Maintenance Manual

WP2300 Series

MS-WP2300 04/03 • Printed in Germany
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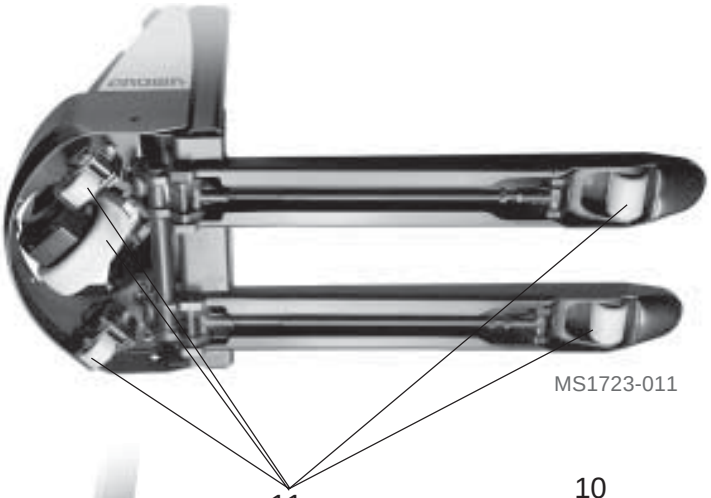
LUBRICATION AND ADJUSTMENT

