IT Cooling Solutions

CyberRow

Intelligent air flow control – for more efficiency in rack cooling

STULZ

Direct rack air-conditioning goes in a new direction

An innovative idea ensures precise climate control and reliable ICT systems – CyberRow from STULZ

There are various ways of air conditioning a data centre – and any of these may lead to your goal. For delivering the best results for your requirements, we offer a range of different, all-embracing airconditioning solutions for the diverse needs of the data centre.

With CyberRow, we have now developed an innovative airconditioning system in which the air is conveyed in a completely new direction – horizontally! The individual units are positioned in the server room itself between the racks, so that they can dissipate extreme heat from the servers. This technique considerably improves air conduction, as the cold air is transported in two directions via the side outlets, and evenly distributed throughout the data centre. The system's close proximity to the rack results in short distances for the air, with correspondingly little mixing of the cold and hot air. This contributes to the high efficiency of the CyberRow.

Cooling racks with STULZ CyberRow

CyberRow is an advanced precision A/C unit, which is tailor-made for the targeted cooling of racks. In the CyberRow, innovative air conduction has been enhanced by state-of-the-art technology, which enhances the performance, flexibility and efficiency. Fluctuating server rack loads, space restrictions, lack of a raised floor, existing server technology … these are some of the tricky situations in everyday practice that the CyberRow has been specially developed to deal with.

CyberRow is a standalone A/C unit and is installed and operated independently from the rack. This complete separation of the rack and the A/C unit increases reliability and provides greater freedom for designing the layout in the data centre

Horizontal air conduction:
The cold air reaches the rack via the shortest route.

Electronic control:
Monitors and controls all components inside and outside the A/C unit that are needed to generate cold air.

3 EC fans:
Independently, infinitely adjustable EC fans ensure maximum efficiency

EC compressor:
Infinetely adjustable for precise cooling capacity and 50 % lower power consumption when starting the compressor, thanks to soft start function

Electronic expansion valve:
Finely controls the cooling capacity within a few seconds

Flexibility and compatibility:
The CyberRow is available in 4 different cooling systems (A, CW, G and as a GE system with Indirect Free Cooling) and in 2 sizes.

Modernising cooling systems in existing buildings:
Thanks to its compact size and universal suitability for racks from different manufacturers, the CyberRow can also be used without problem to modernise cooling systems in existing buildings.

- Targeted cooling of high-density racks
- Variable cooling capacity to match demand
- For data centres with and without raised floor
- Independent of rack manufacturer

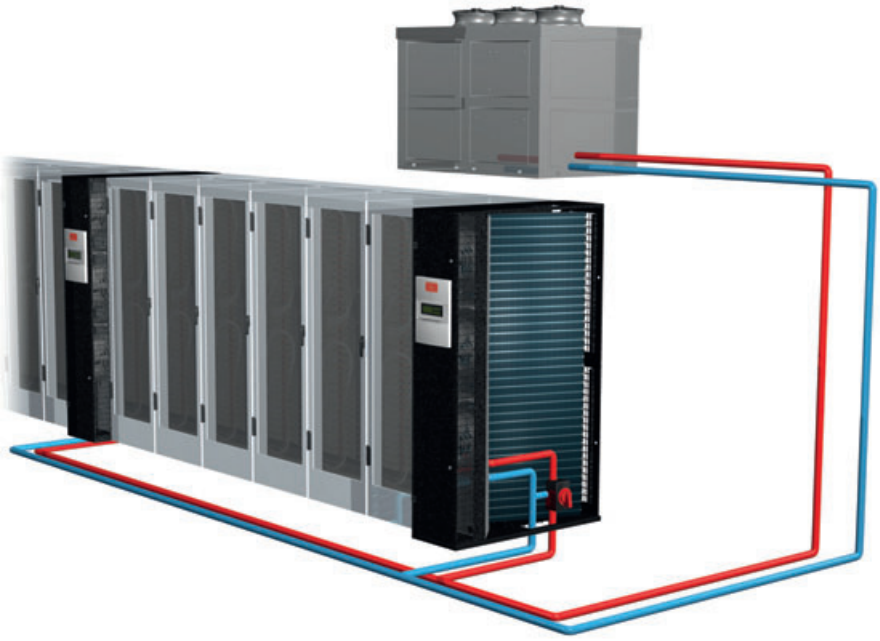
The ideal system for diverse applications

A-system with compressor cooling

The refrigerant circuit of the A/C units consists of an evaporator, an electronic expansion valve, an EC compressor and an external air-cooled condenser. As the room air, encouraged by fans, flows through the evaporator, heat is removed from it and emitted into the refrigerant. The A/C unit and external condenser are connected to one another by means of a closed refrigerant circuit.

