Instruction Manual

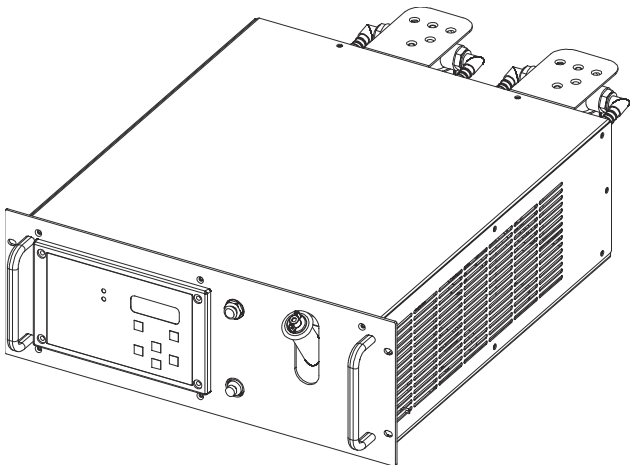
- Original instruction manual -

Cooler

P300

AW / WW Series

90000408194-01 - EN
2015-08-10



Member of the technotrans group

gds technotrans TERMOTEK KLH

TERMOTEK GmbH • Im Rollfeld 6 • 76532 Baden-Baden • Germany
www.termotek.de • Phone: +49 (0) 72 21 9711-0 • Fax: +49 (0) 72 21 9711-111

Copyright statement

TERMOTEK GmbH

gds
gdsCert
www.gds.eu

ecoDoc

1 Contact Addresses

1.1 Service addresses

TERMOTEK GmbH
Im Rollfeld 6
D-76532 Baden-Baden
Phone +49 (0) 72 21 9711-0
Fax +49 (0) 72 21 9711-111
Email: service@termotek.de
Germany

technotrans Asia-Pacific limited, Japan branch
TABLOID 4E, 2-6-24 Kaigan
Minato-ku
105-0022 Tokyo
Phone: +81 (0) 3-5484-3180
Fax: +81 (0) 3-5484-3181
Email: service-japan@technotrans.com
Japan

technotrans technologies pte.ltd
66 Kallang Pudding Road #04-03
Hor Kew Business Centre
Singapore 329324
Phone: +65 6508-6800
Fax: +65 6844-1566
Email: service-singapore@technotrans.com
Singapore

technotrans AG
Robert-Linnemann-Straße 17
48336 Sassenberg
Phone: +49 (0) 25 83-301-1000
Fax: +49 (0) 25 83-301-1030
Email: customer-service@technotrans.de
Germany

technotrans america inc.
1050 E Business Center Dr.
Mt. Prospect, Illinois 60056
Phone: +1 (847) 227-9200
Fax: +1 (847) 227-9400
Email: service-usa@technotrans.com
USA

Shanghai Office
Unit 1007, Pine City Building
No. 777 Zhaojia Bang Road
Shanghai, 200032
Phone: +86 (0) 21-6417-1900 /-9100
Fax: +86 (0) 21-6417 0300
Email: service-china@technotrans.com
P.R. China

1.2 Manufacturer's address

TERMOTEK GmbH
Im Rollfeld 6
D-76532 Baden-Baden
Phone +49 (0) 72 21 9711-0
Fax +49 (0) 72 21 9711-111
Germany

2 About this manual

2.1 Use and storage

Please observe the following:

- Only compliance with this manual ensures that the equipment/machine can be put into service properly, operated and maintained safely.
- These instructions comply only to the product that is mentioned on the cover page.
- We reserve the right to make changes to this manual based on engineering developments without notice.
- This manual is part of the scope of delivery.
- This manual shall be considered valid from the time of the transport to the customer until its final disposal.
- The manual must be stored so that it is easily available at any time. It must be complete, kept close to the machine and must be available to all authorized persons.
- The manual must always remain in a legible condition.
- If the equipment is sold, it must remain with the machine.
- This manual is only applicable for trained and authorised personnel.
- It is the owner's responsibility to ensure that the manual is read and understood by all operating personnel before starting work.
- The "Safety" chapter provides an overview of the most important safety aspects, highlights the optimum protection of personnel, and describes the safe and trouble-free operation of the system.
- The manufacturer cannot be held responsible for damage resulting from non-compliance with this manual.
- Reprints, translations, and duplications in any form, in parts all in its entirety require is the written approval of the publisher.
- The copyright remains with the manufacturer.

2.2 Seal of quality

The seal of quality "gdsCert" of gds GmbH (service provider for technical documentation) is a proof of quality for technical documentation.

With the "gdsCert" seal of quality, the manufacturer provides proof of the high standard of the technical documentation and of the compliance with the relevant standards and guidelines.

The seal of quality "ecoDoc" is used for the certification of instruction manuals under ecological points of view. It is listed under the "green safety instruction".

With the "ecoDoc" seal of quality, the manufacturer indicates that the product documentation includes notes concerning the potential ecological hazards resulting from operating errors or other tasks that are performed with or on the product. Companies thereby make a contribution to the protection of the environment.

The seal of quality "ecoDoc" provides a proof of compliance with the relevant standards and guidelines and/or of the ecological approach concerning the contents of the documents.

2.3 Further applicable documents

In addition to this instruction manual, there are further applicable documents that also need to be taken into consideration. These are usually the following documents:

- spare parts catalogues/lists
- electrical documentation
- safety data sheets
- project drawings
- documentation of third-party manufacturers

▶ Note

Information concerning the actual documents that are part of the product-accompanying documents can be found in the specifications of the order confirmation.

▶ Note

The information on technical data, spare parts and conformity of the units has been separately prepared and made available.

2.4 Explanation of the various notes

Explanation of warning notices used in this manual:

DANGER

Short description of danger

The signal word **DANGER** identified an immediately threatening danger.

Any non-adherence will result in most serious injuries or death.

WARNING

Short description of danger

The signal word **WARNING** identified a potential danger.

Any non-adherence may result in most serious injuries or death.

CAUTION

Short description of danger

The signal word **CAUTION** identified a potential danger.

The non-adherence may result in minor to medium injuries.

Notice

Short description

The signal word **Notice** identifies a potential risk of property damages.

The non-adherence may cause damages at the unit or at the plant.

Note

The signal word **Note** identifies further information on the unit or about its use.

Note concerning the protection of the environment

The keyword **Note concerning the protection of the environment** indicates information concerning the protection of the environment.

3 Safety

3.1 General information regarding safety

The "Safety" chapter provides an overview of all of the important safety aspects for the optimum protection of the personnel and for the safe and trouble-free use of the unit/system from the transport up to the operation and disposal.

The unit/system has been designed and manufactured in line with the current state of the art and is in compliance with the recognised safety regulations and standards.

Only use specialised personnel who are familiar with the fundamental health and safety rules and regulations and who have been briefed about the handling of the unit/system.

Personnel in charge of carrying out work on the unit or system must have read and understood this manual and in particular the section on safety.

If necessary, in-house instruction should be provided, taking into account the technical qualifications of the personnel concerned.

Certain components have additional warning plates or labels to enable safer operation. Plates or labels must not be covered or removed.

Observe all safety instructions. Observation of these instructions is in the interest of personal safety.

The relevant accident prevention regulations as well as other generally recognised regulations concerning workplace health and safety must be observed.

Failure to wear personal protective equipment may cause serious injuries or death.

- Wear the prescribed personal protective equipment, e.g. hearing protection, eye protection, safety shoes, helmet, protective clothing, safety gloves, and respiratory protective equipment.
- Long hair must be tied back. Do not wear any jewellery or loose-fitting clothes. There is a risk of injury if these items get caught in or are pulled into any moving parts of the machinery.
- Ensure that there are no unauthorised persons in the danger zone.

3.2 Safety of personnel

Avoid any working practice that:

- endangers the health and safety of the user or third parties,
- presents a danger to the unit or system or other property,
- impairs the safety or functionality of the unit or system,
- does not comply with the safety instructions.

Maintenance and service should be performed only by suitably qualified persons who are familiar with the unit and who have been informed concerning the potential hazards.

⚠ WARNING

Warning – Danger to personnel!

There is an increased risk of injury if the safety devices are put out of operation. Do not remove or deactivate any safety devices.

- Check the safety devices daily for correct operation.
- Malfunctions and defects concerning the safety devices must be reported immediately to the after-sales service.
- The housing must be closed during the operation and may be opened only to rectify malfunctions or to perform maintenance tasks.
- Repairs to pipe systems and tanks may only be carried out when the system is depressurised.
- When handling chemicals, observe the applicable safety data sheets and disposal instructions that are provided by the suppliers, as well as any relevant local safety regulations. Wear protective clothing!

Any safety devices that have been removed for set-up, maintenance, or repair purposes must be reinstalled and checked for correct operation immediately upon the completion of the maintenance and repair work.

In the above case, particular attention must be paid to the general accident prevention and safety regulations.

3.3 Intended use

The unit or the system is intended solely for the application outlined in the “Description/Overview” section and only with the components supplied and approved.

Using the unit for purposes other than those mentioned above is considered contrary to the intended use. The manufacturer cannot be held liable for any damage resulting from such use. The risk of such misuse lies entirely with the user.

3.4 Terms of warranty

The manufacturer is not liable for damage resulting from improper use, the failure to observe this manual, the employment of insufficiently qualified personnel, or unauthorised modifications. In these cases the manufacturer’s warranty is rendered void.

! Notice

Unit function is affected when using incorrect spare parts!

When using components which have not been approved, correct operation can no longer be guaranteed. Only use spare parts approved by the after-sales service.

! Notice

Caution - Loss of warranty!

The use of media (e.g. washing agents, cleaning agents, etc.) that are not approved may result in damage to the unit or to the system. The warranty will be rendered void. The same shall apply if different media are mixed.

Use only media that have been approved by the manufacturer.

▶ Note

Removing type plates will make the warranty claim expire.

▶ Note

The warranty will be rendered void if seals are broken without authorisation.

3.5 Installation site

When selecting an installation site, observe the following instructions:

- Keep the specified escape routes clear.
- Ensure firm support and a horizontal position of the device.
- Comply with the data stated in the “Technical Data” section concerning the ambient temperature for operation, transport, and storage when the device is completely empty.
- Ensure sufficient space for operating, maintaining, and cleaning the device.
- If provided, keep vents for inlet and exhaust air clear.

Comply with the relevant technical and building regulations.

Lay the hoses and electrical cables so that there is no danger of tripping and that they are protected from damage.

When selecting an installation site, the applicable safety regulations and manufacturer instructions concerning any substances that are used for, or located near, the machine must be observed.

When installing the devices near traffic routes, separate the devices from the traffic routes by means of suitable structures.

3.6 Safety instructions for transport

⚠ WARNING

Danger for persons!

Increased risk of injuries through improper transport.

The transport of the unit should be carried out only by suitably qualified persons who are familiar with the unit and who have been informed as to potential hazards.

! Notice

Damaging of unit!

Damage due to improper transport.

- Make sure to follow signs (if attached) at unit when transporting unit.
- Transport units with suitable lifting gear only.
- Transport the unit only when it is empty.
- Transport on suitable and secured transporting pallet.

3.7 Use of cleaning agents

No material, i.e. neither metals nor plastics, can be certified to be completely chemically resistant.

Due to the large number of available additives and cleaning agents, the recipes of which are subject to change, the manufacturer cannot assume any liability for damage attributable to the influence of such substances.

! Notice

Damages through cleaning agents!

Cleaning agents can have an effect on devices and measuring equipment and can destroy materials and harm the environment.

Please observe the following points:

- Cleaning agents must not enter system circuits.
- Use cleaning agents economically and for specific objectives.
- Keep the application duration to a minimum, especially for plastic parts and seals.
- Excess cleaning agent has to be removed and parts have to be wiped dry or, if possible, rinsed with clear water.
- Do not use any flammable cleaning agents (unless explicitly specified by the manufacturer).
- Do not use any cleaning agents containing silicone or chlorine (unless explicitly specified by the manufacturer).

In case of doubt, the user should perform a test to see whether the detergents / chemicals are compatible with the materials used.

The materials used for this product have been selected on the basis of several years of field experience of these products worldwide. If the product is used as intended and if the information provided in the "Safety" chapter is observed, this product offers very good performance and a long service life.

Note concerning the protection of the environment

The excessive use of cleaning agents has a negative impact on the environment.

- Use environmentally friendly cleaning agents.
- Use cleaning agents economically and for specific objectives only.
- Do not spill any cleaning agents.
- Keep the containers tightly sealed. Empty containers or containers that are in use must also be sealed upon the completion of the task.
- Used cleaning agents and the associated containers, tanks, etc. must be disposed of in an environmentally sound manner and in compliance with the local and national rules and regulations.

3.8 Use of chemicals

⚠ CAUTION

Health hazard!

The use of chemicals can present a health hazard.

- When handling chemicals, always wear protective gloves, eyewear, and clothing.
- Observe the safety data sheets.

! Notice

Damage due to aggressive chemicals!

Aggressive chemicals can damage the components.

- Do not use any chemicals (e.g. for cleaning) that are aggressive to the components.
- Observe the relevant material safety data sheets of the suppliers.

Note concerning the protection of the environment

The improper disposal of chemicals (e.g. additives) has a negative impact on the environment.

- Chemicals must not be disposed of as household waste and it must be ensured that they are not released into the sewage system or soil.
- Wear suitable protective equipment (gloves, eye protection) when performing disposal tasks.
- Chemicals must be disposed of separately (e.g. as special waste if applicable) and supplied separately to the recycling centres.
- Comply with the safety data sheets and also with the applicable national and local rules and regulations.

3.9 Use of refrigeration units

If refrigeration devices are used, please comply with the rules and regulations that are in force in the country where the system is set up.

Information concerning the refrigerant and the filling quantities can be found in the “Technical Data” section or on the type plate of the refrigeration device.

Note the requirements regarding the installation site according to EN 378, "Refrigeration systems and heat pumps".

The refrigeration circuit contains a fluorinated greenhouse gas (refrigerant) that falls under the Kyoto Protocol. The refrigerants used are so-called hydrofluorocarbons (HFCs) without ozone-depleting potential (ODP = 0). Information on the refrigerant fill quantity and the global warming potential can be found in the “Technical Data” section in the Appendix.

Note concerning the protection of the environment

Refrigerants are harmful to the environment when they are released into the atmosphere.

- Work on the refrigeration unit should be performed only by specialist refrigeration companies.
- Do not damage the refrigerant pipes.

3.10 Safety instructions for set-up

WARNING

Danger through faulty commissioning!

There is an increased risk of injury to persons who perform tasks for which they are not suitably qualified or trained.

- The commissioning of the system shall only be carried out by persons familiar with the system and instructed with respect to dangers and risks involved, also having the required qualifications.
- Fulfil all safety-relevant conditions before commissioning.
- The location of the unit or of the system must correspond to the regulations according to Chapter "Safety, Choice of Location".

Notice

Damage to components!

Danger of damage due to improper operation. Observe the description of additional components, if included.

Note

Check all hoses and hose connections for leaks when commissioning the unit.

3.11 Safety instructions for maintenance

WARNING

Carry out instructed maintenance works only!

There is an increased risk of injury to persons who perform tasks for which they are not suitably qualified or trained.

- Maintenance works should be carried out only by suitably qualified personnel who are familiar with the unit and who have been informed as to potential hazards.
- Repairs to pipe systems and tanks may only be carried out when the system is depressurised.

WARNING

Connections alive!

Negligence can lead to electric shock.
Observe the following points when carrying out maintenance work on the electrical system:

1. Disconnect the unit from the power supply in order to deenergise it.
2. Secure the unit so that it cannot be switched on again accidentally.
3. Check whether the unit is properly disconnected from power and absolutely voltage-free
4. Earth and short-circuit the unit.
5. Cover any adjacent live parts and secure the danger area.

Notice

Damage to electronic components!

Take suitable measures (ESD protection measures) to prevent the electronic components from being damaged due to electrostatic discharge.

4 Description / Overview

4.1 General information

The chiller is used for the cooling of consumer mediums. The medium will be maintained by way of this cooling process at a constant level within temperature limits specified before.
The chilling device is a compressor chiller with a closed cooling circuit.

The device may be equipped with the following optional components:

- Heater
- Filter (chilling medium)
- Air filter
- Conductivity measurement
- Pressure sensor
- Temperature sensor (ambient)
- Temperature sensor (in inlet)
- Internal transformer (changes the mains voltage)
- Bypass valve
- Pressure relief valve
- Non-return valve/solenoid valve
- Flow switch
- Flow meter

► Note

See the "Technical data" document in the appendix for information about the equipment status of the device.

The cooling device is intended for 19" racks ("Euroracks").

The cooling unit is intended solely for the cooling of media as stated in the technical datasheet in the appendix and in compliance with all of the installation and safety instructions.

The chiller is a subordinate component of the overall system (slave). In the event of an error message (e.g. min./max. temperature), switch the unit off immediately. Non-compliance may lead to consequential damage to the overall system. TERMOTEK shall assume no liability for such consequential damage.

The device is disconnected from the power supply via a superordinate power supply.
The control unit is used solely for switching the device on and off.

The following requirements must be met for the operation of the unit:

- Use the unit solely inside buildings. An operation in the open air is not allowed.
- Use the unit solely with a fixed fan grid.
- Ensure a free suction and blowing out of chilling air and a sufficient air exchange for a heat dissipation at the installation site.
- The electrical connection corresponds to the valid standards.
  Make sure that the unit is properly grounded.
- The unit shall be exclusively operated with the allowed a filtered chilling medium.
- Comply with the specifications (e.g. coolant quality, connections) stated in the appendix under "Technical data".
- The unit must be positioned horizontally.

4.2 Explanations concerning the device names

Abbreviation	Meaning
AW	**Air-water chiller** AW chillers cool the medium to a specific temperature. The air cools the refrigerant.
AWS	The heat exchange is realised via a coil that is installed in the tank.
AWP	The heat exchange is realised in a separate heat exchanger.
WW	**Water-water chiller** The medium is cooled to a specific temperature via the process water. In this case, the refrigerant is cooled by the process water and not by air. The air is used solely for cooling the components inside the device.
WWS	The heat exchange is realised via a coil that is installed in the tank.
WWP	The heat exchange is realised in a separate heat exchanger.