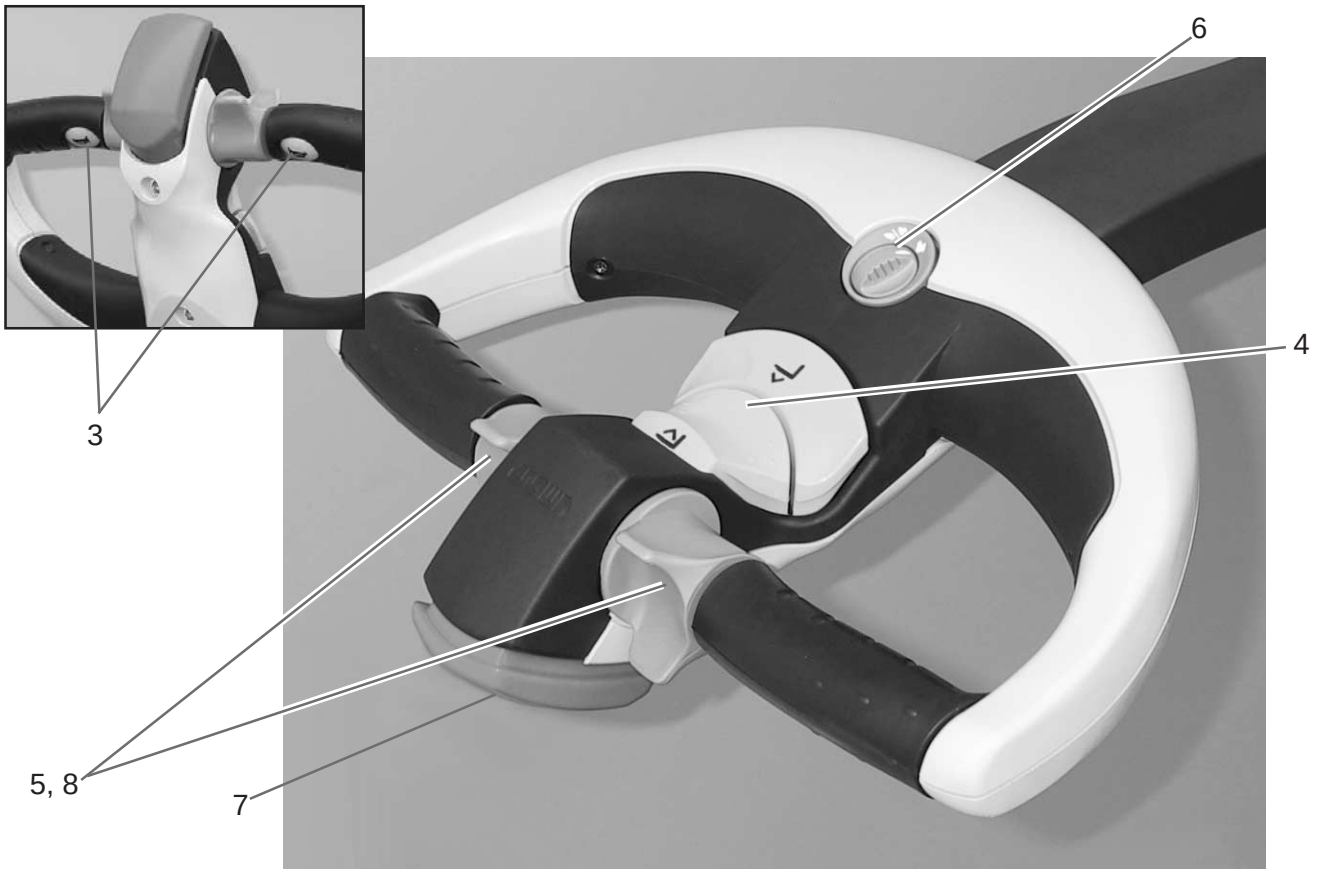
Printed in Germany



MS1723-011

MS1723-014

MS1723-012



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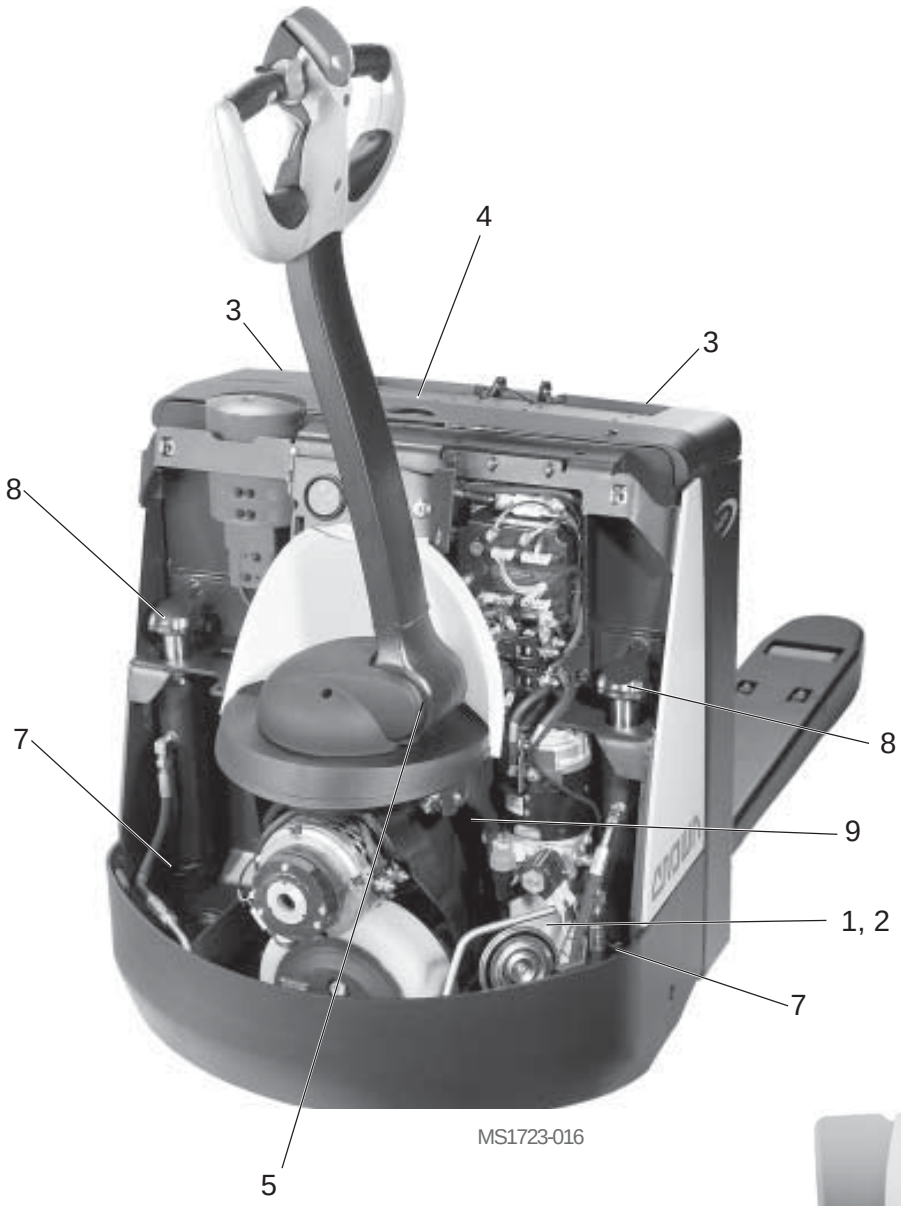

