

# Service Handbook



# HD 1050

**Foreword**

Indispensable prerequisites for the competent execution of service procedures are comprehensive, real-life training workshops for technical personnel, supported by clearly designed documentation.

To meet these requirements, we provide all service technicians with regular courses dedicated to basic training, and advanced workshops across our entire product range.

In addition, the service manuals developed for major Kärcher products are specifically designed to be used as operating manuals during initial product familiarization, and to serve as reference works thereafter.

All of the referred measures are augmented by regularly scheduled releases of service information containing pertinent details about continuing product development and improvement.

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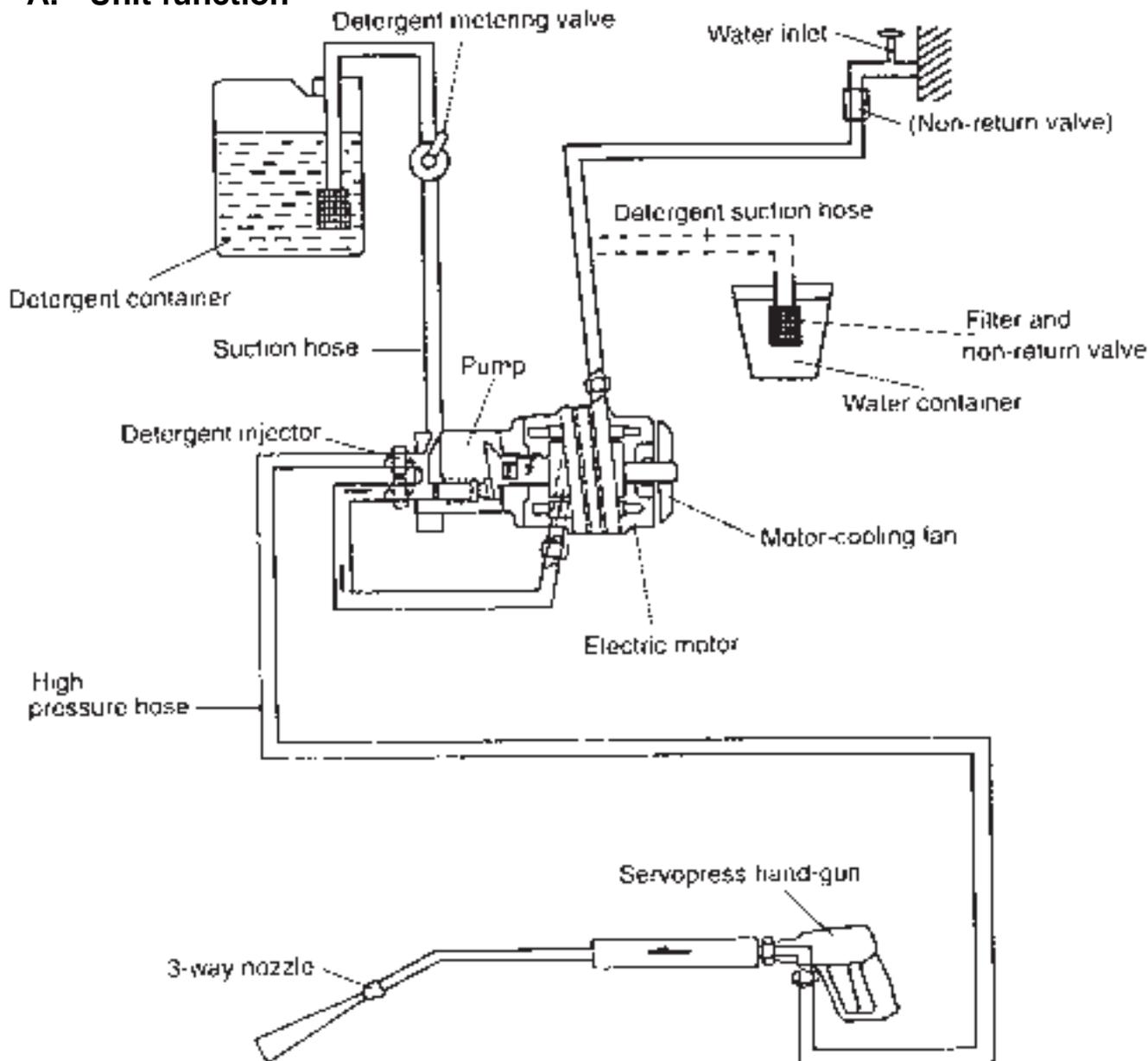
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The Kärcher HD1050 high pressure cleaner has many features in common with the model Kärcher HD 1000 SEI and so this handbook will prove most helpful when working with this cleaner also.

## A. Unit function



### 1. Operation with mains water feed

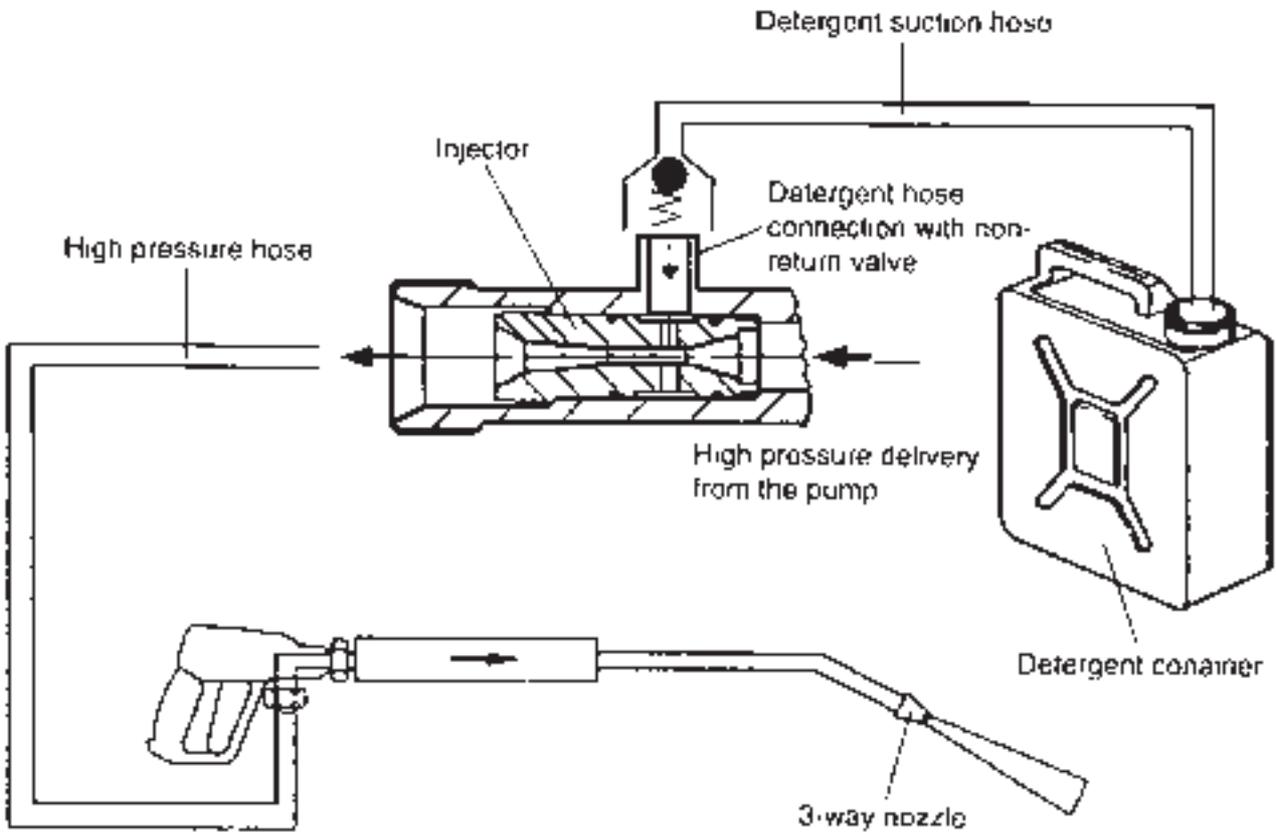
The water from the mains connection flows through the non-return valve to the pump and, when the motor is switched on, the pump delivers the water under high pressure through the high pressure hose and hand gun to the 3-way nozzle.

### 2. Operation with suction feed

When the motor is switched on, the pump draws water from the water tank or container through the filter and non-return valve and delivers it at high pressure through the high-pressure hose and hand gun to the 3-way nozzle.

### 3. Operation with detergent

When the 3-way nozzle is switched to fan jet, detergent is drawn by the injector through the detergent suction hose and is mixed with the water delivered by the pump. On the HD 1050 cleaner, the amount of detergent fed can be steplessly adjusted by means of metering valve.