4.3 Working principle

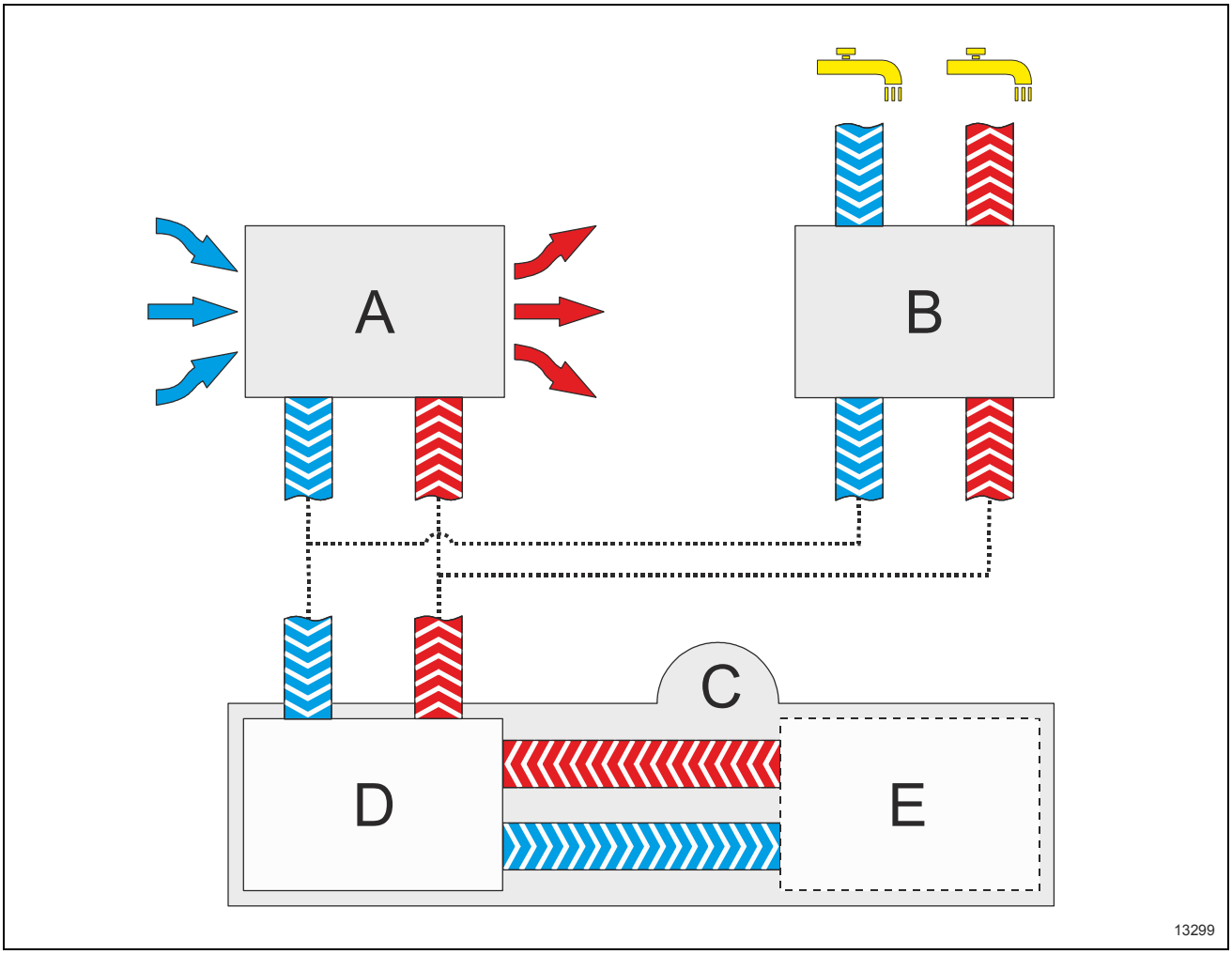


Fig. 1: Working principle

Only for AW devices:

A Cooling circuit (air cooling)

Only for WW devices:

B Cooling circuit (waste water cooling)

C Cooling circuit

D Heat exchanger (water tank)

E Consumer

AW devices (air-water devices) have the following circuits:

- Refrigeration circuit
- Cooling circuit
- Air circuit
- Electric circuit

WW devices (water-water devices) have the following circuits:

- Refrigeration circuit
- Cooling circuit
- Waste water circuit
- Electric circuit

4.4 Refrigerant circuit

In the refrigeration circuit the compressor sucks refrigerant from the evaporator and compresses it. In the condenser, the heat thus generated in the refrigerant will be transferred to the medium (air or water). During this process, the refrigerant is liquefied.

4.5 Cooling circuit

The hot water flows into the chiller via the medium inlet line. A flow monitor (optional) is installed directly downstream of the medium inlet monitoring the flow in the cooling circuit.

Depending on the device variant, the heat exchange between the refrigerant and cooling water takes place in a heat exchanger (P) or tank (S). The cooled water is drawn in by the pump.

The water flows from the pump to the filter unit (optional). Here, even smallest contaminants are removed from the water. After passing through the filter, the cooled water exits the device via the medium outlet line.

A conductivity sensor (option) in the tank monitors the conductivity value of the water. If the conductivity value exceeds the pre-defined switching value for the ion quantity in the water, the corresponding messages is shown in the display of the device control unit.

4.6 Air circuit

Ambient air is used as cooling air. It is sucked into the unit through the air inlet. In the condenser block, the air cools the refrigerant and from there it is vented through a fan.

In water-water chillers, the air is exclusively used for cooling the integrated components.

▶ Note

Depending on the set-up of the unit, the following must be taken into consideration:

- If it is installed in a rack, ensure sufficient ventilation.
- If it is set up as a stand-alone unit, the minimum clearances (e.g. to the wall and ceiling) that are stated on the technical data sheet in the appendix must be complied with.

4.7 Electric circuit

All components and assemblies relevant to power supply and control are centrally located in the device. All integrated electric components are connected with cables to the respective control system.

4.8 Waste water circuit

The water flows through a filter (optional) to the heat exchanger and cools down the refrigerant to the temperature required.

Subsequently, the heated water flows out of the chiller. A control valve automatically regulates the flow. Based on the operating condition, the control valve may be fully closed.

! Notice

Danger due to contamination/soiling of the device!

Make sure that the DIN Guidelines for Drinking Water, Heating Water, Vd-TÜV Guidelines and the Guidelines of the AGFW for water constituents are complied with.

Water constituent	Unit	Value
pH value		7-9
Total hardness	°dH	6-15
Substances that can be removed by filtration	mg/l	< 30
Chlorides (up to water temperature of 50°C)	mg/l	< 200
Free chlorine	mg/l	< 0,5
Sulphate	mg/l	< 100
Sulphide	mg/l	< 1
Conductivity	µS/cm	10-500
Hydrogen sulphide	mg/l	< 0,05
Ammonium	mg/l	< 2
Hydrogen carbonate	mg/l	< 300
Hydrogen carbonate / sulphide	mg/l	> 1
Nitrate	mg/l	< 100
Nitrite	mg/l	< 0,1
Iron dissolved	mg/l	< 0,2
Manganese	mg/l	< 0,1
Free aggressive carbonic acid	mg/l	< 20

4.9 Information on refrigerant

The device contains a small quantity of refrigerant.

The refrigerants used are so-called hydrofluorocarbons (HFCs) without ozone-depleting potential (ODP = 0).

It is important to comply with the following points:

- Avoid damaging the pipes of the refrigerant circuit during transportation and assembly.
- In case the refrigerant circuit is damaged, ensure that open flames and ignition sources are kept away from the device.
  - Spurting refrigerant can cause injuries.
  - Ensure adequate ventilation! Open windows and doors fully!

▶ Note

- The greater the amount of refrigerant in a device, the larger the space accommodating the device needs to be.
- There must be at least 1 m^3 of space for every 8 g of refrigerant.
- Information on the refrigerant fill quantity and the global warming potential can be found in the “Technical Data” section in the Appendix or on the name plate of the device.

Note concerning the protection of the environment

Refrigerants are harmful to the environment when they are released into the atmosphere.

- Work on the refrigeration unit should be performed only by specialist refrigeration companies.
- Do not damage the refrigerant pipes.

4.10 Safety devices

- The refrigeration circuit is secured by a high-pressure switch.
  The high-pressure switch is triggered, if the refrigeration circuit is overloaded and the chilling medium is thus under high pressure.
  The high-pressure switch is automatically reset after the triggering.

4.11 Incorrect use

In general:
any incorrect use is classed as 'not for the intended purpose'. The manufacturer cannot be held liable for any damage resulting from such use. The risk of such misuse lies entirely with the user. Moreover, intended use of the unit also involves use in accordance with the applicable international and national safety instructions as well as the safety instructions in the manual.

Amongst others, the unit is **NOT** intended for the following applications:

- Use of the unit in an explosive atmosphere.
- Outdoor use.
- Operation of the unit without protective earth connection.
- Use of chilling medium that exceeds the permissible dirt particle size as specified in "Technical Data".
- Use of chilling media that are not specified and approved in "Technical Data".
- Installation in confined spaces.
- Non-compliance with the permissible technical data. Information on the refrigerant type can be found in the “Technical Data” section in the Apppendix.
- Transport with filled tank.
- Operation of the unit without unit cladding.
- Operation without fan grille.
- Use of the unit as a storage area.
- Use of the unit as a work platform.

5 System Layout

5.1 Overview

5.1.1 AW devices (air-water chillers)

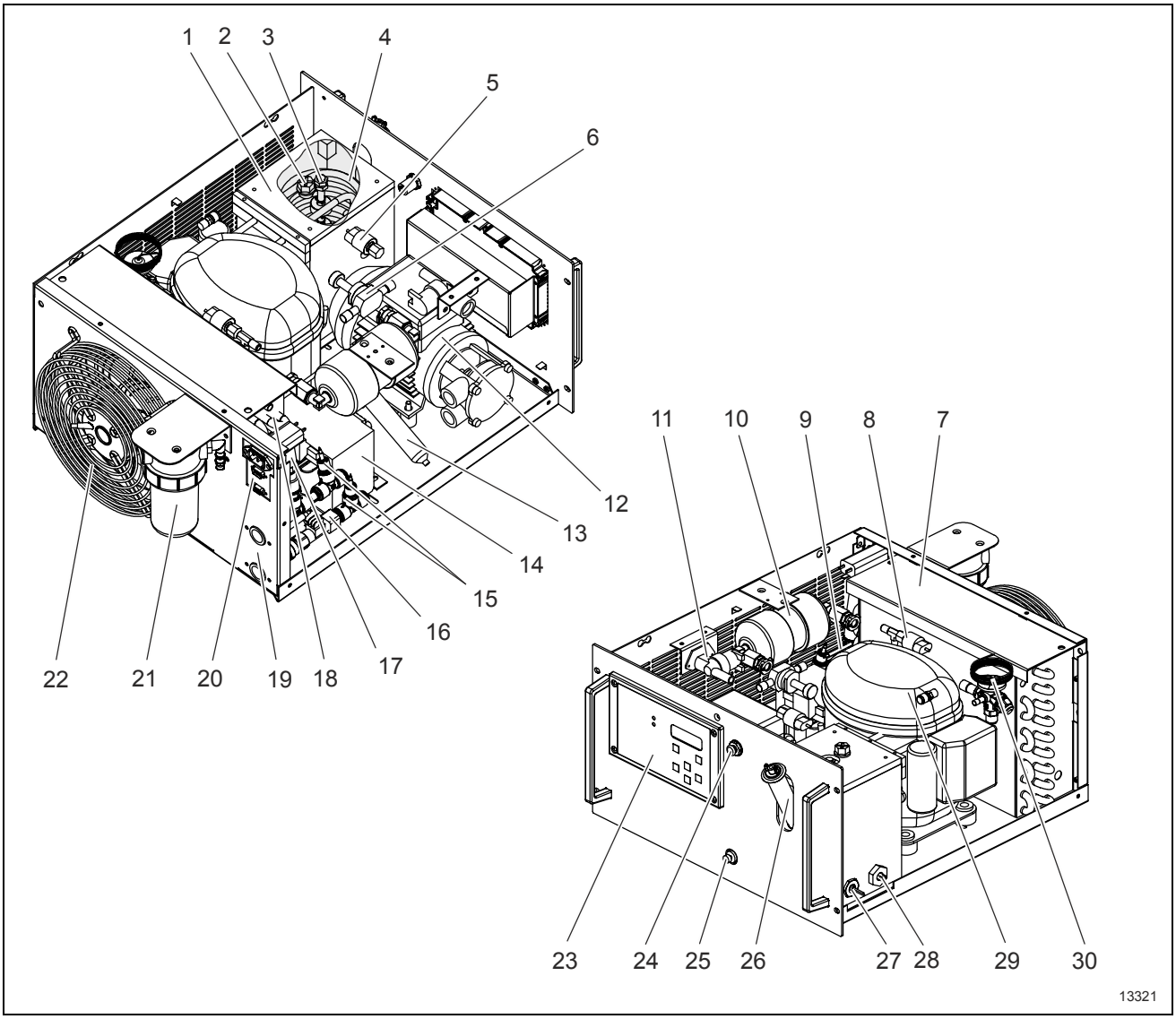


Fig. 2: AW devices (example: P310 AWS)

1	Tank	16	Flow meter (turbine) *)
2	Plug/vent valve	17	Pressure sensor *)
3	Fill level sensor	18	Temperature sensor (condenser) *)
4	Evaporator coil	19	Hose connections
5	Low-pressure sensor *)	20	Electrical connections
6	Hot gas valve *)	21	Filter *)
7	Condenser	22	Fan
8	High-pressure sensor	23	Control unit
9	Temperature sensor (ambient) *)	24	Pump vent *)
10	DI cartridge *)	25	Bypass valve *)
11	Control valve *)	26	Fill level indicator
12	Pump	27	Heater *)
13	Filter dryer	28	Conductivity valve *)
14	Transformer *)	29	Compressor
15	Temperature sensor inlet *) and outlet	30	Expansion valve/capillary tube

*) option

▶ Note

See the chapter "System layout/Connections" for information concerning the hose connections (19) and electrical connections (20).

5.1.2 WW devices (water-water chillers)

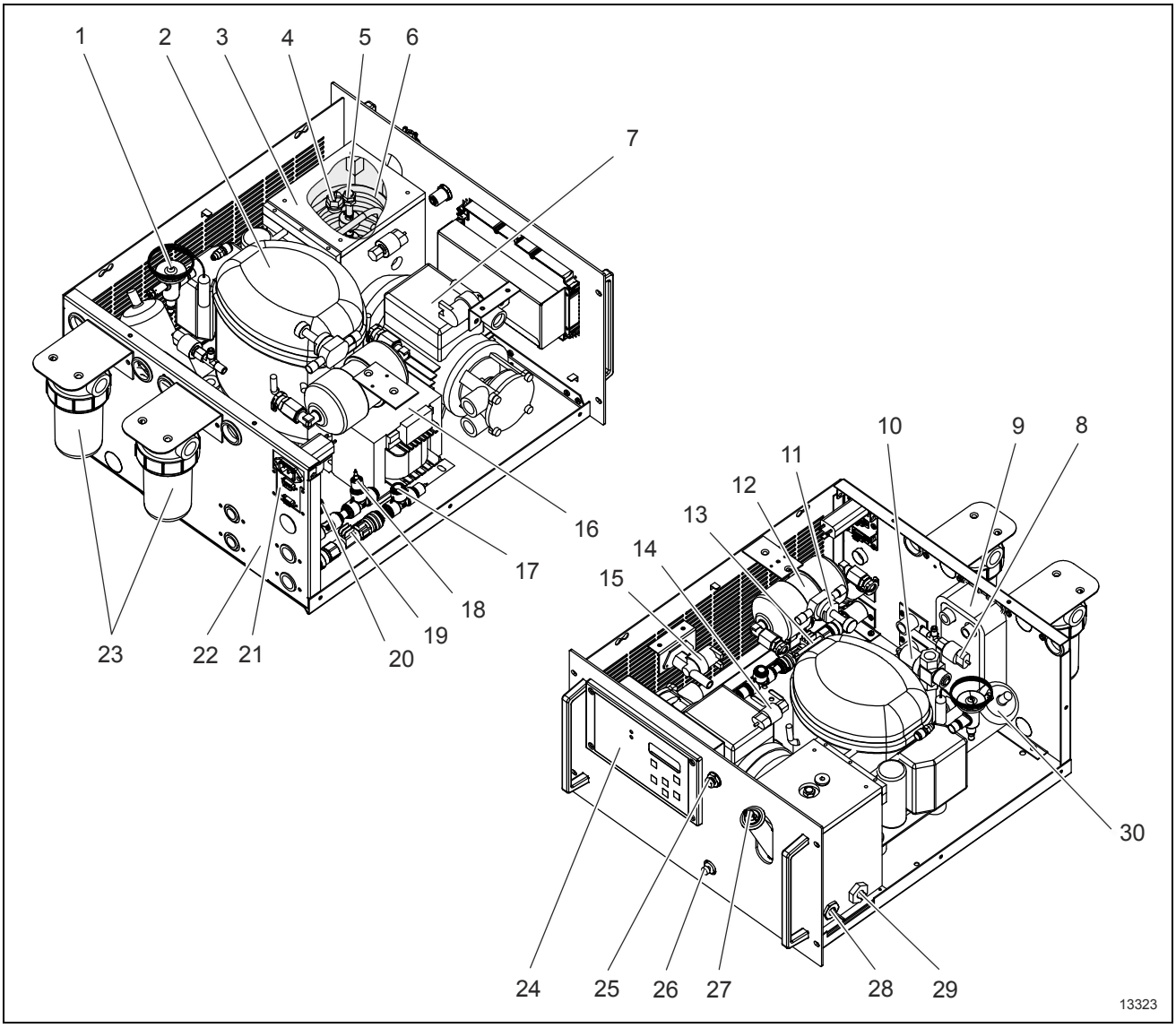


Fig. 3: WW devices (example: P310 WWS)

1	Expansion valve/capillary tube	16	Transformer *)
2	Compressor	17	Temperature sensor (inlet) *)
3	Tank	18	Temperature sensor (outlet) *)
4	Plug/vent valve	19	Flow meter (turbine) *)
5	Fill level sensor	20	Pressure sensor *)
6	Evaporator coil	21	Electrical connections
7	Pump	22	Hose connections
8	High-pressure switch	23	Filter *)
9	Heat exchanger	24	Control unit
10	Cooling water control valve *)	25	Pump vent *)
11	Hot gas valve *)	26	Bypass valve *)
12	DI cartridge *)	27	Fill level indicator
13	Temperature sensor (ambient) *)	28	Conductivity valve *)
14	Low-pressure switch *)	29	Heater *)
15	Control valve *)	30	Collector dryer

*) option

▶ Note

See the chapter "System layout/Connections" for information concerning the electrical connections (21) and hose connections (22).

5.2 Schematic system diagram

5.2.1 AW devices (air-water chillers)

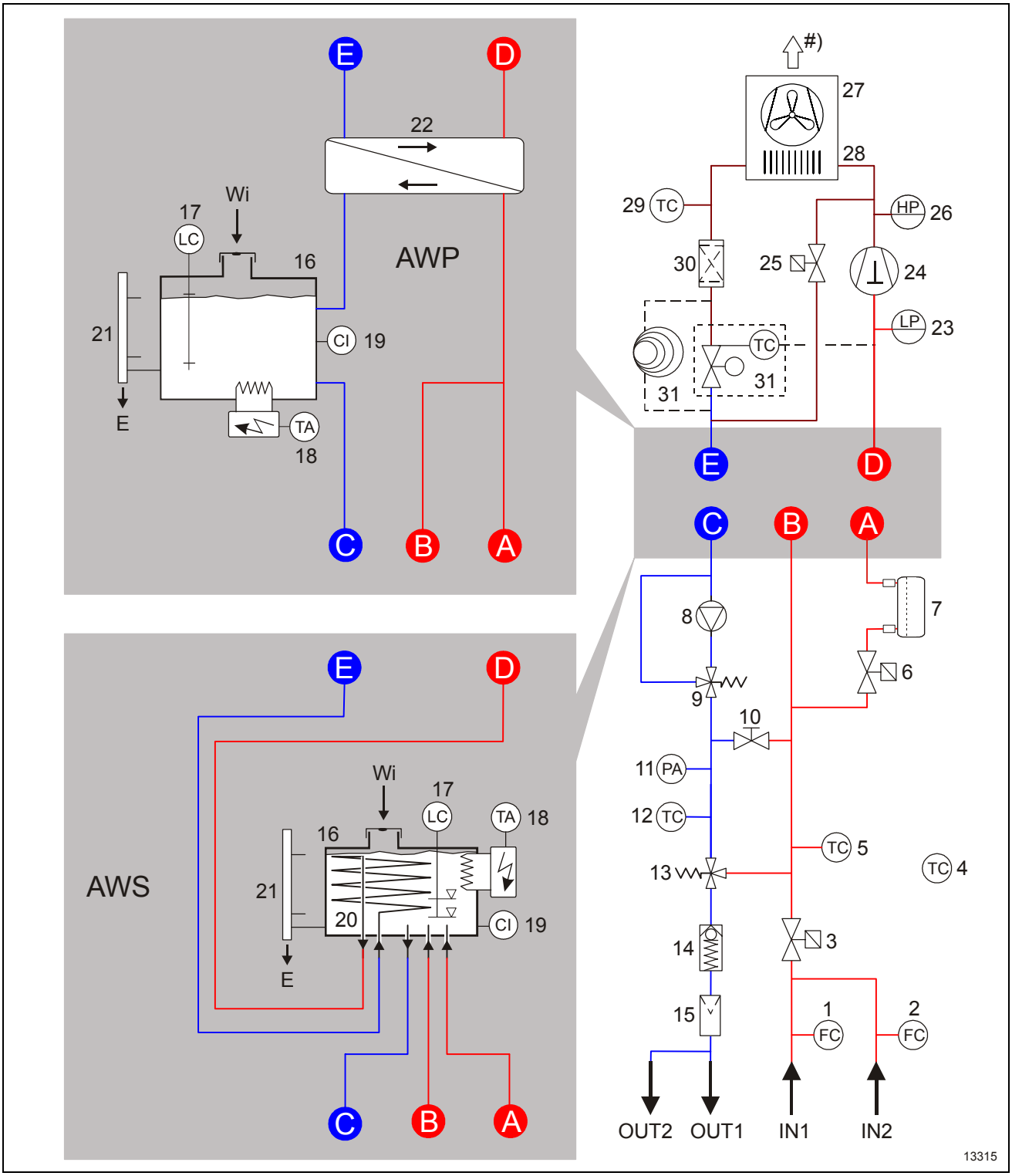


Fig. 4: Schematic system diagram (AW devices)

Cooling circuit

1 Flow meter (turbine/paddle) *)
2 Flow meter (turbine/paddle) *)
3 Shut-off valve *)
4 Temperature sensor (ambient) *)
5 Temperature sensor (inlet) *)
6 Conductivity valve *)
7 DI cartridge *)
8 Pump
9 Bypass valve/pressure relief valve integrated in the pump *)
10 Bypass valve *)
11 Pressure sensor *)
12 Temperature sensor (outlet)
13 Bypass valve/pressure relief valve *)
14 Non-return valve *)
15 Filter *)
16 Tank
17 Fill level sensor
18 Heater *)
19 Conductivity sensor *)
20 Evaporator coil
21 Fill level indicator
22 Heat exchanger

Refrigeration circuit

23 Low-pressure switch *)
24 Compressor
25 Hot gas valve *)
26 High-pressure switch
27 Fan
28 Condenser
29 Temperature sensor (condenser) *)
30 Filter dryer
31 Expansion valve/capillary tube (the capillary tube may be optionally installed instead of the expansion valve)

Connections

IN1 Medium inlet
OUT1 Medium outlet
IN2 Second medium inlet *)
OUT2 Second medium outlet *)
E Drain connection
Wi Fresh water filler pipe

*) option

#) Direction of air flow

▶ Note

Depending on the specific device variant (AWS/AWP) different components are installed for the heat exchange. The connections (A) - (E) are fixed connections in the device.

