



IT Cooling Solutions

A guide to Precision Air Conditioning & Cooling Solutions from STULZ

Expertise in Data Centres, Server Rooms and all critical environments





Precision cooling, maximum availability and energy efficiency

Total efficiency: The precision climate control range from STULZ

Precision air-conditioning systems precisely regulate temperature and humidity for sensitive technology. In data centres and mobile phone network exchanges, their continuous operation reliably ensures the high availability of computer systems. This is increasingly challenging as the performance of modern information and telecommunications technology improves.

STULZ precision air-conditioning technology operates continuously even with high heat loads and, above all, with exceptional energy efficiency, as a circulating air system or a chiller. Choose the perfect solution for your individual requirements from different designs and dimensions – precisely configured, proven, tested and superbly reliable. Find out more and choose precision air-conditioning technology from STULZ.

Contents

4 The perfect climate



6 Energy efficient air-conditioning



8 Precision climate control for IT, medical technology and clean rooms

- 10 Circulating air
- 26 Water



32 Precision climate control for telecommunications



36 Intelligent control concepts



38 STULZ service and quality



The perfect climate for every application

In general, a distinction is made between comfort and precision air-conditioning. While comfort air-conditioning creates a pleasant environment for people, precision air-conditioning technology provides reliable cooling that is geared towards the requirements of technical infrastructure. Dedicated equipment rooms in data centres or switching stations require precisely

controlled relative humidity, room temperature, air conduction and air distribution. Precision air-conditioning units from STULZ enable you to create precisely defined climatic conditions – with pinpoint accuracy and outstanding reliability.

Latent or sensible cooling

The sensible cooling capacity lowers the temperature, while the latent capacity dehumidifies the air. Comfort air-conditioning units use up to 50 % of their energy for dehumidification, while precision units convert more than 95 % of the energy used exclusively to cooling power. The technology required to achieve this pays off quickly through lower running costs.

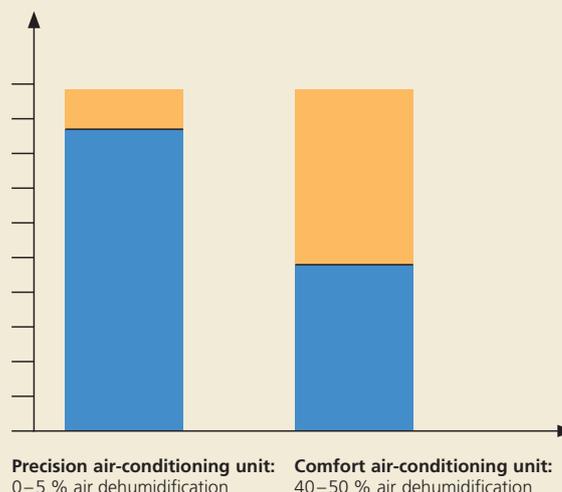
Air distribution, heat dissipation and filtration

Precision air-conditioning units from STULZ filter and circulate three times the amount of air as comfort units with the same rated capacity. They reliably dissipate isolated heat loads even from distant corners of the room, while continuously monitoring and precisely controlling the temperature and air filtration.

Controlled temperatures

Information and communication technology only works reliably and without faults within a narrow temperature range. STULZ precision air-conditioning units ensure optimum temperature accuracy with maximum tolerances of $\pm 1\text{ }^{\circ}\text{C}$, while comfort units can normally deviate from the set value by as much as $\pm 3\text{ }^{\circ}\text{C}$.

High sensible cooling capacity = Low operating costs





Controlled humidity

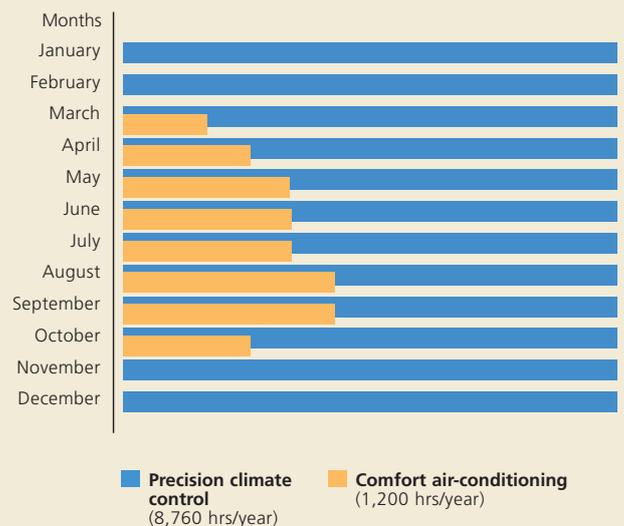
In contrast to comfort air-conditioning units, precision units feature strictly controlled and accurate dehumidification (tolerance +/- 5 % relative humidity), as too much humidity can lead to condensation and corrosion, while too little can cause static charges, data loss and damage to hardware.

Excellent reliability

Comfort air-conditioning units mainly operate in summer and only for a few hours each day. By contrast, precision air-conditioning units need to be available whenever the electronic equipment to be cooled is in operation. This is normally the case for 24 hours a day, 365 days a year.

As a result, STULZ has extremely high demands in terms of the quality of its precision air-conditioning units and offers high availability systems with 99.999 % reliability.

