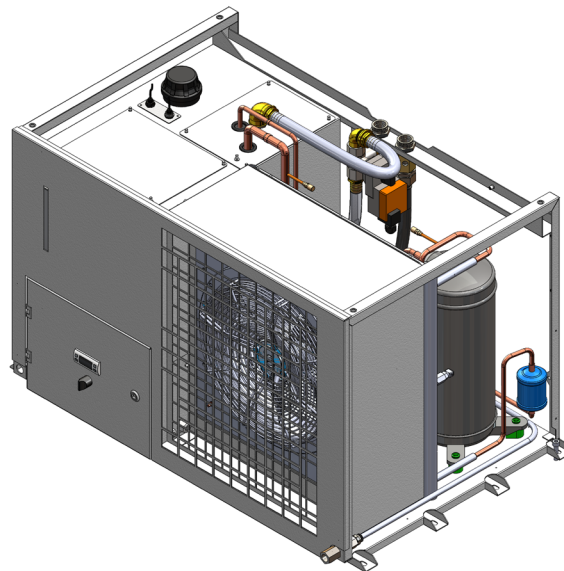


Translation operating manual WK300-11-00-1-2



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1 Notes on the operating manual



Please read through and observe the instructions contained in this operating manual.

1.1 General information

In order to guarantee the optimum performance of this appliance, as well as your personal safety, the contents of this operating manual must be read through in detail before connecting, commissioning or altering pre-programmed settings on the appliance.

Keep this operating manual in a safe and easily accessible place for future reference. ritter & bader GmbH assumes no liability for any mistakes present in this document, nor does the company assume liability for any damage occurring as a result of or in connection with this document or the information it contains. This applies even if ritter & bader GmbH has indicated the possibility that such damage may occur.

This document is exclusively intended for informational and instructional purposes. ritter & bader GmbH reserves the right to make changes to technical data and other information contained in this document without prior notice. ritter & bader GmbH is under no obligation to update the information contained in this document.

1.2 Explanation of symbols and notices

Label/Symbol	Meaning
 A red rectangular label with a white exclamation mark icon and the word DANGER in white capital letters.	Denotes an immediate threat of danger that could result in death or serious physical injury.
 An orange rectangular label with a black exclamation mark icon and the word WARNING in black capital letters.	Denotes a potentially hazardous situation that could result in death or serious physical injury.
 A yellow rectangular label with a black exclamation mark icon and the word CAUTION in black capital letters.	Denotes a potentially hazardous situation that could result in minor physical injury. This can also be used to indicate the possibility of material damage.
 A blue rectangular label with the word NOTE in white capital letters.	This label is used for information regarding installation, operation, maintenance and repair that is not directly associated with any hazards, yet is still important to observe.



Denotes an electrical hazard



Denotes automatic start-up of moving parts



Denotes risk of injury from operational fans without protection against accidental contact



Denotes a hot surface

1.3 Target audience of the overall documentation and their classification

This operating manual is intended for persons who have been tasked with the operation and/or regular maintenance of this cooling unit.

The maintenance and repair of the cooling unit must only be carried out by qualified personnel, i.e.:

- Personnel qualified as per DIN EN 13313 (cooling equipment specialists)
- Personnel qualified as per DIN EN 50110-1 (electrical equipment specialists).

1.4 Legal notices

ritter & bader GmbH reserves the right to modify or supplement this documentation at any time without prior notice. ritter & bader GmbH assumes no liability for printing or typesetting errors in this manual or any damage that occurs as a result of such errors.

Any other brands, product names and/or product logos that are mentioned or depicted in this manual are hereby recognised as the property of their respective legal owners.

2 Technical data

2.1 Technical data

Refrigeration data	Coolant used	R513A	
	Coolant filling volume	1.2	kg
	Chemical formula	C ₂ H ₂ F ₄ (46,7577 %) C ₃ H ₂ F ₄ (53,2423%)	
	GWP value	631	
	CO ₂ equivalent	0.76	t
	Nominal cooling capacity at air intake temperature and process water flow tem- perature	11 40 25	kW °C °C
	High pressure of cooling unit switchpoint	23.5	bar
	Low pressure of cooling unit switchpoint	1.5	bar
Electrical data	Voltage	380 - 400	V AC
	Frequency	50	Hz
	Power consumption	7.4	kW
	Current consumption	13.4	A
	Control voltage	24	V DC
	Voltage limit +/-	5	%
Hydraulic data	Fluid medium	Water / Glycol	
	P1 discharge head	50	m
	P1 volume flow	60	l/min
	P1 volume flow min./max.	40 / 70	l/min
Fan data	Volume flow	4000	m³/h
	Differential pressure	120	Pa

General	Appliance type	Water heat exchanger	
	Appliance designation	WK300-11-00-1-2	
	Manufacturer article number	047-025-016	
	Dimensions L/W/H	1120 / 690 / 690	mm
	Weight	~ 185	kg
	Operating limit	10 - 45	°C
	Temperature tracking K1 from – to	20 - 25 (18 - 28)	°C
	Transport- and Storage temperature (non-condensing!) min./max.	-20 / 50	°C
	Max. installation height above sea level	2000	m
	IP protection	54	
	Connections for cooling medium outlet	L28	
	Connections for cooling medium inlet	L28	
	Tank capacity	66	l

2.2 Definitions of terms

Term	Definition
Coolant	A fluid that is used to transfer heat in a cooling unit by absorbing heat at low temperature and low pressure and emitting heat at high temperature and high pressure; this usually results in changes to the state of the fluid.
Water inlet	A connection through which the water enters the cooling unit.
Water outlet	A connection through which the water passes out of the cooling unit.
Process water (tank)	Process water is a liquid (heat transfer fluid) that transports heat from an area of high temperature to an area of low temperature in a refrigeration circuit. It is used to cool machines, switch cabinets, electric motors, etc. In most cases, it is stored in a tank, conveyed according to customer-specific requirements (refrigeration points) and recooled in the cooling unit (half-open circuit).
Cold water	Used in passive cooling units and <u>directly</u> affects the process water in the heat exchanger. Accordingly, it is always colder than the process water.
Cooling water (mains water)	Used in applications such as water-cooled coolant condensers. It absorbs the thermal energy of the coolant condenser and then emits this to an external area (e.g. a cooling tower).

2.3 Intended purpose

The cooling unit is an active cooling unit that is designed for exchanging heat in industrial processes such as:

- Machine tools
- Laser cooling
- Production lines
- Switch cabinet air conditioning
- Electric motors

⚠ CAUTION

The cooling unit has been developed for a customer-specific application. It must be used exclusively for this purpose. The cooling unit must be installed in the space intended for it on the machine and permanently affixed to the provided mounting points by means of screws. It must only be operated with the industrial fluids that have been prescribed for it.

