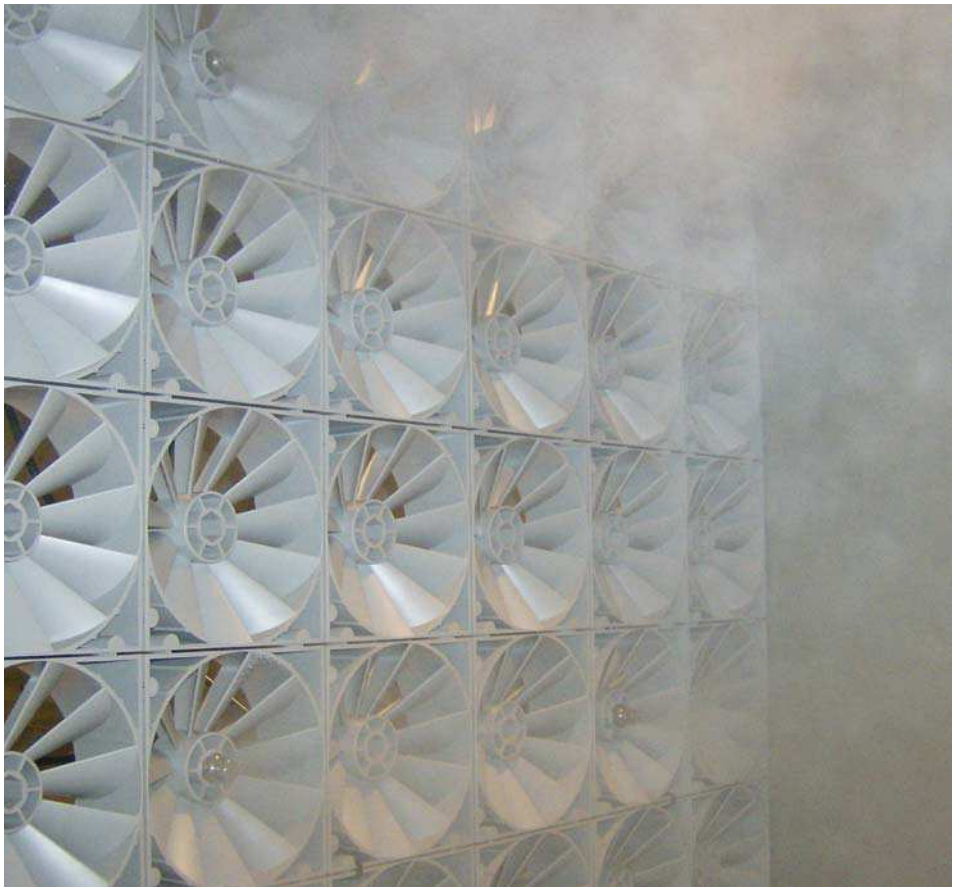
HygroMatik

Operating manual

HPS
High Pressure System

Adiabatic humidification and cooling system



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7.5 Assembling of the distribution pipe

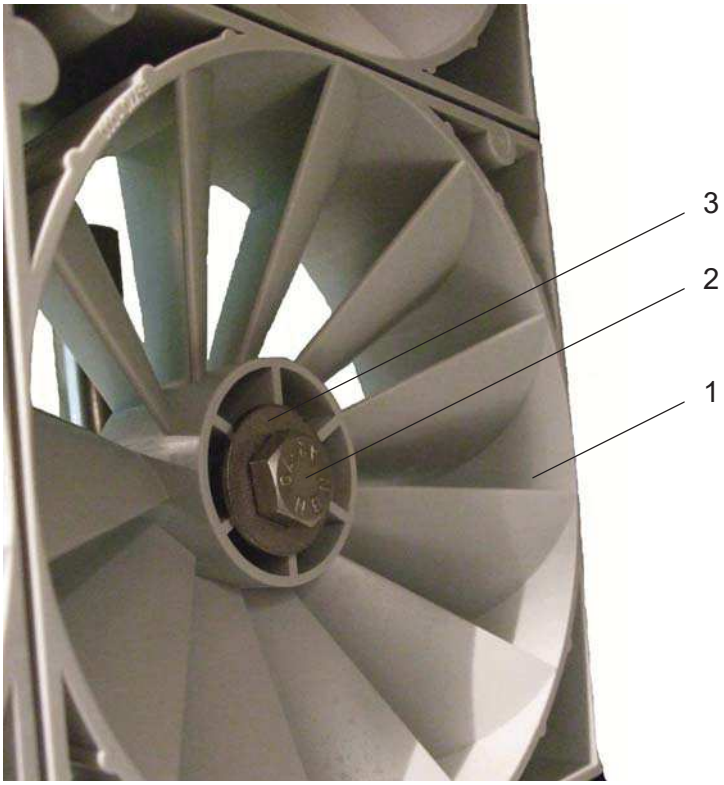
The distribution pipe has to be attached to the vortex module wall in accordance to the assembling sketch that HygoMatik delivers for each project.