High operational reliability thanks to precision climate control



Performance up, consumption down

Half disappears into thin air

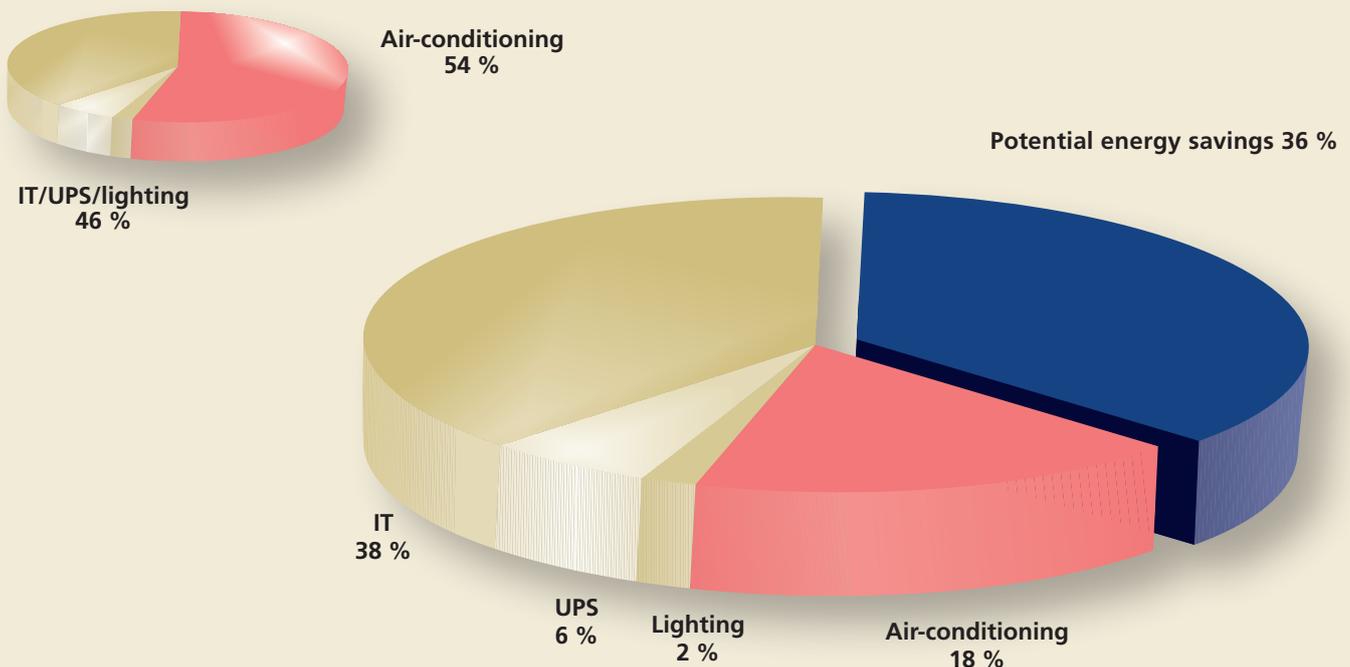
Data centres run 365 days a year. Their tightly packed server racks generate ever increasing computing power in an ever decreasing area – power that is almost entirely converted into heat. Climate control ensures reliable operation. It conveys heat outside right away. But then, the air-conditioning in data centres devours a huge amount of electricity. In the worst cases, it uses more than half of the energy supplied to the data centre.



Choose energy efficient air-conditioning from STULZ

Whether you are interested in optimisation, construction or operation – STULZ can give you added scope for managing your operating costs. Our energy efficient precision air-conditioning systems cut the power consumption of your data centre by up to 40 %. So: Cut your energy costs – or invest your saved energy in expanding your hardware.

Example of energy distribution in a data centre



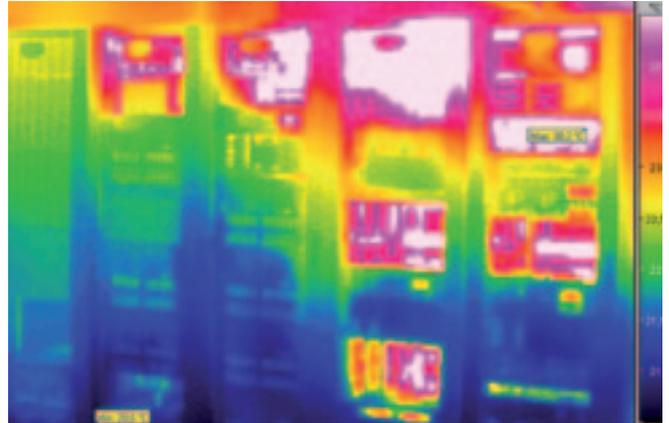
Greater efficiency thanks to free cooling with outside air

Economical precision air-conditioning systems also make use of cool outside air for indirect cooling of the data centre. Modern control electronics only switch on energy-intensive compressor cooling when really necessary. It continuously monitors the climate in the data centre and selects the optimum operating mode in no time.

Operation of cooling compressors and fans in the air-conditioning system is particularly energy-intensive. Electronic control improves the response in changing load conditions, while additional cooling with indirect free cooling keeps the running time of the compressor to a minimum.

