Operation Manual

Water Chiller
Chilly 15-S
Serial number - 10117023PC01100621

Translation

The original operation manual is provided on the attached CD-ROM

Dok-ID: V1.03 – 15.08.2011

Note: Read this manual before operating the system

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1 General information

1.1 Information on this manual

This manual provides important information on the safe and efficient operation of the system.

The manual is an integral part of the system and should be directly accessible for the personnel at any time. Any operator must have carefully read and understood the manual before handling the unit. The strict compliance with the safety precautions and instructions of this manual is a basic requirement for safe operation.

Additionally, the accident prevention regulations and the general safety requirements for the operational area should conform to local codes.

The figures shown in this manual serve as a basic understanding and may vary from the actual design of the system.

Please also note the respective instructions for the fitted components which you will find in the annex.

1.2 Symbol clarification

Safety notes

Safety notes are identified by symbols. The introductory signal word signifies the severity of danger.

Observe the safety notes by all means and act cautiously in order to avoid accidents, personal injuries or property damage.

DANGER!

… indicates an imminently hazardous situation that will result in death or serious injury if not avoided.

WARNING!

… indicates a potentially hazardous situation that may result in death or serious injury if not avoided.

CAUTION!

… indicates a potentially hazardous situation that may result in minor injury if not avoided.

CAUTION!

… indicates a potentially hazardous situation that may result in property damage if not avoided.

Hints and recommendations

NOTE!

… emphasizes useful hints and recommendations as well as information for efficient and trouble-free operation.

Special safety notes

The following symbols are used to call attention to specific hazards:

… indicates hazard generated by electric current. Failure to follow the safety advices could result in serious or fatal injury.

1.3 Limitation of liability

All information and instructions in this manual were compiled subject to all applicable standards and regulations, the state of the art and our years of knowledge and experience.

The manufacturer assumes no liability for damages resulting from:

- disregarding this manual
- improper use
- unskilled operators
- unauthorized alterations
- technical modifications
- use of non-genuine spare parts

The actual delivery contents of customized versions may differ from the descriptions and illustrations specified in this manual depending on the ordered options or due to the latest technical modifications.

The obligations as provided in the delivery contract, the general terms and conditions, the manufacturer's delivery terms as well as the legal requirements at the time when the contract was concluded apply.

Technical data are subject to change in order to improve usability.

1.4 Copyright

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1.5 Spare parts

WARNING!
Safety risk through non-genuine spare parts!

Wrong or faulty spare parts may compromise safety and could result in damage, malfunction or complete failure.

Therefore:

– Use only genuine spare parts from the manufacturer.

Obtain spare parts from authorized dealers or directly from the manufacturer. Refer to page 2 for address.

Refer to the spare parts list in the annex.

1.6 Warranty terms

The warranty terms are part of the manufacturer's general terms and conditions.

1.7 After sales service

For further technical information, please contact our after sales service. See page 2 for contact details.

Our technical service is always interested in getting information about application experiences that could be valuable for product improvement.

2 Safety

This section outlines all necessary safety aspects for optimum protection of personnel and a safe and trouble-free operation.

Failure to follow the instructions and safety notes listed in this manual may result in considerable danger.

2.1 Customer's responsibility

The chiller is designed for both commercial and industrial applications. Hence the operator of the chiller has legal obligations to ensure health and safety at work.

In addition to the safety advices listed in this manual, the relevant safety, accident prevention and environmental protection regulations for the system's field of application must be observed. Attention should be paid in particular to the following instructions:

- The operator must thoroughly acquaint himself with the legal safety and health at work regulations and is obliged to make a suitable and sufficient assessment of the additional risks to health and safety to which the personnel is exposed due to the special working conditions at the cooling unit operating site. He must implement these by means of operating instructions for cooling unit operation.
- The operator must observe and meet the EU regulation 842/2006 of the European Parlament and Council from the 17th of May, 2006 on certain fluorinated greenhouse gases.
- The operator is obliged to check during the entire operating time of the cooling system whether the operating instructions issued by him comply with the actual rules and standards and keep them up-to-date.
- The operator must clearly arrange and decide on responsibilities for installation, operation, maintenance and cleaning.
- The operator must ensure that all personnel handling the cooling unit have read and understood the operation manual. Furthermore, he must train the personnel at regular intervals and inform them about the risks.
- The operator must provide the required protective equipment for the personnel and order the compulsory wearing of protective clothing.
- The operater must ensure that the mandatory signs and indicating labels listed in this operation manual are attached to the unit's housing or interior or in the direct proximity of the cooling unit.
- If the model provides no main switch with emergency stop function, the operator must integrate the cooling unit safety

circuit into the emergency stop concept of the complete system and ensure that additional emergency stop devices are accessible near the cooling unit.

Furthermore, the operator is responsible for the ever perfect working order of the cooling unit. Accordingly the following applies:

- The operator must ensure that the maintenance intervals are observed as specified in this operation manual.
- At regular intervals, the operator must have all the safety devices checked for proper functioning and completeness.
- The operator is obliged to install short circuit detectors which will isolate the phase connections.
- The operator must make sure that the substances specified in this operation manual are used for the field supplied chilled water circuit.
- The operator must ensure that the specified chilled water quality is observed and has to arrange for the required regular water checks.
- The operator must mount the optional components described in the installation section in the water circuit and integrate them into the cooling system control.

2.2 Requirements for personnel

2.2.1 Qualifications

WARNING!
Risk of injury due to low qualification!

Improper operation can result in serious personal injuries or property damage.

Therefore:

– Have all activities performed by qualified personnel only.

In the operation manual, the following qualifications for the various fields of operation are specified.

- **Instructed Person**
  means a person that was instructed by the operator about the assigned tasks and the potential risks caused by inappropriate conduct.

- **Qualified personnel**
  are qualified to perform the assigned tasks and to recognize and avoid potential hazards independantly owing to their professional qualifications, skills and experiences and also their knowledge of relevant regulations.
- **Skilled electrician**
  means a person who is qualified to work on electrical systems and to recognize and avoid potential hazards independantly owing to his professionel qualification, skills and experiences and also his knowledge of relevant standards and regulations. The skilled electrician is qualified for the special field of operation he is working in and knows all the relevant standards and regulations.
- **Accredited refrigeration specialist**
  means a person who is qualified to work on refrigeration systems and to recognize potential hazards independantly owing to his professionel qualification, skills and experiences and also his knowledge of relevant standards and regulations. The issued certification includes the required expertise for emmission avoidance, the recovery of fluorinated greenhouse gases and the sensitive handling of refrigeration systems of relevant art and size.
  The accredited refrigeration specialist is qualified and accredited for the special field of operation he is working in and knows all the relevant standards and regulations.

Only persons who will perform their tasks reliably may be employed. Persons whose ability to respond is affected by e.g. drugs, alcohol or medication use are not permitted.

- When selecting employees, observe the local job-related and age restriction regulations.

2.2.2 Unauthorised persons

WARNING!
Hazards for unauthorised persons!

Unauthorized persons who do not meet the specified requirements do not know the specific work area hazards.

Therefore:

– Keep unauthorised persons away from the work area.
– If in doubt, address the persons and expel them from the work area.
– Interrupt any operations as long as unauthorised persons are present in the work area.

2.2.3 Instructions

The operator is obliged to instruct the personnel at regular intervalls. Record any given instruction for tracking purposes.

Date	Name	Type of instruction	Instruction given by	Signature

Fig. 1

2.3 Intended use

The unit is planned and designed for the limited purpose specified as follows.

The unit is exclusively intended for the use of chilling water that complies with the quality specified in this operation manual.

Intended use also includes the observance of all instructions provided in this manual.

Any other use of the unit or use beyond the intended purpose shall be deemed to be misuse and may involve dangerous situations.

WARNING!
Hazards due to misuse!

Dangerous situations may evolve from the misuse of the system.

– Do not chill combustible coolants.
– Do not chill explosive coolants.

Claims of any kind resulting from any use other than the intended use are excluded.

2.4 Personal protective equipment

Wearing of protective clothing at work is essential in order to minimise health hazards.

- In the course of work, always wear the protective equipment that is required for the respective operations.
- Observe the instructions on personal protective equipment that are affixed in the work area..

Always wear

For all operations, always wear:

Protective clothing

is tight fit work clothing of low tensile strength, with tight sleeves and no protruding parts. It serves mainly as a protection against getting caught in moving machine parts.

Do not wear any rings, necklaces or other jewellery.

Safety boots

to protect the feet against heavy fallen parts and against slipping on slippery surfaces.

Wear for specific operations

Specific operations require extra protective equipment. These will be seperately specified in the particular chapters of this manual. In the following, the extra protective equipment will be illustrated:

Safety glasses

to protect the eyes against hurtling particles and liquid splashes.

Protective gloves

to protect the hands against abrasion, graze, punctures or deeper injuries as well as contact with hot surfaces.

Chemical-resistant protective gloves

to protect the hands against aggressive substances.
Check the gloves for leak tightness before use. Clean them before removing and store them in a well vented place.

Safety helmet

for protection against falling or hurtling parts and materials.

Hygienic breathing protection

for protection against infection by pathogen germs in the ambient air and to prevent the contamination of the ambient air by exhaled pathogen germs.

Self-contained breathing apparatus (SCBA)

for protection against harmful gases, vapours, dust or similar materials or coolants.

SCBA (e.g. compressed air breathing apparatus must be used if the oxygen content of the ambient atmosphere is less than 17 % or if the concentration of a hazardous substance in the air exceeds more than hundred-fold the maximum allowable value.

SCBA may only be applied by persons who completed a respective special training.

2.5 Specific hazards

In the following, residual risks are illustrated that have been determined based on a risk assessment.

- Strictly observe the following safety instructions and the warnings specified in the other chapters of this manual in order to reduce health hazards and avoid hazardous situations.

Safety

Electric current

DANGER!
Risk of fatal injury caused by electric current!

Touching live parts implies an imminent danger to life. Damage to insulation or components may result in fatal injury.

Therefore:

- Disconnect the power supply immediatly if an insulation fault has been detected and arrange for repair.
- All work on the electrical system may be performed by a skilled electrician only.
- When working on the electrical system ensure and recheck that the system is voltage free.
- Disconnect the power supply and secure against reconnection before attempting any maintenance, cleaning or repair work.
- Do not bridge or disable fuses. Observe the correct amperage when replacing fuses.
- Do not expose live parts to moisture. This may cause a short circuit.

Highly inflammable substances

WARNING!
Fire hazard by highly inflammable substances!

Highly inflammable substances, liquids or gases may inflame causing severe or even fatal injuries.

Therefore:

- Do not smoke within the danger area and the immediate surroundings. Refrain from handling of open fire or ignition sources.
- Keep a fire extinguisher ready.
- Report any suspicious substances, liquids or gases immediatly to the person in charge.
- In case of fire abandon your work instantly. Leave the danger area until all-clear is given.

Moving components

WARNING!
Risk of injury caused by moving components!

Rotating and/or linearly moving components may cause severe injuries.

Therefore:

– Do not reach into or work on moving components during operation.
– Do not open any panels during operation.
– Mind the follow-up time:
Ensure that all parts have stopped moving before opening any panels.
– Wear tight fit protective clothing in the danger area.

Fan

WARNING!
Risk of injury caused by rotating parts!

Rotating fan parts may cause severe injuries. The impeller should not be accessible during operation.

Therefore:

– Never reach into the running fan.
– Do not open any panels or access panels during operation!
– Mind the follow-up time:
Ensure that all parts have stopped moving before opening any service access panels..

Safety

Refrigerant

WARNING!
High gas concentration may cause suffocation!
Skin or eye contact may cause frostbite!
Danger of explosion and burning from gas leakage!

Escaping liquid gas in high concentrations may cause unconsciousness and immobility and could lead to suffocation.

Skin or eye contact with the liquid gas could cause frostbite.

At high pressures and high air ratio, escaping vapours may build an explosive mixture.

Therefore:

– Observe the specified water quality to prevent corrosion.
– Observe the manufacturer’s safety data sheet.
– Provide self-contained breathing apparatus (SCBA) for emergencies.
– Provide a person with suffocation symptoms immediately with a SCBA. Remove casualty to fresh air and keep at rest and warm. Seek medical advice.
– In case of apnea apply first aid with artificial respiration.
– Avoid skin and eye contact. Wear protective gloves and safety spectacles with eyeglass side shields when working on refrigerant tanks, lines or supplies.
– In the case of eye or skin contact rinse immediately with plenty of water. Seek medical advice.
– Keep away from ignition sources.
– Do not eat, drink or smoke during work.

Coolant, Glycol

CAUTION!
Poisoning symptoms after inhaling or swallowing the liquid!

Coolants contain substances that are hazardous to health causing poisoning symptoms or skin irritation.

Therefore:

– Observe the manufacturer's safety data sheet.
– Avoid spilling or vapour formation.
– In case of inhalation, remove the affected person to fresh air instantly. Seek medical advice.
– In case of swallowing, seek medical advice instantly. Rinse mouth thoroughly with plenty of water, induce vomiting if necessary.
– Avoid skin and eye contact:

  Apply suitable skin protection creme before working on any containers, piping or supplies.

  Wear chemical-resistant protective gloves and safety spectacles with eyeglass side shields during work.

  After completion, wash thoroughly and apply skincare creme.
– In the case of eye or skin contact rinse immediately with plenty of water. Seek medical advice.
– Do not eat, drink or smoke during work.

Treatment chemicals

CAUTION!
Danger to health by water treatment chemicals in the chilled water

Chilled water may contain anti-freeze, corrosion inhibitor or agents for reducing the bacteria count which may cause a danger to health by skin contact or inhalation.

Therefore:

– When handling chilled water the wearing of chemical-resistant protective gloves, safety glasses und hygienic breathing protection must be strictly observed.
– Regard the manufacturer's safety data sheet.

Safety

Dirt and scattered objects

CAUTION!
Risk of stumbling caused by dirt or scattered objects!

Dirt and scattered objects are sources of slipping or stumbling causing severe injuries.

Therefore:

– Keep the workspace clean and tidy.
– Remove any objects no longer required.
– Indicate potential stumbling risks with yellow-black marker band.

Sharp or pointed edges

CAUTION!
Risk of injury by sharp or pointed edges!

Sharp or pointed edges may cause skin graze or cuts verursachen.

Therefore:

– Be careful when working near sharp or pointed edges.
– In case of doubt, wear protective gloves.

Hot surfaces

CAUTION!
Fire hazard by hot surfaces!

Contact with hot components could result in burns.

Therefore:

– Strictly observe to wear protective clothing and protective gloves when working in the proximity of hot components.
– Ensure that all components have cooled down to ambient temperature before attempting any operation.

2.6 Safety devices

WARNING!
Defective safety devices may pose a fatal risk!

Safety devices must be fully functional at all times to ensure safety.

Therefore:

– Check that all safety devices are fully functional and properly mounted before attempting any operation.
– Never override safety devices.
– Ensure that the safety devices are fully accessible at all times.

NOTE!

Please refer to the chapter "Assembly and function" for further information on the location of safety devices.

Following safety devices are mounted:

Main switch

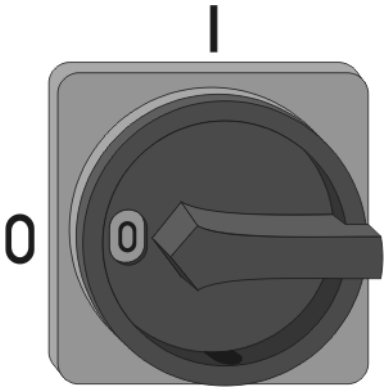


Fig. 2

Turning the main switch to the "0" position will instantly disconnect the power supply. This will not necessarily activate an emergency stop.

WARNING!
Risk of fatal injury caused by accidental restoration of power supply!

The accidental restoration of power supply may result in severe injuries or death.

Therefore:

– Ensure that no persons are present in the danger area and that all safety devices are mounted and fully functional before restoring the power supply.

Service access

For ease of service and maintenance, enclosed housings are fitted with service apertures providing easy access to all components.

Ensure that the unit is shutdown and that the power supply is disconnected and secured before removing any access panels.

Tools are required for access panel removal. After completion refit the access panels and secure with the fasteners.

Following safety devices must be fitted by the operator:

Integration in an emergency stop system required

The cooling unit that provides no main switch with emergency stop function is designed for the installation into a system. There is no autonomous emergency stop device fitted.

Install appropriate emergency stop devices and integrate them into the system safety chain before operating the cooling unit.

Connect the emergency stop devices so that no persons or material assets are at risk when cutting off the power supply or restoring the electrical supply after a shutdown.

The emergency stop devices must be easily accessible at all times.

2.7 Securing against power restoration

WARNING!
Risk of fatal injury caused by unauthorised or unchecked restoration of power supply!

Unauthorized or unchecked restoration of power supply may result in severe injuries right up to death.

Therefore:

– Ensure that all safety devices are mounted and fully functional and that no persons are at risk before attempting to restart the unit.
– Always observe the following sequence of operations to prevent the accidental restart of the unit while it is being serviced.

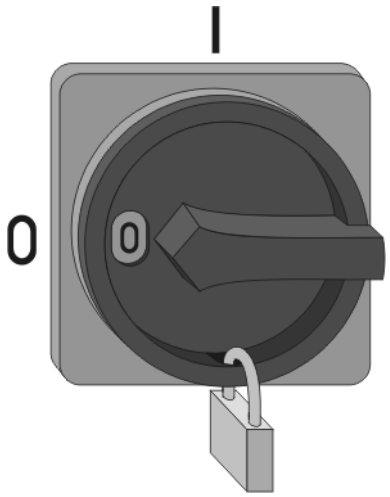


Fig. 3

1. Isolate the unit’s power supply by turning the main switch to the "0" position.
2. Secure the main switch with a padlock.
3. Have the padlock key kept by a responsible assistant.
4. After all operations have been completed check that no persons are at risk.
5. Ensure that all safety and protection devices are mounted and fully functional.

WARNING!

Risk of fatal injury caused by unauthorized restart!

If the main switch is secured with a padlock this could indicate that persons are present in the danger area. By restoring the unit’s power supply these persons could suffer life-threatening injuries.

Therefore:

– Always check that there are no persons at risk before removing the padlock and energizing the unit.

6. Remove the padlock from the main switch.

2.8 Procedure in case of danger or accidents

Precautions

- Always be prepared for accidents or fire!
- Keep first aid equipment (e.g. first aid kit, blankets) and fire extinguisher handy.
- Acquaint the personnel with alarm, first aid and rescue facilities.
- Keep access roads clear for emergency vehicles.

Emergency measures

- Trigger the emergency stop immediately.
- Administer first aid.
- Rescue persons from the danger area.
- Inform the person in charge at the place of action.
- Alarm the rescue service.
- Clear the access roads for the emergency vehicles.

2.9 Environmental protection

CAUTION!
Environmental hazard caused by improper handling!

Improper handling of environmentally hazardous substances, especially improper disposal, may cause considerable ecological damage.

Therefore:

– Always observe the following instructions.
– If environmentally hazardous substances have been accidentally released to the environment, take appropriate measures immediately. If in doubt, inform the local authorities of the damage.

The following environmentally hazardous substances are used:

Lubricants

Lubricants like grease or oil contain toxic substances which may not be released to the environment. The disposal must be carried out by a qualified waste disposal company.

Refrigerant

Refrigerant generates environmentally hazardous decomposition products when released. Hence, handle refrigerant with extreme care and diligence. Strictly observe the manufacturer's safety data sheet. Regularly advise personnel who handle refrigerants of the potential dangers!

Coolant, Glycol

Coolants may contain toxic and environmentally hazardous substances which may not be released to the environment. The disposal must be carried out by a qualified waste disposal company.

Treatment chemicals

Treatment chemicals may contain toxic and environmentally hazardous substances which may not be released to the environment. The disposal must be carried out by a qualified waste disposal company.

2.10 Sign posting on site

The following symbols and information signs which directly refer to the system are located in the work area. They apply in the proximity of the sign's location.

WARNING!
Risk of injury due to illegible signs!

Labels and signs may gradually get dirty or become illegible in any other way.

Therefore:

– Keep the safety, warning and operation signs always in a well legible condition.
– Renew damaged signs or labels immediately.

No access for unauthorised persons

Only persons who have been authorised by the operator are allowed to enter the danger area.

No smoking

There is a risk of fire caused by inflammable or explosive solid, liquid or gaseous substances.

2.11 Pictograms on the unit

The following pictograms which directly refer to the system are affixed to the unit. They apply in the vicinity of the system.

WARNING!
Risk of injury due to illegible pictograms!

Labels and signs may gradually get dirty or become illegible in any other way.

Therefore:

– Keep the signs and labels always in a well legible condition.
– Renew damaged signs or labels immediately.

High voltage

Only skilled electricians are allowed to work in the designated area.

No unauthorised persons are allowed to access the designated work area or to open any cabinets labeled with this warning sign.

