

New Unit Information



HD 10/25 S/S Plus

1.286-...

This three-phase current unit is the new top model of the mobile high-pressure cleaners in the Super Unit Class. Its compact and vertical construction makes it easy to handle and allows space-saving storage.

Drive unit

- 4-pole electric motor with approx. 1500 rpm
- Water-cooled motor housing

Pump

- 3-piston axial pump with ceramic sleeves
- Cylinder head and water inlet made from brass
- High pressure and suction valves made from stainless steel
- Direct switch-off when handgun is closed through a pressure switch
- Overflow valve for pressure and flow control regulation
- Control injector
- Non-return valve
- Pressure gauge

Cleaning agent system

- Cleaning agent injector
- Cleaning agent non-return valve
- Cleaning agent metering valve on the cap of the cleaning agent tank

Electrics

- Unit switch without overload protection
- Motor thermal contact
- Pressure switch switches an additional contactor on, which interrupts all 3 phases of the power supply

Electronics

- Automatic safety shutoff after 30 min during non-operation
- Automatic safety shutoff in case of leaks
- Protection against 2-phase run
- Protection against over- and undervoltage
- Indicator lamp for displaying operational statuses and faults

Other features

- Completely new soft-grip easy press handgun with improved ergonomics
- Maximum ease of operation due to improved, infinitely adjustable pressure and water flow control
- Servo press rotary regulator with ceramic insert
- Integrated fine water filter with a mesh size of 100 µm to protect the pump
- Improved access to stairs due to large solid rubber wheels (ø 300 mm)
- Simple oil level control from outside without removing the housing cover

Note:

Additional contactors significantly extend the service life of the pressure switch.

View from the front



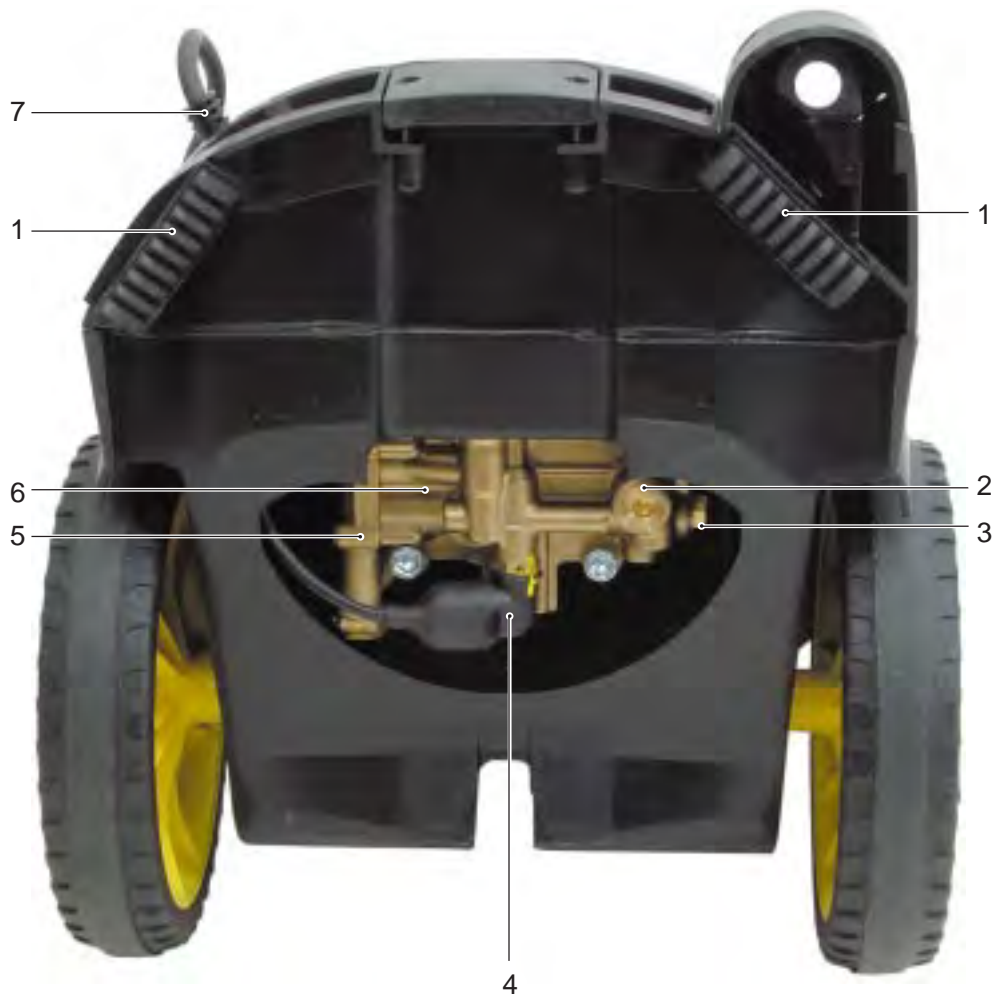
- | | |
|---------------------------------|----------------------------------|
| 1 Mains plug | 11 Safety latch |
| 2 Mains cable | 12 Soft grip easy press handgun |
| 3 Water connection | 13 Trigger lever |
| 4 Oil level control | 14 High-pressure hose |
| 5 Unit switch | 15 Lance with roll-over handle |
| 6 Status display (LED) | 16 Pressure gauge |
| 7 Fastening screw, cover | 17 High-pressure connection |
| 8 Mains cable storage | 18 Three-way nozzle |
| 9 Transport handle | 19 High-pressure hose connection |
| 10 Servo press rotary regulator | |

View from the rear



- | | |
|----------------------------------|---|
| 1 Mains cable storage | 6 Storage compartment for accessories |
| 2 Storage for the dirt blaster | 7 Cap of cleaning agent container with metering valve |
| 3 Storage for three-way nozzle | 8 Transport handle |
| 4 Foot-rest for tilting the unit | |
| 5 Large solid rubber wheels | |

