

Multilift stations

MMS, M, MD, MDL, MOG, MDG, MD1, MDV

Service instructions



Original service instructions.

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1. Symbols used in this document

**Warning**

If these safety instructions are not observed, it may result in personal injury.

**Warning**

These instructions must be observed for explosion-proof versions. We recommend that you also follow these instructions for standard versions.

Caution

If these safety instructions are not observed, it may result in malfunction or damage to the equipment.

Note

Notes or instructions that make the job easier and ensure safe operation.

2. Safety

**Warning**

Work in or near pits must be carried out according to local regulations.

Sumps and pits for submerged wastewater pumps may contain gasses and wastewater with toxic and/or disease-causing substances. Therefore, all persons involved must wear appropriate personal protective equipment and clothing, and all work on and near the pump must be carried out under strict observance of hygienic regulations.

3. Identification

**Warning**

Always lift the pump by its lifting bracket or by means of a forklift truck if the pump is on a pallet. Never lift the pump by the motor cable or the hose/pipe.

This section shows the nameplate, type key and codes that can appear in the variant code.

3.1 Name plate, lifting stations

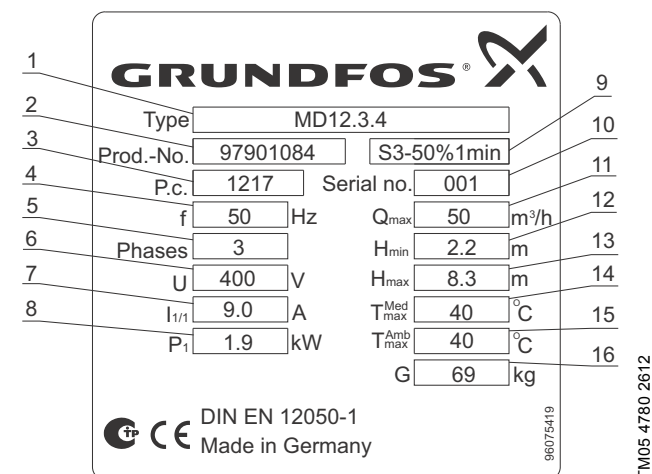


Fig. 1 Nameplate of lifting stations

Pos.	Description
1	Type designation
2	Product number
3	Production code (year/week)
4	Frequency [Hz]
5	Number of phases
6	Voltage [V]
7	Full-load current [A]
8	Motor input power P1 [kW]
9	CE mark
10	Operations mode
11	Serial number
12	Maximum flow rate [m³/h]
13	Minimum head [m]
14	Maximum head [m]
15	Maximum liquid temperature [°C]
16	Maximum ambient temperature [°C]
17	Weight [kg]

3.2 Type key, lifting stations

MSS, M, MD, MLD, MOG and MDG stations

Example	M	SS	.11	.3	.2
Multilift lifting station					
= one pump					
SS = one pump					
D = two pumps					
LD = large tank and two pumps					
OG = one grinder pumps					
DG = two grinder pumps					
Output power, $P_2 / 100$ [W]					
1 = single-phase motor					
3 = three-phase motor					
2 = 2-pole motor					
4 = 4-pole motor					

MD1 and MDV stations

Code	Example	M	D	1	.80	.100	.15	.4	.5	OD/	400	-2	SE
	Type range:												
M	Multilift station												
	Number of pumps:												
D	Two pumps												
	Impeller type:												
1	Single-channel impeller												
V	Vortex impeller (SuperVortex)												
	Spherical passage:												
80	Maximum solids size [mm]												
	Pump discharge port:												
100	Nominal diameter of pump discharge port [mm]												
	Power:												
15	Motor power output $P_2/100$ [W]												
	Number of poles:												
2	2-pole, 3000 min^{-1} , 50 Hz												
4	4-pole, 1500 min^{-1} , 50 Hz												
	Frequency:												
5	50 Hz												
	Voltage and starting method:												
0D	380-415 V, DOL												
1D	380-415 V, Y/D												
0E	220-240 V, DOL												
1E	220-240 V, Y/D												
	Size of collecting tank:												
400	Number of litres												
	Number of collecting tanks:												
[]	One tank												
2	Two tanks*												
	Pump type:												
SE	SE pump												
SL	SL pump												

* A third tank is available as accessory if the effective volume of the standard lifting station is too small.

3.3 Nameplate, motor

MSS

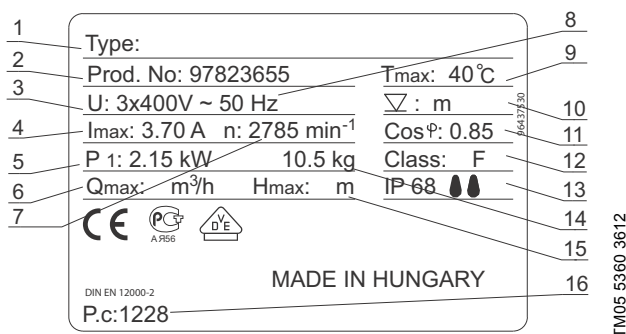


Fig. 2 Nameplate of MSS

Pos.	Description
1	Not filled in
2	Product number
3	Number of phases and voltage [V]
4	Full-load current [A]
5	Motor input power P1 [kW]
6	Not filled in
7	Rated speed
8	Frequency [Hz]
9	Maximum liquid temperature
10	Not filled in
11	Power factor
12	Insulation class
13	Enclosure class to IEC
14	Weight
15	Not filled in
16	Production code (year, week)

M, MD and MLD

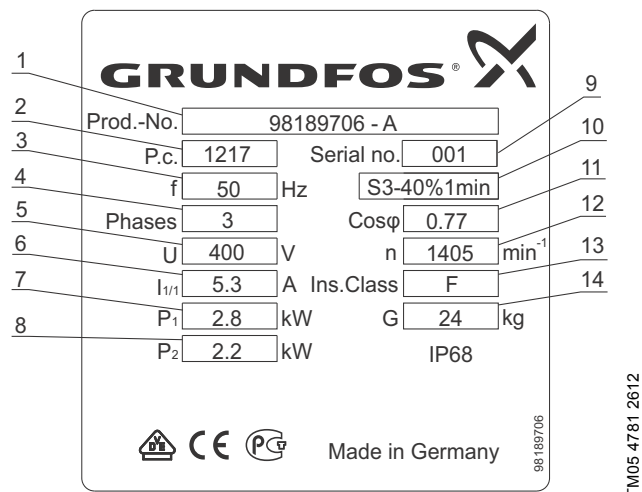


Fig. 3 Nameplate of M, MD and MLD

Pos.	Description
1	Product number and model
2	Production code (year, week)
3	Frequency [Hz]
4	Number of phases
5	Voltage [V]
6	Full-load current [A]
7	Motor input power P1 [kW]
8	Motor output power P2 [kW]
9	Serial number
10	Operation mode
11	Power factor
12	Rated speed
13	Insulation class
14	Weight

MOG and MDG

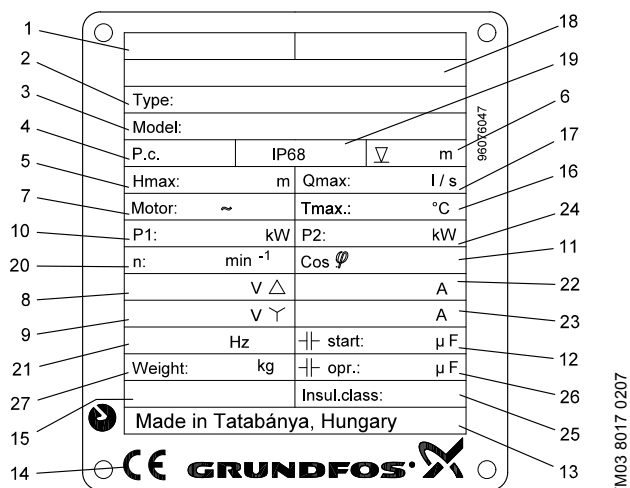


Fig. 4 Nameplate of MOG and MDG

Pos.	Description
1	Ex mark
2	Type designation
3	Product number
4	Production code (year/week)
5	Maximum head
6	Maximum installation depth
7	Number of phases
8	Rated voltage, Δ
9	Rated voltage, Y
10	Rated input power
11	Power factor
12	Starting capacitor
13	Country of production
14	CE mark
15	EN approval
16	Maximum liquid temperature
17	Maximum flow rate
18	Explosion protection
19	Enclosure class according to IEC
20	Rated speed
21	Frequency
22	Rated current, Δ
23	Rated current, Y
24	Shaft power
25	Insulation class
26	Run capacitor
27	Weight without cable

MD1 and MDV

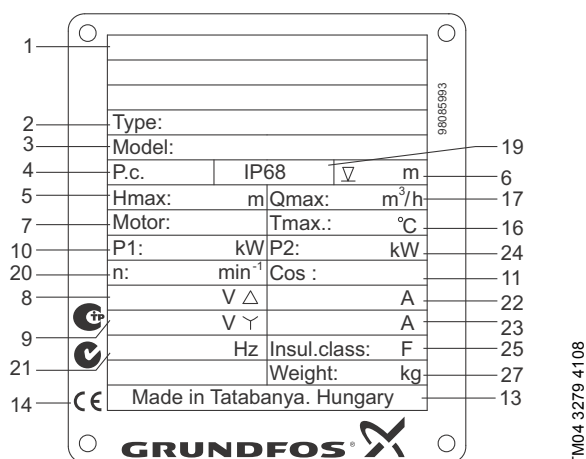


Fig. 5 Nameplate of MD1 and MDV

Pos.	Description
1	Ex mark
2	Type designation
3	Product/model number
4	Production code
5	Maximum head
6	Maximum installation depth
7	Number of phases
8	Rated voltage, Δ
9	Rated voltage, Y
10	Rated input power
11	Power factor
12	Starting capacitor
13	Country of production
14	CE mark
15	EN approval
16	Maximum liquid temperature
17	Maximum flow rate
18	Explosion protection
19	Enclosure class according to IEC
20	Rated speed
21	Frequency
22	Rated current, Δ
23	Rated current, Y
24	Shaft power
25	Insulation class
26	Run capacitor
27	Weight without cable

3.4 Nameplate, controller

Nameplate, LC 220:

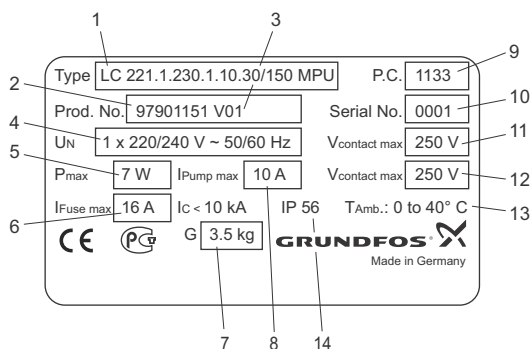


Fig. 6 Nameplate of LC 220

Pos.	Description
1	Type designation
2	Product number
3	Version number
4	Rated voltage
5	Power consumption
6	Maximum back-up fuse
7	Weight
8	Maximum pump input current
9	Production year and week
10	Serial number
11	Maximum voltage at contactor
12	Maximum current at contactor

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Nameplate, LC 221

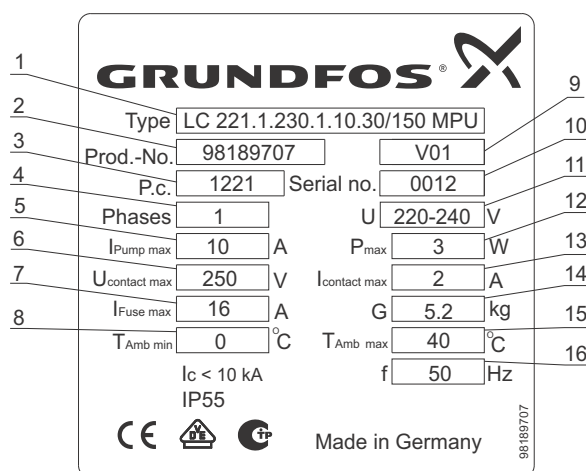


Fig. 7 Nameplate of LC 221

Pos.	Description
1	Type designation
2	Product number
3	Production code (year, week)
4	Numbers of phases
5	Maximum pump input current
6	Maximum voltage at potential-free contact
7	Maximum back-up fuse
8	Minimum ambient temperature
9	Version
10	Serial number
11	Rated voltage
12	Power consumption
13	Maximum current at potential-free contact
14	Weight
15	Maximum ambient temperature
16	Frequency

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3.4.1 Type keys, controllers

LC 220 controller

Example	LC 220	.1	.230	.1	.8
LC 220 = controller type					
1 = one-pump controller					
2 = two-pump controller					
Voltage [V]					
1 = single-phase					
3 = three-phase					
Max. operating current per pump [A]					

LC 221 controller

Example	LC 221	.1	.230	.1	.10	.30
LC 221 = controller type						
1 = one-pump controller						
2 = two-pump controller						
Voltage [V]						
1 = single-phase						
3 = three-phase						
Max. operating current [A]						
Capacitors [μF]						
Starting method:						
[] = DOL						
SD = Star-delta						

4. Torques and lubricants

This section shows the screws and nuts that must be tightened to a certain torque and the lubricants to be used

4.1 Torques

Pos.	Description	Number	Dimensions	Torque [Nm]	Lubricant
17a	Thread forming screw	8	M8 x 30	9	Soapy water
35	Hexagon head screw	8	M16 x 75	20	
18c		4	M6 x 12	4	
55b	Hexagon socket head screw	8	M8 x 30	10	
55c		3	M6 x 16	5	
211		8	M8 x 65	8	
167	Cable entry	1	PG	20	
159a	O-ring				Oil
190a	Plug	1		40	

