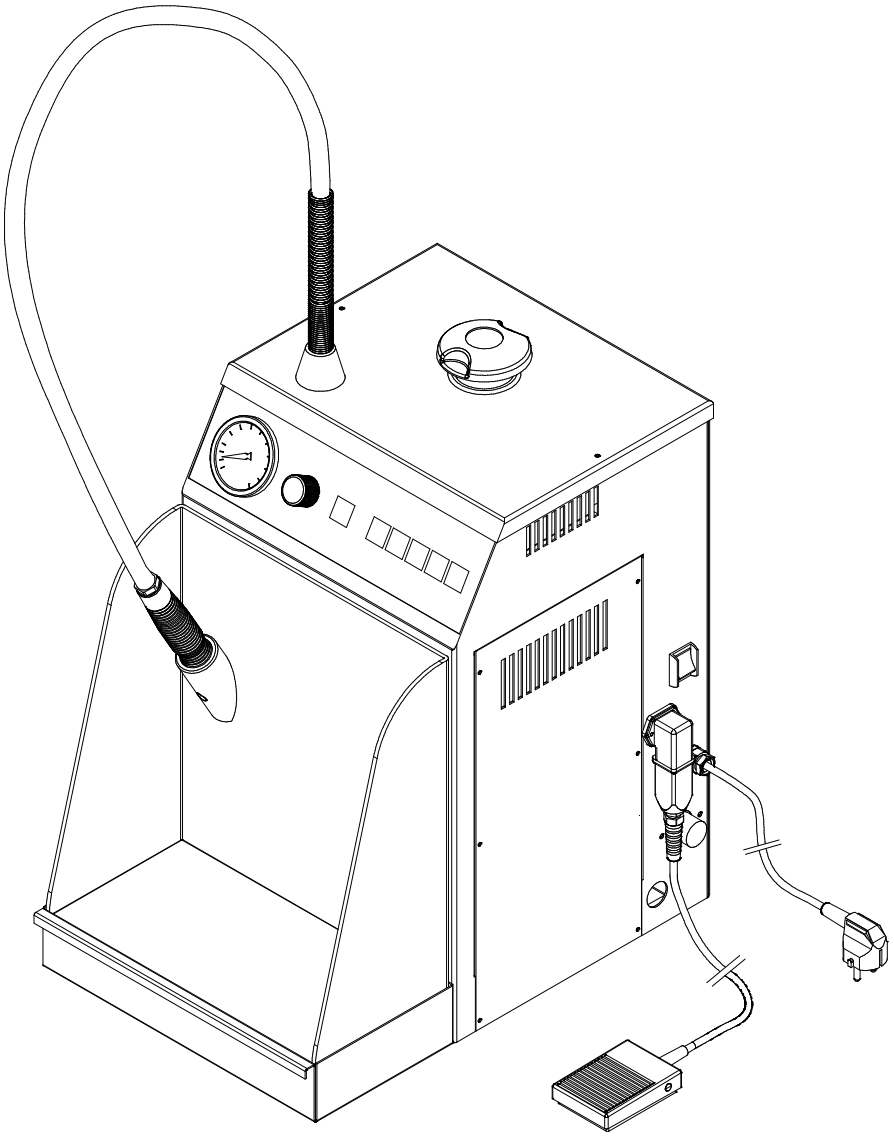


Operating Instructions

Machine Designation:	Steam blasting unit
Machine type:	D-S 100 A
Machine no.:	.....

Keep for future reference!

Hausanschrift:

Harnisch+Rieth GmbH & Co. KG
Küferstr. 14 - 16
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E-mail:
info@hr-dental.de
http://www.hr-dental.de

Dear customer,

Thank you for the confidence you have placed in us by purchasing this steam blasting unit.

To ensure that this unit will be of service to you for many years to come, please take time to read these operating instructions carefully, especially before using the unit for the first time.

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1 Safety

1.1 Intended use

The D-S 100 A steam blasting unit is used in dental laboratories for cleaning (e.g. polish residue on work models), wax extraction or degreasing arising during laboratory work.

Unauthorised conversions and alterations are forbidden for reasons of safety!

Caution	The unit is not designed as a **medical** device! Use on people is prohibited!

1.2 Possible dangers

- The steam blasting unit is safe when used correctly, there is, however, a danger of injury when operated or handled improperly. Never point the hand piece at other persons, as the jet stream emerging from the nozzle can have a temperature of up to 160 °C.
- Hold the hose by the hand piece during all steam blasting work.
- The unit must be shut down at the main switch before carrying out maintenance and cleaning work, and the connection to the mains power supply should be interrupted. Cleaning and maintenance work should only be carried out if the unit is cooled down and relieved of pressure.
- Always disconnect the unit from the electricity supply before working on electrical component parts!

1.3 Approved operators

The operator of the unit should ensure that the operating instructions are accessible to the operating personnel. The operator should ensure that they have been read and fully understood by the operating personnel. Only then should they be allowed to operate the unit.

