Operating manual

- EN -

High-pressure cleaner

therm 895 ST

therm 1165 ST

Read and conform safety instructions before use!

Keep instructions in a safe place for later use and pass them on to any future user.

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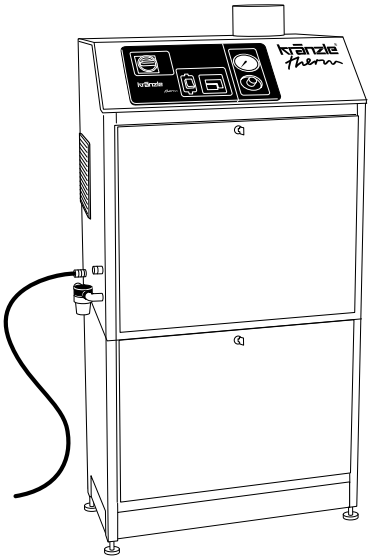
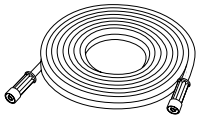
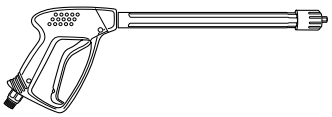
4 This is what you have purchased



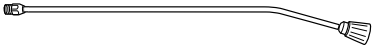
1. Kränzle hot water high-pressure cleaners **therm 895 St, therm 1165 ST**



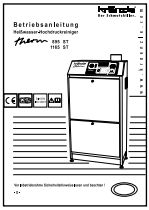
2. 10 m steel-
weave high-pressure hose DN 8



3. Safety trigger gun with insulated handle and screw connection



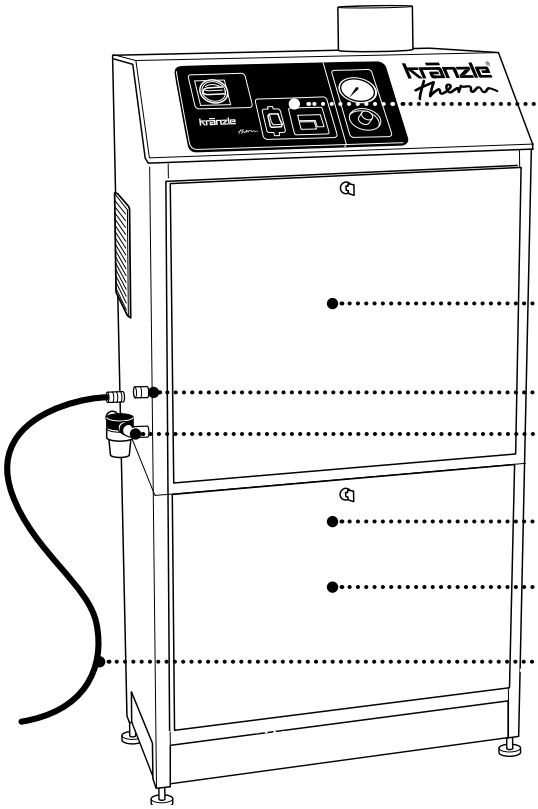
4. Spray lance

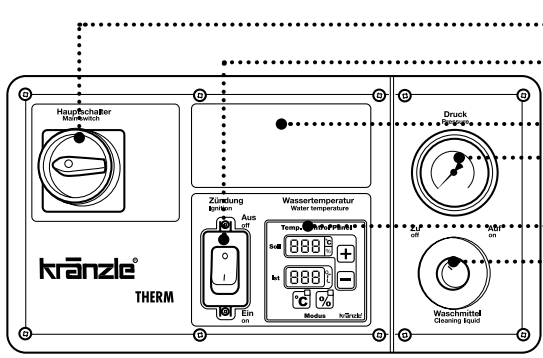


5. Operating manual

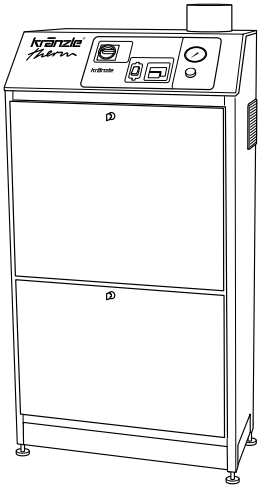
Description of appliance

Kränzle therm 895 ST, 1165 ST





6 Tecnical data



	therm 895 ST	therm 1165 ST
Operating pressure, continuously adjust.	30 - 195 bar / 3 - 19.5 MPa	30 - 165 bar / 3 - 16.5 MPa
Admissible overpressure	215 bar / 21,5 MPa	180 bar / 18 MPa
Water output Qmax	14.9 l/min (895 l/h)	19.4 l/min (1165 l/h)
Hot water output temp. (water supply 12 °C)	12 - 80 °C	12 - 80 °C
Steam level	max. 140 °C	max. 140 °C
Nozzle size, flat jet nozzle	25045	2507
Heating oil jet - Oil pressure	1.5 Gph - 10 bar	1.65 Gph - 13 bar
Heating oil consumption at max. heat. output	6.0 kg/h = 7,1 l/h	7.1 kg/h = 8,5 l/h
Heating oil consumption at ΔT 45 °	4.3 kg/h (5,1 l/h)	5.6 kg/h (6,6 l/h)
Heating output	65 kW	78 kW
Exhaust gas mass flow	0.035 kg/s	0.041 kg/s
Steel fabric high-pressure hose	10 m	10 m
Motor speed	1,400 rpm	1,400 rpm
Connected load	400 V, 11 A, 50 Hz	400 V, 11 A, 50 Hz
Power input	P 1 - 7.5 kW	P 1 - 7.5 kW
Power output	P 2 - 5.5 kW	P 2 - 5.5 kW
Weight	235 kg	240 kg
Dimensions in mm (w x d x h)	800 x 650 x 1600	800 x 650 x 1600
Sound level acc. to DIN 45 635	89 dB (A)	91 dB (A)
Guaranteed sound level L_{WA}	91 dB (A)	91 dB (A)
Recoil at lance	approx. 22 N	approx. 22 N
Vibrations at lance	2.2 m/s^2	2.2 m/s^2
Order no.	**41.352 5**	**41.353 5**

Permissible tolerance for figures ± 5 % in acc. with VDMA uniform sheet 2 24411

General rules

Range of application

This machine may only be used for cleaning facades, vehicles, containers, pavement slabs, stables, machines and smilar objects.

Inspections

The machine must be inspected according to the “Guidelines for Liquid Spray Devices” at least once every 12 months by a qualified person, to ensure that continued safe operation is guaranteed. The results of the inspection are to be recorded in writing. This may be done in any form. For inspection reports see pages 56 - 57.

High-pressure cleaners used for commercial purposes have to be checked by a qualified person at least every 12 months!

Accident prevention

The machine is designed for accidents to be impossible (if used according to these instructions). Please read safety notes included in this manual carefully before using the machine and act correspondingly. Operating staff has to be instructed according to this manual. The “Guidelines for Liquid Spray Devices” must be complied with.

Setting up - Location

Neither set up and operate the machine in rooms where there is a risk of fire or explosion nor put it into puddles. Do not use the machine under water.

During the combustion process air is needed and exhaust gas emerges. If the machine is operated in a confined space, precautions have to be taken to safely exhaust the fumes. Furthermore a sufficient ventilation has to be provided for.

Never shut the exhaust gas outlet on top of the machine. Never stoop over this aperture and never reach into it. Emerging gases are extremely hot!

Safety notes

Do not jam the trigger of the gun during operation!
When carrying through service and maitenance tasks the machine has to be cut off the power supply system. Put main switch to „0“ and pull plug out of socket.

Never operate the machine if cables or other safety-relevant parts (e.g. excess pressure valve, high-pressure hose, spraying devices, etc.) are defective.

8 Safety notes

Never operate the machine without supervision. The machine may only be operated by persons who have been instructed accordingly.

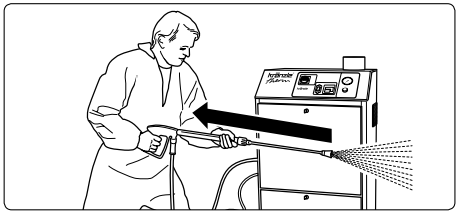
Some parts inside the machine, all water conducting components and all metal parts of gun and lance are hot during hot water operation. Keep all hoods and protective covers closed during operation and never touch any metal parts of gun or lance.

Persons operating the machine should wear the necessary protective clothing, i.e. waterproof clothing, rubber boots, safety goggles, headwear etc. It is prohibited to use the machine in close vicinity to people lacking suitable protective clothing.

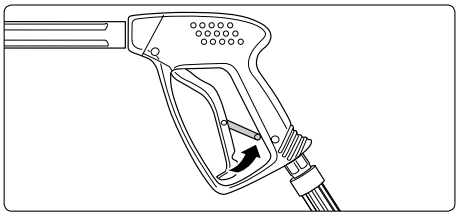
The high-pressure jet can generate a high level of noise. If noise exceeds the maximum allowed levels, users and others in the vicinity must wear suitable ear protection.

Do not spray against matter containing asbestos or other hazardous substances.

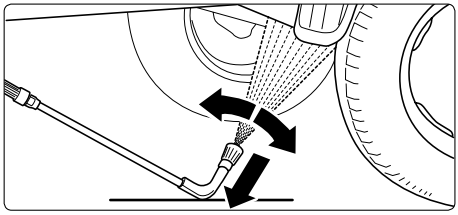
For safety reasons always switch the main switch to „0“- postion after having finished the cleaning task (disconnection from power supply).



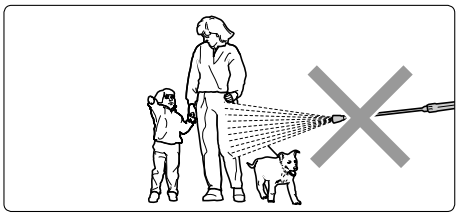
Bear in mind that during cleaning tasks with a high-pressure water jet a significant recoil at the lance arises.
Additionally angled lances produce a clearly perceivable amount of torque.



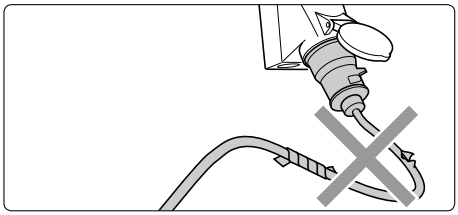
Apply the safety catch on the spray gun after each use, in order to prevent unintentional spraying!



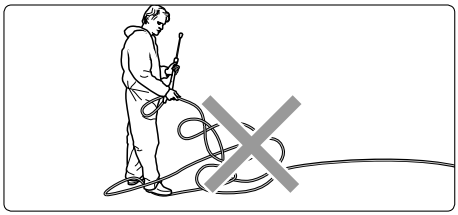
Always aim the underbody lance!
Bear in mind when using a curved or angled spraying lance that there is a significant amount of torque in the recoil!



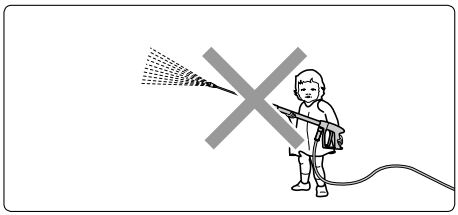
Never direct the water jet at people or animals!



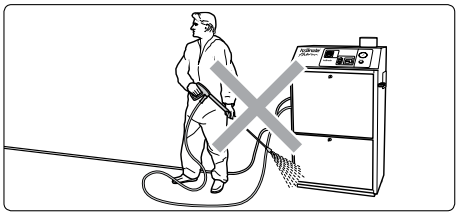
Only use power cables which are in perfect working order! Do not damage the power cable or repair it incorrectly!



Never pull the high-pressure hose if it has formed kinks or “nooses”!
Never pull the hose over sharp edges!

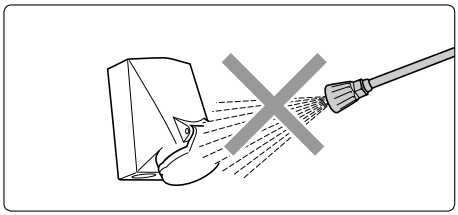


Never allow children or untrained persons to use the high-pressure cleaner!



Never direct the water jet at the machine itself!

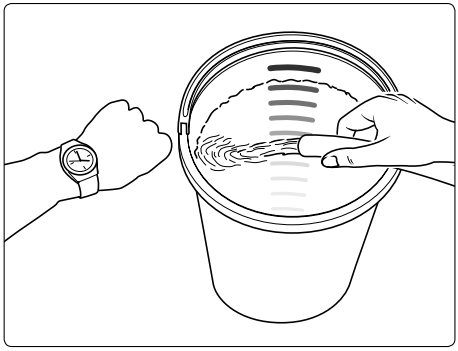
The machine may not be placed within reach of the water jet spray mist!



Never direct the water jet at a power socket!

10 Please note - important!

Lack of water



Lack of water occurs more often than you probably believe. The more powerful a high-pressure cleaner is the greater is the danger that a lack of water occurs. If there is only an insufficient amount of water available, cavitation arises inside the pump, which is normally noticed too late or even not at all. The pump will be destroyed.
Please check the available quantity of water by filling a bucket with litre scale for one minute.

Necessary minimum quantity of water: see technical data.

If the metered quantity of water is too small, you have to use a different water connection, guaranteeing the necessary output.

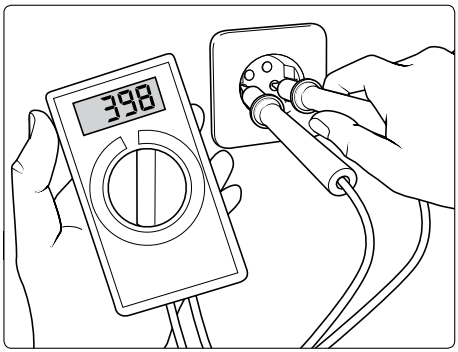
Lack of water leads to an accelerated wear of the joints (guarantee void).

Water supply

Please pay attention to the regulations of your waterworks company! In accordance with DIN EN 61770, the machine may not be directly connected to the public drinking water supply lines. A brief connection however is permissible according to DVGW (German Association for Gas and Water Affairs) if a non-return valve with tube ventilator (Kränzle order no. 41.016 4) is built into the water supply. **Once the water has passed through the non-return valve it is no longer considered as drinking water.**

Also indirect connection to the public drinking water supply lines is permissible by way of free emission in accordance with EN 61 770; e.g. by using a reservoir with a float valve. Direct connection to a non-drinking water supply line is permissible.

