

Rittal – The System.

Faster – better – everywhere.

Roof-mounted Blue e+ cooling unit with refrigerant R-1234yf



SK 3485730

Assembly and operating instructions

ENCLOSURES

POWER DISTRIBUTION

CLIMATE CONTROL

IT INFRASTRUCTURE

SOFTWARE & SERVICES

FRIEDHELM LOH GROUP



Preface

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Preface

Dear Customer!

Thank you for choosing our roof-mounted cooling unit "Blue e+".

Yours
Rittal GmbH & Co. KG

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We are always happy to answer any technical questions regarding our entire range of products.

Contents

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1 Notes on documentation

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1 Notes on documentation

1.1 CE labelling

Rittal GmbH & Co. KG confirms the conformity of the cooling unit with the European Union's Machinery Directive 2006/42/EC and EMC Directive 2014/30/EC.

A corresponding declaration of conformity has been issued and enclosed with the unit. These are the original operating instructions.

The built-in passive NFC functionality operates at 13.56 MHz (HF). The reflected field strength depends on the active reader unit. The interface is designed for operation with reader units compliant with EN 300330 (HF).



1.2 Storing the documents

The assembly and operating instructions as well as all other applicable documents are an integral part of the product. They must be issued to everyone who works with the unit and must always be available and on hand for operating and maintenance personnel.

1.3 Symbols used in these operating instructions

The following symbols are used in this documentation:



Danger!

A dangerous situation in which failure to comply with the instructions will result in death or severe injury.



Warning!

A dangerous situation which may cause death or serious injury if the instructions are not followed.



Caution!

A dangerous situation which may lead to (minor) injuries if the instructions are not followed.



Note:

Important notices and indication of situations which may result in material damage.

- This symbol indicates an "action point" and shows that you should perform an operation or procedure.

1.4 Other applicable documents

Assembly and operating instructions exist as paper documents and/or digital data carriers for the unit types described here and are enclosed with the equipment.

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

2 Safety notes

2.1 General safety instructions

Please observe the following general safety instructions for the installation and operation of the system:

- Always wear the required personal safety equipment when working on this device. As a bare minimum, this should comprise ear defenders, safety shoes and protective gloves.
- Before removing the hood, allow the unit to cool for at least 10 minutes to eliminate the risk of burns from hot surfaces.
- Please do not make any changes to the cooling unit that are not described in these operating instructions or other applicable assembly and operating instructions.
- Note that refrigerants are odourless. In particular, in case refrigerant is unintentionally released, please keep the workplace well-ventilated to avoid inhaling large quantities of refrigerant.
- To avoid damaging the pipes or heat exchanger, do not use sharp objects when working on the unit.
- The unit must not be drilled or burnt.
- The accumulation of flammable substances inside the unit must be avoided.
- All persons working on the refrigerant circuit must have a certificate of competence from an industry-accredited body that demonstrates their competence in the safe handling of refrigerants using an accepted industry procedure. The work must be performed in accordance with Rittal specifications.
- Only objects approved by Rittal may be used to accelerate the defrosting process.
- When the unit is decommissioned, it must be labelled with the decommissioning date together with a note stating it is filled with flammable refrigerant.
- Please refer to the additional information provided in the document "Supplement to the assembly, installation and operating instructions for devices containing flammable refrigerants to UL 60335-2-40 Annex DD" available on the Rittal website.



- Sticker on the packaging: Flammable, warning of flammable materials



- Sticker near the rating plate: Low flammability (A2L), warning of flammable materials



- Other than these general safety instructions, it is also vital to observe the specific safety instructions when carrying out the tasks described in the following chapters.

2.2 Safety instructions for transportation

- The unit may only be shipped as a package.
- Keep the unit aligned with the markings on the packaging throughout transport.
- Please observe the maximum permissible weight to be lifted by one person. Use suitable lifting devices, if needed.

2.3 Safety instructions for assembly

- Ensure that the cooling unit is only installed in a dry condition and in a dry environment.
- To achieve a secure seal against water ingress from outside, the gasket included in the scope of supply must be fitted to seal the interface between the cooling unit and the enclosure in accordance with these instructions.
- All ventilation openings of the cooling unit must be freely accessible after assembly and must not be blocked.
- Do not assemble and re-activate the device until it is completely dry.
- When dismantling, there is a risk that the unit could slip and fall. Ensure a secure grip, particularly with contaminated units.

2.4 Safety instructions for installation

- Please be sure to observe the applicable regulations governing electrical installations of the country in which the device is installed and operated as well as national regulations for accident prevention. Please also observe any internal company regulations, such as work, operating and safety regulations.
- The connection regulations of the appropriate power supply company are to be followed. Otherwise, there is risk of injury from electric shock if the connection to the unit is defective or connected incorrectly in any way.
- Do not strip too much insulation from the connection cable, otherwise the admissible clearance/creepage distances from the terminal point may not be met.
- The cooling unit must be connected to the mains via an all-pole disconnect to overvoltage category III (IEC 61058-1).
- The drill holes on the unit rear may be used only for assembling the IoT interface with the screws supplied

with this unit. If longer screws are used, there is a risk of undershooting the clearance and creepage distances or electric shock.

- Ensure prior to startup that the condensate management system is installed as described in section 5.3.4. Regularly check the solution is working properly during maintenance of the end application.

2.5 Safety instructions for operation

- The operational safety of the cooling unit is only warranted if used as intended. The technical specifications and limit values stated must not be exceeded under any circumstances. In particular, this applies to the specified ambient temperature range and IP protection category.
- The products should only be combined and operated with the prescribed Rittal system accessories.
- Operating the cooling unit in direct contact with water, aggressive materials or inflammable gases and vapours is prohibited.
- It is not permitted to operate the unit without a pleated filter. Only use original accessories (3285.700).

2.6 Safety instructions for maintenance

- The device must only be cleaned by trained specialists. De-energise the device prior to cleaning.
- Never use flammable liquids for cleaning.
- If assistance of other persons is required for maintenance and repair work, a person trained in handling flammable refrigerants should supervise the work at all times.

2.7 Operating and technical staff

- The assembly, installation, commissioning, maintenance and repair of this cooling unit may only be performed by qualified, trained personnel.
- Only properly instructed personnel may operate a cooling unit with the system operational.
- Children and persons with limited cognitive/coordination abilities must **not** operate, maintain or clean the unit or be allowed to use it as a toy.

2.8 Other dangers when using the cooling unit

If the air inlet or outlet of the cooling unit is obstructed, there is a risk of air short-circuits, resulting in inadequate climate control.

- Please ensure that the electronic assemblies in the enclosure are installed in accordance with section 5.3.1 "Assembly instructions".
- Where applicable, use suitable components to divert the air.

2.9 IT safety instructions

To ensure the availability, confidentiality and integrity of data, products, networks and systems must be protected against unauthorised access.

3 Product description

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Such protection can be achieved only with organisational and technical measures. To satisfy the increased safety requirements, Rittal recommends the observance of the following measures. Furthermore, more detailed information can be found on the websites of Bundesamt für Sicherheit in der Informationstechnik (Federal Office for IT Security – BSI).

2.9.1 Measures for products and systems Embed products and systems not in public networks.

- Make sure that the system is only operated in protected networks.

Configure the firewall

- To protect your networks, and the embedded products and systems against external effects, configure a firewall.
- Also deploy a firewall for segmentation of a network or to isolate a controller.

Consider defence-in-depth mechanisms during the planning phase

- Consider defence-in-depth mechanisms for your system planning.
- Defence-in-depth mechanisms cover several levels of mutually coordinated security measures.

Restrict access authorisations

- Restrict access authorisations to networks and systems to only persons that need an authorisation.

Protect accesses

- Do not use the default passwords; instead, use secure, long passwords containing numbers, a mix of upper case and lower case letters, symbols and no repetitions.
- Create random passwords with a password manager.

Deploy the current firmware version

- Ensure that the current Rittal firmware is deployed on all devices.
- The firmware can be downloaded from the associated product pages in the Internet.
- Observe the associated Release Notes for new firmware versions.

Deploy current security software

- To identify and eliminate security threats, such as viruses, trojans and other malicious software, security software should be installed on all PCs and kept up-to-date.
- Deploy whitelist tools to monitor the device context.
- Deploy an intrusion-detection system to validate the communication of your system.

Perform regular threat analyses

- Rittal recommends that you perform regular threat analyses.
- The threat analyses allow you to determine whether your adopted measures are effective.

Protect USB ports against access

- USB ports must be protected against physical access. Ensure that no unauthorised persons have access to USB ports.
- Sensitive data can be read for an unauthorised access to USB ports.

3 Product description

3.1 Functional description and components

3.1.1 Function

There are two separate cooling circuits installed in the cooling unit.

- One conventional refrigerant circuit (compression system), and
- One heat pipe integrated into the condenser and evaporator coil.

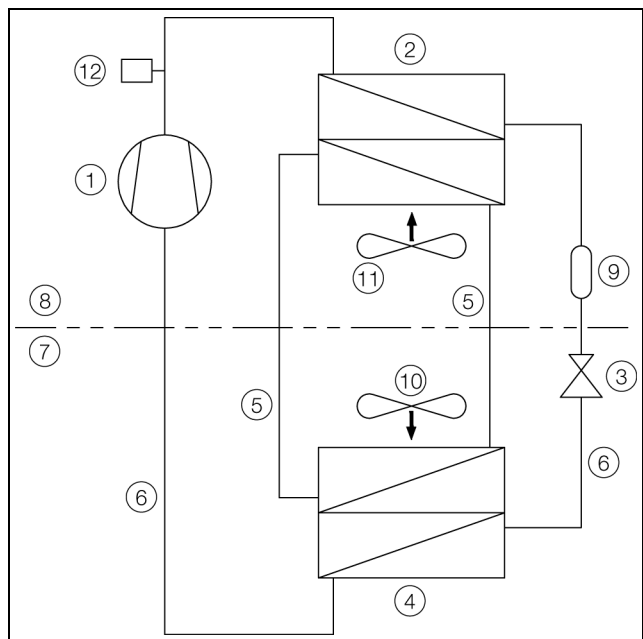


Fig. 1: Cooling circuit

Key

- 1 Compressor
- 2 Condenser (dual version) with fan
- 3 Expansion valve
- 4 Evaporator coil (dual version) with fan
- 5 Refrigerant circuit with heat pipe
- 6 Refrigerant circuit with compression system
- 7 Internal circuit
- 8 External circuit
- 9 Dryer/collector
- 10 Internal fan
- 11 External fan
- 12 PSA^H pressure monitor

In both cooling circuits, the individual components are connected with pipes in which the refrigerant is circulating. This refrigerant is very environmentally friendly, thanks to the following properties:

- Chlorine-free
- Does not deplete the ozone layer (ozone destruction potential ODP = 0)

Refrigerant circuit with compression system

The refrigerant circuit with compression system is comprised of the following four main components:

1. Evaporator coil
2. Compressor
3. Condenser
4. Expansion valve

The evaporator coil fan draws hot air from the enclosure in the internal circuit of the cooling unit and passes it over the evaporator coil. After the evaporator coil, the cooled air is fed back into the enclosure via the outlet opening.

The air is cooled down by evaporating the refrigerant in the evaporator coil. The refrigerant vapour is transported by the compressor in the external circuit of the cooling unit to the condenser. There, the refrigerant condenses and becomes a liquid. The heat produced is dissipated by the condenser fan. The downstream electronic expansion valve reduces the high pressure of the refrigerant, and the refrigerant is then fed back into the evaporator coil.

