

New Unit Information



**HD 6/16 ST, HD 9/16 ST,
HD 13/12 ST**

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The units HD 6/16 ST, HD 9/16 ST, HD 13/12 ST are stationary cold water high-pressure cleaners designed for wall mounting.

They are suitable for direct connection of a high-pressure hose and for operation using a pipeline network. The devices are designed, for instance, for professional application in workshops, and the various models are only differentiated by the use of different high-pressure nozzles and swash plates.

The unit frame and cover panels are made of stainless steel.

Drive system

- Air and water-cooled electric motor (4-pole).

Pump (comparable HD 1094 / HD 1294)

- 3-piston axial high-pressure pump made of brass.
- Pistons made of stainless steel with ceramic sleeves.
- Swash plates with tapered roller bearing.
- Pressure and suction valves in stainless steel.
- Float tank made of stainless steel.
- Vibration damper.

Electrical system

- Unit switch with rotary knob.
- Timer module.
- Switch cabinet prepared for remote unlocking.
- Pressure switch with control by means of power contactor.
- When closing the handgun, the piston rod of the overflow valve actuates the pressure switch and so switches off the unit.

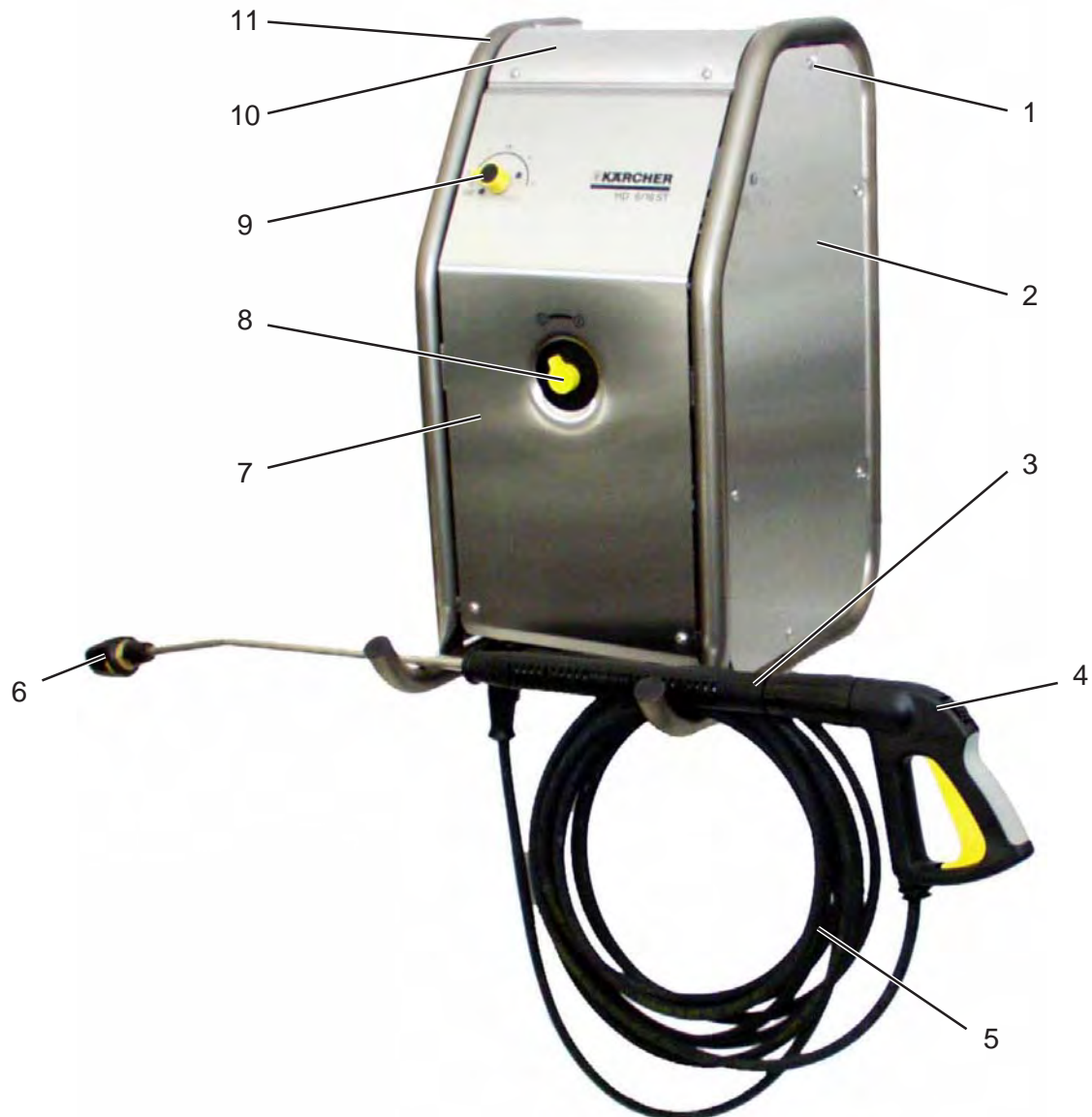
Cleaning agent

- Cleaning agent suction hose with strainer and non-return valve.
- Cleaning agent metering at the front of the unit.
- Cleaning agent operation only in low-pressure mode (Injector).

Accessories

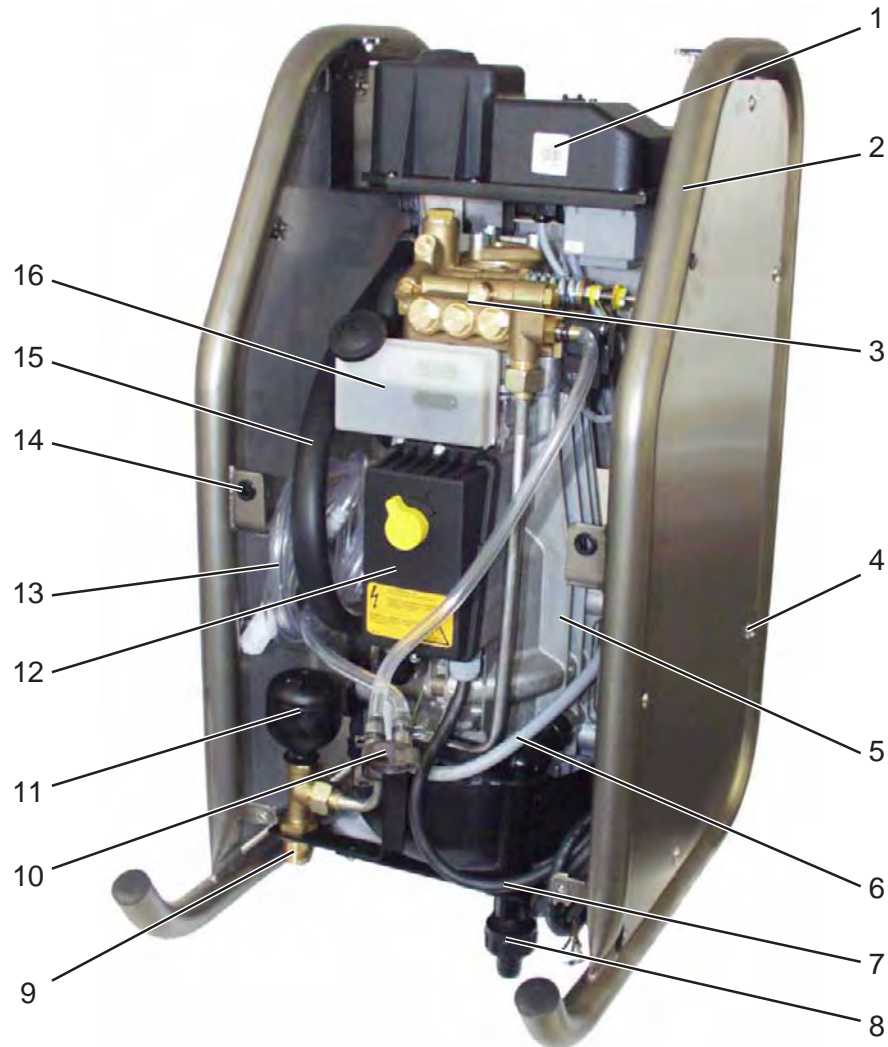
- Handgun (high-pressure servopress handgun) with adjusting wheel for pressure and volume regulation.
- Spray lance.
- Three-way changeover nozzle with switch-over facility to cleaning agent operation.

