

Cooler

PRO300 (AW / WW)

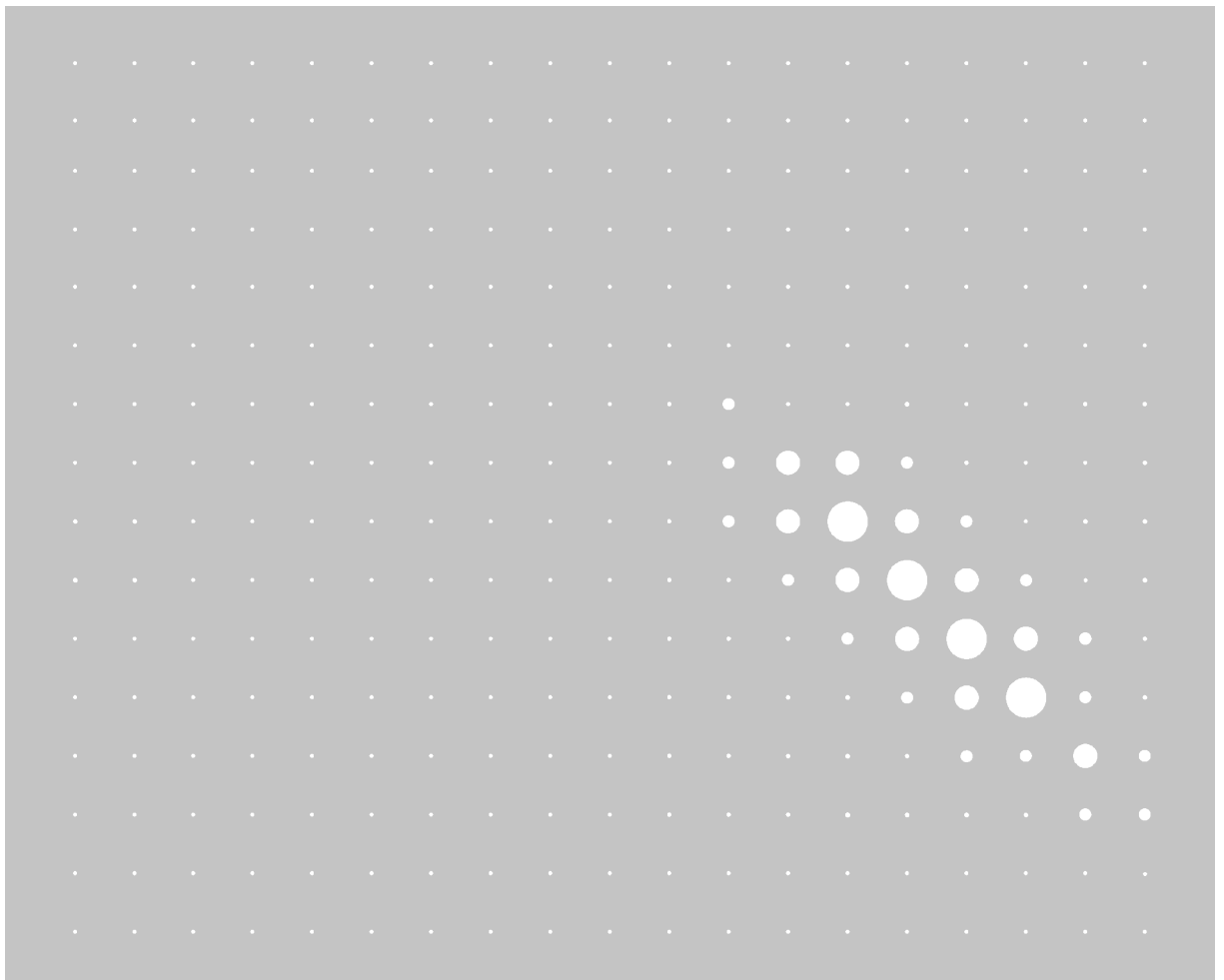
R290

Instruction Manual

ORIGINAL INSTRUCTION MANUAL

90001925984-04-EN

2026-06-10



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1.3 Product registration

Registering the product/system provides you with the following benefits:

- Overview of products and units already registered
- Exclusive offers for registered units
- Access to current product information
- Access to the customer portal
- Best possible service and support from experts when needed
- Reminders to carry out due maintenance (e.g. statutory leak testing/maintenance of refrigeration systems and heating/cooling units)

See the following link for registration of products and systems:

<https://www.technotrans.com/service/registrierung>

1.4 Making contact

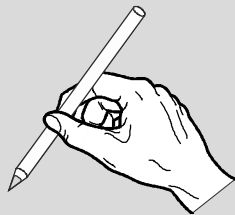
1.4.1 General information

Please keep the following details ready (see the type plate of the unit) when contacting us (e.g. for spare part orders, warranty claims, etc.):

- Product name
- Serial no.

NOTE

If necessary, enter the information, which is stated on the type plate of the unit, into the table.

	Name of the unit: (Product Name)
	Serial number: (Serial No.)
	Part number: (Part No.)
	Year of manufacture: (Year of Manufacture)

1.4.2 Type plate - explanations

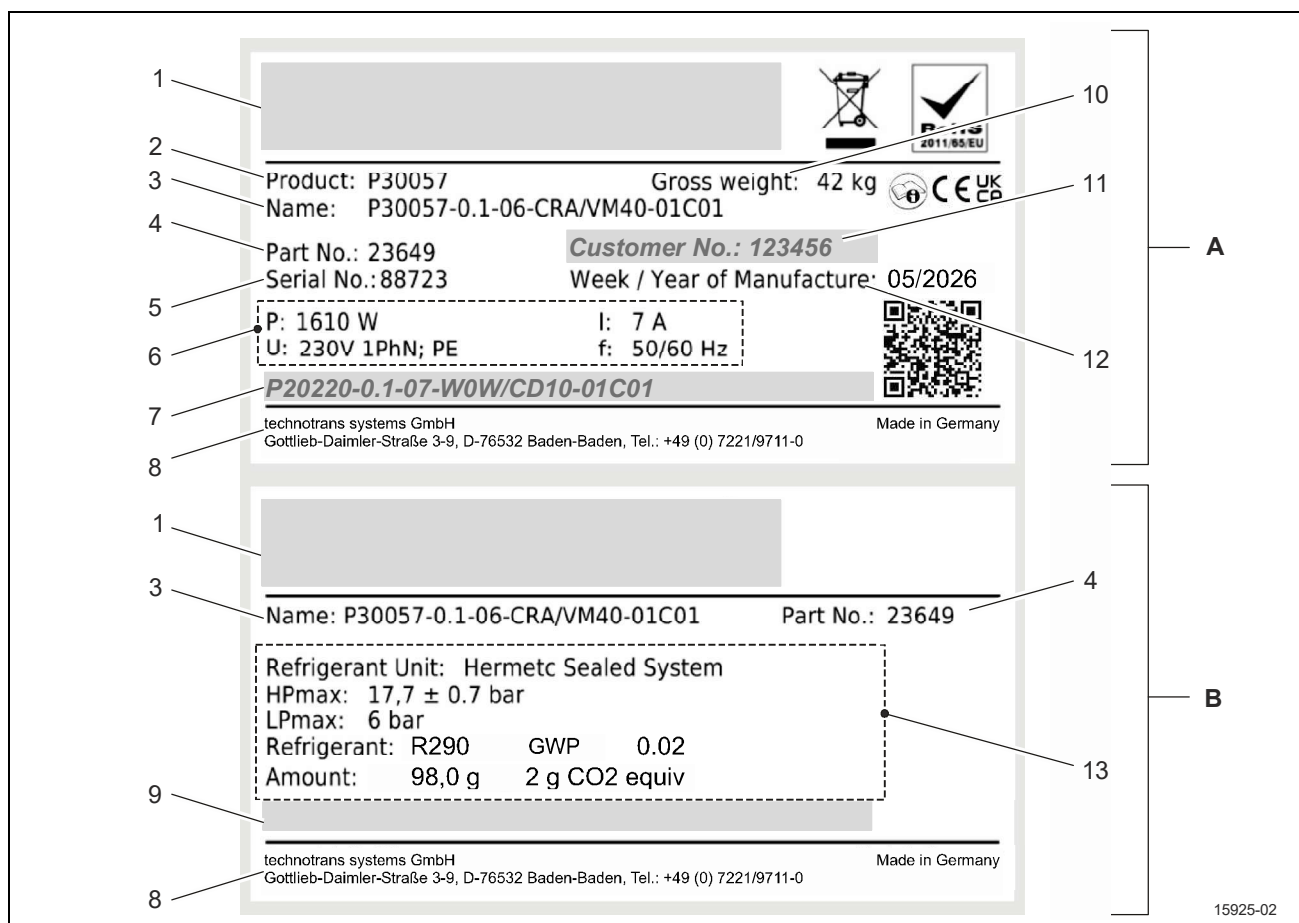


Fig. 1: Type plate (example)

A	Type plate 1 (general information)	10	Gross weight: Gross weight
B	Type plate 2 with information concerning the refrigeration unit	11	Customer No.: Customer number (option)
1	Logo of the manufacturer, technotrans systems GmbH or company logo (option)	12	Week/Year of Manufacture: Week/year of manufacture
2	Product: Model	13	Information concerning the refrigeration unit:
3	Name: Type code *)	-	Refrigerant Unit: Type of system of the refrigeration circuit
4	Part No.: Part number	-	HPmax: High pressure (max.), tolerance
5	Serial No.: Serial number	-	LPmax: Low pressure (max.)
6	Technical data (electrical):	-	Refrigerant: Refrigerant, GWP value
-	P: Power consumption	-	Amount: Refrigerant quantity, CO ₂ equivalent
-	U: Connection voltage		
-	I: Current consumption		
-	f: Frequency		
7	Free text (e.g. a type code) (option)		
8	Contact details of the manufacturer		
9	Free text (option)		

Note

- *) Refer to the following information.
- Fields marked in grey are optional.
 - Units with a refrigeration unit have two type plates, A + B.

Symbols:

	Disposal note
	RoHS-compliant
	Please refer to the instruction manual

	CE-compliant
	UKCA-compliant
	2D barcode (QR code) to access the device information (e.g. part number, serial number, year of manufacture)

1.4.3 Type plate - type code

P1	0070	-	0.1	-	06	-	D	R	A	/	C	M	01	-	01	A	02	/	0003-S
1	2		3		4		5	6	7		8	9	10		11	12	13		14

- 1 Series/type *)
- Example: P1 = P1000 (miniature compressor)
- 2 Cooling capacity *)
- Example: 0070 = 700 W
- 3 Control accuracy
- Example: 0.1 = +/- 0.1 Kelvin
- 4 Housing size *)
- Example: 06 = P805
- 5 Cooling medium *)
- A = air
- W = water
- D = DI water
- G = water- glycol mixture
- C = customer-specific fluid
- 6 Refrigerant *)
- R = refrigerant
- 0 = no refrigerant/passive system
- 7 Heat dissipation *)
- A = air
- W = water

- 8 Pump/mode of operation
- C = centrifugal pump
- G = gear pump
- V = rotary vane pump
- M = diaphragm pump
- S = canned motor pump
- 0 = no pump
- 9 Type of coupling of the pump
- D = direct coupling
- M = magnetic coupling
- 0 = no pump
- 10 Pump variant *)
- 11 Voltage variant *)
- Example: 01 = 230 V, 1 Ph, N, PE
- 12 Frequency *)
- A = 50 Hz
- B = 60 Hz
- C = 50/60 Hz
- D = DC
- 13 Control system *)
- 14 Optional package

*) Refer to the technical data sheet of the unit/units.

2 About this manual

2.1 Use and storage

NOTE

Prior to performing any work on the unit/system, read the instruction manual.

The following points must be noted:

- The instruction manual is an integral part of the unit/system and must be available to the operating personnel at the unit/system at all times.
- The instruction manual is indispensable for the safe start-up, operation and maintenance of the unit/system in line with its intended purpose.
- The instruction manual applies solely to the product that is stated on the cover sheet.
- We reserve the right to change the instruction manual due to further technical developments.
- This instruction manual is part of the scope of supply.
- The instruction manual shall apply from the transport phase up to the final disposal and must be absolutely observed.
- Keep the instruction manual in a place where it is readily accessible at all times. It must be complete, remain with the machine and must be available to all authorised persons.
- Maintain the instruction manual in a clearly legible state at all times.
- Hand over the instruction manual along with the device if it is resold.
- The unit/system may present unavoidable residual risks to persons and property. This is why the instruction manual must be read, understood and strictly complied with for all types of tasks by the personnel prior to commencing any work. In addition, any person who works on or with the unit/system in any way must be instructed and familiar with the potential hazards.
- This instruction manual is solely intended for trained and authorised personnel.
- It is the operator's responsibility to ensure that the manual is read and understood by all operating personnel before starting work.
- The illustrations in this manual are for providing a basic understanding and may differ from the actual unit/system.

2.2 Target audience

When working with the unit/system, the various tasks must be assigned to specific groups of persons.

Depending on the location of use, the necessary qualification of the personnel may be subject to varying statutory provisions. The operator must ensure compliance with the relevant laws. Unless regulated by law, the following list is used to define the permissible personnel and their minimum qualification.

The following points must be noted:

- Any work on the unit/system must be performed by qualified and instructed personnel.
- The personnel must have knowledge of the relevant standards, provisions, accident prevention regulations and operating conditions.
- The personnel must be instructed and trained for the tasks that need to be performed.
- The personnel must be able to identify and avoid any potential hazards.

Person	Task	Qualification	Lifecycle phase
Qualified personnel for transporting loads	Lifting/lowering and transport of the system	Proven experience in the handling of suspended loads and in the securing of loads	Transport, installation, disassembly and removal
Qualified personnel (mechanics)	Mechanical work during: start-up, elimination of faults and malfunctions, maintenance and shut-down	Training as an industrial mechanic or an equivalent professional qualification	Start-up, maintenance, elimination of faults and malfunctions, shut-down, disassembly and removal
Qualified personnel (trained electricians)	Electrical work	Specialised electrical training or an equivalent professional qualification	
Qualified personnel (refrigeration specialists)	Work on the refrigeration unit	Training as a refrigeration specialist or an equivalent professional qualification	
Qualified personnel (machine operators and fitters)	Operation and set-up of the system	Person who has been trained and instructed by the operator based on the instructions for use	Start-up, operation, maintenance, elimination of faults and malfunctions
Qualified personnel (disposal specialists)	Proper disposal of the system	Knowledge about the disposal regulations applicable on site	Shut-down, disassembly and removal, disposal
Qualified personnel (safety specialists)	Implementation of the applicable safety regulations	Knowledge about the safety regulations applicable on site	All phases
Others (e.g. visitors)	Site inspection	Person under the supervision of a safety specialist	-

2.3 Explanation of the various notes

The warning notes are preceded by signal words indicating the severity of the hazard.

Compliance with the warning notes is imperative in order to avoid accidents, injuries and damage to property.

Explanation of warning notices used in this manual:

DANGER

Short description of danger

The signal word **DANGER** identifies an immediately threatening danger.
Any non-adherence will result in severe injuries or death.

WARNING

Short description of danger

The signal word **WARNING** identifies a potential danger.
Any non-adherence may result in severe injuries or death.

CAUTION

Short description of danger

The signal word **CAUTION** identifies a potential danger.
Non-compliance may result in minor to medium injuries.

NOTICE

Short description

The signal word **NOTICE** identifies a potential risk of damage to property.
Non-compliance may cause damage to the unit or system.

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.

2.4 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.

2.5 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.

