HB-Therm®
CLEAN-5

Instruction Manual

HB-CL2

Cleaning Unit

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Translation of original instruction

(Typenschild)

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1 General

1.1 Information about this manual

This manual enables the safe and efficient handling of the unit.

The manual is a component part of the unit and must always be kept close to the unit readily accessible for personnel. Before starting any work, the personnel must have carefully read through and understood this manual. A basic requirement for safe work is the observance of all safety and handling instructions in this manual.

Furthermore, the local accident prevention regulations and general safety regulations are valid for the application area of the unit.

Illustrations in this manual serve the basic understanding and can deviate from the actual design of the unit.

For units with a special design (see the nameplate on the unit or on page 2), the corresponding additional documents are included in Appendix A.

We reserve the right to make technical modifications in order to improve usability.

1.2 Explanation of symbols

Warnings

Warnings are identified by symbols. These warnings are introduced by signal words, which express the severity of a danger. Adhere to these warnings and act cautiously in order to avoid accidents, personal injuries and damage to property.

DANGER!

… indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

WARNING!

… indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

CAUTION!

… indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.

ATTENTION!

… indicates a potentially hazardous situation which, if not avoided, may result in property damage.

Hints and recommendations

NOTE!

… emphasizes useful hints and recommendations as well as information for efficient and trouble-free operation.

Special safety notes

The following symbols are used in connection with the safety notes to highlight particular dangers:

… highlights hazards caused by electric current. There is a danger of serious injury or death if the safety notes are not complied with.

1.3 Limitation of liability

All information and notes in this Manual were compiled under due consideration of valid standards and regulations, the present status of technology and our years of knowledge and experience.

The manufacturer can not be made liable for damage resulting from:

- disregarding this Manual
- unintended use
- employment of untrained personnel
- unauthorized conversions
- technical modifications
- use of unapproved spare parts

In case of customised versions the actual scope of delivery can vary from the explanations and representations in this Manual, because of the utilization of additional options or due to latest technical changes.

Apart from this, the obligations agreed upon in the delivery contract, the general terms and conditions and the delivery conditions of the manufacturer and the legal regulations valid at the time of contract do apply.

1.4 Copyright

1.5 Warranty terms

The warranty terms are provided in the manufacturer's terms and conditions.

1.6 Customer Service

For technical information, please contact the HB-Therm representatives or our customer service department → www.hb-therm.ch.

Furthermore, our employees are always interested in new information and experiences resulting from the application that could be valuable for the improvement of our products.

2 Safety

This paragraph provides an overview of all important safety aspects for optimal protection of personnel as well as safe and trouble-free operation.

Disregarding this Manual and safety regulations specified therein may result in considerable danger.

2.1 Intended Use

The unit is designed and constructed exclusively for the intended use described here.

The unit is exclusively for using cleaning agents to clean temperature control channels in tools, temperature control devices and the hydraulic components of these devices that are dirty/covered in scale, using neutralization agents to neutralize them and to preserve them for storage by using preservatives.

The unit must be operated solely in accordance with the values indicated in Technical Information.

Observance of all information in this manual also pertains to the intended use.

Any use of the unit other than or going beyond the intended use is deemed as misuse and can lead to dangerous situations.

WARNING!
Improper use poses danger!

Improper use of the unit can lead to hazardous situations.

In particular, do not use the unit in the following ways:

– Use of a heat transfer medium other than water.
– Use of cleaning agents, neutralizing agents, or preservatives that are not suited for the materials used.

Any kind of claims arising from damage resulting from improper use are excluded.

2.2 Customer’s responsibility

The device is implemented commercially. Thus the owner of the device is subject to legal industrial safety obligations.

In addition to the safety instructions in this Manual, the safety, accident prevention guidelines and environmental protection regulations, applicable at the site of implementation must be complied with. In particular:

- Owner must inform himself of applicable industrial safety regulations and determine additional hazards that arise due to the specific working conditions prevailing at the site where the device is implemented, in a risk analysis. The risk assessment must be implemented in the form of work instructions for device operation.
- Owner must check throughout the entire implementation period of the device, whether the work instructions that owner has created satisfy current legislation, and must adapt the instructions if necessary.
- Owner must clearly regulate and specify the responsibilities for installation, operation, maintenance, and cleaning.
- Owner must ensure that all employees who deal with the device have read and understood this Manual.
  In addition, owner must train personnel at regular intervals and inform personnel of the hazards.
- Owner must provide personnel with the required protective equipment.

In addition, owner is responsible to ensure that the device is always in a technically perfect condition, and therefore the following applies:

- Owner must ensure that the maintenance intervals described in these operating instructions are complied with.
- Owner must have all safety devices inspected regularly for function and completeness.

2.3 Personnel requirements

2.3.1 Qualifications

WARNING!
Danger of injury if insufficiently qualified!

Improper operation can lead to serious personal injuries or property damage.

Therefore:

– Have all activities performed only by qualified personnel.

The following qualifications are specified for different areas of activity listed in the Manual.

- **An instructed person**
  has been instructed by the customer in an orientation session on the assigned tasks and possible dangers in case of improper behavior.
- **Qualified personnel**
  based on their professional training, know-how and experience as well as knowledge of the applicable standards and regulations is able to perform assigned work activities and to detect and avoid possible dangers on their own.
- **A professional electrician**
  based on his/her professional training, know-how and experience as well as knowledge of the applicable standards and regulations is able to perform work on electrical systems and to detect and avoid possible dangers on his/her own.
  The professional electrician has been trained for the special location where he/she works and knows the relevant standards and regulations.
- **Hydraulic specialist**
  based on his or her technical training, knowledge and experience as well as knowledge of the relevant standards and regulations, is able to carry out work on hydraulic systems and to independently recognise and avoid possible dangers.
  The hydraulic specialist is trained for the specific location at which he or she is employed and is familiar with the relevant standards.

- **Chemicals specialist**
  based on his or her technical training, knowledge and experience, as well as knowledge of the relevant standards and regulations, is able to carry out work with chemicals and to independently detect and avoid possible dangers.
  The chemicals specialist is trained for the specific location at which he or she is employed, and is familiar with the relevant standards and regulations.

2.3.2 Unauthorized persons

WARNING!
Danger for unauthorized persons!

Unauthorized persons not meeting the requirements outlined here are not aware of the dangers in the work area.

Therefore:

– Keep unauthorized persons away from the work area.
– If in doubt, address the persons and direct them to leave the work area.
– Interrupt work activities as long as unauthorized persons are present in the work area.

2.4 Personal protective equipment

When working, it may be necessary to wear personal protective equipment in order to minimise dangers to health.

- During work, always wear the protective equipment necessary for the particular work.
- Follow the information placed in the working area with regard personal safety equipment.

Personal protective equipment for special tasks

When performing special tasks it is necessary to wear personal protective equipment. This personal protective equipment will be separately specified in the chapters of this Manual. This special protective equipment is explained below.

Protective clothing

means close-fitting working clothes with long sleeves and long trousers. It is primarily for protection from hot surfaces, acids and alkalis when handling chemicals.

Protective gloves

for protection of hands from abrasions, cuts or deeper wounds, as well as to prevent direct contact with hot surfaces, acids and alkalis when handing chemicals.

Tight-fitting protective goggles

to protect the eyes from splashing of liquids.

Safety shoes

for protection from heavy parts falling and to prevent slipping on a slippery surface.

2.5 Specific dangers

The following section lists the residual risks that have been determined by the risk assessment.

- Heed the safety instructions listed here, and the warnings in subsequent chapters of this Manual, to reduce health hazards and to avoid dangerous situations.

Electric current

DANGER!
Danger of death by electric current!

Live parts are dangerous. Contact with high voltages causes injury or death. Damaged insulation or components can cause injury or death.

Therefore:

– In case of damage of the insulation of the power supply, switch off immediately and arrange repair.
– Work on the electrical system must only be carried out by certified electricians.
– For all work on the electrical system, for maintenance, cleaning or repair work, disconnect from the mains or disconnect all phases of the external power supply and secure them against being switched on again. Check unit is isolated from power supply.
– Do not by-pass or disable fuses. Comply with the correct ampere when changing fuses.
– Keep away humidity from live parts. This could cause a short circuit.

Safety

Chemicals

WARNING!
Danger of injury from chemicals!

Depending on the type and dilution, chemicals can cause burns, irritate respiratory organs and mucous membranes and have a toxic effect if swallowed.

Therefore:

– Only allow work with chemicals to be carried out by qualified specialist personnel.
– The general safety instructions for handling chemicals must be carefully observed in accordance with the safety data sheets.
– Do not mix chemicals.

Danger of crushing

WARNING!
Danger of crushing due to rolling away or tipping

With an uneven floor or when the castors are not locked, there is a danger that the unit tips over or rolls away causing crushing.

Therefore:

– Only install the unit on an even floor.
– Ensure that the castors are locked.

2.6 Safety devices

WARNING!
Malfunctioning safety devices may pose a fatal risk!

Safety devices must be intact in order to guarantee safety.

Therefore:

– Never disable safety devices.
– Take care to ensure that safety devices such as main switch are always accessible.

Main switch

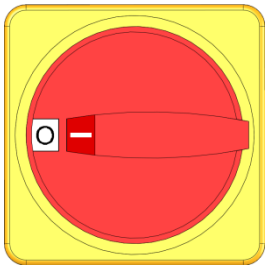


Fig. 1: Main switch

The power supply to consumers is cut and an emergency stop is triggered by turning the main switch to the "0" position.

WARNING!
Danger of fatal injury from uncontrolled restarting!

Premature uncontrolled restarting can lead to severe personal injury or to death!

Therefore:

– Before restarting, make sure that the cause for the emergency stop is eliminated and all safety devices are installed andoperational.

WARNING!
Danger of fatal injury from live conductors!

After switching off the unit via the main switch, there are still live conductors in the unit!

Therefore:

– For all work on the electrical system, for maintenance, cleaning or repair work, disconnect from the mains or disconnect all phases of the external power supply and secure them against being switched on again
– Check unit is isolated from power supply

2.7 CE Declaration of Conformity for Machinery

(CE-Directive 2006/42/EG, Annex II 1. A.)

Product	Cleaning Unit HB-Therm Clean-5
Unit types	HB-CL2
Manufacturer Address	HB-Therm AG Piccardstrasse 6 9015 St. Gallen SWITZERLAND www.hb-therm.com
CE guidelines	2014/30/EU; 2011/65/EU
Responsible for documentation	Martin Braun HB-Therm AG 9015 St. Gallen SWITZERLAND
Standards	EN 12953-6:2011; EN 60204-1:2018; EN IEC 61000-6-2:2019; EN IEC 61000-6-4:2019; EN ISO 12100:2010; EN ISO 13732-1:2008; EN IEC 63000:2018

We declare of our own responsibility that the above mentioned products, to which this declaration refers, comply with the appropriate regulations of the CE-Machinery Directive. (CE-Directive 2006/42/EG), including its appendices and the corresponding legal remission for implementation of the directive in national law.
Furthermore, the above mentioned CE-Directives and standards (or parts/clauses thereof) are applied.

St. Gallen, 2023-08-17

Reto Zürcher
CEO

Stefan Gajic
Compliance & Digitalisation

2.8 UK Declaration of Conformity for Machinery

(Supply of Machinery (Safety) Regulation 2008, Statutory Instrument 2008 No. 1597)

Product	Cleaning Unit HB-Therm Clean-5
Unit types	HB-CL2
Manufacturer Address	HB-Therm AG Piccardstrasse 6 9015 St. Gallen SWITZERLAND www.hb-therm.com
UK guidelines	The Electromagnetic Compatibility Regulations 2016 Statutory Instruments 2016 No. 1091 The Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2012 Statutory Instruments 2012 No. 3032
Responsible for documentation	Martin Braun HB-Therm AG 9015 St. Gallen SWITZERLAND
Standards	EN 12953-6:2011; EN 60204-1:2018; EN IEC 61000-6-2:2019; EN IEC 61000-6-4:2019; EN ISO 12100:2010; EN ISO 13732-1:2008; EN IEC 63000:2018

We declare of our own responsibility that the above mentioned products, to which this declaration refers, comply with the appropriate regulations of the Supply of Machinery (Safety) Regulations 2008, including its appendices. Furthermore, the above mentioned Statutory Instruments and standards (or parts/clauses thereof) are applied.

St. Gallen, 2023-08-17

Reto Zürcher
CEO

Stefan Gajic
Compliance & Digitalisation

3 Technical data

3.1 General Information

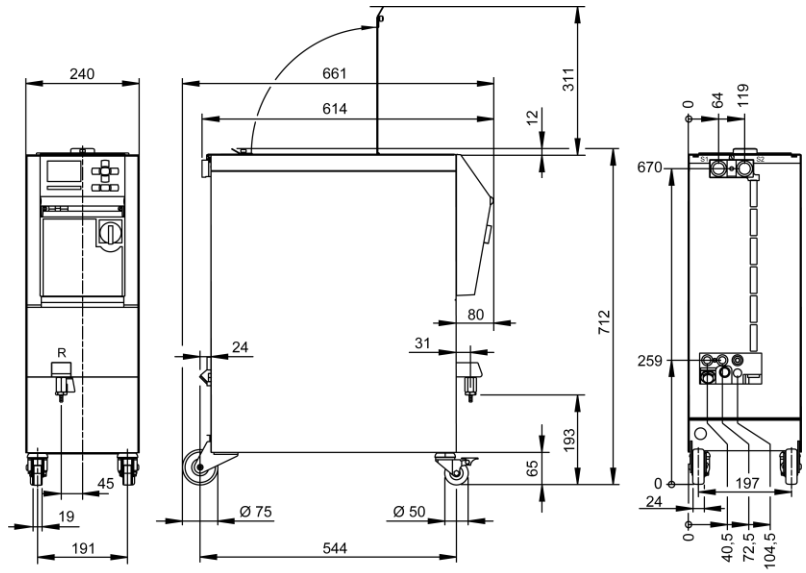


Fig. 2: Dimensions

Max. weight

	Value	Unit
HB-CL2	56	kg

Pressure measurement

	Value	Unit
Measuring range	0–20	bar
Dissolution	0,1	bar
Tolerance	±5 % of the final value	

3.2 Emissions

	Value	Unit
Continuous sound pressure level	<70	dB(A)

3.3 Operating conditions

Environment

The unit may only be operated indoors.

	Value	Unit
Temperature range	5–40	°C
Relative humidity *	35–85	% RH

* non-condensing

3.4 Connection values

Electrical connection

Mains cable to unit, cross section	CE	H07BQ-F
	U_N = 400/460 V	4x2,5 mm²
	U_N = 210 V	
Power grid	TN (net with protective conductor)	
Mains voltage U_N	see nameplate on unit or on page 2	
Rated short-circuit current	I_{max} to 63 A = 6 kA	
Overvoltage category	II	
Degree of contamination	2	

Maximum prefuse:

380–415 V	200–220 V	440–480 V
3x16 A	3x16 A	3x16 A

NOTICE!

On units without frequency converter

To protect against electric shock, the use of a residual current circuit-breaker (RCD) Type A is recommended.

Connection main and return line

	Value	Unit
Thread	G¾	
Resistance	10, 80	bar, °C

G… Connector inside thread in inches

Connection: fresh water

	Value	Unit
Pressure	2-5	bar
Thread	G⅜	
Resistance	10, 60	bar, °C

G… Connector inside thread in inches

Connection at outlet

	Value	Unit
Thread	G⅜	
Resistance	10, 80	bar, °C

G… Connector inside thread in inches

Drain connection

	Value	Unit
Thread	G⅜	

G… Connector inside thread in inches

3.5 Nameplate

The nameplate is located on the rear panel of the unit, on the inside of the service flap and on page 2 o these operating instructions.

