

# KaCool D HC

► Assembly, installation and operating instructions

Keep these instructions in a safe place for future use!



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## 1 General

### 1.1 About these instructions

These instructions ensure the safe and efficient handling of this equipment. These instructions form an integral part of the equipment and have to be kept in the direct vicinity of the equipment and available to personnel at all times.

All personnel must have carefully read through these instructions prior to commencing all work on the equipment. A fundamental prerequisite for safe working is compliance with all the stated safety instructions and other instructions contained in this manual.

In addition all local occupational health and safety at work regulations apply, as do general safety provisions governing the use of the equipment.

Illustrations in this guide are intended to provide a basic understanding and may differ from the actual model.

Ongoing tests and further developments may result in small variations between the unit supplied and the instructions.

### 1.2 Explanation of Symbols



#### **DANGER!**

This combination of symbol and signal word indicates an immediately dangerous situation caused by electrical power, which will cause death or serious injury if not avoided.



#### **WARNING!**

This combination of symbol and signal word indicates a possible hazardous situation.



#### **IMPORTANT NOTE!**

It represents a potentially hazardous situation, which could lead to damage to property or for a measure to optimise workflows.



#### **IMPORTANT NOTE!**

This symbol highlights useful hints, recommendations and information for efficient and trouble-free operation.

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## 2 Safety

This section provides an overview of all important safety aspects to ensure optimum protection of personnel as well as safe and trouble-free operation. In addition to the safety instructions in these operating instructions, the valid safety, accident prevention and environmental protection regulations must be observed for the area of use of the unit. It is the duty of the operator to ensure that instructions relating to maintenance (e.g. relating to hygiene) are complied with.

### 2.1 Correct use

The units are only intended to be used for heating and cooling air in frost-free and dry rooms. Within the room, the unit needs to be connected to the building's heating/cooling/ventilation system and to the building's waste water and power network. The operating limits and limits of use described in Chapter 2.2 [► 6] must be observed.



#### **IMPORTANT NOTE!**

Only use the unit after completion of the complete building and system. Site heating is not deemed to be correct and proper use.

Intended use of the unit also includes adherence to these instructions.

#### **Information in accordance with EN60335-1**

- This unit can be used by children aged 8 years or more and also by people with reduced physical, sensory or mental capabilities or a lack of experience and knowledge, if they are supervised or have been instructed in the safe use of the unit and the resulting dangers. Do not allow children to play with the unit. Do not allow children to clean and maintain the unit without supervision.
- This unit is not intended for permanent connection to the drinking water supply system.
- This unit is intended for being accessible to the general public.

Any use beyond or other than the stated intended use is considered as misuse.

Any change to the unit or use of non-original spare parts will cause the expiry of the warranty and the manufacturer's liability.

## 2.2 Limits of operation and use

Limits of operation		
Min./max. water temperature	°C	4-90
Min./max. air intake temperature	°C	6--40
Min./max. air humidity	%	20-60
Min. operating pressure	bar/kPa	-
Max. operating pressure	bar/kPa	10/1000
Min./max. glycol percentage	%	0-50

Tab. 1: Limits of operation

Operating voltage	230 V/ 50/60 Hz
Power/Current consumption	On the type plate

Tab. 2: Operating voltage

We would refer to VDI-2035 Sheets 1 & 2, DIN EN 14336 and DIN EN 14868 with regard to the properties of the medium used to protect the equipment. The following values provide further guidance.

The water used should be free of contamination, such as suspended substances and reactive substances.

Water quality		
pH value (at 20 °C)		8-9
Conductivity (at 20 °C)	µS/cm	< 700
Oxygen content (O <sub>2</sub> )	mg/l	< 0.1
Hardness	°dH	4-8.5
Sulphur ions		not measurable
Sodium ions (Na <sup>+</sup> )	mg/l	< 100
Iron ions (Fe <sup>2+</sup> )	mg/l	< 0.1
Manganese ions (Mn <sup>2+</sup> )	mg/l	<0.05
Ammonia ions (NH <sup>4+</sup> )	mg/l	< 0.1
Chlorine ions (Cl)	mg/l	< 100
CO <sub>2</sub>		< 50
Sulfate ions (SO <sub>4</sub> <sup>2-</sup> )	mg/l	< 50
Nitrite ions (NO <sub>2</sub> <sup>+</sup> )	mg/l	< 50
Nitrate ions (NO <sub>3</sub> <sup>+</sup> )	mg/l	< 50

Tab. 3: Water quality

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## IMPORTANT NOTE!

### Danger of frost in cooling mode!

There is a risk of the heat exchanger freezing when used in unheated rooms.

- ▶ Make sure that the unit is equipped with a frost protection sensor and/or thermostat in this case.



## IMPORTANT NOTE!

### Warning of misuse!

In the event of misuse, as itemised below, there is a danger of limited or failing operation of the unit. Ensure that the airflow can circulate freely.

- ▶ Never operate the unit in humid areas, such as swimming pools, wet areas etc.
- ▶ Never operate the unit in rooms with an explosive atmosphere.
- ▶ Never operate the unit in aggressive or corrosive atmospheres (e.g. sea air).
- ▶ Never operate the unit above electrical equipment (such as switch cabinets, computers or other electrical units, or contacts that are not drip-proof).



## IMPORTANT NOTE!

### Energy losses due to misuse!

Operating the unit with open windows (or other room openings) can result in significant energy losses.

- ▶ Heating and cooling modes (particularly when operating different units) need to be coordinated with each other.

## 2.3 Risk from electrocution!



## DANGER!

### Risk of fatal injury from electrocution!

Contact with live parts will lead to fatal injury from electrocution. Damage to the insulation or individual components can lead to a fatal injury.

- ▶ Only permit qualified electricians to work on the electrical system.
- ▶ Immediately disconnect the system from the power supply and repair it in the event of damage to the insulation.
- ▶ Keep live parts away from moisture. This can cause a short circuit.
- ▶ Properly earth the unit.



## 2.4 Personnel requirements - Qualifications

### Expertise

The installation of this product requires specialist knowledge of heating, cooling, ventilation, installation and electrical engineering. This knowledge, generally learned in professional training in one of the fields mentioned above, is not described separately.

Damage caused by improper installation is the responsibility of the operator or installer. The installer of these units should have adequate knowledge of the following gained from specialist professional training

- ▶ Safety and accident prevention regulations
- ▶ Guidelines and recognised technical regulations, i.e. Association of German Electricians VDE regulations, DIN and EN standards.
- ▶ DIN EN 1946-4 for compliance with advanced hygiene standards specifically for clean rooms, hospitals, medical practices etc.
- ▶ VDI 6022 ("Ventilation and air conditioning, air quality - Hygiene requirements governing ventilation and air conditioning systems and units")

The installation, operation and maintenance of this unit must comply with the applicable laws, standards, provisions and regulations in the respective country and the current state of the art.

## 2.5 Personal Protective Equipment

Personal protective equipment is used to protect people from impaired safety and health when working with the unit. The applicable accident prevention regulations at the place of use apply in all cases.

Personnel have to wear personal protective equipment during maintenance and troubleshooting on and with the unit.

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## 3 Transport, storage and packaging

### 3.1 General transport instructions

Check on delivery for completeness and transport damage.

Proceed as follows in the event of visible damage:

- ▶ Do not accept delivery or only accept with reservations.
- ▶ Record any transport damage on the transportation documents or on the transport company's delivery note.
- ▶ Submit a complaint to the freight forwarder.



#### **IMPORTANT NOTE!**

Warranty claims can only be made within the applicable period for complaints. (More information is available in the T&Cs on the Kampmann website)



#### **IMPORTANT NOTE!**

2 people are needed to transport the unit. Wear personal protective clothing when transporting the unit. Only lift the unit on both sides and not by the pipes / valves.



#### **IMPORTANT NOTE!**

##### **Material damage caused by incorrect transport!**

Units being transported can drop or topple over if transported wrongly. This can cause serious material damage.

- ▶ Proceed carefully when unloading the equipment on delivery and when transporting it on site and note the symbols and instructions on the packaging.
- ▶ Only use the holding points provided.
- ▶ Only remove packaging shortly before assembling the unit.

### 3.2 Scope of delivery



#### **IMPORTANT NOTE!**

##### **Check the scope of delivery!**

- ▶ Check the delivery for damage.
- ▶ Check that the articles and type numbers are correct.
- ▶ Is the delivery and number of items delivered correct?

## 3.3 Storage

Store packaging under the following conditions:

- ▶ Do not store outdoors.
- ▶ Store in a dry and dust-free place.
- ▶ Store in a frost-free place.
- ▶ Do not expose to aggressive media.
- ▶ Protect from direct sunlight.
- ▶ Avoid mechanical vibrations and shocks.



### IMPORTANT NOTE!

Under certain circumstances, packages can carry storage instructions that exceed the requirements listed here. Comply with these instructions accordingly.

