

STULZ

CLIMATE. CUSTOMIZED.



CyberAir 3PRO DX

Air conditioning data centers with maximum precision,
reliability and energy efficiency

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

For over 40 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, 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 21 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.

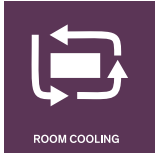
The combined wealth of our experience, values, performance and service is what defines us and is especially valued by our customers. Air conditioning solutions – custom tailored and from one source:
ONE STULZ. ONE SOURCE.

ONE STULZ.

ONE SOURCE.



Maximum cooling capacity, minimal footprint



High-efficiency precision air conditioning units for optimum regulation of temperature and humidity

The CyberAir 3PRO DX is the result of more than three decades of experience with projects around the world, and is the logical next step in the development of the successful CyberAir-3 series.

To achieve maximum cooling capacity with a minimal footprint while promising you maximum potential savings, these units are more adaptable than any other precision air conditioning unit on the market. Size, cooling capacity, air conduction or control system – STULZ air conditioning solutions can be tailored precisely to your data center's individual requirements.



+ Advantages at a glance

- Technological leader when it comes to cooling capacity with maximum efficiency
- Maximum cooling capacity with a minimal footprint
- Air conduction with maximum efficiency
- Further reduction in operating costs as supply air conditions conform to the ASHRAE recommendation
- Maximum potential savings thanks to Indirect Dynamic Free Cooling from STULZ
- Cools reliably, precisely, quietly and exceptionally economically
- Designed for a long service life
- Use of EC technology for maximum efficiency
- Compact design for easier transport and installation
- Option of having your unit tested in our Test Center
- Control based on supply air, return air or room air

Optimized unit design for maximum potential savings

The design of our units means that STULZ precision air conditioning units boast maximum EER values and the lowest AER (Airflow Efficiency Ratio) values, and therefore achieve air conduction with maximum efficiency. The AER describes the ratio of the fan power consumption to the airflow.

ASR air conduction (fans integrated in 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.



Energy Efficiency Ratio (EER)

$$\text{EER} = \frac{\text{Total cooling capacity}}{\text{Power consumption}}$$

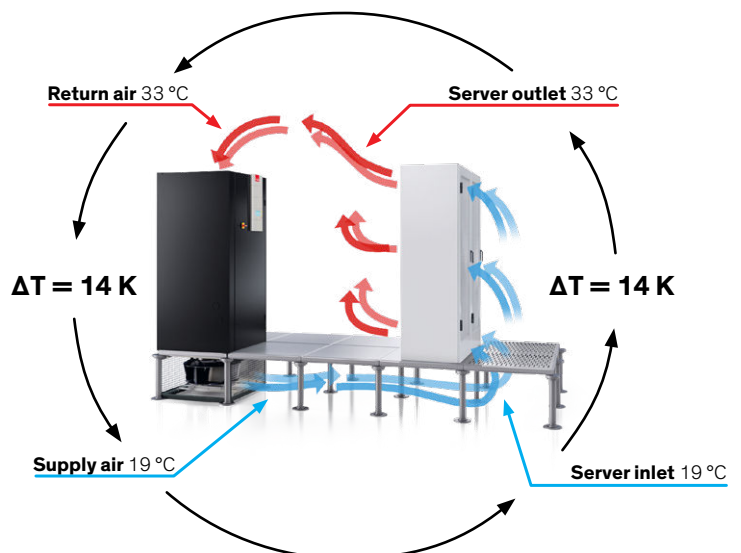
Airflow Efficiency Ratio (AER)

$$\text{AER} = \frac{\text{Fan power consumption}}{\text{Airflow}}$$

Precise control

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

Our dynamic control enables this adaptation to the changing requirements of your IT, ensuring maximum energy efficiency during operation.