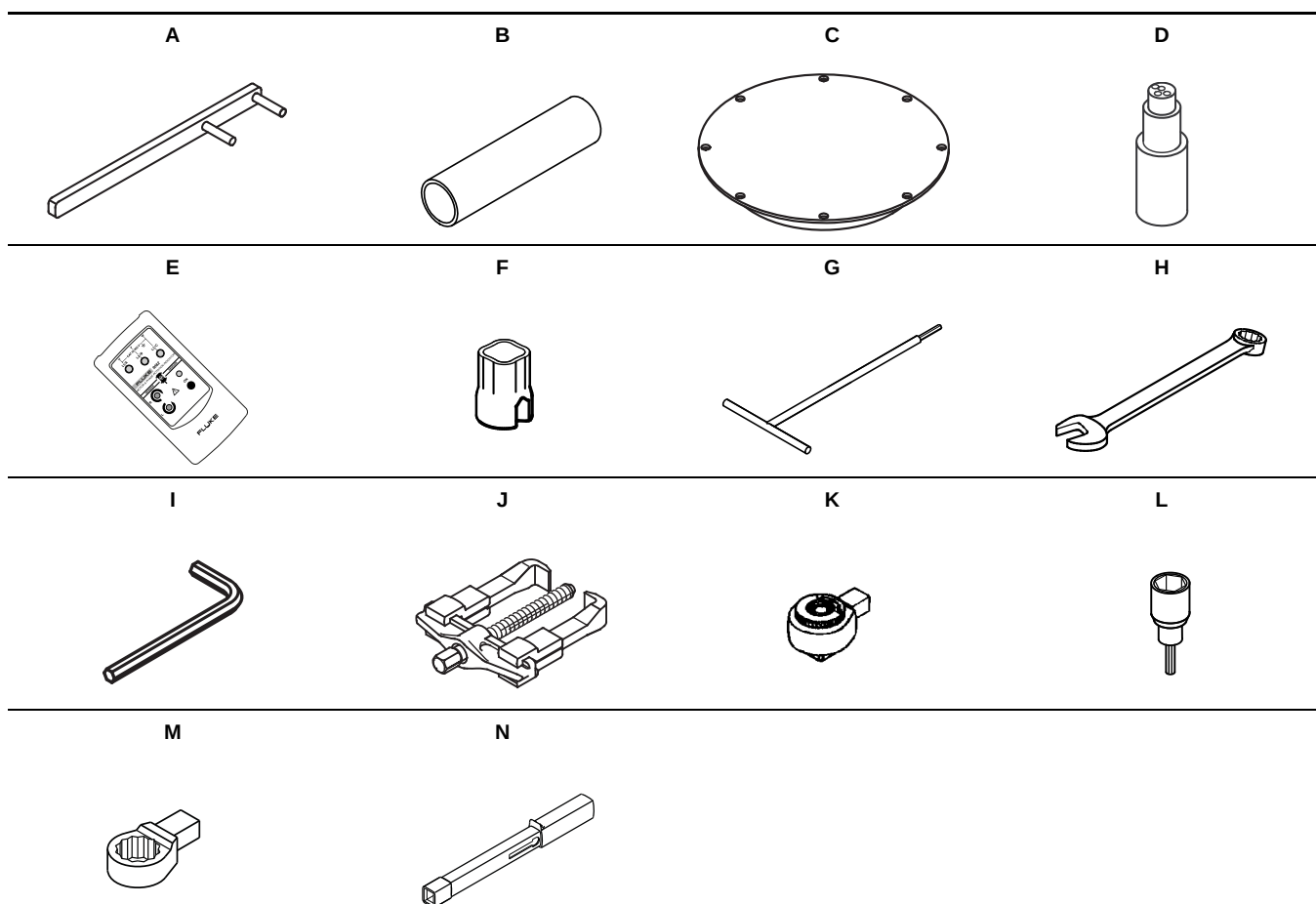
4.2 Lubricants

Pos.	Description	Dimensions	Lubricant
105	Oil	50 ml	Castrol Optileb HY 68
105	Shaft seals 2 and 3	10 g	Grease*

* Acc. to ISO 6743/9-L-X BDEB2 and SEB181.253 DIN51825

5. Service tools

The following drawings and tables show special, standard and torque tools for service.



5.1 Special tools

Pos.	Description	For pos.	Suppl. information	Part no.
A	Key for impeller	49		SV2079
B	Punch for lip seal ring	103-104		SV2081
C	Blanking flange for MD			96477896
D	Connecting plug			SV0128
E	Fluke rotation indicator			98350275
F	Socket spanner	USA Mexico Canada	7 mm	SV0457*
	Socket spanner			00010757*

* The tools are included in the cable kit.

5.2 Standard tools

Pos.	Description	For pos.	Suppl. information	Part no.
G	Tee key	55c	4 mm	SV0181
		18c-25c	5 mm	SV0124
		55b	6 mm	SV0050
H	Ring/open-end spanner	35-35c	24 mm	SV0122
I	Hexagon key	25b	2.5 mm	SV0277
		211	6 mm	SV0196
J	Puller for bearing	153-154		Standard
K	Ratchet insert tool		9 x 12	SV0295
L	Hexagon socket driver	18c-55c	5 mm	SV0296
		55b-211	6 mm	SV0297
M	Ring insert tool	- 35	24 mm	SV0424

5.3 Torque tools

Pos.	Description	For pos.	Suppl. information	Part no.
J	Torque wrench		4-20 Nm	SV0292

6. Maintenance

Pumps in normal operation should be checked at least once a year. Local regulations must be observed.

Warning



Before carrying out maintenance and service on lifting stations used for pumping liquids which might be hazardous to health, make sure that the lifting station has been thoroughly flushed with clean water and that the discharge pipe has been drained. Rinse the parts in water after dismantling. Make sure that the isolating valves have been closed. The work must be carried out in accordance with local regulations.



Warning

Before making any connections in LC 220 or LC 221 or working on lifting stations, make sure that the power supply has been switched off and that it cannot be accidentally switched on.

These periodical checks of the lifting station should be carried out by authorized personnel and must, among other things, comprise electrical and mechanical maintenance.

6.1 Electrical maintenance

- Check the power consumption of the motor according to the nameplate.
- Check the gaskets of the LC 220 and LC 221 cabinet front and those of the Pg-cable entries.
- Check the cable entries. Make sure that the cable entries are watertight and that the cables are not bent sharply and/or pinched.
- Check the controller functions.
- Check and clean the level sensor. Check its functions, e.g. in a bucket of water. See section 7.11 *Cleaning of level sensor*.
- If the LC 220 or LC 221 has been installed in a particularly aggressive environment, it is advisable to check the contacts of the motor starter, if installed, in order to identify possible chemical attack resulting in corrosion. In typical installations, the motor starter contacts will work for several years and do not require any inspection.
- Check the winding resistance. See section 7.13 *Checking the winding resistance*.

Note: The above list is *not* exhaustive. The LC 220 or LC 221 may be installed in environments which require thorough and regular maintenance.

6.2 Mechanical maintenance

- Check for possible deposits and/or sludge build-up in the collecting tank.
- Check for possible blockage on the inlet side of the lifting station. A blockage will typically be a large solid object.
- Check the gaskets of connections to the stationary system (at valves etc.).
- Check the tank for cracks and deformations. These may occur in case of faulty assembly resulting in excessive stress on the tank.
- Check the shaft for noisy and heavy operation (turn the shaft by hand). Noise may indicate defective ball bearings. Replace defective ball bearings.
A general overhaul of the pump is usually required in case of defective ball bearings or poor motor function. This work should be performed by the pump manufacturer or an authorized service workshop.

Note: The above list is *not* exhaustive. The lifting station may be installed in environments which require thorough and regular maintenance.

7. General service information

If it is necessary to dismantle the pump, either because it is choked or damaged, please follow the instructions in the following sections.

Position numbers of parts (digits) refer to drawings and parts lists; drawing numbers of tools (letters) refer to section 5. *Service tools*.

If a pump has to be removed for service, the tank can be fitted with a blanking flange in order to seal it hermetically.

The blanking flange is available as an accessory. Fitted to MD Multilift lifting stations, the blanking flange allows continued operation by means of the remaining pump.

Before dismantling

- Switch off the electricity supply to the lifting station and the controller. It must be ensured that it cannot be accidentally switched on.
- Close the inlet isolating valve.
- Drain the discharge pipe by tightening the drain screw pos. 210b whereby the non-return valve opens. This is only necessary if there is no isolating valve in the discharge pipe.
- Flush the lifting station thoroughly with clean water. Rinse the parts when dismantling the lifting station.

Before assembly

- Check all parts.
- Gaskets and O-rings should always be replaced when the pump is overhauled/serviced.
- Check the stator winding resistance, see section 7.13 *Checking the winding resistance*.

During assembly

Lubricate and tighten the screws and nuts to the torque stated in section 4. *Torques and lubricants*.

After assembly

- Open all isolating valves.
- Check all functions by filling the tank with water and starting the pump.

7.1 Replacement of motor cable

7.1.1 MSS

See service instruction on WebCaps on how to remove the cable on the Unilift AP pump.

7.1.2 M, MD and MLD

Dismantling

1. Remove the cover of controller LC 220 or LCD 221 by slackening the plastic screws.
2. Remove the motor cable conductors, see section 9. *Wiring diagrams*.
3. Slacken the union nut of the cable entry by means of the special socket spanner (J) (see section 5.3 *Torque tools*), and remove the nut and washer.
4. Remove the cable.

Assembly

1. Clean the motor socket before the cable is fitted.
2. Press the plug home into the motor.
3. Fit washer and nut and tighten the nut by means of the special socket spanner (J) (see section 5.3 *Torque tools*).
4. Fit the conductors inside the controller cabinet, see section 9. *Wiring diagrams*.
5. Fit the cover of the controller and tighten the plastic screws.

7.1.3 MOG and MDG

The cable must only be replaced by Grundfos or an authorized service workshop.

7.1.4 MDV and MD1

See the service instruction of the SEV/SE1 - SLV/SL1 pumps on WebCAPS.

7.2 Replacement of pump head

7.2.1 MSS

1. Remove the screws pos. 150b and clamps pos. 150a.
2. Lift the pump out of the tank.
3. Remove the old pump.
4. Fit the O-ring pos. 187 on the new pump. Check that the O-ring is home in the recess.
5. Fit the pump head into the tank, mount the holding-down clamps pos. 150a and tighten the screws pos. 150b.
6. Check the direction of rotation, e.g. with the rotation measurement tool (E) (see section 5.1 *Special tools*).

7.2.2 M, MD and MLD

1. Remove the screws pos. 55b and lift the motor out of the tank.
2. Remove the old pump.
3. Fit the new O-ring pos. 187a on the new pump. Check that the o-ring is home in the recess.
4. Fit the motor into the tank and tighten the screws pos. 55b. to the correct torque. See section 4. *Torques and lubricants*.
5. Check the direction of rotation by removing the eye bolt and the plug at the top of the motor. See fig. 8, or use a rotation measurement tool (E) (see section 5.1 *Special tools*).

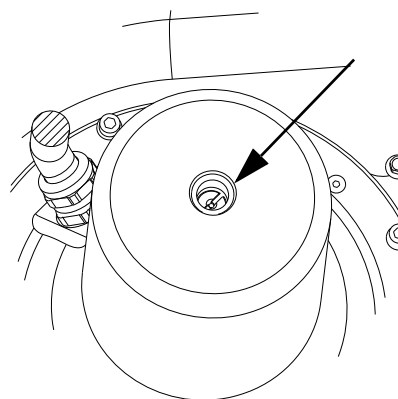


Fig. 8 Top of slotted motor shaft

Caution If the pump has been disassembled, remember to align the vent hole in the pump with the vent hole in the tank when remounting the pump to the tank. See figs 9 and 10 below.

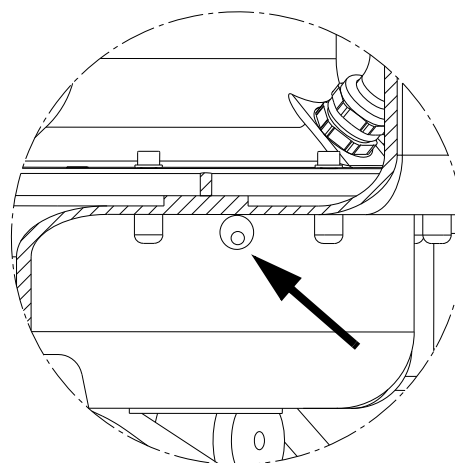


Fig. 9 Vent holes in pump housing and collecting tank

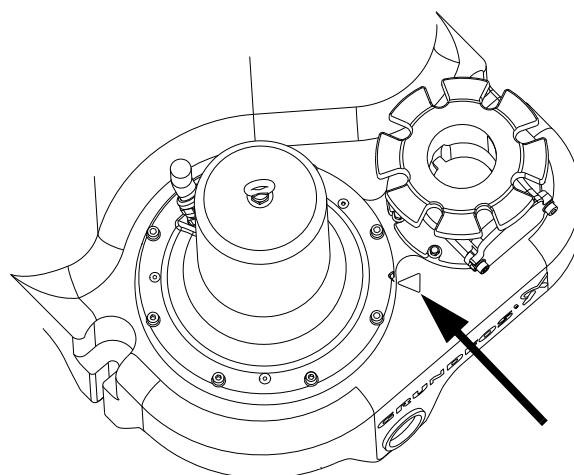


Fig. 10 Alignment marks on tank and pump flange

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TM05 0344 1011

TM05 0330 0111

7.2.3 MOG and MDG

1. Remove the screws pos. 55b.
2. Disconnect the discharge flange.
3. Disconnect the ventilation pipe pos. 32.
4. Lift the pump out of the tank.
5. Remove the old pump.
6. Fit the O-ring pos. 187 on the new pump.
Check that the O-ring is home in the recess.
7. Fit the pump head into the tank, tighten the screws pos. 55b to the correct torque. See section 4. *Torques and lubricants*.
8. Check the direction of rotation, e.g. with the rotation measurement tool (E) (see section 5.1 *Special tools*).

7.2.4 MD1 and MDV

1. Unscrew the nuts pos. 357.
2. Disconnect the pump from the discharge pipe.
3. Remove the old pump.
4. Renew the gaskets on both sides of the flange pos. 353.
5. Fit the new pump and tighten the nuts pos. 357.

7.3 Replacement of impeller

7.3.1 MSS

See section 7.2 *Replacement of pump head*.

See the Unilift AP service instruction on WebCAPS.

7.3.2 M, MD and MLD

Dismantling

1. Remove the screws pos. 55b and lift the motor out of the tank.
2. Turn the motor bottom up and remove the O-ring pos. 187 and any lip seal ring pos. 187a.
3. Loosen the eye bolt and the plug on the top of the motor and lock the shaft by inserting a screw driver in the slotted shaft end. See fig. 8.
4. Loosen and remove the impeller pos. 49 using the key to the impeller (A).

Assembly

5. Fit the impeller so that its thread engages with the thread of the shaft end. Screw the impeller home by hand.
6. Lock the shaft by inserting a screw driver in the slotted shaft end. See fig. 8.
7. Slightly tighten the impeller with the impeller key (A).
8. Replace the O-ring pos. 187.
9. Fit the motor into the tank and tighten the screws pos. 55b to the correct torque. See section 4. *Torques and lubricants*.
Check that the O-ring pos. 187 remains in the recess.

7.3.3 MOG and MDG

See the SEG pump service instruction on WebCAPS.

7.3.4 MD1 and MDV

See the SE/SL pump service instruction on WebCAPS.

7.4 Replacement of grinder system, MOG and MDG

See 7.2 *Replacement of pump head*.

See the SEG pump service instruction on WebCAPS.

7.5 Replacement of shaft seal

7.5.1 MSS

See the service instruction on WebCAPS.