Each nozzle on the vortex module wall has to be connected to the distribution pipe by using a high pressure hose. Each nozzle has to be positioned on a higher level than its connection point at the distribution pipe - there should be a constant fall in the high pressure hose.

Assembling:

A distribution pipe is attached at least to two vortex modules.

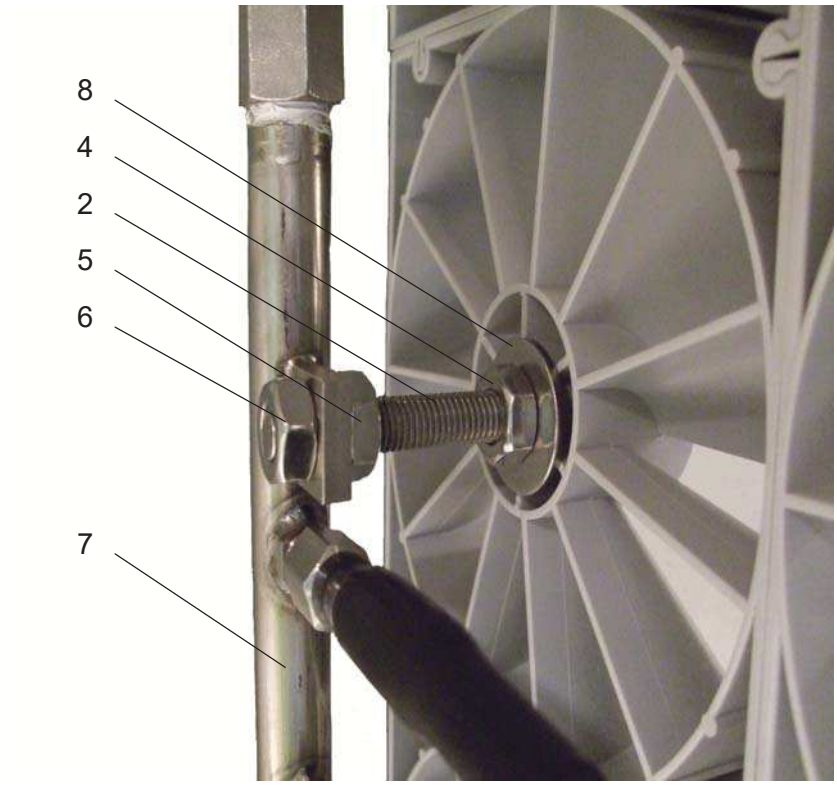
On the upstream side of such a vortex module (1) a screw (2) with a washer (3) is inserted in the vortex module.



On the back side of the vortex module a washer (8) and another nut (4) are added to the screw (2). The nut has to be tightened.

Next step is to put a second nut (5), the distribution pipe (7) and a third nut (6) onto the screw.

Thightening the two nuts will fix the distribution pipe on the screw. The distance between vortex module and distribution pipe can be varied by changing the position of nuts (5) and (6).



12. Device Control

12.1 Electrical and electronical components of the device

In the system housing, below the fold-up console cover, the electrical components are arranged along with the terminals. A PLC (3) is responsible for control.

