

# Operation & Maintenance

Translation of the original operating instruction



# THERM CONNECT

WOLF WOLF run around coil systems



Spirit of Air



## Quality Assurance

**QZV**  
Veren zur Qualitätssicherung und Zertifizierung  
für den Mittelstand e.V.

**QZV DIN EN ISO 9001:2015**

**ZERTIFIKAT**

Der Verein zur Qualitätssicherung und Zertifizierung für den Mittelstand e.V.  
bescheinigt, dass das Unternehmen

**WOLF Anlagen-Technik GmbH & Co. KG**  
Münchener Straße 54  
85290 Geisenfeld

ein Qualitätsmanagementsystem entsprechend der DIN EN ISO 9001:2015 eingerichtet hat und unterhält.  
Der Nachweis wurde in einem Audit erbracht.

Prüfbericht-Nummer: 12291191

erstellt durch:

Prof. Dr.-Ing. Siegfried Krause

Dieses Zertifikat wurde ausgestellt am: 14.10.2021 und gilt bis zum: 13.10.2024  
Zertifikats-Registernummer: 12191191

für den QZV

Axel Winkel

QZV e.V. Schleierweg 40, 81539 München  
Registrierungsnummer 33150102 (AICB e.V.)

**ACB**

## Declaration of incorporation

WOLF Anlagen-Technik GmbH & Co. KG  
Münchener Str. 54  
85290 Geisenfeld, GERMANY

**Einbauerklärung**

Im Sinne der Maschinenrichtlinie 2006/42/EG, Anhang I, Teil 1, Absatz B bis 17.05.2008  
Declaration of Incorporation in the sense of Machine Directive 2006/42/EC, Annex I, Part 1, Para. B-41 17.05.2008

Hiermit erklären wir, dass die nachfolgend bezeichnete unvollständige Maschine zum Zusammenbau mit anderen Maschinen/Maschinenteilen zur bestimmungsgemäßen Verwendung vorgesehen ist und dass seine Inbetriebnahme zulässig ist, bei festgelegter Montage, Betriebs- und Wartungsanleitung (gem. Anhang VI), durch Zusammenbau entsteht Maschine, bzw. Anlage oder die Maschine eingebaut werden soll, den Bestimmungen der Richtlinie 2006/42/EG entspricht und die EG-Konformitätserklärung gemäß Anhang IX vorliegt. Bei einer nicht mit uns abgestimmten Änderung der unvollständigen Maschine verliert diese Erklärung ihre Gültigkeit. Diese Einbauerklärung gilt nur im Zusammenhang mit den gültigen Datenblättern und der aktuellen Montage-, Betriebs- und Wartungsanleitung.

We hereby declare that the incomplete machine described below is suitable for assembly with other machine/machine parts for the intended use and that its commissioning is prohibited until it has been determined that the machine or system created by assembly according to our current assembly, operating and maintenance instructions (according to Appendix VI) the machine or plant created by assembly or the machine is to be installed, complies with the provisions of Directive 2006/42/EC and the EC Declaration of Conformity according to Annex IX is available. This declaration becomes invalid if the incomplete machine is modified without our agreement. This declaration of incorporation is only valid in conjunction with the valid data sheets and the current assembly, operating and maintenance instructions.

Diese Einbauerklärung gilt nur im Zusammenhang mit den gültigen Datenblättern und der aktuellen Montage-, Betriebs- und Wartungsanleitung und bezieht sich nur auf den auftragsbezogenen Leistung- und Lieferumfang.

This declaration of incorporation is only valid in conjunction with the valid data sheets and the current assembly, operating and maintenance instructions and only refers to the order-related scope of supply and services.

Produktbezeichnung  
Product Name: Raumlufttechnisches zentrales Luftbehandlungsgeriät  
Central Air handling Unit

Serien-/Typenbezeichnung  
Serial / Type Name: WK-com...

Fabrikatsnummer  
Production Number: siehe Typenschild am Gerät  
See nameplate on the machine

Baujahr  
Year of Construction: 2023

Einzelgültige EG-Richtlinien und Verordnungen:  
Relevant EC-Directives and Regulations: Maschinenrichtlinie 2006/42/EG  
Machine Directive 2006/42/EC  
ENF-Richtlinie 2014/30/EU  
EMV-Directive 2014/53/EU  
Druckgeräterichtlinie 2014/68/EU  
Pressure Equipment Directive 2014/68/EU

Bevollmächtigter der WOLF Anlagen-Technik GmbH & Co. KG für die Zusammenstellung aller technischen Unterlagen ist Herr Viktor Richterfeld, Leitung Technik  
Authorized Representative of WOLF Anlagen-Technik GmbH & Co. KG for compiling all technical documents is Mr. Viktor Richterfeld, Technical Management

Geisenfeld, 01.10.2023

Viktor Richterfeld, Mitglied der Geschäftsführung  
Viktor Richterfeld, Member of Management

Seite 1 von 2

WOLF Anlagen-Technik GmbH & Co. KG  
Münchener Str. 54  
85290 Geisenfeld, GERMANY

**EG-Konformitätserklärung**

Im Sinne der Lüftungsgeräte-Richtlinie 2009/125/EG, Artikel 5 vom 07.07.2014  
zur Durchführung der Richtlinie 2009/125/EG vom 21.10.2009,  
EC-Declaration of Conformity in the sense of Eco-design Regulation (EU) 2009/125/EC, Art. 5 of 07.07.2014  
for implementation of Eco-design Directive 2009/125/EC of 21.10.2009

Hiermit erklären wir, dass die nachfolgend bezeichnete unvollständige Maschine zum Zusammenbau mit anderen Maschinen/Maschinenteilen zur bestimmungsgemäßen Verwendung geeignet ist und dass seine Inbetriebnahme zulässig ist, bei festgelegter Montage, Betriebs- und Wartungsanleitung (gem. Anhang VI), durch Zusammenbau entsteht Maschine, bzw. Anlage oder die Maschine eingebaut werden soll, den Bestimmungen der Richtlinie 2009/125/EG entspricht und die EG-Konformitätserklärung gemäß Anhang IX vorliegt. Wir erklären außerdem, dass die nachfolgend bezeichnete unvollständige Maschine den Ökodesignanforderungen der Lüftungsgeräte-Richtlinie entspricht. Bei einer nicht mit uns abgestimmten Änderung der Maschine verliert diese Erklärung ihre Gültigkeit. Diese Einbauerklärung gilt nur im Zusammenhang mit den gültigen Datenblättern und der aktuellen Montage-, Betriebs- und Wartungsanleitung.

We hereby declare that the incomplete machine described below is suitable for assembly with other machine/machine parts for the intended use and that its commissioning is prohibited until it has been determined that the machine or system created by assembly according to our current assembly, operating and maintenance instructions (according to Appendix VI) the machine or plant created by assembly or the machine is to be installed, complies with the provisions of Directive 2009/125/EC and the EC Declaration of Conformity according to Annex IX is available. We also declare that the incomplete machine designated below complies with the eco-design requirements of the Ventilator Unit Eco-design Directive. This declaration becomes invalid if the incomplete machine is modified without our agreement. This declaration of incorporation is only valid in conjunction with the valid data sheets and the current assembly, operating and maintenance instructions.

Diese Konformitätserklärung gilt nur im Zusammenhang mit den gültigen Datenblättern und der aktuellen Montage-, Betriebs- und Wartungsanleitung und bezieht sich nur auf den auftragsbezogenen Leistung- und Lieferumfang.

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See nameplate on the machine

Baujahr  
Year of Construction: 2023

Einzelgültige EG-Richtlinien und Verordnungen:  
Relevant EC-Directives and Regulations: Lüftungsgeräte-Richtlinie 2009/125/EG  
Ventilator Unit Eco-design Directive 2009/125/EC  
Eco-design Order for Ventilator Equipment (2009/125/EC)  
for implementation of Eco-design Directive 2009/125/EC

Bevollmächtigter der WOLF Anlagen-Technik GmbH & Co. KG für die Zusammenstellung aller technischen Unterlagen ist Herr Viktor Richterfeld, Leitung Technik  
Authorized Representative of WOLF Anlagen-Technik GmbH & Co. KG for compiling all technical documents is Mr. Viktor Richterfeld, Technical Management

Geisenfeld, 01.10.2023

Viktor Richterfeld, Mitglied der Geschäftsführung  
Viktor Richterfeld, Member of Management

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# 1. Notes and regulations for the operator

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## Meaning of the operating instructions

Read these operating and maintenance instructions carefully before installation and commissioning to ensure correct use! We would like to point out that these operating and maintenance instructions only apply to the unit and in no case to the complete system! All unit-specific data such as order number, energy data, weight, dimensions, etc. can be found either on the type plate of the respective unit component or in the technical order confirmation. These operating and maintenance instructions are intended for safe working on and with the above-mentioned unit. They contain safety instructions that must be observed as well as information that is necessary for trouble-free operation of the unit. The operating and maintenance instructions must be kept with the unit. It must be ensured that all persons who have to carry out activities on the unit can consult the operating and maintenance instructions at any time. The operating and maintenance instructions must be kept for further use and must be passed on to every user or end customer.