## 3.4 Packaging

Handling packaging materials



### IMPORTANT NOTE!

Dispose of packaging materials in line with the applicable statutory requirements and local regulations.



### IMPORTANT NOTE!

The packaging is also use to protect the product from site dust and dirt. Only remove packaging shortly before assembling the unit.

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## 4 Technical data

Unit	KaCool D HC
Model	1
Width of basic unit [mm]	625
Panel width [mm]	580
Length of basic unit (carcass) [mm]	1250
Panel length [mm]	1180
Height of basic unit, complete [mm]	406
Weight of basic unit [kg]	56.5
Air volume flow [m³/h]	26 - 489
Internal volume of 2-pipe system [l]	1.5
Heat output [kW]	465 - 6301
Cooling output [kW]	348 - 3013
Sound power level [dB(A)]	29 - 60

## 5 Construction and function

### 5.1 Overview

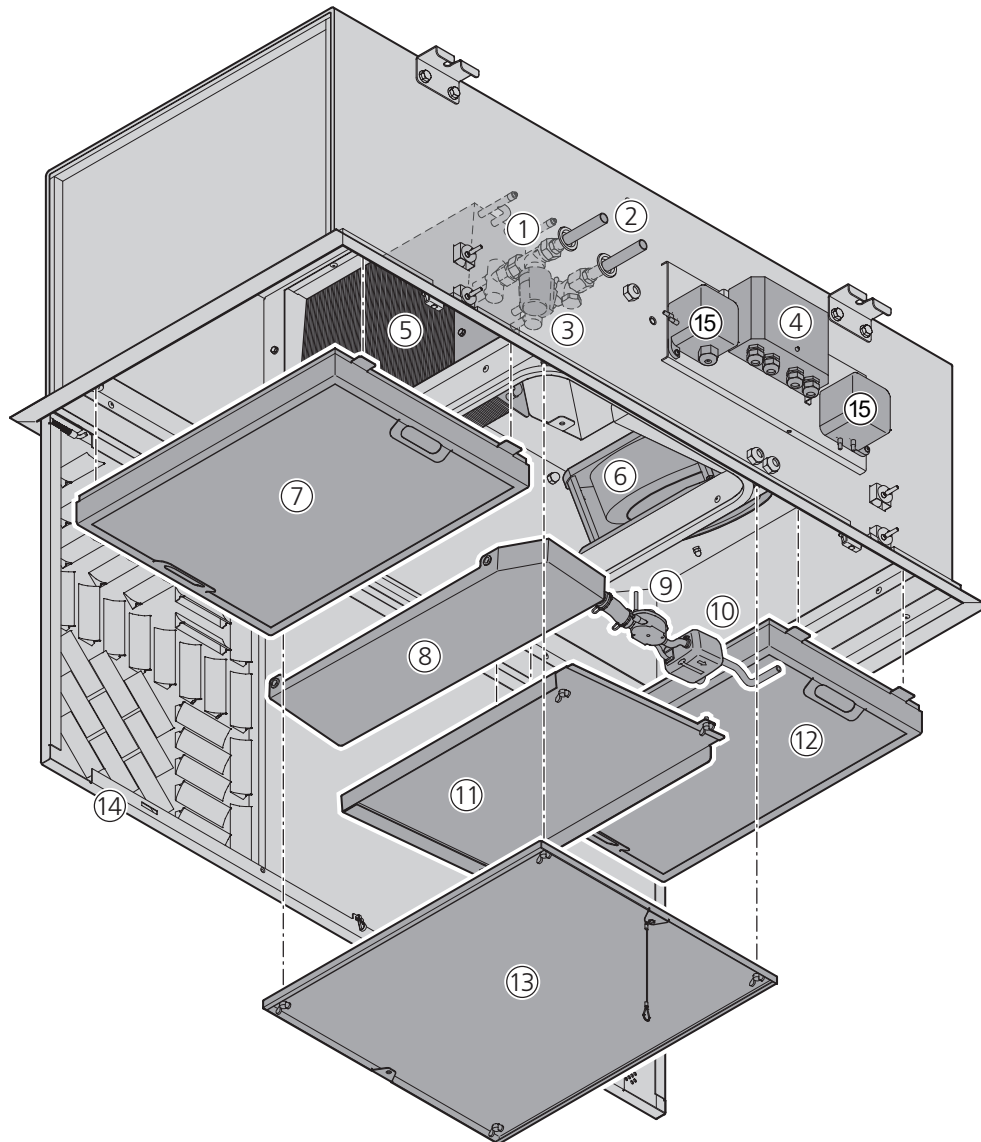


Fig. 1: KaCool D HC at a glance

1	Air vents	2	Water connections
3	Actuator	4	Electrical junction box
5	Heat exchanger	6	EC radial fan
7	Filter cassette epm1, 85 %	8	Condensate tray
9	Float switch	10	Condensate pump
11	Air baffle	12	Filter cassette epm1, 55 %
13	Inspection cover	14	Revision flap
15	Differential pressure bellows		




# KaCool D HC

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## 5.2 Brief description

KaCool D HC are decentralised units for the heating, cooling and filtering of room air, specifically developed for use in clean rooms in the healthcare sector (hospitals, medical surgeries etc.) in compliance with the Hygiene Standard 1946-4. Secondary air is drawn in by the fan through an ePM1>55 % filter and is passed through the copper/aluminium heat exchanger. Here, the air is either heated or cooled depending on the temperature of the water in the heat exchanger. Through the ePM1>85% filter, the heated or cooled air is fed into the room through an 180° discharge panel.

## 5.3 Wear parts list

Figure	Article	Properties	Suitable for	Art. no.
	Spare air intake filter ePM1 > 55 %	1 no.	KaCool DHC	<b>Model 1:</b> 525150700010
	Spare air outlet filter ePM1 > 85 %	1 no.	KaCool DHC	<b>Model 1:</b> 525150009020
	Spare air outlet filter Hepa H14	1 no.	KaCool DHC	<b>Model 1:</b> 525150013020

## 6 Installation and wiring

### 6.1 Definition of the connection side

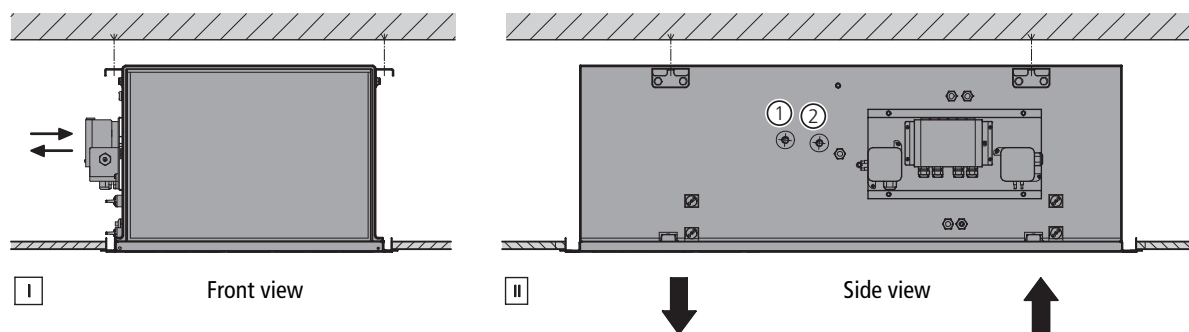


Fig. 2: Water connection position

1	Supply ½"	2	Return ½"
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### 6.2 Requirements governing the installation site

Only install and assemble the unit if the following conditions are met:

- ▶ Make sure that the ceiling is sufficiently load-bearing to take the weight of the unit (Technical data [► 12]).
- ▶ Make sure that the unit is securely suspended/standing.
- ▶ Ensure that the airflow can circulate freely.
- ▶ Provide adequate space for appropriately sized flow and return water connections on site (Connection to the pipe network [► 19]).
- ▶ There is a power supply on site (Maximum electrical rating values [► 26]).
- ▶ If need be, provide a condensation connection with a sufficient gradient on site.
- ▶ The load-proof and vibration-free installation of the unit can be guaranteed.