3 Liability and warranty

3.1 General information

The unit/system has been manufactured in line with the state of the art as well as the recognised safety regulations and standards. Still, its use may jeopardise the health and safety of the user or third parties or cause damage to the unit/system or other property.

Warranty and liability claims for injuries to persons/damage to property are excluded if they are due to one or several of the following causes:

- Improper use of the unit/system not in line with its intended use
- Non-compliance with the instruction manual and its associated parts and annexes
- Unauthorised structural or technical modifications of the unit/system
- Use of untrained personnel
- Use of the unit/system with defective or improperly installed safety devices and guards
- Operating errors
- Failure to maintain the unit/system
- Non-elimination of faults/malfunctions
- Use of non-authorised spare parts
- Other misuse
- Catastrophic events caused by foreign objects or force majeure

The information in this instruction manual describes the characteristics of the product without guaranteeing them.

No claims for the modification of components that have already been supplied may be made on the basis of the information, illustrations and descriptions in this instruction manual. The information, data and notes provided in this instruction manual were up to date at the time of writing.

3.2 Terms of warranty

The manufacturer cannot be held liable for damage resulting from improper use, non-compliance with this manual, the employment of insufficiently qualified personnel, or unauthorised modifications. In these cases the manufacturer's warranty is rendered void.

The correct operation of the unit will be impaired if incorrect spare parts are used! The correct operation of the unit cannot be guaranteed if components are used which have not been approved. Only use spare parts approved by the after-sales service.

No warranty claim!

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

Use only media that have been approved by the manufacturer.

NOTE

Removing type plates will make the warranty claim expire.

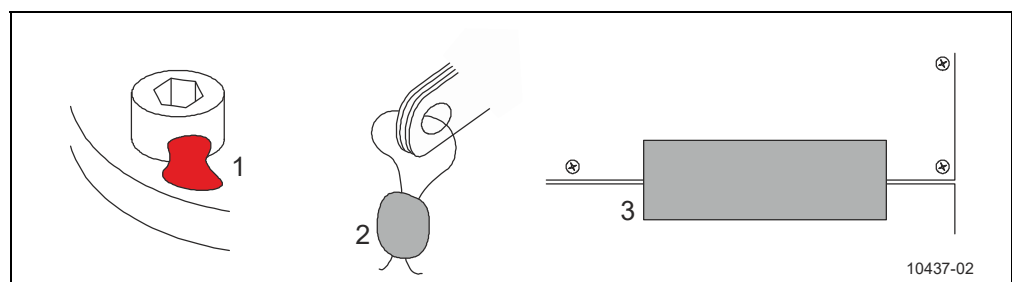


Fig. 2: Sealings

Sealings may exist at various different locations at the unit or plant:

- 1 Sealing wax (Application example)
- 2 Seals (Application example)
- 3 Seal stickers (Application example)

NOTE

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

3.3 Information on IT Safety

Devices with a communication interface are designed to be connected to a customer's network interface and to use these devices to transmit information and data.

The operating company is solely responsible for providing and ensuring a safe connection between the device and the network.

The operating company must undertake to provide and maintain appropriate measures (such as installing firewalls, using authentication, data encryption, installing anti-virus programs, etc.) to protect the device, the network, its systems and the interface from any interference. The operating company must undertake to protect the device from vulnerabilities, prevent unauthorised access, faults, intrusion, loss, and/or theft of data or information.

technotrans SE and its subsidiaries shall not be held liable for any damage and/or loss caused by such security breaches, unauthorised access, faults, intrusion or loss and/or theft of data or information.

4 Safety

4.1 General information

NOTE

Every person who is ordered to work on the unit/system must have read and understood these instructions and, in particular, the "Safety" chapter.

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

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.

The unit/system is safe to operate.

Non-compliance with the instructions and safety notes in this instruction manual may lead to substantial hazards to persons and damage to the unit/system.

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.

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

Compliance with the safety instructions is mandatory. The observation of these instructions is essential for ensuring safety.

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

4.2 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.

The product-specific documentation can only refer to the intended use of the unit/system.

The instructions cannot cover any specific situations arising from special local conditions or special applications that the manufacturer was not aware of. In this case, the operator must ensure the safe operation of the unit/system or shut the unit/system down until appropriate measures for the safe operation have been coordinated or implemented in consultation with the manufacturer or other competent authorities.

4.3 Safety of personnel

Knowledge of, and compliance with, the present content is a prerequisite for the protection of persons against danger and for the avoidance of errors and mistakes.

Tasks (e.g. maintenance and service tasks) should be performed only by suitably qualified persons who are familiar with these tasks and who have been informed concerning the potential danger.

Avoid any working practice that:

- puts the health and safety of the user or third parties at risk,
- is detrimental to the unit or system or other material assets,
- impairs the safety or functionality of the unit or system,
- does not comply with the safety instructions.

In addition:

- Always wear personal protective equipment when working on the unit/system.
- Comply with the relevant accident prevention regulations.
- Comply with the occupational health regulations.
- Comply with the generally recognised safety rules.

There is an increased risk of injury if the safety devices and guards are disabled. Never dismantle or disable any safety devices or guards.

- Check the safety devices and guards daily for correct operation.
- Report any faults and defects concerning the safety devices and guards to the customer service without delay.
- Keep covers (e.g. panels, shields, housings) closed during operation.
- Perform repairs of the pipe systems and tanks only when the system is depressurised.
- Observe the respective supplier's safety data sheets and disposal instructions as well as all of the local safety regulations when using chemicals.
- When handling process fluids (e.g. oils, greases and other chemical substances), comply with the supplier's specifications and safety information for the respective product.
- Wear personal protective equipment.

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.

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.

There is a risk of damage to property if the unit/system is operated improperly.

- Comply with the description of any add-on parts or ancillary equipment (if included).
- See also the supplier documentation or the separate documentation provided by the third-party suppliers.

4.4 Transport and installation/start-up

There is an increased risk of injury for persons who perform tasks for which they are neither qualified nor trained.

Only persons who are familiar with the tasks, who have been informed about the associated hazards have the necessary qualifications are authorised to transport the unit.

- Never work or stand under suspended loads. There is a risk of fatal injuries from falling loads.
- Transport tasks may only be performed by qualified and authorised persons and in compliance with the safety instructions!
- The shipping company and the manufacturer must be informed immediately in writing about any damage that is noticed after the delivery. The start-up of the unit/system must be suspended, if necessary.
- Use only suitable lifting devices, transport equipment, load handling attachments and lifting accessories and ensure that they are in a perfect technical state and have a sufficient load-bearing capacity.
- Take the attachment points and centre of gravity of the load into consideration.
- Do not add any additional attachment points to the units/systems by welding, flame cutting or drilling. There is a risk of cracking due to the notch effect of the weld seam or flame-cutting spot or bore.
- When transporting the unit, observe the instruction labels on the unit (if provided).
- Transport the unit only when it is empty.
- If the unit/system needs to be replaced, fasten and secure it thoroughly on the lifting devices.
- The banksman must be within the range of vision of the operator or have voice contact with the operator.
- Block and mark the transport routes so that unauthorised persons cannot reach the hazard area!
- Always secure the transport route with the aid of a third person!

NOTE

Comply with the general accident prevention and safety regulations.

4.5 Operation

- Operation is permissible only if all of the components are in a perfect technical state and proper operational condition and if they are used in line with the intended purpose.
- Avoid any operation that compromises the safety of the unit/system.
- The operator must ensure that unauthorised persons cannot work on the machine.
- Prior to switching the unit/system on, the operator must ensure that no persons are put at risk by starting the machine.
- During operation, the entire hazard area must be observed or closed off so that no one can enter this area without being noticed.
- Use the unit/system only if all of the guards and safety devices are present and fully functional.
- The operator must ensure a clean and clearly arranged workplace at and around the unit/system by issuing corresponding instructions and performing checks.
- Observe the controls and indicators during operation.

4.6 Maintenance

The operator must ensure that the unit/system and its safety devices and guards are kept in a functional state. The control devices as well as the safety devices and guards must be checked in terms of their effectiveness.

Only specialised and trained personnel are authorised to perform maintenance, repairs and overhauls.

If safety devices or guards need to be removed for maintenance, overhauls and repairs, they must be reinstalled and checked for correct operation immediately after the completion of the tasks.

4.7 Operating faults

Malfunctions of the unit/system may be caused by a fault that can be localised and eliminated with the aid of the "Troubleshooting" section.

- Assign the associated tasks to the corresponding specialised personnel.
- If the fault cannot be eliminated, contact the service of the manufacturer.

NOTE

See the "Contacts" section.

4.8 Residual risks

4.8.1 General information

Any unavoidable, design-based residual risks (if present) are mentioned and described in this instruction manual in the corresponding sections.

The notes and information provided below should be understood as basic safety-relevant instructions regarding specific types of danger. Follow these basic safety-relevant instructions for all of the work involving the unit.

4.8.2 Electrical dangers

An electric shock can kill or cause serious injury. Damage to the insulation or individual components is life-threatening. Only specially trained persons are permitted to work on electrical lines and components.

- Shut off the unit immediately in the case of a power supply failure or if there is damage to the components/insulation.
- Lockout/Tagout/Tryout the electrical system before commencing maintenance or repair work.
- Never bypass or disable safety devices.
- Immediately fix/replace loose connections, damaged cables, defective electrical components. Do not crush or pinch cables.
- Keep electrical parts dry.
- Keep control cabinets closed at all times. Permit access to authorised personnel only.
- Use only original fuses with the prescribed amperage.
- When working on live components:
 1. Disconnect the unit from the power supply to de-energise it.
 2. Secure it against being switched back on.
 3. Verify the de-energised state.
 4. Earth and short-circuit the unit/machine.
 5. Cover any adjacent live parts and secure the hazard zone.

4.8.3 Mechanical dangers

Moving parts

Moving parts that are freely accessible can kill or cause serious injury. There is danger due to impact/shock, getting caught, entanglement, crushing, or entrainment by moving parts.

- Operate the unit only with mounted covers/panels and locked doors.
- Maintain a safe distance from moving parts.
- Do NOT reach into the unit.
- Do NOT introduce any auxiliary devices into the unit such as search mirrors, cameras, torches, tools, etc.
- Wear close-fitting clothing.
- Do not wear rings, necklaces or any other jewellery.
- If you have long hair, wear a hair net.
- Commence servicing, maintenance or repair work only after the unit has come to a standstill.

4.8.4 Pressurised components

Pressure in the unit or wiring system

The internal and external lines could be under pressure, even after the unit has been shut off.

- Before carrying out any work, ensure that the unit is shut off and secured against being switched back on.
- Before carrying out work on the piping system and tanks ensure that they are depressurised.
- Before carrying out any work, ensure that the feed valves and drain valves are closed.
- Before connecting or disconnecting plug-and-socket connections:
 - Perform a manual emergency release.
 - Switch off pump(s).
 - Close the shut-off valve (if present) of the pressure line.
 - Always wear the protective clothing that is suitable for carrying out the work.

Bursting lines and hoses

Bursting lines and hoses can cause injuries.

- Before using the unit and the work equipment check them for proper condition and operational reliability.
- Do not use the unit if connecting lines or important unit parts are damaged.
- Use the unit only as intended and within the performance limits specified in the section "Technical data".

4.8.5 Refrigerant

Warning – General hazards!

Danger due to improper handling of the refrigeration unit.

Only companies specialised in the servicing of refrigeration systems are authorised to perform work on the refrigeration unit.

Additional expertise is required for personnel to work on refrigeration systems with flammable refrigerants.

Fire hazard!

The unit contains a flammable refrigerant. There is an increased risk of physical injury due to fire should the refrigerant escape in combination with an existing ignition source.

- Keep open flames and ignition sources away from the unit.
- Ensure adequate ventilation.
- Wear personal protective clothing (e.g. safety gloves, safety goggles).
- Use only approved work equipment for carrying out work on the unit.
- When setting up the unit in buildings, select the size of the room in accordance with the specifications defined by DIN EN 378-1 in dependence of the refrigerant fill quantity stated in the “Technical data” section.

Dangers associated with handling flammable refrigerants.

The refrigerant is a highly flammable gas. There is an increased risk of physical injury due to fire should the refrigerant escape in combination with an existing ignition source.

- Keep away from heat, hot surfaces, sparks, open flames and other ignition source types.
- Remove all ignition sources if this is possible in a safe manner.
- No smoking.
- Observe the safety data sheet for the refrigerant.
- Ensure adequate ventilation.
- Stop gas leakage.

4.8.6 Hot surface

Hot surfaces can cause severe injuries/burns.

- Only carry out work with suitable protective clothing, protective gloves and complete arm covering.
- Allow components to cool down before touching them. Wait until the surface temperature has dropped below 40° C.

4.8.7 Chemicals

The handling of chemicals (oils, greases, cleaning agents, consumables, auxiliary substances) can present a health hazard. Chemical media can cause chemical burns to unprotected body parts, chemical irritations and damage to components. Chemical substances are a danger to the environment.

- Use only approved and released resources for whose use, dosing and handling you have received instruction.
- When handling chemicals, comply with the relevant safety data sheets.
- Do not mix different substances.
- Check cleaning agents for material compatibility. Do not use any flammable cleaning agents containing silicone or chlorine (unless explicitly specified by the manufacturer).
- Ensure that cleaning agents cannot enter any system circuits.
- Use suitable collection systems to catch drippings or leakage.
- Remove leaked/excess chemicals without delay.

4.8.8 Behaviour in the case of an emergency

Switch off the unit immediately if persons or material assets are directly put at risk.

- Disconnect the unit from the power supply to de-energise it.
- If possible, close the media supply lines.

4.8.9 Behaviour in the case of faults

Immediately switch off the unit in the case of abnormal operating behaviour such as unusual noise/vibration/odour, increased temperatures, incorrect behaviour or indication errors.

- Disconnect the unit from the power supply to de-energise it.
- Perform a fault analysis as specified in the section "Fault rectification".

4.9 Safety labels

Notes and symbols on the equipment/system, e.g. safety labels and plates, must be absolutely complied with. Do not remove them and ensure that they are fully legible.

The operator must record the position of the warning plates or labels.

NOTE

Destroyed or illegible marks/symbols must be replaced immediately.

	Warning – Electrical hazard. Only qualified personnel are authorised to perform work on the electrical systems. Carelessness can lead to electrocution. • Observe the "Safety" section. • Wear protective clothing.
	Warning – electrical hazard. Do not connect or disconnect any of the electrical connectors under voltage/load.
	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.
	Warning! Connection point for fixed connection only. The user must provide an all-pole disconnecting device.
	Warning! High leakage current! Ensure earthing before connection.
 	Dangerous voltage! Wait 5 minutes after disconnecting from the mains before continuing work. See also the operating instructions.
	Warning concerning flammable substances (propane)! The unit contains pressurised, flammable refrigerant. • Keep open flames and ignition sources away from the unit. • Compliance with the information in the "Safety" section is mandatory. • Compliance with the safety data sheets is mandatory.

Option

Attention! This unit includes a connector inside. Select the right voltage before using. 230/208/115/100VAC 50/60 Hz 	Power supply connection Notice! This Unit includes a connector inside. Select the right voltage before using. 230V/208/115/100VAC, 50/60Hz
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5 Description / Overview

5.1 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.

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

- Process water circuit
- Refrigeration circuit
- Cooling/temperature control circuit

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

- Air circuit
- Refrigeration circuit
- Cooling/temperature control circuit

With its customer-specific design, the cooling device is intended for use in racks.

The cooling device is optionally placed on a trolley.