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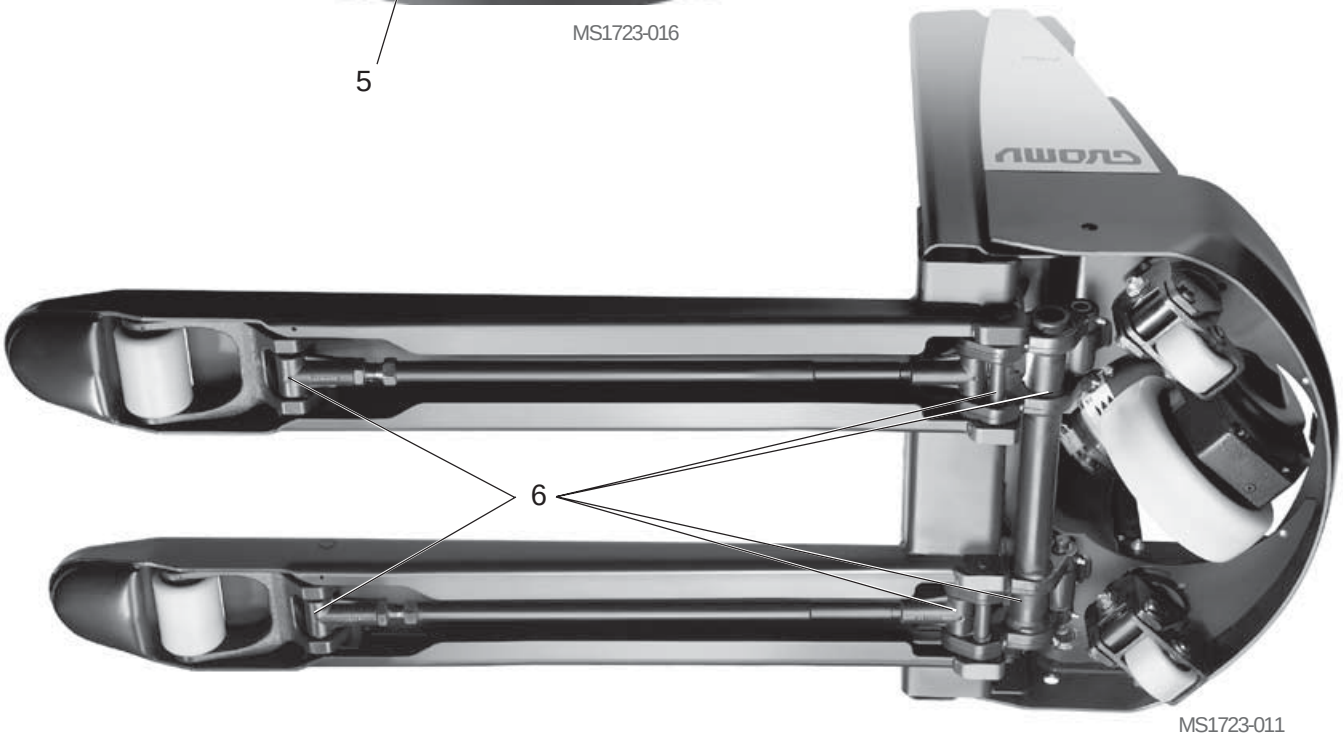