The following information can be taken from the nameplate:

- Manufacturer
- Type designation
- Unit number
- Year of manufacture
- Performance data
- Connection data
- Type of protection
- Additional equipment

4 Structure and function

4.1 Overview

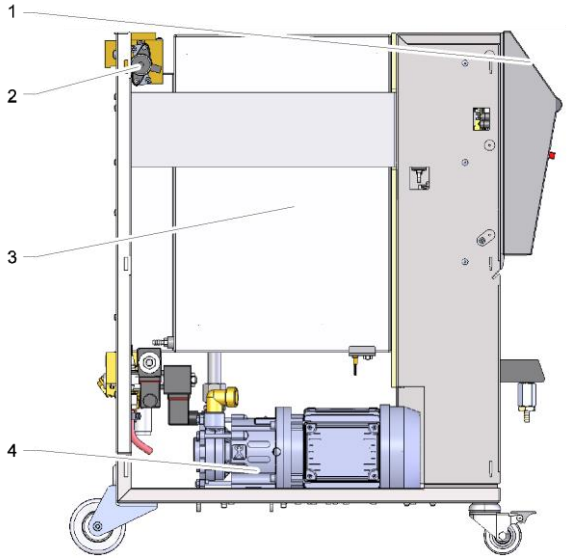


Fig. 3: Overview

1 Keyboard and display
2 Switch valve
3 Tank
4 Pump

4.2 Brief description

The unit is for cleaning temperature control channels in tools, temperature control devices and the hydraulic components of these devices. The integrated pump moves the medium out of the tank through the attached components. Particles are filtered out with the filter basket built into the tank.

With the cleaning agents, neutralization agents, and preservatives, the unit forms a mobile cleaning system.

The unit supports the user with a graphic display throughout the entire process of cleaning, neutralization, rinsing, and preservation.

4.3 Functional principle

The cleaning unit contains a tank, a pump and a filter basket.

The integrated level measurement controls the filling level in the tank. The unit is automatically replenished and after the termination of the filling phase, the user is being informed to fill in cleaning agent.

The cleaning phase starts subsequently, whereas the flow direction is cyclically changed. After termination of the cleaning phase the cleaning agent is neutralised. Subsequently the complete circuit is being rinsed and preserved. If user interventions are necessary, the unit will display these accordingly. After termination of all phases the connected components and the tank of the unit are drained. In this process, the tank content is being drained through the drain in the unit with the pump running and the drain valve open.

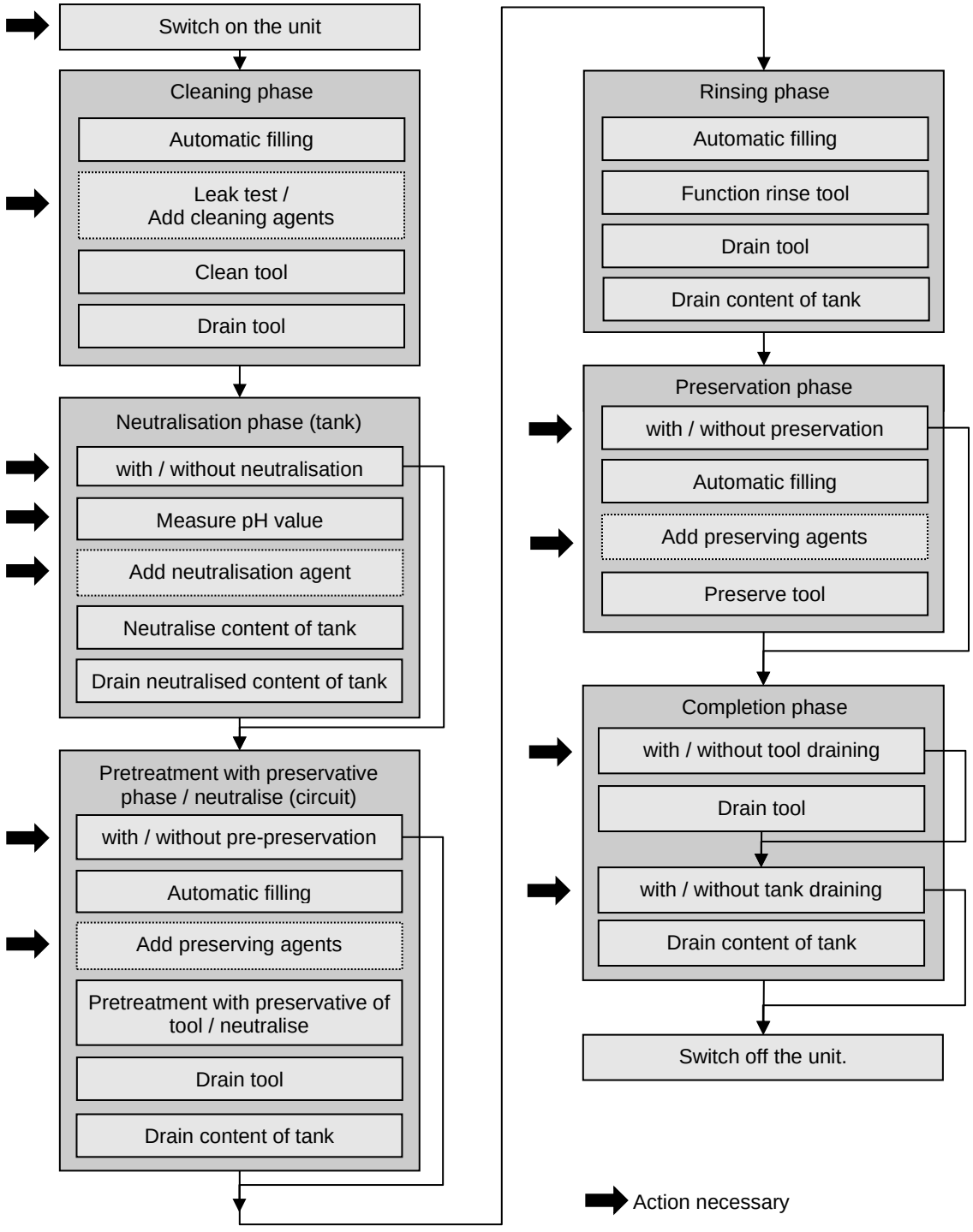


Fig. 4: Process diagram

4.4 Medium

The medium used is water that has been treated with cleaning agents, neutralization agents, or preservatives.

HB-Therm recommends appropriate cleaning agents, neutralization agents, and preservatives.

NOTICE!

For further information, you can go to www.hb-therm.ch to download "Recommendations for Agents for the Cleaning Device".

4.5 Connections

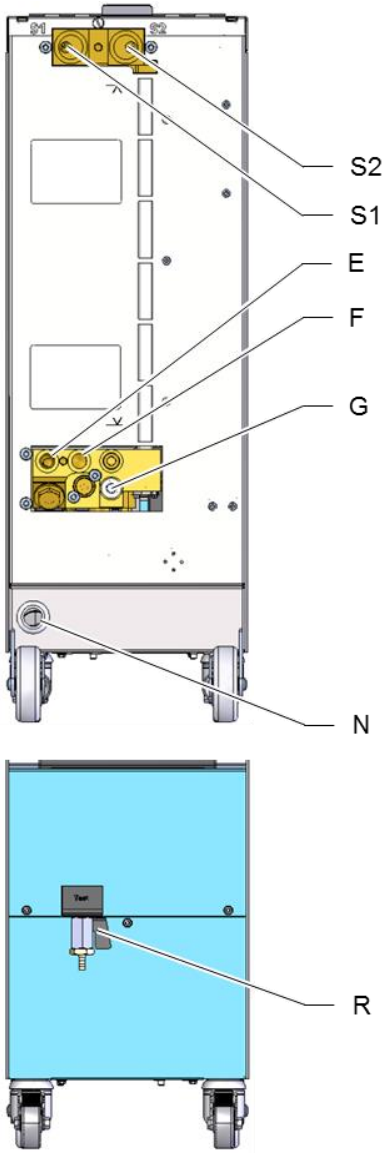


Fig. 5: Connections

The connections and important components on the rear of the unit are marked as follows:

S1	**S1**	Connection 1
S2	**S2**	Connection 2
E		Fresh water inlet
F		Drain
G		Emptying
R	**TEST**	Sample water outlet
		Fresh water filter
		Min. filling level
		Max. filling level
N		Mains connection cable

4.6 Additional equipment

The following additional equipment can be installed in addition to the basic equipment for the unit (→ nameplate):

	Additional equipment	Description
ZK	Keyboard-protection	Transparent flap over display and controls
X	Special Design	Special design without additional description
XA	Special Design with appendix	Special design with additional description in Appendix A

4.7 Operation modes

4.7.1 Main operating modes

Cleaning

During cleaning, the attached components are rinsed using a cleaning medium. The flow direction is automatically switched using the switch valve.

4.7.2 Modes of auxiliary operation

Tank emptying

In the Tank emptying mode, the entire contents of the tank are emptied into the outlet. After the tank has been emptied, the unit turns off.

Rinse tank

In the Rinse tank mode, the tank is automatically filled with fresh water and emptied through the connection

Rinse tool

In the Rinse tool mode, the attached components are rinsed with fresh water and then emptied.

Tool preservation

In the Preservation mode, the attached components are rinsed with a preservative.

4.8 Work and danger zones

Working areas

- The primary working area is located at the front of the unit on the keyboard.
- The secondary working area is located at the rear of the unit.

Danger areas

- Connection from unit to consumer is at the rear of the unit. These areas are not protected by the unit housing. If a hose ruptures, water treated with chemicals can escape and cause injuries.

5 Transport, packing and storage

5.1 Safety notes for transport

Improper transport

ATTENTION!
Damage due to improper transport!

Improper transport can result in considerable material damage.

Therefore:

– Unit must be completely emptied (cooling and system circuit)
– Only use original or equivalent packaging.
– On delivery as well as during internal transport, proceed carefully when unloading the packages and observe the notices on the packaging.
– Only use the designated suspension points.
– Only remove the packaging shortly before assembly.

5.2 Transport

Transport by forklift truck

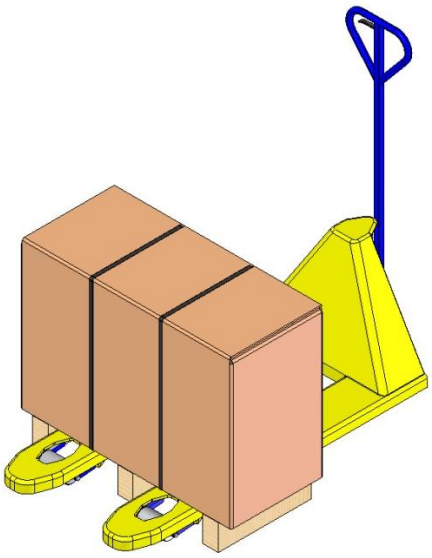


Fig. 6: Attachment points Palette

Packing units mounted on pallets can be transported by forklift truckunder the following condition:

- The forklift truck must be designed for the weight of the unit.
- The driver must be authorised to drive the forklift truck.

Attachment:

1. Insert the forks of the forklift truck between or under the pallet stringers.
2. Insert the forks deep enough so they protrude on the other side of the pallet.
3. Make sure that the pallet cannot tip over, if the centre of gravity is offset.
4. Raise the packing unit and begin with the transport.

Transport with a crane

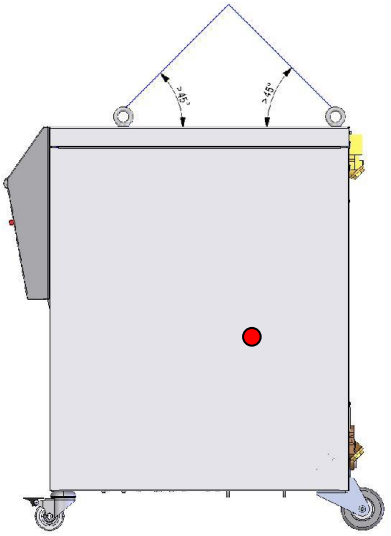


Fig. 7: Suspension points

The unit can be equipped with lifting brackets (special design). Transport with a crane can be carried out under the following conditions:

- Crane and lifting gear must be designed for the weight of the unit.
- The operator must be authorised to operate the crane.

Attachment:

1. Attach the ropes and straps according to Fig. 7.
2. Ensure that the unit hangs straight, pay attention to off-centre centre of gravity (→ ● Fig. 7).
3. Raise the unit and begin with the transport.

Transport, packing and storage

5.3 Transport inspection

Check the delivery immediately on receipt for completeness and transport damage.

If externally detectable transport damage is found, proceed as follows:

- Do not accept the delivery, or only with reservation.
- Record the extent of transport damage in the transport documents or on the delivery note of the forwarding agent.
- Start complaints procedure.

NOTE!

Claim any damage as soon as it is detected. Compensation claims can only be submitted within the applicable complaints periods.

5.4 Packing

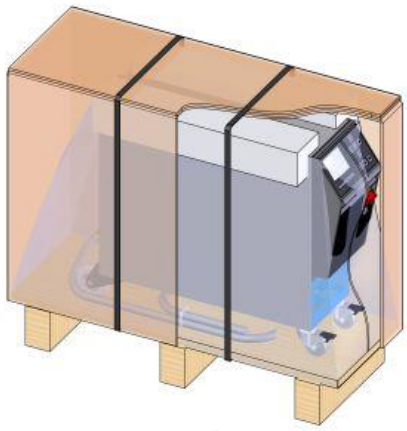


Fig. 8: Packaging

The unit is packed corresponding to the expected transport conditions on a wooden pallet, secured with a polypropylene strap and wrapped in stretch film.

Only environmentally compatible materials have been used for the packaging.

The packaging should protect the individual components from transport damage, corrosion and other damage. Therefore, do not destroy the packaging.

Transport, packing and storage

Handling packing materials

If there is no returns agreement for the packing, separate materials according to type and size and direct to further use or recycling.

ATTENTION!
Environmental damage caused by incorrect waste disposal!

Packing materials are valuable raw materials and can continue to be used in many cases or sensibly reconditioned and recycled.

Therefore:

– Dispose of packing materials environmentally.
– Follow the locally valid waste disposal regulations. If necessary employ a special waste disposal company to dispose of packing material.

Recycling codes for packaging materials

Recycling codes are markings on packaging materials. They provide information about the type of material used and facilitate the disposal and recycling process.

These codes consist of a specific material number framed by an arrow-triangle symbol. Below the symbol is the abbreviation for the respective material.

Transport pallet

→ Wood

Folding carton

→ Cardboard

Strapping band

→ Polypropylene

Foam pads, cable ties and quick release bags

→ Polyethylene low density

no recycling code

Stretch film

→ Polyethylene linear low density

Transport, packing and storage

5.5 Symbols on the packing

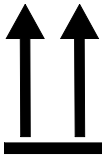
Protect against wetness

Protect packages against wetness and keep dry.

Fragile

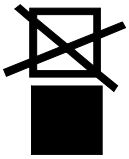
Identifies packages with fragile or sensitive content.

Handle package with care, do not drop and do not subject to shock loads.



Top

The arrows in this sign symbolize the top side of the package. They must always point up, as otherwise the content may get damaged.