- In the case of the AWS variant, the heat exchange is realised via a coil that is installed in the tank.
- In the case of the AWP variant, the heat exchange is realised in a separate heat exchanger.

5.2.2 WW devices (water-water chillers)

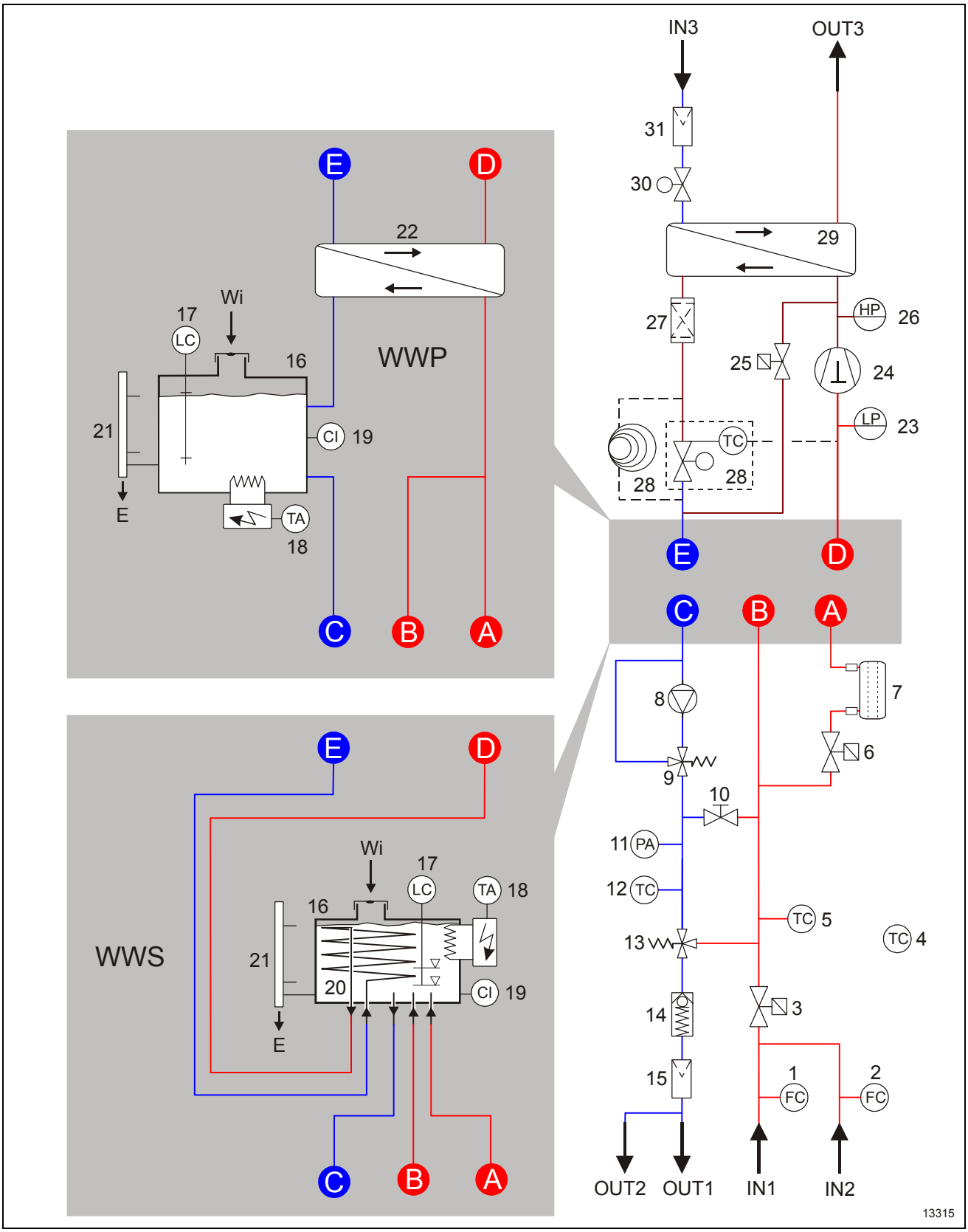


Fig. 5: Schematic system diagram (WW devices)

Cooling circuit

1 Flow meter (turbine/paddle) *)
2 Flow meter (turbine/paddle) *)
3 Shut-off valve *)
4 Temperature sensor (ambient) *)
5 Temperature sensor (inlet) *)
6 Conductivity valve *)
7 DI cartridge *)
8 Pump
9 Bypass valve/pressure relief valve integrated in the pump *)
10 Bypass valve *)
11 Pressure sensor *)
12 Temperature sensor (outlet)
13 Bypass valve/pressure relief valve *)
14 Non-return valve *)
15 Filter *)
16 Tank
17 Fill level sensor
18 Heater *)
19 Conductivity sensor *)
20 Evaporator coil
21 Fill level indicator
22 Heat exchanger

Refrigeration circuit

23 Low-pressure switch *)
24 Compressor
25 Hot gas valve *)
26 High-pressure switch
27 Filter dryer
28 Expansion valve/capillary tube (the capillary tube may be optionally installed instead of the expansion valve)

Process water circuit

29 Heat exchanger
30 Cooling medium control valve (pressure-controlled)
31 Filter *)

Connections

IN1 Medium inlet
OUT1 Medium outlet
IN2 Second medium inlet *)
OUT2 Second medium outlet *)
IN3 Process water inlet
OUT3 Process water outlet

E Drain connection
Wi Fresh water filler pipe

*) option

▶ Note

Depending on the specific device variant (WWS/WWP) different components are installed for the heat exchange. The connections (A) - (E) are fixed connections in the device.

- In the case of the WWS variant, the heat exchange is realised via a coil that is installed in the tank.
- In the case of the WWP variant, the heat exchange is realised in a separate heat exchanger.

5.3 Connections

▶ Note

For inlets and outlets, please observe the blue and red signs at the device, respectively.

The signs for the waste water connections additionally display a yellow tap icon.

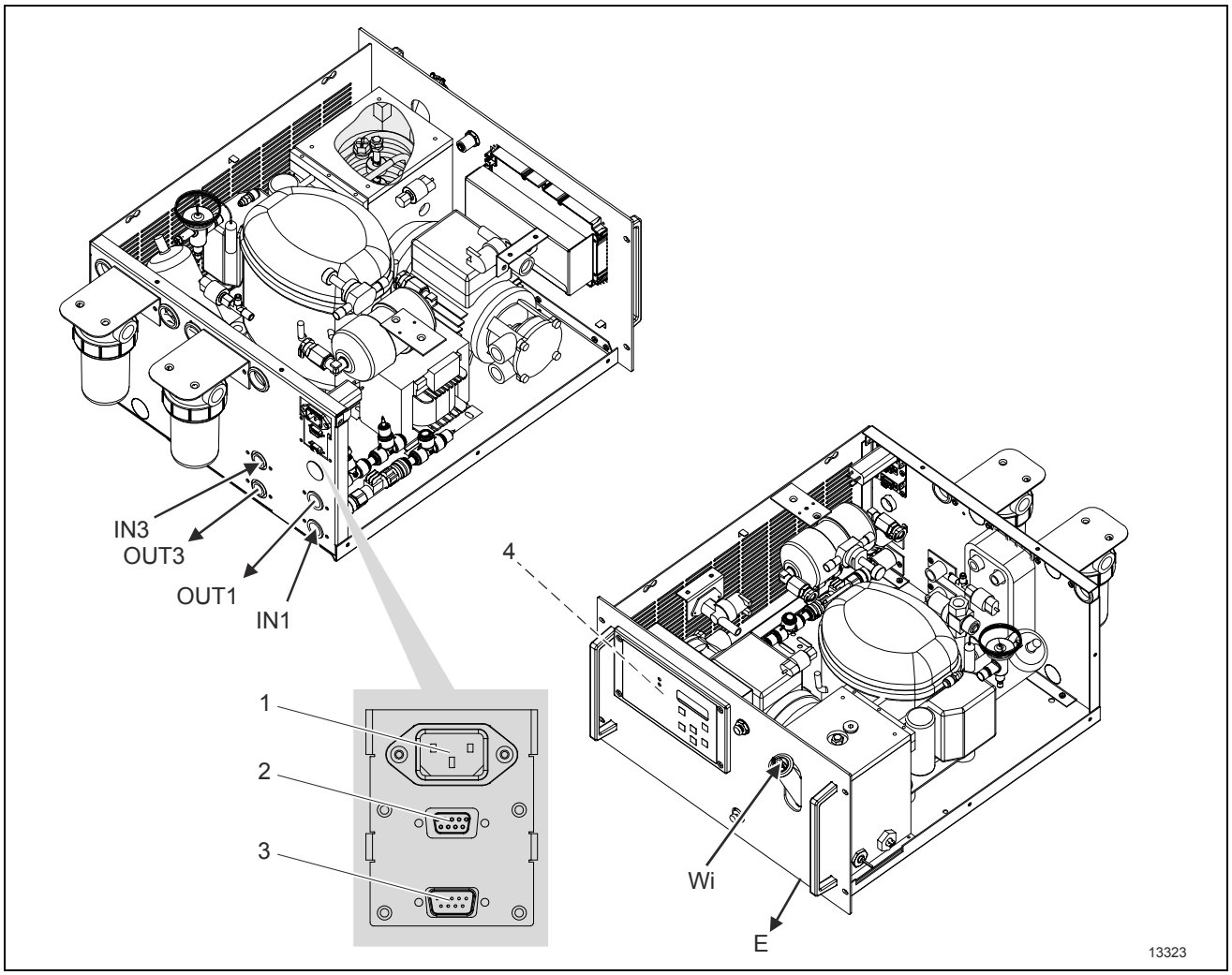


Fig. 6: Connections (example. P310 WWS)

1	Power supply connection
2	Interlocks SUB-D, 9-pin
3	RS232 SUB-D, 9-pin
4	Fuses (hidden)
	F1 Heater *)
	F2 Pump
	F3 Hot gas valve
	F4 Conductivity valve *)
	F5 Fan *)

IN1	Cooling medium inlet
OUT1	Cooling medium outlet
E	Drain connection
Wi	Fresh water filler pipe

Only for WW devices:

IN3	Process water inlet
OUT3	Process water outlet

*) option

Information concerning the fuses can be found in the circuit diagram in the appendix.

5.4 Symbols / labels on the unit

▶ Note

Destroyed or illegible marks/symbols must be replaced immediately.

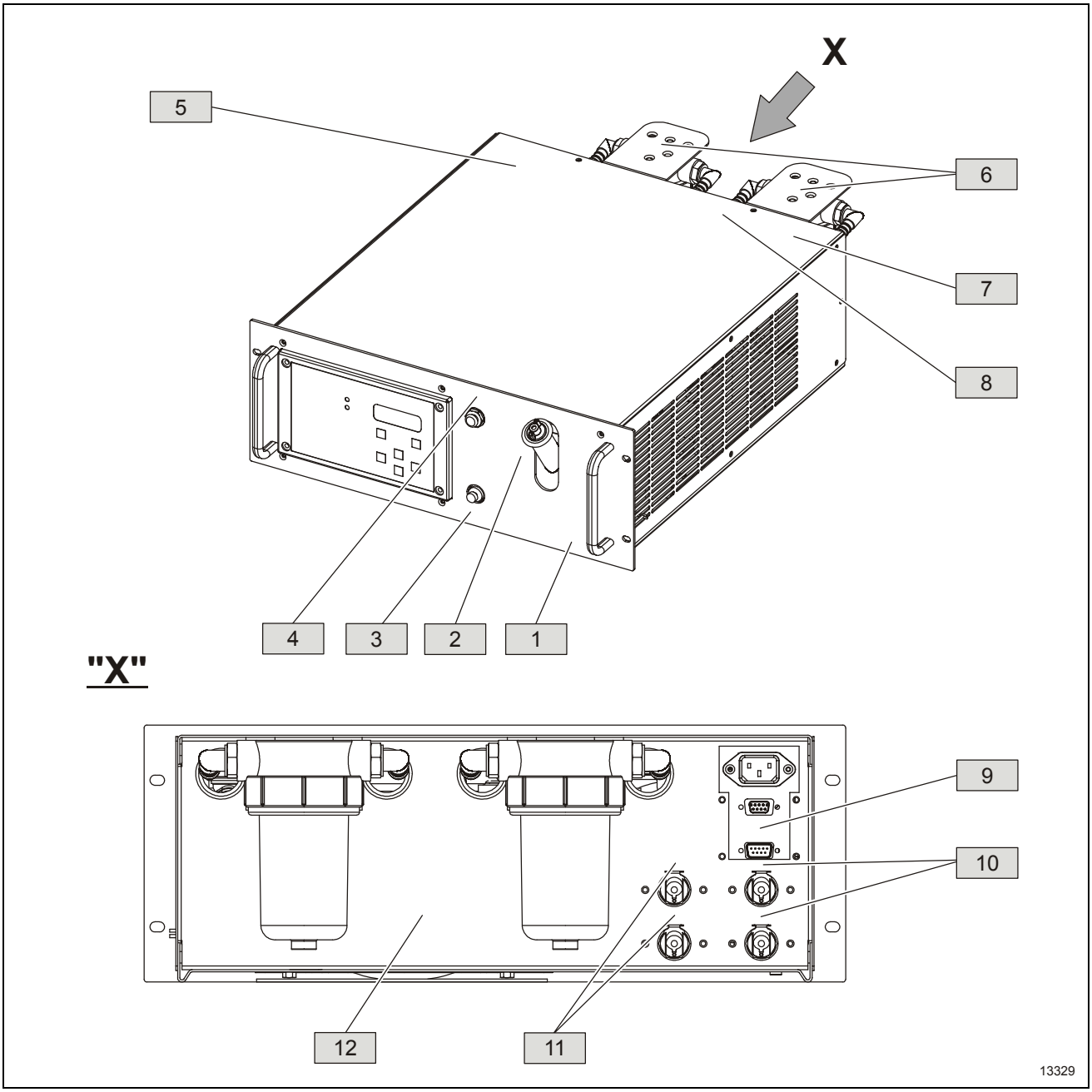


Fig. 7: Plates/labels on the device (example)

Label 1	
Entleerung Emptying Vidange	**Drain** Drain opening for draining the unit. Provide a collecting vessel.

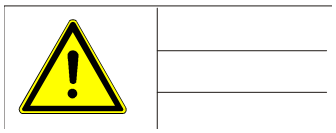
Label 2	
——— Max. ——— ——— Min. ———	**Min. - Max. level** Fill up tank via filler neck at the most to max level. Follow section "Commissioning/Filling".

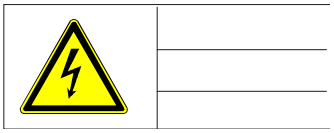
Label 3	
Bypassventil **Bypass valve**	**Bypass valve** • Control of the flow to the heat source.

Label 4	
Pumpenentlüftung Pump bleeding	**Pump ventilation**

Label 5	
230V AC 50/60 Hz 	**Power supply connection**

Label 6	
Filter	**Filter** Follow maintenance intervals. Change of filter, see section "Maintenance/Filter change".

Label 7	
	**Warning** The unit contains a liquid under pressure, rotating parts, and high voltage. Do not use the unit if the panels have been removed. **Disconnect the unit from the power supply prior to opening it.** Do not manipulate any safety devices and/or modify the parameters of the temperature control system without prior consultation.

Label 8	
	**Warning – electrical hazard.** Do not connect or disconnect any of the electrical connectors under voltage/load.

Label 9	
INTERLOCKS	**Connection for I/O signal** • Interlocks Sub-D 9pol.
RS 232	**Connection for serial interface** • RS232

Label 10	
	**Medium inlet (return flow)**
	**Medium outlet (feed flow)**

Label 11	
	**Medium outlet (waste water)**
	**Medium inlet (waste water)**

Label 12	
TERMOTEK GmbH LASERKÜHLUNG ein Unternehmen der technotrans-Gruppe 76532 Baden- Baden, Im Rollfeld 6 Tel. 07221/9711-0 **Typ: PXXX-YYYYY** **Kühlleistung: ??? W bei ?? °C Wasser/?? °C Umgebung** **Pumpenleistung: ?l/min bei ? bar** **Elektrische Leistung ??? V, ?? Hz, ? A** **Kältemittel: R134 A** **Max Druck: ?? bar** **Serien-Nr: XXXXX** **Baujahr: MM/JJJJ**	**Type plate of the unit**

6 Components

▶ Note

Not all units include equal components. The components specified here, may be integrated into the device upon customer requirements (optional) and may not be present.

6.1 Bypass valve

Bypass valve for regulating the flow to the heat source.

▶ Note

During setting/adjustment work the device must be in operation.