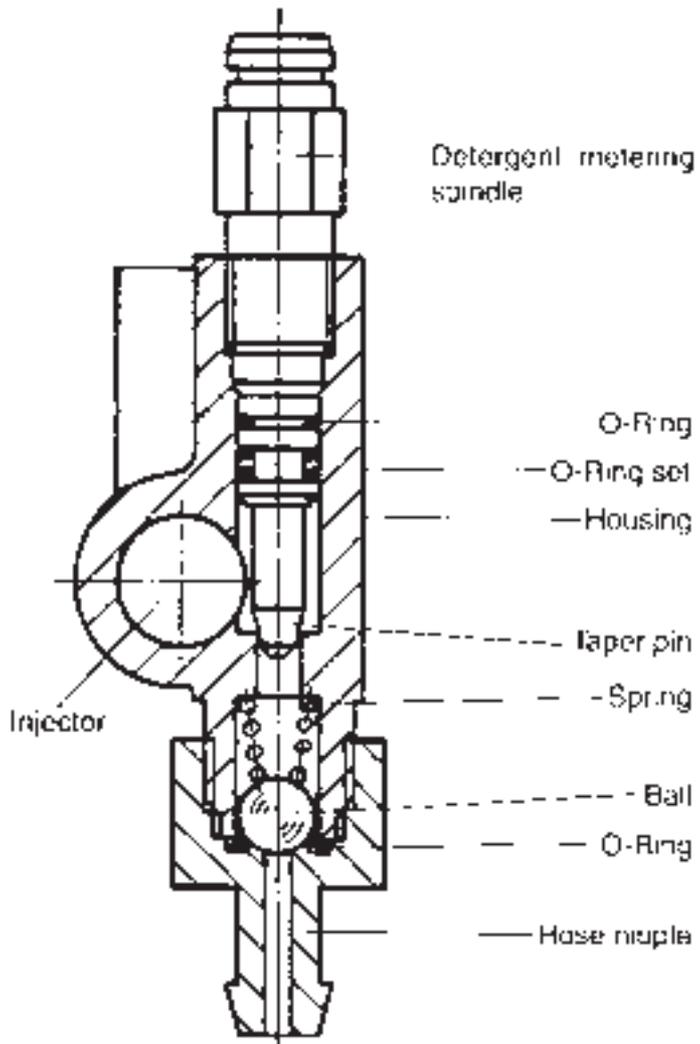
**4. High-pressure cleaning without detergent**

The water is pumped through the injector to the 3-way nozzle. The pressure at which the water leaves the nozzle depends on the size of nozzle bore, the larger the bore, the lower the pressure and vice-versa.

**5. Low-pressure cleaning with detergent**

With the 3-way nozzle switched to low-pressure (large nozzle bore), the water passes at high speed through the injector and this results in a reduction in pressure (vacuum) at the detergent hose connection. Such a vacuum is only generated if the bore of the nozzle is larger than the bore of the injector.

The vacuum thus generated causes detergent to be drawn through the detergent non-return valve and detergent metering valve, to be mixed with the water delivered by the pump.

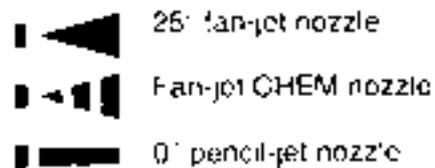


**7. Nozzle setting**

At standard working pressure (3-way nozzle set to 0° pencil jet) no detergent is drawn in.

At standard working pressure (3-way nozzle set to 25° fan jet) no detergent is drawn in.

Detergent is only drawn in when working at low pressure (3-way nozzle to fan-jet CHEM).



**6. Detergent metering valve**

The knob is pressed onto the detergent metering valve.

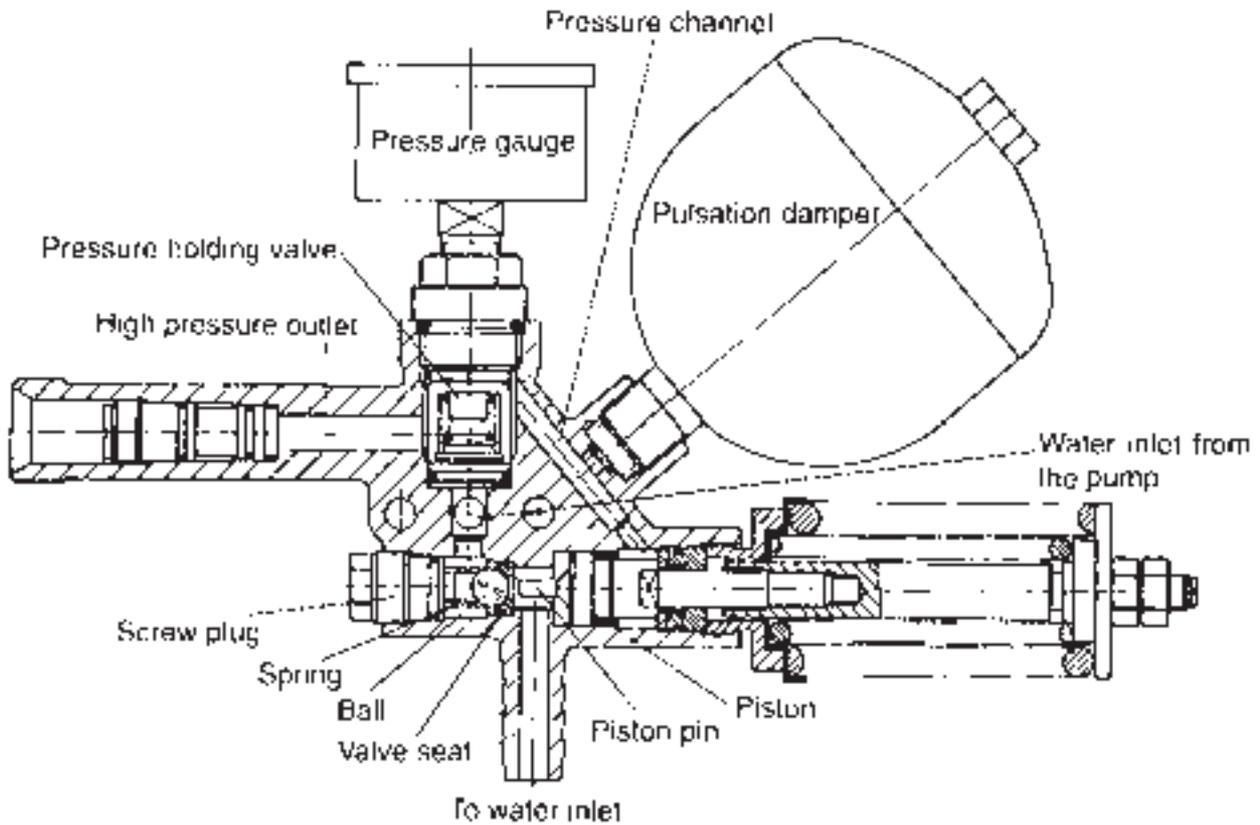
Turning the knob counter-clockwise moves the tapered metering spindle out of the bore.

If the detergent metering spindle is turned counter-clockwise as far as it will go, then a larger quantity of detergent will be drawn in.

If the detergent metering spindle is turned clockwise as far as it will go, the “O” position is reached and no detergent should be drawn in.

**8. Switching the 3-way nozzle**

On the Kärcher HD 1050 cleaner, the nozzle is set by turning the spray lance and or by turning the nozzle garde.



**9. Function with Servopress hand gun fully open**

Adjustment of the flow and pressure is effected bei setting the Servopress hand gun.

Relief valve closed

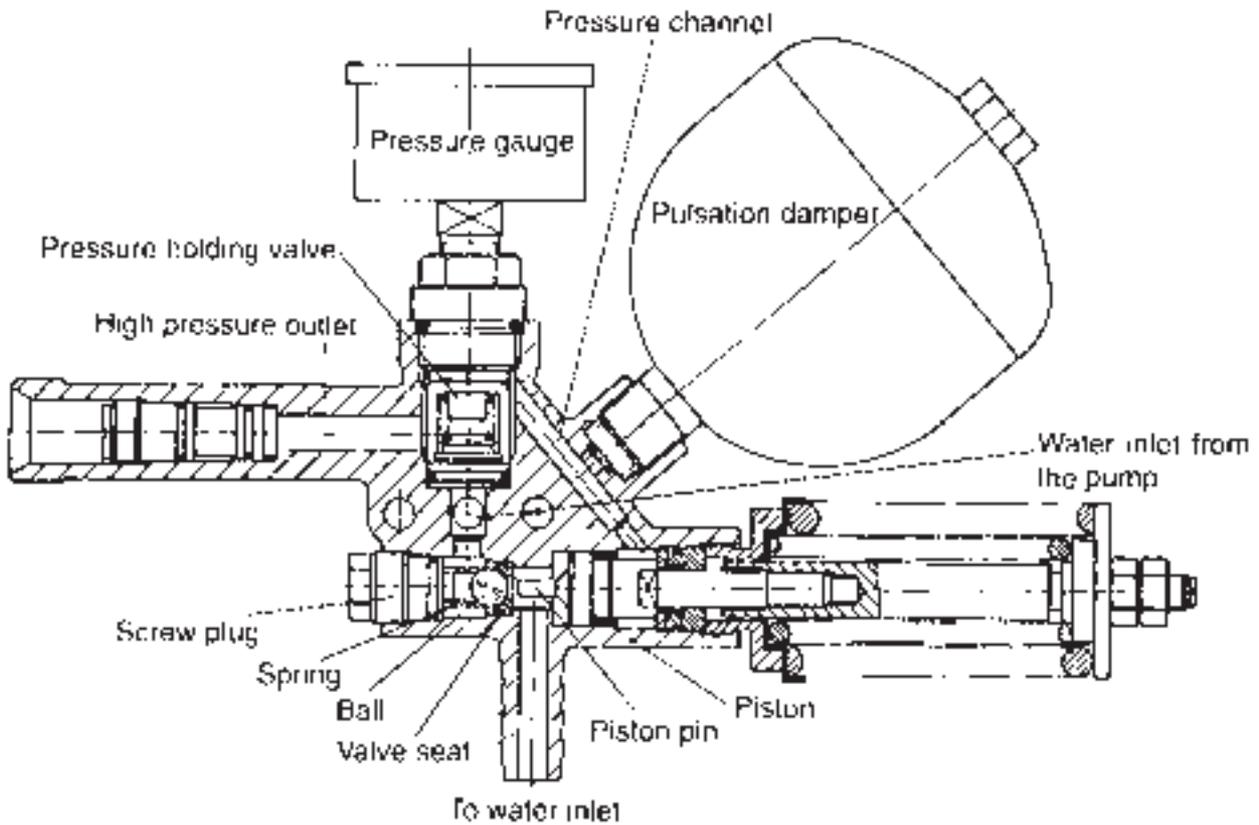
With the Servopress hand gun fully open, the full delivery of the pump is fed at standard working pressure by way of the high-pressure outlet to the spray lance.

