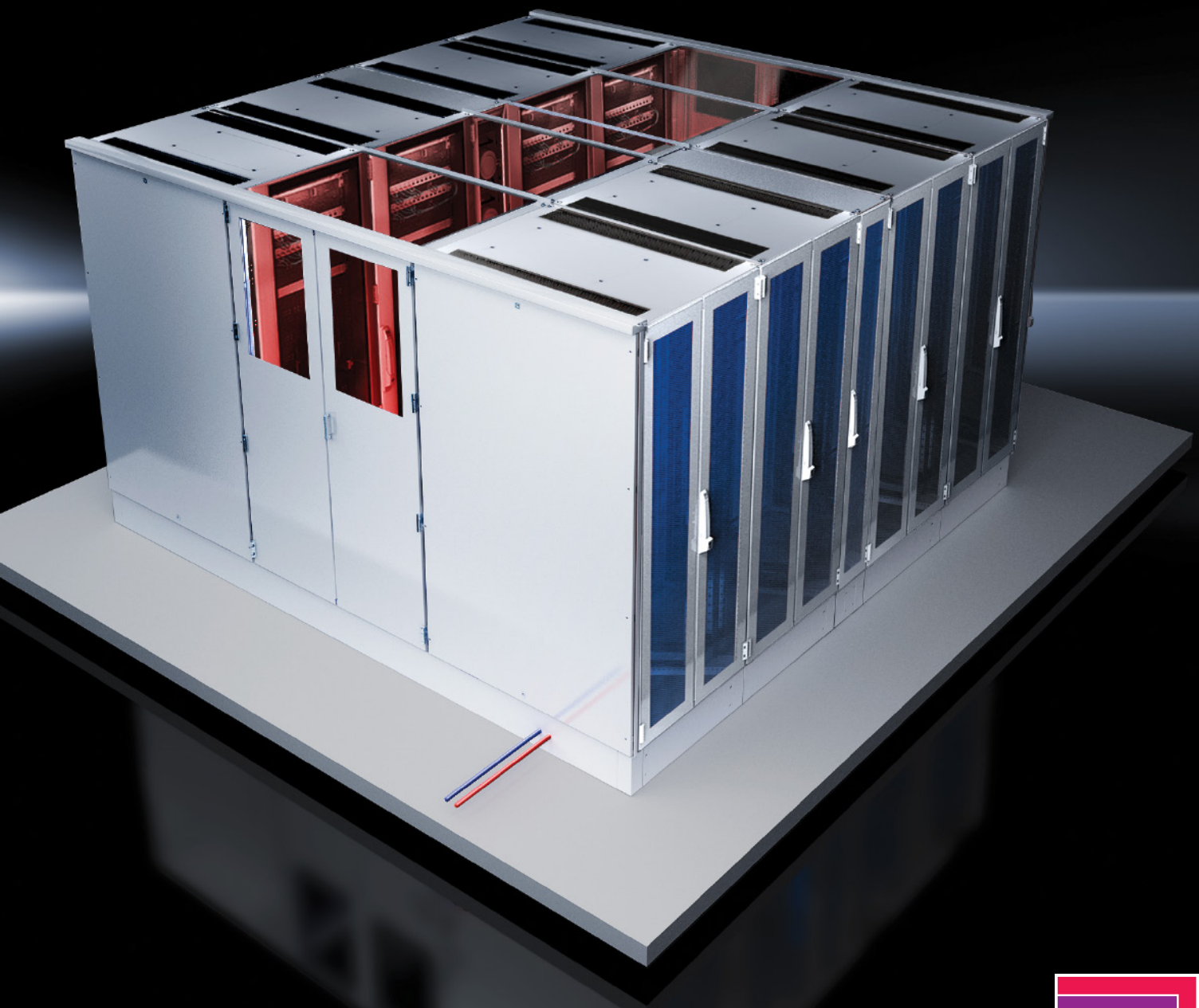
Rittal – The System.

Faster – better – everywhere.

IT Thermal Management Handbook



ENCLOSURES | POWER DISTRIBUTION | CLIMATE CONTROL | IT INFRASTRUCTURE | SOFTWARE & SERVICES

FRIEDHELM LOH GROUP

Match Thermal Management Solutions to the Application Challenge

Not all climate control solutions will meet your unique applications

Heat is an ongoing threat to your IT equipment. The vulnerability extends to the outside with extreme variations in ambient temperatures, and the inside with high thermal loads caused by dense components.

Managing temperatures consistently from all heat sources on the thermal spectrum is a major challenge. As space within an enclosure continues toward efficiency, heat removal becomes more of a threat to the components inside. Generated heat must be removed efficiently or heat damage will occur—controlling units and microprocessors age quickly under heat pressure. And, enclosures in harsh or uncontrolled environments increase that heat risk. Higher temperatures can lead to sudden catastrophic failure that can cost thousands in downtime costs and even leave critical information unrecoverable.

It's easy to understand why choosing the right cooling system is so critical from the beginning. Your thermal control system must manage the impact of any factor that inhibits air flow and increases temperature, ensuring uptime against any element.

The Challenges of Data Centers

Growth and scalability come at a cost. As businesses lean on data centers to meet growing data demands and enterprise challenges, more equipment is concentrated into existing footprints. This can lead to significant thermal management issues, potentially equipment failure, downtime and lost business revenue. Recent estimates put the cost of downtime at from $300K up to $1 million per hour, not including the future loss of customers, regulatory fines and other staff costs.

Although most businesses find it difficult to quantify the value of thermal management, they do understand the cost of service failure. In most data center environments, an aisle containment solution is an accepted approach to thermal management.

But as businesses add more equipment, the added thermal density can create hot spots that are difficult to manage simply by increasing airflow. An important consideration for data center customers to know is the impact of ASHRAE TC 9.9 standards that recommend that facility managers operate at higher server inlet temperatures and adjust humidity ranges to save energy.

One option for businesses looking to increase rack density is to consider a localized cooling solution. A closed loop configuration is designed to keep hot/cold air confined exclusively to the cabinet. As a result, cooling can be supplied precisely as required, eliminating the need to adjust the entire data center. For applicable customers Rittal offers direct expansion, close-coupled cooling in in-rack or in-row versions. Additionally, chilled water, close-coupled cooling in in-rack or in-row versions are available.

> "Recent estimates put the cost of downtime at from $300K up to $1 million per hour
>
> – IDC

Cooling at the Edge

Edge network data systems are often located in uncontrolled environments. Temperature and air flow can change from minute to minute, so protection for the components is provided by the enclosure and integrated climate control systems. In particular, these systems need to be able to manage thermal loads and still ensure maximum protection for the network components. A spike in temperature beyond the healthy range can compromise critical operating information at best, or cause a system meltdown at worst—potentially leaving critical information unrecoverable.

Rittal thermal management products answer the demands of data center managers across all industries – from the cruise ship operator to the heavy goods manufacturer. Rittal offers ambient air and liquid cooling systems to meet low-, mid- and high-density requirements. Proven products include filter fans, roof-mounted fans, Blue e+ A/C unites and air-to-air heat exchangers.

Choose Better. Choose Rittal.

Rittal thermal management products answer these demands plus provide future-proofing for any increases, or even high spikes, in the heat load. Rittal advanced climate control technology is your defense.

From cooling a single rack, room or Edge network through to entire data centers, Rittal covers the full spectrum of applications, keeping security and optimum energy and cost efficiency paramount. These innovative solutions are only available from Rittal.



3 Edge Cooling Challenges…



1. Dynamic Temperatures:
Fluctuating ambient air temperatures can shorten the life of components.



2. Future-proofing:
Small, confined micro data centers can impact scalability when adding equipment or planning for future growth.