View from the front



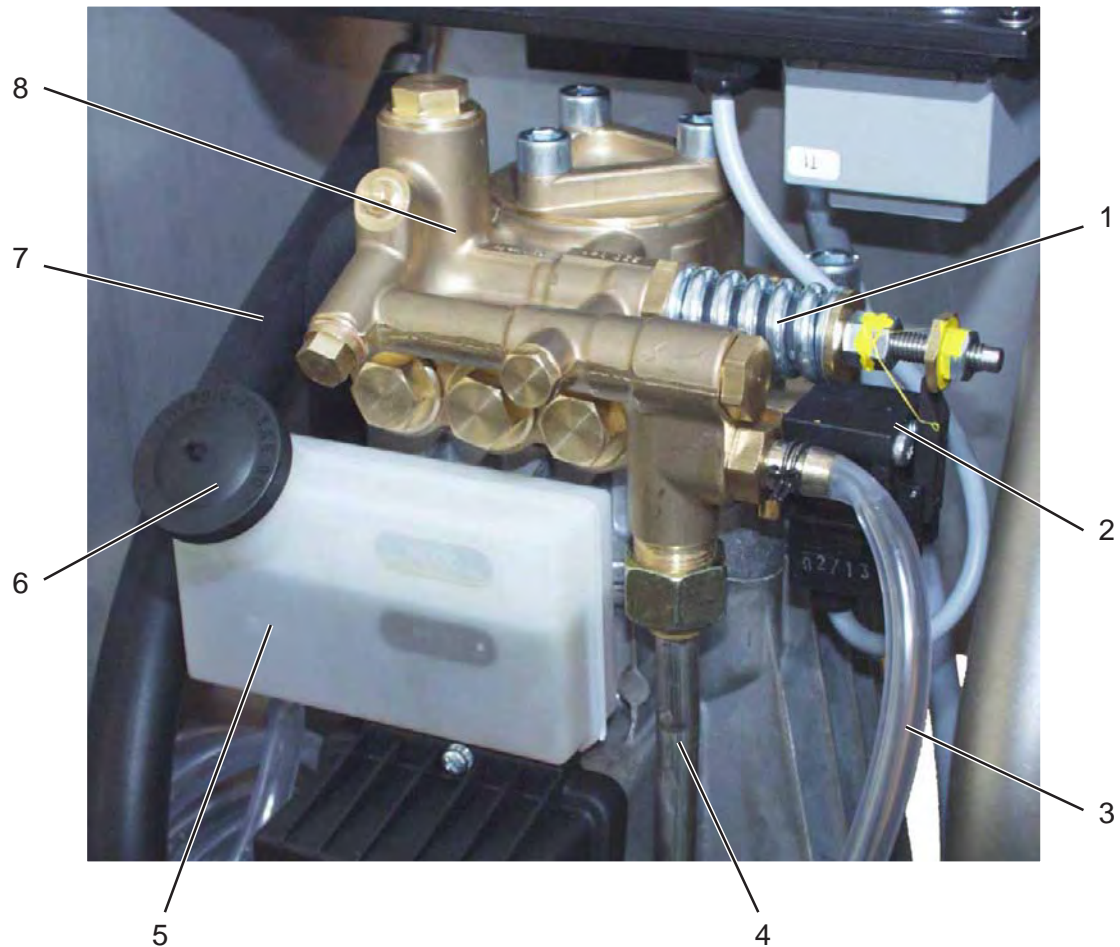
- 1 Fastening screw for sheet metal guards, Torx 25 (18x)
- 2 Lateral stainless steel cover panel
- 3 Spray lance
- 4 Handgun (high-pressure servopress handgun)
- 5 High-pressure hose
- 6 Three-way changeover nozzle
- 7 Front stainless steel cover panel
- 8 Unit switch
- 9 Metering valve, cleaning agent
- 10 Top stainless steel cover panel
- 12 Stainless steel unit frame

View without front and top cover panel

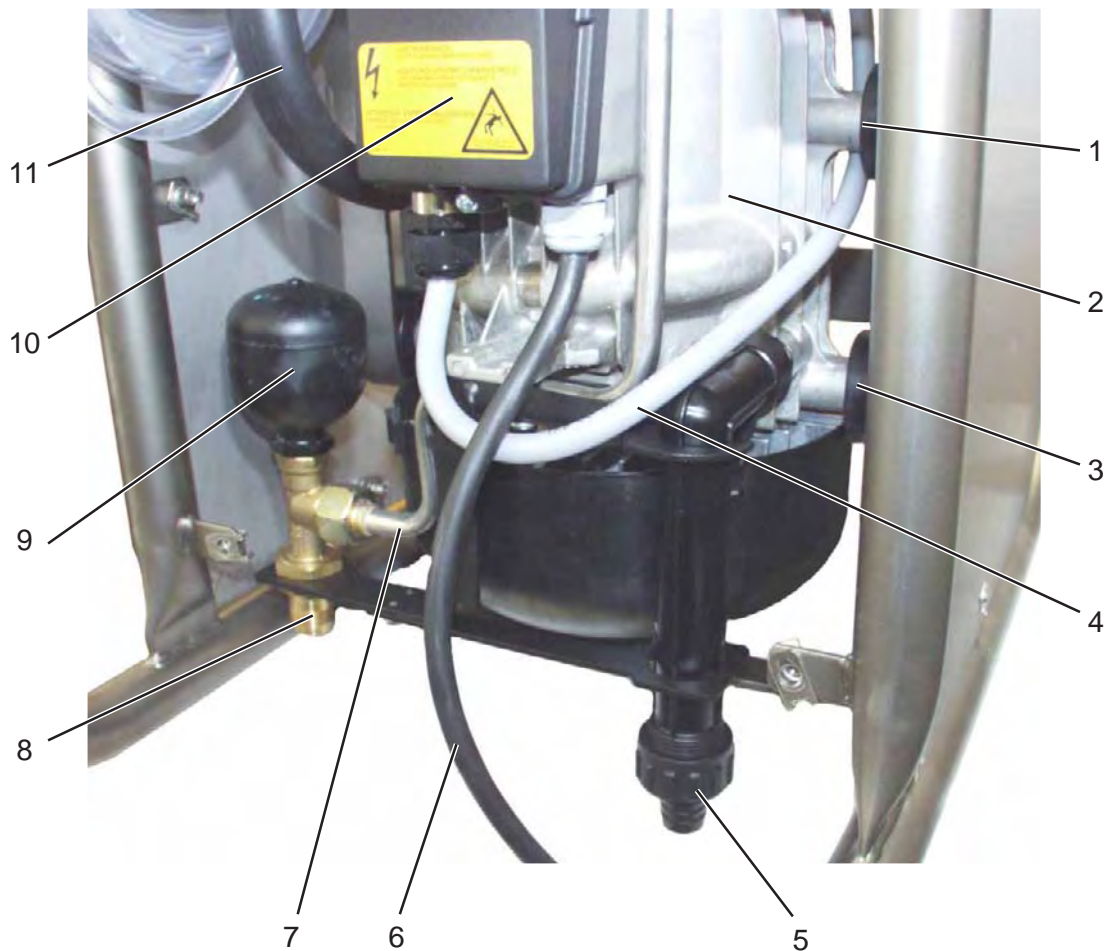


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|---|---|----|---|
| 1 | Switch box | 10 | Metering valve, cleaning agent |
| 2 | Unit frame | 11 | Vibration damper |
| 3 | Cylinder head | 12 | Unit switch with lid |
| 4 | Fastening screw for cover panel,
Torx 25 (18x) | 13 | Cleaning agent suction hose with strainer |
| 5 | Electric motor | 14 | Rubber buffer, guard |
| 6 | Connecting cable, unit switch (12) to
switch box (1) | 15 | Hose line, motor cooling to float tank |
| 7 | Connecting cable, power supply | 16 | Oil tank |
| 8 | Water connection with strainer | | |
| 9 | High-pressure connection | | |