Do not stack

Marks packages that cannot be stacked or onto which nothing should be stacked.

Do not stack anything on the marked package.

5.6 Storage

Storing the packages

Store the packages under the following conditions:

- System completely emptied.
- Do not store out of doors.
- Store dry and dust-free.
- Do not expose to aggressive media.
- Protect from sunlight.
- Avoid mechanical vibrations.
- Storage temperature 15–35 °C.
- Relative humidity max. 60 %.

6 Installation and initial commissioning

6.1 Safety

Personnel

- The installation and commissioning must only be carried out by qualified personnel.
- Work on the electrical system must only be carried out by certified electricians.
- Work on the hydraulic system must only be carried out by qualified hydraulics technicians.

Special dangers

The following dangers exist:

- Danger of fatal injury by electric current.
- Danger of injury from aggressive working materials.
- Danger of crushing due to rolling away or tipping.

Improper installation and initial commissioning

WARNING!
Risk of injury due to improper installation and initial commissioning!

Improper installation and initial commissioning can lead to severe personal injury or material damage.

Therefore:

– Before starting work, ensure that there is sufficient space for assembly.
– Open components with sharp edges should be handled carefully.

6.2 Requirements for the installation location

WARNING!
Improper installation can cause risk of injury and fire!

Improper installation can lead to severe personal injury or material damage.

Therefore:

– Observe and comply with the requirements at the installation site

Install the unit under the following conditions:

- ensure adequate ventilation and a water-protected unit location
- on a horizontal, stable and low-vibration surface
- secured against rolling away and tipping
- ensure access to the main switch at all times
- all connection cables of the unit must not touch hydraulic lines or parts whose surface temperatures are above 50 °C
- protect the unit with a suitable back-up fuse and, if necessary, a residual current circuit breaker (max. back-up fuse and recommended residual current circuit breaker → page 23)

6.3 Installation work

6.3.1 Lock castors

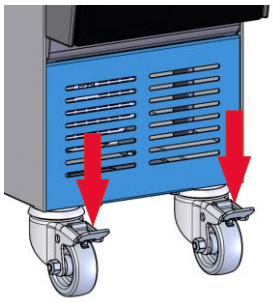


Fig. 9: Lock castors

The castors must be locked in order to secure the unit from rolling away unintentionally.

1. Place the unit in the appropriate location.
2. Press the two brake arms on the castors downwards.

6.3.2 Setting up system connections

WARNING!
Danger from hydraulic energy!

On using unsuitable pressure lines and connectors, the danger exists that liquids under high pressure can escape and cause severe or fatal injuries.

Therefore:

– Use exclusively temperature-resistant pressure lines.

NOTE!

Specific to the product, system connections are screwed or plugged in.

Connecting attachments and accessories

Attachments and accessories are external flow meters, manifolds and connection adapters (main-/ return line, cooling water) that are connected to the unit.

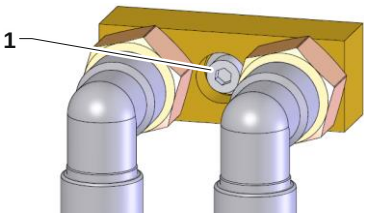


Fig. 10: Central fixing

NOTE!

The metric M8 hexagon socket head screw (1) of the attachments and accessories must be tightened to a maximum torque of 20 Nm.

Installation and initial commissioning

Connect , connection 1 and 2

1. Connect, connection 1 (S1) to the entry of the component.
2. Connect, connection 2 (S1) to the entry of the component.

NOTICE!

If the component to be cleaned may only be passed through in one direction, the Interval flow inversion must be set to „OFF“.

Connect fresh water

3. Connect fresh water entry to the fresh water network.

Connect drain

NOTICE!

If the drain is not connected to the drain system, a collection container must be connect to the drain.

4. Connect drain to the drain system / collection container

Make electrical connections

5. Electrical connections should be made by a certified electrician under the following conditions:

- Only make the electrical connections after the hydraulic connections have been made.
- Ensure that mains voltage and frequency corresponding to the specification on the nameplate and in the technical data are observed.
- Prefuse the temperature control unit in accordance with the electrical specifications (→ page 23).

7 Control

7.1 Keyboard

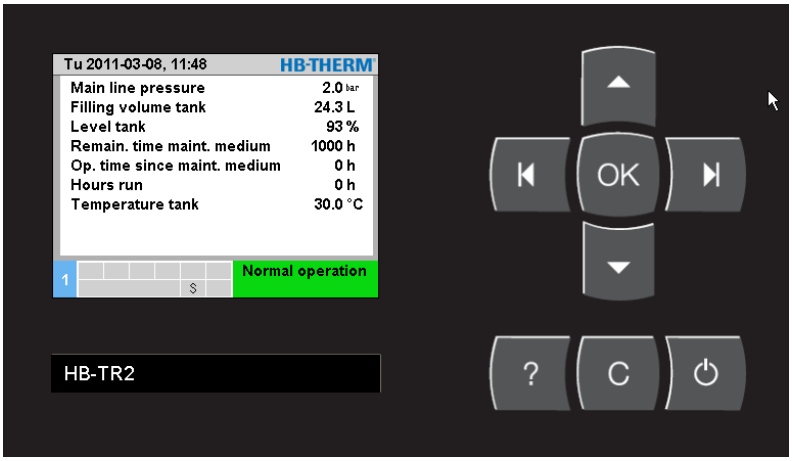


Fig. 11: Keyboard and display

Key	Key function in basic display	Key function within menu	Key function with active parameter adjustment
▲	no function	Navigate upwards.	Increase values.
⏮	no function	Navigate to the left.	Switch from „one tenth setting“ to „whole value setting“.
OK	Display main menu.	Display sub-menus or activate parameter adjustment.	Confirm values.
⏭	In menu Functions jump to Skip current phase.	Navigate to the right.	Switch from „whole value setting“ to „one tenth setting“.
▼	In menu Profile jump to Language.	Navigate downwards.	Decrease values.
?	Display online help.	Display online help.	Display online help.
C	Acknowledge active horn or alarm.	Navigate back to previous menu.	Cancel the adjustment of values.
⏻	Switch unit on or off.	Switch unit on or off.	Switch unit on or off.

Control

Basic display

Fig. 12: Basic display

Pos. No.	Designation	Display
1	Menu bar	Date and time
2	Symbol field	Display active functions and details
3	Address field	Display unit address
4	Unit	Unit for actual values displayed
5	Operating mode and colour-coded condition display	Display of current operating mode and pending alarms and warnings
6	User values	Display of max. 3 freely selectable actual values
7	Phases	Display of the individual process phases
8	Status of the phase	Display with ✓ when phases are finished and completed. Display with ✕ when phase has been omitted
9	Process bar	Display phase in process
10	Status repetitions	Display of the actual number of repetitions

Status indication individual unit

The status display lights in a different colour depending on the operating condition. The following conditions are defined:

Display	Description
green	trouble-free
yellow	warning
red	Fault

Symbol display

Symbol	Description
S	Simulation mode active
●	Recording USB
	Switch off horn
	Acknowledge alarm

7.2 Operating structure

Navigate through the menu structure as follows:

- Use the OK key to display step-by-step the next lowest hierarchy level starting from the basic display.
- Use the C key to display step-by-step the next highest hierarchy level up to the basic display.
- Press the C key for longer than 1 second to directly display the basic display from a lower hierarchy level.
- Use the arrow keys and to switch between the individual modules.

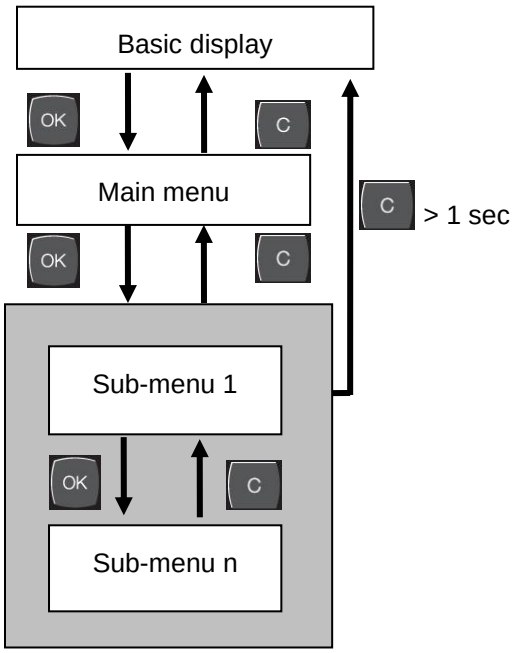


Fig. 13: Operating structure

Control

7.3 Menu structure

NOTE!

Depending on the software version used, the menu structure and the parameter values can deviate from the following table.

Display	User profile	Operating - release	Default value	Unit	Additional - equipment
Functions	S	-	-	-	-
Skip current phase	S	1	OFF	-	-
Emptying tank	S	1	OFF	-	-
Rinse tank	S	1	OFF	-	-
Rinse tool	S	1	OFF	-	-
Preserve tool	S	1	OFF	-	-
Rinse tool/preserve	S	1	OFF	-	-
Display	S	-	-	-	-
Actual values	S	-	-	-	-
Hold screen	S	1	OFF	-	-
Cleaning effectiveness	S	-	-	l/min	-
Main line pressure	S	-	-	bar	-
Filling volume tank	S	-	-	L	-
Level tank	S	-	-	%	-
Operating hours	S	-	-	h	-
Temperature tank	U	-	-	°C	-
Current phase L1	U	-	-	A	-
Current phase L2	U	-	-	A	-
Current phase L3	U	-	-	A	-
Selection	S	-	-	-	-
Cleaning effectiveness	S	3	ON	-	-
Main line pressure	S	3	ON	-	-
Filling volume tank	S	3	ON	-	-
Level tank	S	3	OFF	-	-
Operating hours	S	3	OFF	-	-
Temperature tank	U	3	OFF	-	-
Current phase L1	U	3	OFF	-	-
Current phase L2	U	3	OFF	-	-
Current phase L3	U	3	OFF	-	-
Voltage 24 VAC	U	3	OFF	-	-
Monitoring	S	-	-	-	-
Alarm contact function	S	3	NO1	-	-
Horn volume	S	3	10	-	-
Horn ON dur. maint. medium	S	3	ON	-	-

Control

Level	U	-	-	-	-
Level premonition	U	4	5	%	-
Setting	S	-	-	-	-
Remote mode	S	-	-	-	-
Address	S	3	1	-	-
Protocol	S	3	0	-	-
Transfer rate	E	4	19200	B/s	-
Parity	E	4	none	-	-
Data bit	E	4	8	-	-
Stop bit	E	4	1	-	-
Serial recording cycle	E	4	1	s	-
Date/Time	S	-	-	-	-
Time	S	3	CET	HH:MM	-
Date	S	3	CET	-	-
Time zone	S	3	CET	-	-
Switch over summer/winter	S	3	autom.	-	-
Time zone offset UTC	S	3	60	min	-
Units	S	-	-	-	-
Temperature scale	S	2	°C	-	-
Pressure scale	S	2	bar	-	-
Miscellaneous	S	-	-	-	-
Time mould evacuation	S	3	45	s	-
Limitation filling time	E	3	60	s	-
Temperature limiting	E	3	80	°C	-
Emptying after unit OFF	S	3	enquiry	-	-
Dilution factor	S	3	OFF	-	-
Preservation	S	3	enquiry	-	-
Neutralization	S	3	enquiry	-	-
Tool emptying	S	3	enquiry	-	-
Pre-preservation	S	3	enquiry	-	-
Cleaning	S	-	-	-	-
Cleaning time	S	3	180	min	-
Time of tool rinsing	S	3	10	min	-
Time preservation	S	3	120	min	-
Number of rinses	S	3	1	-	-
Delay pressure meas. clean.	S	3	20	s	-
Time of neutralization	S	3	10	min	-
Temperature max. clean	S	3	60	°C	-
Cleaning time aborted	U	3	30	min	-
Tol. band cleaning rate	U	3	0,2	-	-
Interval flow inversion	S	3	5	min	-
Nom. val. filing level cleaning	S	2	5.0	L	-
Nom. val. filing level rinsing	S	2	8.0	L	-
Cleaning agent	S	2	RM_	-	-
Density cleaning agent	S	2	1.00	g/ml	-

Control

Nominal conc. cleaning	S	2	--	g/L	-
Neutralisation agent	S	2	NM_	-	-
Density neutralization agent	S	2	1.00	g/ml	-
Limit value neutral. pH low	S	2	--	pH	-
Limit value neutral. pH high	S	2	--	pH	-
Offset neutralization	S	2	1.00	-	-
Factor neustralization 1	S	2	1.00	-	-
Factor neustralization 2	S	2	1.00	-	-
Factor neustralization 3	S	2	1.00	-	-
Preservation agent	S	2	KM_	-	-
Density preservation agent	S	2	1.00	g/ml	-
Nominal conc. preservation	S	2	--	g/L	-
Pre-preservation agent	S	2	--	-	-
Density pre-pres. agent	S	2	1.00	g/ml	-
Nom. cons. pre-pres. agent	S	2	--	g/L	-
Mixing time	E	3	1	min	-
Recording USB	S	-	-	-	-
Serial recording cycle	S	4	1	s	-
Activate all values	S	3	OFF	-	-
Deactivate all values	S	3	OFF	-	-
Cleaning effectiveness	S	3	ON	-	-
Main line pressure	S	3	ON	-	-
Filling volume tank	S	3	ON	-	-
Level tank	S	3	ON	-	-
Operating hours	S	3	OFF	-	-
Temperature tank	S	3	OFF	-	-
Current phase L1	S	3	OFF	-	-
Current phase L2	S	3	OFF	-	-
Current phase L3	S	3	OFF	-	-
Voltage 24 VAC	S	3	OFF	-	-
Operating hours USR	S	3	OFF	-	-
Operating hours GIF	S	3	OFF	-	-
Average tank temp.	S	3	OFF	-	-
Operating hours pump	S	3	OFF	-	-
Switching cycles alarm relay	S	3	OFF	-	-
Switch cycle X52.1	S	3	OFF	-	-
Switch cycle X52.2	S	3	OFF	-	-
Switch cycle X52.3	S	3	OFF	-	-
Switch cycle X52.4	S	3	OFF	-	-
Switch cycle X51.2	S	3	OFF	-	-
Switch cycle X51.3	S	3	OFF	-	-
Switch cycle X51.4	S	3	OFF	-	-
Total number of alarms	S	3	OFF	-	-
Average voltage 24 VAC	S	3	OFF	-	-
Profile	S	-	-	-	-

User profile	S	3	Standard	-	-
Operating release	S	0	2	-	-
Code	S	3	1234	-	-
Language	S	0	-	-	-
Key press volume	S	3	5	-	-
Fault finding	S	-	-	-	-
Logbook Alarms	S	-	-	-	-
Logbook Alarms	S	-	-	-	-
Logbook agent	S	-	-	-	-
Logbook agent	S	-	-	-	-
Save/Load	S	-	-	-	-
Start USB Software Update	E	4	OFF	-	-
Recording USB	S	3	OFF	-	-
Load configuration data	E	4	OFF	-	-
Save configuration data	S	4	OFF	-	-
Load parameter data	E	4	OFF	-	-
Save parameter data	S	4	OFF	-	-
Save error and operation data	S	4	OFF	-	-
Save Serviceinfo	S	4	OFF	-	-

8 Operation

8.1 Switching on

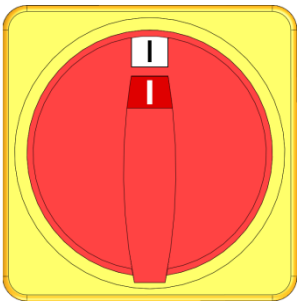


Fig. 14: Main switch

Switch on unit as follows:

1. Turn the main switch to position "I".

→ Unit initialisation runs. The indication "Ready-to-operate" appears on the display.