1.4 Safety measures at installation site

- The unit should be positioned on a level and stable surface. About 10 cm of clearance room must be kept free on the left and right sides of the unit for ventilation and aeration purposes.
- If the unit is to be fixed to the wall it must be ascertained that the wall is sufficiently strong to support the unit. Suitable securing devices (dowels, screws, or similar) should be used. The securing elements (Ø 6 mm) should be pushed into the receiving holes at the rear of the unit.
- Heat resistant gloves and protective glasses should be worn under all circumstances when operating the steam blaster.
- Ensure that no foreign bodies enter the ventilation apertures of the unit.

Danger	The unit is not suitable for use in rooms where special conditions exist (e.g. corrosive or potentially explosive atmospheres).

1.5 Marking of safety references contained in these instructions

Note	Refers to tips and other particularly useful information.
Caution	Refers to particular means of operation or handling, non-adherence to which can lead to malfunction, damage or other difficulties.
Danger	**Refers to dangerous situations which can lead to injury.**

2 Unpacking the steam blasting unit

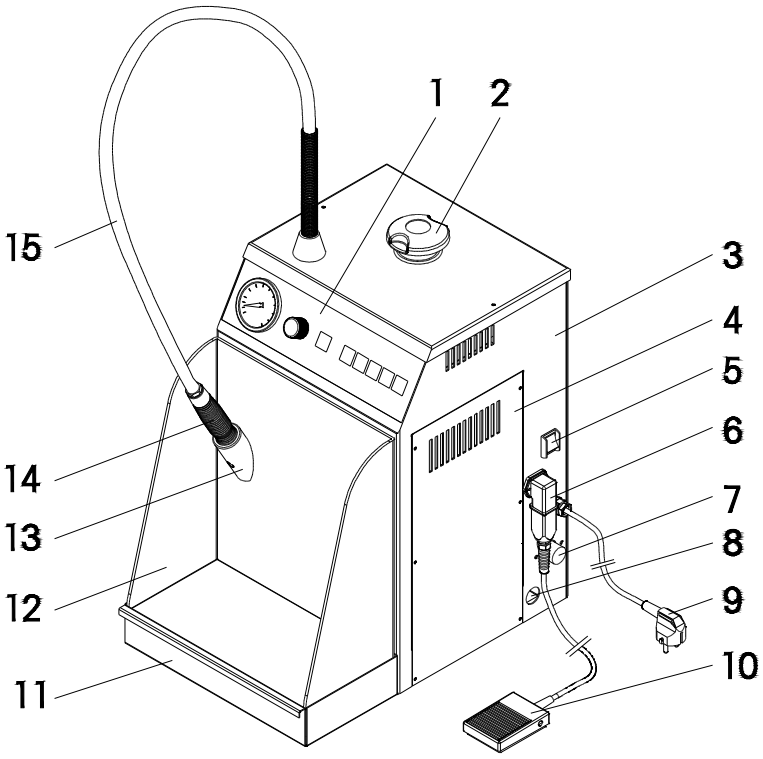
1. Place the carton on a flat surface.

2. Remove upper packing material.
3. Press packing material away from unit and grasp the lower edge of the unit.
4. Remove the unit (weight = approx. 20 kg) from the carton.
5. Check the accessories:
   - Documentation
   - Pedal switch with cable and plug
   - Socket spanner
   - Hydraulic connection hose
   - Water drainage hose with jubilee clip
   - See delivery docket for any possible further accessories

3 Commissioning

3.1 Short description of unit and identification of components

The steam blaster can be used as a table or wall unit. The unit is equipped with a fully electronic control system which continually monitors and controls temperature, pressure and water level. High-performance pressure sensors ensure that a constant steam pressure is maintained. The unit is equipped with a safety pressure relief valve which automatically releases excessive steam pressure at 8 bar. Steam is created in an insulated stainless steel boiler with a powerful spiral heating element. The pressure and the steam temperature are monitored continually by a pressure relief device and thermal protection device with automatic tripping. Water is supplied from either an internal reservoir tank or an external water mains connection. Both forms of water supply involve the boiler being filled by a robust high-pressure pump with thermal protection. Steam blasting is carried out with the hand piece which is equipped with a fine nozzle. Steam blasting can be carried out selectively with dry steam or wet steam. The hand piece is reinserted in the holder on the spray deflector or housing after use. The drainage tap is used for cleaning the boiler (de-sludging).



Diag. 1: View of unit from right

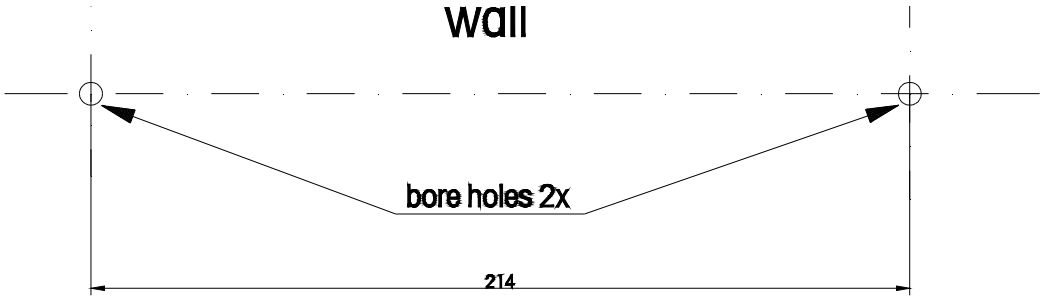
1	Mask	9	Power cable
2	Tank closure	10	Pedal switch
3	Housing	11	Drip tray
4	Side casing (right)	12	Spray deflector
5	Main switch	13	Hand piece holder
6	Pedal switch connection	14	Hand piece
7	Water supply connection	15	Steam protection hose
8	Opening for water drainage hose		

3.2 Commissioning procedure

Position the unit on a level, stable surface suitable for supporting the weight of the steam blaster, or hang it on a supporting wall.

