

HD 9/50-4 Cage
HD 13/35-4 Cage
HD 9/50 PE Cage
HD 13/35 PE Cage
Service Manual



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1 Preface

Good service work requires extensive and practice-oriented training as well as well-structured training materials. Hence we offer regular basic and advanced training programmes covering the entire product range for all service engineers. In addition to this, we also prepare service manuals for important appliances - these can be initially used as instruction guides and later on as reference guides. Apart from this, we also regular information about product enhancements and their servicing.

If you should require supplements, have corrections or questions regarding this document, please address these citing the following subject to:

international-service@de.kaercher.com

Subject:	Fall 108022
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The responsible product specialist will take care of your issue.

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2 Safety instructions

2.1 Hazard levels

Danger

Immediate danger that can cause severe injury or even death.

Warning

Possible hazardous situation that could lead to severe injury or even death.

Caution

Possible hazardous situation that could lead to mild injury to persons or damage to property.

3 Technical Features

Customised specifically to the requirements of the construction industry's machinery and accessories, these appliances feature a crankshaft pump for long idle periods. The appliance can be transported easily due to its large, air-filled tyres and powder-coated steel pipe frame with its built-in crane hook.

3.1 Drive

3.1.1 HD 9/50-4 Cage, HD 13/35-4 Cage

- 4-pin, air-cooled three-phase motor with 1400 rpm.

3.1.2 HD 9/50 PE Cage, HD 13/35 PE Cage

- 24 PS/17,76 kW, 2-cylinder petrol motor Honda GX 670

3.2 Pump

- 3 piston crankshaft pump
- Ceramic piston
 - Diameter 16 mm at HD 13/35
 - Diameter 14 mm at HD 9/50
- Cylinder head made of brass
- Pressure and suction valves made of stainless steel, valve cages made of plastic
- Pressure and quantity regulation at the overflow
- Built-in large water filter protects the pump from contamination. The filter can be easily removed and cleaned
- Oil level can be checked from the outside

3.3 Control

3.3.1 HD 9/50-4 Cage, HD 13/35-4 Cage

- Automatic safety switch-off after 30 minutes of non-operation
- Winding protection contact
- The pressure switch on the overflow switches the motor contactor
- Soft start increases the motor speed gradually to 1,400 1/min and protects the circuit from overloads when switched on

3.3.2 HD 9/50 PE Cage, HD 13/35 PE Cage

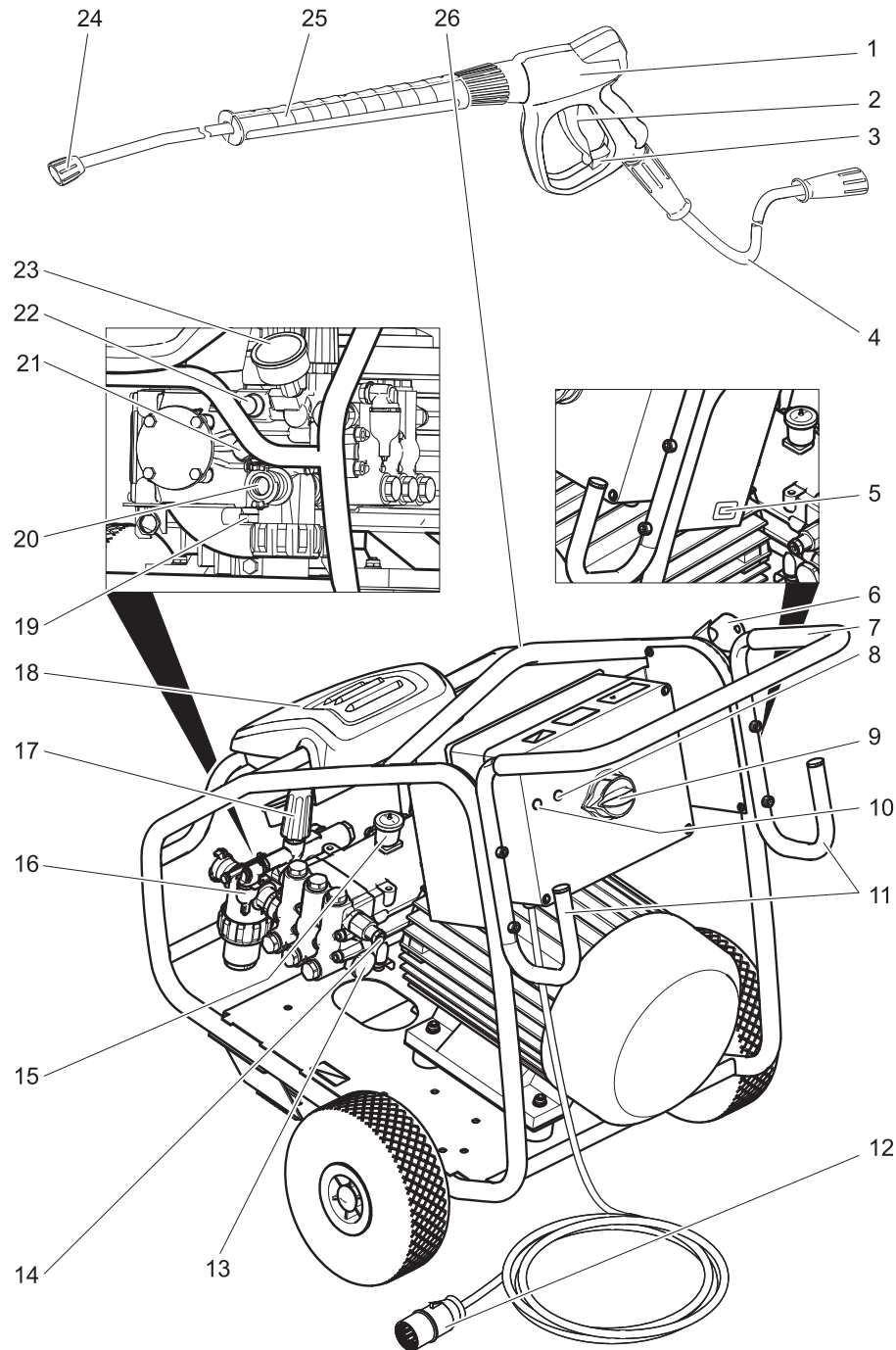
- Speed control on the pump reduces the motor speed to idle speed when the hand spray gun is closed
- The thermo valve the circuit water from becoming overheated while the hand spray gun is closed

3.4 Accessories

- Newly developed industrial hand spray gun with rotating spray tube
- Power nozzle, 15° flat spray
- High pressure hose 10 m
 - HD 9/50-4 Cage: DN 8, 64 MPa (640 bar)
 - HD 13/35-4 Cage: DN 10, 62 MPa (620 bar)
- Rotating coupling for the connection of the high pressure hose to the gun

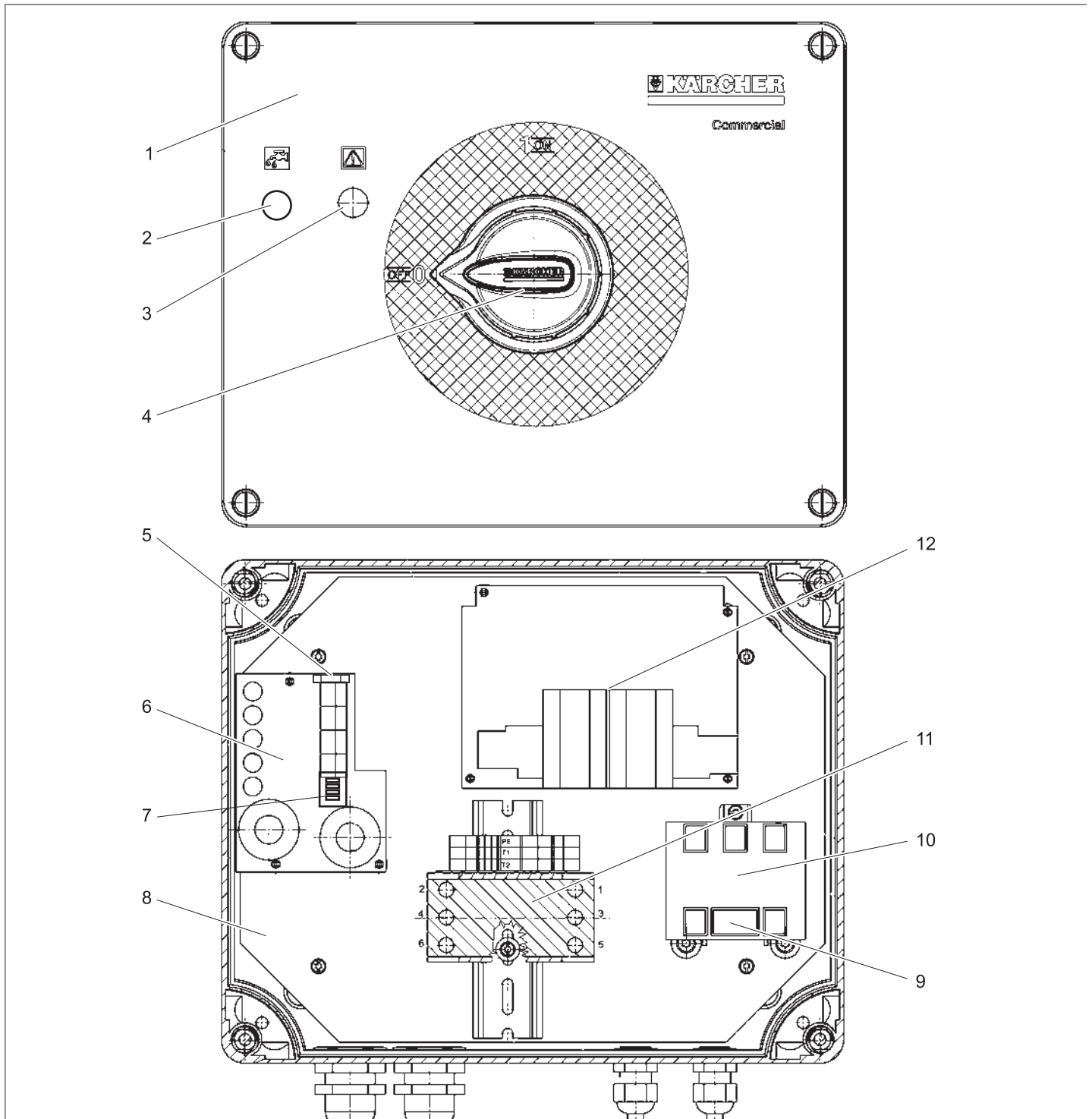
4 Setup and function

4.1 Total view HD 13/35-4 Cage, HD 9/50-4 Cage



- | | |
|--|--|
| 1 Trigger gun | 18 Accessory compartment |
| 2 Lever for hand spray gun | 19 Oil drain screw (pump) |
| 3 Safety catch | 20 Water connection with filter, 1" Geka |
| 4 High pressure hose | 21 Oil level indicator |
| 5 Operating hour counter | 22 High pressure connection |
| 6 Storage for spray pipe | 23 Manometer |
| 7 Push handle | 24 Power nozzle with covering nut |
| 8 Indicator lamp operation status / malfunction | 25 Spray lance |
| 9 Power switch | 26 Strut for crane loading |
| 10 Indicator lamp lack of water fuse (option) | |
| 11 Hose/cable holder | |
| 12 Power cable with plug | |
| 13 Lack of water fuse, dry run safe guard (option) | |
| 14 Safety valve | |
| 15 Oil filling nozzle | |
| 16 Pressure switch | |
| 17 Pressure/ quantity regulation | |

4.2 Switch box HD 13/35-4 Cage, HD 9/50-4 Cage



- 1 Cover, switch box
- 2 Indicator lamp lack of water fuse (option)
- 3 Indicator lamp operation status / malfunction
- 4 Appliance switch (S1)
- 5 Fuse (F1), 1AT
- 6 Circuit board (A1)
- 7 DIP switch
 - 1 not used
 - 2 Leakage monitoring (default setting: ON)
 - 3 not used
 - 4 30 minute continuous operation/continuous break (default setting: ON).
- 8 Electronics system
- 9 Fuse (F2), 2AT
- 10 Control transformer (T1)

- 11 Contactor (K1)
- 12 Soft starter board (A2)

4.2.1 Indicator lamp

The indicator lamps display the operating states (green) and interruptions (red).

Reset:

- Set the appliance switch to "0".
- Wait for a while.
- Set the appliance switch to "I".

Operating status display:

- Continuous green:
The appliance is now ready for operation.
- blinks green once:
Operational readiness has expired after 30 minutes.
The appliance has switched off after 30 minutes of continuous operation (safety if the high pressure hose bursts).

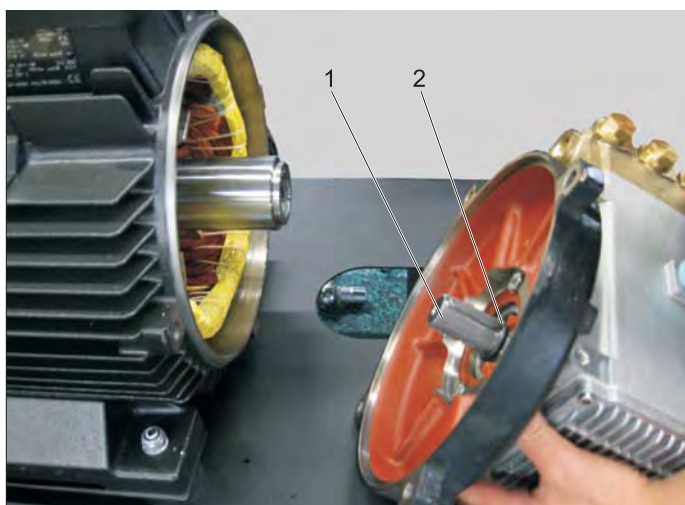
Fault display:

- Continuous red light:
Electric fault.

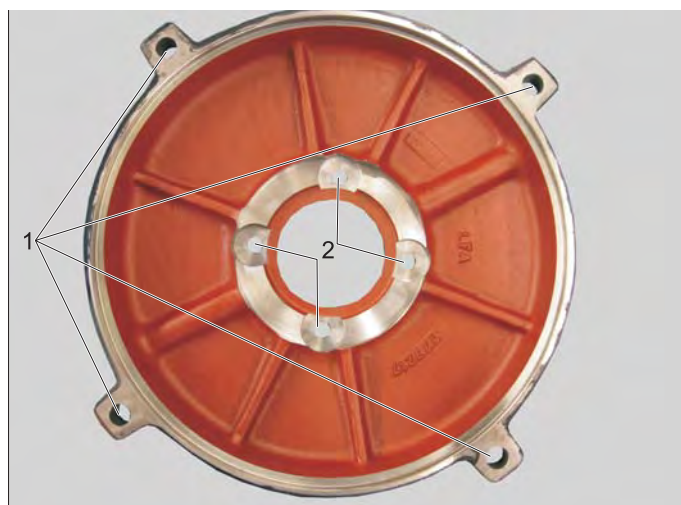
Check electrics/replace defective component.

- blinks red once:
High-pressure side is leaky.
Check high pressure hose, hose connections and hand spray gun for leaks.
- blinks red twice:
Engine is too hot.
Set the appliance switch to "0".
Allow device to cool down.
Set the appliance switch to "I".
- blinks red thrice:
Fault in the voltage supply.
Check main connections and mains fuse.
- blinks red four times:
Excessive power consumption.
Check/replace motor.
Check pump for blockage/make it work.

