

Instruction Manual Circulator DC10 including all Baths

Part No. 003-3046
1-1-061-2/04.1998

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Key to Symbols

1. Key to Symbols

1.1 Symbols used in this manual

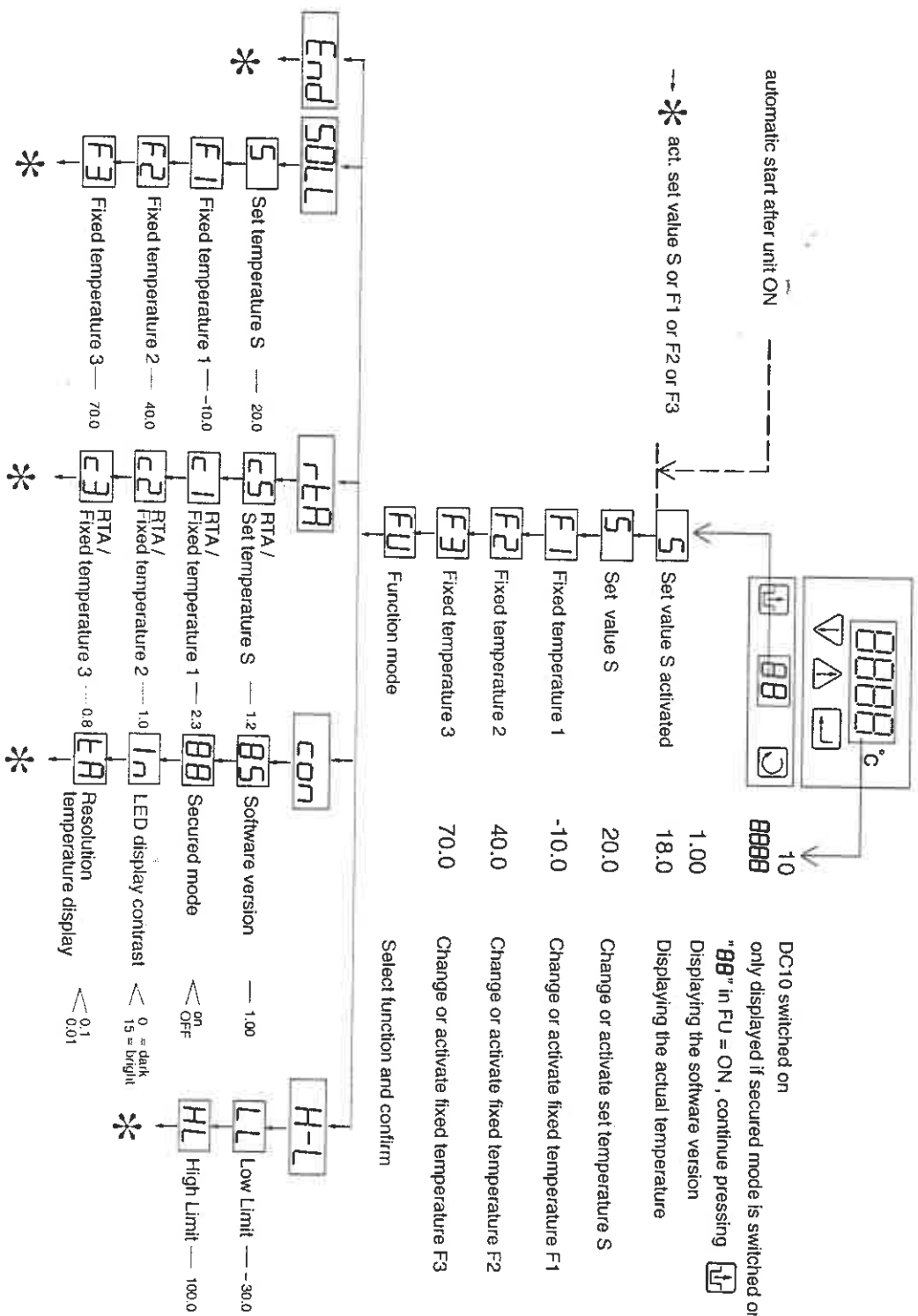
-  Warns the user of possible damage to the unit, draws attention to the risk of injury or contains safety notes and warnings.
-  Denotes an important remark.
-  Indicates the next operating step to be carried out and...
-  ⇒ ...what happens as a result thereof.

