



# Ultra DX

► 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.

### Responsibilities

This appliance complies with the requirements of EN 378, Part 1-4. The requirements of this standard must be observed by both the installer and the operator.

### 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 Behavior in an emergency

The appliance contains potentially hazardous fluids or gases. The operator's risk assessment must include an emergency plan for the escape of the gas used.

### 2.2 Correct use

The units are used for decentralized heating and ventilation of halls and workplaces in industry and commerce. The appliance must be connected to the on-site cooling/ventilation system and the on-site waste water and power supply within the room to be treated. The appliance may only be filled and operated with the specified refrigerant. The operating and application limits in chapter 2.2 [▶ 6] must be observed.

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.
- ▶ The unit is not intended for operation above 2,000 m.a. s.l.
- ▶ This unit is designed to be accessible to the general public.

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

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

### 2.3 Limits of operation and use

Operating limits		
Min./max. refrigerant temperature	°C	10-120
Min./max. air intake temperature	°C	10-40
Min./max. air humidity	%	15-75
Max. operating pressure	bar	see type plate

Tab. 1: Operating limits

Operating voltage	230 V/ 50/60 Hz
Power/current consumption	On the typeplate

Tab. 2: Operating voltage

Only use a dry and pure form of refrigerant to protect your equipment and the cooling circuit. It needs to be approved for use in chillers.



## IMPORTANT NOTE!

### Notes and operating limits for cooling operation

When using for cooling with dehumidification of the air, observe certain settings and operating modes:

- ▶ Only operate devices of type 963158/ 964158 with an air flow rate of max. 2900 m<sup>3</sup>/h.
- ▶ Do not move the air outlet fins to the end positions, as high air velocities occur in high speed ranges and water droplets can be entrained.



## 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).
- ▶ Never use the unit as a construction site heater.
- ▶ Never operate the unit in areas with a high dust content.



## 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.

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## 2.4 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.



### **DANGER!**

#### **Risk of fatal injury from electrocution!**

- ▶ When multiple EC fans are connected in parallel, there is an electrical charge (>50 C) between the line conductor and protective earth conductor when the power is switched off. Before working on the electrical wiring, short-circuit the mains connections and PE!
- ▶ The terminals and connectors are still energised even when the unit is switched off. Use a two-pin voltage tester to establish that the unit has been de-energised. Only open the unit 5 minutes after all poles of the voltage have been switched off.
- ▶ The protective earth carries high leakage currents (depending on the frequency, intermediate voltage and motor capacity). Therefore, check EN-compliant earthing under test conditions (EN 50178, Art. 5.2.11). Without earthing, hazardous voltages can occur on the motor housing. In the event of a fault, electrical voltage will be present at the rotor and impeller. Rotor and impeller are base-insulated. Do not touch!

## 2.5 Dangers from hot surfaces



### **DANGER!**

#### **Danger from hot surfaces**

During operation, the heat exchanger and the pipes of the appliance can reach temperatures of over 45 °C, which can lead to burns if touched. Wear appropriate hand protection to protect yourself from high temperatures.

## 2.6 Personnel requirements - Qualifications

### Expertise

The installation of this product requires specialist expertise in heating, cooling, ventilation, installation and electrical engineering. As this knowledge is normally acquired through professional training in one of the above fields, it is not dealt with further here.

Damage caused by improper installation is the responsibility of the operator or installer. Installers of these units should have adequate knowledge of the following based on their qualifications

- ▶ Safety and accident prevention regulations
- ▶ Guidelines and recognised technical regulations, i.e. VDE regulations (Association of German Electricians, DIN and EN standards).
- ▶ VDI 6022; maintenance personnel must be trained to Category B (possibly Category C) to comply with hygiene requirements (as required).
- ▶ Certificates of competence according to EN 378 1-4: Refrigerating systems and heat pumps - Safety and environmental requirements

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.

## 2.7 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.

Observe the appropriate precautionary measures when handling gases.

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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.

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## 4 Technical data

Unit	Ultra (size 96)	
Pipe content [l]	1.5	
Weight [kg]	44 – 55	
EC, 230 V standard	96_58	96_56
<b>Heating or cooling applications</b>		
EC, 230 V type	963358	963356
	964356	
Dry cooling	yes	yes
Cooling with dehumidification	no	yes

