

Rittal – The System.

Faster – better – everywhere.

LCP Rear Door CW



Passive module

3314.615	3314.625
3314.630	3314.650
3314.815	3314.825
3314.830	3314.850

Active module

3314.020	3314.025
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Water module

3314.635

Assembly and installation instructions

ENCLOSURES

POWER DISTRIBUTION

CLIMATE CONTROL

IT INFRASTRUCTURE

SOFTWARE & SERVICES

FRIEDHELM LOH GROUP



Foreword

Dear Customer,

Thank you for choosing a Rittal LCP Rear Door CW.

Please take the time to read this documentation carefully and pay particular attention to the safety instructions in the text and to section 2 "Safety instructions".

This is the prerequisite for:

- safe assembly of the LCP Rear Door CW,
- safe handling and
- the most trouble-free operation possible.

Please keep the complete documentation readily available so that it is always on hand when needed.

We wish you every success!

Yours

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

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1 Notes on documentation

1.1 Storing the documents

The assembly and operating instructions as well as all applicable documents are integral components of the product. They must be handed out to those persons who are engaged with the unit and must always be available and on hand for operating and maintenance personnel.

1.2 Symbols in these operating instructions

The following symbols are found in this documentation:



Danger!
Hazardous situation which causes death or serious injury if the instructions are not followed.



Warning!
Hazardous situation which may lead to death or serious injury if the instructions are not followed.



Caution!
Hazardous situation which may lead to (minor) injuries if the instructions are not followed.



Note:
 Information concerning individual procedures, explanations, or tips for simplified approaches. Also indicates situations which may result in material damage.

- This symbol indicates an "Action Point" and shows that you should carry out an operation/procedure.

1.3 Other applicable documents

In conjunction with these assembly and operating instructions, the superordinate system documentation (if available) also applies.

Rittal GmbH & Co. KG is not responsible for any damage which may result from failure to comply with these assembly and operating instructions. The same applies to failure to comply with the valid documentation for accessories used.

1.4 Normative instructions

1.4.1 Legal information concerning the operating instructions

We reserve the right to make changes in content. Rittal GmbH & Co. KG will not be held liable for any mistakes in this documentation. Liability for indirect damages which occur through the delivery or use of this documentation is excluded to the extent allowable by law.

1.4.2 Copyright

The distribution and duplication of this document and the disclosure and use of its contents are prohibited unless expressly authorised.

Offenders will be liable for damages. All rights created by a patent grant or registration of a utility model or design are reserved.

2 Safety instructions

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2 Safety instructions

The LCP Rear Door CW produced by Rittal GmbH & Co. KG is developed and produced with due regard to all safety measures. Nevertheless, the unit still poses a number of unavoidable dangers and risks. These safety instructions provide an overview of these dangers and the necessary safety precautions.

In the interests of your own safety and the safety of others, please read these safety instructions carefully before assembling and commissioning the LCP Rear Door CW!

Follow the user information found in these instructions and on the unit carefully.

2.1 General safety instructions

Please observe the following general safety instructions.

- Wear your personal protective equipment for all work performed on the unit (see section 2.9 "Personal protective equipment").
- Please do not make any changes to the LCP Rear Door CW that are not described in these assembly and operating instructions or other associated manuals.
- The LCP Rear Door CW should only be combined and operated with the prescribed Rittal system accessories.
- The LCP Rear Door CW service door may be opened only by appropriately qualified service personnel.
- Other than these general safety instructions, ensure you also observe the specific safety instructions when performing the tasks described in the following chapters.

2.2 Safety instructions for transportation

- There is risk of injury if the entire packaging unit collides with people during relocation. Transport the units by qualified specialists trained by Rittal.
- There is risk of injury from heavy components. Use suitable transport/auxiliary equipment (e.g. lifting eyebolt, load handling equipment and lifting gear).
- There is risk of injury from falling loads. Do not stand under suspended loads when transporting the unit with a hoist trolley, a forklift, or a crane.
- There is risk of injury caused by the unit toppling. Transport the unit only lying flat lashed down on a pallet, and in its original packaging! If it is not possible to transport the unit lying flat to the installation site due to local conditions, it must be transported by at least two persons that secure the unit from toppling.

2.3 Safety instructions for assembly

- Assemble the units by qualified specialists trained by Rittal.
- The product must only be used in restricted-access areas.
- When unpacking the LCP Rear Door CW, there is risk of being crushed between the unit and the packaging.

Wear personal protective equipment before lifting out the unit (as with all work on the unit)!

- There is risk of injury caused by the unit toppling. In the upright position, there is risk of the LCP Rear Door CW tipping over when it is not connected to a server rack. Have a second person secure the unit in an upright position or secure it to a hoist using a lifting eyebolt and lifting gear. The unit must **not** be lifted by lifting eyebolts when in the upright position.
- There is risk of injury from falling loads. If the server rack is not fully equipped, there is risk of tipping when the LCP Rear Door CW is swivelled away. Heavy equipment should be installed in the bottom part of the server rack. Where necessary, secure the server rack to the floor to prevent it tipping over.
- There is risk of being trapped between the server rack and the LCP Rear Door CW, particularly in the hinge area during assembly. Ensure that no limbs are in the danger area when the LCP Rear Door CW is being moved.
- There is risk of being trapped between the server rack and the LCP Rear Door CW when screwing the components together. Ensure that no limbs are in the danger area.
- There is risk of being trapped between the active module and the LCP Rear Door CW (passive module) when incorporating the active module. Ensure that no limbs are in the danger area.
- There is risk of injury should the water module fall (especially when installed in the roof section). Wear personal protective equipment!
- The units may need to be assembled in a warm environment, especially for a retrofitted active module. Ensure that the assembly personnel are sufficiently fit to avoid collapse due to heat effects.

2.4 Safety instructions for installation

- There is risk of being trapped when screwing on the cooling medium pipes. Wear personal protective equipment before beginning assembly and cleaning work!
- There is risk of injury in the event of leakage, particularly when using the passive module without the active module and water module. The operating company must provide shut-off valves in the cooling water pipes so that work can be performed on the unit without water pressure.

2.5 Safety instructions for operation

- There is risk of malfunction or damage. Do not modify the unit. Use only original spare parts.
- An increased noise level may occur during operation of the LCP Rear Door CW. Wear your personal protective equipment!
- Proper operation can only be ensured if the unit is operated under the intended ambient conditions. As far as possible, observe the ambient conditions for which

the unit was designed, e.g. temperature, humidity, air purity.

- The cooling water medium necessary for the control system must be available throughout the entire operating time.
- It is vital that the manufacturer's consent is obtained before adding anti-freeze!

2.6 Safety instructions for maintenance

- There is risk of cut injuries, particularly from sharp edges of the heat exchanger module. Wear personal protective equipment before beginning assembly and cleaning work!
- When removing and installing the active module, there is risk of injury from sharp edges in the interior of the LCP Rear Door CW, the active module falling, high air speeds and noise. Wear your personal protective equipment!
- There is risk of injury from the fan impellers. Keep persons and objects away from the fan impellers! Open the service door only when the power supply is disconnected and fan impellers are stationary! Always use mechanical protection when working! Tie long hair back! Do not wear loose clothing! The fan runs automatically when power is switched on!
- Observe the relevant safety data sheet for all work with the cooling medium.

2.7 Safety instructions for shutdown

- During storage and transportation below freezing point, the water circuit should be drained completely using compressed air!

2.8 Operating and technical staff

The installation, commissioning, maintenance and repair of this unit must be performed by qualified mechanical specialists.

Only instructed personnel may work on the unit while in operation.

2.9 Personal protective equipment

Personal protective equipment, which should as a minimum include waterproof protective gloves and safety goggles, must be worn during any work on the unit when personnel might come into contact with cooling medium (for deployment of a water-glycol mixture).

Personal protective equipment, consisting of at least cut-resistant gloves and safety shoes, must be worn, especially during assembly, installation and maintenance of the unit.

We also recommend the wearing of suitable ear muffs and a hair net when working near the unit.

For all work on the unit, in particular on the air outlet side, wearing safety goggles is recommended to prevent eye injuries caused by the high air speeds.

2.10 RoHS compliance

The LCP Rear Door CW fulfils the requirements of EU Directive 2011/65/EU that restricts the use of hazardous substances in electrical and electronic equipment (RoHS) from 1 July 2011.



Note:

The corresponding information about the RoHS Directive can be found on our website at www.rittal.com.

Safety instructions in accordance with Regulation (EC) No. 1907/2006

The product contains the following SVHC materials:

SVHC ingredient	CAS No.
4,4'-isopropylidendiphenol	80-05-7
Lead	7439-92-1
Cadmium	7440-43-9
Mercury	7439-97-6
Lead titanate	12060-00-3
Lead oxide	1317-36-8
Boron trioxide	1303-86-2

Tab. 1: SVHC ingredients

According to the manufacturer, there are no health risks provided the product is handled correctly during use. After use, the product must be disposed of properly in accordance with the applicable statutory regulations.

2.11 IT safety instructions

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

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).

2.11.1 Measures for products and systems

Do not embed products and systems unprotected 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.

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- 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 plant 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 units.
- The firmware can be downloaded from the associated product pages in the Internet.
- Observe the associated Release Notes for new firmware versions.

Deploy the latest 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 smartphones, and kept up-to-date.
- Deploy whitelist tools to monitor the unit context.
- Deploy an intrusion-detection system to validate the communication of your plant.

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 General functional description

The LCP Rear Door CW is essentially an air/water heat exchanger that is used to dissipate high heat losses from server enclosures or for the effective cooling of devices built into a server enclosure.

The air routing in the LCP Rear Door CW supports the "front to back" cooling principle of the devices built into the server enclosure. The hot air emitted by the devices in the server enclosure is directed through the heat exchanger module. Once the active module is installed, the fans also extract warm air from the server enclosure.

In the heat exchanger module, the heated air is directed through an air/water heat exchanger, and its thermal energy (heat losses from the server) is transferred to a cold water system. The air is cooled to a freely selectable temperature within the specified parameters and then discharged into the environment at the rear.

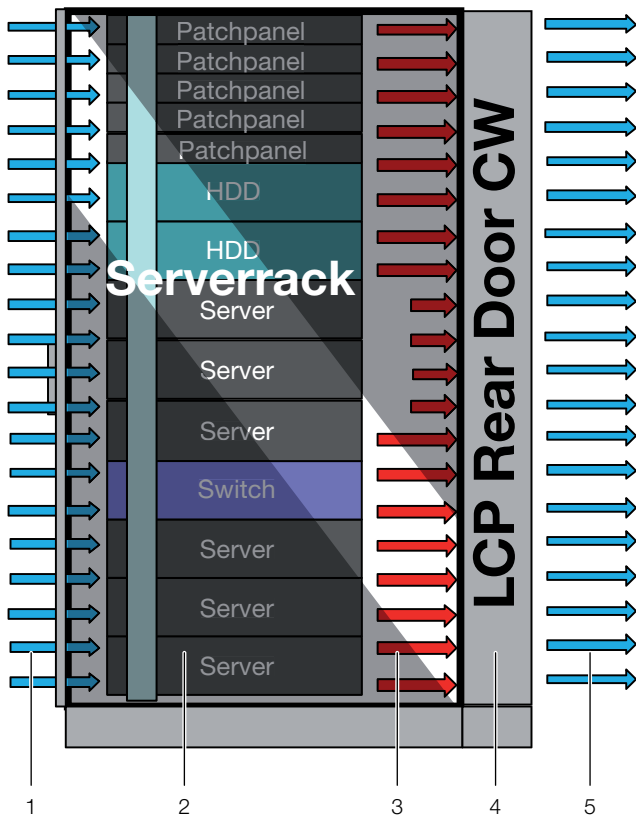


Fig. 1: Air routing on the LCP Rear Door CW – side view

Key

- 1 Cold ambient air
- 2 Server rack with installed units
- 3 Hot spot caused by failure to expel hot air
- 4 LCP Rear Door CW with air/water heat exchanger
- 5 External air flow to the LCP Rear Door CW



Note:

The water inlet temperature must always be chosen (controlled) so that it always lies above the dew point for the prevailing ambient temperature and humidity in the data centre. The dew point can be found in the Mollier h-x diagram (fig. 4).

Furthermore, we advise compliance with the ASHRAE standard "ASHRAE TC 9.9, 2011 Thermal Guidelines for Data Processing Environments".

3.2 Control modes

3.2.1 General information



Note:

Control modes can be used only when the (optional) active module and/or the (optional) water module are installed.

The LCP Rear Door CW can be operated in various, optional control modes depending on the deployment condition, when the active module and the water module are installed:

- Inlet air temperature (Auto IT supply): The reference variable is the exhaust temperature into the room (cold air). The water flow and the fan speed are controlled to provide the required cooling capacity.
- Delta-P mode (optional): If the fan speed is controlled according to the pressure difference, the pressure in front of and behind the enclosure's built-in devices is ascertained. The determined value is compared with the set setpoint for the pressure difference to determine the fan speed
- Delta-T mode: The setpoint temperature of the water return serves as reference variable. The server inlet temperature (cold air) can vary within the specified, settable limits.
- Manual control: The water flow and the fan speed are specified manually. The set parameters serve as reference variables.
- Remote operation: The water flow and the fan speed are specified by an external software system. The external parameter changes serve as reference variables.



Note:

Rittal cannot accept any liability for damage and consequential damage caused by improper parameter settings.

3.2.2 Inlet air temperature

The temperature of the cold air intake is controlled via constant comparison of the actual temperature with the

3 Product description

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setpoint temperature set on the LCP Rear Door CW (preset +24 °C).

If the server-in temperature exceeds the setpoint temperature, the control valve in the cooling water system opens (linear opening from 0 – 100%), and the heat exchanger is supplied with cold water.

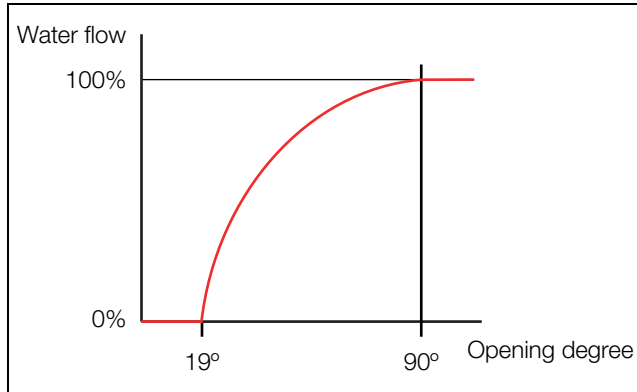


Fig. 2: Opening degree of the control valve

If the difference "server inlet temperature – setpoint value"

- is less than 0: the control valve is further closed.
- is greater than 0: the control valve is further opened.
- is equal to 0: the control valve retains its opening degree.

The temperature differential between the setpoint and the warm air that is drawn is used to determine and set the fan speed. The control unit attempts to keep the air temperature constant by activating the control valve.



Note:

The inner construction of the regulating control valve means the actual opening point lies at 19%.

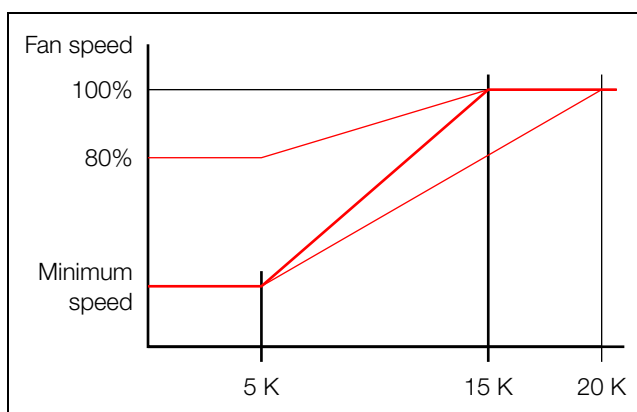


Fig. 3: Fan control

- The lower limit of the Delta-T value can be set in the range between 0 K...20 K.
- The upper limit of the Delta-T value can be set in the range between 3 K...40 K.
- The lower speed value can be set in the range between the minimum speed and 40% of the maximum speed.

3.2.3 Delta-T mode

In Delta-T mode, the water return temperature is controlled to the preset setpoint. This is done by varying the water quantity and changing the inlet air temperature (cold air) within the set limits. If control within the set values is not possible, the unit switches to controlling the inlet air temperature (see section 3.2.2 "Inlet air temperature").

3.2.4 External temperature sensor

The virtual device "LCP Temperature Controller" is used to transmit an external temperature value to the LCP Rear Door CW. This value overwrites the input variable for the control valve in automatic mode.

Procedure

- Install an external sensor, such as 7030.110 or 7010.110, in the cold aisle and connect to the climate controller. The control valve control should be set to "Automatic".
- Create a virtual device.
- Select the temperature sensor.
- Confirm the device message, e.g. using the "SET" key. The value measured by the external temperature sensor is used as the input variable for the valve.



Note:

In the LCP, active control is displayed in the visualisation and in the device tree.

3.3 Ambient conditions

The LCP Rear Door CW is used to dissipate the thermal load generated by IT equipment and prevent the installation site of the IT equipment from overheating. If IT systems are operated at excessive ambient temperatures, this may lead to malfunctions and restricted operation of the system. The correct system temperature is based on manufacturer-specific information. The LCP Rear Door CW only dissipate the thermal loads from the IT equipment, but not the thermal loads produced by lighting and other heat sources; these must be dissipated by other air-conditioning systems. In data centres, the air-conditioning systems are responsible for air quality. Where defined requirements apply to relative humidity at the installation site for the operation of IT equipment, the most efficient way of achieving this is via the air-conditioning system.

Depending on the ambient conditions, generally speaking it is advisable to regulate the intake air supplied to the data centre via an air-conditioning system. This prevents the formation of condensation on the heat exchanger due to an excessively hot or damp air supply to the data centre. If it is imperative to work with inlet temperatures below the dew point, the fresh air supply must likewise be regulated via an air-conditioning system. If there is a central air-conditioning system for basic climate control installed in the data centre, when planning

an LCP cooling system to dissipate the thermal loads, the following information must be available:

- If there is a central air-conditioning system for basic climate control installed in the data centre, when planning an LCP cooling system to dissipate the thermal loads, the following information must be available:



Note:

ASHRAE (American Society of Heating, Refrigerating and Air-Conditioning Engineers) recommends server intake air temperatures of between 18 °C and 27 °C. The selected server intake air temperature should be agreed with the manufacturer of the IT equipment and the operator at the project planning stage.

Based on the prescribed conditions, please use the Mollier h-x diagram to check whether cooling at the prescribed cold water temperature will fall below the dew point (fig. 6 4 "Mollier-h-x diagram for humid air").



Note:

To obtain support, contact Rittal.

The blue markings in the Mollier h-x diagram give an example of how to calculate the dew point for the following conditions:

- Room temperature: 22 °C
- Relative humidity: 50%

This produces a dew point of 11 °C.

Sensitive and latent cooling output

If the surface temperature of the heat exchanger in the Liquid Cooling Package is below the dew point, condensation will form on the heat exchanger. This leads to cooling capacity losses, because the energy is sometimes used for condensation (latent cooling capacity).

If, however, when working with cold water temperatures where the surface temperature of the heat exchanger is above the dew point, the energy is used only to cool the server supply air (sensitive cooling capacity).

Section 6.2 "Cooling water connection" describes a tried-and-tested hydraulic circuit which quickly and easily supplies the required volume of water at the correct temperature.

3 Product description

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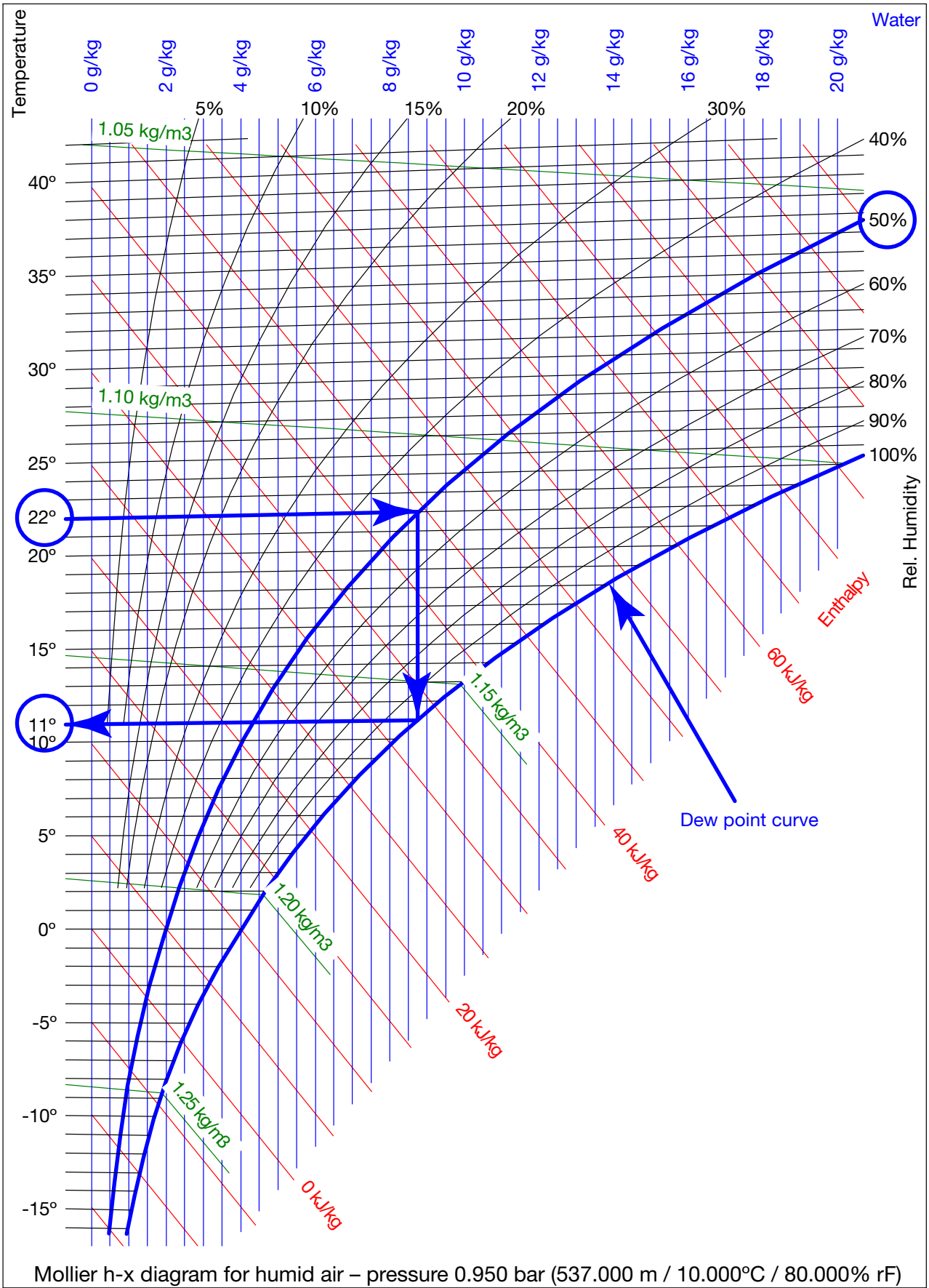


Fig. 4: Mollier-h-x diagram for humid air

3.4 Air routing

In order to achieve sufficient cooling in the server enclosure, it is important to ensure that the cooling air passes through the interior of the built-in units and is unable to flow past at the sides.

Targeted air routing in the server enclosure has a major effect on the heat loss to be dissipated. It is therefore important to assemble the device and the additional installed equipment in the server enclosure as described in section 5.2 "Assembly procedure".

In order to ensure targeted air routing in the system, the server enclosure should be divided vertically into warm air and cold air sections. The division is accomplished in the rear section of the server assembly to the left and right of the 482.6 mm (19") level using foam strips or air baffle plates which, depending on the enclosure width and the number of server enclosures to be cooled, can be ordered as an accessory (see section 15 "Accessories").

This prevents the hot air from flowing back at the sides adjacent to the server installations and forming hot spots (fig. 5).



Note:
 The 482.6 mm (19") level must likewise be completely sealed. This is already the case in a fully equipped server enclosure. If the server enclosure is partially equipped, the open height units (U) of the 482.6 mm (19") level must be sealed with blanking plates, which are available from Rittal Accessories (see section 15 "Accessories").
 As more devices are installed in the server enclosure, it becomes even more important to follow this specification.

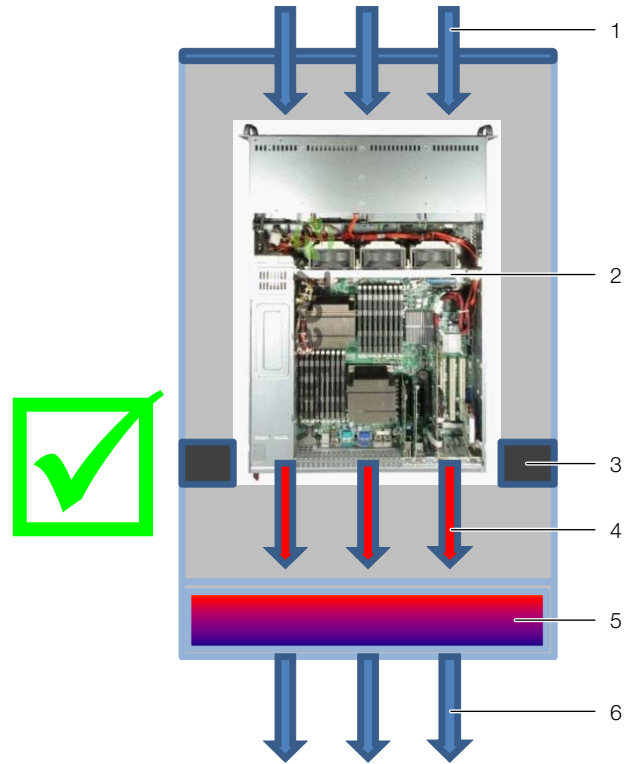


Fig. 5: Correct arrangement of the partitioning plates

Key

- 1 Cold ambient air
- 2 Installed devices
- 3 3 Partitioning plates in the rear section
- 4 Hot airflow
- 5 LCP Rear Door CW with air/water heat exchanger and Active module (optional)
- 6 Cooled air

If the air baffle plates remain in the front section of the server enclosure, hot spots may form in the server enclosure (fig. 6).

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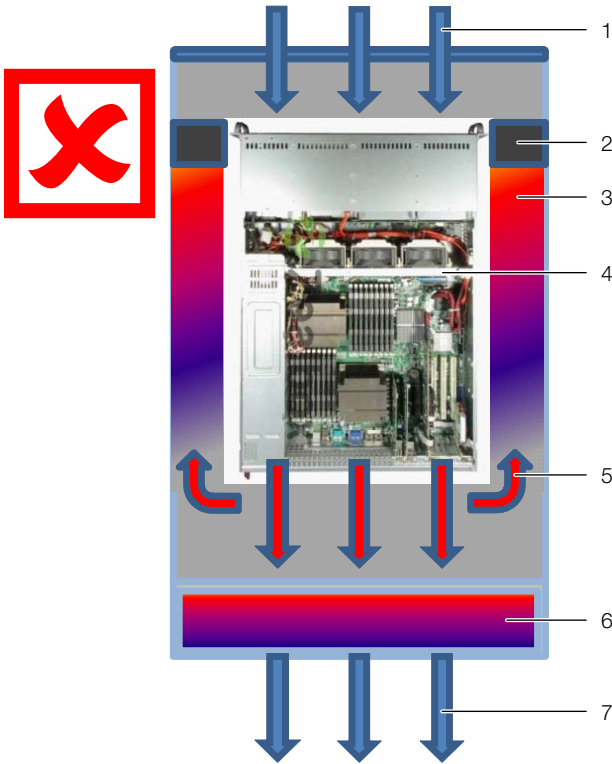



Fig. 6: Incorrect arrangement of the partitioning plates

Key

- 1 Cold ambient air
- 2 Partitioning plates in the front section
- 3 Formation of a hot spot
- 4 Installed devices
- 5 Misdirected hot airflow
- 6 LCP Rear Door CW with air/water heat exchanger
- 7 Cooled air

If devices which require sideways air throughput are built into the server enclosure (e.g. switches, router, etc.), these may be cooled through targeted placement of the foam strips or air baffle plates.

 **Note:**
When using devices which require sideways air throughput, repositioning of the air baffle plates means that the entire width of the heat exchanger is not used to optimum effect.

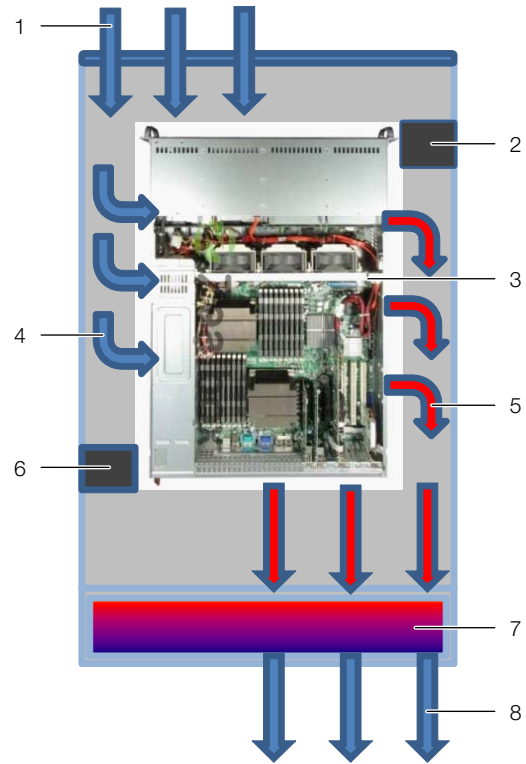


Fig. 7: Arrangement of the partitioning plates for devices with sideways air throughput

Key

- 1 Cold ambient air
- 2 Partitioning plate in the front section
- 3 Installed devices
- 4 Cold airflow in the server enclosure
- 5 Hot airflow in the server enclosure
- 6 Partitioning plate in the rear section
- 7 LCP Rear Door CW with air/water heat exchanger
- 8 Cooled air

Additionally, please observe the following regarding installed equipment in the server enclosure:

- Ensure that the 482.6 mm (19") equipment is distributed as evenly as possible inside the server enclosure. This prevents selective loading of the heat exchanger.
- Install heavy equipment with high heat generation at the bottom of the server enclosure, and passive components with low heat generation at the top.
- If the server enclosure is not fully populated, seal the open height units (U) in the 482.6 mm (19") level with blanking plates, available as Rittal accessories (see section 15 "Accessories").

 **Note:**
Foam strips may also be used as an alternative to air baffle plates.

3.5 Unit setup

3.5.1 Passive module

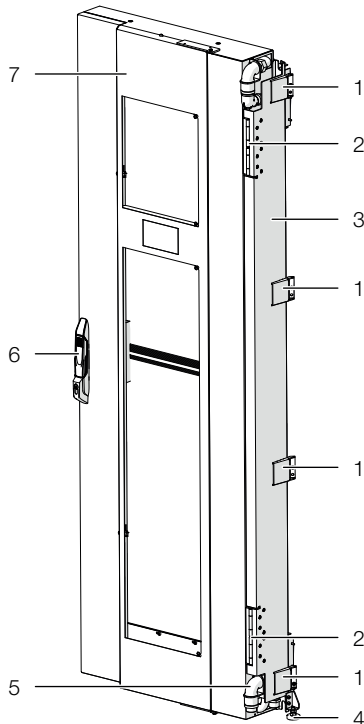


Fig. 8: LCP Rear Door CW (passive module) – front view

Key

- 1 Frame with four outer fastening points of the LCP Rear Door CW (4x)
- 2 Hinges (2x)
- 3 LCP Rear Door CW
- 4 Assembly foot
- 5 Cooling water connection, inlet
- 6 Door handle
- 7 Service door for access to the heat exchanger / active module

The LCP Rear Door CW consists of the so-called passive module, ultimately a rear door with heat exchanger and side frame.

The LCP Rear Door CW is assembled with four screws on the rear frame of the server rack and thus closes the server rack with a 2-point locking mechanism. In addition, the LCP Rear Door CW is fixed to the server rack with two support brackets.

A maintenance door is assembled in the centre of the LCP Rear Door CW. Whilst closed, this provides access protection for the heat exchanger. Alternatively, the active module can be assembled here.

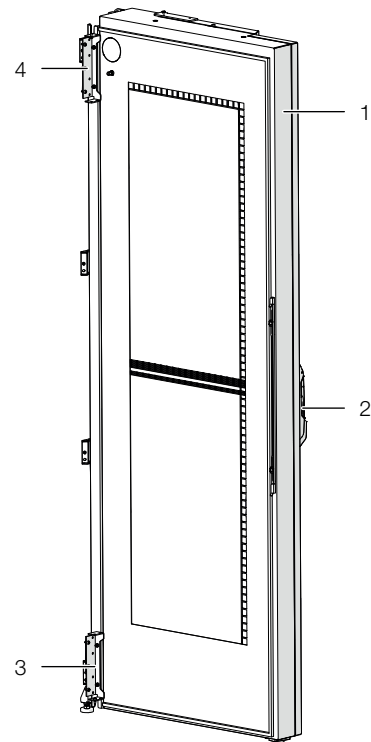


Fig. 9: LCP Rear Door CW (passive module) – rear view

Key

- 1 Enclosure
- 2 Door handle
- 3 Bottom support bracket
- 4 Top support bracket

Air/water heat exchanger with cooling water connection

The air/water heat exchanger is assembled in the LCP Rear Door CW. The cooling water connection is connected to the main connections of the cooling water inlet and return by two DN 25 (AG 1") externally threaded pipes. As standard, the connection nozzles are positioned vertically downwards.

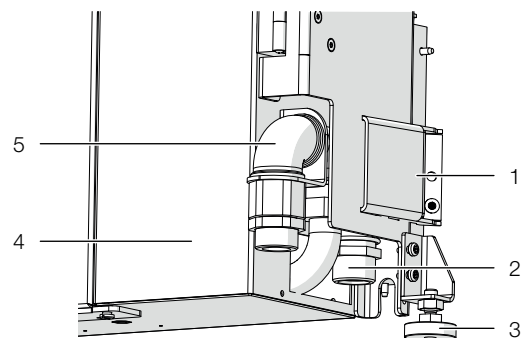


Fig. 10: Bottom connection nozzles on the LCP Rear Door CW

Key

- 1 Frame
- 2 Cooling water connection, return
- 3 Assembly foot
- 4 LCP Rear Door CW
- 5 Cooling water connection, inlet

3 Product description

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An upward connection is also available on request as an option.

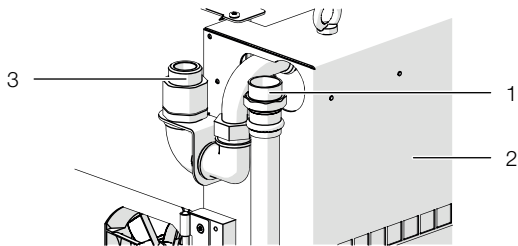


Fig. 11: Top connection nozzles on the LCP Rear Door CW

Key

- 1 Cooling water connection, return
- 2 LCP Rear Door CW
- 3 Cooling water connection, inlet



Note:

If the LCP Rear Door CW is equipped with the optional water module, the water module is connected to the connection nozzles and only from there to the on-site cooling water supply.

3.5.2 Active module

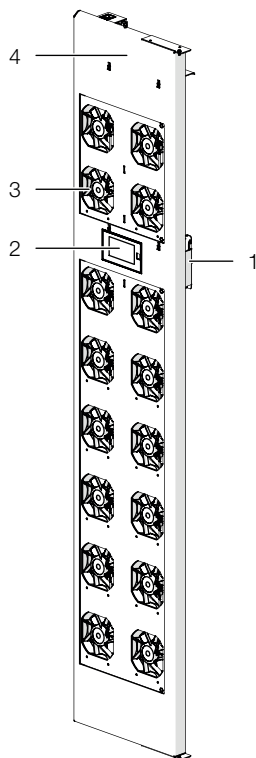


Fig. 12: Active module – front view

Key

- 1 I/O Board holder
- 2 Display (optional – assembled in the service door)
- 3 Fan (16x)
- 4 Active module

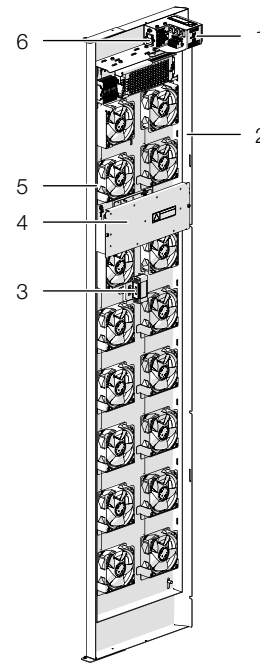


Fig. 13: Active module – rear view

Key

- 1 Network and sensor connections
- 2 Active module
- 3 CMC III temperature/humidity sensor
- 4 I/O Board holder
- 5 Fan (16x)
- 6 Mains connection

The active module consists essentially of 16 fans arranged on a common base plate. The active module is assembled completely inside the LCP Rear Door CW. The fans are controlled via a common control unit assembled in the centre of the active module.

The fans can be operated continuously from 10% – 100%.

The fans are assembled on the rear of the active module. The connections for the power supply and the control lines are also located on the rear of the active module. The air intake side of the LCP Rear Door CW is positioned against a sealing profile. This means that when installed, the fans are directly connected to the air/water heat exchanger of the LCP Rear Door CW, and thus ensure a problem-free and direct channelling of the air from the air/water heat exchanger to the active module.

3.5.3 Water module

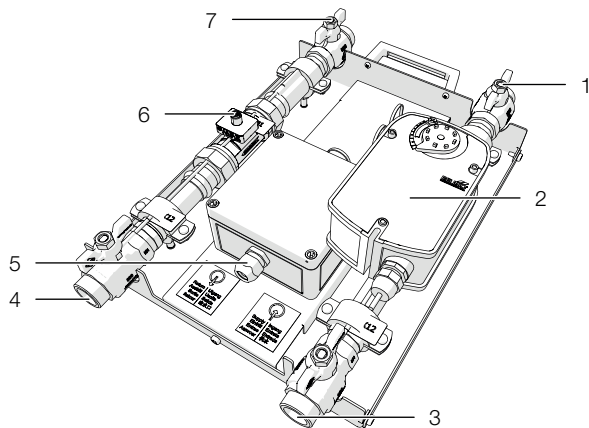


Fig. 14: Water module

Key

- 1 LCP Rear Door CW cooling water connection, inlet
- 2 Belimo stop valve
- 3 Cooling water connection, building inlet
- 4 Cooling water connection, building return
- 5 Cable with plug (X7) for connection to the active module
- 6 Flow sensor
- 7 LCP Rear Door CW cooling water connection, return



Note:

An active module is always required for the electrical connection and operation of the water module (see section 3.5.2 "Active module").

The piping for the building cooling water connection (inlet and return) of the LCP Rear Door CW runs in the water module. The water module pipes must be connected to the corresponding connections on the LCP Rear Door CW, as appropriate for the water module positioning. A motorised control stop valve is located in the cooling water inlet pipe to control the cooling water flow. A flow sensor is located in the cooling water return pipe. The cooling water connection is connected to the main inlet and return connections by two G1" externally threaded pipes for flange gaskets. The connection nozzles are arranged horizontally. The cooling water connection to the cold water network can be made by either rigid pipework or flexible hoses, which are available from the Rittal accessory range.

3.6 Proper and improper usage

The LCP Rear Door CW is an air/water heat exchanger that cools closed housings in which IT components such as servers, switches or similar are installed.

The LCP Rear Door CW must always be used in conjunction with a cold water supply, typically a chiller or free cooler. The water supply must always be a closed circuit. The water quality over the entire service life must conform to the specifications in these instructions. The unit must be deployed within the technical operating limits described in these instructions.

The Rittal LCP Rear Door CW active module may be integrated only into an LCP Rear Door CW passive module and operated there.

The 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 plant and other property.

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

Proper use also includes following the operating instructions and fulfilling the inspection and maintenance conditions.

Improper use may result in danger. Examples of improper use include:

- Use of impermissible tools.
- Improper operation.
- Improper rectification of malfunctions.
- Use of spare parts which are not authorised by Rittal GmbH & Co. KG.

3.7 LCP Rear Door CW scope of supply (passive module)

LCP Rear Door CW (passive module) scope of supply includes:

Quantity	Parts
1	LCP Rear Door CW, ready for connection
1	<ul style="list-style-type: none"> – 2x locking pieces – 4x countersunk screws M6 x 16/TX 30 – 2x countersunk screws M6 x 14/TX 30 – 4x M6 polystop nuts – 1x mounting aid (levelling foot) – 10x screws M5 x 12 (TX 30) – 2x support brackets VX-TS connection from inside – 1x sealing roll, self-adhesive – 1x earthing cable, contact washer, M8 captive nut, washer 8.4, hex screw M8 x 20, M8 nut – 1x assembly and installation instructions (short form)

Tab. 2: Scope of supply

3 Product description

EN



Note:

Please refer to the accompanying note for the scope of the supply of the optional components "Active module" and "Water module".

4 Transport and handling

4.1 Transport

Depending on the scope of supply or configuration, the LCP Rear Door CW components are supplied on a pallet for each unit (stacked four high) incl. the corresponding dispatch bag.



Danger! Injury due to falling loads!
Do not stand under suspended loads when transporting the unit with a hoist trolley, a forklift, or a crane.



Warning! Risk of injury caused by toppling the unit!
Transport the unit only lying flat lashed down on a pallet!



Warning! Risk of injury!
Please note the maximum weights that may be lifted by individuals. It may be necessary to use lifting gear.

4.2 Unpacking



Caution!
There is a general risk of being crushed when removing the LCP Rear Door CW components from the packaging.



Note:
After unpacking, the packaging materials must be disposed of in an environmentally friendly way. They are comprised of the following materials:
Wood, polyethylene film (PE film), strap, edge protectors, cardboard.

4.2.1 Passive module

The LCP Rear Door CW (passive module) is supplied lying flat on a pallet.

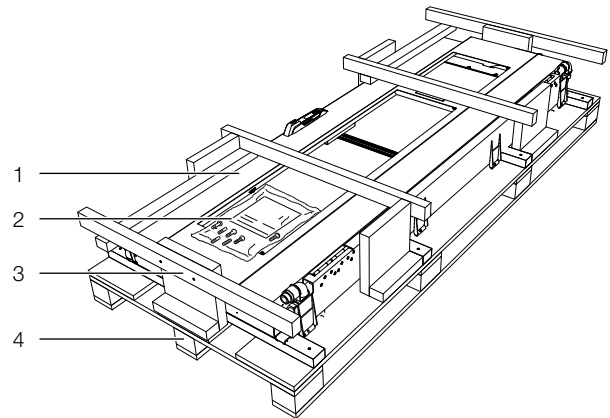


Fig. 15: LCP Rear Door CW on pallet

Key

- 1 LCP Rear Door CW
- 2 Dispatch bag
- 3 Transport clamps
- 4 Pallet

- Remove all transport clamps of the LCP Rear Door CW top and bottom, on the front and on the left-hand side of the LCP Rear Door CW. The transport clamps are screwed together with wood screws. The LCP Rear Door CW now lies between the side transport clamps on the pallet, wrapped in air-cushioned foil.

