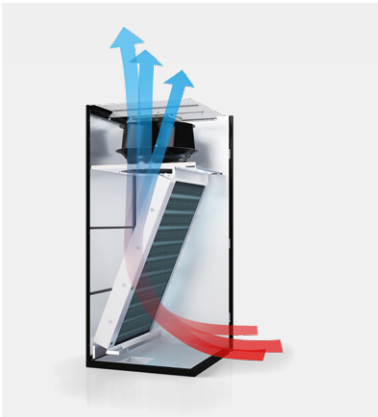


STULZ

CLIMATE. CUSTOMIZED.



CyberAir 3PRO CW

Innovative chilled water cooling for data centers.
Made in Germany.

The complete range of air conditioning technology – from one source.

For over 50 years, the STULZ family-run company has been synonymous with precision air conditioning at the highest level.

Our solutions for the air conditioning of business-critical applications and sensitive systems have made us a leading company in our industry.

Whether for data centers, industry or communication technology, the STULZ portfolio has a tailor-made cooling solution to suit your requirements.

We guarantee adherence to our uncompromisingly high requirements and quality standards both at our factory in Hamburg and all our production sites around the globe. Moreover, we work hard not only to satisfy our customers' individual wishes, but also to make sure our air conditioning solutions offer maximum energy efficiency and a minimal CO₂ footprint.

Our portfolio extends from traditional room cooling and High Density Cooling to chillers, Liquid Cooling solutions, air handling units and container modules, all the way to micro data centers, service, and our self-developed monitoring software. An all-embracing quality assurance system monitors all the details in development, production, implementation, and service.

Today, STULZ has a presence in more than 140 countries. STULZ GmbH has 23 subsidiaries and eleven production sites in Europe, India, China, and North and South America. We also have partner agreements with numerous sales and service partners on every continent. Our network of highly qualified specialists is a reliable guarantee of the highest standards.

The combined wealth of our experience, values, performance and service is what defines us and is especially valued by our customers. Air conditioning solutions – custom tailored and from one source:
ONE STULZ. ONE SOURCE.

ONE STULZ.

ONE SOURCE.





Maximum cooling capacity Minimum footprint Optimum efficiency

The CyberAir 3PRO CW controls the conditions in the data center with the utmost precision, reliability and energy efficiency. Because STULZ technology leads the field, it can exploit potential savings to the full while still ensuring maximum reliability.

No matter how different data centers may be, the CyberAir 3PRO CW is flexible and made to measure: it is available in 11 sizes with various air conduction methods.

+ Advantages at a glance

- Maximum potential savings with Indirect Dynamic or Direct Free Cooling
- Maximum cooling capacity with a minimal footprint
- Highly efficient air conduction (Airflow Efficiency Ratio)
- Optimized for operating conditions based on the ASHRAE recommendation
- Flexibility for individual customer solutions: 2 cooling systems (CW, CW2), 11 sizes, different air conduction methods, a variety of heat exchangers
- Superior EER values due to maximum size heat exchangers and filter surfaces
- Minimal pressure drops thanks to the unit's optimum design
- EC fans of the latest generation reduce power consumption
- Compact design facilitates transport and installation
- Control based on the supply air, return air, room air or server inlet temperature
- CW standby management, differential pressure control and filter control management
- Individual unit test at the STULZ Test Center

"Reliability and energy efficiency are the principal challenges for all data center operators. The CyberAir 3PRO CW has been developed to satisfy both these requirements."

Reliability & energy efficiency #1

Fans in the raised floor

The CyberAir 3PRO CW offers four air conduction systems. ASR air conduction (fans integrated under the raised floor), in particular, hugely reduces fan power consumption by ensuring minimal turbulence and changes in airflow direction, for energy savings that you will notice straight away.

Reliability & energy efficiency #2

Optimized unit design for maximum savings

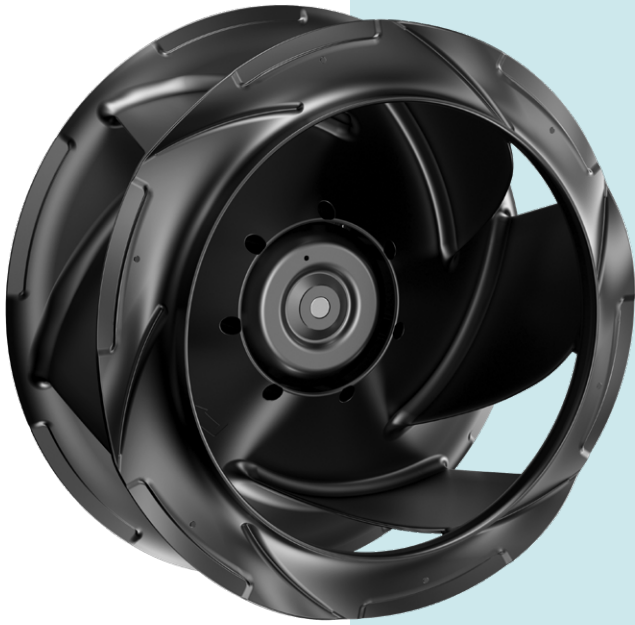
CyberAir 3PRO CW has enabled EER values to be considerably increased even further. This was achieved by modifying the geometry of the heat exchangers and optimizing the unit's design to ensure minimal pressure drops, greatly increasing efficiency. Thanks to their design, the units also promise the lowest AER (Airflow Efficiency Ratio) and therefore air conduction with maximum efficiency. The AER equates to fan power per airflow.