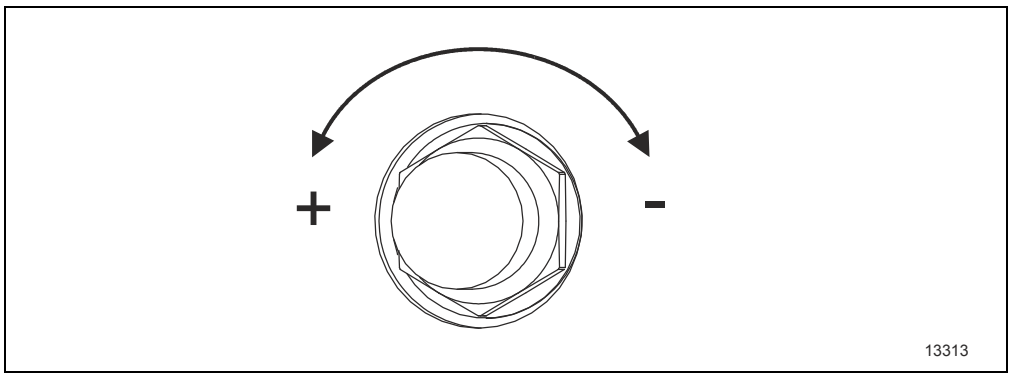


Fig. 8: Bypass valve

6.2 Conductivity measuring device

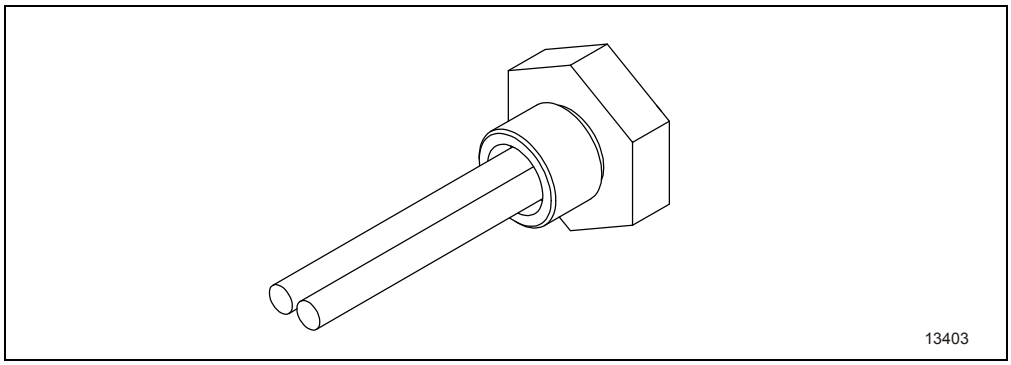


Fig. 9: Conductivity measuring

Conductivity measuring device for determining the conductivity of liquids.

6.3 Filter

The built-in filter removes dirt particles from the circuit.

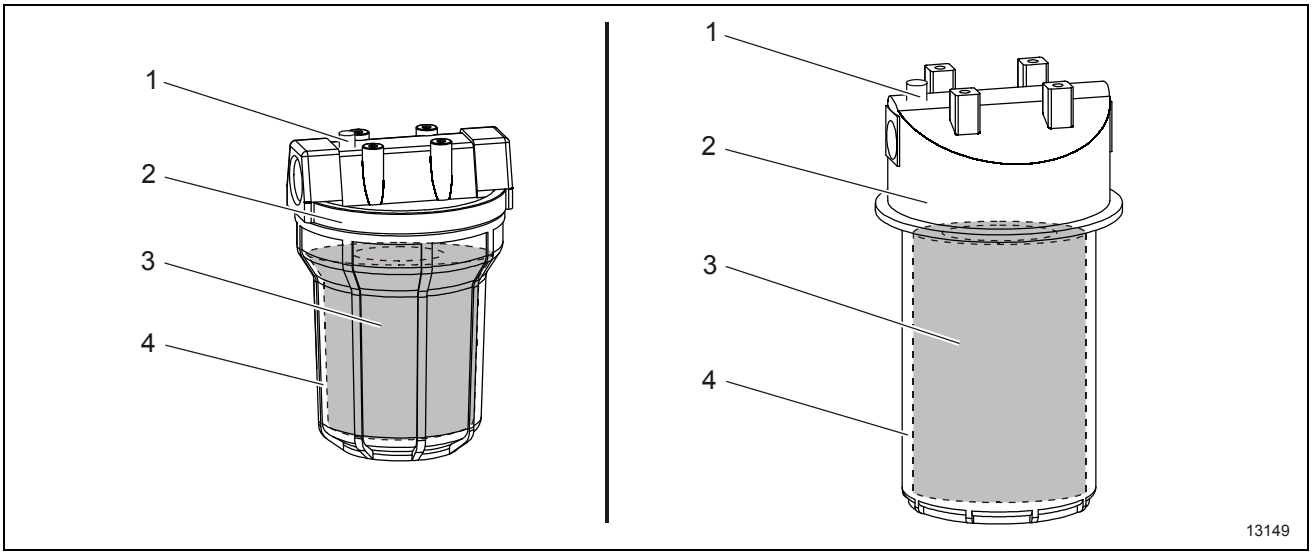


Fig. 10: Filter (example)

1	Venting valve (option)	3	Filter element
2	Filter head	4	Filter housing

6.4 DI cartridge (ion exchanger)

The DI cartridge absorbs the free ions present in water.

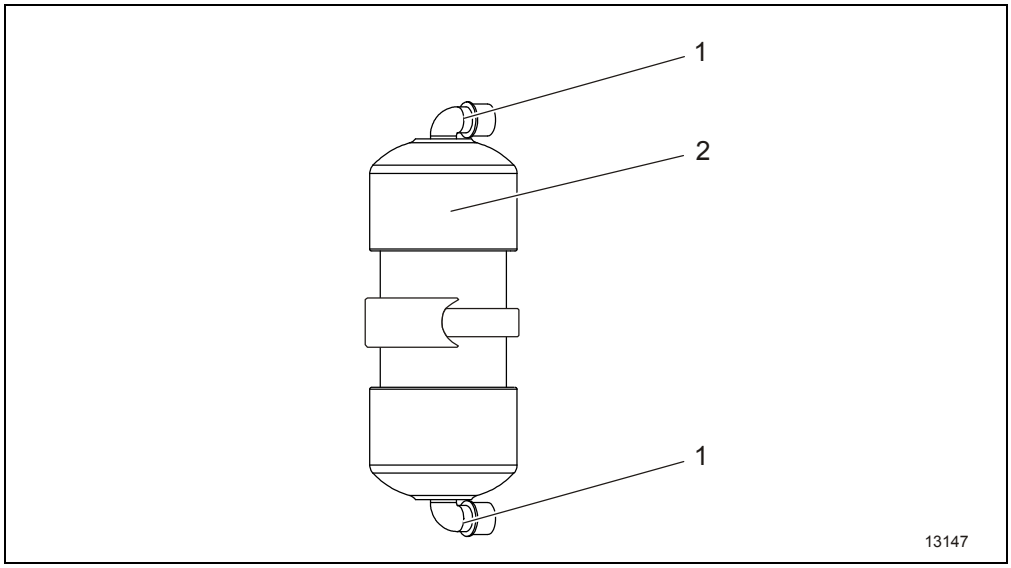


Fig. 11: DI cartridge

1 Sleeve screw connection / quick coupling
2 DI cartridge (ion exchanger)

▶ Note

- Replace the DI cartridge as specified in the maintenance plan.
- If the "Conductivity value too high" fault message is flashing in the display of the device control unit for a longer period, the DI cartridge must be replaced.
- Comply with the maximum period of use and/or operating hours in accordance with the maintenance plan.
- Prior to replacement, drain and rinse the circuit (see section "Maintenance / Draining , refilling the medium").

6.5 Fan

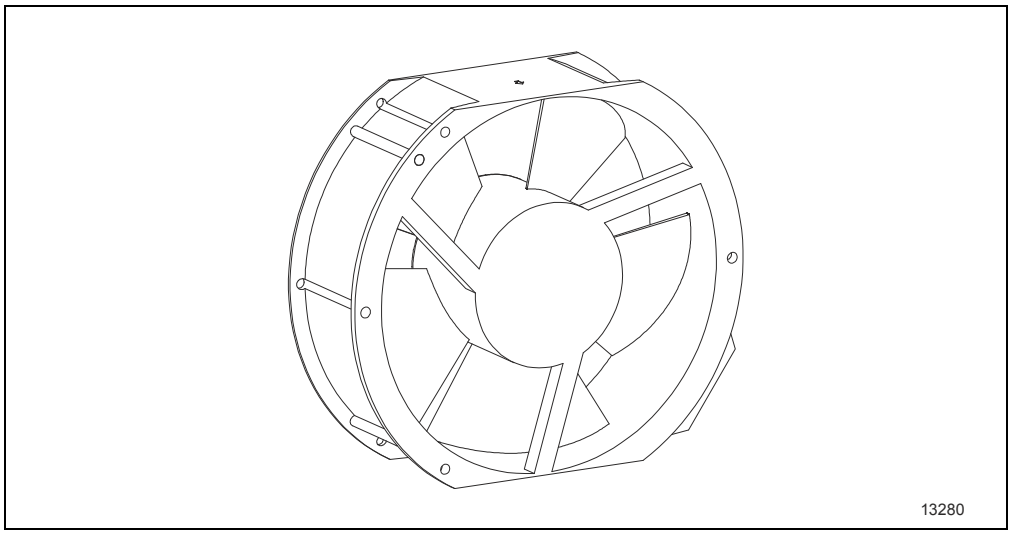


Fig. 12: Fan (general)

The fans push air through the cooling fins of the condenser block. Optionally, the speed of the fans can be proportionally controlled with the condenser temperature of the refrigeration circuit.

When used in the electric circuit, the integrated components are cooled by the passing air.

6.6 Filter dryer

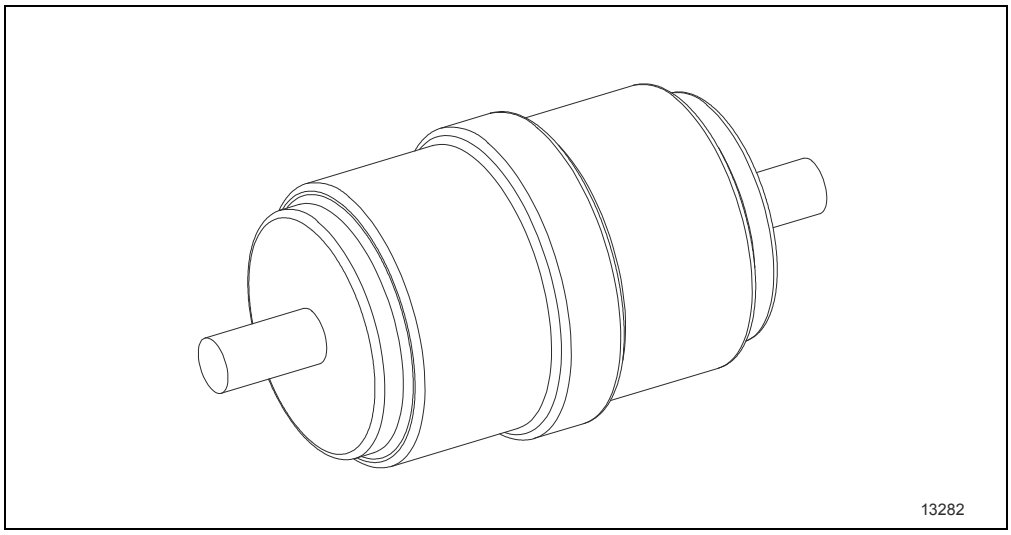


Fig. 13: Filter dryer (general)

The filter dryer dries and cleans the liquid refrigerant that flows through it. This ensures the proper functioning of the cooling process.

6.7 Refrigeration unit

⚠ CAUTION

Improper handling of the refrigeration unit!

Danger due to improper handling of the refrigeration unit.

The unit should be serviced and repaired only by persons who have been trained in the use and maintenance of the unit and are informed about the potential hazards.

- Risk of burns. Do not touch the refrigerant hot-gas pipes.
- Risk of injuries. Do not touch the sharp cooling fins of the condenser used on air-cooled versions.

! Notice

Impairment of air circulation!

Impairment of air circulation leads to reduced refrigeration capacity of air-cooled versions.

- Provide sufficient space for unhindered air circulation.
- Do not place objects in front of or on top of the unit.

The refrigeration circuit operates as a "compression refrigeration system". The filling volume of the refrigerant is noted on the type plate. The refrigerant is classified in safety group A1 in accordance with EN 378 "Refrigeration systems and heat pumps". Information on the refrigerant type can be found in the “Technical Data” section in the Apppendix.

The refrigeration circuit contains a fluorinated greenhouse gas (refrigerant) that falls under the Kyoto Protocol. The refrigerants used are so-called hydrofluorocarbons (HFCs) without ozone-depleting potential (ODP = 0). Information on the refrigerant fill quantity and the global warming potential can be found in the “Technical Data” section in the Appendix.

Note concerning the protection of the environment

Refrigerants are harmful to the environment when they are released into the atmosphere.

- Work on the refrigeration unit should be performed only by specialist refrigeration companies.
- Do not damage the refrigerant pipes.

▶ Note

Pressure vessels of the refrigeration unit must undergo an approval test that is to be performed by a competent technical control organisation if the refrigeration unit has been modified or if it has not been in use for more than two years.

Comply with the national and local rules, regulations, and laws.

6.8 Expansion valve

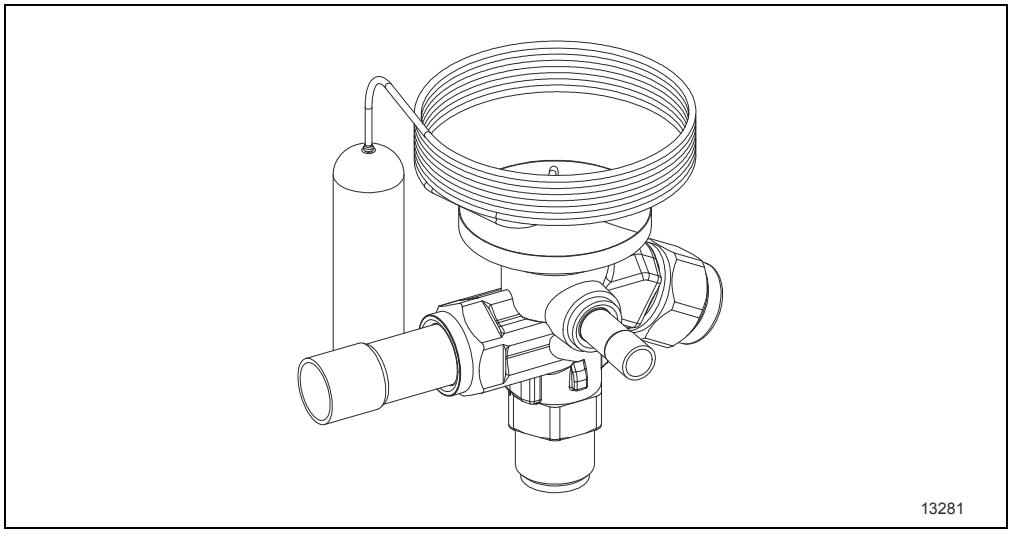


Fig. 14: Expansion valve (general)

The expansion valve reduces the pressure in the refrigerant pipe. The cooled and dried refrigerant enters the expansion valve as a liquid and leaves it as a gas. This allows it to absorb heat from the surrounding medium in the vaporiser. The expansion valve has a control device, with which the process can be optimised.

A capillary tube may be optionally installed instead of an expansion valve. A capillary tube has the same function as an expansion valve.

6.9 High-pressure switch

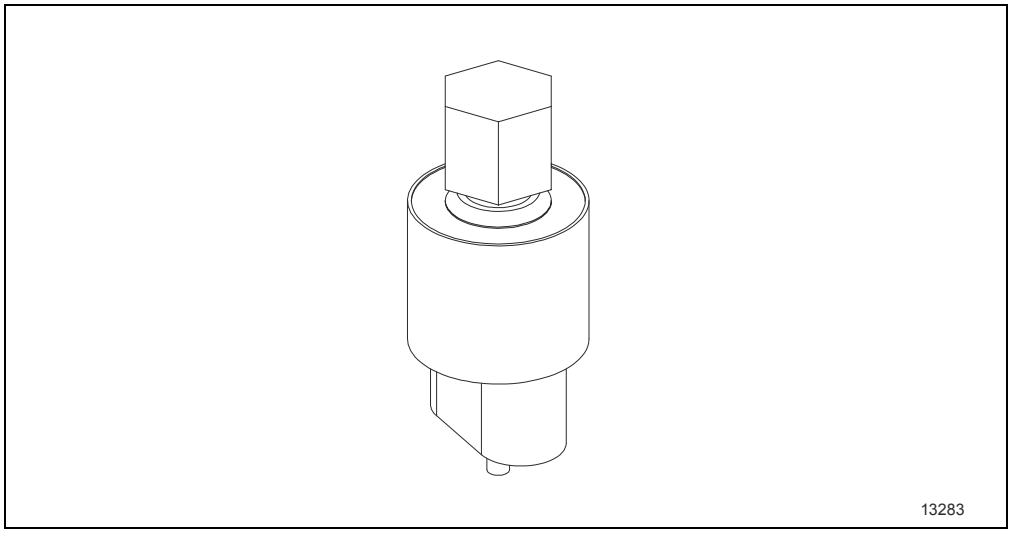


Fig. 15: High-pressure switch (general)

For a description, please see the "Safety devices" chapter.

6.10 Control unit

▶ Note

The control unit switches on automatically after the unit has been switched on or after the power supply has been connected.

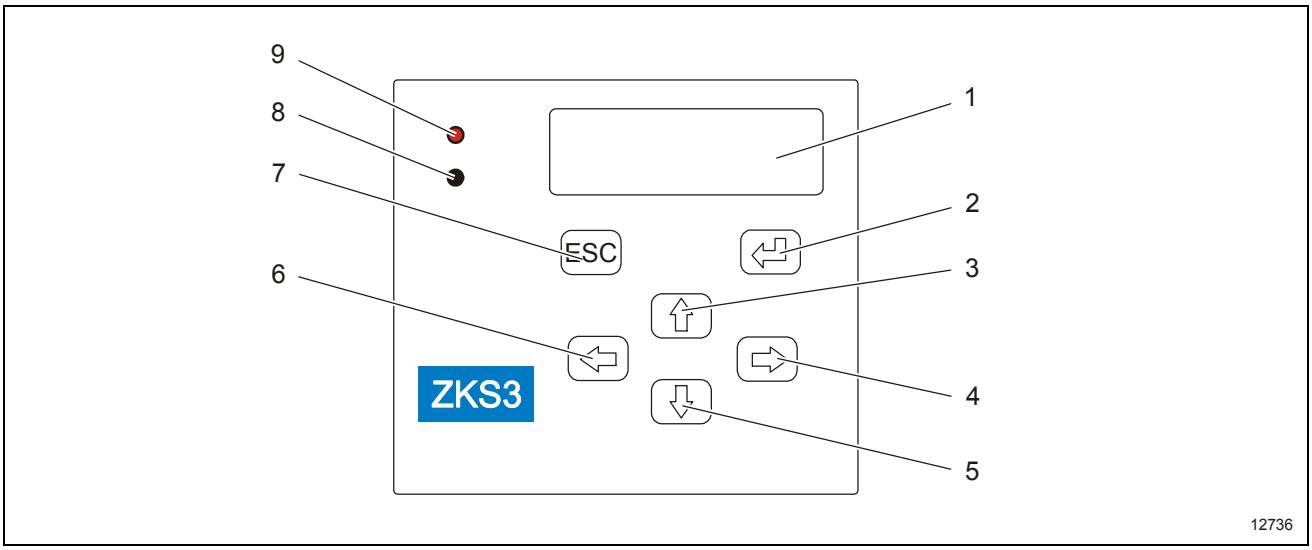


Fig. 16: Device control unit ZKS3

1	Display	6	Left key / mute
2	Enter, menu key	7	Escape key
3	Up key / On / Off	8	Power LED (green)
4	Right key / roll / info	9	Error LED (red)
5	Down key / ack		

7 Setting Up

7.1 Notes

DANGER

Risk of injury due to electric shock!

When the unit is open, certain parts may be energised and cause an electric shock if they are touched.

The following points are to be observed when working on the opened unit:

- Observe the "Safety" section.
- Ensure that the tasks are performed solely by qualified experts.
- Disconnect the electrical connecting cable.

WARNING

Danger to personnel!

There is a risk of injury due to liquid under pressure, rotating parts, and high electrical voltage in the unit.

- Do not use the unit when the side panels are removed.
- Open the side panels only in order to perform maintenance tasks and only in compliance with the safety instructions.

WARNING

Risk of injury for personnel!

There is a risk of burns o freezing of limbs due to damaged refrigerant pipes.

Do not damage the refrigerant pipes.

Notice

Risk of damage to the components!