Any setup or usage that deviates from this is prohibited.

The cooling unit cannot be operated as a stand-alone unit.

2.4 Operating environment

- Ensure that the specifications given in the technical data („2 Technical data“) are adhered to.
- Set up the cooling unit in such a way that the air inlet and outlet will not be obstructed and so that it is possible to change the filter, should the appliance type require this. Depending on the degree of contamination, the air intake filter must be replaced once a week as appropriate.
- The air intake area of the cooling unit should not be situated in the warm air area of another system (otherwise, there is a risk of the cooling unit overheating).
- The build-up of heat must be avoided. Check that the appliance is positioned a sufficient distance away from other units, walls and ceilings.
- Ensure that there is a sufficient supply of fresh air and ease of access for maintenance personnel.

2.5 Functional description

A flowing volume of process water is heated in the customer-specific machine and cooled down by the coolant in the evaporator as required.

The cooling unit has its output regulated by the addition of cold water from the tank. This makes it possible to precisely regulate the water temperature at the water inlet. Once a certain evaporating temperature has been reached, the cooling unit switches itself off.

Description of the individual components:

■ Compressor

The coolant compressor draws in gaseous coolant from the low-pressure side and compresses it to the condensing pressure.

■ Condenser

The compressed coolant from the compressor is cooled down in the condenser. This process causes it to fall below the dew point, meaning that the coolant is then liquefied. In doing so, the coolant transfers thermal energy to the cooling medium (air or water).

■ Expansion element

In the throttle, the coolant is depressurised.

■ Evaporator

In the evaporator, the coolant undergoes a phase change from a liquid to a gas. During this process, the evaporating coolant absorbs thermal energy from the process water. As a result of this, the process water is cooled.

■ High-pressure switch

The high-pressure switch switches off the cooling unit if the condensing pressure exceeds the permitted upper limit.

■ Low-pressure switch

The low-pressure switch switches off the cooling unit if the evaporating pressure falls below the permitted lower limit.

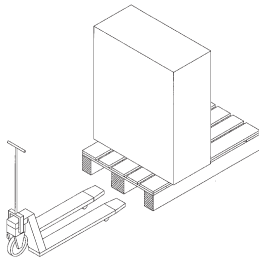
■ Dryer

The coolant drier filters abrasive particles (e.g. from the compressor) and moisture out of the refrigeration circuit.

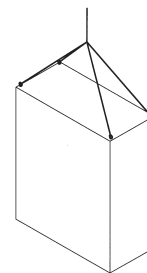
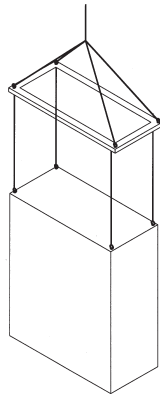
■ Inspection glass

The inspection glass allows you to visually determine whether there is an insufficient amount of coolant (through the formation of bubbles). A moisture indicator is also located by the inspection glass.

2.6 Transport and setup



The manufacturer accepts no liability for damage occurring in connection with transportation, e.g. as a result of incorrect storage. In general, the cooling unit must be stored and transported in a way that takes the subsequent assembly into account. Shocks and vibrations that may affect the unit during transportation must be avoided. In addition, the cooling unit must be protected against frost (i.e. potential frost damage) when being transported and during intermediate storage in winter. The setup procedure is specific to the customer and is carried out on their premises.



⚠ CAUTION

When lifting the cooling unit, a transport frame must be used that is appropriate to the transport dimensions and suitable for the vertical application of force. Alternatively, the specifications in the load-bearing capacity table below must be observed.

Ensure that the water has been removed from the tank.

Mode of assembly		
Quantity	3 or 4	3 or 4
Tilt angle	0° - 45°	45° - 60°
Description		
RS 06 DIN 580	0,17	Not permissible according to DIN 580: 2010-09!
RS 08 DIN 580	0,29	
RS 10 DIN 580	0,48	
RS 12 DIN 580	0,71	
RS 14 DIN 580	0,71	
RS 16 DIN 580	1,47	
RS 18 DIN 580	1,47	
RS 20 DIN 580	2,52	
RS 22 DIN 580	2,52	
RS 24 DIN 580	3,78	
RS 27 DIN 580	5,25	
RS 30 DIN 580	6,72	
RS 36 DIN 580	9,66	
RS 42 DIN 580	13,23	

For this kind of lifting, it is imperative to use suitable

- adjustable ring bolts or
- rotatable sling swivels.

Four threads are provided for this at the corners on the top of the cooling unit.

Observe DIN 580.

3 Safety

This chapter contains important fundamental information on how to operate the cooling unit correctly and safely. Read through it carefully before you begin working. Note that all following chapters may contain additional warning notices specific to the particular section or actions described.

3.1 Product liability

The following scenarios may compromise the protection that is provided for the cooling unit. Liability for the functionality of the appliance is transferred to the operator if:

- The cooling unit is not operated in accordance with the operating manual.
- The cooling unit is used for any application other than that which it is intended for, as described in this manual.
- Unauthorised functional or structural modifications have been made to the cooling unit by the operator.

3.2 Limitation of liability

Incorrect operation and improper handling of the cooling unit can result in defects and/or accidents. In the event that the unit is operated or handled incorrectly, warranty services and liability claims are excluded.

3.3 Guarantee

The manufacturer guarantees that the supplied product is free of material and processing defects. Should any defective parts nonetheless be present, the manufacturer undertakes to repair or replace these free of charge. The period of limitation for any claims regarding defects lasts for 12 months upon delivery of the appliance. Any provisions that deviate from this can be agreed in writing as part of the supply contract.

3.4 Intended use

The cooling unit must only be installed and operated for the purpose for which it is intended. Modifications must only be made by the manufacturer or customer service personnel. Only persons with a certificate of competence as per DIN EN 13313 are permitted to work on the unit. Coolant may only be replenished if a leak-tightness test has been conducted and may only be carried out by competent personnel who are informed in accordance with DIN EN 13313.

3.5 Improper use

⚠ WARNING

Safety, protective and regulatory devices must not be adjusted or rendered ineffective. Work that intervenes in the refrigeration circuit is only permitted to be carried out by persons with a certificate of competence as per DIN EN 13313. Unqualified personnel must not carry out work on the refrigeration circuit.

3.6 General safety instructions

⚠ DANGER

In case of fire

Switch off the cooling unit.

System components that have been filled with coolant can burst in the event of fire. The coolant itself is not flammable. However, at high temperatures, the coolant can decompose into toxic products. Ensure that you use respiratory protective equipment that functions independently of the ambient air conditions and avoid making contact without wearing suitable protective clothing.

