ETM/V 210-325

11.21

Operating instructions

en-GB

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ETV 210
ETV 212
ETM 214
ETM 216
ETV 214
ETV 216
ETV 318
ETV 320
ETV 325
ETM 325

JUNGHEINRICH

Declaration of Conformity

CE

Manufacturer

Jungheinrich AG, 22039 Hamburg, Germany

Description
Industrial truck

Type	Option	Serial no.	Year of manufacture
ETV 210 ETV 212 ETM 214 ETM 216 ETV 214 ETV 216 ETV 318 ETV 320 ETV 325 ETM 325			

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:	ETM/V 210-325 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

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Contents

A Correct Use and Application

1 General

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

2 Correct application

NOTICE

The maximum load and load distance are indicated on the capacity plate and must not be exceeded.
The load must rest on the load handler or be lifted by an attachment approved by the manufacturer.
The load must be fully raised, see page 128.

⚠ 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.

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.

– Operation in industrial and commercial environments.
– Permissible temperature range – see page 13 and following.
– Operation only on secure, level surfaces with sufficient capacity.
– Do not exceed the permissible surface and point loading limits on the travel paths.
– Operation only on routes that are visible and approved by the operating company.
– Negotiating slopes up to a maximum of 15 %.
– Do not travel across or at an angle on slopes. Travel with the load facing uphill.
– Use in non-public transport.
– Permissible altitude during operation up to 2000 m above the average sea level.

Ground conditions

The ground conditions must satisfy the following requirements:

– The supporting floor must comply with relevant regulations.
– The floor must be resistant to oil and grease.
– The floor insulation resistance RE must not exceed 10^6 Ω (in accordance with DIN EN1081).
– The capacity data indicated on the truck applies to floor surfaces that conform to DIN 18202 Table 3, Row 3.

⚠ 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.

For trucks with a lithium-ion battery (○), the permissible ambient temperature during operation changes to 0°C to +30°C. An ambient temperature of up to +35°C is permissible for a short period but no longer than 1 month per year. Longer periods of use reduce the expected service life of the lithium-ion battery.

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

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.

– Permissible temperature range -28°C to +40°C.
– Maximum relative air humidity 95% non-condensing.
– Thawing is permissible only if the truck can be subsequently dried thoroughly.
– In cold store areas below -28°C, the truck must be operated permanently and should not be parked securely for more than 15 minutes.
– Do not charge the battery below +5°C.

4 Proprietor responsibilities

For the purposes of the present operating instructions the “operating company” is defined as any natural or legal person who either uses the industrial truck himself, or on whose behalf it is used. In special cases (e.g. leasing or renting) the proprietor is considered the person who, in accordance with existing contractual agreements between the owner and user of the industrial truck, is charged with operational duties.
The proprietor must ensure that the industrial truck is used only for the purpose it is intended for and that danger to life and limb of the user and third parties are excluded. Furthermore, accident prevention regulations, safety regulations and operating, servicing and repair guidelines must be followed. The operating company must ensure that all users have read and understood these operating instructions.

NOTICE

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

5 Adding attachments and/or optional equipment

The mounting or installation of additional equipment which affects or enhances the performance of the industrial truck requires the written permission of the manufacturer. Local authority approval may also need to be obtained.
Local authority approval however does not constitute the manufacturer’s approval.

B Truck Description

1 Application

The ETM/V 210-325 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 ETM/V 210-325 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.

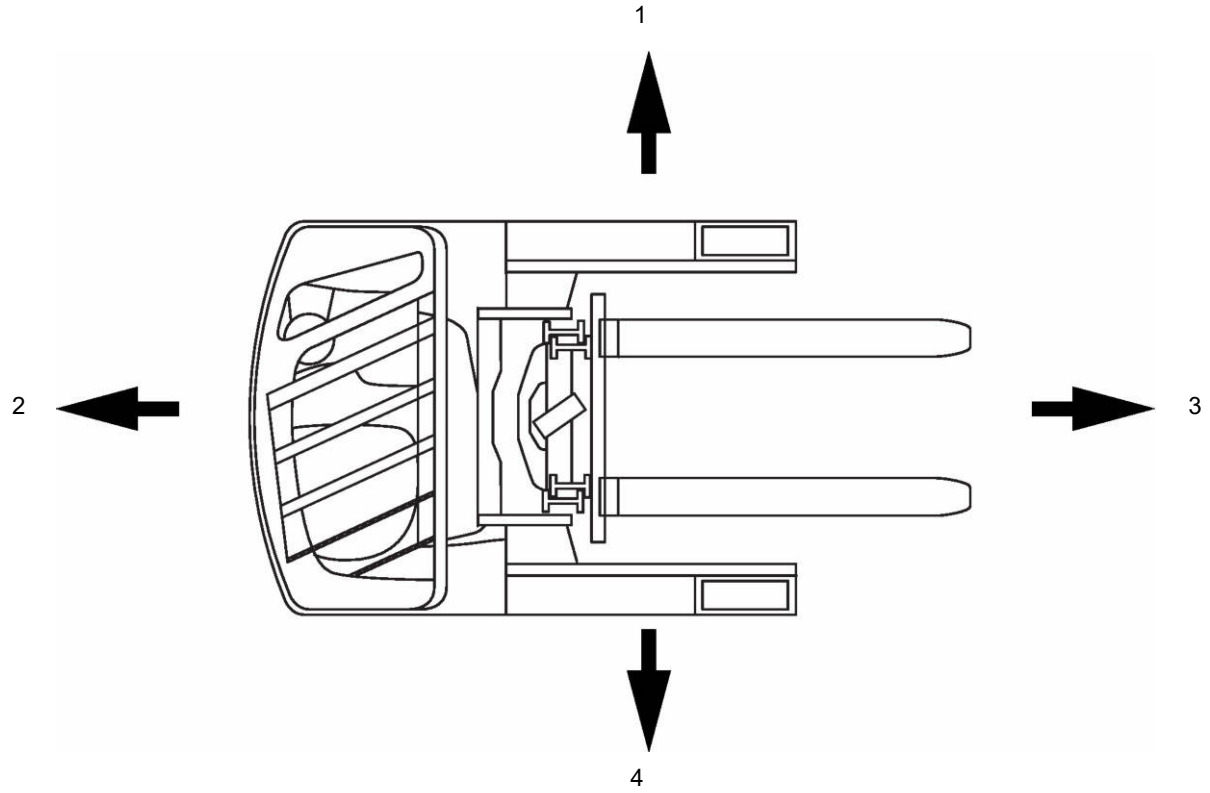
ETV212

ETV	Model name
2	Series
12	Rated capacity x 100 kg

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.

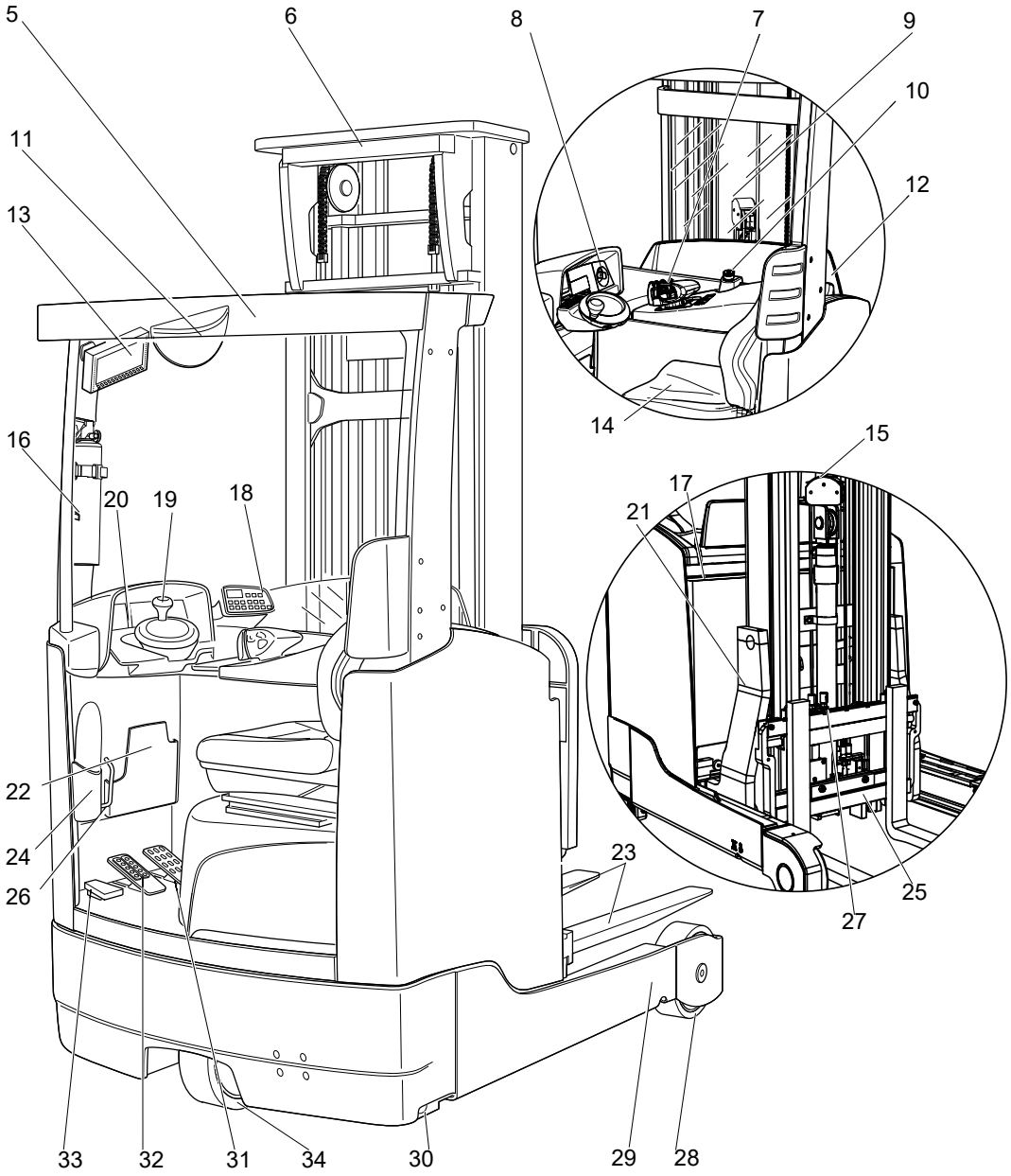
3 Travel direction definition

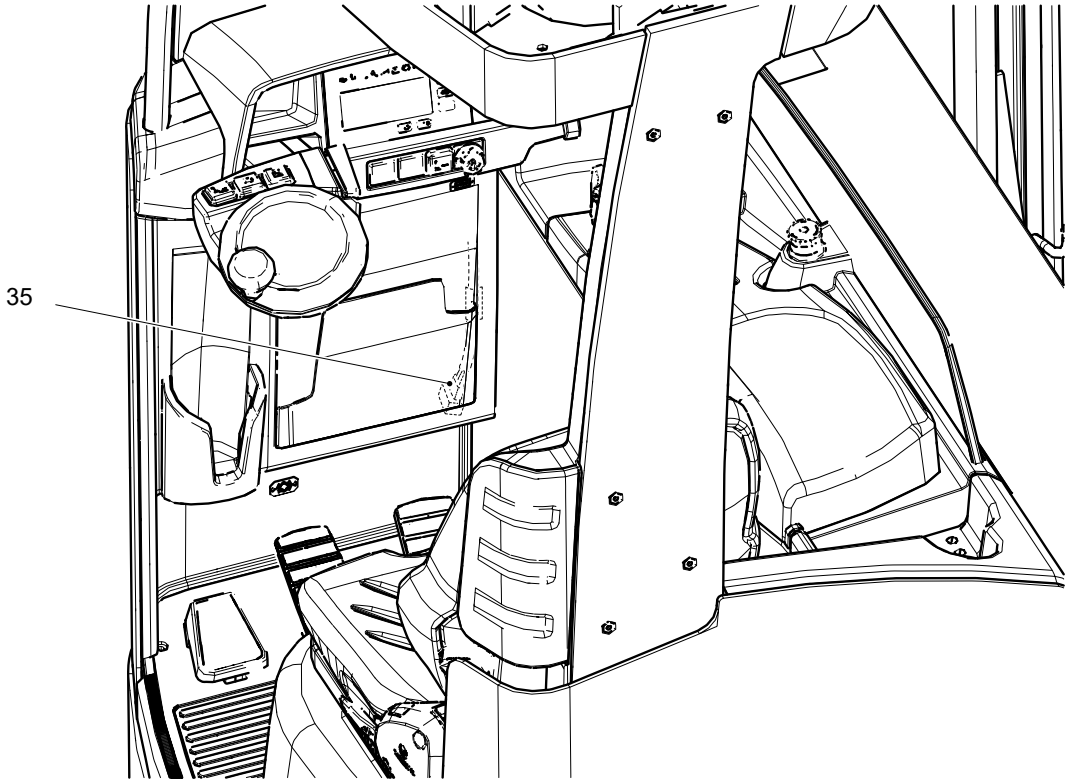
The following determinations have been made for travel direction specification:



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

4 Assembly description

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Item		Description	Item		Description
5	●	Overhead guard	6	●	Mast
8	●	Key switch	7	●	soloPILOT
	○	ISM access module		○	multiPILOT
		Transponder			duoPILOT
		Keypad			
		EasyAccess			
9	○	Mast protective screen panel	10	●	Emergency disconnect switch
11	○	Panoramic mirror	12	●	Protective screen panel
13	○	Camera system	14	●	Driver's seat
15	●	Free lift cylinder	16	○	Fire extinguisher
17	●	Battery compartment	18	○	Rack height select
19	●	Steering wheel	20	●	Control and display unit
21	●	Mast holder	22	●	Paper compartment
23	●	Forks	24	●	Bottle holder
25	●	Fork carriage	26	●	Entry grab handle
27	○	Quick-change coupling for auxiliary hydraulics	28	●	Load wheels
29	●	Support arms	30	●	Support columns
31	●	Accelerator pedal	32	●	Brake pedal
33	●	Deadman switch	34	●	Drive wheel
35	○	External power supply			
	●	Standard equipment		○	Optional equipment

5 Functional Description

Safety mechanisms

An enclosed truck perimeter with rounded edges ensures safe handling of the ETM/V 210-325. The driver is protected by the overhead guard (5). The drive wheel (34) and load wheels (28) 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 (10) 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 (33) 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 (33). Steering and braking remain enabled. The deadman switch can be adjusted so that when the deadman switch (33) 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 (31, 32) are of "automotive" design.

Mast reach damping (○)/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. Mast reach damping operates with a hydraulic damping cylinder, thus reducing mast vibrations. Active mast vibration damping suppresses vibration of the mast by actively controlling the hydraulic mast reach.

Curve Control

Automatic speed reduction for cornering. Curve Control limits the speed and acceleration when cornering. This reduces the risk of oscillations or tipovers.

Drive system

The entire drive unit is bolted onto the chassis of the truck. A fixed AC threephase motor controls the drive wheel via a bevel spur gearbox.The electronic traction current controller ensures a smooth drive motor speed and as a result smooth start-up, powerful acceleration and electronically controlled braking with energy recovery.

Controls and displays

Controls and displays are clearly arranged in the driver's cab. The logically designed SOLO-PILOT (95) enables single handed operation of travel direction, lift/lowering, forward / reverse reach, mast tilt, sideshift left or right and auxiliary hydraulics HF5 (○).

The Easy Access option with PIN code (○) allows the truck to be switched on via the control and display unit.

Displays

Control and display unit (20) with integrated residual time display, battery discharge indicator, lift and travel profile setting and steer angle display. The battery discharge indicator and hour meter (20) 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.

Brake system

The electric braking system consists of up to two independent braking systems. Applying the brake pedal (32) results in inversion braking (plugging) in the traction motor.

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 appears when the brake is applied. Faults in the steering and brake systems (which trigger an emergency stop) are shown on the control and display unit.

Steering

Electrical steering which turns the transmission via a spur gear. The infinitely adjustable steering wheel acts as a steering transmitter. The steering can be operated in two modes.
- 180° (●)
- 360° endless (○)

A key (○) can be used to change between 180° and 360° steering.

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 (20). Warning displays, operator errors and service functions can also be shown on the control and display unit.
Battery types see page 66.

Mast

The trucks are equipped with tilting telescopic clear view masts positioned in the mast holder. Adjustable side rollers and slide pieces take up the lateral pressure exerted on the fork carriage if the load is positioned on one side. The forks are fitted to the fork carriage and are adjustable. With the two-stage triplex mast (DZ) a free lift cylinder (15) initially lifts the load carriage (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 (95).

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 (29).

Attachments

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

6 Technical Specifications

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

6.1 Performance data

	Description	ETV 210	ETV 212	
Q	Capacity (with c = 600 mm)	1000	1200	kg
	Travel speed with/without load[1]	11.0/11.0	11.0/11.0	km/h
	Lift speed with/without load[2]	0.48/0.70	0.43/0.70	m/s (±10%)
	Lowering speed with/without load	0.50/0.50	0.50/0.50	m/s (-15%)
	Reach speed with/without load[3]	0.2/0.2	0.2/0.2	m/s
	Gradeability with/without load	7/10	7/10	%
	Max. gradeability (5 min on-time rating) with/without load	10/15	10/15	%
	Acceleration time with/without load [2]	5.1/4.8	5.1/4.8	m/s²
	Traction motor, output S2 60 min [1]	6.0	6.0	kW
	Lift motor, output at S3 15%	13.3	13.3	kW
	Battery according to DIN 43531/35/36 A, B, C, no	DIN 43531 - B	DIN 43531 - C	

[1)] *Second value for drivePLUS option*
[2)] *Second value for liftPLUS option*
[3)] *Mast-dependent: over h3 = 6200 mm: 0.1 m/s, h3 = 8000 mm: 0.08 m/s*

	Description	ETM 214	ETV 214	
Q	Capacity (where c = 600 mm)	1400	1400	kg
	Travel speed with/without load[1]	11.0/11.0 14.0/14.0	11.0/11.0 14.0/14.0	km/h
	Lift speed with/without load[2]	0.38/0.70	0.51/0.70	m/s (±10%)
	Lowering speed with / without load	0.55/0.55	0.55/0.55	m/s (-15%)
	Traverse speed with/without load (Efficiency/liftPLUS)	0.18/0.18		m/s
	Gradeability with/without load	9/13	9/13	%
	Max. gradeability (5 min on time rating) with/without load	10/15	10/15	%
	Acceleration with/without load[1]	4.6/4.3	4.6/4.3	S
	Drive motor, output S2 60 min[1]	6.0/8.5	6.0/8.5	kW
	Lift motor, output at S3 15%[2]	13.3/15.5	13.3/15.5	kW

[1)] *Second value for drivePLUS option*
[2)] *liftPLUS option*

	Description	ETM 216	ETV 216	
Q	Capacity (where c = 600 mm)	1600	1600	kg
	Travel speed with/without load[1]	11.0/11.0 14.0/14.0	11.0/11.0 14.0/14.0	km/h
	Lift speed with/without load[2]	0.48/0.70	0.48/0.70	m/s (±10%)
	Lowering speed with/without load	0.55/0.55	0.55/0.55	m/s (-15%)
	Traverse speed with/without load (Efficiency/liftPLUS)	0.22/0.22		m/s
	Gradeability with/without load (Efficiency/liftPLUS)	8/12	8/12	%
	Max. gradeability (5 min on time rating) with/without load	10/15	10/15	%
	Acceleration with/without load[1]	4.6/4.3	4.6/4.3	S
	Drive motor, output S2 60 min	6.0/8.5	6.0/8.5	kW
	Lift motor, output at S3 15%[2]	13.3/15.5	13.3/15.5	kW

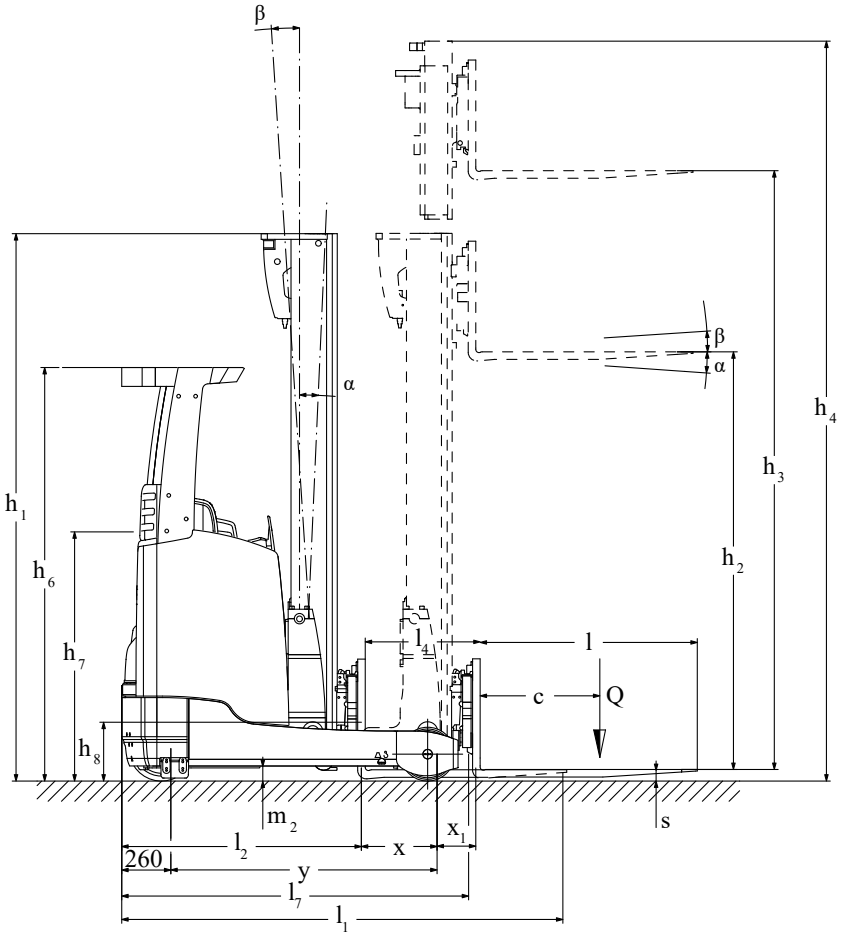
[1)] *Second value for drivePLUS option*
[2)] *liftPLUS option*

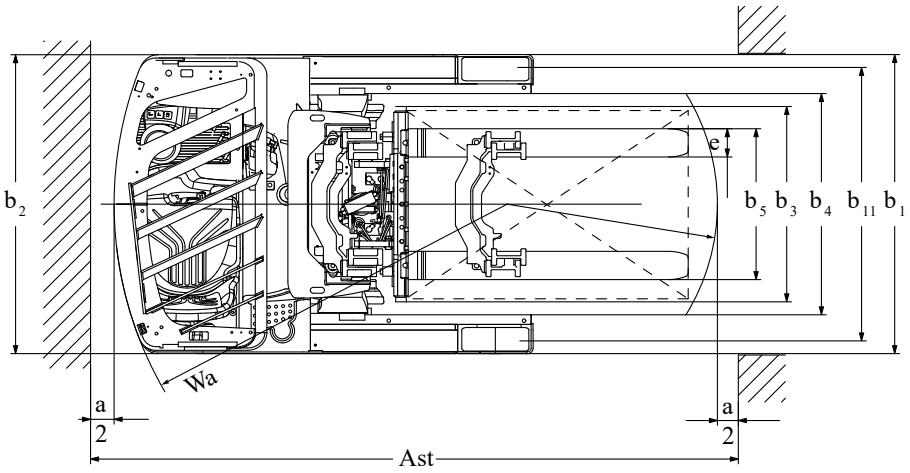
	Description	ETV 318	ETV 320	
Q	Capacity (where c = 600 mm)	1800	2000	kg
	Travel speed with / without load[1]	11.0 / 11.0 14.0 / 14.0	11.0 / 11.0 14.0 / 14.0	km/h
	Lift speed with/without load[2]	0.32 / 0.64 0.38 / 0.64	0.38 / 0.64	m/s (±10%)
	Lowering speed with / without load[3]	0.55 / 0.55	0.55 / 0.55	m/s (-15%)
	Traverse speed with/without load[2]	0.18 / 0.18	0.2 / 0.2	m/s
	Gradeability with/without load[3]	7 / 11	7 / 11	%
	Max. gradeability (5 min on time rating) with/without load	9 / 13	10 / 15	%
	Acceleration laden/unladen[3]	5.4 / 5 5.2 / 4.7	5.6 / 5 5.3 / 4.7	S
	Drive motor, output S2 60 min[1]	6.0 / 8.5	6.0 / 8.5	kW
	Lift motor, output at S3 15%[2]	13.3 / 15.5	13.3 / 15.5	kW

[1)] *Second value for drivePLUS option*
[2)] *Efficiency / liftPLUS*
[3)] *Efficiency / drivePLUS*

	Description	ETM 325	ETV 325	
Q	Capacity (where c = 600 mm)	2500	2500	kg
	Travel speed with / without load	14.0 / 14.0	14.0 / 14.0	km/h
	Lift speed with/without load	0.35 / 0.64	0.35 / 0.64	m/s (±10%)
	Lowering speed with / without load	0.55 / 0.55	0.55 / 0.55	m/s (-15%)
	Traverse speed with/without load	0.2 / 0.2	0.2 / 0.2	m/s
	Gradeability with/without load	7 / 11	7 / 11	%
	Max. gradeability (5 min on time rating) with/without load	10 / 15	10 / 15	%
	Acceleration laden/unladen	5.4 / 4.7	5.4 / 4.7	S
	Drive motor, output S2 60 min	6.0 / 8.5	6.0 / 8.5	kW
	Lift motor, output at S3 15%[1]	13.3 / 15.5	13.3 / 15.5	kW
[1)] *liftPLUS option*				

6.2 Dimensions





	Description	ETV 210	ETV 212	
s/e/l	Fork arm dimensions	40/80/1150	40/80/1150	mm
c	Load centre distance	600	600	mm
x	Load distance	339	424	mm
x_1	Load distance, mast extended [1]	170		mm
y	Wheelbase	1300	1385	mm
h_6	Overhead guard height (cabin)	2190		mm
h_7	Seat height / standing height	1057		mm
h_8	Support arm height	265		mm
l_1	Overall length, with fork length 1150 mm[2]	2321		mm
l_2	Headlength	1196		mm
l_4	Fwd. reach	485	570	mm
l_7	Length across support arms	1640	1725	mm
b_1/ b_2	Overall width	1120		mm
b_3	Fork carriage width	830/730		mm
b_4	Inside straddle	900		mm
b_5	Width across forks (min/max)	296/665	296/665	mm
b_{11}	Track width, rear	993		mm
Wa	Turning radius	1515	1595	mm
Ast	Aisle width [1, 3] for 1000 mm x 1200 mm pallets, traverse	2626	2644	mm
Ast	Aisle width [1, 4] for 800 mm x 1200 mm pallets, lengthways	2686	2689	mm
m_2	Ground clearance at lowest point/ centre of wheelbase	30/80		mm
	Mast tilt α/β [4]	1/3		°
	Net weight see truck data plate			

[1] *ETV 110 with 560 Ah battery = 205 mm*
[2] *Different battery sizes, masts and fork lengths will affect this dimension.*
[3] *Second value applies to floor storage.*
[4] *Mast-dependent*

	Description	ETM 214	ETV 214	
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[1]	353	423	mm
x_1	Load distance, mast extended	205	205	mm
y	Wheelbase	1410	1410	mm
h_6	Overhead guard height (cabin)	2190	2190	mm
h_7	Seat height / standing height	1057	1057	mm
h_8	Support arm height [2]	285	285	mm
l_1	Overall length [1]	2418	2346	mm
l_2	Length to fork face [1]	1268	1198	mm
l_4	Reach[1]	558	628	mm
l_7	Length across support arms	1780	1780	mm
b_1/ b_2	Overall width	1120/1120	1270/1270	mm
b_3	Fork carriage width	830	830	mm
b_4	Inside straddle	780	940	mm
b_5	Width across forks (min/max)	336/560	336/705	mm
b_{11}	Track width, rear	986	1136	mm
Wa	Turning radius	1620	1620	mm
Ast	Aisle width [1]for pallets 1000 x 1200 lengthways	2702	2652	mm
Ast	Aisle width [1]for pallets 800 x 1200 crossways	2757	2694	mm
m_2	Ground clearance, centre of wheelbase	80	80	mm
	Mast tilt α/β[3]	1/3		°
	Net weight see truck data plate			

[1)] *Different battery sizes and masts will affect this value*
[2)] *With load wheel guard + 30 mm*
[3)] *Mast-dependent*

	Description	ETM 216	ETV 216	
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[1]	403	413	mm
x_1	Load distance, mast extended	205	205	mm

[1)] *Different battery sizes and masts will affect this value*
[2)] *With load wheel guard + 30 mm*
[3)] *Mast-dependent*

	Description	ETM 216	ETV 216	
y	Wheelbase	1460	1460	mm
h_6	Height of overhead guard	2190	2190	mm
h_7	Seat height / standing height	1057	1057	mm
h_8	Wheel arm height[2]	285	285	mm
l_1	Overall length [1]	2418	2408	mm
l_2	Length to fork face [1]	1268	1258	mm
l_4	Reach[1]	608	618	mm
l_7	Length across support arms	1830	1830	mm
b_1/ b_2	Overall width	1120/1120	1270/1270	mm
b_3	Fork carriage width	830	830	mm
b_4	Inside straddle	780	940	mm
b_5	Width across forks (min/max)	336/560	336/705	mm
b_{11}	Track width, rear	986	1136	mm
Wa	Turning radius	1670	1670	mm
Ast	Aisle width [1]for pallets 1000 x 1200 lengthways	2716	2709	mm
Ast	Aisle width [1]for pallets 800 x 1200 crossways	2762	2753	mm
m_2	Ground clearance, centre of wheelbase	80	80	mm
	Mast tilt α/β [3]	1/3		°
	Net weight see truck data plate			

[1)] *Different battery sizes and masts will affect this value*
[2)] *With load wheel guard + 30 mm*
[3)] *Mast-dependent*

	Description	ETV 318	ETV 320	
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[1]	364	412	mm
x_1	Load distance, mast extended	205	230	mm
y	Wheelbase	1460	1518	mm
h_6	Height of overhead guard	2190	2190	mm
h_7	Seat height / standing height	1057	1057	mm
h_8	Wheel arm height[2]	285	355	mm
l_1	Overall length [1]	2418	2459	mm
l_2	Length to fork face [1]	1306	1316	mm
l_4	Reach[1]	569	624	mm
l_7	Length across support arms	1842	1920	mm
b_1/ b_2	Overall width	1270/1270	1290/1270	mm
b_3	Fork carriage width	830	830	mm
b_4	Inside straddle	940	940	mm
b_5	Width across forks (min/max)	336/730	336/750	mm
b_{11}	Track width, rear	1136	1155	mm
Wa	Turning radius	1663	1710	mm
Ast	Aisle width [1]for pallets 800 x 1200 lengthways	2790	2794	mm
Ast	Aisle width [1]for pallets 1000 x 1200 crossways	2737	2750	mm
m_2	Ground clearance centre wheelbase	30/80	30/95	mm
	Mast tilt α/β [3]	1/5		°
	Net weight see truck data plate			

[1)] *Different battery sizes and masts will affect this value*
[2)] *With load wheel guard + 30 mm*
[3)] *Mast-dependent*

	Description	ETM 325	ETV 325	
s/e/l	Fork arm dimensions	50/140/1150	50/140/1150	mm
c	Load centre distance	600	600	mm
x	Load distance, mast retracted[1]	389	487	mm
x_1	Load distance, mast extended	230	230	mm

[1)] *Different battery sizes and masts will affect this value*
[2)] *With load wheel guard + 30 mm*
[3)] *Mast-dependent*

	Description	ETM 325	ETV 325	
y	Wheelbase	1673	1673	mm
h_6	Height of overhead guard	2190	2190	mm
h_7	Seat height / standing height	1057	1057	mm
h_8	Wheel arm height[2]	355	355	mm
l_1	Overall length [1]	2547	2547	mm
l_2	Length to fork face [1]	1494	1396	mm
l_4	Reach[1]	703	736	mm
l_7	Length across support arms	2075	2075	mm
b_1/ b_2	Overall width	1198/1120	1348/1270	mm
b_3	Fork carriage width	830	830	mm
b_4	Inside straddle	790	940	mm
b_5	Width across forks (min/max)	356/580	356/725	mm
b_{11}	Track width, rear	1034	1184	mm
Wa	Turning radius	1865	1865	mm
Ast	Aisle width [1]for pallets 800 x 1200 lengthways	2969	2883	mm
Ast	Aisle width [1]for pallets 1000 x 1200 crossways	2921	2854	mm
m_2	Ground clearance centre wheelbase	30/95	30/95	mm
	Mast tilt α/β [3]	1/5		°
	Net weight see truck data plate			

[1)] *Different battery sizes and masts will affect this value*
[2)] *With load wheel guard + 30 mm*
[3)] *Mast-dependent*

6.2.1 Standard mast version dimensions

	Component	Two stage Triplex mast (DZ)	
h_1	Mast height retracted	2050 - 2900	mm
h_2	Free lift	1415 - 2265	mm
h_3	Lift	4550 - 7100	mm
h_4	Mast height extended	5185 - 7735	mm

6.3 Weights

Description	ETV 210	ETV 212	
Net weight incl. battery	2910	2930	kg
Axle load, forks retr., without load, front/rear	1587/973	1587/993	kg
Axle load, forks extd., with load, front/rear	634/2926	516/3264	kg
Axle load, forks retr., with load, front/rear	1282/2278	1361/2419	kg

→ Values with 280 Ah battery and 530 DZ mast

Description	ETM 214	ETV 214	ETM 216	ETV 216	
Net weight including battery[1]	3225	3250	3360	3386	kg
Axle loading, unladen front/rear[1]	1785/1190	1830/1170	1835/1275	1882/1254	kg
Axle loading, forks fwd. laden front/rear[1]	481/3894	572/3828	518/4192	521/4215	kg
Axle loading forks back laden front/rear[1]	1531/2844	1628/2772	1649/3061	1658/3078	kg
[1)] *Different battery sizes will affect this value*					

→ Values with 420 Ah battery and 530DZ mast

Description	ETV 318	ETV 320	ETM 325	ETV 325	
Net weight incl. battery	3772	3900	4145	3950	kg
Axle loading, unladen front/rear[1]	2074/1448	2163/1487	2274/1621	2264/1436	kg
Axle loading, forks fwd. laden front/rear[1]	446/4876	558/5092	366/6029	602/5598	kg
Axle loading forks back laden front/rear[1]	1805/3517	1953/3397	2057/4338	2032/4168	kg

→ Values with 560 Ah battery and 530DZ mast

6.4 Tyre type

Description	ETV 210/212	
Tyre size, front (drive wheel)	343 x 114	mm
Tyre size, rear (load wheels)	230 x 85	mm
Wheels, number front / rear (x = driven)	1x/2	

Component	ETV 214/216	ETM 214/216	
Tyre size, front (drive wheel)	343 x114		mm
Tyre size, rear (load wheels)	285 x 100		mm
Wheels, number front / rear (x = driven)	1x/2		

Component	ETV 318	ETV 320	ETM/V 325	
Tyre size, front (drive wheel)	343 x114	343 x114	343 x140	mm
Tyre size, rear (load wheels)	285 x 100	355 x 106	355 x 135	mm
Wheels, number front / rear (x = driven)	1x/2	1x/2	1x/2	

6.5 Battery

Approved battery types see page 66.

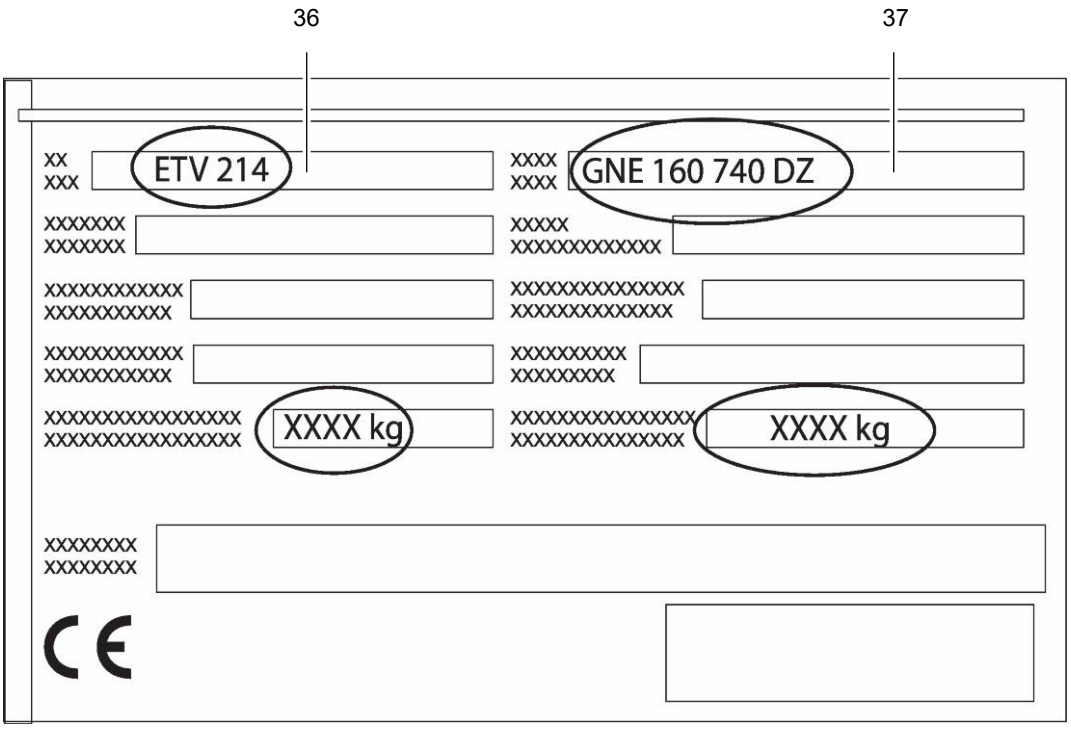
6.6 Hydraulics

Description	ETM/V 210-325	
Operating pressure for attachments	150	bar
Maximum operating pressure	250	bar
Oil flow for attachments	20	l/min

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 (36): ETV 214
– Mast (37): GN E DZ
– Mast weight = 1.0 x lift height (37) + 340 kg
– Mast weight = 1.0 * 740 + 340 kg = 1080 kg

Truck series	Mast Design	Lift height	Weight calculation without fork arms
ETM/V 210-216	GE DZ	All	0.8 x lift height + 300 kg
ETM/V 214-216	GE DZ V	All	1.0 x lift height + 300 kg
ETV 214-216	GNE DZ	All	1.0 x lift height + 340 kg
ETV 318-325	GE DZ	All	1.0 x lift height + 400 kg
ETM/V 318-325	GNE DZ	h3 < 1000	1.2 x lift height + 400 kg
ETM/V 318-325	GNE DZ	1000 ≤ h3 < 1300	1.2 x lift height + 420 kg
ETM/V 318-325	GNE DZ	1300 ≤ h3	1.1 x lift height + 620 kg

6.8 EN norms

Continuous sound pressure level

– ETM/V 210-325: 64 dB(A)

in accordance with EN 12053 as harmonised with ISO 4871.

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

Vibration

– ETM/V 210-325 MSG 65: 0,30 m/s²

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
Telematics box Plus 4G/2G noWLAN EU	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

Ambient temperature

– During operation -28°C to +40°C

➔ Special equipment and authorization 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.

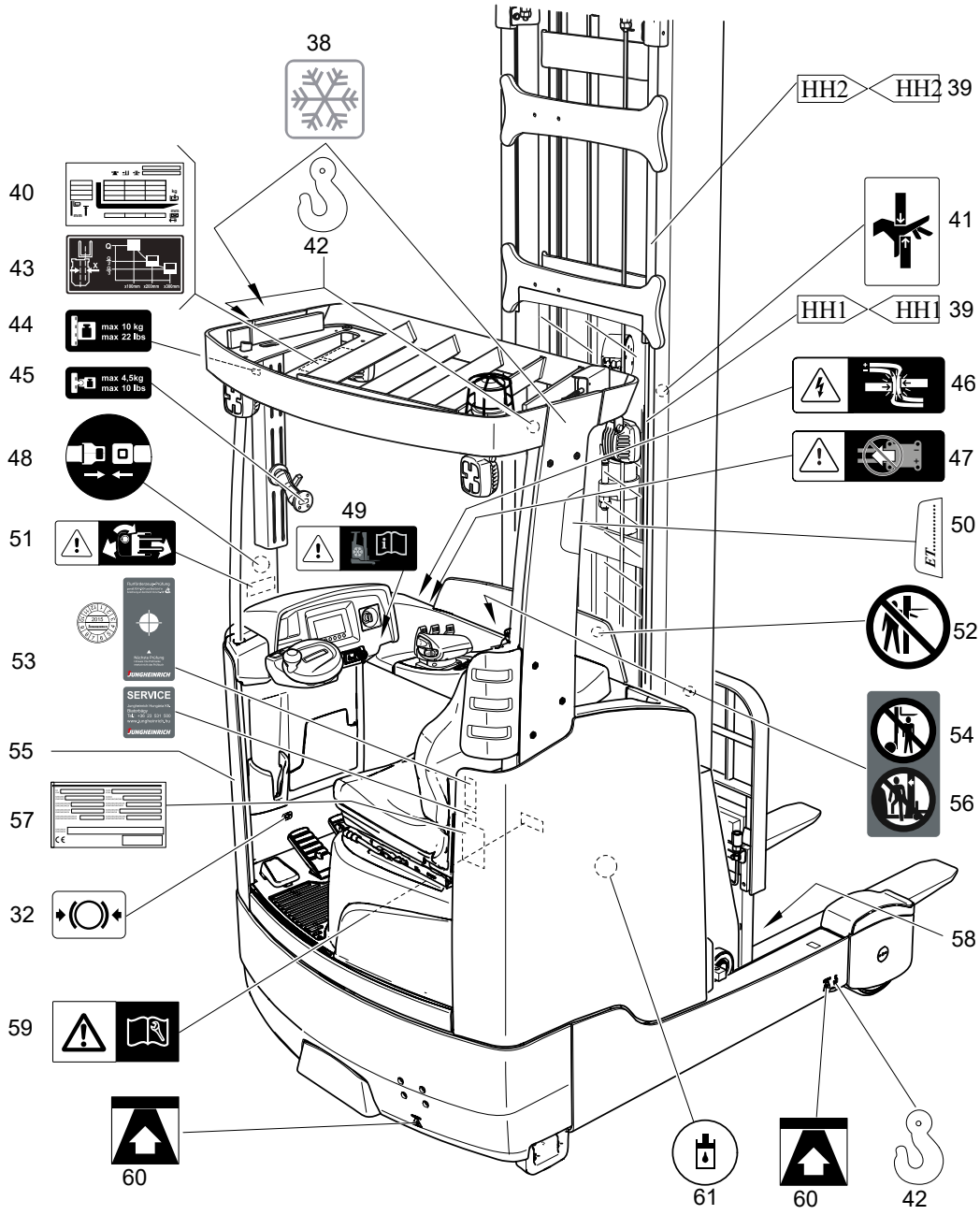
➔ For trucks with a lithium-ion battery (○), the permissible ambient temperature during operation changes to 0°C to +30°C. An ambient temperature of up to +35°C is permissible for a short period but no longer than 1 month per year. Longer periods of use reduce the expected service life of the lithium-ion battery.