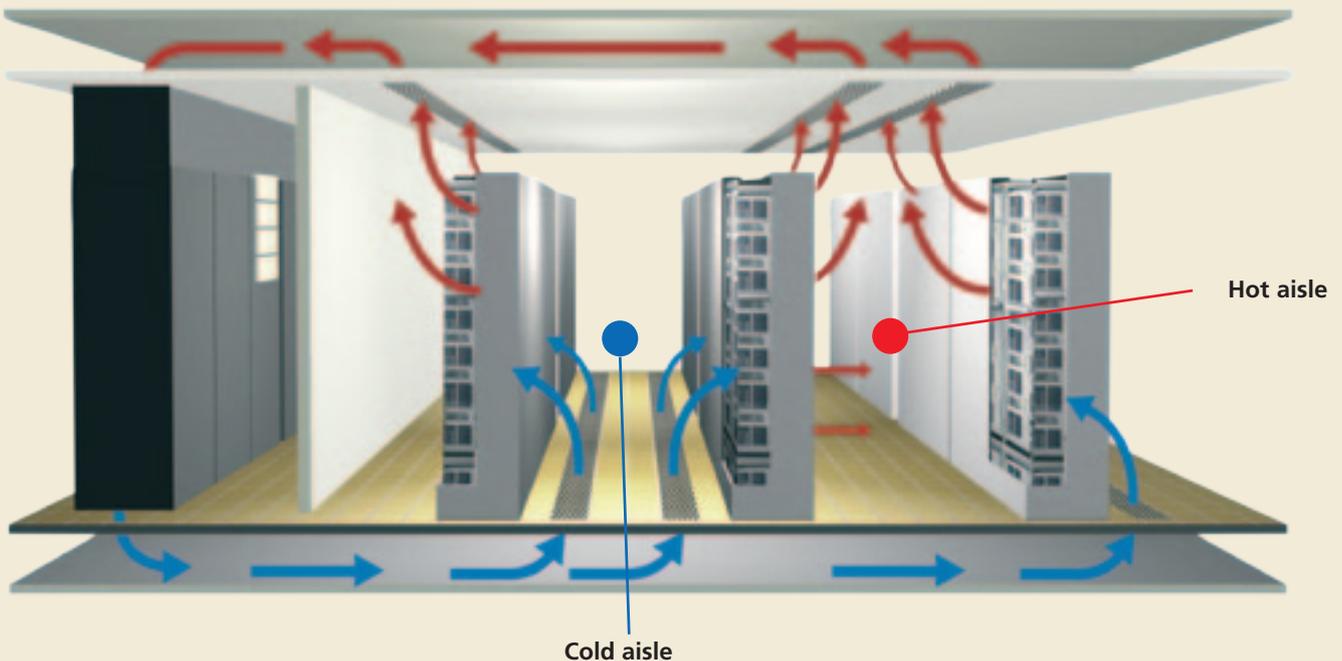
Greater effectiveness through precise air conduction and even power distribution.

To ensure that the cooled air gets to where it is needed, professional planning of the air conduction and careful configuration of the server racks is part of every good climate control concept. Hot and cold aisles, raised floors and cover panels convey the cooled air to the computer with precision. For example, particularly economical systems make use of closed air circuits, which feed the waste heat from the server racks directly back to the air-conditioning unit via closed air ducts.



A thermographic image visualises the hot and cold zones in the data centre, as on a weather map. This provides you with an early warning system of conditions in the air-conditioning system that may increase consumption.

Optimum air distribution in a data centre



STULZ – the natural choice:

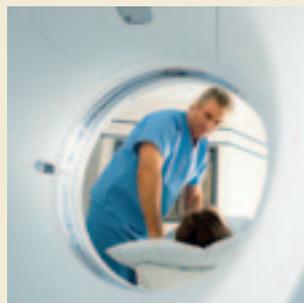
For information technology

Modern servers have a great deal of power. Their processors reliably control critical business processes 24/7, 365 days a year. But where there's computing power, there's also considerable heat. As computers only operate reliably at certain temperatures, climate control is essential. The more efficient the cooling, the less electricity the data centre consumes.

For medical technology and clean rooms

In medical technology, availability of life-saving equipment and instruments must be guaranteed. Our STULZ CyberCool indoor data chillers provide you with three different systems for ensuring the required cold water supply on demand, all autarkic and with high availability.