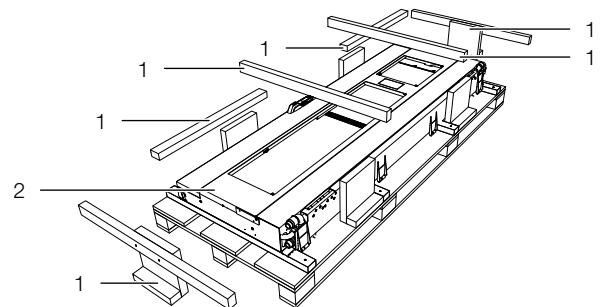


Fig. 16: Removing the transport clamps

Key

- 1 Transport clamps
- 2 LCP Rear Door CW

- Remove the transport clamps on the service door (two Torx 30 screws at the top and bottom) and open the door.
- Remove the dispatch bags from the unit and close the service door again.

4 Transport and handling

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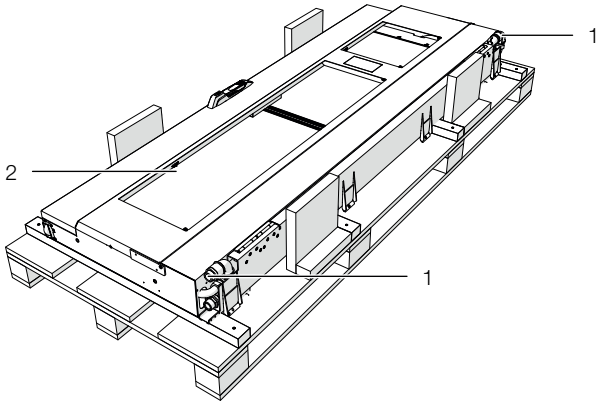


Fig. 17: LCP Rear Door CW after removing the transport clamps

Key

- 1 Water connections
- 2 LCP Rear Door CW

- If necessary, also remove the side transport clamps or lift out the unit with two persons.
- Take care not to place or lay the unit on the water connections.
- Place the unit in a suitable position and remove the air-cushioned foil.
- Check the unit for any damage that may have occurred during transport.



Warning! Risk of injury caused by toppling the unit!
In the upright position, there is risk of the LCP Rear Door CW tipping over when it is not connected to a server rack. Secure the unit in an upright position with a second person.

4.2.2 Active module

- Proceed similarly with the optional component "Active module".
The "Active module" is also packed in air-cushioned foil in-side the cardboard packaging.

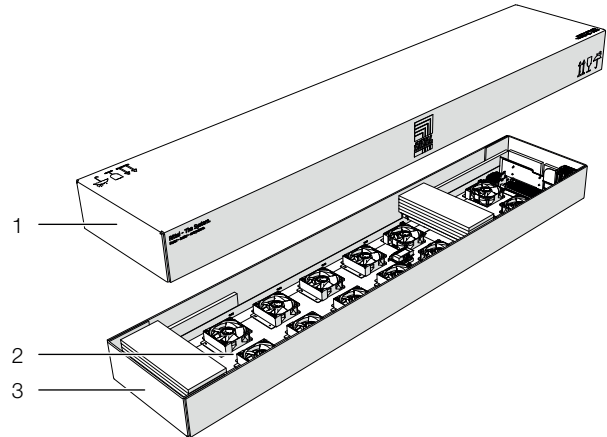


Fig. 18: Removing the snap-on cover on the active module

Key

- 1 Snap-on cover
- 2 Active module
- 3 Cardboard packaging

4.2.3 Water module

- Proceed similarly with the optional component "Water module".

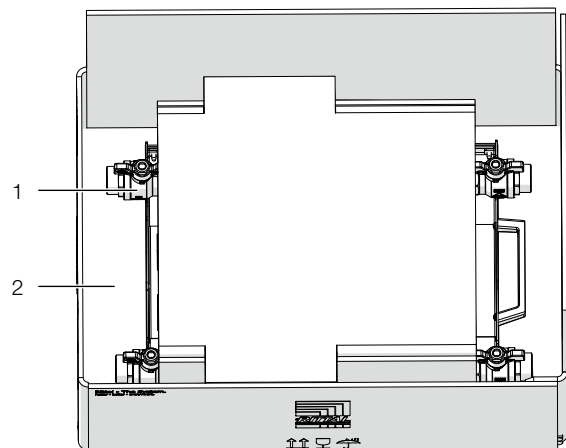


Fig. 19: Opened packaging of the water module

Key

- 1 Water module
- 2 Cardboard packaging

5 Assembly and installation

5.1 General



Warning! Injury due to falling loads!
If the server rack is not fully equipped, there is risk of tip-ping when the LCP Rear Door CW is swivelled away! Heavy equipment should be installed in the bottom part of the server rack.
Where necessary, secure the server rack to the floor to pre-vent it tipping over.



Caution! Risk of malfunction or damage!
Assemble the units by qualified specialists trained by Rittal.

5.1.1 Installation site requirements

The LCP Rear Door CW is an air/water heat exchanger for IT equipment.

Please observe the following general notes on the installation site:

- The installation site of the LCP Rear Door CW must be protected from external weather conditions.
- The installation room should be sealed in order to avoid uncontrolled air ex-change with the environment.
- The fresh air supply should be reduced to a minimum, in accordance with generally recognised technical regulations.
- If the intake air to the installation room is cooled by an air-conditioning system, ensure that the relative air humidity is adapted to the water inlet temperature of the LCP Rear Door CW. This avoids condensation and ensures maximum energy efficiency.
- The unit must not be located or operated at sites accessible to the general public. Only appropriately authorised personnel should have access to the installation site.

In order to ensure problem-free operation of the LCP Rear Door CW, the following conditions for the installation site should be observed:

Supply connections required on-site

Connection type	Connection description
Power connection:	110...240 V, 1~, 50/60 Hz Line protection in accordance with wiring plan (see section 16.4 "Wiring plan").
Cooling water connection:	15 °C inlet temperature (depending on relative humidity) Max. 10 bar permissible operating pressure Volumetric flow: in accordance with the configuration DN 25 (G1") external pipe thread

Tab. 3: Supply connections required on-site



Note:

For the cooling water connection, also observe the notes and specifications in section 6.2 "Cooling water connection" and in section 16.1 "Information concerning the filling and additive water".



Recommendation:

To facilitate servicing of the LCP Rear Door CW, maintain a distance of at least 1 m between the rear of the unit and the nearest wall. In the assembly, installation and operating instructions.

Floor conditions

- The floor of the installation area should be rigid and level.
- Choose the installation site carefully so that the unit is not situated on a step or uneven surface, etc.

Climate conditions

In accordance with the technical specifications (see section 13 "Technical specifications").



Recommendation:

Room temperature +22 °C at 50% relative air humidity, according to ASHRAE directive.

5.1.2 Installation guidelines

The positioning in the rack suites must be considered when planning the installation site. In particular, care should be taken to ensure that external air flows are not pointing directly to the rear of the LCP Rear Door CW. Such counter-flows prevent hot air from being expelled by the LCP Rear Door CW, leading to the formation of a hot spot inside the server rack.

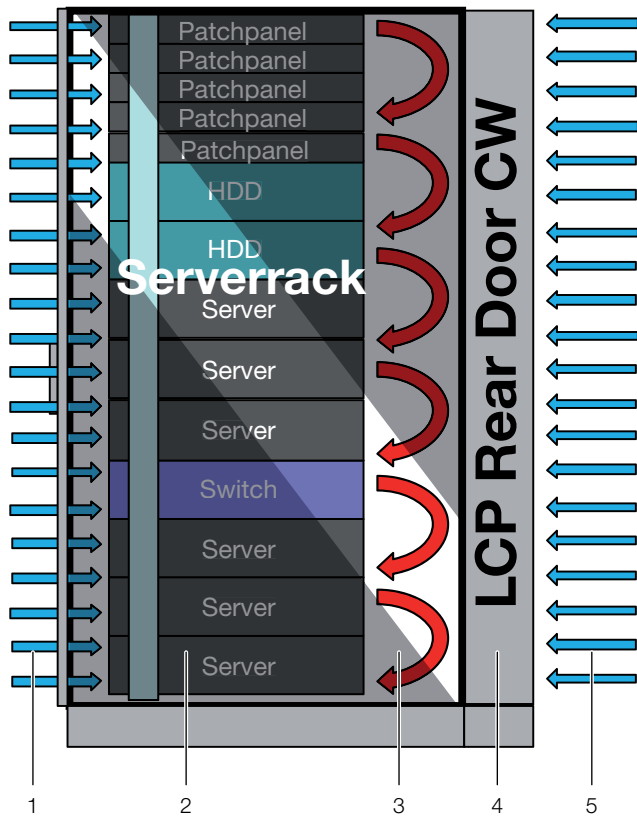


Fig. 20: Incorrect external air flow

Key

- 1 Cold ambient air
- 2 Server rack with installed units
- 3 Hot spot caused by failure to expel hot air
- 4 LCP Rear Door CW with air/water heat exchanger
- 5 External air flow to the LCP Rear Door CW

A serial layout is the best option. This means the cold air generated by the LCP Rear Door CW is drawn in by a server rack behind it. The LCP Rear Door CW installed there cools the air in this server rack, etc.

If several server racks are positioned adjacent to one another, each rack must be partitioned separately. To this end, we recommend using a partition between two racks, and a corresponding side panel as the termination.

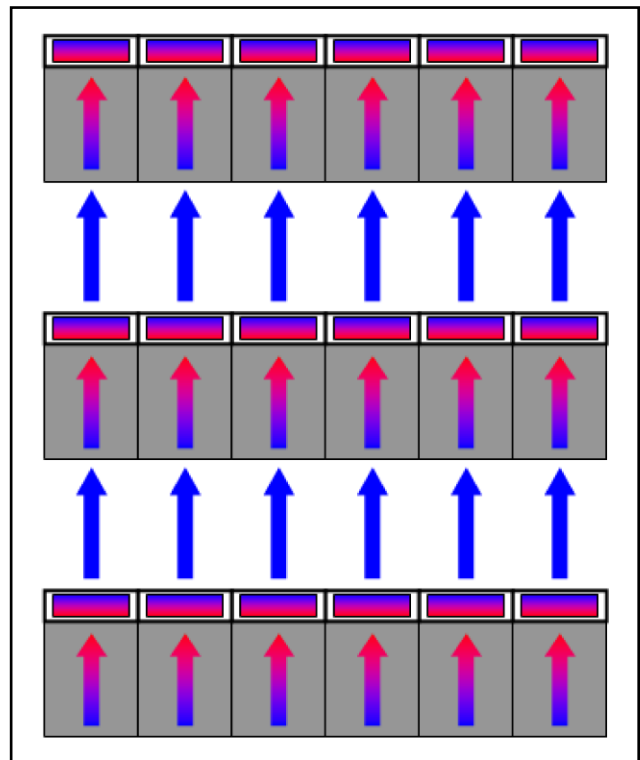


Fig. 21: Serial layout

5.2 Assembly procedure

5.2.1 General

Before the LCP Rear Door CW can be installed onto the server rack, the following work must be performed:

- Seal the server rack,
- Dismantle the rear server rack door, if present
- Remove the locking pieces for the divided rear door and
- Dismantle the right-hand side panel, if present.

5.2.2 Seal the server rack

In order to ensure targeted air routing in the system, the server rack is vertically divided into hot air and cold air zones by sealing the 19" level.

Proceed as follows to seal the 19" level:

- If the server rack is only partially configured, seal the open zones of the 19" level using blanking plates. Screw these tightly into the server rack from the rear.



Note:

Blanking plates in the various height units (U) and narrow air baffle plates are available from the Rittal accessory range (see section 15 "Accessories").

5.2.3 Dismantle the rear server rack door

For buying the LCP Rear Door CW, the rear door of the server rack (if present) must be removed. Rather than the existing server door, the frame of the LCP Rear door CW is bayed to the server rack frame.

Proceed as follows to dismantle the server rack door:

- Release and open the server rack door.



Note:
Support the server rack door so that it cannot fall during removal. If needed, work with a second person.

- Remove the rear door from the hinge, as appropriate for the installed rear door.

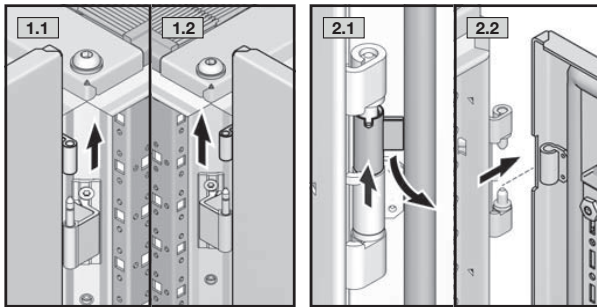


Fig. 22: Removing the rear door

Key

- 1 Vertically divided sheet steel door
- 2 One-part sheet steel door

- On each hinge, loosen the fastening screws used to secure it to the server rack.

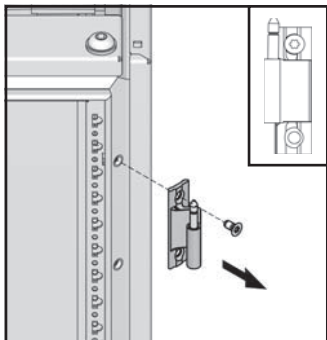


Fig. 23: Door hinge – dismantling

- Remove the rack hinges from the rear.

5.2.4 Fit the door latch mechanisms



Recommendation:
The following descriptions assume that the unit is installed in the standard version with the "door hinge on the right".

To lock the LCP Rear Door CW with the server rack, two locking pieces from the scope of supply are attached to the centre on the handle side.

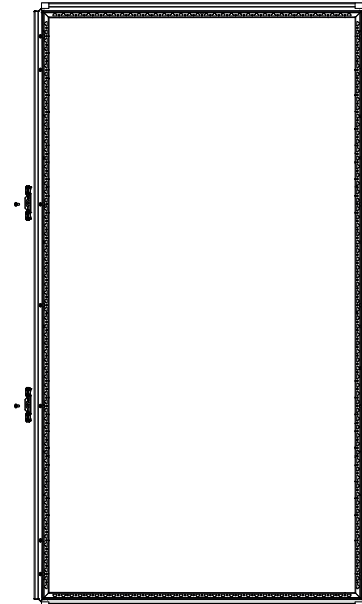


Fig. 24: Locking pieces

- Rotate the first locking piece so that the "L" marking is legible.
- Screw the locking piece through the bottom opening on one of the two middle mounting positions in the server rack.
- Similarly, attach the second locking piece to the handle side on the server rack.

5.2.5 Assembling LCP Rear Door CW



Warning! Risk of injury caused by toppling the unit!
Due to local conditions, it may not be possible to transport the unit lying flat to the installation site. In this case, the unit must be transported by at least two persons who secure it against toppling.



Caution! Danger of becoming trapped!
There is risk of being trapped between the server rack and the LCP Rear Door CW, particularly in the hinge area during assembly. Ensure that no limbs are in the danger area when the LCP Rear Door CW is being moved.



Caution! Danger of becoming trapped!
There is risk of being trapped between the server rack and the LCP Rear Door CW when screwing the components together. Ensure that no limbs are in the danger area.

5 Assembly and installation

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Note:

The LCP Rear Door CW must be assembled by least two persons.

- When transporting the unit in an upright position, at least two persons must be assigned to ensure that the unit does not tip.
- Transport the LCP Rear Door CW to the immediate vicinity of the installation site and place it behind the server rack on which it should be assembled.

While the unit is still lying, the assembly foot must first be fitted to the unit. To do this:

- Measure the distance from the floor to the lower, first hole on the rack to which the frame is attached later.
- Select from the three holes, the two that best match the distance (top or bottom).

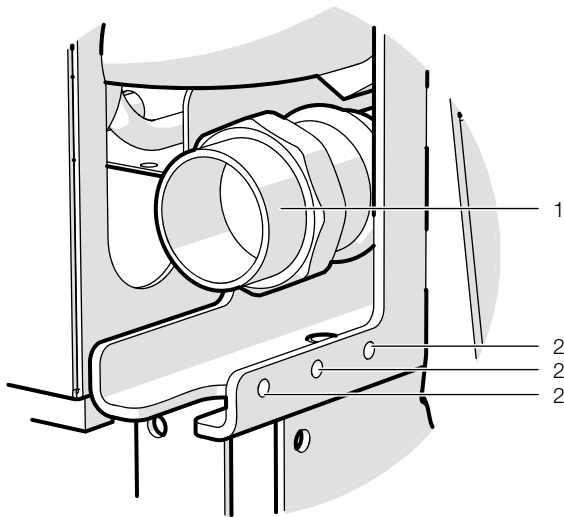


Fig. 25: Fastening point of the assembly foot (unit lying flat)

Key

- 1 Cooling water connection, return
- 2 Fastening points (3x)

- Mount the assembly foot bracket to the frame using two fastening screws.

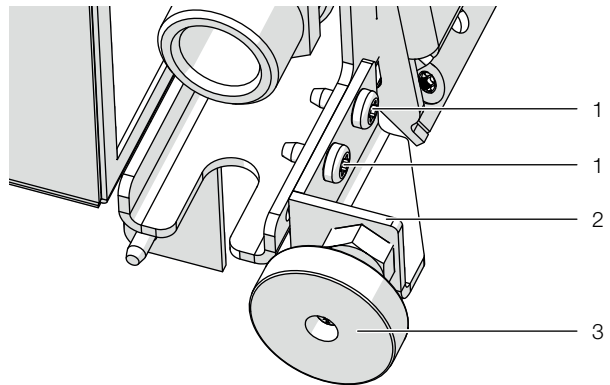


Fig. 26: Fastening the assembly foot (here the top position)

Key

- 1 Fastening screws (2x)
- 2 Assembly foot bracket
- 3 Assembly foot

- Finally, adjust the assembly foot on the thread to set the previously measured distance.

There is a transport castor at the bottom of the LCP Rear Door CW for safely swivelling the LCP Rear Door CW away from the server rack and back into the end position on the server rack.

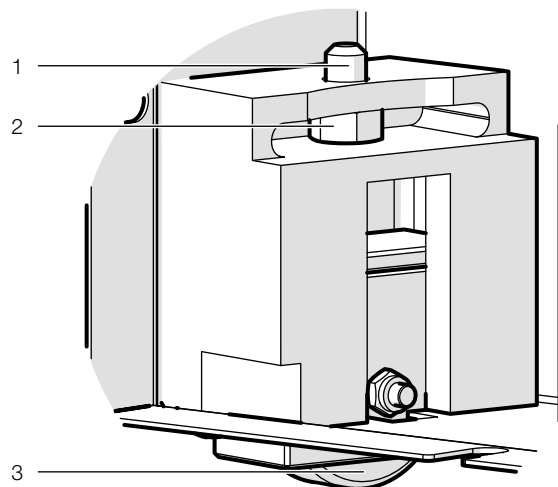


Fig. 27: Transport castor on the LCP Rear Door CW

Key

- 1 Threaded rod
- 2 M10 nut for setting the height
- 3 Transport castor

- Also adjust the position of the transport castor on the LCP Rear Door CW lying flat using the nut so that the castor is approximately level with the assembly foot. In this position, the LCP Rear Door CW should later remain at the height of the server rack during the swivelling movement (i.e. it should neither rise nor sink).

The LCP Rear Door CW can then be mounted on the rack.

- Align the LCP Rear Door CW to the server rack with at least two persons.

- Rotate the LCP Rear Door CW so that the fastening points and the cooling water connections are on the right-hand side.
- Push the LCP Rear Door CW onto the server rack and align so that the four outer fastening points (item 1) of the LCP Rear door CW are flush with the corresponding openings in the server rack.

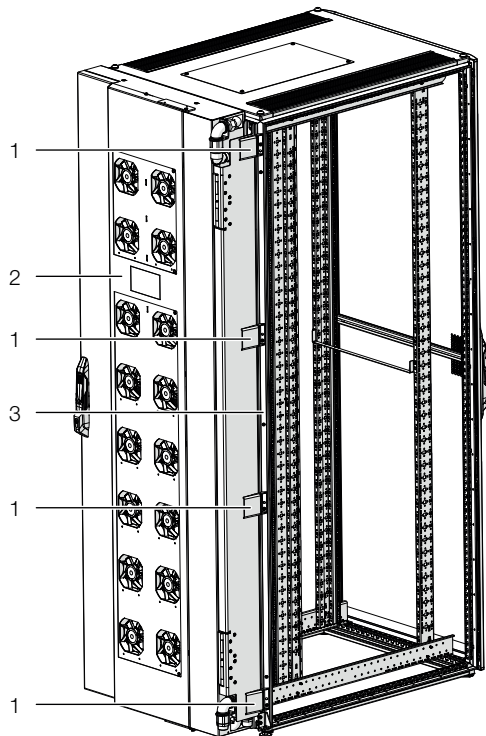


Fig. 28: Frame with four attachment holes of the LCP Rear Door CW

Key

- 1 Frame with four attachment holes
- 2 LCP Rear Door CW
- 3 Server rack

- Screw the frame onto the four fastening points to which the standard server rack door hinges are attached.

The LCP Rear Door CW is also screwed to the inside of the server rack at the top and bottom.

- Swing the LCP Rear Door CW away from the server rack to provide access to the rear of the server rack.

The two support brackets from the accessories bag must then be mounted to the top and bottom of the rack.

- Then mount the upper support bracket on the rack using four fastening screws.

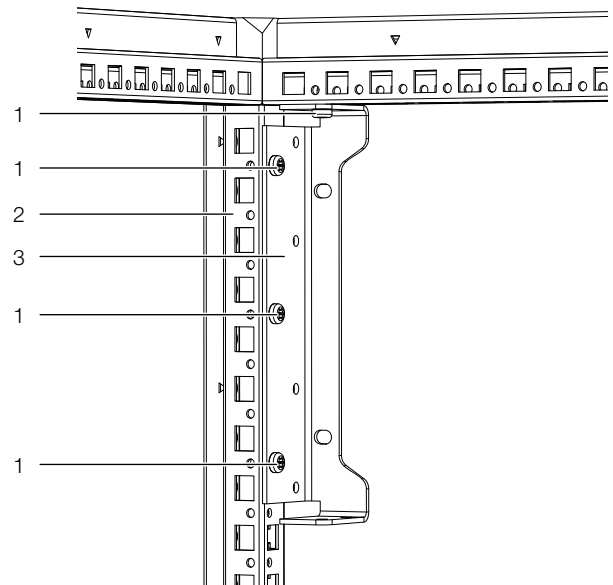


Fig. 29: Fastening the top support bracket to the rack

Key

- 1 Fastening screws (4x)
- 2 Server rack
- 3 Upper support bracket

- Mount similarly the lower support bracket on the rack using four fastening screws.

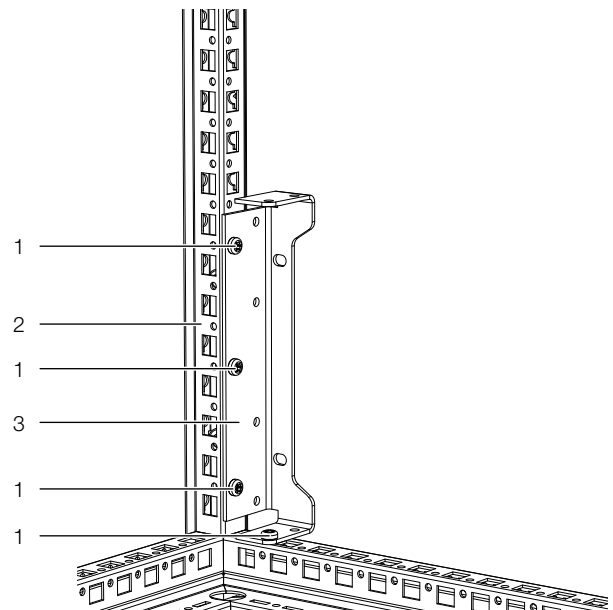


Fig. 30: Fastening the lower support bracket to the rack

Key

- 1 Fastening screws (4x)
- 2 Server rack
- 3 Lower support bracket

- Fasten the frame at the top to the support bracket with two polystop nuts from the accessories.

5 Assembly and installation

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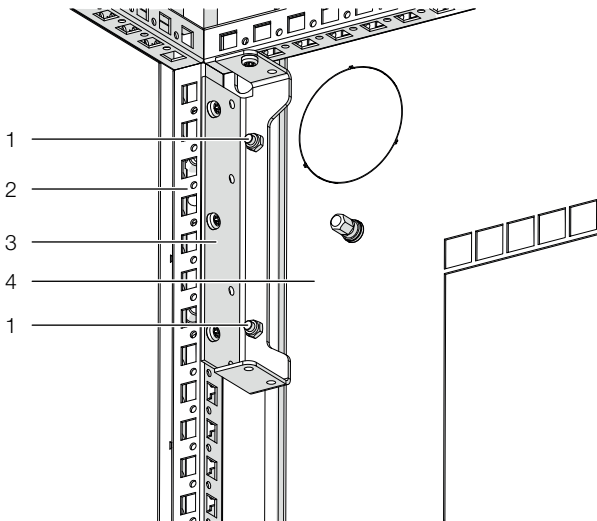


Fig. 31: Fastening the upper support bracket to the frame

Key

- 1 Polystop nuts (2x)
- 2 Server rack
- 3 Upper support bracket
- 4 LCP Rear Door CW (inside)

- Fasten the frame at the bottom inside also with two polystop nuts from the scope of supply.

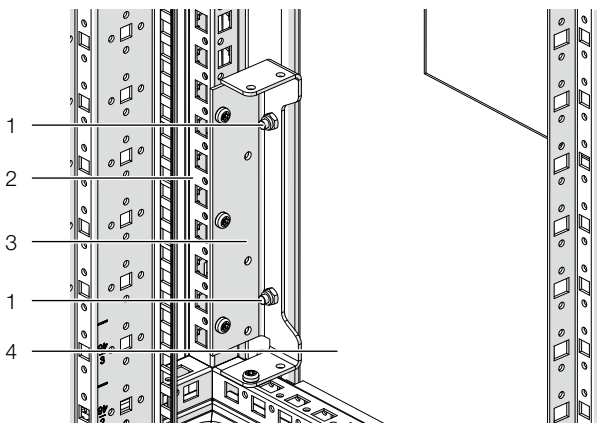


Fig. 32: Fastening the lower support bracket to the frame

Key

- 1 Polystop nuts (2x)
- 2 Server rack
- 3 Lower support bracket
- 4 LCP Rear Door CW (inside)

- Ensure that the LCP Rear Door CW is in contact with the server rack.

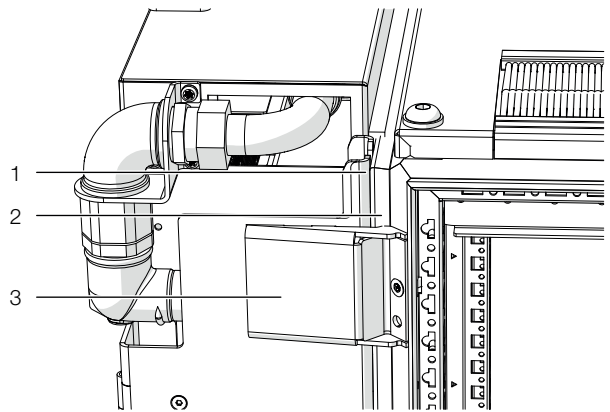


Fig. 33: Placing the LCP Rear Door CW on the server rack

- Remove the assembly foot from the LCP Rear Door CW.
- Establish an earthing connection between the LCP Rear Door CW and the rack frame.

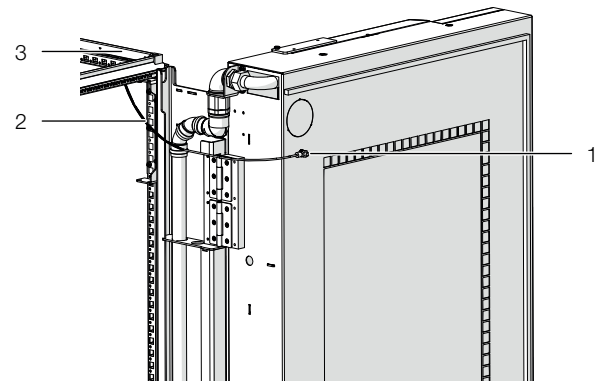


Fig. 34: Earthing connection between LCP Rear Door CW and the rack frame

Key

- 1 Passive module earthing point
- 2 Earthing cable
- 3 Rack frame

Note:
 Observe the information in the wiring plan (see section 16.4 "Wiring plan") when establishing the earthing connections.

- Take the seal from the accessories bag and stick it onto the inside of the enclosure. Please note the following:
 - On the rear of the enclosure is an embossing showing the correct positioning of the seal.
 - The seal must be laid around the edge of the device.
 - At the joint where the horizontal section meets the vertical section, the seal should be cut and re-positioned.

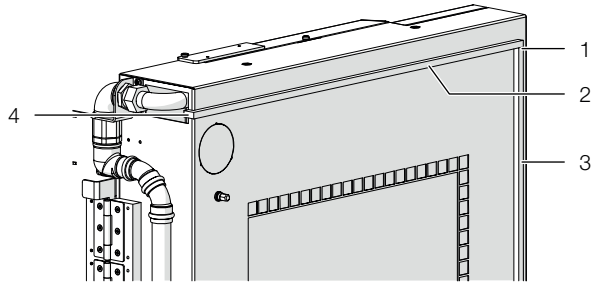


Fig. 35: Seal in the upper enclosure section

Key

- 1 Joint
- 2 Seal running horizontally
- 3 Seal running vertically
- 4 Seal stuck around the edge

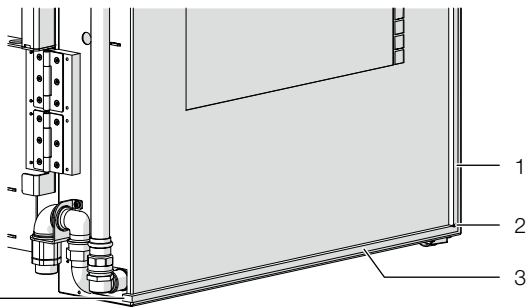


Fig. 36: Seal in the lower enclosure section

Key

- 1 Seal running vertically
- 2 Joint
- 3 Seal running horizontally
- 4 Seal stuck around the edge

- Take a section of seal from the accessories bag and stick it onto the inside of the frame across the entire height.
- Take care to ensure that the seal is flush with the frame at the top and bottom.

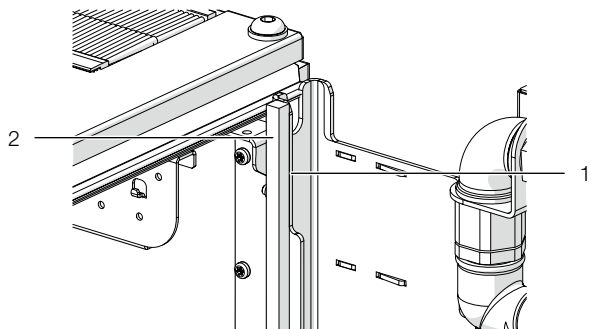


Fig. 37: Seal at top of frame

Key

- 1 Frame
- 2 Seal

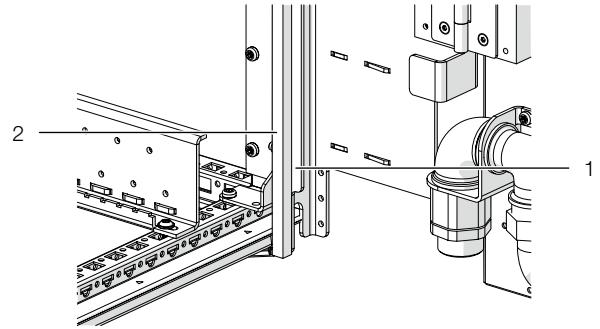


Fig. 38: Seal at bottom of frame

Key

- 1 Frame
- 2 Seal

5.2.6 Install the optional display



Note:

The display should be fitted before installing the active module, because free access to the rear of the service door is still possible at this point.



Caution! Risk of injury!

When installing the display, there is the risk of injury caused by sharp edges inside the LCP Rear Door CW. Wear personal protective equipment (PPE)!

In its delivered state, the front door of the LCP Rear Door CW is prepared for installing the optional display. The cut-out in the service door is covered with an inside cover at the factory.

- Open the service door of the LCP Rear Door CW.
- Loosen and remove the four nuts that secure the retaining plate on the inner side to the service door studs.

5 Assembly and installation

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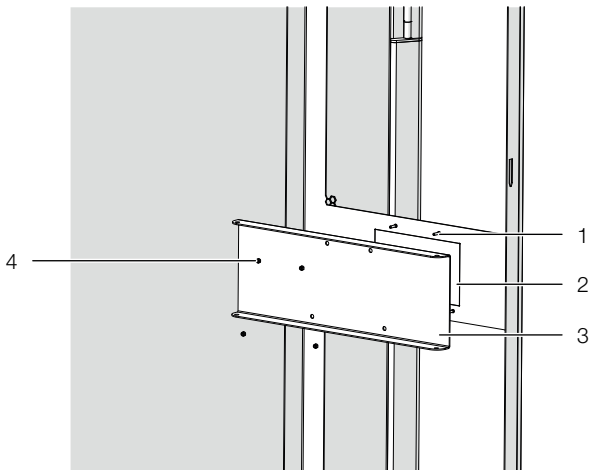


Fig. 39: Dismantling the retaining plate

Key

- 1 Studs
- 2 Cut-out in the service door
- 3 Cover
- 4 Nut (4 x)

- Remove the retaining plate from the service door.
- Break the prepared punch-out (e.g. by hitting it with a hammer) from the service door of the LCP Rear Door CW.
- Push the display onto the studs from the inside until it rests against the service door front of the LCP Rear Door CW.

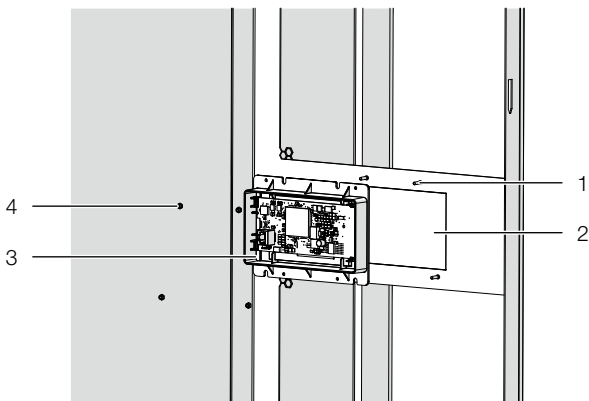


Fig. 40: Inserting and fastening the display

Key

- 1 Studs
- 2 Cut-out in the service door
- 3 Display
- 4 Nuts M3 (4 x – max. torque 0,5 Nm)

- Screw the M3 nuts onto the studs (max. torque 0.5 Nm) and fasten the display to the door inside.



Note:
The electrical connection of the display and the connection of the earthing cable are performed after installing the active module.



Note:
To clean the display, use appropriate cleaning agents, such as normal household detergents, that do not attack the display surface.

5.2.7 Installing the active module (optional)

After installing the LCP Rear Door CW (passive module), the active module can be installed as option.

- First open the service door.
The active module is installed at the rear of the service door.

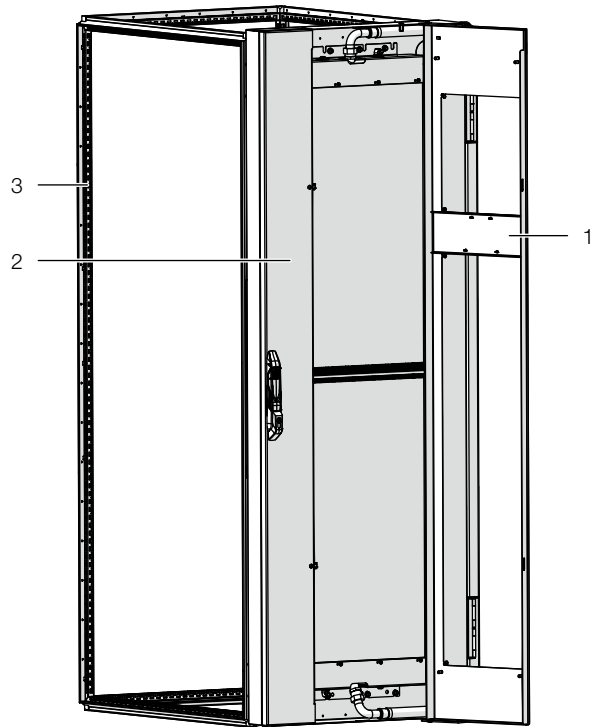


Fig. 41: Opened service door

Key

- 1 Opened service door
- 2 Installed LCP Rear Door CW (passive module)
- 3 Enclosure

- Lightly screw two M8 nuts from the dispatch bag onto the studs in the upper area (approx. 2 to 3 turns).

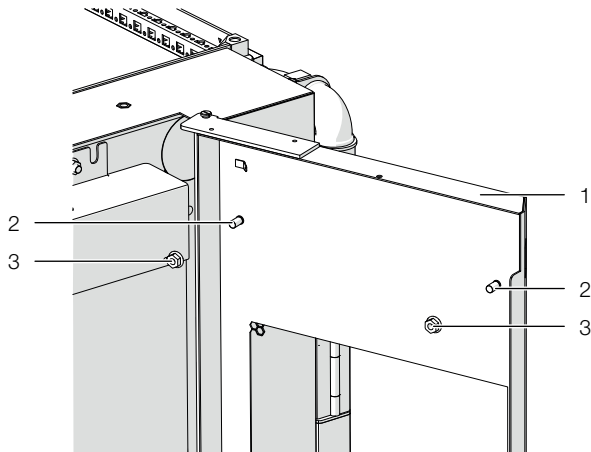


Fig. 42: Opened service door – upper studs and nuts

Key

- 1 Opened service door
- 2 Studs (2 x)
- 3 Nuts (2 x)

- Attach the active module with the keyholes into the two upper studs behind the pre-mounted nuts.

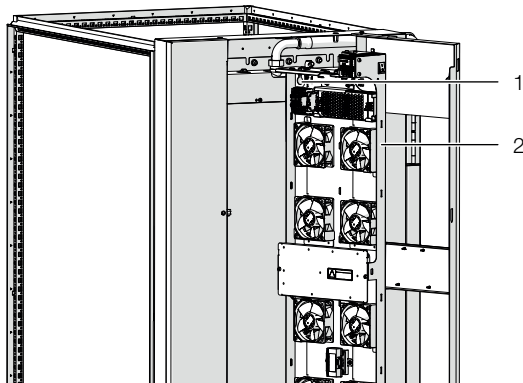


Fig. 43: Attaching the active module

Key

- 1 Keyhole
- 2 Active module

- Ensure that the lower studs are inserted into the corresponding holes at the bottom of the active module.
- Fully tighten the two nuts on the upper studs.
- Screw two further nuts from the dispatch bag onto the lower studs and secure the active module in its final position.

Connection of the display

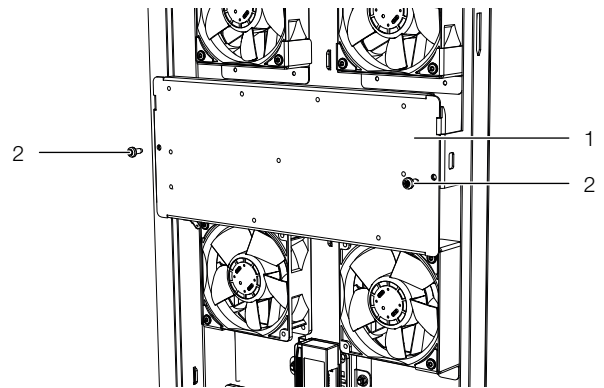


Fig. 44: Loosening the CIOC board

Key

- 1 CIOC board holder
- 2 Fastening screws (2 x)

- Loosen the two fastening screws that secure the CIOC board holder to the active module.
- Remove the holder, including the CIOC board, and fasten it above the display.

You now have access to the display rear and the connection sockets.

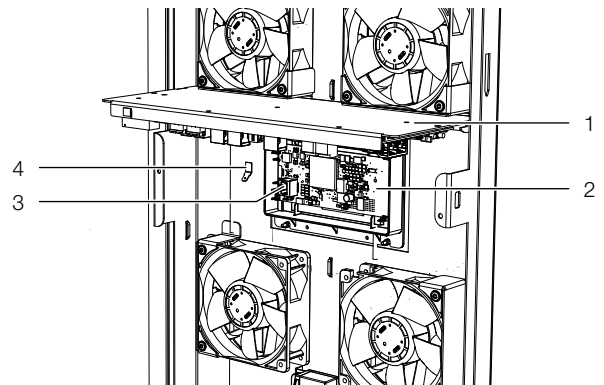


Fig. 45: Opened CIOC board

Key

- 1 CIOC board holder
- 2 Display rear
- 3 Signal cable connection socket and earthing tag
- 4 Active module earthing tag

- Insert the connection cable into the connection socket on the display rear.
- Insert the other end of the cable into the X14 connection of the CIOC board.
- Connect the enclosed earthing cable to the flat plug connection at the display rear (below the connection socket) and to the envisaged connection point on the active module.
- Place the holder with the CIOC board back in its original position and secure it with the two fastening screws.

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Note:
Further notes can be found in the accompanying note included with the display.

Installing the temperature sensors

The three temperature sensors must then be installed on the **warm air side** (server exhaust air).

- To do this, first push the temperature sensors out of the openings in the housing towards the hinge side of the entire LCP Rear Door CW.

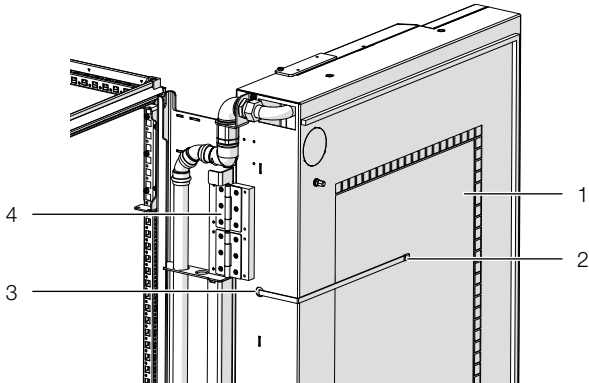


Fig. 46: Positioning the temperature sensors

Key

- 1 Warm air side of the heat exchanger
- 2 Temperature sensor
- 3 Opening in the housing
- 4 Hinge side

- Then position the temperature sensors horizontally, roughly in the centre in front of the heat exchanger.
- Fasten the temperature sensors in this position on the hole grid in front of the heat exchanger and on the bridge punching using two cable ties.