High-pressure pump, cylinder head



- 1 Overflow valve
- 2 Pressure switch
- 3 Cleaning agent suction hose
- 4 High-pressure pipe to high-pressure connection
- 5 Oil tank
- 6 Lid, oil tank (5)
- 7 Hose line, motor cooling to float tank
- 8 Cylinder head

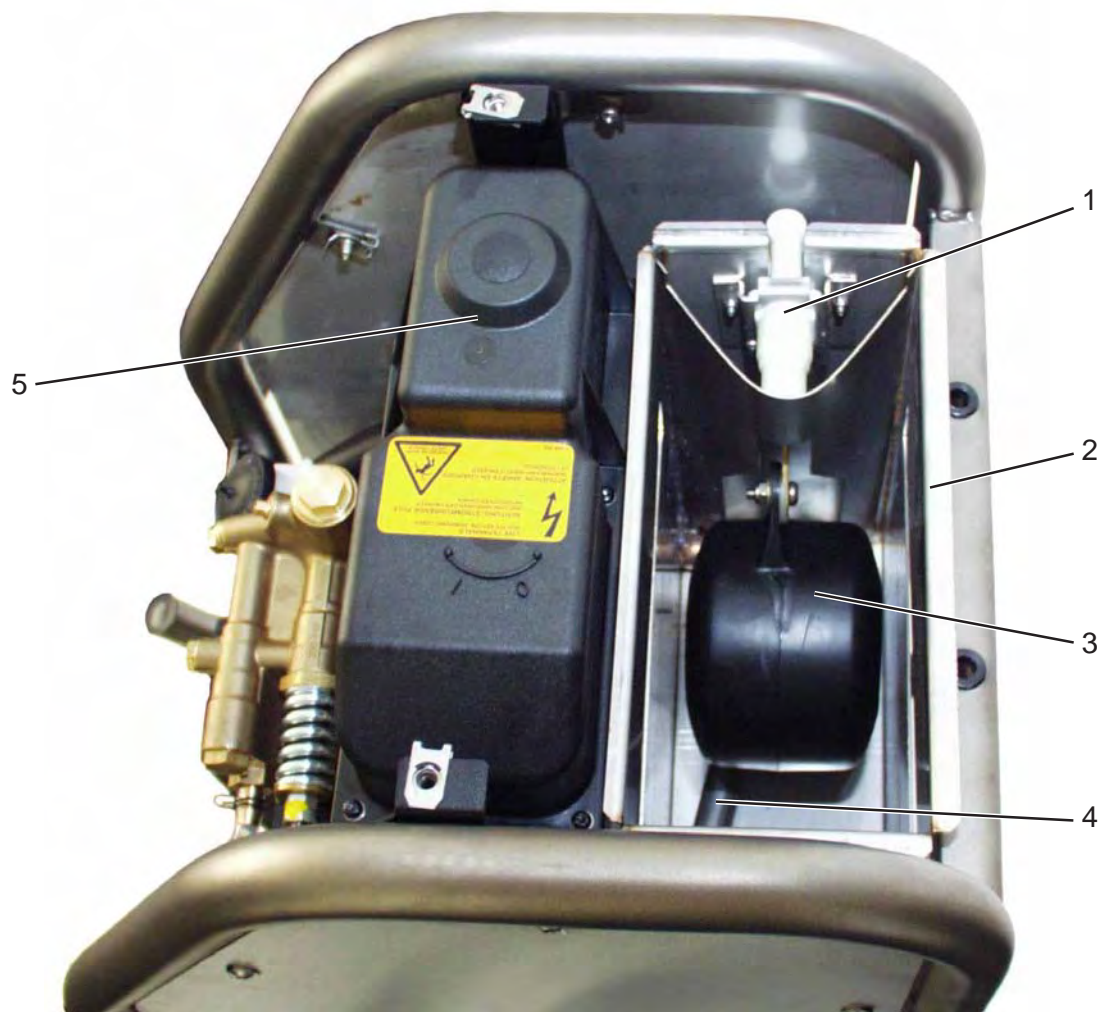
Water connection, electric motor, water connection

- 1 Rubber buffer, motor bearing (one each left and right)
- 2 Electric motor
- 3 Rubber buffer, motor bearing (one each left and right)
- 4 Connecting cable, unit switch (10) to switch box
- 5 Water connection
- 6 Connecting cable, power supply
- 7 High-pressure pipe to high-pressure connection (8)
- 8 High-pressure connection
- 9 Vibration damper
- 10 Unit switch with lid
- 11 Hose line, motor cooling to float tank

Unit switch, opened

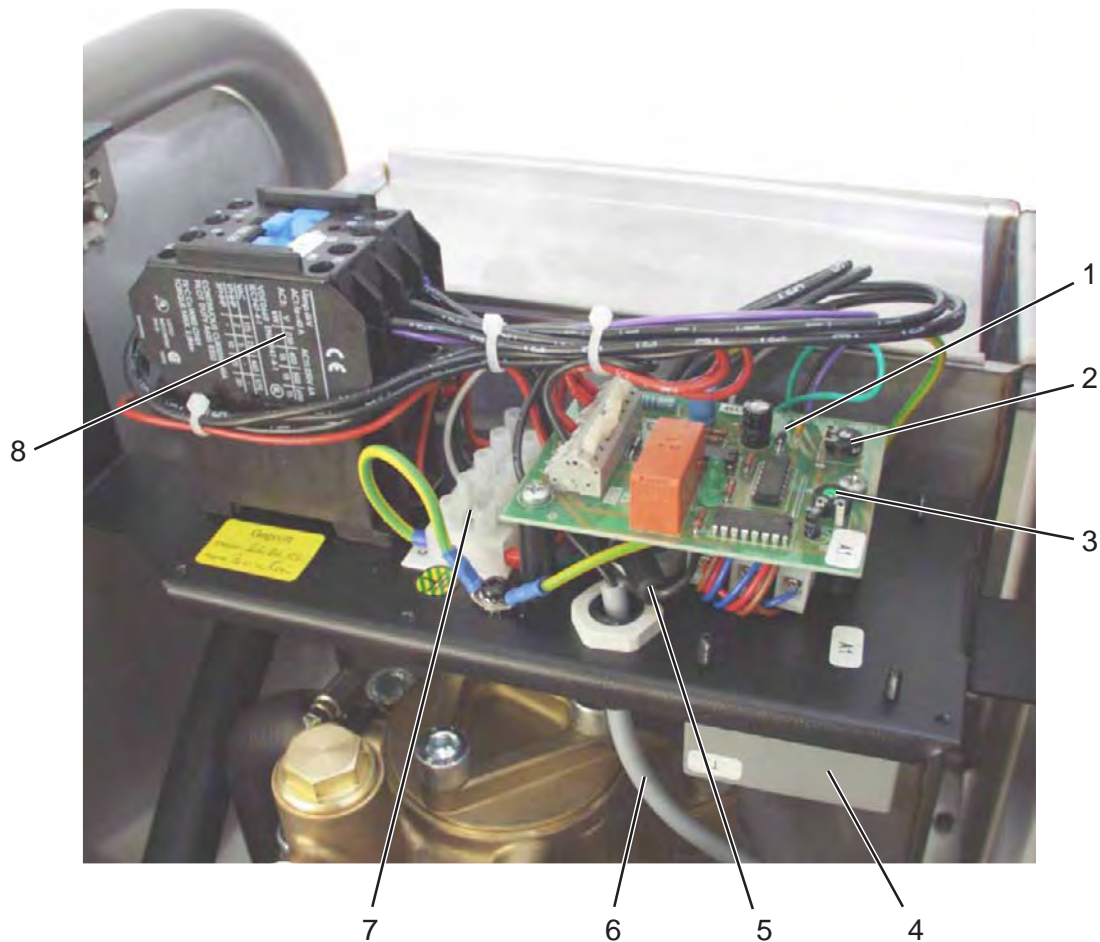
- 1 Motor housing
- 2 Connecting cable, power supply
- 3 Connecting cable, unit switch to switch box
- 4 Unit switch with integrated motor protection switch

