Repair manual 7572514

en

LPE200
LPE220
LPE250
LPE340BE

Abbreviation	Meaning	Explanation
MCU	Main Control Unit	Main control unit.
MLD	Multi Load Detection	Sensor for automatic detection of loads, etc.
PDA	Personal Digital Assistant	A compact, portable handheld computer.
PPS	Personal Protection System	Personal Protection System.
PTC	Positive Temperature Coefficient	Electrical property that causes resistance to increase with temperature.
SAU	Secondary Automation Unit	Device used for automatic control in order to have enough I/O.
SCU	Secondary Control Unit	Secondary steering unit
SEU	Spider Expansion Unit	Expansion unit
SF	Shuttle Forks	Telescoping fork unit.
SR	Safety Relay	Relay to disconnect power to certain components in order to stop all movements.
SPLC	Safety PLC	Device used in automation applications for control with SR and UAC.
SSU	Shock Sensor Unit	Shock sensor that registers any collision.
TBD	To Be Defined	Means that the instruction/chapter will be added at a later date.
TCS	Truck Control System	The truck control system that communicates with units.
TH	Turret Head	Turret head fork unit
I_Site	Toyota Wireless Information System	Wireless communication.
TX	Triplex	Mast with three sections.
UAC	Unit for Automation Control	Device used for automated control of an operator-less truck. UAC will build an extra CAN and a power system for automation by itself
VNA	Very Narrow Aisle	Narrow aisles
VRE	Very narrow aisle Rider Electric	

The maximum travel speed can also be limited by factory parameter 1044 and it is always the lowest speed for a parameter that is the limiting one.

No.	Designation	See section	Valid for
1	*Max. speed, in fork direction*, page 4 - 3	*4.4.1.1 General*, page 4 - 3	
2	*Maximum speed, in drive wheel direction*, page 4 - 3	*4.4.1.1 General*, page 4 - 3	
3	*Acceleration* , page 4 - 3	*4.4.1.1 General*, page 4 - 3	
4	*Automatic speed reduction*, page 4 - 3	*4.4.1.1 General*, page 4 - 3	
5	*Maximum speed, gates are down*, page 4 - 3	*4.4.1.1 General*, page 4 - 3	
6	*Max. speed, walk-along mode*, page 4 - 3	*4.4.1.1 General*, page 4 - 3	
7	*Maximum speed, forks above 1.8 m*, page 4 - 4	*4.4.1.1 General*, page 4 - 3	

4.4.1.1 General

No.	Designation	Min	Std.	Max	Step	Unit
1	Max. speed, in fork direction	30	100	100	5	%

Adjusts the maximum speed of the truck in the fork wheel direction, with gates up and operator on the platform

No.	Designation	Min	Std.	Max	Step	Unit
2	Maximum speed, in drive wheel direction	30	100	100	5	%

Adjusts the maximum speed of the truck in the drive wheel direction, with gates up and operator on the platform

No.	Designation	Min	Std.	Max	Step	Unit
3	Acceleration	10	100	100	5	%

The lower the parameter value, the more time is needed to accelerate to the maximum speed.

No.	Designation	Min	Std.	Max	Step	Unit
4	Automatic speed reduction	40	100	100	5	%

Defines plug braking force when the operating control [L1] returns to the neutral position. The lower the value of parameter, the longer it takes to reduce speed.

No.	Designation	Min	Std.	Max	Step	Unit
5	Maximum speed, gates are down	30	100	100	5	%

Adjusts the maximum speed of the truck for this application, with gates down and operator on the platform

No.	Designation	Min	Std.	Max	Step	Unit
6	Max. speed, walk-along mode	30	100	100	5	%

No.	Designation	Min	Std.	Max	Step	Unit
307	Automatic support arm lowering (On/Off)	0	2	3	1	
Not valid for LPE200, LPE220, LPE250, LPE340BE						

Controls whether the support arms should be lowered automatically when the forks reach the 1.8 m sensor.1.8 m sensor

Value	Function
0	Inactivated
1	Activated = Fork lifting is temporarily stopped
2	Activated = Fork lifting continues
3	Activated = Support arms are automatically lowered each time the forks are lifted even if the forks are below the 1.8 m sensor.1.8 m sensor

No.	Designation	Min	Std.	Max	Step	Unit
311	Indication of load weight	0	0	2	1	Kg

Indication of load weight in kg, based on hydraulic pressure
The display automatically shows the load weight in increments of,
1 = Weight indication on support arm lift (100kg increments) NB! Weight indication is also possible on the fork lift, but the weight will be reported incorrectly on the display. Use option 2 if fork lift/free lift is required.
2 = Weight indication on fork lift/free lift (50kg increments) Applies from software -018 onwards
if the support arms/forks are lowered shorter than 300 ms. The load weight is shown on the display for four seconds.

Calibration sequence 13 must be run before you use “Weight indication on fork lift value 2” for the first time.

Value	Function
0	No weight indication activated
1	Weight indication on support arm lift
2	Weight indication on fork lift

No.	Designation	Min	Std.	Max	Step	Unit
312	Pressure equalization	0	0	5	1	ms

Activates and controls a pressure equalization pulse after a lift. This is to equalize the pressure, and to get a better measurement of the load weight. Is set to 0 to switch off the function (standard). If it is set to a higher value than 0, the duration of the lowering pulse will be a multiple of the parameter value 20 ms. The truck must have a pressure sensor Load detection to enable the function.

No.	Designation	Min	Std.	Max	Step	Unit
313	Support arm lift speed	10	40	40	5	%
Not valid for LPE200, LPE220, LPE250, LPE340BE						

Specifies the lift speed of the support arms.

No.	Designation	Min	Std.	Max	Step	Unit
314	Deactivate lifting above 1.8 m	0	0	1	1	
Not valid for LPE200, LPE220, LPE250, LPE340BE						

Deactivate lifting above 1.8 m

0 Off

No.	Description	Argument 1	Argument 2	Argument 3	Argument 4	Comments
24	Fork spread and sideshift	Not used	Option button 0 = 1 and 2 1 = 2 and 3 2 = 3 and 4 3 = 4 and 5 4 = 5 and 6	50-255 max. speed of pump upon lift command	50-255 max. speed of pump upon lower command	If SEU 0 digital outputs 1, 2 and 3 are used, it cannot be combined with optional function 7 or 8. For special trucks only
25	Activate the SEU output depending on the weight of the load on the forks	0=SEU 0 1=SEU 1	0-3 Digital outputs 1-4	Weight limit 50 kg 0-255 50 kg Weight limit 50 kg	Not used	
26	Activate the SEU output depending on the battery status	0=SEU 0 1=SEU 1	0-3 Digital outputs 1-4	Battery charge level 10-100%	Output mode: 0=activated 1=flashing 1 Hz 2=flashing 2 Hz	For special trucks only

Description of optional functions

1) A digital output from the SEU can be activated from any option button on the tiller arm handle. When the button is pressed, the output signal can be either activated temporarily or deactivated.

2) An unactivated (active low) digital input on SEU or ACT / ACC will reduce the maximum travel speed. The programmable speed is reduced to 0 - 12.5 km/h. Platform trucks with two speed ranges, high speed and low speed, can have the reduction programmed for a chosen range.

3) A digital SEU output is activated when a specific truck movement occurs.

   The movements which can be selected are:

   Driving in fork direction

   Driving in drive wheel direction

   Fork lifting

   Fork lowering

   One of the four digital outputs from SEU can be assigned this alternative and one of the following activities can be selected:

   Activated

   Flashing, 1 Hz

   Flashing, 2 Hz

4) An activated (active high) digital input on an SEU or ACT / ACC activates the main contactor with a selected time in minutes.

5) Two external switches connected to a SEU digital input for monitoring fork and support arm lift/lower function when the input is activated (active high). A foot guard function can be added with a third external switch. When this switch is deactivated (active low), the lowering function will be deactivated.

6) The lifting function is limited by default. When an external switch, connected to an SEU or ACT / ACC digital input, is activated (active high), the limitation will be cancelled. If you press an option button on the handle, you will override the limitation for 15 seconds.

7) The function is activated by pressing and holding down an option button while giving the command (using the sensilift potentiometer or the digital rocker). SEU digital output 1-4 must be connected to the 3rd or 4th hydraulic function valves (Q33-Q36). The output combination can be selected with a parameter argument. On a standard truck with two hydraulic functions, where Q23 is used for the other hydraulic function, this valve is replaced with a cavity plug and Q23 is moved to the new hydraulic unit.

Value	1001 Model	1108
111	SPE200D	2
112	SPE120XR	0
		1
113	SPE120XRD	0
		1
151	SWE145	0
152	SWE160	0
153	SWE200	0
154	SWE145L	0
155	SWE160L	0
156	SWE200L	0
157	SWE140S	0
158	SWE120XR	0

No.	Designation	Min	Std.	Max	Step	Unit
1110	Reset voltage for BDI	24.8	25.2	27.0	0.1	V

After the battery is charged to full capacity, BDI is reset to 100% provided that battery voltage comes up to the pre-programmed reset value. If the reset voltage value is not reached, it could be due to a voltage drop between the battery and the logic card.

In case of reset problems:

• Charge the battery to full capacity following the instructions in the operator's manual.

• Then drive the truck for at least 25 seconds before logging out.

• BDI will only set to 100% if the battery has been disconnected/reconnected.

• Check the battery voltage and compare with the voltage between wires 20 and 40 on the tiller arm logic card (A5)

• A voltage drop between the battery and the logic card (A5) could be caused by poor contacts/connections or a loose connection in the battery connector.

No.	Designation	Min	Std.	Max	Step	Unit
1111	Platform	0	0	4	1	

Indicates the type of platform fitted to the truck.

Value	Function
0	No platform
1	Platform (folding up)
2	Platform (staying down)
3	Platform (backrest)
4	Platform (built in)

No.	Designation	Min	Std.	Max	Step	Unit
1113	Protective overhead guard	0	0	1	1	Bool

Indicates if there is a overhead guard on this application.

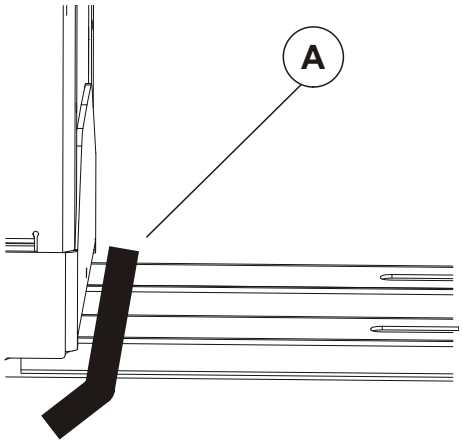
Value	Function
0	No overhead guard

5 Installation

5.1 Transport

5.1.1 Transporting the truck

Use inserts and sheets of shock-absorbing material to prevent damage to the truck during lashing and transport.



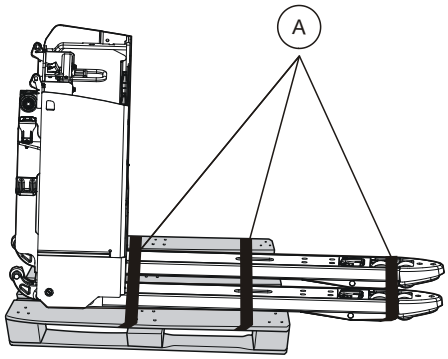
1. Secure the truck properly with stopping (A).

5.1.2 Transporting the fork carriage

Preparations

Removing the fork carriage, page 8 - 11

1. Cables and hoses must be secured so they cannot come loose or be damaged.



2. The entire fork carriage must then be anchored on a pallet or some other suitable support for transport.

6 Maintenance

6.1 Introduction

Follow the general safety regulations when performing maintenance work. *General safety regulations*, page 2 - 1

- To maintain a high level of safety and to minimise downtime, all the points specified in the service programme must be carried out.
- The set intervals of 1000 operating hours/12 months (whichever comes first) are those that meet the manufacturer's requirements for a product in standard applications. The local operating environment may require service intervals that differ from those specified.
- The first service may occur after x operating hours to reduce wear during the run-in period. See the maintenance schedule.
- Once the service intervals have been determined, the hour counter is primarily used for determining when servicing is to be carried out.
- To maintain safety, only spare parts approved by the manufacturer may be used for servicing and repairs.
- Worn components on the truck must be replaced when discovered.

During the warranty-period:

If repairs/servicing have been carried out by non-authorised personnel, or if non-approved spare parts are used, the warranty ceases to be valid.

6.2 Maintenance instructions

6.2.1 Cleaning

Cleaning is an important factor in maintaining product service life.

- Always clean the product when servicing it.

NOTICE Risk of short-circuiting
Risk of damage to the electrical system.

- ***Before cleaning, switch off the power supply to the truck by disconnecting the battery.***

6.2.2 High-pressure washers

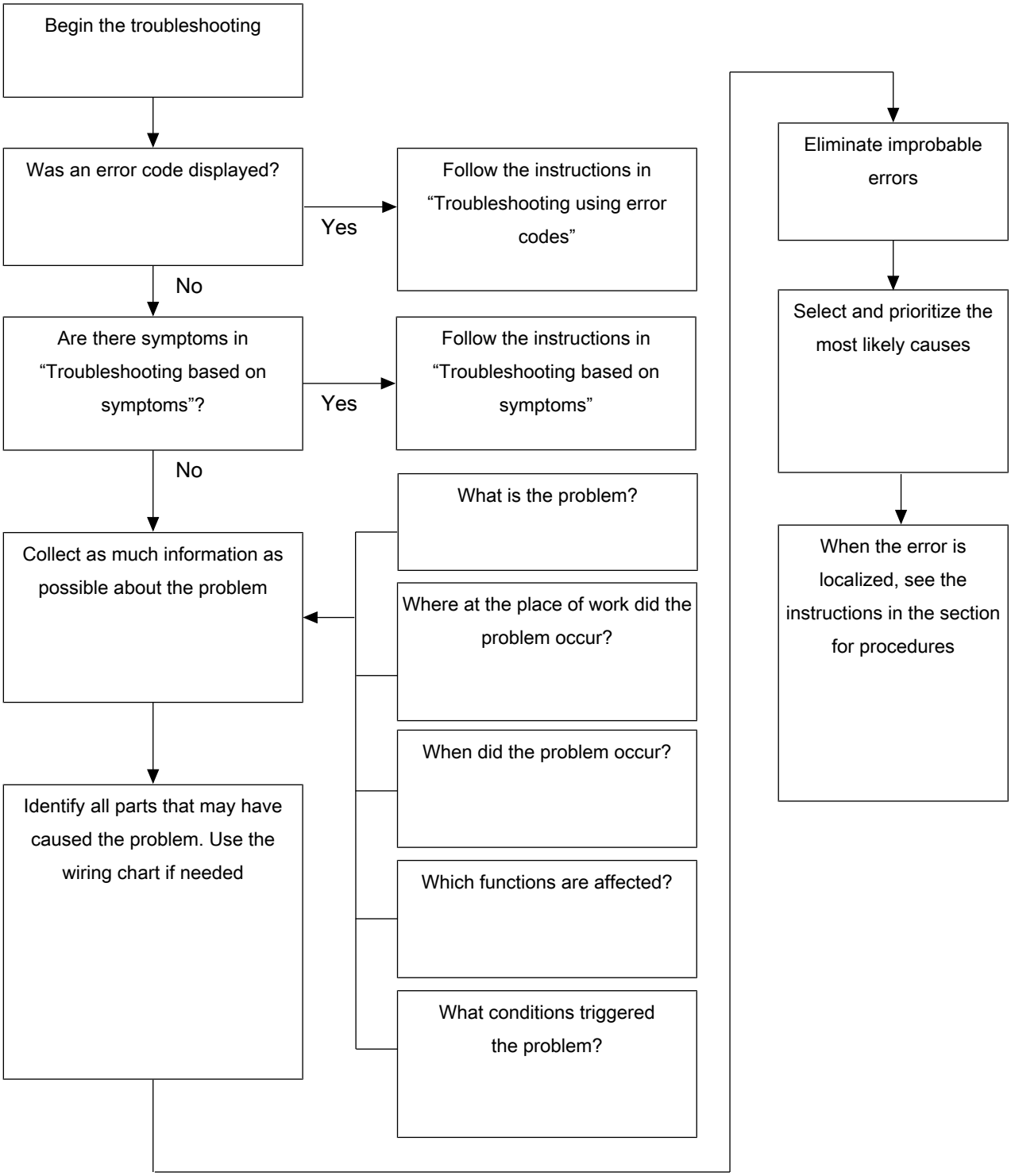
If using a high-pressure washer, remember that:

- High-pressure washing may only be performed on metal surfaces.
- Under no circumstances may high-pressure washers be used in the motor compartment.
- When using a high-pressure wash, the jet must be directed in such a way that it does not damage electric cables, electric sensors, hydraulic hoses or decals.
- Lifting chains, piston rods and end pieces of hydraulic cylinders, ball and roller bearings, including those that are fully enclosed, must not be exposed to the jet, as there is a risk that water may penetrate and cause corrosion.

Pos.	Type	Point	Instruction	Measure	250	500	750	1000	1500	2000	3000	4000	5000
38		The drive gear for oil change	Change the drive gear oil. The drive gear oil is only replaced during the first 1000-hour service. *Drive gear oil change*, page 10 - 8	*Empty the drive gear oil*, page 10 - 9 *Empty the drive gear oil*, page 10 - 10 *Filling oil in the drive gear*, page 10 - 11 *Filling oil in the drive gear*, page 10 - 12				F					
39		The wear surface of the drive wheel	Measure the drive wheel tread. The tread must be D=250 ≥12.5mm. *Measuring the drive wheel tread*, page 11 - 14	*Replacing the drive wheel*, page 11 - 16				X					
40		The wear surface of the drive wheel	Measure the drive wheel tread. The tread must be D=230 ≥15 mm. *Measuring the drive wheel tread*, page 11 - 15	*Replacing the drive wheel*, page 11 - 16				X					
41		The caster wheel	Check that the castor wheel is properly attached and that it rotates and pivots freely. *Checking the castor wheels*, page 11 - 20	*Replacing the castor wheel assembly*, page 11 - 24				X					
42		The wear surface of the caster wheels	Measure the castor wheel tread. The tread must be D=125 ≥7.5mm. *Measuring the castor wheel tread*, page 11 - 20	*Replacing the castor wheel*, page 11 - 20				X					
43		The wear surface of the caster wheels	Measure the castor wheel tread. The tread must be D=150 ≥10mm. *Measuring the castor wheel tread*, page 11 - 19	*Replacing the castor wheel*, page 11 - 20				X					

7 Troubleshooting

7.1 Initial troubleshooting



7.4 Troubleshooting using error codes

7.4.1 First actions when an error code is displayed

Perform these actions before doing anything else.

1) Restart the truck by logging out and logging back in.
2) Disconnect the power supply for a while, and then reconnect it again.

7.4.2 List of error codes

Software: 7528678

7.4.2. Error Codes

No.	Description	Error cause(s)	Action
2:002	**Parameters set to standard values** At start-up, it was detected that one or more parameters were not within acceptable intervals; they have therefore been reset to standard values. **Truck performance** Not influenced	• New software has been loaded in the truck, adding a new parameter, or it has changed the parameter limit values • Corrupt memory ICH	1) Check parameters: - Check that factory parameters are set according to the truck configuration. - Check that other parameters are set correctly. 2) Replace the ICH.
2:004	**Backup copies do not match.** Backup copy in secondary unit (T1) does not match data in primary unit (ICH) **Truck performance** Not influenced	• Hardware (T1 or ICH) has been replaced on the truck. • Software has been updated to an older version • Corrupt memory T1 • Corrupt memory ICH	1) Copy the truck configuration using TruckCom See the separate manual for TruckCom 2) Copy the truck configuration using TruckCom See the separate manual for TruckCom 3) Replace T1 See *Replacing the motor control panel*, page 13 - 135 4) Replace the ICH. See *Replacing the logic card*, page 12 - 15
2:005	**Internal program error** Internal program error **Truck behaviour** Not influenced	• Internal program error ICH	1) Create a truck report. Send a report to the manufacturer. 2) Update the truck software to the latest version.