Insufficient quantity of electricity



If there are too many collectors in your proximity connected to the network at the same time, the available voltage and the current intensity may decline. Consequently the motor of the high-pressure cleaner does not start or even blows. The power supply may also be insufficient if the power cable is too long or too thin. If extension cables are too long, this may lead to a voltage drop causing malfunctions or start-up difficulties.

Connected load:

Kränzle therm 895 ST: 400 V, 50 Hz (direction of rotation of no importance)
Kränzle therm 1165 ST: 400 V, 50 Hz (direction of rotation of no importance)

Check the line fusing and have the voltage and the available current intensity checked by an expert in case of uncertainty.

Electrical connection

The machine is supplied with an electrical power cable with plug. The mains plug must be fitted to a standard grounded socket with a **30 mA** residual current operated device. The socket must be protected with a **16A delay action fuse** on the mains side. When using an extension cable, this must have an earthed lead which is properly connected to the socket. The conductors in the extension cable must have a minimum cross section of **1.5 mm²**. Plug connections must be of a spray-proof design, and may not be located on a wet floor. With extension cables of **more than 10 m** the minimum cross section must be **2.5 mm**! When using a cable drum, always keep the cable wound as far as possible.

12 Kränzle technology

Water and Cleaning System

The water is fed to the high-pressure cleaner under pressure (2-8 bar pre-pressure). A float valve regulates the water flow in the storage tank. Then the water is sucked directly from the storage tank by the high-pressure pump and forced with the adusted pressure through the heat exchanger to the safety spray lance. The high pressure jet is formed by the nozzle at the end of the safety lance.

Environmental, refuse disposal and water protection regulations must be observed!

Lance with trigger gun

The machine can only be operated when the safety trigger is squeezed. When the lever is squeezed, the spray gun opens. The liquid is then pumped to the nozzle. The spray pressure increases and quickly reaches the selected operating pressure. When the trigger is released, the trigger gun closes and any further spraying of liquid from the lance is stopped. The motor stops.

When actuating the gun once more the pressure control valve - safety valve closes and the motor is started again. The pump resumes feeding water to the spraying lance with the selected operating pressure. When the gun is closed, the water hammer opens the pressure control valve - safety valve and the motor is switched off by the pressure switch.

The trigger gun is a safety device. Repairs should only be performed by qualified persons. Should replacement parts be required, use only components authorized by the manufacturer.

Total stop system

The machine is fitted with a Total-Stop-System. If the gun is closed for longer than approx. 20 seconds, the machine switches off automatically, after 20 minutes the machine moves to safety switch off and you must use the main switch to turn it back on. The machine restarts automatically when the gun is operated, provided the master switch is on.

High-pressure hose and spraying device

The high-pressure hose and spraying device supplied with the machine are made of high grade material, they are also optimized for the machine and marked as required by the appropriate regulations.

If replacement parts are required, only such parts that are authorized by the manufacturer and which bear the markings required by the appropriate regulations may be used.

The high pressure hose and spraying device must be connected in a pressure-tight manner.

The high-pressure hose may not be driven over, pulled excessively, or twisted. The hose may under no circumstances be pulled over sharp edges, since otherwise the guarantee is automatically void.

Hoses are wearing parts. The guarantee only covers defects of fabrication no external damages whatsoever.

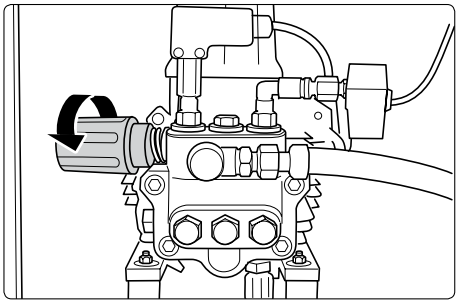
Defective high-pressure hoses and spraying devices may not be repaired. They always have to be replaced.

Pressure control valve-safety valve

The pressure control valve allows full adjustment of the quantity and pressure of the water. The safety valve protects the machine from excessive pressure and cannot be adjusted beyond the admissible operating pressure. The setting nuts are sealed with lacquer.

Replacements, repairs, new adjustments and sealing operations may only be performed by trained personnel.

Setting for pressure, quantity and temperature



The pressure control valve on the pump head is used to control the operating pressure plus the water flow and consequently the water temperature as well. Turn right to increase the pressure, turn left to reduce the pressure.

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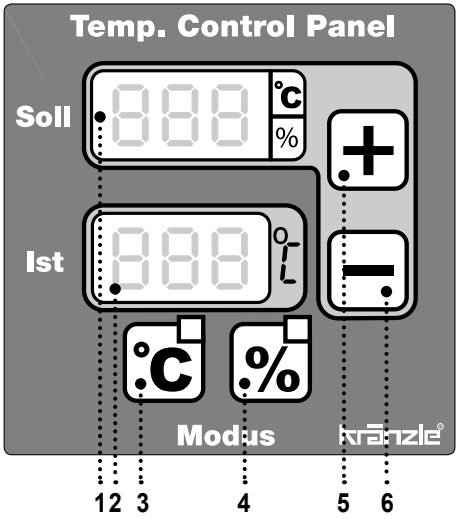
Thermostat



The thermostat controls the spray water temperature.
After you switch on the device, “888” appears in both displays for approx. 1 second as a test of the functioning of the displays. The thermostat also monitors the minimum fuel level in the tank with a floating switch. If the level is below the minimum amount, the thermostat switches the oil burner off and the “OIL” sign flashes in the set temperature display (Pos. 1). If the unit displays “FLA” in the upper display, a malfunction in burning exists.

The thermostat has two operating modes:

1. Temperature mode

This mode is always activated when the unit is switched on or can be selected using the “°C” button (Pos. 3). The red LED above the “°C” button and next to the set temperature display lights up. The desired “Set” temperature is set using the two buttons (+/-, Pos. 5+6) and can be read in the upper display (Pos. 1). If you press the button for a longer time, the set temperature is quickly adjusted in 5°C increments.

The last set value set is also stored after the unit is switched off and is available again immediately after switching back on. The current spray temperature can be read from the bottom display (Pos. 2).

2. Percentage mode

This mode is activated by pressing the “%” button (Pos. 4). The yellow LED above the “%” button and next to the set temperature display flashes.

In the temperature control system in conventional high-pressure cleaners, and in **temperature mode** for this unit, the water temperature is measured at the outlet of the heater, and the heater is switched On an Off according to the temperature desired by the user. Due to the large amount of water in the heating coil, it takes a long time until the temperature sensor registers that the burner has switched on and the desired temperature has been reached. This means that the temperature increases far above the desired value or falls far below the desired value.

Thermostat - percentage mode

The innovative new **percent mode** now lets the user specify the switching duration of the heater in percent using the “+” and “-” buttons (Pos. 5+6) (100% being the max. temperature) rather than setting the desired temperature. Now the result of the setting must be checked by using the “Actual” temperature display. If the desired temperature has not yet been reached, the percentage must be increased. By setting percentages of the heating duration, the temperature of the high pressure jet is kept constant in a very narrow range. The last value set is also saved after the unit is switched off in percent mode.

Operating hour meter

The cleaner is equipped with an operating hour meter. If during normal operation the momentary operating mode button (“°C” or “%”) is actuated for more then 2 seconds, the operating time of the pump is displayed for 5 seconds and afterwards the combustion time for 5 seconds as well. Thereafter the display shows the original values again. As long as the operating hours are displayed no further inputs on the monitor are possible. The operating time is displayed in hours [h] either in the “TARGET” or in the „ACTUAL“ window. The 1000 and 100 hours are displayed in the „TARGET“ window and the 10, 1 and 1/10 hours in the “ACTUAL” window:

Pump operating time:	Target-Display: P 9 9	Actual-Display: 9 9. 9	for 9 999.9h
Combustion time:	Target-Display: F 9 9	Actual-Display: 9 9. 9	for 9 999.9h

e.g.: F00 27.3 = Cumbustion time 27 hours and 18 minutes

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Heat exchanger

The water is forced through a heating coil by the high pressure pump. Heating coil: 38 m long - Content: 5 l of water - Heating capacity: max. 90 kW

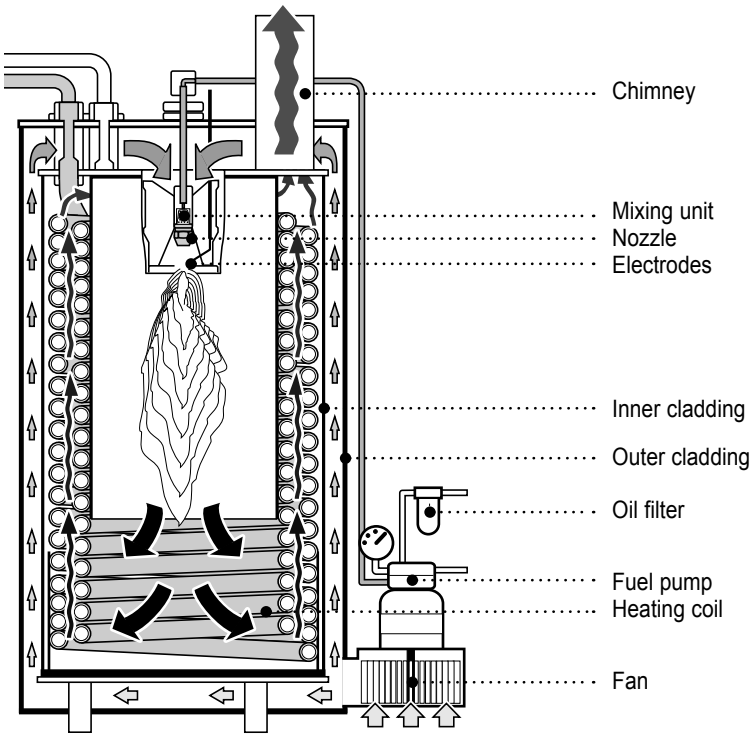
The fuel pump draws the oil from the tank through a filter and pumps it to the injector nozzle. The oil pressure is shown on the fuel manometer.

The heat exchanger is heated by a high pressure fan heater.

A ventilator draws in the cold, fresh air from the bottom end of the machine and forces it upwards between the outer cladding and the inner cladding. In the process, the fresh air is pre-heated and the outer cladding of the heat exchanger is cooled.

The pre-heated air is pressed through a mixing unit. Here finely atomized fuel is injected via a nozzle and mixed with the air. The electrodes located below then ignite the fuel-air mixture.

The flame burns from top to bottom, turns round and the hot gas flows past the heating coil on its way back up. The burned gases collect in the exhaust chamber and are emitted from the chimney.



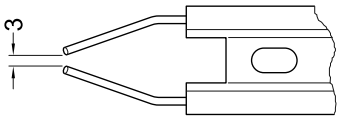
■ Fuel System:

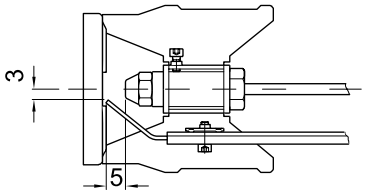
Your fuel may contain particles of dirt, or impurities or water may get into the tank during refuelling. To protect the fuel pump the machine is equipped with a fuel filter. Check this filter regularly for impurities and clean if necessary.

Check the tank for impurities on a regular basis. Clean the tank when necessary. Empty the fuel tank using the drainage screw at the bottom of the tank. Clean tank and fuel pipes thoroughly. Screw drainage screw back in.

Detergent and dirty fuel must be disposed of responsibly.

■ Adjusting ignition electrodes:





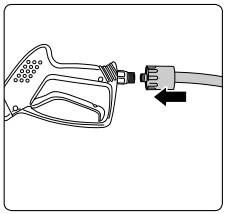
For a smooth ignition, the setting of the ignition electrode must be controlled regularly (after 500 operating hours at the latest).

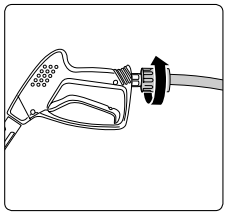
18 Commissioning

1. Connect to power circuit. **Make sure that the main switch is in the „OFF“ position.**

2. Connect machine to water mains (2 - 8 bar pre-pressure). Inside diameter of hose minimum 1/2“. The water storage tank is filled with water. The float valve shuts the water intake as soon as the tank is full.

3. Screw HP hose tightly to the cleaner.

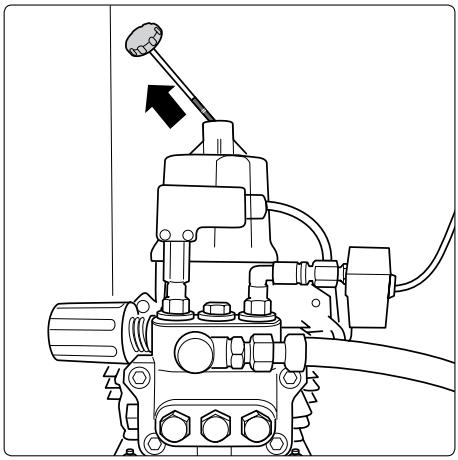




4. Push on HP hose to gun.

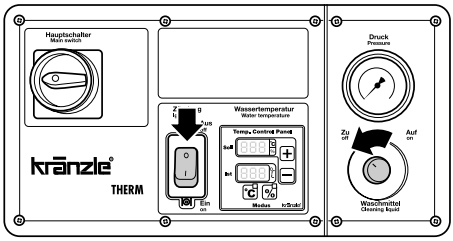
5. Screw together HP hose and gun pressure-tightly.

Take care that all screw connections are pressure-tight. A leakage of gun, high-pressure hose or hose drum has to be repaired at once. Leakages lead to an increased wear and to a possible malfunction of the delayed motor cut-out.



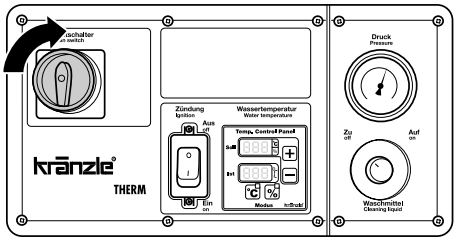
6. Always check oil level prior to operation!
Open the machine.
Do not start the machine if the oil level is not between the two markings on the oil-level glass. Refill with oil if necessary. See page 23.

