HB-Therm®
TREAT-5

Instruction Manual

HB-TR2

Water Treatment 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 treating water using treatment agents and supplying this as system water for a temperature-control unit. The unit must not be used for treatment of cooling water of a temperature-control unit.

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 dangers!

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 treatment agents that are unsuitable for the temperature range applied and 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.

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.

Safety

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

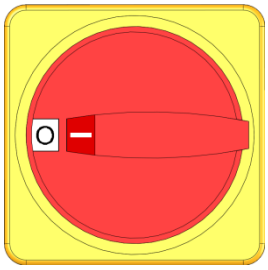


Fig. 1: Main switch

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	Water Treatment Unit HB-Therm Treat-5
Unit types	HB-TR2
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	Water Treatment Unit HB-Therm Treat-5
Unit types	HB-TR2
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

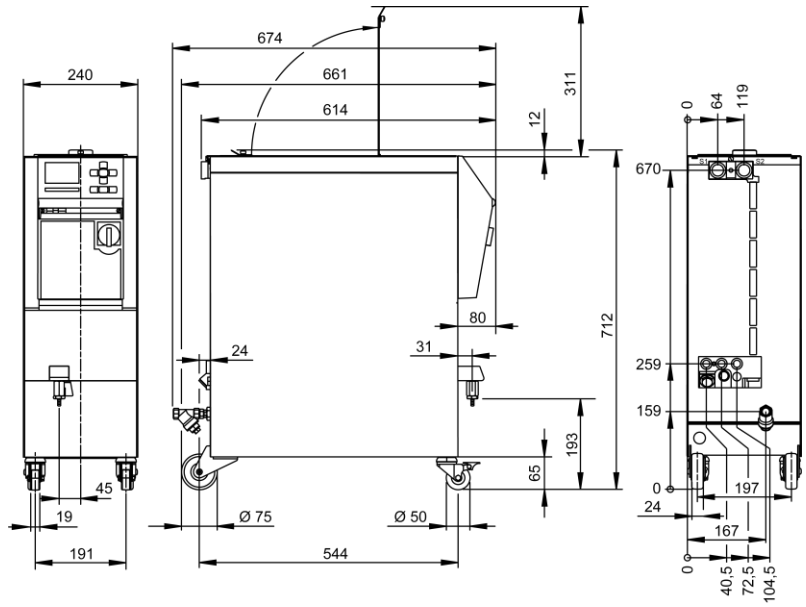


Fig. 2: Dimensions

Max. weight

	Value	Unit
HB-TR2	57	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, 100	bar, °C

G… Connector inside thread in inches

Connection fresh water inlet (ZW additional equipment)

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

G… Connector inside thread in inches

Connection cooling water

	Value	Unit
Pressure	2–5	bar
Thread	G⅜	
Resistance	10, 80	bar, °C

G… Connector inside thread in inches

Technical data

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

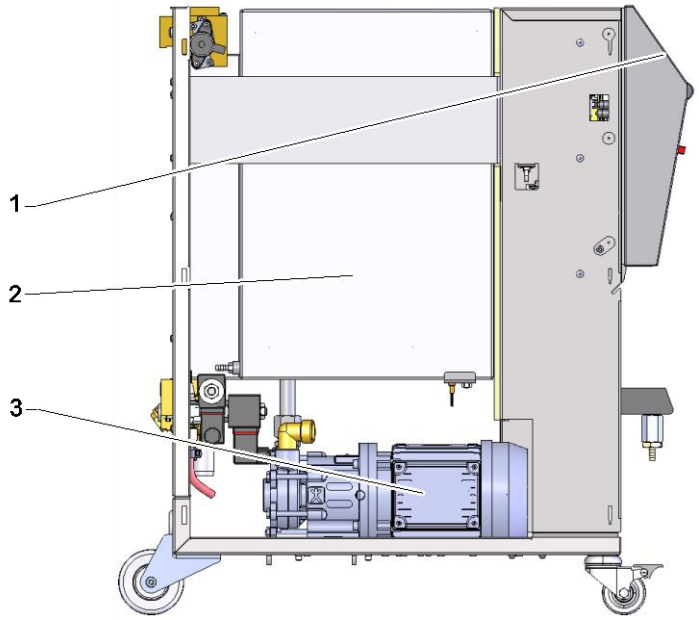


Fig. 3: Overview

1 Keyboard and display
2 Tank with filter element
3 Pump

4.2 Brief description

The water treatment unit is used for supply and as a collection tank for the system fluid of temperature control units. The water treatment unit supplies treated water, which is pumped to the connected temperature control units serving as system water. A built-in filter basket in the tank removes any particles. The system water released by the temperature control units is collected in the tank.

Together with the treatment agents, the unit serves as a mobile water treatment system.

The unit supports the user with graphic displays during the entire water treatment process. This includes the selection and preparation of the treatment agents, the periodic checks and the emptying of the diluted tank contents.

4.3 Functional principle

The water treatment unit contains a tank, a pump, a tank cooler and a filter basket.

The integrated level measurement controls the filling level in the tank. If the filling level of the unit is too low when switched on, the tank must be refilled (done automatically with the additional equipment ZW). After termination of the filling phase, the user is informed about the quantity of treatment agent needed.

The tank temperature is permanently controlled. If the tank temperature exceeds the set limit value, then the internally installed cooler starts cooling.

In the mixing phase, the treatment agent is mixed with the tank content. Through the filter basket particles are removed from the water. After termination of the mixing phase, the normal operation starts. The treated and filtered water is placed under pressure at disposal in the main line of the temperature control unit.

If no treated water is drawn from the temperature control units connected, the pump switches off after a short period of time and only starts running again if the measured pressure in the main line drops.

The unit supports the periodic maintenance of the medium, which can be easily carried out by taking water samples.

The drainage of the used medium is carried out through the function Emptying tank. In this process, the tank content is being drained through the drain in the unit with the pump running and the drain valve open.

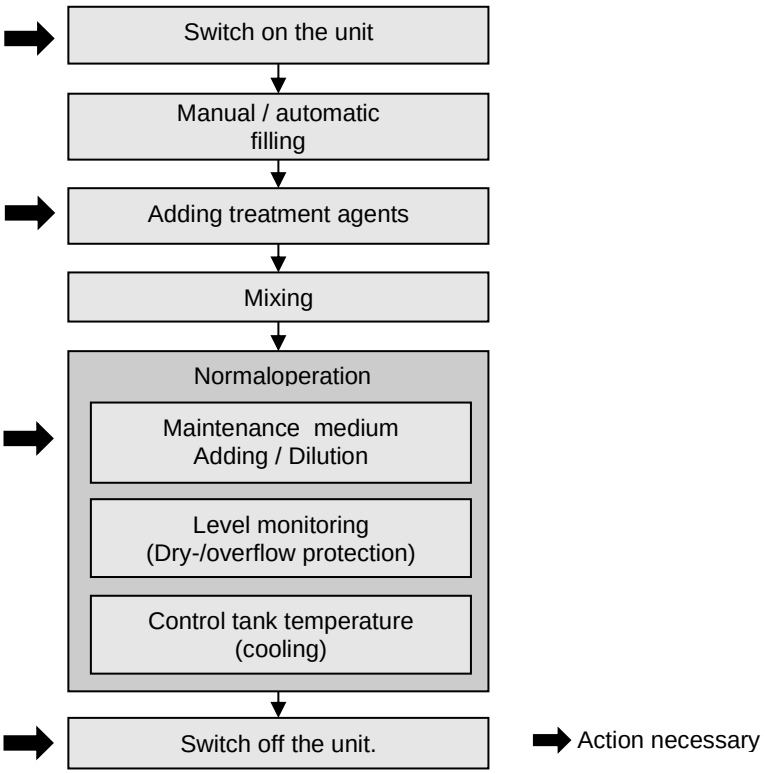


Fig. 4: Process diagram

4.4 Medium

Water treated with treatment agent is used as a medium.

HB-Therm recommends appropriate treatment agents.

NOTICE!

For additional information, you can download „Wasseraufbereitungsmittel – Empfehlung für Temperiergeräte“ [Water Treatment Agent Recommendations for Temperature Regulation Devices] at www.hb-therm.ch.

Structure and function

4.5 Connections

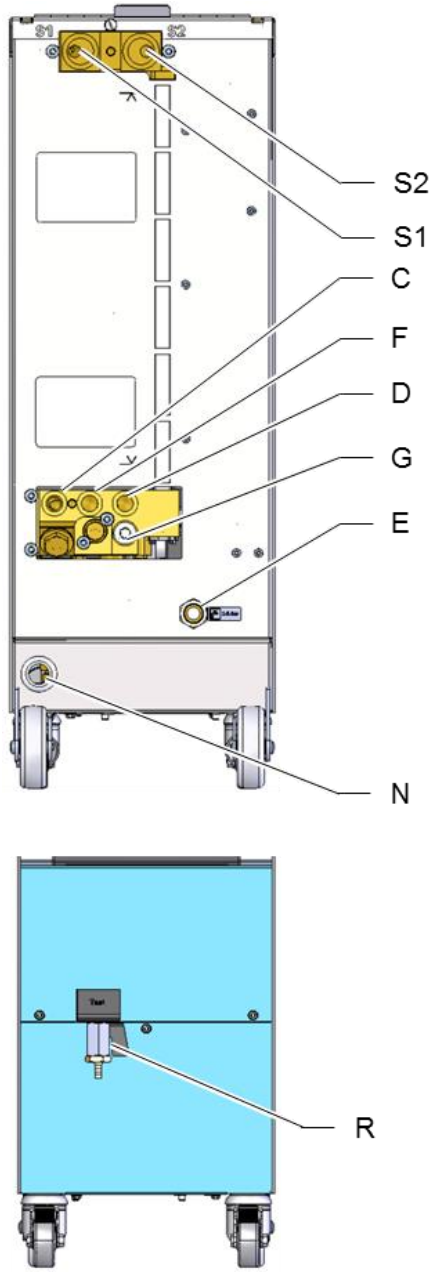


Fig. 5: Connections

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

S1	**S1**	Main line
S2	**S2**	Return line
C		Cooling water inlet
D		Cooling water outlet
E		Fresh water inlet (additional equipment ZW)
F		Drain
G		Emptying
R	**TEST**	Sample water outlet
		Cooling 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
ZB	Connection for alarm and external control	Alarm using potential-free contact rating max. 250 VAC, 4 A
		Unit ON/OFF using potential-free contact
		1 socket Harting Han 7D (male)
ZD	Interface DIGITAL	Serial data interface 20 mA, RS-232 or RS-422/485
		Various protocols selectable: Arburg, Billion, Bühler, Dr. Boy, Engel, Ferromatik Milacron, Haitian, KraussMaffei, Negri Bossi, Stork, Sumitomo Demag, Wittmann Battenfeld, Zhafir
		2 sockets Sub-D 25 pin (female)
ZK	Keyboard-protection	Transparent flap over display and controls
ZW	Automatic filling	Automatic filling using connection for fresh water inlet
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

Normal operation

During normal operation, the treated water is supplied by means of a pump to the consumer as required.