There is a risk of damage to the electrical components when electrical connectors are connected or disconnected under voltage/load.
Do not connect or disconnect any electrical connectors under voltage/load.

! Notice

Damage through dirt particles!

Dirt particles in customer-provided installations (e.g. pipes, hoses, ...) may lead to malfunctions or damage to the components or unit/system.

- Ensure that the customer-provided installations (e.g. pipes, hoses, ...) are free from dirt particles.
- If necessary, clean, rinse, or flush the customer-provided installations.

! Notice

Damage to components!

Damage to the pump due to dry operation. Never start the unit when it is not, or only insufficiently, filled.

▶ Note

For the optimum filling water quality, please refer to the "Technical Data" section.

▶ Note

- Observe national and local regulations regarding liquids that are hazardous to water (e.g. German Federal Water Act (WHG)).
- The owner is responsible for ensuring that the system meets the requirements for quality and operation.

For further information regarding connections, versions, pressure specifications, settings etc. please refer to the following chapters:

- Layout / System layout
- Components
- Maintenance
- Technical Data

as well as the instruction labels on the unit (if provided).

7.2 Transport and packaging material

Check the packaging for transportation damage.

If transportation damage has occurred, observe the following points:

- Inform the forwarding agent and the supplier in written form.
- Keep the packaging material.
- Note down any external and internal damages.
- Document the damage (e.g. by means of photos).

Remove any transport material and packaging.

Note concerning the protection of the environment

The improper disposal of packaging materials has a negative impact on the environment.

- Packaging material that cannot be reused for transport purposes at a later point of time (e.g. packaging film) must be disposed of in an environmentally sound manner and in accordance with the applicable national and local rules and regulations.
- Ensure that the packaging material will be recycled.
- If applicable, assign the disposal to a specialist company.

▶ Note

After unpacking, check the unit for signs of transport damage or other damage.

▶ Note

Comply with the instructions given in the "Safety/Transport" chapter.

7.3 Transport

⚠ WARNING

Danger to persons due to heavy objects

This unit is a heavy, bulky object. The unit should always be mounted and dismounted by two persons.

▶ Note

Comply with the instructions given in the "Safety/Transport" chapter.

- Transport the unit only when it is empty.
- Use the transport equipment (e.g. forklift, pallet truck) for transporting the unit in line with the local conditions and in compliance with the applicable accident prevention regulations.
- Comply with the maximum lifting capacity of the transport equipment. The weight of the unit is stated in the "Technical Data" section.
- Push the forks of the forklift/pallet truck horizontally into the transport opening of the unit over the entire depth of the unit.
- Ensure that the load is evenly distributed when using a forklift/pallet truck.
- Use a low lifting speed.

7.4 Antifreeze and anti-corrosion agents

In order to protect the components against corrosion and frost damage, the system -control circuit must be filled with an anti-corrosion and anti-freezing agent.

! Notice

Danger due to frost damage at the device!

Frost damage does not fall under the manufacturer's warranty!

Only use anti-freezing and anti-corrosion agents approved by Termotek. The device must only be transported and stored within the permitted temperature range (see "Technical Data"). For such conditions, the device must be completely drained.

▶ Note

Frost damage may be caused by the following:

- Contamination or soiling in the cater circuit
- Pump fault
- Air inclusions within the system (only for devices with closed circuits).

! Notice

Risk of damage to components!

If the concentration of the anti-corrosion or anti-freeze agents in the system circuit is too high or too low, components may be damaged (e.g. the seals). If the concentration is too low, corrosion may be stimulated.

When using anti-corrosion or antifreeze agents, please comply with the information provided by the manufacturers concerning the area of application, compatibility with other materials, and minimum/maximum mixing ratios, etc.

When using monoethylene glycol as the anti-corrosion and anti-freezing agent, please observe the following points:

- Do not mix anti-corrosion and anti-freezing agents of different manufacturers. Document the name and type of the anti-corrosion and anti-freezing agent that is used.
- For filling the system control circuit with anti-corrosion and anti-freezing agents, we recommend mixing the liquids in advance with the aid of a filling pump.
- Concentration of frost/corrosion protection: see Technical Data.
- Regarding the usage of alternative anti-corrosion and anti-freeze agents, use only monoethylene glycol (1,2-ethanediol) from established manufacturers and comply with the information provided. Check the material compatibility and reliability with respect to the device and the higher-level machine.

Note concerning the protection of the environment

The excessive use of antifreeze and corrosion inhibitors places a burden on the environment.

- Use environmentally friendly anti-freeze and corrosion inhibitors.
- Do not spill anti-freeze and corrosion inhibitors into the soil.
- Keep containers tightly closed. Ensure to close empty containers and those that are currently being used after the work is finished.
- Used antifreeze and corrosion inhibitors must be disposed of in an environmentally responsible way and compliant with local and national regulations.

7.5 Connections

7.5.1 Medium connections

▶ Note

Please observe the direction of flow when installing the connecting pipes.

▶ Note

For inlets and outlets, please observe the blue and red signs at the device, respectively.

The signs for the waste water connections additionally display a yellow tap icon.

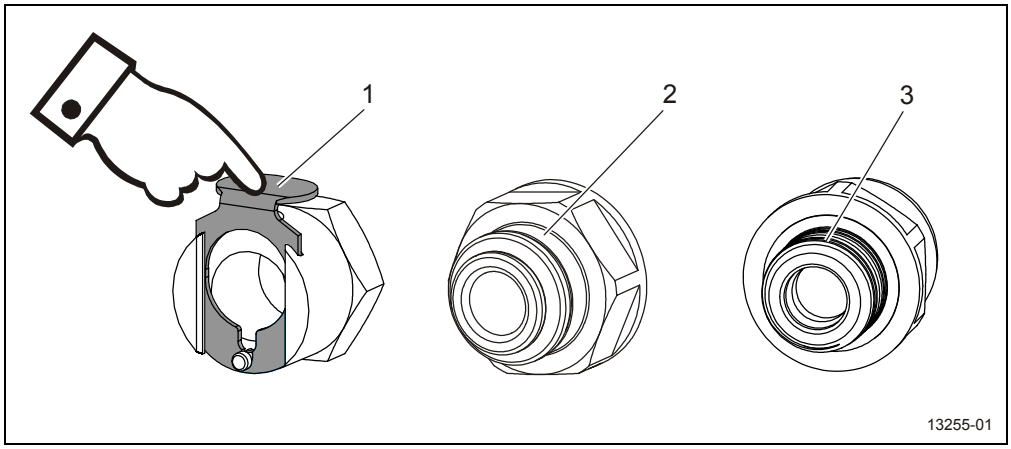


Fig. 17: Medium connections (general)

▶ Note

- The hoses can be connected to, or disconnected from, the device connectors by pressing the locking device (1). The locking devices can be located on the hose or on the device itself.
- For devices with plug-type connectors (2), the locking device can be found on the device itself.
- For devices with screw-type connectors (3), the locking device can also be found on the device itself.

- Medium inlet (IN, return flow)
- Medium outlet (OUT, feed flow)

Only for WW devices:

- Process water inlet (IN)
- Process water outlet (OUT)

Comply with the maximum lengths (hoses, pipes, cables etc.) and pressure and temperature values as stated in the "Technical Data" section.

The connections to the device must be flexible and sufficiently pressure- and temperature-proof.

7.5.2 Electrical connection

DANGER

Danger of death from electrical shock!

There is a risk of death by electric shock if the connected voltages are not correct.

Compare the connection voltage to the voltage stated on the unit type plate.

Notice

Incorrect connection voltage!

Incorrect connection voltages can lead to component damage.

Compare the connection voltage to the voltage stated on the device type plate. Set up the necessary fuse protection in accordance with the “Technical Data” section.

Note

Ensure clockwise phase rotation.

Note

- Install fuse for the power supply connection (Phase) on site according to wiring diagram.
- When using an automatic circuit breaker (Characteristics C), this may also be used as a disconnecting device, if it fulfils the respective requirements.
- The fuses must be designed for an inductive load!

The signal contacts are potential-free and open in up in case of a fault. Maximum load of contacts = 100mA/24V.

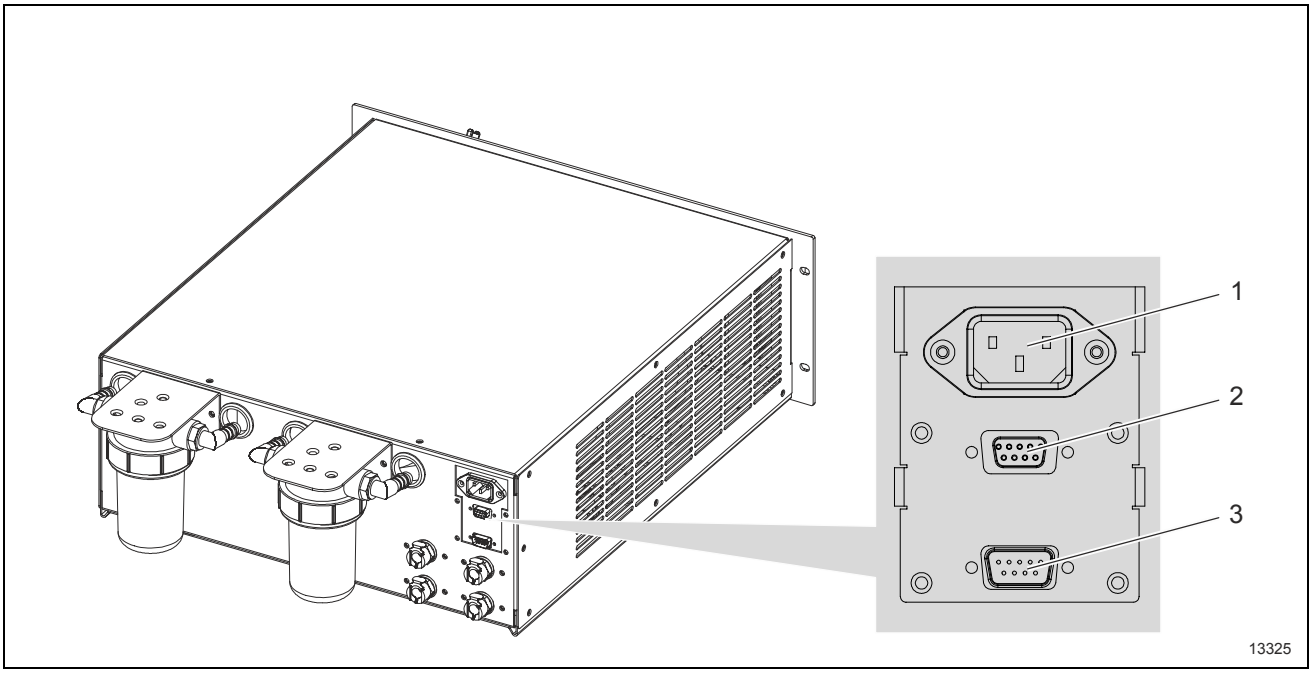


Fig. 18: Electrical connections

1	Power supply connection	3	Serial interface RS232 for data transfer (option)
2	I/O signals (interlocks)		

Connect the unit to the power supply. Observe the local rules and regulations.

The device is disconnected from the power supply via a superordinate power supply.
The control unit is used solely for switching the device on and off.

7.5.3 Pin assignment

▶ Note

Comply with the pin assignment in accordance with the circuit diagram.

7.6 Installation

⚠ WARNING

Risk of crushing!

There is a risk of crushing of the limbs (hands, fingers) when lifting, lowering, or installing the device.

Keep your limbs out of the danger zone when setting the device up.

⚠ WARNING

Risk of injuries for persons due to heavy objects!

The components mentioned above are very heavy and bulky.

Always have several persons carry out the installation or dismantling or use appropriate lifting devices!

▶ Note

Comply with the instructions that are given in the "Safety/Selecting the installation site" section.

▶ Note

Prior to installing the device in its intended mounting location, the filter must be installed and the medium connections as well as the power supply connections must be completed.

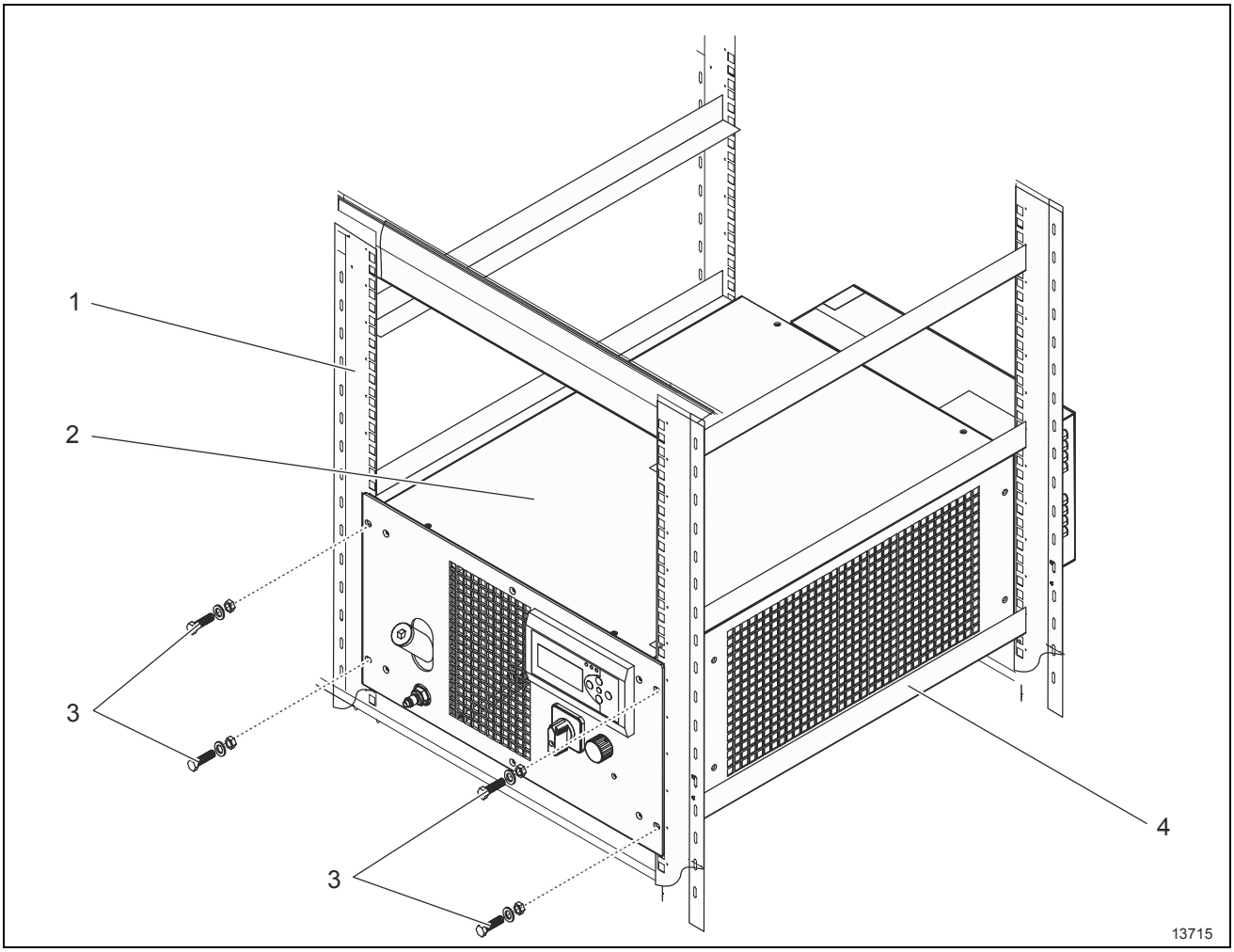


Fig. 19: Installation of the device (example)

1	Frame (rack)	3	Screws
2	Device	4	Base plate

Install the device as follows:

1. Push the device into the rack on the base plate (4) by way of the guide rails.

▶ Note

The back of the device must be free for the air outlet.

2. Secure the front plate by screwing four screws (3) into the four holes.

Set the unit up at the intended installation site.

Set the unit up in a horizontal position.

▶ Note

- Use the unit solely inside buildings.
- Do not set the unit up in areas in which other systems/units cause high ambient temperatures.
- The air inlet and outlet must be free. It must be ensured that air that is blown out cannot be sucked in again.
- Ensure sufficient air circulation.
- Protect the unit against dust and moisture.

Comply with the maximum lengths (hoses, pipes, cables etc.) and pressure and temperature values as stated in the "Technical Data" section.

The connections to the device must be flexible and sufficiently pressure- and temperature-proof.

7.7 Setting the mains voltage (option)

WARNING

Danger due to incorrect supply voltage!

There is an increased risk of injury to persons performing tasks for which they are neither qualified nor have received appropriate instruction.

- The supply voltage for the unit may be set only by suitably qualified persons, who are familiar with the unit and who have been informed about the potential hazards.
- All technical safety conditions have to be satisfied.

Note

Check whether the device is deenergised!

Note

Please read the "Preset voltage" sign for the default voltage / frequency settings. Take the "Symbols / labels on the unit" chapter into account.

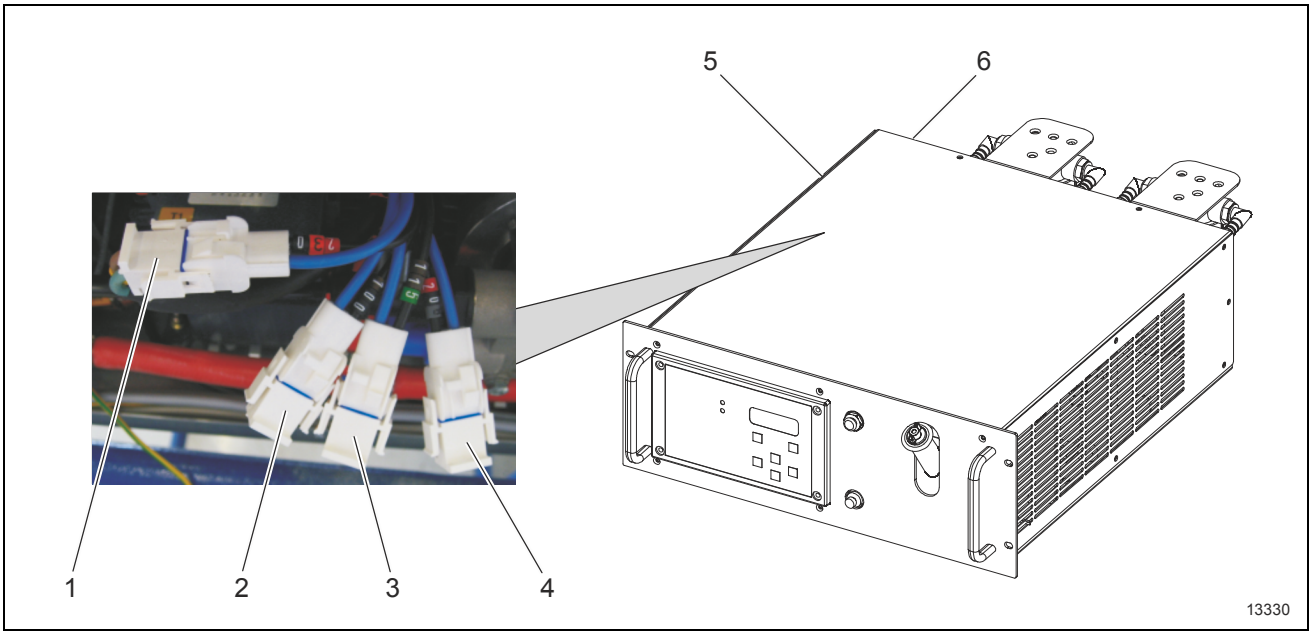


Fig. 20: Changing the mains voltage

1	Voltage connector 1 *)	4	Voltage connector 4 *)
2	Voltage connector 2 *)	5	Side panel
3	Voltage connector 3 *)	6	Power supply connection

Note

*) Voltages as stated in the technical data in the appendix.

With an integrated transformer, the device may optionally be operated at a voltage other than the default.

▶ Note

Comply with the voltages and frequencies as stated in the "Technical data" and "Circuit diagram" in the appendix.