RadiCal EC fan of the latest generation

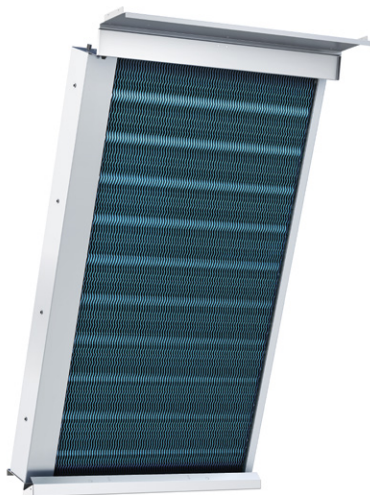
Increased performance. Maximum energy efficiency. Quieter.

- GreenTech EC technology
- Significantly higher air output
- Over 10% lower power consumption
- Reduced noise
- Optimized airflow
- Improves the AER of CyberAir 3PRO CW units
- Latest motor generation
- Impellers made of high-tech composite material for increased fan power density
- Long lifetime



Optimized heat transfer

In chilled water systems, the heat exchangers are the most important component and a guarantee of the best possible heat transfer. The heat exchanger system of the CyberAir 3PRO CW is continually being further developed and optimized for the latest data center applications. Different versions of heat exchangers are available, ensuring the flexibility to satisfy every customer's specific requirements.



Special solution for modernized data centers:

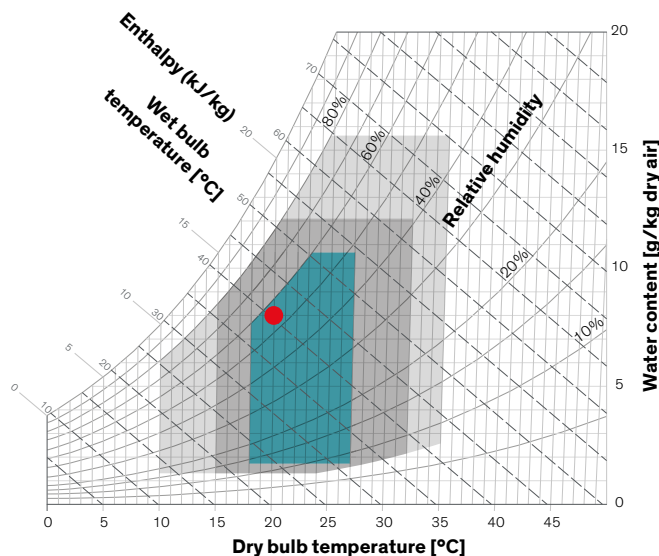
A special heat exchanger is suitable for operation at high air-side and low water-side temperatures – and therefore for data center modernization projects where old chillers will continue to be used. This configuration enables supply air conditions in accordance with the ASHRAE recommendation.

+ Advantages at a glance

- Optimized cooling unit geometry
- Reduced water and air-side pressure drops
- Several versions for maximum flexibility

Optimum supply air conditions as per ASHRAE recommendation

In order to cool data centers as efficiently as possible without compromising on reliability in return, ASHRAE has published a recommendation for the air temperature at the server inlet. For decades, STULZ has been developing air conditioning units for mission-critical applications, in which malfunctions could have severe consequences. However, in order to keep a constant eye on energy efficiency as well, the supply air conditions of the CyberAir 3PRO CW have been optimized to achieve the range recommended by ASHRAE.



Mollier h-x diagram

Air pressure 1,013 hPa

- Allowable range for non-mission critical applications (A2 according to ASHRAE)
- Allowable range for mission critical applications (A1 according to ASHRAE)
- ASHRAE recommendation:
Range within which IT systems are both the most reliable and the most energy efficient
- Supply air temperature of STULZ units

Safe control, reliable monitoring

In order to achieve the highest standards of reliability and usability, STULZ develops the controller in-house, ensuring that software, hardware and air conditioning units are perfectly harmonized.