3. Increased Power Density:
Power density is not easily managed with large room cooling designs, which can impact growth.

Edge cooling introduces new challenges to the complexity of IT equipment cooling, including:

…And How Rittal Helps

With thousands of installations in the globe's toughest, uncontrolled environments, Rittal can offer the same trusted quality to tackle Edge-related problems, such as our:

1. Full LIne of Accessories:
Cooling solutions include in-rack air flow management and AC units designed for fluctuating IT loads; in addition, enclosures are NEMA-rated to protect against dusty, damp environments.



2. Scalable Solutions:
In-row cooling scales to match evolving equipment configurations to protect future growth.





3. Closed Loop Cooling:
Closed loop solutions handle large thermal loads and power density challenges without the need for aisle containment cooling systems.

4. IoT Interface:
Blue e+ module measures enclosure temperatures and connects to IoT devices to provide centralized management.



Changes to data center environmental conditions

are being driven by the need to save energy and reduce operational expenses. ASHRAE, the industry's regulatory body, has helped drive international standards for thermal management.

Key considerations:

25%

Percentage of total energy costs that cooling represents.

Data centers run several degrees warmer than 10 years ago.

Air- and water-side economization are growing in adoption.

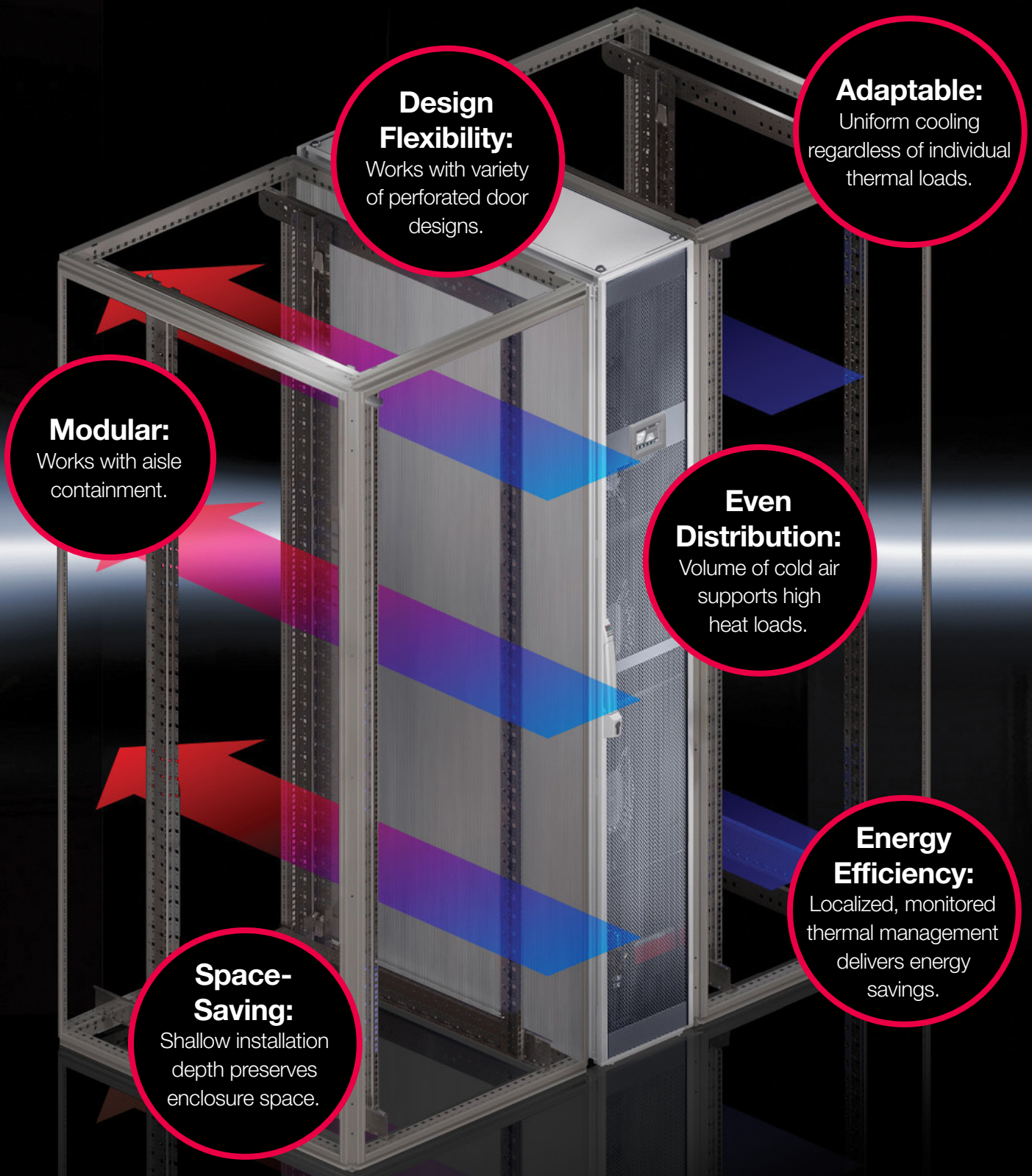
Air-side economization brings filtered outside air into the data center without air conditioning or humidity control.

Water-side economization uses outside air to chill liquid through an air-liquid heat exchanger.

Refrigerant economization is a variant of air conditioning.

Supplement Aisle Containment with Open Loop Cooling

An open-air loop configuration supports the traditional cold aisle/hot aisle row orientation, which is common in many data centers. But the fluctuation of thermal loads among racks in an aisle could create dangerous thermal conditions. Open loop cooling can deliver a number of benefits:



Design Flexibility: Works with variety of perforated door designs.

Adaptable: Uniform cooling regardless of individual thermal loads.

Modular: Works with aisle containment.