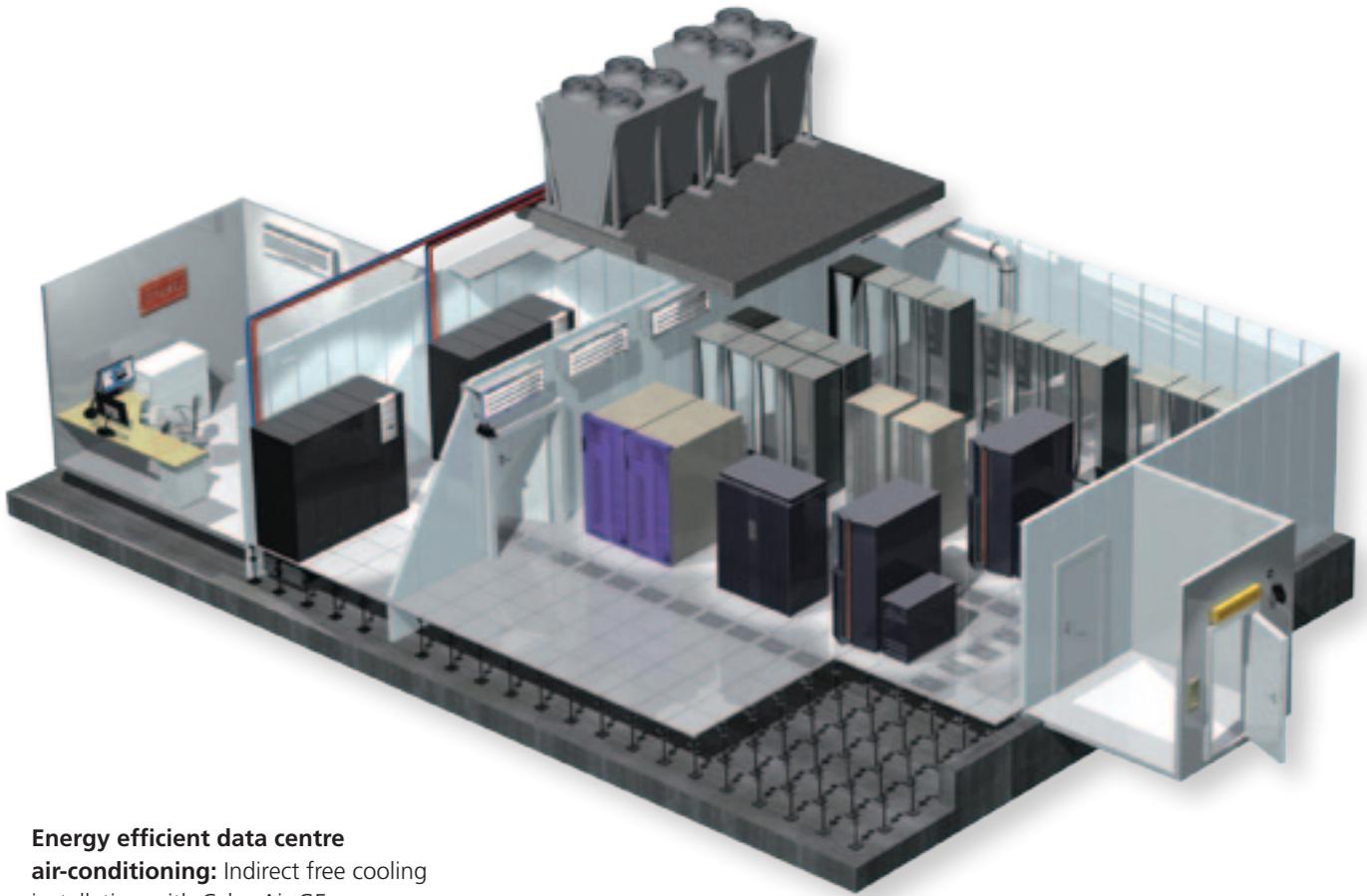
In clean rooms, there are hardly any heat loads. Here, the key is sufficient air throughput, precise temperature and humidity control and constant air quality.



IT cooling solutions for data centres

IT and telecommunications are of vital importance to the economy, science and administration in general. Even the very shortest downtimes in ICT systems can result in a collective inability to act, and the loss of sensitive data. An ideal operating environment is the prerequisite for continuous, dependable operation ensuring uninterrupted availability.

Stulz expertise in data centre cooling technology, creates the optimum conditions for high-availability IT infrastructure.



Energy efficient data centre air-conditioning: Indirect free cooling installation with CyberAir GE

Circulating air

- MiniSpace/EC
- Compact Plus DX
- Compact CCD 2300 / 2800 CWE
- CyberAir 3 DX and Dualfluid
- CyberAir 3 DX and Dualfluid with EC compressor
- CyberAir 3 CW2, CWE and GE
- CyberAir 3 GES with EC compressor
- CyberAir DFC²
- CyberRow
- AirBooster, AirBooster Pro and AirModulator

Water

- CyberCool
- CyberCool XT
- Pump&Transfer
- Pump stations

Compact and precise air-conditioning

Most precision air-conditioning systems for IT, medical technology and clean rooms are circulating air systems designed specifically for the individual heat loads that occur. The more technology is installed in a room and the greater the waste heat from the hardware, the more care is required in planning and designing the air distribution. STULZ precision air-conditioning units enable you to base your planning on maximum reliability – regardless of whether the performance requirements are simple or complex.



MiniSpace

If you need precise, reliable and cost effective air-conditioning solutions for small to medium sized server and technology rooms, the MiniSpace series provides a space-saving, microprocessor controlled solution.

Cooling capacity, total	kW	5 ~ 28
Cooling capacity, sensible	kW	5 ~ 24
Volumetric air flow	m³/h	2,000 ~ 7,000

MiniSpace EC

Cooling capacity, total	kW	6.5 ~ 31.5
Cooling capacity, sensible	kW	6.5 ~ 28.5
Volumetric air flow	m³/h	2,500 ~ 7,500

The advantages at a glance

- Maximum cooling performance with minimum floor space
- Air-cooled, water/glycol-cooled or chilled water versions available
- Units as down flow and up flow versions
- Simple installation and maintenance through doors on the front
- Air filtering with filter class EU 4
- Continuously adjustable EC fan*
- C7000 IO controller for controlling and monitoring the air-conditioning system
- Automatic switchover to redundant standby units in the event of problems
- Continuous recording of measured values
- Options
 - C7000 Advanced user interface with LCD graphic display, RS485 interface and other pre-installed data protocols for GLT connections
 - Communication via SNMP/HTTP IP protocols
 - Humidifier/heating
 - R134a high temperature refrigerant*

*for MiniSpace EC only



Compact Plus DX

If you need to reliably dissipate large heat loads while keeping an eye on your investments, Compact DX is the professional solution featuring proven technology.

To further improve the efficiency of the series, the entire product range has been revised and now features a directly driven AC fan as standard.

Compact Plus DX, single and double circuit

Cooling capacity, total	kW	18 ~ 104
Cooling capacity, sensible	kW	18 ~ 89
Volumetric air flow	m ³ /h	6,000 ~ 24,000



Low operating costs thanks to special sizes

Are you planning a new data centre and looking for optimum integration of your precision air-conditioning systems from day one? The units have been trimmed for energy efficiency, regardless of previous standard dimensions. The increased depth provides improved air conduction within the unit.