3.2.1 Drilling pattern for wall mounting (wall unit)

- Drill two bore holes in the wall according to the sketch.
- See section 1.4 for more detailed information on the selection of wall securing material and Appendix 1 for the drilling stencil.

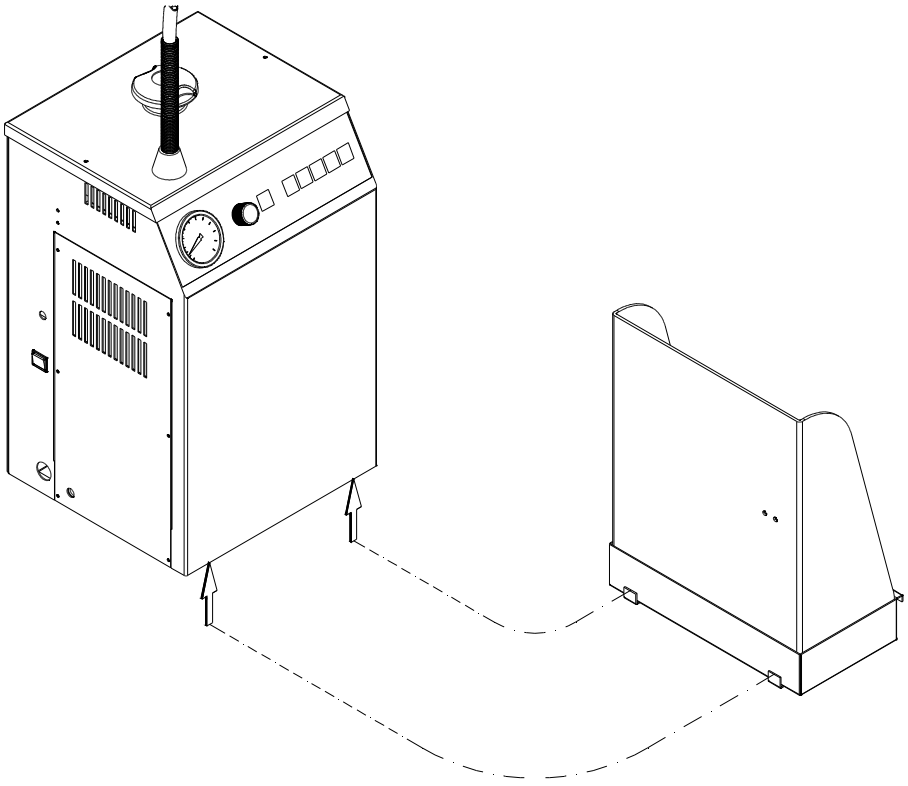


Diag. 2: Drilling pattern sketch

3.2.2 Installation

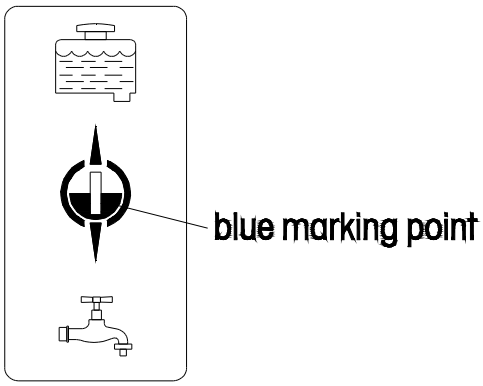
Fixing the spray deflector (optional):

- The spray deflector can be positioned directly on the unit and attached to it using the two connecting hooks on the drip tray. The connecting hooks are inserted in the two slots in the base of the unit.
- The spray deflector can also be positioned free-standing beside the unit, depending on the space available.



Diag. 3: Connection of spray deflector to unit

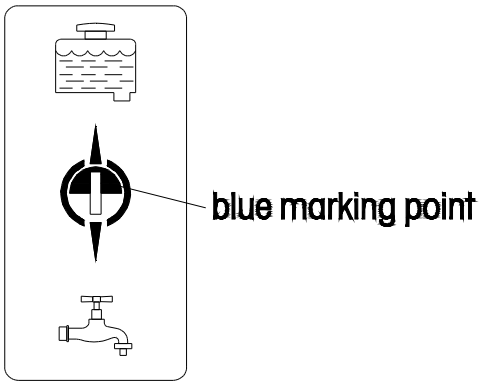
1. **External water supply to unit:**
   - Turn the water supply double-throw switch (30) (see diag. 8) with a screwdriver so that the blue marking points in the direction of the water tap (blue marking points downwards).



