

Rittal – The System.

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► CRAC – Precision climate control units for data centres



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The whole is more than the sum of its parts

The same is true of “Rittal – The System.” With this in mind, we have bundled our innovative enclosure, power distribution, climate control and IT infrastructure products together into a single system platform. Complemented by our extensive range of software tools and global service, we create unique added value for all industrial applications: Production plant, test equipment, facility management and data centres. In accordance with our simple principle, “Faster – better – everywhere”, we are able to combine innovative products and efficient service to optimum effect.

Faster – with our “Rittal – The System.” range of modular solutions, which guarantees fast planning, assembly, conversion and commissioning with its system compatibility.

Better – by being quick to translate market trends into products. In this way, our innovative strength helps you to secure competitive advantages.

Everywhere – thanks to global networking across 150 locations. Rittal has over 60 subsidiaries, and more than 150 service partners with over 1,000 service engineers worldwide. For more than 50 years, we have been on hand to offer advice, assistance and product solutions.

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ENCLOSURES POWER DISTRIBUTION CLIMATE CONTROL

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The technology – Simply efficient

CRAC CW and CRAC DX precision climate control units from Rittal ensure optimum climatic conditions in data centres that are exposed to high thermal loads. By precisely regulating the temperature and humidity, these climate control units guarantee optimum ambient conditions for your valuable IT equipment. Waste heat is dissipated according to requirements. Redundant solutions offer a high degree of fail-safeness and energy-efficient use.

- CRAC DX: Precision climate control unit for direct evaporation with external air-cooled condenser unit
- CRAC CW: Precision climate control unit for cold water operation



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Computer Room Air Conditioner



IT Cooling Cat. 34, page 427

The precision climate control unit for cold water operation draws in the warm data centre air from the top of the equipment, cools it with water in a closed heat exchanger, and blows the cooled air into the raised floor with overpressure. From there, the air is returned to the data centre via ventilation panels. The heated cooling water is cooled in an external recooling system outside of the building.

Colour:

- Substructure and frame: RAL 9005
- Metal parts: RAL 7015

Supply includes:

- Basic unit with EC fan

Optional:

- Steam humidifier
- Reheater
- Serial interface BACnet, Ethernet, SNMP, TCP/IP
- Condensate pump
- Base frame

Note:

- Neutral conductor required

CRAC CW

Model No.	P. of	3300.384	3300.385	3300.386	3300.387	3300.388
Rated operating voltage V, ~, Hz		400, 3~, 50	400, 3~, 50	400, 3~, 50	400, 3~, 50	400, 3~, 50
Width mm		1085	1305	1875	2499	2499
Height mm		1925	1980	1980	1980	2580
Depth mm		775	930	930	930	930
Weight kg		313.0	366.0	513.0	640.0	555.0
Cooling - cold water 7°C/12°C and air inlet 24°C/50% relative humidity						
Cooling output, total kW		34.1	60.9	98.9	130	167
Cooling output, sensible kW		28.8	52.2	81.7	109	139
Air throughput m ³ /h		6600	12200	18000	24200	30950

Computer Room Air Conditioner



IT Cooling Cat. 34, page 427

The CRAC DX precision climate control unit for direct evaporation draws in the warm data centre air from the top of the equipment, cools it in a closed heat exchanger, and blows the cooled air into the raised floor with over-pressure. From there, the air is returned to the data centre via ventilation panels. It is connected to the air-cooled condenser via refrigerant lines. The condenser unit is positioned externally.

