Workshop literature

STILL
ELECTRONIC
DOCUMENTATION
SYSTEM

Double stacker

EXD 20
EXD-SF 20

CE

0260 0261

50238070901 EN - 03.2010

first in intralogistics

Description

Introduction

Layout

This workshop manual essentially has 2 parts, namely:

- General information on the product, diagnosis of breakdowns and specific tools: Group 0
- Repair instructions: Groups 1 to 9

Each part of the current manual is composed of a set of separate sheets that are filed in a STILL binder according to their group number.

The manual is organised according to the same rules used for the spare parts catalogue, which is divided into sub-groups (assemblies or construction groups).

To make it as simple as possible to identify the assemblies presented in this manual, the number of each assembly is printed in the upper right-hand corner of each page.

Where necessary, we have included tables to provide the maintenance department with relevant technical data. These tables must also be consulted by experienced mechanics.

The manual contains a detailed description of truck design characteristics as well as component and assembly operating characteristics.

To supplement the operations described in this manual, notes, instructions and explanatory diagrams have been provided.

Diagnosis of breakdowns

The diagnostic software makes it possible to quickly locate the source of a problem identified in the electrical system and to accurately determine its cause. It has been set out as follows:

- Using a notebook
- Controller setting
- Menus

The circuit diagrams in Chapter 6 are in DIN A4 format and those found at the end of the manual are in DIN A3 format.

Notes, printing

To be observed when working with this manual

This workshop manual addresses standard truck models, as well as particularly common variants of these vehicles.

Using this manual in accordance with our instructions does not guarantee a specific result. It will have no bearing on STILL warranty conditions.

Editor

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60160 MONTATAIRE CEDEX, France

STILL makes continuous efforts to enhance and improve its products. The design and construction of our trucks are constantly evolving. As a result, the information contained in this manual may be modified without prior notice.

Emissions

Noise emissions

The values are determined using the methods set out in European Standard EN 12053 (measurement of noise emissions from industrial trucks, based on Standards ISO 11201 and EN ISO 3744 and in compliance with standard EN ISO 4871). According to these methods, the truck generates the following weighted sound pressure levels: Permanent sound pressure level in the operator's seat:

LpAz	66 dB (A)
Uncertainty KpA	2,5 dB (A)

These values were recorded during a test cycle using an identical machine and calculated from the weighted values under driving, lifting and idling conditions.

Time proportions:

Lifting	18%
Idling	58%
Driving	24%

However, the noise measurements taken near the truck cannot be used to calculate the noise level at the work places in compliance with the **European Community Directive 86/188/EEC** (daily personal noise exposure). Noise levels must be measured directly at the work places and measurement must account for other factors (additional sources of noise, specifics of application and sound reflection).

Vibrations

Machine vibrations were measured using an identical machine, in accordance with Standard CEN EN 13059 "Test methods for measuring vibration by industrial trucks".

Weighted effective value of the stress on the body by acceleration (feet or seat):	0.76 m/s^2
Uncertainty K	±0.23 m/s^2

Trials have shown that the amount of hand-arm vibration when using the steering wheel and controls is less than 2.5 m/s^2 for industrial trucks. Consequently, no legal guidelines exist for this type of measurement.

The personal stress on the operator caused by vibrations during a day's work must be noted if

Slinging and jacking the truck

Slinging

To lift the truck, the truck sub-assemblies or additional equipment, lifting devices must only be hooked onto the appropriate lifting points. When lifting with a jack, take appropriate measures (use chocks or wooden blocks) to prevent the truck from slipping or tipping over.

Jacking

Certain maintenance operations require the truck to be lifted using a jack and chocks to be fitted. Always make sure:

- to use a jack with an adequate lifting capacity,
- the truck is parked on level ground and is secured against rolling and tipping over.

⚠ WARNING

Always disconnect the battery connector before lifting the truck!

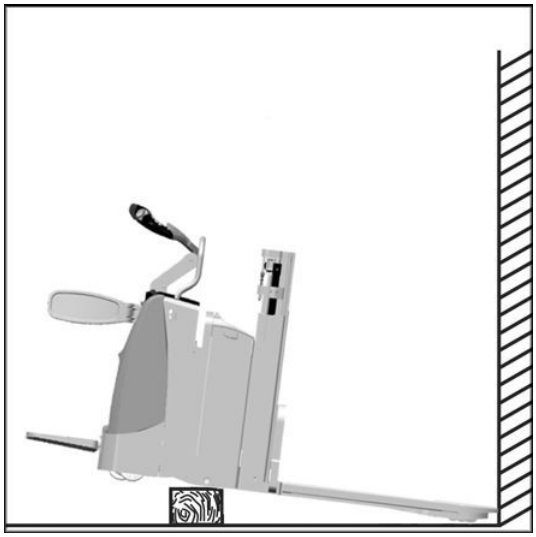
Jacking the chassis

▷

– Place the truck with its fork against the wall.

– Jack up the truck until the wheels are no longer in contact with the ground.

– Ensure that the truck is safe by using chocks.