View from above



- 1 Float valve
- 2 Float tank
- 3 Float switch
- 4 Suction tube for high-pressure pump
- 5 Lid, switch box

Switch box, opened

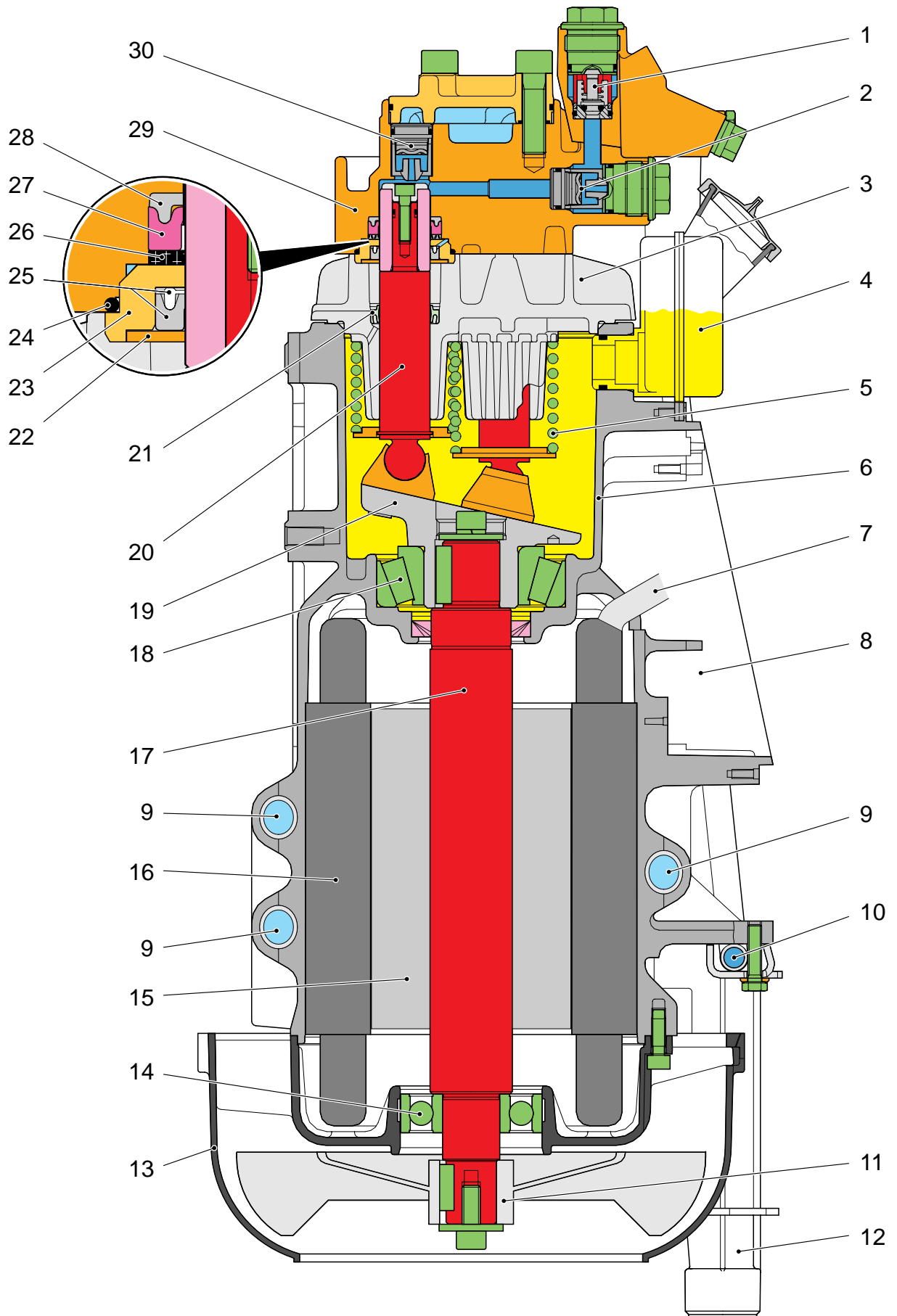


- 1 Main control printed circuit board (timer module)
- 2 Potentiometer, precision adjustment of availability time (between 2 and 8 minutes)
- 3 Potentiometer, rough adjustment of availability time (sealed)
- 4 Transformer for main control printed circuit board (1)
- 5 Fuse
- 6 Connecting cable, switch box to unit switch
- 7 Terminal strip
- 8 Power contactor

Note:

The rough adjustment potentiometer (3) on the main control printed circuit board is pre-set in the factory and must not be changed.

Functional characteristics: Motor and high-pressure pump



Functional characteristics: Motor and high-pressure pump

- 1 Non-return valve
- 2 Pressure valve (3x)
- 3 Piston housing
- 4 Oil tank
- 5 Piston spring
- 6 Motor housing
- 7 Connecting cable to unit switch
- 8 Housing, unit switch
- 9 Water inlet to float tank (simultaneously acts as cooling coil for motor)
- 10 High-pressure pipe
- 11 Impeller fan wheel
- 12 Water connection for water supply
- 13 Impeller fan cover
- 14 Motor bearing
- 15 Motor winding (rotor)
- 16 Motor winding (stator)
- 17 Drive shaft, motor
- 18 Motor bearing
- 19 Swash plate
- 20 Piston (3x)
- 21 Oil seal
- 22 Washer
- 23 Bushing
- 24 O-ring
- 25 Low-pressure seal with support ring
- 26 Washer
- 27 High-pressure seal
- 28 Support ring
- 29 Cylinder head
- 30 Suction valve (3x)

High-pressure pump

The high-pressure pump is a 3-piston swash plate pump with drive system immersed in an oil bath. Its efficiency is maximized by its being fastened directly on the drive shaft (17).