Diag. 4: Double-throw switch set for external water supply

   - Connect the steam blaster to the water tap with the hydraulic hose. The water tap should be fitted with a return flow blocking device and have adequate ventilation (similar to washing machine taps).
   - Secure the water drainage hose to the drainage tap with the jubilee clip provided. The drainage tap is at the lower part of the unit. Remove the base before connecting the water drainage hose. Insert the water drainage hose through the opening (8) in the right or left side casing (see diag. 1).
   - Connect the pedal switch to the unit and secure with the clip provided.
   - Connect the unit to the 230V/50Hz power supply.

2. **Internal water supply to unit:**
   - Turn the water supply double-throw switch with a screwdriver so that the blue marking points in the direction of the water reservoir tank (blue marking points upwards).



Diag. 5: Double-throw switch set for internal water supply

   - Secure the water drainage hose to the drainage tap with the jubilee clip provided. The drainage tap is at the lower part of the unit. Remove the base before connecting the water drainage hose. Insert the water drainage hose through the opening (8) in the right or left side casing (see diag. 1).
   - Connect the pedal switch to the unit and secure with the clip provided.
   - Connect the unit to the 230V/50Hz power supply.

3.2.3 Commissioning (external water supply)

1. Open water tap.
2. Switch on main switch (5). The switch control lamp illuminates green.
3. The unit is immediately filled with water. The heating is switched on automatically after the stipulated water level is reached in the boiler. The button (23) illuminates yellow.

Note	Switch the unit off and on again if a signal sounds after approx. 45 seconds during the initial filling and the red signal lamp (25) flashes. Repeat the procedure several times if necessary until the signal light (23) illuminates. It is imperative that the water intake be checked if the heating does not switch on automatically (signal light (23) illuminates yellow) after the unit is switched off and on for the fourth time (The water tap should be opened, the hydraulic connection hose should be free of bends or kinks. The water supply double-throw switch (30) should be positioned correctly (see section 3.2.2) and the intake sieve should not be dirty).

4. The working steam pressure of approx. 5 bar is reached after approx. 5 minutes. The unit is ready for operation.

Caution	The unit should be switched off at the main switch and the water intake tap closed if the unit is not used for a longer period of time.

3.2.4 Commissioning (internal water supply)

Working steps for filling of reservoir tank and boiler during initial commissioning or after the boiler has been de-sludged):

Caution	Only fill with clean water free of residue, otherwise the pump could be damaged.

1. Switch on main switch (5). The switch control lamp illuminates green.
2. The **signal light (25) illuminates continuously** (the water in the reservoir tank has dropped below the stipulated level) and a signal sounds.
3. Fill reservoir tank with water, using a funnel.
4. The **signal light (25) extinguishes** as soon as the water pump is switched on automatically, and the filling process must be interrupted immediately. However, the signal continues to sound.

Caution	The red signal light (25) extinguishes while the reservoir tank is being refilled **if the minimum water level in the tank is reached**. The accompanying signal alarm sounds until the maximum water level in the tank is reached. Refilling must be interrupted immediately at the moment the signal alarm stops, otherwise there is a danger that the reservoir tank will overflow. If the tank is filled too much there is a danger that the boiler will fill with sucked-in water after the device is subsequently switched on and the boiler cools down. This will result in the boiler having no free room for the formation of steam.

5. The water pump is switched off automatically after approx. 45 seconds, and the **signal light (25)** starts to **flash or illuminates continuously**.

Note	• **A flashing red signal light (25)** with an accompanying signal alarm means there is a shortage of water in the boiler. • **A continuous red signal light (25)** with an accompanying signal alarm means there is a shortage of water in the water reservoir tank.

6. Switch the unit off and on again at the main switch (5). The water pump is switched on automatically again for approx. 45 seconds. Repeat the working steps as of point 3 if the water pump is not switched on automatically (too little water in reservoir tank).
7. Repeat points 5 and 6 until the **signal light (23) illuminates** (heating is on).

Working steps for refilling the reservoir tank:

Caution Only fill with clean water free of residue, otherwise the pump could be damaged.

1. If the signal light (25) illuminates continuously and a signal sounds it means that the water in the reservoir tank has dropped below the stipulated level.
2. Refill the water reservoir tank until the red signal light (25) extinguishes and the signal alarm ceases.

