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## **Installation and maintenance manual**

**RFCS-6HE-000600-W-L-R23-2-DI**

**Mat. Nr. 120119291**

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## Scope of the installation and maintenance manual

This Installation and maintenance manual covers the recoolers:

See Annex and technical data sheet.

Read the Installation and maintenance manual before startup .

Keep and make available these Installation and maintenance manual for further use!



The unit is not suitable for use in an explosible atmosphere.

The unit must not be used for cooling flammable or explosible substances.

This operating manual was made to the best of our knowledge. Nevertheless and despite the greatest care, it cannot be excluded that mistakes could have crept in. Therefore please understand that in the absence of any provisions to the contrary hereinafter our warranty and liability – for any legal reasons whatsoever – are excluded in respect of the information in this operating manual. In particular, we shall not be liable for lost profit or other financial loss. This exclusion of liability does not apply in cases of intent and gross negligence. Moreover, it does not apply to defects which have been deceitfully concealed or whose absence has been guaranteed, nor in cases of culpable harm to life, physical injury and damage to health. If we negligently breach any material contractual obligation, our liability shall be limited to foreseeable damage. Claims due to the Product Liability shall remain unaffected.

In the event of translation, only the original version of the operating manual in German is legally valid.

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## 1.0 Foreword

This Installation and maintenance manual is designed to familiarize the user with the machine / unit and its designated use.

This manual contains important notes which are to be observed during the installation, operation and maintenance of the unit, in order to guarantee safe, proper and economical use of the system.

The operating manual must always be available wherever the machine / unit is in use.

This manual must be read and applied by any person in charge of carrying out work with and on the machine / unit, such as

- **operation**, including setting up, troubleshooting in the course of work, evacuation of production waste, care and disposal of fuels and consumables
- **installation, set-up, wiring**
- **maintenance** (serving, inspection, repair)
- **transport**

In addition to the operating manual and to the mandatory rules and regulations for accident prevention and environmental protection in the country and place of use of the machine / unit, the generally recognized technical rules for safe and proper working must also be observed.



WARNING

The marking for transport and stocking indicated on the packaging have to be observed under all circumstances

NOTE

Please check the type of manual (see Annex A, Type List) against the label on your device.

## 2.0 Warning notes and symbols

### 2.1 Symbols



WARNING

#### WARNING:

This heading is used whenever the ignorance or inaccurate obeying of factory rules, working rules, laid down work routines, etc. can lead to the death, injury to or an accident of a person.



ATTENTION

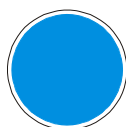
#### ATTENTION:

This heading is used whenever the ignorance or inaccurate obeying of factory rules, working rules, laid down work routines, etc. can lead to damage to the system.

NOTE

#### NOTE:

This heading is used when an exceptional feature should be taken notice of.



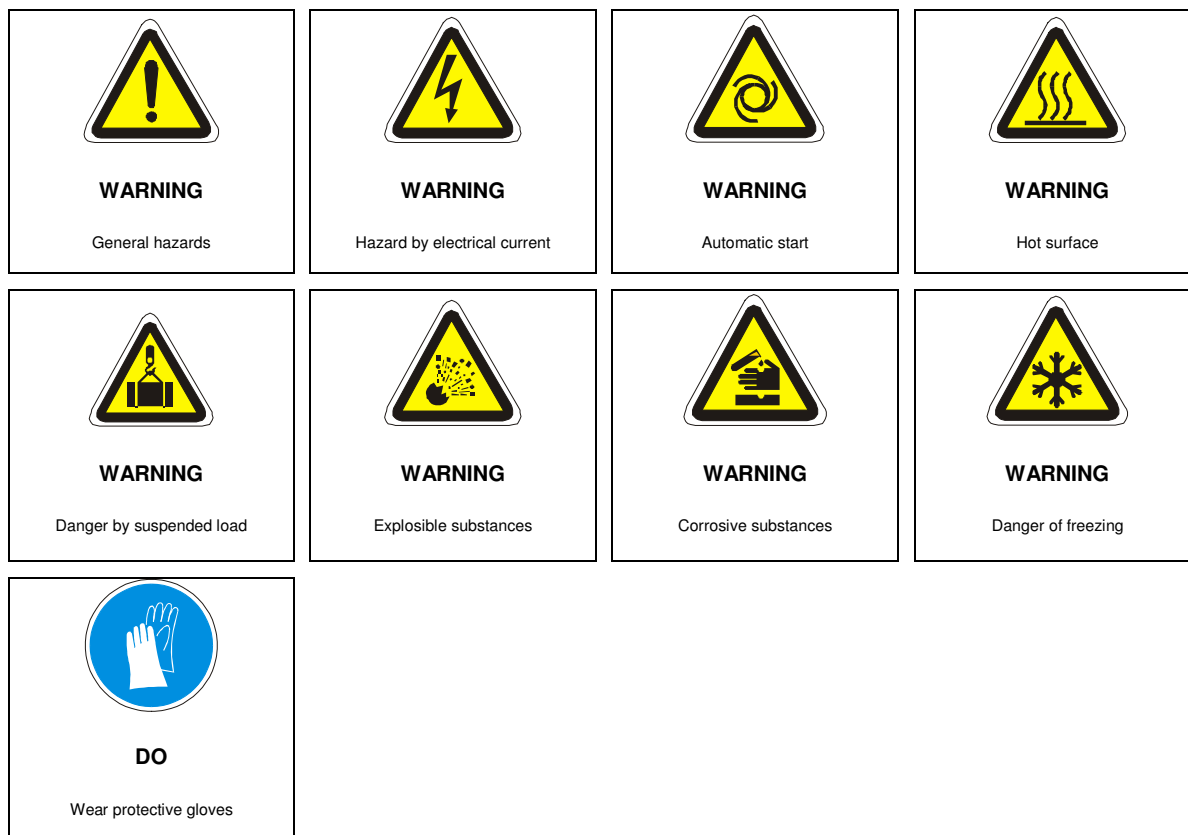
DO

#### DO:

This heading is used when technical rules or regulations require that a course of action be observed.

## 2.1.1 Warning notices and symbols used

The following warning notices and symbols are used in this manual:



## 2.2 Safety / Prevention of accidents

### 2.2.1 General notes

This installation and maintenance manual contains basic notes to be observed for startup, operation and maintenance. Read before starting the unit without fail.

The manufacturer declines any responsibility for damage and breakdowns resulting from a failure to observe this operating manual.

### 2.2.2 Qualification and training of personnel

The personnel for operation, maintenance, inspection and assembly must be adequately qualified for the work concerned. The user must clearly specify the sphere of responsibility, competence and supervision of the personnel.

### 2.2.3 Dangers when the notes on safety are ignored

Ignoring the safety regulations can have a harmful effect on persons or cause damage to the system or environment. Ignoring the safety regulations may cause a loss of claim for damages.

### 2.2.4 Safety - conscious working

Observe the notes and safety given in the manual, the national rules for prevention of accidents in force, as well as any internal instructions by the user for working, operation and safety.

### 2.2.5 Notes on safety for the user / operator

Any guard preventing accidental contact of moving parts must not be removed when the machine / unit is running. Take appropriate steps to preclude any hazard by electric power. (For relevant details see the rules of the VDE and the local energy supply companies).



**WARNING**

Mechanical, pneumatic, hydraulic or electrical components of the unit must in no case be overridden or changed.

The employer shall instruct the insured person on:

- the dangers when handling refrigerating plants and cooling
- The safety regulations
- the conduct in the case of accidents and failures and the Steps to be taken in such cases

Before they start their work for the first time and at reasonable intervals, however, at least once a year. (see VBG 20§19)

## **2.2.6 Notes on safety for maintenance, inspection and assembly work**

On principle, cleaning and maintenance of the machine / unit must be carried out with the machine / unit at standstill only. The procedure for shutdown of the unit given in the operating manual must be observed without fail. Immediately after completing the work all safety and guarding devices must be replaced and / or put into service again.

## **2.2.7 Unauthorised modification or use of spare parts**

Modification of or changes to the machine / unit are only permitted after previous consultation of the manufacturer. Original spare parts and accessories authorised by the manufacturer serve for ensuring safety. The use of any other parts may make the liability for the ensuing consequences invalid.

## **3.0 Reference**

### **3.1 Instructions for use**

- Please find out even before starting up about the measures for installation, set up, operation and maintenance
- These operating instructions contain basic advice that is to be observed during start-up, operation and maintenance
- No liability is accepted by the manufacturer for damage and operating faults that arise from a failure to observe these manual.