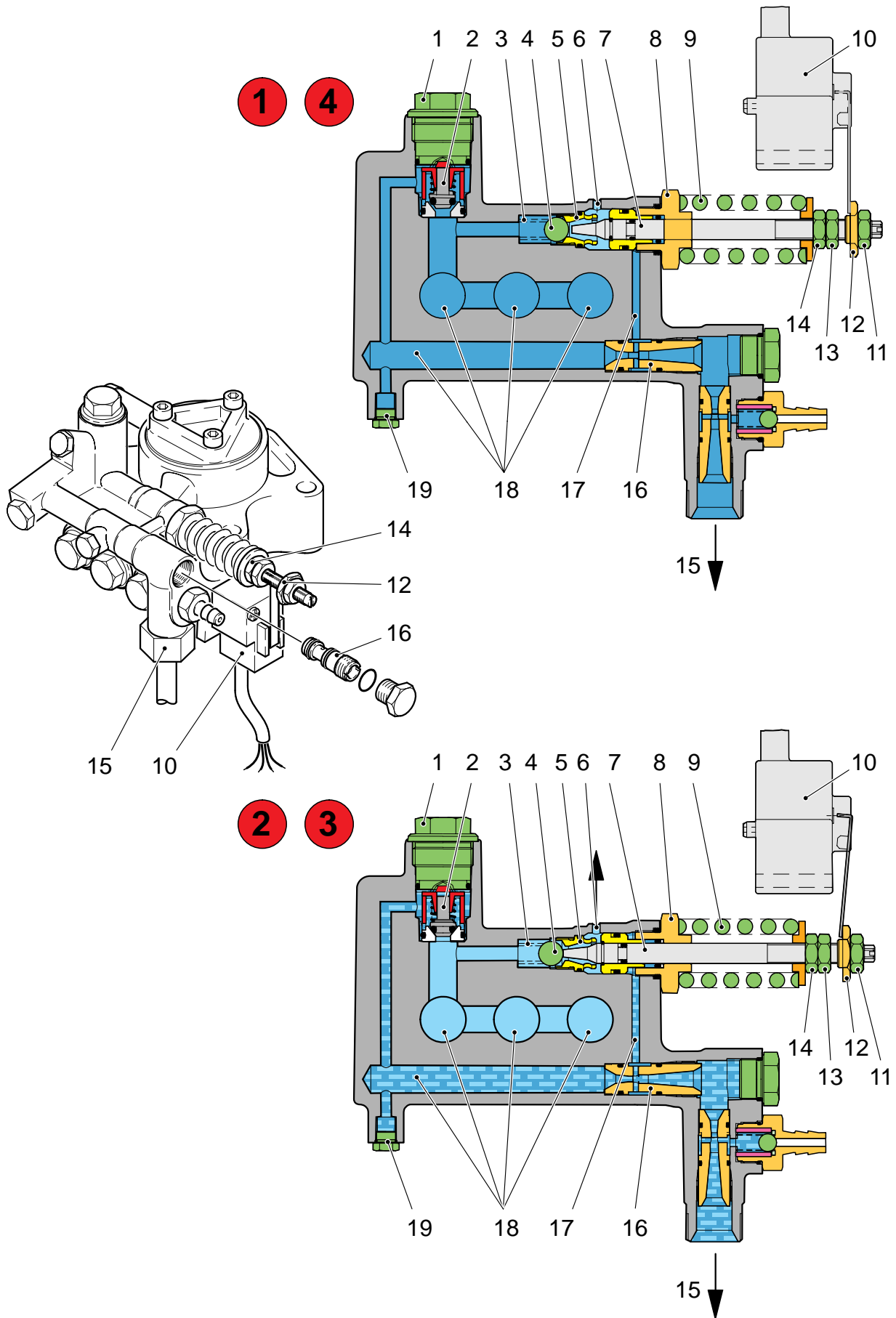
- When the piston retracts (20) water is drawn in via the opened suction valve (30).
- While the piston (20) is moving forward, the suction valve (30) closes and the water is transported through the open pressure valve (2) to the high-pressure pipe (10).

Motor

The motor is an air and water-cooled electric motor (4-pole). It is air-cooled by the impeller wheel (11).

The intake water provides an additional cooling effect by being guided around the motor in a cooling coil (9).

Functional characteristics: Overflow valve



Functional characteristics: Overflow valve

- 1 Screw plug
- 2 Non-return valve
- 3 Spring
- 4 Ball
- 5 Valve seat
- 6 Connection bore to the suction chamber
- 7 Piston rod
- 8 Threaded connection
- 9 Spring
- 10 Pressure switch
- 11 Lock nut
- 12 Adjusting nut, pressure switch
- 13 Lock nut
- 14 Adjusting nut, operating pressure
- 15 High-pressure outlet
- 16 Control pressure injector
- 17 Connection bore from control pressure injector (16) to overflow valve
- 18 Pressure chamber
- 19 Screw plug

1 When the Servopress handgun is opened

When the Servopress handgun is fully opened, water flows out of the pressure chamber (18), through the pressure holding valve (2) and control pressure injector (16) then on to the high-pressure outlet (15). The ball (4) in the overflow valve is pressed against the valve seat (5) by the pump pressure and closes off the connecting channel (6) to the suction chamber. The action of the control pressure injector (16) results in a pressure level in the connecting channel (17) that is approx. 30 bar (435 psi) lower.

2 The Servopress handgun is partially closed

When the handgun is partially closed, the pressure in the pressure chamber (18) does not increase. Due to the decreased water flow rate, the effect of the control pressure injector (16) action is reduced, so that the pressure in the connecting channel (17) rises. The piston rod (7) is pushed to the left slightly against the spring pressure (9). The tapered tip of the rod pushes the ball (4) away from its seat (5) slightly, so that a part of the pump flow rate flows into the suction chamber (6).

Note:

Opening or closing the Servopress handgun while the cleaner is operating in high-pressure mode does not result in a change to the motor current consumption. The current consumption is only reduced when the cleaner is being operated in cleaning agents mode.

3 The Servopress handgun is completely closed

As the handgun closes, the pressure in the pressure chamber (18) rises abruptly. This peak of pressure acts upon the piston rod (7) via the connecting channel (17) and forces the piston rod (7) all the way to the left (approx. 4 mm / 0.16 in.). The tapered tip of the piston rod (7) pushes the ball (4) completely off its seat, so that the entire pump flow rate flows through the connecting channel (6) into the suction chamber.

As soon as the handgun is closed, the pressure holding valve (2) closes. This trapped pressure holds the valve in the by-pass mode.

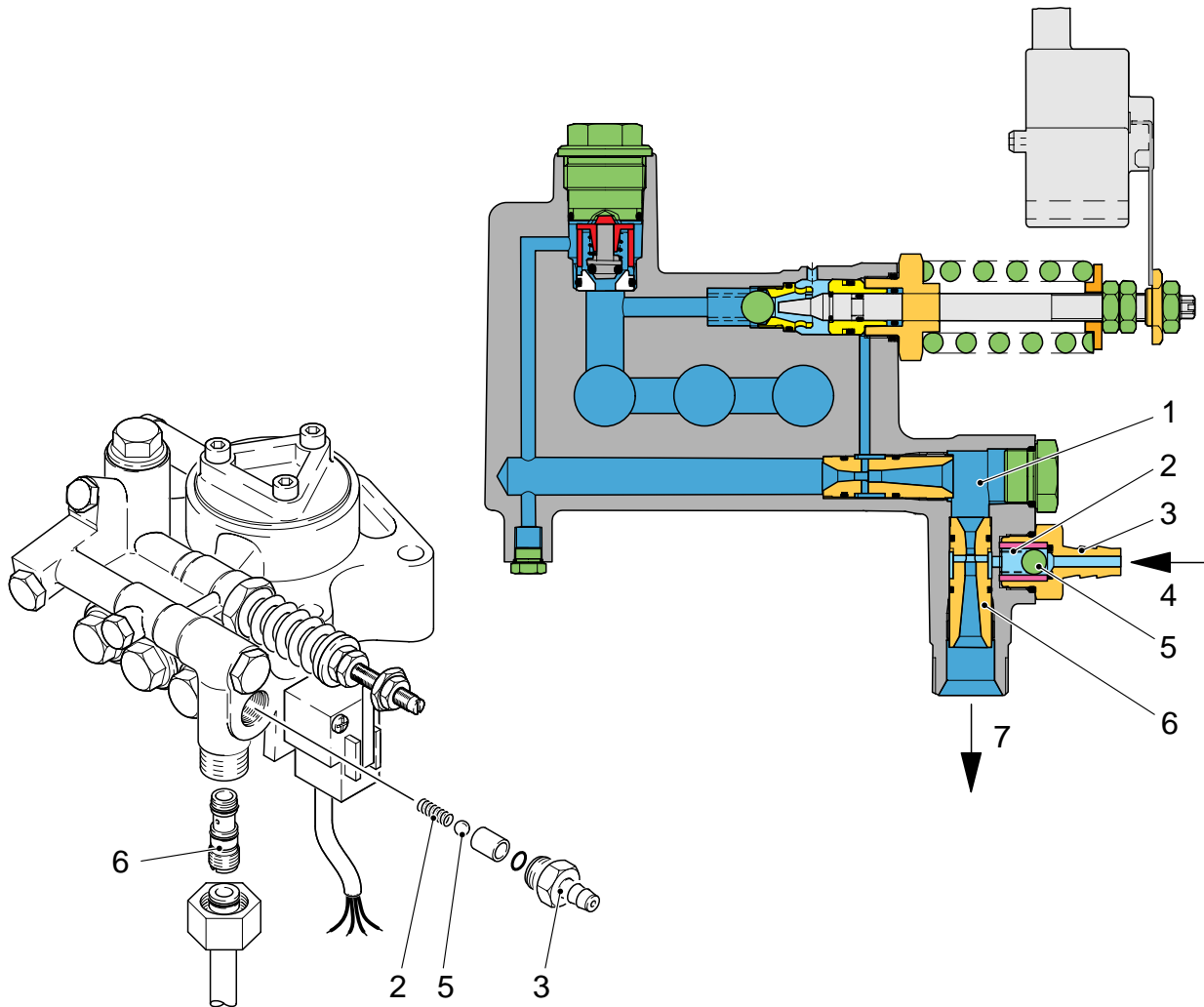
When this position is reached, the pressure switch (10) is actuated. The electrical supply interrupted and the motor switched off.