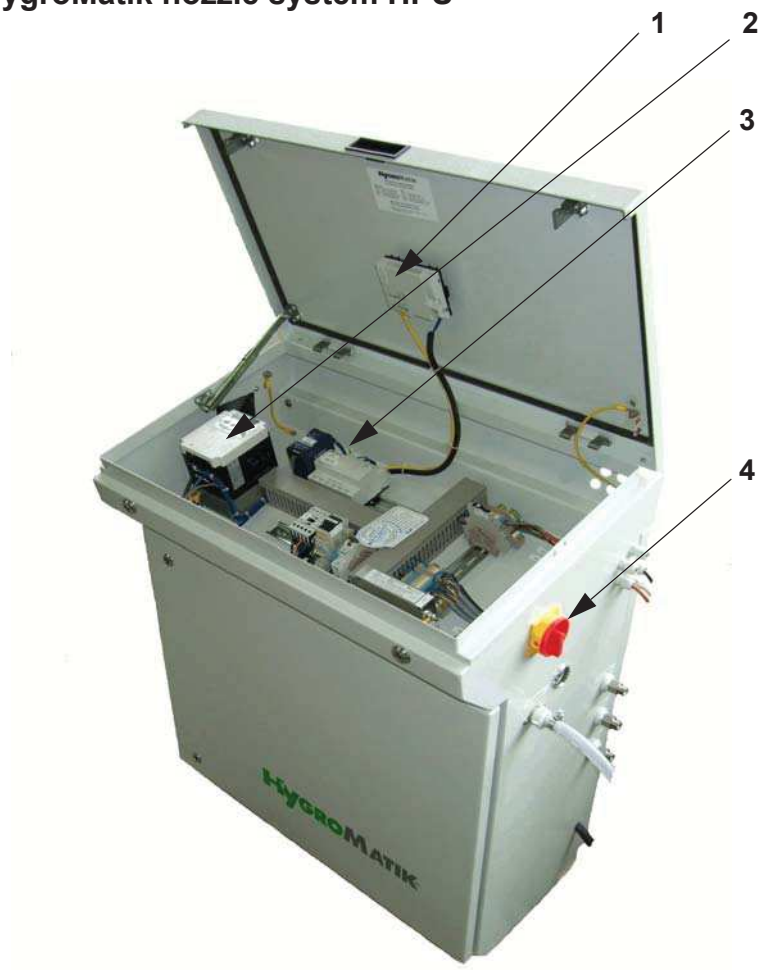
In the display and control unit (1) of the control important operating data are displayed and parameter settings can be adjusted.
A frequency inverter (2) delivers different frequencies for the asynchronous motor of the pumping station that is in the lower part of the system housing.

Depending on the pump speed, the water pressure and thus the volume of the water to be sprayed can be varied. The water pressure can have values between 25 and 75 bar.

Below 25 bar, there is no optimal spray pattern of the nozzles. The higher the water pressure, the better the spray pattern and thus humidification.

The main switch (4) on the right hand side serves to switch the HygroMatik nozzle system HPS on and off.

HygroMatik nozzle system HPS



1	Display and control unit
2	Frequency inverter
3	PLC control
4	Main switch

Note: The longer the duration of the running time of the pump the quicker the sealings will wear. In such a case please contact HygroMatik.

13.1.1 Changing the oil in the high-pressure pump

An oil change on the high-pressure pump must be carried out once a year (or every 2500 operating hours). If contamination is visible through the oil sight glass the oil may have to be changed more frequently.

Changing the oil:

1. Switch off the HygroMatik high-pressure nozzle system by setting the main switch on the control cabinet to position '0'.

2. Unscrew the oil dipstick (see no. 12).

3. Loosen the drain screw (no. 14.) and let the oil drain. Be careful of the sealing ring.

4. Tighten the drain screw (no. 14) with the sealing ring in place.

5. Add 15W40 motor oil (approx. 0.4 l) via the filler hole (no. 12).

6. Check the oil level using the dipstick and close the filler hole.

7. Set the main switch to 'I'.

Note: Only use **mineral oil**!