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## 6.3 Minimum clearances

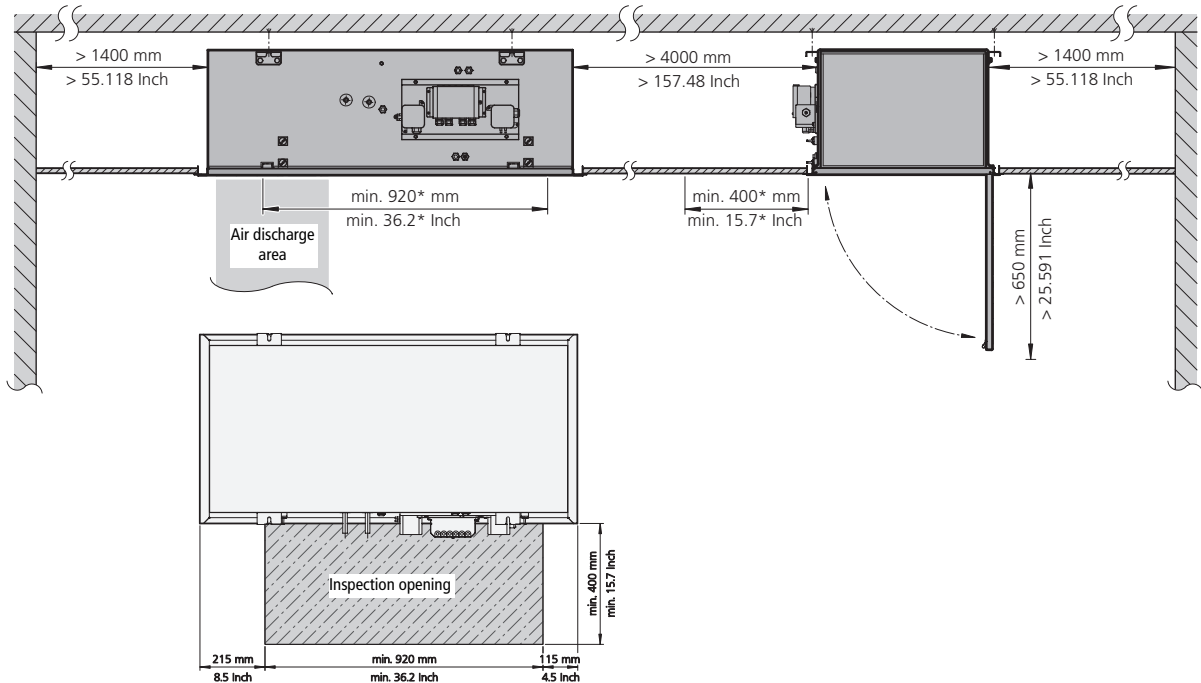


Fig. 3: Minimum distances

- ▶ The air discharge area needs to be completely unobstructed to guarantee the free circulation of air! Obstacles in the immediate vicinity (3 m distance) of the air discharge can cause the air to fall and lead to uncomfortable downdrafts.
- ▶ The minimum distance between the discharge sides and the wall must be 1.4 m. If several units are installed, they should have a distance of 4 metres from each other.
- ▶ There needs to be a minimum clearance of 650 mm under the unit for inspection purposes!

## Opening dimensions in the suspended ceiling

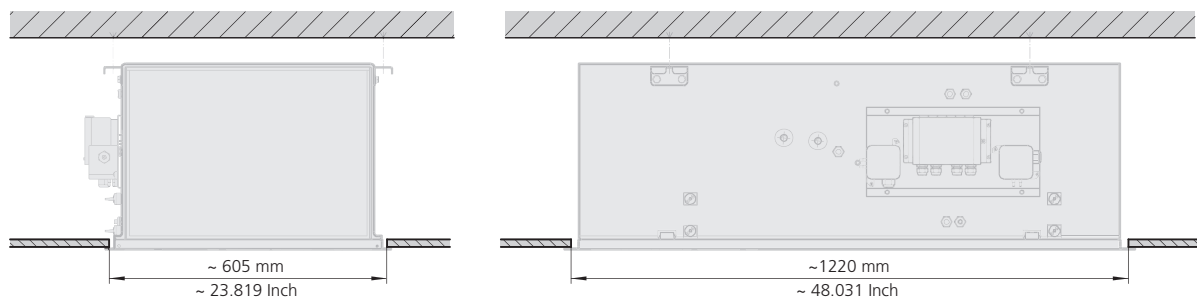


Fig. 4: Opening dimensions in the suspended ceiling

The opening dimensions in the suspended ceiling can only be adjusted once the unit has been installed as the unit is not designed for installation in a prefabricated recess.



## 6.4 Installation

2 people are needed to install the unit.



### CAUTION!

#### **Risk of injury from sharp metal housing!**

The inner metal of the casing can have sharp edges.

- Wear suitable protective gloves.



### IMPORTANT NOTE!

#### **Horizontal installation of units!**

When installing the units, ensure that they are completely horizontal to ensure proper operation.



### IMPORTANT NOTE!

#### **Avoid draughts!**

Consider the occupied zone when installing/suspending the units. Do not expose people to the direct air flow. Position the unit accordingly and adjust the air outlet if required.



### IMPORTANT NOTE!

#### **Sound insulation**

Provide for sound isolation between the KaCool D HC and the adjacent building if required.

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## 6.4.1 Installation of basic unit

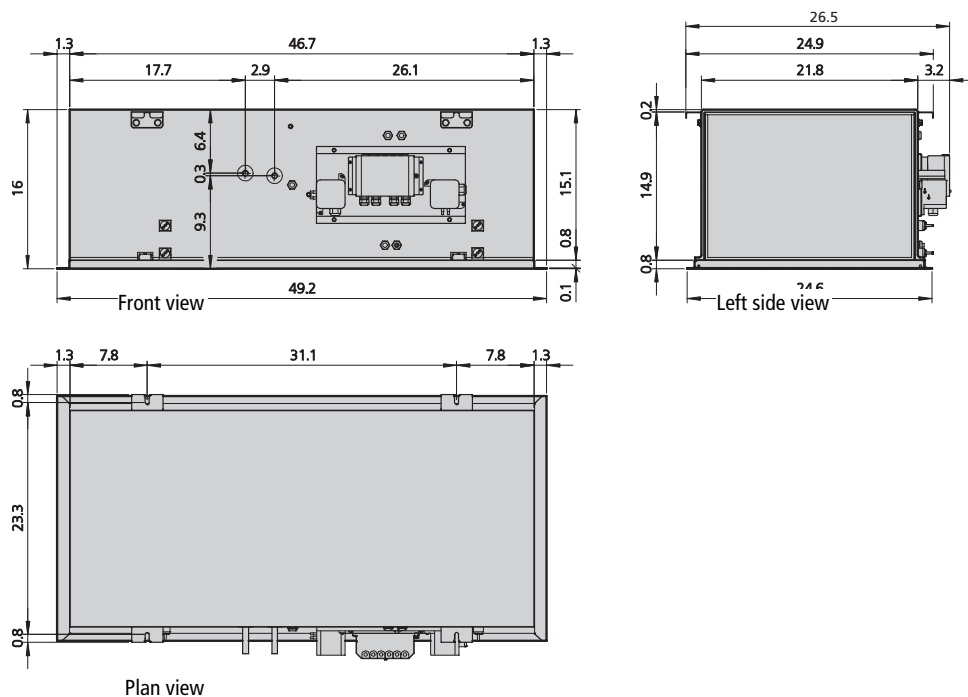


Fig. 5: Suspension points, inch

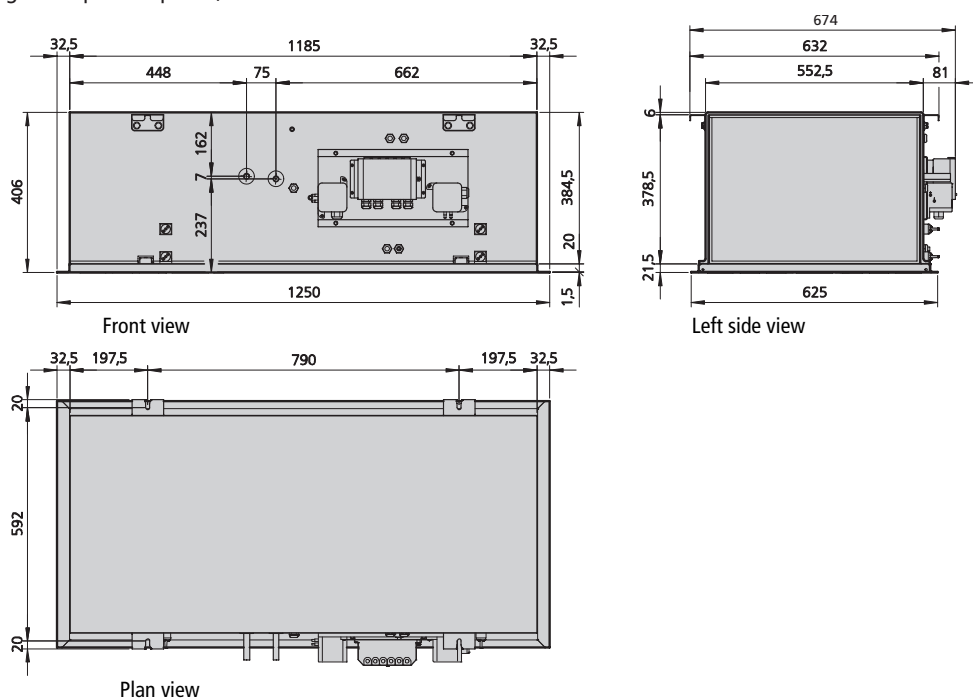


Fig. 6: Suspension points, mm

Note the Venkon minimum clearances when installing the basic units!

- ▶ Mark the dimensions and distances of the key holes on the wall or ceiling as per the drawing, drill the holes and use appropriate fixing materials to install the basic unit.
- ▶ Once the basic unit has been levelled, prevent the fixing material from coming loose.