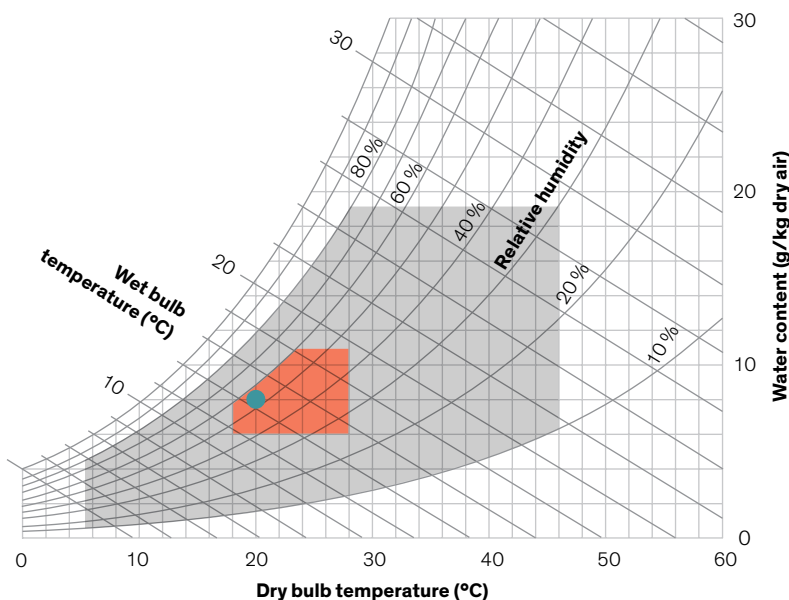
AT A GLANCE



- Cooling capacity range from 20 kW to 150 kW
- Largest possible heat exchanger and filter surface areas for minimal pressure drops
- Available with R407C, R410A and R134a refrigerants
- STULZ controller manages all functions and components, even when several units are combined in one system
- Filter control manager
- All parts requiring maintenance can be accessed from the front
- Filter class ISO 16890: ISO Coarse 80% up to ePM10 70%
- Simple transport – fits through any standard door
- Flexible installation in the data center
- 2 designs and 6 sizes
- 5 cooling systems

Optimum supply air conditions for reliability and maximum efficiency

To cool your data center as efficiently as possible without compromising on reliability, ASHRAE has published a recommendation for the air temperature at the server inlet. We have been developing air conditioning units for mission-critical applications – where even tiny malfunctions can have serious consequences – for decades now. Not only that, we have always focused on energy efficiency, and because of this, the supply air temperatures of our units lie within ASHRAE's recommended range.



Mollier h-x diagram

Air pressure 1.013 hPA

■ Permitted range

■ ASHRAE recommendation:
Range within which IT systems are both the most reliable and the most energy efficient

● Supply air temperature of STULZ units

Two designs for individual installation options

The CyberAir 3PRO DX is a model of adaptability. Size, cooling capacity, air conduction or control: STULZ air conditioning solutions can be precisely adapted to your data center's individual requirements. With two designs and air conduction systems specifically optimized for each unit, the CyberAir 3PRO DX ensures maximum flexibility for integration in your system.

ASD and ASU versions

The design with integrated fans is available with standard ASD (Downflow) and ASU (Upflow) air conduction. Through further development and by optimizing the design, the units are now considerably more efficient than the previous version. This can be witnessed in the noticeably higher EER and lower AER.



ASD
Downflow



ASU
Upflow

High energy savings with fans in the raised floor



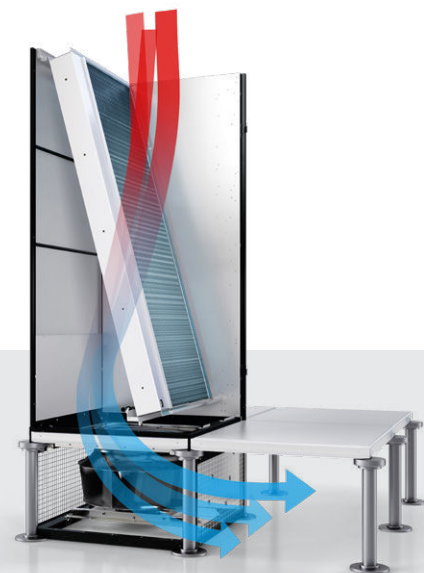
ASR version

The ASR (Raised Floor) series promises even higher energy savings than units with fans on the raised floor. This model is equipped with an external fan box, and air conduction is specific to the unit. The fan box is installed under the unit, in the raised floor. The resulting additional space in the air conditioning unit enables the use of larger heat exchangers, resulting in a noticeably higher cooling capacity per footprint. What's more, positioning the fans in the raised floor means less turbulence and fewer changes in airflow direction. The result is ideal air conduction and therefore massively reduced fan power consumption (AER).



