

Rittal – The System.

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Compact cooling unit

3370.22X 3370.52X
3370.32X 3370.62X
3370.37X 3370.72X
3370.42X
1194.42X 1194.55X
1194.62X 1194.72X

Assembly and operating instructions

ENCLOSURES

POWER DISTRIBUTION

CLIMATE CONTROL

IT INFRASTRUCTURE

SOFTWARE & SERVICES

FRIEDHELM LOH GROUP



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EN

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1 Application

Enclosure cooling units are designed and built to dissipate heat from enclosures by cooling the air inside the enclosure and protecting temperature sensitive components.

2 Technical data

See nameplate

3 Assembly

The standard wall-mounted unit is suitable for external mounting. Cut out the sections and drill according to the drawing.

Cut the enclosed seals to the required length and attach to the unit. Screw tapped pins into the blind nuts on the rear of the unit. The unit is then to be secured using washers and nuts

4 Safety notes

The following safety notices are to be observed in their entirety for the correct use of the equipment:

- To prevent the enclosure with the cooling unit fitted tipping over, it is essential that this be bolted to the floor.
- A roller door is to be used to ensure problem free opening and closing of the enclosure door.
- A transportable enclosure with built-in cooling unit may only be produced if an additional transport anchorage to support the cooling unit is used.
Prior to mounting, ensure that:
 - the site for the enclosure, and hence the arrangement to the cooling unit, is selected so as to ensure good ventilation;
 - the location is free from excessive dirt and moisture,
 - the cutout for air extraction is located in the upper area of the enclosure;
 - the mains connection ratings, as stated on the rating plate, are available;
 - the ambient temperature does not exceed +50°C;
 - The packaging shows no signs of damage. Traces of oil on damaged packaging are an indication of refrigerant loss and of leakage in the unit system. Any damage to the packaging may be the cause of subsequent malfunctions:
 - the enclosure is sealed on all sides. Condensation will occur if the enclosure is leaky;
 - the separation of the units from one another and from the wall should not be less than 200mm;
 - air inlet and outlet are not obstructed on the inside of the enclosure;
 - units are only fitted horizontally in the specified position. Max. deviation from the true horizontal: 2°
 - condensate drainage is provided
 - electrical connection and repair are carried out only by authorized personnel

- Use only original replacement parts and accessories.
- Losses from the components installed in the enclosure must not exceed the specific refrigeration capacity of the cooling unit itself;
- The customer may not modify the cooling unit in any way.

5 Commencing operation and control behavior

Following the completion of mounting and a waiting period of approximately 30 minutes (to allow oil to collect in the compressor in order to ensure lubrication and cooling).

5.1 Controller control

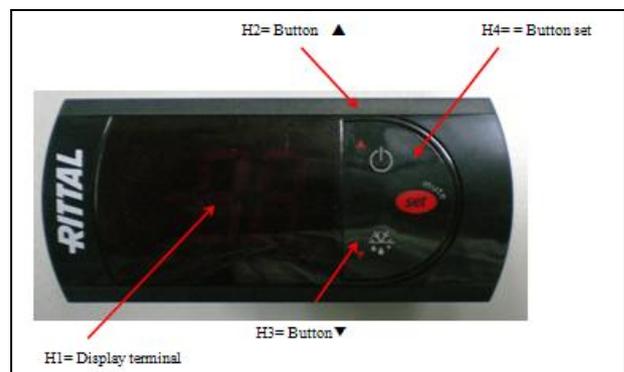


Figure 1: Controller

After electrical connection the internal fan turns on and circulates the enclosure air. This helps assure even temperature distribution within the enclosure. The condenser fan and compressor are controlled by the controller. The minimum time is 3 minutes to restart the compressor after it has switched off. The switching difference is 5 K. To avoid short switching cycles and hence the danger of inadequate or only partial cooling in some sections of the enclosure, The switching difference should be set to be only as low as necessary. For economic reasons (energy saving), the nominal value of the internal enclosure temperature T_i should also be set to be only as low as necessary.

5.1.1 Operation of the controller

The display terminal H1 consists of a 3 position 7-segment display which indicates the internal enclosure temperature in °C as well as any fault codes. The actual enclosure internal temperature is constantly displayed on H1. When a system message is generated, this alternates in the display with the current internal enclosure temperature.