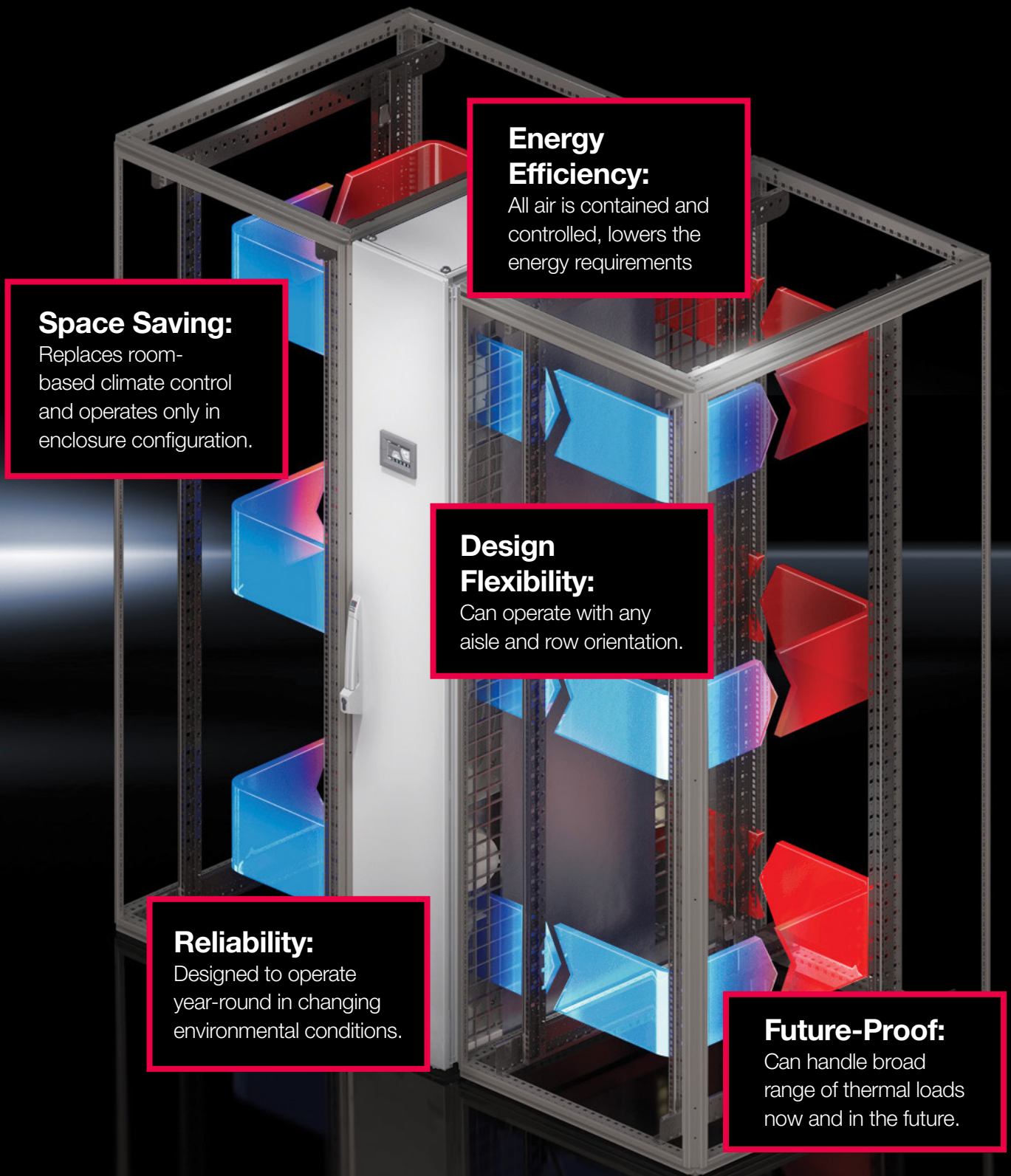
Even Distribution: Volume of cold air supports high heat loads.

Energy Efficiency: Localized, monitored thermal management delivers energy savings.

Space-Saving: Shallow installation depth preserves enclosure space.

Reduce the Risk of Uncontrolled Environments with Closed Loop Cooling

Closed loop systems direct all the cold air to the IT equipment inlets, supplying evenly cooled air to the complete height of the enclosure and avoiding temperature gradients, meaning no hot air is returned outside of the enclosure. It's ideal for handling large thermal loads and power density challenges in uncontrolled environments. Benefits include:



Energy Efficiency:
All air is contained and controlled, lowers the energy requirements

Space Saving:
Replaces room-based climate control and operates only in enclosure configuration.

Design Flexibility:
Can operate with any aisle and row orientation.

Reliability:
Designed to operate year-round in changing environmental conditions.

Future-Proof:
Can handle broad range of thermal loads now and in the future.

IT cooling solutions



Cooling solutions to protect vital equipment

From enclosure-based to room-based thermal management.

Controlling climate is key, and Rittal has a lock on a complete range of solutions: in line / in row, refrigerant and chilled water. Each product offers state-of-the-art, high efficiency climate control technology. We can support your precise application with planning, assembly, commission and service, all from your one-stop supplier.

All optimally coordinated to the tailored requirements of your data center

30-50% of your data center energy costs* are attributable to your cooling infrastructure. An IT Cooling Solution that includes Rittal is energy efficient, cost efficient and saves resources and CO_2 output while your IT components work to capacity.

*– ASHRAE





Choose the best:
IT cooling solutions

Advantages of chilled water systems:
- Maximum energy efficiency due to EC fan technology and IT-based control
- Minimal pressure loss at the air end, which in turn minimizes the power consumption of the fans
- Optimum adaptability due to dynamic, continuous control of the cold water volume flow
- By using high water inlet temperatures, the proportion of indirect free cooling is increased, which in turn reduces operating costs
- Targeted cooling output thanks to modular fan units
- Fan modules configurable as n+1 redundancy
- Redundant temperature sensor integrated at the air end
- The separation of cooling and enclosure prevents water from entering the server enclosure
- Up to 60 kW cooling output on a footprint of just 0.36 m2 (600 mm wide)
- Minimal area load due to low weight

Approvals:
- UL
- cUL

Functions:
- The hot air is drawn in from the room or hot aisle at the rear of the device and expelled at the front into the cold aisle after cooling. The LCP achieves maximum performance and efficiency in conjunction with cold aisle containment. With this product, a raised floor is not necessary.

Monitoring:
- Monitoring of all system-relevant parameters such as server air intake temperature, server waste air temperature, water inlet/return temperature, water flow, cooling output, fan speed and leakage
- Direct connection of the unit via SNMP over Ethernet
- Integration into RiZone

Temperature control:
- Infinitely variable fan control
- 2-way control ball valve

Color:
- Black RAL 9005

Protection category IP to IEC 60 529:
- IP 20

Cooling medium:
- Water

Optional:
- Various sensors
- Racks 47U 2,200 mm high

Technical details:
- Available at Rittal.us

Photo shows a configuration example with equipment not included in the scope of supply.

Rittal is the leading provider of closed-loop cooling systems, which eliminates the need for aisle containment.

Rittal Thermal Management: Ultra-High efficiency

The Blue e+ principle
Hybrid Technology: Pioneering Climate Control

The Blue e+ is a completely new generation of cooling units that represents a quantum leap in terms of cost-effectiveness and energy conservation. As well as providing far higher energy efficiency than existing cooling solutions, the units offer a range of powerful new features that provide longer component life, flexibility and ease of use.

Blue e+ features hybrid cooling technology that delivers 75% greater energy savings than competitive products. The cooling mode automatically adjusts to ambient conditions, switching from a passive heat pipe to an active speed-regulated refrigerant circuit or hybrid combination to maintain a constant temperature. This precision cooling aggressively manages internal temperatures to extend the life of enclosure components.

Data collection and analysis with Rittal's new Smart IoT interface data exchange allows relevant operating data and parameters to be shared around the plant and around the world. A multitude of values can be measured and recorded, and seamlessly interfaced with other IoT devices. This ease of access to energy data management improves efficiency and lowers maintenance costs. With multi-voltage capacity, Blue e+ is versatile and ready for international use. It provides an intuitive user experience, with a simple, multi-lingual touch display and NFC-enabled interfaces.

In addition to significant energy savings, Blue e+ features:

- One standard model, one range of spare parts
- Easy, rapid assembly
- Maintenance-friendly, tool-less filter mat replacement
- Blue e+ app for smartphone interface
- International approvals and certifications
  - cULus Listed
  - EAC
  - TÜV Nord GS




20
60
EER
35
°C

Rittal Thermal Management: Ultra-High Tech

IoT interface – allows devices and systems to communicate face to face.

Cooling units can be equipped with a wide range of communication technology and are playing an increasingly important role in Industry 4.0. Seamless communication between sensors inside the cooling unit and cloud-based systems is opening up opportunities for new applications. Essential to these applications are IoT-capable devices such as the new cooling units and chillers in the Rittal Blue e+ climate control product offering.

Remotely-accessed devices and predictive maintenance are based on the provision of data and networked communications. For this to happen, IoT-compatible devices equipped with the necessary communication options are required. With our Blue e+ platform and the new IoT interface, Rittal is laying the foundation for the optimal integration of cooling units and chillers in Industry 4.0 applications. This makes continuous communication from the sensor to the cloud possible, as well as connection to external monitoring or energy management systems.

Rittal's IoT interface supports; OPC-UA, Profinet, SNMP, Modbus TCP and CANopen – allowing climate control solutions to be easily integrated into IoT applications and paving the way for new applications and smart service solutions.