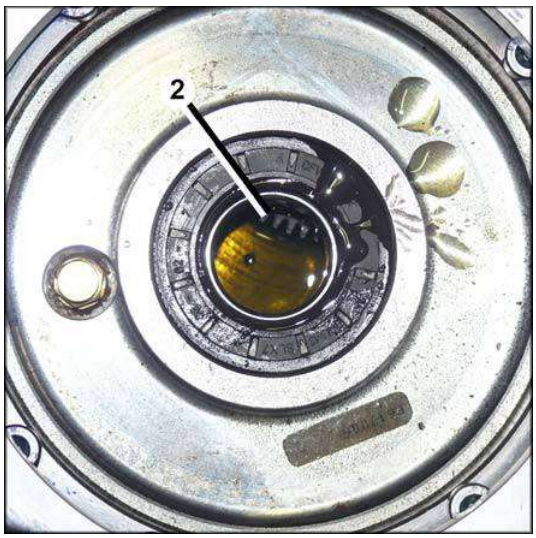
Code	Designation	Problem	Consequence
485	Software (internal controller fault)	Monitoring microcontroller: the main microcontroller has not processed the serial connection correctly	Truck stops
486	Software (internal controller fault)	Monitoring microcontroller: incorrect "Speed-Reduction-With-Steering" signal	Truck stops
49x and 431	Hardware (internal controller fault)	External relay fault during the start-up test	Truck stops

– Unscrew the six transmission gear mounting screws (1).
– Carefully lower the transmission gear to the floor, then release it from the chassis from underneath.

Reassembly

– For reassembly, proceed in the reverse order
– Coat the six mounting screws of the transmission gear (1) with Loctite 242 and tighten them.

– Fill up with ARAL DEGOL GS 220 gearbox oil (approximately 1.1 litres).



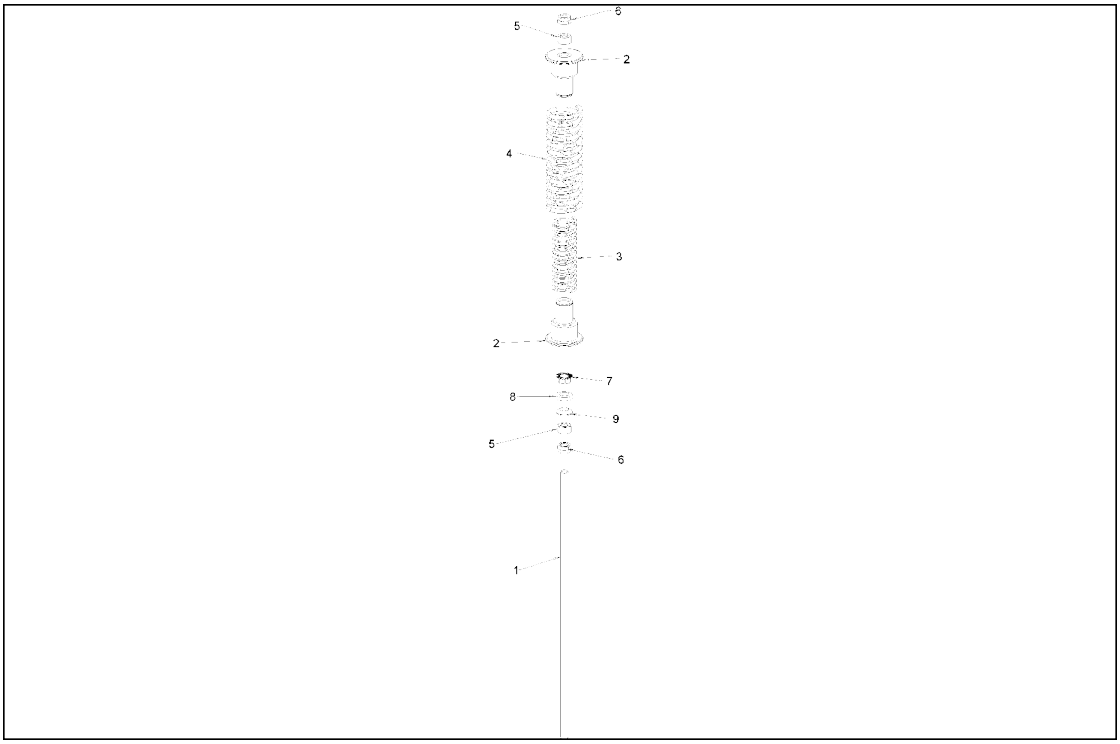
NOTE

If the level is correct, approximately 1/3 of the pinion (2) must be immersed in the oil.

⚠ CAUTION

Do not overfill. Overfilling may damage the seals and make it impossible to maintain the correct operating temperature.