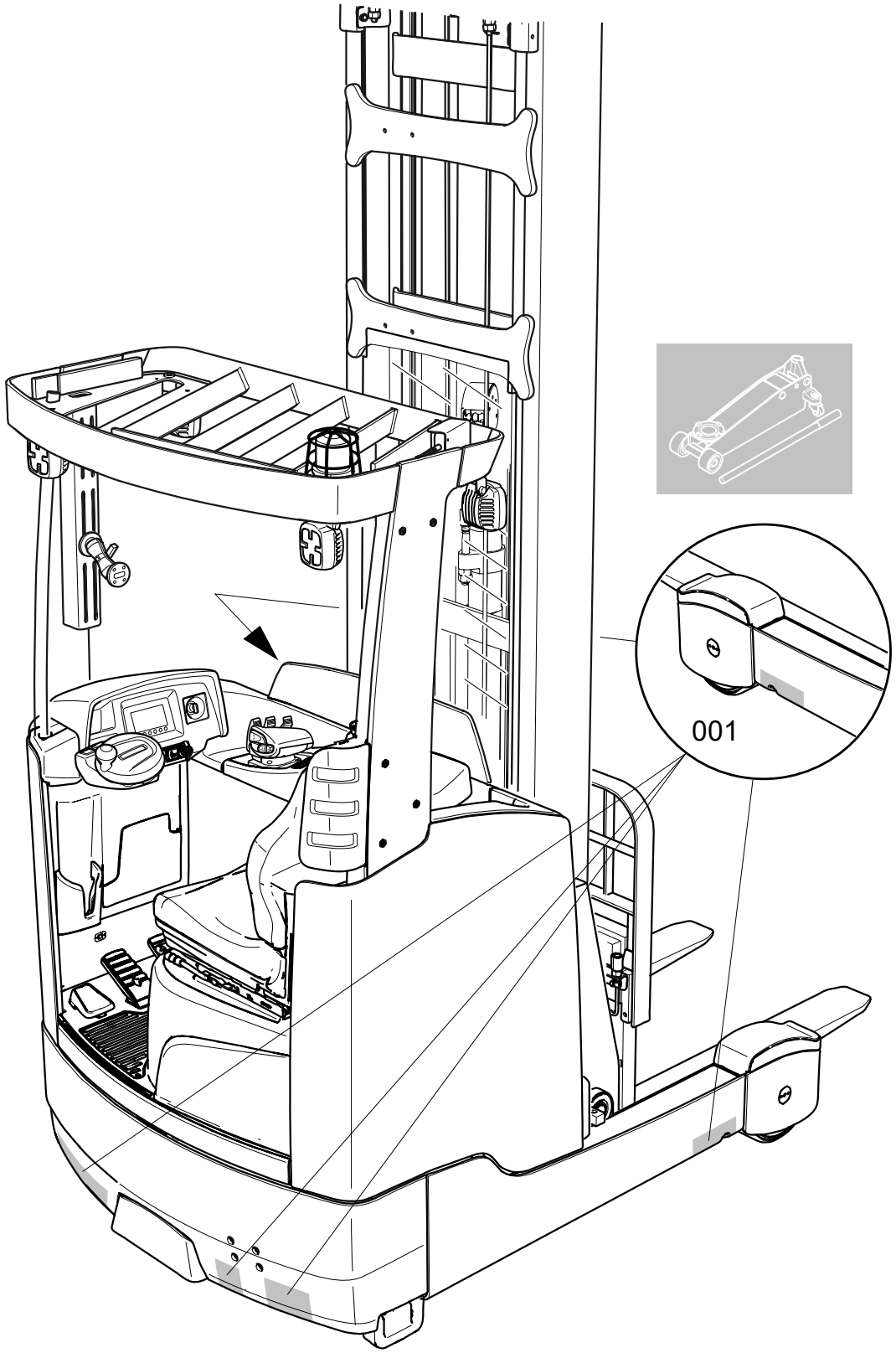
6.10 Electrical Requirements

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

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⚠ CAUTION!

Overload through bolt-on components

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

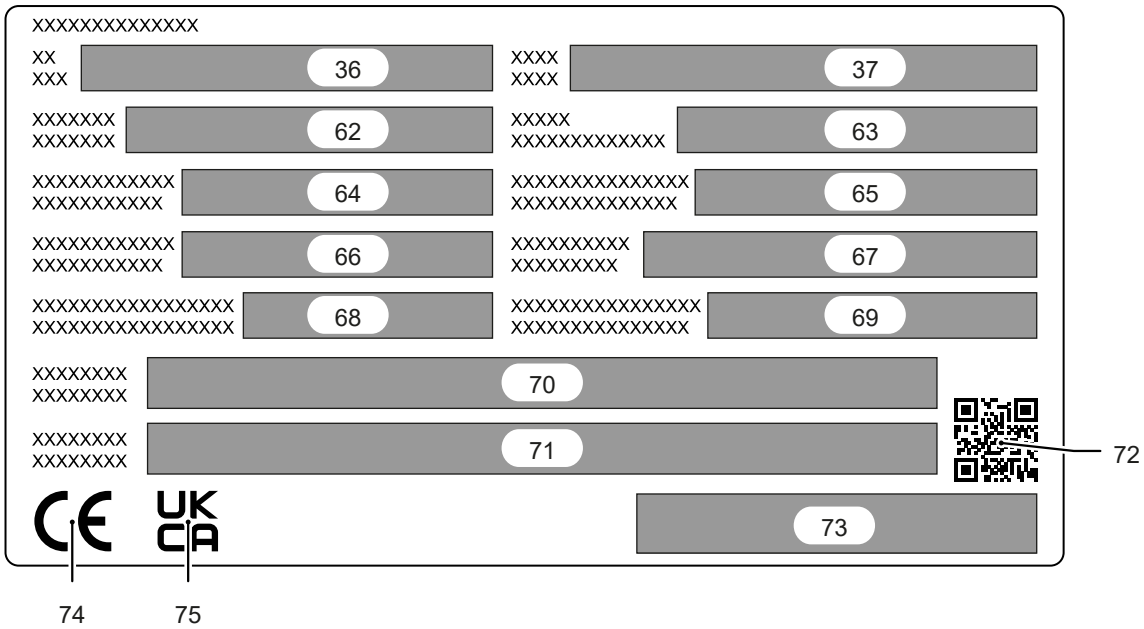
▶Note the maximum weights for M device (44) and universal joints (45).

Item	Model
32	Brake pedal
38	Cold store (○)
39	Lift height limits
41	Warning notice: “Trapping hazard”
54	Prohibition plate: "No standing under the load handler"
43	Side shift capacity plate
40	Capacity plate
42	Attachment points for loading by crane
44	Warning notice: "M-Device max. 10 kg (22 lb)" capacity (○)
48	Wear seat belt (○)
51	Travel direction, steering wheel angle, synchronous steering (○)
56	Prohibition plate: "Do not step into the reach mechanism"
52	Prohibition plate: "Do not reach through the mast"
53	Inspection plaque (○)
45	Warning notice: "Universal joints max. 4.5 kg (10 lb)" capacity (○)
55	Overview of electronic component part numbers
58	Truck serial no.
46	Warning notice: "Damaged battery cables are hazardous"
59	Attention: Read operating instructions
60	Jack attachment points (both support arms)
61	Information notice: "Add hydraulic oil"

Item	Model
57	Truck data plate
50	Model description
49	Information notice: "Faults with hydraulic functions on trucks with cold store equipment" (○)
47	Warning notice: "Do not disconnect Li-ion battery connector" (○)

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
36	Type	68	Net weight without battery [kg]
37	Option	69	Min./max. battery weight [kg]
62	Serial number	70	Manufacturer
63	Year of manufacture	71	Importer - imported by (○)
64	Rated capacity [kg]	72	QR code
65	Load centre distance [mm]	73	Manufacturer's logo
66	Battery voltage [V]	74	CE marking[1)]
67	Drive output [kW]	75	UKCA marking (○)[2)]

For queries regarding the truck or when ordering spare parts, always quote the truck serial number (62).

[1)] *Conformité Européenne*

[2)] *United Kingdom Conformity Assessed*

7.2.1 Position of serial number

NOTICE

The truck serial number (62) is indicated on the data plate (57) and is stamped on the chassis (58) (see page 41).

7.2.2 QR code

QR code

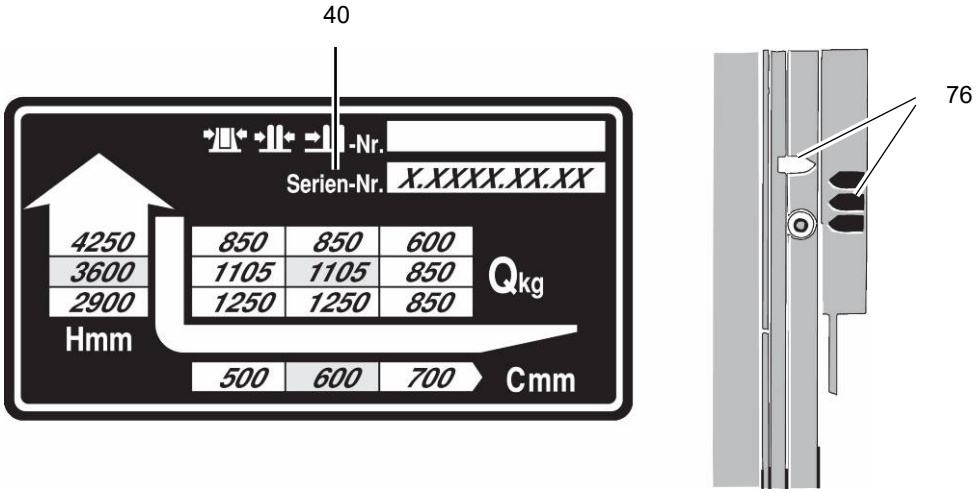
The QR code contains the serial number and product hierarchy of the truck.

7.3 Truck capacity plate

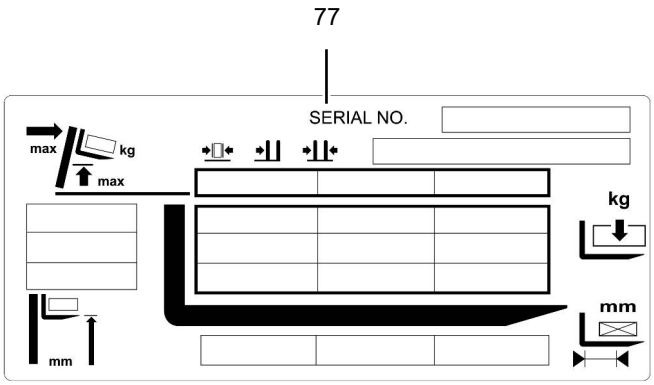
7.3.1 Capacity plate

The capacity plate (40) 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 (76) 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 (77)



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.

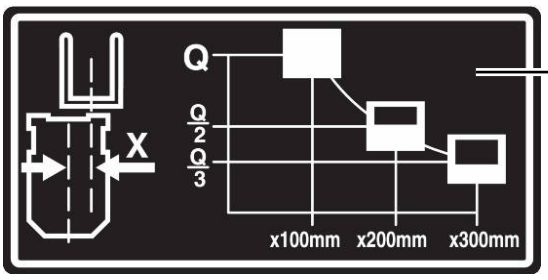
7.3.2 Attachment load chart

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 (43) gives the reduced capacity Q (in kg) when the sideshift is extended.



7.3.4 Jacking points for jacks

The "Jack contact point" decal (60) indicates where the truck may be lifted and jacked up (see page 207)

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.

Stability can also be affected by the following factors:
– Battery size and weight
– Tyre type
– 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.

Changes to the factory configuration of the truck are not permitted and can lead to material damage and personal injury.

This applies to the following, for example:
– Change to fork arms
– Telescopic forks
– Fork positioners
– Attachments with clamping function

Batteries that are pushed forward or unlocked can alter the stability.

If the ground conditions do not comply with DIN 18202 Table 3, Row 3, the truck capacity ratings (see page 24) may differ.

8.1 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.

C Transport and Commissioning

1 Transport

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); hydraulic lines for the lift and auxiliary functions disconnected
– Horizontal, with the mast disassembled (for large heights); all mechanical connections and all hydraulic lines between the basic unit and the mast disconnected

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.

NOTICE

Possible faults with hydraulic functions on trucks with cold store equipment

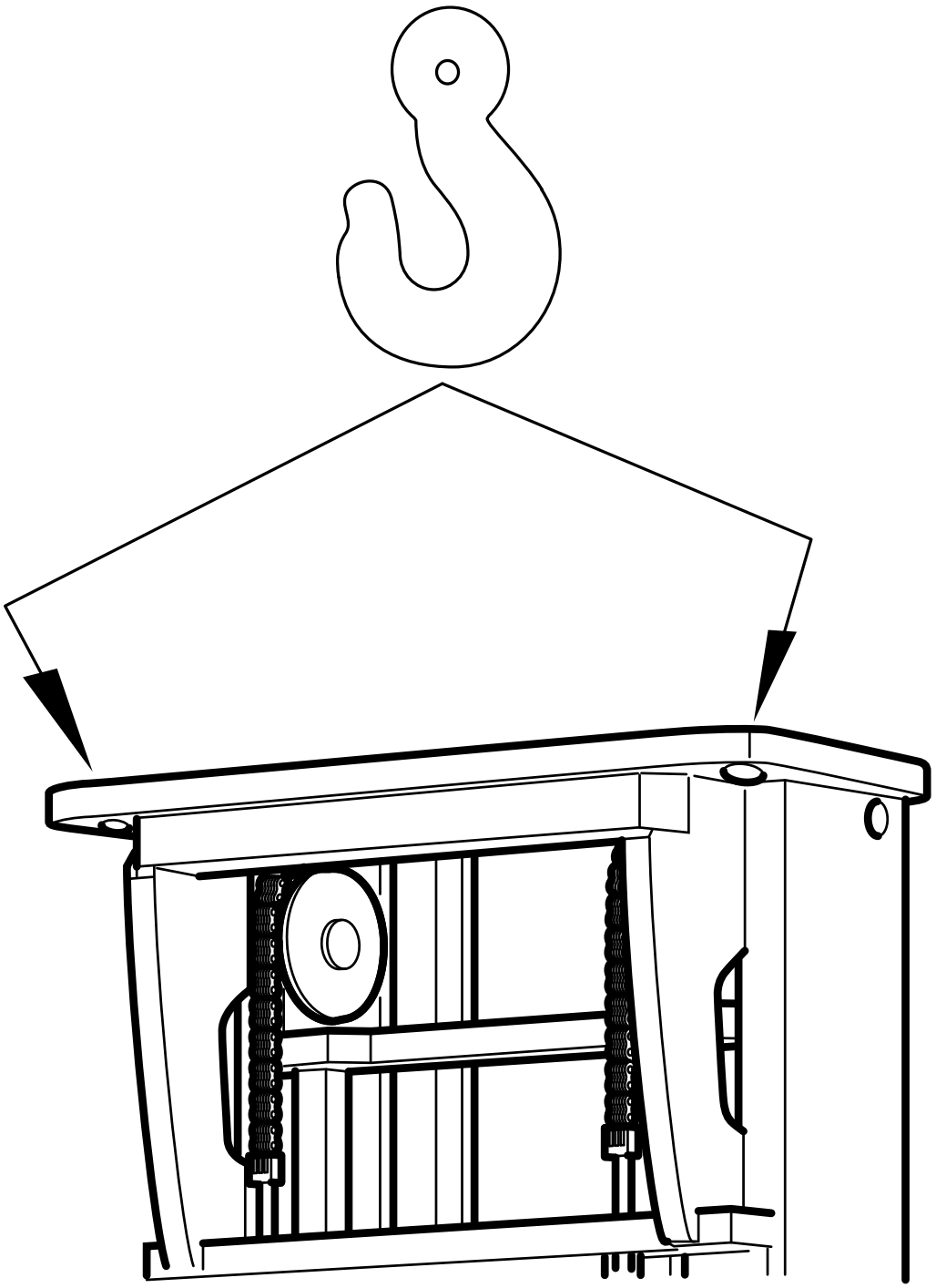
Commissioning the truck after an extended period of out of use or in ambient temperatures outside of the deep-freeze area in which the truck is intended to be used can give rise to noticeable noise development, jerky cylinder movements and damage to the hydraulic system.

▶ Execute hydraulic functions only in cold store temperatures.

▶ Spray piston rod ends 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!

Risk of accidents and injuries when handling acid batteries

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

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

2.1 Lifting the truck by crane

⚠ CAUTION!

The mast can get damaged

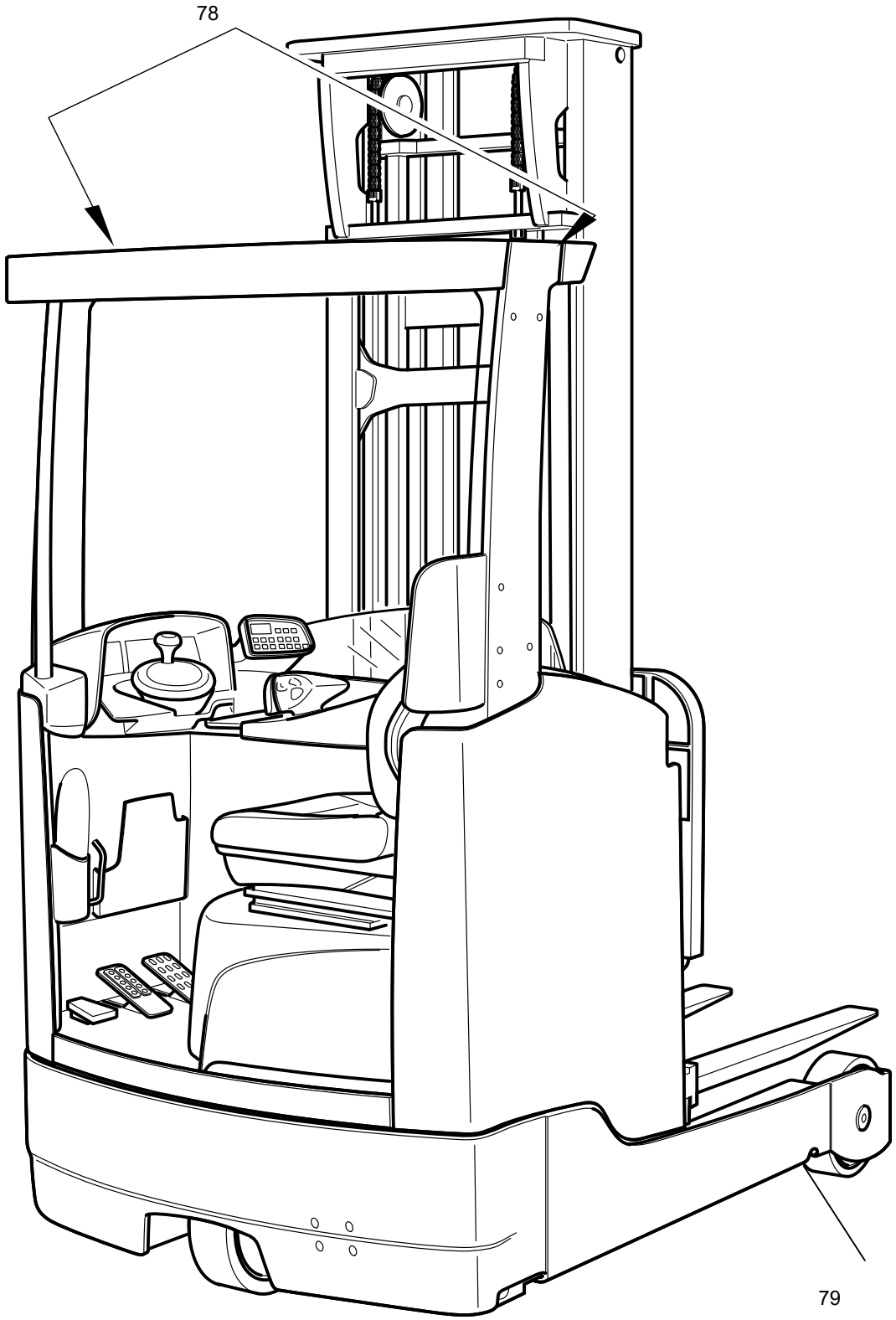
- ▶ Loading by crane is only intended for the initial transport before the truck is used for the first time.
- ▶ Loading must be carried out by specially trained staff in accordance with recommendations contained in Guidelines VDI 2700 and VDI 2703

⚠ 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.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Lifting the truck by crane

Requirements

– Truck parked securely, see page 153.

Tools and Material Required

– Crane lifting gear
– Lifting slings
– Wedges

Procedure

- Route rope slings around the two strap points (78) of the overhead guard strut.
- Secure crane lifting gear to the two strap points (79) on the wheel arms.
- Load the truck.
- Park the truck securely, see page 153.
- Secure the truck with wedges to prevent it from rolling away.

The truck is now loaded.

Lifting the truck and cab by crane

Requirements

– Truck parked securely, see page 153.

Tools and Material Required

– Sufficiently wide cross member
– Crane lifting gear with hook
– Wedges

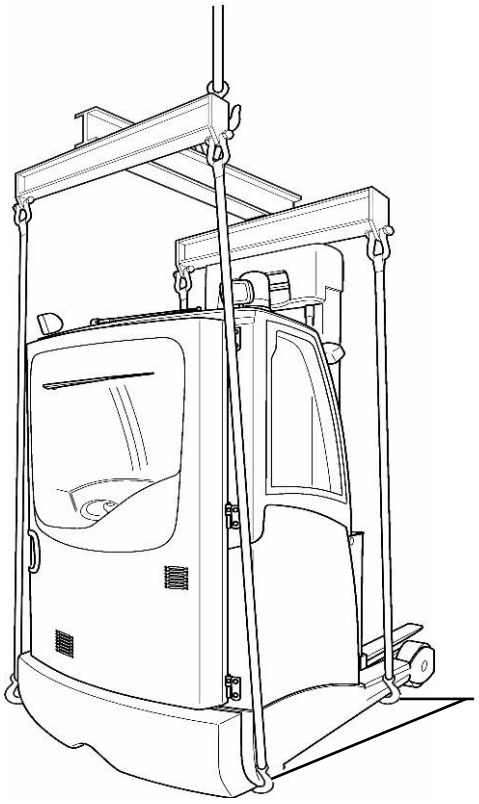
Procedure

• Secure the crane lifting gear to the strap points (80).

➔ The lifting of trucks with a weather-proof cab (○) or cold store cab (○) is subject to restrictions. Because of the risk to the window, the crane lifting gear and rope slings must not pass over the front door.

• Load the truck.
• Park the truck securely, see page 153.
• Secure the truck with wedges to prevent it from rolling away.

The truck is now loaded.



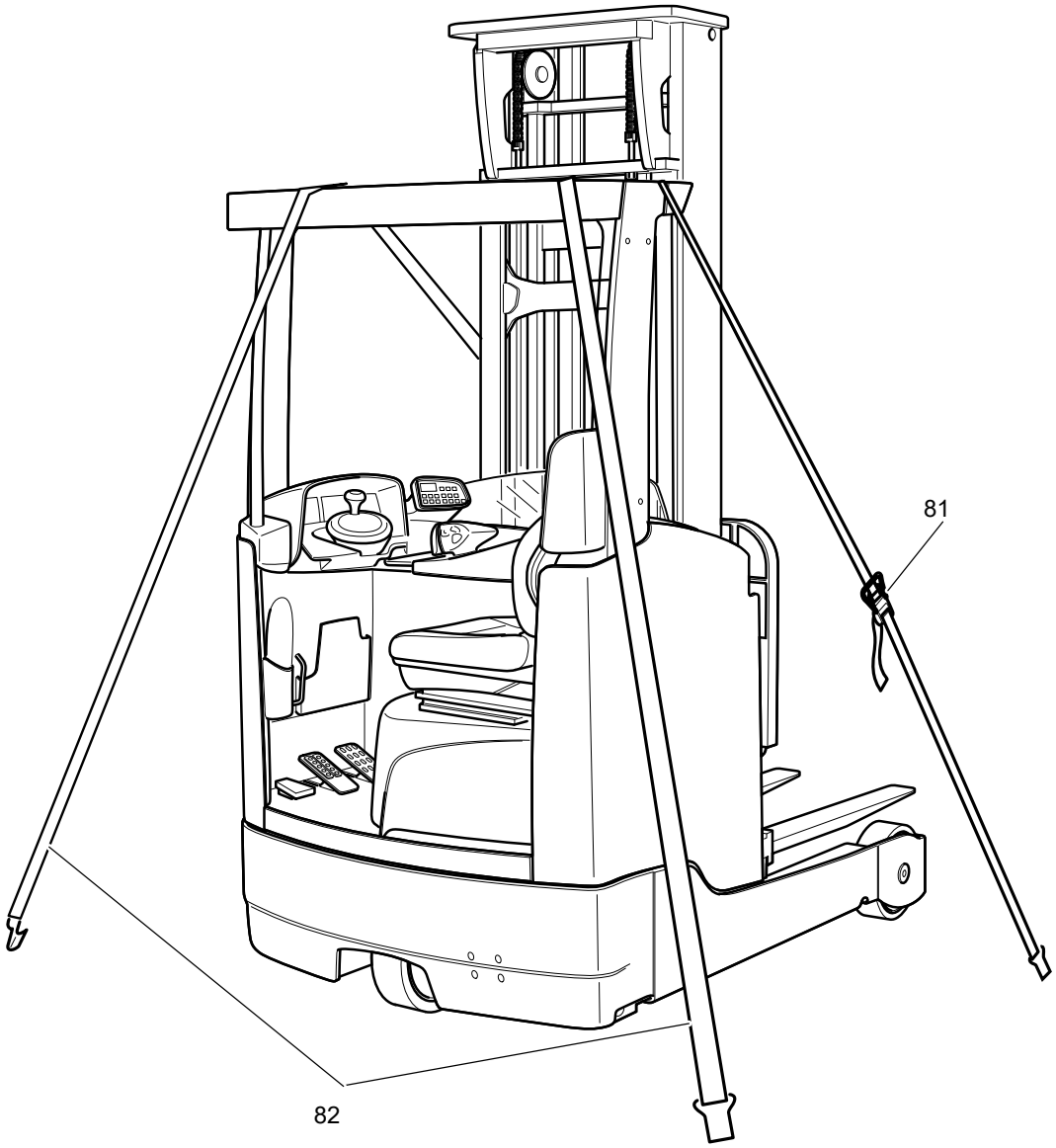
3 Securing the truck during transport

⚠ 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.



Securing the industrial truck for transport

Requirements

– 2 tensioning belts

Procedure

- Pull the tensioning belts (82) through the overhead guard over the strut.
- Secure the tensioning belts (82) to the fastening rings.
- Tighten the tensioning belts (82) with the tensioner (81).

The truck is now secured for transport.

4 Using the Truck for the First Time

⚠ WARNING!

Incorrect assembly can result in accidents

The assembly of the truck at the application site, commissioning and operator 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 when the mast has been properly assembled.

▶ Only then can the truck be started.

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

⚠ WARNING!

The use of unsuitable energy sources can be hazardous

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

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

▶ The truck must only be operated with battery current.

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

Procedure

- Check the equipment is complete.
- If necessary, install the battery, see page 76. Do not damage the battery cable.
- Charge the battery, see page 73.

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

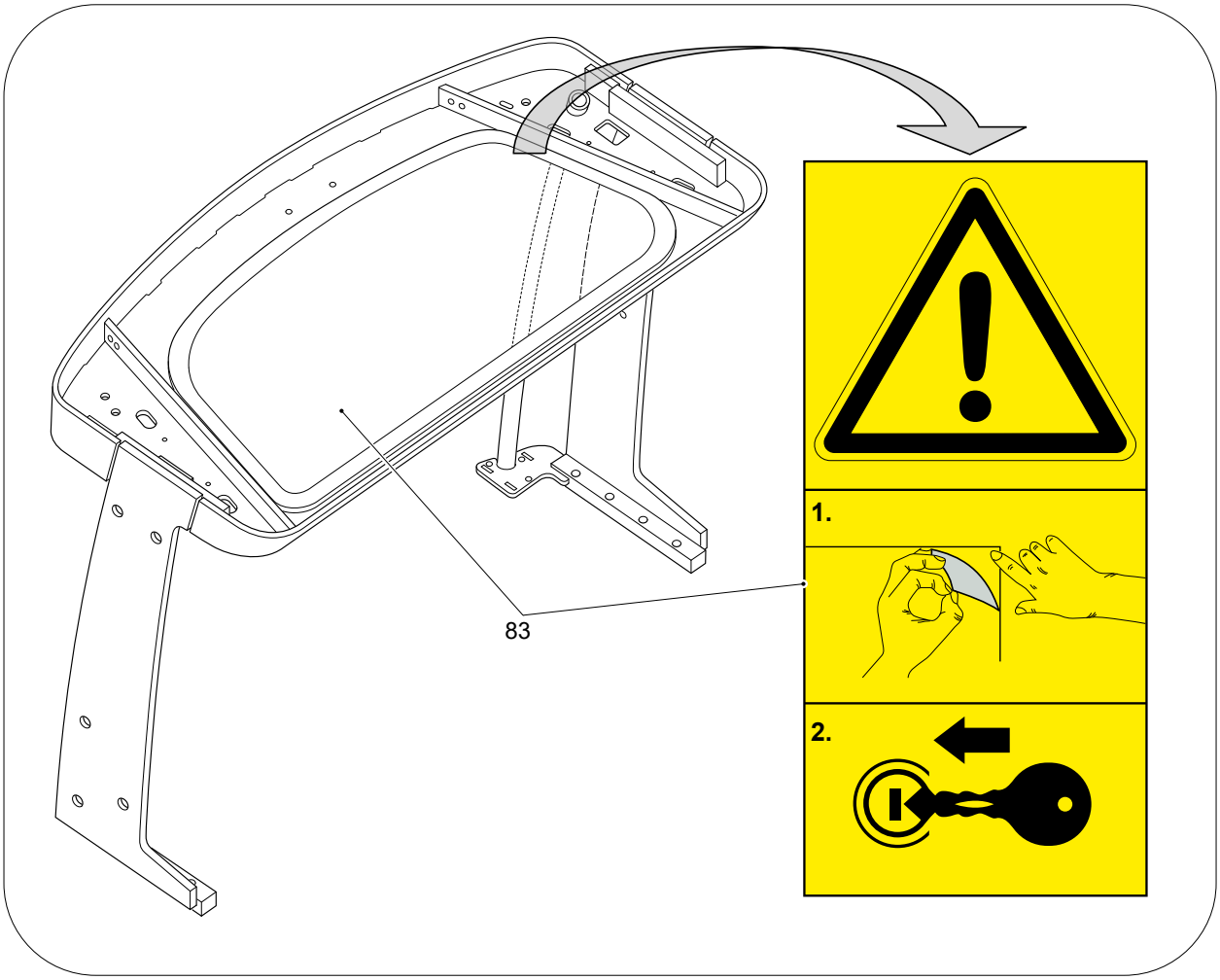
- Check the hydraulic oil level and top up if necessary (see page 223).
- Start up the truck (see page 115).

Truck is operational.

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 (83) must be removed before initial commissioning of the truck.

D Battery - Servicing, Recharging, Replacement

For use of lithium-ion batteries (○), see the manufacturer's operating instructions.

1 Safety instructions for handling lead-acid batteries

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.

Fire protection measures

⚠ WARNING!

Short circuits can result in fire

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

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

⚠ CAUTION!

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

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

▶ Use powder extinguishers.

▶ Never extinguish burning batteries with water.

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

Battery maintenance

The battery cell covers must be kept dry and clean. Terminals and cable shoes must be clean, lightly greased with terminal grease and must be securely tightened. Batteries with non insulated terminals must be covered with a non slip insulating mat.

⚠ CAUTION!

When retracting the battery cover make sure that the battery cable cannot be damaged. Damaged cables can result in short circuits.

Battery disposal

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

1.1 General notes on handling batteries

⚠ WARNING!

Risk of accidents and injuries when handling acid batteries

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

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

⚠ WARNING!

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

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

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

The truck must be parked securely before all work on the batteries, see page 153.

2 Battery types

⚠ CAUTION!

Always use batteries with insulated covers or live components.

The battery weights are indicated on the battery data plate.

The truck will be equipped with different battery models, depending on the application. The following table shows which combinations are included as standard:

Battery base space [1]	B circuit				
	ETV 210	ETV 212	ETM 214	ETM 216	ETM 325
XS	●	●			
S	○	○	●	●	
M	○	○	○	○	
L			○	○	●
XL					○
[1] *For special configurations, the battery sizes deviate from the standard.*					

Battery base space [1]	C circuit				
	ETV 214	ETV 216	ETV 318	ETV 320	ETV 325
S	●	●			
M	○	○	●	●	●
L	○	○	○	○	○
XL				○	○
[1] *For special configurations, the battery sizes deviate from the standard.*					

Battery type	Battery base space	Voltage [V]	Mass [kg][1]
48 V - 2PzS	XS	48	556
48 V - 3PzS	S	48	750
48 V - 4PzS	M	48	939
48 V - 5PzS	L	48	1119
48 V - 6PzS	XL	48	1309
[1] *Tolerance +/-5%*			

Battery type	Battery base space	Voltage [V][1]	Mass [kg][2]
Lithium-ion	XS	51.1-51.8	556
Lithium-ion	S	51.1-51.8	750
Lithium-ion	M	51.1-51.8	939
Lithium-ion	L	51.1-51.8	1119
Lithium-ion	XL	51.1-51.8	1309

[1)] *Values can deviate depending on battery manufacturer.*
[2)] *Tolerance +/-5%*

3 Exposing the battery

⚠ CAUTION!

Moving parts can cause accidents

The mast moves when the battery is exposed. This constitutes a risk of accidents and trapping in the hazardous area.

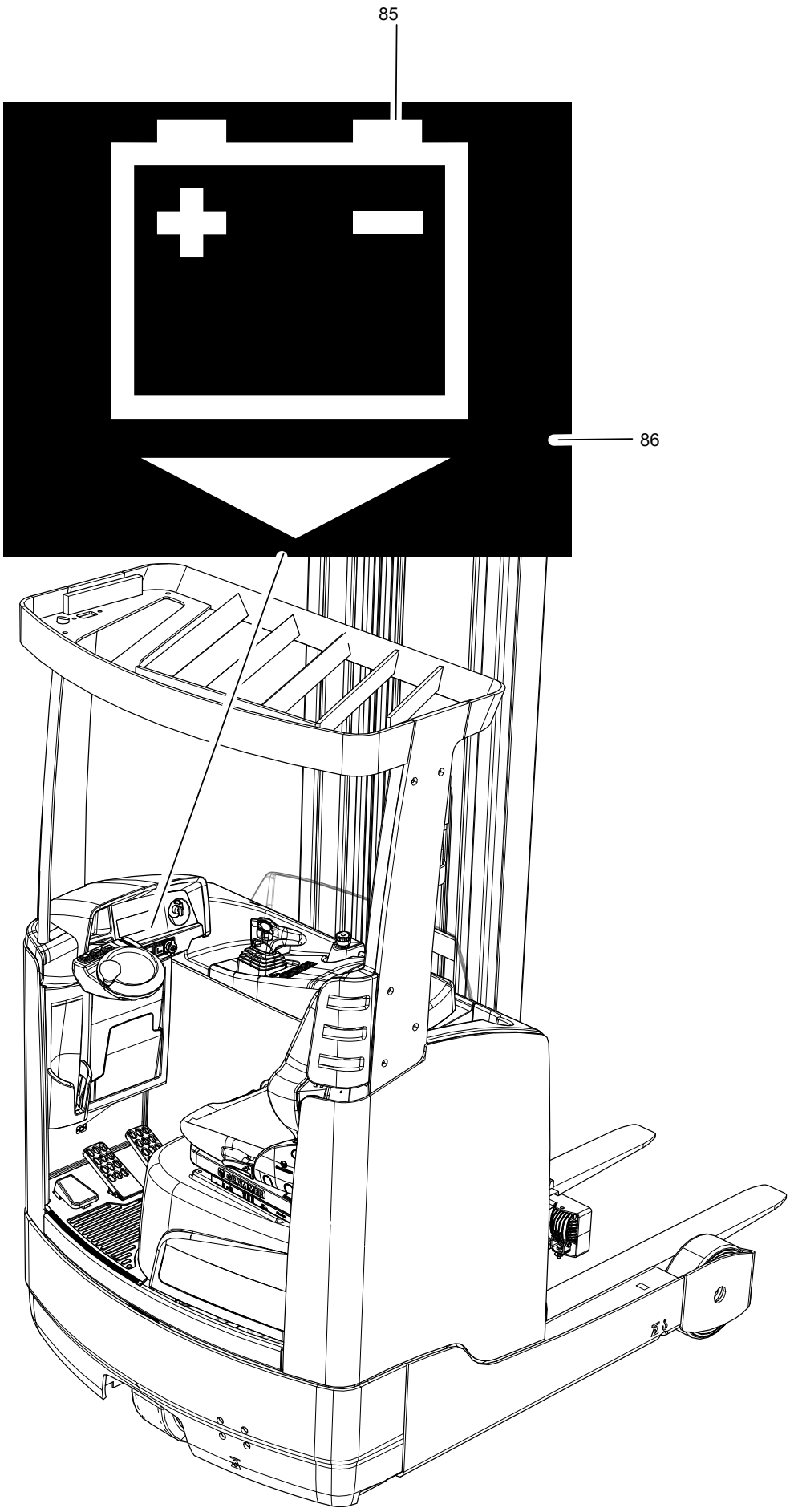
- ▶ Instruct any persons to leave the hazardous area.
- ▶ Make sure there is nothing between the battery and the mast holder when you move the mast holder.

NOTICE

Trapped battery cables can cause damage

When the battery is inserted the battery cable can be damaged if fitted without a cable duct.

- ▶ Always install the battery with a cable duct (84).
- ▶ The cable duct (84) must match the battery used. The battery cable length depends on the battery type.
- ▶ Contact the manufacturer's service department when replacing the factory-fitted battery.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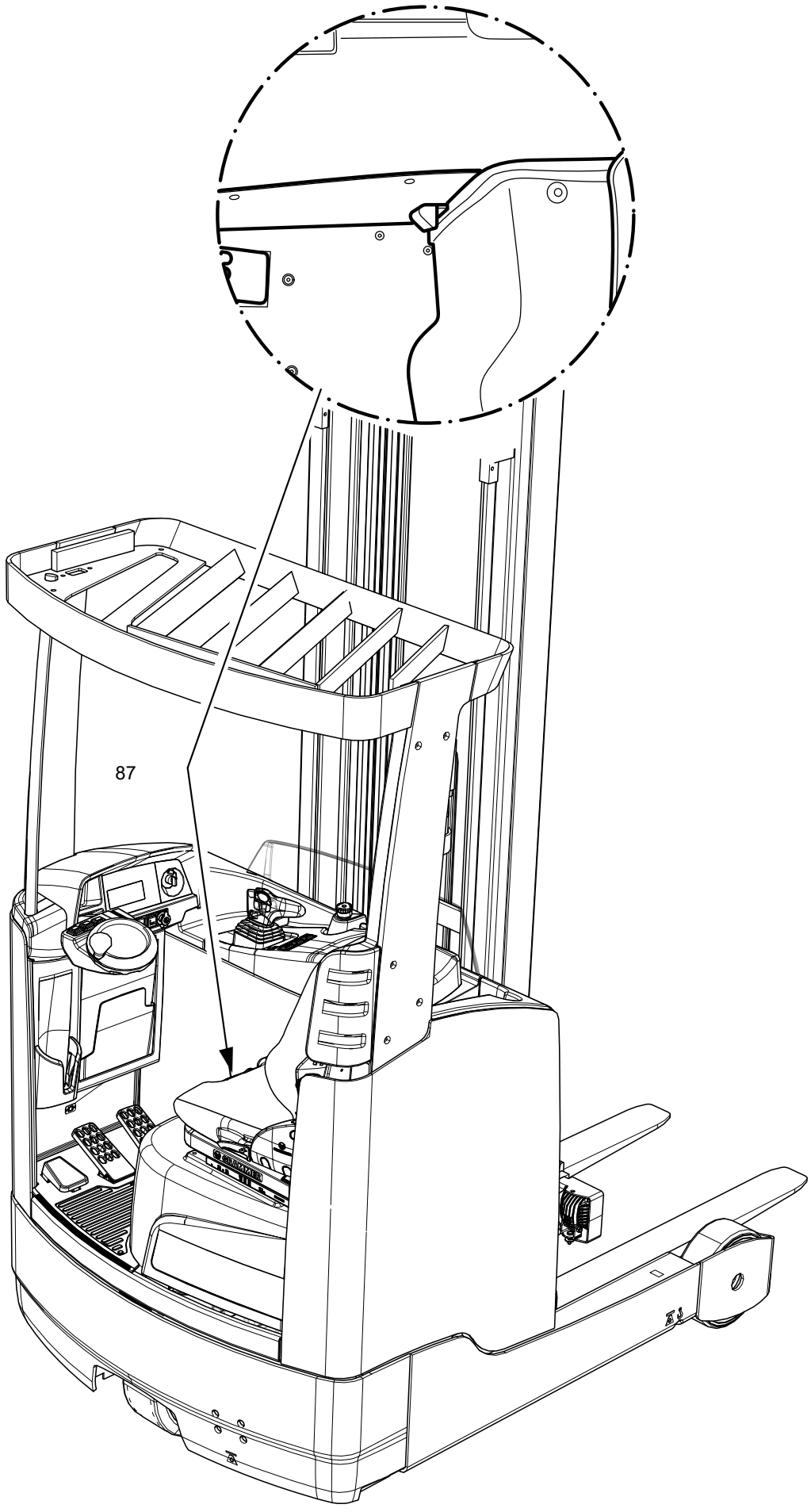

87

Exposing the battery

Requirements

– Truck prepared for operation, see page 105.