Highly flammable

Keep away all sources of ignition (e.g. open fire, hot heat sources, electric appliances without protection against explosion).

No welding, cutting or grinding allowed.

2.12 Further information on the unit

The following information which directly refers to the system is attached to the unit.

CAUTION!
Risk of material damage due to illegible pictograms!

Labels and signs may gradually get dirty or become illegible in any other way.

Therefore:

– Keep all information always in a well legible condition.
– Renew damaged signs or labels immediately.

3 Technical data

3.1 Dimensional drawings

Following information applies to the versions: CHILLY 08, 15, 25, 35 and 45

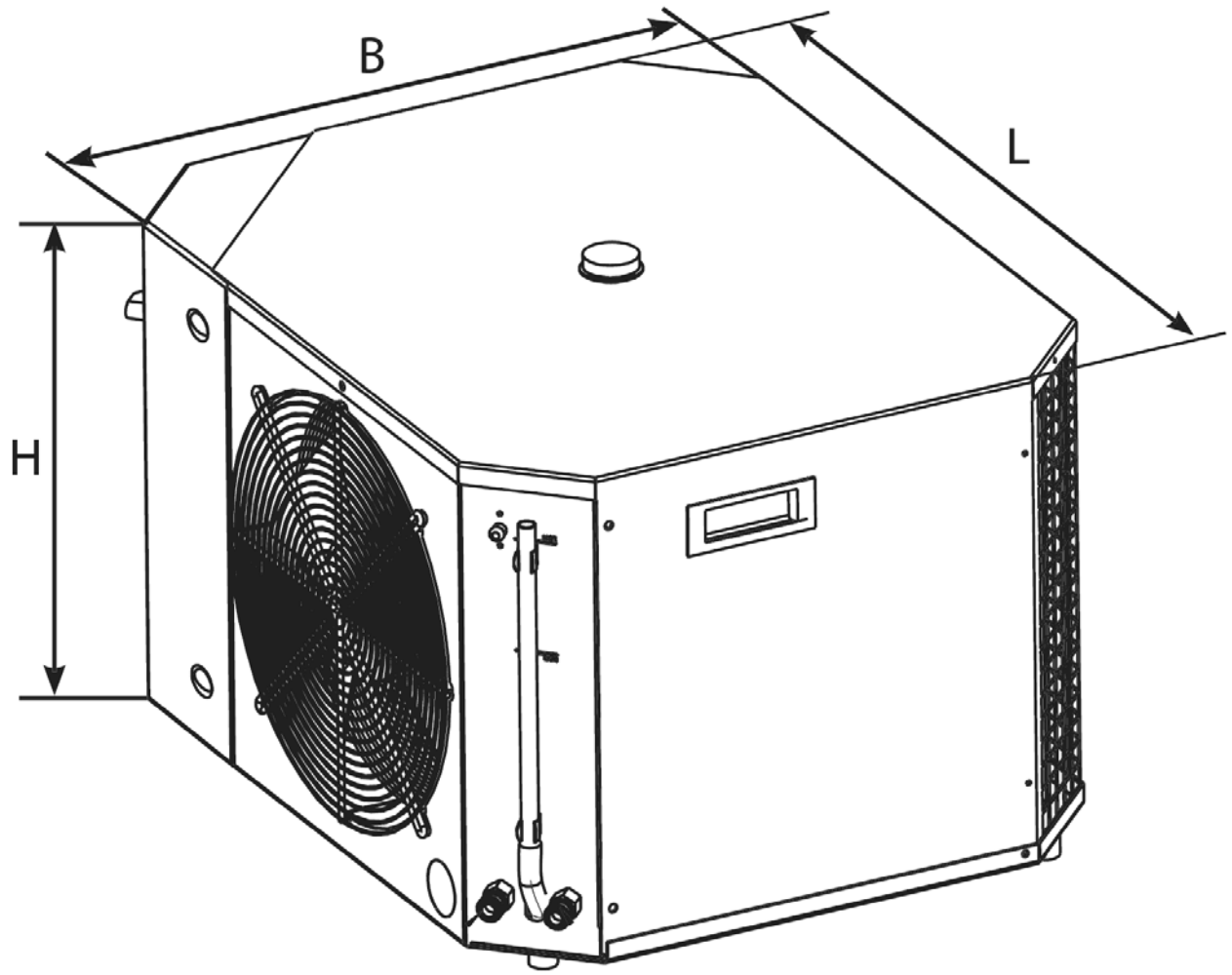


Fig. 4

Technical data

3.2 General information

Term	Figure	Measure
Weight	⇨ Refer to the technical data sheet in the annex	
Length		
Width		
Height		
Water tank volume		

3.3 Specifications

Electrical

Term	Figure	Measure
Supply voltage	⇨ Refer to the technical data sheet in the annex	
Current max.		
Frequency		
Power consumption max.		
Back-up fuse		
Control voltage		

Hydraulical

Term	Figure	Measure
Pipe connection, supply and return	⇨ Refer to the technical data sheet in the annex	

3.4 Operating conditions

3.4.1 Ambient conditions

Term	Figure	Measure
Coolant temperature:	⇨ Refer to the technical data sheet in the annex	
Relative Humidity	0…100	%
Chiller IP	44	IP

3.4.2 Set point

Term	Figure	Measure
Coolant temperature	⇨ Refer to the technical data sheet in the annex	

3.4.3 Duty

Term	Figure	Measure
Continuous operating time max.	Designed for uninterrupted duty	

3.5 Performance data

Term	Figure	Measure
Cooling capacity	⇨ Refer to the technical data sheet in the annex	
Number of compressors		
Compressor type		
Power consumption max. - compressor		
Current max. - compressor		
Air flow rate		
Number of fans		
Power consumption max. - fan		
Current max. - fan		

3.6 Emissions

Term	Figure	Measure
Maximum sound pressure level according to DIN EN ISO 3745	⇨ Refer to the technical data sheet in the annex	
Heat loss	Cooling capacity x 1,3	kW

3.7 Operating fluids

Operating fluids	Type	Capacity	Measure
Refrigerant	⇨ Refer to the technical data sheet in the annex		
Ester oil	See compressor operation manual		

3.8 Site requirements

⇨ refer to chapter "Installation and commissioning“ for site requirements

3.9 Nameplate

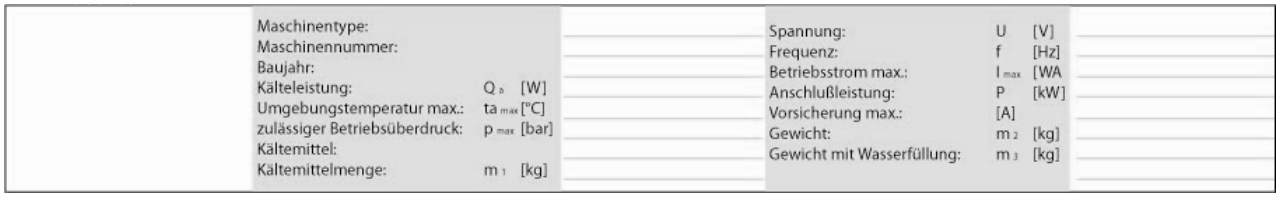


Fig. 5: Nameplate

The nameplate is located between the water connections and the condenser and provides the following information:

- Manufacturer
- Machine type
- Machine number
- Year of manufacture
- Cooling capacity
- Maximum ambient temperature
- Maximum allowable pressure (HP) HP / LP:
- Refrigerant
- Refrigerant charge
- Voltage
- Frequency
- Maximum operating current
- Power input
- Back-up fuse
- Weight
- Weight including water charge

4 Assembly and function

4.1 General view

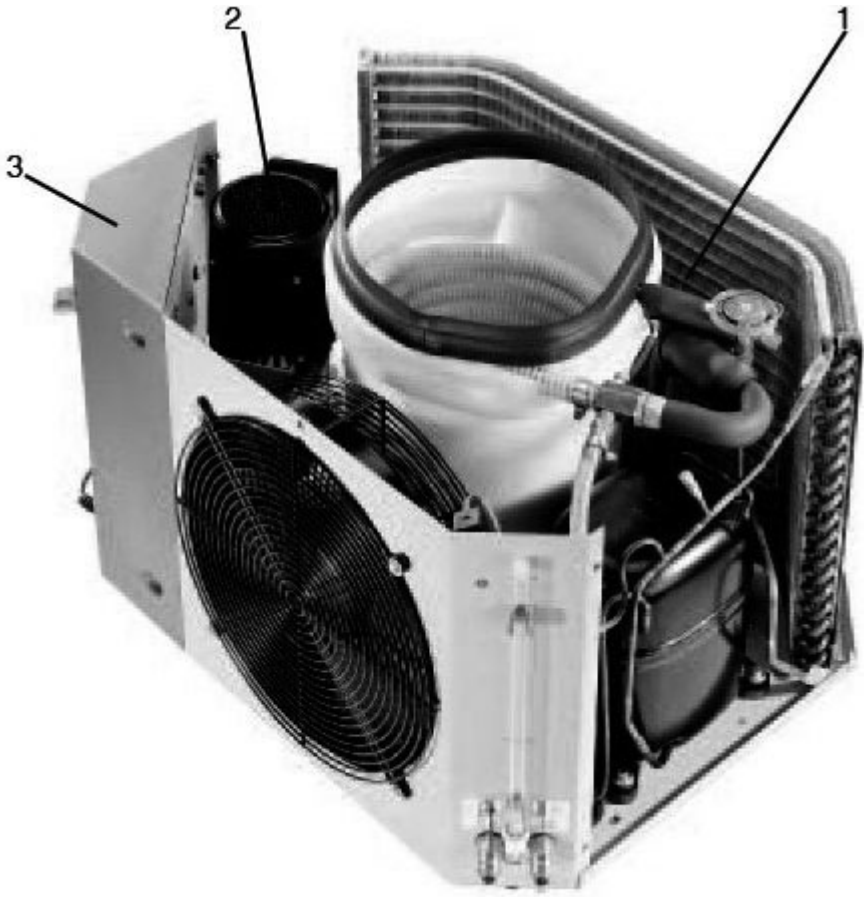


Fig. 6

1 Refrigeration system
2 Chilled water circuit
3 Electric box

4.2 Brief description

The chiller CHILLY is connected to a field supplied chilled water circuit and the customer equipment via the supply and return ports. The water which is heated by the customer equipment flows through the chiller and the integrated refrigeration system chilles the water. Then, the chiller returns the chilled water to the customer equipment.

4.3 Assembly description

4.3.1 Refrigeration system

The refrigeration system is a thermo-dynamic process where heat from the chilled water circuit is absorbed and then released to the ambient air at higher temperatures. This compressorised refrigeration system consists of a compressor, a restrictor, a condenser and an evaporator. The compressor compresses mechanically the applied refrigerant. The evaporator boiles the refrigerant and absorbes this way the heat from the coolant. Then the fan assisted condenser releases the heat to the ambient air.

4.3.2 Chilled water circuit

The chilled water circuit consists mainly of a pump, a tank with level indicator and a bypass circuit. Inside the tank, the chilled water circulates around the lower located evaporator of the refrigeration system, thus the water cools down. The pump pumps the chilled water through the piping to the customer equipment and back to the tank. The limited bypass fitted to the pump outlet is used as a pump protection.

4.3.3 Electric box

The electric box supplies all electric loads of the chiller and protects them from overcurrent. A chilled water temperature control is also integrated. A temperature sensor measures the temperature of the chilled water and the temperature control device adjusts the temperature to the preset value by use of the chiller.

4.4 Connections

4.4.1 Chiller with single pipe connection

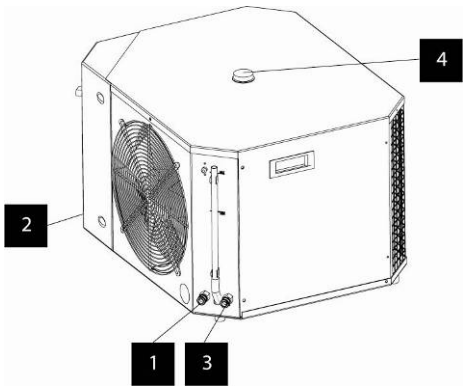


Fig. 7

1 Supply (chilled water to customer equipment)
2 Power connection
3 Return (chilled water from customer equipment)
4 Fresh water

4.4.2 Chiller with double pipe connection

Systems with two water connections are available as an option. This allows the cooling of two separate water circuits.

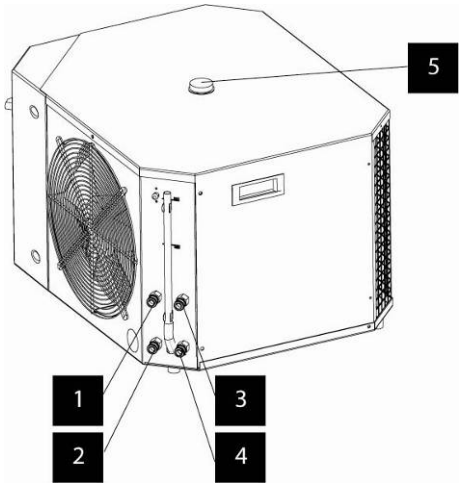


Fig. 8

2 Supply (chilled water to customer equipment) first circuit
4 Return (chilled water from customer equipment) first circuit
5 Fresh water

Optional
1 Supply (chilled water to customer equipment) second circuit
3 Return (chilled water from customer equipment) second circuit

4.5 Work and danger areas

Following information applies to the versions: CHILLY 08, 15, 25, 35 and 45

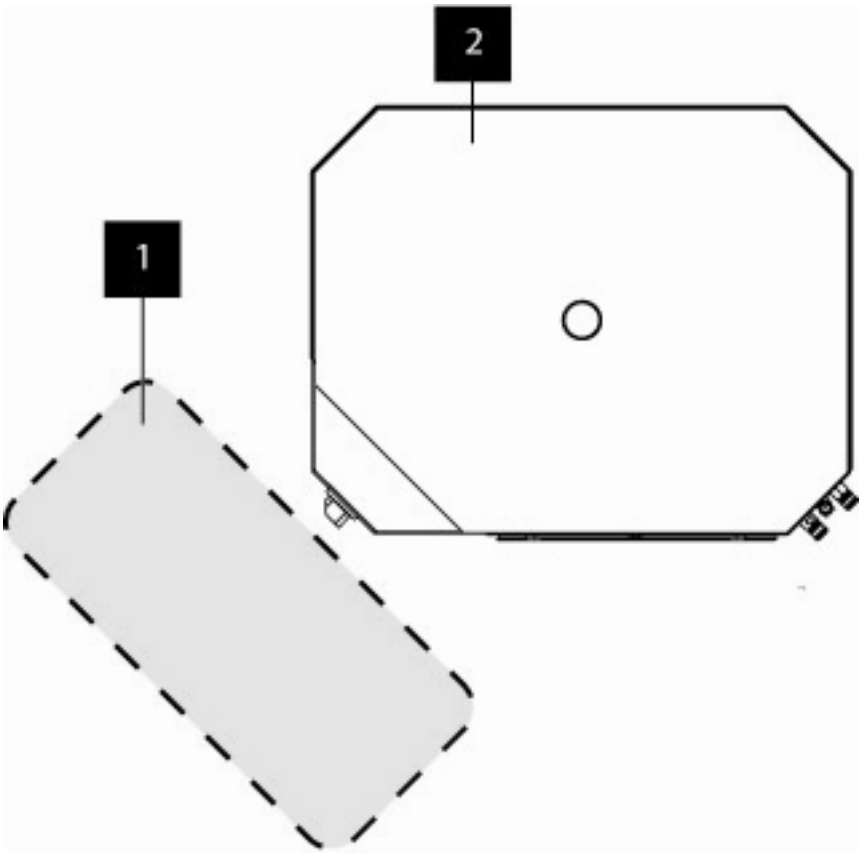


Fig. 9

Work areas

1 In normal mode, operation in front of the electric box

Danger areas

2 Inside the enclosed cooling system.

4.6 Location of the emergency stop devices

Integration in an emergency stop system required

The cooling unit that provides no main switch with emergency stop function is designed for the installation into a system. There is no autonomous emergency stop device fitted.

Install appropriate emergency stop devices and integrate them into the system safety chain before operating the cooling unit.

Connect the emergency stop devices so that no persons or material assets are at risk when cutting off the power supply or restoring the electrical supply after a shutdown.

The emergency stop devices must be easily accessible at all times.

4.7 Controls

Fig. 10

1 Main switch with emergency stop function
2 Coolant temperature control display for temperature settings and troubleshooting

Control display

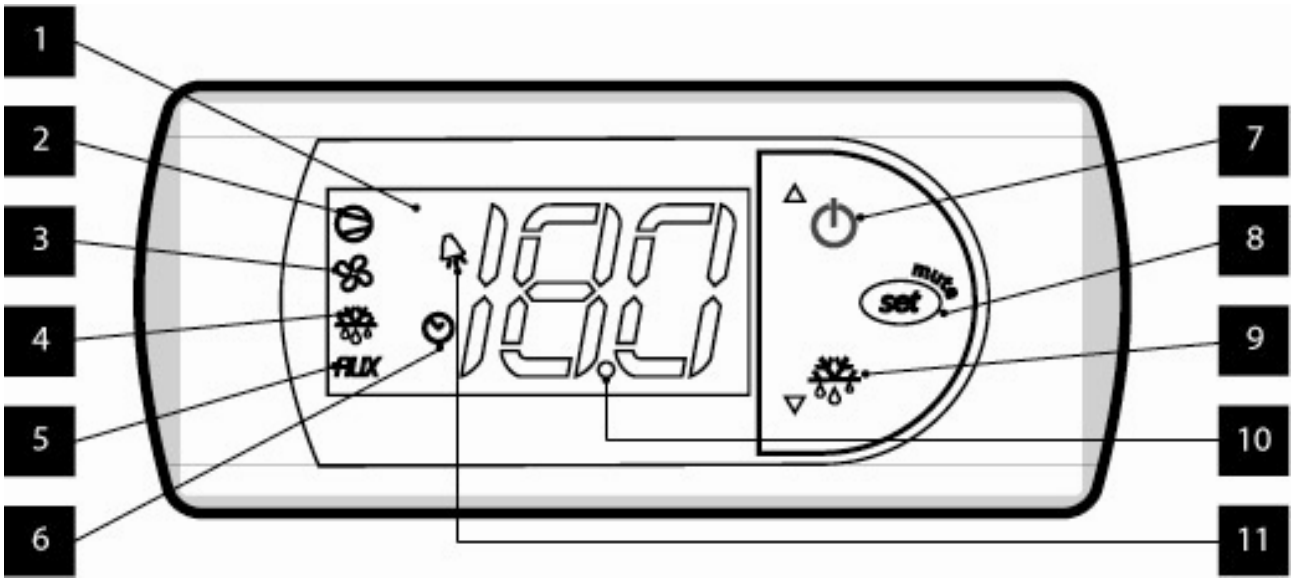


Fig. 11

1 The display indicates the measured value of the temperature sensor which is located in the tank or in the chilled water supply.
During an alarm condition, the measured temperature and the alarm message will be displayed alternately. In set mode, the parameters and the set values are displayed.

2 The „⊖“ LED is on when at least one relay is activated in cooling mode.

3 This function „✻“ is not used.

4 This function „❄“ is not used.

5 The „ALIX“ LED is on when the system is running trouble-free. The LED goes out if a failure occurs.

6 This function „🕐“ is not used.

7 Press the „△⏻-key to increase the set-point or each of the other selected settings.

8 Press the „set mute“ key to silence the alarm buzzer.

In programming mode, pressing the „set mute“ key will save the altered parameter values and quit the programming.

9 Press the „▽❄- key to decrease the set-point or each of the other selected settings.

Press the „▽❄“ key to show the selected set point of the cooling system. Subsequent pressing of the „▽❄“ key will save the set point.

10 The "DECIMAL POINT“ LED is on when the decimal notation is selected.

4.8 Operating modes

4.8.1 Automatic cooling mode

In automatic mode, the "automatic cooling mode“ is the standard operating mode. The refrigeration system and the entire chilled water circuit are activated. The safety chain is energized and the system is controlled automatically.

4.9 Optional features

4.9.1 Heating

A heating in the tank can be supplied as an option. The tank heating ensures that the water quickly attains the required operating temperature if it is too cold.

4.9.2 Dry running protection

Dry run causes pump and/or heating damage. The dry run protection activates an emergency stop whenever a dry run occurs. The alarm indicator is enabled.

4.9.3 Check valve and solenoid valve

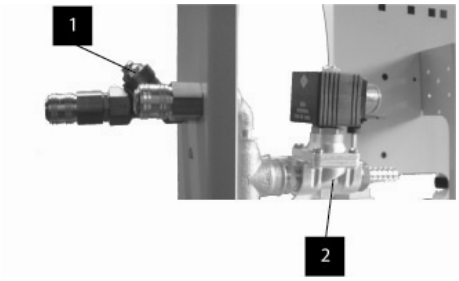


Fig. 12

For installations where the cooling unit is lower located then the customer equipment to which the chilled water is lead, a check valve (1) and a solenoid valve (2) are fitted as an option.