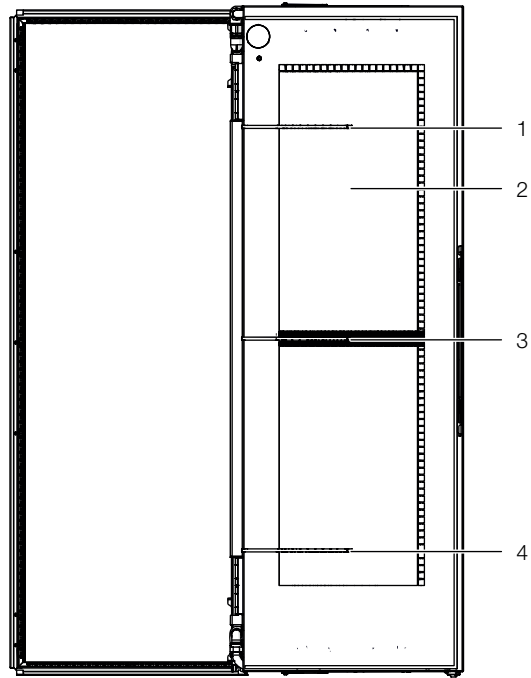


Fig. 47: End position of the temperature sensors

Key

- 1 Top
- 2 LCP Rear Door CW inner side
- 3 Centre
- 4 Bottom

5.2.8 Installing the water module (optional)

Once the active module has been installed, the water module can be installed. This is typically located in the raised floor below the LCP Rear Door CW.

- At the final installation location of the LCP Rear Door CW: Install the water module so it can be easily connected later between the building cooling water connection and the LCP Rear Door CW (see section 6.2 "Cooling water connection").
- The water module must be located not more than 3 metres from the LCP Rear Door CW. The connection cable is 5 m long and must be connected to the rear upper area of the LCP Rear Door CW.

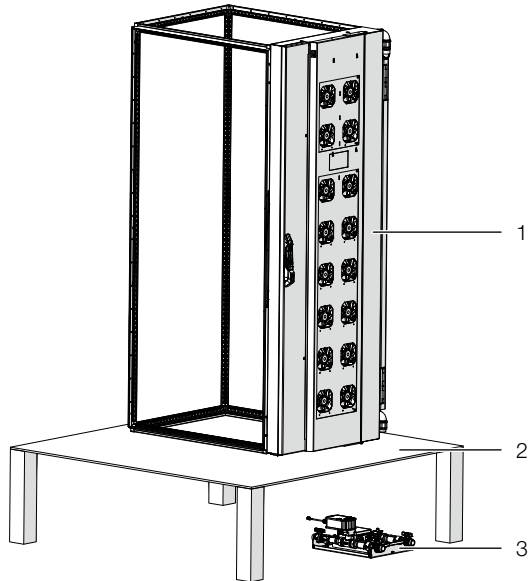


Fig. 48: Installation position of the water module

Key

- 1 LCP Rear Door CW
- 2 Raised floor
- 3 Water module

- Connect the connection cable from the water module to the X7 connection in the rear upper area of the LCP Rear Door CW (see fig. 49).

5.3 Placement of the pressure sensors

The closed-loop control of the fan speed with reference to the pressure difference requires at least one, maximum two, differential pressure sensors (7030.150 or 7010.150). They are available from the Rittal accessory range.

- Assemble the differential pressure sensor in the server rack in accordance with the instructions supplied with the sensor.
- When assembling the associated air hoses, ensure that the two measuring points for reference pressure and comparison measurement are not in a direct air flow.
- Connect the pressure sensor to the CAN bus connection of the Climate Controller (see fig. 65).

The sensor is then managed via the "Real Devices" in the tree on the LCP Rear Door CW web site.

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6.1 Electrical connection

Electrical connection of the LCP Rear Door CW is necessary only when it is equipped with the optional active module as well as, if applicable, the water module.

General



Note:

Please keep this electrical documentation readily available so that it is always on hand when needed. This is the only documentation which is authoritative for the unit.



Caution!

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

The unit may only be connected after the personnel mentioned above have read this information.

Use only electrically insulated tools.

Wear personal protective equipment.

The connection regulations of the responsible power supply company must be observed.

The voltage values shown in the wiring plan or on the rating plate must match the mains voltage.

The pre-fuse specified in the wiring plan / rating plate should be provided to protect the cable and equipment from short-circuits. The unit must be individually fused.

The unit must be connected to the mains via an isolating device which ensures at least 3 mm contact opening when switched off.



Caution!

The unit must be installed in accordance with national wiring regulations.

The electrical installation must comply with the NEC and CEC standards for the USA and Canada.

A line protection switch (external 16 A circuit-breaker) must be provided in the fixed wiring.

No additional control equipment may be connected up-stream of the unit at the supply end.



Note:

Complete separation is the contact separation of a pole to ensure the equivalent of basic insulation in accordance with IEC 61058-1 between the supply grid and the parts to be separated.

The electrical connection of the LCP Rear Door CW is made at the type C14 unit installation plug.

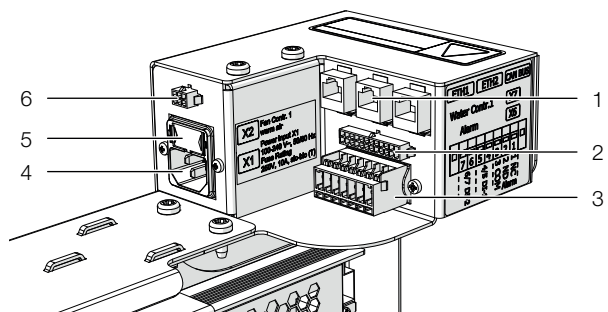


Fig. 49: Connections in the rear upper area

Key

- 1 Network connections and CAN bus RJ45 (ETH1, ETH2 and CAN bus)
- 2 Water module connection (X7)
- 3 Signal connector connection (X6)
- 4 IEC unit connector C14 (X1)
- 5 Fuse holder
- 6 Hot air NTC sensors connection (X2)

- Connect a cable with a C13 socket to the unit installation plug.



Note:

All cables plugged into the LCP Rear Door CW must be secured to the housing with two cable ties as strain relief (jumper punchings).

6.2 Cooling water connection



Warning! Risk of being trapped when screwing on cooling medium pipes! Wear personal protective equipment before beginning assembly and cleaning work!



Caution! Risk of malfunction or damage! The cooling water medium necessary for the control system must be available throughout the entire operating time.



Caution! Risk of malfunction or damage! When operating the LCP Rear Door CW, observe the instructions concerning permitted and recommended coolants (see section 16.1 "Information concerning the filling and additive water").

The LCP Rear door CW is connected to the cold water network via two DN 25 (AG 1") threaded pipe connections (external thread) on the inlet and return. As standard, the connection nozzles are positioned vertically downwards. In this instance, connection to the on-site cold water network is made in a downward direction, through a raised floor if present, or optionally initially on the water module. Alternatively, the connection can be made from the top of the unit.

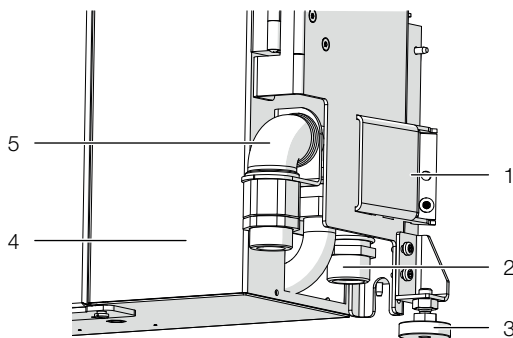


Fig. 50: Bottom cooling water connection

Key

- 1 Frame
- 2 Cooling water connection, return
- 3 Assembly foot (not yet dismantled here)
- 4 LCP Rear Door CW
- 5 Cooling water connection, inlet



Caution! When installing, observe the applicable specifications concerning water quality and water pressure.



Recommendation:

Ideally, when using a water/glycol mixture, the LCP Rear Door CW is connected to the cooling water circuit via a water/water heat exchanger.

Benefit:

- Reduction of water volumes in the secondary circuit,
- Setting of a defined water quality,
- Setting of a defined inlet temperature and
- Setting of a defined volumetric flow.

General remarks on the cold water system

IT climate control poses a major challenge for the cold water system, because the IT equipment whose heat loss is to be dissipated by the cold water system can undergo multiple load changes per minute. This hysteresis is transferred directly to the cold water system, leading to a fluctuating ΔT . If this causes a major load step, leading to a rapid increase in heat loss, cold water must be made available immediately by the cold water system. Depending on the distance of the cooling unit from the IT cold water circuit, this can create a significant dead time during which no water is available to cool the IT heat loss.

Because of hysteresis induced by the IT equipment, ΔT fluctuations in the cold water circuit are unavoidable. Fluctuations of between 1 K and 10 K are not uncommon in IT climate control. For this reason, the usual ΔT of 6 K for a cold water circuit cannot be used to calculate the pipework. In the case of LCP Rear Door CW, the volumetric flow required for the rated cooling output is always specified. With this volumetric flow, the correct pipe dimensions can be selected when calculating the pipework. Because very high cooling outputs of up to 53 kW are required for each LCP Rear Door CW, in addition to individual sections of pipe it is also advisable to hydraulically regulate the individual connection lines.

Example of an injection circuit

Fluctuations in the ΔT in the cold water circuit can be compensated using an hydraulic circuit. For example, by assembling an injection circuit, the cold water system is able to counteract the hysteresis generated by the IT equipment.

With the injection circuit, the primary circuit is installed as close as possible to the secondary circuit. The secondary circuit is assembled in the immediate vicinity of the equipment. The cold water is able to circulate permanently in the primary circuit, and is therefore always available when needed by the secondary circuit. Without this circuit, the cold water would first need to cover the entire distance from the producer to the equipment whenever the flow rate is altered by the equipment. Here too, there may be a significantly lower temperature in the primary circuit than in the secondary circuit, e.g. 6 °C in the pri-

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primary circuit and 15 °C in the secondary circuit as a result of mixing.

In this way, the primary circuit pump 1 permanently provides the secondary circuit with water. The mixer valve in the return limits the volume of water flowing out of the secondary circuit and back into the primary circuit. This therefore limits the incoming water volume as well. The secondary circuit pump allows the entire volume of water required for cooling in the secondary circuit to circulate, and is responsible for mixing the temperatures. Pump 2 allows water from the secondary return to be "injected" into the secondary inlet via the bypass. In this way, cold water from the primary circuit is raised directly to the correct temperature level. The injection circuit is just one example of many possibilities for adapting the cold water system to the requirements of IT climate control.

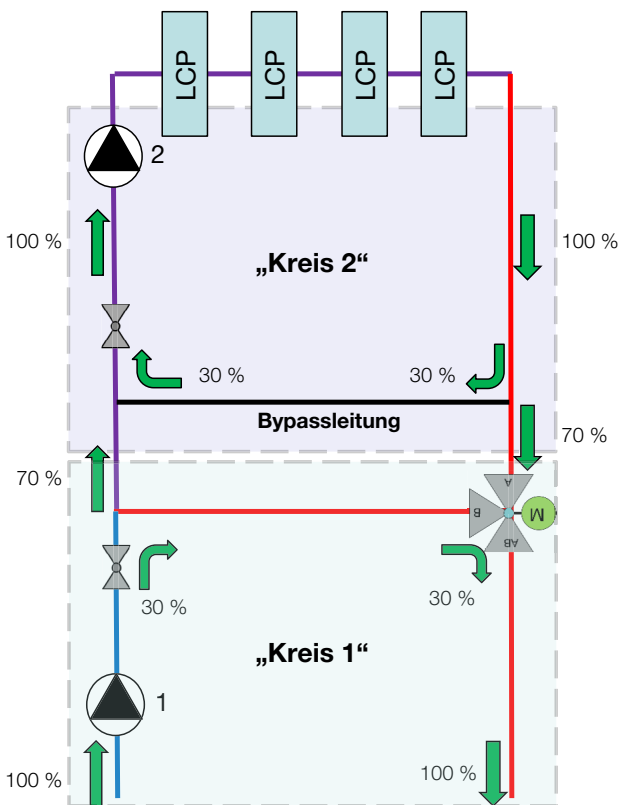


Fig. 51: Injection circuit (layout diagram)

In the LCP Rear Door CW, a sensor built into the upstream end measures the water flow rate without any moving components. The measurement range of this flow meter is between 7 l/min and 150 l/min. The measurement uncertainty is in the range of 1% FS for flow rates below 10 l/min and approx. 0.3% FS for flow rates above 10 l/min.

If the server racks are initially only equipped with minimal IT equipment, or if operating at low water inlet temperatures (e.g. 10 °C), the flow rate will be low. If this flow rate falls below the aforementioned limits, this may lead to system warnings from the flow meter. These warnings may be deactivated by configuring the parameters "System Warning min. Flow" and "System Warning min.

Valve" (see section 7.2.4 „LCP Rear Door CW configuration“)

Alternatively, the occurrence of such error messages can also be avoided by using the injection circuit. To this end, the supplied cooling water from the primary and secondary circuit must be mixed differently to create a higher inlet temperature.

Tichelmann principle and hydraulic balancing

For an efficient cold water supply to the LCP Rear Door CW, the cold water system must be hydraulically balanced. If the hydraulics are not balanced, the LCP systems will not be supplied homogeneously with the required volume of cold water. This will adversely affect efficient operation.

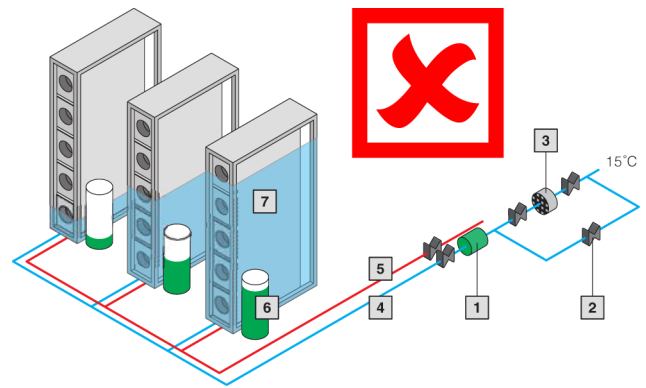


Fig. 52: Cooling distribution without hydraulic balancing

Key

- 1 Circulating pump
- 2 Shut-off valve
- 3 Fine filter
- 4 Inlet
- 5 Return
- 6 Pump pressure
- 7 Cooling supply
- 8 Pipe friction pressure loss
- 9 Opening degree of control valve
- 10 Control valve

Here, hydraulic balancing can be achieved via circuit control valves.

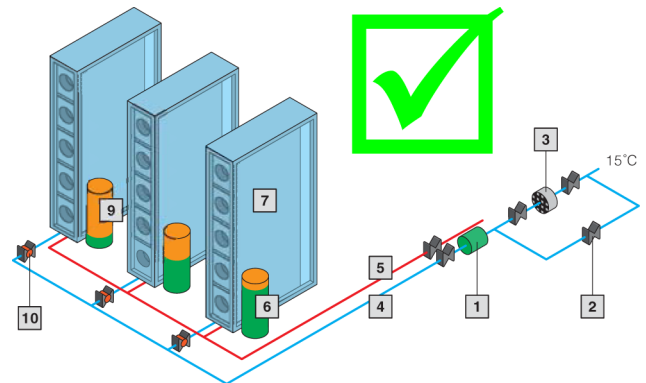


Fig. 53: Cooling distribution with hydraulic balancing

If, on the other hand, the individual connection lines for the LCP systems are laid according to the "Tichelmann" connection principle, hydraulic balancing is not necessary. With this connection variant, all individual connection lines have the same pressure loss.

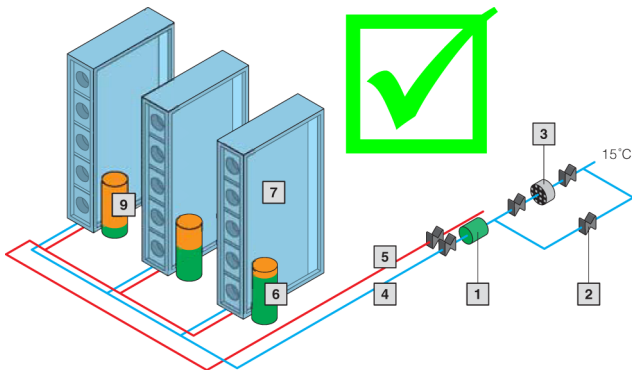


Fig. 54: Cooling distribution with Tichelmann principle

6.3 Bleeding the air from the heat exchanger

A valve is fitted at both the uppermost and the lowermost point of the heat exchanger package in the LCP Rear Door CW. When the unit is delivered, both valves are fully closed; before commissioning, the unit should be bled using the vent valve at the uppermost point.



Warning! Danger of cut wounds, especially from the sharp edges of the heat exchanger module!

Wear personal protective equipment before beginning assembly and cleaning work!

Proceed as follows to bleed the unit:

- Swivel the LCP Rear Door CW service door away from the server rack.
The vent valve is located at the top of the heat exchanger.

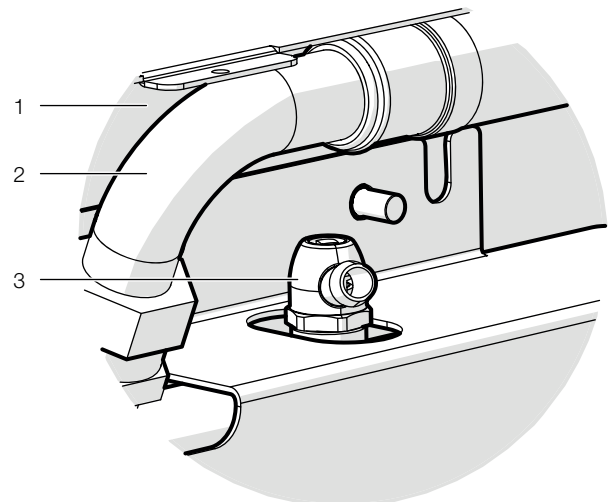


Fig. 55: Vent valve at the top of the heat exchanger

Key

- 1 LCP Rear Door CW
- 2 Cooling water pipe
- 3 Vent valve

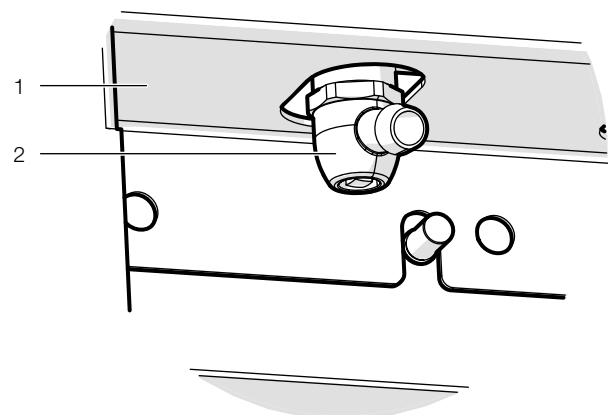


Fig. 56: Drain valve at the bottom of the heat exchanger

Key

- 1 LCP Rear Door CW
- 2 Drain valve

- Attach a vent hose (12 mm diameter) to the upper vent valve.
- Position a collecting vessel underneath the open end of the vent hose to collect any escaping water.
- Open the vent valve with a square key (5 mm) until the hiss of escaping air can be heard.
- Wait until water escapes from the vent hose, then close the valve again fully.
- Then open the vent valve again slightly and check whether any more air escapes.
- If so, keep the vent valve open until water escapes again.

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- Repeat this process until there are no bubbles visible in the vent hose for a significant period of time, ensuring that there is no air left in the system.
- Once bleeding is complete, remove the vent hose again.
- Close the LCP Rear Door CW service door and lock it.



Note:

The system is usually bled during the course of commissioning. This process may need to be repeated if the unit does not supply the desired cooling output (see section 10 "Troubleshooting").



Note:

The heat exchanger can be completely drained at the lower drain valve (e.g. for storage below freezing point).

7 Configuration

7.1 General

Basic configuration of the LCP Rear Door CW, particularly the (one-off) adjustment of the network settings, may be carried out in various ways:

1. HTTP connection via the Ethernet interface
2. SSH connection via the Ethernet interface
3. Serial connection via a USB cable

The settings are generally made via an HTTP connection. If this is not possible, for example because access via HTTP or HTTPS has been deactivated, we recommend access via a SSH connection. To this end, as with access via an HTTP connection, the IP address of the climate controller integrated into the LCP Rear Door CW must be known. If this address is not known, the device may be accessed directly via the USB-C/serial interface on the front.

The following descriptions assume that the LCP Rear Door CW, and in particular the climate controller, are in their delivered state, i.e. that no changes have been made to the basic configuration. In particular, the connection types "HTTP" and "SSH" must not be blocked.

7.2 HTTP connection

7.2.1 Making the connection

- Using a network cable, connect the device to your computer via the Ethernet interface (fig. 49, Pos. 1 – ETH1 or ETH2).



Note:

Depending on your computer, you may need to use a crossover cable.

- Change your computer's IP address to any address within the range 192.168.0.xxx, e.g. **192.168.0.191**. The device's preset address **192.168.0.190** must not be used.
- Set the subnet mask to the value **255.255.255.0**.
- If applicable, switch off the proxy server in the browser to facilitate a direct connection to the device.
- In the browser, enter the address **http://192.168.0.190**. The log-on dialogue for registering the device will appear.

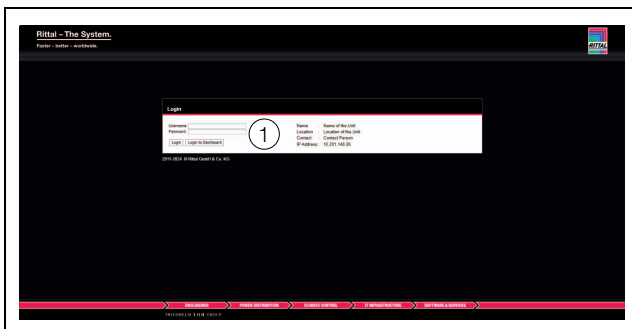


Fig. 57: Log-on screen with an HTTP connection

- Log in with the username **admin** and the password **admin** (fig. 57, item 1). The overview window for the device will appear (fig. 58).

7.2.2 Changing the network settings

As a general rule, during the course of commissioning, the network settings of the climate controller will only need to be changed once, so that it is linked into your network structure.

- In the left-hand section of the overview window (navigation area), click on the **Processing Unit** entry (fig 58, item 1) and in the right-hand section (configuration area), click on the **Configuration** tab (fig. 58, item 2).

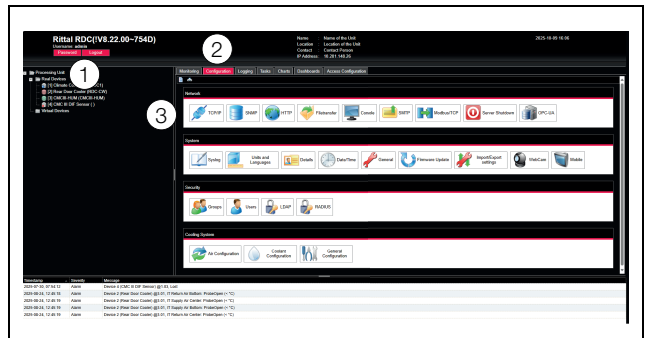


Fig. 58: Adjusting the TCP/IP settings

- In the group box Network, click on the TCP/IP button (fig. 58, item 3).

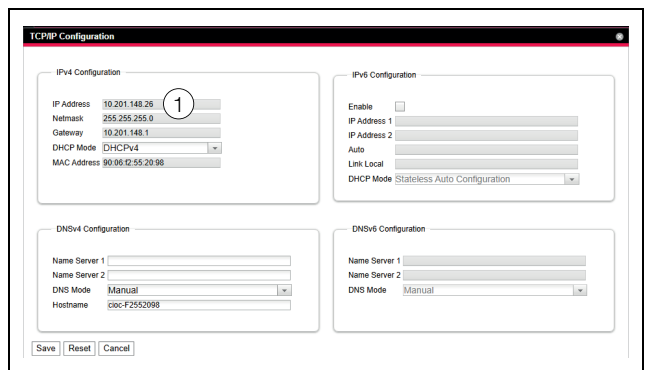


Fig. 59: Adjusting the TCP/IP settings



Note:

The following sections describe in detail how to make the setting for the IPv4 protocol. Further notes regarding the TCP/IP configuration are contained in the assembly and operating instructions for the IoT Interface 3124.300.

- In the **TCP/IP Configuration** window, change the device's IP address in the **IPv4 Configuration** group box to an address permitted in the network (fig. 59, item 1).
- If necessary, correct the settings for the subnet mask and the gateway.
- Alternatively, select the "DHCPv4" setting instead of "Manual" for automatic IP allocation.

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- Click on the **Save** button to change your settings.



Note:

If the **Save** button cannot be clicked, an incorrect entry has been made. In such cases, check your entries and correct them.

- Change the network settings of your computer to the original IP address and subnet mask values.
- Disconnect the network cable from your computer.
- Using a network cable, connect the device to your computer via the Ethernet LAN (fig. 49, item 1 – ETH1 or ETH2).



Note:

If you have activated automatic IP allocation ("Use DHCP" setting is activated), the IP address of the climate controller may be viewed via the USB-C interface (see the assembly and operating instructions for the IoT Interface 3124.300).

7.2.3 Changing the measurement units



Note:

After any adaptation of the units, all temperature values and flowrates of the LCP Rear Door CW are set to the default values. Consequently, you should set the units (once) as desired and the limit values specified only on completion. If the units should be changed subsequently, note all setting values of the LCP Rear Door CW so you can restore them manually.

The measurement units used may be converted from "°C" to "°F" and from "litres" to "gallons".

After registering on the Liquid Cooling Package (see section 7.2.1 "Making the connection"), the Web interface for device operation is displayed.

- In the left-hand section of the overview window, click on the **Processing Unit** entry and in the right-hand section, click on the **Configuration** tab.
- In the group box **System**, click on the **Units and Languages** button.
- In the **Units and Languages Configuration** window in the group box **Units**, under the "Temperature Format" dropdown list, select the entry "Fahrenheit" if preset to "Celsius", and vice versa.
- In the dropdown list "Volume Format", select the entry "Gallon" if preset to "Litre", and vice versa.
- Click on the **Save** button to change your settings.



Note:

While the units are being converted, the LCP Rear Door CW switches to failsafe mode.

7.2.4 LCP Rear Door CW configuration

The basic settings for the Liquid Cooling Package are defined in the **Cooling System** group frame. To do this, call the appropriate dialogue by clicking each of the **Air Configuration**, **Coolant Configuration** and **General Configuration** buttons.



Note:

"Admin" rights are required to access configuration settings.

- Click the required button in the **Cooling System** group frame.



Caution!

Changes to the configuration are for service purposes only and for setting key operating parameters, which should only be carried out by Rittal service personnel.

Air Parameter Configuration dialogue

Fig. 60: **Air Parameter Configuration** dialogue

- Using the "Control Mode" parameter, determine whether the fan is controlled via the temperature difference ("Temperature") or the pressure difference ("Differential Pressure") in front of and behind the server rack's built-in devices.

Fan control according to temperature difference

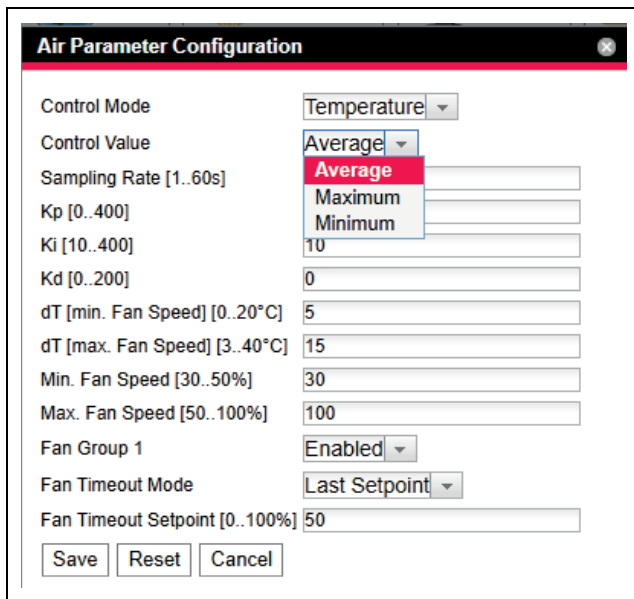


Fig. 61: Settings for the "Control Valve" parameter

Parameter	Explanation
Control Value	This setting allows you to determine whether the fans in "Automatic" mode are controlled by the average of the server outlet temperature or the pressure difference ("Average" setting), the maximum value ("Maximum" setting) or the minimum value ("Minimum" setting).
Sampling Rate	Controller sampling time when regulating the fans via the pressure difference.
Kp	Parameter for setting the proportional part of the PID control algorithm when regulating the fans via the pressure difference.
Ki	Parameter for setting the integral portion of the PID control algorithm when regulating the fans via the pressure difference.
Kd	Parameter for setting the differential portion when regulating the fans via the pressure difference.
dT min. Fan Speed	When regulating the fans via the temperature difference: The fans operate at the lowest fan speed below this temperature difference (see parameter "Min. Fan Speed"). Preset value: 5. Linear fan control occurs in the range between the "dT min. Fan Speed" and "dT max. Fan Speed" values.

Tab. 4: Settings in the **Air Parameter Configuration** dialogue

Parameter	Explanation
dT max. Fan Speed	When regulating the fans via the temperature difference: The fans operate at the highest fan speed above this temperature difference (100%). Preset value: 15. Linear fan control occurs in the range between the "dT min. Fan Speed" and "dT max. Fan Speed" values.
Min. Fan Speed	In the "Automatic", "Manual" and "Minimum" operating modes, the fans will at least run at this set speed. "Automatic" operating mode When regulating the fans via the temperature difference: If this difference is less than or equal to the "dT min. Fan Speed" value, the fans will run at the minimum speed set here. When regulating the fans via pressure difference: The speed set here is the minimum rotational speed of the fans. "Minimum" operating mode All fans will always run at the minimum speed set here. "Manual" operating mode If a speed is entered which is less than the minimum speed set here, the value is automatically corrected to the minimum speed. Exception: If a speed of "0%" is entered, the fans will be switched off. Preset value: 30%
Max. Fan Speed	Maximum fan speed. In the "Automatic", "Manual" and "Minimum" operating modes, the fans will at maximum run at this set speed. "Automatic" operating mode When regulating the fans via the temperature difference: If this difference is higher than or equal to the "dT max. Fan Speed" value, the fans will run at the maximum speed set here. When regulating the fans via pressure difference: The speed set here is the maximum rotational speed of the fans. "Maximum" operating mode All fans will always run at the maximum speed set here. "Manual" operating mode If a speed is entered which is higher than the maximum speed set here, the value is automatically corrected to the maximum speed.

Tab. 4: Settings in the **Air Parameter Configuration** dialogue

7 Configuration

Parameter	Explanation
Fan Group 1	If fan monitoring is deactivated, only the monitoring of the fans is deactivated. The fans themselves will continue to run even after monitoring has been deactivated. The fan symbols will be greyed out, both in the graphical representation on the web interface and on the optional display with touch function. The display of the speed values changes to "--". In the tree structure, the speed values will be set to "0", and the status changes to "Inactive".
Fan Timeout Mode	This setting is used to determine how the fans operate when the climate controller is in emergency mode. "Last Setpoint" setting: The fans operate in their most recent normal mode setting. "Manual Setpoint" setting: Operation of the fans is set manually.
Fan Timeout Setpoint	Here, the fan setpoint can be manually set at 0-100% with the climate controller in emergency mode.

Tab. 4: Settings in the **Air Parameter Configuration** dialogue

Fan control according to pressure difference

The air pressure difference in front of and behind the LCP Rear Door CW in the server rack is measured by one (or a maximum of two) differential pressure sensor(s) (delta P control) and used as the reference. The differential pressure sensors are not included with the supply and must be ordered separately and fitted (see section 5.3 "Placement of the pressure sensors").

They are controlled via a PID controller. The control parameters (Kp, Ki, Kd) are set using the **Air Parameter Configuration** dialogue, where this control mode is usually available as a presetting.

With fan speed control according to the pressure difference, the required pressure in front of and behind the server rack's built-in devices is prescribed as the setpoint.

When using two differential pressure sensors, the mean of the two sensors is used.

- If **one** sensor fails, the value from the other sensor is used.
- If **both** sensors fail, the system switches to delta T control.

The connected differential pressure sensors are managed in the variables tree under "Real Devices". The current actual value is displayed here, and the relevant limits for alarms and warnings are configured. The evaluation of the limits is displayed in the status variables.

If delta P control is activated, as a maximum the first two differential pressure sensors detected are automatically used to determine the actual value. If there is no differential pressure sensor available, this information will appear in the status variables. The control method will then switch to delta T control.

Fan calibration

After installing and connecting an additional fan or a replacement fan, the maximum fan speed must be determined automatically by a calibration run. **All** fans are calibrated together.



Note:

If the calibration run for the fans is started in the "Disabled" state, the operating hours of the fans will be reset after the calibration run. The fans can be recalibrated without resetting the operating hours when the state switches from "Enabled" to "Calibration" and when calibration is started via the optional display with touch function.

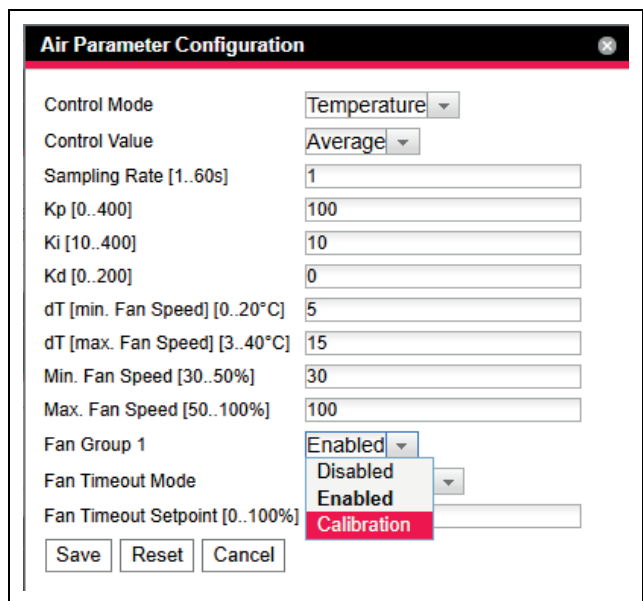


Fig. 62: Settings for the "Fan Group 1" parameter

- Select the "Calibration" option for the "Fan Group 1" parameter.

The fans will be started and a mean value is formed over a certain period of time. This value is then cyclically compared with the current speed.

If the measured speed corresponds to the mean value (within specific limits), the calibration run will be ended and the maximum speed stored in the climate controller. A new calibration run will be carried out if the measured speed deviates too much from the mean. If this is successful, the maximum speed will now be stored in the climate controller. If the deviation is still too high, the status of the fans will be set to "Error" and the calibration run also ended.

Coolant Parameter Configuration dialogue

Fig. 63: Coolant Parameter Configuration dialogue

Parameter	Explanation
Sampling Time	Controller scan time.
Kp	The parameter for setting the proportional amount of the PID control algorithm.
Ki	The parameter for setting the integral proportion of the PID control algorithm.
Kd	The parameter for setting the differential proportion.
Valve Min. Value	<p>Analogous to the minimum fan speed (parameter "Min. Fan Speed"), a permanent opening of the control valve for all operating modes may be set here. This setting guarantees a minimum flow at all times, whereby the control system is able to react more spontaneously to sudden capacity increases.</p> <p>"Automatic" operating mode The control valve is always opened at least to the value set here. Exception: In case of leaks, if the "0" setting is selected (= Emergency), the control valve is closed completely (see parameter "Leakage Mode").</p> <p>"Minimum" operating mode The control valve is always opened to the value set here.</p> <p>"Manual" operating mode If the operator enters an opening value for the control valve which is less than the minimum opening set here, the value is automatically corrected to the minimum opening.</p>

Tab. 5: Settings in the Coolant Parameter Configuration dialogue

Parameter	Explanation
Coolant Sensors	If the temperature sensors for the water inlet and water return are deactivated, the display is greyed out and replaced by "n.a." in both the graphical display on the web interface and on the optional display with touch function. In the tree structure, the temperature values will be set to "0"; the status of the variables is set "inactive".
Flowmeter	If the flowmeter is deactivated, the flowmeter is greyed out and replaced by "n.a." in both the graphical display on the web interface and on the optional display with touch function. In the tree structure, the value of the cooling capacity is set to "0" and the flowrate status is "inactive".
Control Valve	If the control valve is deactivated, the flowmeter is greyed out and replaced by "n.a." in both the graphical display on the web interface and on the optional display with touch function. In the tree structure, the value is set to "0". Similarly, the control valve status changes to "inactive".
Cp Value	The specific thermal capacity of the cooling medium. This value needs to be adjusted only if the cooling medium used is changed.
Valve Timeout Mode	<p>This setting determines how the control valve behaves with the climate controller in emergency mode.</p> <p>"Last Setpoint" setting: The control valve opens to its most recent setting in normal mode.</p> <p>"Manual Setpoint" setting: The control valve opens to the manual setting.</p>
Valve Timeout Setpoint	With the climate controller in emergency mode, the control valve can be manually set here.

Tab. 5: Settings in the Coolant Parameter Configuration dialogue



Note:

- Because the percentages affect both the speed and the accuracy of control, the default values for the PID control algorithm should be changed only in exceptional cases.
- Rittal cannot accept any liability for damage caused by the incorrect parameterisation of the PID controller.

7 Configuration

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General Parameter Configuration dialogue

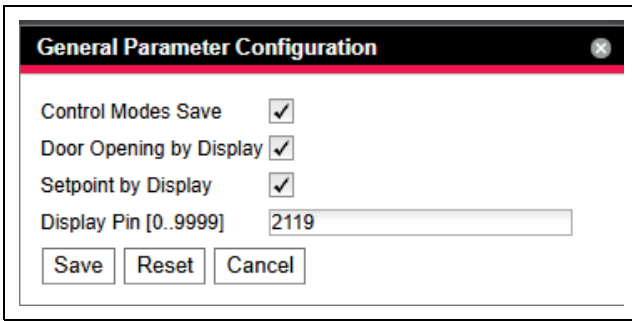


Fig. 64: **General Parameter Configuration** dialogue

Parameter	Explanation
Control Modes Save	If this option is activated, the control modes set for the fan and water control are transferred again automatically after a system restart. If this option is deactivated, the control modes are set to the "Automatic" setting after a system restart.
Setpoint by Display	After entering the standard PIN, the setpoint can be entered via the optional display with touch function, irrespective of whether the option is enabled or disabled.
Door Opening by Display	The doors can be opened after entering the standard PIN via the optional display with touch function, irrespective of whether the option is enabled or disabled here.
Display Pin	Customise the PIN required to access the protected pages of the display with touch function (as standard, "2119").

Tab. 6: Settings in the **General Parameter Configuration** dialogue

7.2.5 Settings

All other setting options for the LCP Rear Door CW are described in section 8 "Operation".

8 Operation

8.1 Description of operating and display components

8.1.1 Control unit hardware for the LCP Rear Door CW

The LCP Rear Door CW control unit is the climate controller. It supplies and processes actual values for server-in and server-out temperatures, actual pressure values in front of and behind the heat exchanger and actual values for flowrate, control valve control and temperatures of the upstream inlet and return. The control valve and fan are regulated based on the measured actual values.

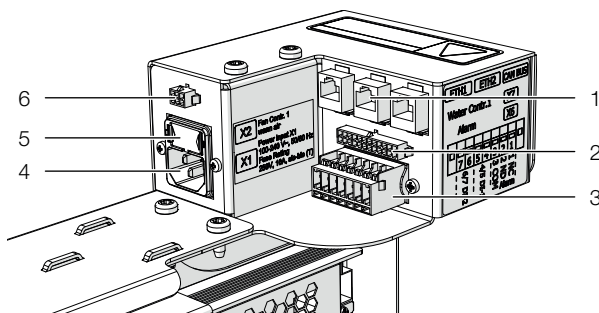


Fig. 65: Connections in the rear upper area

Key

- 1 Network connections and CAN bus RJ45 (ETH1, ETH2 and CAN bus)
- 2 Water module connection (X7)
- 3 Signal connector connection (X6)
- 4 IEC unit connector C14 (X1)
- 5 Fuse holder
- 6 Hot air NTC sensors connection (X2)

The X6 terminal strip has two alarm relays. Alarm relay 2 (terminals 4 - 6) is inactive.

■ Please note the pin assignment of the terminal strip.

- 1: NC
- 2: NO
- 3: COM
- 4/5: DI-1
- 6/7: DI-2

The alarm relay is configured on the website.

In addition to the built-in sensors, a wide range of sensors, actuators and systems for access monitoring can be connected via the CAN bus interface.



Warning! Risk of injury!

Before installing additional components, such as sensors, the LCP Rear Door CW must be switched-off completely at the circuit-breaker and secured against unintentional re-activation.

8.2 Description of operation

8.2.1 General

The LCP Rear Door CW climate controller carries out the following functions:

- Scan all measurements (temperatures, pressures, speeds, flowrate, current rating etc.).
- Evaluate all measurements and generate alarm and warning signals.
- Calculate the thermal output of the inlet and return temperature as well as determine the water flow volume.
- Control air temperature in the server enclosure by regulating the fan speed and the water volume through the heat exchanger.
- Set the setpoint temperature for the incoming cold air (factory setting 24 °C).
- Activate an optional display with touch function via an RS485 interface.
- Display the measurements and settings of parameters and setpoints via the Web interface.
- Scan the sensor and setting values via various protocols.

The measurements supplied by the individual modules are evaluated by the climate controller, and warning and alarm signals are generated where applicable. If a new warning or alarm occurs, at the same time, the alarm relay is switched. The alarm can be acknowledged via the web interface for operating the device. To do this, the LCP Rear Door CW must be integrated into a network.



Note:

In emergency operation, device cooling is ensured even if there are malfunctions inside the unit. All fans will then operate at 100% output, and the control valve will open completely.

Design of the temperature control circuit

The actual temperature values of the cold air on the air input side (IT Supply) supplied by the three temperature sensors on the heat exchanger are used to control the air which is blown into the server enclosure. The mean is calculated from the actual temperature values. The control unit constantly compares this (average) actual temperature with the setpoint temperature. As an alternative to the mean, control may also be based on the minimum or maximum temperature. This can be set on the website.

By comparison of the actual temperature with the setpoint temperature, the control unit attempts to maintain a constant temperature by opening and closing the control valve. The control valve is only kept closed (or set to the value stored in the parameter "ValveMin value") if the actual temperature falls below the "setpoint temperature" value, i.e. cold coolant no longer flows through the heat exchanger. Additionally, the temperature difference

between the actual temperature (IT Supply) and the air expelled on the server outlet side (IT Return) is used to determine and control the fan speed. Optionally, the fan speed may also be controlled according to the pressure difference. The temperature values of the sensors on the server outlet side may either be averaged, the minimum or the maximum temperature is used (see section 7.2.4 "LCP Rear Door CW configuration"). The setpoint speed for the fans and the control valve setting are sent to the connected control units via the climate controller.

8.2.2 Acknowledging messages

Generally speaking, there are different ways of acknowledging messages. To do this, the LCP Rear Door CW must be integrated into a network.