7.5.2 M, MD and MLD

Dismantling

1. Remove the impeller, see section 7.3 *Replacement of impeller*.
2. Remove the screws pos. 55c.
3. Lift the bearing cover free of the rotor pos. 172. It may be necessary to use a puller (J). Oil will then escape.
4. If the bearing pos. 153 is not removed with the rotor shaft, it may be necessary to push it free of the bearing cover.
If the bearing is pushed too strongly, it should be replaced, see section 7.6 *Replacement of bearings*.
5. Press/knock the three lip seal rings pos. 103 and 104 down and out of the bearing cover using the punch for lip seal ring (B).

Assembly

1. Place the bearing cover on a table with the bottom upwards.
2. Press/knock the inner lip seal ring pos. 103 home in the bearing cover using the punch for lip seal ring (B).
3. Place the rotor in a vice with the shaft end upwards.
4. Fit the bearing cover to the shaft so that the ball bearing pos. 153 is pressed home in the bearing seat.
Follow the instructions in section 7.6 *Replacement of bearings* if the bearing has been removed from the shaft.
5. Fill the oil chamber in the bearing cover with oil (included in the shaft seal kit).
6. Press/knock the two lip seal rings pos. 104 home in the bearing cover using the punch for lip seal ring (B).
7. Fit the impeller, see section 7.3 *Replacement of impeller*.
8. Replace the O-ring pos. 187.
9. Fit the motor into the tank and tighten the screws pos. 55b to the correct torque. See section 4. *Torques and lubricants*.
Check that the O-ring pos. 187 remains in the recess.

7.5.3 MOG and MDG

See the service instruction on WebCAPS on how to remove the impeller on a SEG pump.

7.5.4 MD1 and MDV

See the service instruction on WebCAPS on how to remove the impeller on a SEV/SE1 - SLV/SL1 pump.

7.6 Replacement of bearings

7.6.1 MSS

No service instruction exists for the MSS pump. Replace the pump head. For this, see service instruction on WebCAPS.

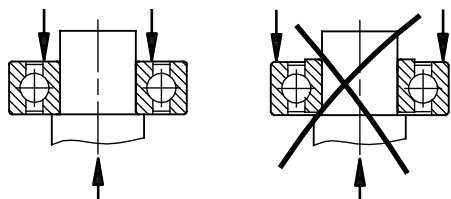
7.6.2 M, MD and MLD

Dismantling

1. Remove the shaft seal, see section 7.5 *replacement of shaft seal*.
2. Remove the bearing pos. 154 using the puller (J).
3. Turn the rotor in the vice and remove the bearing pos. 153 using the puller (J).
4. Check the bearing seats on the shaft.

Assembly

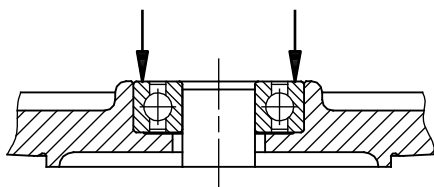
1. Fit a new bearing pos. 154 on the shaft. We recommend to heat the bearing to approx. 90 °C so that the bearing can be easily fitted.
Press the bearing home on the shaft by applying force to the inner ring. See fig. 11.



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Fig. 11 Bearing, inner ring pressure

2. Press the bearing pos. 153 home in the bearing cover. We recommend to heat the bearing cover to approx. 100 °C so that the bearing can be easily fitted.
Press the bearing home in the bearing cover by applying force to the outer ring. See fig. 12.



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Fig. 12 Bearing, outer ring pressure

3. Place the rotor with the shaft end upwards and the bearing pos. 154 downwards.
4. Press the bearing cover with bearing pos. 153 down on the shaft by applying force to the inner bearing ring.
5. Fit the shaft seal, see section 7.5 *Replacement of shaft seal*.

7.6.3 MOG and MDG

See the SEG pump service instruction on WebCAPS.

7.6.4 MD1 and MDV

See the SEV/SE1 - SLV/SL1 pump service instruction on WebCAPS.

7.7 Cleaning the non-return valve on MSS, M, MD and MLD

1. Close the isolating valve in the discharge pipe and the inlet pipe (if fitted).
2. Drain the discharge pipe by tightening the drain screw pos. 210b.
3. Remove the inspection cover pos. 18 with the screws pos. 18c and the O-ring pos. 100.
4. Clean the non-return valve inside.
5. Slacken the drain screw pos. 210b until the non-return valve closes completely.
6. Refit the inspection cover with a new O-ring pos. 100.
7. Refit the dismantled parts.
8. Open the isolating valve (if fitted).

7.8 Replacement of print circuit board (PCB)

1. Turn off the power to the controller.
2. Push the ON-OFF-AUTO selector switch to "OFF" on the control panel.
3. Remove the front cover of the controller box.
4. Disconnect all wires of the controller board and carefully mark all wires.
5. Remove the communications cable from the main board to the display.
6. Remove the Piezo IC.
7. Unscrew the holding down screws from the print board and replace the board.
8. Connect all wires on the PCB again.
9. Plug in the communications cable to the display.
10. Fit the Piezo sensor (make sure not to bend the hose).
11. Make a calibration. See 7.12 *Calibration of level sensor*.

7.9 Replacement of display

1. Turn off the power to the controller.
2. Push the ON-OFF-AUTO selector switch to "OFF" on the control panel.
3. Remove the front cover of the controller box.
4. Remove the communications cable from the display PCB.
5. Remove the six holding down screws with a screwdriver.
6. Replace the display PCB.
7. Insert the holding down screws and tighten carefully.
8. Plug in the communications cable.
9. Turn on the power to the controller.

7.10 Connection of the PC Tool

In order to connect the controller to the PC Tool, the cable needs to be connected correctly. The following two drawings show where and how to connect the cable to the PCB on both LC220 and LC 221.

The plug must be disconnected before performing a complete restart where the power supply is switched OFF and ON again.

Note

If the PC Tool is connected when the power supply is ON, the controller will stop in the boot sequence.

This will result in a communication failure (no display) for 5 minutes followed by fault code F117.

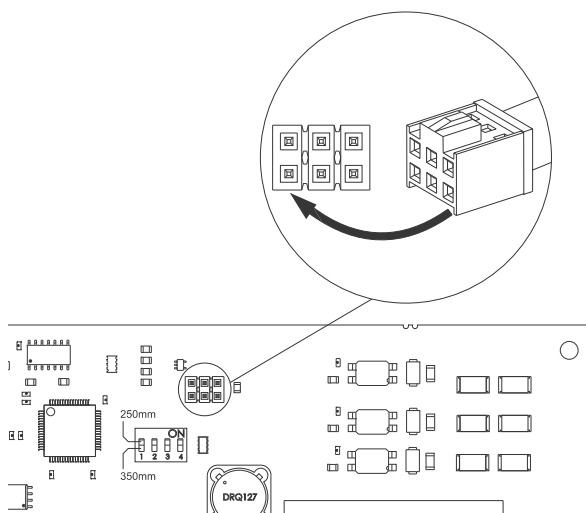


Fig. 13 Connecting the PC Tool cable to the LC 220 controller PCB

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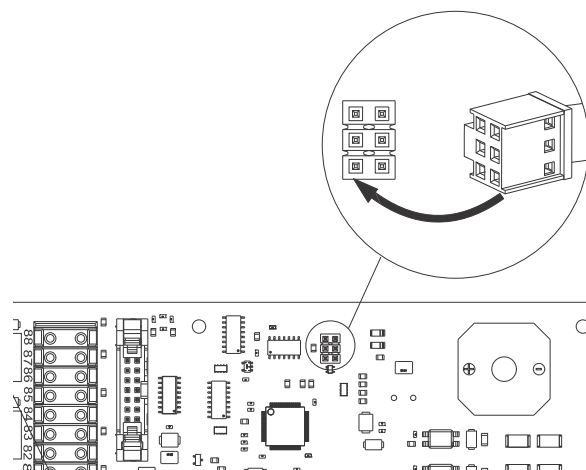


Fig. 14 Connecting the PC Tool cable to the LC 221 controller PCB

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7.11 Cleaning of level sensor

1. Push the ON-OFF-AUTO selector switch to "OFF" on the LC 220 control panel.
2. Loosen the screw cap by turning it counterclockwise. See fig. 15.

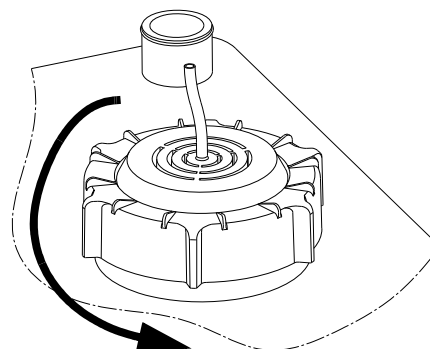


Fig. 15 Removing the pressure tube

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3. Lift the pressure tube carefully out of the collecting tank. Do not lift it by means of the hose.
4. Check for possible deposits on or in the pressure tube and the condensate trap underneath the screw cap.
5. Scrape off any deposits. If necessary, remove the hose from the controller and rinse the tube and hose with clean water at low pressure.
6. Refit the pressure tube by screwing the screw cap on to the tank. Reconnect the hose to the controller.
7. Check the sensor by running a test.

7.12 Calibration of level sensor

MSS

1. Set the selector switch to "OFF".
2. Remove the level sensor tube from the tank so that the air pressure on the Piezo sensor is normal atmospheric pressure.
3. Set DIP switch no. 4 to "OFF" - **wait 5 seconds**.
4. Set DIP switch no. 4 to "ON".
5. The sensor is now reset and calibrated.

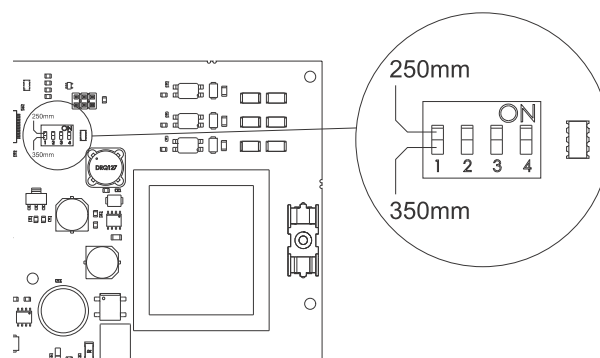


Fig. 16 LC 220 PCB, DIP switch

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M, MD and MLD

The calibration can be done by using a bucket of water and the sensor pipe.

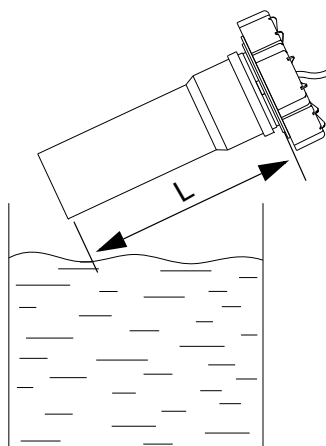


Fig. 17 Piezo sensor length

1. Set the selector switch to "OFF".
2. Lift the sensor pipe out of the tank.
3. In the setup menu of the LC 221 controller, go to calibration menu point C_01 and press "OK".
4. Type in the length [L] (mm) of the pipe and press "OK". See fig. 17.
5. Make a mark on the sensor pipe below the top level, and enter the distance [X] (mm) from the top down to the mark. See fig. 18.

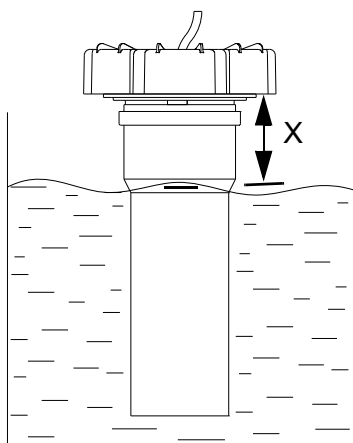


Fig. 18 Piezo sensor calibration

6. Lower the sensor pipe into the water until the water surface is at the painted mark. Press "OK" in the display while keeping the sensor pipe steady in the water. The sensor has now been calibrated. The "offset" value can be checked by measuring the height between sensor head and ground floor.

Note For MSS/M/MD, the height from ground floor to sensor connection is 409 mm. Use display sub menu C_02.

Note When replacing the LC(D)109 sensor unit, the "offset" value must be adjusted.

Note The longer the distance is between the "zero point" and the simulated "max level", the more precise the sensor will be.

MOG and MDG

Use the same method as for M, MD and MLD.

MD1 and MDV**The Piezo-resistive pressure sensor:**

- Use the same method as for M, MD and MLD.

The hydrostatic level sensor:

1. Set the selector switch to "OFF".
2. Lift the sensor pipe out of the tank.
3. In the setup menu of the LC 221 controller, go to calibration menu point C_01 and, while the sensor is out of the water, press "OK" to "Cal 0".
4. Lower the pipe into a bucket of water and type in the distance between bottom of sensor and upper edge of sensor pipe. Press "OK" in the display while keeping the sensor pipe steady in the water. The sensor has now been calibrated. The "offset" value can be checked by measuring the height between sensor head and ground floor.

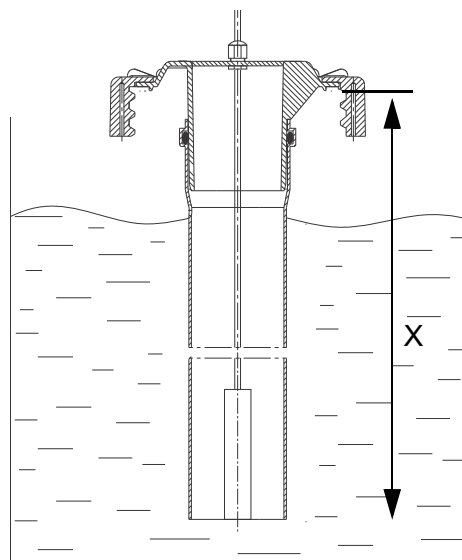


Fig. 19 Hydrostatic pressure sensor

7.13 Checking the winding resistance

7.13.1 MSS

Fit the connecting plug, part number SV0128, see section 5. *Service tools*.

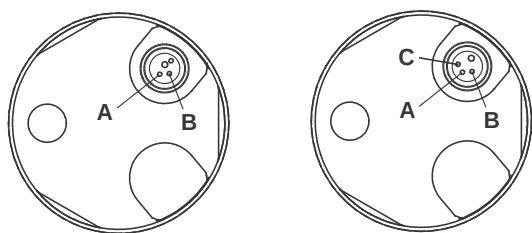


Fig. 20 Illustration of connection plug on MSS

Single-phase:

Main winding = A-B

The auxiliary winding cannot be measured.

Three-phase:

Auxiliary winding = A-B / A-C / B-C.

7.13.2 M, MD and MLD

Check the winding resistance by means of an ohmmeter.

- For measuring points, see fig. 21. Measure the motor side. For measuring values, see the table below.
- The values measured must be within the indicated ranges; otherwise the motor is defective and must be replaced.