You will notice the results in considerably lower operating costs. The maintenance-free electronically controlled EC fans respond continuously to changing power requirements and can be adjusted to the current conditions with pinpoint accuracy.



Compact CWE

Energy optimised CW A/C unit in compact design with EC fans installed on top of the raised floor.

Cooling capacity, total	kW	202 ~ 246
Cooling capacity, sensible	kW	202 ~ 246
Volumetric air flow	m ³ /h	36,500 ~ 43,300



Compact CWE UF

UF version with EC fans installed under the raised floor for optimised power utilisation and air distribution. In every case, for maintenance the EC fan can easily be accessed from the front of the unit thanks to the "fan slide up system".

Cooling capacity, total	kW	202 ~ 246
Cooling capacity, sensible	kW	202 ~ 246
Volumetric air flow	m ³ /h	36,500 ~ 43,300

The advantages at a glance:

- Low power consumption
- EC fan
- C6000 controller
- Standby manager
- VDE and NRTL-C specified (in line with UL 1995)
- All maintenance work can be carried out from the front of the unit

Efficient climate control with STULZ CyberAir 3

The CyberAir 3 closed-circuit air-conditioning system from STULZ controls the conditions in the data centre with utmost precision, maximum reliability and energy efficiency. Intelligent control electronics ensure that up to 90 % less electricity is consumed than with conventional precision air-conditioning systems. The CyberAir 3 embodies more than three decades of project experience by STULZ. No other precision air-conditioning system offers more flexibility, as every STULZ system is tailored to your requirements. Designed for reliable continuous operation over many years, the STULZ CyberAir 3 is accurate to the nearest degree, quiet and exceptionally economical. It keeps your IT available at all times.

Seven cooling systems cool with three refrigerants

From a choice of seven cooling systems, data centre operators will find the optimum balance between investment, operating costs and energy efficiency. In addition to water as the cooling medium, the STULZ CyberAir 3 can run with three different refrigerants: standard R407C and R410A refrigerants, and high temperature R134a refrigerant.



CyberAir A/C units in standard door sizes are available as energy or space-saving versions. The six available sizes range from 1,000 to 3,350 mm in width.

STULZ CyberAir

- Closed-circuit precision air-conditioning systems for data centres and equipment rooms
- Standard and low energy versions
- Scalable to 20 air-conditioning modules per bus system
- Up to 90 % more economical thanks to STULZ DFC and DFC² automatic air-conditioning
- The C7000 microprocessor efficiently regulates all system states, CW standby management, the EC fan and the electronic expansion valve
- Reliability thanks to redundant design and automatic alarm notification via SMS or e-mail
- Compact dimensions
- Filter control management
- All parts requiring maintenance can be accessed from the front

CyberAir 3 DX and Dualfluid

Cooling capacity, total	kW	18 ~ 102
Cooling capacity, sensible	kW	18 ~ 88
Volumetric air flow	m³/h	5,900 ~ 24,500

CyberAir 3 DX and Dualfluid with EC compressor

Cooling capacity, total	kW	20 ~ 82
Cooling capacity, sensible	kW	20 ~ 82
Volumetric air flow	m³/h	5,000 ~ 20,000

CyberAir 3 GE

Cooling capacity, total	kW	18 ~ 102
Cooling capacity, sensible	kW	18 ~ 88
Volumetric air flow	m³/h	5,900 ~ 24,500

CyberAir 3 GES with EC compressor

Cooling capacity, total	kW	21 ~ 82
Cooling capacity, sensible	kW	21 ~ 82
Volumetric air flow	m³/h	5,000 ~ 20,000

CyberAir 3 CW/CW 2

Cooling capacity, total	kW	28 ~ 214
Cooling capacity, sensible	kW	26 ~ 169
Volumetric air flow	m³/h	7,000 ~ 39,000



CyberAir 3 CWE/CWU

Cooling capacity, total	kW	39 ~ 237
Cooling capacity, sensible	kW	36 ~ 196
Volumetric air flow	m³/h	10,000 ~ 48,000



CyberAir 3 CWE/CWU

Two modules, one aim:
efficient use of space and energy!

- Unit split into two modules
- Easy transportation thanks to standard door size
- Flexible installation in data centres
- Energy-optimised heat exchanger design for high water and return air temperatures

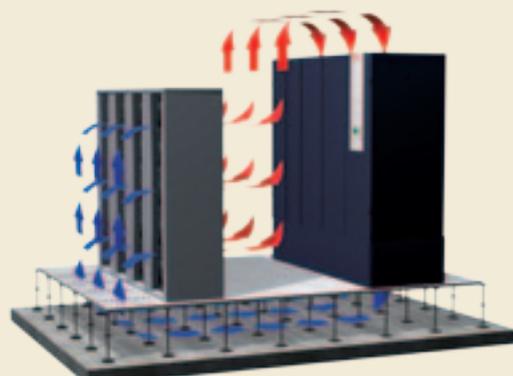


Installation options for CyberAir 3 CWE/CWU



CWU version:

Fan module installed under raised floor (up to 35 % reduction in fan power consumption compared to installation on raised floor)



CWE version:

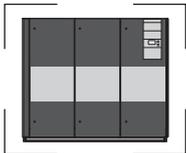
Fan module installed on top of raised floor with low raised floor height

