

Instruction Manual

ORIGINAL INSTRUCTION MANUAL

Cooler P70100-24495

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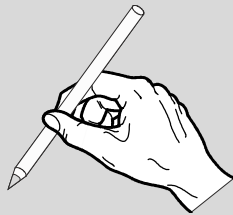
1.3 Making contact

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)

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.

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 included in this instruction manual were up to date at the time of printing.

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.

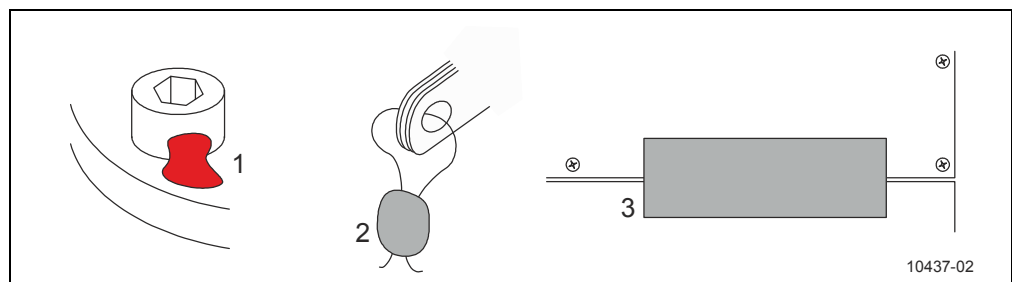


Fig. 1: Sealings

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 on which the order is based.

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 and 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.
- Do not leave the unit/system unattended during operation.
- 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

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

4.9 Use of chemicals

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.

Damage due to aggressive chemicals!

Aggressive chemicals can damage the components.

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



Note concerning the protection of the environment

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

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

4.10 Use of cleaning agents

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

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

Damages through cleaning agents!

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

Please observe the following points:

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

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

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



Note concerning the protection of the environment

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


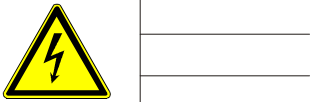
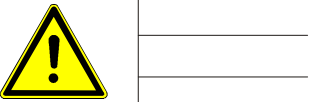

- Use environmentally friendly cleaning agents.
- Use cleaning agents economically and for specific objectives only.
- Do not spill any cleaning agents.
- Keep the containers tightly sealed. Empty containers or containers that are in use must also be sealed upon the completion of the task.
- Used cleaning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

4.11 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.

NOTE

Destroyed or illegible marks/symbols must be replaced immediately.

	<p>Warning – Electrical hazard.</p> <p>Only qualified personnel are authorised to perform work on the electrical systems.</p> <p>Carelessness can lead to electrocution.</p> <ul style="list-style-type: none"> • Observe the "Safety" section. • Wear protective clothing.
	<p>Warning – electrical hazard.</p> <p>Do not connect or disconnect any of the electrical connectors under voltage/load.</p>
	<p>Warning</p> <p>The unit contains a liquid under pressure, rotating parts, and high voltage. Do not use the unit if the panels have been removed.</p> <p>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.</p>
<p>230V AC 50/60 Hz</p> 	<p>Electrical power connection</p>

5 Description / Overview

5.1 General information

The cooling unit is used for cooling the medium of a connected device. The temperature of the medium is maintained at a constant level between specified limits by way of the cooling process.

The unit is suitable for the use of a water-glycol mixture.

The cooling unit is a compressor chiller with a closed cooling circuit. It is a closed unit and includes the following circuits:

- Refrigeration circuit
- Cooling circuit
- Process water circuit
- Electric circuit
- Air circuit

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. min./max. temperature), switch the unit off immediately. Non-compliance may lead to consequential damage to the overall system. termotek GmbH shall assume no liability for such consequential damage.

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".

NOTE

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

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.

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

- Warning labels (in accordance with the German regulation BGV A8) e.g. "Warning – dangerous voltage".
- Protective earthing / potential equalization for static discharge.

5.4 Deactivation

- The device is de-energized by disconnecting the electrical connecting line.
- The unit is switched on and off via a switch that is integrated in the housing.
- To start the unit, a button must be pressed.

5.5 Foreseeable misuse

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

- Insufficiently trained personnel
- Non-compliance with the operating data
- Non-compliance with the maintenance intervals
- Non-performance, incorrect performance, or incomplete performance of maintenance tasks
- Non-elimination of faults/malfunctions
- Attaching transport aids
- Use of the unit for storage purposes or as a work platform.
- Set-up in unsuitable locations
- Transport with filled tank.
- Stepping on the unit.
- Outdoor use.
- Operation of the unit without medium.
- Operation in hazardous areas with a risk of explosion.
- 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.