■ Usage as cold water high-pressure cleaner



1. Ignition switch to **-OFF-** position

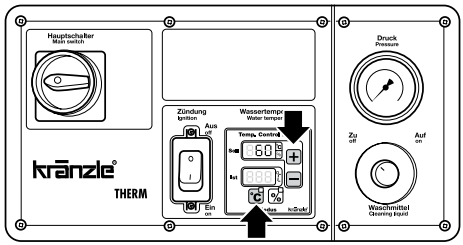
Detergent valve must be closed!
(Turn knob to extreme left position „close“)



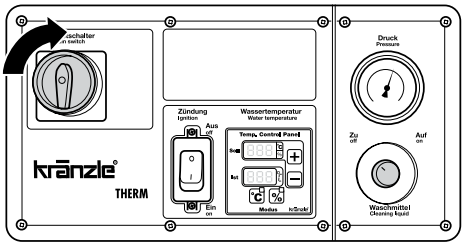
2. Switch on main switch with disengaged spray gun. Vent high-pressure cleaner: Pull and release trigger of spray gun various times.

Start cleaning process.

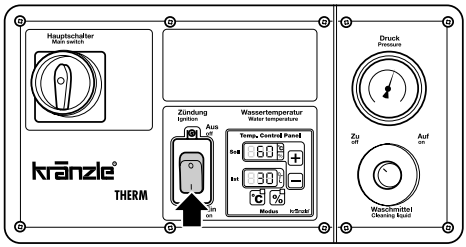
■ Usage as hot water high pressure cleaner



1. a) Temperature mode: Set desired temperature at the thermostat. (Min. temperature 40 °C)
b) Percentage mode: Set percentage value of the heat output



2. Switch on main switch with disengaged spray gun. Vent high-pressure cleaner: Pull and release trigger of spray gun various times.
Detergent switch must be closed!
(switch in left end position)



3. Start heating. The water is heated up and constantly kept at the set temperature.

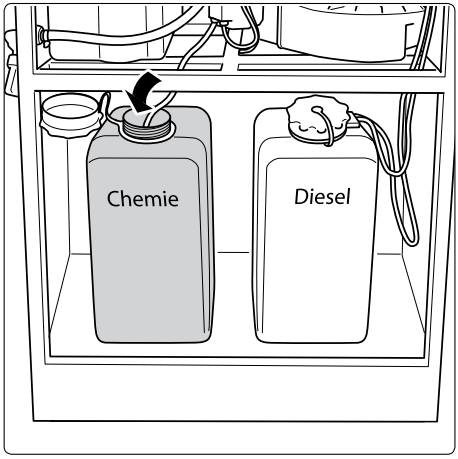
Start cleaning process.

20 Suction of detergents

With detergent supply from the suction side:

Detergent injectiors on the pressur side, as you probably know from other HP cleaners, consume approx. 30 % of the cleaning energy, no matter if they are used or not. Due to the water tank fitted to the Kränzle therm cleaners it is now possible to directly suck the detergent into the pump thus reducing output loss and increasing the efficency considerably.

The detergents are applied without having to reduce the working pressure.



1. Place detergent filter into detergent container.
2. Dosing of detergent is done by turning the detergent valve switch into the right.
3. By closing the detergent valve the supply of detergent is stopped.
4. After having used detergents rinse the appliance with open spray gun and clean water for at least 2 minutes.

Only open the dosing valve, if the detergent sieve is placed in a liquid. Sucked air leads to destruction of the pump seals! No guarantee!

Keep detergent-ph-value neutral 7 - 9!
Observe specifications of detergent manufacturer!
e.g.: protective equipment, rules for waste water treatment etc.

Never suck in liquids containing solvents like varnish solvents, petrol, oil or similar liquid! Observe specifications of detergent manufacturers!

Seals inside the appliance are not resistant against solvents! The spray mist of solvents is highly inflammable, explosive and poisonous.

Decommissioning - frost protection

1. **Switch off the machine - main switch to „0“- position**
2. **Cut off the water supply**
3. **Open the spray gun briefly until the pressure is released**
4. **Apply the gun**
5. **Remove the water hose and spray gun**
6. **Drain the pump: switch on the motor for approx. 20 seconds**
7. **Pull the plug from the socket**
8. **Clean HP hose and wind up; fix drum**
9. **Clean water filter**

Frost protection

The machine is normally still partially filled with water after work has been completed.

In case the cleaner is stored at temperatures below zero:
To protect the appliance from frost, completely empty it of water:
Disconnect the machine from the water supply and switch off the ignition. Switch on the master switch and open the gun. The pump now presses the remaining water out of the water tank, the pump and the continuous-flow heater.

Do not allow the machine to run for longer than a minute without water.

If the machine is not in use for lengthy frosty periods of time, it is advisable to pump anti-freeze into the machine: For this purpose, fill the antifreeze agent into the water tank and switch on the machine without heating. Wait with opened gun, until the agent comes from the nozzle.

However, the best protection against frost is to keep the machine in a place that is safe from frost.

22 Care and Maintenance

The machine must be disconnected from the power supply when servicing work is being carried out. The main switch should be in position „0“ and the plug out of the socket.

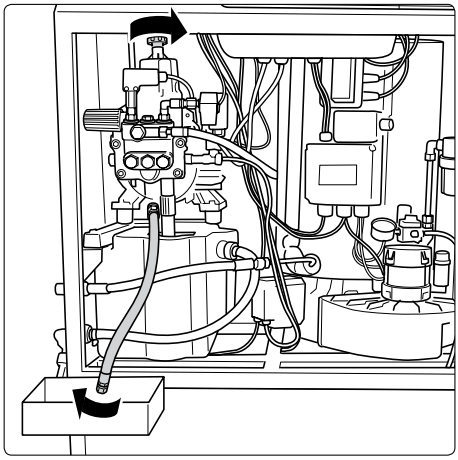
Weekly, or after approx. 40 hours of operation:

- Check the oil level of the high pressure pump. If the oil level is too low, add oil until the oil level is between the two markings on the oil sight glass.
  Change the oil if it has a grey or whitish appearance. The oil should be disposed of responsibly.
- Check the water filter at the water inlet and in front of the float valve in the water tank. Clean the filters if necessary.

Yearly, or after approx. 500 hours of operation:

- Check and decalcify continous flow heater, if necessary.
- Change the oil

Changing the oil:



First oil change after approximately **50 operating hours**. Thereafter the oil should be changed every 500 operating hours or yearly.

Take the oil drainage hose, which is connected to the oil drainage screw from the inside of the appliance.

Open the red oil filler plug at the top side of the black oil housing.

Open the cap at the end of the hose. Drain off the oil into an oil pan and dispose of it responsibly. Close the end of the hose. Refill with new oil.

Oil leakage: If oil leaks out, go to the nearest customer service (dealer) immediately. (Environmental damages, transmission damages)

In case of increased humidity or fluctuations in temperature development of condensed water is possible; if the oil turns grey, you must change it at once.

■ Decalcifying the heating coil:

Calcified machines use an unnecessary amount of energy because the water can only be heated slowly and the excess pressure valve feeds a part of the water back into the pump circuit.

Calcified machines can be recognised by increased pipeline resistance.

Check pipeline resistance by disconnecting the high pressure lance from the gun and switching the machine on. A full jet of water emerges from the gun. The machine must be decalcified if the pressure shown on the manometer is above **25 bars**.

Proceed as follows to decalcify the machine:

1. Unscrew the high pressure hose from the machine and decalcify it separately.
2. Put the detergent suction hose into a container of decalcifying solution.
3. Turn detergent switch on.
4. Switch on the machine.
5. Aim the gun into a separate container and press the trigger.
6. Wait for about a minute until the decalcifier comes out of the gun (recognisable by its whitish colour)
7. Switch off the machine and allow the solution to act for about 15-20 minutes.
8. Switch the machine back on and rinse it through with clear water for about 2 minutes.
9. Now check whether pipeline resistance is back to an acceptable level.

Repeat the decalcifying process if the pressure without the high pressure lance is still above 25 bars.

Decalcifiers are caustic! Observe the instructions for usage and accident prevention. Wear protective clothing to prevent the decalcifying agent from contacting your skin, eyes and clothing (e.g. gloves, safety mask etc.)

24 Particular rules, directives and inspections

Inspections performed by Kränzle

- measurement of earth line resistance
- measurement of voltage and current
- inspection of tension consistency with +/- 1530 V
- pressure check of heating coil at 300 bar
- visual and functional check as per the inspection sheet provided
- exhaust fume analysis (see test strips provided)

Guidelines for liquid sprayers

The machine conforms with the „Guidelines for liquid sprayers“. These guidelines are issued by the organisation of trade associations and may be obtained from Carl Heymann-Verlag KG, Luxemburger Str. 49, 50939 Köln. These guidelines specify that this machine is to be inspected by qualified personnel whenever necessary, but no less than once every 12 months. These inspections must be recorded in the inspection log at the end of this manual.

Pressure container and steam boiler directives

Kränzle high pressure cleaning equipment conforms to the pressure container and steam boiler directive. No construction approval, notification of licence and takeover inspection are required. The water capacity is less than 10 l.

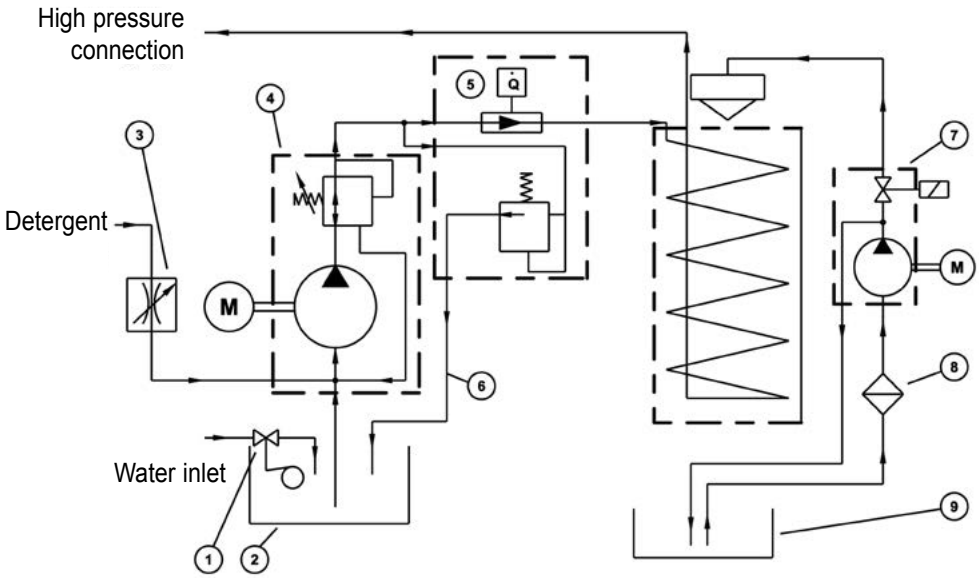
Duties of owner

The owner is to ensure that all safety-relevant components are in a serviceable condition before the sprayer is used. (e.g., safety valves, hose and electric cables, spray equipment etc.)

Emission control legislation

With stationary installation, the emission levels of the machine must be checked once a year by a qualified organisation or person according to German law. The first inspection must be carried out four weeks after the machine is commissioned. The owner is responsible for having the inspection performed.

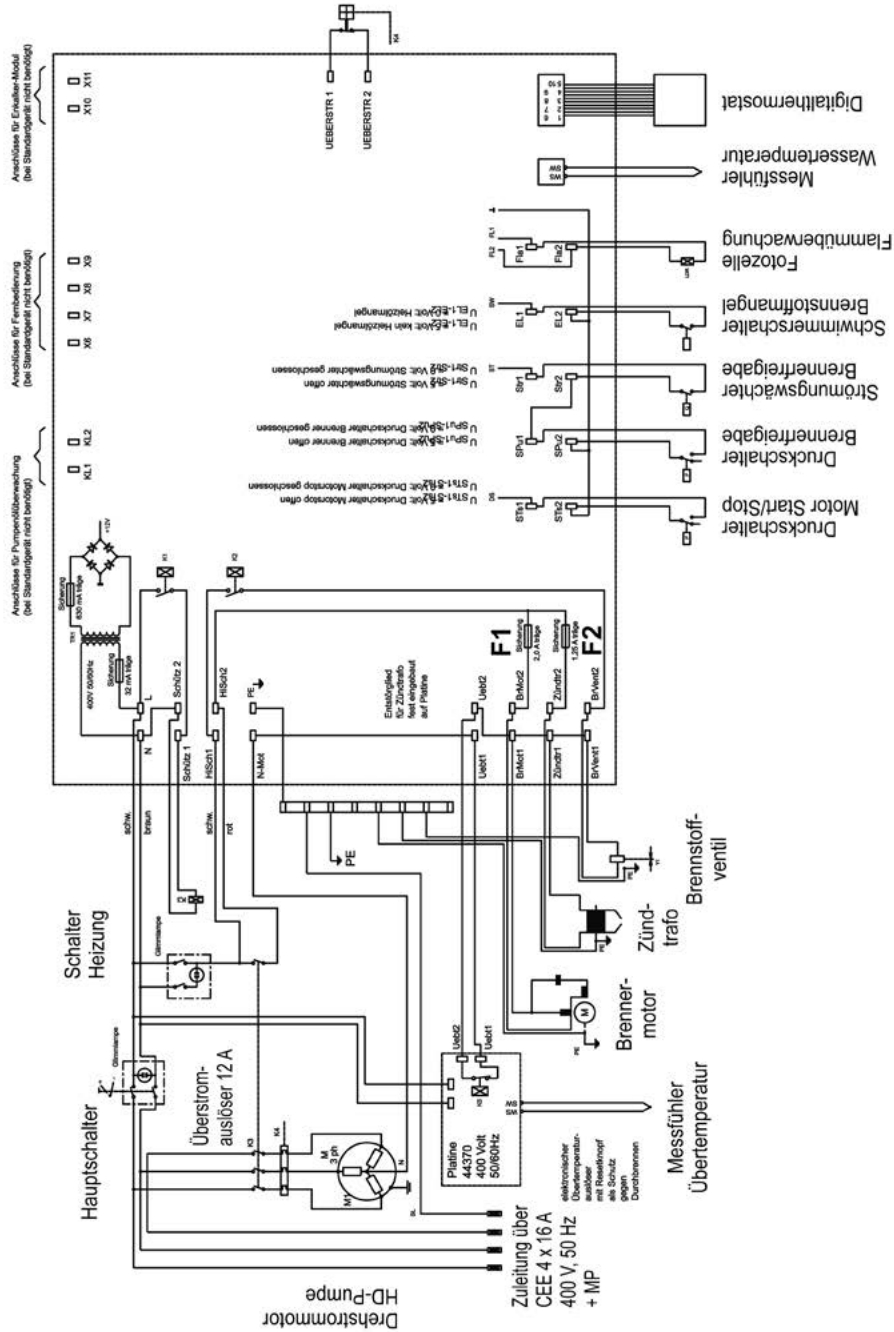
Pipeline plan



Safety valve number 5 must be set approx. 15 % higher than the unloader valve on the HP pump.