CyberAir 3 – Unlimited versatility with a diverse range of options



Mechanical and general options

- High-efficiency rear panel (optional for DX and GE downflow systems)
- Raised floorstand
- Louvered shutters
- Flexible canvas fittings
- Fresh air connection
- Filter class F5 (EU5)
- Discharge air plenum
- Suction base for upflow units
- Duct fitting with pocket filter attachment F6, F7, F9
- Mufflers
- Dual wall design
- Condensate pump
- Special paint

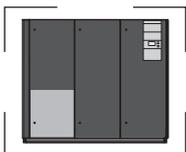


Heating options

- Electric heating, 1 to 3 stages, continuous
- Refrigerant heating
- Low-pressure hot water heating

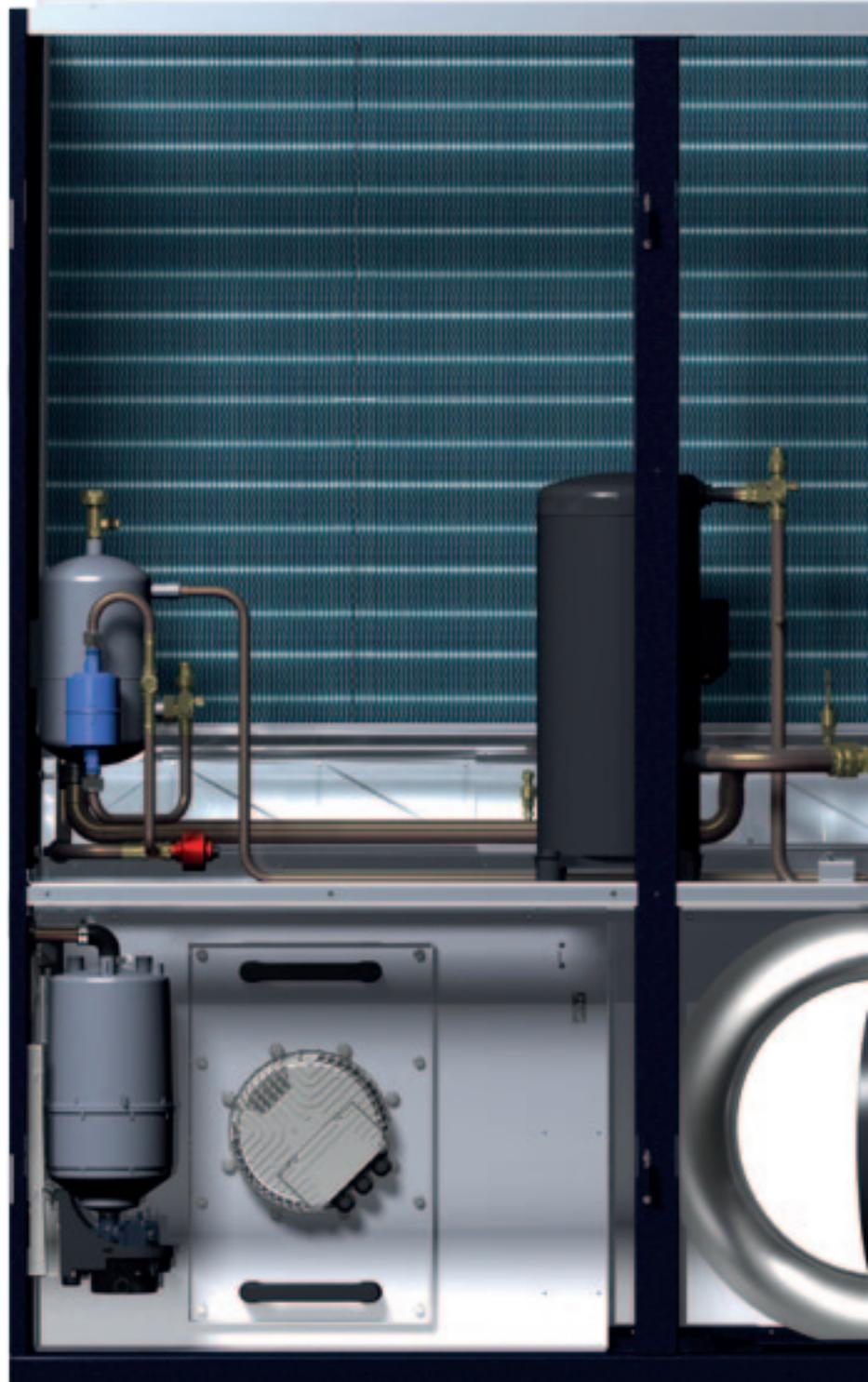
Options for air-cooled condensers

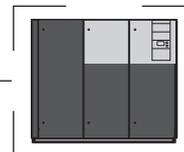
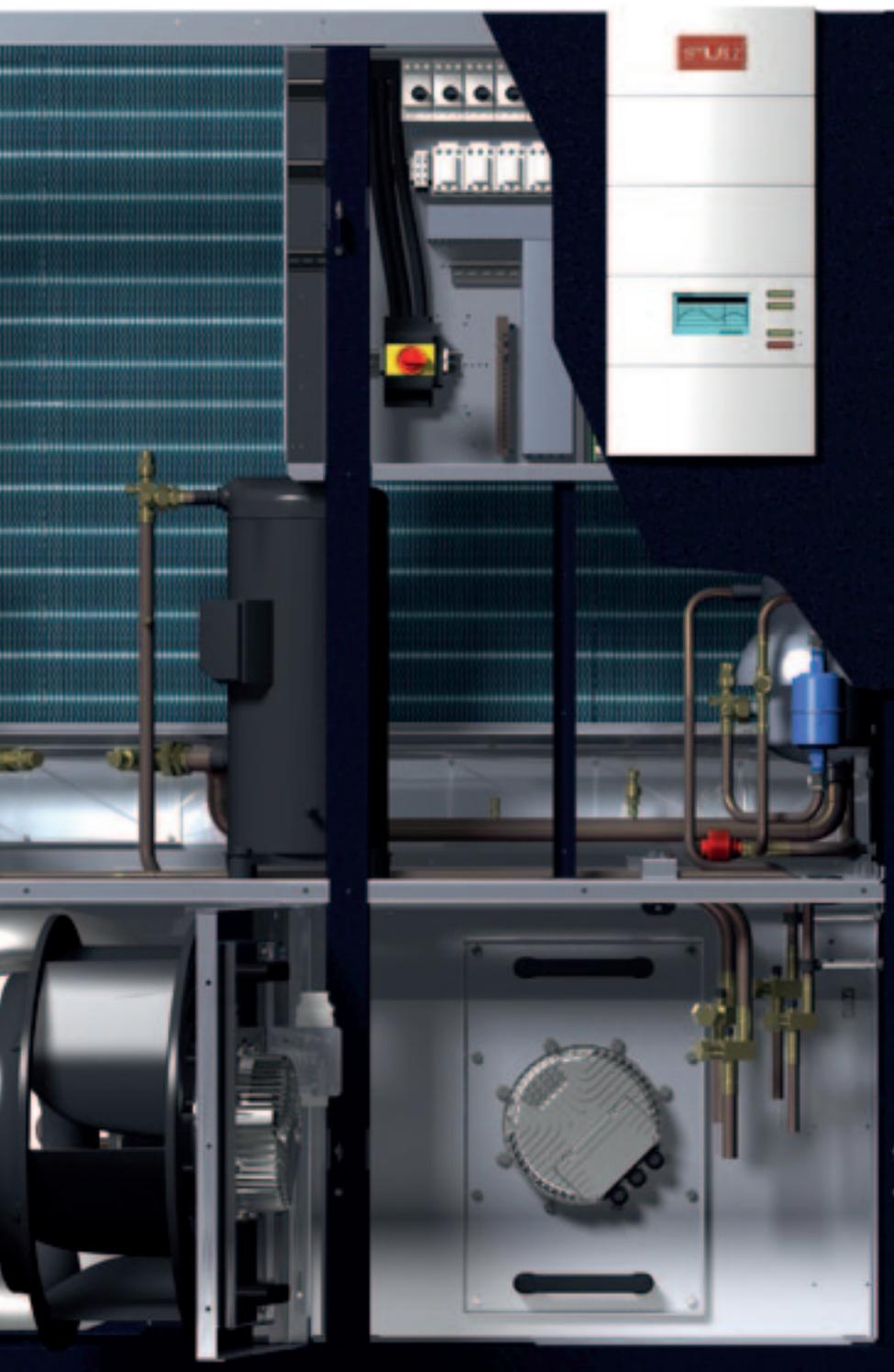
- Fan speed control