When the system is switched off the solenoid valve and the check valve close and prevent so the flooding of the tank by returned chilled water.

4.9.4 Filter elements

One or more of the listed filter elements are fitted as an option:

- Air filter
- Fine filter

Air filter

The air filter is located at the inner side of the perforated panel. It protects the sytem against pollution from outside.

A pressure switch is fitted optional which indicates rising condenser pressure as a result of a clogged air filter. An additional

alarm LED indicates that the filter should be changed

Fine filter

The optional fine filter protects the water circuit from pollution.

4.9.5 Room temperature control

Systems with optional room temperature control cool the chilled water down to room temperature.

It is possible to adjust a temperature difference at the control display. However, the difference must be within the manufacturer's specified range which cannot be altered.

4.9.6 Remote starting

In addition to the main switch at the electric box, the system can be started remotedly as an option. However, for remote starting the system's main switch must be in position "1".

If no refrigeration is required the system can be shutdown respectively.

The remote start devices must be wired according to the electrical schematic provided in the annex.

4.9.7 Mobile version on castors

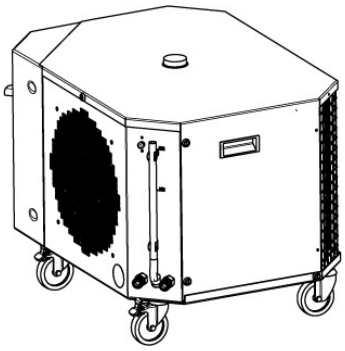


Fig. 13

Four castors (1) can be fitted as an option. Two of them are equipped with brakes. This provides for relocation of the unit without the need for lifting gear or the like

The maximum inclination is ± 2°.

5 Transport, packaging and storage

5.1 Safety notes for transport

Floating loads

WARNING!
Risk of fatal injury caused by floating loads!

When lifting loads, falling or erraticly moving parts may cause fatal injury.

Therefore:

– Never stand underneath floating loads.
– Note the information about the provided lifting points.
– Do not hit overhangig machine parts nor components attached to lugs. Make sure that the lifting means are securely fitted.
– Use only approved lifting gear and lifting means with sufficient load capacity.
– Do not use worn or torn belts or ropes.
– Do not put belts or ropes against sharp edges nor knot or twist them.

Forklift trucks

WARNING!
Risk of accident caused by forklift trucks!

During material handling there is the risk of severe injuries caused by parts fallen off the forklift truck uncontrolledly.

There is also a risk of persons being overlooked by the truck driver, thus being knocked down.

Therefore:

– Forklift trucks must only be operated by specially trained drivers.
– Use only approved forklift trucks with sufficient load bearing capacity.
– Never lift materials across persons nor across areas where people are standing.
– Only pass by forklift trucks if the driver has signalized that he is aware of the persons.

Improper transport

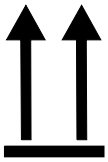
CAUTION!
Risk of damage caused by improper transport!

Improper transport can cause substantial material damage.

Therefore:

– Be careful when unloading the charge on delivery and during field transport. Observe the symbols and references on the packaging.
– Use only the provided lifting points.
– Do not remove the packaging until units are ready for assembly..

5.2 Symbols and references on the packaging



Top

The arrows in this sign indicate the top side of the package. They must always point up to avoid the content getting damaged.

Fig. 14

Instruction meaning:

CAUTION!

High sensitive electric equipment

- Do not lay down
- Do not stack
- Do not drop

5.3 Transport inspection

Check the delivery immediately upon arrival for completeness or transport damage.

If any visible damage is detected proceed as follows:

- Do not accept or do only conditionally accept the delivery.
- Record the extent of the damage in the transport documents or on the delivery note of the carrier.
- File a damage claim.

NOTE!

Claim any damage as soon as it is detected. A claim for compensation can only be made within the applicable time for complaints..

5.4 Transport

Lifting points

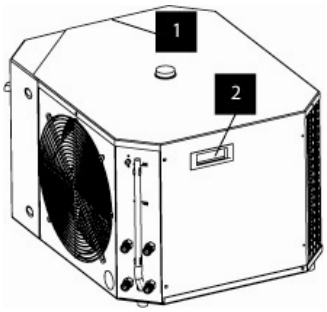


Fig. 15

Following carrying facility is provided:

2 carrying handles (1-2) for 1-2 persons

WARNING!
Risk of accidents caused by improper carrying!
Lifted loads may drop or swing uncontrolledly if improperly carried.
Therefore:
– Always wear safety boots when carrying loads.

Load transport by crane (optional)

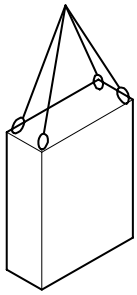


Fig. 16

Loads with lifting points may be directly lifted by cranes under the following conditions:

- The payload of the crane and lifting gear must be dimensioned for the load.
- The operator must be skilled for operating the crane.

Attachment:

1. Attache robes, belts or multipoint lifting tackle as shown in figure 16.
2. Ensure that the load is hanging upright. Consider an exentric center of gravity if necessary.
3. Start transport.

Pallet transport by forklift truck

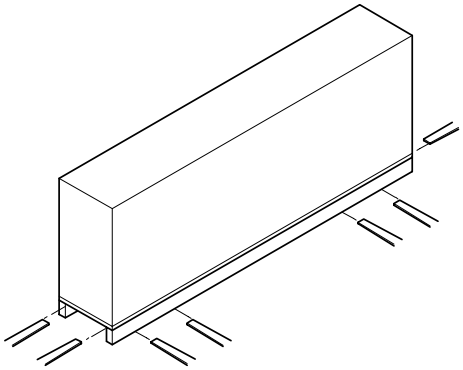


Fig. 17

Loads on pallets may be transported by a forklift truck under the following conditions:

- The forklift truck must be dimensioned for the weight of the transported units.
- The driver must be skilled for driving forklift trucks.

Attachment:

1. Drive the forklift truck forward to insert the forks between or below the pallet beams.
2. Enter the forks until they protrude from the other side.
3. Make sure that the pallet can not overbalance in case of an exentric center of gravity.
4. Lift the load and start transport.

Relocation of units on castors (optional)

By means of castors which are fitted as an option the unit can be moved to another location.

WARNING!
Risk of injury by exceeding the maximum inclination!

If the maximum inclination is not observed there is a risk of severe injury, material damage or tank overflow caused by tilted units.

Therefore:

– Incline the unit no more than ± 2° max.

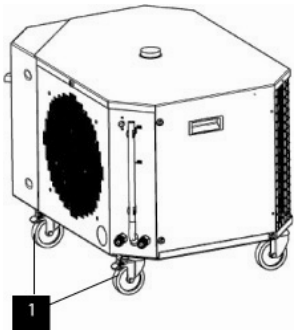


Fig. 18

To relocate the unit proceed as follows:

1. Release castor brakes (1) by pushing them upwards (arrow).
2. Move the unit carefully to the designated location.

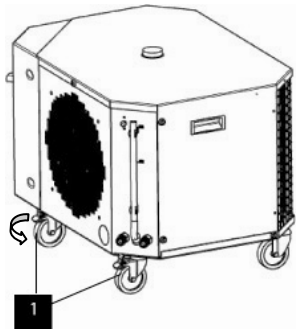


Fig. 19

3. Arrest the castor brakes (1) by pushing them downward (arrow).

5.5 Packaging

Concerning packaging

Fig. 20

The cooling units are wrapped in film and fastened onto the pallet using tension belts.

The packaging shall protect the single components from transport damage, corrosion and other damaging until installation. Thus, do not demolish and do not remove the packaging until shortly before installation.

Handling packing material

Dispose of the packing material according to the relevant legal requirements and local codes.

CAUTION!
Ecological damage caused by improper waste disposal!

Packing materials are valuable raw materials and can be re-used in many cases or reasonably processed and recycled.

Therefore:

– Dispose of the packing material environmentally compatibly.
– Observe the relevant local waste disposal regulations. If necessary engage a specialized company to dispose of the packing material.

5.6 Storage

Storing the cooling system

Store the package items under the following conditions:

- Do not store outdoors.
- Store in a dry and dust-free area.
- Do not expose to aggressive media.
- Protect from solar radiation.
- Avoid mechanical vibration.
- Storage temperature: 15 to 35 °C.
- Relative humidity: max. 60%.
- When storing for more than 3 months, regularly check the general condition of all parts and packaging. If necessary, refresh or replace preservation.
- Before storing the unit after commissioning and disassembly, the entire chilled water circuit must be drained.

NOTE

It is possible that the storage instructions on the package items go beyond the above mentioned requirements. These should be observed accordingly.

6 Installation and commissioning

NOTE!

The installation and commissioning of the refrigeration system within the cooling system will be exclusively performed by employees of the manufacturer at the place of manufacture.

6.1 Safety

Personnel

- The required qualification of personnel for performing the individual installation and commissioning tasks will be specified in the respective chapters.
- All work on the electrical system may be performed by a skilled electrician only.

Personal protective equipment

Always wear the following protective equipment during all installation and commissioning operations:

- Protective clothing
- Safety boots

NOTE!

Please note the separate warnings in this chapter regarding extra protective equipment which may be required for specific operations.

Electrical system

DANGER!
Risk of fatal injury caused by electric current!

Contact with active components may cause fatal injury. Energized electrical components could move uncontrolledly and may cause life-threatening injuries.

Therefore:

– Isolate the unit's power supply and secure against reconnection before attempting any installation work.

Restart lockout

WARNING!
Risk of fatal injury caused by accidental restoration of power supply!

During installation, there is a risk of the electrical supply being restored accidentally. This could result in fatal injury to the persons being within the danger zone.

Therefore:

– Isolate the unit's power supply and secure against restoration before attempting any installation work.

Improper installation and commissioning

WARNING!
Risk of injury due to improper installation and commissioning!

Improper installation and commissioning may result in serious personal injury or property damage.

Therefore:

– Before attempting any installation work, provide for sufficient work space.
– Handle components with exposed sharp edges with care.
– Pay attention to a clean and tidy installation area! Scattered components and tools are sources of accidents.
– Assemble components professionally. Observe the required tightening torques.
– Ensure that components cannot fall over or down.

Installation and commissioning

Floating loads

WARNING!
Risk of fatal injury caused by floating loads!

When lifting loads, falling or erraticly moving parts may cause fatal injury.

Therefore:

- Never stand underneath floating loads.
- Note the information about the provided lifting points.
- Do not hit overhangig machine parts nor components attached to lugs. Make sure that the lifting means are securely fitted.
- Use only approved lifting gear and lifting means with sufficient load capacity.
- Do not use worn or torn belts or ropes.
- Do not put belts or ropes against sharp edges nor knot or twist them.

Refrigerant

WARNING!
High gas concentration may cause suffocation!
Skin or eye contact may cause frostbite!
Danger of explosion and burning from gas leakage!

Leaking liquid gas in high concentrations may cause unconsciousness and immobility and could lead to suffocation.

Skin or eye contact with the liquid gas could cause frostbite.

At high pressures and high air ratio, leaking vapours may build an explosive mixture.

Therefore:

– Observe the specified water quality to prevent corrosion.
– Observe the manufacturer's safety data sheet.
– Provide self-contained breathing apparatus (SCBA) for emergencies.
– Provide a person with suffocation symptoms immediately with a SCBA. Remove casualty to fresh air and keep at rest and warm. Seek medical advice.
– In case of apnea apply first aid with artificial respiration.
– Avoid skin and eye contact. Wear protective gloves and safety spectacles with eyeglass side shields when working on refrigerant tanks, lines or supplies.
– In the case of eye or skin contact rinse immediately with plenty of water. Seek medical advice.
– Keep away from ignition sources.
– Do not eat, drink or smoke during work.

6.2 Preparations

Before set-up ensure that:

- the base is dimensioned for the static load and the dynamic loading
- the base is level and hard-surfaced
- the entire installation area is clean and clear of materials
- the illumination of the entire installation area is adequate
- there are no heating sources near the air inlets

6.2.1 Space requirement

Following information applies to the versions: CHILLY 08, 15, 25, 35 an 45

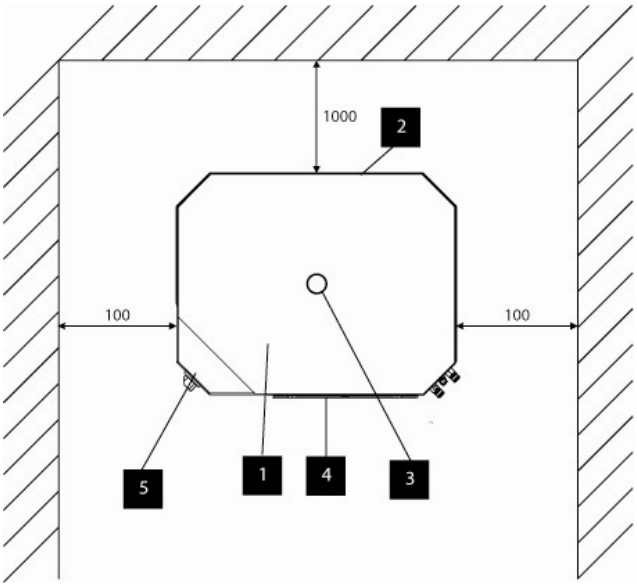


Fig. 21

1 Removable service panel
2 Horizontal airflow
3 Manual fresh water supply
4 Air intake and removable service panel
5 Electric box and removable service panel

6.2.2 Air circulation specifications

Following examples show how to ensure a sufficient and intended air circulation.

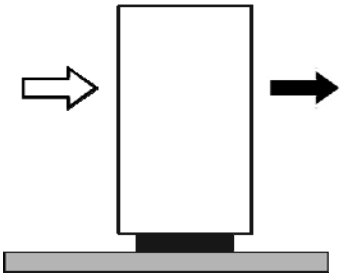
NOTE!

For optional outdoor installations, only systems with horizontal airflow are utilized.

Please contact our customer support for technical information. Refer to the contact details at page 2.

Airflow of fresh air supply

Airflow of hot air return



The suction fresh air and the discharge hot air circulate in the same room.

For fresh air inlet and hot air outlet, the minimum clearance between cooling unit and wall is 1 m.

Ensure that there is no short circuit between the discharge hot air and the suction fresh air.

Fig. 22: Standard airflow

6.3 Installation

6.3.1 Setting up the cooling unit

- To be conducted by qualified personnel only.
- Additionally required protective equipment:
  - Safety helmet
  - Protective gloves

CAUTION!
Risk of material damage caused by deformations!

Attachment at other angles or removing of panels can damage the cooling unit.

Therefore:

– Observe the specified angle.

– Do not remove any panels.

1. Put the cooling unit down at the site of installation. Remove the ropes, belts or multipoint lifting tackle.

WARNING!
Risk of injury by exceeding the maximum inclination!

If the maximum inclination is not observed there is a risk of severe injury, material damage or tank overflow caused by tilted units.

Therefore:

– Incline the unit no more than ± 2° max.

Addition for units on castors (optional)

2. Use an air lever to check again the level position of the cooling unit. The inclination may not exceed ± 2°.

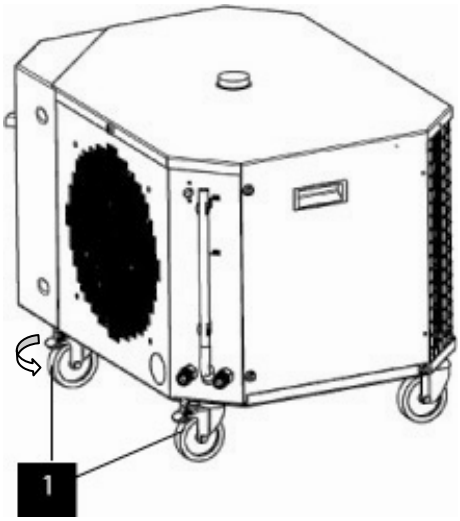


Fig. 23

3. Push castor brakes (1) downward (arrow) to arrest them.

6.3.2 Connection of chilled water circuit and fresh water supply

WARNING!
Risk of injury caused by improper installation of the field supplied chilled water circuit and the fresh water supply!

Improper installation of the field supplied chilled water circuit and the fresh water supply may result in severe damage of persons or property.

Therefore:

– Installation of chilled water circuit and fresh water supply by skilled professionals only.
– Install piping, hoses and other mountings so that there is no risk of stumbling or impact.
– Observe the technical specifications of the cooling unit and of the external assemblies.
– Regard the following manufacturer's specifications of material and safety devices.

Installation and commissioning

On delivery, the cooling unit is equipped only with the provided chilled water circuit connections (supply, return and fresh water connection). The chilled water and fresh water connections are specified in the chapter "Technical data“. The whole pipe or hose installation including the connection of customer equipment must be carried out state-of-the-art by skilled professionals and meet the applicable standards and regulations.

Manufacturer’s specifications

- Approved materials:
  - PVC
  - Stainless steel
  - Copper
  - Brass
- Pipelines with a length ≤ 5 m must be insulated.
- If the customer equipment is geodetically higher located than the cooling unit a check valve must be fitted to the supply and a solenoid valve must be fitted to the return line.
- Connect the supply of the cooling unit to the water inlet of the customer equipment (⇨ see chapter "Connections“).
- Connect the return of the cooling unit to the water outlet of the customer equipment (⇨ see chapter "Connections“).
- Connect the fresh water to the fresh water connection (⇨ see chapter "Connections“).
- Ensure that all connections are tight. The executing specialized company must conduct a strength test.

For further technical information, please contact our after sales service. See page 2 for contact details.

6.4 Commissioning

6.4.1 Charging the chilled water circuit

- To be conducted by qualified personnel only.
- Additionally required protective equipment:
  - Chemical-resistant protective gloves
  - Safety glasses
- Required special tool:
  - Key to open the covering

CAUTION!
Risk of material damage caused by stress corrosion of the evaporator!

Failure to comply with the specified water quality or the use of approved deionized, demineralized, desalinated or reverse osmosis water may cause corrosion of the evaporator.

Therefore:

– Observe the water quality specified in the technical data sheet and check it regularly.

– Strictly observe to add corrosion inhibitor to the chilled water. Comply with the specified mixing ratio (⇨ specification of the corrosion inhibitor manufacturer).

CAUTION!
Risk of material damage caused by frozen chilled water!

If components are exposed to temperatures below zero the system may be damaged by frost.

Therefore:

– Add an adequate frost protection agent (glycol) to the chilled water if individual system components are operated under sub-zero temperature conditions. Observe the specified mixing ratio (⇨ specification ot the glycol manufacturer).

Installation and commissioning

CAUTION!
Danger to health by water treatment chemicals in the chilled water

Chilled water may contain anti-freeze, corrosion inhibitor or agents for reducing the bacteria count which may cause a danger to health by skin contact or inhalation.

Therefore:

– When handling chilled water the wearing of chemical-resistant protective gloves, safety glasses und hygienic breathing protection must be strictly observed.
– Regard the manufacturer's safety data sheet.

NOTE!

Contact details of manufacturer of corrosion inhibitor and agents for reducing the bacteria count are listed in the annex.

Manual charge

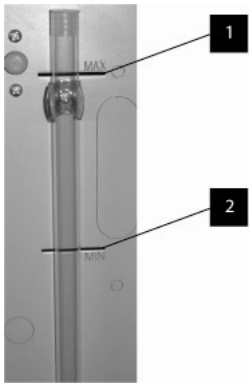


Fig. 24

1. Open the red cap on the upper side of the unit and fill the tank until the water level on the level indicator reaches maximum (1).

2. Close the red cap on the upper side of the unit.

Important : Bleeding the pump

Before start-up carry out the following procedure to bleed the pump:

- **Check the tank water level and refill if necessary**
- **Open the outlet or**
- **connect the supply line only and allow the return line to discharge freely**

Repeat the above procedure if there is still air present in the system. After opening the outlet, run the pump for a short while.

Attention

After prolonged downtime, the pump may not start despite being bleeded properly. In this case, turn the mounting screw of the impeller clockwise (approx. 1 – 2 turns) using a slot screwdriver until it moves easily.

Bleeding the chilled water circuit

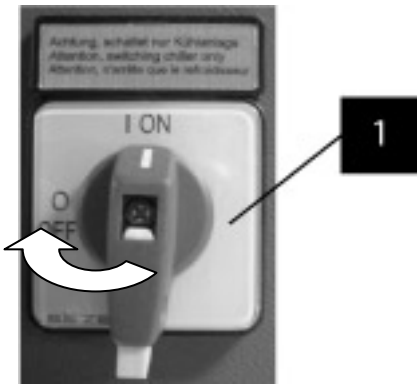


Fig. 25

1. Turn the main switch (1) clockwise to the "1/ON“ position.
2. Check that all valves in the chilled water circuit are open.