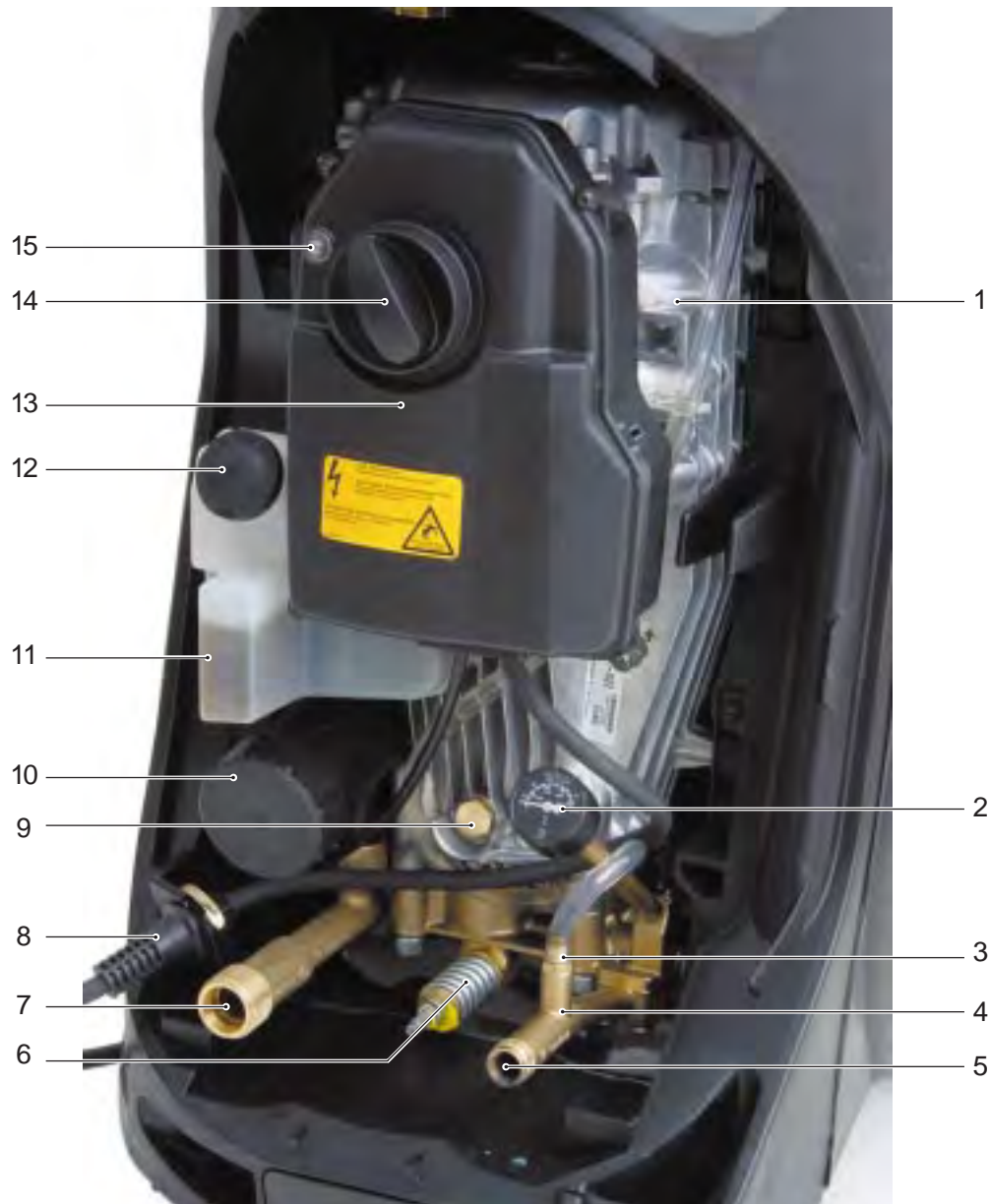
View from below



- 1 Rubber feet
- 2 Screw plug for non-return valve
- 3 Screw plug for pressure valve
- 4 Pressure switch (incased watertight)

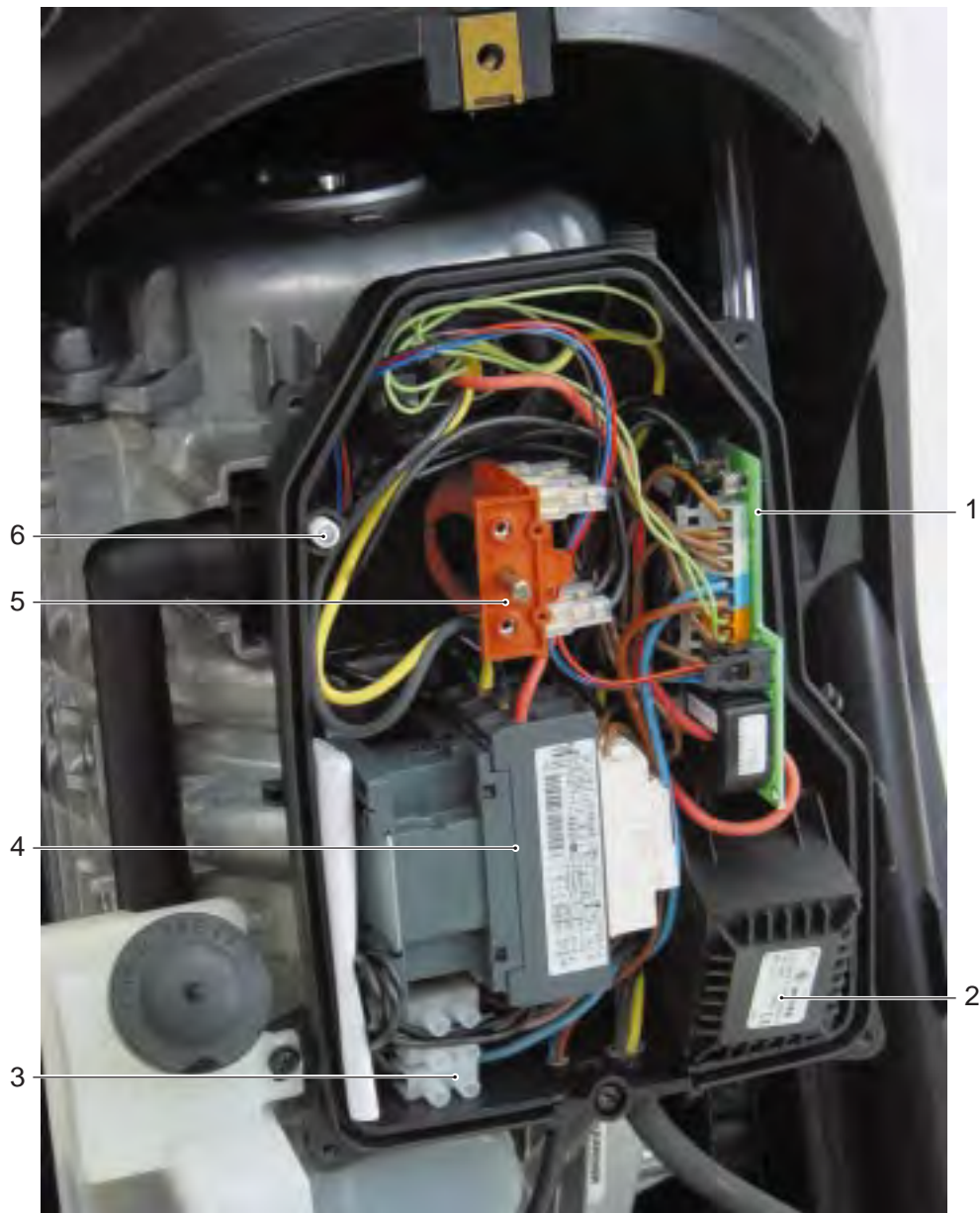
- 5 Water inlet cover
- 6 Pump head
- 7 Mains cable

View from the front (housing open)



- | | |
|---|-------------------------|
| 1 Motor | 8 Mains cable |
| 2 Pressure gauge | 9 Oil drain plug |
| 3 Cleaning agent connection with non-return valve | 10 Water filter |
| 4 Cleaning agent injector | 11 Oil tank |
| 5 High-pressure connection | 12 Oil tank cap |
| 6 Overflow valve | 13 Electrical box |
| 7 Water connection | 14 Unit switch |
| | 15 Status display (LED) |