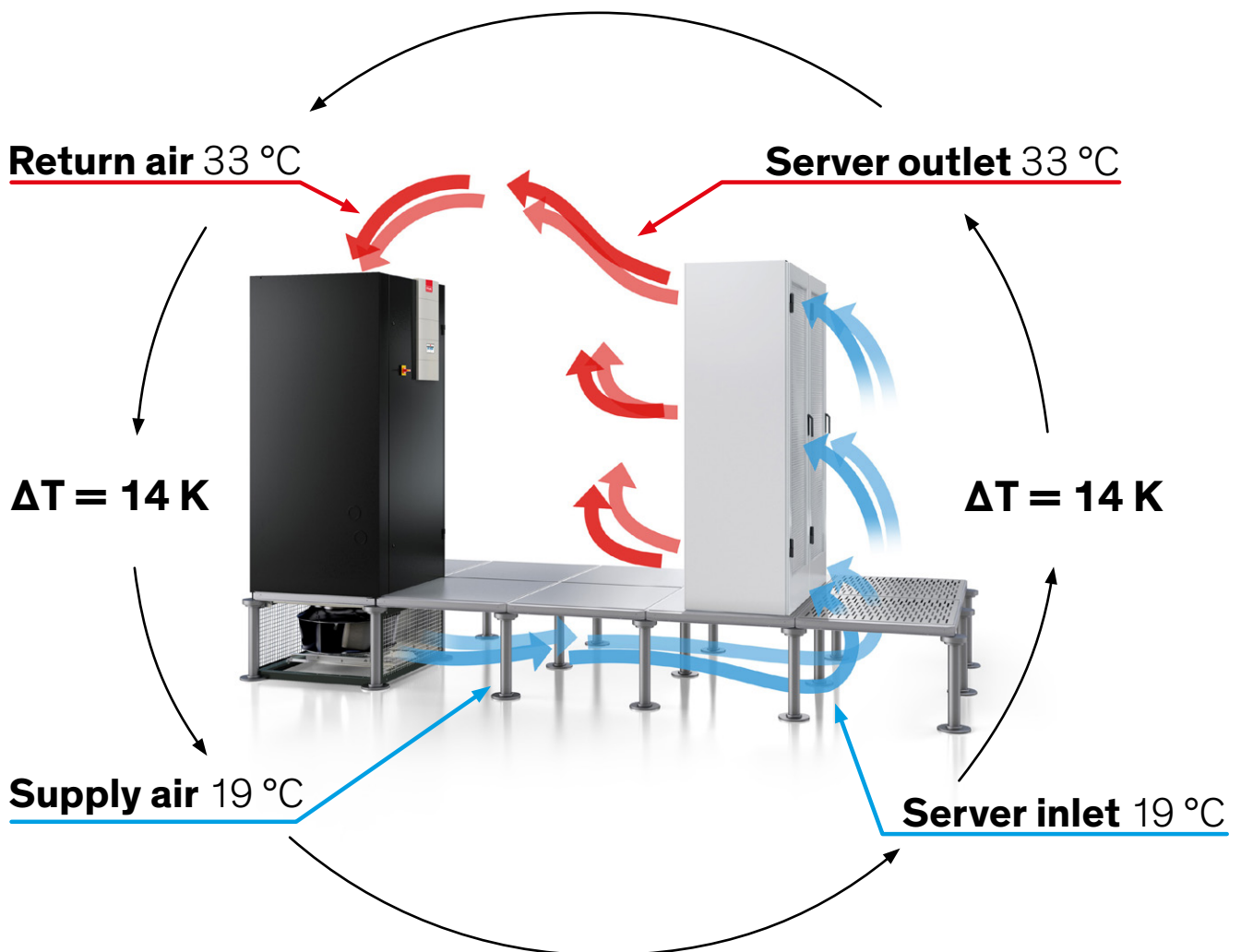
- High flexibility:** Project-specific software development and optimization
- Optimized usability:** Touch display offers clear menu navigation and intuitive handling of the controller.
- Maintenance-friendly:** Plug-and-play installation and optimized control parameters simplify maintenance tasks
- Maximum reliability:** Redundancy management, integrated standby management with backup operation, differentiated warning and alarm system
- Energy management:** Supports energy demand optimization for interconnected systems, operation of several air conditioning units in parallel
- Monitoring:** Direct BMS interfaces on the controller, support for all relevant BMS protocols and a compact data point list simplify commissioning.



Dynamic control for precise temperature regulation

The air-side difference in temperature between the air inlet and outlet of server cabinets and air conditioning systems is known as ΔT . To ensure optimum operation and the greatest possible savings on running costs, it is vital that the ΔT of the air conditioning units is adapted precisely and efficiently to the ΔT of your server cabinets.

Dynamic control enables ΔT to be adapted to changing IT requirements, ensuring maximum energy efficiency during operation.