### **3.2 Safety instructions**

#### **3.2.1 When removing housings**

- The device should be disconnected from the
- It is possible that the copper wires and the compressor will still have hot surfaces even when the device is disconnected from the mains
- You should check whether the fan has stopped turning. If this is the case, then the repairs and maintenance may be carried out.
- Any guard preventing accidental contact of moving parts must not be removed when the machine / unit is running. Take appropriate steps to preclude any hazard by electric power.



**WARNING**

Affixed on the packaging instructions for transport and storage must be observed!

- On principle, cleaning and maintenance of the machine / unit must be carried out with the machine / unit at standstill only. The procedure for shutdown of the unit given in the manual must be observed without fail.
- Immediately after completing the work all safety and guarding devices must be replaced

and / or put into service again.

- Modification of or changes to the machine / unit are only permitted after previous consultation of the manufacturer. Original spare parts and accessories authorized by the manufacturer serve for ensuring safety.
- The use of any other parts may make the liability for the ensuing consequences invalid.

### 3.2.2 Improper operating modes

The operating safety of the delivered machine / unit is only guaranteed with proper use. The limit stated in the technical data must never be exceeded.



WARNING

The unit is not suitable for use in an explosible atmosphere.  
The unit must not be used for cooling flammable or explosible substances.

### 3.2.3 Handling of refrigerants

The refrigerant has some kind of irritant effect on skin and mucous membranes. Liquid refrigerants on the skin may cause frostbite.

Refrigerants may decompose and form toxic decomposition products (e.g. hydrogen chloride, phosgene) in the presence of naked flames or hot surfaces. The refrigerant volatilizes when it escapes in gaseous form the air. Intentionally blowing off and / or discharging the refrigerant is not permitted.

Transport and / or install refrigerating plants in such a way that they cannot be damaged by inhouse transportation or traffic.



WARNING

When refrigerant is escaping the unit, you must never smoke in the vicinity of the unit / machine.  
The gases will decompose to cauterizing acids in the burning cigarette that will damage your lungs.



WARNING

Repairing the cooling circuit may be by an expert firm only.

### 3.2.4 Staff qualifications and training

The personnel for the operation, maintenance, inspection and installation must be suitably qualified for his work. The staff's areas of responsibility and supervision must be precisely specified by the operating firm.

### 3.2.5 Plant log

The user is obliged to keep a plant log up to date in accordance with ES 378-2 paragraph 11.5.

The following data shall be entered into the log:

- Details of all maintenance and repair work
- Amount and kind of (new, re-used or recycled) of the refrigerant filled up, for each filling-up
- Amount of refrigerant drained of the plant, for each draining
- If there is an analysis of the re-used refrigerant, the results shall also be recorded in the log
- Origin of the re-used refrigerant
- Change to and replacement of components of the plant
- Results of all periodic routine checks
- Prolonged periods of downtime



## 3.2.6 Leak check

Certified personnel must perform legally prescribed periodic leakage tests on the coolant circuit at fixed intervals. The personnel must verify their certified status to the owner.

The testing interval is determined by the particular CO<sub>2</sub> equivalent of the coolant in the coolant circuit.

The CO<sub>2</sub> equivalent of the cooling system is given on the coolant ID plate (attached next to the serial no. plate) or the test log.

At 5 metric tons of CO<sub>2</sub> equivalent or more, tests must be performed every year, at 50 tons or more every six months and at 500 tons or more every three months.

Source: Regulation (EU) No. 517/2014 of the European Parliament and of the Council on fluorinated greenhouse gases and repealing Regulation (EC) No. 842/2006, Germany (2017)

All European member states have the option of taking stricter protective measures by means of national law in addition to Regulation (EU) Nr. 517/2014. This may involve a requirement for shorter leakage test intervals or a complete prohibition of a particular coolant.

The owners are themselves responsible for being adequately informed of the national law in the country where the coolant circuit is being used.

The tests must be documented in an operator's manual intended for the system. The operator's manual can be ordered from the manufacturer.

This operator's manual contains the basic technical data and documents the history of the machine. The manual must be updated by specialist personnel whenever the coolant circuit is broken into and whenever repair, maintenance, leak detection and leakage tests are performed.

Such work must always be performed in compliance with state-of-the-art technical standards.

## 4.0 General description of the unit

### 4.1 Usage to the intended purpose

The unit serves for cooling the water or refrigerant required for the working or finishing process.

The unit is designed as stand-alone or integrated device, depending on the configuration concerned.



WARNING

Warning:

-Unauthorized modifications of and changes to the unit  
-Use for any other purpose  
are forbidden for safety reasons.

### 4.2 Description of operation of compressor-cooled

The cooling water is supplied to the consumer and back by the circulating pump. The flow controller (option) mounted in the water circuit monitors the flow. The absorbed heat is dissipated via the cooling circuit to the ambient air or an external cooling water circuit. A low-level float switch mounted in the storage tank protects the circulating pump against running dry.

A flow sensor monitors the level and reports not enough water.

Option: Another level sensor monitors the level and automatically fills the cooling system via a 2/2 way valve.

**Refrigerating Operation:** Absorbed heat is dissipated to the refrigerant gas by the evaporator. Any refrigerant that evaporates during this process is drawn in and compressed by the compressor. The compressed refrigerant (hot gas) is then cooled and liquefied in the condenser. Depending on the refrigerating system, the heat released during this process is dissipated to the ambient air or an external cooling system. Liquefied refrigerant is again injected into the evaporator via the expansion valve and absorbs heat during this process. A high-pressure relief valve integrated in the system protects the cooling system against excess pressure.

**Option: Hot gas bypass operation**

A 2/2 way valve mounted in the cooling circuit controls the required cooling capacity as a function of the measured process water temperature via the temperature sensor and the temperature controller.

## Option: Flow control

A motorized control valve mounted in the cooling circuit controls the required cooling capacity as a function of the measured process water temperature via the temperature sensor and the temperature controller.

### 4.2.1 Function diagram compressor-cooled system:

See Annex



NOTE

The machine performance of air-cooled cooling units depends on the ambient temperature and the cooling water temperature to a considerable extent. The lower the ambient temperature, the higher the overall performance of the unit.



NOTE

The machine performance of water-cooled cooling units depends on the water temperature. The lower the water temperature, the higher the overall performance of the unit.

### 4.3 Heating Operation (optional)

After prolonged periods of standstill or under certain operating conditions it may become necessary to heat the cooling water by means of a heating element to reach the process temperature faster or to maintain it. The unit controller will cut the heating element in if required.

## 5.0 Transport

The machine / unit may be transported in the original packing only until the first startup. Notify the manufacturer immediately if you detect any damage. When the machine / unit is given another place in a plant, all connections of the machine / unit must be disconnected. Any dislocating of the machine / unit must be done in such a way that damage is excluded.

Should there be a damage despite these notes, have the machine / unit inspected and/or repaired, if required, by an expert before you start it again.



WARNUNG

The machine may only be transported upright and in position for use. The machine / unit has a weight of (see appendix, Technical Data).



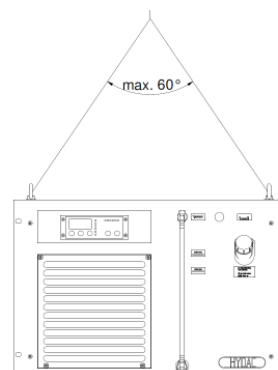
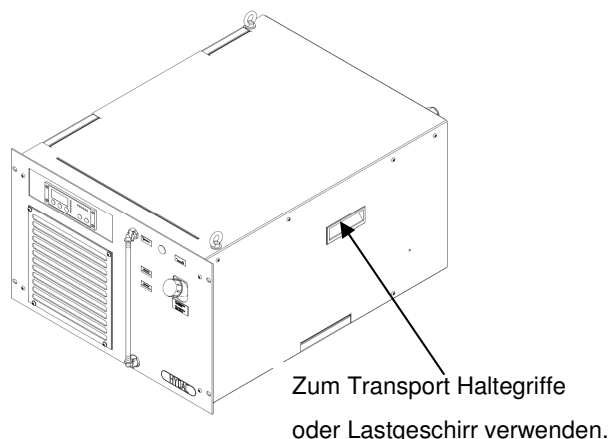
WARNUNG

Use appropriate means for transporting it. Observe all relevant safety regulations without fail.