Proportional spring

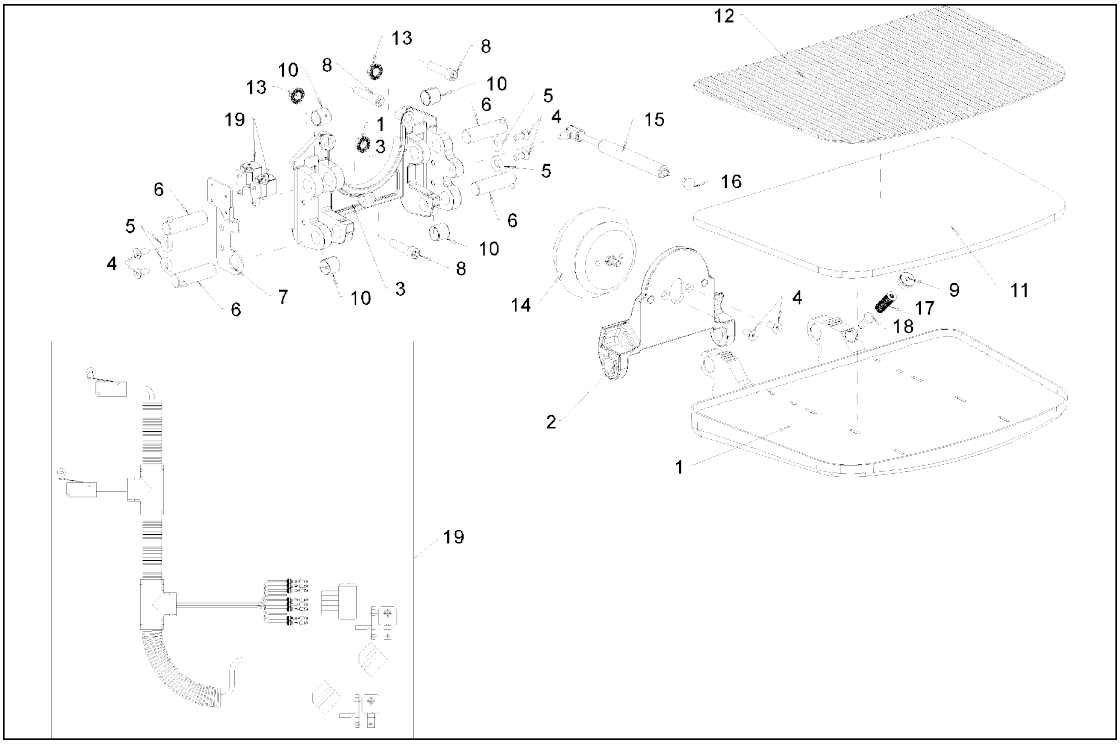


1	Rod	6	DIN 985 HM 12x8 A2C nut
2	Spacer ring	7	M12 RIPP DAC nut
3	Spring	8	DIN 6319 D 14.2 bearing
4	Spring	9	DIN 6319 C13 spherical washer
5	DIN 934 HM 12x8 A2C nut		

– Park the truck (see ⇒ Chapter "Parking the truck.", P. 00-19).
– Engage the emergency stop.
– Open the battery cover.
– Disconnect the battery connector (see ⇒ Chapter "Battery plug", P. 00-19).
– Remove the motor cover (see ⇒ Chapter "Access to the technical compartment", P. 30- 1).

Platform

Folding platform



1	Platform	10	Bush
2	Support	11	Rubber mat
3	Support	12	Rubber mat
4	ISO 10642 DIN 7991 FHC M8x20 10.9 A2R screw	13	M12 RIPP DAC nut
		14	Air spring
5	Locking pin	15	Gas spring
6	Shaft	16	Ball joint
7	Support	17	Washers
8	Screw	18	Shaft
9	DIN 908 M18x1.5 cap screw	19	Platform wiring harness

Removing the upholstery

– Unscrew the three mounting screws (10) from the upholstery (3). ▷

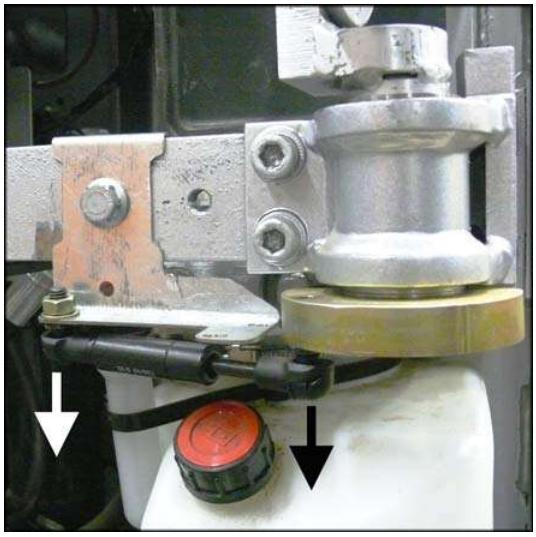
Refitting the upholstery

– For reassembly, proceed in the reverse order.

Removing gas springs

– Remove the motor cover (see ⇒ Chapter "Access to the technical compartment", P. 30- 1).

– Unclip the gas spring (11). ▷



Refitting gas springs

– For reassembly, proceed in the reverse order.

⚠ CAUTION

Observe the direction of fitting of the springs.

Removing side partitions

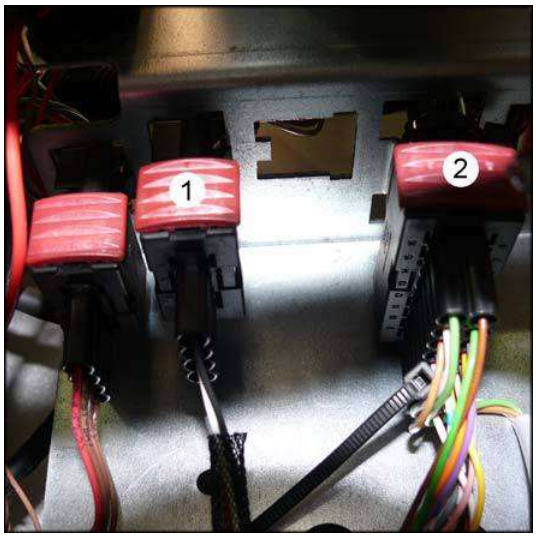
– Remove the motor cover (see ⇒ Chapter "Access to the technical compartment", P. 30- 1).