Measuring values for M, MD and MLD			
Motor		Main winding [Ω]	Auxiliary winding [Ω]
[kW]	[V]		
1.2	1 x 230	2.56-2.83	5.98-6.61
1.5	1 x 230	1.8-2.0	2.66-2.94
1.2	3 x 230	6.55-7.24	-
1.5	3 x 230	4.46-4.93	-
2.2	3 x 230	2.75-3.05	-
2.4	3 x 230	2.09-2.31	-
3.2	3 x 230	2.09-2.31	-
3.2	3 x 400	2.09-2.31	-

The table values do not include the cable.

Resistance in cables: 10 m, approx. 0.14 Ω.

For illustrations on single-phase motors, see figs 24 and 28, and for three-phase motors, see figs 25 to 27 and 29 to 31.

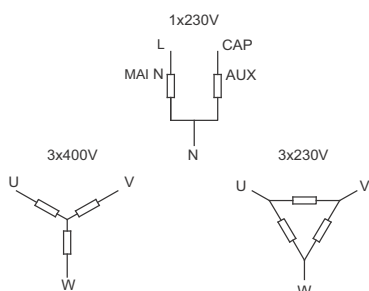


Fig. 21 Example of windings

7.13.3 MOG and MDG

Single-phase:

The following resistance can be measured in the motor windings:

Motor size	Winding resistance	
	Starting winding Pins 1-3	Main winding Pins 1-2
0.9 kW	4.5 Ω	2.75 Ω

The table values do not include the cable.

Resistance in cables: 10 m, approx. 0.14 Ω.

For illustrations, see figs 32 and 33.

Three-phase:

Motor size	Winding resistance	
	3 x 230 V	3 x 400 V
0.9 kW		
1.2 kW	6.8 Ω	9.1 Ω
1.5 kW		
2.6 kW	3.4 Ω	4.56 Ω
3.1 kW	2.52 Ω	3.36 Ω
4.0 kW		

The table values do not include the cable.

Resistance in cables: 2 x 10 m, approx. 0.28 Ω.

For illustrations, see figs 34 and 35.

7.13.4 MD1 and MDV

Check the winding resistance by means of an ohmmeter.

- For measuring points, see figs 36 and 37. Measure the motor side.
- For measuring values, see the table below.

The values measured must be within the indicated ranges; otherwise the motor is defective and must be replaced.

Measuring values						
Product	Pump type	Motor		Product no.	Main winding	
		[kW]	[V]		Multilift	Min [Ω]
MD1.80.80.15.4.50D/400	SE	1.5	3 x 380-415	96102280	8,41	9,84
MD1.80.80.22.4.50D/400		2.2		96102282	5,06	5,91
MD1.80.80.30.4.50D/400		3.0		96102284	3,37	3,80
MD1.80.80.40.4.51D/400		4.0		96102286	2,43	2,83
MD1.80.80.55.4.51D/400		5.5		96102288	1,85	2,15
MD1.80.80.75.4.51D/400		7.5		96102290	1,07	1,24
MD1.80.100.15.4.50D/400-2		1.5	3 x 380-415	96102292	8,41	9,84
MD1.80.100.22.4.50D/400-2		2.2		96102294	5,06	5,91
MD1.80.100.30.4.50D/400-2		3.0		96102296	3,37	3,80
MD1.80.100.40.4.51D/400-2		4.0		96102298	2,43	2,83
MD1.80.100.55.4.51D/400-2		5.5		96102300	1,85	2,15
MD1.80.100.75.4.51D/400-2		7.5		96102302	1,07	1,24
MDV.65.80.22.2.50D/400	2.2	3 x 380-415	SuperVortex free-flow impeller	96102274	4,88	5,69
MDV.65.80.30.2.50D/400	3.0			96102276	3,28	3,81
MDV.65.80.40.2.51D/400	4.0			96102278	2,37	2,76
MDV.80.80.60.2.51D/400	5.5			96776520	1,20	1,39
MDV.80.80.75.2.51D/400	7.5			96741485	1,20	1,39
MD1.80.80.15.4.50D/400	1.5	3 x 380-415	Single-channel impeller	97577857	2,31	2,69
MD1.80.80.22.4.50D/400	2.2			97577859	3,68	4,29
MD1.80.80.30.4.50D/400	3.0			97577861	2,71	3,02
MD1.80.80.40.4.51D/400	4.0			97577863	2,09	2,43
MD1.80.80.55.4.51D/400	5.5			97577865	1,26	1,45
MD1.80.80.75.4.51D/400	7.5			97577867	0,93	1,07
MD1.80.100.15.4.50D/400-2	1.5	3 x 380-415	Single-channel impeller	97577870	6,72	7,85
MD1.80.100.22.4.50D/400-2	2.2			97577872	3,68	4,29
MD1.80.100.30.4.50D/400-2	3.0			97577874	2,71	3,02
MD1.80.100.40.4.51D/400-2	4.0			97577876	2,09	2,43
MD1.80.100.55.4.51D/400-2	5.5			97577878	1,26	1,45
MD1.80.100.75.4.51D/400-2	7.5			97577880	0,93	1,07
MDV.65.80.22.2.50D/400	2.2	3 x 380-415	SuperVortex free-flow impeller	97577818	3,97	4,63
MDV.65.80.30.2.50D/400	3.0			97577833	3,05	3,55
MDV.65.80.40.2.51D/400	4.0			97577836	1,81	2,10
MDV.80.80.60.2.51D/400	6.0			97577838	1,09	1,25
MDV.80.80.75.2.51D/400	7.5			97577840	1,09	1,25

8. Fault finding chart

Before fault finding or fault correction, the electricity supply must be switched off. See also section 7. *General service information*.

Fault	Possible cause	Remedy
1. The pump does not run.	Fault in voltage supply.	Check power supply and fuses.
	Pump is blocked.	Remove the blockages through the inspection cover, see section 7.7 <i>Cleaning the non-return valve on MSS, M, MD and MLD</i> . If this is not possible, remove the pump and clear away the blockages.
	Pump (motor) is defective.	Replace the pump.
	Motor cable is defective.	Replace the motor cable, see section 7.1 <i>Replacement of motor cable</i> .
	Level sensor is blocked or defective.	Clean or replace the level sensor, see section 7.11 <i>Cleaning of level sensor</i> .
2. The pump runs constantly.	Fault in voltage supply.	Check power supply and fuses.
	Level sensor is blocked or defective.	Clean or replace the level sensor, see section 7.11 <i>Cleaning of level sensor</i> .
3. The pump starts/stops frequently.	Level sensor is blocked or defective.	Clean or replace the level sensor, see section 7.11 <i>Cleaning of level sensor</i> .
	Fault in voltage supply.	Check power supply and fuses.
	Non-return valve is blocked or defective (constantly open).	Clean or replace the non-return valve, see section 7.7 <i>Cleaning the non-return valve on MSS, M, MD and MLD</i> .
4. The head/flow rate is not high enough.	Fault in voltage supply.	Check power supply and fuses.
	Impeller is defective.	Replace the impeller, see section 7.3 <i>Replacement of impeller</i> .
	Tank is defective.	Replace the tank.
	Outlet is (partly) blocked.	Clean the non-return valve, see section 7.7 <i>Cleaning the non-return valve on MSS, M, MD and MLD</i> .
5. Fault code 117		
6. Display blank	The PCTool connection has not been removed before resetting the system.	Restart the system again, and make sure that the PCTool cable is removed from the PCB.
7. Controller stopped in the boot sequence		

9. Wiring diagrams

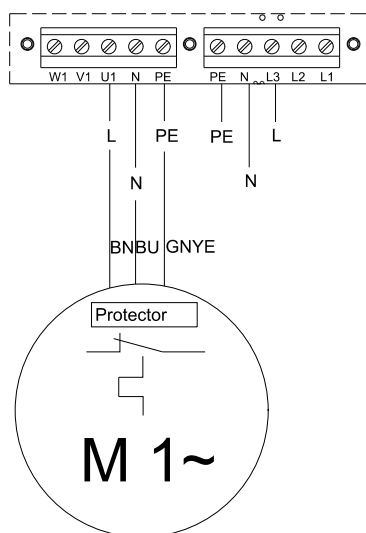


Fig. 22 Wiring diagram, single-phase Multilift MSS

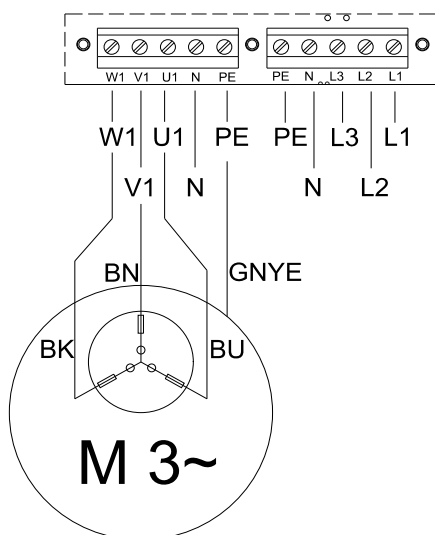


Fig. 23 Wiring diagram, three-phase Multilift MSS

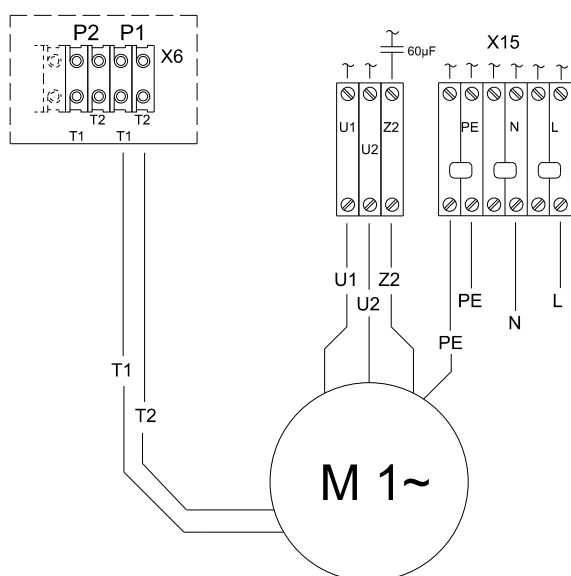


Fig. 24 Wiring diagram, single-phase Multilift M.12.1.4 and M.15.1.4

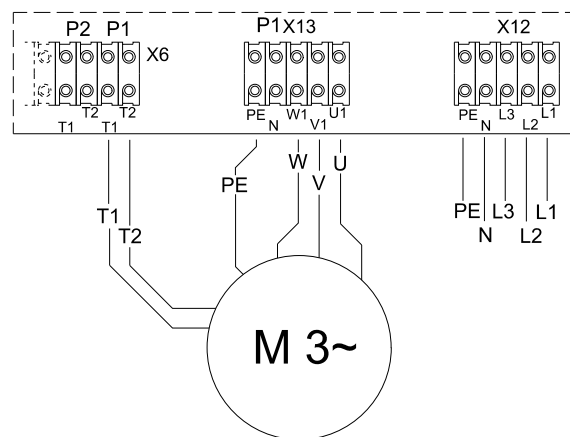


Fig. 25 Wiring diagram, three-phase Multilift M.12.3.4 and M.15.3.4

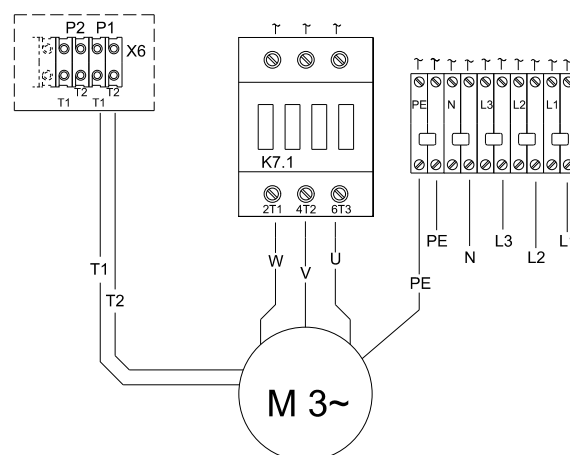


Fig. 26 Wiring diagram, three-phase Multilift M.22.3.4 with contactors

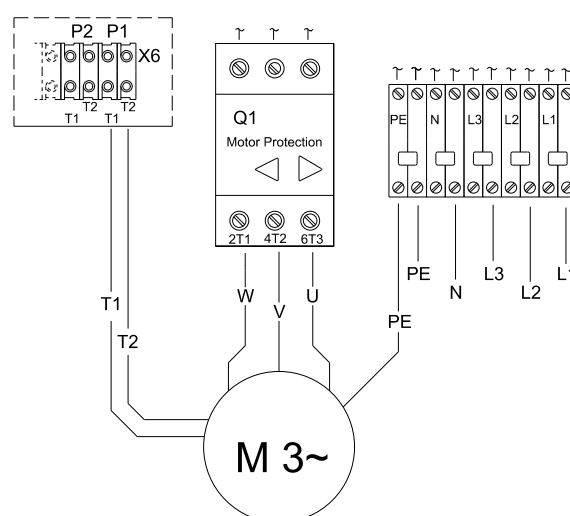


Fig. 27 Wiring diagram, three-phase Multilift M.22.3.4, M.24.3.2, M.32.3.2 and M.38.3.2 with motor-protective circuit breaker

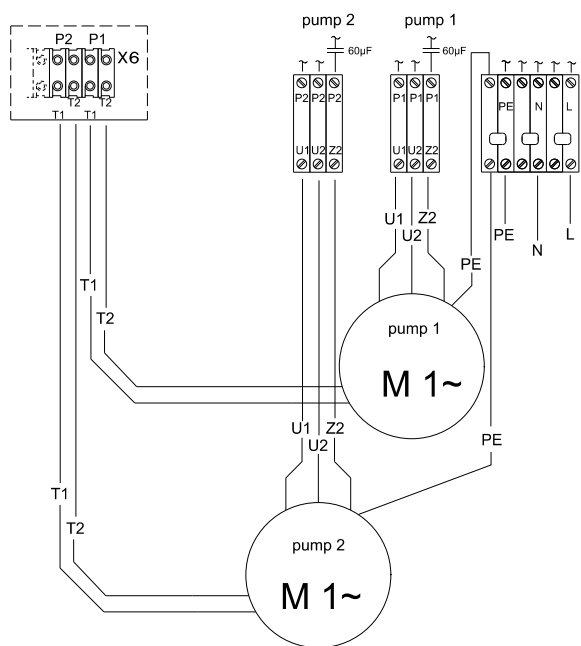


Fig. 28 Wiring diagram, single-phase **Multilift MD/MLD.12.1.4** and **MD/MLD.15.1.4**

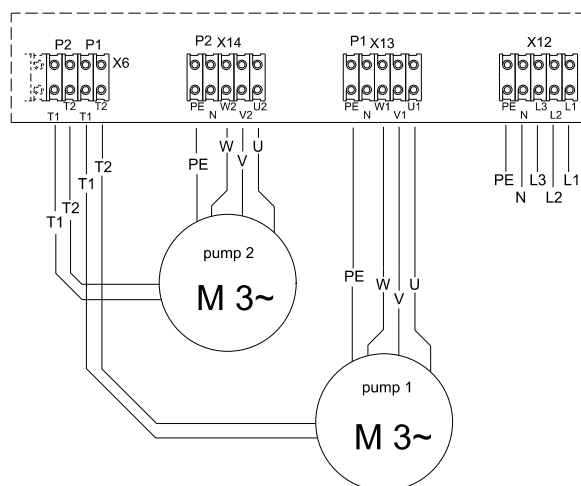


Fig. 29 Wiring diagram, three-phase **Multilift MD/MLD.12.3.4** and **MD/MLD.15.3.4**

