

**Luft/Wasser-  
Wärmetauscher**

**Air/water  
heat exchangers**

**Echangeurs  
thermiques air/eau**

**Lucht/water-  
warmtewisselaars**

**Luft/vatten  
värmväxlare**

**Scambiatori di calore  
aria/acqua**

**Intercambiadores  
de calor aire/agua**

**水冷ヒートエクスチェンジャー**



**SK 3363.xxx**

**SK 3364.xxx**

**SK 3373.xxx**

**SK 3374.xxx**

**SK 3375.xxx**

**Montage-, Installations- und Bedienungsanleitung**

**Assembly and operating instructions**

**Manuel d'installation et de maintenance**

**Montage- en bedieningshandleiding**

**Montage- och hanteringsanvisning**

**Istruzioni di montaggio e funzionamento**

**Instrucciones de montaje**

**取扱説明書**



## Contents

<b>1</b>	<b>Notes on documentation</b>	<b>4</b>	<b>6</b>	<b>Operation</b>	<b>17</b>
1.1	Associated documents	4	6.1	Control using the Basic controller	17
1.2	CE labelling	4	6.1.1	Properties	17
1.3	Retention of documents	4	6.1.2	Operating and error display	18
1.4	Symbols used	4	6.1.3	Basic controller test mode	18
<b>2</b>	<b>Safety notes</b>	<b>4</b>	6.1.4	Setting the temperature	19
<b>3</b>	<b>Device description</b>	<b>5</b>	<b>6.2</b>	<b>Control using the Comfort controller</b>	<b>19</b>
3.1	Functional description	5	6.2.1	Properties	19
3.1.1	How it works	5	6.2.2	Launching test mode	20
3.1.2	Control	5	6.2.3	General programming information	20
3.1.3	Bus mode (Comfort controller only)	5	6.2.4	Editable parameters	21
3.1.4	Safety equipment	6	6.2.5	Programming overview	22
3.1.5	Condensation	6	6.2.6	Defining system messages for evaluation	23
3.1.6	Leak detection	6	6.2.7	Setting the master-slave identifier	23
3.1.7	Door limit switch	6	6.2.8	Evaluating system messages	24
3.1.8	Additional interface X3 (Comfort controller only)	6	<b>7</b>	<b>Inspection and maintenance</b>	<b>25</b>
3.2	Proper use	6	7.1	General	25
3.3	Scope of supply	7	<b>8</b>	<b>Storage and disposal</b>	<b>26</b>
<b>4</b>	<b>Assembly and connection</b>	<b>7</b>	<b>9</b>	<b>Technical specifications</b>	<b>27</b>
4.1	Choosing the installation site	7	<b>10</b>	<b>List of spare parts</b>	<b>30</b>
4.2	Assembly instructions	7	<b>11</b>	<b>Further technical information</b>	<b>32</b>
4.2.1	General	7	11.1	Hydrological data	32
4.2.2	Layout of the electronic components in the enclosure	8	11.2	Characteristic curves	33
4.3	Fitting the air/water heat exchanger	8	11.2.1	Water resistance	33
4.3.1	Cutting out the enclosure	9	<b>12</b>	<b>Appendix 1:</b>	
4.3.2	Fitting the air/water heat exchanger	9		<b>Cut-out and hole sizes</b>	<b>36</b>
4.4	Connecting the condensate discharge	9	12.1	Dimensions for external mounting	36
4.5	Connecting the water connection	10	<b>13</b>	<b>Appendix 2:</b>	
4.5.1	Notes on water quality	11		<b>Preparation and maintenance of the water in recooling systems</b>	<b>38</b>
4.6	Notes on electrical installation	11			
4.6.1	Connection data	11			
4.6.2	Overvoltage protection and supply line load	11			
4.6.3	Door limit switch	12			
4.6.4	Notes on the flicker standard	12			
4.6.5	Potential equalisation	12			
4.7	Carrying out the electrical installation	13			
4.7.1	Bus connection (only when interconnecting several units with a Comfort controller)	13			
4.7.2	Installing the power supply	15			
4.8	Finalising assembly	17			
4.8.1	Finalising air/water heat exchanger assembly	17			
<b>5</b>	<b>Commissioning</b>	<b>17</b>			

# 1 Notes on documentation

## 1 Notes on documentation

These assembly instructions are aimed at tradespersons who are familiar with assembly and installation of the air/water heat exchanger, and are trained specialists who are familiar with the operation of the air/water heat exchanger.

### 1.1 Associated documents

There are two sets of instructions for the unit types described here:

- Assembly and installation instructions enclosed with the unit in the form of a paper document
- Assembly, installation and operating instructions enclosed with the unit in the form of a PDF file (Adobe Acrobat) on CD-ROM.

We cannot accept any liability for damage associated with failure to observe these instructions. Where applicable, the instructions for any accessories used also apply.

### 1.2 CE labelling

The declaration of conformity is supplied with the unit as a separate document.

### 1.3 Retention of documents

These instructions and all associated documents constitute an integral part of the product. They must be given to the plant operator. The plant operator is responsible for storage of the documents so they are readily available when needed.

### 1.4 Symbols used

Please observe the following safety instructions and other notes in this guide:

#### Symbol for an instructed action:

- The bullet point indicates that you should perform an action.

#### Safety and other instructions:



**Danger!**  
**Immediate danger to life and limb!**

---



**Note!**  
**Potential threat to the product and its environment.**

---



**Note:**  
Useful information and special features.

---

## 2 Safety notes

Please observe the following general safety instructions when assembling and operating the unit:

- Assembly, installation and servicing may only be performed by properly trained specialists.
- The minimum water inlet temperature of +1°C must not be reduced at any point in the water cycle. Otherwise there is danger of frost damage!
- Use antifreeze agents only with the manufacturer's consent.
- Do not obstruct the air inlet and air outlet of the air/water heat exchanger inside and outside the enclosure (see also Section 4.2.2).
- The heat loss of the components installed in the enclosure must not exceed the specific useful cooling output of the air/water heat exchanger.
- The air/water heat exchanger must always be transported in a vertical position.
- Use only original spare parts and accessories.
- Do not make any changes to the air/water heat exchanger other than those described in these instructions or associated instructions.
- The mains connector of the air/water heat exchanger must only be connected and disconnected with the system de-energised. Connect the pre-fuse specified on the rating plate.

## 3 Device description

Depending on the model chosen, your air/water heat exchanger may vary in appearance from the illustrations contained in these instructions. However, the functions are identical in principle.

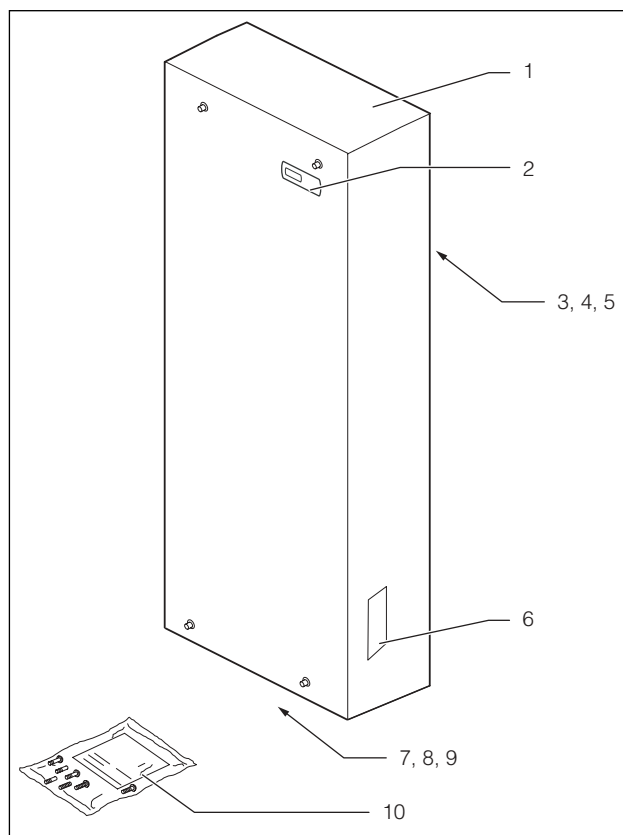


Fig. 1: Device description

### Legend

- 1 Cover
- 2 Controller
- 3 X2 master-slave connection (Comfort controller)
- 4 X1 terminal strip (unit rear)
- 5 X3 optional serial interface (unit rear)
- 6 Rating plate
- 7 Condensate discharge (underside of the unit)
- 8 Cooling water inflow (underside of the unit)
- 9 Cooling water return (underside of the unit)
- 10 Dispatch bag

## 3.1 Functional description

Air/water heat exchangers are designed and built to dissipate heat from enclosures by cooling the air inside the enclosure and so protect the temperature-sensitive components. Air/water heat exchangers are particularly appropriate for the temperature range of +40°C to +70°C where comparable units, such as air/air heat exchangers, enclosure cooling units or filter fans, cannot be used for system reasons to effectively and economically dissipate heat loss. The air/water heat exchanger is mounted on the side wall or at the rear of an enclosure.

### 3.1.1 How it works

The air/water heat exchanger comprises of three main components (cf. Fig. 2): Heat exchanger package (1), fan (2) and the magnetic valve (3) connected with each other using pipes.

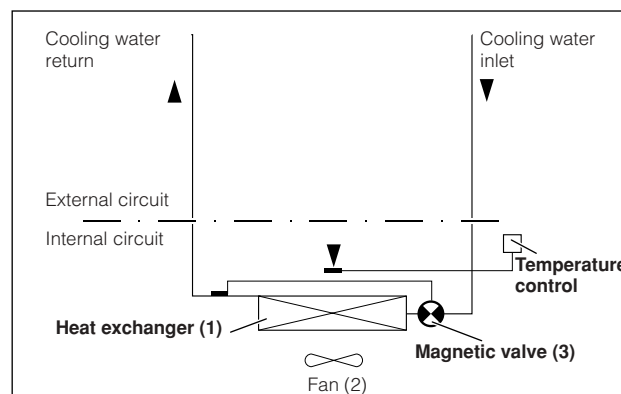


Fig. 2: Air/water heat exchanger

The heat loss of the enclosure is dissipated in a membrane heat exchanger to the water coolant. A fan blows the internal enclosure air over the heat exchanger (1); except for the inlet and outlet water and the condensed water discharge, the unit is closed to the environment.

The flow regulator (3) controls the cooling output by changing the water flow volume depending on the required housing temperature and the water inlet temperature.

### 3.1.2 Control

Rittal enclosure air/water heat exchangers are fitted with a controller for setting the functions of the heat exchanger. Depending on the design, this is either a Basic controller (display of the operating status via LED) or a Comfort controller (display plus extended functions, see chapter "6 Operation", page 17).

### 3.1.3 Bus mode

#### (Comfort controller only)

The serial unit interface X2 allows you to create a bus connection with up to ten air/water heat exchangers using the master-slave cable (shielded, four-wire cable, Model No. SK 3124.100). This allows you to implement the following functions:

- Parallel unit control (the air/water heat exchangers in the network can be switched on and off simultaneously)
- Parallel door status message ("door open")
- Parallel collective fault message

Data is exchanged via the master-slave connection. During commissioning, assign an address to each unit that also includes the identifier "master" or "slave".

## 3 Device description

EN

### 3.1.4 Safety equipment

- To protect against overcurrent and overtemperature, the fan is equipped with a thermal winding protection.
- The unit has one (in the case of the Basic controller) or two (in the case of the Comfort controller) integral floating contacts on the connection terminal (system message relay with change-over contact, terminal 3 – 5) which may be used to retrieve messages from the heat exchanger, e.g. via PLC.
- Units with Basic and Comfort controllers are also equipped with a condensate alarm.

### 3.1.5 Condensation

At high levels of humidity and low cooling water temperatures inside the enclosure, condensation may form on the heat exchanger.

Any condensation that forms on the heat exchanger (with high humidity and low water temperatures) is routed to the right and/or rear out of the unit via a drain opening in the evaporator tray. For this purpose, a hose must be connected to the condensate nozzle (see “4.4 Connecting the condensate discharge”, page 9). The condensate must be able to run off freely. The hose used for draining off condensate must be laid free from kinks and checked for correct drainage.

Units with Basic and Comfort controllers are also equipped with a condensate alarm.

Condensate hoses are available as accessories (refer also to the accessories section in the Rittal Catalogue).

### 3.1.6 Leak detection

If a leakage or pipe breakage occurs in the water circuit of the air/water heat exchanger, a magnetic valve immediately stops the cooling water supply, the floating change-over contact activated and the fan switched off.

### 3.1.7 Door limit switch

The air/water heat exchanger may be operated with a door limit switch connected. The door limit switch is not included with the supply (available as an accessory, Model No. PS 4127.000).

The door limit switch function causes the fan and the magnetic valve in the air/water heat exchanger to be switched off after approximately 15 seconds when the enclosure door is opened (contacts 1 and 2 closed). This prevents the formation of condensation inside the enclosure while the enclosure door is open.

The fan will start up after about 15 seconds on closure of the door. Connection is made at the terminals 1 and 2. The extra-low voltage is supplied by the internal power pack; the current is approx. 30 mA DC.



#### Note:

The door limit switches must only be connected free from potential. No external voltages!



#### Note:

For air/water heat exchangers with basic control, the fan continues to run even when the door is open.

### 3.1.8 Additional interface X3 (Comfort controller only)



#### Note:

The electrical signals at the interface are of an extra-low voltage (not extra-low safety voltages in accordance with EN 60 335).

An additional interface card may be connected to the 9-pole SUB-D connector X3 in order to incorporate the air/water heat exchanger into higher-level monitoring systems (available as an accessory, interface card Model No. SK 3124.200).

## 3.2 Proper usage

Rittal enclosure air/water heat exchangers were developed and designed in accordance with the state-of-the-art and the recognised rules governing technical safety. Nevertheless, if used improperly, they may pose a threat to life and limb or cause damage to property. The unit is only intended for cooling enclosures. Any other use is deemed improper. The manufacturer will not be liable for any damages caused as a result of improper use, or for incorrect assembly, installation or use. All risk is borne solely by the user.

Proper usage also includes the observation of all valid documents and compliance with the inspection and servicing conditions.

## 3.3 Scope of supply

The unit is supplied in a packaging unit in a fully assembled state.

