

Installation, Operation and Maintenance Instructions

Transport | Installation | Operation | Maintenance | Disposal



V-Shape

GFD 2X12 V-SHAPE MAXX



Consider these instructions to be part of the unit.
Read and follow these instructions carefully before performing any work on the unit.
Always keep these instructions accessible in the immediate vicinity of the unit.

guntner.com/us

About us

Product family: GFD V-shape
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1 Key basic information

1.1 Importance of the instructions

⚠ WARNING	
	Being unaware of, or failing to acknowledge, the basic safety instructions and the safety regulations for handling and operating this unit can result in severe injury and damage to property. • Always keep the instructions in the unit's immediate vicinity at all times. • Ensure that the instructions are accessible to all people that have anything at all to do with the unit at all times. • Ensure that the instructions are read and understood by all people that have anything at all to do with the unit.

Legal framework

These instructions have been written for the US Market.

Scope

These instructions apply for the GFD units product family. GFD Units offers various working fluids and operating principles (e.g. water/glycol: fluid cooler), different casing variants, diverse material combinations and adapted fan concepts.

Requirement for installation and operation

The basic requirement for safe handling and smooth operation of this unit is knowledge of the basic safety instructions and safety regulations.

Important notes on the installation and operation

- These instructions include the most important notes for safely installing and operating the unit.
- These instructions, especially the safety instructions, must be observed by everyone who works on the unit.
- The accident prevention rules and regulations that apply for the place of installation must also be observed.

1.2 Set-up and applicable documents

The following documents are applicable:

- These instructions, in particular the following information on:
 - Intended use
 - Installation and operation
 - Safety instructions and warnings
 - Technical data
- Connection diagram inside the terminal box
- For further technical data, see nameplate

These instructions are part of the system's operating instructions, which are provided by the system's installer.

1.3 Responsibilities

1.3.1 Responsibilities of the manufacturer

The notes provided in these instructions on maintaining the unit's functional safety, preventing possible hazards during transport, installation, commissioning and operation, and with maintenance activities (cleaning, maintenance and repair) refer exclusively to the unit.

The materials used in the construction and for soldering and welding are designed to withstand the foreseeable mechanical, thermal and chemical stresses, and are resistant to the working fluid used and to the mixture of the working fluid and the lubricating oil for refrigerating compressors.

The working fluid-carrying parts of the unit are designed to remain leak-tight and to withstand the maximum permissible operating pressure, taking into account the foreseeable mechanical, thermal and chemical stresses.

Material, wall thickness, tensile strength, corrosive resistance, shaping process and testing are suitable for the working fluid used and ensure that the unit withstands the possible pressures and stresses that may occur.

All responsibility for the system into which the unit is integrated, are the exclusive responsibility of the people involved in the individual workflows.

1.3.2 Responsibilities of the installer of the system

Interfaces component supplier – installer of the system:

- In case of failure, inform Güntner U.S. LLC.
Inform the Claims Department <https://guntner.com/en-us/contact> immediately if faults occur during the installation, startup and operation.

The responsibilities of the installer of the system include in particular:

- Planning and preparing emergency measures:
To avoid consequential damage caused by malfunction, a warning system that immediately signals all faults must be provided on site. Prepare emergency measures in accordance with the state of the art that prevent consequential damage for persons, the environment and property should faults occur.
- Specify checking and maintenance intervals:

When the unit is integrated, the working fluid and unit type must not deviate from the order-related information specified in the order-related documents.

The installer of the system must point out the need for sufficient instruction of the operating and monitoring personnel for the operation and maintenance of the system.

It is recommended that the future customer staff – if possible – is present on site during the installation, for tightness tests and cleaning, while the system is being filled with working fluid and for the adjustment of the system.

1.3.3 Responsibilities of the owner or operator

The responsibilities of the owner or operator are reflected in the operation, maintenance, repair and recovery of the system.

The owner or operator must ensure that the employees entrusted with the operation, monitoring and maintenance of the system are adequately instructed and competent.

The operating personnel responsible for the system must have sufficient knowledge and experience with regard to the operating principles, operation and daily monitoring of this system.

Before commissioning the system, the owner or operator must ensure that the operating personnel are sufficiently instructed about the system's documentation (which is part of these instructions) on the set-up, monitoring, operating principles and maintenance of the system and the safety measures to be observed, and with regard to the properties and handling of the working fluid to be used.

The owner or operator must ensure that when operating, monitoring and maintaining the system, the working fluid and unit type must not deviate from the details specified in the order documents.

Planning and preparing emergency measures: To avoid consequential damage caused by malfunction, a warning system that immediately signals all faults must be provided on site. Prepare emergency measures that prevent consequential damage for persons, the environment and property should faults occur.

Responsibility remains with the owner or operator of the system if the system is used by anybody else unless there is an agreement on a different division of responsibilities.

1.4 Legal note

Please note that any warranty and/or liability claims require the presence of a proven defect of the unit supplied by us.

These installation instructions are an integral part of the supplied unit. It is essential that the contents of these installation instructions are fully observed. Any damage and/or malfunction resulting from failure to observe the contents of these installation instructions will not be covered by our warranty/liability. This applies in particular, but not exclusively, to the use of spare parts other than those specified (in case of doubt: use only original Güntner spare parts) and to unauthorized modifications to the unit compared to its original delivery condition, i.e. modifications without the express written consent of Güntner U.S. LLC. In particular, but not exclusively, modifications requiring our prior approval include the use of working fluids other than those specified, changes to the operating parameters and mechanical changes such as machining (e.g. drilling) without adequate protection of the unit from the resulting metal chips.

1.5 Document conventions

Mark-up elements for special information

bold	Requires special attention!
grey triangle	Instructions

1.6 List of abbreviations

Abbreviation	Meaning
°C	Degrees Celsius (Celsius scale temperature)
1~	Single-phase alternating current
3~	Three-phase current
bar	Bar (pressure indication)
D	Delta connection (electrical connection type with three-phase motors)
DIN	German industrial standard (specification of a standard)
EN	European standard
ESC	Energy supply company
Hz	Hertz (frequency)
IP	Degree of protection against the penetration of solids/liquids
ISO	International Organization for Standardization (German: Internationale Organisation für Normung)
L	Litre (volume)
m ²	Square metre
MAC	Maximal allowable concentration
min	Minutes
Emergency STOP	Switch for immediately switching off the refrigeration system
P	Pump (forced circulation)
ppm	parts per million, concentration figure, stands for "millionth"
Q 6.3	Balancing quality with fans
S	Star connection (electrical connection type with three-phase motors)
TCC	Technical connection conditions
VDE	"Verband der Elektrotechnik Elektronik Informationstechnik e. V." (Association for Electrical, Electronic and Information Technologies)
VDI	"Verein Deutscher Ingenieure" (Association of German Engineers)
vol%	Volume per cent (concentration level relative to a volume)

1.7 Conventions for safety signs and instructions

1.7.1 General safety signs and their meaning in these instructions

⚠ DANGER

Addresses a hazardous situation which, if encountered, will result in death or serious injury.

⚠ WARNING

Addresses a hazardous situation which, if encountered, might result in death or serious injury.

⚠ CAUTION

Addresses a hazardous situation which, if encountered, could result in minor or moderate injury.

NOTICE

Indicates instructions that pertain to safe equipment operation. Failure to comply with these instructions could result in damage to the equipment.

SAFETY INSTRUCTIONS

Indicates specific safety-related instructions or procedures.

1.7.2 Warning signs and their meaning in these instructions

**Warning of hand injury**

Failure to observe the warnings can result in hands or fingers being crushed, drawn in or otherwise injured.

**Warning of hot surface**

The temperature is above +45 °C (the temperature at which protein clots) and can cause burns.

**Warning of extreme cold**

The temperature is below 0 °C and can cause frostbite.

**Warning of dangerous electrical voltage**

Risk of an electric shock if live parts are touched.

**Warning of heavy loads**

Severe injury can occur when lifting.

**Warning of cutting danger**

Sharp edges and corners.

**Warning of risk of crushing**

Transport, loading and unloading can result in life-threatening injury.

**Warning of the risk of falling**

Risk of falling when working high up.

**Warning of the risk of slipping**

After defrosting, after cleaning work or due to other circumstances, there is a risk of slipping.

**Warning of explosive substances at the place of installation**

Use of ignition sources can cause explosions at the place of installation.

**Warning of flammable substances at the place of installation**

Use of ignition sources can cause fire at the place of installation.

**Warning of corrosive substances**

Contact with corrosive substances can cause injuries, especially to the eyes.

**Warning of harmful or irritant substances at the place of installation**

Contact with or inhaling harmful or irritant substances can cause injury or damage to health.

**Warning of toxic substances at the place of installation**

Contact with or inhaling toxic substances can cause injury or death.

**Warning of suspended loads**

Standing under suspended loads can cause injury or death.



Warning of risk of suffocation

Being in an atmosphere with oxygen deficiency or with hazardous substances, gases or vapors can cause suffocation and death.



Warning of high operating pressure

Breakage of pressurized components can cause injury or death.



Warning of automatic start-up

Automatic start-up of fans can result in hands and fingers being trapped.



Warning of the danger of pulling in

If body parts are being pulled into the unit, this can cause injury or death.

1.7.3 Prohibitory signs and their meaning in these instructions



No fire, no naked flames and no smoking!

Ignition sources must be kept away or at a safe distance, and ignition sources must not develop.



No climbing!

Do not climb onto the unit and do not place heavy loads on the unit.



No lifting!

Do not lift the unit at this area, and do not attach lifting gear at this area.



Do not enter!
Do not enter the marked area.

1.7.4 Mandatory signs and their meaning in these instructions



Wear protective gloves!
Protective gloves must protect against mechanical and chemical dangers (see imprinted pictograms).



Use respiratory protection!
Breathing apparatuses must be suitable for the working fluid used. Breathing apparatuses must consist of:

- At least two self-contained breathing apparatuses (respiratory protective devices)
- For ammonia: an additional breathing apparatus with filter (full mask) or a self-contained breathing apparatus (respiratory protective device)



Use hearing protection!
Hearing protection must protect against loud noises (see imprinted pictograms).



Wear protective clothing!
Personal protective clothing must be suitable for the working fluid used and for low temperatures respectively, and must have good heat insulation properties.



Disconnect from mains before working!
Disconnect the electrical system and secure against restart before starting installation, maintenance and repair work.



Use eye protection!

Eye protection must protect against mechanical and chemical dangers and radiation .



Lifting point/lifting hook

Marking of lifting points to ensure safe transport of loads

2 Safety

2.1 Intended/improper use

2.1.1 Intended use

Dry coolers of the GFD product family are heat exchangers for outdoor installation. The dry cooler cools the heat carrier through heat dissipation into the air that is conveyed by the fans over the dry heat exchanger surface.

The unit is delivered for operation at a specific operating point:

- Heat carrier flow temperature (with the water/glycol working fluid)
- Heat carrier return temperature or circulating heat carrier quantity (with the water/glycol working fluid)
- Air volume flow
- Air inlet temperature
- Relative humidity

The intended operating point is given in the order-related offer documents.

The nameplate states the permitted working fluid, the admissible pressure and the temperature.

The unit is designed for the following standard conditions (for deviating data, see nameplate):

The machine must be operated in the professional sector.

The operator must be trained and experienced in handling this type of unit.

The customer is responsible for any installations and mounted parts retrofitted to the unit by him or herself, and for the associated risks to the overall construction.

The material selection of all components must be suitable for the local conditions.

2.1.2 Operating conditions

Overview

The unit is a component of a system including its working fluid circuit. The purpose of these instructions, as part of the system's operating instructions, is to minimize the possible danger to persons, property and the environment from the unit and the working fluid used in it. These dangers are essentially connected with the physical and chemical properties of the working fluid and with the pressures and temperatures that occur in the working fluid-carrying components of the unit (see "Residual risks caused by the working fluid").

Safety measures

Observe the following to prevent personal injury, environmental damage and damage to property in accordance with the state of the art:

- The unit must be used only in accordance with the proper intended use.
- The operator must ensure that when operating, monitoring and maintaining the unit, the fluid and unit type do not deviate from the order-specific information specified in the order documents.
- The operator must ensure that maintenance measures are performed in compliance with the system's operating instructions.
- Filling the unit with a different fluid is permitted only with the prior written consent of the manufacturer. Refer to the enclosed order-specific offer documents for the order-related intended use.
- Do not exceed the max. operating pressure stated on the unit's nameplate.

2.1.3 Improper use

Safety

⚠ WARNING	
	RISK OF PERSONAL INJURY AND DAMAGE TO PROPERTY! Operating the unit with another working fluid can cause personal injury and damage to property. • Operate the unit only with the working fluids indicated on the nameplate (fluid group and state). Operating the unit with another working fluid is permitted only after consultation with the manufacturer. • Certain working fluids may be used only in conjunction with specific materials. Pay attention to the exact unit name in chapter "Types of V-shape". • The maximum permissible operating pressure stated on the nameplate must NOT be exceeded.

General

The unit is being used improperly if:

- An unspecified working fluid, an unspecified pressure, an unspecified temperature and/or an unspecified connecting piping not prescribed in acc. with the installation instructions are used
- The unit is not disconnected from the mains for cleaning/maintenance purposes,
- the main dimensions, weight, distances and recommended fixing sizes are not taken into account/adhered to during mounting,
- The supply line (electric) is fused or dimensioned incorrectly on site
- The wrong fixing elements or not all of the fixing points provided were used for mounting
- The unit is operated in an environment or for capacity requirements (e.g. aggressive/corrosive environment; capacity range) the unit with its material combination or capacity is not designed for, or which do not correspond to the intended use.

Improper modifications

The unit must not be modified without prior written consent of Güntner U.S. LLC. Modifications to the unit are:

- Change of the operating point (the specified operating point is indicated in the order related documents)
- Changing the fan capacity (air volume)
- Changing the volume of the working fluid passing through
- Changeover to another working fluid
- Modification to load-bearing components

Improper operation

The unit must not be operated if safety devices recommended by the manufacturer are not available, not properly installed or not fully functional.

The unit must not be operated if it is damaged or shows signs of faults. All damage and faults must be reported to Güntner U.S. LLC immediately and must be rectified without delay.

Work on the unit must not be performed without the personal protective equipment prescribed in these instructions.

The unit must not be operated if there are factors at the place of installation (e.g. corrosive atmosphere) for which the unit was not designed. This applies in particular to the material combination the unit is made from.

2.1.4 Further information

Space limits

The unit must be mounted securely, evenly and free from vibrations.

The unit must be fixed at all fixing points.

The place of installation (refers to the set-up location and the mounting location respectively) must be accessible without hazard.

Provide good accessibility free from obstacles.

Main dimensions and weight:

- In accordance with order confirmation and drawing

Assembly drawing:

- In accordance with drawing

Layout plan:

- Outdoor installation only. A layout plan must be drawn up by the system operator. Energy supply interfaces, hydraulics:
- Electrics:
 - As interfaces to the electrical equipment, there are terminal boxes and switch cabinets for the electrical supply and signal exchange (see connection diagrams and manuals of the control systems).
- Hydraulics:
 - Drains, ventilations, connections and shut-off devices must be freely and safely accessible.

Time limits

Service life: 10 – 12 years

Additional requirements

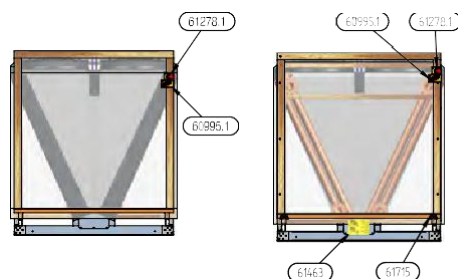
- Cleaning the system (in acc. with section "Unit" and the system's operating instructions)
 - Corrosion test of the load-bearing fasteners and the load-bearing components (according to section "Coil" Maintenance schedule and according to section "General", Safety notice "Risk of injury due to corrosion")
 - Frost protection check
 - Periodic inspection of the system (leak tightness tests, among other things)
 - Inspection of fan unit(s)
 - Visual inspection of the earthing points on the unit
 - Checking the continuity of the earthing points on the unit
 - Visual inspection of electrical connections, cables and components for integrity prior to commissioning
 - Regular checking for icing and snow accumulation
-

Further limits

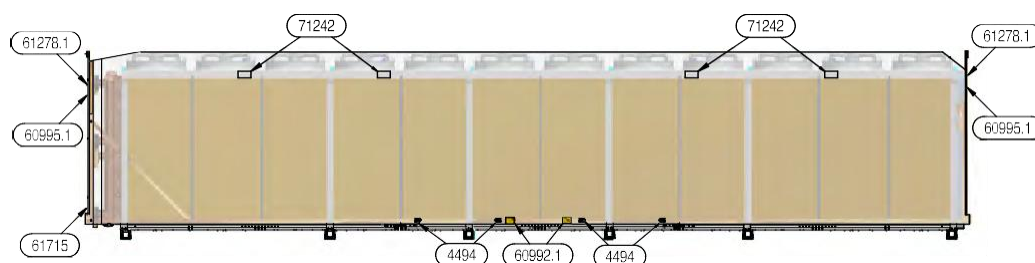
- Connection, operation and maintenance must be performed by skilled workers (mechanics or electricians) instructed in the specific hazards posed by refrigeration and air conditioning.
- The operator must prevent access by unauthorized persons and anyone under 14 years old (children etc.).
- The operator must take measures to detect and prevent a working fluid concentration that is too high. The system operator/planner must comply with relevant laws, regulations and ordinances for the respective installation outdoors or in closed rooms.
- At the end of its life cycle, the unit requires proper disposal of the materials used.
- All applicable laws, regulations, directives and standards must be complied with when disposing of materials and substances.

2.2 Labelling on the packaging/the unit

2.2.1 Packaging overview

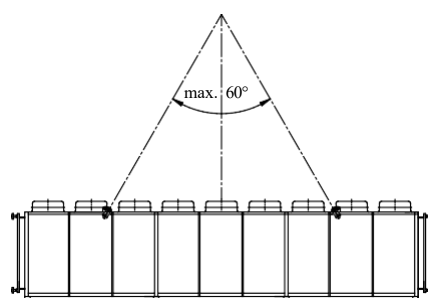


Packaging for units with max. 2 x 12 fans

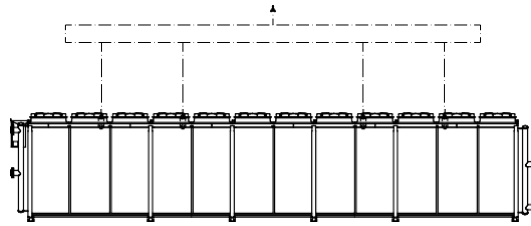


Packaging for units with 2 x 12 fans

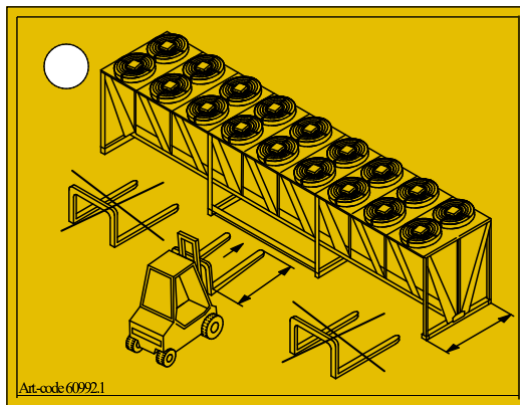
2.2.2 Signs and notes on the packaging



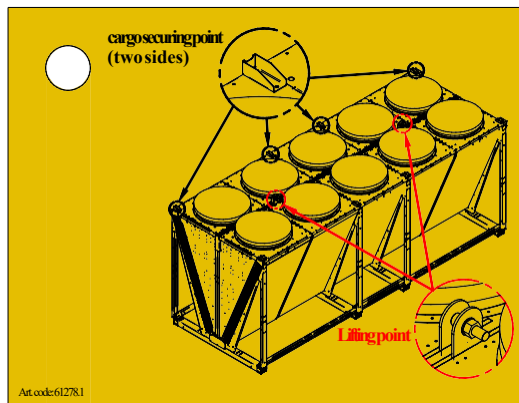
60994 – Crane lifting instructions for units with 2 x 12 fans



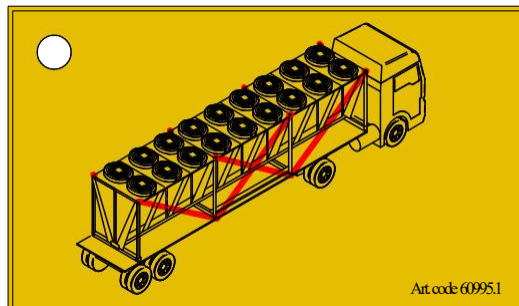
71242 – Crane lifting instructions for units with 2 x 12 fans



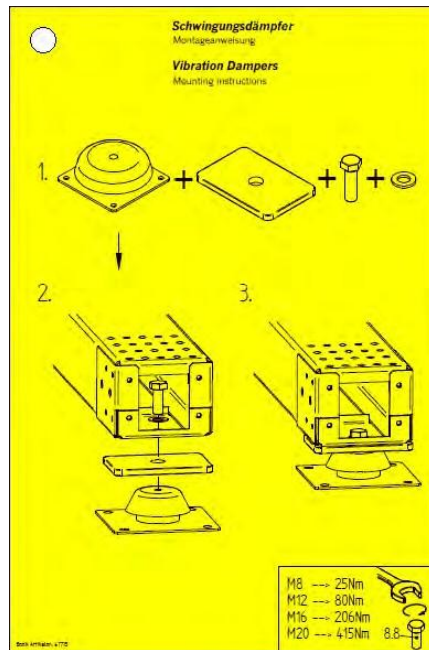
60992.1 – Transport with industrial truck with forks



61278.1 – Lifting and fixing point

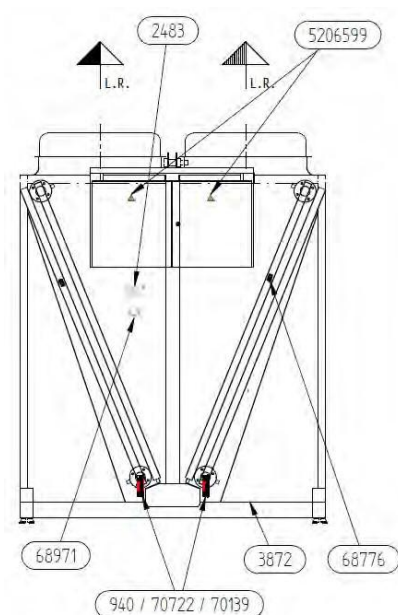


60995.1 – Lashing eye

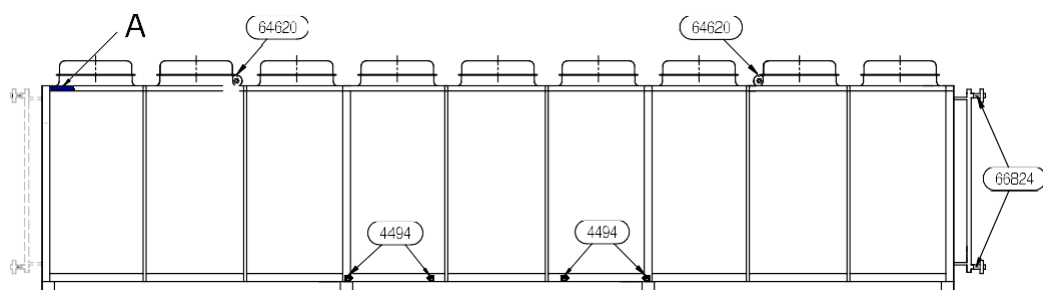


61715 – Vibration dampers

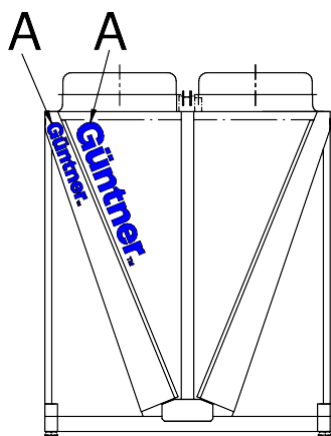
2.2.3 Unit overview



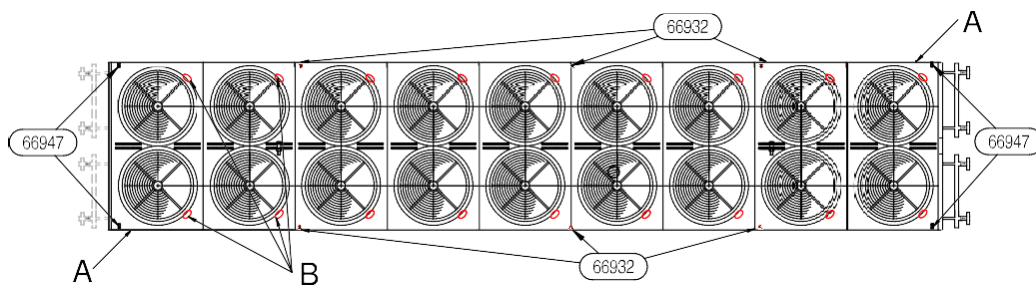
Markings on the unit (left side view)



Markings on the unit (side view)



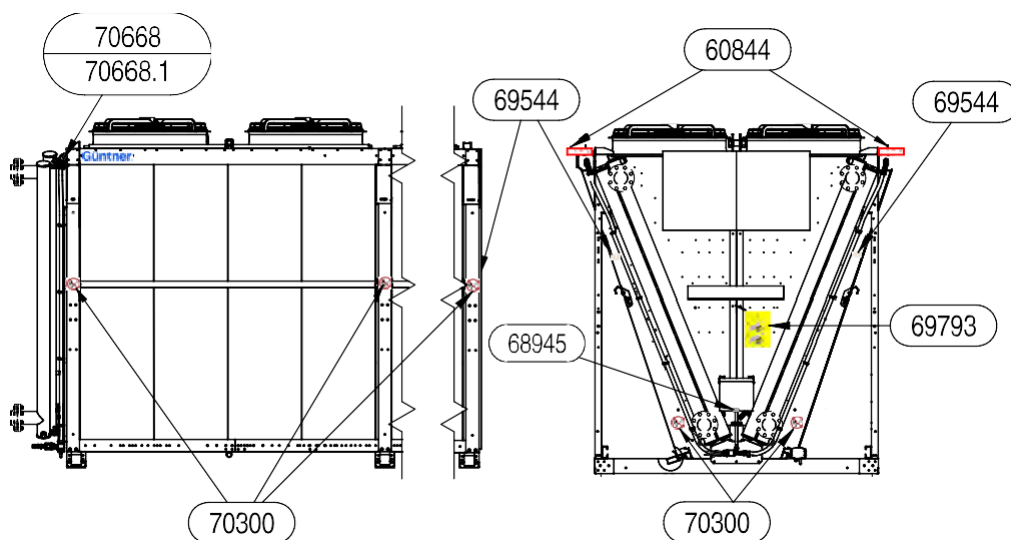
Markings on the unit (right side view)



Markings on the unit (top view)

A – Güntner logo

B – Number for fan 1, 2, 3, ...