Extinguishing instructions: Cool containers and systems using a water spray jet.

Personal protective equipment

If large quantities of coolant have been discharged from the unit, the machine area or installation area must only be entered when wearing respiratory protective equipment that functions independently of the ambient air conditions (with the required training and testing in how to use this). Keep face and hands away from direct contact with the coolant. Wear protective goggles and gloves. The requirements for personal protective equipment as per DIN EN 378-3 or BGR 500 Chapter 2.35 must be adhered to.

Safety instructions relating to coolant

A high concentration can lead to oxygen deficiency. This means there is a risk of asphyxiation. When inhaling high concentrations of coolant, there is a possibility of cardiac sensitisation from adrenaline. This can lead to arrhythmia or even cardiac arrest.

Liquid coolant that comes into contact with skin or eyes can result in frostbite. Should a coolant leak be present, ensure that hands and eyes are adequately protected by means of personal protective equipment such as gloves and goggles.

⚠ CAUTION

Coolants R134a/R410A/R407C/R513A belong to group A1 as per DIN EN 378-1. They are not flammable and normally pose no considerable harm to human health.

The coolant used is heavier than air and can initially accumulate on the floor in the event of leakages or an accident that results in a discharge of coolant. Escaping coolant is almost undetectable by smell.

Open flames or extremely hot surfaces can cause the coolant to decompose into highly toxic products. Smoking and open flames in the vicinity of the system are therefore prohibited. Should you suspect any leaks, you must inform qualified customer service personnel who will then be able to check for these.

The system contains fluorinated greenhouse gases. Coolants must not be allowed to escape into the atmosphere, as these emissions contribute to global warming.

Observe safety data sheets and operating instructions as per the German Ordinance on Hazardous Substances ("GefStoffV").

3.7 Product-specific safety instructions

Manufacturer contact details

ritter & bader GmbH
Adolf-Wolf-Straße 44
89264 Weißenhorn, Germany
Tel: +49 (0) 73 09 96 370

For medical emergencies

European emergency phone number 112

Decommissioning in the event of an emergency

Immediately de-energise the cooling unit by:

1. **Switching off the main switch and control switch** on the machine
2. Activating the emergency switch **on the machine**
3. **Disconnecting** the electrical plug connection

⚠ WARNING



Denotes an electrical hazard



Denotes automatic start-up of moving parts



Denotes risk of injury from operational fans without protection against accidental contact



Denotes a hot surface

NOTE

In the event of faults or any questions regarding application, please contact the manufacturer or a sales representative.

3.8 Requirements for operators

All work on the cooling unit must exclusively be carried out by trained technical personnel. Read through the user manual carefully prior to commencing work and ensure that you are familiar with the how the appliance functions.

Maintenance and repair must only be carried out by qualified personnel (i.e. electrical engineers, cooling equipment specialists, personnel qualified as per DIN EN 13313).

Ensure that operating personnel are thoroughly acquainted with the contents of this operating manual.

3.9 Working environment for operating personnel

The requirements for personal protective equipment as per DIN EN 378-3 or BGR 500 Chapter 2.35 must be adhered to.

Personal protective equipment must be stored in area close to the cooling unit that is easily accessible. It must be stored carefully so that it is not subject to any adverse influences.

Personal protective equipment and equipment for use in the event of an emergency must be inspected and maintained at regular intervals in accordance with the recommendations of the manufacturer. In the event of defects or shortages, the equipment must be replaced immediately.

Ensure that the accident prevention regulations of German industrial associations (UVV or BGV A1 Section 2), the Occupational Health and Safety Act ("ArbSchG" Sections 4, 9 para. 1 and 12 para. 1) and the Ordinance on Industrial Health and Safety ("BetrSichV" Section 9) are adhered to.

For all handling of and work with coolants and glycol mixtures/additives, the following protective equipment must be provided:

- Safety gloves
- Eye protection
- First aid equipment
- Eye wash

3.10 Proper disposal of coolant and additives



Do not allow the coolant to escape into the atmosphere. The coolant must be collected by competent persons as per DIN EN 13313. Subsequently, the coolant undergoes appropriate reprocessing for recycling or disposal.



Glycol, and consequently also water-glycol mixtures, are included in water hazard class (WGK) 1 and must therefore be prevented from getting into groundwater. In accordance with Section 5 of the German Water Resources Act ("WHG"), everyone is obliged to prevent long-term changes to the properties of water. The legal provisions of individual federal states also apply, which have further regulations of their own that must also be adhered to.

NOTE

The appropriate reprocessing, recycling or disposal of coolants and additives must be documented in writing. Observe the safety data sheet of the coolant or additive manufacturer/supplier.

4 Product description

A cooling unit is a closed circuit in which coolant circulates without being consumed.

The compressor extracts gaseous coolant from the evaporator, where it is brought up to a higher pressure. During this process, the coolant heats up. The compressed gas then enters the condenser. There, it is cooled at a consistent pressure, which causes it to change phase from a gas to a liquid. Afterwards, the liquid coolant enters the expansion element, where it is depressurised to a lower pressure. Here, the coolant begins to boil and evaporate. The coolant absorbs the thermal energy necessary for this process from its surroundings, thereby cooling substances in its vicinity.

As long as the compressor is operational and the circuit is closed, this process will repeat perpetually.

5 Installation

5.1 Operating environment

The prerequisite conditions for the operating ambient temperature can be found in the technical data table („2 Technical data“).

NOTE

The guarantee and any liability claims are rendered void should the prescribed operating ambient temperatures be exceeded or fallen short of, any technical changes be made or any work be carried out on the unit without consulting the manufacturer.

5.2 Process water

Process water is used to cool electric motors and for air conditioning of switch cabinets in half-open refrigeration circuits.

Process water/cooling water/cold water specifications for use with coaxial capacitor (copper CU-DHP, K21, C12200) or condenser pipe bundle with CU pipe or plate heat exchanger (copper-soldered)

General

Property	Concentration
Free from suspended matter (solids)	< 0.05 g/m ³
Conductivity	< 500 µS/cm
pH value	7 to < 9
Foreign matter	< 0.3 mm

Recommendation: ≤ 200 µ filter in the water circuit

Guidance for limit values of chemical substances:

Water content	Concentration
Overall hardness	< 8.5 dGH
Carbon-related hardness	< 20 dGH *1
Free carbon dioxide (CO ₂)	< 5 mg/l
Ammonia	Not detectable
Nitrite	< 1 mg/l
Iron (Fe)	< 0.2 mg/l
Manganese (Mn)	< 0.05 mg/l

Water content	Concentration
Sulphate (SO_4^{2-})	< 50 mg/l
Sulphite (SO_3)	Not detectable
Hydrogen sulphide (H_2S)	< 0.05 mg/l
Chloride (Cl^-) (< 60 °C)	< 1000 mg/l
$\text{HCO}_3^-/\text{SO}_4^{2-}$	> 100 mg/l
Nitrate (NO_3)	< 100 mg/l
Aluminium (Al)	< 0.2 mg/l
Microbiological growth *2	
- Colony count	< 1000 KBE/ml
- Sulphate reducer	Not detectable

*1 The presence of additive can simulate a higher value

*2 Dip slide test

NOTE

In general, potable water should be used as preparation water.