**10. Function with Servopress hand gun partly closed**

Relief valve partialy opened.

Partial circulation operation. If the Servopress hand gun is partialy closed, the pressure generated by the pump and the pressure in the pressure channel increases. The piston with piston pin then partialy opens the sealing surface between the ball and valve seat.

This causes part of the flow from the pump to be fed back to the suction side and so the pressure at the nozzle of the spray lance is reduced.



**11. Function with Servopress hand gun fully closed**

Relief valve fully opened.

Complete circulation pressure. When the Servopress hand gun is fully closed, the pressure generated by the pump increases to such an extent that the piston with piston pin opens the ball from valve seat fully. The circulation pressure is then maintained and the entire delivery from the pump is fed back to the suction side.

The high pressure above the pressure holding valve, fed by way of the pressure channel, holds the relief valve against its stop so the piston with piston pin holds the ball away from the valve seat.

When the Servopress hand gun is opened again, the high pressure is released, the piston of the relief valve moves back to its original position and the spring-loaded ball closes against the valve seat. The pump then builds up the standard working pressure again.



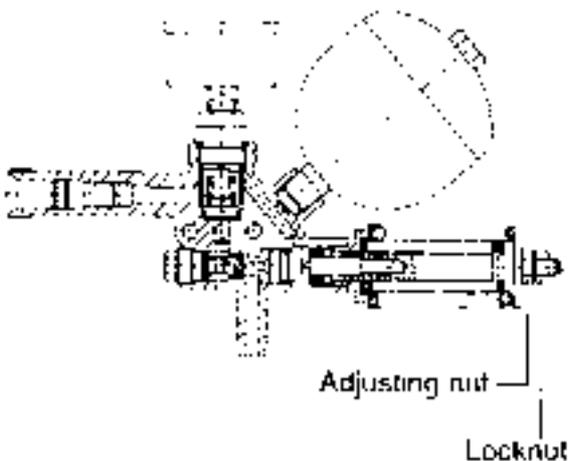
## B. Basic settings

### 1. Checking the pump delivery

Fit the shut off valve (special tool) to the high pressure outlet, connect the high pressure hose (without hand gun and spray lance).

Start the cleaner.

Close the shutoff valve as far as necessary to bring the cleaner up to working pressure (see technical data) and measure the quantity of water delivered into a suitable container in litres per minute.



### 2. Checking the relief valve opening pressure

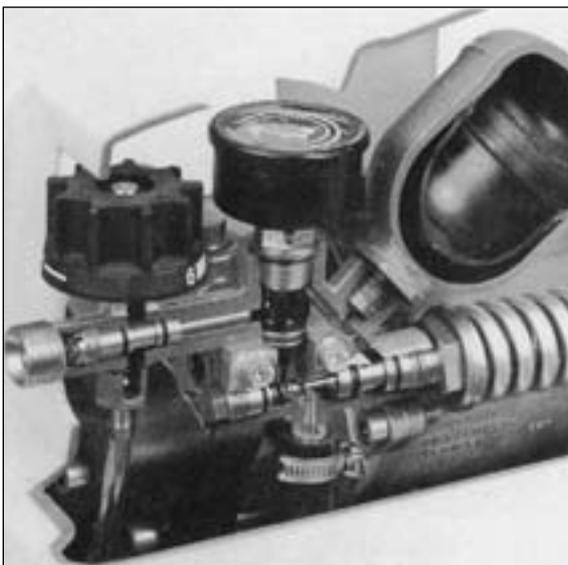
Connect the standard equipment to the cleaner (Servopress hand gun, spray lance, nozzle and hose).

Start the cleaner

Set the Servopress hand gun to Position 1

Read the pressure on the pressure gauge.

Required pressure: (see technical data)



### 3. Adjusting the relief valve

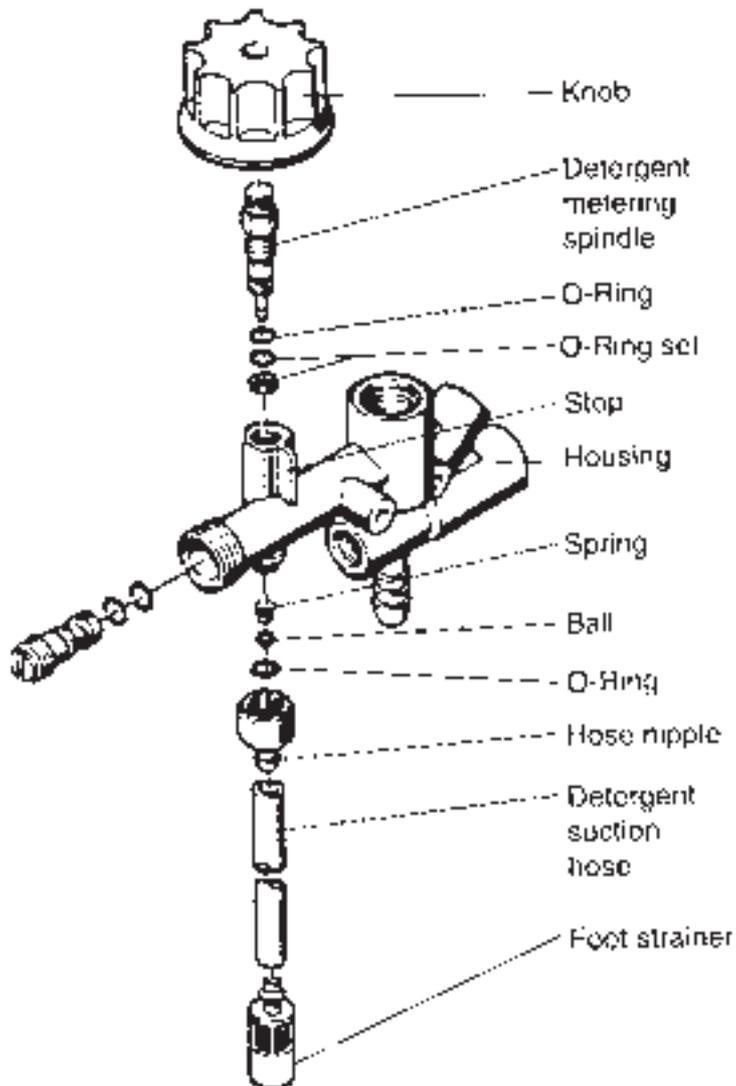
If the pressure is incorrect, it should be adjusted to bring it to the required pressure.

Adjustment is best done when the cleaner is not under pressure.

Loosen the lock nut.

Adjust by turning the adjusting nut. If need be, hold the rod with a screwdriver.

To increase the pressure, turn the nut clockwise (increase the spring pressure). To reduce the pressure, turn the nut counterclockwise (reduce the spring pressure).



#### 4. Checking the detergent feed

Start the cleaner and switch over to "operation with detergent" by turning the 3-way nozzle to low-pressure CHEM. Turn the detergent-feed knob to "O".

When the metering valve is set to position "O", no detergent must be drawn into the cleaner. If detergent is drawn in, then the knob must be pulled off and the detergent metering valve should then be turned hand-tight to close the valve completely and then the knob should be pressed back on (the stop limiting the rotation of the knob is at the side of the housing).

#### 5. Checking the detergent flow

The maximum detergent flow is checked by turning the knob to the maximum setting and by measuring the quantity of detergent drawn from a measurement glass in a given time (see technical data).

## C. Trouble shooting

### 1. Cleaner does not run

#### 1.1 Motor does not run

Check main fuse or circuit breaker (16 Amp delayed action).

Check voltage at power socket and compare the voltage on the nameplate.

Check the motor protective switch on the cleaner.

#### 1.2 Circuit breaker trips or fuse blows

Check main fuse or circuit breaker (16 Amp delayed action).