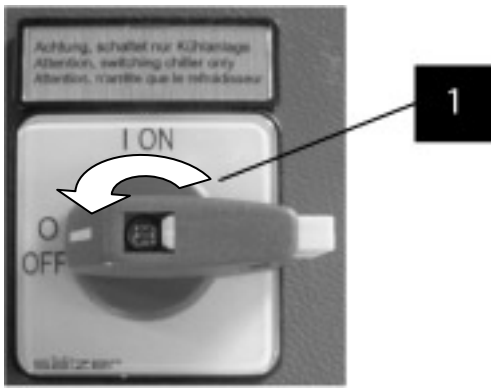


Fig. 26

3. Turn the main switch (1) anti-clockwise to the „0/OFF“ position.

6.4.2 Float valve adjustment (optional)

- To be conducted by the operator.
- Additionally required protective equipment:
  - Chemical-resistant protective gloves
  - Safety glasses
- Required special tool:
  - Key to open the covering

CAUTION!
Danger to health by water treatment chemicals in the chilled water

Chilled water may contain anti-freeze, corrosion inhibitor or agents for reducing the bacteria count which may cause a danger to health by skin contact or inhalation.

Therefore:

– When handling chilled water the wearing of chemical-resistant protective gloves, safety glasses und hygienic breathing protection must be strictly observed.

The float valve is preset to 3 bar by the manufacturer. If the fresh water supply pressure is different the float valve must be adjusted.

Following information applies to the versions:

CHILLY 08, 15, 25, 35 and 45

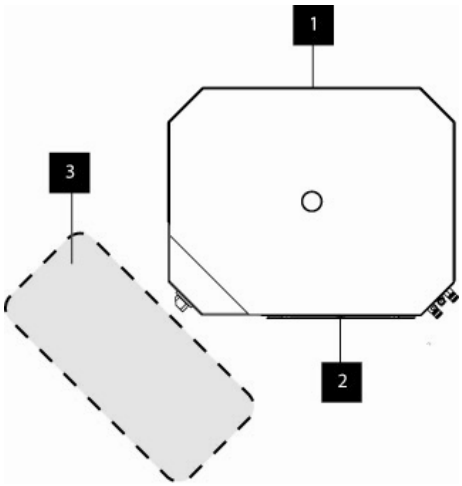


Fig. 27

1 Horizontal airflow
2 Fan side
3 Control side

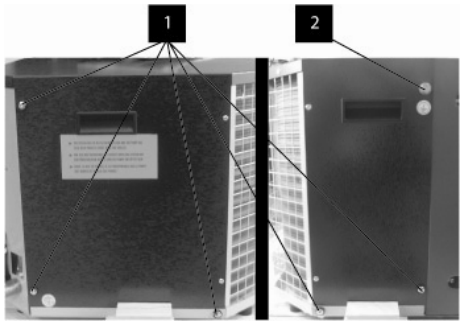


Fig. 28

1. Use a screwdriver to loosen the bolts of the covers (Fig. 28/1), use a 13 mm socket wrench to loosen the bolts (Fig. 28/2).

Fig. 29

2. Remove cover upwards.

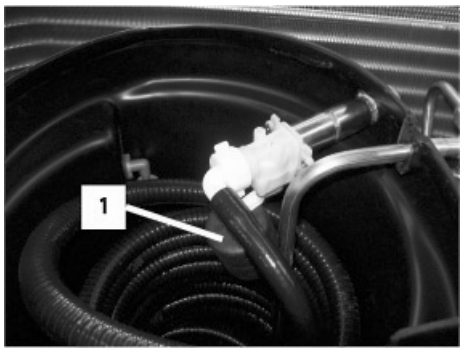


Fig. 30

The float valve (1) (optional) is located at the edge of the chilled water tank.

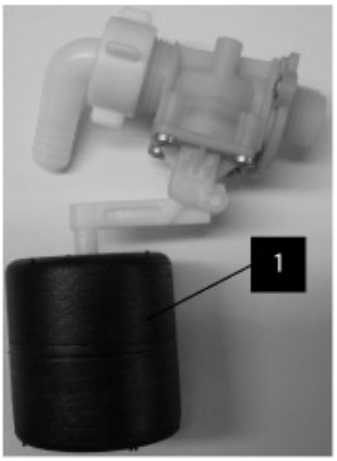


Fig. 31

3. The float valve (Fig. 30/1) is factory-set so that the water level on the level indicator is in the upper third between the maximum and minimum indication when the valve is closed.

To adjust the float valve for other water pressures turn the float (Fig. 31/1) clockwise or anti-clockwise.

4. Refit the cover (Fig.29) in reverse order.

6.4.3 Adjustment of temperature difference by optional room temperature control

- To be conducted by the operator

The room temperature of the system is preset by the manufacturer. Optional the customer can adjust the room temperature by entering a difference to the preset value. The allowable temperature difference is –10 to +25 °C.

Example

Room temperature of 20 °C + difference (ST1) 5 °C = temperature of 25 °C

Room temperature of 20 °C - difference (ST1) 5 °C = temperature of 15 °C

NOTE!

If the coolant temperature exceeds 25 °C the system will change over from room temperature control to absolute cooling. The room temperature control will be activated again if the coolant temperature is lower than 25 °C.

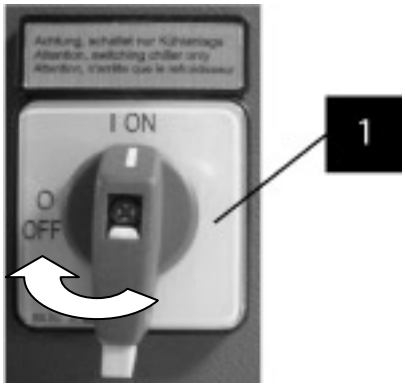


Fig. 32

1. Turn the main switch (1) clockwise to the "1/ON“ position.

2. Check that all valves in the chilled water circuit are open.

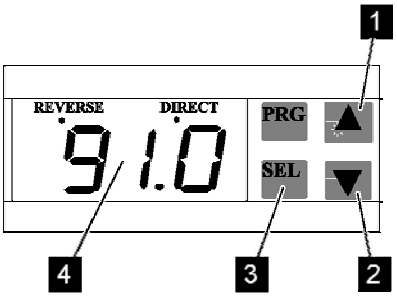


Fig. 33

3. Press the "SEL“ key (3) and hold it for five seconds. The display (4) will indicate the actual room temperature difference (ST1).

4. Release the "SEL“ key (3).

5. Press the respective key to adjust the room temperature difference:
   - "▲-key“ (Fig. 33/1) will increase the room temperature difference
   - "▼-key“ (Fig. 33/2) will decrease the room temperature difference.

6. Press the "SEL“ key (Fig. 33/3). The adjusted room temperature difference will be saved and the display (Fig. 33/4) will show the parameter "ST2“ which is not used (not used as a standard feature).

7. Press the "SEL“ key (Fig. 33/3) again to return to the standard operating mode.

6.4.4 Starting the cooling unit

- To be conducted by qualified personnel only.

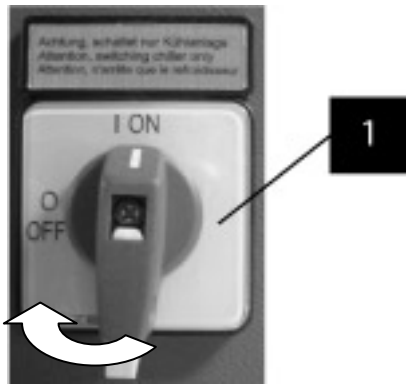


Fig. 34

1. Turn the main switch (1) clockwise to the "1/ON“ position.
2. Check that all valves in the chilled water circuit are open.

6.4.5 Chilled water temperature setpoint adjustment

- To be conducted by the operator.

At customer’s request the chilled water temperature setpoint can be preset by the manufacturer. Later adjustments of the chilled water temperature settings are possible within the range of 10 °C to 25 °C.

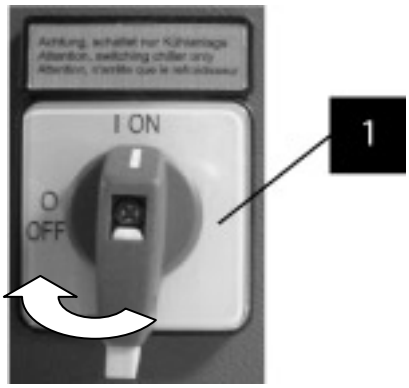


Fig. 35

1. Turn the main switch (1) clockwise to the "1/ON“ position.
2. Check that all valves in the chilled water circuit are open.
3. The refrigeration system, the chilled water circuit and the controls will start.

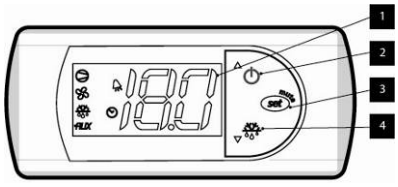


Fig. 36

4. Press the "SET“ key (3) and hold it for five seconds. The display (1) will indicate the actual chilled water temperature setpoint (ST1).

5. Release the "SET“ key (3).

6. Press the respective key to adjust the chilled water temperature setpoint:
- "▲-key“ (Fig. 36/2) will increase the chilled water temperature setpoint
- "▼-key“ (Fig. 36/4) will decrease the chilled water temperature setpoint.

7. Press the "SET“ key (Fig. 36/3). The adjusted chilled water temperature setpoint will be saved

8. Press the "SET“ key (Fig. 36/3) again to return to the standard operating mode.

6.5 Inspections

After installation and commissioning check the following:

- The entire chilled water circuit for leaks
- All electrical and mechanical components for smooth operation
- Occurrence of extraneous noises
- Water level on the tank’s level indicator
- Discharge pressure of the chilled water pump

7 Operation

7.1 Safety

Personnel

- The described operations may be performed by the operator.

Personal protective equipment

Always wear the following protective equipment when operating the unit:

- Protective clothing
- Safety boots

Improper operation

WARNING!
Risk of injury due to improper operation!

Improper operation may result in severe injuries or material damage.

Therefore:

– Perform the operating steps as specified in this operation manual.

– Ensure that all panels and safety devices are mounted and operate properly before operating the unit.

– Never ever override safety devices during operation.

– Pay attention to a clean and tidy operation area! Scattered components and tools are sources of accidents.

7.2 Steps before use

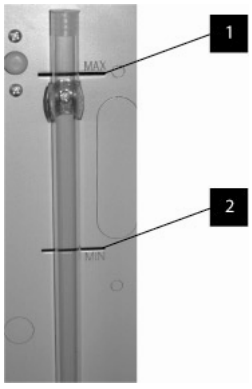


Fig. 37

1. Ensure that the water level on the level indicator is at maximum (1) before starting the cooling unit. (⇨ see also chapter "Charging the chilled water circuit“).

7.3 Switching on

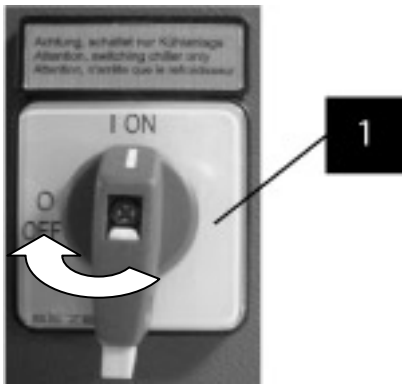


Fig. 38

1. Turn the main switch (1) clockwise to the "1/ON“ position.

2. The refrigeration system, the chilled water circuit and the controls will start.

NOTE!

Apart from starting the unit on site an additional remote start device is available as an option (⇨ chapter "Remote starting“).

7.4 Shutdown

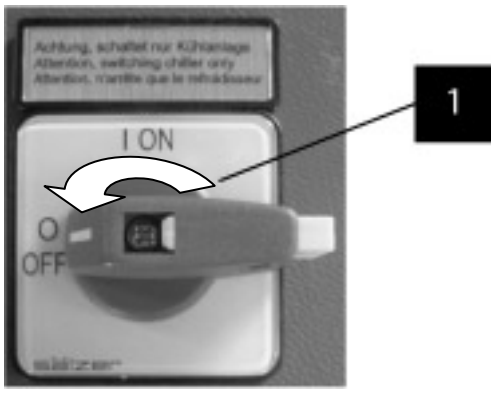


Fig. 39

1. Turn the main switch (1) anti-clockwise to the "0/OFF“ position.

7.5 Emergency stop

In dangerous situations, machine operations must be stopped as quickly as possible and the power supply must be disabled.

Operation

Emergency stop

In case of danger proceed as follows:

1. Trigger an emergency stop immediately.
2. If there is no danger to your own health rescue the persons from the danger zone and apply first aid measures.
3. Call the fire and rescue service.
4. Inform the person in charge at the place of action.
5. Disconnect the main switch and secure against reconnection.
6. Keep the access roads clear for rescue vehicles.

After rescue measures

7. Depending on the severeness of the emergency, inform the relevant authorities.
8. Assign qualified personnel with the trouble-shooting.

WARNING!
Risk of fatal injury by untimely reconnection!

There is a risk of fatal injury for all persons within the danger zone if the unit is restarted untimely.

Therefore:

– Ensure that no persons are within the danger zone before restarting the unit.

9. Check the system before recommissioning and ensure that all safety devices are mounted and fully operational.

8 Troubleshooting

The following chapter describes possible causes of malfunction and the corrective actions to be taken.

Reduce the maintenance intervals corresponding to the real load if faults occur frequently.

Please contact the manufacturer if faults cannot be corrected by carrying out following instructions. See service address on page 2.

8.1 Safety

Personnel

- Unless specified otherwise the operator is allowed to perform the troubleshooting as described below.
- Some actions may be taken by qualified specialists only or exclusively by the manufacturer. This will be indicated separately in the description of the individual faults.
- All work on the electrical system may be performed by a skilled electrician only.
- All work on the refrigeration system may be performed by accredited refrigeration specialists only.

Personal protective equipment

Always wear the following protective equipment during all troubleshooting operations:

- Protective clothing
- Safety boots

NOTE!

Please note the separate warnings in this chapter regarding extra protective equipment which may be required for special operations.

Electrical system

DANGER!
Risk of fatal injury caused by electric current!

Contact with active components may cause fatal injury. Energized electrical components could move uncontrolledly and may cause life-threatening injuries.

Therefore:

– Isolate the unit's power supply and secure against reconnection before attempting any troubleshooting.

Troubleshooting

Restart lockout

WARNING!
Risk of fatal injury caused by accidental restoration of power supply!

During troubleshooting, there is a risk of the electrical supply being restored accidentally. This could result in fatal injury to the persons being within the danger zone.

Therefore:

– Isolate the unit’s power supply and secure against restoration before attempting any troubleshooting.

Improper troubleshooting

WARNING!
Risk of injury due to improper troubleshooting!

Improper troubleshooting may result in serious personal injury or property damage.

Therefore:

– Before attempting any actions, provide for sufficient work space.
– Pay attention to a clean and tidy installation area! Scattered components and tools are sources of accidents.
– Ensure that removed components will be refitted properly. Refit all fasteners and observe the required tightening torques.

Refrigerant

WARNING!
High gas concentration may cause suffocation!
Skin or eye contact may cause frostbite!
Danger of explosion and burning from gas leakage!

Leaking liquid gas in high concentrations may cause unconsciousness and immobility and could lead to suffocation.

Skin or eye contact with the liquid gas could cause frostbite.

At high pressures and high air ratio, leaking vapours may build an explosive mixture.

Therefore:

– Observe the specified water quality to prevent corrosion.
– Observe the manufacturer's safety data sheet.
– Provide self-contained breathing apparatus (SCBA) for emergencies.
– Provide a person with suffocation symptoms immediately with a SCBA. Remove casualty to fresh air and keep at rest and warm. Seek medical advice.
– In case of apnea apply first aid with artificial respiration.
– Avoid skin and eye contact. Wear protective gloves and safety spectacles with eyeglass side shields when working on refrigerant tanks, lines or supplies.
– In the case of eye or skin contact rinse immediately with plenty of water. Seek medical advice.
– Keep away from ignition sources.
– Do not eat, drink or smoke during work.

Hot surfaces

CAUTION!
Fire hazard by hot surfaces!

Contact with hot components of the refrigeration system could result in burns.

Therefore:

– Strictly observe to wear protective clothing and protective gloves when carrying out any work inside the refrigeration system.

Troubleshooting

Troubleshooting procedure

The following applies as a general rule:

1. Activate the emergency stop immediately if the faults pose an imminent danger to persons or material assets.
2. Determine the cause of malfunction.
3. Disconnect the unit and secure against reconnection if the troubleshooting demands action in the danger area.
4. Inform the person in charge immediately of the fault.
5. Depending on the type of fault order authorized specialists for troubleshooting or correct the malfunction yourself.

NOTE!

Refer to the following troubleshooting tables for precise information on who is entiteled to correct the determined fault.

8.2 Alarm indication

Following devices indicate system failure:

Common alarm indicator

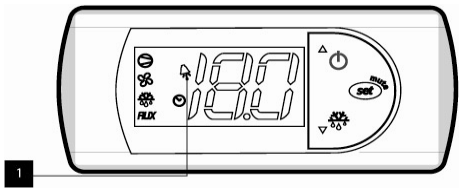


Fig. 40

The common alarm indicator lamp in the display (Fig.40/1) lights in case of malfunction.

In alarm condition, the controller displays an error code
Please refer to pages 85 and 86 for the error code lists.

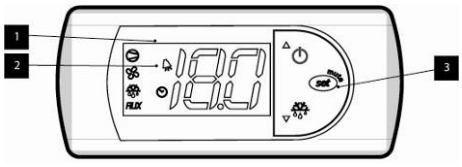


Fig. 41

When an alarm condition occurs the display (3) of the keypad/display unit (1) will indicate alternately the temperature sensor value and the alarm message. Simultaneously an alarm buzzer is activated. The audible alarm may be silenced by pressing the "PRG“ key (2) without the need for acknowledgeing the alarm condition.

Low water level alarm indicator (optional)

Fig. 42

When the tank water level drops under the permitted level the optional corresponding alarm indicator lamp (1) on the electric box is activated. Additionally the common alarm indicator lamp lights up.

When sufficient chilled water is refilled the visual alarm will be deactivated.

Clogged air filter alarm indicator (optional)

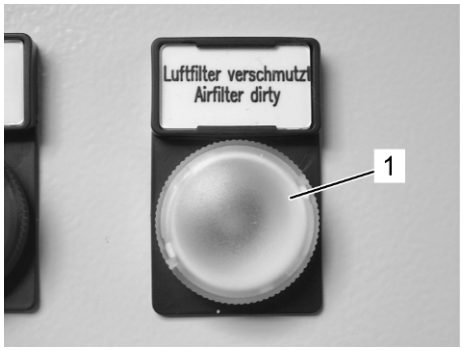


Fig. 43

An air filter may be fitted as an option. A clogged filter will not necessarily be indicated. Therefore air filters must be examined regularly to detect clogging.

A corresponding alarm indicator (1) can be fitted on the electric box as an option which will be activtated in addition to the common alarm indicator lamp in case of a clogged air filter.

8.3 Troubleshooting for faults without error message

The following table provides a list of possible faults and causes that do not generate an error code as well as corrective actions to be taken.