Please check the delivery for completeness:

Qty.	Designation
1	Air/water heat exchanger
1	Dispatch bag:
1	– Sealing tape
1	– Plug-in terminal strip
1	– Assembly and installation instructions
1	– Assembly, installation and operating instructions on CD-ROM
1	– Declaration of conformity
1	Drilling template

Tab. 1: Scope of supply

## 4 Assembly and connection

### 4.1 Choosing the installation site

When choosing the installation site for the enclosure, please observe the following:

- The site for the enclosure, and hence the arrangement of the air/water heat exchanger, must be carefully selected so as to ensure good ventilation. Depending on the siting of the unit, if several units are installed directly adjacent to one another, the distance from the wall must be at least 200 mm.
- The air/water heat exchanger must be installed and operated in a vertical position (maximum deviation: 2°).
- The site must be free from excessive dirt and moisture.
- The ambient temperature must not exceed +70°C.
- It must be possible to fit a condensate discharge (see “4.4 Connecting the condensate discharge”, page 9).
- It must be possible to fit a cooling water supply and return (see “4.5 Connecting the water connection”, page 10).
- The mains connection data as stated on the rating plate of the unit must be guaranteed.

### 4.2 Assembly instructions

#### 4.2.1 General

- Check the packaging carefully for signs of damage. Packaging damage may be the cause of a subsequent functional failure.
- The enclosure must be sealed on all sides (IP 54). Increased condensation will occur if the enclosure is not airtight.
- The air inlet and outlet must not be obstructed on the inside of the enclosure.
- In order to avoid excessive condensation inside the enclosure, we recommend installing a door limit switch (e.g. PS 4127.000) which deactivates the air/water heat exchanger when the enclosure door is opened (see “3.1.7 Door limit switch”, page 6).

## 4 Assembly and connection

### 4.2.2 Layout of the electronic components in the enclosure



#### Note!

##### Risk of condensation!

When arranging the components inside the enclosure, please ensure that the cold airflow from the air/water heat exchanger is not directed at active components. Please also ensure that the cold airflow is not directed at the warm exhaust airflow from active components such as converters. This may lead to an air short-circuit and therefore prevent adequate climate control, or may even cause the air/water heat exchanger's internal safety devices to cease cooling operation.

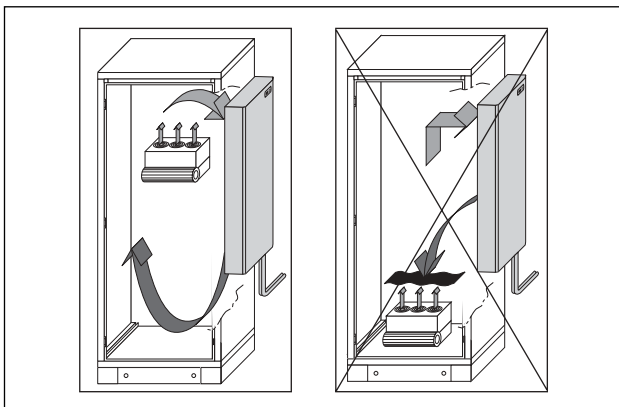


Fig. 3: Never direct the cold airflow at active components

Exercise particular caution with the airflow from the blowers of built-in electronic components (cf. Fig. 3). Components for targeted air routing are available as accessories – please refer to the chapter on “System climate control” in the Rittal Catalogue.



#### Note:

The air/water heat exchangers should never be fitted directly behind the mounting plate. If it is not possible to install the unit any other way, appropriate air baffle plates should be used, and air inlet and outlet openings should be provided in the mounting plate.



#### Note:

It is important to ensure even air circulation inside the enclosure. Under no circumstances should air inlet and outlet openings be obstructed, otherwise the cooling performance of the unit will be reduced. Ensure a suitable distance from electronic components and other installed enclosures so that the required air circulation is not obstructed and prevented.

One cold air outlet from the air/water heat exchanger must be kept open at all times when operating with the air duct, to prevent the accumulation of cold air inside the unit.

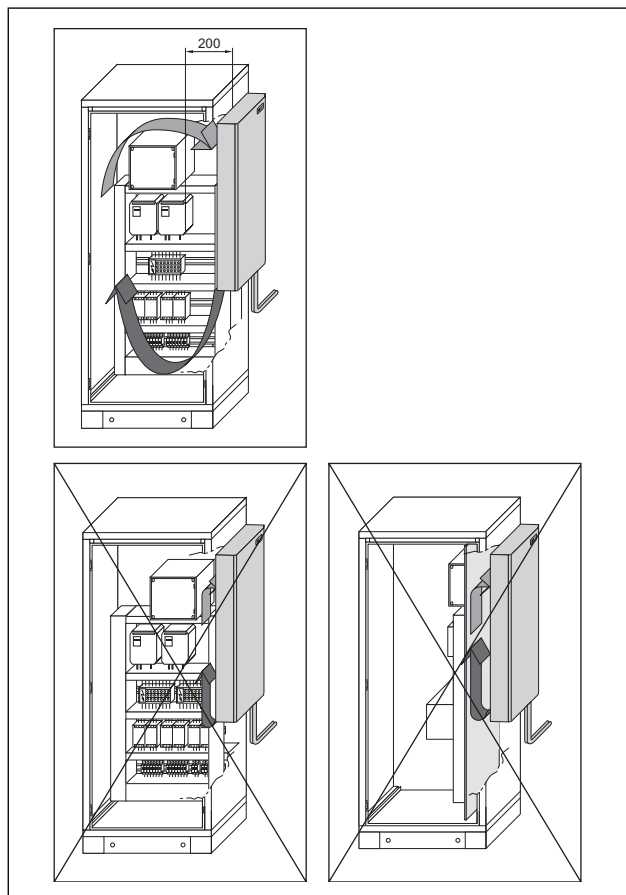


Fig. 4: Targeted air routing inside the enclosure

### 4.3 Fitting the air/water heat exchanger

The enclosure air/water heat exchanger can be mounted on one of the side walls, rear panel or the door of the enclosure.

For this purpose, the appropriate enclosure panel or door must be cut out using the supplied drilling template.



### 4.3.1 Cutting out the enclosure

- Stick the supplied drilling template with adhesive tape to the mounting position on the enclosure. The heat exchanger is suitable for both external and internal mounting.

There are dimensioning lines on the drilling template to suit the installation type for your air/water heat exchanger.



#### **Risk of injury!**

**Carefully deburr all cut-outs to prevent injuries caused by sharp edges.**

- Make the cut-outs including the line width as per the drilling template. Deburr the cut-outs.

### 4.3.2 Fitting the air/water heat exchanger

- Stick the supplied sealing tape appropriate for the installation type without any gaps to the rear or front of the heat exchanger.
- Check the door sealing for any damage.



#### **Note:**

The enclosure must be sealed on all sides. In particular, in the area of the cable inlet openings and the enclosure base.

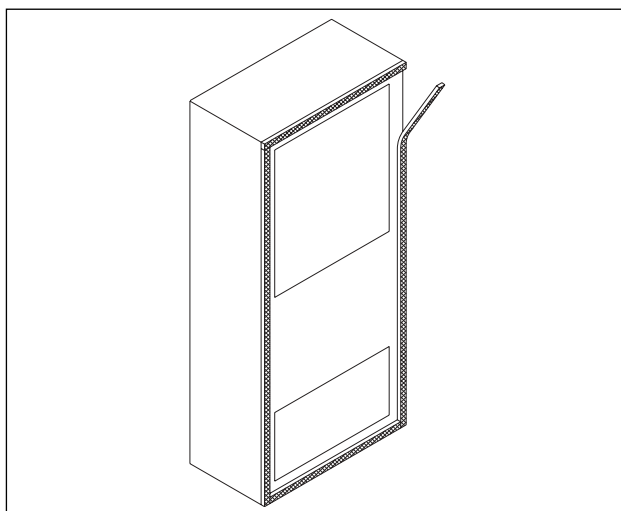


Fig. 5: "External" mounting sealing

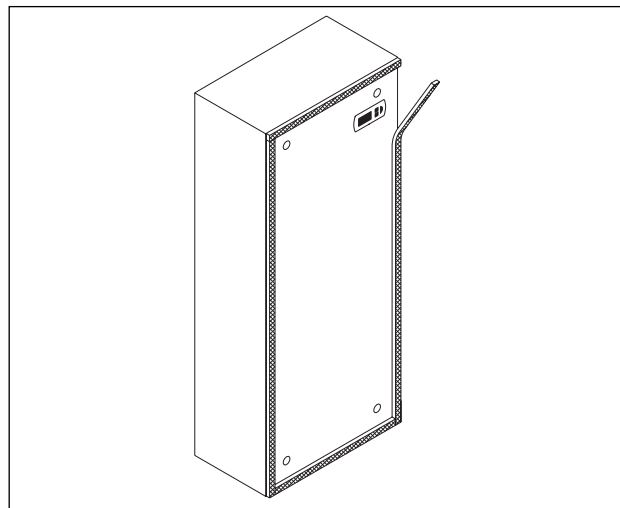


Fig. 6: "Internal" mounting sealing

- Mount the air/water heat exchanger on the enclosure.
- Screw the supplied grub screws into the blind nuts on the rear of the unit.
- Secure the unit using the supplied washers and nuts.



#### **Note:**

In order to achieve a permanent seal between the air/water heat exchanger and the enclosure, the mounting surface should be reinforced or supported if necessary.

### 4.4 Connecting the condensate discharge

A flexible condensate discharge hose ( $\varnothing 1/2''$ ) can be fitted to the air/water heat exchanger.

The condensate discharge

- must be laid with a suitable and constant gradient (no siphoning)
- must be laid without kinks
- must not have a reduced cross-section if extended.

The condensate hose is available as an accessory (refer also to Accessories in the Rittal Catalogue).

## 4 Assembly and connection

EN

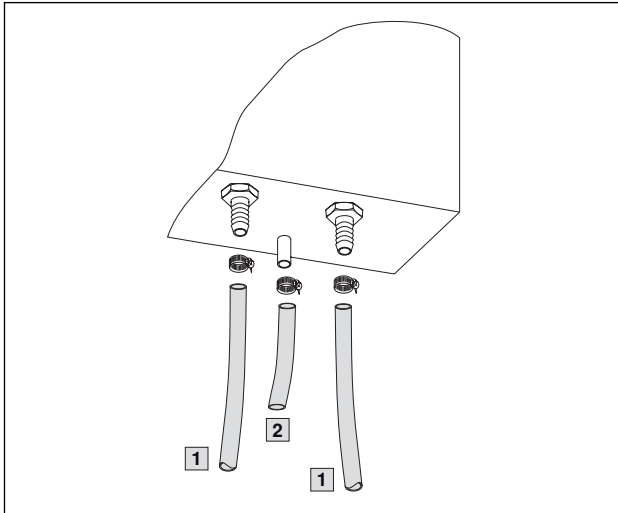


Fig. 7: Connecting the condensate discharge

### Legend

- 1 Cooling water connection
- 2 Condensate discharge

- Connect a suitable hose to the condensate nozzle (at the bottom of the unit) and secure it with a hose clip (with 2 Nm torque).
- Lay the condensate hose, e.g. into a drain.

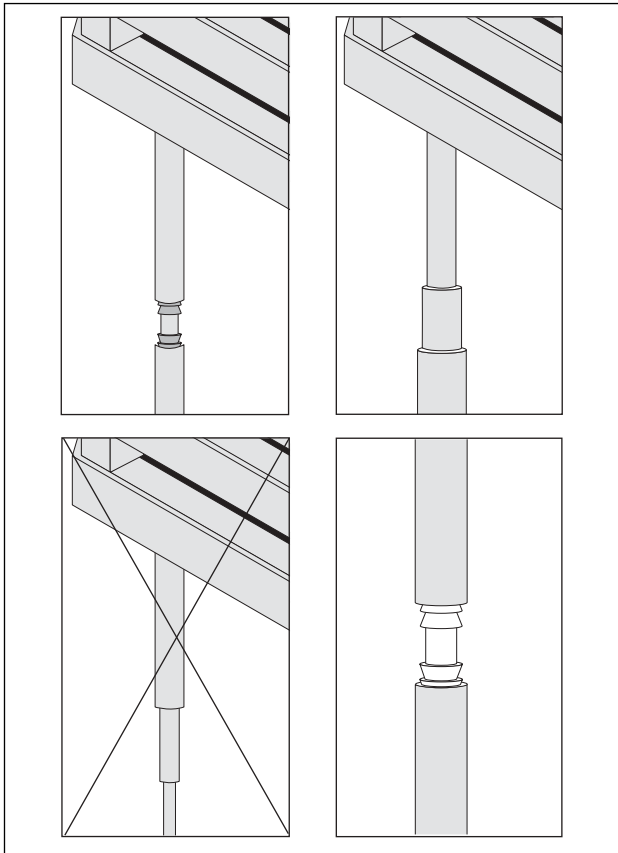


Fig. 8: Laying the condensate discharge

### 4.5 Connecting the water connection

A compression-proof flexible condensate discharge hose ( $\varnothing 1/2''$ ) for both the supply and the return can be fitted to the air/water heat exchanger.

The cooling water hose

- must be laid without kinks
- must not have a reduced cross-section if extended and, if necessary, must be insulated.

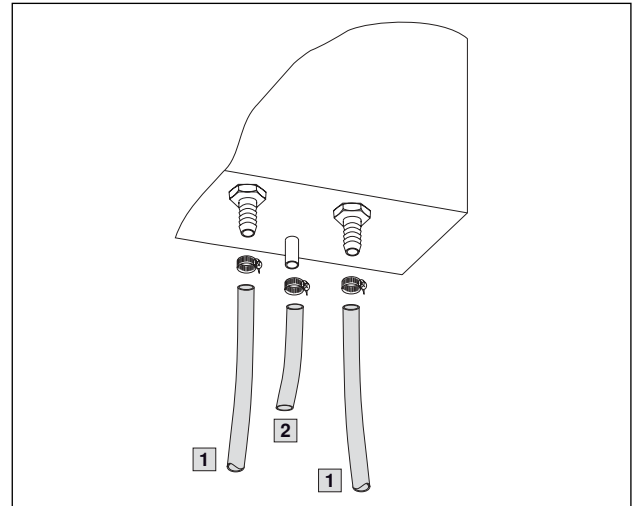


Fig. 9: Connecting the cooling water supply and return

### Legend

- 1 Cooling water connection
- 2 Condensate discharge

- Connect a suitable hose to the cooling water connecting pieces and secure it with a hose clip (with 15 Nm torque).



### Note:

The water circuit should be protected from ingress of dirt or excess pressure (maximum permitted operating pressure 10 bar)!



### Note:

Observe the flow direction and check for leaks!

The units do not have any separate ventilation.

- For pressure-sealed systems, install the appropriate ventilation equipment on the water side.

## 4.5.1 Notes on water quality

To ensure the reliable operation of the above-mentioned units, the VBG guidelines for cooling water must be observed (VGB-R 455 P).

The cooling water must not contain any limescale deposits or loose debris; in other words, it should have a low level of hardness, in particular, a low level of calcium hardness. In particular, for recooling within the plant, the calcium hardness should not be too high. On the other hand, the water should not be so soft that it attacks the materials. When recooling the cooling water, the salt content should not be allowed to increase excessively due to the evaporation of large quantities of water, since electrical conductivity increases as the concentration of dissolved substances rises, and the water thereby becomes more corrosive.