Tab. 3: Technical data for Ultra, size 96

## 5 Construction and function

### 5.1 Overview

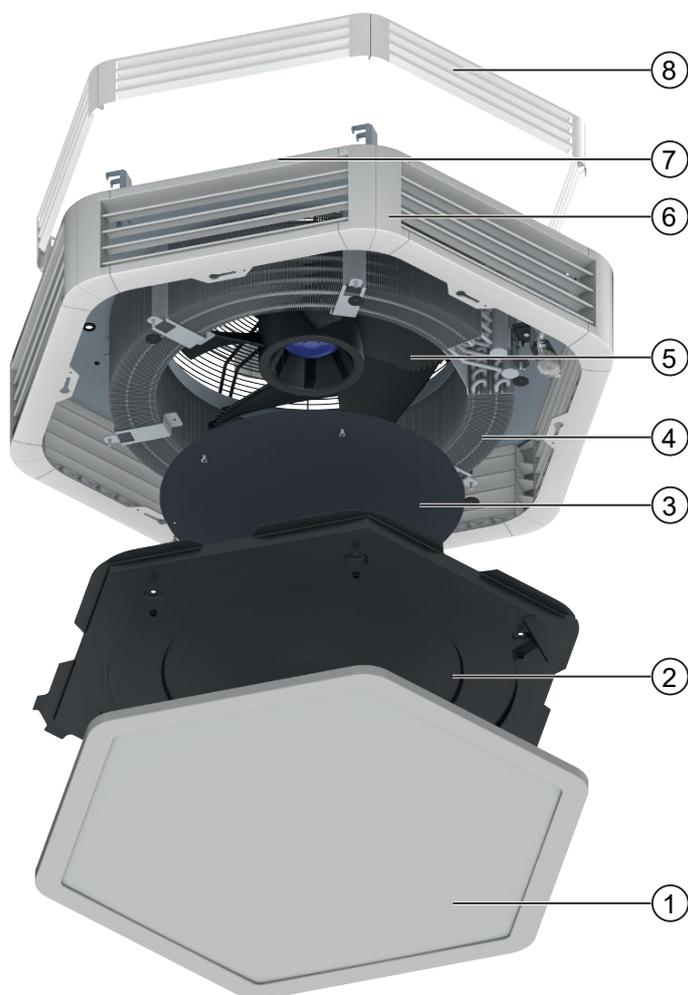


Fig. 1: Ultra at a glance

1	Base panel	2	Plastic condensate tray (only with cooling unit)
3	Air guide (only with cooling unit)	4	Cu/Al heat exchanger
5	Whisper-quiet, sickle-blade fan, conforms to ErP 2015	6	Self-supporting plastic housing
7	Condensate pump (hidden), only with cooling unit	8	6-section intake crown

### 5.2 Brief description

The heating and/or cooling models of Ultra unit heaters are used as ceiling-mounted units for the decentralised heating and ventilation of halls, exhibition halls and sales rooms. Air is drawn in through the axial fan and is blown through the circular heat exchanger into the room. The heated or cooling air is guided into the room on-demand through the pre(settable) louvre fins.

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## 5.3 Wear parts list

Figure	Article	Properties	Suitable for	Art. no.
	Recirculating air filter element	For direct installation onto the intake area of the unit with recirculating air units, ISO Coarse 45% (G3) filter	Size 96 (cannot be used with under-ceiling installation!)	154000066050

## 6 Installation and wiring

### 6.1 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.
- ▶ There is a power supply on site (Maximum electrical rating values [▶ 25]).
- ▶ If need be, provide a condensation connection with a sufficient gradient on site.

### 6.2 Installation height and throws

Observe the maximum mounting heights and throwing distances for the suspension! Ensure vibration-free suspension (use rubber suspension elements if necessary).

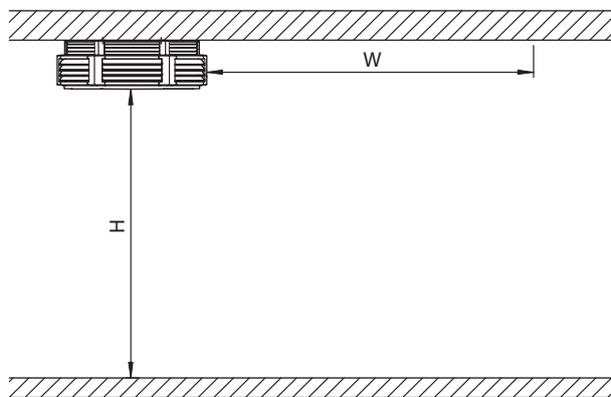


Fig. 2: Maximum mounting heights and throwing distances

Type series	Voltage [V]	Speed [ $\text{min}^{-1}$ ]	Max. Mounting height H [m]	Throw range W [m]
96__56	10	680	3.6	5.7
	8	550	3.4	5.1
	6	410	3.2	4.4
	4	270	3.0	3.8
	2	100	2.7	3.0
96__58	10	1000	4.1	7.2
	8	800	3.8	6.2
	6	580	3.5	5.2
	4	370	3.2	4.2
	2	170	2.8	3.3

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## 6.3 Installation



### 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.

6.3.1 Ultra suspension points



**IMPORTANT NOTE!**

**Cutting out the drilling template.**

The cardboard drilling template is part of the packaging and should be used to position the fixing points on the ceiling. Cut out the drilling template before disposing of the packaging!