1. By selecting a message with the right mouse button in the message display and clicking on the "Acknowledge Alarm" or "Acknowledge Devices" entry with the left mouse button in the context menu.
If an alarm message has been selected, "Acknowledge Alarm" confirms only the currently selected message.
If a message concerning a configuration change has been selected, "Acknowledge Devices" confirms all related messages jointly.
2. By clicking with the right mouse button on a component entry and clicking with the left mouse button on the "Acknowledge Alarm" or "Acknowledge Devices" entry in the context menu.
This can be used to confirm pending alarm messages for that particular component or all configuration changes.

8.2.3 Operation in stand-alone mode

In stand-alone mode, the LCP Rear Door CW can be operated via the display with touch function.

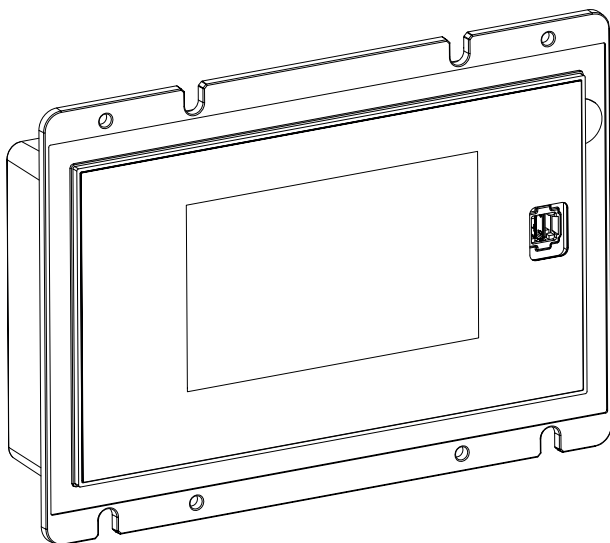
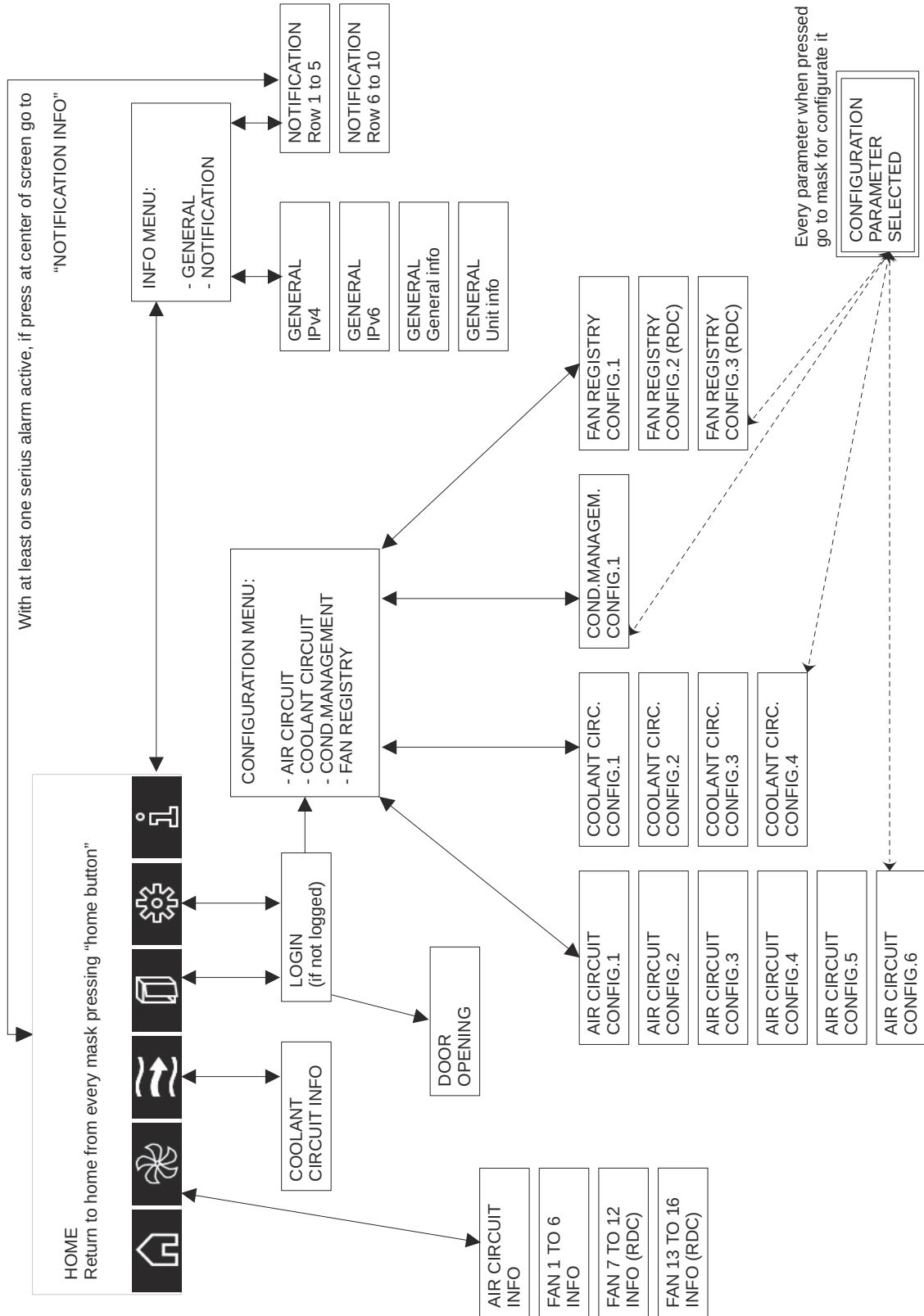


Fig. 66: Display with touch function

The user interface of the display with touch function allows the user to navigate between the individual menu options of the LCP Rear Door CW controller using software-controlled buttons.

"Screen pages" overview



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Connections on the display

The following interfaces are located on the display:

- Front: USB Micro B
- Rear: RJ 12/45 data cable (available factory-installed in the LCP Rear Door CW)

"Home" screen page

- Press the "Home" button to display the overview page of the user interface.



Fig. 67: "Home" screen page

The average value from the three server inlet temperatures of the sensors on the heat exchanger is displayed in the centre on the main page.

The current control modes are displayed on the left-hand side (from top to bottom):

- Control mode for the fans
- Control mode for the control valve
- Control mode for humidity control

The pPUE and EER values as well as the current cooling capacity are displayed on the right-hand side (from top to bottom).

Depending on the current status of the LCP Rear Door CW warnings (see fig. 68) and/or alarm messages (see fig. 69) may also be output here. Details of pending messages may be viewed on the "Notification" screen in the "Info" menu (see fig. 91).



Fig. 68: "Home" screen page with warning message



Fig. 69: "Home" screen page with alarm message

"Air Circuit Info" screen page

- Press the "Fan" button to display information about the air circuit.

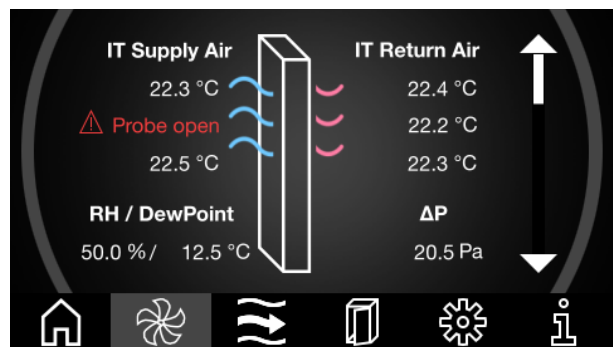


Fig. 70: "Air Circuit Info" screen page

The following information is displayed on the "Air Circuit Info" screen page:

- Server inlet temperature at the three sensors or error messages (IT Supply Air)
- Server outlet temperature at the three sensors or error messages (IT Return Air)
- Relative humidity (RH) and calculated dew point when deploying the optional temperature/humidity sensor
- Measured pressure difference (ΔP) for Delta P closed-loop control

- Scroll with the arrow keys to the second page.

A screen page appears with detailed information about the fans 1 to 6 (status or current speed).

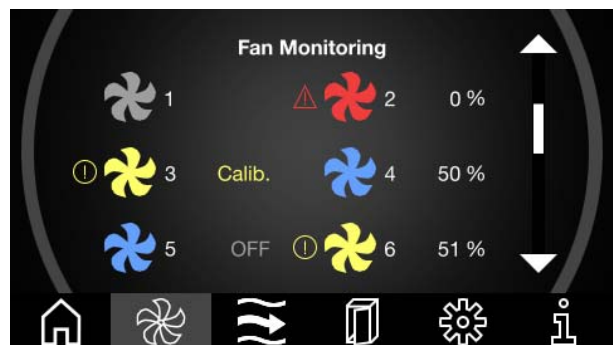


Fig. 71: "Fan Monitoring" screen page (fans 1...6)

Note:
 The position of fans 1 to 16 can be obtained from the wiring plan in section 16.4 "Wiring plan".

The various statuses of the fans are indicated with different colours:

- Blue: "OK" status
- Grey: Fan is disabled
- Yellow: "Warning" status
- Red: "Alarm" status

■ If necessary, scroll through the following pages to view the status of fans 7 to 12 and 13 to 16.

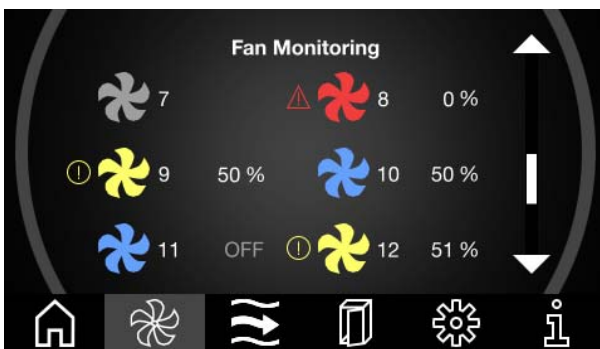


Fig. 72: "Fan Monitoring" screen page (fans 7...12)

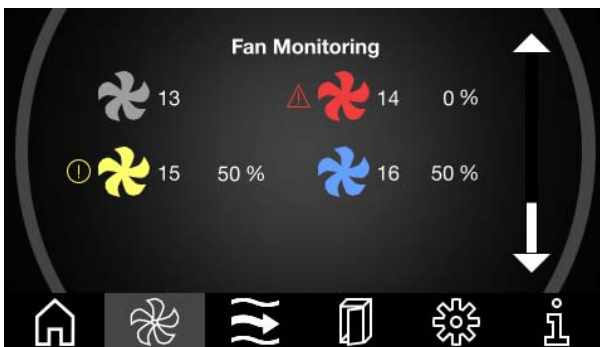


Fig. 73: "Fan Monitoring" screen page (fans 13...16)

"Coolant Circuit Monitoring" screen page

■ Press the "Cooling medium" button to display information about the cooling medium circuit.

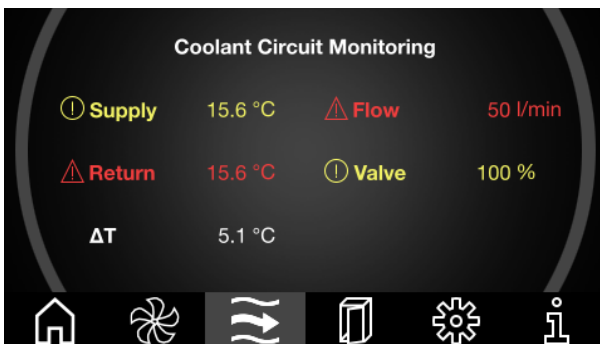


Fig. 74: "Coolant Circuit Monitoring" screen page

Note:
 The values displayed on this screen page also depend on the LCP Rear Door CW configuration (e.g. whether the flow meter is activated; see sections 7.2.4 "LCP Rear Door CW configuration" and 8.5.4 "Coolant").

The following information is displayed on the "Coolant Circuit Monitoring" screen page:

- Supply temperature of the cooling medium (Supply)
- Return temperature of the cooling medium (Return)
- Temperature difference (ΔT) between supply and return of the cooling medium
- Volumetric flow (Flow) of the cooling medium
- Actual setting of the control valve (Valve)

"Door Opening" screen page

Note:
 The "Door Opening" function is required for the LCP Rear Door CW only in exceptional cases. If necessary, consult Rittal.

■ Press the "Door Opening" button to perform the settings for automatic door opening (provided the "Automatic door opening" option is installed).
 The "PIN" screen page appears first to prevent access by unauthorised persons.

Note:
 The "PIN" screen page is displayed only when you are not currently logged in. Otherwise, the "Door Opening" screen page appears directly.

Note:
 The PIN "2119" factory-setting is stored in the LCP. The PIN can be changed on the "General Parameters Configuration" screen page (fig. 101, see section 7.2.4 "LCP Rear Door CW configuration").

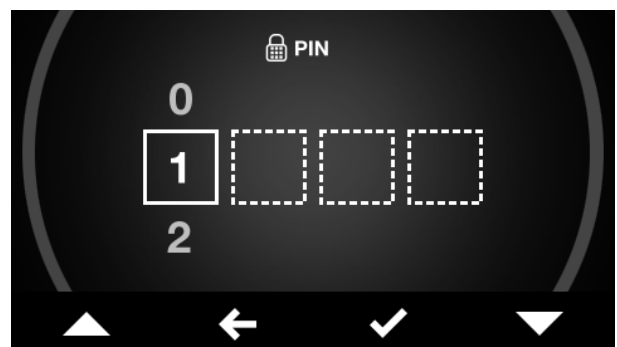


Fig. 75: "PIN" screen page

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- Scroll with the arrow buttons until the correct PIN digit is displayed for the first digit.
 - Confirm the entry with the "✓" button and continue with the following digits accordingly.
- The "Door Opening" screen page appears when the correct PIN has been entered.

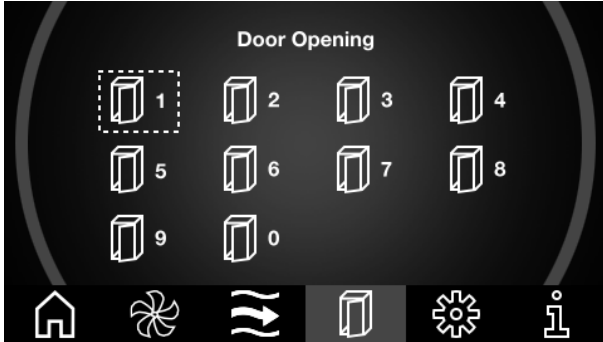


Fig. 76: "Door Opening" screen page

The buttons from "1" to "0" are displayed. The buttons are assigned to the door magnets via a so-called virtual device (see section 8.7 "Door Opening").

- Press the desired button, e.g. "1".
The door magnets for the door output assigned to this button are switched off for 10 seconds and the door opens. Once this period has expired, the magnet is re-energised.

"Settings" screen page

- Press the "Settings" button to call the overview page from which you can switch to the individual settings. Similar to the "Door Opening" screen page, the "PIN" screen page may appear first. After entering the correct PIN, the "Settings" screen page appears.

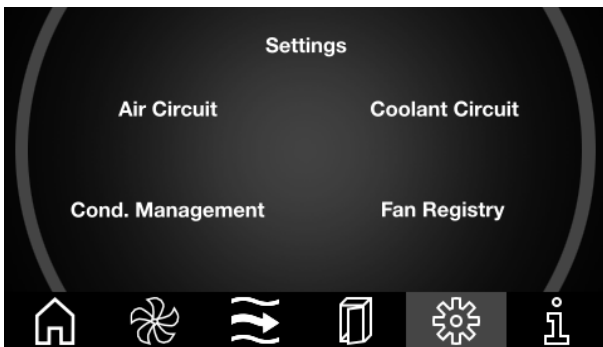


Fig. 77: "Settings" screen page

- Press the button for the area whose settings should be customised or viewed.

"Air Circuit" screen pages

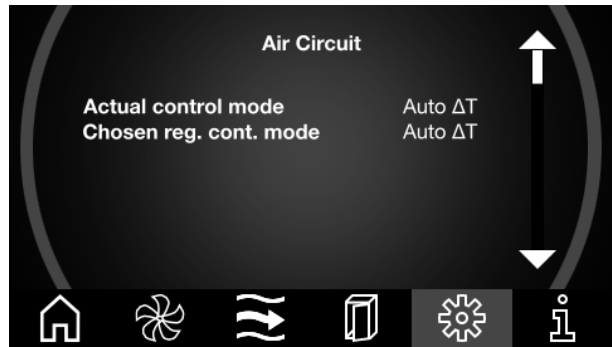


Fig. 78: "Air Circuit" screen pages

The currently enabled modes for fan control are displayed on the first page.

- Press the currently selected control mode (e.g. "Auto ΔT").
A screen page appears on which the control mode can be selected.

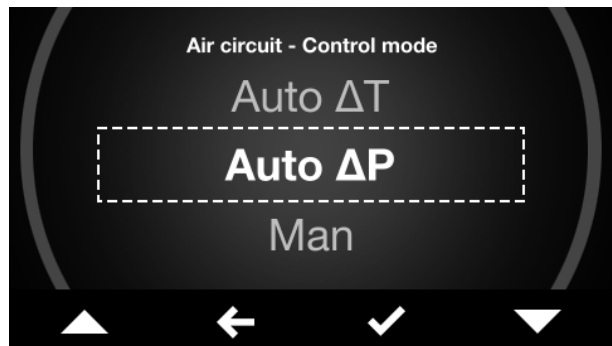


Fig. 79: "Air Circuit – Control Mode" screen page

- Scroll with the arrow keys until the desired control mode is displayed in the centre (here "Auto ΔP") and confirm the selection with the "✓" button.
Further screen pages are accessed with the arrow buttons on the right-hand side. The settings for the enabled and disabled control modes can be changed there. The basic operation is always the same and is explained below using the "Auto ΔT" example.
- Scroll with the arrow keys from the "Air Circuit" screen page (fig. 78) to the second screen page.
The temperature differences between which the speed is controlled linearly for the current control mode "Auto ΔT" are displayed here.

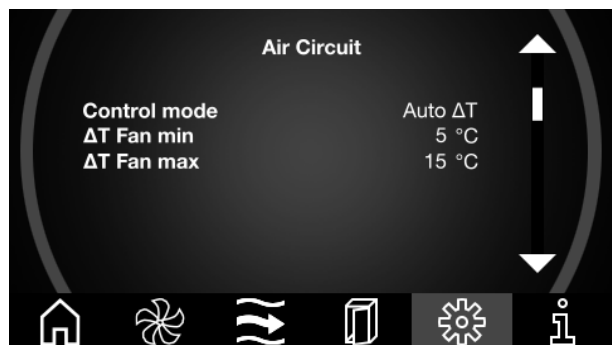


Fig. 80: "Air Circuit" screen page (2nd page)

- Press the upper limit value (ΔT Fan min.) below which the fans should run at the stored minimum speed (see section 7.2.4 "LCP Rear Door CW configuration"). The following screen page opens.

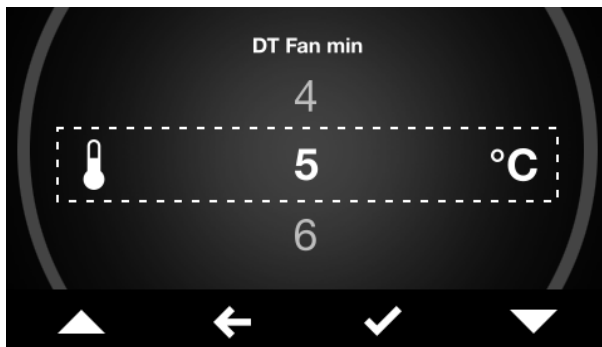


Fig. 81: "dT Fan min" screen page

- Scroll with the arrow keys until the desired temperature value is displayed in the centre (here "5") and confirm the selection with the "✓" button.
- Similarly, set the lower limit value (ΔT Fan max.) above which the fans should run at the stored maximum speed (see section 7.2.4 "LCP Rear Door CW configuration").

"Coolant Circuit" screen pages

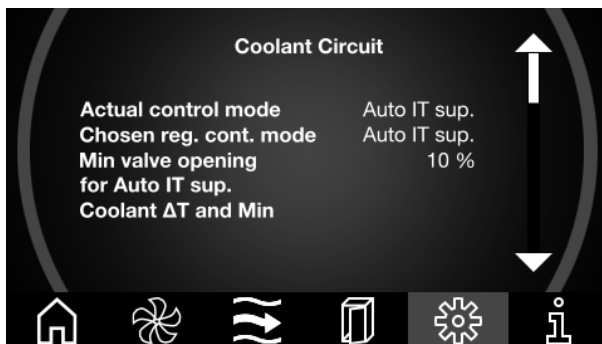


Fig. 82: "Coolant Circuit" screen pages

As with the air circuit for fans, the currently enabled control mode for the cooling medium circuit is displayed behind "Actual control mode" on the first page. This mode may differ from the standard selected mode displayed after "Chosen reg. cont. mode" (e.g. "Invalid Air Temperatures" or "Remote Control").

- In the right-hand column, press the standard selected control mode (e.g. "Auto IT sup."). A screen page appears on which the control mode can be selected.

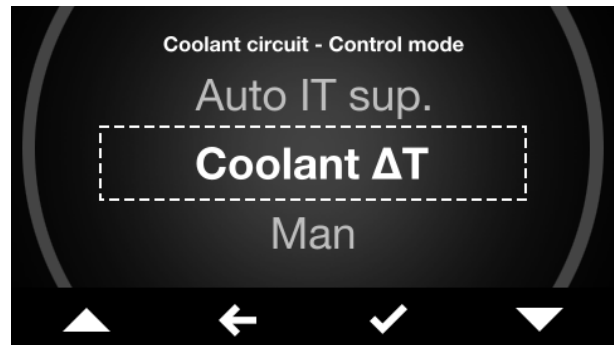


Fig. 83: "Coolant Circuit - Control Mode" screen page

- Scroll with the arrow keys until the desired control mode is displayed in the centre (here "Coolant ΔT ") and confirm the selection with the "✓" button.

Further screen pages can be accessed with the arrow keys on the right-hand side. The settings for the enabled and disabled control modes can be changed there. The basic operation is always the same and is explained below using the "Coolant ΔT " example.

- Scroll with the arrow keys from the "Coolant Circuit" screen page (fig. 82) to the third screen page. The settings for the current control mode "Coolant ΔT " are displayed here as well as the target temperature of the cooling medium return, and the minimum and maximum server inlet temperatures.

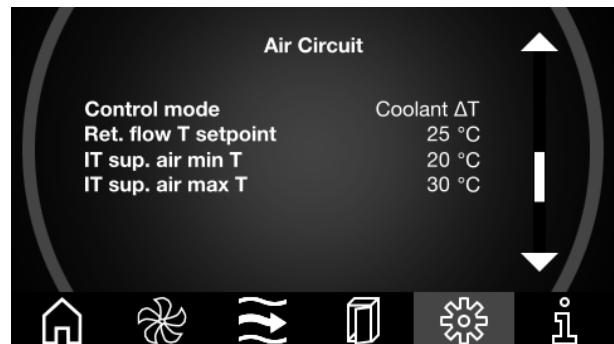


Fig. 84: "Air Circuit" screen page (3rd page)

- Press the individual temperature values and set the temperatures to the desired values.

"Condensate Management" screen page

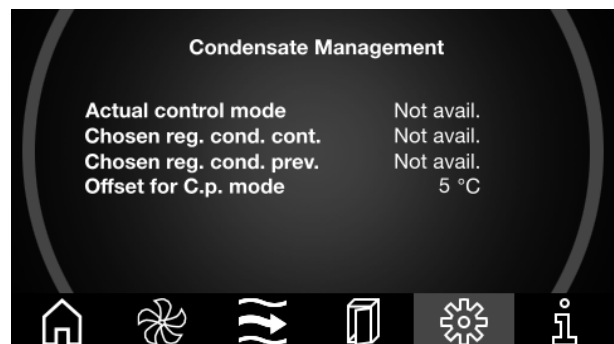


Fig. 85: "Condensate Management" screen page

The currently enabled control modes for condensate management are displayed on the first page.

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The first line behind "Actual control mode" shows the control mode currently enabled. The standard selected modes for dew point control ("Chosen reg. cond. cont.") and condensate prevention ("Chosen reg. cond. prev.") are also displayed. Dew point control can be selected via the right-hand column provided there is a spray eliminator in the device and a humidity sensor is connected. To prevent condensation, the fans must be operated in automatic mode. Condensate prevention can be selected via the right-hand column provided a humidity sensor is connected. To prevent condensation, the control valve must be operated in automatic mode. A safety distance to the dew point can be set for this mode (see "Offset" parameter in section 8.5.12 "Features").



Note:
The basic operation is the same as for the air circuit and the cooling medium circuit. For this reason, a detailed description is not included.

"Fan Registry" screen page

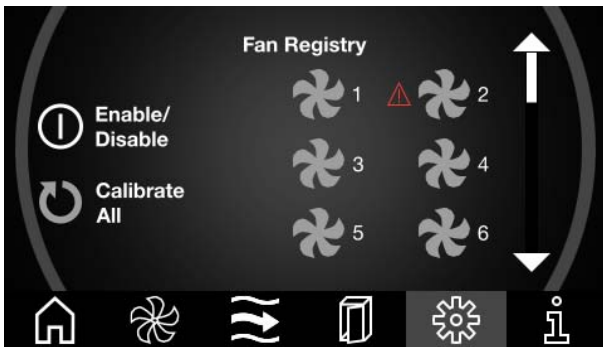


Fig. 86: "Fan Registry" screen page (fans 1...6)

The current status of the fans is displayed here. The various statuses of the fans are indicated with different colours, unlike the representation on the "Fan Monitoring" screen page (fig. 71):

- Blue: Fans are enabled
- Grey: Fans are disabled
- Yellow: Fans are currently being calibrated
- Red warning symbol next to the fan: Fan is in "Alarm" status
- Enable or disable monitoring of the fans by pressing the "Enable/Disable" button.
- If necessary, recalibrate the fans by pressing the "Calibrate All" button.
- Observe the following notes when enabling the calibration run via the display:
 - The calibration run cannot be started when fans are in "Disabled" status.
 - The fans operating hours are not reset.



Note:
Connect the LCP Rear Door CW to a network for extended setting options (see section 8.3 "Extended options by connecting the LCP Rear Door CW to a network").

- If necessary, scroll through the following pages to view the status of fans 7 to 12 and 13 to 16.

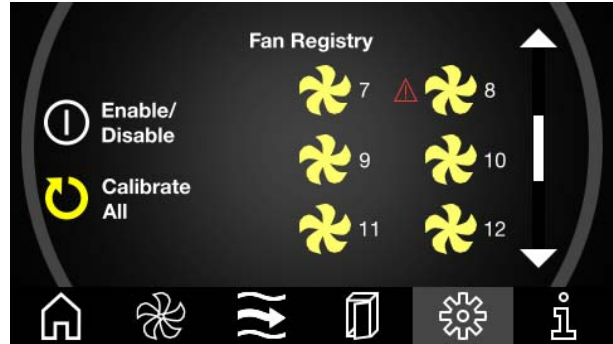


Fig. 87: "Fan Registry" screen page (fans 7...12)

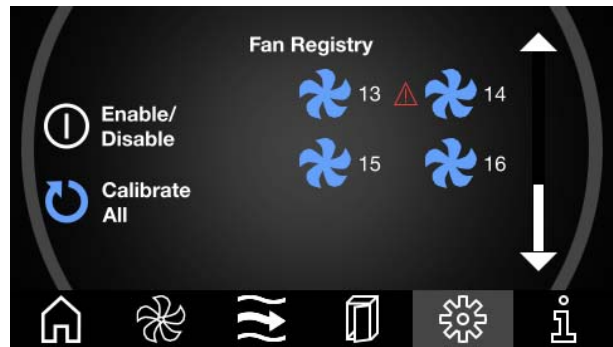


Fig. 88: "Fan Registry" screen page (fans 13...16)

"Info" screen page

- Press the "Info" button to call the overview page from which it is possible to switch to the "General" and "Notifications" areas.

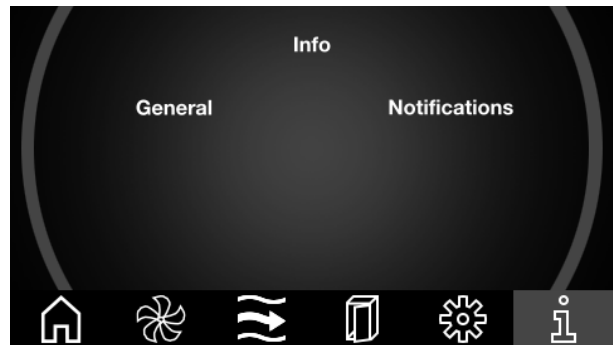


Fig. 89: "Info" screen page

"General" screen pages

Fig. 90: "General" screen pages

Detailed information about the LCP Rear Door CW, such as network addresses and version information, is displayed on several screen pages.

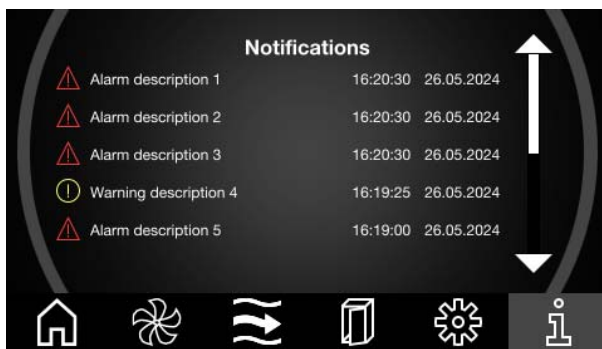
"Notifications" screen pages

Fig. 91: "Notifications" screen pages

Pressing the "Notifications" key opens the corresponding screen page. Here, all pending alarm messages are displayed in plain language.

Updating the display software

The display software update can be installed via Blue e+ Updater. An example procedure for Blue e+ Updater is described below. It can be downloaded from the Rittal web site for the 3314.030 display and the LCP Rear Door CW devices.

- After installing the software, connect your laptop to the display using a USB cable with a Micro (type B) connector.

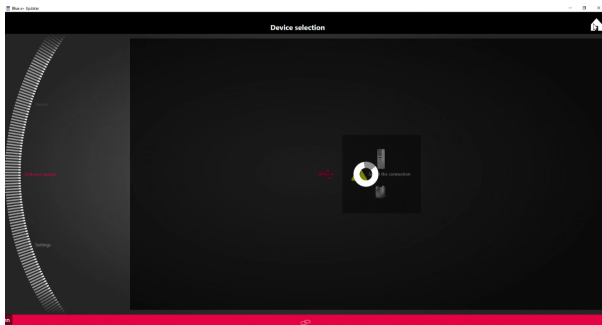


Fig. 92: "Device selection" screen page in Blue e+ Updater

- Once the connection has been established, select the "Software Update" entry in the left-hand area.

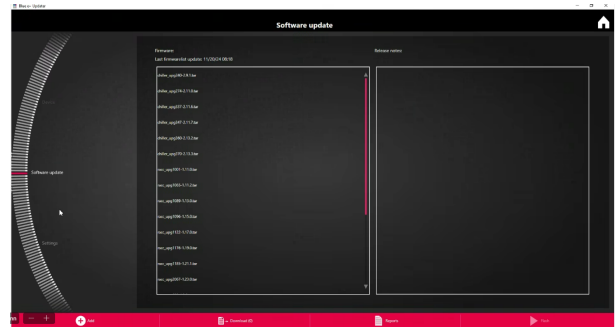


Fig. 93: "Software update" screen page in Blue e+ Updater

- To ensure all software updates are displayed, click the "Downloads" entry in the bottom bar.
- Select the current file for the display software ("racc_upgXXXX-X.X.X.tar").
Updates that cannot be installed on the device are not displayed or the flash button cannot be enabled.

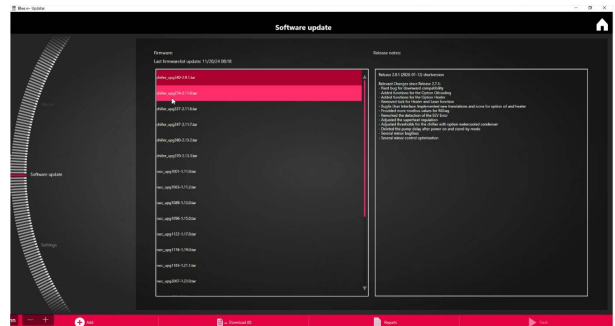


Fig. 94: "Release notes" display in Blue e+ Updater

**Note:**

Further information about the software is displayed in the Release Notes on the right-hand side of the screen page.

- To install the software, click the "Flash" entry in the bottom bar.

8.3 Extended options by connecting the LCP Rear Door CW to a network

By connecting the LCP Rear Door CW climate controller to a network, you are able to call up various measurements and warning or alarm messages. These may then be further processed (e.g. via a Web browser, SNMP, etc.). Furthermore, various values can be set via the network and then sent to the climate controller.

- To connect to the network, connect the climate controller jack (fig. 65, item 4) to a free jack on the network access using a suitable network cable.
- For this, use a suitable network cable.

The LCP Rear Door CW is preset in the factory to the IP address 192.168.0.190 (see section 7.2 "HTTP connection").

8.4 General operation

8.4.1 Layout of screen pages

After logging on to the Liquid Cooling Package (see section 7.2.1 "Making the connection"), the Web interface for operating the device is displayed. In principle, the screen is divided into four different sections:

1. Top section: Display general information about the device, change the password and log off the current user (see section 8.4.7 "Logging off and changing the password").
2. Left-hand section (navigation area): Select the overall system or respective component for which information is displayed in the right-hand section of the screen (see section 8.4.2 "Navigation area in left-hand section").
3. Right-hand section (configuration area): Display seven index tabs (see section 8.4.3 "Index tabs in the configuration area") with input options for all settings.
4. Bottom section: Display messages (see section 8.4.4 "Message display").



Note:
This documentation shows the English screenshots. The descriptions of individual parameters on the LCP Rear Door CW website likewise use English terminology. Depending on the set language, the displays on the website may be different (see assembly and operating instructions for the IoT Interface 3124.300).

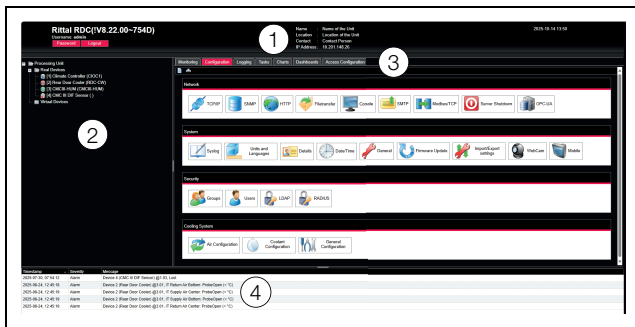


Fig. 95: Layout of screen pages

Key

- 1 General information
- 2 Navigation area
- 3 Configuration area with tabs
- 4 Message display

8.4.2 Navigation area in left-hand section

The overall system including all installed components is displayed in the form of a tree structure in the navigation area of the screen.

At the top of the navigation area is the Processing Unit, i.e. the overall system. The sub-groups "Real Devices" and "Virtual Devices" are displayed below the overall system. The climate controller, the LCP Rear Door CW

itself and the installed hardware devices and sensors are listed under "Real Devices".

Each device can assume different statuses. To allow rapid identification of the current status, the symbol before the respective device is colour-coded:

Symbol	Explanation
	Status "OK". There are no warnings or alarm messages.
	Status "Warning". There is at least one warning message.
	Status "Alarm". There is at least one alarm message.
	Status "OK". The additional information symbol indicates that further status information may be displayed. This symbol is only displayed if the registered user has at least read-only access to the data for that particular device.
	Status "Detected". The sensor has recently been added and not yet confirmed. This sensor must be confirmed by pressing the "SET" button on the climate controller or via the Web interface.
	Status "Lost". Communication with a sensor is no longer possible. The connection must be checked. Alternatively, the sensor can also be logged off by confirming.
	Status "Changed". The sequence of sensors has been altered and not yet confirmed. This configuration change must be confirmed via the Web interface.

Tab. 7: Status display symbols

8.4.3 Index tabs in the configuration area

Seven index tabs are displayed in the right-hand section of the screen:

1. Monitoring: Current data of the LCP Rear Door CW or connected devices (see section 8.5 "Monitoring index tab").
2. Configuration: Configuration of basic settings (see section 8.6 "Configuration index tab").
3. Logging: Message archive about the Liquid Cooling Package and connected devices (see assembly and operating instructions for the IoT Interface 3124.300).
4. Tasks: Creating links between different values and related actions (see section 8.8 "Tasks").
5. Charts: Charts for the chronological trend of the variable values (see assembly and operating instructions for the IoT Interface 3124.300).
6. Dashboards: Create different views as dashboards (see the assembly and operating instructions of the IoT Interface 3124.300).

7. Access Configuration: Configure access authorisations for connected access control systems to the server rack doors (optional).

The content of the index tabs **Monitoring** and **Configuration** depends on whether the entire system ("Processing Unit" entry) or an individual component, e.g. "Liquid Cooling Package" entry has been selected in the left-hand section of the screen.

8.4.4 Message display

Current pending messages are displayed in the bottom section of the screen. The message display is structured as follows:

1. Timestamp: The date and time when the error occurred (fig. 96, item 1).
2. Severity: Severity of the error. A distinction is made between Warnings and Alarms (fig. 96, item 2).
3. Message: Error message in plain language (fig. 96, item 3).

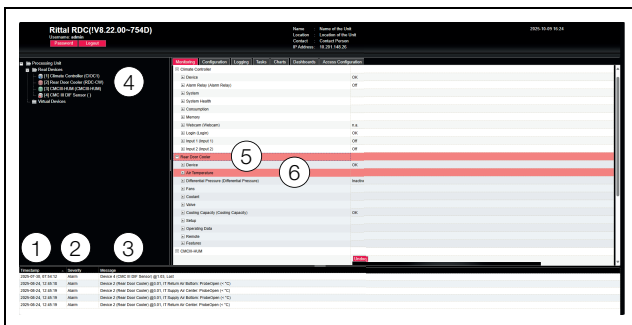


Fig. 96: Layout of message display

Key

- 1 Date and time
- 2 Error category
- 3 Error message in plain language
- 4 Component with error message
- 5 Component
- 6 Parameter

Additionally, errors occurring are displayed as follows:

- Left-hand screen section (navigation area): The symbol in front of the component on which the error occurred is shown in red in the tree view in the event of an alarm message, and yellow in the event of a warning message (fig. 96, item 4).
- Right-hand screen section (configuration area): On the **Monitoring** index tab, the entire component and the specific parameter to which the warning or alarm applies is shown in red or yellow (fig. 96, item 5 And 6).
- The multi-LED on the front of the climate controller is permanently red or orange.
- Depending on the settings, the alarm relay will switch.

If the cause of an error message has been rectified, the corresponding message may be automatically deleted from the message display. The status of the respective component may also be reset, and all other displays triggered by the error may disappear. However, this de-

pends on the chosen alarm configuration (see assembly and operating instructions of the IoT Interface 3124.300). In some cases, error messages and the status may remain in the overview until acknowledged in the Web interface (see section 8.2.2 "Acknowledging messages").

If the device configuration is permanently altered, e.g. a new sensor is connected to the climate controller, this is likewise output in the message display as an error message, type "Alarm". Additionally, in such cases, the multi-LED in the front of the climate controller will cyclically flash green – orange – red. Such configuration changes are not deleted from the message display until confirmed by the operator (see section 8.2.2 "Acknowledging messages").

Example: Increased temperature

If the temperature sensor integrated into the climate controller measures a temperature above the value stored as "SetPtHighWarning", a warning message will be emitted.

In such cases, the display will change as follows:

- The symbol in front of the component in the navigation area will be coloured yellow.
- On the **Monitoring** index tab, the entire component and the lines "Temperature" and "Status" will be coloured yellow. The "High Warn" warning message will also be emitted.
- A corresponding warning message will appear in the message display.

If the temperature drops back below the "SetPtHighWarning" value plus the hysteresis value (see section 18 "Glossary"), the message may be automatically deleted from the message display and the relevant status displays reset, depending on the alarm configuration (refer to the assembly and operating instructions of the IoT Interface 3124.300).

8.4.5 Other displays

The operator's entries in the Web interface are automatically checked against preset rules, depending on the parameter entered. This means that changes can only be saved if all values have previously been correctly entered in a dialogue.

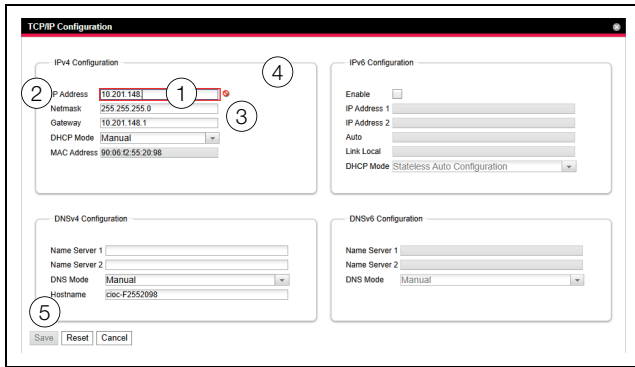


Fig. 97: Display of an incorrect entry

Key

- 1 Netmask field
- 2 Incorrect entry
- 3 Prohibited symbol
- 4 Note
- 5 Inactive button

The following changes occur in case of an incorrect entry in the dialogue (illustrated here by the example of an incorrectly entered IP address):

- A red "prohibited symbol" (fig. 97, item 3) appears after the incorrect entry (fig. 97, item 2) in the **Netmask** field (fig. 97, item 1).
- By holding the mouse pointer over the prohibited symbol, additional information about the error will appear (fig. 97, item 4).
- The **Save** button is deactivated (fig. 97, item 5), so that the current values cannot be saved.

Proceed as follows to rectify the error:

- Using the information provided, identify the precise nature of the incorrect entry.
In this particular example, the value entered does not comply with the format of an IP address.
- Correct the defective value, e.g. by entering the value "255.255.255.0".
The "prohibited symbol" is masked out and the **Save** button is activated.
- Save the settings by pressing the **Save** button.

8.4.6 Changing parameter values

Different parameters for the currently selected component are displayed in the list view of the **Monitoring** index tab. Some of these parameters can be adjusted by the operator, while others have fixed values assigned to them.

For all parameters that can be changed, an "Edit" symbol in the form of a stylised notepad and pen will appear after the respective parameter if the mouse pointer is placed in the relevant line (fig. 98, item 1).

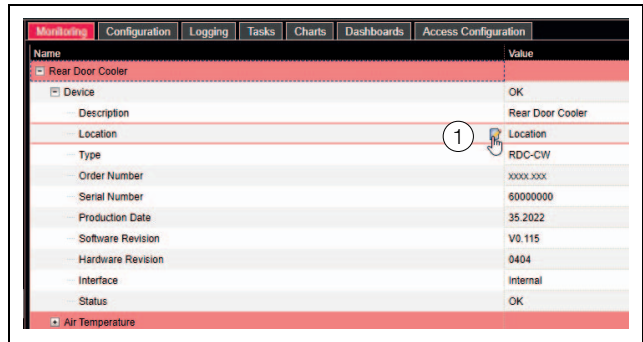


Fig. 98: Editable parameter with "Edit" symbol

Key

- 1 "Edit" symbol

If this symbol does not appear, the corresponding value cannot be altered.