4 The Servopress handgun is opened

If the handgun is opened again, the pressure in the system drops off abruptly.

The overflow valve is pushed back towards the right into its original position by the spring (9). The pressure switch (10) reconnects the electrical supply and the motor is switched on again.

Functional characteristics: Operation cleaning agent



- 1 Pressure chamber in front of the cleaning agent injector
- 2 Spring
- 3 Connecting nipple for cleaning agent suction hose
- 4 Cleaning agent feed
- 5 Ball
- 6 Cleaning agent injector
- 7 High pressure outlet

Cleaning agent injector

Detergent can only be taken in if the three-way-changeover nozzle on the spray lance is set at "CHEM".

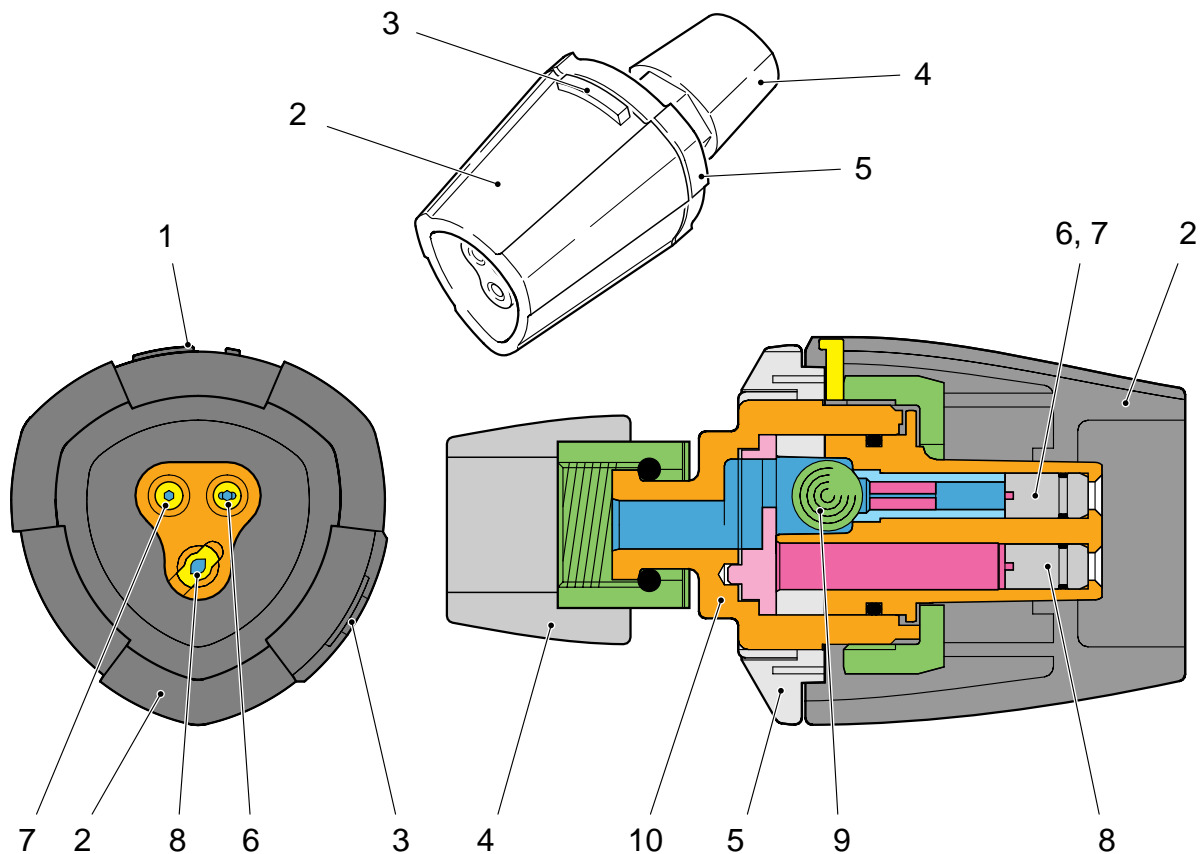
The pressure in the system thereby drops to approx. 50 bar (725 psi) and the Cleaning agent injector (6) generates its maximum low pressure (ca. 0,8 bar / 11.6 psi).

The ball (5) of the detergent non-return valve is lifted out of its seat and detergent is taken in.

With high-pressure operation, the ball of the non-return valve seals off the detergent connection, thus preventing any water from flowing into the detergent tank.

Note:
With high-pressure operation, no detergent can be taken in.

Functional characteristics: Three-way changeover nozzle



- 1 Marking "Pencil/fan jet nozzle"
- 2 Nozzle guard
- 3 Marking "Cleaning agent operation" (**CHEM**)
- 4 Union nut with brass insert
- 5 Bevelled adjusting ring
- 6 Fan jet nozzle
- 7 Pencil jet nozzle
- 8 Chemical nozzle
- 9 Ball
- 10 Nozzle body

Note:

Mount the three-way changeover nozzle with the spray lance in such a way that the bevelled edge of the adjusting ring (5) is pointing upwards.

High pressure cleaning operation

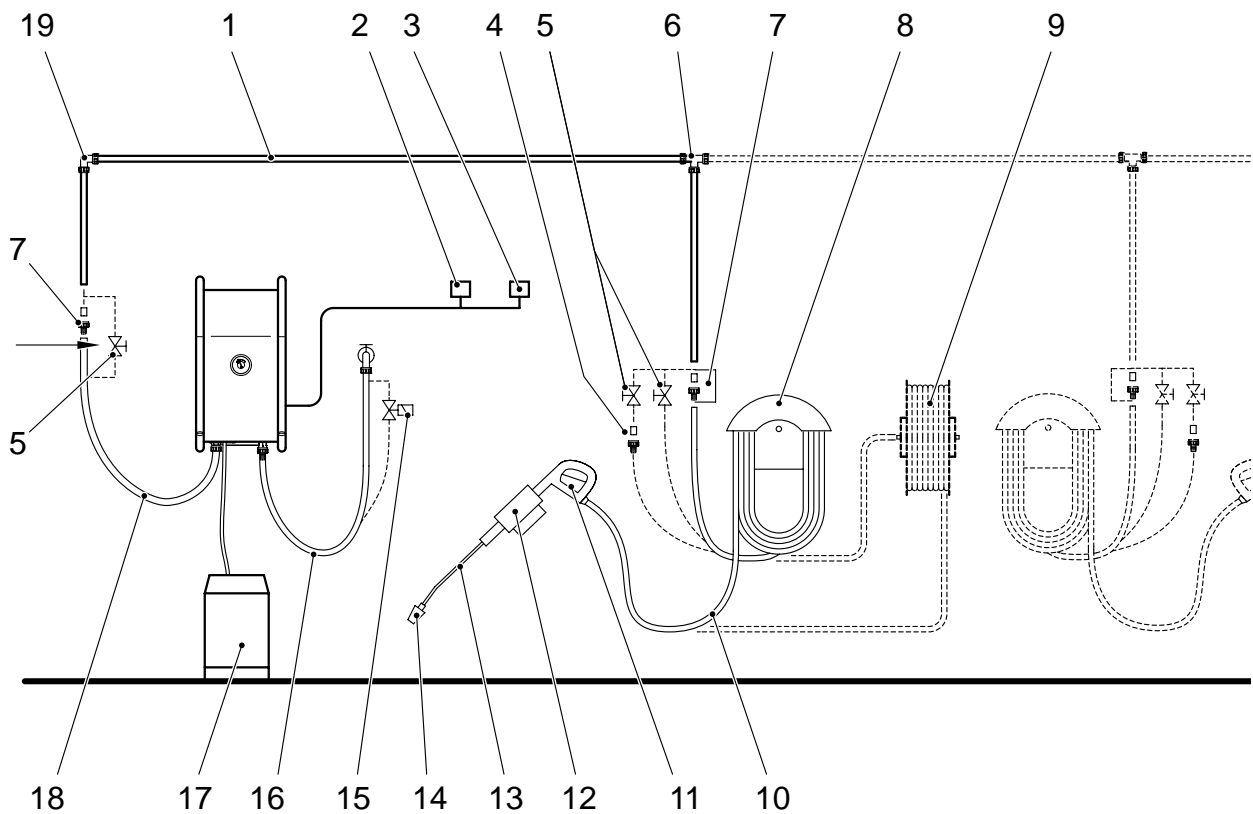
- Set the nozzle guard (2) in such a way that the marking "Pencil/fan jet nozzle" coincides with the bevelled edge of the adjusting ring (5).
- Turning the Servopress handgun and the spray lance when the handgun is closed causes the ball (9) to roll to the right or left and closes the relevant nozzle inlet. This selects either the "fan jet" or "pencil jet" function as the operating mode.