MS1723-011

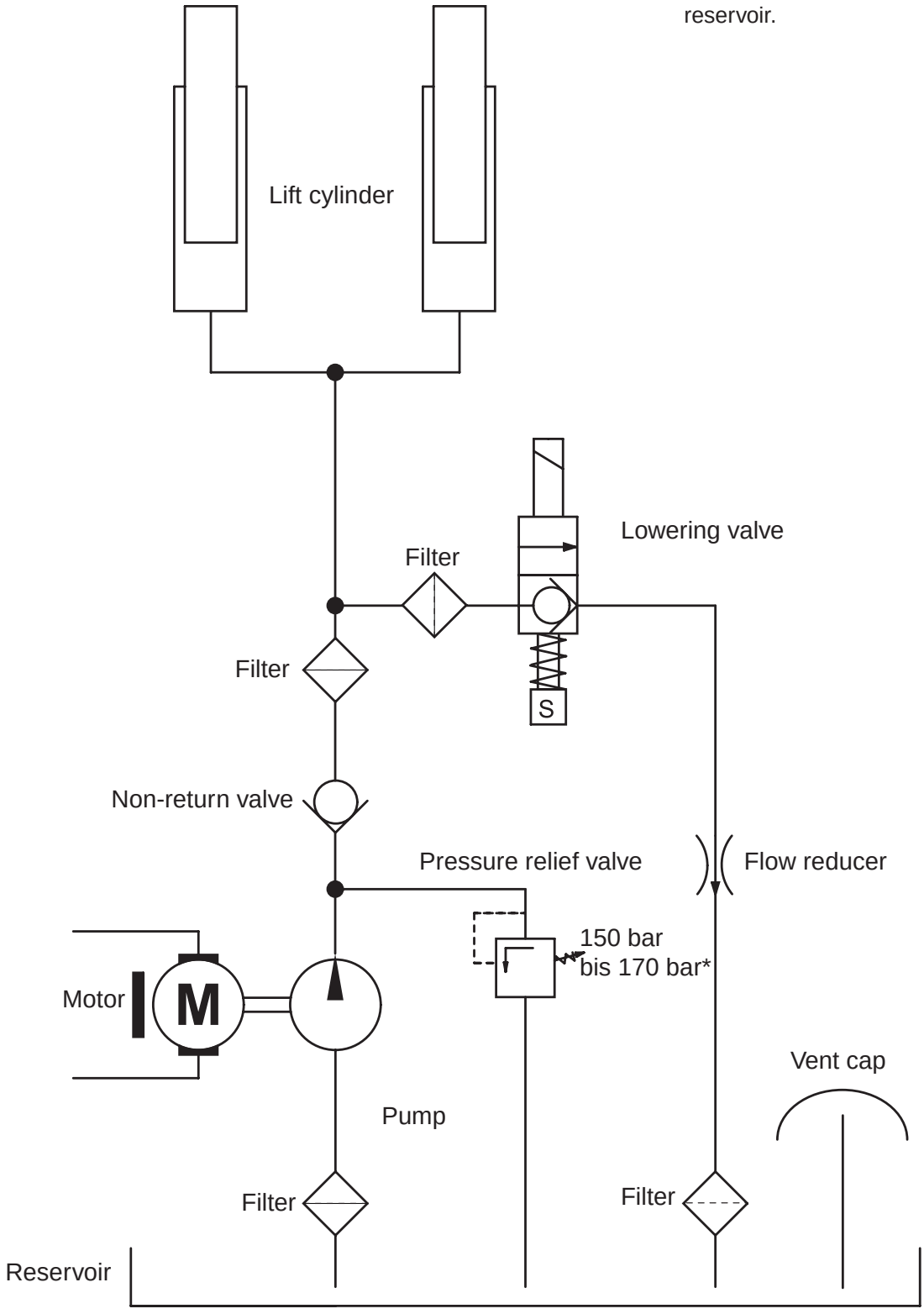
Hydraulic System

Operation

The hydraulic unit is installed next to the left hand lift cylinder and comprises the motor, pump, reservoir and all filters and valves.

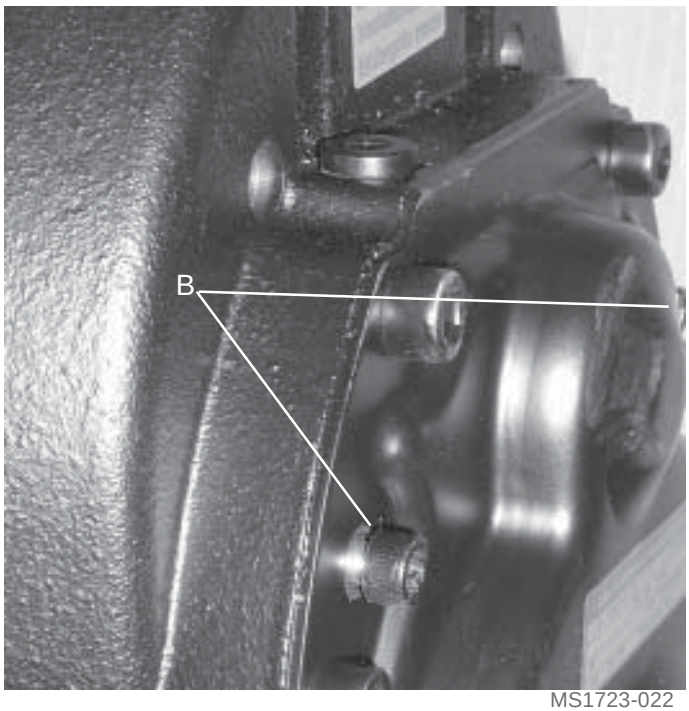
Lifting: The pump delivers oil from the reservoir to the two lift cylinders.
The lowering valve remains closed.

Lowering: The lowering valve opens. The oil flow returns from the two lift cylinders to the reservoir.