4.7.2 Modes of auxiliary operation

Emptying tank

In the Emptying tank mode, the entire contents of the tank are emptied during the process. After the tank is emptied, the device turns off.

Change filling volume tank

In the Change filling volume tank mode, an amount of the current tank content that can be pre-set is removed, added or diluted.

Start maintenance medium

In the Start maintenance medium mode, the medium is tested. After the test results are entered, they are checked. Depending on the results, the user is informed how much treatment agent/fresh water for dilution must be added or whether the entire contents of the tank must be removed.

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.

Transport, packing and storage

5.2 Transport

Transport by forklift truck

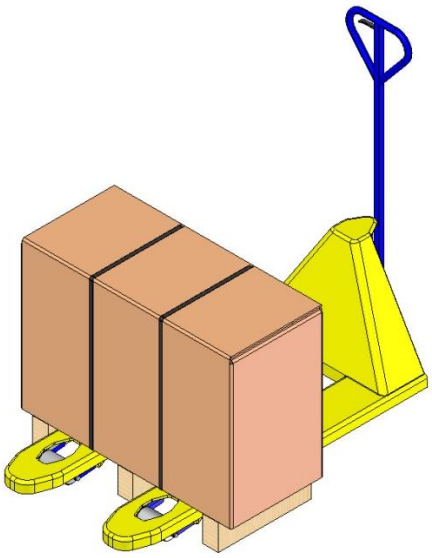


Fig. 6: Attachment points Palette

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

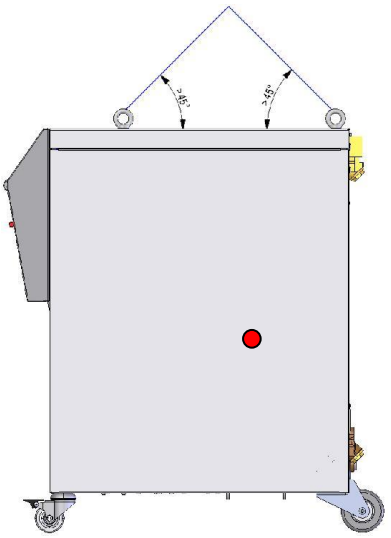


Fig. 7: Suspension points

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.

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

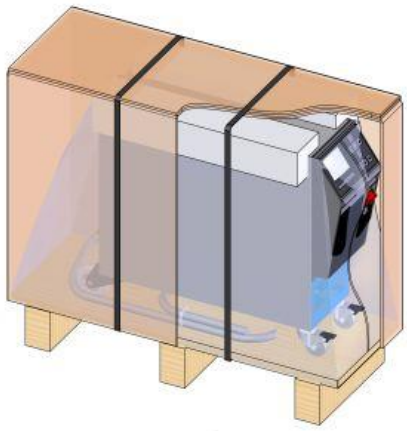


Fig. 8: Packaging

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

5.5 Symbols on the packing

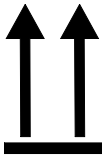
Protect against wetness

Protect packages against wetness and keep dry.

Fragile

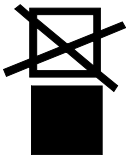
Identifies packages with fragile or sensitive content.

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

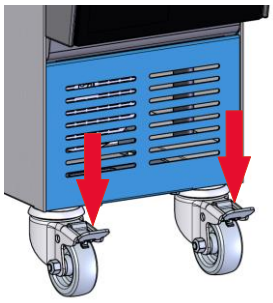


Fig. 9: Lock castors

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.

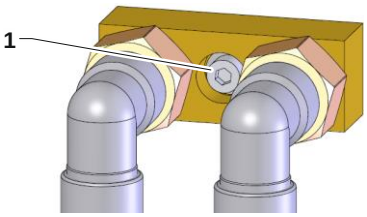


Fig. 10: Central fixing

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 main and return lines

1. Connect main and return lines to the system water intake and outlet for the temperature regulation device

Connect cooling water intake and outlet

2. Connect cooling water intake and outlet to cooling water system.

Hook up fresh water

(only if ZW additional device is used)

3. Attach fresh water intake to the fresh water system.

Hook up outlet

NOTICE!

If the outlet is not hooked up to the sewage system, a collection container must be hooked up to the outlet when the Emptying tank function is used

4. Hook up outlet to the sewage 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).

6.3.3 Connect data interfaces

Serial data interfaces (additional equipment ZD)

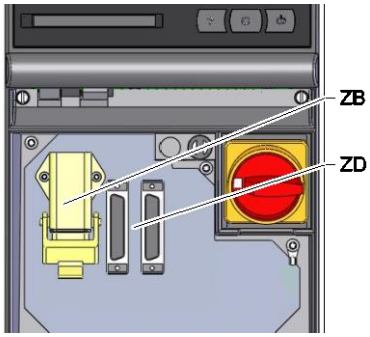
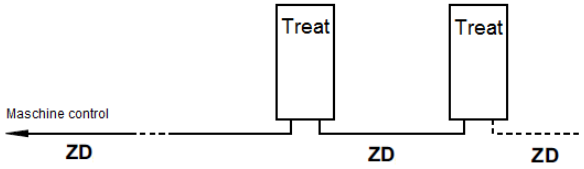


Fig. 11: Interfaces

In order to control the unit via an external controller, a control cable can be connected to the unit:

1. Pull the control cable between the front and the service cover.
2. Plug the control cable into socket ZD.
3. Close the service lid.
4. Settings for Address resp. of theProtocol (→ page 52)



ZD Maximum number of units, as well as operating volume depend on the machine control, protocol resp.

External control (additional equipment ZB)

In order to control the unit via potential-free external contacts, an external control cable can be connected to the unit:

1. Loop the external control cable between the front and the service flap.
2. Plug the external control cable into socket ZB.
3. Close the service flap
4. For the contact assignment (→ page 96)

NOTE!

The pin assignment for the various control cables is given in page 96.

7 Control

7.1 Keyboard

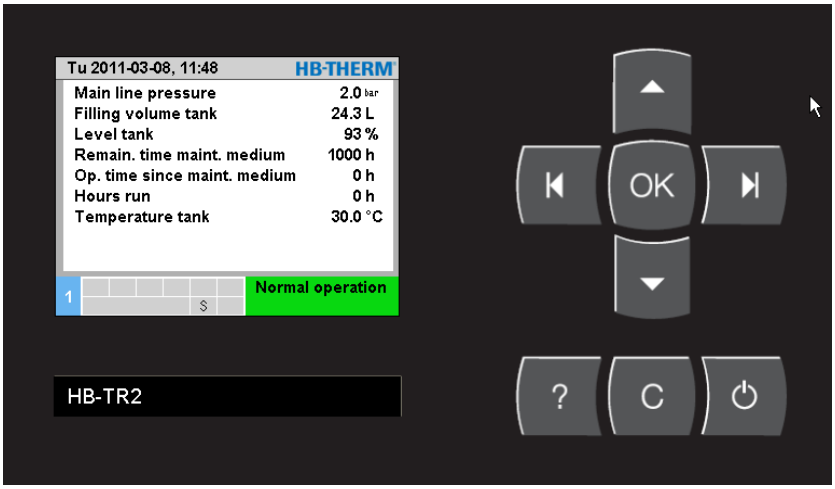


Fig. 12: Keyboard and display

Key	Key function in basic display	Key function within menu	Key function with active parameter adjustment
▲	no function	Navigate upwards.	Increase values.
⏮	In menu Functions skip to Emptying tank.	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 Function skip 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

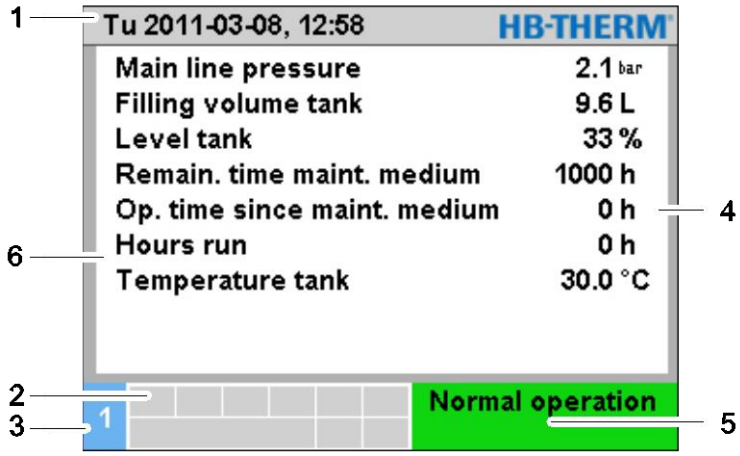


Fig. 13: Basic display

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 displayed actual values
5	Operating mode and colour-coded condition display	Display of current operating mode and pending alarms and warnings
6	User values	Display of max. 9 freely selectable actual values

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
C	Switch off horn
Alarm C	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.

