the optional seat belt (○).

The operating company must take the necessary safety precautions and define special work instructions to prevent the danger of falls during operation. A seat belt (○) is recommended as an additional measure when using the truck on a ramp/load bridge.

⚠ 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.

Negotiating slopes and inclines

Negotiating slopes and inclines up to 15 % is only permitted when they are recognised lanes. The slopes and inclines must be clean, have a non-slip surface, and negotiating them safely must be within the technical specifications of the truck. The truck must always be driven with the load facing uphill. The industrial truck must not be turned, operated at an angle or parked on inclines or slopes. Inclines must only be negotiated at slow speed, with the driver ready to brake at any moment.

Negotiating lifts, loading ramps and docks

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

Type of loads to be carried

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

⚠ WARNING!

Loss of operational stability can cause accidents

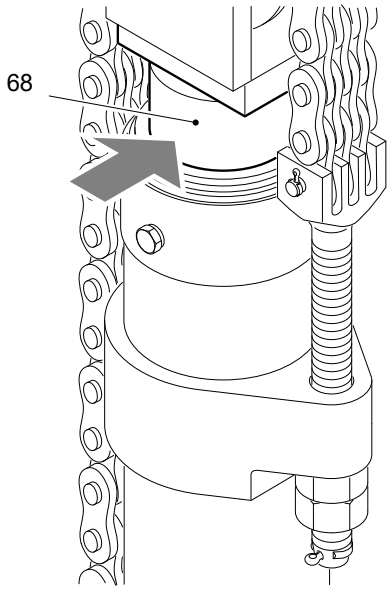
Extended mast sections when the truck is travelling with or without load will reduce the truck's operational stability.

▶ Always travel with the mast holder retracted, the mast tilted back, the load centre in the middle of the truck's longitudinal axis and the load handler lowered.

▶ Position the fork arms as far apart as possible. The load centre must lie centrally between the fork arms.

Do not park the truck in escape routes, aisles, or in access areas to stairways or safety equipment.

When parking a truck near railway tracks, no part of the truck should be closer than 2 m from the nearest railway track.



⚠ WARNING!

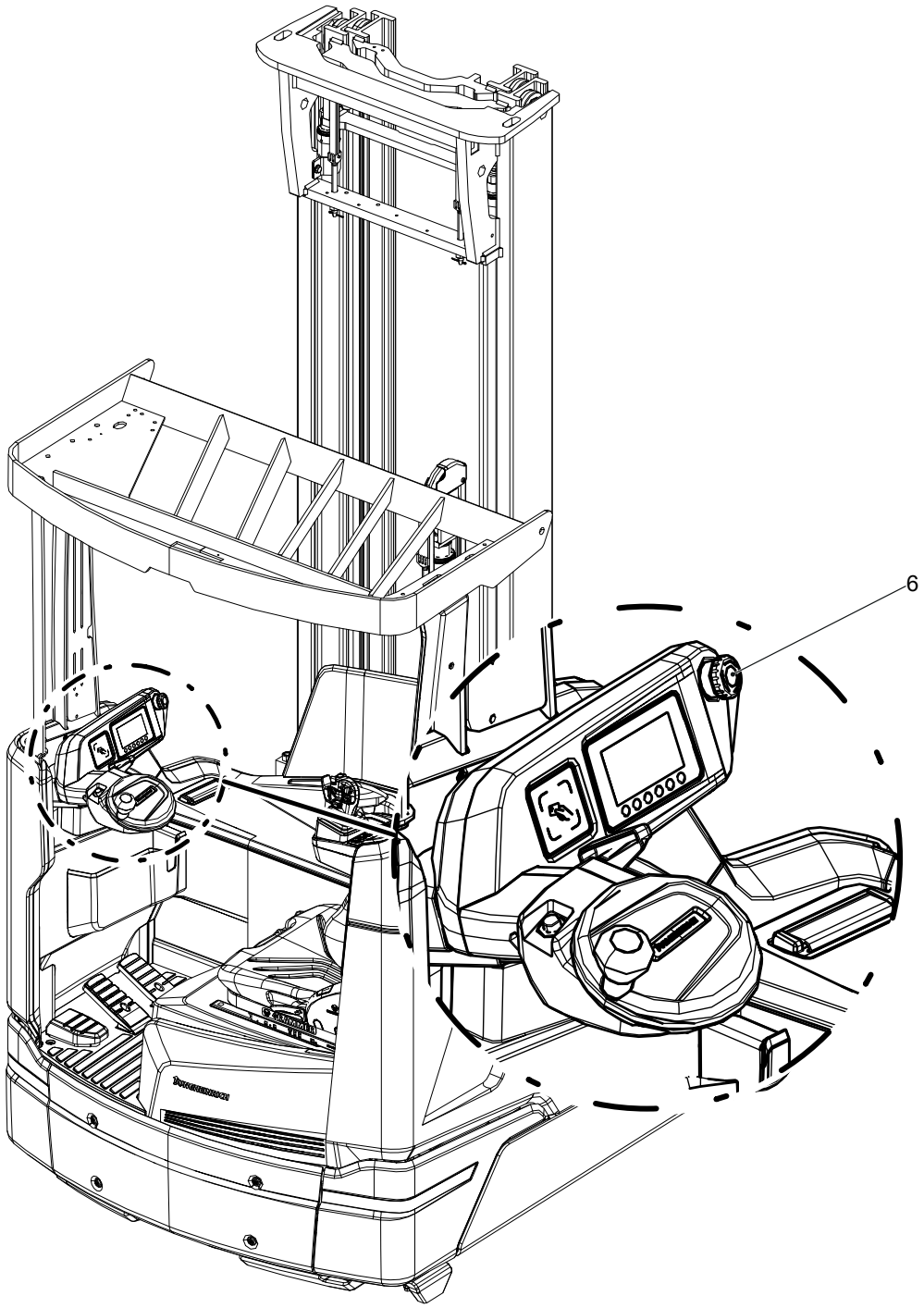
Possible faults with hydraulic functions on trucks with cold store equipment

Starting up the truck after a long period of non-use or at ambient temperatures outside the intended cold store range can lead to unusual noise, jerky cylinder movements and damage to the hydraulic system.

▶Execute hydraulic functions only in cold store temperatures.

▶Spray piston rod ends (68) with chain spray after extended periods out of use.

4.2 Emergency Disconnect



Applying the emergency disconnect switch

Procedure

⚠ CAUTION!

Risk of accident

The operation of the emergency disconnect switch must not be affected by any objects placed in its way.

➔ Do not use the emergency disconnect switch (6) as a service brake.

Press the emergency disconnect switch (6).

All electrical functions are deactivated. The truck brakes to a halt.

Releasing the emergency disconnect switch

Procedure

- Pull or turn the emergency disconnect switch (6) to unlock it again.

All electrical functions are enabled and the truck is operational again (assuming the truck was operational before the emergency disconnect switch was pressed).
With ISM, transponder, keypad and Easy Access, the truck is still switched off.

4.3 Emergency stop

The truck is fitted with an emergency stop device. If a system fault is detected, the truck automatically brakes until it comes to a halt. If a fault is detected in the steering or brake systems, an information message will appear on the display and control unit (9), see page 94.

Re-setting the emergency stop

Procedure

- Press the Emergency Disconnect (6).
- Pull or turn the Emergency Disconnect switch (6) to unlock it.

The emergency stop is reset.

If the emergency stop is shown on the control and display unit (9) after repeatedly resetting the emergency stop, notify the manufacturer’s service department.

4.4 Travel

⚠ WARNING!

Improper travel can result in accidents

- ▶ Do not get up from the driver’s seat during travel.
- ▶ Make sure that the travel area is clear.
- ▶ Adapt the travel speed to the conditions of the route, the work area and the load.
- ▶ Tilt the mast back and raise the fork carriage approx. 200 mm.
- ▶ Make sure you have enough visibility when reversing.

⚠ WARNING!

Loss of operational stability can cause accidents

Extended mast sections when the truck is travelling with or without load will reduce the truck's operational stability.

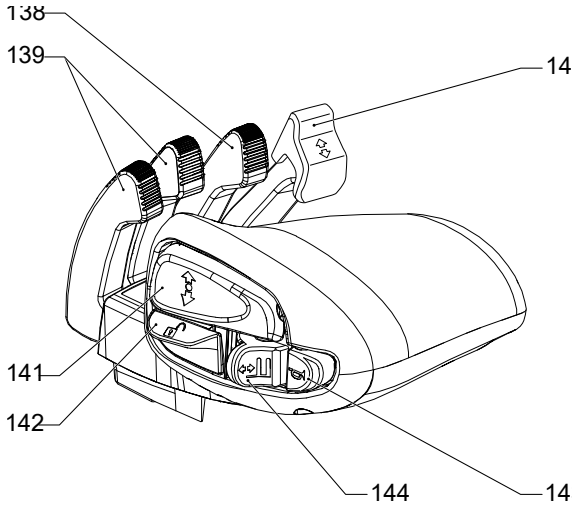
- ▶ Always travel with the mast holder retracted, the mast tilted back, the load centre in the middle of the truck's longitudinal axis and the load handler lowered.
- ▶ Position the fork arms as far apart as possible. The load centre must lie centrally between the fork arms.

Each time the truck is started the operation of the emergency stop safety switch is tested. The fault display is shown on the display unit for the duration of the safety check. Travel and steering are only enabled if the condition is satisfactory.

Travel

Requirements

– Truck prepared for operation, see page 132.



Procedure

- The parking brake is released automatically when starting up.
  - The parking brake is automatically applied when the truck comes to a standstill and the deadman button is released at the same time.
- Select the travel direction; to do this
  - Push the direction button (141) up to select travel in the fork direction.
  - Push the direction button (141) down to select travel in the drive direction.
- Press and hold down on the deadman button (20).

➔ The deadman button (20) ensures that the driver's feet do not extend beyond the geometry of the truck during travel. If it is not pressed, travel and lifting are inhibited with the exception of steering, the control and display unit and the horn. The truck coasts according to the coasting brake parameter setting and after a short time comes to a halt via the drive brake.

➔ If the deadman button (20) is not actuated for 5 seconds, the travel direction automatically switches to neutral.

- Apply the accelerator pedal (16).

➔ The travel speed is governed by the accelerator (16).

The truck travels in the selected travel direction.

4.5 Brakes

The truck’s brake pattern depends largely on the ground conditions. The driver must take this into consideration when handling the truck.

The truck can brake in three different ways:
– With the service brake
– With the coasting brake
– With the reversing brake

⚠ WARNING!

Individual parameter settings can cause accidents

If the truck is operated by several drivers (e.g. multi-shift operation) and the parameters are individually set, be aware of the different brake and travel patterns.

▶ Test the truck's response on start-up.

⚠ WARNING!

Risk of accident

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

▶ The driver must take into account the travel route conditions when braking.

▶ Ensure that no one is in the hazardous area.

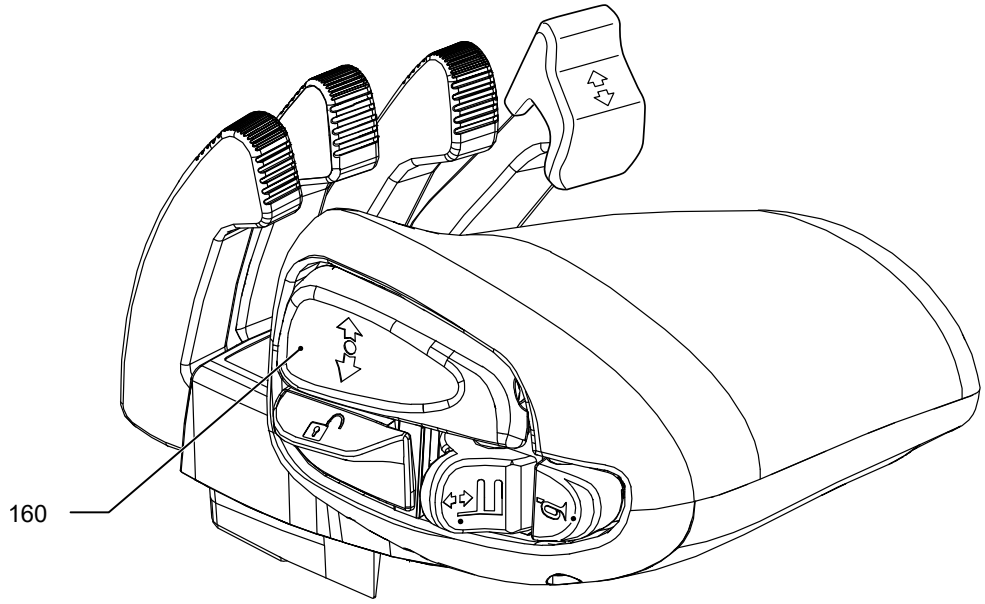
▶ Brake the truck gently so that the load does not slip.

▶ If the load might slip during braking, e.g., in an emergency stop, it may need to be secured.

▶ Allow for increased stopping distance when travelling with an attached load.

▶ In emergencies only use the service brake.

4.5.1 Braking with the reversing brake



Braking with the reversing brake

Procedure

- Set the travel direction switch (160) to the opposite direction while travelling.

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

This method reduces energy consumption. Energy is recovered, which is controlled by the traction current controller. The energy recovery is indicated on the control and display unit.

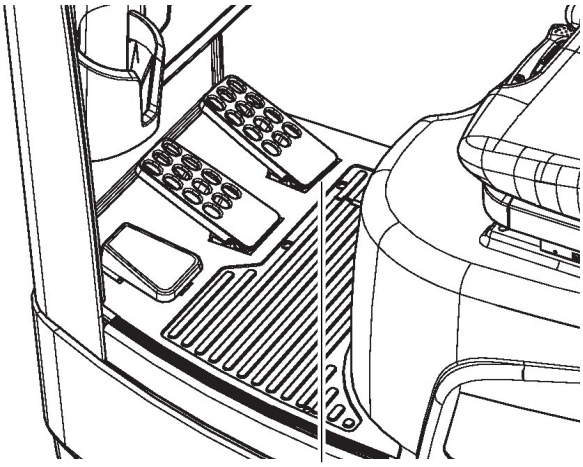
4.5.2 Braking with the coasting brake

Braking with the coasting brake

Procedure

- Take your foot off the accelerator pedal (16).

The truck brakes.



16

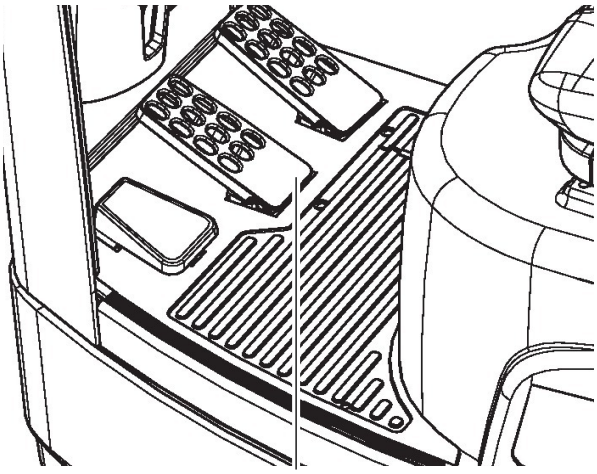
4.5.3 Braking with the service brake

Braking with the service brake

Procedure

- Press down on the brake pedal (18) until you reach the required deceleration.

The truck decelerates depending on the brake pedal position.



18

If the brake pedal is applied suddenly just before the truck stops, the drive brake also applies and is released when the brake pedal is released.

4.6 Steering

4.6.1 Steering type

Reverse steering

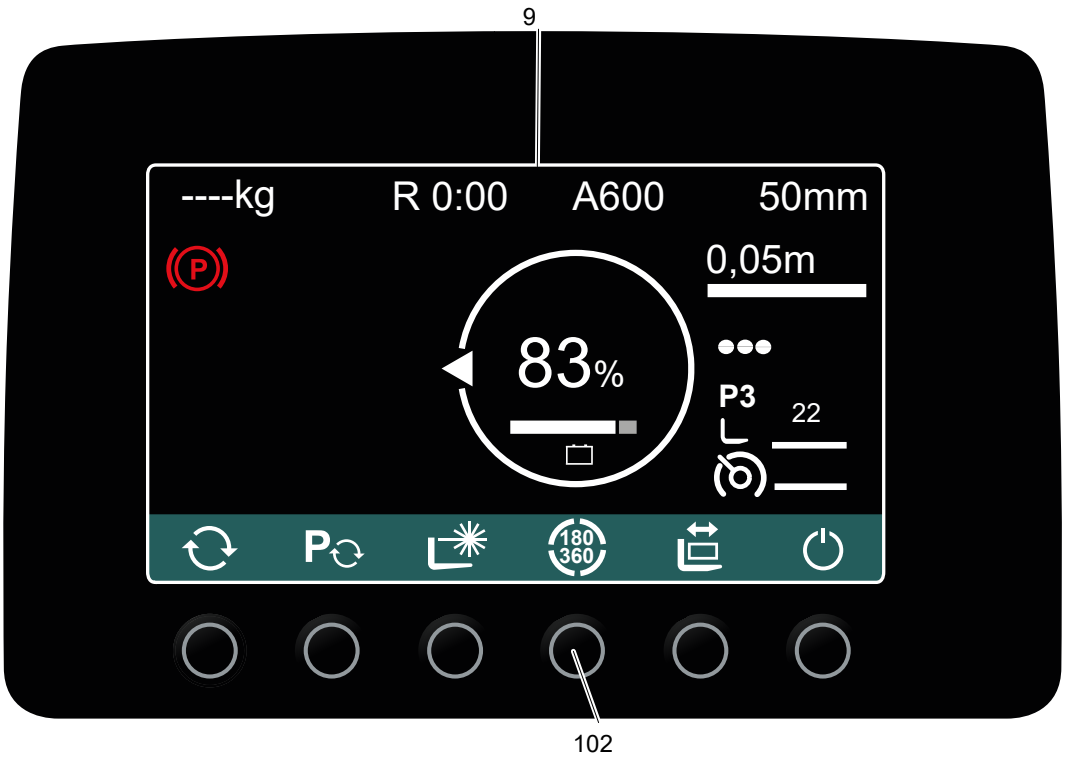
When travelling forward (travel in direction of entry = drive direction) steer left to turn into a left hand bend and right into a right hand bend. The drive wheel position is indicated on the driver’s display.

Forward steering (○)

When travelling forward (travel in direction of entry = drive direction) steer left to turn into a right hand bend and right into a left hand bend. The drive wheel position is indicated on the driver’s display.

4.6.2 Setting the Steering Mode

Press the steer mode button (102) to change between 180° and 360° steering. The range selected is shown in the control and display unit (9).



Setting the steering mode

Procedure

- Press the steering mode button (102).

The steering mode is now set.

Steering

Procedure

- Turn the steering wheel in the desired direction.

The truck travels in the required direction.

4.7 Forks

⚠ WARNING!

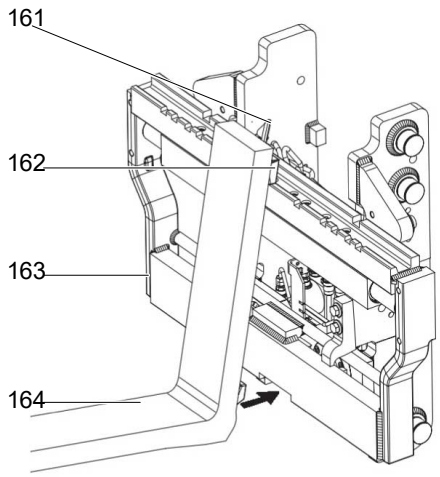
Risk of injury due to unsecured fork arms

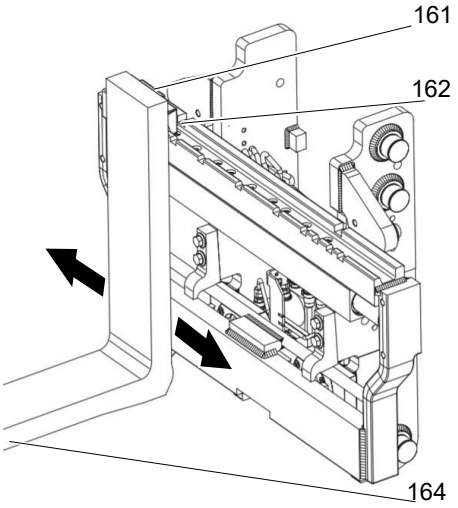
You can injure your legs when replacing the forks.

▶ Never pull the forks towards your body.

▶ Always push the fork arms away from your body.

▶ Secure heavy fork arms with lifting accessories and a crane before pushing them down from the fork carriage.





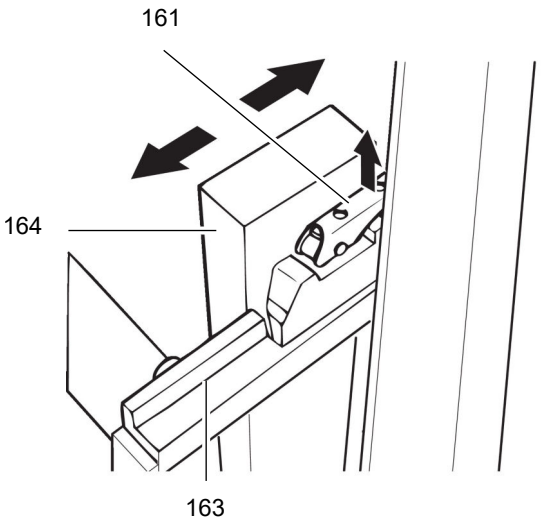
Attaching and adjusting the fork arms

Requirements

– Truck parked securely – see page 165.
– The fork arms are attached and detached at the centre of the fork carriage (163).

Procedure

- Lift up the locking lever (161).
- Move the fork arm (164) to the desired position.
- Swing the locking lever (161) down and adjust the fork arms (164) until the locking pin (161) engages in a slot.



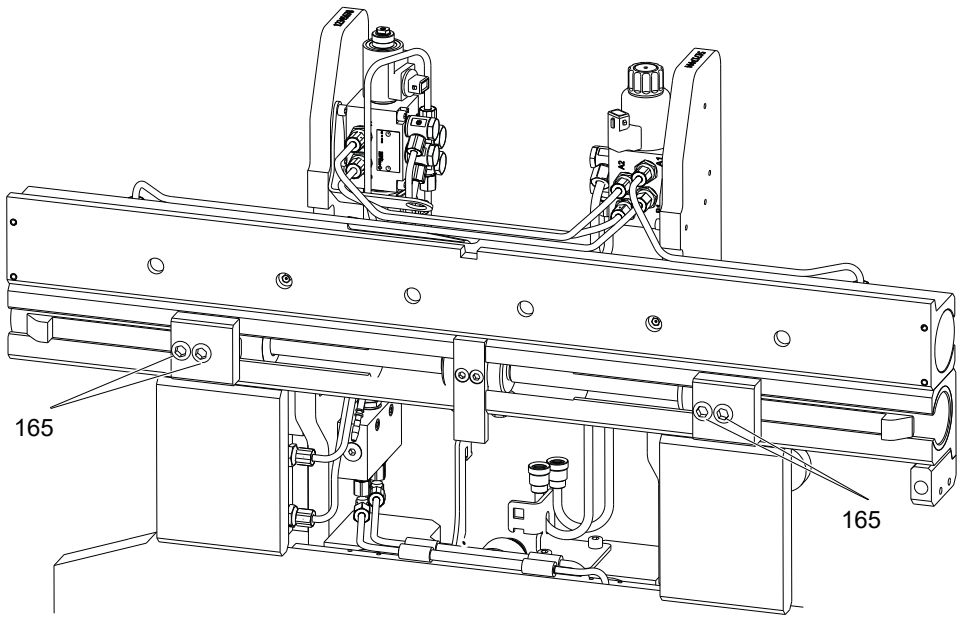
The fork arms have been adjusted.

The truck must only be operated when the locking pin (161) is correctly engaged.

Securing the fork arms with an integrated fork positioner

Procedure

- Tighten the mounting screws (4x) (165). Tightening torque 20 Nm.
- Secure the mounting screws (4x) with Loctite 243.



4.8 Lifting, transporting and depositing loads

⚠ WARNING!

Unsecured and incorrectly positioned loads can cause accidents

Before lifting a load unit the driver must ensure that it has been correctly palletised and does not exceed the truck's capacity.

- ▶ Instruct other people to move out of the hazardous area of the industrial truck. Stop working with the truck if people do not leave the hazardous area.
- ▶ Only carry loads that have been correctly secured and positioned. Use suitable protection measure to prevent parts of the load from tipping or falling down.
- ▶ Do not transport loads other than on the authorised load handler.
- ▶ Damaged loads must not be transported.
- ▶ Never exceed the maximum loads specified on the capacity chart.
- ▶ Never stand underneath a raised load handler.
- ▶ Do not stand on the load handler.
- ▶ Do not lift other people on the load handler.
- ▶ Do not reach through the mast.
- ▶ Check the fork spread before lifting the load and adjust if necessary.
- ▶ Insert the forks as far as possible underneath the load.

⚠ WARNING!

Loss of operational stability can cause accidents

Extended mast sections when the truck is travelling with or without load will reduce the truck's operational stability.

- ▶ Always travel with the mast holder retracted, the mast tilted back, the load centre in the middle of the truck's longitudinal axis and the load handler lowered.
- ▶ Position the fork arms as far apart as possible. The load centre must lie centrally between the fork arms.

⚠ CAUTION!

Uncontrolled movements due to pressure release

In trucks with single operation, pressure release can occur when switching between tilt and side shift, causing the fork arms to jump.

Conduct a function test after switching between tilt and side shift.

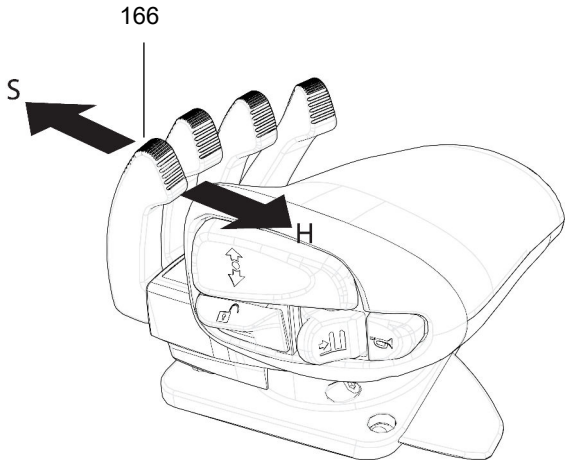
⚠ WARNING!

When stacking, retrieving or setting down the load, ensure there is always sufficient space between the load handler / load, the rack or any other object. This prevents the goods or the load handler from inadvertently resting on or getting caught on the rack or another object.

Failure to comply could result in falling parts.

▶ Ensure there is always adequate space between the load handler / load, the rack or any other object.

Lifting and lowering with the SOLO-PILOT



Procedure

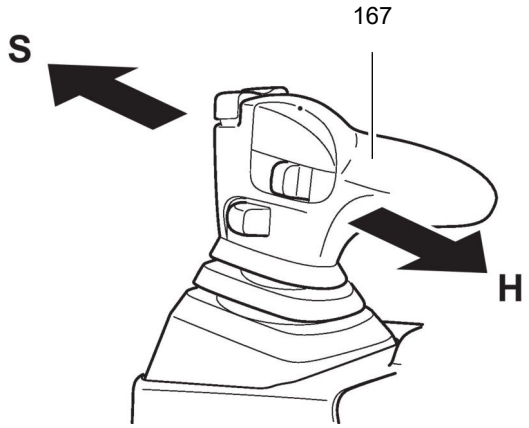
- Pull the SOLO-PILOT lever (166) in direction H to raise the load unit.
- Push the SOLO-PILOT lever (166) in direction S to lower the load unit.
- Apply the SOLO-PILOT lever (166) until you reach the required lift height.

➔ The lift/lower speed is determined by the inclination of the control lever.

➔ When you reach the limit position return the control lever to its home position.

The load unit is now raised or lowered.

Lifting and lowering with the MULTI-PILOT



Procedure

- Pull the MULTI-PILOT (167) in direction H to raise the load unit.
- Push the MULTI-PILOT (167) in direction S to lower the load unit.
- Apply the MULTI-PILOT until you reach the required lift height.

➔ The lift/lower speed is determined by the inclination of the control lever.

➔ When you reach the limit stop the pressure relief valve makes a noise. Set the control lever immediately to the home position.

The load unit is now raised or lowered.

Deactivating the speed reduction

Procedure

- Lower the load handler.
- Set the accelerator pedal to the zero (home) position.

This deactivates the speed reduction and releases normal travel.

⚠ CAUTION!

Risk of trapping from moving parts!

When the mast holder moves you can get trapped between the mast and battery tray.

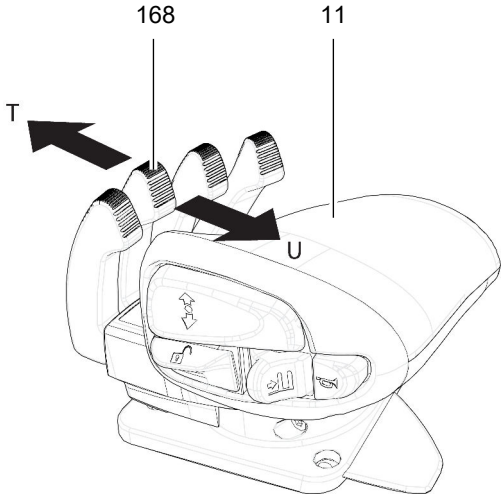
▶Do not reach between the mast and the battery tray.

Moving the mast holder with the SOLO-PILOT

Procedure

- Push the SOLO-PILOT (168) in direction (T) to extend the mast holder forward.
- Pull the SOLO-PILOT (168) in direction (U) to retract it.

The mast holder is now extended.

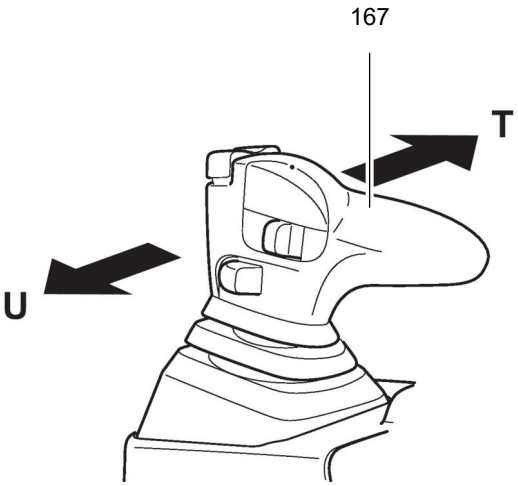


Moving the mast holder with the MULTI-PILOT

Procedure

- Push the MULTI-PILOT (167) in direction (T) to extend the mast holder forward.
- Pull the MULTI-PILOT (167) in direction (U) to retract it.