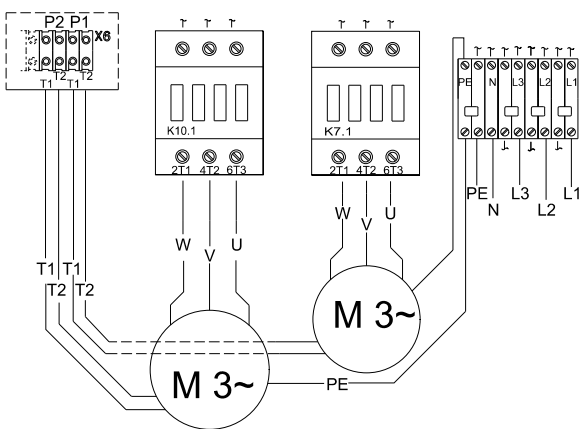


Fig. 30 Wiring diagram, three-phase **Multilift MD/MLD.22.3.4** with contactors

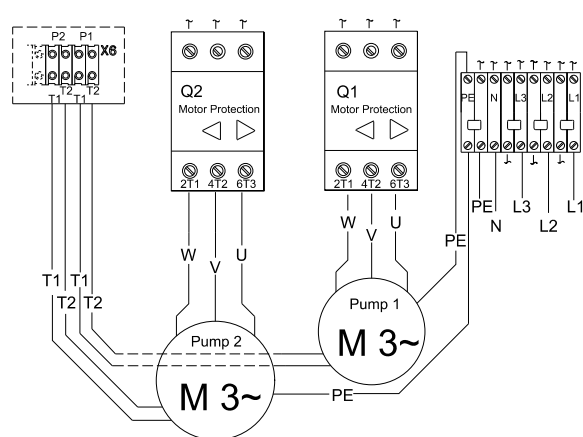


Fig. 31 Wiring diagram, three-phase **Multilift MD/MLD.24.3.2**, **MD/MLD.32.3.2** and **MD/MLD.38.3.2** with motor-protective circuit breaker

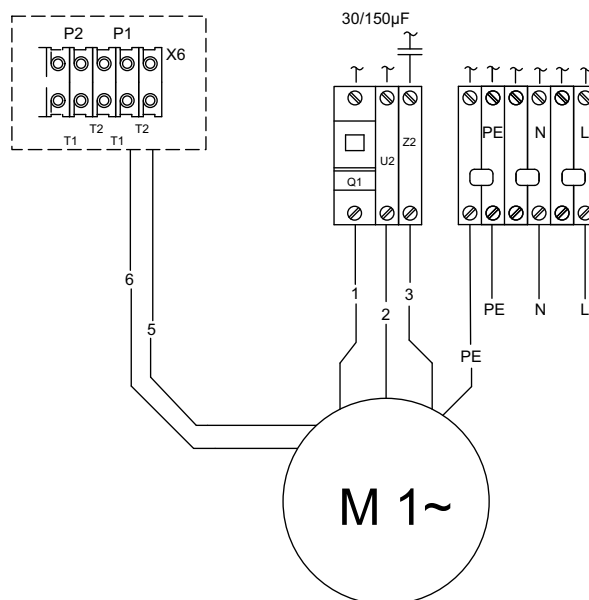


Fig. 32 Wiring diagram, single-phase **Multilift MOG**

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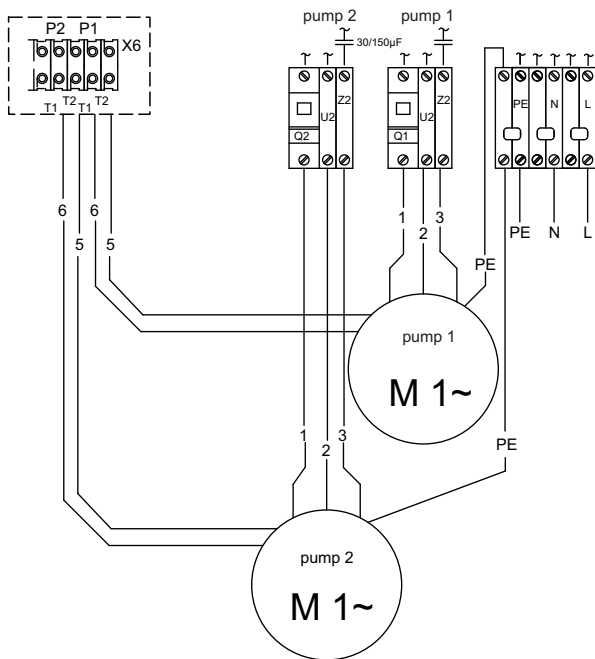


Fig. 33 Wiring diagram, single-phase Multilift MDG

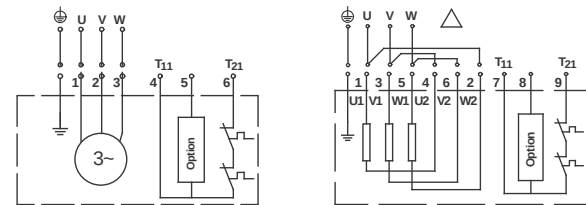
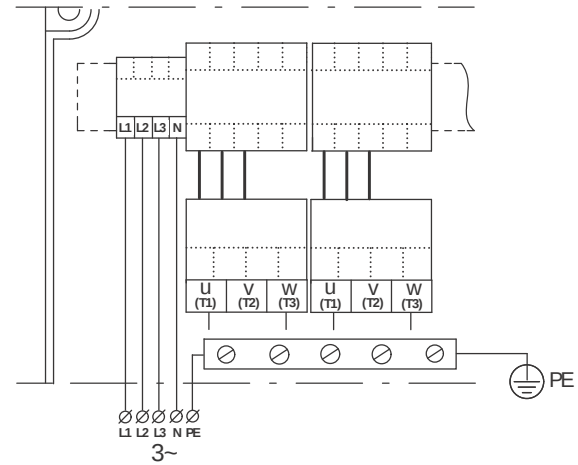


Fig. 36 Wiring diagram, three-phase DOL (< 5 kW) for Multilift MD1 and MDV

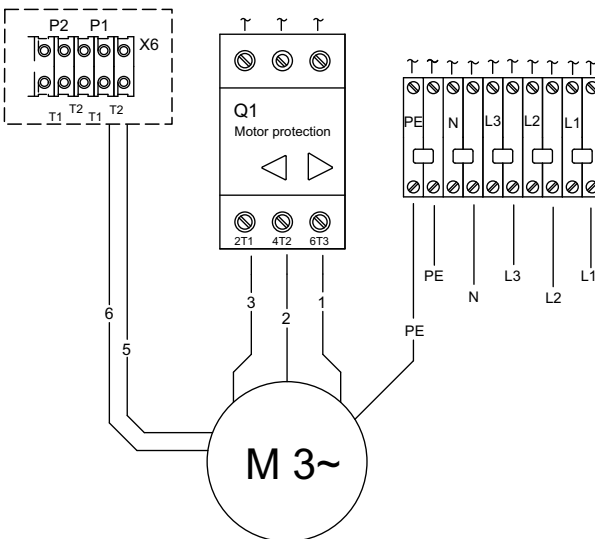


Fig. 34 Wiring diagram, three-phase Multilift MOG

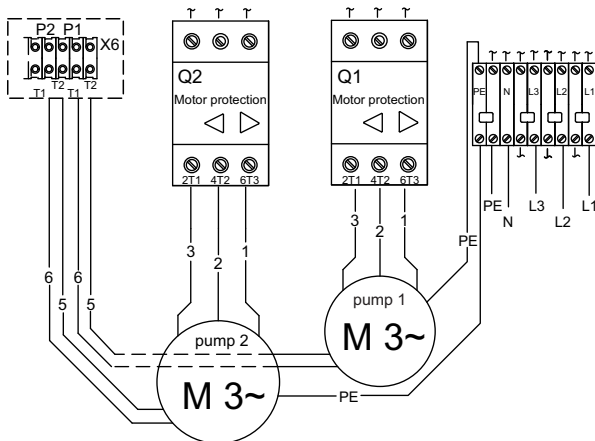


Fig. 35 Wiring diagram, three-phase Multilift MDG

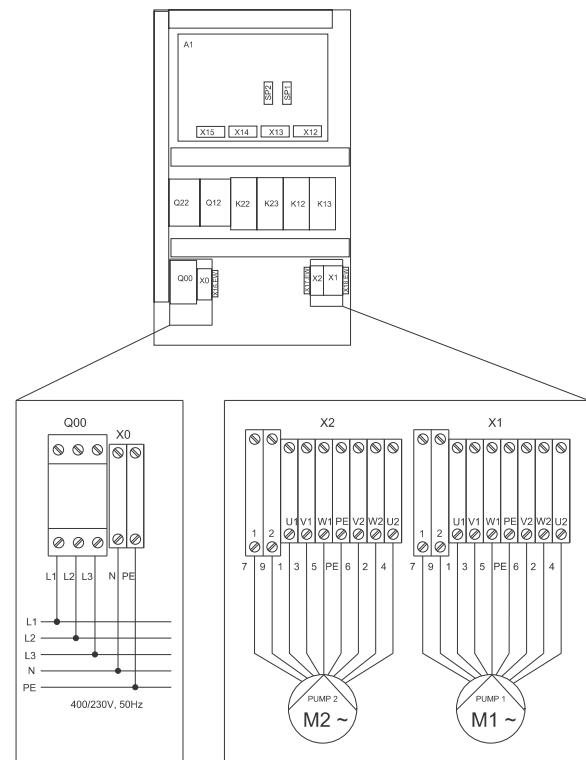
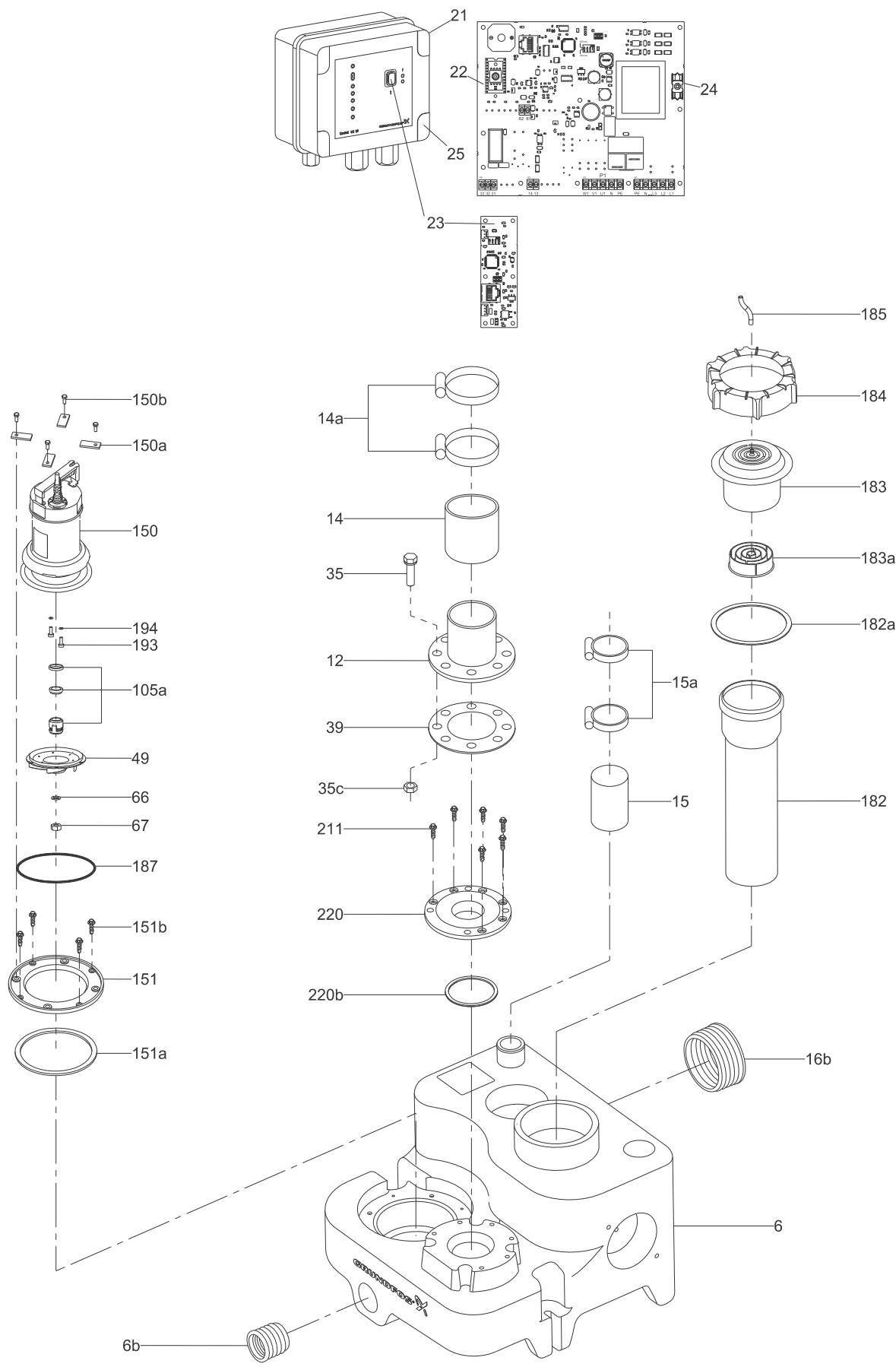
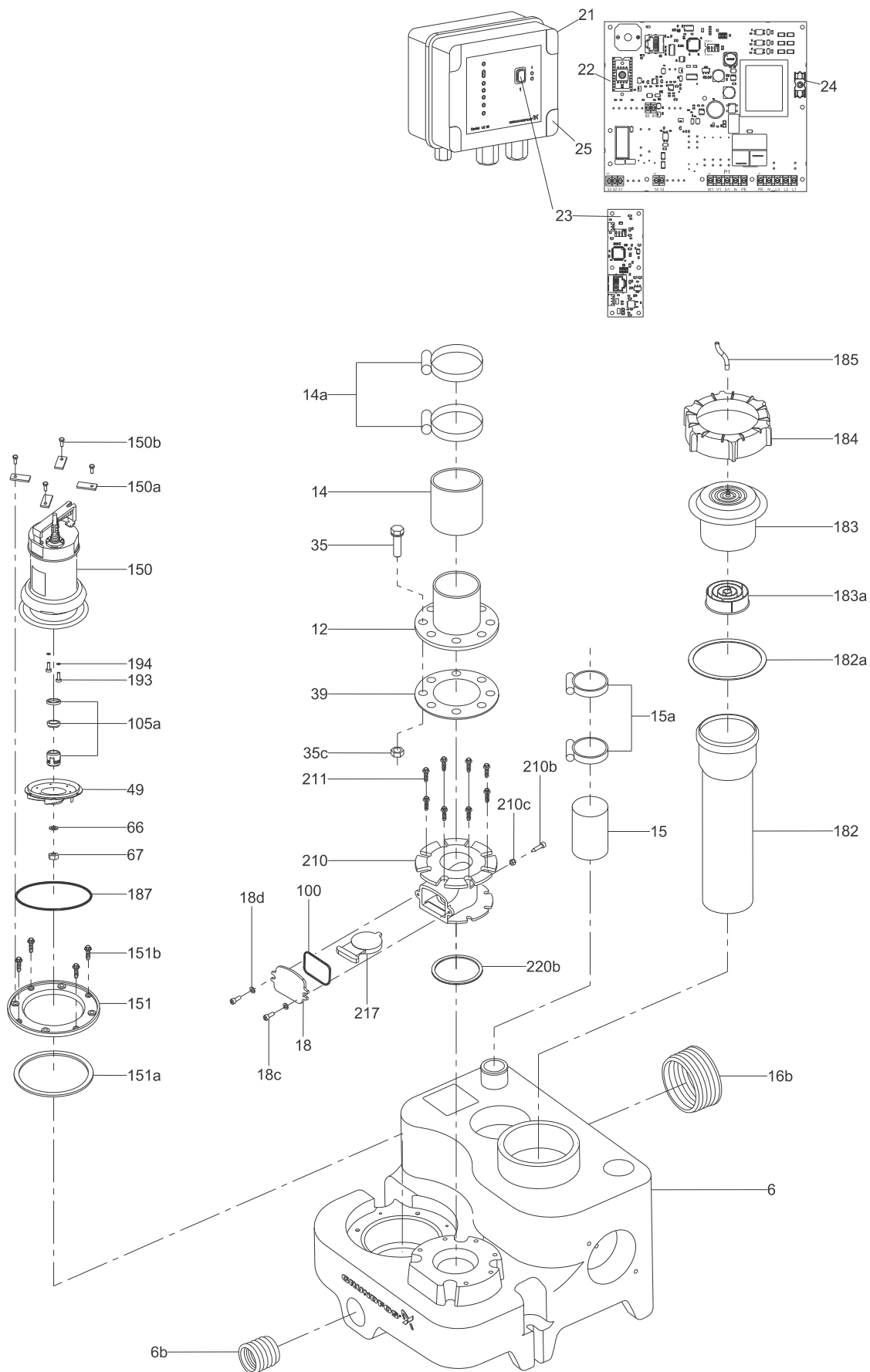