Both the compressor and the two fans in the cooling unit are activated via an inverter. This makes it possible to control these components, so that the fan and compressor may be activated for a longer time but at a lower output and improved efficiency.

Refrigerant circuit with heat pipe

The additional second refrigerant circuit operates without a compressor, expansion valve or other control elements, and is integrated into the evaporator coil and condenser as a heat pipe.

The refrigerant inside the heat pipe absorbs thermal energy from the intake of enclosure air and evaporates.

The gaseous refrigerant then rises through the pipeline until it reaches the condenser. The refrigerant is cooled down again in the condenser (provided $T_u < T_i$), and the heat released is emitted into the environment. Gravity then causes the liquid refrigerant to flow back down the pipelines. The whole cycle begins again.

3.1.2 Components

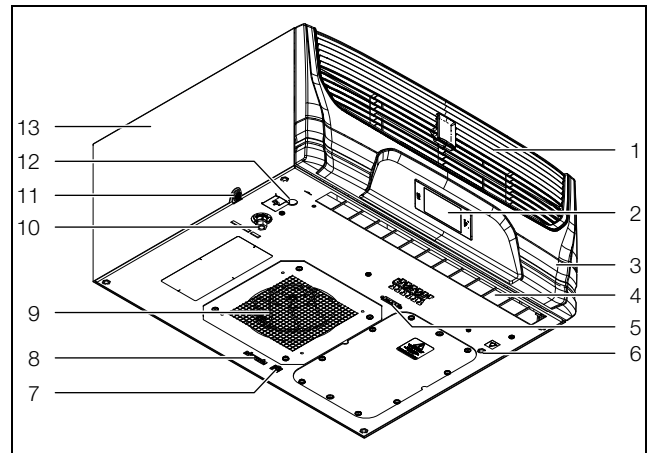


Fig. 2: Main components

Key

- | | |
|----|---|
| 1 | Louvred grille |
| 2 | Display |
| 3 | Infill panel |
| 4 | Air outlet opening (internal circuit) |
| 5 | Connection for mains connector (X1) |
| 6 | Connection point for potential equalisation |
| 7 | Connection for IoT interface (3124.300) (X3) |
| 8 | Connection for signal connector (X2) |
| 9 | Air inlet with evaporator fan (internal circuit) |
| 10 | Condensate water discharge below (closed with a bung) |
| 11 | Condensate water discharge at the side |
| 12 | Electrical condensate water evaporation connection point (3355.720 accessory) |
| 13 | Housing |

3.1.3 Control

Rittal enclosure cooling units are fitted with a controller for setting the functions of the cooling unit.

Operation using this controller is described in section 7 "Operation".

3.1.4 Safety devices

- In the refrigerant circuit, the cooling units have a type-tested pressure monitor (to EN 12263) which switches off the cooling unit if the maximum admissible pressure is exceeded. Once the pressure drops back below the admissible pressure, the unit will automatically resume operation.
- Temperature monitoring prevents the evaporator coil from icing over. If there is a risk of icing, the compressor switches itself off and automatically switches itself back on again at higher temperatures.
- The compressor is monitored and protected by the inverter to prevent overloading.
- The fans have a built-in overload protection with automatic reset.
- In order to allow a reduction of pressure inside the compressor and hence a safe restart, once it has been switched off (e.g. upon reaching the set temperature via the door limit switch function or via de-energising), the device will switch back on with a delay of 180 seconds.

3 Product description

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– The device has floating contacts on the connection pins on terminals 1 and 3 of the signal connector (X2), via which system messages from the device may be polled, e.g. using a PLC (2 x normally closed or normally open contacts).

3.1.5 Condensation

At high levels of humidity and low temperatures inside the enclosure, condensate water may form on the evaporator coil.



Note:

The automatic, electrical condensate water evaporation is **not** installed as standard, but available as accessory (3355.720) and can be installed subsequently.

The thermal component used for this purpose is based on self-regulating PTC technology. Condensate water arising on the evaporator coil is collected in a tank in the external circuit of the cooling unit, and partially evaporated via the airflow. When the water level rises, the water enters the PTC thermal component and is evaporated (through-flow heater principle). The water vapour streams out of the cooling unit with the airflow from the external fan.

The PTC thermal component is activated automatically when the compressor is running, and continues to run for around 15 minutes after the compressor has been switched off. During the after-run phase, the condenser fan will likewise continue to run at low speed.

In the event of a short-circuit in the PTC component or if there is a risk of inverter overload (possible at high ambient temperatures), the PTC component will be deactivated. This means that any condensate water arising can be discharged via the safety overflow.

If the fuse has tripped, any condensate water is drained off via the safety overflow. The condensate water is discharged at the bottom from the condensate water evaporator with an overflow pipe. The condensate hose included with the scope of supply **must** be connected to the condensate water nozzles at this overflow pipe. (see section 5.3.4 "Connect the condensate water discharge").

3.1.6 Filter mats

The entire cooling unit condenser is covered with a dirt-repelling, easy-to-clean RiNano coating. A pleated filter is also installed in the cooling unit. This pleated filter **must** be installed to achieve IP 54 degree of protection.



Note:

Operation without the pleated filter is **not** permitted! Use only original accessories (3285.700).

Depending on the incidence of dust, you will need to replace the pleated filter regularly (see section 8 "Inspection and maintenance").

tion and maintenance").

3.1.7 Door limit switch

The cooling unit may be operated with a floating door limit switch connected. The door limit switch is available as accessory from Rittal.

The door limit switch function causes the fans and the compressor in the cooling unit to gradually slow down and then switch off after approximately 15 seconds when the enclosure door is opened (contacts 5 and 6 closed). This prevents the formation of condensate water inside the enclosure while the enclosure door is open. In order to prevent damage to the unit, it is equipped with an ON delay: The evaporator fan will cut in again after a delay of a few seconds on closure of the door.

Please note that no external voltage may be applied to the door contacts (connection clamps 5 and 6).

3.2 Proper use, foreseeable misuse

The cooling unit is intended exclusively for cooling closed control cabinets as well as for professional use in accordance with DIN EN 61000-3-2. Any other use is not permitted.

- The unit must not be installed and operated in locations which are accessible to the general public (see DIN EN 60335-2-40, paragraph 3.119).
- The unit is designed solely for stationary use.

The cooling unit is state of the art and built according to recognised safety regulations. Nevertheless, improper use can pose a threat to the life and limb of the user or third parties, or result in possible damage to the system and other property.

Consequently, the cooling unit must only be used properly and in a technically sound condition! Any malfunctions which impair safety should be rectified immediately.

Proper use also includes the observance of the documentation provided, and compliance with the inspection and maintenance conditions.

Rittal GmbH & Co. KG is not liable for any damage which may result from failure to comply with the documentation provided. The same applies to failure to comply with the valid documentation for any accessories used.

Inappropriate use may be dangerous. Examples of inappropriate include:

- Use of the cooling unit over long periods with the enclosure open.
- Use of impermissible tools.
- Improper operation.
- Improper rectification of malfunctions.
- Use of accessories not approved by Rittal GmbH & Co. KG.

– Operation in an explosion-risk area.

3.3 Supply includes

Qty.	Description
1	Roof-mounted Blue e+ cooling unit, including pleated filter
1	Shipping bag with
1	– Assembly and installation instructions
1	– T-rail
4	– Threaded bolt M8 x 40 mm
4	– Hex nut M8
4	– Washer M8
1	– Signal connector X2
1	– Connector X1
1	– Condensate hose (3 m)
1	– Hose clip
1	– Screw-in nozzles
1	– Seal
1	– Ferrite core

Tab. 1: Blue e+ roof-mounted cooling unit scope of supply

4 Transport and handling

4.1 Delivery

The cooling unit is supplied in one packaging unit.

- Check the packaging carefully for signs of damage. Traces of oil on damaged packaging indicate a loss of refrigerant and/or a leak in the cooling unit. Any packaging damage may be the cause of a subsequent functional failure.

4.2 Unpacking

- Remove the packaging materials from the cooling unit.



Note:
After unpacking, the packaging materials must be disposed of in an environmentally friendly way.

- Check the cooling unit for any damage that may have occurred during transport.



Note:
Damage and other faults, e.g. incomplete delivery, should be reported immediately, in writing, to the shipping company and to Rittal GmbH & Co. KG.

- Check the supply contents for completeness (see section 3.3 "Supply includes").

4.3 Transport

The cooling unit weighs 38 kg. The components in the cooling unit chassis account for the bulk of the weight.



Warning!
Please note the maximum weights that may be lifted by individuals. Lift the cooling unit by two persons or, if necessary, use lifting gear.

An M12 thread provided at the top of the chassis allows a Rittal eyebolt (e.g. for an enclosure) to be screwed in. The cooling unit is readily transported with the aid of lifting gear and an indoor crane.



Note:
An eyebolt with M12 thread may be ordered as an accessory from Rittal (see section 13 "Accessories").



Note:
The roof-mounted cooling unit may be transported only in a horizontal position.

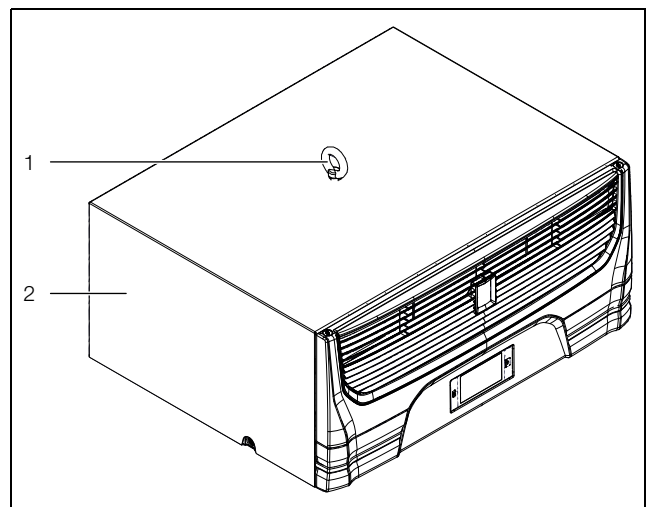


Fig. 3: Eyebolt on top of the chassis

Key

- 1 Eyebolt
- 2 Cooling unit

- Before transporting by crane, please ensure that the lifting gear and crane have sufficient load capacity to transport the cooling unit safely.
- Never allow anyone to stand beneath a suspended load, even for a short time, during transportation by crane.
- Protect the lifting gear on the crane hook from load deflection, because the load's centre of gravity may be off-centre.

5 Installation

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- First position the cooling unit close to the installation site and protect from accidentally being knocked over.

5 Installation

5.1 Safety instructions



Warning!

Please note the maximum weights that may be lifted by individuals. It may be necessary to use lifting gear.

Work on electrical systems or equipment may only be carried out by an electrician or by trained personnel under the guidance and supervision of an electrician. All work must be carried out in accordance with electrical engineering regulations.

The cooling unit may only be connected after the aforementioned personnel have read this information!

Use only insulated tools.

Follow the connection regulations of the appropriate electrical supply company.

The cooling unit must be connected to the mains via an all-pole disconnecting device to overvoltage category III (IEC 61058).

The cooling unit is not de-energised until all of the voltage sources have been disconnected!