ASR

Air conduction, front/back/down



ASR

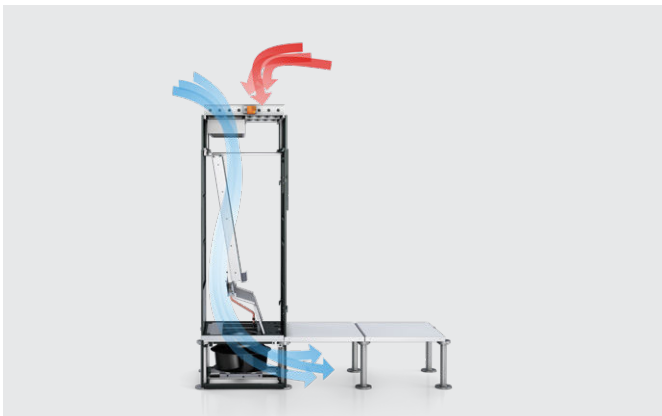
Air conduction, front

Potential savings thanks to Free Cooling

Direct Free Cooling

Direct Free Cooling exploits the potential of low outside temperatures, to cool the data center with outside air. With this method of cooling, outside air treated by filtration systems enters the room directly. Direct Free Cooling is suitable for applications with wider temperature and humidity tolerances.

The CyberAir 3PRO DX precision air conditioning unit with Direct Free Cooling air conditions data centers up to 90 % more economically than conventional compressor cooling systems.



The FreeCool Plenum design with 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 (FCP)

To exploit huge potential savings in smaller data centers, too, and when modernizing existing cooling systems, CyberAir 3PRO DX units with downflow air conduction can be equipped with the FreeCool Plenum. With this option, Free Cooling is automatically combined with 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 remains off, completely saving the cooling energy normally required
- If the outside temperature is too cold, the outside air is mixed with return air

2. Mixed mode

- As 1, plus:
- The compressor is switched on for extra support
- When the outside air damper is open, the compressor runs in partial load mode
- The return air damper of the FreeCool Plenum opens proportionate to this

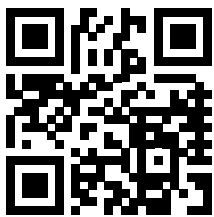
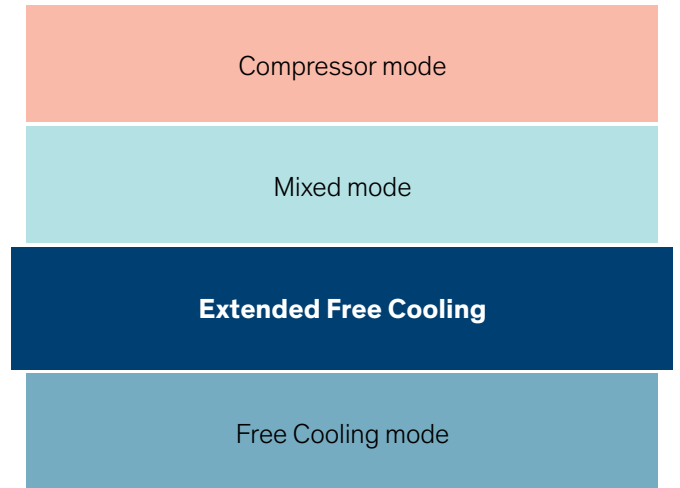
3. Compressor mode

- The CyberAir 3PRO DX cools solely using compressor cooling
- The outside air damper remains closed, and no outside air is used for cooling
- Return air damper open 100 %

Indirect Dynamic Free Cooling

With Indirect Free Cooling, no outside air gets into the sensitive interior of the building. Indirect Free Cooling is therefore not dependent on the quality of the outside air. Indirect Dynamic Free Cooling from STULZ is the only system in the world with automatic efficiency optimization. Dynamic control without a fixed Free Cooling start value and an additional operating mode guarantee maximum potential savings.

The dynamic controller regulates all active components based on the outside air temperature and current heat load, therefore reducing compressor cooling to a minimum. Moreover, the dynamic controller has an Extended Free Cooling mode. In this mode, variable-speed components keep cooling capacity constant by increasing the airflow. This has the side effect of lengthening Free Cooling periods, cutting operating costs to a minimum.



Test the advantages of Indirect Dynamic Free Cooling under your conditions with our animation.