– Unscrew the outer nut (16). ▷

1	Tiller arm
2	Fixed support
3	Bush
4	ISO 70894 washer
5	M4x12 8.8 A2C ISO 4762 screw
6	Bolt
7	Stop
8	A20x13.5 DIN 95364 spring
9	Backing plate
10	3x6x0.5 A2C NFE 25511 washer
11	M3x20 8.8 A2C ISO 4762 screw
12	Gas cylinder
13	Ring
14	Bolt
15	Bearing
16	0.5 mm planing ring
17	Bearing
18	Spacer ring
19	Spring washer
20	Parallel pin
21	60x95 DIN 625 grooved ball bearing
22	Retaining ring 60x2 DIN 471
23	Flange
24	Screw
25	Potentiometer
26	M3x6 ISO 4762 screw
27	M3x25 ISO 4762 screw
28	3x6x0.5 A2C NFE 25511 washer
29	Screw
30	8x16x1.4 NFE 25511 washer
31	M8x12 8.8 A2C NYL ISO 4762 screw
32	Guard plate
33	M4x10 10.9 screw
34	Electronic key
35	Retaining ring M8x16 DIN 471
36	M8x16 ISO 10642 screw
37	Sealing ring
38	Support
98	Electronic key harness
99	Electronic key harness

Removal

- Park the truck (see ⇒ Chapter "Parking the truck.", P. 00-19).
- Engage the emergency stop.
- Open the battery cover.
- Disconnect the battery connector (see ⇒ Chapter "Battery plug", P. 00-19).
- Remove the motor cover, the tiller cover and the dashboard cover (see ⇒ Chapter "Access to the technical compartment", P. 30- 1).
- Disconnect the tiller connector (1) and the connector for the tiller sensor + tiller head (2). ▷



- Cut off the cable ties.
- Unscrew the three mounting screws from the tiller support using a size 6 mm ratchet handle.
- Remove the tiller.

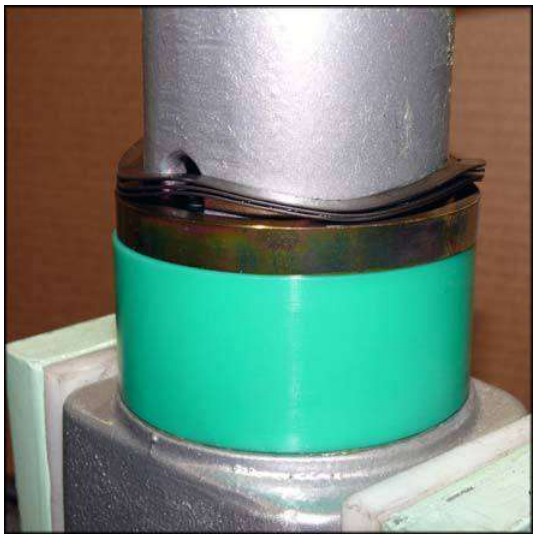
Reassembly

- To refit, proceed in reverse order.

Complete disassembly of the tiller arm

- Park the truck (see ⇒ Chapter "Parking the truck.", P. 00-19).
- Engage the emergency stop.
- Open the battery cover.
- Disconnect the battery connector (see ⇒ Chapter "Battery plug", P. 00-19).

– Remove the trunnion, the spacer and the three pre-load washers. ▷
– Remove the bearing.



Wheels

Drive wheel

Dimensions

Initial dimensions: Ø 230 x 75

The drive wheel must be replaced if:

- the tyre tread is cut, loose or badly out-of-round.
- the wheel diameter has reduced by 10 %.

Disassembly

– Park the truck (see ⇒ Chapter "Parking the truck.", P. 00-19).

– Engage the emergency stop.

– Open the battery cover.

– Disconnect the battery connector (see ⇒ Chapter "Battery plug", P. 00-19).

– Remove the motor cover (see ⇒ Chapter "Access to the technical compartment", P. 30- 1).

– Loosen the nuts with the wheel on the floor.

– Jack up the machine.

– Turn the drive wheel to allow the nuts to be unscrewed from inside the chassis.

– Remove the drive wheel.

Reassembly

– Before refitting the drive wheel, clean the seating and check it is in perfect condition.

– Fit the drive wheel and cross-tighten the wheel nuts to a torque of 83 Nm.

NOTE

If the thread on a wheel nut or stud is damaged, they must be changed.

After changing the drive wheel, you are advised to check the stabiliser roller setting.

⚠ DANGER

The stabiliser roller setting affects truck stability (risk of the truck tipping).