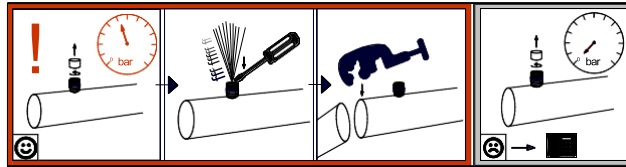


Markings on the unit with hydroBLU™

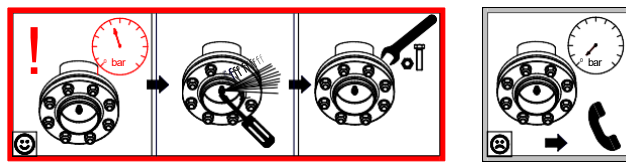
2.2.4 Safety signs on the unit

As standard

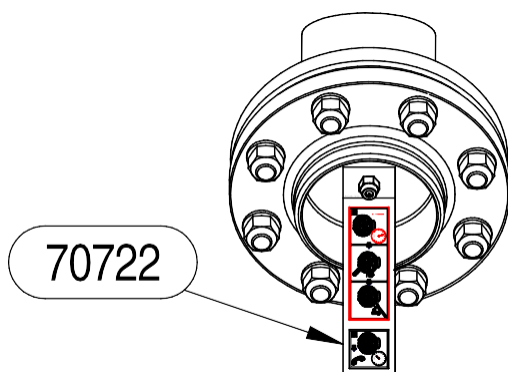
Specific safety signs on the unit:



940 – Transport filling at Schrader valve



70722 – Transport filling



70722 – Transport filling



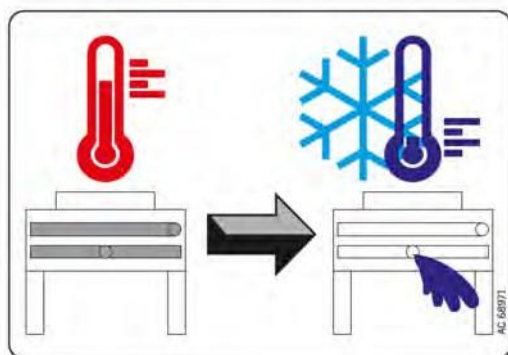
66947 – Inspection cover/inspection door: "Disconnect from the mains before working", "Warning of risk of crushing"



64620 – Lifting point



60325, 68776 – Do not load, do not lift



68971 Danger of frost for dry coolers in general (only for dry coolers/flange connection)



5206599 – Warning of electric shock (always used for electronic attachments)

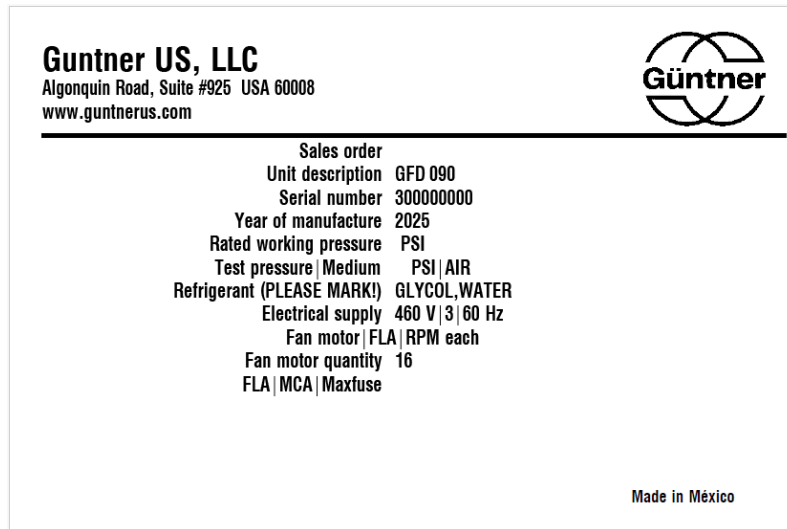


3872 – Earthing marking. The earthing marking in the drawing (connection side of the unit) shows the earthing point for earthing connection by customer. The earthing connections on the unit itself are also marked with this label (not shown in the drawing).



66932 – No stepping onto the surface

2.2.5 Other signs and notes on the unit

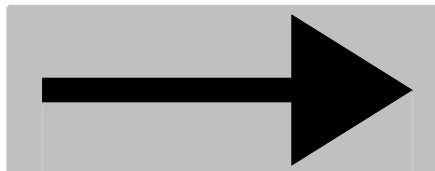


This image is just for illustration purposes

64789 – Nameplate – **Sample image**



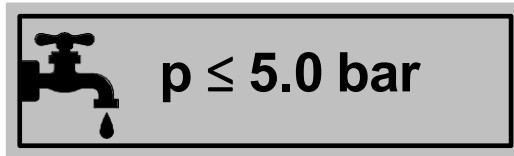
706** – Güntner logo (white color for dark unit color)



66824, 68909 – ON and OFF connections



60844 – Transport safety bolt



68945 – Pressure limit for water pipe (in case of hydroBLU™)



70299, 70300 – Warning "No open flame" (in case of hydroBLU™)

2.3 Basic safety instructions

2.3.1 General

Please note

NOTICE	
	Only persons who meet the requirements for the personnel may work in the area of the unit (see section "Requirements for staff, duty of care"). The operator must prevent access by unauthorized persons and anyone under 14 years old.
NOTICE	
	Prior to all work on the unit and in case of danger respectively: • Power off the unit and secure it against unintentional restart • Refer to the order documents for the permissible working fluid • Observe the safety data sheets for the working fluid

General risks

 DANGER		
	ELECTRICAL VOLTAGE!	
	A short-circuit on the electrical connections and the direct and indirect contact with live parts of the unit or a cable can cause severe injury or even death. Short circuits in the electrics/electronics can result in unpredictable reactions. Impermissible heating can occur. The risk increases if the insulation is removed by environmental influences or mechanical and/or willful damage. • Disconnect the supply line from the mains before performing electrical work on the unit. • Work on the unit and the connection and control configuration must be performed by specialist staff. • The supply line of the unit must be designed by customer. Main switch/repair switch and similar to be provided by customer. Consider the information provided in the connection diagram. • Check electrical components regularly, including testing • Connect the unit to the building's earthing system in the proper manner. • Perform earthing checks and visual inspections of the earthing points regularly. • Observe the five safety rules of the German standard series or national relevant regulations to prevent electrical accidents. • Provide adequate lightning protection. • The pipes of the hydroBLU™ system are connected to the protective conductor system by connecting the pipes provided by customer with the equipotential bonding of the building.	
 WARNING		
 	RISK OF SUFFOCATION AND POISONING!	
	Due to leaks in the heat exchanger, the fluid escapes and is inhaled by bystanders. It can cause anything from breathing problems to suffocation or poisoning. • Drain the unit prior to work and for transport respectively. • Ensure that the operator provides appropriate firefighting equipment for welding or soldering work. • Ensure that the plant is designed in such a way that the unit can be filled/emptied safely.	

⚠ WARNING

RISK OF INJURY CAUSED BY A LOSS OF STABILITY!

The unit loses its stability due to external influences such as extreme wind and falls over or falls from the roof. Bystanders can be severely injured.

- Check fixing screws regularly and particularly before and after lifting the unit and replace them if necessary.
- Arrange the unit's surroundings in such a way as to ensure safe access and safe working on the unit.

⚠ WARNING

EXPLOSION HAZARD!

The pressure in the heat exchanger exceeds the defined threshold values and is released explosively. Bystanders are injured.

- Drain the unit prior to work and for transport respectively.
- Ensure that the operator provides appropriate firefighting equipment for soldering and welding work.
- Ensure on the plant side that safe filling/emptying of the unit is guaranteed.

⚠ WARNING

RISK OF BURNS!

The working fluid/unit catches fire during work (e.g. soldering and welding work) at the pipes of the heat exchanger and injures bystanders.

- Drain the unit prior to work and for transport respectively.
- Ensure that the operator provides appropriate firefighting equipment for soldering work.
- Ensure on the plant side that safe filling/emptying of the unit is guaranteed.

⚠ WARNING

RISK OF BURNS!

Due to leaks, the working fluid (water/glycol) escapes. Its concentration becomes so high over time that an explosive mixture forms that injures bystanders.

- Drain the unit prior to work and for transport respectively.
- Ensure that the operator provides appropriate firefighting equipment for soldering work.
- Ensure on the plant side that safe filling/emptying of the unit is guaranteed.

⚠ WARNING

RISK OF FIRE AND BURNS!

The humidification pads for the pre-cooling system are flammable if in contact with sparks, fire and high heat respectively, especially if they are dry. Burning pads can cause severe injuries and even death, and result in serious damage to property.

- Remove the pads from the unit prior to grinding, welding and hot work.
- Store the pads in a safe area for the duration of the work.


⚠ WARNING

RISK OF BURNS OR RISK OF FROSTBITE!

Contact with the working fluid (e.g. during filling/draining) or with surfaces can cause severe burns/frostbite.

- Wear personal protective equipment.


⚠ WARNING

RISK OF HEARING DAMAGE!

Persons who spend long periods in the vicinity of the unit can suffer hearing damage, discomfort and stress as the unit produces noise levels of over 70 dB(A).

- Wear personal protective equipment.
- Observe the requirements of local authorities.



⚠ WARNING		
	DANGER OF PULLING IN AND DANGER OF CUTTING OFF! Limbs can be caught by the running fan and pulled in or cut off. Hair and clothing can be pulled in the running fan and cut off. • Power off the unit before starting any work. • Secure the unit against unintentional restart. A lockable repair switch is available or to be provided by customer. • Attach an appropriate warning label to the unit. • Check the fan unit regularly in acc. with the inspection and maintenance schedule. • Do not wear any loose clothing or jewellery. Secure long hair on the head. • Wear personal protective equipment. • Operate the unit only with safety devices. • Stop the unit immediately if a missing or ineffective safety device is detected.	
		

⚠ WARNING	
	RISK OF FALLING! Person slips when accessing the unit or on the unit's surface, or trips over a protruding part and falls. • Arrange the unit's surroundings in such a way as to ensure safe access and safe working on the unit.
	
	

⚠ CAUTION	
	RISK OF INJURY CAUSED BY CORROSION! The unit is exposed to corrosive environment for a long time. Due to the onset of corrosion, the unit loses stability and is no longer suitable for lifting by crane or industrial truck with forks and endangers bystanders. • Check all fixings, load-bearing components, fixing elements and fans of the unit regularly and especially before and after lifting the unit for corrosion damage, lifting capacity and structural integrity, and replace them if necessary.

⚠ CAUTION		
	RISK OF CUTTING OR INJURY! Person can injure him or herself on the packaging (e.g. wood) or sharp edges of sheet metal. • Wear personal protective equipment.	 
⚠ CAUTION		
	RISK OF INJURY CAUSED BY OVERLOADING! Overload results in structural failure of the unit. Bystanders can be injured as a result of the unit breaking up. • If the unit reaches its load limits (e.g. owing to wind, snow or an earthquake), carry out an inspection of the unit. • Ensure that the unit remains free of ice and snow. • Regularly check all fixing devices, especially of the lifting accessories (e.g. crane lug screws), for lifting capacity and structural integrity, and replace them if necessary.	
⚠ CAUTION		
	RISK OF INJURY DUE TO SLIPPING! Leakage in the piping and the humidification pads results in slipping and falling. • Check the drain system and the fixing bolts regularly.	
⚠ CAUTION		
	RISK OF FREEZING! With pressure tests, operation and standstill with water or insufficient antifreeze filling in areas where there is a risk of frost, the unit can freeze. With units that cannot be completely drained, there is a risk of freezing even after draining. • When draining, always ensure that the unit is properly ventilated.	

2.3.2 What to do in an emergency when using ethylene glycol as a working fluid

⚠ WARNING		
  	RISK OF PERSONAL INJURY AND DAMAGE TO PROPERTY! The unit is operated with the working fluid ethylene glycol (synonyms: ethanediol, glycol). Be sure to consult the manufacturer before using other working fluids. Ethylene glycol is a colorless, slightly viscous, not very volatile, water-miscible, hygroscopic liquid with a sweet smell or taste. Ethylene glycol is flammable and, at higher temperatures, explosive in a vapor/gaseous state. Skin contact with ethylene glycol causes slight irritation with the risk of skin absorption; eye contact causes mucous membrane irritation; ingestion causes agitation with disruption of the central nervous system and, after prolonged harmful exposure, it causes fatigue, coordination disruption, unconsciousness and kidney damage. • Keep ethylene glycol away from ignition sources. • No smoking! Ethylene glycol vapors are heavier than air and can flow off to rooms on a lower level. In still air, there can be an increase of the ground level concentration. With high concentrations, there is a risk of suffocation due to the reduced oxygen concentration, especially at ground level. • Avoid contact with skin, floor, clothing! • Remove contaminated, soaked clothing immediately! • Do not allow contact with heavy oxidants (chromic sulphuric acid, potassium permanganate, fuming sulphuric acid or similar)! Risk of violent reactions! • Unauthorized persons must not have access to the unit. • When setting up the unit, ensure that the working fluid escaping from the unit cannot penetrate the interior of the building or areas subject to water, or put people at risk in any other way. • All necessary protective and other measures are to be performed by experienced, trained personnel wearing the prescribed protective clothing. • Use respiratory protection. • Use a self-contained breathing apparatus for repair work in areas with high working fluid concentrations in the ambient air. • Ensure that the installation room is well ventilated. • Drain escaped working fluid liquid safely	   

2.3.3 Requirements for staff, duty of care

⚠ CAUTION	
	RISK OF DAMAGE TO PROPERTY! Work performed by untrained, inexperienced and incompetent persons can result in damage to the unit. • Ensure that all persons who are responsible for performing the tasks described here read and understand these instructions. • Ensure that the unit is installed, put into operation, operated, repaired and maintained only by trained, experienced and competent persons. • People who are responsible for the operation, maintenance, repair and evaluation of systems and their components must have the required training and technical knowledge to be competent. Competence means the ability to satisfactorily perform the activities required for the operation, maintenance, repair and evaluation of refrigeration systems and their components. • Ensure that only persons work on the electrical equipment who have the required competence (e.g. an electrician or an electro-technically instructed person), and who are authorized by the operator. • Ensure that changes to the unit, which the manufacturer has first agreed to in writing, are made by instructed and competent personnel.
NOTICE	
	The unit may be operated by operating personnel who have no specific knowledge of refrigeration engineering but have sufficient knowledge and experience with regard to the operating principles, operation and daily monitoring of this system . This operating personnel must not work on the system or change the settings of the system .

2.4 Safety instructions in all of the unit's life phases

2.4.1 Residual mechanical risks

2.4.1.1 Fins, sharp unit corners and edges

⚠ CAUTION		
	RISK OF INJURY TO HAND AND BODY! Risk of cutting on the fins or on sharp edges and corners of the unit. • Wear personal protective equipment (PPE)!	
⚠ CAUTION		
	RISK OF SKIN INJURY! User comes into contact with insulating material or its fixing needles, which causes skin irritations. • Wear protective gloves!	

2.4.1.2 Fans

⚠ WARNING		
 	DANGER OF PULLING IN AND DANGER OF CUTTING OFF! There is a danger of cutting off fingers on the rotating fan blades, injury hazard for the hands and danger of loose elements such as hair, necklaces or clothing parts being pulled in. • Do not operate the fans without protection guards. Risk of trapping! • With automatic fan start during maintenance work there is a risk of trapping for the hands and fingers. • Power off the unit before you begin maintenance work where you must remove the protection guards. Secure the unit against unintentional restart by removing the electric fuses for the unit. Attach a suitable warning label to the unit, referring to unintentional restart. • The protection guards must be opened by trained specialist staff and only for maintenance and repair purposes. Close the protection guards after completing the work and secure them against unintentional or unauthorized opening! Open the protection guards only after the fan has been disconnected from the mains!	

2.4.2 Residual electrical risks

⚠ DANGER		
	WARNING OF DANGEROUS ELECTRICAL VOLTAGE! Direct and indirect contact with live parts such as motors and electric lines can cause severe injury or even death. • Disconnect the unit from the mains before performing maintenance work. See the plant documentation of the refrigerating system. Secure the unit against unintentional restart by removing the electric fuses for the unit. Attach a suitable warning label to the unit, referring to unintentional restart. • Note that the mains supply lines can still carry voltage even if the unit is disconnected from the mains. • Work on the electrical equipment must be performed by personnel who have the required competence (e.g. an electrician or an electro-technically instructed person), and who are authorised by the operator. • If the unit needs to be earthed: Observe the information on earthing points (number, position) at the unit! • After completion of all work, attach and tighten all bolts of the terminal boxes (see section "Fans") to prevent water from entering.	

2.4.3 Thermal residual risks

2.4.3.1 Risk of burns

⚠ WARNING		
 	FIRE! The humidification pads for the pre-cooling system are flammable if in contact with sparks, fire and high heat respectively, especially if they are dry. Burning pads can cause severe injuries and even death, and result in serious damage to property. • Remove the pads from the unit prior to grinding, welding and hot work. • Store the pads in a safe area for the duration of the work.	

⚠ WARNING		
	RISK OF BURNS! During operation, the coil (heat exchanger) of the unit and pipes have temperatures above +45 °C. Touching can cause burns. At refrigerant temperatures above +45 °C, there is a risk of burns on pipe elements and inlet headers. • Wear personal protective equipment.	

2.4.3.2 Risk of freezing

⚠ WARNING	
	WARNING OF FREEZING! The unit CANNOT be completely drained without the use of tools! For the unit operated with water/glycol mixture, there is a risk of freezing with insufficient antifreeze filling and operation in areas where there is a risk of frost. With units that cannot be completely drained, there is a risk of freezing even after draining. • The specified operating fluid must be used when performing pressure tests and during operation and standstill! • During pressure tests, operation and standstill, the working fluid must not fall below its freezing point at any time as otherwise the unit (heat exchanger coil) will be destroyed. • Where there is the risk of freezing, the unit must be fully drained or rinsed with a frost-proof agent until adequate protection against freezing is assured. • When draining, the unit must be sufficiently ventilated! • Draining must be possible at all times by a descending drain line outside the unit. • When draining, the pressure may need to be increased using compressed air.

Water/glycol**General description of hazards:**

Ethylene glycol is a colorless, slightly viscous, not very volatile, water-miscible, hygroscopic liquid with a sweet smell or taste.

Unauthorized persons must not have access to the unit. When installing the unit, ensure that the heat carrier escaping from the unit cannot penetrate the interior of the building or areas subject to water, or put people at risk in any other way.

⚠ WARNING**RISK OF ENVIRONMENTAL POLLUTION!**

Care must be taken during installation to ensure that no heat carrier escaping from the unit can enter the groundwater.

- Ensure that no heat carrier enters the groundwater.

⚠ WARNING



RISK OF HARM TO HEALTH!

Skin contact with ethylene glycol causes slight irritation with the risk of skin absorption; eye contact causes mucous membrane irritation; ingestion causes agitation with disruption of the central nervous system and, after prolonged harmful exposure, it causes fatigue, coordination disruption, unconsciousness and kidney damage.

- Avoid contact with skin, eyes and clothing! Remove contaminated, soaked clothing immediately!
- Ethylene glycol vapors are heavier than air and can flow off to rooms on a lower level. In still air, there can be an increase of the ground level concentration. With high concentrations, there is a risk of suffocation due to the reduced oxygen concentration, especially at ground level.
- Ensure that working areas are well-ventilated in order to prevent inhalation of high vapor concentrations.
- Check the leak tightness of the unit regularly as described in these instructions.

⚠ WARNING



IGNITION AND FIRE HAZARD!

Ethylene glycol is flammable and, at higher temperatures, explosive in a vapor/gaseous state.

- Do not allow contact with heavy oxidants (chromic-sulphuric acid, potassium permanganate, fuming sulphuric acid or similar)! Risk of violent reactions!
- Keep ethylene glycol away from ignition sources.
- With hot work, e.g. grinding, soldering, etc., ensure suitable fire fighting equipment is on-site.
- Ensure that fire-fighting equipment is provided in sufficient quantities, that it functions properly and that the extinguishing agents do not react with the coolant.
- No smoking!

⚠ WARNING		
	RISK OF FROSTBITE! During troubleshooting work after coolant leakage, pay attention to any remaining heat carrier as splashes can cause frostbite to the skin and the eyes. • Wear personal protective equipment.	
⚠ WARNING		
	RISK OF POISONING! Care must be taken to prevent the heat carrier from coming into contact with open fire, as toxic combustion products can form. • Prevent the heat carrier from coming into contact with open fire! • Perform soldering and welding work only after complete removal of the heat carrier from the relevant section of the system. Ensure good ventilation. • Do not allow contact with heavy oxidants (chromic-sulphuric acid, potassium permanganate, fuming sulphuric acid or similar)! Risk of violent reactions!	
⚠ WARNING		
	RISK OF FREEZING! With insufficient antifreeze filling and operation in areas with risk of frost, the unit can freeze. With units that cannot be completely drained, there is a risk of freezing even after draining. • When draining, the unit must be sufficiently ventilated! • When performing pressure tests and during operation and standstill of units filled with water or an insufficient amount of antifreeze, or if the concentration of the heat carrier is insufficient, the units are destroyed at sub-zero temperatures.	

2.4.4 Residual risks caused by vibrations

⚠ WARNING	
	PERSONAL INJURY AND DAMAGE TO PROPERTY CAUSED BY EJECTED MATERIALS! If fans are destroyed during fan operation, ejected parts of the fan blades can injure people or cause damage to property close to the fan. Fans, components and pipes in the system must be designed, constructed and integrated in such a way that risks caused by vibrations are reduced to a minimum.
⚠ CAUTION	
	DAMAGE TO PROPERTY CAUSED BY VIBRATIONS! The operation of fans regularly causes vibrations that are increased by imbalances resulting from impurities, frost accumulation, icing or damage of fan blades. These vibrations are transmitted to the building and the unit and can result in damage to the building and the unit, and to the unit mounting bracket or components of the system connected to the unit. - Regularly check the fan blades and protection guards for impurities and make sure the fans run smoothly (see section "Fans"). - To further reduce the transmission of vibrations from the unit to its surroundings, additional vibration dampers can be installed by the customer between the unit and the ceiling.

2.4.5 Residual risks caused by pressurized parts

⚠ WARNING	
	RISK CAUSED BY PRESSURIZED PARTS! Breakage of pressurized pipes or pressurized components of the unit can cause personal injury or damage to property caused by ejected materials. A sudden large release of the working fluid with its hazardous properties after a break or leak on pressurized components of the unit can cause the following hazards: Regarding the glycol working fluid ▪ Irritations and damage to health ▪ Violent chemical reactivity ▪ Fire hazard ▪ Explosion hazard ▪ Frostbite General ▪ Suffocation ▪ Panic ▪ Environmental pollution • Before performing maintenance work, ensure that the unit concerned is pressure-free or remove the working fluid from the unit concerned. • Only perform maintenance work – especially soldering and welding work – on the unit concerned after the working fluid has been completely removed from the unit.

2.4.6 Residual risks caused by improper installation

 WARNING	
	PERSONAL INJURY AND DAMAGE TO PROPERTY CAUSED BY IMPROPER INSTALLATION! Improper installation results in hazards caused by: ▪ Breaks or leaks on working fluid-carrying components of the unit and pipes ▪ Absence of release devices to prevent liquid expansion: No liquid may be trapped that could heat up when the refrigeration system is at a standstill and cause pipes or connecting flanges to crack due to expansion. ▪ Uneven load distribution on the fastenings with the danger of stresses inside the unit or unit displacement (breaks or leaks on working fluid-carrying components of the unit and pipes; risk of breaking off). ▪ Insufficient securing of working fluid-carrying pipes against mechanical damage! On-site connections: loaded installation; effect of forces on the inlet and outlet headers with the risk of breaks or leaks on working fluid-carrying components of the unit and pipes; risk of breaking off! ▪ Risk of the unit breaking off with the risk of escaping working fluid and exposed electric lines ▪ Risk of damage caused by environmental hazard sources (production, transport and other processes at the place of installation) ▪ Malfunction of the unit caused by obstructions of the air inlet/outlet ▪ Obstruction of all-side inspection, checks and maintenance, i.e. no unobstructed accessibility to the working fluid-carrying and electrical components, connections and lines, no recognizable marking of the pipes and insufficient space for tests ▪ The units are installed on the fixing points corresponding with their weight and fixed with fixing screws. The operator or installer is responsible for ensuring that the screw connections are of an adequate strength, ▪ The diameter of the mounting holes has been statically determined by the manufacturer and the fixing screws are adapted accordingly,

- The fixing screws are secured against loosening by means of an appropriate locking device,
- The fixing screws are not overtightened,
- All fixing screws are tightened equally to achieve a load distribution on the fastenings that is as balanced as possible,
- All fixing points maintain the same spacing to the fixing level permanently and under load so that no mechanical stress occurs in the unit structure. The units are anchored in their fixing position to prevent the equipment from moving,
- The functional safety of the fixing screws is tested as part of regular maintenance (see section "Maintenance and cleaning"),
- The unit is fixed and set up so that it is not damaged by environmental hazard sources (production, transport and other processes at the place of installation), and that its functioning is not disturbed by the interventions of unauthorized persons,
- The units are fixed and set up so that unobstructed air intake and discharge is constantly ensured without short circuiting of the air,
- The units are fixed and set up so that they can be inspected, checked and maintained from all sides at all times, i.e. there must be unobstructed access to the refrigerant-carrying and electrical components, connections and lines, the pipe labelling must be legible and adequate space must be available for testing,
- The working fluid-carrying pipes are protected against mechanical damage! On-site connections: unloaded installation; force must not be exerted on the inlet and outlet headers
- The following was observed without fail during the installation of the unit:
 - It is essential to maintain a distance from objects that could be endangered by the effects of heat carriers (with glycol working fluid).
 - Highly flammable materials must not be placed below the unit,
 - Set up and fix units as follows: In areas that are used for internal traffic, the pipes to and from the units must be installed only with connections and fittings that cannot be removed.
 - Relief devices against liquid expansion must be available.
 - Subcooled liquid may only be present to a minimal extent in parts of the system when the refrigeration system is at a standstill – by minimizing the number of "dead end traps".