ADVANTAGES AT A GLANCE +

Minimal compressor running time

Using Indirect Free Cooling, the system exploits the cooling potential of outside air as soon as outside temperatures allow. This enables energy-intensive compressor cooling to be partially or even wholly dispensed with.

No oversupply

The variable-speed components ensure precisely the required cooling capacity is generated. There is therefore no energy-intensive oversupply.

Minimal refrigerant quantities

As the system is water-cooled, the amount of refrigerant required is low. The result is environmentally friendly operation with reduced greenhouse gas emissions, for a forward-looking investment in the future.

EC fans optimized for specific units



- Fan speed control
- Minimal power consumption
- Low noise
- Nominal airflow rate at a fan speed optimized for partial load mode
- Increased airflow for the size
- State-of-the-art motors, electronic processor and impellers
- Satisfies current ErP Ecodesign Directive
- Aerodynamically optimized vanes
- Integrated soft start

EC compressor for precision control



- Infinite compressor control for maximum efficiency and precise temperature regulation
- Maximum efficiency especially in partial load and Mixed mode
- Constant supply air temperature
- Integrated compressor soft start
- Fast, precise reaction to variations in heat load
- Long service life thanks to continuous operation without compressor on/off cycles



Reliable control, monitoring for peace of mind

- In-house developed STULZ controller for regulating and monitoring the air conditioning system
- Autonomous controllers in every air conditioning unit for high redundancy and availability
- Sequencing with standby functions
- Control of up to 20 air conditioning units
- Data bus system
- UPS operation with configurable components for low unit power consumption
- Recording of room climate
- Service interface
- Modbus protocol preinstalled



Extensive options

Thanks to the diverse options and equipment versions available, you can perfectly adapt STULZ units to your requirements.

- Dual power feed with automatic or manual switchover plus optional UPS buffering of the controller
- Suitable for connection to all common building services management systems, RS485 and RS232 interface for direct connection to a BMS
- Pressure control for raised floors and enclosures
- Continuous, multi-stage electric heater
- Refrigerant post-heating
- PWW post-heating
- Continuous steam humidification
- Actuation of ultrasonic humidifiers
- Raised floor stand in various heights
- FreeCool Plenum for Direct Free Cooling
- Blow-out and extraction plenum
- Pocket filter attachment F7, F9
- User interface
- Smoke and fire alarms
- And a great deal more

The right system for your requirements

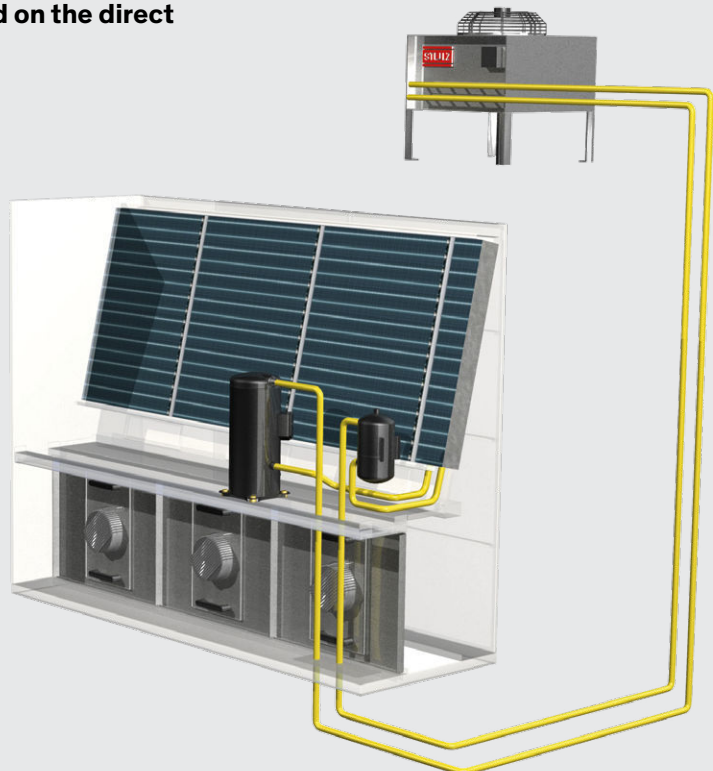
Energy efficiency, capital investment, operating costs, room size, noise protection, redundancy, local climate – every project has its own specific requirements when it comes to precise air conditioning. That's why STULZ offers you the chance to have the units adapted to your project's individual requirements. The right cooling system is a crucial factor here. The CyberAir 3PRO DX is available in five different cooling systems, to help you achieve the ideal balance between investment, operating costs and energy efficiency.