- Please be sure to observe the applicable regulations governing electrical installations of the country in which the device is installed and operated, as well as national regulations for accident prevention. Please also observe any internal company regulations, such as work, operating and safety regulations.
- The technical specifications and limit values stated must not be exceeded under any circumstances. In particular, this applies to the specified ambient temperature range and IP protection category.

5.2 Siting location requirements

When choosing the installation location, observe the following notes:

- The installation location, and hence the arrangement of the cooling unit, must be chosen to ensure good ventilation (the separation between cooling units and the clearance to the wall must be at least 200 mm in each case, and 500 mm from the louvred grille).

- The cooling unit must be installed and operated in a horizontal position (maximum deviation: 2°).
- The installation site must be free from excessive dirt, aggressive ambient conditions and moisture.
- The ambient temperature must be within the limits specified on the rating plate.
- It must be possible to fit a condensate water discharge (see section 5.3.4 "Connect the condensate water discharge").
- The mains connection data as stated on the rating plate of the cooling unit must be guaranteed.

Size of installation room

- **Unit SK 3485730** must not be installed in rooms of less than 3 m³.

Electromagnetic interference (EMI)

- Interfering electrical installations (high frequency) must be avoided.
- Signal cables must be laid separately from live cables.

5.3 Assembly procedure

5.3.1 Assembly instructions

- Before mounting the roof-mounted cooling unit, ensure that the enclosure is sealed on all sides (IP 54). Increased condensate water occurs if the enclosure is not airtight when it is put into operation later.
- If necessary, also mount on the enclosure, on which the roof-mounted cooling unit is to be mounted, a door limit switch (e.g. 4127.010) that switches off the cooling unit when the enclosure door opens and so prevents an increased condensate water accumulation (see section 3.1.7 "Door limit switch").
- Please ensure that the electronic assemblies in the enclosure allow the even circulation of air.
- Under no circumstances should the air inlet and outlet openings of the cooling unit be obstructed. Only in this way is it possible to ensure that the maximum cooling output is available.
- Please ensure that the cold airflow from the cooling unit is not directed at active components.

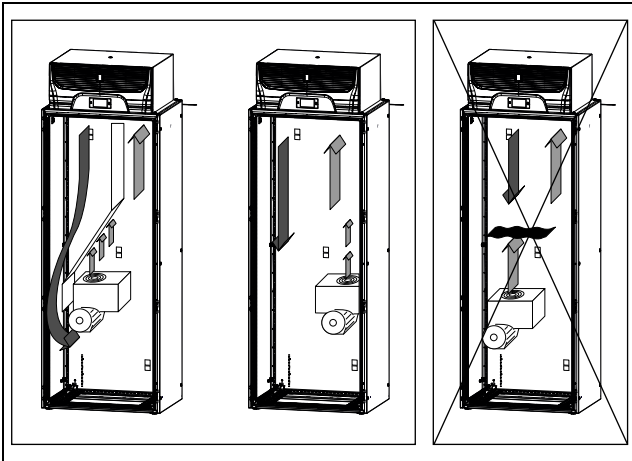


Fig. 4: Never direct the cold airflow at active components (example illustration)

5.3.2 Make a mounting cut-out in the enclosure



Note:

To mount the roof-mounted cooling unit, the roof surface of the enclosure must be at least 800 mm x 600 mm (W x D).

An appropriate mounting cut-out must be provided to mount the roof-mounted cooling unit on the roof of an enclosure.

For this purpose, you must cut the roof plate as specified in the drawing in section 12.1 "Mounting cut-out representation".

- Determine the required dimensions for the mounting cut-out as shown in the representation.
- Remove the roof plate from the enclosure on which the roof-mounted cooling unit should be mounted.
- Drill all the required holes and make the mounting cut-out.
- Carefully deburr all drilled holes and the cut-out to prevent injuries caused by sharp edges.



Caution!

Drilled holes and cut-outs that have not been fully deburred may cause cut injuries, particularly when assembling the cooling unit.

- Remount the roof plate onto the enclosure.

5.3.3 Mounting of the roof-mounted cooling unit

- Affix the supplied sealing frame onto the cut out roof plate.
- Mount the cooling unit on the enclosure roof.

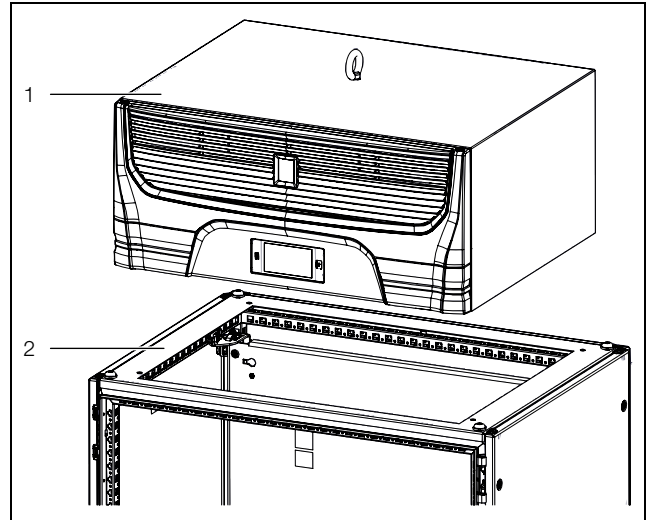


Fig. 5: Attaching the cooling unit to the roof plate

Key

- 1 Cooling unit
- 2 Roof plate with mounting cut-out

- Screw the supplied twin-threaded bolts into the core holes in the plastic base on the underside of the cooling unit with a maximum of 5 Nm.
- Secure the unit using the supplied washers and nuts.



Note:

In order to achieve a permanent seal between the cooling unit and the enclosure, the mounting surface should be reinforced or supported if necessary. This is particularly applicable with large roof areas.

Accessories for roof plate reinforcement with VX25 system

- Punched section with mounting flange, 18 x 64 mm, for VX

5.3.4 Connect the condensate water discharge



Caution!

Before commissioning, ensure that the condensate management is installed, as described in this section. The correct functioning must be checked regularly for maintenance of the final application (see section 8 "Inspection and maintenance").

A condensate water evaporator (3355.720) can be subsequently installed in the cooling unit as an accessory. With an enclosure connected, this condensate water evaporator may typically evaporate condensate water volumes of up to 100 ml/h.

5 Installation

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General notes for routing the condensate water discharge hose

- The hose must be laid with an adequate and constant gradient to prevent siphoning.
- The hose must be laid without any kinks.
- If extended, the cross-section of the hose must not be reduced.
- The hose should be routed to a drain or external condensate water evaporator by the customer.

You can attach the supplied condensate water discharge hose (L=3 m, Ø ½") to the roof-mounted cooling unit. For this purpose, two connection points are provided on the cooling unit.

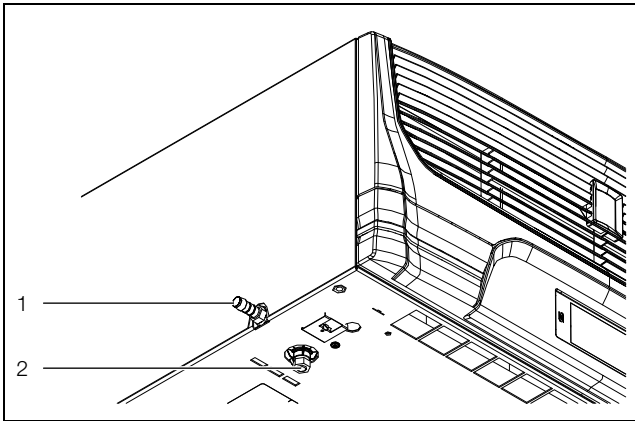


Fig. 6: Connection for the condensate water discharge hose

Key

- 1 Connection point on the side of the unit (here with screw-in grommet)
- 2 Connection point at the bottom of the unit (closed with a bung)

Proceed as follows when you want to use the side connection point of the unit:

- Screw the supplied screw-in grommet into the side connection point.
- Then place the supplied condensate hose onto the screw-in grommet and secure it with the hose clip (also supplied).
- Lay the hose as per the instructions above.

Proceed as follows when you want to use the bottom connection point on the unit:

- Unscrew the bung from the bottom connection point.
- Close with this bung the side connection point of the unit so that condensate water cannot discharge there.
- Screw the supplied screw-in grommet into the bottom connection point.
- Then place the supplied condensate hose onto the screw-in grommet and secure it with the hose clip (also supplied).
- Lay the hose as per the instructions above.



Note:

If you **must** use the bottom connection point of the unit, connect the supplied condensate hose there. Otherwise, condensate can escape uncontrolled from the cooling unit and cause an electrical short-circuit or fire in the enclosure.

5.4 Electrical connection

5.4.1 Notes on electrical installation

- When carrying out 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.
- Electrical installation must only be carried out by a qualified electrician who is responsible for compliance with the existing standards and regulations.
- All cables routed into the wiring compartment have to be insulated for the maximum voltage of the power supply.

Connection data

- The connected voltage and frequency must correspond to the ranges stated on the rating plate. The units support multiple voltages.
- The cooling unit must be connected to the mains via an all-pole disconnect to overvoltage category III (IEC 61058-1).
- We recommend that the power supply cable and the signal cable should be of a shielded design. The cable shield can make contact with the T-rail.
- No additional temperature control may be connected upstream of the unit at the supply end
- To ensure the proper functioning of internal safety devices in the event of a malfunction, a line fuse not less than 15 A and of type "Slow (Time Delay CCMR)" or one of the following UL-listed circuit-breakers (DIVQ/7) is required:
 - 3RV2711-4AD10 by SIEMENS (E235044) rated 15 A
 - FAZ-C15/3-NA by EATON (E235139) Class curve C rated 15 A
 - FAZ-D15/3-NA by EATON Class curve D rated 15 A
- If a motor circuit-breaker or circuit-breaker is used, it should be selected in accordance with EN 60898-1 (tripping characteristic type D).
- Low-noise potential equalisation must be guaranteed with the mains connection.

Overvoltage protection and supply line load

Rittal recommends the following measures for protecting the cooling units in non-standard environmental and connection conditions.

- The unit does not have its own overvoltage protection. Measures must be taken at the supply end by the

- switchgear manufacturer or operator to ensure effective protection against lightning and overvoltage.
- Overvoltage protection must be installed upstream of the infeed to the cooling units and not immediately after the infeed to the entire enclosure. This is the only way to ensure that surge pulses generated by the machine itself are discharged.
- The units are classified as overvoltage category III. The mains voltage must not deviate by more than the tolerance specified in section 10 "Technical specifications".
- The discharge current may exceed 3.5 mA.
- The units are high-voltage tested ex works. An additional high voltage test must only be carried out with a DC voltage supply source (1500 VDC max.).
- If the combined output of the frequency converters, power converters or transformers in the network where the device is being operated is >70 kVA, the customer must connect a Class II surge voltage protector in the mains supply line upstream of the cooling unit. The surge voltage protector must be designed to EN 61800 -1. The following values may be assumed as starting-points for the design:

Transformers, power electronics	Assumed discharge energy
70 kVA...100 kVA	40 J
100 kVA...200 kVA	80 J
200 kVA...400 kVA	160 J
400 kVA...800 kVA	320 J

Tab. 2: Design of the surge voltage protector

Three-phase devices

- There is no need to observe a counterclockwise or clockwise phase rotation when making the electrical connection for inverter devices in the three-phase version. The electronics incorporated into the devices automatically create the required phase rotation.
- In three-phase devices, the absence of a phase is detected, and the device is switched off.
- Outgoing equipment is monitored by the inverter, and deactivated in the event of a malfunction in the electricity supply.