Colour:

- Substructure and frame: RAL 9005
- Metal parts: RAL 7015

Supply includes:

- Basic unit and external condenser unit

Optional:

- Steam humidifier
- Reheater
- Serial interface BACnet, Ethernet, SNMP, TCP/IP
- Condensate pump
- Inverter-regulated compressors
- Base frame
- EC fan

Note:

- Neutral conductor required

CRAC DX

Model No.	P. of	3300.394	3300.395	3300.396	3300.397	3300.398
Rated operating voltage V, ~, Hz		400, 3~, 50	400, 3~, 50	400, 3~, 50	400, 3~, 50	400, 3~, 50
Width mm		650	1085	1320	2155	2155
Height mm		1925	1925	1980	1980	1980
Depth mm		650	750	860	860	860
Weight kg		198.0	317.0	442.0	591.0	694.0
Cooling output L 24°C/50%						
Cooling output, total kW		10.8	19	32.8	44.8	56.7
Cooling output, sensible kW		9.54	18.2	28.3	41	51.7
Refrigerant kg		R410a, 4.5	R410a, 6.8	R410a, 8.3	R410a, 18.4	R410a, 19.2
Air throughput m ³ /h		2653	5460	7440	11310	14500
Condenser units						
Rated operating voltage		230 V	230 V	230 V	230 V	230 V
Width mm		875	1400	1600	1850	2320
Height mm		727	1027	1027	1027	1140
Depth mm		540	665	665	665	665
Weight kg		54.5	102.0	153.0	175.0	214.0

Computer Room Air Conditioner

CRAC CW

Model No.	P. of	3300.384	3300.385	3300.386	3300.387	3300.388	Page
Rated operating voltage V, ~, Hz		400, 3~, 50	400, 3~, 50	400, 3~, 50	400, 3~, 50	400, 3~, 50	
Width mm		1085	1305	1875	2499	2499	
Height mm		1925	1980	1980	1980	2580	
Depth mm		775	930	930	930	930	
Weight kg		313.0	366.0	513.0	640.0	555.0	
Cooling - cold water 7°C/12°C and air inlet 24°C/50% relative humidity							
Cooling output, total kW		34.1	60.9	98.9	130	167	
Cooling output, sensible kW		28.8	52.2	81.7	109	139	
Fans							
Quantity		1	1	2	3	3	
Air throughput m³/h		6600	12200	18000	24200	30950	
External static compression Pa		20	20	20	20	20	
Power consumption, total kW		1.19	2.09	2.96	4.91	5.64	
Rated current A		2.7	2.77	6.16	8.1	9.24	
Current rating (OA) A		1.73	3.41	5.23	6.68	9.89	
Current rating max. (FLA) A		4.18	4.3	9.6	12.54	14.4	
Cold water coil							
Quantity m³/h		5.84	10.4	17	22.4	28.6	
Loss of pressure from the device and valve Pa		35	58	70	66	86	
Frost protection %		0	0	0	0	0	
Cooling - cold water 10°C/15°C and air inlet 26°C/45% relative humidity							
Cooling output, total kW		27.2	49.5	76.5	102	130	
Cooling output, sensible kW		26.4	48.4	72.8	97.6	125	
Air filters							
Quantity		2	3	4	5	10	
Filter class to DIN EN 779		G4	G4	G4	G4	G4	
Noise pressure level							
At a distance of 1 m from the air outlet dB(A)		65.2	68.3	67.9	73.4	72.6	
At a distance of 1 m from the front dB(A)		47.1	50.2	49.8	55.3	54.5	
Technical specifications optional							
Steam humidifier: Volume 3 kg/h, 2.3 kW, 3.2 A		■	-	-	-	-	
Reheater: Thermal output 6 kW, 8.7 A, 2 levels		■	-	-	-	-	
Base frame, max. height = 350 mm		■	■	■	■	■	
Base frame, max. height = 450 mm		■	■	■	■	■	
Base frame, max. height = 510 mm		■	■	■	■	■	
Steam humidifier: Volume 8 kg/h, 6 kW, 8.7 A		-	■	■	-	-	
Reheater: Thermal output 9 kW, 13 A, 3 levels		-	■	-	-	-	
Reheater: Thermal output 13.5 kW, 19.5 A, 3 levels		-	-	■	-	-	
Steam humidifier: Volume 15 kg/h, 11.3 kW, 16.2 A		-	-	-	■	■	
Reheater: Thermal output 18 kW, 26 A, 3 levels		-	-	-	■	■	