CW system with liquid cooling

The CW unit manages without its own refrigerant circuit, but requires separate chilled water generation. The room air conveyed by the fans flows through the direct cooling unit, which transfers the heat to the cooling water. A chiller removes the heat from the cooling water. The A/C unit and chiller are connected to one another by means of a closed cooling water circuit.



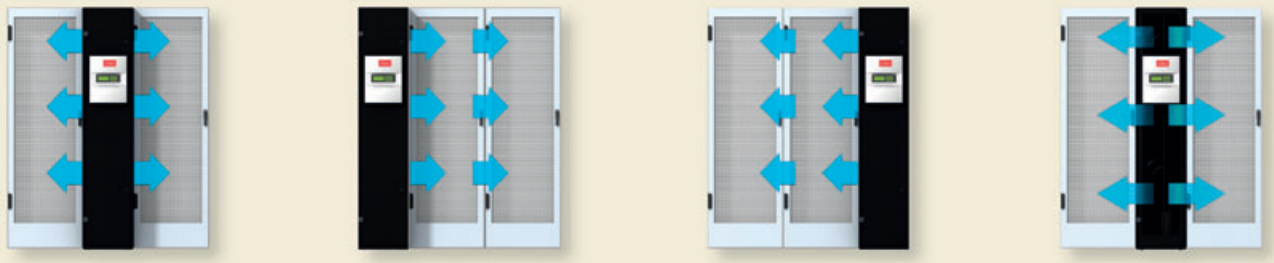
As an option, we can also supply CyberRow with a frontal air outlet

G-system with compressor cooling and plate type condenser

Like the A-system, but with a difference: in the G-system, the heat from the DX circuit is transferred to a water-glycol mixture by a plate-type condenser integrated in the A/C unit. The mixture circulates in a closed circuit, and emits the heat to the outside air via an external dry cooler.

GE system with Indirect Free Cooling

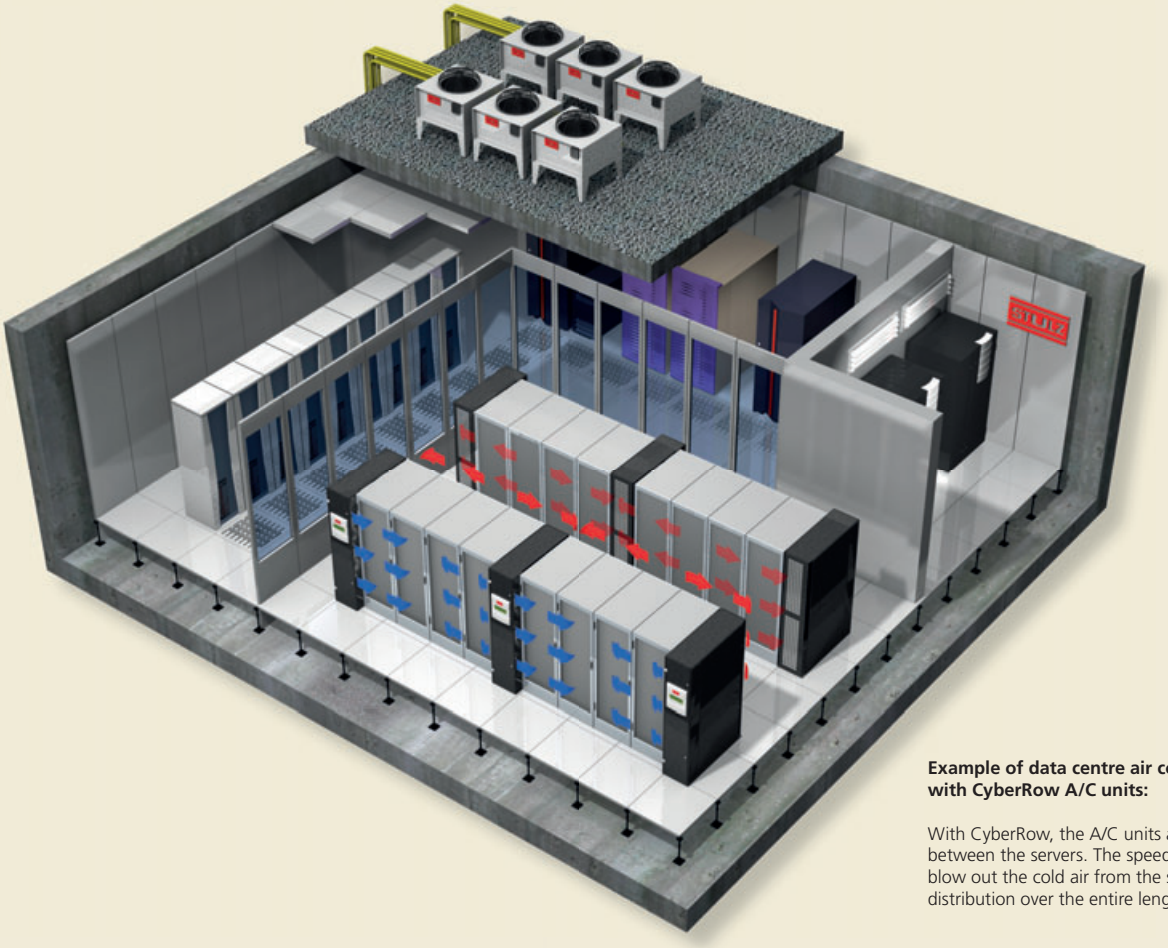
This cooling system combines a G-system with Indirect Free Cooling. The GE system switches to energy-saving mode as soon as the ambient air temperature permits. The ambient air is then utilised for Indirect Free Cooling. Electricity consumption for the air conditioning of racks falls by up to 60 %. The application of CyberRow GE significantly reduces both operating costs and carbon emissions.