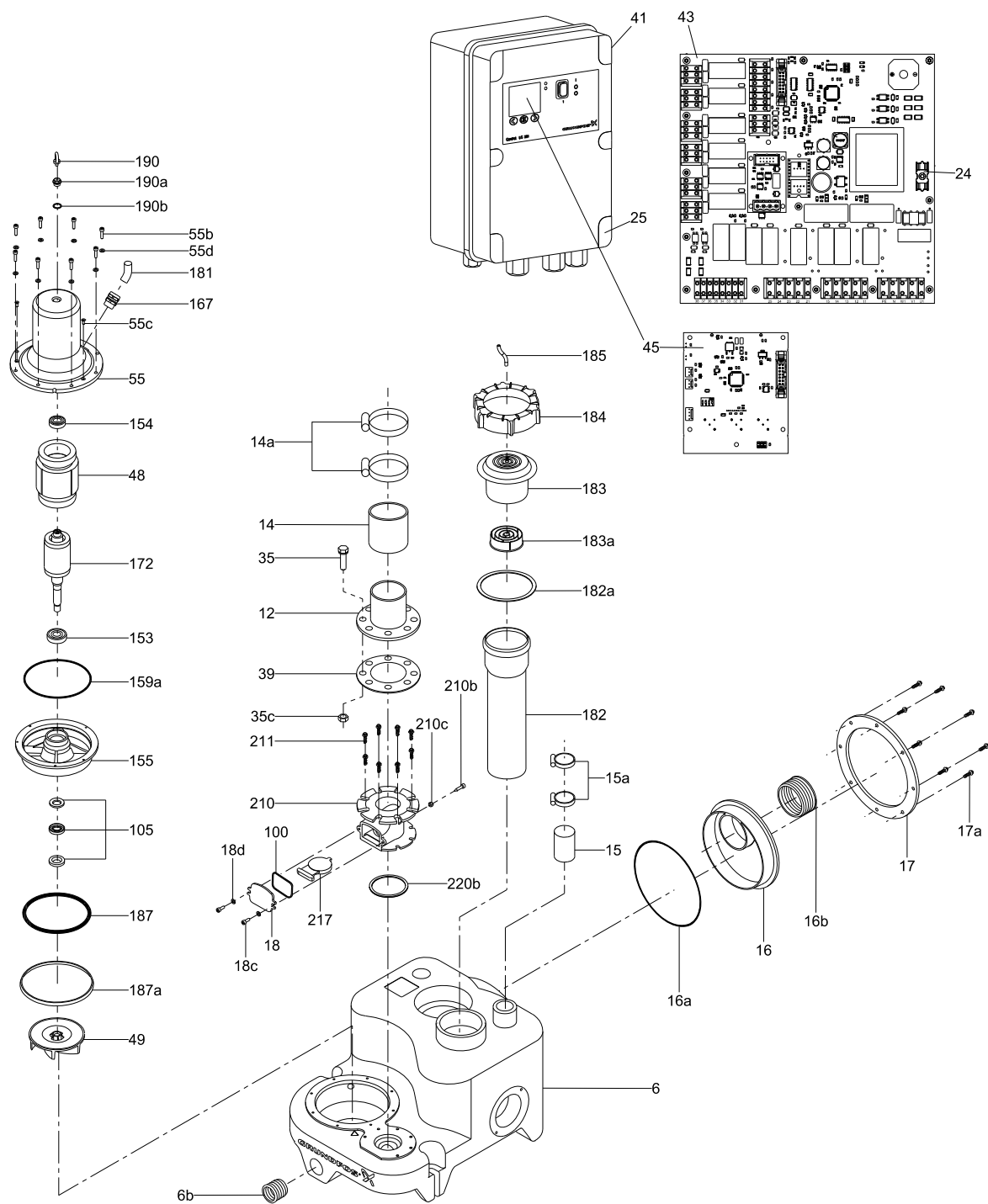
Fig. 37 Wiring diagram, three-phase Y/D (> 5 kW) for Multilift MD1 and MDV