## Duty of care of the operator

- The contractor or operator must ensure that the equipment and operating materials are operated and maintained in accordance with the applicable rules and legal regulations.
- The operator is obliged to operate the unit only when it is in perfect condition.
- The unit may only be used for its intended purpose („area of use“).
- The safety devices must be checked regularly for proper functioning.
- The operating and maintenance instructions must always be kept available in a legible condition and complete at the place of use of the unit.
- The personnel must be regularly instructed in all applicable questions of occupational safety and environmental protection and must know the operating and maintenance instructions and in particular the safety instructions contained therein.
- All safety and warning notices attached to the unit must not be removed and must remain legible.

# 2. Intended use

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The intended use of these units is for heat recovery from the exhaust air stream of an air handling unit into the supply air stream. The idle pressure range must be operated in the range of 2.5 bar to 5 bar, depending on the specifications on the type plate of the unit. The exact idle pressure is specified on the type plate of the respective system. Deviations require prior agreement or approval by the manufacturer. Any other use or use beyond this is considered improper. The manufacturer is not liable for any damage resulting from this.

Before commissioning the THERM-CONNECT, the hydraulic system must be completely filled to the idle pressure indicated on the type plate and vented. For this purpose, on-site air vents must be provided and the system must be vented at the pump. If the pump is operated without sufficient filling with water-glycol mixture, damage to the pump may occur!

# 3. Safety

---

The qualified personnel responsible for installation, commissioning, maintenance, troubleshooting and decommissioning must be instructed to observe these operating instructions before starting work. All persons who carry out an activity on this device must have read the operating and maintenance instructions. Non-observance of the operating instructions can endanger the persons entrusted with the work as well as cause malfunctions of the device.



### Attention!

Activities on the air handling unit may only be started or carried out after the following functions have been ensured:

- Repair switches attached to the unit are connected in the control circuit of the air handling unit.
- All poles of the power supply are voltage-free.
- Power-operated, rotating parts are secured against restarting (repair switch can be shut off).
- Rotating parts are at standstill
- Device components have cooled down to normal ambient temperatures (room temperature)

After completion of the work, start up the plant according to >> Commissioning - Test run <<!

**Attention!**

Only qualified personnel may work on electrical components. The local Energy Supply Companies (german: EVU) regulations and Association of Electrical, Electronic & Information Technologies (german: VDE) regulations must be observed.

No changes or additions may be made to the unit, otherwise the manufacturer's declaration of conformity will become invalid! The WRG equipment can be a life-threatening source of danger due to rotating machine parts and the risk of electric shock. Failure to observe the following safety instructions will result in DANGER FROM ELECTRICAL SHOCK.

- The equipment contains high voltage capacitors that require a period of time to discharge after the main power supply is interrupted.
- Make sure the hydraulic unit is disconnected from the power supply before performing any work. Wait at least three minutes for the inverter to discharge to a safe voltage.
- Always disconnect the inverter from the circuit under test before performing a high voltage resistance test on that circuit.

**Symbols:**

Opposite symbol is indicated in the operating instructions at any place where in case of non-observance

- there is danger to life and limb of persons
- damages of the machine can occur.



You will find this symbol anywhere in these operating instructions where there is a suspended load hazard.



Warning against harmful and irritant substances



Opposite symbol is indicated in the operating instructions at any place where there is danger from electric components.



Opposite symbol in the operating instructions indicates guidelines or cross-references which are important for the operation of the RLT-plant.



You find this symbol anywhere in these operating instructions wherever there is a risk or need for increased protective measures due to areas at risk from explosions.



Opposite symbol in the operating instructions indicates information or application tips.



You will find this symbol anywhere in these operating instructions where there is a crushing hazard.



You will see the adjacent symbol anywhere, where for example a risk of ignition can arise as a result of electrostatic charge. The operator must earth (equipotential bonding) the entire unit according to state of the art in order to prevent electrostatic charging.

## 4. General Information

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### 04.01 Field of application

The area of application of the THERM-CONNECT unit supplied is for hydraulic heat recovery in air handling units. Exact data can be taken from the order confirmation, in particular the technical unit design.

### 04.02 Accessories

The manufacturer offers or supplies units according to tenders from external designers of the entire air handling unit. As a rule, this is only a part of the entire air handling system. Since the delivery is made only through specialized companies, certain accessories such as:

- Piping
- Insulation of piping and components
- High efficiency run around coils
- Complete regulation, control, power electrics

can be provided by the customer. In the technical design, reference is made to accessories provided by the customer. Safety-relevant accessories must be installed by the specialist company before the first test run.

### 04.03 Protection measures taken

As a rule, our devices are equipped with the device-related safety measures. The repair switches are to be secured against being switched on again during maintenance (repair switch can be shut off).

### 04.04 Material resistance to cleaning agents, disinfectants

For wipe disinfection of the inner surfaces of our air handling units in design

- Hot-dip galvanized
- Stainless steel (1. 4301)
- Aluminum (AlMg)

all commercially available disinfectants can be used.

We recommend disinfectants based on formaldehyde, whereby the information on the manufacturer's safety data sheets, with regard to

- material compatibility
- processing

must be observed.

### 04.05 Lightning protection

According to VDE 0185 T1 (VDE: Association of Electrical, Electronic & Information Technologies), a professional lightning protection system must be installed on roof control centers.

## 5. Storage, Transport and Assembly

### 05.01 Receipt of goods, transport damage



Unpack the goods in the presence of the driver and check for completeness and damage using our delivery bill. Transport damage must be acknowledged by the forwarder! (date and signature)  
A subsequent claim will be rejected by the forwarding insurers.

### 05.02 Note on disposable packaging



This is purely transport packaging. It has been quantitatively reduced to the indispensable minimum in order to be able to transport and unload the high-quality parts without damage.  
The material is fully recyclable and can therefore be recycled.  
The disposal costs are borne by the recipient of the goods.  
Alternatively, it is possible to return the packaging material to us. The costs for the return transport are to be borne by the customer of the goods. Please note that the packaging material must not be contaminated and must be delivered separately according to groups.

### 05.03 Storage and functional maintenance

If parts are packed in foil, this must be removed immediately after delivery. Foils promote the formation of condensation water and thus oxidation phenomena, especially on hot-dip galvanized material.

In the case of sendzimir-galvanized components, corrosion is possible at the cut edges. A reddish or whitish discoloration of the cut edge alone is not a sign of problematic corrosion. The corrosion protection is still guaranteed and does not represent a reduction in its quality or a reason for complaint.

All device components and parts must be stored in such a way that impairments, damage due to contamination, condensation, weathering or external influences are excluded. In case of storage, standstill or delayed commissioning (standstill longer than 3 months!), the belts of belt-driven components must be slackened. Rotating and rotating components such as fans, motors, pumps, WRG rotors, actuators and louver dampers must be moved and rotated monthly. In addition, the following measures should be observed:

- Remove foils
- Store units temporarily in a dry and dust-free place protected from the weather.
- Close device openings so that no impurities (dust, vermin) can penetrate.
- Avoid condensation
- Ensure functional integrity of the components and built-in parts
- Observe additional maintenance and operating instructions of the component manufacturers

The units must also be carefully protected from contamination during installation.

**Maximum permissible storage period or downtime for:  
Frequency converters, EC controllers, motors with integrated controllers.**

#### Reformatting of DC link capacitors

The maximum permissible storage period or the downtime without mains voltage depends in particular on the electrolytic capacitors, since the dielectric in the capacitor degrades and the electrolyte evaporates.

Depending on the duration without supply with mains voltage, before applying the full mains voltage a the internal capacitors before applying the full mains voltage.

| Period without mains voltage | Measure before commissioning                                                                                                                                                                                                                                                                                                                                                                                                                           |
|------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| less than 1 year             | none                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| 1-2 years                    | connect device to mains for 1 hour without release                                                                                                                                                                                                                                                                                                                                                                                                     |
| longer than 2 years          | reformatting (without enable) via adjustable supply voltage <ol style="list-style-type: none"> <li>1. 30% of mains voltage for 1 hour</li> <li>2. for 1 hour 60% of the mains voltage</li> <li>3. for 2 hours 85% of the mains voltage</li> <li>4. for 3 hours 100% of the mains voltage</li> </ol> <p><b>Mains voltage:</b> Technical data of the respective device,<br/>for wide voltage range = upper value of the mains voltage specification.</p> |



## 05.04 Construction site transport of air handling units and assemblies



### Caution!

Serious personal injury or property damage may result from falling loads if the safety instructions are not observed.

Use and observe the safety instructions for the means of transport, lifting gear and approved lifting gear (according to BGV D6, Regulations of the employers' liability insurance association).

Do not stand under suspended loads!

Units without transport device: When transporting with a forklift or rollers, leave the transport pallet under the air handling unit. When transporting with a forklift, ensure that the forks extend over the full width of the housing. Frame must rest on forks on both sides.