## 6.5 Installation

### Actuator with 'First Open' function

- ▶ When delivered, the actuator is normally open in a de-energised state, thanks to the First Open function. This enables heating mode to run even if the electric wiring is not yet completed.
- ▶ When subsequently commissioned and with the application of power (for longer than 6 minutes), the First Open function is automatically unlocked so that the actuator becomes fully operational.

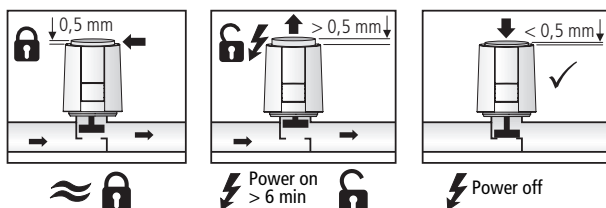


Fig. 7: "First Open" function

### Hydraulic connection

Note the following points when connecting the hydraulic side:

- ▶ Install and test safety components (expansion vessels, pressure relief valves and overflow valves).
- ▶ Route condensation lines with a sufficient cross-section without bends and narrow sections with a gradient to the in situ waste water pipe.
- ▶ Allow adequate space for the air flow (air inlet and outlet).

Additionally consider the following point with cooling mode:

- ▶ Provide continuous vapour-tight insulation on all components that carry water (pipework, valves, connections) as far as the unit.
- ▶ Select appropriate pipe brackets (cooling clamps) for cooling mode.
- ▶ Dimension the diameter of the condensate line appropriately.
- ▶ Protect any traps (if fitted) in the condensate line from drying out.



### IMPORTANT NOTE!

#### "Wet cooling" operating mode only when the fan is switched on

Only operate KaCool D HC with "wet cooling" mode (supply temperature below 15 °C) when the fan is switched on, as otherwise condensate can be produced on the outlet panel, which could then drip down.

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## 6.5.1 Connection to the pipe network

The supply and return connections are located as standard on the left side of the unit seen in the direction of air flow.

Route the pipework so that no mechanical stresses are transferred to the heat exchanger and to ensure that the unit can be accessed with ease for maintenance and repair work. Proceed as follows when connecting up the unit's hydraulic pipework:

- ▶ Shut off the heating/cooling medium and prevent it from being opened accidentally before connecting to on-site pipework and making the hydraulic connections on the basic unit, as there is a danger of scalding from escaping heating medium!
- ▶ With cooling units there is a danger to the user from cold temperatures and a danger to the environment from the use of glycol. Put in place appropriate safety measures.
- ▶ Remove protective caps from the supply and return.
- ▶ With cooling mode, route the pipework and valves directly over the side condensate tray (accessory) to drain any condensate produced on the pipes during cooling mode into the tray.
- ▶ Seal and tighten the connections. Prevent the connection nuts from shearing and twisting.
- ▶ When connecting the unit to the on-site pipework, make sure that you use a suitable tool to hold the water connections of the unit in place!
- ▶ Make sure that the pipework can be vented.
- ▶ Use appropriate insulating material, and impermeable insulating material for cooling units.
- ▶ Tighten all threaded connections once the pipes have been fitted and check that they are not under any tension.

## 6.5.2 Connection of 2-way valve kit

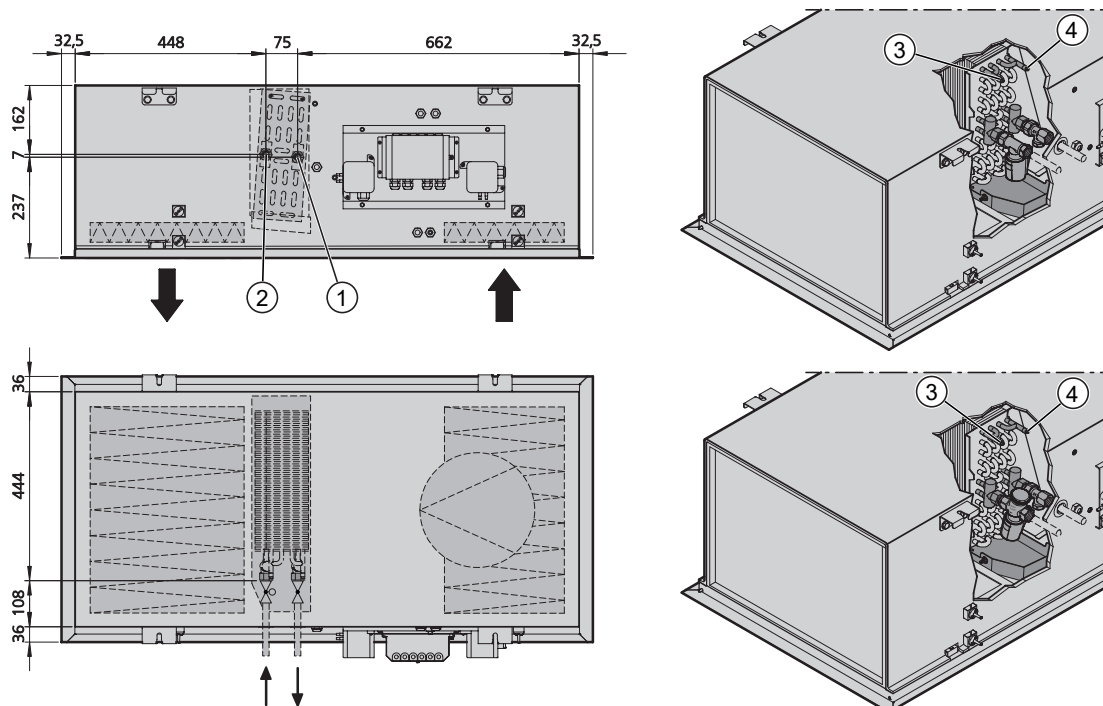


Fig. 8: Dimensions in mm

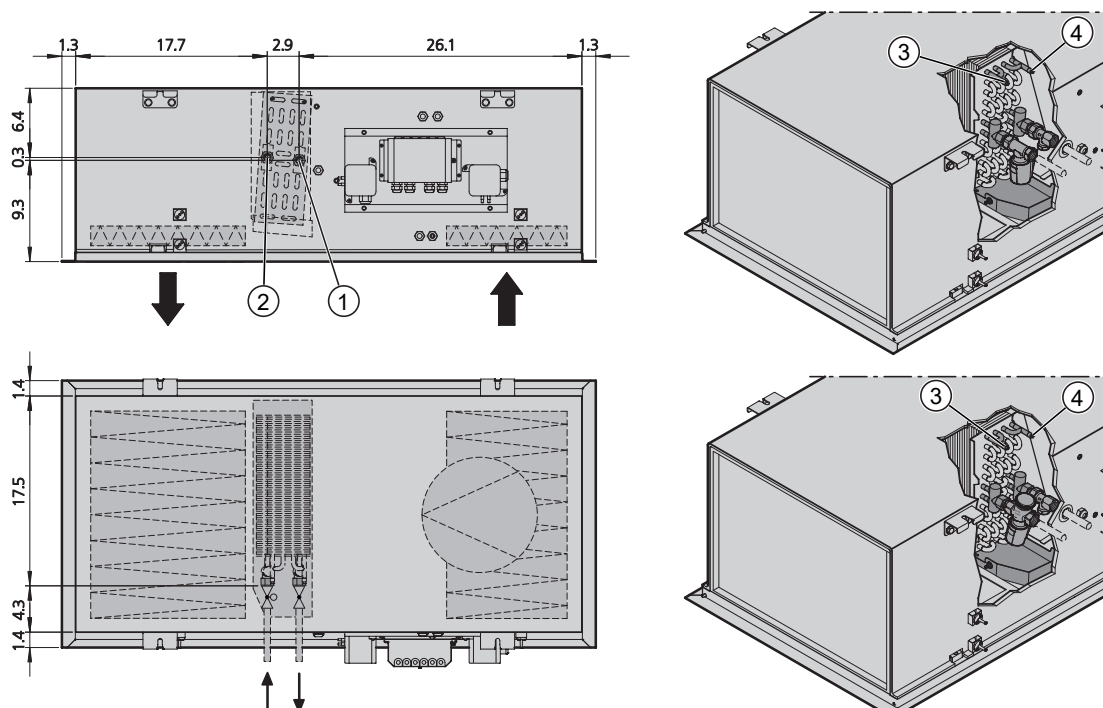


Fig. 9: Dimensions in inches

1	Return ½"	2	Supply ½"
3	Supply vent	4	Return vent

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## 6.5.3 Insulating the pipework



Fig. 10: Insulating the pipework on site

- ▶ Apply adhesive to the front cross-section of the diffusion-tight insulation (by others).
- ▶ Push the diffusion-tight insulation (by others) along the pipes as far as the wall of the housing and press it to produce an adhesive joint.