The mast holder is now extended.

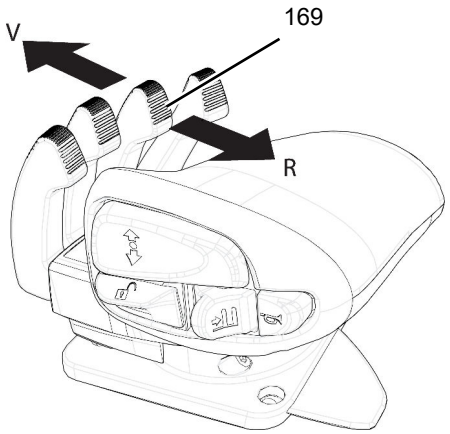


Tilting the mast / fork carriage with the SOLO-PILOT

Procedure

- Push the SOLO-PILOT lever (169) in direction (V) to tilt the mast holder forward.
- Pull the SOLO-PILOT lever (169) in direction (R) to retract it.

The mast / fork carriage is tilted.

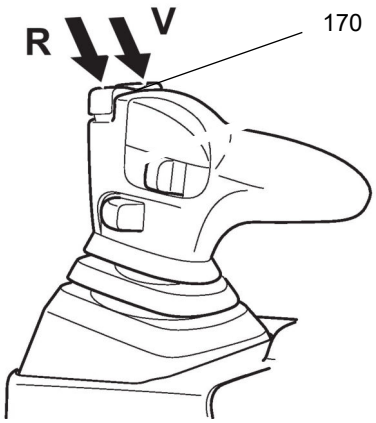


Tilting the mast / fork carriage with the MULTI-PILOT

Procedure

- To tilt forward, push the MULTI-PILOT (170) in direction (V).
- To tilt back, push the MULTI-PILOT (170) in direction (R).

The mast / fork carriage is tilted.



Lifting load units

Requirements

– Load unit correctly palletised.
– Fork spread for the pallet checked and adjusted if necessary.
– Load unit weight matches the truck's capacity.
– Forks evenly loaded for heavy loads.

Procedure

- Drive the truck carefully up to the pallet.
- Set the mast vertical.
- Extend the mast holder.
- Raise the forks to the correct height.
- Slowly insert the forks into the pallet until the fork shank touches the pallet.
- Raise the load handler.
- Tilt the mast back.
- Retract the mast holder.
- Reverse carefully and slowly until the load unit is outside the storage area. Make sure you have a clear route when travelling in the forks direction.

Load unit raised.

Transporting loads

Requirements

– Load raised correctly.
– Position the fork arms under the load with the maximum possible spacing.
– Mast and load section tilted back fully.

Procedure

- Lower the load into transport position.
- Accelerate and decelerate the truck carefully.
- Adapt your travel speed to the conditions of the route and the load you are transporting.
- Watch out for other traffic at crossings and passageways.
- You must use a lookout at blind spots.
- On slopes and inclines, always carry the load facing uphill; never approach at an angle or turn.

NOTICE

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

Depositing load units

Requirements

– Storage location suitable for storing the load.

Procedure

- Set the mast vertical.
- Drive carefully up to the storage location.
- Raise the load unit to the correct height.
- Extend the mast holder.
- Carefully lower the load handler so that the forks are clear of the load.

➔ Avoid depositing the load to prevent damage to the load and the load handler.

- Lowers the load handler.
- Retract the mast holder. Carefully remove the forks from the pallet.

The load unit is lowered.

4.9 Operating attachments

4.9.1 Safety instructions for operating additional attachments

Optionally, trucks can be fitted with one or more auxiliary hydraulic functions to operate attachments. The auxiliary hydraulics are indicated with HF4 and HF5.
Auxiliary hydraulic functions for exchangeable equipment are fitted with replacement couplings on the fork carriage. To fit exchangeable equipment see page 162.

⚠ DANGER!

Attaching exchangeable equipment can result in accidents

Other people can be injured when attaching exchangeable equipment. Use only exchangeable equipment that has been deemed safe after a risk analysis carried out by the owner.

- ▶ Only use attachments that have been approved by the manufacturer of the truck.
- ▶ Only use attachments that have been designed by the attachment manufacturer for use with the respective truck.
- ▶ Only use attachments that are suitable for the operating pressure and oil flow available at the hydraulic port, see page 42.
- ▶ Only use attachments that have been fitted for the purpose by the owner.
- ▶ Make sure the operator has been instructed in the use of the attachment and that he uses it for its correct purpose.
- ▶ Re-assess the residual capacity of the truck and, if it has been altered, attach an additional capacity plate to the truck.
- ▶ Note the attachment manufacturer's operating instructions.
- ▶ Use only attachments that do not restrict visibility in the travel direction.

⚠ WARNING!

Risk of accident due to overload and failure of the attachment or the load falling or becoming damaged.

When using attachments that are not suitable for the operating pressure and oil flow available, overload may give rise to damage and failure of the attachment, as well as the load falling or becoming damaged.

- ▶ Only use attachments that are suitable for the operating pressure and oil flow available at the hydraulic port, see page 42.

⚠ CAUTION!

Risk of slipping and environmental damage due to leaked hydraulic oil

When using attachments that are not suitable for the operating pressure and oil flow available, overload may give rise to leaks or broken lines with the potential for hydraulic oil leaks.

Risk of slipping due to leaked hydraulic oil. The risk is greater when combined with water.

- ▶ Only use attachments that are suitable for the operating pressure and oil flow available at the hydraulic port, see page 42.

⚠ WARNING!

Incorrect symbols can cause accidents

Symbols on controls that do not depict the function of the attachments can cause accidents.

- ▶ Mark the controls with symbols that indicate their function.
- ▶ Specify the attachments' direction of movement in accordance with ISO 3691-1 so that they match the controls' direction of movement.

If visibility in the travel direction is impaired, the operating company must determine and apply suitable measures to ensure the safe operation of the truck. A lookout may have to be used or certain hazardous areas may have to be cordoned off. The truck can also be equipped with optional visual aids such as a camera system or mirrors. Travelling with visual aids requires plenty of practice at slow speed.

Safety instructions for side shifter and fork adjuster attachments

⚠ WARNING!

When using multi fork adjusters (multi pallet clamps), restricted visibility and reduced lateral tilt resistance can result in accidents.

- ▶ Adapt the travel speeds to the visibility and load.
- ▶ Make sure you have sufficient visibility when travelling in the load direction.

Safety instructions for clamping attachments (bale clamps, barrel clamps, grabs, etc.)

⚠ WARNING!

Risk of accidents due to falling loads

Operating errors can occur and the load can fall accidentally.

- ▶ Clamping attachments may only be added to trucks which have a button to enable additional hydraulic functions.
- ▶ Clamping attachments must only be operated on trucks with HF4, HF5 or higher auxiliary hydraulics requiring acknowledgement.
- ▶ When connecting the attachment, make sure that the hydraulic lines of the attachment are connected to the correct ports – see page 162.
- ▶ Do not use clamping attachments for clamping purposes or in clamping operation while fork extensions are in use.

The highest auxiliary hydraulics after HF5 must be released by the acknowledgement button.

Safety instructions for rotary attachments

⚠ WARNING!

A non-centred load centre of gravity can result in accidents

When using rotary devices and non-centred loads, the centre of gravity can be displaced from the centre with a high risk of accidents.

- ▶ Adapt the travel speed to the load.
- ▶ Lift the load from the centre.

⚠ WARNING!

Risk of accidents due to falling loads

As the rotation of the rotary device increases, the load acting on the forks changes from a vertical to a lateral force, until the load is only acting on one fork arm. If you overload the forks or use unsuitable forks, this can result in damage and the load may fall down accidentally.

- ▶ Do not use fork extensions to lengthen the forks on rotary devices.
- ▶ Only use forks that are approved for use with the relevant rotary device.
- ▶ Damaged forks must be marked accordingly and taken out of service.

Safety instructions for telescopic attachments

⚠ WARNING!

Accident risk due to increased tipover hazard and reduced residual capacity

An increased risk of tipover exists with extended telescopic attachments since incorrectly carried loads can reduce the stability of the truck. When the residual capacity is reduced, a risk of serious material damage and personal injury due to falling loads exists in the vicinity of the truck.

- ▶ Do not exceed the maximum loads specified on the capacity charts.
- ▶ Loads must only be transported when resting against the back of the fork arms. The load centre distance must be no more than half the fork length.
- ▶ Do not transport loads solely on the front fork. Moving and transporting the load with the telescopic fork extended is not permitted if the load is located solely on the front fork.
- ▶ Travelling without a load on the forks is only permitted with the forks retracted.
- ▶ Reduce the travel speed according to the altered load centre.

Safety instructions for attachments when transporting suspended loads

⚠ WARNING!

Swinging loads and a reduced residual capacity can result in accidents.

Transporting hanging loads can reduce the stability of the truck.

- ▶ Adapt the travel speed to the load, less than walking pace.
- ▶ Secure swinging loads for example with lifting slings.
- ▶ Reduce the residual capacity and have it certified by a expert.
- ▶ If the truck is to be operated with hanging loads, proof of sufficient safety distance under local operating conditions must be obtained from a specialist assessor.

Safety instructions for using loading buckets as attachments

⚠ WARNING!

Increased mast loading can cause accidents.

▶ When carrying out the daily checks and operations before starting, see page 115, check in particular check the fork carriage, mast rails and mast rollers for damage.

Safety instructions for fork extensions

⚠ WARNING!

Unsecured and oversized fork extensions can cause accidents.

▶ Only use fork extensions that are suitable and have been approved for the base forks of the truck. Observe the data on the data plates of the fork extensions and truck.

▶ The basic fork length must be at least 60% of the length of the fork extension.

▶ Push out the fork extensions fully and lock onto the basic fork arms.

▶ Lay the load as close to the fork shanks as possible. The distance between the overall centre of gravity of the load and the fork shank must not exceed 50% of the length of the fork extension.

▶ When carrying out checks and operations before daily commissioning, see page 115, check the fork extension lock.

▶ Mark any fork extensions with an incomplete or faulty lock and take them out of service.

▶ Do not use trucks with an incomplete or faulty fork extension lock. Replace the fork extension.

▶ Only restore the fork extension to service when the fault has been rectified.

▶ Use only fork extensions which are free of dirt and foreign bodies near the entry opening point. Clean the fork extensions as required.

The weight of the fork extensions reduces the residual capacity of the truck. When determining the residual capacity, the increased load distance must be taken into account, see the data plate and capacity plate of the fork extension.

4.9.2 Integral sideshifter (SOLO-PILOT)

➔ The directions "left" and "right" refer to the load handler when viewed from the operator position.

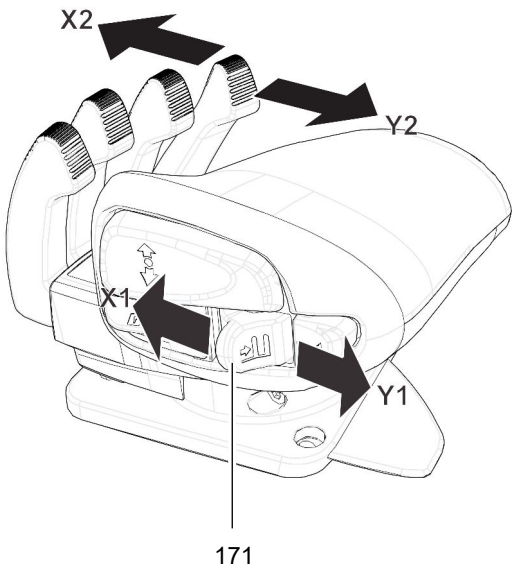
➔ On trucks without integrated side shift and HF4 connection, the lever 171 may have a different assignment.

Moving the side shift

Procedure

- Press the button (171) in direction (X1). The side shift moves to the left.
- Press the button (171) in direction (Y1). The side shift moves to the right.

➔ Note the capacity reduces when traversing.



The side shift has now been moved.

4.9.2.1 Operating additional attachments with soloPILOT

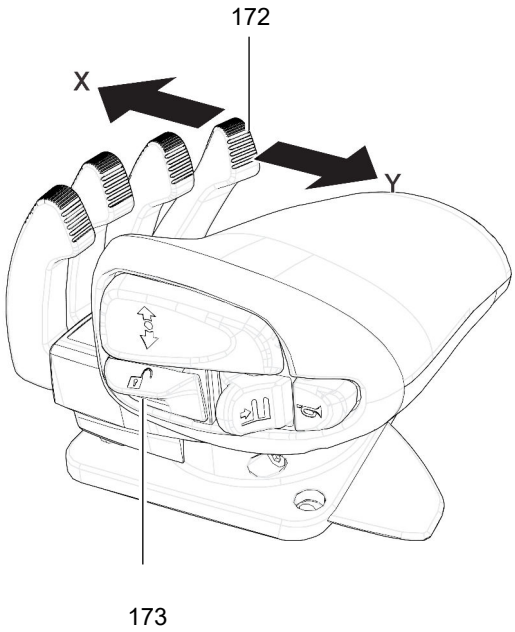
The control lever (172) has functions X and Y to operate hydraulic attachments connected to the connection HF5 (see attachment manufacturer's operating instructions).

Controlling the auxiliary hydraulic function using the acknowledgement button (○)

Procedure

- Press the acknowledgement button (173)
- Within 1.5 seconds, move the lever (172) in direction X or Y

The attachment performs its function



4.9.3 Integral sideshifter (MULTI-PILOT)

➔ The directions "left" and "right" refer to the load handler when viewed from the operator position.

Moving the side shift

Procedure

- Press the lever (171) in direction (X1). The side shift moves to the left.
- Press the lever (171) in direction (Y1). The side shift moves to the right.

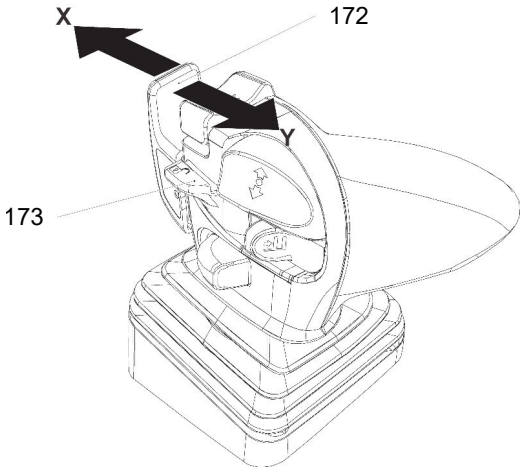
➔ Note the capacity reduces when traversing.

The side shift has now been moved.

➔ On trucks without integrated side shift and HF4 connection, the lever 171 may have a different assignment.

4.9.3.1 Operating additional attachments with multiPILOT

The control lever (172) has functions (X2) and (Y2) to operate hydraulic attachments connected to the terminal HF5 (see manufacturer's operating instructions).



Controlling the auxiliary hydraulic function using the acknowledgement button (○)

Procedure

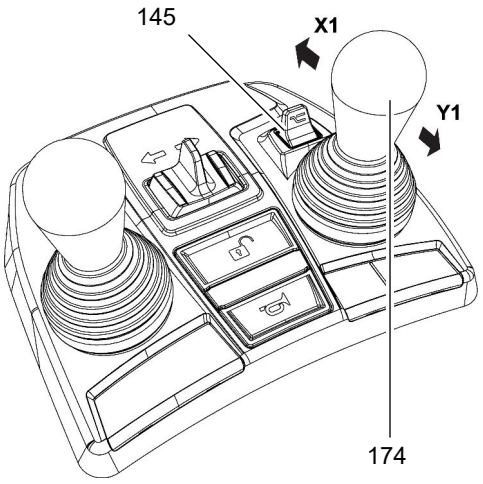
- Press the acknowledgement button (173)
- Within 1.5 seconds, move the lever (172) in direction X or Y

The attachment performs its function

4.9.4 Integrated side shift (duoPILOT)

➔ The directions "left" and "right" refer to the load handler when viewed from the operator position.

➔ On trucks without integrated side shift and HF4 connection, the lever 174 may have a different assignment.



4.9.4.1 Operating additional attachments with duoPILOT

Moving the side shift

Procedure

- Press the button (174) in direction (X1). The side shift moves to the left.
- Press the button (174) in direction (Y1). The side shift moves to the right.

➔ Note the capacity reduces when traversing.

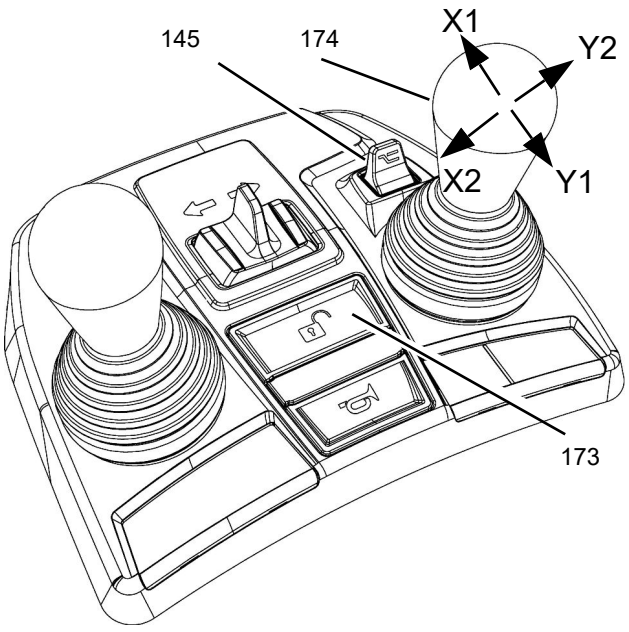
The side shift has now been moved.

4.9.4.2 duoPILOT with control of ZH1 hydraulic port

➔ Depending on the attachments used the lever (174) is assigned the function of the attachment. Unused levers have no function. For connections see page 162.

Procedure

- Pull the lever (174) in direction X2 or push in direction Y2.
  The attachment performs its operation.



4.9.4.3 duoPILOT with control of ZH1, ZH2 and ZH3 hydraulic ports

Depending on the attachments used, the lever/button (174,173) is assigned the function of the attachment. Unused levers have no function. For connections see page 162.

Operating hydraulic port ZH1

Procedure

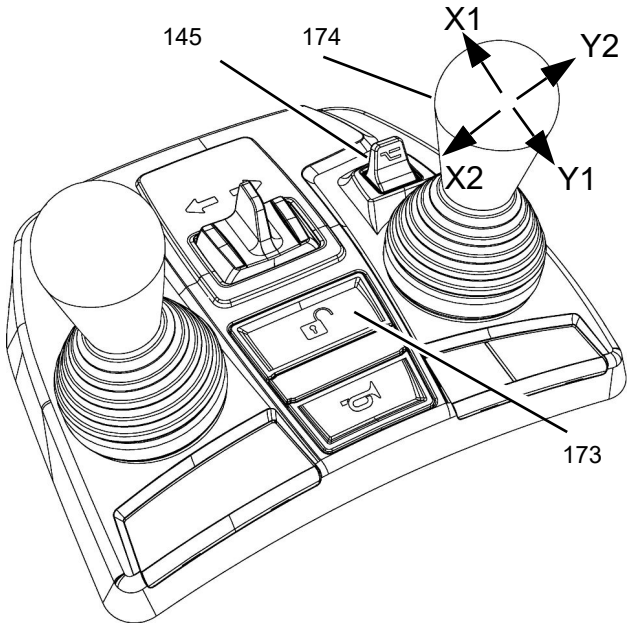
- Pull the lever (174) in direction X2 or push in direction Y2.
  The attachment performs its operation.

Operation of hydraulic ports ZH2 and ZH3 (○)

Procedure

- Press the toggle switch (145).
  - For clamping attachment:

    Press the acknowledgement button (173).
- Pull the lever (174) in direction X1 or push in direction Y1 within 2 seconds.
  The attachment performs its operation.



4.10 Fitting additional attachments

⚠ WARNING!

Incorrectly connected attachments can cause accidents.

Attachments that are incorrectly hydraulically or mechanically connected can result in accidents. There is a risk of fingers or hands being crushed.

▶ Attachments must only be assembled and commissioned by trained, specialist personnel.

▶ Observe the manufacturer's operating instructions.

▶ Before starting, check the fasteners are positioned correctly and securely and make sure they are complete.

▶ Before starting, make sure the attachment is working correctly.

Connecting attachments hydraulically

Requirements

– Non-pressurised hydraulic hoses.
– The exchange ports on the truck are marked HF4 and HF5.
– Attachment directions of movement defined to match the controls' direction of movement.

Procedure

- Non-pressurised hydraulic hoses
  - Switch off the truck and wait a few minutes.
- Attach the plug connector and engage it in position.
- Mark the controls with symbols that indicate their function.

The attachment is now hydraulically connected.

Spilled hydraulic oil must be set using a suitable agent and disposed of in accordance with environmental regulations.
If hydraulic oil comes into contact with the skin, wash it off immediately with soap and water. If it comes into contact with the eyes rinse them immediately with flowing water and call for a doctor.

4.11 Emergency lowering

The load handler can be lowered manually if a fault occurs in the hydraulic controller.

⚠ WARNING!

Lowering the mast can result in injuries

- ▶ Instruct other people to move out of the hazardous area of the truck during emergency lowering.
- ▶ Never stand underneath a raised load handler.
- ▶ Apply the emergency lowering valve from a position next to the truck.
- ▶ Emergency lowering of the mast cannot be applied when the load handler is in the rack.
- ▶ Report any defects immediately to your supervisor.
- ▶ Tag out and decommission a faulty lift truck.
- ▶ Only return the truck to service when you have identified and rectified the fault.

Mast emergency lowering

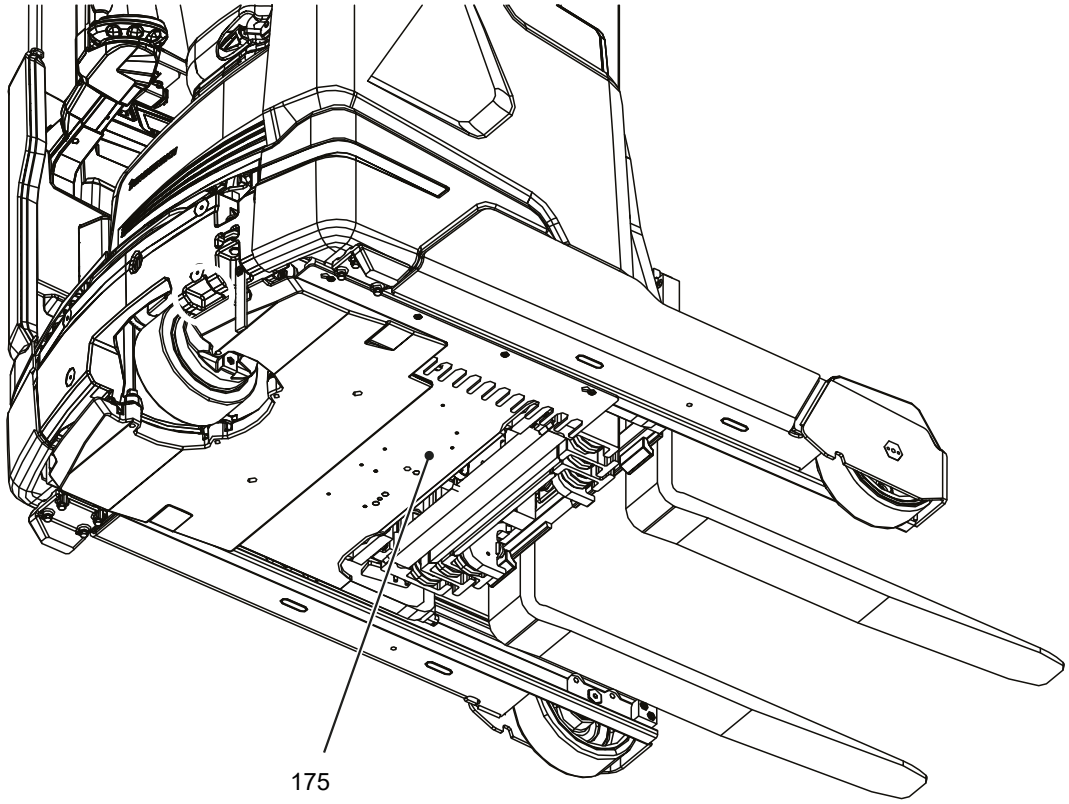
Requirements

– Load handler is not in the rack.
– Turn off the emergency disconnect switch and key switch.
– Disconnect communication connector XS12 (225) – see page 245.

Procedure

- Loosen the emergency lowering valve (175) on the base of the truck with the 4 mm Allen screw by a maximum of half a turn anticlockwise.
- The mast and load handler will lower slowly. If necessary the lowering speed can be reduced by turning clockwise or the load can be stopped.
- Close the emergency lowering valve with a tightening torque of 2,5 Nm after the load has been lowered.

The mast is now lowered.



⚠ WARNING!

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

4.12 Parking the truck securely

⚠ WARNING!

Parking the truck on an incline without the parking brake applied or with a raised load / load handler is dangerous and is strictly prohibited.

- ▶ Always park the truck on a level surface. In special cases the truck may need to be secured with wedges.
- ▶ Always fully lower the mast and load handler.
- ▶ Tilt the mast forward.
- ▶ Before parking, always apply the pedal brake until the parking brake symbol on the display lights up continuously.
- ▶ Choose a place to park where no one is at risk of injury from the lowered fork arms.
- ▶ Do not park and abandon a truck on an incline.

Parking the truck securely

Procedure

- Fully lower the load handler and tilt it forward.
- Retract the mast holder fully.
- Switch off the truck – see page 177.
- Press the emergency disconnect switch.

The truck is parked.

5 Troubleshooting

5.1 Recovering the truck

⚠ WARNING!

This task must only be performed by a qualified technician who has received instruction in its handling.

When the brakes are deactivated, the truck must be parked on a level surface, as the brakes are no longer effective.

▶ After recovery, the parking brake must be checked for functionality.

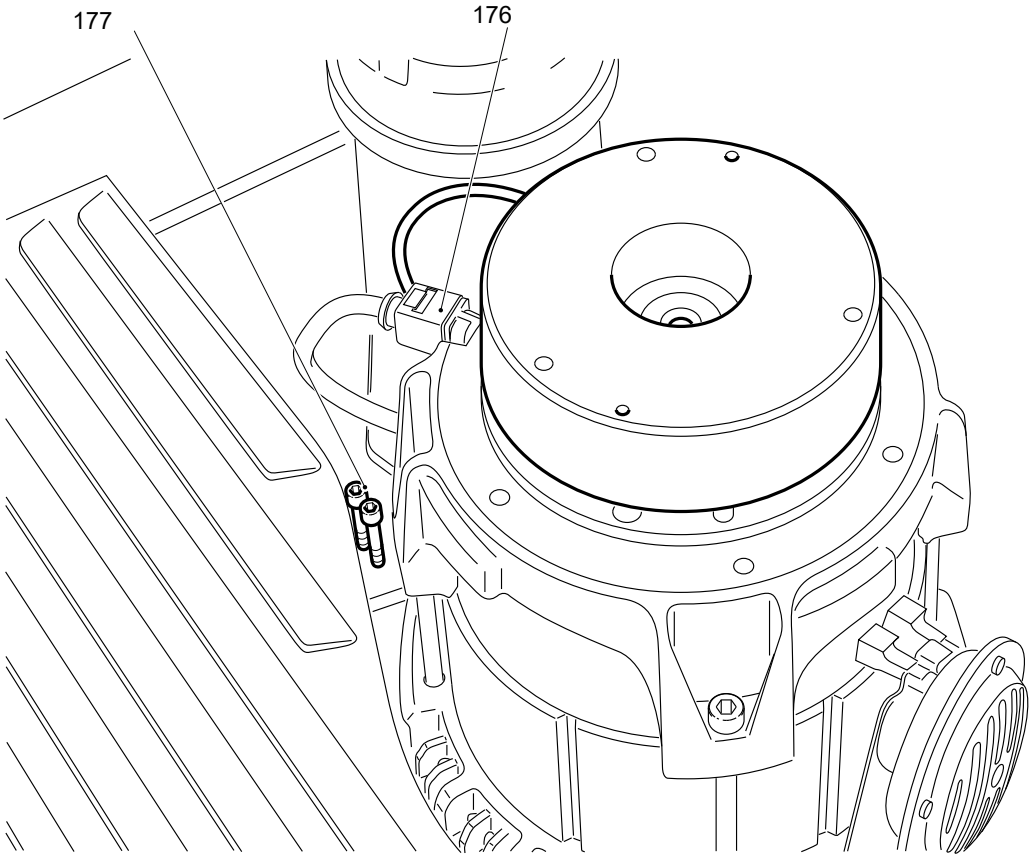
Preparing the truck for moving without its own drive system

Procedure

- Turn off the emergency disconnect switch and key switch.
- Disconnect the charge connector and communication connector XS12 (225).
- Wait 10 seconds.
- Prevent the truck from rolling away.
- Remove seat cover – see page 240.
- Disconnect the two-pin connector (176) from the magnetic brake.
- Unscrew two screws (177) from the drive plate and screw them into the holes on the magnetic brake.

  The magnetic brake is bled.
- Remove protective cap.
- Adjust the desired steer angle using an Allen key.
-

The truck has been prepared.



Bleed the magnetic brake

Tools and Material Required

– Two screws (177)
– Allen key

Procedure

- Disconnect the two-pin connector (176) from the magnetic brake.
- Unscrew two screws (177) from the drive plate and screw them into the holes on the magnetic brake.

The magnetic brake is bled.

Aligning the drive wheel

Procedure

- Remove the protective cap over the centre screw.

⚠ CAUTION!

Tensioned tyres can cause accidents

When steering in the standing position the driving wheel band is under tension. Releasing the Allen key or steering crank can create a correcting moment.

▶ Release the Allen key or steering crank carefully.

Only adjust the position of the steering wheels when the truck is stationary.

Place the Allen key or steering crank (178) on the steering transmission and turn the drive wheel to the required steering position.

The drive wheel is now aligned.

The steering wheel setting can only be adjusted when the truck is stationary.

Towing the truck

⚠ WARNING!

An unsecured truck can cause accidents

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

▶ Park the truck on a level surface. In special cases the truck may need to be secured with wedges.