No.	Description	Error cause(s)	Action
2:515	**No response is received from K110 (DHU/I_Site)** No return signal from K110 (DHU/I_Site) within 0.6 seconds after logging on. **Truck performance** Everything is stopped at once, the parking brake is activated, and the main contactor opens.		istance between the chassis and CAN connector. Limit value >24kOhm. 2) Check parameters: - Check that factory parameters are set according to the truck configuration. - Check that other parameters are set correctly. 3) Check (DHU/I_Site): - Check that the DHU's green LED is lit. If the LED is not lit: Check that the DHU's feed voltage = battery voltage. - Make sure it is possible to connect TruckCom to the DHU. If it is possible to connect them, check the DHU's configuration. If there is a power supply but no communication, check the CAN bus. If it still not possible to communicate with the DHU, replace the unit. 4) Check for loose connections: - Switch on the truck, and pull carefully in the branches of the wiring harness to find any loose connections, and note when/if the error code appears. 5) Update the truck software: - Update the truck software to the latest version.

No.	Description	Error cause(s)	Action
3:507	**Internal error in T1** **Truck performance** Everything is stopped immediately. The parking brake is activated and the main contactor opens.	• Defective motor control	1) Replace T1. See *Replacing the motor control panel*, page 13 - 135.
3:511	**CAN communication problem** CAN communication problem between T1 and ICH, ICH gets no signals from T1 **Truck behaviour** Everything is stopped at once, the parking brake is activated, and the main contactor opens	• Error on CAN bus wiring or connection • CAN module in ICH defective	1) Check the CAN bus Check that the CAN bus is intact in terms of wiring harness, resistance and connectors. Disconnect the battery. Check that the resistance between (X41:3) and (X41:4) is 54 - 66 ohms. Check that the CAN wiring harness is not pinched. Measure resistance between the chassis and CAN connector. Limit value >24 kOhm 2) Replace ICH See section “13.1.6 Replacing the logic card”.
3:512	**CAN communication problem** CAN communication problem between ICH and T1, T1 gets no signals from ICH **Truck behaviour** Everything is stopped at once, the parking brake is activated, and the main contactor opens	• Error on CAN bus wiring or connection	1) Check the CAN bus Check that the CAN bus is intact in terms of wiring harness, resistance and connectors. Disconnect the battery. Check that the resistance between (X41:3) and (X41:4) is 54 - 66 ohms. Check that the CAN wiring harness is not pinched. Measure resistance between the chassis and CAN connector. Limit value >24 kOhm
3:514	**CAN communication problem** CAN communication problem, ICH cannot send to T1 **Truck behaviour** Everything is stopped at once, the parking brake is activated, and the main contactor opens	• Error on CAN bus wiring or connection • CAN module in ICH defective	1) Check the CAN bus Check that the CAN bus is intact in terms of wiring harness, resistance and connectors. Disconnect the battery. Check that the resistance between (X41:3) and (X41:4) is 54 - 66 ohms.

No.	Description	Error cause(s)	Action
3:594	**Signal error rotational speed sensor B11/B12.** Loss of channel B in the rotational speed sensor detected **Truck behaviour** The drive is stopped immediately with the parking brake		wheel on the motor axle is clean, intact and properly mounted.
3:596	**High temperature** The motor control unit temperature exceeds +110°C. **Truck behaviour** The drive is stopped immediately with the parking brake	• Intensive use of the truck • Cooling is reduced or the temperature sensor is defective.	1) Intensive use of the truck. Let the truck cool down. 2) Check the cooling Check the cooling flanges of the transistor regulator, motor and steering motor as well as the battery charger and fans and filters for accumulations of dirt and dust. Too much dust and dirt cause the cooling not to work properly. Check that the fans work when the speed control is activated (fans behind T1 and motor fan) Check that the fan on charger BCU works when the charging starts, i.e. when the mains cable is connected. Check the signal from the temperature sensors for T1 and EPS and from B1 via the integrated test or TruckCom. Determine if the temperature signals are plausible relative to the real temperatures of the components. If not, replace T1, EPS or replace B1 with a repair kit.
3:597	**High temperature** The motor temperature exceeds +180°C. **Truck behaviour** The drive is stopped immediately with the parking brake	• Intensive use of the truck • Cooling is reduced or the temperature sensor is defective.	1) Intensive use of the truck. Let the truck cool down. 2) Check the cooling Check the cooling flanges of the tran-

No.	Description	Error cause(s)		Action
4:243	**Lowering valve (Q4/Q40)** Output is short circuited or current too high through the output to lowering valve. Valid limit values - maximum value = 2.5 A, continuous value = 1.5 A **Truck performance** Blocked lifting/lowering movement			or is jammed. If points 1-3 are OK, it indicates that the output stage is short circuited - Replace the power-supplying component.
4:244	**Solenoid (Q41/Q23)** Output is short circuited or current too high through the output to lowering valve. Valid limit values - maximum value = 2.5 A, continuous value = 1.5 A **Truck behaviour** Blocked lifting/lowering movement	• High power consumption or short circuit.	1)	Check for overcurrent or short circuit: Check the ohms and the amperes of the component, compare them to the setpoint values if they outside the accepted range. Check the connections and wiring harness for short-circuit. Check that the component does not seize or is jammed. If points 1-3 are OK, it indicates that the output stage is short circuited - Replace the power-supplying component
4:245	**Drain valve PowerTrak (Q58)** Output is short circuited or current too high through the output to the drain valve. Valid limit values - maximum value = 2.5 A, continuous value = 1.5 A. **Truck performance** Creep speed, blocked lifting movement.	• High power consumption or short circuit.	1)	Check for overcurrent or short circuit: Check the Ohms and the Amperes of the component, compare them to the setpoint values, and replace the unit if they are outside the accepted range. Check the connections and wiring harness for circuiting. Check that the component does not seize or is jammed. If items 1-3 are OK, it indicates that the output stage is short circuited. Replace the component that supplies the power.

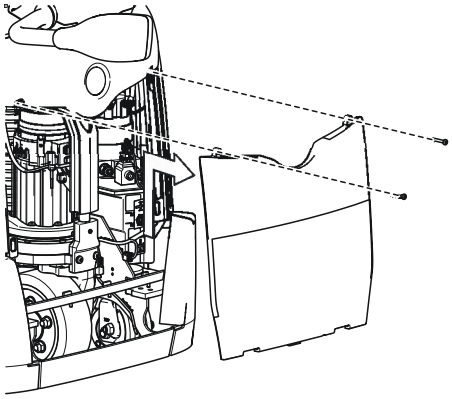
No.	Description	Error cause(s)	Action
5:135	**Steering motor overloaded** Overloaded steering motor to 80% of maximum capacity. **Truck behaviour** Creep speed	• Intensive steering with stationary truck • Turning of drive wheel was prevented.	1) Avoid steering the truck when stationary 2) Checking the steerability of the drive unit. Check why the drive wheel cannot be turned with the help of the steering motor in the following places. Steering motor Gears of the steering motor Gears Steering bearings Crown wheel/ steering motor gear Drive wheel/surface
5:136	**Error in power supply to brake coil in (A83)** Current differs from requested current by 100 mA and current exceeds 2 A. **Truck performance** Creep speed	• High power consumption or short circuit. • Low power consumption or break.	1) Check for overcurrent or short circuit: Check the ohms and the amperes of the component, compare them to the setpoint values if they outside the accepted range. Check the connections and wiring harness for circuiting. Check that the component does not seize or is jammed. If points 1-3 are OK, it indicates that the output stage is short circuited - Replace the power-supplying component. 2) Check wiring and component for a disconnection. Cut off power to the truck. Visually check the wiring harness. Using instruments, check that there is no break in any wire. Check the Ohms and the Amperes of the component, compare them to the setpoint values, and replace the unit if they are outside the accepted range.

No.	Description	Error cause(s)	Action
5:435	**Internal program error** **Truck behaviour** Everything is stopped at once, the parking brake is activated, and the main contactor opens	• Software failure	1) Update the truck software to the latest version.
5:436	**Wiring breaks in one or more phases in EPS/M6** **Truck behaviour** Everything is stopped at once, the parking brake is activated, and the main contactor opens	• Wiring break in power steering motor • Wiring break in power stage	1) Replace M6 See RM for instructions (TBD) 2) Replace EPS See RM for instructions (TBD)
5:437	**ESP detects an erroneous signal from Hall sensor** **Truck behaviour** Everything is stopped at once, the parking brake is activated, and the main contactor opens	• Defective components internally in M6 • Faulty input signal	1) Replace M6 See RM for instructions (TBD) 2) Replace ESP See RM for instructions (TBD)
5:438	**EPS detects a problem with voltage measurement** **Truck behaviour** Everything is stopped at once, the parking brake is activated, and the main contactor opens	• Internal error in electronics	1) Replace the EPS or the complete unit
5:500	**Unknown steering motor error** **Truck behaviour** Everything is stopped at once, the parking brake is activated, and the main contactor opens	• No software compatibility	1) Update the truck software Update the truck software to the latest version.
5:501	**Internal program error** **Truck performance** Everything is stopped at once, the parking brake is activated, and the main contactor opens	• Internal program error	1) Create a truck report. Send a report to the manufacturer.

No.	Description	Error cause(s)	Action
8:131	**Temperature in the li-ion battery is too high** **Truck performance** Creep speed, blocked lifting movement.		Let the battery cool down.
8:132	**Current in the li-ion battery is too high** **Truck performance** Creep speed, blocked lifting movement.	• Regenerative braking with fully-charged battery.	Check battery voltage: - Check the voltage using the built-in test procedure and comparing with value from external volt meter. - Check connectors, joints and splices for damage or corrosion. - Check fuses F1 and F50.
8:133	**Li-ion battery temperature below permitted level** **Truck performance** Creep speed, blocked lifting movement.		Move the truck to a warmer area.
8:134	**Defective hardware in the li-ion battery** **Truck performance** Creep speed, blocked lifting movement.	• Defective sensor in the module.	Contact the battery manufacturer.
8:135	**Internal CAN problem** CAN communication problem in the lithium-ion battery. **Truck performance** Creep speed, blocked lifting movement.	• Communication problem between modules in the battery.	Contact the battery manufacturer.
8:136	**Overvoltage in the li-ion battery** **Truck performance** Creep speed, blocked lifting movement.	• A module in the battery has been switched off because its voltage is too high..	Restart the battery.
8:137	**Battery cells deactivated by internal monitoring** Overvoltage, undervoltage, temperature too high or temperature too low. **Truck performance** Creep speed, blocked lifting movement.	• Some battery functions are not working.	Let the battery rest and then restart the battery.

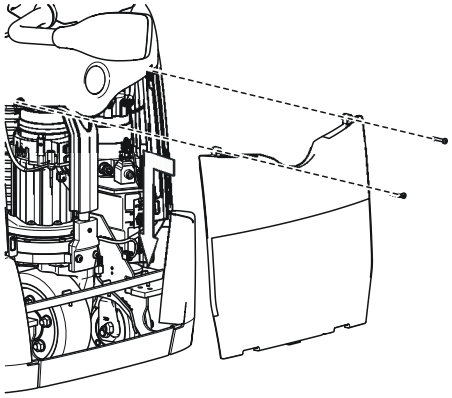
8.2.2.1.2 Replacing a service cover

8.2.2.1.2.1 Removing a service cover



1. Undo the screws.
2. Turn out the upper edge of the cover.
3. Carefully remove the cover from the rubber seal.

8.2.2.1.2.2 Installing a service cover

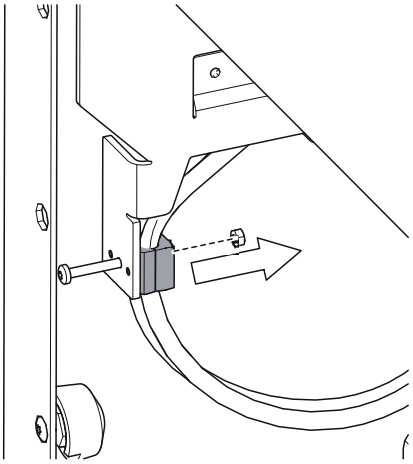


1. Fit the lower edge of the cover.
2. Turn in the cover.
3. Fit the screws

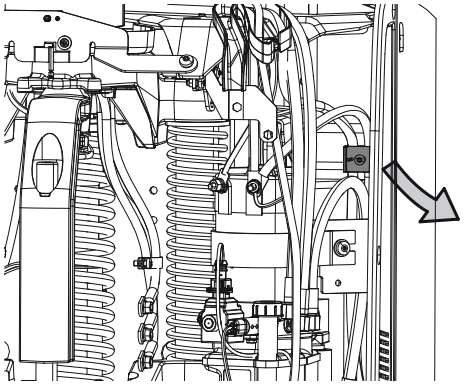
8.2.2.1.3 Replacing a side cover

8.2.2.1.3.1 Removing a side cover

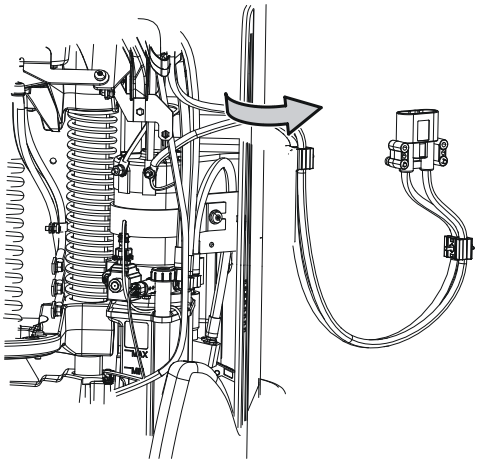
Removing a service cover, page 8 - 3



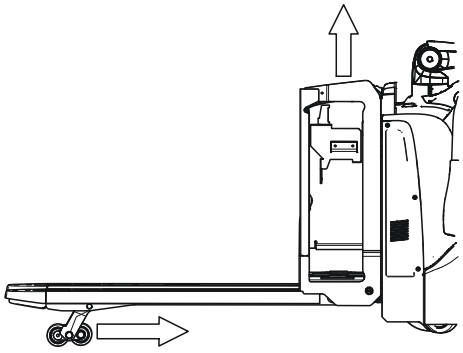
8. Remove the bracket of the battery wiring harness in the battery tray.



9. Remove the bracket of the battery wiring harness inside the chassis.

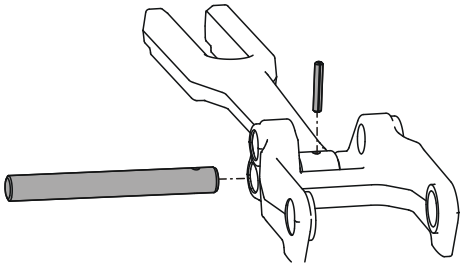


10. Pull the battery wiring harness out of the battery tray.

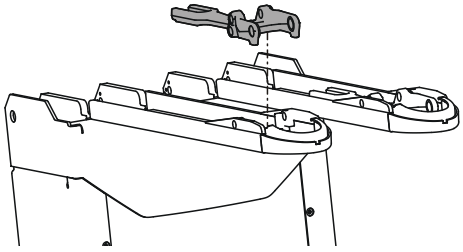


11. Lift the fork carriage until the fork wheels hang freely. Only use a lifting device that is suitable for this work.

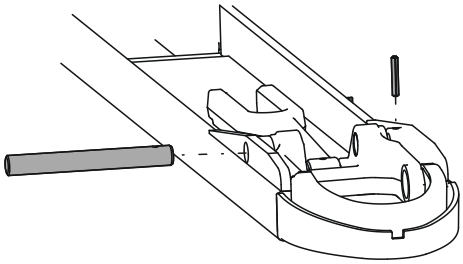
    Check that the torsion tubes have free clearance under the truck. If not, move the fork wheels backwards so that the torsion tubes have free clearance during the lift.



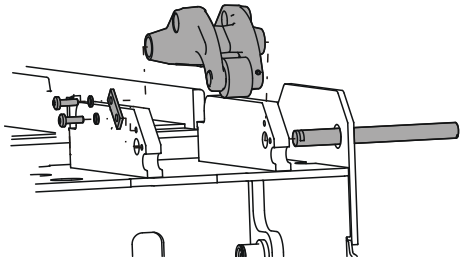
1. Fit the wheel fork and front push rod.



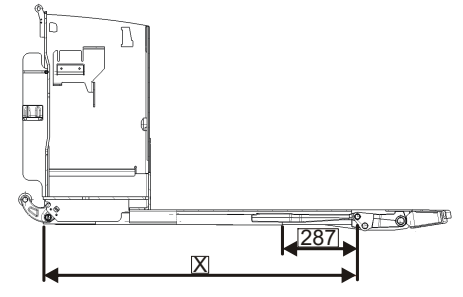
2. Fit the fork.