## 6.5.4 Condensation connection

### 6.5.4.1 Condensation drain with natural gradient

A condensate drain needs to be connected and appropriately fixed to a condensate drain spigot on the unit (15 mm drain). Ensure that the gradient is at least 1 cm/m, without restrictions and without rising sections of pipe, to ensure the drainage of condensate from the basic unit providing no adequately sized condensate pump has been fitted (in accordance with DIN EN 12056; formerly: DIN 1986-100). However, no condensate pump is factory-fitted as standard. Take into account all applicable regulations, such as the use of a ball trap, when connecting the condensate line to the sewer system. Protect the trap from drying out. The suction effect of the fan on the condensate drain neck could otherwise produce troublesome odours. Consider using water vapour-impermeable insulation depending on the pipe material used for the condensate drain. You will need a condensate pump (permanently installed in the basic unit) if a natural gradient is impossible on site. This is used to pump the condensate into higher collection or discharge equipment. When delivered, the condensate pump and float switch is factory-fitted to the unit.

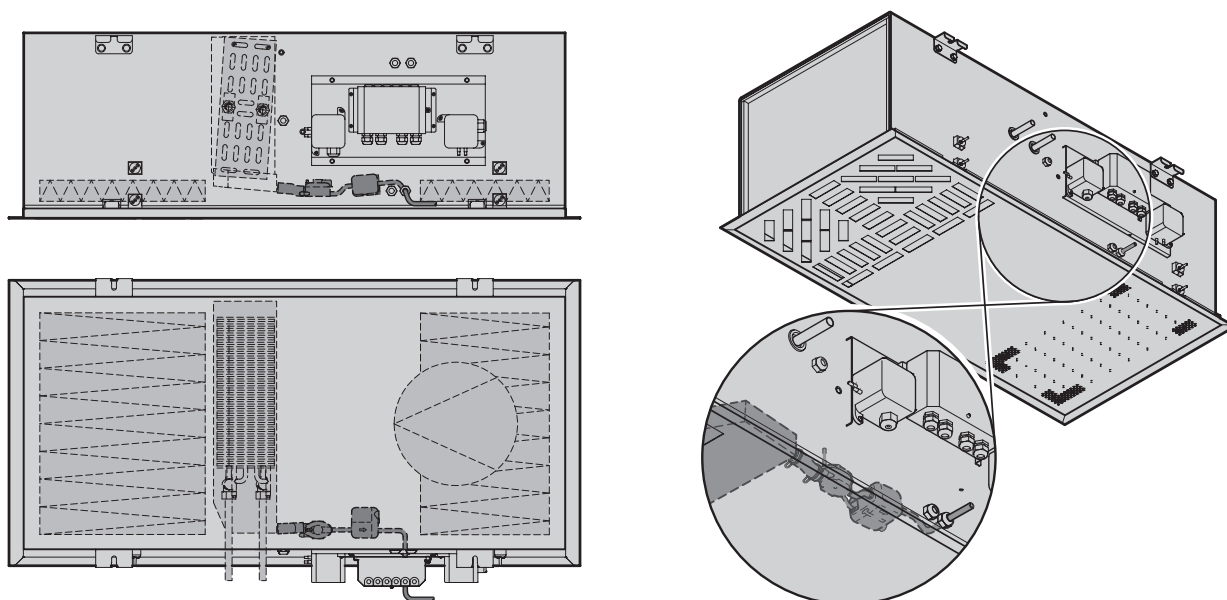


Fig. 11: Correct condensate drainage

## 6.5.4.2 Condensate drainage using a condensate pump (accessory)

The water is drawn off by the condensate pump and discharged along a hose (supplied loose) connected on the pressure side. Depending on conditions on site, the water can be discharged into drainage lines, possibly with a trap connection.

In the event of a fault with the condensate drain, the water level will continue to rise until the float switch triggers an alarm contact. The contact can be analysed by external signalling devices.

We recommend automatically terminating cooling mode, possibly with a shut-off valve, if the alarm contact is triggered to prevent the condensate tray from overflowing.

### Condensate drain

- ▶ Drainage of condensate from the condensate pump must be along a natural gradient with an adequate cross-section (minimum 1/2"). Increase the cross-section of the line with longer condensate lines.
- ▶ Check whether the condensate line needs to be insulated to prevent the build-up of condensate along the line.
- ▶ Do not use a rigid transition to the on-site condensate drain, as this lengthens the pressure hose of the pipe. We recommend free overflow into a trap.

### Installation, cabling of the condensate pump (accessory)

The condensate pump is electrically connected in the factory and fused by the T4A unit fuse. The alarm contact can be tapped to terminals 'C-AP' as a potential-free contact max. 250 V/ 2 A or as a non-floating contact (230 V AC) to terminal 'Cp'. Contact 'C-AP' is closed or terminal 'Cp' carries 230 V AC in a fault-free state.

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## Connecting the condensate pump

Push the suction hose as far as it will go and fix in place with a cable tie to prevent the pump from running dry.

- Connect the hose to the condensate drain (separate). Direction of flow: refer to the arrow on the side of the housing

Max. flow rate [l/h]	20 l/h
Max. suction height [m]	3 m
Max. delivery height [m]	10 m (flow rate = 4 l/h)
Max. pressure [m]	14 m (flow rate = 0 l/h)
Noise level at 1 m according to EN ISO 3744 [dBA] (measured in the LNI laboratory, pump operated with water, not installed)	20 dBA
Noise level when installed at 1 m [dBA] (measured in the Sauermann acoustic laboratory, pump operated with water)	≤27 dBA
Power supply	230 V 50/60 Hz – 14 W
Insulation class	(double insulated)
Switching points	ON: 16 mm, OFF: 11 mm, ALARM: 19 mm
Safety contact	NC 8 A ohmic load – 250 V
Overheating protection (switching-off point)	115 °C (auto-reset)
Operating mode	100 % ED - continuous operation
Protection class	IP20
Safety standards	CE & EAC
RoHS Directive	Compliance
Waste Electrical and Electronic Equipment Directive (WEEE)	Compliance (EAR registered)
Weight – Packaging dimensions	0.48 kg – L135 x W135 x H90 mm

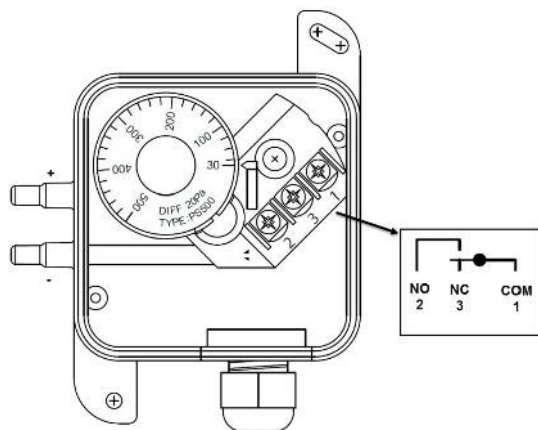
Tab. 4: Technical data, condensate pump



## 6.5.5 Differential pressure switch

### Differential pressure switch

Two differential pressure switches are factory-fitted on the unit. They are used to evaluate the condition of the intake and discharge filter. Before commissioning, set the required final pressure differences according to the table below.



**When the differential pressure is reached:**

- ▶ 1 – 3 open
- ▶ 1 – 2 closed

### Commissioning

- ▶ Open the cover.
- ▶ Turn the selector dial and select the required switching point as per the "Filter pressure loss" table.
- ▶ Close the cover again.

Filter type	Starting pressure difference [Pa]	Final pressure difference [Pa]
epM1>55 % / formerly F7	15	38
ePM1>85% / formerly F9	20	50
H14 Hepa	65	104

Tab. 5: Filter pressure losses

The final pressure differences listed apply to an operating voltage of 10 V. If the unit is to be operated at maximum fan speed below 10 V, then lower final pressure differences need to be set on the differential pressure sensor, as otherwise a filter warning alert will be displayed too late.

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## 7 Electrical connection



### IMPORTANT NOTE!

#### Condensation formation in the cooling unit!

In the event of on-site valve control, the cooling valve must be closed when the fans are switched off.