Computer Room Air Conditioner

CRAC CW

Design

- Substructure made from extruded aluminium, thermal spray-coated with epoxy powder
- Frame made from hot-galvanised metal
- Plates made from hot-galvanised sheet steel coated in semi-rigid PVC, with sound-insulating material on the inside, rapid removal and re-assembly of the front cover
- Separate enclosure for switchgear on the front of the unit
- Air intake from above, waste air is expelled downwards

Filter

- Reusable G4 air filter, cells made from synthetic fibres with metal frame (optionally F5 filter, washable)

Heat exchanger

- Finned tube heat exchanger with copper pipes and high-efficiency cooling fin, specifically for ensuring a high heat transfer coefficient and a low airside pressure loss
- Motorised two-way valve to regulate the water flow
- Condensate collecting tray with flexible PVC drain pipes

Fans

- For 3300.384, 3300.385, 3300.386, 3300.387:
The fan unit is located inside the device
- For 3300.388:
The fan unit is separate and is installed underneath the device.
The fan unit is designed to expel air forwards, and may be installed in the raised floor or on the floor (for expelling air downwards).
Air may also be expelled to the rear by moving the plates and protective grille accordingly.
- Centrifugal fans, direct coupled
- Fans with synchronous EC motor

Switchgear

In accordance with standard EN 60204-1 and equipped with the following components:

- Master switch for door latch
- Circuit-breaker for fans
- Protection for each individual application (except evaporator fans with EC motor)
- Converter to supply the auxiliary circuits and microprocessor
- Terminals for inputs and outputs
- Mains voltage: 400/3/50+N

Control system

- Microprocessor with graphic display for controlling and monitoring the function and alarm status.

The system comprises:

- Real-time clock
- Device for positioning a network card
- Hour counter for operation of the main components
- Flash memory to log data in the event of a power failure and to record alarm events
- Management of the menu with a protected password
- LAN connection

Selectable options

- Steam humidifier
- Reheater
- Condensate pump
- Dehumidification system
- Electric expansion valve
- Fine filter F5 (washable)
- Filter F6, F7, F9 (air outlet)
- Filter monitoring sensors
- Water monitoring in the raised floor
- Additional water sensor kit
- Interface BACnet, Ethernet, SNMP, TCP/IP serial board
- Raised floor base frame $H_{\max} = 350$ mm
- Raised floor base frame $H_{\max} = 450$ mm
- Raised floor base frame $H_{\max} = 510$ mm
- Other options are also possible