6 System Layout

6.1 Overview

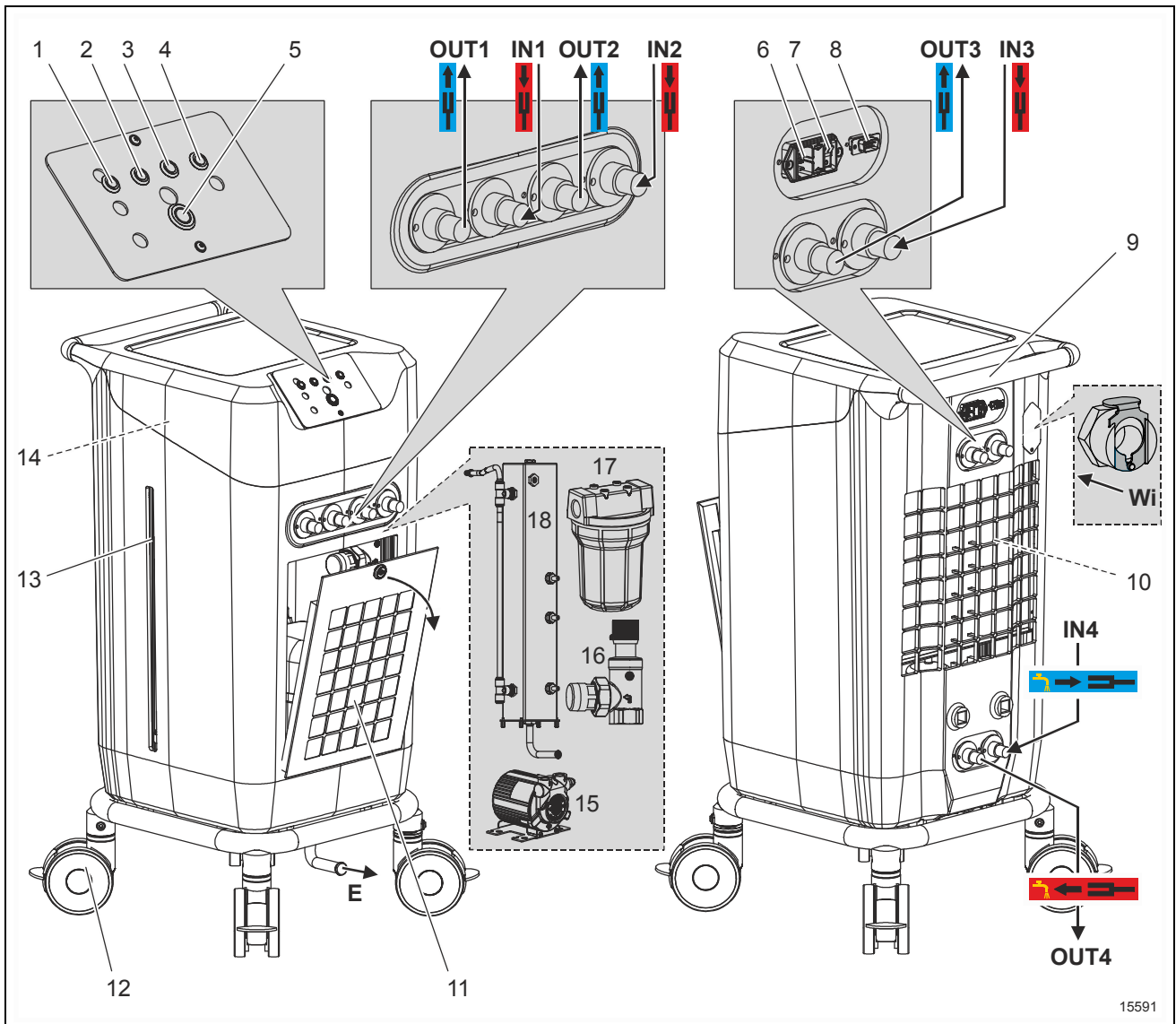


Fig. 2: Cooling unit

- 1 Alarm LED
 - Illuminated: Maximum tank fill level; the functions of the unit will be switched off
- 2 Warning LED
 - Illuminated: Minimum tank fill level
- 3 Pilot LED
 - Illuminated: Tank overfilled
- 4 Pilot LED
 - Illuminated: Fault
- 5 Pushbutton for switching the unit functions on/off
 - Illuminated: Unit in operation
- 6 Electrical connection (connector)
- 7 Switch for switching the unit on/off
- 8 RS232 interface
- 9 Handle
- 10 Refrigeration unit with:
 - Compressor
 - High-pressure switch
 - Heat exchanger and fan
 - Condenser
 - Temperature sensor
 - Refrigerant collector
 - Filter dryer
 - Refrigerant sight glass
 - Expansion valve
 - Solenoid valve