Extension cable has too small a conductor cross-section.

Extension cable not unwound from drum.

#### 1.3 Cleaner switches off after running for only a short period of time

Check current consumption.

Check the setting of the overload trip on the motor protective switch (see technical data).

Check current consumption.

### 2. Cleaner does not come up to pressure

#### 2.1 Inadequate water supply

Check water supply hose (not less than 3/4" i.d.).

A supply of at least 16 litres of water per min. must be available.

#### 2.2 Pump not vented of air

Switch off the cleaner and keep the trigger of the hand gun pulled until a steady flow of water emerges. Then switch the cleaner on again.

#### 2.3 Pump is sucking air

Turn off the water-supply valve and check the hose connection.

If you are drawing water by suction from a tank, the suction head should not be higher than 1 metre (39") with cold water. Fill the suction hose with water before operation.

#### 2.4 High pressure nozzle worn (bore too large)

Replace the high pressure nozzle (pencil jet 055, fan jet 25055) and check the pressure.

If the pressure is still too low, the fault is in the high pressure pump (measure pump delivery).

#### 2.5 Water inlet filter blocked.

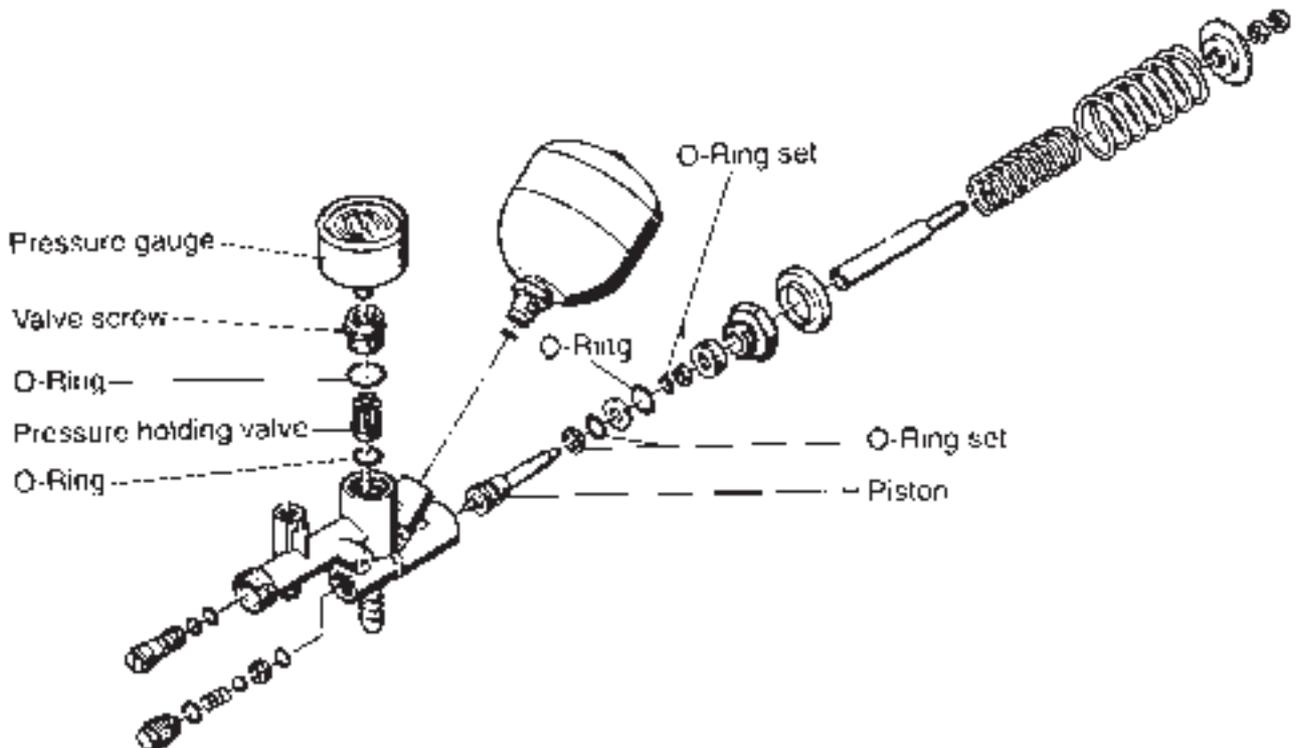
Remove the filter, clean it and reinstall.

2.6 Functional faults in relief valve

Safety valve pulsating (repeatedly opens and closes with the hand gun closed).

Remove the pressure gauge and valve screw.

Pull out the pressure holding valve with pliers (special tool).



Check the valve seat and valve plate for wear, if needed, replace the complete valve.

When installing the valve screw, tighten it with a torque of 50 Nm.

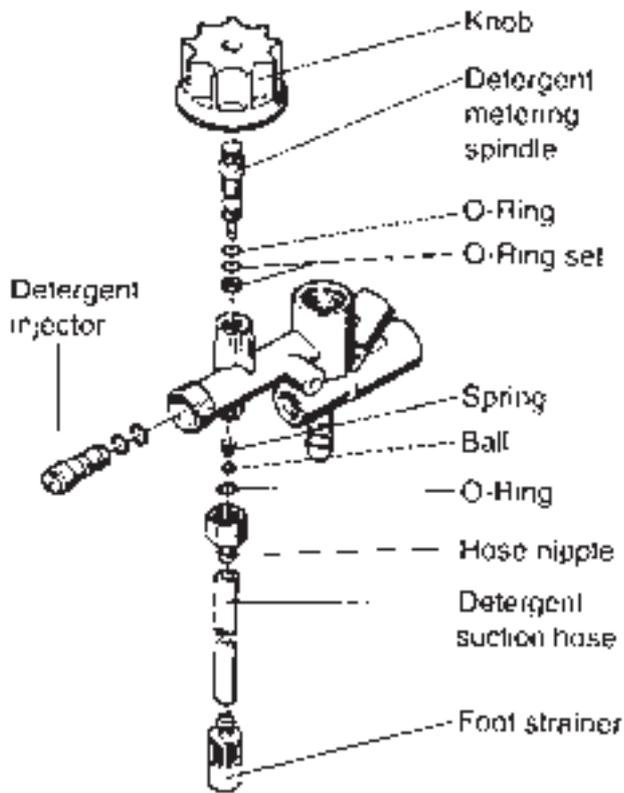
Dismantle the relief valve completely.

Remove the O-ring sets from the piston.

Grease the new O-ring sets with silicon grease and then install them.

**Caution:** Be sure to install in the correct order.

When reassembling the relief valve, tighten it to a torque of 30 Nm.



2.7 No detergent is drawn in

Detergent check valve sticking.

Pull suction hose from the hose nipple. Unscrew the hose nipple using a 19 mm wrench.

**Caution:** The non-return valve could fall out.

Remove the spring, ball and O-ring and clean them.

Replace the O-ring (**without grease**), ball and spring.

**Note:** The smaller end of the spring has to face towards the ball.

2.8 Air is drawn in when working with detergent or water is entering the detergent container

Suction hose not fitting firmly over the hose nipple.

Detergent metering valve spindle leaks.

Detergent non-return valve defective or fitted incorrectly.

Pull the hose off the nipple. Unscrew the hose nipple.

Check the spring, ball and O-ring and replace parts if necessary. Insert the O-ring, ball and spring in the screw connector.

**Caution:** Be sure to insert the spring and ball in the correct order.

Remount the hose nipple and connect the suction hose.

Pull off the adjusting knob.

Screw out the metering spindle.

Replace the upper O-ring.

Replace the O-ring set complete.