1 Float valve, water inlet
2 Water tank
3 Control valve detergent
4 High-pressure pump with integrated unloader valve
5 Flow-Safety-Block with integrated
safety valve for heating coil and flow monitoring device
6 By-Pass line
7 Fuel pump with solenoid valve
8 Fuel filter
9 Fuel tank

Circuit diagram 400 V, 50 Hz



28 Troubleshooting

Malfunction	Cause of malfunction / remedy
Water supply	
Water tank runs over.	Float valve is dirty or defective.
Water tank does not fill completely.	Float valve is defective. Water filter is dirty. Insufficient water inlet quantity.
Pump does not suck.	Valves stick or are dirty. Suction hose leaks. Chemistry valve is open or leaks. Check hose clips (connections). High-pressure nozzle is clogged.
Test: check water and chemical system for tightness.	Connect water inlet directly to the pump (2 - 4 bar pre-pressure). Disconnect suction lines below the pump
High-pressure pump	
Pump makes loud noises. Operating pressure is not reached.	Pump sucks air. Check suction connections. Check high-pressure nozzle. Check valves. Check O-rings under valves. Check sleeves. Manometer is defective. Unloader: check stainless steel seat and ball. Check seals on the control piston.
Water drops from the pump.	Replace sleeves in the pump. Replace O-rings.
Oil drops from the transmission.	Check oil seals (replace). Check plunger and plunger guides. Check water supply, since water deficiency or air suction can cause damage to seals and O-rings (chemistry valve leaks?)
Pressure is too low.	Worn high pressure nozzle. Stainless steel seat, ball, O-ring in unloader is dirty or defective. Manometer is defective.
Machine does not switch off	Check return body and O-ring in unloader of the valve housing.
Test: Bridge pressure switch (red)	Check pressure switch (red). Check micro switch. Check cable connections. Board is defective.
Appliance does not start or stops during operation	Check electricity supply. Check main switch. Check cable connections. Check board. Check pressure switch. Switch off by overcurrent release.

Troubleshooting

Displayed malfunctions

Display as follows		Cause	Action
TARGET	ACTUAL		
Err	OFF	Water temperature at heating chamber outlet above 147 °C	Operate appliance without heating „Heating OFF“ until the temperature has dropped below 147°C. Switch main switch „OFF“ and then back „ON“ again
AUS	E7	Appliance has not been operated for more than 20 minutes -> Safety cut-off	Switch main switch „OFF“ and then back „ON“ again.
Err	E2	Temperature sensor defective	Replace temperature sensor
FLA	E8	Warning Flame monitoring; No combustion was detected by the flame sensor after 2s	Check flame sensor; Check combustion system Switch main switch „OFF“ and then back „ON“ again.
OIL	Actual value	Fuel level inside tank too low	Refill fuel (Heating oil EL)
UES	Actual value	Motor overload protection, high-pressure pump has triggered	Check power supply, remove extension cable, nozzle clogged? Switch main switch to „OFF“ and back to „ON” again

■ Excess temperature release

As an additional safety device the appliance is equipped with an excess temperature sensor inside the chimney. Should the safety devices as e.g. the float monitoring device be defectice and the burner continues to heat although the heating coil does not conduct away heat a destruction of the heating coil would be inevitable. As soon as the temperature inside the chimney exceeds 260 °C the excess temperature release triggers and cuts out the appliance.

The display of the excess temperature release is located on the back of the switchbox inside the appliance.

RED: Excess temperature released, let appliance cool down, no hot water operation possible

YELLOW: Appliance cooled down, activation of hot water opertion possible by pressing the **RESET**-button.

ATTENTION !!!
Immediately contact service in case of recurrence!

30 Troubleshooting

■ Hot water mode

The fuel manometer shows the fuel pressure.
If no pressure is shown, check if

- there is heating oil in the tank.
- the fuse in the electric box (below the operating panel) for the motor has blown.
- the fuel sieve or the fuel sieve in the pump is dirty.
- the fuel pump does no operate smoothly or is blocked.
- the ventilator jams.

The thermostat grants permission to open the solenoid valve. The burner starts and heats the water to the temperature preset by you. As soon as the temperature is reached the burner switches off.

If the temperature drops again, the burner switches on automatically, so that the desired temperature is constantly kept.
The thermostat is controlled by a thermosensor, mounted to the outlet of the heating coil.

In the electro distributor box (below the operating panel), there is a fuse (circuit diagram F1) on the PCB which protects the motor for fuel pump and ventilator. If the motor is overloaded, the fuse blows. This can happen when the fuel pump is blocked or does not work freely, when the ventilator is blocked or does not operate freely or when there is an electrical problem.

A second fuse (circuit diagram F2) on the PCB triggers, if the ignition transformer is faulty.

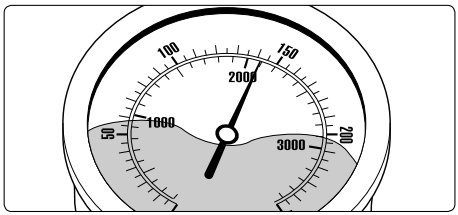
The transformer on the PCB is protected by two fuses (32 mA, 630 mA).

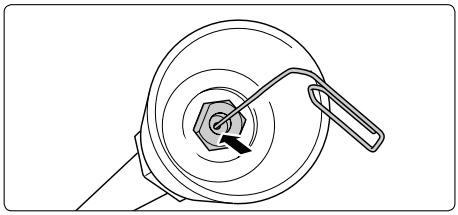
To avoid an overheating of the combustion chamber, a flow monitoring device is installed between high-pressure pump and combustion chamber, which only permits fuel injection if water is running through the heating coil at the same time.

Troubleshooting

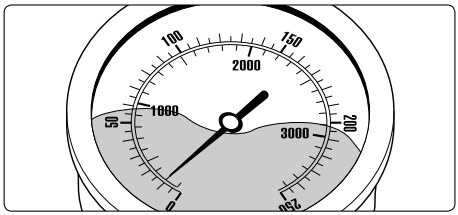
Malfunction	Cause of malfunction / remedy
Heating (burner)	
Fuel pump/blower operates, but burner does not heat.	Set water temperature is reached. Increase temperature on thermostat with rotary control switch. Open gun, until temperature drops. Fuel tank is empty. Fuel filter is dirty. Fuel nozzle is dirty.
Fuel pump/blower does not operate.	Coupling between burner motor and fuel pump is defective. Blower/fuel pump motor is defective. Check electrical equipment. Check fuse in electric box. Water in fuel tank.
- Pump makes loud noises. Fuel operating press. is not reached	Dirt or rust in the fuel pump. Clean tank. Replace fuel pump.
Smoke during operation. Smoke after switching off.	Fuel is dirty. Nozzle or nozzle stock leaks. Water in tank.
Solenoid valve on the fuel pump does not open **Test:** Pressure switch (black) Bridge in terminal box between terminal 3 +4 **Test:** Connect solenoid valve 230 V externally. Oil pressure on the fuel pump is too low/too high.	Check pressure switch (black). Solenoid valve is defective or dirty. Clean filter, clean supply line, clean fuel pump. Setting is wrong. Clean fuel nozzle, or replace it.
Ignition does not function.	Check ignition cable. Charring of plug-in contacts by moisture. Cable is broken. Check ignition transformer connections. Transformer is defective Ignition electrode has been falsely set or burnt up.
Ventilator does not operate.	Blower-/fuel pump motor is defective. Check electrical equipment. Check fuse in terminal box. Coupling between burner motor and fuel pump is defective.
Leakage	
Gun drips. High pressure hose drips.	Replace seals. Replace O-ring under screwed connection.
Manometer shows pressure but no water comes out.	Clean nozzle.
Sucking detergent	
Detergent is not sucked.	Pump sucks air. Check hose clips.
	Test: Connect water line to the pump. Water inlet: 2 - 4 bar pre-pressure. No water must come from the detergent hose.

Small repairs do it yourself!

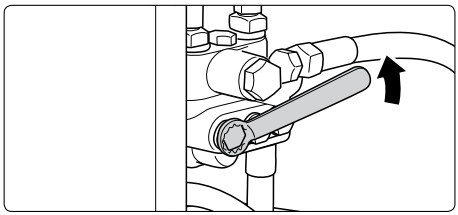




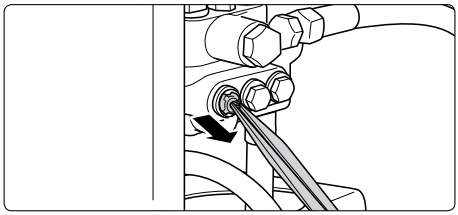
No water from the nozzle but the gauge shows full pressure: Most likely the nozzle is blocked. (Inside the pressure gauge there is no water but a filling with glycol to damp the vibration of the pointer.)
Proceeding: Switch off the cleaner. Pull plug from the socket. Operate gun seveal times to decrease the pressure. First unscrew gun and lance, then rinse hose from any residues. Check water inlet filter for soiling. If the problem still exists, take wire (paper clip) and push cautiously through nozzle opening. If this procedure is not successful, the nozzle has to be dismantled and cleaned (from the backside) or even replaced, if necessary.



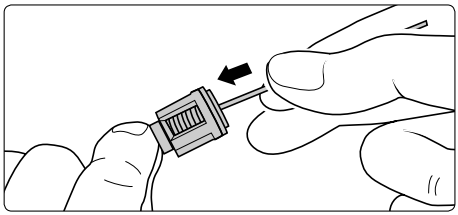
Pressure gauge shows little pressure, the water from the nozzle comes in squirts.
The high-pressure hose vibrates.
Most likely the valves are soiled.
(Inside the pressure gauge is no water but a filling with glycol to damp the vibration of the pointer).



Proceeding:
Unscrew all 6 valves, one after the other (hexagonal brass screws, 3 in a row, vertically and horizontally)

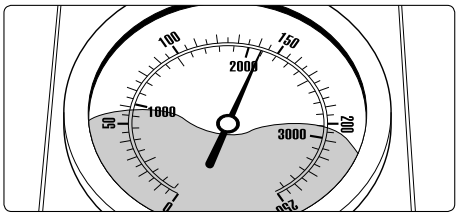


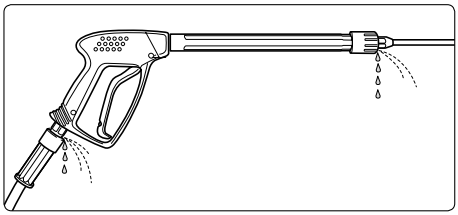
Take out valve body (with green or red plastic coating) and O-ring by means of needle nose pliers. Check O-ring for damage. In case of a damage the O-ring has to be replaced.

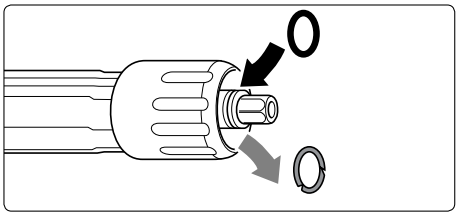


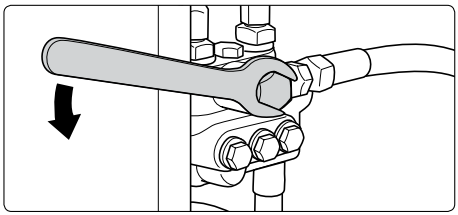
Take a wire (paper clip) and clean valves under running water. Also clean valve seating inside the pump.

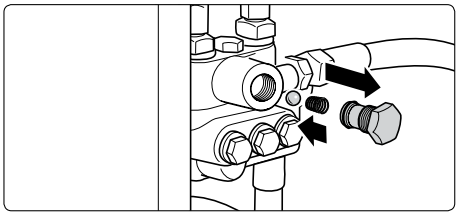
Do not forget the O-ring during reassembly!

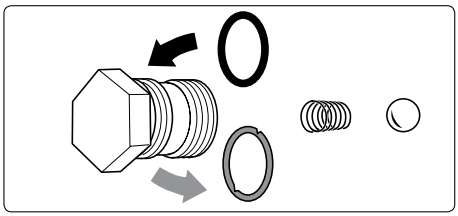












The pressure gauge shows full pressure although the gun has been closed. The pressure switch valve switches constantly.
Possible cause no.1: Leakage

Having closed th gun, the HP cleaner must shut down and the pressure gauge must show **„0“** bar. If the pressure gauge still shows full pressure and the motor constantly switches on and off, the possible reason for this can be a leakage of the pump, the HP hose or the lance.

Proceeding:
Check the connections from the HP cleaner to the the HP hose, from the hose to the gun and also the connection between lance and gun for tightness. Switch off the cleaner. Shortly press the trigger of the gun to decrease the pressure. Unscrew HP hose, gun and lance and check the O-rings. If the O-rings are damaged they have to be replaced.

In case of a leakage there is no guarantee for possible consequential damages.