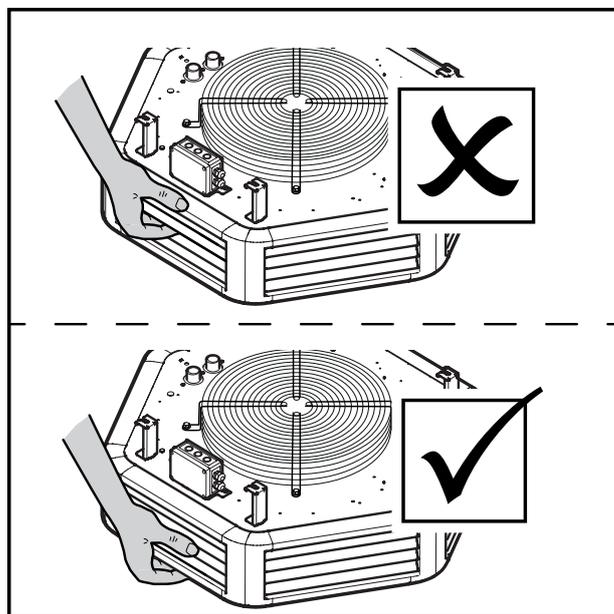
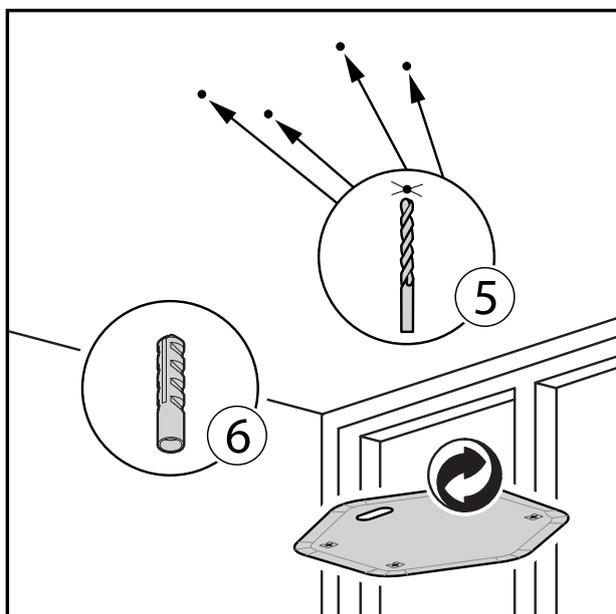
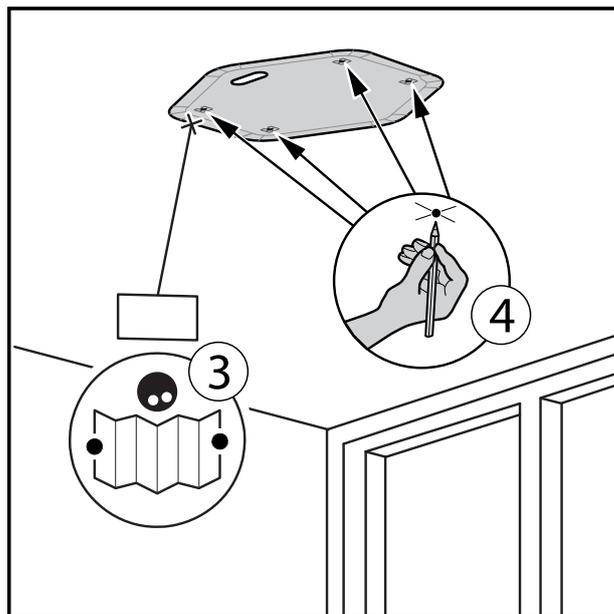
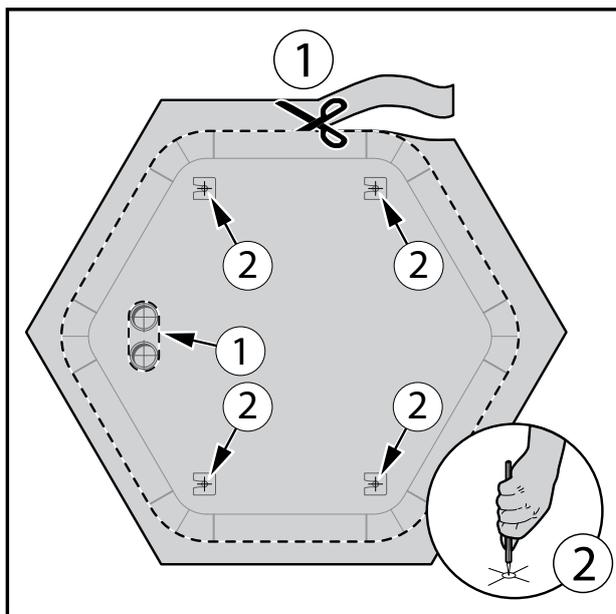
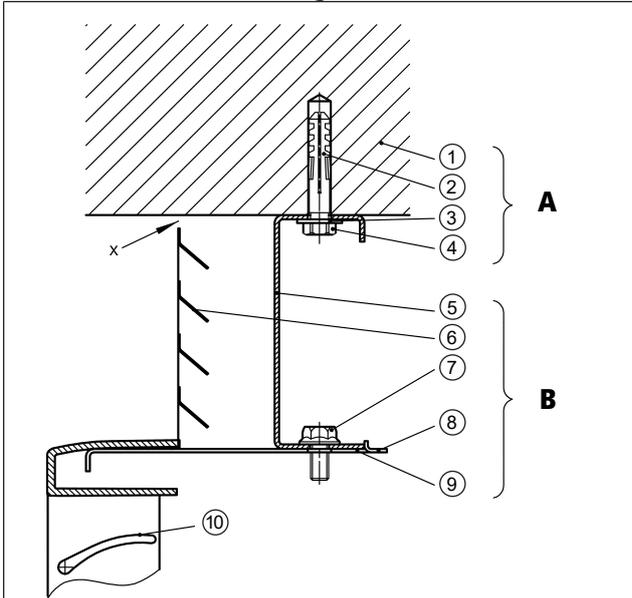


Fig. 3: Ultra suspension points

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## 6.3.2 Installation on a solid ceiling



- ▶ A: by others
- ▶ B: Scope of delivery
- ▶ x: Maintain this gap to undertake any service work on the intake crown! Make sure that the gap is not filled by subsequent work on the ceiling, such as plastering, as it would then be impossible to fit or remove the intake crown!
- ▶ Use all four fixing points!

Fig. 4: Ultra installation, solid ceiling

1	Solid ceiling	2	Rawlplug
3	Washer	4	M8 screw
5	Bracket	6	Intake crown
7	Corrugated-head screw M8 x 16	8	Torsion prevention mechanism
9	Ultra base plate	10	Louvre

## 6.3.3 Installation on a suspended ceiling

► A: by others  
 ► B: Scope of delivery  
 ► x: Maintain this gap to undertake any service work on the intake crown! Make sure that the gap is not filled by subsequent work on the ceiling, such as plastering, as it would then be impossible to fit or remove the intake crown!  
 ► Use all four fixing points!