1.2 Symbols used on the unit

-  Caution: Read the instruction manual!
-  Adjustment possibility for setting the cut-off point for excess temperature protection
-  Menu selection
-  Value alteration (↑) higher / (↓) lower
-  Enter key
-  Reset button (for usage after a fault or interruption)

Key to Symbols

1.3 Menu Tree



2. Quality Assurance

Dear customer,
HAAKE implements a **Quality Management System** certified according to EN 29001. This guarantees the presence of organizational structures which are necessary to ensure that our products are developed, manufactured and managed according to our customers expectations. Internal and external audits are carried out on a regular basis to ensure that our **QMS** system is fully functional.

We also check our products during the manufacturing process to certify that they are produced according to the specifications as well as to monitor correct functioning and to confirm that they are safe. This is why we initiate this monitoring process of important characteristics already during manufacturing and record the results for future reference. The "Final Test" label on the product is a sign that this unit has fulfilled all requirements at the time of final manufacturing. Please inform us if, despite our precautionary measures, you should find any product defects. You can thus help us to avoid such faults in future.

3. Your Contacts at HAAKE

Please get in contact with us or the authorized agent who supplied you with the unit if you have any further questions.

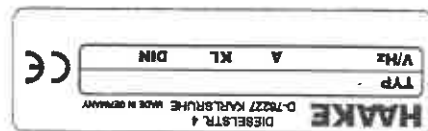
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D-76227 Karlsruhe
GERMANY

Tel. +49 (0)721 4094-444
Fax +49 (0)721 4094-418

E-mail haake_helpdesk@bigfoot.com

The following specifications should be given when product enquiries are made:

- Unit name printed on the front of the unit,
- TYP as specified on the name plate.
- Version of the operating software (see chap. 15.3).



Safety Notes

4. Safety Notes

These notes are intended to draw your attention to risks which only **YOU** can recognize and avoid or overcome. They are intended to enhance your own safety consciousness. We have set the highest quality standards for ourselves and this unit during development and production. Every unit meets relevant safety regulations. **The correct unit usage and proper handling is however solely your responsibility.** The intended workplace should correspond to a laboratory or pilot plant environment. The user should have an education level which is at least equivalent to a trained laboratory worker or specialized chemist. The following list should be seen as an example.

The device may not be operated if there are any doubts regarding a safe operation due to the outer appearance (e.g. damages).
A safe operation of the instrument cannot be guaranteed if the user does not comply with this instruction manual.
Ensure that this manual is always at hand for every unit operator.

Only use this unit solely for the intended application.
Repairs, alterations or modifications must only be carried out by specialist personnel. Considerable damage can be caused by improper repairs. The HAAKE service department is at your disposal for repair work.

Do not operate the unit with wet or oily hands.
Do not expose the unit to spray water or immerse it in water.

Do not clean the unit with solvents (fire risk!), a wet cloth soaked in household detergent is normally sufficient.
This device is not designed according to the standard EN 60601-1: 1990 (DIN VDE 0750-1 and IEC 601-1) and should not be operated in rooms used for medical purposes and/or in the vicinity of patients.

Do not move the unit from the position where it was set up during operation or when it is still hot. There is a high risk of burns!

Only use water or water with anti-freeze as bath liquid.

i The temperature controlling i.e. immersing of test tubes, Erlenmeyer flasks or similar objects directly within the circulator constitutes normal circulator practise. We do not know which substances are contained within these vessels. Many substances are dangerous: inflammable, easily ignited or explosive hazardous to health environmentally unsafe

You alone are responsible for the handling of these substances! Our advice:

- If in doubt, consult a safety specialist.
- Read the product manufacturer's or supplier's EC Safety Data Sheet according to directive 91/155/EEC.
- Read relevant regulations concerning dangerous materials.
- Observe relevant guidelines for laboratories in your country.