10. Drawings
Multilift MSS without non-return valve

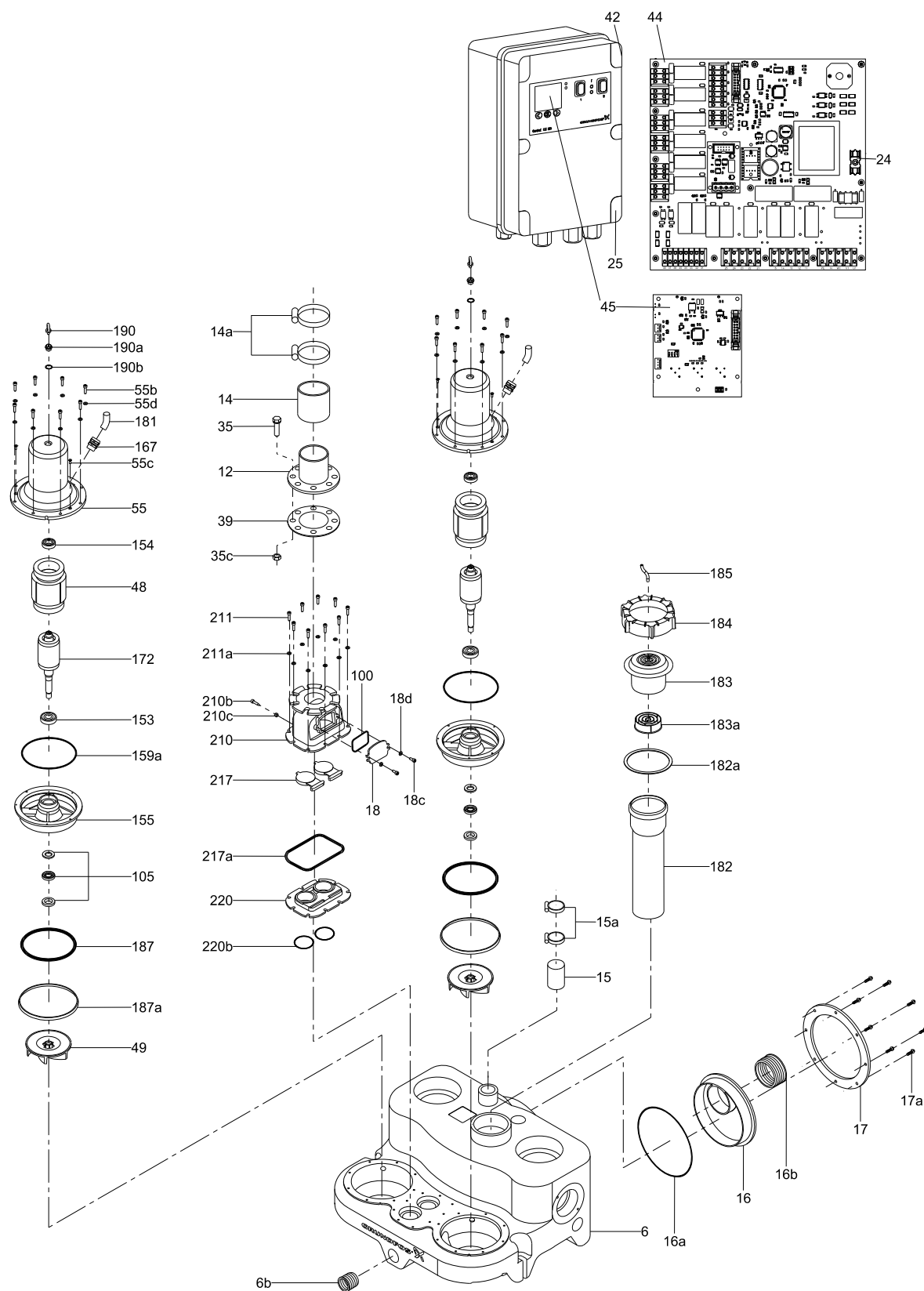


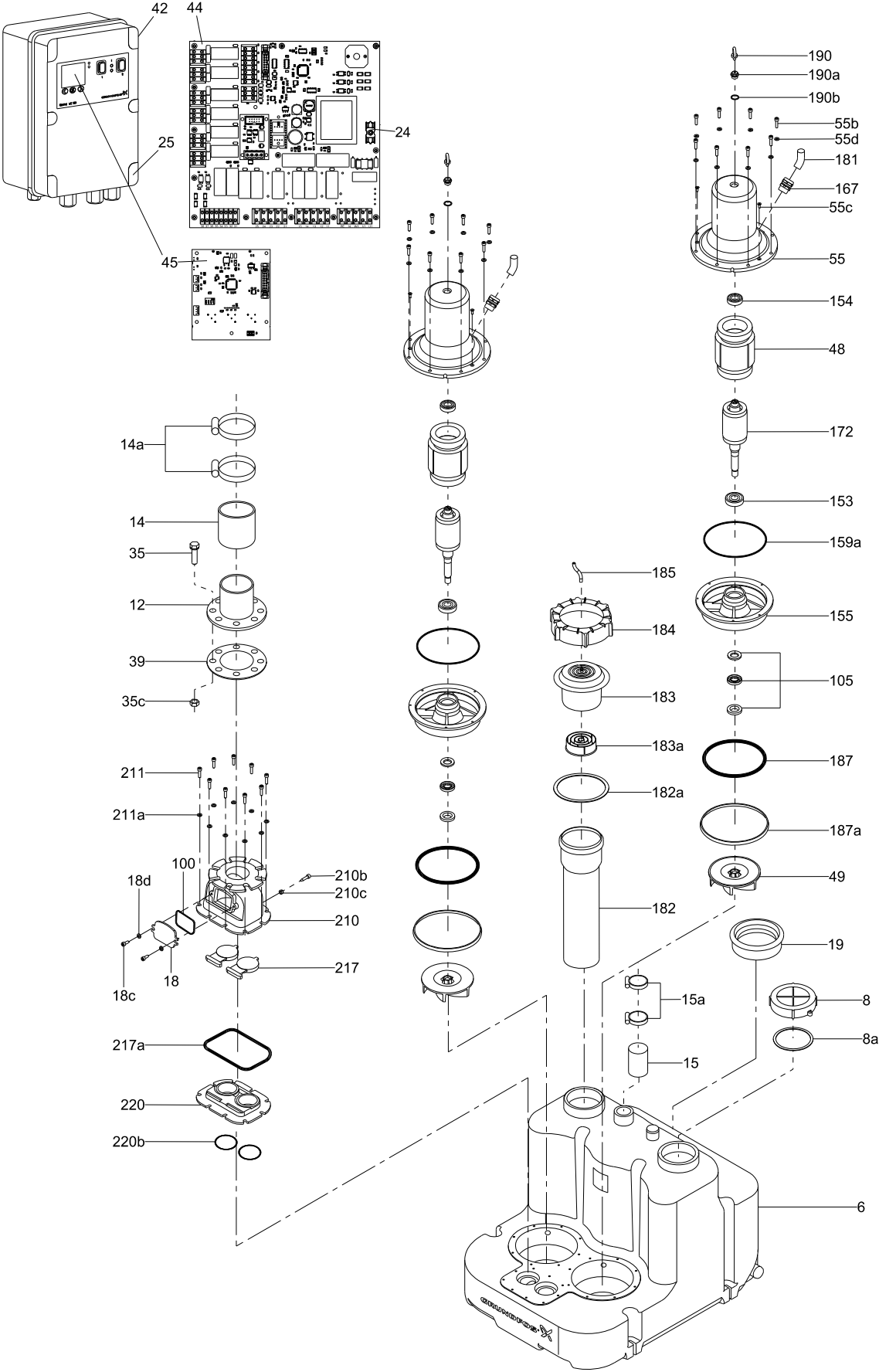
Multilift MSS with non-return valve



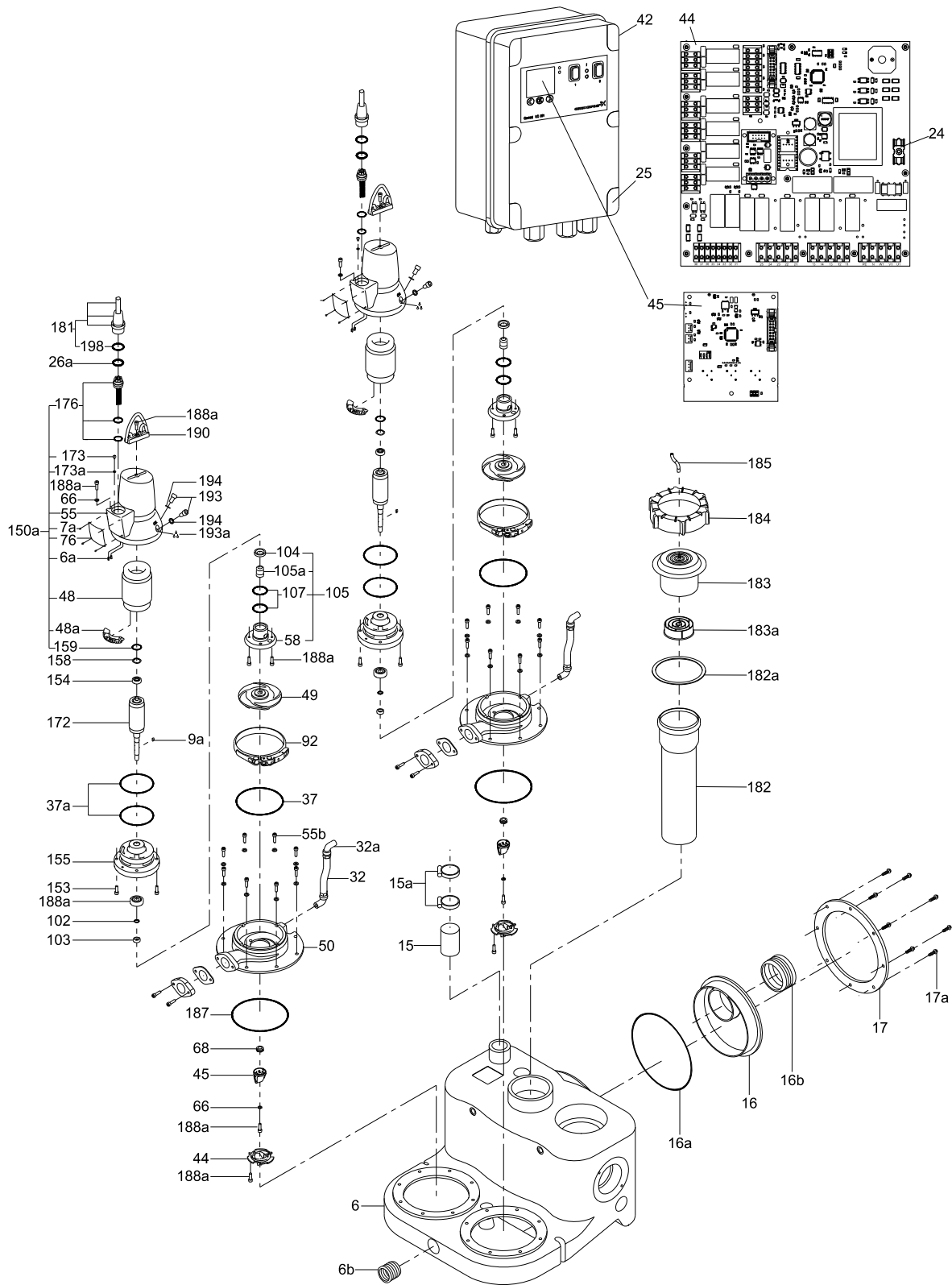


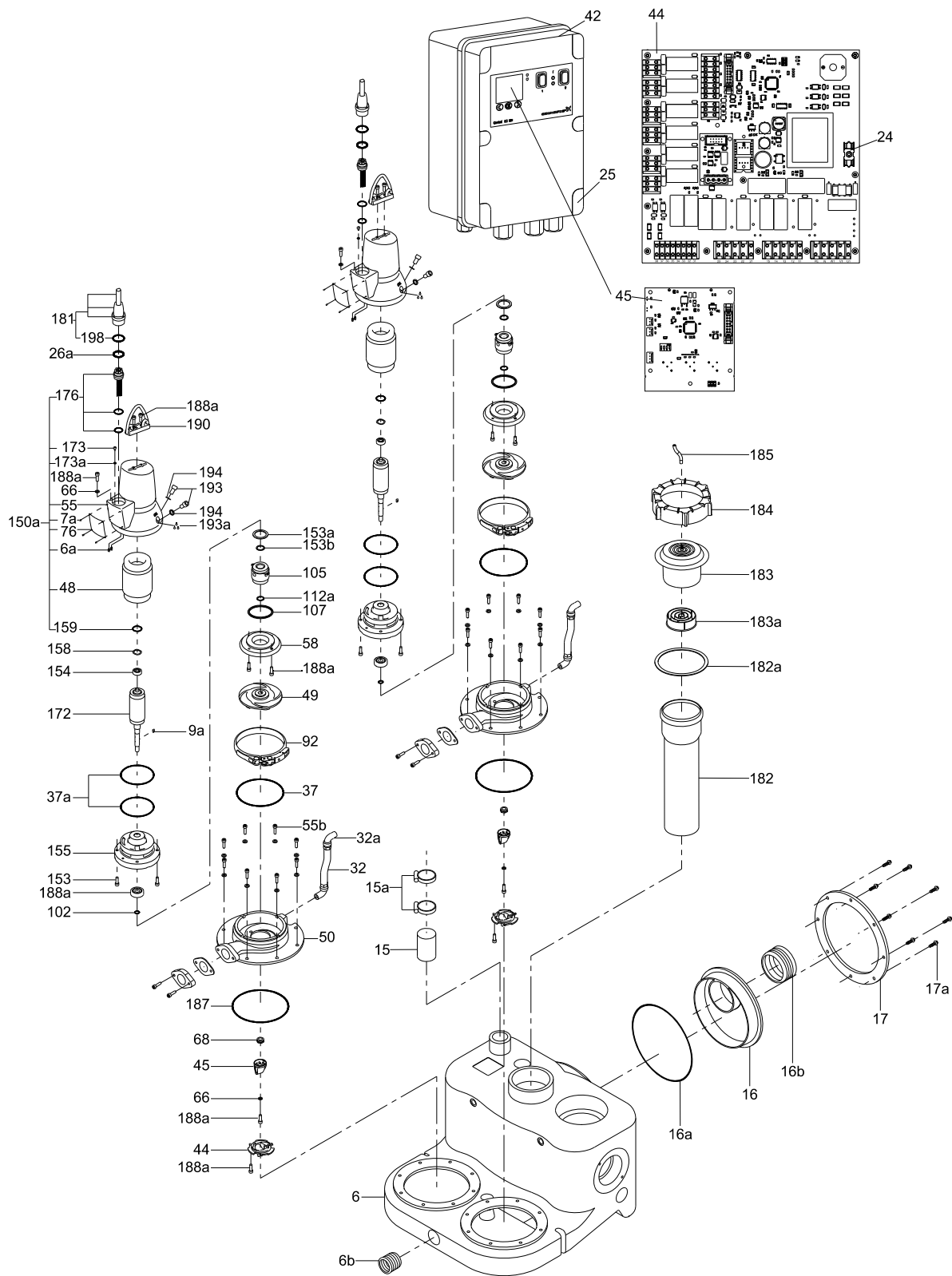
Multilift MD

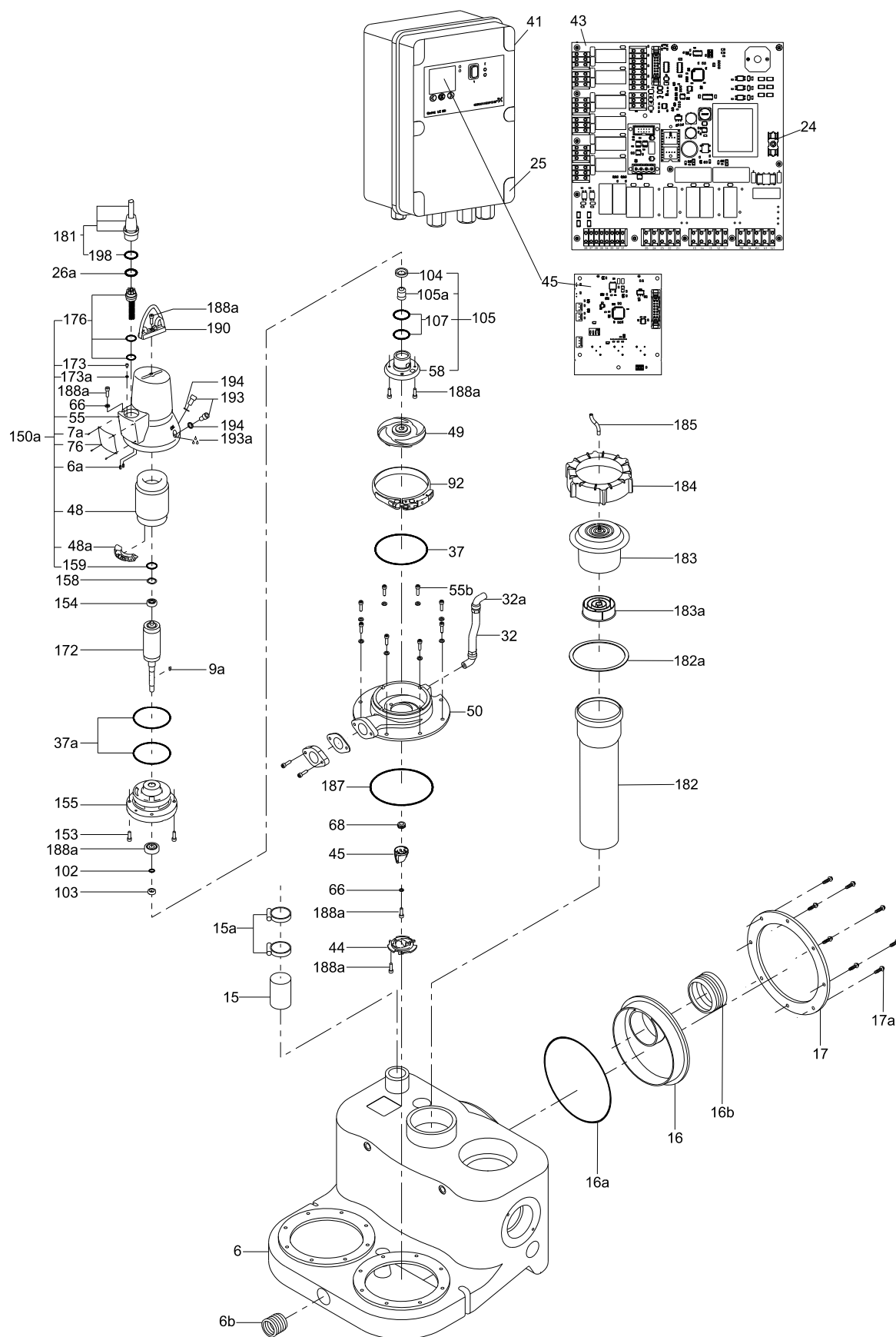


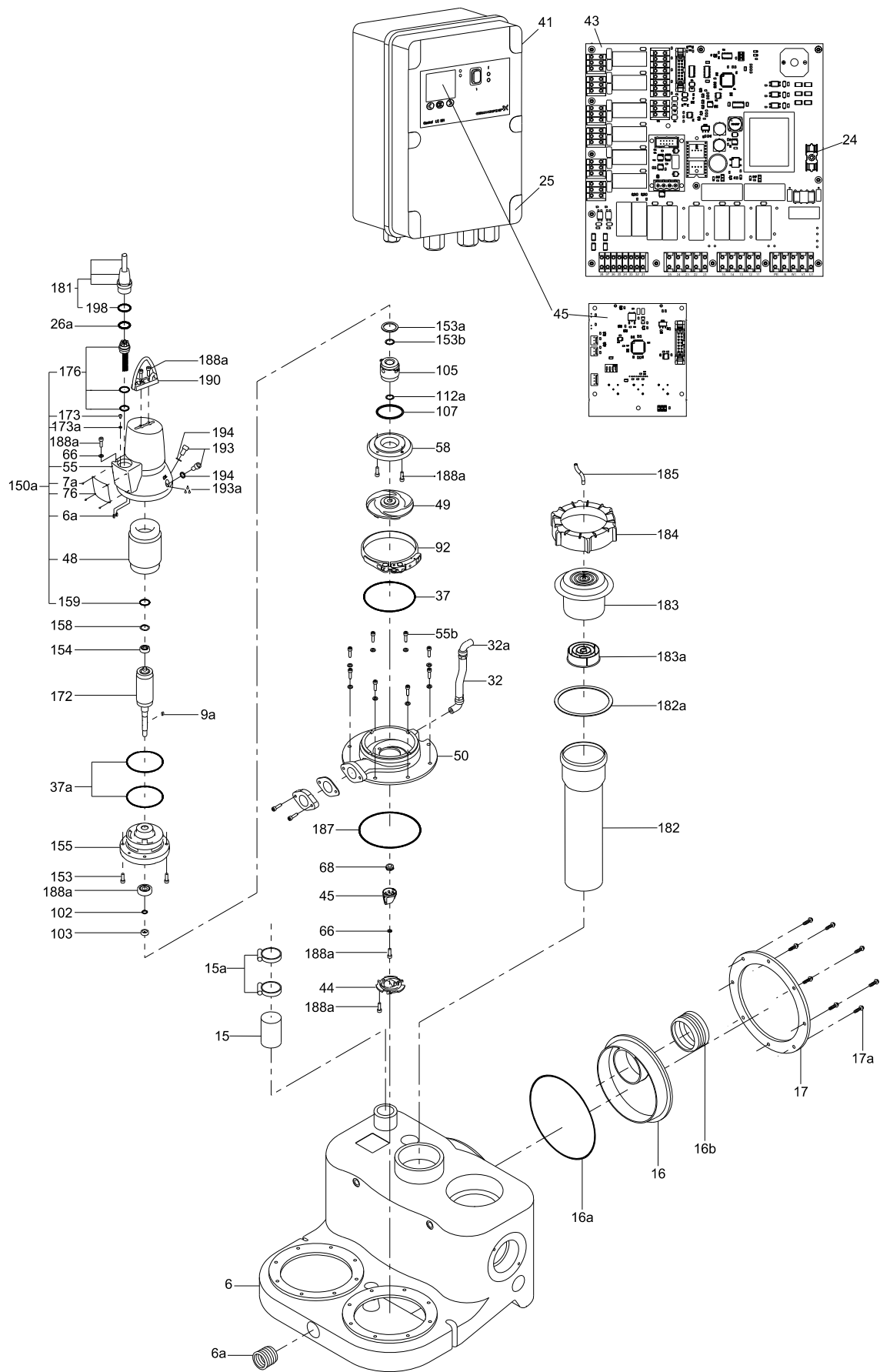


Multilift MDG up to 1.5 kW

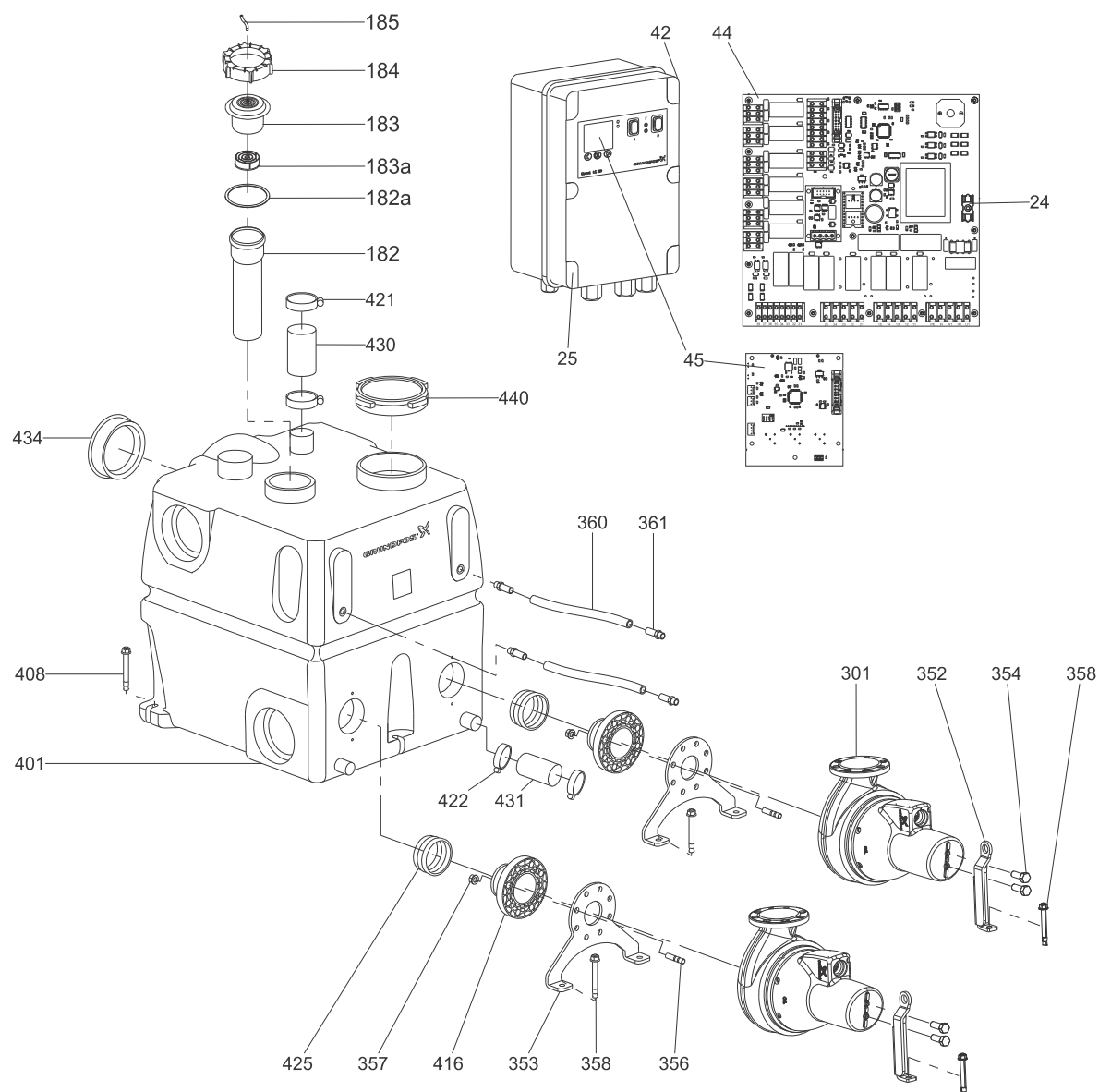