NOTE

The castors are not suitable for transporting the unit. They are solely intended for moving the unit in the area of the installation location.

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

NOTE

The unit has been designed for indoor use in industrial buildings.

Operate the machine/device only as intended and within its capacity range. Please refer to the "Technical data" section.

Use only approved operating materials according to the "Technical data" chapter.

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.

5.2 Safety devices

- Safety devices of the refrigeration unit as per EN378, part 2
- 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.

5.3 Factory protective measures

- Outer painting/coating/anodisation against corrosion.
- Protective earthing / potential equalization for static discharge.
- Warning signs (in accordance with the German Arbeitsstättenrichtlinie (Technical Regulation for Workplaces) A1.3 "Sicherheits- und Gesundheitsschutzkennzeichnung" (Health and/or Safety Signs)), e.g. "Warning – dangerous voltage".

5.4 Deactivation

- The unit is switched on/off by connecting/disconnecting the power supply connector.
- The device can be switched on/off by the higher-level system/by the higher-level device.
- The device is de-energized by disconnecting the electrical connecting line.

5.5 Foreseeable misuse

The following points describe a foreseeable misuse of the unit/system:

- Use of the unit for storage purposes or as a work platform.
- Attaching transport aids
- Set-up in unsuitable locations
- Transport with filled tank.
- Stepping on the unit.
- Outdoor use.
- Operation in hazardous areas with a risk of explosion.
- Operation of the unit without medium.
- Operation of the unit without protective earth connection.
- Operation with missing or damaged sub-assemblies intended to protect the safety of persons and the device/system.
- Operation of the unit without unit cladding.
- Use of chilling media that are not specified and approved in "Technical Data".
- Non-compliance with the permissible technical data. Information on the refrigerant type can be found in the "Technical Data" section in the Appendix.
- Cooling of media and objects that are not intended for the operation of the unit/system.

5.6 Information concerning the refrigerant

The refrigerants used are so-called hydrofluorocarbons (HFCs) without Ozone Depletion Potential (ODP = 0).

The refrigerant is classified in safety group A3 in accordance with EN 378 "Refrigeration systems and heat pumps".

NOTE

Observe the relevant safety data sheets of the suppliers.

Dangers:

If there is insufficient ventilation, the formation of explosive/highly flammable mixtures is possible.

The vapours are heavier than air and can accumulate in higher concentrations in lower areas (e.g. on the ground or in pits or floor drains).

Inhalation of high concentrations of the gas can cause detrimental health effects due to the reduced oxygen content. The gas has an asphyxiating effect in high concentrations.

DANGER

Fire hazard!

The unit contains a flammable refrigerant. There is an increased risk of physical injury due to fire should the refrigerant escape in combination with an existing ignition source.

- Keep open flames and ignition sources away from the unit.
- Ensure adequate ventilation.
- Wear personal protective clothing (e.g. safety gloves, safety goggles).
- Use only approved work equipment for carrying out work on the unit.
- When setting up the unit in buildings, select the size of the room in accordance with the specifications defined by DIN EN 378-1 in dependence of the refrigerant fill quantity stated in the "Technical data" section.

Danger to life due to suffocation!

The refrigerant is heavier than air and can cause asphyxiation if released in high concentrations.

- Do not position the unit in pits, lower areas or close to floor drains.
 - Ventilate the work area.
 - Wear protective clothing, gloves and respiratory protection.
-

⚠ WARNING**Carry out instructed work 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).

It is important to comply with the following points:

- Avoid damage to the pipes of the refrigeration circuit during transportation and assembly.
- In case the refrigeration circuit is damaged, ensure that open flames and ignition sources are kept away from the device.
 - Issuing refrigerant can cause injuries.
 - Ensure adequate ventilation!
- Do not put damaged refrigeration units into operation.
- 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 if released into the atmosphere.

- Work on the refrigeration unit should be performed only by personnel qualified according to the Chemicals Climate Protection Ordinance.
- Do not damage the refrigerant pipes.
- Used refrigerants must be returned to a certified company for reclamation.

5.7 Information on gas leaks

The unit is filled with a combustible refrigerant.

Even just small quantities can form a flammable gas/air mixture in certain conditions. Given that the refrigerant is heavier than air, it can collect near to the floor or in closed spaces.

There is an increased risk of fire or injuries in case of refrigerant leaks in conjunction with an ignition source.

NOTE

- technotrans refrigeration units are engineered as hermetically sealed systems.
 - Before dispatch, all units are carefully inspected to make sure they are leak tight and pressure resistant.
-

In the event that, despite these measures, there is a suspected leak, adhere to the following points:

- Do not put the unit into operation.
- Contact the technotrans service department. They will carry out all the necessary work on the refrigeration unit (e.g. leak tightness test, inspection of the refrigerant).
Personnel require additional expertise for work on refrigeration systems with combustible refrigerants.
- Refer to the chapter "Contact addresses".
- Adhere to the chapter "Transportation".

Measures for finding leaks

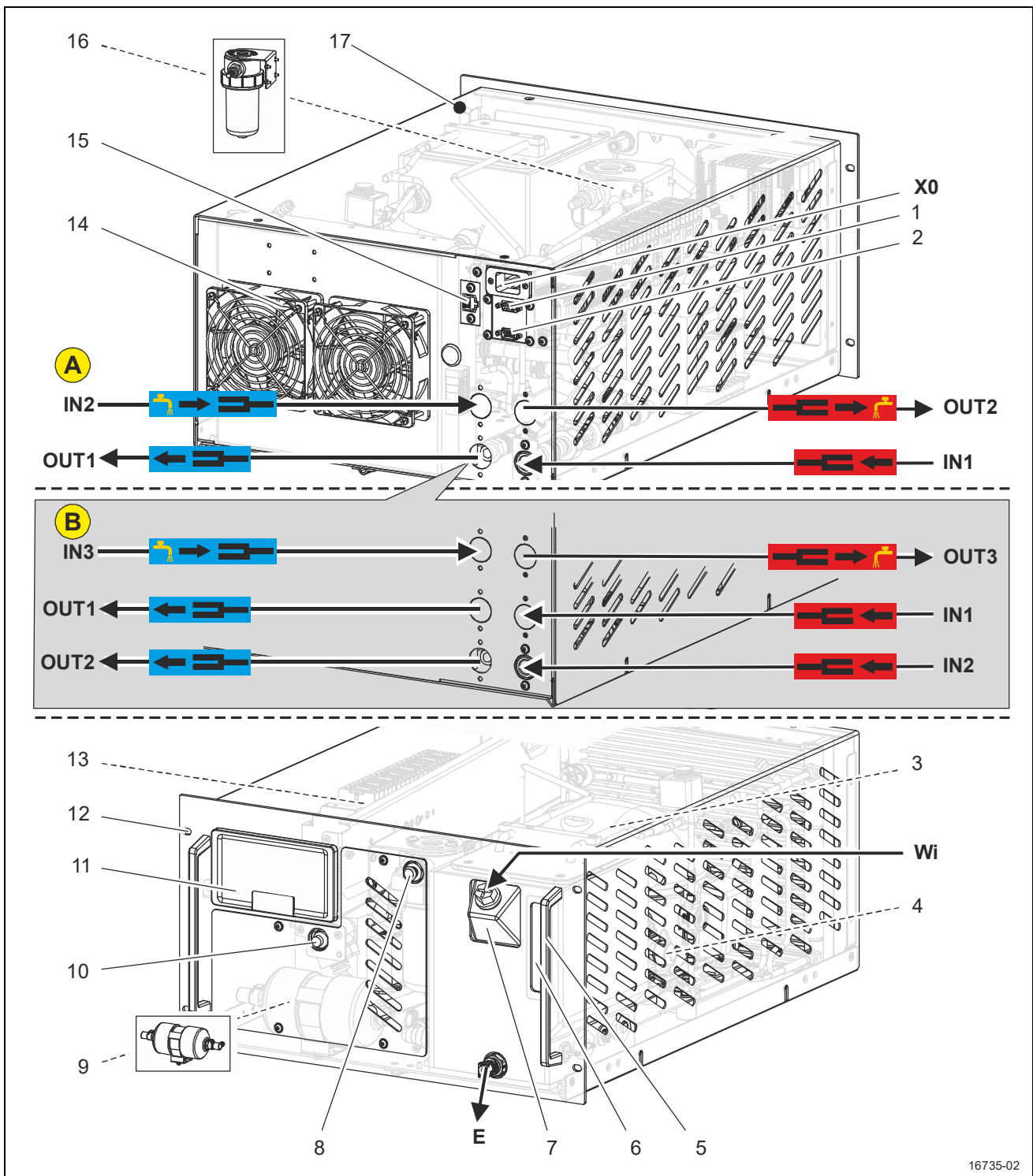
- Make sure there is sufficient ventilation.
- Keep open flames and ignition sources away from the unit.
- Wear personal protective equipment (e.g. gloves, safety goggles).
- Use only approved work equipment for carrying out work on the unit.

Detecting gas leaks

The following auxiliary devices can be used for detection (examples):

- Electronic gas detectors (stationary or mobile, calibrated for hydrocarbons)
- Portable leak detector devices (Hand-held detectors for flammable gases)

6 System layout



16735-02

Fig. 3: Cooling unit (example)

- 1 Interlocks (I/O signals)
- 2 Serial interface RS485
- 3 Refrigeration unit with:
 - Low-pressure switch
 - Compressor
 - High-pressure switch
 - Hot-gas bypass valve
 - Condenser
 - Filter dryer
 - Refrigerant sight glass
 - Expansion valve
 - Heat exchanger
- 4 Pump
- 5 Handhold (both sides) (optional)
- 6 Fill level indicator
- 7 Tank with:
 - Level switch
 - Heater
 - Temperature sensor
- 8 Sealing plug for venting the pump
- 9 Ion exchanger (DI cartridge, option)
- 10 Bypass valve for adjusting the volumetric flow rate (cooling medium)
- 11 Control unit
- 12 Hole for fastening (both sides)
- 13 Switch box with:
 - Air-break contactor
 - Fuses
 - Speed controller (compressor)
 - Relay
- 14 Condenser with fan (for AW units only)
- 15 Network connector (RJ45, Ethernet)
- 16 Filter for cooling medium (behind the cover plate)
- 17 Cover plate (removable)

Connections

- | | |
|----|-------------------------------|
| E | Drainage point |
| Wi | Filling point |
| X0 | Power supply connection point |

Variant "A"

- | | |
|------|----------------------------------|
| IN1 | Medium inlet 1 (cooling medium) |
| OUT1 | Medium outlet 1 (cooling medium) |

Only for WW units:

- | | |
|------|-------------------------------|
| IN2 | Medium inlet (process water) |
| OUT2 | Medium outlet (process water) |

Variant "B"

- | | |
|------|----------------------------------|
| IN1 | Medium inlet 1 (cooling medium) |
| IN2 | Medium inlet 2 (cooling medium) |
| OUT1 | Medium outlet 1 (cooling medium) |
| OUT2 | Medium outlet 2 (cooling medium) |

Only for WW units:

- | | |
|------|-------------------------------|
| IN3 | Medium inlet (process water) |
| OUT3 | Medium outlet (process water) |

NOTE

Please refer to the blue and red labels on the device indicating the inlets and outlets.

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

Follow the instructions given in the circuit diagram.

7 Transport

The following must be observed in order to avoid injuries and damage to property:

- Only qualified personnel are authorised to perform these tasks.
- Comply with the information given in the "Safety" section.

WARNING

Danger to persons due to heavy objects!

The total weight must be taken into account for transport of the device.

- Observe the weight given in "Technical data".
- Ensure that several persons and/or suitable lifting equipment is used to transport the device.
- Wear personal protective equipment.

7.1 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 damage.
- 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.

7.2 Transport to the installation location

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.

Risk of crushing between components during transport.

During the transport of components, limbs may be crushed. Serious injuries may result.

- Only use suitable means of transport.
- Secure the loads adequately.
- Wear personal protective equipment.

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.
-
- When moving the unit, the respective transport vehicle (e.g., forklift, pallet truck) must be operated compliant with the local rules and regulations and according to relevant industrial accident prevention regulations.
 - Compliance with the maximum lifting capacity of the transport equipment is mandatory. The weight of the unit is stated in the "Technical Data" section.
 - Push the forks of the forklift/pallet truck horizontally into the transport pockets of the unit.
 - Ensure that the load is evenly distributed when using a forklift/pallet truck.
 - Use a low lifting speed.

7.3 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 unit.
- Comply with the data stated in the “Technical Data” section concerning the ambient temperature for operation, transport and storage when the unit is completely empty.
- Ensure sufficient space for operating, maintaining and cleaning.
- If provided, keep the vents for incoming and outgoing air clear

Observe relevant technical and building regulations.

Hoses and electrical cables must be laid such 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’s instructions concerning substances used for or located near the machine must be observed.

When installing the units near traffic routes, separate the units from the traffic routes by suitable structures.

8 Setting Up

8.1 Notes

The following must be observed in order to avoid injuries and damage to property:

- Only qualified personnel are authorised to perform these tasks.
- Comply with the information given in the "Safety" section.

WARNING

Risk due to incorrect installation/start-up!

There is an increased risk of injury for persons who perform tasks for which they are neither qualified nor trained.

- Only persons who are familiar with the tasks, who have been informed about the associated hazards and who have the necessary qualifications are authorised to install/start the unit.
- All technical safety conditions must be fulfilled prior to the installation/start-up.
- The location of the unit or system must comply with the specifications that are stated in the chapter "Transport/Location selection".

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

- 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
- Maintenance
- Technical Data

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

8.2 Installation

⚠ 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!

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.

NOTICE

Risk of chiller overheating!

An insufficient exchange of air will result in the chiller overheating.

The size of the room where the chiller is to be installed must be selected so that unrestricted extracting and exhausting of cooling air, as well as a sufficient exchange of air for heat dissipation purposes, are ensured.

NOTE

The load-bearing capacity of the set-up surface must be sufficient for the total weight of the unit/machine. The set-up surface must be vibration-free and sufficiently firm. The set-up surface must not transfer any vibrations.

Take the following measures prior to the set-up:

- Prepare the set-up location (level ground with a sufficient load-bearing capacity).
- Perform the set-up in accordance with the specifications in the project drawings (e.g. floor plan, foundation plan) (if provided).

Set the unit up at the intended installation site.

NOTE

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

The customer is responsible for ensuring the stability of the unit.

The unit is intended as a version for 19" racks (Euro rack).

Fastening takes place via the front plate in order to prevent parts from being loose.

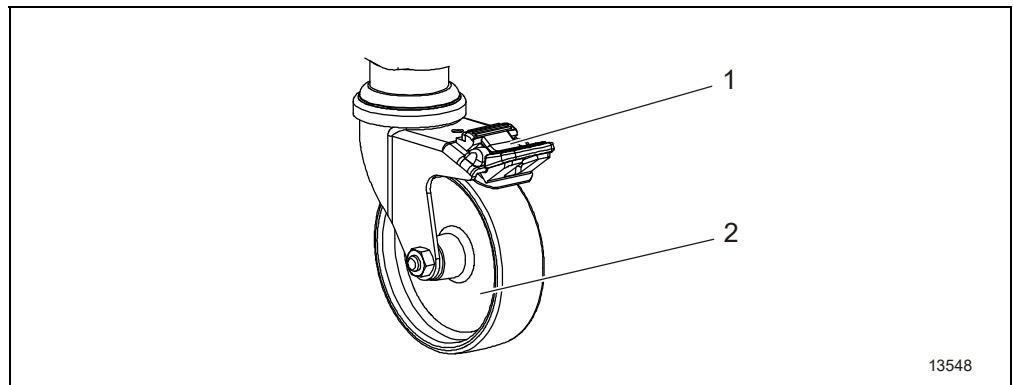
Unit with castors

Fig. 4: Castors underneath the device

- 1 Brake
- 2 Castor

After positioning at the installation site and prior to commissioning the device, secure the castors (2) by means of the brakes (1).