* abhängig von Modell und Einstellung des Sicherheitsventills

M1457-1

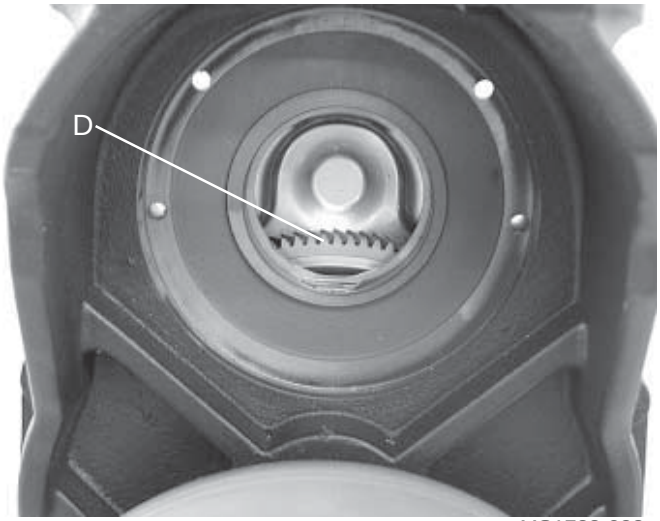


MS1723-022

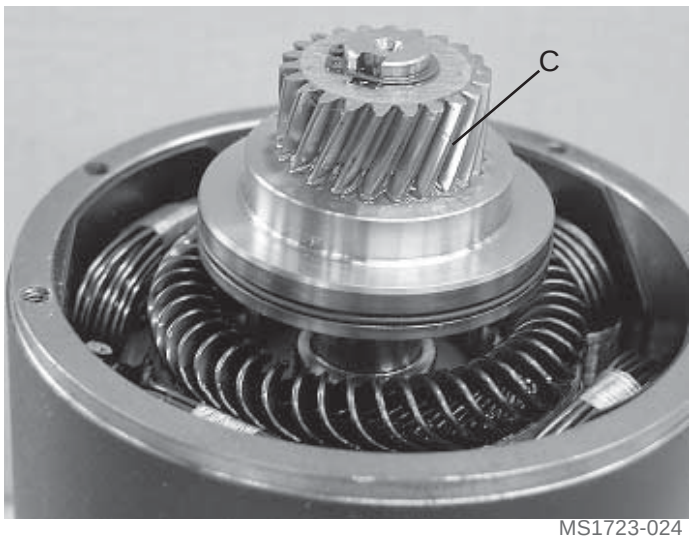
- Unscrew both screws (B, Fig. MS1723-022) by approx. 2 turns.
- Using a plastic hammer tap alternately on the screw heads (B) to drive the motor from the centering flange. **Do not damage the screws.**
- Fully remove the screws (B) and take out the motor. **Note: Do not damage the gear teeth in the process (C, Fig. MS1723-024) and D, Fig. MS1723-023)**

Dismantling the Motor

Note: If no other figure number is indicated, all reference numbers in the following sections refer to Figure MS-1723-027-A on the next page.



MS1723-023



MS1723-024

- Remove the motor as described in the previous section.
- Dismantle the brake (see “BRAKE” chapter)
- Remove the retaining ring (40).
- Using an extractor, remove the pinion (1) via the bushing (11).
- Remove the seal (29).
- Force out the rotary shaft seal (32).
- Remove the bearing (20) and the inner raceway (12).

Assembling the Motor

- Press the bearing (20) onto the rotor shaft while holding up the opposite shaft end.
- Apply Loctite® 601 to the inner raceway (12).
- Insert the seal (29) into the bushing (11) and press the rotary shaft seal (32) in. Now insert the ball bearing compensating shim (33) into the bushing (11).
- Fit the complete bushing onto the motor rotor.
- Insert the key (50) and press on the pinion (1).
- Put the retaining ring (40) in position.
- Attach the brake (see “BRAKE” chapter)
- Attach the motor as described below.

Electrics - General

Wire Colour Codes

The wires used in the truck are colour-coded and numbered according to their function. The first digit or the first two digits indicate the wire colour while the last two digits are counter numbers.

BLK	Black	0 **	Digital signal
BRN	Brown	1 **	Analog signal
RED	Red	2 **	Positive not connected
ORG	Orange	3 **	+12 V DC converter
YEL	Yellow	4 **	Third DC converter
GRN	Green	5 **	Negative not connected
BLU	Blue	6 **	Insulated negative
VIO	Violet	7 **	+5 V DC converter
GREY	Grey	8 **	Fourth DC converter
WHT	White	9 **	Various
RED/WHT	Red/White	29 **	Positive connected
GRN/WHT	Green/White	59 **	Negative connected

** Numbers 01 to 99

E01-gb

Maintenance

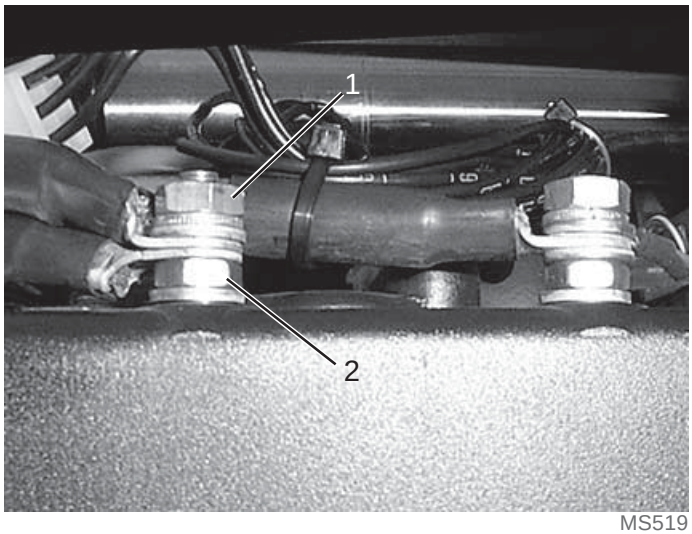
Maintenance of the SEM0 controller is confined to external cleaning. When carrying out maintenance work, check the listed errors using the programmer.