Cleaning agent operation

- Set the nozzle guard (2) in such a way that the marking "Chem" coincides with the bevelled surface on the adjusting ring (5).

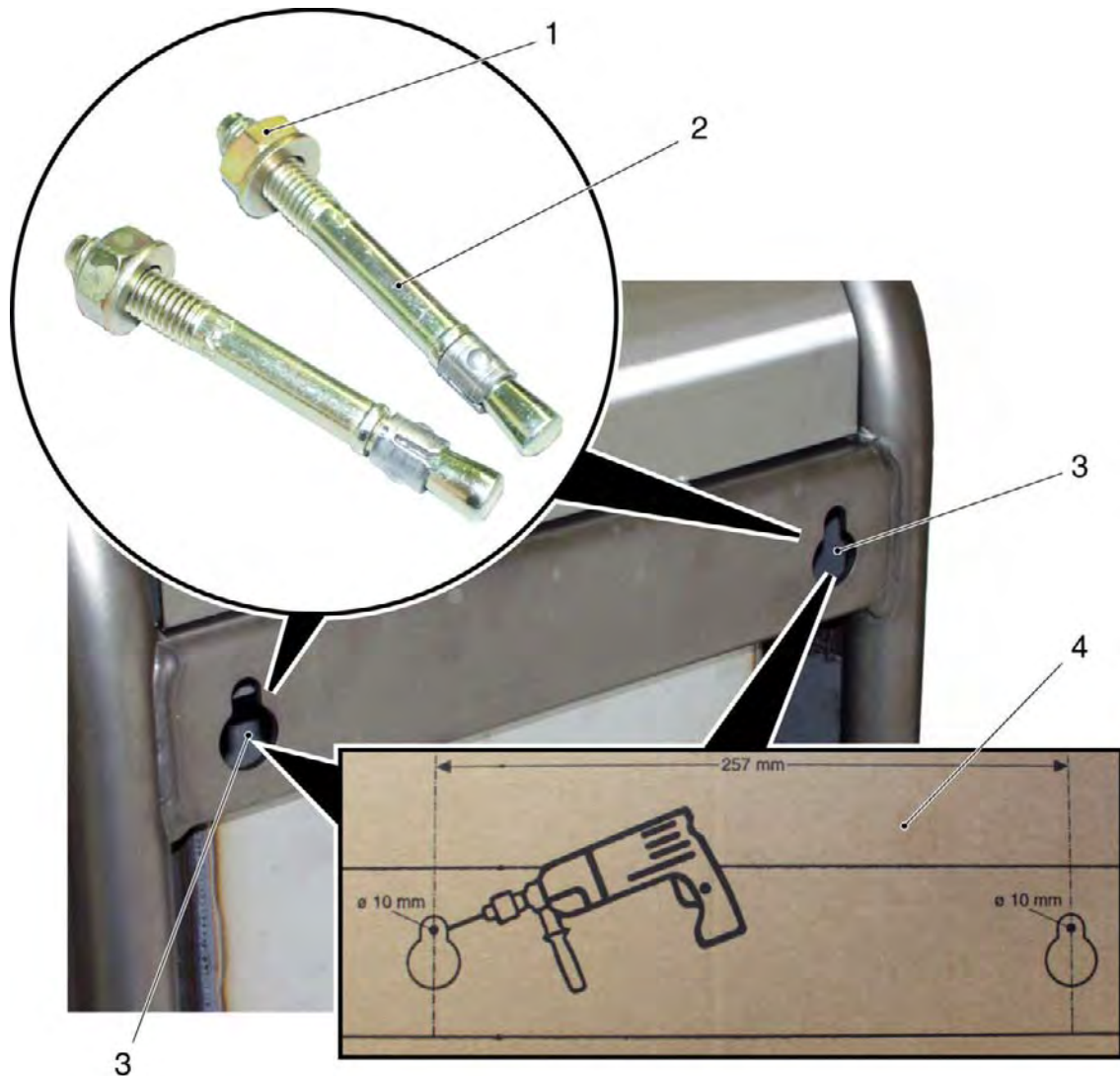
This causes the system pressure to drop during cleaning operation to around 50 bar (725 psi) and cleaning agent to be drawn in.

Suggested installation – fixed pipeline network



- | | |
|-------------------------|---------------------------------|
| 1 High pressure pipe | 13 Spray lance |
| 2 Remote release | 14 Three-way changeover nozzle |
| 3 EMERGENCY-STOP switch | 15 Solenoid valve, water supply |
| 4 Quick coupling | 16 Supply water hose |
| 5 Shut-off valve | 17 Cleaning agent tank |
| 6 T-threaded connection | 18 High-pressure hose |
| 7 Connection fitting | 19 Angular threaded connection |
| 8 Hose support | |
| 9 Hose reel | |
| 10 High pressure hose | |
| 11 Handgun | |
| 12 Spray lance holder | |

Installation – wall fixture



- 1 Nut with washer (2x)
- 2 Heavy-duty dowel (2x)
- 3 Fixing holes
- 4 Drilling template (printed on unit packaging)