Symptom	Possible cause	Check or remedy	To be corrected by
Refrigeration system will not start	No main power	Check for rated voltage	Skilled electrician
	Blown back-up fuse	Replace back-up fuse	Skilled electrician

Troubleshooting

Symptom	Possible cause	Check or remedy	To be corrected by
	Blown transformer fuse (control voltages)	Replace transformer fuse	Skilled electrician
	No signal from temperature control	Renew temperature control	Skilled electrician
	Chilled water temperature is beyond the set range	Adjust chilled water temperature	User
High chilled water temperature	Incorrect phase sequence of supply voltage	Change phase sequence (For 3-phase systems)	Skilled electrician
	High ambient temperature	Operate cooling system acc. to technical specifications	Operator
	Clogged evaporator	Clean evaporator	User
	Clogged condenser	Clean condenser	User
	Low refrigerant charge (bubbles in the refrigeration system sight glass)	Refill refrigerant	Accredited refrigeration specialist
	High chilled water temperature adjustment	Adjust chilled water temperature	User
	Low tank water level	Check water level, refill if necessary	User
	High refrigeration load	Operate cooling system acc. to technical specifications	Operator
	High power consumption of cooling system	Operate cooling system acc. to technical specifications and check power consumption against technical specifications	Operator, skilled electrician
Motor overload trips	High power input of affected component	Check component’s voltage and power input. Replace if necessary	Skilled electrician
	Wiring breaks	Correct the wiring breaks	Skilled electrician
	Loose connection	Retighten terminals	Skilled electrician
	High or low supply voltage	Check supply voltage	Skilled electrician

Troubleshooting

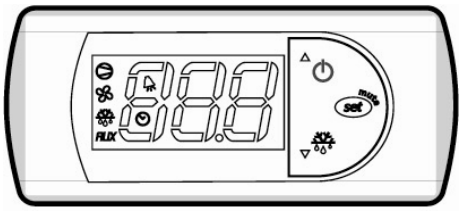
Symptom	Possible cause	Check or remedy	To be corrected by
High pressure switch trips	Clogged air filter	Renew air filter and reset high pressure switch	User
	Clogged evaporator	Renew evaporator and reset high pressure switch	User
	Incorrect direction of fan rotation	Change phase sequence and reset high pressure switch	Skilled electrician
	Faulty fan	Renew fan and reset high pressure switch	Specialist and skilled electrician
	High chilled water temperature	Operate cooling system acc. to technical specifications	Operator
	High ambient temperature	Operate cooling system acc. to technical specifications	Operator
Optional flow switch (potential-free) trips	Clogged flow switch	Clean flow switch	Specialist
	Faulty flow switch	Replace flow switch	Specialist and skilled electrician
	Air in chilled water system or pump	Bleed pump and chilled water circuit	Specialist
	Incorrect direction of pump rotation	Change phase sequence	Skilled electrician
	Faulty pump	Check pump (⇨ see manufacturer’s pump operation manual)	Specialist
	Faulty chilled water supply or return line to the customer equipment	Check chilled water lines and repair if necessary	Specialist
	Low tank water level	Check water level and refill if necessary	User
Optional water level switch (potential-free) trips	Low tank water level	Check water level and refill if necessary	User
	Defective water level switch	Renew water level switch	Specialist
Optional dry run protection (potential-free) trips	Low tank water level	Check water level and refill if necessary	User

8.4 Troubleshooting for faults with flashing alarm indication

The following table provides a list of possible faults and causes which are indicated by a flashing error message as well as corrective actions to be taken.

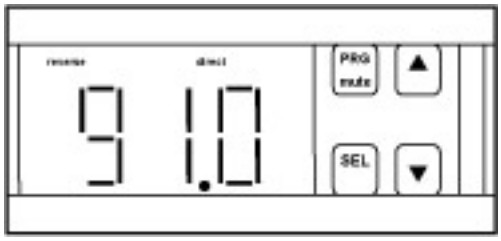
Symptom	Possible cause	Check or remedy	To be corrected by
Optional flow switch trips (Fault: IA, Er3)	Clogged flow switch	Clean flow switch	Specialist
	Faulty flow switch	Replace flow switch	Specialist and skilled electrician
	Air in chilled water system or pump	Bleed pump and chilled water circuit	Specialist
	Incorrect direction of pump rotation	Change phase sequence	Skilled electrician
	Faulty pump	Check pump (⇨ see manufacturer's pump operation manual)	Specialist
	Faulty chilled water supply or return line to the customer equipment	Check chilled water lines and repair if necessary	Specialist
	Low tank water level	Check water level and refill if necessary	User
Optional flow switch trips (Fault: IA, Er3)	Low tank water level	Check water level and refill if necessary	User
	Defective water level switch	Renew water level switch	Specialist
Optional dry run protection trips (Fault: IA, Er3)	Low tank water level	Check water level and refill if necessary	User
Optional alarm indicator "Clogged air filter" illuminates	Clogged air filter	Replace air filter	User
Optional alarm indicator "Low water level" illuminates	Low tank water level	Check water level and refill if necessary	User

8.5 Troubleshooting table for alarm messages



Alarm message and fault	Possible cause	Check or Remedy	To be corrected by
E1 Fault: Sensor	Broken or short-circuited wiring on the temperature sensor	Correct wiring breaks or shorts	Skilled electrician
	Loose connection	Retighten terminals	Skilled electrician
	Defektive temperature sensor	Check for temperature sensor signal (10 kΩ at 25 °C), renew temperature sensor if necessary	Skilled electrician
E2 Fault: Sensor NTC2	Like E1, but for room sensor		
EE Fault: Memory	Interrupted power supply during programming	Restore power supply	Skilled electrician
	Faulty display unit	Renew display unit	Skilled electrician
IA Alarm: Digital input	Interrupted safety chain	Complete safety chain (⇨Refer to the electrical schematic in the annex)	Skilled electrician
HI Alarm: High	Chilled water temperature exceeds maximum setpoint	(⇨ Refer to symptom "High chilled water temperature“)	
LO Alarm: Low	Chilled water temperature below minimum setpoint	Operate cooling system acc. to technical specifications	Operator

Troubleshooting



Alarm message and fault	Possible cause	Check or Remedy	To be corrected by
Er0 Fault: Sensor	Broken or short-circuited wiring on the temperature sensor	Correct wiring breaks or shorts	Skilled electrician
	Loose connection	Retighten terminals	Skilled electrician
	Defektive temperature sensor	Check for temperature sensor signal (10 kΩ at 25 °C), renew temperature sensor if necessary	Skilled electrician
Er1 Fault: Sensor NTC2	like Er0, but for room sensor		
Er2 Fault: Memory	Interrupted power supply during programming	Restore power supply	Skilled electrician
	Faulty display unit	Renew display unit	Skilled electrician
Er3 Alarm: Digital input	Interrupted safety chain	Complete safety chain (⇨Refer to electrical schematic in the annex) (⇨Refer to troubleshooting table on page 81 et seq)	Skilled electrician
Er4 / HI Alarm: High	Chilled water temperature exceeds maximum setpoint	(⇨ Refer to symptom "High chilled water temperature“)	
Er5 / LO Alarm: Low	Chilled water temperature below minimum setpoint	Operate cooling system acc. to technical specifications	Operator

NOTE!

- *When an alarm occurs the buzzer can be silenced by pressing the PRG/Mute-key.*
- *If a fault is detected, the audible signal and the error message must be reset by pressing the PRG key (Note: The error message will only disappear after the fault has been corrected.)*

8.6 Troubleshooting operations

8.6.1 Chilled water temperature adjustment

For detailled information on adjusting the chilled water temperature, please refer to the chapter "Chilled water temperature setpoint adjustment”.

8.6.2 High pressure switch reset

- To be conducted by the operator

- Required special tool:
  - Key to open the covering and the electric box

CAUTION!
Fire hazard by hot surfaces!

Contact with hot components of the refrigeration system could result in burns.

Therefore:

– Strictly observe to wear protective clothing and protective gloves when carrying out any work inside the refrigeration system.

Following information applies to the versions:

CHILLY 08, 15, 25, 35 and 45

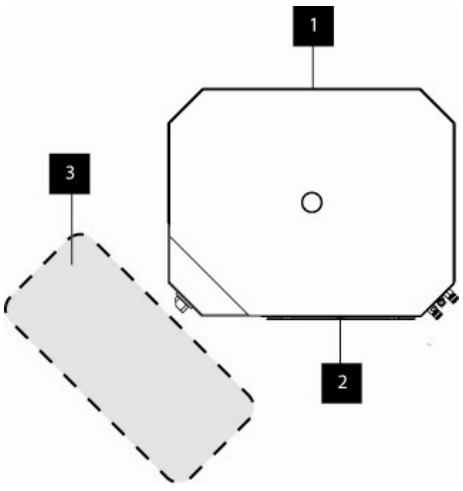


Fig. 44

1 Horizontal airflow
2 Fan side
3 Control side

1. Shut off the cooling unit (⇨ see chapter "Shutdown“) and ensure against restart.

Fig. 45

2. Press the button (2) on the high pressure switch (1) and release. This will reset the high pressure switch.

8.7 Start-up after rectification of faults

Before beginning start-up, make certain that all faults have been corrected. Then proceed as follows:

1. Reset the emergency stop devices.
2. Acknowledge the alarm at the control.
3. Ensure that there are no persons in the danger area.
4. Start up the unit according to the instructions provided in the Chapter "Operation”.

9 Maintenance

9.1 Safety

Personal

- Unless specified otherwise the operator is allowed to perform the maintenance work as described below.
- Some actions may be taken by qualified specialists only or exclusively by the manufacturer. This will be indicated separately in the description of the individual maintenance procedures.
- All work on the electrical system may be performed by a skilled electrician only.
- All work on the refrigeration system may be performed by accredited refrigeration specialists only.

Personal protective equipment

Always wear the following protective equipment during all maintenance operations:

- Protective clothing
- Safety boots

NOTE!

Please note the separate warnings in this chapter regarding extra protective equipment which may be required for specific operations.

Electrical system

DANGER!

Risk of fatal injury caused by electric current!

Contact with active components may cause fatal injury. Energized electrical components could move uncontrolledly and may cause life-threatening injuries.

Therefore:

– Isolate the unit's power supply and secure against reconnection before attempting any maintenance.

Maintenance

Restart lockout

WARNING!
Risk of fatal injury caused by accidental restoration of power supply!

During maintenance work, there is a risk of the electrical supply being restored accidentally. This could result in fatal injury to the persons being within the danger zone.

Therefore:

– Isolate the unit's power supply and secure against restoration before attempting any troubleshooting.

Improper maintenance

WARNING!
Risk of injury due to improper maintenance!

Improper maintenance operations may result in serious personal injury or property damage.

Therefore:

– Before attempting any actions, provide for sufficient work space.
– Pay attention to a clean and tidy installation area! Scattered components and tools are sources of accidents.
– Ensure that removed components will be refitted properly. Refit all fasteners and observe the required tightening torques.

Refrigerant

WARNING!
High gas concentration may cause suffocation!
Skin or eye contact may cause frostbite!
Danger of explosion and burning from gas leakage!

Leaking liquid gas in high concentrations may cause unconsciousness and immobility and could lead to suffocation.

Skin or eye contact with the liquid gas could cause frostbite.

At high pressures and high air ratio, leaking vapours may build an explosive mixture.

Therefore:

– Observe the specified water quality to prevent corrosion.
– Observe the manufacturer's safety data sheet.
– Provide self-contained breathing apparatus (SCBA) for emergencies.
– Provide a person with suffocation symptoms immediately with a SCBA. Remove casualty to fresh air and keep at rest and warm. Seek medical advice.
– In case of apnea apply first aid with artificial respiration.
– Avoid skin and eye contact. Wear protective gloves and safety spectacles with eyeglass side shields when working on refrigerant tanks, lines or supplies.
– In the case of eye or skin contact rinse immediately with plenty of water. Seek medical advice.
– Keep away from ignition sources.
– Do not eat, drink or smoke during work.

Hot surfaces

CAUTION!
Fire hazard by hot surfaces!

Contact with hot components of the refrigeration system could result in burns.

Therefore:

– Strictly observe to wear protective clothing and protective gloves when carrying out any work inside the refrigeration system.

Environmental protection

Observe the follwing instructions regarding environmental protection when carrying out any maintenance work:

- Collect the discharged chilled water containing the added anti-freeze, corrosion inhibitor and antibacterial agents in suitable containers and dispose of according to the local regulations. Observe the manufacturer's safety data sheet.

9.2 Maintenance schedule

To ensure efficient and troublefree operation carry out the maintenance work as described below.

Shorten the maintenance intervals corresponding to the actual sign of wear if increased wear is detected during the regular inspections.

For further information on maintenance work and intervals, please contact the manufacturer. See page 2 for contact details.

Interval	Maintenance work	To be completed by
daily	Check water level	Operator
	Check optional air filter for clogging	Operator
weekly	Take chilled water sample	Operator
	Check water quality	Specialist
monthly	Clean condenser	Operator
Six monthly resp. as required	Change optional air filter	Operator
	Clean optional fine filter and renew as required	Operator
Yearly resp. as required	Change chilled water of complete system	Operator

9.3 Maintenance work

9.3.1 Checking the chilled water level

Please refer to the chapter "Charging the chilled water unit“ for detailled information on checking the chilled water level.

9.3.2 Changing the optional air filter

- To be conducted by the operator.

An air filter may be fitted as an option. The filter must be renewed every six months or whenever it is clogged.

CAUTION!
Risk of material damage through non-genuine spare parts!

Wrong or faulty spare parts may result in damage or malfunction of the system.

Therefore:

– Use only genuine spare parts from the manufacturer.

1. Disconnect the cooling system (⇨ see chapter "Shutdown“) and ensure against reconnection.
2. Pull the filter element (Fig. 46/1) upwards and replace it with a new filter element.

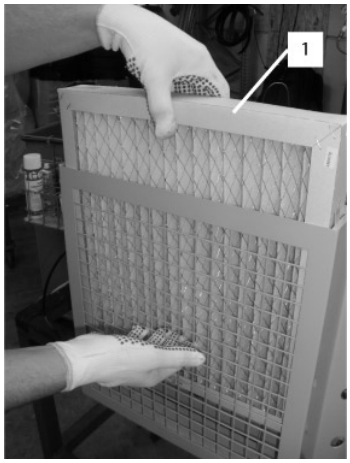


Fig. 46

3. Switch on the cooling system (⇨ see chapter "Switching on“).

9.3.3 Changing the optional strainer

- To be conducted by the operator
- Additionally required protective equipment:
  - Safety glasses
  - Chemical-resistant protective gloves
  - Hygienic breathing protection
- Required special tool:
  - Key to open the covering

CAUTION!
Danger to health by water treatment chemicals in the chilled water

Chilled water may contain anti-freeze, corrosion inhibitor or agents for reducing the bacteria count which may cause a danger to health by skin contact or inhalation.

Therefore:

– When handling chilled water the wearing of chemical-resistant protective gloves, safety glasses und hygienic breathing protection must be strictly observed.

– Regard the manufacturer's safety data sheet.

Preparations for the versions:

CHILLY 140/1, 141/1, 180/1, 181/1, 220/1, 270/1, 320/1, 360/1, 540/1, 640/1, 360/1/2, 440/1/2, 540/1/2 und 640/1/2

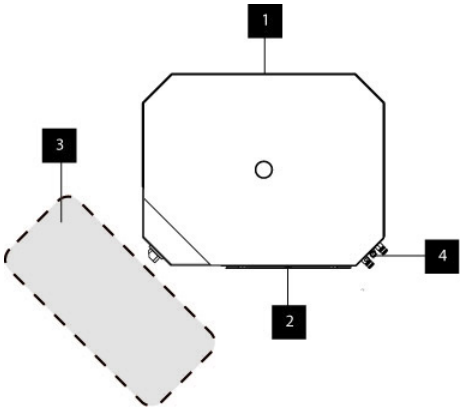


Fig. 47

1 Air outlet side
2 Fan side
3 Control side
4 Water connection side

1. Switch off the system and ensure against reconnection using a padlock.

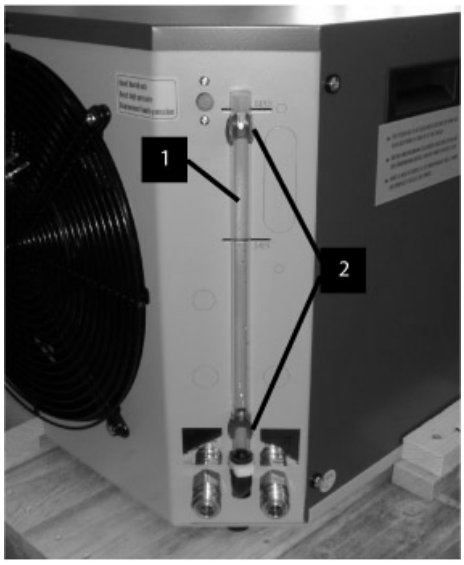


Fig. 48

2. Drain the system through the level indicator (Fig. 48/1).

For that carefully pull the level indicator out of the retaining brackets (Fig. 48/2).

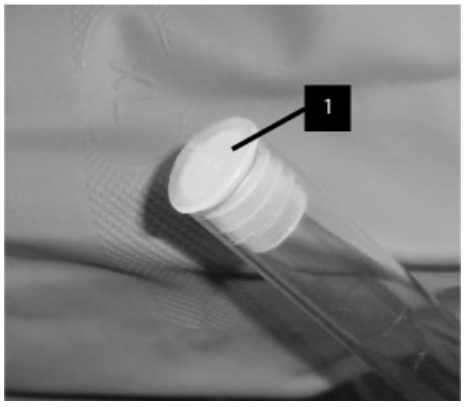


Fig. 49

3. Remove the cap (Fig.49/1) from the level indicator (Fig. 48/1).

It will be used again after the system has been drained.

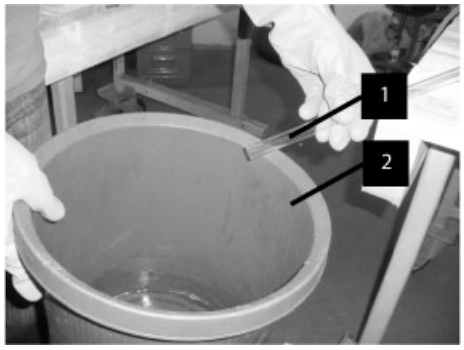


Fig. 50

4. By use of the level indicator (Fig 50/1) collect the water in a suitable container. The drained water must be disposed of according to the local regulations and must not be reused.
5. Refit the level indicator cap (Fig. 49/1) after the system has been drained.

   Carefully insert the level indicator in the retaining brackets (Fig. 48/2) to its original position.

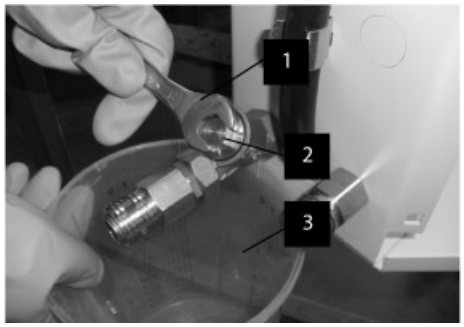


Fig. 51

1. Loosen the strainer cap (Fig. 51/2) by turning the wrench (Fig. 51/1) counter-clockwise. Hold a container (Fig. 51/3) beneath the strainer to catch any residual water released.

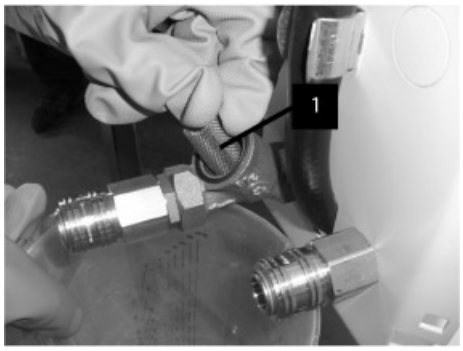


Fig. 52

2. Remove the insert (Fig. 52/1) from the strainer and rinse in clear water.
3. Refit the cleaned insert (Fig. 52/1) to the strainer.
4. Tighten the strainer cap (Fig. 51/1) by turning clockwise.

   Attention should be paid to insert the o-ring seal correctly into the strainer.
5. Switch on the cooling unit (⇨ see chapter "Switching on“).

9.3.4 Taking chilled water samples

- To be conducted by the operator.
- Additionally required protective equipment:
  - Safety glasses
  - Chemical-resistant protective gloves
  - Hygienic breathing protection
- Required special tool:
  - Scoop
  - Leakproof sample container

CAUTION!
Danger to health by water treatment chemicals in the chilled water

Chilled water may contain anti-freeze, corrosion inhibitor or agents for reducing the bacteria count which may cause a danger to health by skin contact or inhalation.

Therefore:

– When handling chilled water the wearing of chemical-resistant protective gloves, safety glasses und hygienic breathing protection must be strictly observed.

Following information applies to the versions:

CHILLY 08, 15, 25, 35 and 45

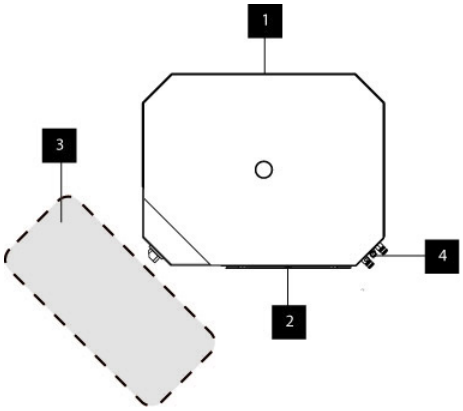


Fig. 53

1 Air outlet side
2 Fan side
3 Control side
4 Water connection side

1. Disconnect the cooling system (⇨ see chapter "Shutdown“) and ensure against reconnection.

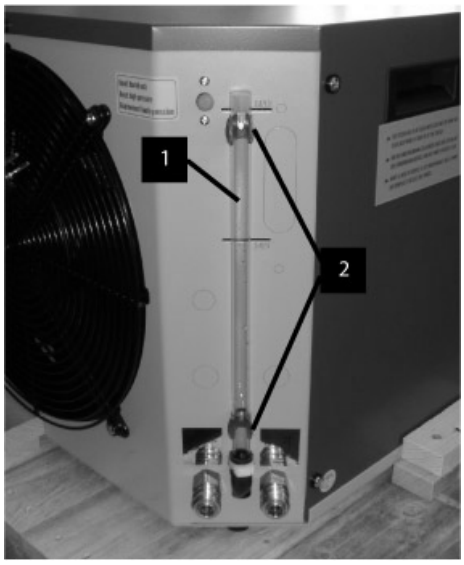


Fig. 54

2. Take the water sample by use of the level indicator (Fig. 54/1).

   For that carefully pull the level indicator out of the retaining brackets (Fig. 54/2).