3. Tap in the shaft and lock it in place with the spring pin..



4. Fit the torsion tube in the fork carriage.

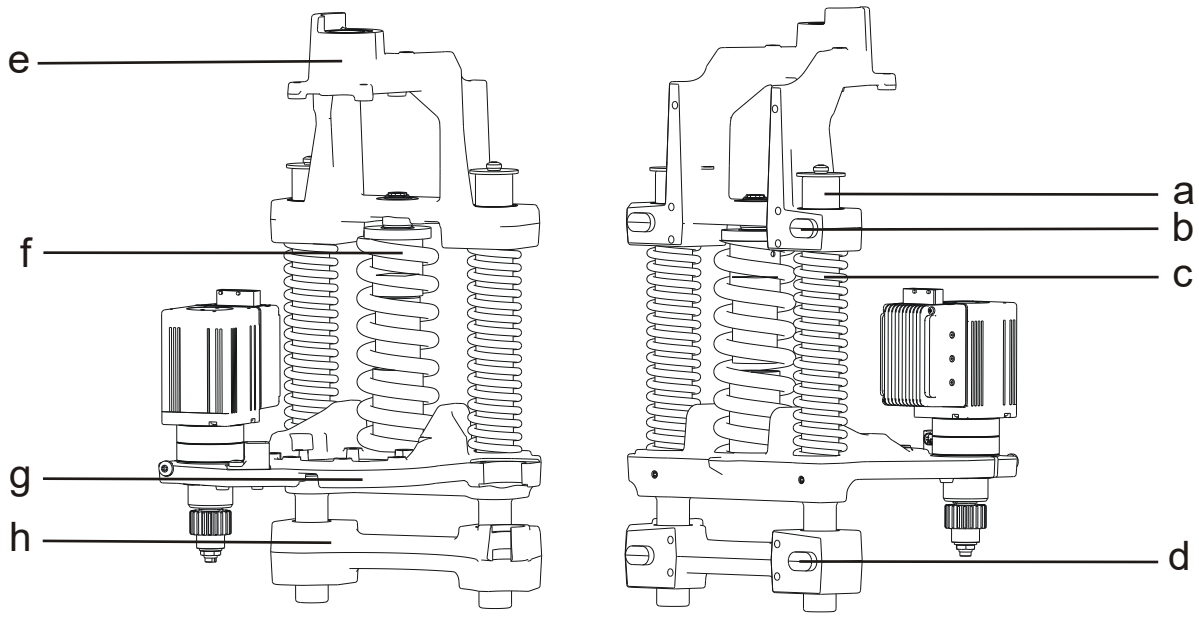


5. Cut the push rod to the correct length. L (push rod) = X-287 as measured in the fork's home position..

8.3.2.2 Drive unit mountings

8.3.2.2.1 Drive unit mountings 6/8 km/h.

8.3.2.2.1.1 Overview 6/8 km/h.



Pos.	Designation
a	Rod
b	Upper lug
c	Initial spring
d	Lower lug
e	Upper bracket
f	PowerTrak spring
g	Drive gear bracket
h	Lower bracket

8.3.2.2.1.2 Description

8.3.2.2.1.2.1 Technical data

Model: LPE200, LPE220

a	b	c	d	e	f	g	h
6/8/8	6/8/7.5	400	650	197	Black	White	Blue
6/8/8	6/8/7.5	450	680	245	Black	White	Green
6/8/8	6/8/7.5	500	720	342	Black	White	Orange

Tab. 5: Suspension/PT cylinder servo control

a - Speed unloaded

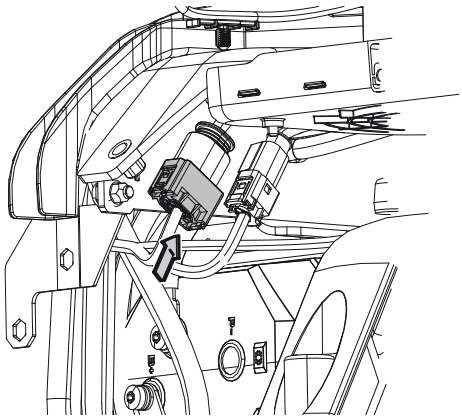
b - Speed maximum load

c - Minimum drive wheel load (0 kg load)

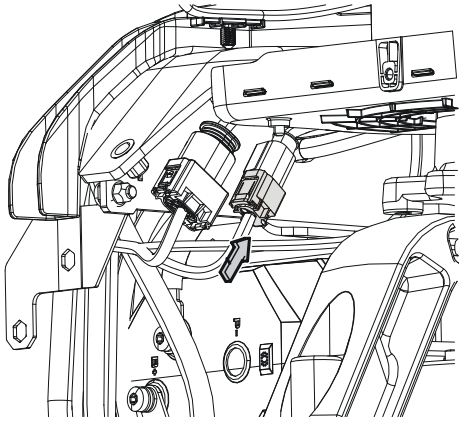
d - Maximum drive wheel load (maximum load)

e - Battery compartment

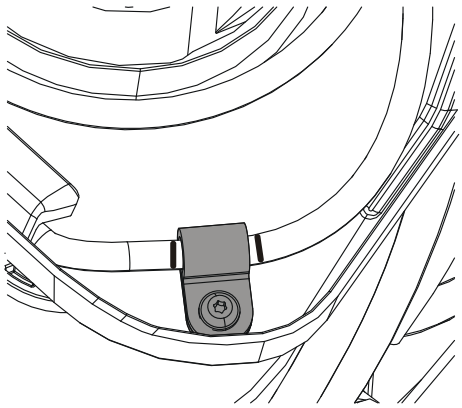
f - PowerTrak cylinder



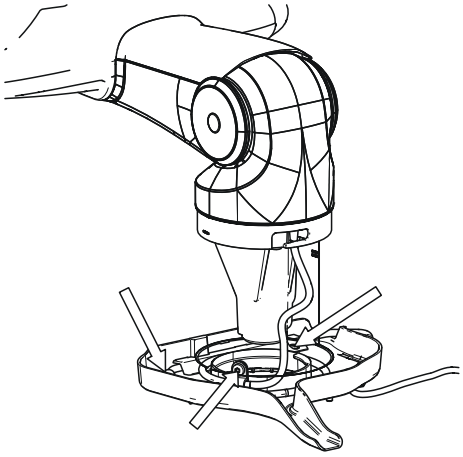
8. Connect the connector *[X65]*, page 19 - 4



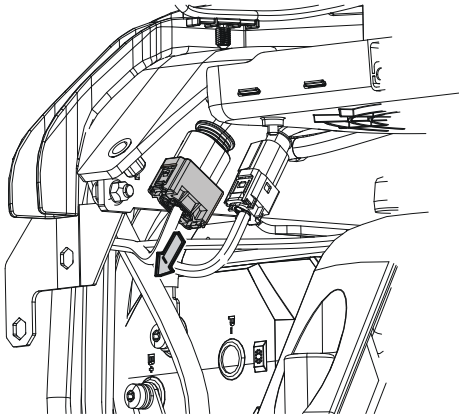
9. Connect the connector, *[A83]*, page 19 - 2 for power steering or *[B13]*, page 19 - 2 for mechanical steering.



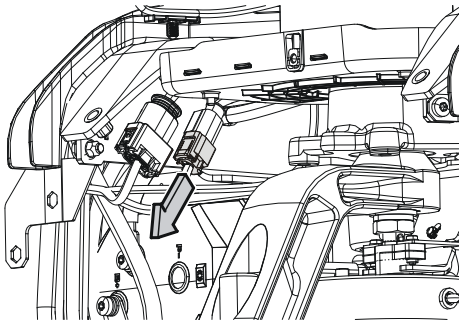
10. Tie the cable clamp between the markings on the wire. Then twist the wire forward so that the wire is flat against the water trough. Then tighten the cable clamp.



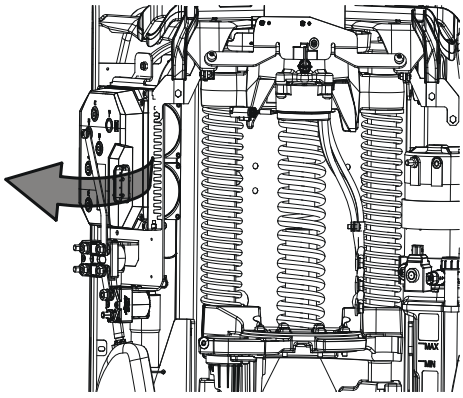
1. Undo the wiring harness clips in the water trough.



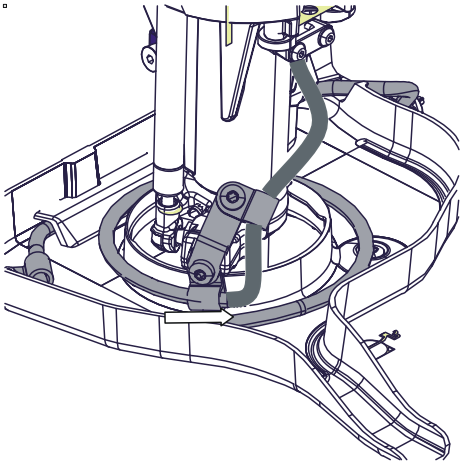
2. Disconnect the connector *[X65]*, page 19 - 4



3. Disconnect the connector, *[A83]*, page 19 - 2 for power steering or *[B13]*, page 19 - 2 for mechanical steering.

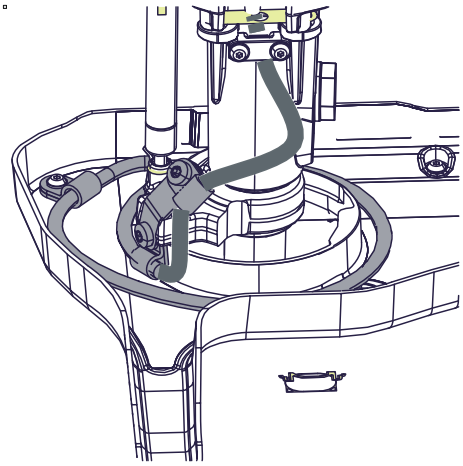


4. Undo the screws of the electric panel and move it aside.



12. Place the cable clamp on the tape mark of the wiring harness. Mount the cable clamp to the bracket so that it leans back as much as possible to enable the wiring harness to lie snugly in the water trough.

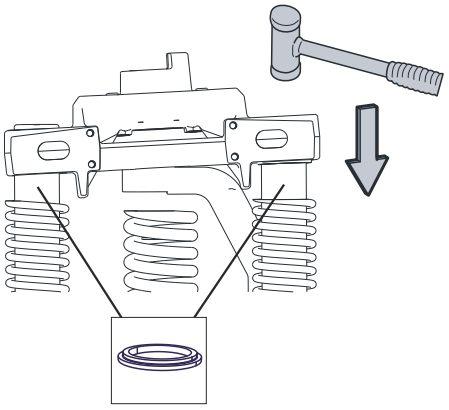
    Make sure the clamp is fitted to the tape. The wiring harness will be damaged if it is fitted to the wrapping.



13. Turn to the right and left and raise and lower 3 times to check that the wiring harness does not bend or stretches.

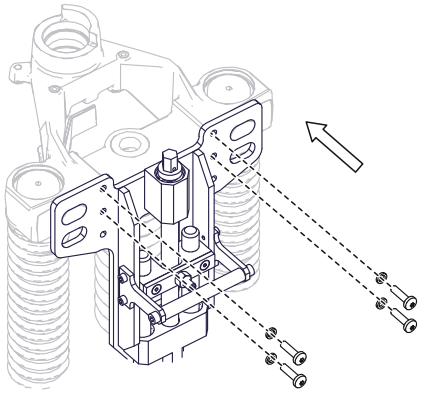
Resetting

Installing the drive gear, page 10 - 5
Installing the steering motor [M6], page 9 - 9
Installing the steering damper [A83], page 12 - 89
Installing the steering damper [A83], page 12 - 90
, page 8 - 106
Fitting the platform [Fixed side guards], page 8 - 95
Installing a battery using a battery changing table, page 13 - 7
Installing a battery using a lifting device, page 13 - 5

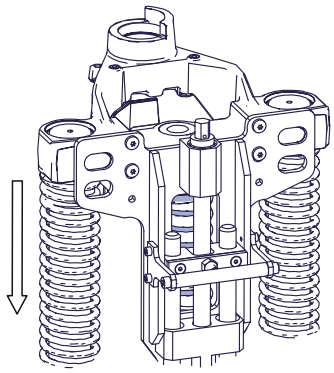


1. Fit the springs, rings (only for Ø30 rods) and the upper bracket to the drive unit mount.

   Do not use pressing tools or similar if the upper bracket sticks. There is a "risk of damage to the seals and the bushings". Use a plastic mallet to carefully tap the bracket straight down over the bars.



2. Fit the tool.*Fitting tool V08-18302*, page 21 - 6



3. Compress the drive unit suspension so much that it is possible to fit the pins to the shafts.

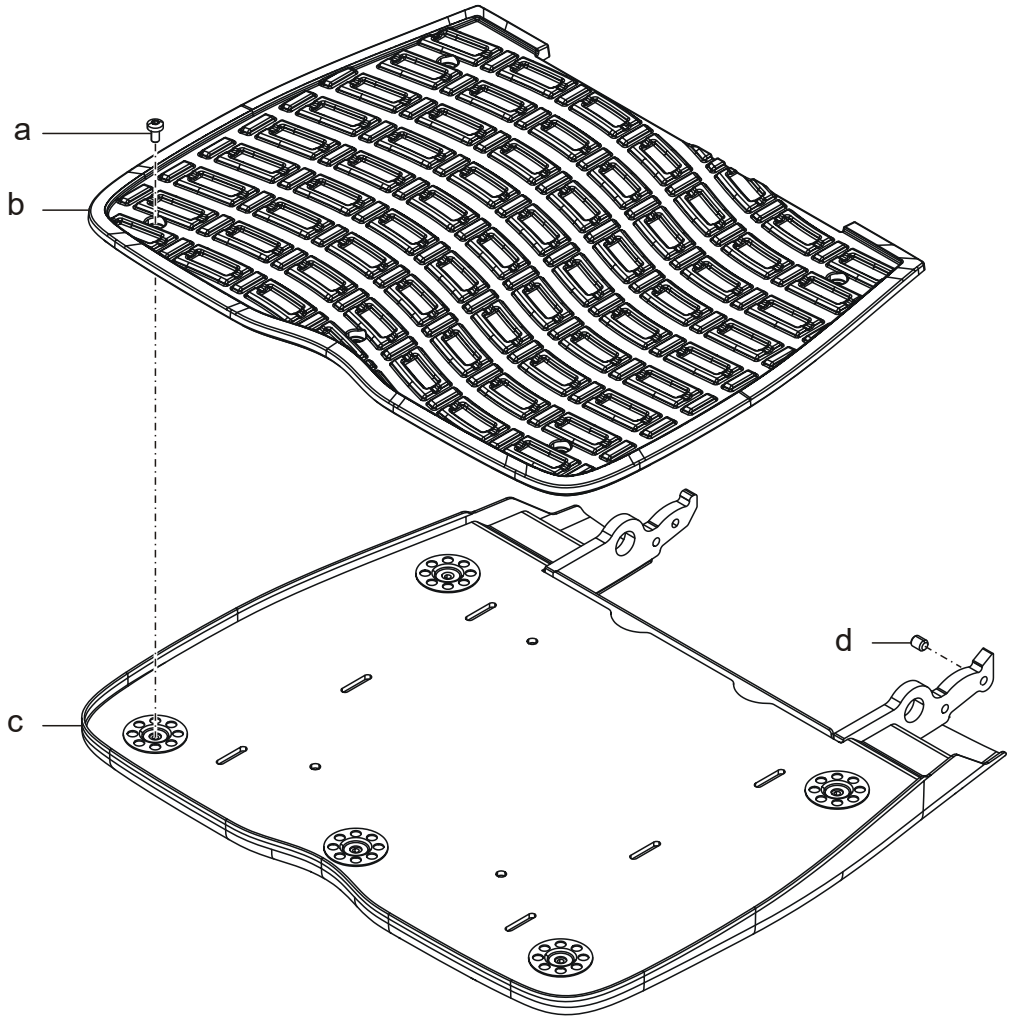
   ⚠ **WARNING It is only permitted to use hand tools**
   Do not use a power tool or similar when compressing with the tool, only hand tools are permitted

8.4 Operator compartment, cab C0500

8.4.1 Platform including fixing points C0560

8.4.1.1 Overview

Part number: 7523935-031 7552772

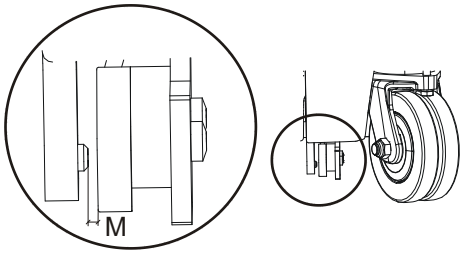


Pos.	Designation
a	Screw
b	Carpet
c	Platform
d	Stop screw

8.4.1.10 Safety switch, platform [B119]/[B120]

8.4.1.10.1 Measuring the detection distance [B120]

Fitting the platform [Fixed side guards], page 8 - 95



1. Measure the space between the sensor*[B120]*, page 19 - 2 and the platform arm=4 $^{5}/_{3}$mm

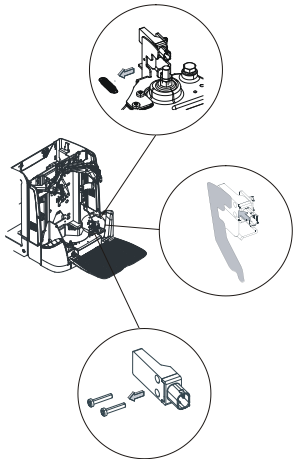
   If the space is outside the permitted range: *Adjusting the position sensor [B120]*, page 8 - 85, *Adjusting the position sensor [B119]. From serial number: 6586314-*, page 8 - 86

Installing a service cover, page 8 - 3

8.4.1.10.2 Replacing sensor [B119]

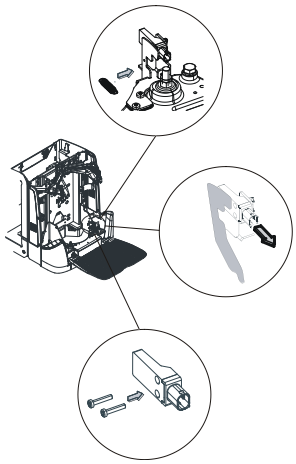
8.4.1.10.2.1 Removing the platform position sensor [B119]

Removing the platform [Fixed side guards], page 8 - 94

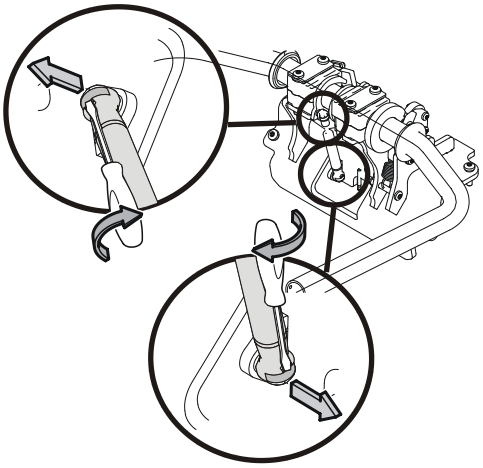


1. Remove the spring of the detection plate.
2. Move the plate rearwards.
3. Remove the sensor.*[B119]*, page 19 - 2

8.4.1.10.2.2 Fitting the platform position sensor [B119]



1. Fit the sensor.*[B119]*, page 19 - 2
2. Move the detection plate back into position.
3. Fit the spring.

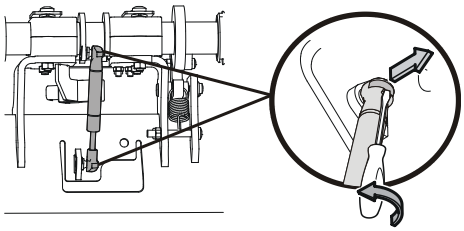


1. Use a screwdriver or similar tool to undo the spring lock at each end of the gas strut.
2. Remove the damper.

8.5.1.2.4.2 Removing the gate damper

Part number: 7577717

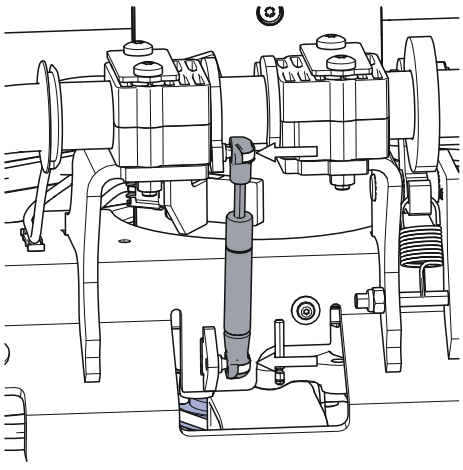
Removing an emblem cover, page 8 - 4



1. Use a screwdriver or similar tool to undo the spring lock at each end of the gas strut.
2. Remove the damper.

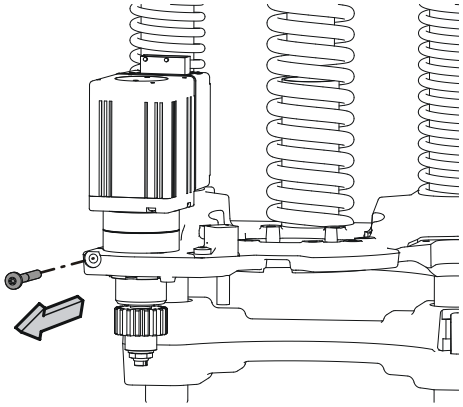
8.5.1.2.4.3 Fitting the gate damper

Part number: 7569855

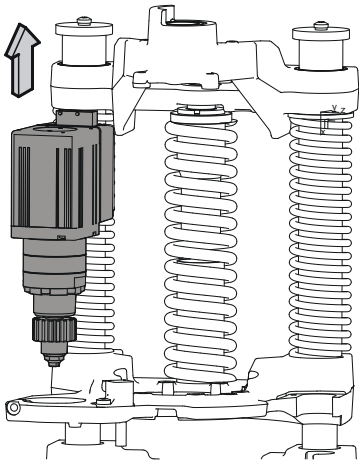


1. Fit the gas strut with the piston rod up.

Checking the gate bar, page 8 - 102

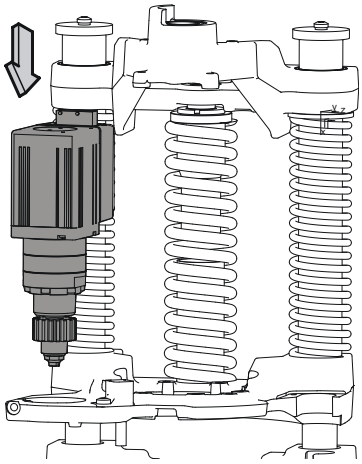


2. Detach and remove the screw.



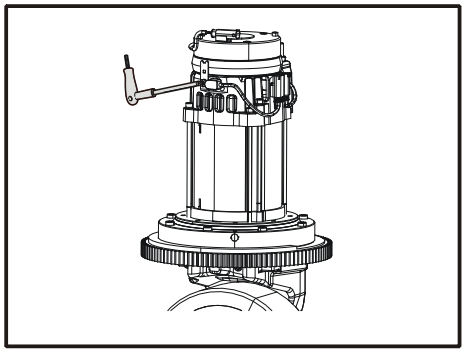
3. Pull the steering motor straight up.