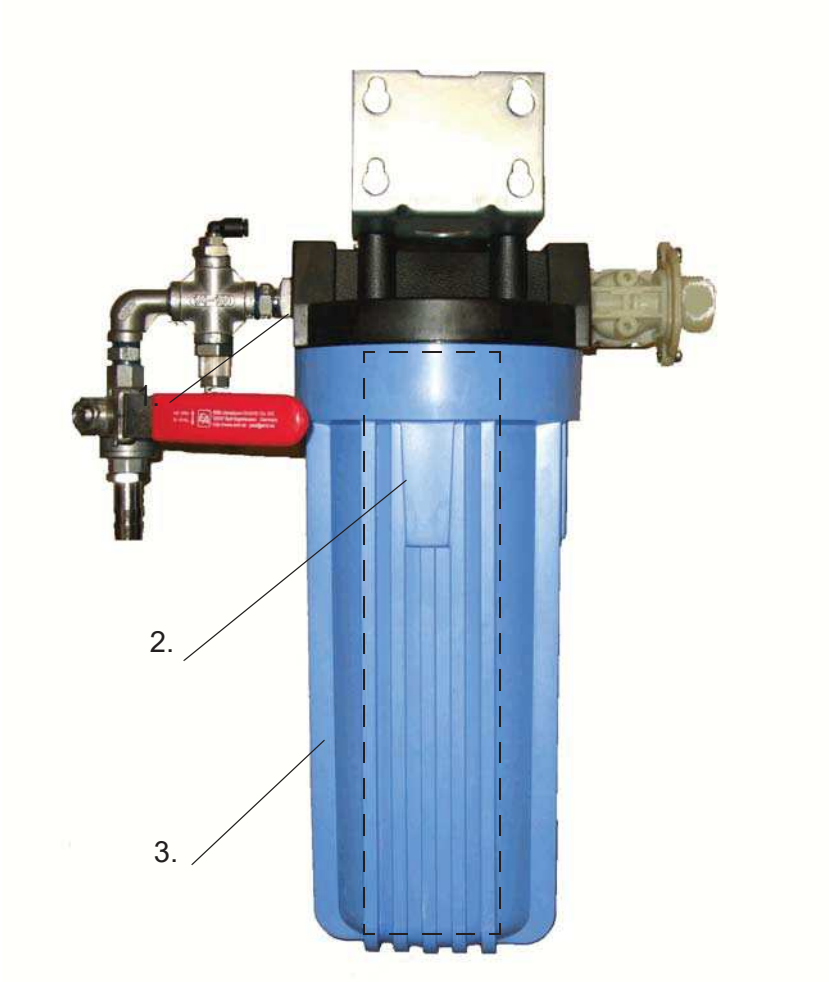
13.1.2 Checking/replacing the mains water filter

The mains water filter must be checked monthly for contamination and replaced if necessary. Colouring of the originally white water filter cartridge indicates contamination.

Contamination results in an increased resistance to flow. This lowers the supply pressure to the pump. An excessively low supply pressure can lead to switch-off of the high-pressure nozzle system HPS (dry run protection).

Replacing the water filter:

1. Mount of water filter housing
2. Filter catridge (int.)
3. Water filter housing



13.1.4 Cleaning the high-pressure nozzle

1. Set the main switch on the control panel of the HygroMatik high-pressure nozzle system to '0'.

2. Unscrew the nozzle from the holder.

3. Unscrew the nozzle by screwing the inside parts out.

4. Clean the nozzle components in an ultrasonic bath for about 10 minutes, if necessary use a lime remover in low concentration (less than 10%).

5. Put nozzle components back together.

Caution: Risk of injury.

6. Screw the nozzle back on.

7. Set the main switch back to 'I'.

8. Finally: check the spray pattern.

Caution: Ensure that the high pressure is reduced by, for example, activating the flushing program.

Caution: Wear safety goggles when cleaning the high-pressure nozzle.