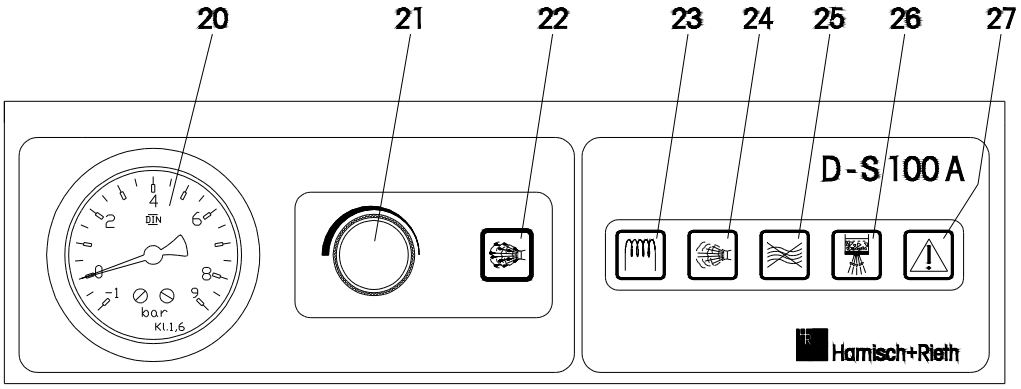
Caution The red signal light (25) extinguishes while the reservoir tank is being refilled **if the minimum water level in the tank is reached**. The accompanying signal alarm sounds until the maximum water level in the tank is reached. Refilling must be interrupted immediately the signal alarm stops, otherwise there is a danger that the reservoir tank will overflow.

3. The boiler is immediately filled with water. The heating is switched on automatically after the stipulated water level is reached in the boiler. The button (23) illuminates yellow.
4. The working steam pressure of 5 bar is reached after approx. 5 minutes. The unit is ready for operation.

Caution The unit should be switched off at the main switch and the water intake tap closed if the unit is not used for a longer period of time.

4 Operation

4.1 Steam extraction



Diag. 6: Mask

20	Pressure gauge	24	Steam standby signal light
21	Water rate regulator	25	Water shortage signal light
22	Wet steam button	26	De-sludging signal light
23	Heating signal light	27	Malfunction signal light

1. Remove hand piece (14) from hand piece holder (13).
2. Select dry steam or wet steam.

Note	Wet steam is selected by actuating button (22). The button illuminates yellow. The water rate in the steam jet is set with the knob (21).

3. Actuate the pedal switch to steam blast the surface to be cleaned.

4.2 Switching off unit

1. Switch off main switch (5).
2. Close water intake tap.

5 Cleaning/Maintenance

Note	The unit is equipped with an electronic decalcifying system.

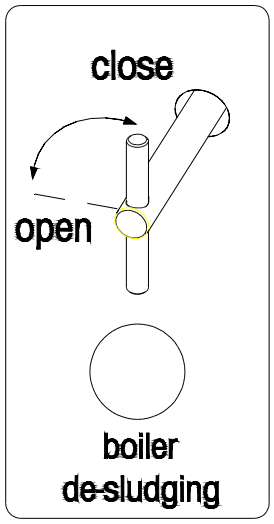
The unit should be rinsed at regular intervals to avoid lime deposits forming or the accruing of residual lime (it is recommended that this be done once a week or, at the latest, should the decalcification light (26) flash).

Danger	The unit should only be de-sludged when cold, otherwise there is a danger of scalding!

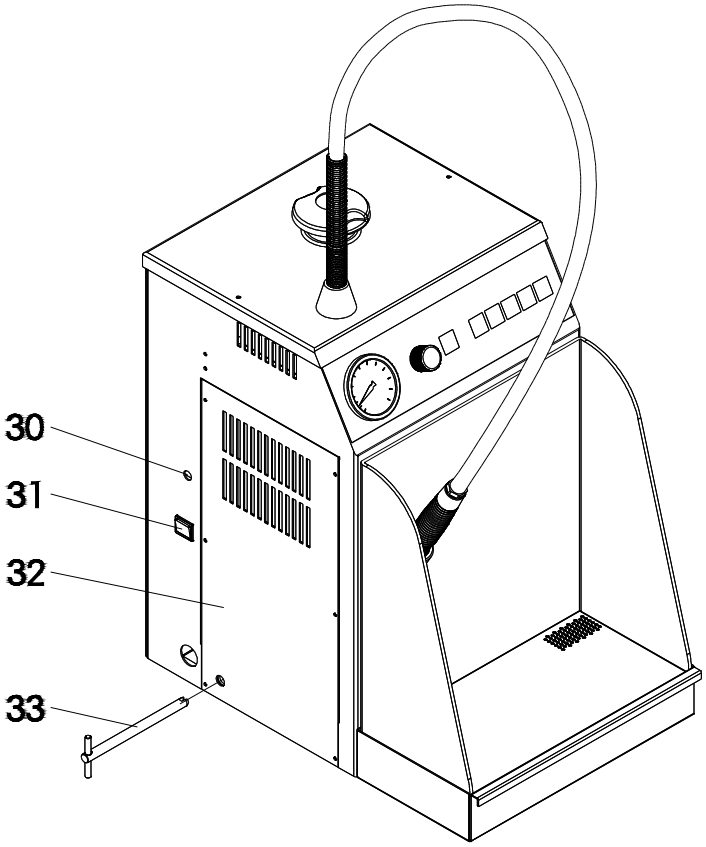
5.1 Rinsing

The unit must be cooled and relieved of pressure before de-sludging.

1. Switch on unit, main switch (5) on.
2. Turn the drainage valve counter-clockwise through 90° to the limit stop with the spanner (33) (the valve opens).
3. Press the black rinse button (31) until the water flowing in the water drainage hose shows no more evidence of lime particles.
4. Turn the drainage valve again clockwise through 90° (the valve closes).