- 11 Air filter
- 12 Castors with brakes
- 13 Fill level indicator (tank)
- 14 Switch box with:
 - Power supply unit
 - Automatic circuit breaker
 - Air-break contactor
 - Circuit board with fuses
- 15 Pump
- 16 Control valve
- 17 Filter
- 18 Tank with:
 - Fill level indicator
 - Float switch
 - Venting system

Connection points

- IN1 Medium inlet (cooling medium)
- IN2 Medium inlet (cooling medium)
- IN3 Medium inlet (cooling medium)
- IN4 Medium inlet (process water)

- OUT1 Medium outlet (cooling medium)
- OUT2 Medium outlet (cooling medium)
- OUT3 Medium outlet (cooling medium)
- OUT4 Medium outlet (process water)

- E Drainage point
- Wi Filling point

6.2 Information concerning the refrigerant

The device contains a small quantity of a refrigerant.

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

It is important to comply with the following points:

- Avoid damaging the pipes of the 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.
 - Spurting refrigerant can cause injuries.
 - Ensure adequate ventilation! Open windows and doors fully!
- 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.
- The refrigerant is classified in safety group A1 in accordance with EN 378 "Refrigeration systems and heat pumps".

CAUTION

Improper handling of the refrigeration unit!

Danger due to improper handling of the refrigeration unit.

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

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



Note concerning the protection of the environment

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.

6.3 Refrigeration unit

6.3.1 General information

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

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

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

The refrigeration unit contains a fluorinated greenhouse gas (refrigerant). The refrigerants that are used are so-called partially halogenated fluorohydrocarbons (HFCs) without an ozone depletion potential (ODP=0). Information concerning the refrigerant filling quantity and greenhouse potential can be found in the "Technical Data" section.

NOTE

The pressure vessels of the refrigeration system are subject to periodic inspections depending on the device category and in accordance with the Pressure Equipment Directive.

- Pressure vessels of category 1 and 2 must be tested by a competent person.
- Pressure vessels of a higher category than category 2 must be tested by an approved inspection body (e.g. TÜV in Germany).
- The device category in accordance with the Pressure Equipment Directive is stated in the "Technical data" section.
- Comply with the applicable national and local regulations and laws (e.g. Pressure Equipment Directive).

Please refer to the "Technical data" section.



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.
-

6.3.2 Obligation to maintain records

Refrigerant	annual leak test		semi-annual leak test
	Refrigeration unit	hermetically sealed refrigeration unit	Refrigeration units
R449A	as of a CO ₂ equivalent (global warming potential) of		
	5,0 t	10,0 t	50,0 t

In accordance with the F-gases regulation (EU regulation 517/2014), the operators must maintain records about systems that are subject to statutory leak tests.

In addition, the documents must be preserved by the operator for a minimum of five years.

The following information must be specified in the records:

- the quantity and type of fluorinated greenhouse gases installed;
- the quantities of fluorinated greenhouse gases added during installation, maintenance or servicing or due to leakage;
- whether the quantities of installed fluorinated greenhouse gases have been recycled or reclaimed, including the name and address of the recycling or reclamation facility and, where applicable, the certificate number;
- the quantity of fluorinated greenhouse gases recovered;
- the identity of the undertaking which installed, serviced, maintained and where applicable repaired or decommissioned the equipment, including, where applicable, the number of its certificate;
- the dates and results of the checks carried out;
- if the equipment was decommissioned, the measures taken to recover and dispose of the fluorinated greenhouse gases.

NOTE

The classification of the refrigeration unit as a hermetically sealed system is stated on the type plate.

7 Transport

7.1 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 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.

7.2 Transport and packaging material

Check the packaging for transportation damage.

If transportation damage has occurred, observe the following points:

- Inform the forwarding agent and the supplier in written form.
- Keep the packaging material.
- Note down any external and internal 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.

7.3 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.

NOTE

The equipment cannot be moved by crane.

7.4 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".
-

WARNING

Risk of injury!

There is an increased risk of injury when working on the machine.