WARNING

The SEM0controller operates with high current. Special safety measures are therefore required.

- *Only properly trained personnel must carry out maintenance work.*
- *Wear safety glasses.*
- *Do not wear any loose clothing.*
- *Do not wear any jewelry.*
- *Use insulated tools only.*

- Disconnect the battery (= emergency disconnect).
- Jack up the truck.
- Discharge the controller capacitors by connecting for a short time BATT- and BATT+ of the controller via a cable including a resistor of about 10 Ohm, 5 W.
- Remove the power cable: mark the cable if necessary. Secure the lower nut (2, Fig. MS519) with a fork wrench. Undo the upper nut (1, Fig. MS519).



MS519

Note:

The lower nut secures the connection bolt to the power part board and the plastic housing. If this nut is insufficiently torqued (less than 6 Nm), excessive transition resistances will occur between the board and the bolt. The resultant heat may damage the controller and melt the cover around the connection bolts.
If the torque is too high (more than 7 Nm) the power part board and the housing may suffer physical damage.

- **Using a torque wrench check the torque for the fastening nut (2, Fig. MS519)** of the connection bolt. The rated value is **6 – 7 Nm**.

  Important: An incorrect torque may damage the controller board and housing.

- Remove any dirt and corroded material from the contact surfaces.
- Wipe the traction controller with a clean, damp cloth.
- When everything is dry connect the power cable again. To do so, secure the lower nut (2, Fig. MS519) with a fork wrench and only tighten the upper nut (1, Fig. MS519). Connect the control lines.
- **For cold store versions**: coat the control line connectors with Dow Corningâ 4 Compound, part no. 053051-006.

Error Message	Description	Possible Cause
VMN NOT OK	Test performed in idle mode with the main contactor closed and during travel. The error message appears when VMN - is below the battery voltage when truck is idle - does not comply with power when truck is travelling	- Motor cable wiring error. - Motor loss to earth. - Power part error.
VFIELD NOT OK	Test performed when truck is idle and main contactor open. The error message appears if approx. 50% of the battery voltage is not applied to the field connections.	- Motor loss to earth. - Motor field connections not connected or incorrectly connected to controller. - Error in power part field controller range.
VACC NOT OK	Test performed during auto-diagnostic function on power-up and when truck is idle. The error message appears if the potentiometer signal deviates by more than 2 volts from the stored minimum value.	- Broken potentiometer cable. - Wiring error. - Potentiometer faulty. - Tiller main board faulty. - PROGRAM VACC not performed or incorrectly performed.
PEDAL WIRE KO	Test performed constantly and monitors the traction potentiometer and its wiring. Error message appears for broken wires.	-Potentiometer connections not wired or interrupted. - Tiller main board faulty.
STBY I HIGH	Test performed during auto-diagnostic function on power-up and when truck is idle. The error message appears if a current flow is detected.	- Faulty current sensor (replace controller). - Back coupling, logic system or power part error (replace component or entire controller).
I = 0 EVER	Test performed during travelling. The error message appears if the traction current does not exceed a given minimum value.	- Insufficient motor contact (check carbon brushes). - Faulty current sensor (replace controller). - Back coupling, logic system or power part error (replace component or entire controller).

PROGRAM VACC Menu

E09-GB

The PROGRAM VACC sub-menu enables each traction potentiometer to be calibrated individually for each truck by taking and storing the minimum and maximum output voltages of the traction potentiometer.

The minimum output voltage is read as the travel switch is closed, the maximum output voltage when the travel switch is fully applied (rocket switch at limit). This ensures that the full physical path of the potentiometer is used.

Approx. 14V is applied to the travel switch via the traction controller. The signal range used by the potentiometer is from 0V (minimum speed) to 10V (maximum speed).

- Remove the mains plug and disconnect the battery.
- Disconnect the charger connections to the earth contact or the pump contactor and fuse F1 and short-circuit the two leads of the charger. Alternatively, wait 10 minutes. Then re-connect the charger lead to the battery.
- Re-connect the mains plug.
- Check that the green LED is permanently lit and the charger fan is running.
- If the green LED is not lit and/or the fan is not running, replace the charger.