The unit components may only be transported in the installed position. They must not be overturned or rotated in the longitudinal axis, otherwise damage may occur to installed parts (e.g. fan vibration dampers shear off).

### 05.04.01 Fastening the load suspension brackets

Only the load suspension brackets specified or supplied by the factory may be used to attach the suspension ropes to the unit.



### Attention! The use of the load suspension brackets is only permitted for one device mounting!

The brackets must not be used for several devices, as possible hairline cracks could impair safety.

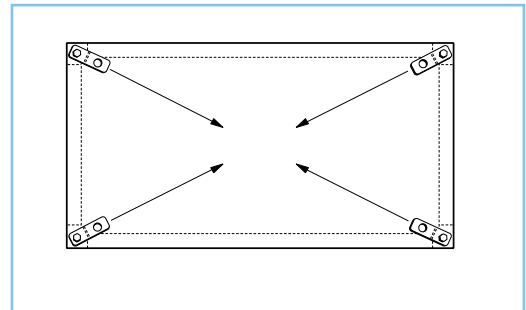
The load suspension brackets must be mounted using hexagonal bolts DIN 933 M16 x 55 mm - 8.8 for standard design or hexagonal bolts DIN 933 M16 x 105 mm - 8.8 for weatherproof design and washers 6.0 mm thick with a minimum screw-in depth of 35 mm to ensure the load capacity of the load suspension brackets.

The thread in the corner connector must not be dirty or damaged.

**For weatherproof units, use the spacer sleeves specified by the factory or supplied with the unit.**

To fasten, align the lugs to the center (see illustration) and hand-tighten.

- Load suspension brackets with missing markings must not be used.
- Modifications and repairs, in particular welding, are not permitted.
- Use for or of other manufacturers' products is not permitted.





### 05.04.02 Attachment to lifting devices

Attachment to lifting devices must be carried out in accordance with the specifications in these operating instructions.

For fastening the suspension ropes or chains to the load suspension bracket, fastening elements appropriate to the load, e.g. shackles, must be used! For crane transport, all applicable safety regulations according to DGUV regulation 52 Cranes and DGUV 500 chapter 2.8 must be observed (DGUV german: German Statutory Accident Insurance).



**Attention!** The maximum load capacity per delivery unit incl. dead weight of the lifting aids must not be exceeded! Exceeding the load capacity may result in damage to the delivery unit. There is a danger to life.

| WK-com type    | max. load capacity / delivery unit | max. load capacity / corner connector |
|----------------|------------------------------------|---------------------------------------|
| N, N-W, H, H-W | 2.500 kg                           | 625 kg                                |
| S, S-W         | 3.000 kg                           | 750 kg                                |

When unloading, lifting and assembling, do not lift several equipment units together. Lift units with more than 4 lifting lugs only with a crane traverse.

The rope angle (S) must not exceed 60°.

The angle of inclination (A) must not exceed 30°.

The arrangement and dimensioning of the lifting lugs refers to a rope angle of 60° (corresponds to an angle of inclination of 30°).

Larger rope or inclination angles cause an overload of the lifting straps and lead to damage to the device.

The length of the transport chain or ropes must at least correspond to the distance between the lifting straps.

Please take the prescribed values from the table "05.04.03 Standard values for attachment to lifting devices".

The values in the table refer to a rope angle of 60° (= angle of inclination 30°).

### 05.04.03 Standard values for fastening to lifting devices

| L = length of the module | width of the module | H = hook height | K = chain length |
|--------------------------|---------------------|-----------------|------------------|
| 6,00 m                   | 3,00 m              | 5,81 m          | 6,71 m           |
| 6,00 m                   | 1,65 m              | 5,40 m          | 6,22 m           |
| 6,00 m                   | 1,00 m              | 5,30 m          | 6,08 m           |
| 5,00 m                   | 3,00 m              | 5,06 m          | 5,84 m           |
| 5,00 m                   | 1,65 m              | 4,56 m          | 5,27 m           |
| 5,00 m                   | 1,00 m              | 4,41 m          | 5,09 m           |
| 4,00 m                   | 3,00 m              | 4,33 m          | 5,00 m           |
| 4,00 m                   | 1,65 m              | 3,75 m          | 4,33 m           |
| 4,00 m                   | 1,00 m              | 3,57 m          | 4,12 m           |
| 3,00 m                   | 3,00 m              | 3,67 m          | 4,24 m           |
| 3,00 m                   | 1,65 m              | 2,97 m          | 3,42 m           |
| 3,00 m                   | 1,00 m              | 2,73 m          | 3,15 m           |
| 2,00 m                   | 1,65 m              | 2,24 m          | 2,59 m           |
| 2,00 m                   | 1,00 m              | 1,93 m          | 2,23 m           |
| 1,00 m                   | 1,00 m              | 1,21 m          | 1,40 m           |

## 05.05 Structure-borne sound decoupling

For vibration isolation it is recommended to use suitable isolators.

## 05.06 Potential equalization

To avoid ignition hazards due to electrostatic charging, all electrically non-conductive connection points must be bridged with potential equalization, e.g. elastic connections, decoupled frame, vibration damper, etc. All metal parts of the device must be integrated into the local potential equalization measure. The base frames of the equipment must be grounded according to the state of the art (foundation grounding).

## 05.07 Medium-side connections

The heat exchangers are connected with detachable connections. Care must be taken that access to other parts of the unit is not obstructed by the connection lines (fan, filter, scrubber, etc.). When connecting the heat exchangers, hold them with a pipe wrench.

The connections of the heat exchangers must not be loaded with expansion forces of the on-site supply lines. Use expansion loops or compensators to absorb any forces that occur.

The flow of the heating or cooling system is connected to the exchanger on the air outlet side (counterflow principle).

Ensure that there is a venting and draining facility on site!

The connections on the THERM-CONNECT unit are provided with internal thread or flange. For the correct connection, the respective lines are provided with labels.

## 05.08 Drain-side connections

Depending on the unit type, the unit is equipped with a drain pan with ½" connection at the bottom or a glycol collecting pan with 1" connection on the control cabinet side.

In the case of a drain pan, a collection device for the water-glycol mixture must be provided on site (retention device for glycol-water mixture according to VAUwS, German: Directive on Installations for Handling Substances Hazardous to Water!). The drain pan in the THERM-CONNECT unit provides a controlled discharge of leakages into the drain.

If the unit is equipped with a drain pan, it offers sufficient volume to collect the entire amount of leaking fluid in the event of an accident. In this case, the drain can be closed with a stopcock or forwarded to a collection device provided by the customer.

When installing the THERM-CONNECT unit in the unit, a suitable siphon must be provided at the drain!

## 05.09 Electrical connection



### Attention!

During commissioning and maintenance, all terminal points of the electrical system must also be tightened.

EMC directives and radio interference suppression levels must be taken into account. For mains bypass circuits, the relevant regulations according to VDE (Energy Supply Companies) and EVU (Association of Electrical, Electronic & Information Technologies) for star-delta starting or direct starting must be observed. The connection guidelines of the manufacturer must be observed!



The cross-section of the ground cable must be at least 10 mm<sup>2</sup>, or two separately laid ground cables connected in accordance with DIN EN 50178 or IEC 61800-5-1 must be used. Always follow the national and local regulations on cable cross-section.

**Commissioning:** The operating instructions of the frequency inverter must be observed during commissioning. The setting values of the frequency converter must be logged.



### Caution:

Touching electrical components can be life-threatening even after disconnection from the power supply. Wait at least 15 minutes.



**Caution:** The electrical connections as well as the wiring must be carried out by a qualified electrician. The applicable standards must be observed.