■ Demineralised water:

Demineralised water is water that has been completely demineralised and can be used in the additive with the appropriate inhibitors. Demineralised water that is manufactured via reverse osmosis contains traces of salt, yet is suitable as preparation water.

■ Additives

Frost protection:

When used in active water cooling units (WK), frost protection at temperatures as low as -10 °C must be used. Frost protection is also necessary for transportation, to prevent frost damage at low external temperatures.

Corrosion protection:

In the condenser circuit of the WK3-xx, WK31-xx and WK33-xx water cooling unit series, we use copper, gunmetal, brass and stainless steel. Corrosion protection must be ensured using the additive in the cooling water circuit.

Biocides

In half-open cooling water circuits, the cooling water comes into contact with atmospheric oxygen, which is dissolved in the water at a water temperature of 20 °C with approx. 9 mg/l O_2 . This means there is a risk that algae and slime bacteria can develop. These can slowly clog the water filter. This impedes the water flow, meaning that the cooling of machines and the switch cabinet can no longer be guaranteed. In order to prevent this, an additional additive should be used for such systems.

When using a combination of additives (frost/corrosion protection and biocide), the compatibility must be taken into consideration. As a precautionary measure, these should be supplied by the same manufacturer in an approved combination.

NOTE

No metals that have a high difference in voltage potential – e.g. aluminium (-1.7 V) and copper (+0.36 V) – may be directly connected in the water circuit.

The entirety of the process water must be changed once a year. However, it must be checked at least every six months.

5.3 System components

A representation of the system components, including their arrangement and dimensions, can be found in the dimensions sheet („11.4 Dimensions sheet“) in the appendix.

5.4 Scope of delivery

NOTE

The cooling unit is delivered with a full charge of coolant.

If additional transportation is required, the shipping agent must be made aware of this. Details on coolant type and quantity can be found in the technical data („2 Technical data“) and on the nameplate of the cooling unit.

5.5 Cable connections

The electrical design and electrical connections as well as cable specifications can be found in the type-specific electrical circuit diagrams in the appendix („11.1 Electrical circuit diagrams and electrical components list“).

5.6 Dimensions

The dimensions (external dimensions of the housing) of the cooling unit unit can be found in the technical data table („2 Technical data“) and the dimensions sheet in the appendix („11.4 Dimensions sheet“).

6 Transport

6.1 Safety instructions for transportation

⚠ CAUTION

When lifting the cooling unit, a transport frame must be used that is appropriate to the transport dimensions and suitable for the vertical application of force. Alternatively, the specifications in the load-bearing capacity table below must be observed.

Ensure that the water has been removed from the tank.

Mode of assembly		
Quantity	3 or 4	3 or 4
Tilt angle	0° - 45°	45° - 60°
Description		
RS 06 DIN 580	0,17	Not permissible according to DIN 580: 2010-09!
RS 08 DIN 580	0,29	
RS 10 DIN 580	0,48	
RS 12 DIN 580	0,71	
RS 14 DIN 580	0,71	
RS 16 DIN 580	1,47	
RS 18 DIN 580	1,47	
RS 20 DIN 580	2,52	
RS 22 DIN 580	2,52	
RS 24 DIN 580	3,78	
RS 27 DIN 580	5,25	
RS 30 DIN 580	6,72	
RS 36 DIN 580	9,66	
RS 42 DIN 580	13,23	

For this kind of lifting, it is imperative to use suitable

- adjustable ring bolts or
- rotatable sling swivels.

Four threads are provided for this at the corners on the top of the cooling unit.

Observe DIN 580.

⚠ CAUTION

Ensure that the accident prevention regulations of German industrial associations (UVV or BGV A1 Section 2), the Occupational Health and Safety Act ("ArbSchG" Sections 4, 9 para. 1 and 12 para. 1) and the Ordinance on Industrial Health and Safety ("BetrSichV" Section 9) are adhered to.

Only suitable methods of transportation (e.g. forklift truck, pallet truck) may be used.

6.2 Packaging

The cooling unit is supplied ex-works in appropriate and secure packaging for transportation (pallet/transportation safeguards/outer packaging/cardboard box/filling material).

According to packaging regulations, priority should be given to recycling and recovery of materials ahead of the recovery of energy and disposal that is commensurate with public interest.

6.3 Transportation and storage

In general, the water cooling unit must be stored and transported in a way that takes the subsequent assembly into account. To this end, suitable pallets and appropriate transportation safeguards that protect against tipping and slipping must be used. Shocks and vibrations that may affect the unit during transportation must be avoided. The cooling unit must not be stacked or have other items resting on it.

In addition, the cooling unit must be protected against frost (i.e. potential frost damage) when being transported and during intermediate storage in winter. If the system is being stored and transported at temperatures below -15 °C, it must be emptied completely in order to avoid damage from bursting (particularly in the evaporator). The system must only be transported and stored when there is no heat transfer fluid inside (tank, hoses, pumps, etc.).

The system must not be stored outdoors.

6.4 Incoming goods inspection

According to Section 377 of the German Commercial Code ("HGB"), the unit must be immediately checked by the customer upon delivery to ensure there are no defects (e.g. missing components, damage incurred in transit, material defects, etc.).

Any defects that are identified must be reported to ritter & bader GmbH without delay.

Manufacturer contact details

ritter & bader GmbH
Adolf-Wolf-Straße 44
89264 Weißenhorn, Germany

Tel: +49 (0) 73 09 96 370

Fax: +49 (0) 73 09 96 3717

E-mail: mail@ritter-bader.com

The goods are considered to be approved should no notice of defects be received.

7 Assembly

7.1 Safety instructions for assembly

⚠ WARNING

Safety, protective and regulatory devices must not be adjusted or rendered ineffective. Work that intervenes in the refrigeration circuit is only permitted to be carried out by persons with a certificate of competence as per DIN EN 13313. Unqualified personnel must not carry out work on the refrigeration circuit.

7.2 Assembly (appliance)

⚠ WARNING



Work on the electrical system must only be carried out when it has been disconnected from the power supply.

Connect the cooling unit as per the circuit diagram („11.1 Electrical circuit diagrams and electrical components list“). When connecting, ensure that local safety regulations are adhered to in addition to the safety standards EN 60204 and EN 60335.