Important: **Before replacing a charger, always check whether the malfunction is due to a temperature problem or the battery.**

Faulty battery cells of poorly serviced batteries or charger ambient temperatures above 40 °C are typical causes of faults.

Take into account the fact that the charger emits heat (the temperature of the airflow extracted by the on-board fan is 20 °C above ambient temperature). This heat loss also heats up the environment if the ventilation is inadequate.

If the temperature and battery can both be safely ruled out as possible causes, reset the microprocessor and check if it is possible to charge.

Important Technical Data

Mains voltage: 230 V +10% / -15%
Mains frequency: 50 - 60 Hz + /-1%
Output capacity: 720 W + /-3%

- Can be used for open lead acid batteries with 12 cells and a cell voltage of 2 volts (24 volt battery)
- Minimum battery capacity 160 Ah
- Maximum battery capacity 300 Ah

The maximum charging time at room temperature for an 80% discharged battery is:

- 15 h for a 300 Ah battery
- 12 h for a 240 Ah battery
- 8 h for a 160 Ah battery

Charger safety class: IP20

Ambient temperature: 0 °C to +40 °C

Air humidity: 90% relative, not condensing

Replacing the Charger

WARNING

Do not reverse the battery connection wires

- *If you reverse connect the charger wires to a battery, the minimum damage you will incur is a blown internal fuse.*
  This fuse can only be replaced by the manufacturer. Replace the charger where necessary with an original Crown replacement charger.

Removal / Installation

- Remove the mains plug and disconnect the battery.
- Undo the mains supply lock on the charger and remove the connector.
- Disconnect the charger connections to the earth contact of the pump contactor and fuse F1.
- Disconnect the plug connection of the 3 wire lead to the LEDs.
- Remove the 4 screws which attach the charger to the retaining plate and remove the charger.
- Installation is the reverse order of removal.

Assembly

To assemble, proceed in the reverse order.

- If any thrust members (for the three internal compression springs) have fallen out of the magnetic body, insert them correctly with the end face facing the spring.
- Place the anchor disk correctly on the magnetic body: thefriction plate must lie on the side facing away from the magnetic body.
- Screw the banjo bolts into the magnetic body as far as the stop.
- Screw the cylinder bolts into their nuts so that there is a gap of at least 1mm between the anchor disk and the magnetic body.
- Place the friction plate on the motor.
- Push the rotor onto the hub while taking care not to damage the toothing.
- Attach the magnetic body and everything connected to it to the motor with the hex. bolts.

Air Gap Setting

The working air gap is measured between the magnetic body and the anchor disk while the brake is applied.
It should be set to 0.2 mm.
The max. permissible setting is 0.55 mm.

- Unscrew the banjo bolts as far as the fixed stop on the friction plate.
- Tighten the hex. bolts evenly.
- Using a feeler gauge measure the working air gap at several points. It must be uniform throughout.
- To increase the air gap slightly unscrew the hex. bolts. To reduce the air gap slightly screw the banjo bolts into the magnetic body. Then proceed as described above.
- When the air gap has been correctly set, torque the hex. bolts to 6 Nm using a torque wrench.

Brake Moment Setting

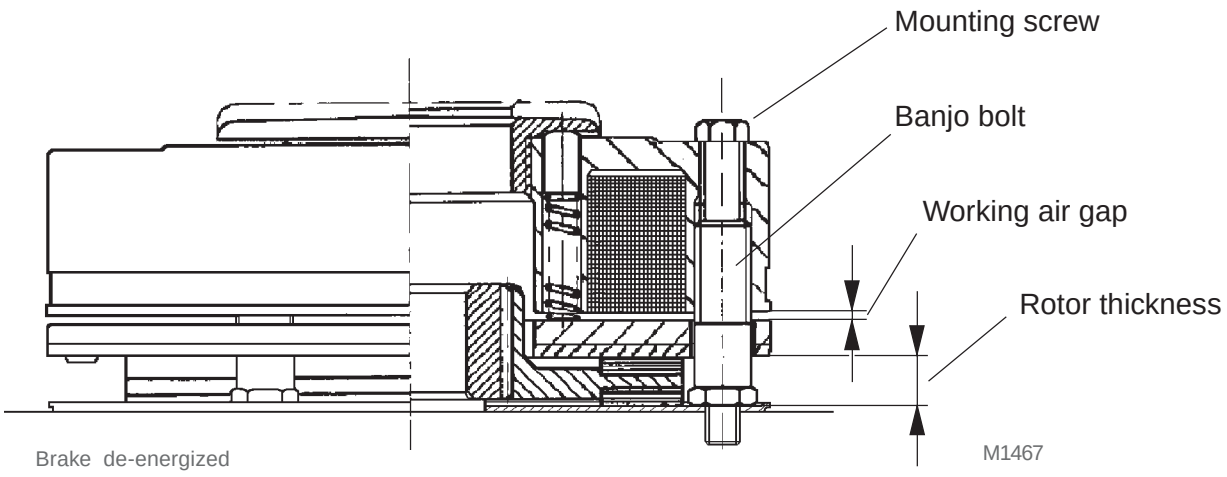
The brake moment can be increased by screwing the adjusting ring (1) into the magnetic body. The setting is notched.