Diag. 7: Socket spanner

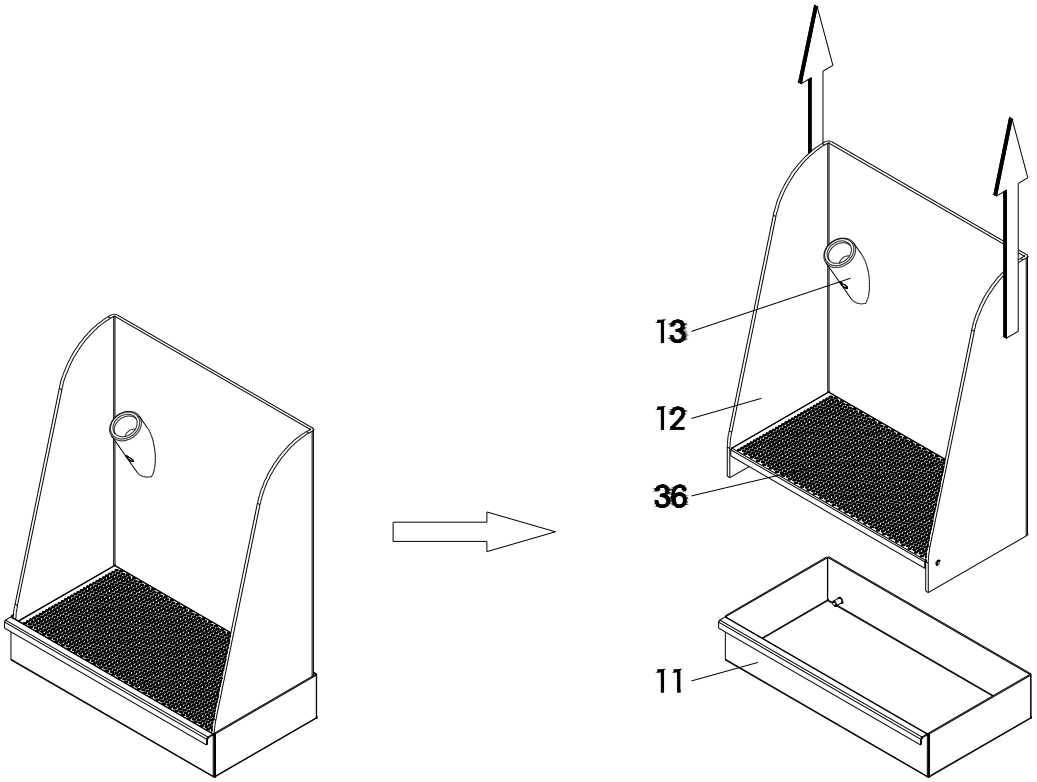


Diag. 8: Unit view from left

30	Double-throw switch for water supply
31	Rinse button
32	Side casing (left)
33	Socket spanner for drainage valve

5.2 Cleaning the spray deflector

1. Remove the spray deflector (12) together with the apertured base plate (36) by lifting upwards (see arrows).
2. Empty the drip tray (11) and rinse out the sludge residue.



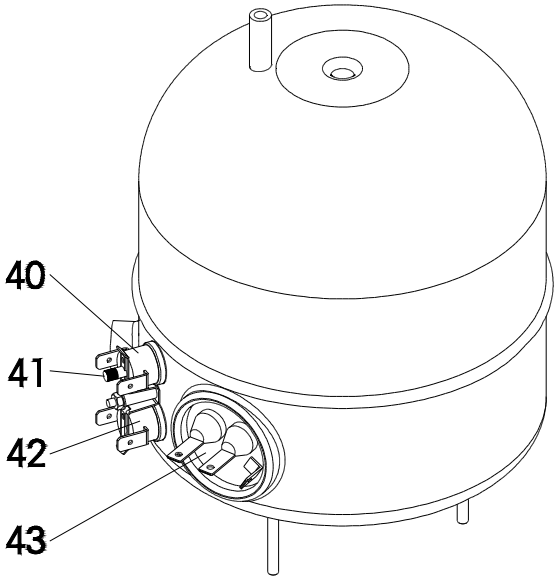
Diag. 9: Remove spray deflector

6 Safety equipment

6.1 [Allgemeines]

- The unit is equipped with a water recognition sensor which switches off the unit immediately in the event of internal water leakage.
- The built-in pressure release valve releases the steam at a steam pressure of 9.5 bar.
- The pressure relief valve should be inspected annually. Consult Harnisch+Rieth customer service department if necessary.
- The built-in temperature monitors switch the unit off at 160°C (the temperature monitor will only switch on again after the unit has cooled down) and 170°C respectively (manual resetting is only possible if the red knob (41) is actuated).

  The temperature monitors are fitted directly to the lower part of the boiler beside the heating connection. They can be accessed by removing the right-hand side casing (4).