9.2.2.9.2 Installing the steering motor [M6]



1. Fit the steering motor to the motor plate.

9.2.4.9 Check the rotational speed sensor fitting



1. Check the rotational speed sensor *[B11]*, page 19 - 2 fitting

   Replace the sensor in case of malfunction. *Replacing the rotational speed sensor*, page 9 - 32

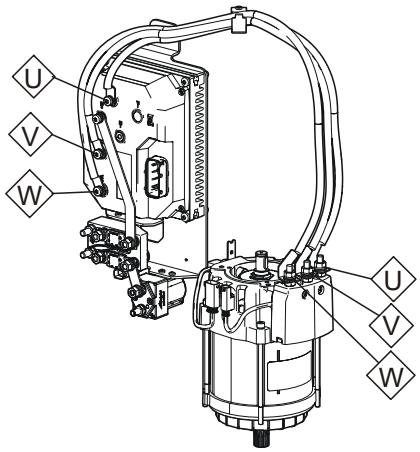
9.2.4.10 Replacing the drive motor

9.2.4.10.1 Removing the drive motor [M1]

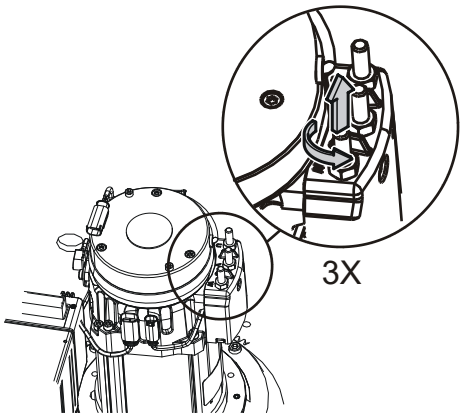
Part number: 7560160

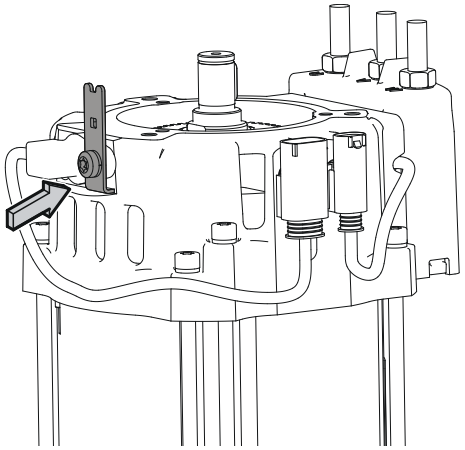
Preparations

Removing the parking brake, page 11 - 10



1. Detach the motor cables U, V and W.





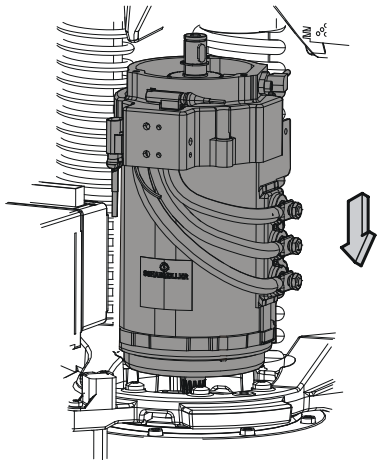
5. Install the rotational speed sensor bracket or fit new straps.

Resetting

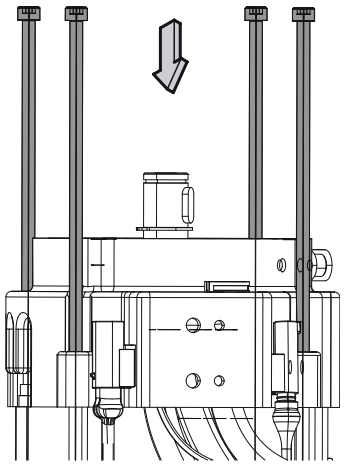
Fitting the parking brake, page 11 - 12

9.2.4.10.6 Installing the drive motor [M1]

Part number: 7554832



1. Lower the motor in the drive gear, taking care so as not to damage the splines on the drive shaft.



2. Install the motor, torque tighten 9.5 N·m and replace the cable bracket on the mounting screw.

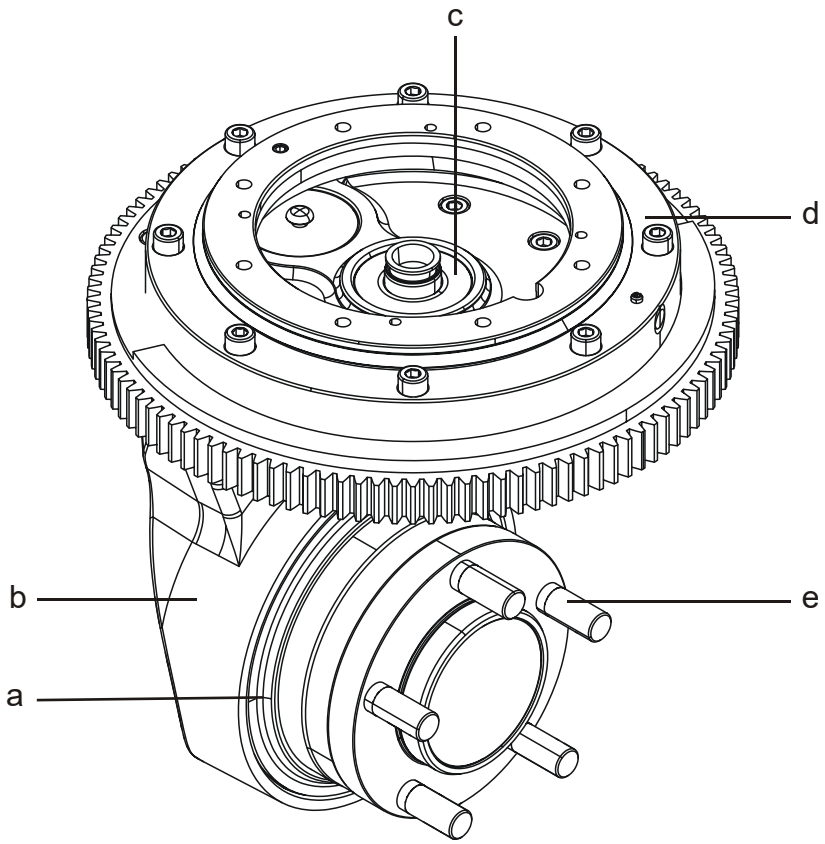
10 Transmission/Drive gear C2000

10.1 Drive unit, final gear C2500

10.1.1 Drive unit/gear C2550

10.1.1.1 Overview

Part number: 7525839 7540133



Pos.	Designation
a	Seal and cover ring
b	Transmission housing
c	Motor bearing and packing box
d	Steering bearings
e	Stud M14X1.5

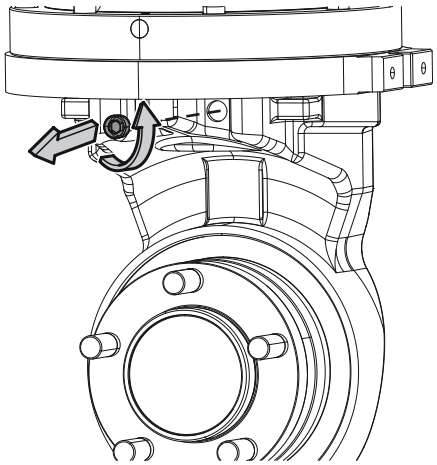
10.1.1.2 Description

10.1.1.2.1 Design

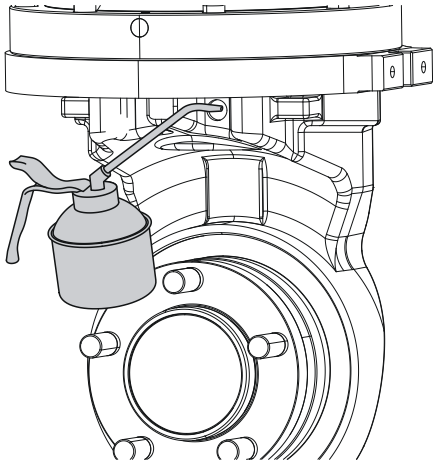
The drive gear is a two-stage angle gear that is integrated with the motor and brake assembly in a complete drive unit. The drive gear is bolted to the chassis. At the top edge of the gear, the steering bearing and a gear ring for the steering motor (option) are fitted.

A complete reconditioning of the drive gear must be performed in the workshop by trained technicians.

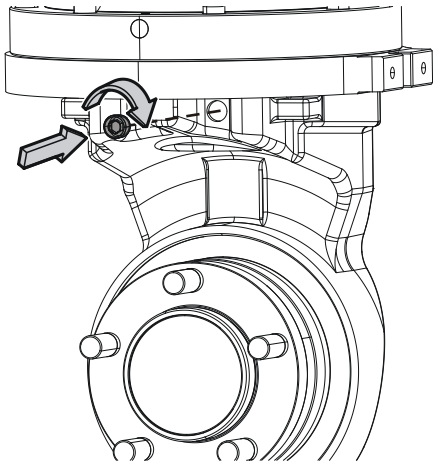
10.1.1.8.3 Filling oil in the drive gear



1. Remove the oil filler plug on the upper part of the gear housing.



2. Top up with oil up to the lower edge of the hole to reach the correct level, *Lubricants specification*, page 22 - 2.



3. Screw in the plug.

11.2.1.2 Description

11.2.1.2.1 Technical data

Part number: 7552246 7549853

Description	Standard	Unit
Brakes	Non-CCV/CCV	
Type	Single stage electromechanical spring-loaded brake	
Nominal brake torque	30	Nm
Nominal air gap	0.2 ± 0.05	mm
Maximum gap before replacement	0.5	mm
Coil resistance	6.261 Ohms at 20° C	Ohms
Result	23	W
Nominal clearance in applied position	0.2	mm
Minimum brake disc thickness	Breaks when the friction material is completely worn	mm
Thickness of new brake disc	7.5	mm

11.2.1.2.2 Technical data

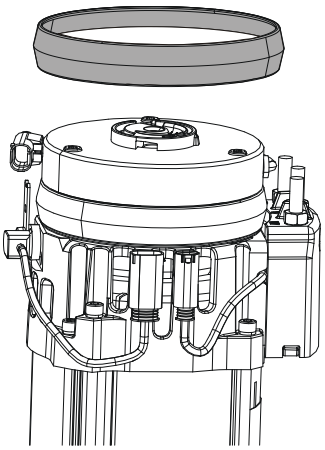
Part number: 7552244 7588119

Description	Standard	Unit
Brakes	Non-CCV	
Type	Single stage electromechanical spring-loaded brake	
Nominal brake torque	21	Nm
Nominal air gap	0.2 +0.15/-0.05	mm
Maximum gap before replacement	0.65	mm
Coil resistance	7.68 Ohms at 20° C	Ohms
Result	18.75	W
Nominal clearance in applied position	0.2	mm
Minimum brake disc thickness	Breaks when the friction material is completely worn	mm
Thickness of new brake disc	7.5	mm

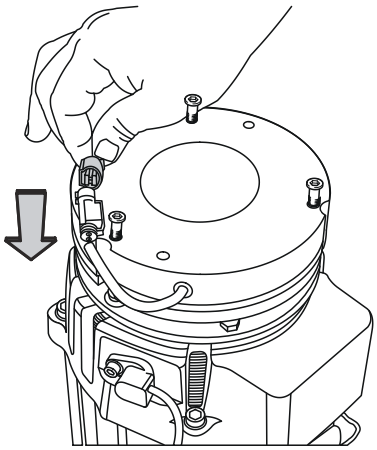
11.2.1.3 Cleaning the parking brake

Preparations

Removing a service cover, page 8 - 3



3. Fit the dust guard.



4. Connect the connector (Q1).

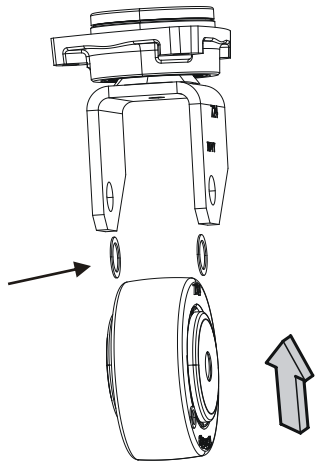
⚠ WARNING Test drive after working on the parking brake
Be careful when test driving after performing work on the truck parking brake.

- ***The sleeved screws must be removed in order to engage the parking brake.***

Resetting

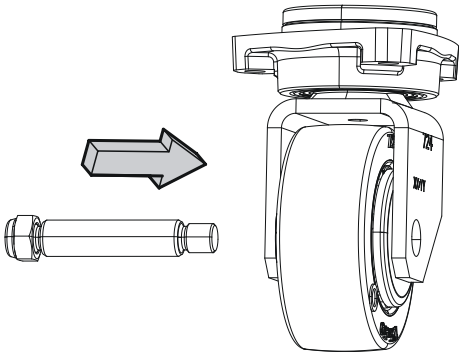
Installing a service cover, page 8 - 3

11.3.2.8.3 Installing a castor wheel

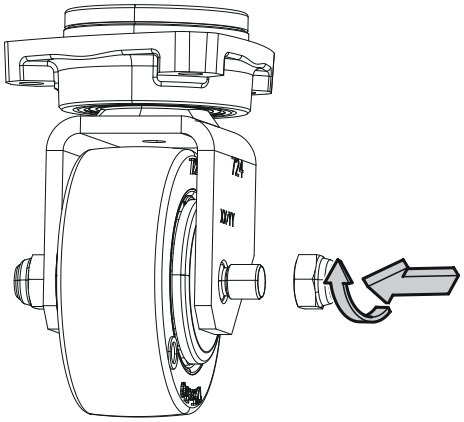


1. Fit the wheel.

   Do not forget to refit the washers.



2. Fit the wheel shaft.

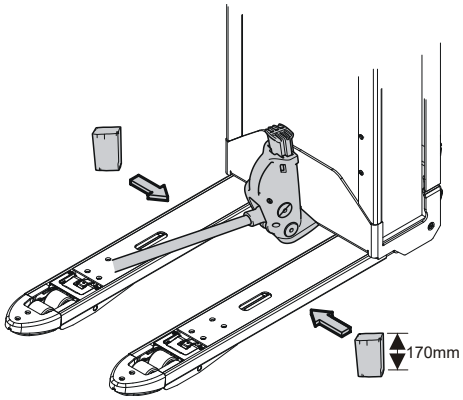


3. Fit the nut on the wheel shaft, tightening torque 160 N·m.

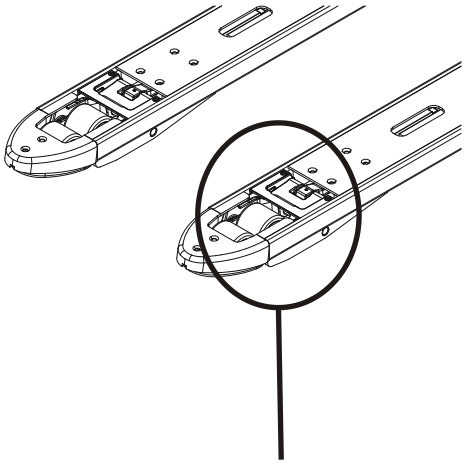
Installing the castor wheel assembly, page 11 - 25.

11.3.3.8 Replacing bogie wheels

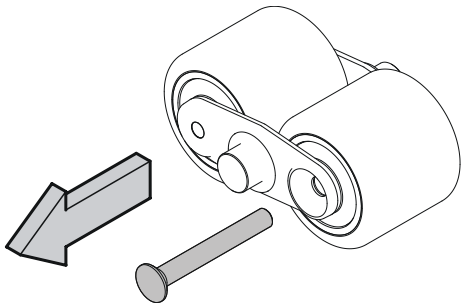
11.3.3.8.1 Removing bogie wheels



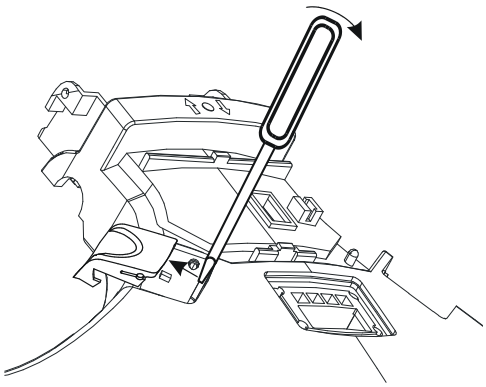
1. Support the truck:



2. Remove the wheel screw.



12.2.1.2.2.3.2 Fitting the signal button/switch



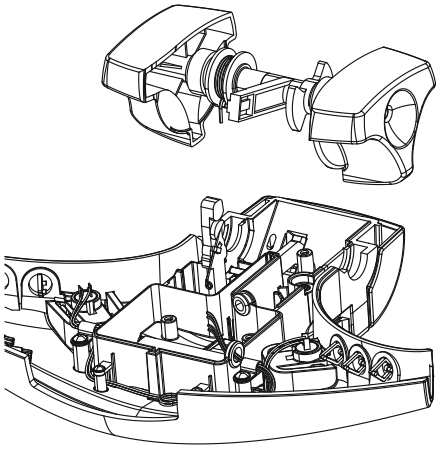
1. Fit the new switch and connect the wire to the logic card.
2. Align the button with the catch and secure it by hand.