Testing the Brakes

- Accelerate the unladen truck with completely loaded battery at operating temperature on an even, dry concrete surface until it reaches maximum speed.
- Set multi-task handle to lower brake zone.
- Measure the braking distance from the time of application of the brakes to the time the truck

Model	New Rotor	Used (braked) Rotor
2320	0.6 to 0.7 m	0.5 to 0.6 m
2315	0.5 to 0.6 m	0.45 to 0.55 m

B01-gb



Brake de-energized

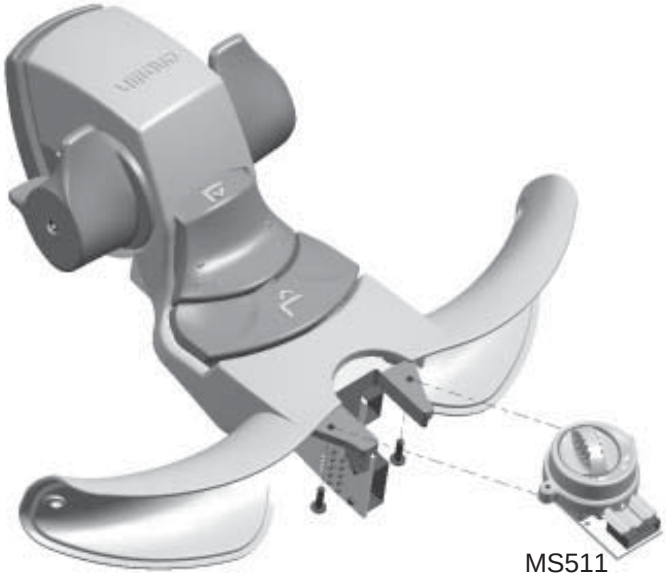
"Fast/Slow" Toggle Switch

There are no parts in this switch module which can be repaired. The entire module must be replaced.

The switch module comes in two variants: a standard version (812943-001) and a cold store version (812274-001). Make sure you use the right module!

Removal

- Remove the switch unit (see *SWITCH UNIT* section in this chapter).



MS511

- Remove the two M3 Torx® screws (see Fig. MS511) and remove the toggle module.

Installation

- Fit the new toggle module and fix it with two M3 Torx® screws.
- Re-install the switch unit (see *SWITCH UNIT* section in this chapter).Carry out a functional test.

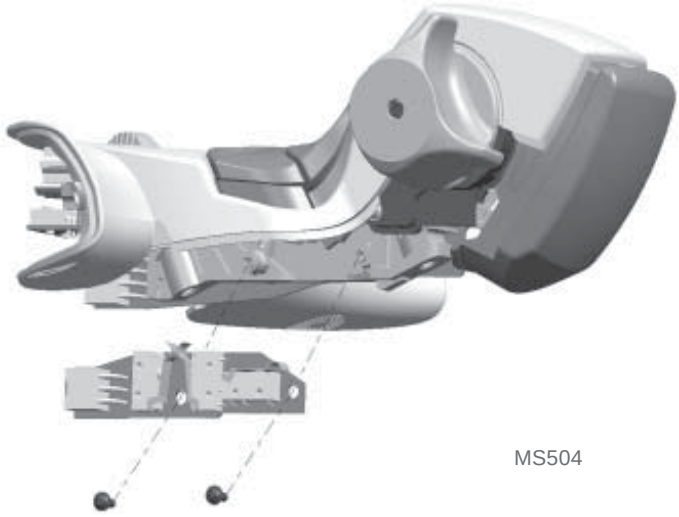
Hydraulic Board

There a no parts in this board which can be repaired. It must be replaced in full.

The board comes in two variants: a standard version and a cold store version. Make sure you use the right board!

Removal

- Remove the switch unit (see *SWITCH UNIT* section in this chapter).



MS504

- Remove the two M3 Torx® screws (see Fig. MS504) from the smaller of the two boards (the larger one is the main board). Remove the hydraulic board.

Installation

- Fit a new hydraulic board (ensuring it is the right version, cold store or standard!) and fix it with two M3 Torx® screws.
- Re-install the switch unit (see *SWITCH UNIT* section in this chapter).Carry out a functional test.

CYLINDERS

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