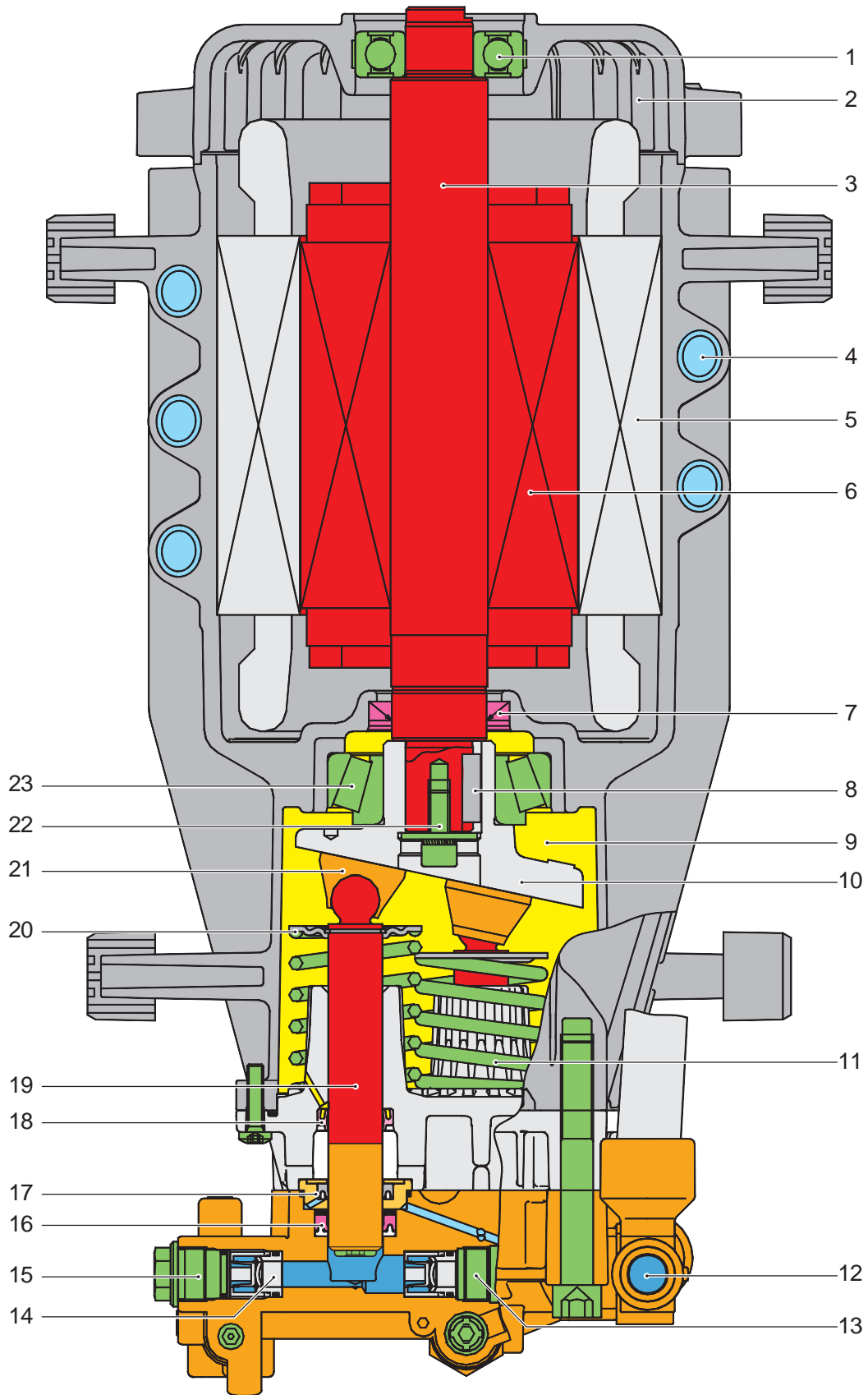
Electrical box open



- 1 Printed circuit board
- 2 Control circuit transformer
- 3 Cable clamp

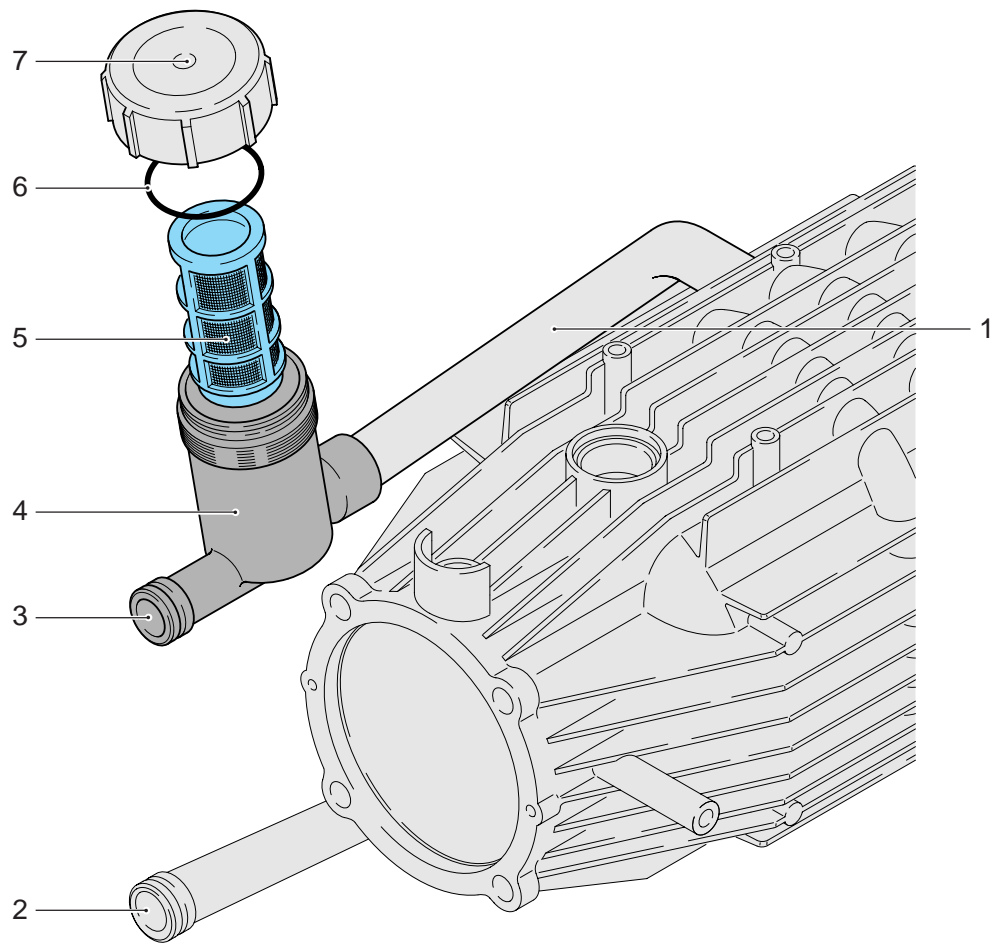
- 4 Main contactor
- 5 Unit switch
- 6 Status display (LED)