2.4.7 Residual risks caused by breakage during operation

⚠ WARNING	
	PERSONAL INJURY AND DAMAGE TO PROPERTY CAUSED BY BREAKAGE DURING OPERATION! Caution! Improper installation, failure to observe the maximum permissible operating pressure, failure to observe pressurized pipe sections during maintenance or failure to observe the residual hazards due to vibrations result in breakage during operation and maintenance. This results in hazards caused by • ejected materials, • released working fluid. Ensure that: • Installation is performed properly, • The maximum permissible operating pressure is always adhered to, • Pressurized pipe sections are depressurized prior to all maintenance and repair work. • Vibrations are reduced with all available means and brought down to an absolute minimum. This applies to vibrations from the refrigeration system (vibrations caused by the compressor, units and pipes of the complete system including the heat carrier circuit (with glycol and water working fluids) and the fan (imbalances due to accumulation of dirt or damage). • Relief devices against liquid expansion are available. See the sections below: • "Residual risks caused by improper installation", • "Operating conditions", • "Residual risks caused by pressurized parts", • "Residual risks caused by vibrations", • "Residual risks caused by the working fluid".

2.4.8 Residual risks caused by ejected objects and/or liquids

⚠ WARNING	
	PERSONAL INJURY AND DAMAGE TO PROPERTY CAUSED BY EJECTED OBJECTS AND/OR LIQUIDS! Residual risks caused by ejected objects and/or liquids (see section "Residual risks caused by breakage during operation").

2.4.9 Residual risks associated with disposal

⚠ WARNING	
	RISK OF PERSONAL INJURY AND DAMAGE TO PROPERTY CAUSED BY THE WORKING FLUID! The following notes are recommendations for the proper and professional disposal of the unit. Applicable waste disposal laws are binding for the country of operation: ▪ Disposal must be performed by competent persons. ▪ With the glycol working fluid, the working fluid-carrying components of the unit must be drained prior to scrapping, and the pressure may need to be increased using compressed air when draining. ▪ All components of the unit, e.g. working fluids, lubricating oil for refrigerating compressors, heat exchangers and fans, must be disposed of properly. ▪ Prior to scrapping, the working fluid-carrying components of the unit must be drained whereby the pressure must be reduced to at least 0.6 bar absolute for a unit pipe volume up to and including 200 l, and to 0.3 bar absolute for a unit pipe volume over 200 l. The process of pressure reduction is finished when the pressure no longer increases and remains constant, and the unit is at ambient temperature. ▪ Used working fluid that is not intended for reuse must be treated as waste and disposed of safely. There must be no emissions into the environment. ▪ The unit consists predominantly of the basic materials stainless steel, aluminum, steel, galvanized steel (casing), copper, polyamides (electrical parts). These materials can be recycled by the waste industry, including in color-treated state, via mechanical and thermal separation.

- An officially authorized facility can be required to destroy the working fluid.
- The heat carrier glycol must be filled into a special container in compliance with the respective safety measures. This special container must be suitable for the heat carrier. It must be easy to identify and labelled for the refrigerant, e.g. "ethylene glycol recovered".
- The working fluid must not be filled in a fluid container that contains another or an unknown working fluid. This other or unknown working fluid must not be released into the atmosphere, but rather identified, reclaimed or properly disposed of as specified.
- Do not use a disposable container for glycol as it is possible that coolant residues in the container escape during disposal.
- The working fluid container must not be overfilled. The maximum permissible pressure of the working fluid container must not be exceeded during the entire work process.

Water/glycol

⚠ WARNING	
	RISK OF ENVIRONMENTAL POLLUTION! Ethylene glycol is a colorless, slightly viscous, not very volatile, water-miscible, hygroscopic liquid with a sweet smell or taste that is harmful to the environment. • Ensure that no working fluid enters the sewer system or groundwater. • Operate the facility for recovering or disposing of working fluids in such a way that the risk of working fluid being released into the environment is kept as low as possible. • In case of spillage or leakage, immediately absorb with universal binding agent and dispose of as hazardous waste, indicating the substance absorbed.

Güntner U.S. LLC transport packaging is made from environmentally sound material and is suitable for recycling.

3 Description

3.1 Types of GFD

Introduction

Güntner's GFD is a unit with variable equipment. Depending on the requirements, it can be configured in the most diverse variants. The following tables show the areas in which the V-shape can be put together individually.

Refer to the order documents for the exact unit name.

Letter (example)	Meaning	Possible variants
G	Company	G: G üntner
F	Function	F: F luid cooler (Water/glycol)
D	Heat exchanger design	D: D iagonal
D	Operating mode	D: D ry (without humidification of the supply air or fins) A: hydroBLU™ pad pre-cooling system (Pad)

Exemplary presentation of the nomenclature

Fans

Fan types	Number of fans	Fan diameters
EC fans	2 x 12	900 mm

Available working fluids and their operating modes

Working fluid	Operating mode
Heat carriers (e.g. water/glycol)	Dry/hydroBLU™

Material combinations available as a standard

Material	Core tube	Fin	Casing	Header outlet/header inlet	Connections
Aluminium		X			
Copper	X			X	X
Aluminium, epoxy resin-coated		(X)			
Galvanized steel, powder-coated			X		
Stainless steel V2A/AISI 304	(X)			(X)	(X)

X Standard design
(X) Optional

Accessories available:

- Vibration dampers – Upon request (supplied loose)
 - hydroBLU™
-

The design and function are shown using the example of a standard unit of the GFD family.

3.2 General information

Introduction

The dry cooler consists of

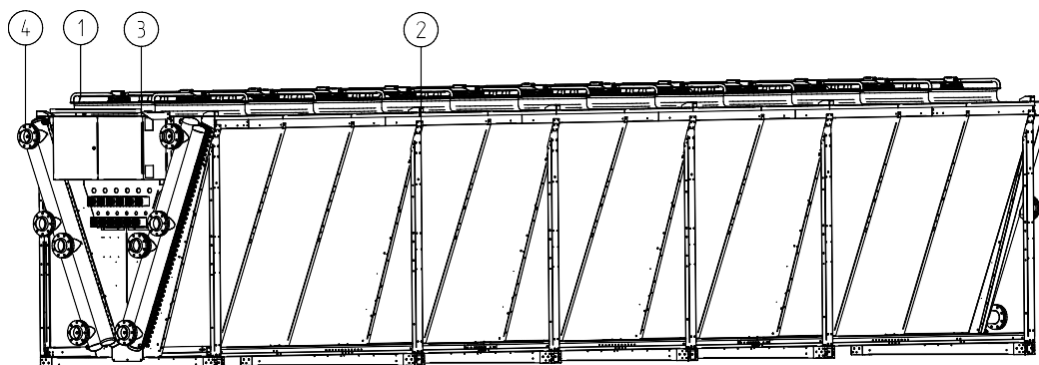
- a coil consisting of copper pipe coils with aluminum fins, inlet and outlet headers and tube connections to the piping,
- a self-supporting casing consisting of galvanized steel sheet
- and fans arranged in pairs.

Dry coolers of the GFD product family are intended for installation in the heat carrier circuit of a cooling plant. The cooling plant is a combination of interconnected refrigerant-carrying components and fittings that form a closed circuit in which the refrigerant circulates.

The heat carrier is the working fluid that is used for the heat exchange and that remains in the liquid phase during heat absorption.

The fluid used is a heat carrier. According to the state of the art, there is no imminent risk of personal injury or damage to property.

Overview



Function

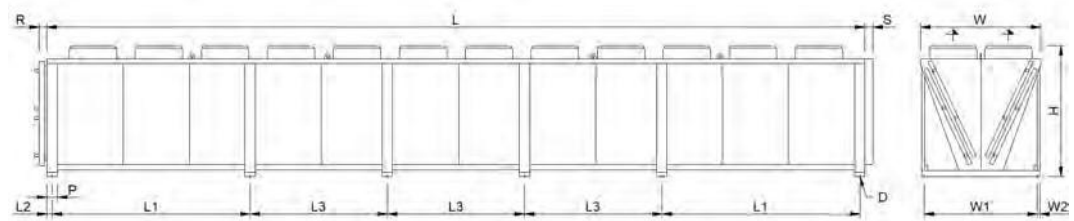
No.	Designation	Function
1	Fan	Dissipation of heat released by the working fluid into the atmosphere
2	Legs for floor mounting	Support the unit
3	Control panel	Electrical connections
4	Unit connections	Connection of the pipes to the plant

3.3 Set-up and function

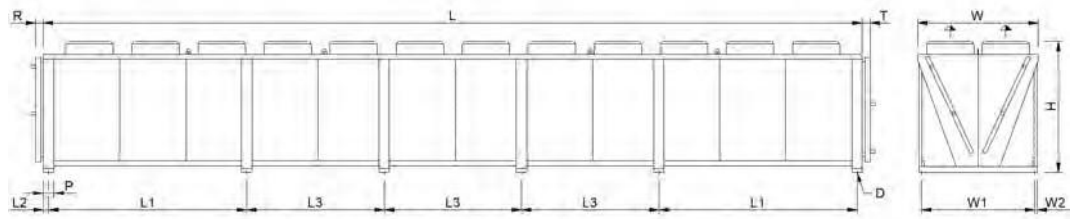
3.3.1 Versions

Overview

The unit is available in 24 fans (2X12). The following figures are schematic representations of possible designs.



Dimensioning (one-sided connections)



Dimensioning (connections on both sides)

Refer to the order documents for the dimensioning of the units for the available sizes D, H, L, L1, L2, L3, P, R, T, W, W1 and W2.

3.3.2 Operating modes

Introduction

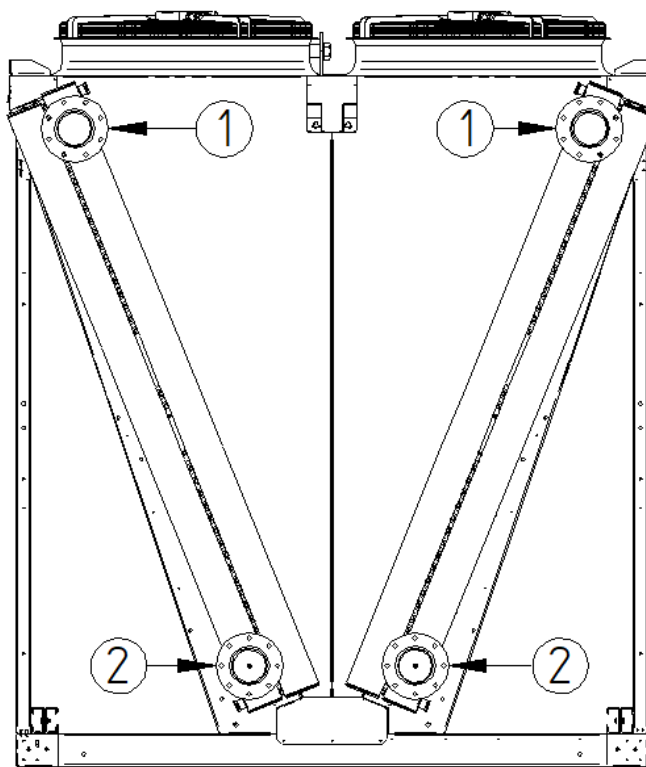
The unit can be operated in two different ways:

- **Dry**
- hydroBLU™ pad pre-cooling system (**Pad**)

Material

Depending on the application, the tube material is made from copper, high-strength copper alloy or stainless steel. The material of the inlet and outlet headers is made from stainless steel or copper. With stainless steel, the connection to the plant must be welded. With copper, the connection to the plant must be soldered.

Dry cooler GFD



No.	Designation
1	Heat carrier inlet
2	Heat carrier outlet

Operating principle

With water and glycol working fluids:

The heat carrier absorbs heat at a low temperature, heats up, and gives off the heat again at a higher temperature. Dry coolers cool the heat carrier by dissipating heat to the air (air side) that is guided over the dry heat transfer surface by fans.

3.4 Fan motor

NOTICE



Operate the unit once a month at full speed for at least three hours so that the bearings move and any penetrated condensate can evaporate.

NOTICE



With fans with an IP55 rating or higher, open the existing closed condensation water holes at least once a month.

EC technology

The fan motors have their own electronic power unit. This power unit can be controlled via the Güntner Motor Management GMM. Depending on the fan/motor type, three-phase supply. For the connected loads, refer to the connection diagrams or the nameplate on the unit or the fan.

NOTICE

The fan motors have their own electronic power unit. This power unit can be controlled via the Güntner Motor Management GMM. The motors can be operated three-phase (3~, 200 – 240 VAC, 50/60 Hz) or three-phase supply (3~, 380 – 480 VAC, 50/60 Hz). Operation without GMM requires fan control with a voltage of 0 – 10 V. For the electrical connection, refer to the connection diagrams or the information provided at the motor terminal box.

3.5 hydroBLU™ pad pre-cooling system (optional)

The units can be extended with the optional hydroBLU™ pad pre-cooling system. The hydroBLU™ pad pre-cooling system operates on the principle of adiabatic evaporative cooling and can be controlled with the Hydro Management function in the GMMnext.

The distribution pipes used are wear parts that must be replaced regularly (see section "hydroBLU™ pad pre-cooling system (optional)").

4 Transport

4.1 Safety instructions for transport

⚠ WARNING		
	RISK OF CRUSHING AND SHEARING! When transporting or maneuvering the crane, bystanders can get under the unit suspended from the crane and be caught by a component/unit falling from a forklift respectively, and be crushed or lose limbs.	
		
		
	• Transportation including loading and unloading only by specialist staff. • Do not stand in the loading/danger zone under or in the vicinity of suspended loads. • Remove snow and other foreign material before lifting the unit. • Ensure that the unit is not filled during transport. • Suspend the unit from the crane or position it on the forklift so that it has a stable center of gravity. • Use appropriate lifting or tie-down points. • Use suitable tools and working equipment. • Do not lift the unit in strong winds. • Observe maximum permissible total weight.	
⚠ WARNING		
	RISK OF INJURY OWING TO STRONG IMPACTS! When transporting or maneuvering the crane/forklift, bystanders can be caught by the unit. This can cause severe impact injuries.	
	• Transportation including loading and unloading only by specialist staff. • Do not stand in the loading/danger zone under or in the vicinity of suspended loads. • Remove snow and other foreign material before lifting the unit. • Ensure that the unit is not filled during transport. • Suspend the unit from the crane or position it on the forklift so that it has a stable center of gravity. • Use appropriate lifting or tie-down points. • Use suitable tools and working equipment. • Do not lift the unit in strong winds. • Observe maximum permissible total weight.	

⚠ WARNING



RISK OF INJURY!

Attempting to transport the unit by hand can cause injury (e.g. to the spine) due to the lifting of an overload.

- Not intended for transport by hand.
- Transport and installation including loading and unloading only by specialist staff.
- Do not stand in the loading/danger zone under or in the vicinity of suspended loads.
- Ensure that the unit is not filled during transport and prior to installation.
- Remove snow and other foreign material before lifting the unit.
- Do not lift the unit in strong winds.

⚠ WARNING



RISK OF INJURY CAUSED BY A LOSS OF STABILITY!

The unit loses its stability due to accelerations during transport and falls over or falls from the goods vehicle. Bystanders can be severely injured.

- Transport including loading and unloading only by specialist staff.
- Do not stand in the loading/danger zone under or in the vicinity of suspended loads.
- Ensure that the unit is not filled during transport.
- Remove snow and other foreign material before lifting the unit.
- Do not lift the unit in strong winds.

NOTICE



The lifting capacity of the means of transport must be at least 1.5 times the weight of the unit.

NOTICE



Observe all basic safety instructions (see section "Basic safety instructions").

4.2 Transport and storage of the unit

4.2.1 Transporting the unit

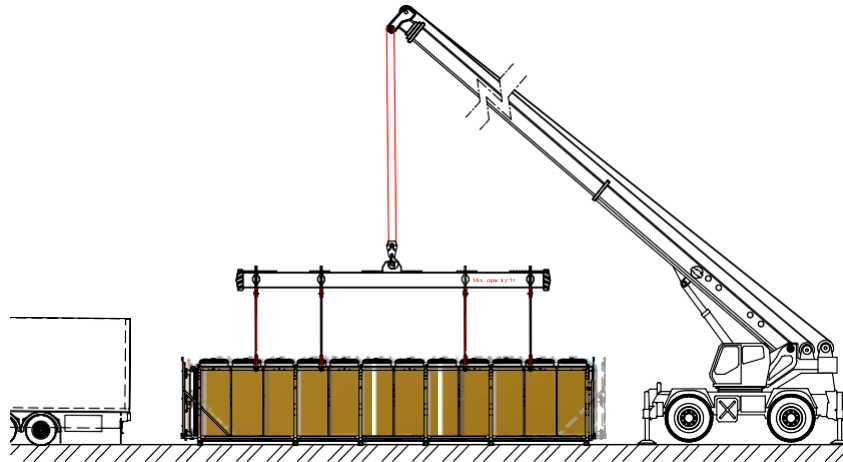
NOTICE	
	Read and observe the transport signs on the unit packaging! Permanent mechanical load caused by uneven road surfaces and potholes, and vibrations during ship transport, can result in transport damage. • Mounted parts that can be induced to vibrate – particularly fans and bases (if applicable) – must be removed prior to maritime transport or in countries with critical traffic routes. • Supports of outlet headers and flanges must be added if required. • After transport, all threaded connections, especially on EC fan terminal boxes, must be checked and retightened if necessary (for tightening torque values, see section "Fans"). • After transport and installation of the unit, check all parts of the unit for damage. Seal any damage properly with varnish to ensure corrosion protection. This applies in particular to crane lugs and cross struts on the unit frame for transport with industrial trucks.

Crane

NOTICE	
	When transporting the unit with a crane, pay attention to the angle between the cables/chains/loops. If too great an angle is allowed between the cables/chains/loops when transporting with a crane, this can lead to excessive mechanical stress on the crane lugs, which can break in extreme cases, causing the unit to fall down.

Observe the following regulations when transporting with a crane.

- ⇒ Use the drill holes for the eyes.
- ⇒ Ensure that the cables/chains/loops do not rub against the legs or other components.
- ⇒ The angle between the cables/chains/loops must not exceed 60°.
- ⇒ The cables/chains/loops should pull upwards in as straight a line as possible when viewed from the front.
- ⇒ Prevent any vibration of the unit.
- ⇒ Use a lifting beam (lifting capacity > 15 tons) when transporting units equipped with 22 or more fans (2 x 12).



4.2.2 Storing the unit prior to installation

- ⇒ Protect the unit against dust, dirt, moisture and wetness, damage and other harmful influences until it is installed.
- ⇒ For storage periods of more than one month: Operate the unit at least once a month at full speed for at least three hours so that the bearings move and any penetrated condensate can evaporate. Check, once a month and prior to installation, if the transport pressure is still present to confirm the leak tightness of the unit. If the pressure is too low or if there is no transport pressure at all, be sure to contact the service department of the manufacturer. Before moving the unit to the installation site, check the load capacity and structural integrity of the crane lugs and replace them if required. Store the unit only in its original packaging until installation.
- ⇒ If the unit installation is delayed beyond the initial deadline scheduled for installation: Protect the unit against weather and other harmful effects as well as dirt with an appropriate tarpaulin. In this context, ensure good ventilation of the unit.

4.3 Transport and storage of humidification pads

The delivery consists of individual packages. If the delivery is not intended for direct mounting, store it in a dry place where they are protected from damage and moisture until mounting.

Depending on the size of the packages, provide a suitable means of transport to the place of installation.

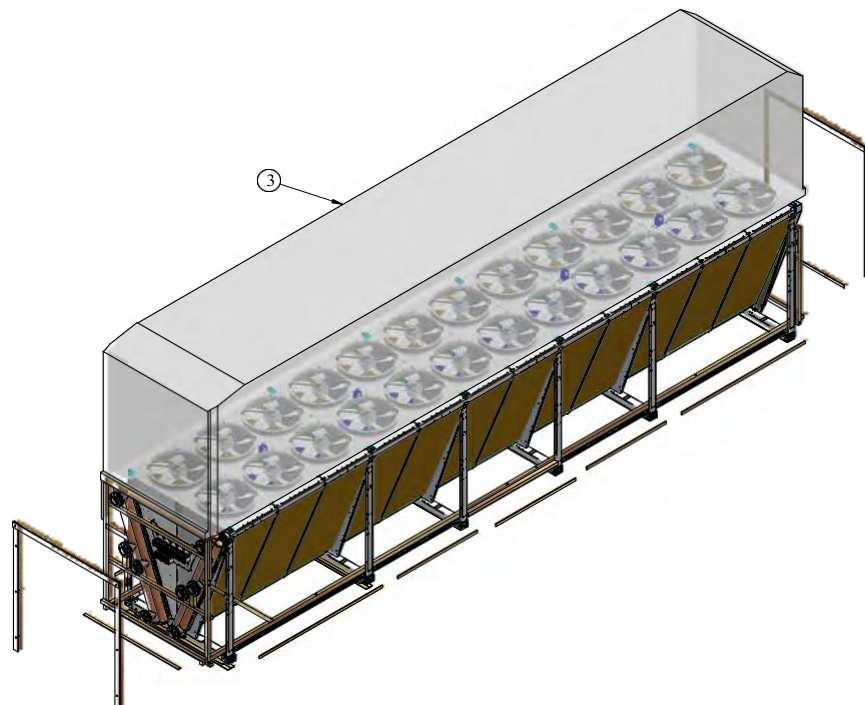
4.4 Unpacking the unit

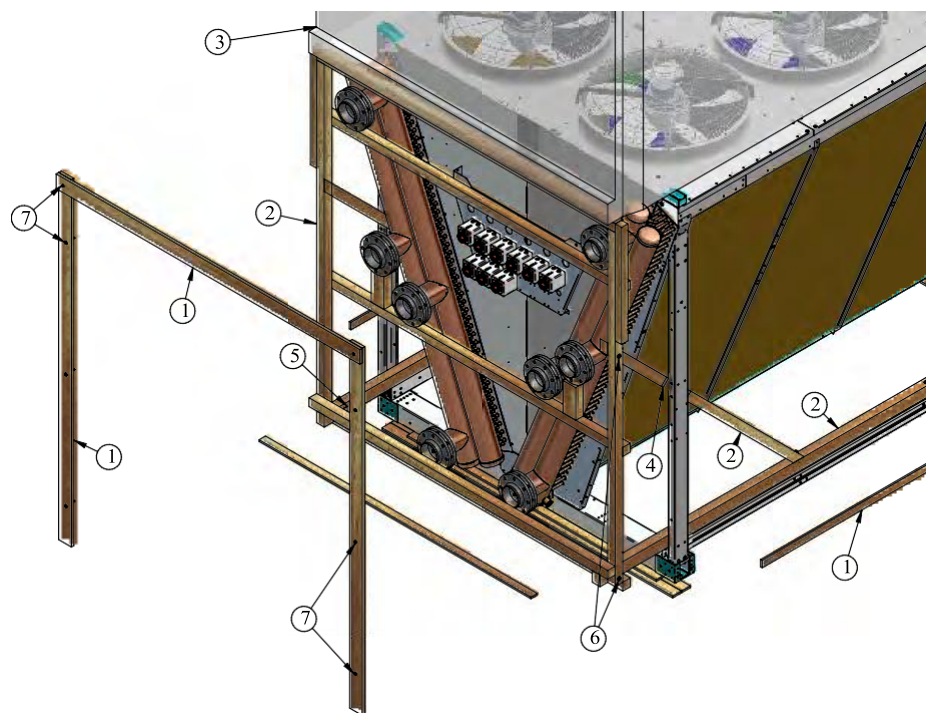
Safety

⚠ CAUTION	
	RISK OF DAMAGE TO PROPERTY! The unit is supplied with transport excess pressure. An unpressurized unit indicates a leak due to transport damage. See "Residual risks caused by the working fluid". • Do not put the unit into operation! • After releasing the transport excess pressure, shorten the tube if necessary.
NOTICE	
	RISK OF CORROSION AND SOILING! Moisture and dirt must be prevented from penetrating the unit. • Protect the unit against dust, dirt, moisture and wetness, damage and other harmful influences. • Begin with the installation as soon as possible.

Unpacking the standard unit

The unit types are delivered in wooden packaging and wrapped in film.