Possible cause no. 2:
The non-return valve is soiled or defective

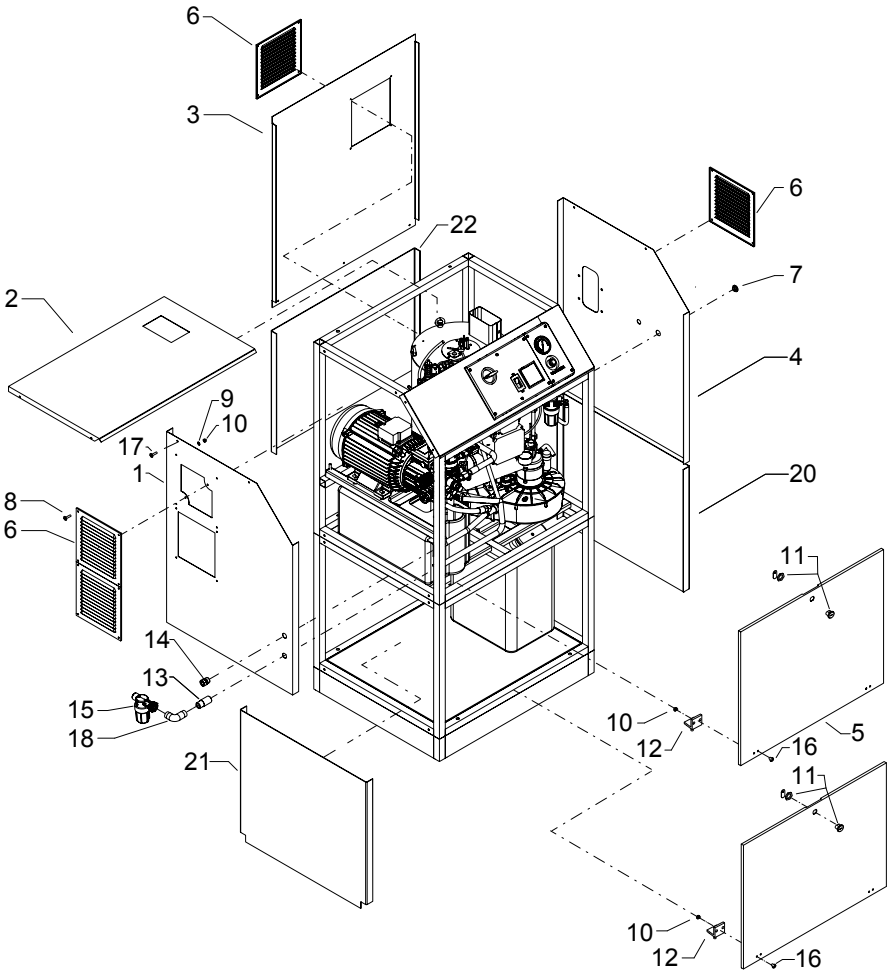
Proceeding:
Unscrew pump outlet.

Take out non-return valve body and check for soiling or damage of the O-ring.

Replace non-return valve if necessary.

There is no guarantee if the pump is damaged by defective O-rings due to air induction or lack of water (cavitation).

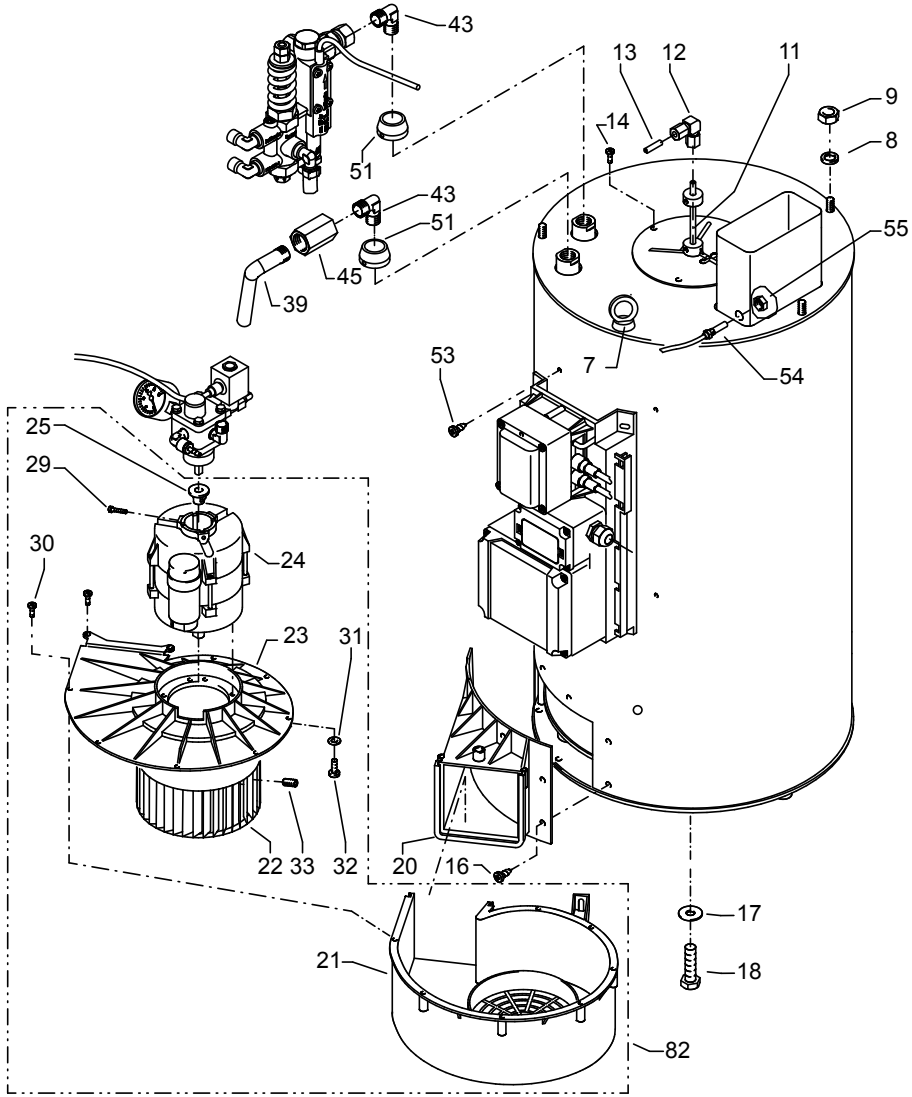
34 Spare parts list



Kränzle therm 895 ST, 1165 ST - housing

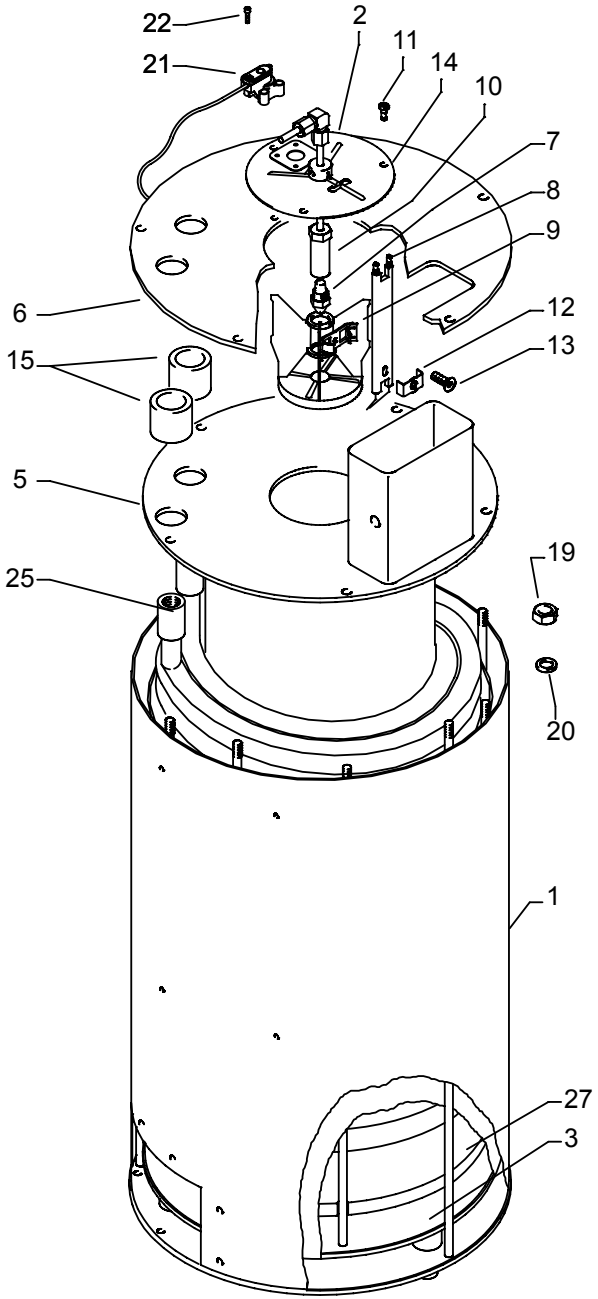
No	Description	Qty.	Ord.-No
1	Seitenblech links	1	47.111
2	Deckel	1	47.113
3	Rückwand	1	47.114
4	Seitenblech rechts	1	47.112
5	Frontblech	1	47.115
6	Wetterschutzgitter	3	47.100 2
7	Blindstopfen M20 x 1,5		
8	Kreuzschlitzschraube M4 x 10	22	43.470
9	Zahnscheibe Ø 4,3 mm	22	43.471
10	Mutter M4 (niedrige Bauform)	24	40.111
11	Schließzylinder	1	47.116
12	Winkel mit Bolzen	2	47.117
13	Sauganschluß Wassereing. 3/4“AG x 1/2“AG	1	41.016 1
14	HD-Ausgang	1	13.368
15	Wasserfilter	1	13.300 3
16	Innensechskantschraube M4 x 10	4	46.002
17	Kreuzschlitzschraube M6 x 12	11	43.421
18	Winkel 1/2 AG x 1/2 AG	1	41.282
20	Seitenblech rechts unten	1	
21	Seitenblech links unten	1	
22	Rückwand unten	1	

36 Spare parts list



Kränzle therm ST combustion chamber

No	Description	Qty.	Ord.-No
7	Ringmutter M 8 DIN 582	3	44.115
8	Federring A 8	3	44.222
9	Edelstahlmutter M 8	3	14.127 2
11	Brennstoffleitung „Düsenstock“ 115mm	1	44.089 1
12	Winkelverschraubung 6L x 6L	1	44.106
13	Brennstoffleitung Pumpe	1	44.108 1
14	Edelstahlschraube M 6 x 10	3	44.177
16	Blechschraube 6,3 x 13	7	44.109
17	Unterlegscheibe A 10,5 DIN 9021	3	50.182
18	Sechskantschraube M 10 x 20 DIN 933	3	44.116
20	Gebläsestutzen	1	44.068
21	Gebläsegehäuse	1	44.353
22	Lüfterrad	1	44.380
23	Gebläsedeckel	1	44.354
24	Brennermotor 200-240 V / 50/60 Hz	1	44.072 6
25	Steckkupplung	1	44.085
29	Schraube M 5 x 12	1	40.134
30	Schraube 5,0 x 25	9	41.414 1
31	Unterlegscheibe 4,3	4	44.059
32	Schraube M 4 x 8	5	44.091
33	Gewindestift M 6 x 8 DIN 914	2	44.090
39	Ermetorohr Wasserausgang	1	40.030
43	Einschraubwinkelverschr. 3/8“ x 12L	2	44.092
45	Verbindungsstück 1/8“ IG x 1/8“ IG	1	
51	Abschlussring	2	44.086 1
53	Blechschraube 4,8 x 13	6	44.112
54	Übertemperatur-Fühler	1	44.388
55	Mutter M10 x 1	1	44.172
82	**Gebläseeinheit**		**44.390**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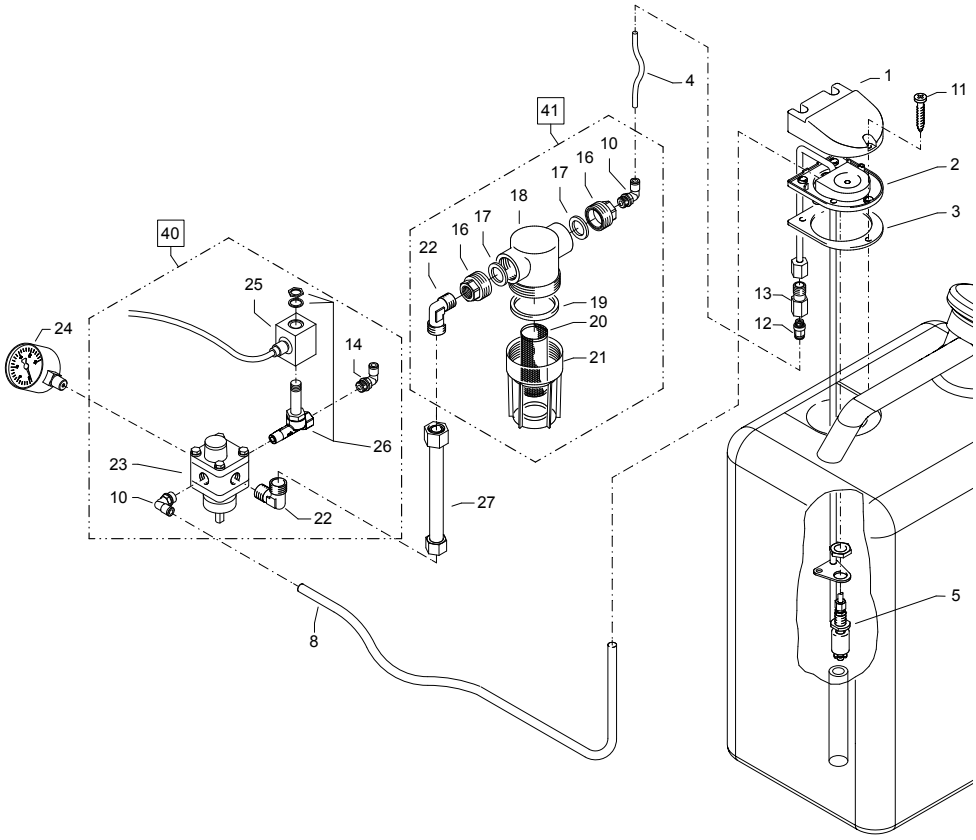
Kränzle therm ST comubstion chamber