WARNUNG

As a rule, work on the electrical system must be carried out by expert personnel; the valid wiring diagram and the VDE guidelines must be observed.



## 6.0 Unpacking and handling

A visual inspection must be performed before and during unpacking in order to discover any damage that might have occurred during transportation.

Please watch out for loose parts, dents, scratches etc.

Any damage is to be reported immediately to the transport company (Note „Terms concerning instances of damage“). More over ZVEI's "Standard supply terms and conditions" in the relevant latest version apply.

Before the packaging material is disposed of, it is necessary to check whether there are any loose functional parts still in it.

To permit claims under the guarantee to be processed, we request precise information of the defect (possibly a photo) and a statement of the description of the device's serial number.

To protect the device from damage, it must only be transported and stored in its operating orientation. Failure to observe this will result in the guarantee becoming void.

### 6.1 General information

In the event of transportation, we recommend emptying the device's liquid container. Please always keep the device in its operating orientation when handling it.

Work on the device may only be performed by experts. The relevant safety and environmental regulations are to be observed.

In the design of the devices following standards were used:

EG- machinery Directive 2006/42/EG

EG- Low Voltage Directive

DIN EN ISO12100-1, -2 Safety of machinery

EN 60204-1 Electrical equipment of machines

The device has been checked at the factory as regards its seals.

It is certified that the device has been subjected to an electrical safety test in the factory before being dispatched.

### 6.2 Technical Data and type plate

Please find the technical data in the annex.

The information on the plate is to be noted when giving statements and for maintenance. It is located on the side of the device.

## 7.0 Use and function

This water recooling device is a compact device to which only electricity and hydraulics or technical water systems still need to be connected and after it has been filled with the primary medium it can be started up straight away.

Cooling of the primary medium occurs in an insulated open container with a plate heat exchanger as an evaporator. The heat absorbed by the refrigerant in the evaporator is released to the environment by the air-cooled condenser.

The device is used to recool liquid media such as water or brine in industrial or commercial machines, plant or processes.

Any use other than this is deemed not to be in accordance with the constructions.



WARNING

If the device is to be operated in accordance with the instructions but with water temperatures of  $<12^{\circ}\text{C}$ , then an antifreeze should be added to the water to provide protection against freezing.

Here it should be noted that although the lower limit of use extends downwards, the cooling performance changes considerably. Moreover, the pump performance is to be checked. Please checked to an expert before changing over



ATTENTION

The device may be operated only with the technical data stated in coolant.

## 8.0 Installation / Startup

### 8.1 Installation

The location of the unit should be selected in such a way that it will always be easily accessible for the operating personnel and that it is not subjected to extreme heat, e.g. near a heating. Protect the unit against humidity. If the unit is to be installed in areas where there is danger of frost, it must be specially equipped for such an installation.

The unit has been specially designed for mounting in 19" racks

Place the unit into the bay in the direction of the arrow and mount it.

The direction of installation (direction of the arrow) marks the flow of the cooling air, too. Free flow must be ensured.



ATTENTION

Before you install the unit outdoors or in areas where there is danger of frost, contact the Manufacturer



ATTENTION

The cooling air must be able to circulate freely. Any air intake and outlet channels must provide their own suction i.e. they must contain compensation bellows. The fitting of air-conducting device has to be agreed with the manufacturer.



Pos.	description
1.	Air inlet
2.	Air outlet

### 8.2 Hydraulic connection

The connections and the liquid circuits are to be positioned by experts in accordance with the technical regulations.



WARNING

If parts of the cable or other connected elements is higher than the intended level of liquid placed as the return flow of the medium at a stationary plant is to be prevented with proper facilities.

### 8.3 Electrical connection

The cooling device is designed in accordance with the electrical circuit diagram. (See annex)



WARNING

It must be safeguarded in accordance with the current consumption of the device provided. See technical data sheet.



WARNING

Mains voltage and mains frequency must match the nominal values stated on the device's type plate.



WARNING

The cooler needs to be integrated into the customer EMERGENCY district. (Off the 24V supply)



WARNING

Work on electrical systems may only be performed by experts. The relevant local safety regulations are to be observed.

## 9.0 Start up and Operation

### 9.1 preparation

- The unpacked unit has to be left in operating position for some 24 hours prior to start up so that the cooling oil may collect after transport.
- Before using the correct connection of the proposed utility lines (pipes / tubes for Prior to- and return) and their tightness.
- The tank through the filler neck, to the max. Filled with a suitable medium. (See technical data sheet.)
- In systems without tank, the entire plant system to be completely filled with medium.
- Creating a main power supply.



WARNING

As a rule, work on the electrical system must be carried out by expert personnel; the valid wiring diagram and the VDE guidelines must be observed. Compare the mains voltage at side with the nameplate of the unit.

### 9.2 Operation

- Cooling switch on



WARNING

The device may only be operated with closed housing, Otherwise it can cause failure of the device.



WARNING

After a short period of operation it is necessary to check whether the medium needs to be topped up.

Check tightness of the supply lines.

For external lockable medium - a bypass circuit is the customer care provided to the media.

### 9.3 Tank filling



WARNING

Use only the specified medium!

For filling the fuel cap and unscrew the medium fill to the mark (maximum level). Check the Level indicator. Be careful in the filling is clean.

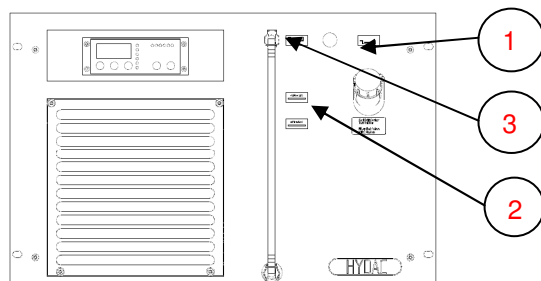


WARNING

Use only clean medium. Make sure no dirt gets into the tank.

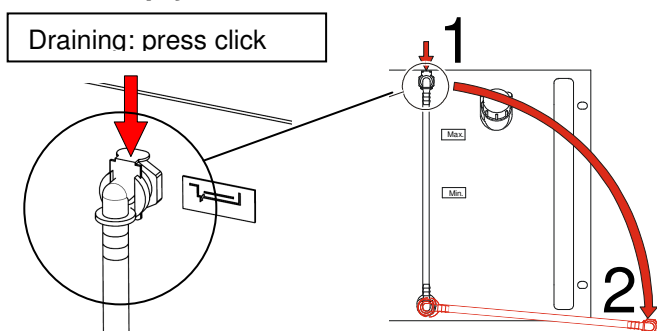
Check that:

- The hoses are routed correctly and installed in accordance with labeling
- Is the system filled and vented.
- Water level maximal.
- Power supply available.
- The circulation pump is connected and vented.



Pos.	description
1.	filling
2.	min./max. level
3.	draining

## 9.4 Empty the tank



## 10.0 Operation of the temperature controller

(Separate instruction: see annex)

### General functional description:

The electronic regulator displays the temperature determined by the sensor in the buffer store and compares it with the target value. Depending on the temperature, the output relay is activated in accordance with the preset target value, the status of the circuit being displayed by the display

## 11.0 Service and maintenance

### 11.1 Inspection

When the mechanical parts are running irregularly or when there are strange noises, switch off the machine / unit.

### 11.2 Maintenance schedule

WHEN	WHAT	WHERE
Daily	Check	Water level
Weekly	Check	Fins of condenser
Monthly	Check	Air filter
Half yearly	Change	Water filter
Yearly	Check	Electric system, safety
Customer specific	Replace or cleaning	Air filter, DI -cartridge

## 11.3 Maintenance generally



WARNING

Make the unit dead by means of the master switch and/or the protective motor switches when carrying out maintenance and secure against inadvertent switching-on.



WARNING

There are hot components behind the covers.

When the covers are removed for maintenance or repair work, make sure not to touch these components!



WARNING

Wear protective gloves when you reach into this area. (Sharp fins – danger of injury!).



WARNING

Do not reach within the range of rotation of the fan blade. Danger of injuries when the fan blade start to rotate. Before you open the front cover, the plant must be switched off by means of the master switch and must be secured against inadvertent switching on.

The level of the primary medium is to be checked at regular intervals and if necessary the medium (see Technical Data) topped up. It is recommended that the bolt fixings of the primary circuit be regularly checked for tightness. This applies in particular if the primary medium is frequently low.

## 11.4 Change the Air filter

Make sure that the filter mat upstream of the condenser remains sufficiently pervious to ensure the required heat exchange. Replace the filter mat at intervals that determine yourself considering the service conditions concerned.