- Always add the appropriate volume of fresh water.
- Always remove part of the enriched water.

The following criteria for the cooling water must be observed:

- Water with high gypsum content is unsuitable for cooling purposes because it has a tendency to form boiler scale that is particularly difficult to remove.
- The cooling water should be free from iron and manganese, because otherwise deposits may occur that accumulate in the pipes and block them.
- At best, organic substances should only be present in small quantities, because otherwise sludge deposits and microbiological contamination may occur.

## 4.6 Notes on electrical installation

When performing the electrical installation, it is important to observe all valid national and regional regulations as well as the provisions of the responsible power supply company. The electrical installation may only be performed by a qualified electrician who is responsible for compliance with the applicable standards and regulations.

### 4.6.1 Connection data

- The connected voltage and frequency must correspond to the values stated on the rating plate.
- The air/water heat exchanger must be connected to the mains via an all-pin isolating device that ensures at least 3 mm contact opening when switched off.
- No additional temperature control may be connected upstream of the unit at the supply end.
- Install the pre-fuse specified on the rating plate (miniature circuit-breaker “K” characteristic or slow fuse) to protect the cable and equipment from short-circuits.
- The mains connection must ensure low-noise potential equalisation.

### 4.6.2 Overvoltage protection and supply line load

- The unit does not have its own overvoltage protection. Measures must be taken by the operator at the supply end to ensure effective lightning and overvoltage protection. The mains voltage must not exceed a tolerance of  $\pm 10\%$ .
- In accordance with IEC 61 000-3-11, the unit is intended solely for use at sites with a continuous current-carrying capacity (incoming mains power supply) of more than 100 A per phase and with a supply voltage of 400/230 V. If necessary, the power supply company must be consulted to ensure that the continuous current-carrying capacity at the point of connection to the public grid is sufficient for connection of such a unit.
- The fans in single- and three-phase units are intrinsically safe (thermal winding protection). The same also applies to all transformer versions and to special-voltage units which are likewise equipped with a transformer.
- Install the slow pre-fuse specified on the rating plate (miniature circuit-breaker with “K” characteristic, motor circuit-breaker or transformer circuit-breaker) to protect the cable and equipment from short-circuits. Select a suitable motor circuit-breaker/transformer circuit-breaker in accordance with the information specified on the rating plate: Set it to the minimum specified value. This will achieve the best short-circuit protection for cables and equipment. Example: Specified setting range MS/TS 6.3 – 10 A; set to 6.3 A.

## 4 Assembly and connection

EN

### 4.6.3 Door limit switch

- Each door limit switch must only be assigned to one air/water heat exchanger.
- Several door limit switches may be connected in parallel and operated on one air/water heat exchanger.
- The minimum cross-section of the connection cable is  $0.3 \text{ mm}^2$  for a cable length of 2 m. We recommend the use of a shielded cable.
- The line resistance to the door limit switch must not exceed a maximum of  $50 \Omega$ .
- The door limit switch only supports a floating connection; no external voltages.
- The contact of the door limit switch must be closed when the door is open.

The safety extra-low voltage for the door limit switch is provided by the internal power pack: Current approx. 30 mA DC.

- Connect the door limit switch to terminals 1 and 2 of the connector.

### 4.6.4 Notes on the flicker standard

The flicker limits specified in standard EN 61 000-3-3 or -3-11 are adhered to, provided the supply impedance is less than approx.  $1.5 \Omega$ .

Where necessary, the unit operator should measure the connected impedance or consult the responsible power supply company. If there is no way of influencing the supply impedance and sensitive installed components (e.g. BUS) are subjected to interference, a line reactor or starting-current limiting device should be connected upstream of the air/water heat exchanger to restrict the startup current of the air/water heat exchanger.

### 4.6.5 Potential equalisation

Rittal recommends connecting a conductor with a nominal cross-section of at least  $6 \text{ mm}^2$  to the potential equalisation connection point in wall-mounted air/water heat exchangers and incorporating it into the existing potential equalisation system.

According to the standard, the PE conductor in the mains connection cable is not classified as an equipotential bonding conductor.

## 4.7 Carrying out the electrical installation

### 4.7.1 Bus connection (only when interconnecting several units with a Comfort controller)

When using several air/water heat exchangers, the serial unit interface can be used to connect up to ten air/water heat exchangers with the bus cable (Model No. SK 3124.100).



#### Note:

The electrical signals at the X2 interface are of an extra-low voltage (not extra-low safety voltages in accordance with EN 60 335).

When interconnecting, please note the following:

- De-energise the air/water heat exchangers to be connected.
- Ensure proper electrical insulation.
- Make sure the cables are not laid in parallel to power lines.
- Make sure that the lines are short.

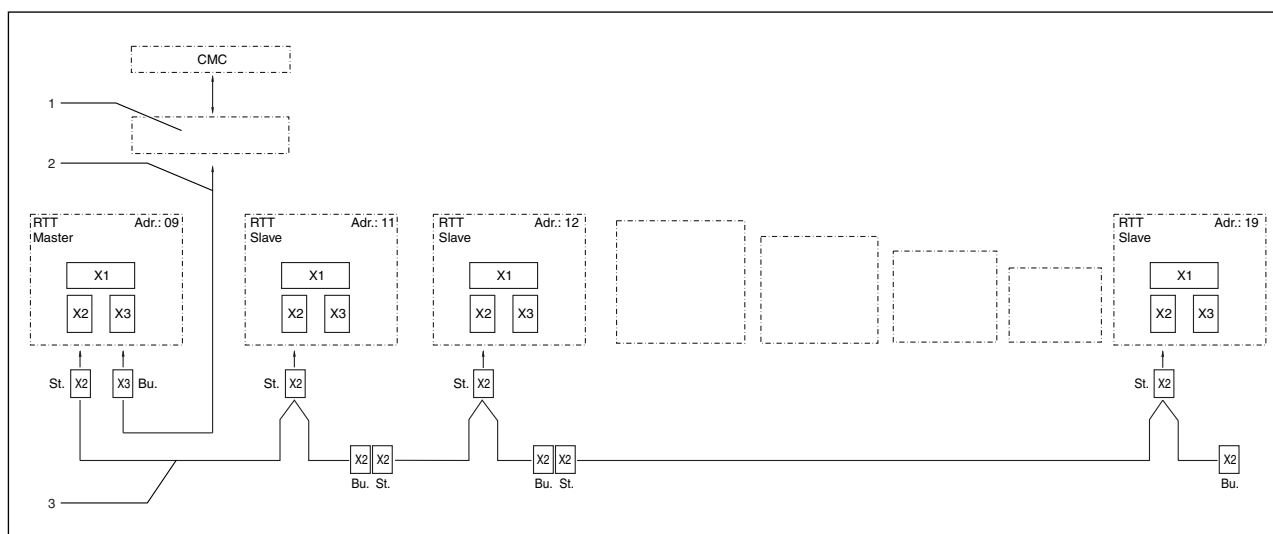


Fig. 10: Connection example: Master-slave operation

#### Legend

- 1 Serial interface
- 2 Serial interface cable
- 3 Master-slave bus cable (Model No. SK 3124.100)
- RTT Rittal TopTherm air/water heat exchanger
- X1 Supply connection/door limit switch/alarms
- X2 Master-slave connection Sub-D, 9-pole
- X3 Serial interface Sub-D, 9-pole
- St. Sub-D connector, 9-pole
- Bu. Sub-D jack, 9-pole
- Adr. Address

## 4 Assembly and connection

EN

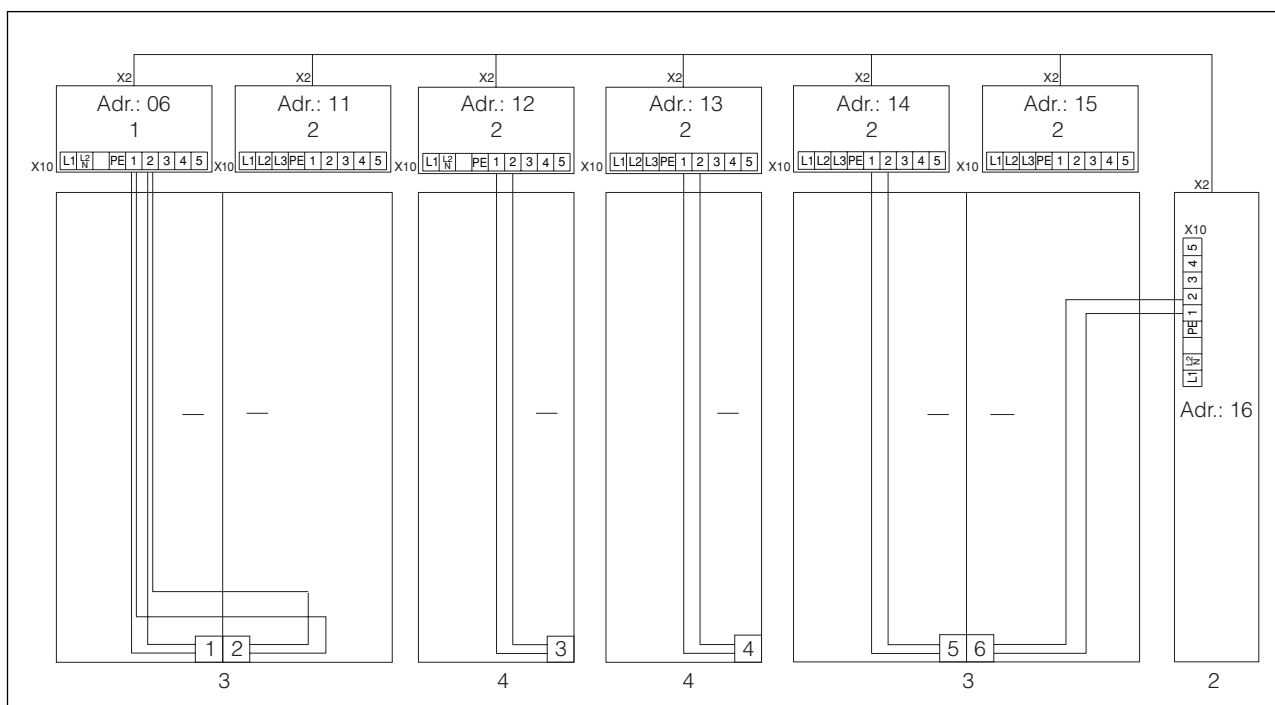


Fig. 11: Connection example: Door limit switch and master-slave operation

### Legend

- 1 Master air/water heat exchanger
- 2 Slave air/water heat exchanger
- 3 2-door enclosure with two door limit switches
- 4 Enclosure with door limit switch



## EN

[illegible]

### Legend

- 

For technical data refer to the rating plate.

Tab. 2: Contact data



## 4.8 Finalising assembly

### 4.8.1 Finalising the air/water heat exchanger assembly

- Connect the connector to the rear of the display.

## 5 Commissioning

- Once all the assembly and installation work is complete, switch on the power supply to the air/water heat exchanger.

The air/water heat exchanger starts running:

- With Basic controller: The green operating LED (“line”) is illuminated.
- With Comfort controller: The software version of the controller first appears for approx. 2 seconds, then the enclosure internal temperature appears in the 7-segment display.

You can now make your individual settings on the unit, e.g. set the temperature or (with Comfort controller only) assign the network identifier, etc. (refer to the “Operation” chapter).

## 6 Operation

You can operate the air/water heat exchanger using the controller on the front of the unit (Fig. 1, no. 2, page 5). Depending on the model, the unit is equipped with a Basic or Comfort controller.

## 6.1 Control using the Basic controller

For the SK 33xx.1xx unit types.

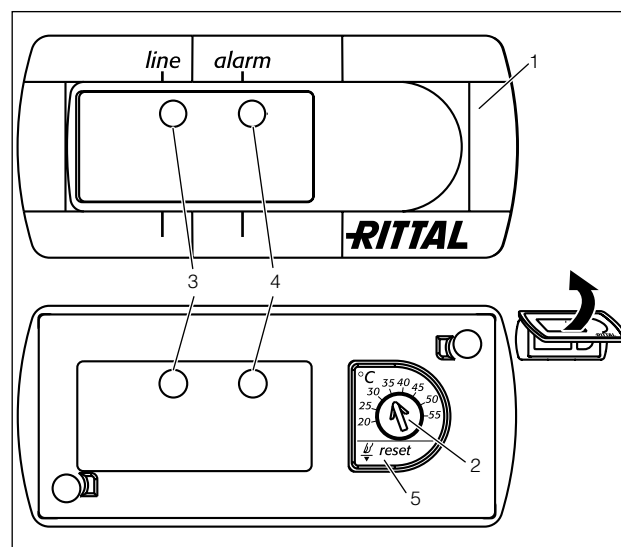


Fig. 14: Basic controller

### Legend

- 1 Controller trim panel
- 2 Temperature setting
- 3 LED green (“line”)
- 4 LED red (“alarm”)
- 5 Reset button

### 6.1.1 Properties

- Three voltage variants are supported:
  - 115 V
  - 230 V
  - 400 V, 2-phase
- Integral start-up delay and door limit switch function
- Monitoring of all motors (fans)
- Visualisation of the operating status via LED display:
  - Voltage on, unit operational
  - Door open (only if door limit switch installed)
  - Warning of overtemperature
- Switching hysteresis: 5 K
- Floating system message contact in case of overtemperature
- Temperature setting (setting range 20 – 55°C) via potentiometer
- Test function

The air/water heat exchanger operates automatically, i.e. after switching on the power supply, the fan (see page 5, Fig. 2) will run continuously and permanently circulate the internal enclosure air. The magnetic valve controls the cooling water flow as specified by the temperature setpoint. The built-in Basic controller ensures automatic normal shut-down operation of the air/water heat exchanger by the value of the fixed preset switching difference of 5 K.