Allocation of pins

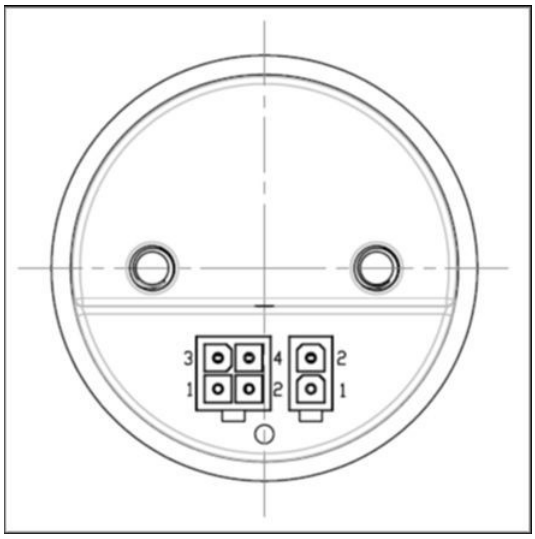
4-pin connector:

- Pin 1: -
- Pin 2: +
- Pin 3: CAN_L
- Pin 4: CAN_H

2 pin connector (only where there is an on-board charger):

- Pin 1: green LED
- Pin 2: red LED

▷



Disassembly

Disassembly

– Park the truck (see ⇒ Chapter "Parking the truck.", P. 00-19).

– Engage the emergency stop.

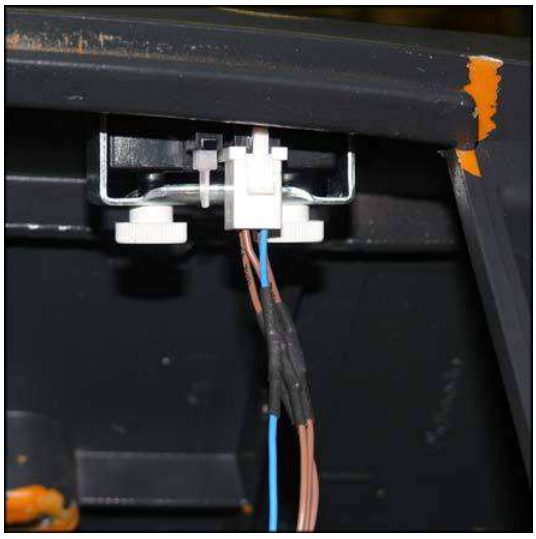
– Open the battery cover.

– Disconnect the battery connector (see ⇒ Chapter "Battery plug", P. 00-19).

– Remove the dashboard (see ⇒ Chapter "Access to the technical compartment", P. 30- 1).

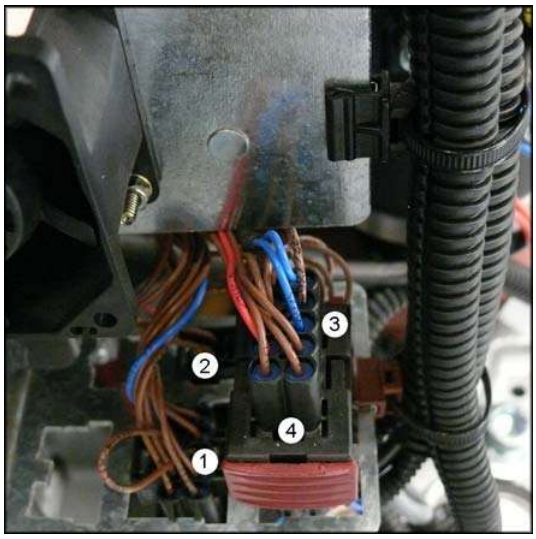
– Remove the connector.

▷



– Disconnect the connector for the two side protection and platform sensors (1).
– Disconnect the recopy potentiometer connector (3).

▷

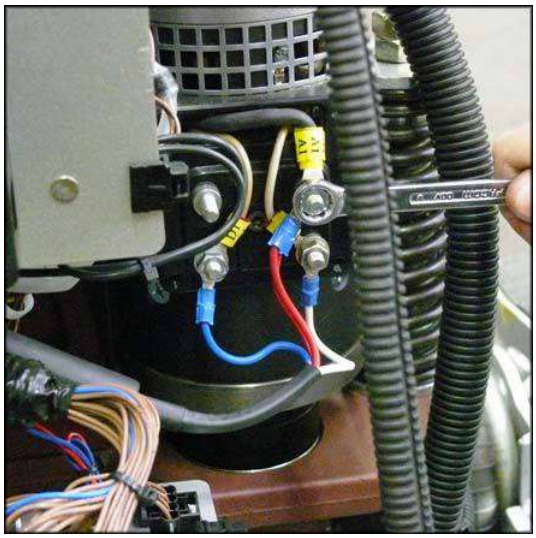


– Extract the two fan pins from the connector using a puller.

▷

– Unscrew the steering motor cables, taking care to mark them for refitting.

▷



- Charged 1.27 kg/l
- Discharged: 1.13 kg/l

During measurement, the floater must not touch laterally or above. The correct value for the acid density is obtained about 1/2 hour after charging finishes.

If the correct value is to be ensured, avoid measuring immediately after topping up with water, because the water and the acid must be mixed.

The battery temperature must not differ much from 30 °C during measurement.

Protection against damage and accidents

When handling batteries, you are exposed to a high risk of accident. For this reason it is essential the following points are observed.

⚠ DANGER

The charging gas can cause fire or explosion.

Measures to be taken: Good ventilation, avoid electrical sparks, no naked flames in battery compartments, no smoking.