Motor pump unit



Motor pump unit

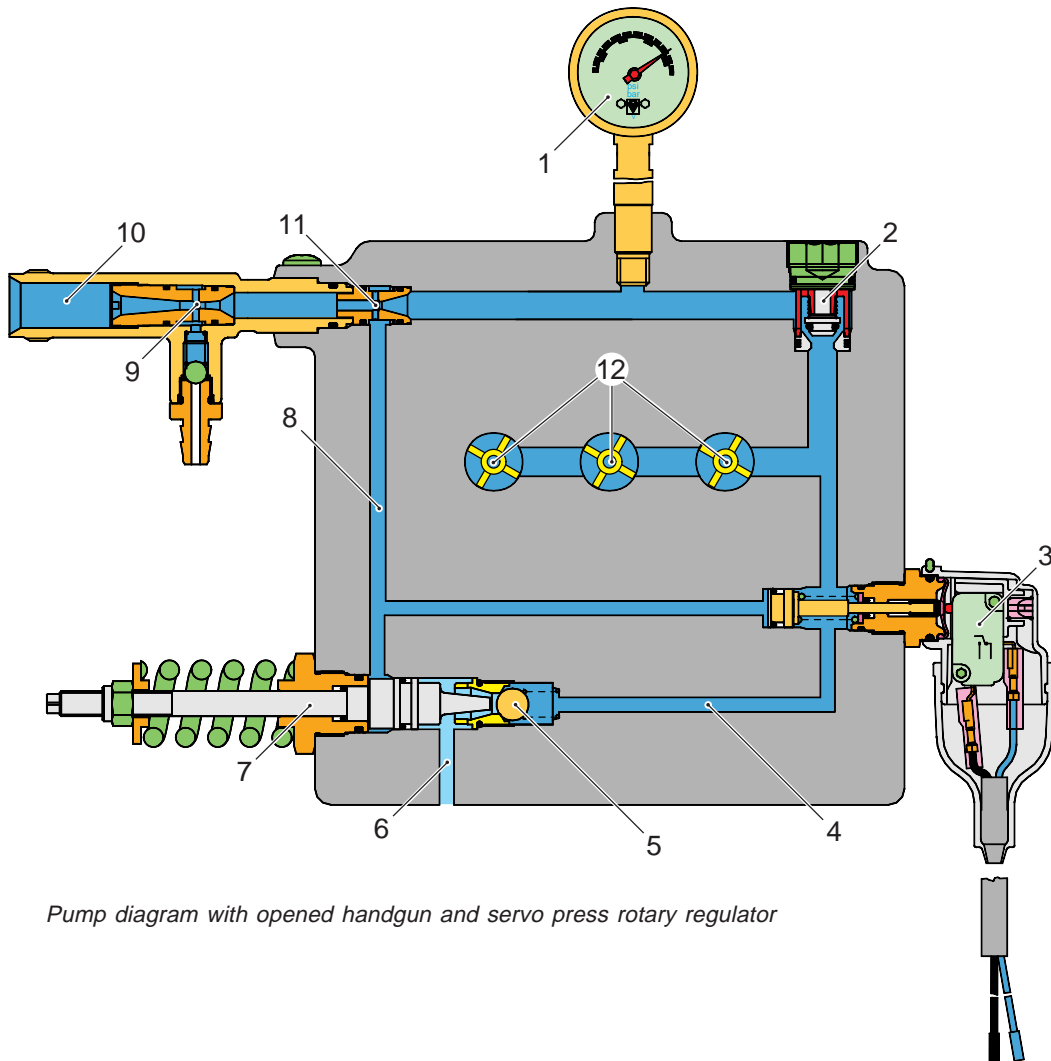
- 1 Upper motor bearings
- 2 Motor cover
- 3 Motor shaft
- 4 Water cooling for motor
- 5 Stator winding
- 6 Rotor winding
- 7 Shaft seal
- 8 Key
- 9 Oil bath
- 10 Swash plate
- 11 Piston spring
- 12 Screw plug for non-return valve
- 13 Suction valve
- 14 Pressure valve
- 15 Screw plug for pressure valve
- 16 High-pressure seal
- 17 Low-pressure seal
- 18 Oil seal
- 19 Piston
- 20 Retaining plate for piston spring
- 21 Glide shoe
- 22 Retaining bolt swash plate
- 23 Motor bearing

Water filter

- 1 Water inlet to motor cooling
- 2 Water inlet to the pump
- 3 Water inlet to the water filter
- 4 Filter housing