As an option, we can also supply CyberRow with four different air outlets (both sides, right, left and with front air outlet)

Advantages of rack cooling with STULZ CyberRow

Thanks to its horizontal dual-direction air outlet, CyberRow creates a uniform, close-contact air flow concentrated in front of the racks – meaning the cold air is always directed to just where it is needed.

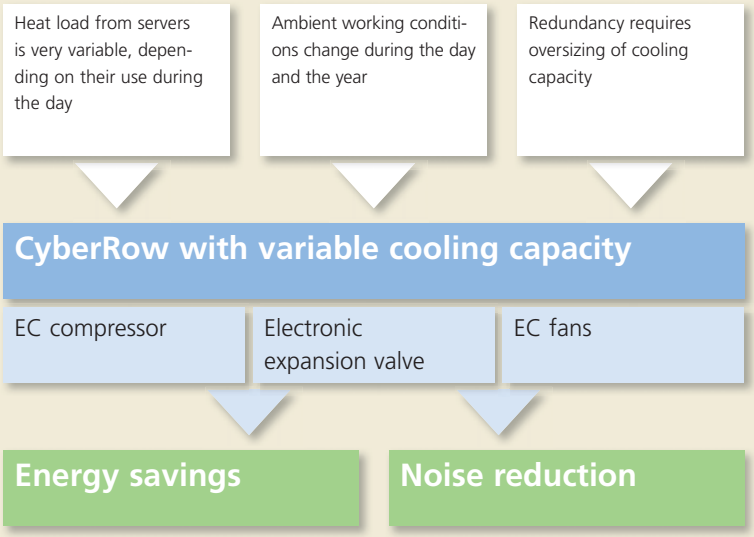


Example of data centre air conditioning with CyberRow A/C units:

With CyberRow, the A/C units are placed directly between the servers. The speed-controlled EC fans blow out the cold air from the sides, ensuring uniform distribution over the entire length of the aisle.

CyberRow with Variable Capacity Control

Efficient IT plant runs 24/7, but the operational conditions in a Data Centre can change throughout the day. The CyberRow rack-coolers monitor and adapt the cooling capacity to the local heat load. This avoids the under or over supply of cooling in a particular area.



For an airflow that's right on target
The fans of the CyberRow units are powered as standard by energy-saving EC DC motors. The electronically controlled EC fans respond steplessly to changing power requirements and are especially economical in partial load mode. EC fans consume up to 30 % less energy than conventional AC models!

Each unit features 3 vertically arranged EC fans, which can be controlled independently from one another. This precise control allows energy costs to be lowered still further

Compressor with EC technology
The compressor installed in the CyberRow units is EC driven: variable capacity to match the actual thermal load is obtained by means of speed control. This results in maximum efficiency at partial loads, plus rapid variations in capacity in a wide range between 30 and 100 %.

Greater efficiency with electronic expansion valve (EEV)
With its pinpoint reaction to temperature and pressure fluctuations, the electronic expansion valve (EEV) permanently increases the performance and efficiency of your air-conditioning system. In ideal operating conditions, efficiency is raised by up to 37 %. The EEV is integrated in a control chain together with the compressor. As cooling requirements change, the EEV provides fine control by changing the opening angle within just a few seconds. If fine control is no longer sufficient, the cooling capacity is adapted by the speed of the compressor. Therefore, the system always works in the optimum operating range.

CyberRow DX – compressor cooling integrated right where you need it

The CyberRow DX is the embodiment of our decades of experience in the air conditioning of data centres. All its tried and tested components are perfectly tuned to each other, and can reliably deliver the necessary cooling capacity even in the most restricted space.

1 E-box

2 Air filter

3 Evaporator

4 EC fans

5 EC compressor

6 Humidifier (optional)

- EC compressor
- Stepless compressor control for cooling capacity with maximum efficiency
- Brushless motor for maximum electronic efficiency
- Scroll compressor for maximum mechanical efficiency

CyberRow CW – Liquid cooling integrated right where you need it

High performance values and top results in the most restricted space: this requirement was also decisive in the development of our CW units. Here, too, you can rely on ultra-reliable, tried and tested STULZ technology.