## 6 Operation

### 6.1.2 Operating and error display

The Basic controller monitors and controls the air/water heat exchanger. It indicates the operating and error status via the green and red LEDs (Fig. 14, nos. 3 and 4):

LED	Status	Cause	Solution
Green (line)	Illuminated	Voltage present, unit operational	–
	Flashing	Only with door limit switch installed: Enclosure door open	In order to avoid condensation, close the enclosure door as quickly as possible.
		Only with door limit switch installed: Enclosure door closed	Check the position of the door limit switch.
Red (alarm)	Illuminated	The enclosure internal temperature is 10 K above the set temperature.	Check the temperature setting. Check the heat exchanger and, if necessary, clean. Check the heat loss to be dissipated; it must not exceed the rated cooling capacity of the air/water heat exchanger.
	Flashing	Leakage alarm in the water circuit	Check the water hoses and, if necessary, clean or seal again.
		Connection to board interrupted	Check, replace board if necessary
Off	No display	No power	Check power supply
		Rotary current phase monitoring: "LED off" = Incorrect phase connection	Swap phases

Tab. 3: Operating and error display of the Basic controller

The overtemperature message (red LED illuminated) may also be polled via an integral floating contact on the connection terminal of the air/water heat exchanger (system message relay with change-over contact, see connection diagrams under "4.7.2 Installing the power supply", page 15):

- Terminal 3: NC (normally closed)
- Terminal 4: C (connection of the supply voltage to the system message relay)
- Terminal 5: NO (normally opened)

The NC and NO definitions refer to the de-energised state. As soon as power is applied to the air/water heat exchanger, the system message relay picks up, so that the relay contacts change status (contact 3 – 4 open; contact 4 – 5 closed). This is the normal operating state of the air/water heat exchanger. As soon as an error message occurs or the power supply is interrupted, the relay drops out.

### 6.1.3 Basic controller test mode

The Basic controller is equipped with a test function, whereby the air/water heat exchanger commences cooling operation independently of the set temperature or door limit switch function.

First you must dismantle the trim panel of the controller.

- Switch off the mains voltage.
- Remove the louvred grille in which the controller is installed.
- Release the display lock from behind and pull it forwards slightly.

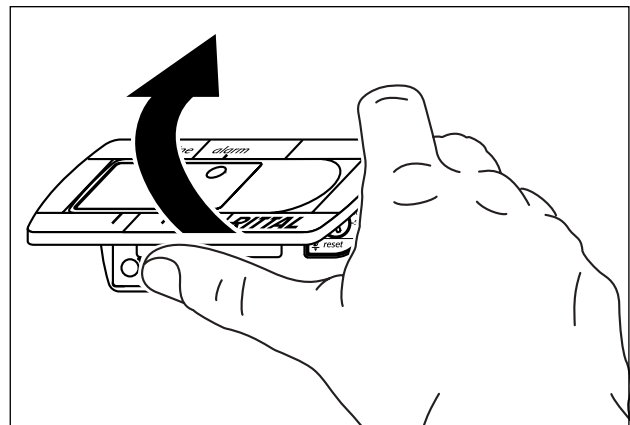


Fig. 15: Loosen the trim panel of the Basic controller

- Carefully raise the trim panel, e.g. using your thumb or a flat screwdriver, and remove it. You can now start test mode.
- Hold the rubberised potentiometer display (see Fig. 14, item 5, page 17) down while you switch the mains power back on, and keep the button (5) held down for a further 10 seconds (for access to the potentiometer, see also 6.1.3).

The air/water heat exchanger starts running. This is signalled by an asynchronous flashing of the green LED. After approximately three minutes or upon reaching 15°C, test mode will end. The unit switches off and changes to normal operation.

#### 6.1.4 Setting the temperature



##### Note:

With the Basic controller, the temperature is preset at the factory to +35°C. In order to save energy, do not set the temperature lower than that actually necessary.

To change the temperature setting:

- Dismantle the trim panel of the controller as described in “6.1.3 Basic controller test mode”, page 18.
- Set the required temperature on the temperature setting device (page 17, Fig. 14).
- Carefully push the trim panel onto the display until you hear it snap into place.
- Push the display back into the louvred grille.
- Re-attach the louvred grille to the air/water heat exchanger.

## 6.2 Control using the Comfort controller

For the SK xxxx.500/.510/.540 and SK xxxx.504/.514/.544 unit types.

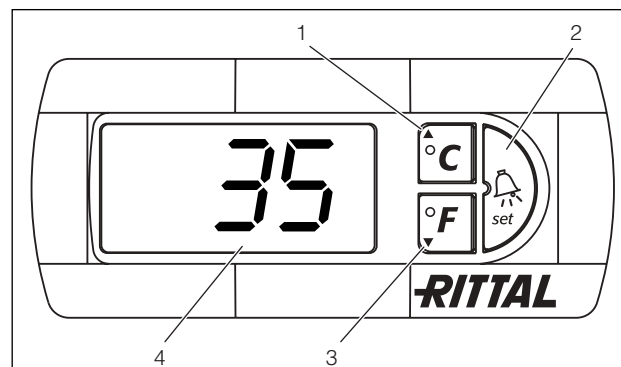


Fig. 16: Comfort controller

### Legend

- 1 Programming button, also display of the set temperature unit (degrees Celsius)
- 2 Set button
- 3 Programming button, also display of the set temperature unit (degrees Fahrenheit)
- 4 7-segment display

### 6.2.1 Properties

- Three voltage variants are supported:
  - 115 V
  - 230 V
  - 400 V, 2-phase
- Integral start-up delay and door limit switch function
- Protective function to prevent icing
- Monitoring of all motors (fans)
- Phase monitoring for three-phase units
- Master-slave function with a maximum of ten units. One unit functions as a master unit. Once the set temperature is reached by one of the connected slave units or in the event of the door limit switch function, the affected slave unit will report to the master unit, which will switch all the other air/water heat exchangers on or off as required.
- Switching hysteresis: Adjustable within the range 2 – 10 K, preset to 5 K.
- Visualisation of the current enclosure internal temperature and all error messages in the 7-segment display.
- Using an interface card (Model No. SK 3124.100), the unit may be incorporated into higher-level remote monitoring systems such as the Rittal Computer Multi Control CMC.

The air/water heat exchanger operates automatically, i.e. after switching on the power supply, the fan (see page 5, Fig. 2) will run continuously and permanently circulate the internal enclosure air. The fan and the magnetic valve are controlled by the Comfort controller.

## 6 Operation

EN

The Comfort controller has a 7-segment display (Fig. 16, no. 4). After switching on the power supply, the current software version initially appears on this display for approx. two seconds. In regular operation, the display shows both the temperature (in degrees Celsius or Fahrenheit – users may switch between the two) and any error messages.

The current enclosure internal temperature is usually displayed permanently. In the event of an error message, this will alternate with the temperature display. The unit is programmed using buttons 1 – 3 (Fig. 16). The relevant parameters also appear in the display.

### 6.2.2 Launching test mode

The Comfort controller is equipped with a test function, whereby the air/water heat exchanger commences cooling operation independently of the set temperature or door limit switch function.

- Simultaneously press buttons 1 and 2 (Fig. 16) for at least ten seconds.

The air/water heat exchanger starts running.

After approximately three minutes or upon reaching 15°C, test mode is complete. The unit switches off and changes to normal operation.

### 6.2.3 General programming information

Using buttons 1, 2 and 3 (Fig. 16) you can change 24 parameters within the preset ranges (min. value – max. value).

Tables 4 and 5 show the parameters which can be altered. Fig. 17 on page 22 shows which buttons must be pressed.



#### Note on switching hysteresis:

With a low hysteresis and short switching cycles, there is a risk that cooling may not be adequate or that only partial sections of the enclosure are cooled.

#### Note on temperature settings:

With the Comfort controller, the temperature is preset in the factory to +35°C.

In order to save energy, do not set the temperature lower than that actually necessary.

#### Note on useful cooling output:

Interactive performance diagrams for calculating the useful cooling output may be found at [www.rittal.com](http://www.rittal.com).

In principle, the programming is identical for all editable parameters.

To enter programming mode:

- Press button 2 (“Set”) for approx. five seconds.

The controller is now in programming mode. While in programming mode, if you do not press any buttons for approx. 30 seconds, the display will first flash, then the controller will switch back to normal display mode. The “Esc” display indicates that any made changes have not been saved.

- Press the programming buttons ▲ (°C) or ▼ (°F) to switch back and forth between the editable parameters (see tables 4 and 5).

- Press button 2 (“Set”) to select the displayed parameter for editing.

The current value of this parameter is displayed.

- Press one of the programming buttons ▲ (°C) or ▼ (°F).

The “Cod” display will appear. In order to be able to change a value, you must enter the authorisation code “22”.

- Keep the programming button ▲ (°C) held down until “22” appears.

- Press button 2 (“Set”) to confirm the code.

You can now alter the parameter within the preset limits.

- Press one of the programming buttons ▲ (°C) or ▼ (°F) until the required value appears.

- Press button 2 (“Set”) to confirm the change.

You can now alter other parameters in the same way. There is no need to re-enter the authorisation code “22”.

- To exit programming mode, press button 2 (“Set”) again for approximately five seconds.

“Acc” will appear in the display to indicate that the changes have been saved. The display will then switch back to regular operation (enclosure internal temperature).

You can also program the Comfort controller using a diagnosis software package (Model No. SK 3159.100), the supply of which also includes a connection cable to the PC. The cable connector on the rear of the Comfort controller display serves as an interface.

**6.2.4 Editable parameters**

See also Fig. 17 on page 22.

Progr. level	Display screen	Parameter	Min. value	Max. value	Factory setting	Description
1	St	Internal enclosure temperature setpoint $T_i$	20	68	35	The setting of the enclosure internal temperature is preset at the factory to 35°C and may be altered within a range of 20 – 55°C.
2	Mod	Control mode	0	1	0	Control mode setting. The temperature control is made as factory setting with the magnetic valve (0). It is, however, possible to change the temperature control by starting and stopping the internal fan (1); the magnetic valve then remains permanently open. You must obtain the manufacturer's consent before changing to control mode (1).
3	Ad	Master-slave identifier	0	19	0	See "6.2.7 Setting the master-slave identifier", page 23.
4	CF	Temperature conversion °C/°F	0	1	0	The temperature display can be switched from °C (0) to °F (1). The corresponding LED displays the current unit of temperature.
5	H1	Setting for switching difference (hysteresis)	2	10	5	The air/water heat exchanger is preset in the factory to a switching hysteresis of 5 K. This parameter should only be changed in consultation with us. Please contact us for advice.
6	H2	Differential for error message A2	3	15	5	If the internal enclosure temperature exceeds the set value by more than 5 K, then error message A2 (enclosure internal temperature too high) appears on the display terminal. If necessary, the differential may be altered here within the range of 3 – 15 K.

Tab. 4: Editable parameters

# 6 Operation

## 6.2.5 Programming overview

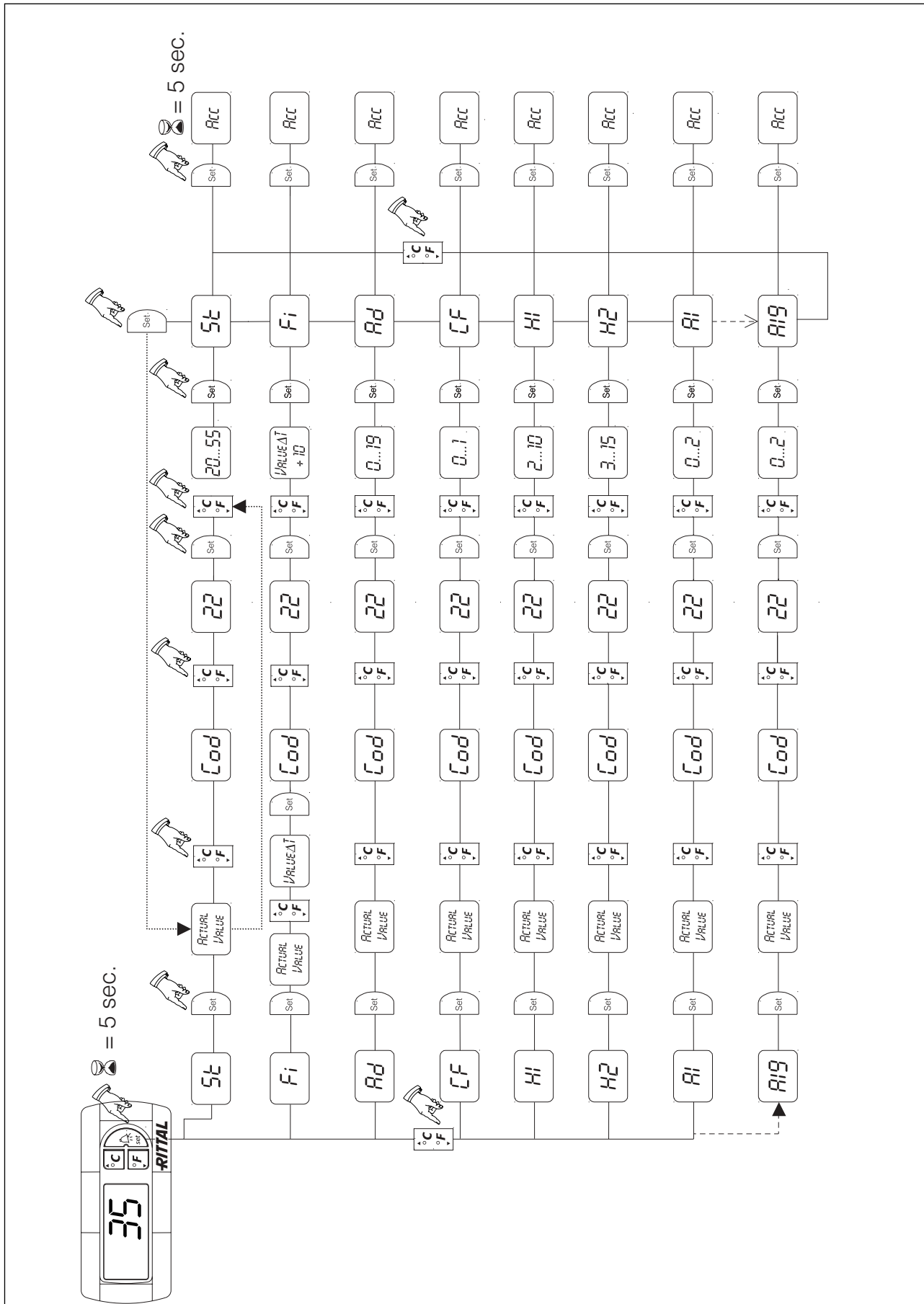


Fig. 17: Programming overview

### 6.2.6 Defining system messages for evaluation

System messages are shown on the display screen of the Comfort controller via the displays A1 to A20 and E0.

A more detailed explanation of the system messages may be found in section "6.2.8 Evaluating system messages", page 24.  
See also Fig. 17 on page 22.