- 5 Filter
- 6 O-ring
- 7 Screw cap

Pump with overflow valve

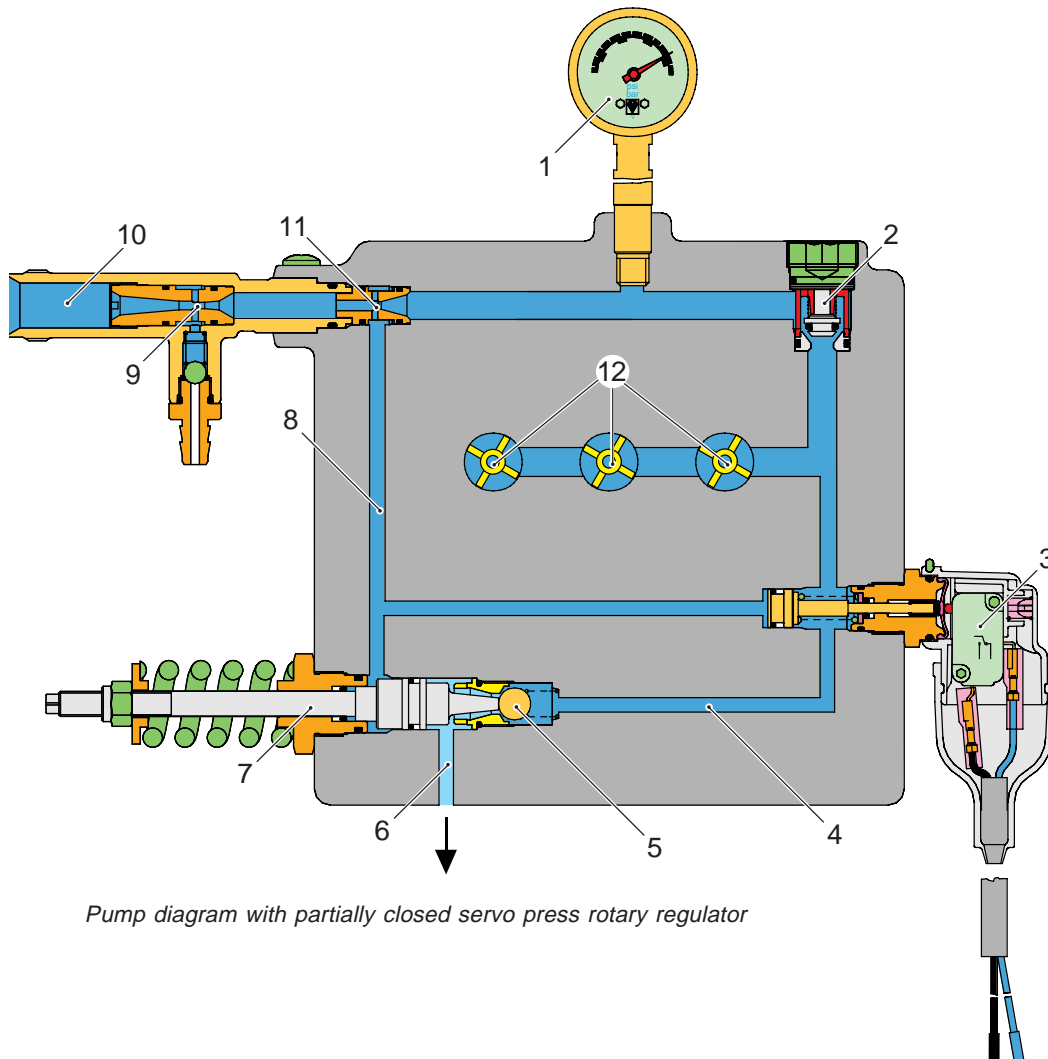


Pump diagram with opened handgun and servo press rotary regulator

- 1 Pressure gauge
- 2 Non-return valve
- 3 Pressure switch
- 4 Connection bore to the overflow valve
- 5 Overflow valve ball
- 6 Connection bore to the suction chamber
- 7 Piston rod
- 8 Connection bore overflow valve to the control pressure injector
- 9 Cleaning agent injector
- 10 High-pressure outlet
- 11 Control pressure injector
- 12 Pressure chamber with pressure valves

When the servo press rotary regulator is fully opened the water flows out of the pressure chamber (12) through the non-return valve (2), through the control pressure injector (11) to the high-pressure outlet (10). The ball (5) of the overflow valve is pressed onto the valve seat by the pump's pressure and thus seals off the connection bore (6) to the suction chamber. The pressure gauge (1) indicates the working pressure in the pressure chamber (12). However the action of the control pressure injector (11) results in a lower pressure in the connection bore (8).

Pump with overflow valve



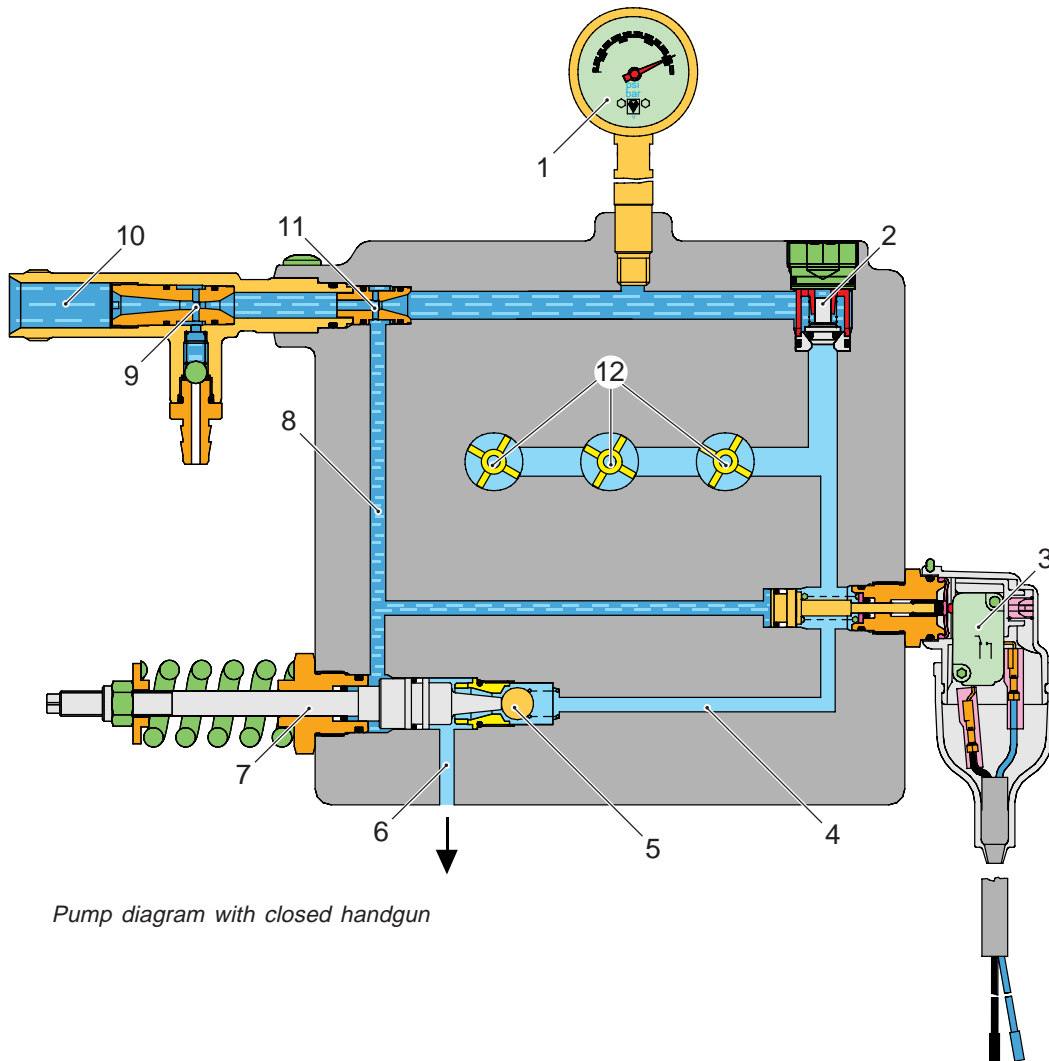
Pump diagram with partially closed servo press rotary regulator

- 1 Pressure gauge
- 2 Non-return valve
- 3 Pressure switch
- 4 Connection bore to the overflow valve
- 5 Overflow valve-ball
- 6 Connection bore to the suction chamber
- 7 Piston rod
- 8 Connection bore overflow valve to the control pressure-injector
- 9 Cleaning agent injector
- 10 High-pressure outlet
- 11 Control pressure-injector
- 12 Pressure chamber with pressure valves

If the servo press rotary regulator is partially closed the pressure in the pressure chamber (12) does not continue to rise. The smaller quantity of water also reduces the effect of the control pressure injector (11), so that the pressure in the connection bore (8) rises. This presses the piston rod (7) to the right slightly, against the spring pressure. The spindle point of the rod presses the ball (5) out of its seat slightly, so that part of the water quantity flows to the suction chamber.

The pressure switch (3) is pressed slightly to the right by the increased pressure in the connection bore (8), however not far enough to switch off the pressure switch.