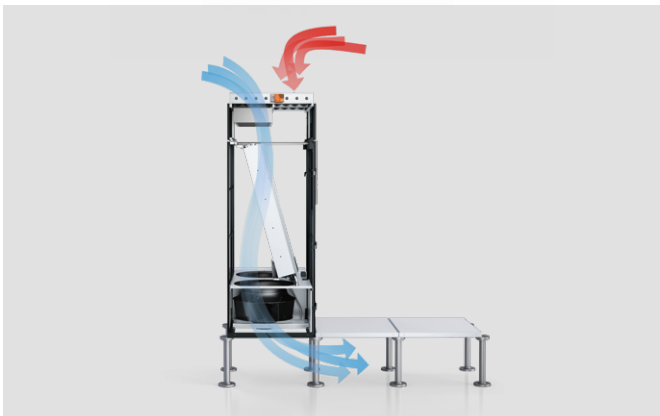


Potential savings with Free Cooling

Direct Free Cooling

With Direct Free Cooling, the CyberAir 3PRO CW air conditions data centers up to 90% more economically than conventional compressor cooling systems. The prerequisite for this is data centers with wider temperature and humidity tolerances.

Direct Free Cooling exploits the potential of outside temperatures to air condition the data center using the cool outside air. Via the CyberAir 3PRO CW, the outside air, which has been treated by filter systems, gets directly into the server room.



The FCP design with the dampers on top is a flexible construction that takes up no extra space.

Special solution for small to medium-sized data centers: Direct Free Cooling with FreeCool Plenum

To exploit huge potential savings in smaller data centers, too, and when modernizing existing cooling systems, CyberAir 3PRO CW units with downflow air conduction can be equipped with the FreeCool Plenum Free Cooling box. With this option, Free Cooling is automatically combined with the chiller system's compressor cooling in three variable stages, to suit the outside temperature and cooling needs, ensuring that maximum savings are always exploited to the full:

1. Free Cooling

- The outside air damper opens
- Outside air is conveyed through the filter of the FreeCool Plenum directly into the unit, then into the data center
- The compressor of the chiller system remains off, completely saving the cooling energy normally required
- If the outside temperature is too low, the outside air is mixed with the return air

2. Mixed mode

- As 1, plus:
- The compressor of the chiller system is additionally switched on for support
- When the outside air damper is open, the compressor of the chiller system runs in partial load mode

3. Compressor mode

- The CyberAir 3PRO CW cools exclusively using the chiller system's compressor
- The outside air damper remains closed, and no outside air is used for cooling
- Return air damper open 100 %

Indirect Dynamic Free Cooling

Indirect Dynamic Free Cooling is the only system in the world with automatic efficiency optimization, which is developed and marketed exclusively by STULZ. It offers a twofold advantage: in addition to energy savings of up to 60 %, the dual circuit system increases redundancy and therefore cuts the probability of failure to a minimum, so that the cooling system always runs with minimal energy consumption.

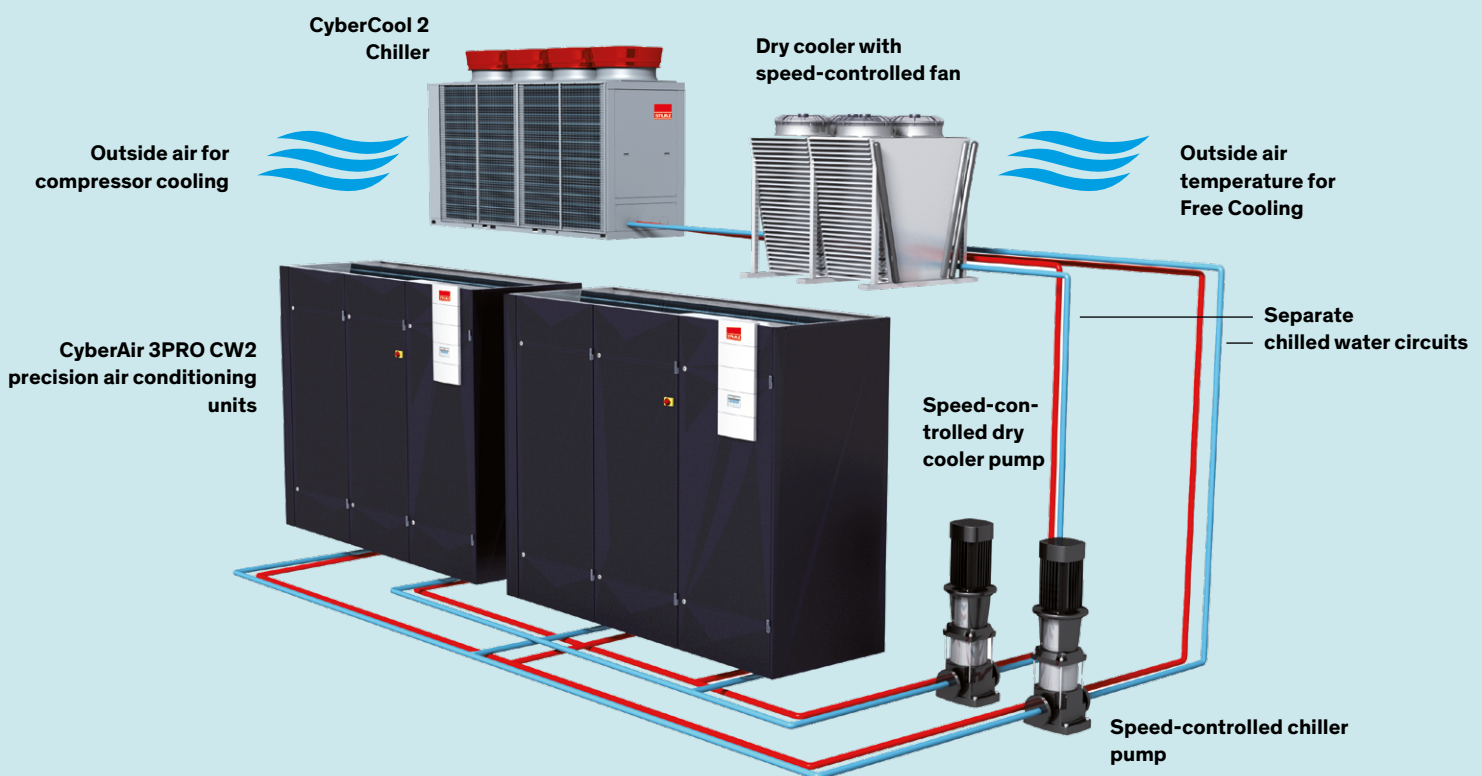
Indirect:

With Indirect Free Cooling, no outside air gets into the data center.

Dynamic:

The dry cooler, chiller and precision air conditioning unit are actuated automatically to suit the prevailing heat load and outside temperature, irrespective of water temperatures.

Indirect Dynamic Free Cooling components



Advantages of Indirect Dynamic Free Cooling with the CyberAir 3PRO CW2

- The world's only Free Cooling with automatic efficiency optimization
- Up to 60 % energy savings
- Situational control based on heat load and outside temperature, with no fixed Free Cooling start value
- Networking of all active components: CyberAir 3PRO CW modules (including standby units), dry cooler, chiller and pumps
- Dual cooling circuit for maximum reliability

Combined efficiency from STULZ: CyberAir 3P

Air conditioning solutions from STULZ offer synchronized overall systems that cool server rooms efficiently and reliably. For data centers, in particular, combining the CyberCool 2 chiller with the CyberAir 3PRO CW precision air conditioning unit is an investment in lasting quality, reliability and outstanding efficiency.



Chilled water cooling (CW) – efficiency, flexibility and reliability

Maximum efficiency

Water transfers heat 3,500 times better than air, which explains the efficiency of chilled water systems. Only the chilling energy the data center actually needs is produced. And Free Cooling has the potential to reduce power consumption radically – by up to 90 %.