5 Commencing operation and control behavior

5.1.2 Editable parameters

Param. Type	Display screen	Parameter	Min. value	Max. value	Factory setting	Description
F	PS	Password	0	99	22	Protection code for modifying the configuration parameters (default=22). The value of the password can be customized from the supervisor
S	St	Setpoint	r1	r2	35	:r1 minimum value and r2 maximum value of the set point. Parameter St determines the desired temperature to be maintained inside the cabinet or cold room (set point).
F	rd	Regulation differential	0	+19	5	Value that is added to (or subtracted from, in 'reverse' mode) the temperature set point. <i>rd= low values:</i> <ul style="list-style-type: none"> more precise temperature control; high compressor On/Off switching frequency in the event of minimum. Temperature deviations (with the risk of causing damage). <i>rd= high values:</i> <ul style="list-style-type: none"> less precise temperature control; low compressor On/Off switching frequency in the event of minimum temperature deviations. Important: the compressor can also be safeguarded using the parameters that limit the number of activations/hour and the minimum off time
C	r1	Setpoint min. value	20	r2	30	r1 & r2 :set the range of temperatures for setting the set point.
C	r2	Setpoint max. value	r1	50	45	
C	cc	Continuous cycle period	0	15	1 (hours)	?
C	A0	Alarm and fan differential	-20	+20	2	See chapter 5.2
F	AH	Alarm maximum temp.	-50	+99	10	See chapter 5.2
C	Ad1	Delay for high and low temp. alarm	0	199	30	Delay for high temperature alarm when power on just before. When alarm condition is achieved but power on just before , the timer start to count for a specify value (Ad1). Only the time elapsed, alarm relay can be active

5.1.3 Parameter navigation

The operating parameters, modifiable using the keypad, are divided into two types: frequent (type F) and configuration (type C). Access to the latter is protected by password (default= 22) to prevent accidental or un-authorized modifications.

Accessing the type F parameters:

- Press the SET button for more than 3 s (if there are active alarms, mute the buzzer), the display shows the parameter code 'PS' (password);
- use the UP and DOWN buttons to scroll the parameters. The LED corresponding to the category of parameters will be on (see parameters list)

- press SET to display the value associated with the parameter increase or decrease the value using the UP or DOWN button respectively;
- press SET to temporarily save the new value and display the parameter again; repeat the procedure for any other parameters that need to be modified;
- press the SET button for more than 3 s to permanently save the parameters and exit the parameter setting procedure.

Accessing the type C parameters:

- Press the SET button for more than 3 s (if there are active alarms, mute the buzzer), the display shows the parameter code "PS" (password);

5 Commencing operation and control behavior

- press the SET button to access the password setting; use the UP and DOWN buttons to scroll the numbers until displaying "22" (password to access the parameters);
- press the SET button to confirm the password ;
- use the UP and DOWN buttons to scroll the parameters. The LED corresponding to the category of parameters will be on (see Below Table);
- press SET to display the value associated with the parameter increase or decrease the value using the UP or DOWN button respectively;
- press SET to temporarily save the new value and display the parameter again;
- repeat the procedure for any other parameters that need to be modified;
- press the SET button for more than 3 s to permanently save the parameters and exit the parameter setting procedure.

Accessing the type S parameters:

- press SET for 1 s, the set value will start flashing;
- increase or decrease the value using UP or DOWN;
- press SET to confirm the new value.

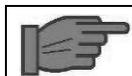
5.1.4 Setting the target temperature

The temperature is preset at the factory to 35°C.

- press SET for 1 s, the set value will start flashing;
- increase or decrease the value using UP or DOWN;
- press SET to confirm the new value.

5.1.5 Setting the temperature range

- Press the SET button for more than 3 s (if there are active alarms, mute the buzzer), the display shows the parameter code "PS" (password);
- press the SET button to access the password setting; use the UP and DOWN buttons to scroll the numbers until displaying "22" (password to access the parameters);
- press the SET button to confirm the password; use the UP and DOWN buttons to scroll the parameters.
- press SET to display the value associated with the parameter increase or decrease the value using the UP or DOWN button respectively;
- press SET to temporarily save the new value and display the parameter again;
- repeat the procedure for any other parameters that need to be modified;
- press the SET button for more than 3 s to permanently save the parameters and exit the parameter setting procedure.



Notice!