Door limit switch

- Each door limit switch can only be assigned to one cooling unit.
- Several door limit switches may be operated in parallel with one cooling unit.
- The minimum cross-section for the connection cable is 0.3 mm² for a cable length of 2 m.
- The line resistance to the door limit switch must not exceed a maximum of 50 Ω.
- The maximum admissible line length is 10 m.

- 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. 5 mA DC.
- Connect the door limit switch to terminals 5 and 6 of the signal connector.

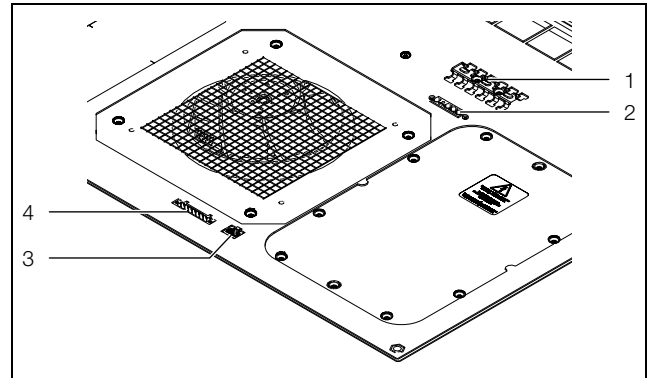


Fig. 7: Fasteners at the bottom of the roof-mounted cooling unit

Key

- 1 T-rail for strain relief
- 2 Connection for mains connector (X1)
- 3 Connection for IoT interface 3124.300 (X3)
- 4 Connection for signal connector (X2)

Potential equalisation

If, for EMC reasons, the unit is to be integrated into the customer's existing potential equalisation system, a conductor may be connected to the potential equalisation connection point. The connection point is labelled with the required switch symbol.

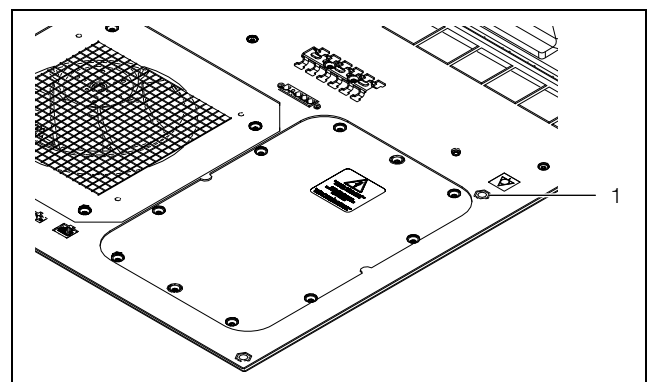


Fig. 8: Connection point for potential equalisation

Key

- 1 Connection point M6

- Attach the potential equalisation to the unit's connection point using the screw, washer and contact washer.

5 Installation

EN

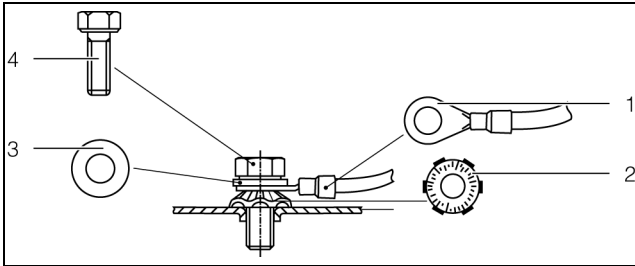


Fig. 9: Potential equalisation arrangement

Key

- 1 Ring terminal with PE conductor
- 2 Contact washer
- 3 Washer
- 4 Screw



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

Ferrite core

- Attach the ferrite core from the scope of delivery to the signal cables near the connection plug to prevent interference in the signal transmission. The ferrite core must be wrapped twice.



Fig. 10: Signal cable with mounted ferrite core

5.4.2 Install the power supply



Note:

- We recommend that the power supply cable and the signal cable should be of a shielded design.
- The cable shield can make contact with the T-rail (fig. 7, item 1).

- Remove the mains connector from the dispatch bag and connect to the mains as shown on the connection diagram (fig. 11).

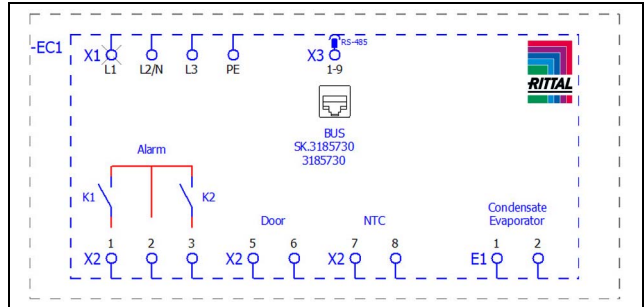


Fig. 11: Circuit diagram 3485730

Key

- X1 Main terminal strip
- K1 Relay collective fault 1
- K2 Relay collective fault 2
- Door Door limit switch (optional, without door limit switch: terminal 5, 6 open)
- NTC External temperature sensor (optional)
- X3 RS 485 interface for IoT Interface (3124.300)

Create a strain relief

- For the roof-mounted cooling unit, take the T-rail from the dispatch bag and attach it to the connection unit.
- Then establish the strain relief on the T-rail using cable ties.

5.4.3 Connect the alarm relays

System messages from the cooling unit may be output to an external signal source via two floating relay outputs.



Note:
The factory setting of the relay outputs in their de-energised state is NO (Normally Open).

- Connect a suitable connection cable to the connection terminals 1 (Alarm K1) and/or 3 (Alarm K2) of the signal connector (X2).
- Configure the alarm relays you wish to use to output error messages (see section 7.4.3 "Alarm relays").

<p>AC cos φ = 1</p>

I max. = 2 A
U max. = 250 V

Tab. 3: Contact data

5.4.4 Interfaces

The cooling unit has the following interfaces for communicating with external systems:

- Micro-USB interface on the front
- RS 485 interface at the bottom

Micro-USB interface

A micro-USB interface is located on the front, to the right of the display. A tablet or laptop may be connected here for easy configuration of the unit.

- Connect a tablet or laptop with installed RiDiag III software to the micro-USB interface. No other USB devices will be detected on this connection.

RS 485 interface

An RS 485 interface is located at the bottom of the cooling unit. The IoT interface (3124.300) for linking the cooling unit to the customer's own monitoring, energy management and/or superordinate systems may be connected here.

- Connect the the IoT interface (accessory) to the RS 485 interface (X3).

Note:
A direct connection to the cooling unit via the RS 485 interface is not possible.

6 Commissioning

Note:
The oil must collect in the compressor in order to ensure adequate lubrication and cooling. For this reason, do not operate the cooling unit for at least 30 minutes after assembling the equipment.

- Observe the aforementioned waiting period of at least 30 minutes before commissioning the unit after assembly.
- Next, switch on the voltage supply to the cooling unit. The Rittal logo will initially appear on the display, followed a short time later by the start screen.
- You can now make your individual settings on the unit, e.g. set the temperature or assign the network identifier, etc. (refer to chapter 7 "Operation").

Note:
It is **not** necessary to carry out leak or pressure tests on the cooling unit prior to commissioning. Rittal has already done this in the factory.

7 Operation

7.1 General

The cooling unit is equipped with a touch function display for making basic settings and displaying error messages. This is an industrial-grade touch display which is pressure-sensitive and may therefore be operated with gloves.

As well as operating directly on the cooling unit itself, there is also a smartphone app available. This offers almost the same functions as the actual display, and additionally provides extended explanations of error messages, as well as the option of contacting the Rittal Service team directly.



Note:

- Install other languages using the RiDiag software or an online tool, available on the Rittal website, to enable the use of all the following functions.

7.2 Layout of the display

The display is divided into a top section on a dark background, and a bottom section with the menu bar. This layout is always identical, but the content of the two sections will vary according to the menu selected.

7.2.1 Start screen

The start screen is always displayed while the cooling unit is in normal operation, provided there are no error messages.



Fig. 12: Layout of the start screen

Key

Item	Description	Possible icons
1	Internal temperature display (2-digit °C/3-digit °F)	Numbers from 0-9
2	EER scale: Range 0...20 / current average EER value of the last 24 hours	EER
3	Ti scale: Range 20 ...60 / value: Average enclosure internal temperature of the last 24 hours	
4	Display temperature unit	°C °F
5	USB connection (if connected)	
6	Self-test (if initiated)	
7	NFC connection (max. 120 seconds after connecting)	

Tab. 4: List of all icons with descriptions

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Item	Description	Possible icons
8	Type of cooling	
9	Control based on ...	
10	External sensor	
11	Information menu	
12	System messages (where applicable)	
13	Service icon (if required)	
14	Configuration	

Tab. 4: List of all icons with descriptions

Type of cooling

The current form of cooling is indicated by one of the following four icons.

Symbol	Parameters
	Cooling in compressor mode without support from the heat pipe
	Cooling in compressor mode with support from the heat pipe
	Cooling via the heat pipe only
	No cooling

Tab. 5: Possible icons for the current type of cooling

7.2.2 Changing a parameter value

If a parameter value is changed, the display including the menu bar will also change.

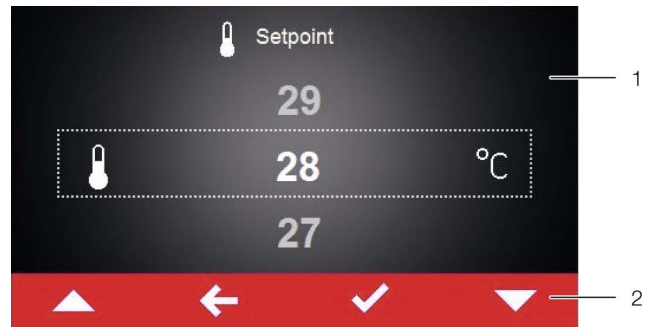


Fig. 13: Screen for changing a parameter value

Key

- 1 Main screen
- 2 Control bar

The currently selected parameter value is displayed in the centre of the main screen. To change this value, you always proceed in the same way, as described below with the example of adjusting the set temperature:

- On the start screen, click on the "Configuration" button.
- Enter the PIN to gain access to the lower-level screen pages of the "Configuration" zone.
"22" is the default PIN.
- Click on the "Temperature" symbol.
- Click on the "Control mode" symbol.
- Select your preferred control mode from the display.
- Change the setting to the required temperature using the "Up" and "Down" arrows.
- Alternatively, you can also select the one of the displayed higher or lower values directly.
- Finally, confirm the set value with "OK".
- Exit this screen page with the "Back" button.

7.3 Information menu



- Click on the "Information" symbol to display a list of lower-level screen pages.

Symbol	Parameters
	Temperature info
	Device info
	Efficiency info

Tab. 6: "Information" zone

7.3.1 Temperature information










- Click on the "Temperature information" symbol.
The ambient temperature and internal temperature are displayed, in each case as an average for the last 24 hours of operation.

Symbol	Parameter
	ØTU 24h Average ambient temperature (external temperature) over the last 24 hours of operation.
	ØTI 24h Average internal temperature over the last 24 hours of operation.

Tab. 7: "Temperature information" zone

7.3.2 Device information

- Click on the "Device information" symbol.
A list of general information about the device will be displayed.
- Page through the list using the "Up" and "Down" arrows.