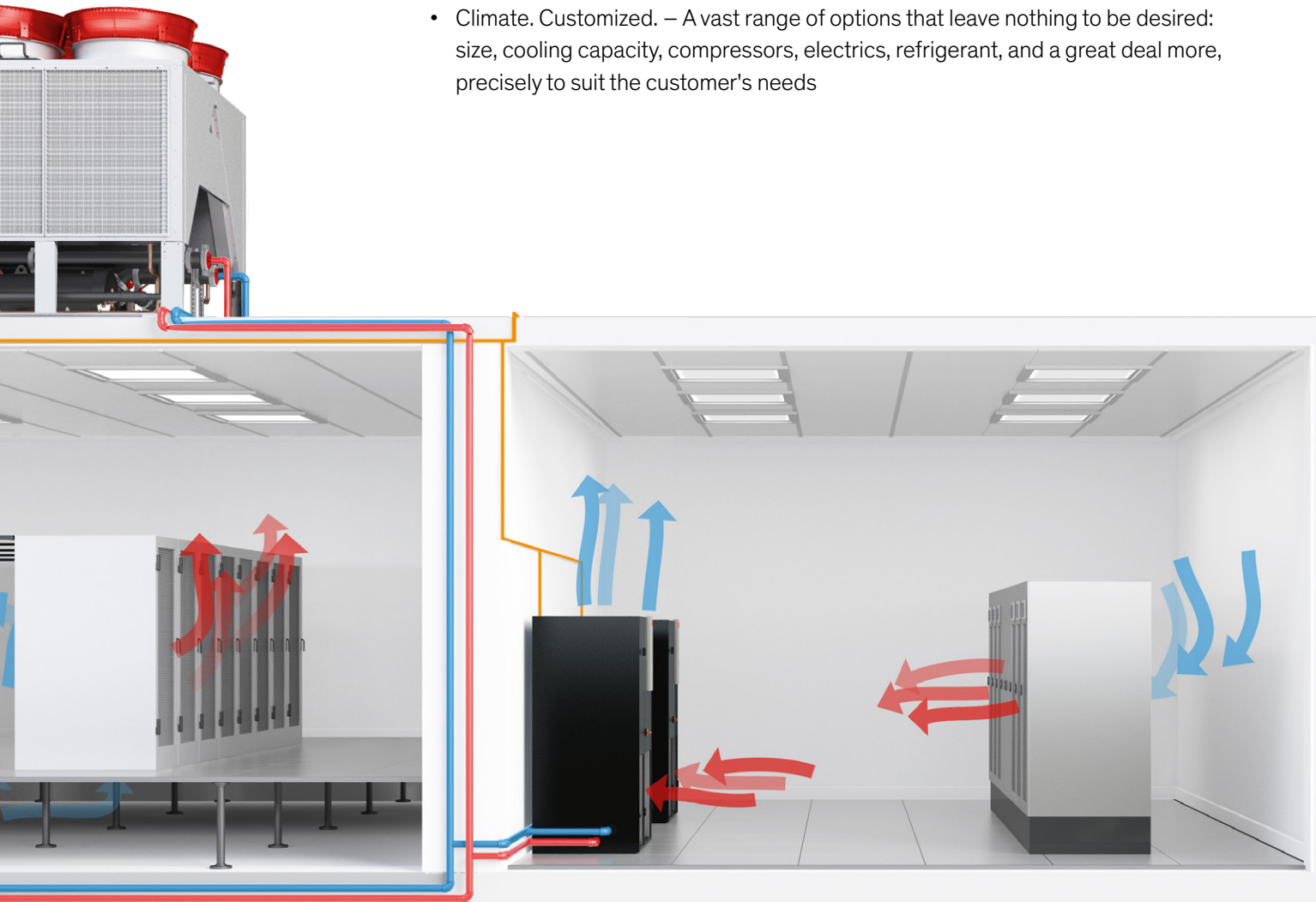
Optimum flexibility

Chilled water systems can be flexibly adapted, whether intended for a first-time installation or for modernization. The components can be adapted in terms of size, quantity, layout, room type, heat load and air conduction, and can be combined with and without raised floor. A CW system is always universal.

RO CW with CyberCool 2 chiller

Efficient, reliable and quiet: the CyberCool 2 chiller

- TCO leader: the lowest overall costs over lifetime
- Maximum size components for the highest possible energy efficiency
- Operational reliability "Made in Germany": ideally harmonized system components for use 24/7 throughout the year
- Climate. Customized. – A vast range of options that leave nothing to be desired: size, cooling capacity, compressors, electrics, refrigerant, and a great deal more, precisely to suit the customer's needs



Superior reliability

Made in Germany – at STULZ, this is a promise of quality, reliability and a long life. It incorporates solid production engineering, innovative cooling technology, simple and intuitive use and – if the occasion arises – lightning-fast service on your doorstep and excellent spare part availability.

TCO leader

STULZ chiller solutions are consistently further developed to be the best when it comes to a TCO comparison: chiller systems that continue to have the lowest overall running costs over their lifetime, in all operating conditions. With STULZ, data center operators are making a sensible investment decision, because they realize: investing in the quality, reliability and efficiency of STULZ chiller solutions pays off during operation after just a short time, due to energy savings and operational reliability.

Integration made easy: ASR, ASH, ASD and ASU versions

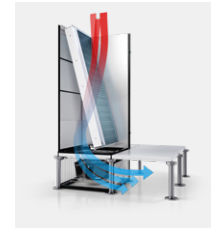
The CyberAir 3PRO CW is a model of adaptability. Size, cooling capacity, blow-out direction, type of heat exchanger, and control: you can adapt STULZ air conditioning solutions precisely to your data center's individual requirements.



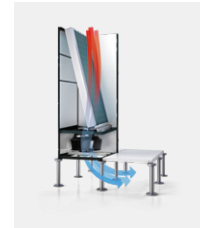
ASR and ASH version



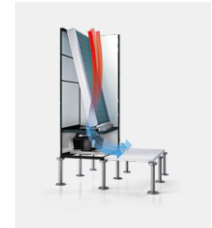
ASR
Air conduction front/
back/down



ASR
Air conduction
front



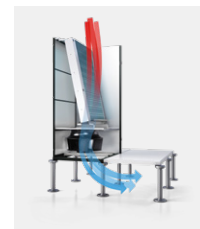
ASH
Air conduction
down



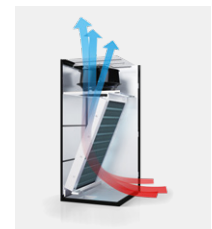
ASH
Air conduction as
displacement



ASD and ASU version



ASD
Downflow

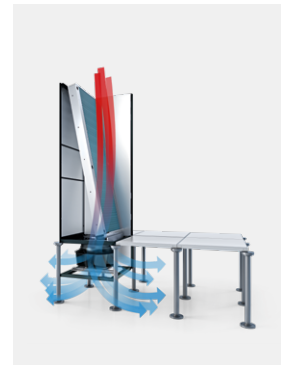


ASU
Upflow

ASR (R=Raised Floor)
ASH (H=High)
ASD (D=Downflow)
ASU (U=Upflow)

Optimized for large and hyperscale data centers

This series was developed to meet the requirements of large data centers while keeping an eye on efficiency and reliability. By maximizing unit dimensions, this new series delivers more cooling capacity per footprint and increases efficiency in large and hyperscale data centers.