Example:

- In the navigation area, select the entry "Liquid Cooling Unit".
- In the right-hand part of the screen, select the **Monitoring** index tab.
- One after the other, open the "Liquid Cooling Unit" and "Device" entries by clicking on the "plus" symbol in front of the entry (fig. 99, item 1).

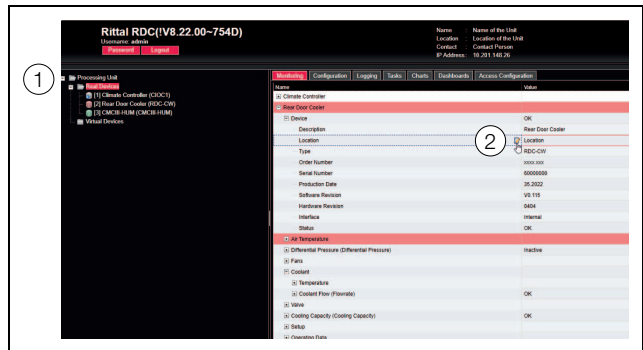


Fig. 99: Selecting an individual parameter

Key

- 1 Liquid Cooling Unit and Device entries
- 2 "Location" parameter

- Position the mouse pointer at the end of the first column in the "Location" line (fig. 99, item 2).
An "Edit" symbol will appear, and the mouse pointer will change to a "Hand" symbol.
- Click on the "Edit" symbol.
The "Device Settings" dialogue will appear with the parameter "Device.Location".

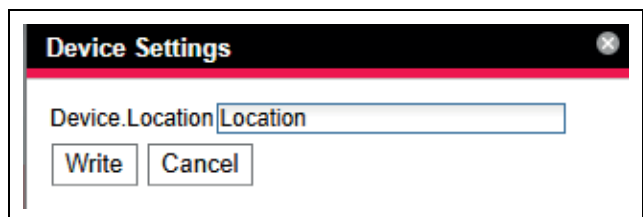


Fig. 100: "Device Settings" dialogue

- Here, enter the location of the LCP Rear Door CW.

- Confirm your entry by clicking on the **Write** button. The dialogue box will close and the new value will appear in the "Location" line.
- Next, position the mouse pointer at the end of the first column in the "Type" line. In this case, **no** "Edit" symbol will appear, i.e. the value stored here (e.g. "LCP Rear Door CW") cannot be altered.

You may wish to amend several values simultaneously, or may not know the entry under which the required parameter is stored. In such cases, all editable parameter values of subordinate entries can also be displayed in one window.

- Simply open the "Rear Door Cooler" entry by clicking on the "plus" symbol in front of that entry (fig. 101, item 1).
- Position the mouse pointer at the end of the first column in the "Rear Door Cooler" line (fig. 101, item 2). An "Edit" symbol will appear, and the mouse pointer will change to a "Hand" symbol.

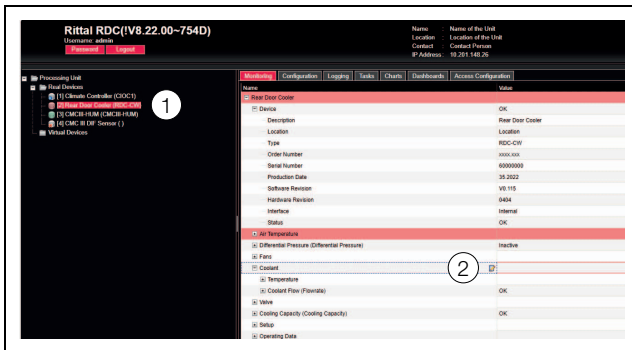


Fig. 101: Selecting multiple Data parameters

Key

- 1 "Processing Unit" entry
- 2 "Edit" symbol

- Click on the "Edit" symbol. The "Device settings" dialogue will appear with a list of all parameters that can be edited.

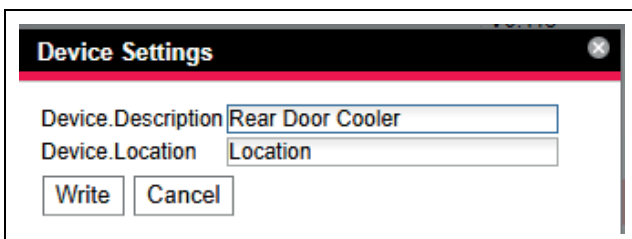


Fig. 102: "Device Settings" dialogue with multiple parameters

- Store the amended values for all required parameters.
- Confirm your entries by clicking on the **Write** button. The dialogue is closed. Reopen the dialogue to view the edited values.



Note:

If the number of variables to be amended is too high, an error message will appear. In such case, you will need to move down a level.

8.4.7 Logging off and changing the password

For every user group (and hence for every user), it is possible to set a time after which the user is automatically logged off in case of inactivity (refer to the assembly and operating instructions of the IoT Interface 3124.300). However, a user can also log off via the Web interface.

- Press the **Logout** button in the top left of the screen.

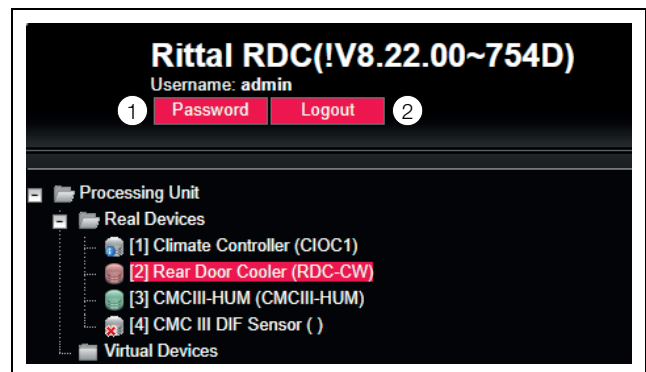


Fig. 103: **Password** and **Logout** buttons

Key

- 1 **Password** button
- 2 **Logout** button

Logout occurs immediately and the login window will appear.

Additionally, every user may change their own password in the Web interface.

- Press the **Password** button in the top left of the screen. The dialogue "Set new Password for User 'XXX'" will appear.

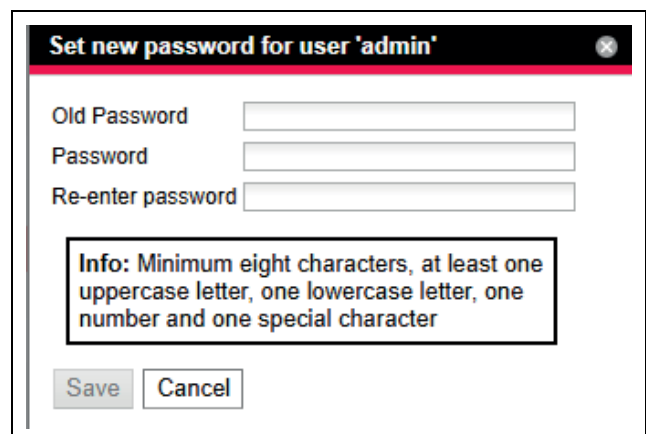



Fig. 104: Changing the password

- First, enter the existing password in the "Old Password" field.

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- Enter the new password in the "Password" field. Observe the notes for creating a secure password.
- Re-enter the corresponding password in the "Re-enter password" field.
- Click the **Save** button to confirm your inputs.
The dialogue box closes if the password complies with the required rules.
You will need to use the new password the next time you log into the system.

 **Note:**
Irrespective of this amendment, a user with appropriate rights can also alter the passwords of all users via the user administration feature (refer to the assembly and operating instructions of the IoT Interface 3124.300).

8.4.8 Reorganising the connected components

When new components are installed on the climate controller, these are inserted into the next free space in the tree structure and allocated a corresponding ID number. Particularly with multiple upgrades and changes in the sequence of connected components, this may result in a lack of allocation between the position of the components in the bus and the corresponding ID number. The "Reorganize" function renumbers all connected components as follows.

1. Climate Controller
 2. Liquid Cooling Unit
 3. Sensor 1 (bus 1)
 4. Sensor 2 (bus 1)
 5. Sensor 3 (bus 1)
 6. Sensor n (bus 1)
- In the navigation area, click on the "Rear Door Cooler" entry or any other connected component with the right mouse button.

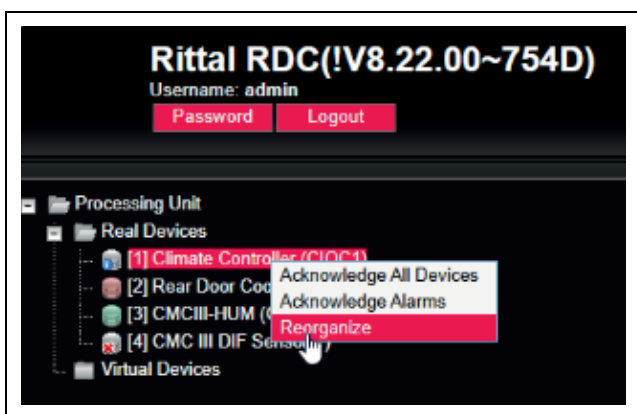



Fig. 105: "Reorganize" entry in the context menu

- With the left mouse button, click on the "Reorganize" entry in the context menu.
A message will appear stating that the components have been renumbered as a result of reorganisation. This may lead to problems when accessing these components, e.g. via SNMP, and access will need to be re-

configured. However, the "Alarm Configuration" of the individual sensors is retained.
The sensors are then registered automatically again on the climate controller.

 **Note:**
When reorganising the components, all components with the status "Lost" are removed from the navigation area.

8.5 Monitoring index tab

All settings for the individual system components are made in the **Monitoring** index tab, such as limits for warning and alarm messages. The display in the right-hand section of the screen depends on which component was selected in the navigation area.

- If you select the "Climate Controller" entry (below "Real Devices") in the navigation area, all "Real Devices" will be available for selection in the **Monitoring** index tab.
- If you select a specific component, such as the "Liquid Cooling Unit" entry, in the left-hand tree structure, only that component will be available for selection in the **Monitoring** index tab. Here, you can choose between two display options:
 - Tree view: This allows fast, targeted access to individual parameters.
 - Graphical representation: This provides a quick overview of the entire Liquid Cooling Package system, such as the status and speed of the fans or temperature values of the server inlet and outlet side.

If, after selecting the "Rear Door Cooler" level, the subordinate entries "Device", "Air", "Water" etc. are displayed (fig. 106, item 1), you can switch to the graphical representation as follows:

- Press the coloured "Graphics" symbol after the "Rear Door Cooler" entry in the form of a stylised diagram (fig. 106, item 2).

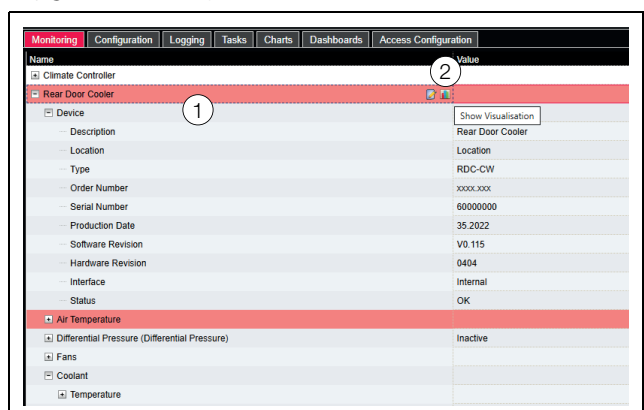


Fig. 106: Tree structure

The display switches to the graphical representation (fig. 107) and all statuses and speeds of the fans and temperature values for the server inlet and outlet temperature as well as the control modes for the fan and coolant control can be seen at a glance and amended by clicking the graphic (fig. 107, item 2)

After selecting the "Rear Door Cooler", if graphical representation (fig. 107) is preselected, you can switch to the tree view as follows:

- Click on the greyed "Graphics" symbol after the "Rear Door Cooler" entry (fig. 107, item 1).

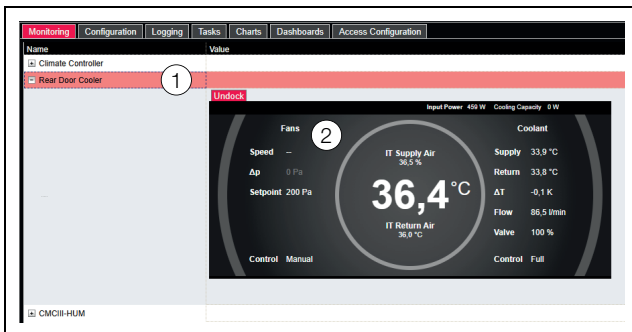


Fig. 107: Graphical representation

The display switches to the tree view (fig. 106) and the individual settings for the LCP Rear Door CW may be selected.

The following descriptions assume that you have selected the tree view.

The following sections 8.5.1 "Device" to 8.5.7 "Setup" only contain detailed descriptions of those parameters which may be altered. There are also display values for information purposes.

8.5.1 Device

General settings for the LCP Rear Door CW are carried out at "Device" level.

Parameter	Explanation
Description	Individual description of the LCP Rear Door CW
Location	Installation site of the LCP Rear Door CW

Tab. 8: Settings at "Device" level

Parameters containing detailed information, such as the software and hardware versions used, are also displayed. You should have this information to hand when contacting Rittal with a query, so as to facilitate rapid error diagnosis.

8.5.2 Air Temperature

ISensor settings for the server inlet and outlet temperatures are performed at this level. For this purpose, the appropriate sublevels are created. The values for each individual "Top", "Mid" and "Bottom" sensor are displayed or set below the "IT Supply" and "IT Return" levels. Furthermore, settings for the averaged values of the three temperature sensors are performed at the "Average" level.

"IT Supply" level > "Air Temperature (Top)"

You can set the following parameters for the top temperature sensor of the server inlet temperature at this level:

Parameter	Explanation
DescName	(Detailed) description of the temperature sensor.
SetPtHigh-Alarm	Upper limit of the server inlet temperature at the top temperature sensor for which an alarm message is output when overshoot.
SetPtHigh-Warning	Upper limit of the server inlet temperature at the top temperature sensor for which a warning message is output when overshoot.
SetPtLow-Warning	Lower limit of the server inlet temperature at the top temperature sensor for which a warning message is output when undershoot.
SetPtLow-Alarm	Lower limit of the server inlet temperature at the top temperature sensor for which an alarm message is output when undershoot.
Hysteresis	Required percentage deviation for undershooting or overshooting the limit temperature at the top temperature sensor for a status change (see section 18 „Glossary“).

Tab. 9: Settings at the "Air Temperature (Top)" level

The following parameters are also displayed for the temperature sensor:

Parameter	Explanation
Value	Server inlet temperature, measured at the top temperature sensor.
Status	Current status of the top temperature sensor. "OK": The temperature sensor is connected and operational. "Alarm": The temperature sensor has failed or is not detected.

Tab. 10: Displays at the "Air Temperature (Top)" level

"IT Supply" level > "Air Temperature (Center)" and "Air Temperature (Bottom)"

At these levels, you can set all parameters similar to the top temperature sensor.

"IT Supply" level > "Air Temperature (Average)"

At this level, you can set all parameters similar to the top temperature sensor. Whereby, the specified limit values apply to the averaged values of the three temperature sensors.

"IT Return" level

The settings for the server outlet temperature are performed at this level. The settings, as well as the displayed parameters, correspond to those in the "IT Supply" level.

8.5.3 Fans

Settings for the installed fans are performed at this level.
"Current Speed" sub-level > "Fan1" to "Fan9"

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Settings for the associated fan are performed at this level.

Parameter	Explanation
DescName	(Detailed) description of the respective fan.

Tab. 11: Settings at sub-levels "Fan1" to "Fan9"

The following parameters are also displayed for the fans:

Parameter	Explanation
Value	Current speed of the respective fan as a % of maximum speed
Status	Current status of the respective fan. "OK": Fan is connected and operational. "Low Warn": Fan speed is below the "Set-LowWarning" limit. "Off": Fan is deactivated. "Inactive": Although fan monitoring is disabled, the fan runs.

Tab. 12: Displays at sub-levels "Fan1" to "Fan9"

"Config" sub-level

Settings for the operating modes and fan speeds are performed at this level:

Parameter	Explanation
SetPtLow-Warning	Bottom limit of the fan speed; a warning message is emitted if this is undercut.
Command	Select the operating mode. The operating mode can be selected uniformly for all fans. "Automatic": Fan speeds are determined and automatically regulated according to the server outlet temperature. "Manual": Fan speeds are set manually. "Off": Fans are deactivated. "Minimum": Fans rotate at the preset minimum speed. "Full": Fans rotate at 100%.

Tab. 13: Settings in "Config" sub-level

"Config" sub-level > "Manual"

The fan speeds in the "Manual" operating mode are specified at this level:

Parameter	Explanation
Group	Specification of the fan speed as a % for the "Manual" operating mode.

Tab. 14: Displays at levels "Manual"

"Internal Control" sub-level

The parameters as specified by the fan control unit for the individual fans are displayed at this level.

Parameter	Explanation
Control Mode	Currently selected operating mode.

Tab. 15: Settings at the "Internal Control" sub-level

Parameter	Explanation
Override	Reason for affecting the fan speed. If the temperature sensors fail, a message appears here, for example, "Invalid Air Temperatures"; if control is made in remote operation, "Remote" appears here. "None": If no effect is present, the fans operate at the calculated speed.
Group	The setpoint for the fan speed as percentage of the maximum speed, as specified by the control unit.

Tab. 15: Settings at the "Internal Control" sub-level

8.5.4 Coolant

The settings for the water circuit are performed at this level.

"Temperature" level > "Coolant Supply"

The settings for the water inlet temperature are performed at this level.

Parameter	Explanation
DescName	(Detailed) description of the water inlet temperature.
SetPtHigh-Alarm	Top limit of the water inlet temperature; an alarm message is emitted if this is exceeded.
SetPtHigh-Warning	Top limit of the water inlet temperature; a warning message is emitted if this is exceeded.
SetPtLow-Warning	Bottom limit of the water inlet temperature; a warning message is emitted if this is undercut.
SetPtLow-Alarm	Bottom limit of the water inlet temperature; an alarm message is emitted if this is undercut.
Hysteresis	Required percentage deviation for a status change if the temperature limit of the water is undercut or exceeded (see section 18 „Glossary“).

Tab. 16: Settings in the "Coolant Supply" level

The following parameters are also displayed for the water inlet temperature:

Parameter	Explanation
Value	Current water inlet temperature.

Tab. 17: Display at the "Coolant Supply" level

Parameter	Explanation
Status	Current status regarding the water inlet temperature. "OK": No limit has been exceeded or undercut. "Alarm": The temperature sensor has failed. Too Low: "SetPtLowAlarm" limit undercut. Low Warn: "SetPtLowWarning" limit undercut. High Warn: "SetPtHighWarning" limit exceeded. Too High: "SetPtHighAlarm" limit exceeded. "n.a.": The sensors for the water inlet and water return temperature are deactivated in the configuration (see section 7.2.4 „LCP Rear Door CW configuration“).

Tab. 17: Display at the "Coolant Supply" level

"Temperature" level > "Coolant Return"

The settings for the water return temperature are performed at this level.

The representations fully match those for the "Coolant Supply" level.

"Coolant Flow" level

The settings for the water flow are performed at this level:

Parameter	Explanation
DescName	(Detailed) description of the water flow rate.
SetPtHigh-Alarm	Top limit of the water flow rate; an alarm message is emitted if this is exceeded.
SetPtLow-Alarm	Bottom limit of the water flow rate; an alarm message is emitted if this is undercut.

Tab. 18: Settings at the "Coolant Flow" level

The following parameters are also displayed for the water flow rate:

Parameter	Explanation
Value	Current flow rate of water.
Status	Current status regarding the water flow rate. "OK": The flow meter is correctly connected and in operation, and the flow rate lies within the limit values. Too Low: "SetLowAlarm" limit undercut. Too High: "SetHighWarning" limit exceeded. "Inactive": The flowmeter is deactivated in the configuration (see section 7.2.4 "LCP Rear Door CW configuration").

Tab. 19: Displays at the "Coolant Flow" level

Observe the following notes for flow monitoring:

– To activate flow monitoring, the flow meter must be activated in the configuration (see section 7.2.4 "LCP Rear Door CW configuration").

– If the control valve is less than 70% open, the flow monitoring status is always "OK".

The following information applies only when the control valve is more than 70% open.

– If both limit values are set to "0", the flow monitoring status is always "OK".

– An appropriate status message is issued if the flow rate lies below the "Low Alarm" value.

– An appropriate status message is issued if the flow rate lies above the "High Alarm" value.

– If the flow lies within the limit values, the flow monitoring status is always "OK".

8.5.5 Valve

The settings for the control valve are performed at this level:

"Current Position" sub-level > "Control Valve"

The settings for the control valve are performed at this sub-level.

Parameter	Explanation
DescName	(Detailed) description of the control valve.

Tab. 20: Settings at the "Control Valve" sub-level

The following parameters are also displayed for the control valve:

Parameter	Explanation
Value	Position of the control valve in %: 0% = valve closed, 100% = valve completely open.
Status	Current status of control valve. "Error": The control valve is completely closed, but a water flow is still being measured. "OK": The control valve is correctly connected and operational. "n.a.": The control valve is deactivated in the configuration (see section 7.2.4 "LCP Rear Door CW configuration").

Tab. 21: Displays at the "Control Valve" sub-level

"Config" sub-level

Settings for the operating modes and positioning of the control valve are performed at this level:

8 Operation

Parameter	Explanation
Command	Select the operating mode: "Automatic": The positioning of the control valve is determined and automatically regulated according to the server inlet temperature. "Manual": The positioning of the control valve is set manually. "Off": The control valve is completely closed. "Minimum": The control valve is opened to the preset minimum value. "Full": The control valve is completely opened.

Tab. 22: Settings at the "Config" sub-level

"Config" sub-level > "Manual"

The position of the control valve in the "Manual" operating mode is specified at this level:

Parameter	Explanation
Value	Positioning of the control valve as a % for the "Manual" operating mode.

Tab. 23: Settings at the "Manual" level

"Internal Control" sub-level

The parameters as specified by the water circuit control unit for the control valve are displayed at this level.

Parameter	Explanation
Control Mode	Currently selected operating mode.
Override	Reason for affecting the position of the control valve. If control is performed in remote operation, "Remote" appears here. "None": If no effect is present, the control valve has the calculated position.
Value	The setpoint for the control valve position as percentage, as specified by the control unit.

Tab. 24: Settings at the "Internal Control" sub-level

8.5.6 Cooling Capacity

The settings for the cooling capacity are performed at this level:

Parameter	Explanation
DescName	(Detailed) description of cooling capacity.

Tab. 25: Settings at the "Cooling Capacity" level

The following parameters are also displayed for the cooling capacity:

Parameter	Explanation
Value	The calculated cooling capacity of the LCP Rear Door CW. The capacity is calculated from the inlet and return temperatures as well as from the flow values of the cooling water circuit (the value is determined over the duration of 1 to 2 minutes).
Status	Current cooling output status. "OK" is always displayed here, except when there is no flow meter connected. In such cases, "inactive" is shown. Settings are made under "Water configuration".

Tab. 26: Displays at the "Cooling Capacity" level

8.5.7 Setup

The following settings are performed at this level:

Parameter	Explanation
Temperature IT Supply	Set the setpoint (server inlet temperature).
Differential pressure	Set the pressure difference setpoint. This is only required if the fan speed is controlled according to the pressure difference between the pressures in front of and behind the built-in components.

Tab. 27: Settings at the "Setup" level

8.5.8 Operating Data

The following parameter is displayed at this level:

Parameter	Explanation
Product Number	LCP production number

Tab. 28: Displays at the "Operating Data" level

"Runtimes" sub-level

Settings for the operating hours and switching cycles of the individual components are made at this sub-level.

The following settings are performed at this level:

Parameter	Explanation
Runtimes	Accumulated operating hours for each individual fan.
Valve	"Cycles": Accumulated switching cycles for the control valve. "Reset": Reset the number of switching cycles.
Flow meter	Accumulated cooling water flow in litres.
Thermal Energy	Accumulated thermal energy in kWh.

Tab. 29: Displays at the "Runtimes" sub-level

Parameter	Explanation
Electrical Energy	Accumulated electrical energy in kWh.
EER	Display the current Energy Efficiency Ratio (ratio between generated cooling energy and electrical energy).

Tab. 29: Displays at the "Runtimes" sub-level

8.5.9 Remote

Remote control allows the system to be controlled by external SW systems using the available protocols (SNMP, Modbus TCP, OPC-UA).

The remote function is only active when the corresponding "Internal.Control.Mode" of the fans and control valve is set to "Automatic".

"Remote Temperature" sub-level

Remote control of the temperature overwrites the "IT Supply Air Average.Value" value, allowing it to be regulated to an externally set temperature.

Parameter	Explanation
DescName	(Detailed) description of remote mode with respect to temperature control.
Timeout	Duration between 1 and 60 seconds while the external control is (still) active, provided the timeout is activated. In such cases, the time must be repeatedly extended by the external software. Once the value "0" is reached, temperature control by the LCP Rear Door CW's internal controller will resume.
Mode	Remote control mode in relation to temperature. "Off": Remote control is deactivated. "With timeout": With an active timeout, the timeout value must be cyclically re-written by the external system. If the time expires (value = 0), remote control is deactivated and control reverts to the internally pre-selected control mode (delta T or delta P). "Without timeout": If timeout monitoring is not active, the most recent "Value" setting will remain active.

Tab. 30: Settings at the "Remote Temperature" sub-level

The following parameters are also displayed for remote control:

Parameter	Explanation
Value	Externally prescribed setpoint for the server inlet temperature.

Tab. 31: Displays at the "Remote Temperature" sub-level

Parameter	Explanation
Status	Current status of remote mode. "Off": Remote mode not activated (timeout has the value "0"). "On": Remote mode activated (timeout has a value of greater than 1).

Tab. 31: Displays at the "Remote Temperature" sub-level

"Remote Fans" sub-level

Parameter	Explanation
DescName	(Detailed) description of remote mode in relation to the fans.
Timeout	Duration between 1 and 60 seconds while the external control is (still) active, provided the timeout is activated. In such cases, the time must be repeatedly extended by the external software. Once the value "0" is reached, control of fan speed by the LCP Rear Door CW's internal controller will resume.
Mode	Remote control mode in relation to fans. "Off": Remote control is deactivated. "With timeout": With an active timeout, the timeout value must be cyclically re-written by the external system. If the time expires (value = 0), remote control is deactivated and control reverts to the internally pre-selected control mode (delta T or delta P). "Without timeout": If timeout monitoring is not active, the most recent "Value" setting will remain active.

Tab. 32: Settings at the "Remote Fans" sub-level

The following parameters are also displayed for remote operation:

Parameter	Explanation
Value	Externally prescribed setpoint for the fan speed.
Status	Current status of remote mode. "Off": Remote mode not activated (timeout has the value "0"). "On": Remote mode activated (timeout has a value of greater than 1).

Tab. 33: Displays at the "Remote Control" sub-level > "Remote Fans"

"Remote Valve" sub-level

Parameter	Explanation
DescName	Remote control mode in relation to the control valve.

Tab. 34: Settings at the "Remote Valve" sub-level

Parameter	Explanation
Timeout	Duration between 1 and 60 seconds while the external control is (still) active, provided the timeout is activated. In such cases, the time must be repeatedly extended by the external software. Once the value "0" is reached, valve control by the LCP's internal controller will resume.
Mode	Remote control mode in relation to the control valve. "Off": Remote control is deactivated. "With timeout": With an active timeout, the timeout value must be cyclically re-written by the external system. If the time expires (value = 0), remote control is deactivated and control reverts to the internally pre-selected control mode (delta T or delta P). "Without timeout": If timeout monitoring is not active, the most recent "Value" setting will remain active.

Tab. 34: Settings at the "Remote Valve" sub-level

The following parameters are also displayed for remote operation:

Parameter	Explanation
Value	Externally prescribed setpoint for the opening angle of the control valve.
Status	Current status of remote mode. "Off": Remote mode not activated (timeout has the value "0"). "On": Remote mode activated (timeout has a value of greater than 1).

Tab. 35: Displays at the "Remote Valve" sub-level

8.5.10 Features

Settings for condensate prevention, Delta T control (medium: water) and dew point monitoring are made at this level.

"Condensate Prevention" sub-level

With remote mode deactivated, the quantity of condensate produced if the temperature drops below the dew point can be minimised or eliminated altogether using the condensate prevention function. This function must be activated via the "Command" (default setting) and is only possible with server inlet temperature control, but not with delta T control of the cooling medium.

If the temperature is approaching the dew point, the server air inlet temperature increases until it is sufficiently far above the dew point.

To determine the current dew point, a CMC III temperature/humidity sensor (7030.111 or 7010.120) is needed in the LCP Rear Door CW.

The sensor is managed under "Real Devices" in the selection tree on the LCP Rear Door CW website.

The ascertained dew point value is compared with the prescribed minimum server inlet temperature measured by the three temperature sensors (see section 8.5.2 "Air Temperature"). Calculation of the dew point value includes the adjustable offset, i.e. the ascertained dew point is added to the adjustable offset to produce the "Calculated Dewpoint".

If the measured minimum server inlet temperature is below the "Calculated Dewpoint", the condensate prevention function will be activated. The server inlet temperature is then gradually increased to a maximum value ("IT Supply Air Alarm") above the manually set "IT Supply Temp." setpoint. During this period, the setpoint is increased by 0.5 K per minute.

If the temperature reaches the adjustable alarm limit "IT Supply Alarm", an alarm message is immediately issued. Once the minimum server inlet temperature has climbed back above the calculated dew point (including a hysteresis of 1 K), the server inlet temperature is gradually reduced again.

Parameter	Explanation
DescName	(Detailed) description of condensate prevention.
Dewpoint	Dew point determined with the help of the CMC III temperature/humidity sensor.
Offset	Safety margin for the measured dew point at which condensate prevention is activated.
Calculated Dewpoint	Calculated dew point value including offset.
IT Supply Air Min	Minimum server inlet temperature.
Temperature IT Supply	Setpoint for the server inlet temperature.
IT Supply Alarm	Maximum server inlet temperature.
Command	Activate or deactivate the condensate prevention function. "On": The dew point prevention function is activated (default setting). "Off": The dew point prevention function is deactivated.

Tab. 36: Settings at the "Condensate Prevention" sub-level

The following parameter is also displayed for the condensate prevention function:

Parameter	Explanation
Status	Current status of dew point prevention function. "Off": The function is not pre-selected (Command is set to "Off"). "On": The function is pre-selected (Command is set to "On"). "Active": Function pre-selected and active (the setpoint is adjusted). "Error": The function has been pre-selected but the humidity sensor is not available. "Alarm": The limit for the alarm message has been reached.

Tab. 37: Displays at the "Condensate Prevention" sub-level

**Note:**

If the condensate prevention function is enabled, "Cond. prev." is shown in the optional display with touch function on the home screen below the symbol for controlling the control valve.

"Coolant Delta T-mode" sub-level

In this mode, the LCP Rear Door CW is controlled according to the return temperature of the cooling medium. The control valve regulates according to a constant set value based on the return temperature in the cooling medium circuit (cooling medium outlet temperature).

The air inlet temperature is within the dynamic specified range. It is possible to set a permissible temperature range (IT Supply Low Temperature and IT Supply High Temperature) for the server inlet temperature (IT Supply Temperature).

If the temperature leaves this range, the LCP Rear Door CW will **immediately** regulate it based on the static air inlet temperature (IT Supply Fallback). This produces a constant server inlet temperature at the prescribed setpoint.

Following a set period (Retry Time Set), the LCP Rear Door CW will revert to control based on the dynamic temperature of the cooling medium. If the temperature is exceeded again, the LCP Rear Door CW will once again regulate it based on the static temperature. The LCP Rear Door CW will make three further attempts to get within the dynamic range. If the 3rd attempt also fails, the LCP Rear Door CW will remain in static control mode and issue an alarm.

Parameter	Explanation
DescName	(Detailed) description of control based on the return temperature of the cooling medium.
Coolant Return Target	Setpoint for the return temperature in the cooling medium circuit.

Tab. 38: Settings at the "Coolant Delta T-mode" sub-level

Parameter	Explanation
IT Supply Low Temperature	Minimum server inlet temperature.
IT Supply High Temperature	Maximum server inlet temperature.
Command	Activate / deactivate delta T control of the cooling medium. "On": Control based on the return temperature of the cooling medium is activated (default setting). "Off": Control based on the return temperature of the cooling medium is deactivated.
Retry Time Set	Time after which the LCP Rear Door CW attempts to switch to control based on the return temperature of the cooling medium (after exceeding / undercutting the setpoints).

Tab. 38: Settings at the "Coolant Delta T-mode" sub-level

The following parameters are also displayed for control based on the return temperature of the cooling medium:

Parameter	Explanation
Coolant Supply	Current inlet temperature in the cooling medium circuit.
Coolant Return	Current return temperature in the cooling medium circuit.
Flowrate	Current cooling medium flowrate.
IT Supply Temperature	Current server inlet temperature.
IT Supply Fallback	Server inlet temperature if control based on the return temperature of the cooling medium is not possible. This equates to the "IT Supply Temp." value.
Retry	Number of attempts to switch to control based on the return temperature of the cooling medium.
Retry Time	Time that has elapsed since the last changeover attempt.
Status	Current status of control based on the return temperature of the cooling medium. "Off": Control is not activated. "On": Control is activated.

Tab. 39: Displays at the "Coolant Delta T-mode" sub-level

8.6 Configuration index tab

The content of the **Configuration** index tab depends on which component was selected in the left-hand section of the tree view.

If the overall system "Processing Unit" (top node) is selected, the following configuration options are available:

- Group frame **Network**
 - TCP/IP
 - SNMP
 - HTTP
 - File Transfer
 - Console
 - SMTP
 - Modbus/TCP
 - Server Shutdown
 - OPC-UA
- Group frame **System**
 - Syslog
 - Units and Languages
 - Details
 - Date/Time
 - General
 - Firmware Update
 - WebCam
 - Mobile
- Group frame **Security**
 - Groups
 - Users
 - LDAP
 - RADIUS
- Group frame **Cooling System**
 - Air Configuration
 - Water Configuration
 - General Configuration

The configuration options for the LCP Rear Door CW in the group frame **Cooling System** are described in detail in sections 7.2.3 "Changing the measurement units" and 7.2.4 "LCP Rear Door CW configuration". All other configuration options are described in the assembly and operating instructions of the IoT Interface 3124.300.

If a subordinate component such as the "Liquid Cooling Unit" is selected, the following configuration options are available by clicking on the relevant symbols:

- Configure All Alarms
- Configure Device Rights

These configuration options are described in detail in the assembly and operating instructions of the IoT Interface 3124.300.

8.7 Door Opening



Note:
The "Door Opening" function is required for the LCP Rear Door CW only in exceptional cases. If necessary, consult Rittal.

The Door Control Module 7030.500, 7030.501 or 7010.501 (ADO Control Unit) is operated with the ten

buttons from "1" to "0". This requires that the access authorisations are specified in the Access Configuration. The access authorisations for the door to be monitored are defined on the **Access Configuration** tab.

To add a new access code:

- Select the **Access Configuration** tab in the configuration area.
- Below the list of access codes / transponder cards that have already been added in the **Access** group frame of the **Access Configuration** tab, click the **Add** button.

The "Access Configuration" dialogue appears, analogous to configuring an access authorisation.

To configure an access code:

- In the **Access** group frame, select the line for the desired entry to adjust the settings stored for this purpose.
- Click the **Edit** button.
The "Access Configuration" dialogue opens.

Parameter	Explanation
Type	Configuration of an access. The "Keycode" entry must be selected here.
Code	Number of the button with which the output should be switched. Only one position can be specified, a number code with multiple positions is not supported.
User	Selection of the user authorised for the access. The user must have been created in advance.
Information	Specific additional information for the access. This text is also added for the user in the climate controller logfile.

Tab. 40: Parameters group frame

All connected access modules are displayed in the **Tree** group frame. This is where the assignment is made concerning the handles, which can, in principle, be activated with the access authorisation.

- If necessary, activate a higher-level group in the tree view (e.g., all "real devices", so you can open all the assigned handles with the access authorisation.
- If necessary, deactivate individual handles in a group by clicking again.



Note:
A user must be assigned to the access code. Otherwise, access is not possible even with the input of the correct access code.

To delete an access code:

- Select the line with the required entry you wish to delete.

- If necessary, select another entry by keeping the shift key pressed. All lines from the first entry selected to the last entry selected (inclusive) are selected.
- If necessary, select further entries by keeping the "Ctrl" key pressed. These lines are added individually to the selection.
- Click the **Delete** button.
All selected access authorisations are immediately deleted without a confirmation prompt.

8.8 Tasks

The status of all connected components may be polled and logically interlinked using Tasks. The meanings of all statuses are described under the setting options for the individual components (see section 8.5 "Monitoring index tab"). Additionally, date values may also be incorporated into the links. In the event of a status change to the so-called trigger expression, various actions may then be activated. For example, in the event of an alarm message from the integrated access sensor on a certain day of the week, a corresponding e-mail may be sent. The current status of a task cannot be polled via SNMP. Tasks have general validity. For this reason, the information displayed on the **Tasks** index tab is independent from the components selected in the left-hand section of the screen.

Example: The fans should be switched off when the upper limit temperature of the server inlet temperature for which an alarm message will be output is exceeded.

- Activate the "Enable" checkbox in the **Details** group frame and specify a meaningful name for the task in the **Name** field.
- Select the "=" operator in the **Trigger Expression** group frame.
- Click the "No Variable Selected" entry below the "=" operator.
- Select the "Variable" entry (preselected by default) in the "Nature" dropdown list.
- Select the "[2] Liquid Cooling Unit" entry in the "Device" dropdown list.
- Select the "Air.IT Supply.Status" entry in the "Variable" dropdown list.
- Set in the trigger expression below the selected "Air.IT Supply.Status" variable the associated value for which the fans should be switched off, e.g. "Too High".
- Now select the "Set Variable Value" entry as action in the dropdown list in the **Details** group frame.
- Click the **Setup** button.
The "Configure Set Variable Value" dialogue is displayed.
- Select the "[2] Liquid Cooling Unit" entry for the device.
- Select the "Config.Fans.Command" entry in the "Variable" dropdown list.
- Select the "Off" entry in the "Value on True" dropdown list.
- For safety reasons, select the "Automatic" entry in the "Value on False" dropdown list.

This causes the fans to be switched on again when the status of the server inlet temperature no longer has the status "Too High".

If, in addition to shutting down the fans, the control valve in the water circuit should also be closed, a further task for the same condition must be created.

Manual settings e.g. regarding the operating mode of the fans may be overwritten by actions triggered in the event of status changes.

Example: You have defined a task whereby the fans are switched off if the upper server inlet limit temperature is exceeded. To this end, the variable **Config.Fans.Command** is assigned the value **Off** if the **Temperature.Status** has a value of **Too High** ("Value on True"). Furthermore, the variable **Config.Fans.Command** is assigned the value **Automatic** if the **Temperature.Status** does not have a value of **Too High** ("Value on False"). If the server inlet temperature then drops back to within the preset limits after exceeding the upper limit, the fans are **always** switched to automatic mode by the task, regardless of the previously selected fan operating mode (e.g. "Manual", "Off" or "Full").



Note:

Further information on the creation of tasks may be found in the assembly and operating instructions of the IoT Interface 3124.300.

9 Updates and data backup

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9 Updates and data backup

Because SFTP access to the climate controller of the LCP Rear Door CW is required only to perform software updates and for data backup, the access should be generally blocked and briefly activated only for the above-mentioned tasks.



Note:

Further information about these topics is available in the assembly and operating instructions of the IoT Interface 3124.300.

Rittal recommends that a data backup of the climate controller configuration is made in regular intervals. The settings and configurations of all connected components as displayed currently for the individual sensors on the **Monitoring** and **Configuration** tabs are stored in the "cmcllsave.cfg" file (as of software version V3.11.00).

For a second LCP Rear Door CW of the same type, this configuration file can be placed for transfer similarly in the upload directory. This LCP Rear Door CW is then configured automatically similarly as the LCP Rear Door CW for which this file was saved.



Note:

It is not possible to transfer a configuration file that was stored from a climate controller with an older software version to a climate controller with a newer software version.

10 Troubleshooting

10.1 General faults

Malfunction location	Malfunction	Cause of malfunction	Effect	Remedy
Control valve	The climate controller displays flow even though the control valve is displayed as closed	The control valve is dirty	The flow meter displays a value. There is a ΔT .	Use the climate controller to open and close the control valve several times; contaminants may be loosened. It is highly recommended that a filter be installed in the system to ensure the required water quality. If needed, disconnect power to the complete LCP Rear Door CW and restart after approx. 1 minute.
Flow meter	The climate controller displays no flow even though the control valve is displayed as open	Flow meter is dirty	The flow meter displays no value, even though the control valve is open and there is a ΔT .	The flow meter must be removed and cleaned or replaced by authorised personnel. It is highly recommended that a filter be installed in the system to ensure the required water quality.
LCP Rear Door CW	The LCP Rear Door CW is not regulating temperature and is operating in emergency mode	The communication to the climate controller is interrupted	The 2-way control valve is open and the fans operate at full speed.	Press the "SET" button on the climate controller for approx. 2 seconds. If the communication can be restored, the system then returns to normal operation. If this is not the case, the system restarts. Contact the service department if the fault continues.
	The unit is not providing the required cooling output	Air in the water circuit	If air is present in the water circuit, the water cannot circulate properly in the heat exchanger and so cannot remove heat.	Bleeding the air from the heat exchanger
LCP Rear Door CW	The unit is not providing the required cooling output	Increased pressure loss on the piping network side, e.g. through a clogged filter or incorrectly set flow limiter	The external pumps are not able to pump enough cold water through the Liquid Cooling Package.	Clean the filter, set the flow limiter correctly.
		Air routing not correct	The cooled air passes through unsealed openings past the equipment to the back of the enclosure.	Unused height units in the 482.6 mm (19") level as well as side slots and openings must be sealed using blanking plates or foam strips. Both are available as accessories.
		Pump incorrectly dimensioned.	Flow rate too low.	Dimension the pump larger.
		Hydraulic balancing not established.	Water flow rate in LCP too low.	Establish hydraulic balancing with balancing valves or similar.

10 Troubleshooting

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In order to prevent malfunctions caused by the cold water system, the following remedies should be implemented.

Malfunction location	Malfunction	Cause of malfunction	Effect	Remedy
Cold water system	Corrosion and contaminants in the cold water system	Insufficient cleaning after a new installation	Unclean and aggressive water leads to a weakening of the material and to improper function.	During initial installation, the pipe network and the system parts should be flushed out before the installation of the LCP Rear Door CW.
		Improper treatment of the water with corrosion protection additives		Rittal GmbH & Co. KG recommends the installation of filters and the treatment of the water with appropriate corrosion and, if needed, antifreeze additives. The recommended notes regarding water quality are found in section 16.1 "Information concerning the filling and additive water".
		Older systems with existing contaminants		Upon integration in existing cold water networks, the use of a water/water heat exchanger is recommended. This forms a second water circuit.