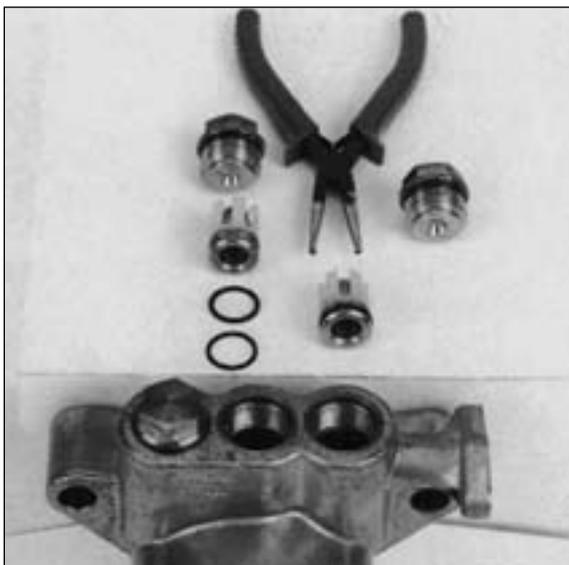
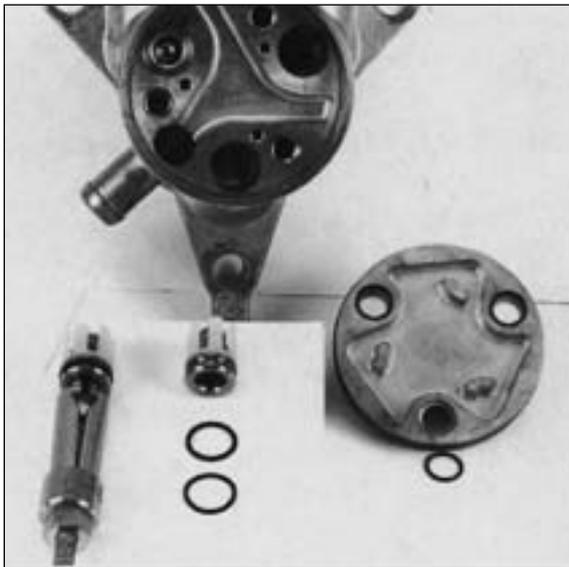
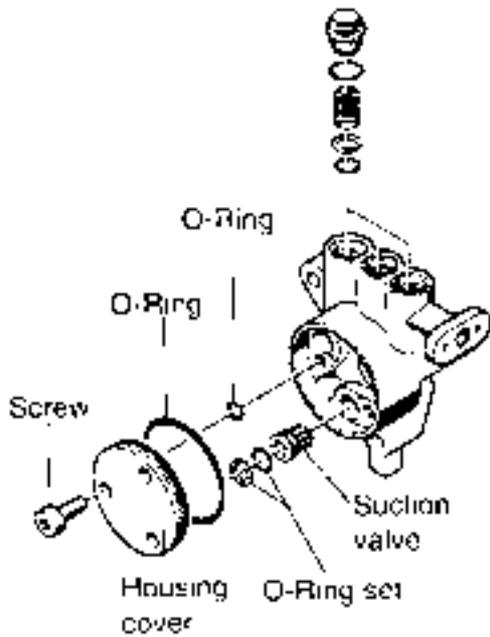
Tighten the metering valve spindle hand-tight and install the knob. Make sure the stop on the knob does not hit the stop on the housing.

2.9 Injector defective

Screw out the injector with the aid of a suitable screwdriver.

Replace the O-rings or, if necessary, replace the complete injector.





### 3. Internal water leakage

Measuring the pump delivery, indicates a loss of some water.

Possible cause: The suction valves, pressure valves or relief valve are defective or incorrectly mounted.

#### 3.1 Checking the suction valves

Remove the housing cover.

Pull out the valves using the puller (special tool).

Check the sealing surfaces of the valve seat and valve plate for dirt or grooves and replace them if necessary.

Check the O-rings of the housing cover and replace them if necessary.

**Note:** The support rings and O-rings should first be coated with silicon grease before mounting.

Fit the housing cover and tighten the screws with a torque of 22 Nm.

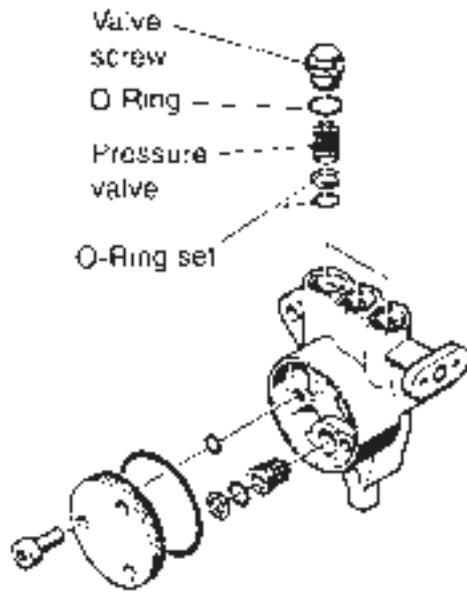
#### 3.2 Checking the pressure valves

Unscrew the valve screws.

Pull out the valves using the pliers (special tool).

If the valve seat cannot be pulled out with pliers, use the puller tool (special tool).

Check the O-rings, support rings, valve plates and valve seats for wear and replace them if necessary.



**Caution:** It is important for O-rings and support rings to be greased with silicon grease before mounting and that they be inserted correctly.

Press the valve into the cylinder head, screw in the valve screw and tighten with a torque of 65 Nm.

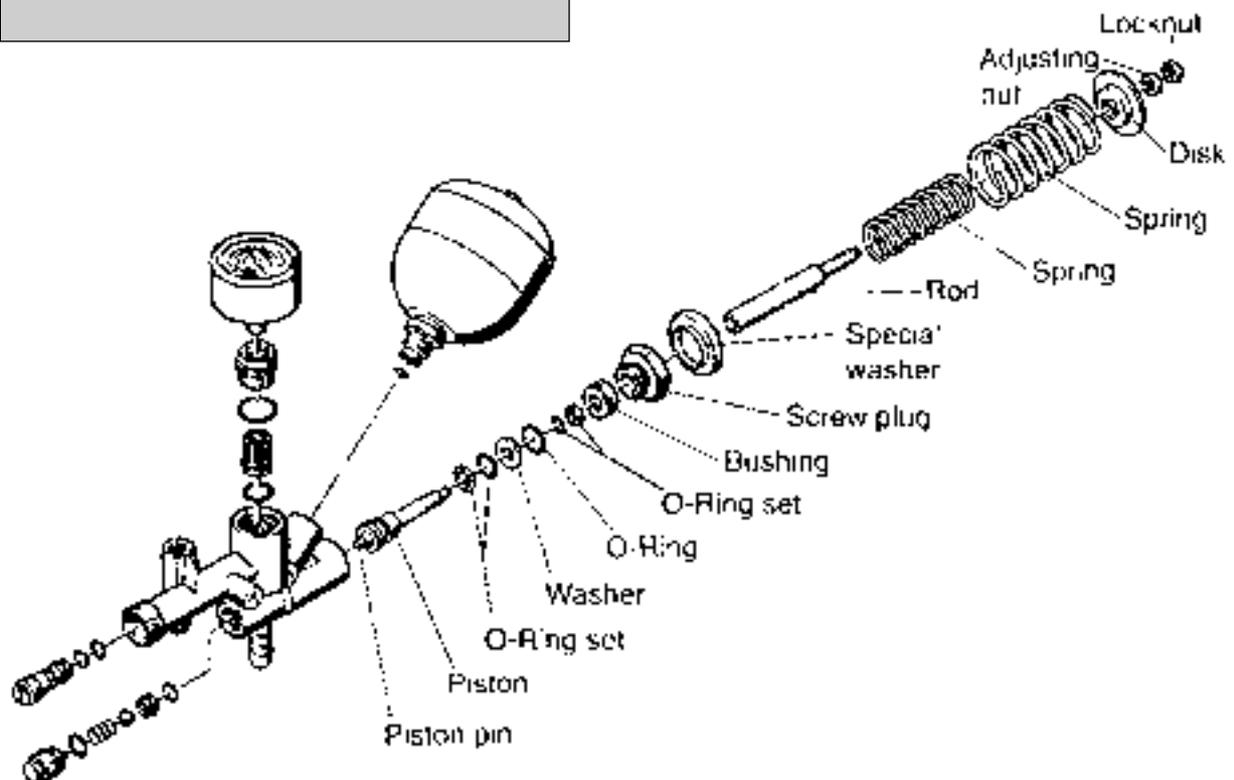
### 3.3 Checking the relief valve

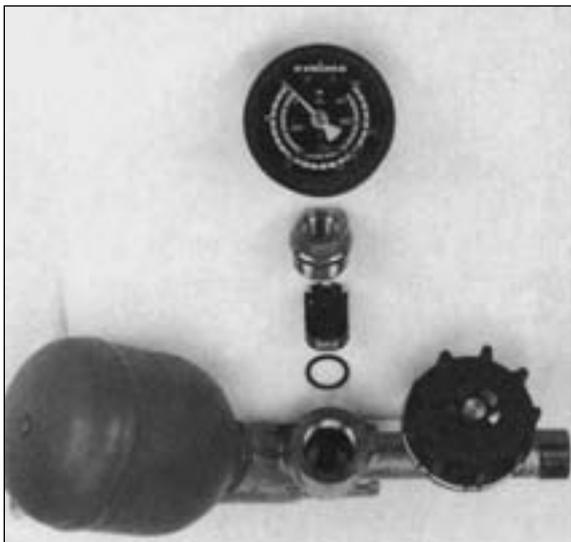
Unscrew the locknut and adjusting nut and pull off the washer and springs from the rod.

Unscrew the screw plug.

Pull out the rod and piston complete. Check the piston pin for wear. If it should show signs of wear, it is essential to replace the piston.

To replace the piston, grip the rod in a vice, heat the female-thread end and unscrew the piston with an open-ended wrench.