ABR
Air conduction front/
back/down

ABR (B=BIG)

+ Benefits

- High cooling capacity per footprint
- Minimum fan power consumption thanks to the reduced internal pressure losses
- Optimized Energy Efficiency Ratio (EER)
- Optimized AER (Airflow Efficiency Ratio) and therefore air conduction with maximum efficiency
- Increased Free Cooling times of the chiller due to higher air and water temperatures
- Optimization of air temperatures based on the ASHRAE recommendation
- Reduced water flow rate and therefore:
 - Lower overall power consumption of the system
 - Lower investment costs as smaller hydraulic components can be used

Pressure independent 2-way control ball valve

CyberAir 3PRO CW can be equipped with a pressure independent control valve.

Performance features and advantages:

- The water flow rate is regulated independently from the differential pressure
- Automated hydraulic compensation
- Reduced energy consumption of pumps in the hydraulic system



Climate. Customized.

From standard units to completely tailor-made customer solutions – the ability to offer such a bandwidth for customers is the embodiment of our "Climate. Customized." philosophy. Our aim is to put our customers' wishes into practice in the ideal way, to create perfectly adapted air conditioning solutions that are at once powerful, reliable and efficient.

Climate. Customized. #1 Standard units

For its standard units, STULZ offers a huge selection of accessories and options, which permit high flexibility and individualization – from our standard catalog.

Climate. Customized. #2 Standard units with special options

If the standard catalog does not suffice, our Design and Development departments can create special options that further individualize the standard unit.

Climate. Customized. #3 Tailor-made air conditioning solutions

STULZ has the solution! In the best case, this can mean that the planning, implementation and ongoing support of air conditioning solutions is completely tailored to the customer's needs. Ideally, the data center and air conditioning solution are developed hand in hand, so that all performance features are perfectly harmonized right from the beginning.

Options for the CyberAir 3PRO CW

**Tailor-made solutions for data centers are achieved
by numerous options and equipment versions:**

- Dual power supply with automatic or manual switchover plus option of UPS buffering of the controller
- Pressure independent 2-way control ball valve
- C7000 Advanced user interface
- C7000 AT controller with display of airflow rate, total cooling capacity, unit EER
- Indirect Dynamic Free Cooling for CW2
- Intake plenum for Direct Free Cooling
- Electric heater, one to three stages or continuous
- Reheating of hot water
- Continuous steam humidification
- Raised floor stand in various heights
- Louver dampers
- Pocket filter attachment F7, F9
- 3-way CW valve
- Smoke and fire alarms
- Suitable for connection to all common BMS systems, RS485 and RS232 interface for direct connection to a BMS

Technical Data

CyberAir 3PRO ASR CW

Raised Floor (1 chilled water circuit)		400	610	1040	1360	1710	2060	2410
Airflow	m³/h	10,500	14,000	20,500	25,000	31,000	41,000	46,000
Cooling capacity (total) ¹⁾ Water temperature: 12 °C/18 °C	kW	58	81	117	146	181	243	273
Noise ¹⁾⁴⁾	dBA	49	55	53	56	55	55	57
EER ¹⁾	kW/kW	44.5	53.8	50.7	47.1	47.7	45.0	42.0
AER ¹⁾⁵⁾	W/(m³/h)	0.12	0.11	0.11	0.12	0.12	0.13	0.14
Size		1	2	3	4	5	7	8

CyberAir 3PRO ASR CW2

Raised Floor (2 chilled water circuits)		360	580	770	1080	1460	1960	2160
Airflow	m³/h	10,000	13,800	19,000	23,300	29,000	38,000	45,000
Cooling capacity (total) ¹⁾ Water temperature: 12 °C/18 °C	kW	40	62	95	118	138	187	195
Noise ¹⁾⁴⁾	dBA	49	55	53	56	54	54	56
EER ¹⁾	kW/kW	34.8	41.1	41.1	40.7	40.6	39.7	33.1
AER ¹⁾⁵⁾	W/(m³/h)	0.12	0.11	0.12	0.12	0.12	0.12	0.13
Size		1	2	3	4	5	7	8

CyberAir 3PRO ASH CW

High (1 Kaltwasserkreislauf)		400	610	1040	1360	1710	2060	2410
Airflow	m³/h	10,500	14,000	20,500	25,000	31,000	41,000	46,000
Cooling capacity (total) ¹⁾ Water temperature: 12 °C/18 °C	kW	58	81	117	146	181	243	273
Noise ¹⁾⁴⁾	dBA	56	55	53	58	58	56	57
EER ¹⁾	kW/kW	34.1	42.5	41.6	39.4	33.5	38.6	35.9
AER ¹⁾⁵⁾	W/(m³/h)	0.16	0.14	0.14	0.15	0.17	0.15	0.17
Size		1	2	3	4	5	7	8

Dimensions

Size		1	2	3	4	5	7	8
Width	mm	950	1,400	1,750	2,200	2,550	3,110	3,350
Height	mm	2,495						
Depth	mm	890					980	