It is not allowed to change the value for „r1 & r2“ without Rittal authorization

5.1.6 Controller display

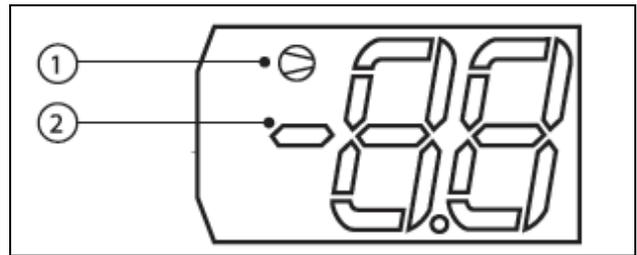


Figure 2: Controller display

no.	function	Normal operation			Start up
		on	off	flash	
1	compressor	on	off	call	on
2	digits	two digits with sign and decimal point, -99 to 99(*).			



Notice!

The parameters that feature three digit values can be set from the supervisor. In this case the display will show "..."

5.1.7 Display buttons

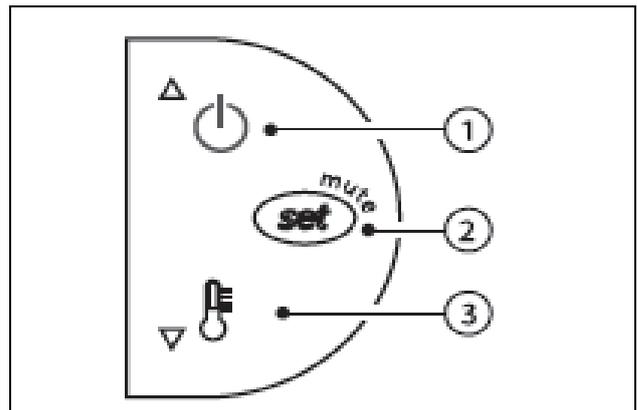


Figure 3: Display buttons

no.	Normal operation	Start up/ reset	
	Pressing the button alone		
1	more than 3 s: switch the compressor ON/OFF	-	
2	<ul style="list-style-type: none"> 1 sec: displays/sets the set point more than 3 sec.: accesses the parameter setting menu (enter password 22) mutates the audible alarm (buzzer) 	-	pressed together (2 and 3) activate parameter reset procedure

Start up/ reset to factory setting parameters

- Disconnect power supply
- Reconnect power supply while holding buttons 2 and 3
- Display will show the message "CF"
- After a few seconds the unit will restart with factory setting parameters

5 Commencing operation and control behavior

5.1.8 Compressor: On / Off

Switching the compressor ON: press UP for more than 3 s (when pressing the button, the display shows ON).

Switching the compressor OFF: press UP for more than 3 s. The display shows the message "OFF".

In OFF status, the following functions are disabled (if featured by the model):

- compressor control
- duty setting
- continuous cycle

5.2 Alarm parameters

A0: Alarm temperature differential

This represents the differential used to activate the high temperature alarm ("AH"). In the event of an alarm, as seen in the figure, the value of "A0" determines the actual activation of the temperature alarm. The value of "A0" (negative or positive) defines the nature of alarm "AH" (absolute or relative):

- $A0 \leq 0 \rightarrow$ AH expressed as absolute
- $A0 > 0 \rightarrow$ AH expressed relative to the set point

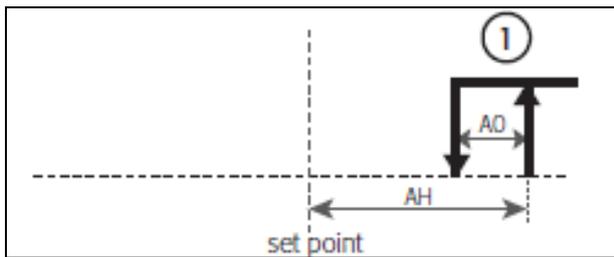


Figure 4: High temperature alarm

AH: High temperature alarm

AH setting: 10 degrees is the factory setting (-50 to 99 is the lower and upper limit). Other Factory settings: Setpoint (ST) = 35°C; A0 = 2°C.

For example: If the internal temperature of the cabinet is $T_i = 46^\circ\text{C}$, $ST (35^\circ\text{C}) + AH (10^\circ\text{C}) = 45^\circ\text{C}$, so $46^\circ\text{C} > 45^\circ\text{C}$ the display will show AH-alarm. As long as T_i is more than 43°C the display will show AH-alarm, because $ST (35^\circ\text{C}) + AH (10^\circ\text{C}) - A0 (2^\circ\text{C}) = 43^\circ\text{C}$. If the temperature T_i will fall to 42°C the alarm AH will no longer be shown in the display. As long as the temperature inside of the cabinet will not rise over 45°C again there will be no AH-alarm displayed.