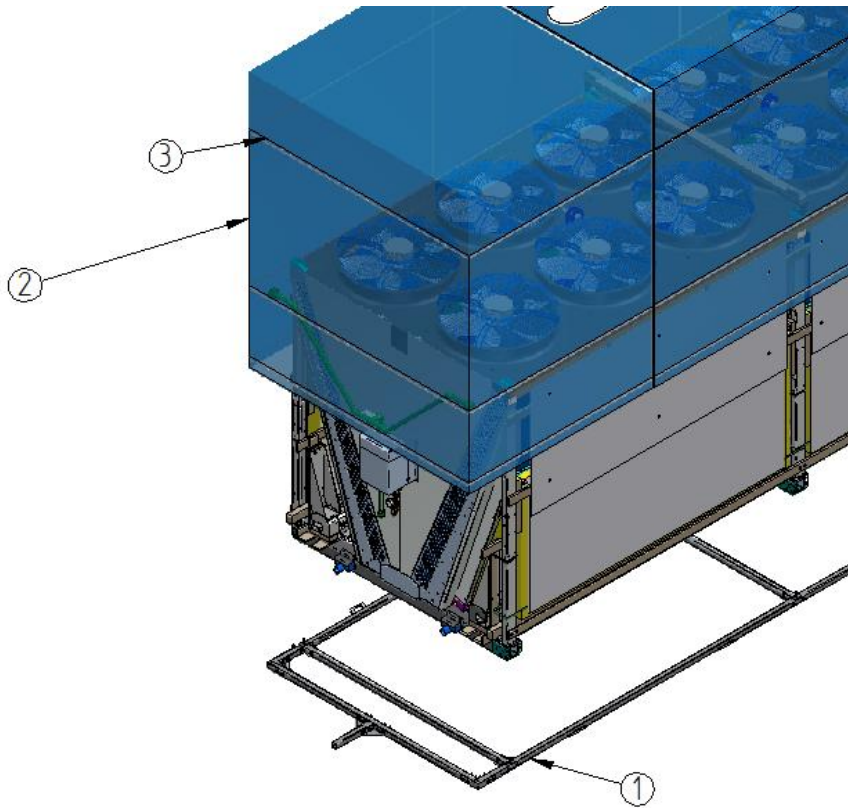


No.	Designation
1	Lining board
2	Squared timber
3	Film
4	Paint protection rubber
5	Transport bracket, wood screw and washer
6	Hexagon bolt, washer and nut
7	Wood screw and washer

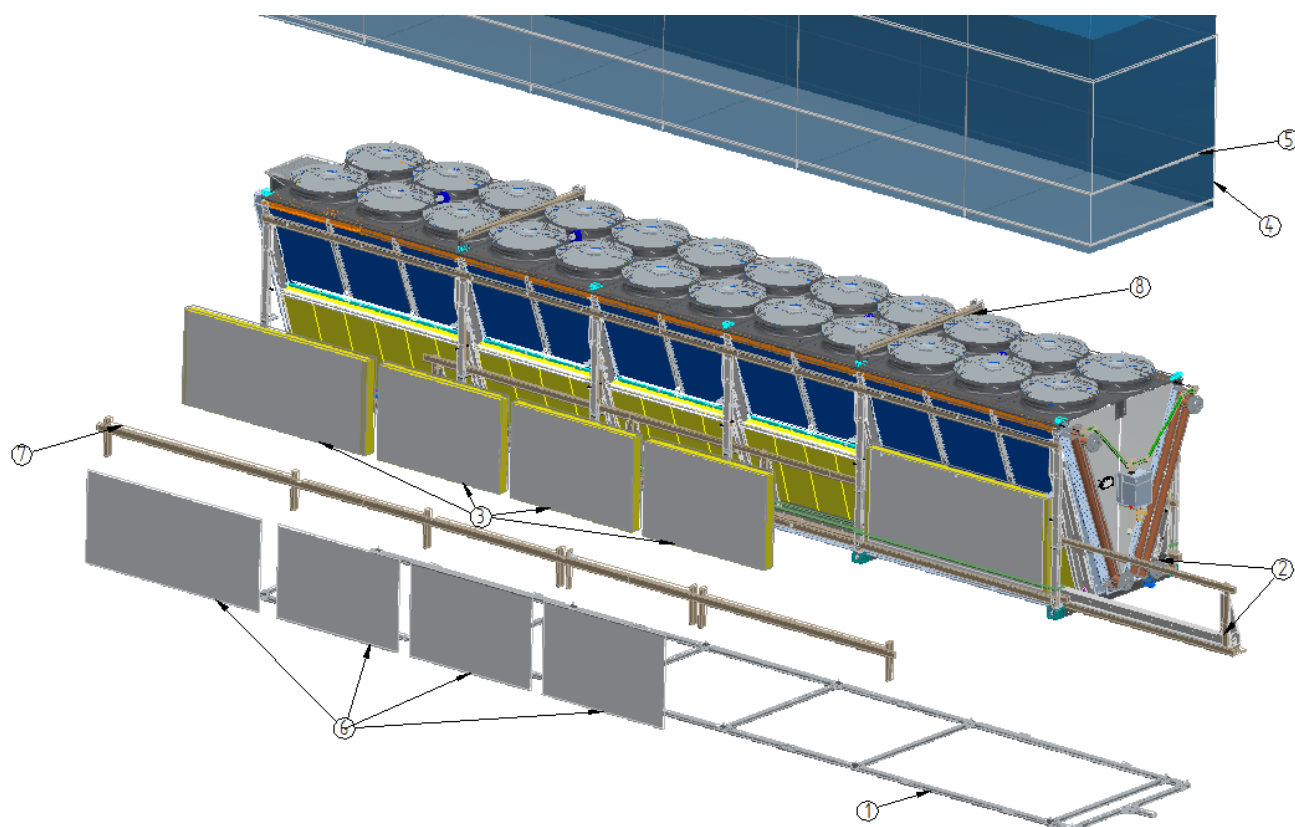
- ⇒ Remove the film (3).
- ⇒ Remove all lining boards (1) that are screwed to squared timbers (2) by means of wood screws (7).
- ⇒ Remove all transport safety bolts marked with special tags (see "Other signs and notes on the unit"). After removing the bolts, the areas where the bolts were inserted must be properly repainted to ensure corrosion protection.
- ⇒ Remove the unit from the wooden packaging.
- ⇒ Check scope of delivery for completeness. Refer to the order-related offer documents for the scope of delivery.
- ⇒ State transport damages and/or missing parts on the delivery notes. Immediately notify the manufacturer in writing about the matter. Damaged fins can be repaired on site using a fin comb.

Unpacking the unit with hydroBLU™

The unit types are delivered in wooden packaging and wrapped in film.



No.	Designation
1	Transport Base
2	Film
3	Strapping cord

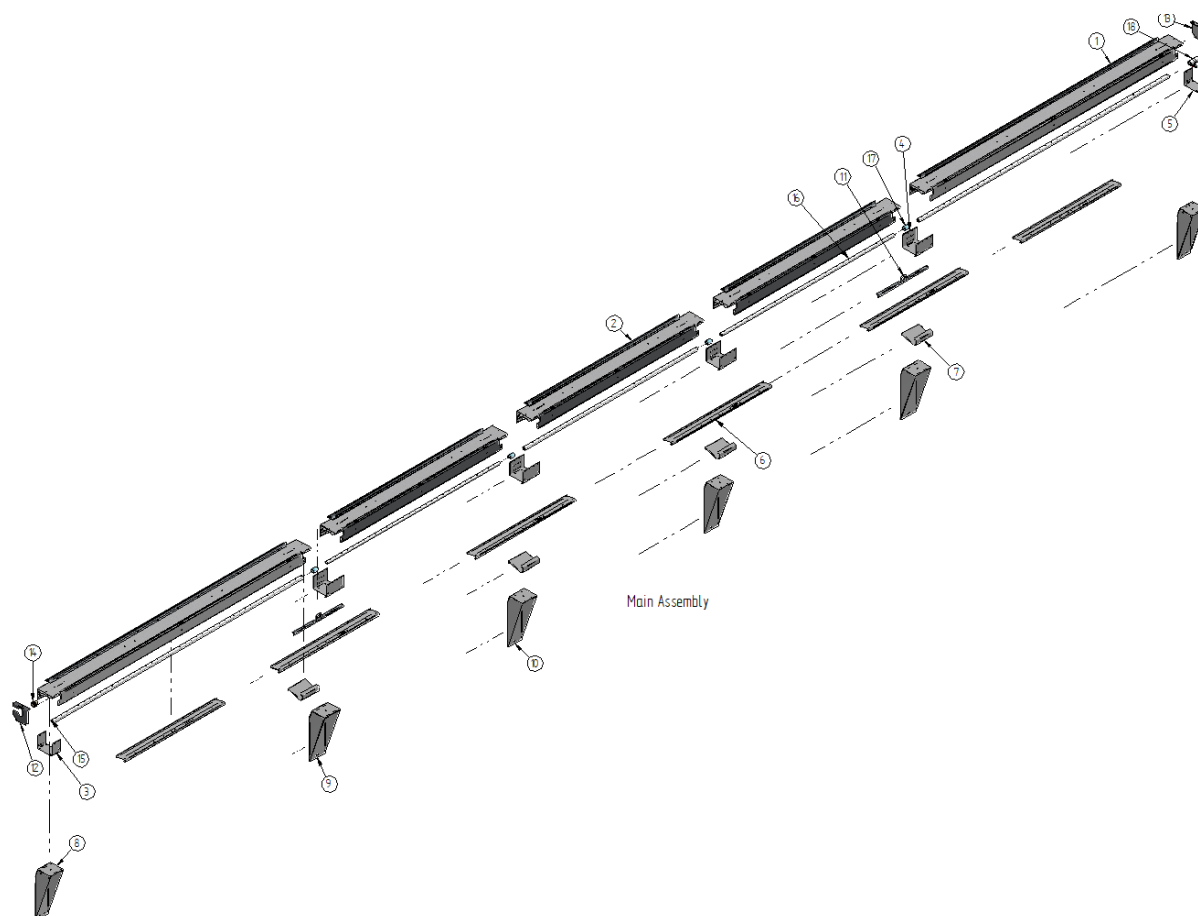


No.	Designation
1	Transport base
2	Hydroblu water distribution
3	Pack of pads
4	Film
5	Strapping cord
6	Plastic protector
7	Support pad frame
8	Support for straps

- ⇒ Remove the film (4) and the strapping cord (5).
- ⇒ Remove the support for straps (8).
- ⇒ Remove all lining boards (7) that are screwed to squared timbers (2) by means of wood screws.
- ⇒ Remove all transport safety bolts marked with special tags (see "Other signs and notes on the unit"). After removing the bolts, the areas where the bolts were inserted must be properly repainted to ensure corrosion protection.
- ⇒ Remove the unit from the wooden packaging.
- ⇒ Remove all the nuts and screws in the transport base (1)
- ⇒ Check scope of delivery for completeness. Refer to the order-related offer documents for the scope of delivery.
- ⇒ State transport damages and/or missing parts on the delivery notes. Immediately notify the manufacturer in writing about the matter. Damaged fins can be repaired on site using a fin comb.

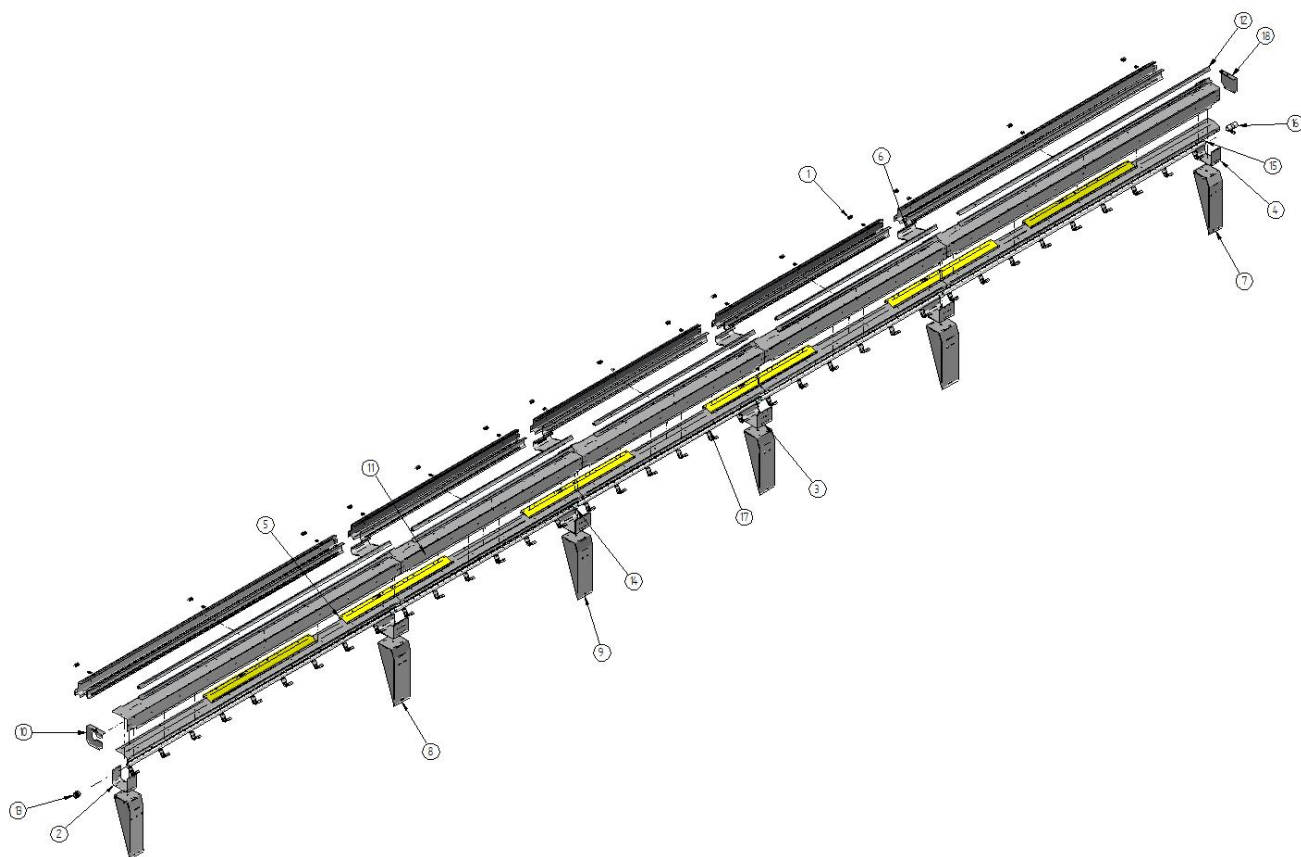
SHIP LOOSE

Hydroblu water distribution Sections



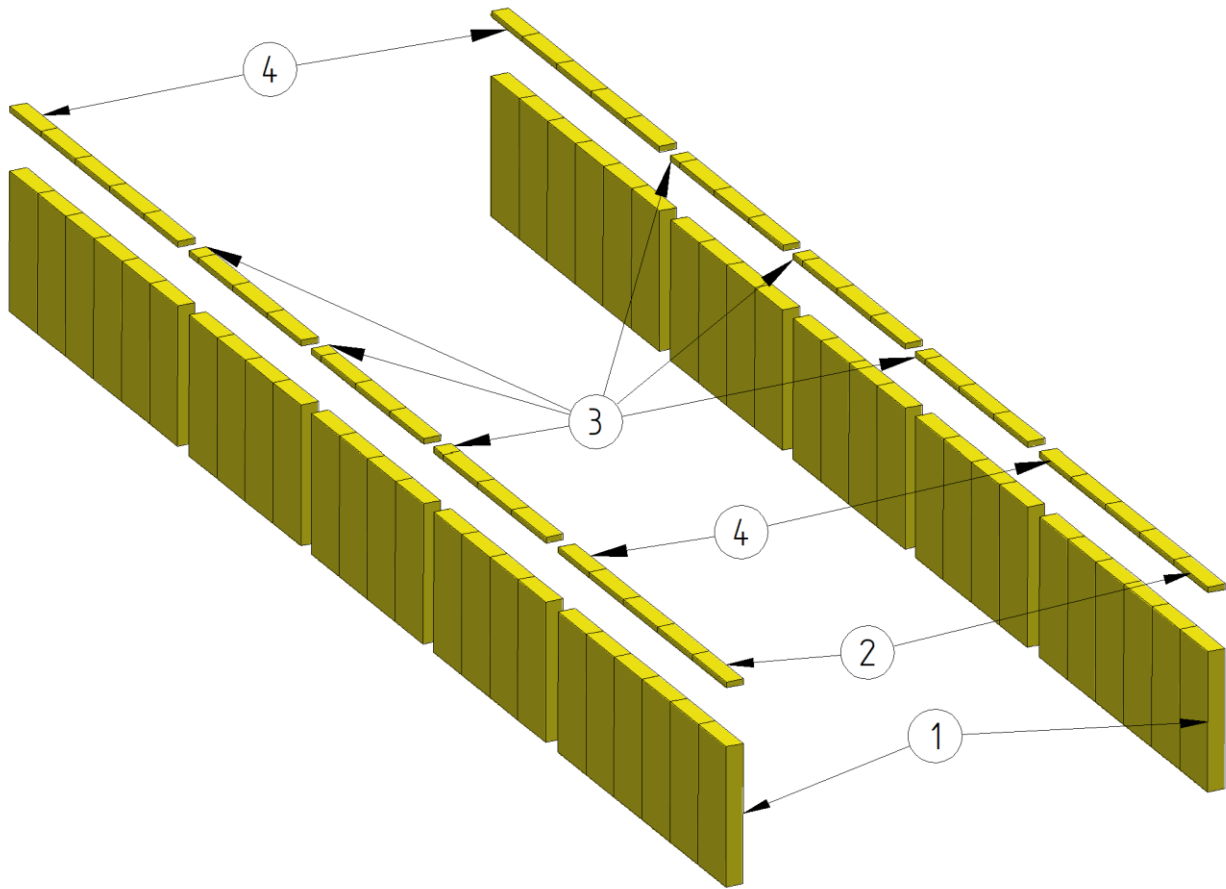
No.	Description	item	Quantity
1	Water task section	AY189.9946G	2
2	Water task section	AY189.9947G	3
3	Support	AP189.9944G	1
4	Support	AP189.9943G	4
5	Support	AP189.9945G	1
6	Stiffening	AP189.9930G	4
7	Connector	AP189.9932G	4
8	Bracket	AP189.9039G	2
9	Bracket	AP189.9041G	2
10	Bracket	AP189.9040G	2
11	Bracket	AY189.9026V	2
12	Blind	AP189.9941G	1
13	Blind	AP189.9044G	1
14	Reducer 1x1-1/4 NPT	70375	1
15	Water Distribution Tube Ø 1"	AY189.9951	2
16	Water Distribution Tube Ø 1"	AY189.9952	3
17	Coupling PVC 1" S40	61710	4
18	Ball valve 1" PVC Sch.40	66952	1

Hydroblu water distribution Sections



No.	Description	Item	Quantity
1	Water task section	AY189.9947G	3
2	Support	AP189.9945G	1
3	Support	AP189.9943G	4
4	Support	AP189.9944G	1
5	Stiffening	AP189.9930G	4
6	Connector	AP189.9932G	4
7	Bracket	AP189.9039G	2
8	Bracket	AP189.9041G	2
9	Bracket	AP189.9040G	2
10	Cover	AP189.9942G	1
11	Bracket	AY189.9026V	2
12	Water task section	AY189.9946G	2
13	Reducer 1x1-1/4 NPT	70375	1
14	Coupling PVC 1" S40	61710	4
15	Water Distribution Tube Ø 1"	AY189.9951	2
16	Ball valve 1" PVC Sch.40	66952	1
17	Water Distribution Tube Ø 1"	AY189.9952	3
18	Blind	AP189.9044G	1

Pack of pads (top section)



No.	Description	Item	Quantity
1	Cooling Panel CELdek 06x19x47"	72148	48
2	Cooling Panel CELdek 1.75x23.63x6"	70318	34
3	Cooling Panel CELdek 1-7/8x6"x23.62"	AY189.9956	6
4	Cooling Panel CELdek 1-7/8X6"X21.25"	AY189.9957	4

4.5 Check transport excess pressure

Introduction

All units are delivered by the manufacturer with approx. 1 bar of transport excess pressure (cleaned and dehumidified air).

NOTICE



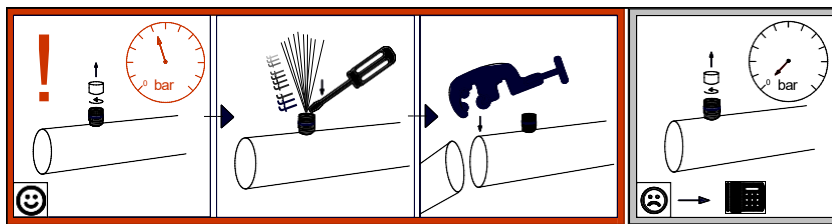
The unit is under pressure! The transport excess pressure is used to check the leak tightness and must be released before the unit is installed!

- For pressure less unit: Immediate notification to the manufacturer and notation on delivery note.

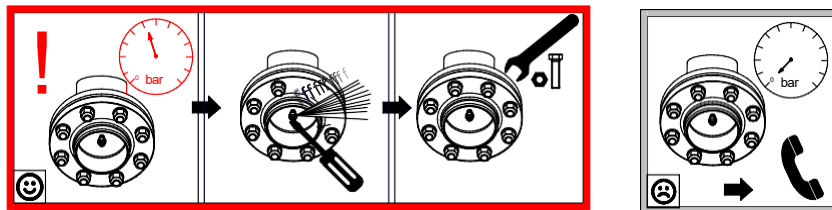
Procedure after receiving the unit

- ⇒ Read the transport pressure on the Schrader valve (pressure measurement).

Procedure immediately before the installation



With all working fluids except for glycol



Regarding the glycol working fluid

- ⇒ Check and release transport pressure (1).
- ⇒ Remove caps (2)

5 Set-up, installation and commissioning

5.1 Safety instructions for installation and commissioning

⚠ WARNING	
	RISK OF DAMAGE TO PROPERTY! In order to avoid stray currents, heat exchanger tubes, casing parts and the like must not be used as return line when performing welding work as these loadbearing components and lifting accessories are not designed for high welding currents. If not observed, unintended or improper current flow can damage heat exchanger pipes of the unit and lead to damage during operation. Securely connect the insulated welding return line to the workpiece to be welded directly at the welding point.
⚠ WARNING	
	RISK OF DAMAGE TO PROPERTY! To prevent damage to the heat exchangers, always connect them without force and torque. There must be no forces or moments acting on the heat exchanger at any time. Failure to observe this can result in leaks and further damage to the heat exchanger in the short and medium term. - Ensure that the outlet headers and flanges are not used as a climbing aid, e.g. during installation. They are not designed for external forces. - Ensure that no forces or moments act on the heat exchanger at any time by using suitable fixed bearings during pipe installation.
NOTICE	
	Observe all basic safety instructions and the safety instructions for transport (see sections "Basic safety instructions" and "Safety instructions for transport").

5.2 Requirements for the place of installation

Dimensions/weights

Refer to the order-related documents for dimensions and weights.

Installation conditions

- ⇒ Install the unit only outdoors, on a stable and level surface.
- ⇒ The floor of the place of installation must have sufficient load-bearing capacity.
- ⇒ The layout plan must be drawn up by the plant operator.
- ⇒ Set up the unit in such a way that it is not damaged by environmental hazard sources (production, transport and other processes at the place of installation), and that its functioning is not disturbed by the interventions of unauthorized persons,
- ⇒ Place the unit in such a way that it can be reached safely and cannot be damaged by internal traffic or transport processes.
- ⇒ Place the unit in such a way that that it can be monitored and checked from all sides at all times.
- ⇒ Ensure that sufficient space is available for maintenance.
- ⇒ Ensure that all working fluid-carrying components, connections and pipes and all electrical connections and lines are easy to access.
- ⇒ Ensure that the labelling of the pipes is easily visible.

NOTICE



Do not move the unit with contact to the floor. Instead, lift the unit completely. Otherwise, the base frame can be deformed.

NOTICE



Risk of corrosion of the vibration dampers and legs for floor mounting
Installation of the unit in standing water or on surfaces on which water can collect (such as glycol protectors) can result in rust on vibration dampers and legs for floor mounting.
Rusting vibration dampers or legs for floor mounting result in instability of the unit.

GFD V-shape Maxx Lay Out

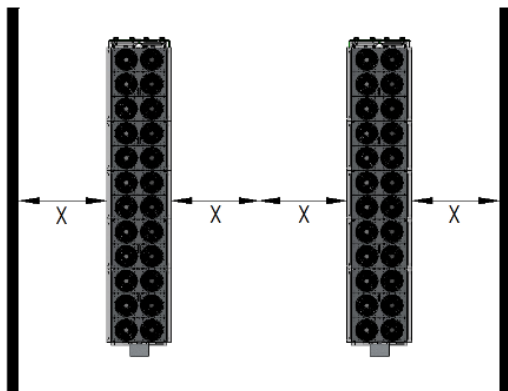
The below chart and diagrams illustrate the distance requirements for different positioning cases of GFD units. The 4 cases below represent the different possibilities for long(x) and short(y) side obstructions, and their purpose is to provide the free space envelope required for each unit. Given that there are effectively infinite numbers of possibilities for layout configurations, the diagrams shown for each case present examples of the required envelopes, but they can apply to many more not shown

In cases where the obstruction is not another air moving device, the distance required from the short side is "y" and the distance required from the long side is "x". However, if the obstruction is another GFD or some other type of air-moving equipment, then the distance required for the envelope of each piece of equipment needs to be allowed for.

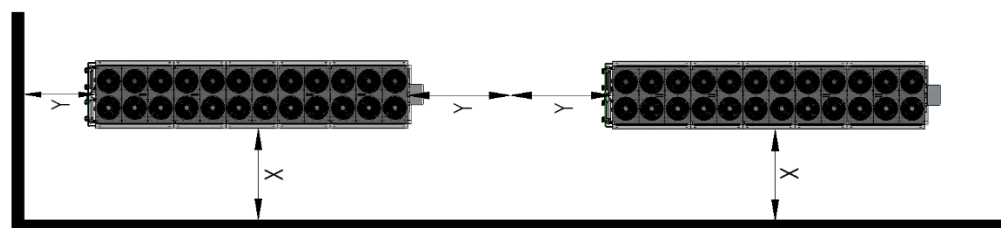
This method can be applied to GFD units and different layout possibilities, since it ensures the free area envelope is maintained on a per unit basis. However, should there be any doubts, please contact your Güntner representative for further assistance.