WARNING

Make the unit dead by means of the master switch and/or the protective motor switches when carrying out maintenance and secure against inadvertent switching-on.



ATTENTION

A soiled filter mat will cause the refrigerating capacity of the unit to decrease. As a result of the additionally increasing power consumption of the compressor, the efficiency of the plant / machine will drop considerably.



ATTENTION

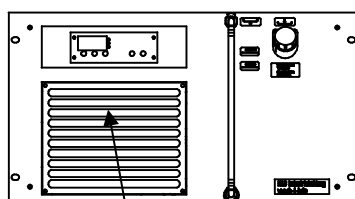
The filter mat may be replaced by instructed personnel only.



WARNING

There are hot components behind the covers.

When the covers are removed for maintenance or repair work, make sure not to touch these components!



Cover of air inlet

Pos.	Process as follows
1.	Dismount cover
2.	Replace filter by new one
3.	Mount cover.

## 11.5 Cleaning the condenser

Make sure with air-cooled units that the fins of the compressor are always clean to ensure the required heat exchange. Clean the fins of the condenser of dust and fluffing by means of compressed air. Determine the intervals for cleaning yourself taking the service conditions into consideration..



ATTENTION

Cleaning may be done by instructed personnel only

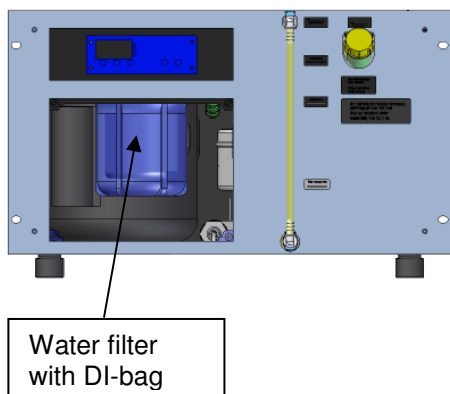


DO

Wear protective gloves when you reach into this area. (Sharp fins – danger of injury!)

## 11.6 Replacing the Water Filter (Optionally DI-bag) (Option)

Check the water filter and the DI-bag are for soiling at regular intervals (also see maintenance schedule). Replace the filter cartridge and the DI-bag are in time, before the flow volume is reduced.



### Process as follows

1. Switch the unit off and secure it against being switched on
2. drain the tank
3. Remove filter mat
4. Unscrew the filter case (transparent bottom part)
5. Pull the filter cartridge off to the bottom
6. Mount new filter cartridge and DI-Bag
7. Clean filter case
8. Mount filter case
9. mounted air intake panel and filter mat
10. Fill the tank
11. Deaerate the unit

Shows the particulate filter with DI-bag is placed around the particle filter. (Optional)





## 12.0 Guarantee terms and conditions

Within the legal guarantee period, functional faults that are attributable to defective manufacture or defects in materials will be corrected free of charge within the country. Only the materials costs are covered abroad.

Further claims, in particular for consequential loss, are excluded.

Damage and functional faults caused by incorrect handling or failure to observe the operating instructions do not fall within the terms of the guarantee.

The guarantee is extinguished if the system structure has been interfered with or the serial number on the device has been changed or made illegible.

The device has been carefully tested and set in the factory. If you nevertheless have a complaint, please contact your contract partner with confidence. Please do not forget to tell us the name of your specialist or technician responsible in case of further enquiries.

### For the conservation of the following warranty please:

- Enclose a precise description of the defect with your letter.
- Enclose the proof of purchase in the form of a copy of a delivery note or invoice and note on it the type and manufacturing reference number of the device.

## 13.0 Shutdown of the unit

If the unit some time out of service, we recommend the primary medium drained off. Frost damage is excluded from all liability.

## 14.0 Repair and Troubleshooting

If the operation a failure occur at the last device that you want to search using the interference of the table makes it easier in the plant. If in doubt, you should always consult a specialist (expert).



WARNING

Repairing the refrigerant circuit may be by an expert firm only. Should there be any problems, please contact the manufacturer

When working in the refrigeration cycle is to ensure adequate ventilation.



WARNING

As a rule, work on the electrical system must be carried out by expert personnel; the valid wiring diagram and the VDE guidelines must be observed. Compare the mains voltage at site with the nameplate of the unit.

## 15.0 Possible causes of errors and breakdowns

### 15.1 Lack of refrigerant

You will notice a lack of refrigerant by a marked drop in the refrigerating capacity. If this is the case, there is a leak in the cooling circuit. You will see a lot of gas bubbles in the sight glass.



WARNING

Repairing the cooling circuit may be by an expert firm only.



WARNING

When refrigerant is escaping the unit, you must never smoke in the vicinity of the unit / machine. The gases will decompose to cauterizing acids in the burning cigarette that will damage your lungs. Never use a naked flame when checking for leaks!

## **15.2 Compressor overloaded – High pressure cut – out triggers**

Possible reasons for the release of the pressure switch can be:

- High ambient temperature ( $>+42\text{ °C}$ )
- non-compliance of necessary clearances (→see Chapter Installation / Startup)
- broken fan
- dirty fan / dirty condenser (→see Chapter Maintenance)
- Excessive water temperature (→ pay attention to the area of application)

## **15.3 Compressor constantly switching on and off – Low pressure cut – out triggers**

A possible cause for constant switching on and off is:

- Excess refrigerating capacity of the chilling unit
- Loss of refrigerant

## **15.4 Excessive water temperature**

During operation, the cooling unit is running into a reliable condition. The refrigerating unit keeps the water supply line temperature at the set point adjusted. Possible causes for a deviation are:

- Heat input  $>$  the refrigerating capacity at this operating point (Annex range of usability – Technical data)
- At high temperature ( $>42\text{ °C}$ )
- failure to meet the required clearances (→ see Chapter Installation und Startup)
- defekt cooling fan (air cooled units)
- dirty condenser (→ see Chapter Maintenance)
- Lack of refrigerant
- Water level too low

## **15.5 General malfunction**

### **Overload current**

All electrical drive mechanismus of the refrigerating plant are protectec by motorprotecting switches. The motor protecting switvh may trigger in the following cases:

- Wrong rotary field
- One phase missing
- Overloading of the plant
- Wrong mains voltage
- Wrong frequency
- Motor defective
- Defective supply lead of motor concerned
- Excess temperature in control cabinet

### **No pump power**

This fault may be due to the following causes:

- Pump rotating in the wrong direction
- Pump not vented (→ Start-up)

- Back pressure in the primary too high
- Water level in tank below minimum

## 16.0 For waste and recycling

The environmental requirements for recovery, recycling and disposal of materials and the refrigeration unit must be respected in accordance with DIN EN 378 and ROHS Directives. For this purpose, the operator should be responsible.

## 17.0 Dismounting

### 17.1 Electric connection



WARNING

As a rule, work on the electrical system must be carried out by expert personnel; the valid wiring diagram and the VDE guidelines must be observed. Make the unit dead.

### 17.2 Scrapping



WARNING

All components of the unit must be disposed of according to the applicable rules and regulations.

### 17.3 Refrigerant



WARNING

The refrigerant may only be drained by a specialised firm for refrigeration air-condition engineering and must then be disposed of in accordance with the relevant rules and regulations.

### 17.4 Process water



WARNING

The process water must be disposed of in accordance with the relevant rules and regulations.

Draw off the process medium by means of a pump and dispose of it according to the relevant regulations.

In the case of plants with a draining plug, the process medium may be discharged by means of this. Make sure that the system is drained completely.

### 17.5 Emptying the external water system



WARNING

The external water system must be completely emptied by to avoid frost damage.

**18.0 Annex**

**18.1 Regulator Description**

**18.2 Technical Data**

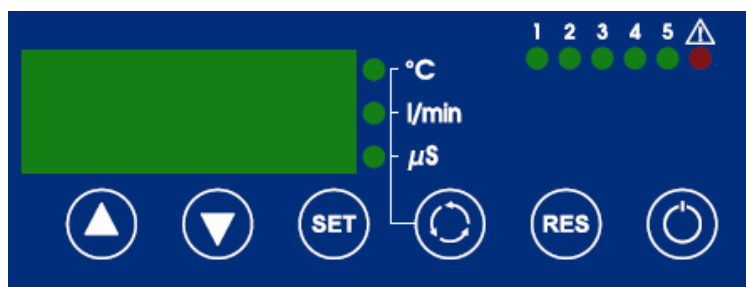
**18.3 Spare parts list**

**18.4 Dimension sheet**

**18.5 Flow chart**

**18.6 declaration of incorporation**

**18.7 Wiring diagramm**



# USER MANUAL

## Temperature Controller Display

Part-No.: 3756766  
Document Version: A4

## 1. GENERAL NOTES

### a) Control Elements

The display is operated by pressing keys.