Temperature alarm output

- Logo and buzzer on display: The information "AH" and logo will be shown on the display and buzzer.
- The over temperature message may also be polled via a contact on the connection clamp of the cooling unit (system message relay with changeover contact, see connection diagrams).

--Terminal "1" C (connection of the supply voltage to the fault signal relay)

--Terminal "2" NO (normally open).



Notice!

Delay for high temperature alarm when power ON: When alarm condition is achieved but power is ON, the timer start to count for a specify value (Ad1). Alarm relay becomes active when this time is elapsed.



Notice!

The unit of parameter "Ad" is "Sec".
The unit of parameter "Ad1" is "Min".



Notice!

The contacts of the relays are normally open (NO). If the alarm occurs the contacts close (NC).

5.3 Evaluating system messages

Display screen	Buzzer	Alarm relay	System message	Measures
E0	Active	Not active	Ambient temperature probe broken	Check sensor cable and replace if necessary
H1	Active	Active	High temperature alarm	Check cooling capacity/check unit

5.4 Forced cooling

The continuous cycle is used to maintain refrigeration forced cooling mode active in the cabinet or cold room, regardless of the temperature inside the unit. This may be useful for rapidly bringing the temperature below the set point value.

To activate or deactivate the continuous cycle from the keypad, Press UP+DOWN for more than 3 s, the display shows "cc" and the icon flashes (2 flashes, pause).

The unit starts the forced cooling mode at least after the minimum compressor off time (3 min.). The forced cooling mode is activated after the start for 1 h. After this time the unit starts normal operation.

6 Filter mats

The stainless steel filter mat available as an accessory is coarse and filters large dust particles or fluff from the air. Subject to the suction of the blower being high enough, fine dust is blown through the filter mat and the external circuit of the unit. This does not affect the unit's operation.

5 Commencing operation and control behavior

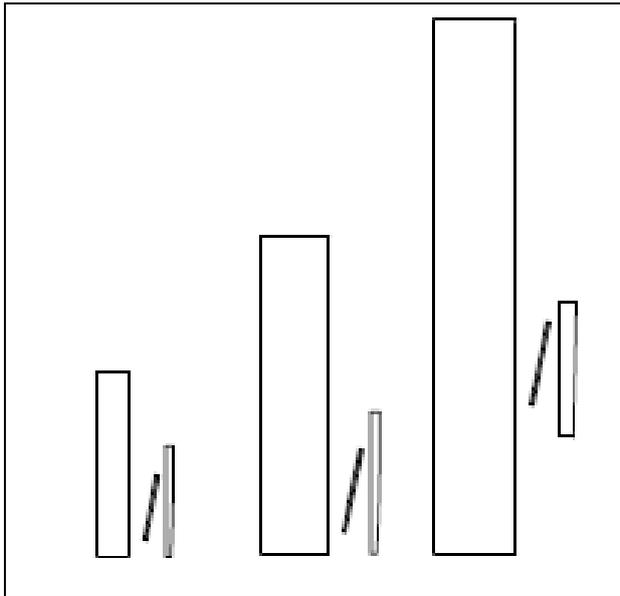


Figure 5: Replacement of the filter mat

7 Technical informations

The cooling unit (compressor refrigeration unit) consists of four main components: the coolant compressor, evaporator, condenser, and the capillary, which are connected by suitable Pipe-work. This circuit is filled with a readily boiling substance, the refrigerant. The R134a (CH₂FCF₃) refrigerant is free from chlorine. It has an ozone destroying potential (ODP) of 0 and is therefore environmentally friendly. A filter dryer which is integrated in the hermetically sealed cooling circuit, provides effective protection against moisture, acid, dirt particles, and foreign bodies within the cooling circuit.