For maximum efficiency in partial load mode, the AS and GES systems are equipped with variable-speed EC compressors.

System	Description of system
A/AS	Air-cooled system based on the direct evaporator principle
G	Water-cooled system based on the direct evaporator principle
GE/GES	Hybrid Free Cooling system
ACW	Chilled water system with redundant air-cooled system
GCW	Chilled water system with redundant water-cooled system

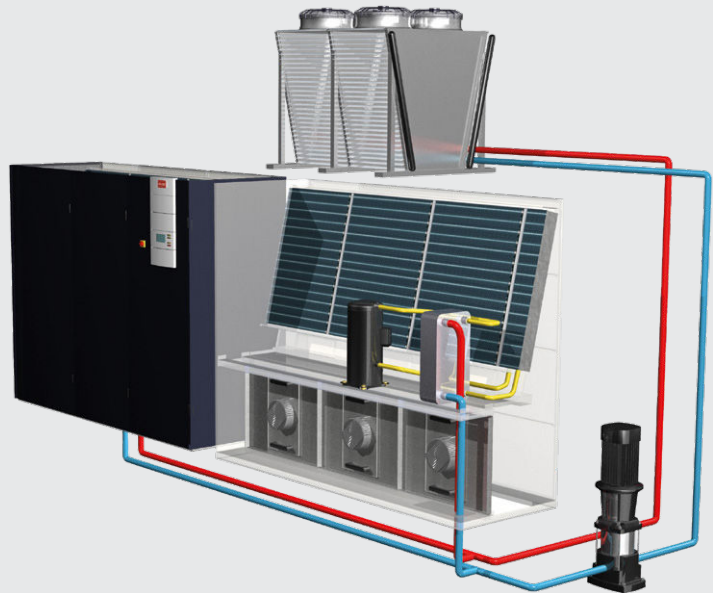
Air-cooled system (A/AS): The compact standard solution with air-cooled condenser based on the direct evaporator principle

Heat is extracted from the room air as it flows through the evaporator, and is then transferred to the refrigerant. The air conditioning unit and condenser are connected to one another by a closed refrigerant circuit. The refrigerant emits the heat to the outside air via the air-cooled condenser.



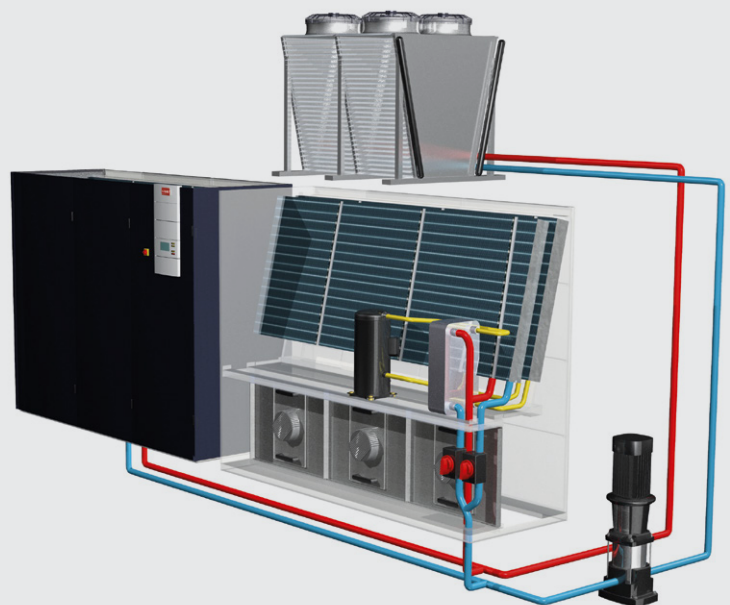
Water-cooled system (G): Simple heat dissipation via a water/glycol mixture

Our water-cooled system works like the air-cooled system (A/AS), with one difference: the heat from the refrigerant circuit is transferred to a cooling water circuit via a brazed plate condenser integrated in the air conditioning unit, so that low quantities of refrigerant are needed. The heat in the cooling water circuit is then discharged into the outside air via an external dry cooler.