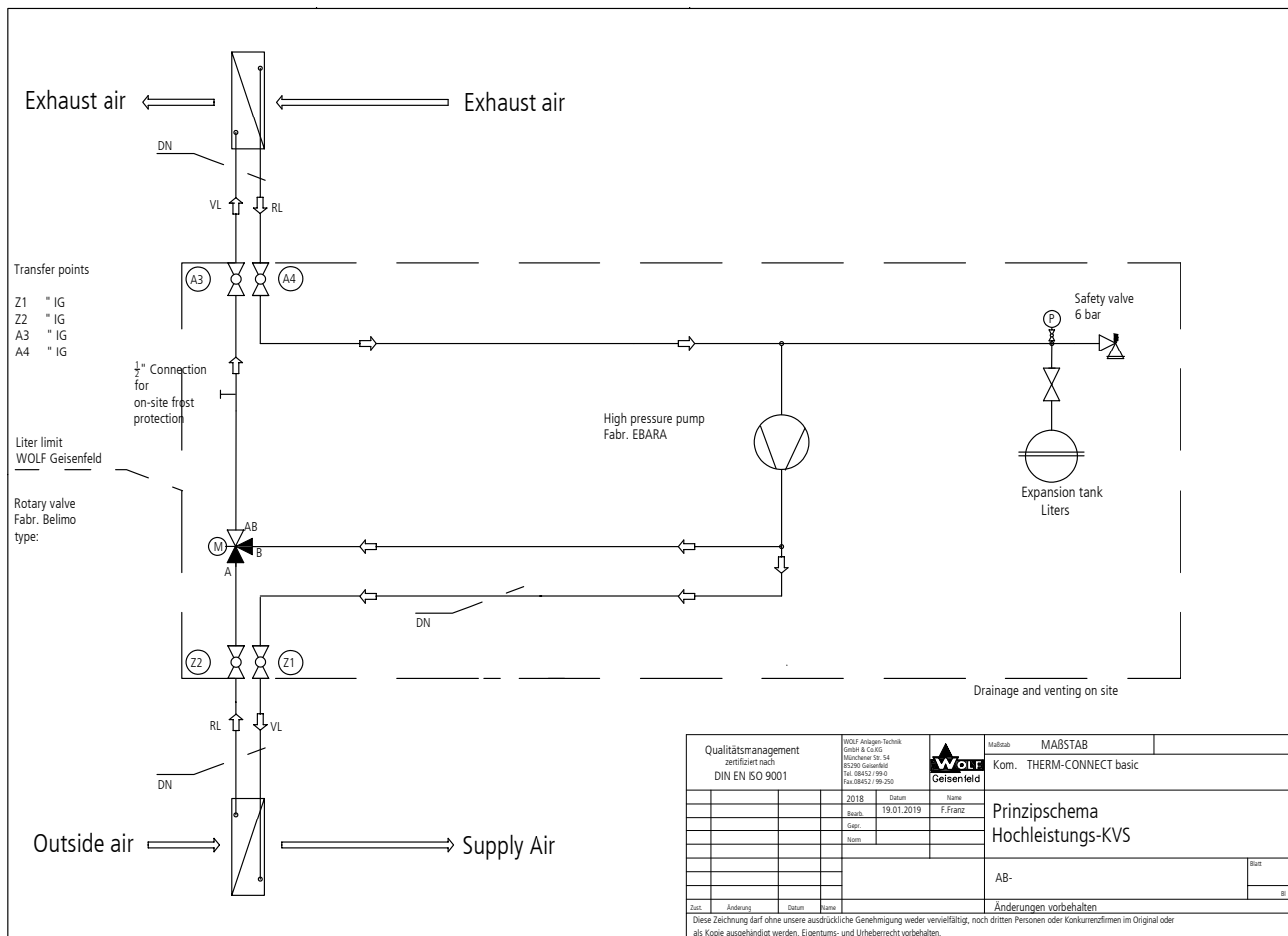
## 6. THERM-CONNECT basic

### 06.01 General description

The high efficiency run around coil system consists of two heat exchangers with a high counterflow ratio and a series connection of the individual heat transfer stages.

The heat is transferred via an intermediate medium consisting of a water-glycol mixture between the exhaust air coil and the outdoor air coils.

The brine mass flow is controlled by the three-way control ball valve depending on the power demand of the BMS. In addition, frost protection can be controlled via this using a temperature sensor provided by the customer. This allows the brine mass flow to be routed past the supply air coil in order to prevent ice formation on the coil. The pump is controlled digitally by switching the operating voltage through an on-site contactor.



### 06.02 Control functions

- External release Pump On
- Pump starts up to set frequency.
- External power signal ( 0-10V DC) directly controls the three-way valve for power control.
- External enable pump off
- The system stops

#### Frost protection control:

An on-site temperature sensor for frost protection control can be integrated via the existing 1/2" connection in the exhaust air flow.

## 06.03 Commissioning

### 06.03.01 Filling the system

#### Checking before filling the system

Before filling the hydraulic control group, check the following parameters

- Proper installation of all parts
- Vent valve installed at the highest point of piping
- Flow direction at valves, pumps, etc.
- Installation position of valves, etc.
- Connection of heaters, coolers in counterflow principle (otherwise considerable power losses will occur!)
- Tight fit of all connections (screwed connections, flanges, etc.)
- Smooth running of valves, slide valves, actuators
- Hydraulic lines must be flushed and cleaned



#### Attention! When filling and venting the system, there is a risk of injury due to

- Escaping pressure jet
- Scalding with hot heating media
- Burning in case of skin contact with antifreeze additives

#### Filling and bleeding

Fill hydraulic control group slowly - vent carefully. During the filling process, open the venting valve. During the filling process, check all connection points for leaks, eliminate them if necessary. After reaching the system pressure on the medium side, close the venting valve.



#### Attention

When opening the venting device of the run around coil system, the plant must be switched off. Secure the main switch! The liquids, e.g. water-glycol mixture (-20°C to 40°C), are under pressure and can thus escape abruptly. Personal protective equipment such as suitable goggles and gloves must be worn or the manufacturer's instructions must be observed.

### 06.03.02 First test run

Tighten all clamping points of the electrical system!

During commissioning, ensure that the system is not operated beyond the limits specified in the design data.

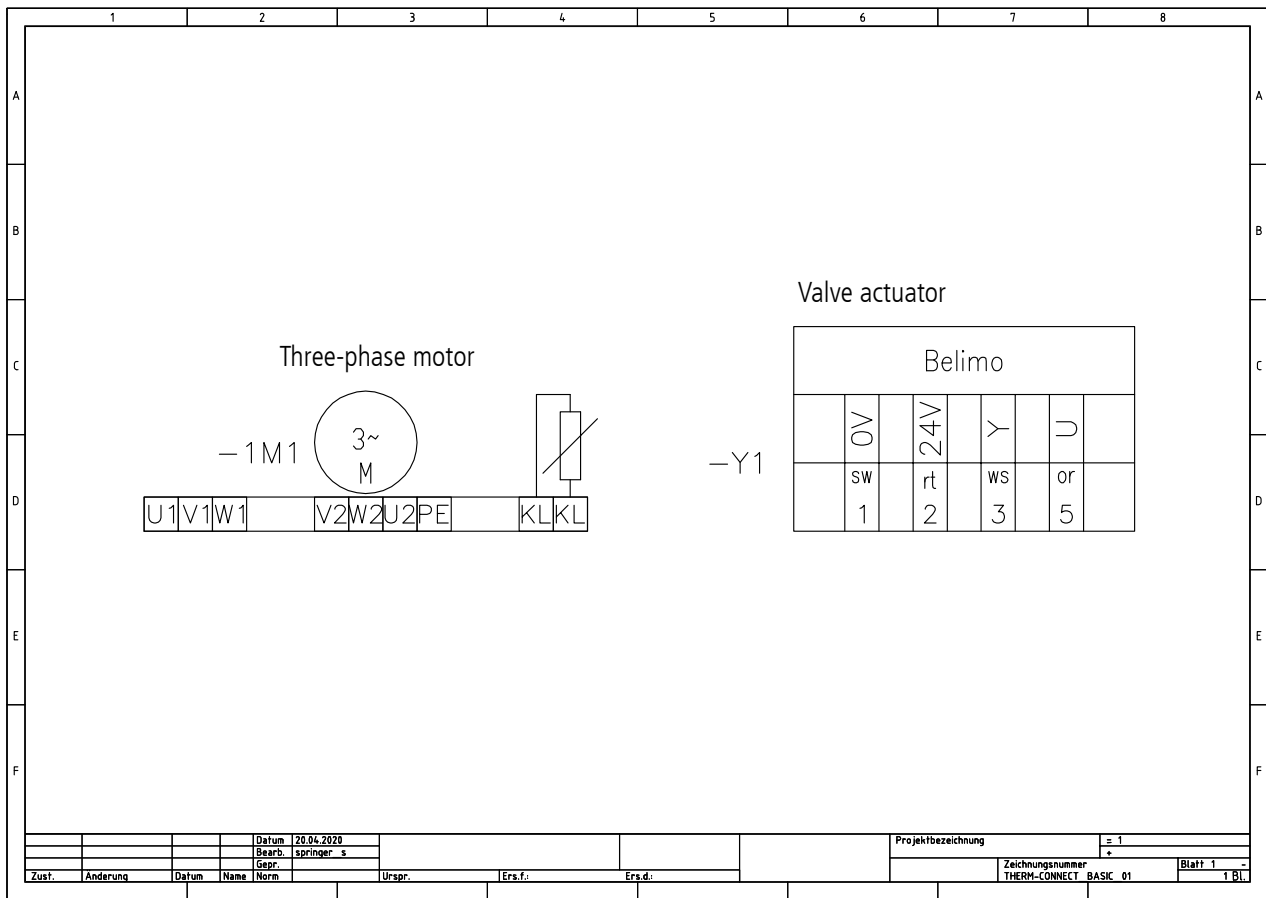
Improper operation will result in damage to the unit for which we do not accept any warranty! During commissioning, as well as for the subsequent operation of the air handling unit, the information signs on the air handling unit must be observed!

Switch on the circulation pump, check the direction of rotation, reverse the direction of rotation electrically if necessary. Run the circulation pump to remove residual air from the control group. Check system pressure, top up if necessary and vent again.

## 06.04 Faults and their elimination

All malfunctions such as the pump PTC thermistor, danger of frost or too low brine pressure must be evaluated via the on-site control system.