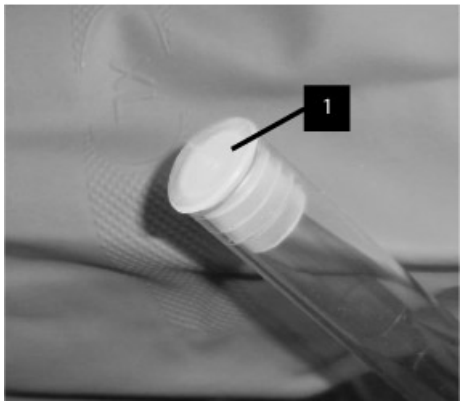


Fig. 55

3. Remove the cap (Fig.55/1) from the level indicator (Fig. 54/1).

   It will be used again after water sampling.
4. Tilt the level indicator and fill a sample of tank water into a container.
5. Seal the sample container and hand it over to a water treatment specialist to check whether the water quality complies with the technical specifications.
6. Refit the level indicator cap (Fig. 55/1) after water sampling.

   Carefully insert the level indicator in the retaining brackets (Fig. 54/2) to its original position.
7. Switch on the cooling unit (⇨ see chapter "Switching on“).

9.3.5 Changing the chilled water

- To be conducted by the operator.
- Additionally required protective equipment:
  - Safety glasses
  - Chemical-resistant protective gloves
  - Hygienic breathing protection

CAUTION!
Danger to health by water treatment chemicals in the chilled water

Chilled water may contain anti-freeze, corrosion inhibitor or agents for reducing the bacteria count which may cause a danger to health by skin contact or inhalation.

Therefore:

– When handling chilled water the wearing of chemical-resistant protective gloves, safety glasses und hygienic breathing protection must be strictly observed.

Manual Change

1. Disconnect the cooling system (⇨ see chapter "Shutdown“) and ensure against reconnection.
2. Ensure that all valves in the chilled water circuit are open.
3. Drain the system through the level indicator (Fig. 56/1).

   For that carefully pull the level indicator out of the retaining brackets (Fig. 56/2).

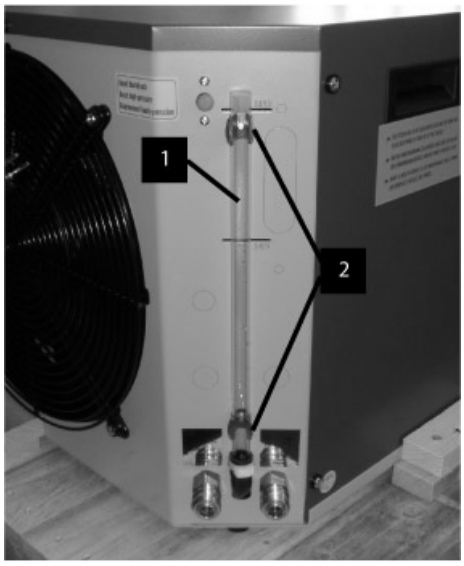


Fig. 56

Maintenance

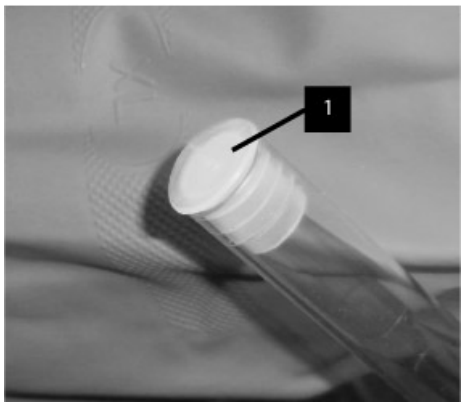


Fig. 57

4. Remove the cap (Fig.57/1) from the level indicator (Fig. 56/1).

It will be used again after the system has been drained.

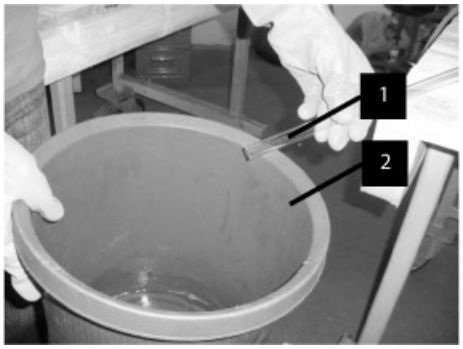


Fig. 58

5. By use of the level indicator (Fig 58/1) collect the water in a suitable container. The drained water must be disposed of according to the local regulations and must not be reused.

6. Refit the level indicator cap (Fig. 57/1) after the system has been drained.

Carefully insert the level indicator in the retaining brackets (Fig. 56/2) to its original position.

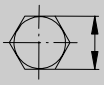
6. For installations with lower located customer equipment, drain the chilled water from the respective drain valve. Then shut the drain valves (⇨ see operation manuals of the customer equipment).

7. Charge the chilled water circuit (⇨ see chapter "Charging the chilled water circuit“).

9.4 Bolt tightening torques

Standard metric thread

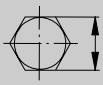
Maximum recommended tightening torque for standard metric threads. All torque figures in Nm.

Diameter	 [mm]	 [mm]	Bolt quality		
			8G / 8.8	10K / 10.9	12K / 12.9
M 8	13	6	25	34	43
M 10	17	8	47	65	83
M 12	19	10	78	100	120
M 14	22	12	120	175	215
M 16	24	14	180	260	310
M 18	27	14	250	360	430
M 20	30	17	340	470	560
M 22	32	17	430	600	700
M 24	36	19	560	790	950

Maintenance

Metric fine thread

Maximum recommended tightening torque for metric fine threads.
All torque figures in Nm.

Diameter	 [mm]	 [mm]	Bolt quality		
			8G / 8.8	10K / 10.9	12K / 12.9
M 8 x 1	13	6	30	41	50
M 10 x 1	17	8	55	78	95
M 12 x 1,5	19	10	95	107	128
M 14 x 1,5	22	12	140	200	240
M 16 x 1,5	24	14	200	290	350
M 18 x 1,5	27	14	270	390	470
M 20 x 1,5	30	17	350	500	600
M 22 x 1,5	32	17	450	630	740
M 24 x 1,5	36	19	590	830	1000

9.5 Measures after maintenance

After completion of maintenance and before switching on the unit proceed as follows:

1. Check all previously loosened screw connections for a tight fit.
2. Check whether all previously removed protective devices and panels are properly refitted.
3. Ensure that the workspace is free of tools, materials and other equipment.
4. Clean the workspace and remove any spilled substances such as fluids, used materials or the like.
5. Check the system’s safety devices for proper functioning.

10 Disassembly

At the end of the operational life, the system must be disassembled and disposed of in an environmentally sensitive way.

10.1 Safety

Personnel

- The disassembly may be performed by qualified specialists only.
- All work on the electrical system may be performed by a skilled electrician only.
- The disassembly of the refrigeration system may be performed by accredited refrigeration specialists only.

Personal protective equipment

Always wear the following protective equipment during all disassembly operations:

- Protective clothing
- Safety boots

NOTE!

Please note the separate warnings in this chapter regarding extra protective equipment which may be required for specific operations.

Electrical system

DANGER!
Risk of fatal injury caused by electric current!

Contact with active components may cause fatal injury. Energized electrical components could move uncontrolledly and may cause life-threatening injuries.

Therefore:

– Isolate the unit’s power supply and finalize electrical disconnection before disassembly.

Improper disassembly

WARNING!
Risk of injury due to improper disassembly!

Stored residual energy, sharp-edged components, sharp or pointed edges in or on the unit or at the required tools may cause injuries.

Therefore:

– Provide sufficient space before attempting any disassembly work.
– Handle components with exposed sharp edges with care.
– Pay attention to a clean and tidy installation area! Scattered components and tools are sources of accidents.
– Disassemble the components properly. Consider the component weight and use appropriate lifting gear if necessary.
– Secure components from falling down or over.
– In case of open questions contact the manufacturer.

Refrigerant

WARNING!
High gas concentration may cause suffocation!
Skin or eye contact may cause frostbite!
Danger of explosion and burning from gas leakage!

Leaking liquid gas in high concentrations may cause unconsciousness and immobility and could lead to suffocation.

Skin or eye contact with the liquid gas could cause frostbite.

At high pressures and high air ratio, leaking vapours may build an explosive mixture.

Therefore:

– The disassembly and disposal of the refrigeration system may be performed by accredited refrigeration specialists only.
– Wear personal protective equipment.
– Observe the manufacturer’s safety data sheet.
– Provide self-contained breathing apparatus (SCBA) for emergencies.

Disassembly

Floating loads

WARNING!
Risk of fatal injury caused by floating loads!
When lifting loads, falling or erraticly moving parts may cause fatal injury.

Therefore:

- Never stand underneath floating loads.
- Note the information about the provided lifting points.
- Do not hit overhangig machine parts nor components attached to lugs. Make sure that the lifting means are securely fitted.
- Use only approved lifting gear and lifting means with sufficient load capacity.
- Do not use worn or torn belts or ropes.
- Do not put belts or ropes against sharp edges nor knot or twist them.

10.2 Disassambly

Before disassembly:

- Disconnect the cooling unit and secure against reconnection.
- Physically disconnect all power to the cooling system.

10.2.1 Draining the chilled water circuit

Please refer to the chapter "Changing the chilled water“ for detailled information on draining the chilled water circuit.

10.2.2 Disconnecting the chilled water circuit and the fresh water supply

On delivery, the cooling system was equipped only with the provided chilled water circuit connections (supply, return and fresh water connection). The chilled water and fresh water connections are specified in the chapter "Technical data“. The disconnection of all customer equipment (piping and hoses) must be carried out state-of-the-art by qualified professionals only.

For further technical information, please contact our after sales service. See page 2 for contact details.

10.2.3 Preparations for further transport

- Only required for scheduled recommissioning or disposal by the manufacturer or by a specialised waste disposal company.
- To be conducted by qualified personnel only.
- Additionally required protective equipment:
  - Safety helmet
  - Protective gloves

Following carrying facility is provided:

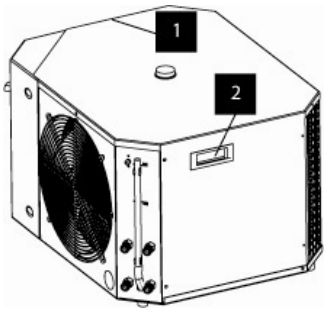


Fig. 59

1. 2 carrying handles (1-2) for 1-2 persons

CAUTION!
Risk of material damage caused by deformations!

Attachment at other angles or removing of panels can damage the cooling unit.

Therefore:

– Observe the specified angle.

– Do not remove any panels.

Fig. 60

2. Fasten the cooling unit onto a palett with tensioning belts. Remove ropes, belts and multipoint lifting tackle.

10.2.4 Further disassembly

- Clean the cooling system properly before disposal.
- Remove supplies and other auxiliary materials and dispose of in an environmentally sensitive way.
- Disassemble the components and assemblies according to the local regulations for safety at work and environmental protection.

10.3 Disposal

Unless any redemption or disposal agreements were made, recycle the disassembled parts as follows:

- Metals for scrap.

Disassembly

- Refrigerants for professional recovery (by accredited refrigeration specialist only according to the EU regulation 842/2006 of the European Parlament and Council from the 17th of May, 2006 on certain fluorinated greenhouse gases).
- Plastic components for recycling.
- Sort the remaining components according to material properties and dispose of respectively.

CAUTION!
Ecological damage caused by refrigerant leaks!

Refrigerant is a fluorinated greenhouse gas which pollutes the global climate by the greenhouse effect when leaking.

Therefore:

– Disposal of refrigerant by accredited refrigerant specialists only.

CAUTION!
Ecological damage caused by improper waste disposal!

E-waste, electronic components, lubricants and other auxiliary materials are subject to hazardous waste regulations and may be disposed of by licensed specialised companies only!

Please contact your local authorities or specialised waste disposal companies for further information on environmentally sensitive waste disposal.

11 Annex

11.1 Process water quality

CAUTION!
Machine damage!

Filling the system with process water of unsuitable quality may result in corrosion and deposits.

– Test the water quality before filling the system.
– Only fill the system with process water of suitable quality.

Information about manufacturer liability

The manufacturer is not liable for any damage or disruptions to operation resulting from non-observance of this section.

Requirements

The water quality of the cooling water must satisfy specific requirements. A wide range of conditions may cause corrosion (rust, material destruction) and deposits (limescale, sludge, bacteria, algae, etc.).
To protect the system from these and similar problems, the manufacturer generally recommends treating the water using suitable agents (corrosion protection, lime stabiliser, biocide)

Guidelines (process water quality)

Parameter	Max.	Unit
pH value, without aluminium (Al)	7 - 9,5	
pH value, with aluminium (Al)	7 - 8,5	
Conductivity (without treatment agents)	< 80	mS/m (T = 25 °C)
Total hardness ($CaCO_3$)	< 300	ppm
Total hardness	< 15	°dH
Chloride (Cl)	< 50	mg/l
Sulphate (SO_4)	< 200	mg/l
Iron (Fe) / manganese (Mg) / copper (Cu)	< 0,2	mg/l
Corrosion protection, e.g. ST-DOS H-390	10 - 20	g/l
No solids / rust	< 0,1	mg/l <
Microbiology, pathogens	1000	CFU/ml

Annex

Water treatment

If the quality of the water available does not comply with these guidelines, we recommend altering the water quality by means of suitable water treatment (filter technology, softening systems, demineralisation systems). The operator is responsible for adhering to the recommended water quality and other parameters. The manufacture therefore assumes no responsibility for problems caused by corrosion, deposits, etc.

Example of treatment agents

Example 1

ST-DOS H-390, corrosion protection with non-ferrous metal protection and hardness stabilisation, suitable for all water qualities and typical materials (including Al), required quantity 1 % – 2 %, easy to verify. Alternative ST-DOS K-370, 0.3 % – 0.5 %, not suitable for aluminium.

Example 2

ST-DOS KK-372, ready-to-use solution, corrosion protection suitable for all typical materials, easy to verify.

Example 3

ST-DOS B-513, disinfectant and biocide suitable for all water qualities and typical materials, required quantity 10 ml per 10 l.

Example 4

ST-DOS F-196 L, ready-to-use mixture on a basis of propylene glycol, antifreeze with corrosion protection and bacterial protection, approved for the food industry. Alternative ST-DOS F-190 on a basis of monoethylene glycol.

Other questions about water treatment

If you have any other questions, please contact a water treatment specialist, e.g. *Schweitzer-Chemie GmbH*.

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EG-Konformitätserklärung im Sinne der EG-Maschinenrichtlinie, Anhang II 1A

Original - EG-Konformitätserklärung

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Produkt: **Industriekühlanlage**

Modell: Chilly 15-S *Nr.:* 10117023PC01100621

Hiermit erklären wir, dass das oben genannte Produkt allen einschlägigen Bestimmungen der Maschinenrichtlinie 2006/42/EG entspricht. Das oben genannte Produkt erfüllt die Anforderungen der folgenden einschlägigen Richtlinien und Verordnungen:

- Richtlinie 2006/42/EG des Europäischen Parlaments und des Rates vom 17. Mai 2006 über Maschinen und zur Änderung der Richtlinie 95/16/EG (Neufassung)
- Richtlinie 2014/30/EU des Europäischen Parlaments und des Rates vom 26. Februar 2014 zur Harmonisierung der Rechtsvorschriften der Mitgliedstaaten über die elektromagnetische Verträglichkeit (Neufassung)
- Verordnung (EU) 2016/2281 der Kommission vom 30. November 2016 zur Durchführung der Richtlinie 2009/125/EG des Europäischen Parlaments und des Rates zur Schaffung eines Rahmens für die Festlegung von Anforderungen an die umweltgerechte Gestaltung energieverbrauchsrelevanter Produkte im Hinblick auf Luftheizungsprodukte, Kühlungsprodukte, Prozesskühler mit hoher Betriebstemperatur und Gebläse Konvektoren

Folgende harmonisierte Normen wurden angewandt:

- DIN EN ISO 12100:2011-03 Sicherheit von Maschinen - Allgemeine Gestaltungsleitsätze - Risikobeurteilung und Risikominderung (ISO 12100:2010)
- DIN EN ISO 14120:2016-05 Sicherheit von Maschinen - Trennende Schutzeinrichtungen - Allgemeine Anforderungen an Gestaltung und Bau von feststehenden und beweglichen trennenden Schutzeinrichtungen (ISO 14120:2015); Deutsche Fassung EN ISO 14120:2015
- DIN EN 60204-1:2007-06 Sicherheit von Maschinen - Elektrische Ausrüstung von Maschinen - Teil 1: Allgemeine Anforderungen (IEC 60204-1:2005, modifiziert); Deutsche Fassung EN 60204-1:2006
- DIN EN ISO 13849-1:2016-06 Sicherheit von Maschinen - Sicherheitsbezogene Teile von Steuerungen - Teil 1: Allgemeine Gestaltungsleitsätze (ISO 13849-1:2015); Deutsche Fassung EN ISO 13849-1:2015
- DIN EN ISO 13732-1:2008-12 Ergonomie der thermischen Umgebung - Bewertungsverfahren für menschliche Reaktionen bei Kontakt mit Oberflächen - Teil 1: Heiße Oberflächen (ISO 13732-1:2006); Deutsche Fassung EN ISO 13732-1:2008
- DIN EN 378-2:2018-04 Kälteanlagen und Wärmepumpen - Sicherheitstechnische und umweltrelevante Anforderungen - Teil 2: Konstruktion, Herstellung, Prüfung, Kennzeichnung und Dokumentation; Deutsche Fassung EN 378-2:2018-04
- DIN EN IEC 61000-6-2 VDE 0839-6-2:2019-11 Elektromagnetische Verträglichkeit (EMV) - Störfestigkeit für Industriebereiche
- DIN EN IEC 61000-6-4:2020-09 VDE 0839-6-4:2020-09 Elektromagnetische Verträglichkeit (EMV) - Störaussendung für Industriebereiche

Krunkel, 01.02.2021, Hendrik Havermann, Technischer Direktor

EC-Declaration of Conformity according to the EC-Machine Directive, Annex II 1A

Translation - EC-Declaration of Conformity

Manufacturer: Hyfra Industriekühlanlagen GmbH
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Authorized person for technical documentation: Hendrik Havermann
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Industriepark 54
56593 Krunkel / Deutschland

Product: **Industrial refrigeration unit**

Model: Chilly 15-S *no.:* 10117023PC01100621

We herewith confirm that the product mentioned above meets all relevant requirements of the Machine Directive 2006/42/EC.
The product mentioned above meets the requirements of the relevant directives and regulations referenced below:

- Directive 2006/42/EC of the European Parliament and of the Council of 17 May 2006 on machinery, and amending Directive 95/16/EC (recast)
- Directive 2014/30/EU of the European Parliament and of the Council of 26 February 2014 on the harmonization of the laws of the Member States relating to electromagnetic compatibility Directive 2014/20/EU (recast)
- Commission Regulation (EU) 2016/2281 of 30 November 2016 implementing Directive 2009/125/EC of the European Parliament and of the Council establishing a framework for the setting of ecodesign requirements for energy-related products, with regard to air heating products, cooling products, high temperature process chillers and fan convectors

Applied harmonized Standards:

- DIN EN ISO 12100:2011-03 Safety of machinery - General principles for design - Risk assessment and risk reduction (ISO 12100:2010); German version EN ISO 12100:2010
- DIN EN ISO 14120:2016-05 Safety of machinery - Guards - General requirements for the design and construction of fixed and movable guards (ISO 14120:2015); German version EN ISO 14120:2015
- DIN EN 60204-1:2007-06 Safety of machinery - Electrical equipment of machines - Part 1: General requirements (IEC 60204-1:2005, modified); German version EN 60204-1:2006
- DIN EN ISO 13849-1:2016-06 Safety of machinery - Safety-related parts of control systems - Part 1: General principles for design (ISO 13849-1:2015); German version EN ISO 13849-1:2015
- DIN EN ISO 13732-1:2008-12 Ergonomics of the thermal environment - Methods for the assessment of human responses to contact with surfaces - Part 1: Hot surfaces (ISO 13732-1:2006); German version EN ISO 13732-1:2008
- DIN EN 378-2:2018-04 Refrigerating systems and heat pumps - Safety and environmental requirements - Part 2: Design, construction, testing, marking and documentation; German version EN 378-2:2018-04
- DIN EN IEC 61000-6-2 VDE 0839-6-2:2019-11 Electromagnetic compatibility (EMC) - Immunity for industrial environments
- DIN EN IEC 61000-6-4:2020-09 VDE 0839-6-4:2020-09 Electromagnetic compatibility (EMC) - Emission standard for industrial environments

Krunkel, 01.02.2021, Hendrik Havermann, Technical Director

Déclaration de Conformité CE en accord avec la directive CE, Annexe II 1A

Traduction - Déclaration de Conformité CE

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Produit: **Refroidissement industriel**

Modèle: Chilly 15-S *numero.:* 10117023PC01100621

Par la présente nous déclarons que les produits suivants de part leur fabrication et de part leur distribution sont conformes aux exigences essentielles de sécurité et de santé des directives CE référencés ci-dessous.