Computer Room Air Conditioner

CRAC DX

Model No.	P. of	3300.394	3300.395	3300.396	3300.397	3300.398	Page
Rated operating voltage V, ~, Hz		400, 3~, 50	400, 3~, 50	400, 3~, 50	400, 3~, 50	400, 3~, 50	
Width mm		650	1085	1320	2155	2155	
Height mm		1925	1925	1980	1980	1980	
Depth mm		650	750	860	860	860	
Weight kg		198.0	317.0	442.0	591.0	694.0	
Cooling output L 24°C/50%							
Cooling output, total kW		10.8	19	32.8	44.8	56.7	
Cooling output, sensible kW		9.54	18.2	28.3	41	51.7	
Power consumption of compressors kW		3.01	5.18	7.99	12	14.3	
Current rating of compressors A		5.09	9.04	15	22.3	26.5	
Fans							
Quantity		1	1	1	2	2	
Air throughput m³/h		2653	5460	7440	11310	14500	
External static compression Pa		50	50	50	50	50	
External static compression, max. Pa		118	600	50	313	94	
Power consumption, total kW		0.3	0.63	1.29	1.85	2.52	
Current rating (OA) A		1.74	0.98	2.5	3.38	4.91	
Current rating max. (FLA) A		2.2	4.3	2.5	5.2	5.2	
Compressor							
Version		Scroll	Scroll	Scroll	Scroll	Scroll	
Quantity		1	1	1	2	2	
Current rating max. (FLA) A		8	15	22	30	42	
Start-up current (LRA) A		43	75	118	116	132	
Output categories		1	1	1	2	2	
Air filter							
Quantity		1	2	2	3	3	
Filter class to DIN EN 779		G4	G4	G4	G4	G4	
Refrigerant							
Operating charge kg		4.5	6.8	8.3	18.4	19.2	
Refrigerant kg		R410a, 4.5	R410a, 6.8	R410a, 8.3	R410a, 18.4	R410a, 19.2	
No. of cooling circuits		1	1	1	1	1	
Energy efficiency rate EER		3.03	3	3.26	3	3.17	
Noise pressure level							
At a distance of 1 m from the air outlet dB(A)		59.7	65.2	72.2	67.3	72.5	
At a distance of 1 m from the front dB(A)		43.1	49	53.3	51.5	57.3	
Condenser units							
Rated operating voltage		230 V	230 V	230 V	230 V	230 V	
Width mm		875	1400	1600	1850	2320	
Height mm		727	1027	1027	1027	1140	
Depth mm		540	665	665	665	665	
No. of fans		1	1	2	2	2	
Air throughput m³/h		4500	9600	12000	17000	18000	
Weight kg		54.5	102.0	153.0	175.0	214.0	
Power consumption kW		0.25	0.53	0.78	1.08	1.08	
Current rating max. (FLA) A		1.18	2.85	3.6	5.7	5.7	
At 1 m distance in empty space dB(A)		63	67	67.4	69.4	69.4	
At 5 m distance in empty space dB(A)		51.3	56.1	56.6	58.7	59	
At 10 m distance in empty space dB(A)		45.6	50.5	51.1	53.2	53.6	
Technical specifications optional							
Steam humidifier: Volume 3 kg/h, 2.3 kW, 3.2 A		■	■	–	–	–	
Reheater: Thermal output 5.1 kW, 7.4 A, 2 levels		■	■	–	–	–	
Base frame, max. height = 350 mm		■	■	■	■	■	
Base frame, max. height = 450 mm		■	■	■	■	■	
Base frame, max. height = 510 mm		■	■	■	■	■	
Steam humidifier: Volume 8 kg/h, 6 kW, 8.7 A		–	–	■	–	–	
Reheater: Thermal output 9 kW, 13 A, 2 levels		–	–	■	–	–	
Steam humidifier: Volume 15 kg/h, 11.3 kW, 16.2 A		–	–	–	■	■	
Reheater: Thermal output 13.5 kW, 19.5 A, 2 levels		–	–	–	■	■	

Computer Room Air Conditioner

CRAC DX

Design

- Substructure made from extruded aluminium, thermal spray-coated with epoxy powder
- Inner and outer frame made from aluminium sections thermal spray-coated with epoxy powder
- Plates made from hot-galvanised sheet steel coated in semi-rigid PVC, with sound-insulating material on the inside
Attached to the frame with an invisible anchoring system
- Separate enclosure for switchgear on the front of the unit
- Air intake from above, waste air is expelled downwards

Compressors

- Hermetic scroll compressor, refrigerant R410a

Filter

- Reusable G4 air filter, cells made from synthetic fibres with metal frame (optionally F5 filter, washable)

Heat exchanger

- Finned tube heat exchanger with copper pipes and high-efficiency cooling fin, specifically for ensuring a high heat transfer coefficient and a low airside pressure loss. Condensate collecting tray with flexible PVC drain pipes.

Fan

- Radial fans, direct coupled to electric motor with external rotor
- Fans with synchronous EC motor (supplied as standard for 3300.394 and 3300.395, optional for 3300.396, 3300.397, 3300.398)

Cooling circuit

- Thermostatic expansion valve
- Signal to control the condensation monitoring system of the air-cooled condenser unit

Switchgear

In accordance with standard EN 60204-1 and equipped with the following components:

- Master switch for door latch
- Circuit-breaker for every compressor
- Circuit-breaker for fans
- Protection for each individual application (except evaporator fans with EC motor)
- Converter to supply the auxiliary circuits and microprocessor
- Mains voltage: 400/3/50+N

Control system

- MP.COM microprocessor with graphic display for controlling and monitoring the function and alarm status.