The following measures were taken for the protection of the operator:

- Protection Class I according to VDE 0106 T1 i.e. protection against electric shocks by grounding all parts which carry the risk of electric contact.
- The device must only be connected to mains receptacles with a protective ground.
- Protection IP 20 according to EN 60529 i.e. regarding the protection against accidentally touching live parts and damage by foreign matter, it has been ensured that foreign bodies with a thickness or diameter of more than 12 mm cannot penetrate.

i No special precautions were taken against the penetration of water and dust. The device should therefore not be used in a dusty atmosphere or in the neighborhood of spray water.

i Do not insert wires or tools in any of the openings.

i Complete separation from the mains is required when:

- all dangers caused by this device are to be avoided,
- cleaning is carried out,
- repairs or maintenance by specialist personnel is about to be carried out

Complete separation means:

Pull out the mains plug!

5. Unit Description

This device contains safety elements according to category NFL making it suitable for unattended continuous operation with non-combustible substances as bath liquid (water or water with antifreeze).

The circulator pump motor is protected against thermal overloading. Two pump speeds can be selected.

The safety element measures the surface temperature of the heating element. If this exceeds a certain temperature (due to e.g. a leakage in the liquid circuit or a liquid shortage), the safety element is triggered.

The HAAKE DC10 circulators offer the possibility of setting this cut-off temperature variably.

5.1 Safety features

The comprehensive safety system is designed on the principle of the concept of the "single fault" (EN 61010). This assumes that two separate faults do not occur simultaneously. This system therefore offers protection against *one* (single) fault. This one fault will effectively occur automatically if you...

- do not read this manual,

- do not correctly set the excess temperature protection, i.e. your safety reserves have already been used up.

Such faults can include e.g.:

Fault in the temperature control unit:

- ⇒ Excess temperature ⇒ poss. fire danger

Leakage in the liquid circuit or

Evaporation of heat transfer liquid:

- ⇒ Low liquid level ⇒ poss. fire danger,

destruction of

polyacrylic bath vessel

Pump blocked or

Great portion of antifreeze in the bath liquid:

- ⇒ Motor overheating ⇒ poss. fire danger

Or also:

Excess temperature protection level not correctly set:

- ⇒ poss. fire danger

- If a safety feature is triggered...
- Fault Identification System (FIS) indicates the fault,
 - the safety-relevant components of the heating unit (heating element and motor) are switched off immediately i.e. the safety circuit transfers the unit to a stable, safe condition,
 - the heat transfer liquid in the heating unit gradually adjusts to ambient temperature, but...
- ! For units with switched on compressor cooling, this cooling remains functional and thus cools the heat transfer liquid to the lowest reachable temperature.

5.2 Applications

Open-bath circulators:

For temperature controlling samples within the circulator's own bath.

Heating and refrigerated circulators:

For temperature controlling closed temperature control circuits such reactors, heat exchangers or similar objects. Separate open vessels cannot be temperature controlled as these circulators are only equipped with a pressure pump.

5.3 Temperature ranges

Working temperature range:

The temperature range of the circulator without additional heating or cooling sources.

Operating temperature range:

The temperature range of the circulator which can be reached if additional heating or cooling sources are used. Tap water can be used as a cooling source. In this case the minimum working temperature possible is approx. 3°C above that of the tap water temperature.

! High operating temperatures mean the unit surfaces heat up. Protective measures must be taken!

5.4 Unit combinations

A complete, ready-to-use circulator always consists of a temperature control module, a bath vessel (B3, K15, K20, W13, etc.) and a connecting element which attaches the temperature control module to or on the bath.

6. Unpacking / Setting Up

6.1 Transportation damage?

- Notify carrier (forwarding merchant, railroad) etc.
- Compile a damage report.

Before return delivery:

- Inform dealer or manufacturer

(Small problems can often be dealt with on the spot).

6.2 Information concerning the CE sign

HAAKE circulators and cryostats carry the CE sign which confirms that they are compatible with the EU guideline 89/336/EEC (electromagnetic compatibility). The tests are carried out according to module H (official sheet L380 of the European Community) as our quality assurance system is certified according to DIN / ISO 9001.