Positioning cases

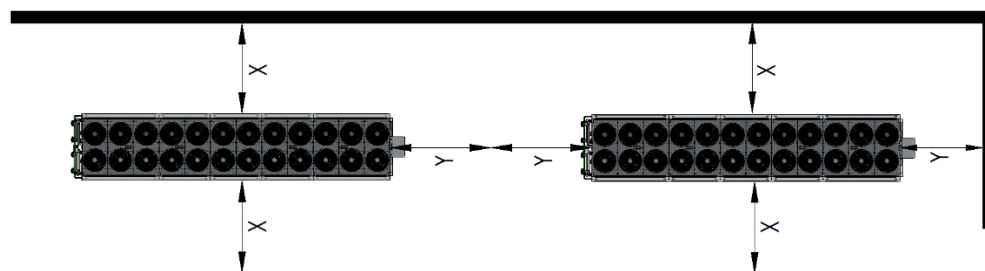
Model	Case 1	Case 2		Case 3		Case 4	
	X (ft)	X (ft)	Y (ft)	X (ft)	Y (ft)	X (ft)	Y (ft)
GFD 2X12 V-SHAPE MAXX	10	8	8	10	8	10	8



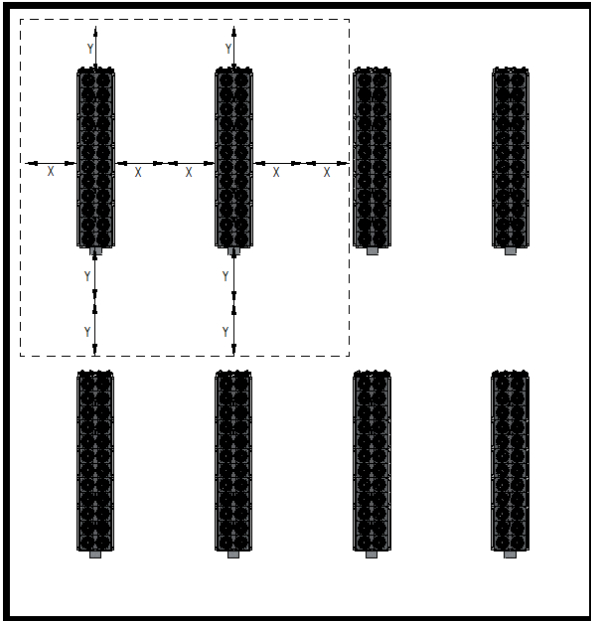
Case 1



Case 2



Case 3

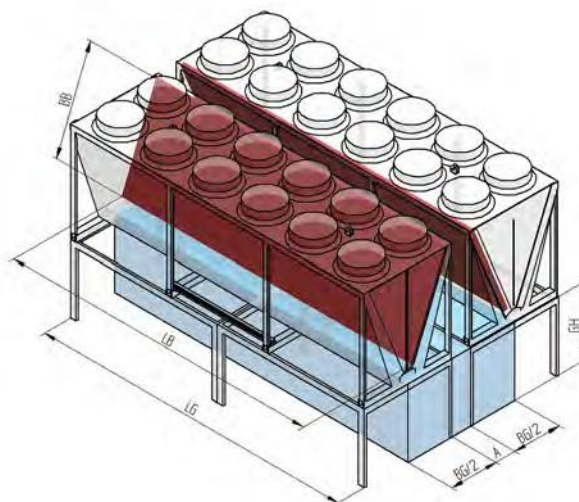


Case 4

Requirements for unobstructed air flow to the unit

To cover high capacities, several units can be lined up in a space-saving manner. For sufficient air supply on the suction side, a base frame is usually required. Maintain a minimum distance between adjacent units.

The following notes cover 6 different installation situations (variants) for up to 10 units side by side. They differ in the respective type of incoming air inflow. If the installation differs, please consult the manufacturer Güntner U.S. LLC.



Caption for abbreviations in drawings

A	Distance	G	Frame
AB	Cover sheet	GH	Frame height
UH	Unit height	UL	Unit length
BG	Frame width	LG	Frame length

As a rule of thumb, ensure a flow ratio of $AV \geq 70\%$ when maintaining the minimum distance and assuming unobstructed incoming air flow from all relevant sides. The following applies:

Flow ratio $AV =$
 $= \text{free face area (total supply air)} / \text{suction area (all heat exchangers)}$

Face area =
 $= (LG \times GH \times 2) + ((2 \times BG/2 \times GH \times 2) + (A \times (GH + UH) \times 2)) \times (\text{number of units } 1)$

Suction area = $UH \times UL \times 0.83 \times 2 \times (\text{number of units } 1)$

Refer to the order documents for the length and height of the unit.

NOTICE



Consider additional obstacles at the place of installation that may impede the air flow!
 Examples of additional obstacles: Walls, beams, pipes, etc.

NOTICE



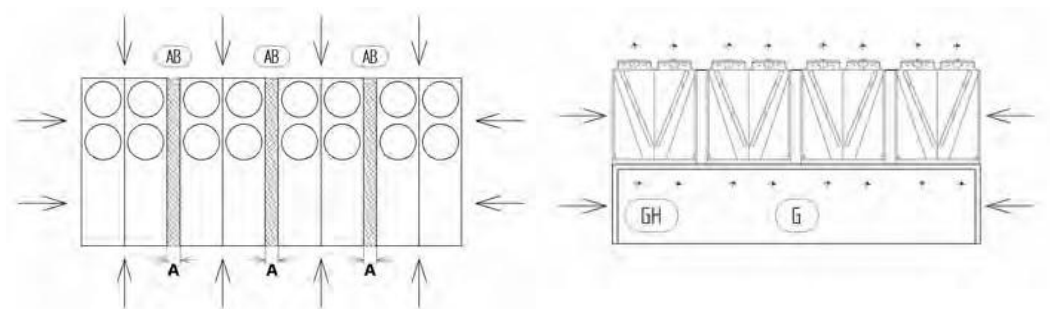
When installing several units side by side, it is recommended to cover the top between the units with a cover sheet.

Refer to the following table for the minimum distance $A_{\min}$ between the units for the different set-up variants.

Variant	Unit type G_DV/2C... (24 fans)
A	0.65 m
B	0.85 m
C	0.65 m
D	0.65 m
E	0.85 m
F	1.14 m

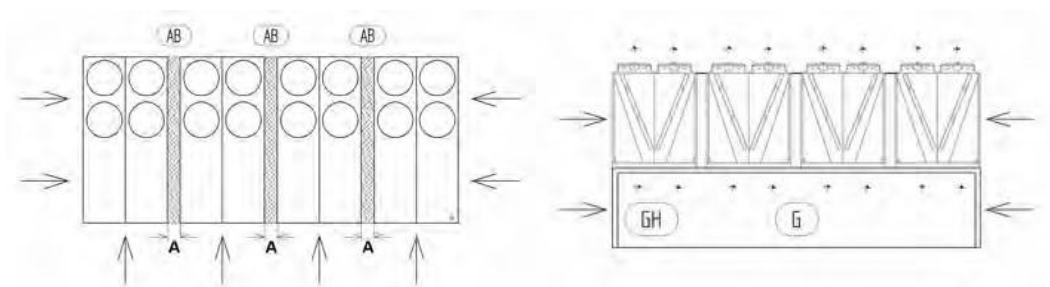
Overview of the set-up variants

Set-up variant A: Air intake via base frame and unit



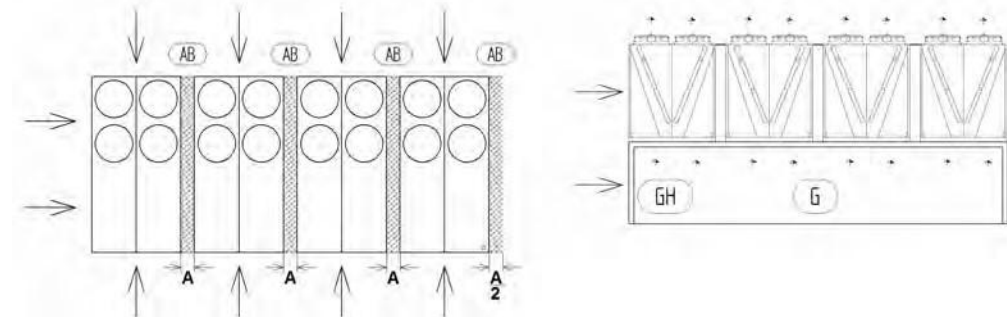
Air intake: 2 x short side and 2 x long side, over the entire height

Set-up variant B:



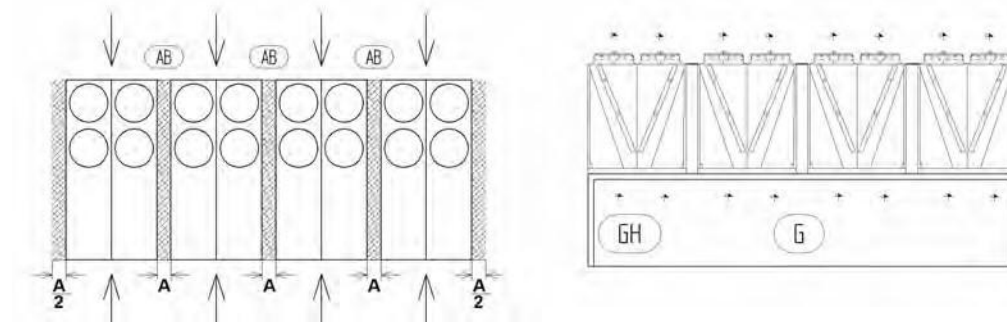
Air intake: 1 x short side and 2 x long side, over the entire height

Set-up variant C:



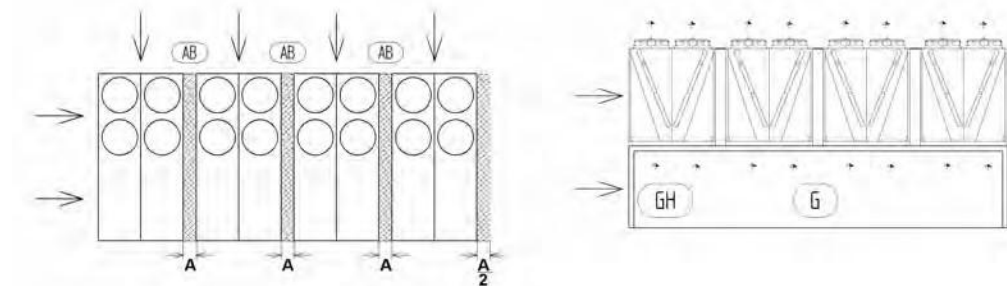
Air intake: 2 x short side and 1 x long side, over the entire height

Set-up variant D:



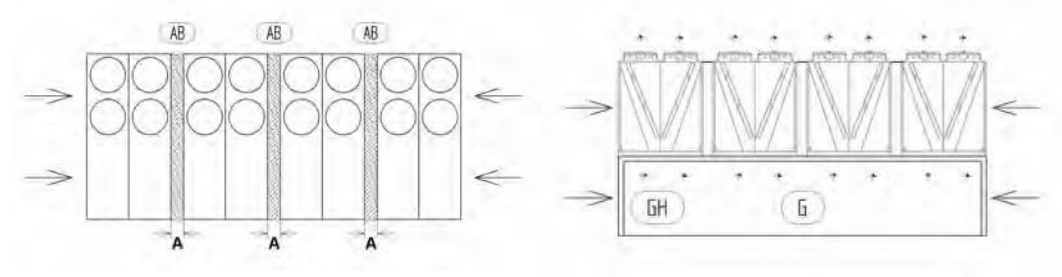
Air intake: 2 x short side, over the entire height

Set-up variant E:



Air intake: 1 x short side and 1 x long side, over the entire height

Set-up variant F:

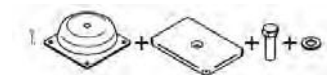


Air intake: 2 x long side, over the entire height

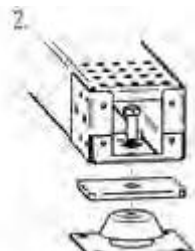
5.3 Installation of the unit

5.3.1 Mounting the vibration dampers (optional)

The optional vibration dampers are supplied loose with the unit.



M8 → 25Nm
M12 → 80Nm
M16 → 206Nm
M20 → 415Nm



⇒ On delivery, check that the scope of delivery is complete.

⇒ Observe the torque specifications.

⇒ Assemble the individual parts in the order shown.

⇒ After mounting the vibration dampers, properly repaint all fixing elements to ensure corrosion protection.

Mounted vibration damper

5.3.2 Mounting the unit

Safety

NOTICE	
	Observe all safety instructions regarding the working fluid used (see sections "Basic safety instructions" and "Safety instructions in all of the unit's life phases").
NOTICE	
	As a lightning protection measure, conductor antennas next to the units are strongly recommended.
NOTICE	
	Observe the earthing marking on the unit. Ensure professional equipotential bonding to protect any warranty claims. After ensuring that the unit is earthed on site, properly repaint and seal all components of the earthing point to ensure corrosion protection.
NOTICE	
	When carrying out metal-cutting activities on or near the unit, such as drilling holes in the unit, grinding with an angle grinder and cutting, protect the unit from flying sparks and falling chips. Covering during and careful cleaning after processing is necessary. Remove all falling chips and repaint the unit in the reworked areas to ensure corrosion protection.

Required staff

- The installation must be performed by at least two persons.

Auxiliary equipment/tools

- Lifting accessories and lifting gear
- Cables
- Climbing aids
- Fixing devices (fixing bolts, washers and raw plugs)
- Hole pattern (see section "Versions")

Provisions for fixing

- Prevent mechanical stresses in the unit as follows:
 - Ensure that all fixing points have the same distance to the fixing level.
 - Ensure that all fixing points maintain the same distance to the fixing level, under load and permanently.
- At the place of installation, bolt the units into place at the fixing points using fixing bolts with washers. The fixing points must support the weight of the respective unit. The operator or installer of the equipment is responsible for ensuring that the bolted connections are of an adequate strength.
- Observe the following instructions when fixing the units:
 - The diameters of the mounting holes have been statically determined by the manufacturer; the fixing screws and washers must correspond to this. When calculating the bearing strength, it is imperative to take into account the total weight of the unit (= structural weight of the unit + weight of tube volume + additional weight such as moisture, ice, snow, dirt or similar).
 - The fixing screws must be secured against loosening by means of an appropriate screw locking device.
 - The fixing screws must not be overtightened.
 - All fixing screws must be tightened equally.
- Prevent the unit from shifting in its position. Fix the unit in its position.
- Use the intended fixing points to fix the unit.

5.4 Mounting the hydroBLU™

5.4.1 General safety instructions for hydroBLU™

⚠ WARNING	
 	RISK OF FIRE AND BURNS! The humidification pads for the pre-cooling system are flammable if in contact with sparks, fire and high heat respectively, especially if they are dry. Burning pads can cause severe injuries and even death, and result in serious damage to property. • Remove the pads from the unit prior to grinding, welding and hot work. • Store the pads in a safe area for the duration of the work.
⚠ CAUTION	
	RISK OF DAMAGE TO PROPERTY! Deposits can result in reduced performance and, in the long term, to leaks. • Ensure that the heat exchanger is leak-tight, clean and without damage and deposits before mounting the system.

⚠ CAUTION	
	RISK OF DAMAGE TO PROPERTY! Too high or too low pressure in the water supply line can result in reduced performance or damage to the pad system. • Keep the water pressure in the water supply line within the permissible range. The pressure must be at least 2 bar and must not exceed 5 bar. If necessary, install a pressure controller or limiter for this purpose on site. • Pressure fluctuations can damage the distribution pipes and must therefore be avoided.
⚠ CAUTION	
	RISK OF BIOFILM FORMATION DUE TO STANDING WATER! If the drains of the trays remain closed, standing water can occur, resulting in biofilm formation. This can cause adverse health effects. • Ensure that the drains are not closed. • Connect the drains to the drain line.
NOTICE	
	The dirt trap for the water supply line to the hydroBLU™ system, which protects the components against dirt and damage, must be cleaned regularly. Otherwise, the holes of the distribution pipes can become clogged, resulting in reduced water distribution and reduced performance. Also the pads can become dirty more quickly, which may require earlier replacement.
NOTICE	
	Observe all basic safety instructions (see section "Basic safety instructions")
NOTICE	
	When operating units with adiabatic pre-cooling systems such as hydroBLU™, observe the specifications for any applicable national regulations on the operation and maintenance.

NOTICE


The owner or operator must ensure that the persons responsible for the installation and maintenance of the system are adequately trained and competent to perform these tasks.

NOTICE


The owner or operator must ensure that there is a separate supply line including shut-off and drain valve per unit.

NOTICE


Exclusion of warranty in case non-permissible water quality is used! Pay attention to water quality to ensure optimal performance of the humidification pad system and maximum service life of the humidification pads.

Water quality requirements

Parameters	Unit	Abbr.	Value
Material in contact with water			Stainless steel, aluminium, cellulose
Appearance		-	Clear, without sediment
Colour		-	colourless
Smell		-	none
pH value (at 20 °C)		-	6.5 ... 8.5
Temperature	°C	T	< 20
Electrical conductivity (at 20 °C)	µS/cm	EC	< 1000
Total water hardness	°d	GH	< 21
Chloride	g/m ³	Cl ⁻	< 200
Sulphate	g/m ³	SO ₄ ²⁻	< 300
Gen. colony-forming units	CFU/ml	CFU gen.	< 10000
Pseudomonas aeruginosa	CFU/100 ml	Pseud. aer.	< 100
Legionella spp.	CFU/100 ml	Legionl.	< 100

5.4.2 Mounting Preparation

Required staff:

- Competent personnel, at least two persons

Required tools, materials:

- Socket wrench set
- Cordless screwdriver
- Knife
- Screwdriver
- Sealing compound
- Scale trap/filter to be provided on site

Procedure

- ▶ Unpack all parts and check that the delivery is complete and not damaged. Report all defects to the manufacturer immediately.
- ▶ Put the humidification pads aside for later mounting.
- ▶ Ensure that the humidification pads are dry for installation.

5.4.2.1 Removal of humidification pads

- ▶ Slide the retaining plate for the humidification pads upwards.
- ▶ Pull the upper part of the pad towards you.
- ▶ Pull the lower part of the pad out of the bottom rail.

5.4.2.2 Mounting the water distribution system (retrofit kit)

- ▶ Attach the brackets to the legs.
- ▶ Insert the lower trays and screw them to the brackets.
- ▶ Attach the side plates and, if necessary, intermediate sheets to the unit.

NOTICE



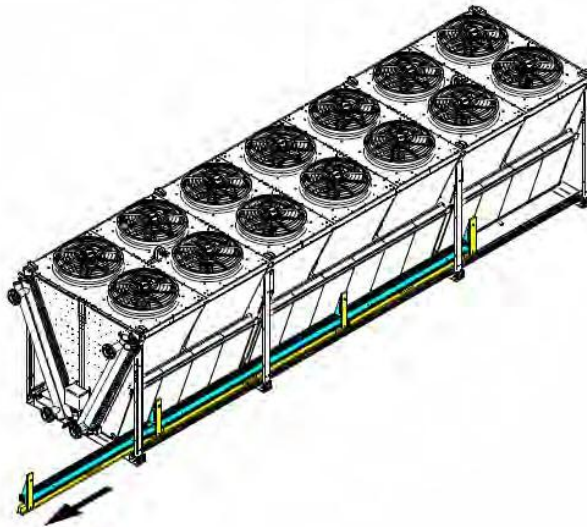
Infiltrated air (air that does not flow through the hydroBLU™ pads to the coil) impairs the performance of the adiabatic pre-cooling system. The lower trays and the side plates prevent infiltrated air from being taken in. If the humidification pads are not to be mounted directly on the unit, an on-site solution is also possible instead of the supplied barrier sheets. In any case, the owner or operator of the plant is responsible for closing the gaps between the humidification system and the unit to such an extent that false air is prevented but water (e.g. rainwater or water produced during cleaning) can still drain. In addition, ensure that all parts of the hydroBLU™ system are suitably tightly and permanently fixed if the system is not installed directly on the unit.

NOTICE

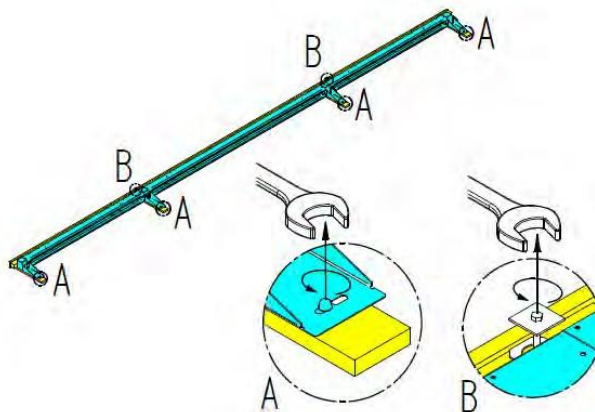


If components such as a temperature sensor for measuring the ambient temperature is located between the humidification pads and the unit, move those components to another position to ensure smooth operation and the intended control. Using the example of the above-mentioned ambient air temperature sensor that is connected to a Güntner GMM controller, leaving the sensor in this position would result in a change in the control of the fans. The ambient air temperature would no longer be measured. Move the temperature sensor so that it is in the shade.

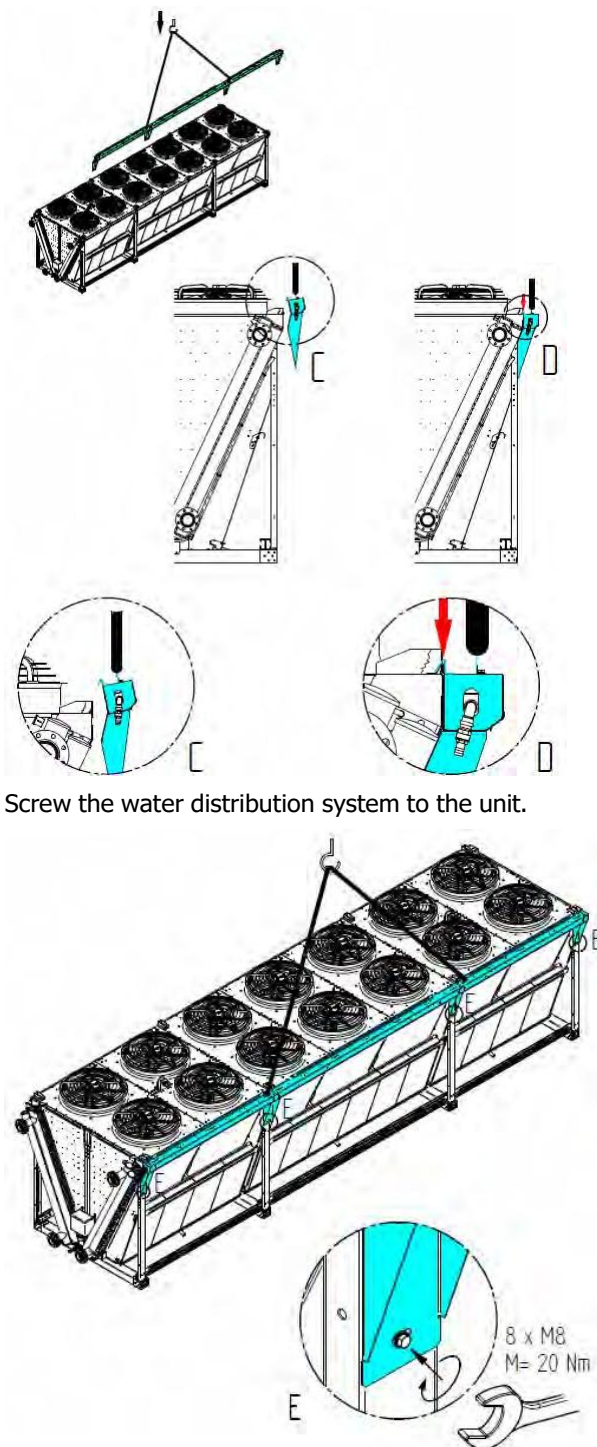
- If necessary: Move the components stated in the note above as described.
- Pull out the water supply profile for mounting (explained in the figure using an example unit)



- Loosen the fixing bolts of the water supply profile and separate it from the sheet.



- Mount the water distribution system in the upper part of the unit.



- Screw the water distribution system to the unit.

- Mount the collecting trays in the lower part of the unit.
- Mount the horizontally attached intermediate sheets for fixing the humidification pads that will later be arranged in two rows one above the other.
- Repeat these installation steps on the other side of the unit.
- Ensure that all parts are firmly screwed together and to the unit.
- Where necessary, seal the parts of the collecting trays that are screwed together to prevent leakage.