### 7.1 Maximum electrical rating values

KaCool D HC , electromechanical design (\*00), F7/ F9 filter

Size	Nominal voltage [V AC]	Mains frequency [Hz]	Nominal power [W]	Nominal current [A]	Leakage current [mA]	Ri analogue input [kΩ]	Max. fuse [A]	IP class	Protection class
1	230	50/60	100	0.8	0.21	100	B16A	IP20	I

Tab. 6: Maximum electrical connection values

### 7.2 Electromechanical control

#### 7.2.1 Connection (\*00)



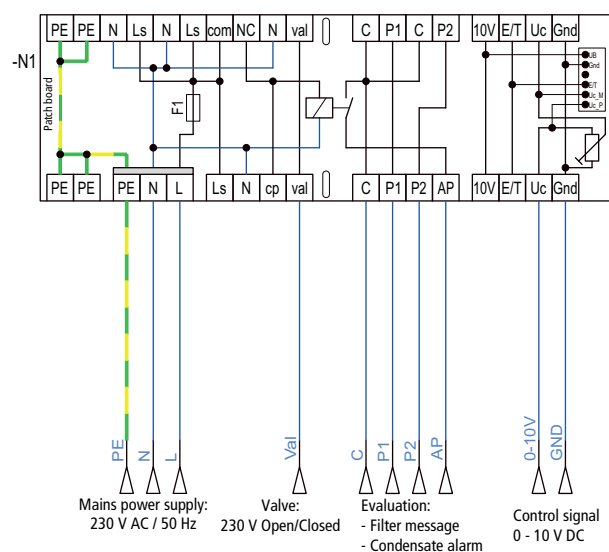
Fig. 12: PCB in the electrical junction box

#### Power supply and control:

The unit needs a 230 V / 50 Hz power supply. The fan speed of the EC fan installed can be continuously variably controlled via the 0-10 V DC ( $R_i = 100 \text{ k}\Omega$ ) control input. The internal motor electronics detects any possible motor malfunction and automatically switches off the fan.

The electrical junction box accommodate potential free contacts max. 250 V / 2 A to evaluate the filter message (NO) and the condensate alarm (NC). The contact C-P1, P2 is open and the contact C-AP is closed in fault-free normal operation. Alternatively, the condensate alarm can also be evaluated as a switched 230 V signal via terminal 'cp'. Terminal 'cp' carries 230 V AC voltage in fault-free normal operation.

## Terminal assignment, KaCool D HC



### Note these points in the following layout plans for KaCool D HC:

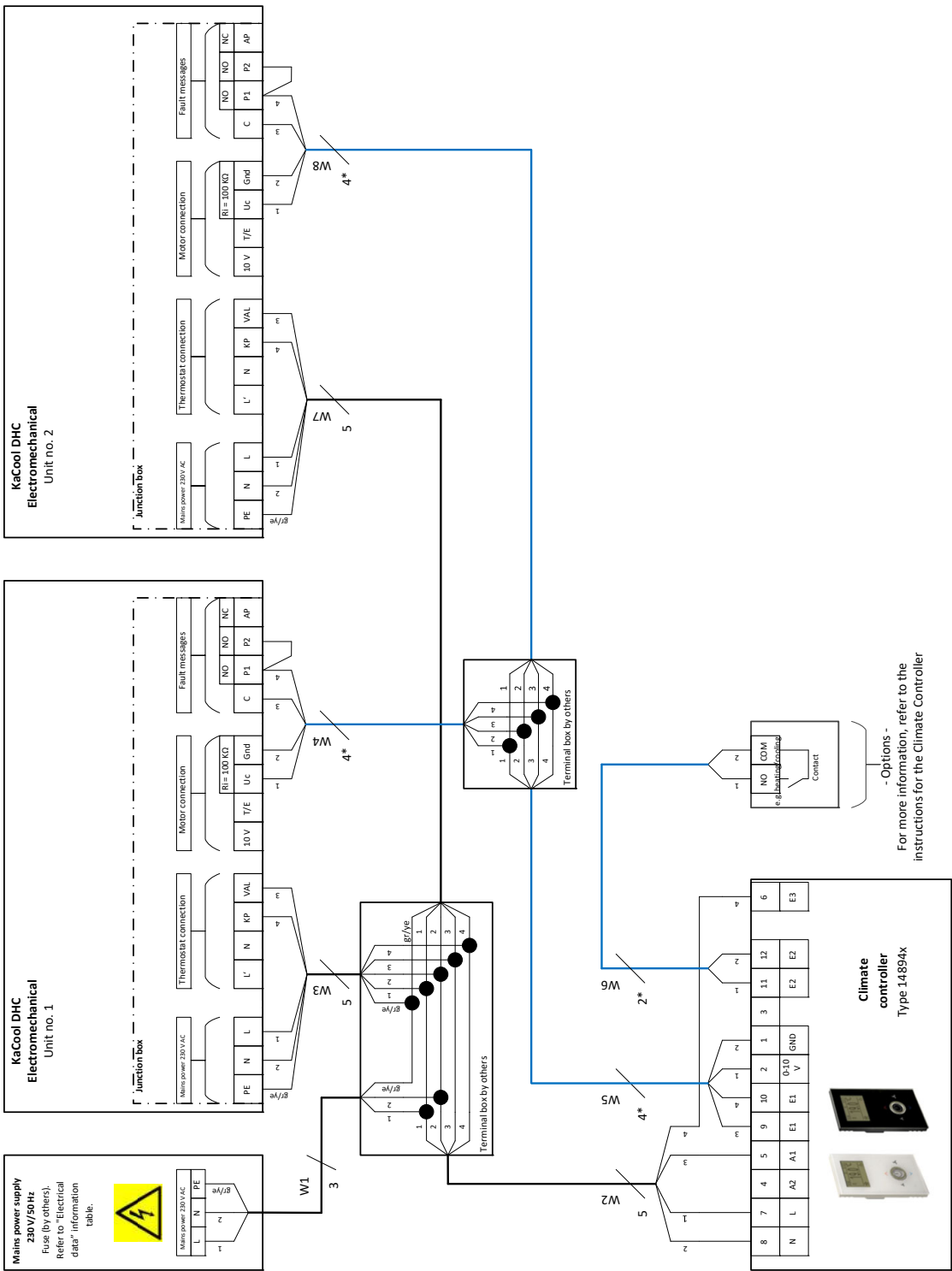
- ▶ Comply with the details on cable types and cabling with due consideration of VDE 0100.
- ▶ Without \*: NYM-J. The requisite number of wires, including PE conductor, is stated on the cable. Cross-sections are not stated, as the cable length is involved in the calculation of the cross-section.
- ▶ With \*: J-Y(ST)Y 0.8mm. Lay separately from high voltage lines. If other types of cables are used, they must be at least equivalent.
- ▶ Type F is recommended when using RCCBs. Refer to the provisions of DIN VDE 0100 Parts 400 and 500 when designing the rated fault current, and note the leakage currents.
- ▶ Note the electrical data when designing the on-site mains power supply and fuse.

# KaCool D HC

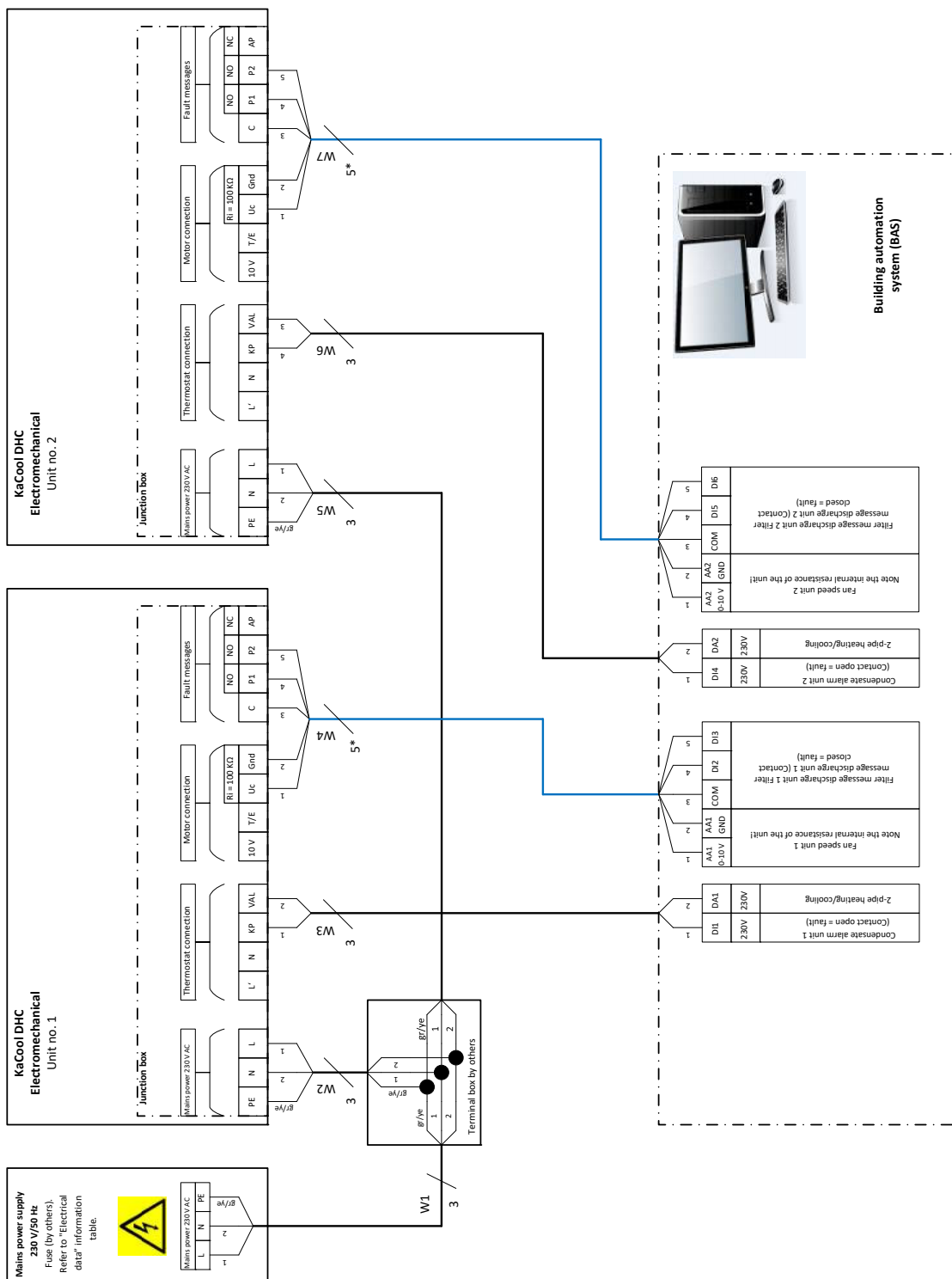
Assembly, installation and operating instructions