Procedure

- Press the battery unlock button (86) button until the battery trolley reaches its unlocking position.
- Release the battery unlock button pedal (86).
- Press the battery unlock pedal (87) with your right foot and hold it in this position.

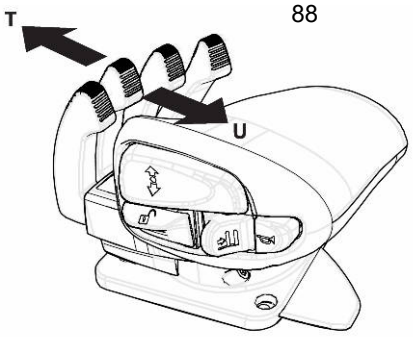
➔ The “battery unlocked” button (85) lights up on the display unit.

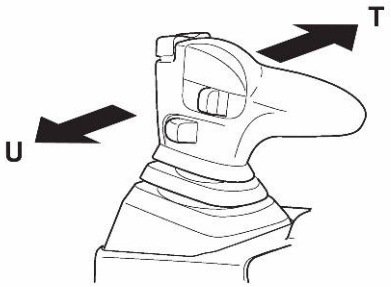
- Move the lever (88) in the direction of the arrow (T) and extend the mast support with the coupled battery trolley until the battery is exposed for maintenance.
- Release the battery unlatch pedal (87).
- Turn off the emergency disconnect switch and key switch.

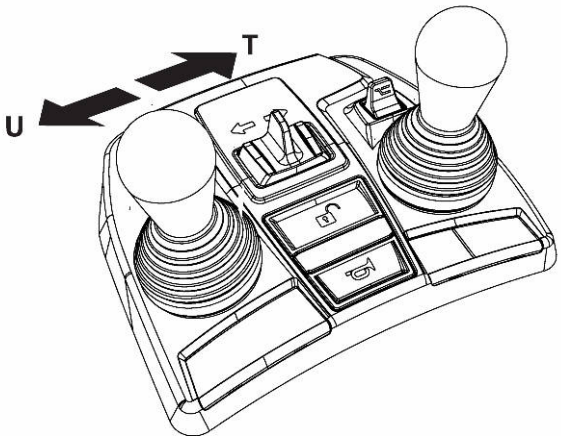
➔ The battery unlatch safety switch only allows for travel at crawl speed if the battery trolley is unlatched and the indicator lamp (85) is still on. Before starting up the truck again, the battery trolley must be restored to its initial position in order to uncouple the battery trolley and the mast support. The indicator (85) must be off

The battery is exposed.

88







Inserting the battery

Requirements

– Truck prepared for operation, see page 105.
– Battery exposed.

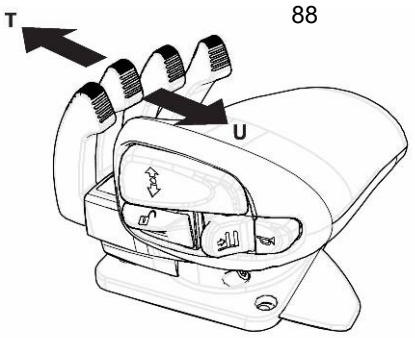
Procedure

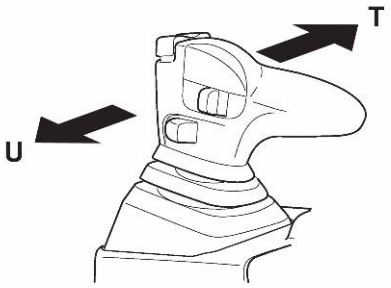
• Pull the lever (88) in the direction of the arrow (U) and retract the mast holder.

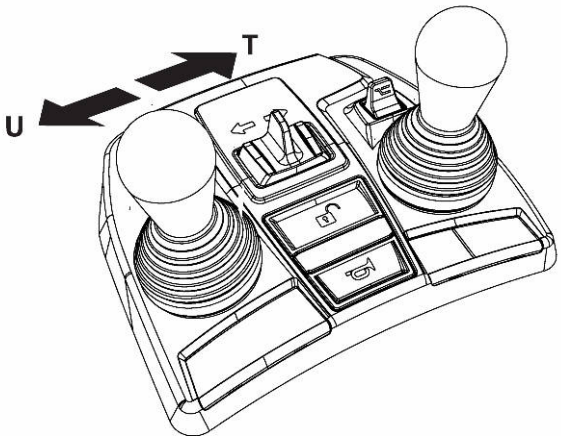
➔ The "battery unlocked" (red graphic symbol) (85) goes out on the display unit.

➔ The battery unlatch safety switch only allows for travel at crawl speed if the battery trolley is unlatched and the indicator lamp (85) is still on. Before starting up the truck again, the battery trolley must be restored to its initial position in order to uncouple the battery trolley and the mast support. The indicator (85) must be off

The battery is now inserted.







4 Charging the battery

⚠ WARNING!

Risk of explosion due to gases produced while charging

The battery gives off a mixture of oxygen and hydrogen (oxyhydrogen gas) during charging. Gassing is a chemical process. This gas mixture is highly explosive and must not be ignited.

- ▶ Switch the charging station and truck off first before connecting/disconnecting the charging cable of the battery-charging station to/from the battery connector.
- ▶ The charger must be compatible with the battery in terms of voltage and charge capacity.
- ▶ Before charging, check all cables, plug connections and coding pins for visible signs of damage.
- ▶ Ventilate the room in which the truck is being charged.
- ▶ The battery cell surfaces must be exposed during charging to ensure adequate ventilation.
- ▶ Do not smoke and avoid naked flames when handling batteries.
- ▶ Wherever an industrial truck is parked for charging, there must be no combustible material or consumables capable of creating sparks within a minimum distance of 2,5 m from the truck.
- ▶ Fire control equipment must be available.
- ▶ Do not place any metallic objects on the battery.
- ▶ Always follow the safety regulations of the battery manufacturer and the charging station manufacturer.

⚠ WARNING!

Risk of use of unsuitable battery charger on trucks with comfort charging socket

Voltage peaks may occur when using a battery charger with an incompatible voltage, charging capacity and battery technology. Voltage peaks can permanently damage the battery charger, truck and battery Spark formation and uncontrolled movement of electronically controlled components may cause personal injury and material damage.

- ▶ The battery must only be charged with the Jungheinrich battery charger designed for this battery.
- ▶ Use only battery chargers approved by the manufacturer.

Charge the battery

Requirements

– Battery exposed, see page 68.
– Remove any insulating mats from the battery.

Procedure

- Connect the charger lead of the battery charger station with the battery connector.
- Charge the battery in accordance with the battery and charging station manufacturers' instructions.

Battery is charged.

⚠ WARNING!

Risk of accidents and injuries when handling lithium-ion batteries.

Improper use can result in overheating, fire or a battery explosion.

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

▶ Observe the operating instructions for charging the lithium-ion battery.

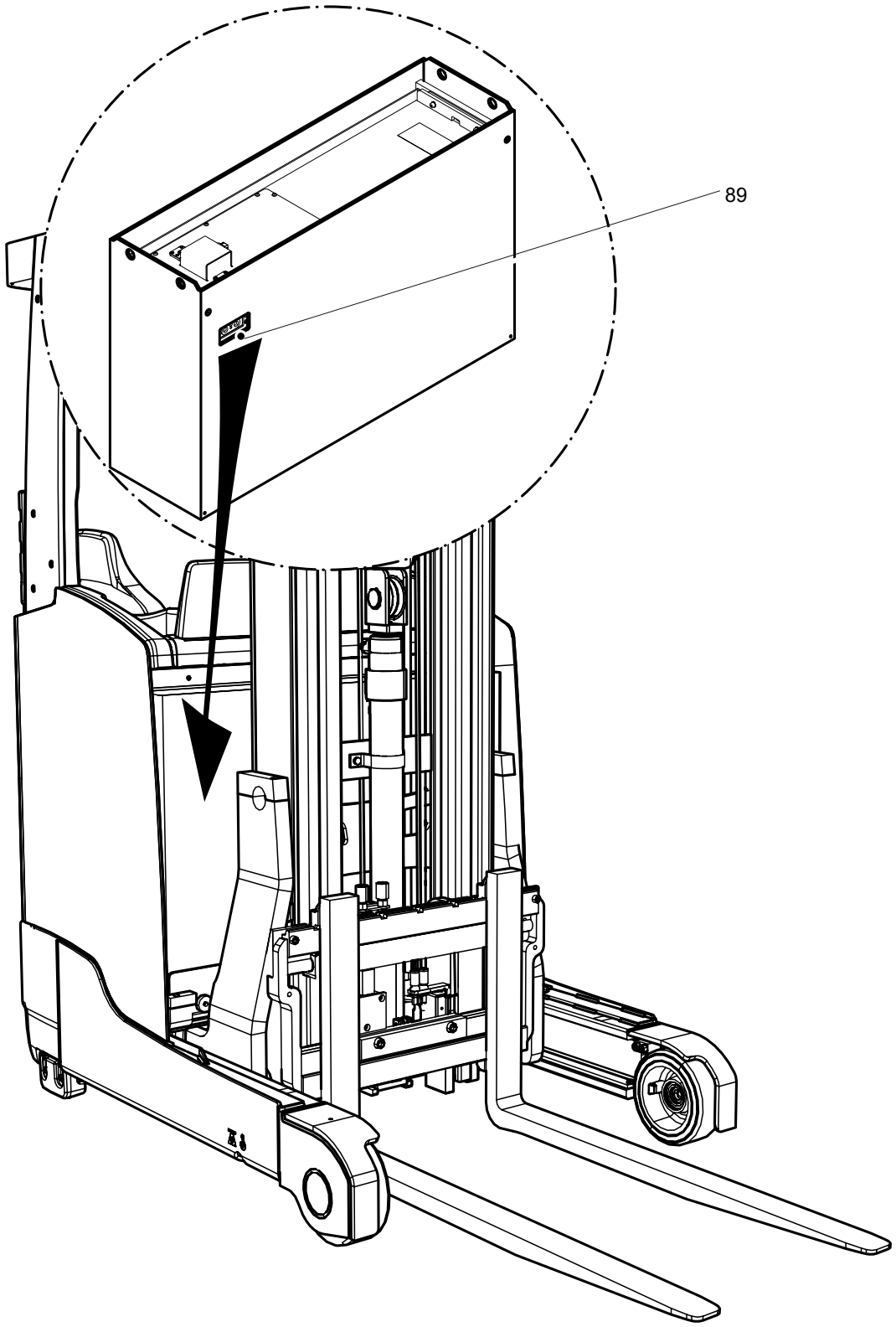
▶ Do not use the lithium-ion battery cable for charging. The battery cable is permanently connected to the truck.

▶ Do not place any metallic objects on the lithium-ion battery.

▶ The battery charger must comply with national regulations.

Procedure

- Connect the charger cable of the deactivated charger to the battery connection (89).
- Switch on the battery charger.
- The lithium-ion battery is charged, see the manufacturer's operating instructions.
  The battery is charging.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5 Removing or installing the battery

⚠ WARNING!

Improper loading by crane can result in accidents

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

- ▶ Prevent the truck from hitting other objects during lifting, and avoid uncontrolled movements. If necessary, secure the truck with guide ropes.
- ▶ Loading by crane may only be performed by persons who have been trained in the use of the lifting accessories.
- ▶ Wear personal protective equipment (e.g. safety shoes, hard hat, hi-vis jacket, protective gloves) when loading by crane.
- ▶ Do not stand under suspended loads.
- ▶ Do not enter or stand in the hazardous area.
- ▶ Always use lifting gear with sufficient capacity (observed truck weight in accordance with truck data plate – see page 45).
- ▶ Always secure crane lifting gear to the prescribed attachment points and prevent it from slipping.
- ▶ Use the lifting accessories only in the prescribed load direction.
- ▶ Lifting slings should be fastened in such a way that they do not come into contact with any attachments when lifting.

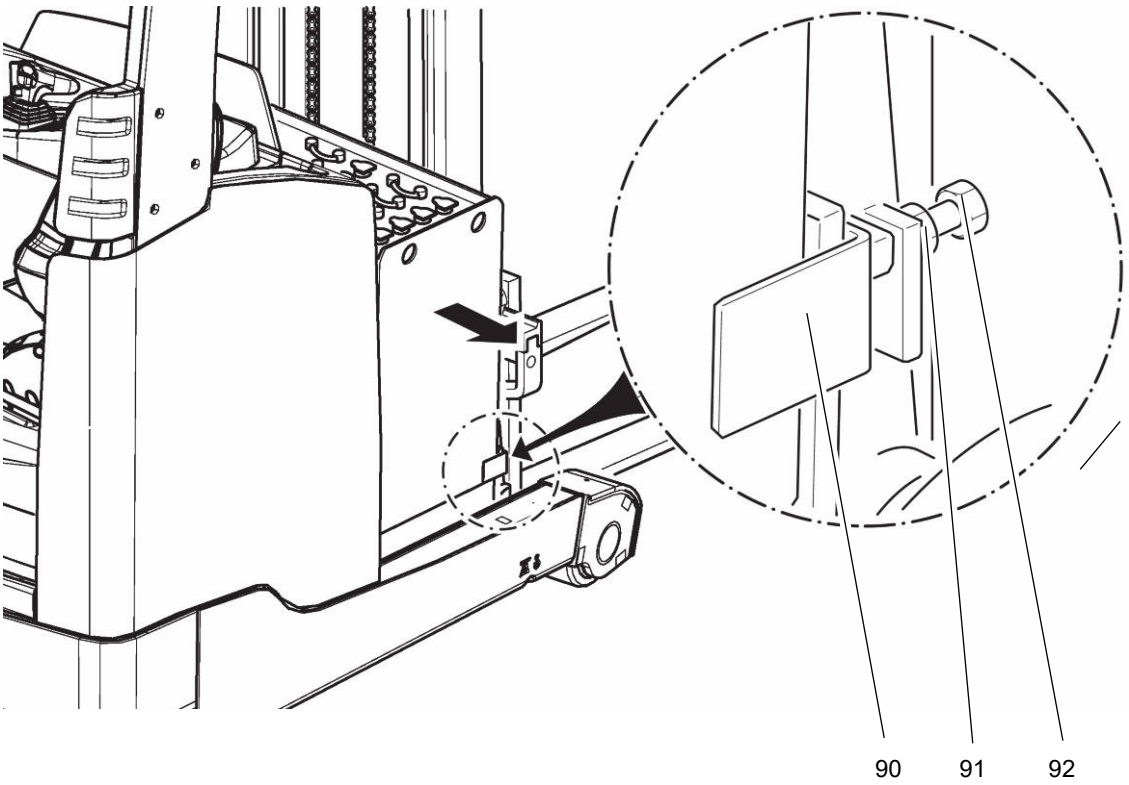
⚠ WARNING!

Risk of accidents and injury from electrical voltage

When installing and removing the lithium-ion battery, there is a risk of accidents and injury from electrical voltages.

- ▶ The lithium-ion battery may only be installed and removed by authorised maintenance personnel.

5.1 Removing the battery



Removing the battery

Requirements

– Battery exposed, see page 68.

Tools and Material Required

– Crane lifting gear

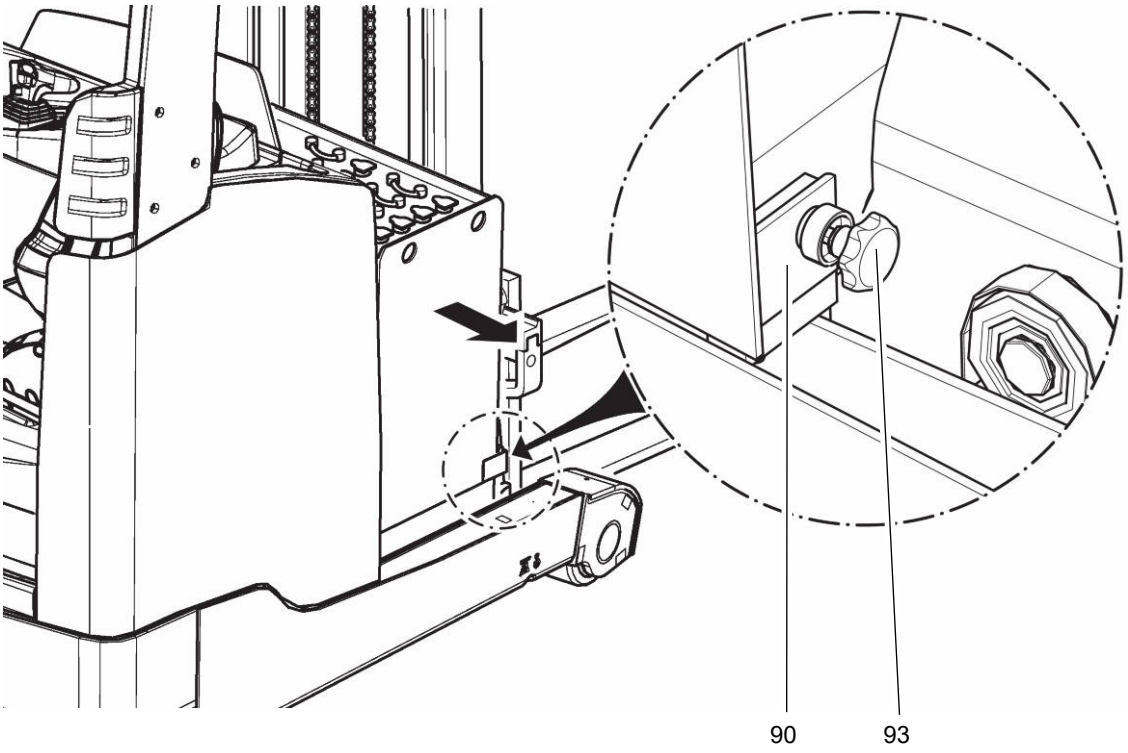
Procedure

- Loosen the jam nut (91) on the battery lock (90).
- Undo the retaining screw (92).
- Pull out the battery stop (90).
- Remove the battery cover.
- Strap the crane lifting gear to both sides of the battery container.

➔ The hooks must be fitted in such a way that when the crane lifting gear is slackened, they do not fall onto the battery cells. The lifting gear must exert a vertical pull so that the battery container is not compressed.

- Lift the battery clear and move out to the side.

The battery is now removed.



Removing the battery with the battery trolley (○)

Requirements

– Battery exposed, see page 68.

Tools and Material Required

– Battery trolley

Procedure

⚠ CAUTION!

An unsecured battery can result in accidents

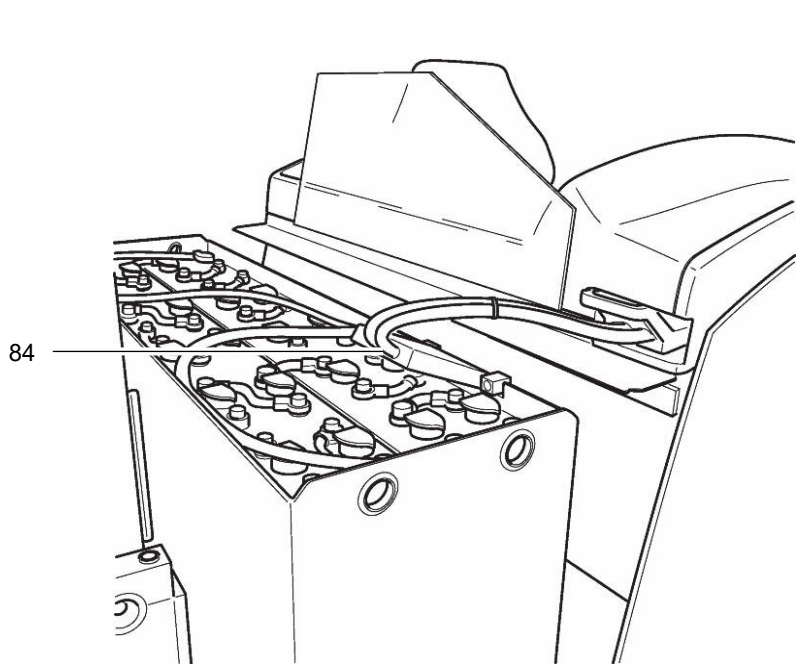
When the battery stop (90) is removed, the battery can roll out if the truck is not horizontal.

▶Park the truck on a level surface.

- Release the handle (○) (93).
- Pull out the battery stop (90).
- Remove the battery cover.
- Pull the battery out to the side onto the battery trolley.

The battery is now removed.

5.2 Battery installation



NOTICE

Trapped battery cables can cause damage

When the battery is inserted the battery cable can be damaged if fitted without a cable duct.

- ▶ Always install the battery with a cable duct (84).
- ▶ The cable duct (84) must match the battery used. The battery cable length depends on the battery type.
- ▶ Contact the manufacturer's service department when replacing the factory-fitted battery.

Battery installation

Requirements

– Battery removed.
– Battery cover removed.

Tools and Material Required

– Crane lifting gear

Procedure

- Strap the crane lifting gear to both sides of the battery container.
- Lift the battery with the crane lifting gear, lift it in from the side and lower it.
- Insert the battery stop (90).
- Tighten the retaining screw (92) and jam nut (91) or handle (93) on the battery stop (90).
- Attach the battery connector to the truck connector.
- Fit the battery cover.

The battery is now assembled.

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

Installing the battery with the battery trolley (○)

Requirements

– Battery removed.
– Battery cover removed.

Tools and Material Required

– Battery trolley

Procedure

- Bring the battery trolley with the battery up to the truck.
- Push the battery off the trolley into the battery compartment.
- Insert the battery stop (90).
- Tighten the retaining screw (92) and jam nut (91) or handle (93) on the battery stop (90).
- Attach the battery connector to the truck connector.
- Fit the battery cover.

The battery is now assembled.

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.

Safety devices, warning signs and warning instructions

Safety devices, warning signs (see page 41) and warning instructions in the present operating instructions must be strictly observed.

⚠ 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.

⚠ CAUTION!

Loss of stability can cause accidents

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

- ▶ Always travel with the mast holder retracted, the mast tilted back and the load handler lowered.

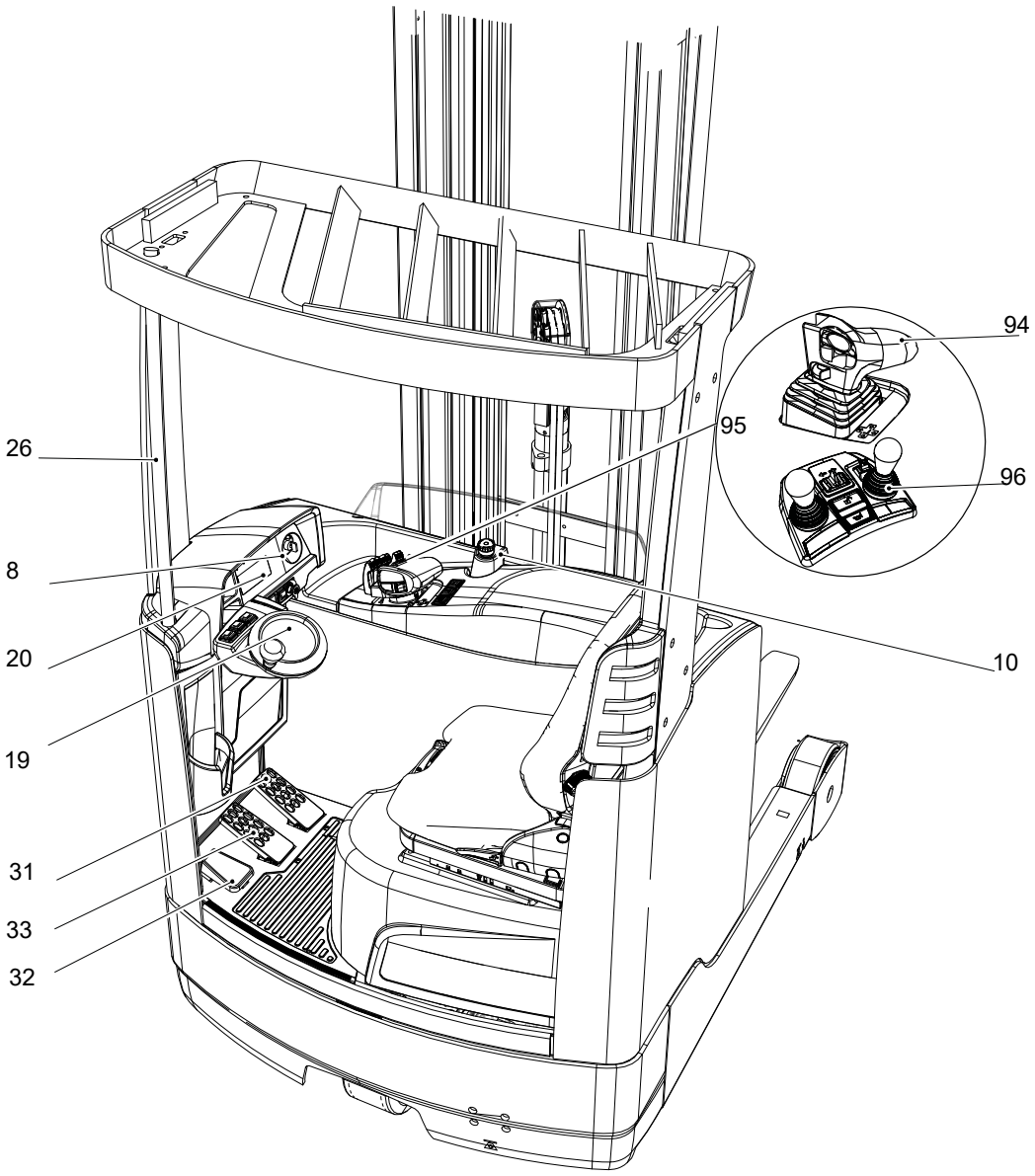
⚠ WARNING!

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.

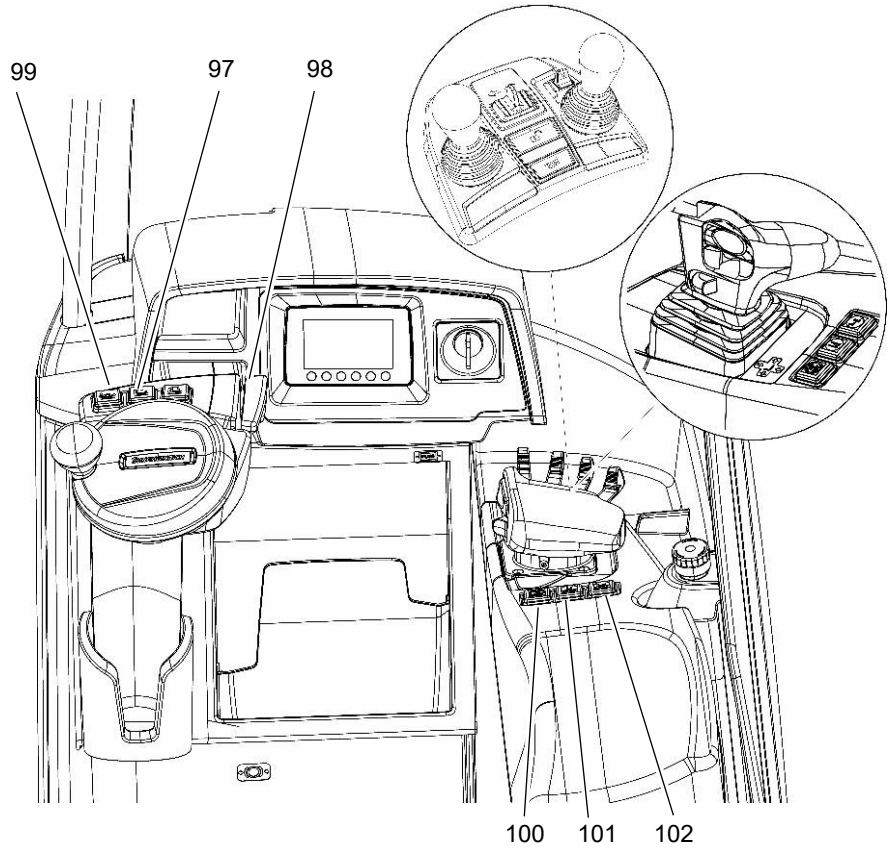
- ▶ Report any defects immediately to your supervisor.
- ▶ Tag out and decommission a faulty lift truck.
- ▶ Only return the truck to service when you have identified and rectified the fault.

2 Displays and Controls



Item	Control and display item		Function
95	soloPILOT	●	Functions: – Fwd/rev. travel direction – Lifting/lowering load – Mast forward/reverse tilt – Horn button – Sideshift left / right – Auxiliary hydraulics (○) – Mast reach forward / reverse – Acknowledgement key (○)
94	multiPILOT	○	
96	duoPILOT		
26	Grab handle	●	Entry and exit

Item	Control and display item		Function
8	Key switch	●	Switches control current on and off. Removing the key prevents the truck from being switched on by unauthorised personnel.
	ISM access module	○	Switches the truck on
	Keypad		
	Transponder		
	EasyAccess storage compartment		
20	Control and display unit	●	Displays steering modes, warning indicators, incorrect operation notes and service displays
		○	Switches on the truck using EasyAccess with PinCode
10	Emergency disconnect switch	●	Switches the power supply on and off
19	Steering wheel	●	Sets the travel direction
31	Accelerator pedal	●	Provides infinitely variable travel speed control
33	Deadman switch	●	– Not applied: Travel and hydraulic functions inhibited, truck decelerates – Applied: Travel and hydraulic functions enabled
32	Brake pedal	●	Provides infinitely variable braking control.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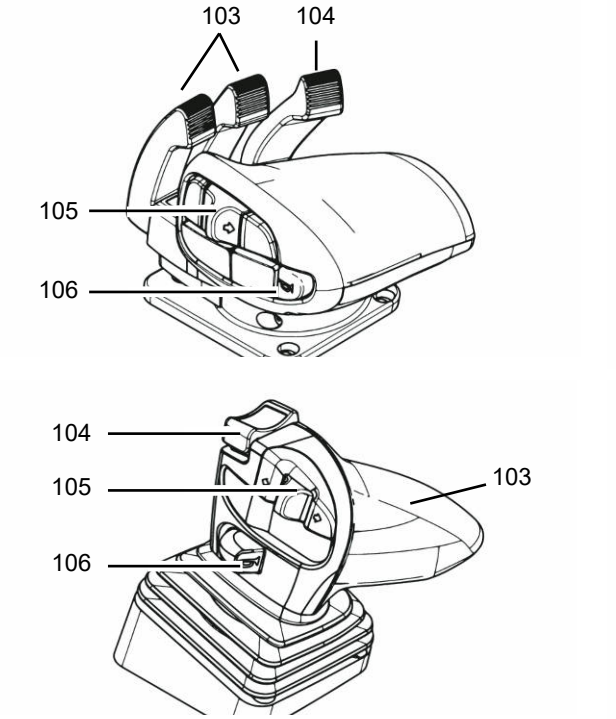
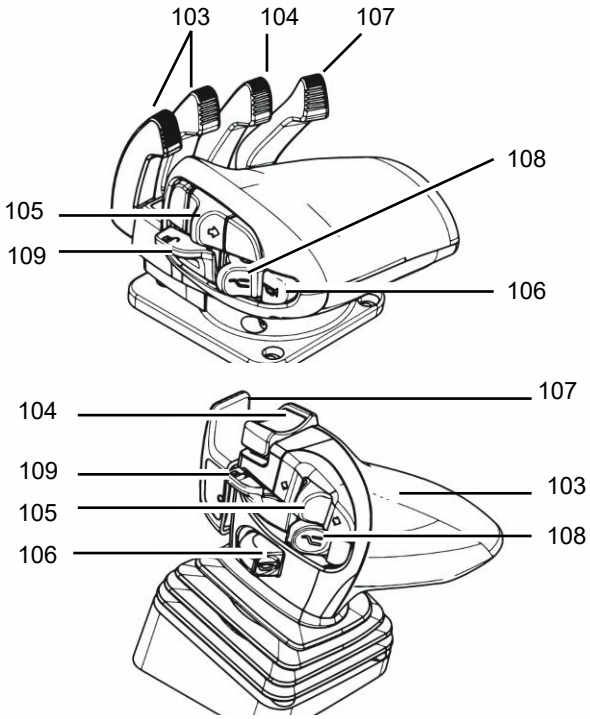
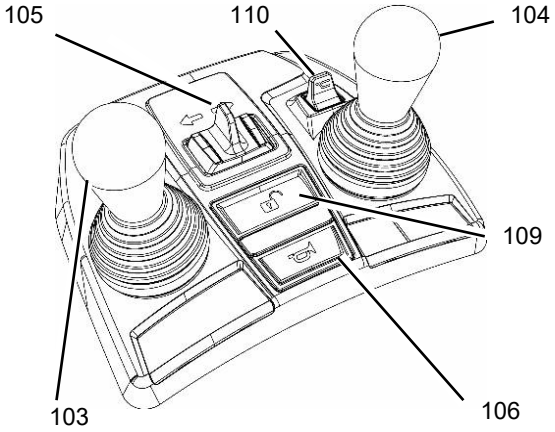






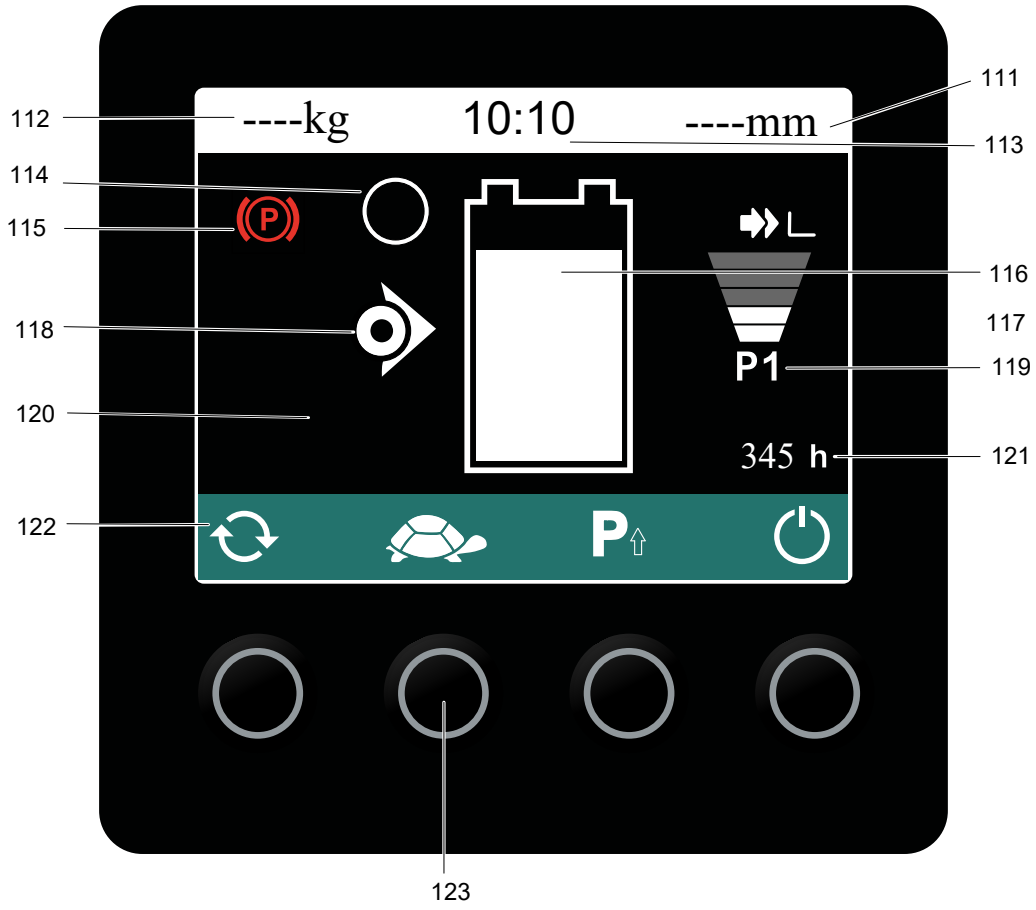
Item	Control and display element		Function
97	Weighing button	○	Weighs the load.
98	Steering column stop	●	
99	Limit switch system and lift height display override button	○	Prevents damage to the truck and the load.
100	Steering mode button	○	Switches the steering mode between 180° and 360°.
101	Side shift centre position button	○	Moves the side shift to the centre position.
102	Forks horizontal button	○	Allows the load handler to be aligned horizontally.
103	Basic hydraulic functions lever	●	Lever for operating the basic lift/mast reach hydraulic functions

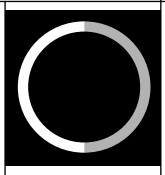
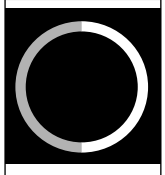
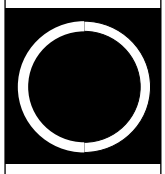
Item	Control and display element		Function
104	Side shift/auxiliary hydraulics 1 optional button/lever	●	Button for side shift or auxiliary hydraulics 1
105	Travel direction button	●	Selects travel direction/neutral position.
106	Horn button	●	Activates a signal
107	Fork positioner/auxiliary hydraulics 2 button/lever - optional	○	Button for fork positioner or auxiliary hydraulics 2
108	Side shift	○	Side shift operation
109	Acknowledgement button	○	Additional confirmation means for hydraulic functions requiring acknowledgement
110	Toggle switch	○	Switches to the second function of the respective lever / button

2.1 Display unit

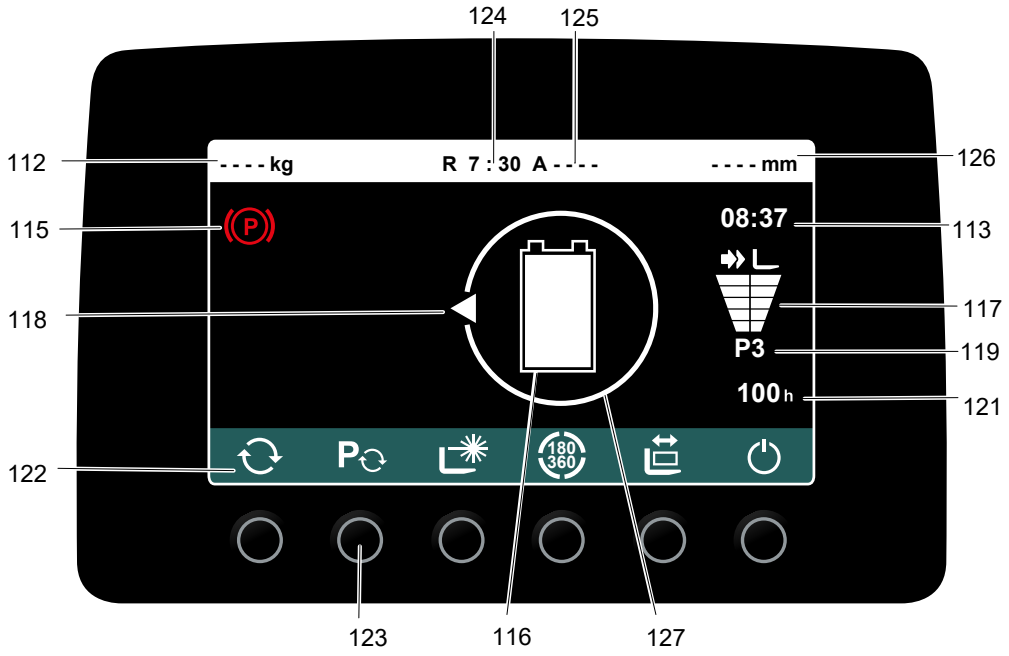
2.1.1 Display

2.1.1.1 Display 2 inch



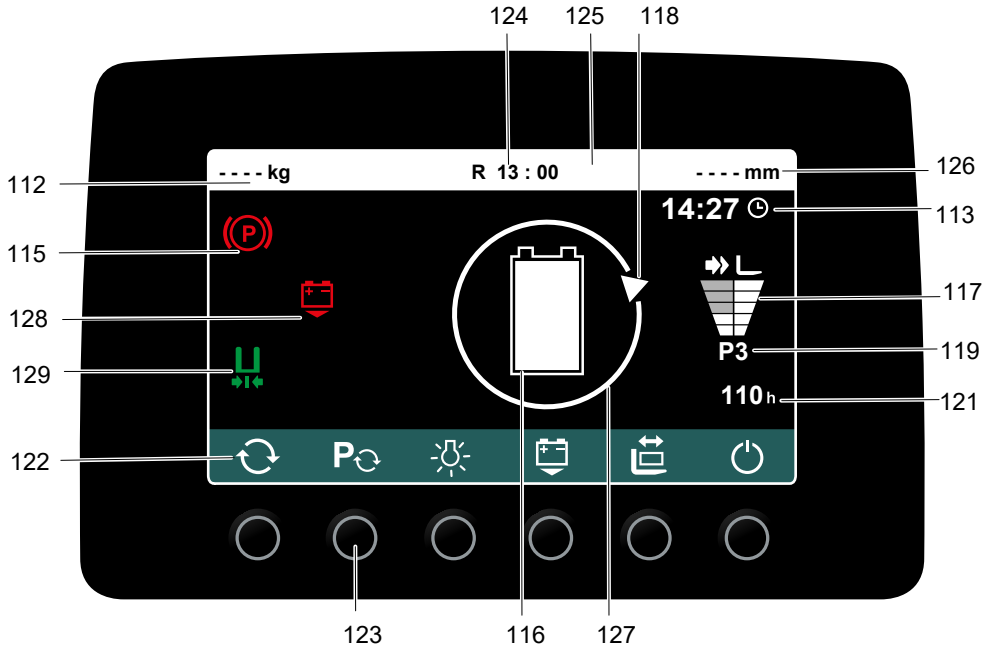
Item	Control and display item		Function
114	Steering mode		180° steering
			
			360° steering
118	Arrow to display the travel and steering directions		Shows the current travel direction of the truck and the current wheel position in 15° segments.
113	Time		Shows the time.
117	Power display		Shows the travel/lift speed as a bar value
119	Operating program		Shows the operating program selected.
121	Service hours		Shows the truck's service hours, see page 100.
122	Button allocation		see page 85.
123	Buttons		Selection buttons for the functions shown above them.
116	Battery capacity display		Battery discharge status
111	Lift height display		Shows the lift height
112	Load-weight display		Shows the weight of the raised load.