NOTE

The castors are not suitable for transporting the unit. They are solely intended for moving the unit in the area of the installation location.

8.3 Connections

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.
-

NOTE

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

Connection sizes according to the "Technical Data" section.

All hoses must be designed to withstand the maximum operating pressure of the unit. Observe the maximum operating pressure listed in the Technical Data.

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

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 unit must be flexible and sufficiently pressure- and temperature-proof.

Connect the unit.

NOTE

Comply with the information given in the "System layout" section.

- Medium inlet (IN)
- Medium outlet (OUT)

Only for WW devices:

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

Please refer to the blue and red labels on the device indicating the inlets and outlets.

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

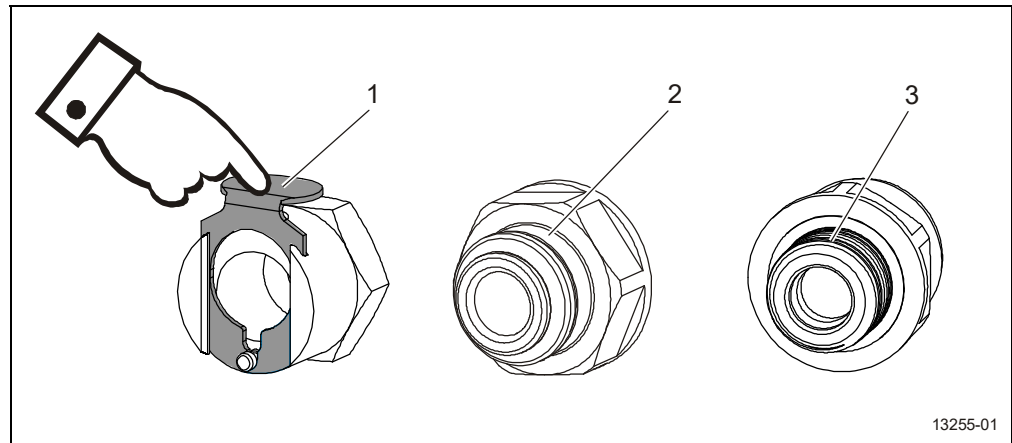


Fig. 5: Medium connections (general)

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.

8.4 Electrical connection

8.4.1 General information

⚠ WARNING

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.

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.

NOTICE

Wrong connected voltage!

Incorrect supply voltages can lead to component damage.

Compare the supply voltage value with the voltage specification stated on the nameplate. Ensure the necessary fuse protection in accordance with the "Technical Data" section or circuit diagram.

Possible false tripping of a site-installed residual current circuit breaker!

When switching on the device, the built-in frequency converter may cause a site-installed residual current circuit breaker to trip incorrectly.

- Only use residual current circuit breakers that are sensitive to all currents.
- When connecting the device via an AC plug (e.g. Schuko plug), ensure that phases L and N are correctly assigned. If necessary, rotate the plug by 180° to ensure correct phase alignment.

NOTE

Follow the instructions given in the circuit diagram.

Fuses or circuit breakers must be provided by the customer in accordance with the circuit diagram.

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

Connect the interface cable for the communication with the unit.

Provide connection according to the enclosed circuit diagram (if provided). Observe the local rules and regulations.

Connection for the power supply connector for the unit.

8.4.2 Residual-current-operated circuit-breaker

technotrans recommends using residual-current-operated circuit breakers if the technotrans unit is connected to the customer's power supply system. It is not permissible to connect other devices (consumers, power sockets, etc.) downstream of the residual-current-operated circuit breaker.

If the technotrans unit is supplied with power via the customer-provided machine, the specifications of the manufacturer, which must be provided by the customer, must be complied with.

Fuse protection to be provided by the customer	Residual-current-operated circuit breaker Nominal current (In)
10 / 16 / 20 / 25	25
35	40
50 / 63	63
80	80
100 / 125	125

WARNING

Danger to life due to nuisance tripping of the customer-provided residual current circuit breaker (RCCB).

Nuisance tripping of the customer-provided residual current circuit breaker and increased residual current can occur in devices equipped with frequency converters.

- The customer should select an AC/DC-sensitive residual current circuit breaker (alternating voltage, pulsating alternating voltage, direct current and pulsating direct current) for devices equipped with frequency converters.
- Use a type B+ residual current circuit breaker for protection against fire and for protection of the system.

8.4.3 Setting the mains voltage

⚠ 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

Follow the instructions given in the circuit diagram.

Based on its factory settings, the device is intended for an input voltage as per the circuit diagram. Thanks to the integrated transformer, the unit can also be operated with a different input voltage.

Prior to changing the mains voltage, ensure that the unit is disconnected from the power supply.

Change the mains voltage in accordance with the circuit diagram of the device.

NOTE

Select the correct connector for the mains voltage.

8.5 Process water circuit

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.

General	Unit	Value
Maximum permissible operating pressure of the process water	bar	5,0

Water constituent	Unit	Value
pH value		7-9
Total hardness	°dH	6-15
Substances that can be removed by filtration	mg/l	< 30
Biological quality, germs	KBE/ml	< 100
Permissible glycol content	%	20-35
Permissible oil content	%	0
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
Copper	mg/l	< 2
Manganese	mg/l	< 0,1
Free aggressive carbonic acid	mg/l	< 20
Max. contaminant particle size	µm	< 100

8.6 Filling

⚠ WARNING

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 to components!

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

NOTE

For information about the optimum water quality for filling the circuit, see the "Technical data" section in the appendix.

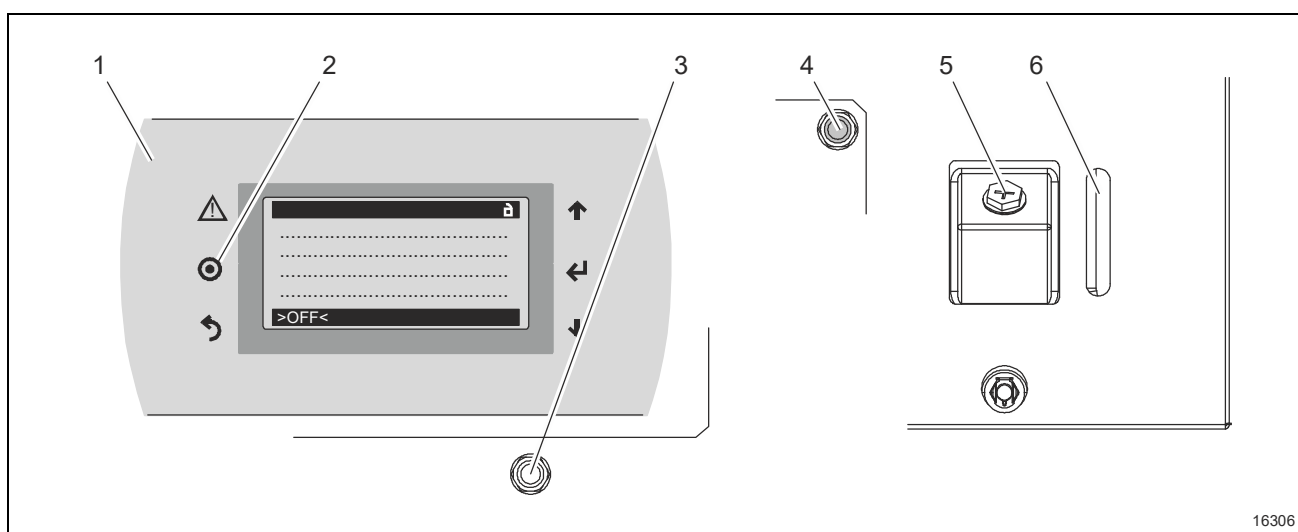


Fig. 6: Filling (example)

- | | | | |
|---|--|---|------------------------------------|
| 1 | Control unit | 3 | Bypass valve |
| 2 | Key for switching the unit on/off
(only if respective switch-on mode is
activated) | 4 | Pump vent (plug) |
| | | 5 | Filler neck (Wi) with sealing plug |
| | | 6 | Fill level indicator |
- lit orange: Unit is switched on.
 - Press and hold the key for approx. one second to switch the unit on.
 - Briefly press the key to switch the unit off.

The appliance must be filled before it is used for the first time.

Prerequisite:

- Medium connections to the consumer are connected.
- The appliance is connected to the power supply.

NOTE

- Only use the cooling medium that is specified in the "Technical data" section.
- Information regarding setpoints and actual values is indicated on the display screen of control unit.
- The filling level is indicated on the display screen of the control unit.
- If the tank fill level falls below the minimum, the pump and the compressor are switched off.
- In "filling mode" (optional), only the pump is activated.
- Observe the "Operation/Control unit" section.

Full the unit as described in the following:



1. Remove the plug from the pump vent valve (if available).



2. Open the bypass valve (if available) for initial filling.
For information about adjusting the bypass valve, see the "Bypass valve" section.

3. Remove the sealing plug from the filler neck.
4. Fill the tank with medium via the filler next up to the MAX level, as per the section "Technical data". Observe the filling level indicator as necessary.
5. Re-attach the plug to the pump vent valve (if available).
6. Seal the filler pipe with its plug.
7. Switch the unit on briefly, e.g. using the control unit.
8. Check the fill level. If necessary, continue topping up the tank.
9. Repeat the process, if necessary.
10. Set the required medium temperature at the operator panel provided by the customer.
11. Set the bypass valve (if available) again.
For information about adjusting the bypass valve, see the "Bypass valve" section.

Filling mode (option):



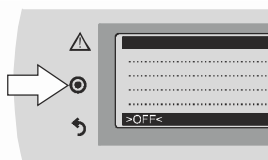
1. Remove the plug from the pump vent valve (if available).



2. Open the bypass valve (if available) for initial filling.
For information about adjusting the bypass valve, see the "Bypass valve" section.

3. Remove the sealing plug from the filler neck.
4. Fill the tank with the medium up to the MAX level as per the section "Technical data". Observe the filling level indicator as necessary.
The filling level ("level" parameter) is displayed as a percentage value on the display screen of the control unit.
5. Re-attach the plug to the pump vent valve (if available).
6. Seal the filler pipe with its plug.
7. Acknowledge the fault message on the control unit as necessary.
Observe the "Operation/Control unit" section.
8. Call up "filling mode" on the control unit as described in the following.
 - Call up the page "**select menu / work hours / ON/OFF/Filling modus**".
 - Set the parameter "**filling mode**" to "**ON**" (filling mode is active).
 - Observe the "Operation/Control unit" section.
9. Switch on the unit, depending on the activated switch-on mode (On/Off mode). Observe the "Operation/Control unit" section.

NOTE



The device can only be switched on/off using the unit button on the display screen if the page "**Main Display x**" or "**On/Off/filling modus**" is displayed.

The pump starts for a set time.

The following cases can arise.

Case 1:

- The filling level in the tank drops not below the minimum in the set time. The filling process is completed automatically.
- The parameter "**filling mode**" switches automatically to "**OFF**" (filling mode deactivated).

Case 2:

- The filling level in the tank drops below the minimum in the set time. A fault message is displayed on the display screen.
- The parameter "**filling mode**" remains set to "**ON**" (filling mode activated).

If case 2 arises, continue the process as follows:

10. Continue topping up the medium and acknowledge the pending fault message.
11. Switch on the unit again depending on the activated switch-on mode (On/Off mode). The unit is in filling mode.
12. Repeat the process until the filling level in the tank does not fall below the minimum level within the specified time.
The filling process is then completed automatically. The parameter "**filling mode**" switches automatically to "**OFF**" (filling mode deactivated).

Continue the process as follows:

13. If necessary, continue topping up the medium as the hose system of the circuit must be filled. To do so, repeat filling process.
14. Fill the tank to 100% as necessary.
15. Readjust the bypass valve.
For information about adjusting the bypass valve, see the "Bypass valve" section.

Refilling:

1. Remove the sealing plug from the filler neck.
2. Fill the tank with the medium via the filler neck as per the section "Technical data" in the appendix. Observe the filling level indicator.
3. Screw the sealing plug of the filler neck back on.
4. Acknowledge the fault message on the control unit as necessary.
Observe the "Operation/Control unit" section.
5. Switch on the unit again depending on the activated switch-on mode (On/Off mode). Observe the "Operation/Control unit" section.

8.7 Bypass valve

Bypass valve for regulating the flow to the heat source.

NOTE

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

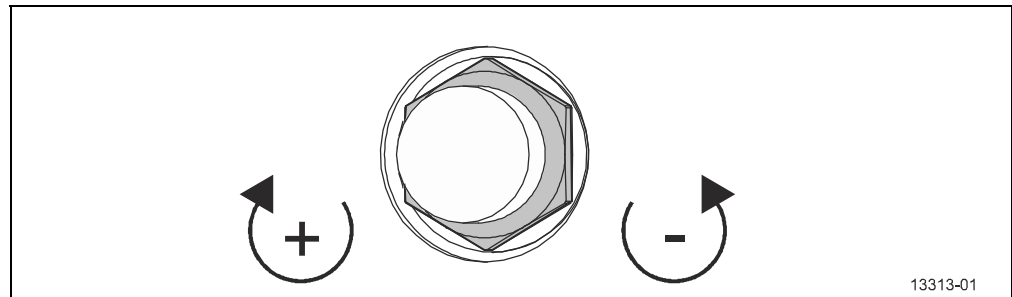


Fig. 7: Control valve

Set the flow rate as follows:

- Adjust the bypass valve in the plus “+” direction to close the bypass valve, increasing the flow rate to the consumer.
- Adjust the bypass valve in the minus “-” direction to open the bypass valve, reducing the flow rate to the consumer.

8.8 Final steps after start-up

Prior to using the unit/system, it must be absolutely ensured that there are no safety-critical defects or malfunctions. After the completion of the tasks and prior to switching the unit/system on, comply with the following (if applicable):

- Ensure that any safety devices, guards and covers which were removed prior to commencing the tasks have been properly reinstalled.
- Ensure that the area around the unit/system is free from tools, materials or other pieces of equipment that had to be used.
- Clean the workspace and remove any liquid spills or similar substances.
- Check whether the safety devices and guards of the unit/system operate correctly.

9 Operation

9.1 Notes

The following must be observed in order to avoid injuries and damage to property:

- Only qualified personnel are authorised to perform these tasks.
- Comply with the information given in the "Safety" section.

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 of the electrical connectors under voltage/load.

Damage to components!

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

NOTE

Use the unit only if the housing panels are installed.

Check proper condition of unit before switching it on. Please comply with the instructions given in the "Maintenance" section.

9.2 Switching the unit on or off

- The unit is switched on/off by connecting/disconnecting the power supply connector, depending on the operating mode set.
- The device can be switched on/off via the superordinate system/device depending on the operating mode set.
- The device is de-energized by disconnecting the electrical connecting line.

9.3 Adjustments

Once the unit is electrically connected, it will switch on.

The control unit is also automatically switched on. It may be necessary to adjust some of the parameters.

- If the external release signal (customer) is interrupted, the unit will be switched off.

The device can be switched on and off via the device control.