Change the mains voltage as follows:

1. Switch the device off via the main switch.
2. Disconnect the power supply connector (6).
3. Loosen the screws at the left-hand side panel (5), remove the panel, and lay it down.
4. Disconnect the voltage connector from the internal connector.
5. Remove the protective sleeve from the selected voltage connector.
6. Connect the selected voltage connector **to the internal connector.**
7. Push the protective sleeve over the exposed voltage connector.
8. **Affix the corresponding label (supplied with the device) for the selected voltage supply next to the power supply connector (6).**
9. Reattach the side panel (5) and tighten the screws.
10. Check the protective earth connection of the side panel (5) and reconnect it if necessary.
11. Reconnect the power supply connector (6).

The device is now set to the required voltage.

▶ Note

The customer-provided fuse protection must be adapted to the selected voltage.

7.8 Filling

The device must be filled prior to the initial start-up.

▶ Note

- Only use the cooling medium that is specified in the "Technical data" section in the appendix.
- If the water level falls below the alarm limit, certain functions (e.g. the compressor, pump, heater) will be switched off.

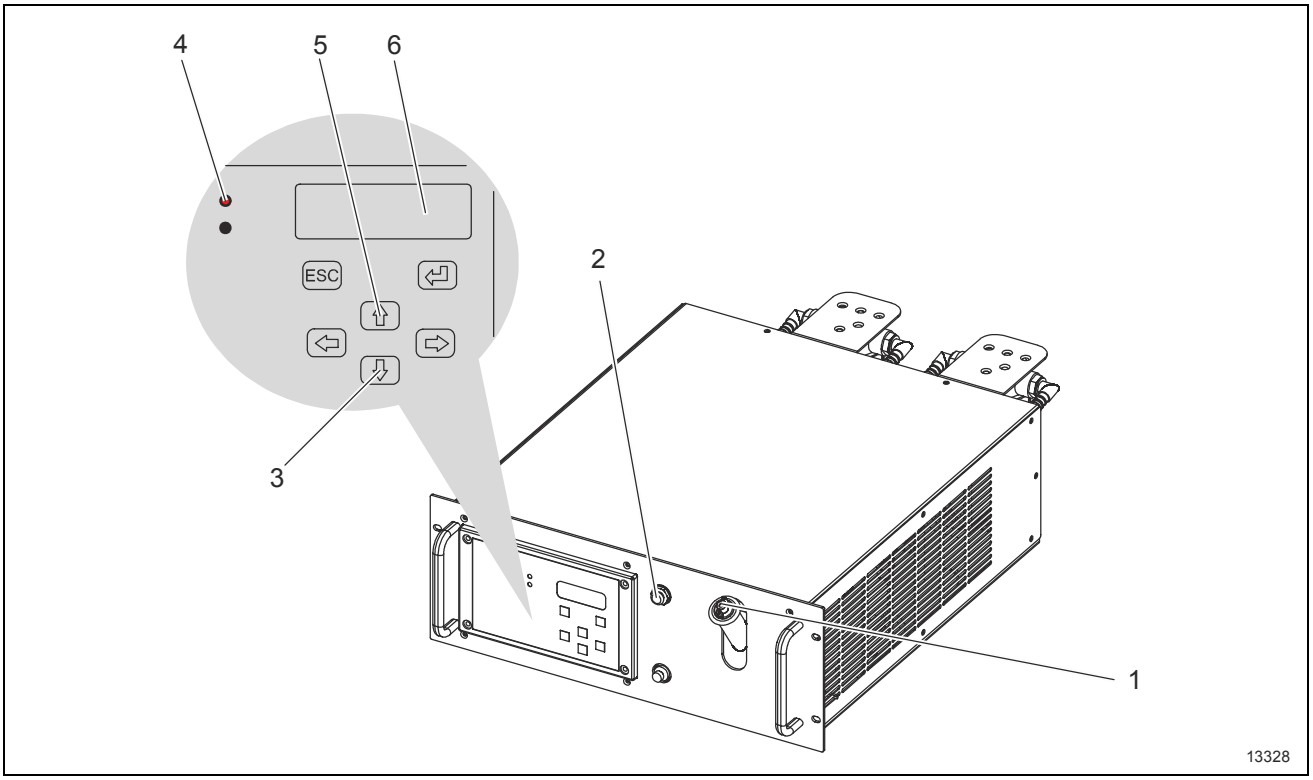


Fig. 21: Filling system

1	Filler pipe with fill level indicator	4	Error LED (red)
2	Vent (option)	5	"Up" button of the control unit
3	Acknowledgement button of the control unit	6	Display of the control unit

Prerequisites:

- The medium connections to the consumer have been made.
- The device is connected to the power supply.

▶ Note

- After the supply voltage has been applied, the red LED (4) on the display (6) of the control unit lights.
- An error message indicating a water level alarm will be displayed.

Initial filling/refilling:

1. Remove the cap of the filler pipe (1).
2 Open the air vent (2, option).
3. Fill the cooling medium (see the "Technical data" section in the appendix) in via the filler pipe (1) until the fault message on the display (6) is cleared.
4 Close the air vent (2, option).
5. Following the filling process, seal the filler pipe (1) with the cap.
6. Confirm the message on the display (6) with the acknowledgement button (3). The red LED (4) goes out.
7. Check the fill level at the filler pipe (1). Check whether a fault message is displayed (6).
8. Repeat the process, if necessary.
9. Switch the device on by way of the "up" button " (5).

▶ Note

- If the pump does not draw in any water when the device is switched on, vent the pump via the air vent (2). Switch the device off prior to venting.
- If the device includes the remote start option, it must be activated by a remote start.

10. It may be necessary to fill the hose system of the consumer for the initial filling of the device. If so, repeat the filling process and add water as required.

8 Operation

8.1 Notes

DANGER

Risk of injury due to electric shock!

When the unit is open, certain parts may be energised and cause an electric shock if they are touched.

The following points are to be observed when working on the opened unit:

- Observe the "Safety" section.
- Ensure that the tasks are performed solely by qualified experts.
- Disconnect the electrical connecting cable.

WARNING

Danger to personnel!

There is a risk of injury due to liquid under pressure, rotating parts, and high electrical voltage in the unit.

- Do not use the unit when the side panels are removed.
- Open the side panels only in order to perform maintenance tasks and only in compliance with the safety instructions.

Notice

Risk of damage to the components!

There is a risk of damage to the electrical components when electrical connectors are connected or disconnected under voltage/load.
Do not connect or disconnect any electrical connectors under voltage/load.

8.2 Refilling

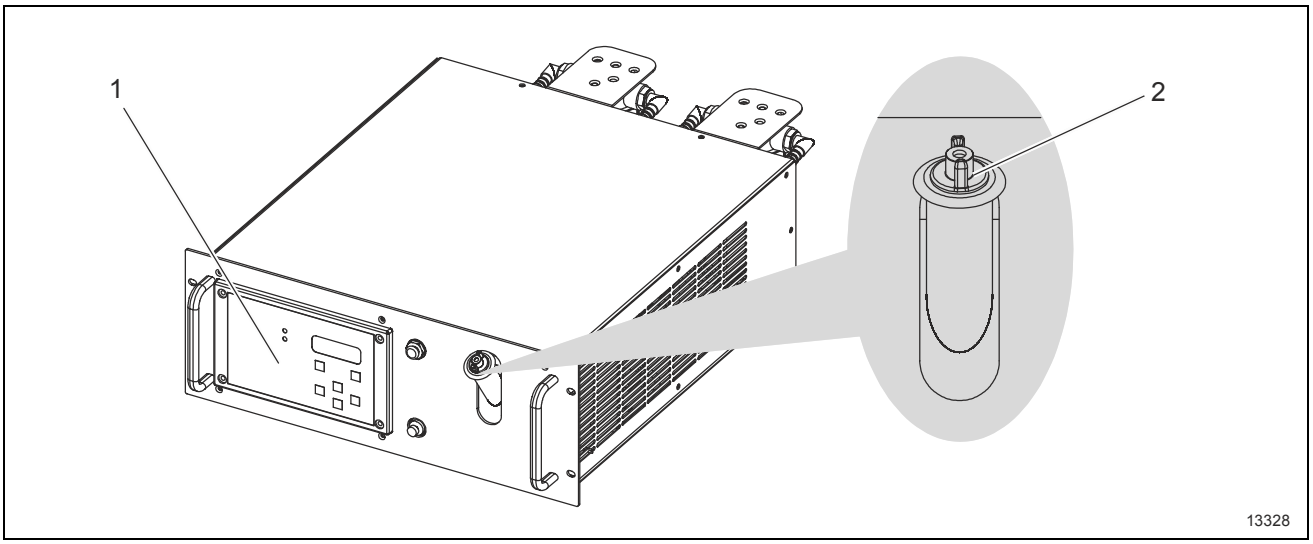


Fig. 22: Fill level

1. Check the fill level at the filler pipe (2) and add filtered cooling medium as stated in the "Start-up/Filling" section.
   Observe the notifications on the display (1). If applicable, follow the instructions in the "Troubleshooting" section.

! Notice

Device damage due to incorrect medium!

The device will be damaged if an unsuitable cooling medium is used.

Only use the cooling medium that is specified in the "Technical data" section in the appendix.

2. Check the set values (e.g. temperature) via the control unit (1). Adjust them if necessary. See the "Operation/Control unit" section.

8.3 Control unit

8.3.1 Overview

▶ Note

The control unit switches on automatically after the unit has been switched on or after the power supply has been connected.

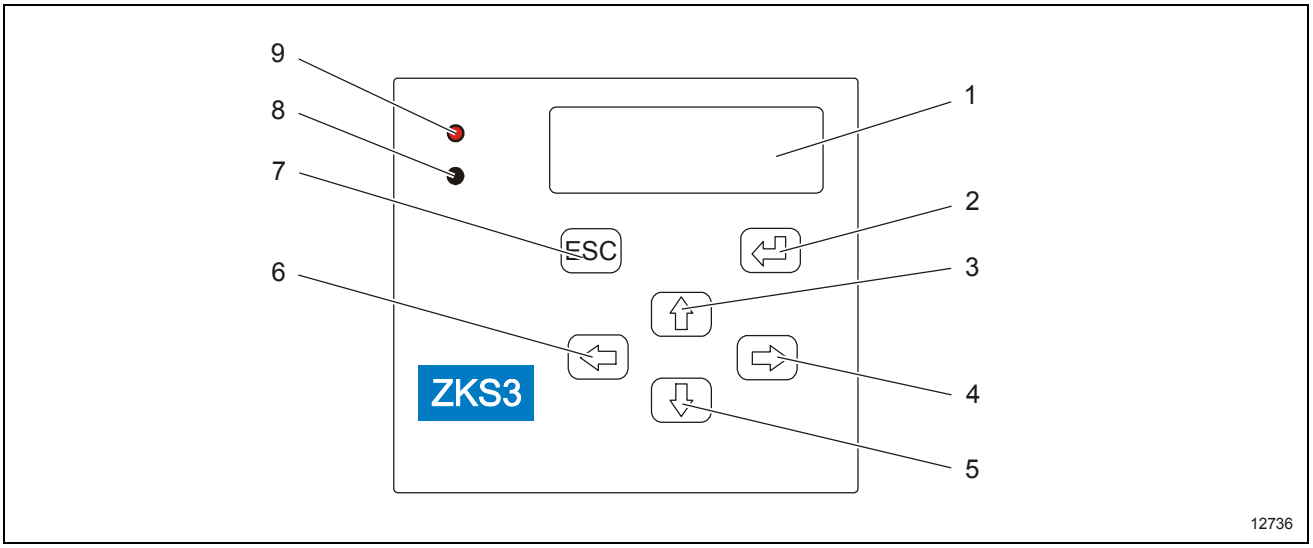


Fig. 23: Device control unit ZKS3

1	Display	6	Left key / mute
2	Enter, menu key	7	Escape key
3	Up key / On / Off	8	Power LED (green)
4	Right key / roll / info	9	Error LED (red)
5	Down key / ack		

▶ Note

- The operating mode is indicated by the **green** LED.
- Errors are indicated by the **red** LED. Depending on the type of error and on the set parameters, the cooling process will be interrupted.
- The horn can be suppressed by pressing the **Mute** button.
- Error messages are self-explaining.
- Pressing the **ESC** button on the start screen opens the setpoint adjustment screen (first programming level).
- Pressing the **ENTER** button opens the second programming level. The system may prompt the user to enter a password (0020).

Operating keys:

	Function	Description
	Enter key Menu	• Apply / Store parameter • Jump to main menu
	Escape key Target value	• Cancel parameter entry • Jump to target value parameter
	Up key ON/OFF	• Change to one of upper parameters • Increase numeric value • Activation or deactivation of the unit
	Down key Ack	• Change to one of lower parameters • Decrease numeric value • Acknowledge key
	Right key Scroll / Info	• Select numeric value • Scroll / Info - Scroll display - Show information on fault messages
	Left key Mute	• Select numeric value • Mute the horn for error messages

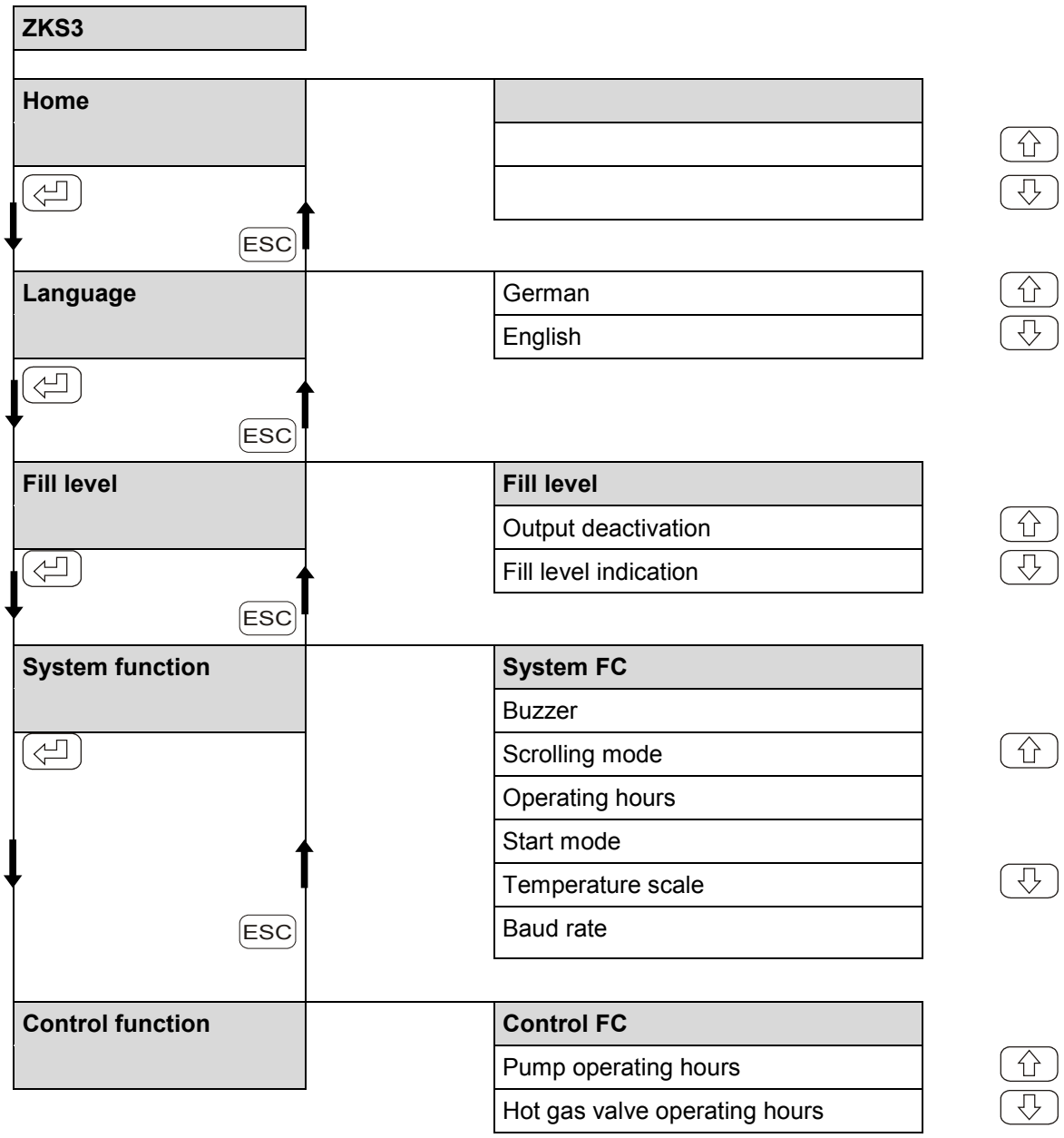
8.3.2 Program overview

Notice

Damage to the unit!

Due to unauthorised adjustment of other settings/parameters that are not described in this document, the device may be rendered inoperative.

Only change the parameters described in this document!



8.3.3 Setpoint adjustment

Screen contents	Description
Home / start screen	The screen appears after switching on. By actuating the ESC key, the system changes to the next screen.
ESC **/ Target value**	Display and modification of parameters.
	Select parameters by pressing the Up or Down keys and confirm with Enter key. Set the desired value for the parameter by actuating the Left or Right keys and confirm by pressing the Enter key.
Hrs	Setting of the outlet temperature of the unit. Standard value 20.0 °C
Rang	Setting of the range within which the operating temperature is limited. Standard value 15 - 35 °C
⏎ **/ Password**	Entry of the password for change of parameters.
	Select numbers by pressing the Up or Down keys and confirm with Enter key. Set the numbers by actuating the Left or Right keys and confirm by pressing the Enter key.
Password	0020
⏎ **/ Language**	Display and modification of available languages.
	Select the language by pressing the Up or Down keys and confirm with Enter key. Set the desired value for the parameter by actuating the Left or Right keys and confirm by pressing the Enter key.
⏎ **/ Filling level**	Display and modification of parameters.
Switch off the outputs	By this function the switch-off of outlets can be prohibited in case of water filling level alarm. Standard value YES
Filling level display	By this function, the display at the controller can be switched on and/or off. Standard value ACTIVE

Screen contents	Description
⏎ / **System FK**	Display and modification of parameters.
	Select parameters by pressing the Up or Down keys and confirm with Enter key. Set the desired value for the parameter by actuating the Left or Right keys and confirm by pressing the Enter key.
System FK	
Buzzer	Enables switch-off of the buzzer. Standard value ON
Scrolling mode	The various function values are shown in the display in succession. Standard value OFF
Operating hours	Display of the operating hours of the chiller.
Start mode	The control can be switched on and/or off via the key on the front (KEY), the remote start input (REMOTE START), the voltage supply (MAINS) or the software (START FLAG). • If the remote start input is used for enabling the outputs, the control is always switched on. • With the MAINS start-up mode, the chiller will start as soon as the supply voltage is applied. • With the START FLAG start-up mode, the chiller is started and/or stopped by setting/deleting a bit through the RS232 interface. Standard value KEY
Baud rate	Setting the data transmission rate of the RS232 interface. Standard value 38400
Controller FK	
Pump operating hours	Display of the operating hours of the pump.
Hot gas valve operating hours	Display of the operating hours of the hot gas valve.

8.4 Bypass valve

Bypass valve for regulating the flow to the heat source.

▶ Note

During setting/adjustment work the device must be in operation.