⚠ DANGER

The acid can cause injury and corrode the cells.

Measures to be taken: Wear protective clothing against acids, rubber gloves and safety glasses, keep neutralisation products close at hand. Have water ready for rinsing eyes (if there is any injury to the eyes call a doctor immediately).

⚠ DANGER

Voltages greater than 40 V can be a danger to health.

Measures to be taken: Do not touch current conducting elements, inform the personnel. Respect VDE 0100 and VDE 0105.

⚠ DANGER

Lead and lead compounds are harmful to health if they are absorbed by the human body.

Measures to be taken: Do not eat or drink where batteries are charged, always wash your hands after working on batteries.

⚠ DANGER

If tipped over or if they fall from lifting gear, batteries can cause damage.

Measures to be taken: Only use appropriate, safe lifting gear. When transporting, provide appropriate protection to prevent the batteries from tipping over or slipping off the load platform of the means of transport.

Putting a battery into service, not filled and plates not charged.

After removing the closing stoppers, all the cells must be filled regularly with sulphuric acid, density 1.25 kg/l, up to the lower acid level marker, (using a cell filling system or a plastic hopper).

The filling acid must have a temperature greater than or equal to 15 °C. After a rest period of 5 to 6 hours, possibly add a little acid.

The rise in temperature must be measured using a thermometer dipped into the electrolyte of a cell in the middle of the battery. If the rise in temperature is less than 10 °C, the battery can be connected to the charger for recharging.

The charging time is from 6 to 12 hours, until automatic stoppage by the charger control switch.

The temperature must be monitored during charging. It must not exceed 55 °C. if it does the charging process must be stopped so that the battery can cool down.

At the end of the charging process, the acid density must be 1.27 kg/l plus or minus 0.01 kg/l. If it is not, charging must be continued until a uniform acid density of 1.27 kg/l is reached.

The battery is then ready to operate. If necessary, bring the electrolyte up to the nominal level, using distilled water. If the acid density is too high, remove some acid and add distilled water.

Replacing the battery

There are two options:

- from above using a lifting device,
- from the side using a battery trolley (option).

1 Base lift cylinder (Z1)
2 Lowering retarder
3 Main lift cylinder (Z2)
4 Main lift cylinder (Z2)
5 Lowering retarder
7 Hydraulic block
8 Main lift solenoid valve (Y4)
9 Base lift solenoid valve (Y3)
10 Hydraulic unit
11 Lowering solenoid valve (Y1)
12 Flow restrictor
13 Pressure cut-off
14 Tank
15 Oil screen
16 Pump motor
17 Pump
18 Non-return valve

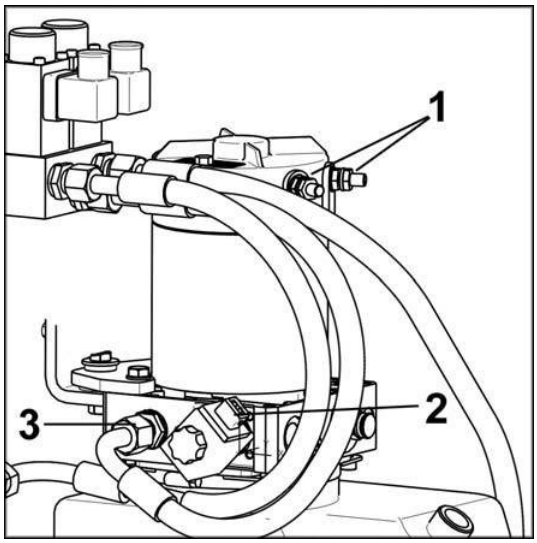
Purpose	Activated component			
	M	Y1	Y4	Y3
Main Lift	x		x	
Base lift	x			x
Main lowering		x	x	
Base lowering		x		x

– Disconnect the battery plug (see ⇒ Chapter "Safety instructions", P. 00-19).
– Take off the motor cover (see ⇒ Chapter "Covers", P. 30- 1).
– Disconnect the electric cables on the motor (1) and the solenoid valve (2).
– Disconnect the hydraulic hose (3) on the pump unit.
– Plug the hole with an M"" stopper.

⚠ CAUTION

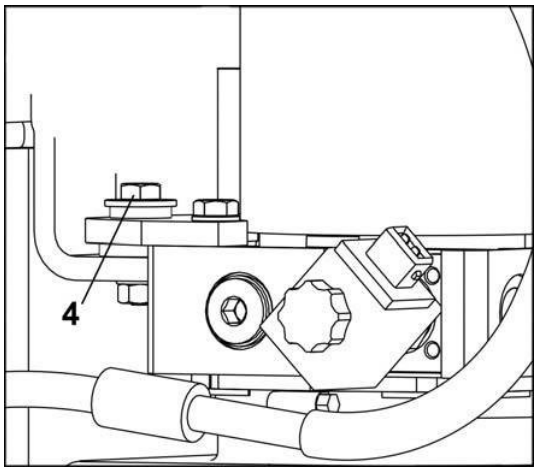
Oil may escape, so make sure you have something to collect in it and wear appropriate protection.