▶ Fully lower the load handler.

▶ Select a place to park where no other people are at risk of injury from the lowered load handler.

▶ If the brakes are not working, place wedges underneath the wheels of the truck to prevent it from moving.

⚠ WARNING!

Accident risk

Other people can be injured if the truck is towed incorrectly.

▶ Only use vehicles to tow the truck which have sufficient tow and brake forces for the trailer load without its own braking system.

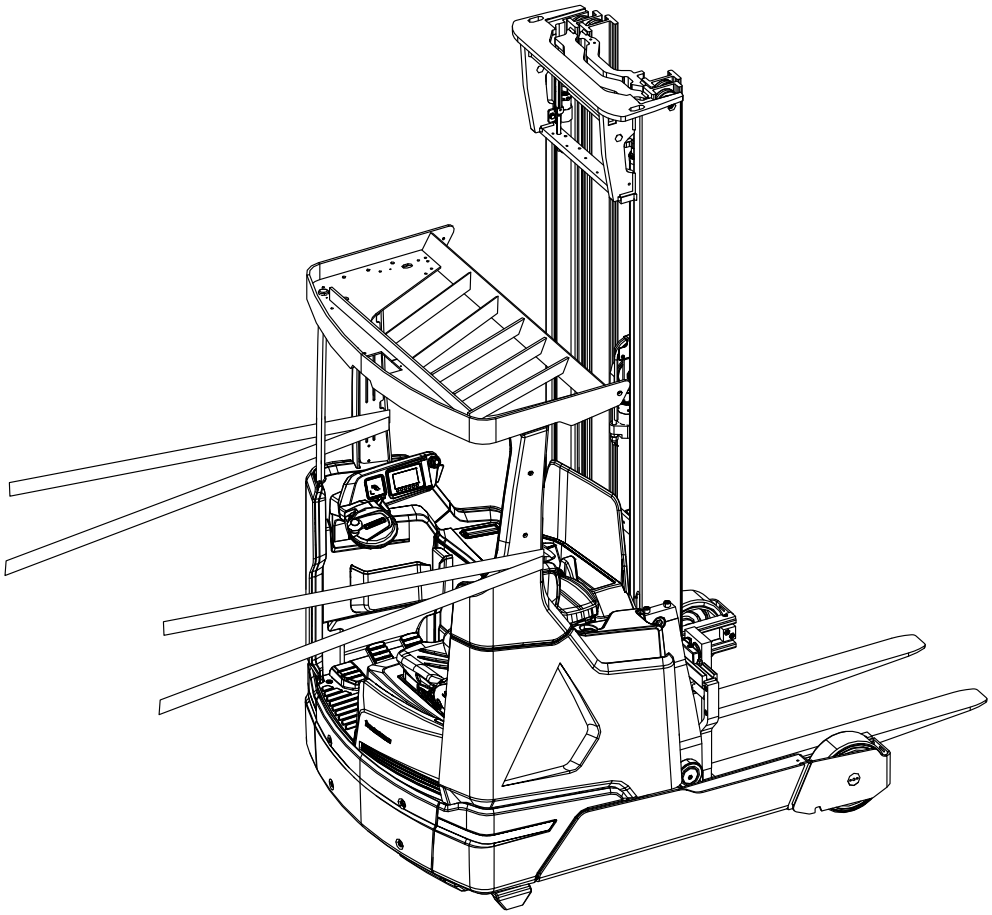
▶ Always tow the truck at walking pace.

▶ Do not park the truck with the parking brake released.

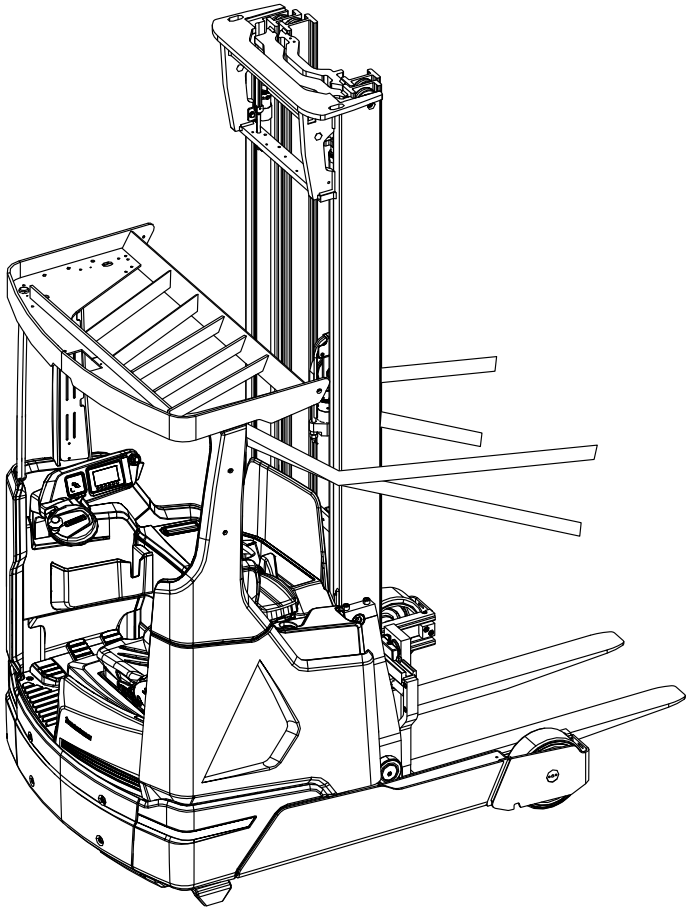
Tools and Material Required

– Tow rope, drawbar pull > 5 to

Procedure



- Guide the tow rope around the struts of the overhead guard as shown in the figure to tow the truck in the drive direction.
-



Guide the tow rope around the mast as shown in the figure to tow the truck in fork direction.
- Tow the truck carefully and slowly.
- When the truck reaches its destination, restore the brake system to its operating condition.

The truck has now been towed.

Activating the magnetic brake

Tools and Material Required

– Screws 2 x M6
– Allen key

Procedure

- Remove the screws (2 x M6) from their holes in the magnetic brake and insert them in the drive plate.
- Connect the two-pin connector to the magnetic brake.

Magnetic brake is activated.

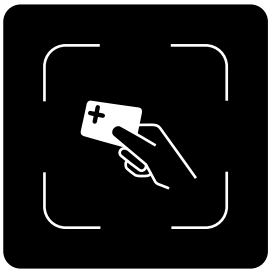
5.2 Warning messages

Display	Cause	Action
0350	Loss of battery connection or connection to battery management	Switch the truck off and on.
1901	During system start-up, the accelerator pedal home position could not be determined.	Do not press the accelerator pedal during system start-up.
1904	Accelerator pedal is pressed, but no travel direction selected.	Take your foot off the accelerator pedal, select a travel direction and set off.
1909	Accelerator pedal pressed and parking brake not released via parking brake button.	Release the parking brake; to do this press the parking-brake button.
1917	Accelerator and brake pedal pressed simultaneously.	Press one pedal at a time only.
1952	Travel direction switch pressed during system start-up.	Do not press the travel direction switch during system start-up
2951	PILOT pressed during system start-up. No neutral position sensing possible.	Do not operate the multiPILOT / soloPILOT during system startup. – Switch off the truck. – Switch the truck on again. – Call the service department if necessary.
9961	Fleet management (○) has detected a shock event in the vertical direction	Obtain acknowledgement from authorised person (warehouse manager) and arrange for the truck to be started up again
9962	Fleet management (○) has detected a shock event in the horizontal direction	Obtain acknowledgement from authorised person (warehouse manager) and arrange for the truck to be started up again
5992	After switching on the truck, no radio network could be established with the battery management	– Switch off the truck. – Switch the truck on again. – Check battery management connection. – Call service department.
5408 / 5409	Lithium-ion battery overtemperature	Stop work.
5413	Lithium-ion battery low temperature	Move truck to warm environment.

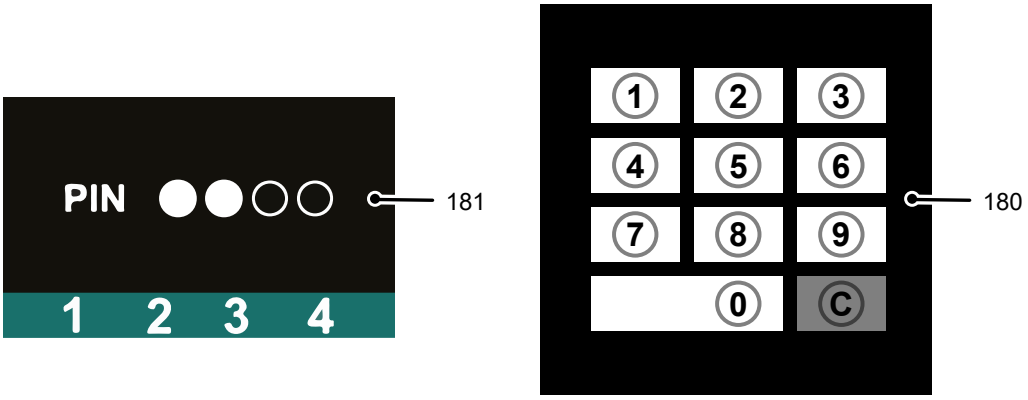
For all other warning messages switch the truck off and on again. If the warning message appears again call the service department.

6 Keyless Access System

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



179



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

7 General Information about the Use of Keyless Access Systems

The default code is to be found on a sticker. When using for the first time, change the set-up code and remove the sticker!
– Default code: 1-2-3-4
– Factory set-up code: 2-4-1-2

➔ When a valid code is entered or a valid transponder used, a green tick appears in the display unit.
When an invalid code has been entered or a invalid transponder used, a red cross is displayed, and the entry must be repeated.

➔ If the truck is not used for a certain length of time, the display unit switches to standby mode. Pressing any key cancels the standby mode.

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

Symbol	Meaning
	Back: Cancels the current procedure and returns to the previous menu.
	Log-in history: Displays the chronological log-in history
	Change set-up code: To change the set-up code and to activate the keypad or the transponder reader.
	Edit access code / transponder: To add or delete access codes or transponders

Button allocation in the submenus

Symbol	Meaning
	Selection up: To select access codes or transponders, to scroll back during the log-in process
	Selection down: To select access codes or transponders, to scroll forward during the log-in process
	Delete: To delete access codes selected
	Add: To add a new access code
	Confirm: To confirm an entry or a transponder code

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

8 Commissioning the keypad and the transponder reader

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

8.1 Activating the keypad

Procedure

- Release the emergency disconnect switch, see page 135.
- Enter the default code 1-2-3-4 using the keys below the display unit (181).
  The truck is switched on.
- Press the key below the "Settings" symbol (182).
- Press the key below the "Change set-up code" symbol (183).
- Enter the set-up code 2-4-1-2 using the keypad (180).
  The set-up code entered is displayed.

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

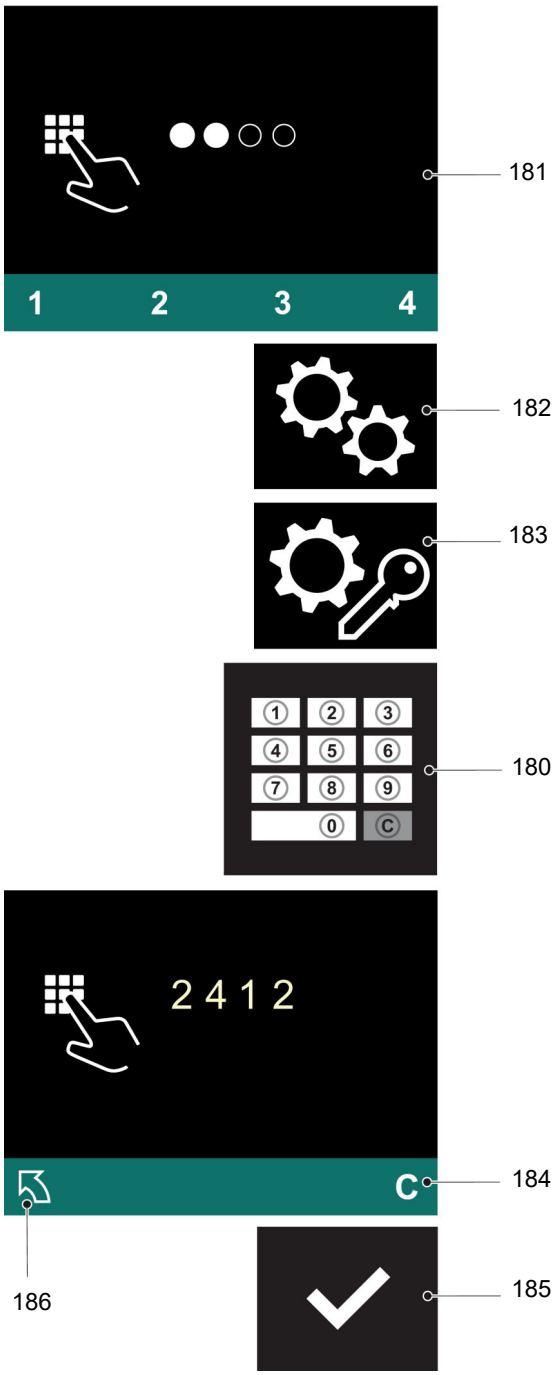
Press the key below the "Delete" symbol (184).
The set-up code is deleted.

- Enter the new set-up code using the keypad (180).
- Press the key below the "Confirm" symbol (185).
  The new set-up code is displayed.

If the new set-up code was entered incorrectly, the procedure can be repeated using the key below the "Delete" symbol (184).

- To return to the main menu, press the key below the "Back" symbol (186).
- Delete the default code, see page 180.
- Create access codes, see page 179.

The keypad is active.



8.2 Activating the transponder reader

Procedure

- Release the emergency disconnect switch, see page 135.
- Enter the default code 1-2-3-4 using the keys below the display unit (181).
  The truck is switched on.
- Press the key below the "Settings" symbol (182).
- Press the key below the "Change set-up code" symbol (183).
- Enter the set-up code 2-4-1-2 using the keys below the display unit (181).
  The set-up code entered is displayed.
- Press the key below the "Delete" symbol (184).
  The set-up code is deleted.
- Hold a transponder in front of the transponder reader (187).
  This transponder thus becomes the set-up transponder.
- Press the key below the "Confirm" symbol (185).
  The code for the set-up transponder is displayed.

If the wrong transponder has been used, the procedure can be repeated using the key below the "Delete" symbol (184).

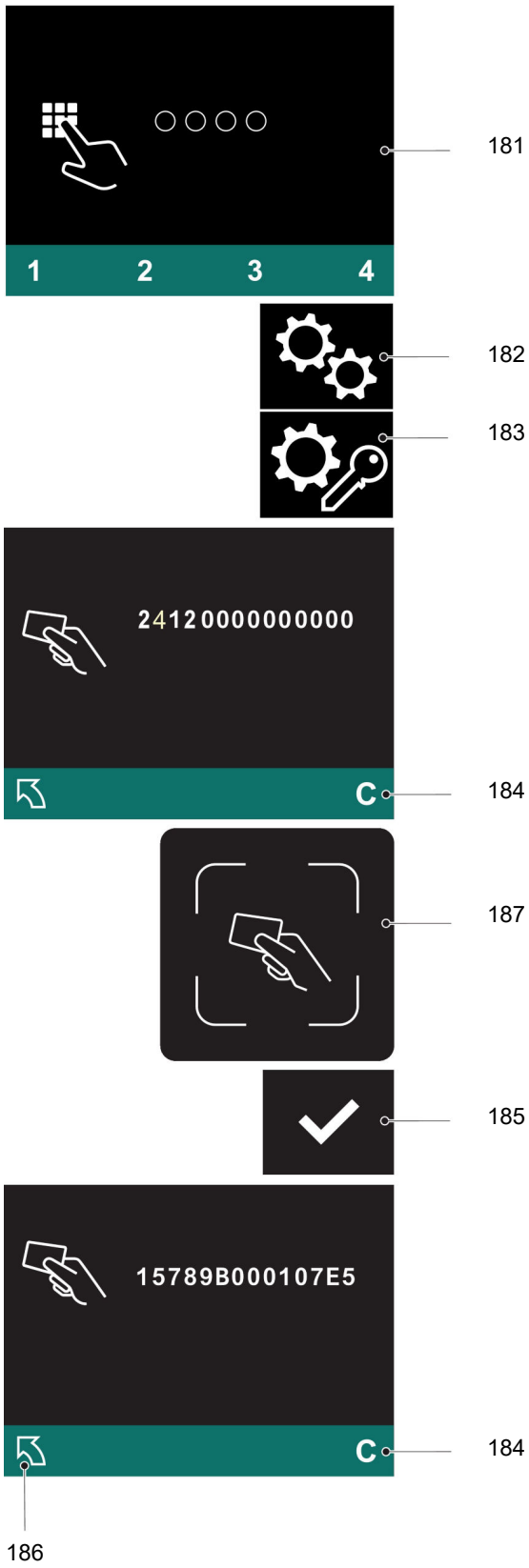
- To return to the main menu, press the key below the "Back" symbol (186).

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

Delete the default code, see page 190.

- Add new transponders, see page 189.

The transponder reader is now active.



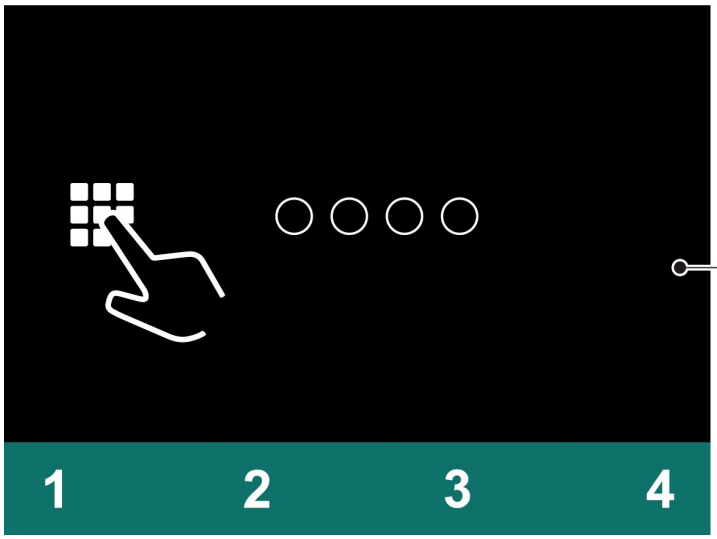
9 Using the Display:

9.1 Switching on the truck with an access code

Procedure

- Release the emergency disconnect switch, see page 135.
- Enter the access code with the buttons below the display (181).

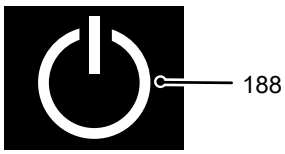
The truck is switched on.



9.2 Switching off the truck

Procedure

- Press the key under the "Switch off" symbol (188) in the display unit.
- Press the Emergency Disconnect switch, see page 135.



The truck is switched off.

9.3 Changing the Set-up Code

Requirements

– The truck is switched on, see page 177.

Procedure

- Press the key below the "Settings" symbol (182).
- Press the key below the "Change set-up code" symbol (183).
- Enter the set-up code using the keys below the display unit (181).

  The set-up code entered is shown as filled-in circles.
- Press the key below the "Delete" symbol (184).

  The set-up code is deleted.
- Enter the new set-up code using the keys below the display unit (181).

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

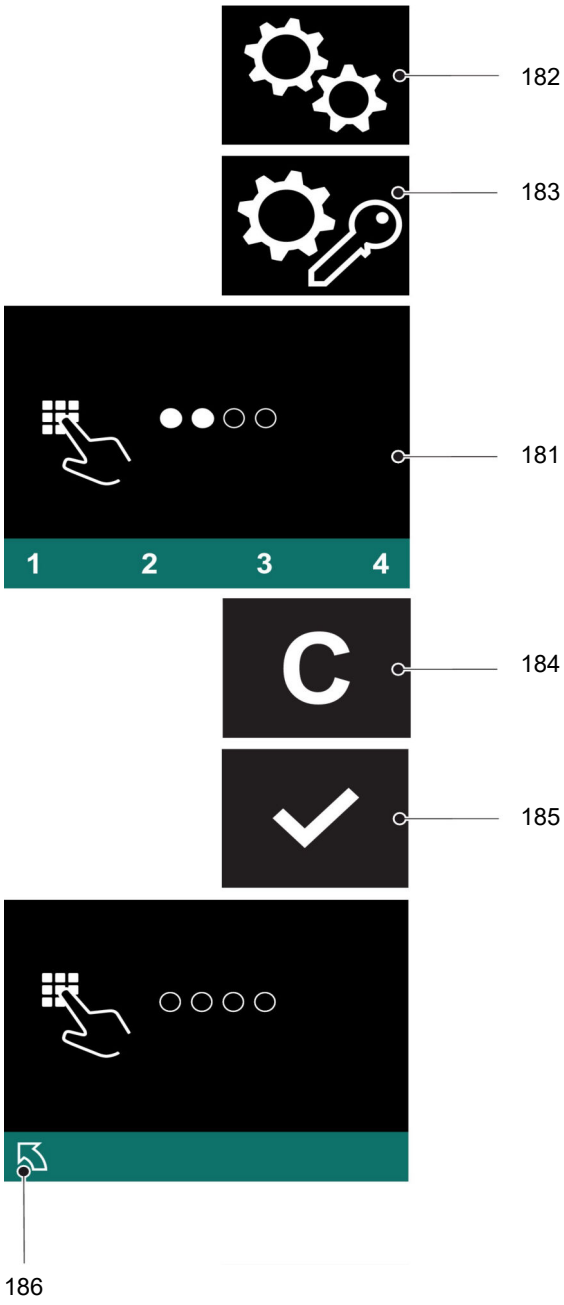
- Press the key below the "Confirm" symbol (185).

  The new set-up code is displayed.

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

To return to the main menu, press the key below the "Back" symbol (186).

The set-up code has been changed.



9.4 Adding a new access code

Requirements

– The truck is switched on, see page 177.

Procedure

- Press the key below the "Settings" symbol (182).
- Press the key below the "Edit access code" symbol (189).

  The set-up code is requested.
- Enter the set-up code using the keys below the display unit (181).

  All the access codes are displayed.
- Press the key below the "Add" symbol (190).
- Enter the new access code using the keys below the display unit (181).

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

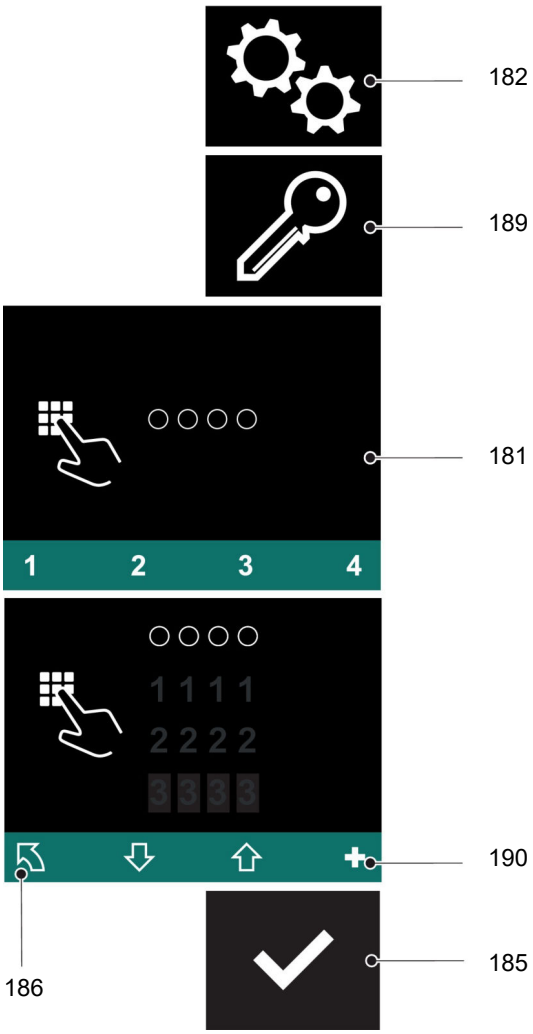
- Press the key below the "Confirm" symbol (185).

  The new access code is displayed.

➔ If the new access code has been entered incorrectly, delete it, see page 180, and add an access code again.

To return to the main menu, press the key below the "Back" symbol (186).

A new access code has been added.



9.5 Deleting an access code

Requirements

– The truck is switched on, see page 177.

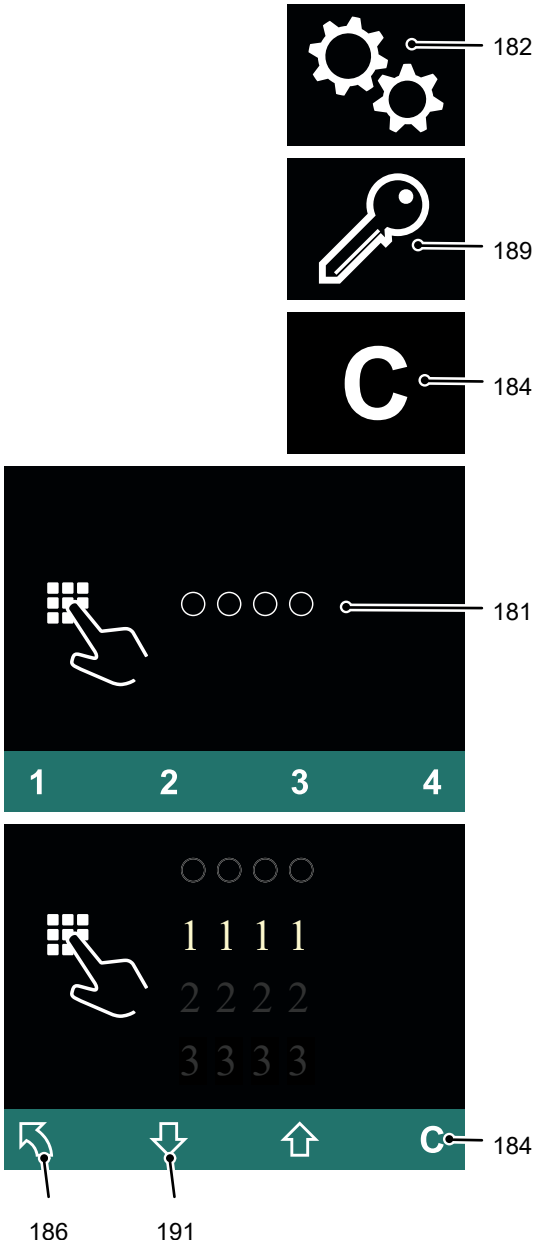
Procedure

- Press the key below the "Settings" symbol (182).
- Press the key below the "Edit access code" symbol (189).

  The set-up code is requested.
- Enter the set-up code using the keys below the display unit (181).

  All the access codes are displayed.
- Select the access code to be deleted using the key below the "Down selection" symbol (191).
- Press the key below the "Delete" symbol (184).

  The access code has been deleted.
- To return to the main menu, press the key below the "Back" symbol (186).



9.6 Displaying the log-in history

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

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

Requirements

– The truck is switched on, see page 177.

Procedure

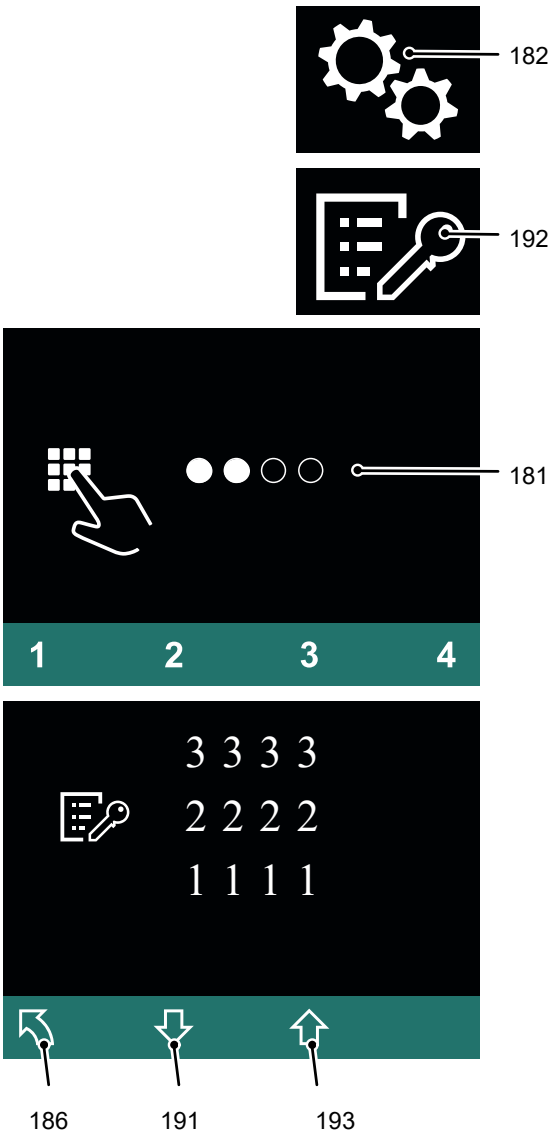
- Press the key below the "Settings" symbol (182).
- Press the key below the "Log-in process" symbol (192).
- Enter the set-up code using the keys below the display unit (181).

  The set-up code entered is shown as filled-in circles.
- To scroll forward, press the button under the "Down selection" symbol (191) as many times as necessary.

  The display area moves: Additional earlier log-ins are displayed.
- To scroll back, press the button under the "Up selection" symbol (193) as many times as necessary.

  The display area moves: More recent log-ins are displayed.
- To return to the main menu, press the key below the "Back" symbol (186).

The log-in process is displayed.



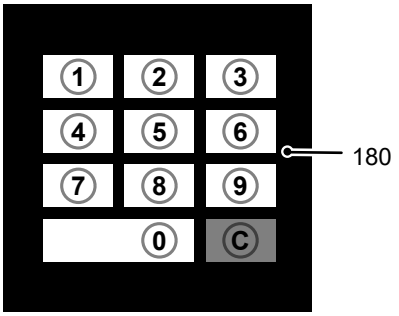
10 Using the Keypad

10.1 Switching on the truck with an access code

Procedure

- Release the emergency disconnect switch, see page 135.
- Enter the access code with the keypad (180).

The truck is switched on.