## 06.05 Wiring diagram



## 7. THERM-CONNECT defrost

### 07.01 General description

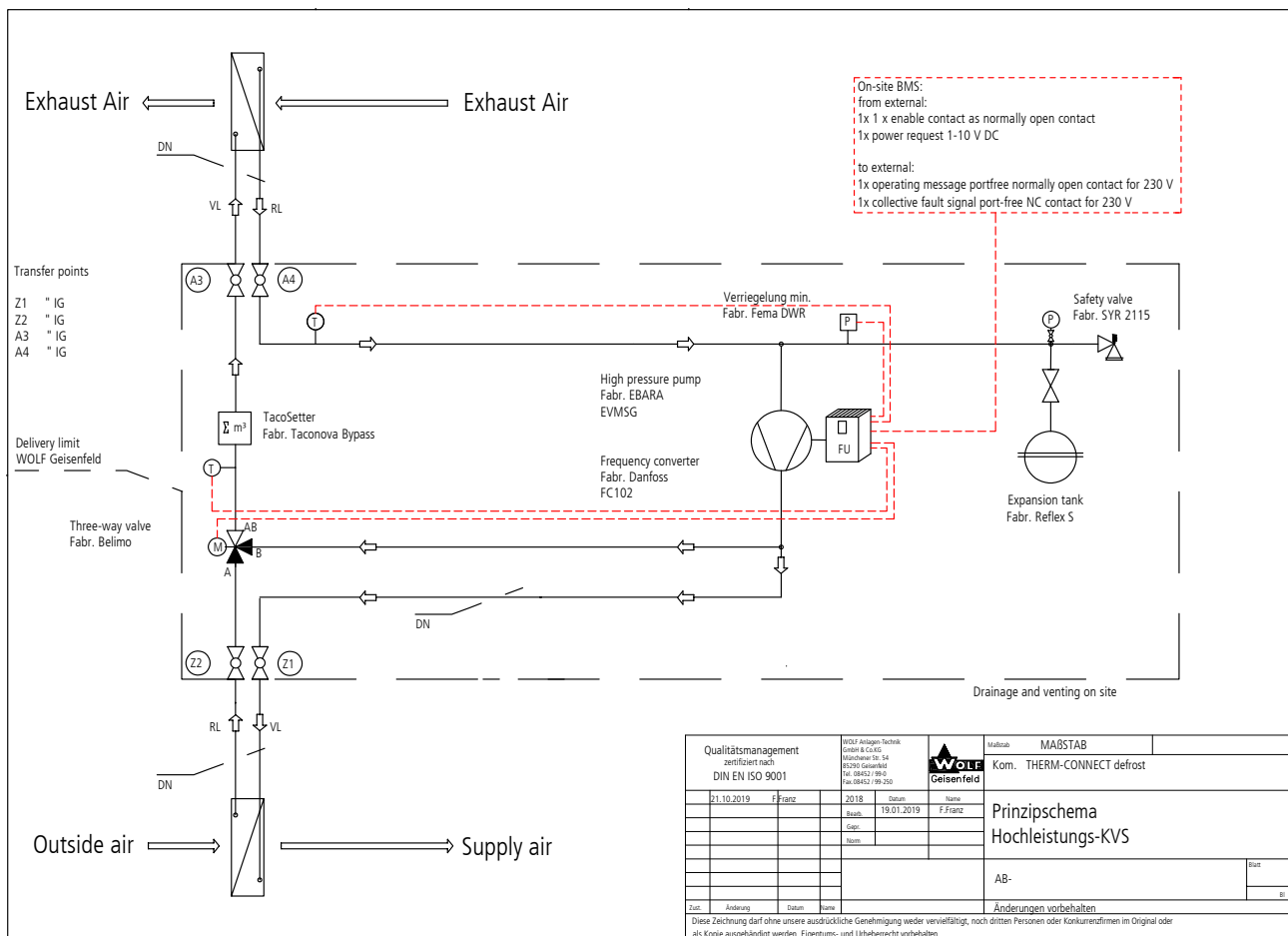
The high efficiency run around coil system consists of two heat exchangers with a high counterflow ratio and a series connection of the individual heat transfer stages.

The heat is transferred via an intermediate medium consisting of a water-glycol mixture between the exhaust air coil and the outdoor air coil.

The brine mass flow is controlled by the frequency converter depending on the power demand of the BMS.

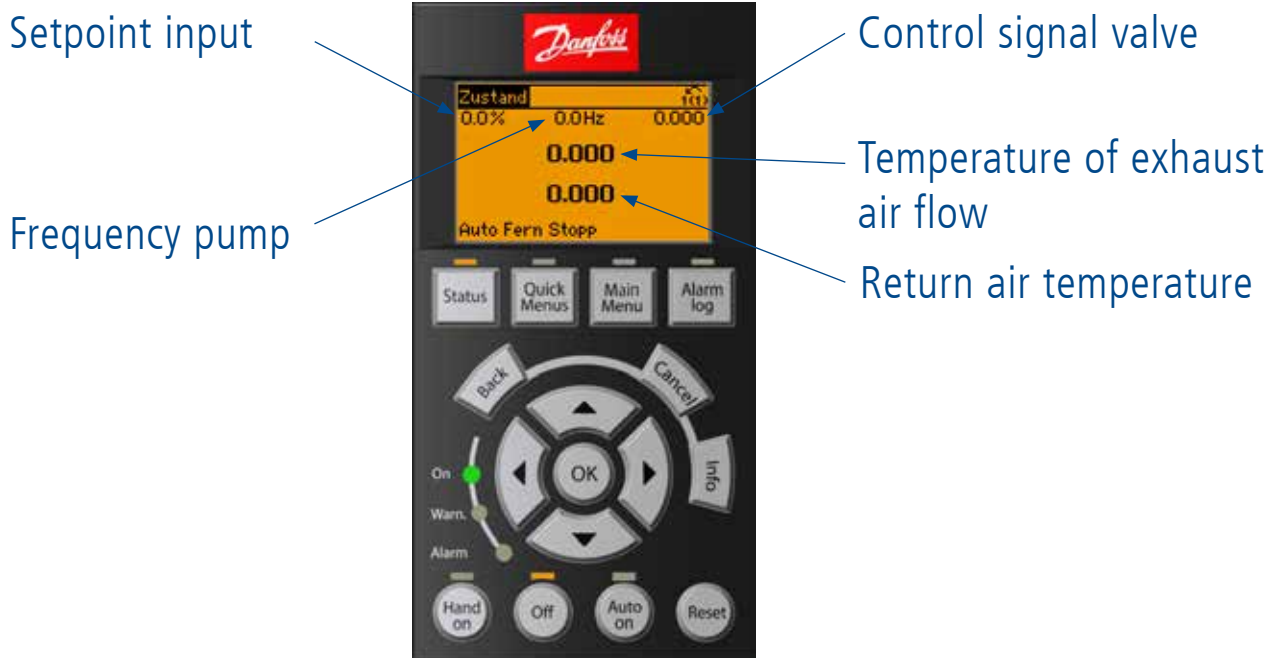
The power and frost protection control is also performed by the three-way mixing valve with high control accuracy. This allows the brine mass flow to bypass the supply air register to prevent ice formation on the register.

All parameters are already programmed on the frequency converter. Since the pumps are designed separately for each system, the flow rate must be adapted to the particular system. For this purpose, the flow rate is read off the integrated TacoSetter and set as the maximum setpoint on the frequency inverter „*07.05.03 Setting the maximum flow rate*“ on page 17 For this purpose, the system must be filled up to operating pressure and completely vented to avoid damage to the pump.



## 07.02 Frequency inverter display

The most important system parameters can be read directly from the display of the frequency inverter:



## 07.03 Control functions

- External enable On
- The system starts up to the minimum frequency. The valve closes as long as no external power signal ( 0-10V DC) is present.
- External power signal ( 0-10V DC) from the higher-level temperature control sequence
- The setpoint of the circulating water-glycol quantity is determined depending on the ext. power signal, the maximum water quantity and the frost protection temperature value.
- The volume flow is controlled in the internal control sequence valve and speed control of the recirculation water pump via frequency converter.
- External release Off
- The system stops

### Periodic pump run:

To prevent the pump from getting stuck, even if there is no demand from the control system, a periodic pump run is performed once a week. During this, the pump runs for 10 minutes at 50% power demand.

### Frost protection control:

The integrated frost protection control is set to the limit value  $-1^{\circ}\text{C}$  at the factory. Experience has shown that this value is sufficient to prevent icing of the register and at the same time to operate the heat recovery as efficiently as possible.

If this frost protection is not sufficient, a second limit value at  $-2.5^{\circ}\text{C}$  is stored. If the temperature falls below this limit, the system is switched off and locked.