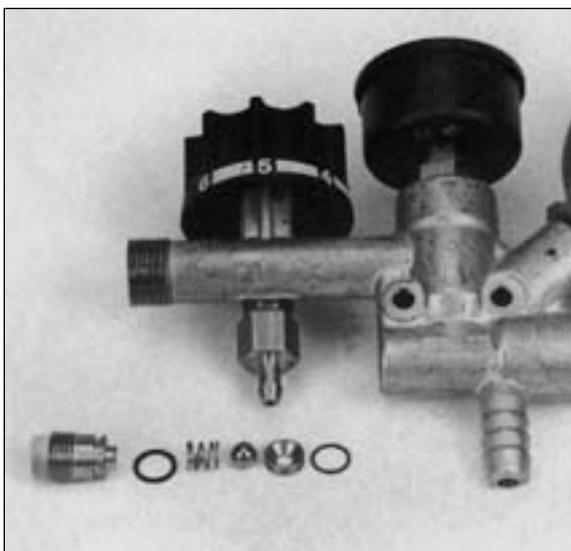
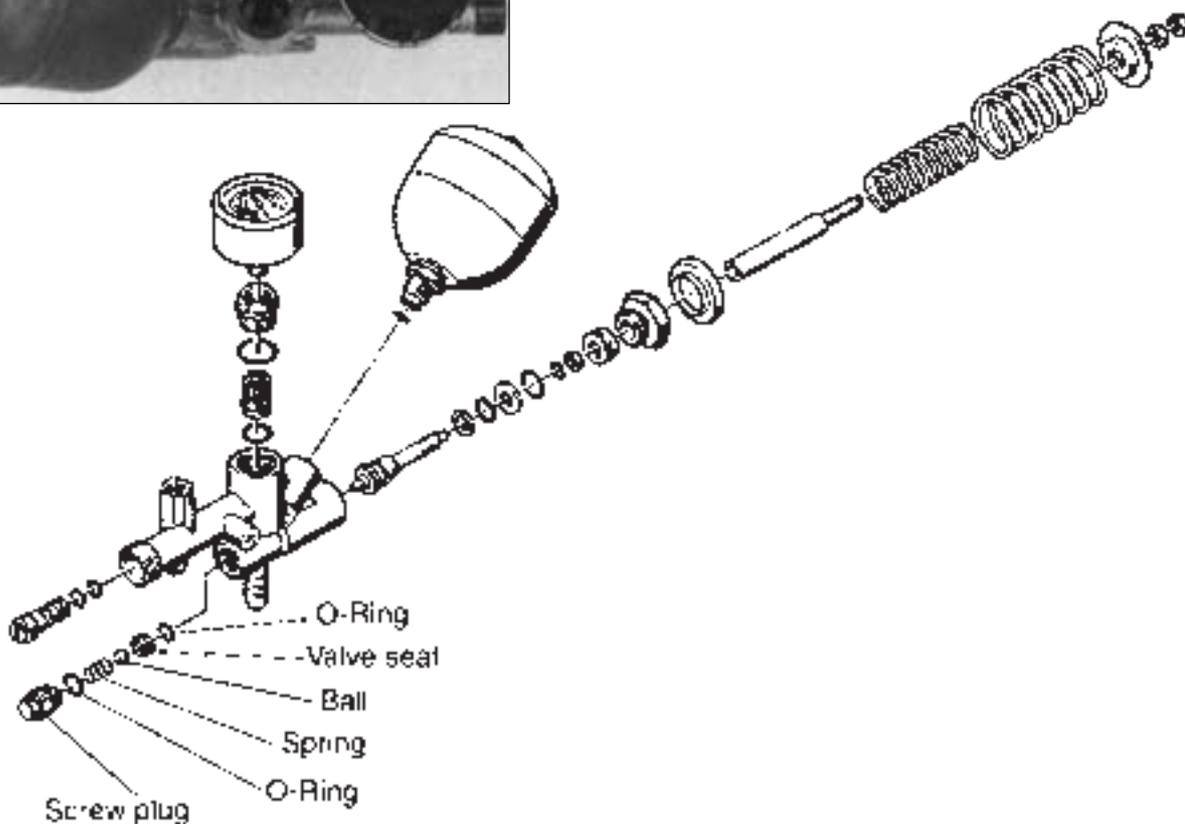




Replace the O-ring set of the piston and the O-ring set of the bushing, greasing the new parts with silicon grease before fitting.

**Caution:** Be sure to insert the parts in the correct order.

Secure the new piston to the rod with Loctite (No. 6.869-028).



### 3.4 Checking the valve seat

Remove the complete relief valve.

Unscrew the screw plug.

Check the spring and ball for wear and replace them if necessary.

Drive out the valve seat with a punch, check its condition and replace it if necessary, also the O-ring.

When replacing the valve seat, drive it in to the stop, do not damage it.

Tighten the screw plug with a torque of 20 Nm.

**4. Visible water leakage**

**4.1 Relief valve**

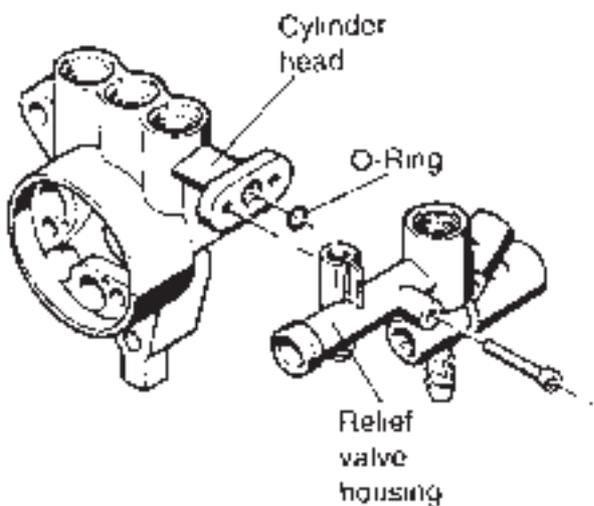
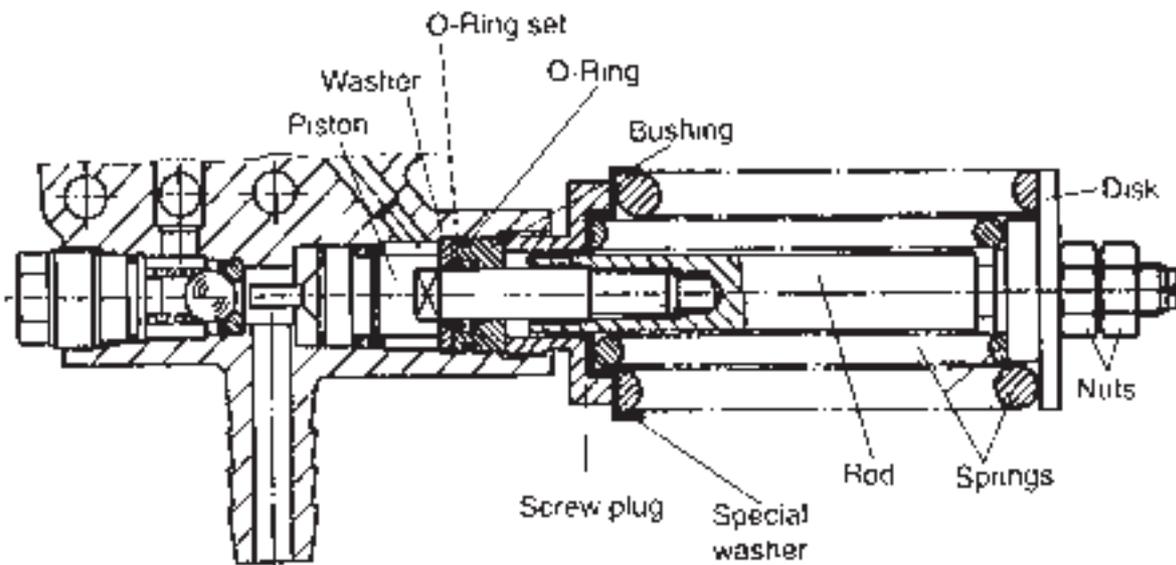
Unscrew the nuts, pull off the springs and unscrew the screw plug.

Pull the rod together with the piston out of the housing.

Heat the rod and screw out the piston.

Replace the O-ring and O-ring sets.

For fitting instructions, see page 12.

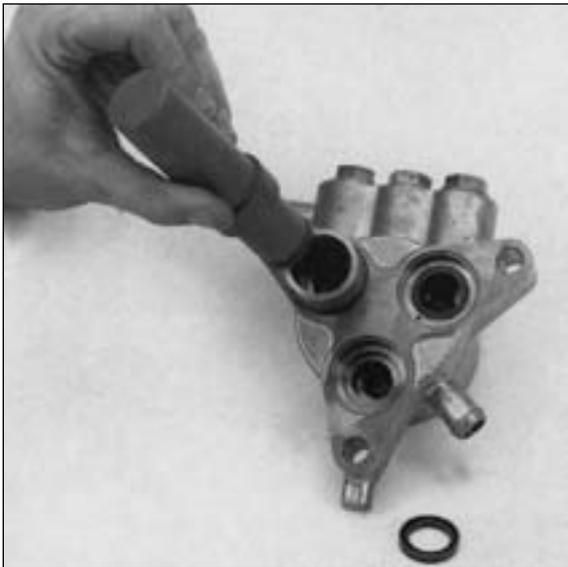


**4.2 Leakage between the cylinder head and relief-valve housing**

Unscrew the screws and remove the relief-valve housing.

Replace the O-ring, applying silicon grease before fitting.

Remount the housing and tighten the screws to a torque of 9 Nm.