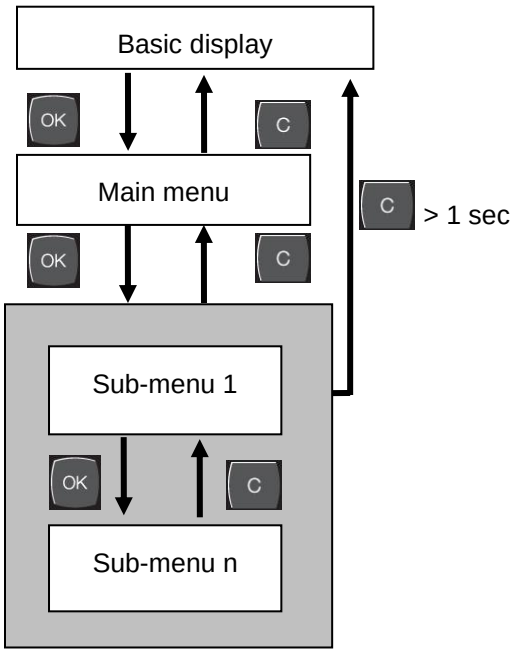


Fig. 14: Operating structure

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	-	-
Change filling volume tank	S	1	OFF	-	-
Start maintenance medium	S	1	OFF	-	-
Remote	S	1	OFF	-	ZD
Display	S	-	-	-	-
Actual values	S	-	-	-	-
Hold screen	S	1	OFF	-	-
Main line pressure	S	-	-	bar	-
Filling volume tank	S	-	-	L	-
Level tank	S	-	-	%	-
Remain. time maint. medium	S	-	-	h	-
Op. time since maint. medium	S	-	-	h	-
Hours run	S	-	-	h	-
Temperature tank	U	-	-	°C	-
Current phase L1	U	-	-	A	-
Current phase L2	U	-	-	A	-
Current phase L3	U	-	-	A	-
Voltage 24 VAC	U	-	-	V	-
Remaining duration unit OFF	S	-	-	min	-
Selection	S	-	-	-	-
Main line pressure	S	3	ON	-	-
Filling volume tank	S	3	ON	-	-
Level tank	S	3	ON	-	-
Remain. time maint. medium	S	3	ON	-	-
Op. time since maint. medium	S	3	ON	-	-
Hours run	S	3	OFF	-	-
Temperature tank	U	3	ON	-	-
Current phase L1	U	3	OFF	-	-
Current phase L2	U	3	OFF	-	-
Current phase L3	U	3	OFF	-	-
Remaining duration unit OFF	S	3	ON	-	-

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	-	-
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	even	-	-
Data bit	E	4	8	-	-
Stop bit	E	4	1	-	-
Cycle serial recording	E	4	1	s	-
Transmit alarm	E	3	OFF	-	-
Date/Time	S	-	-	-	-
Time	S	3	MEZ	HH:MM	-
Date	S	3	MEZ	-	-
Time zone	S	3	MEZ	-	-
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	-	-	-	-
Limitation filling time	E	3	60	s	-
Temperature limiting	E	3	40	°C	-
Dilution factor	S	3	OFF	-	ZW
Delay unit OFF	S	3	-	min	-
Treatment	S	-	-	-	-
Mixing time	S	3	2	min	-
Tol. band pressure pump	E	4	3.0	bar	-
Treatment agent	S	2	AM_	-	-
Nominal conc. treatment	S	2	--	g/L	-
Density treatment agent	S	2	1.00	g/ml	-
Factor test kit	S	2	--	g/L	-
Factor additional volume	S	2	0,5	-	-
Tolerance treatment	S	2	--	-	-
Limit value test kit low	S	2	--	-	-
Limit value test kit high	S	2	--	-	-
pH limit value treatment low	S	2	--	pH	-
pH limit value treatment high	S	2	--	pH	-
Recording USB	S	-	-	-	-

Control

Serial recording cycle	S	4	1	s	-
Activate all values	S	3	OFF	-	-
Deactivate all values	S	3	OFF	-	-
Main line pressure	S	3	ON	-	-
Filling volume tank	S	3	ON	-	-
Level tank	S	3	ON	-	-
Remain. time maint. medium	S	3	ON	-	-
Op. time since maint. medium	S	3	ON	-	-
Hours run	S	3	ON	-	-
Temperature tank	S	3	ON	-	-
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	-	-
Operating hours pump	S	3	OFF	-	-
Average tank temperature	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	-	-
Time overflow protection	S	3	OFF	-	-
Total number of alarms	S	3	OFF	-	-
Remaining duration unit OFF	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	4	-	-	-
Logbook agent	S	-	-	-	-
Logbook agent	S	4	-	-	-
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

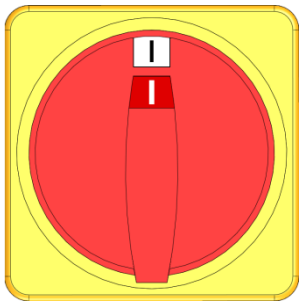


Fig. 15: Main switch

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

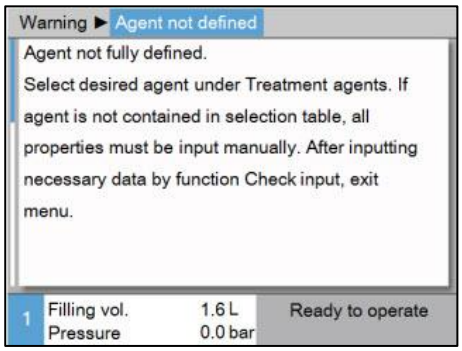


Fig. 16: Warning Agent not defined

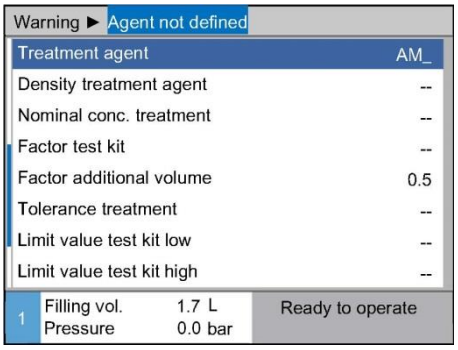


Fig. 17: Define treatment agent

As long as no treatment agent is defined, the warning Agent not defined will be displayed.
The treatment agent can be selected as follows:

1. Change to the next screen page with the key.
2. Set the treatment agent parameter to the treatment agent used.

→ The properties of the agent are set automatically.

NOTICE!

If the agent does not appear on the list of the respective treatment agent parameters, all properties must be introduced manually (→ Manual input of agent properties).

3. Apply properties with Check input.

Manual input of agent properties

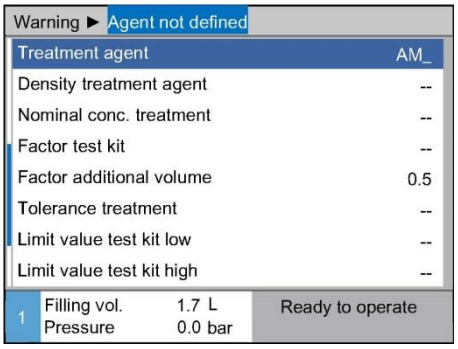


Fig. 18: Agent properties

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

1. Set the treatment agent parameter on the „AM_“ value.
2. Set the following parameters
   Density treatment agent
   nom.cons. Treatment agent *),
   Factor test kit *),
   Factor additional volume,
   Limit value test kit low,
   Limit value test kit high,
   pH limit value treatment low
   pH limit value treatment high
   according to the agent and test kit.

NOTICE!

**) these parameters must be compulsory defined.*

If you encounter problems with the determination of nom. cons. treatment agent and Factor test kit please contact the nearest HB-Therm representative.

3. Apply properties with Check input.

Change agent

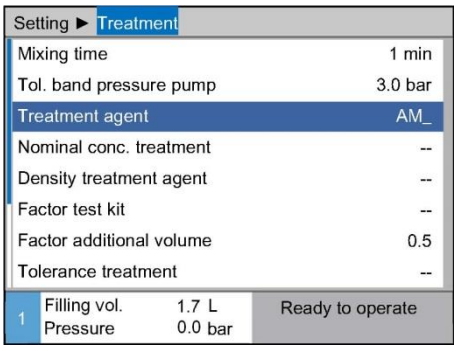


Fig. 19: Change agent

Proceed as follows in order to subsequently change the agent:

1. Display the menu page Setting \ Treatment.
2. Set the treatment agent parameter to the used treatment agent, resp. set the properties of the agent manually.

8.1.2 Normal operation

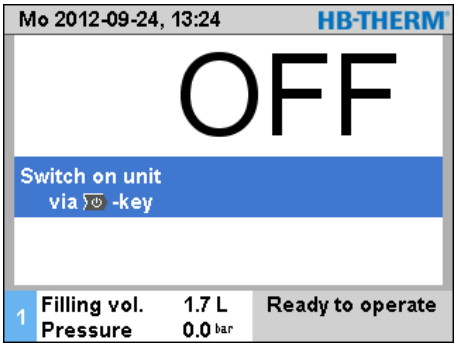


Fig. 20: Basic display

Switch on normal operation as follows:

1. Press the key.

→ If necessary, the device indicates that it needs to be filled or it automatically fills itself (ZW additional equipment). Then the mixing phase starts, followed by normal operation

Add treatment agent

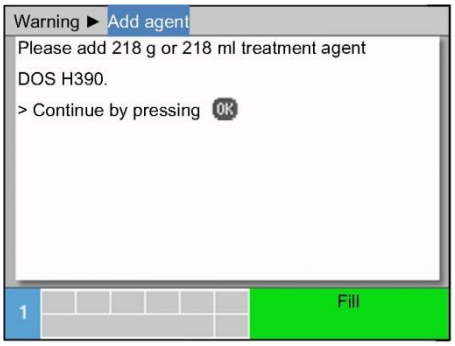


Fig. 21: Medium warning

If the Add agent warning is shown, proceed as follows:

1. Acknowledge horn with the C key.
2. Put the indicated amount of treatment agent in the tank through the tank opening.

WARNING!
Danger of being injured by chemicals!

Depending on the type and concentration, chemicals can cause burns, irritate the respiratory organs and mucous membranes, or be poisonous if swallowed.