Link target missing for title: [ID: 1307338123]

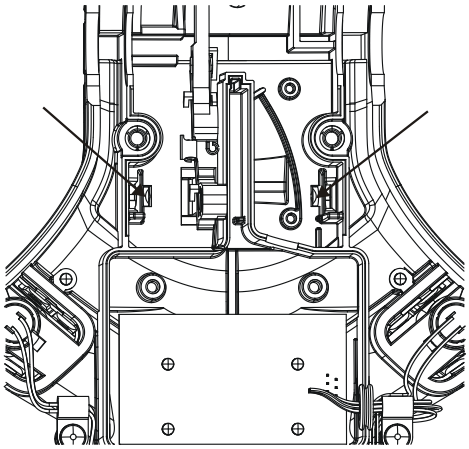
12.2.1.2.2.4 Replacing the lift/lower button

12.2.1.2.2.4.1 Removing the lift/lower button

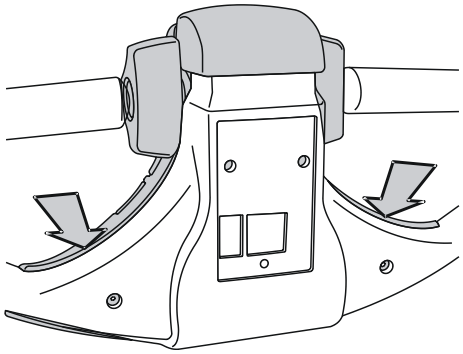
Preparations



1. Remove the speed control.



2. Use a screwdriver and carefully press down the button fitting.



4. Check that there is no space between the handle and the steering head.

5. Make sure that the control can be moved back and forth without difficulty, and that the control returns to the neutral position. Adjust the screws as explained in step 3 if the control is difficult to move.

Resetting

Installing a keypad, page 12 - 11
Installing the tiller arm cover "Built-in", page 12 - 30

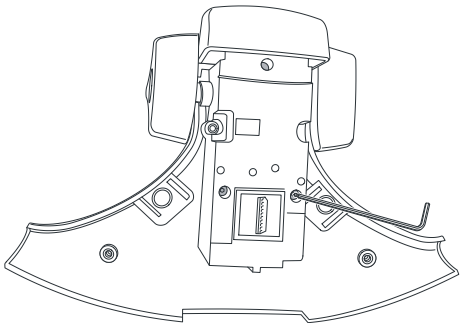
12.2.1.2.5 Replacing the logic card

12.2.1.2.5.1 Removing the logic card

⚠ WARNING Static electricity
Risk of static discharge that can damage the electronics.

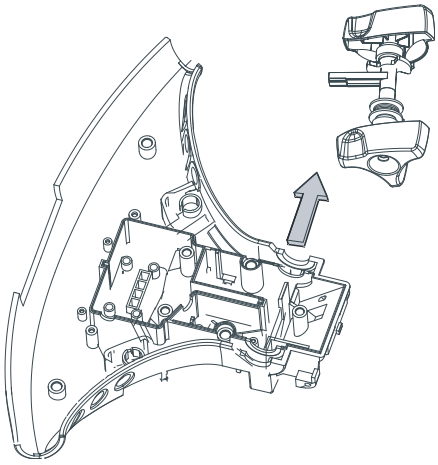
- ***Make sure you take the necessary steps to prevent static electricity, ESD protection, before starting work on the steering module.***

Preparations

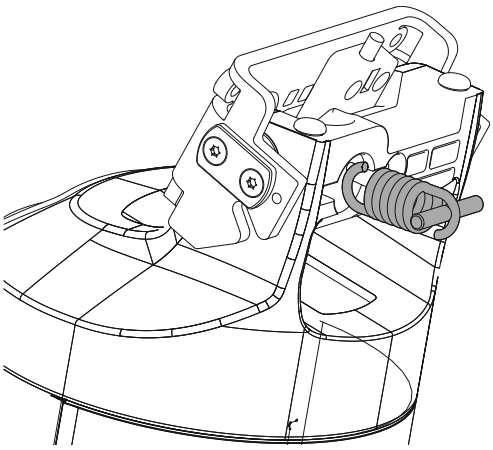


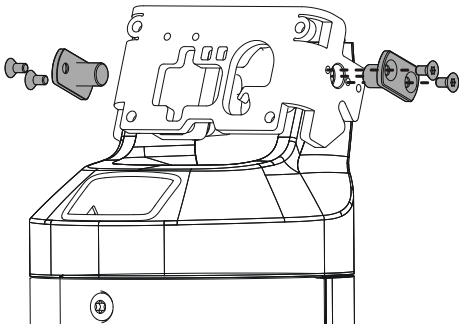
1. Remove the screws holding the cover over the logic card and carefully lift away the cover.

   Keep a finger between the cover and the shaft for the speed control buttons to prevent the speed control assembly from falling down.

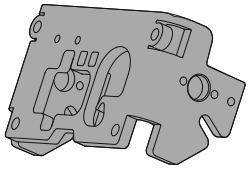


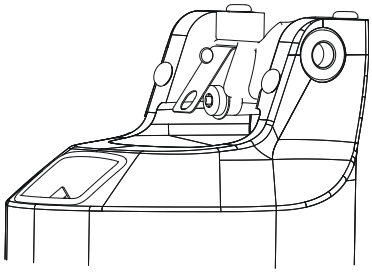
2. Lift away the speed control assembly.



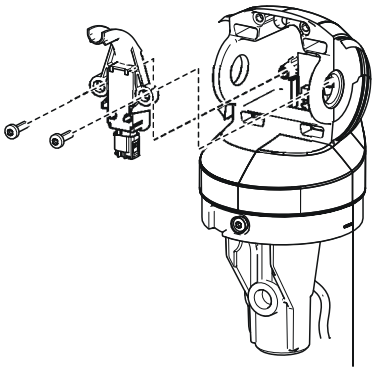


2. Remove the shafts.

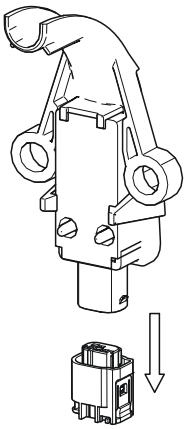




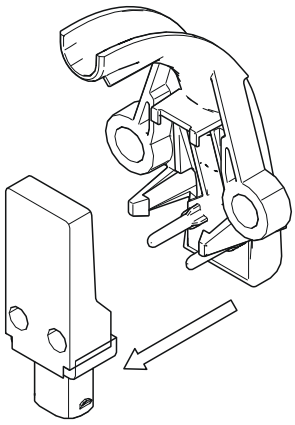
3. Disassembling the tiller arm.



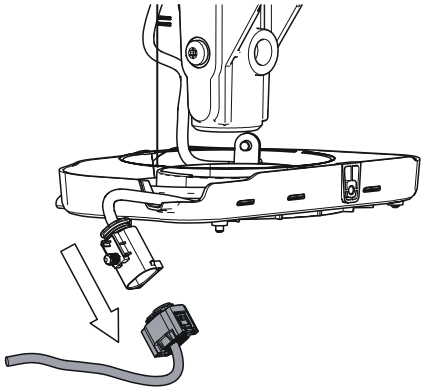
1. Unscrew and remove the sensor bracket.



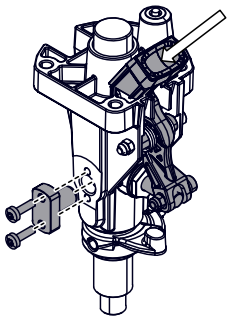
2. Remove the sensor from the snap lock.



3. Disconnect the connector.



2. Disconnect the connector *[X65]*, page 19 - 4

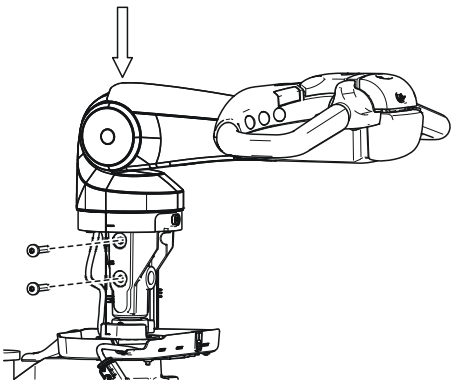


3. Detach and remove the guide pin.

4. Press the button and release the lock for the height adjustment and pull the steering adapter straight upwards.

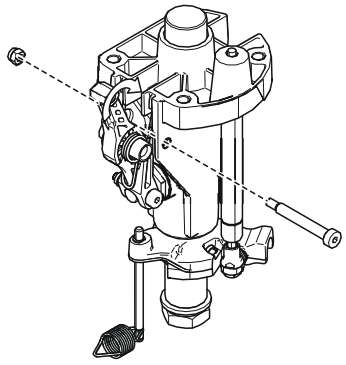
12.2.1.6.3.5 Installing a steering adapter

Serial number: 6277977-6528400



1. Install the steering adapter using the screws.

12.2.1.6.6.3 Installing the height adjustment lock



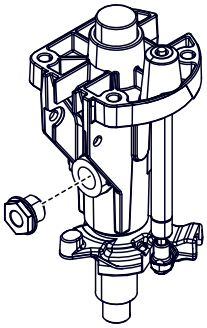
1. Push the arm up into the steering adapter and fit the guide pin in the brass sleeve.
2. Install the arm.

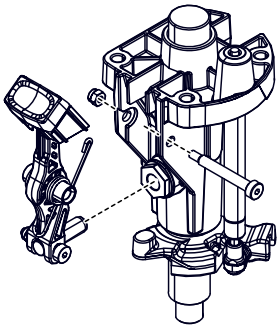
Resetting

Installing the steering adapter cover, page 12 - 52

12.2.1.6.6.4 Installing the height adjustment lock

1. Fit the bushing. Apply Loctite 243 to the threads.20 N·m

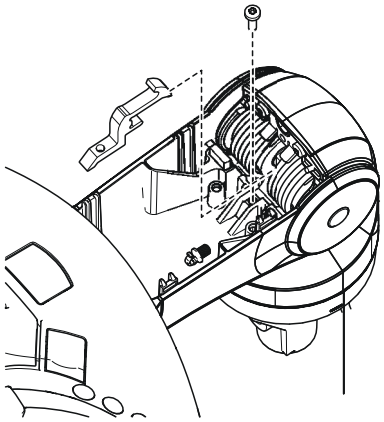




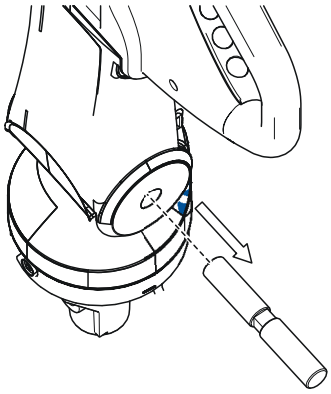
2. Push the arm up into the steering adapter and fit the guide pin in the bushing.
3. Install the arm. 5 N·m

Resetting

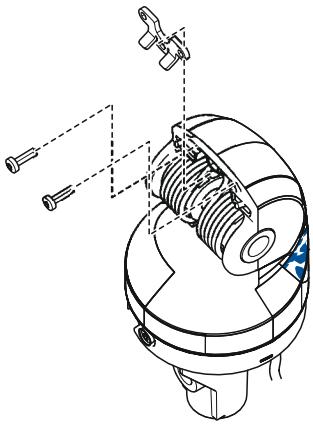
Installing the steering adapter cover, page 12 - 52



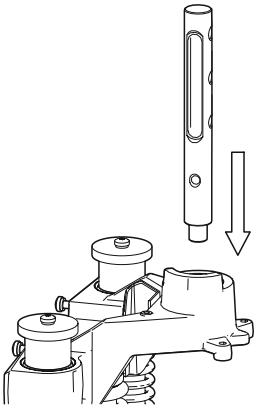
4. Remove the shaft lock.



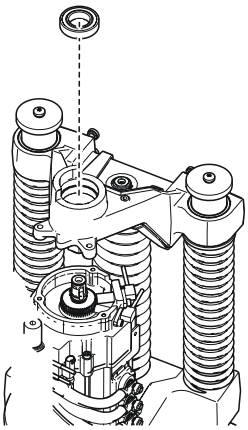
5. Knock out the shaft and lay the arm down.



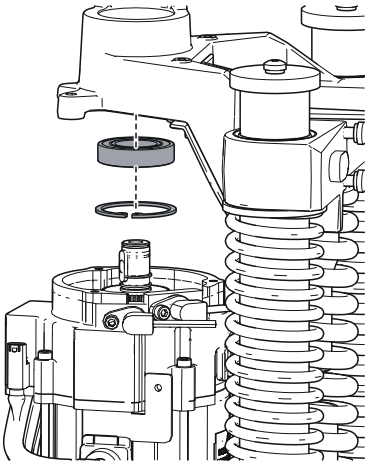
6. Remove the spring stop.



2. Tap the shaft straight up. Use a rubber mallet or other suitable tool.



3. The upper steering bearing is removed downwards.



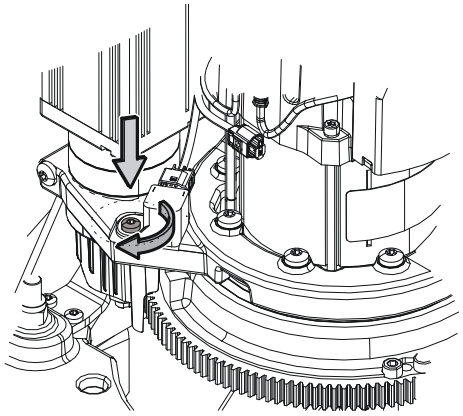
4. Lower bearing, remove the circlip and knock out the bearing.

12.2.1.8.3 Removing the steering bearing (power steering)

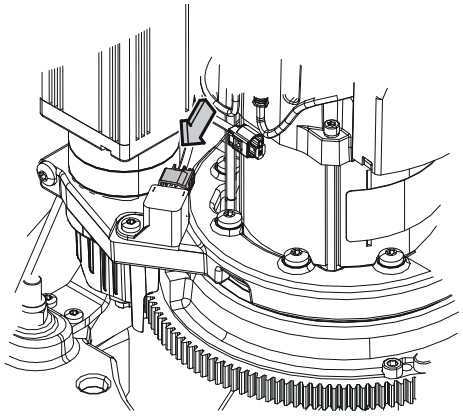
Serial number: 6624074-

Removing the steering adapter, page 12 - 41, *Removing the steering adapter*, page 12 - 42, *Removing the steering adapter*, page 12 - 43, *Removing the steering adapter*, page 12 - 44

Removing the steering damper [A83], page 12 - 88



2. Fit the screw. 10 N·m



3. Connect the connector.

Installing a service cover, page 8 - 3

12.3.2.3 Checking the reference sensor

1. Steer slightly to the right so that the gear ring is correctly positioned in relation to the reference sensor.
2. Cut off power to the truck.
3. Check the clearance between the sensor and the elevated part of the gear ring using a feeler gauge. Nominal gap =1.5mm.
4. **⚠ WARNING Powering up the truck**
   There is a risk of personal injury if power is restored to the truck while work is performed on the gear ring.

   Reconnect the battery.
5. Check if there is any power supply to [B17], 9.8 - 13.5V V between wires 95 and 97.
6. If there is power, replace [B17].
7. Check if there is a short circuit between wires 95 and 97, but also between wire 95 and the rest of the electrical system.
8. If there is no power supply or short circuit, replace the T13.

13 Electrical system C5000

13.1 Description

13.1.1 General

The electrical system in the AC powered trucks consists of a number of electronic modules, [A5-T1], which communicate with each other via two separate CANs (Controller Area Network). Communication is active as long as the truck is switched on.

The following electronic units are found in the tiller arm: ICH, integrated control panel [A5]

The following electronic units are found in the chassis: ACT/ACC, motor control unit [T1]

The input signals for the various truck functions received by the electronic modules are both digital (switches and sensors) and analogue (potentiometers and sensors).

Likewise, the output signals for the various truck functions received by the electronic modules are both digital (valves, drive wheel brakes, etc.) and analogue (proportional valves).

13.2 Using the anti-static carpet

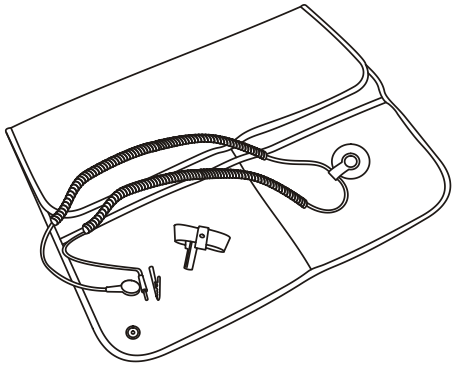
Preparations

Electrostatic risks, page 2 - 3

Required special tools

- Anti-static carpet 148115

1. Disconnect the power source.



2. Attach the clamp to the area that is to be protected, and the other end to the wrist. *Anti-static carpet 148115*, page 21 - 7.

13.3 Programming tools

13.3.1 TruckCom

13.3.1.1 Connect the CAN interface to the truck

See the separate TruckCom manual to see the various connection alternatives available.