40	Temperature monitor 170°C
41	Red actuating knob
42	Temperature monitor 160°C
43	Spiral heating element connection

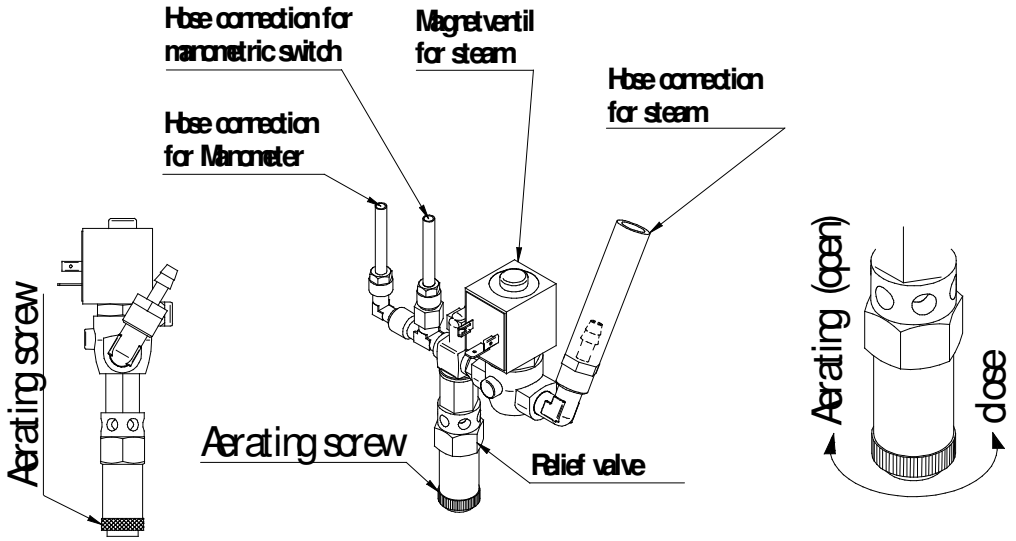
Diag. 10: Arrangement of temperature monitors

- The built-in safe working pressure switch switches the unit off at a pressure of 6 bar.
- The mains power supply plug should be pulled out during cleaning/maintenance work.
- Cool the unit and relieve it of pressure before carrying out cleaning/maintenance work.
- Heat resistant gloves and protective glasses should be worn when carrying out any work with steam (wet steam).

Danger	The hand piece nozzle becomes very hot during operation. There is therefore a danger of burn injuries!

- Only use the hand piece in the vicinity of the spray deflector.
- Do not point the steam jet at persons or animals.
- Use only original spare parts for repairs.
- Repair work may only be carried out by trained personnel. Alterations to the construction are not permitted.

6.2 Checking the pressure relief valve



Diag. 11: Pressure relief valve

Relief valves should be checked at regular intervals (service interval max. 3 months) to ensure that they are functioning correctly. Open the aerating screw for this purpose (as illustrated in the drawing above) – **This procedure should be carried out under working pressure.**

Visual inspection

Check the relief valve for dirt and mechanical damage.

Aerating (bleeding) screw

The relief valve should be aerated to loosen stubborn dirt particles.

Caution — Wear safety glasses or goggles, gloves and hearing protection during aeration. Dirt particles can be flung out along with the escaping steam. Noise develops and the temperature rises during this procedure.

Aerating procedure

This procedure should be carried out under working pressure. The aerating screw should be turned a few revolutions to the left until the relief valve has aerated, then turned to the right again and tightened firmly. The valve is now sealed tightly again.

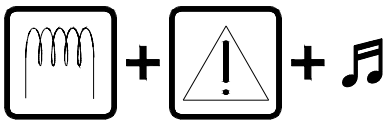
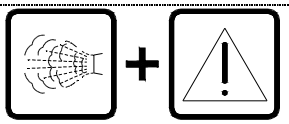
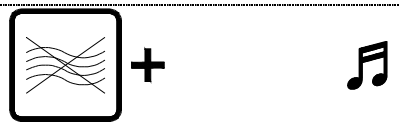
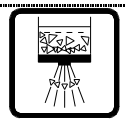
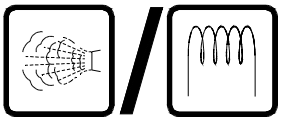
Cleaning

Use a dry cloth for cleaning. Cover the relief valve when cleaning the entire unit. Aggressive media can adversely influence the function.

Caution — The relief valve should never be dismantled, nor should the set pressure be altered at any time.

7 Service

These service instructions should help the operator to locate any faults occurring which can be traced back to normal wear or incorrect operation.

	**Signal light (27) illuminates continuously and a signal alarm sounds.** Water leakage in unit. Unit is switched off.
	**Signal light (23) flashes and signal light (27) illuminates continuously, signal alarm sounds.** Boiler overheating. Unit is switched off.
	**Signal lights (24) and (27) flash.** Permitted maximum steam pressure in boiler has been exceeded. Unit is switched off.
	**Signal light (25) <u>illuminates continuously</u> and a signal alarm sounds.** No water in water reservoir tank. Heating is switched off.
	**Signal light (25) <u>flashes</u> and a signal alarm sounds.** Water shortage in water reservoir tank. Heating is switched off.
	**Signal light (26) flashes.** Lime sludge in boiler. De-sludge boiler (see point 5).
	**Only a signal alarm sounds.** Minimum water level in water reservoir tank is reached during filling, but the maximum water level has not yet been reached.
Pump is operating, but no water is being conveyed	Input sieve filter is blocked, water tap is closed, double-throw switch (30) is incorrectly adjusted.
	The signal light (24) illuminates, but it is extinguished again after a brief withdrawal of steam and the signal light (23) illuminates. There is too much water in the boiler because the water tank has been filled too much. Remedy: Keep the pedal switched depressed for approx. 60 seconds until only signal light (24) is illuminated.