The specialist basic standards to be applied are EN 50081-2 for interference emission and EN 50082-2 for interference resistance. The following tests were carried out:

- for according to
- EN 50081 class B (interference voltage)
 - EN 55011 class B (interference radiation)

- EN 50082 class B (discharging static electricity)
- EN 50140 (electromagnetic HF field, amplitude modulated)

- EN 61000-4-4 (quick transient interference variable)

- ENV 50141 (high-frequency asymmetrical amplitude modulated)

- EN 61000-4-8 (magnetic field with power-engineered frequency)

There are thus no limitations placed on usage. A declaration of conformity can be supplied with the ordered unit on request.

Our strict standards regarding minimum operating quality and the resulting considerable amount of time and money spent on development and testing reflect our commitment to guarantee the high level of quality of our products even under extreme electromagnetic conditions. Practice however also shows that even units which carry the CE sign such as monitors or analytical instruments can be affected if their manufacturers accept an interference (e.g. the flickering of a monitor) as the minimum operating quality under electromagnetic compatibility conditions. For this reason we recommend you to observe a minimum distance of approx. 1 m from such units. The CE-sign also certifies the conformity with the EU-directive 72/23/EEG (low voltage regulation). The applied standards are EN61010-1 and EN61010-2-010.

- 6.3 Ambient conditions according to DIN EN 61010**
- indoors, max. 2000 meters above sea level,
 - ambient temperature 5 ... 40 °C,
 - relative humidity max. 80%/31 °C (→ 50%/40 °C)
 - excess voltage category II, contamination level 2

6.4 Resting time after transportation (only for refrigerated circulators)

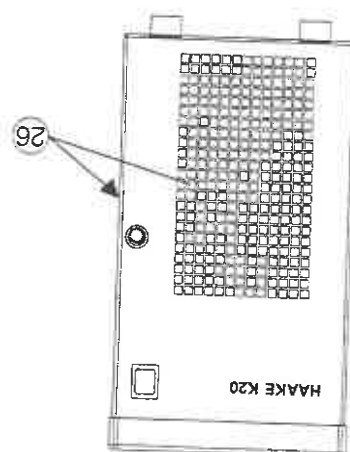
As we can unfortunately not guarantee that our refrigerated circulators are always transported according to our recommendations (i.e. upright), lubrication oil can leak from the compressor into the cooling circuit.
If the refrigerated circulator is started up whilst still in this state, the compressor may be damaged to the lack of oil.
Therefore:

! Rest the unit for 24 hours after setting up.

6.5 Ventilation

! Keep all ventilation grids 26 free from obstruction to ensure unhindered air circulation.

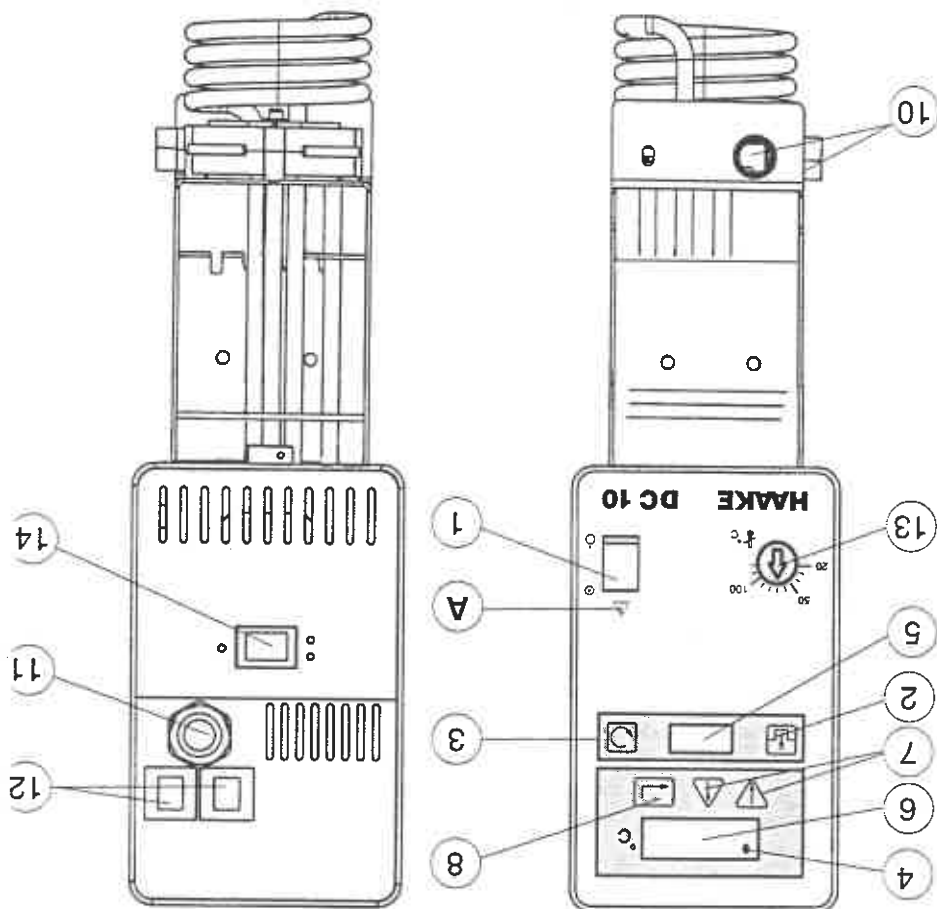
! Blocked ventilation grids lead to increased unit heating which in turn reduces the cooling capacity and thus impairs correct functioning.