4.3 Electric motor HD 13/15-4, HD 9/50-4



- 1 Crankshaft journal
- 2 Washer ring



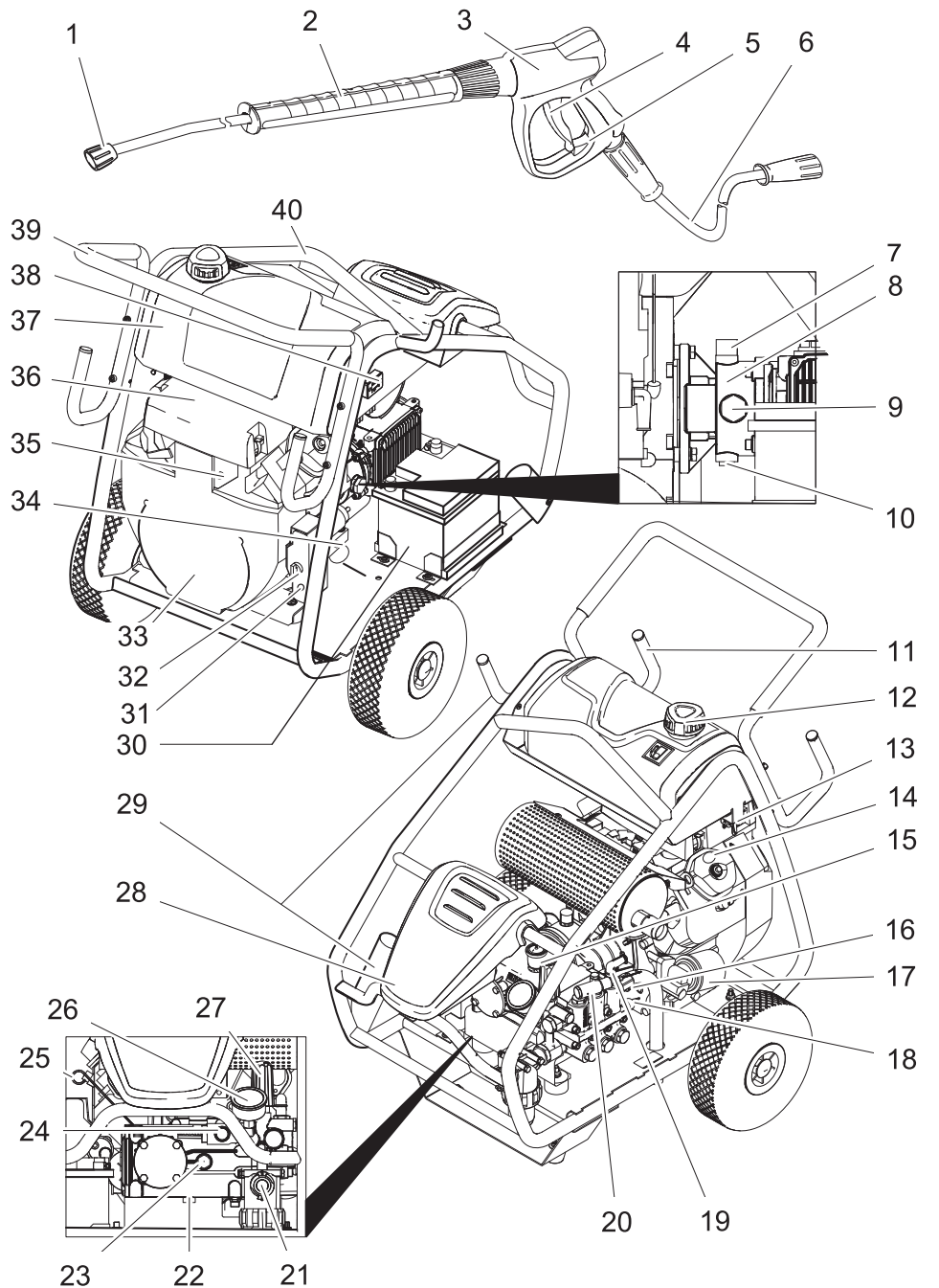
- 1 Fastening borings storage cover - motor
- 2 Fastening borings storage cover - pump
- 3 Bearing lid



Note

During assembly, the crankshaft journal must be coated with copper paste (6.-288-065.0) from all sides to ensure a future disassembly. Also, the boring in the motor shaft must be filled all the way with copper paste.

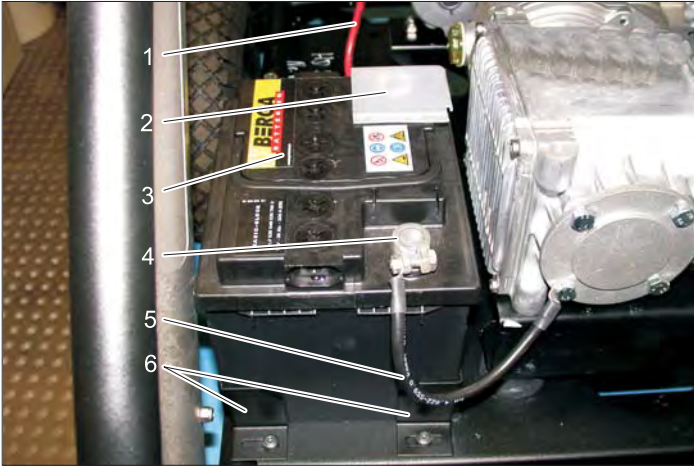
4.4 Total view HD 13/15 PE, HD 9/50 PE



- | | | | |
|----|---|----|--|
| 1 | Power nozzle with covering nut | 21 | Water connection with filter |
| 2 | Spray lance | 22 | Oil drain screw (pump) |
| 3 | Trigger gun | 23 | Oil level indicator (pump) |
| 4 | Lever for hand spray gun | 24 | High pressure connection |
| 5 | Safety catch | 25 | Oil dip (engine) |
| 6 | High pressure hose | 26 | Manometer |
| 7 | Oil fill neck (gears) | 27 | Pressure/ quantity regulation |
| 8 | Gear | 28 | Accessory compartment |
| 9 | Oil level indicator (gears) | 29 | Storage for spray pipe |
| 10 | Oil drain screw (gears) | 30 | Battery |
| 11 | Hose switch | 31 | Indicator lamp lack of water fuse (option) |
| 12 | Tank lid | 32 | Machine switch (engine) |
| 13 | Fuel tap | 33 | Petrol engine |
| 14 | Oil fill cover (motor) | 34 | Oil drain screw (engine) |
| 15 | Oil fill neck (pump) | 35 | Choke knob |
| 16 | Safety valve | 36 | Air filter |
| 17 | Oil filter (engine) | 37 | Fuel tank |
| 18 | Dry run safe guard (lack of water fuse, option) | 38 | Operating hours counter/tachometer |
| 19 | Thermostat valve | 39 | Push handle |
| 20 | Speed control | 40 | Strut for crane loading |

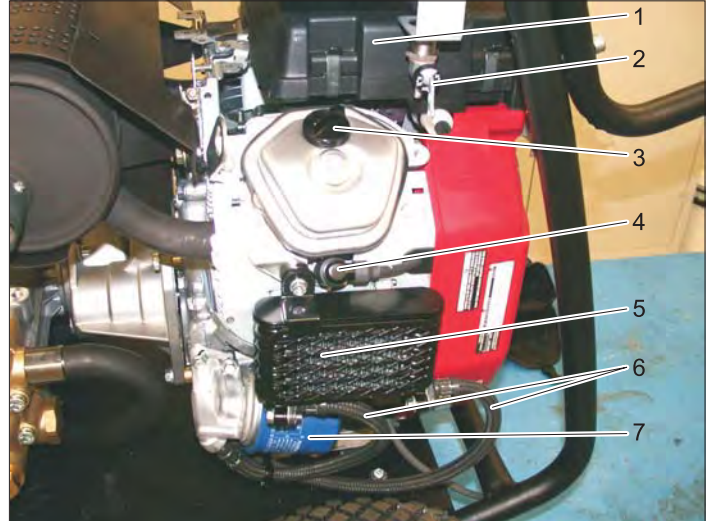
4.5 Petrol engine HD 13/15 PE, HD 9/50 PE

4.5.1 Battery



- 1 Battery connection cable (+)
- 2 Battery terminal (+)
- 3 Battery (voltage and capacity, see "Specifications")
- 4 Battery terminal (-)
- 5 Battery connection cable (-)
- 6 Battery holder

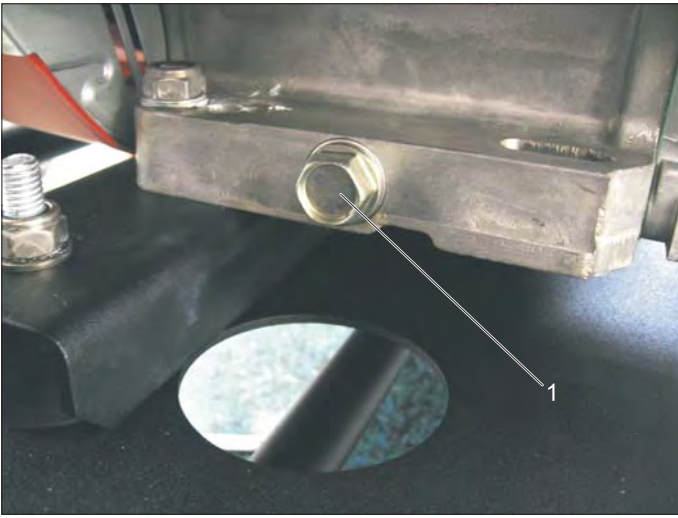
4.5.2 Motor



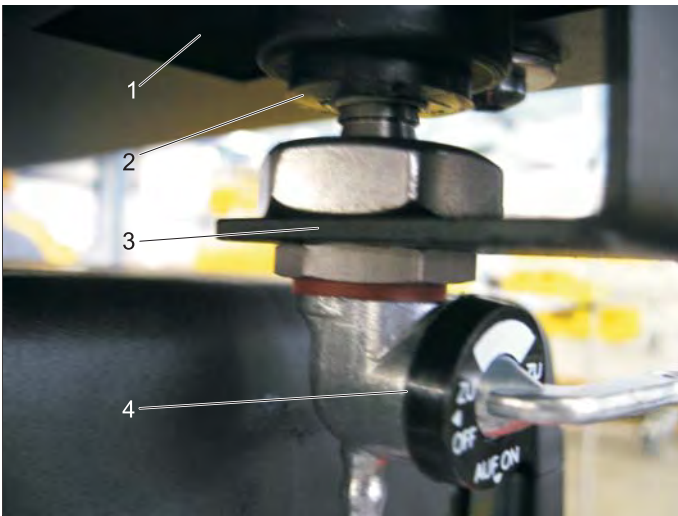
- 1 Air filter box
- 2 Fuel tap
- 3 Oil filling screw (engine)
- 4 Ignition plug
Spark plug (type: ZGR5A (NGK), J16CR-U (DENSO))
- 5 Oil cooler
- 6 Hose, oil cooler
- 7 Oil filter



- 1 Cooling fan, motor
- 2 Oil cooler
- 3 Fuel filter
- 4 Cover of air filter box
- 5 Choke knob
- 6 Oil dip (engine)
- 7 Motor electrics
- 8 Appliance switch with ignition key (motor)
- 9 Indicator lamp lack of water fuse (option)



1 Oil drain screw, right



- 1 Fuel tank
- 2 Rubber grommet
- 3 Halting plate
- 4 Fuel tap

The fuel tap is screwed to the support plate and is sealed with a rubber grommet on the tank.

4.5.3 Motor electrics



- 1 Fuse 25 A (charging current)
- 2 Ignition plug
- 3 Switch amplifier, lack of oil fuse
- 4 Solenoid for electric starter
- 5 Cover of motor electrics



The individual wires of the wire harness are colour-coded.



- 1 Cable to shut off the electrical fuel supply

→ The connector to the electrical fuel shut off must be disconnected in order to connect the dry run protection switch.



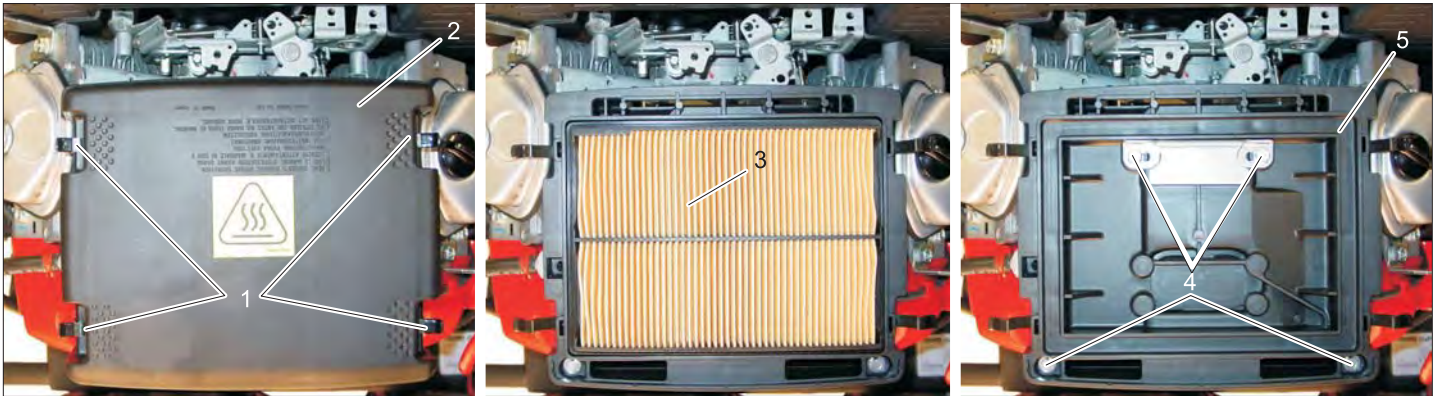
The operating hour display shows the speed while the motor is running and the number of operating hours when the appliance is at a standstill.