#### Key 1 UP

- Increase a value
- Navigation



#### Key 2 DOWN

- Decrease a value
- Navigation



#### Key 3 SET

- Show set point value
- Show/Change a parameter value
- Enter a parameter level



#### Key 4 SELECT

- Change between actual values: actual temperature, flow rate, conductance



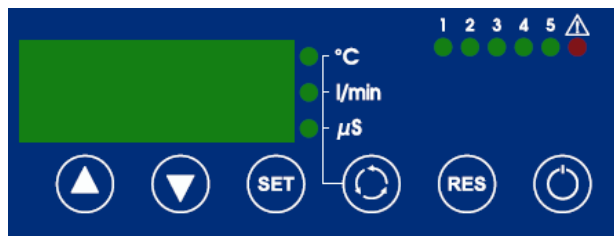
#### Key 5 RESET

- Reset errors
- Exit the parameter level



#### Key 6 POWER / STANDBY (long press on key)

- Chiller on / Chiller off
- Attention: The device is in standby still energized!



### b) Display Elements

A seven-segment indicator with three digits shows parameters and actual values. If the value can't be displayed due to the limited number of digits, the display shows  $\square\square\square$ .

Three vertically arranged LEDs indicate which measurement refers to the display value.



**Measured Value 1** °C  
actual temperature









**Measured Value 2** l/min  
flow rate



**Measured Value 3** µS (µS/cm)  
conductance

Use the **SELECT** button to switch between the measured values. When switching, measurement values are automatically skipped if they are not present.

Six horizontally arranged LEDs indicate the state of each component (actuators).

	<b>State 1</b> Compressor
	<b>State 2</b> Pump
	<b>State 3</b> Heating
	<b>State 4</b> HGB-Valve (at multicompressor systems: Compressor 2)
	<b>State 5</b> Fan
	<b>Fault</b> flash light: warning (chiller stays on, display shows error code) continuous light: error (chiller turns off automatically, display shows error code)

## 2. BASIC FUNCTIONS

Once the chiller is powered on, the display initializes and returns to home screen.

### a) Home Screen

If the chiller is in standby mode, the display shows „OFF“.

If the chiller is turned on, the display shows the actual temperature.

#### Turn chiller on/off



The chiller can be turned on with the **POWER** button. For this, a long press is required.

*Note: The **POWER** button is disabled if an external remote start signal is used to turn on and off.*

#### Select a measured value



After switching on, the display shows the actual temperature. The corresponding LED (°C) lights. With the **SELECT** button you can switch between other measured values. After a delay, the display returns automatically back to the actual temperature.

#### Change the set point temperature



As long as the **SET** button is pressed, the display shows the set point temperature (parameter S1). At the same time, you can change the temperature by pressing the **UP** or **DOWN** button. By releasing the **SET** key, the new value is stored.

#### Reset an error



In the event of a fault (*FAULT*-LED flashes or lights), all error messages displayed alternately. If the problem is resolved, warning messages (Uxx) will be reset automatically. An alarm message (Exx) must be acknowledged by pressing the **RESET** button.

Error codes:

Error codes (warnings and alarms) are automatically displayed on the home screen when a fault is present. At same time, the red fault LED flashes (at warning messages) or continuous light (at alarm message). If several errors occur simultaneously, the error codes are displayed alternately every second.

## b) Change the set point temperature (Parameter S1)

Initial point: The display shows the home screen.



As long as the **SET** button is pressed, the display shows the set point temperature (parameter S1). At that time, you can change the temperature by pressing the **UP** or **DOWN** button. By releasing the **SET** key, the new value is stored.

*Note: The set point can be changed only within the set point limits. The limits were defined by the manufacturer and are specially configured for the chiller.*

## c) Enter the parameter level

Initial point: The display shows the home screen.



+

Enter the parameter level

Press and hold **UP** and **DOWN** buttons for at least 3 seconds pressed, until the display changes to the view of the parameter groups. Use now the **UP** or **DOWN** button to set the parameter group *USR* or *OPH* be selected. The parameter group is entered with the **SET** button.

*Note: The user have no access to parameter groups PA and PAE.*

Exit the parameter level

The parameter level can be left with **RESET** button to return to home screen.

Within the parameter groups *USR* or *OPH* following navigation applies:



or

Scroll in parameter list

Use **UP** or **DOWN** button to select a parameter.

Show parameter value

The value of a parameter is displayed as long as the **SET** key is pressed.

Change parameter value

The value of a parameter is displayed as long as the **SET** key is pressed. Now you can change the value using the **UP** or **DOWN** buttons. If you hold the **UP** or **DOWN** button, then the value is automatically increased or decreased. When you release the **SET** button, the value is stored.



#### d) Parameter group USR

Parameter group *USR*: parameter list for customers

Parameter	Functional description	Adjustment range
<b>5 1</b>	Temperature Set point (same function like pressing the SET button at home screen)	depends on chiller
<b>A 3</b>	Temperature Lower limit warning (error code: U10) relative value to set point parameter S1	-99,9K ... +99,9K
<b>A 4</b>	Temperature Upper limit warning (error code: U11) relative value to set point parameter S1	-99,9K ... +99,9K
<b>A 6</b>	Conductance Set point	depends on chiller
<b>A20</b>	Flow rate Lower limit alarm (error code: E01) absolute value	depends on chiller
<b>A24</b>	Flow rate Lower limit warning (error code: U04) offset to A20 (U04 occurs if flow rate is less than A20 + A24)	0...99,9l/min
<b>L 6</b>	Software-Version (f.e. V1.04.0)	read only

**Notes:**

- A6 is shown only when a conductance control is possible.  
A20 is shown only when a flow sensor with analogue output is available.  
A24 is shown only when a flow warning is supported by the controller.  
L 6 is shown only when the view is supported by the controller.

#### e) Parameter group OPH (Operating hours)

The parameter group *OPH* shows the operating hours of each component (actuators).

Example: 0\_H = 1 0\_L = 85 → Operating time of the compressor is 1085 hours (1 \* 1000 + 85).

Parameter	Component / Actuator	Multiplication factor
<b>0_L</b> <b>0_H</b>	Compressor	1 1000
<b>1_L</b> <b>1_H</b>	Pump	1 1000

2-L 2-H	Heating	1 1000
3-L 3-H	HGB-Valve (at multicompressor systems: Compressor 2)	1 1000
4-L 4-H	Fan	1 1000
5-L 5-H	DI-Valve	1 1000
7-L 7-H	Complete system (including standby)	1 1000

### 3. ERROR CODES

Once an error (warning or alarm) is present, the error code is displayed automatically. The following tables give you a complete overview over all error messages. Please note that not all error codes are displayed because the technical requirements therefore are maybe missing.

#### a) Warnings

A warning is automatically reset when the fault is no longer present. When a warning appears, all electrical components (actuators) will remain in operation. If a warning is present, it is signalled via the collective output "warning" (pre-interlock via potential-free relay).

Code	Short description	Causes & Actions
U01	Low tank level warning	refill tank up to mark causes: leakage, evaporation, defective level switch
U02	Dirty air filter	clean or change air filter further causes: defective (differential) pressure switch
U03	Missing air filter	insert air filter further causes: defective monitoring switch
U04	Low flow rate warning flow rate is less than parameter A20 + A24	change cartridge filter further causes: damage to hoses, defective flow sensor
U06	Misc. warning 1 definition: see electrical circuit	contact service hotline due to free use
U07	Misc. warning 2 definition: see electrical circuit	contact service hotline due to free use
U10	Low temperature warning	temperature is less than parameter A3 (see parameter group USR)

U 11	High temperature warning	temperature is greater than parameter A4 (see parameter group USR)
U32	High conductance value	change DI cartridge causes: no use of DI water, defective valve for conductance control
U34	Low temperature warning signalling via alarm interlock!	temperature is less than parameter A28
U35	High temperature warning signalling via alarm interlock!	temperature is greater than parameter A29
U40	Low pressure warning (refrig. circuit) signalling via alarm interlock!	contact service hotline causes: loss of refrigerant, defective refrigerant component
U41	High pressure warning (refrig. circuit) signalling via alarm interlock!	clean air filter & check air inlet contact service hotline causes: defective fan, no flow in external water circuit, open housing
U96 U97	Conductance sensor maybe not working	measured value out of range change conductance sensor check electrical connection

**Notes:**

U01

U34, U35, U40, U41

U40, U41

U40, U41

heating inside the tank is blocked (off).

error signalling via alarm interlock, not pre-interlock!

error must be acknowledged with the RESET button.

all actuators turn off, only the pump stays on.