- Observe the "Safety" section.
 - Start-up, maintenance, and repair work should be performed only by trained and specialised personnel.
 - Ensure that the machine is at a complete standstill and secured against inadvertent start-up prior to working on it.
 - Comply with the safety instructions in the operating manuals of the connected units/machines.
-

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!

NOTICE

Impairment of air circulation!

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

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

NOTE

The unit is equipped with castors (swivel-type and lockable).

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.

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.

Set up the unit in a horizontal position.

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 air that is blown out cannot be sucked in again.
- Ensure sufficient air circulation.
- Protect the unit against dust and moisture.

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

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

8.3 Medium 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

Please observe the connection sizes in the "Technical Data" section in the appendix.

NOTE

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

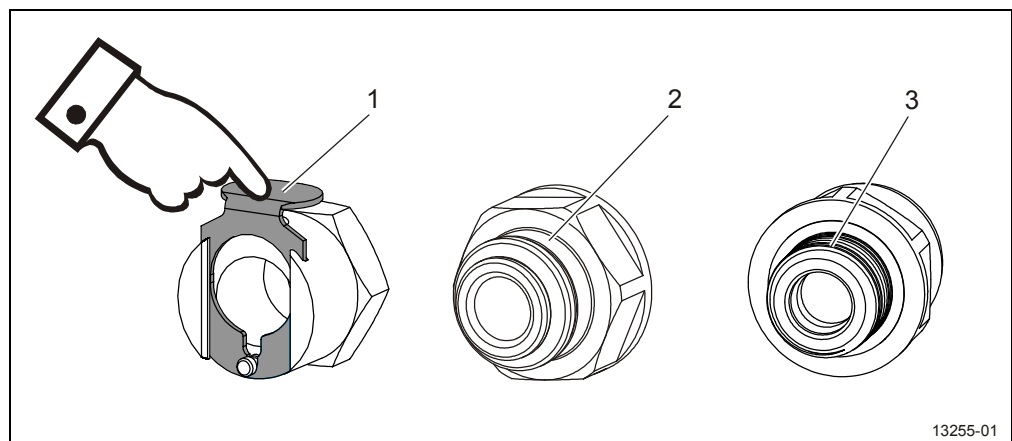


Fig. 3: Medium connections (general)

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.

Cooling circuit:

Connect the unit.

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

Waste water circuit

A customer-provided process water supply can be connected to the unit to dissipate the waste heat produced by the unit.

Connect the unit.

- Process water inlet (IN, feed flow)
- Process water outlet (OUT, return flow)

NOTE

When a customer-provided process water supply is connected to the unit, the fans inside the unit become active.

8.4 Electrical connection

⚠ DANGER**Electrical hazard!**

Disconnect the unit from the power supply prior to performing any work on the unit.

Check whether the unit is properly disconnected from power and absolutely voltage-free. Secure it so that it cannot be reconnected.

Only skilled and certified electricians are authorised to perform any work on the system.

⚠ DANGER**Danger to life due to electrical hazard!**

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

- Only qualified and specialised personnel is authorised to perform the connection.
 - Compare the connection voltage to the voltage that is stated on the type plate.
 - Comply with the specifications of the circuit diagram.
-

NOTICE**Loose bolts and terminal clamping points!**

During transport and installation, screws and terminal clamping points might get loose.

Check all screws and terminal clamping points in the control cabinet for secure fitting prior to setting up the unit.

NOTICE**Impairment of the unit operation!**

EMC disturbance may affect the unit function negatively and/or damage components in case of insufficient equipotential bonding.

- If devices/machines are electrically coupled, additional local equipotential bonding must be provided between the devices/machines.
 - Connect a suitable equipotential bonding cable to the marked location in the unit.
 - Connect any conductive pipes to the equipotential bonding system.
-

Connect the interface cable for the communication with the unit.

Provide protective earthing according to circuit diagram.

Set up the electrical connection according to the unit's circuit diagram. Observe local rules and regulations.

8.5 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

Information concerning the optimum medium quality can be found in the “Technical data” section.