## 07.04 BMS connection

### Control from external AHU control

- 1 x release contacts from external AHU control cabinet as normally open contact
- 1 x power request 0-10 V DC

### Contacts to external AHU control

- 1 x operating message potential free normally open contact for 230 V
- 1 x collective fault signal floating NC contact for 230 V

## 07.05 Commissioning

### 07.05.01 Filling the system

#### Check before filling the system

Before filling the hydraulic control group, check the following parameters

- Proper installation of all parts
- Vent valve installed at the highest point of piping
- Flow direction at valves, pumps, etc.
- Installation position of valves, etc.
- Connection of heaters, coolers in counterflow principle (otherwise considerable power losses will occur!)
- Tight fit of all connections (screwed connections, flanges, etc.)
- Smooth running of valves, slide valves, actuators
- Hydraulic lines must be flushed and cleaned



#### Attention! When filling and venting the system, there is a risk of injury due to

- Escaping pressure jet
- Scalding with hot heating media
- Burning in case of skin contact with antifreeze additives

#### Filling and bleeding

Fill hydraulic control group slowly - vent carefully. During the filling process, open the venting valve. During the filling process, check all connection points for leaks, eliminate them if necessary. After reaching the system pressure on the medium side, close the venting valve.



#### Attention

When opening the venting device of the run around coil system, the plant must be switched off. Secure the main switch! The liquids, e.g. water-glycol mixture (-20°C to 40°C), are under pressure and can thus escape abruptly. Personal protective equipment such as suitable goggles and gloves must be worn or the manufacturer's instructions followed.

### 07.05.02 First test run



Tighten all clamping points of the electrical system!

During commissioning, ensure that the plant is not operated beyond the limits specified in the design data.

Improper operation will result in damage to the unit for which we cannot accept any liability! During commissioning, as well as for the subsequent operation of the AHU, the information signs on the AHU must be observed!

Switch on recirculation pump, check direction of rotation, reverse direction of rotation electrically if necessary. Run the recirculation pump to remove residual air from the control group. Check system pressure, top up if necessary and vent again.

### 07.05.03 Setting the maximum flow rate

- Start the pump on the frequency converter via "Hand On"
- Use the arrow keys to adjust the setpoint between 20 Hz and 45 Hz
- Adjust the setpoint so that the nominal flow rate (see type plate of the hydraulic unit) is adjusted at the taco setter.
- Enter the required frequency in the table below.
- Stop the pump at the frequency converter via "Off"
- On the frequency inverter, navigate via the "Main Menu" to the item 0-11 Program block and select [1] Block 1.
- Then navigate to 3-03 Maximum Reference and enter the previously determined setpoint using the arrow keys. Enter the same value also under 6-15 Terminal 53 High Ref./Feedb. Value
- Finally, the value [9] Active block must be set again under 0-11 Program block and the main display reactivated via "Status".
- Now the plant can be activated again via "Auto on".

| Menu | Menu designation                             | Setting                   | Display indication | Unit |
|------|----------------------------------------------|---------------------------|--------------------|------|
| 0-11 | Program block                                | Activated parameter block | [1] Block 1        |      |
| 3-03 | Max. Setpoint                                | Max. Output frequency     | _____              | Hz   |
| 6-15 | Terminal 53 Scal. Max. setpoint/actual value | signal scaling            | _____              | Hz   |
| 0-11 | Program block                                | Activated parameter block | [9] Active block   |      |



## 07.06 Faults and their elimination

### 07.06.01 Min. pressure switch-off

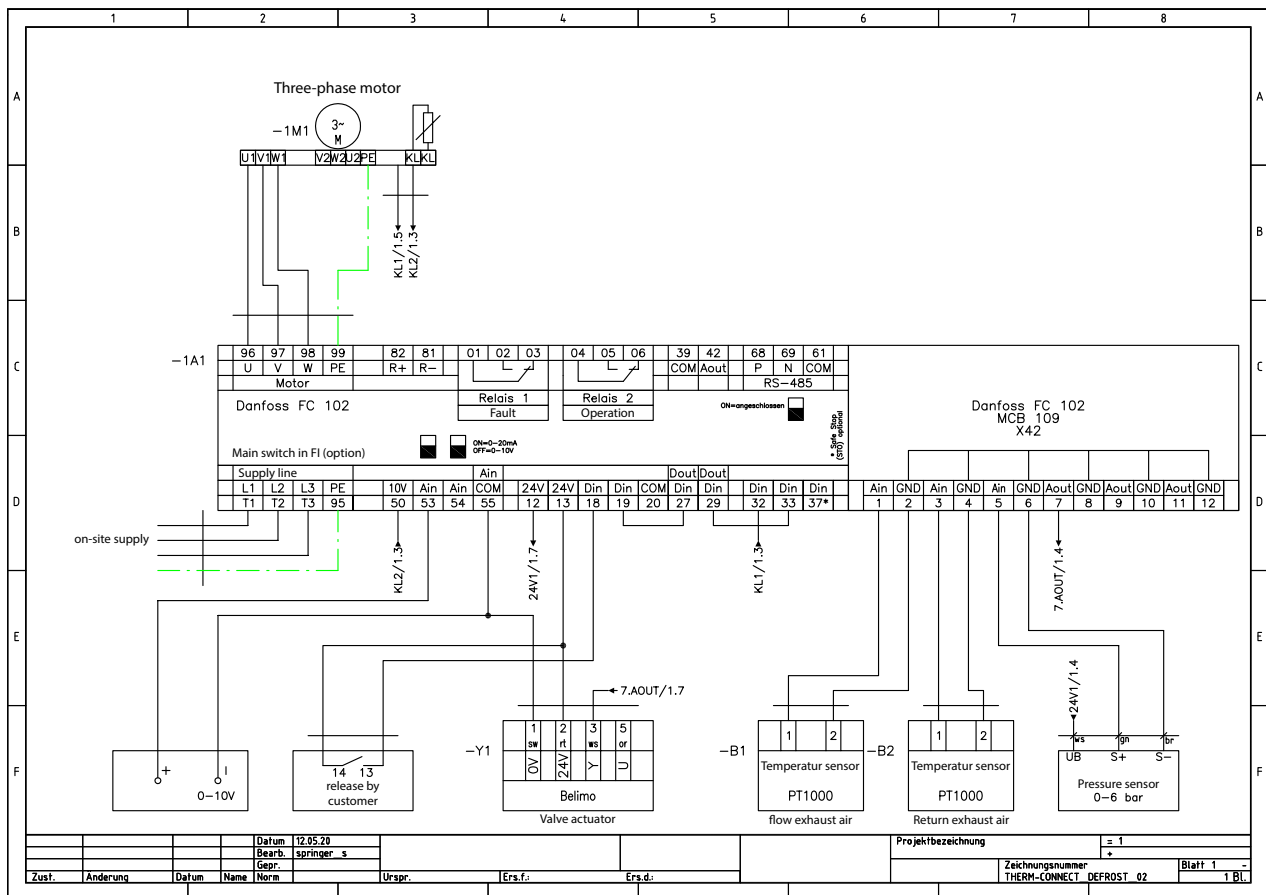
If the pressure on the suction side of the system falls below the standard 1.5 bar, the system must be switched off to protect the components of the pump. When the minimum pressure limitation is triggered, the frequency inverter locks the system and the alarm lamp on the display lights up. In order to be able to acknowledge the fault, the rest pressure of the system must be refilled to the pressure value specified on the type plate. The fault can then be acknowledged via the reset button on the FI display.

### 07.06.02 Further fault messages

All other fault messages, such as the PTC thermistor of the pump or internal fault messages of the frequency inverter, are displayed as messages on the FI display. These can be acknowledged via the reset key after they have been rectified.

All fault messages are forwarded to the BMS as a collective fault message.

## 07.07 Wiring diagram



## 8. THERM-CONNECT magna

### 08.01 General description

The high efficiency run around coil system consists of two heat exchangers with a high counterflow ratio and a series connection of the individual heat transfer stages.