For cable ducts on the terminal box, use appropriate cable glands of the correct protection type. Apply strain relief.

Avoid abrasion of the cables.

Take the maximum operating current as a basis when dimensioning motor contactors, supply lines and fuses.

Compare the voltage and frequency data of the cooling unit („2 Technical data“) with the data of the power supply.

Only connect the cooling unit if the data corresponds correctly.

7.3 Assembly (interfaces to other components/appliances)

The interfaces to the cooling unit unit can be found in the technical data table („2 Technical data“), the dimensions sheet „11.4 Dimensions sheet“, and the electrical circuit diagrams („11.1 Electrical circuit diagrams and electrical components list“), as well as the fluid diagram in the appendix („11.3 Fluid diagram“).

7.4 Setup

- Set up the system in such a way that the air inlet and outlet will not be obstructed and so that it is possible to change the filter. Depending on the operating environment (air contamination level), the air intake filter must be replaced once a week as appropriate.
- The air intake area of the system must not be situated in the warm air area of another system (otherwise, there is a risk of the cooling unit overheating).
- The build-up of heat must be avoided. Check that the appliance is positioned a sufficient distance away from other units, walls and ceilings.
- Ensure that there is a sufficient supply of fresh air and ease of access for maintenance personnel.

8 Commissioning

8.1 Safety instructions for assembly

⚠ WARNING

Safety, protective and regulatory devices must not be adjusted or rendered ineffective. Work that intervenes in the refrigeration circuit is only permitted to be carried out by persons with a certificate of competence as per DIN EN 13313. Unqualified personnel must not carry out work on the refrigeration circuit.

8.2 Pre-commissioning

Prior to commissioning, observe the following points:

- Water cooling unit assembly: Installed vertically on the machine by means of screws
- Check that the present nominal voltage and frequency corresponds to the nameplate and technical data („2 Technical data“).
- During assembly, ensure that the system is unable to tip over, and do not allow it to be placed upside down.
- The hydraulic circuit must be completely open.
- The circulation of the heat transfer fluid must be guaranteed via the nominal flow.
- Once assembly is complete, wait approx. 60 minutes before switching on the water cooling unit.

⚠ WARNING

Note that the main switch does not interrupt the control voltage; it only controls the various operating states of the cooling unit.

8.3 Description of how to operate the machine/system

Due to the lack of accessibility to the cooling unit when it is installed on the customer-specific machine, no EMERGENCY STOP switch is installed on the cooling unit itself.

⚠ WARNING

There is no device to trigger an EMERGENCY STOP on the cooling unit.

There are no externally accessible plug connections on the cooling unit that can be disconnected to interrupt the power supply.

The power supply to the cooling unit can only be interrupted via the machine it is installed in. The operator is responsible for ensuring that the power is disconnected safely and securely.

Step	Action
1	Set the programme selector switch to the "Off" position. ⚠ WARNING Note that the switch does not interrupt the control voltage; it only controls the various operating states of the cooling unit.
2	Switch off the main supply ■ Switch off the main electric circuit and prevent it from being switched on again. ■ Check that the unit is free of voltage.
3	Fill the tank (via the filler pipe or filling and draining valve) ■ Check that the pipework of the water circuit is complete. ■ Open all sliders and valves (apart from the drain valve). ■ When filling the tank for the first time, fill it up to the fill level indicator.

Step	Action
4	Switch on the main supply ■ Switch on the main electric circuit. ■ Connect the power supply. ■ Set the programme selector switch from the "Off" to the "On" position. ⚠ CAUTION After switching on the main electric circuit, take note of the rotational direction of the pump, the fan and the compressor. If the direction of rotation is incorrect, there is a fault with the system. Ensure the wiring of L1, L2 and L3 corresponds to the electrical circuit diagrams. ■ The water circuit is automatically vented. ■ The water level in the tank sinks. ■ Adhere to a minimum running time of 10 minutes to ensure that the water-carrying systems have been fully vented.
5	Automatic mode ■ Set the programme selector switch to "Auto".
6	Cooling unit ready for operation ■ Water shortages, air bubbles or blockages in the cooling unit can lead to faults. An error code will be shown on the regulator display. („11.6 Regulator description“). ■ It is possible to carry out an external reset by switching the control voltage on and off. In doing so, the position of the programme selector switch must not be changed.

9 Maintenance and service

9.1 Safety instructions for maintenance

⚠ WARNING

The safety-relevant components of the cooling unit must be checked and reported on by the operator every six months. (Operating manual)

Safety, protective and regulatory devices must not be adjusted or rendered ineffective. Work that intervenes in the refrigeration circuit is only permitted to be carried out by persons with a certificate of competence as per DIN EN 13313. Unqualified personnel must not carry out work on the refrigeration circuit.

9.2 Fault diagnosis for connector output

Fault	Possible cause	Recommended action
Fill level	Water level in tank too low	Check the water level in the tank and fill via the filler pipe if necessary. Check the water level via the fill level indicator. When doing so, take note of the concentration of the water additives.
	Level switch in tank is defective	Check the level switch and replace it if necessary (at the correct water level, the contact is closed). Pay attention to the installation position – the switch opens downwards.
	There is a break in the cable	Examine the cable and replace it if necessary.
Volume flow	The flow in the external water circuit has been impaired	Check the external water circuit for blockages and/or bent hoses.
	Rotational direction of the pump is incorrect	Check that the rotational direction corresponds to the affixed arrow (to do this, switch the water cooling unit on and off again) and adjust if necessary.
	The pump is defective	Check the operating voltage of the pump and replace it if necessary.
	Flow monitor is defective	Check the flow monitor and replace it if necessary.
	There is a break in the cable	Examine the cable and replace it if necessary.

Fault	Possible cause	Recommended action
Water temperature	The regulator has been incorrectly set	Check the parameters of the regulator.
	The regulator is defective	Replace the regulator.
	The regulator sensor is defective or there is a break in the cable	Check the sensor and cable.
Low pressure of cooling system/ pressure monitor	There is a lack of coolant	Must be rectified by the manufacturer.
	Rotational direction of the pump is incorrect	Check the direction of rotation.
	Low pressure of pressure monitor is defective	Must be rectified by the manufacturer.
High pressure of cooling system/pressure monitor	Air filter is contaminated	Clean or replace filter mat.
	Ambient temperature is too high	Reduce the air intake temperature.
	Voltage fluctuations	Check that the supply voltage corresponds to the nameplate.
	Condenser is contaminated	Clean the condenser.
	High pressure of pressure monitor is defective	Must be rectified by the manufacturer.
Cooling system/ therm. overcurrent circuit breaker for compressor / fan	Voltage fluctuations	Check that the supply voltage corresponds to the nameplate.
	Therm. overcurrent circuit breaker is defective	Replace therm. overcurrent circuit breaker
	Compressor is defective	Must be rectified by the manufacturer.
Filter contamination	Differential pressure switch adjusted or defective	Check the cable connection. Check the setting.