Progr. level	Display screen	Min. value	Max. value	Factory setting	Type or location of fault
7	A01	0	2	0	Enclosure door open
8	A02	0	2	0	Internal temperature of enclosure too high
9	A08	0	2	1	Condensate warning
10	A10	0	2	1	Fan blocked or defective
11	A16	0	2	1	Internal temperature sensor
12	A18	0	2	1	EPROM
13	A19	0	2	0	LAN/Master-Slave
14	A20	0	2	0	Voltage drop

Tab. 5: System messages which may be evaluated via relays

The system messages A01 – A20 may additionally be evaluated via two floating system message relays. In this way, one of the two system message relays may be allocated to each system message. (System message relays with change-over and normally open contact: See wiring diagrams at "4.7.2 Installing the power supply", page 15:

- Terminal 3: NC (normally closed)
- Terminal 4: C (connection of the supply voltage to the system message relay)
- Terminal 5: NO (normally opened)

The NC and NO definitions refer to the de-energised state. As soon as power is applied to the air/water heat exchanger, the system message relay picks up, so that the relay contacts change status (contact 3 – 4 open; contact 4 – 5 closed). This is the normal operating state of the air/water heat exchanger. As soon as a system message occurs or the power supply is interrupted, the relay drops out.

Program system messages with the value

- 0: System message is not sent to the system message relay, but merely appears in the display
- 1: System message is evaluated by relay 1
- 2: System message is evaluated by relay 2

### 6.2.7 Setting the master-slave identifier

When several air/water heat exchangers are connected together (maximum ten), one of the air/water heat exchangers must be defined as the "master" and the others as "slaves". For this purpose, assign a corresponding identifier (address) to each air/water heat exchanger which will enable the air/water heat exchanger to be identified in the network. If one of the slave units reaches the set temperature or if the door limit switch function is activated, the affected slave unit will report to the master unit, which then deactivates all the other air/water heat exchangers.



#### Notes:

- Only one unit may be configured as master, and its identifier must match the number of connected slave units.
- The slave units must have different identifiers.
- The identifiers must be numbered in ascending order without any gaps.



## 6 Operation

EN

### On the **master air/water heat exchanger**

(00 = factory setting), set the number of slave units present in the network:

- 01: Master with 1 slave air/water heat exchanger
- 02: Master with 2 slave air/water heat exchangers
- 03: Master with 3 slave air/water heat exchangers
- 04: Master with 4 slave air/water heat exchangers
- 05: Master with 5 slave air/water heat exchangers
- 06: Master with 6 slave air/water heat exchangers
- 07: Master with 7 slave air/water heat exchangers
- 08: Master with 8 slave air/water heat exchangers
- 09: Master with 9 slave air/water heat exchangers

### On the **slave air/water heat exchanger**

(00 = factory setting), set its own address:

- 11: Slave air/water heat exchanger no. 1
- 12: Slave air/water heat exchanger no. 2
- 13: Slave air/water heat exchanger no. 3
- 14: Slave air/water heat exchanger no. 4
- 15: Slave air/water heat exchanger no. 5
- 16: Slave air/water heat exchanger no. 6
- 17: Slave air/water heat exchanger no. 7
- 18: Slave air/water heat exchanger no. 8
- 19: Slave air/water heat exchanger no. 9

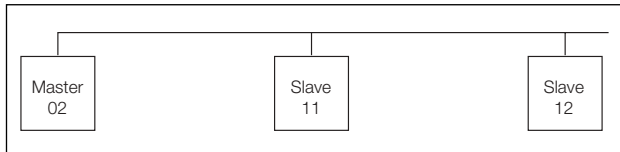


Fig. 18: Master-slave connection (example)

For further connection examples, see “4.7.1 Bus connection (only when interconnecting several units with a Comfort controller)”, page 13.

For details of how to set the identifier, see “6.2.4 Editable parameters”, page 21 or “6.2.5 Programming overview”, page 22, parameter “Ad”.

### 6.2.8 Evaluating system messages

In the Comfort controller, system messages are indicated by a number in the display.

Display screen	System message	Possible cause	Measures to rectify the fault
A01	Enclosure door open	Door open or door limit switch incorrectly positioned	Close door, position door limit switch correctly, check connection if necessary
A02	Internal temperature of enclosure too high	Cooling capacity inadequate/unit undersized	Check cooling capacity
A08	Condensate warning	Condensate discharge kinked or blocked	Check condensate drainage; repair any kinks or blockages in the hose
A10	Fan	Blocked or defective	Clear the blockage; replace if necessary
A16	Internal temperature sensor	Open or short-circuit	Replace
A18	EPROM error	New board obstructed	Software update needed (only following board installation with more recent software): Enter the programming level with Code 22; press button 1 and confirm with “Set” until “Acc” appears. Next, disconnect the unit from the mains and reconnect.
A19	LAN/Master-Slave	Master and slave not connected	Check setting and/or cable
A20	Voltage drop	Error display not shown	Event is stored in the log file
E0	Display message	Connection problem between the display and the controller board	Reset: Switch power supply off, then switch on again after approx. two seconds
		Cable defective; connection loose	Exchange the boards

Tab. 6: Troubleshooting with the Comfort controller



## 7 Inspection and maintenance



### Risk of electric shock!

The unit is live. Switch off the power supply before opening, and take suitable precautions against it being accidentally switched on again.

### 7.1 General

The air/water heat exchanger is a maintenance-free, hermetically sealed system. The water circuit is checked at the factory for leaks and subjected to a function trial run.

The installed maintenance-free fan is mounted on ball bearings, protected against moisture and dust, and fitted with a temperature monitor. The life expectancy is at least 30,000 operating hours. The air/water heat exchanger is consequently largely maintenance free. If dirt is present in the cooling water, a filter must be fitted.

Maintenance interval: 2,000 operating hours.



### Note!

### Risk of fire!

Never use flammable liquids for cleaning.

Sequence of maintenance measures:

- Check the level of dirt.
- Activate test mode; cooling function OK?
- Check noise generation of compressor and fans.

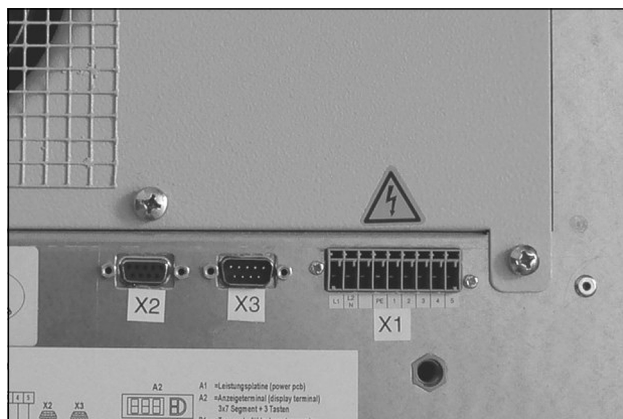


Fig. 19: Disconnect the mains plug (X1)



Fig. 20: Remove the fastening screws for the cover with fan

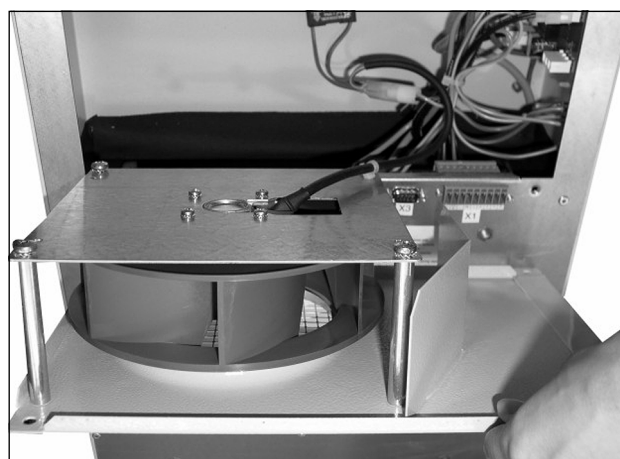


Fig. 21: Remove the cover with fan

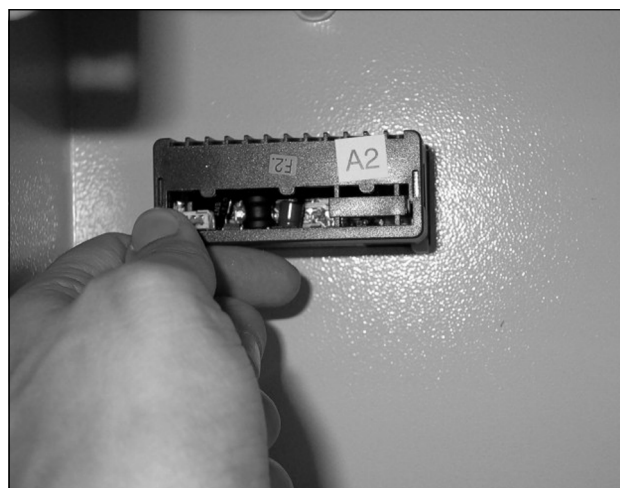


Fig. 22: Disconnect the connector from the display

## 8 Storage and disposal

EN



Fig. 23: Disconnect the earthing cable

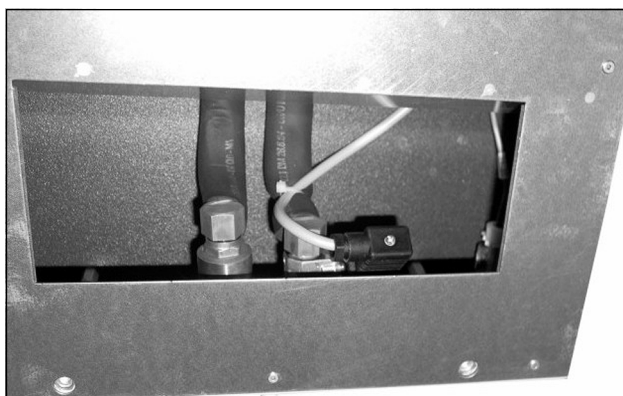


Fig. 24: Check the cooling water connections

### 8 Storage and disposal



#### Note! Risk of damage!

**The air/water heat exchanger must not be subjected to temperatures above +70°C during storage.**

During storage, the air/water heat exchanger must stand upright.

Disposal can be performed at the Rittal plant. Please contact us for advice.

#### Emptying:

During storage and transportation below freezing point, the air/water heat exchanger should be drained completely in the water supply direction using compressed air. This requires that the magnetic valve be opened.

For the Basic controller: keep the rubberised potentiometer display (5) pressed for ten seconds (for access to the potentiometer, see also 6.1.3).

For the Comfort controller, this is achieved by simultaneously pressing the H2 (°C key) and H4 (/set key) keys for five seconds. The magnetic valve is then opened for approximately five minutes.

## 9 Technical specifications

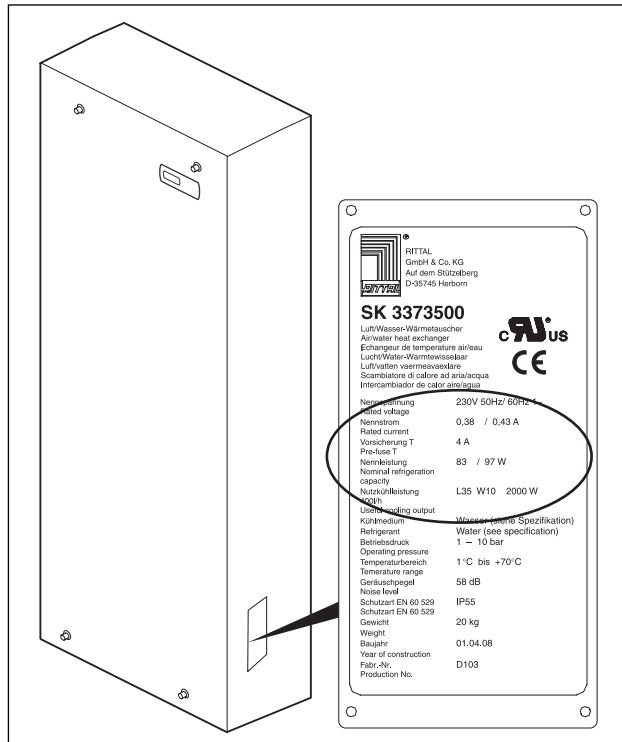


Fig. 25: Rating plate (technical data)

- Observe the mains connection data (voltage and frequency) as per the rating plate.
- Observe the pre-fuse as per the specifications on the rating plate.

	Unit	Model No. SK					
Basic controller, RAL 7035	–	3363.100	3363.110	3363.140	3363.104	3363.114	3363.144
Comfort controller, RAL 7035	–	3363.500	3363.510	3363.540	3363.504	3363.514	3363.544
Rated voltage	V Hz	230, 1~, 50/60	115, 1~, 50/60	400, 2~, 50/60	230, 1~, 50/60	115, 1~, 50/60	400, 2~, 50/60
Rated current	A	0.17/0.18	0.35/0.4	0.09/0.1	0.17/0.18	0.35/0.4	0.09/0.1
Pre-fuse T	A	6.0/6.0	6.0/6.0	6.0/6.0	6.0/6.0	6.0/6.0	6.0/6.0
Motor circuit-breaker	–	–	–	–	–	–	–
Transformer circuit-breaker	–	–	–	–	–	–	–
Miniature circuit-breaker	–	■	■	■	■	■	■
Useful cooling output $\dot{Q}_k$ to DIN 3168 L 35 W 10	W	500			375		
Volumetric flow	l/h	400			400		
Admissible pressure	bar	1 to 10					
Water inlet temperature	°C	+1 to ±30					
Temperature setting range	°C	+1 to +70					
Noise level	dB (A)	58					
Type of connection	–	Plug-in terminal strip					
Protection category to EN 60 529	–	IP 55					
Dimensions (W x H x D)	mm	280 x 550 x 92					
Air throughput of the fans (unimpeded air flow)	m³/h	270/320					
Weight	kg	12					

## 9 Technical specifications

EN

	Unit	Model No. SK					
<b>Basic controller, RAL 7035</b>	–	<b>3364.100</b>	<b>3364.110</b>	<b>3364.140</b>	<b>3364.104</b>	<b>3364.114</b>	<b>3364.144</b>
<b>Comfort controller, RAL 7035</b>	–	<b>3364.500</b>	<b>3364.510</b>	<b>3364.540</b>	<b>3364.504</b>	<b>3364.514</b>	<b>3364.544</b>
Rated voltage	V Hz	230, 1~, 50/60	115, 1~, 50/60	400, 2~, 50/60	230, 1~, 50/60	115, 1~, 50/60	400, 2~, 50/60
Rated current	A	0.2/0.19	0.4/0.38	0.12/0.11	0.2/0.19	0.4/0.38	0.12/0.11
Pre-fuse T	A	6.0/6.0	6.0/6.0	6.0/6.0	6.0/6.0	6.0/6.0	6.0/6.0
Motor circuit-breaker	–	–	–	–	–	–	–
Transformer circuit-breaker	–	–	–	–	–	–	–
Miniature circuit-breaker	–	■	■	■	■	■	■
Useful cooling output $\dot{Q}_k$ to DIN 3168 L 35 W 10	W	1000			750		
Volumetric flow	l/h	400			400		
Admissible pressure	bar	1 to 10					
Water inlet temperature	°C	+1 to ±30					
Temperature setting range	°C	+1 to +70					
Noise level	dB (A)	58					
Type of connection	–	Plug-in terminal strip					
Protection category to EN 60 529	–	IP 55					
Dimensions (W x H x D)	mm	280 x 550 x 142					
Air throughput of the fans (unimpeded air flow)	m³/h	270/320					
Weight	kg	15					