## 7.2.2 Cable laying, KaCool D HC (\*00)

Cable laying with KaCool DHC (\*00), control by Climate Controller, type 14894x



### Cable laying with KaCool DHC (\*00), control by DDC/BMS



# KaCool D HC

Assembly, installation and operating instructions

## 8 Pre-commissioning checks

Check before initial commissioning whether all necessary conditions have been met so that the unit can function safely and properly.

### Structural tests

- ▶ Check that the unit is securely standing and fixed.
- ▶ Check the horizontal installation/suspension of the unit.
- ▶ Check the completeness and correct seating of all filters (dirt side).
- ▶ Check whether all components are properly fitted.
- ▶ Check whether all dirt, such as packaging or site dirt, has been removed.

### Electrical tests

- ▶ Check whether all lines have been properly laid.
- ▶ Check whether all lines have the necessary cross-section.
- ▶ Are all wires connected in accordance with the electric wiring diagrams?
- ▶ Check all external electrical connections and terminal connections are fixed in place and tighten if necessary.

### Water-side checks

- ▶ Check whether all supply and drainage lines have been properly connected.
- ▶ Fill pipes and unit with water and bleed.
- ▶ Check whether all bleed screws are closed.
- ▶ Check leak tightness (pressure test and visual inspection).
- ▶ Check whether the parts carrying water have been flushed through.
- ▶ Check whether any shut-off valves fitted on site are open.
- ▶ Check whether any electrically actuated shut-off valves have been properly connected.
- ▶ Check whether all valves and actuators are working properly (note permitted mounting position).

### Air-side checks

- ▶ Check whether there is unimpeded flow at the air inlet and outlet.
- ▶ Check whether the air inlet filter is fitted and dirt-free.

### Condensation water connection

- ▶ Check whether the condensation tray is free of building rubble.
- ▶ Check the condensation drain and operation of the alarm signal on the condensation pump.
- ▶ Check whether the cooling valve switches off in the event of an alarm signal.
- ▶ Check whether the unit is connected leak-free to the on-site condensation connection.
- ▶ Check whether the waste water lines are clean and have a sufficient gradient.
- ▶ Check whether the condensation pump has a working power supply.

## 9 Operation

### 9.1 Operation of electromechanical control



Fig. 13: Climate controller type 196000148941

#### Climate controller, white, type 196000148941

- ▶ For 2- and 4-pipe applications, surface-mounted wall mounting on a flush-mounted box in visually unobtrusive design with 2.5" :CD display and high-quality glass finish with capacitive keys
- ▶ Automatic LED backlight
- ▶ Parametrisable language: German or English
- ▶ Timer program with 3 time channels, each with 4 switchover points
- ▶ Option to connect an external room sensor
- ▶ 3 control inputs (functions parametrisable, e.g. window contact, presence detector, heating/cooling switchover)
- ▶ Parallel operation of 2 units is possible



Fig. 14: Climate controller type 196000148942

#### Climate controller, black, type 196000148942

- ▶ For 2- and 4-pipe applications, surface-mounted wall mounting on a flush-mounted box in visually unobtrusive design with 2.5" :CD display and high-quality glass finish with capacitive keys
- ▶ Automatic LED backlight
- ▶ Parametrisable language: German or English
- ▶ Timer program with 3 time channels, each with 4 switchover points
- ▶ Option to connect an external room sensor
- ▶ 3 control inputs (functions parametrisable, e.g. window contact, presence detector, heating/cooling switchover)
- ▶ Parallel operation of 2 units is possible

# KaCool D HC

Assembly, installation and operating instructions



Fig. 15: Climate controller type 196000148943

## Climate controller, white, type 196000148943

- ▶ With Modbus interface
- ▶ For 2- and 4-pipe applications, surface-mounted wall mounting on a flush-mounted box in visually unobtrusive design with 2.5" :CD display and high-quality glass finish with capacitive keys
- ▶ Automatic LED backlight
- ▶ Parametrisable language: German or English
- ▶ Timer program with 3 time channels, each with 4 switchover points
- ▶ Modbus-RTU interface as a slave device
- ▶ Option to connect an external room sensor
- ▶ 2 control inputs (functions parametrisable, e.g. window contact, presence detector, heating/cooling switchover)
- ▶ Parallel operation of 2 units is possible



Fig. 16: Climate controller type 196000148944

## Climate controller, black, type 196000148944

- ▶ With Modbus interface
- ▶ For 2- and 4-pipe applications, surface-mounted wall mounting on a flush-mounted box in visually unobtrusive design with 2.5" :CD display and high-quality glass finish with capacitive keys
- ▶ Automatic LED backlight
- ▶ Parametrisable language: German or English
- ▶ Timer program with 3 time channels, each with 4 switchover points
- ▶ Modbus-RTU interface as a slave device
- ▶ Option to connect an external room sensor
- ▶ 2 control inputs (functions parametrisable, e.g. window contact, presence detector, heating/cooling switchover)
- ▶ Parallel operation of 2 units is possible



## 10 Maintenance

### 10.1 Securing against reconnection



#### **DANGER!**

##### **Risk of death by unauthorised or uncontrolled restart!**

Unauthorised or uncontrolled restarting of the equipment can result in serious injury or death.

- Before restarting, ensure that all safety devices are fitted and working properly and that there is no hazard to humans.

Always follow the procedure described below to prevent accidental restart:

1. de-energise.
2. Prevent accidental re-connection.
3. Check that the equipment is de-energised.
4. Cover and cordon off adjacent live parts.



#### **WARNING!**

##### **Risk of injury from rotating parts!**

The fan impeller can cause severe injuries.

- Switch off the unit and prevent it from reconnection before commencing any work on moving components of the fan. Wait until all parts have come to a standstill.

### 10.2 Maintenance Schedule:

The sections below describe maintenance work needed for the proper and trouble-free operation of the equipment.

If there are signs of increased wear during regular checks, shorten the required maintenance intervals to the actual wear and tear. Contact the manufacturer with any questions about maintenance work and intervals.

Interval	Maintenance task	Personnel
As required	Regular visual checks and acoustic checks for damage, dirt and function.	User
quarterly	Check filter for dirt, clean and change filter when needed.	User
every six months	Clean unit components (heat exchanger, condensate tray, condensate pump, float switch).	User
every six months	Check water-side connections, valves and fittings for dirt, leak-tightness and function.	User
every six months	Check the electrical wiring.	Qualified personnel
every six months	Clean components/surfaces that come into contact with air.	User
quarterly	Check the heat exchanger for dirt, damage, corrosion and leak-tightness. Carefully vacuum the heat exchanger if dirty.	User
quarterly	Check the condensation tray, float switch and drain connection for dirt, damage and leak-tightness. Remove any condensation deposits that have accumulated.	User

# KaCool D HC

Assembly, installation and operating instructions

## 10.3 Maintenance work

### Dismantle the service hatch before maintenance work!

Remove the service hatch before all visual inspections and maintenance work to access the basic unit.

#### 10.3.1 Opening the inspection flap

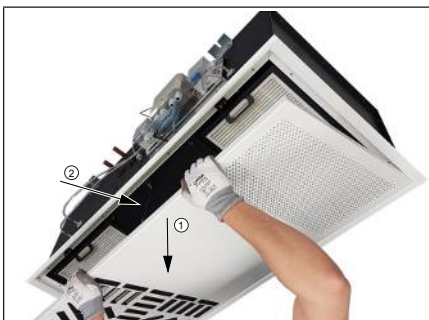


Fig. 17: Opening the revision flap

- ▶ Carefully pull the revision flap down until it comes to a stop ① and is held by the retaining cable.
- ▶ Loosen the revision flap from the retaining cable ②.

#### 10.3.2 Replacing the filter.



#### CAUTION!

#### Risk of injury from sharp metal housing!

The inner metal of the casing can have sharp edges.

- ▶ Wear suitable protective gloves.