Symbol	Parameter
	Serial number
	Manufacture date YYYY-MM-DD
	Hardware Release x.xx.xx
	Firmware Release x.xx.xx
	Software Release x.xx.xx
	Last update YYYY-MM-DD
	Last maintenance YYYY-MM-DD
	User device name Name assigned to the cooling unit by the customer. This title can be assigned using the RiDiag software or the Blue e+ app to distinguish between individual units.
	Act. control mode

Tab. 8: "Device information" zone

7.3.3 Efficiency information

- Click on the "Efficiency information" symbol.
The average energy efficiency ratio (EER) for the last 24 hours of operation will be displayed. The energy ef-

iciency ratio is the ratio of the cooling output generated to the electrical power used.

Symbol	Parameter
	Average EER 24h Average energy efficiency ratio (EER) of the last 24 hours of operation.

Tab. 9: "Efficiency information" zone

7.4 Configuration menu







- Click on the "Configuration" symbol.
A screen page will appear asking you to enter the PIN in order to access the lower-level screen pages.



Note:

"22" is preset in the factory as the default PIN.

- For the first digit, page through the digits "0" to "9" using the "Up" and "Down" arrows until the required digit appears in the box.
 - Confirm your selection with "OK".
 - For the second digit, once again page through the digits "0" to "9" using the "Up" and "Down" arrows until the required digit appears in the box.
 - Confirm your selection with "OK".
- A list of lower-level screen pages will be displayed.

Symbol	Parameter
	Temperature Settings for set temperature and control mode
	Network Display of network information from the IoT interface (3124300)
	Alarm relay Settings for the alarm relays.
	Filter mats
	Display language Choice of language for display texts.
	Self-test Perform a self-test.

Tab. 10: "Configuration" zone

7.4.1 Temperature

- Click on the "Temperature" symbol to display a list of lower-level screen pages.

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Symbol	Parameter
	Change unit Set the unit "°C" or "°F"
	Control mode
	Alarm threshold Temperature limit which will trigger an alarm message if exceeded.

Tab. 11: "Temperature" zone

Change unit

All temperature values for the unit may be displayed either in degrees Celsius "°C" or degrees Fahrenheit "°F".

- Click on the "Change unit" symbol.
- Change the required unit ("°C" or "°F") using the "Up" or "Down" arrows.
- Confirm your entry with "OK".

Control mode

The cooling unit controls cooling output according to one of the following three temperature values:

- **Inside temp.:** The temperature at which air is drawn out of the enclosure into the cooling unit.
- **External sensor:** The temperature measured with an external temperature sensor at a so-called hot spot in the enclosure.
- **Outlet temp.:** The temperature measured with an external temperature sensor at the cold air outlet from the cooling unit.

Control mode "external sensor"

Please observe the following when selecting the sensor position: The sensor must **not**

- be influenced directly by the cold air expelled from the cooling unit,
- be influenced by external heat sources or heat radiation,
- be exposed to humidity,
- have its connection cable laid in the vicinity of AC cables,
- be exposed to different temperature levels within the first 10 cm of the connection cable.

The sensor **must**

- be located within the effective range of the cooling unit,
- be surrounded by adequate moving air which has blended well with the air expelled by the cooling unit,
- be at an adequate distance from solid and liquid substances.

Control mode "outlet temperature"

- Attach the temperature sensor in front of the cold air outlet from the cooling unit, in the centre (fig. 14).

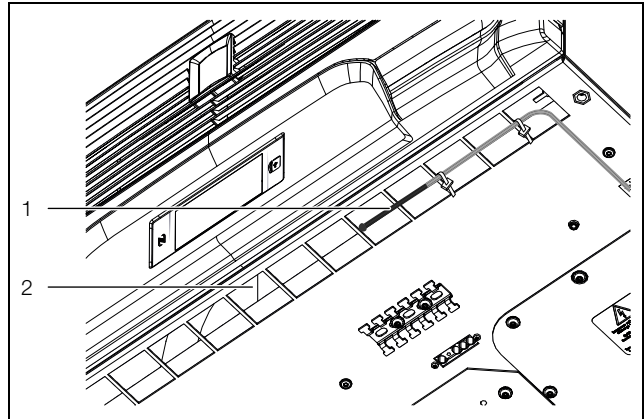


Fig. 14: Temperature sensor in front of cold air outlet

Key

- 1 Temperature sensor
- 2 Cold air discharge at the bottom of the unit



Note:

The sensor element must not be in contact with the enclosure.



Note:

To ensure the accuracy of the outlet temperature, at least 50% of the total cooling output should be installed as heat loss. The output can be taken from the characteristic curve for this unit.

Selecting a control mode

- Click on the "Control mode" symbol.
The setpoint for the currently set control mode is displayed.
- Choose your preferred control mode by selecting it from the display:

Symbol	Parameter	Setpoint	Factory setting
	Internal temperature	20 °C (68 °F)	35 °C (95 °F)
		... 50 °C (122 °F)	
	External sensor		
	Outlet temperature	18 °C (64 °F)	24 °C (75 °F)
		... 28 °C (82 °F)	

Tab. 12: "Control mode" zone

The corresponding symbol for the chosen control mode is likewise displayed on the overview page.

**Note:**

The external temperature sensor is available as accessory from Rittal (see section 13 "Accessories").

- Change the setpoint using the "Up" and "Down" arrows or select the required temperature directly.
- Confirm your entry with "OK".

Alarm threshold

This limit is used for an alarm message. The set value must therefore be above the actual setpoint to which the cooling unit has been set.

For example:

- Setpoint: 35 °C (95 °F)
- Alarm limit min.: 38 °C (100 °F)
- Alarm limit max.: 50 °C (122 °F)

Symbol	Parameter	Alarm limit	Factory setting
	Internal temperature	3 K...15 K	5 K
	External sensor		
	Outlet temperature	12 K...24 K	14 K

Tab. 13: Alarm limit

- Click on the "Alarm limit" symbol.
- Change the setpoint using the "Up" and "Down" arrows or select the required temperature directly.
- Confirm your entry with "OK".

**Note:**

In "external sensor" and "outlet temperature" control mode, the cooling unit additionally monitors the temperature of the air as it is drawn in. If the set alarm limit seems likely to be exceeded (e.g. due to a rise in heat loss), the cooling output is increased for the duration of the threatened overtemperature, and the setpoint is undercut.

Example of "outlet temperature" control mode:

- Setpoint: 24 °C (75 °F)
- Alarm limit: 38 °C (100 °F)

Current situation:

- Temperature of air intake: 37 °C (< alarm limit)
- Temperature of expelled air: 24 °C (= setpoint)

If the alarm limit is exceeded:

- Temperature of air intake: 39 °C (> alarm limit)
- Temperature of expelled air: 22 °C (< setpoint)

If the alarm limit is subsequently undercut due to an increase in the cooling output:

- Temperature of air intake: 37 °C (< alarm limit)
- Temperature of expelled air: 24 °C (= setpoint)

7.4.2 Network

- Click on the "Network" symbol to display a list of lower-level screen pages.

Symbol	Parameter
	Network on/off
	Network info

Tab. 14: "Network" zone

Network on/off

Here, you can activate / deactivate data communication to the IoT interface. Data communication is activated by default.

- Click on the "Network on/off" symbol.
- Select your preferred setting by selecting it from the display.
- Confirm your entry with "OK".

Symbol	Parameter
	Network off
	Network on

Tab. 15: Data communication settings

Network info

Get IP information about how the IoT interface is incorporated into the network.

- Click on the "Network info" symbol to display a list of lower-level screen pages.

Symbol	Parameter
	IPv4
	IPv6

Tab. 16: Select the protocol version

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IPv4

- Click on the "IPv4" symbol.
A list of general information about the IPv4 settings will be displayed.
- Page through the list using the "Up" and "Down" arrows.

Parameter	Setting
DHCP	off/on
IP address	xxx.xxx.xxx.xxx
Network mask	xxx.xxx.xxx.xxx
Router address	xxx.xxx.xxx.xxx

Tab. 17: IPv4 settings

IPv6

- Click on the "IPv6" symbol.
A list of general information about the IPv6 settings will be displayed.
- Page through the list using the "Up" and "Down" arrows.
- Click on the desired entries to display the IPv6 addresses.


Parameter	Setting
DHCP	off/on
IP address 1	...
IP address 2	...
Auto address	...
Link-local addr.	...

Tab. 18: IPv6 settings


7.4.3 Alarm relays

There are two floating relay outputs in the connection box on the rear of the unit, which may be used to output system messages from the cooling unit to an external signal source (see section 5.4.3 "Connect the alarm relays"). The relay outputs may be configured here.

- Click on the "Alarm relay" symbol to display a list of lower-level screen pages.

Symbol	Parameter
	Switch NO/NC Switch the alarm relay as a normally closed or normally open contact.

Tab. 19: "Alarm relay" zone

Symbol	Parameter
	Function list Allocation of a function to the respective alarm relay.

Tab. 19: "Alarm relay" zone





Note:

For the factory setting of alarm relay allocation see section 7.6 "List of system messages" (Tab. 23).

Switch NO/NC

The switch logic of the relay output, i.e. whether it is to be used as a normally closed or normally open contact, may be set here.

- Click on the "Switch NO/NC" symbol.
- Choose your preferred switch logic by selecting it from the display.
- Confirm your entry with "OK".

Symbol	Parameters
	Normally open Switch the alarm relay as a normally open contact.
	Normally closed Switch the alarm relay as a normally closed contact.

Tab. 20: Switch logic of the alarm relay




Note:

The factory setting of the relay outputs in their de-energised state is NO (Normally Open).


List of functions

This is where you specify which error messages should lead to switching of the respective relay output.

- Click on the "Relay 1" or "Relay 2" symbol, and select the alarm relay to which you wish to assign a function.
- From the list of errors, select the function which should cause the previously selected relay output to switch.
- If applicable, assign further functions to the relay output, and the output will then be switch if **at least one** of the assigned functions leads to an error message.
- Confirm your entry with "OK".
- If applicable, configure the other relay output with other functions.

Symbol	Parameter
	Assign relay 1



Tab. 21: List of functions

Symbol	Parameter
	Assign relay 2

Tab. 21: List of functions

7.4.4 Filter mats

- Click on the "Filter mat" symbol to display a list of lower-level screen pages.

Symbol	Parameter
	Filter reference
	Alarm tolerance

Tab. 22: "Filter mat" zone

Filter reference

Here the device may be set permanently to operation with filter mats.

- Click on the "Filter reference" symbol.
- Click on the "New filter mat" symbol.
- Confirm your entry with "OK".

If the device has already been set to operation with filter mats, by clicking on the menu point "New filter mat", the adjacent system message "Change filter mat" may be reset.



Note:

This message is also reset automatically as soon as the device identifies an improved air throughput in the external circuit thanks to the use of a new filter mat. Assessment of the air throughput only occurs when using the compression system at constant speed, and takes a few minutes.

Alarm tolerance

Here, the alarm tolerance may be set to one of five levels, or filter mat monitoring deactivated. If the set alarm tolerance is exceeded, the system message "Change filter" appears in the display.

Example:

- Setpoint: 35 °C (95 °F)
- External temperature: 20 °C (68 °F)

If an alarm tolerance level of "medium" is selected, the system will tolerate an impairment to the air throughput in the external circuit of approximately 35% before the system message "Change filter" appears in the display.