	Unit	Model No. SK					
<b>Basic controller, RAL 7035</b>	–	<b>3373.100</b>	<b>3373.110</b>	<b>3373.140</b>	<b>3373.104</b>	<b>3373.114</b>	<b>3373.144</b>
<b>Comfort controller, RAL 7035</b>	–	<b>3373.500</b>	<b>3373.510</b>	<b>3373.540</b>	<b>3373.504</b>	<b>3373.514</b>	<b>3373.544</b>
Rated voltage	V Hz	230, 1~, 50/60	115, 1~, 50/60	400, 2~, 50/60	230, 1~, 50/60	115, 1~, 50/60	400, 2~, 50/60
Rated current	A	0.38/0.43	0.75/0.85	0.22/0.25	0.38/0.43	0.75/0.85	0.22/0.25
Pre-fuse T	A	6.0/6.0	6.0/6.0	6.0/6.0	6.0/6.0	6.0/6.0	6.0/6.0
Motor circuit-breaker	–	–	–	–	–	–	–
Transformer circuit-breaker	–	–	–	–	–	–	–
Miniature circuit-breaker	–	■	■	■	■	■	■
Useful cooling output $\dot{Q}_k$ to DIN 3168 L 35 W 10	W	2000			1500		
Volumetric flow	l/h	400			400		
Admissible pressure	bar	1 to 10					
Water inlet temperature	°C	+1 to ±30					
Temperature setting range	°C	+1 to +70					
Noise level	dB (A)	58					
Type of connection	–	Plug-in terminal strip					
Protection category to EN 60 529	–	IP 55					
Dimensions (W x H x D)	mm	400 x 950 x 142					
Air throughput of the fans (unimpeded air flow)	m³/h	600/625					
Weight	kg	20					

## 9 Technical specifications

EN

	Unit	Model No. SK					
Basic controller, RAL 7035	–	3374.100	3374.110	3374.140	3374.104	3374.114	3374.144
Comfort controller, RAL 7035	–	3374.500	3374.510	3374.540	3374.504	3374.514	3374.544
Rated voltage	V Hz	230, 1~, 50/60	115, 1~, 50/60	400, 2~, 50/60	230, 1~, 50/60	115, 1~, 50/60	400, 2~, 50/60
Rated current	A	0.57/0.78	1.15/1.55	0.35/0.45	0.57/0.78	1.15/1.55	0.35/0.45
Pre-fuse T	A	6.0/6.0	6.0/6.0	6.0/6.0	6.0/6.0	6.0/6.0	6.0/6.0
Motor circuit-breaker	–	–	–	–	–	–	–
Transformer circuit-breaker	–	–	–	–	–	–	–
Miniature circuit-breaker	–	■	■	■	■	■	■
Useful cooling output $\dot{Q}_k$ to DIN 3168 L 35 W 10	W	3000			2250		
Volumetric flow	l/h	400			400		
Admissible pressure	bar	1 to 10					
Water inlet temperature	°C	+1 to ±30					
Temperature setting range	°C	+1 to +70					
Noise level	dB (A)	58					
Type of connection	–	Plug-in terminal strip					
Protection category to EN 60 529	–	IP 55					
Dimensions (W x H x D)	mm	400 x 950 x 142					
Air throughput of the fans (unimpeded air flow)	m³/h	700/730					
Weight	kg	20					

	Unit	Model No. SK		
<b>Basic controller, RAL 7035</b>	–	<b>3375.100</b>	<b>3375.110</b>	<b>3375.140</b>
<b>Comfort controller, RAL 7035</b>	–	<b>3375.500</b>	<b>3375.510</b>	<b>3375.540</b>
Rated voltage	V Hz	230, 1~, 50/60	115, 1~, 50/60	400, 2~, 50/60
Rated current	A	1.0/1.35	2.0/2.7	0.60/0.80
Pre-fuse T	A	6.0/6.0	6.0/6.0	6.0/6.0
Motor circuit-breaker	–	–	–	–
Transformer circuit-breaker	–	–	–	–
Miniature circuit-breaker	–	■	■	■
Useful cooling output $\dot{Q}_k$ to DIN 3168 L 35 W 10	W	5000		
Volumetric flow	l/h	400		
Admissible pressure	bar	1 to 10		
Water inlet temperature	°C	+1 to ±30		
Temperature setting range	°C	+1 to +70		
Noise level	dB (A)	60		
Type of connection	–	Plug-in terminal strip		
Protection category to EN 60 529	–	IP 55		
Dimensions (W x H x D)	mm	450 x 1400 x 250		
Air throughput of the fans (unimpeded air flow)	m³/h	2365/2750		
Weight	kg	56		

## 10 List of spare parts

### 10 List of spare parts

SK 3363.xxx

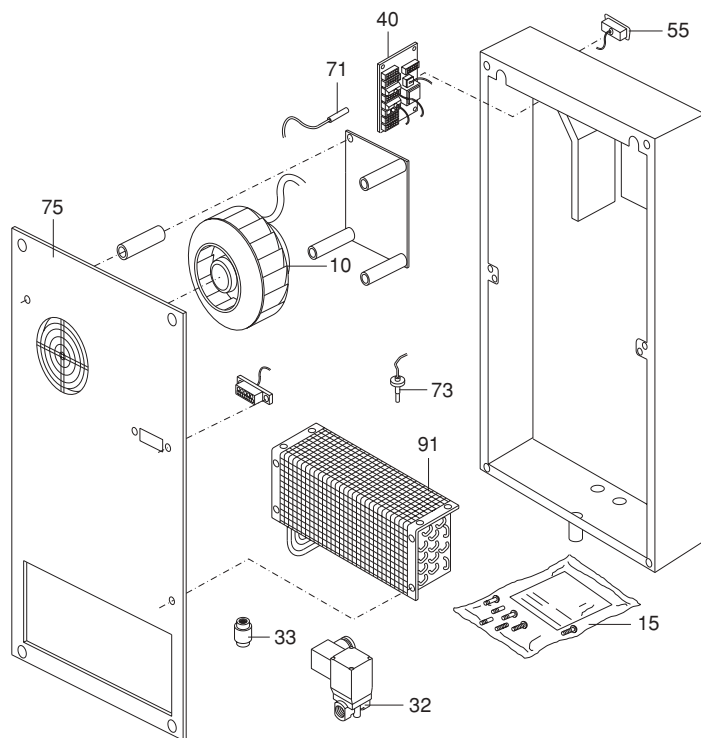


Fig. 26: Spare parts for SK 3363.xxx

SK 3364.xxx

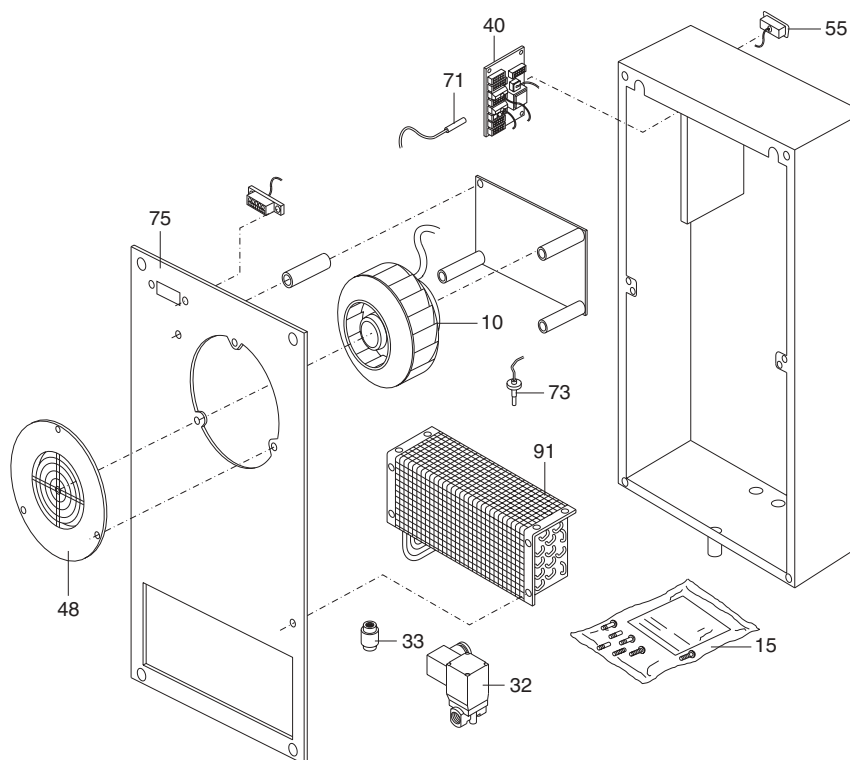


Fig. 27: Spare parts for SK 3364.xxx

SK 3373.xxx, SK 3374.xxx

SK 3375.xxx

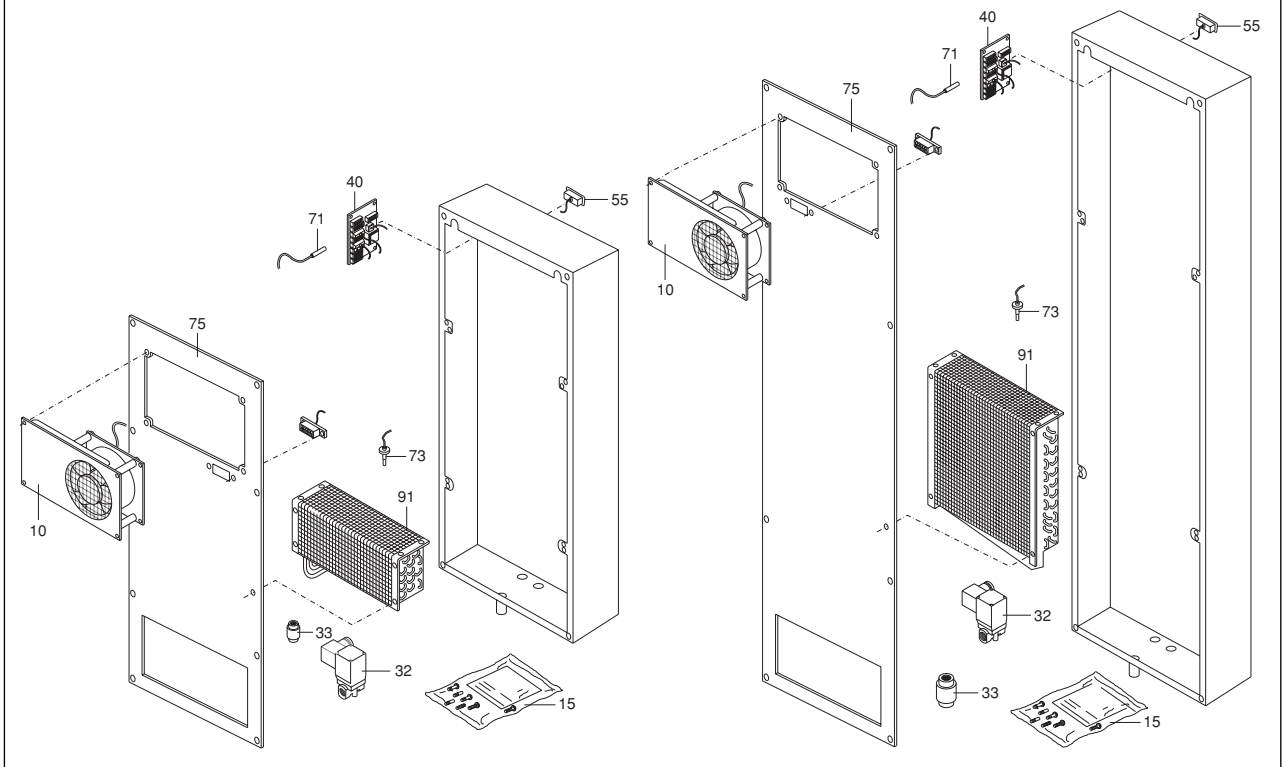


Fig. 28: Spare parts for SK 3373.xxx/SK 3374.xxx and SK 3375.xxx

## Legend

- 10 Fan, complete
- 15 Dispatch bag
- 32 Magnetic valve, complete
- 33 Non-return valve
- 40 Controller board
- 55 Display
- 71 Temperature sensor
- 73 Leak detection
- 75 Enclosure tray
- 91 Heat exchanger



## Note:

As well as the spare part number, when ordering spare parts the following information must be provided:

- Unit model
- Fabrication number
- Date of manufacture

This information may be found on the rating plate.



# 11 Further technical information

## 11 Further technical information

### 11.1 Hydrological data

To avoid system damage and to ensure safe operation, Rittal GmbH & Co. KG recommends the use of system water or an additive whose composition does not differ from that presented in the following summary:

Hydrological data	Unit	Model No. SK	Model No. SK <sup>1)</sup>
	–	3363.100/.110/.140/.500/.510/.540 3364.100/.110/.140/.500/.510/.540 3373.100/.110/.140/.500/.510/.540 3376.100/.110/.140/.500/.510/.540	3363.104/.114/.144/.504/.514/.544 3364.104/.114/.144/.504/.514/.544 3373.104/.114/.144/.504/.514/.544 3376.104/.114/.144/.504/.514/.544
pH value		7 – 8.5	6 – 9
Calcium hardness	°dH	3 < 8	1 – 12
Free carbonic acid	mg/dm <sup>3</sup>	8 – 15	1 – 100
Corresponding carbonic acid	mg/dm <sup>3</sup>	8 – 15	Zero
Aggressive carbonic acid	mg/dm <sup>3</sup>	0	0 – 400
Sulphides	mg/dm <sup>3</sup>	Zero	Zero
Oxygen	mg/dm <sup>3</sup>	< 10	< 10
Chloride ions	mg/dm <sup>3</sup>	< 50	< 200
Sulphate ions	mg/dm <sup>3</sup>	< 250	< 500
Nitrates and nitrites	mg/dm <sup>3</sup>	< 10	< 100
COD	mg/dm <sup>3</sup>	< 7	< 40
Ammonia	mg/dm <sup>3</sup>	< 5	< 20
Iron	mg/dm <sup>3</sup>	< 0.2	Zero
Manganese	mg/dm <sup>3</sup>	< 0.2	Zero
Conductivity	µS/cm	< 2200	< 4000
Evaporation residue	mg/dm <sup>3</sup>	< 500	< 2000
Potassium permanganate	mg/dm <sup>3</sup>	< 25	< 40
Suspended matter	mg/dm <sup>3</sup>	< 3	
	mg/dm <sup>3</sup>	> 3 < 15; partial current purification recommended	
	mg/dm <sup>3</sup>	> 15; continuous purification recommended	

<sup>1)</sup> The complete absence of corrosion under experimental conditions suggests that solutions with a significantly higher salt content and greater corrosion potential (such as seawater) can still be tolerated.