 = Signal alarm

8 Electrical fuse protection

- The mains connection is protected by two 15 A/M main fuses. They are situated in the unit interior. The fuses can be located after removing the right-hand side casing (4) on the upper part of the unit.
- The electrical control unit (PCB) is protected by 0.05 A/T and 2 A/M fuses. They are located on the PCB.

9 Technical data

Machine designation	:	Steam blasting unit
Machine type	:	D-S 100 A
Unit dimensions	:	Width 325 mm Depth 305 mm Height 540 mm
Electrical connection	:	230 Volt/50 Hz
Excess voltage category	:	II
Power consumption	:	max. 2.6 kW
Steam temperature	:	max. 160°C
Boiler capacity	:	2.3 l
Water reservoir tank	:	5 l
Pressure relief valve	:	open at 9.5 bar
Operating pressure	:	5 bar
Temperature controller	:	170°C
Electrical fuse protection	:	2x 15 A/M (Main fuse)
	:	1x 0,2 A/T (PCB)
	:	1x 2 A/M (PCB)
Weight	:	approx. 20 kg

10 Guarantee conditions

This device conforms with current safety regulations and was subjected to extensive testing before leaving the works.

We grant a 12 months guarantee in which we are obliged to carry out all repairs necessary as a result of material or production faults free of charge.

Warranty limitations:

1. The guarantee is considered void if repairs are not carried out by specialized dealers or by us.
2. Spare parts deliveries made for reasons covered by the guarantee do not lead to an extension of the original guaranty period.
3. Incorrect installation (e.g. failure to heed VDE* regulations or written installation instructions).
4. Incorrect operation or stress.
5. External influences (e.g. transportation damage, damage caused by impacting or blows, damage caused by the effects of weather or other natural phenomenae).
6. Repairs and alterations not carried out by authorized third parties.
7. Unit breakdown resulting from adjustment, alteration or any other attempt to adapt the unit is not considered a material or production fault. **This guarantee neither encompasses the costs of such adjustment, alteration or any other attempt to adapt the unit, nor remedying of the resulting damage.**
8. Normal wear and tear (e.g. spray nozzles, hoses, and including hand-held pieces, union nuts, glass panes, carbon brushes, illumination agents) or damage resulting from incorrect operation is not covered by the terms of guarantee.

   In order to provide you with a comprehensive service we would like you to fill out the guarantee return form (enclosed at the beginning of these instructions) and send it to us by fax or letter (window envelope).

* Verband Deutscher Elektrotechniker (German Electrical Technician Association)

Fax no.: 0 71 81/ 73 13 9

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Duplicate
Guarantee return form

Harnisch+Rieth GmbH & Co.
Maschinenbau
Postfach 1260

73644 Winterbach

Machine designation: Steam blasting unit

Maschine type: D-S100A

Maschine no.:

Date of purchase:

Dealer/Store:

From:

Date/signature:

11 EC declaration of conformity

In the meaning of the EC Machine Directive 2006/42/EG

We hereby declare that the design of the machine specified below conforms with basic safety and health requirements of the listed EC directives.

This certificate is no longer valid in the event of modifications being made to the machine which are not approved by us.

Name of the manufacturer	:	Harnisch+Rieth
Address of the manufacturer	:	Küferstraße 14-16, 73650 Winterbach
Machine designation	:	Steam blasting unit
Machine type	:	D-S 100 A

The following pertinent EC directives were applied:

EC machine directive 2006/42/EG (29.12.2009)
EC low voltage directive 2006/95 EG (29.12.2007)
EMC directive 2004/108/EG (20.07.2007)

Following harmonising standards apply:

DIN EN ISO 12100		Safety of Machinery—Part 1, General Principles of Design (04.2004)
DIN EN ISO 14121-1		Safety of Machinery – Principles of Risk Assessment (12.2007)
DIN EN 61010-1		Safety regulations for measuring, control, regulating, and laboratory devices
DIN EN 60204-1		Safety of machinery - Electrical equipment of machines (06.2007)
DIN EN 61000-6-3		Radio-Suppression of Electrical Equipment – Radio Interference Voltage / Radio Interference Power (09.2007)
DIN EN 55 014	:	Interference suppression of electrical apparatus and installations.
DIN EN 55 104	:	Electromagnetic compatibility, noise resistance requirements (category I).
Steam boiler regul.	:	Regulation concerning steam boilers formulation 12.96

Technical documentation is available.
The operation instructions relating to the machine are also available.

Director of the Quality Control Department

Winterbach, 02.01.2010

12 Appendix 1

Drilling pattern scale 1:1