9.3 Instructions for replacing components

⚠ CAUTION

The replacement of safety-relevant components must only be carried out by the manufacturer or an authorised service partner.



Denotes an electrical hazard



Denotes automatic start-up of moving parts



Denotes risk of injury from operational fans without protection against accidental contact



Denotes a hot surface

9.4 Filter mat replacement

Remove the filter mat to be replaced via the labelled housing aperture.

NOTE

The filter mat at the air inlet must be replaced before it becomes excessively contaminated. A reduced air flow leads to a reduction in the performance of the cooling unit and increased energy consumption. In turn, this can reduce the service life of the compressor.

The only filter mats permitted for use are those that have been authorised by the manufacturer in writing. („11.2 Components list“, „11.5 Data sheet of filter mat and settings of Differential pressure switch“)

9.5 Maintenance schedule

Maintenance and leakage inspection intervals/protocols

NOTE

At a CO₂ equivalent of five tons or above, the **operator** is obliged to keep a

system protocol

which must be kept up to date as per DIN EN 378-4.

The CO₂ equivalent of the cooling unit can be found in the technical data ("2.1 Technical data")

A system protocol can be obtained from ritter & bader GmbH.

Manufacturer contact details

ritter & bader GmbH
Adolf-Wolf-Straße 44
89264 Weißenhorn, Germany

Tel: +49 (0) 73 09 96 370

Fax: +49 (0) 73 09 96 3717

E-mail: mail@ritter-bader.com

10 Decommissioning

10.1 Safety instructions for decommissioning

⚠ WARNING

Disconnect the cooling unit from the power supply before commencing work.

Ensure that it cannot be switched on again unintentionally.

Note that certain system components may be pressurised.

Safety, protective and regulatory devices must not be adjusted or rendered ineffective. Work that intervenes in and/or decommissions the refrigeration circuit is only permitted to be carried out by persons with a certificate of competence as per DIN EN 13313. It is prohibited for unqualified personnel to carry out work on and/or decommission the refrigeration circuit.



Denotes an electrical hazard



Denotes automatic start-up of moving parts



Denotes risk of injury from operational fans without protection against accidental contact



Denotes a hot surface

10.2 Description of the decommissioning process

Step	Action
1	Set the programme selector switch to the "Off" position.
2	To switch off the main supply: On machines that function automatically, the cooling unit also switches on and off automatically. ■ Switch off the main electric circuit and prevent it from being switched on again. ■ Disconnect the power supply completely. ■ Check that the unit is free of voltage.
3	⚠ WARNING The cooling unit or individual components must be dismantled by an authorised specialist.
4	⚠ CAUTION Note that certain system components are pressurised.
5	■ If the cooling unit is due to be taken out of operation for a long period of time, the instructions on how to store the individual components must be adhered to. ■ In addition, the information from the component manufacturer must be taken into account.
6	NOTE There is a risk that frost damage may occur in winter. To avoid frost damage, ensure that all liquid-carrying components are emptied completely when taking the cooling unit out of operation.

10.3 Disposal

The system or individual components must be dismantled and/or disposed of by an authorised specialist.

All materials must be separated according to type so that these can be successfully returned to the material cycle.

All the relevant locally applicable laws and provisions for environmentally friendly disposal of all components and equipment (e.g. coolant, compressor oil, glycol) must be observed.

If required, corresponding safety data sheets can be obtained upon request.

10.4 Service

Service contact details

ritter & bader GmbH
Adolf-Wolf-Straße 44
89264 Weißenhorn, Germany

Tel: +49 (0) 73 09 96 3715

Fax: +49 (0) 73 09 96 3717

E-mail: service@ritter-bader.com

11 Appendix

This appendix includes the following machine-specific information:

- Plans
- Parts lists
- Data sheets
- Protocols and descriptions

If required, further information can be provided upon request.