**Fig. 5: Ultra installation, suspended ceiling**

1	Solid ceiling	2	Threaded rod
3	Washer	4	M8 threaded rod
5	Suspended ceiling	6	M8 hexagonal nut
7	Projecting thread (ensure that the rod is long enough!)	8	Intake crown
9	Bracket	10	Corrugated-head screw M8 x 16
11	Torsion prevention mechanism	12	Base plate
13	Louvre		

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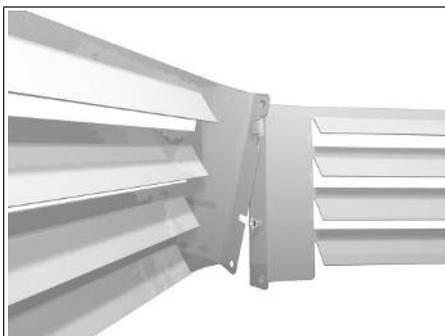
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## 6.3.4 Assembly of the intake crown



### IMPORTANT NOTE!

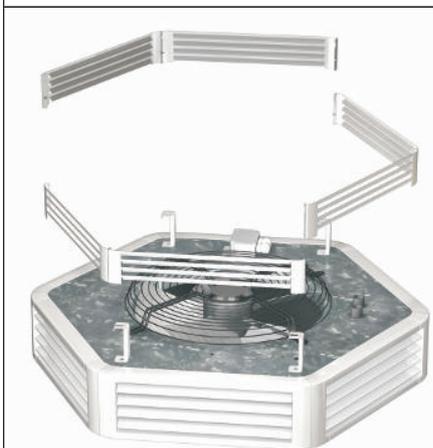
**Accessory components are no longer accessible once the intake crown has been fitted!**  
Only fit the intake crown once all connection and installation work has been completed. The motor junction box, valves, motor guard, condensate pump etc. are then no longer accessible!



- ▶ Screw one of the screws supplied into the screw hole provided on each of the 6 individual components.
- ▶ Connect up 2 sections in each case.



- ▶ Join each of the 2 parts of the intake crown together and screw through the second fin opening from the bottom.



- ▶ Fix the pre-assembled sections in their allocated position on the base plate (with the fins pointing downwards).
- ▶ Screw the sections together.



## IMPORTANT NOTE!

### Air intake crown with the unit installed on a solid ceiling

The air intake crown cannot be fitted as described when the unit is installed underneath a solid ceiling and the pipework is visible. In this case, it may need to be adapted on site, for instance by removing partial segments of the grille.

## 6.4 Installation

### 6.4.1 Connection to the pipe network

The pipe connections protrude from the top of the housing. The heat exchanger connection dimension for copper/aluminum heat exchangers is:

- ▶ 15.88 mm

Connect in accordance with EN 378-3:

- ▶ Shut off the supply line from the medium.
- ▶ Create connection pipework.
- ▶ Remove protective caps from refrigerant inlet and outlet.

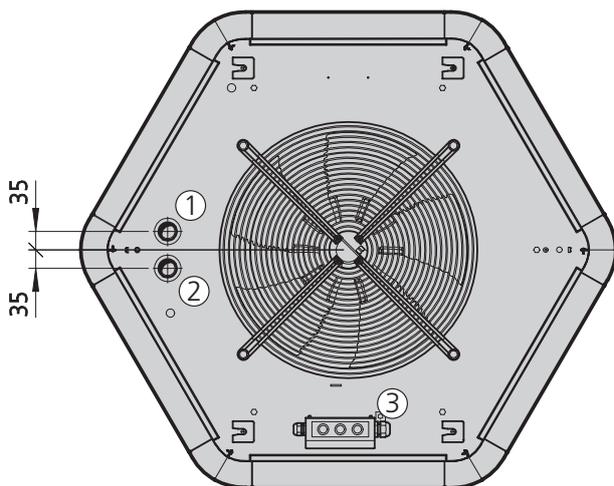


Fig. 6: Ultra connections

1	Refrigerant inlet 15.88 mm	2	Refrigerant outlet 15.88 mm
3	Motor junction box		

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## 6.5 Condensation connection

### 6.5.1 Installing the condensation drain (with cooling units)

#### Condensate pump SI 30

The self-priming condensate pump is factory-connected to the top of the unit as far as the hose connection spigot for the on-site condensate pressurised line.



Fig. 7: Condensation pump

Max. delivery height [m]	8 m with max. 4.5 l/h flow rate and a hose length of 10 m
Max. flow rate [l/h]	Approx. 18 l/h with 0.5 m delivery height and a hose length of 2 m
Supply voltage [V/Hz]	230 V/50 Hz (separate mains power line needed)
Power consumption [W]	14 W
Safety shut-off [A]	5 A resistive
Fuse [A]	Max. 16 A
Diameter of pressurised condensate line	DN 6 mm (hose connection)
Signal contact for condensate overflow	Normally closed (NC) contact, potential-free, switching capacity 250 V/5 A
Switched by "Hall effect"	
Integrated thermal cut-out	

Tab. 4: Technical data

### Delivery rates and application limits

The achievable delivery rate depends on the delivery head and the length of the connected condensate hose. In the case of extreme humidity and/or very low system temperatures, the amount of condensate increases and the possible delivery head of the pump decreases. Ensure that the alarm contact of the float switch is evaluated so that dehumidification is stopped (e.g. by closing the expansion valve).

Observe the following application limits for maximum permissible cooling conditions (evaporation temperature 10 °C at air inlet 27 °C/ 60 % rel. humidity):

- ▶ Size 96: Max. permissible delivery head with 5 m hose length: 2 m

If the permissible flow rate is permanently exceeded, more powerful condensate pumps are available on request.

Max. Delivery head [m]	Total hose length (hose diameter 6 mm)				
	2 m	5 m	10 m	20 m	30 m
0	19.2	18.0	16.8	15.3	14.3
0,5	18.0	16.8	15.0	14.0	13.8
1	16.0	15.5	14.4	13.2	12.6
2		14.3	13.2	11.8	11.0
3		12.4	11.5	10.0	9.5
4		10.0	9.3	8.3	7.5
5			8.1	7.1	6.8
6			7.2	6.2	5.4
7			5.4	4.2	
8			4.5	4.0	

Tab. 5: Flow rates [l/h] Condensate pump - SI 30

#### 6.5.2 Condensate drainage using a condensate pump

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

#### Condensate drainage on site with a natural gradient

- ▶ The further drainage of condensate from the condensate pump must be provided 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 would reduce the delivery height of the pump. We would recommend a free overflow into a trap.