- With the CMC sensors and the IoT interface, temperature, humidity, access, smoke, energy and many other physical environmental parameters can be monitored.
- The system has a modular structure and can be easily adapted to the monitoring.
- Network monitoring and automation of security processes provide benefits such as improved machine availability and reduced maintenance costs.



Rittal products meet the highest internationally recognized quality standards

All components of Rittal products are subjected to the most stringent testing in accordance with international standards and regulations. The consistently high product quality is ensured by a comprehensive quality management system. Regular product inspections by external test institutes guarantee compliance with global standards.

Rittal TopTherm Cooling Units – Guaranteed Output TÜV-tested output to DIN EN 14511

Rittal is the only supplier in the world to deliver its entire range of enclosure cooling units tested to the latest DIN EN standard. All TopTherm cooling units in the output range from 300 to 4,000 W are tested to the DIN EM 14511:2012-01 standard by the independent test institute TÜV NORD, and are authorized to carry the relevant test mark for the entire series.

This testing assures you that Rittal provides:

- Cooling units that are guaranteed to provide the cooling output you have paid for, giving you complete confidence when designing your climate control solution.
- Verified cooling outputs that are up to 10% higher than previously claimed.
- Improved Energy Efficiency Ratio (EER)
- Commitment to annual voluntary inspections

IoT Interface

The IoT interface is used to link Rittal components such as Blue e+ cooling units, Blue e+ chillers, smart monitoring systems etc. to the customer's own monitoring and/or energy management systems. Data may be integrated both horizontally and vertically into data collectors and processors, to allow the long-term logging and evaluation of device data, statuses and system messages.

Communication protocols:
SNMPv1, SNMPv2c, SNMPv3, OPC-UA, Modbus/ TCP, CAN bus, Profinet

Network protocols:
Telnet, SSH, FTP, SFTP, HTTP, HTTPS, NTP, DHCP, DNS, SMTP, Syslog, LDAP, RADIUS

Benefits:
– The IoT interface is middleware, whose interfaces allow a variety of devices and systems to communicate with one another. The data can then be forwarded into superordinate systems.

Material:
– Plastic to UL 94-V0

Color:
– RAL 7016 Anthracite grey

Protection category IP to IEC 60529:
– IP 20

Supply includes:
– Connection cable (1 m) with RJ 45 connector
– Angle bracket for Blue e+ cooling unit

Assembly instruction:
– The IoT interface can be secured on a 35 x 7.5 top hat rail to DIN EN 60 715 using a springloaded metal clip, or to the rear of a Blue e+ cooling unit using the angle bracket.

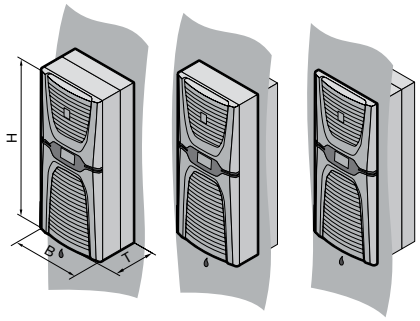
Model No.	3124.300
W x H x D in. (mm)	0.07 x 4.6 x 4.72 (18 x 117 x 120)
For	Blue e+ cooling units Blue e+ chillers Smart monitoring system CMC III sensors
Operating temperature range °F (°C)	+32°F...+158°F (+0°C...+70°C)
Protocols	SNMP, OPC-US, Modbus/TCP, CAN bus, Profinet
Interfaces	1 x Micro USB type B (device) for USB 2.0 1 x Micro-SD memory card slot for SD 2.0 1 x USB 2.0 high-speed functions (EHCI) 1 x acknowledgement button 1 x 3-pole push-in spring connection terminal for NTC sensor 2 x RJ45 jack for RS 485 interface (climate control unit interface
Network interface	Ethernet IPv4/IPv6 Ethernet to IEEE 802.3 via 10BASE-T, 100BASE-T and 1000BASE-T
Type of electrical connection	3-pole push-in spring connection terminal (24 V DC)



Wall-mounted air conditioners Blue e+

Benefits:
– 75% energy saved due to speed-regulated components and heat pipe technology
– Suitable for international use due to a unique multi-voltage capability
– Longer service life of the components inside the enclosure and the cooling unit due to component-friendly cooling
– Intuitive operation due to touch display and intelligent interfaces

Temperature control:
– e+ controller (factory setting +35°C)
Material:
– Sheet steel
Color:
– RAL 7035
Protection category IP to IEC 60 529:
– Internal circuit IP 55
Supply includes:
– Assembly parts



Power Category 5118 BTU (1600 W)

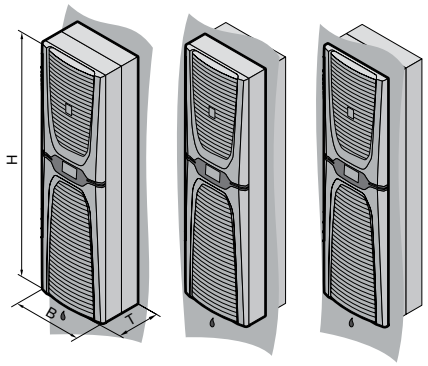
Model No.	Packs of	**3185.830**
Total cooling output 50 Hz L35 L35 to DIN EN 14511 BTU (kW)		**5459 (1.6)**
Total cooling output 50/60 Hz L35 L35 BTU (kW)		5459 / 5459 (1.6 / 1.6)
Total cooling output 50/60 Hz L35 L50 BTU (kW)		4095 / 4095 (1.2 / 1.2)
Rated operating voltage V, ~, Hz		110 - 240, 1~, 50/60 380 - 480, 3~, 50/60
Width (B) Inches (mm)		16 (400)
Height (H) inches (mm)		37 (950)
Depth (T) inches (mm)		12 (310)
Rated output kW		0.62
Power consumption Pel 50/60 Hz L35 L35 kW		0.54 / 0.54
Power consumption Pel 50/60 Hz L35 L50 kW		0.61 / 0.61
Operating temperature range °F (°C)		-4°F...+140°F (-20°C...+60°C)
Setting range °F (°C)		+68°F...+122°F (+20°C...+50°C)
Storage temperature range °F (°C)		-40°F... +158°F (-40°C...+70°C)
Energy efficiency ratio (EER) 50 Hz L35 L35 to DIN EN 14511		3.05
Refrigerant g		R134a, 750
Permissible operating pressure (p. max.) bar		24
Air throughput of fans (unimpeded air flow), Internal circuit/external circuit m^3/h		700 / 895
Weight lbs (kg)		67 (30.5)



Wall-mounted air conditioners Blue e+

Benefits:
– 75% energy saved due to speed-regulated components and heat pipe technology
– Suitable for international use due to a unique multi-voltage capability
– Longer service life of the components inside the enclosure and the cooling unit due to component-friendly cooling
– Intuitive operation due to touch display and intelligent interfaces

Temperature control:
– e+ controller (factory setting +35°C)
Material:
– Sheet steel
Color:
– RAL 7035
Protection category IP to IEC 60 529:
– Internal circuit IP 55
Supply includes:
– Assembly parts



Power Category 6830 – 19808 BTU (2000W – 6000W)