- Click on the "Alarm tolerance" symbol.
- Change the alarm tolerance ("very small" – "very large"), or deactivate filter monitoring using the "Up" or "Down" arrows.
- Alternatively, select the required level directly (factory setting: "Medium" level).
- Confirm your entry with "OK".



Note:

The more the air throughput in the external circuit is impaired, the lower the maximum cooling output and energy efficiency of the cooling unit will be.

The following diagram illustrates the development of cooling output depending on the air throughput in the external circuit and the alarm limit (fig. 15).

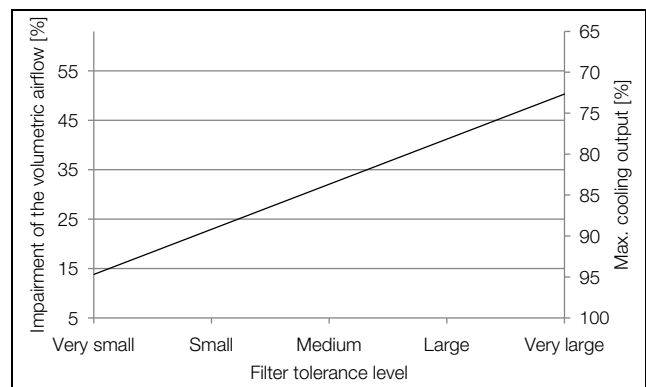


Fig. 15: Sample cooling output development



Note:

- If filter mat monitoring is deactivated ("Deactivate" level), it is still possible to select a filter tolerance level. If the limit is exceeded, the system message "Clean condenser" appears in the display instead of "Change filter".
- If filter mat monitoring is deactivated and no filter tolerance level is selected, no system message will be output.

7.4.5 Language settings

All displays on the unit are available in 21 different languages.

- Click on the "Display language" symbol.
- Page through to the required language using the "Up" and "Down" arrows.
- Confirm the chosen language with "OK".

The language will change over immediately, and all menu displays will appear in the chosen language.

7.4.6 Self-test

In the event of a malfunction in the unit which fails to produce an error message, it may be useful to check the key functions of all components with a self-test. You

7 Operation

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may continue to operate the unit as normal while the self-test is being carried out.

- Click on the "Self-test" symbol.

- Confirm the start of the self-test with "OK".

While the self-test is being carried out, a progress indicator will appear on the display. Once the test is complete, either the message "Unit OK" or "Check error" will be displayed.

- If applicable, use the error list to determine which malfunction applies.

7.5 System messages

We distinguish between three different types of system messages on the unit:

- Malfunctions ⚠
- Errors ⚠
- Servicing 🛠

If a corresponding message applies, the "System messages" symbol is displayed in the menu bar (fig. 12, item 13). A list of all possible system messages may be found in section 7.6 "List of system messages".

- Click on the "System messages" symbol.

A list of all active system messages will be displayed. The individual messages are arranged in ascending order as they occur according to the above three categories.

If an error message can only be resolved by the Rittal Service team, the "Service" symbol Ⓢ will additionally appear after the error message.

- In such cases, please contact Rittal Service (see section 14 "Customer service addresses").

7.5.1 Occurrence of a malfunction

In the event of a malfunction, the start screen will be superimposed with an error message.



Fig. 16: Screen in the event of a malfunction

Key

- 1 Superimposed
- 2 Menu bar in red

The start screen is superimposed with a message in the following two cases:

1. There is a malfunction on the unit itself.
2. The enclosure door is open and a connected door contact is emitting a corresponding message.

If the malfunctions cannot be resolved by the operator himself, the Service symbol will additionally be displayed

(fig. 12, item 14).

- Contact the Rittal Service team if you are unable to resolve the malfunction yourself (see section 14 "Customer service addresses").

7.5.2 Display in case of errors

If errors have occurred or servicing is required, the "System messages" symbol will appear in the menu bar (see section 7.5 "System messages").

Most system messages are reset automatically once the fault has been resolved.

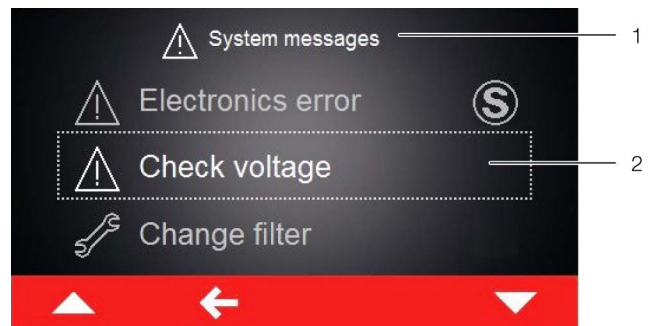


Fig. 17: Screen showing error messages

Key

- 1 "Errors" menu
- 2 Error message

If an error message applies that cannot be resolved by the operator himself and which is not reset automatically, the "Service" symbol will appear after the error message and in the control bar next to the symbol for system messages (fig. 18, item 2).

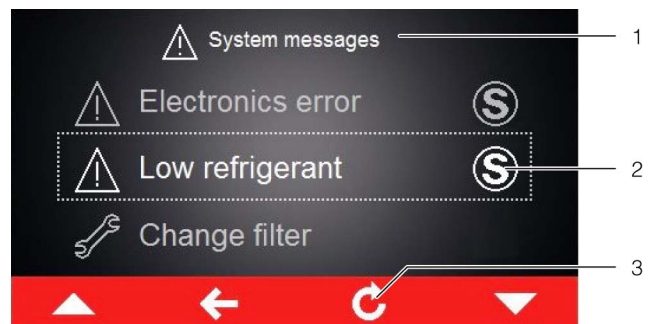


Fig. 18: Screen showing error messages

Key

- 1 "Errors" menu
- 2 Error message
- 3 "Return" button

- Contact Rittal Service (see section 14 "Customer service addresses").














- Acknowledge the error message by pressing the "Return" button.

7.6 List of system messages

The applicable error messages are displayed with the corresponding symbol in the Errors list (see section 7.5

"System messages"). Extended information for resolving individual faults may be found in this section.













Contact details for the Rittal Service team can be found in section 14 "Customer service addresses".

System message	Alarm relay output (factory setting)	Troubleshooting measures/solutions
Door open 	–	Please close the enclosure door and check the door contact switch. The error message will terminate automatically approximately 30 seconds after it has been resolved.
Int.temp too high 	–	The measured interior temperature exceeds the set alarm limit for your cooling unit. Please check any maintenance and error messages, and check the rating of your cooling unit. For any further questions, please contact Rittal Service directly.
Change filter 	–	The filter mat in your cooling unit is dirty. Please replace or clean the filter mat and confirm this by pressing reset in the list of system messages on the cooling unit display.
Clean condenser 	–	The condenser in your cooling unit is dirty. Please remove the top louvred grille and clean the heat exchanger, e.g. using compressed air. The error message will terminate automatically approximately 30 seconds after it has been resolved.
Ext. air circuit 	1	The air inlet or outlet in the external circuit is blocked. Please remove the blockage and ensure that minimum distances from the air inlet or outlet are observed.
Int. air circuit 	–	The air inlet or outlet in the internal circuit is blocked. Please remove the blockage and ensure that minimum distances from the air inlet or outlet to components inside the enclosure are observed.
Exp. valve defect  	–	A malfunction has been detected in the electronic expansion valve. Please contact your Rittal Service.
Ext.temp too high 	–	Your cooling unit is being operated outside of the admissible ambient temperature. Please ensure that the ambient temperature does not exceed the admissible range (-20 °C...+60 °C).
Low refrigerant  	2	Your cooling unit is reporting a lack of cooling in the active refrigerant cycle. Please contact the Rittal Service team immediately. The system message will need to be acknowledged manually once the cause has been rectified.
Condensate alert 	1	Please check whether the condensate water drain of your cooling unit is blocked, and remove the blockage. If you are unable to resolve the fault, please contact your Rittal Service team.
Int. fan alarm 1 	1	The fan in the internal circuit of your cooling unit is blocked. Please check if you can see a blockage and remove it. If no blockage is visible, please replace the fan in the internal circuit. The required spare part may be ordered directly from Rittal using the Blue e+ app. Please use the contact form "Generate service order".




Tab. 23: Error messages

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System message	Alarm relay output (factory setting)	Troubleshooting measures/solutions
Int. fan alarm 2 	1	The fan in the internal circuit of your cooling unit is defective. Please replace the fan in the internal circuit. The required spare part may be ordered directly from Rittal using the Blue e+ app. Please use the contact form "Generate malfunction report".
Ext. fan alarm 1 	1	The fan in the external circuit of your cooling unit is blocked. Please check if you can see a blockage and remove it. If no blockage is visible, please replace the fan in the external circuit. The required spare part may be ordered directly from Rittal using the Blue e+ app. Please use the contact form "Generate service order".
Ext. fan alarm 2 	1	The fan in the external circuit of your cooling unit is defective. Please replace the fan in the external circuit. The required spare part may be ordered directly from Rittal using the Blue e+ app. Please use the contact form "Prepare malfunction report".
Inverter cooler 	–	The cooling body of the inverter in your cooling unit is dirty. Please remove the filter grille and the cover at the front and clean the cooling body, e.g. using compressed air. The error message will terminate automatically approximately 30 seconds after it has been resolved.
Compressor defect 	2	The compressor in your cooling unit is reporting a malfunction. Please contact the Rittal Service team immediately.
Sensor xx defect 	1	Sensor xx in your cooling unit is reporting a sensor failure. Please contact the Rittal Service team.
Ext.sens. missing 	1	The external sensor is not connected or has a malfunction. Please check the connection or select another control mode.
Check voltage 	1	You are operating your cooling unit outside of the admissible voltage ranges. Please check the power supply to the cooling unit and observe the specifications on the rating plate. With a three-phase infeed, please also check that all three phases are correctly connected.
Electronics error 	2	The electronics in your cooling unit are reporting an electronic fault. Please contact the Rittal Service team.
Check parameters 	–	Due to an error, the cooling unit has been reset to the factory defaults. Please check the current messages or contact your Rittal Service team.
Inverter fault 	2	The inverter in your cooling unit is reporting a malfunction. Please contact the Rittal Service team.
Alarm mode active 	–	Due to a previous error your cooling unit is only operating with a performance of 50%. Please remedy this error and/or contact your Rittal Service team.

Tab. 23: Error messages

System message	Alarm relay output (factory setting)	Troubleshooting measures/solutions
Compressor phase 	2	The compressor in your cooling unit is reporting a malfunction. Please contact your Rittal Service team.
Overload 	1	Please check the rating of your cooling unit. For any further questions, please contact your Rittal Service team directly.
Alarm act.cooling 	–	The active cooling function of your unit is defective. Please contact the Rittal Service team immediately, and/or check the rating of your cooling unit.

Tab. 23: Error messages

8 Inspection and maintenance

8.1 Safety instructions for maintenance work

The unit must be opened in order to carry out maintenance work. There is a risk of injury from electric shock.

- Switch off the power supply before carrying out maintenance work.
 - Secure the power supply to prevent it being switched back on accidentally.
 - Disconnect the electrical connection cable of the cooling unit from the power supply.
 - Wait at least five minutes before handling the unit. Only then will the capacitors built into the unit have discharged themselves.
 - When handling the enclosure, be aware of any exposed power sources, where applicable.
 - If possible, disconnect the entire enclosure from the power.
- If assistance of other persons is required for maintenance and repair work, a person trained in handling flammable refrigerants should supervise the work at all times.