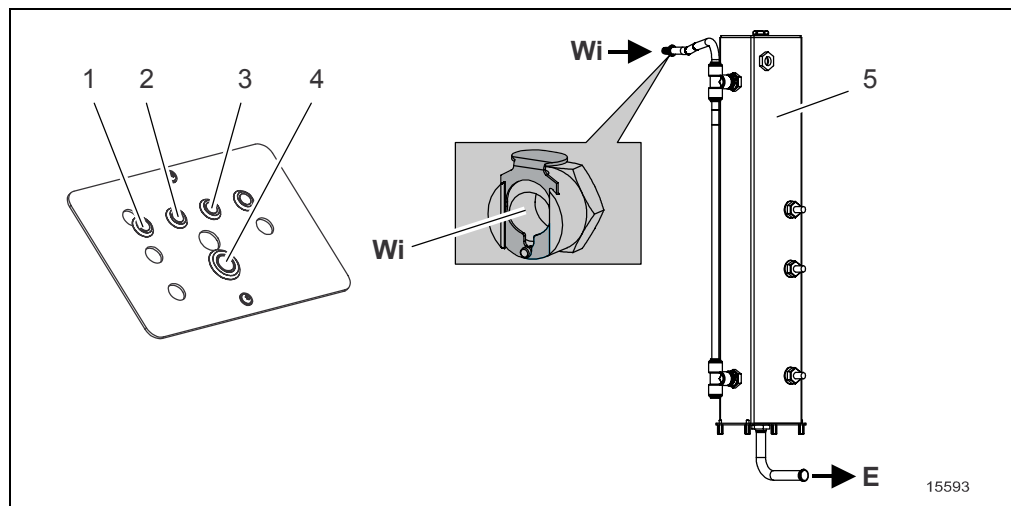


Fig. 4: Tank (example)

- 1 Alarm LED
 - Illuminated: Maximum tank fill level; the functions of the unit will be switched off
- 2 Warning LED
 - Illuminated: Minimum tank fill level
- 3 Pilot LED
 - Illuminated: Tank overfilled
- 4 Pushbutton for switching the unit functions on/off
- 5 Fill level indicator
- E Drainage point
- Wi Filling point

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

NOTE

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

Prerequisites:

- The medium connections to the connected device have been set up.
- The unit is connected to the power supply.
- The unit has been switched on (see the switch on the connector).

NOTE

When the unit is switched on, the alarm LED (1) and the warning LED (2) light up since there is no medium in the tank.

1. Connect a customer-provided hose to the filling connector (Wi) to fill the tank.
2. Fill the tank with the medium in accordance with the "Technical data" section via the filling connector (Wi) until the LEDs (1 and 2) go out.
3. Check the fill level by way of the fill level indicator (5).
4. Switch the unit on briefly. To do so, press the pushbutton (4).
5. Check the fill level. If the warning LED (2) lights up, continue to fill the tank.

NOTE

If the pilot LED (3) lights up, the tank is overfilled. Drain the medium from the tank via the drainage point (E).

6. Repeat the process, if necessary.

NOTE

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

8.6 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.

NOTICE

Risk of damage to the components!

There is a risk of damage due to improper operation.

Observe the description of the ancillary equipment, if included.

NOTE

Use the unit only if the housing panels are installed.

9.2 Switching the unit on or off

- If the external release signal (to be provided by the customer) is interrupted, the unit will be stopped.
- The device is de-energized by disconnecting the electrical connecting line.
- The unit is switched on and off via a switch that is integrated in the housing.

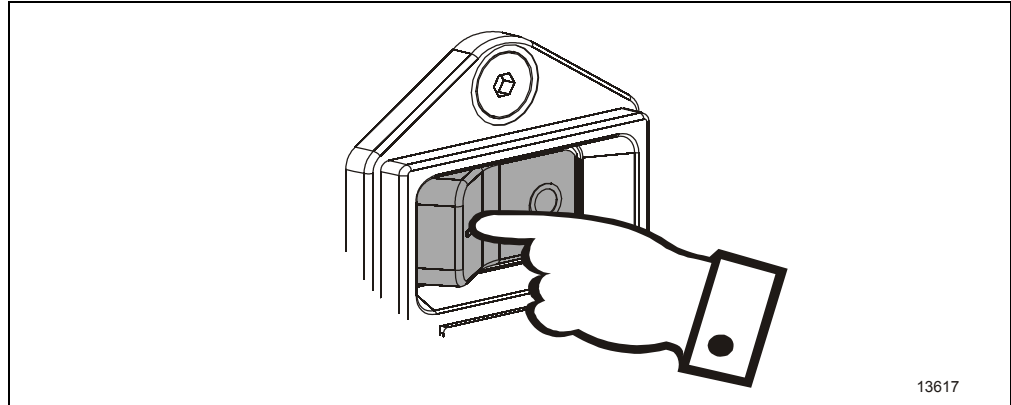


Fig. 5: Switching the device on and off

A switch is provided for switching the device on and off.