Therefore:

– Only allow trained qualified personnel to work with chemicals.
– The general safety instructions for working with chemicals that are in the safety data sheets must be followed carefully.
– Do not mix chemicals

3. After the treatment agent is added, acknowledge the request using the OK button.

Mixing

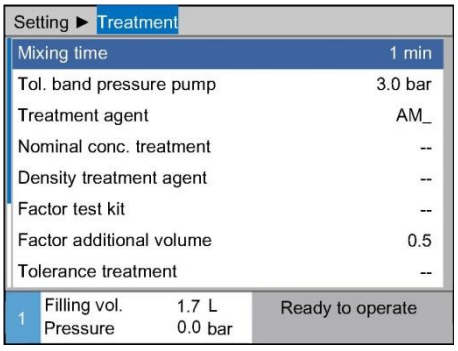


Fig. 22: Set mixing time

After the Add agent warning is acknowledged, mixing starts automatically. The treatment agent is mixed with the contents of the tank.

If appropriate, set the desired time for mixing:

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

8.1.3 Remote mode

In the remote mode the water treatment unit is controlled by external signals.

NOTE!

For the pin assignment of the various interface cables → page 96.

External control connection (additional equipment ZB)

By means of a potential-free external contact, the water treatment unit can be switched on and off.

NOTICE!

The function remote control must not be switched on for the external control.

Turn remote mode on or off

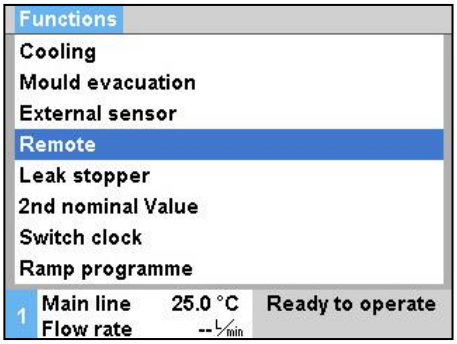


Fig. 23: Remote mode

Proceed as follows in order to switch the remote mode on and off:

1. Display menu page Functions .
2. Select the functionRemote and activate or deactivate with the OK key.

   The activated function is indicated with the ✔ symbol.

→ When the remote mode is switched on, the symbol appears on the basic display.

NOTE!

When the remote mode is active, all parameters and functions that are defined via the protocol are blocked at the unit.

Remote mode settings (additional equipment ZD)

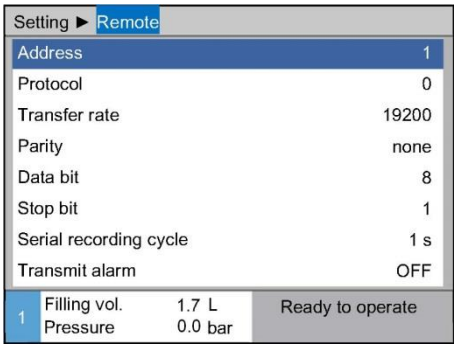


Fig. 24: Set address, protocol

Operation of the water treatment unit can take place via the serial interface.

The following settings must be made in order to communicate with an external controller:

1. Display the menu page Setting \ Remote operation.
2. Set parameter Address to the desired value.
3. Set parameter Protocol to the desired value.

NOTICE!

A set address may only exist once in a network.

Specific characteristic of remote control

The remote controlled operation differs from the temperature-control unit as follows:

- Switching on the unit through the ‘Regulate(normal operation)‘ command
- Switching off the unit through all the other commands
- The temperature of the tank is being transmitted as the actual temperature value
- The tank cooling is being transmitted as the temperature control capacity.
- The actual value of the flow is always transmitted as 0 L/min

Alarm output remote control

The alarms of the water treatment unit can be transmitted by the interface. Proceed as follows:

1. Display the menu page Setting \ Remote operation.
2. Set parameter Transmit alarm to the desired value.

Switching on with the remote control

If the unit is switched on with the remote control, the "mixing" phase is being omitted automatically.

Protocol	Used for
0	Recording text
1	Arburg, Billion, Bühler, Dr. Boy, Ferromatik Milacron, KraussMaffei, Negri Bossi, Sumitomo Demag, Wittmann Battenfeld, Zhafir
4	Engel, Haitian
5	Stork

Operation

8.1 Switching off

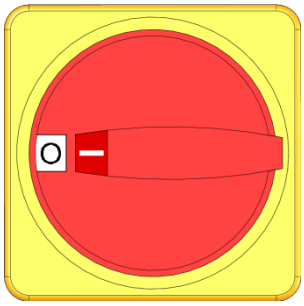


Fig. 25: Main switch

After use, switch the unit off as follows:

1. Press the key.

→ The water treatment unit switches off delayed (→ page 54) aus.

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

2. Turn the main switch to "0".

8.1.1 Switch-off delay

If the unit is switched off by the key, remote control or external control, the unit will switch off after a switch-off delay. Proceed as follows in order to set the switch-off delay:

1. Display the menu page Settings \ Miscellaneous.

2. Set parameter Delay unit OFF to the desired value.

8.2 Emergency stop

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

Emergency stop

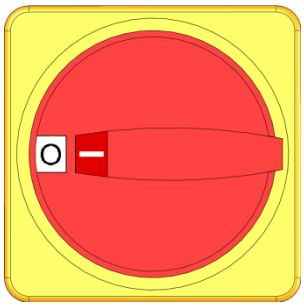


Fig. 26: Main switch

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 Skipping current phase

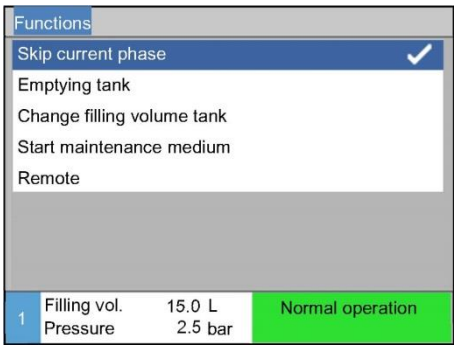


Fig. 27: Enabling Skip current phase

Phases Filling and Mixing can be skipped before they have finished running. To do so, proceed as follows:

1. Display menu page Functions.
2. Select function Skip current phase and press the OK key.
   The activated function is indicated with the ✔ symbol.

→ Jumping from the current phase to the next phase occurs, as far as this is possible.

8.3.2 Emptying tank

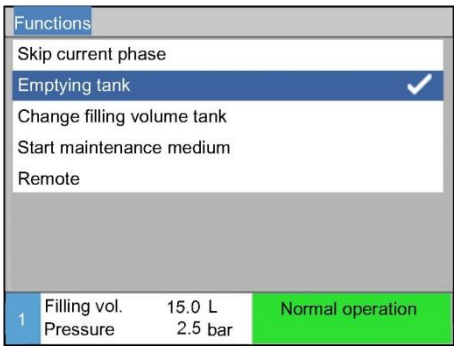


Fig. 28: Turn on Emptying tank

NOTICE!

Follow local regulations on sewerage. Notes about neutralisation can be obtained from the safety data sheet or you can ask the manufacturer of the treatment agent about them.

Turn on the Emptying tank function 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

(only if ZW additional device is used)

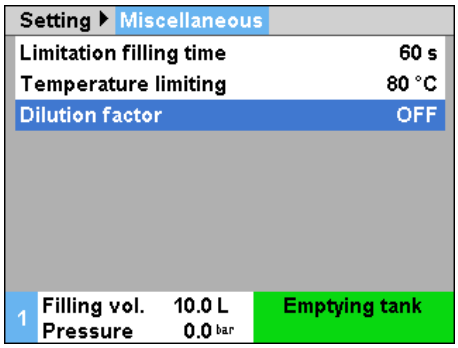


Fig. 29: Set dilution factor

If necessary, set the dilution factor before the Tank emptying function is turned on.

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

NOTICE!

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

8.3.3 Change filling volume tank

With the Change filling volume tank function, a volume can be set and removed, diluted or added.

NOTICE!

Follow local regulations on sewerage. Notes about neutralisation can be obtained from the safety data sheet or you can ask the manufacturer of the treatment agent about them.

Empty function

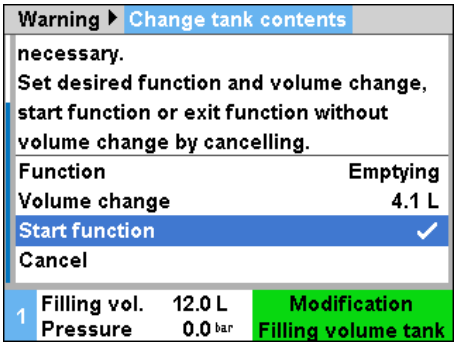


Fig. 30: Turn on Emptying tank contents

Proceed as follows to remove a specific amount:

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

→ The Change tank contents warning is shown.

3. Call up the next screen using the ▼ key.
4. Set Function to "Emptying".
5. Set the parameter Volume change to the value desired.
6. Select Start function and activate it using the OK key.

   The active function is indicated with the ✓ symbol.

→ While the tank is being emptied, the "change filling volume tank" mode is displayed. The volume set is removed during the procedure.

Dilute function

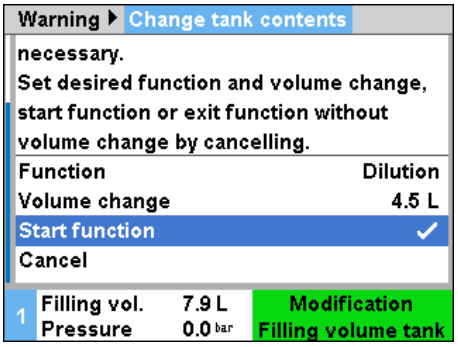


Fig. 31: Turn on Dilute

Proceed as follows to dilute a specific amount:

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

→ The Change tank contents warning is shown.

3. Set Function to "Dilution".
4. Set the parameter Volume change to the value desired.
5. Select Start function and activate it using the OK key.

   The active function is indicated with the ✓ symbol.

→ While the tank is being diluted, the "change filling volume tank" mode is displayed. The volume set is first removed during the procedure. There is then a notification of how much medium must be manually added or, if the ZW additional device is used, automatically added through the fresh water intake.