General information

- Ensure that there are no unauthorised persons in the area of the unit. If necessary, send these persons away from the area.
 - Comply with the instructions that are given in the "Safety" section.
1. Check the fill level in the tank by way of the fill level indicator.
 - If the fill level is too low, top the tank up via the filler pipe.
 - Observe any fault messages that are displayed by the control unit.
 - Follow the instructions that are given in the "Troubleshooting/Control unit" section.
 2. Adjust and/or change the desired medium temperature (set value) on the control unit.

NOTE

Please refer to the following chapter "Control unit".

3. Check the operating mode on the control unit and adjust if necessary depending on the unit requirements.

Waste water circuit

- only for WW devices -

- Ensure that process water is being supplied.

NOTE

The process water supply is not monitored by the unit.

The operator/owner is responsible for the process water supply of the unit.

The operator/owner is responsible for implementing monitoring measures (leakage, flow, shut-off, venting, etc.).

The manufacturer is not liable for any consequential damage.

9.4 Refilling

To refill: Add cooling medium as specified in the "Start-up/Filling" section.

9.5 Control unit

9.5.1 General information

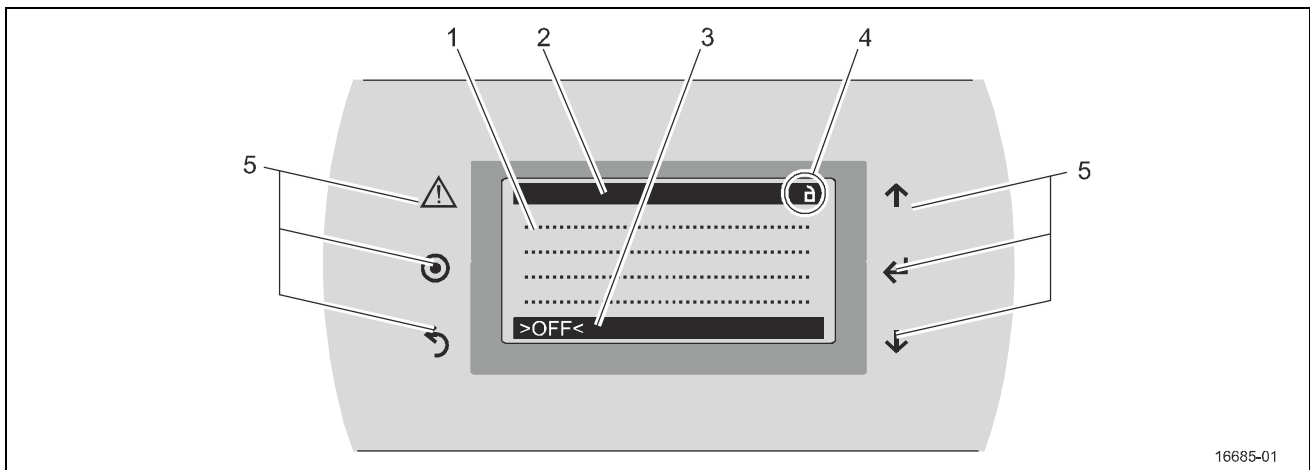
NOTICE

Damage to the unit!

The unit function cannot be ensured if the system configuration is tampered with. The values set at delivery are basic settings and may only be changed after consultation with the customer service.

NOTE

After connecting the voltage supply and switching on the device, the unit controller switches on automatically.



16685-01

Fig. 8: Control unit, operator panel (example)

- | | | | |
|---|---|---|---|
| 1 | Display (multi-line) | 4 | Display of current password protection |
| 2 | Display of current page title | • | Lock opened: password protection is inactive. |
| 3 | Status bar; information about unit status | • | Lock closed: password protection is active. |
| | | 5 | Function keys |

Function keys	Description
	Key for showing fault messages. Pressing this key will display current warnings and/or alarm messages.
	flashing There are no current warnings/alarms.
	Note Observe the “Troubleshooting” section.
	Key for switching the unit on or off (only after enabling the relevant activation mode) lit orange: Unit is switched on.
	>1s Press and hold the key for approx. one second to switch on the unit.
	<1s Briefly press the key to switch the unit off.
	ESC key Pressing the key will cancel the action or you will return to the previous screen.
	Up key Pressing the key enables you to scroll down the menu. Individual values can be adjusted in the current menu.
	Enter key Pressing the key will adopt an action or you will go to the next action.
	Down key Pressing the key enables you to scroll down the menu. Individual values can be adjusted in the current menu.

	Displays of the status bar	Description
0	OFF	The unit is switched off (not in operation). There is no error (defect, cut-off, alarm, warning).
1	ON	The unit is switched on; there are no errors.
2	ON - cooling	The unit is switched on; the unit is cooling.
3	ON - heating	The unit is switched on; the unit is heating.
5	OFF - cut off	The unit is switched off. There is a fault that does not permit the unit to be switched on. The status changes to <12> when attempting to switch the unit on.
6	OFF - defect	The unit is switched off. There is a defect that does not permit the unit to be switched on. The status changes to <13> when attempting to switch the unit on.
7	ON - warning	The unit is switched on and running. There is a warning.
8	ON - alarm	The unit is switched on and running. There is an alarm.
10	ON-emergency operation	The unit is switched on. The unit is processing. However, there is a fault that permits emergency operation only.
12	ON cut off → >OFF<	The unit has been switched on and it was switched off due to a fault. The fault continues to be present.
13	ON defect → >OFF<	The unit has been switched on and it was switched off due to a defect. The defect continues to be present.

9.5.2 Setpoint adjustment

Depending on the unit variant, setpoints (e.g. temperatures, pressures) are indicated/adjusted in the following screens:

- "main display 1" screen or
- "main display 2" screen

NOTE

- Select and adjust the setpoints as specified in the section "Selection and adjustment of values".
 - Comply with the information in the section(s) "Program overview" and/or "Screen contents and descriptions".
-

9.5.3 Selection and adjustment of values

Proceed as follows to select and make parameter settings:

The cursor is in home position at the upper left-hand edge of the display.

1. Press Enter.
2. Adjust the parameter by pressing the Up or Down key.
3. Press Enter.
The value is applied. You will be taken to the next adjustable value.
4. If necessary, repeat the procedure, depending on the listed parameters.
5. After reaching the last adjustable parameter, you will be taken to home position at the upper left-hand edge of the display.

NOTE

The process can be cancelled at any position by pressing the ESC key. The cursor will go to home position at the upper left-hand edge of the display.

9.5.4 Password protection

When unit-specific data are changed, the user is prompted to enter a password.

Password level	Password (preset)	Authorisation
0	No password required	Everyone
1	0011	Operator, customer
2	0012	
3	0013	
4	0014	
5	Cannot be selected	For technotrans service technicians only

	The password protection is active. Password-protected fields cannot be edited.
	The password protection is inactive. The password-protected fields of the corresponding password level can be edited.
<->	Log data recording (event log) active.

Password levels 1 to 4 are preset and only technotrans service technicians can change these or deactivate the password protection for specific PWLs.

Password level 5 is exclusively reserved for technotrans service technicians.

If no key is being pressed within a preset period, the system will automatically return to password level 0.

After switching the unit on (Power ON), it operates at password level "0". Displays and settings are reduced to the most essential items. Entering a higher-level password will enable making extensive settings and showing more displays.

Password level	Parameter settings	Validity
1	set point feed temperature	60 seconds
2	warning/alarm feed temperature	60 seconds
	warning/alarm condenser temperature	
	warning/alarm pressure	
	warning/alarm flow	
	warning/alarm flow 2	
	warning level	
	warning/alarm return temperature	
	warning/alarm ambient temperature	
	warning/alarm conductance	
	on/off modus	
	filling modus	
	filling time	
	overrun delay	
3	fan min. speed	60 seconds
	fan max. speed	
	fan min. temp.	
	fan max. temp.	
	min position	
	max position	
	cond min. temp.	
	cond max. temp.	
	compressor ON	
	compressor OFF	
	periode HGBP	
	P-value	
	I-value	
	D-value	
	I-summ	
	heater ON	
	heater OFF	
	P-control	
	I-control	
	periode PWM	
	Condenser set	
	P-control	
	I-control	
	comp.speed min	
	comp.speed max	
	valve on	
	valve off	
	min set point feed temperature	
	max set point feed temperature	
	selection external temperature sensors	
	date/time settings	
	timezone settings	
	buzzer settings	

4	cutoff feed temperature	60 seconds
	cutoff condenser temperature	
	cutoff pressure	
	cutoff flow	
	cutoff flow 2	
	cutoff level	
	cutoff return temperature	
	cutoff ambient temperature	
	interface protocol	
	interface address	
	interface option	
5	operating hours	For technotrans service technicians only
	fitment	
	service mode	

9.5.5 Setting the network address

Proceed to set the network address as follows:



1. Simultaneously press and hold the Alarm button and the Enter button on the operator panel of the control unit.

The following parameters are displayed:

- INFORMATION
- SETTINGS
- APPLICATION
- UPGRADE
- LOGGER
- DIAGNOSTICS



2. With the aid of the Up or Down arrow button, select the "SETTINGS" parameter.



3. Press Enter.
The following parameters are displayed:

- PASSWORD
- USB SETTINGS
- PLAN SETTINGS
- CLOCK SETTINGS
- RUNTIME SETTINGS
- TCP/IPv4 SETTINGS



4. With the aid of the Up or Down arrow button, select the "TCP/IPv4 SETTINGS" parameter.



5. Press Enter. The network settings are displayed:
Example:

- Enable: Static
- IP: 192,168,178,168
- Mask: 255.255.255.0
- GW: 0. 0. 0. 0
- DNS: 0. 0. 0. 0
- Update config? No

6. Make the desired network settings.
7. Save settings. To this end, set the "Update config?" parameter to "Yes". The settings will be adopted.

NOTE

- If the "DHCP/AutoIP" mode is selected under "Enable", the DHCP data will be shown in the window.
- In order to open the website for the cooling unit, enter the indicated network address in the web browser.

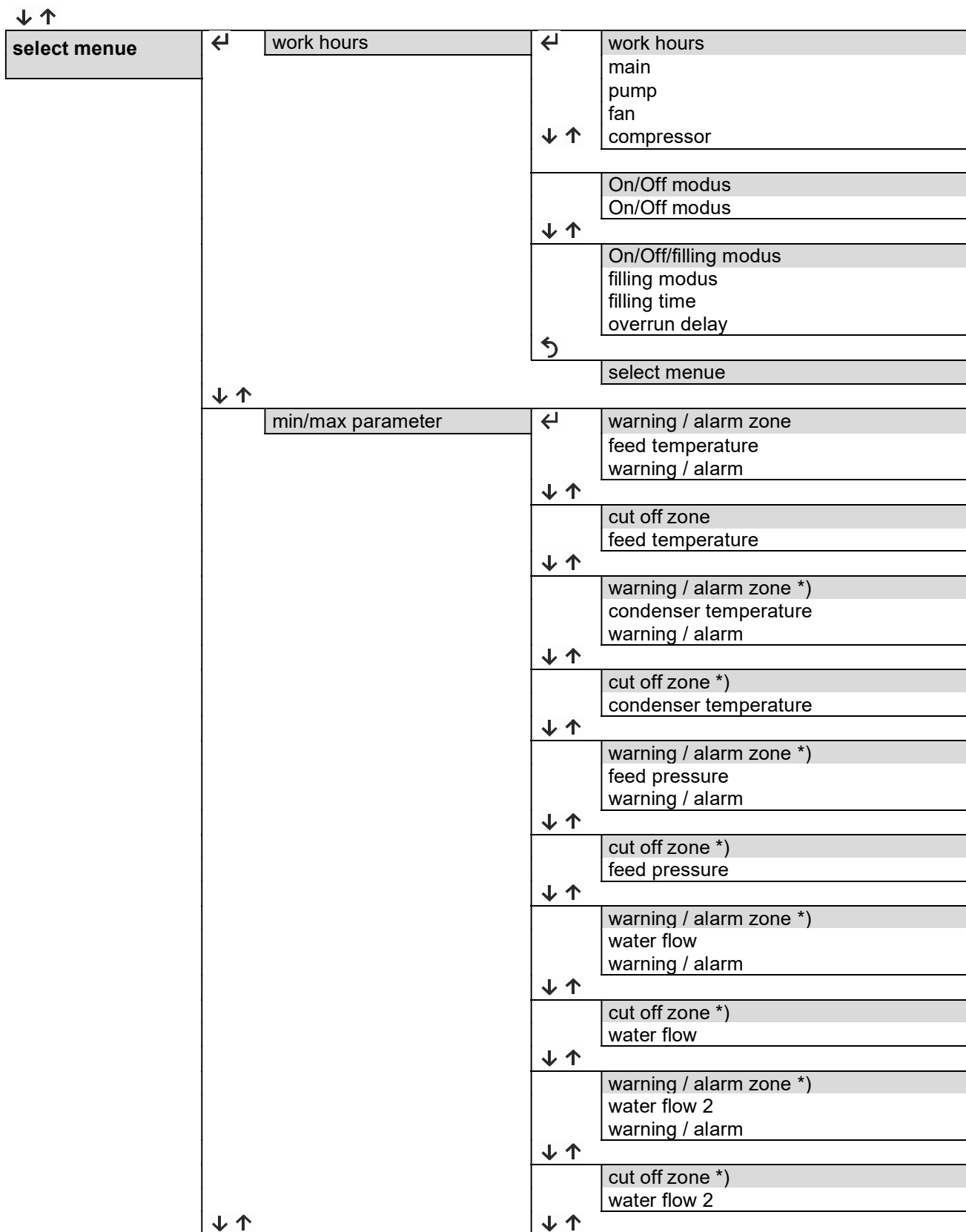
9.5.6 Program overview

NOTE

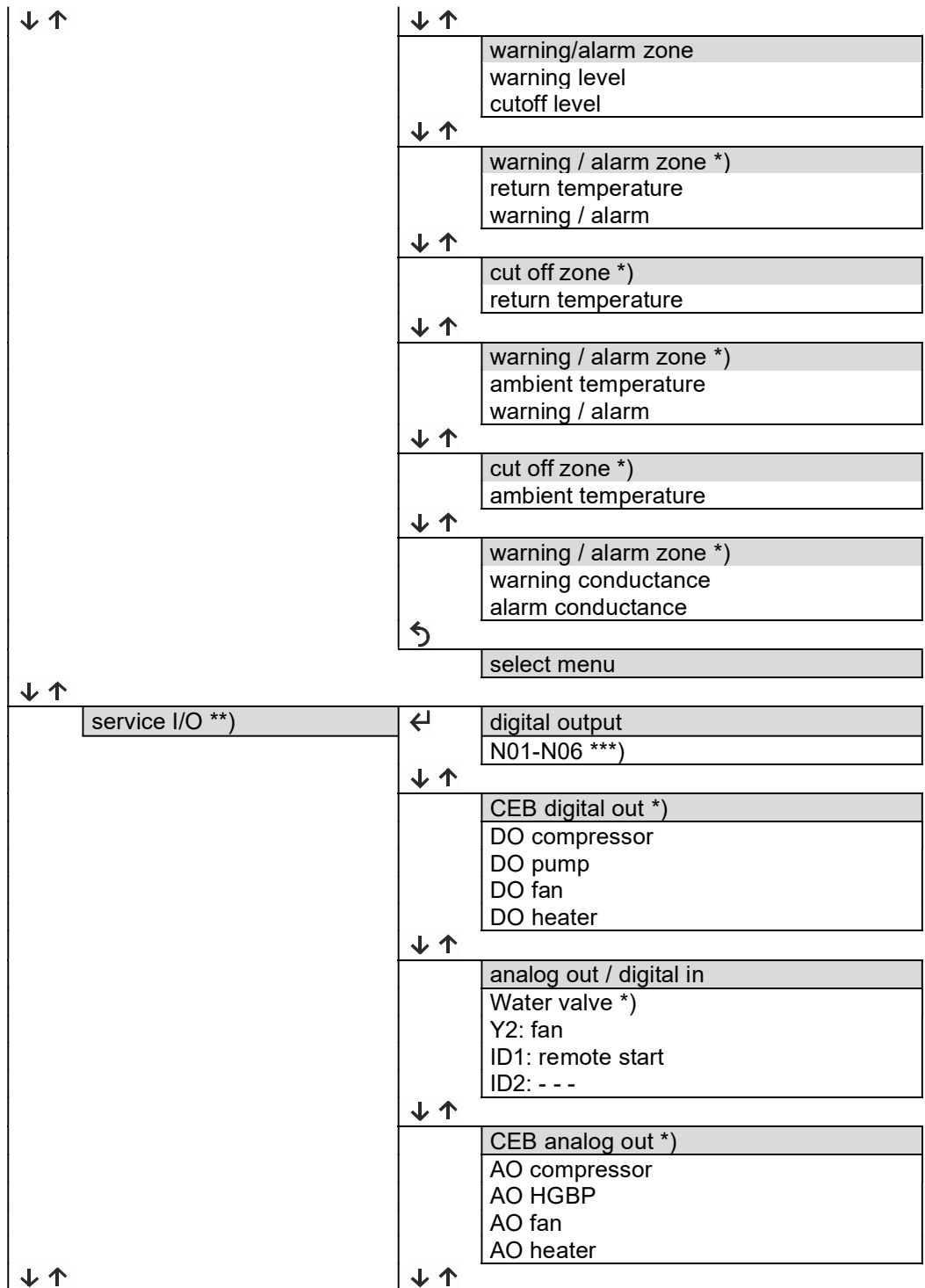
Depending on the equipment status and configuration of the system, there may be deviations in terms of the screens and functions.