7.1.1 Operation of the cooling unit

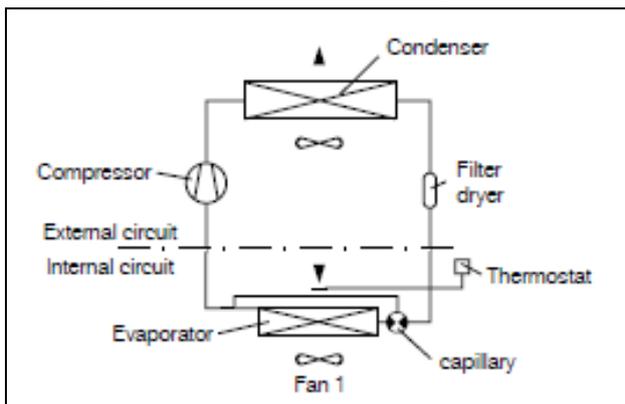


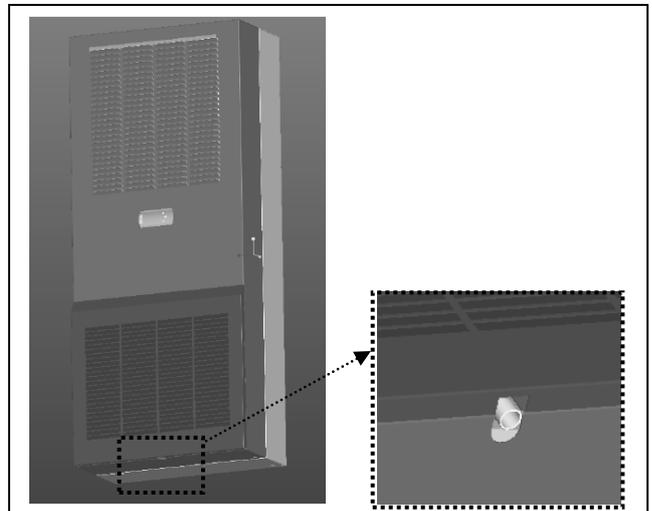
Figure 6: Operation of the cooling unit

The compressor takes the gaseous refrigerant from the evaporator and compresses it to a higher pressure in the condenser. During this process the temperature of the refrigerant rises above the ambient temperature and heat can be dissipated to the environment via the surface of the condenser. Then the refrigerant is liquefied and, by means of a thermostatically controlled capillary, returned to the evaporator, where it evaporates at low pressure. The heat

required for complete evaporation is drawn from the enclosure interior causing it to cool down. The cooling cycle is thus completed, the aforementioned process of the heat transfer starts afresh.

7.1.2 Condensate discharge

A drain pipe fitted to the evaporator divider panel ensures that any condensate which may form on the evaporator (at high air humidity, low temperatures inside the enclosure) is drained away from the bottom of the unit. For this purpose, a length of hose should be fitted to the condensate pipe connection piece. The condensate must be able to run off freely. If the condensate is to be drained off over a greater distance, then care must be taken that the hose is free from kinks and a check for correct drainage made.



8 Handling instructions

8.1 Fitting the cooling unit

The enclosure cooling unit may optionally be externally mounted on the enclosure (1) or partially internally mounted (2).

8 Handling instructions

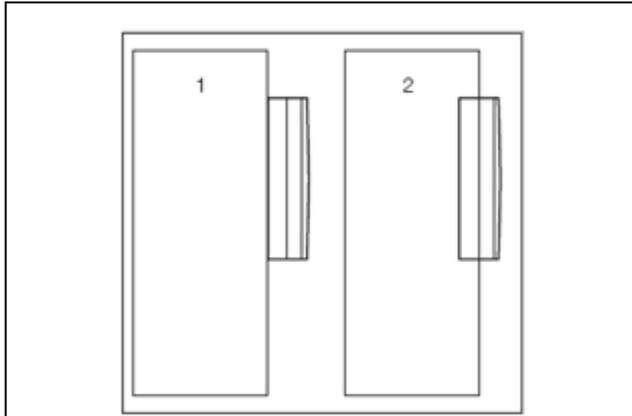


Figure 7: Installation method

To this end, cut the side panel or door of the enclosure, as per the Manu included with the supply, and drill the relevant holes.

	<p>Notice!</p> <p>For mounting the units SK 3370724 in the TS side panel or rear panel, we recommend the use of enclosure panel fasteners TS 8800.071 (see RITTAL Catalogue).</p>
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8.1.1 External mounting of the cooling unit

- Cut the supplied sealing tape to the correct length and stick it carefully along the back of the unit so that no gaps are left at the joints.

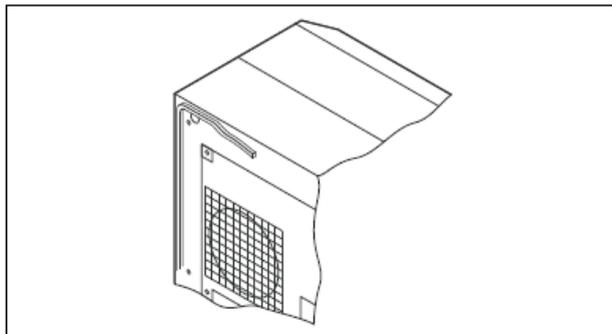


Figure 8: Applying the self-adhesive tape

- Screw the supplied grub screws into the blind nuts on the rear of the unit.
- Secure the unit using the supplied washers and nuts.