2.1.1.2 4-inch display (○)



Item	Control and display item		Function
127	Steering mode		180° steering
			360° steering
118	Arrow to display the travel and steering directions		Shows the current travel direction of the truck and the current wheel position in 15° segments.
113	Time		Shows the time.
117	Power display		Shows the travel/lift speed as a bar value
119	Operating program		Shows the operating program selected.
121	Service hours		Shows the truck's service hours, see page 100.
122	Button allocation		see page 97.
123	Buttons		Selection buttons for the functions shown above them.
116	Battery capacity display		Battery discharge status
124	Remaining running time		Shows the truck's remaining run time.
125	Load centre display		Shows the current load centre.
126	Lift height display		Shows the lift height
112	Load-weight display		Shows the weight of the raised load.

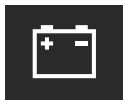
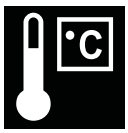
2.1.1.3 6-inch display (○)



Item	Control and display item		Function
127	Steering mode		180° steering
			360° steering
118	Arrow to display the travel and steering directions		Shows the current travel direction of the truck and the current wheel position in 15° segments.
113	Time		Shows the time.
117	Power display		Shows the travel/lift speed as a bar value
119	Operating program		Shows the operating program selected.
121	Service hours		Shows the truck's service hours, see page 100.
122	Button allocation		see page 97.
123	Buttons		Selection buttons for the functions shown above them.
116	Battery capacity display		Battery discharge status
124	Remaining running time		Shows the truck's remaining run time.
125	Load centre display		Shows the current load centre.
126	Lift height display		Shows the lift height
112	Load-weight display		Shows the weight of the raised load.

2.1.2 Symbols in the display

Symbol	Description	Colour	Function/meaning
	Parking brake	Red	Parking brake is activated
	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 malfunction
	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
	Horizontal tilt	Green	Positioning of the forks in horizontal position

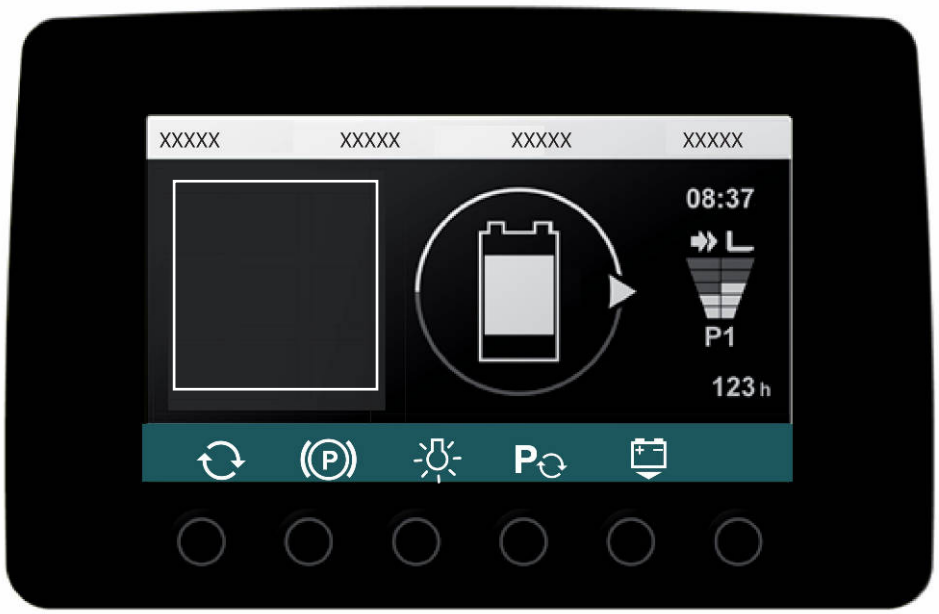
Symbol	Description	Colour	Function/meaning
	Lift cut-off	Yellow	Overriding the lift cut-off
	Lowering cut-off (limit switch system)	Green	Lowering cut-off is overridden
		Yellow	Lowering cut-off is initiated
	Side shift centred	Green	Positioning of the side shift in centre position
	Battery release	Red	Battery is released
	Battery charge status	Yellow	Battery charge status is between 1 and 12%.
		Red	Battery charge status is below 1%. Crawl speed 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 lifting functions are cut out due to insufficient battery capacity.
	operationCONTROL	Red	Tilt limit reached
	Seat belt lock control system	Yellow	Seat belt lock not engaged
		Red	Incorrect operating sequence
	Overtemperature	Yellow	Performance reduction due to overtemperature
		Red	Function cut-off due to overtemperature

2.1.3 Soft keys (○)

Symbol	Meaning	Function
	Button assignment	Switches the operating level
	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 (○)
	Battery release	Releases the battery trolley
	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 (○)
	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 (○)
	Fork direction work lights	Actuates the work lights in the fork direction on the overhead guard (○)

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 (116). When a battery is discharged to the permissible discharge level, the battery symbol (116) is displayed empty. (see page 90)

➔ The standard setting for the battery discharge indicator (116) is based on a truck delivered with a standard battery.

2.1.6 Battery discharge monitor

If the residual capacity falls below the required level, lifting is inhibited. An corresponding display appears. Lifting is only released when the battery connected is at least 70% charged.

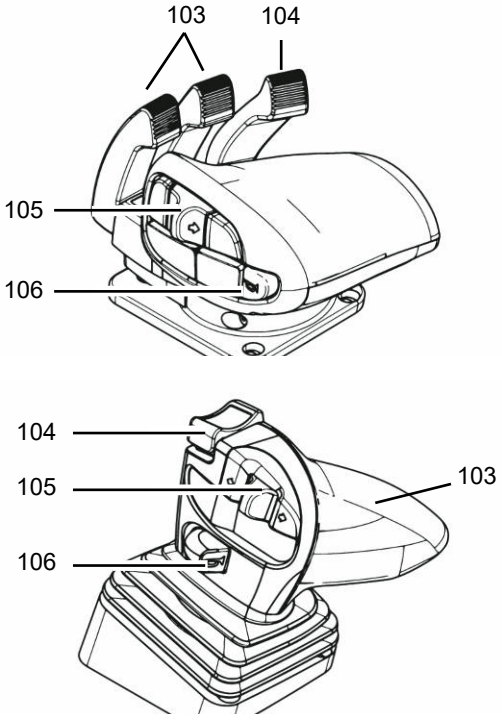
2.1.7 Hourmeter

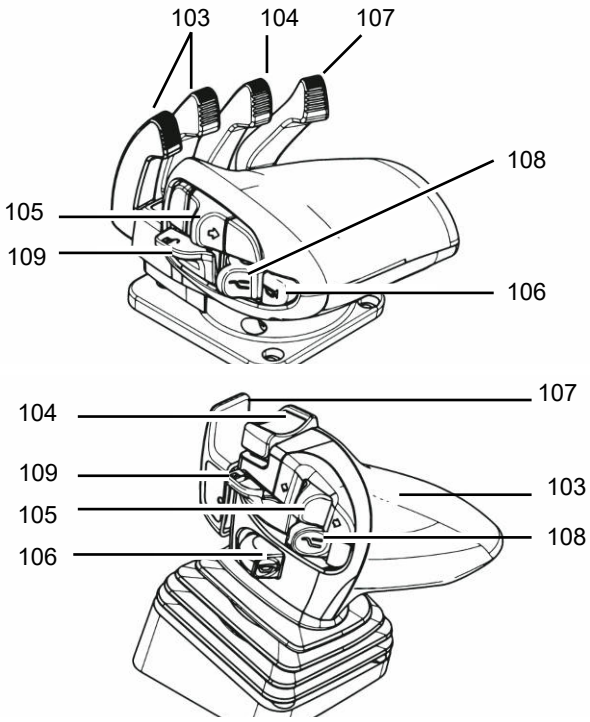
➔ Prepare the truck for operation, see page 105 or see page 163.

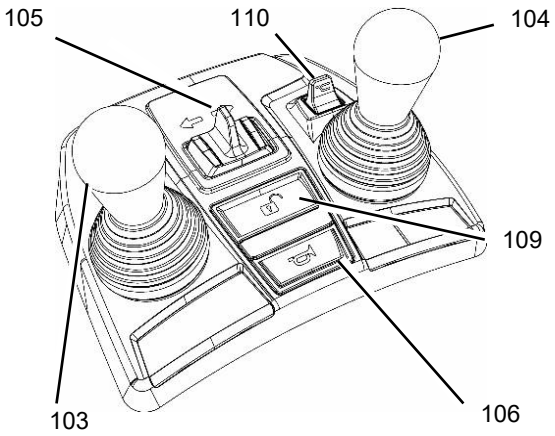
Service hours are counted while the truck is operational and the deadman button is pressed.

2.2 Pilots

Item	Control/ display element		Function
103	Basic hydraulic functions lever	●	Lever for operating the basic lift/mast reach hydraulic functions
104	Tilt button/lever	●	Forwards and backwards tilt of the mast
		○	Auxiliary hydraulics (ZH 1/ZH 2)
105	Travel direction button (not available with twin-pedal control)	●	Selects travel direction / neutral position
106	"Horn" button	●	Activates an audible signal.
107	Fork positioner/auxiliary hydraulics 2 button/lever - optional	○	Button for fork positioner or auxiliary hydraulics 2
108	Side shift	○	Side shift operation
109	Acknowledgement button	○	Additional confirmation means for hydraulic functions requiring acknowledgement
110	Toggle switch	○	Switches to the second function of the respective lever / button





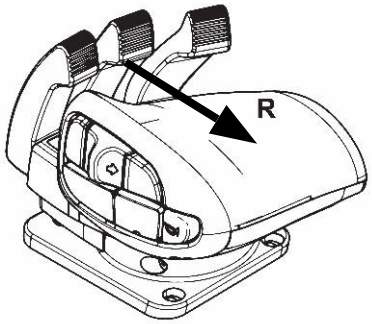

105
110
104
109
103
106

2.3 Function symbols for the Pilots

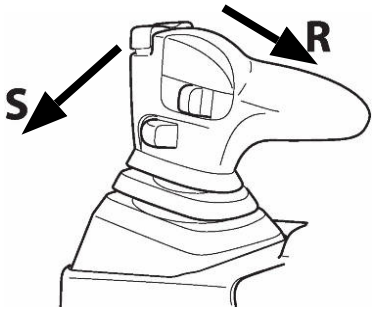
The symbols shown are examples. The actual direction of movement of the hydraulic functions must be determined from the labels on the levers of the Pilots.

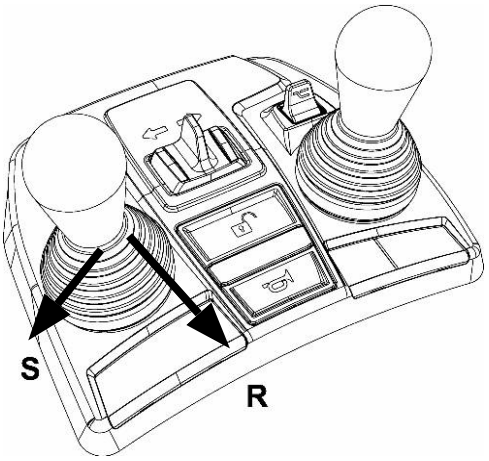
Symbol	Meaning
	Lift
	Tilt
	Side shift
	Fork positioner
	Reach fork
	Telescopic fork
	Adapters ZH1 to ZH4 (example symbol ZH1)

The pictogram shows the direction of movement that is executed when the operator pulls the lever in direction (R).
The counter-movement of the work function is achieved by the operator pushing the lever accordingly.



For controls that operate in the travel direction, the function is shown with the actuation to the left (S) from the operator's perspective. The counter-movement of the work function is achieved by actuating the lever to the right from the operator's perspective.





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

Procedure

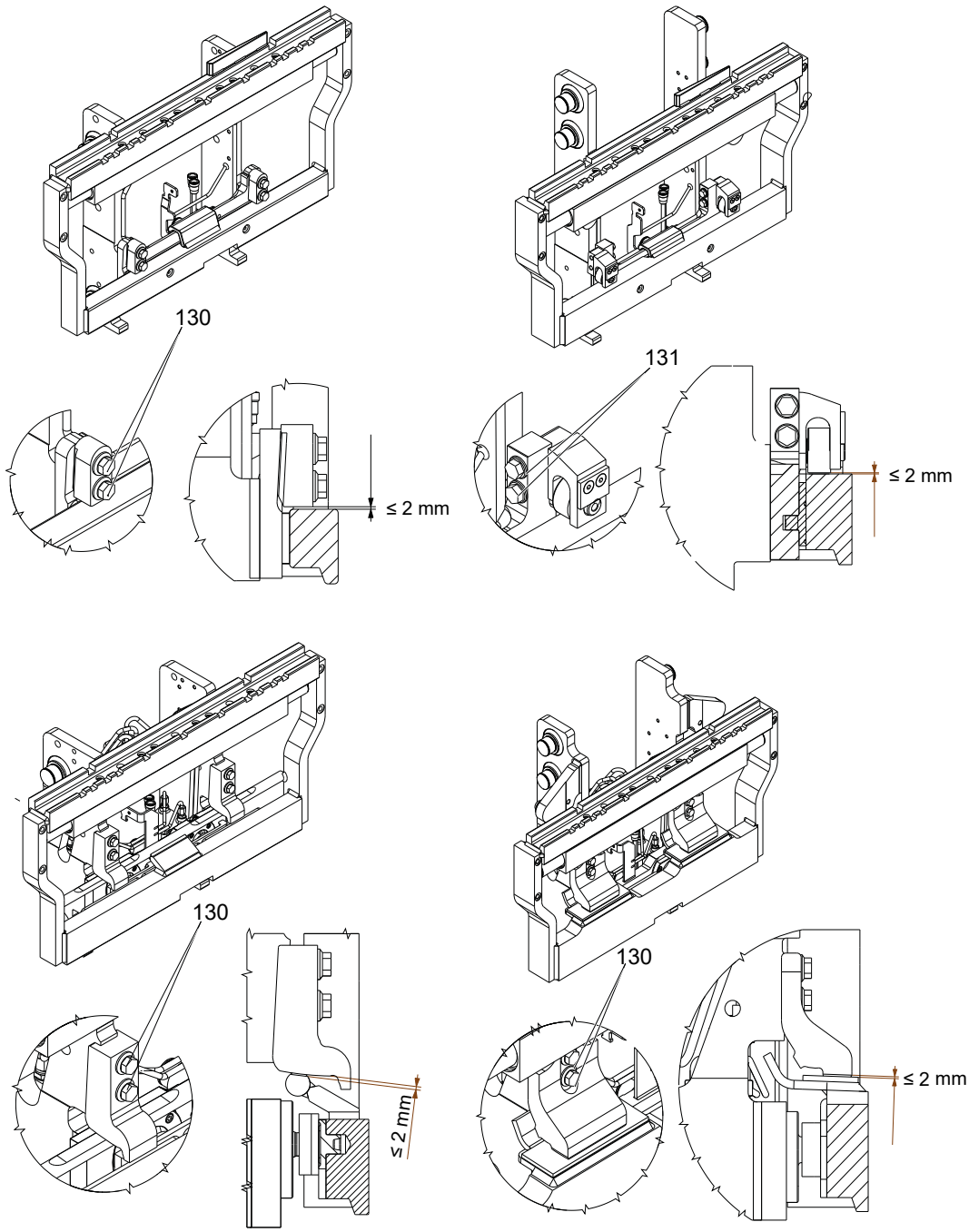
- Visually inspect the entire truck (in particular wheels and wheel bolts) for damage.
- Check the load handler for visible signs of damage such as cracks, bent or severely worn forks.
- Check the fork arm stop and fork retainer – see page 126.
- Check the fork arms for oil and dirt; clean if necessary.
- Visually inspect the hydraulic system in the visible area for damage and leaks.
- Make sure the driver's seat is locked in position.
- Check the horn and, if necessary, the reversing buzzer , Floor-Spot and strobe light / warning beacon (○) for correct function – see page 126.
- Check that the load chart and warning notices are legible.
- Test the controls and displays.
- Test the steering.
- Check the steer angle display, turn the steering wheel in both directions as far as the stop and check that the wheel position is displayed on the control panel.
- Make sure the load chains are evenly tensioned.
- Test the seat belt (○). The belt should jam if extracted suddenly.
- Check all hydraulic functions and, if applicable, the attachment hydraulic functions.
- Check that the mast protective screen panel (○) (9) is present.
- Visually inspect the battery attachment and cable connections.
- Check the battery connectors are secure.
- Check that the battery is positioned securely.
- Makes sure the battery is locked.
- Check that the mounting screws (130) and (131) of the fork carriage are secure; tighten the screws if necessary. Torque: 169 Nm.

➔ Torque (130): 169 Nm

Torque (131): 84 Nm

- The maximum clearance between the components of the restraint system must be no more than 2 mm.

The truck is now checked.



3.2 Entering or exiting

Entry and exit

Requirements

– Truck braked to a halt.

Procedure

- To enter, take hold of the grab handle (26), see page 85.
- Enter or leave the truck.

3.3 Setting up the operator position

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.

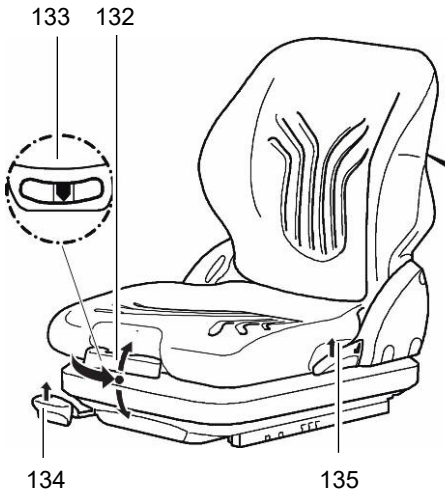
- ▶ Do not adjust the driver's seat while travelling.
- ▶ The driver's seat should lock in position after adjustment.
- ▶ Check and, if necessary, adjust the individual seat setting and driver's weight setting before starting up the truck.

Adjusting the seat position

Procedure

- Sit on the driver's seat.
- Pull up the driver's seat locking lever (134) 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 (134) 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 (132) as far as it will go in the arrow direction.
- Move the weight adjustment lever (132) up and down to set the seat to a higher weight.
- Move the weight adjustment lever (132) 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 (133). The minimum or maximum weight setting is reached when you can feel a return stroke on the lever.

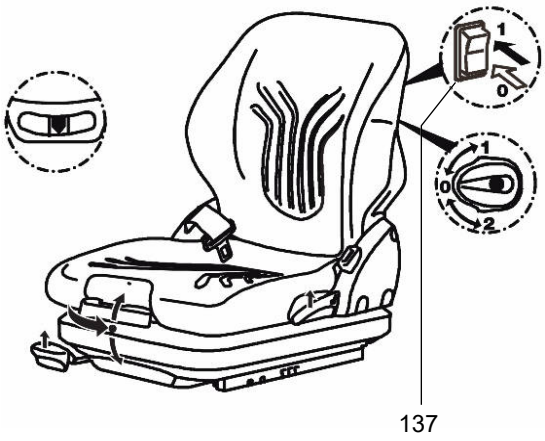
- After setting the weight, move the lever (132) back in full.

The driver's weight is now set.

Switching the seat heating on and off (○)

Procedure

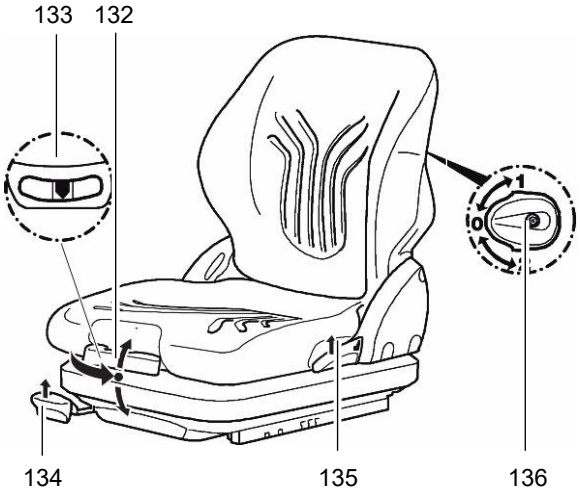
- Press the seat heating switch (137).
  Switch setting 1 = Seat heating on.
  Switch setting 0 = Seat heating off.



Adjusting the lumbar vertebrae support

Procedure

- Turn the hand wheel (136) to the required position.
  Position 0 = no warping in lumbar vertebrae area.
  Position 1 = increasing warping in upper lumbar vertebrae area.
  Position 2 = increasing warping in lower lumbar vertebrae area.



The lumbar vertebrae support is now set.

Adjusting the driver's weight automatically (○)

A compressor in the driver's seat adjusts the seat position according to the weight of the driver.

➔ *The driver's weight adjusts automatically without manual influence.*

➔ *The compressor may cause a buzzing during application.*

3.3.2 Adjusting the driver’s seat

Cold store version (○)

⚠ CAUTION!

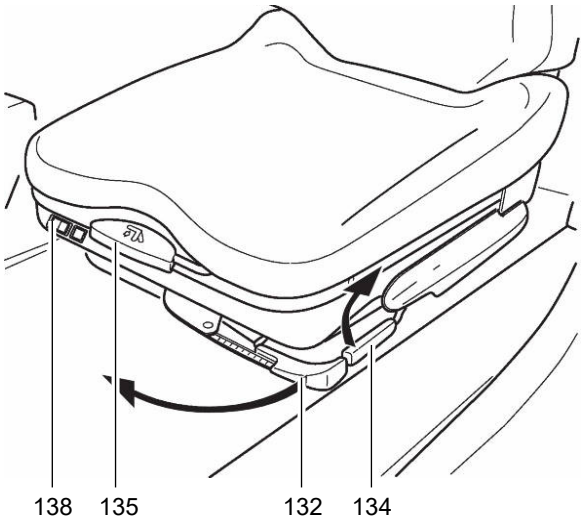
Moving the driver's seat is a trapping hazard

▶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 (132) 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 (132) in the arrow direction until you reach the required weight on the scales.
- Restore the weight adjustment lever (132) to its original position.

The driver’s weight is now set.

Adjusting the backrest

Procedure

- Sit on the driver’s seat.
- Pull the lever (135) to adjust the backrest.
- Adjust the backrest tilt.
- Release the lever (135) 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 (134) 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 (134) in position.

The seat position is now correctly set.

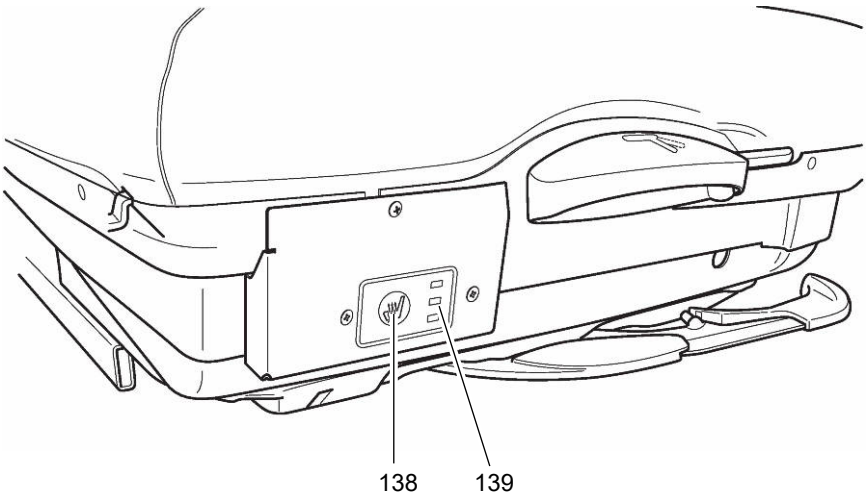
➔ The optional seat heating (138) is operated via the switch on the driver's seat.

Adjust the seat heating (○)

NOTICE

Avoid prolonged contact of uncovered / unprotected skin with the heated seat.

Procedure



- Press the seat heating button (138) a single time.
  The heating changes to heat mode level 3 (highest level), all LEDs (139) are permanently lit.
- Press the seat heating button (138) again.
  The heating changes to heat mode level 2.
- Press the seat heating button (138) again.
  The heating changes to heat mode level 1.
- Press the seat heating button (138) again.
  The heating changes to operational status (off).

Seat heating set.

In the event of an error one or more LEDs (139) next to the switch are lit. Switch off the truck. Switch the truck on again. Call the service department if necessary.

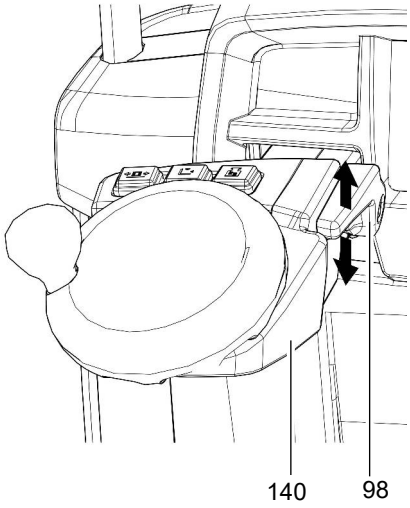
3.3.3 Adjusting the steering column

Adjusting the steering column

Procedure

- Release the steering column stop (98).
- Position the steering head (140).
- Fix the steering column stop (98) in position.

The steering column is now positioned.



3.3.4 Seat belt (○)

NOTICE

Seat belt optional equipment

On request from the customer, the truck can be fitted with a seat belt for special applications.

▶ Always put on the seat belt before starting the industrial 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

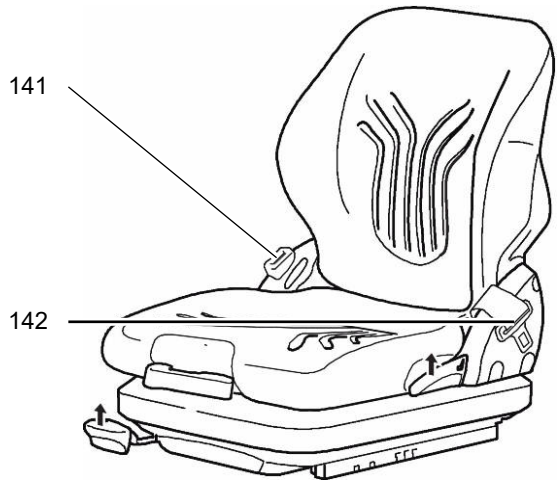
The automatic blocking system locks the belt in the retractor when the truck is positioned on a steep slope. This prevents the belt from being pulled out of the retractor.

➔ 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 (142) in the lock (141).



The seat belt is now in place

Taking off the seat belt

Procedure

- Hold onto the lock tongue (142) with one hand.
- Press the red button on the lock (141).
- Guide the lock tongue (142) 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.

⚠ 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.

When operating the truck with the rated load, it is permitted to travel on slopes and inclines of up to 10 %.

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.

NOTICE

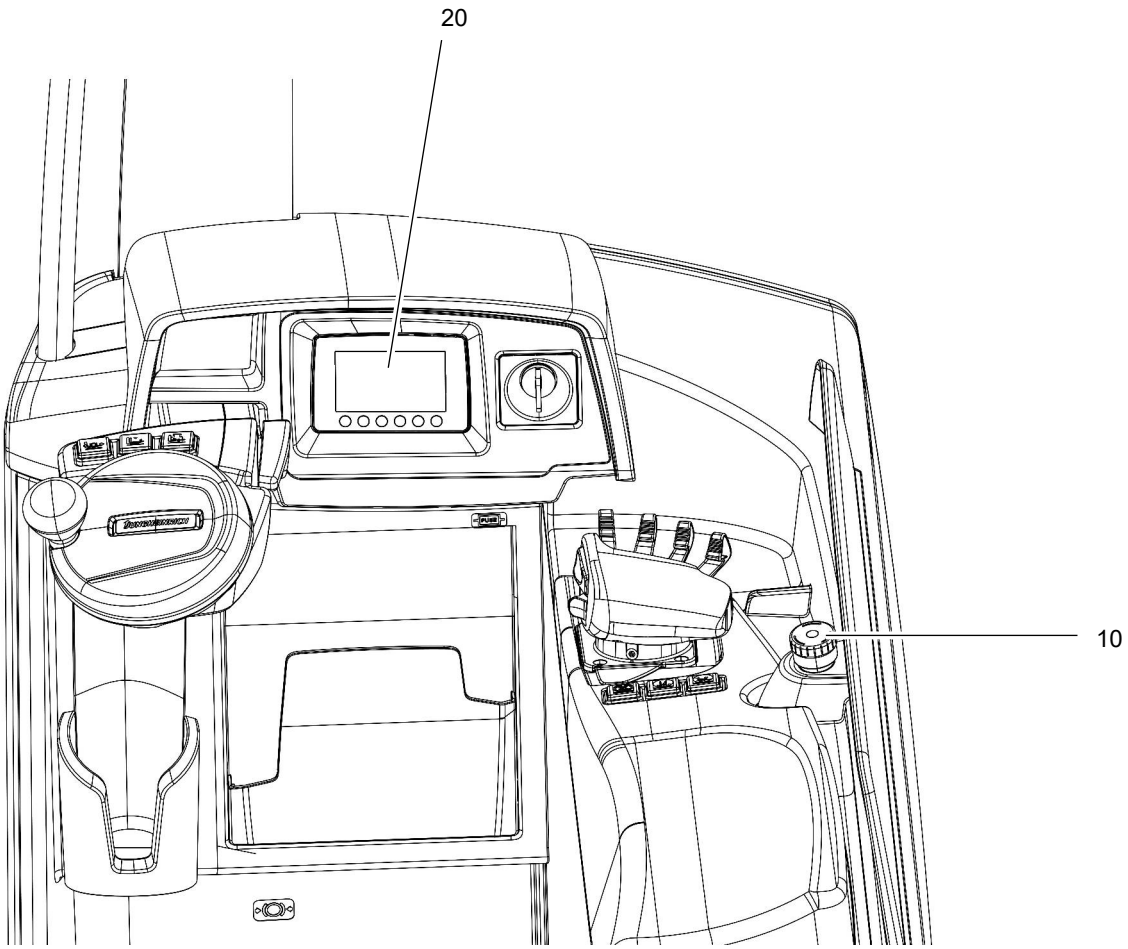
Possible faults with hydraulic functions on trucks with cold store equipment

Commissioning the truck after an extended period of out of use or in ambient temperatures outside of the deep-freeze area in which the truck is intended to be used can give rise to noticeable noise development, jerky cylinder movements and damage to the hydraulic system.

▶ Execute hydraulic functions only in cold store temperatures.

▶ Spray piston rod ends 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 (10) as a service brake.

Press the emergency disconnect switch (10).

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

Releasing the emergency disconnect switch

Procedure

- Pull or turn the emergency disconnect switch (10) 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 (20), see page 85.

Re-setting the emergency stop

Procedure

- Press the Emergency Disconnect (10).
- Pull or turn the Emergency Disconnect switch (10) to unlock it.

The emergency stop is reset.

If the emergency stop is shown on the control and display unit (20) 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.

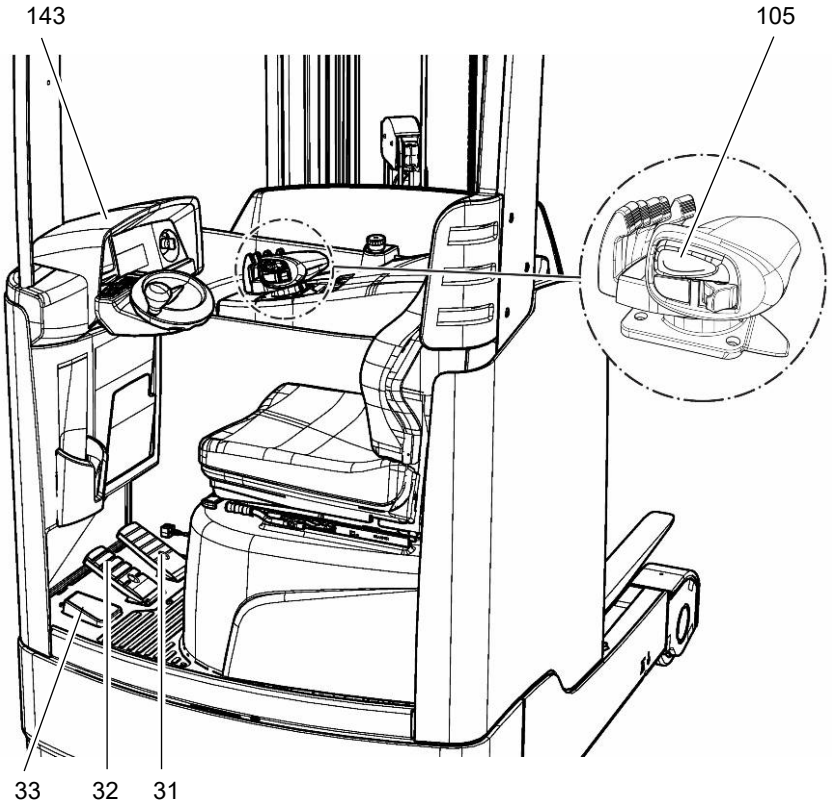
⚠ WARNING!

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.

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 115.

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 (105) up to select travel in the fork direction.
  - Push the direction button (105) down to select travel in the drive direction.
- Press and hold down on the deadman button (33).

➔ The deadman button (33) 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 (33) is not actuated for 5 seconds, the travel direction automatically switches to neutral.

- Apply the accelerator pedal (31).

➔ The travel speed is governed by the accelerator (31).

The truck travels in the selected travel direction.

⚠ 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.

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!

Accident risk

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

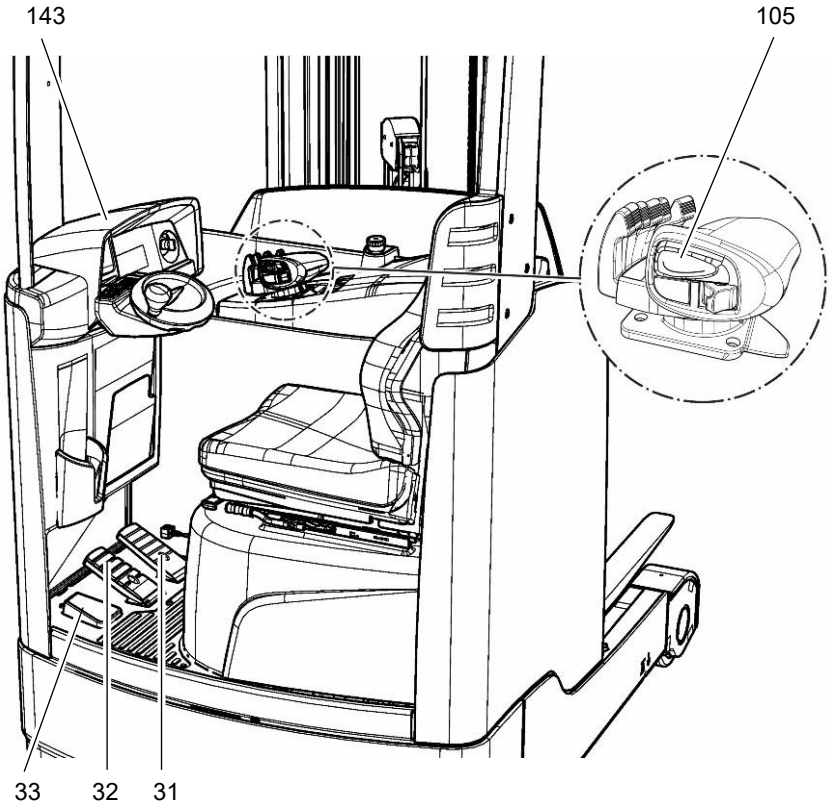
▶ The driver must be aware of travel route conditions and them into account when braking.

▶ Brake with care to prevent the load from slipping.

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

▶ Use the service brake in emergencies.

4.5.1 Braking with the reversing brake



Braking the truck with the inversion brake

Procedure

- Set the travel direction switch (105) to the opposite travel direction while travelling.

The truck brakes until it starts to travel in the opposite travel 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.

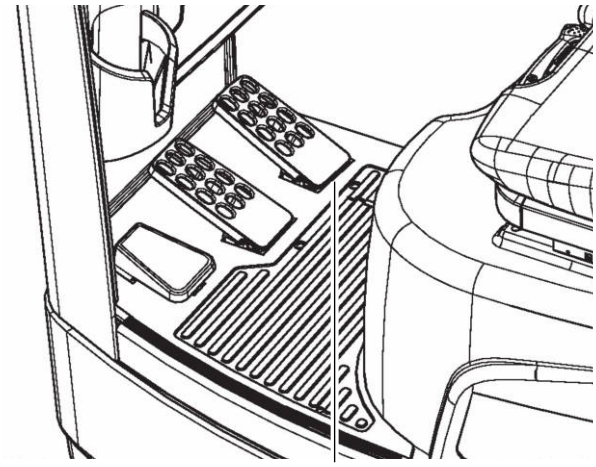
4.5.2 Braking with the coasting brake

Braking with the coasting brake

Procedure

- Take your foot off the accelerator pedal (31).

The truck brakes.



31

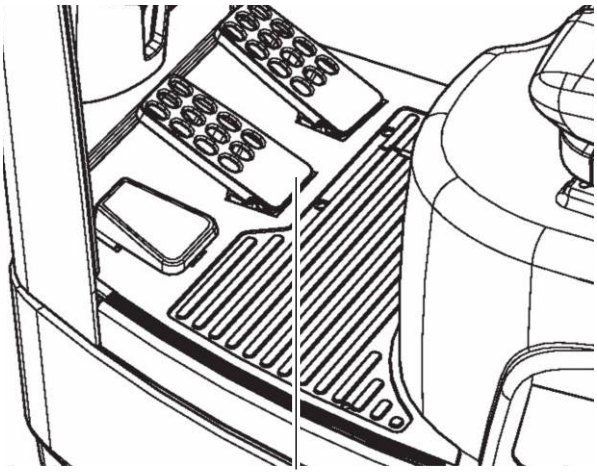
4.5.3 Braking with the service brake

Braking with the service brake

Procedure

- Press down on the brake pedal (32) until you reach the required deceleration.

The truck decelerates depending on the brake pedal position.



32

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

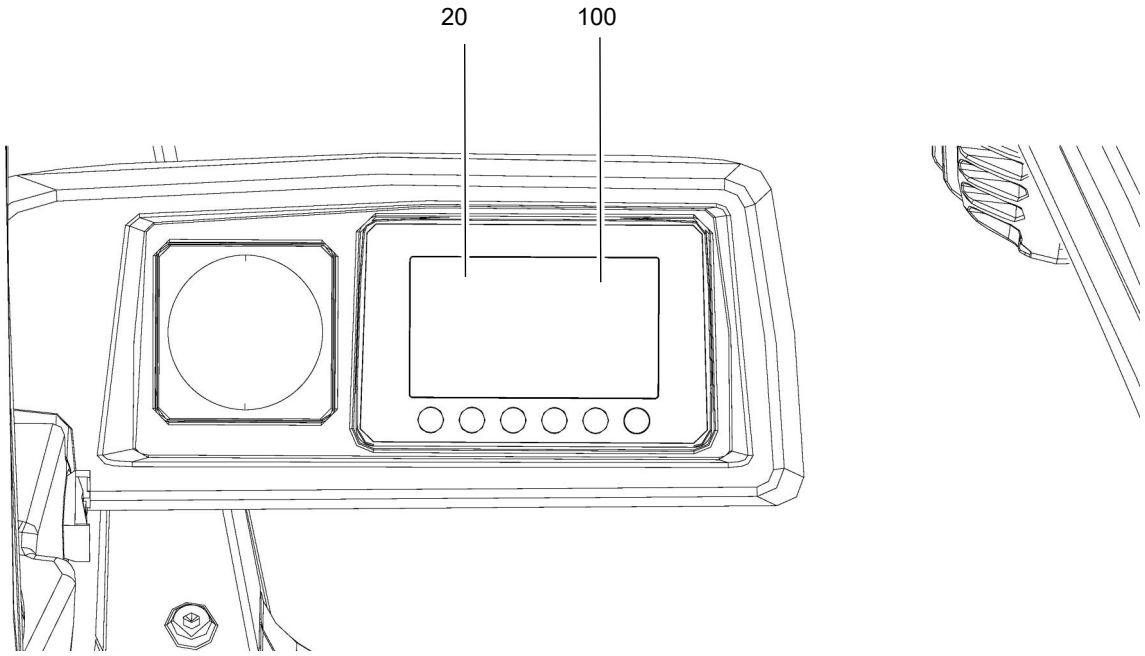
When travelling forward (travel in direction of entry = drive direction) steer left to turn into a left hand bend and right into a right hand bend. The drive wheel position is indicated on the driver’s display.

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 (100) to change between 180° and 360° steering. The range selected is shown in the control and display unit (20).



Setting the steering mode

Procedure

- Press the steering mode button (100).

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!