#### Installation, cabling of the condensate pump

The condensate pump needs a separate power supply 230 V/50 Hz. We would generally advise against connecting it via the room thermostat, as residual condensate could be produced after it has been switched off. Additional wires are needed to analyse the alarm contact.

Use the following type of cable:

- ▶ NYM-J, 1.5 mm<sup>2</sup>

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## 6.5.3 Ultra without KaControl module fitted, recirculating air

Automatically stop cooling operation when the maximum condensate level is reached to prevent the condensate tray from overflowing.

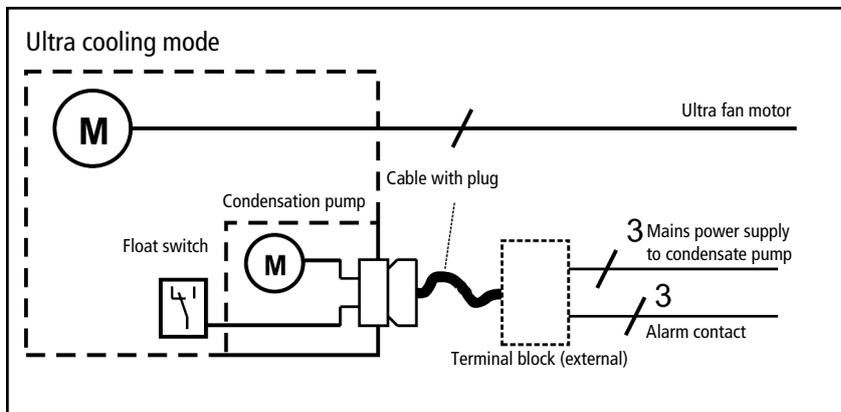


Fig. 8: Wiring of the condensate pump

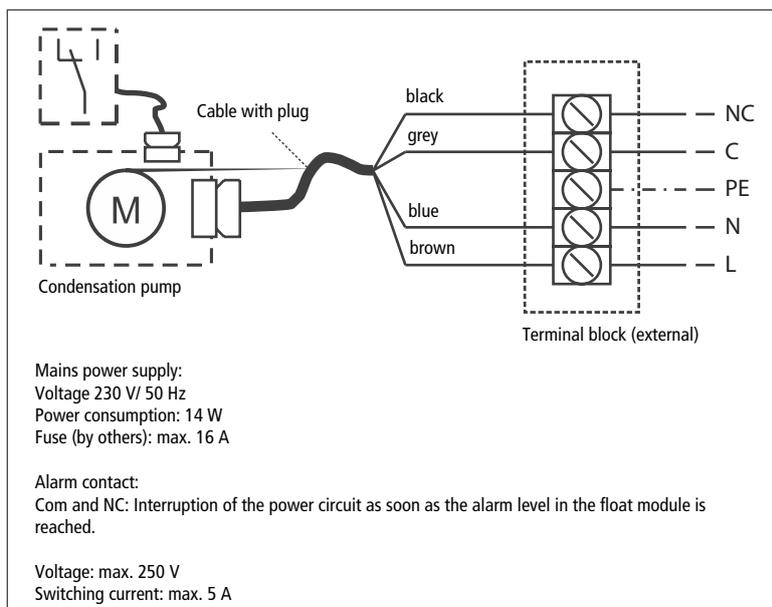


Fig. 9: Connection of the condensate pump

## 6.5.4 Commissioning and functional checks

- ▶ Switch on the mains power.
- ▶ Pour water into the condensate tray. The pump should switch on automatically and switch itself off again.
- ▶ Test the alarm switch: Add water until the alarm switch is triggered (acoustic or visual warning message, fan switches off or similar).

## 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.



### IMPORTANT NOTE!

#### Switch the unit on and off at the control input!

Do not switch the unit on and off at the mains, since a fault message is generated for up to 10 seconds after the mains power is switched on! After this time, the EC fan's electronic circuit is ready for operation and a reliable status message is possible. If no fault is detected, the relay is energised after the initialisation period. The fan restarts automatically when control voltage or the stored speed setpoint is applied, after a mains power failure for example.



### IMPORTANT NOTE!

#### Integrated overload protection for EC fans

All EC fans have integrated overload protection. An upstream motor protective device is not required. First connect the protective earth "PE" conductor to the motor junction box or to the KaControl recirculation air module. When disconnecting, be sure to disconnect the earth terminal last. Connect up the unit in accordance with the valid connection diagram.

To ensure that the switch-on current limit is active, wait until the mains power has been disconnected for at least 90 seconds before restarting!



### IMPORTANT NOTE!

#### Special conditions for use in IT systems

Use in IT systems is governed by special conditions, and these are set out in the EC fan operation manual!



### IMPORTANT NOTE!

Only connect up units with a circuit breaker that switches off all poles from the mains power supply with a contact gap of at least 3 mm! Only connect the unit to permanently installed lines. The operator of the unit is responsible for ensuring EMC compliance of the entire system in accordance with the locally applicable standards.

### 7.1 Maximum electrical rating values

#### Electromechanical version

type	Rated voltage [V]	Mains frequency [Hz]	Active power [kW]	Rated current [A]	Leakage current [mA]	Maximum back-up fuse [A]	IP protection class	Protection class
96**58	230	50/60	0.46	2.13	<3.5	C16	54	I
96**56	230	50/60	0.46	2.13	<3.5	C16	54	I

Tab. 6: Electrical data Ultra DX

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## 7.2 Electromechanical control

### EMC-compliant installation of control cables

To avoid interference, ensure there is sufficient clearance between the mains power and control cables. When using a shielded cable, make sure that the shield is connected just on one side, i.e. only to the signal source with the protective earth (as short and low inductance as possible)!