▷



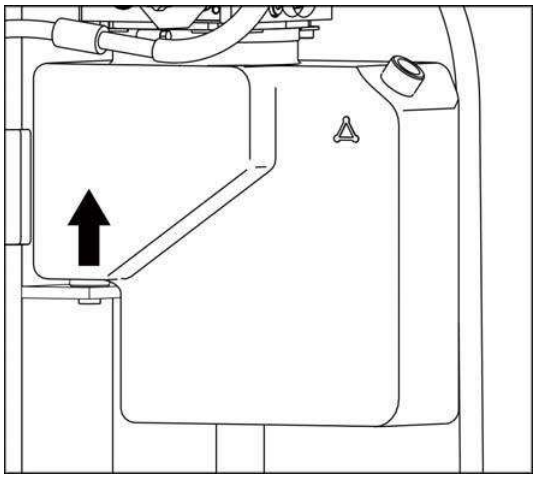
– Remove the screw, nut and washer (4) which hold the pump unit and support in place.

▷



– Lift the pump unit, tilting it slightly, so that the tank comes off its support spigots.
– Remove the pump unit.

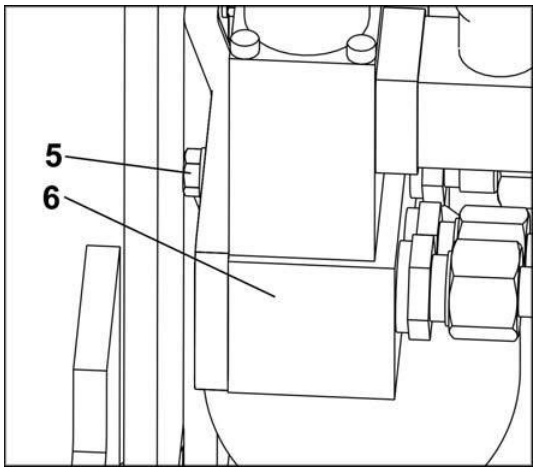
▷



⚠ WARNING

Do not tilt the pump unit too far as there is oil in the tank.

– Remove the screw and washer (5) holding the distributor in place (6).
– Remove the distributor (6).



Reassembly

– Proceed in reverse order.

NOTE

Bleed the hydraulic system and top up the oil if necessary.

Lift cylinder

Main lift cylinder

Removal

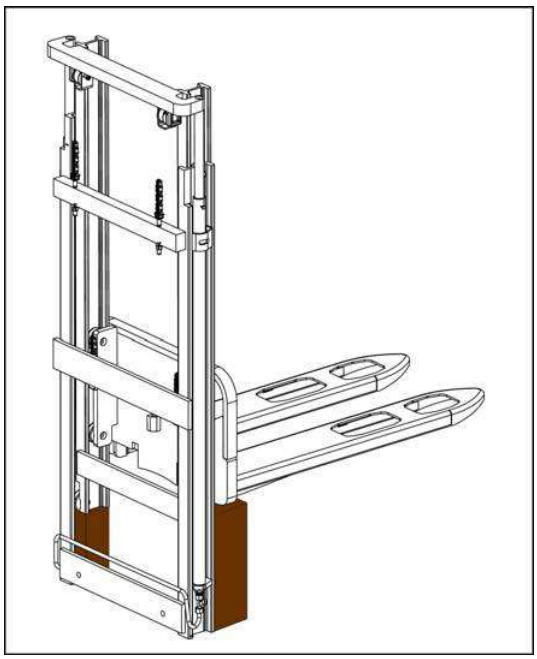
– Remove the protective cover for the lift cylinders (see ⇒ Chapter "Cylinder housing", P. 30- 7).

– Raise the mast about 500 mm with the related control.

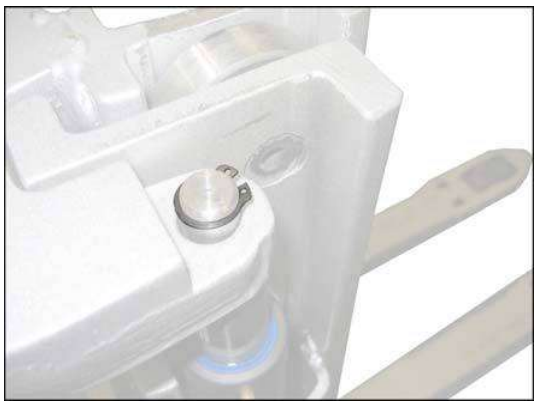
– Secure the truck against rolling with squared timbers.

– Disconnect the battery connector (see ⇒ Chapter "Safety instructions", P. 00-19).

– Support the mast so that the inner mast can not lower (eg with squared timbers). ▷