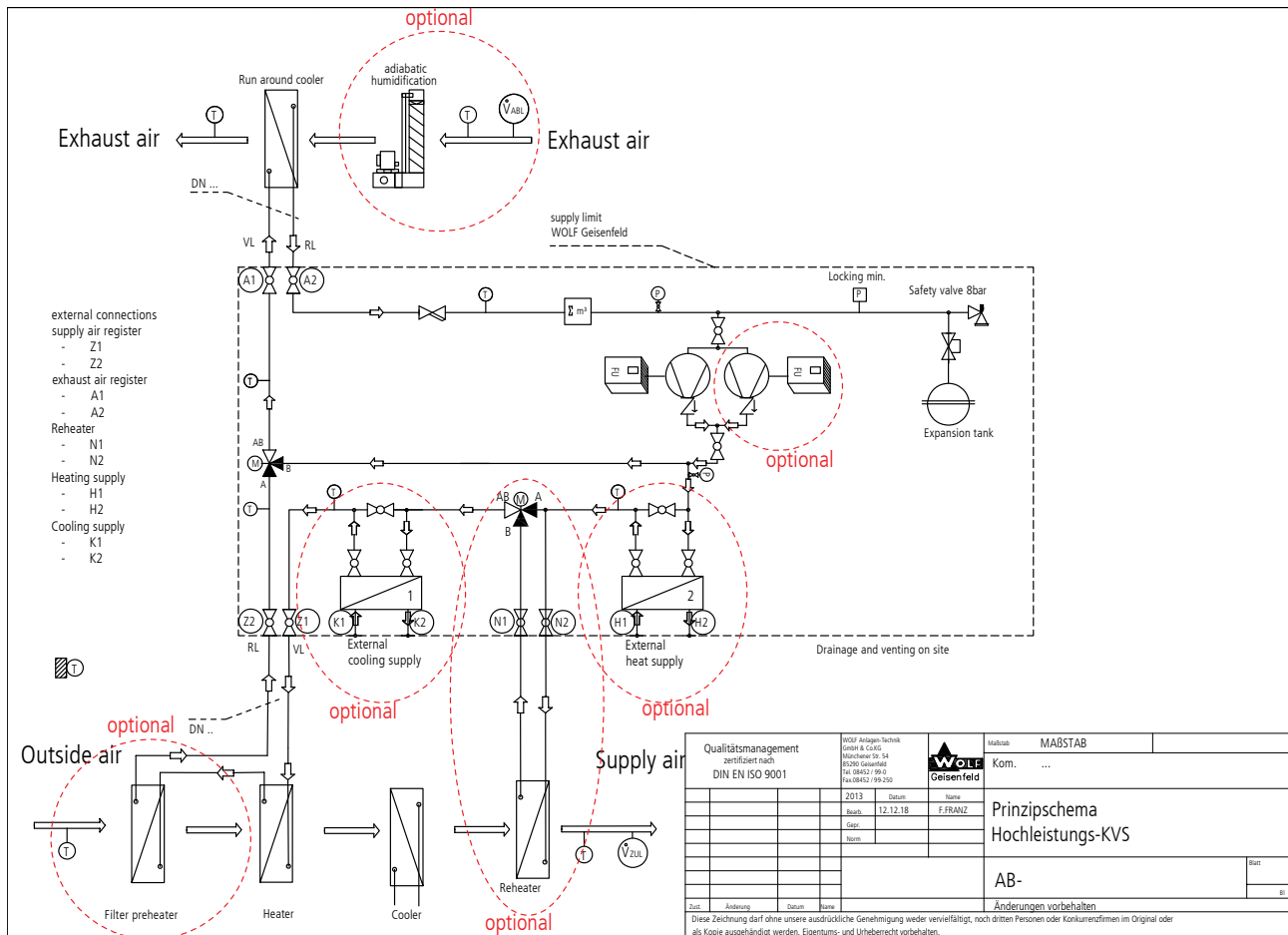
The heat is transferred via an intermediate medium consisting of a water-glycol mixture between the exhaust air coil and the outdoor air coil.

The brine mass flow is controlled by the integrated control system depending on the power requirement of the BMS, the air volume flow in supply air and exhaust air and the temperature conditions in the system.

The power and frost protection control is also carried out via the three-way mixing valve with high control accuracy. This allows the brine mass flow to bypass the supply air register to prevent ice formation on the register.

Optional extensions can be used to integrate an adiabatic exhaust air humidifier, the feeding of external additional energy into the run around coil circuit, an accurate capacity determination with monthly data backup, a reheater for dehumidification cold recovery or a redundant double pump for fail-safe operation.

Since the pumps are designed separately for each system, the flow rate must be adapted to the respective system. This is done during commissioning of the system by a trained technician from WOLF Geisenfeld.



## 08.02 Display indication

In the main overview of the display the respective requirements of the superordinate control can be read. These are divided into the heating and cooling requirements.

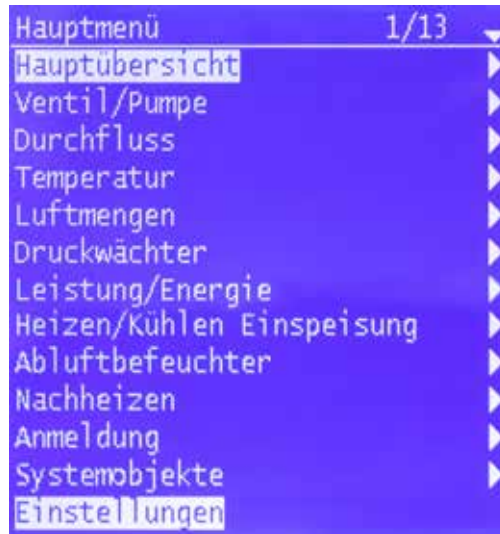


### Operating elements

The operating elements and their functions are:

| Pos. | Designation   | Functions                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|------|---------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1    | Display       | Display of menus, objects, parameters, parameter values, commands, etc.                                                                                                                                                                                                                                                                                                                                                                                                              |
| 2    | Up / Down     | <ul style="list-style-type: none"> <li>• navigating through menus</li> <li>• changing parameter values</li> </ul>                                                                                                                                                                                                                                                                                                                                                                    |
| 3    | Confirm key   | <ul style="list-style-type: none"> <li>• selecting menus</li> <li>• accepting the changed value</li> </ul>                                                                                                                                                                                                                                                                                                                                                                           |
| 4    | Cancel key    | <ul style="list-style-type: none"> <li>• return to parent menu</li> <li>• discard changed value</li> </ul>                                                                                                                                                                                                                                                                                                                                                                           |
| 5    | Alarm key LED | <ul style="list-style-type: none"> <li>• Off: No alarm</li> <li>• Flashing: Pending alarm</li> <li>• On continuously: Pending acknowledged alarm</li> </ul> <p><b>Press key:</b></p> <ul style="list-style-type: none"> <li>• Go to last alarm</li> <li>• Jump to alarm list (display of pending alarms and alarm history)</li> <li>• Jump to alarm history</li> <li>• Jump to alarm settings</li> <li>• Acknowledge and reset alarms in the alarm list or alarm history.</li> </ul> |
| 6    | Info key LED  | <ul style="list-style-type: none"> <li>• Off: Unit Off</li> <li>• Green: Unit On</li> <li>• Orange: Manual operation / simulation</li> <li>• Orange-Red flashing: Manual operation and pending alarm</li> <li>• Red: Pending alarm</li> </ul>                                                                                                                                                                                                                                        |

The main menu contains all other data points and options. The keys on the display can be used to navigate between the individual menus. In this way, all temperatures, air quantities and control signals can be called up via the individual submenus.



## 08.03 Control functions

### 08.03.01 Brine mass flow

- External enable On
- External power signal ( 0-10V DC ) from the superordinate temperature control sequence
- The system starts up to the minimum frequency. The valve closes as long as no external power signal ( 0-10V DC ) is present.
- The setpoint of the recirculating water-glycol quantity is calculated depending on the ext. power signal, the maximum water quantity and the actual air quantity.
- The actual volume flow is controlled in the internal control sequences valve and speed control of the recirculation water pump via the frequency converter.
- External release Off
- The system stops

#### Periodic pump run:

To prevent the pump from getting stuck, even if there is no demand from the control system, a periodic pump run is performed once a week. In this case, the pump runs for 10 minutes at 50% power demand

#### Frost protection control:

The integrated frost protection control is factory set to the limit value -1°C. Experience has shown that this value is sufficient to prevent icing of the register and to operate the heat recovery as efficiently as possible.

### 08.03.02 Exhaust air humidifier (optional)

When an adiabatic exhaust air humidifier is integrated, it is also controlled in cooling mode after the set flow rate of water-glycol mixture has been reached.

Humidification is blocked at low temperatures by means of the outdoor air temperature specified by the customer. This threshold value can be adjusted during commissioning.

After operation of the humidifier, the hardware signal "ventilation overrun" is output. This ensures that the evaporation mats are completely dried before the ventilation is switched off.

When the exhaust humidifier is not in operation, the lines are flushed once a week to prevent germ formation in the lines.

### 08.03.03 Feeding additional energy (optional)

When external additional energy is fed in, the Therm-Connect magna is first brought up to the full set flow rate and the control valve of the feed-in is opened if the higher-level control system demands an even higher flow rate. Thereby, a hardware signal "Request external heating/cooling" is issued so that the on-site heat/cooling can be provided.

### 08.03.04 Power calculation (optional)

By recording the air-side temperatures before and after the high efficiency run around system coils and the water-side values, the transmitted power of the THERM-CONNECT magna unit can be determined. These values are shown in the display. In addition, a calculation of the heating and cooling energy over the period of one month is performed. These monthly values are stored for heating energy and cooling energy for one year. In addition, the total energy of a whole year is stored in the controller for 5 years.

### 08.03.05 Double pump (optional)

With a redundant double pump, two identical pumps are connected in parallel and protected against a hydraulic short circuit by check valves. The pumps are controlled by a respective frequency converter, which enables further operation with reduced power in case of failure of one pump/frequency converter. Depending on the requirements, the pumps can be designed with half the flow rate or full flow rate and operated alternately in order to achieve the same running times of the pumps as far as possible.