10.2 Messages on the display

A configuration change of the LCP Rear Door CW or the climate controller, such as the connection of an additional sensor, will be indicated on the multi-LED (see section 8.1.1 "Hardware der Regeleinheit des Liquid







Cooling Package"). These messages must then be acknowledged appropriately (see section 8.2.2 "Quittieren von Meldungen").

Message	Symbol	Alarm	Reason for alarm
Air Temperature.IT Supply.Top.Status		<ul style="list-style-type: none"> - Red value/text - Alarm= Error, high alarm, low alarm, probe short, probe open 	<ul style="list-style-type: none"> - Temperature sensor faulty - Overtemperature alarm (above the set limit value) - Undertemperature alarm (below the set limit value) - Temperature sensor short-circuit - Temperature sensor not connected
Air Temperature.IT Supply.Center.Status			
Air Temperature.IT Supply.Bottom.Status			
Air Temperature.IT Return.Top.Status			
Air Temperature.IT Return.Center.Status			
Air Temperature.IT Return.Bottom.Status			
Differential Pressure.Status		<ul style="list-style-type: none"> - Red value/text - Alarm= Error 	Pressure sensor faulty
Fans.Current Speed.FanX.Status		<ul style="list-style-type: none"> - Red fan/value - Alarm= Error 	<ul style="list-style-type: none"> - X fan module faulty - Alarm
Coolant.Temperatures.Supply.Status		<ul style="list-style-type: none"> - Red value/text - Alarm= Error, high alarm, low alarm, probe short, probe open 	<ul style="list-style-type: none"> - Water inlet temperature sensor faulty (short-circuit or not connected) - Overtemperature alarm (temperature above the set limit value) - Undertemperature alarm (temperature below the set limit value)
Coolant.Temperatures.Return.Status		<ul style="list-style-type: none"> - Red value/text - Alarm= Error, high alarm, low alarm, probe short, probe open 	<ul style="list-style-type: none"> - Water return temperature sensor faulty (short-circuit or not connected) - Overtemperature alarm (temperature above the set limit value) - Undertemperature alarm (temperature below the set limit value)
Coolant.Flowrate.Status		<ul style="list-style-type: none"> - Red value/text - Alarm= Error, high alarm, low alarm 	<ul style="list-style-type: none"> - Water flow faulty - Insufficient volumetric flow (volumetric flow below the set limit value) - Excessive volumetric flow (volumetric flow above the set limit value)
Valve.Current Position.Status		<ul style="list-style-type: none"> - Red value/text - Alarm= Error 	<ul style="list-style-type: none"> - n.c. (not connected) - Alarm
Air Circuit control		<ul style="list-style-type: none"> - Red value/text - Alarm= Error 	Impermissible air temperature (alarm)
Coolant Circuit control		<ul style="list-style-type: none"> - Red value/text - Alarm= Error 	Impermissible air temperature (alarm)
Selection Cond.prev.			<ul style="list-style-type: none"> - n.u. (not usable) - greyed-out

Tab. 41: Alarm messages

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Message	Symbol	Warning	Reason for warning
Air Temperature.IT Supply.Top.Status		<ul style="list-style-type: none"> - Yellow value/text - Warning= high warning, low warning 	<ul style="list-style-type: none"> - Warning: Overtemperature (above the set limit value) - Warning: Undertemperature (below the set limit value)
Air Temperature.IT Supply.Center.Status			
Air Temperature.IT Supply.Bottom.Status			
Air Temperature.IT Return.Top.Status			
Air Temperature.IT Return.Center.Status			
Air Temperature.IT Return.Bottom.Status			
Fans.Current Speed.FanX.Status		<ul style="list-style-type: none"> - Yellow value/text - Warning= low warning, Calibration 	<ul style="list-style-type: none"> - Low warning (speed below the set limit value) - Calibration (calibration of fan X)
Coolant.Temperatures.Supply.Status		<ul style="list-style-type: none"> - Yellow value/text - Warning= high warning, low warning 	<ul style="list-style-type: none"> - High warning (temperature above the set limit value) - Low warning (temperature below the set limit value)
Coolant.Temperatures.Return.Status		<ul style="list-style-type: none"> - Yellow value/text - Warning= high warning, low warning 	<ul style="list-style-type: none"> - High warning (temperature above the set limit value) - Low warning (temperature below the set limit value)
Valve.Current Position.Status		<ul style="list-style-type: none"> - Yellow value 	Warning <ul style="list-style-type: none"> - Motor feedback missing - Cable not connected or interrupted - Deactivated (not selected in the web interface)
Air Circuit control		<ul style="list-style-type: none"> - Yellow value 	Warning <ul style="list-style-type: none"> - Fan calibration - Door open
Coolant Circuit control			Greyed-out <ul style="list-style-type: none"> - Valve is deactivated in the web interface (or not even installed)

Tab. 42: Warning messages

11 Inspection and maintenance

During inspection and maintenance of the unit, the personal protective equipment, consisting of at least water-proof protective gloves and safety goggles, must be worn.

The LCP Rear Door CW is largely maintenance-free. An additional external strainer with fine-mesh sieve is required if the cooling water is contaminated. This should be cleaned regularly.

- Visually inspect for leaks regularly (annual cycle).
- Routine visual inspection of the heat exchanger for contamination. Clean, if necessary.



Note:

At an ambient temperature of 40 °C, the nominal service life of the built-in fan is 40,000 operating hours.

Fan module malfunctions are displayed on the optional display or on the status screen of the climate controller (if the LCP Rear Door CW is connected to a network).



Caution!

If leaks occur, there is the risk of injury caused by escaping refrigerant, in particular glycol.

Wear personal protective equipment, collect any escaped refrigerant with suitable cloths or absorbent materials, and rectify the leakage cause without delay.



Caution!

Danger caused by coolant, in particular anti-freeze!

Wear personal protective equipment (PPE)!



Caution!

Danger caused by high air speeds and high sound pressure level!

Wear safety goggles, ear muffs and possibly a hair net or head covering.



Caution!

Danger caused by high air temperatures! Do not perform any work on the unit when your cardiovascular system is not 100% or illness symptoms occur.



Warning! Danger of cut wounds, especially from the sharp edges of the heat exchanger module!

Wear personal protective equipment before beginning assembly and cleaning work!



Caution! Risk of injury!

When removing and installing the active module, there is risk of injury from sharp edges in the interior of the LCP Rear Door CW, the active module falling, high air speeds and noise. Wear your personal protective equipment!



Caution! Risk of injury!

Keep persons and objects away from the fan impellers! Open the service door only when the power supply is disconnected and fan impellers are stationary! Always use mechanical protection when working! Tie long hair back! Do not wear loose clothing! The fan runs automatically when power is switched on!



Caution! Risk of malfunction or damage!

Observe the relevant safety data sheet for all work with the cooling medium.

12 Storage and disposal

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12 Storage and disposal



Caution! Risk of malfunction or damage!
During storage and transportation below freezing point, the water circuit should be drained completely using compressed air!



Caution! Risk of damage!
The air/water heat exchanger must not be subjected to temperatures above +70 °C during storage.

During storage, the air/water heat exchanger must be laid on its side.

Disposal can be performed at the Rittal plant.

Please contact us for advice.

Emptying:

During storage and transportation below freezing point, the air/water heat exchanger should be drained completely.



Caution! Risk of environmental contamination!
If a water-glycol mixture is deployed, it must be disposed of in accordance with the applicable regional regulations.

13 Technical specifications

13.1 Output class 15 kW

Technical specifications	
Description/Model No.	LCP Rear Door CW / 3314.615 (height 2000 mm, width 600 mm)
Description/Model No.	LCP Rear Door CW / 3314.625 (height 2200 mm, width 600 mm)
Description/Model No.	LCP Rear Door CW / 3314.815 (height 2000 mm, width 800 mm)
Description/Model No.	LCP Rear Door CW / 3314.825 (height 2200 mm, width 800 mm)
Dimensions and weight	
Depth [mm]	180
Usable U	42
Opening angle of door	180°
Weight [kg]	Height 2000 mm, width 600 mm: 70 Height 2200 mm, width 600 mm: 75 Height 2000 mm, width 800 mm: 80 Height 2200 mm, width 800 mm: 90
Cooling circuit	
Cooling medium	Saline and low-salinity water based on VDI 2035 plus max. 50 volume percent Antifrogen-N
Cold water inlet temperature [°C]	+10...+30 and at least 3 K above the dew points of the ambient and flowing air
Permissible operating PS1 [bar]	10
Fill quantity of heat exchanger [l]	8
Volumetric flow of water [l/min]	0...80
Water connection	DN 25 (AG 1")
Rated cooling output	
Cooling output, sensitive [kW]	15
Air volumetric flow [m ³ /h]	2550 (air from IT equipment)
Room air temperature [°C]	+24 (LCP Rear Door CW air outlet temperature)
Relative humidity [%]	43
Other specifications	
Ambient operating temperature range [°C]	10...50
Sound pressure level	Depends on the installed equipment of the server rack.
Degree of protection	IP 10B
Colour	RAL 7035 and RAL 9005, finely textured matt (service door)

Tab. 43: 15 kW output class technical specifications

13 Technical specifications

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13.2 Output class 30 kW (with active module)

Technical specifications	
Description/Model No.	LCP Rear Door CW / 3314.630 (height 2.000 mm, width 600 mm)
Description/Model No.	LCP Rear Door CW / 3314.650 (height 2.200 mm, width 600 mm)
Description/Model No.	LCP Rear Door CW / 3314.830 (height 2.000 mm, width 800 mm)
Description/Model No.	LCP Rear Door CW / 3314.850 (height 2.200 mm, width 800 mm)
Dimensions and weight	
Depth [mm]	180
Usable U	42
Opening angle of door	180°
Weight [kg]	Height 2000 mm, width 600 mm: 75 Height 2200 mm, width 600 mm: 80 Height 2000 mm, width 800 mm: 85 Height 2200 mm, width 800 mm: 95
Cooling circuit	
Cooling medium	Saline and low-salinity water based on VDI 2035 plus max. 50 volume percent Antifrogen-N
Cold water inlet temperature [°C]	+10...+30 and at least 3 K above the dew points of the ambient and flowing air
Permissible operating PS1 [bar]	10
Fill quantity of heat exchanger [l]	8
Volumetric flow of water [l/min]	0...80
Water connection	DN 25 (AG 1")
Rated cooling output	
Cooling output, sensitive [kW]	30
Air volumetric flow [m ³ /h]	5000 (air from IT equipment)
Room air temperature [°C]	+24 (LCP Rear Door CW air outlet temperature)
Relative humidity [%]	43
Other specifications	
Ambient operating temperature range [°C]	10...50
Sound pressure level	Depends on the installed equipment of the server rack.
Degree of protection	IP 10B
Colour	RAL 7035 and RAL 9005, finely textured matt (service door)

Tab. 44: 30 kW output class technical specifications

13.3 Active module

Technical specifications	
Description/Model No.	Active module for LCP Rear Door CW / 3314.020 (height 2000 mm)
Description/Model No.	Active module for LCP Rear Door CW / 3314.025 (height 2200 mm)
Rated voltage [V]	100...240 V/1~
Rated frequency [Hz]	50/60
Rated input [kW]	0,47
Full-Load Ampere [A]	4,8 – 2,0
Dimensions and weight	
Depth [mm]	123
Weight [kg]	Height 2000 mm: 19 Height 2200 mm: 20
Other specifications	
Ambient operating temperature range [°C]	10...50
Sound pressure level	Depends on the installed equipment of the server rack. However, max. 78 dB(A) with 16 BLDC fans / I/O board / display (optional) at 100% speed and 71 dB(A) at 50% speed.
Degree of protection	87 dB(A) at 100% speed, 77 dB(A) at 50% speed.
Colour	RAL 9005 fine texture matt

Tab. 45: Active module technical specifications

13.4 Water module

Technical specifications	
Description/Model No.	Water module for LCP Rear Door CW / 3314.635
Rated voltage (DC) [V]	24
Rated input [kW]	0,01
Full-Load Ampere [A]	0,40
Dimensions and weight	
Width x height x depth [mm]	340 x 184 x 502
Weight [kg]	10
Other specifications	
Ambient operating temperature range [°C]	10...50
Degree of protection	IP 54
Colour	RAL 7035

Tab. 46: Water module technical specifications

14 Spare parts

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14 Spare parts

Spare parts may be ordered directly from the Rittal website at the following address.

– <https://www.rittal.com/de-de/Services/Ersatzteile>

■ Select the Model No. for your device here.

Alternatively

■ For spare parts enquiries, contact Rittal Service at service@rittal.com

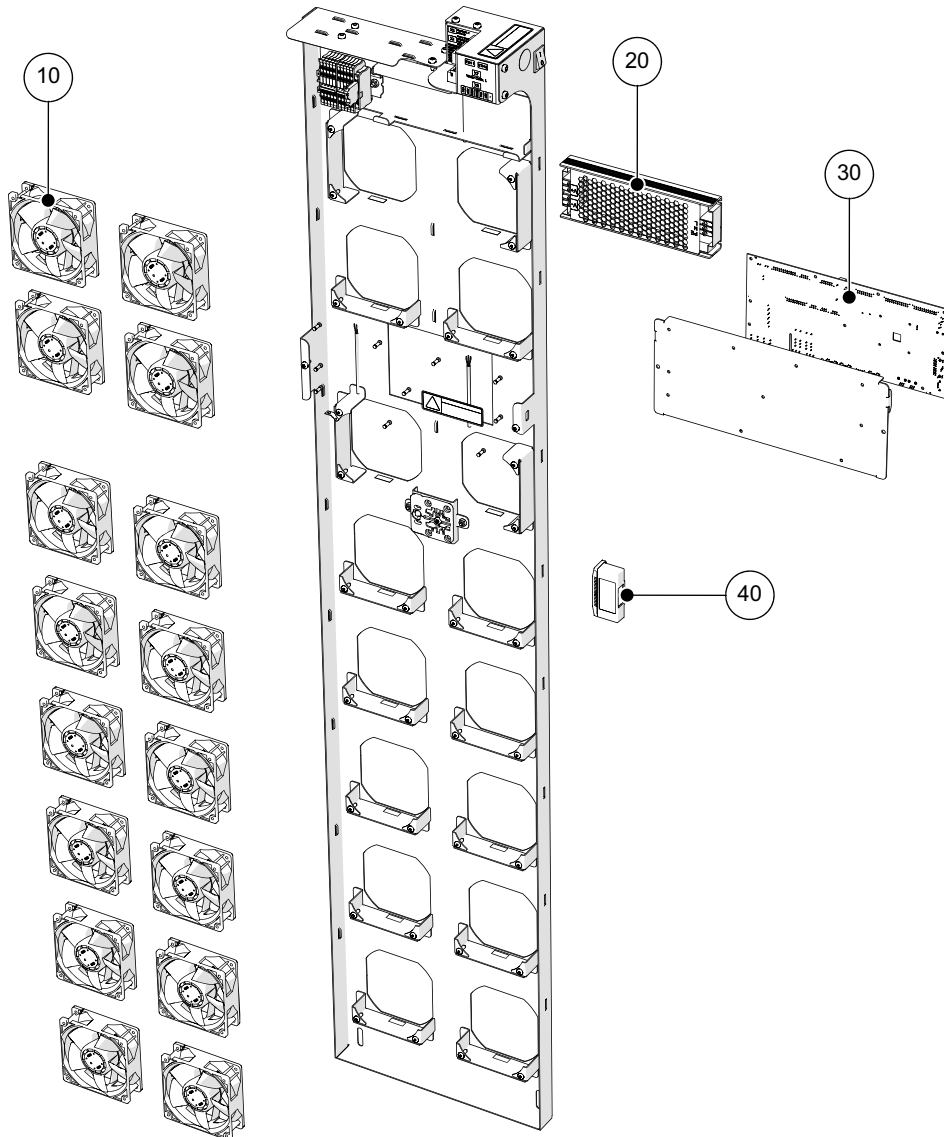


Note:

When ordering spare parts, always include the following information in addition to the spare part number:

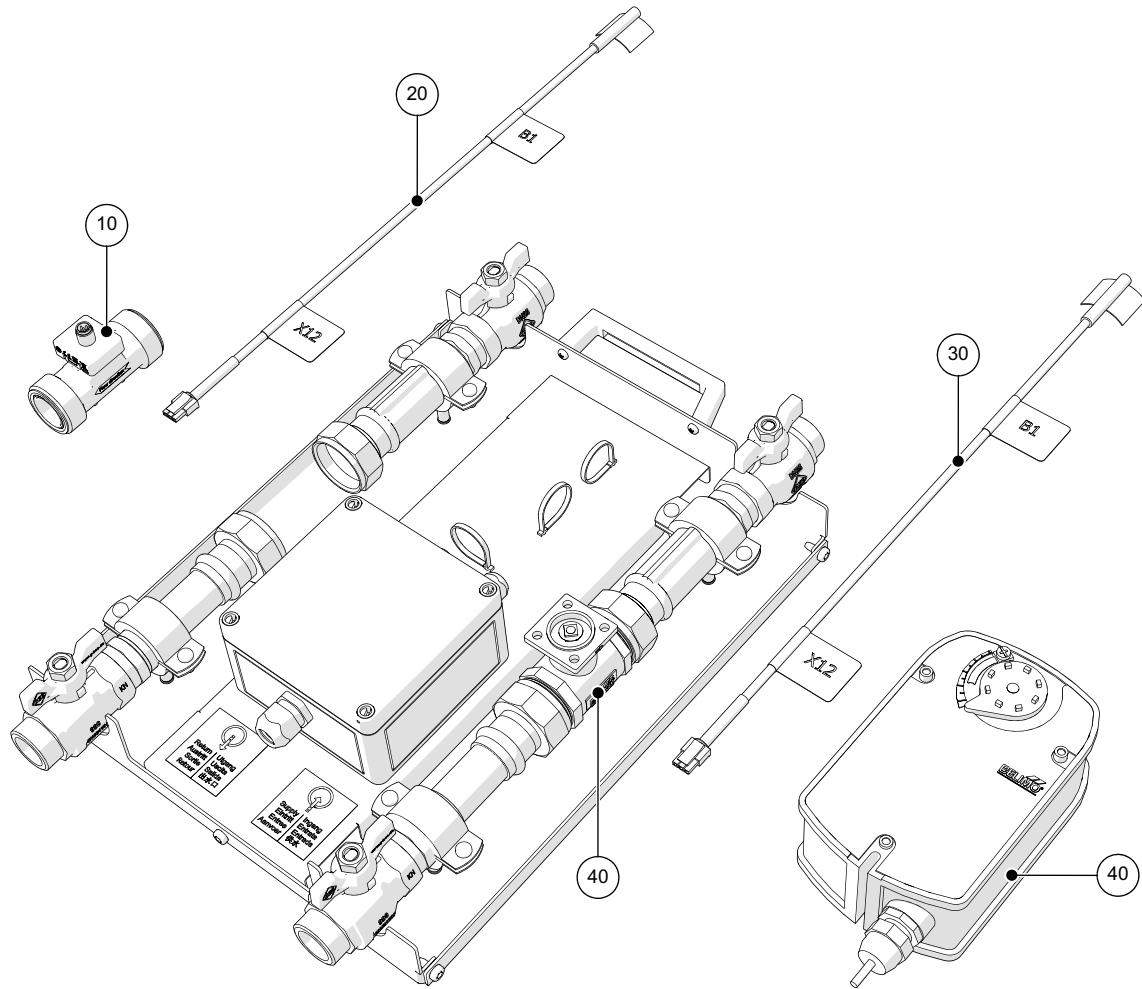
- Device type
- Fabrication number
- Date of manufacture

This information can be found on the rating plate.



Key

- 10 Fan
- 20 Power pack
- 30 Controller
- 40 CMC sensor
- 50 Sensor



Key

- 10 Flow sensor
- 20 Sensor
- 30 Sensor
- 40 Valve

15 Accessories

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15 Accessories

Item	Model No.	Qty./Pack	Comments
Connection hose	3301.351	2	Length 1 m, may be shortened
Active module (H = 2000 mm)	3314.020	1	SK active module for LCP RD CW, for H = 2000 mm RAL 9005 fine structure matt, including 16 BLDC fans, I/O board
Active module (H = 2200 mm)	3314.025	1	SK active module for LCP RD CW, for H = 2200 mm RAL 9005 fine structure matt, including 16 BLDC fans, I/O board
Water module	3314.635	1	SK water module for LCP RD CW for power control, W x H x D: 340 x 184 x 502 mm, RAL 7035
Touch panel display, colour	3314.030	1	
Connection cable	7200.215	1	
Differential pressure sensor	7030.150 or 7010.150	1	

Tab. 47: Accessories list – LCP Rear Door CW

16 Further technical information

16.1 Information concerning the filling and additive water

To avoid damages to the system and ensure reliable operation, the provisions of VDI 2035 should be observed for filling and top-up water.

Admissible cooling media

- Saline and low-salinity water based on VDI 2035 plus max. 50 volume percent Antifrogen-N (see table 48).

Recommended cooling medium

- Low-salinity water (demineralised water) based on VDI 2035. Up to a maximum of 50 volume percent Antifrogen-N may be added (see table 48).

	Low-salinity	Saline
Electrical conductivity at 25 °C [$\mu\text{S}/\text{cm}$]	< 100	100...1,500
Appearance	Free from sedimenting substances	
pH value at 25 °C	8.2...10.0	
Oxygen [mg/l]	< 0.1	< 0.02

Tab. 48: Water specifications

16.2 Characteristic curves and tables

16.2.1 General

All information in the following tables refers to the use of pure water as a cooling medium. The cooling performance data when using a water-glycol mixture is available on request from Rittal.

Proceed as follows to determine the required cooling water temperature:

- Determine the dew point for the room temperature and relative humidity in the room (see section 16.2.2 "Determination of the dew point"). Alternatively, you can use the h-x diagram (fig. 4).
- Determine the minimum admissible cooling water temperature by adding a safety margin of 3 °C to this figure.
- Determine the required water throughput and achieved cooling efficiency for the required airside temperature difference ΔT .

If the cooling efficiency determined in this way is 100%, then the air outlet temperature from the LCP Rear Door CW will be less than, or at the most, equal to the air inlet temperature into the server enclosure.

If the cooling efficiency determined in this way is less than 100%, then the air outlet temperature from the LCP Rear Door CW will be greater than the air inlet tempera-

ture into the server enclosure. The room temperature will rise accordingly over time.

16.2.2 Determination of the dew point

Determination of the dew point for room temperature 20 °C

Room temperature [°C/°F]	Rel. humidity [%]	Dew point [°C/°F]
20 / 68,0	40	6 / 42,8
20 / 68,0	45	7,7 / 45,9
20 / 68,0	50	9,3 / 48,7
20 / 68,0	55	10,7 / 51,3
20 / 68,0	60	12 / 53,6

Tab. 49: Determination of the dew point for room temperature 20 °C

Determination of the dew point for room temperature 21 °C

Room temperature [°C/°F]	Rel. humidity [%]	Dew point [°C/°F]
21 / 69,8	40	6,9 / 44,4
21 / 69,8	45	8,6 / 47,5
21 / 69,8	50	10,2 / 50,4
21 / 69,8	55	11,6 / 52,9
21 / 69,8	60	12,9 / 55,2

Tab. 50: Determination of the dew point for room temperature 21 °C

Determination of the dew point for room temperature 22 °C

Room temperature [°C/°F]	Rel. humidity [%]	Dew point [°C/°F]
22 / 71,6	40	7,8 / 46
22 / 71,6	45	9,5 / 49,1
22 / 71,6	50	11,1 / 52
22 / 71,6	55	12,5 / 54,5
22 / 71,6	60	13,9 / 57

Tab. 51: Determination of the dew point for room temperature 22 °C

16 Further technical information

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Determination of the dew point for room temperature 23 °C

Room temperature [°C/°F]	Rel. humidity [%]	Dew point [°C/°F]
23 / 73,4	40	8,7 / 47,7
23 / 73,4	45	10,4 / 50,7
23 / 73,4	50	12 / 53,6
23 / 73,4	55	13,5 / 56,3
23 / 73,4	60	14,8 / 58,6

Tab. 52: Determination of the dew point for room temperature
23 °C

Determination of the dew point for room temperature 24 °C

Room temperature [°C/°F]	Rel. humidity [%]	Dew point [°C/°F]
24 / 75,2	40	9,6 / 49,3
24 / 75,2	45	11,3 / 52,3
24 / 75,2	50	12,9 / 55,2
24 / 75,2	55	14,4 / 57,9

Tab. 53: Determination of the dew point for room temperature
24 °C

Determination of the dew point for room temperature 25 °C

Room temperature [°C/°F]	Rel. humidity [%]	Dew point [°C/°F]
25 / 77	40	10,5 / 50,9
25 / 77	45	12,2 / 54
25 / 77	50	13,8 / 56,8

Tab. 54: Determination of the dew point for room temperature
25 °C

16.2.3 Pressure loss

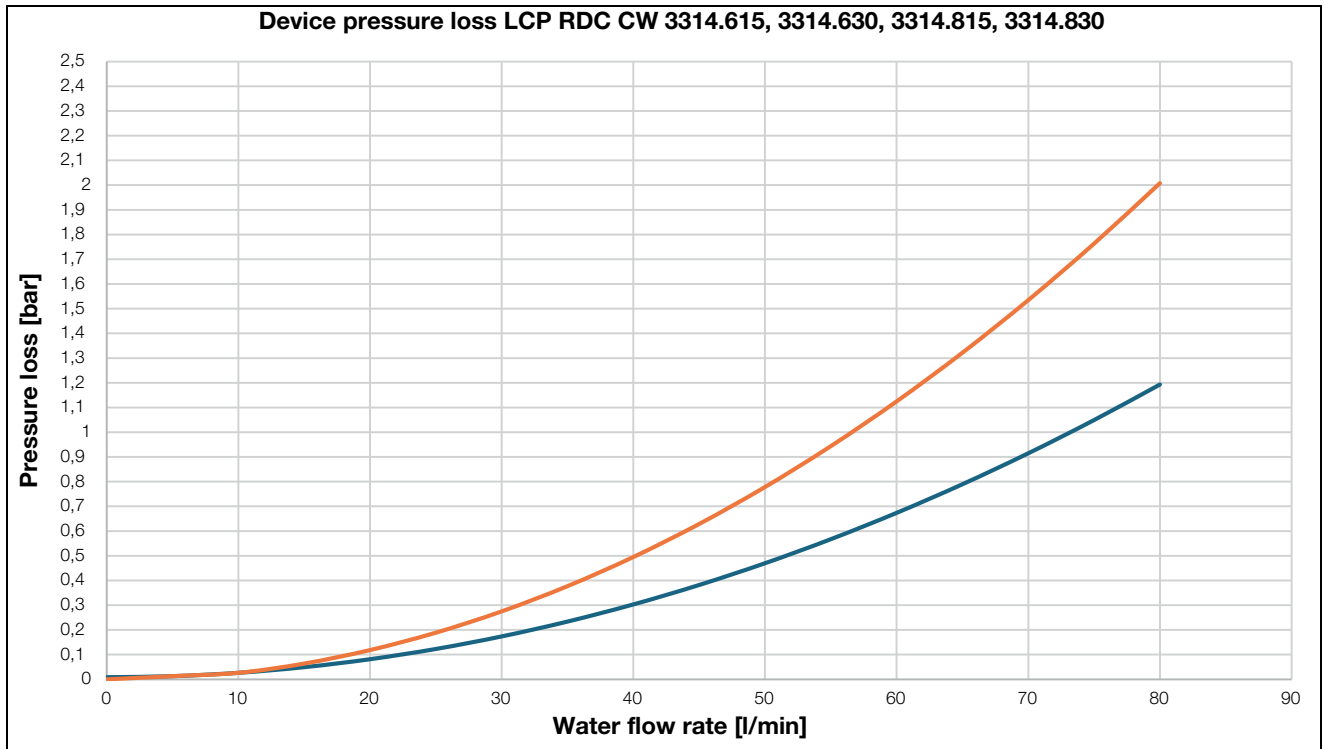


Fig. 108: Device pressure loss LCP Rear Door CW 3314.615, 3314.630, 3314.815, 3314.830

Key

- Pressure loss LCP Rear Door CW without water module
- Pressure loss LCP Rear Door CW with water module

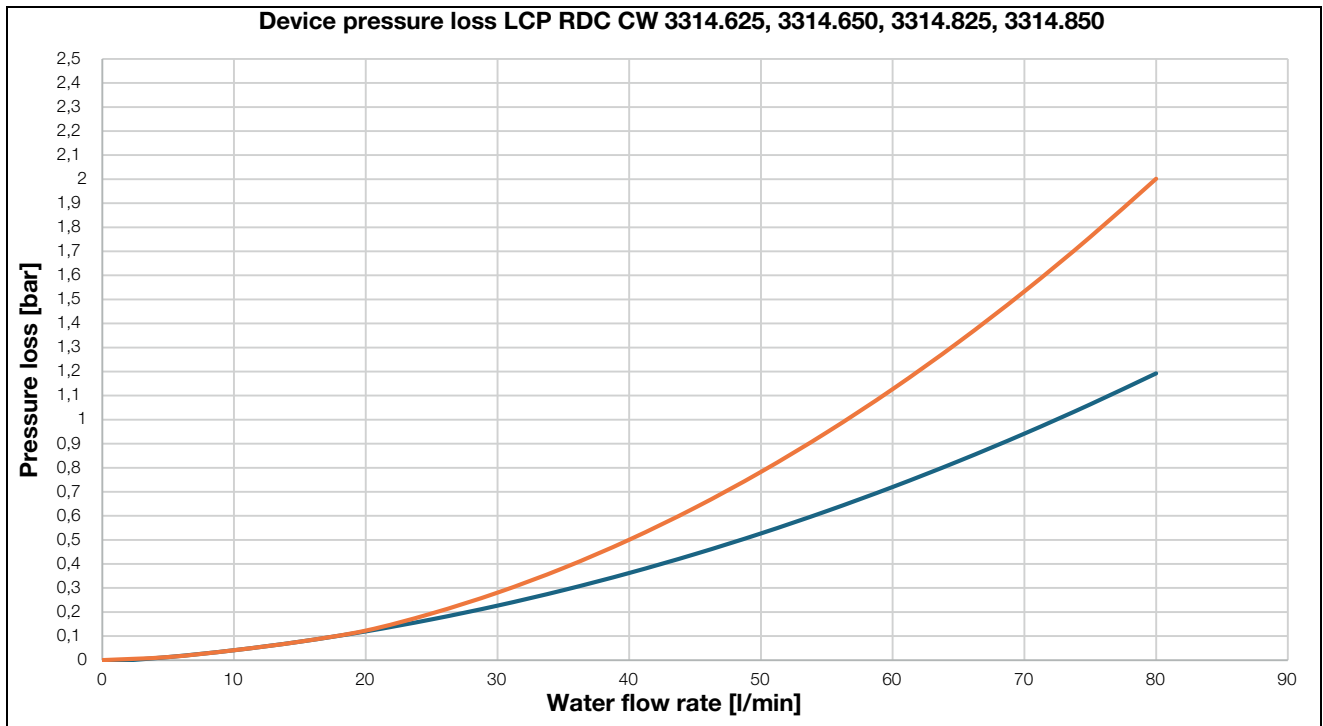


Fig. 109: Device pressure loss LCP Rear Door CW 3314.625, 3314.650, 3314.825, 3314.850

Key

- Pressure loss LCP Rear Door CW without water module
- Pressure loss LCP Rear Door CW with water module

16 Further technical information

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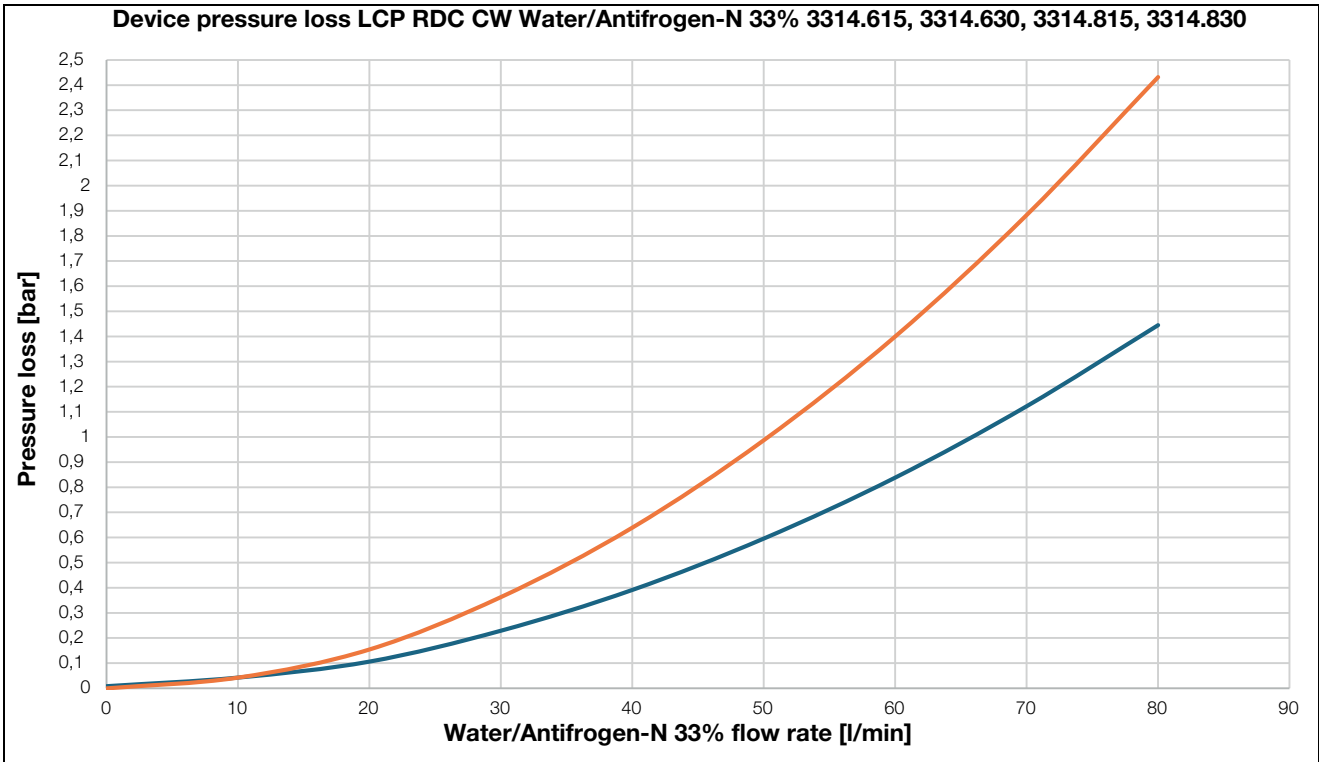


Fig. 110: Device pressure loss LCP Rear Door CW 3314.615, 3314.630, 3314.815, 3314.830

Key

- Pressure loss LCP Rear Door CW Water/Antifrogen-N 33% without water module
- Pressure loss LCP Rear Door CW Water/Antifrogen-N 33% with water module

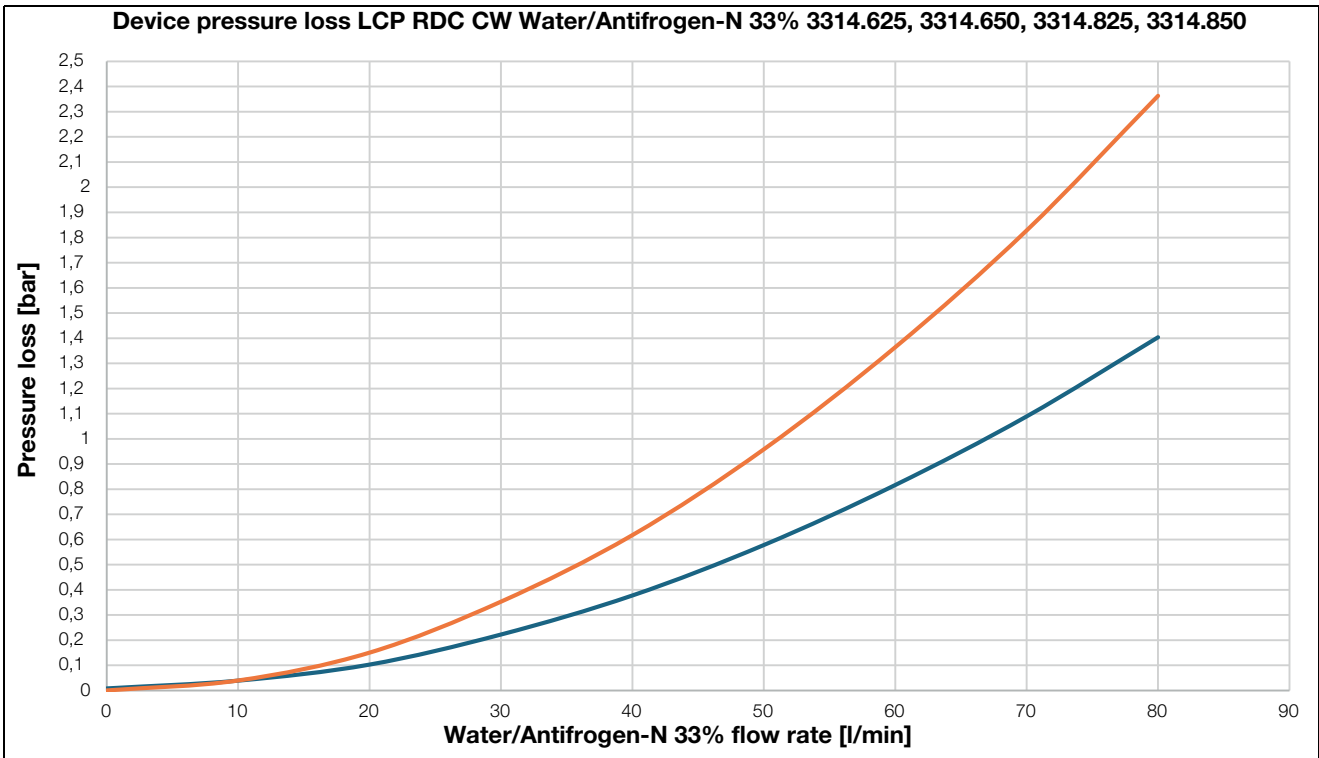


Fig. 111: Device pressure loss LCP Rear Door CW 3314.625, 3314.650, 3314.825, 3314.850

Key

- Pressure loss LCP Rear Door CW Water/Antifrogen-N 33 % without water module
- Pressure loss LCP Rear Door CW Water/Antifrogen-N 33 % with water module

16.2.4 Cooling capacity

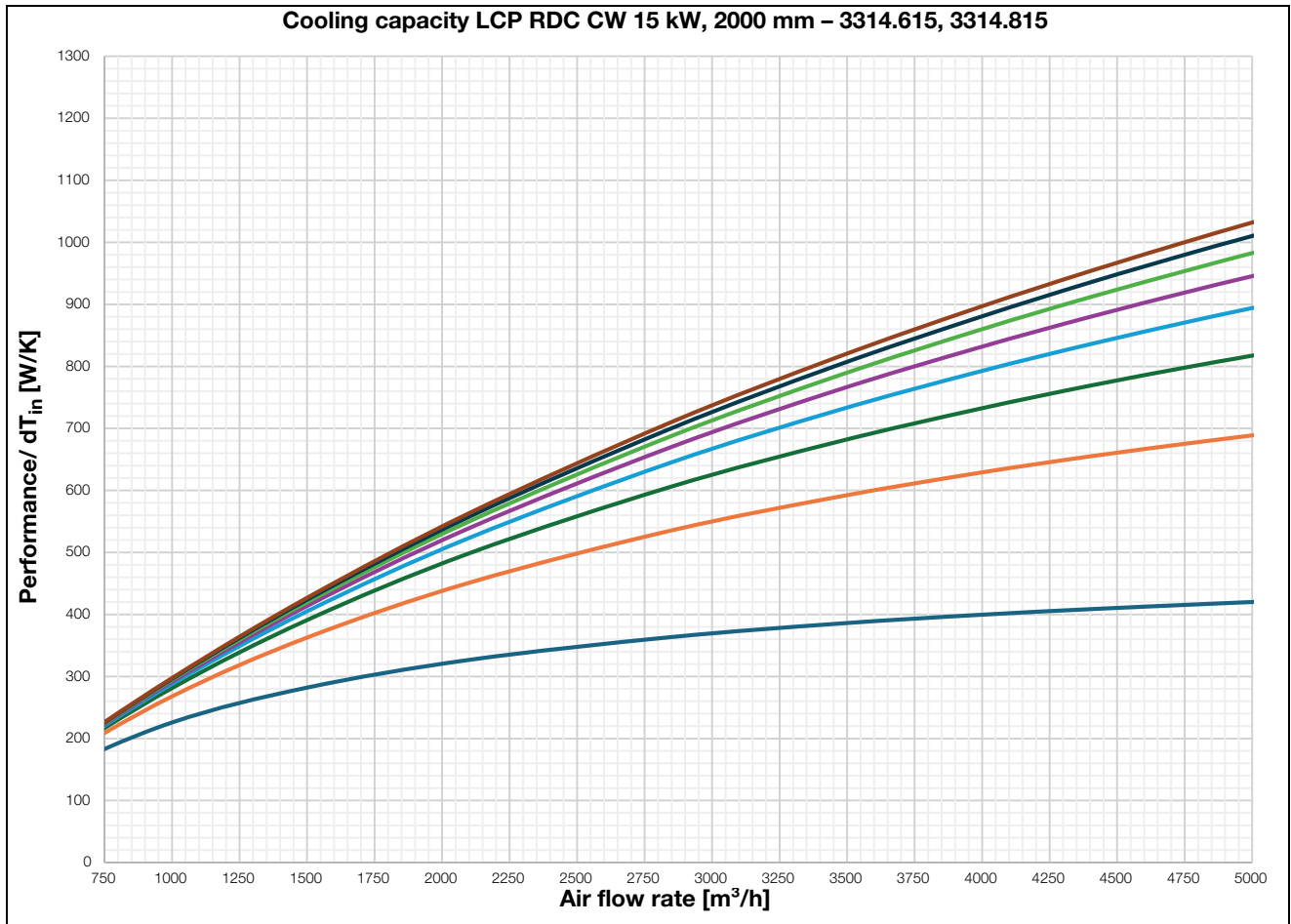


Fig. 112: Cooling capacity LCP Rear Door CW 15 kW, 2000 mm – 3314.615, 3314.815

Key (water flow rate)

- 10 l/min
- 20 l/min
- 30 l/min
- 40 l/min
- 50 l/min
- 60 l/min
- 70 l/min
- 80 l/min