Start page			
Automatic			
main Display 1 ↓ ↑	←	set	Adjustment/Display of set/actual values (temperature, flow rate, pressure, fill level)
		feed	
	↓ ↑	flow *)	
		pressure *)	
		level	
main Display 2 ↓ ↑	←	cooling	Indication of actual values (cooling/heating/fan/valve output level, temperature, conductance)
		heating *)	
	↓ ↑	condenser *)	
		fan water valve *)	
		return temp. *)	
		conductance *)	
main Display 2+ *) ↓ ↑	←	ambient temp *)	Indication of actual values (ambient; cooling capacity, flow rate 2)
		cool capacity *)	
	↓ ↑	flow 2 *)	
main Display 3 *) ↓ ↑	←	comp speed	Actual values display (compressor speed)

*) if present



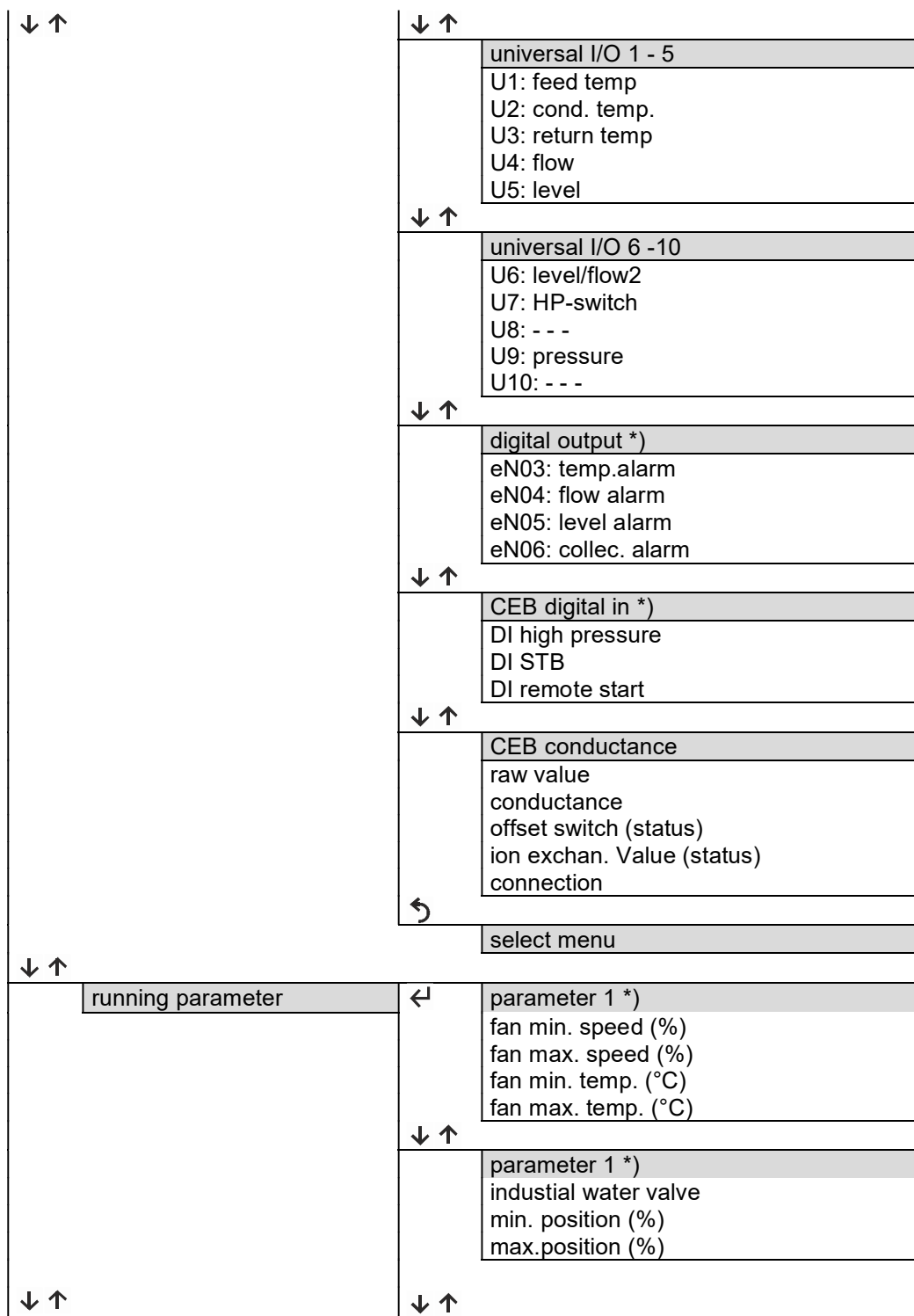
*) if present



*) if present

**) for authorised and qualified personnel only

***) depending on the specification



*) if present

↓ ↑

↓ ↑

parameter 1 *)
industrial water valve
min. position (%)
max. position (%)
cond min. temp. (°C)
cond max. temp. (°C)

↓ ↑

parameter 2
compressor ON (K)
compressor OFF (K)
periode HGBP (s)
P-value (%)
I-value (%)
D-value (%)
I-summ (%)

↓ ↑

parameter 3 *)
heater ON (K)
heater OFF (K)

↓ ↑

parameter 3 *)
heater
P-control (%)
I-control (%)

↓ ↑

parameter 3 *)
Heater
P-control (%)
I-control (%)
periode PWM (s)

↓ ↑

parameter 4 *)
Condenser set (°C)
industrial water valve
P-control (%)
I-control (%)

↓ ↑

parameter 5 *)
comp.speed min (%)
comp.speed max (%)

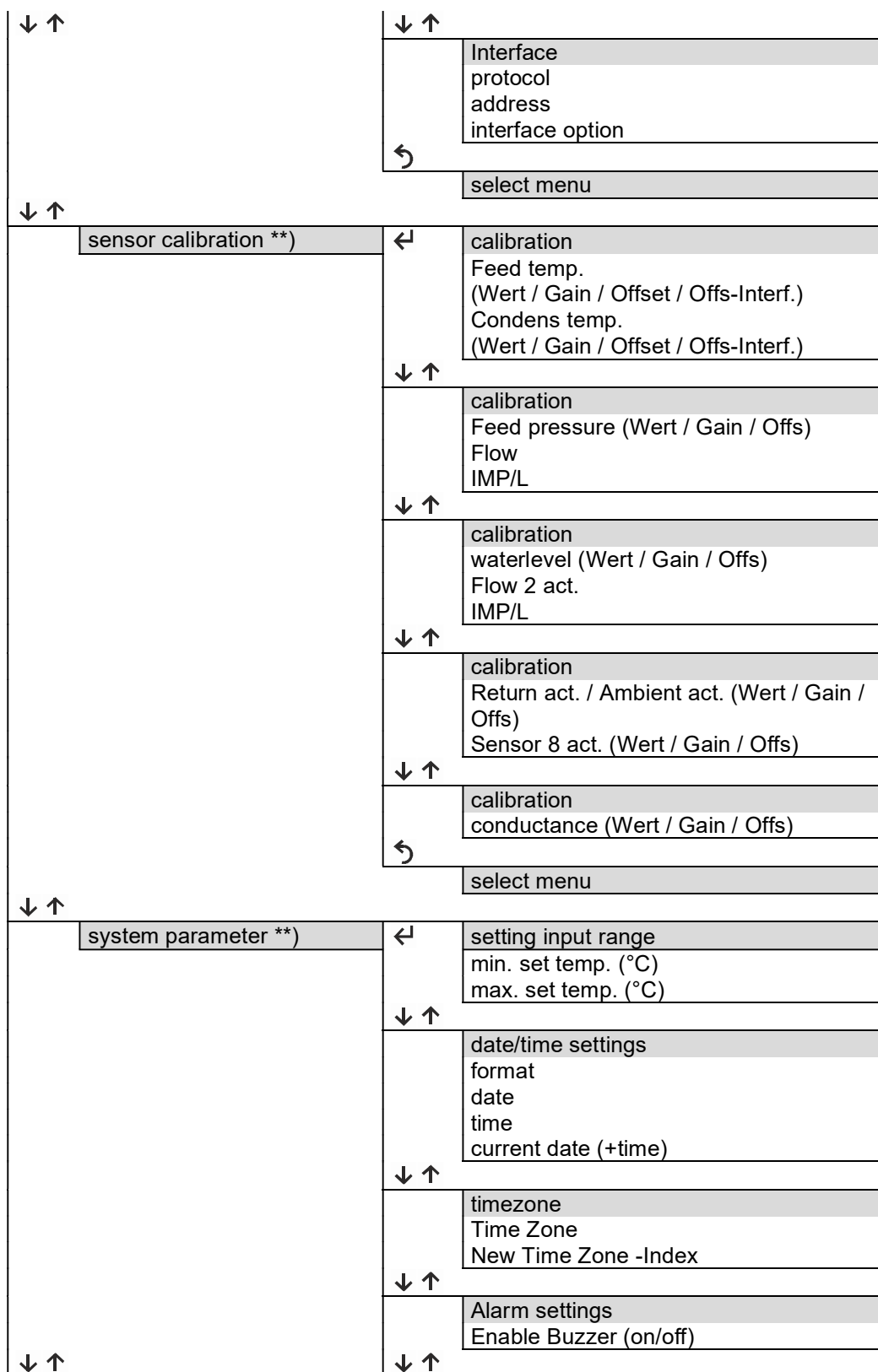
↓ ↑

parameter 6 *)
conductance control
valve on (μS)
valve off (μS)

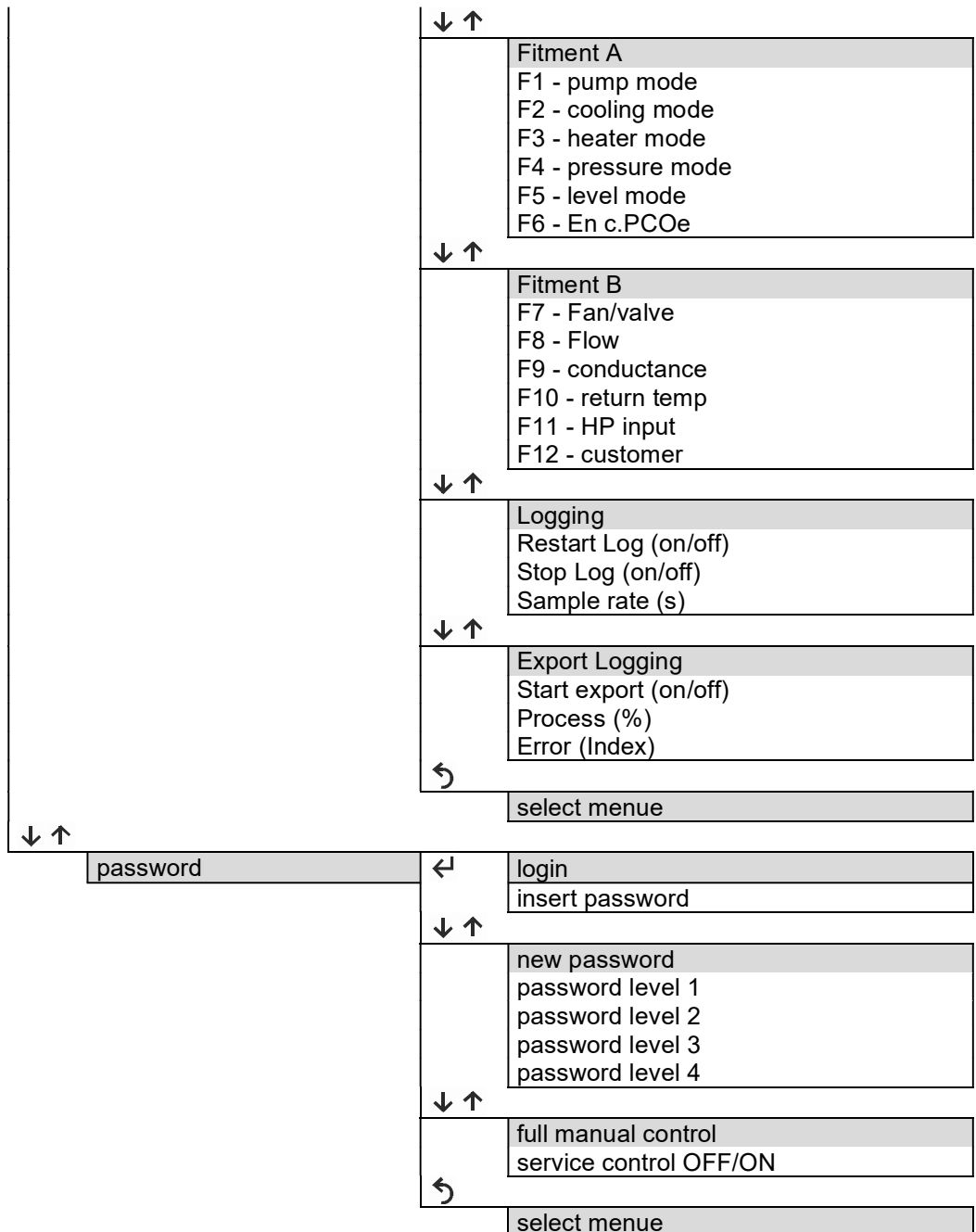
↓ ↑

↓ ↑

*) if present



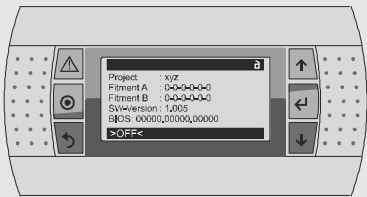
**) for authorised and qualified personnel only



9.5.7 Screen contents and descriptions

NOTE

Depending on the equipment status and configuration of the system, there may be deviations in terms of the screens and functions.