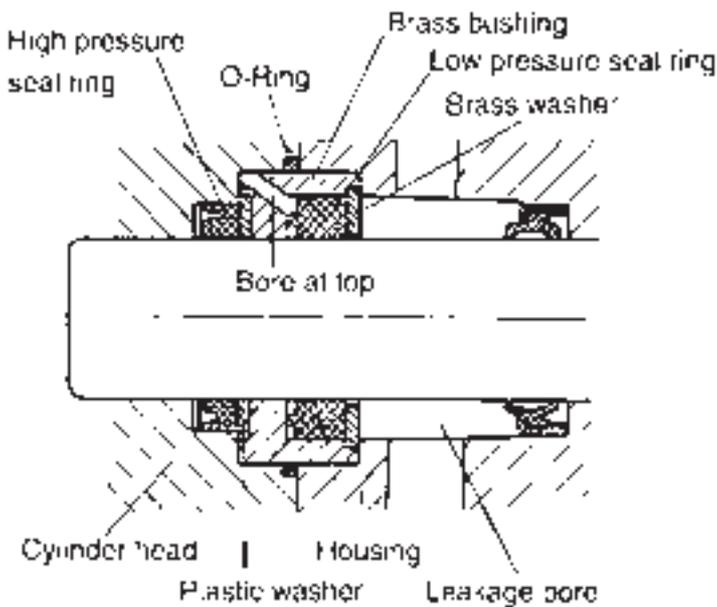
4.3 Leakage between the cylinder head and the pump housing

A leakages of 1 drop per minute is acceptable.

Unscrew the cylinder-head screws and remove the cylinder head.

Pull out the high pressure seal ring by hand. If this is difficult, use a puller. Grease a new high pressure seal ring with silicon graese and fit it with the aid of the mounting mandrel (special tool).

**Caution:** Note that the sealing lips must face towards the cylinder head.



4.4 Replacing the low-pressure seal

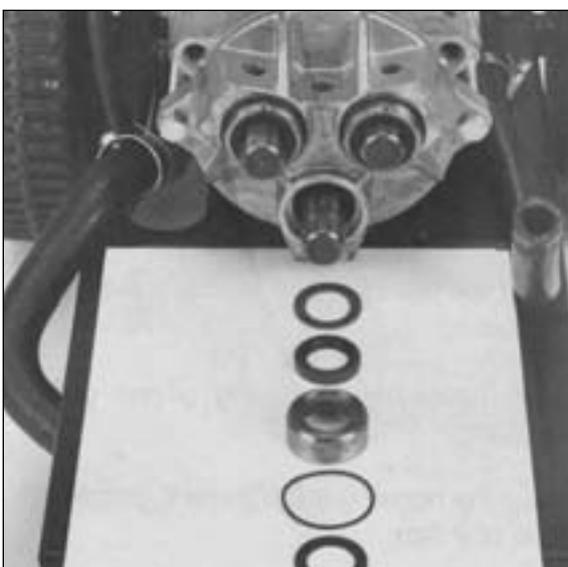
Remove the brass bushing with washers.

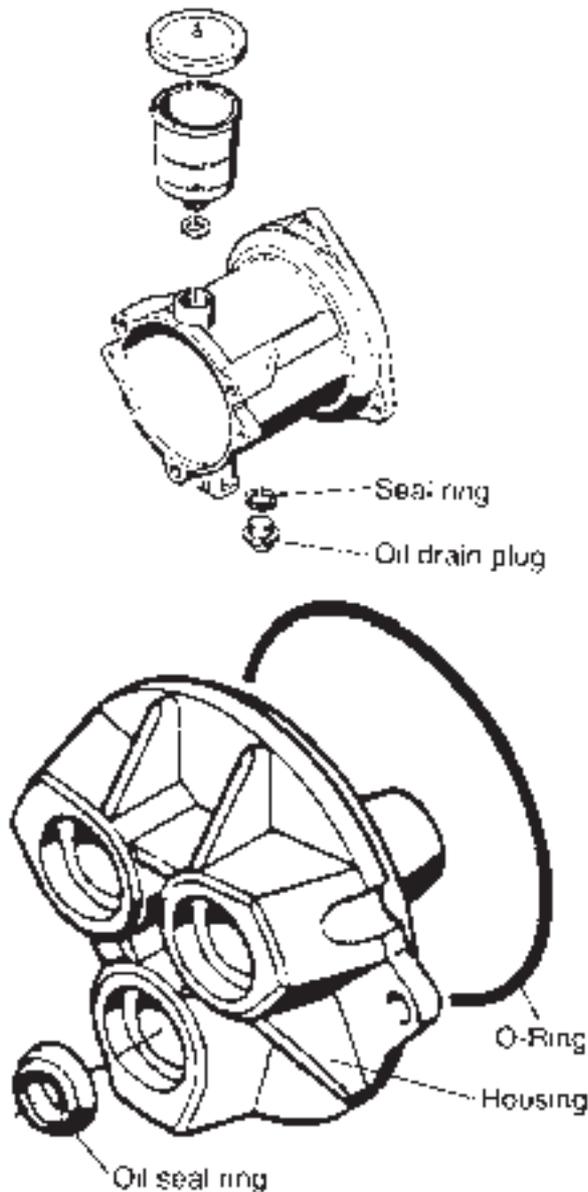
Replace the plastic washer, low pressure seal ring and O-ring.

The low pressure seal ring should be greased with silicon grease and then be pressed into the bushing in such a way that the brass washer comes against the stop in the bushing and a cushion of grease is formed between the seal ring and the bushing.

Insert the bushing with its bore facing upwards in the housing.

Fit the cylinder head and tighten the screws with a torque of 45 Nm.





## 5. Oil leakage from housing

### 5.1 Oil drain plug leaking

Unscrew the oil drain plug and drain the oil into a suitable container.

Replace the seal ring.

Screw in the oil drain plug and tighten with a torque of 45 Nm.

**Caution:** Fill with correct oil (see technical data).

### 5.2 Piston seals and housing seal leaking

Unscrew the housing fastening screws and replace them with the assembly screws (special tools).

Drain the oil.

Remove the cylinder head completely.

**Caution:** Loosen the assembly screws evenly as you draw off the housing. Take care not to tilt it.



Remove the housing together with the pistons.

Pass a suitable screwdriver through the leakage bores and lever out the oil seal rings.

**Caution:** Take care not to damage the sealing surface of the housing.

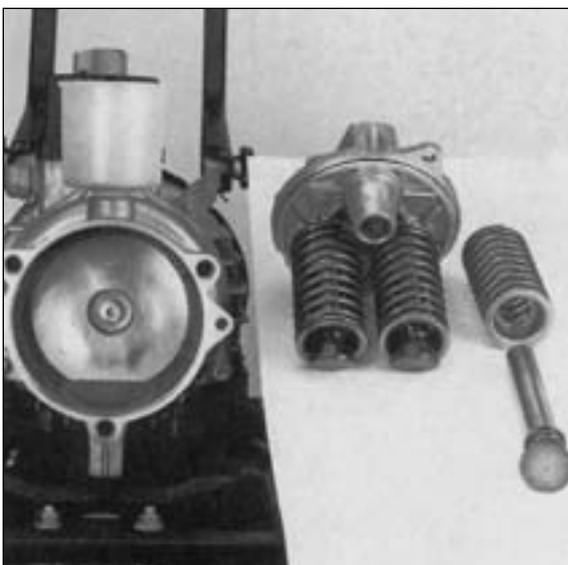
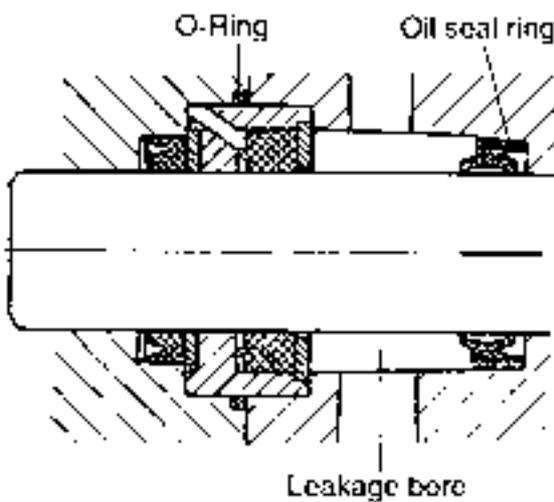
Remove the O-ring.

Clean the housing of grease and oil.

**Note:** The new oil seal rings should be soaked in water for some time before they are fitted.

Without applying any grease or oil, fit the oil seal rings in the housing using the mounting mandril (special tool).

Coat the O-ring with silicon grease and place it in the groove in the housing.



Insert the pistons and springs in the housing

Install the housing evenly into place by means of the mounting screws (special tool), taking care not to tilt it.



**6. Pumps drive defective**

**6.1 Piston jammed, swash plate worn**

Remove the cylinder head.

Use the mounting screws (special tool) to pull off the housing.

Check the pistons for wear and, if necessary, replace the pistons and springs.

Carefully lever out the oil seal rings with a screwdriver.

Fit new oil seal rings without applying grease.

Check the swash plate for wear and replace if necessary.