Model No.	Packs of	**3186.930**	**3187.930**	**3188.940**	**3189.940**
Total cooling output 50 Hz L35 L35 to DIN EN 14511 BTU (kW)		**6830 (2)**	**8879 (2.6)**	**14340 (4.2)**	**19808 (5.8)**
Total cooling output 50/60 Hz L35 L35 BTU (kW)		6830 / 6830 (2 / 2)	8879 / 8879 (2.6 / 2.6)	14340 / 14340 (4.2 / 4.2)	19808 / 19808 (5.8 / 5.8)
Total cooling output 50/60 Hz L35 L50 BTU (kW)		4405 / 4405 (1.29 / 1.29)	6215 / 6215 (1.82 / 1.82)	10313 / 10313 (3.02 / 3.02)	14344 / 14344 (4.2 / 4.2)
Rated operating voltage V, ~, Hz		110 - 240, 1~, 50/60 380 - 480, 3~, 50/60	110 - 240, 1~, 50/60 380 - 480, 3~, 50/60	380 - 480, 3~, 50/60	380 - 480, 3~, 50/60
Width (B) inches (mm)		18 (450)	18 (450)	18 (450)	18 (450)
Height (H) inches (mm)		63 (1600)	63 (1600)	63 (1600)	63 (1600)
Depth (T) inches (mm)		12 (294)	12 (294)	15 (393)	15 (393)
Rated output kW		0.73	1.05	1.3	2.2
Power consumption Pel 50/60 Hz L35 L35 kW		0.57 / 0.57	0.99 / 0.99	1.21 / 1.21	2.2 / 2.2
Power consumption Pel 50/60 Hz L35 L50 kW		0.6 / 0.6	0.94 / 0.94	1.28 / 1.28	2.2 / 2.2
Operating temperature range		-20°C...+60°C	-20°C...+60°C	-20°C...+60°C	-20°C...+60°C
Setting range		+20°C...+50°C	+20°C...+50°C	+20°C...+50°C	+20°C...+50°C
Storage temperature range		-40°C...+70°C	-40°C...+70°C	-40°C...+70°C	-40°C...+70°C
Energy efficiency ratio (EER) 50 Hz L35 L35 to DIN EN 14511		3.5	2.63	3.46	2.64
Refrigerant g		R134a, 1150	R134a, 1150	R134a, 1750	R134a, 1750
Permissible operating pressure (p. max.) bar		24	24	24	24
Air throughput of fans (unimpeded air flow), Internal circuit/external circuit m^3/h		1250 / 1250	1250 / 1250	2300 / 2300	2300 / 2300
Weight lbs (kg)		121 (55.2)	121 (55.2)	159 (72.4)	159 (72.4)
Note on Model No.		-	-	Full installation not possible	**Full installation not possible**

High-capacity rack bayed suite cooling



The benefits

- Reduced noise levels and electrical power consumption, thanks to the flexible use of continually regulating EC fan modules
- Tool-free fan replacement with the plug & play system
- Because the electrical assembly pulls out forwards, maintenance from above is unnecessary
- LCP CW glycol variants:
  – Improved thermal recovery thanks to high water return temperatures
  – High cooling output even with the water/ glycol mixture

Technology

- Integral Delta T control at the water end for simple setting of the individual Delta T
- Highly reliable - redundant fan system provides maximum cooling even if a fan fails.
- High-performance heat exchangers guarantee maximum cooling output in a small space







LCP Rack DX

Applications:
- Ideal for IT cooling of small and medium-sized locations
- One or two racks can be cooled separately

Benefits:
- Maximum energy efficiency due to EC fan technology and IT-based control
- Minimal pressure loss at the air end, which in turn minimizes the power consumption of the fans
- Control of the server inlet temperature
- Thanks to the speed-regulated compressor, the cooling output is ideally adapted to actual requirements
- With redundant temperature sensor integrated at the air end as standard
- Specific maintenance of the LCP DX due to separation of cooling and server racks

Functions:
- The LCP draws in the air at the sides at the rear of the server enclosures, cools it using high- performance compact impellers, and blows the cooled air back into the front part of the server enclosure at the sides
- Absorbed thermal energy is emitted to the ambient air at the external condenser location, without heating up the installation room

IT monitoring:
- Direct connection of the unit via SNMP over Ethernet
- RiZone management software

Temperature control:
- Linear fan control
- Inverter-controlled compressor

Color:
- Black RAL 9005

Protection category IP to IEC 60 529:
- IP 20

Optional:
- Humidifier
- Reheater
- Condensate drain pump
- Higher cooling output
- Low-temperature/high-temperature condenser (-40°F /+127.4°F)

Note:
These are UL approved

Photo shows a configuration example with equipment not included in the scope of supply



LCP Inline DX

Applications:
- Ideal for IT cooling of small and medium-sized locations
- One or two racks can be cooled separately

Benefits:
- Maximum energy efficiency due to EC fan technology and IT-based control
- Minimal pressure loss at the air end, which in turn minimizes the power consumption of the fans
- Temperature monitoring and control
- With redundant temperature sensor integrated at the air end as standard
- Thanks to the speed-regulated compressor, the cooling output is ideally adapted to actual requirements
- Specific maintenance of the LCP DX due to separation of cooling and server racks

Functions:
- The LCP is designed for siting within a bayed enclosure suite. Hot air is drawn in from the aisle at the rear of the device, cooled by the high-capacity compact impellers, and blown back into the room or cold aisle after cooling
- Absorbed thermal energy is emitted to the ambient air at the external condenser location, without heating up the installation room

IT monitoring:
- Direct connection of the unit via SNMP over Ethernet
- Integration into RiZone management software

Temperature control:
- Linear fan control
- Inverter-controlled compressor

Color:
- Black RAL 9005

Protection category IP to IEC 60 529:
- IP 20

Optional:
- Humidifier
- Reheater
- Condensate drain pump
- Air filter
- Low-temperature/high-temperature condenser (-40°F /+127.4°F)

Note:
- These are UL approved

Photo shows a configuration example with equipment not included in the scope of supply



LCP Rack CW

Benefits:

- Maximum energy efficiency due to EC fan technology and IT-based control
- Minimal pressure loss at the air end, which in turn minimizes the power consumption of the fans
- Control of the server inlet temperature
- With redundant temperature sensor integrated at the air end as standard
- Optimum adaptability due to dynamic, continuous control of the cold water volume flow
- By using high water inlet temperatures, the proportion of indirect free cooling is increased, which in turn reduces operating costs
- Targeted cooling output due to modular fan units
- Fan modules configurable as n+1 redundancy
- Standard 3-phase connection for electrical redundancy
- The separation of cooling and enclosure prevents the ingress of water into the server enclosure
- Up to 55 kW cooling output on a footprint of just 0.36 m^2 (600 mm wide)
- Ideal in conjunction with a heat pump, as the LCP CW glycol variants generate high water return temperatures
- Improved heat recovery, thanks to high water return temperatures when using LCP CW glycol variants
- Optimum access for maintenance and servicing from the front and rear
- Tool-free replacement of the fan modules

Functions:

- The LCP draws in the air at the sides at the rear of the server enclosures, cools it using high-performance compact impellers, and blows the cooled air back into the front part of the server enclosure at the sides

IT monitoring:

- Monitoring of all system-relevant parameters such as server air intake temperature, server waste air temperature, water inlet/return temperature, water flow, cooling output, fan speed, leakage
- Direct connection of the unit via SNMP over Ethernet
- Integration into RiZone management software

Temperature control:

- Linear fan control
- Two-way control valve

Color:

- Black RAL 9005

Protection category IP to IEC 60 529:

- IP 20Z

Optional:

- Fully integrated fire detection and extinguisher system
- Automatic server enclosure door opening
- Direct connection of additional CMC III sensors is supported
- Racks 47U 2200 high

Photo shows a configuration example with equipment not included in the scope of supply



LCP Inline CW

Benefits:

- Maximum energy efficiency due to EC fan technology and IT-based control
- Minimal pressure loss at the air end, which in turn minimizes the power consumption of the fans
- Optimum adaptability due to dynamic, continuous control of the cold water volume flow
- By using high water inlet temperatures, the proportion of indirect free cooling is increased, which in turn reduces operating costs
- Targeted cooling output due to modular fan units
- Fan modules configurable as n+1 redundancy
- Standard 3-phase connection for electrical redundancy
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- Improved heat recovery, thanks to high water return temperatures when using LCP CW glycol variants
- Optimum access for maintenance and servicing from the front and rear
- Tool-free replacement of the fan modules

Functions:

- The hot air is drawn in from the room or hot aisle at the rear of the device and expelled at the front into the cold aisle after cooling. With this product, raised floor is not necessary

IT monitoring:

- Monitoring of all system-relevant parameters such as server air intake temperature, server waste air temperature, water inlet/return temperature, water flow, cooling output, fan speed, leakage
- Direct connection of the unit via SNMP over Ethernet
- Integration into RiZone

Temperature control:

- Linear fan control
- Two-way control valve

Color:

- RAL 9005

Protection category IP to IEC 60 529:

- IP 20

Optional:

- Direct connection of additional
- CMC III sensors is supported
- Racks 2200 mm high

Photo shows a configuration example with equipment not included in the scope of supply

Accessories



Blue e+

Accessories

Filter mats

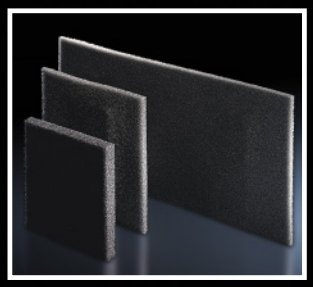
Rittal cooling units are low-maintenance and are supplied without filter mats. Filter mats may be used for extreme conditions.

Benefits:
– Temperature-resistant from -40°C...+80°C

Material:
– Open-celled polyurethane foamed plastic
– Thickness: 10 mm

For Blue e+ air conditioners

To fit model No.	Packs of	Model No.
3185.830	3 pc(s).	**3285.800**
3186.930/ 3187.930/ 3188.940/ 3189.940	3 pc(s).	**3285.900**



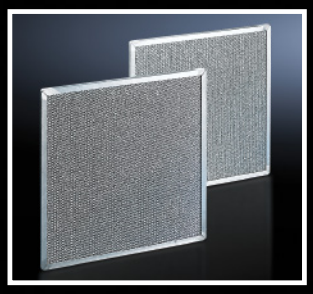
Metal filter

Particularly when cooling units are used in dusty and oily environments, it is advisable to use washable metal filters. If air or steam condenses on the metal surfaces, any particles present will adhere to the metal, and can easily be washed out with water or grease-dissolving solvents.

Material:
– Aluminum
– Thickness: 10 mm

For Blue e+ air conditioners

To fit model No.	Packs of	Model No.
3185.830	1 pc(s).	**3285.810**
3186.930/ 3187.930/ 3188.940/ 3189.940	1 pc(s).	**3285.910**



Temperature sensor

NTC sensor to regulate Blue e+ cooling units according to an individual measurement point within the enclosure (control based on an external sensor).

Supply includes:
– External sensor with connection cable (length 2.5 m)

Packs of.	1 pc(s)
Model No.	**3124.400.**



IT cooling

Accessories

Condenser unit for LCP-DX

The condenser unit is needed to operate the refrigerant-based LCP DX's, and comprises the external condenser, and fan.

Refrigerant:
R410a

For LCP DX	Packs of	Model No.
3311.415 3311.425 3311.435 3311.445	1 pc(s).	**Single Circuit 9951.077**
For 2 LCP DX units	1 pc(s).	**Dual Circuit 9982.148**

Note:
– The pipework between the LCP DX and the condenser is not included with the supply



IT cooling

Accessories



SNMP card

For connecting LCP Rack/Inline DX units to the network. The SNMP card is plugged into the control board of the LCP and is ready to use. Software configuration is subsequently carried out via the Web interface.

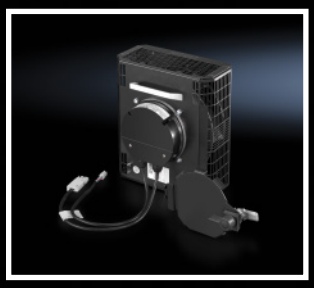
Protocols	Packs of	**Model No.**
SNMPv1 Modbus/TCP	1 pc(s).	**3311.320**

Functions:

– Automatic alarm messages by e-mail or SNMP trap when a limit value is exceeded
– Remote modification of the device setpoint

Supply includes:

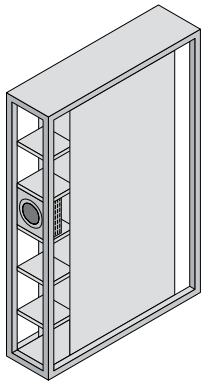
– SNMP card
– RJ 45 coupling
– CAT 6 cable STP



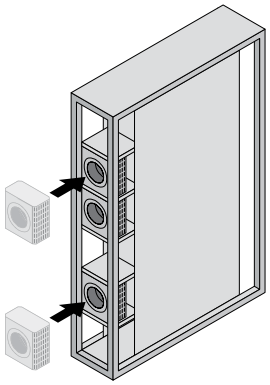
Fan Module for LCP CW

To increase the cooling output, individual fan modules can be retro-fitted into the LCPs. This helps to generate redundancy or reduce the electrical power consumption of the LCP.

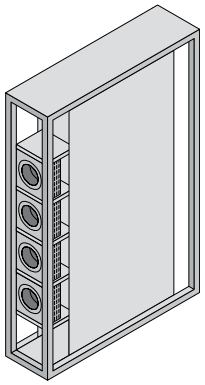
For LCP	Color	Packs of	**Model No.**
3311.148, 3311.238, 3311.268, 3311.538, 3311.548, 3311.568	RAL 9005	1 pc(s).	**3311.016**



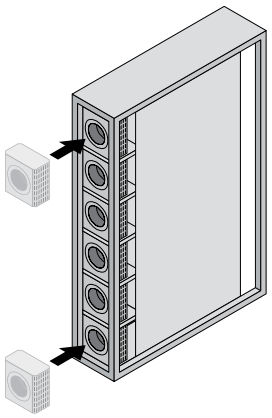
The LCP 3312.130/.230/.530 (max. 30 kW) is supplied with one fan module as standard.



To achieve the max. cooling output of 30 kW, the customer/ service should install two additional fan modules.



The LCP 3312.250/.260/.560/ .570 (max. 40/53/53/35 kW) is supplied with four fan modules as standard.



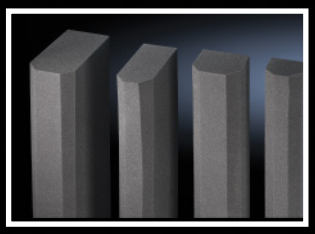
To achieve the max. cooling output of 60 kW, the customer/ service should install two additional fan modules.

Vertical shielding

To block the airflow on the left and right of the 19” (482.6 mm) rails, for enclosure height 79” (2000 mm).

Material:
– Cellular PU foam
– Flame-inhibiting to UL 94 (HF1)
– Length: 75” (1900 mm)
– Self-adhesive on one side

For sealing between	For enclosure width inches (mm)	Packs of	Part No.
Side panel and 19” (482.6 mm) rails	24 (600)	1	**3301.380**
	32 (800)	1	**3301.390**
LCP and 19” (482.6 mm) rails	24 (600)	1	**3301.370**
	32 (800)	1	**3301.320**



Connection hose, bottom and top

Flexible rubber hose, may be shortened. Requires Hose Conversion Kit 9977.379 for connection to LCP CW.