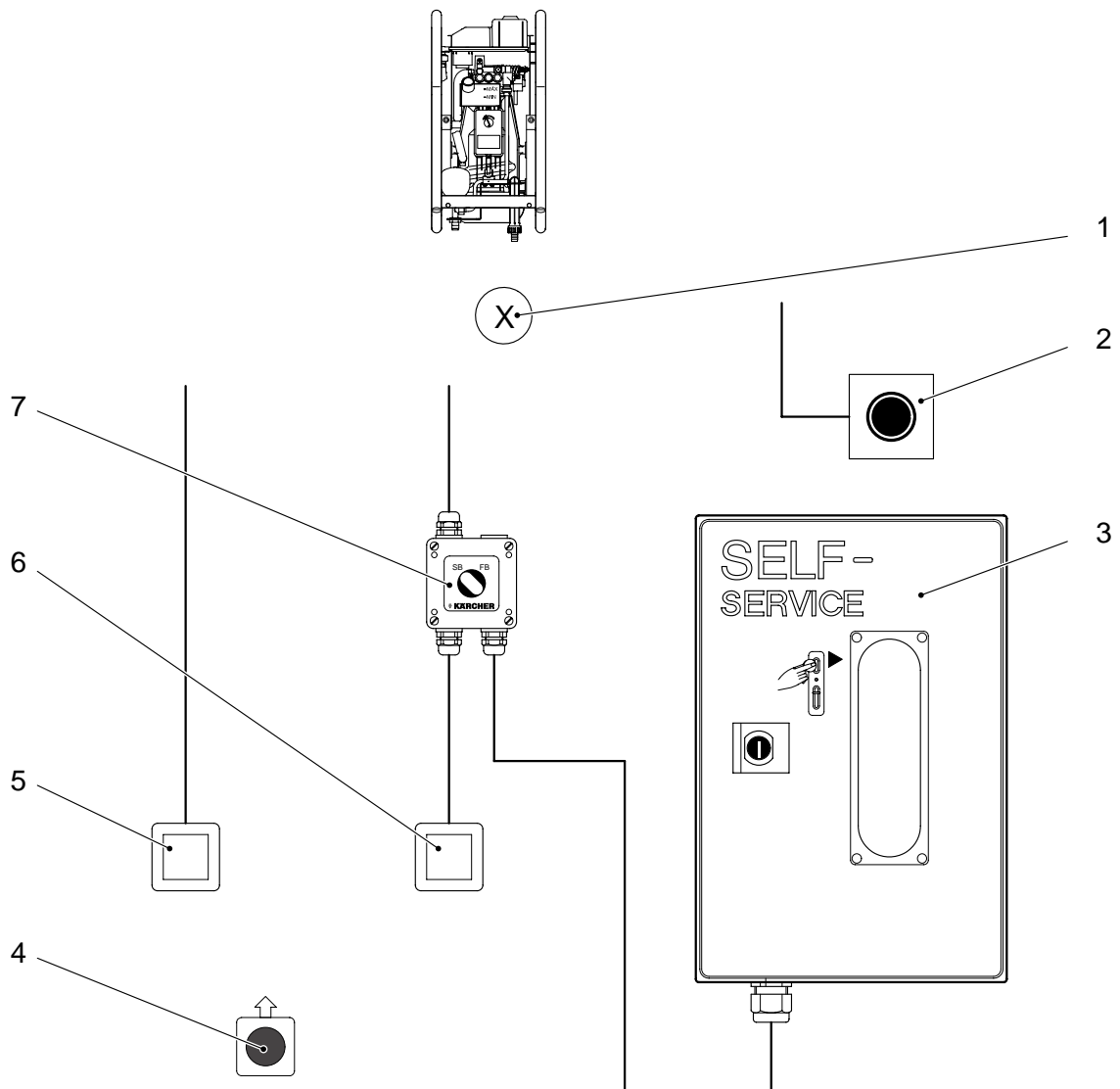
Fixing the unit to the wall

- Separate the drilling template (4) from the unit packaging.
- With the aid of the drilling template (4) drill two 10 mm (0.39 in.) in the wall (hole spacing: 257 mm / 10.12 in.).
- Insert the provided heavy-duty dowels (2) into the drilled holes.
- Remove the side panel.
- Suspend the unit in position and secure against falling down.
- Tighten the nuts (1) of the heavy-duty dowels (2).
- Replace the side panels.

Note:

The provided heavy-duty dowels (2) are only suitable for fixing on concrete walls.

Installation – Remote control (optional)



- 1 Cleaning agent suction, cleaning agent metering valve
- 2 EMERGENCY STOP switch
- 3 Remote operation with coin tester
- 4 Coin tester
- 5 Push-button, remote release
- 6 Push-button, remote release
- 7 Priority switch

Troubleshooting

Fault	Remedy
Unit not running	<ul style="list-style-type: none"> - Check/ replace mains voltage connecting cable and mains fuse. - Check / replace unit switch / pressure switch. - Adjust pressure switch. - Check overflow valve for easily moving / replace. - Check / replace motor unit.
Unit does not come up to pressure	<ul style="list-style-type: none"> - Check / increase water inlet volume. - Clean / replace strainer in water inlet. - Vent the unit. - Check / replace changeover nozzle. - Check pressure and suction valves for leaks / replace. - Check the overflow valve for leaks / replace. - Check the cylinder head for leaks / replace.
Unit switches on and off continuously with gun closed	<ul style="list-style-type: none"> - Check handgun and O-rings at the high-pressure hose for leaks / replace. - Check / replace the non-return valve. - Check / replace the detergent non-return valve. - Check cylinder head for leaks / replace. - Check the overflow valve for leaks / replace. - Check / replace control pressure injector. - Check / replace unit switch / pressure switch.
Unit does not cut out when closing the gun	<ul style="list-style-type: none"> - Check / replace the overflow valve. - Check / replace the non-return valve. - Check / replace the unit switch / pressure switch.
Cleaning agent is not suctioned in	<ul style="list-style-type: none"> - Check / replace cleaning agent nozzle. - Clean / replace cleaning agent strainer. - Check / clean / replace the detergent non-return valve. - Check / replace cleaning agent injector. - Check / replace metering valve.
Water escaping between cylinder head and piston housing	<p>Leakage of 1 drop per minute per piston are admissible.</p> <ul style="list-style-type: none"> - Check / replace high- and low-pressure seal.
Oil escaping between cylinder head and piston housing	<ul style="list-style-type: none"> - Check / replace oil seal at piston.

Technical specification

Special tools

Multimeter	6.803-022
Mounting mandrel, high pressure / oil seal	5.901-055
Mounting sleeve, high pressure seal	5.901-136
Mounting mandrel, overflow valve	5.901-076
Assembly / disassembly tool, overflow valve seat	4.901-054
Valve pliers	4.901-062
Extraction tool, swash plate	4.901-038
Shut-off valve	4.580-034
Mounting screw (2x, M 6 x 80) with long thread	7.304-469

Tightening torque levels

Fastening screw, cylinder head	50 - 60 Nm
Fastening screw, motor housing	4,5 - 6 Nm
Fastening screw, piston housing	4 - 5 Nm
Fastening screw, fan impeller wheel	12 - 15 Nm
Fastening screw, swash plate	12 - 15 Nm
Screw plug, non-return valve	50 Nm
Screw plug, suction valve cover	42 - 45 Nm
Screw plug, pressure valve	50 Nm
Lock nut, angular pipe	35 - 45 Nm
Overflow valve seat	3 - 5 Nm
Cleaning agent connection	15 Nm
Oil drain plug	20 - 25 Nm

Technical specification

unit type	unit no.	circuit diagram	operating instruction	maintanance booklet	spare parts list
HD 6/16 ST *EU I 400 V / 3~ / 50-60 Hz	1.374-201	0.088-533	5.960-490	5.950-582	5.958-996
HD 6/16 ST *EU II 230 V / 3~ / 50-60 Hz	1.374-202	0.088-533	5.960-490	5.950-582	5.958-996
HD 9/16 ST *EU I 400 V / 3~ / 50-60 Hz	1.374-101	0.088-533	5.960-490	5.950-582	5.958-996
HD 9/16 ST *EU II 230 V / 3~ / 50-60 Hz	1.374-102	0.088-533	5.960-490	5.950-582	5.958-996
HD 13/12 ST *EU I 400 V / 3~ / 50-60 Hz	1.374-301	0.088-533	5.960-490	5.950-582	5.958-996
HD 13/12 ST *EU II 230 V / 3~ / 50-60 Hz	1.374-302	0.088-533	5.960-490	5.950-582	5.958-996

The technical specification sheets and circuit diagrams are on the next edition of the spare parts CD-ROM (DISIS) and in the Intranet.

Technical specification sheet: folder "Central / Service Info Int'l / Technical Specifications"

circuit diagram: folder "Central / Service Info Int'l / Circuit Diagram"

Further operating instructions and spare parts lists as paper documents can be ordered with the corresponding part number from our Spare Parts Department.