Les produits référencés ci-dessous sont conformes aux exigences des directives et règlements référencés ci-dessous

- Directive 2006/42/EC du Parlement européen et du Conseil du 17 Mai 2006 aux machines et modifiant la directive 95/16/EC (refonte)
- Directive 2014/30/EU du Parlement européen et du Conseil du 26 février 2014 relative à l'harmonisation des législations des États membres concernant la compatibilité électromagnétique Directive 2014/20/EU (refonte)
- Décret (EU) 2016/2281 de la commission du 30 novembre 2016 sur l'exécution de la directive 2009/125/UE du Parlement européen et du Conseil établissant un cadre pour la fixation d'exigences en matière de fabrication respectueuse de l'environnement de produits consommateurs d'énergie concernant les systèmes de chauffage d'air, les appareils de refroidissements, les refroidisseurs industriels à température de service élevée et les convecteurs de soufflerie

Standards Harmonisés Appliqués:

- DIN EN ISO 12100:2011-03 Sécurité des machines, exigences générales. - Appréciation du risque et réduction du risque (ISO 12100:2010); Version Allemande EN ISO 12100:2010
- DIN EN ISO 14120:2016-05 Sécurité des machines - Protecteurs - Prescriptions générales pour la conception et la construction des protecteurs fixes et mobiles (ISO 14120:2015); Version Allemande EN ISO 14120:2015
- DIN EN 60204-1:2007-06 Sécurité machines, équipements électriques des machines - Partie 1: Règles générales (CEI 60204-1:2005, modifiée); Version Allemande EN 60204-1:2006
- DIN EN ISO 13849-1:2016-06 Sécurité des machines - Parties des systèmes de commande relatives à la sécurité - Partie 1 : principes généraux de conception (ISO 13849-1:2015); Version Allemande EN ISO 13849-1:2015
- DIN EN ISO 13732-1:2008-12 Ergonomie des ambiances thermiques - Méthodes d'évaluation de la réponse humaine au contact avec des surfaces - Partie 1 : surfaces chaudes (ISO 13732-1:2006); Version Allemande EN ISO 13732-1:2008
- DIN EN 378-2:2018-04 Systèmes de réfrigération et pompes à chaleur - Exigences de sécurité et d'environnement - Partie 2 : conception, construction, essais, marquage et documentation; Version Allemande EN 378-2:2018-04
- DIN EN IEC 61000-6-2 VDE 0839-6-2:2019-11 Compatibilité électromagnétique (CEM) - Immunité pour les environnements industriels
- DIN EN IEC 61000-6-4:2020-09 VDE 0839-6-4:2020-09 Compatibilité électromagnétique (CEM) - Norme sur l'émission pour les environnements industriels

Krunkel, 01.02.2021, Hendrik Havermann, Directeur technique

T E C H N I C A L D A T A S H E E T

Industrial-Recooler
Typ: Chilly 15-S
(Domino-Nr.: 121204) IP55

1. GENERAL DATA

Refrigerant gas:		R134a	
Specifications:			
Nominal ambient air:	°C	32	
Coolant temperature:	°C	15 20 0	
Cooling Capacity:	W	1290 1655	
Min ambient air:	°C	10	
Max ambient air:	°C	45	
Min coolant temperature:	°C	13.5	
Max coolant temperature:	°C	25	
Evaporator material:		copper	
Temperature control:		electronic, absolute control	
Temperature display:		digital	
Control voltage:		230V AC	
Main Power supply:		1/N/PE/60Hz 230V +-10%	
Total absorbed power:	kW		max: 1.5
Full load current:	A		max: 7.3
Safety fuse protection:	A	10.00	
Sound-pressure-levels in 1m Distance:	dB(A)	70.00	

2. AIR CONDENSER:

air cooled, axial

Nominal Air Flow:	m^3/h	1335.00
Number of fan:	Unit	1
Nom Absorbed power:	kW	0.09
Starting current:	A	0.40

3. COMPRESSOR:

reciprocating piston

Number:	Unit	1	
Technology:		direct	
Total absorbed power:	kW		max: 0.83
Full load current:	A		max: 3.94

4. PUMP:

First PUMP:		horizontal centrifugal pump
Type:		Y 2051.0018
Number:	Unit	1
Total absorbed power:	kW	0.37

Full load current:	A	2.65
Nominal flow rate:	m³/h	0.26
Nominal pressure rate:	bar	3.60

5. LIQUID TANK: plastic

Volume:	l	18.00
Outlet / inlet connections:	Inch	1/2

6. WEIGHT AND PHYSICAL SIZE:

Length:	mm	707
Width:	mm	523
Height:	mm	421
Weight :	kg	55

7. TECHNICAL ALTERATION:

technical modifications are subject to change without prior notification

R-134a

Safety Data Sheet

according to Regulation (EC) No. 1907/2006 (REACH) with its amendment Regulation (EU) 2015/830
SDS Ref.: 100013400
Revision date: 6/4/2020 Supersedes: 1/2/2020 Version: 18.1

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1. Product identifier

Product form	: Substance
Name	: R-134a
Chemical name	: 1,1,1,2-Tetrafluoroethane
EC-No.	: 212-377-0
CAS-No.	: 811-97-2
REACH registration No	: 01-2119459374-33
Product code	: 100013400
Synonyms	: HFC 134a / NovaSpray HFC 134a / Novexpans HFC 134a

1.2. Relevant identified uses of the substance or mixture and uses advised against

1.2.1. Relevant identified uses

Use of the substance/mixture : Refrigerant
Aerosol jet
Blowing agent

1.2.2. Uses advised against

No additional information available

1.3. Details of the supplier of the safety data sheet

Supplier

Dehon Service SAS
26 Avenue du Petit Parc
94683 VINCENNES Cedex - France
T 01 43 98 75 00 - F 01 43 98 21 51
ContactFDS@climalife.dehon.com

Other

Galco s.a/n.v.
Avenue Carton de Wiart, 79
1090 BRUSSELS - Belgium
T 00 32 2 421 01 84 - F 00 32 2 421 01 84 / 00 32 2 425 38 12
ContactFDS@climalife.dehon.com

Other

Climalife Hongrie Kft
Villányi út 47
1118 Budaörs - Hungary
T (36) 23 431 660 - F (36) 23 431 661
ContactFDS@climalife.dehon.com

Other

Climalife Kft Budepesta sucurcala Bucuresti Romania
Bulevardul Hristo Botev, Nr. 28,
Biroul NR 4, Modulul I
Bucuresti Sectorul 3 - Romania
ContactFDS@climalife.dehon.com

Other

Climalife Supplied by Inventec Performance Chemicals Italia SRL
Via del Lavoro, 10/G
20874 Busnago MB - Italia
T +39 39-5973480 - F +39 39-5973490
ContactFDS@climalife.dehon.com

Other

Dehon Kälte-Fachvertriebs GmbH
Robert-Bosch-Strasse 14
40668 MEERBUSCH - Germany
T 00 49 2150 7073 0 - F 00 49 2150 7073 17
ContactFDS@climalife.dehon.com

Other

Dehon nordic service
Östra Hamngatan 50B 3tr
41109 GÖTEBORG - Sweden
T 00 46 44 21 58 80 - F 00 46 44 21 58 80
ContactFDS@climalife.dehon.com

Other

Dehon Service Belgium s.a/n.v.
Avenue Carton de Wiart, 79
1090 Bruxelles - Belgium
T 00 32 2 421 01 70 - F 00 32 2 426 96 62
ContactFDS@climalife.dehon.com

Other

Dehon Service Nerderland B.V.
Van Konijnenburgweg 84
NL-4612 PL Bergen Op Zoom - Netherlands
T 00 31 164 212 830 - F 00 31 164 212 831
ContactFDS@climalife.dehon.com

Other

Friogas sa
Poligono Industrial SEPES
Parcela 10
46500 SAGUNTO (Valencia) - Spain
T 00 34 9 6 266 36 32 - F 00 34 9 6 266 50 25
ContactFDS@climalife.dehon.com

Other

IDS Refrigeration Limited
22 Apex Court, Woodlands, Bradley Stoke
BS32 4JT Bristol - United Kingdom
T 00 44 1179 802520 - F 00 44 1179 802521
ContactFDS@climalife.dehon.com

Other

Prochimac SA
Rue du Château 10
CH-2000 NEUCHATEL - Switzerland
T 00 41 32 727 36 00 - F 00 41 32 727 36 19
ContactFDS@climalife.dehon.com

Other

Climalife Asia Corporation
Room 302-A82,No.3,Building 1509,Xin Zhen Road,
201101 Shanghai - China
T +86 21 6442 3972 - F +86 21 6442 3952
ContactFDS@climalife.dehon.com

1.4. Emergency telephone number

Emergency number : +33 (0) 1 72 11 00 03

Country	Organisation/Company	Address	Emergency number	Comment
United Kingdom	National Poisons Information Service (Birmingham Centre) City Hospital	Dudley Road B18 7QH Birmingham	0344 892 0111	

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

Classification according to Regulation (EC) No. 1272/2008 [CLP]

Press. Gas (Liq.) H280

Full text of hazard classes and H-statements : see section 16

Adverse physicochemical, human health and environmental effects

Vapours are heavier than air and can cause suffocation by reducing oxygen available for breathing. Contact with the liquid may cause frostbite and serious damage to eyes. Under certain temperature and pressure conditions may form a flammable mixture in the presence of air.

2.2. Label elements

Labelling according to Regulation (EC) No. 1272/2008 [CLP]

Hazard pictograms (CLP) :

GHS04

Signal word (CLP) : Warning

Hazard statements (CLP) : H280 - Contains gas under pressure; may explode if heated.

Precautionary statements (CLP) : P410+P403 - Protect from sunlight. Store in a well-ventilated place.

Extra phrases : Greenhouse fluorinated gas falling within Kyoto Protocol (GWP=1430).

2.3. Other hazards

No additional information available

SECTION 3: Composition/information on ingredients

3.1. Substances

Name : R-134a

CAS-No. : 811-97-2

EC-No. : 212-377-0

Name	Product identifier	%	Classification according to Regulation (EC) No. 1272/2008 [CLP]
1,1,1,2-Tetrafluoroethane	(CAS-No.) 811-97-2 (EC-No.) 212-377-0 (REACH-no) 01-2119459374-33	100	Press. Gas (Liq.), H280

Full text of H-statements: see section 16

3.2. Mixtures

Not applicable

SECTION 4: First aid measures

4.1. Description of first aid measures

First-aid measures after inhalation : Move the affected person away from the contaminated area and into the fresh air. If you feel unwell, seek medical advice.

First-aid measures after skin contact : In the event of contact with the liquid: treat resulting frostbite as a burn. Immediately remove contaminated clothing or footwear. Immediately rinse with plenty of water. If skin burns appear, call a doctor immediately.

First-aid measures after eye contact : Rinse immediately and thoroughly, pulling the eyelids well away from the eye (15 minutes minimum). Consult an eye specialist immediately.

First-aid measures after ingestion : Not specifically applicable (gas).

4.2. Most important symptoms and effects, both acute and delayed

Symptoms/effects : CNS depression. Narcosis. Cardiac disorders. Lack of oxygen: risk of death.

4.3. Indication of any immediate medical attention and special treatment needed

No additional information available

SECTION 5: Firefighting measures

5.1. Extinguishing media

Suitable extinguishing media : All extinguishing agents can be used.

Unsuitable extinguishing media : None to our knowledge. If there is a fire close by, use suitable extinguishing agents.

5.2. Special hazards arising from the substance or mixture

Explosion hazard : Pressure increase. Under certain temperature and pressure conditions may form a flammable mixture in the presence of air. On heating : Toxic and corrosive vapours are released.

5.3. Advice for firefighters

Firefighting instructions : Use water spray or fog for cooling exposed containers.

Protection during firefighting : Self-contained breathing apparatus. Complete protective clothing.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

General measures : Avoid contact with skin and eyes. Remove all sources of ignition. Do not smoke. Evacuate the danger area. Do not breathe smoke. Stop the leak.

6.1.1. For non-emergency personnel

No additional information available

6.1.2. For emergency responders

No additional information available

6.2. Environmental precautions

No additional information available

6.3. Methods and material for containment and cleaning up

Other information : Mechanically ventilate the spillage area.

6.4. Reference to other sections

For further information refer to section 8: "Exposure controls/personal protection".

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Precautions for safe handling : Ventilation.

Hygiene measures : Do not drink, eat or smoke in the workplace.

7.2. Conditions for safe storage, including any incompatibilities

Storage conditions : Store : in a cool, well-ventilated area. away from any source of ignition. away from any source of heat.

Incompatible materials : Strong oxidizing agents. Alkaline hydroxide. Alkaline earth metals. Finely divided metals (Al, Mg, Zn).

Packaging materials : Recommended materials. Carbon steel. Stainless steel. Do not use : Plastic materials. Alloys containing more than 2% magnesium.

7.3. Specific end use(s)

No additional information available

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

R-134a (811-97-2)	
Sweden - Occupational Exposure Limits	
Anmärkning (SE)	V (Vägledande korttidsgränsvärde ska användas som ett rekommenderat högsta värde som inte bör överskridas)

1,1,1,2-Tetrafluoroethane (811-97-2)	
Germany - Occupational Exposure Limits (TRGS 900)	
TRGS 900 Local name	Norfluran
Occupational exposure limit value (mg/m³)	4200 mg/m³

Occupational exposure limit value (ppm)	1000 ppm
Limitation of exposure peaks (mg/m³)	33600 mg/m³
Limitation of exposure peaks (ppm)	8000 ppm
Limitation of exposure peaks	8(II)
TRGS 900 Remark	DFG;Y
TRGS 900 Regulatory reference	TRGS900
Sweden - Occupational Exposure Limits	
Local name	HFC 134 a (1,1,1,2-Tetrafluoretan)
nivågränsvärde (NVG) (mg/m³)	2000 mg/m³
nivågränsvärde (NVG) (ppm)	500 ppm
kortidsvärde (KTV) (mg/m³)	3000 mg/m³
kortidsvärde (KTV) (ppm)	750 ppm
Anmärkning (SE)	V (Vägledande korttidsgränsvärde ska användas som ett rekommenderat högsta värde som inte bör överskridas)
Regulatory reference	Hygieniska gränsvärden (AFS 2015:7)
United Kingdom - Occupational Exposure Limits	
Local name	1,1,1,2-Tetrafluoroethane (HFC 134a)
WEL TWA (mg/m³)	4240 mg/m³
WEL TWA (ppm)	1000 ppm
Regulatory reference	EH40. HSE
Switzerland - Occupational Exposure Limits	
MAK (mg/m³)	4200 mg/m³
MAK (ppm)	1000 ppm

1,1,1,2-Tetrafluoroethane (811-97-2)	
DNEL/DMEL (Workers)	
Long-term - systemic effects, inhalation	13936 mg/m³
DNEL/DMEL (General population)	
Long-term - systemic effects, inhalation	2476 mg/m³
PNEC (Water)	
PNEC aqua (freshwater)	0.1 mg/l
PNEC aqua (marine water)	0.01 mg/l
PNEC (Sediment)	
PNEC sediment (freshwater)	0.75 mg/kg dwt
PNEC (STP)	
PNEC sewage treatment plant	73 mg/l

8.2. Exposure controls

Hand protection:

Leather protective gloves. Nitrile-rubber protective gloves. VITON gloves

Eye protection:

Safety glasses with side shields

Skin and body protection:

Majority cotton protective clothing

Respiratory protection:

In the event of insufficient ventilation: Gas mask with filter type AX. In a confined area : Self-contained breathing apparatus

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state	: Gas
Appearance	: Press. Gas (Liq.).
Colour	: Colourless.
Odour	: slightly ethereal.
Odour threshold	: No data available
pH	: Not applicable
Relative evaporation rate (butylacetate=1)	: No data available
Melting point	: No data available
Freezing point	: -101 °C
Boiling point	: -26.2 °C
Flash point	: None
Critical temperature	: 101 °C
Auto-ignition temperature	: > 750 °C
Decomposition temperature	: > 370 °C
Flammability (solid, gas)	: Non flammable.
Vapour pressure	: 5.7 bar
Vapour pressure at 50 °C	: 13.2 bar
Critical pressure	: 4070 kPa
Relative vapour density at 20 °C	: 3.5
Relative density	: No data available
Density	: 1.2 g/cm³ (20°C)
Solubility	: Water: 1.5 g/l
Log Pow	: 1.06
Viscosity, kinematic	: No data available
Viscosity, dynamic	: No data available
Explosive properties	: Not explosive material according to EC criteria.
Oxidising properties	: Non oxidizing material according to EC criteria.
Explosive limits	: No data available

9.2. Other information

No additional information available

SECTION 10: Stability and reactivity

10.1. Reactivity

No information available.

10.2. Chemical stability

Stable at ambient temperature and under normal conditions of use.

10.3. Possibility of hazardous reactions

No information available.

10.4. Conditions to avoid

Under certain temperature and pressure conditions may form a flammable mixture in the presence of air.

10.5. Incompatible materials

Alkalis and caustic products. Alkaline earth metals. Strong oxidizing agents. Finely divided metals (Al, Mg, Zn).

10.6. Hazardous decomposition products

On thermal decomposition (pyrolysis), releases : Carbon oxides (CO, CO2). Hydrogen fluoride.

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Acute toxicity (oral)	: Not classified
Acute toxicity (dermal)	: Not classified
Acute toxicity (inhalation)	: Not classified

1,1,1,2-Tetrafluoroethane (811-97-2)	
LC50 inhalation rat (ppm)	> 500000 ppm/4h

Skin corrosion/irritation	: Not classified pH: Not applicable
Additional information	: Contact with the liquid causes frostbite

Serious eye damage/irritation : Not classified
pH: Not applicable
Additional information : Contact with the liquefied gas may cause severe ocular lesions
Respiratory or skin sensitisation : Not classified
Germ cell mutagenicity : Not classified
Carcinogenicity : Not classified

1,1,1,2-Tetrafluoroethane (811-97-2)	
NOAEL (chronic, oral, animal/male, 2 years)	300 mg/kg bodyweight rat

Reproductive toxicity : Not classified
STOT-single exposure : Not classified
STOT-repeated exposure : Not classified
Aspiration hazard : Not classified

SECTION 12: Ecological information

12.1. Toxicity

Hazardous to the aquatic environment, short-term (acute) : Not classified
Hazardous to the aquatic environment, long-term (chronic) : Not classified

1,1,1,2-Tetrafluoroethane (811-97-2)	
LC50 fish 1	450 mg/l 96 Hours (Oncorhynchus mykiss)
EC50 Daphnia 1	980 mg/l 48 Hours (Daphnia magna)
EC50 72h algae (1)	> 118 mg/l (Selenastrum capricornutum)

12.2. Persistence and degradability

1,1,1,2-Tetrafluoroethane (811-97-2)	
Persistence and degradability	Photodegradation in the air : Half-life in air : 9,7 y. 3 % biodegradation after 28 days.

12.3. Bioaccumulative potential

R-134a (811-97-2)	
Log Pow	1.06

1,1,1,2-Tetrafluoroethane (811-97-2)	
Log Pow	1.06

12.4. Mobility in soil

1,1,1,2-Tetrafluoroethane (811-97-2)	
Log Koc	1.5

12.5. Results of PBT and vPvB assessment

Component	
1,1,1,2-Tetrafluoroethane (811-97-2)	This substance/mixture does not meet the PBT criteria of REACH regulation, annex XIII This substance/mixture does not meet the vPvB criteria of REACH regulation, annex XIII

12.6. Other adverse effects

Other adverse effects : Ozone depletion factor ODP (R-11=1) = 0. Total global warming potential (GWP) : 1430.

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Regional legislation (waste) : Switzerland : OTD : RS 814.600 / OMoD : RS 814.610.
Product/Packaging disposal recommendations : Methods of disposal of packaging. Reuse or recycle following decontamination. Destroy at an authorised site.
Additional information : The user's attention is drawn to the possible existence of specific european, national or local regulations regarding disposal.