Conditions

$$\Delta T_{in} = T_{Air,in} - T_{Water,in}$$

Humidity 10% and water according to VDI 2035

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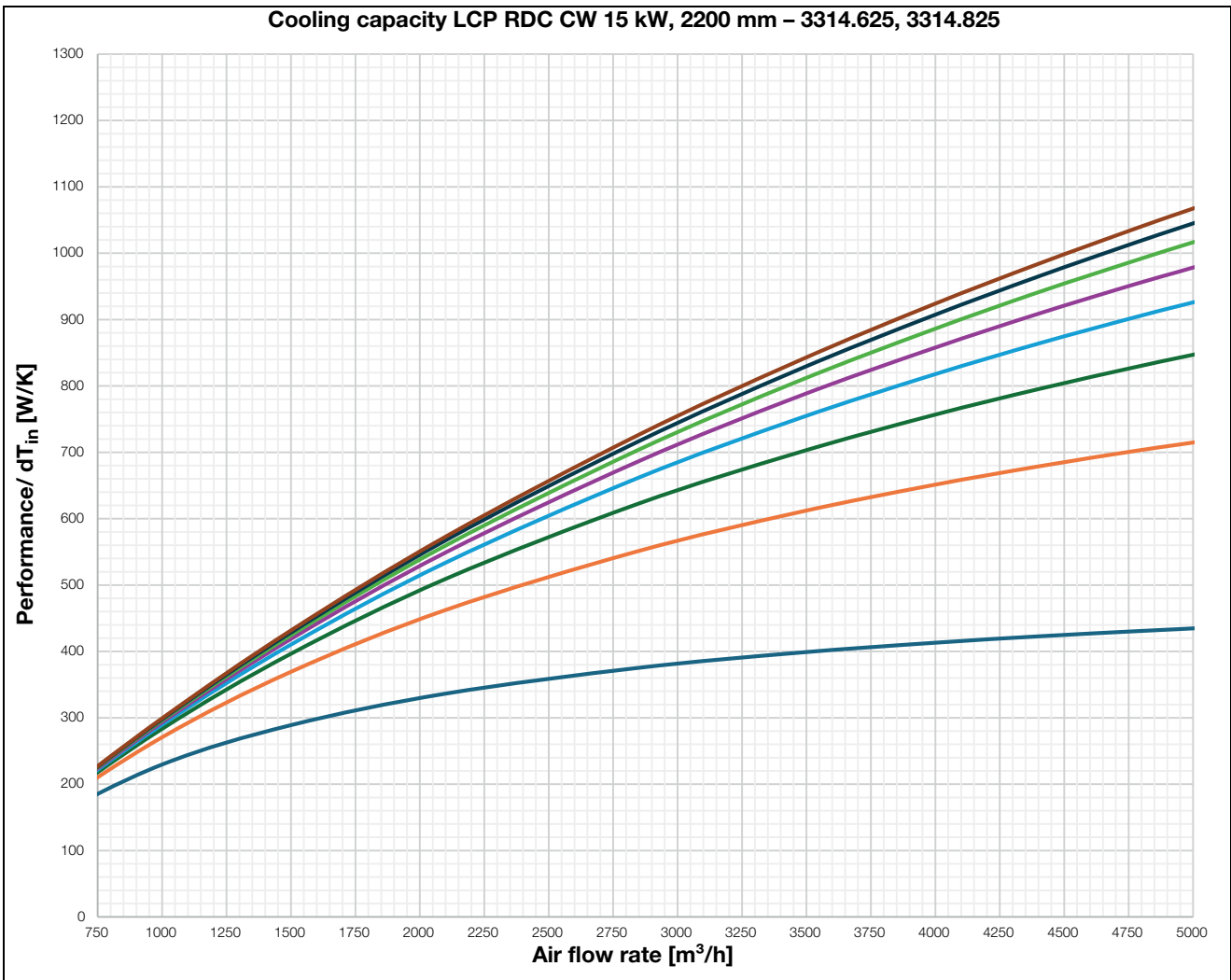


Fig. 113: Cooling capacity LCP Rear Door CW 15 kW, 2200 mm – 3314.625, 3314.825

Key (water flow rate)

- 10 l/min
- 20 l/min
- 30 l/min
- 40 l/min
- 50 l/min
- 60 l/min
- 70 l/min
- 80 l/min

Conditions

$\Delta T_{in} = T_{Air,in} - T_{Water,in}$
 Humidity 10% and water according to VDI 2035

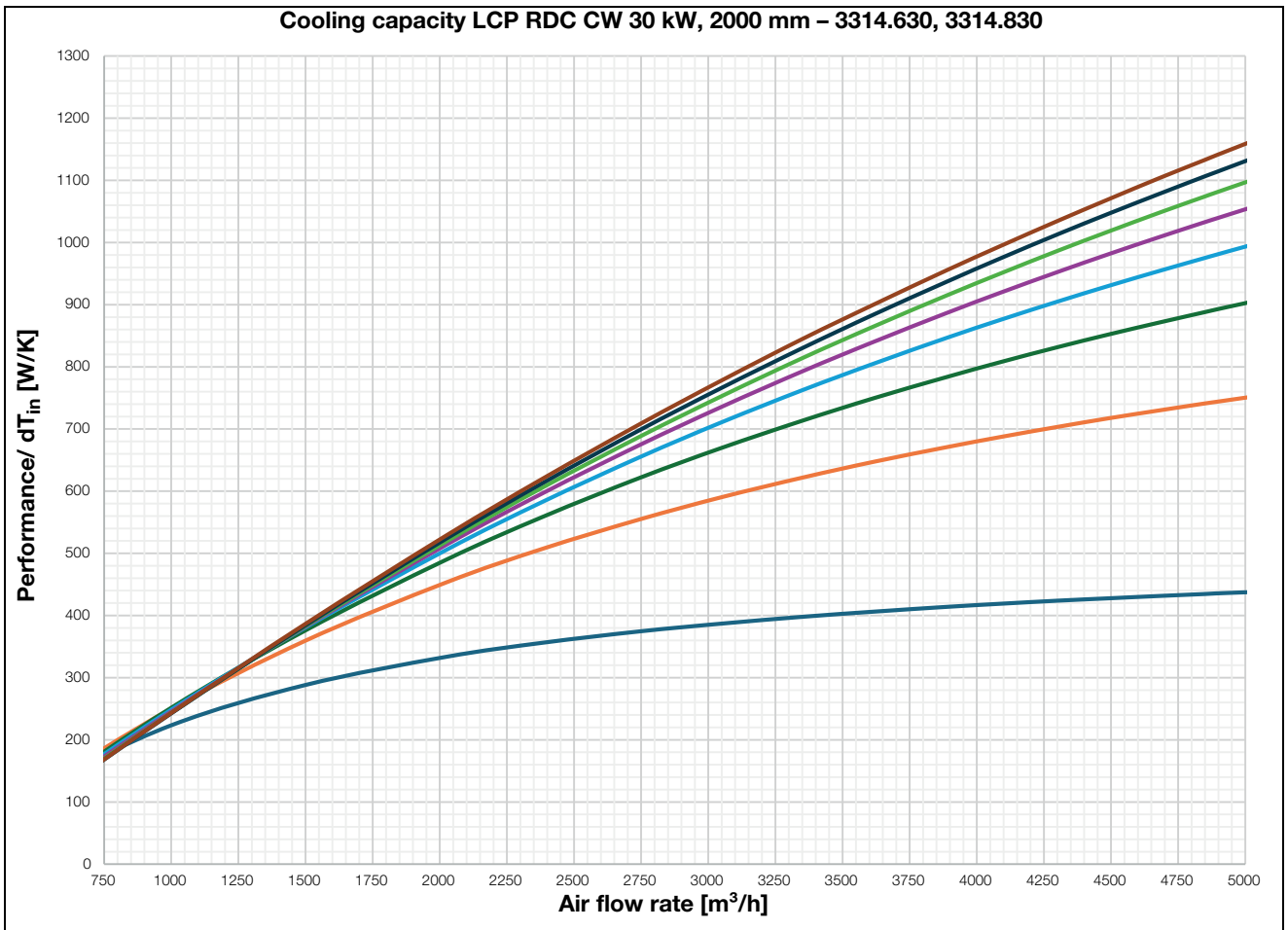


Fig. 114: Cooling capacity LCP Rear Door CW 15 kW, 2000 mm – 3314.630, 3314.830

Key (water flow rate)

- 10 l/min
- 20 l/min
- 30 l/min
- 40 l/min
- 50 l/min
- 60 l/min
- 70 l/min
- 80 l/min

Conditions

$\Delta T_{in} = T_{Air,in} - T_{Water,in}$
 Humidity 10% and water according to VDI 2035

16 Further technical information

EN

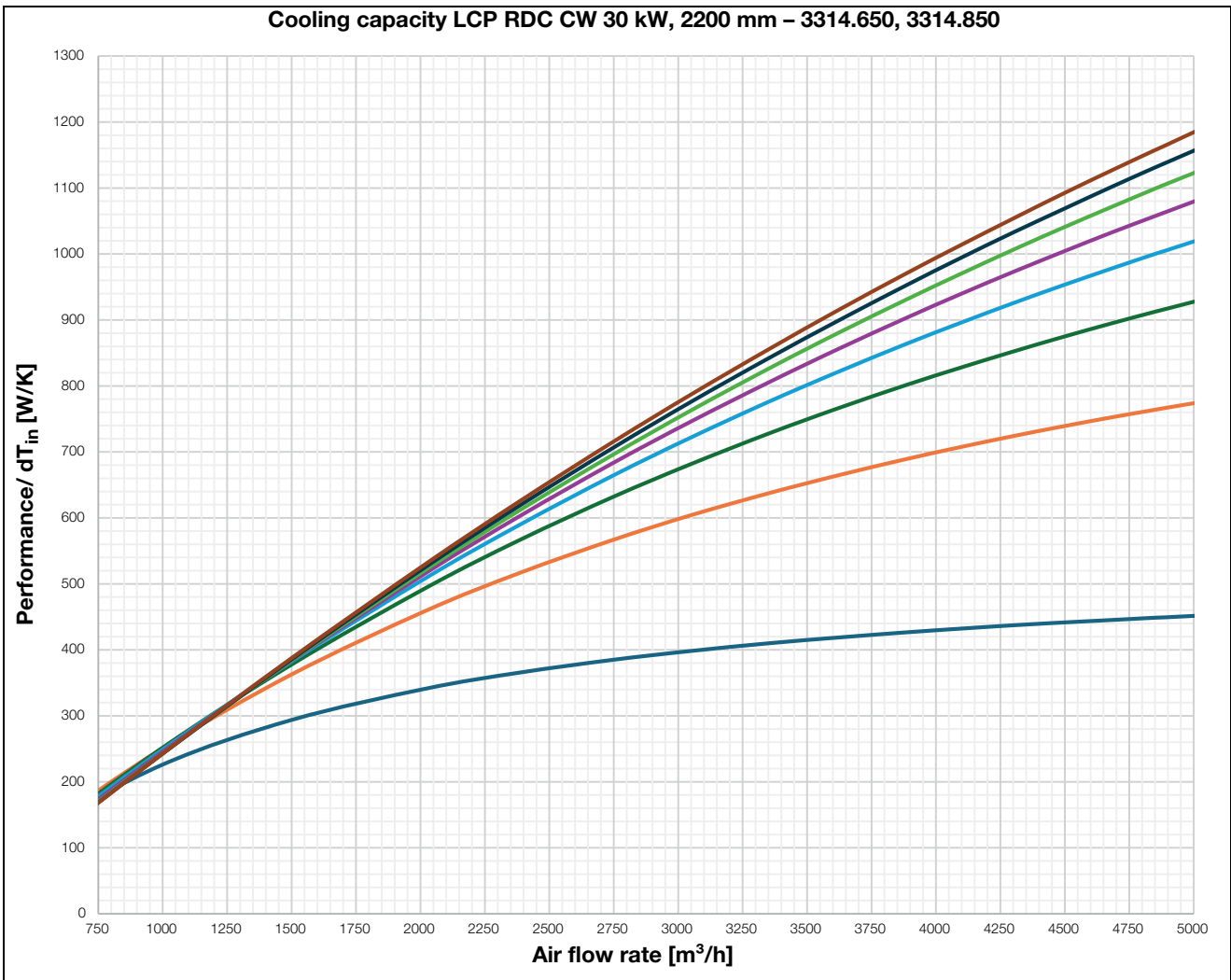


Fig. 115: Cooling capacity RDC 30 kW, 2200 mm – 3314.650, 3314.850

Key (water flow rate)

- 10 l/min
- 20 l/min
- 30 l/min
- 40 l/min
- 50 l/min
- 60 l/min
- 70 l/min
- 80 l/min

Conditions

$\Delta T_{in} = T_{Air,in} - T_{Water,in}$
 Humidity 10% and water according to VDI 2035

16.3 Overview drawings

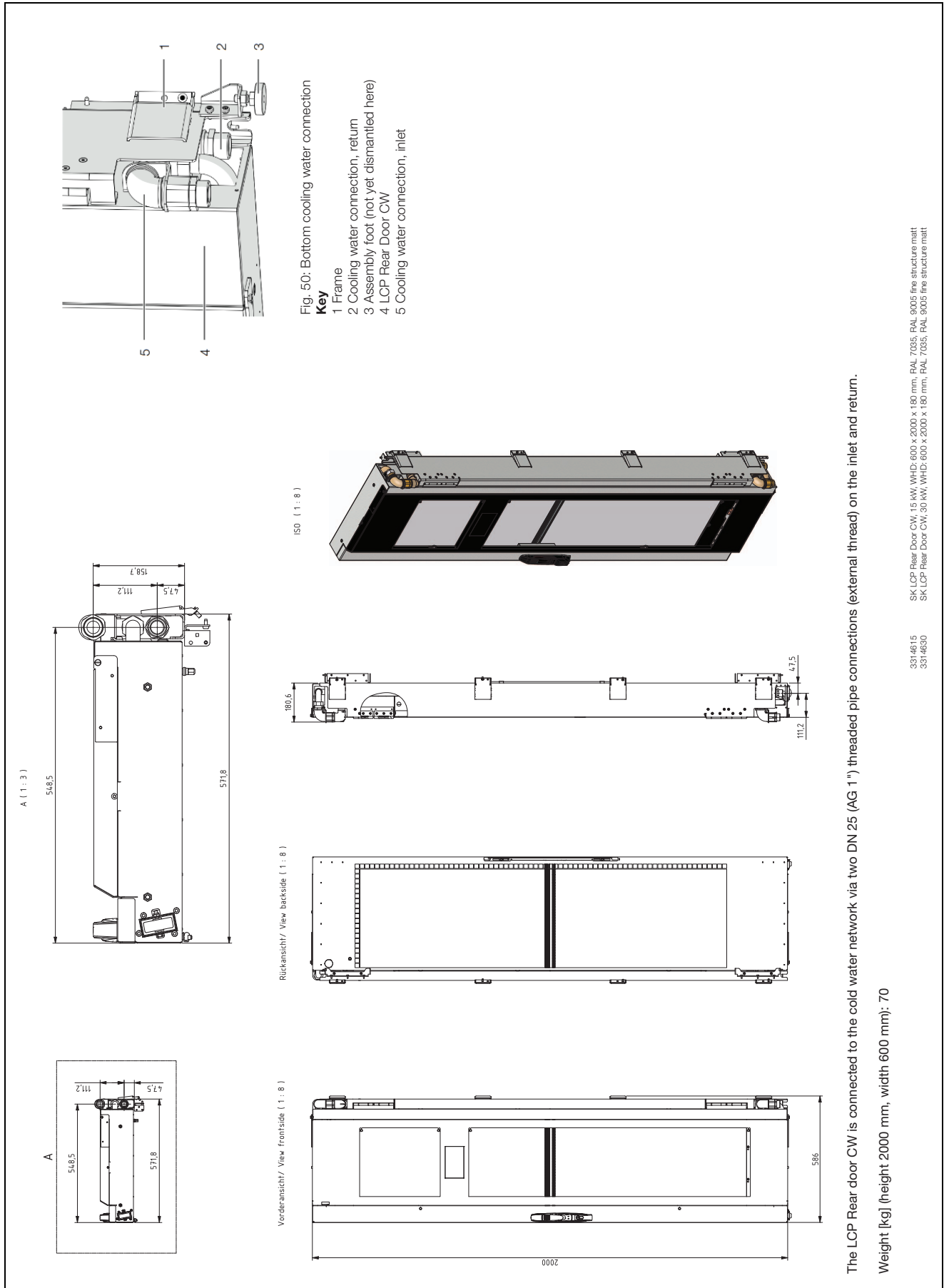


Fig. 116: Passive module 3314.615/3314.630 (600 x 2000 mm)

16 Further technical information

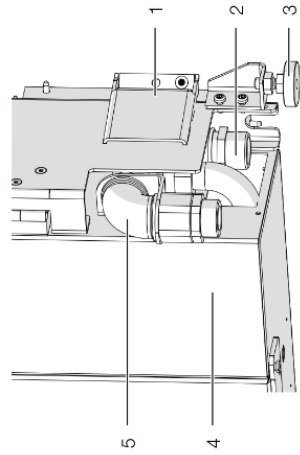
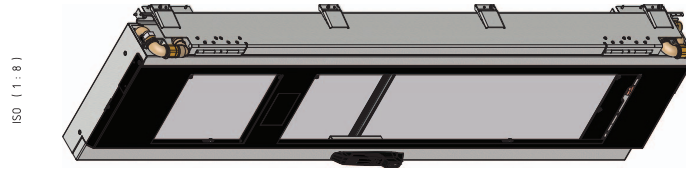
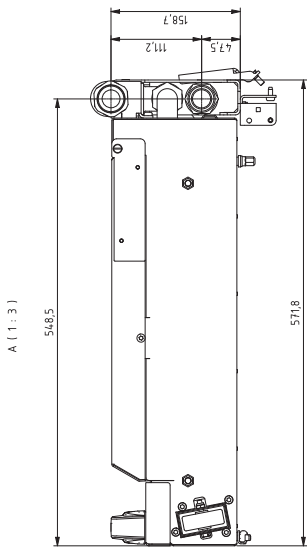


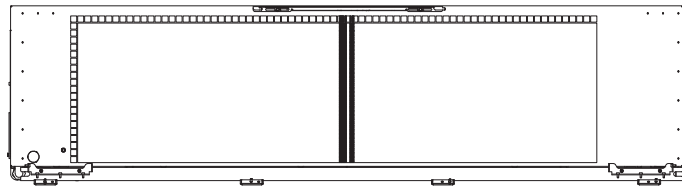
Fig. 50: Bottom cooling water connection

Key

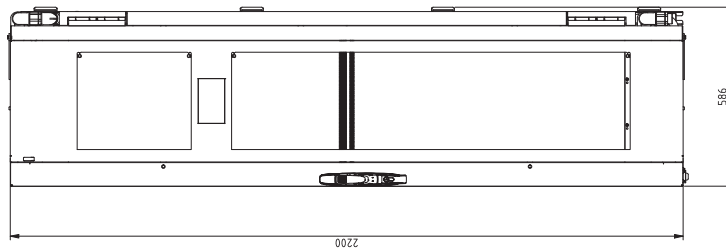
- 1 Frame
- 2 Cooling water connection, return
- 3 Assembly foot (not yet dismantled here)
- 4 LCP Rear Door CW
- 5 Cooling water connection, inlet



Rückansicht/ View backside (1:8)



Vorderansicht/ View frontside (1:8)



The LCP Rear door CW is connected to the cold water network via two DN 25 (AG 1") threaded pipe connections (external thread) on the inlet and return.

Weight [kg] (height 2200 mm, width 600 mm): 75

SK LCP Rear Door CW, 1.5 kW, WHD, 600 x 2200 x 180 mm, RAL 7035, RAL 9005 fine structure matt
 SK LCP Rear Door CW, 30 kW, WHD, 600 x 2200 x 180 mm, RAL 7035, RAL 9005 fine structure matt

3314650
 3314650

Fig. 117: Passive module 3314.625/3314.650 (600 x 2200 mm)

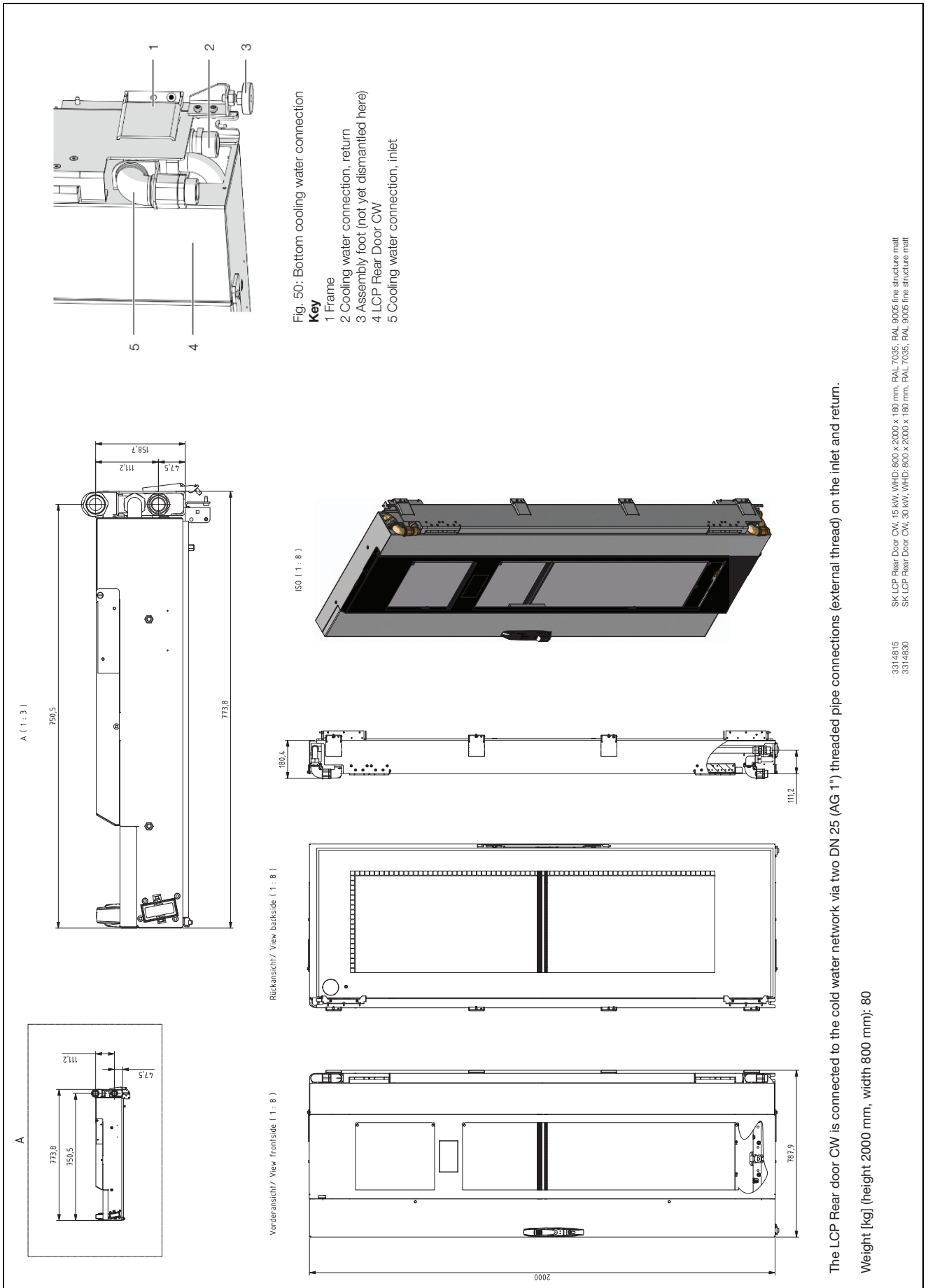


Fig. 118: Passive module 3314.815/3314.830 (800 x 2000 mm)

16 Further technical information

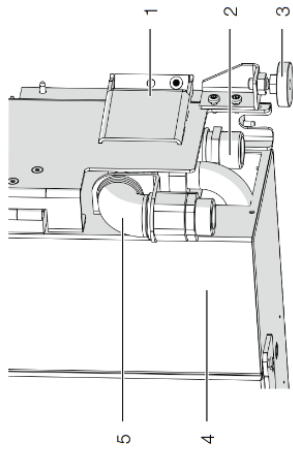
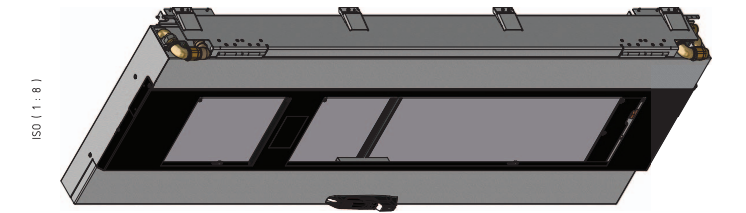
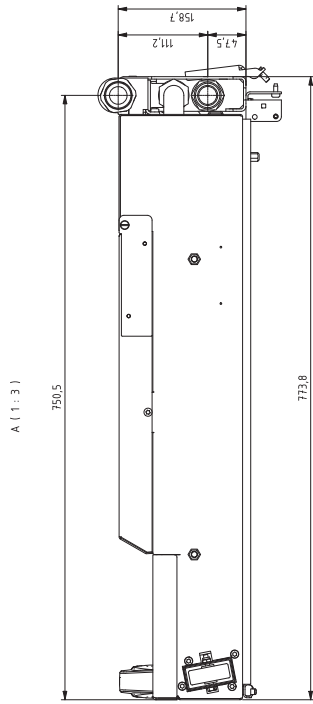


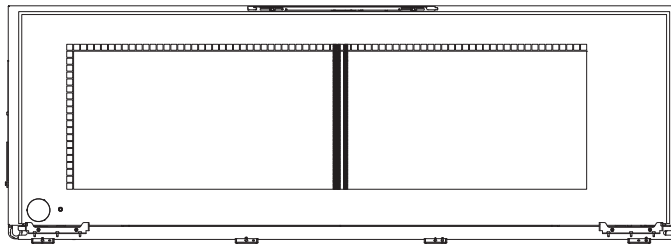
Fig. 50: Bottom cooling water connection

Key

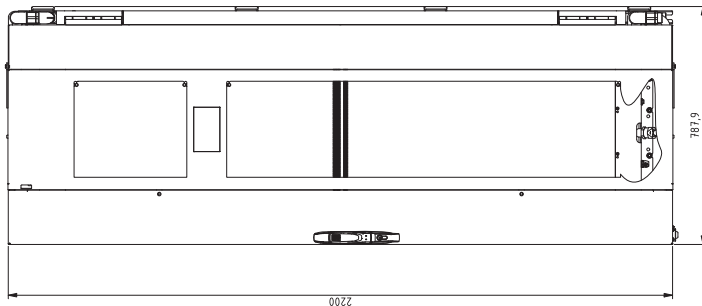
- 1 Frame
- 2 Cooling water connection, return
- 3 Assembly foot (not yet dismantled here)
- 4 LCP Rear Door CW
- 5 Cooling water connection, inlet



Rückansicht/ View backside (1 : 8)



Vorderansicht/ View frontside (1 : 8)



The LCP Rear door CW is connected to the cold water network via two DN 25 (AG 1") threaded pipe connections (external thread) on the inlet and return.

Weight [kg] (height 2200 mm, width 800 mm): 90

SK LCP Rear Door CW, 15 kW, WHD: 800 x 2200 x 180 mm, RAL 7035, RAL 9005 fine structure matt
 SK LCP Rear Door CW, 30 kW, WHD: 800 x 2200 x 180 mm, RAL 7035, RAL 9005 fine structure matt

331482/5
 331485/0

Fig. 119: Passive module 3314.825/3314.850 (800 x 2200 mm)

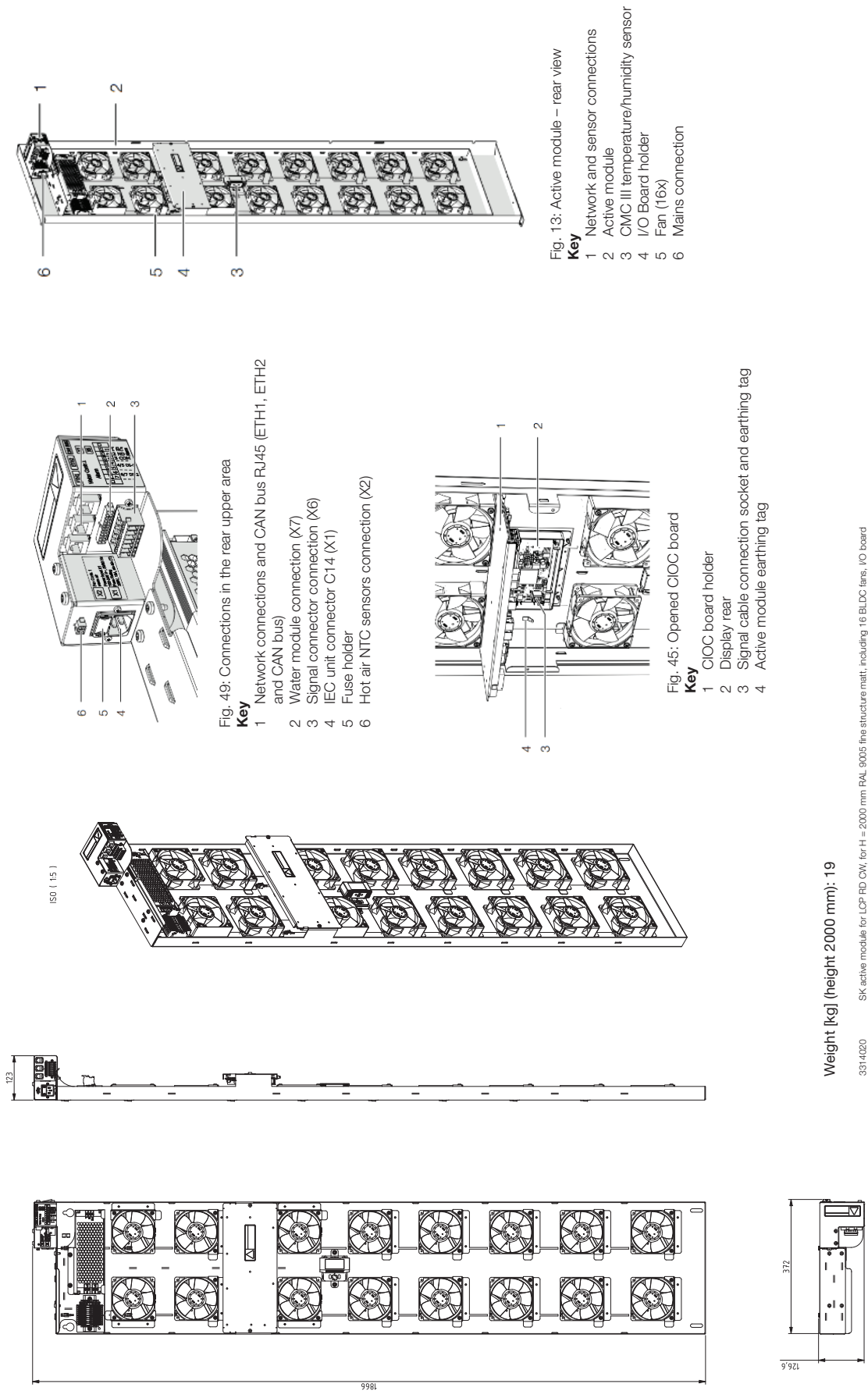


Fig. 120: Active module 3314.020 (2000 mm)

Fig. 49: Connections in the rear upper area

Key

- 1 Network connections and CAN bus RJ45 (ETH1, ETH2 and CAN bus)
- 2 Water module connection (X7)
- 3 Signal connector connection (X6)
- 4 IEC unit connector C14 (X1)
- 5 Fuse holder
- 6 Hot air NTC sensors connection (X2)

Fig. 45: Opened CIOC board

Key

- 1 CIOC board holder
- 2 Display rear
- 3 Signal cable connection socket and earthing tag
- 4 Active module earthing tag

Fig. 13: Active module – rear view

Key

- 1 Network and sensor connections
- 2 Active module
- 3 CMC III temperature/humidity sensor
- 4 I/O Board holder
- 5 Fan (16x)
- 6 Mains connection

Weight [kg] (height 2000 mm): 19

3314.020 SK active module for LCP RD CW, for H = 2000 mm RAL 9005 fine structure matt, including 16 BLDC fans, I/O board

16 Further technical information

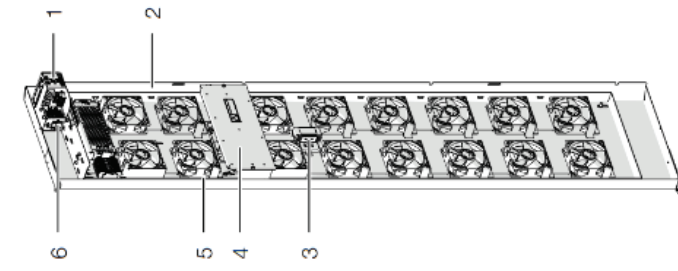


Fig. 13: Active module - rear view
Key
 1 Network and sensor connections
 2 Active module
 3 CMC III temperature/humidity sensor
 4 I/O Board holder
 5 Fan (16x)
 6 Mains connection

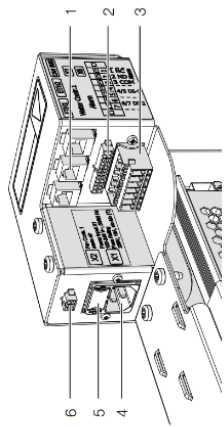


Fig. 49: Connections in the rear upper area
Key
 1 Network connections and CAN bus RJ45 (ETH1, ETH2 and CAN bus)
 2 Water module connection (X7)
 3 Signal connector connection (X6)
 4 IEC unit connector C14 (X1)
 5 Fuse holder
 6 Hot air NTC sensors connection (X2)

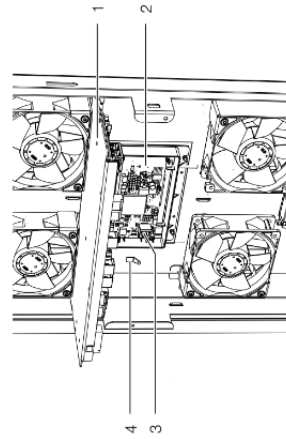
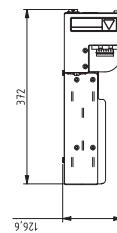
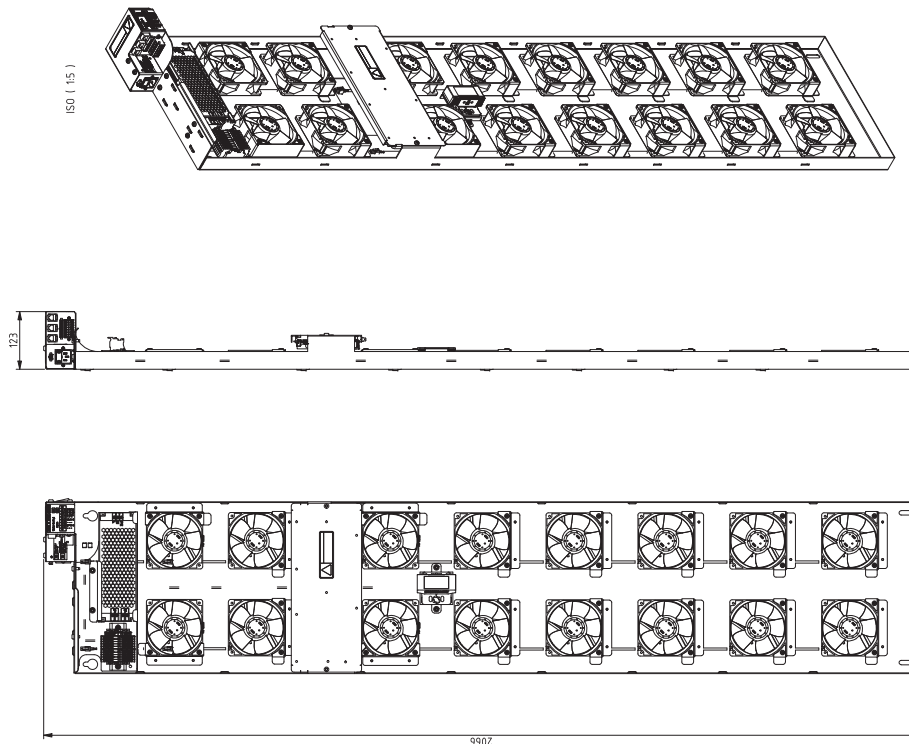


Fig. 45: Opened CIOC board
Key
 1 CIOC board holder
 2 Display rear
 3 Signal cable connection socket and earthing tag
 4 Active module earthing tag



Weight [kg] (height 2200 mm): 20

3314025 SK active module for LCP RD CW, for H = 2200 mm RAL 9005 fine structure matt, including 16 BLDC fans, I/O board

Fig. 121: Active module 3314.025 (2200 mm)

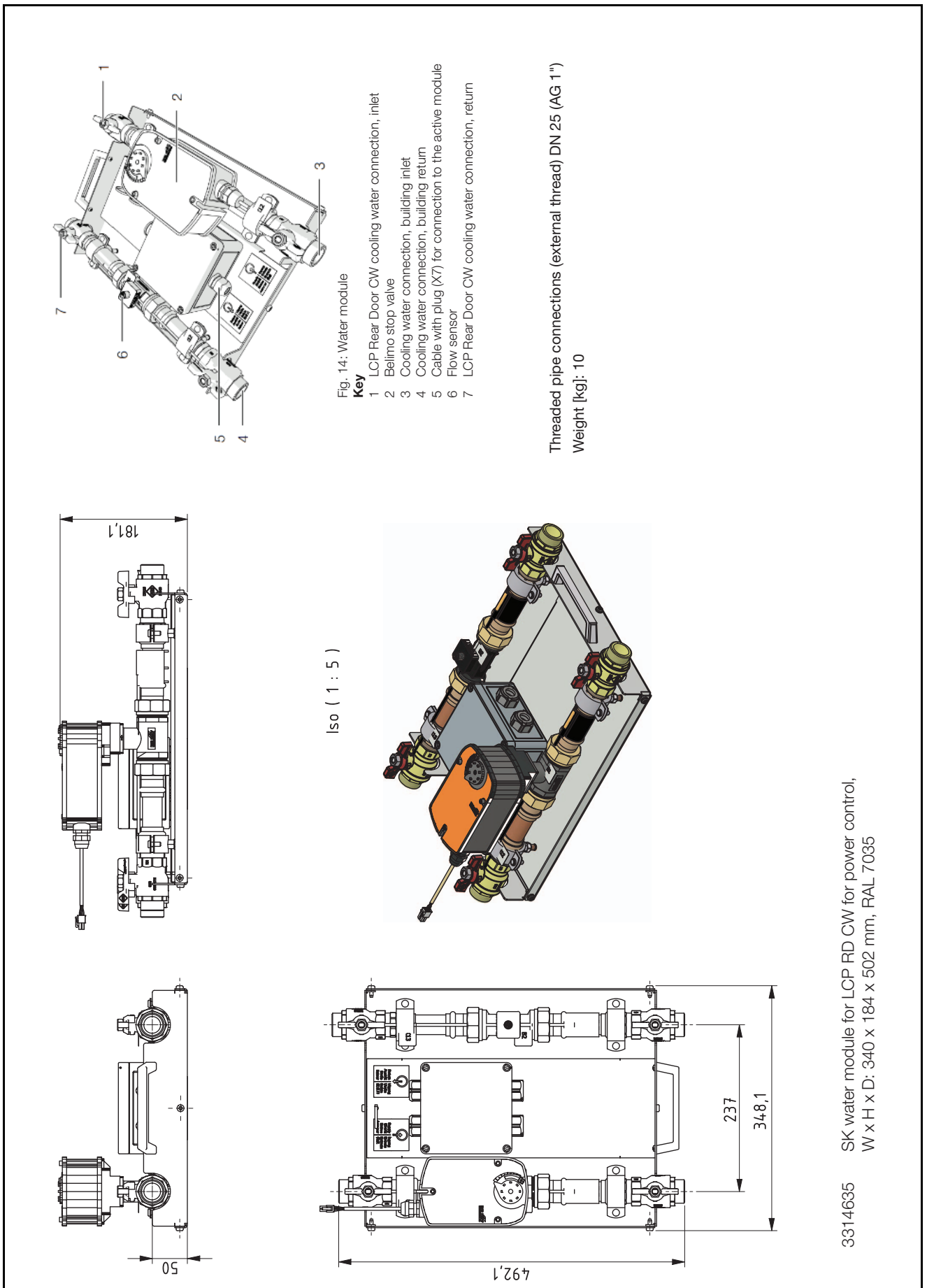
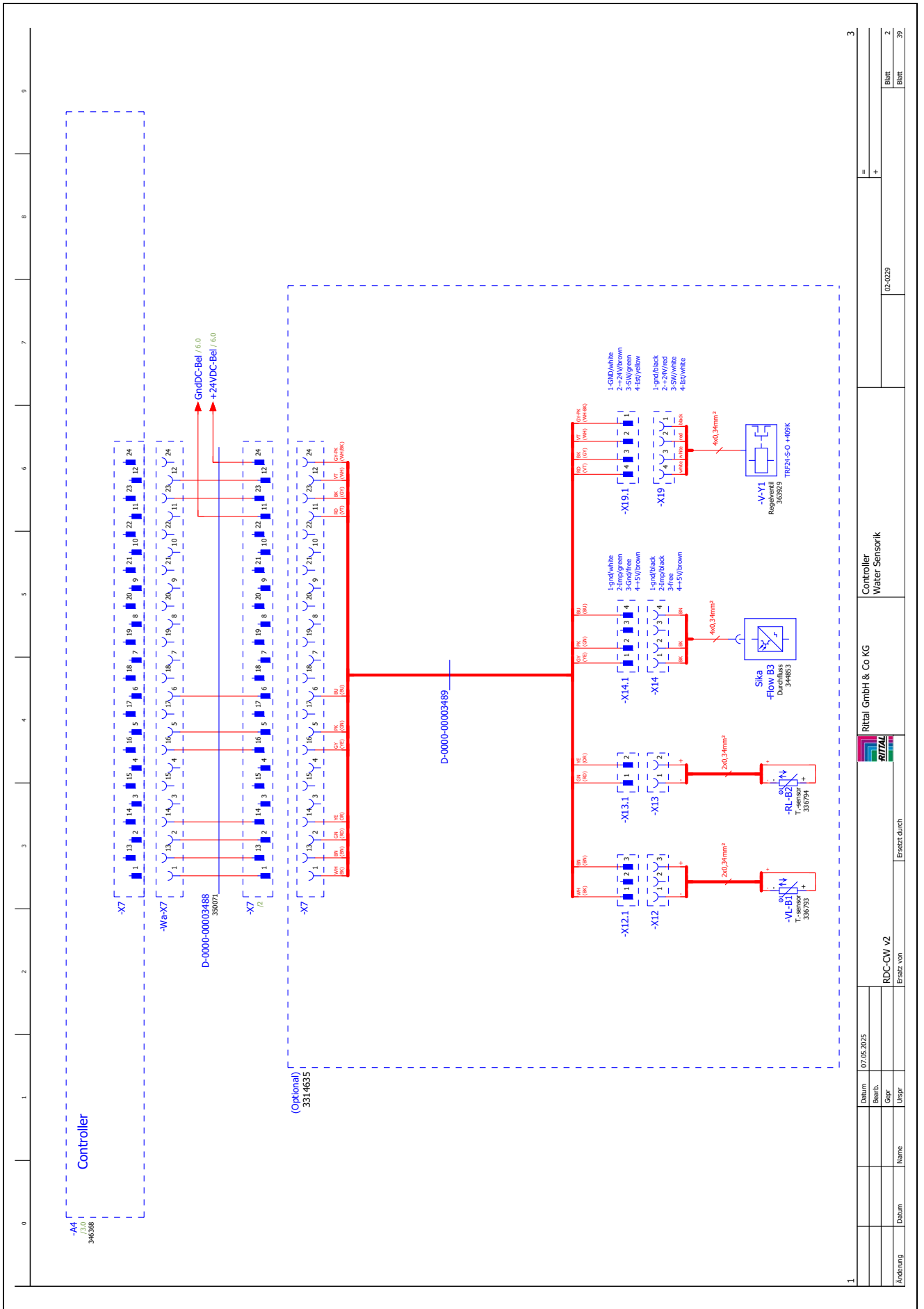