- Winter set-up for operation at temperatures down to -45 °C
- Anti-corrosive coating of heat exchanger pipes



Humidifier options

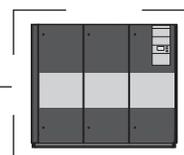
- Continuous steam humidification





Electrotechnical options:

- Fire alarms
- Smoke alarms
- Emergency fire shutdown
- Water detection system
- Emergency manual override
- Triggering of fire doors
- Phase sequence monitoring
- Connection facility for remote On/Off
- Special voltages



Cooling system options

- Output regulation with suction throttle or discharge bypass
- 2-way CW valve
- Microprocessor-controlled regulation of condensation pressure via 2 or 3-way valves

Optional refrigerants

- R407C (standard)
- R410A
- R134a

Ease of maintenance

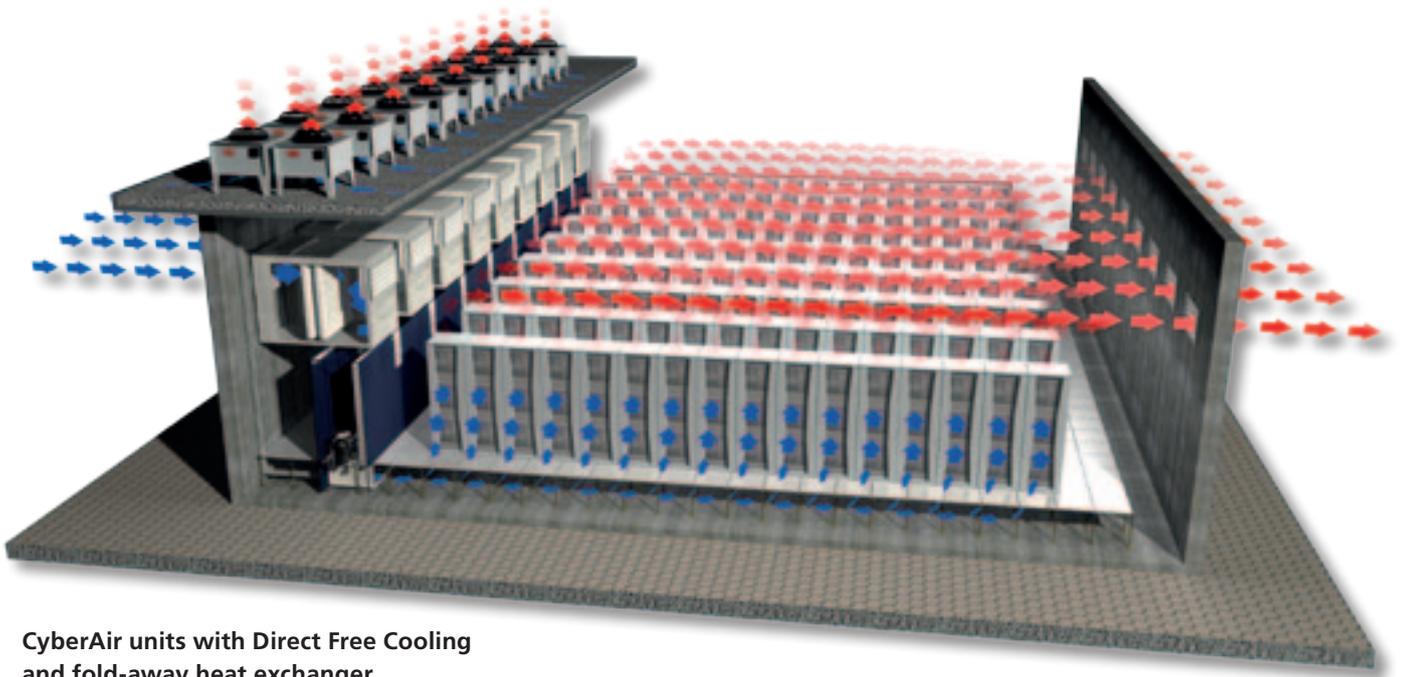
- Direct front access to all components requiring service, including the EC fans