$\frac{d}{dt} \left(\frac{1}{\rho} \right) = - \frac{1}{\rho^2} \frac{d\rho}{dt}$

7. Functional and Operating Elements

7.1 Temperature control module DC10

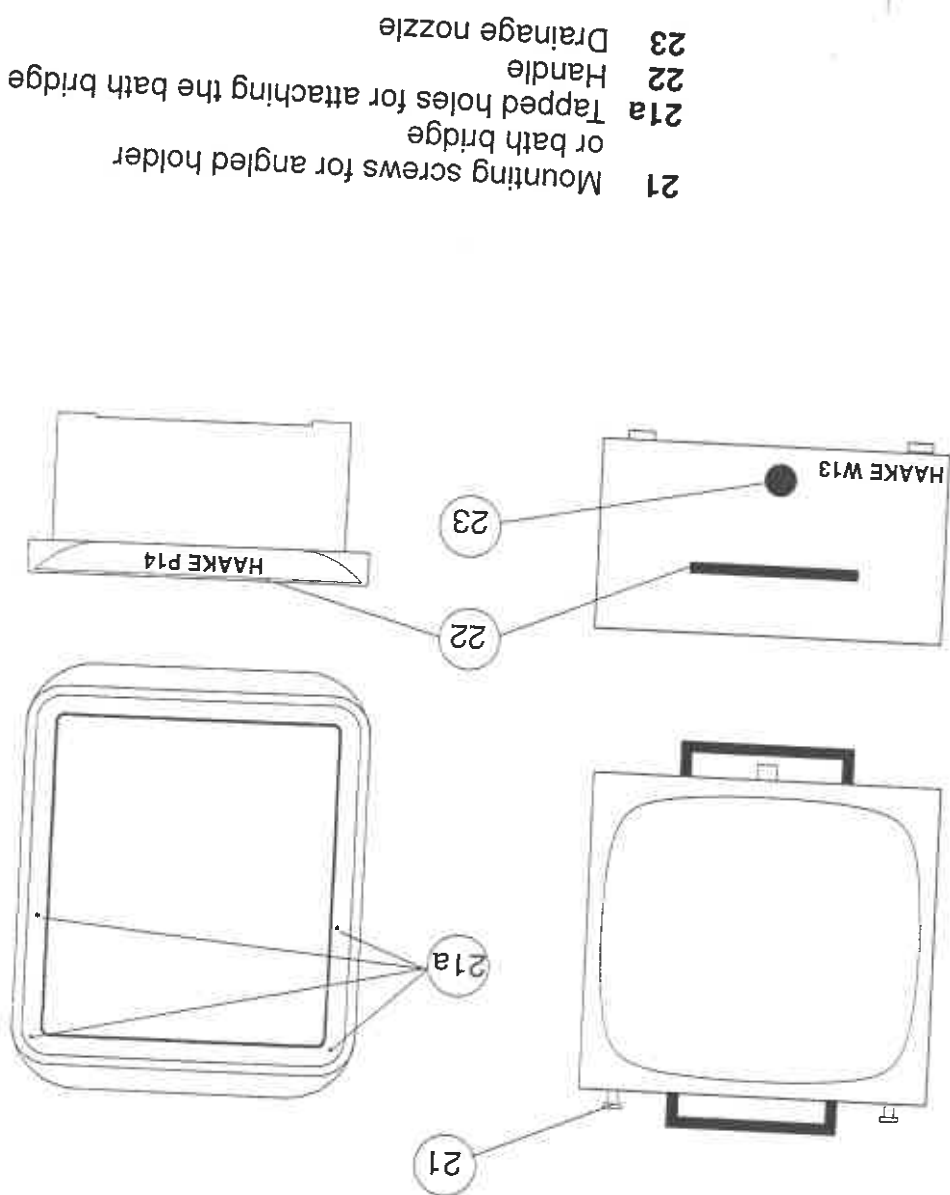


A Symbol: Read the instruction manual!

- | | |
|----|---|
| 1 | Mains switch |
| 2 | Reset button |
| 3 | Menu selection key |
| 4 | Heating control display |
| 5 | Menu position display |
| 6 | Set or actual temperature display |
| 7 | Value alteration (↑) higher (↓) lower |
| 8 | Enter key |
| 10 | Pump outlet (depending on requirements, one of the opening must be closed). |
| 11 | Mains cable |
| 12 | Fuses (if this fuse is triggered, see chap. 12.4) |
| 13 | Excess temperature setting dial |
| 14 | Speed reduction switch for TRS system |