Technical Data

CyberAir 3PRO ABR CW/CW2

BIG (1/2 water circuits)		1400	1750	2200	2500	1650	2130
Airflow	m³/h	27,500	34,500	44,000	50,000	31,000	39,000
Cooling capacity (total) ²⁾³⁾	kW	99	122	155	176	89	112
Noise ^{2) 4)}	dBA	58	57	54	56	54	52
EER ²⁾	kW/kW	26.8	27.0	27.2	24.9	26.1	26.6
AER ^{2) 5)}	W/(m³/h)	0.13	0.13	0.13	0.14	0.11	0.11
Water circuits		1	1	1	1	2	2
Size		4 ^{ABR}	5 ^{ABR}	7 ^{ABR}	8 ^{ABR}	5 ^{ABR}	7 ^{ABR}

Dimensions

Size		4 ^{ABR}	5 ^{ABR}	7 ^{ABR}	8 ^{ABR}
Width	mm	2,200	2,550	3,110	3,350
Height	mm	2,915			
Depth	mm	1,040			

Comments:

All data apply at 400 V/3 ph/50 Hz with 20 Pa ESD

¹⁾ Return air conditions: 33 °C/30 % r.h.; glycol proportion: 0 %

²⁾ Return air conditions: 35 °C/25 % r. H.; glycol proportion: 0 %

³⁾ Water temperature: CW: 20 °C/32 °C; CW2: 20 °C/30 °C

⁴⁾ Noise measured at a distance of 2 m in free-field conditions

⁵⁾ AER = Airflow Efficiency Ratio = Fan power input/Airflow



Technical Data

CyberAir 3PRO ASD CW

Downflow (1 chilled water circuit)		430	640	940	1220	1560	2080
Airflow	m³/h	8,300	13,000	19,500	22,200	29,300	38,000
Cooling capacity (total) ¹⁾ Water temperature: 12 °C/18 °C	kW	44	70	102	122	157	210
Noise ¹⁾²⁾	dBA	52	56	55	56	57	55
EER ¹⁾	kW/kW	34.1	37.0	33.8	36.0	32.7	34.4
AER ¹⁾³⁾	W/(m³/h)	0.16	0.15	0.15	0.15	0.16	0.16
Size		1	2	3	4	5	7

CyberAir 3PRO ASD CW2

Downflow (2 chilled water circuits)		280	480	700	850	1090	1280
Airflow	m³/h	7,500	11,000	16,500	19,500	25,500	33,500
Cooling capacity (total) ¹⁾ Water temperature: 12 °C/18 °C	kW	35	53	77	91	121	157
Noise ¹⁾²⁾	dBA	52	53	53	55	56	54
EER ¹⁾	kW/kW	28.8	35.6	32.0	31.4	28.7	28.5
AER ¹⁾³⁾	W/(m³/h)	0.16	0.14	0.15	0.15	0.16	0.16
Size		1	2	3	4	5	7

Dimensions

Size		1	2	3	4	5	7
Width	mm	950	1,400	1,750	2,200	2,550	3,110
Height	mm	1,980					
Depth	mm	890					980

Technical Data

CyberAir 3PRO ASU CW

Upflow (1 chilled water circuit)		430	640	940	1220	1560
Airflow	m³/h	8,300	13,000	19,500	22,200	29,300
Cooling capacity (total) ¹⁾ Water temperature: 12 °C/18 °C	kW	44	70	102	122	157
Noise ¹⁾²⁾	dBA	54	57	57	58	59
EER ¹⁾	kW/kW	34.1	35.2	31.8	34.0	31.4
AER ¹⁾³⁾	W/(m³/h)	0.16	0.15	0.16	0.16	0.17
Size		1	2	3	4	5

CyberAir 3PRO ASU CW2

Upflow (2 chilled water circuits)		280	480	700	850	1090
Airflow	m³/h	7,500	11,000	16,500	19,500	25,500
Cooling capacity (total) ¹⁾ Water temperature: 12 °C/18 °C	kW	35	53	77	91	121
Noise ¹⁾²⁾	dBA	53	55	55	56	58
EER ¹⁾	kW/kW	26.6	33.4	29.6	31.4	28.1
AER ¹⁾³⁾	W/(m³/h)	0.17	0.15	0.16	0.15	0.17
Size		1	2	3	4	5

Dimensions

Size		1	2	3	4	5	7
Width	mm	950	1,400	1,750	2,200	2,550	3,110
Height	mm	1,980					
Depth	mm	890					980

Comments:

All data apply at 400 V/3 ph/50 Hz with 20 Pa ESD

¹⁾ Return air conditions: 33 °C/30 % r.h.; glycol proportion: 0 %

²⁾ Noise measured at a distance of 2 m in free-field conditions

³⁾ AER = Airflow Efficiency Ratio = Fan power input/Airflow

CLOSE TO YOU AROUND THE WORLD

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