8.1.1 Define agent

Select agent

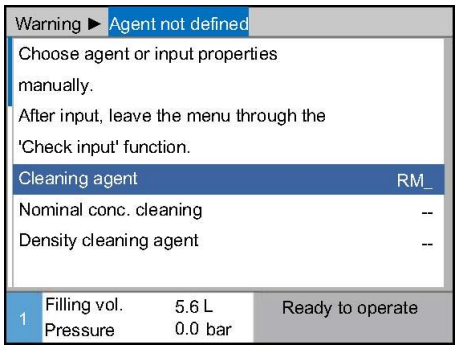


Fig. 15: Warning Agent not defined

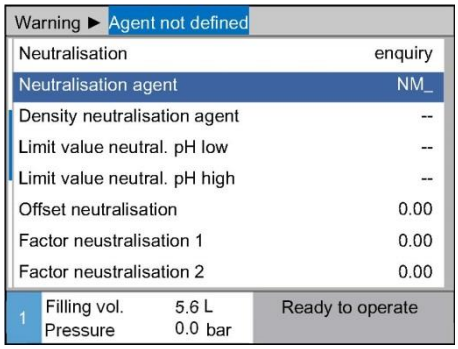


Fig. 16: Define agent

As long as the cleaning, neutralisation, pre-preservation and pre-servationagents are not determined, the warning Agent not defined will be displayed.
The agents and properties are to be selected as follows:

1. Set the cleaning agent parameter to the cleaning agent used.

→ The properties of the agent are set automatically.

2. Set parameter Neutralisation to the desired value.

→ If settings are „OFF“ no neutralisation agent must be set.

3. Set the neutralisation agent parameter to the neutralisation agent used.

→ The properties of the agent are set automatically.

4. Set parameter Pre-preservation to the desired value.

→ If settings are „OFF“ no pre-preservation agent must be set.

→ The properties of the agent are set automatically.

5. Set parameter Preservation to the desired value.

→ If settings are „OFF“ no preservation agent must be set.

6. Set the preservation agent parameter to the preservation agent used.

→ The properties of the agent are set automatically.

NOTICE!

If the agent does not appear on the list of the respective cleaning agent, neutralisation agent, pre-preservation agent, preservation agent resp. parameter, all properties must be introduced manually (→ Manual input of agent properties).

7. Apply properties with Check input.

Operation

Manual input of agent properties

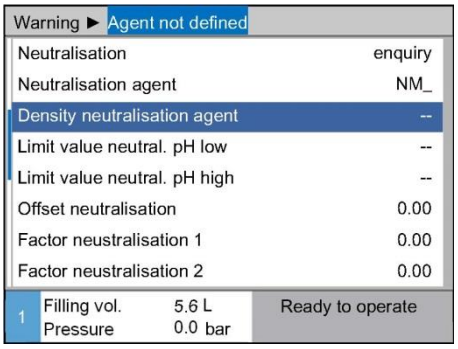


Fig. 17: Agent properties

If the cleaning agent does not appear on the list of cleaning agent parameters, proceed as follows:

1. Set the cleaning agent parameter on the „RM_“ value.
2. Set the nom.cons. cleaning and Density cleaning agent according to the agent used.

If the neutralisation agent does not appear on the list of neutralisation agent parameters, proceed as follows:

3. Set the neutralisation agent parameter on the „NM_“ value.
4. Set the Density neutralisation agent, pH limit value neutr. low and pH limit value neutr. high according to the agents used.

If the pre-preservation agent does not appear on the list of Prepreservation agents parameters, proceed as follows:

5. Set the Pre-preservation agent on the „VKM_“ value.
6. Set the nom.cons. pre-preservation and Density pre-preservation agent according to the agent used.

If the preservation agent does not appear on the list of preservation agent parameters, proceed as follows:

7. Set the preservation agent parameter on the „KM_“ value.
8. Set the nom.cons. preservation and Density preservation agent according to the agent used.

NOTICE!

If you encounter problems with the determination of the parameter, please contact the nearest HB-Therm representative.

9. Apply properties with Check input.

Change agent

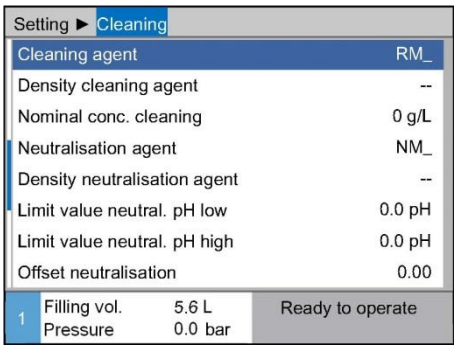


Fig. 18: Change agent

Proceed as follows in order to subsequently change the agent:

1. Display the menu page Settings \ Cleaning.
2. Set the desired parameter to the agent used resp. set the properties of the agent manually.

8.1.2 Normal operation

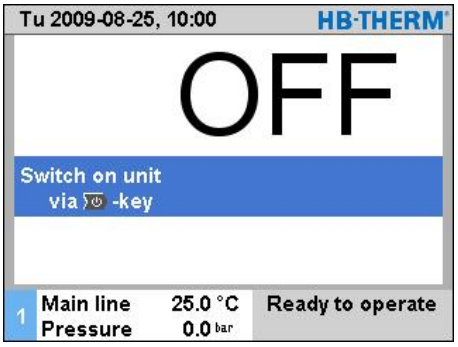


Fig. 19: Basic display

Switch on cleaning unit as follows:

WARNING!
Damages if switched off early!

If the cleaning cycle is not completely finished, the connected components can be damaged.

Therefore:

– Plan ample time for a complete cleaning.
– If the cleaningcycle is terminated prematurely, rinse the components with fresh water and neutralisation agent.

1. Press the key.

→ The unit is filled up automatically. The unit subsequently proceeds the single phases, starting with the cleaning phase. After completion of all phases, the unit automatically swithes OFF and displays the achieved cleaning rate.

Operation

8.1.2.1 Cleaning phase

Check seal / add cleaning agent

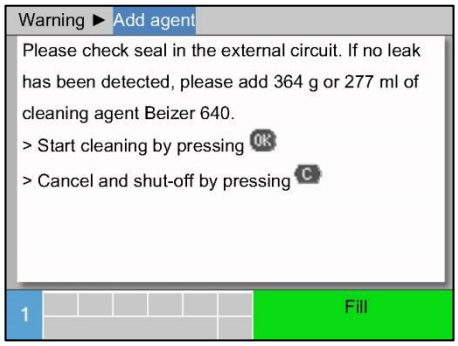


Fig. 20: Warning medium

Proceed as follows if the warning Add agent is displayed:

1. Acknowledge horn with the C key.
2. Proceed to check the seal in the external circuit.

→ If a leak appears, cancel the cleaning cycle and switch off the unit with the C key.

3. Fill indicated cleaning agent quantity in through the tank opening in the tank.

WARNING!
Risk of injury due to chemicals!

Chemicals can cause chemical burns, depending on the type and dilution, cause irritation of the membrane and respiratory system and be toxic if swallowed.

Therefore:

- Only allow work on with chemicals s to be carried out by qualified personnel.
- The general safety instructions on how to handle chemicals according to the safetydata sheets must be observed at all times.
- Do not mix chemicals

4. Acknowledge after adding of cleaning agent the query with the OK key.

Cleaning operation

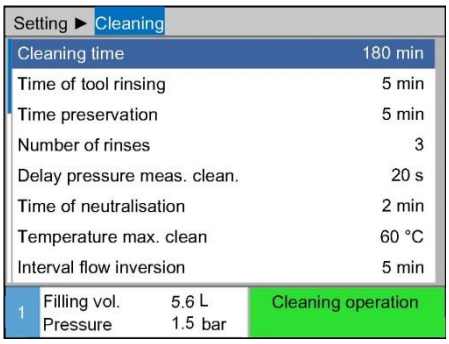


Fig. 21: Set cleaning duration

After having acknowledged the warning Add agent the cleaning operation starts automatically. In this phase the agent is pumped through the components to be cleaned.

Set if necessary the desired maximum cleaning duration:

1. Display the menu page Settings \ Cleaning.
2. Set parameter Cleaning time to the desired value.

NOTICE!

The unit calculated permanently the cleaning rate through the pressure change. If the cleaning rate is steady through a longer period of time, the unit stops automatically the cleaning operation, independently of the set cleaning duration.

Cyclical change of the flow direction

The flow direction is changed cyclical during the cleaning, pre-preservation, rinsing and preservation phases to obtain a more efficient cleaning rate.

If necessary, set the desired interval for the change of flow direction:

1. Display the menu page Settings \ Cleaning.
2. Set parameter interval flow inversion to the desired value.

Mould evacuation

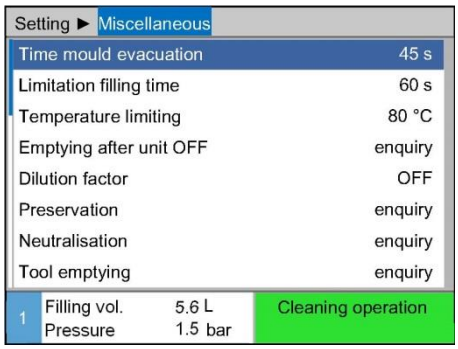


Fig. 22: Time mould evacuation

After finishing of the cleaning, pre-preservation, rinsing and preservation phases the connected components are being emptied through the mould evacuation.

Set if necessary the desired maximum cleaning duration:

1. Display the menu page Settings \ Miscellaneous.
2. Set parameter Time mould evacuation to the desired value.

Automatic termination cleaning

If the cleaning rate is stable over the set duration, the unit automatically stops the cleaning operation.

If necessary, set the desired termination conditions:

1. Display the menu page Settings \ Cleaning.
2. Set the Cleaining time aborted and Tol band cleaning rate to the desired value.

NOTICE!

If the cleaning rate is during the cleaning time aborted within the Tol. band cleaning rate, the cleaning is terminated automatically..

8.1.2.2 Neutralization phase

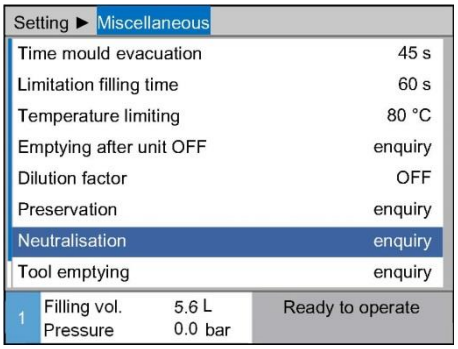


Fig. 23: Set neutralization

In this phase, the cleaning agent is neutralized with the neutralizing agent so that no aggressive medium is pumped into the outlet. Neutralization occurs only in the interior tank.

NOTICE!

Local sewage regulations must be followed. Information about neutralization can be taken from the safety sheet or you can ask the manufacturer of the cleaning agent about it.

The neutralization phase is automatically conducted or skipped or a query is made, depending on how the Neutralization parameter is set.

The Neutralization parameter is set as follows:

1. Display the menu page Settings \ Miscellaneous.
2. Set Neutralization to the desired value.
   → When set to "OFF", the neutralization phase is skipped.
   When set to "ON", neutralization is started automatically.
   When set to "enquiry", a query is made as to whether neutralization should or should not be started.

Neutralize medium

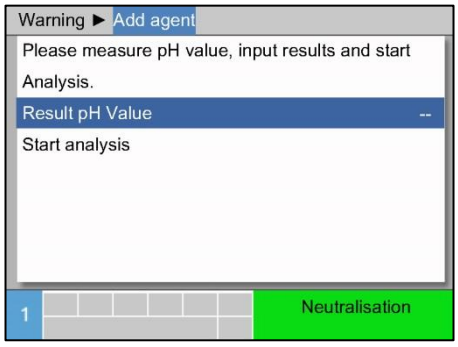


Fig. 24: Neutralization warning

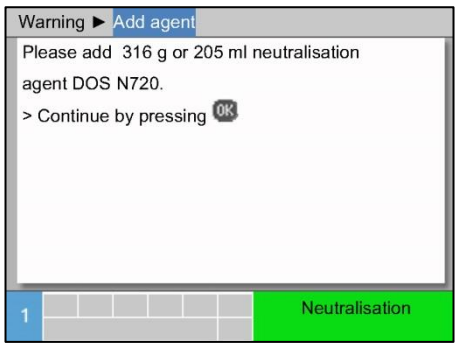


Fig. 25: Example of add neutralizing agent

If the warning Neutralization is shown, proceed as follows:

1. Acknowledge horn with the C key.
2. Place a measuring container under the connection and open the tap until the measuring container is completely full.
3. Empty the medium in the measuring container into the tank through the tank opening.
4. Place the measuring container back under the test connector and open the tap until the measuring container is full enough that the medium can be tested using a test kit.
5. Test the medium using the test kit and enter the results in Result pH Value.
6. Check entry using Start analysis.

→ The amount of neutralizing agent is computed automatically and displayed using the warning Add agent. If no neutralization is needed, the tank contents will be automatically emptied and the next phase started.

7. Empty the amount of neutralizing agent into the tank through the tank opening and acknowledge using the OK key.

WARNING!
Danger of being injured by chemicals!

Depending on the type and dilution, chemicals may cause burns, irritate the respiratory organs and mucous membranes and be dangerous when swallowed.

Therefore:

– Only allow work with chemicals to be carried out by qualified personnel.
– The general safety instructions for handling chemicals in accordance with the safety data sheets must be followed carefully.
– Do not mix chemicals

→ The medium in the tank will now be automatically neutralized. After the end of the neutralization phase, the warning Neutralization is shown again and the medium must be checked again (repeat all steps).

Neutralization time

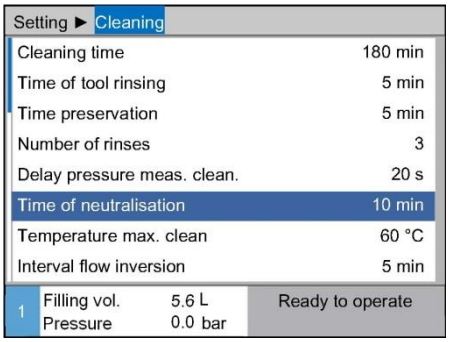


Fig. 26: Setting neutralization time

If necessary, before switching on neutralization, set the neutralization time:

1. Display the menu page Settings \ Cleaning.
2. Set Time of neutralization to the desired value.

8.1.2.3 Pre-preservation phase

In this phase the connected components are being neutralised and pre-preserved with pre-preservation agents. At the end of the pre-preservation phase the connected components are emptied again.

Fig. 27: Set pre-preservation

The pre-preservation phase is either carried out automatically, omitted or queried depending on the setting of the pre-preservation parameter.

The pre-preservation parameter is set as follows:

1. Display the menu page Settings \ Miscellaneous.
2. Set parameter Pre-preservation to the desired value.
   → With the setting OFF, the pre-preservation phase is omitted, with the setting ON, the pre-preservation is started automatically and with the setting Query, it is being asked whether the pre-preservation phase should be started or not.