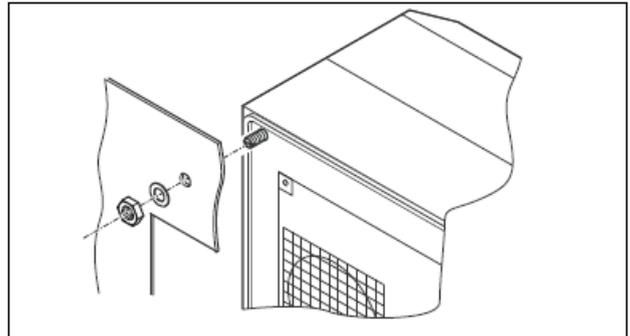


Figure 9: Securing the unit (all compact units except 3370220)

8.1.2 Partial internal mounting of the cooling unit (accessories not included)

- Fix the 4 mounting bars on the air conditioner by using screws.

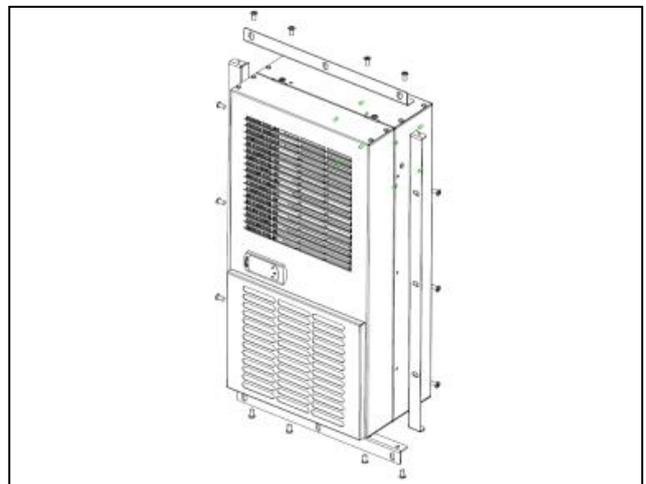


Figure 10: Fixing mounting bars

- Cut the supplied sealing tape to the correct length and stick it carefully along the inside of the rear enclosure half so that no gaps are left at the connection points.

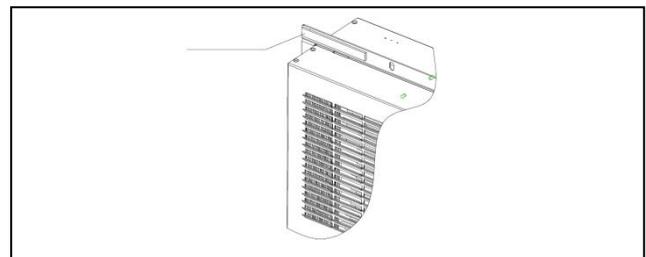


Figure 11: Sticking sealing tape

- Mount the front enclosure tray using the washers and nuts.

8 Handling instructions

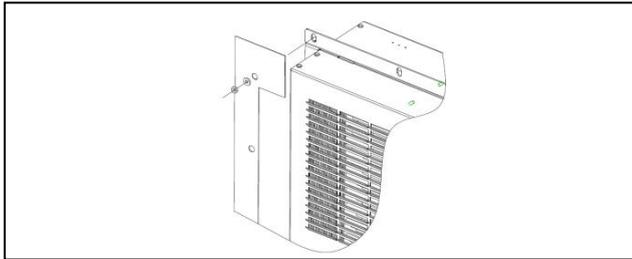


Figure 12: Mounting cooling units

8.2 Electrical connection

When performing electrical installation, shall comply with national and local institute There are existing regulations and provisions of the local power supply bureau. Electrical safety. Installed by qualified electrician, electrician must comply with the current standards and regulations. Connect the power supply cable according to the power supply tension as shown on the name plate by following the instructions below:

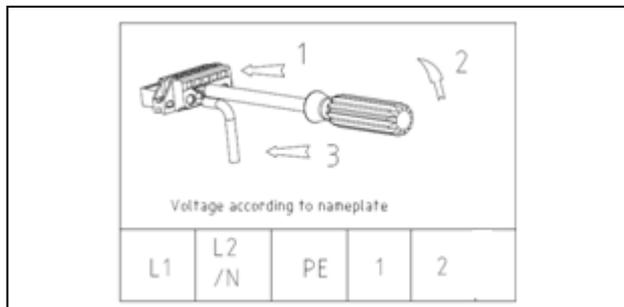


Figure 13: Electrical connection

Type	Power Input
SK 3370220	L1-N
SK 3370320	L1-N
SK 3370370	L1-N
SK 3370420	L1-N
SK 3370424	L1-L2
SK 1194420	L1-N
SK 1194424	L1-L2
SK 3370520	L1-N
SK 3370524	L1-L2
SK 1194550	L1-N
SK 1194554	L1-L2
SK 3370620	L1-N
SK 1194620	L1-N
SK 3370724	L1-L2
SK 1194724	L1-L2