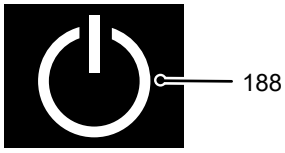


10.2 Switching off the truck

Procedure

- Press the key under the "Switch off" symbol (188) in the display unit.
- Press the Emergency Disconnect switch, see page 135.

The truck is switched off.



10.3 Changing the set-up code

Requirements

– The truck is switched on, see page 182.

Procedure

- Press the key below the "Settings" symbol (182).
- Press the key below the "Change set-up code" symbol (183).
- Enter the set-up code using the keypad (180).

  The set-up code entered is shown in the display unit (181) as filled-in circles.
- Press the key below the "Delete" symbol (184).

  The set-up code is deleted.
- Enter the new set-up code using the keypad (180).

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

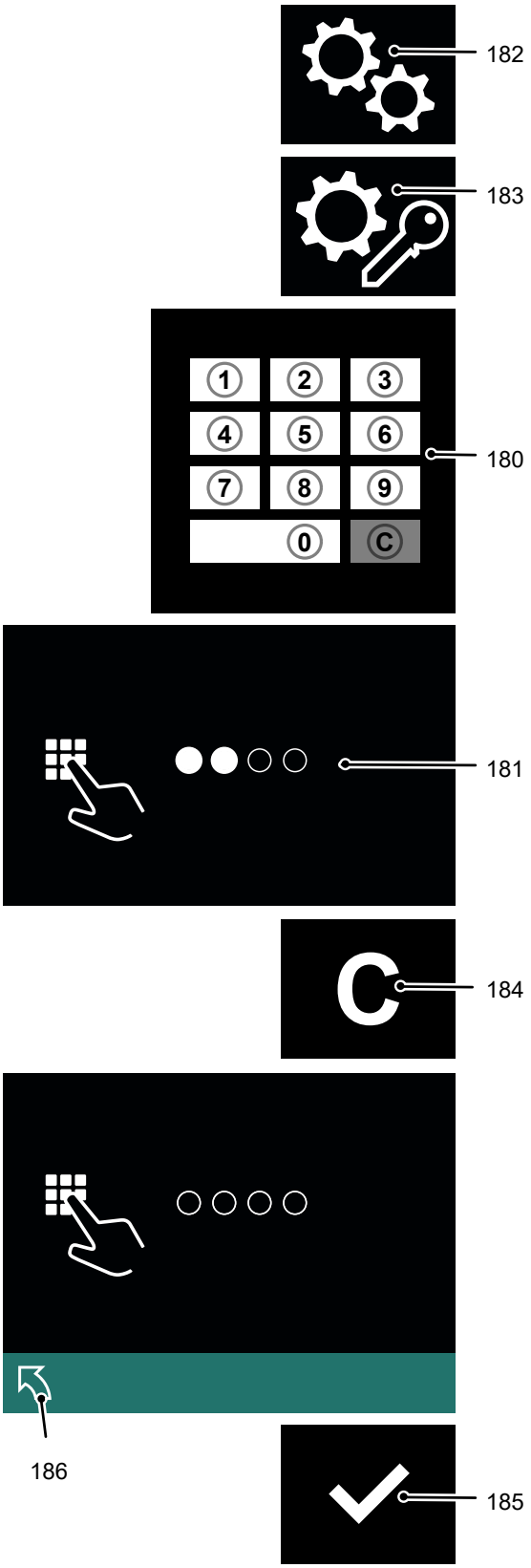
- Press the key below the "Confirm" symbol (185).

  The new set-up code is displayed.

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

To return to the main menu, press the key below the "Back" symbol (186).

The set-up code has been changed.



10.4 Adding a new access code

Requirements

– The truck is switched on, see page 182.

Procedure

- Press the key below the "Settings" symbol (182).
- Press the key below the "Edit access code" symbol (189).

  The set-up code is requested.
- Enter the set-up code using the keypad (180).

  All access codes are shown on the display unit (181).
- Press the key below the "Add" symbol (190).
- Enter a new access code using the keypad (180).

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

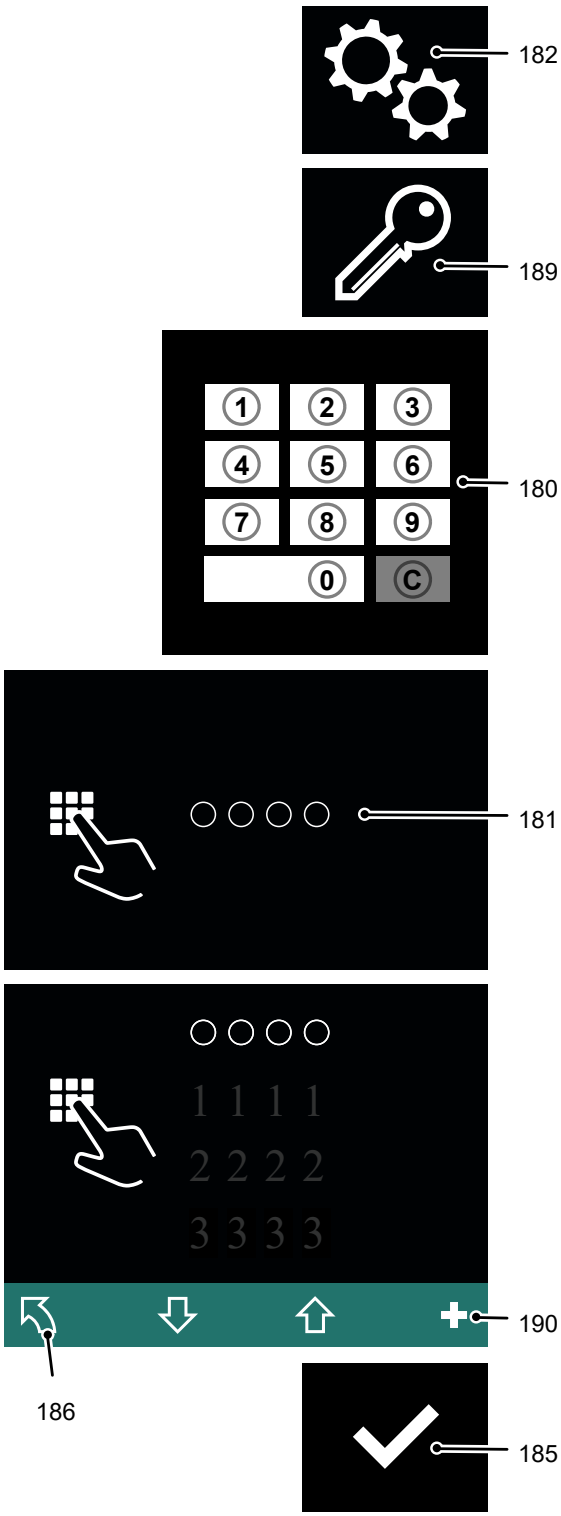
- Press the key below the "Confirm" symbol (185).

  The new access code is shown on the display unit (181).

➔ If the new access code has been entered incorrectly, delete it, see page 185, and enter the correct access code.

To return to the main menu, press the key below the "Back" symbol (186).

A new access code has been added.



10.5 Deleting an access code

Requirements

– The truck is switched on, see page 182.

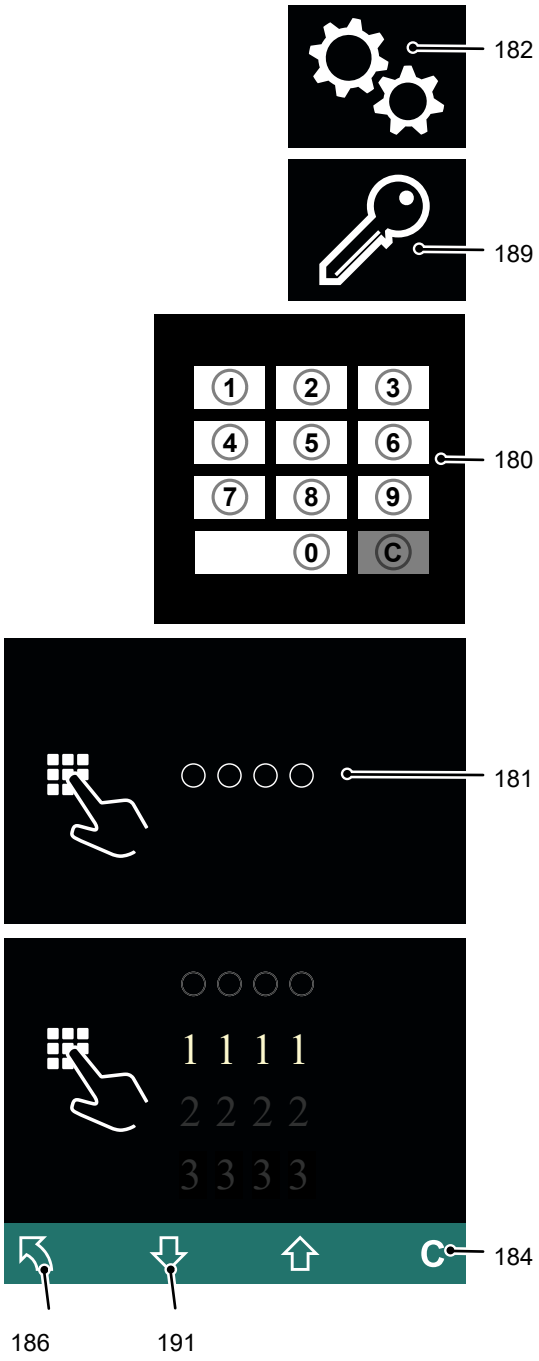
Procedure

- Press the key below the "Settings" symbol (182).
- Press the key below the "Edit access code" symbol (189).

  The set-up code is requested.
- Enter the set-up code using the keypad (180).

  All access codes are shown on the display unit (181).
- Select the access code to be deleted using the key below the "Down selection" symbol (191).
- Press the key below the "Delete" symbol (184).

  The access code has been deleted.
- To return to the main menu, press the key below the "Back" symbol (186).



10.6 Displaying the log-in history

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

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

Requirements

– The truck is switched on, see page 182.

Procedure

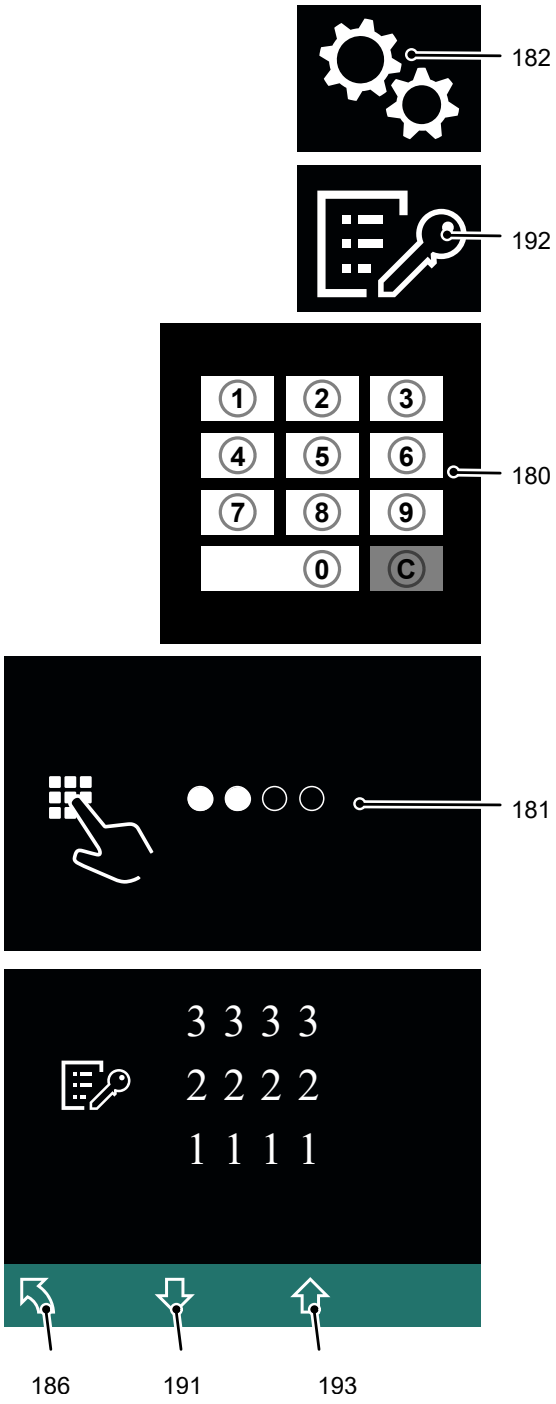
- Press the key below the "Settings" symbol (182).
- Press the key below the "Log-in process" symbol (192).
- Enter the set-up code using the keypad (180).

  The set-up code entered is shown in the display unit (181) as filled-in circles.
- To scroll forward, press the button under the "Down selection" symbol (191) as many times as necessary.

  The display area moves: Additional earlier log-ins are displayed.
- To scroll back, press the button under the "Up selection" symbol (193) as many times as necessary.

  The display area moves: More recent log-ins are displayed.
- To return to the main menu, press the key below the "Back" symbol (186).

The log-in process is displayed.



11 Optional Equipment

11.1 Operating the transponder reader

NOTICE

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

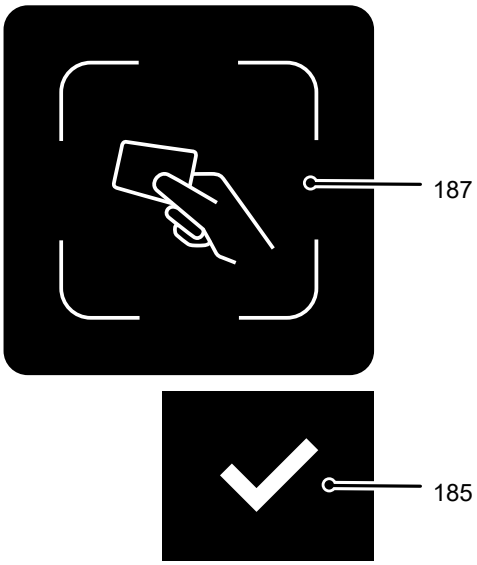
11.1.1 Switching on the truck with a transponder

Procedure

- Release the Emergency Disconnect switch, see page 135.
- Hold the transponder in front of the transponder reader (187).

  A green tick appears and remains until the transponder has been confirmed. If there is no confirmation within 20 seconds the access prompt appears.
- Press the button below the "Confirm" symbol (185).

The truck is switched on.

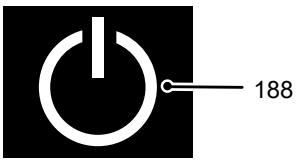


11.1.2 Switching off the truck

Procedure

- Press the key under the "Switch off" symbol (188) in the display unit.
- Press the Emergency Disconnect switch, see page 135.

The truck is switched off.



11.1.3 Changing the set-up transponder

Requirements

– The truck is switched on, see page 187.

Procedure

- Press the key below the "Settings" symbol (182).
- Press the key below the "Change set-up code" symbol (183).
- Place the set-up transponder on the transponder reader (187).

  The code of the set-up transponder is shown on the display unit (181).
- Press the key below the "Delete" symbol (184).

  A dashed line is shown.
- Place the new set-up transponder on the transponder reader (187).

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

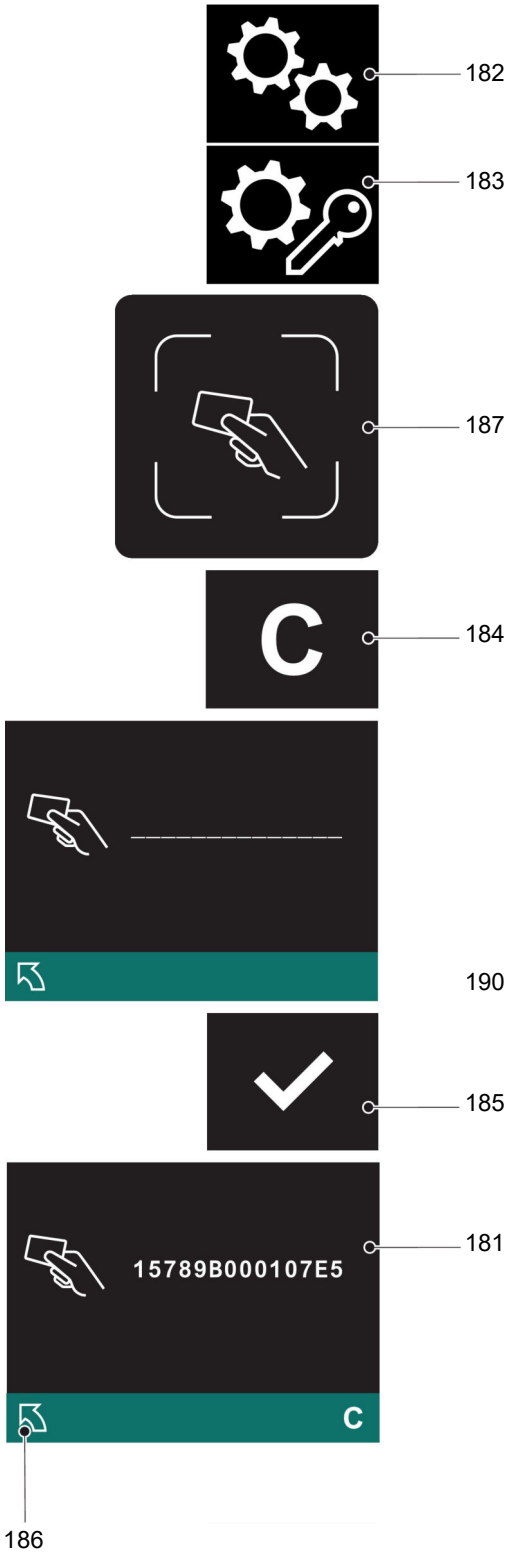
- Press the key below the "Confirm" symbol (185).

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

➔ If the wrong transponder has been used, the procedure can be repeated using the key below the "Delete" symbol (184).

To return to the main menu, press the key below the "Back" symbol (186).

The set-up transponder has been changed.



11.1.4 Adding a new transponder

Requirements

– The truck is switched on, see page 187.

Procedure

- Press the key below the "Settings" symbol (182).
- Press the key below the "Edit transponder" symbol (189).

  The set-up transponder is requested.
- Place the set-up transponder on the transponder reader (187).

  All transponder codes are shown on the display unit (181).
- Press the key below the "Add" symbol (190).
- Place the new transponder on the transponder reader (187).

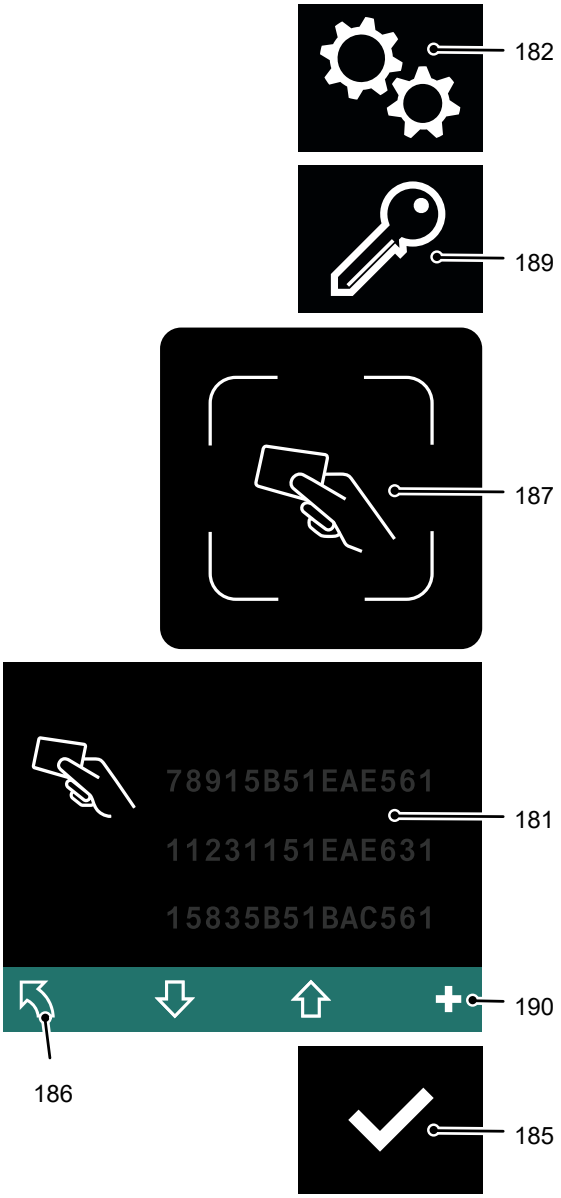
➔ The new transponder code must be different from existing transponder codes.

- Press the key below the "Confirm" symbol (185).

  The new transponder code is displayed.

➔ If the wrong transponder has been used, delete it, see page 190, and add a correct transponder.

To return to the main menu, press the key below the "Back" symbol (186).



A new transponder has been added.

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

11.1.5 Deleting a transponder

Requirements

– The truck is switched on, see page 187.

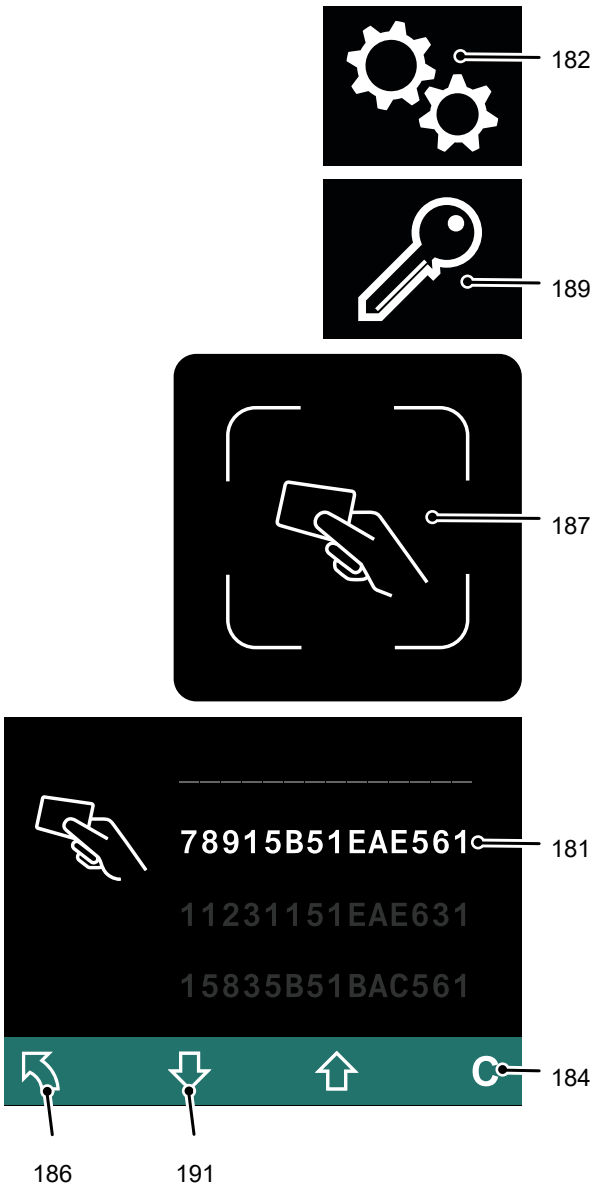
Procedure

- Press the key below the "Settings" symbol (182).
- Press the key below the "Edit transponder" symbol (189).

  The set-up transponder is requested.
- Place the set-up transponder on the transponder reader (187).

  All transponder codes are shown on the display unit (181).
- Select the transponder code to be deleted using the key below the "Down selection" symbol (191).
- Press the key below the "Delete" symbol (184).

  The transponder has been deleted.
- To return to the main menu, press the key below the "Back" symbol (186).



11.1.6 Displaying the log-in history

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

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

Requirements

– The truck is switched on, see page 187.

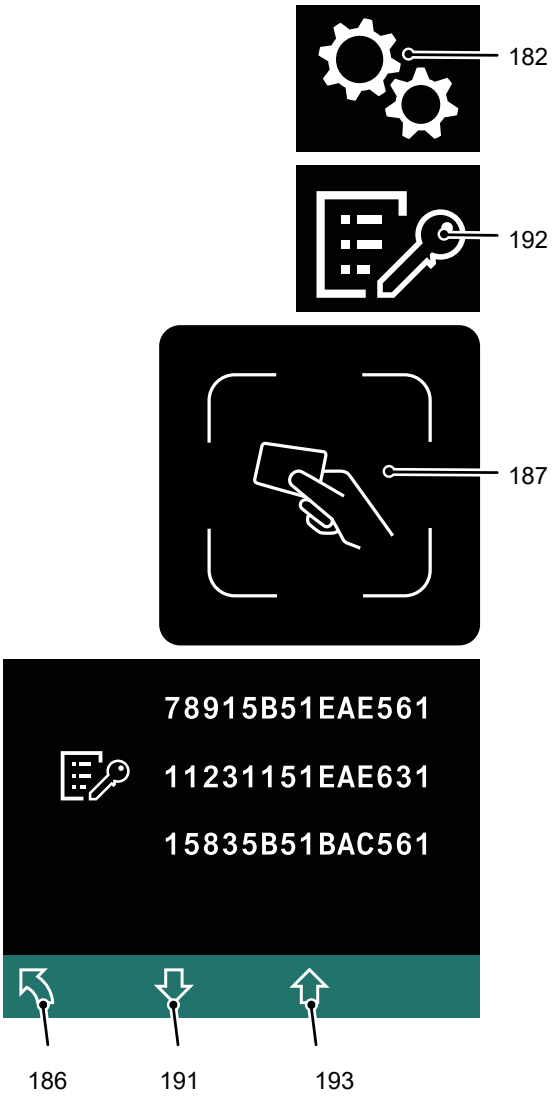
Procedure

- Press the key below the "Settings" symbol (182).
- Press the key below the "Log-in process" symbol (192).
- Place the set-up transponder on the transponder reader (187).
- To scroll forward, press the button under the "Down selection" symbol (191) as many times as necessary.

  The display area moves: Additional earlier log-ins are displayed.
- To scroll back, press the button under the "Up selection" symbol (193) as many times as necessary.

  The display area moves: More recent log-ins are displayed.
- To return to the main menu, press the key below the "Back" symbol (186).

The log-in process is displayed.



11.2 Assistance systems

The assistance system must be used, operated and maintained in accordance with these operating instructions. Any other type of use is beyond the scope of application and can result in accidents and personal injury as well as damage to forklift trucks or property.

The Jungheinrich assistance system supports the operator, but does not release him from his responsibility:
When using the assistance system, responsibility for the safe operation of the truck lies with the operator. The operator must also be familiar with the system amenities, as well as potential hazards in the event of a failure. The operator remains obligated to monitor the environment and control the truck at all times.

Travel conduct

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

Active mast vibration damping (○)

Damping of the vibrations of the extended mast and reduction of the travel speed to slow travel when lifting the load beyond the free lift. The vibration-damping systems support the operator when stacking and retrieving loads with the mast extended in mast lift. Active mast vibration damping suppresses vibration of the mast by actively controlling the hydraulic mast reach.

11.2.1 accessCONTROL (○)

Release takes place only if the operating sequence is adhered to after switching on the industrial truck, via key switch, transponder or keypad depending on the equipment:
1. The operator is occupying the seat.
2. The seat belt is fastened.
3. The deadman switch is actuated.

➔ If the driver vacates the seat for a short while, the truck can be operated again when he returns (seat occupied) and puts the seat belt back on again.

➔ If travel is not released, depending on the malfunction either the seat switch or seat belt lock warning indicators light up. Items 1 to 3 must be performed again in the order listed.

Symbol	Meaning	Colour	Function
	Seat switch	Yellow	Seat switch not applied or seat switch applied for more than 6 hours uninterrupted
		Red	Error on seat switch
	Seat belt lock control system	Yellow	Seat belt lock not engaged
		Red	Wrong activation sequence of seat switch, seat belt lock and deadman switch

11.2.2 reachCONTROL (○)

The reachCONTROL option maximises the speeds for the mast traverse function depending on the lift height and the load weight – see page 145.

11.2.3 Telematics box

If equipped with a telematics box, refer to the operating instructions “Jungheinrich Fleet Management System”.

11.2.4 warehouseCONTROL

The liftNAVIGATION option acts as an interface to the WMS (Warehouse Management System).

– Order entry via WMS
– Querying the status of an order
– Querying truck statuses

11.2.5 positionCONTROL (○)

If the truck is equipped with positionCONTROL, refer to the "Rack Height Select" operating instructions.

11.2.6 positionCONTROL Light (○)

The SNAP function makes it easier for the operator to approach the stored lift heights. Unlike positionCONTROL, in this case the load handler approaches all stored lift heights in order.

When using the SNAP function, the storage support is activated automatically.

11.2.7 curveCONTROL (○)

⚠ WARNING!

Risk of accidents due to individually set parameters

If curveCONTROL settings differ across several trucks, there is a risk that the operator will anticipate different cornering responses.

▶The owner must mitigate the risk by implementing suitable protective measures.

Automatic speed reduction when cornering. curveCONTROL limits the travel speed and acceleration when cornering. The risk of rocking or tipping over is reduced.

11.2.8 driveCONTROL (○)

Optional driveCONTROL is available in different versions.

In free lift
– Automatic slow travel in free lift is possible from a lift height of h3 = 100 mm up to a maximum h2.

Already within the free lift from h3 = 500 mm to a speed of 3 km/h
– Automatic slow travel in free lift is reduced to a travel speed of 3 km/h starting at h3 = 500 mm. The h3 = 500 mm and travel speed of 3 km/h settings cannot be altered.

In free lift h3=0–250 mm 3 km/h
– Automatic slow travel at lift height h3 in a range from 0 mm to 250 mm. The travel speed is reduced to 3 km/h. From a lift height of >250 mm, the system switches to the standard travel speed of the profile. Upon transitioning to mast lift, driveCONTROL switches to "in mast lift". Before commissioning, the forks should be completely lowered to the ground.

11.2.9 Lift height display

The height indicator is an assistance system that only works within tolerance levels. The operator depends on the data on the load capacity plate and the estimation of the lift height using the lift limit marking on the mast (64).