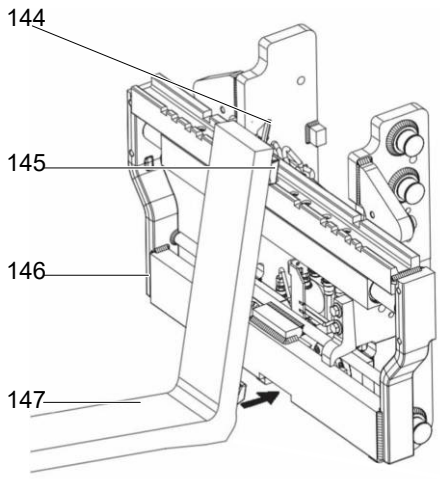
Risk of injury due to unsecured fork arms

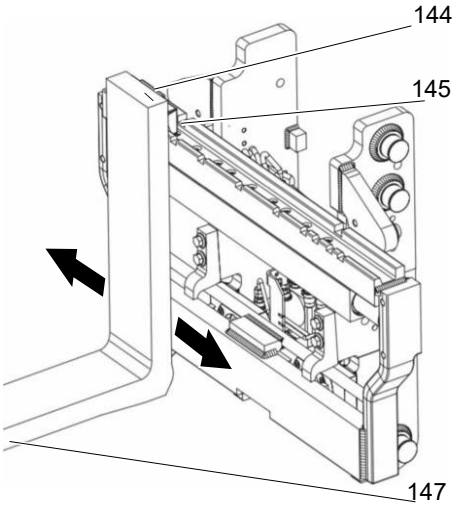
You can injure your legs when replacing the forks.

▶ 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.





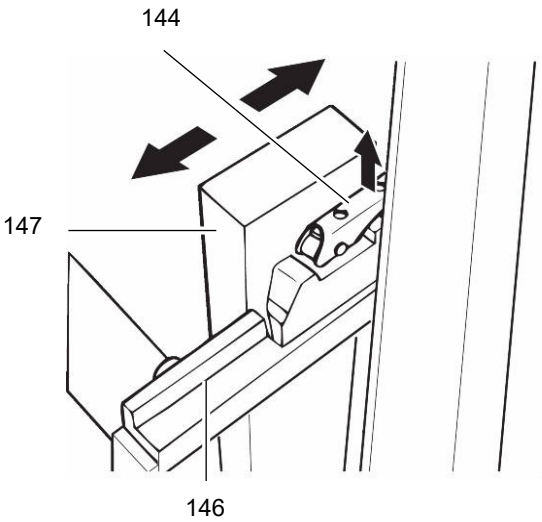
Attaching and adjusting the fork arms

Requirements

– Truck parked securely – see page 153.
– The fork arms are attached and detached at the centre of the fork carriage (146).

Procedure

- Lift up the locking lever (144).
- Move the fork arm (147) to the desired position.
- Swing the locking lever (144) down and adjust the fork arms (147) until the locking pin (144) engages in a slot.



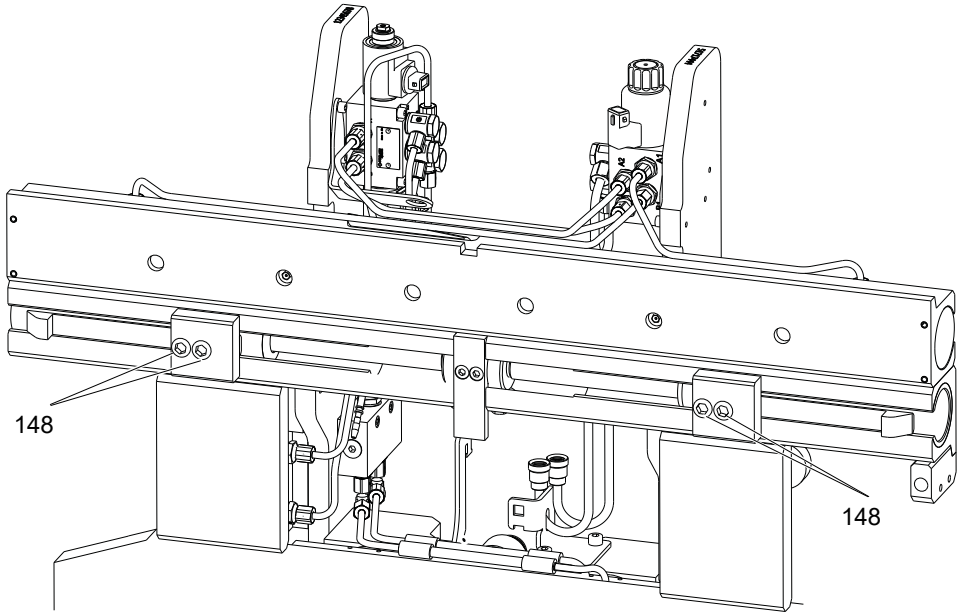
The fork arms have been adjusted.

The truck must only be operated when the locking pin (144) is correctly engaged.

Securing the fork arms with an integrated fork positioner

Procedure

- Tighten the mounting screws (4x) (148). 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.

NOTICE

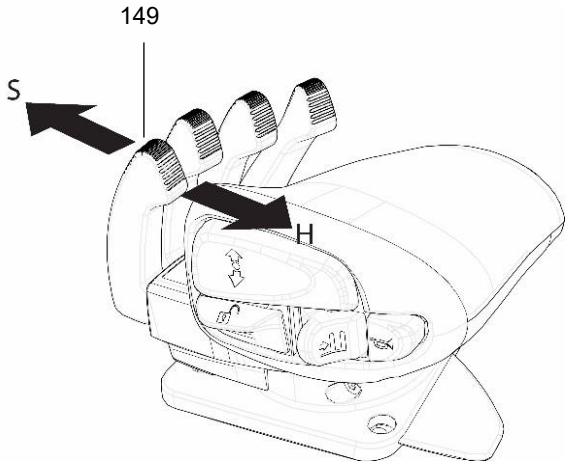
Risk of component damage when lifting at full lift speed

Frequent lifting at maximum speed against the end stops of the lift mechanism can cause damage to the truck.

- ▶ Reduce the lift speed before reaching the end stop.

On trucks with lift height sensors, the end positions are only reached by operating the control element again. This behaviour can be adjusted by the manufacturer's customer service department.

Lifting and lowering with the SOLO-PILOT



Procedure

- Pull the SOLO-PILOT lever (149) in direction H to raise the load unit.
- Push the SOLO-PILOT lever (149) in direction S to lower the load unit.
- Apply the SOLO-PILOT lever (149) 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.

loweringPRO (○)

⚠ WARNING!

Accident risk due to increased tipover hazard and reduced residual capacity

In the case of incorrect use of the loweringPRO option, an increased risk of tipover exists since attachments can reduce the operational stability of the truck – see page 50. 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.

▶ The loweringPRO option must only be used up to a fork length of max. 1300 mm.

▶ Fully retract the mast holder during lowering.

▶ No front-mounted attachments must be used with the loweringPRO option (HF5).

Procedure

➔ Operating the work cage with persons is prohibited and not permitted.

➔ Do not use the loweringPRO option during multi-hour lift operation.

➔ Trucks equipped with the loweringPRO option reach an increased lowering speed of up to 1.2 m/s.

- Push the soloPILOT (149) at least 2/3 towards the stop in direction S to rapidly lower the load unit.

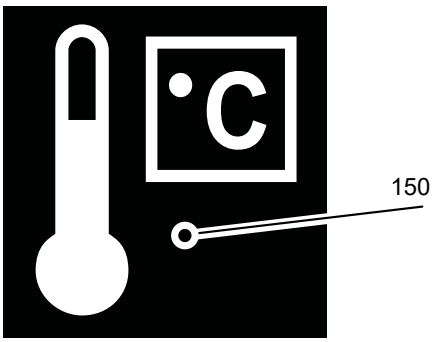
The load unit is lowered rapidly.

➔ *The maximum lowering speed is not available at lift heights greater than 2/3 of height h3 (*see page 29*).*

➔ *Moving the soloPILOT (149) back automatically cancels the loweringPRO function.*

➔ *If loweringPRO is cancelled prematurely, the current lift sequence no longer matches the standard process. The lift sequence can be restored by pressing the acknowledgement button (109).*

On trucks equipped with the loweringPRO option with automatic balancing, the acknowledgement button (109) cannot be used for balancing purposes following a cancelled lowering operation. Mast balancing is performed automatically.

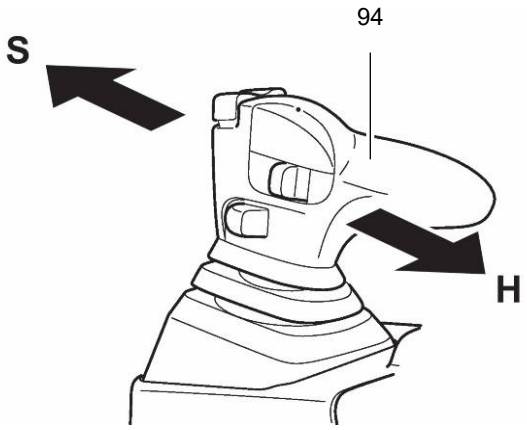


loweringPRO can cause excess temperatures on the system. Excess temperatures are indicated by the symbol (150). In the case of an excess temperature, the performance of the function is reduced or deactivated.

Lifting and lowering with the MULTI-PILOT

Procedure

- Pull the MULTI-PILOT (94) in direction H to raise the load unit.
- Push the MULTI-PILOT (94) 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.

loweringPRO (○)

⚠ WARNING!

Accident risk due to increased tipover hazard and reduced residual capacity

In the case of incorrect use of the loweringPRO option, an increased risk of tipover exists since attachments can reduce the operational stability of the truck – see page 50. 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.

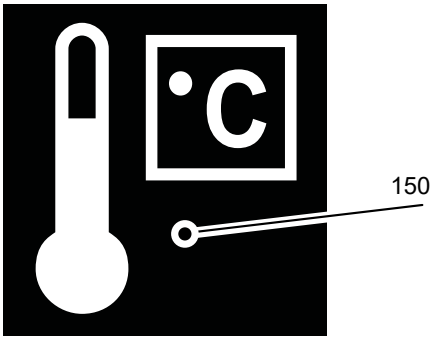
▶ The loweringPRO option must only be used up to a fork length of max. 1300 mm.
▶ Fully retract the mast holder during lowering.
▶ No front-mounted attachments must be used with the loweringPRO option (HF5).

Procedure

- ➔ Operating the work cage with persons is prohibited and not permitted.
- ➔ Do not use the loweringPRO option during multi-hour lift operation.
- ➔ Trucks equipped with the loweringPRO option reach an increased lowering speed of up to 1.2 m/s.
  - Push the multiPILOT (94) at least 2/3 towards the stop in direction S to rapidly lower the load unit.

The load unit is lowered rapidly.

- ➔ *The maximum lowering speed is not available at lift heights greater than 2/3 of height h3 (*see page 29*).*
- ➔ *Moving the multiPILOT (94) back automatically cancels the loweringPRO function.*
- ➔ *If loweringPRO is cancelled prematurely, the current lift sequence no longer matches the standard process. The lift sequence can be restored by pressing the acknowledgement button (109).*
- ➔ *On trucks equipped with the loweringPRO option with automatic balancing, the acknowledgement button (109) cannot be used for balancing purposes following a cancelled lowering operation. Mast balancing is performed automatically.*



- ➔ loweringPRO can cause excess temperatures on the system. Excess temperatures are indicated by the symbol (150) on the display unit. In the case of an excess temperature, the performance of the function is reduced (yellow) or deactivated (red).

Lifting and lowering

Requirements

– Truck prepared for operation, see page 105.

Procedure

- Pull the lever (103) in direction H to raise the load.
- Push the lever (103) in direction S to lower the load.

The load 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.

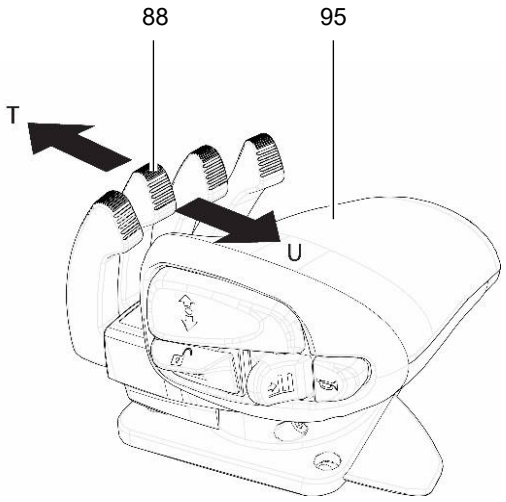
▶Do not reach between the mast and the battery tray.

Moving the mast holder with the SOLO-PILOT

Procedure

- Push the SOLO-PILOT (88) in direction (T) to extend the mast holder forward.
- Pull the SOLO-PILOT (88) in direction (U) to retract it.

The mast holder is now extended.

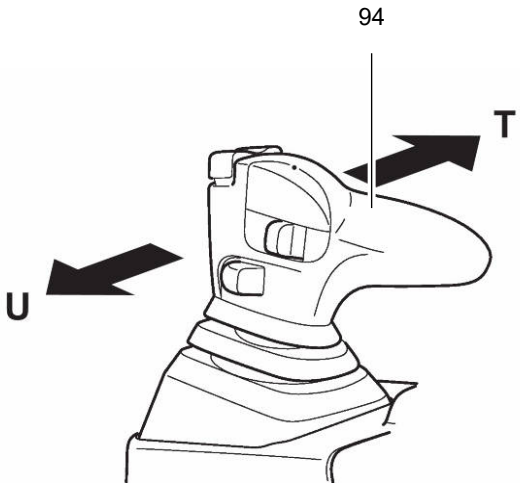


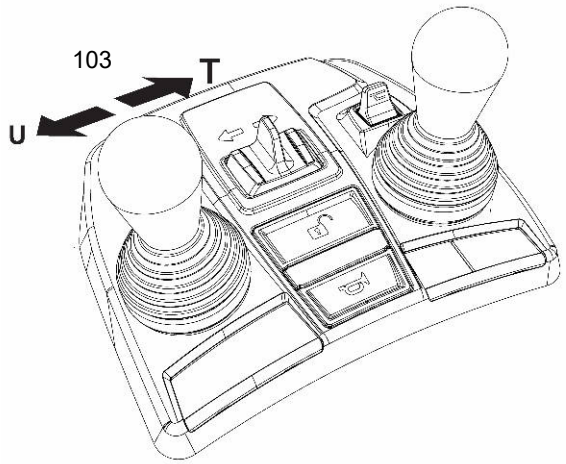
Moving the mast holder with the MULTI-PILOT

Procedure

- Push the MULTI-PILOT (94) in direction (T) to extend the mast holder forward.
- Pull the MULTI-PILOT (94) in direction (U) to retract it.

The mast holder is now extended.





Moving the mast holder with the duoPILOT

Procedure

- Push the duoPILOT lever (103) in direction (T) to extend the mast holder forward.
- Pull the duoPILOT lever (103) in direction (U) to retract it.

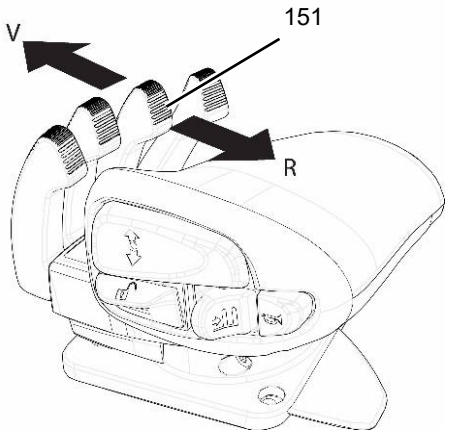
The mast holder is now extended.

Tilting the mast / fork carriage with the SOLO-PILOT

Procedure

- Push the SOLO-PILOT lever (151) in direction (V) to tilt the mast holder forward.
- Pull the SOLO-PILOT lever (151) in direction (R) to retract it.

The mast / fork carriage is tilted.

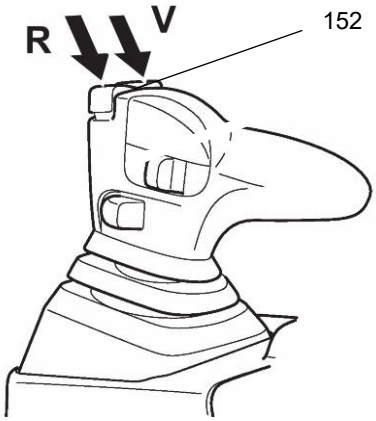


Tilting the mast / fork carriage with the MULTI-PILOT

Procedure

- To tilt forward, push the MULTI-PILOT (152) in direction (V).
- To tilt back, push the MULTI-PILOT (152) in direction (R).

The mast / fork carriage is tilted.

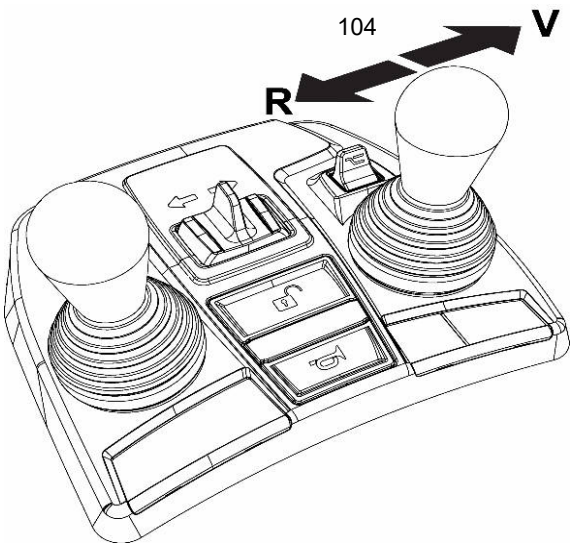


Tilting the mast/fork carriage with the duoPILOT

Procedure

- Push the duoPILOT lever (104) in direction (V) to tilt the mast holder forward.
- Pull the duoPILOT lever (104) in direction (R) to retract it.

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 151.

⚠ 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 36.
- ▶ 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 36.

⚠ 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 36.

- 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 151.

▶ Do not use clamping attachments for clamping purposes or in clamping operation while fork extensions are in use.

The highest auxiliary hydraulics after ZH2 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.

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 105, 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 starting, see page 105, 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.

⚠ 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.

4.9.2 Integral sideshifter (SOLO-PILOT)

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

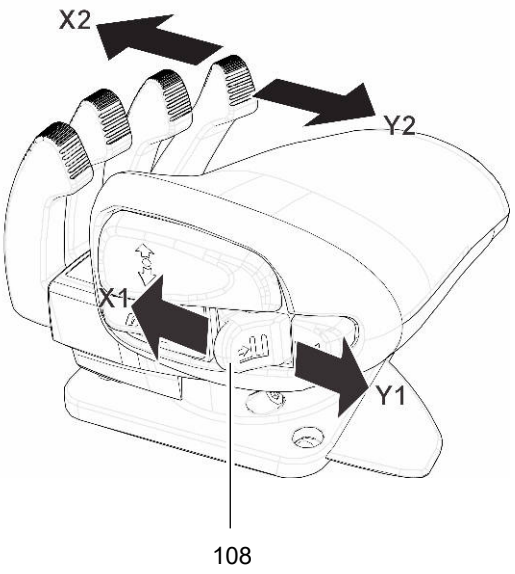
➔ On trucks without integrated side shift and HF4 connection, the lever 104 may have a different assignment.

Moving the side shift

Procedure

- Press the button (108) in direction (X1). The side shift moves to the left.
- Press the button (108) 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

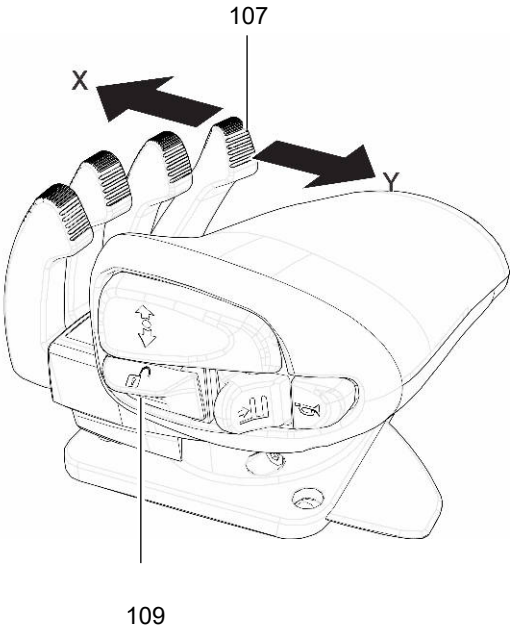
The control lever (107) has functions (X2) and (Y2) to operate hydraulic attachments connected to the terminal HF5 (see manufacturer's operating instructions).

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

Procedure

- Press the acknowledgement button (109)
- Within 1.5 seconds, move the lever (107) in direction X or Y

The attachment performs its function



4.9.3 Integral sideshifter (MULTI-PILOT)

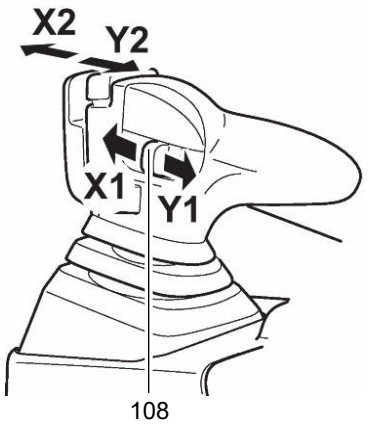
➔ The directions "left" and "right" refer to the load handler when viewed from the operator position.

Moving the side shift

Procedure

- Press the lever (108) in direction (X1). The side shift moves to the left.
- Press the lever (108) in direction (Y1). The side shift moves to the right.

➔ Note the capacity reduces when traversing.



108

The side shift has now been moved.

➔ On trucks without integrated side shift and HF4 connection, the lever 104 may have a different assignment.

4.9.3.1 Operating additional attachments with multiPILOT

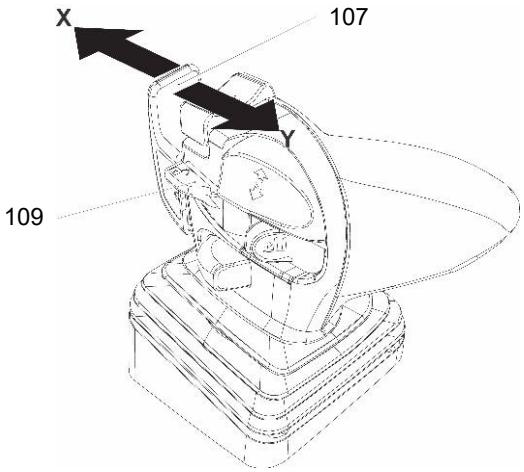
The control lever (107) has functions (X2) and (Y2) to operate hydraulic attachments connected to the terminal HF5 (see manufacturer's operating instructions).

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

Procedure

- Press the acknowledgement button (109)
- Within 1.5 seconds, move the lever (107) in direction X or Y

The attachment performs its function



Fork positioner HF5 (○)

Procedure

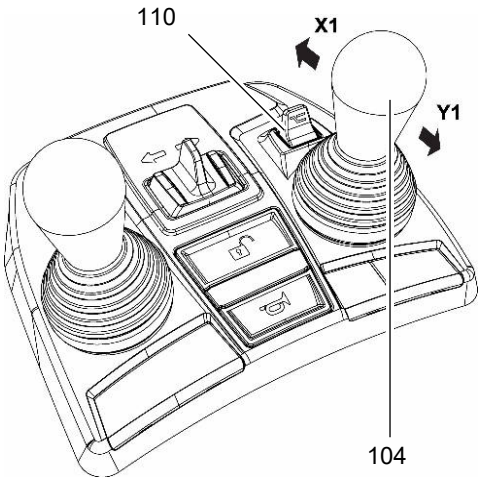
- Press the acknowledgement button (109).
- Move the lever (107) in direction X or Y within 1.5 seconds.
  - Moving the lever in direction X spreads the fork arms.
  - Moving the lever in direction Y brings the fork arms back together.

The fork positioner function is performed.

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 104 may have a different assignment.



4.9.4.1 Operating additional attachments with duoPILOT

Moving the side shift

Procedure

- Press the button (104) in direction (X1). The side shift moves to the left.
- Press the button (104) in direction (Y1). The side shift moves to the right.

➔ Note the capacity reduces when traversing.

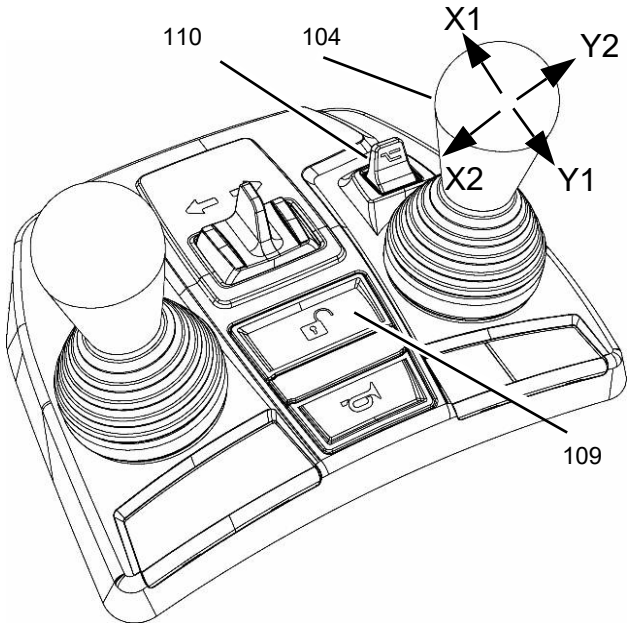
The side shift has now been moved.

4.9.4.2 duoPILOT with control of ZH1 hydraulic port

➔ Depending on the attachments used the lever (104) is assigned the function of the attachment. Unused levers have no function. For connections see page 139.

Procedure

- Pull the lever (104) 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 (104,109) is assigned the function of the attachment. Unused levers have no function. For connections see page 139.

Operating hydraulic port ZH1

Procedure

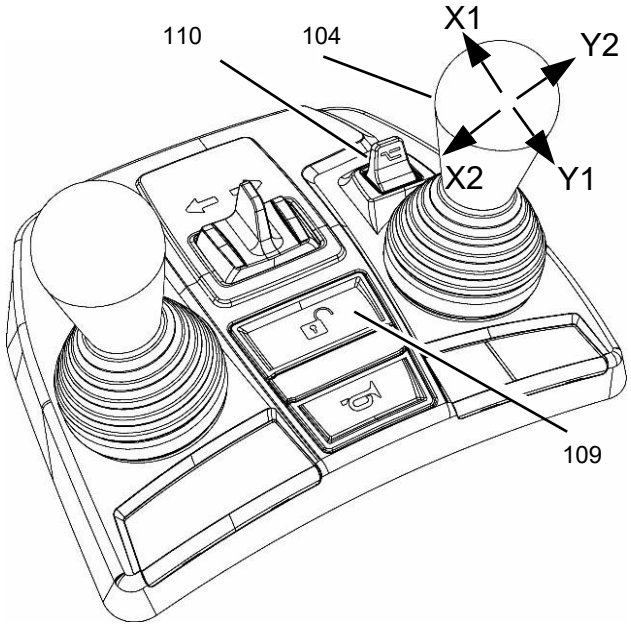
- Pull the lever (104) in direction X2 or push in direction Y2.
  The attachment performs its operation.

Operation of hydraulic ports ZH2 and ZH3 (○)

Procedure

- Press the toggle switch (110).
  - For clamping attachment:

    Press the acknowledgement button (109).
- Pull the lever (104) 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!

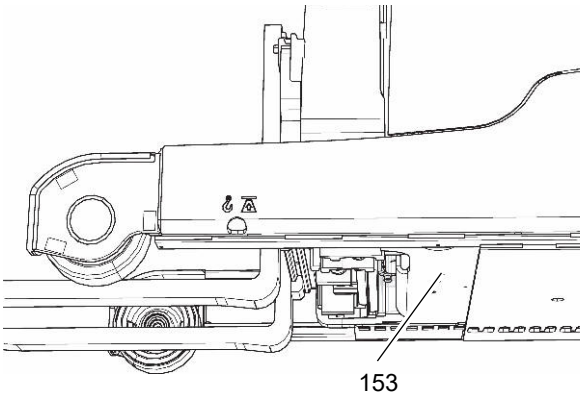
Lowering the mast can result in injuries

- ▶ 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 the Emergency Disconnect switch and key switch off.
– Disconnect the battery.



Procedure

- Release the emergency lowering valve (153) underneath the truck by max. 1/2 a turn anti-clockwise with the4 mm Allen screw.
- 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.
- When the load has been lowered, close the emergency lowering valve with a torque of 2,5 Nm.

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!

An unsecured truck can cause accidents

Parking the truck on an incline, without the brakes 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.

▶ Always apply the parking brake button before parking the truck.

▶ Choose a place to park where no other people are at risk of injury from lowering forks.

▶ 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. To do this:
  - For a key switch, turn the key in the key switch to the left as far as the stop and remove the key.
  - Keyless access systems (○), see page 163.
- Press the emergency disconnect switch.

The truck is parked.

5 Troubleshooting

5.1 Recovering the truck

⚠ CAUTION!

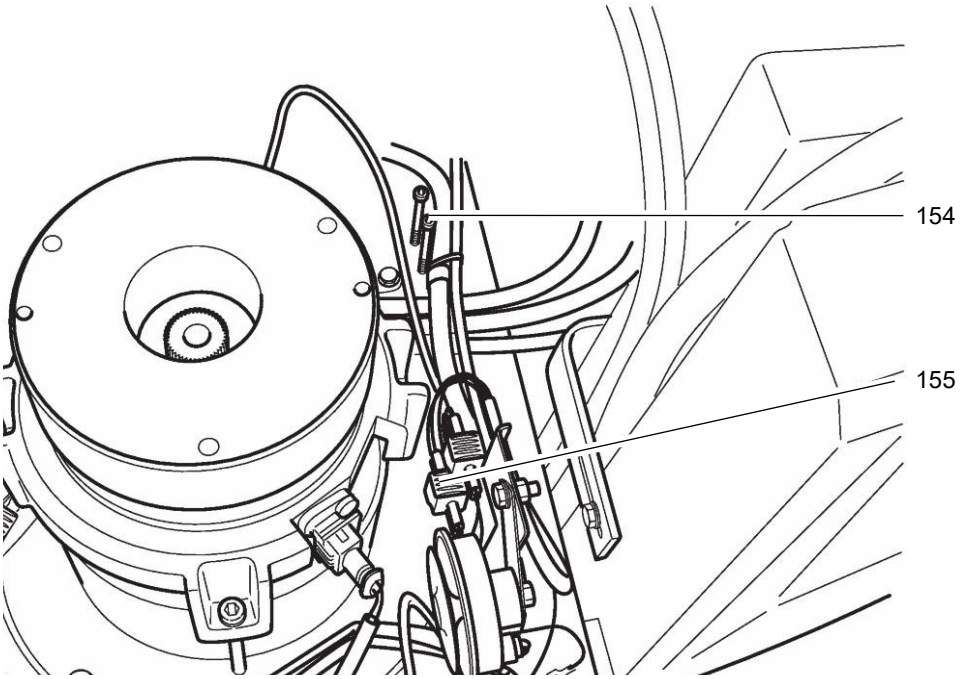
This operation must only be performed by suitably trained maintenance personnel. When the brakes are de-activated the truck must be parked on a level surface, since the brakes are no longer effective.

Preparing to move the truck without its own drive system

Procedure

- Turn the Emergency Disconnect switch and key switch off.
- Disconnect the battery.
- Prevent the truck from rolling away.
- Remove the seat panel, see page 222.

Truck prepared.



Releasing the magnetic brake

Tools and Material Required

– Screws (2 x M6) (154)
– Allen key

Procedure

- Disconnect the two-pin connector (155) from the magnetic brake.
- Remove the screws (2 x M6) (154) from the drive plate and insert them in the magnetic brake holes.

The magnetic brake is now released.

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 (156) 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.

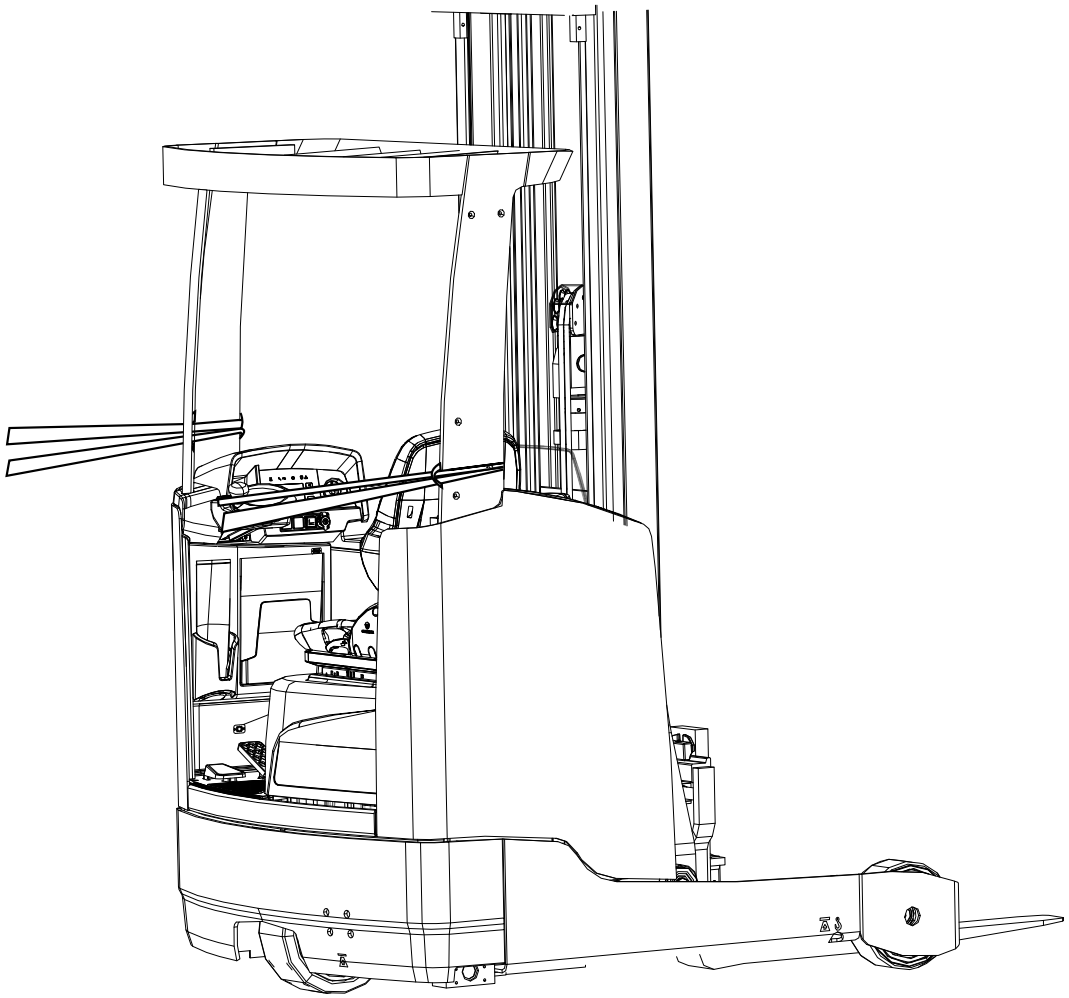
- ▶ Only use vehicles to tow the truck which have sufficient tow and brake forces for the trailer load without its own braking system.
- ▶ Always tow the truck at walking pace.
- ▶ Do not park the truck with the parking brake released.

Tools and Material Required

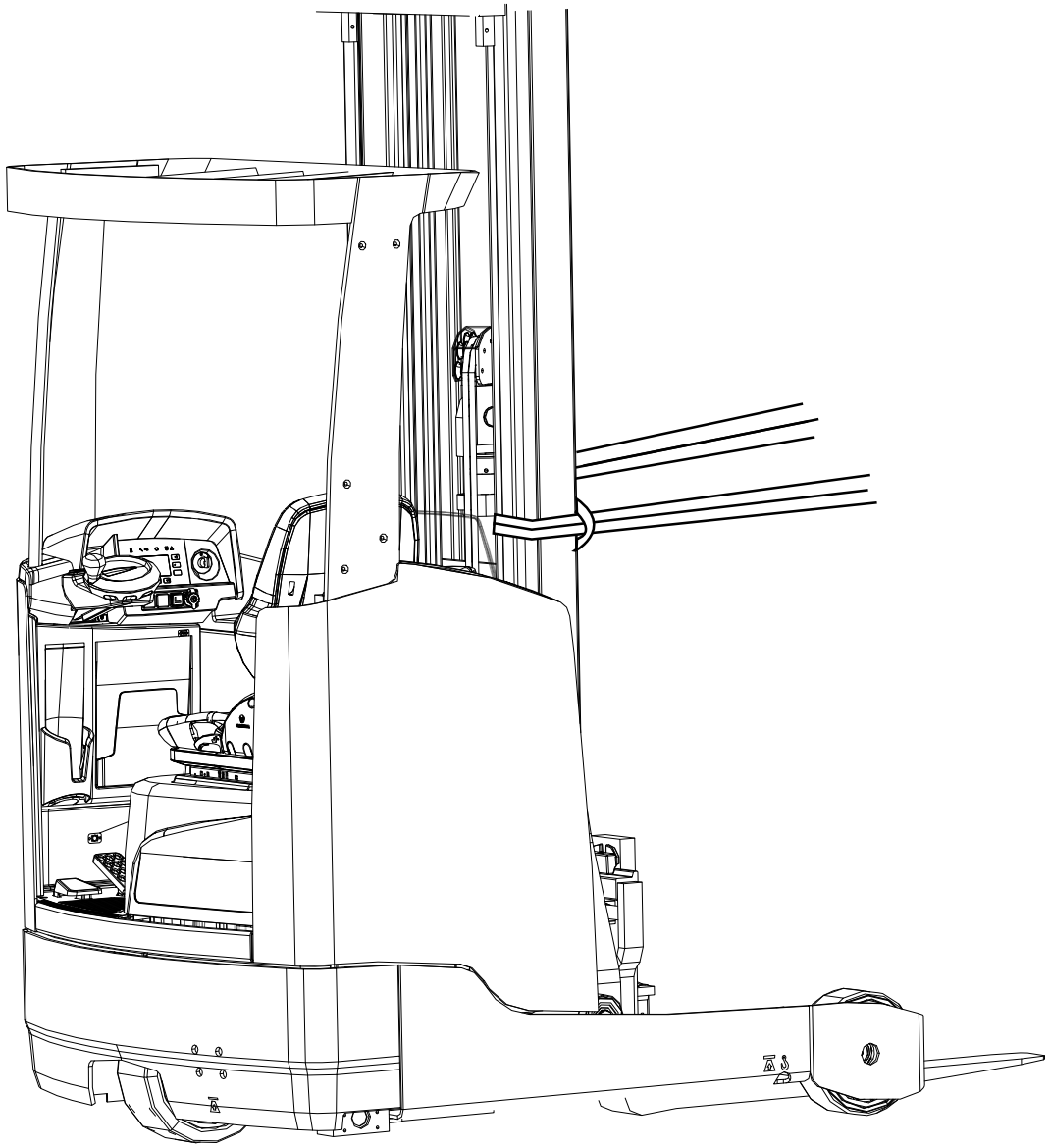
– Tow rope, drawbar pull > 5 to

Procedure

•



Guide the tow rope around the struts of the overhead guard as shown in the figure to tow the truck in 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
1901	During system start-up, the accelerator pedal zero position could not be determined.	Do not press the accelerator pedal during system start-up.
1904	Accelerator pedal 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 by pressing the parking brake button.
1917	Accelerator and brake pedals pressed simultaneously.	Press one pedal at a time only.
2951	PILOT pressed during system start-up. No zero position sensing possible.	Do not apply the multi/soloPILOT during system start-up. – Switch the truck off. – Switch the truck on again. – Call the service department if necessary.
1952	Travel direction switch pressed during system start-up.	Do not press the travel direction switch during system start-up
9961	ISM (option) 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	ISM (option) 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
5990	The electrolyte level sensor check (battery-management option) on the battery has detected a lack of electrolyte	Add electrolyte.
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.

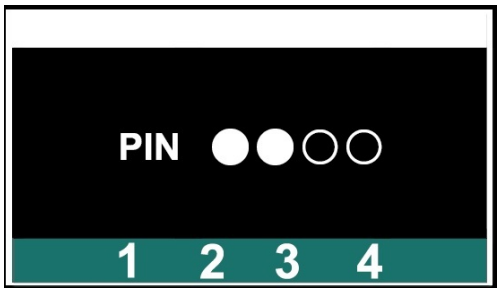
6 Optional Equipment

Changes to the factory configuration of the truck are not permitted and can lead to material damage and personal injury.

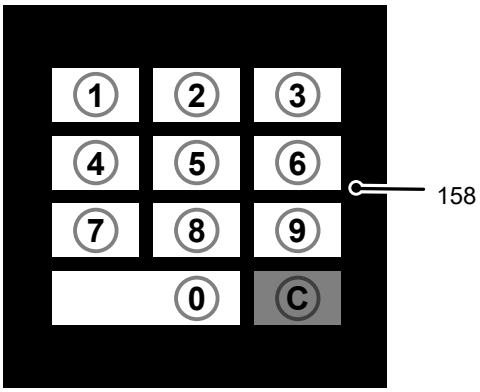
This applies to the following, for example:
– Change to fork arms
– Telescopic forks
– Fork positioners
– Attachments with clamping function

6.1 Keyless Access System

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

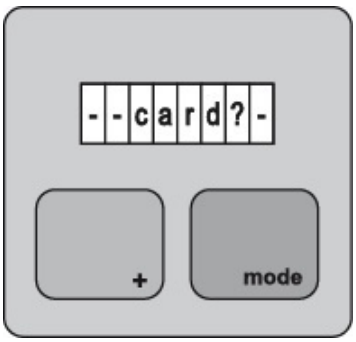


157



158


159



160

6.2 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.

6.3 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.

6.3.1 Activating the keypad

Procedure

- Release the emergency disconnect switch, see page 117.
- Enter the default code 1-2-3-4 using the keys below the display unit (157).
  The truck is switched on.
- Press the key below the "Settings" symbol (161).
- Press the key below the "Change set-up code" symbol (162).
- Enter the set-up code 2-4-1-2 using the keypad (158).
  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.