8.2.1 Connection data

- The connected voltage and frequency must correspond to the values stated on the rating plate
- The cooling unit must be connected to the mains via an all-pin isolating device, which 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 to protect the cable and equipment from short-circuits
- The mains connection must ensure low-noise

8.2.2 Overvoltage protection and power 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 electricity 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 and compressors in single- and three-phase units are intrinsically safe (thermal winding protection). This also applies to transformer versions, types 3370.420, 3370.520, 3370.724 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 appropriate characteristic – e.g. “K” characteristic – or gG standard type slow fuse, circuit-breaker for plant or transformer protection) to protect the cable and equipment from short-circuits. Select a suitable 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 6.3 – 10 A; set to 6.3 A.

9 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 back on.

The cooling circle is designed in the form of a maintenance-free, hermetically sealed system. The cooling unit is filled with the required quantity of refrigerant at the factory, checked for leaks, and subjected to a functional test run.

The installed maintenance-free fans are mounted on ball bearings, protected against moisture and dust. The life expectancy is at least 30,000 operating hours. The cooling unit is thus largely maintenance-

9 Inspection and maintenance

free. All that may be required from time to time is to clean the components of the external air circuit using a vacuum cleaner or compressed air if they become visibly dirty. Any stubborn, oily stains may be removed using a non-flammable detergent, such as degreaser. Maintenance interval: 2,000 operating hours. Depending on the level of contamination in the ambient air, the maintenance interval may be reduced to suit the air pollution intensity.

	<p>Notice! Caution! Risk of fire! Never use flammable liquids for cleaning.</p>
---	--

Sequence of maintenance measures:

- Check the level of dirt.
- Filter soiling? Replace the filter if necessary.
- Cooling membranes soiled? Clean if necessary.
- Activate test mode; cooling function OK?
- Check noise generation of compressor and fans.

	<p>Caution! Risk of fire! Never use flammable liquids for cleaning.</p>
---	--

Sequence of maintenance measures:

- Check the level of dirt.
- Filter soiling? Replace the filter if necessary.
- Cooling membranes soiled? Clean if necessary..
- Check noise generation of compressor and fans.