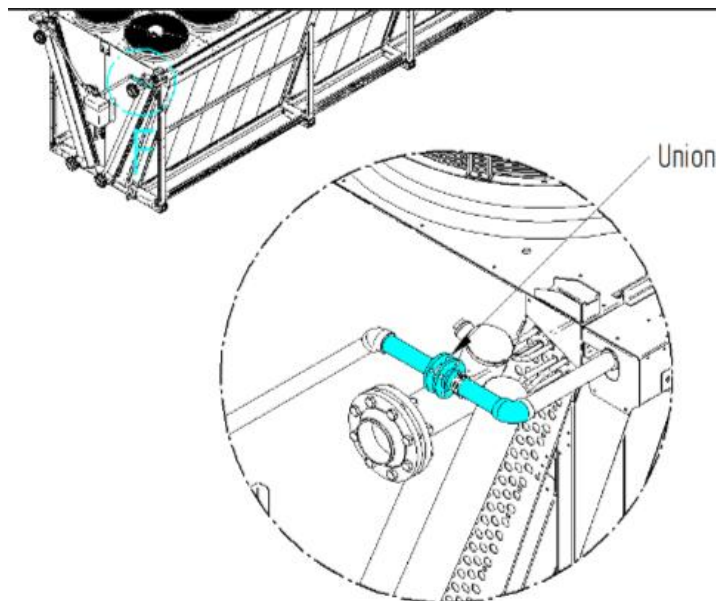
5.4.2.3 Mounting the distribution pipe (retrofit kit)

⚠ CAUTION	
	RISK OF DAMAGE TO PROPERTY! If the distribution pipes are handled carelessly. Ensure that the distribution pipes are handled with care.

Attach the supplied distribution pipes in the grooves provided at the top end of the hydraulic module or in the water distribution system.

▶ NOTICE	
	For even humidification of the pads, the distribution tubes must be placed according to the installation instructions, taking care that all holes are unobstructed and completely open.

- ▶ Position the orifices in the distribution pipe properly facing the top to the pipe.
Avoid to place the pipe orifices to the bottom, at this position the orifices can be clogged.
- ▶ Align and screw the flange at the inlet of the distribution pipe with the hydroBLU system



EINZELHEIT F/ Detail F

5.4.2.4 Mounting the humidification pads

Preparation

- Ensure that the humidification pads are dry for installation.

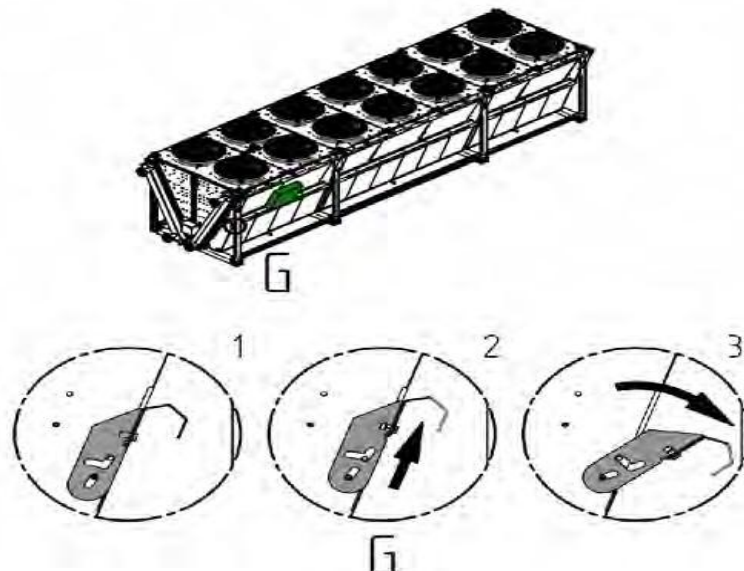
Important note

NOTICE	
	Depending on the unit type and the design of the heat exchanger and the humidification pad system respectively, observe the following installation sequence when installing the pads: Start with the pad near the water connection and continue in sequence to the last pad of the section. Mount the pads section by section.

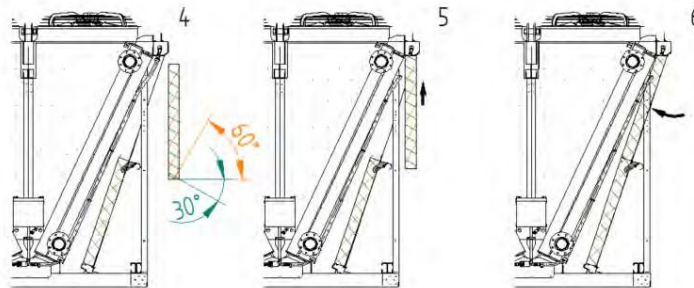
Procedure

Two rows of humidification pads are inserted, one above the other.

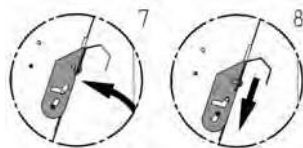
- Screw the height adjustment of the water distribution system into the upper position to create appropriate space for inserting the humidification pads.
- Place the humidification pad fixings on the intermediate rail between the lower and upper pad row in the appropriate position so that the pads can be inserted.
- Ensure that the humidification pad is properly inserted in the lower rail or the collecting tray so that it does not shift.
- Insert the upper part of the pad into the intermediate rail.
- Repeat the procedure for the top section.



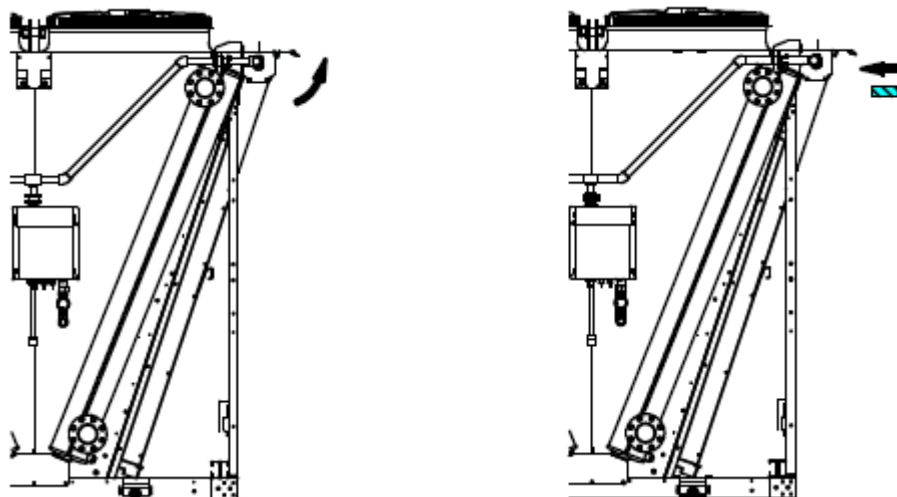
- ▶ Now, insert the remaining humidification pads in the top row.
- ▶ To do this, insert the upper part of the pad vertically from below into the water distribution in the upper part of the unit.
- ▶ Fold the lower part of the pad towards the heat exchanger into the intermediate rails.



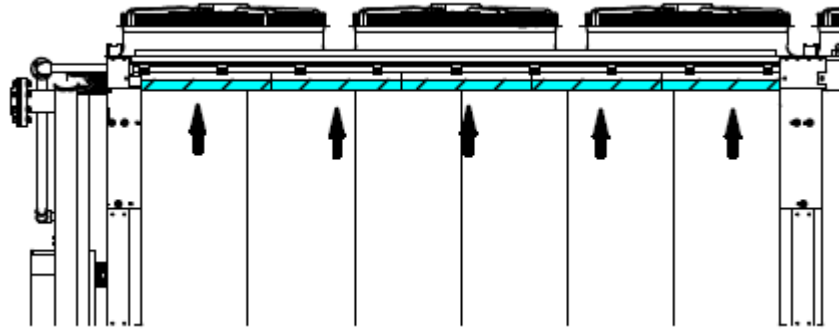
- ▶ Ensure that the humidification pad is properly inserted in the intermediate rail so that it does not shift.
- ▶ Repeat the procedure for this section.
- ▶ Place the humidification pad fixings on the intermediate rail between the lower and upper pad row in the appropriate position so that the pads are held in position.



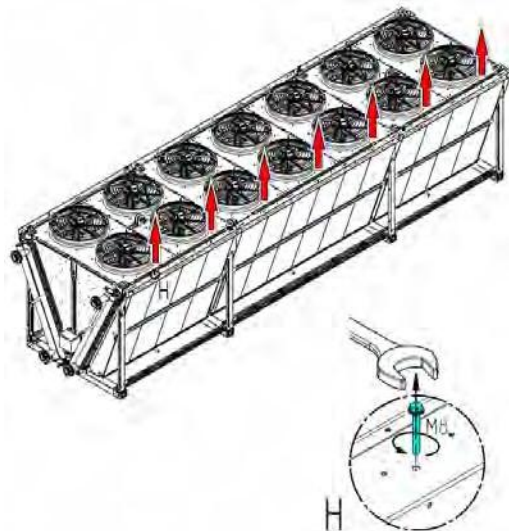
- ▶ Repeat the procedure for all sections on this side of the unit until all pads are inserted in the upper row.
- ▶ Lift the lead of the distribution system and insert horizontally the humidification pad at the top of the upper section. Make sure this horizontally placed pad is in contact with the vertical one.



▶



- Screw the height adjustment of the water distribution system into the lower position so that the distribution pipe rest directly on the pads.



- Repeat these installation steps on the other side of the unit.

5.4.2.5 Connecting the hydraulic module and the humidification pad system

Procedure

- ▶ Screw the hydraulic module tightly (to the unit, the wall nearby, the substructure or to the floor nearby). Choose a place of installation that provides easy access to the module during the operating time of the unit. During installation, pay attention to maintain a slope of at least 3 % from the pad system to the hydraulic module to ensure trouble-free draining of the system. The distribution pipes must not sag, the water must be able to flow out of pipe system without any trouble.
- ▶ Lay the supply lines of the water delivery system from the connections on the pads to the hydraulic module. The connections for inlet and outlet are marked with adhesive labels. Ensure that the distribution pipes are layed in such a way that they are not damaged by external influences during the operating time of the plant. For example, the pipes must be prevented from touching hot surfaces or pipes and the like. Also avoid spots where the pipe can be damaged by chafing or place an appropriate protection or cover in between. Also pay attention to the following in case the electrical module will also be attached to the unit: The distribution pipe system must not be routed at the location of the electrical module so that the mounting location is kept free and the switch cabinet is easily accessible.
- ▶ Connect the water supply line to the hydraulic module. Take into account the draining of the water supply line to prevent frost damage.
- ▶ Connect the drain line of the automatic drain to the hydroBLU™ system.
- ▶ Connect the drain line of the collecting trays below the pads.

NOTICE



The temperature sensor included in the kit is mounted on a module, including insulation and sun protection.

5.4.2.6 Connecting the electrical module

Safety

 DANGER		
	Risk of personal injury due to electrical voltage! Direct and indirect contact with live supply lines can cause serious injuries and even death. • Have the work carried out only by a qualified electrician. • The work must be carried out in accordance with the locally applicable regulations, e.g. DIN VDE 0105/EN 50110.	

Procedure

- ▶ Screw the electrical module tightly (to the unit, the wall, the substructure or to the floor).
- ▶ Wire the electrical module between the switch cabinet and the main supply line in acc. with the connection diagram.
- ▶ Install the fuse protection in acc. with the wiring diagram.
- ▶ Connect the Güntner controller or the externally available fan control to the switch cabinet in acc. with the connection diagram (-> see connection scenarios in the connection diagram).
- ▶ Connect the hydraulic module to the switch cabinet.
- ▶ If desired, connect further external signals to the control cabinet or the Güntner controller (e.g. enabling, drain, monitoring signals).

5.5 Connecting the unit

5.5.1 Important notes on connecting the unit

- ⇒ Regarding welding work: Observe the safety instructions on connecting the welding return line (see "Safety instructions for installation and commissioning").
- ⇒ Perform soldering and welding work only on depressurized units.
- ⇒ Ensure that mechanical stresses and vibrations from the system are not transferred to the unit.
- ⇒ Ensure that relief devices against liquid expansion are available.
- ⇒ It is imperative that working fluid connections are installed without tension and protected against linear thermal expansion and vibrations using Lyra bends or pipe compensators.
- ⇒ Support the on-site piping with at least two fixed points before connecting to the unit.
- ⇒ With the water/glycol working fluid: Use an additional spanner for counter-holding when connecting and disconnecting the threaded connections of pressure-conveying pipes and components to prevent leakage.

5.5.2 Connecting the unit to the system

Safety

NOTICE	
	Observe all safety instructions on the installation and commissioning (see section "Safety instructions for installation and commissioning").
⚠ WARNING	
	RISK OF PERSONAL INJURY AND DAMAGE TO PROPERTY! Improper connection to the plant results in the following risks: Leaks result in the escape of working fluid ("Residual risks caused by the working fluid"). Soldering and welding work on pressurized parts can result in fires and explosions. • Ensure that mechanical stresses and vibrations from the plant, including the heat carrier circuit (with water and glycol working fluids), are not transferred to the unit. • Be sure to lay working fluid-side connections free from mechanical stresses! Be sure to support the on-site piping before connecting to the unit! The factory-mounted connection support prevents only damage during the transport of the unit. • Perform soldering and welding work only on unpressurized units! • Evacuate the unit properly • Smoking is not permitted at the installation site, handling open flames is prohibited. Fire extinguishing equipment and fire extinguishing agents used to protect the unit and the operating staff

⚠ WARNING



RISK OF DAMAGE TO THE UNIT!

In order to avoid stray currents, heat exchanger tubes, casing parts and the like must not be used as return line when performing welding work as these load-bearing components and lifting accessories are not designed for high welding currents.

If this is not observed, an unintended or improper current flow can damage heat exchanger tubes of the component and result in damage during operation.

- Securely connect the insulated welding return line to the workpiece to be welded directly at the welding point.

- Install the pipes. Please note:
 - Prevent the transmission of forces due to linear expansion of the pipes to the unit. Use pipe compensators if necessary.
 - Regarding the glycol working fluid: Be sure to lay liquid supply lines and return lines separately from one another.
 - Be sure to lay liquid and discharge lines separately from one another and to insulate them on both sides.
 - The free space around the unit must be sufficiently large to allow regular maintenance of the components, inspection of the components, pipes and fittings, and repairs.
 - It must be possible to completely shut off the unit in the event of leakage. The shut-off device must be located near the unit. It must be possible to operate all devices meant for diverting escaping working fluids from a safe position.
 - Electrical equipment (e.g. for the fan drive, for ventilation, for lighting and for the alarm system) at the place of installation must be designed while observing humidity condensation and drip water formation.
 - When brazing, observe the following:
 - Braze all connections!
 - Avoid end-to-end joints when brazing. Flare the pipes to be connected or use suitable capillary sockets (capillary brazing)!
 - Avoid leaks, braze conscientiously and carefully!
 - Avoid overheating when brazing (risk of excessive scaling)!
 - Use shielding gas when brazing (to avoid scaling)!
 - When welding, observe the following:
 - Weld all connections!
 - Prevent leaks, weld conscientiously and carefully!
 - Prevent overheating when welding (risk of excessive scaling)!
 - Use shielding gas when welding (to prevent scaling)!
 - Regarding the glycol working fluid: After completion of the pipe installation and before connecting the units, carry out professional internal cleaning, pressure test and evacuation

ATTENTION

RISK OF DAMAGE TO PROPERTY!

Low permissible water content in a refrigerating plant can cause damage to property.

- Ensure that the desiccation ratio of the unit corresponds to the low permissible water content in a refrigerating plant

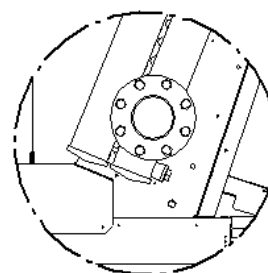
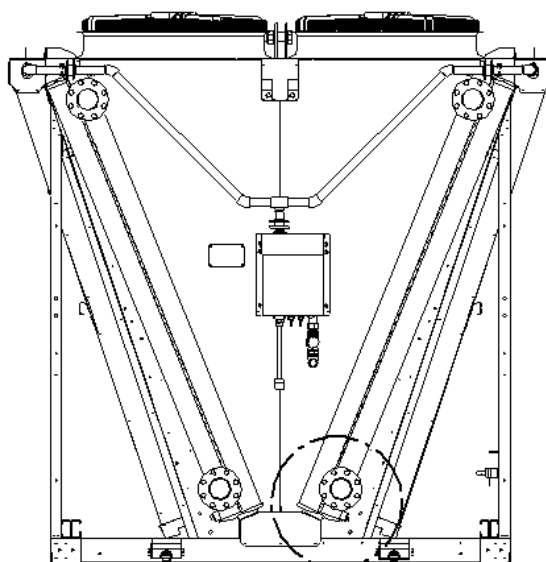
- Ensure that the unit is well ventilated (with glycol working fluid):
 - Provide all bleed connections on the deflected header with automatic bleed valves.
 - In doing so, the cross section of the bleed connections must not be reduced.
- Prevent the bleed mechanism from freezing:
 - Provide the bleed valves and bleed connections with heat tracing. Ensure that the heat tracing is in operation when the outside temperature is $< +3\text{ }^{\circ}\text{C}$.
 - Insulate the bleed valves and bleed connections. Ensure that the insulation does not affect the operation of the automatic bleed valve.

⚠ WARNING



RISK OF DAMAGE TO PROPERTY DUE TO IMPROPER VENTILATION!

Without proper ventilation, the unit can be damaged or destroyed by freezing liquid.



Detaille A

A

Installation notes on pipes

- Keep the installation of pipes as short as possible; use as few bends as possible, and if bends are necessary, use large radii to minimize the pressure drop.
- The free space around the unit must be sufficiently large to allow for the following measures:
 - Regular maintenance of the components,
 - Checking of components, pipes and fittings,
 - Repairs.
- It must be possible to shut off the unit in the event of leakage.

Procedure

- ⇒ With stainless steel, the connection to the plant must be welded.
- ⇒ With copper, the connection to the plant must be soldered.
- ⇒ With units with threaded connections/flanges, bolt the connections together.
- ⇒ In the case of threaded connections, prevent the pipe from twisting by holding it in place.

5.5.3 Commissioning the hydroBLU™ system

Safety

NOTICE	
	See "General safety instructions for hydroBLU™"

Procedure

- ▶ Activate the water supply line.
- ▶ Check the water pressure and adjust it if necessary (at least 2.0 bar [29 psig], maximum 5.0 bar [72.5 psig]). Check the supply voltage.
- ▶ Activate the power supply.
- ▶ Commission the hydroBLU™ controller (see controller instructions, commissioning wizard).
- ▶ Enter the default data (e.g. height above sea level at the place of installation; air volume flow through the heat exchanger at maximum speed of all fans; air velocity; etc. – for the required data, refer to your technical unit documentation).
- ▶ Set the parameters to the application.

NOTICE



- In connection with a Güntner controller (e.g. GMM EC), the hydroBLU™ functionality must first be activated in the controller (see controller instructions).
- In combination with a GMM EC HDU FC controller, communication with the Güntner GMM controller must necessarily take place via bus connection. Activation of the hydroBLU™ functionality and settings in the GMM EC HDU FC must take place **prior to** commissioning the hydroBLU™ controller GHM pad, otherwise the bus connection will not be established. To establish the connection between the two controllers, the setting must be made on the **GMM EC HDU FC*** prior to commissioning the hydroBLU™ controller **GHM pad***; if commissioning has already been carried out – without prior setting in the GMM controller – commissioning must be carried out again on the hydroBLU™ controller GHM pad to activate the connection via bus system (this can only be done in the course of commissioning the controller; see controller description "Resetting to delivery status"). * The humidification controller GHM pad communicates with the speed controller of the fans via 0 – 10 V signal. If the speed controller is a GMM EC, communication can take place either via 0 – 10 V signal or via CAN bus. The humidification controller GHM pad must be set in acc. with the design of the heat exchanger and the fans. When switching on, the humidification controller automatically detects whether commissioning has already taken place. If this is the case, normal controlled operation is continued. If the GHM pad detects that no commissioning has not yet taken place, a commissioning procedure starts. After the procedure, all set parameters are saved. All values set during commissioning, except for the CAN bus communication with the speed controller, can also be viewed and changed individually later in the menus.

**The humidification controller GHM pad communicates with the speed controller of the fans via 0 – 10 V signal. If the speed controller is a GMM EC, communication can take place either via 0 – 10 V signal or via CAN bus. The humidification controller GHM pad must be set in acc. with the design of the heat exchanger and the fans. When switching on, the humidification controller automatically detects whether commissioning has already taken place. If this is the case, normal controlled operation is continued. If the GHM pad detects that no commissioning has not yet taken place, a commissioning procedure starts. After the procedure, all set parameters are saved. All values set during commissioning, except for the CAN bus communication with the speed controller, can also be viewed and changed individually later in the menus.

The humidification controller GHMnext communicates with the speed controller of the fans via 0 – 10 V signal. With the GSCnext humidification controller, communication takes place internally.. The humidification controller GHMnext/GSCnext must be set according to the design of the heat exchanger. When switching on, the humidification controller automatically detects whether commissioning has already taken place. If this is the case, normal controlled operation is continued. If the GHMnext/GSCnext detects that commissioning has not yet taken place, a commissioning procedure starts. After the procedure, all set parameters are saved. All values set during commissioning can later be viewed and changed individually via the menus.

- ▶ Check the connection/communication between the two Güntner controllers – the GHM pad of the hydroBLU™ system and the GMM controller (0 – 10 V or CAN bus) – and to the customer system (e.g. for EC fans: 0 – 10 V with external specification of the fan control signal; with AC fans: with external ON/OFF release of the fans -> see connection scenarios in the connection diagram).
- ▶ If fine dirt particles are suspected to be present in the customer's water supply line, flush the water supply line:
 - Activate draining; keep the local drain in the water supply line closed; open the drain valve of the hydroBLU™ system (via manual operation of the controller).
 - Open the control valve (via manual operation of the controller).
 - The water supply line is flushed; any dirt in the water supply line is flushed away or collects in the scale trap.
 - Close the control valve (via manual operation of the controller).
 - Depressurize the water supply line and clean the scale trap.
 - To flush the local water supply line, reset the following to the values required for normal automatic operation: Any previously made adjustments to external signals, adjustments to the draining in the local water supply line or on the controller (deactivate manual operation of the controller -> automatic operation is activated).
- ▶ Check the function of the hydroBLU™:
 - Simulate the operating situation previously set in the controller (set the switch point for hydroBLU™ accordingly or simulate an increased ambient temperature; activate fan control signal -> e.g. for EC fans: 0 – 10 V and bus respectively with GMM or external specification of the fan control signal; with AC fans: with external ON/OFF release).
 - Check the correct operation of the hydroBLU™ system.
 - Check the water supply and distribution and improve if necessary (e.g. tightness of the water and drain system, even water supply to the hydroBLU™ pads, water pressure).
 - Reset the adjustments made to external signals or to the controller for checking the system to the values necessary for normal automatic operation.
 - Ensure that the hydroBLU™ controller is in automatic operation and not in manual operation.

The hydroBLU™ is now ready for operation.

NOTICE



To save energy in dry operation, the pads can be removed (winter operation). This measure allows the air to flow freely to the heat exchanger coil, eliminating the pressure drop caused by the humidification pads and improving the energy efficiency of the fans. During this time, store the pads in a dry place where they are protected from damage and moisture.

5.6 Electrically connecting and protecting the unit

Introduction

Each unit is designed for a specific fan speed in accordance with the data sheet and wired accordingly. Some fans provide the option of a second, reduced speed or a continuous control as a standard. Refer to the relevant connection diagram for details. Changing the fan speed can have a negative impact on the thermodynamic configuration of the unit.

Safety

NOTICE	
	Observe all safety instructions on the installation and commissioning (see section "Safety instructions for installation and commissioning").

Procedure

- ⇒ Connect the power supply in acc. with the connection diagram.
- ⇒ To safeguard any warranty claims, use the prepared thermocontacts to protect the motors.

5.7 Connection diagrams

Connection diagram for fan motor

See inside the motor terminal box on the fan, inside the unit's terminal box or order documents

Connection diagram 0-10 V control

See inside the unit's terminal box

See order documents

5.8 Performing an acceptance test

Safety

⚠ WARNING	
	RISK OF PERSONAL INJURY AND DAMAGE TO PROPERTY! Escaping working fluid can cause personal injury (see safety instructions regarding working fluids in sections "Basic safety instructions" and "Safety instructions in all of the unit's life phases"). • Have the following acceptance test performed by a competent person before commissioning the unit, after making important changes to the unit and after replacing the unit.

Requirement

- The temperature and humidity at the place of installation correspond to the permissible operating range (see section "Unit").

When to perform an acceptance test

- Before commissioning the unit
- After making important changes to the unit
- After replacing the unit

Procedure

- ⇒ When operated with water, the unit must be put into operation quickly after initial filling (maximum two weeks) to prevent pitting corrosion caused by stagnant water.
- ⇒ Ensure that sufficient air can be sucked in and blown out.
- ⇒ Ensure the power supply is sufficiently dimensioned: Compare the connection diagram of the unit with the connection diagrams of the complete system.
- ⇒ Ensure that a professional equipotential bonding has been performed.
- ⇒ Check the unit for vibrations and movements that could be caused by the operation of the fans or the plant. Eliminate vibrations and external forces, following consultation with the manufacturer if required.
- ⇒ Perform a visual inspection of the structural design, the brackets and fastenings (materials, connections), the operability and the arrangement of the fittings.
- ⇒ Check all threaded connections, especially on the fans. Retighten if required.

Thread	Type of bolt	Tightening torque
M6 (property class 8.8)	Cage nut/snap nut	10 Nm
M8 (property class 8.8)	Cage nut	23 Nm
M8	Nut (SST, cold side)	23 Nm
M8 (property class 8.8)	Nut (steel, warm side)	27 Nm
M8 (property class 10.9)	Nut (steel, condenser and evaporator from Ø710)	35 Nm

- ⇒ Check all other threaded connections and tighten them if necessary.
- ⇒ Check the pipe connections.
- ⇒ Check that working fluid-carrying pipes are laid correctly.
- ⇒ Ensure that the unit is protected against mechanical damage.
- ⇒ Ensure the unit is protected against excessive heating up and cooling down.
- ⇒ Check the protection guards for damage.
- ⇒ Ensure that optimum control of the unit and optimum accessibility to the unit are guaranteed:
 - Is the unit positioned so that it can be monitored and checked from all sides at all times?
 - Is sufficient space available for maintenance?
 - Are all working fluid-carrying components, connections and pipes and all electrical connections and lines easy to access?
 - Are the pipe identifications easily visible?
- ⇒ Check heat exchanger surfaces for dirt and clean them if required (see section "Cleaning the coil").
- ⇒ Perform a function test on the fans (rotation direction, power consumption).
- ⇒ Check the wiring of the fans for damage.
- ⇒ Check the quality and execution of all connections (soldered connections, electrical connections and fixing connections).
- ⇒ Check the corrosion protection: Perform a visual inspection of all pipes, components and component holders that are not heat-insulated. Document and archive the test results.
- ⇒ Perform a test run. Observe and check the unit during the test run, in particular for:
 - Quiet running of the fans (bearing noises, contact noises, imbalances, among other things).
 - Current consumption of the fans
 - Leaks

Procedure in case of defects

- ⇒ Report all defects to the manufacturer immediately.
- ⇒ Rectify defects following consultation with the manufacturer.