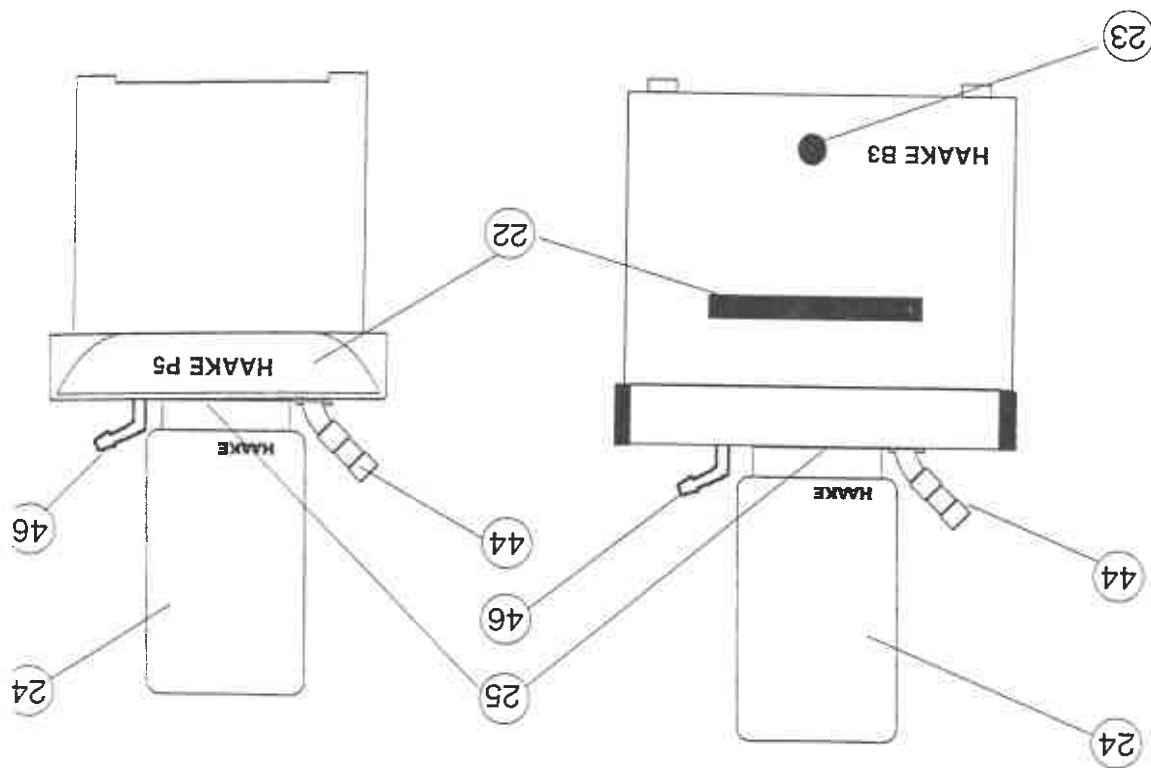
Functional and Operating Elements

7.2 Bath vessel "W" and integral bath "P" (example model)



Functional and Operating Elements

7.3 Bath vessel "B3" and integral bath "P5"



22 Handle

23 Drainage nozzle

24 Temperature control module with intermediate plate

25 Bath opening (with plastic bath covering

as a standard feature)