Part Number	Description	Packs of
9977.379	Hose Connection Kit	1
9971.173	10’ Hose	1
9971.174	15’ Hose	1
9971.175	25’ Hose	1

For use with LCP CW 3311.148, 3311.238, 3311.268,
3311.538, 3311.548, 3311.568



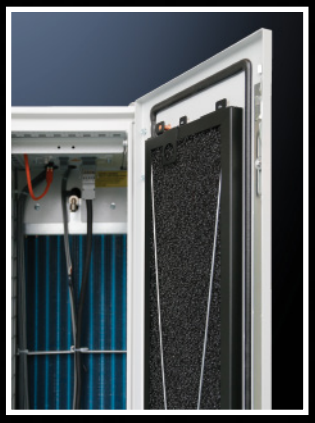
Filter mat holder for LCP Inline CW

The filter mat holder is comprised of a metal frame, into which the open-pore filter mat is inserted. The filter mat is fixed in the frame with additional metal brackets. The filter mat holder itself is secured in the perforated rear door of the LCP Inline CW using magnets.

Supply includes:
– Filter mat holder
– Filter mat
– Assembly parts

Accessories:
– Filter mat

Filter class to DIN EN 779	Packs of	Model No.
G1	1 pc(s).	**3311.042**



Filter mat for LCP Inline CW

Matching, open-pore spare filter mat for the filter mat holder in the LCP Inline CW.

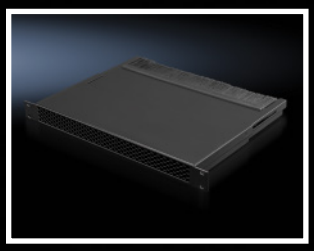
Color:
– Dark grey

Filter class to DIN EN 779	Packs of	Model No.
G1	3 pc(s).	**3311.043**



IT cooling

Accessories



482.6 mm (19”) air duct for horizontal air routing

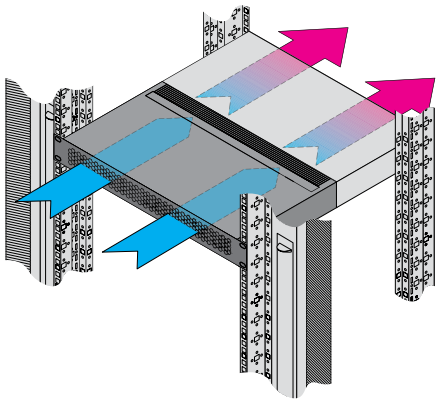
Air duct, passive, for cold air supply to 482.6 mm (19”) IT equipment installed at the rear of server racks; air is drawn in from the front.

Benefits:
– For superior air infeed to the rear 482.6 mm (19”) components
– Integral brush strip for cable entry of 482.6 mm (19”) IT equipment
– Supports front-to-back air routing
– Depth-variable

Material:
– Sheet steel, spray-finished
– Brush strip: Plastic, UL 94-HB

Color:
– RAL 9005

Width mm	Height U	Depth mm	Packs of	**Model No.**
482.6	1	223 – 356	2 pc(s).	**3301.391**





Air duct for side air routing

Air duct, passive, for cold air intake to 482.6 mm (19”) equipment with side air inlet.

Benefits:
– For superior air infeed to the rear 482.6 mm (19”) equipment with side air routing
– Integral membrane cover allows cable entry to the rear
– Depth-variable

Installation options:
– for TS IT 482.6 mm (19”) mounting angles
– for TS IT 482.6 mm (19”) mounting frames

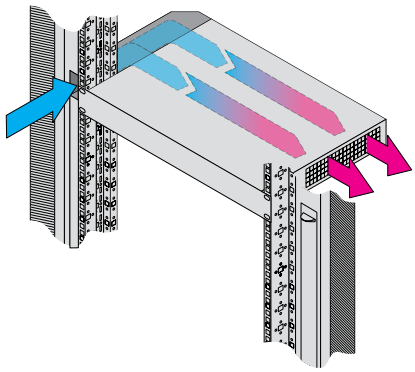
Material:
– Sheet steel, spray-finished

Color:
– RAL 9005

Supply includes:
– Adaptor for attaching to 482.6 mm (19”) mounting angles
– Magnetic strip to cover the remaining vertical openings in the air baffle plate

Also required:
– Air baffle plates for TS IT 482.6 mm 19”) mounting frames, see page 44
– Air baffle plates for TS IT 482.6 mm (19”) mounting angles, see page 44

Assembly instruction:
– Only suitable for fitting on the front 482.6 mm (19”) installation level
– Can only be mounted in the area of



Height U	Depth mm	For enclosure width mm	Packs of	Model No.
2	275 - 418	800	1 pc(s).	3301.392

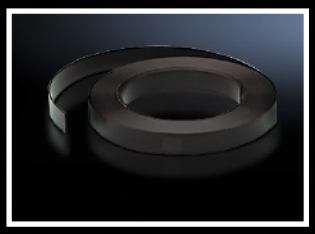
Cover, magnetic

For optionally covering the front system punchings in the event of complete air blocking of the front, or in the absence of installed cable fingers or dynamic rack control strip. With numerical labelling on an imperial pitch pattern for clear identification of the various height units. The double-sided labelling allows the counting direction to be freely selected from 1 – 47 U.

Material:
– Cover: PVC
– Adhesive measurement strips: Plastic

Supply includes:
– 1 cover (front)
– 2 adhesive measurement strips, self-adhesive, 1-47 U (bi-directional)

Length m	Packs of	**Model No.**
5	1 pc(s).	**5501.895**

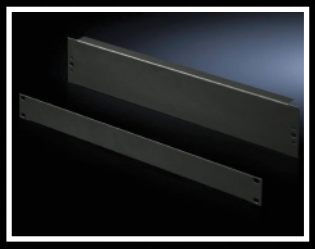




Blanking panels or plates

To place in unused or vacant space, to block off airflow. Or, to neatly finish off unoccupied locations within the mounting level. Installs without the need for additional hardware or tools.





U	Packs of	Item	**Part No.**
1	12	RAL 9005 tool-less (plastic)	**9960.676**[1)]
1	10	RAL 9005 tool-less (metal)	**9970.016**
3	5	RAL 9005 tool-less (metal)	**9970.017**
1	2	RAL 9005 (metal)	**7151.005**
2	2	RAL 9005 (metal)	**7152.005**
3	2	RAL 9005 (metal)	**7153.005**[2)]
6	2	RAL 9005 (metal)	**7156.005**[2)]
1	3	Aluminium, natural-anodized	**1931.200**
2	3	Aluminium, natural-anodized	**1932.200**
3	3	Aluminium, natural-anodized	**1933.200**
4	3	Aluminium, natural-anodized	**1934.200**
6	3	Aluminium, natural-anodized	**1936.200**
9	3	Aluminium, natural-anodized	**1939.200**

[1)] UL 94-VO
[2)] Extended delivery times

LCP Rack DX

Model No.	**3311.415**	**3311.425**	**3311.392**
Total cooling output/number of fan modules required BTU (kW)	**40,946 (12)/4**	**40,946 (12)/4**	**40,946 (20)/4**
Height inches (mm)	79 (2000)	79 (2000)	79 (2000)
Width inches (mm)	12 (300)	12 (300)	12 (300)
Depth inches (mm)	39 (1000)	47 (1200)	48 (1200)
Rated operating voltage V, ~, Hz	208, 1~, 60	208, 1~, 60	208, 1~, 60
Type of connection (electrical)	Terminal	Terminal	Terminal
Air throughput at max. cooling output cfm (m^3/h)	2825 (4800)	2825 (4800)	2825 (4800)
Fans may be exchanged with the system operational	Yes, tooless	Yes, tooless	Yes, tooless
Fan type (Number of fan modules)	EC (4)	EC (4)	EC (4)
Duty cycle %	100	100	100
Weight in supplied state lb (kg)	399 (181.0)	399 (181.0)	443 (201)
Compressor type	Twin Rotary	Twin Rotary	Scroll
Piping (max) distance feet (m)	98 (30)	98 (30)	150 (45)
Accessories			
SNMP card	3311.320	3311.320	Included
Condenser unit	9951.077	9951.077	9951.077