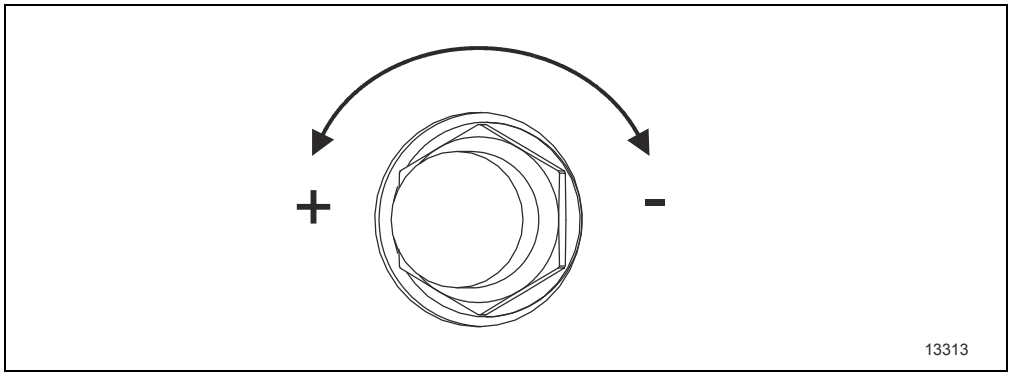


Fig. 24: Bypass valve

Set flow as follows:

- By adjusting the bypass valve in plus direction "+", the flow in the system will be reduced.
- When adjusting the bypass valve in minus direction "-", the flow in the system will be increased.
- Check set flow at the display of the control unit (Right key ⇨ = Flow display).

9 Maintenance

9.1 Notes

DANGER

Risk of injury caused by electric current!

When the device is open, parts of the device may be energised and cause an electric shock when they are touched.

The following points must be observed when performing work on the open unit:

- Comply with the information that is given in the "Safety" chapter.
- Only suitably qualified persons are authorised to perform these tasks.

1. Disconnect the unit from the power supply in order to deenergise it.
2. Secure the unit so that it cannot be switched on again accidentally.
3. Check whether the unit is properly disconnected from power and absolutely voltage-free.
4. Earth and short-circuit the unit.
5. Cover any adjacent live parts and secure the danger area.

WARNING

Risk of injuries for persons due to heavy objects!

The components mentioned above are very heavy and bulky.

Always have several persons carry out the installation or dismantling or use appropriate lifting devices!

CAUTION

Improper handling of the refrigeration unit!

Danger due to improper handling of the refrigeration unit.

The unit should be serviced and repaired only by persons who have been trained in the use and maintenance of the unit and are informed about the potential hazards.

- Risk of burns. Do not touch the refrigerant hot-gas pipes.
- Risk of injuries. Do not touch the sharp cooling fins of the condenser used on air-cooled versions.

Note concerning the protection of the environment

The improper disposal of chemicals (e.g. additives) has a negative impact on the environment.

- Chemicals must not be disposed of as household waste and it must be ensured that they are not released into the sewage system or soil.
- Wear suitable protective equipment (gloves, eye protection) when performing disposal tasks.
- Chemicals must be disposed of separately (e.g. as special waste if applicable) and supplied separately to the recycling centres.
- Comply with the safety data sheets and also with the applicable national and local rules and regulations.

Note concerning the protection of the environment

The improper disposal of consumables (e.g. filters, filter mats) has a negative impact on the environment.

- Consumables must not be disposed of as household waste.
- The materials must be disposed of separately and supplied separately to the recycling centres.
- Comply with the applicable national and local rules and regulations.

▶ Note

Keep the entire system clean.

▶ Note

Do not use any detergents containing solvents.

9.2 Maintenance plan

Carry out the described maintenance tasks at the intervals specified in the maintenance schedule.

Maintenance intervals:

I	Daily	**III**	Monthly	**V**	Annually
II	Weekly	**IV**	Every six months		

Additional information:

E	Spare part required	**K**	Maintenance job to be carried out by the customer

9.2.1 General information

Component	Maintenance task	Equipment	E	I	II	III	IV	V	K
System / unit	Check for contamination and clean it.				X				X
	Check the pipe couplings and hose connections for leaks. If necessary, tighten the pipe couplings and hose connections or replace them.		X		X				X
Tank	Check the filling level and top it up if necessary.				X				X
	Check the water for contamination and change it, if necessary.				X				X

9.2.2 Specifics to this unit

Maintenance intervals:

I	Daily	**III**	Monthly	**V**	Annually
II	Weekly	**IV**	Every six months		

Additional information:

E	Spare part required	**K**	Maintenance job to be carried out by the customer

Component	Maintenance task	Equipment	E	I	II	III	IV	V	K
Refrigeration unit	Check the refrigerant.							X	
	Have the safety switches checked by a refrigeration specialist.							X	
	Perform a leak test in accordance with the statutory and local rules and regulations (e.g. F-gases regulation).							X	X
Condenser	Check for soiling.				X				X
	Clean the cooling fins.	Protective goggles, respiratory equipment, compressed air			X				X
DI cartridge	Replacement: - Upon expiration of the maximum operating period		X				X		X
	- After long-term operation standstill		X						X
	- Upon conductivity error message in the control unit		X						X

Maintenance intervals:

I	Daily	**III**	Monthly	**V**	Annually
II	Weekly	**IV**	Every six months		

Additional information:

E	Spare part required	**K**	Maintenance job to be carried out by the customer

Component	Maintenance task	Equipment	E	I	II	III	IV	V	K
Heat exchanger	Flushing the system	Short circuit hose						X	X
Coolant	Check the quality of the medium and replace it, if required. For this purpose, drain and rinse the cooling system. Replace the filter after having cleaned the system.							X	X
Filter	Replacement: - Upon expiration of the maximum operating period						X		X
	- After cleaning the cooling system			Immediately					X
	- After operating hours			Every 4,300 h					X
Air filter	Check for soiling.				X				X
	Clean the air filter.	Protective goggles, respiratory equipment, compressed air			X				X

9.3 Antifreeze and anti-corrosion agents

To ensure sufficient a concentration of the anti-freeze and corrosion protection agent, check the concentration according to the maintenance schedule.

This test is carried out using a conventional density measuring system or a refractometer. Observe the manufacturer' product information.

Check/top up an anti-freezing and anti-corrosion agent as follows:

1. Take a sample from the control circuit (e.g. at the filling and drain cock). Withdraw at least 0.5 l (0.1 gal) of the medium to achieve useful measuring results.
2. Measure the concentration with a suitable measuring device.
3. If the concentration is outside of the specified range, top up the anti-freezing and anti-corrosion agent.

▶ Note

- Ensure a homogeneous mixture of the medium and anti-freezing and anti-corrosion agent (following refilling of the system control circuit or slow topping up of anti-freezing and anti-corrosion agent while the pumps are running).
- The use of a suitable filling pump is recommended for topping up.

Note concerning the protection of the environment

The excessive use of antifreeze and corrosion inhibitors places a burden on the environment.

- Use environmentally friendly anti-freeze and corrosion inhibitors.
- Do not spill anti-freeze and corrosion inhibitors into the soil.
- Keep containers tightly closed. Ensure to close empty containers and those that are currently being used after the work is finished.
- Used antifreeze and corrosion inhibitors must be disposed of in an environmentally responsible way and compliant with local and national regulations.

9.4 Draining and flushing the system

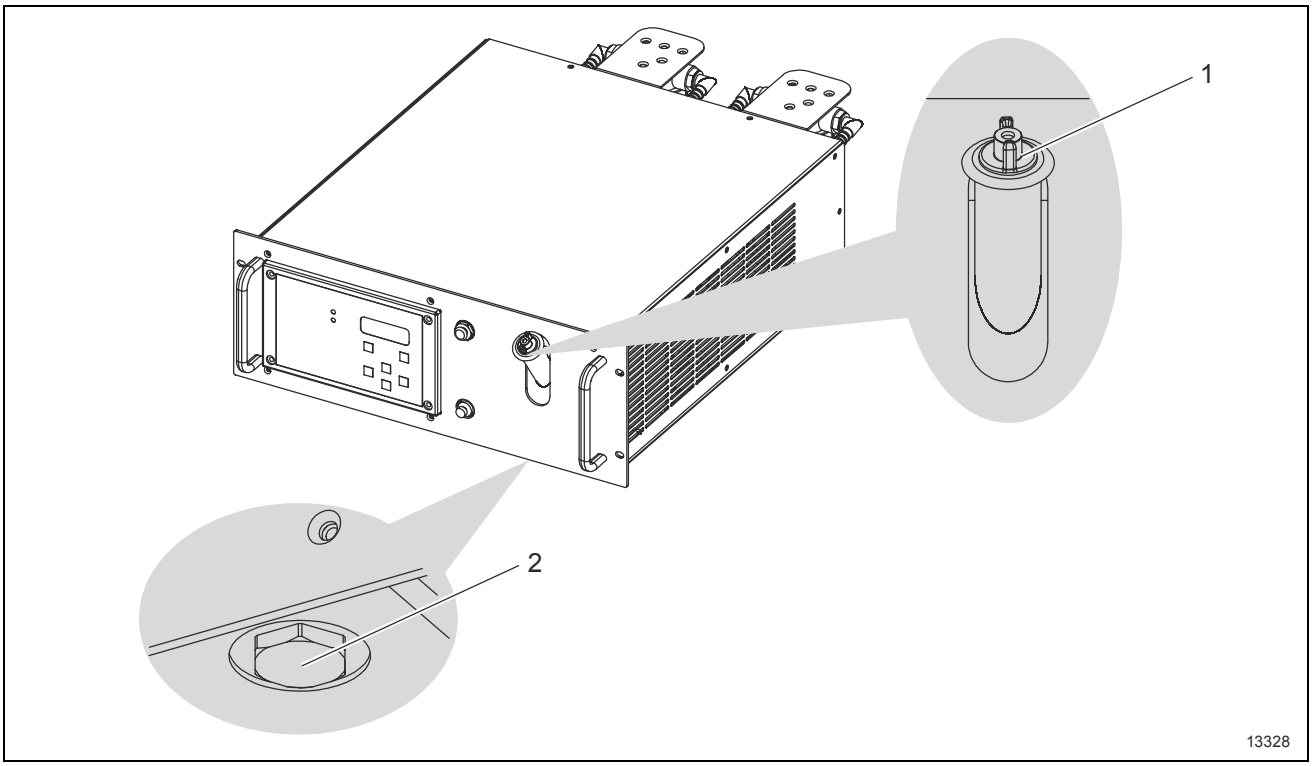


Fig. 25: Draining the system

1	Filler pipe with fill level indicator	2	Drain (discharge opening)

Drain the cooling medium off and flush the system as described below. The process is possible without disconnecting the connections:

1. Drain the water off through the discharge opening.
2. Vent the system by opening the filler pipe.
3. Fill the reservoir with clean water via the filler pipe.
   Comply with the instructions that are given in the section "**Start-up/Filling**".
4. Let the pump run for approximately 10 minutes in order to flush the pipes of the system.
5. Repeat the process approx. three to five times.
6. While doing so, check whether the pump runs smoothly (no noise).

▶ Note

A high noise level of the pump is an indication of high pressure, which may be caused by pinched-off hoses.

7. Check the system for leaks.
8. Replace the filter. See the "Filter replacement" section.

Note concerning the protection of the environment

The improper disposal of spent residual operating fluids (e.g., cleaning agents) places a burden on the environment.

- Spent or residual operating fluids must not be disposed of with domestic waste. It must not be drained into sewage system or allowed to enter into the soil.
- Used or residual operating fluids must be separated and disposed of at a recycling facility.
- Compliance with applicable national and local regulations is mandatory.

9.5 Filter replacement

Notice

Improper restart

The device will be damaged if it is used without a filter.

- Ensure that a filter is installed prior to starting the device.
- After a filter replacement, check the reservoir, holder, and hoses for leaks.
- Comply with the maintenance intervals in accordance with the maintenance plan.
- Ensure the correct position of the earthing connection when mounting the front plate.

Note

- Replace the filter as stated in the maintenance plan.
- Observe the maximum period of use and/or operating hours in accordance with the maintenance plan.
- Before replacing the filter, drain and flush the circuit (see the section "Maintenance/Draining the medium off/Topping-up with medium").

The filter will clog due to the accumulation of particles in the circuit. It will become grey and must be replaced.

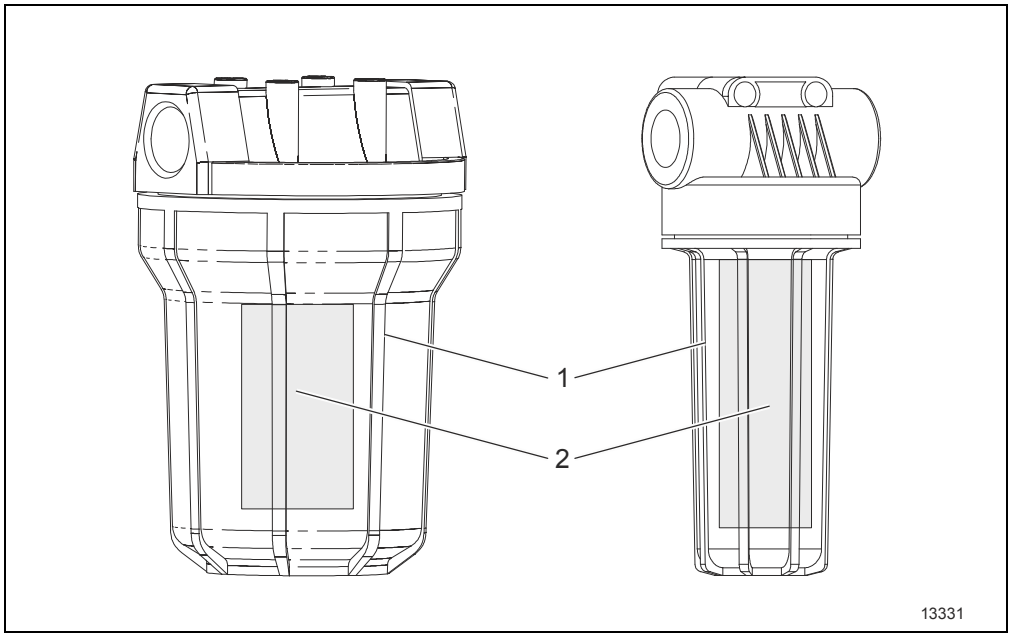


Fig. 26: Filter (example)

1 Filter cup
2 Filter element

Replace the filter as described below:

1. Switch the device off and disconnect the power supply cable.
2. If included, close the shut-off valves upstream and downstream of the filter unit.
3. Depressurise and drain the system.
4. Unscrew the filter cup (1) by turning it counter-clockwise and remove it by pulling it downwards.

   If necessary, use a spanner for unscrewing the filter cup.

▶ Note

Liquid will escape when the filter cup (1) is removed. Keep a collecting vessel ready and collect any escaping liquid.

5. Remove the filter element (2).
6. Remove the clogged filter element and ensure its environmentally-friendly disposal in accordance with the national and local regulations.
7. Insert a new filter element.
8. Clean the dismounted filter cup (1).
9. Check the sealing ring for signs of damage, clean it, and replace it if necessary.
10. Screw the filter cup (1) onto the upper part of the filter by turning it clockwise.

    If necessary, use a spanner for screwing it on.
11. When restarting the device, perform a leak test.

Note concerning the protection of the environment

The improper disposal of consumables (e.g. filters, filter mats) has a negative impact on the environment.

- Consumables must not be disposed of as household waste.
- The materials must be disposed of separately and supplied separately to the recycling centres.
- Comply with the applicable national and local rules and regulations.

9.6 Changing the DI cartridge (option)

The device is optionally equipped with a DI cartridge.

The DI cartridge absorbs the free ions that are present in the water.

▶ Note

- Replace the DI cartridge as specified in the maintenance plan.
- If the fault message "Conductivity too high" flashes on the display of the control unit for a longer period, the DI cartridge must be replaced.
- Observe the maximum period of use and/or operating hours in accordance with the maintenance plan.
- Prior to the replacement, drain and flush the circuit (see the section "Maintenance/Draining the medium off/Topping-up with medium").

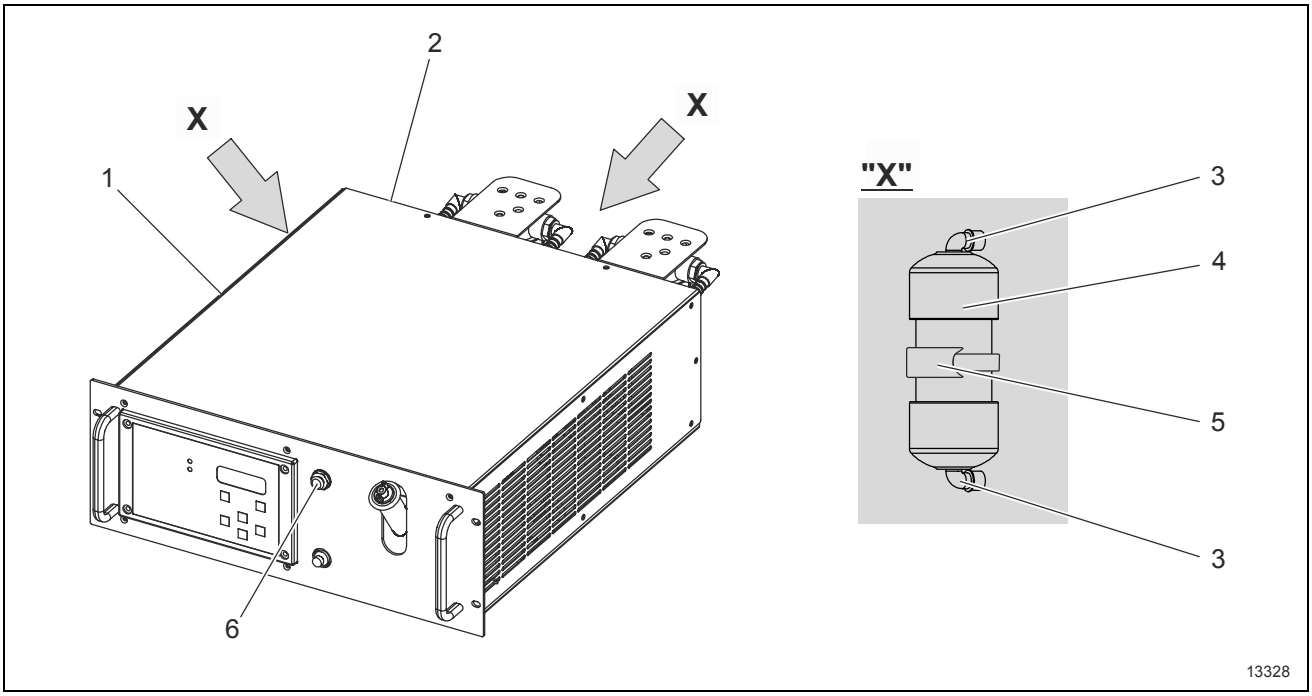


Fig. 27: Replacing the DI cartridge

1	Side panel	4	DI cartridge
2	Power supply connection	5	Holder
3	Sleeve-type union/quick coupling	6	Venting point

Depending on the device variant, the DI cartridge (4) is located on the outside at the back of the device or inside the device behind the left side panel.

Replace the DI cartridge as follows:

1. Disconnect the power supply connector (2).
2. Keep a suitable collecting vessel ready.
3. Disconnect the return flow hose and collect any escaping liquid.
4. If necessary, loosen the screws at the left-hand side panel (1), remove the panel, and lay it down.
5. Remove the holder (5).
6. Open the sleeve-type unions (3) with an open-end spanner no. 20 and 22 or disconnect the quick coupling.
7. Remove the old DI cartridge (4).
8. Insert the new DI cartridge.
9. Close the holder (5).
10. Tighten the sleeve-type unions (3) or let the quick coupling lock in place.
11. If it has been removed, reattach the side panel (1) and tighten the screws.
12. Check the protective earth connection of the side panel (1) and reconnect it if necessary.
13. Reconnect the return flow hose.
14. Reconnect the power supply connector (2).
15. Vent the device via the air vent (6).
16. Fill the device (see the "Start-up/Filling" section).
17. When restarting the device, perform a leak test.

! Notice

Improper restart

The device will be damaged if it is used without a DI cartridge.

- Ensure that a DI cartridge is installed prior to starting the device.
- After a replacement, check the reservoir, holder, and hoses for leaks.
- Comply with the maintenance intervals in accordance with the maintenance plan.
- Ensure the correct position of the earthing connection.

10 Troubleshooting

10.1 Notes

DANGER

Risk of injury caused by electric current!