Add pre-preservation agent

Proceed as follows if the message Add agent is displayed:

1. Acknowledge horn with the C key.
2. Fill indicated pre-preservation agent quantity in through the tank opening in the tank.

WARNING!
Risk of injury due to chemicals!

Chemicals can cause chemical burns, depending on the type and dilution, cause irritation of the membrane and respiratory system and be toxic if swallowed.

Therefore:

– Only allow work on with chemicals s to be carried out by qualified personnel.
– The general safety instructions on how to handle chemicals according to the safetydata sheets must be observed at all times.
– Do not mix chemicals

3. Acknowledge after adding of pre-preservation agent the query with the OK key.

8.1.2.4 Rinsing phase

In this phase the connected components are being rinsed with fresh water.

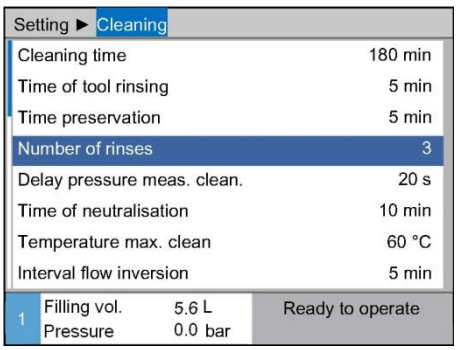


Fig. 28: Setting number of rinses

The rinsing phase is either carried out automatically, omitted or queried depending on the setting of the number of rinses parameter.

The number of rinses parameter is set as follows:

1. Display the menu page Settings \ Cleaning.
2. Set parameter number of rinsesto the desired value.
   → With the setting OFF, the rinsing phase is omitted, with the setting "1 - 9", the rinsing phase is started automatically and repeated according to the setting. With the setting "query" it is asked whether another rinsing should be carried out after the first one or not.

Operation

Time of tool rinsing

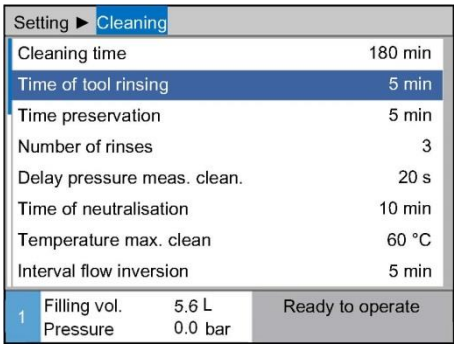


Fig. 29: Setting Time of tool rinsing

If necessary, set the desired time for the tool rinsing:

1. Display the menu page Settings \ Cleaning.
2. Set parameter Time of tool rinsingto the desired value.

8.1.2.5 Preservation phase

In this phase the connected components are treated with the preservation agent, in order to protect them and avoid rusting during stprage- At the end of the preservation phase the connected components are emptied again.

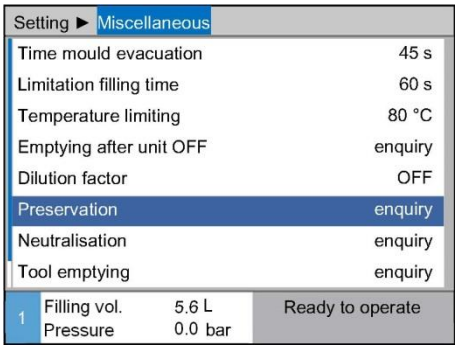


Fig. 30: Preservation setting

The preservation phase is either carried out automatically, omitted or queried depending on the setting of the preservation parameter.

The preservation parameter is set as follows:

1. Display the menu page Settings \ Miscellaneous.
2. Set parameter Preservation to the desired value.
   → With the setting OFF, the preservation phase is omitted, with the setting ON, the preservation is started automatically and with the setting Query, it is being asked whether the preservation phase should be started or not.

Add preservation agent

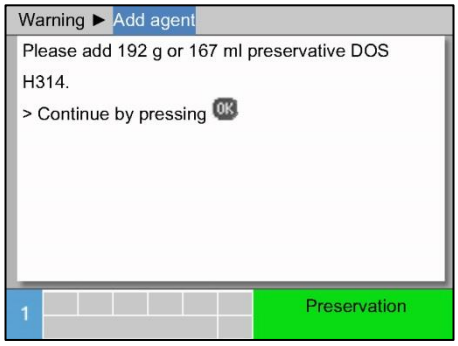


Fig. 31: Example add preservation agent

Proceed as follows if the warning Add agent is displayed:

1. Acknowledge horn with the C key.
2. Fill indicated pre-preservation agent quantity in through the tank opening in the tank.

WARNING!
Risk of injury due to chemicals!

Chemicals can cause chemical burns, depending on the type and dilution, cause irritation of the membrane and respiratory system and be toxic if swallowed.

Therefore:

– Only allow work on with chemicals s to be carried out by qualified personnel.
– The general safety instructions on how to handle chemicals according to the safetydata sheets must be observed at all times.
– Do not mix chemicals

3. Acknowledge after adding of preservation agent the query with the OK key.

Preservation time

If necessary, before switching on preservation, set the desired preservation duration:

1. Display the menu page Settings \ Cleaning.
2. Set parameter Preservation time to the desired value.

Operation

8.1 Switching off

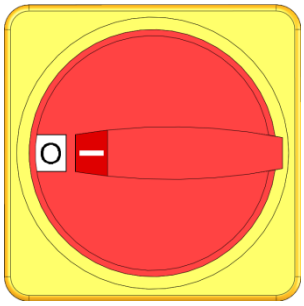


Fig. 32: Main switch

After use, switch the unit off as follows:

1. Press the key.

→ The cleaning unit switches off.

→ In the operatingmodedisplay, "Ready to operate" is indicated.

2. Turn the main switch to "0".

ATTENTION!
Turning it off prematurely will damage it!

If the cleaning cycle is not complete, that may lead to damage of the attached components.

Therefore:

– Plan for enough time for complete cleaning.

– If the cleaning cycle is stopped prematurely, rinse the components with fresh water.

8.2 Emergency stop

In dangerous situations, the unit must be stopped as quickly as possible and the power supply switched off.

Emergency stop

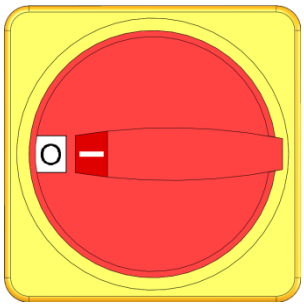


Fig. 33: Main switch

Proceed as follows in a hazardous situation:

1. Turn the main switch to "0".
2. Disconnect from the mains or disconnect all phases of the external power supply and secure them against being switched on again.
3. If necessary, bring people out of the danger area and carry out first-aid.
4. If necessary, alert a doctor and the fire brigade.
5. Inform the responsible person on site.

After rescue measures

6. If required by the severity of the emergency, inform the responsible authorities.
7. Commission qualified personnel to do the fault rectification.

WARNING!
Danger of life due to premature re-activation!

On restarting there is a danger of fatal injury for people in the danger area.

Therefore:

Before restarting, ensure that there are no persons in the danger area.

8. Before recommissioning, check the unit for perfect functioning.

8.3 Functions

8.3.1 Skip current phase

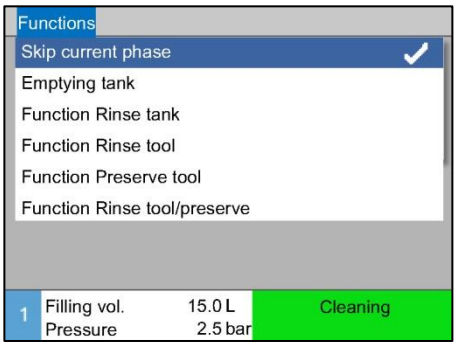


Fig. 34: Turn on skip current phase

The fill (preparation), cleaning operation (cleaning), tool rinsing (rinsing/preservation) can be skipped before they are over. To do so, proceed as follows:

1. Display menu page Functions.
2. Select the parameter Skip current phase and press the OK key.

   The activated function is indicated with the ✔ symbol.

→ There is a jump from the current phase to the next one if that is possible.

8.3.2 Tank emptying

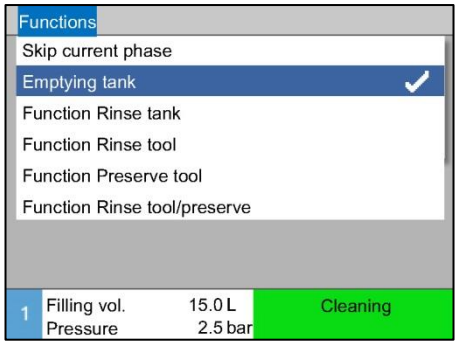


Fig. 35: Turn on tank emptying

NOTICE!

Local sewage regulations must be followed. Information about neutralization can be taken from the safety sheet or you can ask the manufacturer of the cleaning agent about it.

Turn on tank emptying as follows:

1. Display menu page Functions.
2. Select Emptying tank and activate it using the OK key.

   The active function is indicated with the ✔ symbol.

Set dilution factor

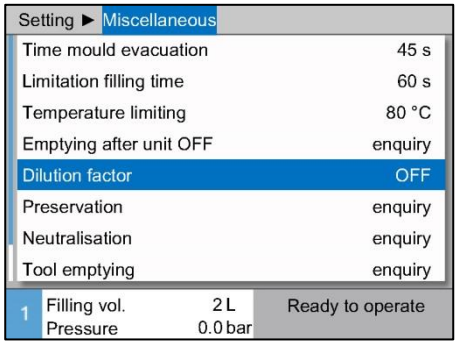


Fig. 36: Set dilution factor

If necessary, set the dilution factor prior to turning on Tank emptying.

1. Display the menu page Settings \ Miscellaneous.
2. Set Dilution factor to the desired value.

NOTICE!

The Dilution factor parameter defines the ratio of fresh water to the current tank contents while the tank is being emptied. If set at "2", twice as much fresh water as the current tank contents is added. If set at "OFF", the tank is emptied without being diluted.

8.3.3 Rinse tank

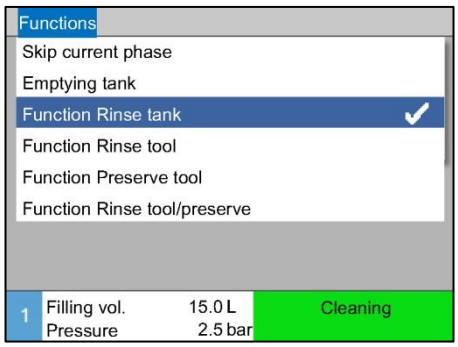


Fig. 37: Turn on rinse tank

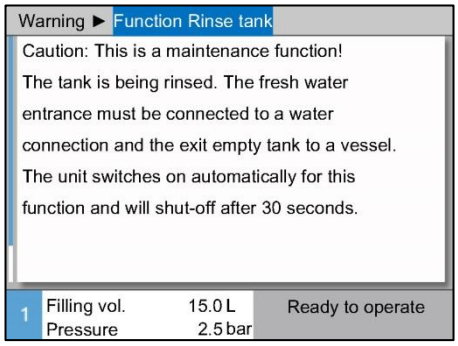


Fig. 38: Warning rinse tank

The tank can be rinsed using the servicing function. Proceed as follows to rinse the tank:

1. Hook up fresh water intake (E) to the plumbing.
2. Attach emptying (G) to a container.
3. Display menu page Functions.
4. Select Rinse tank and activate it using the OK key.
   The active function is indicated with the ✓ symbol.

→ The warning Rinse tank will be shown.

5. To continue the warning, acknowledge with the OK key. To discontinue the warning, acknowledge with the C key.

Set tank rinsing time

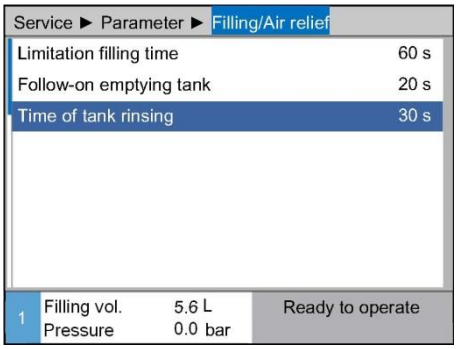


Fig. 39: Set tank rinsing time

If necessary, set the duration of tank rinsing prior to turning on the Rinse tank function.

1. Display menu page Service \ Parameter \ Filling/Air relief.
2. Set parameter Time of tank rinsing to the desired value.

8.3.4 Rinse tool

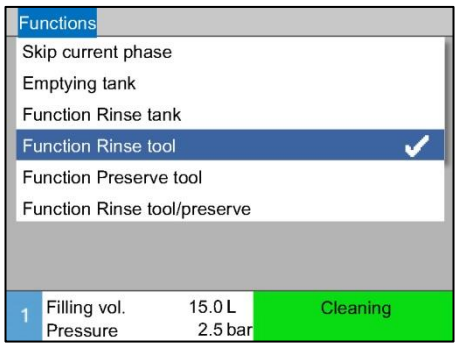


Fig. 40: Rinse tool

Using the Rinse tool function, the attached components are rinsed with fresh water

Proceed as follows to rinse the attached components:

1. Display menu page Functions.
2. Select Rinse tool and activate it using the OK key.
   The active function is indicated with the ✔ symbol.

NOTICE!

To set the duration of tool rinsing and the number of rinses (→ page 57).

8.3.5 Preserve tool

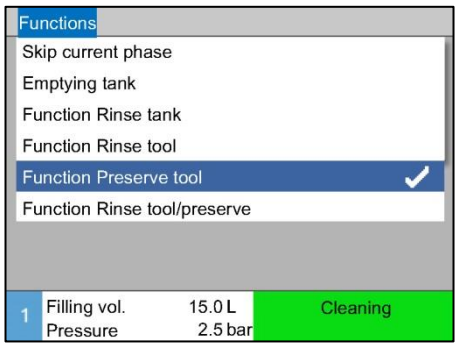


Fig. 41: Preserve tool

Using the Preserve tool function, the attached components are treated with preservative.

Proceed as follows to preserve the attached components:

1. Display menu page Functions.
2. Select Preserve tool and activate it using the OK key.
   The active function is indicated with the ✔ symbol.

NOTICE!

For precise procedures and settings (→ page 59).

8.4 Define access rights

8.4.1 Set user profile

Function

In order to avoid operating error and to improve clarity, menus, functions and parameters are suppressed corresponding to the set user profile.

Differentiating user profiles

A differentiation is made between the following user profiles.

User profile	Code	User/Characteristic
Standard	S	For the standard user
Enhanced	E	For the machine setter
Support	U	For the manufacturer and service personnel authorised by them

Set user profile

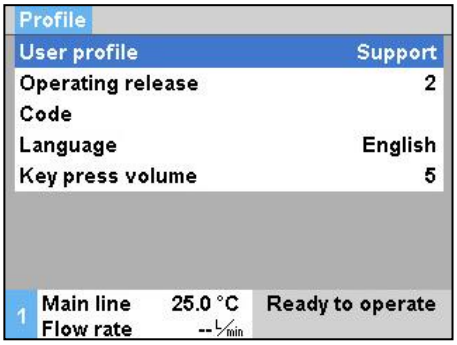


Fig. 42: User profile

The user profile can be set as follows:

1. Display menu page Profile .
2. Select parameter User profile.
3. Enter access code.
4. Set desired user profile.

8.4.2 Set operating release

Function

With the operating release level, it is determined which functions or values can be changed. If it is attempted to change locked values, a corresponding warning text appears on the display.