Manufacturer contact details

ritter & bader GmbH
Adolf-Wolf-Straße 44
89264 Weißenhorn, Germany

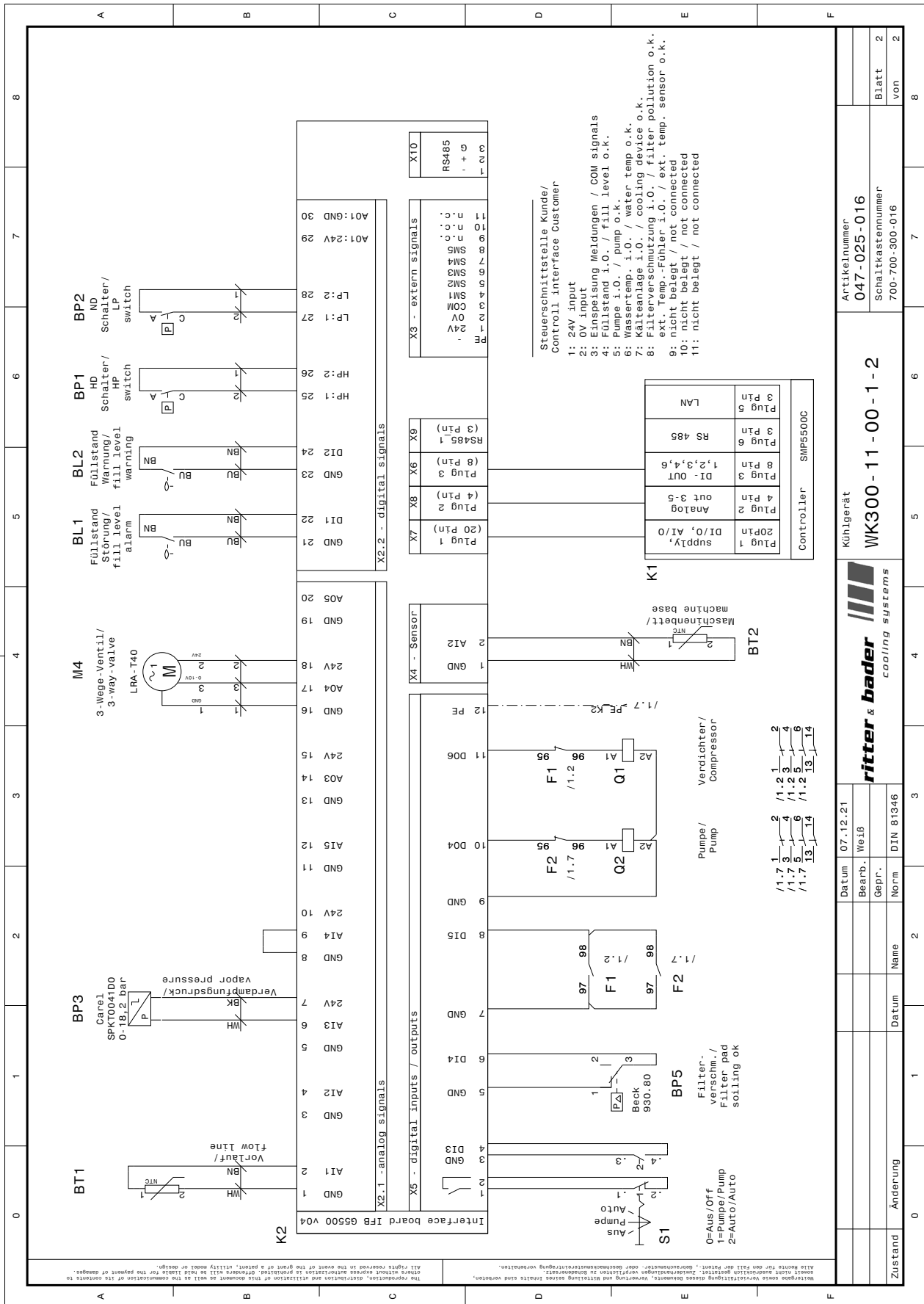
Tel: +49 (0) 73 09 96 370

Fax: +49 (0) 73 09 96 3717

E-mail: mail@ritter-bader.com



Electrical circuit diagrams and electrical components list



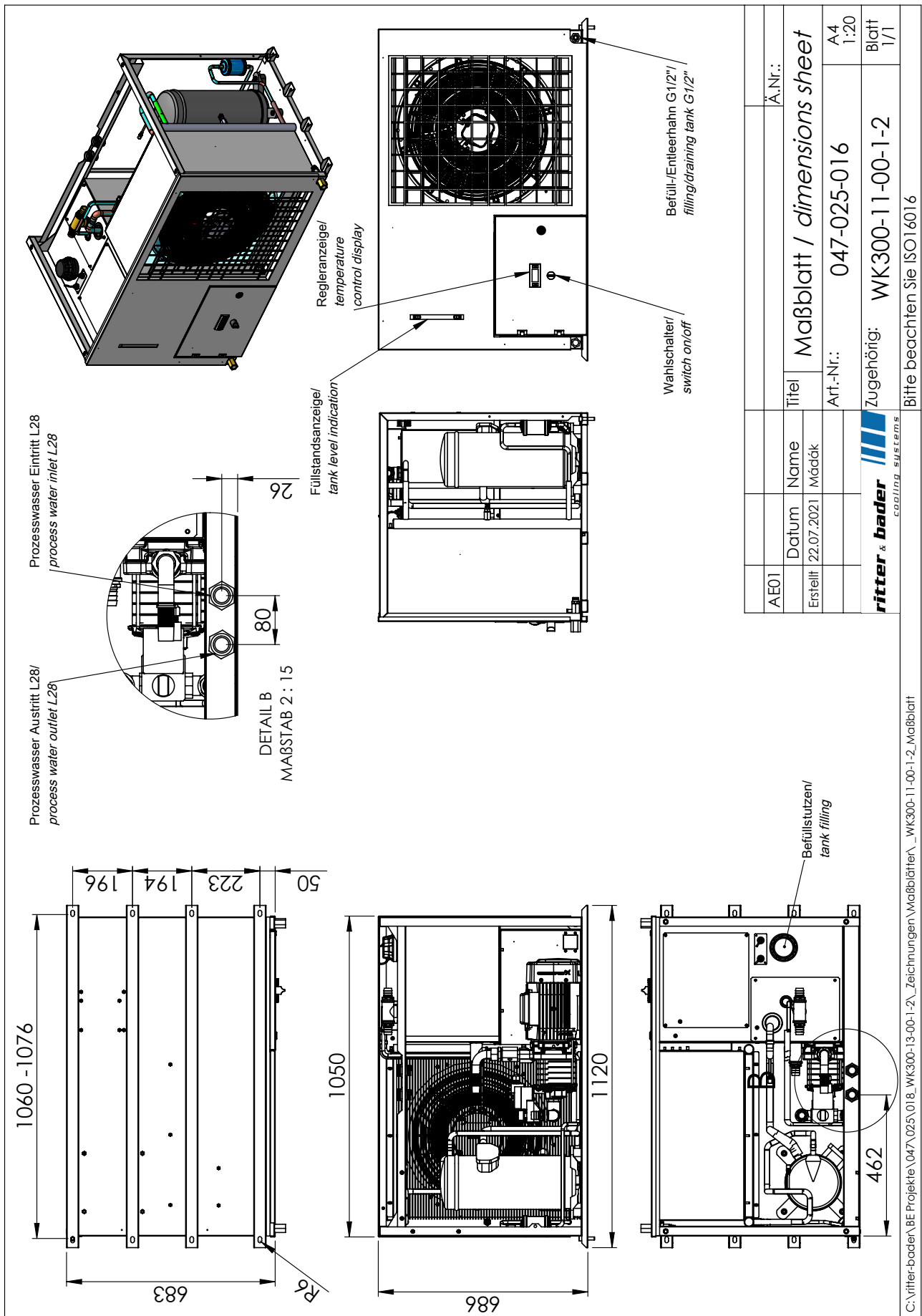
Electrical circuit diagrams and electrical components list

[illegible]

11.2 Components list

ID	Pos. i. Fluid dia- gram	Description	Part number
M1	1	Compressor Panasonic C-SBN453H8A	940-001-550
	2	Condenser Microchannel 4Pass 25mm	940-002-691-2
M3	3	Axial fan W4D 420-CP02-40	922-001-996
	4	Schrader Valve	940-901-001
BP1	5	High pressure switch NSDHA00B79109	940-011-035
	6	Dryer DTG-B08101(083sm) / ADK 0810 MMS	940-010-155
	7	Inspection glass L:11,5 cm; D:10	940-010-004
	8	TUBE-Valve 9,0-R134a/R513A	940-010-1981
	9	Plate heat exchanger CB30-30H-F	940-002-799-07
BP3	10	Pressure transmitter SPKT0041D0	922-060-068-2
BP2	11	Low pressure switch NSDLA00A79109	940-011-036
M4	12	Actuator LRA-T40 0TP 005	940-010-063-10
	13	R3025-BL2, kvs=10, DN25, 1"i, 16bar	940-010-073
M2	14	Pump Grundfos CM5-6 A-R-A-V-AQQV F-A-A-N	941-005-391
BT1/2	15	Screw-In Resistance thermometer M10x1,5 NTC 103AT-2,3	922-004-157
	16	Filler neck TAP-90B-B-10-A-0-0-1-P01	941-011-148
BL1	17	Level switch KR-M12KB230-VZÖ-X0401	941-011-107-03
BL2	18	Level switch KR-M12KB170-VZÖ	941-011-107
	19	Ball valve KFE 1/2" os	401-090-005
	20	Tank Eurobox, 600 x 400 x 320 mm, 66 L	402-000-110
	21	Filter mat WK 300-	919-090-081