- 1 Sensor cable for operating hour display

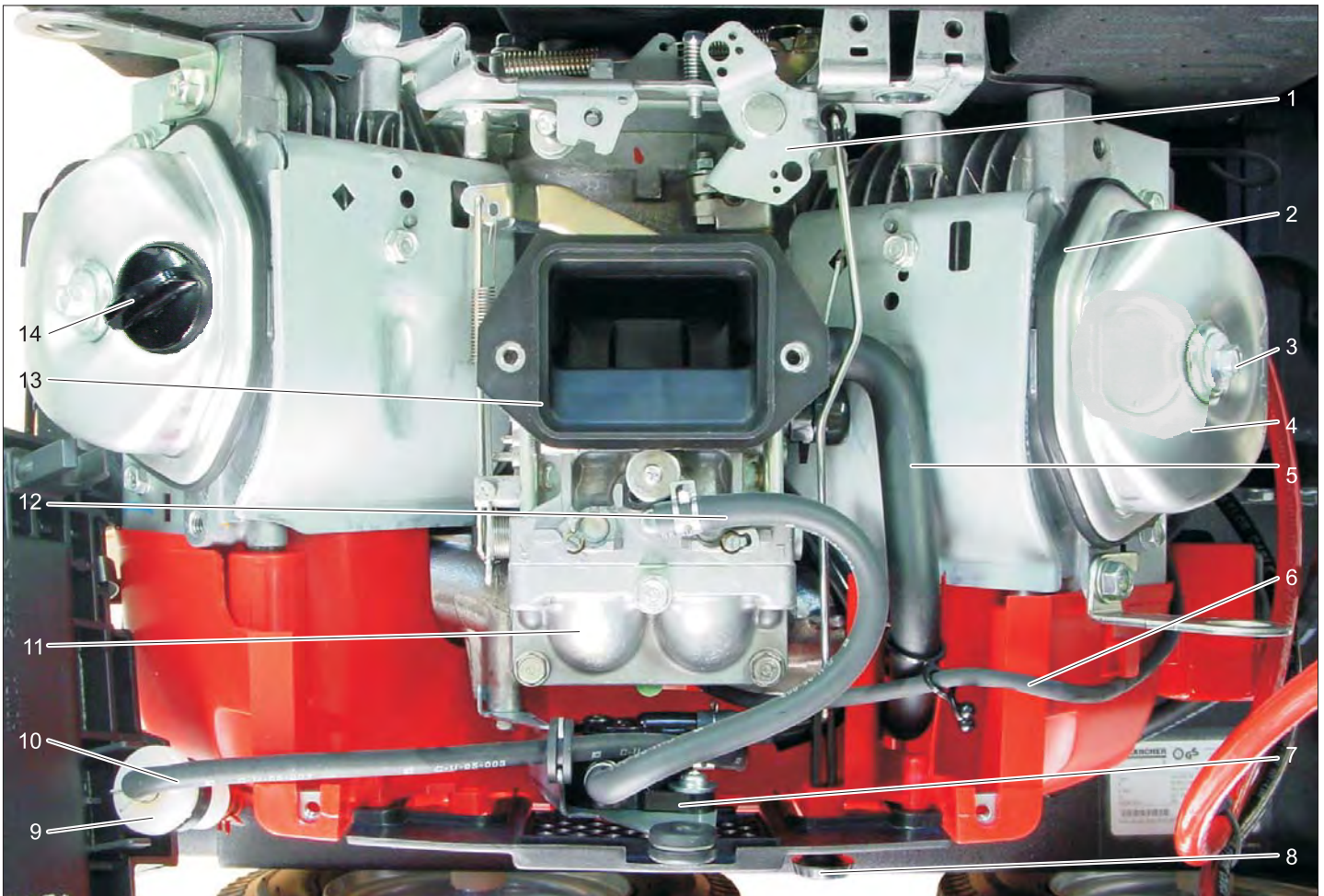
The sensor cable of the operating hour counter/tachometer is fastened to the ignition cable using 4 loops.

4.5.4 Air filter



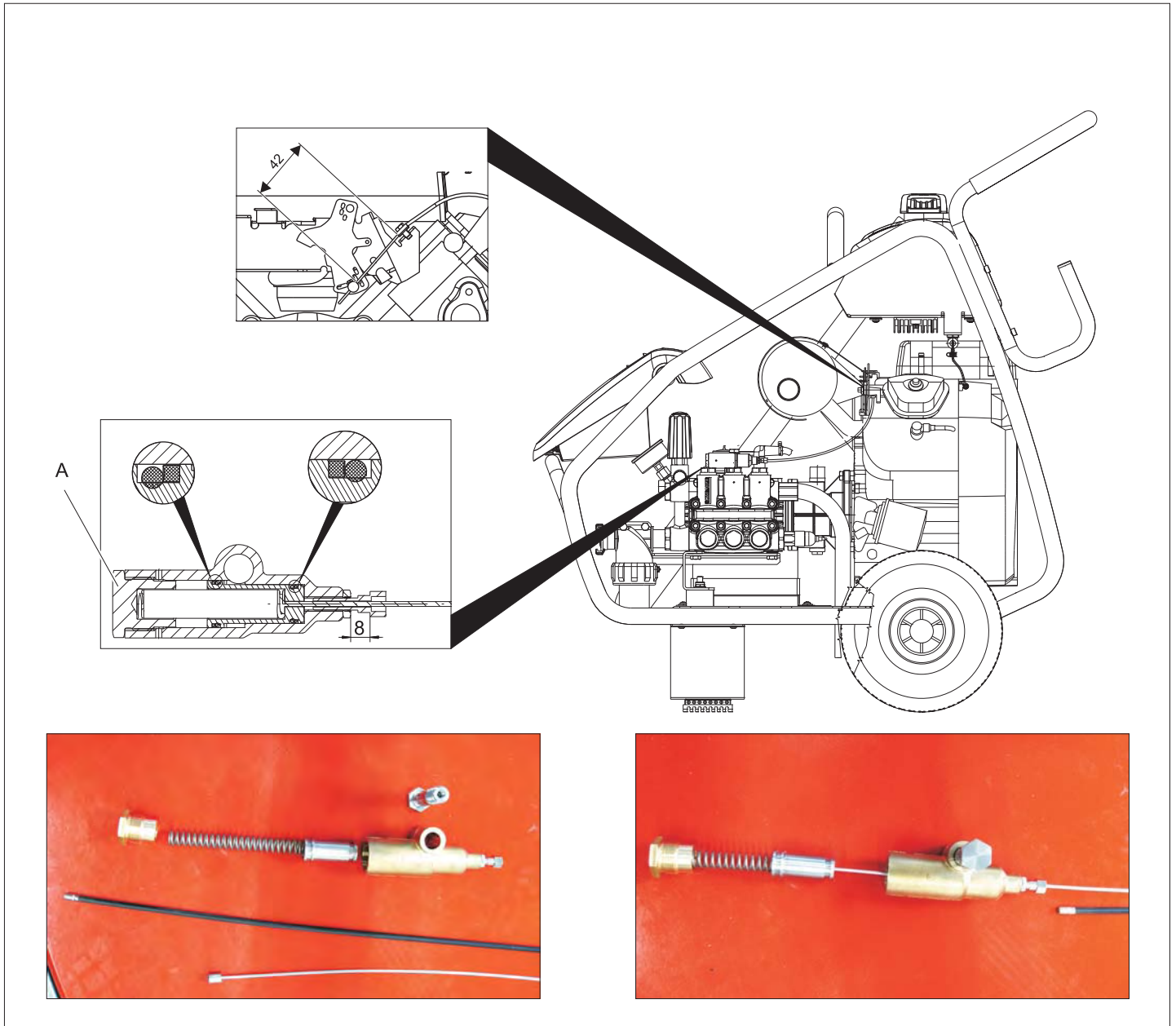
- 1 Lock
- 2 Cover, air filter box
- 3 Air filter insert
- 4 Fastening screws, air filter box
- 5 Air filter box

4.5.5 Motor with removed air filter box



- 1 Adjustment, choke
- 2 Seal, valve cover
- 3 Fastening screw, valve cover
- 4 Valve cover
- 5 Deaeration hose, crankshaft casing
- 6 Cable, fuel solenoid
- 7 Fuel pump
- 8 Choke knob
- 9 Fuel filter
- 10 Fuel hose, fuel pump - filter
- 11 Carburetor
- 12 Fuel hose to carburetor
- 13 Connection to air filter box
- 14 Oil filling screw (engine)
- 15 Adjustment screw, motor speed

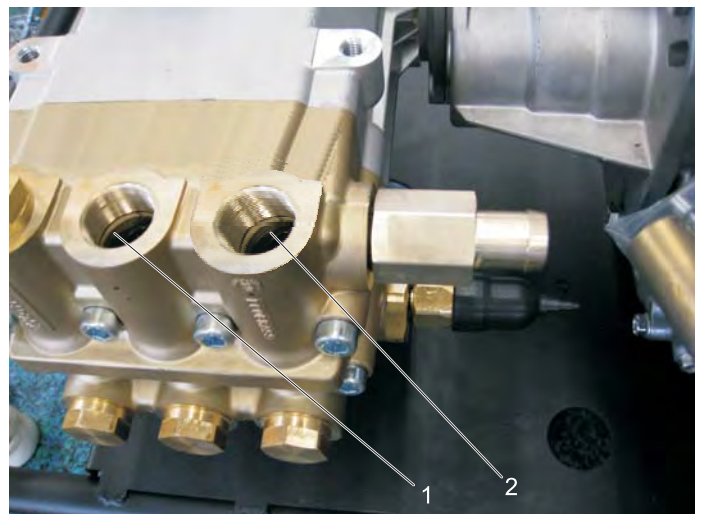
4.5.6 Speed control



A Tightening torque 35 Nm

The speed control lowers the motor speed when the hand spray gun is closed.

- Default setting of the carburator flap while motor is not running: 42 mm
- Grease all O-rings with silicone grease 6.288-028.0 prior to installation.



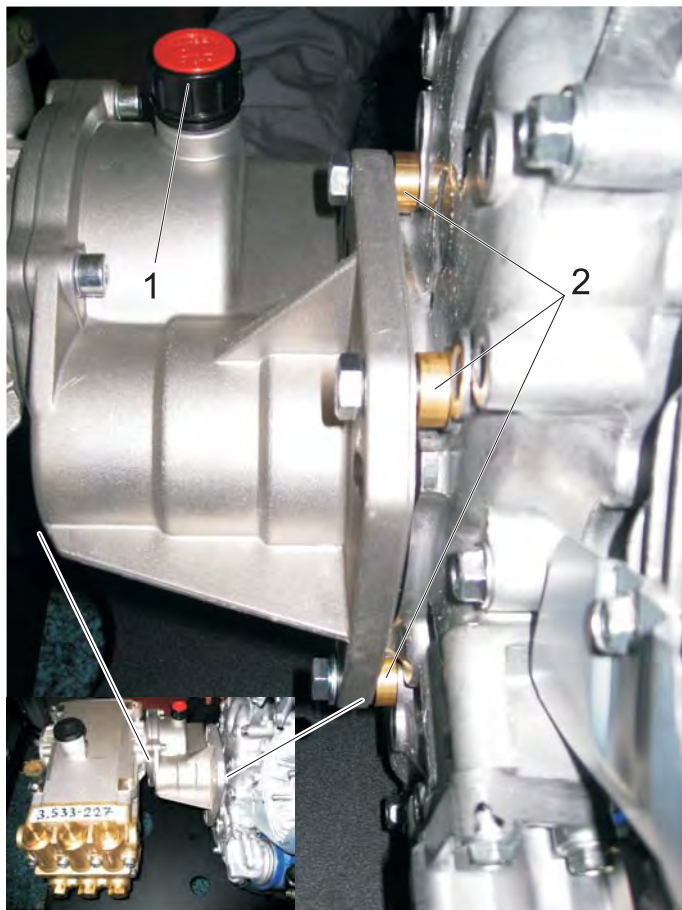
- 1 Fastening boring for the speed control in the cylinder head of the high pressure pump
- 2 Fastening boring for the thermal valve

4.5.7 Intermediate gear

Install the intermediate gear:



- Slide the toothed gear onto the shaft of the high pressure pump.
- Align the toothed wheel so that the shaft protrudes by $13\pm 0,2$ mm from the toothed wheel.
- Coat the threaded pin with soluble screw protection and tighten it.



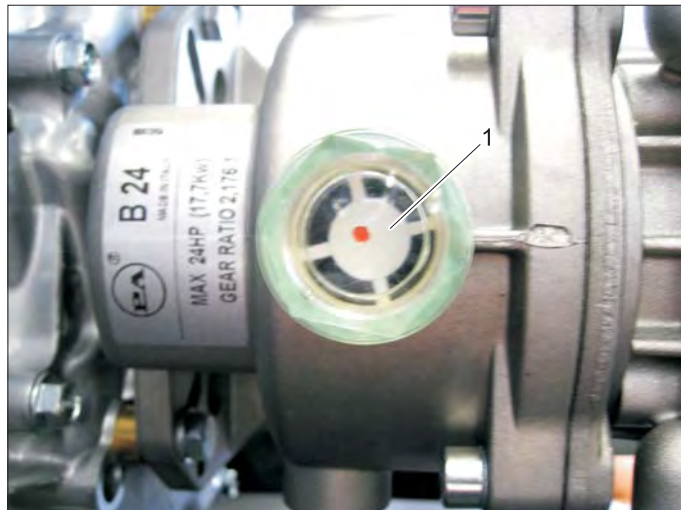
- 1 Oil filling nozzle
- 2 Spacer disc 7.0 mm

- Fasten the intermediate gear to the combustion motor with 4 spacer discs (7.0 mm) and 4 screws.
The washers under the screw head are only required on the elongated borings.

⚠ Warning

Risk of damage. Use only spacer discs that are 7.00 mm long. The spacer discs included in the package of the intermediate gear are 6.0 mm long and must not be used.

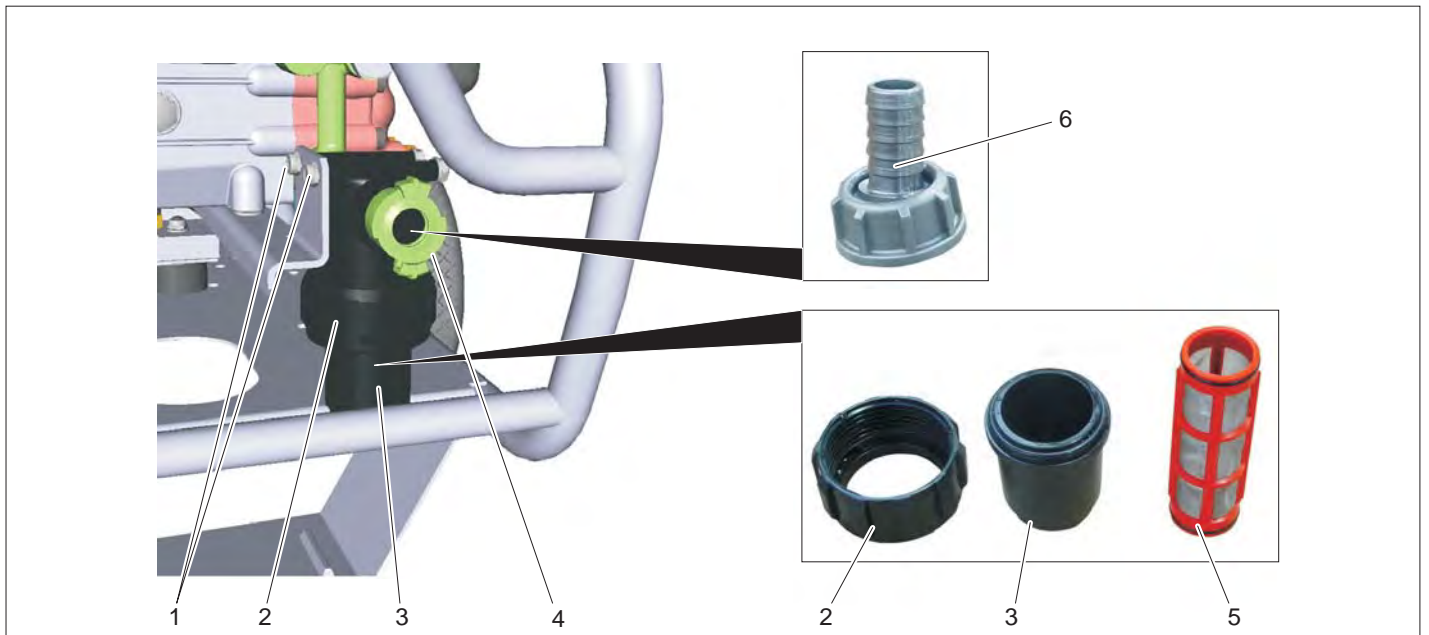
- Fasten the intermediate gear to the high pressure pump using 4 screws.
- Fasten the high pressure pump to the counter holder