There is also a risk of injury from sharp edges, such as the louvres of the heat exchanger.

- Wear cut-resistant gloves for all maintenance work. After removing the cover, there is a risk of burn injuries from hot surfaces on the components inside the unit.
- Before carrying out any work on the interior of the unit, allow it to cool down for at least ten minutes.

8.2 Notes on the refrigerant circuit

The cooling unit is filled with the amount of refrigerant required at the factory, checked for leaks, and subjected to a functional test run. The refrigerant circuit is designed in the form of a maintenance-free, hermetically sealed system. For this reason, the operator should not carry out any maintenance work on the refrigerant circuit.



Caution!

Maintenance tasks on the refrigerant circuit must only be undertaken by a qualified refrigeration specialist.

8.3 Maintenance work on the cooling unit



Note:

The maintenance intervals given below depend to a large extent on the level of contamination in the ambient air. For heavily contaminated air, the maintenance intervals will be reduced accordingly.

8.3.1 Cleaning the cooling unit

- Clean the exterior of the cooling unit at least every 5000-8000 operating hours.
- Any stubborn, oily stains may additionally be removed using a non-flammable detergent, such as degreaser.



Caution!

Never use flammable liquids for cleaning the unit.

8.3.2 Replacing the pleated filter



Caution!

There is the risk of being cut by the louvres when the pleated filter is replaced. Wear cut-resistant gloves.

The pleated filter must be replaced regularly.

- At the top of the louvred grille labelled "Torx 30", turn the fasteners at the left and right to the "Open" position.

9 Storage and disposal

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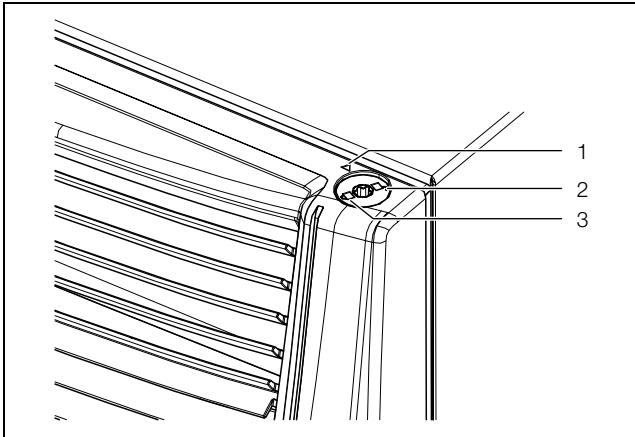


Fig. 19: Open a fastener

Key

- 1 Position display
- 2 "Open" symbol
- 3 "Closed" symbol

■ Extend the louvred grille.

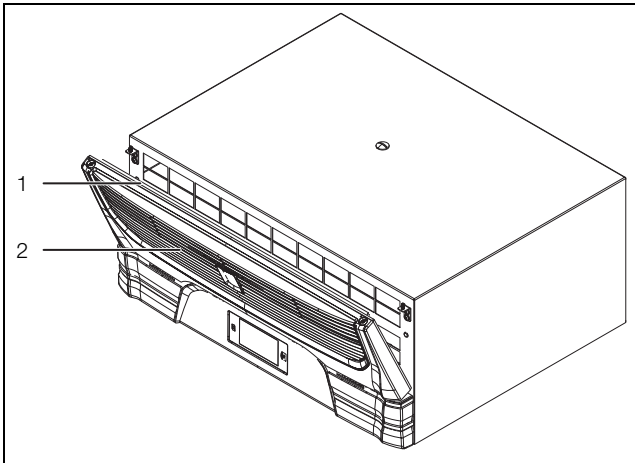


Fig. 20: Extending the louvred grille

Key

- 1 Pleated filter at the rear of the louvred grille
- 2 Louvred grille

- Remove the pleated filter at the rear of the louvred grille.
- Place the new pleated filter (3285.700) at the rear of the louvred grille.
- Extend the louvred grille to the rear and at the top of the louvred grille labelled "Torx 30", turn the fasteners at the left and right to the "Closed" position.

8.3.3 Maintenance of the fans

The installed maintenance-free fans are mounted on ball bearings, protected against moisture and dust, and fitted with a temperature monitor.

- Rittal recommends that the cooling unit fans should be checked e.g. for unusual running noises after around 40,000 operating hours.

9 Storage and disposal



Note:

When storing the cooling unit, please observe the temperature range given in the technical specifications.

- Store the cooling unit in the appropriate position for transport.

The closed refrigerant circuit contains refrigerant and oil which must be properly disposed of for the sake of the environment. Facilities for disposal are available at the Rittal plant or a specialist company. Give us a call (see section 14 "Customer service addresses").

10 Technical specifications

Pos.	Technical specifications		SK 3485730
	General specifications		
	Model number		SK 3485730
	Dimensions (width x height x depth) [mm]		700 x 310 x 565
	Cooling output		
7	Total cooling output P_c to EN 14511 [W]	L35 L35	1300
		L35 L50	660
	Sensible cooling capacity P_c to EN 14511 [W]	L35 L35	1300
	Power consumption P_{el} to EN 14511 [W]	L35 L35	670
		L35 L50	570
	Energy efficiency ratio (EER)	L35 L35	1.94
	Electrical specifications		
1	Rated voltage [V, ~], tolerance	+10%/-10%	110...240, 1
		+5%/-15%	380...480, 3
2	Rated frequency [Hz]		50/60
	Rated insulation voltage U_i [V]		500
3	Rated input [W]		750
4	Rating of over current protective device [A]		≥ 15
5	Minimum circuit ampacity [A]		15
6	Input ampere range [A]		6.8@110 V – 1.2@380 V
	Pre-fuse T [A]	EN 61439	≥ 16
		UL 508A*	≥ 15
	SCCR [kA]		5*
	Cable cross-section [mm ²]	EN 61439	≥ 1.5
		UL 508A	≥ 2.1 or ≤ 14 AWG
	Overvoltage category		III
	Level of contamination		III
	Protection category		
18	IP Rating (for installed pleated filter)		54
	Degree of protection of the enclosure for assembled unit		
19	IP Rating (for installed pleated filter)		54
20	UL Typering		12
	Electromagnetic compatibility		
	Immunity to interference		For industrial areas to EN 61000-6-2

Tab. 24: Technical specifications

10 Technical specifications

EN

Pos.	Technical specifications		SK 3485730
	Emitted interference		For residential, business and commercial areas and small companies to EN 61000-6-3
Refrigerant circuit			
17	Admissible pressure (PS) HP/LP [MPa]		2.4
11	Operating temperature range [°C]		-20...+55
	Heat pipe active mode [°C]		0...+55
	Refrigerant cycle active mode [°C]		+10...+55
	Setting range set value [°C]		+20...+50
14	Refrigerant identification		R1234yf (2,3,3,3-Tetrafluorpropen (C3H2F4))
12	Refrigerant filling mass compression system [g]		370
13	Refrigerant filling heat pipe system [g]		190
15	GWP		0,5
16	CO ₂ e [t]		0,00
Other			
	Weight [kg]		38
	Storage temperature range [°C]		-40...+70
	Noise pressure level Lp [dB(A)]		<70

Tab. 24: Technical specifications

* Type of pre-fuse: "Time delay fuse type CCMR" or one of the following UL-listed circuit-breakers (DIVQ/7):

- 3RV2711-4AD10 by SIEMENS (E235044) rated 15 A (SCCR = 65 kA)
- FAZ-C15/3-NA by EATON (E235139) Class curve C rated 15 A (SCCR = 14 kA)
- FAZ-D15/3-NA by EATON Class curve D rated 15 A (SCCR = 14 kA)

11 List of spare parts

Spare parts may be ordered directly from the Rittal web-site.



Note:

The components used are Rittal-specific components. We recommend using only original Rittal spare parts to ensure the guaranteed unit properties (output).

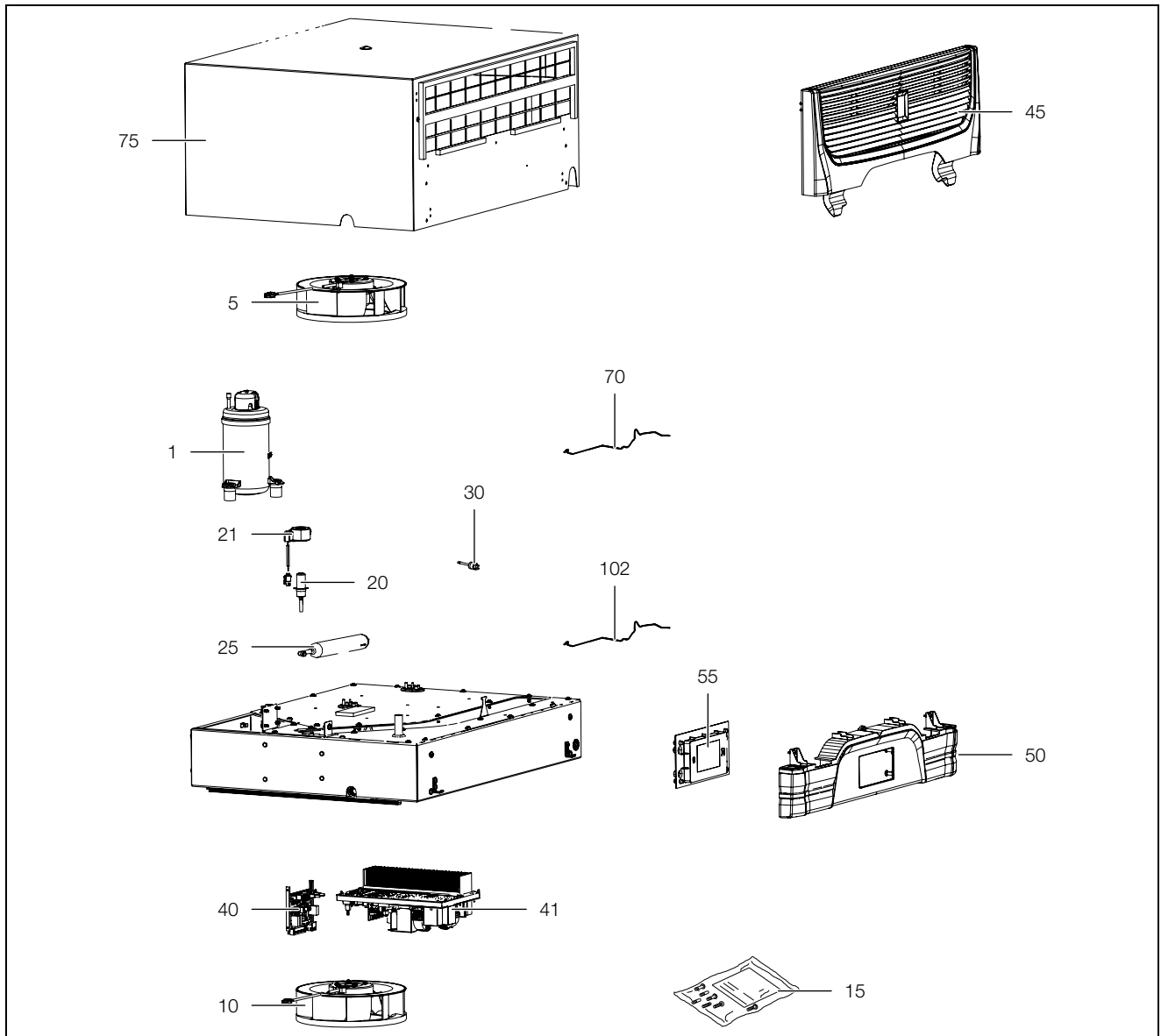


Fig. 21: Spare parts

Key

- | | | | |
|----|---|-----|-----------------------------|
| 1 | Compressor | 70 | Temperature sensor kit |
| 5 | Condenser fan | 75 | Cover |
| 10 | Evaporator coil fan | 90 | Evaporator coil |
| 15 | Shipping bag as accessories bag | 100 | Condenser |
| 20 | Expansion valve | 101 | Condensate water evaporator |
| 21 | Coil for expansion valve | 102 | Display cable |
| 25 | Filter dryer | | |
| 30 | PSA ^H pressure-operated switch as pressostat | | |
| 40 | I/O-board | | |
| 41 | Inverter | | |
| 45 | Louvred grille | | |
| 50 | Infill panel | | |
| 55 | Display/controller | | |