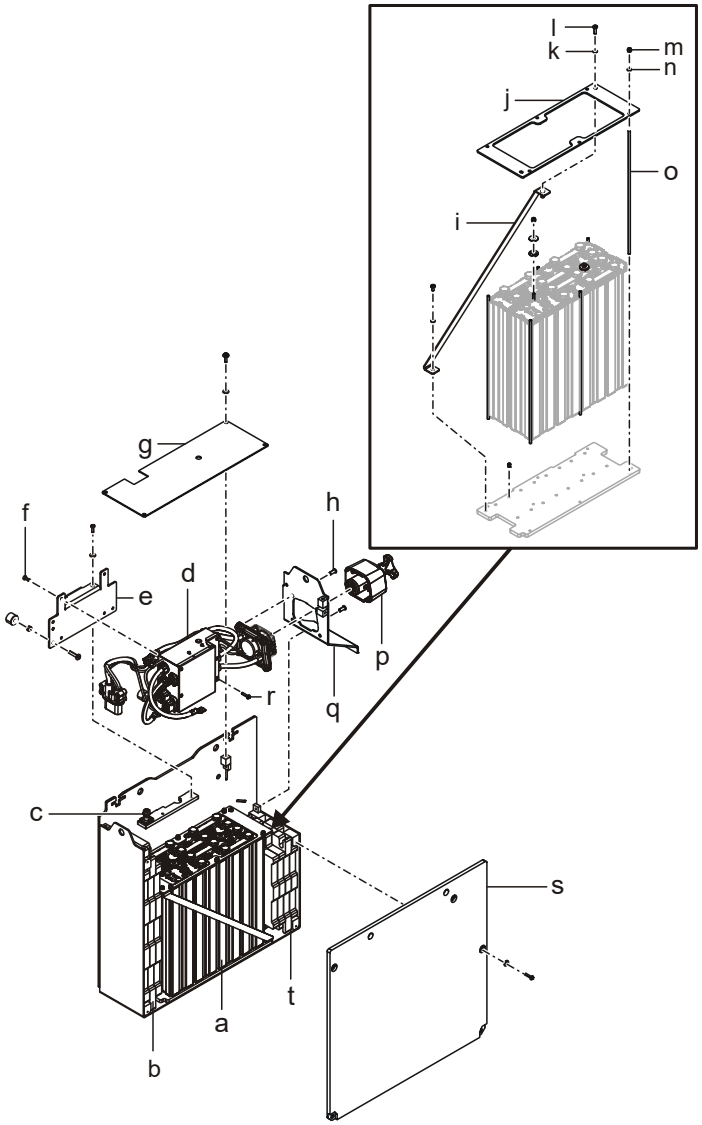
Required special tools

- PC to CAN cable 163793
- CASTOR USB 7521083

13.4.3.2 Battery system overview

13.4.3.2.1 Overview, 210 Ah

Model: LPE200, LPE220, LPE250



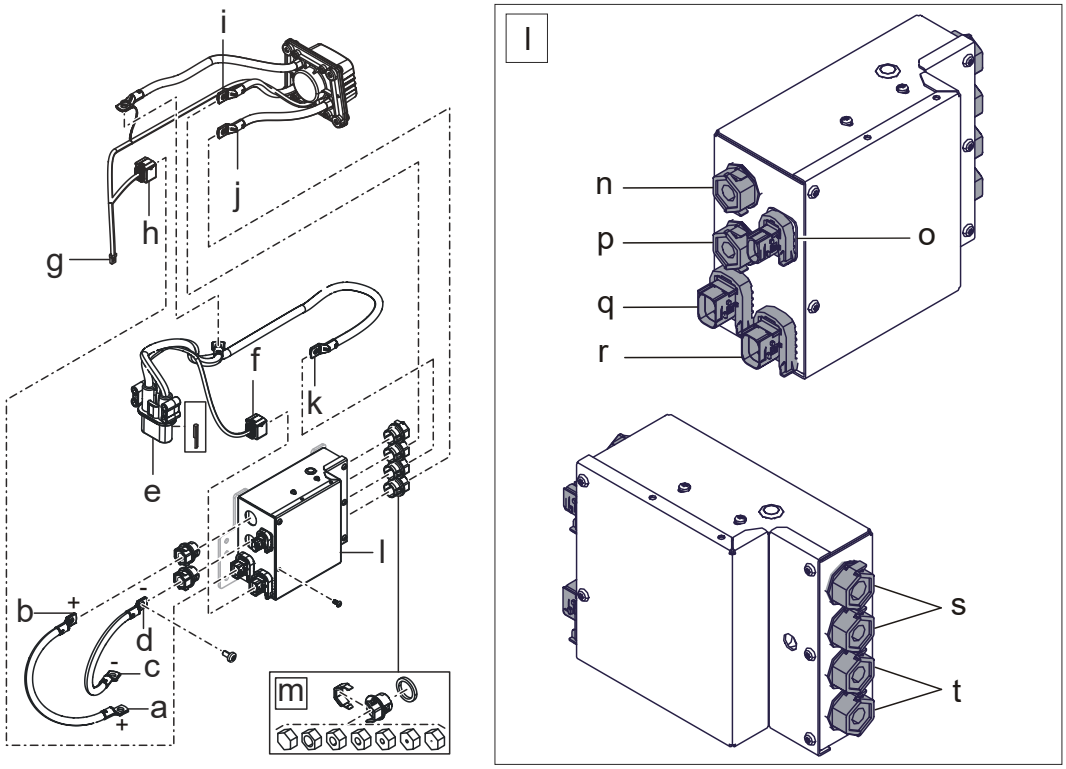
Pos.	Designation	Pos.	Designation
a	Battery modules	b	Counterweights
c	Isolator	d	E-box
e	Bracket	f	Screw
g	Cover	h	Screw (9.8 Nm)
i	Side support	j	Frame
k	Plate	l	Screw (9.8 Nm)
m	Nuts (5.5 Nm, tightening in a crosswise arrangement)	n	Plate
o	Threaded bar	p	Battery switch
q	Plate	r	Screw (5± 0.5 Nm)
s	Cover plate	t	Counterweights

13.4.3.5 Battery Management System, BMS

13.4.3.5.1 Overview E-box connection

13.4.3.5.1.1 Overview of connection of E-box, external charger

Model: LPE200, LPE220, LPE250



Pos.	Description	Connection	Notes
a	Battery cable	Connection to battery module +	T = 22± 2,2
b	Battery cable	Connection to E-box See pos. n	T = 15±1,5
c	Battery cable	Connection to battery module -	T = 22± 2,2
d	Battery cable	Connection to E-box See pos. p	T = 15±1,5
e	CAN wiring harness	Connection to battery connector in the truck	
f	CAN wiring harness	Connection to E-box, contact X111, (X1 CAN) See pos. r	
g	Signal wire	Connection to battery module	
h	CAN wiring harness	Connection to E-Box, contact X112, (X2 Charger) See pos. q	
i	Battery cable	Connection to E-box, (BAT OUT +) See pos. s	T = 15±1,5

- Undervoltage (while discharging)
- Over and under temperatures

13.4.3.5.3 Replacing the E-box

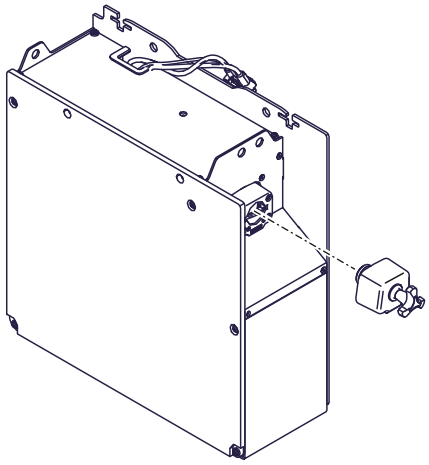
13.4.3.5.3.1 Replacing the E-box

13.4.3.5.3.1.1 Removing the E-box

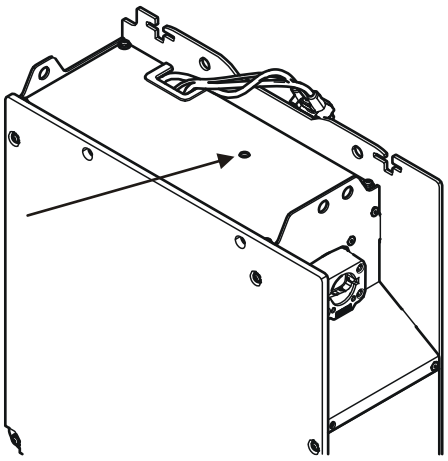
Model: LPE200, LPE220, LPE250

⚠ WARNING Electrically live
Erroneous fitting of connector strips or battery cables may result in injuries to personnel or in damage to the battery system, charger and wiring.

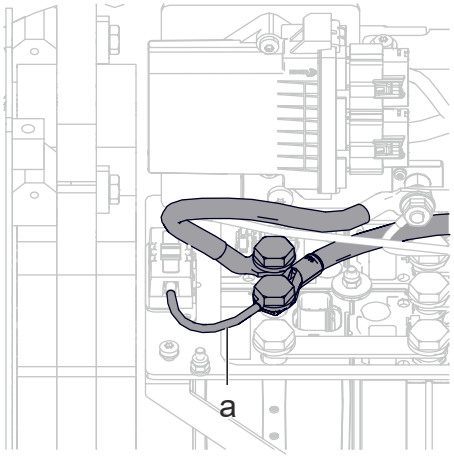
1. Download a truck report which includes a battery log. See *Truck report with battery log*, page 13 - 103.



2. Remove the battery yoke.

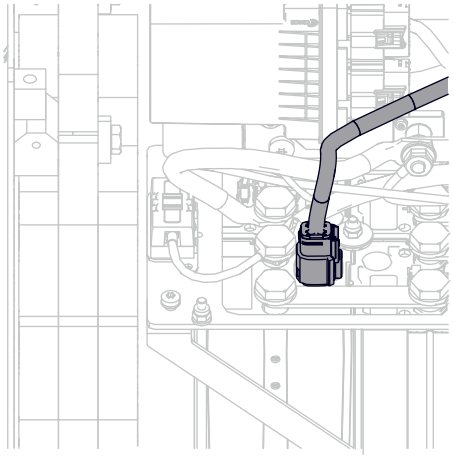


3. Shut down the battery system using the on/off button.

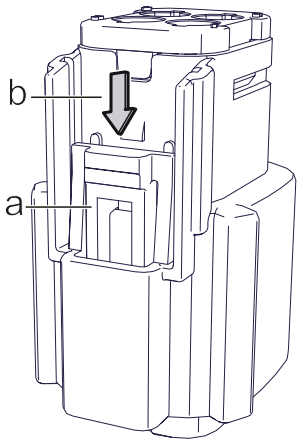


4. Fit the cables to the positive and negative terminals. Tightening torque 22±2.2 N·m.

   • Cable (a) only applies to batteries with a built-in heater.

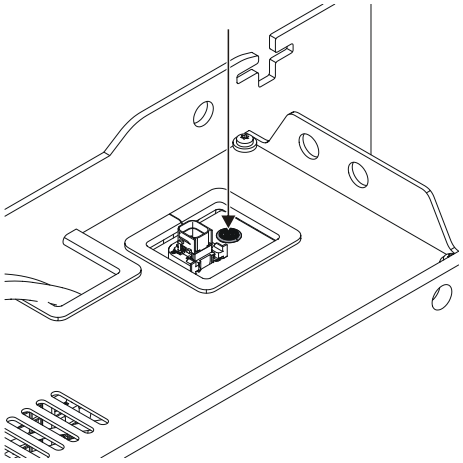


5. Connect the signal wire (Q50) to the PMU.



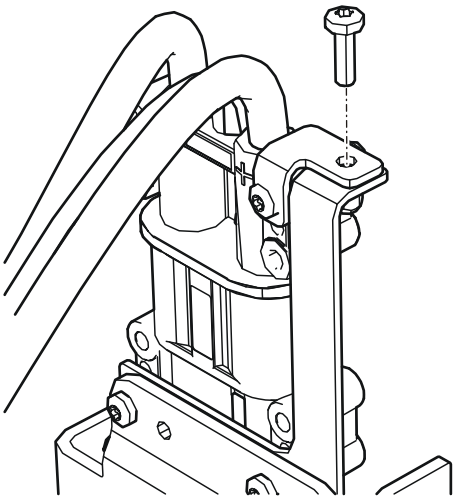
6. Push in the connector until a click can be heard in the lever (a) and then press down the lock (b).

7. Ensure that cables and connections are connected correctly and do not have any visible damage.



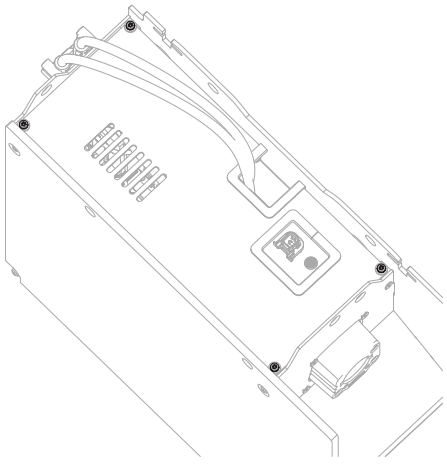
3. Shut down the battery system using the on/off button. See *On/off button, E-box Lite*, page 13 - 19.

4. Disconnect the cable from the CAN connector (X112).

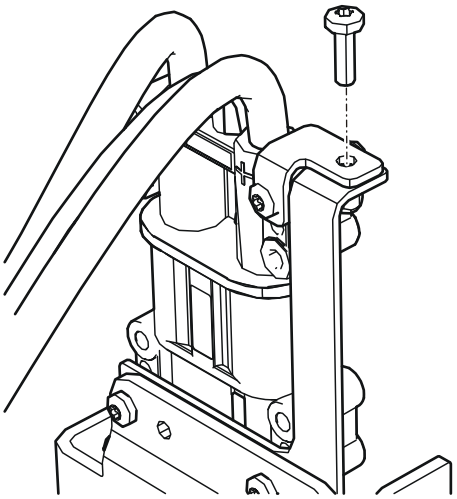


5. Loosen the screw that secures the battery connector and disconnect the battery connector.

6. Lift out the battery from the truck.

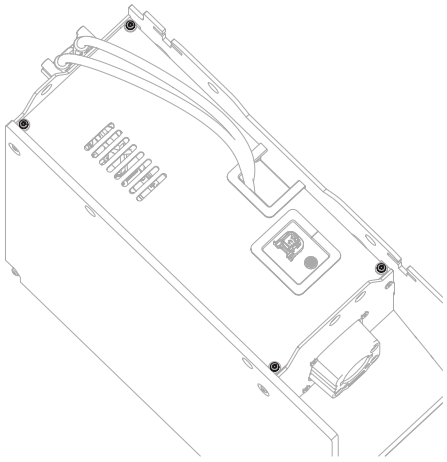


7. Remove the cover.

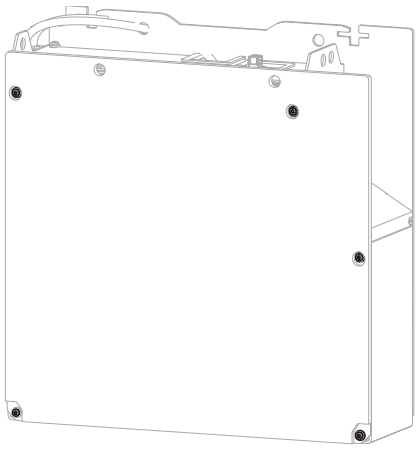


5. Loosen the screw that secures the battery connector and disconnect the battery connector.

6. Lift out the battery from the truck.



7. Remove the cover.

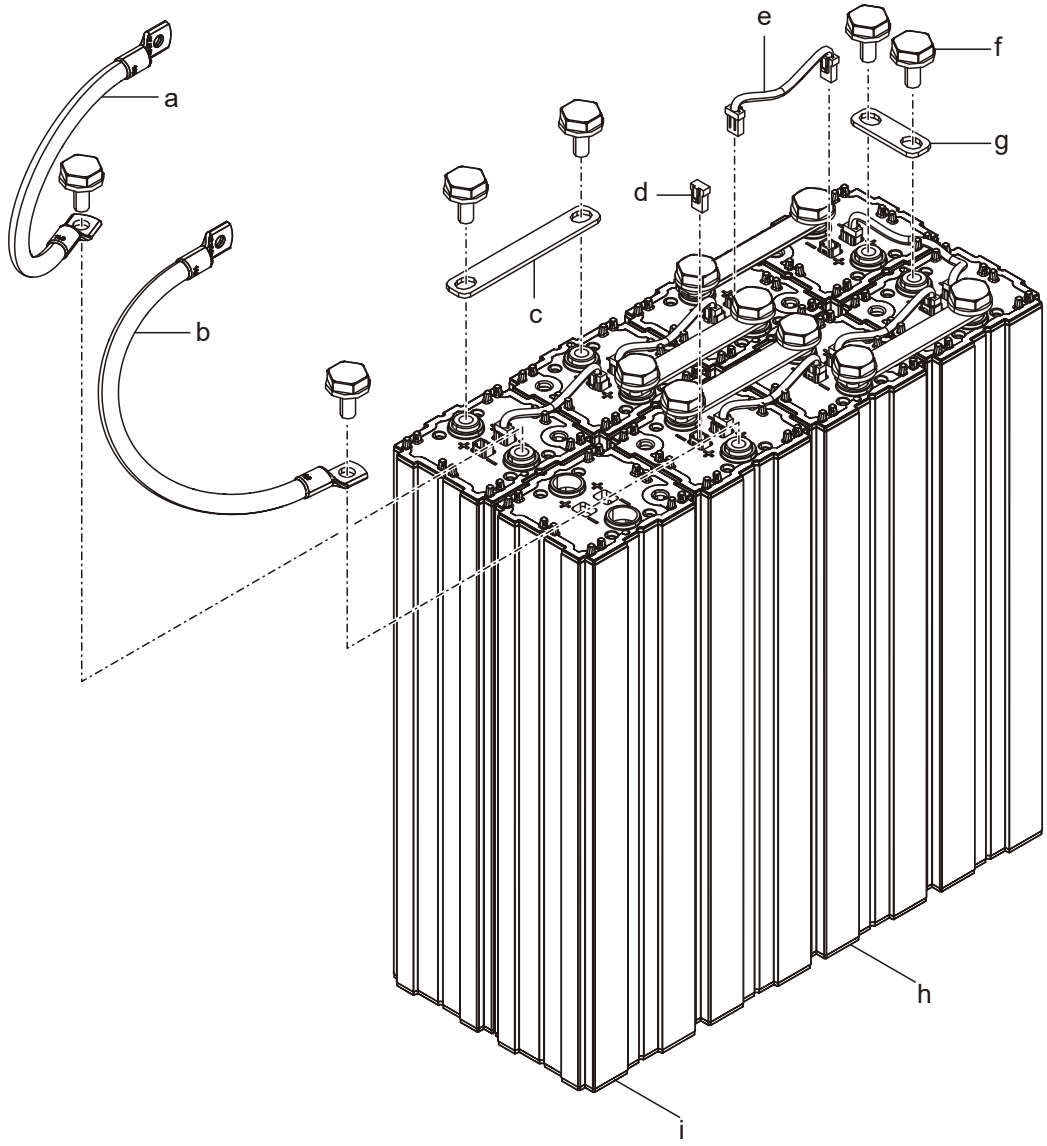


8. Remove the cover plate.

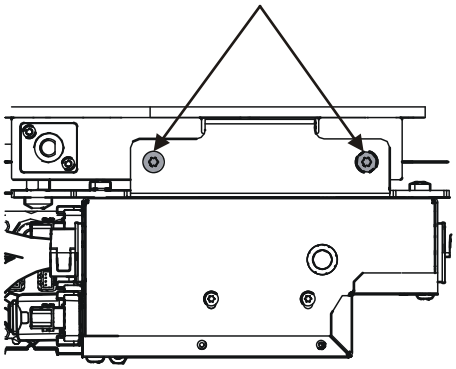
13.4.3.6.2 Overview of module connection

13.4.3.6.2.1 Overview of module connection, 210 Ah

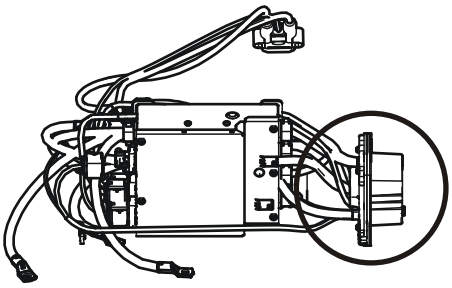
Model: LPE200, LPE220, LPE250



Pos.	Description	Connection	Notes
a	Battery cable	Connection (-) E-box	15± 1.5 N·m
b	Battery cable	Connection (+) E-box	15± 1.5 N·m
c	Connector strip	Between battery modules	
d	Plug		
e	Signals wire	Between battery modules	
f	Terminal bolt	Battery module terminals	22± 2.2 N·m
g	Connector strip	Between battery modules	
h	Battery module		7 pcs
i	Battery mock up		1 pcs



10. Remove the screws to the E-box plate.



11. Remove the battery connector.
12. Remove the signal wire (position g on “Overview E-box connection”) from the battery module.
13. Remove the E-box and E-box plate.
14. Remove the cable to the negative terminal.

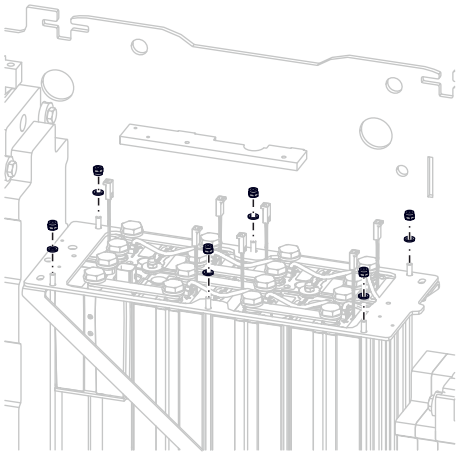
    Mark the cables and use insulating tape around the cable clip.
15. Remove the battery frame.
16. Remove the connector strip that is required in order to replace the module. Refit the terminal bolts.
17. Disconnect the signal wires in order to remove the module(s).
18. Lift out the module(s).