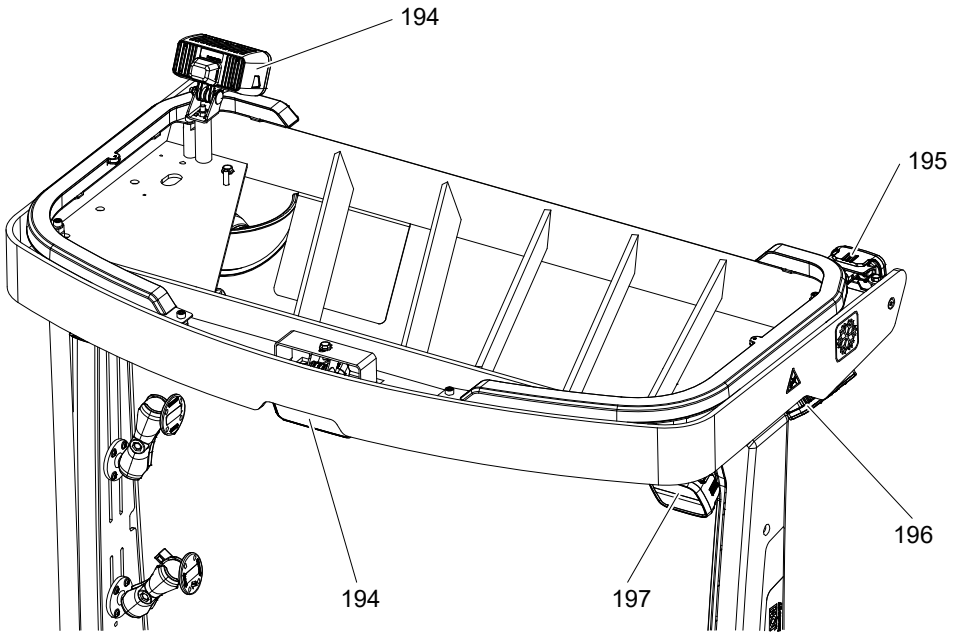
⚠ WARNING!

Loss of operational stability can cause accidents

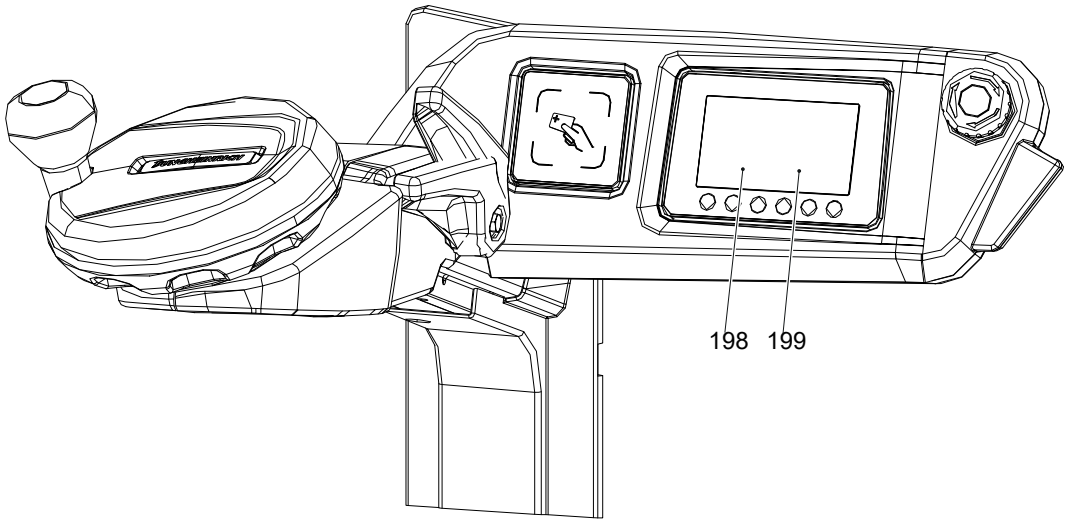
A faulty lift height sensor may cause the operator to rely on an incorrect value in the lift height display and exceed the lift height indicated in the load chart. If the lift height is exceeded, the operational stability of the truck may be reduced and the truck may tip over, causing serious or even fatal injuries.

▶ Observe the lift limit marking on the mast (64).

11.3 Work lights



➔ The work lights are fitted with a pivot that can swivel in all directions.



➔ Button (198) switches the work lights (197) in the drive direction on or off. Button (197) switches the work lights (195) in the fork direction on or off. As an option, the work lights can be controlled as a function of the travel direction.

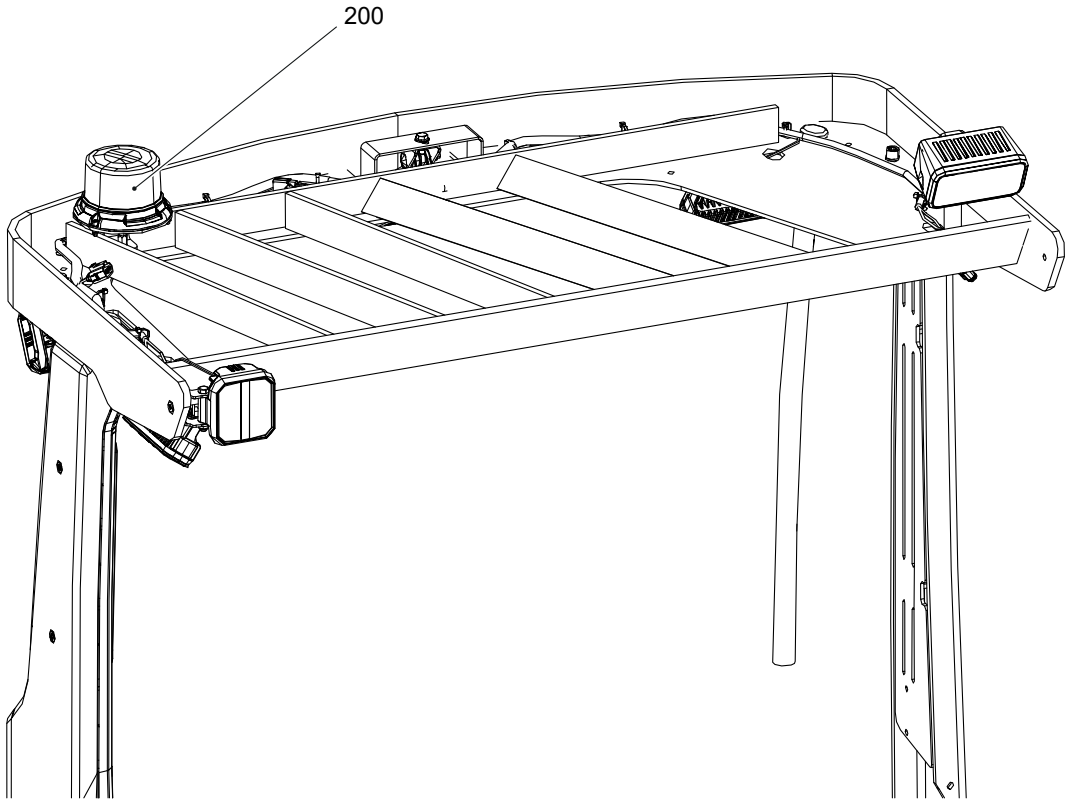
Switching the work lights on and off

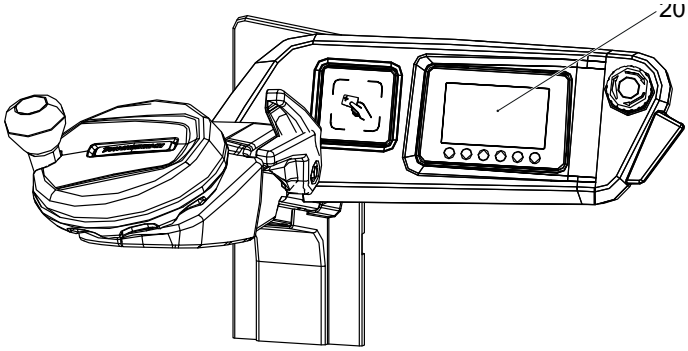
Procedure

- Press the work light button (198, 199).

The work lights are switched on / off.

11.4 Strobe light





Switch the strobe light on or off

Procedure

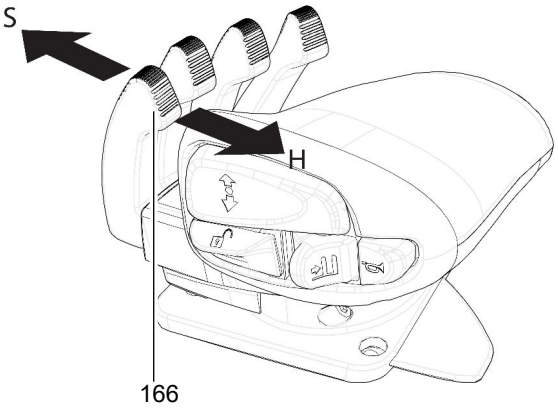
- Press the strobe light button (201).

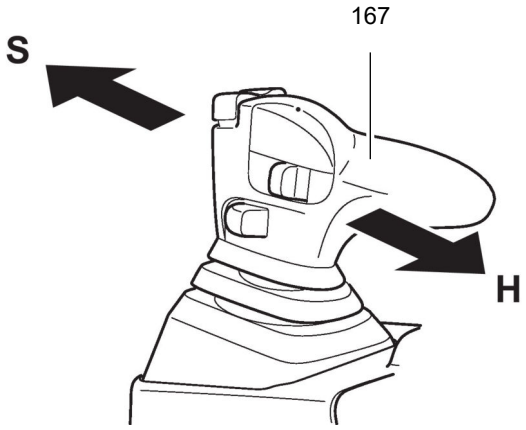
The strobe light (200) is switched on or off.

11.5 Lift Height Cut-off (○)

The lift height cut-off is an electrical lift limit for restricting the maximum lift height in the mast lift range. The cut-off height is defined by a sensor; the pump motor is deactivated accordingly and the lifting function is disabled.

➔ The magnetic switch on the mast is not present with the rack height select option (○) or the operationCONTROL option (○).



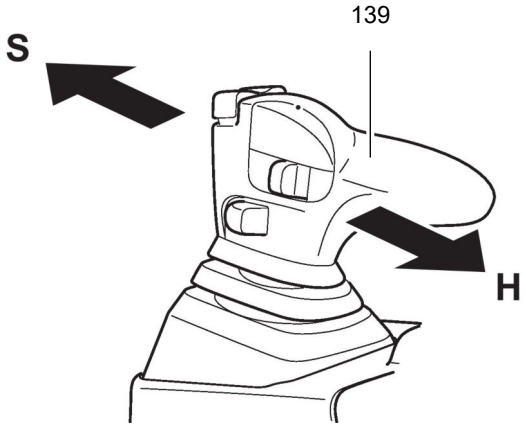


Overriding the lift limit cutout without the override button

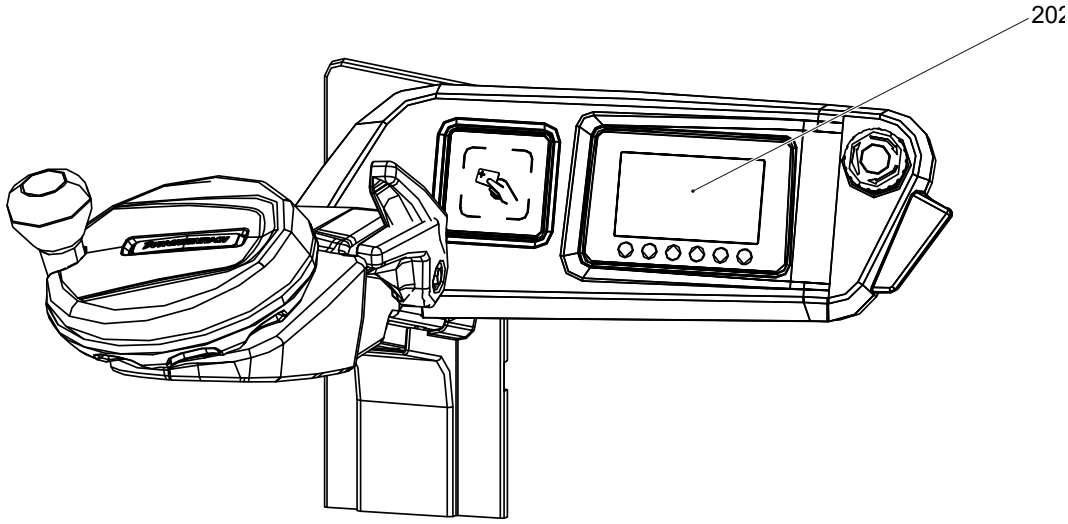
Procedure

- Set the SOLO-PILOT lever (166) or MULTI-PILOT (167) to neutral.
- Pull the SOLO-PILOT lever (166) or MULTI-PILOT (167) in direction H, see page 147

The lift limit cutout is now overridden.
Lifting can now be performed at reduced speed.



11.6 Electric lift limit



ESA stands for limit switch system and is available in the variants ESA 1, ESA 2 and ESA 3. The purpose of the ESA is to prevent damage to the industrial truck or the load in the area of the support arms due to incorrect operation.

➔ After switching on, the speeds of hydraulic functions are initially only reduced. The limit switch system (ESA) only develops its full protective effect when the exact lift height is available in the system after lifting / lowering (= referencing).

11.6.1 Lift limit 1

Lift limit 1 is only available for trucks with an integrated side shift.

Operation

Lift limit 1 determines the position of the mast and fork carriage via sensors in the mast. If the mast is fully extended or if the fork carriage is outside the safety range (500 - 600 mm above the wheel arms), Lift Limit 1 releases all hydraulic functions.

If the mast is not fully extended or if the load is near the wheel arms, sideshift, mast reach, lower and hydraulic auxiliary functions are disabled.
If the mast is fully extended and the load is near the wheel arms, only mast reach is inhibited - the mast cannot be retracted.
Lifting and tilting are never disabled.

The disabled hydraulic functions are released automatically without user input.
Automatic centring release allows
– the mast reach to move automatically in the wheel arm area when the sideshift is centred.
– the load to be lowered to the ground when the sideshift is centred.
– the centre position on the control and display unit to be shown via an indicator (202)

11.6.2 Lift limit 2

➔ Lift limit 2 is available for trucks with an integrated side shift and various attachments, such as fork positioner and ball clamps.

Operation

Lift limit 2 determines the position of the mast and forks via sensors in the mast. If the mast is fully extended or if the forks are outside the safety range (500 - 600 mm above the wheel arms), Lift Limit 2 releases all hydraulic functions.

Sideshift, mast reach, lowering and the hydraulic accessory functions are deactivated if the mast is not fully extended or if the load is near the wheel arms.
If the mast is fully extended and the load is near the wheel arms, only mast reach is inhibited, the mast cannot be retracted.
Lifting and tilting are never inhibited.

Releasing hydraulic functions without the override button

Requirements

– The function selected is inhibited. The mast or forks are in the safety range.

Procedure

- Set the control (SOLO-PILOT or MULTI-PILOT) to neutral.
- Set the control (SOLO-PILOT or MULTI-PILOT) back to its original direction.

➔ Only the originally applied function is released, at reduced speed.

- Repeat this procedure separately for each function.

The hydraulic function is released.

11.6.3 Lift limit 3

➔ Lift limit 3 is only available for trucks with tilting forks in conjunction with a fork positioner.

Operation

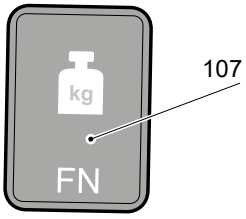
Lift limit 3 determines the position of the mast and forks via sensors in the mast. If the mast is fully extended or if the forks are outside the safety range (500 - 600 mm above the wheel arms), Lift Limit 3 releases all hydraulic functions.

Sideshift, mast reach, lowering and the hydraulic accessory functions are deactivated if the mast is not fully extended or if the load is near the wheel arms.
If the mast is fully extended and the load is near the wheel arms, only mast reach is inhibited, the mast cannot be retracted.
Lifting and tilting are never inhibited.

Lift limit 3 also checks that the forks cannot collide with the wheel arms and are free of the load. If both criteria are met, mast reach and lower are enabled. Sideshift and hydraulic auxiliary functions remain inhibited.

➔ Loads with a weight < 100 kg cannot be reliably detected by the system.

11.7 Weigher



While the weigher button (107) is pressed, the load is raised approx. 10 cm and then lowered again. This process determines the load weight which is then shown on the driver's display. The weigher function is not a substitute for a calibrated weigher. The weigher function must not be used to lift the load freely. All other hydraulic operations are inhibited during weighing.

Weighing the load

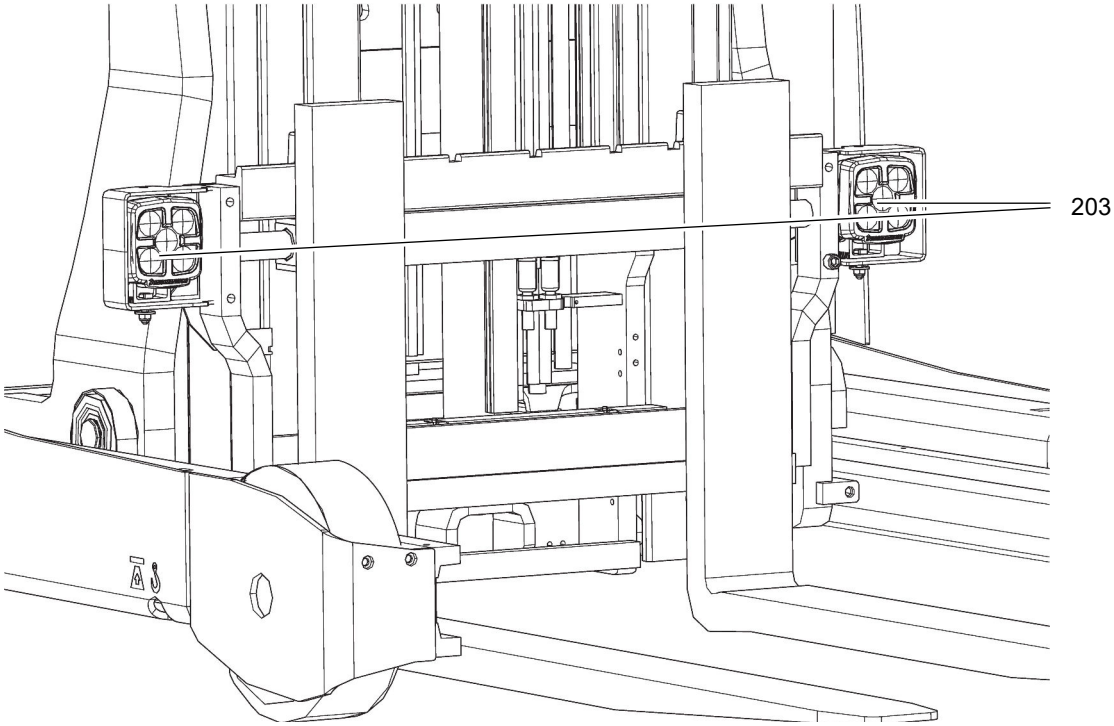
Procedure

- Press and hold down on the weigher button (107) until weighing is completed.

➔ If the button is released before weighing is completed, the weighing procedure is interrupted and no valid readings are obtained. The display shows "- - - - kg".

The load is weighed and shown on the display.

11.8 LED work lights on load handler

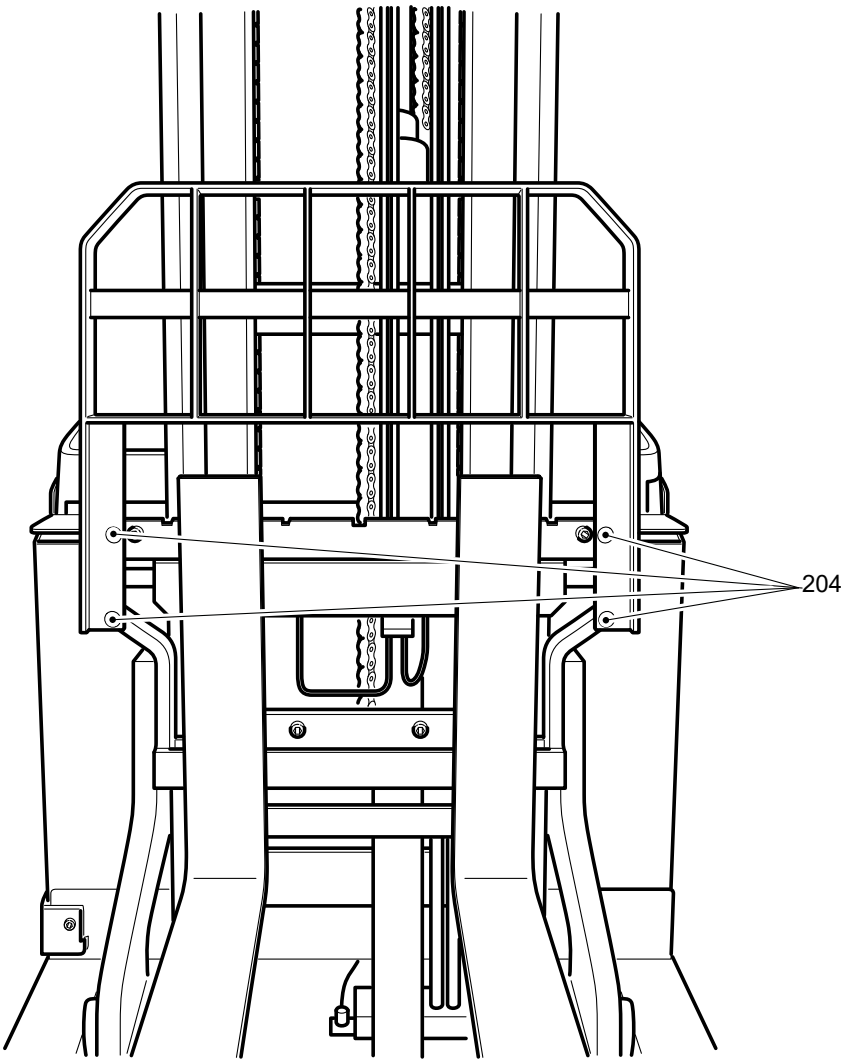


Item	Component
203	Load handler work lights LED

➔ Load handler work lights LEDs are available for trucks that work with a sideshifter.

The LED work lights on the load handler are
- switched on automatically when a hydraulic function is activated and the travel speed is less than 8 km/h.
- switched off when a hydraulic function is inactive and the travel speed is greater than 4 km/h for t > 2 s.
- switched off when a hydraulic function is inactive for t > 5 min.

11.9 Removable load backrest



⚠ CAUTION!

Trapping hazard and heavy load backrest weight

▶Wear safety gloves and safety shoes when carrying out this operation.

▶Two people are required to remove and attach the load backrest.

Load backrest disassembly

Procedure

- Loosen the screws (204).
- Remove the load backrest from the fork carriage and put it down securely.
- Fit the fork retaining screws.

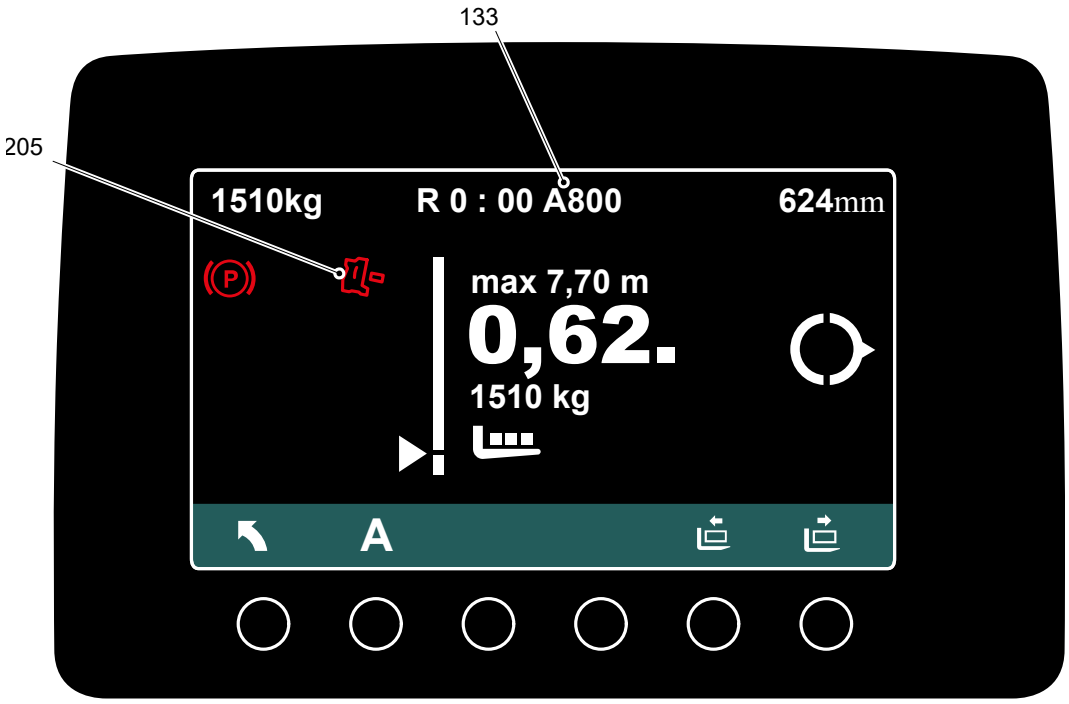
Load backrest assembly

Procedure

- Attach the load backrest to the top rail of the fork carriage.
- Fit the bolts and tighten them with a torque wrench.

➔ Tightening torque = 85 Nm

11.10 operationCONTROL

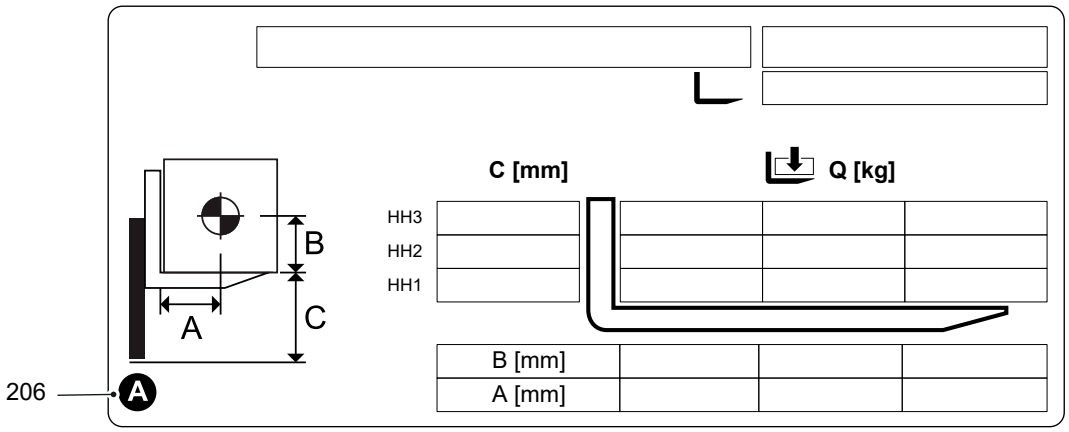


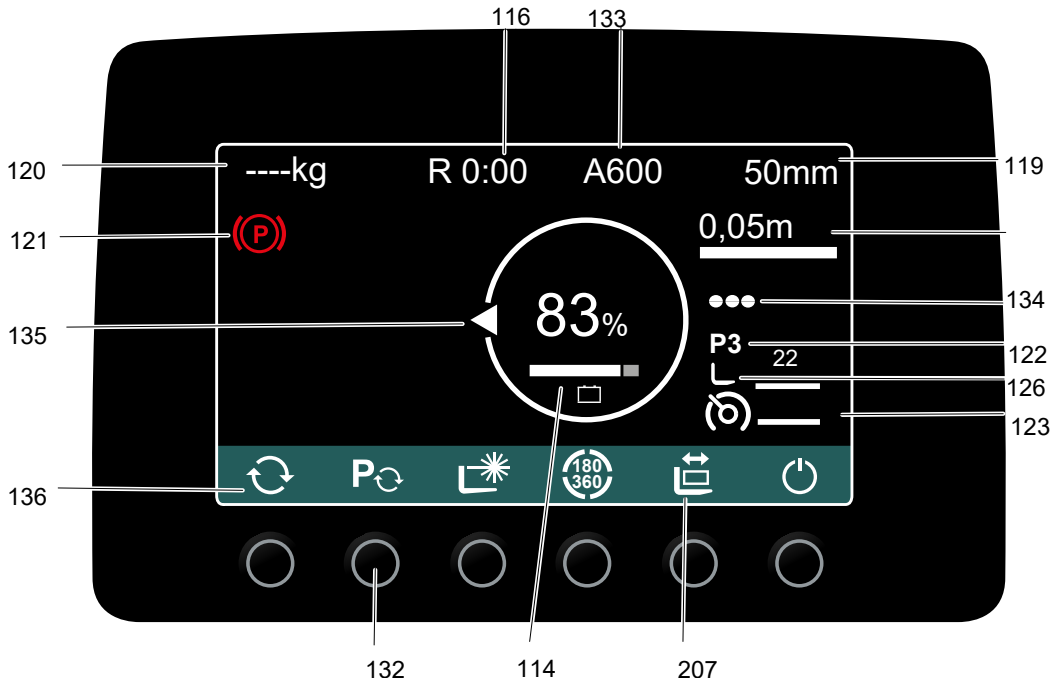
⚠ DANGER!

An incorrectly set load centre poses a risk of tipover

If the load centre is set too low, the warning will not sound in time. This may endanger the operational stability of the truck, causing it to tip over.

▶Set the correct load centre.

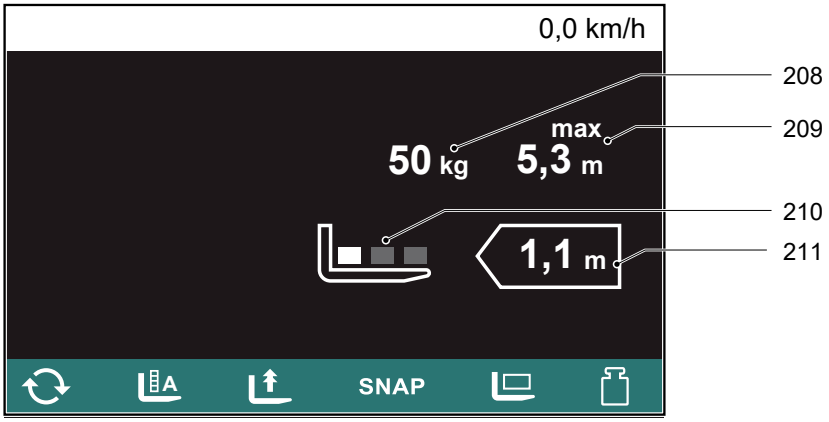




operationCONTROL is an assistance system. It maps the truck's capacity plates and informs the operator when the truck's capacity limit has been reached.