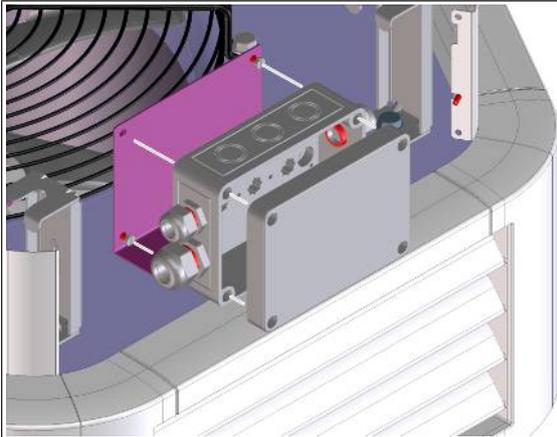
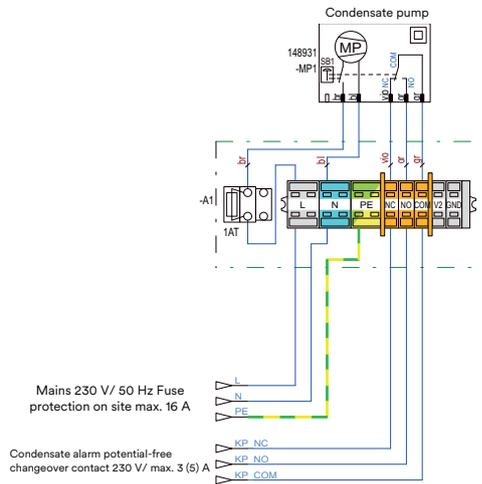


Fig. 10: Install the motor junction box.

- ▶ Unscrew the screw in the bracket of the motor junction box and remove the motor junction box from the area of the intake crown.
- ▶ Loosen screws in the cover of the motor junction box and remove the cover.
- ▶ Carry out the electrical wiring.
- ▶ Commission the unit.
- ▶ Close the motor junction box and refit it to the Ultra. Assemble in reverse order to dismantling.
- ▶ **Important:** After completion of the electrical wiring, do not push the cables through the motor guard close to the fan!

### 7.2.1 Connection (\*\*00)

#### Terminal configuration for control of unit heater with EC fan



#### Control via 0 - 10 VDC

The 0 - 10 VDC control signal is interpreted for speed according to the following values:

Control signal	Function
0 V	Off
2 - 10 V	$n_{(2V)} - 100\%$

The speed can be limited to approx. 50% of the maximum speed by the potentiometer in the junction box.

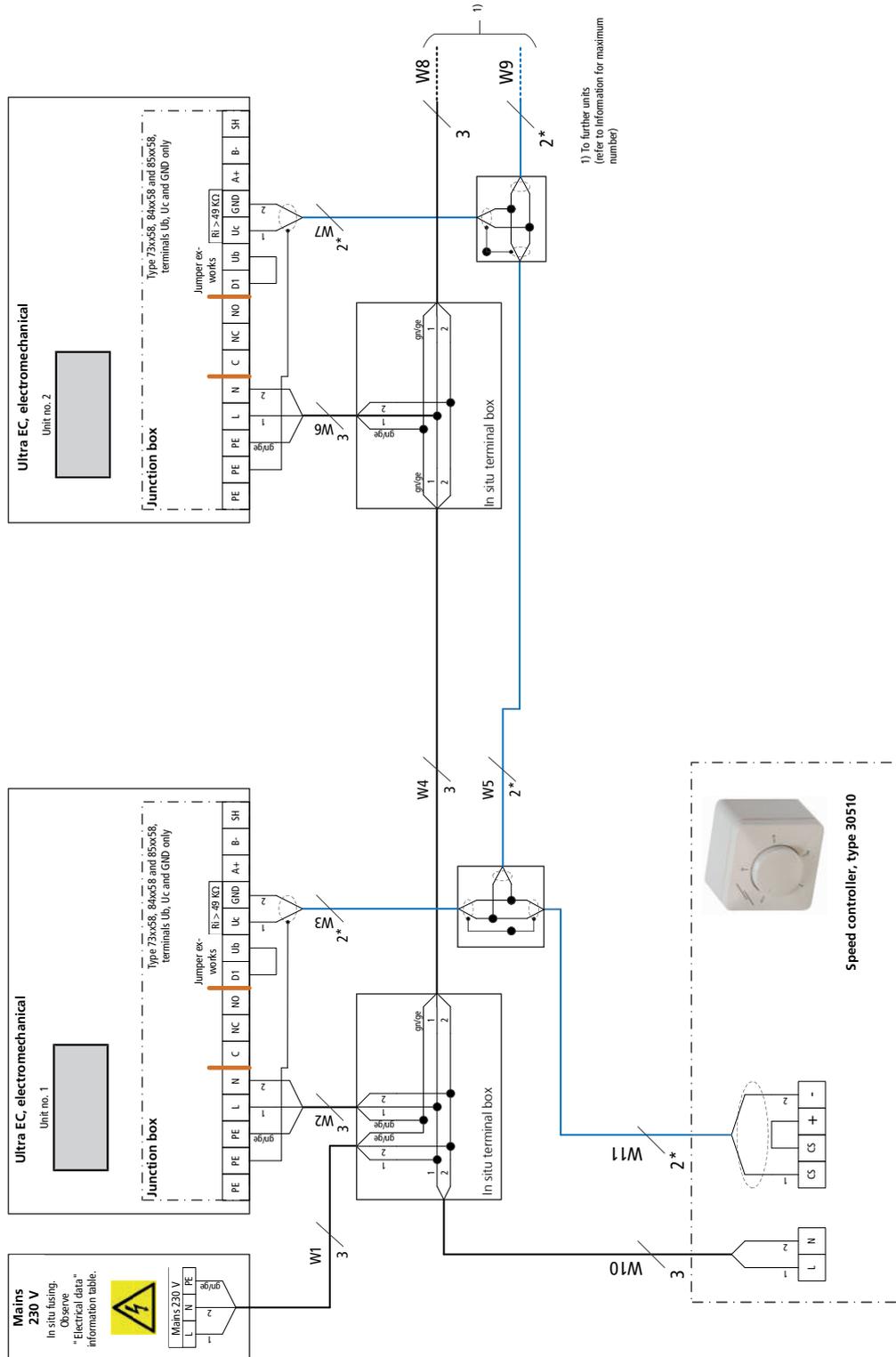
**Refer to these points in the following installation diagrams with electromechanical control:**