12 Drawings

12.1 Mounting cut-out representation

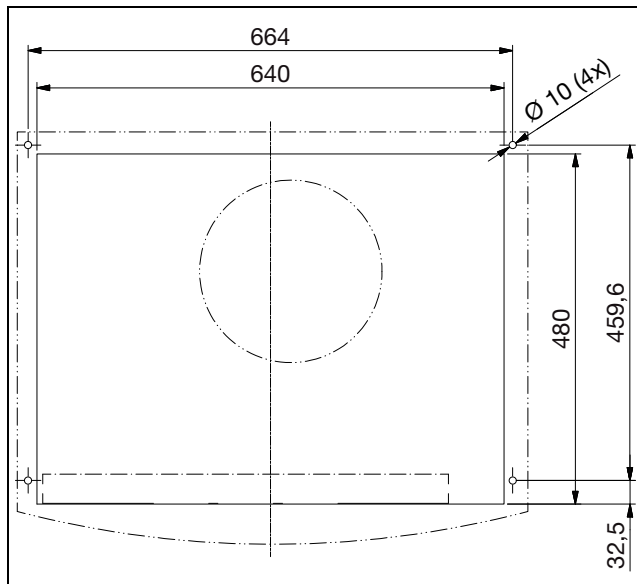


Fig. 22: Mounting cut-out

12.2 Dimensions

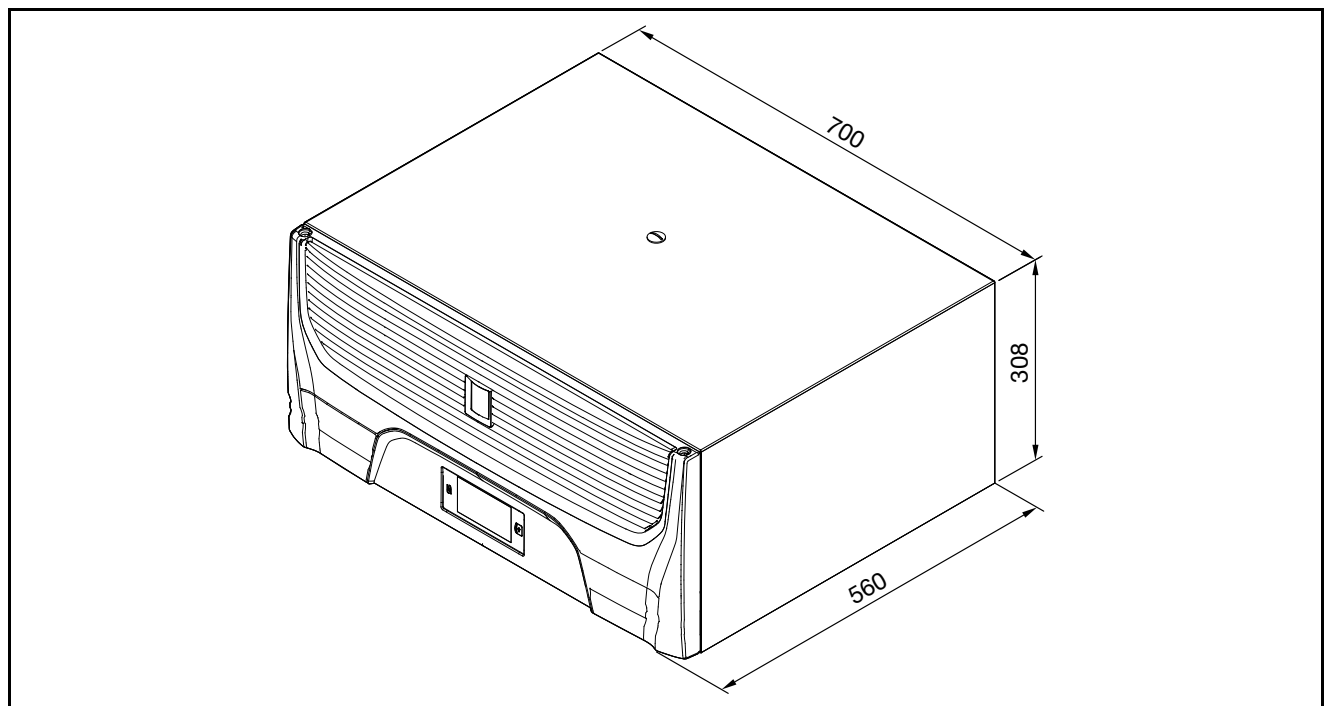


Fig. 23: Dimensions

13 Accessories

As well as the components listed below, a detailed list of the entire range of accessories may be found on the website given in section 14 "Customer service addresses".

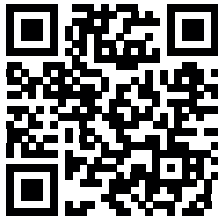
Item	Model No.
Door limit switch	SK 4127.010
M12 eyebolt	SK 4568.000
Pleated filter	SK 3285.700
Electrical condensate evaporator for Blue e+ roof-mounted cooling unit	SK 3355.720
External temperature sensor	SK 3124.400
IoT Interface	SK 3124.300
RiDiag III	SK 3159.300
Display frame	SK 3355.700

Tab. 25: List of accessories

14 Customer service addresses

Contact details can be found on the Rittal website at:

– <https://www.rittal.com/rittal-locations>



15 Compact service information

EN

15 Compact service information

Step	See	OK/comment
Assembly and connection		
– Installation site requirements taken into account	Section 5.2	
Assembly instructions		
– Observe the relevant assembly instructions	Section 5.3.1	
– Condensate water discharge connected	Section 5.3.4	
– Electrical installation (overvoltage protection, door limit switch)	Section 5.4	
Commissioning		
Check the assembly – All attachments checked, filter mat fitted		
Commissioning – At least 30 minutes after assembly	Section 6	
– Download the Blue e+ app to support commissioning and subsequent operation		
– Commissioning check carried out via Blue e+ app		
Operation		
– Check the device status during operation using the Blue e+ app		
– Read maintenance instructions and warnings or fault messages using the Blue e+ app		

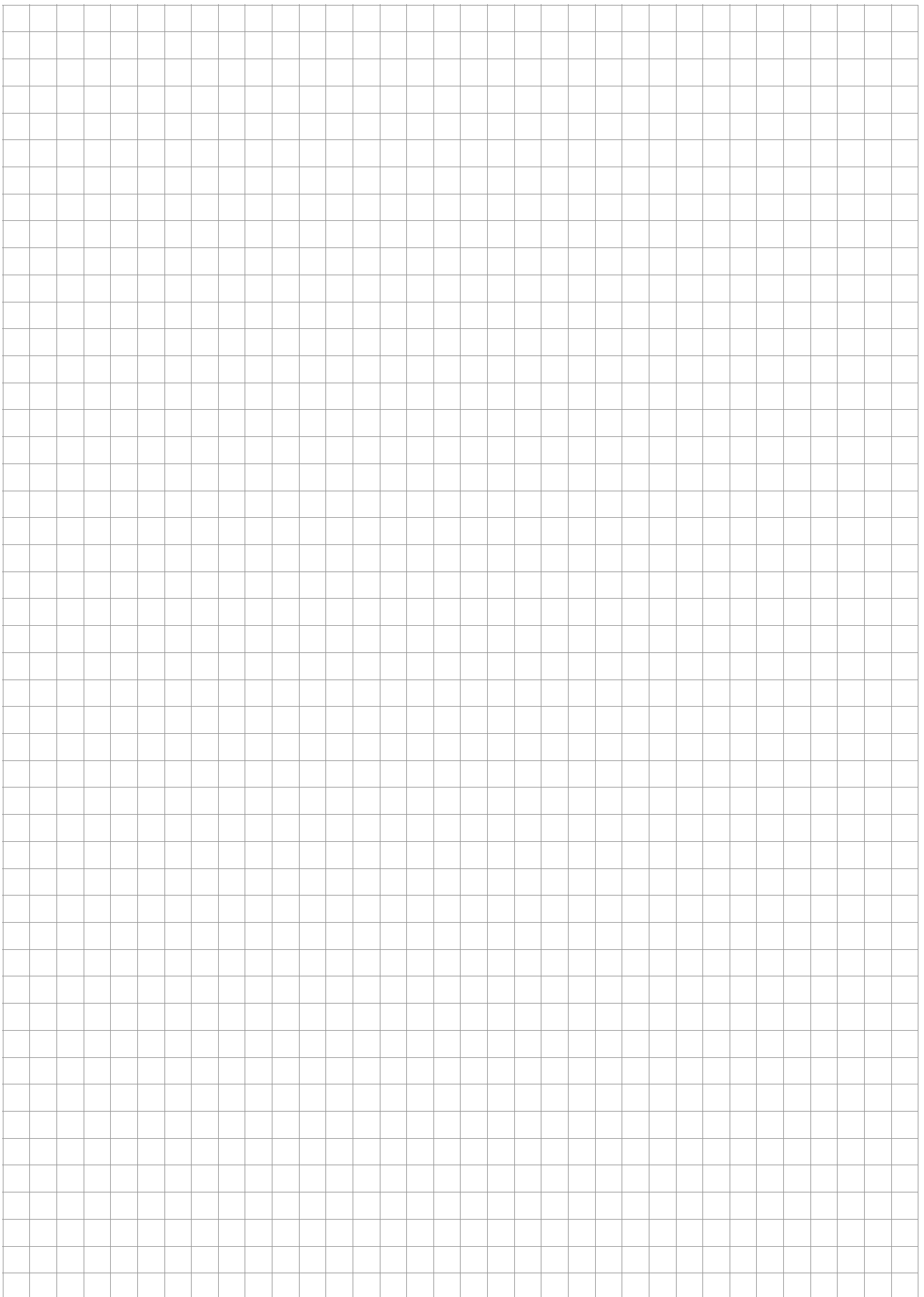
Tab. 26: Quick installation check

For all other service enquiries:

Original spare parts	Maintenance, warranty extensions (up to 5 years), service agreements
<ul style="list-style-type: none"> – Enquire directly via Blue e+ app – www.rittal.com 	<ul style="list-style-type: none"> – Enquire directly via Blue e+ app – www.rittal.com – Enquire at the relevant national company

Other service contacts worldwide: Rittal International Service HUBs (see section 14 "Customer service addresses")

Tab. 27: Service contacts worldwide



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- Power Distribution
- Climate Control
- IT Infrastructure
- Software & Services

You can find the contact details of all Rittal companies throughout the world here.



www.rittal.com/contact

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