Tab. 7: Hydrological data



## 11.2 Characteristic curves

### 11.2.1 Water resistance

EN

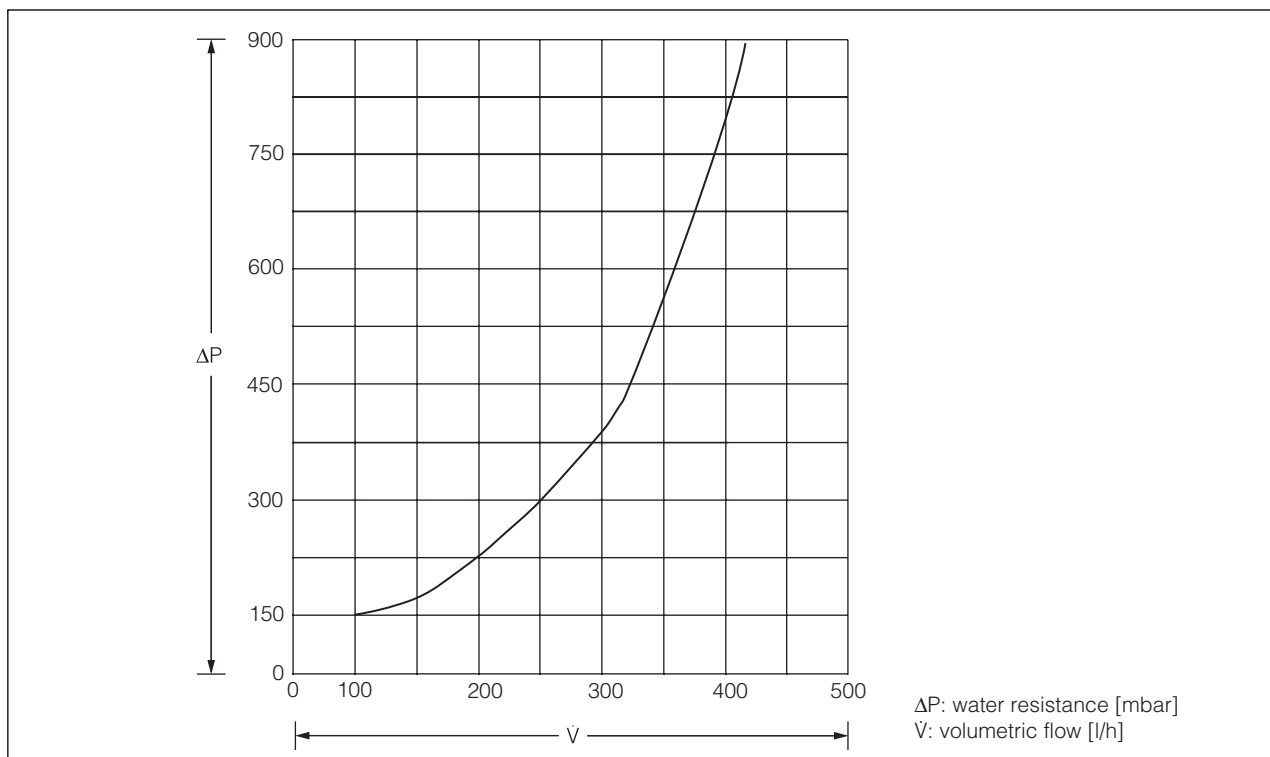


Fig. 29: Water resistance SK 3363.xxx

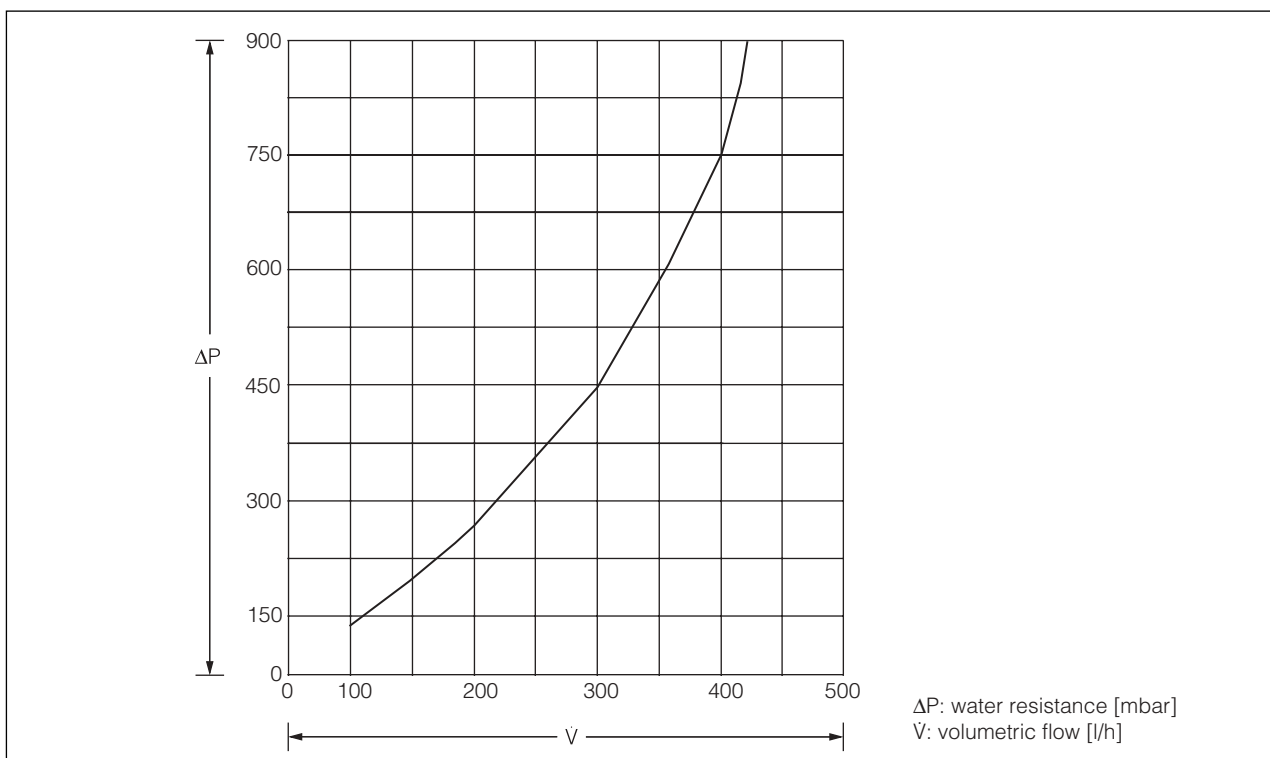


Fig. 30: Water resistance SK 3364.xxx

# 11 Further technical information

EN

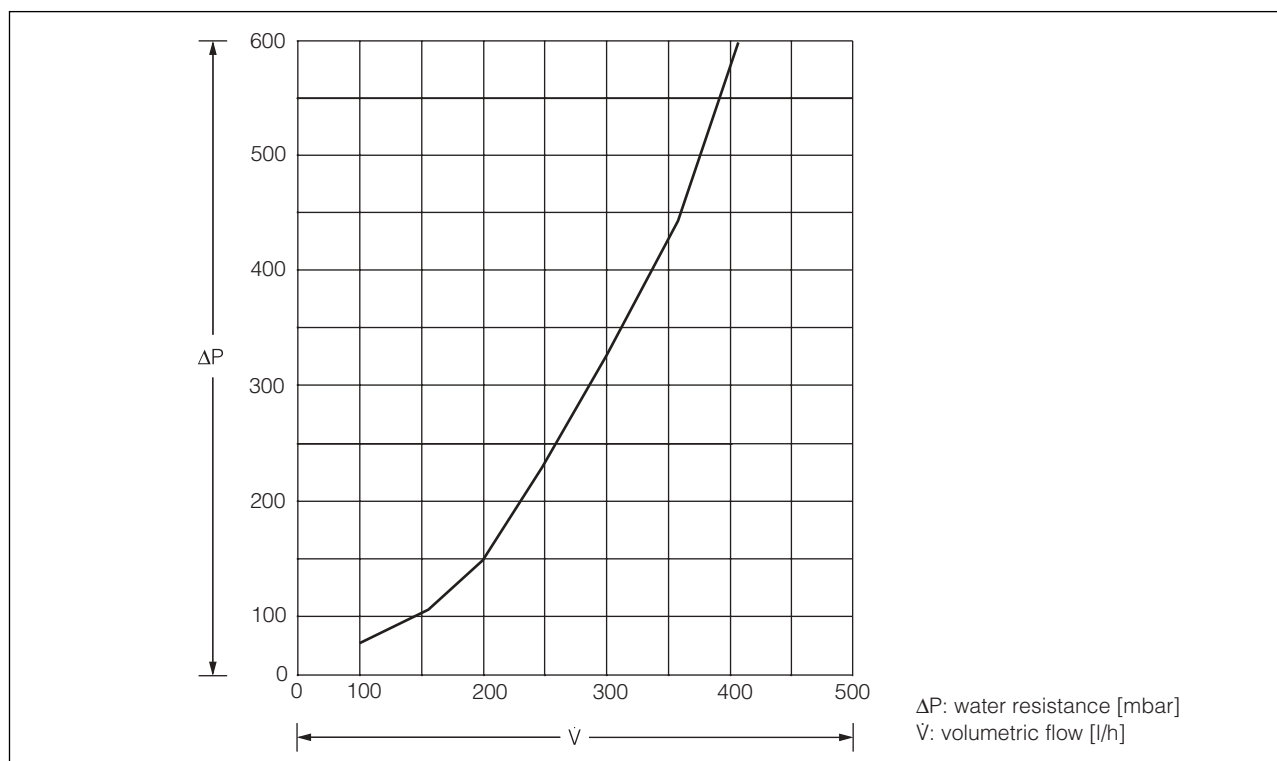


Fig. 31: Water resistance SK 3373.xxx

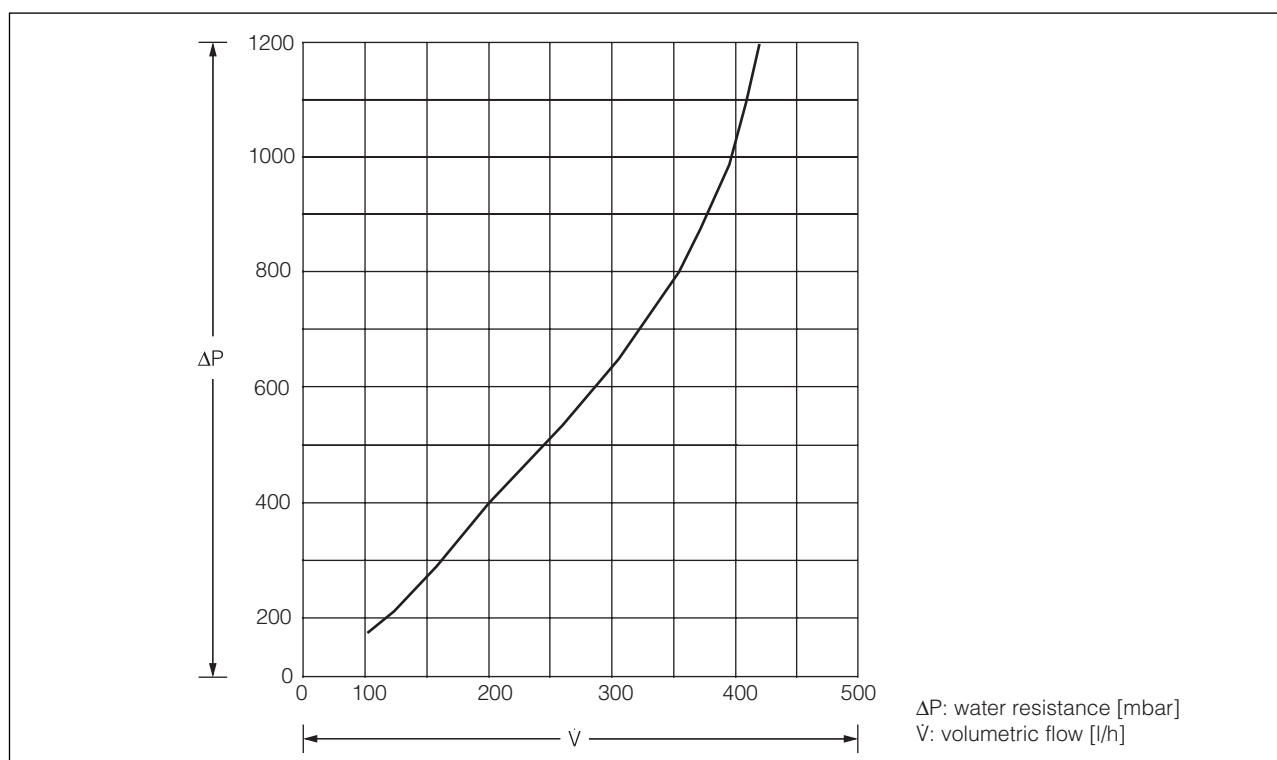


Fig. 32: Water resistance SK 3374.xxx

## 11 Further technical information

EN

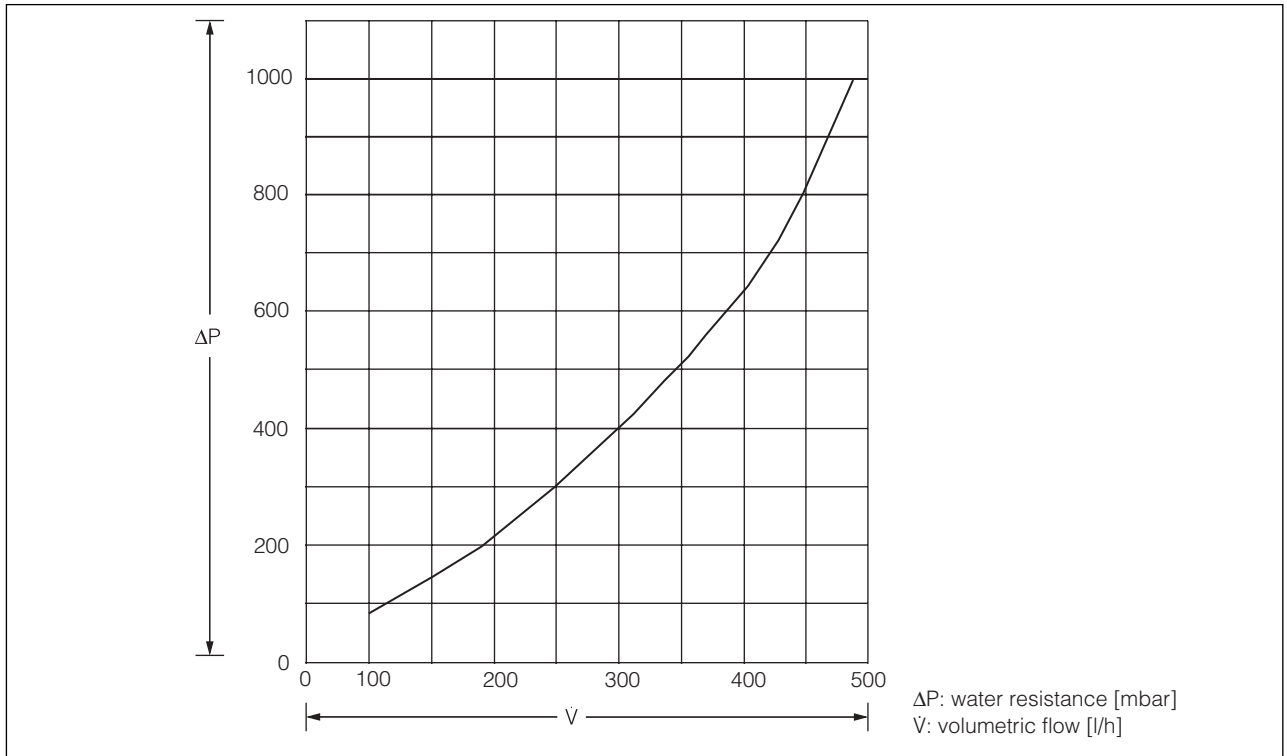


Fig. 33: Water resistance SK 3375.xxx

# 12 Appendix 1: Cut-out and hole sizes

## 12 Appendix 1: Cut-out and hole sizes

### 12.1 Dimensions for external mounting

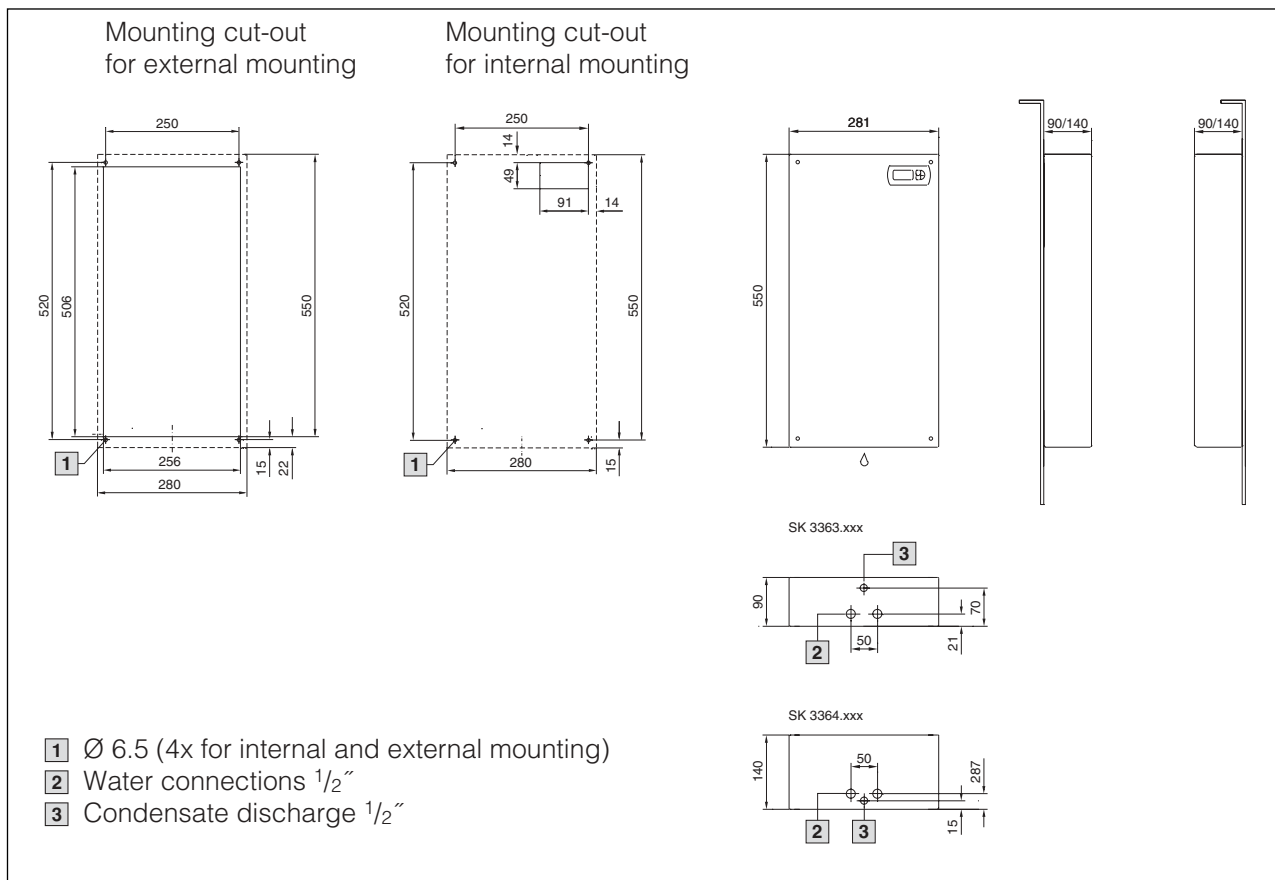


Fig. 34: SK 3363.xxx/SK 3364.xxx external mounting

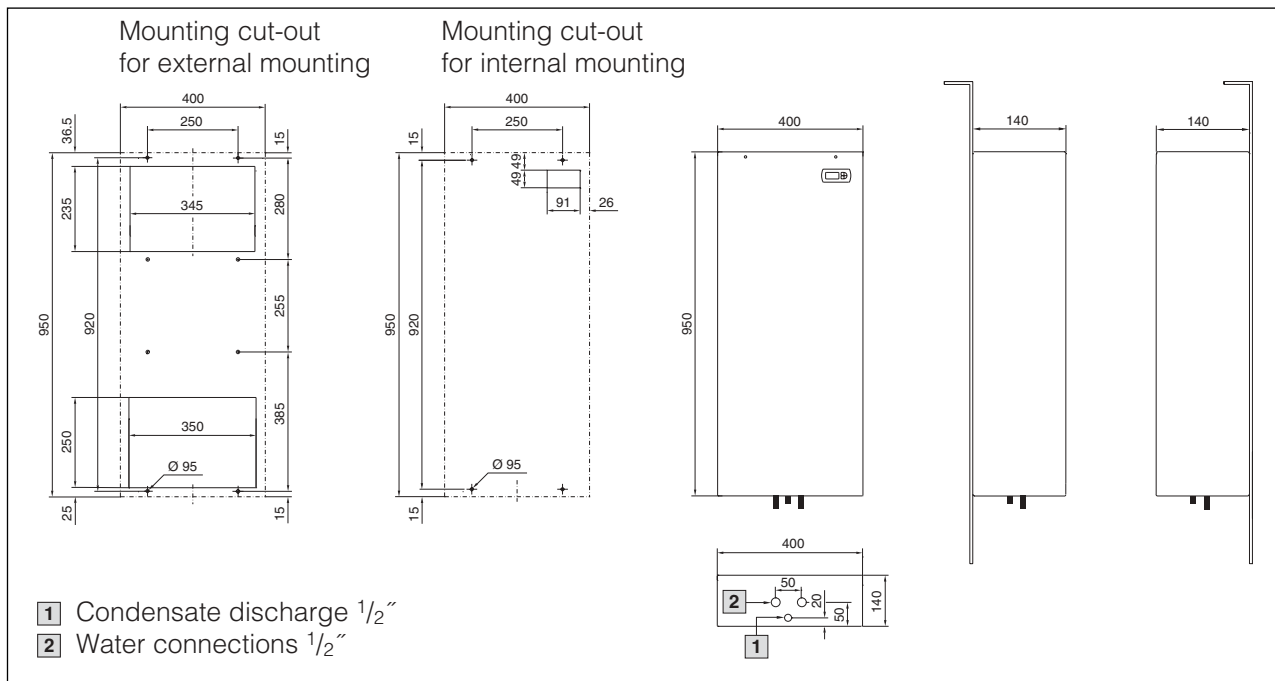


Fig. 35: SK 3373.xxx/SK 3374.xxx external mounting

## 12 Appendix 1: Cut-out and hole sizes

EN

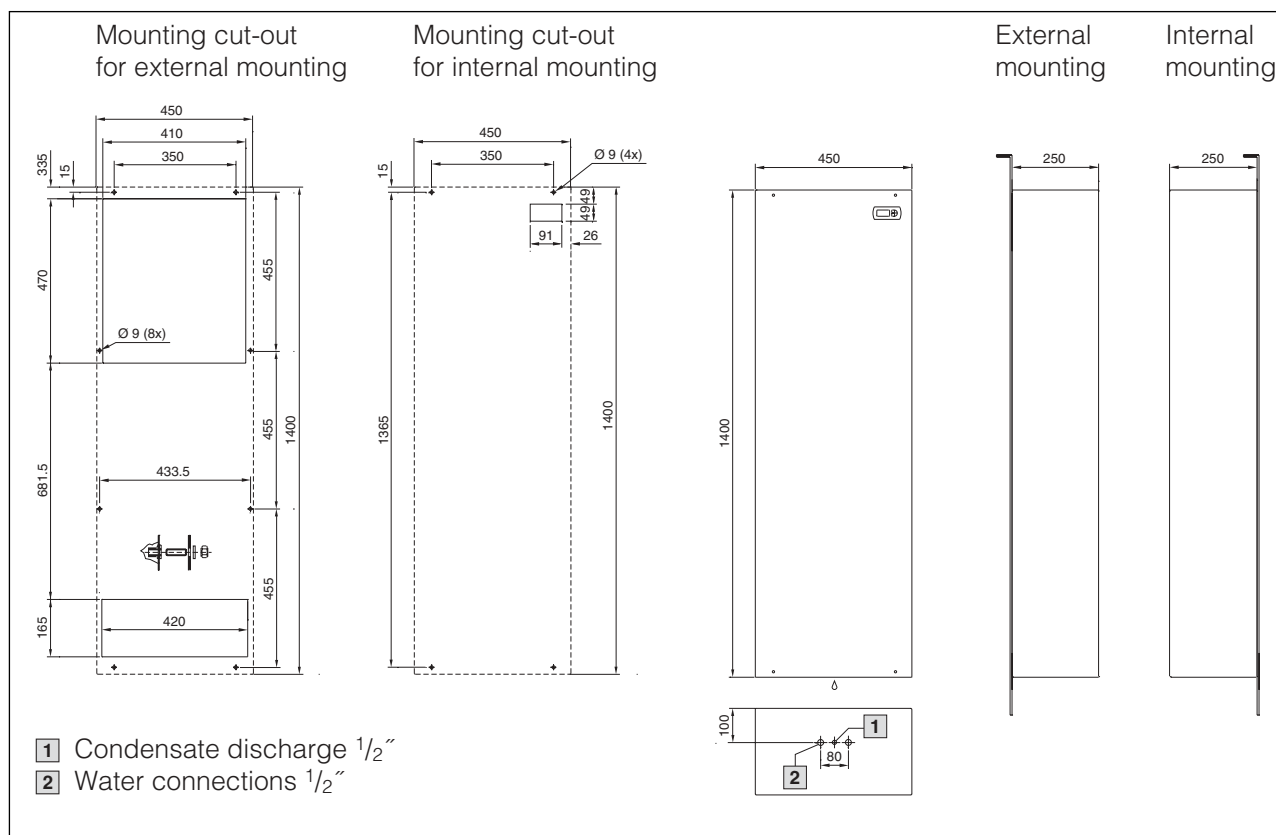


Fig. 36: SK 3375.xxx

## 13 Appendix 2: Preparation and maintenance of the water

### 13 Appendix 2:

#### Preparation and maintenance of the water in recooling systems

Depending on the type of installation to be cooled, certain requirements are placed on the cooling water with respect to purity. According to the level of contamination and the size and design of the recooling systems, a suitable process is used to prepare and/or maintain the water.

The most common types of contamination and most frequently used techniques to eliminate them in industrial cooling are:

Contamination of the water	Procedure
Mechanical contamination	Filter the water using: <ul style="list-style-type: none"><li>– Mesh filter</li><li>– Gravel filter</li><li>– Cartridge filter</li><li>– Precoated filter</li></ul>