⚠ WARNING!

operationCONTROL is an assistance system that only works within tolerance levels. The capacity plate data is always binding for the operator.



The operationCONTROL assistance system makes it easier for the operator to work with loads by, for example, displaying the weight and remaining lift height of a raised load.

Operation

During lifting, when the load comes within less than 1000 mm of the maximum lift height indicated on the capacity plate, the "tip limit reached" symbol (205) flashes on the display and an audible signal sounds. As the load continues towards the maximum lift height, the interval of the audible signal reduces and the "tip limit reached" symbol (205) flashes more rapidly.

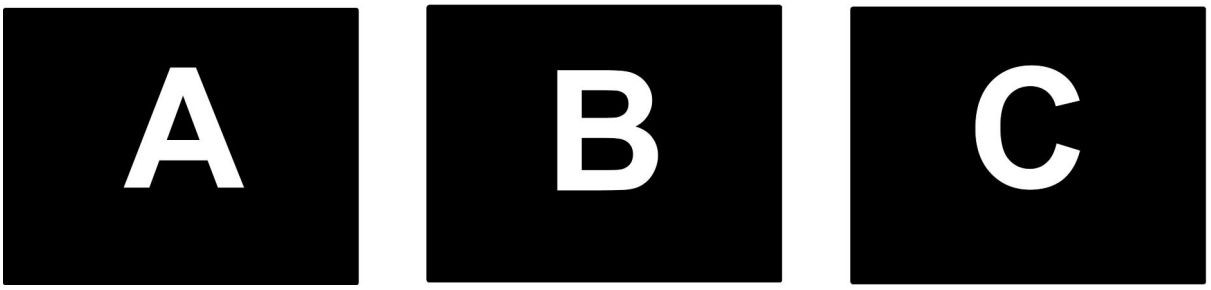
The load centre selected appears on the "load centre" display (133). Each capacity plate covers different load centres. Up to 3 load charts may be attached to the truck

at the factory, e.g. basic truck capacity, attachment capacity and min./max. capacity when using telescopic forks. The load charts are marked with corresponding letters (206).

The load centre is moved in the load direction or the drive direction using the softkeys listed here.

	Operation Control menu	Switches to the Operation Control menu
	Operation Control Load direction	Moves the load centre in the load direction
	Operation Control Drive direction	Moves the load centre in the drive direction

205



206

Setting the load centre

⚠ DANGER!

An incorrectly set load centre poses a risk of tipover

If the load centre is set too low, the warning will not sound in time. This may endanger the operational stability of the truck, causing it to tip over.

▶Set the correct load centre.

Procedure

- Record the letters of the capacity plate according to the attachment.
- Select the load centre that is relevant to the current stacking operation. To do this:
  - Press the program key (132).
  - Press the Operation Control menu (207).
  - Press program button A, B or C (206).
- The load centre selected appears in the "load centre" display (133).

The load centre is set.

Troubleshooting

Failure of the lift height sensor or the pressure sensor and calculation inconsistencies can cause the Operation Control assistance system to fail. If the Operation Control assistance system fails, the load distance symbol and "-----" are shown instead of the load centre on the driver's display. An event message is displayed.

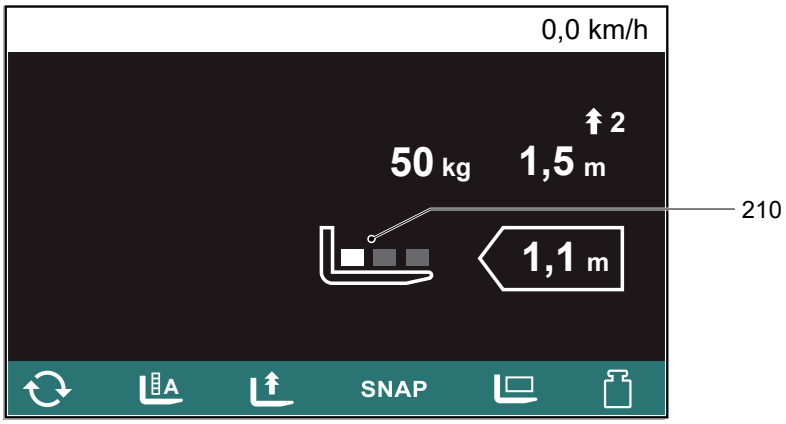
Item	Display or control element	Function
208	Current load weight	Shows the weight of the raised load.
209	Remaining lift height	Shows the lift height to which the current load may be raised according to the capacity plate, see page 51.
210	Load centre pre-selection	Indicates the area of the load handler in which the load centre is currently set.
211	Current load height	Shows the current height of the load.

Loads with a weight < 100 kg cannot be reliably detected by the system.

Function button assignment

Symbol	Meaning	Function
	Load centre (operationCONTROL)	Switches through the various load centre presettings.
	Fine weighing	Press briefly: Activates or deactivates the "fine weighing" function.
		Hold down (approx. 3 seconds): Activates tare mode.

11.10.1 Adjusting the Load Centre Setting (○)



The load centre preselection (210) allows the operator to set the area of the load handler in which the load centre is currently located.

Procedure

- Press the "load centre" function key until the desired load centre selection appears on the display.

The remaining lift height displayed is adjusted to the modified load centre setting.

Display symbols

Symbol	Meaning
	Load centre is at the rear of the load handler, closer to the mast.
	Load centre is at the front of the load handler, closer to the fork tips.
	Load centre is central on the load handler.

Function button assignment

Symbol	Meaning	Function
	Load centre (operationCONTROL)	Switches through the various load centre presettings.

11.11 Floor-Spot

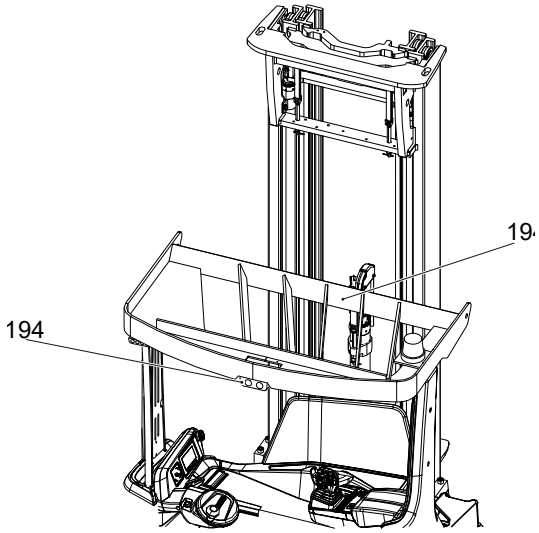
The floor spot serves as an auxiliary device and, with the travel direction switch engaged, projects a coloured dot on the floor at a distance of 4,5 m / 4 m.
When the truck travels forward, the coloured dot is in front of the truck. When reversing, it is behind the truck.

⚠ CAUTION!

Risk of accident due to restricted view

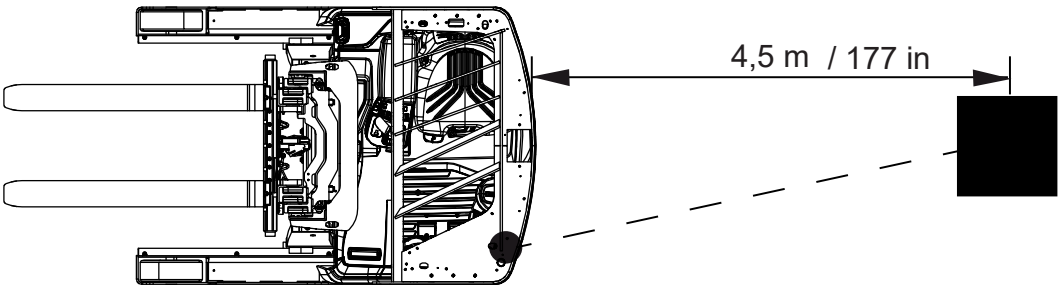
Looking directly at the Floor-Spot (LED light) can dazzle and temporarily impair eyesight.

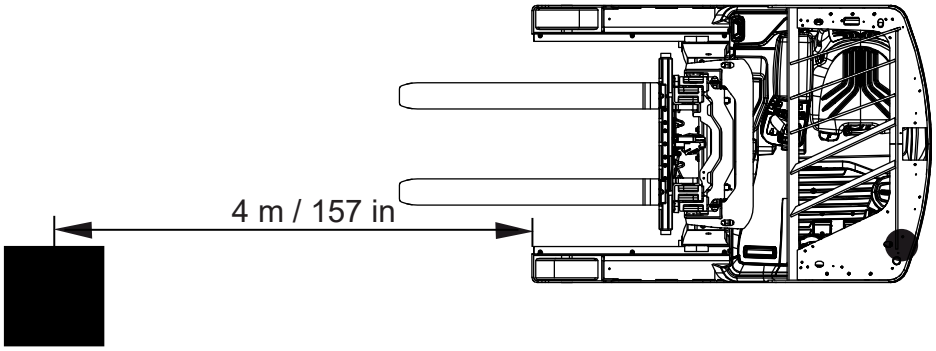
- ▶ Do not look directly at the Floor-Spot.
- ▶ Practise travelling and working with the Floor-Spot carefully.
- ▶ Do not change the factory setting.



The floor spot (194) is available both in the drive direction underneath the overhead guard and in the load direction above the overhead guard.

The position of the projected spot is preset in the factory.


4,5 m / 177 in


4 m / 157 in

11.11.1 Additional information on Floor-Spot blue

The activated Floor-Spot gives persons advance warning of the travel path of the forklift truck by projecting a blue dot onto the ground at a set distance.

⚠ CAUTION!

Risk of accident due to dazzling

Looking directly into the light beam of the Floor-Spot can dazzle and temporarily impair eyesight.

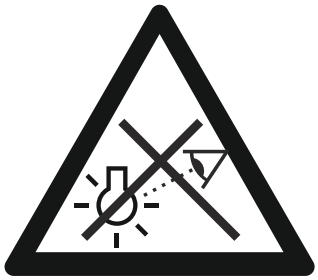
- ▶ Do not look directly into the light beam of the Floor-Spot.
- ▶ Do not adjust the position and alignment of the Floor-Spot on the truck.

⚠ CAUTION!

Risk of retinal damage due to blue light

The Floor-Spot on the truck is classified in risk group 2 according to the standard IEC 62471: medium risk. In the range of 400 nm to 780 nm, blue light can potentially damage the retina of the human eye.

- ▶ Check that the warning notice: "Caution! Potentially dangerous optical radiation" is present and legible, and replace if necessary.
- ▶ Do not look directly into the light beam of the Floor-Spot.
- ▶ When performing maintenance and repairs, take the Floor-Spot out of service, e.g. by disconnecting the battery, and secure it against unintentional recommissioning.



The warning notice "Caution! Potentially dangerous optical radiation" is attached to the side of the chassis or to the overhead guard. Small warning notices are attached to the side of the Floor-Spot.

11.12 Integrated Fork Positioner with Telescopic Forks and Hold-down Device

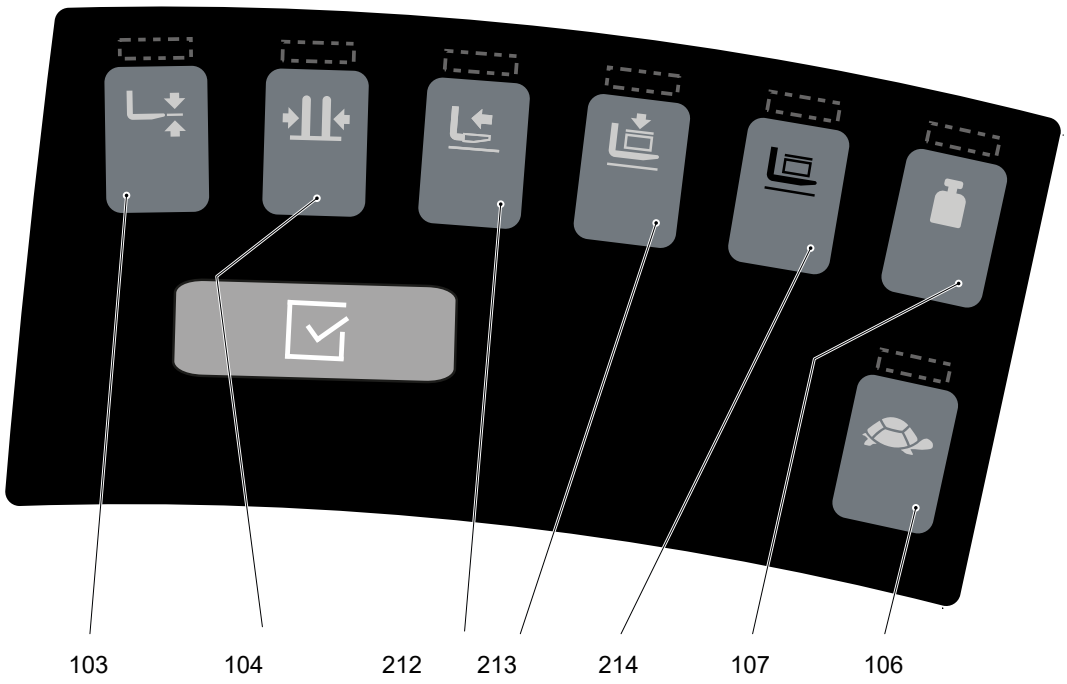
Application

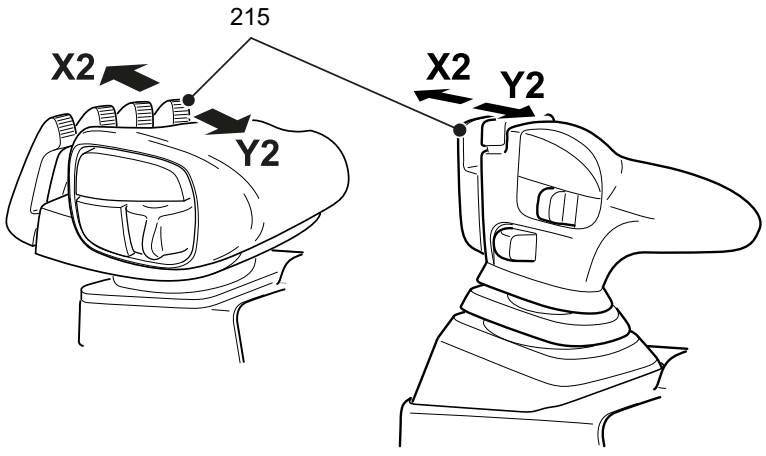
The hold-down device can be used to stabilise loads. This increases safety during transport and when storing and retrieving loads.

If no load is clamped, the "fork positioner" function is activated when the truck is switched on.

The "hold-down device" function remains activated whenever a load is clamped; in this state it is not possible to switch to the "fork positioning" or "telescoping" function. The "hold-down" function even remains active when the truck is switched off then back on again if a load is clamped.

➔ Whenever one of the "fork positioning", "telescoping" or "hold-down device" functions is activated, the other two are deactivated.





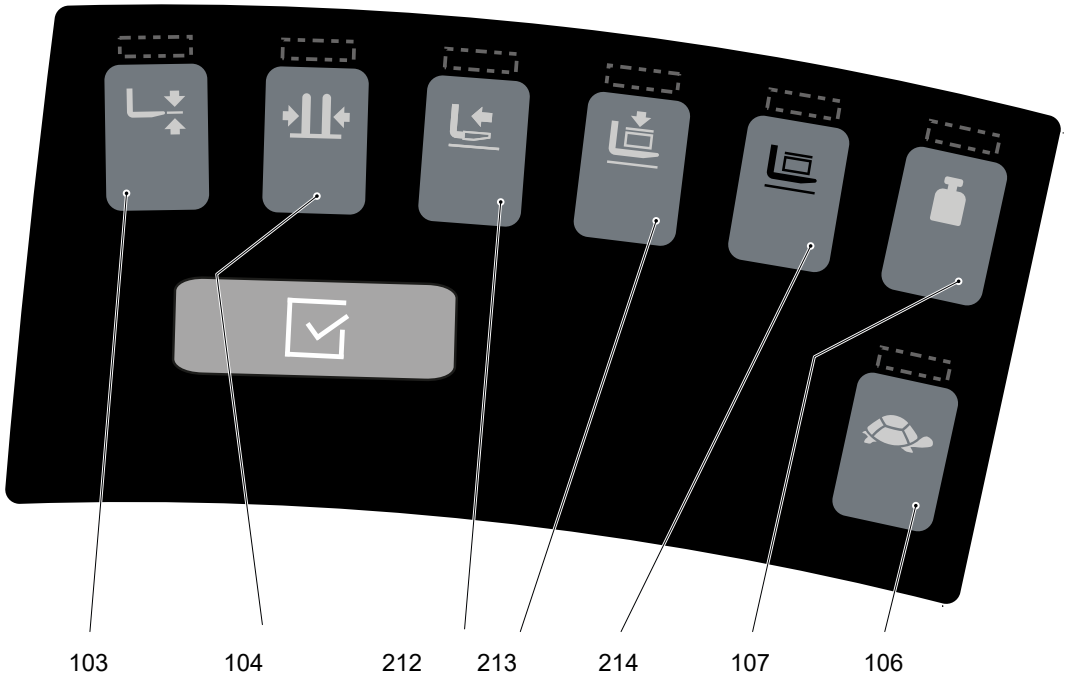
Item	Control and display item	Function
103	"Horizontal tilt" button	Activates the "horizontal fork tilt" function: While the button is held down, the LED is lit and the load forks are placed horizontal. When the load forks reach the horizontal tilt position, the display unit shows the "horizontal tilt" symbol (see page 101).
104	"Fork positioning" button	Activates the "fork positioning" function: Actuating the control (215) in direction X2 increases the fork spread; actuating in direction Y2 decreases the fork spread. While the function is active, the LED is lit.
212	"Telescoping" button	Activates the "telescoping" function: Actuating the control (215) in direction X2 extends the telescopic forks; actuating in direction Y2 retracts the telescopic forks. While the function is active, the LED is lit.
213	"Hold-down device" button	Activates the "hold-down device" (stabiliser) function: Actuating the control (215) in direction X2 first folds down and then moves up the hold-down device; actuating in direction Y2 first moves down and then folds up the hold-down device. While the function is active, the LED is lit.
214	"Hold-down device" LED	Remains lit whenever the hold-down device is clamping and stabilising the load.
107	"Weigher" button	Weighing function – see page 202
106	"Slow travel" button	Activates and deactivates the "slow travel" function. While the function is active, the LED is lit.

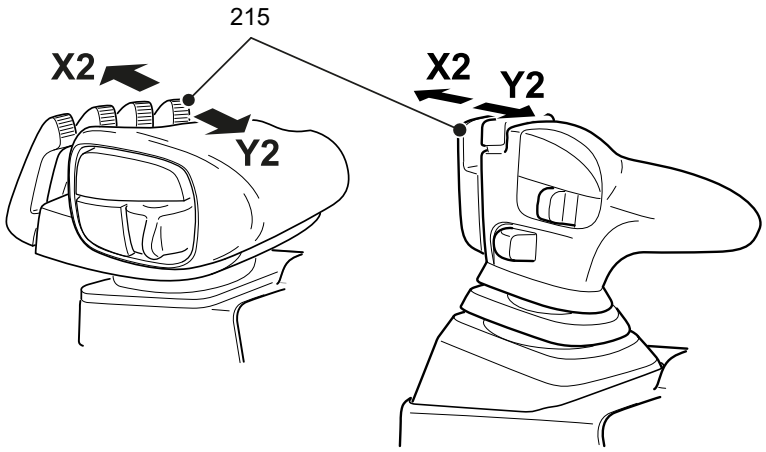
11.13 Integrated Fork Positioner with Telescopic Forks

Actuating the corresponding button activates the "fork positioning" or "telescoping" function.

When the truck is switched on, the "fork positioning" function is activated.

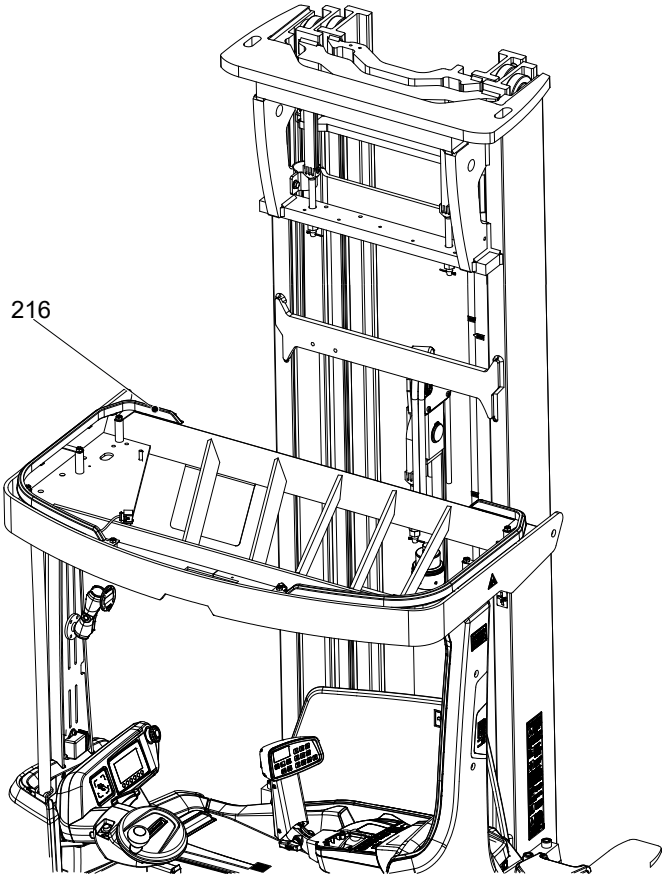
➔ Whenever the "fork positioning" or "telescoping" function is activated, the other function is deactivated.





Item	Control and display item	Function
103	"Horizontal tilt" button	Activates the "horizontal fork tilt" function: While the button is held down, the LED is lit and the load forks are placed horizontal. When the load forks reach the horizontal tilt position, the display unit shows the "horizontal tilt" symbol (see page 101).
104	"Fork positioning" button	Activates the "fork positioning" function: Actuating the control (215) in direction X2 increases the fork spread; actuating in direction Y2 decreases the fork spread. While the function is active, the LED is lit.
212	"Telescoping" button	Activates the "telescoping" function: Actuating the control (215) in direction X2 extends the telescopic forks; actuating in direction Y2 retracts the telescopic forks. While the function is active, the LED is lit.
213	"Hold-down device" button	Button not used ➔ Button used only on versions with "hold-down device" (stabiliser) – see page 214.
214	"Hold-down device" LED	LED not used ➔ LED used only on versions with "hold-down device" (stabiliser) – see page 214.
107	"Weigher" button	Weighing function – see page 202
106	"Slow travel" button	Activates and deactivates the "slow travel" function. While the function is active, the LED is lit.

11.14 SmartStripe



Light strip (216) on the overhead guard

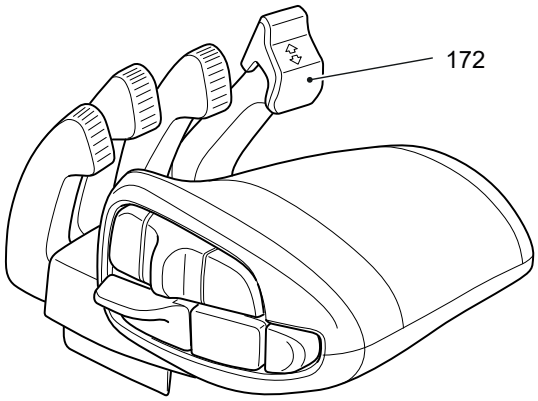
11.14.1 SmartStripe daytime running light

The light strip (216) lights up white, is divided in two, and is clearly visible from all angles, even from a distance.

11.14.2 SmartStripe brake light

When braking, the brake light (216) lights up red. It warns trucks following behind.

11.14.3 SmartStripe travel direction indicator



The travel direction indicator (216) in the light strip flashes yellow. It can be operated with the switch (172).

11.15 Floor-Stripes

Floor-Stripes, red, left, right

– The Floor-Stripes are optical warning devices that project a line along the entire length of the truck onto the ground at a distance of approximately 1 m from the truck. This is to alert third parties on the left and right to the hazardous area for pedestrians (operating area of the truck).

Floor-Stripes, red, left, right, drive direction

– The Floor-Stripes are optical warning devices that project a line along the entire length of the truck onto the ground at a distance of approximately 1 m from the truck. This is to alert third parties on the left and right and in the drive direction to the hazardous area for pedestrians (operating area of the truck).

11.16 Floor-Bow

Floor-Bow red, drive direction

The Floor-Bow is mounted on the overhead guard. The h6 dimension is exceeded by approximately 200 mm. Activation occurs when travelling in the drive direction.

11.17 USB power supply

The option includes one USB-A socket with 5.1 volts and a maximum of 1 amp in the armrest, and two USB-A sockets with 5.1 volts and a maximum of 2.4 amps each on an M device.

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 50.

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 253.

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 253.

⚠ WARNING!

Risk of accidents and damage to components

Any modification to the truck, in particular the safety mechanisms, is prohibited. Do not alter the truck's operating speeds under any circumstances.
Do not bond the front window with adhesive.

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

– Ensure that the changes to be made are planned, tested and performed by a specialist engineer in industrial trucks taking safety into account.
– Keep permanent records of the construction, tests and completion of changes

– Carry out and have authorised the respective changes to the capacity data plates, decals and stickers as well as the operating instructions and workshop manuals
– Attach a permanent and clearly visible marking to the truck indicating the types of changes made, the date of the changes and the name and address of the organisation responsible for the work.

NOTICE

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

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

On completion of inspection and service work, carry out the operations listed in the “Recommissioning the truck after cleaning or maintenance work section, see page 251.

⚠ WARNING!

Fire hazard

Welding operations on the truck can damage or ignite components.

▶ Do not performing welding operations on the truck.

2.1 Protective conductor resistor (○)

On equipment with an on-board charger, the maximum permissible value of the protective conductor resistor is 0,3 Ω.

2.2 Storage, Disposal and Transport

2.2.1 Storing the battery

NOTICE

Damage to the lithium-ion battery due to deep discharge

The charge status of the lithium-ion battery decreases during prolonged periods of non-use or storage. Damage to the lithium-ion battery may occur due to self-discharge.

▶ Disconnect the lithium-ion battery from the truck if it is to remain unused for longer than a week (e.g. detach the battery connector / interface connector).

▶ To protect against deep discharge, fully charge the lithium-ion battery before prolonged periods of non-use and every 4 weeks.

▶ If the battery charger features the "balancing" function, make sure that the balancing phase at the end of charging is completed. For further information on the "balancing" function, refer to the operating instructions for the battery charger.

2.2.2 Instructions for safe handling

NOTICE

Charge status of the lithium-ion battery on leaving the manufacturer's plant

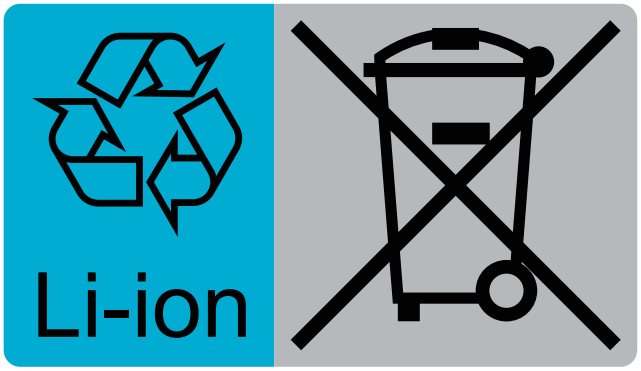
New lithium-ion batteries are transported and stored with a charge status of approximately 50%.

- 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 observe these safety instructions can result in fire.

2.2.3 Disposal and transport of a lithium-ion battery

2.2.3.1 Instructions for disposal



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

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

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

Instructions for disposal

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

▶ Lithium-ion batteries must be disposed of in compliance with applicable national environmental protection regulations or disposal laws.

▶ For disposal of lithium-ion batteries, contact the manufacturer's customer service department, a customer service department authorised by the manufacturer or an approved certified recycling company.

2.2.3.2 Shipping information

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

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

⚠ WARNING!

All persons involved in loading by crane must be trained

Incorrect crane loading procedures due to untrained personnel can result in the battery falling. There is a risk of injury to personnel and a risk of material damage to the battery.

- ▶ 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.

3 Shipping functional batteries

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

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

Sea transport – classification according to IMDG	
EmS	F-A, S-I
Danger label	
	UN 3480 lithium-ion battery class 9
IMDG limited quantity	LQ: -

Air transport – classification according to IATA	
Danger label	 UN 3480 lithium-ion battery class 9

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

NOTICE

New lithium-ion batteries are transported with a charge status of at least 50%.

4 Shipping faulty batteries

To transport defective lithium-ion batteries, contact the manufacturer's customer service department or a customer service department authorised by the manufacturer. Faulty lithium-ion batteries must not be transported independently.

5 Maintenance Safety Regulations

Maintenance personnel

The truck should only be serviced and repaired by the manufacturer's specialist customer service personnel who have been trained to do this. We therefore recommend that you enter into a maintenance contract with the manufacturer’s local sales office.

5.1 Cleaning

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

⚠ CAUTION!

Risk of fire due to use of flammable cleaning agents

Using flammable cleaning agents increases the risk of fire.

▶ Do not use any flammable cleaning agents when cleaning.

▶ Disconnect the plug connection to the energy sources before starting cleaning work.

▶ Before cleaning, take necessary safety measures to prevent spark formation (e.g. due to short circuits).

NOTICE

Risk of component damage when cleaning the truck

Cleaning with high-pressure cleaners or steam cleaners is not permitted.

Cabin cleaning

➔ The operating area should be cleaned regularly.

Remove small dirt particles in the cabin area regularly and thoroughly with a vacuum cleaner.

➔ Alternatively, use a broom or hand brush.

- Remove coarse dirt with a damp cloth.
- Clean windows with standard commercial window cleaner.
  Clean windows ensure higher work quality and more efficient work.
- When cleaning, make sure the window is not scratched by dirt particles.

External cleaning

- First, clean external surfaces and coarse dirt mechanically, then manually moisten and allow to soak
  - Then rinse or wipe manually.
- Sensitive components should only be handled gently or indirectly.
- To reduce drying time, you can vacuum out any remaining water.
- Finally, inspect the cleaned truck for any damage.