The following symbols identify the operating states:

- Switched on
- Switched off

9.3 Adjustments

1. Check the tank level.
 - If the fill level is too low, top the tank up via the filler neck.
 - Compliance with the instruction provided in the “Start-up/Filling” section is mandatory.
2. Switch the unit on by pressing the pushbutton. The pushbutton illuminates.
3. To stop the cooling process, press the pushbutton again.

9.4 Refilling

NOTE

Information concerning the optimum medium quality can be found in the “Technical data” section.

To refill: Add cooling medium as specified in the “**Start-up/Filling**” section via a filler neck (Wi).

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.

DANGER

Risk of injury caused by electric current!

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

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

- Comply with the information that is given in the "Safety" chapter.
 - Only suitably qualified persons are authorised to perform these tasks.
1. Disconnect the unit from the power supply in order to deenergise it.
 2. Secure the unit so that it cannot be switched on again accidentally.
 3. Check whether the unit is properly disconnected from power and absolutely voltage-free.
 4. Earth and short-circuit the unit.
 5. Cover any adjacent live parts and secure the danger area.
-

WARNING

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.
-

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!

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.

**Note concerning the protection of the environment**

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

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

**Note concerning the protection of the environment**

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

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

NOTE

Do not use any detergents containing solvents.

NOTE

Keep the entire system clean.

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
Supply lines	Check for damage, leaks, brittleness and hardening. Replace them, 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.	
Air filter	Check for soiling and clean it, if necessary.	Protective goggles, respiratory equipment, compressed air
Refrigerant sight glass	Check the moisture content of the refrigerant. The colour of the indicator reveals whether or not the refrigerant contains moisture. <ul style="list-style-type: none"> • Green: No moisture in the refrigerant. • Yellow: Moisture in the refrigerant (contact the technotrans service department). 	
	Check the refrigerant quantity with active compressor(s). <ul style="list-style-type: none"> • A continuous formation of bubbles can indicate a lack of refrigerant. Contact the technotrans service department. 	
Refrigeration unit	Visual inspection	

Maintenance interval: every six months		
Component	Maintenance task	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
Maintenance interval: every year		
Component	Maintenance task	Auxiliary devices
Refrigeration unit (refrigeration circuit)	<p>Perform a leak test in accordance with the statutory and local rules and regulations (e.g. F-gases regulation). The following types of refrigeration units must be inspected for leaks:</p> <ul style="list-style-type: none"> • Refrigeration units with a refrigerant filling quantity of more than five tonnes (5 t) of CO₂ equivalent. • Refrigeration units (hermetically sealed systems) with a refrigerant filling quantity of more than 10 tonnes (10 t) of CO₂ equivalent. 	Certified and specialised personnel / Contact the technotrans service department
	<p>Note</p> <ul style="list-style-type: none"> • Information concerning the hermetically sealed system and the refrigerant filling quantity (CO₂ equivalent) can be found in the "Technical data" section or on the type plate of the unit. • Comply with the applicable national and local regulations and laws (e.g. Pressure Equipment Directive). 	

10.3 Draining off the medium / Refilling the cooler with medium

Draining the medium:

1. Switch the device off and disconnect the power supply cable.
2. Keep a suitable collecting vessel ready for collecting the medium.
3. Disconnect the connectors (feed flow, return flow).
4. Drain the medium off via the drain hose.
5. Remove the plug from the filler neck.
6. Wait until no more water flows out of the device.
7. If included, open and drain the filter cup in the filter. See the section "**Maintenance/Filter change**".
The filter cup must be at least half empty in order to avoid damage due to freezing water.
8. Remove any residual medium by suction via the connection points of the device (e.g. with a wet vacuum cleaner).

NOTICE

Risk of damage to the components!

There is a risk of damage to the components if compressed air (pressure higher than 1 bar (14.5 psi)) is used to blow out the device.

- Blow the liquid into the tank with compressed air (pressure below 1 bar (14.5 psi)) via the medium connections (inlet, outlet) and drain it off via the drain (e.g. by way of a draining hose or via a draining connector).
- When blowing in the compressed air, ensure that the filling plug of the tank is open.
- Damage to the unit caused by pressure surges are excluded from the warranty.