The system comprises:

- Floating contact for general alarm
- Hour counter for operation of the main components
- Flash memory for logging data in the event of a power failure
- Menu management with a protected password
- LAN connection

Air-cooled condenser unit

- Air-cooled condenser unit with axial fans for external positioning
 - Application range: -15°C...+45°C
 - Optionally selectable with three different noise levels

Selectable options

- Steam humidifier
- Reheater
- Condensate pump
- Dehumidification system
- Electric expansion valve
- Fine filter F5 (washable)
- Filter F6, F7, F9 (air outlet)
- Filter monitoring sensors
- Water monitoring in the raised floor
- Additional water sensor kit
- Interface BACnet, Ethernet, SNMP, TCP/IP serial board
- Raised floor base frame $H_{max} = 350$ mm
- Raised floor base frame $H_{max} = 450$ mm
- Raised floor base frame $H_{max} = 510$ mm
- Other options are also possible



Computer Room Air Conditioner

CRAC EVO INV

Precision climate control units with inverter technology

Principal features

- Inverter-regulated scroll compressors
- Fans with synchronous EC motors
- Choose between devices with one or two cooling circuits
- Choose between devices with inverter-regulated scroll compressor and ON/OFF scroll compressor
- Cooling medium R410a
- Air outlet downwards

Benefits

- Energy-efficient cooling
- Highly efficient in part-load operation
- Demand-based cooling output
- High EER (Energy Efficiency Ratio)
- Two cooling circuits with inverter-regulated compressor – precisely adapted cooling output with reduced power consumption by compressors

Description of accessory components

Inverter-regulated scroll compressor

The inverter-regulated compressor permits modulating adjustment of the cooling output to the current heat loss in the room. This facilitates energy-efficient cooling, particularly in the part-load range, and avoids major temperature fluctuations in the server inlet air.

Electronic expansion valve

The electronic expansion valve combines superior energy efficiency with increased functional reliability of the units.

Fan with EC motor

The fan is connected directly to a synchronous EC motor with integral switch system for constant, demand-based adjustment of the rotation speed.

Condensate pump

This accessory is comprised of a housing with vertical pump, tank with float and microswitch to activate the pump, plus water and electrical connections. 10 metres of crush-proof spiral drain pipe are supplied together with the pump. The electrical connection comprises the power supply and an alarm signal for heat and overcurrent protection which is displayed on the microprocessor. The pump operates fully automatically.

Depending on the size of the CRAC unit, the pump is either installed in the factory or supplied loose.

Steam humidifier

The steam humidifier allows controlled humidification of the air in the data centre.

Dehumidification system

The dehumidification system allows the air in the data centre to be dehumidified at high levels of relative humidity.

Reheater

The reheater is used to raise the air outlet temperature after dehumidification.

Fine filter F5

Reusable air filter with efficiency class F5.

Interface BACnet, Ethernet, SNMP, TCP/IP serial board

Base frame

Used to bridge the height of the raised floor; available in three different heights.

Kit for noise reduction in external condenser units

Apart from the standard version, two kits are available for the external condenser unit to reduce noise emissions.