NOTICE

Risk of electrical-system damage

Cleaning the electronic system assemblies (controllers, sensors, motors etc.) with water can damage the electrical system.

- ▶ Do not clean the electrical system with water.
- ▶ Clean the electrical system with weak suction or compressed air (use a compressor with a water trap) and a non-conductive, anti-static brush.

After cleaning, carry out the operations detailed in "Restoring the truck to service after maintenance and repairs" (see page 251).

5.2 Working on the electrical system

⚠ CAUTION!

Risk of accidents due to electrical current

There is a risk of injury from electric shock when working on the electrical system. Work may only be carried out when de-energised. The capacitors in the control unit must be completely discharged.

Before starting maintenance on the electrical system:

- ▶ Only suitably trained electricians are permitted to work on the electrical system.
- ▶ Park the truck securely (see page 165).
- ▶ Terminate charging. (Remove the charge connector from the comfort charging socket; return the mains connector for the on-board charger to the park position).
- ▶ Disconnect communication connector X12 (225).
- ▶ Wait 10 seconds.
- ▶ Before working on the electrical system, take all precautionary actions to avoid electric shocks.
- ▶ Remove any rings, metal wristbands etc.

Process when connecting to the energy source

- Connect the + cable to all energy modules using the specified torque. Use new terminal screws, as well as a template and an in-line fuse
- Connect communication connector X12 (225) – see page 245.
- Complete the industrial truck.

5.3 Consumables and used parts

⚠ CAUTION!

Consumables and used parts are an environmental hazard

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

- ▶ Note the safety regulations when handling these materials.

5.4 Tyre type

⚠ WARNING!

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

The quality of the tyres affects the operational stability and performance of the truck.

Uneven wear reduces the operational stability of the truck and increases the stopping distance.

- ▶ When replacing tyres, make sure the truck is not skewed.
- ▶ Always replace tyres in pairs, i.e. left and right at the same time.
- ▶ For pneumatic tyres, only remove the steel ring when the tyre is depressurised.

When replacing rims and tyres fitted at the factory, only use the manufacturer's original spare parts. Otherwise the manufacturer's specifications cannot be ensured. If you have any queries, contact the manufacturer's customer service department.

During the wear test, the wear limit of the respective wheel must be observed.

5.5 Lift Chains

⚠ WARNING!

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

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

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

5.6 Hydraulic system

⚠ WARNING!

Leaky hydraulic systems can result in accidents

Hydraulic oil can escape from leaky and faulty hydraulic systems.

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

⚠ WARNING!

Faulty hydraulic hoses can result in injury and infection

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

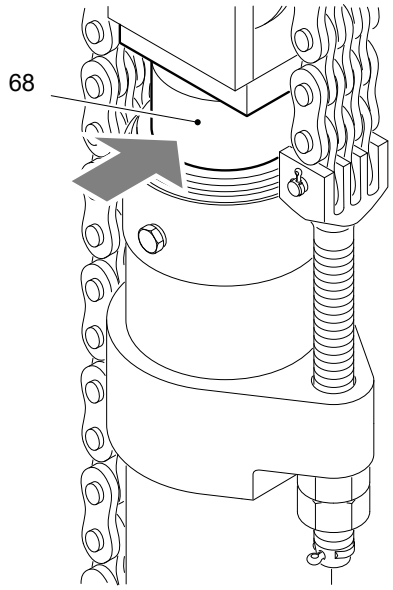
▶ Call for a doctor immediately in the event of an injury.
▶ Do not touch pressurised hydraulic hoses.
▶ Report any defects immediately to your supervisor.
▶ Mark defective truck and take it out of service.
▶ Do not return the industrial truck to service until you have identified and rectified the fault.

Checking and replacing hydraulic hoses

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

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

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



⚠ WARNING!

Possible faults with hydraulic functions on trucks with cold store equipment

Starting up the truck after a long period of non-use or at ambient temperatures outside the intended cold store range can lead to unusual noise, jerky cylinder movements and damage to the hydraulic system.

▶Execute hydraulic functions only in cold store temperatures.

▶Spray piston rod ends (68) with chain spray after extended periods out of use.

6 Lubricants and Lubrication Schedule

6.1 Handling consumables safely

Handling consumables

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

⚠ WARNING!

Improper handling is hazardous to health, life and the environment

Consumables can be flammable.

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

⚠ CAUTION!

Spilled consumables can cause slipping and endanger the environment

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

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

⚠ WARNING!

Improper handling of oils can be hazardous

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

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

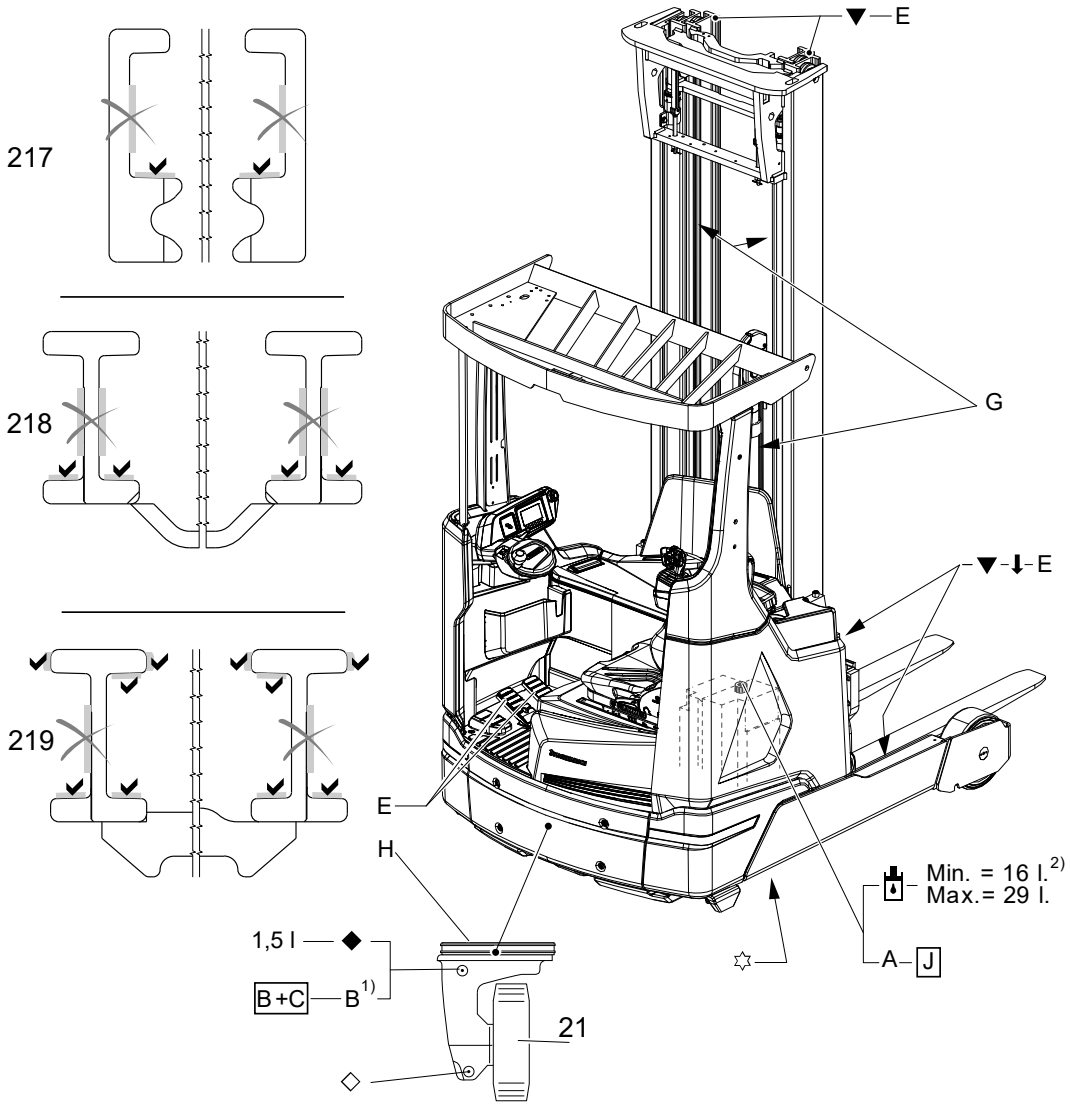
⚠ CAUTION!

Consumables and used parts are an environmental hazard

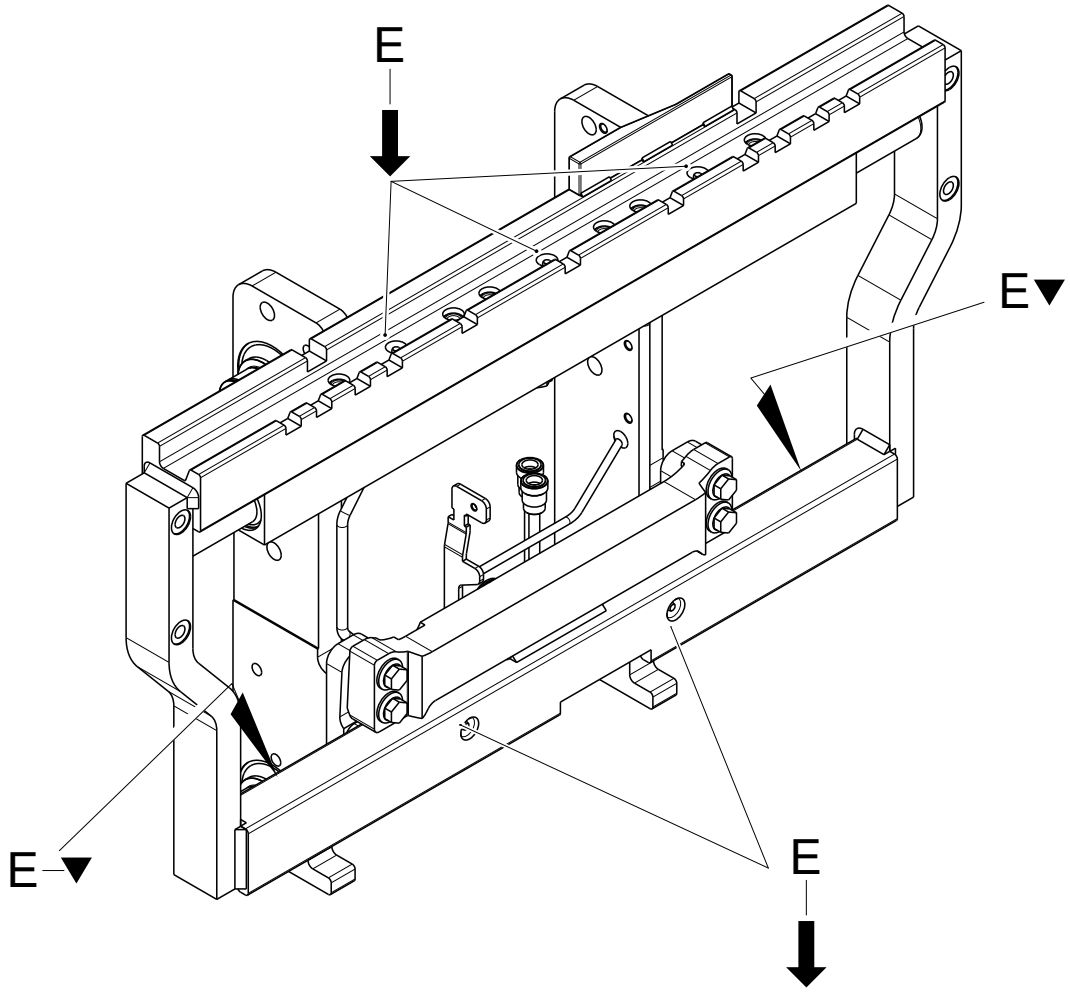
Used parts and consumables must be disposed of in accordance with the applicable environmental-protection regulations. Oil changes should be carried out by the manufacturer's customer service department, whose staff are specially trained for this task.

▶Note the safety regulations when handling these materials.

6.2 Lubrication Schedule



✕	Surfaces must be grease-free.
21	Drive wheel
217	Outer mast frame
218	Centre mast frame
219	Inner mast frame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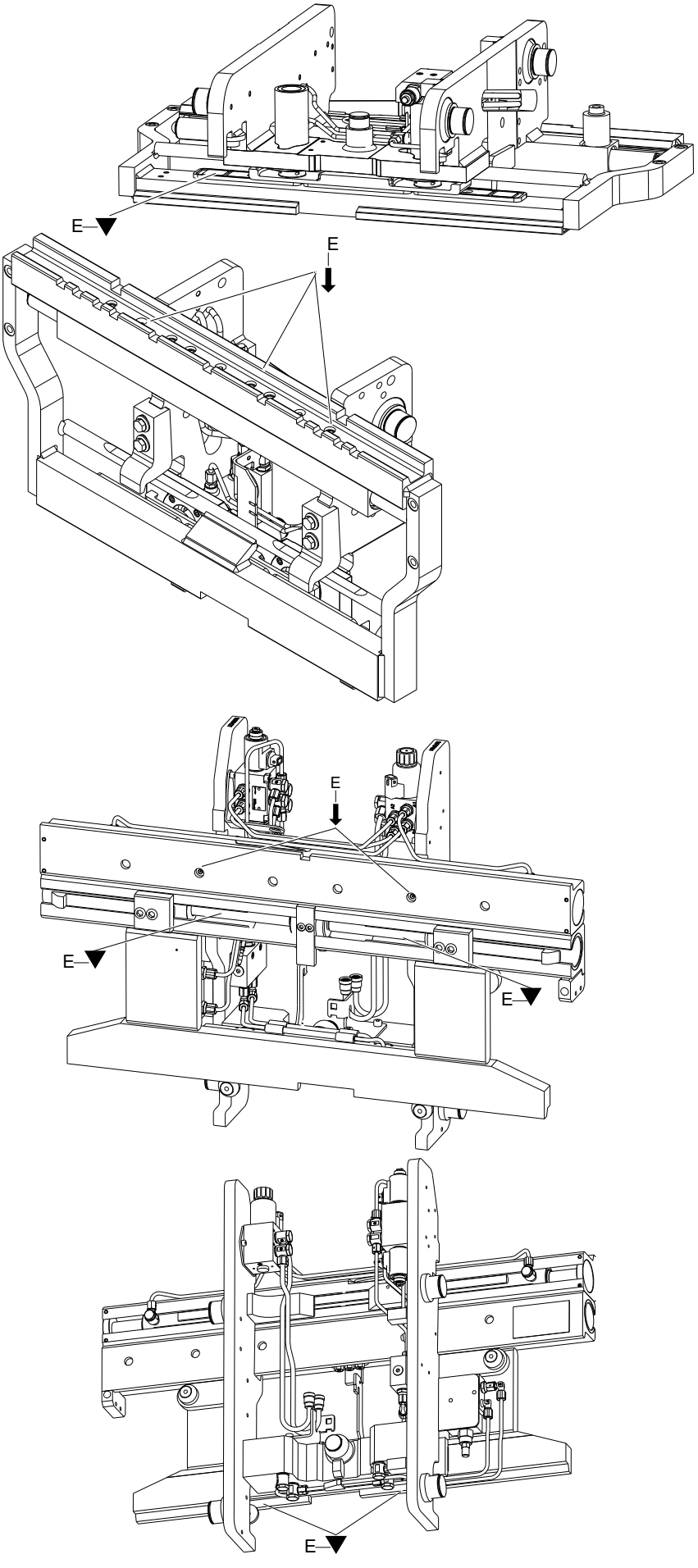
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▼	Contact surfaces	✡	Hydraulic oil drain plug
⬇	Grease nipple	◆	Transmission oil filler neck
	Hydraulic oil filler neck	◇	Transmission oil drain plug

Hydraulic oil volumes

Marking	Litres
I	9
II	14
III	19
IV	24
V	28
Top edge	29

6.3 Consumables

Code	Order no.	Supplied quantity	Designation	Used for
A	51132827*	5.0 l	Jungheinrich hydraulic oil	Hydraulic system
	51081875	5.0 l	Cold store hydraulic oil ISO15	
B	52030273	1.0 l	CLP 100DIN 51517	Fuchs Titan SuperGear 80W90
E	29 201 430	1.0 kg	Grease, DIN 51825	Lubrication
G	29 201 280	400 ml	Chain spray	Chains
H	51142294	300 ml	Spray grease	Teeth

* The trucks are factory-equipped with a special hydraulic oil (the Jungheinrich hydraulic oil with a blue colouration). The Jungheinrich hydraulic oil is available only from the Jungheinrich service department. The use of named alternative hydraulic oils is not prohibited, but may lead to a decline in functionality. The Jungheinrich hydraulic oil may be mixed with one of the named alternative hydraulic oils.

Grease guidelines

Code	Saponification	Dew point °C	Worked penetration at 25 °C	NLG1 class	Application temperature °C
E	Lithium	185	265 - 295	2	-35/+120

7 Maintenance and repairs

7.1 Preparing the truck for maintenance and repair work

All necessary safety measures must be taken to avoid accidents when carrying out maintenance and repair work. The following preparations must be made:

Procedure

- Park the truck on a level surface.
- Fully lower the main and auxiliary lift.
- Park the truck securely – see page 165.
- Switch off the truck; to do this:
  - Turn the key (○) in the key switch left as far as the stop and remove the key, or
  - Keyless access systems (○) – see page 171.
- Press the emergency disconnect switch.
- Secure the truck against unwanted start-up.
- When working under a raised truck, secure it to prevent it from lowering, tipping or sliding away.

⚠ WARNING!

Risk of accidents when working under the load handler, driver's cab and lift truck

▶When working under a raised load handler, driver's cab or a raised truck, secure them to prevent the truck from from lowering, tipping or sliding away.

▶When raising the truck, follow the instructions, see page 57. When working on the parking brake, prevent the truck from accidentally rolling away (e.g. with wedges).

7.2 Lifting and jacking up the truck safely

⚠ DANGER!

A truck tipover can cause accidents

In order to raise the truck, use only suitable lifting gear at the points specially provided for this purpose.

▶ Note the weight of the truck on the data plate.

▶ Always use a jack with sufficient capacity.

▶ Raise the unladen truck on a level surface.

▶ When raising the truck, take appropriate measures to prevent it from slipping or tipping over (e.g. wedges, wooden blocks).

Raising and jacking up the truck securely

Requirements

– Prepare the truck for maintenance and repairs (see page 238).

Tools and Material Required

– Jack
– Hard wooden blocks

Procedure

• Place the jack against the contact point.

➔ Jack contact point, see page 52.

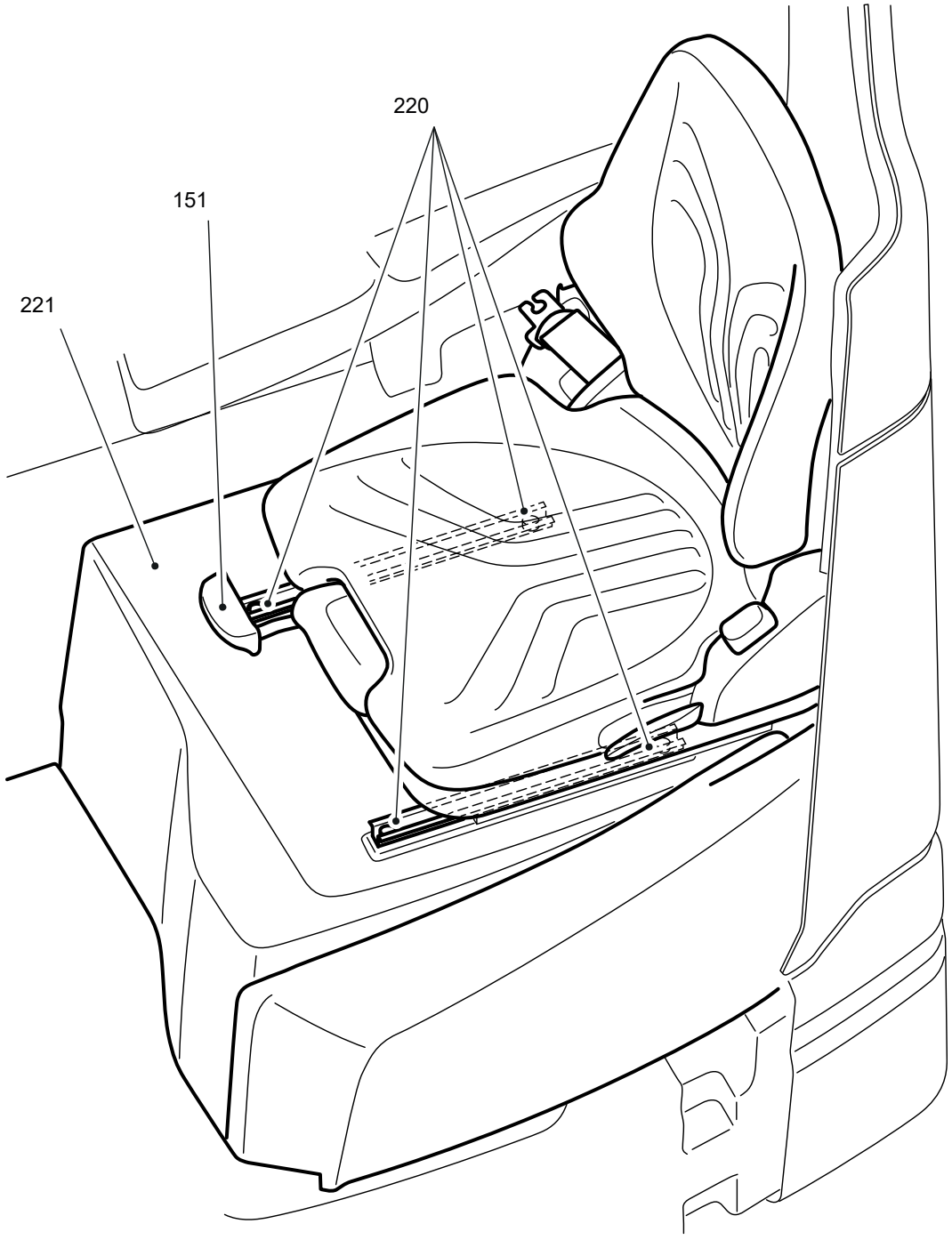
• Raise the truck.
• Support the truck with hard wooden blocks.
• Remove the jack.

The truck is now securely raised and jacked up.

➔ To lower the truck, proceed in reverse order.

7.3 Removing or installing the seat cover

➔ The inspection must only be carried out by maintenance personnel, qualified personnel or specially trained specialists.



Removing the seat panel

Requirements

– Adjust the seat backrest vertically.

Procedure

- Pull the seat locking lever (151) upwards and move it backwards.
- Disconnect the plug connections on the seat.
- Remove the screws at the front (220).
- Pull the seat locking lever (151) upwards and move it forwards.
- Remove the screws at the rear (220).

- Remove the driver’s seat.
- Remove the seat cover (221).
- Assembly is carried out in reverse order.

The seat cover is now removed.

➔ The drive unit and hydraulic aggregate can be made accessible for service by removing the seat panel.

7.4 Checking the hydraulic oil level

The inspection must only be carried out by maintenance personnel, qualified personnel or specially trained specialists.

⚠ CAUTION!

Hydraulic oil can reach high temperatures, which can cause burns.

There is a risk of injury.

▶ Ensure the tank has cooled before unscrewing the cap.

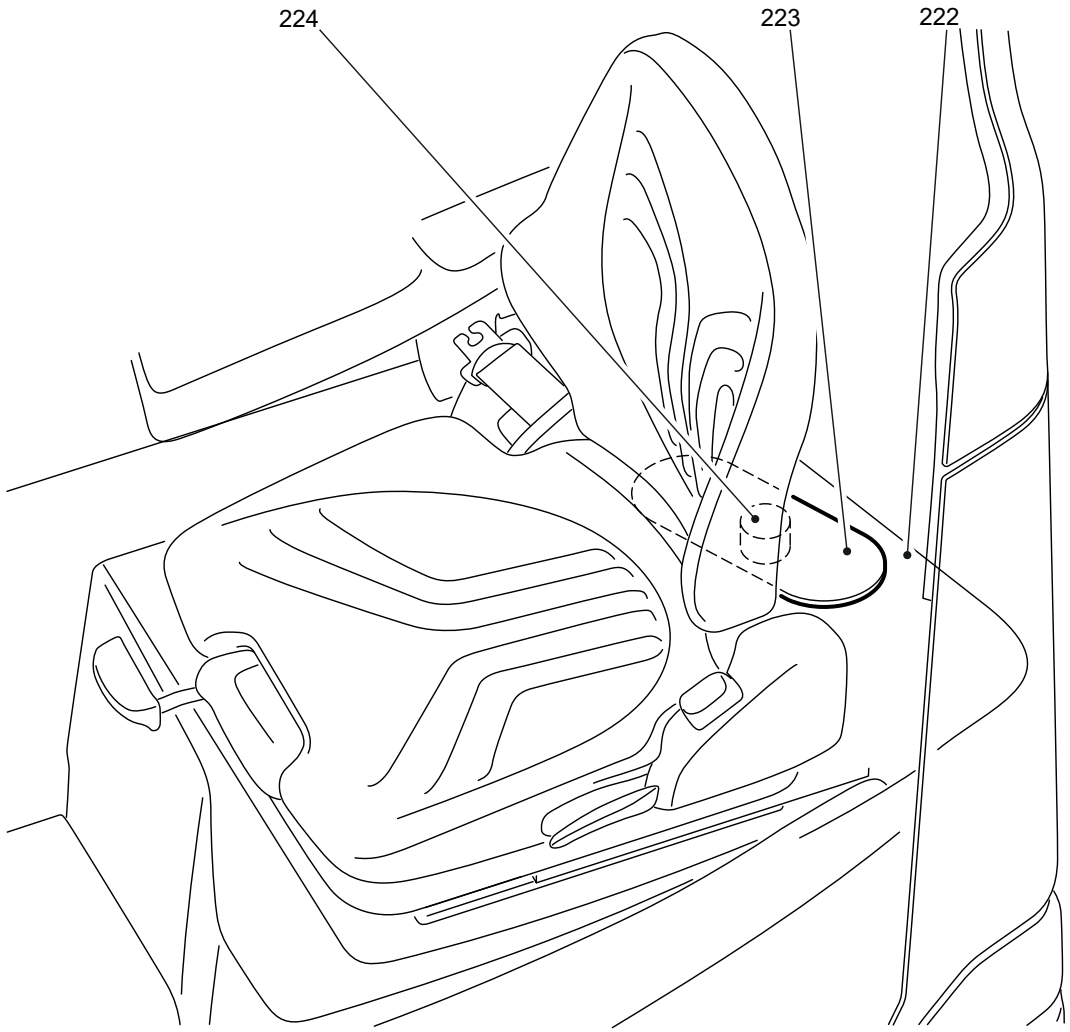
⚠ CAUTION!

The hydraulic oil is pressurised during operation and is a hazard to health and to the environment.

▶ Do not spill hydraulic oil.

▶ The mixture of bonding agents and consumables must be disposed of in accordance with relevant regulations.

▶ Comply with the hydraulic oil manufacturer's instructions for handling hydraulic oil.



Checking the hydraulic oil level

Requirements

– Truck prepared for maintenance and repair work – see page 238.

Procedure

- Push the driver's seat forward.
- Remove the rubber cover (223).
- Open the cap (224).
- Check the oil level in the hydraulic reservoir (222).

➔ Only read the hydraulic oil level on the dipstick on the hydraulic reservoir when the load handler is fully lowered.

- If necessary add hydraulic oil of the correct grade in the filler neck.
- Push the seat back into position and engage the locking lever.

The hydraulic oil level has been checked.

DZ mast (max. lift height in cm)	Marking	Tank filling in litres
400 - 499	Approx. mark I	9
500 - 599	Between marks I and II	
600 - 699	Between marks I and II	
700 - 799	Between marks I and II	
800 - 899	Approx. mark II	14
900 - 999	Between marks II and III	
1000 - 1099	Approx. mark III	19

7.5 Checking the electrical fuses

The inspection must only be carried out by maintenance personnel, qualified personnel or specially trained specialists.

Checking electrical fuses

Requirements

– Remove the knee compartment panel.

Procedure

- Check the fuse ratings against the table and replace if necessary.

The electrical fuses have now been checked.

7.5.1 Electric fuses

⚠ CAUTION!

Risk of accidents due to electrical current

There is a risk of injury from electric shock when working on the electrical system. Work may only be carried out when de-energised. The capacitors in the control unit must be completely discharged.

Before starting maintenance on the electrical system:

▶ Only suitably trained electricians are permitted to work on the electrical system.

▶ Park the truck securely (see page 165).

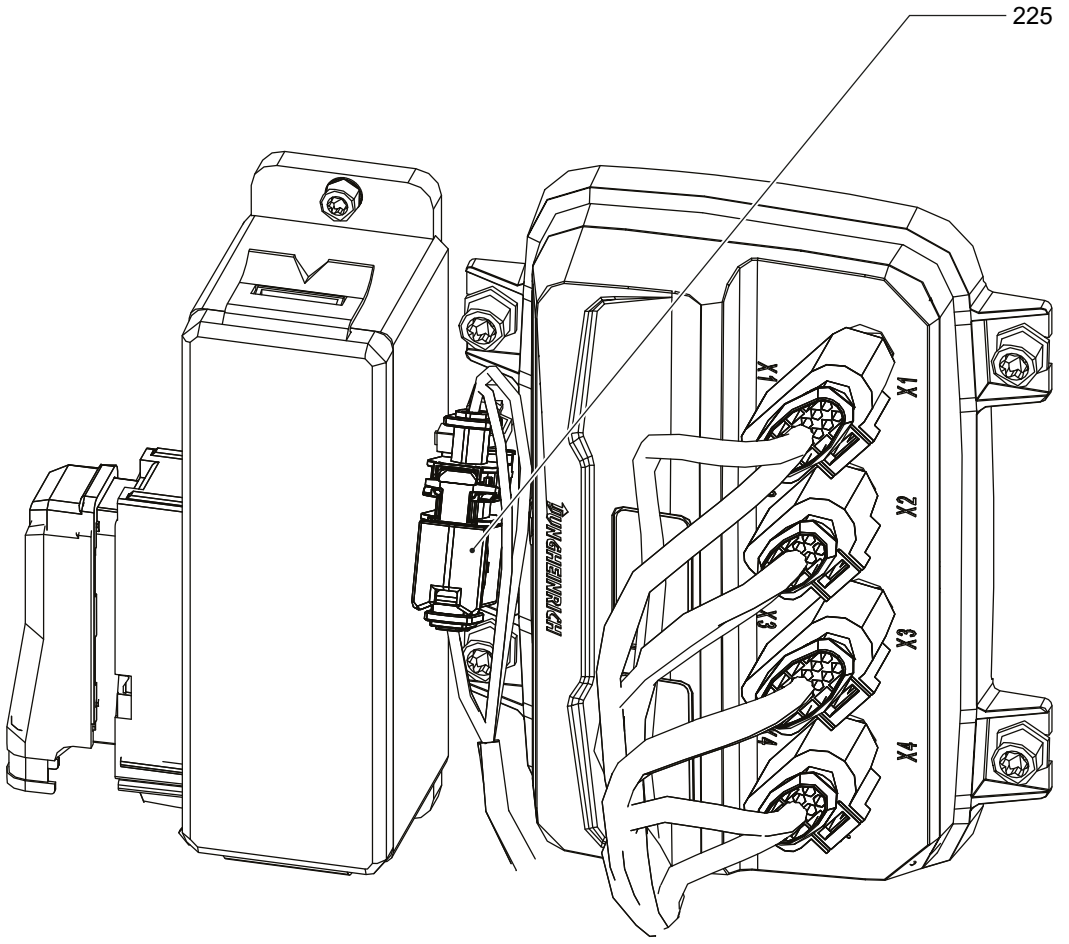
▶ Terminate charging. (Remove the charge connector from the comfort charging socket; return the mains connector for the on-board charger to the park position).