9. Seal the drainage point (discharge opening) under the device.
10. 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 replacement

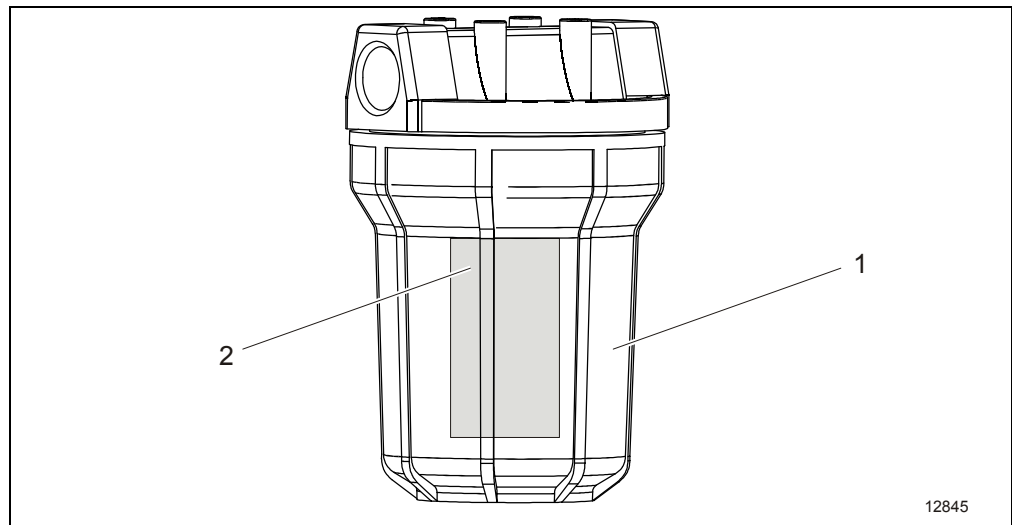


Fig. 6: Filter (example)

- 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. Lay bare the inline filter (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 Refrigeration unit

10.5.1 General information

CAUTION

Improper handling of the refrigeration unit!

Danger due to improper handling of the refrigeration unit.

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

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

NOTE

In the event of any problems please consult a refrigeration specialist

In the case of an air-cooled condenser, clean the cooling fins with the aid of compressed air or use a vacuum cleaner. Do not damage the cooling fins.



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.

10.5.2 Refrigerant sight glass

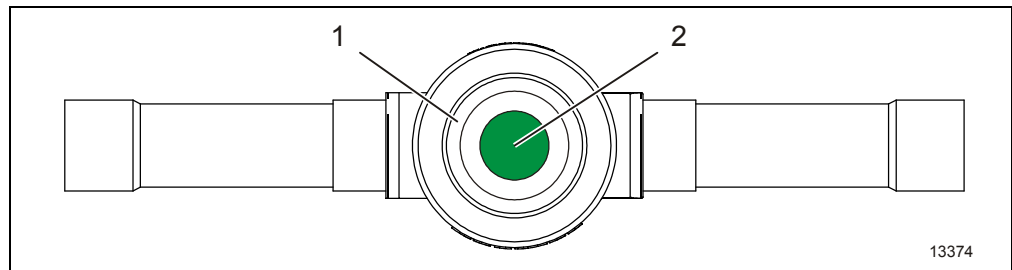


Fig. 7: Refrigerant sight glass (example)

- 1 Sight glass
- 2 Indicator

The colour of the indicator indicates the moisture content of the refrigerant.

- **Green:** No moisture in the refrigerant.
- **Yellow:** Moisture in the coolant. Replace the filter drier.

Symptoms of malfunctions:

- The indicator will turn from green to yellow when there is moisture in the refrigeration circuit.
- Continuous formation of bubbles while the compressors are running (can be seen in the sight glass).

NOTE

In both cases, a refrigerant specialist should be consulted.

10.6 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.

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.

DANGER

Risk of injury caused by electric current!

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

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

- Comply with the information that is given in the "Safety" chapter.
 - Only suitably qualified persons are authorised to perform these tasks.
1. Disconnect the unit from the power supply in order to deenergise it.
 2. Secure the unit so that it cannot be switched on again accidentally.
 3. Check whether the unit is properly disconnected from power and absolutely voltage-free.
 4. Earth and short-circuit the unit.
 5. Cover any adjacent live parts and secure the danger area.

WARNING

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).

⚠ 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!

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.

Risk of injury due to rotating fans!

There is an increased risk of injury due to rotating fans when the unit is switched on.

- Keep housing closed during operation.
- Never reach into the device when it is switched on.
- Prior to opening the housing, ensure that the device is off and secured against reactivation.

NOTE

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.	Check and open.
	The diameters of the lines and hoses are insufficient.	Check and replace.
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.

11.4 Refrigeration unit

⚠ WARNING

Risk of injury for personnel!