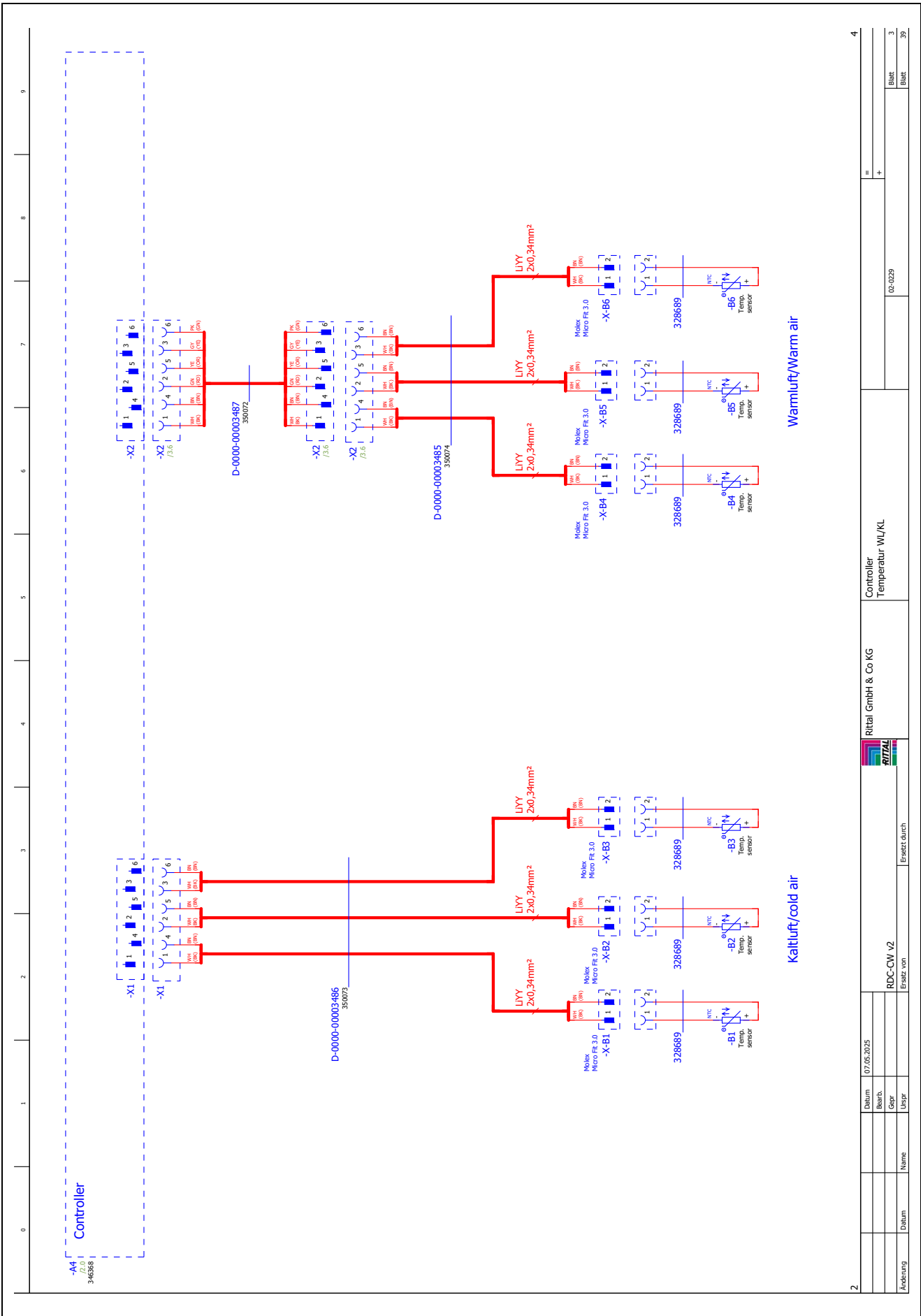
Fig. 122: Water module

16 Further technical information



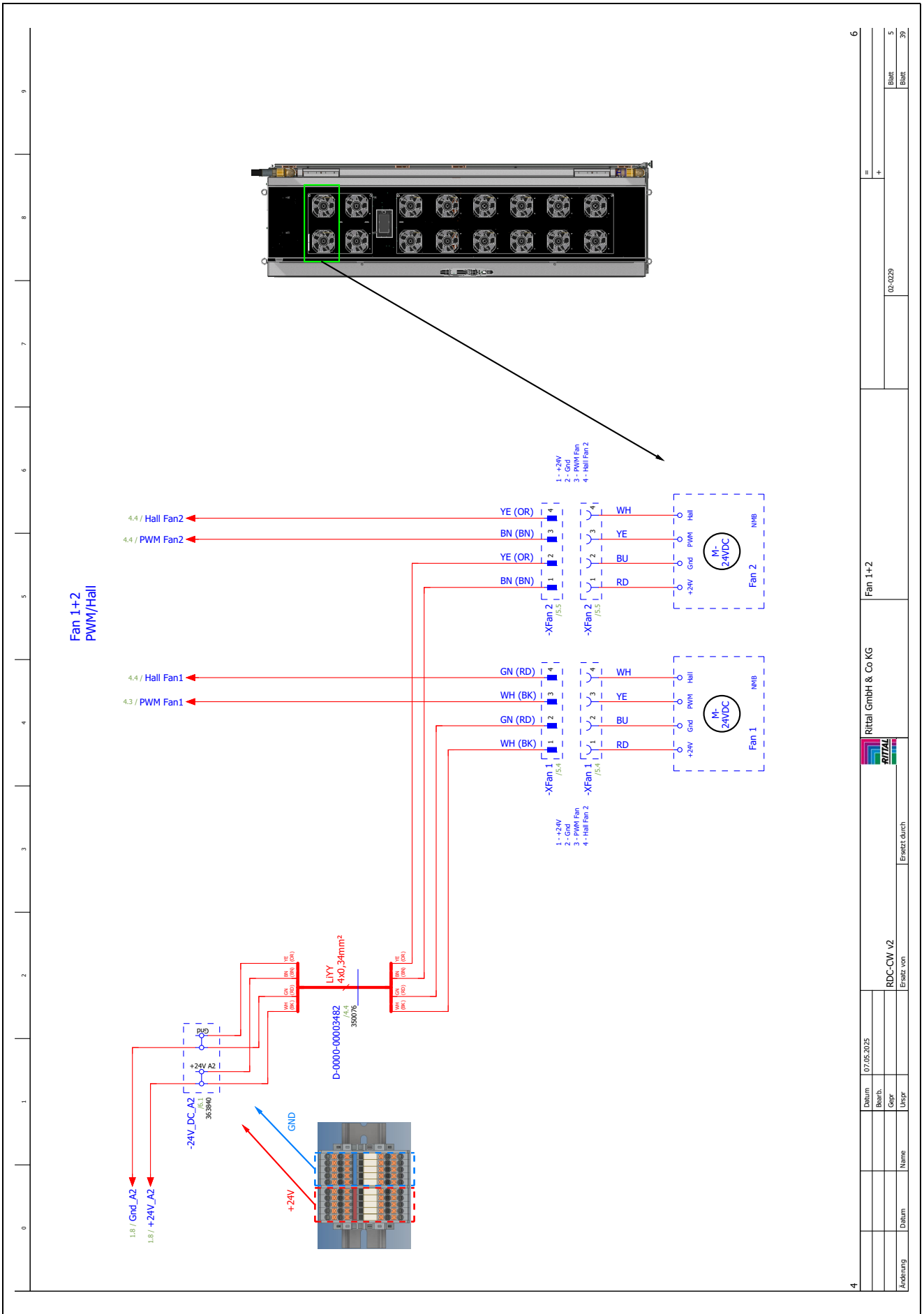
Date: 07.05.2025		Rittal GmbH & Co KG		Controller Water Sensorik		02-0029		=	
Drawing: RDC-CW v2		Ersatz von		Ersatz durch		Blatt: 2		+	
Name:		Name:		Name:		Blatt: 39			

16 Further technical information



Date		07.05.2025	Rittal GmbH & Co KG		Controller Temperatur W/KL		02-0029		Blatt	
Revised			Rittal		Temperatur W/KL				Blatt	
Drawing			Rittal		Temperatur W/KL				Blatt	
Date			Rittal		Temperatur W/KL				Blatt	
Revised			Rittal		Temperatur W/KL				Blatt	
Drawing			Rittal		Temperatur W/KL				Blatt	

16 Further technical information

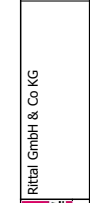


6

Blatt	5
Blatt	39

ID: 0029

Rittal GmbH & Co KG



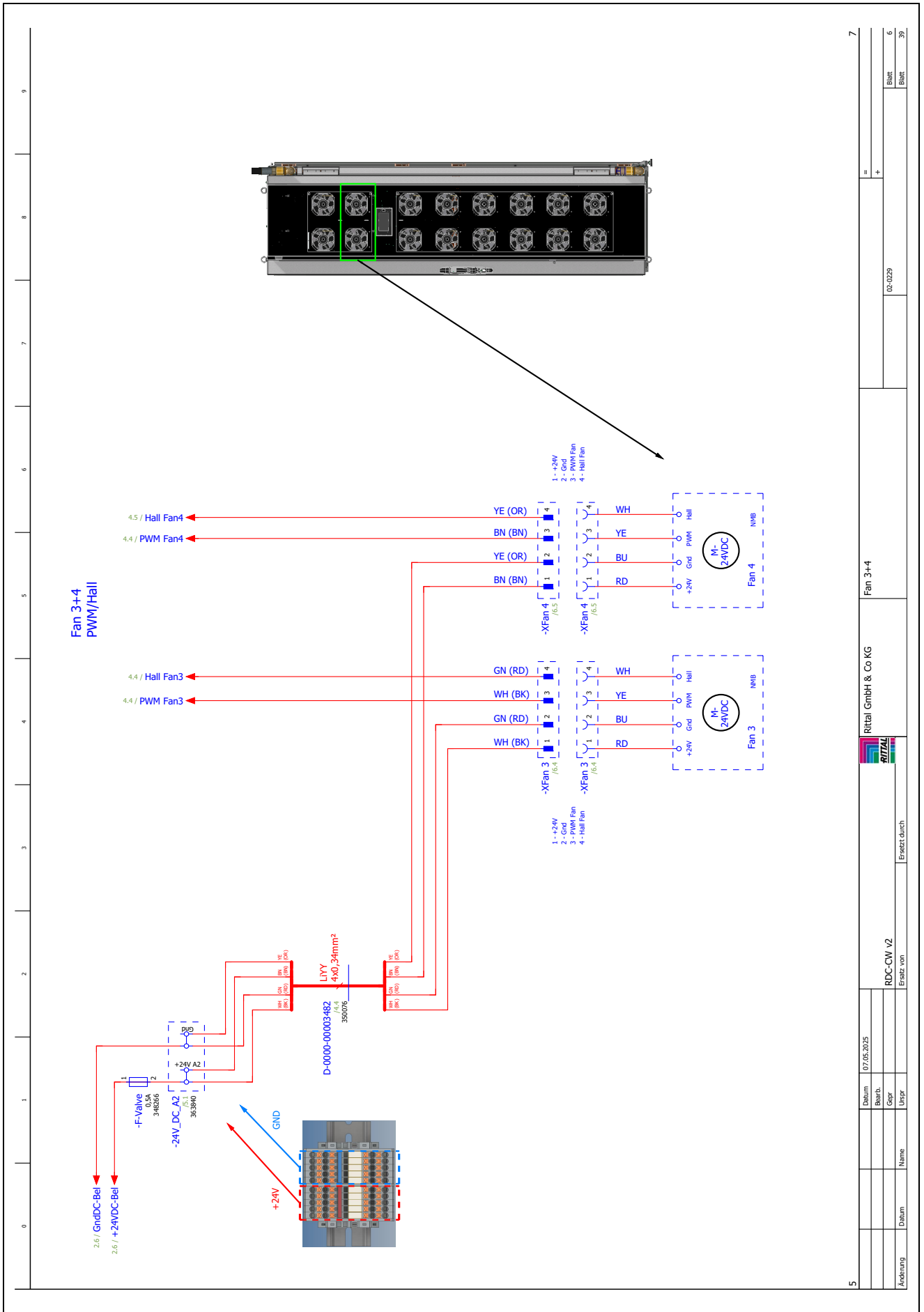
Fan 1+2

RDC-QW V2
Ersatz von

Datum	07.05.2025
Bearb.	
Gepr.	
Urspr.	
Name	
Datum	
Ersatz durch	

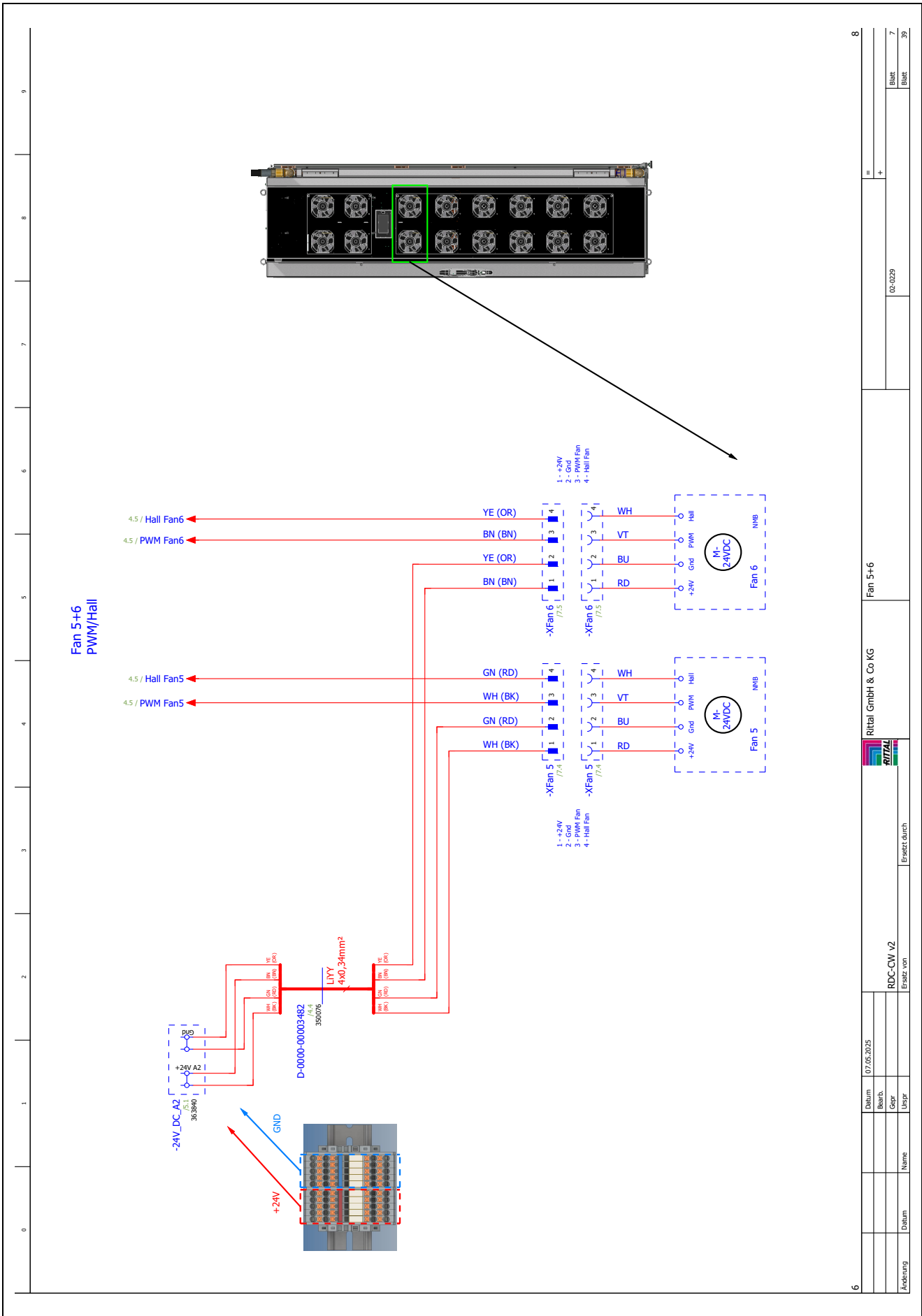
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16 Further technical information

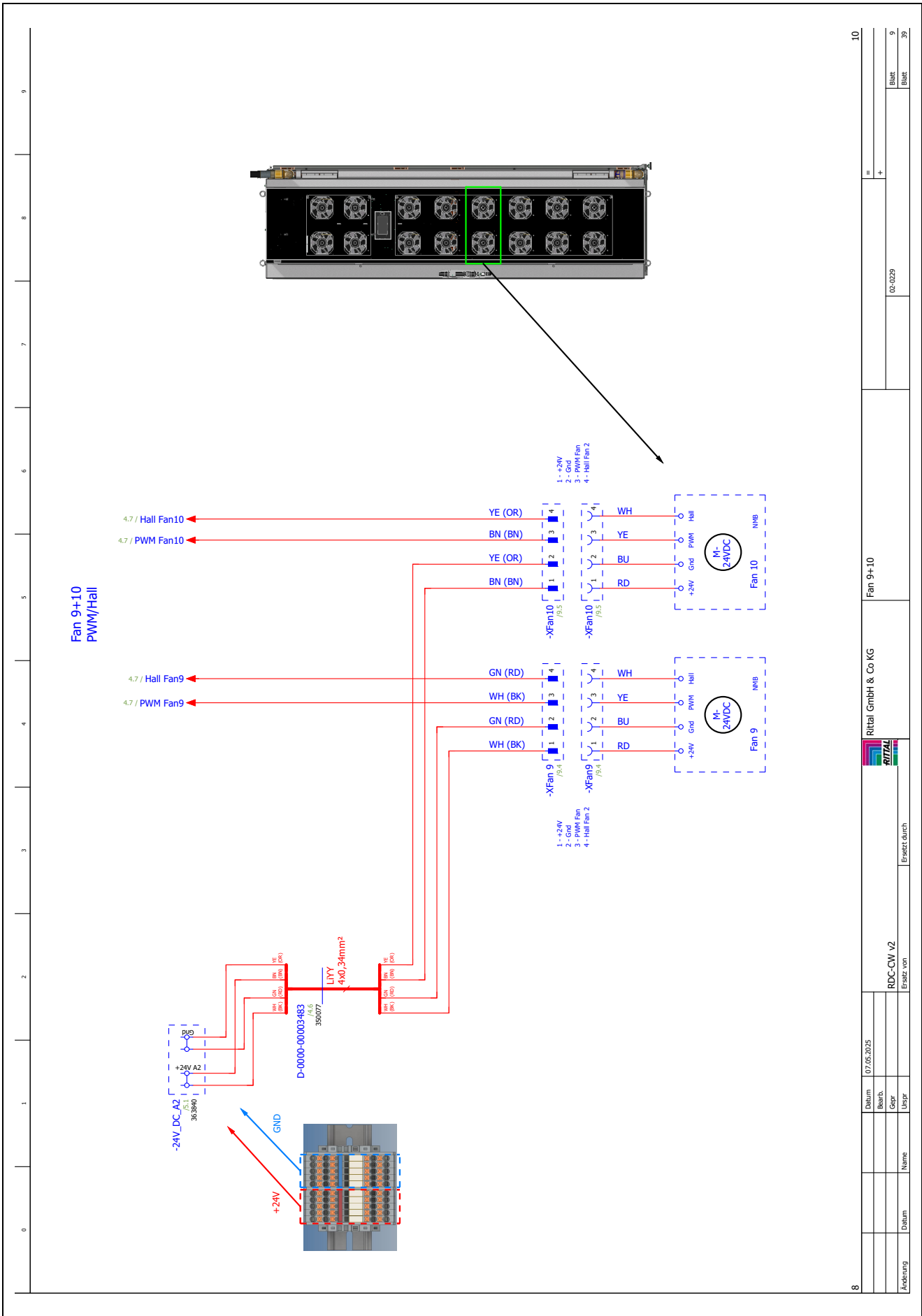


Rittal GmbH & Co KG		Fan 3+4	
RDC-CW_V2		02-0229	
Ersatz von		Ersatz durch	
Datum	07.05.2025		
Bearb.			
Gepr.			
Utspr.			
Datum			
Name			
Blatt 6		Blatt 39	

16 Further technical information

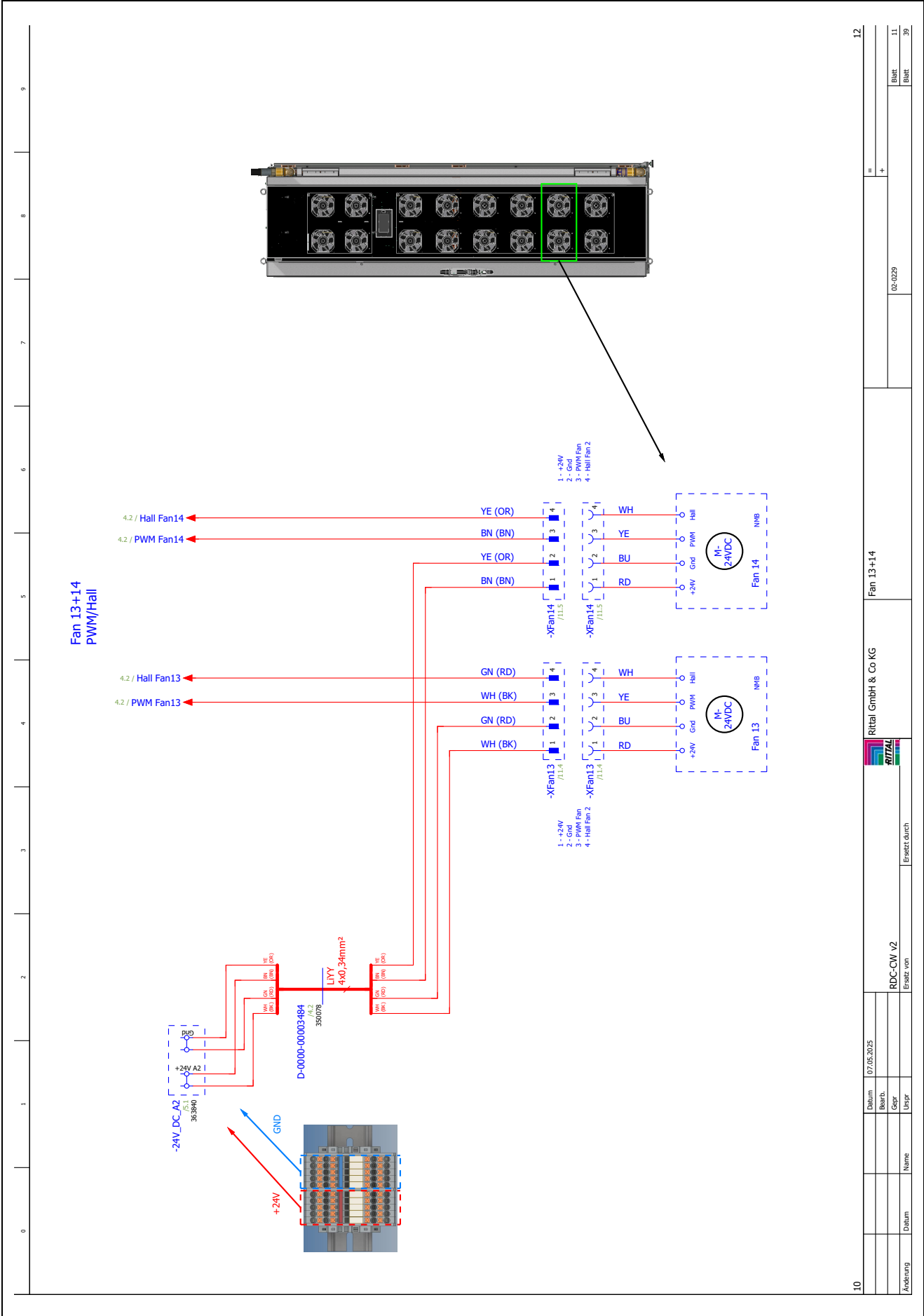


16 Further technical information



Rittal GmbH & Co KG		Fan 9+10	
Rittal		02-0029	
RDC-QV v2		Ersetzt durch	
Datum	07.05.2025		
Bearb.			
Gez.			
Urspr.			
Datum			
Name			
Erstellung			
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		Blatt	39

16 Further technical information

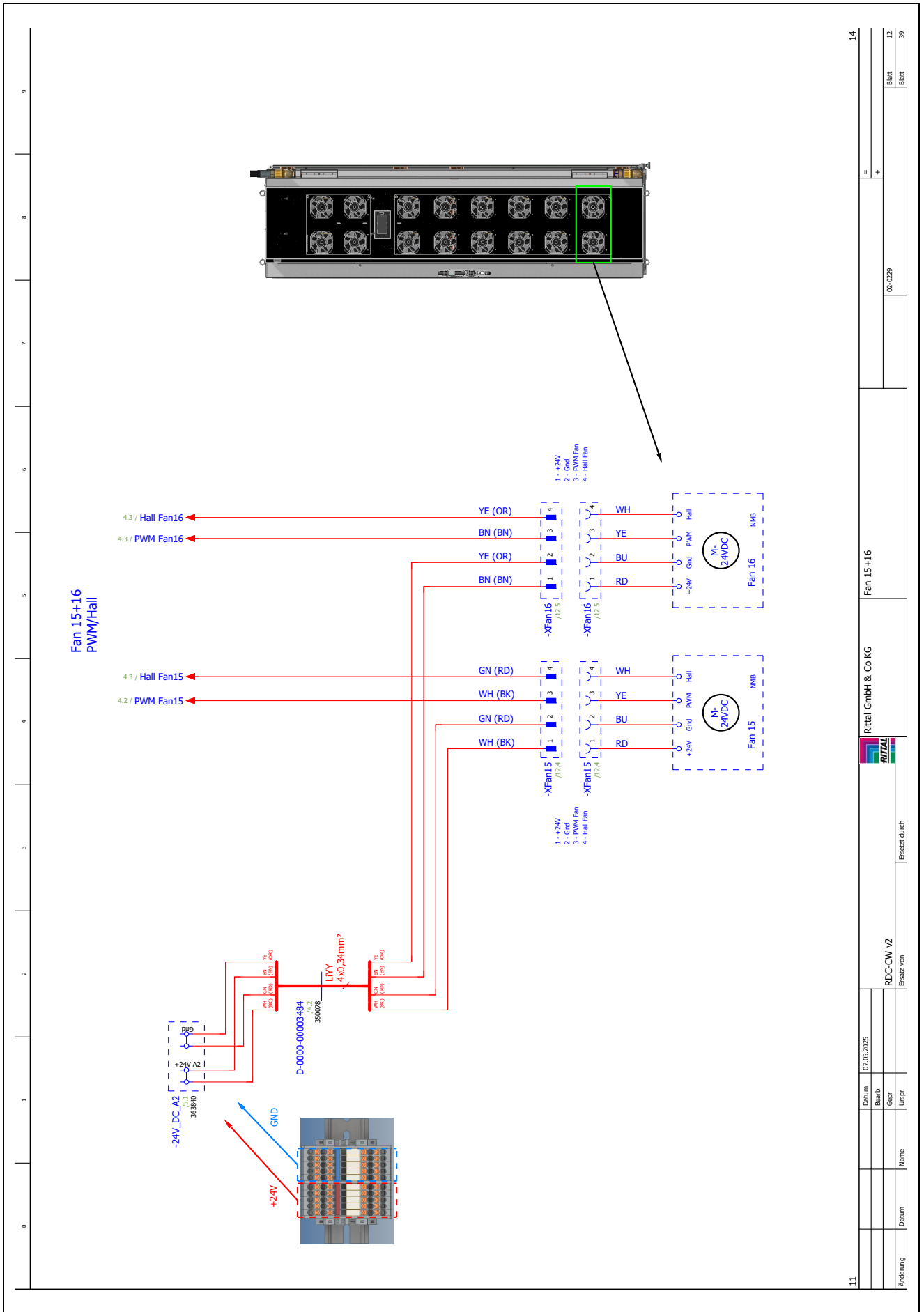


12

Rittal GmbH & Co KG		Fan 13+14	
Rittal		02-0029	
RDC-OM V2		Ersetzt durch	
Datum	07.05.2025	Blatt	11
Bearb.		Blatt	39
Ger.			
Urspr.			
Datum			
Name			
Erstellt von			

10

16 Further technical information



Rittal GmbH & Co KG		Fan 15+16	
Rittal		02-029	
RDC-CW_V2		Ersatz durch	
Datum	07.05.2025		
Bearb.			
Gepr.			
Utspr.			
Name			
Datum			
		Blatt 12	
		Blatt 39	

16 Further technical information

EN



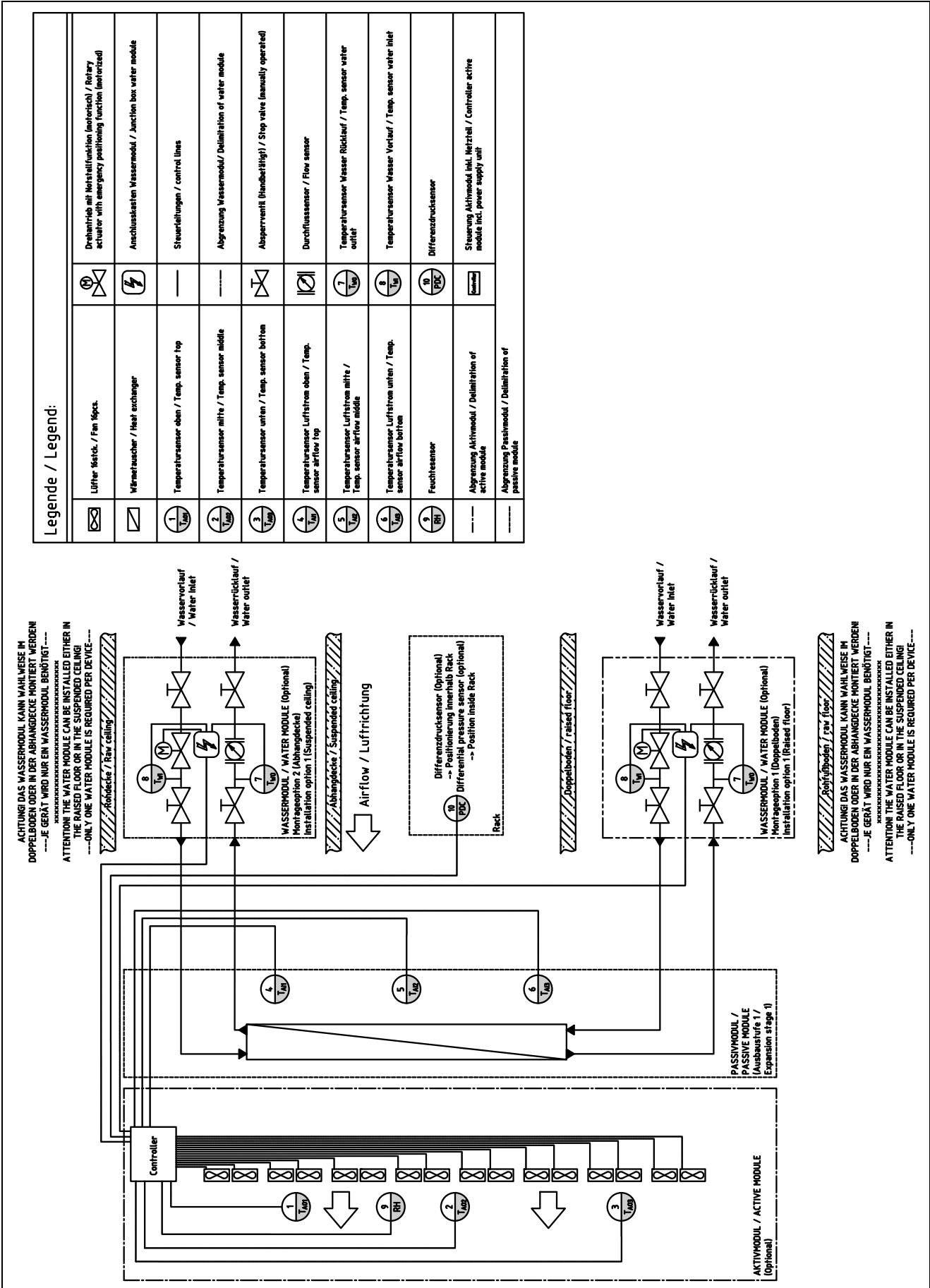
15

Rittal GmbH & Co KG		Feuchte Sensor	
Rittal		02-0029	
RDC-CM v2		Ersetzt durch	
Datum	07.05.2025		
Bearb.			
Gepr.			
Uepr.			
Datum			
Name			
Ersetzt von		Ersetzt durch	
RDC-CM v2		Feuchte Sensor	
Ersetzt von		Ersetzt durch	
Datum		02-0029	
Name		Blatt	
Uepr.		Blatt	
Gepr.		14	
Bearb.		39	

16 Further technical information

16.5 Piping and instrumentation diagram

EN



16.6 Declaration of conformity

Vereinfachte EU-Konformitätserklärung / Simplified EU Declaration of Conformity



Wir
We

Rittal GmbH & Co. KG, Auf dem Stützelberg, 35745 Herborn

Erklären hiermit, dass die Produkte
hereby declare that the products

LCP Rear Door CW Passivmodul / Passive-Module

SK 3314.615, SK 3314.630, SK 3314.625, SK 3314.650, SK 3314.815, SK 3314.830, SK 3314.825,
SK 3314.850

SK Wassermodul für LCP Rear Door CW / SK Water Module for LCP Rear Door CW

SK 3314.635
(Artikel gemäß dieser Anleitung
Types referenced in this manual)

folgenden Richtlinien entsprechen:
conform to the following Directives:

Maschinenrichtlinie 2006/42/EG - Machinery Directive 2006/42/EC

EMV-Richtlinie 2014/30/EU - EMC Directive 2014/30/EU

Bei einer nicht mit uns abgestimmten Änderung des Produkts verliert diese EU-Konformitätserklärung
ihre Gültigkeit.

This EU declaration of conformity shall become null and void when the product is subjected to any
modification that has not met with our approval.

Die vollständige und unterschriebene EU-Konformitätserklärung erhalten Sie auf der Produktseite der
Rittal Homepage www.rittal.com.

The complete and signed declaration of conformity can be obtained from the product site of rittals
homepage www.rittal.com

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STROMVERTEILUNG

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Vereinfachte EU-Konformitätserklärung / Simplified EU Declaration of Conformity



Wir
We

Rittal GmbH & Co. KG, Auf dem Stützelberg, 35745 Herborn

Erklären hiermit, dass die Produkte
hereby declare that the products

LCP Rear Door CW Aktivmodul / Active-Module

SK 3314.020, SK 3314.025
(Artikel gemäß dieser Anleitung
Types referenced in this manual)

folgenden Richtlinien entsprechen:
conform to the following Directives:

Niederspannungsrichtlinie 2014/35/EU - Low Voltage Directive 2014/35/EU

EMV-Richtlinie 2014/30/EU - EMC Directive 2014/30/EU

Bei einer nicht mit uns abgestimmten Änderung des Produkts verliert diese EU-Konformitätserklärung ihre Gültigkeit.

This EU declaration of conformity shall become null and void when the product is subjected to any modification that has not met with our approval.

Die vollständige und unterschriebene EU-Konformitätserklärung erhalten Sie auf der Produktseite der Rittal Homepage www.rittal.com.

The complete and signed declaration of conformity can be obtained from the product site of rittals homepage www.rittal.com

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17 Preparation and maintenance of the cooling medium

Depending on the type of installation to be cooled, certain purity requirements are placed on the cooling water in a recooling system. According to the level of contamination and the size and design of the recooling systems, a suitable process is used to prepare and/or maintain the water. The most common types of contamination and frequently used techniques to eliminate them in industrial cooling are:

Type of impurity	Procedure
Mechanical contamination	Filter the water using: Mesh filter, sand filter, cartridge filter, precoated filter, magnetic filter
Excessive hardness	Soften the water via ion exchange
Moderate content of mechanical contaminants and hardeners	Treat the water with stabilisers and/or dispersing agents
Moderate content of chemical contaminants	Treat the water with passivators and/or inhibitors
Biological contaminants, slime bacteria and algae	Treat the water with biocides

Tab. 55: Cooling water contaminants and treatment procedures



Note:

For the proper operation of a recooling system that uses water on at least one side, the composition of any additive used or system water should not deviate substantially from hydrological data presented in section 16.1 "Information concerning the filling and additive water".

18 Glossary

1 U server:

1 U servers are very flat and deep, modern high performance servers, whose height corresponds to one height unit (1 U = 44.54 mm, the smallest standard height division). Typical dimensions are (W x D x H) 482.6 mm (19") x 800 mm x 1 U.

These systems normally include 2 CPUs, many GB RAM and hard drives, so that they require up to 100 m³/h cooling air at a maximum of 32 °C.

482.6 mm (19") level:

The front sides of the devices built into the server enclosure form the 482.6 mm (19") level.

Blade server:

By orienting dual CPU systems vertically and placing up to 14 units on a common backplane to provide for signal routing and power supply, one has a blade server.

Blade servers can "generate" up to 4.5 kW heat loss per 7 U and 700 mm depth.

Hotspot:

A hotspot is the concentration of thermal energy in a small area.

Hotspots normally lead to local overheating and can cause system malfunctions.

Air/water heat exchanger:

Air/water heat exchangers operate according to the same principle as automobile radiators. A liquid (water) flows through the heat exchanger, while, at the same time, air is blown over its surface area (which is as large as possible), facilitating energy exchange.

Depending on the temperature of the circulating liquid (water), an air/water heat exchanger may either heat or cool the circulated air.

Recooling system:

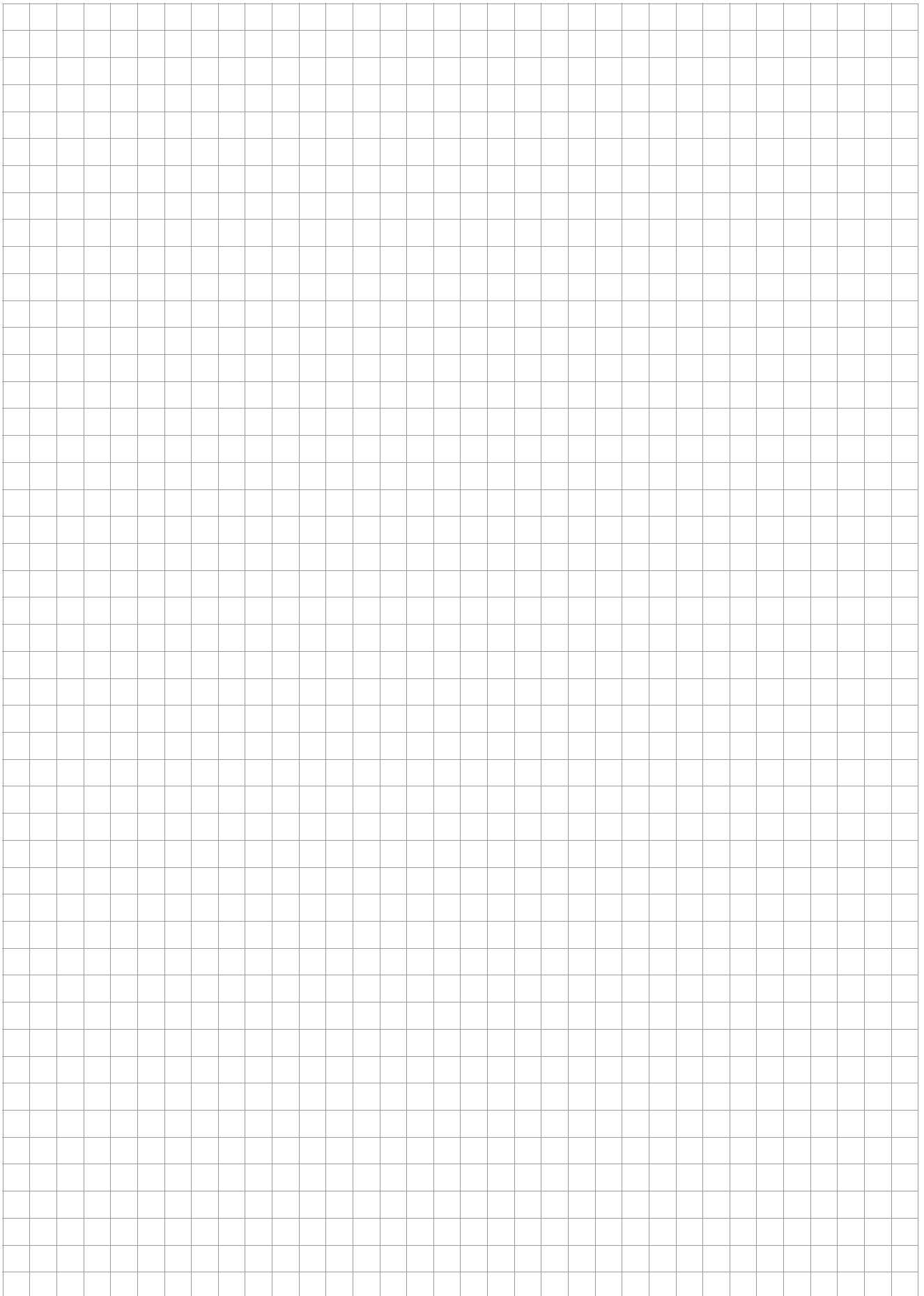
As an initial comparison, a recooling system is like a refrigerator – through an active cooling circuit, unlike a household refrigerator, a recooling system produces cold water. The thermal energy which is removed from the water is dissipated to the outside by fans. Because of this, it is normally advisable to locate recooling systems outside of buildings.

Recooling systems and air/water heat exchangers form a complete cooling solution.

Switch:

Multiple servers normally communicate with one another and in the network using switches.

Because as many inputs as possible are located on the front of switches, they frequently have an airflow from the side, not "front to back" cooling.



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