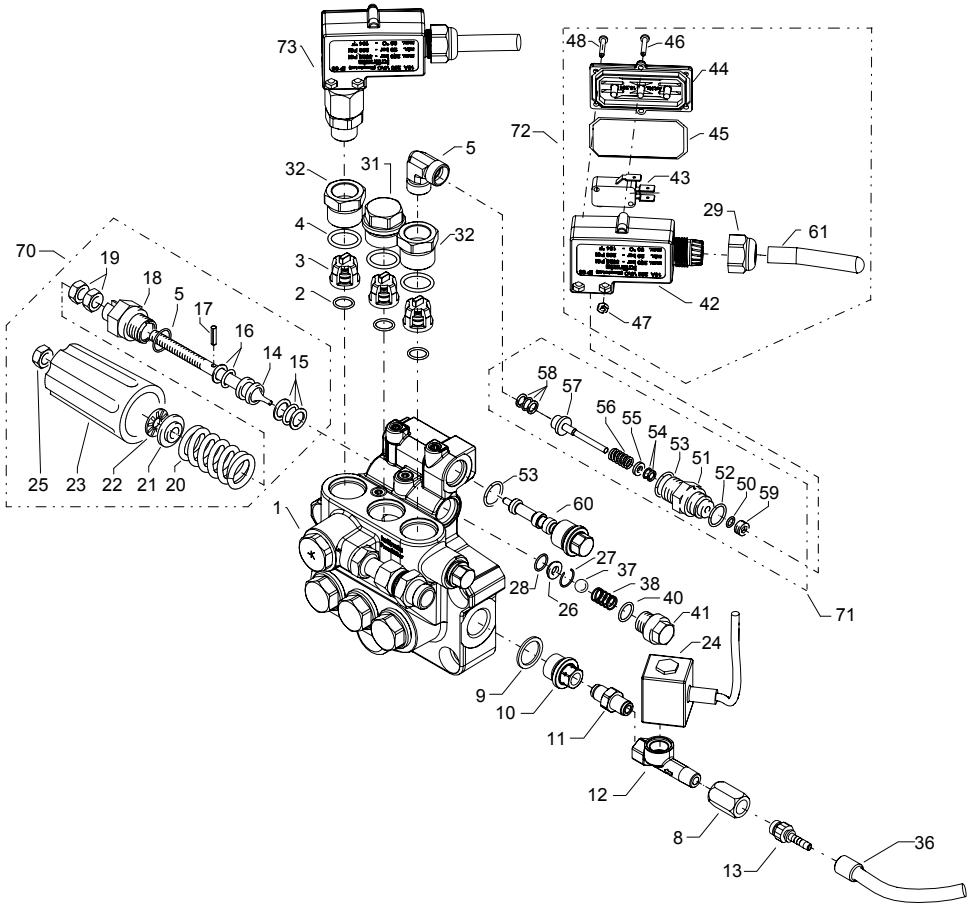
No	Description	Qty.	Ord.-No
1	Außenmantel mit Grundplatte	1	44.379
2	Deckel Düsenstock	1	44.079
3	Innenmantel mit Bodenplatte	1	44.378
5	Innendeckel mit Flammrohr	1	44.377
6	Außendeckel	1	44.066
7	Brennstoffdüse 60° B 1,50 gph bei 895-1	1	44.077
7.1	Brennstoffdüse 60° B 1,65 gph bei 1165-1 / 1525-1	1	44.077 3
8	Blockelektrode	1	44.080
9	Düsenstock Ø 25 mm, 6 Schlitze	1	44.076 4
10	Düsenhalter	1	44.078
11	Edelstahlschraube M 6 x 10	3	44.177
12	Klemmblech für Elektrode	1	44.076 1
13	Zyl.schraube mit ISK M 5 x 15 DIN6912	1	44.076 2
15	Zwischenhülse	2	44.376
19	Edelstahlmutter M 8	7	14.127 2
20	Federring A 8	7	44.222
21	Flammsensor optisch	1	44.256 1
22	Schraube M 4 x 10	4	46.002
25	Heizschlange	1	44.374
27	Isolationsplatte	1	44.360

40 Spare parts list



Kränzle therm ST fuel supply

No	Description	Qty.	Ord.-No
1	Deckel Brennstoffversorgung	1	44.011
2	Flansch mit Brennstoffleitungen	1	44.010 1
3	Gummidichtung	1	44.012
4	PA-Schlauch DN6	0,22 m	44.403
5	Schwimmerschalter	1	44.014
8	PA-Schlauch DN6	0,84 m	44.403
10	Steckverbinderwinkel 1/4“ x 6	2	44.405
11	Schraube 5,0 x 25	3	41.414 1
12	Steckverbinderstutzen 1/8“ x 6	2	44.407
13	Ermeto-Verschraubung R1/8“ x 6L	2	44.372
14	Steckverbinderwinkel 1/8“ x 6	1	44.408
16	Anschlussteil Brennstofffilter	2	44.214
17	Gummidichtung 3/4“	2	41.047 1
18	Filtergrundkörper	1	13.301
19	Gummidichtung	1	13.303
20	Siebkörper Brennstofffilter	1	44.213
21	Filterbecher	1	13.302
22	Einschraubwinkel R1/4“ AG x 10L	2	40.121 1
23	Brennstoffpumpe mit Magnetventil	1	44.073
24	Brennstoffmanometer 0-15 bar R1/8“	1	44.082
25	Spule für Magnetventil	1	44.251 3
26	Magnetventilkörper	1	44.251
27	Abstandsrohr 128 mm	1	44.084
40	**Brennstoffpumpe kpl.**		**44.371**
41	**Brennstofffilter kpl.**		**44.391**

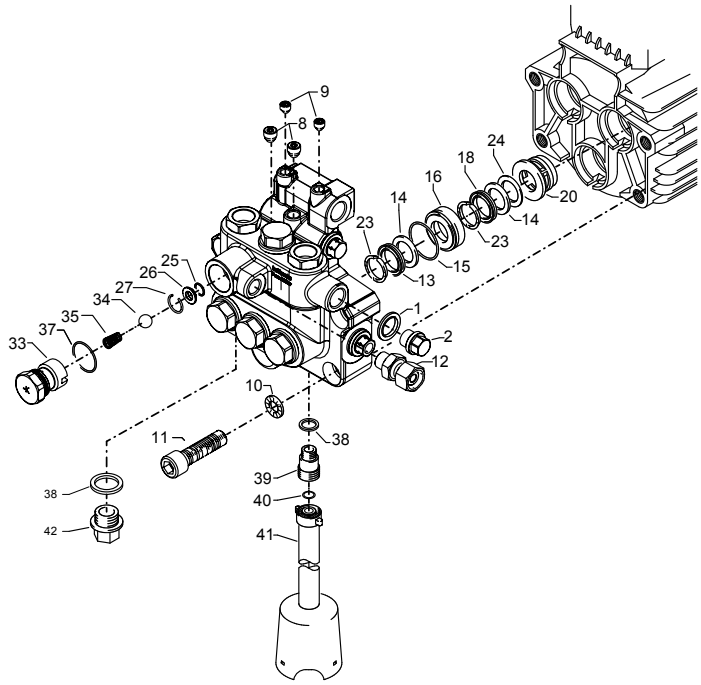


60	Verschlussschraube	1	14.113
61	Kabel 3 x 1,0mm² 0,49m	1	44.131 1
70	**Steuerkolben kpl. mit Handrad**		**44.209**
71	**Rep. Satz Druckschaltermechanik**		
72	**Druckschalter ohne Mechanik**		**44.389**
73	**Druckschalter schwarz komplett**		**12.632**

Kränzle therm ST unloader and pressure switch

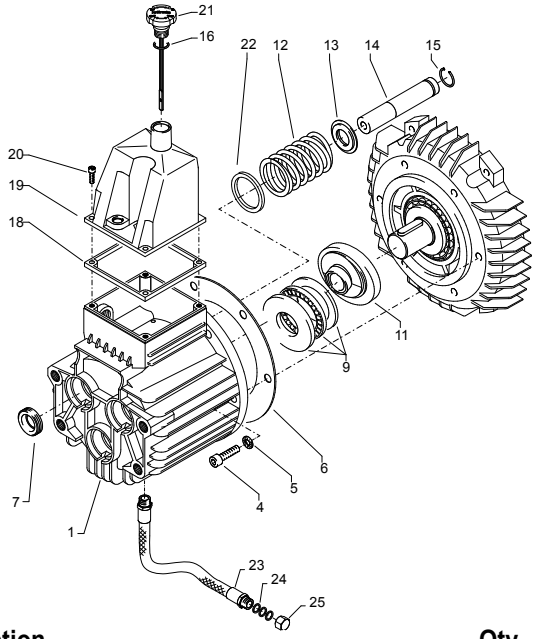
No	Description	Qty.	Ord.-No
1	Ventilgehäuse AM-Pumpe	1	40.451
2	O-Ring 15 x 2	6	41.716
3	Ventile für APG-Pumpe	6	41.715 1
4	O-Ring 15 x 2	6	13.150
5	Einschraubwinkel 1/4“ IG x 1/4“ AG	1	
8	Verbindungsstück 1/8“ IG x 1/8“ IG	1	
9	Dichtring	1	40.019
10	Nippel	1	
11	Doppelnippel	1	44.251 2
12	Magnetventil	1	44.251
13	Schlaucheinbindung NW 4,8	1	12.032 A
14	Steuerkolben	1	14.134
15	Parbaks 16 mm	1	13.159
16	Parbaks 8 mm	1	14.123
17	Spannstift	1	14.148
18	Kolbenführung spezial	1	42.105
19	Mutter M 8 x 1	2	14.144
20	Ventilfeder schwarz	1	14.125
21	Federdruckscheibe	1	14.126
22	Nadellager	1	14.146
23	Handrad AM-Pumpe	1	40.457
24	Magnetspule	1	44.251 1
25	Sicherungsmutter M8 x 1	1	14.152
26	Edelstahlsitz	1	14.118
27	Sprengring 1,3 x 15,5	1	13.147
28	O-Ring 11 x 1,44	1	12.256
29	Überwurfmutter PG11	2	15.203
31	Ventilstopfen	4	42.026
32	Ventilstopfen mit R1/4“ IG	2	42.026 1
36	Chemieschlauch	1	
37	Edelstahlkugel 8,5 mm	1	13.148
38	Edelstahlfeder	1	14.119
40	O-Ring 13,94 x 2,62	1	42.167
41	Druckschalter Blindstopfen	1	44.551
42	Gehäuse Elektroschalter schwarz	1	15.007
43	Mikroschalter	2	44.262
44	Deckel Elektroschalter (sw)	2	15.008
45	O-Ring 44 x 2,5	2	15.023
46	Blechschraube 2,9 x 19	12	15.024
47	Sechskant-Mutter M4	4	15.026
48	Zylinderschraube M4 x 20	4	15.025
50	O-Ring 3,3 x 2,4	2	12.136
51	Führungsteil Steuerstößel	2	15.009 1
52	O-Ring 13 x 2,6	2	15.017
53	O-Ring 14 x 2	2	43.445
54	Parbaks 4 mm	2	12.136 2
55	Stützscheibe	2	15.015 1
56	Edelstahlfeder	2	15.016
57	Steuerstößel	2	15.010
58	Parbaks 7 mm	1	15.013
59	Stopfen M 10 x 1 (durchgebohrt)	2	13.385 1

44 Spare parts list - Valve housing



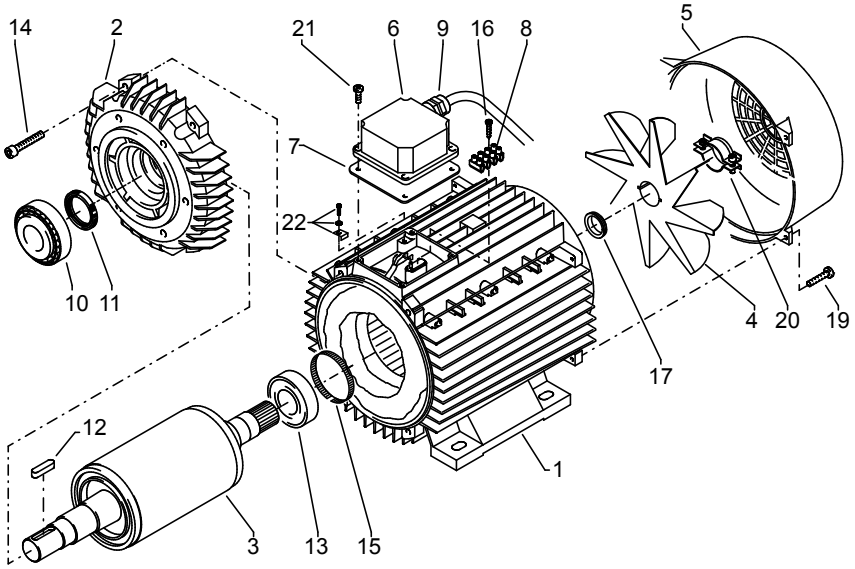
No	Description	Qty.	Ord.-No.
1	Dichtring 17 x 22 x 1,5 (Kupfer)	1	40.019
2	Stopfen 3/8“	1	40.018
3	Ansaugschlauch mit Nippel R 1/4“	2	44.096 4
8	Dichtstopfen M10 x 1	2	43.043
9	Dichtstopfen M8 x 1	2	13.158
10	Sicherungsring	4	40.032
11	Innensechskantschraube M12 x 45	4	40.504
12	Ausgangsteil Pumpe R 1/4“ x 12	1	44.215
13	Gewebemanschette 20 mm	3	40.023
14	Backring 20 mm	6	40.025
15	O-Ring 31,42 x 2,62	3	40.508
16	Leckagering 20 mm	3	40.509
18	Manschette 20 mm	3	40.512
20	Distanzring mit Abstützung	3	40.507
23	Druckring 20 mm	6	40.021
24	Zwischenring 20 mm	3	40.516
25	O-ring 11 x 1,5	1	12.256
26	Edelstahlsitz Ø 7 mm	1	14.118
27	Sprengring	1	13.147
33	Ausgangsteil	1	40.522
34	Edelstahlkugel	1	12.122
35	Rückschlagfeder „K“	1	14.120 1
37	O-Ring 18 x 2	1	43.446