Fig. 18: Removing the intake filter

Remove and clean the intake filter.



Fig. 19: Removing the outlet filter

- ▶ Remove and clean the outlet filter.

## 10.3.3 Visual checks

### Remove the internal panels.

Dismantle the inspection cover and the air baffle as follows for visual inspections after the revision flap has been opened.



Fig. 20:

- Unscrew the wing bolts on the inspection cover.



Fig. 21:

- Unscrew the wing bolts from the air baffle and remove the air baffle.



Fig. 22:

- Remove the air baffle.

# KaCool D HC

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Fig. 23: Internal view of the unit (panels removed)

- ▶ Check all elements that come into contact with air (internal surfaces of the unit, air discharge elements etc.) for soiling or deposits during maintenance and use a commercially available product to remove.
- ▶ Then use commercially available disinfectant to disinfect the unit.

## Clean the heat exchanger.

Check the heat exchanger for soiling and carefully vacuum if necessary. Avoid damage to the pipework and fins.

### 10.3.4 Cleaning the condensate tray



Fig. 24:

Remove the condensate tray.



Fig. 25:

- ▶ Clean the condensate tray.

## 10.3.5 Cleaning the float switch



Fig. 26:

- ▶ Loosen the wing bolt.
- ▶ Remove the retaining panel with the float switch fitted.



Fig. 27:

Open the cover of the float switch.



Fig. 28:

- ▶ Clean the float switch.

## 10.3.6 Clean the inside of the unit

Check all elements that come into contact with air (internal surfaces of the unit, outlet elements etc.) for dirt or deposits during maintenance and use a commercially available product to remove.

# KaCool D HC

Assembly, installation and operating instructions

## 11 Faults

The following chapter describes possible causes of faults and the work needed to rectify them. Should faults occur frequently, shorten the maintenance intervals in line with the actual loading on the unit.

Contact the manufacturer with any faults that cannot be rectified using the following informatio.

### Behaviour in the event of faults

The following applies:

1. Immediately switch off the unit with faults that pose an immediate danger to persons or property!
2. Determine the cause of the fault!
3. Switch off the unit and prevent it from being reconnected if rectifying the fault requires work in the hazard area. Immediately advise a supervisor on site about the fault.
4. Either rectify the fault yourself or have it repaired by authorised personnel, depending on the nature of the fault.

The fault table, Chapter 11.1 "Fault table" [► 38], provides information on who is authorised to rectify and remedy faults.

### 11.1 Fault table

Fault	Possible cause	Remedy
No function.	No power supply.	Check voltage, switch on repair switch. Replace fuse.
Water outlet	Fault on the heat exchanger.	Replace the heat exchanger if you need to.
	Hydraulic connection not properly done.	Check flow and return and tighten, if necessary.
Water outlet	Condensate drain outlets blocked.	Clean condensate outlets and check for adequate gradient.
	Chilled water line incorrectly insulated.	Check insulation.
	Condensate drain not properly installed.	Check correct operation of condensate pump. Check and clean condensate outlet.
	Accessory components carrying air not properly insulated.	Check insulation.
Unit not heating or cooling sufficiently (LPHW/CHW)	Fan is not switched on.	Switch on fan at controller.
	Air volume is too low.	Set a higher speed.
	Filter is dirty.	Replace filter.
	No heating or cooling medium.	Switch on heating and/or cooling system, switch on circulation pump, vent unit/system.
	Valves not operating.	Replace faulty valves.
	Water volume too low.	Check pump output, check hydraulics.
	Setpoint temperature on the controller set too low/high.	Adjust temperature setting on the controller.
	Operating unit with integral sensor and/or external sensor is exposed to direct sunlight or positioned over a heat source.	Place operating unit with integral sensor and/or external sensor in a suitable position.
	Air cannot blow out or in freely.	Remove obstacles at the air outlet/air inlet.
	Heat exchanger dirty.	Clean heat exchanger.
	Air in the heat exchanger.	Vent heat exchanger.
Unit too loud	Speed too high.	Set a lower speed, if possible.
	Air inlet/outlet opening is obstructed.	Free air ducts.
	Filter dirty.	Replace filter.

Fault	Possible cause	Remedy
	Rotating parts unbalanced	Clean and/or replace impeller. Please make sure that no balancing clips are removed during cleaning.
	Fan dirty.	Clean dirt from fan.
	Heat exchanger dirty.	Clean dirt from Heat exchanger.

## 11.2 Start-up after rectification of fault

After correction of the fault, carry out the following steps to re-start:

1. Make sure that all maintenance covers and access openings are sealed.
2. Switch off the unit.
3. Acknowledge fault on controller, if necessary.

## 12 Certificates



### EU-Konformitätserklärung

EU Declaration of Conformity  
Déclaration de Conformité CE  
Deklaracja zgodności CE  
EU prohlášení o konformite

**Wir (Name des Anbieters, Anschrift):**

We (Supplier's Name, Address):  
Nous (Nom du Fournisseur, Adresse):  
My (Nazwa Dostawcy, adres):  
My (Jméno dodavatele, adresa):

**KAMPMANN** GMBH & Co. KG  
Friedrich-Ebert-Str. 128-130  
49811 Lingen (Ems)

**erklären in alleiniger Verantwortung, dass das Produkt:**

declare under sole responsibility, that the product:  
déclarons sous notre seule responsabilité, que le produit:  
deklarujemy z pełną odpowiedzialnością, że produkt:  
deklarujeme, vědomi si své odpovědnosti, že produkt:

**Type, Modell, Artikel-Nr.:**

Type, Model, Articles No.:  
Type, Modèle, N° d'article:  
Typ, Model, Nr artykułu:  
Typ, Model, Číslo výrobku:

**KaCool D HC**

**525\*\*\***

**auf das sich diese Erklärung bezieht, mit der / den folgenden Norm(en) oder normativen Dokumenten übereinstimmt:**

to which this declaration relates is in conformity with the following standard(s) or other normative document(s):  
auquel se réfère cette déclaration est conforme à la (aux) norme(s) ou autre(s) document(s) normatif(s):  
do którego odnosi się niniejsza deklaracja, jest zgodny z następującymi normami lub innymi dokumentami normatywnymi:  
na který se tato deklarace vztahuje, souhlasí s následující(mi) normou/normami nebo s normativními dokumenty:

**DIN 1946-4**

**VDI 6022 Blatt 1**

**DIN EN 1397**

**DIN EN 55014-1; -2**

**DIN EN 61000-3-2; -3-3**

**Raumluftechnische Anlagen in Gebäuden und Räumen  
des Gesundheitswesens**

**Hygieneanforderungen an raumluftechnische Anlagen  
und Geräte**

**Wasserübertrager – Wasser-Luft-Ventilator-konvektoren –  
Prüfverfahren zur Leistungsfeststellung**

**Elektromagnetische Verträglichkeit**

**Elektromagnetische Verträglichkeit**





DIN EN 61000-6-1; -6-2; -6-3  
DIN EN 60335-1; -2-40

Elektromagnetische Verträglichkeit  
Sicherheit elektr. Geräte f. den Hausgebrauch und  
ähnliche Zwecke

**Gemäß den Bestimmungen der Richtlinien:**

Following the provisions of Directive:  
Conformément aux dispositions de Directive:  
Zgodnie z postanowieniami Dyrektywy:  
Odpovídající ustanovení směrnic:

2014/30/EU  
2014/35/EU

EMV-Richtlinie  
Niederspannungsrichtlinie

**Frank Bolkenius**

**Lingen (Ems), den 11.06.2021**

**Ort und Datum der Ausstellung**

Place and Date of Issue  
Lieu et date d'établissement  
Miejsce i data wystawienia  
Místo a datum vystavení

**Name und Unterschrift des Befugten**

Name and Signature of authorized person  
Nom et signature de la personne autorisée  
Nazwisko i podpis osoby upoważnionej  
Jméno a podpis oprávněné osoby

# KaCool D HC

Assembly, installation and operating instructions



## Sekundärluftkühlgerät – KaCool DHC

Krankenhaushygienische Stellungnahme

Datum: 20.01.2021  
Seite: 1 von 15  
EDV: 36375-GUT-KaCool-0121-A.docx

Auftraggeber: Kampmann GmbH  
Friedrich-Ebert-Straße 128 – 130  
49811 Lingen

Ansprechpartner: Hajo Oncken

Objekt: Sekundärluftkühlgerät  
KaCool DHC

Beurteilungsgrundlage: DIN 1946-4:2018-09  
VDI 6022 Blatt 1:2018-01

Prüfer: Dirk Peltzer

	Name	Datum	Unterschrift
Berichtsersteller:	Dirk Peltzer Fachleiter Raumlufttechnik Hygienetechniker	20.01.2021	
Prüfer des Berichtes:	Dr. rer. nat. Frank Wille Geschäftsführer und Fachauditor für die Aufbereitung von Medizinprodukten	20.01.2021	
Freigabe Kunden:	durch		

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Mehr wissen. Weiter denken. ■

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