Operation

Fill function

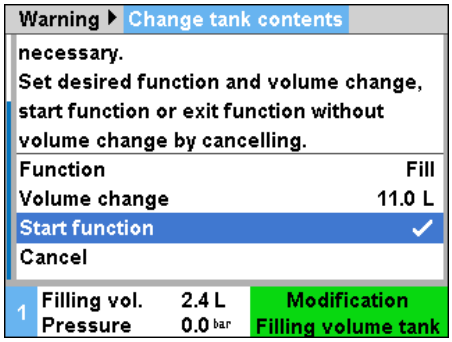


Fig. 32: Turn on fill tank contents

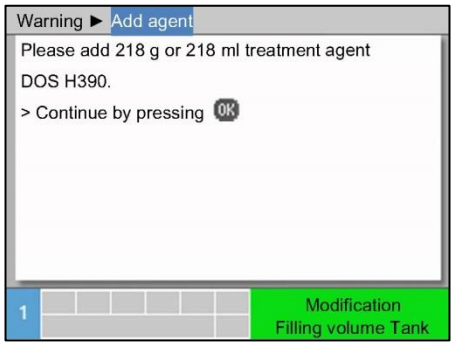


Fig. 33: Mix agent warning

Proceed as follows to add a specific amount:

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

→ The Change tank contents warning is shown.

3. Call up the next screen using the ▼ key.
4. Set Function to "Fill".
5. Set the parameter Volume change to the value desired.
6. Select Start function and activate it using the OK key.

   The active function is indicated with the ✓ symbol.

→ While the tank is being filled, the "change filling volume tank" mode is displayed. A notification is made about how much medium must be added manually or the volume set is automatically added through the fresh water intake if the ZW additional device is used.

→ The Add agent warning is shown.

7. Acknowledge horn with the C key.
8. Put the indicated amount of treatment agent in the tank through the filler pipes.

WARNING!
Danger of being injured by chemicals!

Depending on the type and concentration, chemicals can cause burns, irritate the respiratory organs and mucous membranes, or be poisonous if swallowed.

Therefore:

- Only allow trained qualified personnel to work with chemicals.
- The general safety instructions for working with chemicals that are in the safety data sheets must be followed carefully.
- Do not mix chemicals

9. After the treatment agent is added, acknowledge the request using the OK button.

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

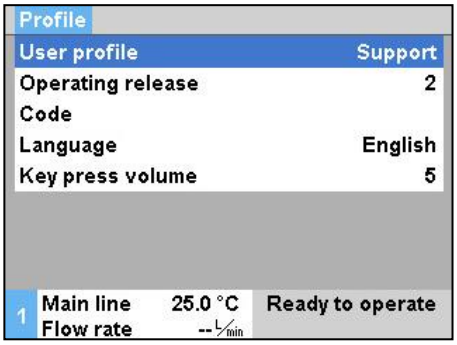


Fig. 34: User profile

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

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.

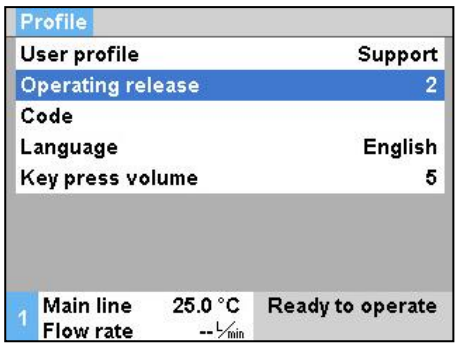


Fig. 35: Operating release

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

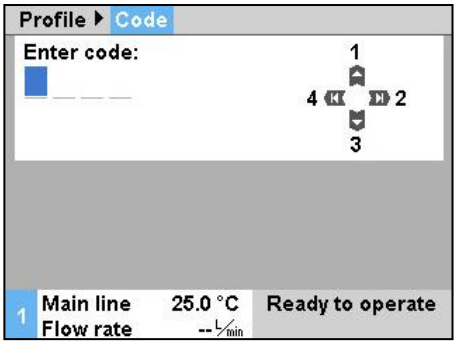


Fig. 36: Enter code

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.

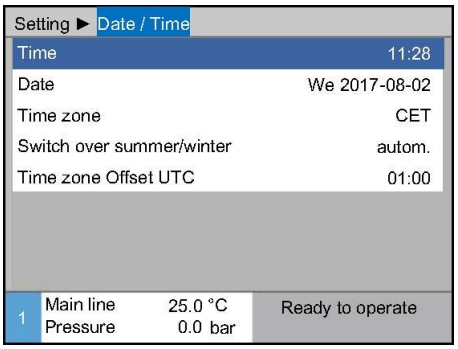


Fig. 37: Setting date / time

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 Defining pump-activation pressure

Function

During normal operation, the pump is switched on only if the pressure in the main line is too low, or pressure fluctuations are present on account of water with drawal.

Preselection of permissible pressure fluctuations

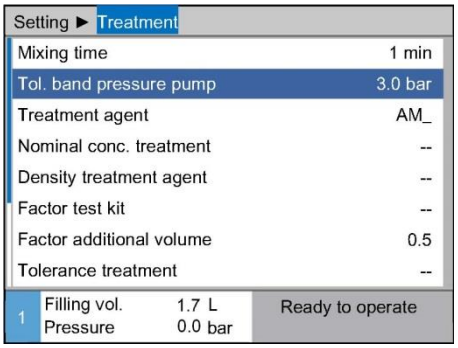


Fig. 38: Setting of tolerance band pressure pump

Proceed as follows to set the tolerance band:

1. Display the menu page Setting \ Treatment.
2. Set parameter Tol. band pressure pump to the desired value.

NOTE!

A tolerance band set too narrow results in frequent on-off switching of the pump.

Setting minimum pressure of pump

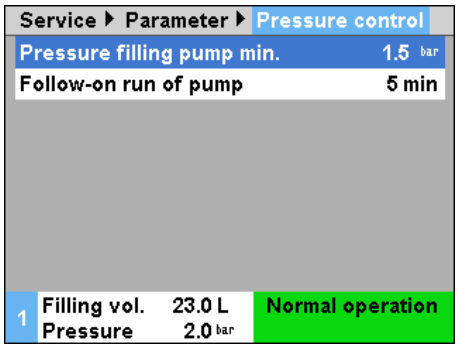


Fig. 39: Setting of minimum pressure of pump

Proceed as follows to set the minimum pressure:

1. Display the menu page Service \ Parameter \ Pressure control.
2. Set parameter Pressure filling pump min. to the desired value.

NOTE!

A minimum pressure set too high results in continuous operation of pump, resulting in unnecessary power consumption.

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

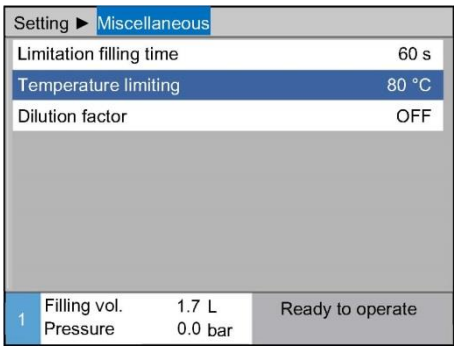


Fig. 40: Temperature limiting

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.

8.1.1 Level

Function

The level in the device is continuously monitored. If the level is low, there is a warning and it must be refilled by hand. With the ZW additional equipment, it is automatically refilled with fresh water.

If it is frequently refilled with fresh water, the concentration of the treatment agent in the water changes. The device reports that using an appropriate warning.

Setting refill volume limiting

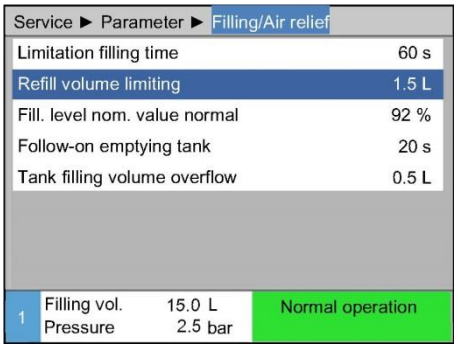


Fig. 41: Refill volume limiting

Refilling is monitored as follows:

1. Call up the menu page Service \ Parameter \ Fill/Air relief
2. Set Refill volume limiting at the desired value.

NOTICE!

If Refill volume limiting is set at "OFF", refilling is not monitored. That can lead to an unfavourable mixing ratio and consequent damages. In addition, leaks between the water treatment devices and the temperature controllers attached to them will not be recognized.

8.1.1 Overflow protection

Function

In the event of a mould evacuation of the external volume (temperature control unit including lines and mould), the treated medium is fed back into the tank If a level of >100 % is reached the drain valve opens while the pump is running.

NOTICE!

The tank contents are discharged into the sewage system via Drain F on the device (→ page 28).

WARNING!

Overflow of the tank due to mould evacuation of large external volumes!

The tank of the Treat-5 can overflow, if the external volume is greater than the tank volume and more treated medium is returned to the tank than can be emptied through the drain.

Therefore:

– Reduce the flow rate in the connection line between the system water outlet from the temperature control unit and the return line from the Treat-5 to <12 L / min

8.2 Explorer window

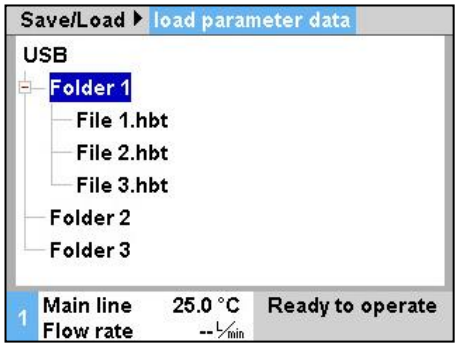


Fig. 42: Example Explorer window

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

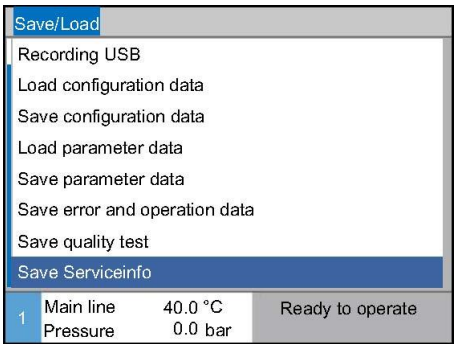


Fig. 43 Saving data

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.