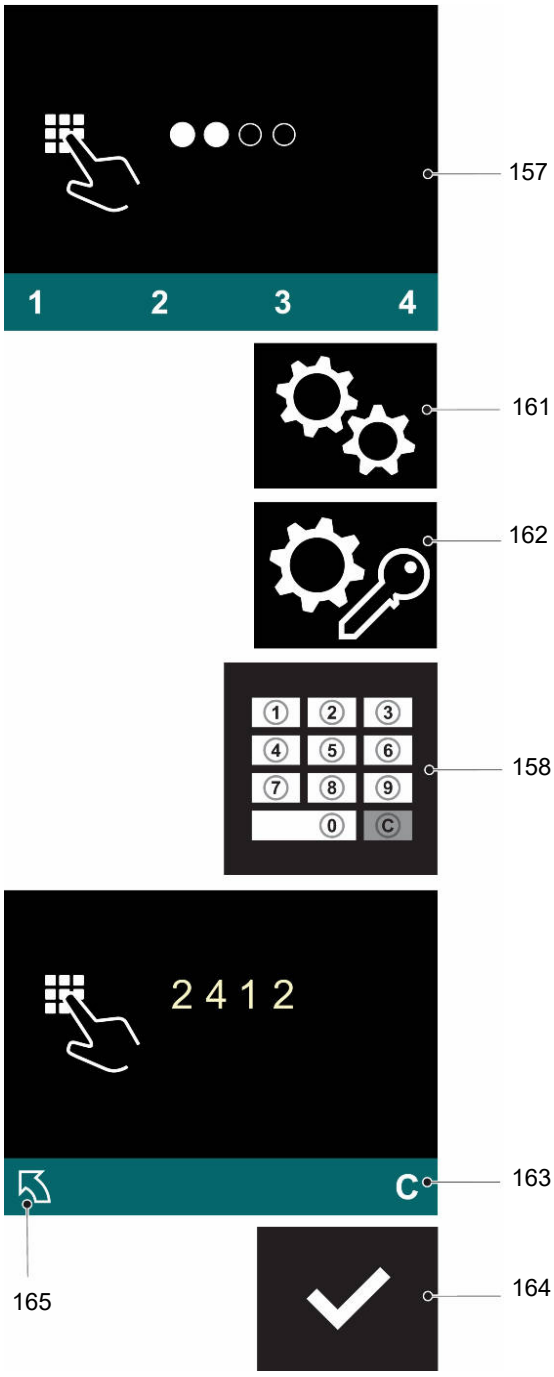
Press the key below the "Delete" symbol (163).
The set-up code is deleted.

- Enter the new set-up code using the keypad (158).
- Press the key below the "Confirm" symbol (164).
  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 (163).

- To return to the main menu, press the key below the "Back" symbol (165).
- Delete the default code, see page 177.
- Create access codes, see page 176.

The keypad is active.



6.3.2 Activating the transponder reader

Procedure

- Release the emergency disconnect switch, see page 117.
- Enter the default code 1-2-3-4 using the keys below the display unit (157).
  The truck is switched on.
- Press the key below the "Settings" symbol (161).
- Press the key below the "Change set-up code" symbol (162).
- Enter the set-up code 2-4-1-2 using the keys below the display unit (157).
  The set-up code entered is displayed.
- Press the key below the "Delete" symbol (163).
  The set-up code is deleted.
- Hold a transponder in front of the transponder reader (159).
  This transponder thus becomes the set-up transponder.
- Press the key below the "Confirm" symbol (164).
  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 (163).

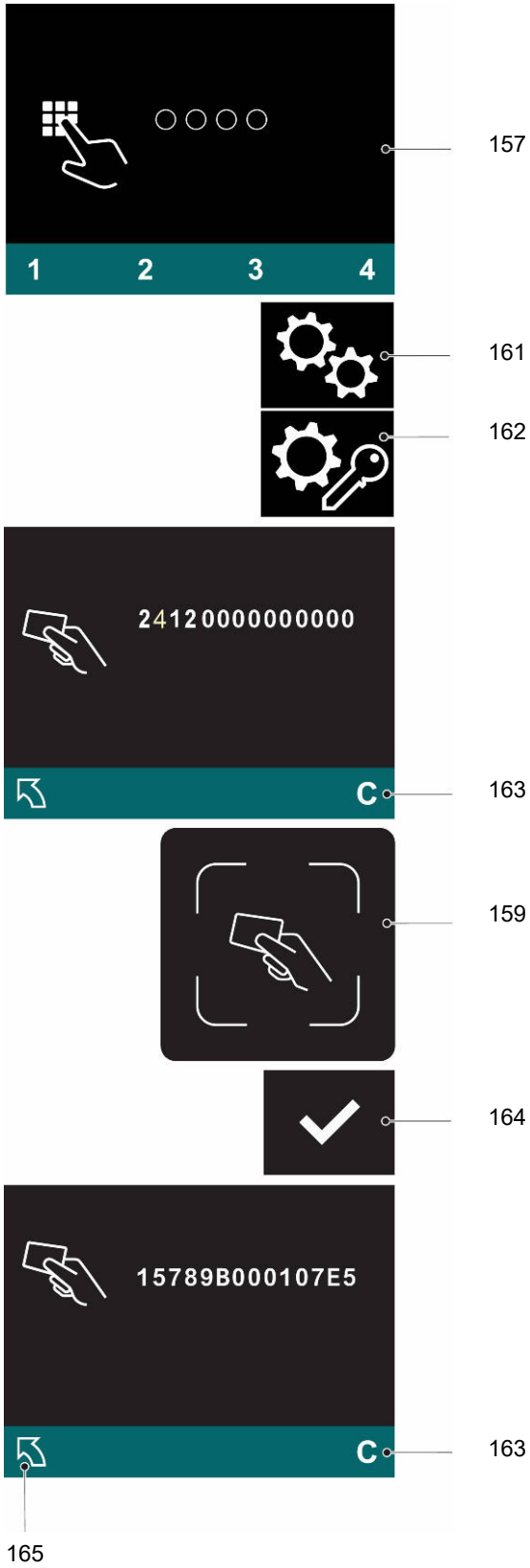
- To return to the main menu, press the key below the "Back" symbol (165).

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

Delete the default code, see page 182.

- Add new transponders, see page 181.

The transponder reader is now active.



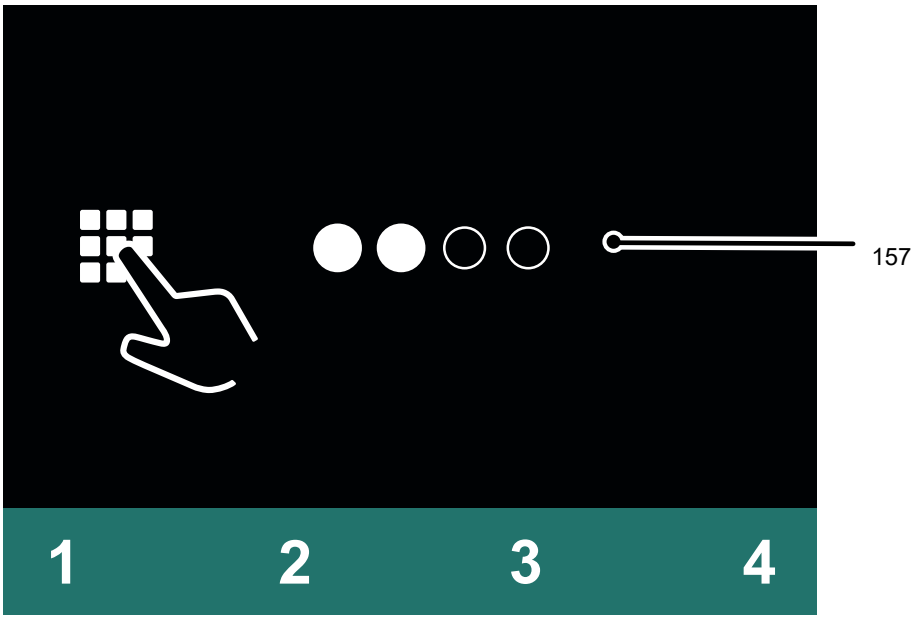
6.4 Using the Display:

6.4.1 Switching on the truck with an access code

Procedure

- Release the emergency disconnect switch, see page 117.
- Enter the access code with the buttons below the display (157).

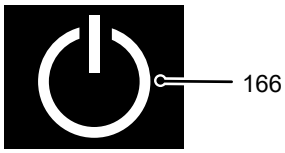
The truck is switched on.



6.4.2 Switching off the truck

Procedure

- Press the key under the "Switch off" symbol (166) in the display unit.
- Press the Emergency Disconnect switch, see page 117.



The truck is switched off.

6.4.3 Changing the set-up code

Requirements

– The truck is switched on, see page 168.

Procedure

- Press the key below the "Settings" symbol (161).
- Press the key below the "Change set-up code" symbol (162).
- Enter the set-up code using the keys below the display unit (157).

  The set-up code entered is shown as filled-in circles.
- Press the key below the "Delete" symbol (163).

  The set-up code is deleted.
- Enter the new set-up code using the keys below the display unit (157).

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

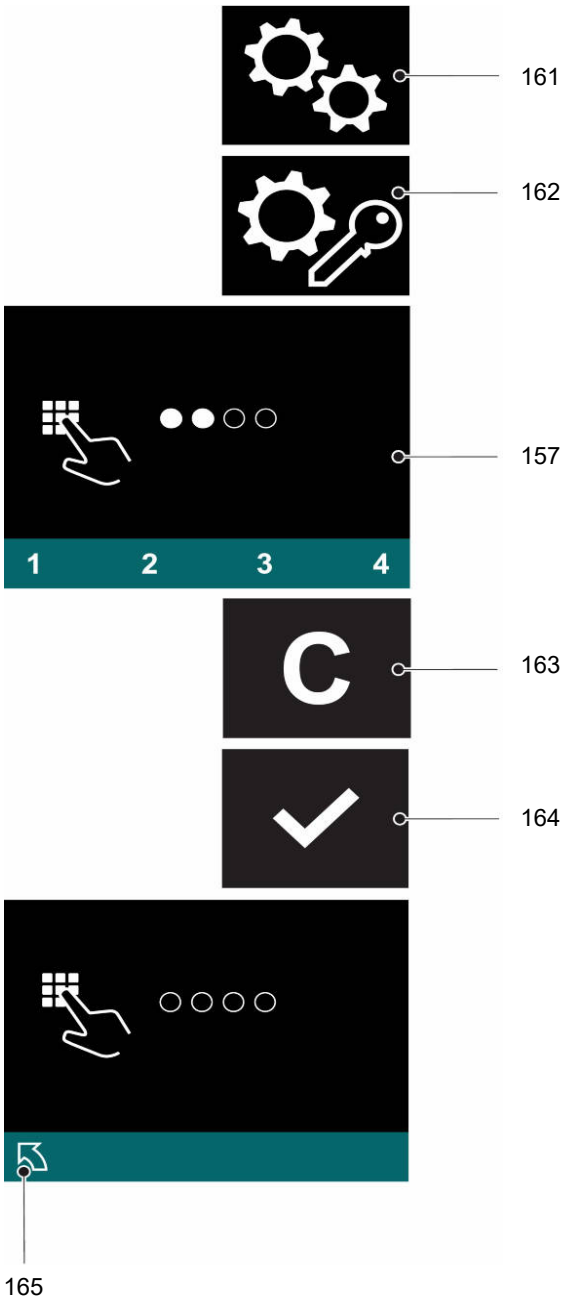
- Press the key below the "Confirm" symbol (164).

  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 (165).

The set-up code has been changed.



6.4.4 Adding a new access code

Requirements

– The truck is switched on, see page 168.

Procedure

- Press the key below the "Settings" symbol (161).
- Press the key below the "Edit access code" symbol (167).

  The set-up code is requested.
- Enter the set-up code using the keys below the display unit (157).

  All the access codes are displayed.
- Press the key below the "Add" symbol (168).
- Enter the new access code using the keys below the display unit (157).

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

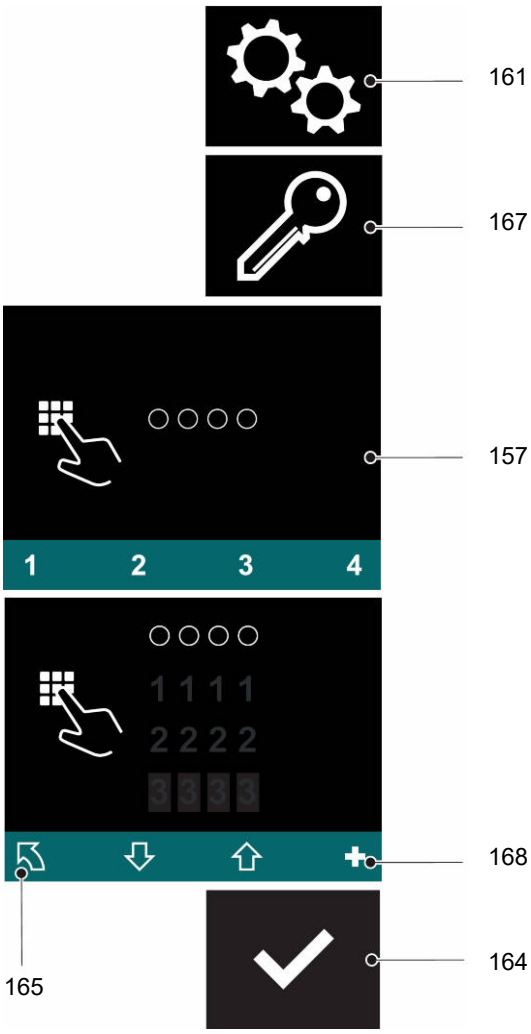
- Press the key below the "Confirm" symbol (164).

  The new access code is displayed.

➔ If the new access code has been entered incorrectly, delete it, see page 171, and add an access code again.

To return to the main menu, press the key below the "Back" symbol (165).

A new access code has been added.



6.4.5 Deleting an access code

Requirements

– The truck is switched on, see page 168.

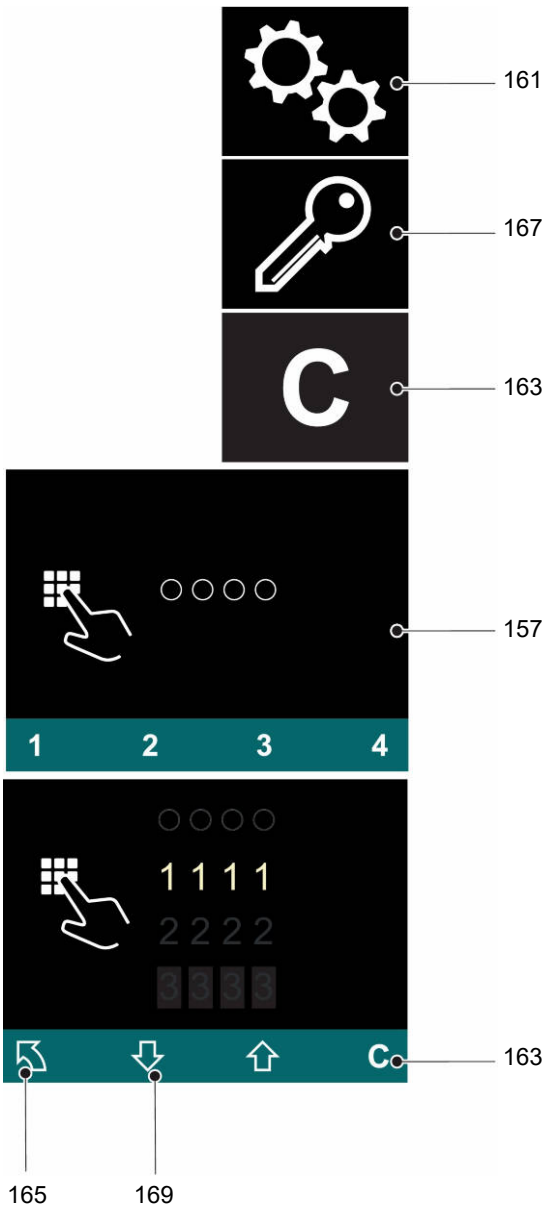
Procedure

- Press the key below the "Settings" symbol (161).
- Press the key below the "Edit access code" symbol (167).

  The set-up code is requested.
- Enter the set-up code using the keys below the display unit (157).

  All the access codes are displayed.
- Select the access code to be deleted using the key below the "Down selection" symbol (169).
- Press the key below the "Delete" symbol (163).

  The access code has been deleted.
- To return to the main menu, press the key below the "Back" symbol (165).



Item	Description
157	Display unit (EasyAccess Softkey): – Description see page 85 – 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
158	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
159	Transponder reader (EasyAccess Transponder): – Up to 100 transponders can be saved
160	ISM Online: – For equipment with JH fleet management system – see "JH fleet management systems" operating instructions.

6.4.6 Displaying the Log-in History (Display Unit)

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.

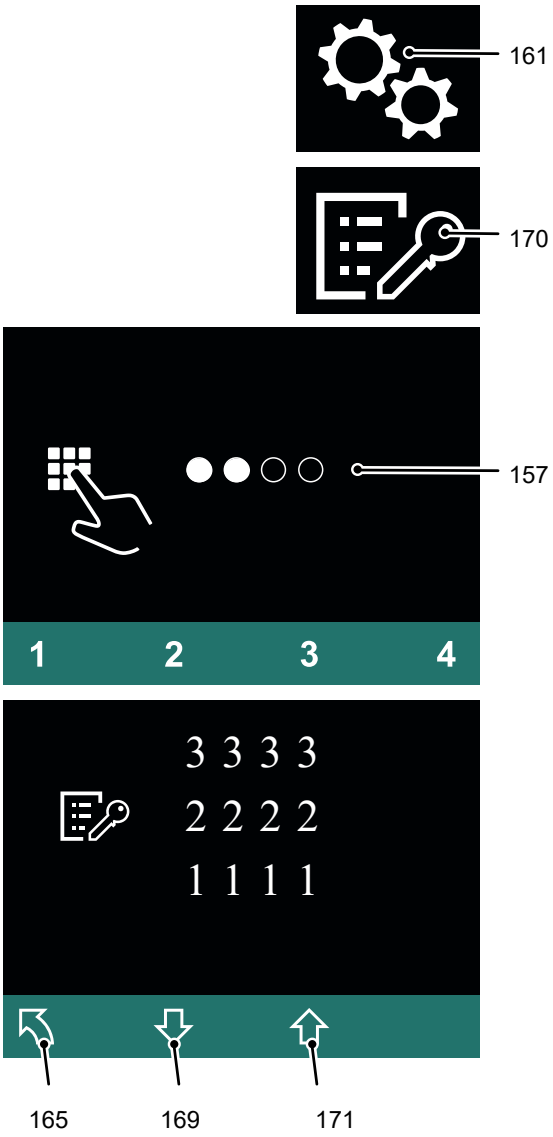
Requirements

– The truck is switched on, see page 168.

Procedure

- Press the key below the "Settings" symbol (161).
- Press the key below the "Log-in process" symbol (170).
- Enter the set-up code using the keys below the display unit (157).
  The set-up code entered is shown as filled-in circles.
- To scroll forward, press the button under the "Down selection" symbol (169) 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 (171) 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 (165).

The log-in process is displayed.



6.5 Using the Keypad

6.5.1 Switching on the truck with an access code

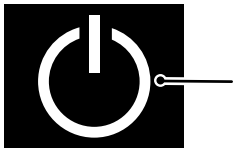
158

Procedure

- Release the emergency disconnect switch, see page 117.
- Enter the access code with the keypad (158).

The truck is switched on.

6.5.2 Switching off the truck


166

Procedure

- Press the key under the "Switch off" symbol (166) in the display unit.
- Press the Emergency Disconnect switch, see page 117.

The truck is switched off.

6.5.3 Changing the set-up code

Requirements

– The truck is switched on, see page 174.

Procedure

- Press the key below the "Settings" symbol (161).
- Press the key below the "Change set-up code" symbol (162).
- Enter the set-up code using the keypad (158).

  The set-up code entered is shown in the display unit (157) as filled-in circles.
- Press the key below the "Delete" symbol (163).

  The set-up code is deleted.
- Enter the new set-up code using the keypad (158).

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

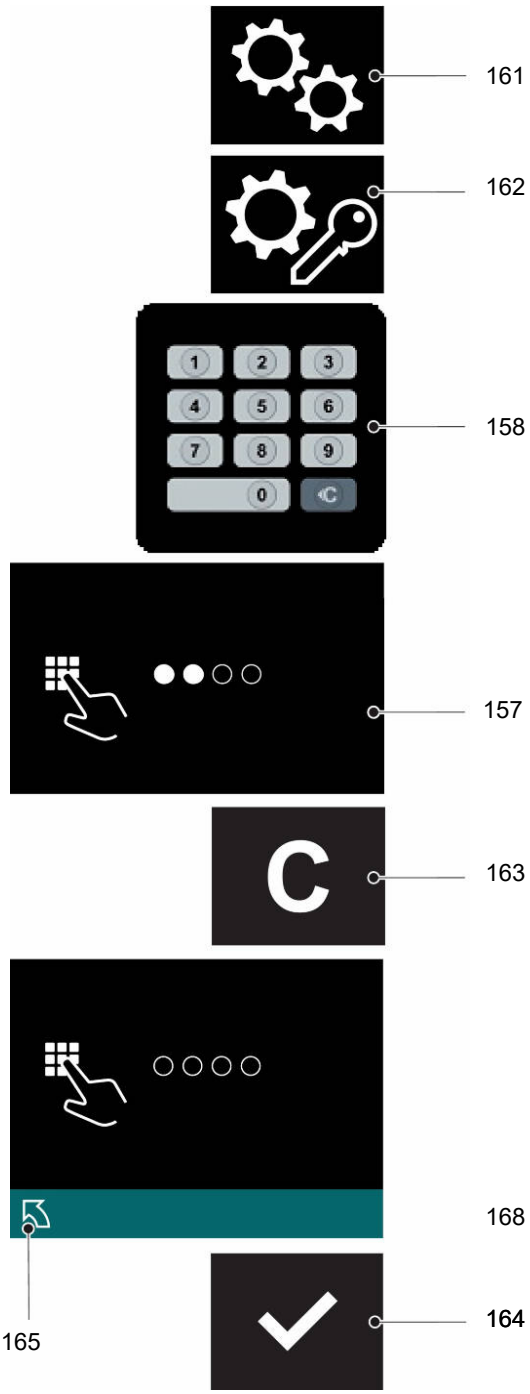
- Press the key below the "Confirm" symbol (164).

  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 (165).

The set-up code has been changed.



6.5.4 Adding a new access code

Requirements

– The truck is switched on, see page 174.

Procedure

- Press the key below the "Settings" symbol (161).
- Press the key below the "Edit access code" symbol (167).

  The set-up code is requested.
- Enter the set-up code using the keypad (158).

  All access codes are shown on the display unit (157).
- Press the key below the "Add" symbol (168).
- Enter a new access code using the keypad (158).

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

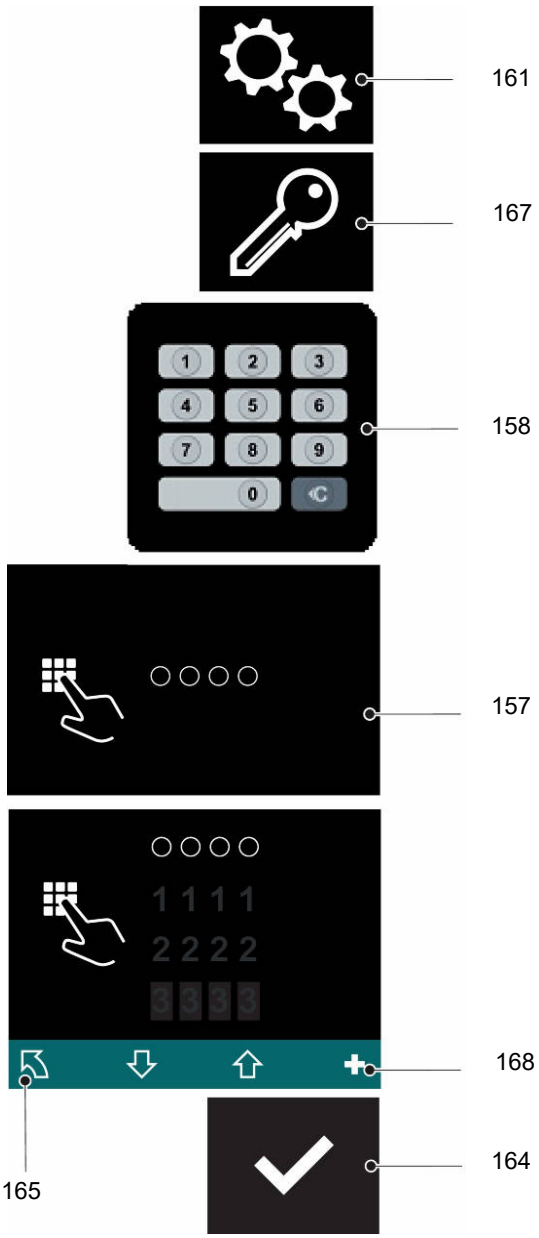
- Press the key below the "Confirm" symbol (164).

  The new access code is shown on the display unit (157).

➔ If the new access code has been entered incorrectly, delete it, see page 177, and enter the correct access code.

To return to the main menu, press the key below the "Back" symbol (165).

A new access code has been added.



6.5.5 Deleting an access code

Requirements

– The truck is switched on, see page 174.

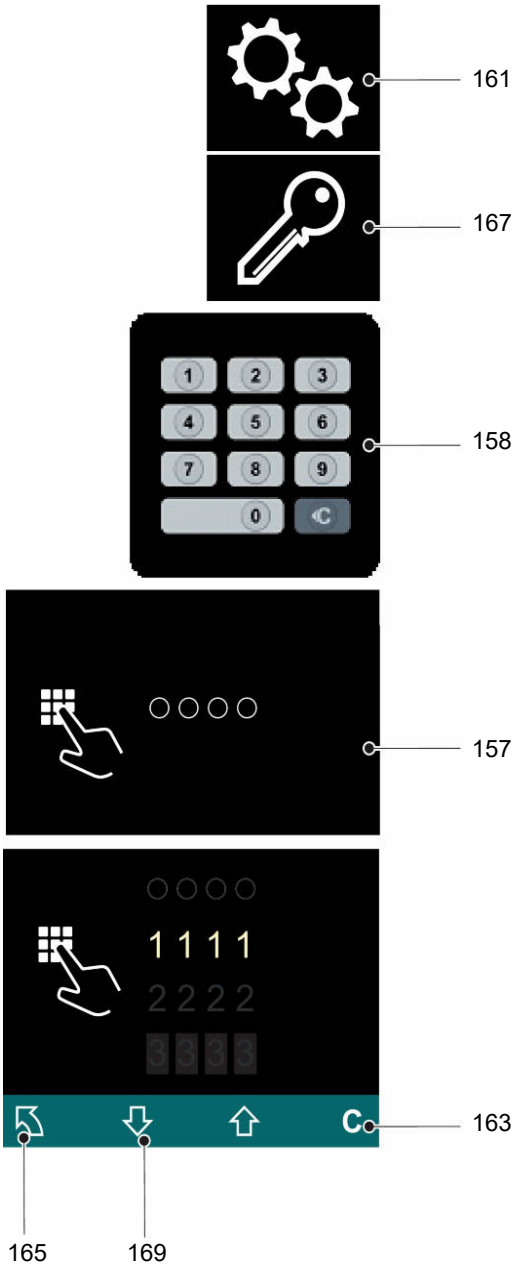
Procedure

- Press the key below the "Settings" symbol (161).
- Press the key below the "Edit access code" symbol (167).

  The set-up code is requested.
- Enter the set-up code using the keypad (158).

  All access codes are shown on the display unit (157).
- Select the access code to be deleted using the key below the "Down selection" symbol (169).
- Press the key below the "Delete" symbol (163).

  The access code has been deleted.
- To return to the main menu, press the key below the "Back" symbol (165).



6.5.6 Displaying the Log-in History (Keypad)

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 174.

Procedure

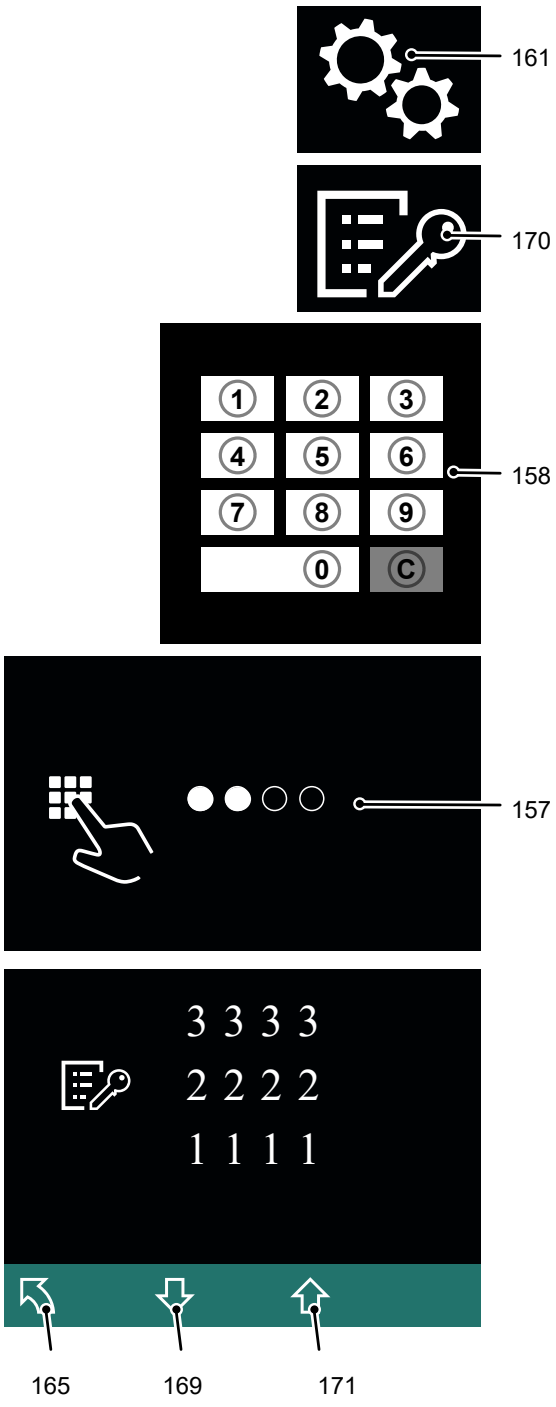
- Press the key below the "Settings" symbol (161).
- Press the key below the "Log-in process" symbol (170).
- Enter the set-up code using the keypad (158).

  The set-up code entered is shown in the display unit (157) as filled-in circles.
- To scroll forward, press the button under the "Down selection" symbol (169) 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 (171) 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 (165).

The log-in process is displayed.



6.6 Operating the transponder reader

NOTICE

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

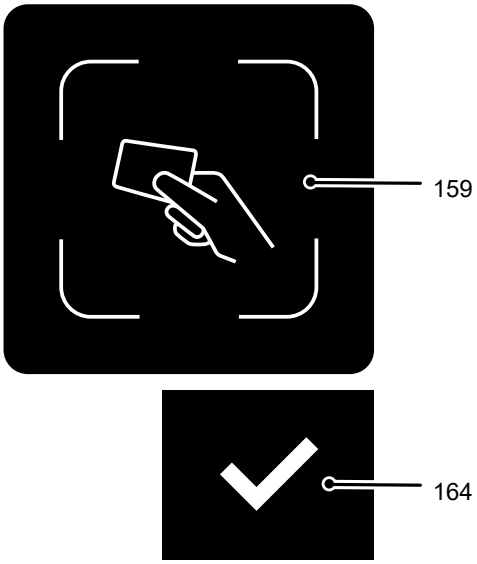
6.6.1 Switching on the truck with a transponder

Procedure

- Release the Emergency Disconnect switch, see page 117.
- Hold the transponder in front of the transponder reader (159).

  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 (164).

The truck is switched on.

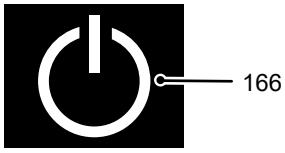


6.6.2 Switching off the truck

Procedure

- Press the key under the "Switch off" symbol (166) in the display unit.
- Press the Emergency Disconnect switch, see page 115.

The truck is switched off.



6.6.3 Changing the set-up transponder

Requirements

– The truck is switched on, see page 179.

Procedure

- Press the key below the "Settings" symbol (161).
- Press the key below the "Change set-up code" symbol (162).
- Place the set-up transponder on the transponder reader (159).

  The code of the set-up transponder is shown on the display unit (157).
- Press the key below the "Delete" symbol (163).

  A dashed line is shown.
- Place the new set-up transponder on the transponder reader (159).

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

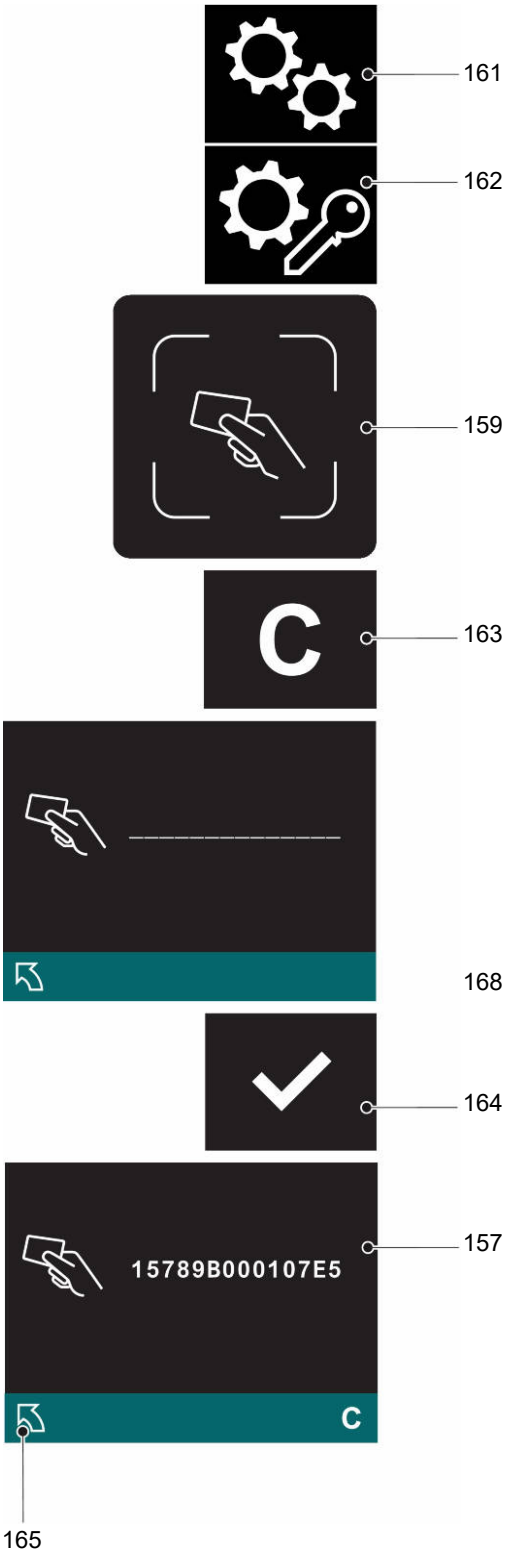
- Press the key below the "Confirm" symbol (164).

  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 (163).

To return to the main menu, press the key below the "Back" symbol (165).

The set-up transponder has been changed.



6.6.4 Adding a new transponder

Requirements

– The truck is switched on, see page 179.

Procedure

- Press the key below the "Settings" symbol (161).
- Press the key below the "Edit transponder" symbol (167).

  The set-up transponder is requested.
- Place the set-up transponder on the transponder reader (159).

  All transponder codes are shown on the display unit (157).
- Press the key below the "Add" symbol (168).
- Place the new transponder on the transponder reader (159).

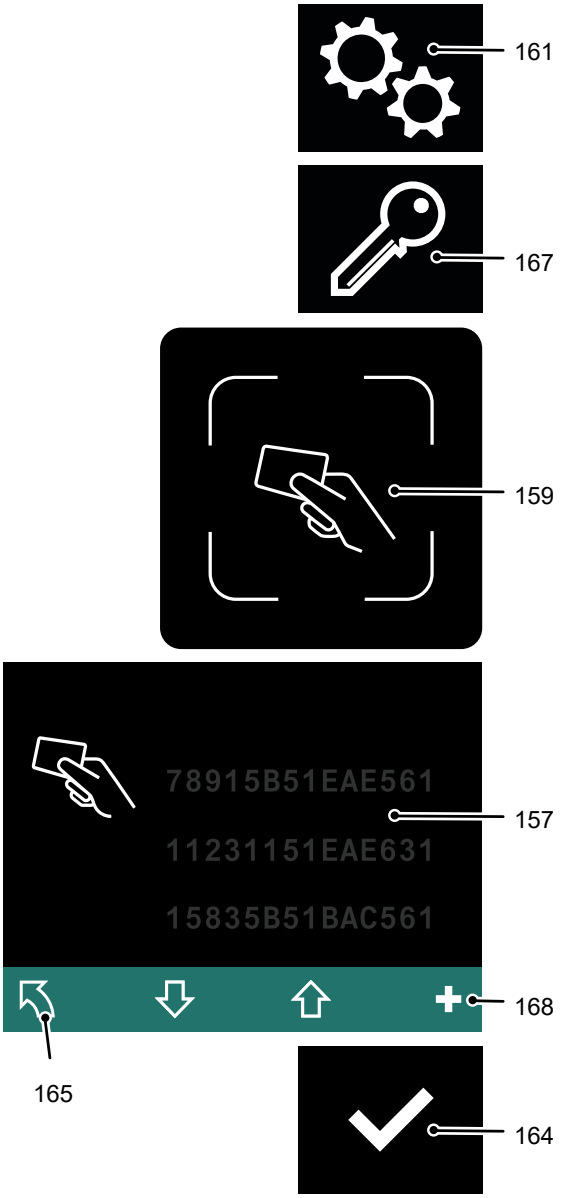
➔ The new transponder code must be different from existing transponder codes.

- Press the key below the "Confirm" symbol (164).

  The new transponder code is displayed.

➔ If the wrong transponder has been used, delete it, see page 182, and add a correct transponder.

To return to the main menu, press the key below the "Back" symbol (165).



A new transponder has been added.

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

6.6.5 Deleting a transponder

Requirements

– The truck is switched on, see page 179.

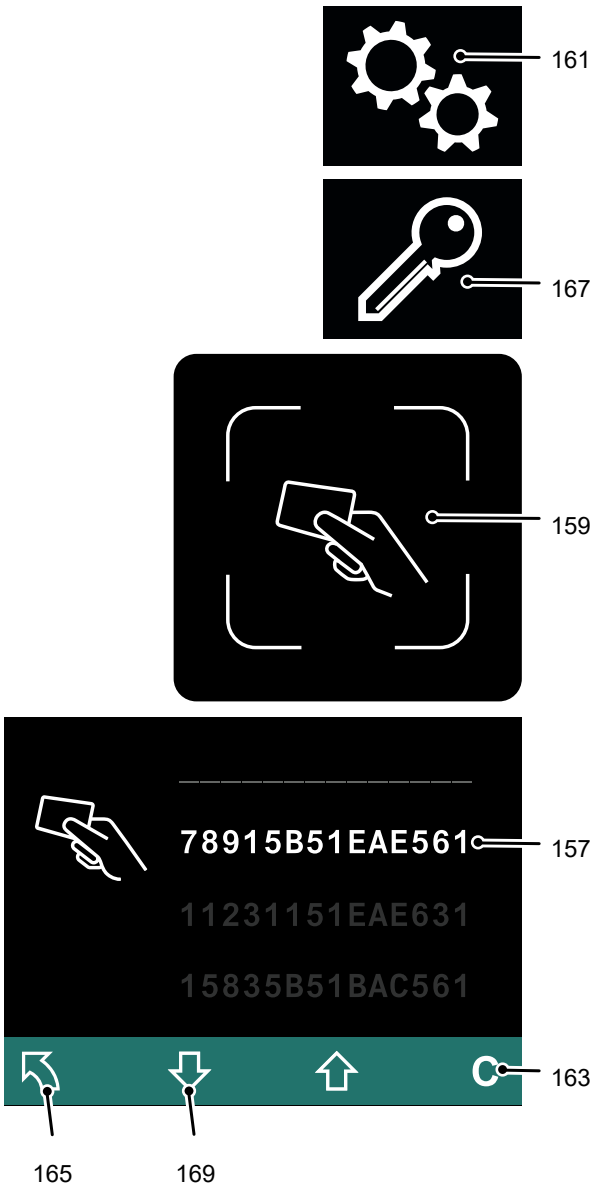
Procedure

- Press the key below the "Settings" symbol (161).
- Press the key below the "Edit transponder" symbol (167).

  The set-up transponder is requested.
- Place the set-up transponder on the transponder reader (159).

  All transponder codes are shown on the display unit (157).
- Select the transponder code to be deleted using the key below the "Down selection" symbol (169).
- Press the key below the "Delete" symbol (163).

  The transponder has been deleted.
- To return to the main menu, press the key below the "Back" symbol (165).



6.6.6 Displaying the Log-in History (Transponder Reader)

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 168.