Screen contents	Description
Start page 	Indication of general information (e.g. project name, equipment, software version, firmware). After switching the unit on, this screen appears briefly. Note Please keep this information ready when contacting us (e.g. for spare part orders, warranty claims, etc.).
main Display 1	Adjustment/display of set/actual values
set	Adjustment/display of cooling medium temperature.
feed	Indication of the current feed flow temperature.
flow	Indication of the current flow rate / OK: Flow rate above minimum flow rate
pressure	Indication of the current delivery pressure.
level	Indication of the current fill level status.
main Display 2	Display of actual values
cooling	Indication of the cooling capacity currently used in per cent.
heating	Indication of the heating capacity currently used in per cent.
condenser	Indication of the current condensation temperature.
fan *)	Indication of the current fan output in per cent.
water valve *)	Indication of the current valve setting in per cent.
return temp.	Indication of the current return flow temperature.
conductance	Indication of the current conductivity value.
*) if present	
main Display 2+	Display of actual values
ambient temp	Indication of the current ambient temperature.
cool capacity	Display of the current cooling capacity in KW.
flow 2	Display the current flow rate in the second circuit. OK: Flow rate above minimum flow rate

Screen contents	Description
main Display 3	Display of actual values
comp.speed	Display of the current compressor speed in revolutions per second.
select menu	Indication of menus that can be selected.
work hours / ON-OFF / work hours	Indication of the number of operating hours:
main	Unit
Pump	Pump
fan	Fan
compressor	Compressor
... On-Off modus	Display/Adjustment of the On/Off mode for switching the unit on or off (= operating voltage is applied/removed).
On-Off modus	0 = unit automatically switches ON after 'Power-ON'.
	Adjustments (switching the unit on or off) can only be made via the display. 1 = Unit is switched off after "Power-ON". 2 = Unit is switched on after "Power-ON". 3 = The state of the unit is restored to that before the failure of the operating voltage occurred.
	Adjustments (switching the unit on or off) can only be made via the external contact. 4 = Unit is switched off after "Power-ON" and can be switched on via a positive edge signal of the external contact. 5 = Unit adopts the state of the external contact after "Power-ON" (closed = ON; open = OFF).
	Adjustments (switching the unit on or off) can only be made via the interface. 6 = Unit is switched off after "Power-ON". 7 = Unit is switched on after "Power-ON". 8 = The state of the unit is restored to that before the failure of the operating voltage occurred.

Screen contents	Description
... On-Off modus ...	
	Adjustments (switching the unit on or off) can only be made via the display AND the external contact. 9 = After "Power-ON" and after applying the external contact, the unit is switched off and can be switched on via the display. 10 = Unit adopts the state of the external contact after "Power-ON" (closed = ON; open = OFF) and it can be switched on or off via the display. 11 = The state of the unit is restored to that before the failure of the operating voltage occurred or can be switched by pressing ON and OFF on the display, upon closing the external contact.
	Adjustments (switching the unit on or off) can only be made via the display OR the external contact. 12 = Unit adopts the state of the external contact after "Power-ON" (closed = ON; open = OFF). 13 = Unit is switched on after "Power-ON" (regardless of the state of the external contact). 14 = The state of the unit is restored to that before the failure of the operating voltage occurred (regardless of the state of the external contact).
... On/Off/filling mode	Activation and configuration of the filling mode
filling mode	On = filling mode active Off = Filling mode deactivated
filling time	Pump operating time when the appliance is started with active filling mode.
overrun delay	Pump operating time when the appliance is started with active filling mode. After the filling time has elapsed or a fill level error has occurred, the pump remains in operation until the set pump run-on time has elapsed.

Screen contents	Description
min/max parameter / warning / alarm zone	Adjustment/display of warnings/alarm messages.
feed temperature	Limits (supply temperature):
warning:	(absolute/relative: evaluation of warning limits) low: lower warning limit high: upper warning limit
alarm:	(absolute/relative: evaluation of warning limits) low: lower alarm limit high: upper alarm limit
	delay: duration in seconds; for suppressing the fault message.
... cut off zone	Limits for switching the unit off.
feed temperature cut off:	Switch-off limits (supply temperature): low level: The unit is switched off whenever the temperature falls below the set supply temperature value. high level: The unit is switched off whenever the temperature exceeds the set supply temperature value.
min/max parameter / warning / alarm zone	Adjustment/display of warnings/alarm messages.
condenser temperature	Condensation temperature limits:
warning:	low: lower warning limit high: upper warning limit
alarm:	low: lower alarm limit high: upper alarm limit
	delay: duration in seconds; for suppressing the fault message (warning, alarm).
... cut off zone	Limits for switching the unit off.
condenser temperature	Condensation temperature switch-off limits:
cut off:	low level: The unit is switched off whenever the condensation temperature falls below the set condensation temperature. high level: The unit is switched off whenever the condensation temperature exceeds the set condensation temperature.

Screen contents	Description
min/max parameter / warning / alarm zone	Adjustment/display of warnings/alarm messages.
feed pressure	Supply pressure limits:
warning:	low: lower warning limit high: upper warning limit
alarm:	low: lower alarm limit high: upper alarm limit
	delay: duration in seconds; for suppressing the fault message (warning, alarm).
... cut off zone	Limits for switching the unit off.
feed pressure	Supply pressure switch-off limits:
cut off:	low level: The unit is switched off whenever the temperature falls below the set supply pressure. high level: The unit is switched off whenever the temperature exceeds the set supply pressure.
min/max parameter / warning / alarm zone	Adjustment/display of warnings/alarm messages.
water flow (water flow 2)	Flow rate limits (flow rate 2):
warning:	low: lower warning limit high: upper warning limit
alarm:	low: lower alarm limit high: upper alarm limit
	delay: duration in seconds; for suppressing the fault message (warning, alarm).
... cut off zone	Limits for switching the unit off.
water flow (water flow 2)	Flow rate switch-off limits (flow rate 2):
cut off:	low level: The unit is switched off whenever the flow rate falls below the set flow rate. high level: The unit is switched off whenever the flow rate exceeds the set flow rate.
min/max parameter / warning / alarm zone	Adjustment/display of warnings/switch-off messages.
water level	Tank fill level limits:
warning level:	low: lower warning limit delay: duration in seconds; for suppressing the fault message
cut off:	cut off level: The unit is switched off whenever the flow rate falls below the set minimum water level.

Screen contents	Description
min/max parameter / warning / alarm zone	Adjustment/display of warnings/alarm messages.
return temperature	Limits (return flow temperature):
warning:	low: lower warning limit high: upper warning limit
alarm:	low: lower alarm limit high: upper alarm limit
	delay: duration in seconds; for suppressing the fault message.
... cut off zone	Limits for switching the unit off.
return temperature cut off:	Switch-off limits (return flow temperature): low level: The unit is switched off whenever the temperature falls below the set return flow temperature value. high level: The unit is switched off whenever the temperature exceeds the set return flow temperature value.
min/max parameter / warning / alarm zone	Adjustment/display of warnings/alarm messages.
ambient temperature	Limits (ambient temperature):
warning:	low: lower warning limit high: upper warning limit
alarm:	low: lower alarm limit high: upper alarm limit
	delay: duration in seconds; for suppressing the fault message.
... cut off zone	Limits for switching the unit off.
ambient temperature cut off:	Switch-off limits (ambient temperature) low level: The unit is switched off whenever the flow rate falls below the set value. high level: The unit is switched off whenever the flow rate exceeds the set value.
min/max parameter / warning / alarm zone	Adjustment/display of warnings/alarm messages.
conductance	Limits (conductivity):
warning:	low: lower warning limit high: upper warning limit
alarm:	low: lower alarm limit high: upper alarm limit
	delay: duration in seconds; for suppressing the fault message.

Screen contents	Description
select menue ...	Indication of menus that can be selected.
service I/O /...	For authorised and qualified personnel only (e.g. service technicians).
... digital output	Indication of digital outputs.
... CEB digital out	Indication of digital outputs from expansion board.
... analog out / digital in	Indication of analogue outputs/digital inputs.
... CEB analog out	Indication of analogue outputs from expansion board.
... universal I/O	Indication of universal inputs and outputs.
... digital output	Indication of digital outputs from expansion module.
... CEB digital in	Indication of digital inputs from expansion board.
... CEB conductance	Indication of digital outputs from expansion board.
running parameter / ...	Indication of parameter settings made.
... Parameter 1	
fan min. speed	Minimum speed of the fan(s) in per cent.
fan max. speed	Maximum speed of the fan(s) in per cent.
fan min. temp	Condensation temperature for minimum speed of fan(s) in degrees Celsius.
fan max. temp	Condensation temperature for maximum speed of fan(s) in degrees Celsius.
min position	Minimum output level of process water valve in per cent.
max position	Maximum output level of process water valve in per cent.
cond min temp	Condensation temperature for minimum output level of process water valve in degrees Celsius.
cond max temp	Condensation temperature for maximum output level of process water valve in degrees Celsius.
... Parameter 2	Indication of parameter settings made.
compressor ON	Compressor switch-on limit in Kelvin.
compressor OFF	Compressor switch-off limit in Kelvin.
periode HGBP	Hot gas bypass control cycle time in seconds.
P-value	Proportional portion for PID control in per cent.
I-value	Integral portion for PID control in per cent.
D-value	Differential portion for PID control in per cent.
I-summ	Effect of control deviations on the integral portion in per cent.

Screen contents	Description
... Parameter 3	Indication/display of heating parameters.
heater ON	Heating switch-on limit in Kelvin.
heater OFF	Heating switch-off limit in Kelvin.
P-control	Proportional portion for PID control in per cent.
I-control	Integral portion for PID control in per cent.
... Parameter 4	Indication of parameter settings made.
Condenser set	Set value of condensation temperature in degrees Celsius.
P-control	Proportional portion for PID control in per cent.
I-control	Integral portion for PID control in per cent.
... Parameter 5	Indication of parameter settings made.
comp.speed min	Minimum compressor speed in per cent.
comp.speed max	Maximum compressor speed in per cent.
... Parameter 6	Indication of parameter settings made.
valve on	Switch-on limit of conductance control valve in microsiemens per centimetre.
valve off	Switch-off limit of conductance control valve in microsiemens per centimetre.
... Interface	Information about the interface. For authorised and qualified personnel only (e.g. service technicians).
protocol	Selection of the serial interface protocol
adress	Address of the interface
interface option	Interface options (baud rate, number of bits, parity, stop bits)

Screen contents	Description
select menu	Indication of menus that can be selected.
sensor calibration xy	Calibration and adjustment of the sensor gain and offset values. Indication of the actual sensor values. For authorised and qualified personnel only (e.g. service technicians).
system parameter	Adjustments of system parameters. For authorised and qualified personnel only (e.g. service technicians).
password	Setting/Changing the required password level.
	Input of the password. Entering the correct password will show the message on the relevant password level status. Entering an incorrect password will show the message "Password incorrect" (password not correct). The system will automatically return to password level 0. Note If the password "0000" is entered in password levels 1 to 4, no password query takes place in the screens (password protection is inactive). For authorised and qualified personnel only (e.g. service technicians).

10 Maintenance

10.1 Notes

The following must be observed in order to avoid injuries and damage to property:

- Only qualified personnel are authorised to perform these tasks.
- Comply with the information given in the "Safety" section.

WARNING

Perform only those tasks that you have been instructed to perform!

There is an increased risk of injury for persons who perform tasks for which they are neither qualified nor trained.

- Only persons familiar with the tasks who have been instructed regarding the associated hazards and who possess the necessary qualifications are authorised to perform work on the unit/system.
- Perform repairs of the pipe systems and tanks only when the system is depressurised.

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.

Wait 5 minutes after disconnecting from the mains before continuing work.

Risk of injury due to pressurised pipes!

Pipes can be under pressure even if the unit has been switched off. When working on the pipes, there is a risk of injury if medium escapes from the pipes.

- Comply with information given in the "Safety" chapter.
- Start-up, maintenance, and repair work should be performed only by trained and specialised personnel.
- Depressurise the pipes.

NOTICE

Risk of damage to the electronic components!

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

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 of the electrical connectors under voltage/load.



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.

NOTE

Keep the entire system clean.

Do not use any detergents containing solvents.

Disconnect the mains plug prior to performing any cleaning or maintenance tasks and secure it so that it cannot be reconnected.

10.2 Maintenance plan

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

Maintenance interval: every week		
Component	Maintenance task	Auxiliary devices
System/unit	Check for soiling and clean it.	
	Check the pipe unions and hose connections for leaks. If necessary, tighten the pipe unions and hose clamps, or replace them.	
Tank	Check the filling level and top it up if necessary.	
	Check the water for contamination and change it, if necessary.	

Maintenance interval: every month		
Component	Maintenance task	Auxiliary devices
Earthing connections	Check all earthing connections for firm fit and re-tighten as needed.	
Refrigeration unit	Visual inspection, e. g. for streaks, formation of ice, smell, noises.	
Supply lines	Check for damage, leaks, brittleness and hardening. Replace, if necessary.	
Screw fittings	Check for tight fit. Retighten if necessary.	Screw locking device
Labels and symbols	Check that the labels and symbols on the unit are complete and legible. Missing or illegible labels/symbols must be replaced.	

Maintenance interval: every six months		
Component	Maintenance job	Auxiliary devices
Fan	Check for correct operation.	
	Check for soiling and clean, if necessary.	
Condenser/heat exchanger	Check for contamination. Clean the cooling fins and, if necessary, secure the surrounding area.	Safety goggles, respiratory equipment, compressed air
Cooling medium filter	Check, clean, and replace: • upon expiration of the maximum operating period • immediately after the cooling system has been cleaned • after a specific number of operating hours	

Maintenance interval: every year		
Component	Maintenance task	Auxiliary devices
Coolant	Check the quality of the medium and replace it if necessary. For this purpose, drain and flush the cooling system. Replace the filter after the system has been cleaned.	

Maintenance interval: As required		
Component	Maintenance task	Auxiliary devices
DI cartridge (ion exchanger)	Replacement: - Upon expiration of the maximum operating period - After a longer period of non-utilisation	

10.3 Draining off the medium / Refilling the cooler with medium



Note concerning the protection of the environment

The improper disposal of the media/liquids that are used has a negative impact on the environment.

- Ensure that the media/liquids are not released into the sewage system or soil.
- The media/liquids must be disposed of separately and supplied separately to the recycling centres.
- Comply with material safety data sheets.
- Comply with the applicable national and local rules and regulations.

1. Switch the unit off and disconnect the power supply cable.
2. Keep a suitable collecting vessel ready for collecting the medium.
3. Disconnect all of the connections (feed flow, return flow) on the unit one after the other.
4. Drain the medium.
5. Wait until no more water flows out of the device.

NOTICE

Risk of damage to the components!

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.

6. 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 that is specified in the "Technical data" section.

10.4 Filter system

WARNING

Risk of injury due to a leaking medium.

The housing is a pressure vessel and may be under pressure. When the housing is opened, there is an increased risk of injury caused by the medium escaping from the housing.

- Observe the "Safety" section.
- Start-up, maintenance, and repair work should be performed only by trained and specialised personnel.
- Depressurise the housing.
- Prior to opening the housing, ensure that the vessel is not under pressure.

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 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

- Replace the filter as stated in the maintenance plan.
- Observe the maximum period of use and/or number of 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.