SECTION 14: Transport information

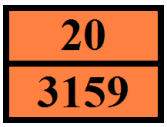
In accordance with ADR / IATA / IMDG

ADR	IMDG	IATA
14.1. UN number		
UN 3159	UN 3159	UN 3159
14.2. UN proper shipping name		
1,1,1,2-TETRAFLUOROETHANE (REFRIGERANT GAS R 134A)	1,1,1,2-TETRAFLUOROETHANE (REFRIGERANT GAS R 134a)	1,1,1,2-Tetrafluoroethane
Transport document description		
UN 3159 1,1,1,2-TETRAFLUOROETHANE (REFRIGERANT GAS R 134A), 2.2, (C/E)	UN 3159 1,1,1,2-TETRAFLUOROETHANE (REFRIGERANT GAS R 134a), 2.2	UN 3159 1,1,1,2-Tetrafluoroethane, 2.2
14.3. Transport hazard class(es)		
2.2	2.2	2.2
		
14.4. Packing group		
Not applicable	Not applicable	Not applicable
14.5. Environmental hazards		
Dangerous for the environment : No	Dangerous for the environment : No Marine pollutant : No	Dangerous for the environment : No
No supplementary information available		

14.6. Special precautions for user

Overland transport

Classification code (ADR) : 2A
Special provisions (ADR) : 662
Limited quantities (ADR) : 120ml
Tank code (ADR) : PxBN(M)
Transport category (ADR) : 3
Hazard identification number (Kemler No.) : 20
Orange plates :



Tunnel restriction code (ADR) : C/E
EAC code : 2TE

Transport by sea

Limited quantities (IMDG) : 120 ml
EmS-No. (Fire) : F-C
EmS-No. (Spillage) : S-V

Air transport

PCA Limited quantities (IATA) : Forbidden
PCA limited quantity max net quantity (IATA) : Forbidden
PCA packing instructions (IATA) : 200
PCA max net quantity (IATA) : 75kg
CAO packing instructions (IATA) : 200
CAO max net quantity (IATA) : 150kg

14.7. Transport in bulk according to Annex II of Marpol and the IBC Code

Not applicable

SECTION 15: Regulatory information

15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture

15.1.1. EU-Regulations

No REACH Annex XVII restrictions

R-134a is not on the REACH Candidate List

R-134a is not on the REACH Annex XIV List

R-134a is not subject to Regulation (EU) No 649/2012 of the European Parliament and of the Council of 4 july 2012 concerning the export and import of hazardous chemicals.

R-134a is not subject to Regulation (EU) No 2019/1021 of the European Parliament and of the Council of 20 June 2019 on persistent organic pollutants

Other information, restriction and prohibition regulations : * Regulation (EC) No 517/2014 : Greenhouse fluorinated gas falling within Kyoto Protocol.

15.1.2. National regulations

Ensure all national/local regulations are observed.

Germany

Reference to AwSV : Water hazard class (WGK) 1, Slightly hazardous to water (Classification according to AwSV; ID No. 2350)

12th Ordinance Implementing the Federal Immission Control Act - 12.BImSchV : Is not subject of the 12. BImSchV (Hazardous Incident Ordinance)

Netherlands

SZW-lijst van kankerverwekkende stoffen : The substance is not listed

SZW-lijst van mutagene stoffen : The substance is not listed

NIET-limitatieve lijst van voor de voortplanting giftige stoffen – Borstvoeding : The substance is not listed

NIET-limitatieve lijst van voor de voortplanting giftige stoffen – Vruchtbaarheid : The substance is not listed

NIET-limitatieve lijst van voor de voortplanting giftige stoffen – Ontwikkeling : The substance is not listed

Switzerland

Swiss National Regulations : ORRChim RS 814.81.

15.2. Chemical safety assessment

No additional information available

SECTION 16: Other information

Indication of changes:			
Section	**Changed item**	**Change**	**Comments**
1.3	Supplier	Added	

Other information : For more information regarding the use of this product, please refer to our technical information or contact the sales department in your region.

Full text of H- and EUH-statements:	
Press. Gas (Liq.)	Gases under pressure : Liquefied gas
H280	Contains gas under pressure; may explode if heated.

SDS EU (REACH Annex II)

This information is based on our current knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It should not therefore be construed as guaranteeing any specific property of the product.

Description of the controller Eliwell ‚ST120‚

operation indicator

1. Switch On/Off: (Option)

   Push the button ⏻ long (>5 seconds) to switch from operation mode „Off“ to „On“ and converse.

   In the mode „Off“ the display will show **Off.**

2. Normal display:
   The actual **medium temperature** is displayed.

3. Adjusting the setpoint:

   a. Fixed value regulation (absolute control)

push set 1x short	⇒	**SEt** is displayed
push set 1x short	⇒	the setpoint appears in the display, you can adjust it by pressing ⌄ or ⌃
		It will be saved in the controller by pressing set The display will switch back to **Set.**
push ⏻ 1x short	⇒	The actual mediumtemperature is displayed

4. Fault:

As soon as one or more faults appear this will be displayed by this symbol
To get the list of the existing faults displayed proceed as follows:

push set 1x short	⇒	is displayed
push set 1x short	⇒	**AL** is displayed
push set 1x short	⇒	List of fitting mistakes, those can be shown with the following button: and
push 1x short	⇒	**AL** is displayed
push 1x short	⇒	The controler will be shown as standard indication.

5. Alarm indications

Number	Desciption
E1	Sensor 1 fault
E2	Sensor 2 fault
E3	Sensor 3 fault
AH1	Alarm high temperature
AL1	Alarm low ttemperature
Opd	Digital input disconnected

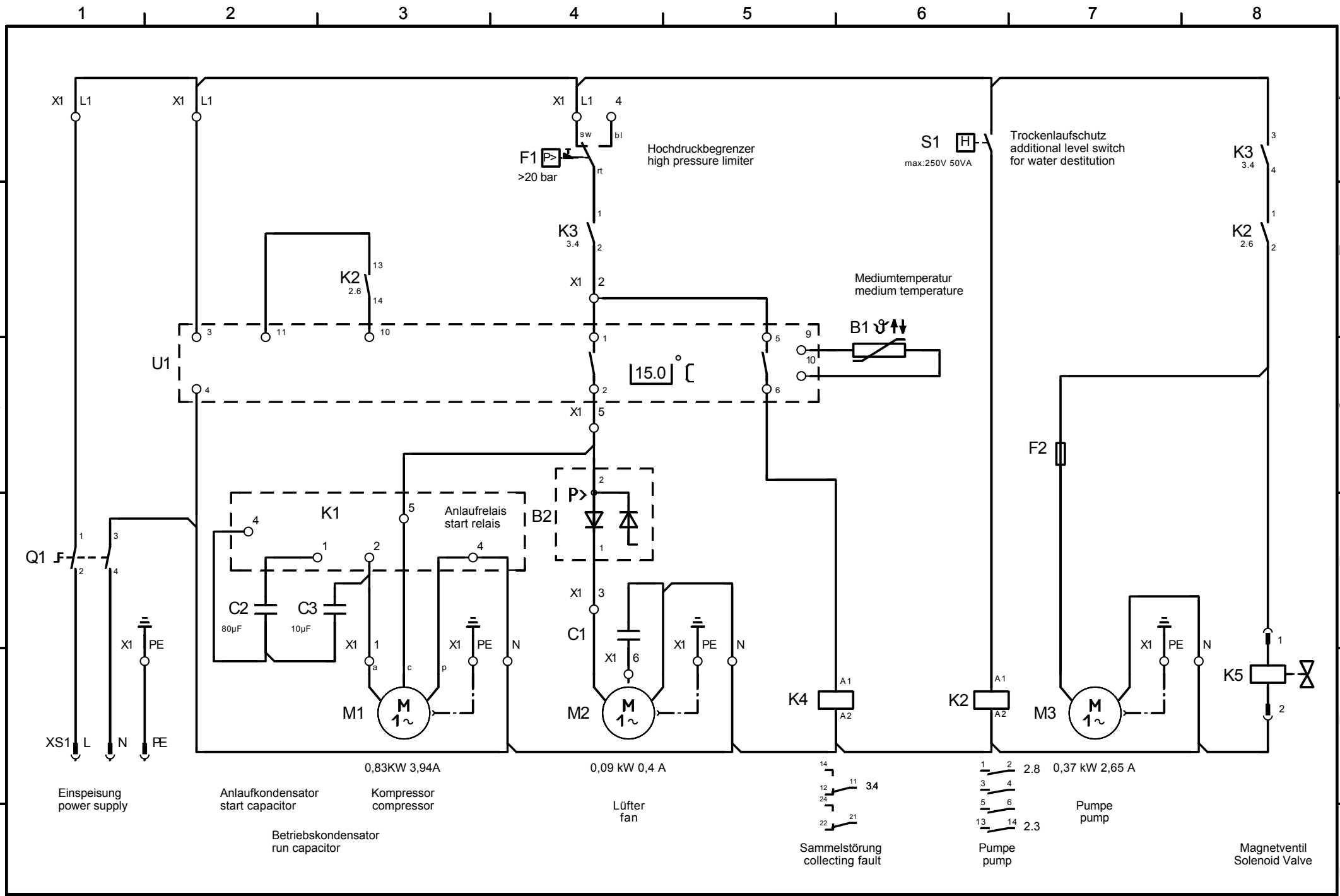
Elektrodokumentation
Electrical documentation

Anschlußdaten
Technical data

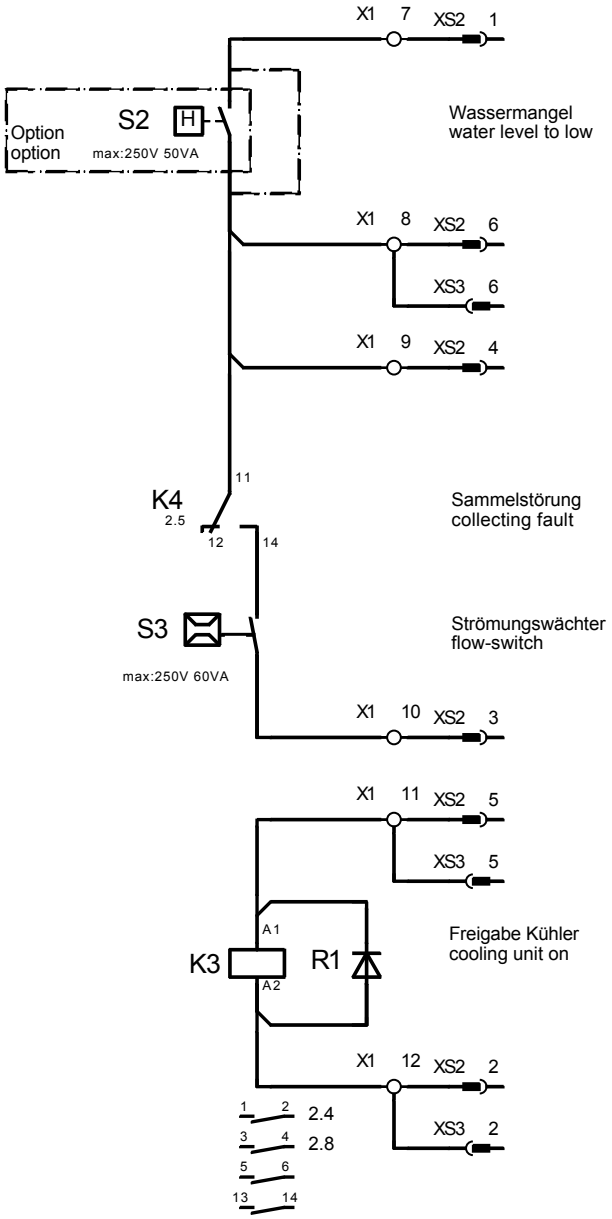
Maschinentyp : Chilly 15-S
Type

Anschlußspannung Voltage	:	230 V
Frequenz frequency	:	60 Hz
Steuerspannung 1 control voltage 1	:	230 V
Steuerspannung 2 control voltage 2	:	---
Anschlußleistung Total absorb power	:	1,5 kW
Max. Betriebsstrom Full load Current	:	7,3 A
Max. Vorsicherung Safety Fuse	:	10 A

				Datum	05.11.2018			Anschlußdaten Technical data	Zeichng. Nr.	E0013244	=
				Bearb.	Kallscheid						+
				Gepr.					Typ	Chilly 15-S	Blatt 1
Zust.	Änderung	Datum	Name	Norm		Ursp.	Ers. f.	Ers. d.			von 5 Blatt



				Datum	05.11.2018			Hauptstromkreise Main circuit	Zeichng. Nr.	E0013244	=
				Bearb.	Kallscheid						+
				Gepr.					Typ	Chilly 15-S	Blatt 2
Zust.	Änderung	Datum	Name	Norm		Ursp.	Ers. f.	Ers. d.			von 5 Blatt

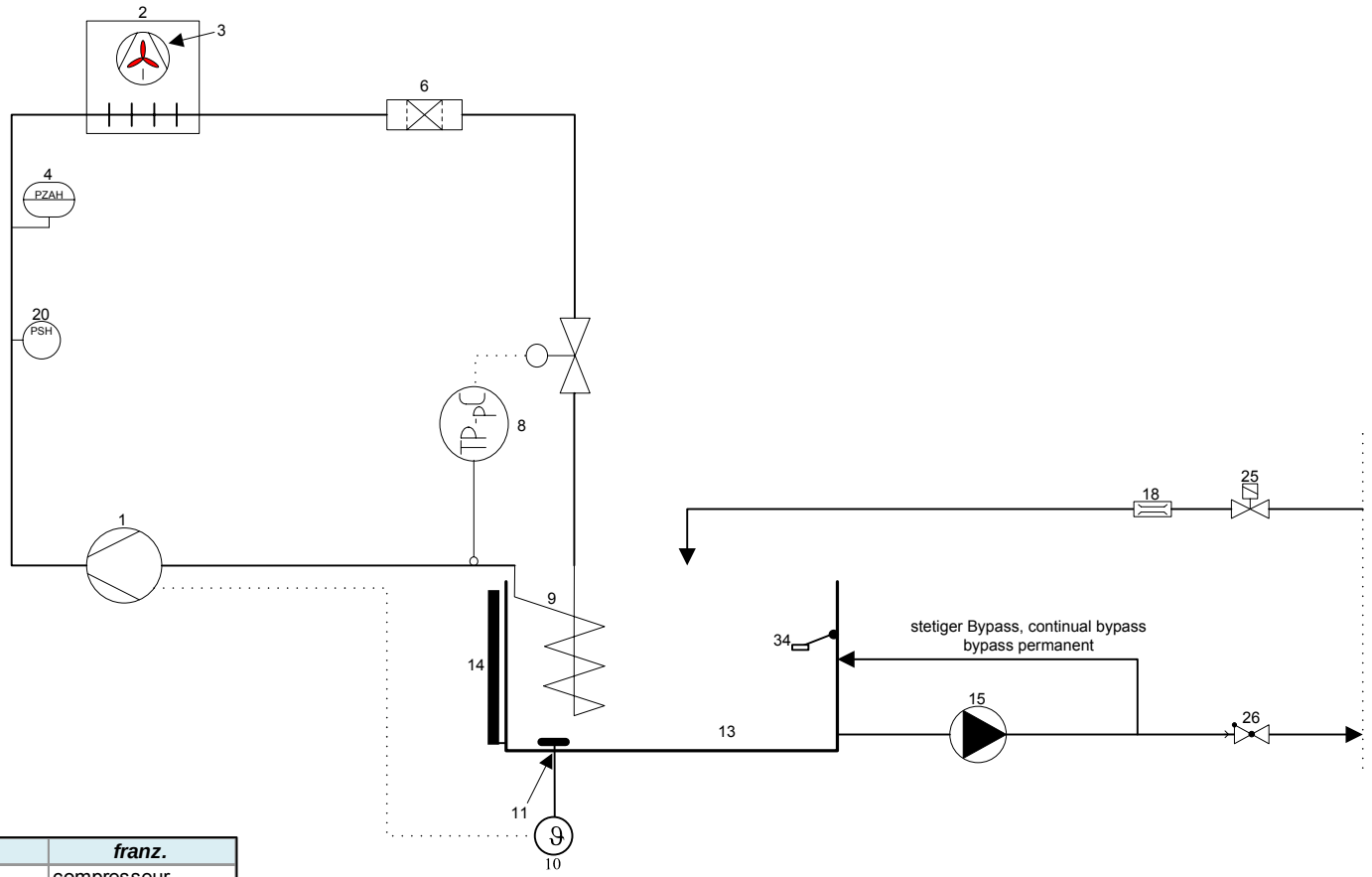


				Datum	05.11.2018			Sammelstörung collecting fault	Zeichng. Nr.	E0013244	= +
				Bearb.	Kallscheid						
				Gepr.					Typ	Chilly 15-S	Blatt 3
Zust.	Änderung	Datum	Name	Norm		Ursp.	Ers. f.	Ers. d.			von 5 Blatt

Pos. pos.	Seite page	Bez. Label	Benennung designation	Typ type	Hersteller manufacturer	Artikelnummer Part number
1	2	B1	Fühler sensor	NTC 030WH01, 3,0m Kabel, IP 67	CAREL	10197
2	2	B2	Drehzahlregler speed controls	FSF-42S, 13-25bar	EMERSON ELECTRIC	28669
3	2	C1	Kondensator Condenser	2µF	EBM Papst	67929
4	2	C2	Kondensator Condenser	80µF	Tecumseh Europe- SA	- ---
5	2	C3	Kondensator Condenser	15µF	Tecumseh Europe- SA	-----
6	2	F1	Druckschalter pressure switch	ACB-061F9247, <12 / >20 bar	Danfoss GmbH	33275
7	2	F2	Sicherung Fuse	5x20F 4AF	Sonepar	24642
8	2	F2	Sicherungshalter Fuse holder	DT 6/2.5-DREHSI	Phoenix	101128
9	2	K1	Schütz contactor	RVA 3 G 3 D für AJ 5470C	Tecumseh Europe- SA	–
10	2	K2	Schütz contactor	3TG10 10-OAL2	SIEMENS	17891
11	3	K3	Schütz contactor	3RT2016-1BB41 S00 24 V DC	SIEMENS	44726
12	2	K4	Schütz contactor	LZX:RT424730 230V AC	SIEMENS	22034
13	2	K4	Schütz contactor	LZX:RT78625	SIEMENS	28343
14	2	K5	Magnetventil Solenoid Valve	21H12KOB120-UDV12230DW	SFS - Fluid Systeme GmbH	75602
15	2	M1	Kompressor compressor	SC18GH	Danfoss	21974
16	2	M2	Lüfter fan	W4E300CS72-40	ebm-papst GmbH & Co.KG	54559.
17	2	M3	Pumpe pump	Y-2051.0018	Walter Speck KG	23073.
18	2	Q1	Hauptschalter main-switch	H216-41300-2X062	Sälzer GmbH	18315
19	3	R1	Diode diode	Murr-Nr.: 26001 24...240V DC	Murr	23973
20	2	S1	Schwimmerschalter level switch	NIG-A-G.3/8"Viton, PP	Elobau	37206
21	3	S2	Schwimmerschalter level switch	NIG-A-G.3/8"Viton, PP	Elobau	37206

Pos. pos.	Seite page	Bez. Label	Benennung designation	Typ type	Hersteller manufacturer	Artikelnummer Part number
22	3	S3	Strömungswächter flow-switch	MG, 1-6 ltr.	Hyfra	39174
23	2	U1	Thermostat thermostat	ST120ECO135 230VAC	Eliwell	82086
24	3	XS2	Stecker plug	Lumberg Stecker	Lumberg	50562
25	3	XS3	Stecker plug	Lumberg Einbaukupplung	Lumberg	51662

Zust.	Änderung	Datum	Name						
				Datum	05.11.2018			Stückliste Bill of Materials	Zeichng. Nr. E0013244
				Bearb.	Kallscheid				Typ Chilly 15-S
				Gepr.					Blatt 5 von 5 Blatt
				Norm		Ursp.	Ers. f.	Ers. d.	= +



Nr.	dt.	engl.	franz.
1	Kompressor	compressor	compresseur
2	Verflüssiger	condenser	condenseur
3	Lüfter	fan	ventilateur
4	HD- Pressostat	hp- switch	pressostat HP
6	Trockner	drier	déshydrateur
8	Expansionsventil	expansion valve	détendeur
9	Verdampfer	evaporator	évaporateur
10	Thermostat	thermostat	thermostat
11	Fühler	sensor	sonde
13	Tank	tank	bac
14	Füllstandsanzeige	fluid level indicator	niveau visuel
15	Pumpe	pump	pompe
18	Strömungswächter	flow switch	controleur de débit
20	Druckschalter	hp- controller	pressostat hp
25	Magnetventil	solenoid valve	électro- vanne
26	Rückschlagventil	non return valve	clapet anti- retour
34	Schwimmerschalter	float switch	controleur niveau

Fließschema/ hydraulic schema/ schéma hydraulique

Type: Chilly 08-45

bearbeitet	geprüft		ZEICHN. NR.
D.Krieger	**A.Wiebe**		**F1219**
DATUM	DATUM		Blatt
25.08.2009	**25.08.2009**		**1 von 1**

Hyfra and its Organisation

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