44 Pump connections

(front = to external object)

46 (rear = return from external object)

Connections for tap water cooling

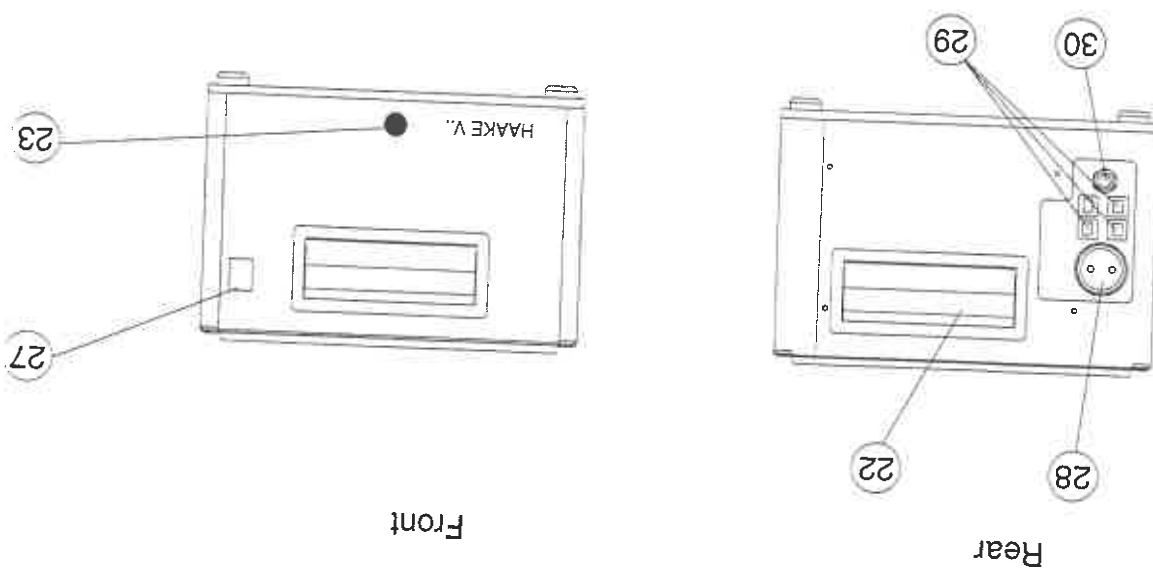
(The flow direction can be chosen arbitrarily.)

!

Depending on the equipment variant, the content of delivery does not always include 44 and 46 but these items can be retro-fitted.