13.4.3.6.4.2 Fitting a battery module

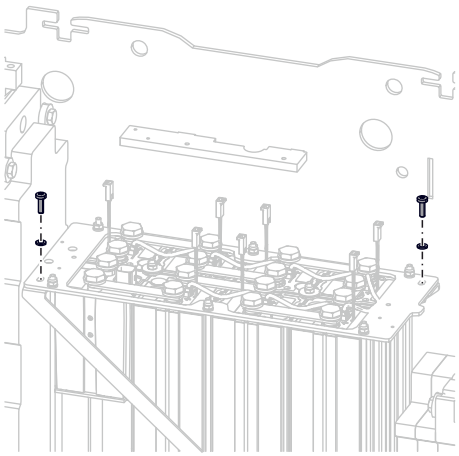
Model: LPE200, LPE220, LPE250

⚠ WARNING Risk of short-circuiting
The lithium-ion battery module is always electrically live.

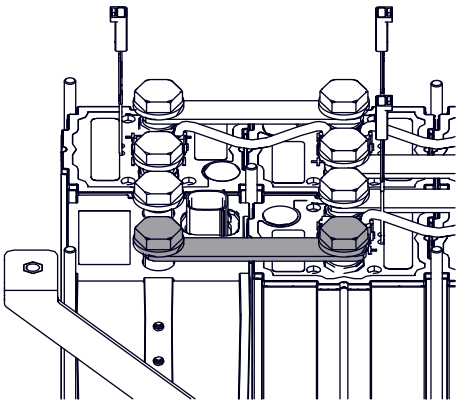
- ***Always take appropriate precautions when handling the lithium-ion battery modules.***



5. Tighten the nuts on the battery frame. Tighten crosswise to a tightening torque of 5.5± 0.5 N·m.



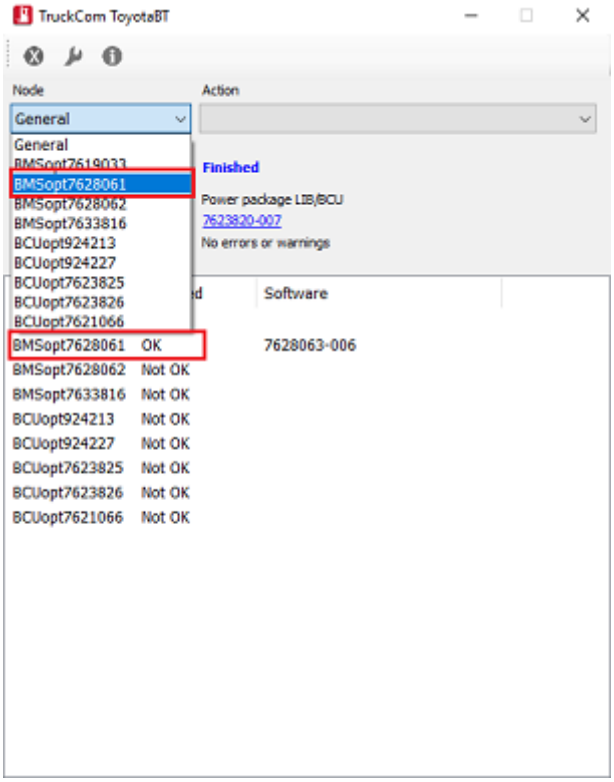
6. Tighten the screws on the diagonal side supports. Tightening torque 9.8±1.5 N·m.



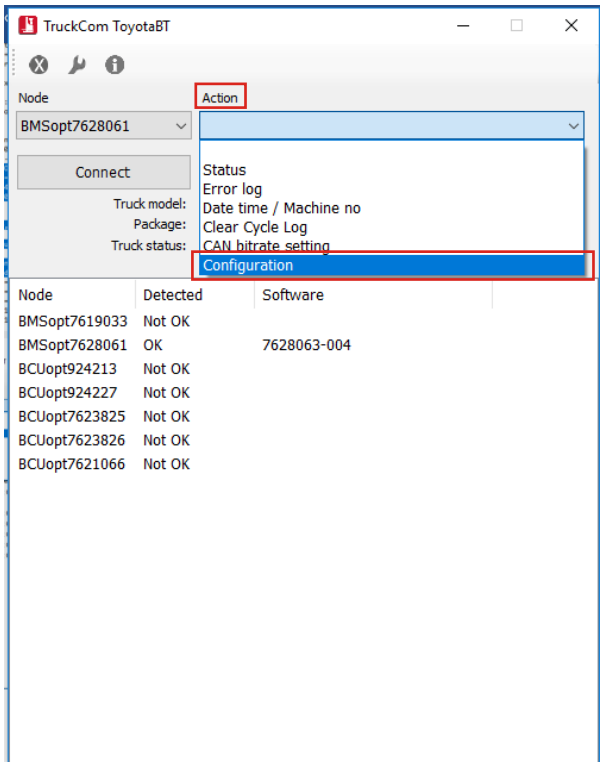
7. Fit the connector strip to the PMU. Tightening torque 22±2.2 N·m.

Resetting

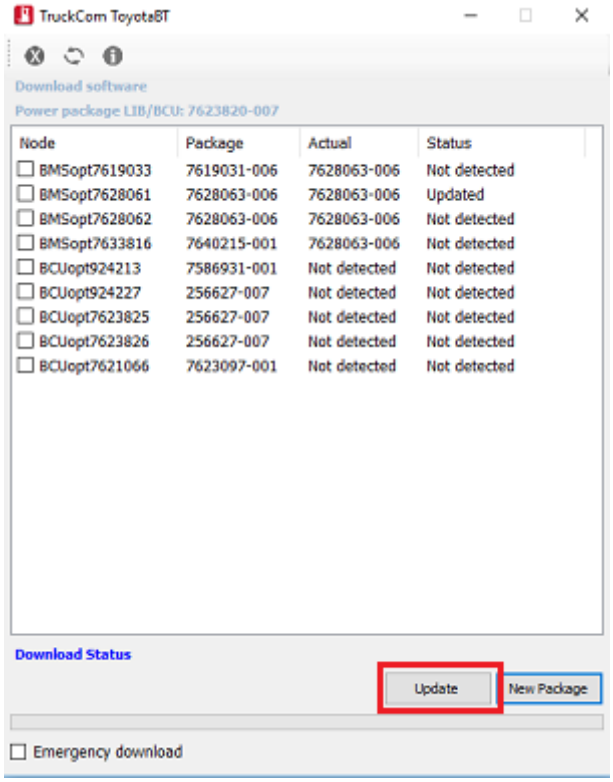
Fitting the E-box plate (210 Ah), page 13 - 55



1. Select BMSoptxxxxxxx from the list under "Node". Select the version that has the status “OK”.



2. Select "Configuration" under "Action".



2. Select the package that is to be updated and click on "Update".

13.4.3.8.6 Protective mode

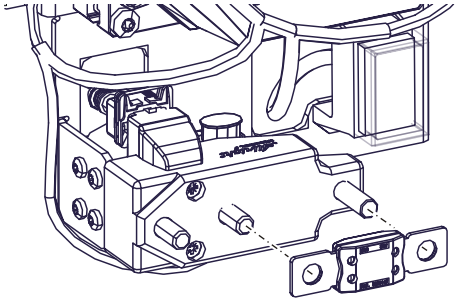
Model: LPE200, LPE220, LPE250

⚠ WARNING Serious error
An error which switches the battery system to protective mode is very serious and can cause personal injury or material damage. The cause of the error must be identified before the battery can be used again.

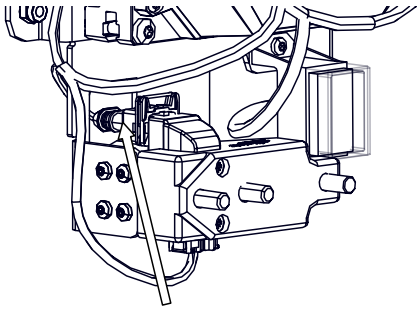
- ***If the cause of the error cannot be identified, TMH support must be contacted for further troubleshooting.***

Preparations

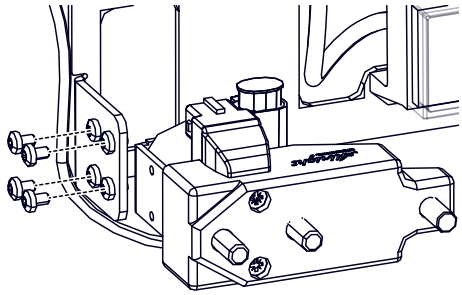
Connecting to the battery system, page 13 - 95



2. Remove the fuse.



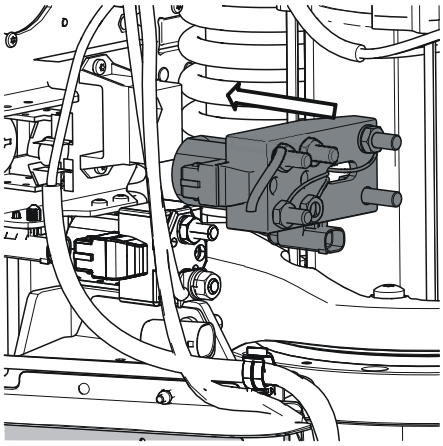
3. Disconnect the connector.



4. Undo the four screws and remove the main contactor.

13.4.6.1.1.3 Fitting the main contactor

Serial number: 6277977-6520197



1. Guide in the main contactor.

13.6.7 Option buttons

There are six option buttons in the handle, all of which can be used for different options.

13.6.8 Display

The display is a four-digit, seven segment, numeric information display with coloured LED symbols, together with a menu-based information system as the primary communication tool between the operator/technician and the truck.

In logged-in mode, the display is always lit and shows battery capacity in the numeric field while the battery indicator is lit.

13.6.9 Symbols on keypad and display

A keypad and a numeric information display with coloured LED symbols are used together with a menu-based information system as the primary communication tool between the operator/technician and the truck.

In logged-in mode, the display is always lit and shows battery capacity in the numeric field while the battery indicator is lit.

Symbol	Description
	ON button. This button is used to start the truck and confirm entered settings during PIN code management
	OFF button
	Error code
	Battery charge as a percentage
	Parameter
	Hour meter

13.6.10 Weighing system

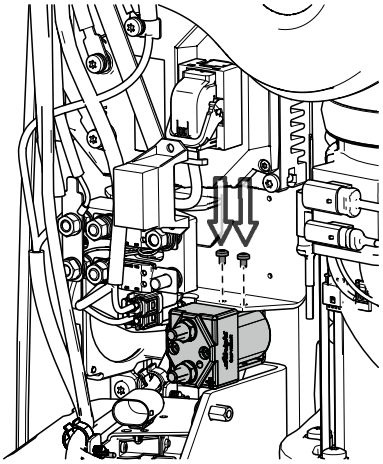
Applies from software -018

Calibration sequence 13 must be run before you use “Weight indication on fork lift value 2” for the first time.

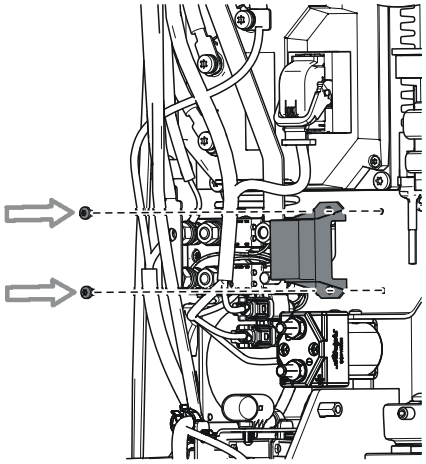
By setting parameter 311 to 2 = fork lift/free lift, you can get an estimated load weight based on hydraulic pressure. The display automatically shows the load weight in increments of 50 kg on fork lift/free lift if the forks are lowered shorter than 300 ms. The load weight is shown on the display for four seconds.

13.6.11 Pressure equalization

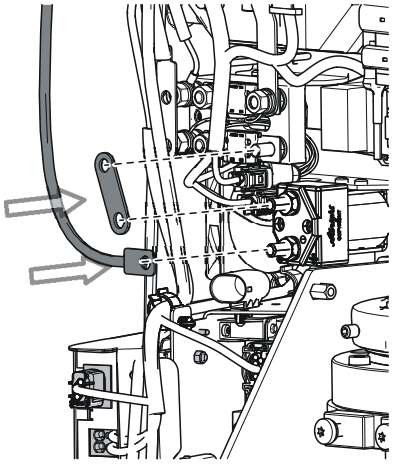
Activates and controls a pressure equalization pulse after a lift. This is to equalize the pressure, and to get a better measurement of the load weight. Set to 0 via parameter 312 to switch off the function (standard). If it is set to a higher value than 0, the duration of the lowering pulse will be a multiple of the parameter value 20 ms. The truck must have a pressure sensor to enable the function.



3. Torque tighten the screws to the pump contactor.2.5 $^{0.25}/_{0.25}$ N·m



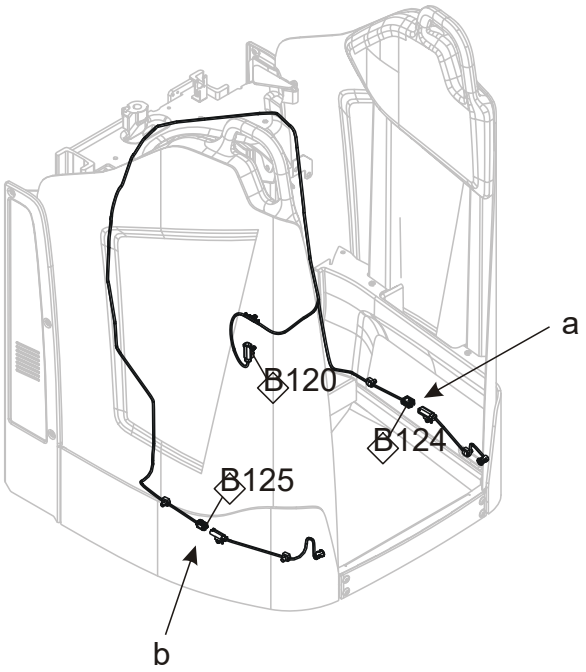
4. Fit the fuse holder. 2.8 $^{0.7}/_{0.7}$ N·m



5. Fit the cable and plate.

13.11.2.3 Photocell

13.11.2.3.1 Overview [Photocells for fixed side guards]



Pos.	Designation
a	Photocell receiver *[B124]*, page 19 - 2
b	Photo cell transmitter *[B125]*, page 19 - 2

13.11.2.3.2 Description

13.11.2.3.2.1 Function

Transmitter/receiver photocell = a transmitter sends a light beam to a separate receiver which is activated when the light beam is interrupted.

13.11.2.3.3 Checking the photocell

1. Check the photocell (Built-in) to ensure it cuts out if a foot is outside the platform.

   If the photocell does not cut out: The photocell does not disconnect if the foot is outside the platform for longer than 500 ms when driving slower than 6 km/h.

   Adjust the sender and the receiver so that they are pointing directly at each other.

When the job is done:

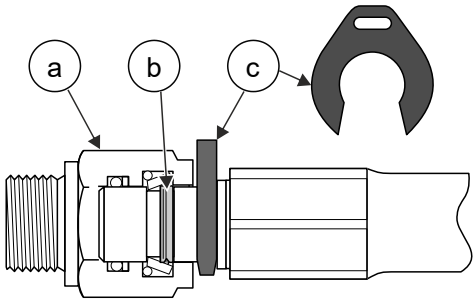
- Check components and connections for leaks.
- Listen for abnormal noise when starting the hydraulic system.
- Tighten all screwed joints, plugs and screws in the system after releasing the pressure.
- Check the oil level with the cylinders retracted after purging the system, top up if needed.

14.2.2 Construction

The hydraulic system consists of a hydraulic unit with contactor-controlled DC motor for lifting and an On/Off-controlled solenoid valve for lowering. The lowering flow and thereby the lowering speed is regulated hydraulically by a flow control valve. The PowerTrak cylinder has a constant connection to the lift cylinders and will thereby always have the same pressure as these. Its speed during filling and emptying is limited by a restrictor.

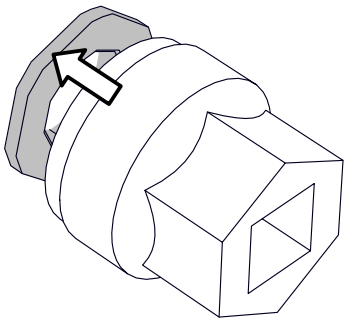
14.3 Quick change connectors

14.3.1 Overview quick change connectors



Pos.	Designation
a	WEO insert (female)
b	Disassembly ring
c	Assembly stop

14.3.2 Removing female quick change connectors



1. Place the removal tool up against the WEO insert

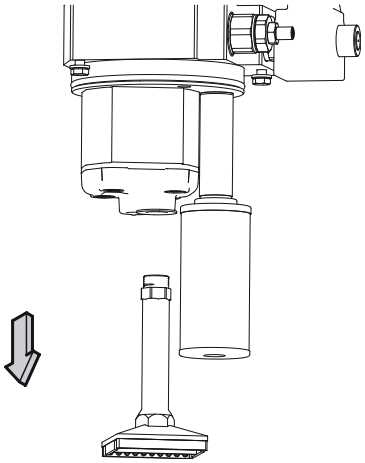
   19mm WEO insert removal
   23mm WEO insert removal
   26mm WEO insert removal