- 1 Oil level indicator

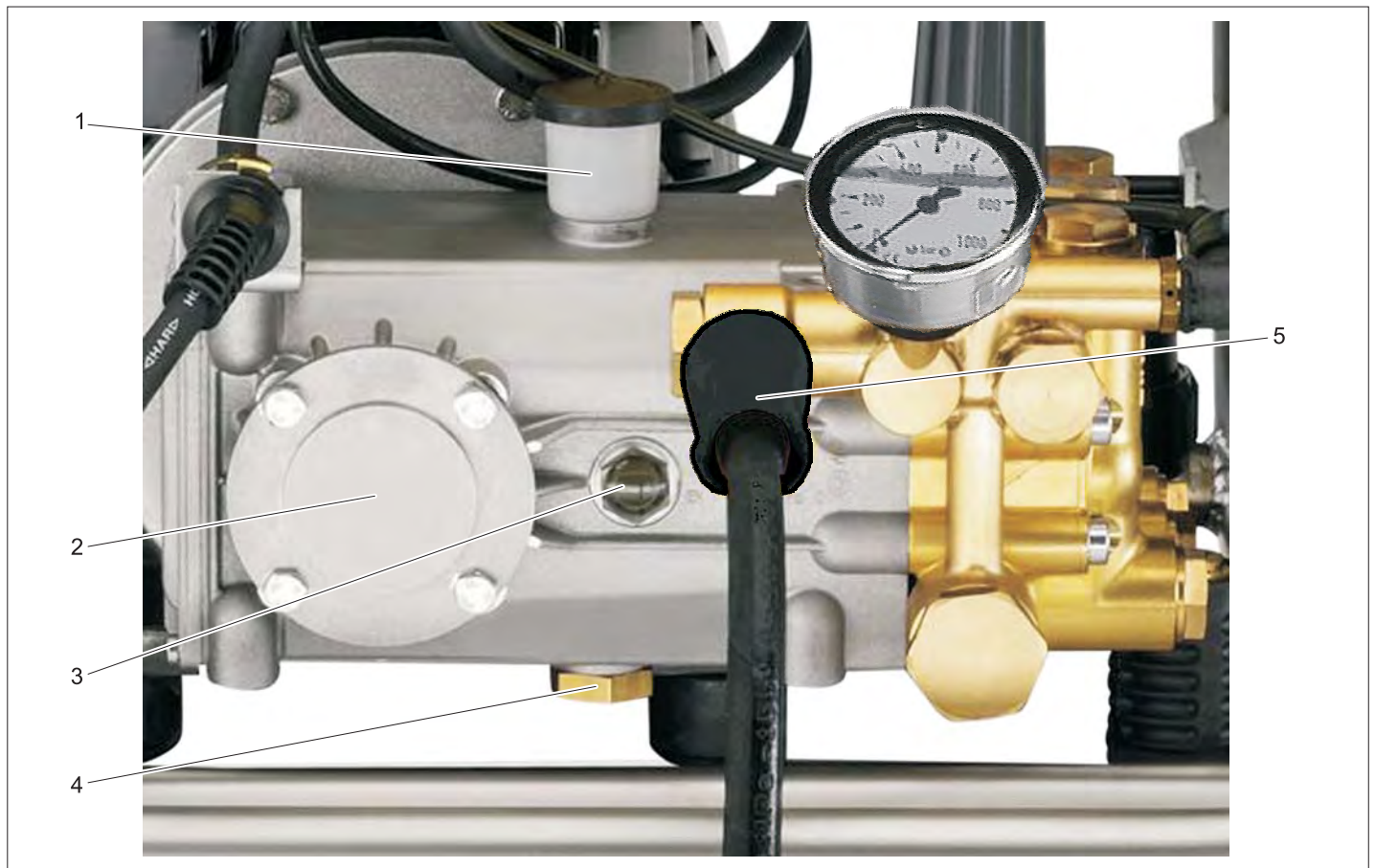
- Fill oil (SAE 90) into the oil fill neck while the appliance is in a horizontal position until the oil level reaches the upper edge of the oil level indicator.

4.6 Water connection with water fine filter



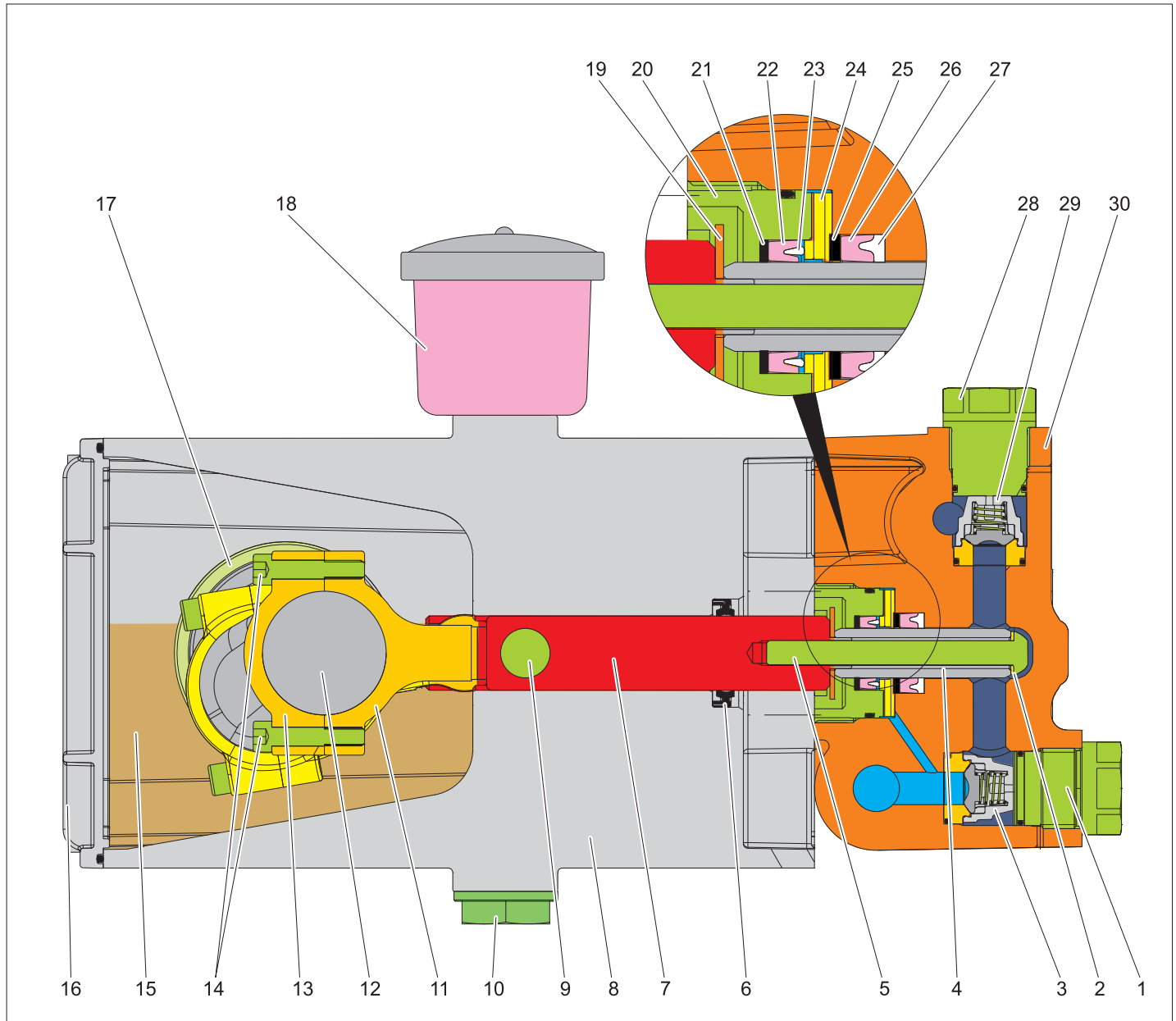
- 1 Fastening screw
- 2 Union joint
- 3 Filter pot
- 4 Water inlet with GEKA coupling
- 5 Filter inlay, 100 µm
- 6 Hose connection instead of the GEKA coupling

4.7 Pump



- 1 Oil filling nozzle
- 2 Crankshaft bearing cover
- 3 Oil level indicator
- 4 Oil drain screw
- 5 High pressure connection

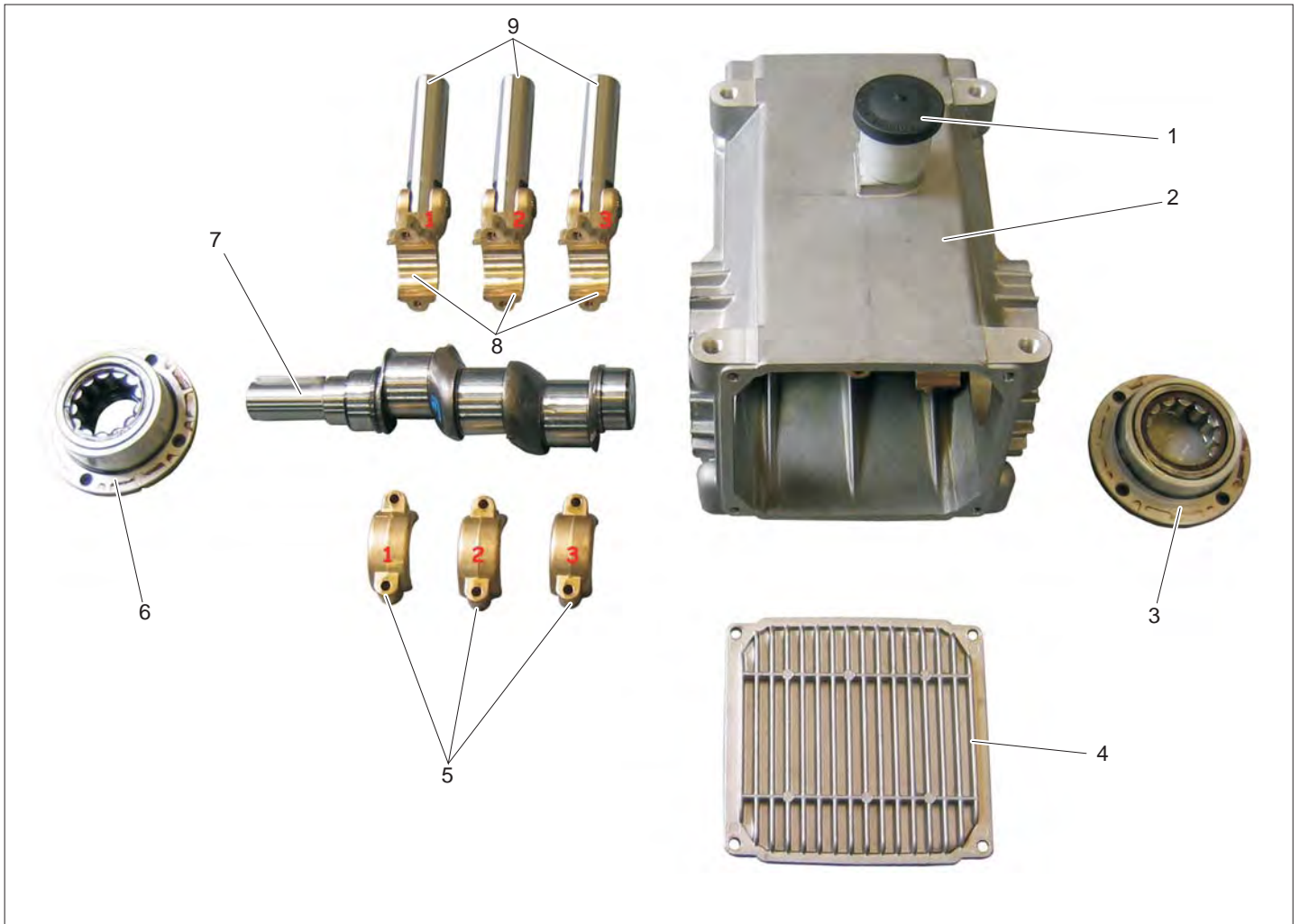
4.7.1 Pump diagram



- 1 Lock screw, suction side, with O-ring
- 2 Disc
- 3 Suction valve with O-ring
- 4 Ceramic piston
- 5 Piston screw
- 6 Oil seal ring
- 7 Push bar
- 8 Pump casing
- 9 Bolt, push bar
- 10 Oil drain screw
- 11 Piston rod top
- 12 Crankshaft
- 13 Piston rod bottom
- 14 Piston rod screw
- 15 Oil bath
- 16 Crankshaft housing cover, with O-ring
- 17 Crankshaft bearing (1 x left, 1 x right)
- 18 Oil filling nozzle
- 19 Distance-/labyrinth discs
- 20 Crown nut
- 21 Disc (back ring)
- 22 Low pressure seal
- 23 Support ring, low pressure seal

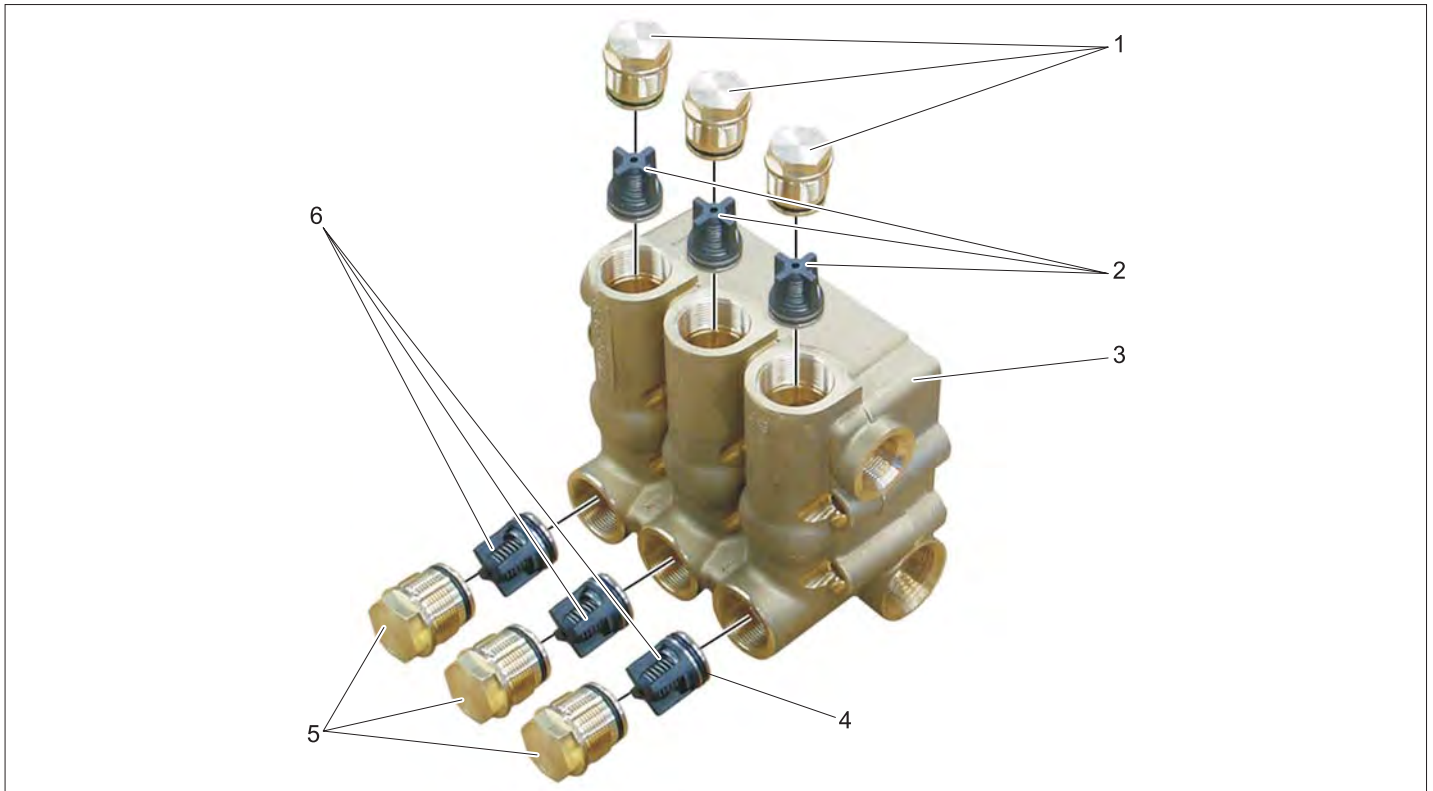
- 24 Support disc, brass
- 25 Disc (back ring)
- 26 High pressure seal
- 27 Support ring, high pressure seal
- 28 Lockscrew, pressure side, with O-ring
- 29 Pressure valve, with O-ring
- 30 Cylinder head