**b) Alarms / Errors**

An alarm must be reset manually using the RESET button if the fault is no longer present. When an alarm appears, all electrical components (actuators) will turn off automatically. If an alarm is present, it is signalled via the collective output "alarm" (interlock via potential-free relay).

Code	Short description	Causes & Actions
E01	Low flow rate error flow rate is less than parameter A20	check fluid circuit further causes: defective pump, valve, hose, dirty filter
E02	Motor protection switch has tripped	reset motor protection switches causes: overload of electrical components
E03	Low tank level error dry run safety	check fluid circuit refill tank up to mark causes: leakage, evaporation, defective level switch
E06	Misc. error 1 definition: see electrical circuit	contact service hotline due to free use
E07	Misc. error 2 definition: see electrical circuit	contact service hotline due to free use
E10	Low temperature error	temperature less than absolute limit parameter A1 → protection shutdown (defined by manufacturer) causes: electrical connection to compressor, defective compressor or valve
E11	High temperature error	temperature greater than absolute limit parameter A2 → protection shutdown (defined by manufacturer) causes: electrical connection to compressor, defective compressor or valve, low flow rate of external water circuit, defective fan, refrigerant shortage

E44	Phase sequence error	check connection of phases L1-L2-L3
E90	Sensor error F1, short circuit	check electrical connection to sensor F1, change sensor F1
E91	Sensor error F1, cable break	check electrical connection to sensor F1, change sensor F1
E92	Sensor error F2, short circuit	check electrical connection to sensor F2, change sensor F2
E93	Sensor error F2, cable break	check electrical connection to sensor F2, change sensor F2
E98	Communication error with display	check electrical connection, change display or controller
E99	Global system error	contact service hotline restart chiller (power reset)  causes: software bug, defective controller

#### 4. ENABLE OR DISABLE REMOTE CONTROL

The chiller can be switched on and off by one of the following options:

- with **POWER** key on the display (H71=0)
- with an external remote control signal via the interface (H71=5)

The following steps show you how to change the parameter setting:

1. Press keys UP and DOWN together for round about 3 seconds.
2. Select level „PAE“ by pressing key UP.
3. Hold key SET pressed and adjust value -38 with key DOWN. Now release the keys.
4. The display shows „A--“
5. Go to level „H--“ by pressing key UP.
6. Hold key SET pressed and adjust value -18 with key DOWN. Now release the keys.
7. Select parameter „H71“ by pressing key UP.
8. Hold key “SET“ pressed and adjust value “0” (disable remote control) or “5” (enable remote control) by pressing key “UP” or “DOWN”. Now release the keys. The new value been stored.
9. Press both keys UP and DOWN for three seconds. Now you exit the upper parameter level.
10. Press both keys UP and DOWN for three seconds. Now you leave the parameter level.
11. Setting of parameters is done.

*Note: Please do not change other parameters. The chiller could be damaged or destroyed!*

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## **Technical Data**

**RFCS-6HE-000600-W-L-R23-2-DI**

**Art. Nr. / Part No. 120119291**

**Compresseur / air coolsystem with hotgasbypass-Ventil**

Stand Alone coolsystem with Display Temperature (t) and flow (l/min)

Device designation: RFCS-6HE-000600-W-L-R23-2-DI  
Mat. No. / Part. No. 120119291

Operating voltage 230V(207-253V1PH50/60Hz)  
current consumption 7,5A (max. 9,0A)

Rated cooling capacity 600W based on  
25°C coolant temperature  
35°C ambient  
>4l/min flow (intern water)  
50- 350W based on  
25°C coolant temperature  
40°C ambient  
>4l/min flow (intern water)

flow temperature +15°C - +28°C

ambient temperature + 5°C - +42°C

Condenser air cooled

Refrigerant R134a / 400gr.

Coolant purified water, DI-water compatible <5µS / cm

Tank capacity: V2A container with 6 ltrs

Heating: Heating cartridge in the tank 700W

Flow controller SIKA VTY Hallsensor 530p/l/min  
Measuring range: 1...15l/min

Pump: immersion pump Y2051.0130

Coolant pump / Duty point Operating point 4l / min at 3bar

controller: PID controller  
Control accuracy: +/-0.1K (PT100)

Partikle filter: 20µm

DI cartridge (optional): DI-bag / Filter

Electrical connection: line filter with fuse

Signal line: 15pol. Sub-D multi pin connector with floating remote start

Hydraulic connection: 2x 12mm hose connection

Air direction: air intake from the front - air outlet over the back

Maximum air flow: 800m³/h 50Hz  
900m³/h 60 Hz

Air filters: foam black

Dimensions: see dimension sheet

Weight: 45kg

Paint: Front RAL 7035 light grey frame blue chromated

Others: Level switch, protection against dry running, Floating collective fault, high pressure switch, rubber buffers, hot gas bypass valve, remote start

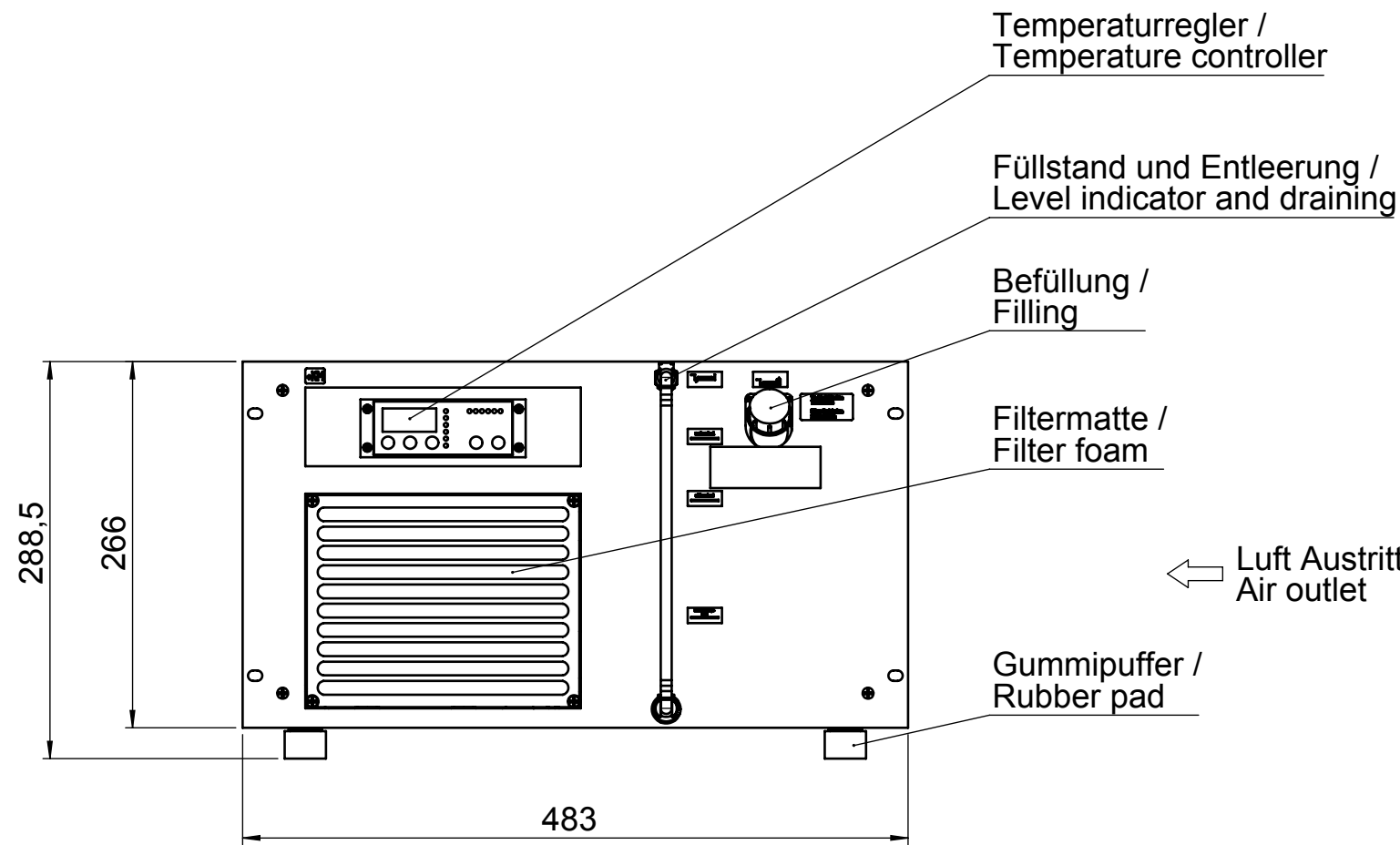
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## Ersatzteilliste / Spare parts list