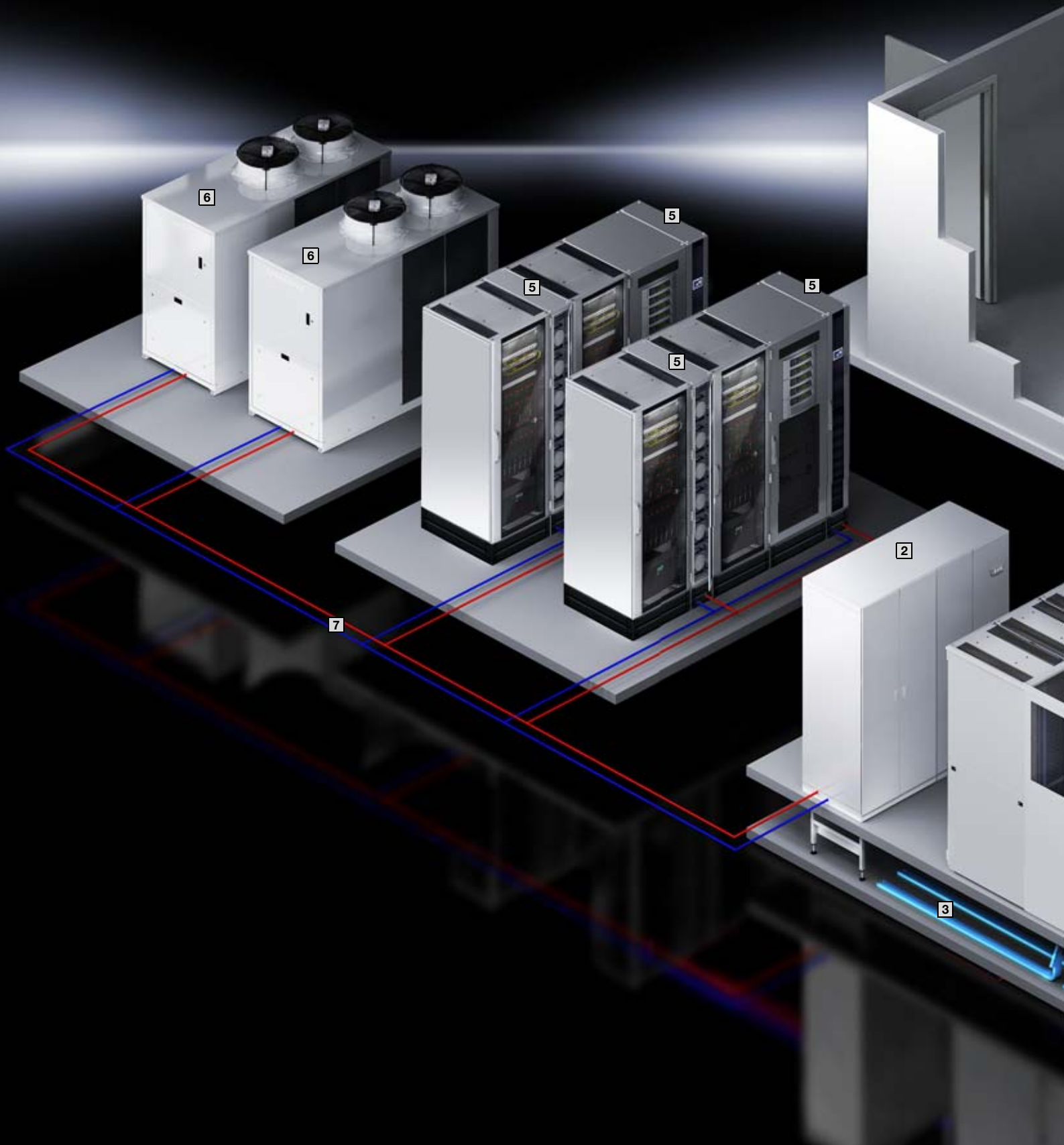
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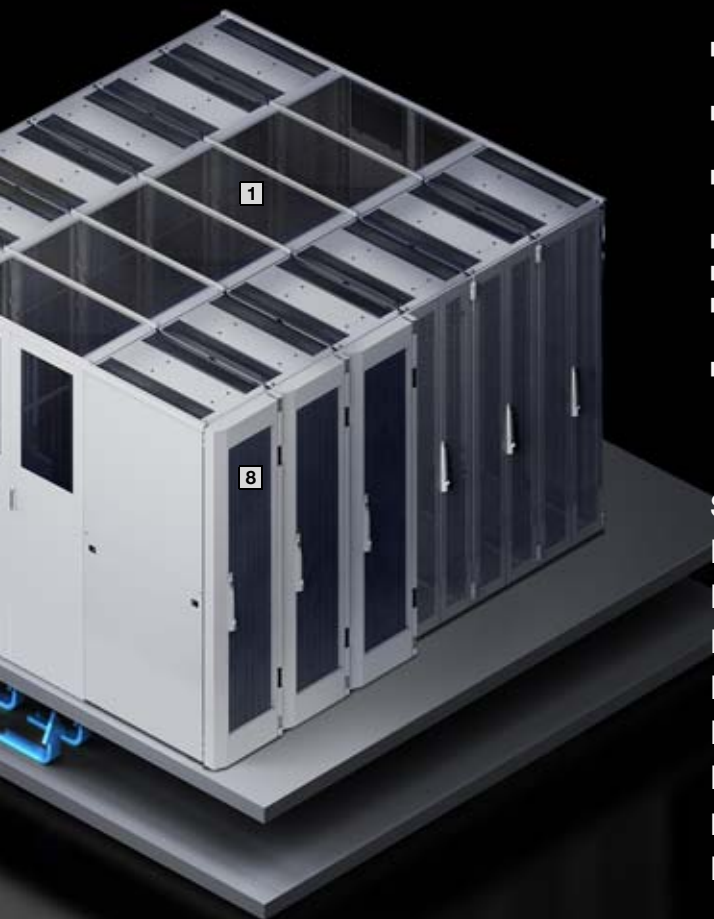
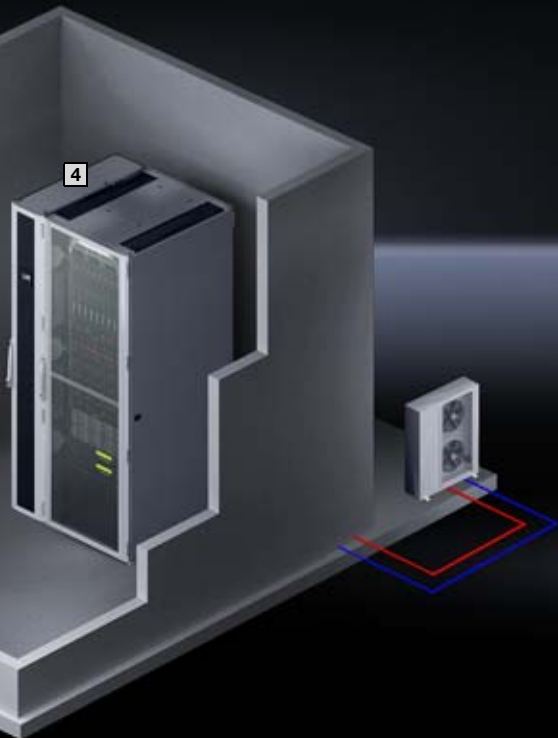
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IT cooling

Climate control concepts from Rittal cover the full spectrum of applications, from cooling a single rack through to entire data centres. Security plus optimum energy and cost efficiency are paramount. An extensive range of technical solutions supports individual climate control concepts for racks, suites and rooms.



Your benefits

- State-of-the-art climate control technology, from cooling a single rack through to entire data centres
- Individual climate control concepts for rack, suite and room cooling
- Enhanced security plus superior energy and cost efficiency
- Optimisation with aisle containment and cross-system control concepts
- Energy-efficient cooling using IT chillers
- Minimisation of operating costs with free cooling
- Environmentally friendly, thanks to resource savings and reduced CO₂ emissions
- Planning, assembly, commissioning and servicing – all from a single supplier!

Sample applications

- 1 Aisle containment
- 2 Computer Room Air Conditioner CRAC
- 3 Raised floor for cold air supply
- 4 Liquid Cooling Package LCP DX
- 5 Liquid Cooling Package LCP CW
- 6 IT chiller with integral free cooling
- 7 Pipework
- 8 LCP Hybrid

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