4.7.2 Crank drive disassembled



- 1 Oil filling nozzle
- 2 Pump casing
- 3 Crankshaft bearing cover with crankshaft bearing and O-ring
- 4 Crankshaft housing cover, with O-ring
- 5 Piston rod bottom, marked
- 6 Crankshaft bearing with flange, O-ring and shaft seal
- 7 Crankshaft
- 8 Piston rod top, marked
- 9 Push bar

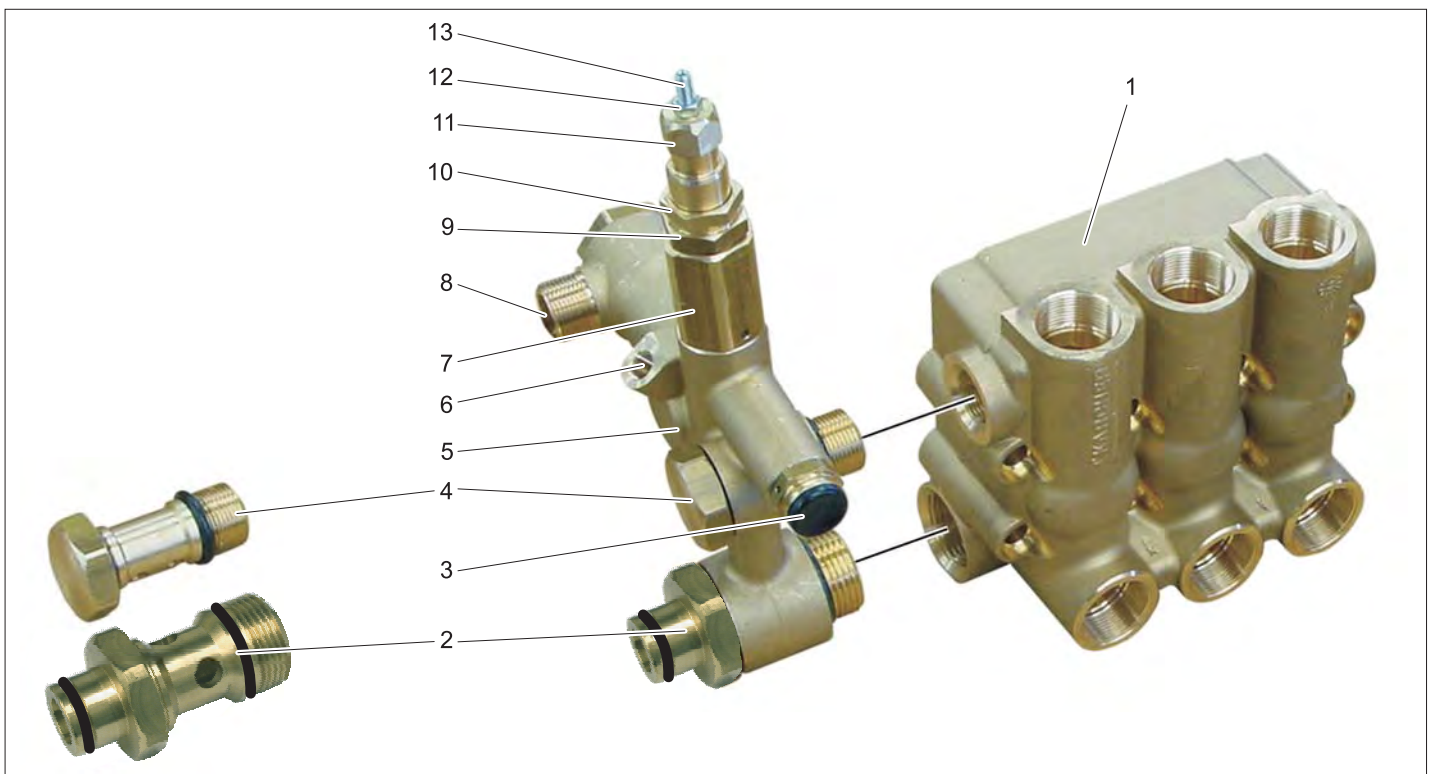
4.7.3 Cylinder head, high pressure valves and water inlet



- 1 Lockscrew, pressure side, with O-ring
- 2 Pressure valve, with O-ring
- 3 Cylinder head

- 4 O ring
- 5 Lock screw, suction side, with O-ring
- 6 Suction valve with O-ring

4.7.4 Cylinder head, overflow valve



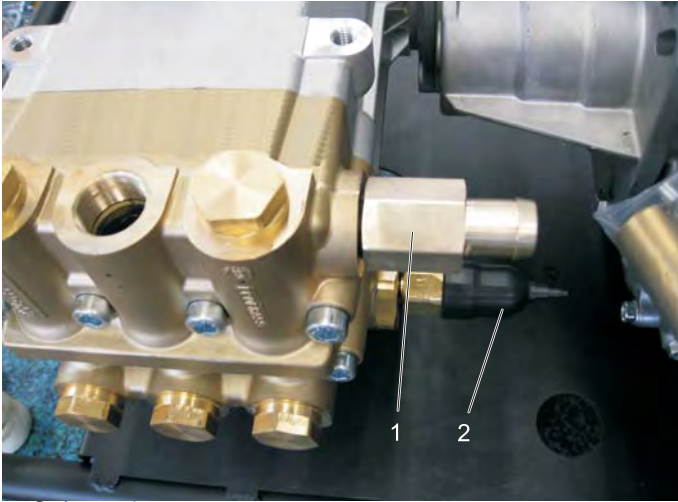
- 1 Cylinder head
- 2 Hollow screw, suction side, with 2 O-rings
- 3 Membrane seal, pressure switch
- 4 Hollow screw, pressure side, with 2 O-rings
- 5 Node piece
- 6 Manometer connection
- 7 Overflow valve housing
- 8 High pressure connection
- 9 Lock nut, adjustment screw, low pressure

- 10 Adjustment screw, low pressure
- 11 Spindle, pressure and quantity regulation
- 12 Lock nut, adjustment screw, high pressure
- 13 Adjustment screw, high pressure

Note

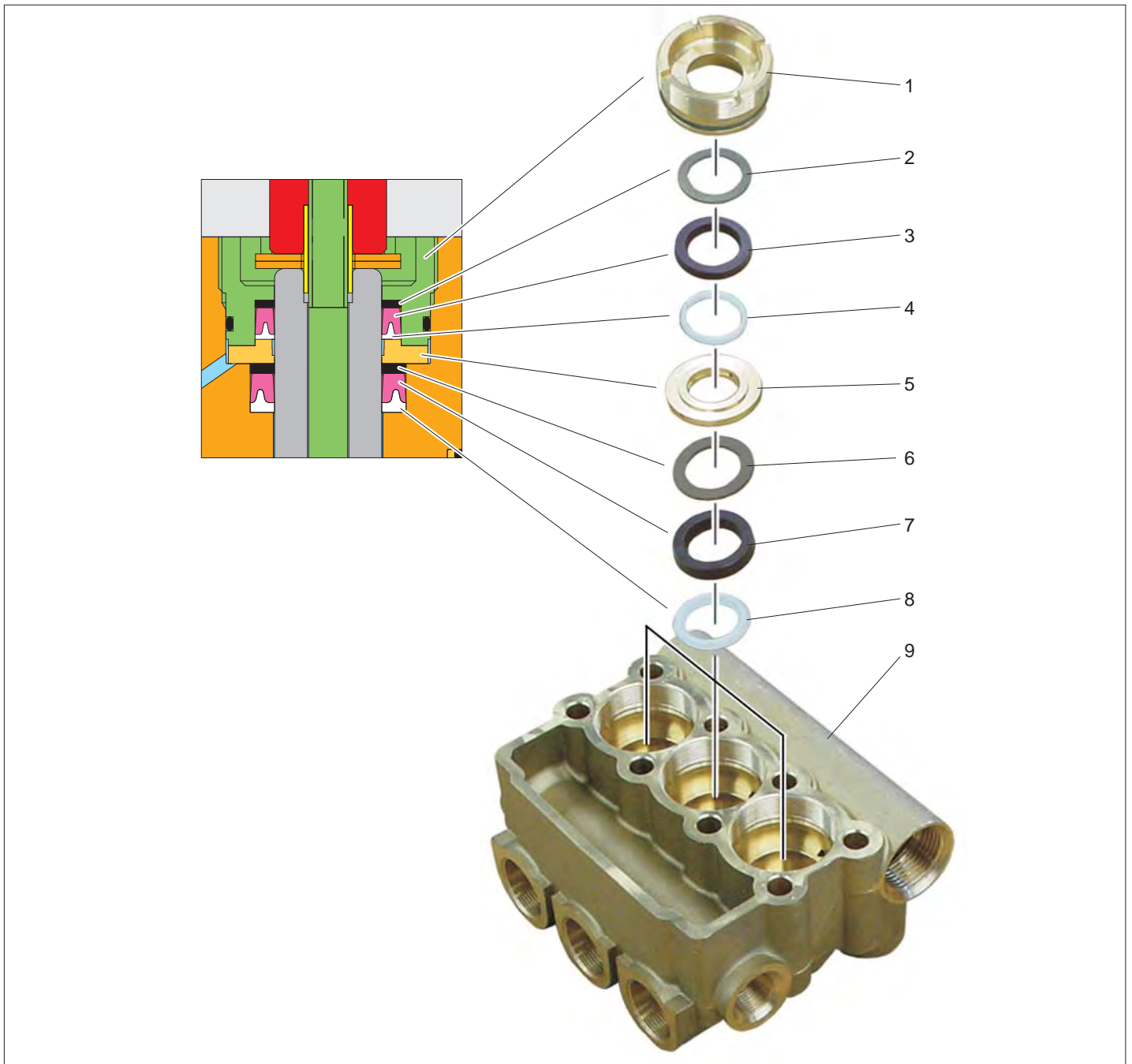
Both hollow screws must be loosened or tightened simultaneously while exchanging the knot section in order to avoid damage to the O-rings.
 Tightening torque, hollow screw, pressure side: 160 Nm
 Tightening torque, hollow screw, suction side: 40 Nm

4.7.5 Safety valve, dry run protection switch



- 1 Safety valve, preset
Opening pressure HD 13/35: 50 MPa (500bar)
Opening pressure HD 9/50: 64 MPa (640 bar)
No additional test necessary
- 2 Dry run protection switch, switch point 0.07 MPa (0.7 bar) nominal pressure

4.7.6 Cylinder head, piston seals



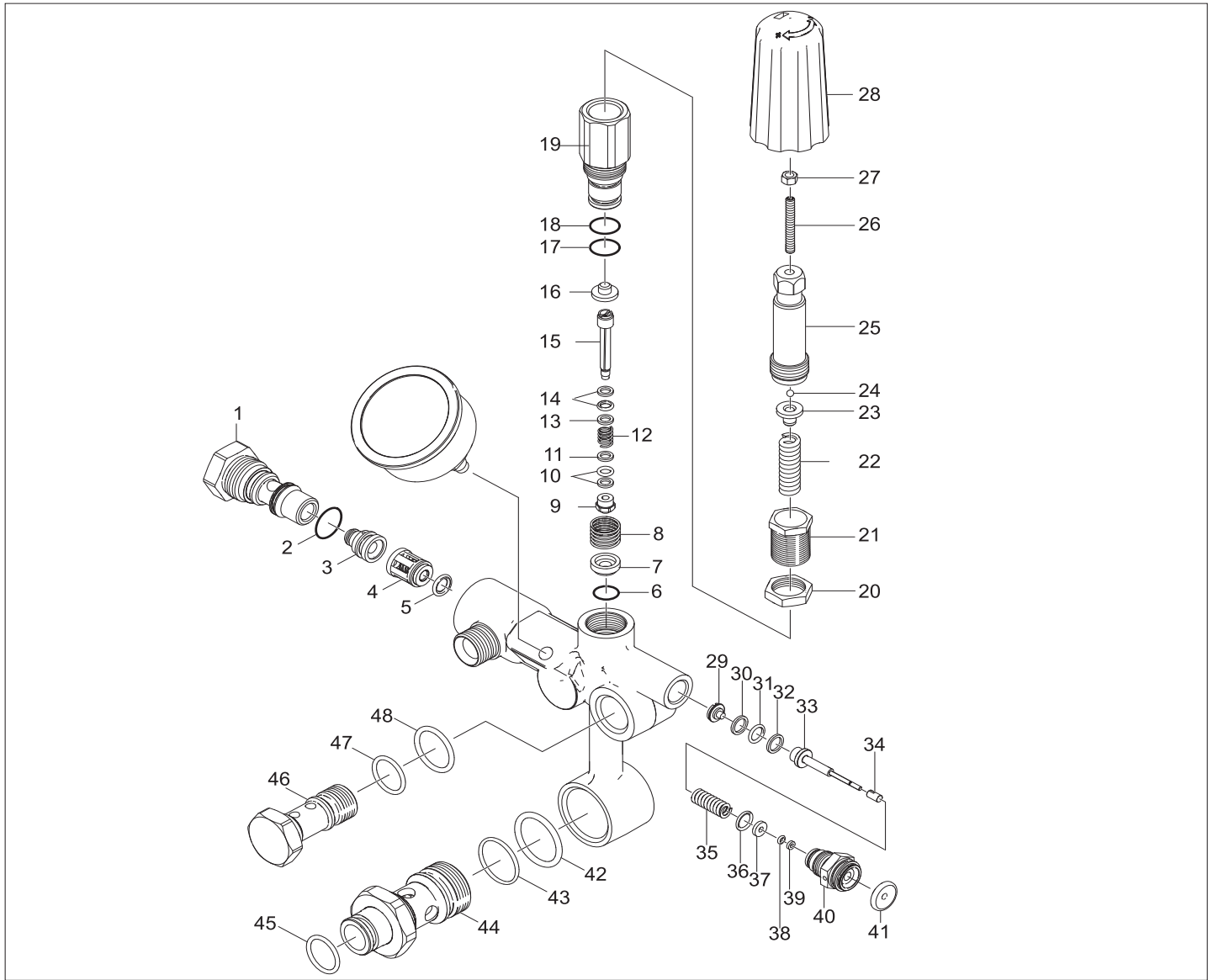
- 1 Crown nut
- 2 Disc (back ring)
- 3 Low pressure seal
- 4 Support ring, low pressure seal
- 5 Support disc, brass
- 6 Disc (back ring)
- 7 High pressure seal
- 8 Support ring, high pressure seal
- 9 Cylinder head

Note

Grease the low and high pressure seals generously with silicone grease 6.288-072.0 prior to installation.