Functional and Operating Elements

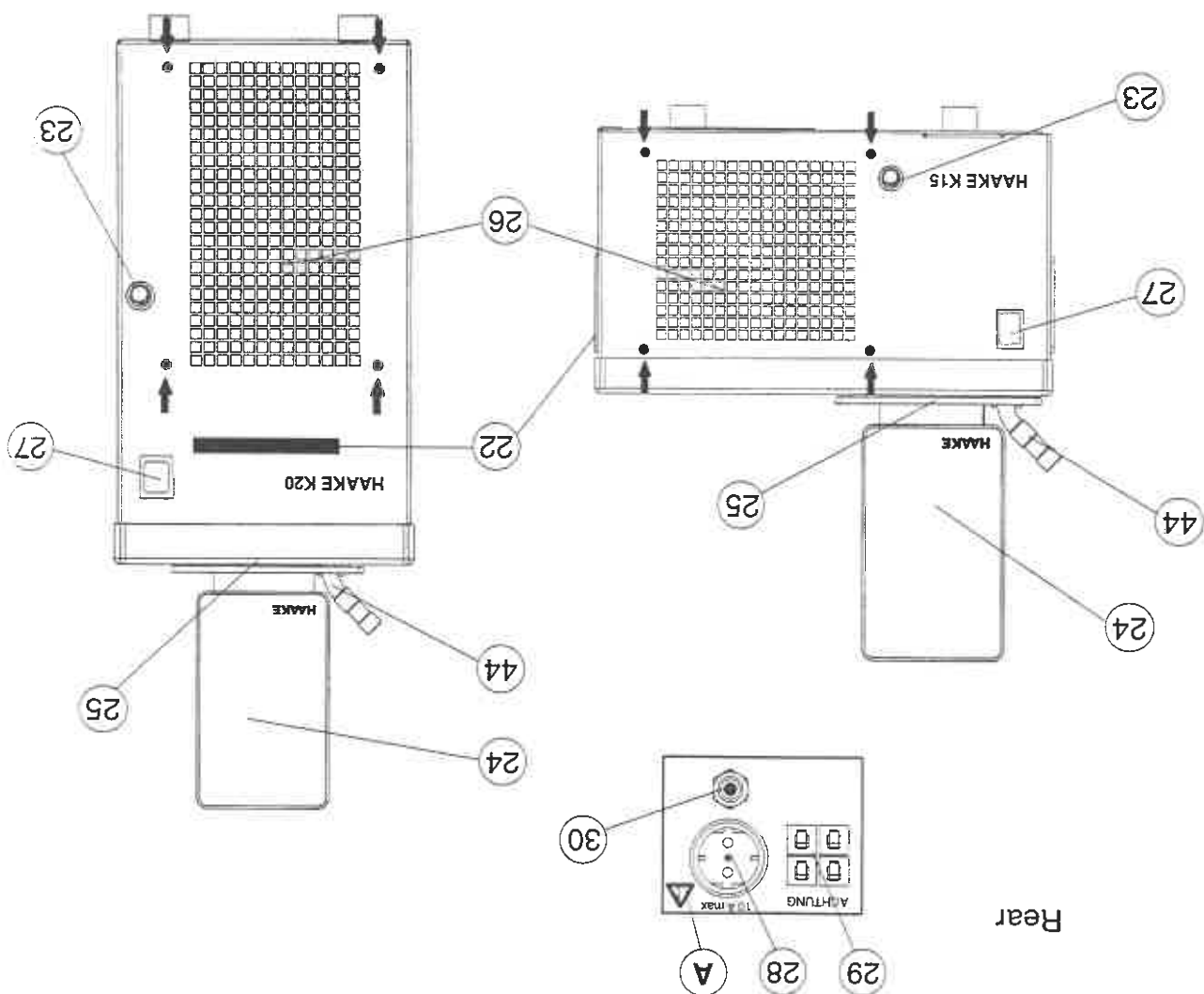
7.4 Bath vessel V15 / V26



- 22 Handle
- 23 Drainage nozzle
- 27 Cooling unit mains switch
- 28 Mains socket for temperature control unit
- 29 Fuses (if this fuse is triggered, see chap. 12.4)
- 30 Mains cable

Functional and Operating Elements

7.5 Bath vessel K15 / K20



- A** Symbol: Read the instruction manual!
- 22** Handle
- 23** Drainage nozzle
- 24** Temperature control module with intermediate plate
- 25** Bath opening (with plastic bath covering as a standard feature)
- 26** Ventilation grid (removeable, four mounting points: ↑)
- 27** Cooling unit mains switch
- 28** Mains socket for temperature control unit
- 29** Fuses (if this fuse is triggered, see chap. 12.4)
- 30** Mains cable
- 44** Pump connections
- (front = to external object)
(rear = return from external object)