Gerät / Cooling system: RFCS-6HE-000600-W-L-R23-2-DI

Artikel Nr / Part.no.: 120119291 – SaByRD6

Bezeichnung / description	Artikelnummer / item number
<b>Kältebauteile / cooling components</b>	
Ventilator Fan	120110220
Temperatursensor für Lüftersteuerung Temperature sensor for fan control	-
<b>Bauteile für Hauswasseranschluss / Components for externwater supply</b>	
3/2-Wege Wasserventil 3/2-way valve water	-
3/2-Wege Wasserventil Anschlussgehäuse 3/2-way valve water connection housing	-
Schmutzfänger Dirt arrester	-
Durchflussbegrenzer Flow controller	-
<b>Bauteile für Wasserkreis / Components for water system</b>	
Pumpe Pump	141300295
Heizung Heating	120103187
Durchflussmesser ohne Temperatursensor Flow meter without temperature sensor	141100311
Temperatursensor Temperature sensor	141100060
Thermoschalter Thermal switch	141100720
Schwimmerschalter Float switch	141100265
Verschlusskappe Tank Tank cap	110800729
Entleerungsschlauch / Füllstandsanzeige Draining / level indicator	150200109
Filtergehäuse Filter case	141200358
Dichtung für Filtergehäuse Seal for filter housing	110801785
Schlauch T-Stück Hose T- piece	141000328
<b>Elektrische Bauteile / Electrical equipment</b>	
Stecker Anschluss CAN Bus CAN bus connector	-
Relaisplatine relay board	120301953
<b>Verschleissteile / Wear parts</b>	
Filtereinsatz für Wasser Filter for water	141200190
Filtermatte für Abluft Filter mat for air outlet	141200397
<b>Optional:</b>	
DI-Beutel DI-bag	141200188



Schnittstelle-Sammelstörmeldung und RS232 /  
Interface-Collecting fault contacts and RS232

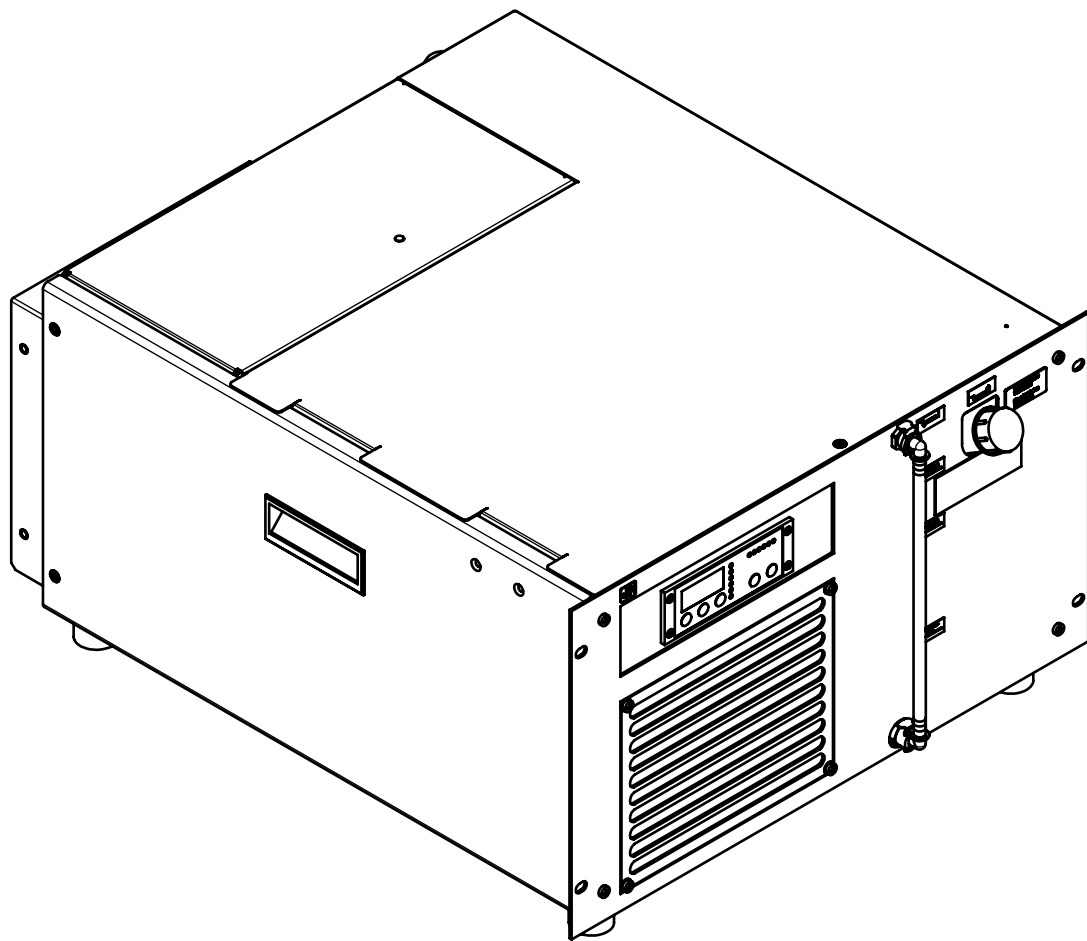
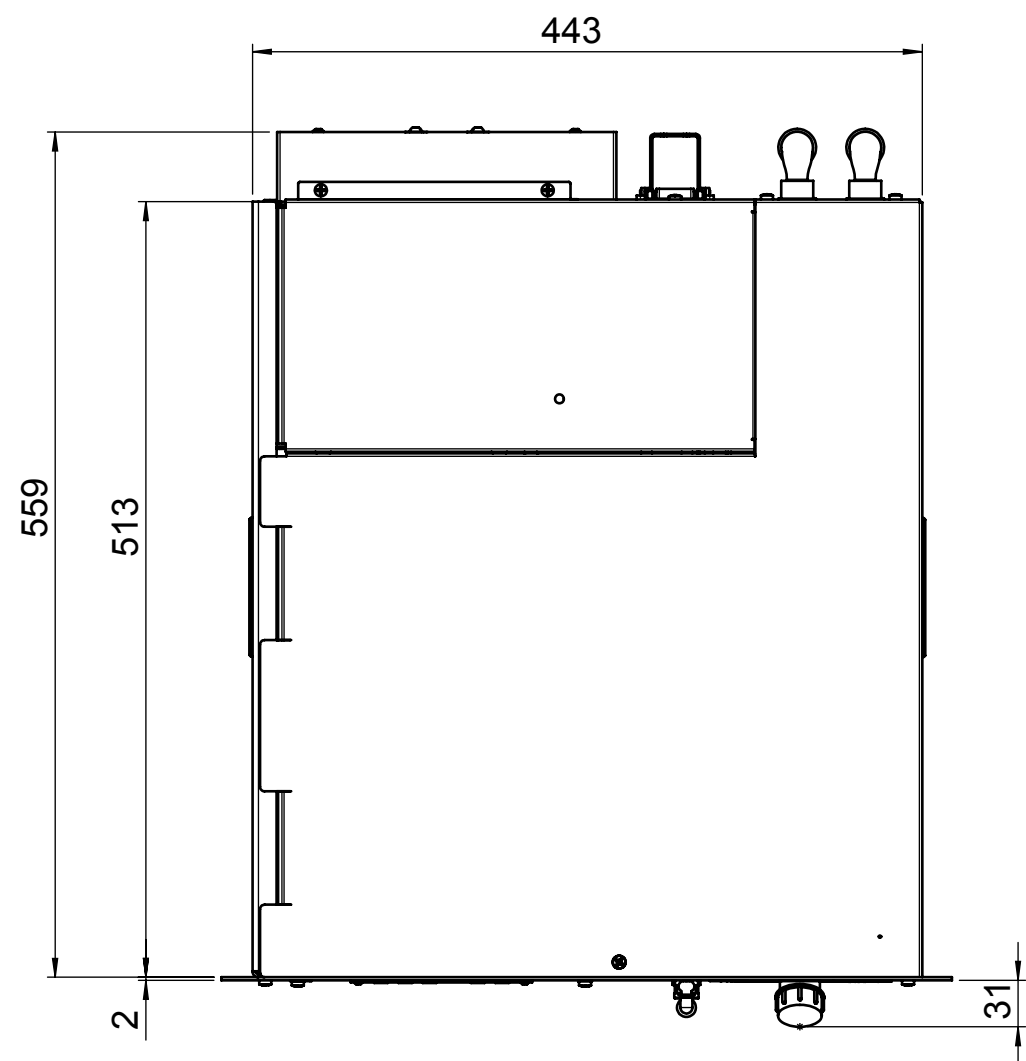
Einspeisung-Elektrischer Anschluss /  
Power feed-Electrical connection