- ▶ 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 0.8 mm, max. 100 m between the fan speed controller and the last unit heater; provide a shield on one side when longer than 20 m. Lay separately from high voltage lines.
- ▶ With \*\*: Sensor connection cable 1.5 mm<sup>2</sup> e.g. J-Y(ST) Y, 4 x 2 x 0.8 mm, max. 100 m. Lay separately from high voltage lines.
- ▶ With \*\*\*: J-Y(ST)Y, 0.8 mm, max. 50 m. Lay separately from high voltage lines.
- ▶ With \*\*\*\*: J-Y(ST)Y, 0.8 mm, max. 100 m. Lay separately from high voltage lines.
- ▶ If other types of cables are used, they must be at least equivalent.
- ▶ The terminals on the unit are suitable for a maximum wire cross-section of 2.5 mm<sup>2</sup>.
- ▶ When using residual current circuit breakers, they need to be at least mixed frequency-sensitive (type F) for types 44xx5x and 45xx56, and all current-sensitive (type B) for all other types. When the power supply to the unit is switched on, pulsed charging currents of the capacitors in the integrated EMC filter can cause residual current safety devices to trip.
- ▶ Note the electrical data when rating the in-situ mains power supply and fuse.

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## 7.2.2 Cabling of Ultra (\*\*00), actuation by speed controller type 30510



## 8 Pre-commissioning checks

During initial commissioning, it must be ensured that all necessary requirements are met so that the appliance can function safely and as intended.

### 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 air ducts are mechanically fixed in place.
- ▶ 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?
- ▶ Is the earth wire connected and wired throughout?
- ▶ Check whether the fault signal contacts of the EC fans have been correctly connected (break contacts in series with multiple units).
- ▶ Check all external electrical connections and terminal connections are fixed in place and tighten if necessary.
- ▶ Check whether DIP switches have been correctly set in accordance with the wiring diagram.

- ▶ 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.

### 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.

### Refrigeration tests

- ▶ A complete pressure test must be carried out and recorded.
- ▶ Check whether any on-site refrigerant shut-off valves are open.
- ▶ Check whether an electrically controlled expansion valve is correctly connected.
- ▶ Check that all suction and pressure lines are installed correctly.

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## 9 Maintenance

### 9.1 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.

### 9.2 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 refrigeration connections, valves and screw connections for dirt, leaks and function.	Users
every six months	Check the electrical wiring.	Qualified personnel
every six months	Clean components/surfaces that come into contact with air.	Qualified personnel
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

## 9.3 Maintenance work

### 9.3.1 Visual checks

Regular visual checks and simple maintenance, including cleaning the external pump sump and float switch, can be performed without removing the housing cover. Simply remove the discharge fins in the discharge field.



Fig. 11: Removing fins

### 9.3.2 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.



#### **DANGER!**

##### **Risk of injury from burning**

High temperatures are produced at the EC fan's electronic housing. Avoid direct contact!



#### **IMPORTANT NOTE!**

##### **Do not use aggressive cleaning agents!**

Aggressive cleaning agents that can damage the paintwork must not be used on the EC fan. Water is not permitted to enter the inside of the motor or the electronics (through direct contact with seals or motor openings, for example), respect the protection rating (IP). Check the condensate drain holes (if present), positioned to suit the installation situation, for clearance. Run the EC fan for at least 1 hour at 80 to 100% of maximum speed before cleaning to prevent moisture accumulating in the motor! Run the EC fan for a minimum of 2 hours at 80 to 100% of maximum speed after the cleaning process!

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### 9.3.3 Dismantling the housing cover

Note: Remove all snap hooks on the cover from their anchoring before dismantling (risk of breakage)!

Dismantle the housing cover for maintenance purposes and visual checks:



Fig. 12: Dismantling the housing cover

Important! Residual condensate can escape when dismantling the housing cover!

### 9.3.4 Cleaning the condensate tray

With the Ultra cooling model, the condensate tray also needs to be dismantled after the housing cover to provide access to the unit for visual checks and any cleaning work needed.



Fig. 13: Unscrewing the plug-in nut on the condensate tray

Unscrew the plug-in nut on the condensate tray.

**Important!** If the alarm has been triggered, there can be up to 1 litre of water in the condensate tray! Drain this off through the drain connection before dismantling the condensate tray.



Fig. 14: Lowering the condensate tray

Lower and remove the condensate tray.

When refitting, make sure that the condensate tray is correctly positioned in the corners of the air intake crown.



Fig. 15: Cleaning the condensate tray

Remove any dirt in the condensate tray. Clean the condensate lines as well if there is serious dirt in the condensate!