Spare parts list - drive



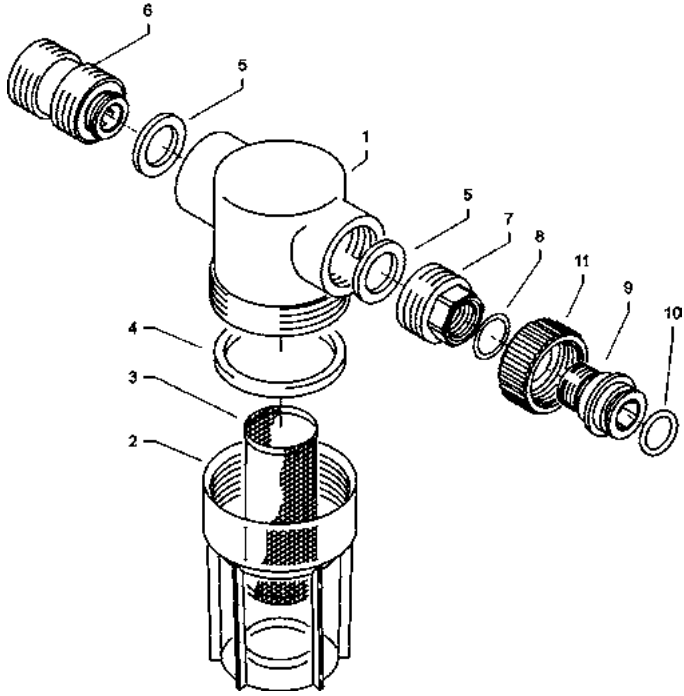
No	Description	Qty.	Ord.-No.
1	Ölgehäuse	1	40.501
4	Innensechskantschraube M 8 x 30	6	41.036 1
5	Sicherungsscheibe	6	40.054
6	Flachdichtung	1	40.511
7	Öldichtung 20 x 30 x 7	3	40.044 1
9	Axial-Zylinderrollenlager AQ-Pumpe	1	40.524
11	Taumelscheibe 9,5° bei 895	1	40.523-9,5
11.1	Taumelscheibe 12° bei 1165	1	40.523-12,0
12	Plungerfeder	3	40.506
13	Federdruckscheibe	3	40.510
14	Plunger 20 mm (lang)	3	40.505
15	Sprengring	3	40.048
16	O-Ring 14 x 2	1	43.445
18	Flachdichtung	1	41.019 3
19	Deckel	1	40.518
20	Innensechskantschraube M 5 x 12	4	41.019 4
21	Ölmessstab	1	42.520
22	Stützscheibe für Plungerfeder	3	40.513
23	Ölablassschlauch	1	44.128 1
24	Kupferring 8 x 14 x 1,5	1	41.500
25	Verschlusskappe	1	44.130
26	Einschraubwinkel 3/8“ x 3/8“	1	44.127
	Ölgehäuse AQ kpl. ohne Taumelscheibe Pos. 1, 4-7, 12-15, 22		**40.514**

46 Spare parts list - engine



No	Description	Qty.	Ord.-No.
1	Stator BG100 2,3kW 230V / 50Hz	1	40.720
	Stator BG100 4,8kW 400V 7 50Hz	1	40.710
2	A-Lager Flansch	1	40.700
3	Rotor BG100 230V / 50Hz	1	40.703 1
	Rotor BG 100 400V / 50Hz	1	40.703
4	Lüfterrad BG100	1	40.702
5	Lüfterhaube BG 100	1	40.701
6	Klemmkasten	1	40.534
7	Flachdichtung	1	43.030
8	Lüsterklemme 2,5 mm² 4-polig	1	43.031 1
9	PG-Verschraubung PG 13,5	1	40.539
10	Schrägkugellager 7306	1	40.704
11	Öldichtung 35 x 47 x 7	1	40.080
12	Passfeder 8 x 7 x 28	1	40.459
13	Kugellager 6206 - 2Z	1	40.538
14	Innensechskantschraube M 6 x 30	4	43.037
15	Toleranzhülse	1	40.544 1
16	Blechschraube 2,9 x 16	1	43.036
17	V-Seal	1	40.545
19	Schraube M 4 x 12	4	41.489
20	Schelle für Lüfterrad BG100	2	40.535
21	Schraube M 4 x 12	4	41.489
22	Erdungsschraube kpl.	1	43.038

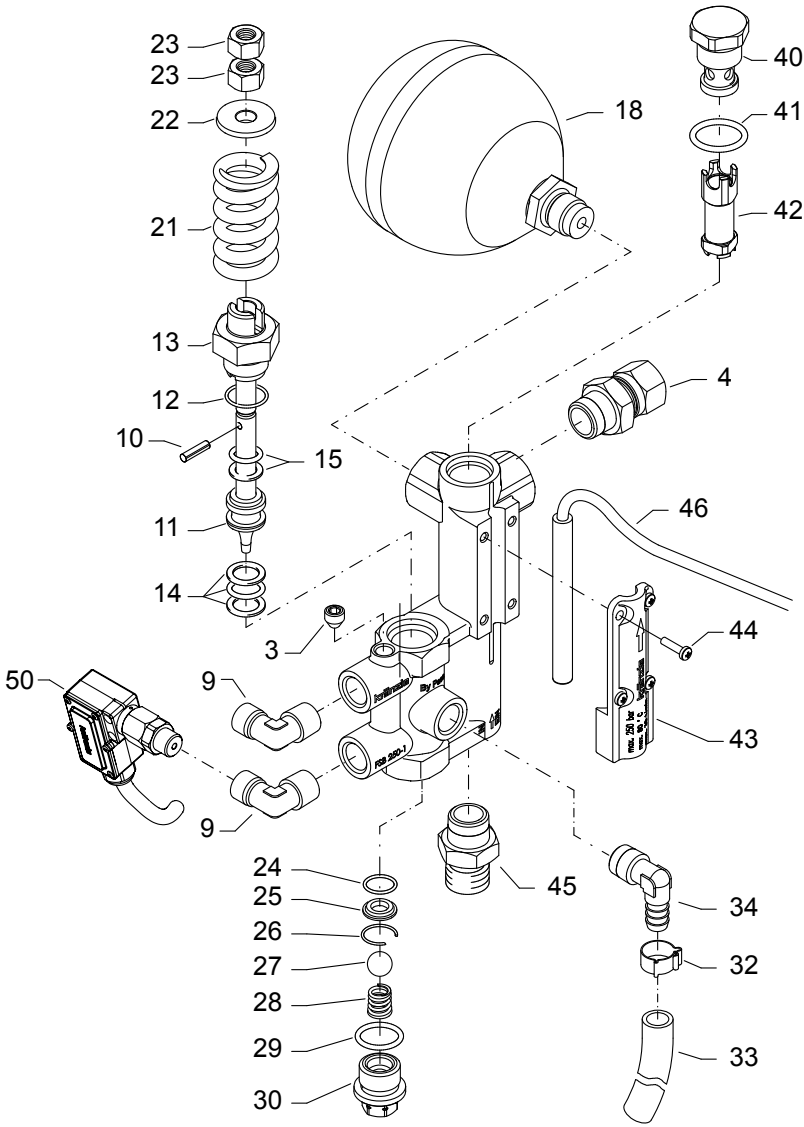
Spare parts list - water filter



No	Description	Qty.	Ord.-No.
1	Filtergrundkörper	1	13.301
2	Filterbecher	1	13.302
3	Siebkörper	1	13.304
4	Gummidichtung	1	13.303
5	Gummidichtung 3/4“	2	41.047 1
6	Eingangsteil beids. 3/4“ AG	1	13.305
7	Anschlussteil	1	13.306
8	O-Ring 14 x 2	1	43.445
9	Tülle	1	13.307
10	O-Ring 13 x 2,6	1	13.272
11	Überwurfmutter	1	41.047 5
	Filter komplett		**13.300 3**

Spare parts list

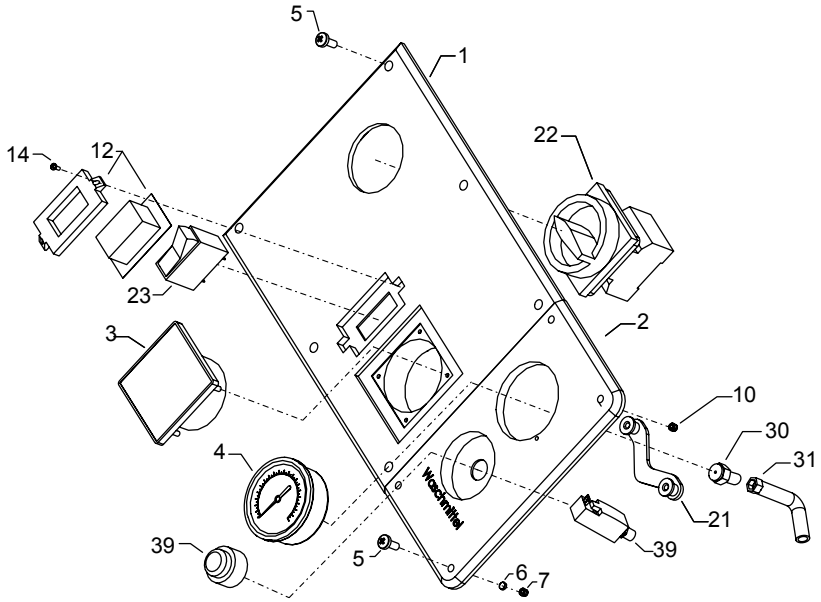
(Setting must be 15% higher than operating pressure)



Kränzle therm ST - Flow-Safety-Block

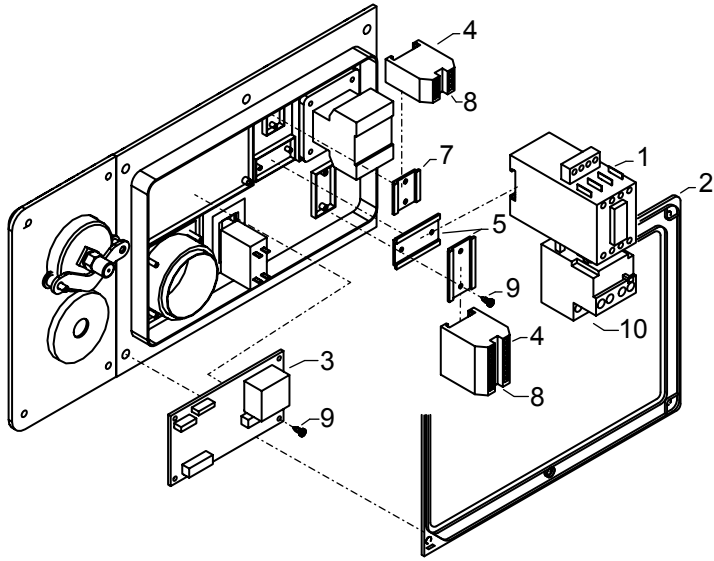
No	Description	Qty.	Ord.-No
1	Ventilkörper FSB250-1	1	14.215
3	Dichtstopfen M 8 x 1	1	13.158
4	Ermetoverschraubung R 3/8“ x 12 mm Rohrstutzen	1	44.365
9	Ermetowinkel R 1/4“ x 6L	2	44.062
10	Spannstift	1	14.148
11	Steuerkolben	1	14.110
12	O-Ring 16 x 2,0	1	13.150
13	Kolbenführung	1	14.130
14	Parbaks 16 mm	1	13.159
15	Parbaks 8 mm	1	14.123
18	Hydrospeicher	1	44.140
21	Ventilfeder	1	14.125
22	Federdruckscheibe	1	14.126
23	Sechskantmutter M 8 x 1	2	14.144
24	O-Ring 11 x 1,44	1	12.256
25	Edelstahlsitz 7,0 mm	1	14.118
26	Sprengring	1	12.258
27	Edelstahlkugel 10 mm	1	12.122
28	Edelstahlfeder	1	14.119
29	O-Ring 13.94 x 2,62	1	42.167
30	Verschlussschraube	1	14.113
32	Schlauchschelle	1	44.363
33	PVC-Schlauch DN 6	0,7m	44.403
34	Winkeltülle R 1/4“ x 8	1	14.212
35	HD-Schlauch Eingang Brennkammer	1	44.384
40	Anschlagstopfen mit Zapfen Strömungswächter	1	14.219
41	O-Ring 14 x 2	1	43.445
42	Strömungskörper mit Zapfen für Feder	1	14.218
43	Abdeckung	1	12.603
44	Schraube M 4 x 8	4	44.216
45	Verschraubung M18x1,5 x 12L	1	44.364
46	Magnetschalter	1	40.594 2
50	Druckschalter kpl. Rot	1	44.757
	Steuerkolben kpl. Pos. 10-15; 21-23		**14.110 1**
	Flow-Safety-Block kpl. Pos. 1-15; 21-45		**14.235**

50 Spare parts list - console



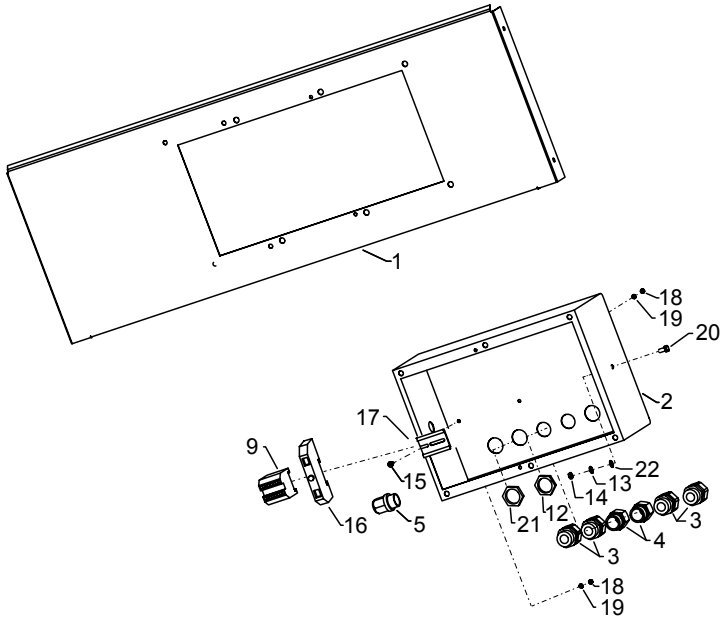
No	Description	Qty.	Ord.-No.
1	Frontplatte Elektrik 891	1	44.042
2	Frontplatte Manometer	1	44.043
3	Bedienteil	1	44.257
4	Manometer 601 – 871 250bar	1	15.039 1
4.1	Manometer 891 400bar	1	15.039 4
5	Schraube M 5 x 14	10	40.536
6	Unterlegscheibe Ø 5,3 mm	4	40.135
7	Mutter M 5	4	44.113 1
10	Sicherungsmutter M 4	4	40.111
12	Klemmrahmen mit Schalterabdichtung	1	41.110 5
14	Kunststoffschraube 3,5 x 9,5	2	41.088
21	Klemmbügel für Manometer	1	44.049
22	Hauptschalter	1	40.046
23	Heizungsschalter	1	41.111 6
30	Anschlussmuffe Manometer	1	44.136
31	Druckmeßleitung	1	44.102 1
39	Chemieschalter kpl.	1	44.620