Operation

Loading data

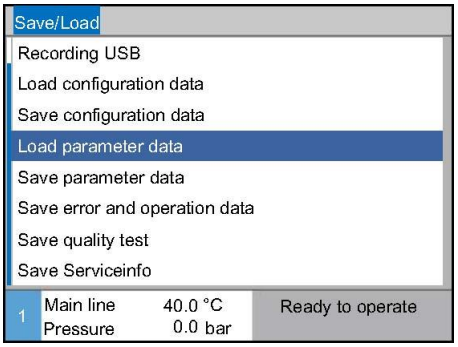


Fig. 44 Loading data

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

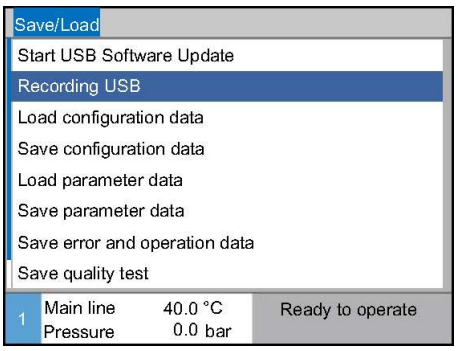


Fig. 45: Recording USB

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!

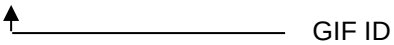
You may choose as many values as you like.

Operation

File name

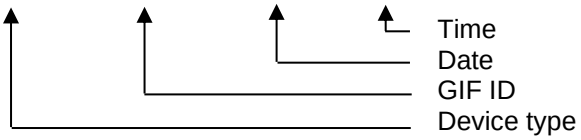
For each unit, a separate directory is automatically generated on the USB data carrier and the recording files are written in it.-

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.

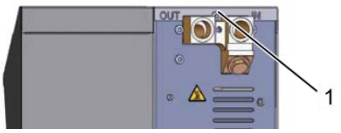


Fig. 46: Loosen screws

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

Fig. 47: Remove cover plate

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

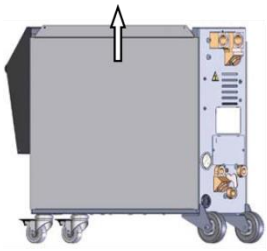


Fig. 48: Pull side plate upwards

3. Pull the side plate slightly upwards.

Fig. 49: 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
quarterly or ~1000 hrs	Filter basket	Clean, wash out	Operator
		Replace if necessary	Operator
	Water quality	Check the chemical levels of the water (→ page 76)	Qualified personnel
	Pump air filter	Blowing out	Qualified personnel
	Screw connectors	Check for firm seating and damage	Qualified personnel
		If necessary tighten or replace	
	Seals	Qualified personnel	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 77)	Specialist
	Level measurement	Checking accuracy of level measurement (→ page 78)	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 Medium servicing

Function

The quality of the treated water must periodically be checked. The protection against corrosion and the pH of the water must be measured. After the test results are entered, the device checks the water quality and reports on what to do next.

Check protection against corrosion and the pH of the medium:

- Only to be carried out by qualified personnel.

Necessary equipment

- Instructions from the treatment agent supplier
- Test kit for the treatment agent
- Container

Periodic servicing

The device automatically reports if the medium should be checked. The Maintenance medium warning is shown (→ Procedure).

Manual servicing

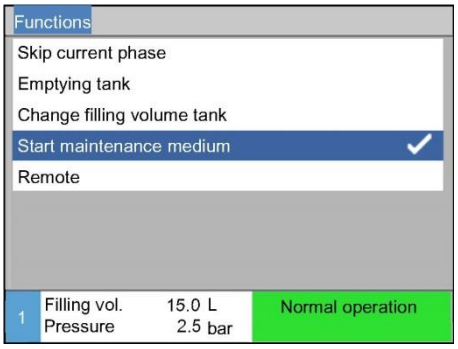


Fig. 50: Turn on medium servicing

Medium servicing can also be started manually. To do so, proceed as follows:

1. Display menu page Functions.
2. Select Start maintenance medium and activate it using the OK key.

→ The Maintenance medium warning is shown (→ Procedure).

Procedure

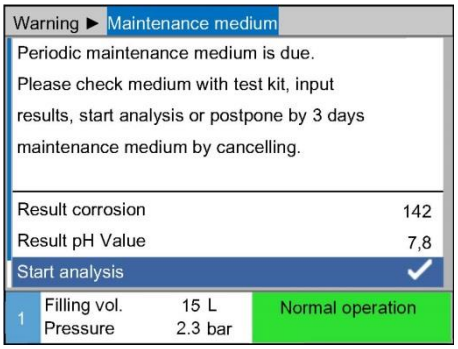


Fig. 51: Enter the results and evaluate them.

1. Wash out the measuring container well and place it empty under the Test connection. Open the faucet until the measuring container is completely filled.
2. Empty the medium in the measuring container through the tank opening into the tank.
3. Place the measuring container under the Test hookup and open it until the measuring container is full enough that the medium can be checked using a test kit.
4. Test the medium using the test kit and enter the results in Result corrosion and pH results.
5. Check data entry using Start evaluation.

→ The results from the test kit are evaluated. Follow the additional instructions on the screen.

9.4.4 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.

9.4.5 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

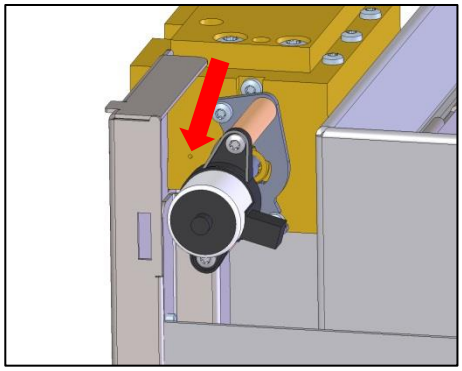


Fig. 52: Open top up level

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 72)

→ Slowly add tap water in the amount computed through the side opening near the switch valve (→ Fig. 52) 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).

9.4.6 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

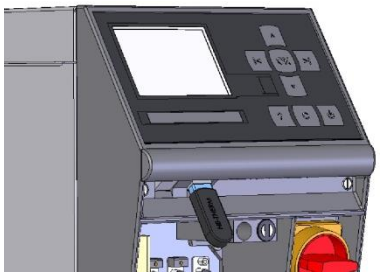


Fig. 53: Connect USB data carrier

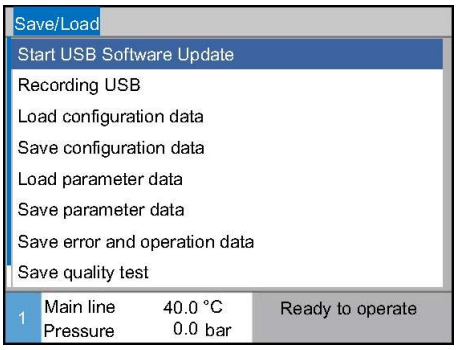


Fig. 54: Start USB software update

1. Switch on main switch.
2. Connect USB data carrier (Fig. 53).
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.

9.4.7 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

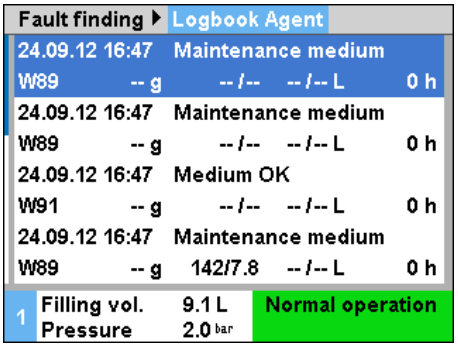


Fig. 55: Logbook agent

Every addition of agent, dilution, change in tank volume, entry of results or servicing the medium is entered chronologically in the logbook for agent (maximum of 100 entries). The entries are displayed as follows:

1. Call up the page Fault finding \ Logbook agent on the menu.
2. Choose the entry desired using the  or the  key as appropriate.

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 67).

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

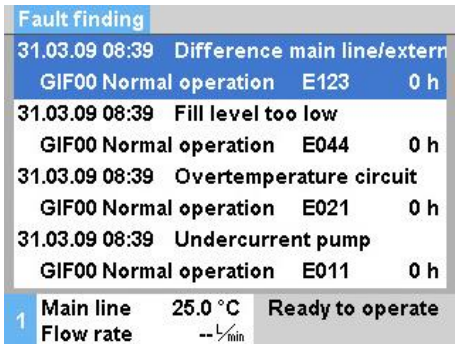


Fig. 56: Logbook Alarms

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
Overtemperature circuit	Pump in continual operation	Adapt tolerance pressure for pump or min. pressure pump fill.	Qualified personnel
	Rinse cycles at temperature-control unit too frequent or set too long	Adjust rinse cycles at temperature-control unit.	Qualified personnel
	Temperature sensor defective	Replace temperature sensor.	Qualified personnel
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

Faults

Fault	Possible cause	Rectification	Rectified by
Filing level too high	Outside volume (temperature regulation device including hose and tool) greater than the tank volume	Reduce external volume (hook up fewer temperature regulation devices to the treatment device)	Qualified personnel
		Set up a treatment device with bigger tank volumes.	Operator
	Too much medium added through the tank opening.	Activate the change filling volume tank function. Select empty and enter the desired volume (→ page 57).	Qualified personnel
	Level measurement faulty	Repair or replace level measurement	Qualified personnel
Fliing level too low	Leakage (hose connection, unit or tool)	Check entire unit for leakages, if necessary repair or replace leaky components.	Operator
	Considerable losses when changing tool	Acknowledge alarm and add treatment agent as indicated by display.	Qualified personnel
	Filling level measurement defective	Repair or replace filling level measurement	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 78).	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