## 9.3.5 Cleaning the float switch

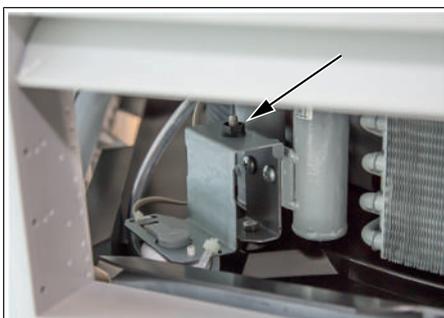


Fig. 16: Retaining bracket of float switch fixed with plug-in nut

Unscrew the plug-in nut and remove the retaining bracket with the float switch fitted.



Fig. 17: Removing the cover

Open and clean the float switch by removing the cover.

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## 9.3.6 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.



The ISO Coarse 45% (G3) recirculating air filter element can simply be removed and replaced on the top of the motor guard.

Fig. 18: Removing/fitting the filter

## 10 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 information.

### 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 [▶ 36] provides information on who is authorised to rectify and remedy faults.

### Status output via flash code

The EC fans are blockage protected. Protective functions that trigger an automatic shut-off in case of a fault are integrated. These depend on the fan type.

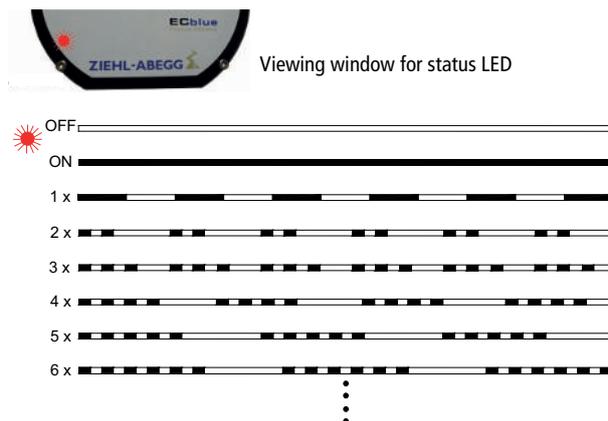


Fig. 19: Flash code

LED code	Relay in the fan*	Cause
OFF	0	No mains power
ON	1	Normal operation without faults
1x	1	No enable = OFF
2x	1	Temperature management active
4x	0	Phase failure (3 ~ types only)
5x	0	Motor blocked
6x	0	Power module fault
7x	0	Intermediate circuit, undervoltage
8x	0	Intermediate circuit, overvoltage
9x	1	Cool down phase, power module
11x	0	Fault, motor start
12x	0	Mains power too low
13x	0	Mains power too high
14x	0	Fault, peak current

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LED code	Relay in the fan*	Cause
17x	0	Temperature alarm
20x	0	MODBUS communication fault

Tab. 7: Status via flash code

\* Relay in the fan with factory-programmed function (fault message not inverted)

0 relay de-energised

1 relay energised

## 10.1 Fault table

Fault	Possible cause	Remedy
No function.	No power supply.	Check voltage, switch on repair switch.
		Replace fuse.
Fan is not running.	Unit is switched off.	Switch on the unit via the controller.
	No mains voltage or mains voltage does not correspond to the unit version.	Check the power supply and restore, if necessary.
	Electrical cable not connected or incorrectly connected.	Check electrical connection and correct if necessary.
	No request from controller, hence fans switch off.	Change controller settings, if required.
	Fan blocked.	Clean dirt from fan.
	Impermissible operating pressure (e.g. excessive back pressure)	Correct operating point. Allow unit to cool down. Switch off the mains power for min. 25 s and switch on again to reset the error message. Alternatively, reset error message by applying a control signal of <0.5 V to DIN1 or by short circuiting DIN1 to GND.
	Temperature monitor has tripped.	Allow the motor to cool down, find and rectify the cause of the fault and release restart lock if necessary.
Unit too loud	Motor winding interrupted.	Replace unit.
	Fan speed too high.	Set a lower fan speed, if possible.
	Air intake / air discharge opening is obstructed.	Free air routes.
	Filter dirty.	Replace filter.
	Rotating parts unbalanced	Clean and/or replace impeller. Make sure that no balancing brackets are removed during cleaning.
	Fan dirty.	Clean dirt from fan.
Appliance is not heating or cooling sufficiently.	Heat exchanger dirty.	Clean dirt from the Heat exchanger.
	Fan is not switched on.	Switch on fan via control.
	Air output is too low.	Set higher speed.
	Filter is dirty.	Replace filter.
	No heating or cooling medium.	Switch on heating or cooling system.
	Valves do not work.	Replace defective valves.
	Volume flow too low (lack of refrigerant).	Check for leaks.
	Setpoint temperature on the controller set too low or too high.	Adjust the temperature setting on the controller.
	Air cannot flow in or out freely.	Remove obstructions at the air outlet/air inlet.
Heat exchanger dirty.	Clean the heat exchanger.	

## 10.2 Fault table, electromechanical control

EC fan does not rotate when power is applied to the module and control signal > approx. 2 VDC	Mechanical blockage.	Switch off, de-energise and remove the mechanical blockage.
	Control voltage poles switched.	Connect the control voltage correctly.
Fan does not rotate 100% at max. control signal 10 VDC	Maximum limit set incorrectly.	Change potentiometer setting in the motor junction box.
	Active temperature management effective (motor or electronics overheated).	Check that the airways are clear; remove any foreign bodies, impeller is blocked or dirty; check supply air temperature; check installation location (air speed over heat sink).
Fault alarm (Contact C – NO open) and EC fan operational	Electronics in motor junction box faulty.	Replace the motor junction box.
	Fault signal chain fuse faulty.	Replace fuse.

## 10.3 Start-up after rectification of fault

After correction of the fault, carry out the following steps for recommissioning:

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

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## 11 Certificates

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<https://www.kampmanngroup.com/hvac/products/unit-heaters/ultra-dx>

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