Check after 48 operating hours

- ⇒ Check the unit and the unit's interaction with the system (cooling equipment and refrigeration system) again after approx. 48 operating hours, especially at the connections and at the fans, and document the test results.
- ⇒ Document the test result.

6 Operation

6.1 Safety instructions for operation

⚠ WARNING



RISK OF DAMAGE TO PROPERTY!

To prevent damage to the heat exchangers, always connect them without force and torque. There must be no forces or moments acting on the heat exchanger at any time. Failure to observe this can result in leaks and further damage to the heat exchanger in the short and medium term.

- Ensure that the outlet headers and flanges are not used as a climbing aid, e.g. during installation. They are not designed for external forces.
- Ensure that no forces or moments act on the heat exchanger at any time by using suitable fixed bearings during pipe installation.

⚠ WARNING



RISK OF INJURY!

A component, a chunk of ice or the complete fan unit loosens because of vibrations and injures bystanders.

- Check the fan unit regularly in accordance with the inspection and maintenance schedule.
- Check the unit and especially the proper functioning of the fans after standstill periods (particularly in the event of snow and freezing rain).
- Keep the unit free of ice.

⚠ WARNING



RISK OF SUFFOCATION AND BREATHING DIFFICULTIES!

A component, a chunk of ice or the complete fan unit loosens because of vibrations, is thrown out of the unit by the fan's rotating movement and damages the heat exchanger whereby the working fluid (e.g. ammonia) escapes and is breathed in by bystanders.

- Check the fan unit regularly in accordance with the inspection and maintenance schedule.
- Check the unit and especially the proper functioning of the fans after standstill periods.
- Disconnect from the mains prior to each work at the unit.

⚠ WARNING

RISK OF BURNS!

A part or the complete fan unit loosens because of vibrations, is thrown out of the unit by the fan's rotating movement and damages the heat exchanger whereby the fluid ignites and injures bystanders.

- Check the fan unit regularly in accordance with the inspection and maintenance schedule.
- Check the unit and especially the proper functioning of the fans after standstill periods (particularly in the event of snow and freezing rain).

⚠ WARNING

EXPLOSION HAZARD!

A component or the entire fan unit can come loose owing to vibrations, is being ejected from the unit because of the fan rotation and damages the heat exchanger. Thereby, a core tube that is under pressure explodes and the resulting pressure wave injures bystanders.

- Check the fan unit regularly in accordance with the inspection and maintenance schedule.
- Check the unit and especially the proper functioning of the fans after standstill periods (particularly in the event of snow and freezing rain).

⚠ CAUTION

VIBRATIONS!

The vibrations caused by the unit cause a building to vibrate which, in turn, results in collapse of this building or in errors of other systems.

- In order to prevent overload during transport and resulting damage of the vibration dampers, the vibration dampers are supplied loose.
- Check the fans regularly and replace them if required (see section "Fans").

NOTICE


Observe all basic safety instructions (see section "Basic safety instructions").

6.2 Putting the unit into operation

Safety

⚠ WARNING	
	RISK OF PERSONAL INJURY AND DAMAGE TO PROPERTY! Escaping working fluid can cause personal injury (see safety instructions regarding working fluids in sections "Basic safety instructions" and "Safety instructions in all of the unit's life phases"). - Put the unit into operation only if the following requirements are met: - A thorough and complete initial cleaning has been performed to remove dirt and other contaminants caused by transport and installation. - Safe filling is ensured. - The unit has been properly installed and connected (see section "Installation of the unit"). - A full acceptance test has been performed (see section "Performing an acceptance test"). - All safety measures have been taken (see 2 Safety).
NOTICE	
	To prevent corrosion caused by stagnant water, units with water as working fluid must be put into operation within two weeks after filling.

Checking the operational readiness

- ⇒ Ensure that all electrical protective measures are operational.
- ⇒ Ensure that all working fluid-side connections are securely established.
- ⇒ Ensure that all electrical connections (fans) are securely established.
- ⇒ Ensure that all threaded connections on the fans, the fixing bolts on the unit and all other threaded connections are tight.

Setting the operating point

- ⇒ For the parameters for setting the operating point, refer to the order documents.
- ⇒ Ensure that the specified operating point is maintained. For this, secure the operating elements for setting the operating point against access by unauthorized persons (e.g. by sealing, screwing on caps, removing the handwheels).

Procedure

- ⇒ Switch on the system including the electrical system (see the system's operating instructions).
- ⇒ Switch on the unit.
 - ⇒ Open the valves on the inlet and outlet side of the system.
 - ⇒ Activate the fans.
 - ⇒ Wait until the operating point is reached. Once the operating point is reached, the unit is ready to operate (see the system's operating instructions).
 - ⇒ Check units with working fluid regularly for correct bleeding after starting the pump.

6.3 Shutting down the unit

Safety

⚠ WARNING	
	RISK OF PERSONAL INJURY AND DAMAGE TO PROPERTY! Escaping working fluid can cause personal injury (see safety instructions regarding working fluids in sections "Basic safety instructions" and "Safety instructions in all of the unit's life phases"). • Ensure that the maximum operating pressure is never exceeded (also after shutdown)!
NOTICE	
	All refrigerants must be removed from the unit by suction and disposed of by an approved specialist company in the field of refrigeration.

Procedure

- ⇒ Shut the unit down (see section "Taking the unit out of operation")
- ⇒ Secure the unit as follows:
 - Secure the fan motor drives against switching on again.
 - Secure the working fluid-carrying pipes against supply with working fluid.
 - Protect against damaging effects at the place of installation or intermediate storage location so that the unit's components are kept in good condition and the intended use and usability of the unit are maintained. To this end, appropriate storage conditions (see section "Storing the unit prior to installation") must be provided, precautionary corrosion protection measures must be taken, regular checks of the functionality of the fans must be performed and the shutdown unit must be checked regularly.
- ⇒ With fluid coolers, drain the unit: Completely release the working fluid.

6.4 Putting the unit back into operation after shutdown

Introduction

The unit must be put back into operation in accordance with the system-specific design as set out in the system's operating instructions.

Procedure

- ⇒ Test the unit's readiness for operation.
- ⇒ Perform pressure test and visual inspection.
- ⇒ Put the unit into operation (see section "Putting the unit into operation").

6.5 Changeover to another working fluid

Safety

 WARNING	
	RISK OF PERSONAL INJURY AND DAMAGE TO PROPERTY! Operating the unit with another working fluid without the manufacturer's prior consent can pose significant hazards (see safety instructions regarding working fluids in sections "Basic safety instructions" and "Safety instructions in all of the unit's life phases"). • The unit must not be changed over to another working fluid without prior written consent from the manufacturer.

Requirements for the working fluid

- Ensure that the unit manufacturer has agreed to the changeover.
- Ensure that the unit is filled with the correct working fluid.
- Ensure that all materials used in the unit are compatible with the new working fluid.
- Ensure that the permissible pressure is not exceeded.
- Check that the new working fluid can be used without requiring a new test certificate for the unit.
- Ensure that classification is complied with.
- Reset the safety device for the unit or replace it where necessary.
- Prevent mixtures with residues of working fluid and possibly oil.
- Change all information regarding the new working fluid accordingly.
- Change the complete documentation including these instructions and the system's operating instructions accordingly.

Procedure

- ⇒ Change the working fluid following written consent by Güntner U.S. LLC and in compliance with the requirements for the working fluid.
- ⇒ Perform acceptance test (see section "Performing an acceptance test").

6.6 Troubleshooting

Safety instructions

NOTICE	
	Observe all basic safety instructions and the safety instructions for operating the unit (see sections "Basic safety instructions" and "Safety instructions for operation").

Online Support

<https://guntner.com/en-us/contact>

Troubleshooting table

The following table shows possible faults and the measures to correct them.

Fault	Possible cause(s)	Remedy
Fan motor not running	Power supply interrupted	Restore power supply
	Fan blade stuck	Enable fan to rotate freely
Bearing noises	Defective fan motor	Replace bearing or fan motor
Unit vibrating	Defective fan blades	Replace fan blades
	Fan bracket loose	Tighten fastenings
Unit capacity is not achieved	Coil is very dirty on the air side	Clean the coil
	Fans not running properly or fail to operate	Repair or replace fans
	Working fluid pressurizing defective (temperature and quantity insufficient)	Set working fluid pressurizing values (temperature and quantity) to setpoint values
	Incorrect mixing ratio of the heat carrier (with water/glycol working fluid)	Adjust mixing ratio of the heat carrier (concentration, inhibition)
Working fluid escaping	Working fluid-carrying components of the unit are leaking	Shut off the working fluid feed and fans, close leak

Rectify faults

- ⇒ Wear respiratory protection
- ⇒ Determine the size of the leak
- ⇒ Turn off working fluid feed.
- ⇒ With the slightest suspicion of injured persons in the working fluid area, sound the alarm. First get persons to safety, then eliminate leaks.
- ⇒ Press the Emergency STOP switch. This switches off valves, motors and other components to prevent working fluid from escaping.
- ⇒ Close shut-off valves, especially on the liquid side, where possible section by section so that the working fluid volume in the leakage area is kept as low as possible.
- ⇒ If possible, siphon off or drain the system section concerned and move the working fluid to other parts of the system. Here too it must be ensured that no liquid working fluid is locked in by shutting off system sections.

7 Maintenance and cleaning

7.1 Safety instructions for maintenance and cleaning

⚠ DANGER		
	ELECTRICAL VOLTAGE! Cleaning using a jet of water causes water to enter live components. This results in a short circuit at the electrical connections and/or a life-threatening electric shock. This can cause severe injury or even the death of bystanders. • Disconnect the supply line from the mains before performing electrical work on the unit. • Work on the unit and the connection and control configuration must be performed by specialist staff. • Check electrical components regularly. • Perform earthing checks and visual inspections of the earthing points regularly. • Connect the unit to the building's earthing system in the proper manner. • Provide adequate lightning protection. • Observe the cleaning pressures and distances when cleaning. • Do not point the water jet at live components (e.g. terminal box). • Do not use steam cleaners or high-pressure cleaners.	

⚠ WARNING		
	RISK OF CRUSHING! When working in the vicinity of the fan unit or moving parts, limbs can be crushed. • Disconnect the unit from the mains before performing maintenance work. • Secure the unit against unintentional restart. A lockable repair switch is available or to be provided by customer. Attach an appropriate warning label to the unit. • Check the fan unit regularly in accordance with the inspection and maintenance schedule. • Do not stand under suspended loads!	

⚠ WARNING	
	WARNING OF BURNS! Person suffers severe burns caused by contact with the unit's surface (surface temperature of the heat exchanger in operation up to 45 °C). • Wear personal protective equipment.
	 
⚠ WARNING	
	RISK OF FALLING! Person falls off the unit and suffers severe injury. • Enter the units only if necessary and only with sturdy, safe footwear. • If the units are designed without railings, they may be accessed, if necessary, only with fall protection.
NOTICE	
	Observe all basic safety instructions (see section "Basic safety instructions").

7.2 Procedure prior to all maintenance work

NOTICE	
	Observe all safety instructions on maintenance and cleaning (see section "Safety instructions for maintenance and cleaning").

Before starting any maintenance work, carry out the following safety measures:

- ⇒ Disconnect the unit from the mains and secure it against unintentional restart.
- ⇒ Drain or siphon off the coil (heat exchanger) of the unit.

- ⇒ Completely remove the working fluid from the leaky unit, especially prior to soldering and welding work.
- ⇒ Clean and blow out the coil (heat exchanger) of the unit.

7.3 Procedure after all maintenance work

NOTICE	
	Observe all safety instructions on maintenance and cleaning (see section "Safety instructions for maintenance and cleaning").

After completing all maintenance work, carry out the following safety measures:

- ⇒ Ensure that the switching and activation devices, the measuring and display devices and the safety devices function properly.
- ⇒ Ensure that the working fluid fittings function properly.
- ⇒ Check the labelling of the pipes and ensure that the labels are visible and legible.
- ⇒ Check the fastening and the corrosion protection of the components concerned.
- ⇒ Ensure that the electrical connections (e.g. fans) function properly.
- ⇒ Perform a pressure test and a leak test (see operating instructions of the plant).
- ⇒ Perform an acceptance test (see section "Performing an acceptance test").
- ⇒ Perform a functional test (see operating instructions of the plant).

7.4 Inspection/maintenance schedule

Document the implementation of the tests and their results.

7.4.1 Unit

Maintenance schedule

Measure	Means	Interval
Perform complete cleaning	Warm water or environmentally safe cleaning agent that is compatible with the unit's materials	As required (visual inspection)
Periodic inspection		Every 12 months
Check for leaks		Every 6 months
Check corrosion protection		Every 6 months
Check frost protection		Every 12 months
Check earthing concept		Every 6 months (visual inspection) Every 12 months (measurement)
Check that electrical connections, cables and components are not damaged (visual inspection)		Every 6 months
Check fastenings: Check all fasteners of the unit including any optional additions	Mechanical	Every 6 months
Check fastenings and loadbearing elements (e.g. crane lug bolts) for corrosion and lifting capacity and structural integrity respectively; replace them if necessary	Mechanical	Every 12 months
Check units with water/glycol working fluid for correct bleeding. During the test, the pump must be running.		Every 6 months

7.4.2 Fans

Maintenance schedule

d = daily, w = weekly, m = monthly, y = yearly										
Work to be performed	d	w	m	y						
Check fans for dirt accumulation In the event of dirt accumulation: Clean fans (see section "Cleaning the fans")	X									
Check the fan drive for quiet running - Vibrations on the unit: Eliminate imbalances - When required, tighten blade fixing devices and correct blade settings		X								
Impeller: Corrosion on bolts (with threaded blades) Replace screws				X*						
Fan blades: Corrosion or damage on blades				X*						
Replace the fan (When required)										
EC fan terminal boxes: Check threaded connections Retighten all threaded connections in acc. with the following table <table border="1"><thead><tr><th>Manufacturer</th><th>Plastic cover</th><th>Metal cover</th></tr></thead><tbody><tr><td>ebm</td><td>1.5 Nm</td><td>3.5 Nm</td></tr></tbody></table>	Manufacturer	Plastic cover	Metal cover	ebm	1.5 Nm	3.5 Nm				X*
Manufacturer	Plastic cover	Metal cover								
ebm	1.5 Nm	3.5 Nm								
Tightening torque with EC fans										

*) Recommended: every six months

7.4.3 Coil

Safety

⚠ WARNING	
	RISK OF PERSONAL INJURY! Risk of personal injury caused by escaping working fluid. See safety instructions regarding the working fluids in sections "Basic safety instructions" and "Safety instructions in all of the unit's life phases".

External inspection

Have an expert (recommendation: Güntner U.S. LLC) perform a regular external check (visual inspection) on the unit every 5 years.

Maintenance schedule

d = daily, w = weekly, m = monthly, y = yearly				
Work to be performed	d	w	m	y
Check coil for dirt accumulation. • In the event of dirt accumulation: Clean coil (see section "Cleaning the coil")			X	
Check the coil's general condition. • If damage is found: Rectify damage				X*
Check the coil's operating point (see section "Set-up, installation and commissioning"). • If change in fan capacity is found: Restore required plant-side conditions. • If change in surface temperatures is found: Restore required plant-side conditions.				X*
Check the coil and connections for leak tightness. • Repair unit sections affected (see section "Fix leaks").				X*
Check the working fluid pressurizing of the coil. • Restore required plant-side conditions.				X*
Check the coil for corrosion. • Corrosion or damage on core tubes, fins, support structures, pipe connections, fastenings: Repair unit sections affected.				X*

*) Recommended: every six months

7.4.4 Humidification pads

Maintenance schedule

System part	Activity	Execution/intervals [every ... months]
Frame/modules	Check position and fastening; if necessary, correct the position and improve the fixing	6

System part	Activity	Execution/intervals [every ... months]
Distribution pipe	Check position and leak tightness; correct position if necessary	6
	Replace distribution pipe	36
Fittings	Check sensors and valves externally for dirt, damage, corrosion and correct fastening	6
	Check valves for proper operation (switching and control operations)	6
	Cleaning (external) to maintain reliable operation	If required
Scale traps	Clean scale traps	6
Humidification pads	Check for dirt deposits and clean if necessary	Daily
	Check for damage and wear and replace humidification pads if necessary	12 (6 recommended)
	Replace all humidification pads	36
Water supply and water supply line	Check for proper operation and restore water supply if necessary	Weekly
Trays, drains	Check for dirt and solids or clogging and, if necessary, clean trays and clear drains of solids	Weekly
Control	Functional test	12 & if required
	Check the automatic drain of the hydroBLU™ system when it is not in operation	6 & if required

7.5 Maintenance work

7.5.1 Fix leaks

Safety

⚠ WARNING	
	RISK OF PERSONAL INJURY! Risk of personal injury caused by escaping working fluid (see safety instructions regarding working fluids in sections "Basic safety instructions" and "Safety instructions in all of the unit's life phases"). • Have leaks fixed as quickly as possible by a competent person. • Do not fill with a working fluid other than that specified in accordance with the order documents! • Only put the unit back into operation when all leaks have been repaired.

Procedure

- ⇒ Perform all work including pressure, acceptance and functional test (see sections "Performing an acceptance test").

7.5.2 Cleaning of the unit

Introduction

The following applies for cleaning: The operator must ensure that the cleaning agent is environmentally friendly. Substances that are harmful to the environment, e.g. acid forming substances, are forbidden.

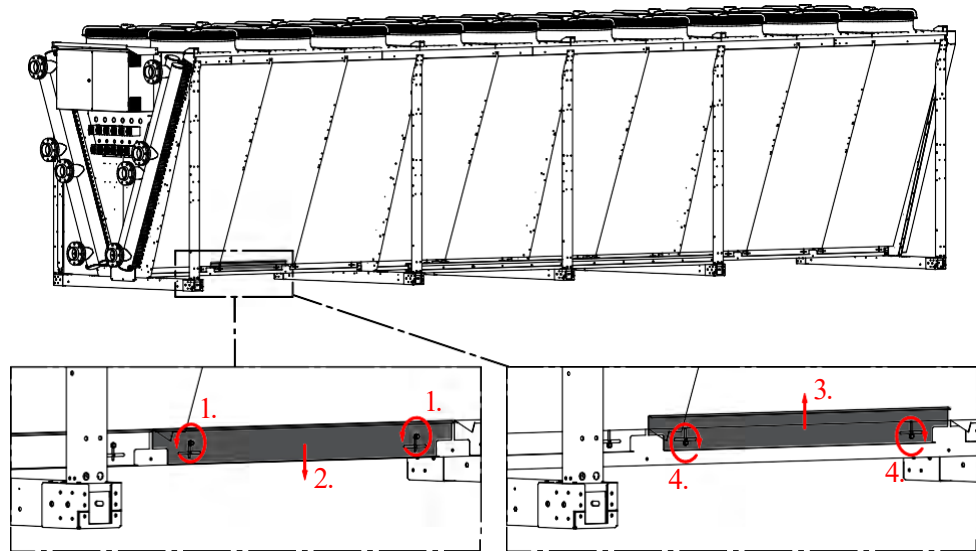
Safety

⚠ CAUTION	
	WARNING OF RISK OF CUTTING OR INJURY! Person can cut or injure him or herself on the cleaning flap or the exposed fins below. • Wear personal protective equipment.
	

NOTICE	
	When cleaning and passivating, follow the instructions of the manufacturer of the cleaning agent!

Procedure

- ⇒ Ensure that the unit is free of voltage.
- ⇒ Remove the humidification pads (see section "Removal of humidification pads").
- ⇒ Hinge down the cleaning flaps in the following order.



Inspection flap

- Loosen the screws (1).
- Hinge down the cleaning flaps (2).
- ⇒ Perform cleaning tasks in accordance with the indications on the drawings (see section "Hydraulic cleaning"). Maintain the distance and the angle. An upward inclination is not permissible to protect the fan from water ingress.
- ⇒ Clean the casing by rinsing with warm water (approx. +25 °C) and/or with environmentally friendly cleaning agents.
- ⇒ Rinse the casing thoroughly with warm water after using cleaning agents. The unit must be free of cleaning agents to prevent corrosion.
- ⇒ Allow the casing to dry completely.
- ⇒ Check the working fluid-side and electrical connections.
- ⇒ Attach the cleaning flaps (see drawing inspection flap) in the following order.
 - Lift the cleaning flaps (3).
 - Tighten the screws (4).
- ⇒ Insert the pads again (see section "Mounting the humidification pads").

7.5.3 Cleaning the coil

Introduction

Removing the fans creates space with a few simple turns for better cleaning of the heat exchanger coil. The cleaning method depends on the type and degree of soiling and the place of installation. With loose and dry dirt, cleaning with compressed air is sufficient. With solid, damp and greasy dirt, we recommend hydraulic cleaning.

Safety

⚠ WARNING	
	RISK OF PERSONAL INJURY! Risk of personal injury caused by escaping working fluid. • See safety instructions regarding the working fluids in sections "Basic safety instructions", and "Safety instructions in all of the unit's life phases"

Preparation for cleaning

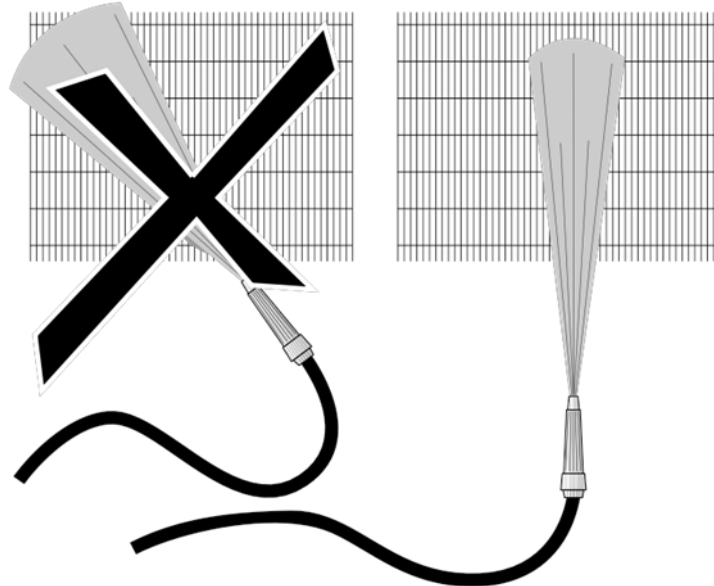
Prepare the unit as follows in accordance with the system's operating instructions:

- ⇒ Switch on the fans
- ⇒ Open the working fluid supply
- ⇒ Drain the unit
- ⇒ Shut the unit off
- ⇒ Disconnect the fans from the mains
- ⇒ Clean the coil (heat exchanger) with one of the following procedures:
 - Cleaning with compressed air (see section "Cleaning with compressed air")
 - Hydraulic cleaning (see section "Hydraulic cleaning")
 - Cleaning with brush or brush and compressed air (see section "Cleaning with brush or brush and compressed air")

⚠ CAUTION	
	RISK OF DAMAGE TO PROPERTY! If the pressure is too high, the distance is too small or the cleaning jet hits the fins at an angle, the fins can be damaged. Mechanical cleaning with hard objects (e.g. steel brushes, screwdrivers, etc.) will damage the heat exchanger. • Use a pressure of max. 30 bar for hydraulic cleaning and max. 80 bar for cleaning with compressed air! • Maintain a minimum distance of 200 mm to the fins! • Always direct the jet at right angles to the fins (max. deviation of ± 5 degrees)! • Do not use hard objects for cleaning!

7.5.3.1 Cleaning with compressed air

Overview

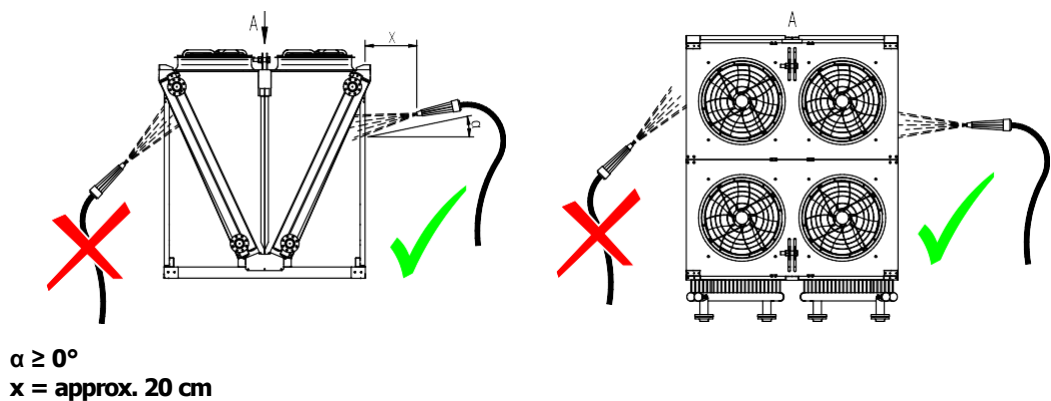


⇒ Blast the coil with compressed air (max. 80 bar pressure) to remove dirt and impurities.

NOTICE	
	Hold the jet of the compressed air cleaner at right angles to the coil (max. deviation of ± 5 degrees) to prevent the fins from bending.