### 08.03.06 Reheater (optional)

When dehumidification cooling is integrated into the supply air unit, the supply air is reheated after dehumidification via the controlled reheater. This "cold recovery" also is pre-cooling the air upstream of the dehumidification cooler, thus saving cooling capacity to be provided externally.

### 08.03.07 second supply/exhaust air unit (optional)

Via additional inputs on the controller, the volume flows of a further supply air and/or exhaust air unit can be connected to the THERM-CONNECT magna. Thus, two units can be connected in parallel to one hydraulic unit. The air volume flows of the individual units are shown separately on the display and are also output via the optional bus protocol.



## 08.04 BMS connection

### Control from external AHU control

- 1 x release contact heating from external AHU control cabinet as normally open contact
- 1 x power request heating 0-10 V DC
- 1 x cooling enable contacts from external AHU control cabinet as NO contact
- 1 x power request cooling 0-10 V DC
- 1 x outdoor temperature (-35°C - 45°C) 0-10 V DC
- 1 x power request reheater 0-10 V DC (optional)

### Contacts to external AHU control

- 1 x operating message heating floating NO contact for 230 V
- 1 x operating message cooling floating NO contact for 230 V
- 1 x Collective fault signal floating NC contact for 230 V
- 1 x request for additional energy heating floating normally open contact for 230 V (optional)
- 1 x request for additional energy for cooling floating normally open contact for 230 V (optional)
- 1 x ventilation exhaust air humidifier overrun dry normally open contact for 230 V (optional)

## 08.05 Commissioning

### 08.05.01 Filling the system

#### Check before filling the system

Before filling the hydraulic control group, check the following parameters

- Proper installation of all parts
- Venting valve installed at the highest point of the piping
- Direction of flow at valves, pumps, etc.
- Installation position of valves, etc.
- Connection of heater, cooler in counterflow principle (otherwise considerable power losses will occur!)
- Tight fit of all connections (screwed connections, flanges, etc.)
- Smooth running of valves, slide valves, actuators
- Hydraulic lines must be flushed and cleaned



**Attention! When filling and venting the system, there is a risk of injury due to**

- Escaping pressure jet
- Scalding with hot heating media
- Burning in case of skin contact with antifreeze additives

#### Filling and venting

Fill hydraulic control group slowly - vent carefully. During the filling process, open the venting valve. During the filling process, check all connection points for leaks, eliminate them if necessary. After reaching the system pressure on the medium side, close the venting valve.


**Attention**

When opening the venting device of the run around coil system, the plant must be switched off. Secure the main switch! The liquids, e.g. water-glycol mixture (-20°C to 40°C) are under pressure and can thus escape abruptly. Personal protective equipment such as suitable goggles and gloves must be worn or the manufacturer's instructions followed.

### 08.05.02 First test run



Tighten all clamping points of the electrical system!

During commissioning, ensure that the system is not operated beyond the limits specified in the design data.

Improper operation will result in damage to the unit for which we do not accept any warranty! During commissioning, as well as for the subsequent operation of the air handling unit, the information signs on the air handling unit must be observed!

Switch on the recirculation pump, check the direction of rotation, reverse the direction of rotation electrically if necessary. Run the recirculation pump to remove residual air from the control group. Check system pressure, top up if necessary and vent again.

### 08.05.03 Preparations for commissioning

To ensure that commissioning runs smoothly, the following prerequisites must be met before the deadline:

- Power supply to the control cabinet is ensured
- Assembly, cabling, connection of all field devices
- Complete piping from the hydraulic station to the run around system coils (incl. shut-off/fill/drain valves outside the hydraulic unit)
- Insulation of the complete piping and components
- Filling of the operating medium to approx. 5 bar idle pressure (see type plate!) incl. flushing and venting of the complete system (observe glycol content according to design)
- During commissioning, you must have competent personnel at your disposal
- (Measurement and Control Technology electrical engineering, hydraulics plant engineering)

## 08.06 Faults and their elimination

### 08.06.01 Minimum pressure shutdown

If the pressure on the suction side of the system falls below the standard 1.5 bar, the system must be switched off to protect the components of the pump. When the minimum pressure limitation is triggered, the control system locks the system and the alarm lamp on the display lights up. In order to be able to acknowledge the fault, the rest pressure of the system must be filled up again to the pressure value specified on the type plate. The fault can then be acknowledged via the reset button on the control cabinet.

### 08.06.02 Further fault messages

All other fault messages, such as the PTC thermistor of the pump or internal fault messages of the frequency inverter are shown as plain text messages on the display. These can be acknowledged via the reset key after they have been rectified.

All fault messages are forwarded to the BMS as a collective fault message.

## 08.07 Wiring diagram

The wiring diagram of the Therm-Connect magna unit is created specifically for the plant. It is stored in the corresponding control cabinet when the system is delivered.

## 9. Maintenance

---

### 09.01 Warranty

Our warranty will be void if damage is caused by improper handling, operation and maintenance. Experience has shown that improper or inadequate maintenance causes greater damage as the products age. Consumable and wear parts are generally excluded from the warranty.

The legislator clearly specifies annual maintenance intervals for safety equipment:

z. B.: Ordinance on workplaces - § 4, 3

Inspections of safety equipment may only be carried out by competent or skilled personnel!

VDI 6022 Hygienic requirements for ventilation and air-conditioning systems

VDI 3801 Operation of ventilation and air-conditioning systems

DIN EN 13053 Performance program for the maintenance of ventilation and other technical equipment in buildings; ventilation and air-conditioning equipment and systems

AMEV Recommendation - Maintenance 85

DIN 1946/4 Ventilation systems in hospitals

DIN EN 13053 Central air handling units - Performance data for units, components and assemblies

We refer to the checklists contained in the aforementioned regulations, in which recommendations for maintenance intervals are given!

For maintenance and servicing work on air handling units, VDI 6022 requires training in accordance with Category B (hygiene training).

### 09.02 Electrical connections



Tighten all terminal points!

The safety functions of the control system must be subjected to an annual function test and, if necessary, the defective components must be replaced/repared.

## 10. Decommissioning, dismantling and disposal

---

### 10.01 Decommissioning

- Reduce plant to minimum capacity via regulation/control system
- Close all control valves
- Switch off circulation pump
- Drain installed parts at risk of freezing. Blow through pipelines with compressed air until they are completely empty
- Switch off the main switch and lock the system

### 10.02 Recommissioning

- Carry out a visual inspection to determine whether there is any visible damage. Then recommission the unit as described under Commissioning.
- Slowly refill drained components and carefully vent them
- Open all valves
- Operate main switch
- Switch on regulation / control

## 10.03 Dismantling and disposal



### Dismantling - Disassembly

Before starting dismantling, the air handling unit or the consumers installed in it must be disconnected from the power supply. All current-carrying connection lines must be removed by a qualified electrician.



Furthermore, all media-carrying components must be completely drained. This must be carried out by a specialist company, which must ensure the proper disposal of

- Water with antifreeze
- Refrigerant in evaporator piping and condenser
- compressor oils



### Attention!

System parts are under pressure!

The AHU can then be dismantled on site into the individual unit modules or into its individual parts. This should also be carried out by a specialist company that is familiar with the environmentally friendly disposal of the individual parts.

**Disposal must be carried out in accordance with the applicable, relevant and local environmental and recycling regulations of your country and municipality.**

The following materials are used in our air handling units

Casing – frame profiles, cladding panels and built-in parts:

- Hot-dip galvanized sheet steel
- Stainless steel 1.4301
- Aluminum AlMg
- Copper
- Brass
- PVC

Sealing profiles:

- Rubber compound profiles EPDM
- Fluoroelastomers FKM
- PVC

Sealing compounds:

- Polyurethane

Insulating material:

- Mineral wool
- Soundproofing mats
- Sandwich panels (coated, hot-dip galvanized steel sheet, polyurethane)
- Armaflex

# 11. Emergency

---

## 11.01 Fire fighting

There is no immediate fire hazard from the AHU. Only the seals, which are installed in small quantities, can burn off due to external influences.

In the event of fire, self-contained breathing apparatus must be worn to fight the fire.



The unit must be disconnected from the power supply. Suitable extinguishing media are

- Water spray
- Extinguishing foam
- Extinguishing powder

## 11.02 Escaping harmful substances

Since only small quantities of combustible seals are installed, only small quantities of harmful substances can be released in the event of fire. Due to the materials used, these are - nitrogen oxides, carbon dioxide, carbon monoxide, hydrogen chloride.

# HEATING VENTILATION AIR CONDITIONING



The latest version of the operating and  
maintenance instructions can be found at:  
[www.wolf-geisenfeld.de/downloads](http://www.wolf-geisenfeld.de/downloads)



WOLF Anlagen-Technik GmbH & Co. KG  
Münchener Str. 54 - 85290 Geisenfeld

**Tel.** +49 (0)8452 99-0  
**Fax** +49 (0)8452 99-250

**Mail** [info.hlk@wolf-geisenfeld.de](mailto:info.hlk@wolf-geisenfeld.de)  
**Web** [www.wolf-geisenfeld.de](http://www.wolf-geisenfeld.de)