There is a risk of burns or freezing of limbs due to damaged refrigerant pipes. Do not damage the refrigerant pipes.

⚠ CAUTION

Improper handling of the refrigeration unit!

Danger due to improper handling of the refrigeration unit.

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

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

♻ 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.

Fault	Cause	Note
Refrigeration unit not running or reduced refrigeration capacity.	Compressor circuit breaker has tripped.	Reset circuit breaker.
	High-pressure fault.	Clean the condenser (air-cooled version). Ensure that there is a sufficient amount of cooling air (air-cooled version).
	Air filter mat is dirty.	Replace.
• on air-cooled version	Condenser cooling fins dirty.	Clean.
	Condenser fan defective (motor coil overheated).	Allow fan motor to cool off (for approximately 30 minutes), replace if necessary.
	Entry /exit of cooling air obstructed.	Remove any objects from in front of or on top of the unit.
	Insufficient external suction.	Check.

11.4.1 Refrigerant sight glass

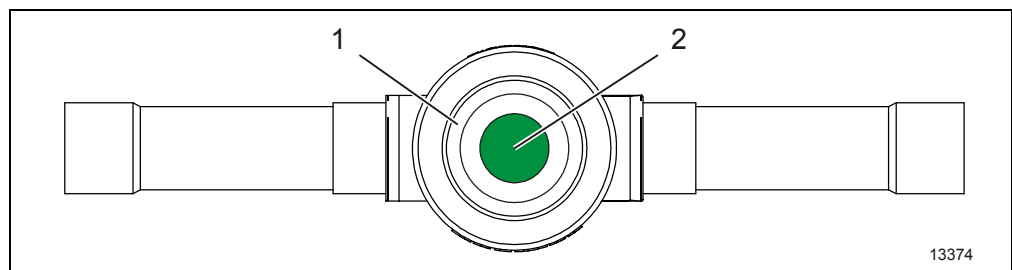


Fig. 8: Refrigerant sight glass (example)

- 1 Sight glass
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The colour of the indicator indicates the moisture content of the refrigerant.

- **Green:** No moisture in the refrigerant.
- **Yellow:** Moisture in the coolant. Replace the filter drier.

Symptoms of malfunctions:

- The indicator will turn from green to yellow when there is moisture in the refrigeration circuit.
- Continuous formation of bubbles while the compressors are running (can be seen in the sight glass).

NOTE

In both cases, a refrigerant specialist should be consulted.

11.5 Unit-specific

Fault	Cause	Note
No or insufficient chilling medium flow.	The level in the medium container is too low.	Top up with medium.
	Pump defective.	Check the unit for leaks. Seal the unit if necessary. Check and replace if necessary. Check the fuse.
	Chilling medium too warm.	Fault concerning the refrigeration unit: <ul style="list-style-type: none"> • Cooling air inlet/outlet blocked.
<ul style="list-style-type: none"> • Fan defective. 		Check. Dismount and replace, if necessary. Inform the service department.
<ul style="list-style-type: none"> • Compressor defective. 		Inform the service department.
Frequent lack of water.	System leaks.	Check / seal leaks.
		Check safety valve for leaks.

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

WARNING

Risk of injuries for persons due to heavy objects!

The components mentioned above are very heavy and bulky.

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

WARNING

Danger through electric current!

Carelessness can lead to electrocution.

Disconnect the electricity supply before disconnecting the unit.

CAUTION

Danger due to improper work practices!

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

Note concerning the protection of the environment

Improper disposal places a burden on the environment.

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

12.2 Dismantling



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.

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 (e.g. water 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.

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

NOTICE

Damage to due air purging!

Do not use air/compressed air to blow out the system; it will destroy sensitive measurement components (e.g., flow meter).

Do not use air/compressed air to blow out the system.

12.3 Transport and storage

NOTICE**Danger of frost**

Damage caused by freezing cooling water in the device.

Completely drain the device before transportation.

NOTE

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

Please note the following:

- The unit must be completely drained before transport.
- The unit must be completely drained before storage.
- The device must be transported vertically and must not be thrown.
- The device must only be stored vertically.
- Ensure that the ambient conditions are in line with the "Technical data".
- 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"

12.4 Recycling



Note concerning the protection of the environment

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

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



Note concerning the protection of the environment

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

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

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

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

NOTE

- The refrigeration circuit must be completely disposed of by a company certified according to § 56 Kreislaufwirtschaftsgesetz (Recycling and Waste Management Act).
- Only trained personnel specialised in refrigeration engineering are authorised to dismantle the refrigeration circuit.

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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