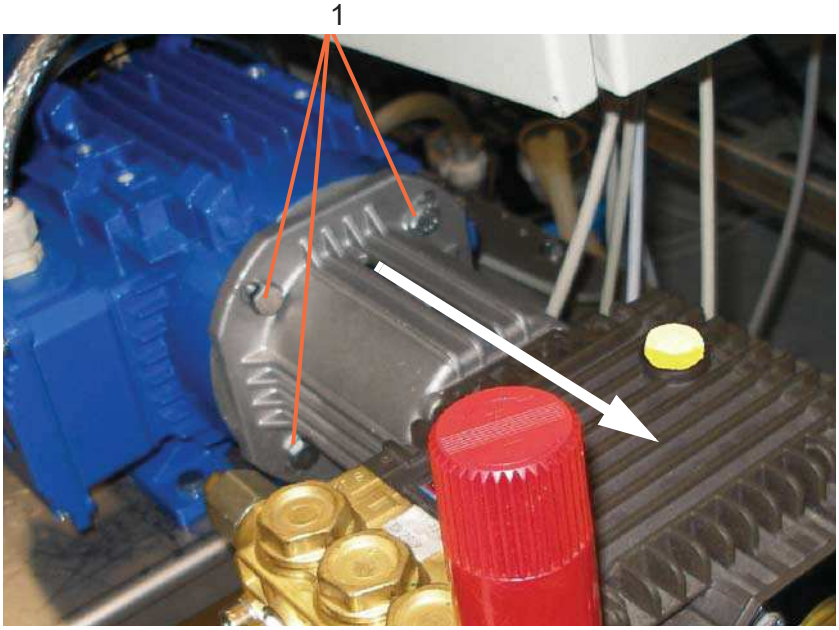
Caution: Use proper tools to screw on or unscrew nozzles. Even slight mechanical modifications to the impact pin lead to an asymmetric spray pattern.

13.2 Extended HPS Service Manual

13.2.1 Replacing the shaft sealing ring of the high-pressure pump EH2009

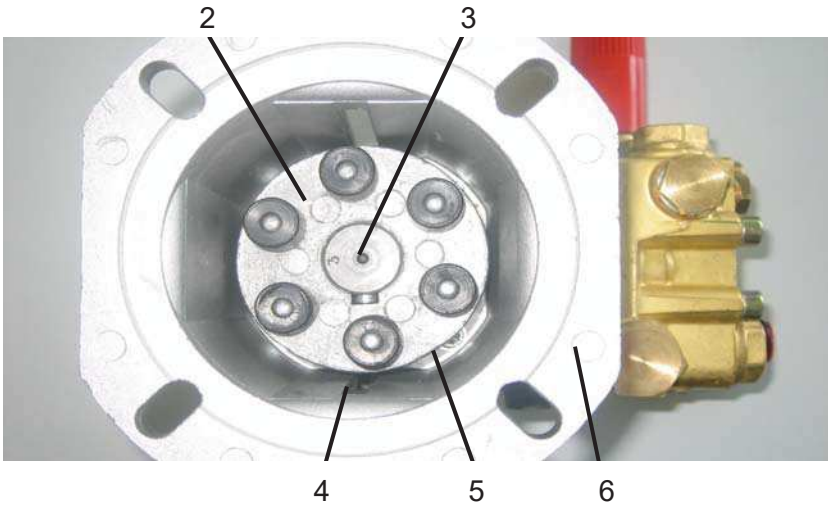
To remedy any oil leakages on the shaft output side of the pump, the shaft sealing ring must be replaced. The following preparatory measures are required: the water supply must be turned off, the system must be switched off at the main switch, the oil of the high-pressure pump must be drained off and correctly disposed off.

Dismantle the water connection lines of the pump and remove the 4 fixing bolts (pos.1).



Now disconnect the pump from the motor and place on a suitable work surface.

Dismantle the coupling piece (pos.2) from the shaft (pos.3). To do this, rotate the shaft until the laterally attached securing bolt (pos.4) is visible through the slot of the bell-shaped top and loosen the screw. Then pull the coupling piece off the shaft.



Loosen the 4 bolts (pos.5) that hold the coupling bell housing (pos.6) and remove the bell-shaped top. Now remove the key (pos.7) and lever the shaft sealing ring (pos.8) out of its seating with a suitable tool.

Note: When removing the shaft sealing ring, take care not to damage the seat and the shaft!

After removing the shaft sealing ring, carefully remove any residues of material left by the sealing ring from the shaft. Do not use any hard implements when doing this in order to avoid causing any damage to the shaft.

Assembly is carried out in reverse order where the new sealing ring is positioned on the shaft by rotating movements and pressing it evenly into place in its seat.

After assembly, the oil outlet (pos.9) must be closed again (pay attention to the sealing ring) and fill the pump with suitable **mineral oil** of the specification **15W-40** (pos.10) until the sight glass (pos.11) is a max. of 3/4 full (filling capacity approx. 0.4l).