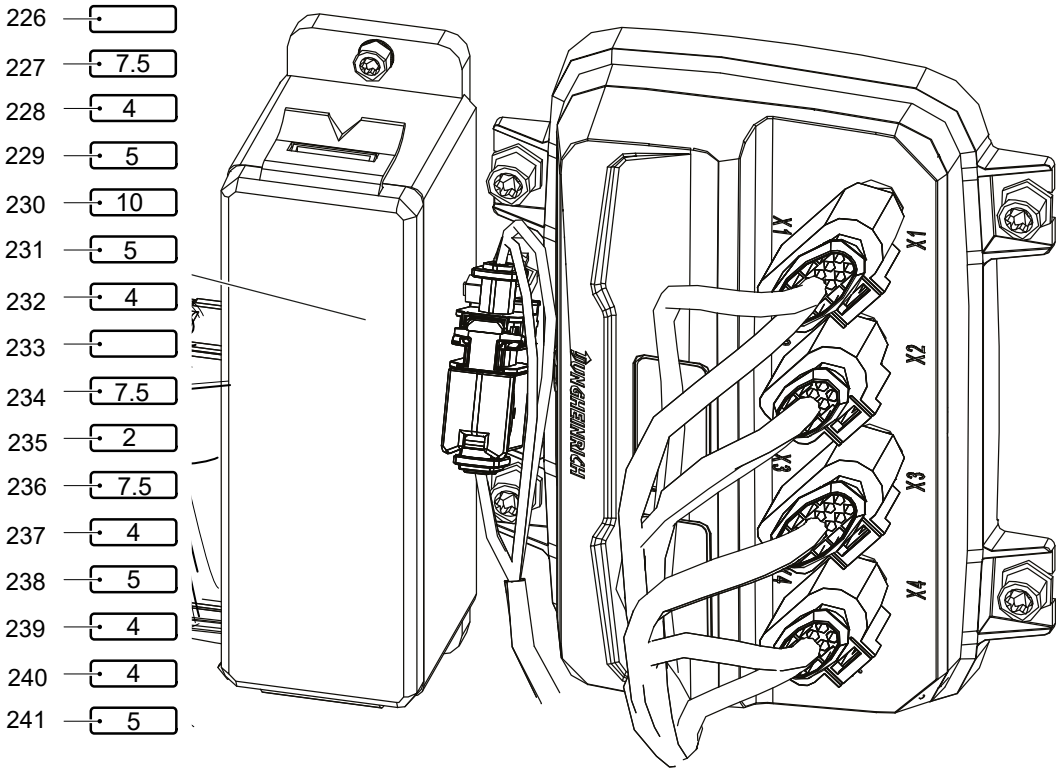
▶ Disconnect communication connector X12 (225).

▶ Wait 10 seconds.

▶ Before working on the electrical system, take all precautionary actions to avoid electric shocks.

▶ Remove any rings, metal wristbands etc.


225
X1
X2
X3
X4
JUNGHEINRICH


226
227 7.5
228 4
229 5
230 10
231 5
232 4
233
234 7.5
235 2
236 7.5
237 4
238 5
239 4
240 4
241 5
X1
X2
X3
X4
JUNGHEINRICH

Fuse ratings

Item	Description	Application	Rating [A]
226	9FC1	Not assigned	
227	9FC2	Steering	7.5
228	9FC3	Travel / lift control	4
229	9FC4	Travel drive system	5
232	9FC21	Rack height select	4
233	9FC22	Not assigned	
234	9FC23	Converter	7.5
235	9FC31	SmartStripe	2
236	9FC44	Charging socket	4
237	9FC41	Mast lighting	4
238	9FC42	Floor-Spot	5
239	9FC43	Horn	4
240	9FC44	Battery charger	4
241	9FC45	Truck activation	4

7.5.2 Connect to the power source

Process when connecting to the energy source

- Connect the + cable to all energy modules using the specified torque. Use new terminal screws, as well as a template and an in-line fuse
- Connect communication connector X12 (225) – see page 245.
- Complete the industrial truck.

7.6 Checking the attachment of the wheels

Checking the wheel attachment

Requirements

– Truck prepared for maintenance and repairs, see page 238.

Tools and Material Required

– Torque wrench

Procedure

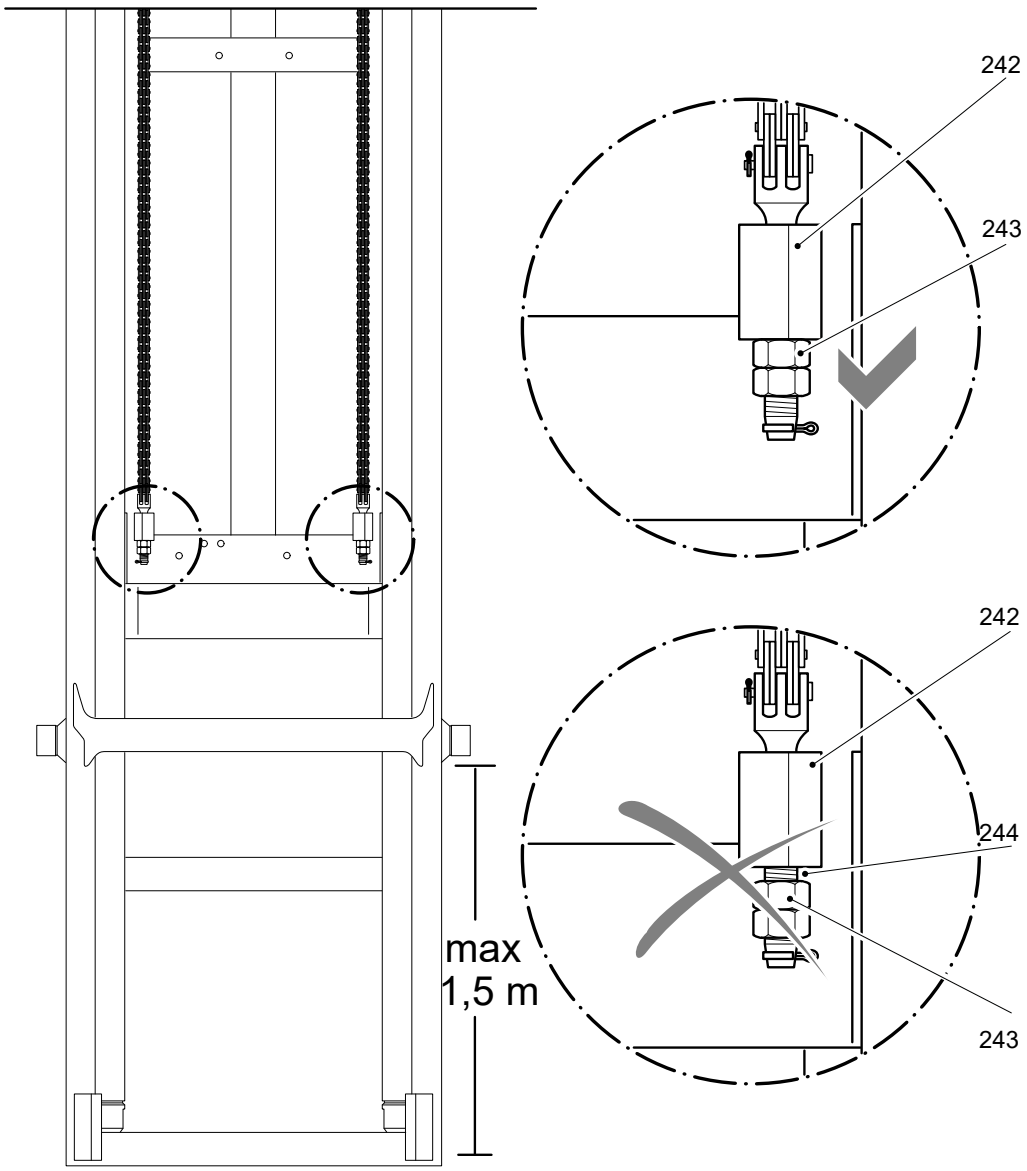
• Tighten the wheel bolts crosswise with a torque wrench.

➔ For torque see table:

The wheel attachment is now checked.

7.7 Check the mast lift chains

➔ The inspection must only be carried out by maintenance personnel, qualified personnel or specially trained specialists.



To be performed every 50 service hours, but at least once a week.

Check that the mast lift chains are evenly tensioned.

Mast lift chains must support the load evenly and typically have uniform tension.

- Extend the mast to approximately 1.5 m at full mast lift (the lower chain connection in the inner mast must be visible).
- The upper lock nut (243) must be firmly in contact with the chain holder (242) on both sides. There must not be any air gap (244) visible on either side.

8 Decommissioning the Industrial Truck

➔ The inspection must only be carried out by maintenance personnel, qualified personnel or specially trained specialists.

If the truck is to be out of service for more than a month, it must be stored in a frost-free and dry room. All necessary measures must be taken before, during and after decommissioning as described hereafter.

When the truck is out of service it must be jacked up so that all the wheels are clear of the ground. This is the only way of ensuring that the wheels and wheel bearings are not damaged.

➔ Jack up the truck, see page 239.

If the truck is to be out of service for more than 6 months, agree further measures with the manufacturer's customer service department.

8.1 Prior to decommissioning

Procedure

- Thoroughly clean the truck – see page 227.
- Prevent the truck from rolling away accidentally.
- Check the hydraulic oil level and top up if necessary, see page 242.
- 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 234.
- Charge the battery – see page 86.

➔ Also observe the battery information – see page 89.

Procedure

- Thoroughly clean the truck – see page 227.
- Prevent the truck from rolling away accidentally.
- Check the hydraulic oil level and replenish if necessary, see page 232.
- Apply a thin layer of oil or grease to any non-painted mechanical components.
- Lubricate the truck according to the lubrication diagram, see page 234.
- Charge the battery, see page 86.
- Disconnect and clean the battery.
- Clean the terminal screws, grease them with terminal grease and screw them into the connection thread to prevent short circuits.

➔ In addition, follow the battery manufacturer’s instructions.

8.2 During decommissioning

NOTICE

Full discharge can damage the battery

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

▶Charge the battery at least every 2 months.

Charge the battery, see page 86.

8.3 Restoring the truck to service after decommissioning

Procedure

- Thoroughly clean the truck – see page 227.
- Lubricate the forklift truck according to the lubrication schedule – see page 234.
- Charge the battery – see page 86.
- Start up the truck – see page 115.

9 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.

10 Final de-commissioning, disposal

➔ 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.

11 Human vibration measurement

➔ Vibrations that affect the operator over the course of the day are known as human vibrations. Excessive human vibrations will cause the operator long term health problems. The European "2002/44/EC/Vibration" operator directive has therefore been established to protect operators. To help operators to assess the application situation, the manufacturer offers a service of measuring these human vibrations.

G Maintenance, Inspection and Changing of Maintenance Parts Requiring Replacement

⚠ WARNING!

Lack of maintenance can result in accidents

Failure to perform regular maintenance and inspections can lead to truck failure and poses a potential hazard to personnel and equipment.

▶Thorough and professionally carried out maintenance and inspection is one of the most important conditions for the safe use of the truck.

NOTICE

The application conditions of a truck have a considerable impact on component wear. The following service, inspection and replacement intervals are based on single-shift operation under normal operating conditions. The intervals must be reduced accordingly if the equipment is to be used in very dusty conditions, sharp temperature fluctuations or multiple shifts.

▶To prevent damage due to wear, the manufacturer recommends an on-site application analysis to agree on appropriate intervals.

The following chapter defines the tasks to be performed, the respective intervals to be observed and the maintenance parts for which replacement is recommended.

1 Maintenance Contents ETM/V 214i/216i

Issued on: 2025-06-17 14:00

1.1 Owner

To be performed every 50 service hours, but at least once a week.

1.1.1 Maintenance contents

1.1.1.1 Standard equipment

Brakes
Test the brake.
Test the emergency stop brake.

Hydraulic operations
Lubricate the load chains.
Correct the hydraulic-oil level.

1.1.1.2 Optional Equipment

Fork positioner

Hydraulic operations
Clean and grease attachment bearings, guides and stops.

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
charge socket for functionality and damage.

Travel
Visually inspect the wheels for damage.

Chassis / structure
Check labels are present and complete.
Inspect the safety device for presence, functionality, contamination, and damage.

Hydraulic operations
Test hydraulic system

1.1.2.2 Optional Equipment

The following points must be checked:

Cold store cabin

Chassis/structure
Windscreens for damage
Test doors and check for damage

Standard on-board charger

Battery charger
Mains plug and mains cable for damage

Fork positioner

Hydraulic operations
Fork positioner for functionality and damage

Restraint system

Chassis/structure
Test driver's seat restraint system and check for damage

Strobe light/warning beacon

Electrical system
Test strobe light/warning beacon and check for damage

1.2 Customer Service

In accordance with the ETM/V 214i/216i 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
Measure the air gap of the magnetic brake.
Test the emergency stop brake.

Electrical system
Test the contactors and/or relays.
Perform insulation inspection.

Energy supply
Test the immobiliser on industrial trucks with an external charge connector (flap switch).

Travel
Correct the transmission oil level or grease filling of the transmission.

Chassis/structure
Note: Check the torques of the seat frame.
Inspect the weld seams of the entry handle and the connection for crack formation and deformation.
Grease the rails.
Measure the height-related and capacity-related settings.

Hydraulic operations
Adjust the slide pieces.
Adjust the load chains and check for elongation.
Lubricate the load chains.
Test emergency lowering.
Correct the hydraulic-oil level.
Test and adjust the pressure relief valve.
Mounting and safeguard against side shift frame detachment for wear and correct function
Test the side shift adjustment.
Where two tilt cylinders with the same stroke are used, measure their relative adjustment.

Agreed services
Carry out a test run with the rated capacity or a customer-specific load.
Lubricate the truck according to the lubrication schedule.
Demonstration after maintenance.

Steering
Inspect the weld seam of the steering console for deformation and crack formation.
Lubricate the steering toothing or steering chain according to the lubrication schedule.

1.2.1.2 Optional Equipment

Standard on-board charger

Battery charger
Test the immobiliser on trucks with an on-board charger.
Carry out a potential measurement on the chassis while charging is in progress.

Fork positioner

Hydraulic operations
Adjust the attachment.
Adjust the axial play of the front and rear rollers.
Clean and grease attachment bearings, guides and stops.

Clamping device

Hydraulic operations
Adjust the attachment.
Adjust the axial play of the front and rear rollers.
Clean and grease attachment bearings, guides and stops.

Rack height select

System components
Test rack height select.

Lift cut-off

Hydraulic operations
Test the lift-limit cut-off/lift cut-off.

Radio data

System components
Clean the scanner and terminal.

Video system

System components
Clean the camera.
Clean the display.

Weigher sensors/switches

Electrical system
Test the weigher.

Automatic crawl speed

Travel
Clean sensors/switches.

1.2.2 Inspection contents

The following points must be checked:

1.2.2.1 Standard equipment

Brakes
Test the brake for functionality and ensure compliance with the minimum braking force according to ISO 6292.
Brake linings for wear and damage

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 cable for damage
Battery cable guide for damage
Check the battery and/or charge connector for damage.
charge socket for functionality and damage.

Travel
Deadman switch for function and damage
Drive system bearings for wear and damage
Drive support plate for secure fit and damage
Transmission for noise and leaks
Check wheels for wear, damage and secure mounting
Check wheel bearings and mounting of wheels for wear and damage

Chassis / structure
Inspect category A screw connections in accordance with the screw connection category list (TR0065).
Conduct a visual inspection of the integrity of the concrete weight.
Adhere to the manufacturer's maintenance instructions and intervals for any attached accessories.
Check labels are present and complete.
Check driver's seat for damage
Driver’s seat and armrest for secure fit and adjustment mechanism functionality
Check mast is securely attached
Check mast bearings for wear
Rails for wear and damage

Chassis / structure
Inspect the safety device for presence, functionality, contamination, and damage.
Check supports/tilt safety devices for correct ground clearance.
Supports / tilt safety devices for presence and damage
Check the overhead guard and/or the driver's cab for secure attachment and damage

Hydraulic operations
Test hydraulic controls and check their labels for legibility, completeness and plausibility
Inspect the lift cylinder clamps for wear and damage.
Lift mechanism for wear, functionality and damage
Check cylinders and piston rods are securely attached and check for damage
Replace hose guide according to manufacturer’s instructions due to ageing.
Check lateral play of the mast sections and fork carriage
Check slide pieces and stops for wear and damage
Check load chain mounting elements and chain pins for wear and damage
Check mast rollers and their running surfaces for wear and damage
Test hydraulic system
Check sliding blocks for completeness, wear and damage
Check fork arms or load handler for wear and damage
Side shift for functionality and damage
Check cylinder seals for leaks and damage
Check cylinder rods and their bushings for wear and damage
Check the hoses, pipes and connections are securely attached and check for wear, leaks, damage, blisters and kinks
Check piston rod screw depth and counter-fixing/clamping
Check tilt cylinders and mounting for leaks, wear and damage
Mast holder guide rollers for wear and damage

Steering
Electric steering and its components for function, wear and damage
Steering bearings, steering play and steering gear teeth or steering chain for wear and damage

1.2.2.2 Optional Equipment

Cold store cabin

Chassis/structure
Roof hatch for functionality and damage
Cold store cabin for secure fit and damage
Windscreens for damage
Test window heating and check for damage
Test doors and check for damage

Standard on-board charger

Battery charger
Mains plug and mains cable for damage
Cables and electrical connections for secure fit and damage

Intercom system

Electrical system
Intercom system for functionality and damage

Fork positioner

Hydraulic operations
Check the attachment is securely attached to the truck and check the load-bearing components for secure fit and damage
Check sliding blocks for completeness, wear and damage
Check attachment bearings, guides and stops for wear and damage
Check hydraulic connections are securely attached and check for leaks
Fork positioner for functionality and damage
Check cylinder seals for leaks and damage
Check cylinder rods and their bushings for wear and damage

Clamping device

Hydraulic operations
Test acknowledgement button
Test attachment and check for damage
Check the attachment is securely attached to the truck and check the load-bearing components for secure fit and damage
Check sliding blocks for completeness, wear and damage
Check attachment bearings, guides and stops for wear and damage
Check hydraulic connections are securely attached and check for leaks
Check cylinder seals for leaks and damage
Check cylinder rods and their bushings for wear and damage

Crane hook

Hydraulic operations
Check the attachment is securely attached to the truck and check the load-bearing components for secure fit and damage

Lift cut-off

Hydraulic operations
Lift-limit cut-off/lift cut-off for secure fit and damage

Seat heating

Electrical system
Check connections and cables are securely attached and check for insulation damage and other signs of damage

Shock sensor/data recorder

Electrical system
Check shock sensor/data recorder is securely attached and check for damage

Radio data

System components
Scanner and terminal for secure fit, functionality and damage
Fuses for correct ratings
Check cables are securely attached and check for damage

Video system

System components
Check cables are securely attached and check for damage
Check camera is securely attached, test and check for damage
Check display is securely attached, test and check for damage

Fire extinguisher

Accessories
Check fire extinguisher is present and securely attached and check the inspection interval

Weigher sensors/switches

Electrical system
Weigher for damage

Access module

Electrical system
Check access module is securely attached, test and check for damage

Optional electrical equipment

Electrical system
Test optional electrical equipment and check for damage

Restraint system

Chassis/structure
Test driver's seat restraint system and check for damage

Side shift centre function

Hydraulic operations
Test side shift centre function

Strobe light/warning beacon

Electrical system
Test strobe light/warning beacon and check for damage

Mast reach damping

Hydraulic operations
Mast reach damping and its components for functionality and damage

Audible warning devices

Electrical system
Check buzzer/warning alarm is securely attached, test and check for damage

Lift height display

System components
Lift height display and its components for functionality and damage

Automatic crawl speed

Travel
Sensors/switches for secure fit, functionality and damage

Discharge strap

Electrical system
Check presence of electrostatic discharge strap or chain and check for damage

Steering console height adjustment

Chassis/structure
function of adjusting mechanism and freedom of movement

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	2000	12
Hydraulic system breather filter	2000	12
Hydraulic oil	2000	12
Hydraulic oil filter	2000	12

1.2.3.2 Optional Equipment

Cold store application

maintenance part	service hours	months
Transmission oil in cold store application	1000	12
Transmission oil additive	1000	12
Hydraulic oil	1000	12

2 Maintenance Contents ETV 314i-325i

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2.1 Owner

To be performed every 50 service hours, but at least once a week.

2.1.1 Maintenance contents

2.1.1.1 Standard equipment

Brakes
Test the brake.
Test the emergency stop brake.

Hydraulic operations
Lubricate the load chains.
Correct the hydraulic-oil level.

2.1.1.2 Optional Equipment

Fork positioner

Hydraulic operations
Clean and grease attachment bearings, guides and stops.

2.1.2 Inspection contents

2.1.2.1 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
charge socket for functionality and damage.

Travel
Visually inspect the wheels for damage.

Chassis / structure
Check labels are present and complete.
Inspect the safety device for presence, functionality, contamination, and damage.

Hydraulic operations
Test hydraulic system

2.1.2.2 Optional Equipment

The following points must be checked:

Cold store cabin

Chassis/structure
Windscreens for damage
Test doors and check for damage

Fork positioner

Hydraulic operations
Fork positioner for functionality and damage

Restraint system

Chassis/structure
Test driver's seat restraint system and check for damage

Strobe light/warning beacon

Electrical system
Test strobe light/warning beacon and check for damage

2.2 Customer Service

In accordance with the ETV 314i-325i service interval, to be performed every 1000 service hours, but at least once a year.

2.2.1 Maintenance contents

2.2.1.1 Standard equipment

Brakes
Measure the air gap of the magnetic brake.
Test the emergency stop brake.

Electrical system
Test the contactors and/or relays.
Perform insulation inspection.

Energy supply
Test the immobiliser on industrial trucks with an external charge connector (flap switch).

Travel
Correct the transmission oil level or grease filling of the transmission.

Chassis/structure
Note: Check the torques of the seat frame.
Inspect the weld seams of the entry handle and the connection for crack formation and deformation.
Grease the rails.
Measure the height-related and capacity-related settings.

Hydraulic operations
Adjust the slide pieces.
Adjust the load chains and check for elongation.
Lubricate the load chains.
Test emergency lowering.
Correct the hydraulic-oil level.
Test and adjust the pressure relief valve.
Mounting and safeguard against side shift frame detachment for wear and correct function
Test the side shift adjustment.
Where two tilt cylinders with the same stroke are used, measure their relative adjustment.

Agreed services
Carry out a test run with the rated capacity or a customer-specific load.
Lubricate the truck according to the lubrication schedule.
Demonstration after maintenance.

Steering
Inspect the weld seam of the steering console for deformation and crack formation.
Lubricate the steering toothing or steering chain according to the lubrication schedule.

2.2.1.2 Optional Equipment

Fork positioner

Hydraulic operations
Adjust the attachment.
Adjust the axial play of the front and rear rollers.
Clean and grease attachment bearings, guides and stops.

Clamping device

Hydraulic operations
Adjust the attachment.
Adjust the axial play of the front and rear rollers.
Clean and grease attachment bearings, guides and stops.

Rack height select

System components
Test rack height select.

Lift cut-off

Hydraulic operations
Test the lift-limit cut-off/lift cut-off.

Radio data

System components
Clean the scanner and terminal.

Video system

System components
Clean the camera.
Clean the display.

Weigher sensors/switches

Electrical system
Test the weigher.

Automatic crawl speed

Travel
Clean sensors/switches.

2.2.2 Inspection contents

The following points must be checked:

2.2.2.1 Standard equipment

Brakes
Test the brake for functionality and ensure compliance with the minimum braking force according to ISO 6292.
Brake linings for wear and damage

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 cable for damage
Battery cable guide for damage
Check the battery and/or charge connector for damage.
charge socket for functionality and damage.

Travel
Deadman switch for function and damage
Drive system bearings for wear and damage
Drive support plate for secure fit and damage
Transmission for noise and leaks
Check wheels for wear, damage and secure mounting
Check wheel bearings and mounting of wheels for wear and damage

Chassis / structure
Inspect category A screw connections in accordance with the screw connection category list (TR0065).
Conduct a visual inspection of the integrity of the concrete weight.
Adhere to the manufacturer's maintenance instructions and intervals for any attached accessories.
Check labels are present and complete.
Check driver's seat for damage
Driver’s seat and armrest for secure fit and adjustment mechanism functionality
Check mast is securely attached
Check mast bearings for wear
Rails for wear and damage
Inspect the safety device for presence, functionality, contamination, and damage.
Check supports/tilt safety devices for correct ground clearance.
Supports / tilt safety devices for presence and damage
Check the overhead guard and/or the driver's cab for secure attachment and damage

Hydraulic operations
Test hydraulic controls and check their labels for legibility, completeness and plausibility
Inspect the lift cylinder clamps for wear and damage.
Lift mechanism for wear, functionality and damage
Check cylinders and piston rods are securely attached and check for damage
Replace hose guide according to manufacturer’s instructions due to ageing.
Check lateral play of the mast sections and fork carriage
Check slide pieces and stops for wear and damage
Check load chain mounting elements and chain pins for wear and damage
Check mast rollers and their running surfaces for wear and damage

Hydraulic operations
Test hydraulic system
Check sliding blocks for completeness, wear and damage
Check fork arms or load handler for wear and damage
Side shift for functionality and damage
Check cylinder seals for leaks and damage
Check cylinder rods and their bushings for wear and damage
Check the hoses, pipes and connections are securely attached and check for wear, leaks, damage, blisters and kinks
Check piston rod screw depth and counter-fixing/clamping
Check tilt cylinders and mounting for leaks, wear and damage
Mast holder guide rollers for wear and damage

Steering
Electric steering and its components for function, wear and damage
Steering bearings, steering play and steering gear teeth or steering chain for wear and damage

2.2.2.2 Optional Equipment

Cold store cabin

Chassis/structure
Roof hatch for functionality and damage
Cold store cabin for secure fit and damage
Windscreens for damage
Test window heating and check for damage
Test doors and check for damage

Intercom system

Electrical system
Intercom system for functionality and damage

Fork positioner

Hydraulic operations
Check the attachment is securely attached to the truck and check the load-bearing components for secure fit and damage
Check sliding blocks for completeness, wear and damage
Check attachment bearings, guides and stops for wear and damage
Check hydraulic connections are securely attached and check for leaks
Fork positioner for functionality and damage
Check cylinder seals for leaks and damage
Check cylinder rods and their bushings for wear and damage

Clamping device

Hydraulic operations
Test acknowledgement button
Test attachment and check for damage
Check the attachment is securely attached to the truck and check the load-bearing components for secure fit and damage
Check sliding blocks for completeness, wear and damage
Check attachment bearings, guides and stops for wear and damage
Check hydraulic connections are securely attached and check for leaks
Check cylinder seals for leaks and damage
Check cylinder rods and their bushings for wear and damage

Crane hook

Hydraulic operations
Check the attachment is securely attached to the truck and check the load-bearing components for secure fit and damage

Lift cut-off

Hydraulic operations
Lift-limit cut-off/lift cut-off for secure fit and damage

Seat heating

Electrical system
Check connections and cables are securely attached and check for insulation damage and other signs of damage

Shock sensor/data recorder

Electrical system
Check shock sensor/data recorder is securely attached and check for damage

Radio data

System components
Scanner and terminal for secure fit, functionality and damage
Fuses for correct ratings
Check cables are securely attached and check for damage

Video system

System components
Check cables are securely attached and check for damage
Check camera is securely attached, test and check for damage
Check display is securely attached, test and check for damage

Fire extinguisher

Accessories
Check fire extinguisher is present and securely attached and check the inspection interval

Weigher sensors/switches

Electrical system
Weigher for damage

Access module

Electrical system
Check access module is securely attached, test and check for damage

Optional electrical equipment

Electrical system
Test optional electrical equipment and check for damage

Restraint system

Chassis/structure
Test driver's seat restraint system and check for damage

Side shift centre function

Hydraulic operations
Test side shift centre function

Strobe light/warning beacon

Electrical system
Test strobe light/warning beacon and check for damage

Mast reach damping

Hydraulic operations
Mast reach damping and its components for functionality and damage

Audible warning devices

Electrical system
Check buzzer/warning alarm is securely attached, test and check for damage

Lift height display

System components
Lift height display and its components for functionality and damage

Automatic crawl speed

Travel
Sensors/switches for secure fit, functionality and damage

Discharge strap

Electrical system
Check presence of electrostatic discharge strap or chain and check for damage

Steering console height adjustment

Chassis/structure
function of adjusting mechanism and freedom of movement

2.2.3 Maintenance parts

The manufacturer recommends the replacement of the following maintenance parts at the specified intervals.

2.2.3.1 Standard equipment

maintenance part	service hours	months
Gear oil	2000	12
Hydraulic system breather filter	2000	12
Hydraulic oil	2000	12
Hydraulic oil filter	2000	12

2.2.3.2 Optional Equipment

Cold store application

maintenance part	service hours	months
Transmission oil in cold store application	1000	12
Transmission oil additive	1000	12
Hydraulic oil	1000	12