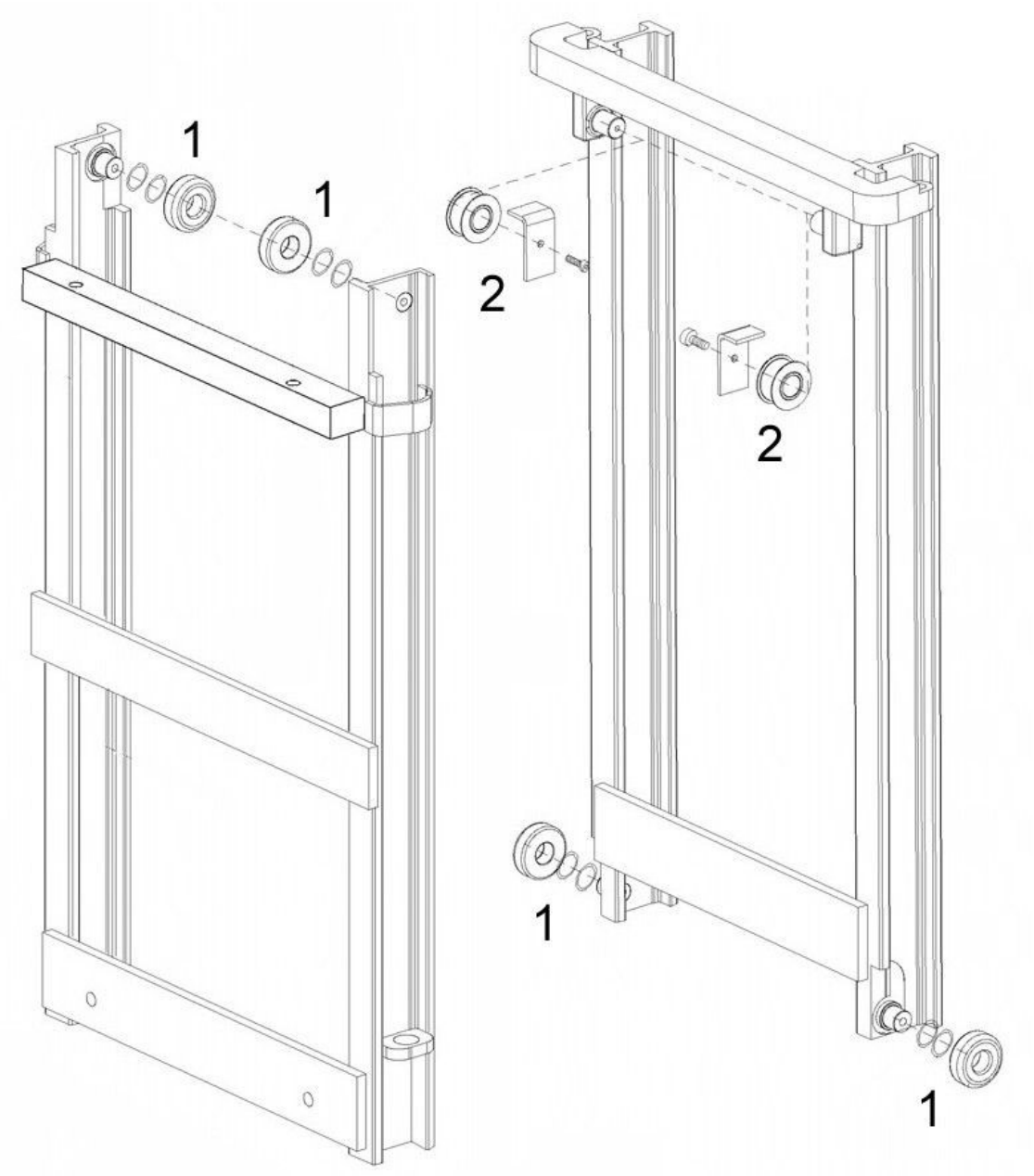
– Remove the circlip on the piston rod. ▷



Rollers

Mast rollers and chain rollers

General



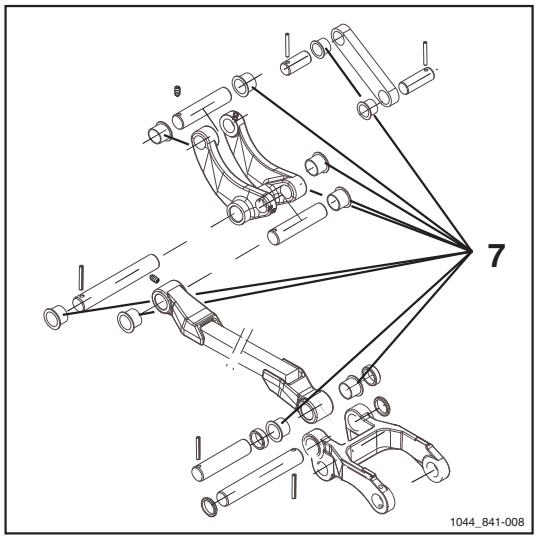
The mast rollers (1) are used for the vertical guidance of the mast.

Except for a light film of grease on the running surface (corrosion protection), the mast rollers do not need servicing during maintenance.

The chain rollers (2) are used to regulate the tension of the lift chains.

– Dismantle the roller holder levers of the tie rods.

– To replace the rings (7) of the lever brackets, countersink them using a jet, then proceed with their replacement.



⚠ CAUTION

Never lubricate the rings (7).

Reassembly

– Proceed in reverse order.

Separating the chassis/motor

Disassembly

– Carry out the dismantling procedure for the tie rods (see ⇒ Chapter "Tie rods", P. 84- 1).
– Dismantle the lifting cylinder (see ⇒ Chapter "Lift cylinder", P. 81- 2).
– Disconnect the (+) cable linked to the emergency stop button.
– Disconnect the (-) cable linked to the changer.

NOTE

Remove the collars which can be a hindrance when separating the chassis.

– Sling the front section.
– Lift until dismantled.

Reassembly

– Proceed in reverse order.

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