13.2.2 Replacing the valves

HygroMatik uses two high-pressure pumps that differ only in size for the high-pressure jet systems. The construction is generally the same. They each have 3 identical valves on the low-pressure and high-pressure side. If the pump can no longer build up the required pressure, worn valves may be the cause. To replace the valves, the water supply must be turned off and the system switched off at the main switch. To replace the valves, *Replacement kit KIT123* is required for the pump EH2009 which includes 6 valves and 6 O-rings.

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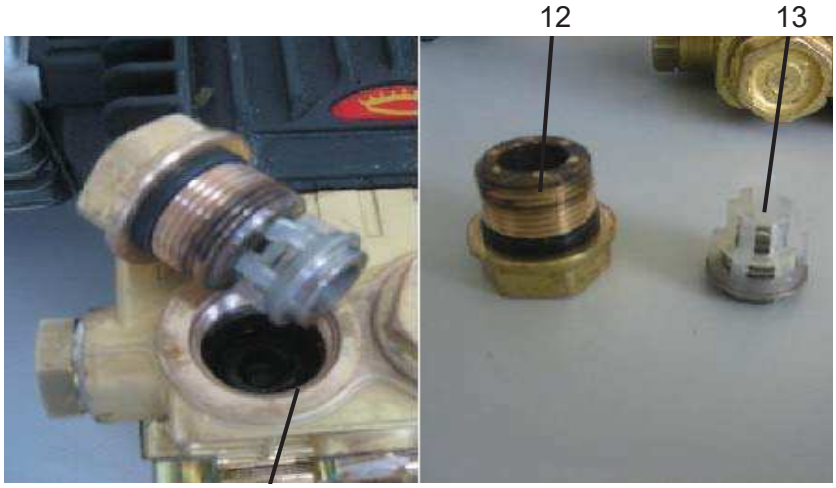
Disassemble the valve holder (pos.12) with a suitable tool and then detach from the valves (pos.13). Also remove the O-ring (pos.14) in the valve seat of the pump with a small screwdriver or similar.



In order to reassemble, lay the new O-ring (Pos.14) in the valve seat, put the valve into the holder and screw the holder with the valve into the pump.

13.2.3 Replacing the seals on the water side

If water leaks occur on the pumps, the seals must be replaced. In order to do this, the water supply must be turned off, the system must be switched off at the main switch and the water connection hoses must be dismantled from the pump.

The 8 bolts (pos.15) must be undone. Now the valve block can be detached from the headstock.

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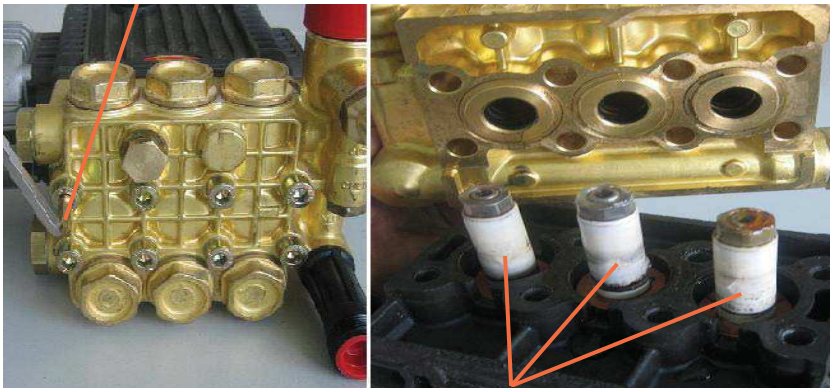

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Carefully free the ceramic plungers (pos.16) of seal deposits with the included polishing wool, check them for signs of wear and replace if necessary.

Remove all sealing parts (pos.17) and replace by means of *KIT160 or KIT166* in the pumps.

Note: *KIT160* contains all the seals required for replacing the plunger sealing of a pump. In the event that the metal parts of the sealing are also defective, *KIT166* must be used, of which 3 pieces are required for each pump.