Levels of operating release

Level	Operating release
0	No access
1	Access to functions
2	Access to nominal values
3	Access to settings and monitoring
4	Access to service

Once-only operating release

1. Select locked parameter and press the OK key, warning text appears on the display.
2. Press the OK key.
3. Enter access code.

NOTE!

The once-only operating release is valid until the basic display reappears.

Permanent operating release

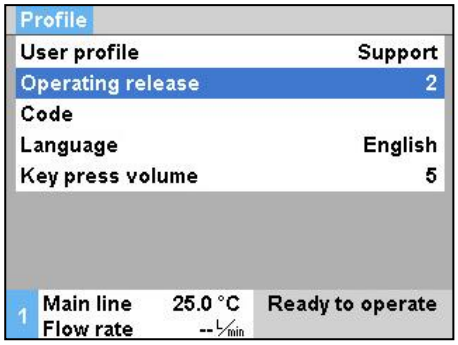


Fig. 43: Operating release

1. Display menu page Profile .
2. Select parameter Operating release and press the OK key.
3. Enter access code.
4. Set parameter Operating release to the desired value.

8.4.3 Change access code

The access code is a four-digit numeral and comprises the numbers *1*, *2*, *3* and *4.*

When the unit is delivered, the access code is *1234.*

NOTE!

For protection against misuse of the unit, change the access code immediately after commissioning.

If the current code is lost, please contact the nearest HB-Therm representative.

Change access code

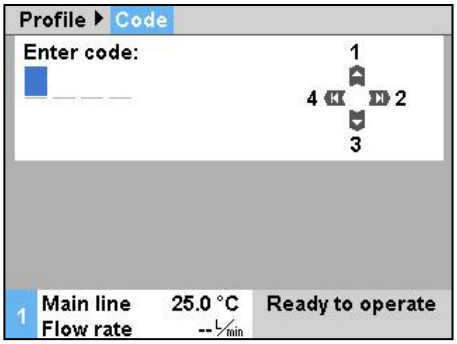


Fig. 44: Enter code

To change the access code:

1. Display menu page Profile .
2. Select the parameter Code and press the OK key.
3. Enter existing access code.
4. Enter new access code.
5. Confirm new access code.

8.5 Settings

8.5.1 Setting time zone, date and time

Set time zone

By default, date and time of the unit are set to Central European Time (CET) at delivery. To accommodate for different time zones, date and time must be set manually before commissioning. In this case, please proceed as follows:

1. Open the Setting \ Date / Time menu page.
2. Set the Time zone parameter to the appropriate time zone.

Set date and time

If the required time zone is not available in the parameter list, date and time will have to be set as follows:

1. Open the Setting \ Date / Time menu page.
2. Set the Time parameter to the appropriate value.
3. Set the Date parameter to the appropriate value.

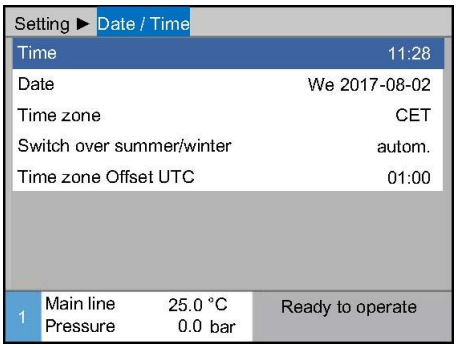


Fig. 45: Setting date / time

NOTICE!

If the required time zone is not available, then switching between summer and winter time will have to be done manually.

Set switching to summer and winter time

For the selectable time zones, switching between summer and winter time is done automatically.

Set the following to suppress the automatic switch:

1. Open the Setting \ Date / Time menu page.
2. Set the Switch to summer/winter parameter to "manual".

8.5.1 Level

Adjust nominal value of fill level for cleaning

Proceed as follows in order to set the nominal value of the filling level for cleaning:

1. Display the menu page Settings \ Cleaning.
2. Set parameter Nominal value of filling level cleaning to the desired value.

NOTICE!

A filling level set too high, leads to an unnecessary high consumption of cleaning agent.

Setting of the nominal value of filling level for rinsing, pre-preservation and preservation

Proceed as follows in order to set the nominal value of the filling level for pre-preservation, preservation and rinsing:

1. Display the menu page Settings \ Cleaning.
2. Set parameter Nominal value of filling level rinsingto the desired value.

Operation

8.1 Monitoring

8.1.1 Tank temperature

Function

The temperature in the tank is continuously monitored. If the limit temperature is exceeded, the "Excessive temperature in the circuit" alarm goes off.

Setting monitoring temperature

Monitoring the temperature in the tank is to be set as follows:

1. Display the menu page Settings \ Miscellaneous.
2. Set Temperature limiting to the desired value.

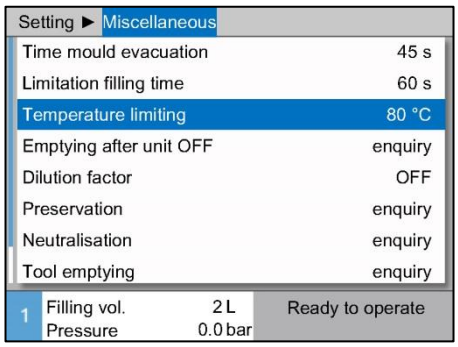


Fig. 46: Temperature limiting

8.2 Explorer window

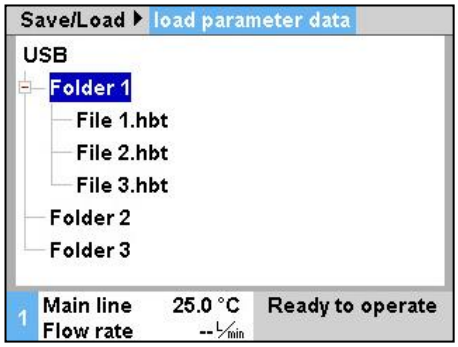


Fig. 47: Example Explorer window

The Explorer window displays the directories and files on the inserted USB data carrier.

- Directories with ⊞ are opened with the ▶▶ key.
- Directories with ⊟ are closed with the ◀◀ key.

NOTE!

Depending on the number of files and directories on the USB data carrier, it can take several minutes before the directory structure is displayed.

NOTE!

From the operating panel it is not possible to create, delete or process directories on the USB data carrier.

8.3 Save/Load

Function

With the menu page Save/Load, various data can be saved to a USB data carrier or loaded from a USB data carrier. With this function, it is possible to transfer data from one unit to another unit.

In case of failure, the service information can be stored on an USB device for fault diagnosis by a representative of HB-Therm.

WARNING!
Damage due to wrong settings!

Loading wrong parameter or configuration data can lead to malfunction or total breakdown.

Therefore:

– Only load data that is intended for the unit.

NOTICE!

The relevant user profile is saved in the file when saving the parameter.
During the subsequent charging, only the relevant parameter with the profile saved and its subordinates is charged.

NOTICE!

Only FAT32 formatted USB data carriers are supported.

Saving data

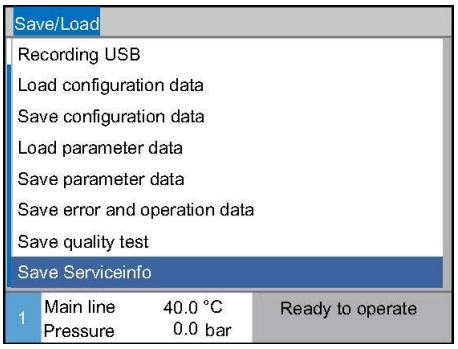


Fig. 48 Saving data

Proceed as follows in order to save data from the unit to a USB data carrier:

1. Display menu page Save/Load.
2. Connect USB data carrier to front connector.
3. Select the data to be saved and confirm with the OK key.
4. In the Explorer window, select the directory and confirm with OK.

→ The file is saved to the selected directory on the USB data carrier.

NOTICE!

Saving service information includes all service relevant data (configuration-, parameter etc.) that are necessary for a fault diagnosis.

Loading data

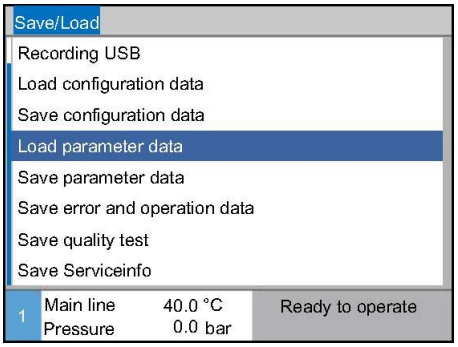


Fig. 49 Loading data

Proceed as follows in order to load data to the unit from a USB data carrier:

1. Display menu page Save/Load.
2. Connect USB data carrier to front connector.
3. Select the data to be loaded and confirm with the OK key.
4. In the Explorer window, select the directory and file and confirm with OK.

→ The data is loaded to the unit. If loaded values are outside the permissible range, then these are reset to the standard settings.

File name

The unit automatically creates file names on the USB data carrier according to the following examples:

Serviceinfo

Exa. **Serviceinfo_2017-03-10_15-26-08**

Time
Date

Configuration data

Exa. **HB TR2 [1].csv**

Index [1]
System and housing size

Parameter data

Exa. **Par HB TR2 [1].csv**

Index [1]
System and housing size

Error and Operation data

Exa. **BD HB TR2 [1].csv**

Index [1]
System and housing size

[1]An index is automatically added when the file name already exists.

8.3.1 Recording actual data

Function

When the Record USB function is activated, the values selected in Setting \ Recording USB are written to the USB data carrier.- A new recording file is created each day. If saving to the USB data carrier is not possible, a corresponding warning is displayed.-

Start recording

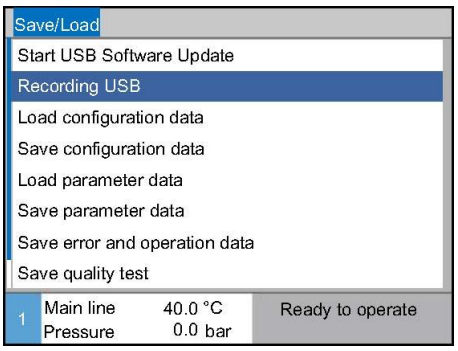


Fig. 50: Recording USB

Proceed as follows to start recording actual data to a USB data carrier:

1. Display menu page Save/Load.
2. Connect USB data carrier to front connector.
3. Select the Recording USB function and confirm with the OK key.

   The function activated is indicated with the ✔ symbol.

→ The data is saved to the USB data carrier.

→ The active Recording USB is indicated with the ● symbol on the basic display.

Stop recording

Proceed as follows to stop an active recording:

1. Display menu page Save/Load.
2. Select the Recording USB function and confirm with the OK key.

→ The USB data carrier can be removed.

Set recording interval

Proceed as follows to set the recording interval:

1. Display the menu page Settings \ Recording USB
2. Set parameter Cycle serial recording to the desired value.

NOTICE!

If the desired recording interval is not possible, recording will be made at the fastest possible interval.

Select values

Proceed as follows to choose the values to be recorded:

1. Display the menu page Settings \ Recording USB
2. Select the desired value and confirm with the OK key.

   The active value is indicated with the ✔ symbol.

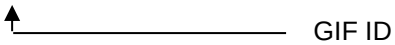
NOTICE!

You may choose as many values as you like.

File name

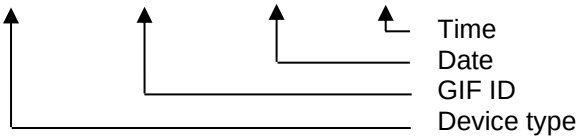
For each unit, a separate directory is automatically generated on the USB data carrier and the recording files are written in it.-

Exa. **HB_Data_00001234**



The unit automatically creates file names on the USB data carrier according to the following examples:

Exa. **HB140Z1_00001234_20100215_165327.csv**



NOTICE!

The GIF-ID can be seen under Display \ Module.

Visualize the data recorded

To visualize and prepare the actual data recorded, the VIP (Visualisation programme – Recording of actual values) software can be downloaded from www.hb-therm.ch.

9 Maintenance

9.1 Safety

Personnel

- Maintenance tasks described here can be performed by the operator, unless otherwise indicated.
- Some maintenance tasks must only be carried out by qualified personnel or by the manufacturer exclusively. If this is required, it is pointed out separately in the description of the respective faults.
- As a rule, work on the electrical system must only be carried out by certified electricians.
- Work on the hydraulic system must only be carried out by qualified hydraulics technicians.

Personal protective equipment

Wear the following protective equipment for all maintenance/repair work:

- Safety goggles
- Protective gloves
- Safety shoes
- Protective clothing

NOTE!

For specific work, the warning notices in this chapter draw special attention to further protective equipment.

Special dangers

The following dangers exist:

- Danger of fatal injury by electric current.
- Danger of injury from aggressive working materials.
- Danger of crushing due to rolling away or tipping.

Maintenance / repair work carried out improperly

WARNING!

Danger of injury due to maintenance / repair work carried out improperly!

Improper maintenance / repair work can lead to severe personal injury or material damage.

Therefore:

– Before starting work, ensure that there is sufficient space for assembly.
– When assemblies are removed, observe correct assembly, re-assemble all fixing elements and observe screw torque specifications.

9.2 Open the unit

The unit has to be opened for specific maintenance work.

- Only to be carried out by a specialist or instructed person.
- Necessary tools (depending on unit status):
  - Torx screwdriver.
  - Hexagon or flat-bladed screwdriver.

DANGER!
Danger of death by electric current!

Live parts are dangerous. Contact with high voltages causes injury or death.

Therefore:

– Work on the electrical system must only be carried out by certified electricians.

– For all work on the electrical system, for maintenance, cleaning or repair work, disconnect from the mains or disconnect all phases of the external power supply and secure them against being switched on again.

– Check unit is isolated from power supply.

Maintenance

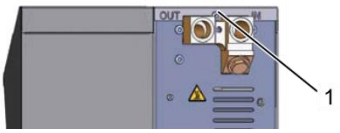


Fig. 51: Loosen screws

1. Use a screwdriver to loosen and remove the screw in the cover plate.

Fig. 52: Remove cover plate

2. Pull the cover plate approx. 1 cm to the rear and lift off upwards.

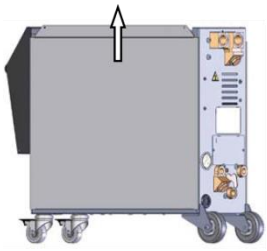


Fig. 53: Pull side plate upwards

3. Pull the side plate slightly upwards.

Fig. 54: Pull out the side plate

4. Pull the side plate upwards at a slight angle out of the securing straps and remove it.

Access to electrical part

Access to the electrical part is obtained by hinging down the front panel.

9.3 Maintenance schedule

Maintenance tasks that are required for optimum and trouble-free operation are described in the sections below.

If increased wear is detected at regular inspections then the required maintenance intervals must be shortened by the customer to correspond with the actual signs of wear.

Contact the HB-Therm distributors for questions on maintenance work (→ www.hb-therm.ch).