LCP Inline DX Liquid Cooling Package

Model No.	**3311.435**	**3311.445**	**3311.391**
Total cooling output/number of fan modules required BTU (kW)	**40,946 (12)/4**	**40,946 (12)/4**	**40,946 (20)/4**
Height inches (mm)	79 (2000)	79 (2000)	79 (2000)
Width inches (mm)	12 (300)	12 (300)	12 (300)
Depth inches (mm)	39 (1000)	47 (1200)	48 (1200)
Rated operating voltage V, ~, Hz	208, 1~, 60	208, 1~, 60	208, 1~, 60
Type of connection (electrical)	Terminal	Terminal	Terminal
Air throughput at max. cooling output cfm (m^3/h)	2825 (4800)	2825 (4800)	2825 (4800)
Fans may be exchanged with the system operational	Yes, tooless	Yes, tooless	Yes, tooless
Fan type (Number of fan modules)	EC (4)	EC (4)	EC (4)
Duty cycle %	100	100	100
Weight in supplied state lb (kg)	399 (181.0)	399 (181.0)	443 (201)
Compressor type	Twin Rotary	Twin Rotary	Scroll
Piping (max) distance feet (m)	98 (30)	98 (30)	150 (45)
Accessories			
SNMP card	3311.320	3311.320	Included
Condenser unit	9951.077	9951.077	9951.077

LCP Rack CW Liquid Cooling Package

Model No.	**3311.238**	**3311.268**
Total cooling output/number of fan modules required BTU (kW)	**34121 (10)/1 68243 (20)/2 102364 (30)/3**	**136486 (40)/4 153546 (45)/5 187668 (60)/6**
Number of fan modules in supplied state	1	4
Height inches (mm)	79 (2000)	79 (2000)
Width inches (mm)	12 (300)	12 (300)
Depth inches (mm)	47 (1200)	47 (1200)
Installation in bayed enclosure suite	Flush	Flush
Rated operating voltage V, ~, Hz	208, 2~, 60 230, 1~, 50/60	208, 2~, 60 230, 1~, 50/60
Type of connection (electrical)	Hard-wired	Hard-wired
Air throughput at max. cooling output cfm (m^3/h)	2825 (4800)	4709 (8000)
Fans may be exchanged with the system operational	■	■
EC fan	■	■
Water inlet temperature °F	59	59
Permissible operating pressure (p. max.) psi (bar)	87 (6)	87 (6)
Duty cycle %	100	100
Water connection	1½" BSP Male Thread	1½" BSP Male Thread
Weight in supplied state lb (kg)	485 (220.0)	529 (240.0)

LCP Inline CW Liquid Cooling Package

Model No..	**3311.148**	**3311.538**	**3311.548**	**3311.568**
Total cooling output/number of fan modules required BTU (kW)	**61419 (18)/2 92128 (27)/3 102364 (30)/4**	**34121 (10)/1 68243 (20)/2 102364 (30)/3**	**61419 (18)/2 92128 (27)/3 102364 (30)/4**	**136486 (40)/4 153546 (50)/5 187668 (60)/6**
Number of fan modules in supplied state	2	1	2	4
Height inches (mm)	79 (2000)	79 (2000)	79 (2000)	79 (2000)
Width inches (mm)	12 (300)	12 (300)	12 (300)	12 (300)
Depth inches (mm)	41 (1050)	47 (1200)	47 (1200)	47 (1200)
Installation in bayed enclosure suite	Flush	Protruding	Flush	Protruding
Rated operating voltage V, ~, Hz	208, 2~, 60 230, 1~, 50/60	208, 2~, 60 230, 1~, 50/60	208, 2~, 60 230, 1~, 50/60	208, 2~, 60 230, 1~, 50/60
Type of connection (electrical)	Hard-wired	Hard-wired	Hard-wired	Hard-wired
Air throughput at max. cooling output cfm (m^3/h)	2825 (4800)	2825 (4800)	2825 (4800)	4709 (8000)
Fans may be exchanged with the system operational	■	■	■	■
EC fan	■	■	■	■
Permissible operating pressure (p. max.) psi (bar)	87 (6)	87 (6)	87 (6)	87 (6)
Duty cycle %	100	100	100	100
Water connection	1½" BSP Male Thread	1½" BSP Male Thread	1½" BSP Male Thread	1½" BSP Male Thread
Water inlet temperature °F	59	59	59	59
Weight in supplied state lb (kg) 485	485 (220.0)	485 (220.0)	485 (220.0)	529 (240.0)



Rittal Service: Uptime protection from the start

An efficient service program guarantees uptime. Your data center operations need to be protected and ensure uptime 24/7. The biggest threat: Heat. Higher temperatures can lead to sudden catastrophic failure that can cost thousands in downtime costs and even leave critical information unrecoverable.

Rittal thermal management service solutions deliver a layer of protection to allow the enclosures to scale for growth and future-proof for additional heat loads. You've made the right choice in investing in Rittal IT thermal management systems. Ensure uptime with service and support that delivers expertise quickly, reliably and cost effectively.

Comprehensive service

Rittal Service offers you an extensive range of IT protection that delivers real value to your bottom line.

On-site repairs:

- Fast expert assistance
- Qualified technicians to handle any problems

Installation and Start-Up:

Installation/assembly and commissioning of individual devices or complete systems

Maintenance and spare parts:

- Preventative maintenance to safeguard the performance of your equipment
- Worldwide availability of spare parts and multiple regional stocking locations
- Customer-specific inventory of spare parts with service contract
- Approved, OEM spare parts shipped direct from Rittal

With Rittal Service, you can expect

- Expert knowledge of your Rittal equipment and systems
- Fast and reliable service
- Cost-effective and flexible planning

	Availability	Onsite Response	Spare parts availability	Prevenative Maintenance	Enhanced Warranty
Basic	Office hours	Not Included	Standard	1x/year	Not Included
Comfort	Office hours	Not Included	Standard	2x/year	Not Included
Advanced	24 x 365	Next day	Expedited	2x/year	Yes

With a total of 63 subsidiaries, more than 250 service partners, and over 1,000 service technicians worldwide, we guarantee regional proximity and fast response times.



Rittal Warranty Protects Uptime

Rittal products are always a good choice. In data center environments worldwide, they demonstrate their high quality and reliability in daily operation. Regular preventative maintenance contributes to a longer product service life, more uptime and a healthier bottom line.



Standard Warranty Terms:

- 24-months from date of manufacturing
- 12 months from date of start-up with the purchase of a service contract

Rittal Start-Up services

Within this period Rittal shall remedy a product malfunction by phone service, and if necessary, by providing replacement parts required to correct the malfunction. Please reference the full warranty statement for all terms and conditions.

Rittal enhanced warranty coverage availability:

Enhanced warranty coverage is available for new equipment or properly maintained existing equipment still covered by the standard warranty. It is included as standard with ADVANCED service and can be added to any CUSTOM service offering. It includes:

- No additional costs for technician travel or labor
- Committed onsite response time
- Expedited parts availability (ships overnight)
- Replacement parts supplied and installed free of charge
- Cost transparency for the term of the agreement

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