1. CW heat exchanger with low air and liquid-side pressure losses
2. EC fans
3. Air filter
4. Pipe connections (access from above and below always possible)
5. 2-way valve

Ideal cold water supply for CyberRow: STULZ Indoor Data Chiller

Optimum cold water supply to CyberRow units is provided by STULZ CyberCool GE Indoor Data Chillers with Indirect Free Cooling – safe, efficient and space-saving.

CyberCool GE selects the optimum operating mode depending on the ambient temperatures and cold water conditions. Energy-intensive compressor cooling is only used when the ambient temperature does not allow Free Cooling.

CyberRow – Efficiency at a glance

CyberRow is the innovative air-conditioning system in which the air distribution takes a whole new direction – horizontal! The individual units are carefully integrated into the rows of server racks, greatly improving air distribution and taking cooling directly to the heat load. This is what the CyberRow has to offer:

- Two sizes:
  Size 1: 1,950 x 400 x 1,175 (H x W x D)
  Size 2: 1,950 x 600 x 1,175 (H x W x D)
- 3 x EC fans, independently controlled, with speed modulation according to return and supply air temperatures
- EC scroll compressor (only available for DX version)
- Maintenance access from front and back
- C2020 connectivity to BMS for telemonitoring (only for A, CW and G versions)
- C7000 Controller only for GE version
- Protective G4 pleated panel filter in a metal frame.
- Powder-coated external frame with hinged front and back panels
- Passage of chilled water and refrigerant pipes from bottom and top
- No direct cables or refrigerant lines are required between the rack and the A/C unit, allowing greater flexibility for installation in the data centre

CyberRow		**DX**		**CW**	
Model		EHMB4A	EHMC7A	EHMC2W	EHME5W
Height	mm	1,950	1,950	1,950	1,950
Depth	mm	1,175	1,175	1,175	1,175
Width	mm	400	600	400	600
Cooling capacity[1)]	kW	24.0	36.5	32.2	56.0
Airflow[1)]	m³/h	4,700	7,700	6,000	10,800
Water flow rate[1)]	m³/h	n.a.	n.a.	5.5	9.6

[1)] Nominal conditions
Return air temperature 35 °C/RH 30 %, DX units: condensing temperature 45 °C, CW units: EWT all models 10 °C, water dT all modells 5 °C, refrigerant: water without additives, gross cooling capacities (including power dissipated by fans)

Convenient monitoring and control of CyberRow

The A, G and CW versions of the CyberRow units are controlled and monitored by the C2020 controller, while in the GE version this is done by the C7000 controller. The controllers bring all active system components into balance. These proven control systems are the nerve centre of the control concept, enabling you to reliably keep control of your STULZ CyberRow precision air-conditioning system. You can monitor the system and view operating data either using separate operator terminals, your PC or via a link to existing BMS.

Control features

- **Six temperature probes**
  3 probes for supply air, 3 probes for return air, for closed-loop controlled cooling in 3 independent vertical zones. The fan is modulated as a function of the temperature difference between the return and the supply air. The compressor speed and chilled water valve opening are adjusted in line with the supply air temperature.

- **Fan redundancy**
  When a fan fails, the remaining 2 fans speed up.

- **Sequenzing LAN units**
  Connection of units in LAN to manage sequenzing and redundancy when a unit is faulty

- **Air flow and filter alarms**

- **BMS connectivity**
  Standard serial port RS485 for connectivity to BMS via ModBus and Stulz protocols

- **Optional humidity sensor**

- **Optional water detector**

- **Remote supply air probes**

C2020 Interface for A-, CW- and G-System

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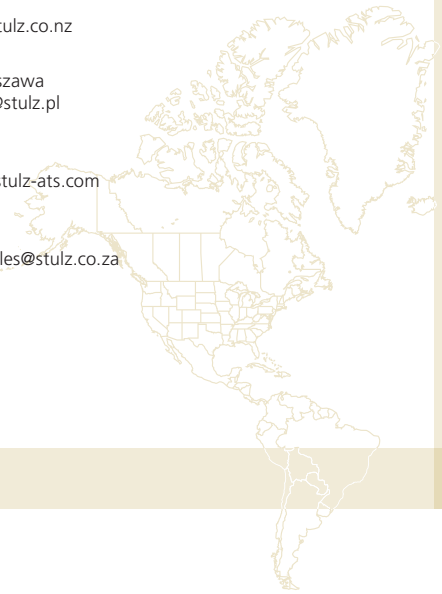

IT Cooling Solutions

Close to you all over the world.

... With specialist, competent partners in our subsidiaries and exclusive sales and service partners around the world. Our five production sites are in Europe, North America and Asia.

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