Excessive hardness	Softening of the water via ion exchange
Moderate content of mechanical contaminants and hardness components	Addition of stabilisers and/or dispersing agents to the water
Moderate content of chemical contaminants	Addition of passifiers and/or inhibitors to the water
Biological contaminants, slime bacteria and algae	Addition of biocides to the water

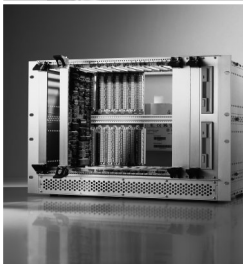
Tab. 8: Water contaminants



Schaltschrank-Systeme  
Industrial Enclosures  
Coffrets et armoires électriques  
Kastsystemen  
Apparatskåpssystem  
Armadi per quadri di comando  
Sistemas de armarios  
インダストリアル エンクロージャー



Stromverteilung  
Power Distribution  
Distribution de courant  
Stroomverdeling  
Strömfördelning  
Distribuzione di corrente  
Distribución de corriente  
分電・配電システム



Elektronik-Aufbau-Systeme  
Electronic Packaging  
Electronique  
Electronic Packaging Systems  
Electronic Packaging  
Contenitori per elettronica  
Sistemas de montaje para la electrónica  
エレクトロニクス パッケージシステム



System-Klimatisierung  
System Climate Control  
Climatisation  
Systeemklimatisering  
Systemklimatisering  
Soluzioni di climatizzazione  
Climatización de sistemas  
温度管理システム



IT-Solutions  
IT Solutions  
Solutions IT  
IT-Solutions  
IT-lösningar  
Soluzioni per IT  
Soluciones TI  
ITソリューション



Communication Systems  
Communication Systems  
Armoires outdoor  
Outdoor-behuizingen  
Communication Systems  
Soluzioni outdoor  
Sistemas de comunicación  
コミュニケーションシステム

Rittal GmbH & Co. KG · Postfach 1662 · D-35726 Herborn  
 Telephone +49(0)2772 505-0 · Telefax +49(0)2772 505-2319 · eMail: info@rittal.de · www.rittal.com



**Switch to perfection** **RITTAL**

2nd  
 edition  
 05/09  
 (09/06)