4.8 Overflow valve

4.8.1 Overflow valve, explosion drawing



1 Screw socket

2 O ring

3 Injector

4 Valve

5 O ring

6 O ring

7 Valve seat

8 Spring

9 Valve bolt

10 O-ring set

11 Disc

12 Spring

13 Disc

14 O-ring set

15 Control piston

16 Spring plate, bottom

17 O ring

18 O ring

19 Overflow valve housing

20 Lock nut, adjustment screw, low pressure

21 Adjustment screw, low pressure

22 Spring

23 Spring plate, top

24 Sphere

25 Spindle of the pressure/quantity regulation

26 Adjustment screw, high pressure

27 Lock nut, adjustment screw, high pressure

28 Turning handle

29 Valve disks

30 O ring

31 O ring

32 O ring

33 Control piston, pressure switch *

34 Control piston, pressure switch *

35 Spring

36 O ring

37 Disc / guide

38 O ring

39 Support ring

40 Screw socket

41 Control piston, pressure switch *

42 O ring

43 O ring

44 Hollow screw, water inlet

45 O ring

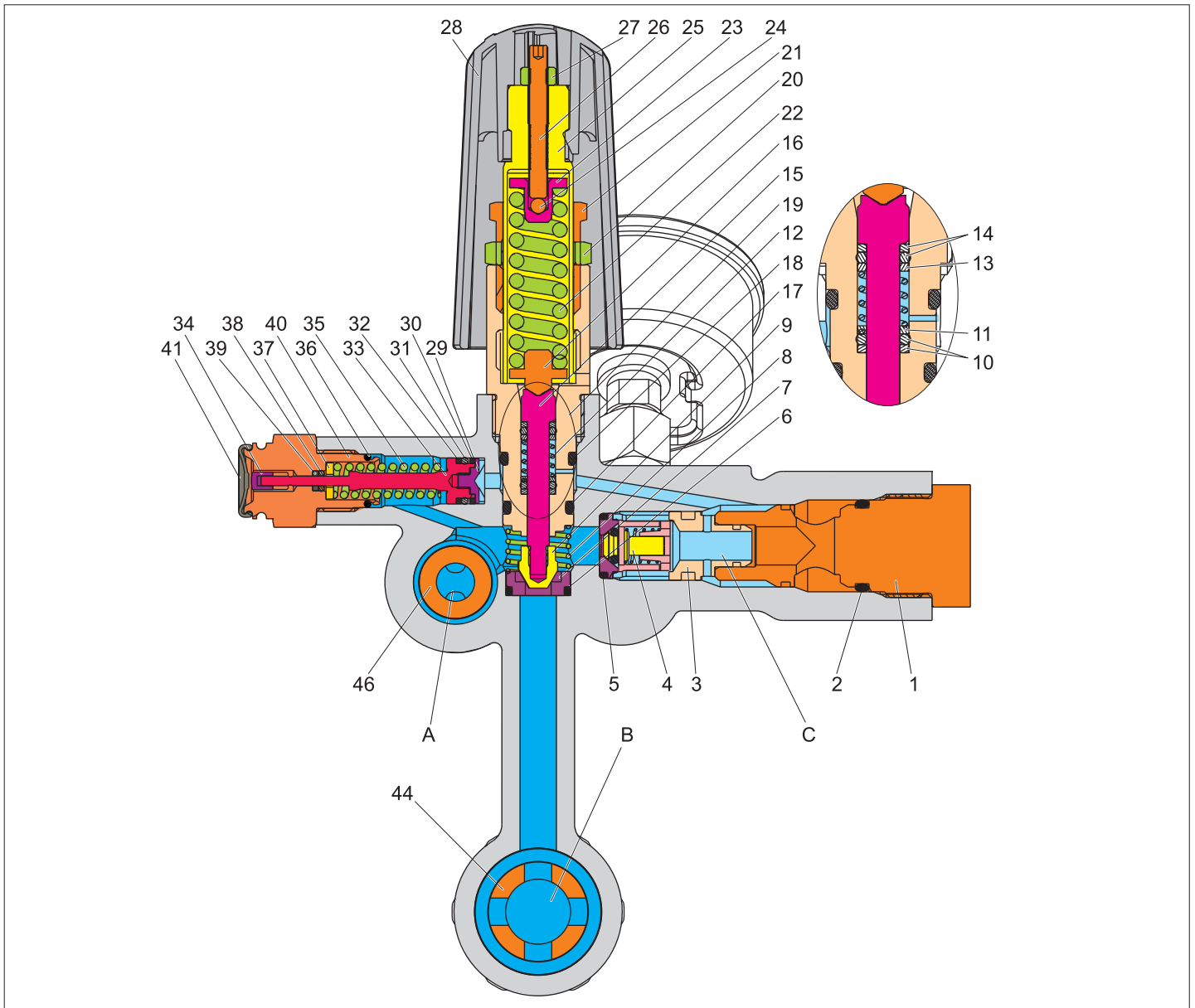
46 Hollow screw, pressure side

47 O ring

48 O ring

* HD 13/35-4 Cage and HD 9/50-4 Cage only

4.8.2 Overflow valve, cross section drawing



Positions 1 through 46 same as with "Overflow, exploded view".

Assembly instructions

First, insert the overflow casing (19), then insert the spring plate, bottom (16) with spring (12), disc (13) and O-ring kit (14).

- A High pressure
- B Return (low pressure, suction side)
- C High-pressure outlet

Function

If the pressure on the high pressure outlet increases, the control piston (15) is lifted up with the valve bolt (9) and the excess pressure escapes to the suction side of the high pressure pump.

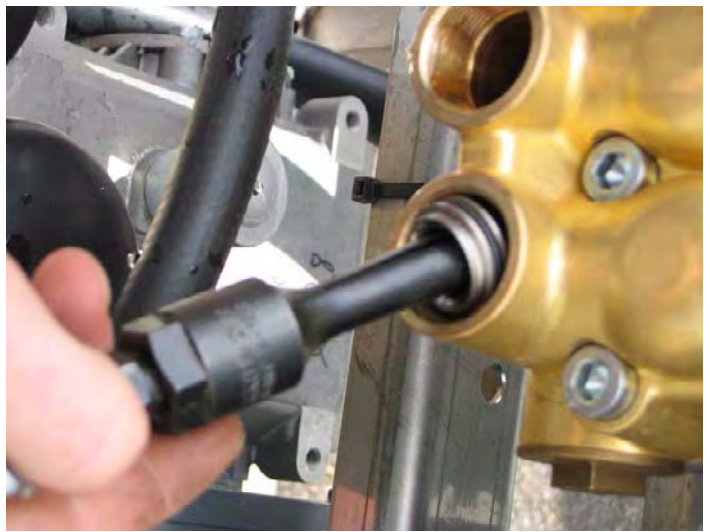
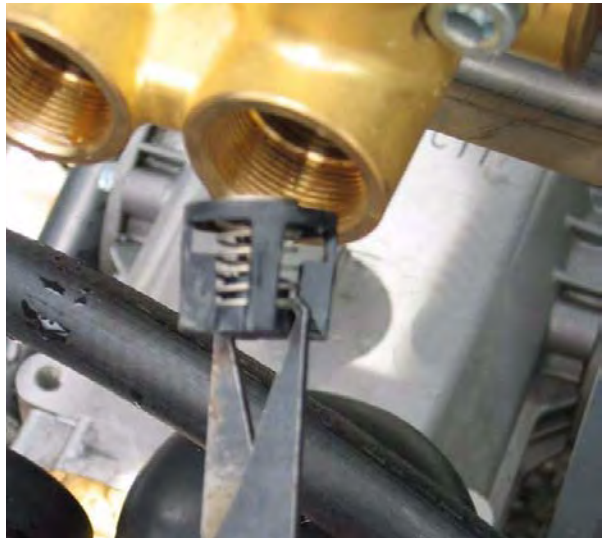
4.9 Seal high pressure pump

4.9.1 Replace the pressure and suction valves

- Turn off the appliance switch and secure against restart.
- Shut off water supply.
- Take the pressure off the high pressure system by opening the gun. Check the pressure ratio of the high pressure system on the pump manometer.

4.9.2 Replace the suction valves.

- Open the lockscrews of the 3 suction valves and replace the O-rings.



- Pull out the suction valves using special pliers (4.901-602.0). If the valve seat gets stuck in the pump head, you can pull it out using the drawing tool (6.815-013.0).



Suction/pressure valve setup

- Press in the new suction valves (lubricate the O-rings with silicon grease).



→ Insert the lock screws of the suction valves and tighten them to 40 Nm (grease O-rings).

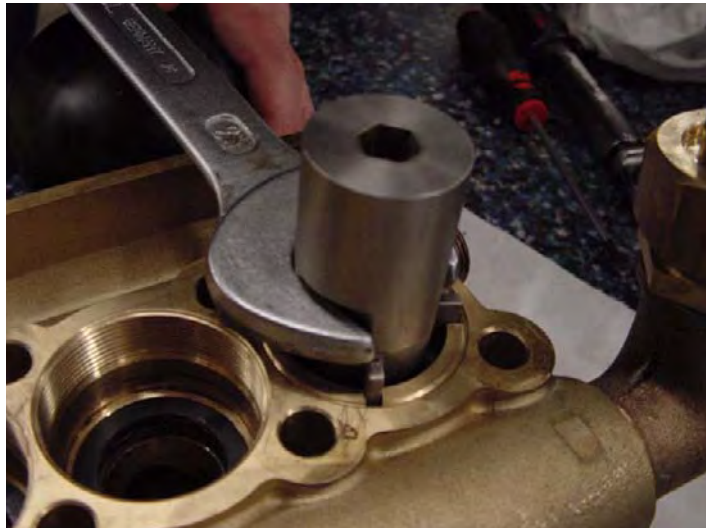


→ Press in the new pressure valves manually (grease the O-rings).

4.9.3 Replace pressure valves

→ Loosen the lock screws of the pressure valves. Pull the pressure valves out with the pliers 4.901-062.0. If the valve seat (a in Fig. 014) gets stuck in the pump head, you can pull it out using the interior driver (6.815-013.0) (see "Replacing suction valves").





4.9.4 Cylinder head, uninstall

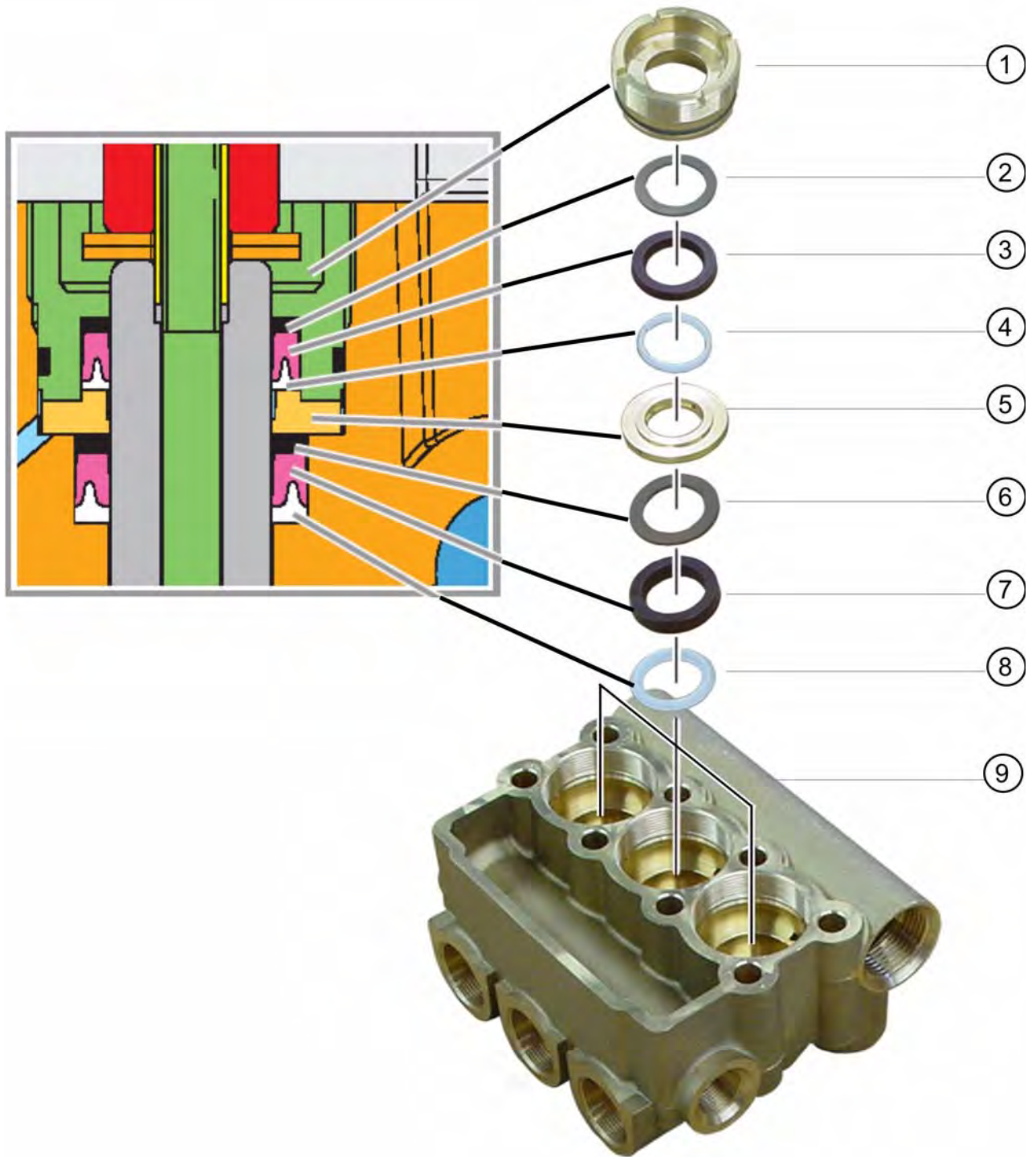
- Unscrew the overflow or slightly loosen the hollow screws that secure the overflow.
- Loosen the 8 screws from the pump head.



- Carefully pull out the cylinder head using both hands.



- Loosen the screw inserts of the stopper bushings using the special tool 5.511-001.0 and take out the washers using the pliers (4.901-062.0).