9.1 Compressed air cleaning

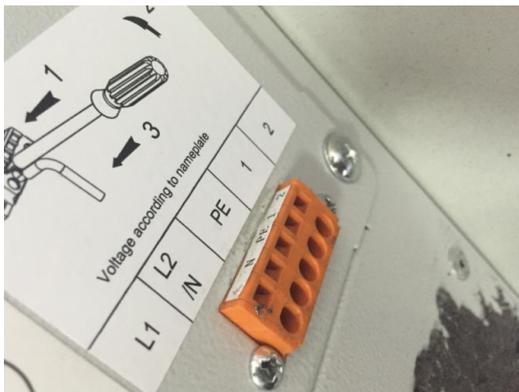


Figure 14: Break power



Figure 15: Twist off the screw on the top of the cover



Figure 16: Twist off the screw on the bottom of the cover

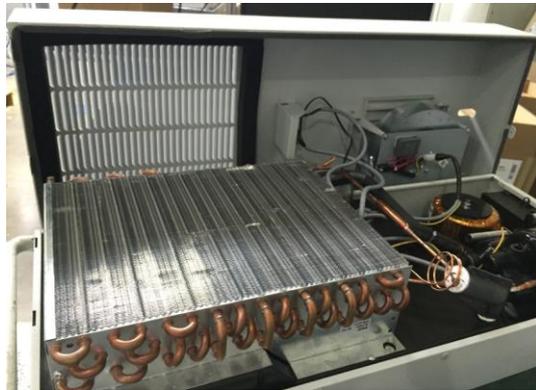


Figure 17: Open the cover

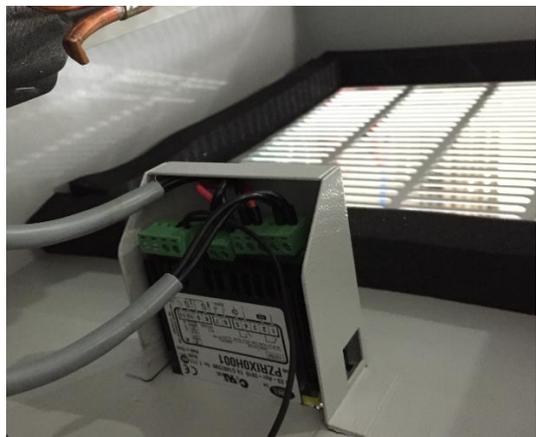


Figure 18: Disconnect the plug of the display

9 Inspection and maintenance



Figure 19: Twist off the screw of the outside fan(1)

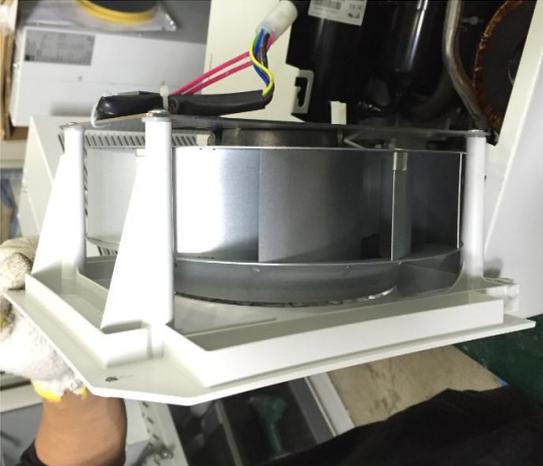


Figure 22: Disconnect the plug of the outside fan(1)



Figure 20: Twist off the screw of the outside fan(2)

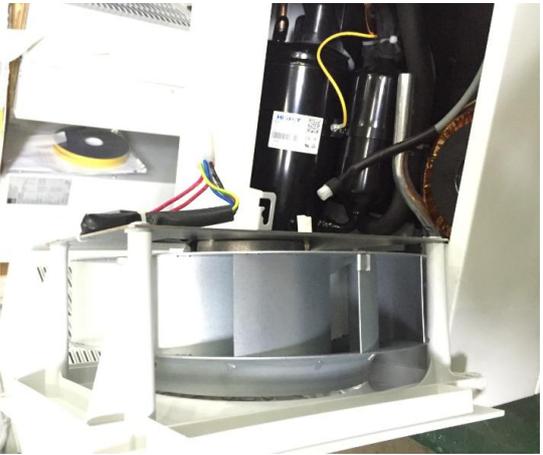


Figure 23: Disconnect the plug of the outside fan(2)



Figure 21: Remove the outside fan

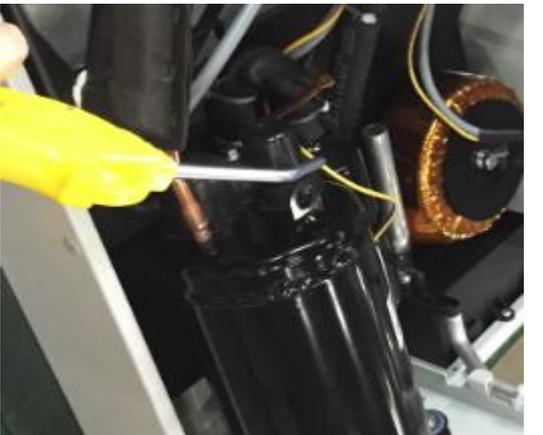


Figure 24: Clean the heat pipe and compressor chamber using compressed air



Figure 25: Clean the heat exchanger using compressed air

10 Storage and disposal



Caution! Risk of damage!

The cooling unit must not be subjected to temperatures above +70°C during storage.

Store the cooling unit in the appropriate position for transport.

The closed cooling cycle contains refrigerant and oil, which must be properly disposed of for the protection of the environment. Facilities for disposal are available at the Rittal plant. Please contact us for advice.

11 Scope of supply and guarantee

- 1 cooling unit, ready for connection
- 1 sealing tape
- 1 set of mounting and operating instructions

Guarantee:

This unit is covered by a 1-year guarantee from the date of supply, subject to correct usage (see also Safety notices under heading 4.). Within this period, the returned unit will be repaired in the factory or replaced free of charge. The cooling unit is to be used for the cooling of enclosures only. If it is connected or handled improperly the manufacturer's guarantee does not apply and in this case we are not liable for any damage caused.

Rittal – The System.

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