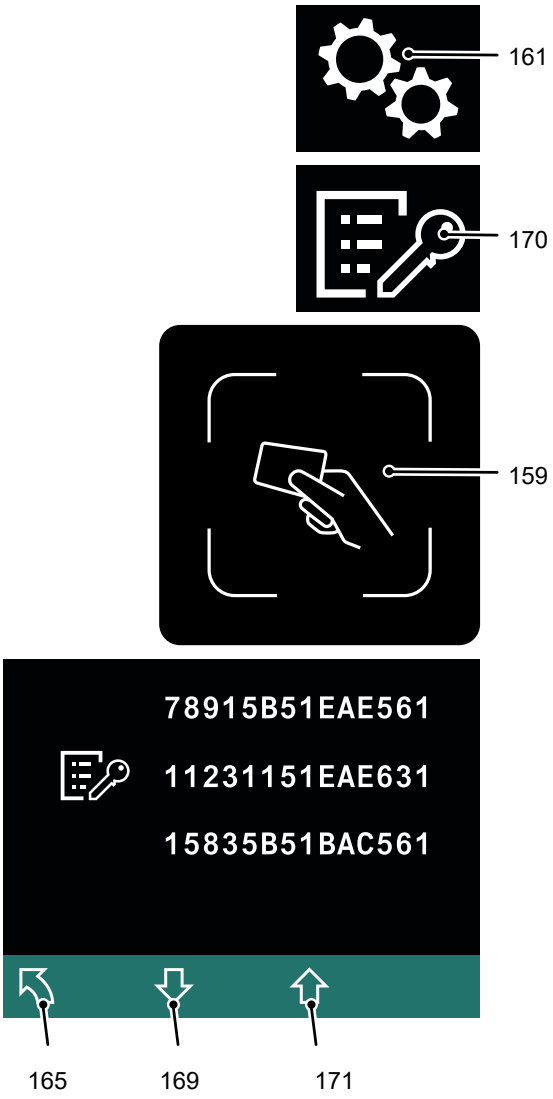
Procedure

- Press the key below the "Settings" symbol (161).
- Press the key below the "Log-in process" symbol (170).
- Place the set-up transponder on the transponder reader (159).
- To scroll forward, press the button under the "Down selection" symbol (169) 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 (171) 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 (165).

The log-in process is displayed.



6.7 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.

6.7.1 accessCONTROL

The truck is only released after switch-on via the key switch (transponder ○ / keypad ○) if the activation sequence is observed:
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

⚠ WARNING!

Risk of accidents due to malfunctions or overfamiliarity when operating the forklift truck

Faults or malfunctions of the truck or the assistance system can result in the assistance system or other functions no longer being performed correctly. Operating the forklift truck with a poor view of the operating and working area or a lack of attention due to overfamiliarity can lead to dangerous situations, collisions with persons and objects or injuries.

- ▶ Check the condition and function of the assistance system when switching on the truck.
- ▶ Trucks with a faulty or malfunctioning assistance system must no longer be operated within the overall system. Contact the manufacturer's customer service department.
- ▶ Increased attention is required during travel and hydraulic operations in order to avoid collisions.
- ▶ When operating the forklift truck, check the visible operating and work area even if the assistance system is functioning correctly to avoid lack of attention caused by overfamiliarity.
- ▶ Adjust your travel speed and load handling according to the visibility conditions.

6.7.2 driveCONTROL (○)

The Drive Control option activates the crawl speed automatically after the transition from free lift to mast lift. This limits both the maximum travel speed and the acceleration.

➔ The reduced travel speed can be set within a range of 0,4 m/s to 1,9 m/s.

6.7.3 reachCONTROL

⚠ WARNING!

Accident risk due to increased tipover hazard and reduced residual capacity

In the case of incorrect use of the reachCONTROL option, an increased risk of tipover exists since attachments can reduce the operational stability of the truck – see page 50. 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.

- ▶ The reachCONTROL option must only be used up to a fork length of max. 1300 mm.
- ▶ No front-mounted attachments must be used with the reachCONTROL option (HF5).

The reachCONTROL option maximises the speeds for the mast traverse function depending on the lift height and the load weight – see page 50.

➔ The reachCONTROL option is only permitted for trucks with a fork length of up to 1300 mm.

6.7.4 curveCONTROL (○)

The curveCONTROL assistance system helps the operator to operate the truck safely. When cornering, the maximum travel speed is reduced according to the steer angle.

➔ The default setting can be changed by the manufacturer's customer service department

6.7.5 warehouseCONTROL

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

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

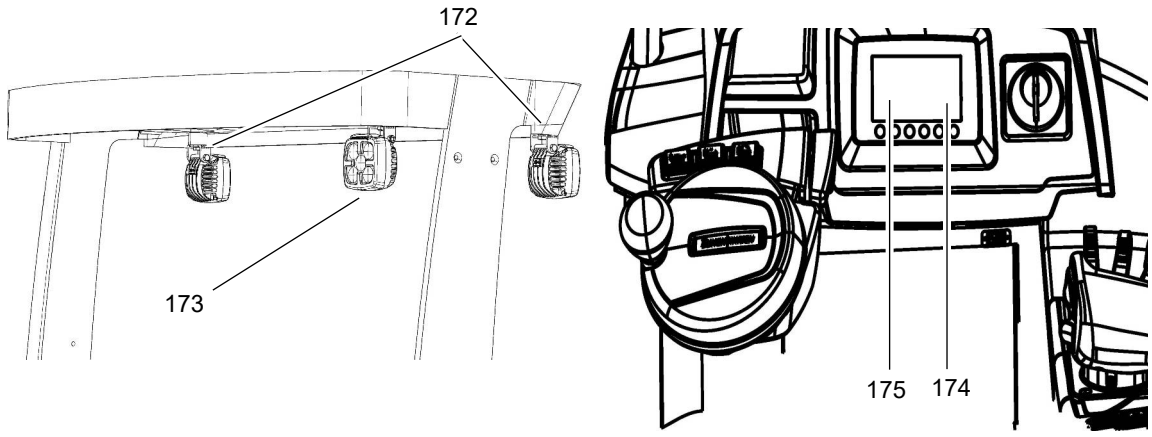
6.7.6 positionCONTROL

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

6.7.7 Rack Height Select (○)

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

6.8 Work lights



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

➔ The button (175) switches the work lights (173) in the drive direction on or off. The button (174) switches the work lights (172) 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 (175, 174).

The work lights are switched on / off.

6.9 Camera system

⚠ CAUTION!

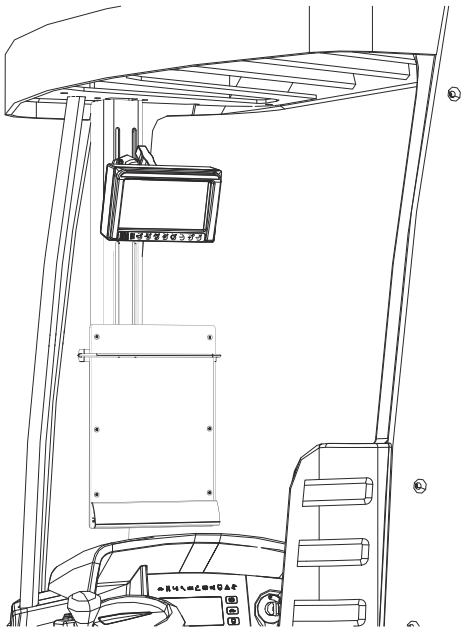
Accident risk from hidden work areas

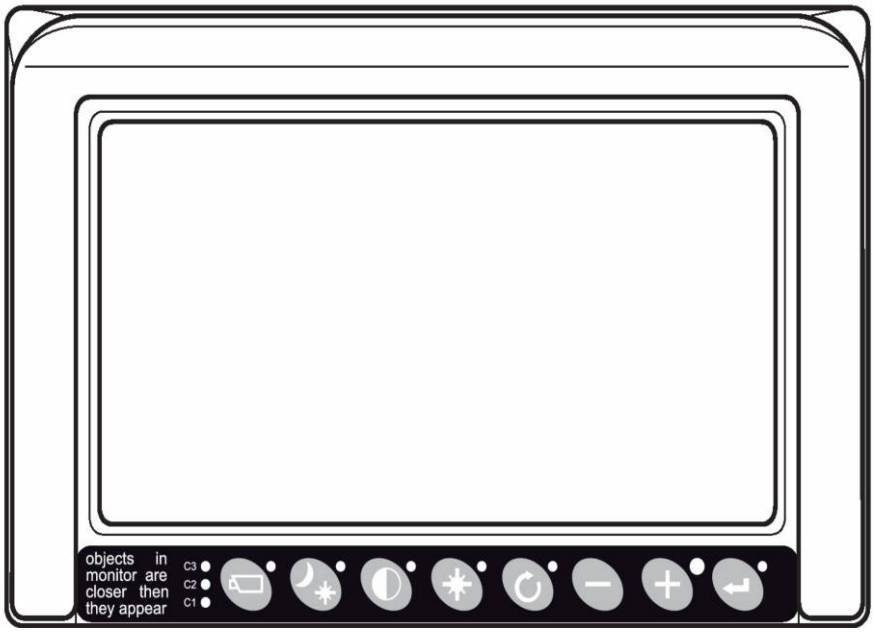
▶The camera system acts as an aid to assist safe operation.

▶Practice travelling and working with the camera system.

▶Align the camera so that the hidden work area can be seen.

The camera is secured to the inside of the right fork. The camera image is displayed via a monitor. fitted to the overhead guard. If a fork positioner is attached, the camera system will be equipped with a wide angle camera.





176 177 178 179 180 181 182 183

Item		Component	Function
176		Camera selection	Selects a camera manually. The LED next to the key indicates that camera selection is activated. Press the key again to switch the camera display.
177		Day/night setting	Press the key to change between ABC mode, day and night setting.
178		Contrast	Press the key to activate the setting module. The desired contrast can be set with the plus and minus keys.
179		Brightness	Press the key to activate the setting module. The desired brightness can be set with the plus and minus keys.
178+ 179		Saturation	Press the contrast and brightness keys simultaneously to activate the setting mode. The saturation can be set with the plus and minus keys.
180		Previous menu	When you press the key the monitor shows the previous menu item.
181		Minus	Press the key to change to the next menu item or to move left in the selection.
182		Plus	Press the key to change to the previous menu item or to move right in the selection.
183		Enter	When you press the key the system switches to standby or the option selected in the menu is activated.

6.9.1 Service Menu

Opening the service menu

Procedure

- Press the (176), (181), (182) keys simultaneously.

6.9.2 Camera settings

Opens the camera settings

Requirements

– The service panel is open.

Procedure

- Open the camera settings with the (176) key.
- Select the camera settings with the (181) and (182) keys.
- Confirm with the (183) key.
- Select the digit to be changed with the (181) and (182) keys.
- Switch digit or change the digit with the (183) key. If necessary set the desired digit with the (181) and (182) keys.

6.9.3 System settings

Opens the system settings

Requirements

– The service panel is open.

Procedure

- Select the system settings with the (181) and (182) keys.
- Confirm with the (183) key.

6.9.4 Keypad block

Deactivates the keypad

Requirements

– System settings are open.

Procedure

- Select the keypad with the (181) and (182) keys and confirm with (183).
- Select the keypad block with the (181) and (182) keys and confirm with (183).
- In the settings menu select the required keypad block.

6.9.5 User menu

Opens the user menu

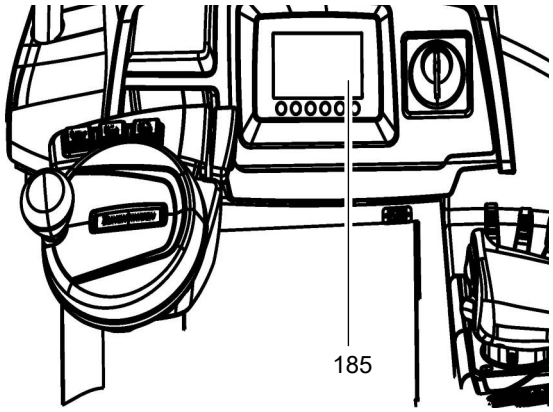
Requirements

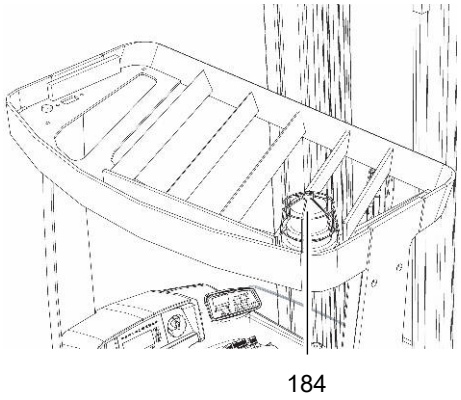
– The keypad block is deactivated.

Procedure

- Press the (181) and (182) keys simultaneously.

6.10 Beacon





Switching the beacon on and off

Procedure

- Press the beacon button (185).

The beacon (184) is switched on or off.

6.11 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 pump motor is deactivated when the set lift height is reached.

The lift function is blocked.

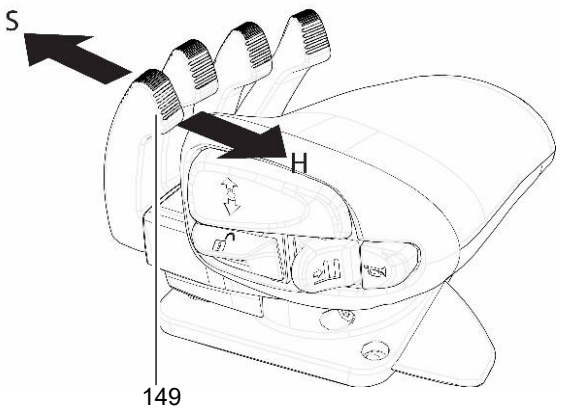
➔ The magnetic switch on the mast is not present with the rack height select option (○) or the operationCONTROL option (○).

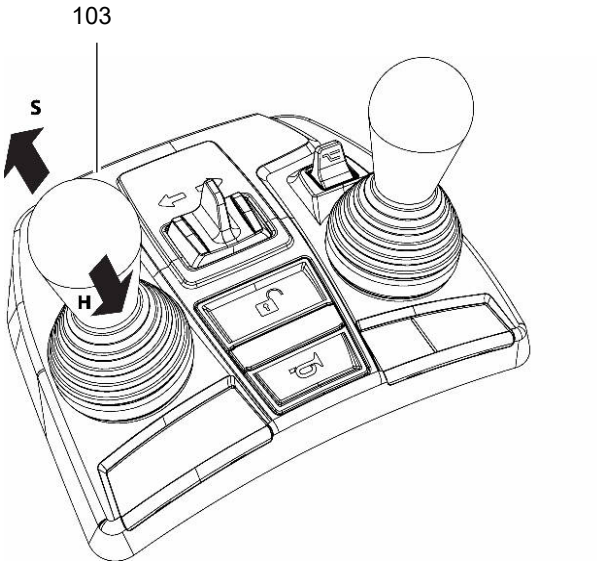
Overriding the lift limit cutout without the override button

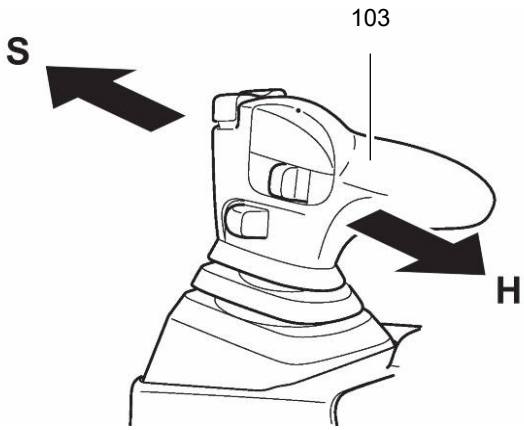
Procedure

- Set the SOLO-PILOT lever (149) or MULTI-PILOT (94) to neutral.
- Pull the SOLO-PILOT lever (149) or MULTI-PILOT (94) in direction H, see page 128

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







Overriding the lift limit cut-off with the override button

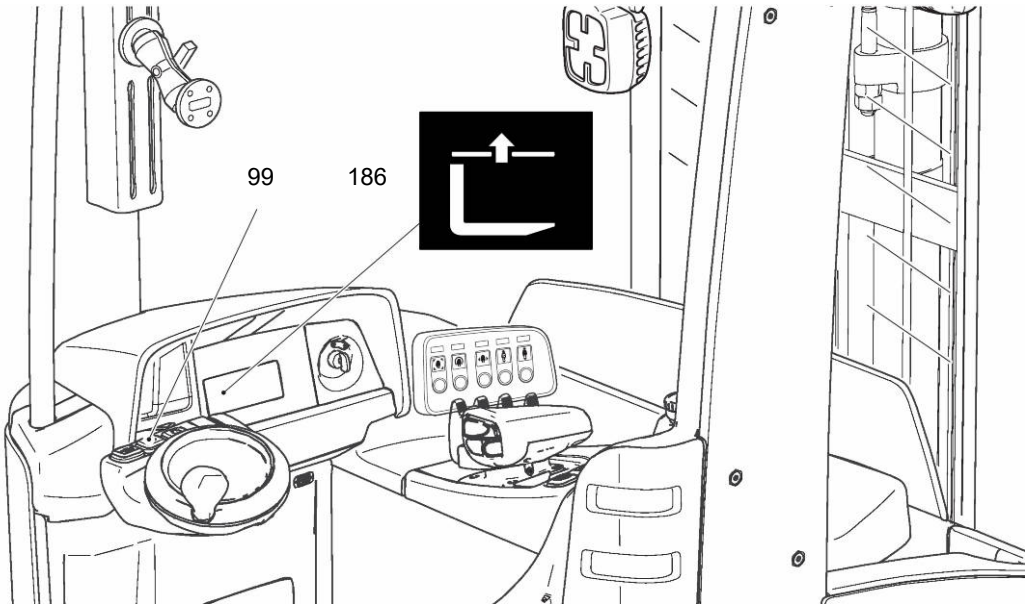
Procedure

- Press the lift limit override button (99) while simultaneously pulling the lever (103) in direction H.

The lift limit cut-off is now overridden.
Lifting can now be performed at reduced lift speed.

6.12 Electric lift limit

The lift limit system comes in versions 1, 2 and 3. The aim of the lift limit system is to prevent damage to the truck and the load near the wheel arms due to incorrect operation.



Item	Description
186	Side shift display
99	Lift limit override button

6.12.1 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 (186)

6.12.2 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 with the override button

Requirements

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

Procedure

- Press the Lift Limit override button (99) while simultaneously performing the selected function.

The hydraulic functions are released for as long as the button is pressed.

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.

6.12.3 Lift limit 3

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

Operation

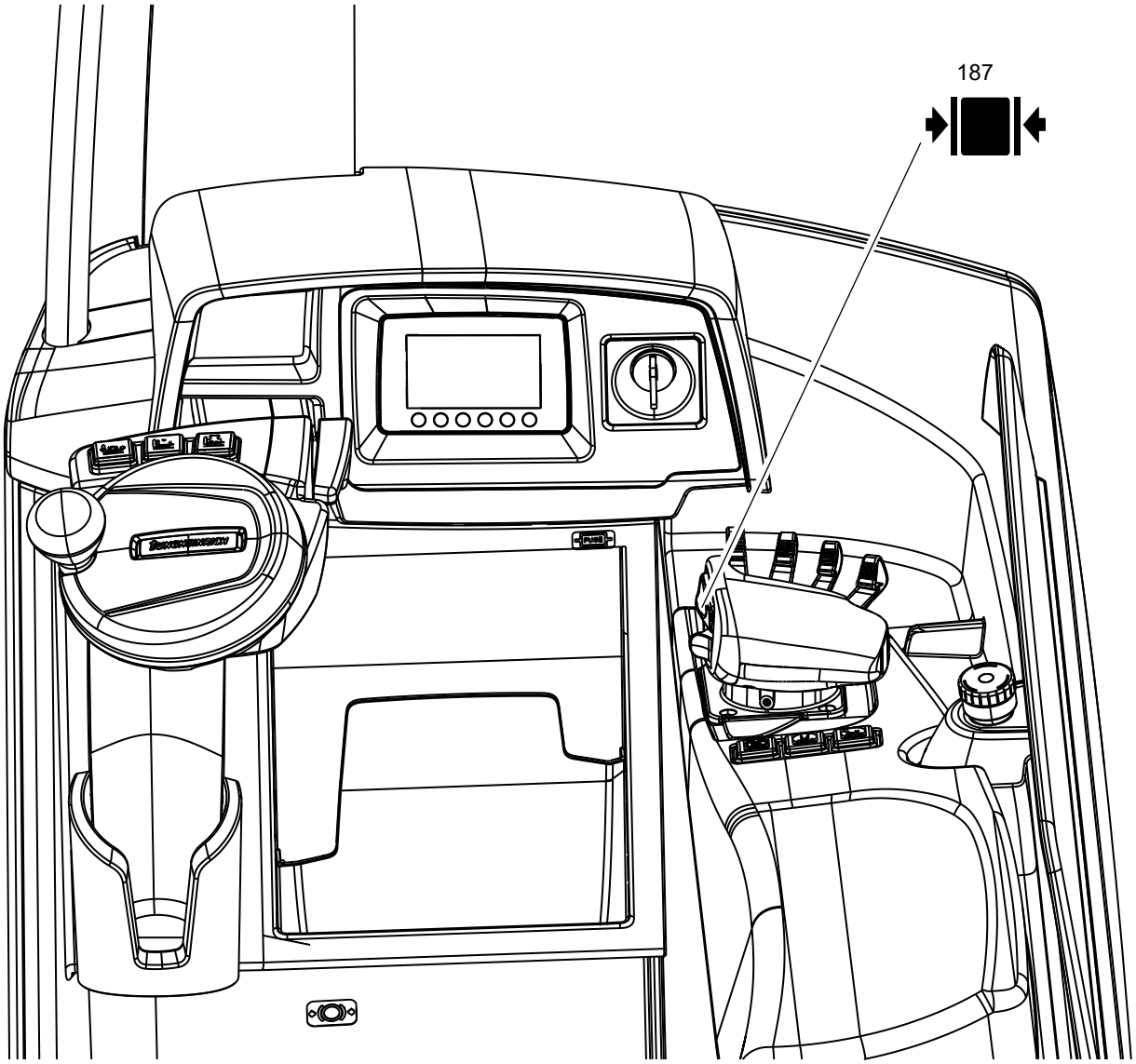
Lift limit 3 determines the position of the mast and forks via sensors in the mast. If the mast is fully extended or if the forks are outside the safety range (500 - 600 mm above the wheel arms), Lift Limit 3 releases all hydraulic functions.

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.

6.13 “Clamp function release” button



Item	Description
187	"Clamp-function release" button

When the "Clamp function release" button is pressed and the corresponding hydraulic function applied simultaneously, the clamp function is activated.

The auxiliary hydraulic function must be actuated within 1.5 seconds of the acknowledgement button being pressed.
(see page 139)

6.14 Positioning the forks with an integrated fork positioner (option)

⚠ WARNING!

Clamping loads with the fork positioner can result in accidents

Do not clamp loads with the fork positioner

▶The fork positioner must not be used to clamp loads.

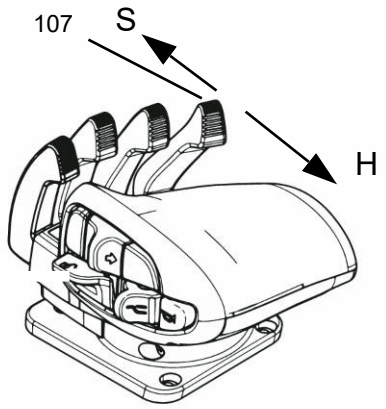
Requirements

– Truck prepared for operation see page 115.

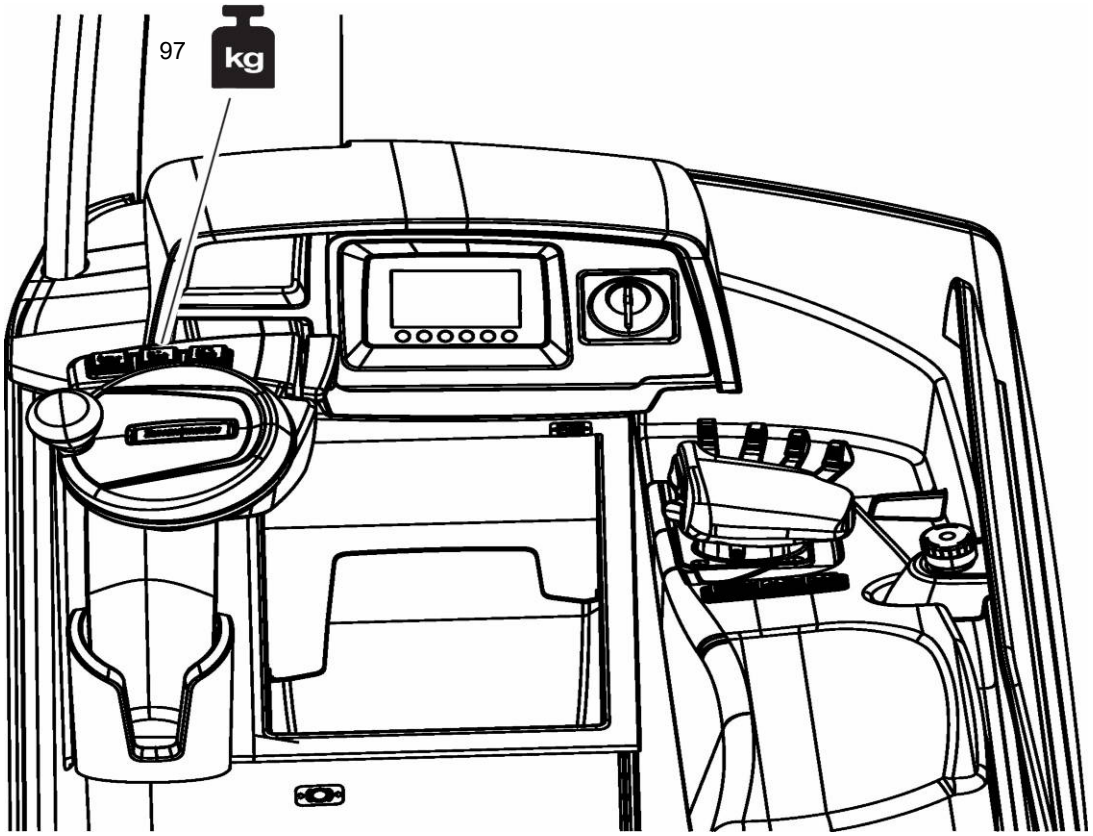
Procedure

- Pull the lever (107) in direction H, the forks move together.
- Push the lever (107) in direction S, the forks move apart.

The forks are now positioned.



6.15 Weigher



Item	Description
97	"Weigher" button

While the weigher button (97) 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

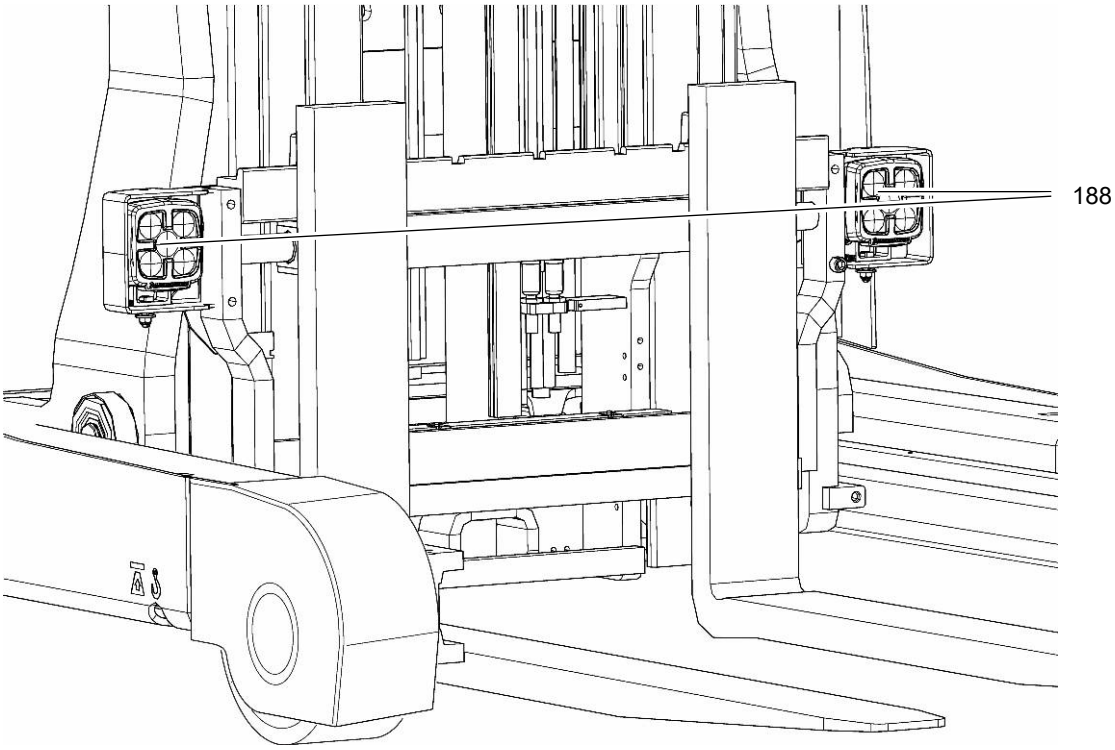
Procedure

- Press and hold down on the weigher button (97) 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.

6.16 LED work lights on load handler

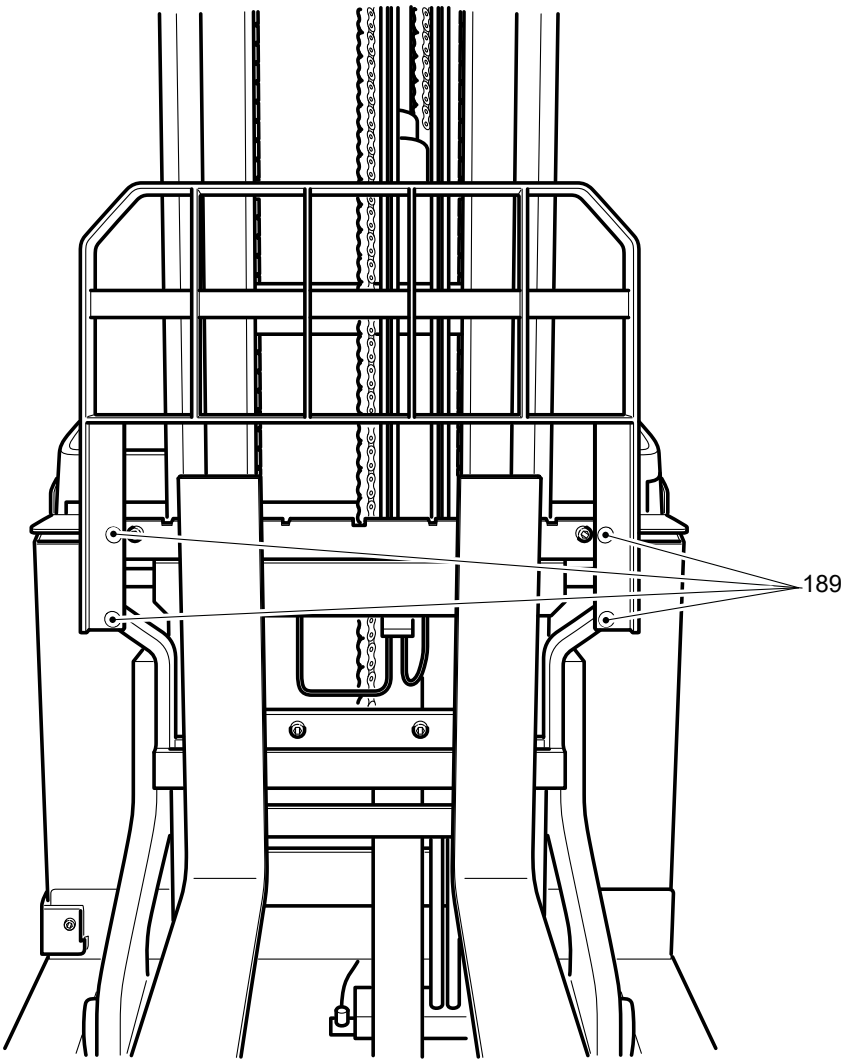


Item	Component
188	Load handler work lights LED

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.

6.17 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 (189).
- 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

6.18 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!

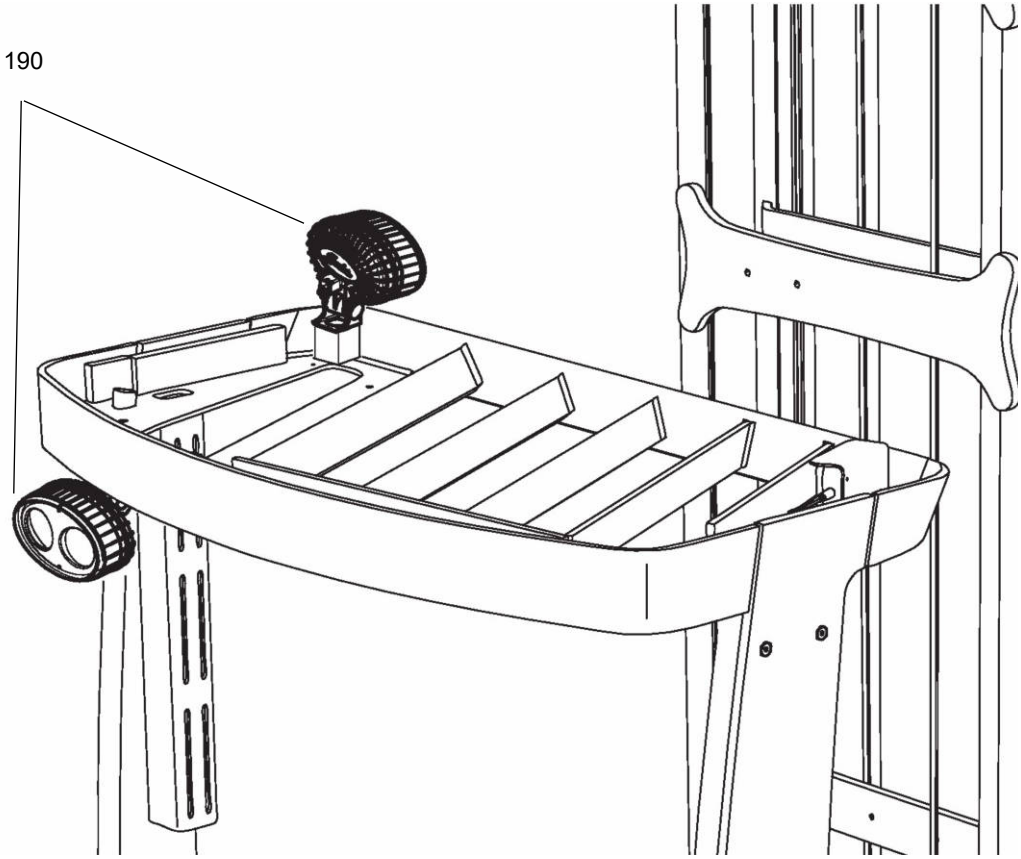
Risk of accident due to restricted view

Looking directly at the LED light can dazzle and temporarily impair eyesight.

▶ Do not look directly at the LED light.

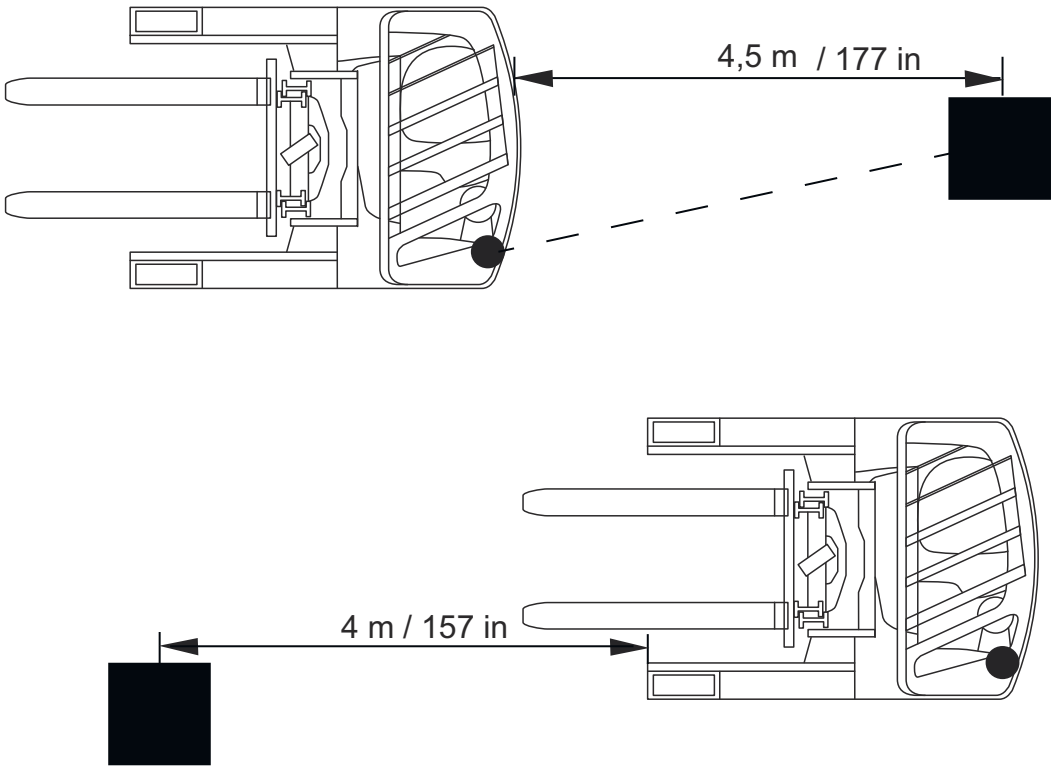
▶ Practise travelling and working with the floor spot carefully.

▶ Do not change the factory setting.



The floor spot (190) 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.



6.18.1 Additional information on Floor-Spot blue

Only for Floor-Spot blue (51466740/51631731)

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.

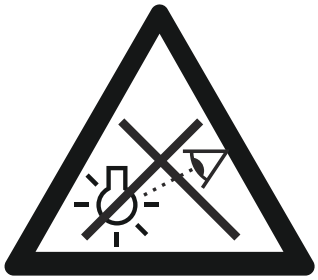
- ▶ Do not look directly into the light beam of the Floor-Spot.
- ▶ Do not adjust the position and alignment of the Floor-Spot on the truck.

⚠ 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.

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 45.

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 239.

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 251.

⚠ 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 235.

3 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.

3.1 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 battery before starting cleaning work.
- ▶ Before cleaning, take necessary safety measures to prevent spark formation (e.g. due to short circuits).

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.

NOTICE

Risk of component damage when cleaning the truck

Cleaning with a high-pressure cleaner can result in malfunctions due to humidity.

- ▶ Cover all electronic system assemblies (controls, sensors, motors etc.) before cleaning the truck with a high-pressure cleaner.
- ▶ Do not hold the jet of the high-pressure cleaner at marking points to avoid damaging them – see page 41.
- ▶ Do not clean the truck with a steam jet.

After cleaning, carry out the operations detailed in "Restoring the truck to service after maintenance and repairs" (see page 235).

3.2 Working on the electrical system

⚠ WARNING!

Risk of accidents due to electrical current

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

Before starting maintenance on the electrical system:

- ▶ Only suitably trained electricians may operate on the truck's electrical system.
- ▶ Before working on the electrical system, take all precautionary measures to avoid electric shocks.
- ▶ Park the truck securely – see page 153.
- ▶ Disconnect the battery connector.
- ▶ Remove any rings, metal wristbands etc.

3.3 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.

3.4 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.

3.4.1 Replacing the drive wheel

The drive wheel must only be replaced by the manufacturer's authorised customer service department.

3.4.2 Replacing the load wheels

Load wheels must only be replaced by the manufacturer's authorised customer service department.

3.5 Lift Chains

⚠ WARNING!

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

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

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

3.6 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.

NOTICE

Checking and replacing hydraulic hoses

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

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

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

NOTICE

Possible faults with hydraulic functions on trucks with cold store equipment

Commissioning the truck after an extended period of out of use or in ambient temperatures outside of the deep-freeze area in which the truck is intended to be used can give rise to noticeable noise development, jerky cylinder movements and damage to the hydraulic system.

- ▶ Execute hydraulic functions only in cold store temperatures.
- ▶ Spray piston rod ends with chain spray after extended periods out of use.

4 Lubricants and Lubrication Schedule

4.1 Handling consumables safely

Handling consumables

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

⚠ WARNING!

Improper handling is hazardous to health, life and the environment

Consumables can be flammable.

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

⚠ CAUTION!

Spilled consumables can cause slipping and endanger the environment

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

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

⚠ WARNING!

Improper handling of oils can be hazardous

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

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

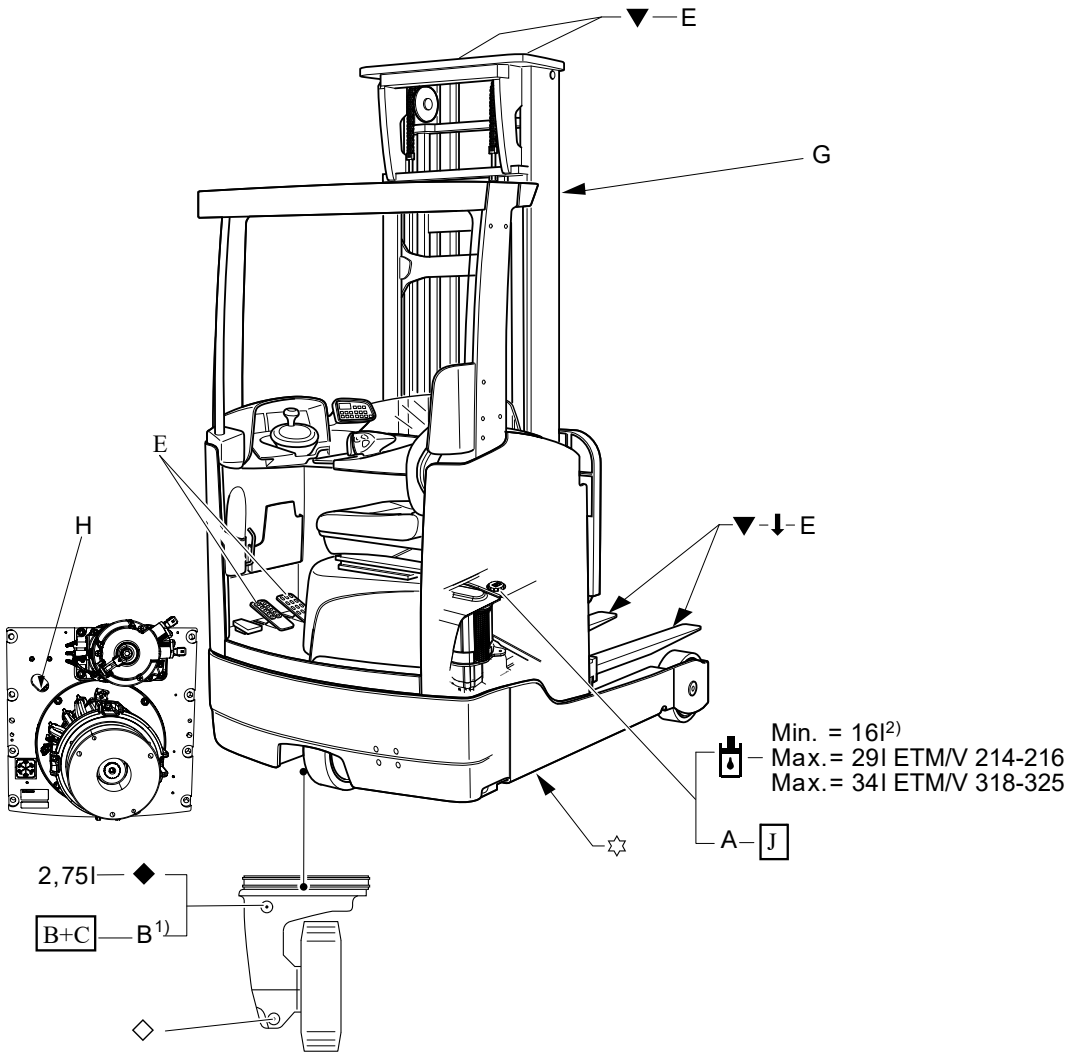
⚠ CAUTION!