Interval	Assembly / Component	Maintenance work	Carried out by
after each cleaning cycle	Filter basket	Clean, wash out	Operator
	Tank	Clean, wash out, rinse with fresh water (→ page 80)	Operator
quarterly or ~1000 h	Pump air filter	Blowing out	Qualified personnel
	Screw connectors	Check for firm seating and damage	Qualified personnel
		If necessary tighten or replace	
	Seals	Check for damage	Qualified personnel
		Replace if necessary	
half-yearly or ~2000 h	Pump	Check for wear (impeller, seals, motor bearings)	Qualified personnel
		If necessary clean or replace	
	Valves	Check for contamination	Qualified personnel
		If necessary clean or replace	
Every 1½ years or ~6000 h	Hydraulic hose connections (internal) [1)]	Check for damage on outer sheath and in the sealing area	Hydraulic specialists
		Replace if necessary	Hydraulic specialists
	Electrical wiring	Checking electrical wiring for damage to outer sheath	Electrical specialists
		Replace if necessary	Electrical specialists
	Pressure measurement	Checking accuracy of pressure measurement (→ page 81)	Specialist
	Level measurement	Checking accuracy of level measurement (→ page 82)	Specialist

1) The maintenance of external hoses is to be carried out according to the manufacturer's instructions.

9.4 Maintenance tasks

9.4.1 Cleaning

Clean the unit under the following conditions:

- Only clean the outer parts of the unit with a soft, moist cloth.
- Do not use any aggressive cleaning agents.

9.4.2 Clean tank, filter basket

Cleaning the tank and filter basket

- To be carried out by the user.

Necessary equipment

- Fresh water

Procedure

1. Activate Emptying tank function and wait until the tank is drained.
2. Open tank lid
3. Remove filter basket from tank and clean under running fresh water.
4. Remove the locking screw at the draining connection and connect a collecting container reps. set one in place.
5. Clean the tank with water, drain dirty water through the draining connection.
6. After cleaning, rinse the tank with fresh water (fill in through the opening of the tank lid and drain through the draining connection)
7. Mount the locking screw on the draining connection.
8. Put the cleaned filter basket in place.
9. Close tank lid.

9.4.3 Pressure measurement

Check the accuracy of the pressure measurement

- Only to be carried out by a specialist.

Necessary equipment

- no special equipment
- Optionally, test equipment can be used for the pressure measurement. For further information go to www.hb-therm.ch

Procedure

1. Switch off the unit.
2. Depressurize main line.
3. Main line pressure on menu page Display \ Actual value must indicate 0.0 bar ±0.1 bar.

→ With a deviation of >0.1 bar, the pressure sensor must be calibrated. On menu page Service \ Calibration \ Pressure, calibrate parameter Pressure sensor 2 offset.

9.4.4 Level measurement

Check the accuracy of the level measurement

- Only to be carried out by qualified personnel.

Necessary equipment

- Scale (in grams)
- Container (at least 10 litres)
- Needle with hollow point
- Flat spanner 10 and 12

Procedure

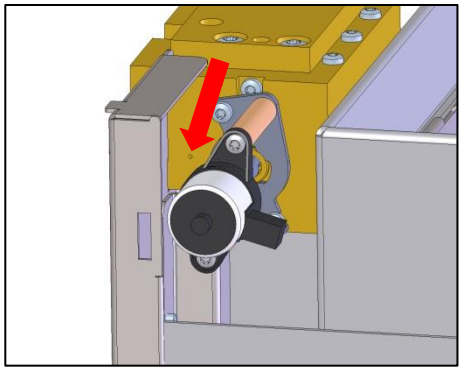


Fig. 55: Open top up level

1. Activate the Emptying tank function and wait until the tank is empty.
2. Open tank lid
3. Remove filter basket.
4. Attach hose clamp for the hose of the fill level container.
5. Detach the screws for the hoses to the tank, remove the nut from the fill level container and remove the fill level container from the tank.
6. Weigh the fill level container including housing.

→ If the measured weight is less than 740 grams, compute the amount to be added:
Amount to be added in mL = 740g − measured weight in g

7. Lay the fill level container in the tank and attach with the nut. Attach the screws at the appropriate connection.
8. Open hose clamp for the hose of the fill level container.
9. Insert filter basket.
10. If the amount to be added is over 40 g, material must be added.

→ Open device (→ page 77)

→ Slowly add tap water in the amount computed through the side opening near the switch valve (→ Fig. 55) using a nozzle.

11. Manually fill tank until the menu page Display \ Actual values shows 100 %. No water may flow over the top of the tank.

NOTICE!

If you have problems, consult the HB-Therm staff (→ www.hb-therm.ch).

9.4.5 Software update

Proceed as follows in order to install a new user programme on an individual unit:

> *NOTICE!*
> *The "gba03Usr.upd", "SW51-1_xxxx.upd" or "SW51-2_xxxx.upd" software must be in the root of the data carrier. It may not be stored in a folder.*

> *NOTICE!*
> *During the software update, the Thermo-5 unit or the Panel-5 control model and all products connected to them may not be switched off.*

Necessary tools:

- USB data carrier with the current software

→ The latest software can be acquired from the HB-Therm representative (→ www.hb-therm.ch).

> *NOTICE!*
> *Only USB data carriers in FAT32 format are supported.*

Run software update

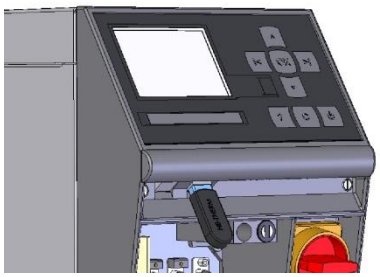


Fig. 56: Connect USB data carrier

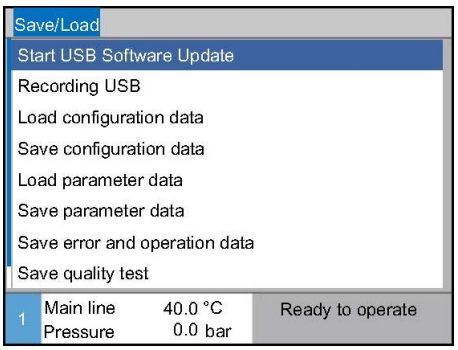


Fig. 57: Start USB software update

1. Switch on main switch.
2. Connect USB data carrier (Fig. 56).
3. Display menu page Profile.
4. Set parameter User profile to "Enhanced".
5. Display menu page Save/Load.
6. Select function Start USB Software Update and confirm with the OK key.

→ The data is loaded from the USB data carrier to the memory in the USR-51. Do not disconnect the USB connection.

→ Conclusion of data transfer is indicated on the display. The USB connection can now be disconnected.

→ The new software is written to the USR-51 flash. On completion, an automatic restart is initiated.

7. If required, the USB connection must be re-established to install further data.

→ If necessary, the new software is written to the connected GIF-51, DFM-51 or VFC-51 after the restart. This process can take a few minutes. On completion, another restart takes place.

→ The message *Ready to operate* appears on the display.

Checking the software version

1. In the basic display, press the ? key.

→ The current software version appears at the top right.

9.4.6 Gain access to components

In order to have clear access to the system components to change them if necessary, the unit must first be opened.

Unit board

1. Disconnect the mains plug from the mains supply.
2. Loosen the screws in the front panel.
3. Hinge down the front panel.

9.5 Logbook agent

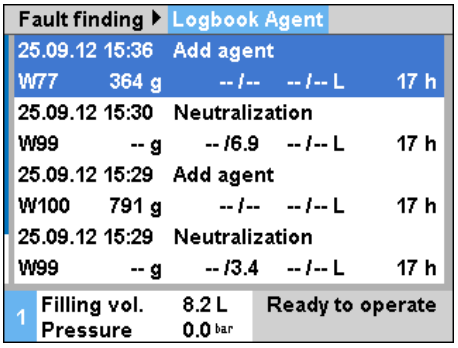


Fig. 58: Logbook agent

Every input of agent, entry of results or interruption of cleaning is chronologically recorded in the logbook agent (no more than 100 entries). The entries can be displayed as follows:

1. Display menu page Fault search \ Logbook agent
2. Select the entry desired using the or the key.

10 Faults

The following chapter describes possible causes of malfunctions and what to do to remove them.

In the case of increased disturbances, reduce the maintenance intervals according to the actual burden.

In the case of faults, which can not be remedied by the following instructions, contact the HB-Therm representative (→ www.hb-therm.ch). For error diagnoses, service information can be saved to a USB data carrier and sent to the HB-Therm representative (→ page 72).

10.1 Safety

Personnel

- Tasks for troubleshooting described here can be performed by the operator, unless otherwise indicated.
- Some tasks must only be carried out by qualified personnel or by the manufacturer exclusively. If this is required, it is pointed out separately in the description of the respective faults.
- As a rule, work on the electrical system must only be carried out by certified electricians.
- Work on the hydraulic system must only be carried out by qualified hydraulics technicians.

Personal protective equipment

Wear the following protective equipment for all maintenance/repair work:

- Safety goggles
- Protective gloves
- Safety shoes
- Protective clothing

NOTE!

For specific work, the warning notices in this chapter draw special attention to further protective equipment.

Special dangers

The following dangers exist:

- Danger of fatal injury by electric current.
- Danger of injury from aggressive working materials.
- Danger of crushing due to rolling away or tipping.

Maintenance / repair work carried out improperly

WARNING!

Danger of injury due to maintenance / repair work carried out improperly!

Improper maintenance / repair work can lead to severe personal injury or material damage.

Therefore:

– Before starting work, ensure that there is sufficient space for assembly.
– When assemblies are removed, observe correct assembly, re-assemble all fixing elements and observe screw torque specifications.

In case of faults:

The following general rules apply:

1. In the event of faults that pose immediate danger to man or machine, activate the emergency shutoff function immediately.
2. Determine cause of fault.
3. If elimination of the fault requires working in the danger zone, switch off unit and secure against being switched on again.
4. Immediately inform the person in charge at the equipment location of the fault.
5. Depending on the type of fault, eliminate the fault or have it eliminated by an authorized specialist.

NOTE!

The chapter "Troubleshooting" below provides information on who is authorised to eliminate the fault.

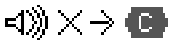
10.2 Fault indications

10.2.1 Fault indication display

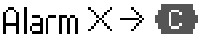
Characteristic	Display	Pump	Acknowledgement
Limit values have been exceeded. The transgression has a direct influence on the operational safety of the unit.	red	off	compulsory

If faults occur:

→ Horn is activated

→  is displayed in the symbol field.

1. Acknowledge horn with the  key.

→  is displayed in the symbol field.

2. Determine the cause of the fault. If required, contact the HB-Therm representative (→ www.hb-therm.ch).

3. Acknowledge alarm with the  key.

10.3 Determine the cause of a fault

Cause of a fault

Proceed as follows to ascertain the possible causes of a current fault indication:

1. Press the  key to display the online help for the pending fault indication.

Fault overview

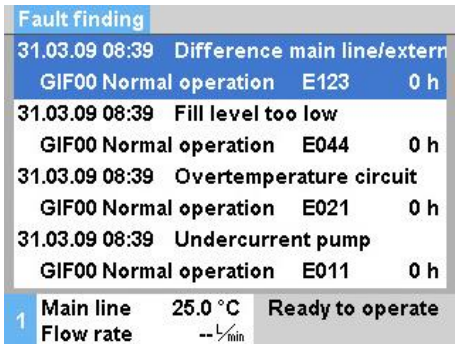


Fig. 59: Logbook Alarms

The most recent 10 fault indications that occurred can be displayed as follows:

1. Display menu page Fault finding \ Logbook Alarms.

→ The overview of the fault indications is displayed.

2. Select desired fault indication.

3. Press the  key.

→ The online help is displayed for the selected fault indication.

10.4 Troubleshooting chart

Fault	Possible cause	Rectification	Rectified by
Undercurrent pump or Overcurrent pump	Not connected to the correct mains voltage	Connect to the correct mains voltage	Certified electrician
	Pump defective	Repair or replace pump	Qualified personnel
Phase missing	Mains connection not made correctly	Make mains connection properly	Certified electrician
Initial filling too long	Mains water pressure too low.	Acknowledge alarm (overstepped with initial filling duration). Increase mains water pressure.	Operator
	Fresh water connection not made correctly	Make fresh water connection correctly (open available shut-off valves)	Operator
	Quick-release connectors used are closed or clogged	Check quick-release connectors, clean or replace as necessary	Qualified personnel
	Hose connections defective	Check hose connections for leaks, replace as necessary	Operator
	Filling valve defective	Repair or replace filling valve	Qualified personnel
	Filling level measurement not calibrated properly	Calibrate filling level measurement	Qualified personnel
	Filling level sensor defective	Replace filling level sensor	Qualified personnel
Filling level too high	Too much medium has been added through the tank opening.	Tank emptying	Qualified personnel
	Level measurement faulty	Repair or replace level measurer	Qualified personnel
Filling level too low	Leakage (hose connection, device or tool)	Check the entire system for leaks. If necessary repair/replace leaky components.	Operator
	Level measurement faulty	Repair or replace level measurer	Qualified personnel
Tank overflows despite level < 100 %	Filling level measurement incorrectly calibrated.	Calibrate filling level measurement	Qualified personnel
	Quantity of medium in filling level container too low.	Check quantity of medium in filling level container (→ Page 82).	Qualified personnel

10.5 Startup after eliminating fault

After remedying the fault, the following steps should be taken to re-start the system:

1. Reset the Emergency Off devices.
2. Acknowledge the fault at the control unit.
3. Ensure that no one is in the danger zone.
4. Start up in accordance with the instructions in the "Operating" chapter.

11 Disposal

11.1 Safety

Personnel

- Disposal must only be carried out by qualified personnel.
- Work on the electrical system must only be carried out by certified electricians.
- Work on the hydraulic system must only be carried out by qualified hydraulics technicians.

11.2 Disposal of materials

Once the end of the useful life has been reached, the unit must be disposed of in an environmentally compatible manner.

As long as no return or disposal agreement was made, dismantled constituent parts are to be recycled:

- Metals should be scrapped.
- Plastic elements should be passed on for recycling.
- Other materials should be sorted and disposed of according to material composition.

ATTENTION!
Environmental pollution on wrong disposal!

Electrical waste, electronic components, grease and other additives are subject to the treatment of special refuse and may only be disposed of by approved specialised companies.

The local authority or specialised disposal companies can give information on environmentally compatible disposal.

12 Spare parts

WARNING!
Safety risk due to wrong spare parts!

Wrong or defective spare parts can impair safety as well as leading to damage, malfunctions or total breakdown.

Therefore:

– Only use original spare parts from the manufacturer.

Purchase spare parts through the HB-Therm representative (→ www.hb-therm.ch).

The spare parts list can be found in Appendix B of this operating manual.

On use of non-approved spare parts, any guarantee or service claims are forfeited.