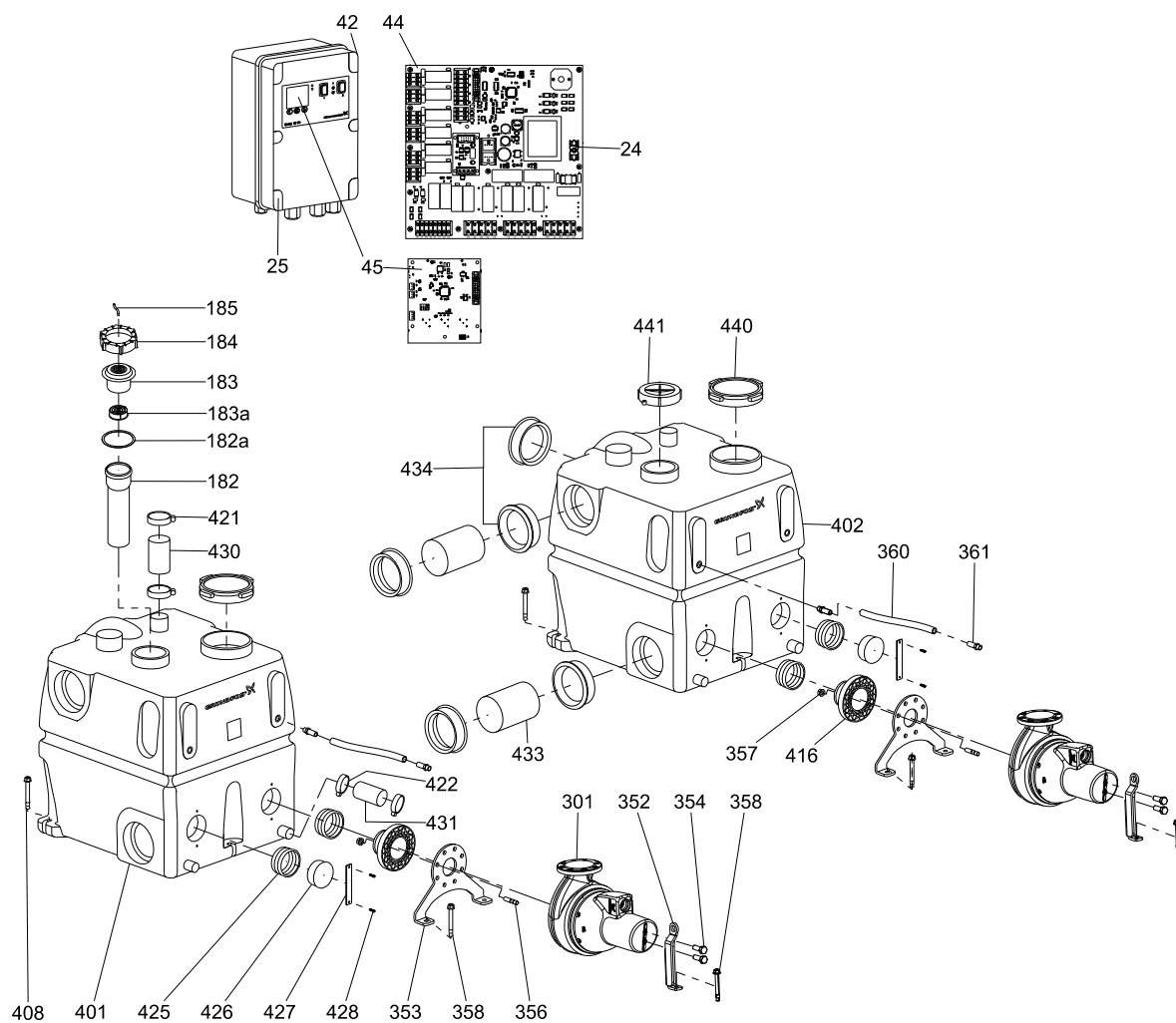






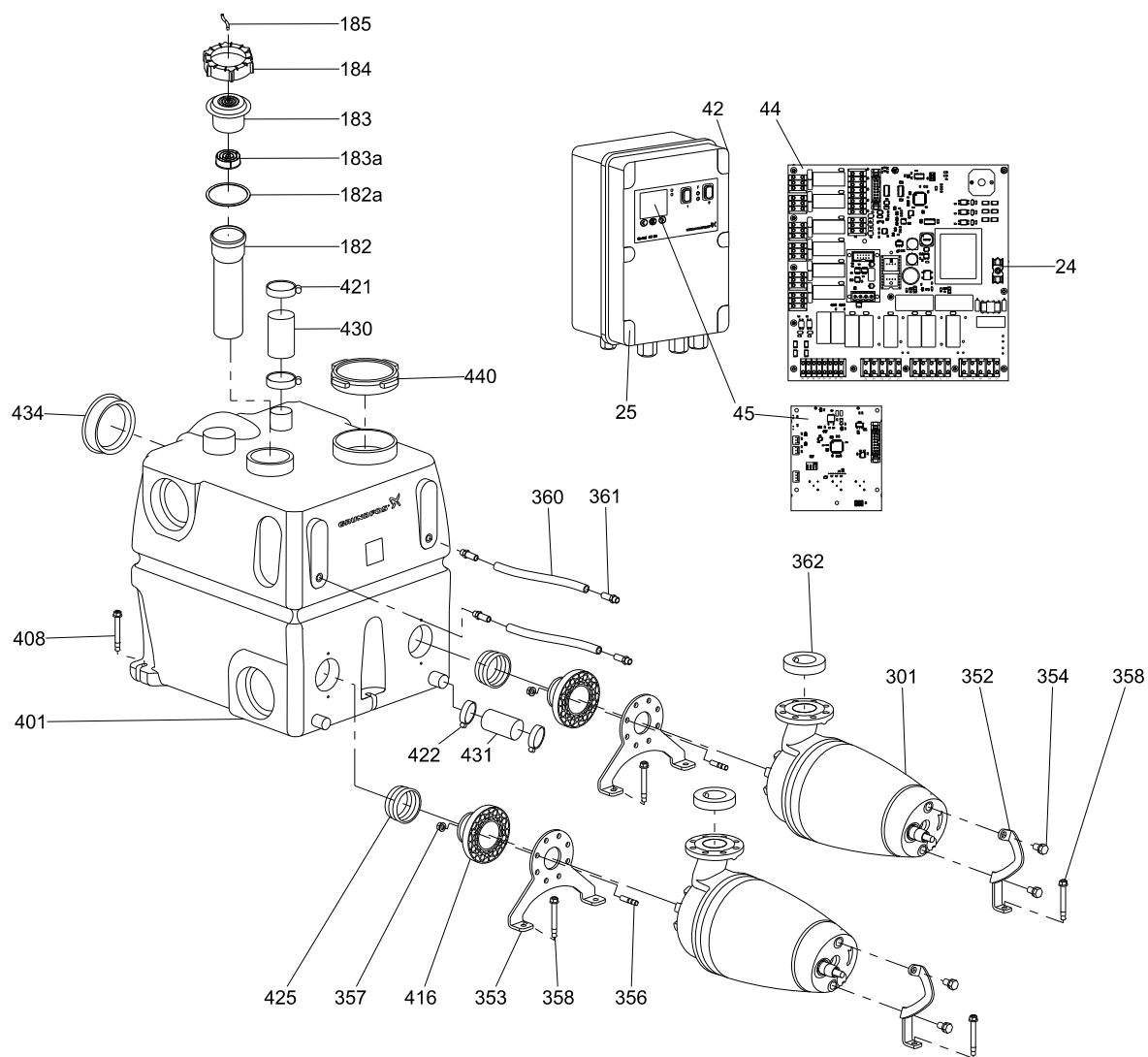
Multilift MD1/MDV, SL version



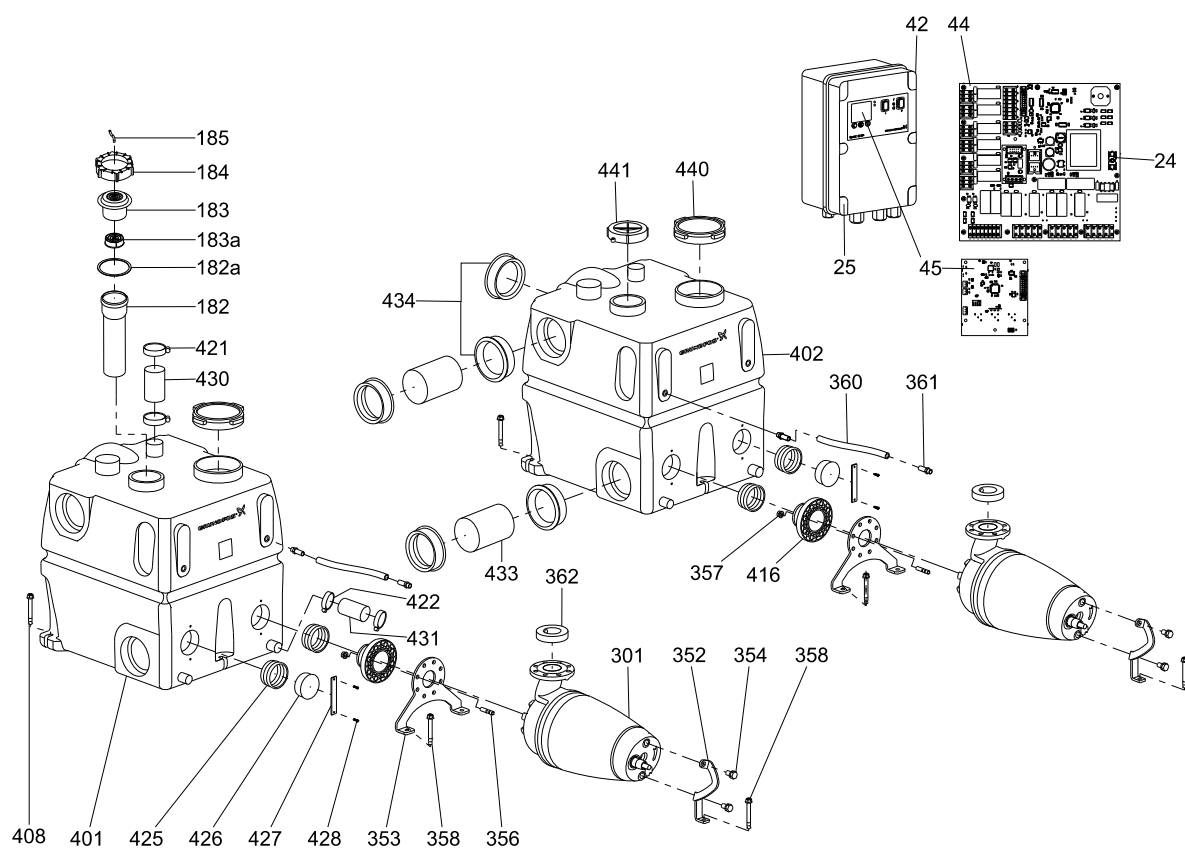


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Multilift MD1/MDV, SE version



TM05 3724 1612



TN05 3723 1612

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Revised 27.04.2012

98288153 1012
ECM: 1099909

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