Consumables and used parts are an environmental hazard

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

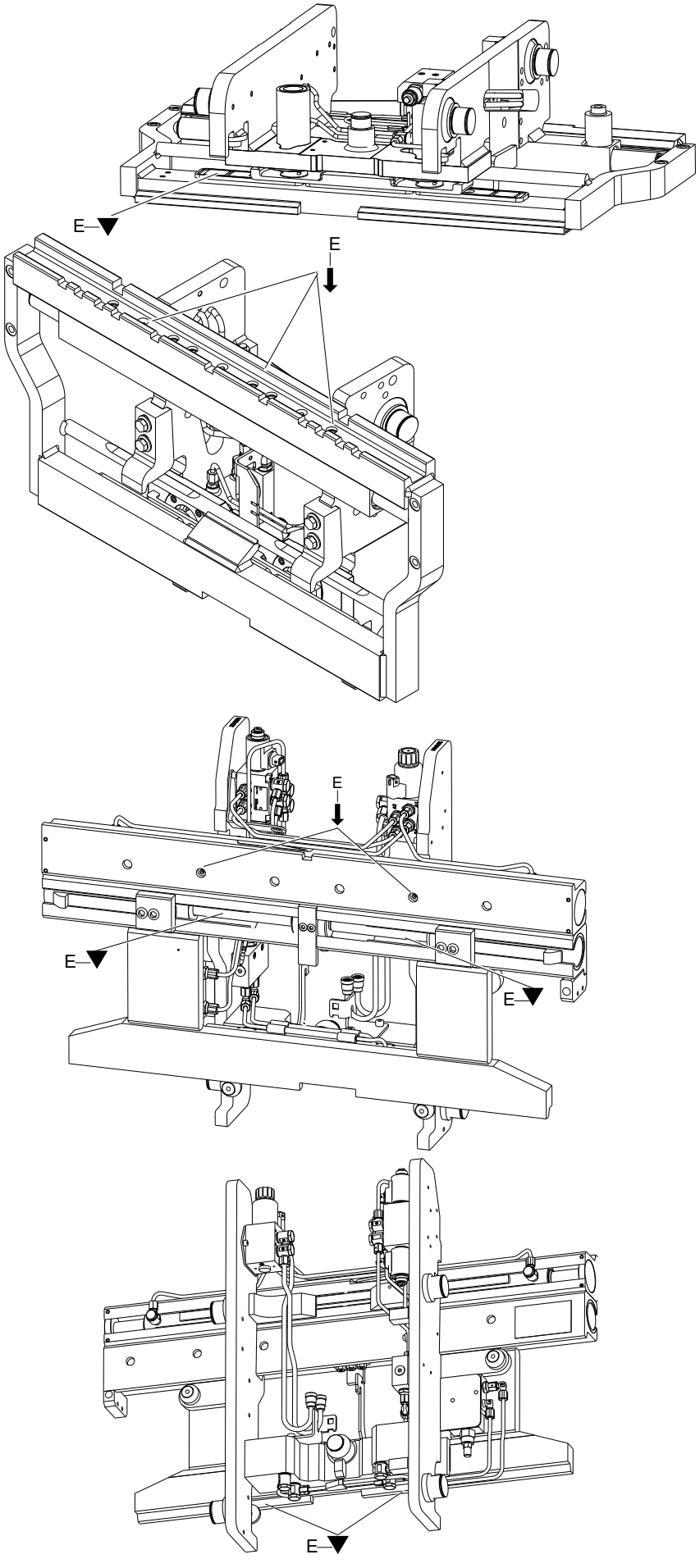
▶Note the safety regulations when handling these materials.

4.2 Lubrication Schedule



▼	Contact surfaces	☼	Hydraulic oil drain plug
⬇	Grease nipple	◆	Transmission oil filler neck
	Hydraulic oil filler neck	◇	Transmission oil drain plug

1 Compound ratio for cold store usage 1:1
2 Capacity, see page 223.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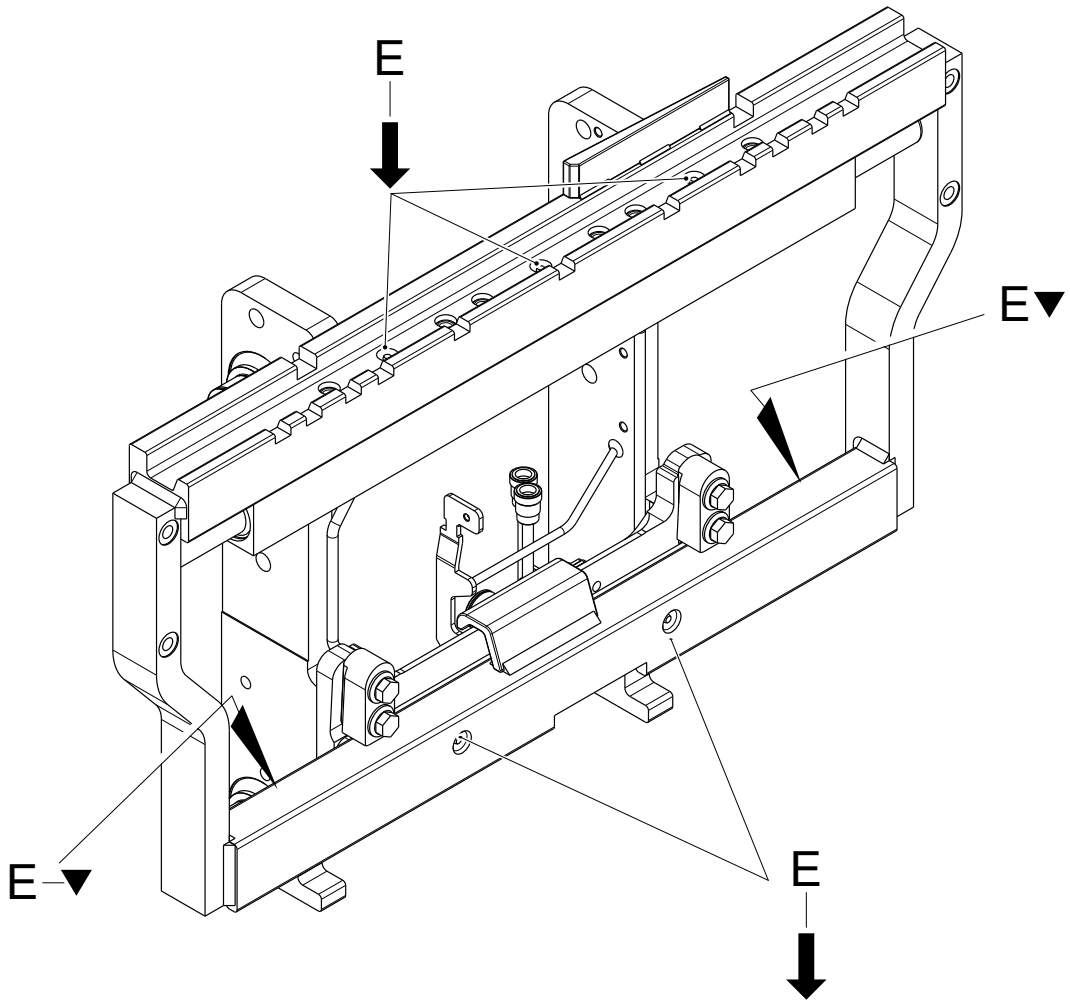


▼	Contact surfaces	☼	Hydraulic oil drain plug
⬇	Grease nipple	◆	Transmission oil filler neck
	Hydraulic oil filler neck	◇	Transmission oil drain plug

1 Compound ratio for cold store usage 1:1
2 Capacity, see page 223.

4.3 Consumables

Code	Order no.	Supplied quantity	Description	Used for
A	51 132 827*	5.0 l	Jungheinrich hydraulic oil	Hydraulic system
B	29 200 680[1]	5.0 l	CLP 100DIN 51517	Transmission
C	29 200 810	5.0 l	HLP 10, DIN 51524	Cold store transmission
E	29 201 430	1.0 kg	Grease, DIN 51825	Lubrication service
G	29 201 280	400 ml	Chain spray	Chains
H	50 002 004	400 ml	Contact spray	Toothing
J	51 081 875	5.0 l	Renolin MR 310	Cold store hydraulic system
[1)] *It is recommended only to use the transmission oil available from Jungheinrich under order number 29 200 680 as this met the necessary requirements in endurance testing. Even if they are DIN-compliant, other transmission oils may exhibit poorer lubrication properties, which could result in shorter service lives.*				

* 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

5 Maintenance and repairs

5.1 Preparing the truck for maintenance and repair work

All necessary safety measures must be taken to avoid accidents when carrying out maintenance and repairs. The following preparations must be made:

Procedure

- Park the truck on a level surface.
- Fully lower the main and auxiliary lift.
- Switch off the truck securely, see page 153.
- 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
  - CanCode (○) press the O button, or
  - Press the red button on the ISM access module (○).
- Press the Emergency Disconnect switch.
- Disconnect the battery to prevent the truck from being switched on accidentally.
- When working under a raised lift 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 51. When working on the parking brake, prevent the truck from accidentally rolling away (e.g. with wedges).

5.2 Lifting and jacking up the truck safely

⚠ WARNING!

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 220).

Tools and Material Required

– Jack
– Hard wooden blocks

Procedure

• Place the jack against the contact point.

➔ Jack contact point, see page 41.

• 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.

5.3 Removing or installing the seat cover

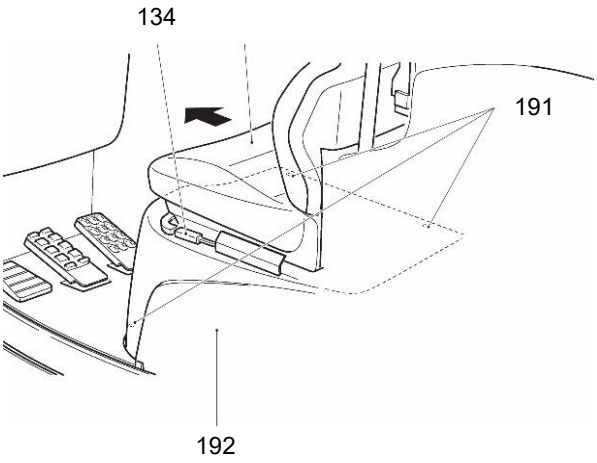
The drive unit and hydraulic aggregate can be made accessible for service by removing the seat panel.

Removing the seat panel

Procedure

- Pull seat locking lever (134) up and pull the seat towards the steering wheel and take it off.
- Disconnect the fan.
- Undo the screws (191) and remove the seat panel (192).
- Assembly is the reverse order.

The seat panel is now removed.



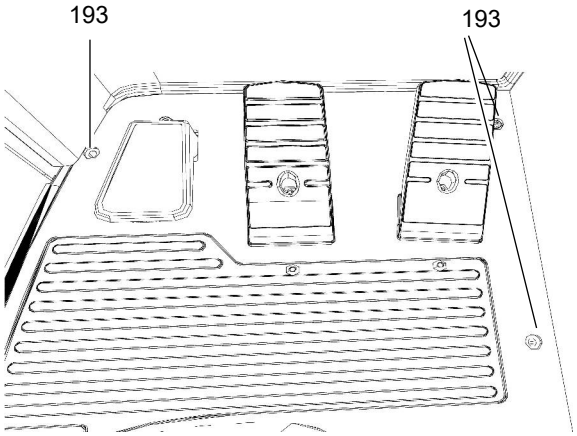
5.4 Removing the floor plate

Removing the floor plate

Procedure

- Loosen and remove the 3 screws (193).
- Open the lock with the Allen key.
- Raise the floor plate carefully.
- Remove the plug connections from the pedal.
- Store the floor plate in a safe place.

Floor plate removed.



5.5 Checking the hydraulic oil level

⚠ CAUTION!

The hydraulic oil is pressurised during operation and is a hazard to health and to the environment.

- ▶ Do not touch pressurised hydraulic lines.
- ▶ Dispose of used oil in accordance with regulations. Store used oil safely until it can be disposed of in accordance with regulations.
- ▶ Do not spill hydraulic oil.
- ▶ Remove any spilled hydraulic immediately with an appropriate bonding agent.
- ▶ The bonding agent / consumable mixture must be disposed of in accordance with regulations.
- ▶ Observe national regulations when handling hydraulic oil.
- ▶ Wear safety gloves when handling hydraulic oil.
- ▶ Prevent hydraulic oil from coming into contact with hot motor parts.
- ▶ Do not smoke when handling hydraulic 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.

Check the hydraulic oil level

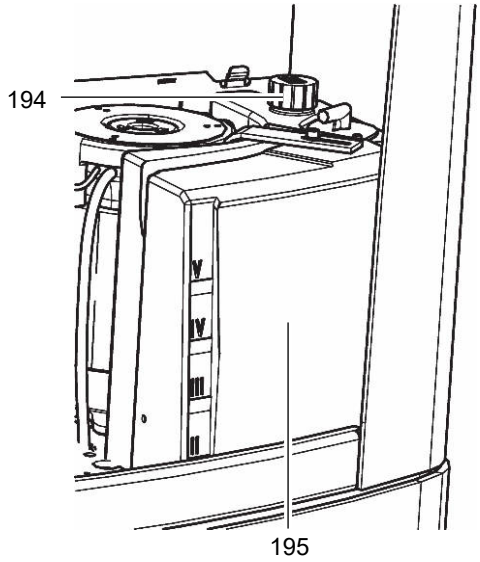
Requirements

– Truck prepared for maintenance and repairs, see page 220.

Procedure

- Push the driver's seat forward.
- Check oil level in hydraulic reservoir (195).
- 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 is now checked.



Mast height[1]	**ETV**
400 - 499	approx. mark III
500 - 599	approx. mark III
600 - 699	approx. mark IV
700 - 799	approx. mark IV

5.6 Checking the electrical fuses

5.6.1 ETM/V 210-216

Removing the safety cover

Procedure

⚠ CAUTION!

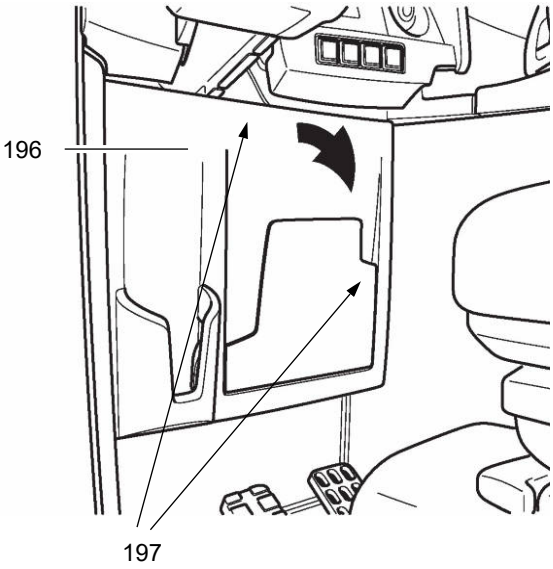
Trapping hazard

▶ Carefully pull off the cover.

Forcibly pull off the safety cover (196) from the (197) points at the top left and bottom right and place them to one side.

- Assembly is in the reverse order.

Safety cover removed.



Removing the instrument panel cover

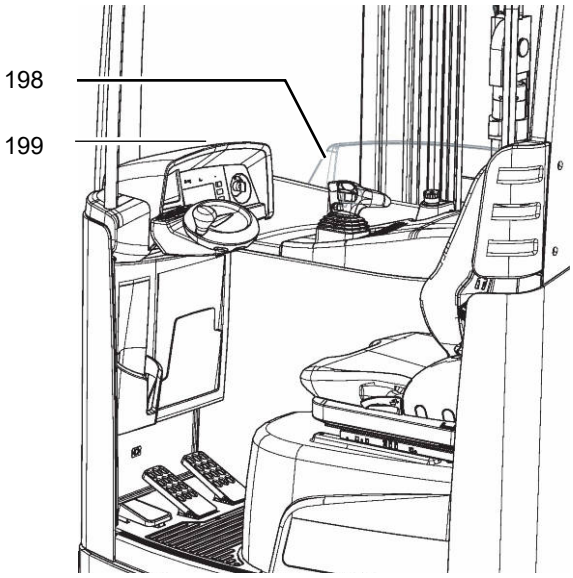
Procedure

- Push the steering wheel towards the seat (outermost position).
- Remove the instrument panel cover (199).
- Remove the side instrument panel (198).

➔ The main fuses are located underneath the side instrument panel (198).

- Assembly is in the reverse order.

Instrument panel cover removed.



Checking electrical fuses

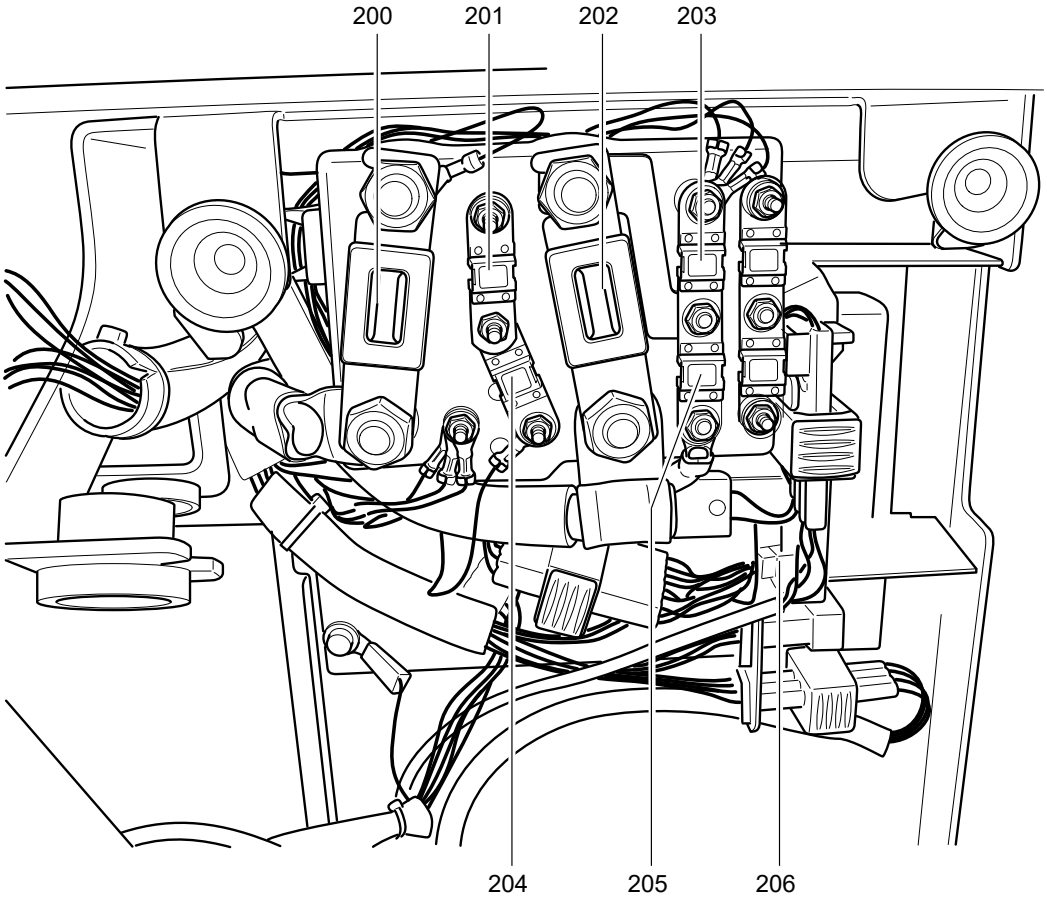
Requirements

– Safety cover removed.
– Instrument panel cover removed.

Procedure

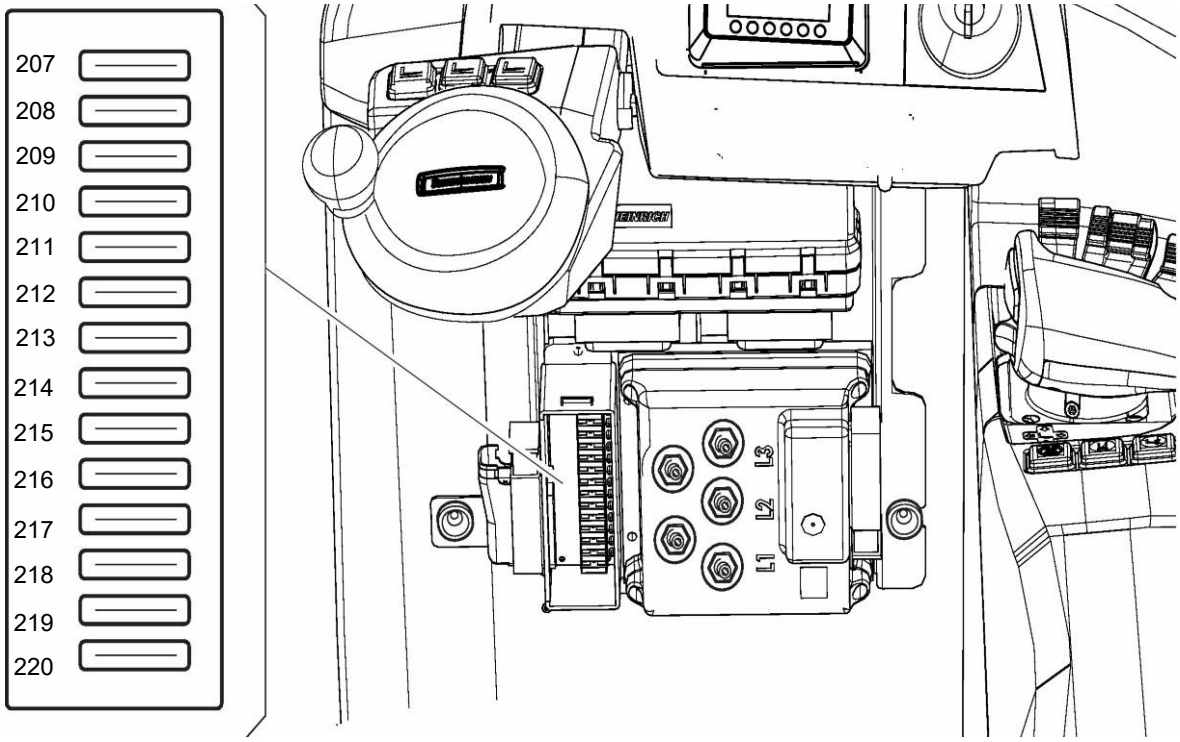
- Check rating of the fuses in accordance with the table and replace if necessary.

The electrical fuses are now checked.



Fuse ratings

Item	Component	Application	Rating [A]
200	F8	Main fuse	425
201	5F6	Cab	30[1]
202	F15	Travel/lift	355
203	F26	48 V behind main contactor	30
204	F1	Overall control circuit fuse	30
205	3F6	Drive wheel steering	30
206	F4	Main contactor	2



Fuse ratings

Item	Component	Application	Rating [A]
207	F17	Data radio	5
208	4F15	Access control	2
209	F27	Traction / lift controller	2
210	5F2	DC/DC converter	7,5
211	9F2	Seat heating	7,5
212	3F11	Drive wheel steering	2
213	4F8	Display and Control Unit	3
214		Not used	
215		Not used	
216	2F17	MFC hydraulics	2
217	1F13	Travel / brake MFC control fuse	7,5
218	1F14	Travel / brake MFC control fuse	5
219	2F18	MFC hydraulics	10
220	F28	MFC travel/braking	5

Removing the safety cover

Procedure

⚠ CAUTION!

Trapping hazard

▶ Carefully pull off the cover.

Forcibly pull off the safety cover (196) from the (197) points at the top left and bottom right and place them to one side.

- Assembly is in the reverse order.

Safety cover removed.

Removing the instrument panel cover

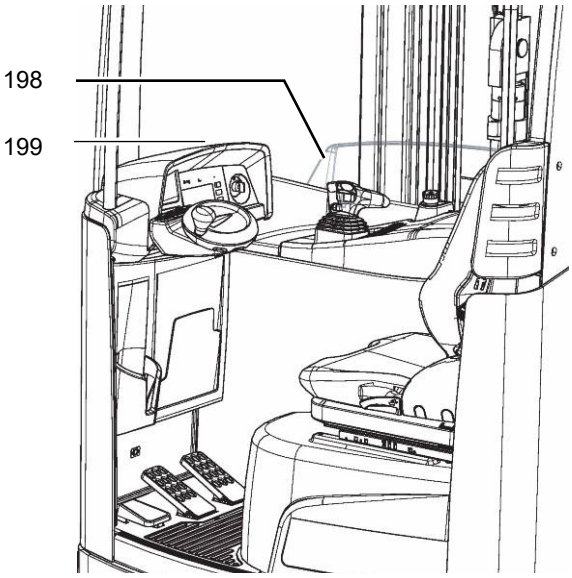
Procedure

- Push the steering wheel towards the seat (outermost position).
- Remove the instrument panel cover (199).
- Remove the side instrument panel (198).

➔ The main fuses are located underneath the side instrument panel (198).

- Assembly is in the reverse order.

Instrument panel cover removed.



Checking electrical fuses

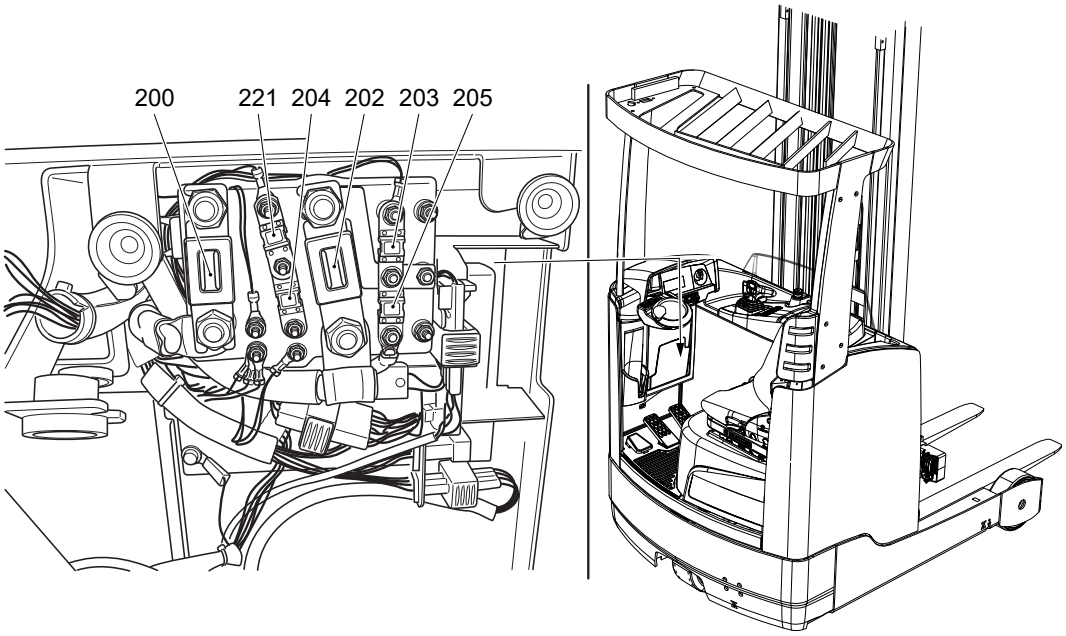
Requirements

– Safety cover removed.
– Instrument panel cover removed.

Procedure

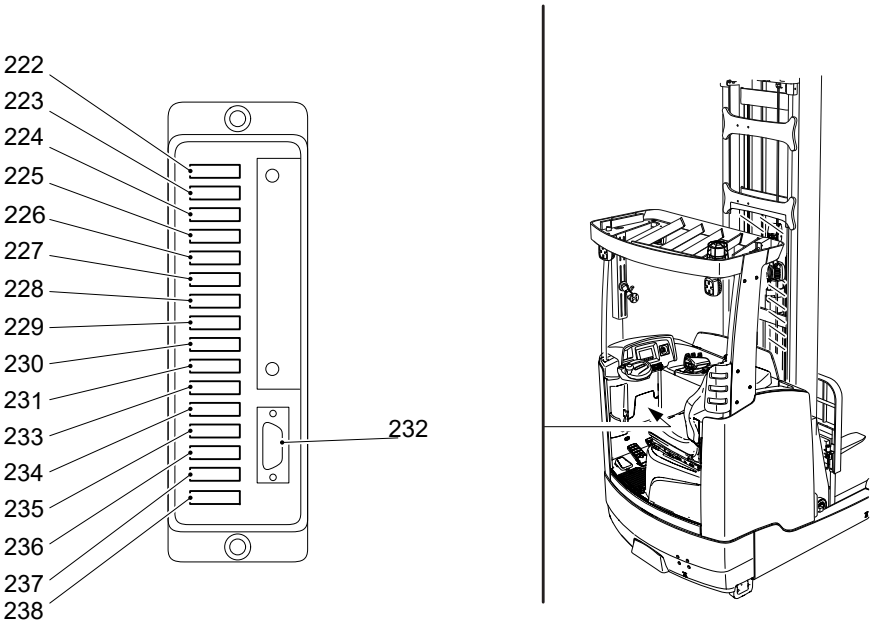
- Check rating of the fuses in accordance with the table and replace if necessary.

The electrical fuses are now checked.



Fuse ratings

Item	Description	Application	Voltage [V]	Rating [A]
200	F8	Main fuse	80	425
221	7F3	DC/DC converter control fuse	58	30
204	F1	Overall control circuit fuse	58	30
202	F15	Travel/lifting	80	355
203	F26	48 V after main contactor	58	30
205	3F6	Drive wheel steering	58	30



Fuse ratings

Item	Description	Application	Voltage [V]	Rating [A]
222	1F13	MFC travel/brake control fuse	58	7.5
223	4F9	Electronic system control fuse	58	3
224	4F7	Display and control unit control fuse	58	4
225	4F8	Display and control unit	58	4
226	2F17	MFC hydraulics	58	5
227	4F15	Access control	58	5
228	F17	Radio data	58	4
229	9F2	Seat heating	58	4
230	5F2	DC/DC converter	58	5
231	F27	Travel/lift control	58	2
232	XB20	Service PC interface		
233	1F14	MFC travel/brake control fuse	58	5
234	2F18	MFC hydraulics	58	10

Item	Description	Application	Voltage [V]	Rating [A]
235	3F11	Drive wheel steering	58	2
236	3F12	Load wheel steering control fuse	58	4
237	F23	Control fuse	58	7.5
238	F35	48V fuse	58	3

5.7 Checking the attachment of the wheels

Tightening Torques

Load wheels (1x centre cylinder screw)	90 Nm
Drive wheel	300 -10 Nm

Checking the wheel attachment

Requirements

– Truck prepared for maintenance and repairs, see page 220.

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.

6 Decommissioning the Industrial Truck

If the truck is to be out of service for more than a month, it must be stored in a frost-free and dry room. All necessary measures must be taken before, during and after decommissioning as described hereafter.

When the truck is out of service it must be jacked up so that all the wheels are clear of the ground. This is the only way of ensuring that the wheels and wheel bearings are not damaged.

➔ Jack up the truck, see page 221.

If the truck is to be out of service for more than 6 months, agree further measures with the manufacturer's customer service department.

6.1 Prior to decommissioning

Procedure

- Thoroughly clean the truck – see page 209.
- Prevent the truck from rolling away accidentally.
- Check the hydraulic oil level and replenish if necessary, see page 214.
- Apply a thin layer of oil or grease to any non-painted mechanical components.
- Lubricate the truck according to the lubrication diagram, see page 216.
- Charge the battery, see page 73.
- Disconnect and clean the battery.
- Clean the terminal screws, grease them with terminal grease and screw them into the connection thread to prevent short circuits.

➔ In addition, follow the battery manufacturer's instructions.

6.2 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 73.

6.3 Restoring the truck to service after decommissioning

Procedure

- Thoroughly clean the truck – see page 209.
- Lubricate the forklift truck according to the lubrication schedule – see page 216.
- Equipment with lead-acid battery (●):
  Clean the battery, grease the battery terminal screws with terminal grease and connect the battery.
- Equipped with lithium-ion battery (○) without interface converter on the battery:
  Insert the truck-side control line into the connection on the battery trough.
- Equipped with lithium-ion battery (○) with interface converter on the battery:
  - Pull the battery forward.
  - Insert the control line into the battery connection at the top of the battery or the inside of the trough.
  - Slide the battery back in.
  - Connect the battery to the truck.
  - Close the battery connector lock: Tighten the bolted bar.
  - Insert the truck control line into the interface converter on the battery.
- Charge the battery – see page 73.
- Commission the forklift truck – see page 105.

7 Safety tests to be performed at intervals and after unusual incidents

The truck must be inspected at least annually (refer to national regulations) or after any unusual event by a qualified inspector. The manufacturer offers a safety inspection service which is performed by personnel specifically trained for this purpose.

A complete test must be carried out on the technical condition of the truck with regard to safety. The truck must also be examined thoroughly for damage.

The operating company is responsible for ensuring that faults are rectified immediately.

8 Final de-commissioning, disposal

➔ Final de-commissioning or disposal of the truck 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.

9 Human vibration measurement

➔ Vibrations that affect the operator over the course of the day are known as human vibrations. Excessive human vibrations will cause the operator long term health problems. The European "2002/44/EC/Vibration" operator directive has therefore been established to protect operators. To help operators to assess the application situation, the manufacturer offers a service of measuring these human vibrations.

G Maintenance, Inspection and Changing of Maintenance Parts Requiring Replacement

⚠ WARNING!

Lack of maintenance can result in accidents

Failure to perform regular maintenance and inspections can lead to truck failure and poses a potential hazard to personnel and equipment.

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

NOTICE

The application conditions of an industrial truck have a considerable impact on component wear. The following service, inspection and replacement intervals are based on single-shift operation under normal operating conditions. The intervals must be reduced accordingly if more stringent requirements are placed on the equipment, e.g., use in conditions of extreme dust, temperature fluctuations or multiple shifts.

▶ To prevent damage due to wear, the manufacturer recommends an on-site application analysis to agree on appropriate intervals.

The following chapter defines the tasks to be performed, the respective intervals to be observed and the maintenance parts for which replacement is recommended.

1 Maintenance Contents ETM/V 210-325

Issued on: 2023-11-14 12:30

1.1 Owner

To be performed every 50 service hours, but at least once a week.

1.1.1 Maintenance contents

1.1.1.1 Standard equipment

Brakes
Test the brake.

Hydraulic operations
Lubricate the load chains.
Correct the hydraulic-oil level.

1.1.1.2 Optional Equipment

Fork positioner

Hydraulic operations
Clean and grease attachment bearings, guides and stops.

Telescopic forks

Hydraulic operations
Clean and lubricate the attachment.

Windscreen washing system

Chassis/structure
Correct the fill level of the windscreen washer reservoir.

Lead-acid battery, international

Power supply
Correct the battery-acid level using demineralised water.

Lead-acid battery

Power supply
Correct the battery-acid level using demineralised water.

1.1.2 Inspection contents

1.1.2.1 Standard equipment

The following points must be checked:

Electrical system
Warning and safety equipment in accordance with the operating instructions
Functionality of display and controls
Test emergency disconnect switch and check for damage

Power supply
Check battery and battery components for damage
Battery cable for damage
Battery cable guide for damage
Battery connector for secure fit, functionality and damage

Travel
Deadman switch for function and damage
Check wheels for wear and damage

Chassis/structure
Check labels for legibility, completeness and plausibility
Mechanism to protect against trapping and shearing is present, secure, functions correctly and is free of dirt and damage
Supports / tilt safety devices for presence and damage

Hydraulic operations
Test hydraulic system
Check fork arms or load handler for wear and damage

1.1.2.2 Optional Equipment

The following points must be checked:

Cold store cabin

Chassis/structure
Roof hatch for functionality and damage
Windscreens for damage
Test doors and check for damage

Windscreen washing system

Chassis/structure
Check windscreen washer reservoir for leaks and damage

Work lights

Electrical system
Test lighting and check for damage

Weather protection

Chassis/structure
Test doors and check for 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

Lead-acid battery, international

Power supply
Check the battery cable connections for secure attachment
Check battery and battery components for damage

Lead-acid battery

Power supply
Check the battery cable connections for secure attachment
Check battery and battery components for damage

1.2 Customer Service

In accordance with the ETM/V 210-325 service interval, to be performed every 1000 service hours, but at least once a year.

1.2.1 Maintenance contents

1.2.1.1 Standard equipment

Brakes
Test the brake.
Measure the air gap of the magnetic brake.
Test the emergency stop brake.

Electrical system
Test the contactors and/or relays.
Perform insulation inspection.

Travel
Correct the transmission oil level or grease filling of the transmission.

Chassis/structure
Note: Check the torques of the seat frame.
Adjust the battery trolley lock.
Check that the panels and covers as well as the floor plate with mounting brackets are secure. Ensure they function correctly and are safe.
Grease the rails.
Measure the height-related and capacity-related settings.

Hydraulic operations
Adjust the slide pieces.
Adjust the load chains.
Lubricate the load chains.
Test emergency lowering.
Correct the hydraulic-oil level.

Hydraulic operations
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
Lubricate steering gears or steering chain.

1.2.1.2 Optional Equipment

Fork positioner

Hydraulic operations
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.

Telescopic forks

Hydraulic operations
Adjust the attachment.
Clean and lubricate the attachment.
Clean and grease attachment bearings, guides and stops.
Adjust the pistons and piston rods.

Windscreen washing system

Chassis/structure
Correct the fill level of the windscreen washer reservoir.

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.

Seat switch

Chassis/structure
Test the seat switch.

Automatic crawl speed

Travel
Clean sensors/switches.

liftCONTROL

Hydraulic operations
Test "liftCONTROL" and check plausibility.

Lead-acid battery, international

Electrical system
Perform insulation inspection.

Power supply
Clean the battery.
Clean and grease the battery terminals.
Measure acid density and battery voltage.
Correct the battery-acid level using demineralised water.

Lead-acid battery

Electrical system
Perform insulation inspection.

Power supply
Clean the battery.
Clean and grease the battery terminals.
Measure acid density and battery voltage.
Correct the battery-acid level using demineralised water.

1.2.2 Inspection contents

The following points must be checked:

1.2.2.1 Standard equipment

Brakes
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 latch and battery attachment for correct function and damage
Battery cable guide for damage
Battery connector for secure fit, 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
Check chassis connections and screw connections are securely attached and check for damage
Battery trolley lock for functionality and damage
Check labels for legibility, completeness and plausibility
Check driver's seat for damage
Check driver's seat is securely attached and test adjustment mechanism
Check mast is securely attached
Check mast bearings for wear
Rails for wear and damage
Mechanism to protect against trapping and shearing is present, secure, functions correctly and is free of dirt and damage
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
Lift mechanism for wear, functionality and damage
Check cylinders and piston rods are securely attached and check for damage
Lift cylinder clamps for wear and damage
Hose guide for functionality and damage
Check lateral play of the mast sections and fork carriage
Check slide pieces and stops for wear and damage
Check load chain mounting elements and chain pins for wear and damage
Check mast rollers and their running surfaces for wear and damage
Test hydraulic system
Check 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

Electrolyte recirculation

Power supply
Hose connections and pump for correct function

Aquamatic

Power supply
Aquamatic plug, hose connections and float for functionality and sealing
Flow indicator for functionality and sealing

Battery refill system

Power supply
Refill system for functionality and leaks

Boom

Hydraulic operations
Check the attachment is securely attached to the truck and check the load-bearing components 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

Telescopic forks

Hydraulic operations
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 attachment bearings, guides and stops for wear and damage
Check cylinder seals for leaks and damage
Check hydraulic connections, hoses and pipes are securely attached and check for leaks and damage
Check pistons and piston rods 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

Windscreen washing system

Chassis/structure
Check windscreen washer reservoir for leaks and damage
Test windscreen wipers and check for 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

Work lights

Electrical system
Test lighting 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

Weather protection

Electrical system
Fuses for correct ratings

Chassis/structure
Test window heating and check for damage
Test doors 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

Overhead guard cover

Chassis/structure
Check overhead guard cover is present and securely attached and check for 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

Belt lock monitoring

Chassis/structure
Test seat belt monitoring and check for 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

Lead-acid battery, international

Power supply
Check battery, battery cables and cell connectors are securely attached and check for damage
Ensure safety labels are present and check for damage

Lead-acid battery

Power supply
Check battery, battery cables and cell connectors are securely attached and check for damage
Ensure safety labels are present and check for damage

1.2.3 Maintenance parts

The manufacturer recommends the replacement of the following maintenance parts at the specified intervals.

1.2.3.1 Standard equipment

maintenance part	service hours	months
Gear oil	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