Pump with overflow valve



Pump diagram with closed handgun

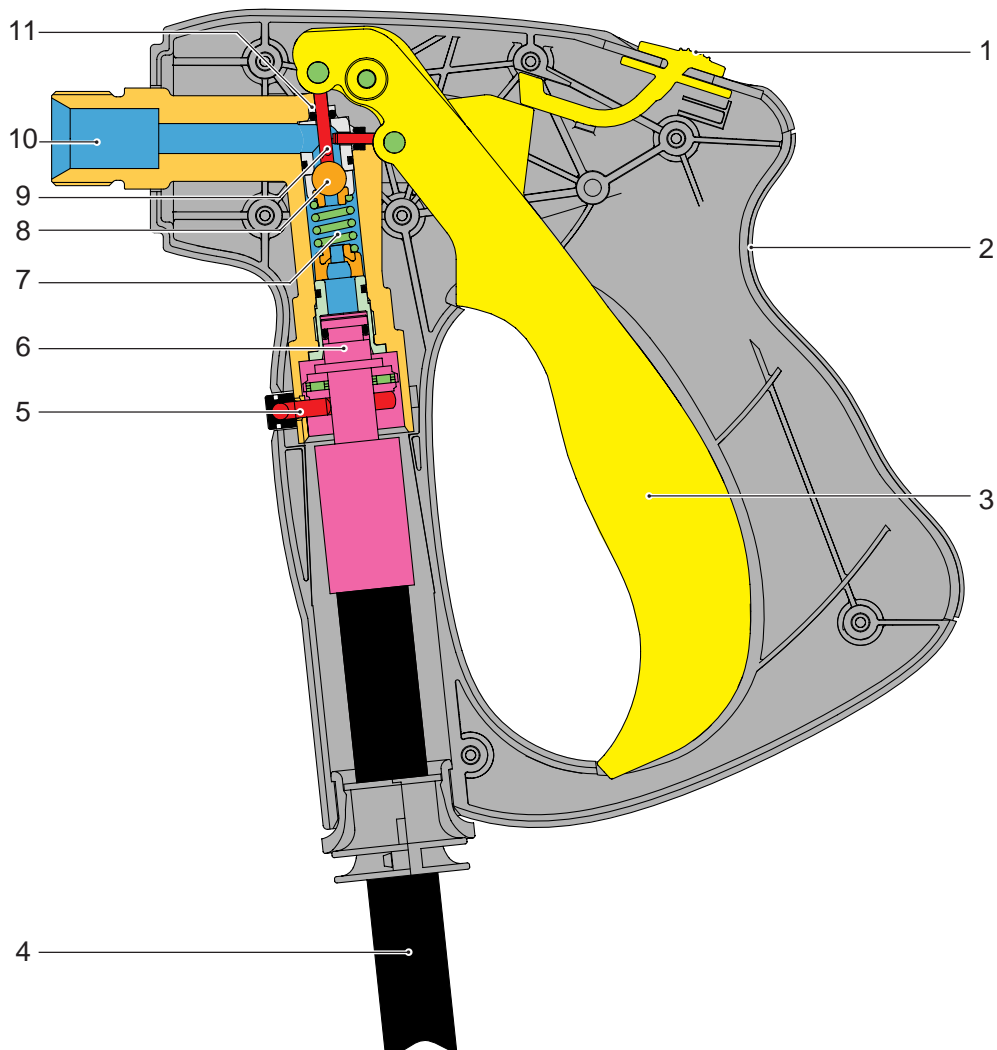
- 1 Pressure gauge
- 2 Non-return valve
- 3 Pressure switch
- 4 Connection bore to the overflow valve
- 5 Overflow valve-ball
- 6 Connection bore to the suction chamber
- 7 Piston rod
- 8 Connection bore overflow valve to the control pressure-injector
- 9 Cleaning agent injector
- 10 High-pressure outlet
- 11 Control pressure-injector
- 12 Pressure chamber with pressure valves

When the handgun is closed the pressure in the pressure chamber (12) rapidly increases. This pressure peak acts on the piston rod (7) and the pressure switch (3) via the connection bores (8). The ball (5) is forced out of its seat by the piston rod (7) and the total water quantity can flow via the connection bore (6) to the suction chamber.

The pressure switch (3) controls the contactor, which in turn switches off all 3 phases of the motor. As soon as the handgun is closed the non-return valve (2) closes. This retains the full system pressure between the handgun and non-return valve.

If the handgun is reopened the pressure in the system falls rapidly, the overflow valve moves back to its original position and the pressure switch (3) switches the motor back on.

Soft grip easy press handgun

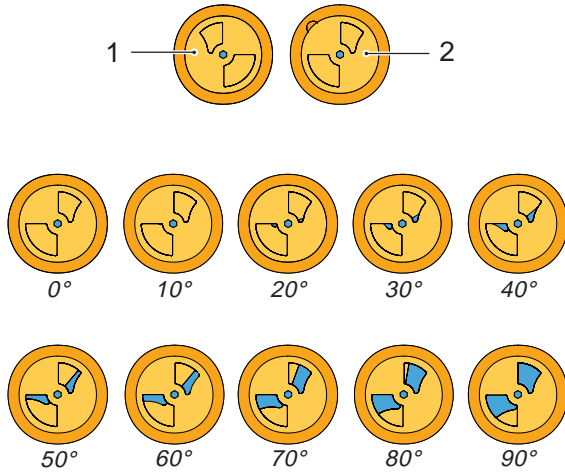


- 1 Safety latch
- 2 Handgun handle cover
- 3 Trigger lever
- 4 High-pressure hose
- 5 Safety bolt
- 6 Coupling between handgun - high-pressure hose
- 7 Spring
- 8 Valve ball
- 9 Valve piston
- 10 Connection for spray lance
- 11 O-Ring / support ring

When the trigger lever (3) is pressed the valve ball (8) is pressed down by the valve piston (9) against the spring (7). The water can flow from the high-pressure hose (4) through the handgun into the spray lance.

By removing the safety bolt (5) the high-pressure hose (4) can be removed from the handgun.

Pressure / flow control valve (servo press rotary regulator)



Water volumn flow by opening angle 0° - 90°

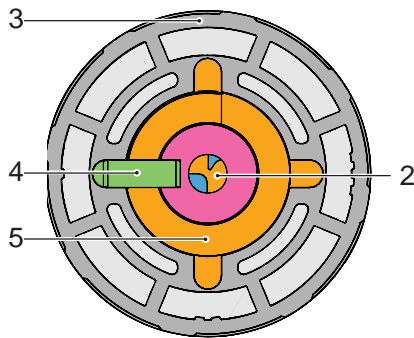
The pressure and flow control valve have been completely redeveloped for the HD 10/25 S and is designed as a rotary regulator between the handgun and the spray lance.

Within the high pressure channel there are two ceramic discs (1, 2).

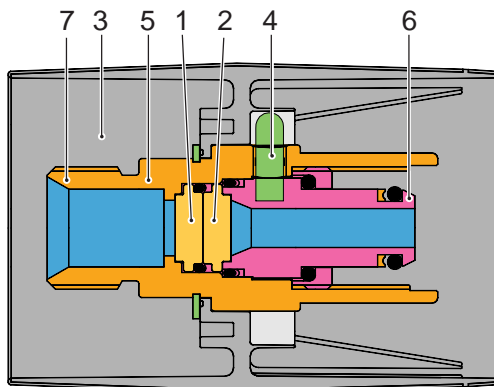
The ceramic disc (2) on the side of the handgun is rigidly connected to the handgun connection (6). The ceramic disc (1) on the spray lance side is connected to the rotary regulator (5) and is thus adjustable. Staggered holes in the ceramic discs (1, 2) enable the flow quantity and pressure to be varied when rotated.