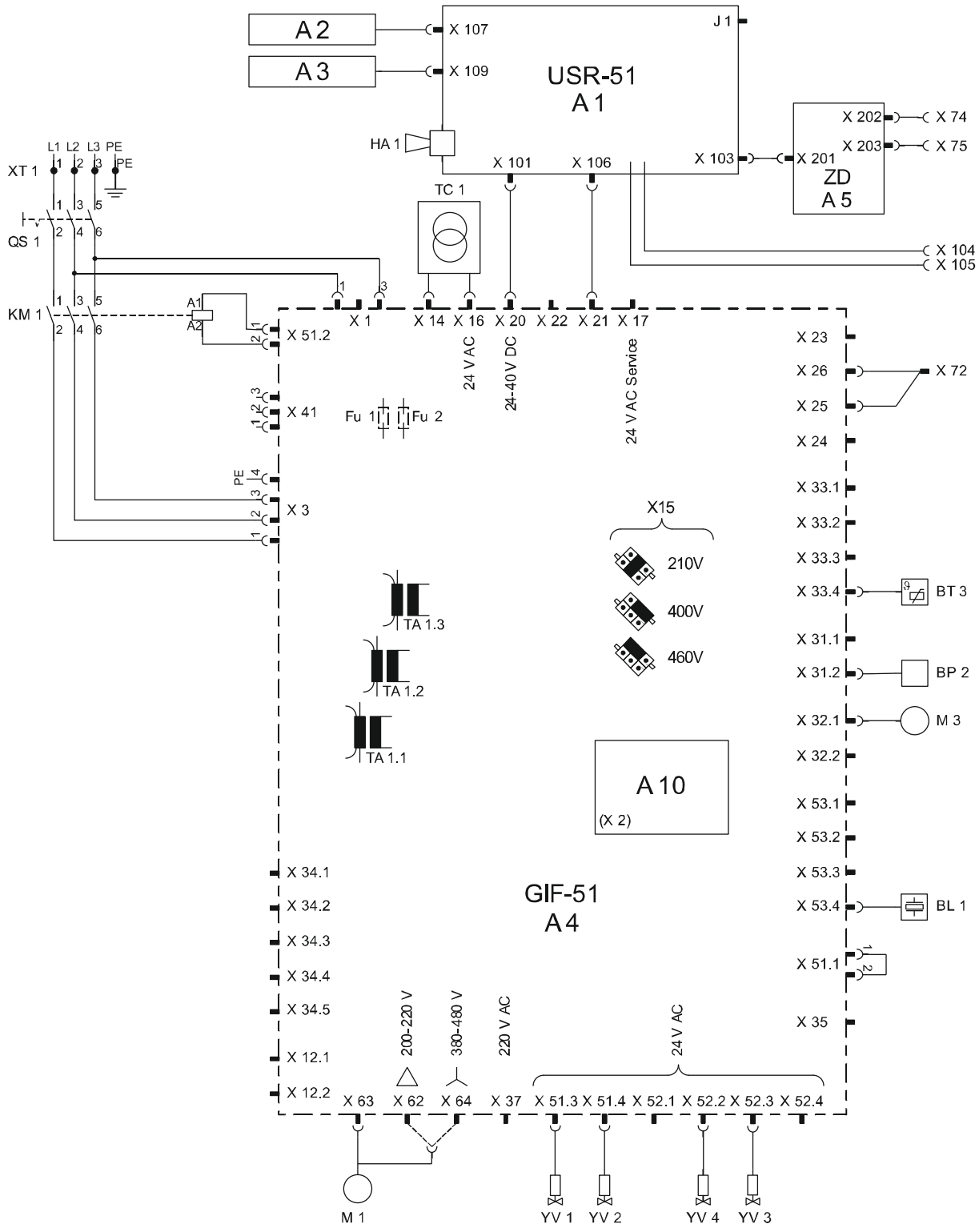
When ordering spare parts, always indicate:

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

13 Technical information

13.1 Electrical circuit diagram

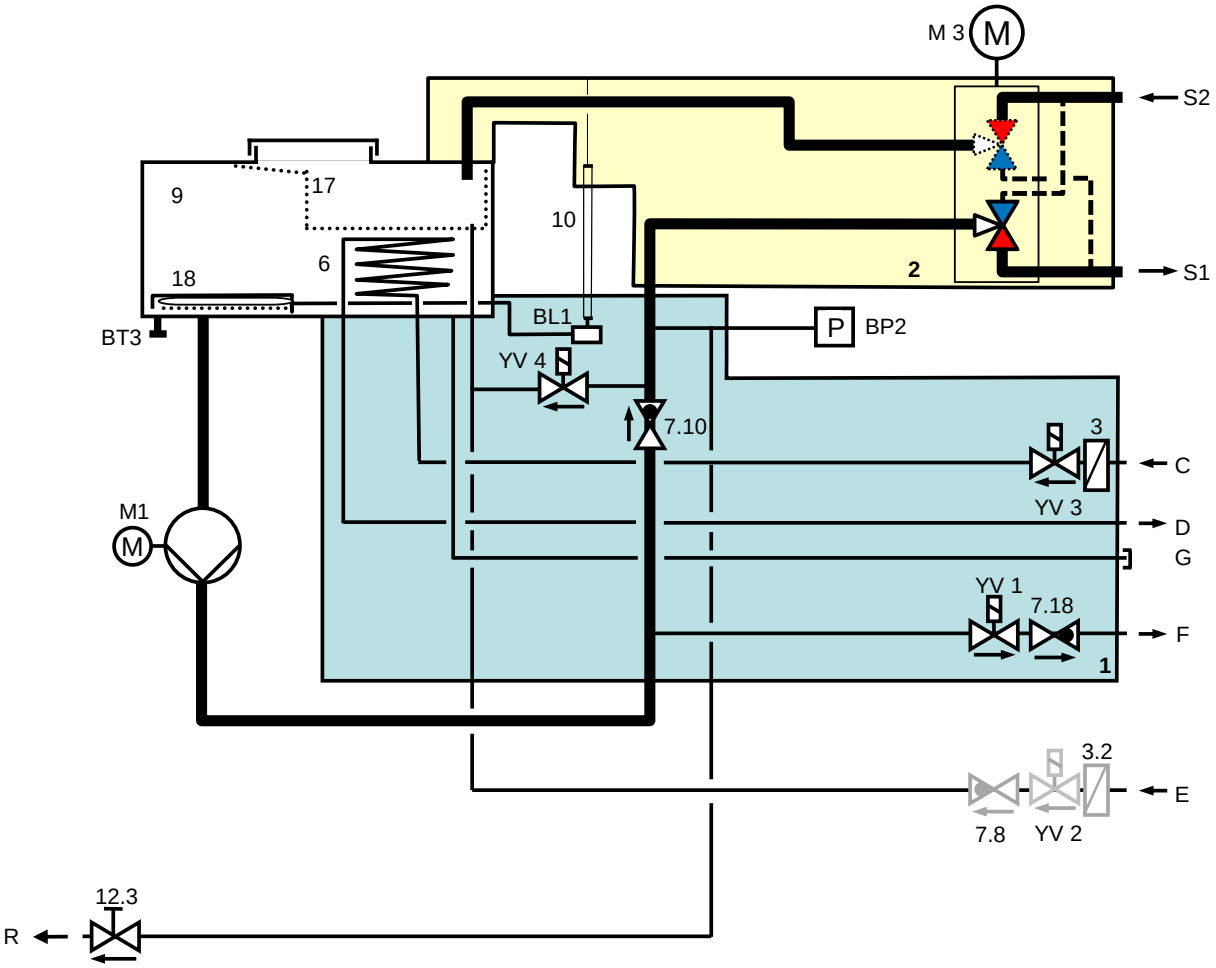
Electrical connection see nameplate on unit or on page 23.