When the device is open, parts of the device may be energised and cause an electric shock when they are touched.

The following points must be observed when performing work on the open unit:

- Comply with the information that is given in the "Safety" chapter.
- Only suitably qualified persons are authorised to perform these tasks.

1. Disconnect the unit from the power supply in order to deenergise it.
2. Secure the unit so that it cannot be switched on again accidentally.
3. Check whether the unit is properly disconnected from power and absolutely voltage-free.
4. Earth and short-circuit the unit.
5. Cover any adjacent live parts and secure the danger area.

WARNING

Risk of injuries for persons due to heavy objects!

The components mentioned above are very heavy and bulky.

Always have several persons carry out the installation or dismantling or use appropriate lifting devices!

WARNING

Carry out instructed works only!

There is an increased risk of injury to persons who perform tasks for which they are not suitably qualified or trained.

Troubleshooting shall only be carried out by qualified personnel. Contact the after-sales service particularly in the event of malfunctions in the electrical system or the refrigeration unit (if provided).

⚠ WARNING

Risk of injury for personnel!

There is a risk of burns o freezing of limbs due to damaged refrigerant pipes.

Do not damage the refrigerant pipes.

⚠ CAUTION

Improper handling of the refrigeration unit!

Danger due to improper handling of the refrigeration unit.

The unit should be serviced and repaired only by persons who have been trained in the use and maintenance of the unit and are informed about the potential hazards.

- Risk of burns. Do not touch the refrigerant hot-gas pipes.
- Risk of injuries. Do not touch the sharp cooling fins of the condenser used on air-cooled versions.

10.2 Electrical connection

Fault	Cause	Note
Unit not working.	No power supply.	Switch the power supply system on.
		Check the external fuse protection.
		Check the supply cable for signs of damage and ensure that it is properly connected.
		Check the electrical circuit.
		Check the fuses/micro-fuses.

10.3 Cooling circuit

Fault	Cause	Note
No or only insufficient water flow.	Pump(s) not running.	Switch on the circuit breaker / motor protection relay.
		Check and replace if necessary.
		Switch on the cooling circuit / unit.
	Valves closed.	Open.
	Insufficient pump pressure.	Adjust the pressure through the shut-off valve in the chilling medium outlet.
	Low water level.	Check the cooling circuit for leaks. Top it up with water.
	The flow controller in the cooling circuit has tripped.	Check the flow.
		Check flow monitor.
	Filter in chilling medium inlet and shilling medium outlet soiled.	Check the filter. Remove and clean it.
Water too hot.	Refrigeration unit fault.	See "Refrigeration unit does not run".
	Temperature target value too high.	Adjust the target value.
	The pump is not running.	Switch on the circuit breaker / motor protection relay.
		Check the pump motor.
		Check flow monitor.
	Control valve defective (if included).	Check the power connection and replace if necessary.
Water too cold.	Temperature setpoint too low.	Adjust the target value.
	Control valve defective (if included).	Check the power connection and replace if necessary.
Frequent lack of water.	System leaks.	Check for leaks and seal them if necessary.

10.4 Refrigerant circuit

Fault	Cause	Note
Refrigeration unit not running or reduced refrigeration capacity.	Circuit breaker / motor protection relay of compressor has tripped (Clickson).	Switch on the circuit breaker / motor protection relay. Let compressor cool down.
	High-pressure fault.	Clean the condenser (air-cooled version).
		Ensure that there is sufficient cooling air (air-cooled version).
		Press the reset button at the pressure switch.
	Low pressure fault.	Check refrigerant (bubbles in the sight glass).
		Contact a refrigeration company.
• on air-cooled version	The condenser cooling fins are soiled.	Clean.
	Condenser fan defective (motor coil overheated).	Allow fan motor to cool down (for approx. 30 minutes); replace it, if necessary.
	Inlet/Outlet for cooling air obstructed.	Remove any objects in front of or on top of the device.
	Insufficient external suction	Check.
	Not enough water in tank (for coolers with cooling coil in tank)	Check fill level of tank and top up with water, if necessary.
	Air filter mat is dirty.	Replace.

Only for WW devices	The filter in the waste water circuit is soiled.	Check the filter. Remove and clean it. See "Filter replacement" section.
	Insufficient flow in the waste water circuit.	Check the waste water quality for water constituents. For this purpose, see the table in chapter "Description / Waste water circuit".

Chilling medium too cold.	Bypass valve defective.	Check the power supply. Dismantle bypass valve. Inform the service department.

Chilling medium too warm.	Cooling air inlet/outlet blocked.	Check. Remove any objects in front of or on top of the unit
	Fan defective.	Check. Dismount and replace, if necessary.
		Contact the customer service if necessary.

10.5 Control unit

▶ Note

Fault messages are displayed as plain text. In general, they are self-explaining.

In the event of a malfunction, the buzzer will be activated and a corresponding text will be displayed.

- Press the "left" key in order to mute the buzzer.
- Press the "down" key in order to acknowledge a fault.

Fault	Cause	Note
Flow (1/2) Warning / Alarm	Water filter blocked.	Replace filter element. See "Filter replacement" section.
	Pump pre-filter blocked.	Clean the filter element.
	Air in the water circuit.	Vent the system.
	Pump failure.	• Check the F2 fuse and replace if necessary. • Check the X2/3 connection plug for correct seat. • Check the pump and motor for external damage. • If required, contact the Termotek service department. • Switch on the circuit breaker / motor protection relay.
	CPC water connection defective, blocked.	• Check for correct seat. • Replace CPC coupling.
	Failure of the 3-phase pump.	• Check the phase sequence L1+L2+L3 and compare with the circuit diagram. Comply with clockwise field of rotation! • If required, contact the Termotek service department.

Fault	Cause	Note
High pressure alarm	The ambient temperature is too high. (Higher than the maximum permissible ambient temperature, see "Technical data" chapter)	• Provide for cooler ambient air. • Remove the device from direct solar radiation.
	Fan rotation speed too low or fan in standstill.	• Check the F5 fuse and replace if necessary. • Check the X2/3 connection plug for correct seat. • Check plugged connections at the housing. • Check the fan for external damage. • If required, contact the Termotek service department.
	Condenser block heavily soiled.	Clean the fan and condenser, blow out using compressed air.
	Air supply is blocked.	Provide for unrestricted air flow.
	Air filter is clogged.	Replace air filter element.
Only for WW devices	The filter in the waste water circuit is soiled.	Check the filter. Remove and clean it. See "Filter replacement" section.
	Insufficient flow in the waste water circuit.	Check the waste water quality for water constituents. For this purpose, see the table in chapter "Description / Waste water circuit".
	Chilling medium control valve defective.	Contact the Termotek service department.

Fault	Cause	Note
Over temperature Warning / Alarm	The compressor is not running.	• Fault current circuit breaker has tripped. • Check the cable at the X2/3 terminal strip, check the green LED at the controller (On/Off). • Measure the voltage at the X2/3 terminal strip, 11/12 terminal. • Controller in low voltage, the internal relay cannot be triggered any more.
	Hot gas bypass valve does not switch.	• Check the F3 fuse and replace if necessary. • Check the X2/3 connection plug and pin 6+5 for correct seat. • Check the valve coil. • Replace the valve, contact the Termotek service department, if required.
	The ambient temperature is too high. (Higher than the maximum permissible ambient temperature, see "Technical data")	• Provide for cooler ambient air. • Remove the device from direct solar radiation.
	Fan rotation speed too low or fan in standstill.	• Check the F5 fuse and replace if necessary. • Check the X2/3 connection plug, terminal 1+2, for correct seat. • Check plugged connections at the housing. • Check the fan for external damage. • If required, contact the Termotek service department.

Fault	Cause	Note
Over temperature Warning / Alarm	Refrigeration medium input towards condenser block too hot. • Refrigeration medium quantity in the circuit too low • Check refrigeration medium in the circuit	The complete refrigeration circuit must be replaced.
	Condenser block heavily soiled.	Clean the fan and condenser, blow out using compressed air.
	Controller defective.	Replace, contact the Termotek service department.
Water filling level Warning / Alarm	Float switch defective.	• Replace. • Check plugged connections. • Check plug and cable X1/2 for firm seat.
	• Hose defective • Clamps not firmly tightened • Leaking components • Evaporation	• Localise and seal the leaking points. • Replace defective components.
Display not on	Power cable loose or defective.	• Check for correct seat at the cooler and at the power outlet. • Check cable for damage and replace if necessary.
	Power outlet defective.	Replace.
	Controller defective.	Replace.
Display shows "F1" Display shows "F2" Display shows "F3" Display shows "F4"	Temperature sensor defective or interrupted.	• Check the cable. • Check plug connector X1/3 for correct seat. • Replace temperature sensor if required.
„↑↑↑↑„ at conductivity display	DI cartridge defective / empty. Chilling medium contaminated.	Replace.
	Solenoid valve does not switch (only for conductivity control).	• Check the F4 fuse and replace if necessary. • Check the X2/3 connector and cable for correct seat.

10.6 Replacement of fuses

DANGER

Risk of injury due to electric shock!

When the unit is open, certain parts may be energised and cause an electric shock if they are touched.

The following points are to be observed when working on the opened unit:

- Observe the "Safety" section.
- Ensure that the tasks are performed solely by qualified experts.
- Disconnect the electrical connecting cable.

The fuses are located behind the control unit.

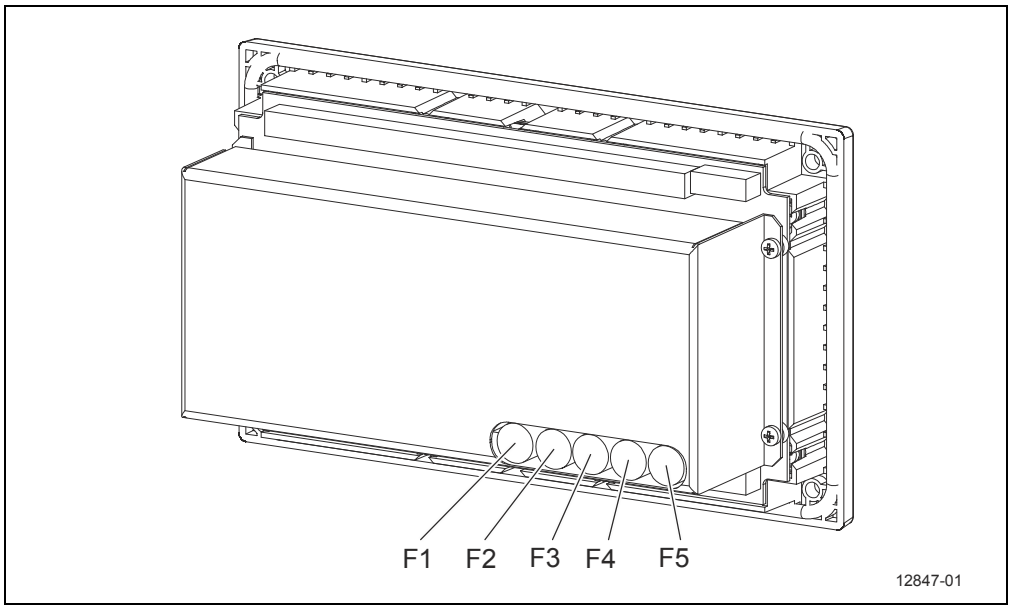


Fig. 28: Fuses (Example)

F1 Heater *)
F2 Pump
F3 Hot gas valve *)
F4 Conductivity valve *)
F5 Fan *)

*) option

▶ Note

Follow the instructions given in the circuit diagram.

Replace defective fuses as follows:

1. Deactivate the device and remove the electrical connection cable.
2. Loose the screws on the control unit.
3. Carefully remove the control unit from the housing.
4. Turn out the defective fuse using a screwdriver.
5. Fit the new fuse.
6. Re-insert the control unit into the housing and fix it in place by tightening the screws.
7. Attach the electrical connection cable.

! Notice

Damage to the unit!

If a fuse will trigger again after replacement, this is an indication for a serious defect at the unit.

- Only use fuses with the same triggering characteristics.
- If necessary, contact manufacturer.

11 Disconnecting the device

11.1 Notes

⚠ WARNING

Risk of injuries for persons due to heavy objects!

The components mentioned above are very heavy and bulky.

Always have several persons carry out the installation or dismantling or use appropriate lifting devices!

⚠ WARNING

Danger through electric current!

Carelessness can lead to electrocution.

Disconnect the electricity supply before disconnecting the unit.

⚠ CAUTION

Danger due to improper work practices!

Danger due to improper handling of the refrigeration unit. The refrigeration unit may only be disconnected by specialist refrigeration companies.

Note concerning the protection of the environment

Improper disposal places a burden on the environment.

The disposal must be compliant with the local regulations and legal conditions.

11.2 Dismantling and draining

Note concerning the protection of the environment

The improper disposal of spent residual operating fluids (e.g., cleaning agents) places a burden on the environment.

- Spent or residual operating fluids must not be disposed of with domestic waste. It must not be drained into sewage system or allowed to enter into the soil.
- Used or residual operating fluids must be separated and disposed of at a recycling facility.
- Compliance with applicable national and local regulations is mandatory.

If the cooler is to be dispatched or stored, the medium must first be drained off.

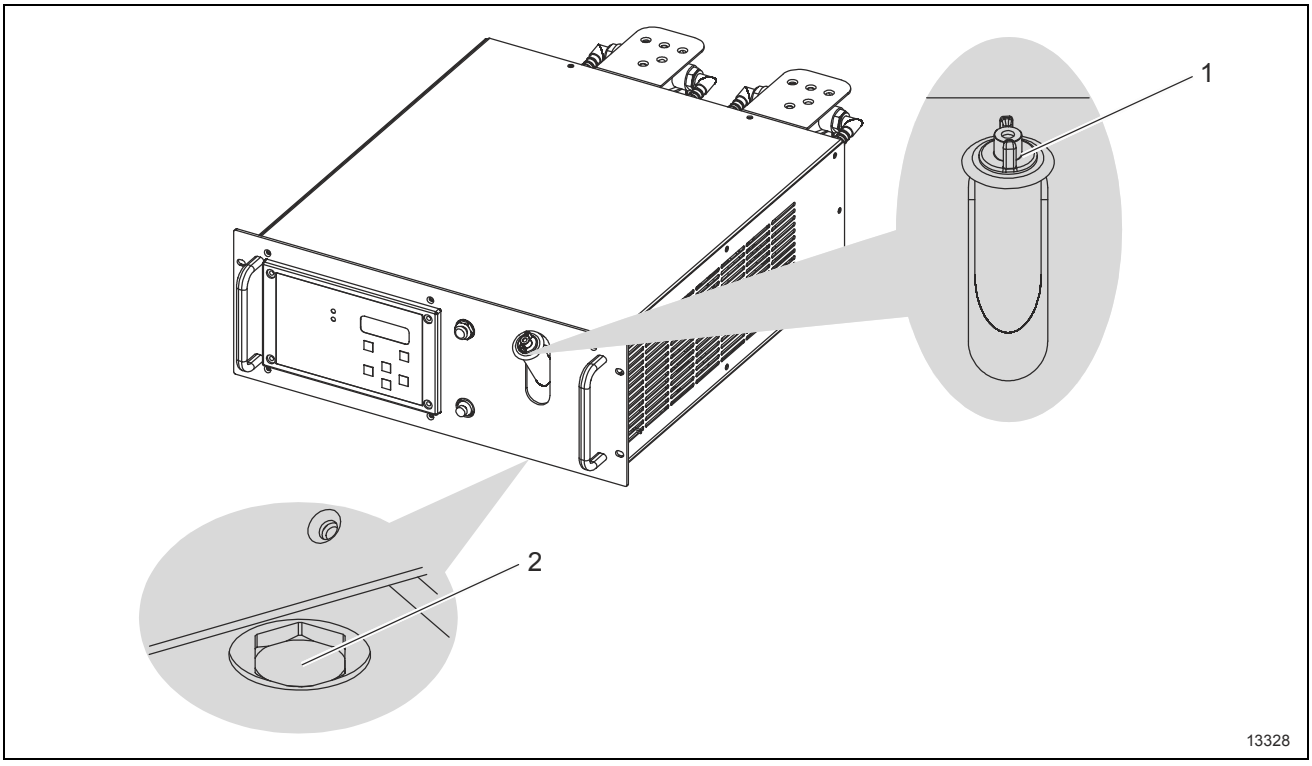


Fig. 29: Draining the system

1 Filler pipe with fill level indicator

2 Drain (discharge opening)

Draining the medium off:

1. Switch the device off and disconnect the power supply cable.
2. Keep a suitable collecting vessel ready for collecting the medium.
3. Disconnect the connectors (feed flow, return flow) at the back of the device.
4. Drain the medium off via the drainage point (discharge opening) under the device.
5. Remove the plug from the filler pipe.
6. Wait until no more water flows out of the device.
7. If included, open and drain the filter cup in the filter. See the section "**Maintenance/Filter change**".
8. Apply suction to remove any remaining liquid via the connectors (feed flow, return flow) at the back of the device.

! Notice

Risk of damage to the components of the device!

The components of the device may be damaged if the device is blown out with compressed air.

Do not blow the device out with compressed air.

9. If included, remove and empty the DI cartridge. See the section "Maintenance/Changing the DI cartridge".

▶ Note

Ideally, the DI cartridge should not be installed until the device is commissioned. Store the DI cartridge in a dry place.

10. Seal the drainage point (discharge opening) under the device.
11. Dispose of the medium in accordance with the applicable national and local guidelines and regulations and in an environmentally sound manner.

Filling / Refilling:

▶ Note

- For filling / refilling, please refer to the description in the "Commissioning / Filling" section.
- Only use the cooling medium specified in the "Technical "Data" section.

11.3 Transport and storage

! Notice

Danger of frost

Damage caused by freezing cooling water in the device.

Completely drain the device before transportation.

▶ Note

Transport the unit carefully and in a shock-free and vibration-free manner.

Please note the following:

- The unit must be completely drained before transport.
- The unit must be completely drained before storage.
- The device must be transported vertically and must not be thrown.
- The device must only be stored vertically.
- Ensure that the ambient conditions are in line with the "Technical data".
- Prior to every transport, the DI cartridge (if used) must be disassembled, drained and dried.
- In case of use after a storage period of more than 3 months, the DI cartridge (if used) must be replaced by a new one to rule out contamination of the water.
- Use suitable packaging material (e.g., shock-absorbing and vibration-absorbing material; preferably, use the original packaging material).
- Ensure that the packaging will protect the unit against dust and dirt.
- Pack the unit so that it is protected against shocks and falling down.
- Ship the unit on a pallet only with belts wrapped around.
- If the unit is shipped separately, use the original padding blocks and mark as follows:
  - "Protect against moisture"
  - "Transport and store in upright position"
  - "Fragile"

11.4 Recycling

Note concerning the protection of the environment

The improper disposal of reusable materials (e.g. plastics, steel and aluminium parts, electronic modules) has a negative impact on the environment.

- Ensure that reusable materials are recovered for reuse. Recycling is an important contribution to the protection of the environment.
- Ensure that reusable materials are recycled.

Note concerning the protection of the environment

The improper disposal of chemicals (e.g. additives) has a negative impact on the environment.

- Chemicals must not be disposed of as household waste and it must be ensured that they are not released into the sewage system or soil.
- Wear suitable protective equipment (gloves, eye protection) when performing disposal tasks.
- Chemicals must be disposed of separately (e.g. as special waste if applicable) and supplied separately to the recycling centres.
- Comply with the safety data sheets and also with the applicable national and local rules and regulations.

The components of the system or unit are mainly made of the following materials:

- plastic
- non-ferrous metals
- stainless steel
- steel and aluminium components
- electronic modules

▶ Note

- The refrigerant circuit must be completely disposed of by a company certified according to § 56 Kreislaufwirtschaftsgesetz (Recycling and Waste Management Act).
- The dismantling of the refrigerant circuit shall only be carried out by qualified staff of refrigeration engineering.

12 Technical data and further information

▶ Note

The information on technical data, spare parts and conformity of the units has been separately prepared and made available.

13 Index