The diagram shows both ceramic discs (1, 2) on top of each other and the water flow (blue) at various opening angles of 0° - 90°.

At the minimum setting the water flows through a small hole in the middle of the ceramic discs (1, 2).



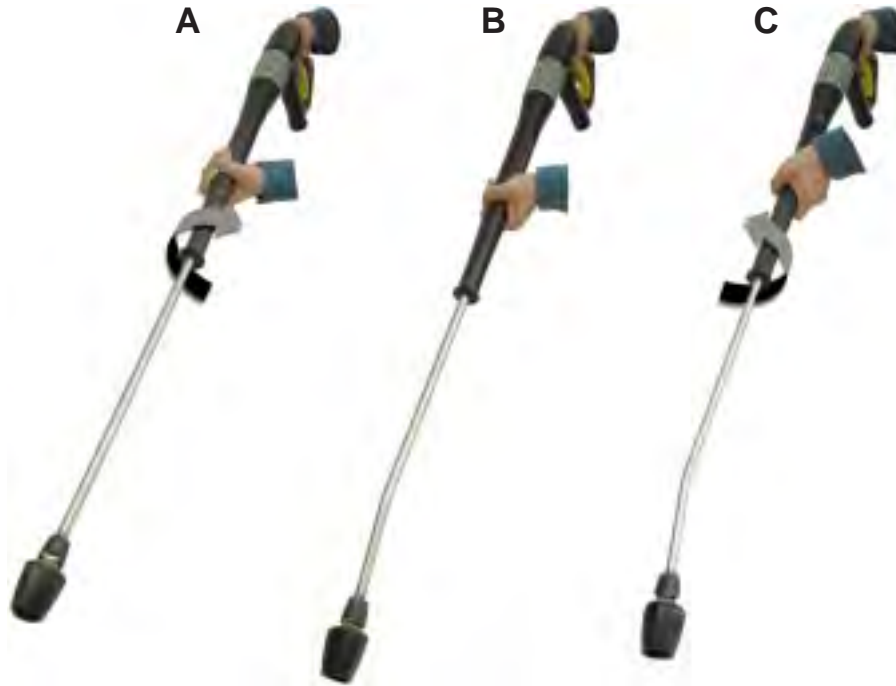
Cross-section through the servo press rotary regulator (handgun side)



- 1 Ceramic disc on spray lance side
- 2 Ceramic disc on handgun side
- 3 Grip rotary regulator
- 4 Connecting pin
- 5 Housing of the rotary regulator
- 6 Handgun connection
- 7 Spray lance connection

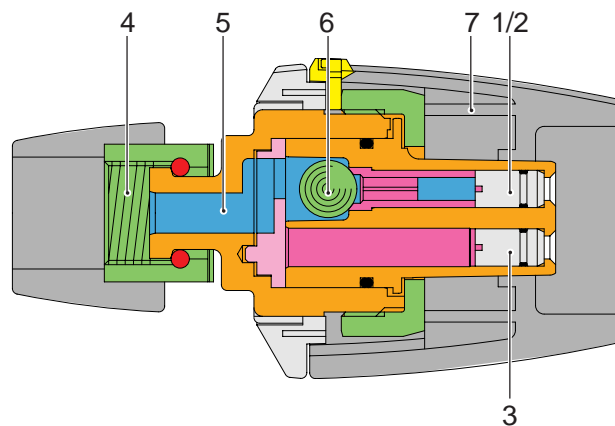
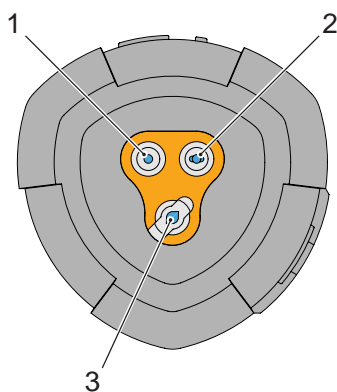
Cross-section through the servo press rotary regulator

Three-way nozzle



The three-way nozzle of the HD 10/25 S/S Plus is a new development differs from previous models in that it only has 2 fixed adjustable settings. By rotating the nozzle guard (7) it is switched between the cleaning agent nozzle (3) and the high-pressure nozzles (1/2). The choice between pencil jet and fan jet is made by turning the spray lance ("roll-over") while the handgun's trigger lever is released.

At the same time the valve ball (6) rolls in front of one of the two nozzles and closes it off. To use the pencil jet, hold the handgun in the original position (B) and rotate the spray lance to the left (A). For the fan jet return the spray lance to the right (C). The pressure while working keeps the ball (6) in the selected position.



- 1 Pencil jet nozzle
- 2 Fan jet nozzle
- 3 Cleaning agent nozzle (low pressure)
- 4 Spray lance connection

- 5 High-pressure channel
- 6 Valve ball (pencil jet/ fan jet)
- 7 Adjustable nozzle guard

Electronics

The HD 10/25 S/S Plus has newly developed control and monitoring electronics.

The system monitors a large number of functions.

1. Pump monitoring

During continuous operation of 30 minutes the unit immediately switches off and interlocks, an optical signal is emitted by the LED (see 5.1.2).

In case of a continuous pause of 30 minutes the unit immediately switches off and interlocks, an optical signal is emitted by the LED (see 5.1.2).

Both functions can be deactivated using the DIP switch (see circuit diagram).

2. Leakage monitoring

The system checks the device by monitoring the pressure switch for leaks. If the pressure switch opens twice within 2 seconds, and if this repeats 10 times during 10 minutes, the unit is immediately switched off and interlocked, an optical signal is emitted by the LED (see 5.2.2).

This function can be deactivated using the DIP switch (see circuit diagram).

3. Motor protection

If a phase fails the unit is immediately switched off and interlocked, an optical signal is emitted by the LED (see 5.2.4).

If the unit overheats it is immediately switched off and interlocked, an optical signal is emitted by the LED (see 5.2.3).

Overheating can occur because of the following causes:

- Over or undervoltage
- Overload
- Poor motor cooling (lack of water or temperature of the cooling water too high)

In case of an undervoltage the unit is immediately switched off and interlocked, an optical signal is emitted by the LED (see 5.2.4).

If the difference in voltage between the 2 phases >50V the unit is immediately switched off and interlocked, an optical signal is emitted by the LED (see 5.2.4).

4. Contactor check

The contactor is checked for bonded contacts or burned out coil. If defective the unit is immediately switched off and interlocked, an optical signal is emitted by the LED (see 5.2.1).

This function can be deactivated using the DIP switch (see circuit diagram).