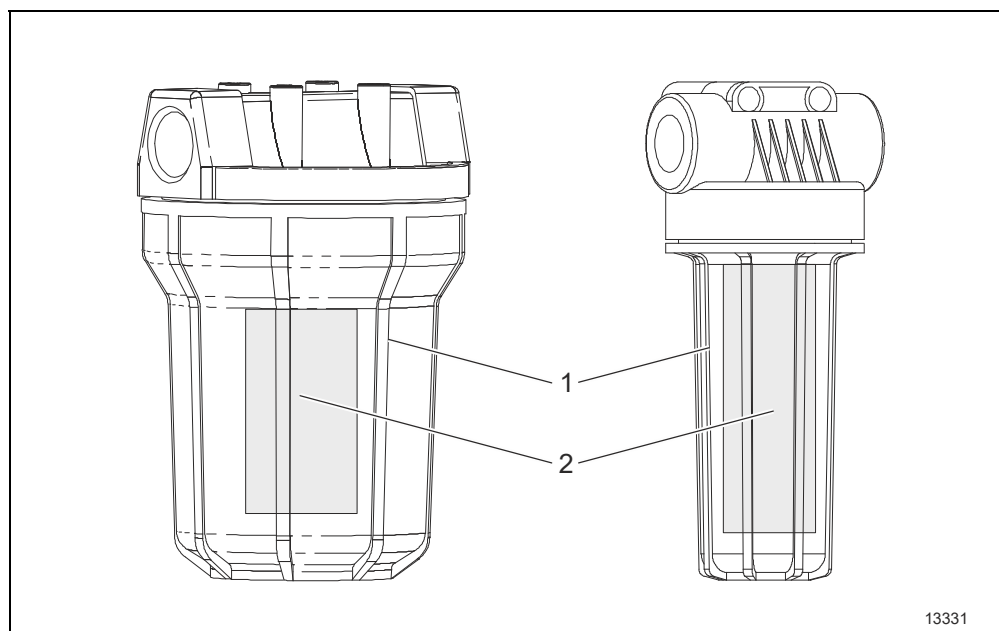


Fig. 9: Filter (example)

- 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 dismantled 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.

10.5 Ion exchanger

NOTE

The cartridge of the ion exchanger can be changed only while the unit is at standstill.

The ion exchanger (DI cartridge) absorbs the free ions that are present in the water.

NOTE

- Replace the ion exchanger as stated in the maintenance schedule.
- If the fault message "Conductivity too high" flashes on the display of the control unit, the DI cartridge must be replaced.
- Observe the maximum period of use and/or number of operating hours in accordance with the maintenance plan.
- Prior to the replacement, drain and flush the circuit (see the section "Maintenance/Flushing the system").

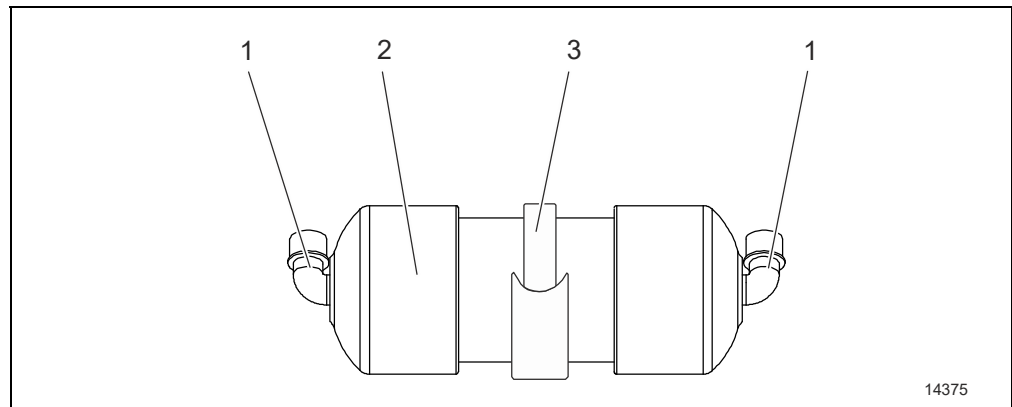


Fig. 10: Ion exchanger

- 1 Sleeve-type union/quick coupling
- 2 Ion exchanger (DI cartridge)
- 3 Holder (option)

Replace the ion exchanger as follows:

1. Use the maintenance switch to switch the unit off.
2. Disconnect the connecting cable.
3. Keep a suitable collecting vessel ready.
4. Disconnect the return flow hose from the medium connector and collect any escaping liquid.
5. If present, unscrew the holder (3).
6. Open the sleeve-type unions (1) (using open-end spanners no. 20 and 22).
7. Remove the old DI cartridge (2).
8. Insert the new DI cartridge.
9. Reinstall the holder (3).
10. Tighten the sleeve-type unions (1).
11. Reconnect the return flow hose to the corresponding medium connector.
12. Reconnect the connecting cable.
13. Vent the unit via the pump vent.
14. Fill the units. To this end, see the "Setting-up/Filling" section.
15. When restarting the unit, perform a leak test.

NOTICE

Improper restart.

The unit will be damaged if it is used without an ion exchanger.

- Ensure that an ion exchanger DI cartridge is installed prior to starting the unit.
- After a replacement, check the tank, holder and hoses for leaks.
- Comply with the maintenance intervals in accordance with the maintenance plan.
- Ensure that the earthing connection is properly connected.

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.

10.6 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.

Additional expertise is required for personnel to work on refrigeration systems with flammable refrigerants.

Danger when cleaning the condenser / heat exchanger!

There is a risk of injury when blowing out (air-cooled version) sharp-edged cooling fins or refrigerant hot-gas lines due to the formation of dust. Comply with the following precautions:

- Mark-off the dangerous area.
- Use personal protective equipment for blowing-out process.
- Do not touch sharp-edged cooling fins (air-cooled version).
- Do not touch the refrigerant hot-gas lines.

1. In the case of an air-cooled condenser clean the cooling fins with the aid of compressed air or a vacuum cleaner.
2. In the event of any problems please consult a refrigeration specialist.



Note concerning the protection of the environment

Refrigerants are harmful to the environment if released into the atmosphere.

- Work on the refrigeration unit should be performed only by personnel qualified according to the Chemicals Climate Protection Ordinance.
- Do not damage the refrigerant pipes.
- Used refrigerants must be returned to a certified company for reclamation.

10.7 Restart

Prior to using the unit/system, it must be absolutely ensured that there are no safety-critical defects or malfunctions. After the completion of the tasks and prior to switching the unit/system on, comply with the following (if applicable):

- Ensure that any safety devices, guards and covers which were removed prior to commencing the tasks have been properly reinstalled.
- Ensure that the area around the unit/system is free from tools, materials or other pieces of equipment that had to be used.
- Clean the workspace and remove any liquid spills or similar substances.
- Check whether the safety devices and guards of the unit/system operate correctly.

11 Troubleshooting

11.1 Notes

The following must be observed in order to avoid injuries and damage to property:

- Only qualified personnel are authorised to perform these tasks.
- Comply with the information given in the "Safety" section.

⚠ WARNING

Carry out instructed work 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).

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.

Wait 5 minutes after disconnecting from the mains before continuing work.

Risk of injury due to pressurised pipes!

Pipes can be under pressure even if the unit has been switched off. When working on the pipes, there is a risk of injury if medium escapes from the pipes.

- Comply with information given in the "Safety" chapter.
- Start-up, maintenance, and repair work should be performed only by trained and specialised personnel.
- Depressurise the pipes.

NOTICE

Risk of damage to the electronic components!

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

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 of the electrical connectors under voltage/load.

NOTE

Disconnect the mains plug prior to performing any cleaning or maintenance tasks and secure it so that it cannot be reconnected.

Re-activation is permitted only after a thorough inspection of the cause of the error and after the device has been tested.

11.2 General malfunctions

Fault	Cause	Note
No flow	The connecting lines and hoses etc. are kinked.	Lay the connecting lines, hoses, etc. in such a way that there is a sufficiently large radius to avoid bending or kinking of the connecting lines and hoses.
	The shut-off valves are closed (if included).	Check and open.
	The diameters of the lines and hoses are insufficient.	Check and replace.
	The filter is fouled.	Check, clean, and replace it, if necessary.
Medium too warm/too cold.	Temperature sensor removed from sensor sheath.	Check. Insert temperature sensor back into sensor sheath.

11.3 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.
	The external activation system is switched off or not connected.	Switch it on or connect it. Refer to the circuit diagram.

11.4 Unit-specific

⚠ 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.

Additional expertise is required for personnel to work on refrigeration systems with flammable refrigerants.

Fault	Cause	Note
Refrigeration unit not running or reduced refrigeration capacity.	Motor protection switch for compressor has tripped.	Let compressor cool down.
	High-pressure fault.	Clean the condenser (air-cooled version).
		Ensure that there is a sufficient amount of cooling air (air-cooled version).
		Press the reset button at the pressure switch.
	The condenser cooling fins are soiled.	Clean the cooling fins.
	Fan defective (motor coil has 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.
No or insufficient cooling medium flow	The pump does not start when the unit is switched on. The level in the medium tank is between the minimum and normal level.	Add some medium. Check the unit for leaks. Seal the unit if necessary.
	The level in the medium tank is too low.	
	The pump is defective.	Check and replace it if necessary. Check the fuse.

Fault	Cause	Note
Chilling medium too warm.	Fault concerning the refrigeration unit:	
	• Cooling air inlet/outlet blocked.	Check. Remove any objects in front of or on top of the unit
	• Hot gas bypass valve defective.	Check the power supply. Inform the service department.
	• Fan defective.	Check. Dismount and replace, if necessary. Inform the service department.
	• Compressor defective.	Inform the service department.
Cooling medium too cold.	Control valve defective.	Check the power supply. Inform the service department.
	The temperature sensor is defective.	Check and replace it if necessary.

11.5 Control unit

Sensor (pressure, temperature, flow rate)	Comment
Warning high	There is no sensor fault; the measured value is above the warning range.
Warning low	There is no sensor fault; the measured value is below the warning range.
Alarm high	There is no sensor fault; the measured value is above the alarm range.
Alarm low	There is no sensor fault; the measured value is below the alarm range.
Cut off high	There is no sensor fault; the measured value is above the cut-off range. The unit is switched off (not in case of external temperature sensors).
Cut off low	There is no sensor fault; the measured value is below the cut-off range. The unit is switched off (not in case of external temperature sensors).
open	There a sensor fault (broken cable). The unit is switched off.
short	There is a sensor fault (short circuit). The unit is switched off.
overflow	The measured value is above the measuring range. The unit is switched off.
underflow	The measured value is below the measuring range. The unit is switched off.

Fill level	Comment
Warning	There is no sensor fault; the measured value is in the warning range (between minimum and warning).
Cut off	The measured value is below the cut-off range. The unit will be switched off.
Underflow	The measured value is outside the lower measuring range.
Overflow	The measured value is outside the upper measuring range.

Heater	Comment
STB-cutoff high	The safety temperature limiter (STL) of the heater was tripped.

HP (High Pressure, high-pressure fault)	Comment
HP-cutoff high	The high-pressure switch of the compressor was tripped.

Compressor drive	Comment
Compressor drive error	There is a compressor drive error.
Compressor drive offline	Compressor drive cannot be reached.

11.6 Restart

Prior to using the unit/system, it must be absolutely ensured that there are no safety-critical defects or malfunctions. After the completion of the tasks and prior to switching the unit/system on, comply with the following (if applicable):

- Ensure that any safety devices, guards and covers which were removed prior to commencing the tasks have been properly reinstalled.
- Ensure that the area around the unit/system is free from tools, materials or other pieces of equipment that had to be used.
- Clean the workspace and remove any liquid spills or similar substances.
- Check whether the safety devices and guards of the unit/system operate correctly.

12 Disconnecting the device

12.1 Notes

The following must be observed in order to avoid injuries and damage to property:

- Only qualified personnel are authorised to perform these tasks.
- Comply with the information given in the "Safety" section.

WARNING

Warning – Danger to life due to electrical current!

Negligence can lead to electric shock. Observe the following points when working on the electrical system:

- 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 the power supply and absolutely voltage-free.
 4. Earth and short-circuit the unit.
 5. Cover any adjacent live parts and secure the danger area.

Danger of injury due to improper work practices!

Pressurised systems can be extremely dangerous.

- Wear suitable protective clothing.
- Depressurise all of the circuits prior to dismantling the system or device.

CAUTION

Danger due to improper work practices!

Danger due to improper handling of the refrigeration unit. Only specialised refrigeration companies are authorised to disconnect the refrigeration unit.

Additional expertise is required for personnel to work on refrigeration systems with flammable refrigerants.

12.2 Drainage

NOTE

For a precise identification of the component positions, see the chapter "Set-up/Layout"!

Proceed as follows to drain the medium:

1. Switch the device off.
2. Disconnect the power supply connections.
3. Disconnect the medium connections.
4. Keep a suitable collecting vessel ready.
5. Let the medium flow out through the hoses.
6. Remove any residual medium by suction via the connectors of the device (e.g. with a wet vacuum cleaner).

NOTICE

Damage caused by air/compressed air!

Blowing the device out with air/compressed air will destroy the sensitive measuring components (e.g. flow meters).

Do not blow the system out with air/compressed air.



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.

Filling / Refilling:

NOTE

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

12.3 Transport and storage

NOTICE**Freezing hazard**

The unit may be damaged if the medium freezes inside the unit.
Drain the unit completely prior to transporting it.

NOTE

Transport the unit carefully and in a shock-free and vibration-free manner.
Comply with the information given in the "Transport" section.

Please note the following:

- The unit must be completely drained before transport.
- The unit must be completely drained before storage.
- Ensure that the ambient conditions are in line with the "Technical data".
- 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"

NOTE

- If a unit on which a leak in the refrigeration circuit has been detected, is dispatched, you must make sure that the refrigerant has been suctioned from the refrigeration circuit by a specialist company.
 - Personnel require additional expertise for work on refrigeration systems with combustible refrigerants.
-

12.4 Dismantling

DANGER

Fire and explosion hazard!

The unit contains a flammable refrigerant. There is an increased risk of physical injury due to fire and explosion should the refrigerant escape in combination with an existing ignition source.

- Properly dispose of the unit in accordance with the national and local regulations.
- Additional expertise is required for personnel to work on refrigeration systems with flammable refrigerants.

Fire hazard!

The device contains a flammable refrigerant. In the event of a refrigerant leak in conjunction with an existing ignition source, there is an increased risk of injury from fire.

- Keep open flames and ignition sources away from the device.
- Ensure sufficient ventilation.
- Wear personal protective clothing (e.g. gloves, safety goggles).
- Only use approved work equipment when working on the device.

WARNING

Improper shutdown!

Pressurised systems present increased dangers.

Depressurise all of the circuits prior to dismantling the system or device.

The following steps must be performed:

1. Disconnect all of the electrical connections leading to the system or unit.
2. Disconnect the medium connections.
3. Remove all of the hose connections leading to the system or unit.
4. Depressurise the circuit. If necessary, tilt the unit in order to empty it completely.



Note concerning the protection of the environment

Refrigerants are harmful to the environment if released into the atmosphere.

- Work on the refrigeration unit should be performed only by personnel qualified according to the Chemicals Climate Protection Ordinance.
- Do not damage the refrigerant pipes.
- Used refrigerants must be returned to a certified company for reclamation.

12.5 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.

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.
- Refrigerants are not allowed to enter the atmosphere. Used refrigerants must be returned to a certified company for reclamation.
- Only personnel qualified according to the Chemicals Climate Protection Ordinance is authorized to perform work on the refrigerant circuit.
- 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

13 Technical data and further information**NOTE**

Information about the technical data, spare parts and conformity of the devices are prepared and provided separately.

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