Resetting

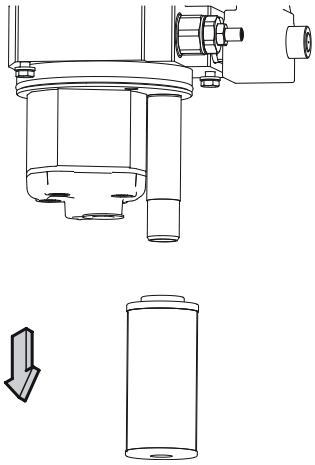
14.4.3.4 Replacing the return filter

14.4.3.4.1 Removing the return filter

Removing the tank, page 14 - 10

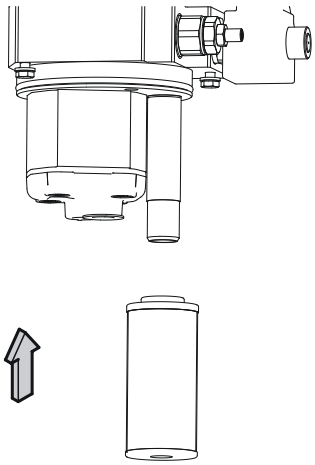


1. Loosen and unscrew the suction strainer.

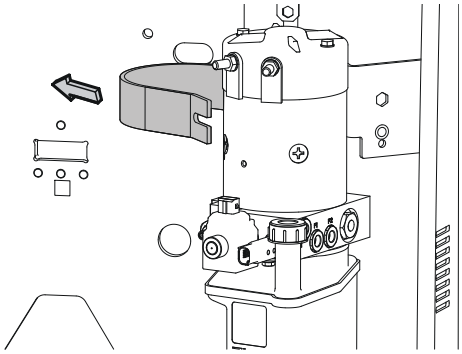


2. Remove the return filter by pulling it straight down.

14.4.3.4.2 Fitting the return filter

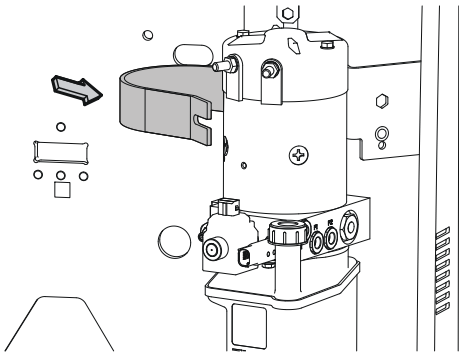


1. Press the return filter straight up on the pipe.

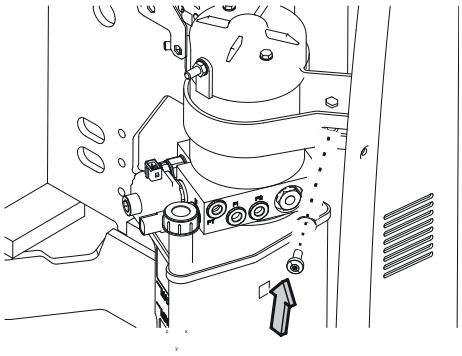


3. Move the clamp to one side.
4. Remove the unit.

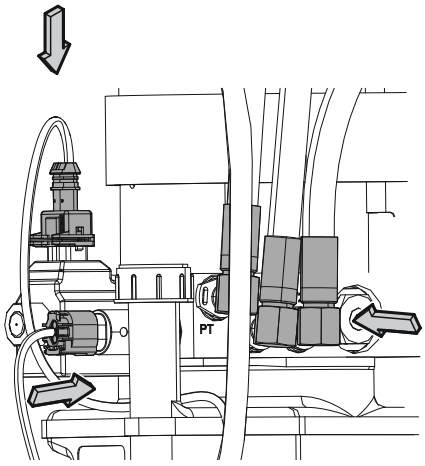
14.4.6.2 Installing the hydraulic unit



1. Lifting the unit into place.
2. Fit the clamp.



3. Screw it in place.



4. Connect and mount all connections.

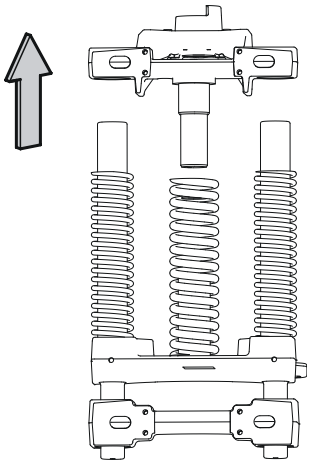
14.7.2 PowerTrak cylinder C6680

14.7.2.1 Replacing the PowerTrak cylinder

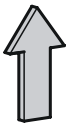
14.7.2.1.1 Removing the PowerTrak cylinder

Preparations

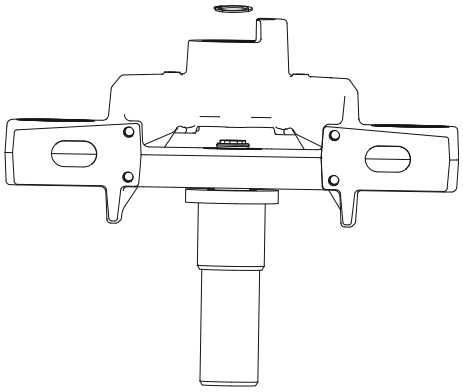
Releasing the spring tension, page 8 - 75
Releasing the spring tension, page 8 - 76



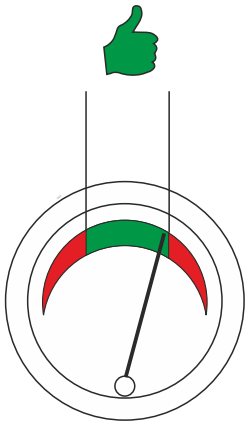
1. Lift the top cover to the drive unit mounting.



2. Remove the circlip.



16 Auxiliary equipment, installation equipment C8000

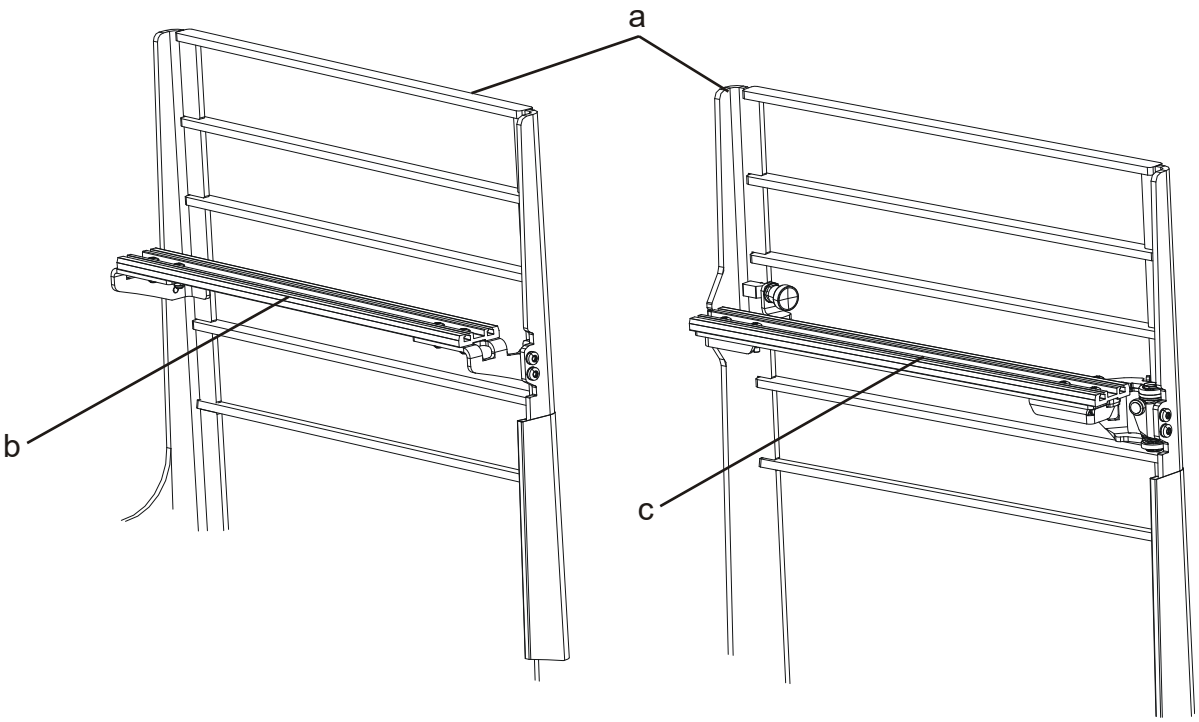


2. Check that the pressure gauge indicator is in the green field.

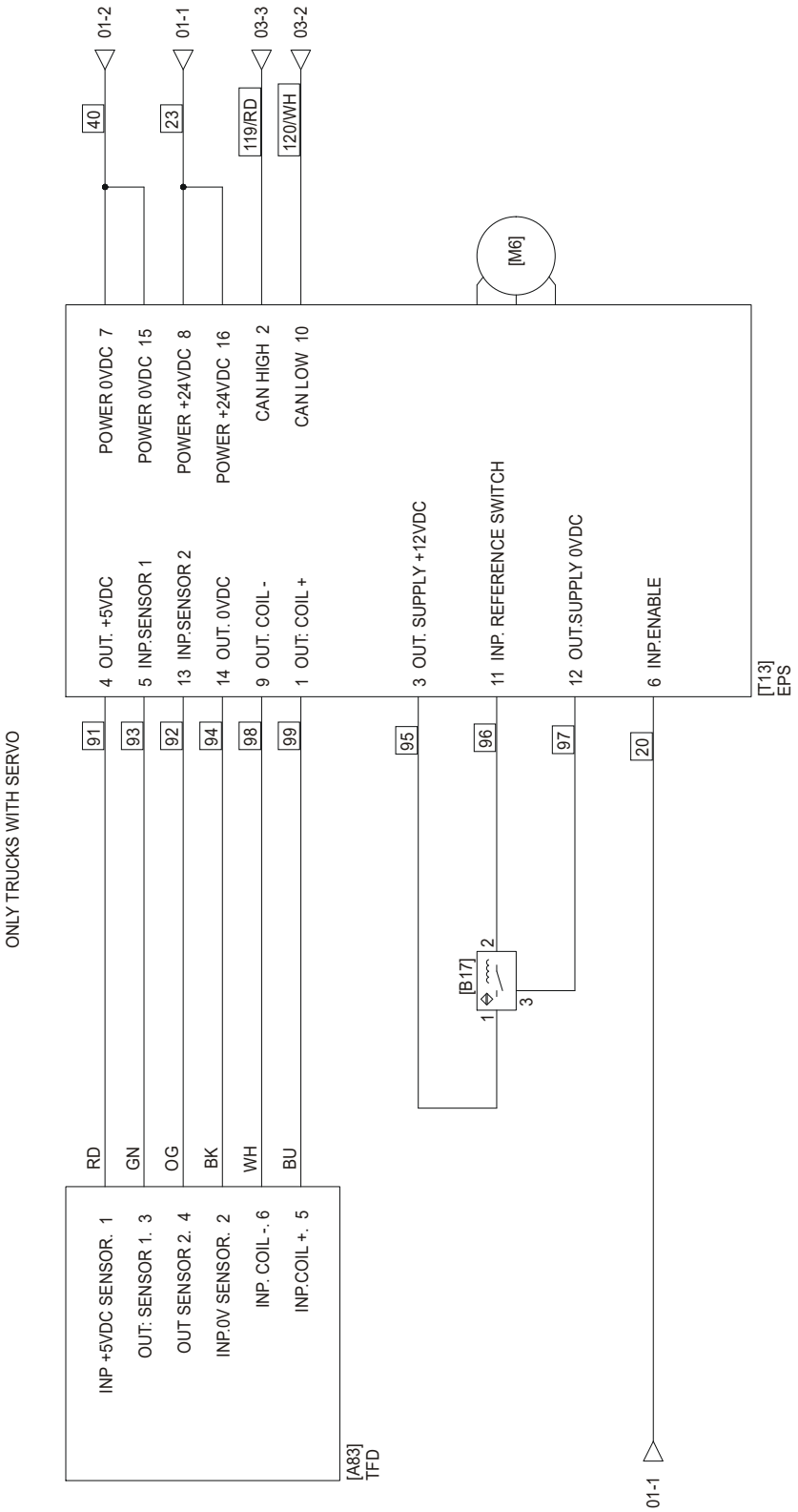
   If the indicator is in the red field, the fire extinguisher is not fit for use and must be recharged.

17.3.2 Horizontal E-bar

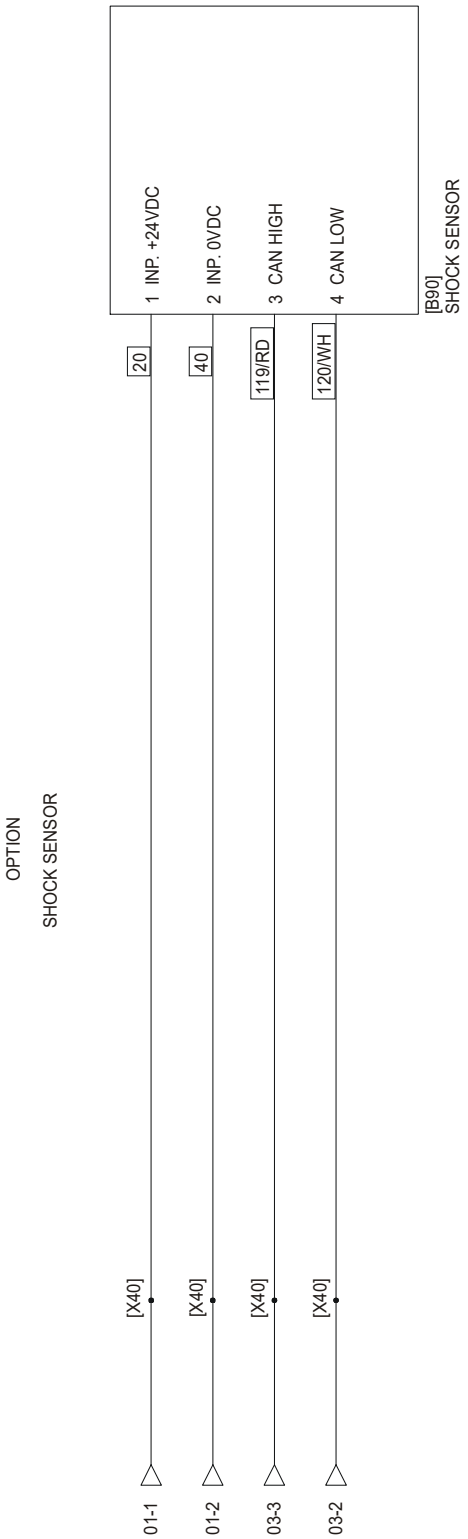
17.3.2.1 Overview



Pos.	Designation
a	Load protection
b	E-bar mounted
c	Pivoting E-bar


ONLY TRUCKS WITH SERVO
01-2
01-1
03-3
03-2
40
23
119/RD
120/WH
[M6]
POWER 0VDC 7
POWER 0VDC 15
POWER +24VDC 8
POWER +24VDC 16
CAN HIGH 2
CAN LOW 10
4 OUT. +5VDC
5 INP.SENSOR 1
13 INP.SENSOR 2
14 OUT. 0VDC
9 OUT. COIL -
1 OUT. COIL +
3 OUT. SUPPLY +12VDC
11 INP. REFERENCE SWITCH
12 OUT.SUPPLY 0VDC
6 INP.ENABLE
[T13]
EPS
91
93
92
94
98
99
95
96
97
20
RD
GN
OG
BK
WH
BU
[B17]
2
1
3
INP +5VDC SENSOR. 1
OUT: SENSOR 1. 3
OUT SENSOR 2. 4
INP:0V SENSOR. 2
INP. COIL -. 6
INP.COIL +. 5
[A83]
TFD
01-1

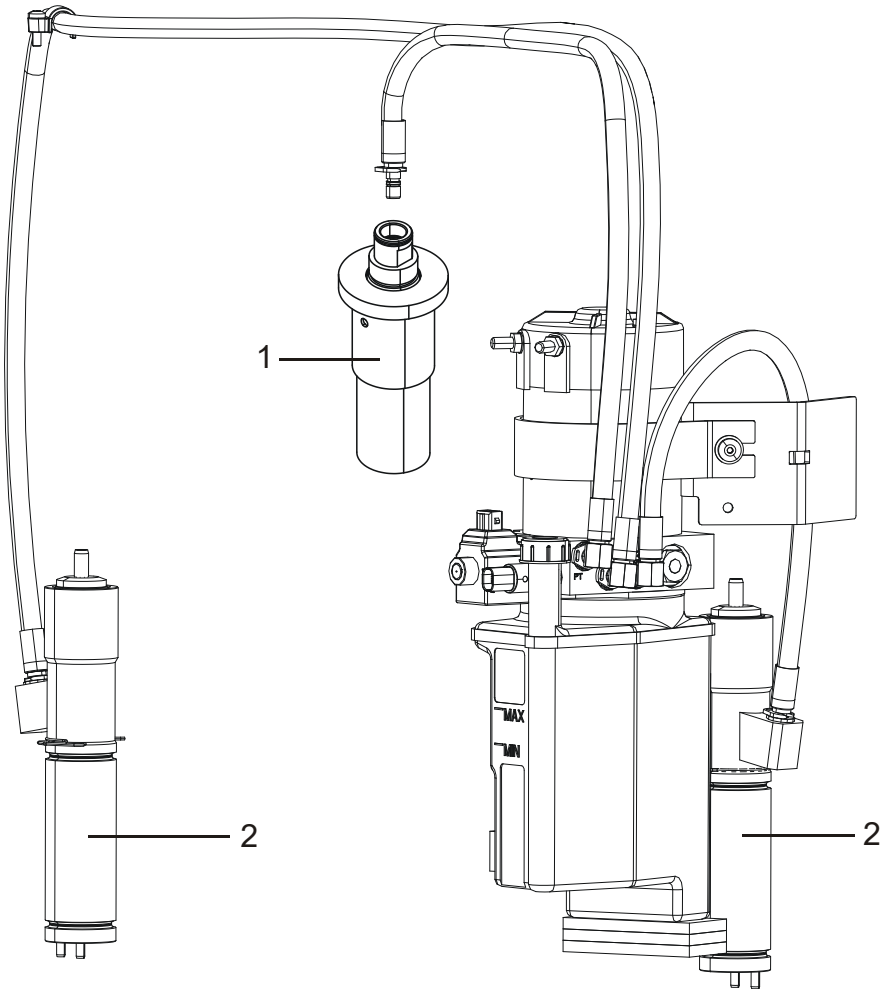
7609115-C-5


OPTION
SHOCK SENSOR
[B90]
SHOCK SENSOR
1 INP. +24VDC
2 INP. 0VDC
3 CAN HIGH
4 CAN LOW
20
40
119/RD
120/WH
[X40]
[X40]
[X40]
[X40]
01-1
01-2
03-3
03-2

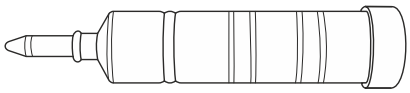
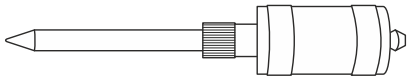
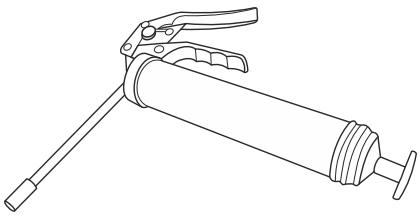
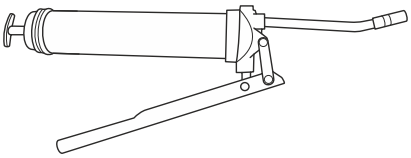
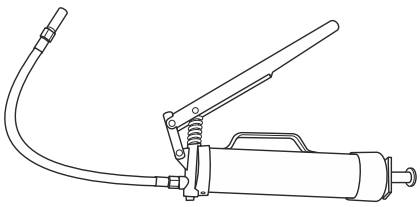
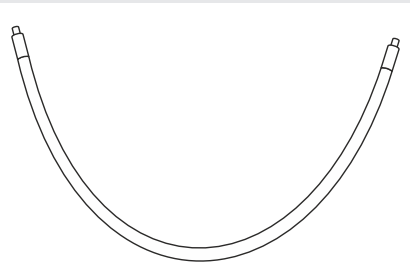
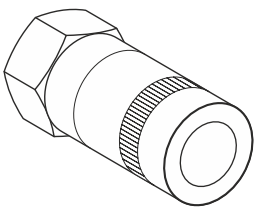
7609115-C-15

20.3 Component location

20.3.1 Picture 1



21.2 Lubricating tool

Tools	Number	Usage
	24981	Tool with a pointed nozzle used to apply grease. Length 170 mm.
	202154PM	Pointed nozzle for grease guns used to apply grease in recessed nipples. Fits grease guns with hose and discharge pipe. Length 125 mm.
	755132	Single-hand grease gun with straight discharge pipe and nozzle.
	755142	Two-handed grease gun with angled discharge pipe and nozzle.
	755152	Two-handed grease gun with hose and nozzle.
	755145 755146 755147	Lubricating hose 450 mm. Lubricating hose 750 mm. Lubricating hose 1500 mm.
	755140	Nozzle for necked nipples. Fits grease guns with hose and discharge pipe.

Pos.	Ambient temperature	Viscosity class	Recommended products*
D	> +45°C < +80°C	VG 220	Klüberoil 4UH 1-220N, Klüber Lubrication