- 1 Crown nut
- 2 Disc
- 3 Low pressure seal
- 4 Support ring, low pressure seal
- 5 Brass support disc
- 6 Disc
- 7 High pressure seal
- 8 Support ring, high pressure seal
- 9 Cylinder head

→ Insert the new washers into the screw insert.



→ Tighten the stopping bushings using the special tool 5.511-001.0 to 50 Nm.

→ Assemble the cylinder head in the reverse sequence.



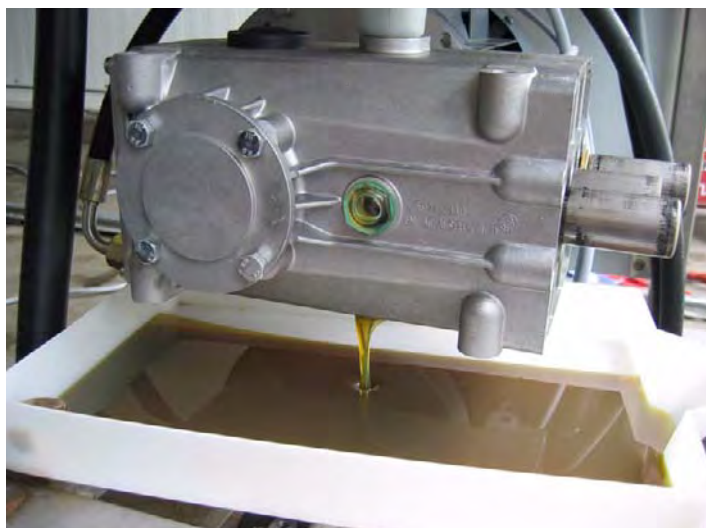
→ Insert and press in the new seal package into the cylinder head using the installation sleeve and the driver. Observe the sequence.



4.9.5 Replace the oil rings

Flange the crankshaft casing off the electric motor

→ Turn out the oil drain screw at the bottom of the pump casing and collect the oil in a suitable container.



- Loosen the 4 flange screws from the pump casing.
- Carefully remove the pump casing using the proper tools at the respective pockets.



- Remove the casing lid from the pump casing by opening the four screws.

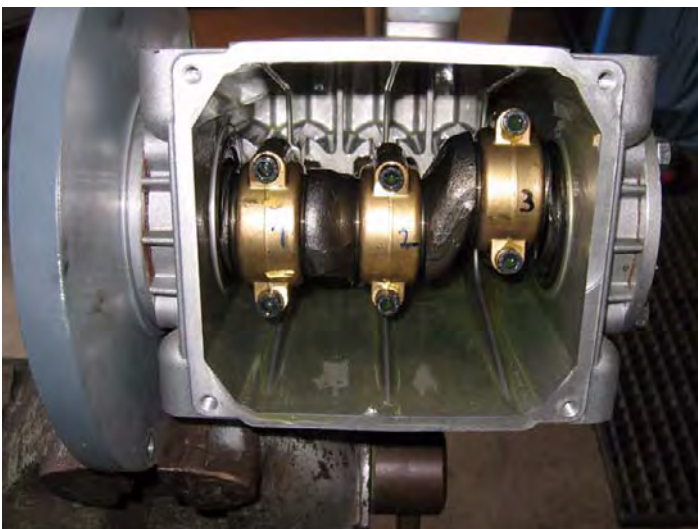
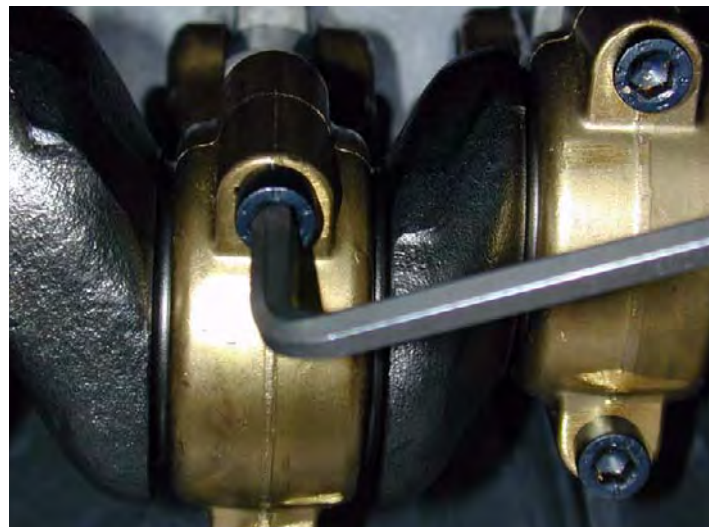


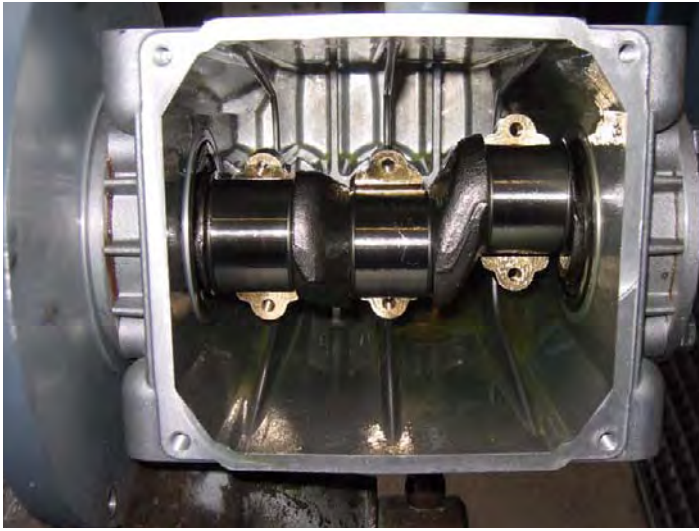
- Loosen the bearing shells of the piston rod and take out the bearing shells.

Note

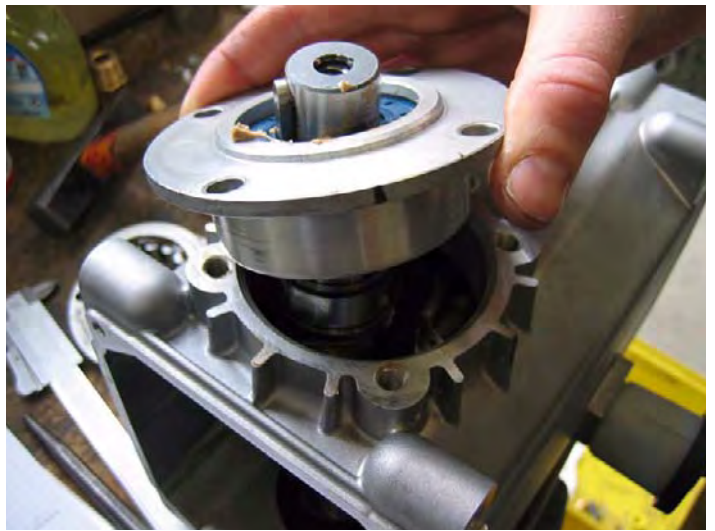
Every bearing cup must later be refastened to the same piston rod with the same alignment. Therefore, mark the components prior to removal.

- Mark the bearing shells with the piston rod so that they do not get interchanged during assembling.

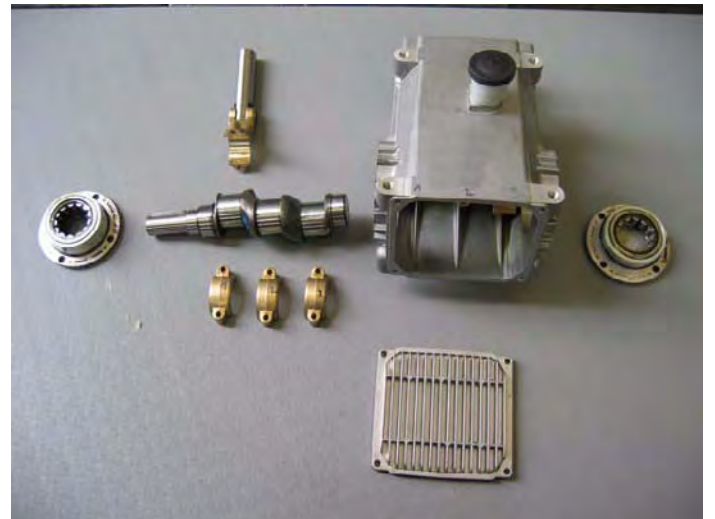




→ Dismantle both the flange bearings at the pump casing; to do that, first loosen the four screws at the flange. At the end, you can pull out the flange bearings. Tightening torque 20 Nm.

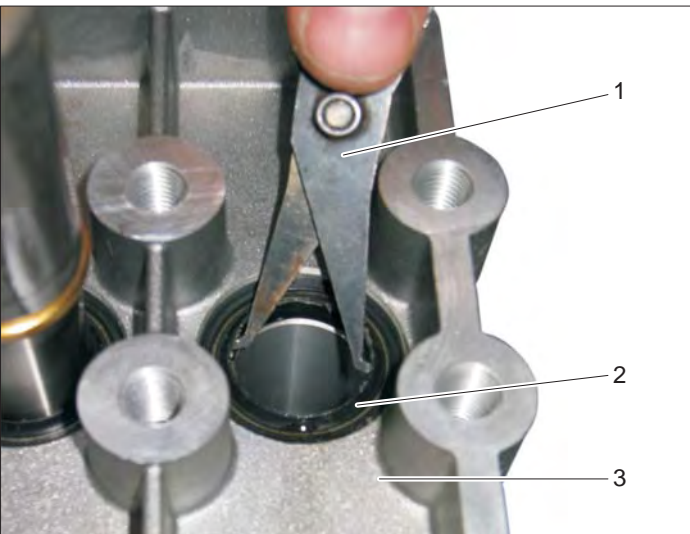


→ Press the piston rods backwards to the end-position and take out the crank shaft.



→ Unscrew the piston screws using an Allen wrench and pull out the piston rod from the rear.

- 19 shaft seal ring (order no. 6.367-032.0)
- 20 discs (order no. 5.116-095.0)
- 27 sleeves (order no. 5.111-035.0)
- 28 seal rings (order no. 7.362-029.0)
- 29 screws (order no. 7.306-244.0)



Removing the oil seal rings

- 1 Special pliers to remove the oil seal rings
- 2 Oil seal ring
- 3 Pump casing

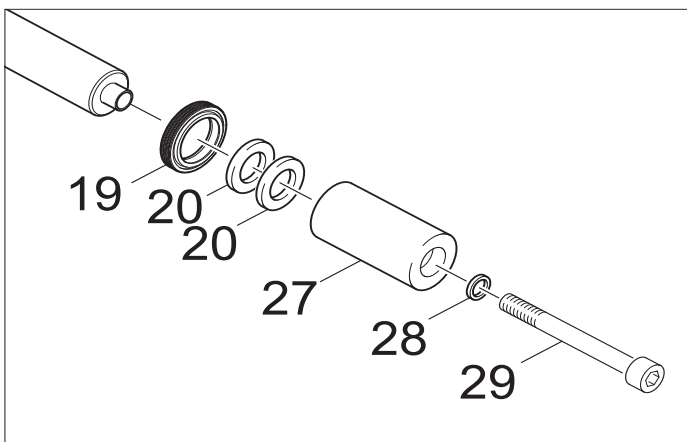
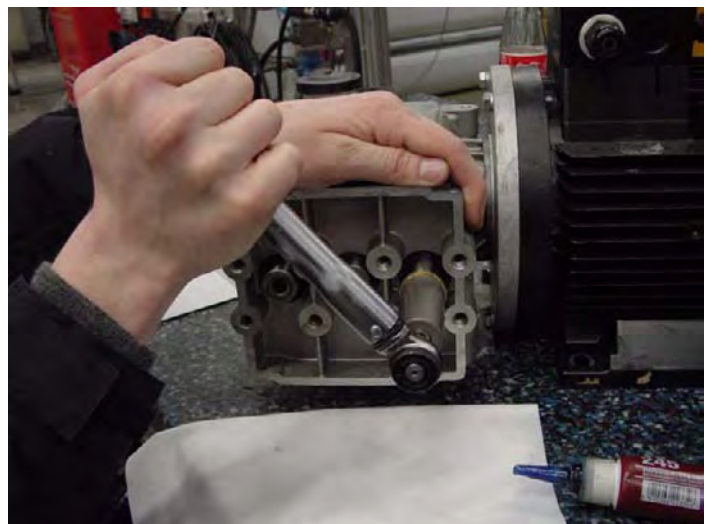
➔ Remove 3 oil seals from the pump housing with the special pliers.

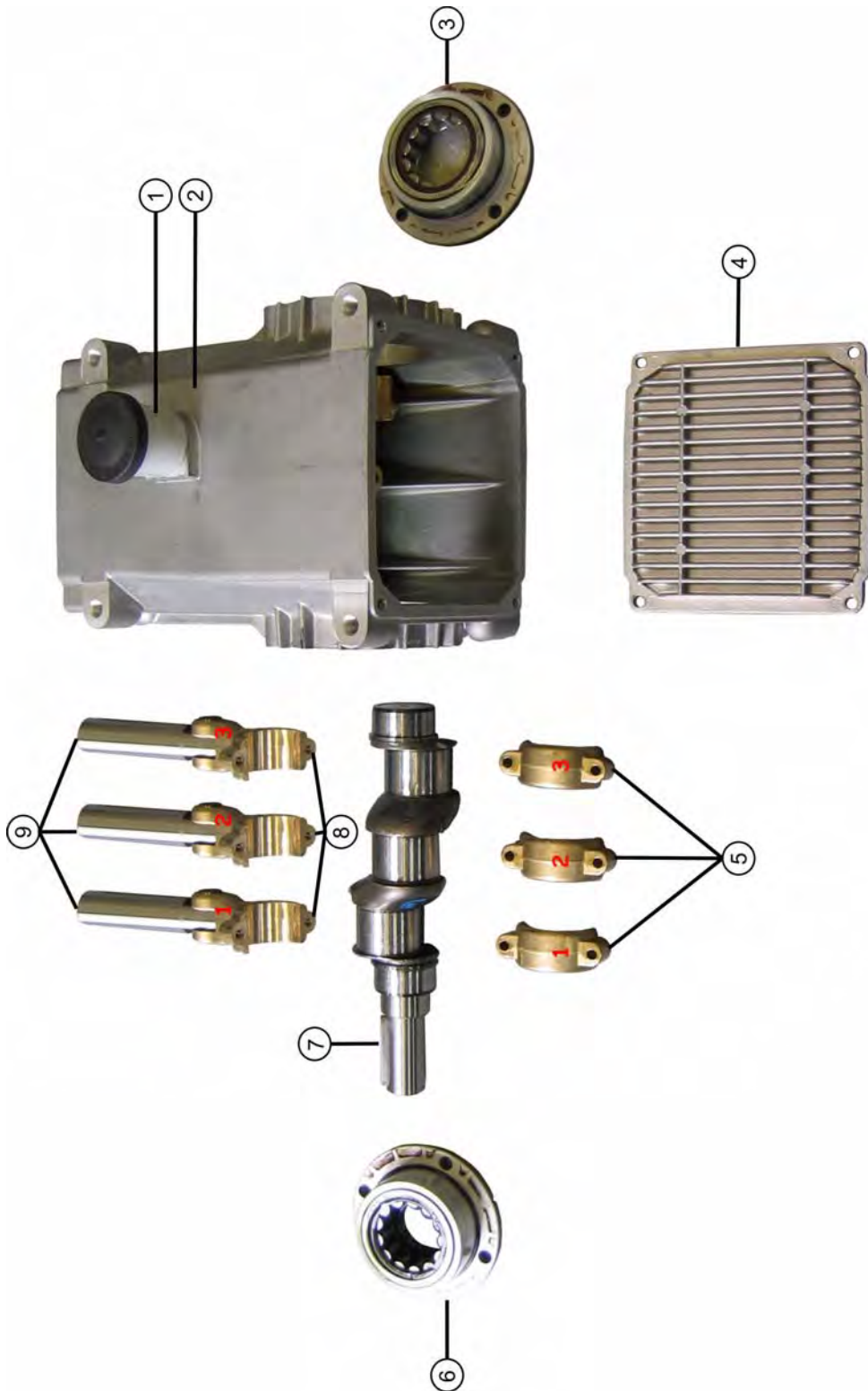
Note

Make sure that the boring is not damaged when the oil seal rings are removed.