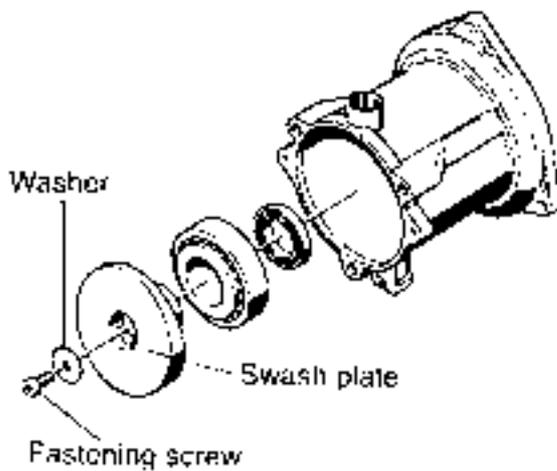
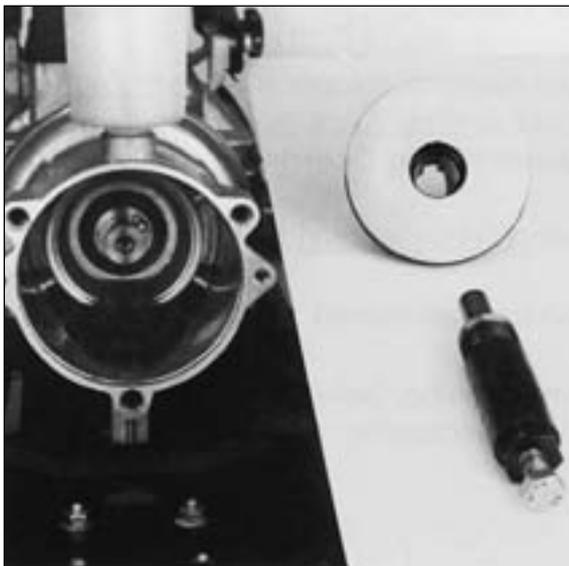
Remove the fastening screw and washer.

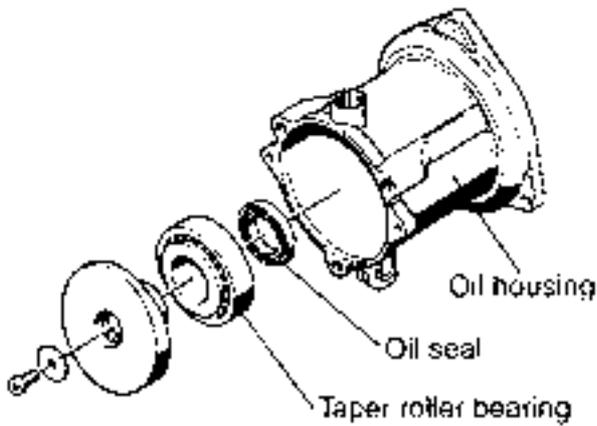
Use the puller (special tool) to pull the swash plate off the shaft.

Fit a new swash plate and secure the fastening screw with loctite (No. 6.869-002).

Insert new pistons and springs in the housing and remount it.

Fit the cylinder head with new seals and remount it.





6.2 Ball bearing and seal defective

Remove the cylinder head.

Remove the piston housing.

Pull the swash plate off the shaft.

Remove the oil housing.

Carefully lever out the oil seal with a screwdriver.

Heat the bearing end of the housing evenly with a flame torch until the ball bearing race falls out. It may be necessary to tap the housing with a wooden hammer.

While the housing is still hot fit it with the new ball bearing race (cold) and tap it in with a brass drift.

Press the bearing from the swash plate and press on the new one.

Fit a new oil-seal without greasing it.

Remount the oil housing.

Remount the swash plate, housing and cylinder head as previously described.

6.3 Motor fan defective

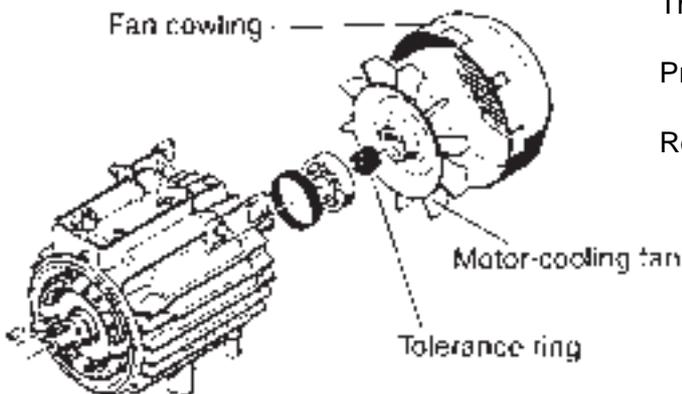
Remove the fan cowling.

Pull off the motor cooling fan using a puller (special tool).

The tolerance ring should always be replaced.

Press the new motor fan onto the motor shaft.

Reinstall the fan cowling.



**D. Special tools**

2.901-015 Mounting mandrel

2.901-030 Shutoff valve

4.901-038 Swash plate puller

4.901-062 Pliers for valve removal

5.901-069 Servopress hand gun, mounting mandril

5.901-070 Servopress hand gun, mounting tool

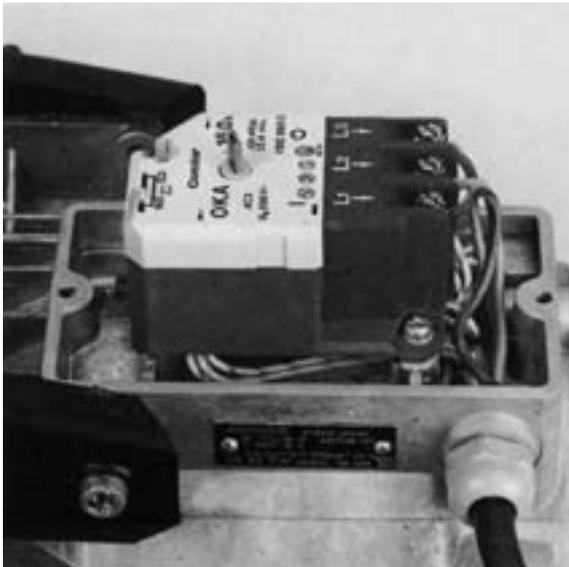
6.815-029 Valve seat internal puller

6.816-069 Puller for motor fan

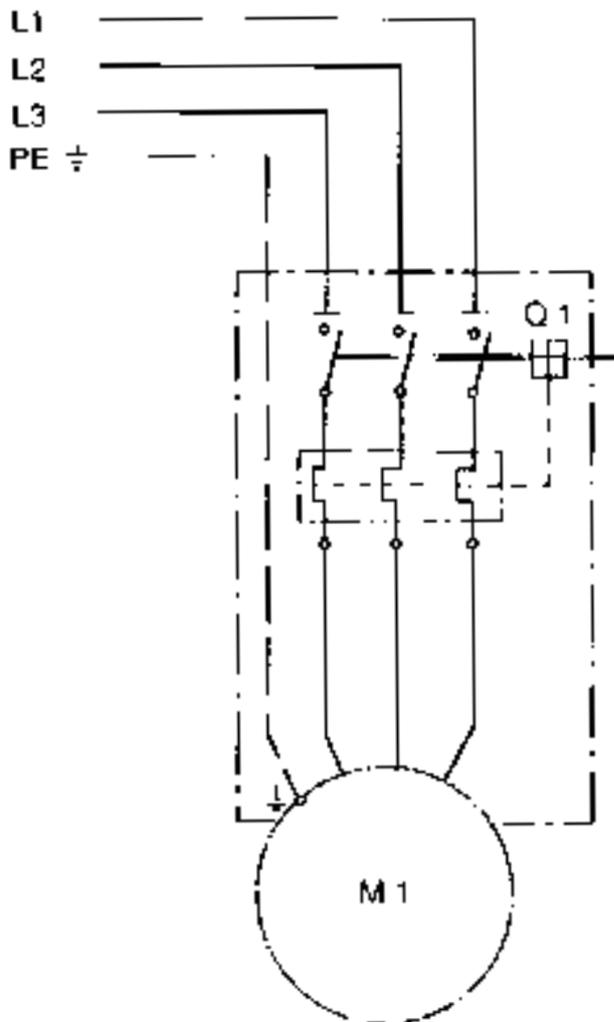
7.304-403 Housing assembly screws

**E. Technical date**

Cleaner type		HD 1050	
Part. No. for cleaner		1.720-111	
Circuit diagram No.		0.087-027	
Voltage	Volt	380	
Type of current	Ph/Hz	3 ~ 50 Hz	
Full-load power consumption	Amp	13,0	
Setting of motor overload trip	Amp	14,5 - 15,0	
High pressure nozzle		055	
Working pressure – full load	bar	185 - 195	
Working pressure – part load	bar	10	
Circulation pressure	bar	10	
Relief valve opening pressure	bar	210 - 215	
Flow volume – full load	liter/min.	14,8 - 15,5	
Flow volume – part load	liter/min.	3,1 - 4,6	
Detergent flow – max.	liter/min.	0.8 - 1.1	
Oil, filling amount	Liter	1,0	
Oil, viscosity		SAE 90	



Phases L1, L2 and L3 are connected to the motor by way of the cleaner's motor protective switch Q1 (with integral thermal overload protection).



M 1 Motor

Q1 Motor protective switch with thermal overload trips