Hybrid Free Cooling system (GE/GES):

The Hybrid Free Cooling system functions like the G system, but additionally features an integrated Free Cooling coil. This way, energy-intensive compressor cooling can be wholly or partially dispensed with at low or moderate outside temperatures. The heat is transferred directly to the cooling water circuit by the integrated Free Cooling coil, and discharged into the outside air via an external dry cooler.



Climate. Customized. You have the challenge, we have the solution.

From standard units to fully customized solutions – the ability to offer such a wide range to customers is the embodiment of our philosophy, “**Climate. Customized.**”

1 **Climate. Customized.** **Standard units**

For its standard units, STULZ offers a huge selection of accessories and options, enabling a high level of flexibility and customization.

2 **Climate. Customized.** **Standard units with special options**

STULZ can add customized options to our standard units, producing highly bespoke designs.

3 **Climate. Customized.** **Customized air conditioning solutions**

STULZ has the solution! In collaboration with the customer and tailored to suit requirements, we plan, implement and provide ongoing support for your perfect air conditioning solution. This allows us to develop individual air conditioning solutions with performance features that are all perfectly harmonized from the outset.



Test to your specifications



In our state-of-the-art, 700-square-meter Test Center with its various climate chambers, we can perform a variety of tests on precision air conditioning units and chillers. During the development of the CyberAir 3PRO DX, for example, we were able to test and optimize it under all climatic conditions encountered around the world.

In addition, we offer you the opportunity to book a witness test in our Test Center. This allows you to have the desired air conditioning system tested according to your exact specifications, creating transparency and providing you with information about your system's performance and energy consumption.

Free Cooling, Downflow, 1-circuit

ASD/ALD xxx GE		171	211	231	341	361	471	481	531
Airflow	m ³ /h	4,000	4,700	6,500	8,400	8,800	11,100	11,100	12,600
Cooling capacity (total) ¹⁾	kW	20.3	23.6	33.1	42.4	44.1	56.0	56.4	63.4
Water temperature for 100 % Free Cooling	°C	10.7	10.5	10.0	9.3	11.8	10.9	9.5	9.4
Noise ²⁾	dBA	49	51	45	52	53	57	53	55
EER	kW/kW	5.1	5.1	5.5	5.1	5.4	5.1	5.5	5.0
EER (Free Cooling)	kW/kW	67.7	59.0	66.2	42.5	49.0	33.0	62.7	48.8
AER ³⁾	W/(m ³ /h)	0.08	0.09	0.08	0.12	0.10	0.15	0.08	0.10
Number of refrigerant circuits/ compressors		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
Width	mm	950		1,400		1,750		2,200	

Free Cooling, Downflow, 2-circuit

ALD xxx GE		472	642	652	792	862	902	1032	1152
Airflow	m ³ /h	11,100	15,800	14,500	18,500	20,700	21,000	23,400	26,800
Cooling capacity (total) ¹⁾	kW	54.2	75.0	73.3	94.7	105.3	108.5	121.1	138.6
Water temperature for 100 % Free Cooling	°C	10.0	9.9	10.0	9.1	8.9	10.9	10.7	10.2
Noise ²⁾	dBA	53	58	58	61	63	62	63	64
EER	kW/kW	5.2	5.0	5.2	5.0	4.7	4.8	4.4	4.4
EER (Free Cooling)	kW/kW	60.3	31.3	52.4	35.1	28.5	28.6	24.8	19.8
AER ³⁾	W/(m ³ /h)	0.08	0.15	0.10	0.15	0.18	0.18	0.21	0.26
Number of refrigerant circuits/ compressors		2/2	2/2	2/2	2/2	2/2	2/2	2/2	2/4
Width	mm	2,200		2,550			3,110		

Dimensions

Width	mm	950 – 2,550		3,110
Depth	mm	890		980
Height	mm	1,980		

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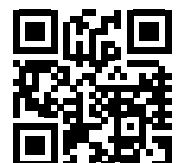
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Close to you around the world

With specialist, competent partners in ten German branches and in subsidiaries and exclusive sales and service agents around the world. Our eleven production sites are situated in Europe, North America and Asia.



You can find out more
on our website.

For further information, please visit our website at www.stulz.com