4.9.6 Replace the piston

➔ After replacing the oil groove rings, push the piston rod back into the straight pushing guide and screw on the pistons (tightening torque: HD 9/50, 20 Nm, HD 13/35 8...9 Nm). Clean the threads before screwing, apply screw securing adhesive (soluble) to the threading of the piston.





- 1 Oil fill container
- 2 Pump casing
- 3 Crankshaft bearing cover with crankshaft bearing and O-ring
- 4 Crankshaft housing cover with O-ring
- 5 Piston rod bottom parts, marked
- 6 Crankshaft bearing with flange, O-ring and shaft seal
- 7 Crankshaft
- 8 Piston rod top parts, marked
- 9 Push bar

- Now, the crankshaft can be put back in. Fixate it with flange bearings. Then screw the bearing cups into the piston rod Nm = 8...9.



- Assemble back the parts in the reverse sequence.
- Fill in SAE 90 oil (part no. 6.288-061.0) to the sight glass (approx. 1l).



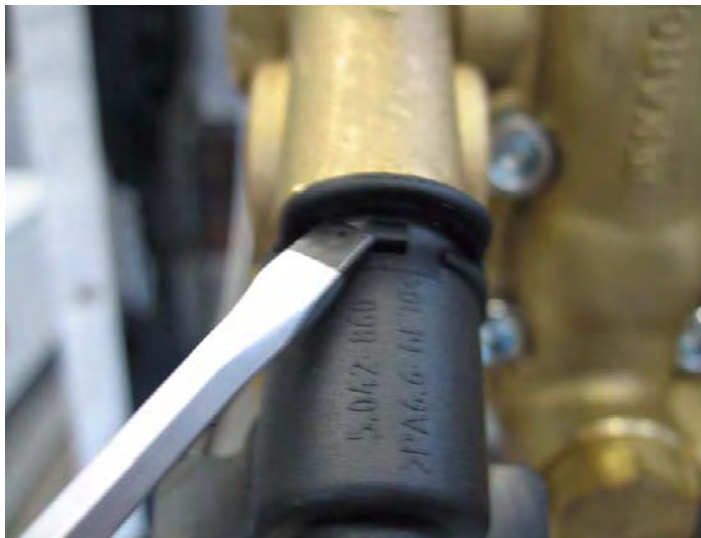
4.10 Pump maintenance

4.10.1 Replace the overflow valve

- Remove the holding bow on the pressure switch (HD 9/50-4 Cage and HD 13/35-4 Cage only).

Note

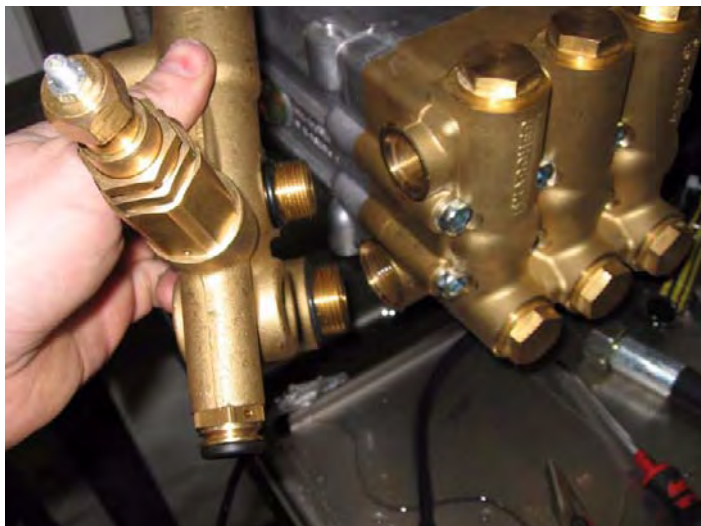
For this, push out the support bow using a screw-driver.



- Pull the pressure switch off the overflow.



- Loosen the hollow screws on the overflow valve evenly and remove the overflow valves.



Note

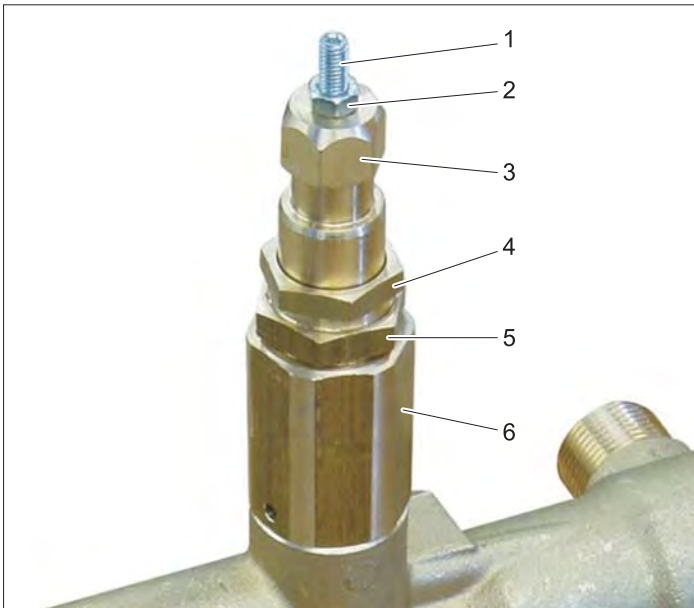
The hollow screws must be loosened or tightened simultaneously to avoid damage to the O-rings when the overflow valve is replaced.

Tightening torque, hollow screw, pressure side: 160 Nm

Tightening torque, hollow screw, suction side: 40 Nm

5 Basic settings and service procedures

5.1 Setting the maximum working pressure



- 1 Adjustment screw, high pressure
- 2 Lock nut, adjustment screw, high pressure
- 3 Spindle of the pressure/quantity regulation
- 4 Adjustment screw, low pressure
- 5 Lock nut, adjustment screw, low pressure
- 6 Housing of the overflow valve

- Fasten the test manometer to the high-pressure connection ($P_{max} = 100 \text{ MPa}$).
- Connect the high-pressure hose with the hand spray gun and the spray lance to the test manometer.
- Turn in the rotary handle of the pressure/quantity regulation until it stops (max. working pressure).
- Pull off the rotary handle.
- Fastening the test nozzle:
 - HD 9/50, 400 l/h at 40 MPa (400 bar)
 - HD 13/35, 300 l/h at 58 MPa (580 bar)

⚠ Warning

Strong heating up.

- Turning on the appliance.
- Press the lever on the hand spray gun.
- Loosen the locknut for high pressure.
- Turn the adjustment screw high pressure so that the pressure display on the test manometer equals the maximum working pressure in the Chapter "Specifications".

Note

Turn in clock-wise direction to increase the working pressure.

Turn in counterclockwise direction to decrease the working pressure.

- Secure the adjustment screw for high pressure by tightening the locknut.
- Install a new high pressure nozzle and check whether the working pressure is reached.
- Check the feed volume and switch points of the pressure switch.
- Seal the adjustment screw for high pressure and the lock nut with locking paint.

5.2 Setting the minimum working pressure

- Fasten the test manometer to the high-pressure connection.
- Connect the high-pressure hose with the hand spray gun and the spray lance to the test manometer.
- Install the new high pressure nozzle.
- Turning on the appliance.
- Press the lever on the hand spray gun.
- Turn in the rotary handle of the pressure/quantity regulation counter-clockwise until it stops (min. working pressure).
- Pull off the rotary handle.
- Loosen the locknut for low pressure.
- Turn the adjustment screw low pressure and the spindle for pressure/quantity regulation at the same time, so that the pressure display on the test manometer equals the minimum working pressure in the Chapter "Specifications".

Note

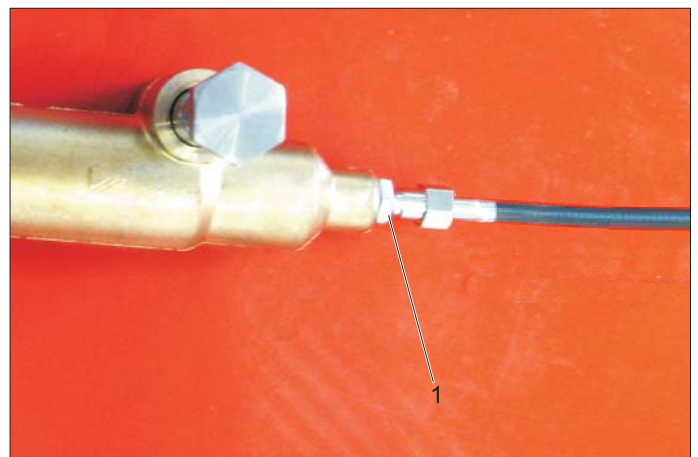
Turn in clock-wise direction to increase the working pressure.

Turn in counterclockwise direction to decrease the working pressure.

- Secure the adjustment screw for low pressure by tightening the locknut.
- Check the feed volume and switch points of the pressure switch.
- Seal the adjustment screw for low pressure and the lock nut with locking paint.

5.3 Adjusting the full load speed (PE model only)

- Fit the spray lance with the new nozzle.
- Start the engine
- Press the lever on the hand spray gun.
- Loosen locknut on the speed adjustment.
- Adjust the operating speed (see "Specifications") on the set screw for the motor speed.



- 1 Locknut on the speed adjustment

- Tighten the locknut of the speed adjustment.

6 Troubleshooting



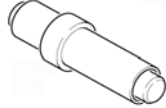

Fault	Remedy
Appliance is not running; indicator lamp links green	Operational readiness period (30 minutes) has expired. Switch on/off the appliance again.
	Self shut-off after 30 minutes; switch on/off the appliance again.
Unit does not work	Check/replace supply voltage, connecting cables and power fuse.
	Check the fuse (F1).
	Check appliance switch (continuity test), replace if required.
	Check pressure switch; replace it, if required.
	Check the control transformer/replace the fuse
	Check/replace the temperature fuse
	Check/replace control board and soft start
	Check/replace contactor (K1)
Phase failure protection or winding protection switch have been triggered	Switch off appliance and let it cool down. Remove the cause of the problem. Turn on the appliance again.
Device is not building up pressure	Check/raise the water input amount.
	Check/clean/replace the water fine filter.
	Appliance ventilation:
	Check/replace high-pressure nozzle.
	Check/replace the pressure and suction valves
	Check/adjust/replace overflow valve.
Appliance continuously turns on and off while hand spray gun is closed	Check hand spray gun for leaks and replace if necessary.
	Check the O-rings on the high pressure hose for leaks, replace if necessary.
	Check the pressure holding valve for leaks/replace the O-rings.
	Check/adjust/replace overflow valve.
	Check/replace the pressure switch and control piston.
	Check/replace electronics.
The appliance does not switch off after the switch off delay when the gun is closed	Check/adjust/replace overflow valve.
	Check the pressure holding valve for leaks/replace the O-rings.
	Check/replace the pressure switch and control piston.
	Check/replace electronics.
Water escapes between the cylinder head and the pump housing	3 drops/minute are allowed.
	Check/replace high pressure and low pressure seals.

Fault	Remedy
Oil escapes between the cylinder head and the pump housing	Replace the oil seals.
Pump is vibrating	Appliance ventilation:
	Check pump for leaks. Fix the leaks.

7 Technical specifications

Type		HD 13/35-4 1.367-150.0	HD 9/50-4 1.367-151.0	HD 13/35 Pe 1.367-500.0	HD 9/50 Pe 1.367-501.0
Power connection					
Voltage	V	400			
Current type	Hz	3~50			
Connection output	kW	15			
Mains fuse (slow-blow)	A	25			
Maximum allowed net impedance	Ohm	(0.075+j0.075)			
		-		Petrol motor Honda GX 670, 2 cylinder, 4-stroke	
Maximum torque at 3600 rpm	kW/HP	17/24			
Operating speed	1/min	3600			
Fuel tank	l	15			
Fuel		Petrol, unleaded			
Battery	V/Ah	12/45			
Water connection					
Max. feed pressure	MPa (bar)	1 (10)			
Max. feed temperature	°C	60			
Min. feed volume	l/min (l/h)	25 (1500)			
Inlet hose diameter (min.)	Inch	1			
Suck height from open container (20 °C)	m	1			
Performance data					
Working pressure	MPa (bar)	10...35 (100...350)	15...50 (150...500)	10...35 (100...350)	15...50 (150...500)
Max. permissible pressure	MPa (bar)	50 (500)	64 (640)	50 (500)	64 (640)
Water flow rate	l/min (l/h)	500...1300 (8,3...21)	500...900 (8,3...15)	500...1300 (8,3...21)	500...900 (8,3...15)
Nozzle size	--	15049	15030	15046	15028
Recoil force of trigger gun	N	93	79	93	79
Noise emission					
Sound pressure level (EN 60704-1)	dB(A)	78		91	
Guaranteed sound power level (2000/14/EC)	dB(A)	95		107	
Machine vibrations					
		Vibration total value (ISO 5349)			
Hand spraygun	m/s ²	0,87			
Spray lance	m/s ²	1,8			
Fuel					
Oil quantity - pump	l	1,2			
Oil type - pipe	SAE 90	Order no. 6.288-050.0			
Oil quantity - intermediate gear	l	-		0,3	
Oil grade of intermediate gear		-		SAE 90	
Dimensions and weights					
Length	mm	1025			
Width	mm	780			
Height	mm	1110			
Weight without accessories	kg	190		130	
Documents					
Circuit diagram:		0.089-091.0		-	
operating instructions		5.962-849.0		5.962-848.0	
Spare parts list		5.970-907.0		5.970-908.0	

7.1 Special tools

Pliers		4.901-062.0
Drawing tool		6.815-013.0
Drive mandrel		6.815-229.0
Insertion tool		6.815-209.0
Installation mandrel, shaft seal ring		6.815-223.0
Installation sleeve		6.815-228.0

7.2 Tightening torques

Hollow screw, pressure side	160 Nm
Hollow screw, suction side	40 Nm
Crown nut	50 Nm
Valve screws	
Cylinder head screws	40 Nm
Piston screws, HD 13/35	20 Nm
Piston screws, HD 9/50	9 Nm
Oil drain screw	40 Nm
Crankshaft bearing cover screws	18..0.22 Nm
Oil pan cover	5 Nm
Piston rod screws	8..0.9 Nm

8 Circuit diagram

See next pages.

Note: Please use the circuit diagram that is valid for the actual version of the unit.