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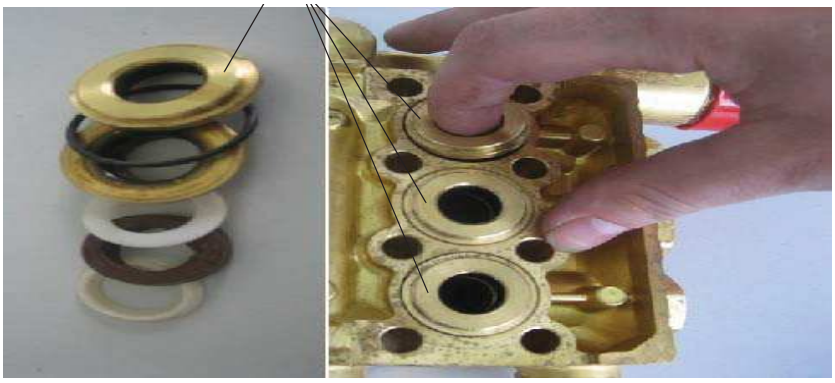

Assembly is carried out in reverse order. To insert the seals suitable tools have to be used.

16. Spare parts

HPS250	HPS500	Article-No.	Pump Station
x		E-7703020	Motor, 1.1 KW 230/400V-50 Hz ; 1400 rpm
	x	E-7703040	Motor, 2.2 KW 230/400V-50 Hz ; 1400 rpm
x		B-7773151	Pump, highpressure EH 2009 incl. automatic press.contr., clutch, covering
	x	B-7773155	Pump, highpressure EH 1416 incl. automatic press.contr., clutch, covering
x		E-7703100	Pump, highpressure EH2009 without adapting devices drive left sided adaption press.contr. left sided
	x	E-7703110	Pump, highpressure EH1416 without adapting devices drive left sided adaption press.contr. left sided
x		E-7703150	Flange bowl for EH 2009 housing-connect. pump to motor
	x	E-7703152	Flange bowl for EH 1416 housing-connect. pump to motor
x		E-7703170	Coupling for EH 2009 drive-axis motor to pump
	x	E-7703172	Coupling for EH 1416 drive-axis motor to pump
		B-7773171	Pressure control valve, autom. EH2009 &EH1416 high press.pump contains HP- & LP-adaption max. 200 bar, max. 50 l/min
		B-7774301	Float switch
		E-7702010	Mounting hook: level control
		E-7774312	Water pan
		E-7706060	Hose, high pressure, DN 8 mm length 0,7 m from pump to highpressure valves
		E-7600184	Hose type PA, black, 10x8 (Piece goods)
		E-7702200	Protection grill, cabinet fan HDS, incl. filter inlay 120 x 120 mm
		E-7621029	Filter element 10" filter quality 10 µm for water-prefilter HP-pumpstation
		E-7705200	Water filter housing, 10" bothside connection 3/4" iD blue sump, pressure release button
		E-7705102	Manometer, 0-10 bar, for control unit CU D=40mm, rear connection G1/8"
		E-7704850	Pressure switch, water inlet
		E-7601626	Hose, PA, black, 4x2 for control unit CU (Piece goods)
		E-7701050	Solenoid valve HDS 220 - 240 V, 50 - 60 Hz 3/4"m - 3/4"m waterinlet
		E-7704510	Coil for HiPres-solenoid valve 230V 50-60Hz
		E-7701100	Solenoid valve, highpressure 2-100 bar for HDS-system
		E-7703044	Fan 230V, 150x172x38 mm, 300m³/h
		E-7703046	Fan covering incl. filter
x		E-7704104	Frequency converter 1.5kW 230V/1ph./N - 230V/3ph
	x	E-7704114	Frequency converter 2.2 kW 230V/1ph./N - 230V/3ph
x		E-7704154	Radio interference sup. filter suppression filter ; 1.5kW HPS 230V/1ph./N
	x	E-7704156	Radio interference sup. filter suppression filter ; 2.2kW HPS 230V/1ph./N
		E-7704316	Power supply HDS control 230VAC/24VDC 15W
		E-2507046	Main contactor 20A(AC1) DILM7 for HDS 1100-2200 coil 24V DC rated voltage 690V
		E-2504052	Auxiliary relay 24V DC 1 switching contact
		E-2505206	Safety fuse 1,6A 5x20mm
x		E-7704610	Line safety switch 16A 1-pole , B-characteristics
	x	E-7704630	Line safety switch 32A 1-pole , B-characteristics
		B-7774103	CPU-unit 822 for HPS
		B-7774105	Multifunktion display display & keyboard