11.4 Dimensions sheet



11.5 Data sheet of filter mat and settings of Differential pressure switch

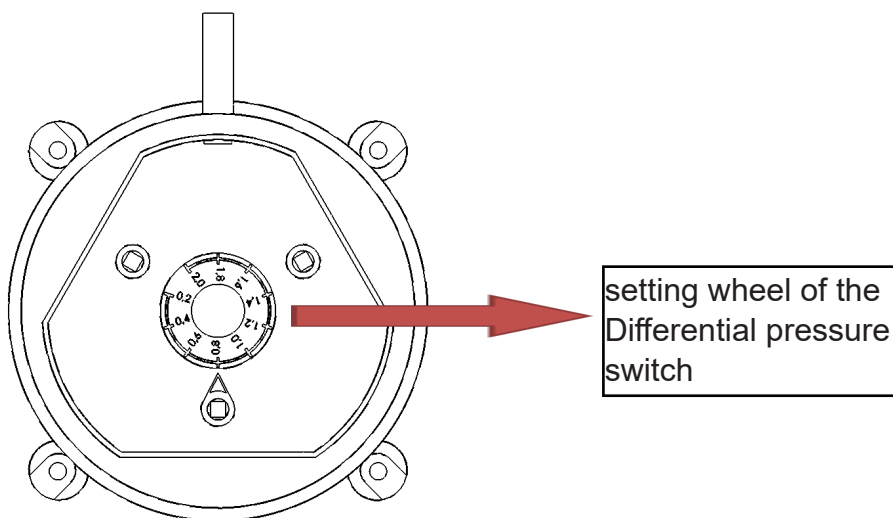
Requirements for filter mat

Initial pressure drop [Pa]	22
Class to ISO 16890	ISO coarse 45%
Initial arrestance	45
Filter class to EN 779.2012	G3

Settings of the Differential pressure switch

This differential pressure switch compares the pressure of the environment with the vacuum that is generated by the fans.

A value in [mbar] can be set on the setting wheel of the Differential pressures switch, which leads to a switching message (see messages „11.1 Electrical circuit diagrams and electrical components list“). The value is an indicator of the degree of filter mat contamination..



Factory setting of Differential pressures switch:

see value " Δp specified in mbar" on Differential pressure switch label

11.6 Regulator description

Displays

The start screen shows the flow temperature BT1.

Possible displays of the controller:



The symbols are explained in more detail in the following chart:

①	Pump
②	
③	Adjustment valve > 0%
④	Adjustment valve > 25%
⑤	Adjustment valve > 50%
⑥	Adjustment valve > 75%
⑦	Adjustment valve = 100%
	Pump operation only without cooling system
	Compressor in operation
	Alarm enabled
	Menu enabled

Controller start

With start of controller, the program version **Pr0** is displayed initially. Subsequently parameter version **PA-R** is displayed.

Then it follows the lower limit value of the tracking **SP U** and the upper limit value **SP 0**. The parameter version has the following meaning:

Regulator description

Key settings

-  (2s) Condensation temperature (optional)
-  (2s) Evaporation temperature
-  (2s) External sensor BT2
-  (2s) Actual set value
-  (2s)+  Opening degree M3 Valve/Fan Condensation (optional)
-  (2s)+  Opening degree M4 Valve flow

Error codes on WK

Following Error codes can be displayed:

Error code	Description
Er 10	Sensor BT1 Cable break: Flow temperature
Er 11	Sensor BT1 Incorrect type: Flow temperature
Er 12	Flow temperature too high
Er 13	Flow temperature too low
Er 14	Temperature alarm disabled
Er 15	Flow temperature critical
Er 20	Sensor BT2 Cable break: Machine base
Er 21	Sensor BT2 Incorrect type: Machine base
Er 30	Sensor BP3 Cable break: Evaporation pressure
Er 40	Sensor BP4 Cable break: Condensation pressure
Er 44	Condensing pressure limitation enabled
Er 45	Sensor BT3 Cable break: Condensation temperature
Er 46	Sensor BT4 Cable break: Ambient temperature
Er 51	Motor protection released
Er 52	Phase monitoring released
Er 61	Low pressure alarm
Er 62	High pressure alarm
Er 64	Valve limitation after high pressure
Er 65	Compressor protection enabled
Er 70	Filling level error
Er 71	Filling level warning
Er 72	Filter pad soiled
Er 76	Ambient teperature too high
Er 98	Modbus Communication Error

11.7 Declaration of incorporation

ENGLISH TRANSLATION

Declaration of Incorporation according to EC directive 2006/42/EC on machinery (Annex II B)

The manufacturer / distributor

ritter & bader GmbH
Adolf-Wolf-Straße 44
D - 89264 Weissenhorn

herewith we declare, that the partly completed machinery described below

product denomination: **Water Cooler**
 product: ritter & bader GmbH
 year of manufacture / serial number: according to the nameplate (YY MM xxxx)
 model / type: **WK300-11-00-1-2**

is complying with the following essential requirements of the Machinery Directive 2006/42/EC compare Annex
 "List of complied requests according to Annex I of the Machinery Directive 2006/42/EC"

In addition the partly completed machinery is in conformity with the EC Directives

F-Gas-Regulation EU 517/2014

The partly completed machinery must not be put into service until the final machinery into which it is to be
 Incorporated or a component, has been declared in conformity with the provisions of all relevant directives.

The following harmonised norms were applied:

DIN EN 60204-1: 2019-06	Safety of machinery - Electrical equipment of machines - Part 1: General requirements
DIN EN 378-2: 2018-04	Refrigerating systems and heat pumps - Safety and environmental requirements - Part 2: Design, construction, testing, marking and documentation
DIN EN 13313: 2011	Refrigerating systems and heat pumps - Competence of personnel

Technical documentation for this product is compiled in accordance with part B of Annex VII. In case of
 reasonable request, this documentation can be transferred via e-mail to a national authority.

Name and address of the person authorised to compile the relevant technical documentation:

Franz Ritter
 Adolf-Wolf-Straße 44
 89264 Weissenhorn

Place: Weissenhorn
 Date: 2021/07/21

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Notes

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