5. Display

5.1 Status display:

- | | |
|---------------------------|------------------------------------|
| 5.1.1 LED lights up green | operation ok. |
| 5.1.2 LED flashes green | power disconnected (time exceeded) |

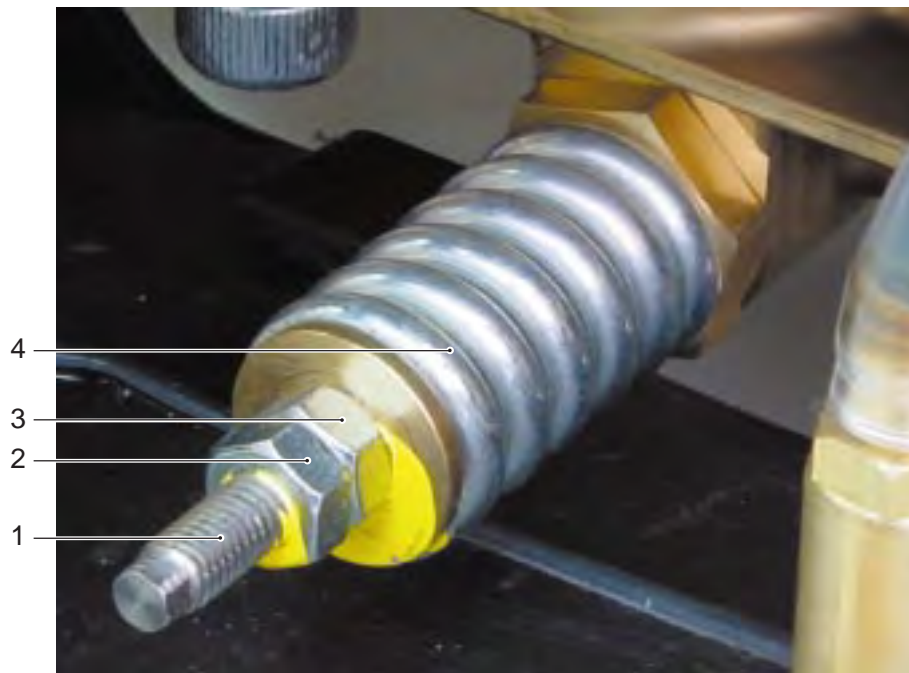
5.2 Fault signals:

- | | |
|--------------------------|-------------------------------------|
| 5.2.1 LED lights up red | contactor or pressure switch not ok |
| 5.2.2 LED flashes 1x red | leakage |
| 5.2.3 LED flashes 2x red | opened motor thermal contact |
| 5.2.4 LED flashes 3x red | voltage supply |
| 5.2.5 LED flashes 4x red | current consumption to high |
| | blocked motor |

6. RESET

In case of faults the system is reset by switching the unit switch on and off.

Adjust overflow valve



- 1 Overflow valve piston rod
- 2 Locking nut
- 3 Adjusting nut – working pressure
- 4 Spring

Adjust overflow valve using a handgun with servo press rotary regulator (standard accessories)

- Connect the testing pressure gauge with the high-pressure hose and handgun with servo press rotary regulator to the high pressure outlet. Insert new high pressure nozzle!
- Turn the servo press rotary regulator to the lowest setting and allow the unit to run.
- Using the adjusting nut (3) set the tension of the spring (4) so that the overflow valve opening pressure is reached (see Techn. Data).
- Use the locking nut (2) to secure the adjusting nut (3).
- Switch off the unit and depressurise by opening the handgun.

Adjust the overflow valve using a standard handgun (optional accessories)

- Connect the testing pressure gauge with the high-pressure hose and standard handgun to the high-pressure outlet. Insert new high-pressure nozzle!
- Open the handgun and let the unit run.
- Using the adjusting nut (3) adjust the tension of the spring (4) so that the working pressure reaches high-pressure (see Techn. Data).
- Use the locking nut (2) to secure the adjusting nut (3).
- Switch off the unit and depressurise by opening the handgun.

Note:

The pressure switch is not adjustable!

Troubleshooting

Fault	Solution
Unit does not run	<ul style="list-style-type: none"> – Check/replace the mains voltage, connection cable and mains fuse – Check/replace the unit switch (Q1) – Check/replace the control circuit transformer (T1) – Check/replace the fuse (F1) – Check/replace the pressure switch (B1) – Check the motor thermal contact (WS_M1) / replace the motor – Check/replace the motor contactor (K1) – Check/replace the printed circuit board
Unit does not reach required pressure	<ul style="list-style-type: none"> – Check/increase the water inlet volume – Clean /replace the fine water filter – Vent the unit – Check/replace the high pressure nozzle – Check the pressure/suction valves for leaks / replace – Check/adjust/replace the overflow valve
Unit constantly switches on and off when the handgun is closed	<ul style="list-style-type: none"> – Check the handgun and O-rings on the high pressure hose for leaks / replace – Check/replace the cleaning agent-non-return valve – Check the pressure / suction valves for leaks / replace – Check/adjust/replace the overflow valve – Check/replace the non-return valve – Check/replace the pressure switch
Unit does not switch off when the handgun is closed	<ul style="list-style-type: none"> – Check/adjust/replace the overflow valve – Check/replace the non-return valve – Check/replace the pressure switch
No cleaning agent function	<ul style="list-style-type: none"> – Clean / replace the cleaning agent-non-return valve – Check/replace the cleaning agent nozzle – Replace injector – Clean/replace the cleaning agent filter – Check/replace the metering valve
Water escaping between the cylinder head and piston housing	<ul style="list-style-type: none"> – Check/replace the high-pressure and low-pressure seals
Oil leaking between the cylinder head and piston housing	<ul style="list-style-type: none"> – Replace the oil seals

Technical Data

Unit type	Unit No.	Circuit diagram	Operating instructions	Main-tenance booklet	Spare parts list
HD 10 / 25 S EU I 400 V / 3 Ph / 50 Hz	1.286-101	0.088-550	5.959-675	-	5.958-680
HD 10 / 25 S EU II 230 V / 3 Ph / 50 Hz	1.286-102	0.088-550	5.959-675	-	5.958-680
HD 10 / 25 S Plus EU I 400 V / 3 Ph / 50 Hz	1.286-201	0.088-550	5.959-675	-	5.958-680
HD 10 / 25 S Plus EU II 230 V / 3 Ph / 50 Hz	1.286-202	0.088-550	5.959-675	-	5.958-680

The technical data sheets and the circuit diagrams are located in the next issue of the spare parts CD-ROM (DISIS) and in the Intranet.

Technical data sheets: Folder: "Central / Service Info Int'l / Technical Specifications"

Circuit diagrams: Folder: "Central / Service Info Int'l / Circuit Diagram"

Paper copies of the operating instructions and spare parts lists can be ordered from the spare parts service by quoting the relevant parts numbers.

Special tools

Multimeter	6.803-022
Mounting mandrel high pressure/oil seal	5.901-055
Mounting sleeve high-pressure seal	5.901-136
Extraction tool swash plate removal	4.901-038
Assembly/dismantling tools - overflow valve seat	4.901-054
Extraction pliers	4.901-062
Shut off valve	4.580-034
Testing pressure gauge	4.742-025

Torques

Cylinder head bolts	50-60 Nm
Piston housing	5-7 Nm
Handgun, Servo press rotary regulator	40 Nm
High-pressure outlet	6-8 Nm
Pressure valves- screw caps	40-45 Nm
Non-return valve- screw caps	40-45 Nm
Pressure switch- screw fitting	15-17 Nm
Suction valves- screw fitting	5-8 Nm
Overflow valve seat	8-10 Nm
Swash plate- retaining bolt	12+3 Nm
Oil drain plug	20-25 Nm
Motor cover, rear	9-10 Nm