HPS250	HPS500	Article-No.	Pump Station
x		E-0605001	Main switch 25 A
	x	E-0605002	Main switch 32 A
		E-7702200	Protection grill, cabinet fan, incl. filter inlay 120 x 120 mm
		E-7704870	Thermal circuit breaker ; NC with automatic reset, switching point at 50°C ± 5K
		E-7704950	Resistor, 1000 Ohm +/- 5%, 0,25 Watt
		E-7705620	Bypass valve for HDS-system 1/4" female - 1/4" female
			Spare parts for Pump
1		E-7621026	Repair kit KIT 123 to consist of 6 valves for highpressure pump EH2009 (pf100/pf250), 1 set per pump
1	1	B-7621003	Repair kit KIT 160 seals (water) highpressure pump EH2009 (pf100/pf250), 1 set per pump
1	1	B-7621001	Repair kit KIT 166 seals and metal parts highpressure pump EH2009 (pf100/pf250), 1 set per pump
1		E-7621032	O-ring 55,56x3,53 for highpressure pump EH2009 sealing pump shaft (oil)
3		E-7621260	shaft seal crankcase for high pressure pump EH2009 18 x 26 x6 mm, 3 parts nessesary
1		E-7621262	Oil dipstick for high pressure pump EH2009
1		E-7621254	Gasket oil sump for high pressure pump EH2009, 101,27 x 2,62 mm
1		E-7621238	O-ring 10,82 x 1,78mm sealing for oil drain for pump EH2009
3		E-7621256	Gasket piston for high pressure pump, 5,28 x 1,78 mm
3		E-7621030	Piston, ceramics for high pressure pump
1		E-7621220	Drive shaft seal for high pressure pump (oil sided), 25x62x10mm
1		E-7621258	Gasket sight glass for high pressure pump EH2009 26,58 x 3,53 mm
		E-7621224	Special oil for high pressure pumps canister contains 1 liter
x	x	E-7704872	Temperature switch, pump
			Vortex-wall
		E-7701000	Vortex module
		B-7771301	Sealing set, complete for distribution pipe incl. sealing cone and nut
		E-7700550	Blind cap for distributor pipe tighting blind cap without nut
		E-7700554	nut of ferrule fitting at blind cap(distributor pipe) without tighting element
		E-7700556	Closing female fitting 3/8" to close end of distrib. tube
		B-7771053	nozzle holder complete
		E-7621020	O-ring for nozzle holder
		E-7601572	O-ring, for nozzle, 10 x 1,5,
		E-7800450	Spraying nozzle HY 0.27/ 120°
		E-7800454	Spraying nozzle HY 0.27/ 60°, for border areas
		E-7621024	Filter for nozzle
		E-7706040	Hose, high pressure, DN 4 mm, length 370 mm
		E-7706042	Hose, high pressure, DN 4 mm, length 440 mm
		E-7706044	Hose, high pressure, DN 4 mm, length 640 mm
		E-7706046	Hose, high pressure, DN 4 mm, length 820 mm
		E-7706048	Hose, high pressure, DN 4 mm, length 960 mm
		E-7706050	Hose, high pressure, DN 4 mm, length 1130 mm
		E-7706052	Hose, high pressure, DN 4 mm, length 1330 mm
		E-7706054	Hose, high pressure, DN 4 mm, length 1750 mm

HPS250	HPS500	Article-No.	Pump Station
			Hose, high pressure, DN 8 mm
		E-7706062	Hose, high pressure, DN 8 mm, length 2 m to connect pump station and nozzle collector pipe
		E-7706064	Hose, high pressure, DN 8 mm, length 2,5 m to connect pump station and nozzle collector pipe
		E-7706066	Hose, high pressure, DN 8 mm, length 4 m to connect pump station and nozzle collector pipe for HDS-systems
		E-7706068	Hose, high pressure, DN 8 mm, length 6 m to connect pump station and nozzle collector pipe
		E-7706070	Hose, high pressure, DN 8 mm, length 8 m to connect pump station and nozzle collector pipe
		E-7706072	Hose, high pressure, DN 8 mm, length 10 m to connect pump station and nozzle collector pipe
		E-7706074	Hose, high pressure, DN 8 mm, length 14 m to connect pump station and nozzle collector pipe