Technical information

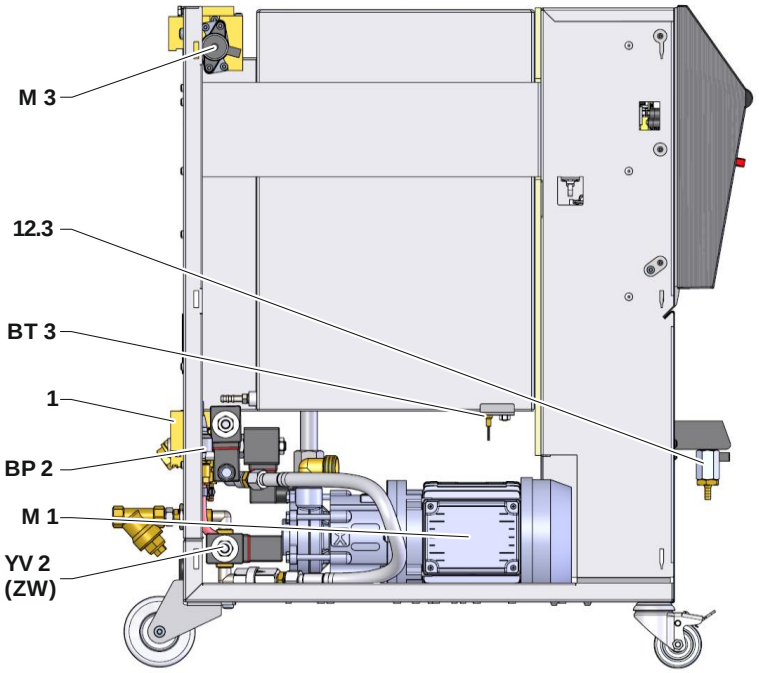
13.2 Hydraulic scheme

HB-TR2

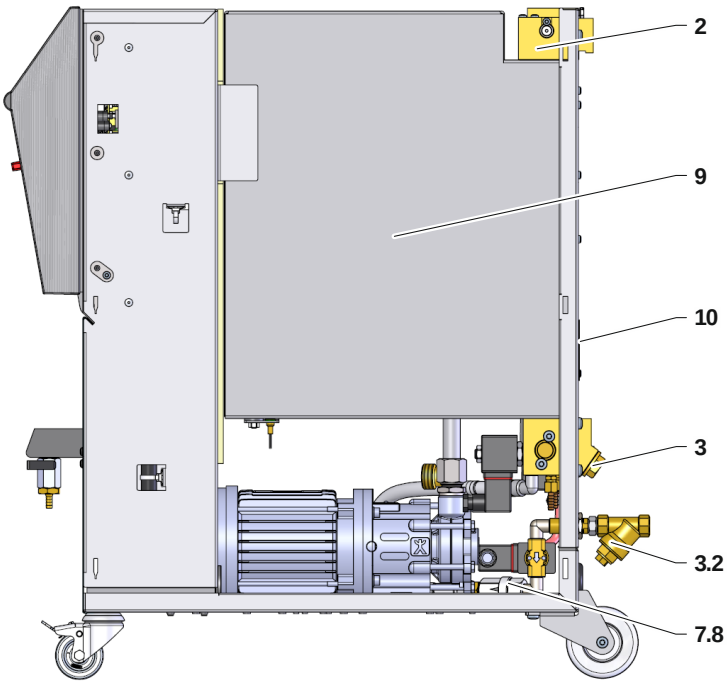


13.3 Item location

Side view left

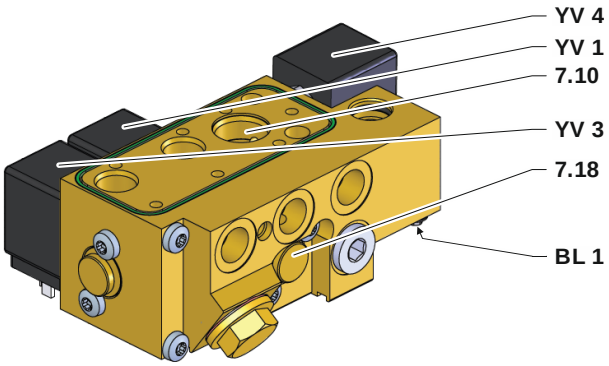


Side view right

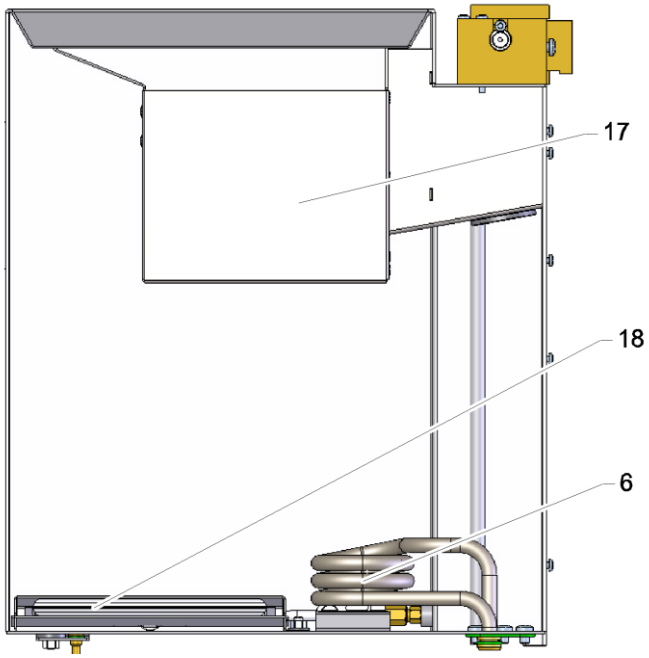


Technical information

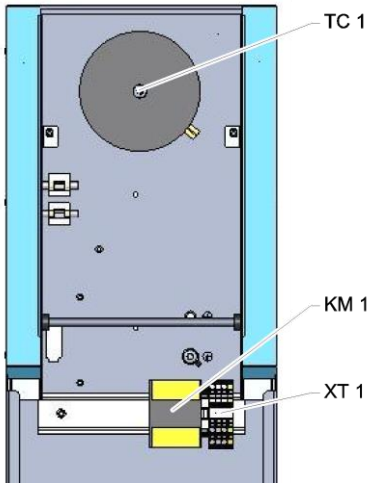
Cold water module



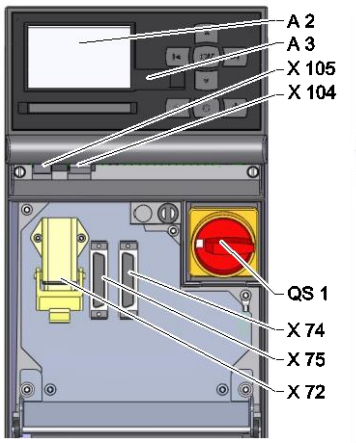
Tank

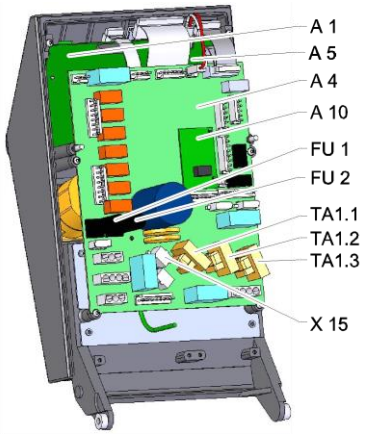


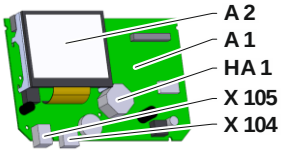
Electric components



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	Main line	
S2	Return line	
C	Cooling water inlet	
D	Cooling water outlet	
E	Fresh water inlet	
F	Discharge water outlet	
G	Drain	
R	Test	
1	Cold water module	
2	Switch module	
3	Filter cooling water inlet	
3.2	Fresh water inlet filter	
6	Cooling	
7.8	Non-return valve filling	
7.10	Main line return valve	
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 5	DIGITAL module	ZD
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	

Technical information

KZ	Designation	only with version
X 15	Preselection of voltage	
X 72	Connector alarm contact, external control	ZB
X 74	Connector interface DIGITAL 1	ZD
X 75	Connector interface DIGITAL 2	ZD
X 104	Connector USB-Host	
X 105	Connector USB-Device	
XT 1	Mains terminal	
YV 1	Solenoid valve drain	
YV 2	Solenoid valve filling	
YV 3	Magnetically-operated cooling valve	
YV 4	Solenoid valve mix	

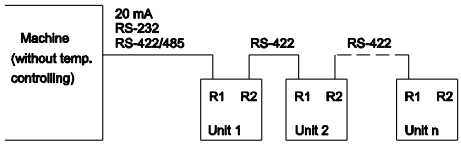
14 Interface cables

14.1 External control

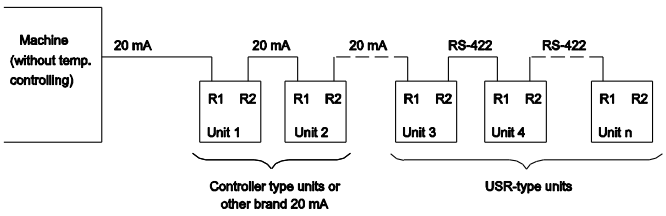
Function		Contact	Load
Unit	ON	Closing (edge)	5 VDC, 2 mA
	OFF	Opening (edge)	
Alarm contact	---	---	250 VAC, 4 A

14.2 Serial data interfaces

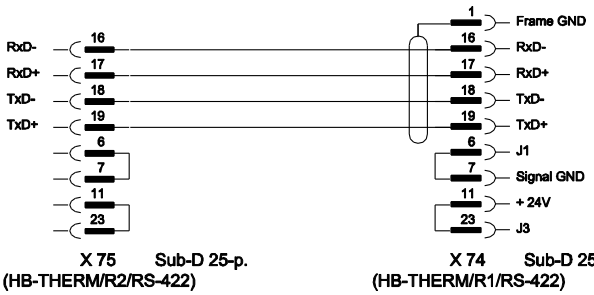
Operation with USR type units



Operation with USR and controller type units



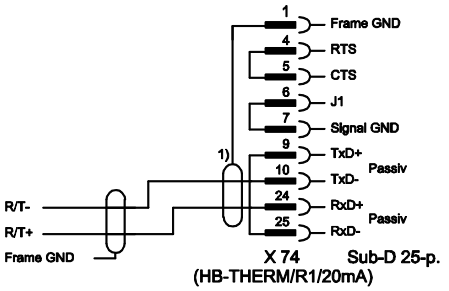
Connection cable RS-422 (between 2 USR units)



Interface cables

20 mA (current loop)

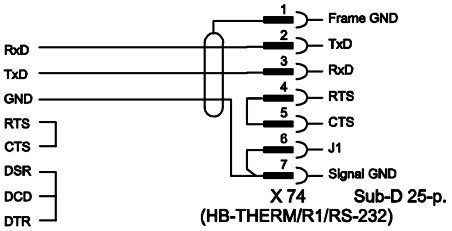
KM 1	Sub D-25	Ferromatik	Sub D-25	ENGEL	Sub D-25	DEMAG	Sub D-25	Battenfeld	Sub D-9	ARBURG 2	Sub D-9	ARBURG	Audio 3-p.
10	R/T-	19	R/T-	10	R/T-	13	R/T-	3	R/T-	3	R/T-	3	R/T-
24	R/T+	13	R/T+	24	R/T+	19	R/T+	2	R/T+	2	R/T+	1	R/T+
-	Frame GND	-	Frame GND	-	Frame GND	1	Frame GND	-	Frame GND	-	Frame GND	-	Frame GND



1) not applicable if shield exists on machine side

RS-232

KM Sub D-25	Ferromatik Sub D-25	Engel Sub D-25	Dr. Boy B Sub D-9	PC Sub D-25	PC Sub D-9
3	3	2	3	3	2
2	2	3	2	2	3
7	7	7	5	7	5
4	4	-	7	4	7
5	5	-	8	5	8
-	-	-	-	6	6
-	-	-	-	8	1
-	-	-	-	20	4



RS-485

Haitian / Zhafir	Sub D-9	Dr. Boy	Sub D-9	Bühler	Sub D-9	Ferromatik	Sub D-25	Engel	Sub D-9	EUROMAP	HAN 3A	NEGRI BOSSI	HAN 3A	FANUC SPI	
3	R/T+	3	R/T+	3	R/T+	2	R/T+	9	R/T+	1	R/T+	1	R/T+	+	R/T+
8	R/T-	9	R/T-	8	R/T-	6	R/T-	4	R/T-	2	R/T-	2	R/T-	-	R/T-
5	GND	5	GND	5	GND	7	GND	8	GND	3	GND	3	GND	GND	GND