Spare parts list - console



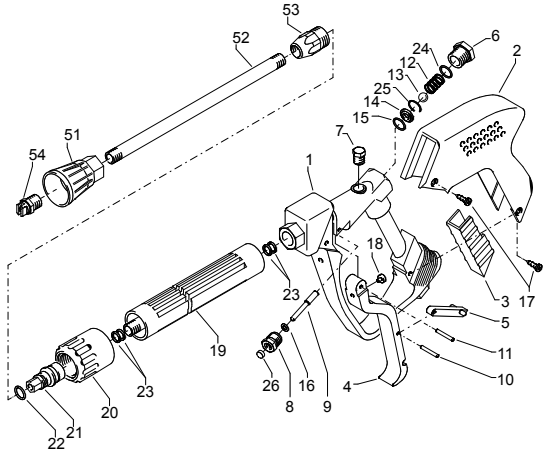
No	Description	Qty.	Ord.-No.
1	Schütz 400V	1	46.005 1
2	Gummidichtung Elektrik	1	44.044
3	Steuerplatine	1	44.255
4	Klemme Wago 2,5mm²	10	44.047
5	Hutschiene 50 mm	2	44.125 1
7	Hutschiene 30 mm	1	44.125 2
8	Erdungsklemme Wago 2,5mm²	3	44.048
9	Blechschraube 3,9 x 9,5	10	41.636
10	Überstromauslöser 12,5A 601-871	1	42.641 2
10.1	Überstromauslöser 16A 891	1	42.641

52 Spare parts list - console



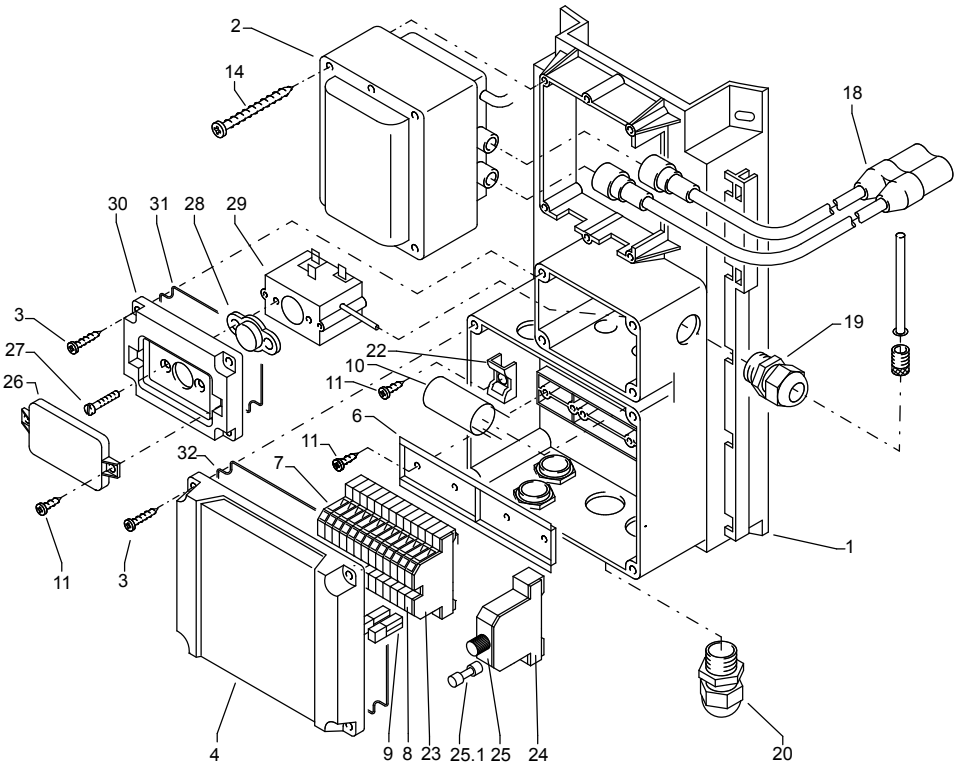
No	Description	Qty.	Ord.-No.
1	Konsolenblech	1	44.122
2	Schaltkasten	1	44.123
3	PG 16 Verschraubung	4	40.145
4	Verschraubung M20	2	
5	PG 9 Verschraubung (3-teilig)	1	43.034
9	Klemme Wago 2,5 mm²	6	44.047
12	Gegenmutter für M20 Verschraubung	2	
13	Federring M20	1	
14	Mutter M6	1	14.127 1
16	Sicherung	1	44.166
17	Klemmschiene 30mm	1	44.125 2
18	Mutter M4	6	12.138
19	Zahnscheibe Ø 3,2mm	4	
20	Sechskantschraube M6 x 20	1	42.012 1
21	Gegenmutter für PG 16 Verschraubung	4	44.119
22	Unterlegscheibe Ø 6,4	2	50.189

Spare parts list - Starlet



No	Description	Qty.	Ord.-No.
1	Ventilkörper mit Handgriff	1	12.294
2	Schutzhülse	1	12.295
3	Abdeckschutz	1	12.296
4	Betätigungshebel grau	1	12.298 3
5	Sicherungshebel	1	12.149
6	Abschlussschraube M 16 x1	1	12.247
7	Stopfen	1	12.287
8	Gewindeführungshülse Ø3 R 1/4“ AG	1	12.250 1
9	Aufsteuerbolzen Ø3	1	12.284 1
10	Stift	1	12.148
11	Lagernadel	1	12.253
12	Edelstahlfeder	1	12.246
13	Edelstahlkugel 8,5	1	12.245
14	Edelstahlsitz Ø7	1	14.118
15	O-Ring 11 x 1,44	1	12.256
16	O-Ring 2,84 x 2,62	1	12.136 1
17	Blechschraube 3,9 x 8,5	4	41.079
18	Druckstück	1	12.252
19	Rohr kunststoffumspritzt bds. R 1/4“ AG	1	15.004 5
20	Überwurfmutter ST 30 M22 x 1,5 IG	1	13.276 1
21	Außen-Sechskant-Nippel R 1/4“ IG	1	13.277 1
22	O-Ring 9,3 x 2,4	1	13.273
23	Aluminium-Dichtring	4	13.275
24	O-Ring 15 x 1,5	1	12.129 1
25	Sicherungsring	1	12.258
26	Gleitschuh Ø3	1	12.289 1
51	Düsenschutz	1	26.002
52	Rohr 600 mm; bds. R1/4“	1	12.385 2
53	ST 30 Nippel M 22 x 1,5 / R1/4” m. ISK	1	13.370
54	Flachstrahldüse 2504 (bei quadro 800)	1	D2504
54.1	Flachstrahldüse 2505 (bei quadro 1000)	1	D2505
54.2	Flachstrahldüse 2507 (bei quadro 1200)	1	D2507

54 Spare parts list



Kränzle therm ST

No	Description	Qty.	Ord.-No.
1	Konsole mit intr. Klemmkasten	1	44.067 1
2	Transformator 230 V / 50 Hz	1	44.074
3	Kunstoffschraube 4,0 x 25	8	43.425
4	Deckel für Klemmkasten	1	44.075 2
6	Hutschiene für Verteilerkasten	1	44.125
7	Durchgangsklemme grau	18	44.047
8	Durchgangsklemme grün/gelb	3	44.048
9	Querbrücker 24 A	6	44.047 1
10	Entstörkondensator	1	44.124
11	Blechschraube 3,9 x 9,5	7	12.172
14	Kunstoffschraube 4 x 60	4	43.420
18	Zündkabel mit Stecker	1	44.114
19	Pg- Verschraubung PG 16	2	44.419 1
20	PG-Verschraubung PG 11	5	41.419
22	Haltesockel für Entstörglied	1	44.178
23	Abdeckplatte für Durchgangsklemme	1	44.047 2
24	Abdeckplatte für Sicherungsklemme	1	44.166 1
25	Halteklemme für Feinsicherung	1	44.166
25.1	Feinsischerung 3,15 A träge	1	44.166 3
26	Abdeckkappe Überstromauslöser	1	44.154
27	Schraube M 4 x 12	2	41.089 1
28	Dichtung für Überstromauslöser	1	44.157
29	Übertemperaturauslöser	2	44.169
30	Deckel für Übertemperaturauslöser	2	44.182
31	Dichtung für Deckel Übertemperaturauslöser	1	44.182 1
32	Dichtung für Deckel Klemmkasten	1	44.075 3

kränzle

56 Inspection report for HP cleaners

Inspection report on annually carried out Labour Safety Inspection (UVV) according to the Guidelines for Liquid Spray Equipment. (This inspection sheet serves as proof for the completion of the retest and must be kept carefully!) Kränzle-Test Stamp Mark: Order Number UVV200106

Owner: ..... Type **therm**: .....

Address: ..... Serial no.: .....

..... Rep.-order-no.: .....

Scope of inspection:	**ok**	**yes**	**no**	**repaired**
Type plate (on hand)				
Operating manual (on hand)				
Protective covering, -device				
Pressure line (tightness)				
Pressure gauge (function)				
Float valve (tightness)				
Spraying device (marking)				
HP-hose/ connector (damage, marking)				
Safety valve opens at 10% / 20% excess				
Pressure reservoir				
Heating oil line (tightness)				
Solenoid valve (function)				
Thermostat (function)				
Flow controller (function)				
Power cable (damage)				
Power plug (damage)				
Protective conductor (connected)				
Emergency Off Switch (function)				
On/Off-switch				
Water quantity safety device (function)				
Used chemicals				
Allowed chemicals				

Inspection data	**determ. value**	**set value**
High-pressure nozzle		
Operating pressure .....bar		
Cutting-off pressure.....bar		
Smoke spot number.....acc. to Bacharach scale		
CO^2-value.....% CO^2		
Efficiency rating.....%		
Conductor resist. not exceeded / value:		
Insulation		
Leakage current:		
Gun locked		

Inspection result (tick)

☐ The appliance was checked by an expert according to the Guidelines for Liquid Spray Equipment, the defects found have been rectified so that the Labour Safety can be confirmed.

☐ The appliance was checked by an expert according to the Guidelines for Liquid Spray Equipment. The Labour Safety cannot be confirmed unless the defects found are rectified by repair or replacement of the faulty parts.

The next retest according to the Guidelines for Liquid Spray Equipment has to be carried out by:
Month ..... Year .....

Place, Date..... Signature .....

Inspection report for HP cleaners

Inspection report on annually carried out Labour Safety Inspection (UVV) according to the Guidelines for Liquid Spray Equipment. (This inspection sheet serves as proof for the completion of the retest and must be kept carefully!) Kränzle-Test Stamp Mark: Order Number UVV200106

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Inspection result (tick)

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The next retest according to the Guidelines for Liquid Spray Equipment has to be carried out by:

Month ..... Year .....

Place, Date ..... Signature .....

EC declaration of conformity

We hereby declare that the design of the HP cleaners: **Kränzle therm 895 ST, 1165 ST**

technical specifications available from: **Manfred Bauer, Fa. Josef Kränzle**
Rudolf-Diesel-Str. 20, 89257 Illertissen

comply with the following guidelines and their amendments for high-pressure cleaners: **Machinery directive 2006/42/EC,**
EMV-directive 2004/108/EC,

Applied specifications and standards:
EN 60 335-2-79: 2009
EN 55 014-1: 2006
EN 55 014-2 / A2: 2008
EN 61 000-3-2: 2006
EN 61 000-3-3: 2008

I. Kränzle GmbH
Elpke 97
D - 33605 Bielefeld

Bielefeld, 30.07.2012

Kränzle Josef
Managing director

Guarantee

■ The guarantee is only valid for material and manufacturing errors.
Wearing does not fall within this gurantee.

The instructions in our operating manual must be complied with..
The operating instructions form part of the guarantee.

The guarantee period is **12 month** from date of purchase**.**

In the case of a guarantee please contact your dealer or authorized seller delivering accessories and your purchase receipt. You can fin them in the internet under **www.kraenzle.com.**

The guarantee is also void if the machine is used with exceeding the temperature and speed limits, a voltage below the required rating, with less than the required amount of water or with dirty water.

Pressure gauge, nozzle, valves, sleeves, high pressure hose and spray equipment are wear parts and are not covered by the warranty.

Inspection sheet Kränzle therm

Customer .....

All lines connected	☐
Hose clamps tight	☐
Screws all installed and tightened	☐
Ignition cable plugged in	☐
Visual check carried out	☐
Brake function checked	☐

Leak test

Water tank filled and checked	☐
Water inlet checked for tightness	☐
Float valve function checked	☐
Machine checked for tightness under pressure	☐

Electrical check

Earth line checked	☐
Current intake	
Operating pressure	
Switch-off pressure	

Steam phase checked ☐
Chemical valve checked ☐
Start/Stop automatic and re-run delay checked ☐
Fuel shortage switch checked ☐
Thermostat function checked ☐
Burner function checked ☐

Water inlet temperature
5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 °C

Water outlet temperature
60 | 62 | 64 | 66 | 68 | 70 | 72 | 74 | 76 | 78 | 80 | 82 | 84 | 86 | 88 | 90 °C

Fuel pressure bar
9 | 9,5 | 10 | 10,5 | 11 | 11,5 | 12 | 12,5 | 13 | 13,5 | 14 | 14,5 | 15 | 15,5 | 16 | 16,5 bar

Measured smoke spot number
0 | 1 | 2 | 3

Result of flue gas analysis

Safety equipment sealed with lacquer ☐
The appliance fulfills all requirements according to this inspection sheet ☐

Name of inspector .....
Date .....
Signature .....

I. Kränzle GmbH
Elpke 97
D - 33605 Bielefeld

Subject to technical modifications. Order no:

Effective 09.07.2014

Made
in
Germany