12.1 Ordering spare parts

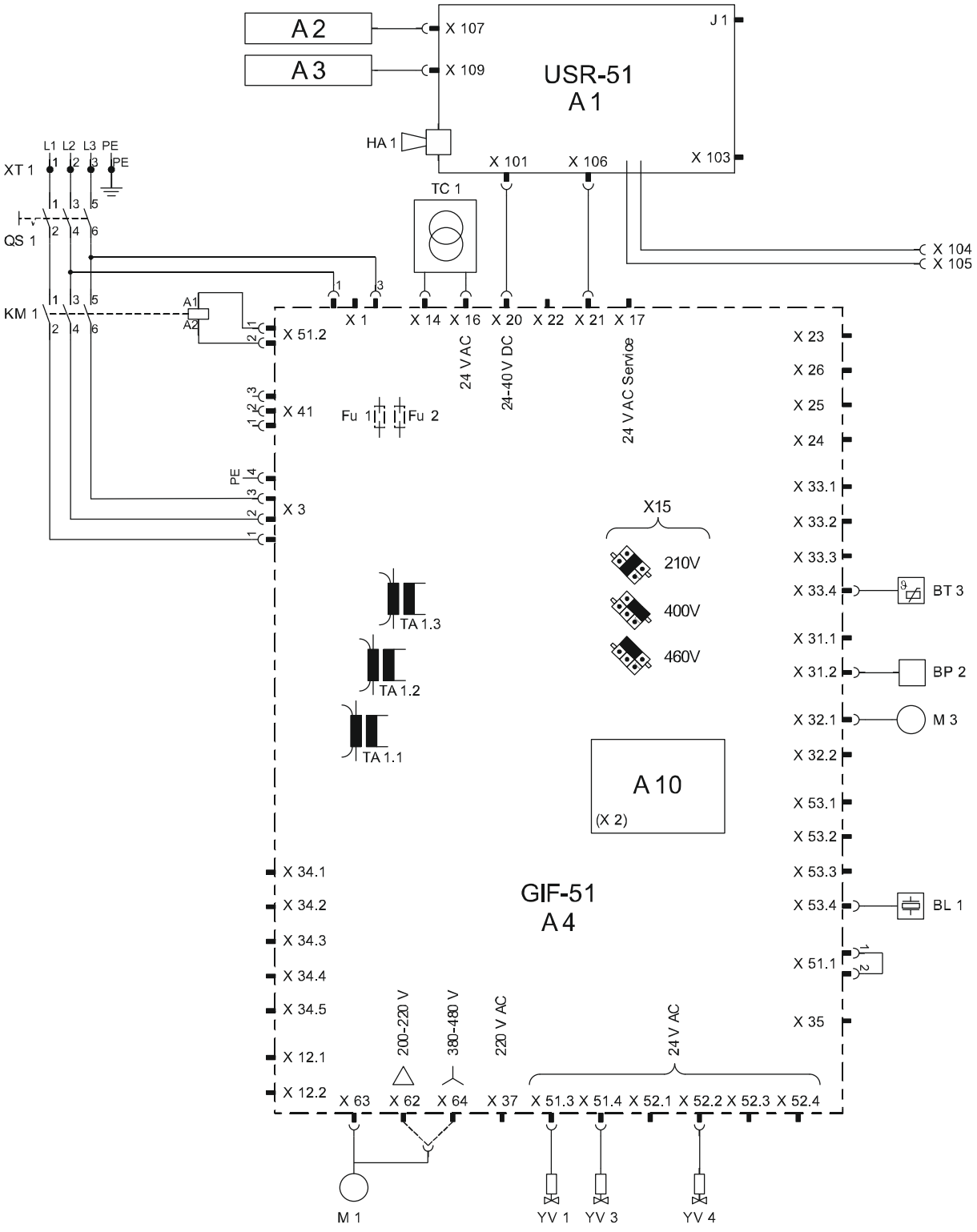
When ordering spare parts, always indicate:

- The designation and ID No. of the spare part.
- Amount and unit.

13 Technical information

13.1 Electrical circuit diagram

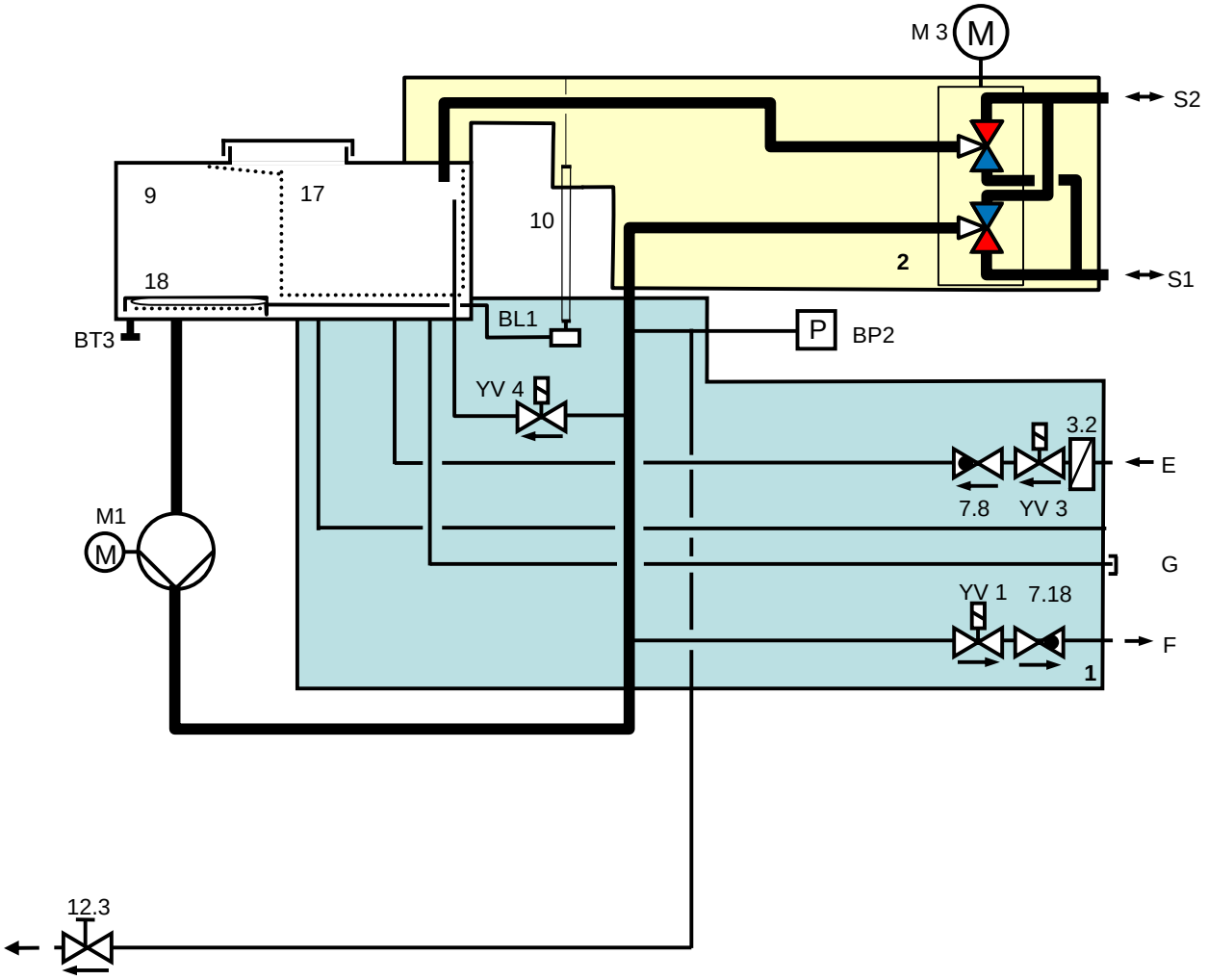
Electrical connection see nameplate on unit or on page 23.



Technical information

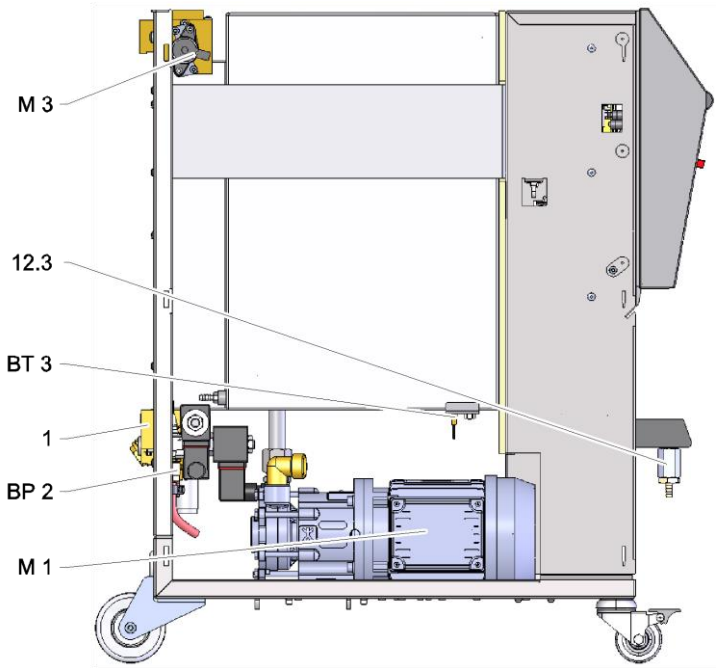
13.2 Hydraulic scheme

HB-CL2

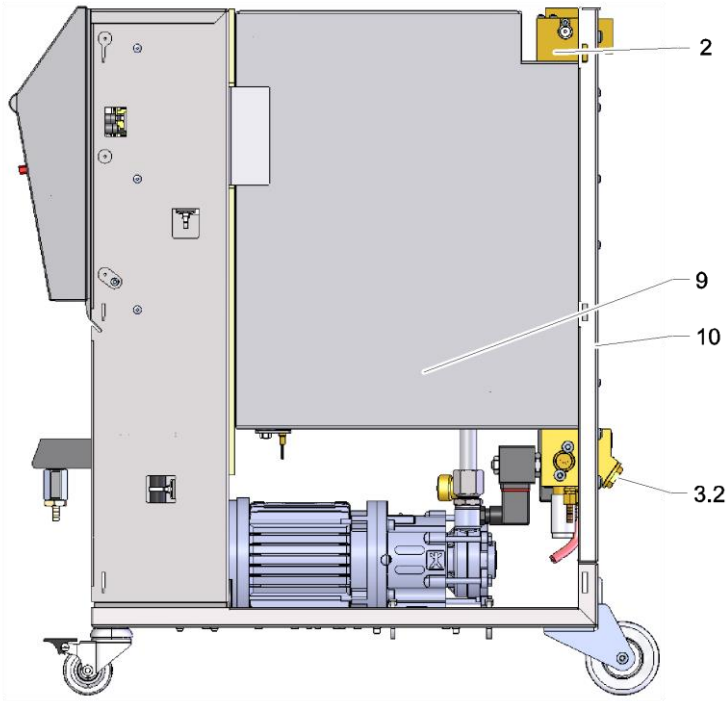


13.3 Item location

Side view left

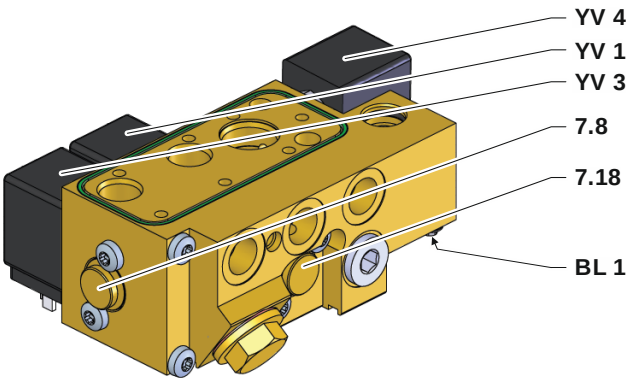


Side view right

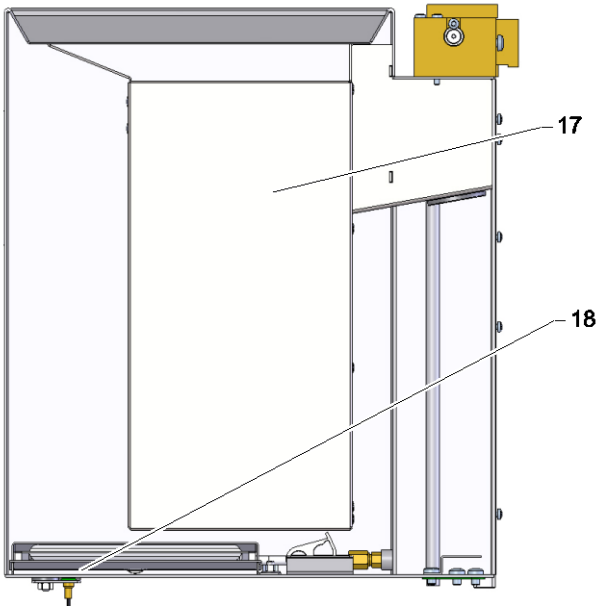


Technical information

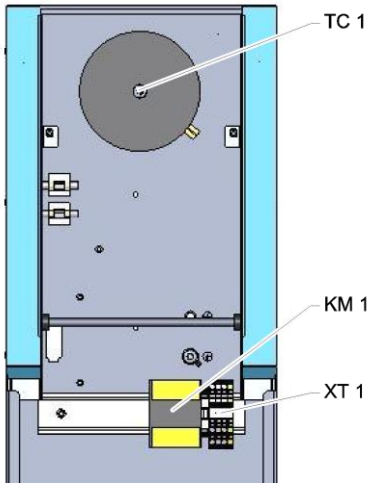
Cold water module



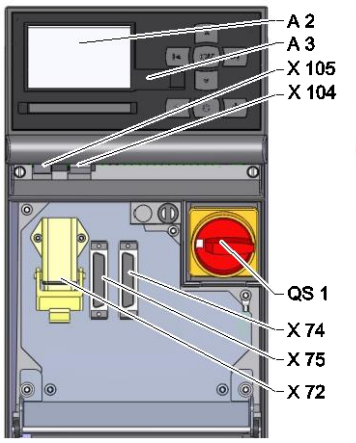
Tank

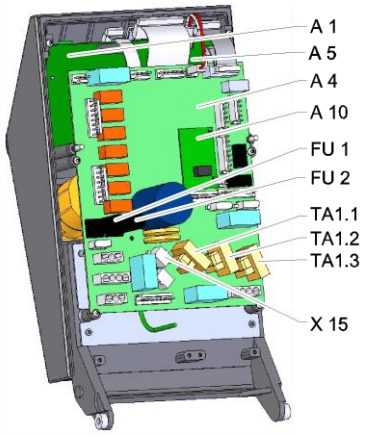


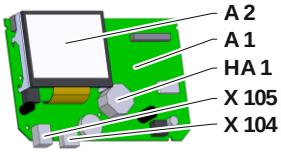
Electric components



Front


A 2
A 3
X 105
X 104
QS 1
X 74
X 75
X 72


A 1
A 5
A 4
A 10
FU 1
FU 2
TA1.1
TA1.2
TA1.3
X 15


A 2
A 1
HA 1
X 105
X 104

13.4 Legend

KZ	Designation	only with version
S1	Connection 1	
S2	Connection 2	
E	Fresh water inlet	
F	Discharge water outlet	
R	Test	
G	Drain	
1	Cold water module	
2	Switch module	
3.2	Fresh water inlet filter	
7.8	Non-return valve filling	
7.18	Non-return valve drain	
9	Tank	
10	Level indicator	
12.3	Test of the cut-off valve	
17	Filter basket	
18	Fill level container	
A 1	Control unit USR-51	
A 2	Display	
A 3	Keyboard	
A 4	Unit board GIF-51	
A 10	Level module	
BL 1	Audio converter level	
BP 2	Pressure sensor main line	
BT 3	Temperature sensor tank	
FU 1	Fuse 0,8 AT	
FU 2	Fuse 0,8 AT	
HA 1	Horn	
KM 1	Main contactor	
M 1	Main pump	
M 3	Switch valve	
N	Mains connection cable	
QS 1	Main switch	
TA 1.1	Current transformer 1	
TA 1.2	Current transformer 2	
TA 1.3	Current transformer 3	
TC 1	Transformer	
X 15	Preselection of voltage	
X 104	Connector USB-Host	
X 105	Connector USB-Device	
XT 1	Mains terminal	
YV 1	Solenoid valve drain	
YV 3	Solenoid valve filling	
YV 4	Solenoid valve mix	