7.5.3.2 Hydraulic cleaning

Overview



Procedure

- ⇒ Always remove heavier damp or greasy dirt against the airflow direction, using a high-pressure water jet (max. 30 bar pressure) or a steam pressure jet (max. 30 bar pressure). In either case, use a flat spray nozzle (distance of at least 200 mm) and, if required, neutral cleaning agents. Always direct the jet at right angles to the fins (max. deviation of ± 5 degrees). Please note:
 - With oily and greasy deposits, add a cleaning agent to the water.
 - When applying cleaning agents, change them from time to time to prevent resistance development in germs.
 - When using chemical cleaning agents, ensure that they do not attack the surfaces of the unit. After cleaning, the unit must be rinsed with warm water so that it is free of cleaning agents.
 - Clean against the air flow direction and from top to bottom (Güntner recommendation) so that dirt is not pushed even deeper into the heat exchanger or does not move to already cleaned areas.
- ⇒ Clean until all dirt has been removed.

7.5.3.3 Cleaning with brush or brush and compressed air

- ⇒ Remove dry dust or dirt with a brush, a hand brush or with compressed air (max. 80 bar pressure, minimum distance of 200 mm to the fins; against the airflow direction) or with a powerful industrial vacuum cleaner. Please note:
 - Use soft brushes (no steel brushes or similar).
 - Preferably clean from inside to outside and from top to bottom so that loosened dirt cannot move to already cleaned areas.
- ⇒ Clean until all dirt has been removed.
- ⇒ Always brush in the longitudinal direction of the fins, never across.

7.5.4 Cleaning the fans

Safety

NOTICE	
	Observe all safety instructions on maintenance and cleaning (see section "Safety instructions for maintenance and cleaning").

Procedure

- ⇒ Disconnect the unit from the mains and secure it against unintentional restart.
- ⇒ Remove protection guard and accessories (if any).
- ⇒ Clean the fans in accordance with one of the following procedures:

- Cleaning with compressed air: Blow the fans with compressed air (max. 10 bar, min. distance 200 mm) to remove dirt and impurities. Clean until all dirt has been removed.
 - Cleaning with compressed air and brush: Remove dry dust or dirt with a brush, a hand brush or with compressed air (max. 10 bar, min. distance 200 mm) or with a powerful industrial vacuum cleaner. Clean until all dirt has been removed.
- ⇒ Switch on the unit.

7.5.5 Cleaning the humidification pads

Safety

⚠ WARNING	
	RISK OF PERSONAL INJURY! When handling the humidification pad, irritation of the eyes, skin and mucous membrane and, in individual cases, allergic skin reactions in persons cannot be ruled out. - Make sure to always wear protective equipment (PPE) when working on humidification pads. - Use suitable tools for the work.
 	
⚠ CAUTION	
	RISK OF DAMAGE TO PROPERTY! Excessive water pressure can cause damage. Use a low-pressure water hose. - Ensure that the applied water pressure does not damage the humidification pads. - Do not clean the humidification pads with high-pressure cleaners.
NOTICE	
	See "General safety instructions for hydroBLU™"

Procedure

Clean the humidification pads regularly. There are various methods of cleaning the humidification pads, depending on the type of soiling. In any case, a careful procedure is recommended.

- ▶ Clean dry humidification pads with a broom or
- ▶ Clean dry humidification pads against the direction of the air flow with a vacuum cleaner.
- ▶ If necessary, remove stubborn dirt with a water hose.

If necessary, replace the pads. In this case, please contact the Güntner service team.

After each cleaning and maintenance work:

- ▶ Ensure that the wetting water fittings work.
- ▶ Ensure that the humidification pads are correctly aligned and in perfect condition.

8 Shutdown, dismantling and disposal

8.1 Safety instructions on shutdown, dismantling and disposal

Please note:

NOTICE	
	Observe all basic safety instructions (see section "Basic safety instructions"), all safety instructions on transport (see section "Safety instructions for transport") and all safety instructions on maintenance and cleaning (see section "Safety instructions for maintenance and cleaning").
NOTICE	
	At the end of its life cycle, the unit requires proper disposal of the materials used.
NOTICE	
	Prior to dismantling and for transport: • Completely disconnect all systems • Drain the unit • Ensure that there are no loose or slack parts
NOTICE	
	All refrigerants must be removed from the unit by suction and disposed of by an approved specialist company in the field of refrigeration.

General risks

⚠ WARNING	
	DANGER OF CUTS! When shutting down or dismantling the unit, there is a risk of cuts from the fins and any sharp edges present. • Wear personal protective equipment. • Ensure that there are no loose or slack parts prior to dismantling.
 	
NOTICE	
	Materials and substances must be disposed of properly. • Observe all applicable standards and directives with regard to disposal!

8.2 Taking the unit out of operation

Introduction

The units are components of a system. The unit is taken out of operation by switching off the system in acc. with the system's operating instructions and after the unit has been shut down (see section "Shutting down the unit").

NOTICE	
	When shutting down the unit, observe the max. operating pressure! When required, take precautions to ensure that it cannot be exceeded, or drain the unit.

Procedure

- ⇒ Switch off the fans.
- ⇒ Switch off the electrical system.
- ⇒ Close working fluid-carrying pipes.

NOTICE

Operate the fans for approx. 2 – 4 hours per month during idle times of one month or longer in order to maintain functionality.

8.3 Dismantling the unit

Safety

NOTICE

Observe all safety instructions regarding the working fluid used and for mounting the unit (see safety instructions regarding working fluids in sections "Basic safety instructions" and "Safety instructions in all of the unit's life phases" and "Safety instructions for installation and commissioning").

Required staff

- Dismantling must be performed by at least two people.

Auxiliary equipment/tools

- Lifting accessories and lifting gear
- Climbing aids

Procedure

- ⇒ Follow the installation steps for humidification pads in reverse order (see section "Mounting the hydroBLU™")
- ⇒ Maintain the dismantling sequence:
 - Remove protection guard when required
 - Remove fan(s)
- ⇒ Follow the installation steps in reverse order (see section "Installation of the unit").

8.4 Disposing of the unit

Safety

⚠ WARNING	
	RISK OF ENVIRONMENTAL POLLUTION! Recovering or disposing of working fluid can result in working fluid or refrigerator oil emissions being released into the environment, causing pollution. • Ensure that no working fluid enters the groundwater. • Operate the facility for recovering or disposing of working fluids in such a way that the risk of working fluids being released into the environment is kept as low as possible. • Observe local regulations.
⚠ CAUTION	
	RISK OF POLLUTION! If the materials are not disposed of correctly, this could result in environmental damage. • Only dispose of materials in compliance with the waste disposal laws that are binding for the country of operation.
NOTICE	
	Observe all safety instructions regarding the working fluid used and for mounting the unit (see safety instructions regarding working fluids in sections "Basic safety instructions" and "Safety instructions in all of the unit's life phases" and "Safety instructions for installation and commissioning").

Procedure

- ⇒ Disposal must be performed by competent persons.
- ⇒ All unit components, e.g. working fluids, lubricating oil for refrigerating compressors, coil (heat exchanger), fans and optional accessories must be disposed of properly.
- ⇒ Treat used working fluid that is not intended for reuse as waste and dispose of it safely. There must be no emissions into the environment.
- ⇒ Do not use a disposable single-use container as working fluid vapor residues in the container could escape during disposal.
- ⇒ Do not overfill the working fluid container. The maximum permissible pressure of the working fluid container must not be exceeded during the entire work process.
- ⇒ Do not pour the working fluid into a fluid container that contains another or an unknown working fluid. Do not release this other or unknown working fluid into the atmosphere but rather identify it, reclaim it or properly dispose of as specified.
- ⇒ Instruct an officially authorized facility to destroy the working fluid.
- ⇒ All applicable laws, regulations, directives and standards must be complied with when disposing of materials and substances. The pads can be disposed of in the residual waste.

9 Technical data

9.1 Unit

NOTICE



The specified typical values refer to standard types of this series. The following applies to special units in particular: Observe the specifications in the design (appendix) and on the nameplate.

NOTICE



The capacity values of the fans depend on the ambient temperature and the air resistance at the place of installation.
All electrical parts are designed in acc. with EN standards.

Type	GFD
Project number	See unit nameplate
Unit name	See unit nameplate
Serial number	See unit nameplate
Year of manufacture	See unit nameplate
Working fluid	Heat carriers (e.g. water/glycol)
Volume	See order documents
Max. permissible pressure (PS)	16 bar / 32 bar (see unit nameplate)
Test pressure	See unit nameplate
Permissible humidity	0 – 100 %
Test date	See unit nameplate
Test medium	Dry air
Airborne noise emitted	See valid offer documents
Weight	See order documents

Legally binding values are indicated on the nameplate.

9.2 Fans

Fan type	EC fan
Degree of protection	At least: IP 55, ISO F
Type of current	Three-phase current or alternating current
Voltage	3~380V-480V, 50/60 Hz 3~200V-240V, 50/60 Hz
Balancing quality	Q 6.3 in accordance with VDI 2060
Permissible ambient temperature	-25 to +60 °C
Protective devices	Mechanical: Protection guard

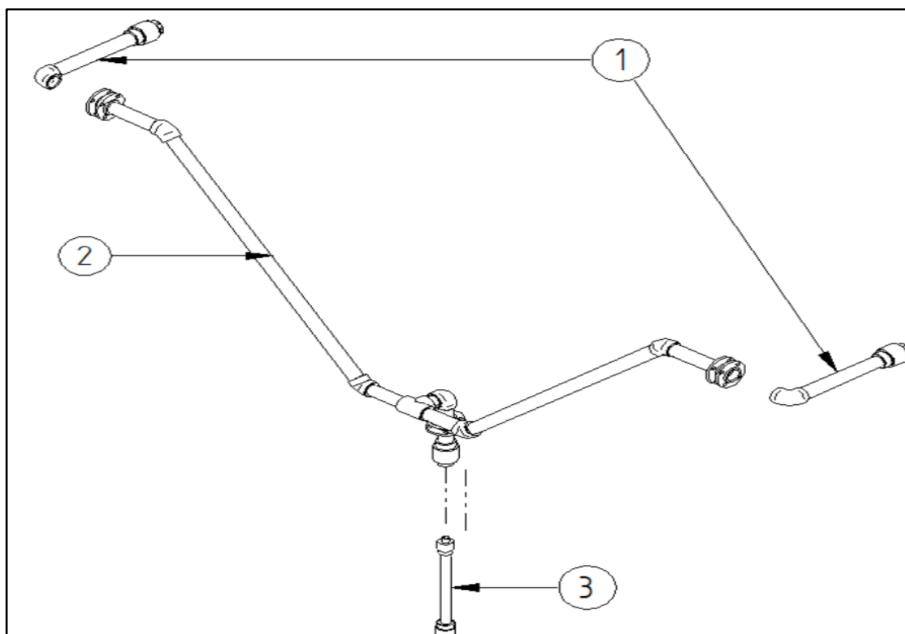
10 Spare parts

EC Fan

Item	Voltage
VT03200U.2	3~ 230V 50/60Hz
VT03147U.2	3~ 460V 50/60Hz
VT03084U.2	3~ 460V 50/60Hz
VT03240U.2	3~ 575V 50/60Hz

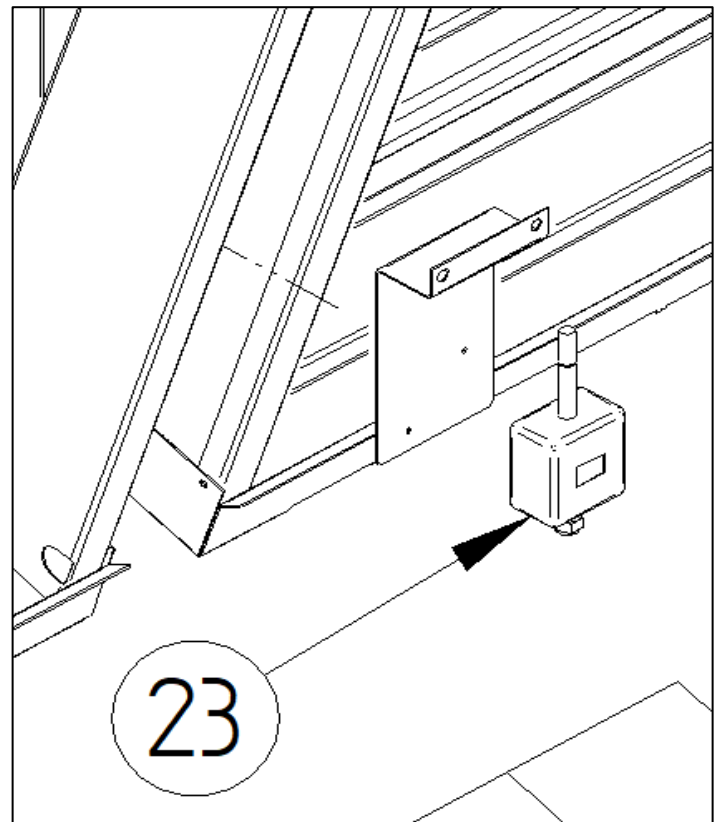
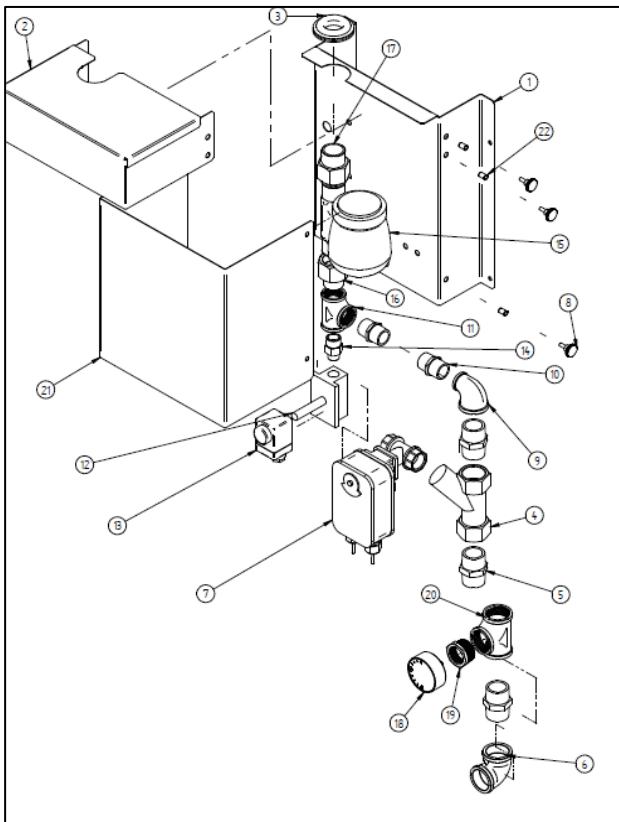
Distribution Pipe

ID	Item	Description	Quantity
1	AY189.10507	Tuboplus system S2	2
2	AY189.10506	Tuboplus system S1	1
3	AY189.7421	Tuboplus drain GFDA	1



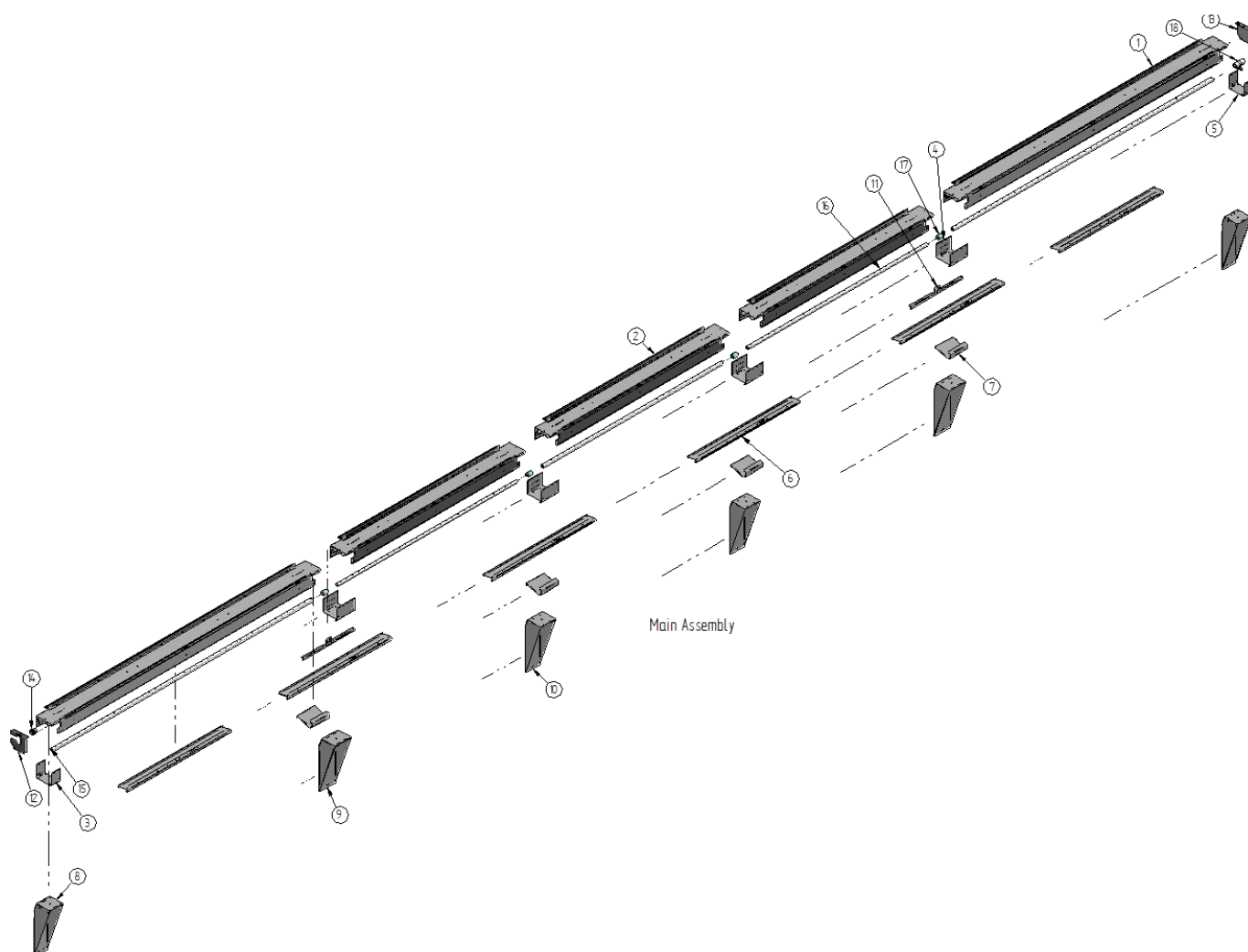
Valve Box Assembly

ID	Item	Description	Quantity
3	66488	Sealing grommets 1"	1
4	66385	Y-Strainer 1 1/4"	1
5	70287	Hex Nipple 1-1/4" NPT	3
6	66405	Elbow RG 90° 1 1/4" NPT	1
7	66399	Valve-aktuator kit B223+LF24	1
9	72121	Solenoid valve EV220B - 3/4"	1
10	70285	Hex Nipple 1" NPT	2
11	68842	T-Piece 1" NPT	1
12	72123	Elbow RG 90° 1-1/4" x 1"NPT	1
13	65597	Coil f.Solenoid Valve BE024DS	1
14	72122	Hex Nipple 1" x 3/4" NPT	1
15	5207763	Multi-jet domestic water meter	1
16	72110	Connector 1-1/4" BSPP x 1" NPT	1
17	72111	Nipple 1-1/4"BSPP	1
18	68843	Pressure gauge 2-1/2"	1
19	66944	Reducer Bushing 1-1/4" x 1" NPT	1
20	68871	T-Piece 1-1/4" NPT	1
23	5204798	Humidity Sensor	1



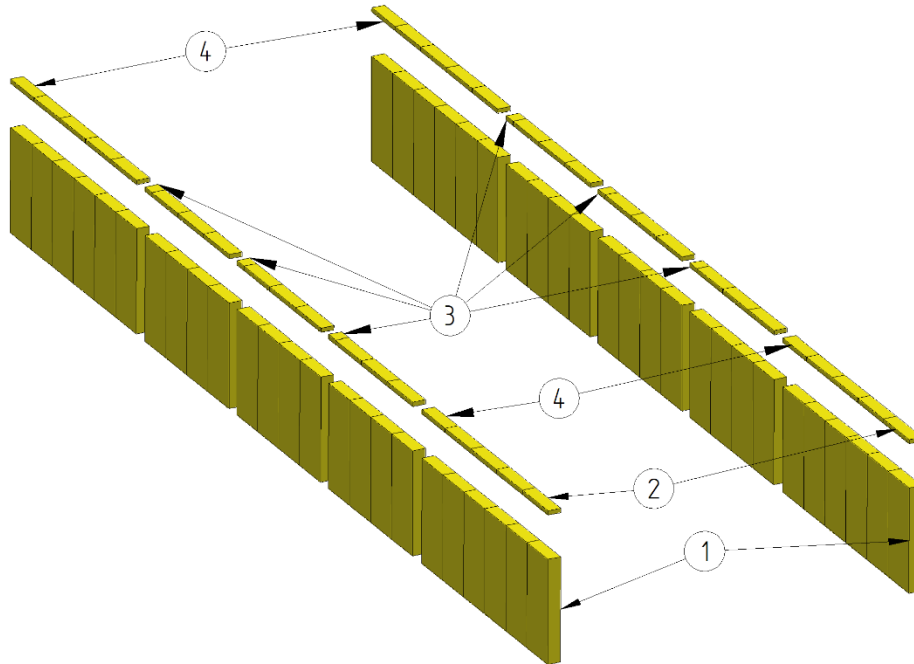
HydroBLU Accessory

ID	Item	Description	Quantity
15	AY189.9951	Water Distribution Tube Ø 1"	2
16	AY189.9952	Water Distribution Tube Ø 1"	3
17	61710	Coupling PVC 1" S40	4
18	66952	Ball valve 1" PVC Sch.40	1



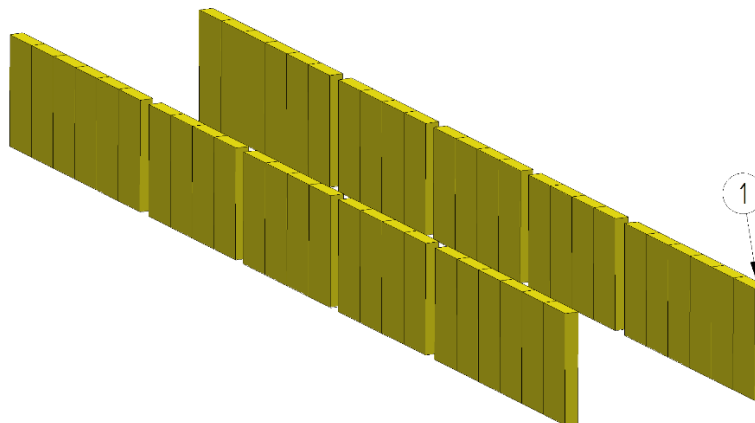
Cooling Pads (Top Section)

No.	Description	Item	Quantity
1	Cooling Panel CELdek 06x19x47"	72148	48
2	Cooling Panel CELdek 1.75x23.63x6"	70318	34
3	Cooling Panel CELdek 1-7/8x6"x23.62"	AY189.9956	6
4	Cooling Panel CELdek 1-7/8X6"X21.25"	AY189.9957	4



(Bottom Section)

No.	Description	Item	Quantity
1	Cooling Panel CELdek 06x19x47"	72148	48



Electrical Components

Non fuse Disconnects MOP 100A

Item	Description	Quantity
4774.1	Grounding Lug, AWG 2...14	1
57127.1	Disconnect Switch non-fusible, 600V, 100A, 50HP, 6mm square shaft	1
10000741	Disconnect shaft for fused and nonfused disconnect switch 200A...400A, 320mm length	1
57130	Operating handle for fused and nonfused disconnect switch 100A...200A, with defeater Red/Yellow Type 3R, 3, 12, 4, 4X / IP66 Dimension reference C1, D1	1
64604	Terminal shield 200A 194R-LNC18	1
63794	Terminal shield for disconnect up to 200A Dimension reference D1	2
63795	Terminal lug for disconnect switch Dimension reference 194R-NU200	2

Non fuse Disconnects MOP 125-200A

Item	Description	Quantity
10000748	GROUNDING LUG GL35/9819830	1
57128.1	Disconnect Switch non-fusible, 575V, 200A, 150HP Dimension reference D1	1
57130	Operating handle for fused and nonfused disconnect switch 100A...200A, with defeater Red/Yellow Type 3R, 3, 12, 4, 4X / IP66 Dimension reference C1, D1	1
10000741	Disconnect shaft for fused and nonfused disconnect switch 200A...400A, 320mm length	1
64604	Terminal shield 200A 194R-LNC18	1
63794	Terminal shield for disconnect up to 200A Dimension reference D1	2
63795	Terminal lug for disconnect switch Dimension reference 194R-NU200	2

Controllers for Unit with Dry Applications

Item	Description	Quantity
5207684.1	Güntner Controller of GMMnext	1
5207184.1	Guentner Expansion Module	3

Controllers for with Hydro Applications

Item	Description	Quantity
5208718	Güntner Controller of GMMnext, Versi GSCnext.1	1
5215440	Guentner Expansion Module	3

Motor Starter Protection MSP

Item	Description	Quantity
5208270	Motor Protection Circuit Breaker, overload and short circuit protection, It=4.0-6.3A, Iscp=81.9A	24
5208236	Motor Protection Circuit Breaker, overload and short circuit protection, It=6.3-10A, Iscp=130A	24



MSP Busbar components

Item	Description	Quantity
5208273	Three phase compact busbar for 25A Motor Protection Circuit Breaker, for use with 140M-C and 140M-D, 4 connections	1
5208299	Three phase compact busbar for 25A Motor Protection Circuit Breaker, for use with 140M-C and 140M-D, 5 connections	5
5208276	Compact busbar feeder, 3 poles	4