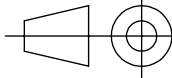

Medium Austritt /  
Medium outlet

Medium Eintritt /  
Medium inlet

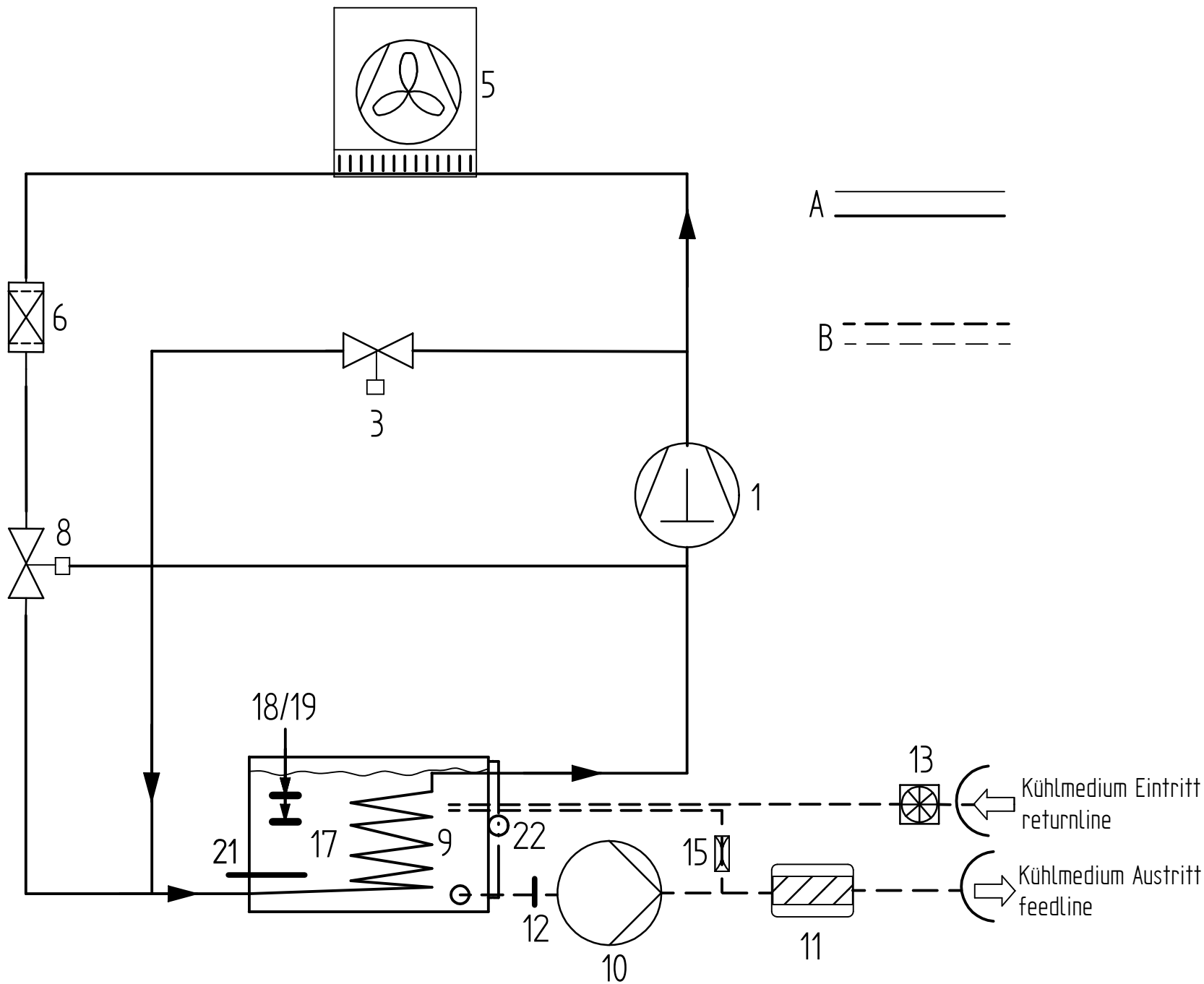
Luft Eintritt  
Air inlet

Lüfter /  
Fan



HYDAC ADA Version		Werkstückkanten Corners ISO13715		 		Oberflächenbeschaffenheit Surface quality		ISO 1302		Allgemeintoleranzen / General tolerances ISO 2768 - m SIZE ISO 14405 (E)					
										Form u. Lagetoleranz / Toleranzklasse Geometrical tolerances / Tolerance class (H)					
										Längenmaße / linear dimensions (mm)					
										über/over 0,5 3 6 30 120 400 1000 bis/to 3 6 30 120 400 1000 2000 +0,1 ±0,1 +0,2 ±0,3 ±0,5 ±0,8 ±1,2					
								1:5		Werkstoff / Material			Masse / Mass 0,000 KG		
								Maßstab		Fertigmaße / Finished size					
Anz. No		gepr.am Chkd.	gepr. von Chkd. by	Ä.M.Nr. Notice of change No	Teil / Part 000	Datum / Date	Name / Name								
Vers.					gez./Drawn	27.01.2017	PLACIDG								
Vers.		geänd. am Modif. on	geänd. von Modif. by		gepr./Chkd.										
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Format/Size A2						alte Mat Nr./Old Mat No. 4223520									
SW-Vers. 2016						alte Dok Nr./Old Doc No.									
						Ers. für /Exchange for									
						Ers. durch /Replaced by									

Änderungstabelle		
Datum	Stand	Änderung



**Bildbeschreibung Kompressor / Wasser gekühltes System**

A: Kältemittel führende Leitungen  
B: Wasser führende Leitungen

- 1 Kompressor
- 3 2/2 Wegeventil - „Heißgasbypassventil“
- 5 Kondensator mit Ventilator
- 6 Kältemitteltrockner
- 8 Thermostatisches Expansionsventil
- 9 Verdampfer
- 10 Pumpe
- 11 Filter
- 12 Temperatursensor
- 13 Durchflusswächter
- 15 Blende oder fester Bypass
- 17 Tank
- 18/19 Füllstandsensor
- 20 ---
- 21 Heizung
- 22 Füllstandanzeige

Allgemeintoleranzen/General tolerances ISO 2768-1m Längenmaße/Linear dimensions (mm)		Maßstab/Scale		Werkstückanten/Corners ISO 13715													
über/over bis/to	<table><tr><td>0</td><td>6</td><td>30</td><td>120</td><td>400</td><td>1000</td></tr><tr><td>±0,1</td><td>±0,2</td><td>±0,3</td><td>±0,5</td><td>±0,8</td><td>±1,2</td></tr></table>	0	6	30	120	400	1000	±0,1	±0,2	±0,3	±0,5	±0,8	±1,2		Werkstoff/Material	Masse/ Mass (kg)	Format/Size A 3
0	6	30	120	400	1000												
±0,1	±0,2	±0,3	±0,5	±0,8	±1,2												
Form und Lage/Geometrical tolerances ISO 2768-2K		-	Datum/Date	Name/Name	Benennung/Designation <b>Kompressor / Luft Kühlsystem mit Heißgas-Bypassventil</b>												
Oberflächenbeschaffenheit/Surface quality ISO 1302		gez/drawn	27.01.17	Placido													
		gepr/chkd															
		Norm			Zeichnungs-Nr./Drawing-No.												
		Diese Zeichnung ist Eigentum des Herstellers und darf ohne Genehmigung Dritten nicht ausgehändigt oder zugänglich gemacht werden.			Blatt von Sheet of 1 / 1												
		Zeich. datei/draw file		Bauteildatei/component file													