Energy-saving potential thanks to ambient air – Direct Free Cooling

With Direct Free Cooling, conditioned ambient air below 18°C is used to keep the data centre cool. This brings huge potential savings, but challenges as well. With this cooling method, a large volume of ambient air enters the rooms, so that extended temperature and humidity tolerances must be permitted. If the ambient temperature rises above 18°C, either an integrated DX system with compressors or a separate chiller assumes the task of cooling the data centre, depending on the air-conditioning solution that is installed.

Thanks to our many years of experience with precision air-conditioning solutions, we have succeeded in optimising all components for Direct Free Cooling, ensuring compliance with the specifications for data centre temperature tolerances according to **ASHRAE TC 9.9 – 2011**.

In addition, both our A/C units with Direct Free Cooling and the mixing and filtration boxes are available in various sizes. This enables you to configure the units precisely to suit your requirements and achieve optimum energy efficiency.



CyberAir units with Direct Free Cooling and fold-away heat exchanger



It pays to have energy efficiency with STULZ air-conditioning systems:

The air-conditioning of a Hamburg data centre with a surface area of 800 m² and a heat load of 1 MW costs only € 34,000.- a year with Direct Free Cooling, as opposed to € 296,000.- a year with compressor cooling only. This corresponds to savings of € 262,000.- a year.

Source: STULZ comparison of system costs, basis for calculation 13 ct/kWh

Two systems and three sizes – for flexibility to suit all requirements

Room size, noise protection, redundancy – every project has requirements of its own. This is why CyberAir with Direct Free Cooling is available in both an air-cooled and a liquid-cooled version. What's more, we have divided the

sizes into different units, in order to enlarge the heat exchanger surfaces and enable a standardised, modular construction.



Device made up of 4 modules

- Mixing and filtration box
- Heat exchanger unit
- Compressor unit (only for DX version)
- Fan unit with EC fans



CyberAir DX mit DFC²

Cooling capacity, total	kW	75 ~ 108
Cooling capacity, sensible	kW	75 ~ 108
Volumetric air flow	m³/h	25,000 ~ 35,000

CyberAir CW mit DFC²

Cooling capacity, total	kW	107 ~ 150
Cooling capacity, sensible	kW	107 ~ 150
Volumetric air flow	m³/h	24,000 ~ 35,000

Advantages

- High energy efficiency through the direct use of Free Cooling
- Fold-away heat exchanger in the CyberAir AMD for additional energy efficiency
- Additional savings opportunities in Mixed and DX mode, thanks to enlarged heat exchanger surfaces and low condensing temperature
- Excellent system scalability – “Build as you grow!”
No hydraulics (pipework, pumps, fittings)

- Maximum reliability thanks to self-contained, simply constructed air-conditioning systems
- Drastically lower energy consumption than all conventional systems
- High-quality materials and perfectly harmonised components
- Lower capital investment than with conventional Indirect Free Cooling systems



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 air-conditioning solutions for the diverse needs of the data centre.

With CyberRow, we have now developed an innovative air-conditioning 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.

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 speed-controlled EC fans, which can be regulated independently and so adapt perfectly to changing return and supply air temperatures
- EC scroll compressor (only available for DX and GE versions)
- Maintenance access from front and back
- RS485 connectivity to popular BMS systems
- G4 pleated panel filter in a metal frame
- Powder-coated external frame with hinged front and back panels
- Ready-made holes as standard at top and bottom for water connections
- 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		GE		CW	
Model		CRS 251 AS/GS	CRS 361 AS/GS	CRS 251 GES	CRS 361 GES	CRS 320 CW	CRS 560 CW
Height	mm	1,950	1,950	1,950	1,950	1,950	1,950
Depth	mm	1,175	1,175	1,175	1,175	1,175	1,175
Width	mm	400	600	400	600	400	600
Cooling capacity ¹⁾	kW	24.0	36.5	24.0	36.5	32.2	56.0
Cooling capacity Indirect Free Cooling ²⁾	kW	–	–	21.6	33.7	–	–
Airflow ¹⁾	m ³ /h	4,700	7,700	4,700	7,700	6,000	10,800

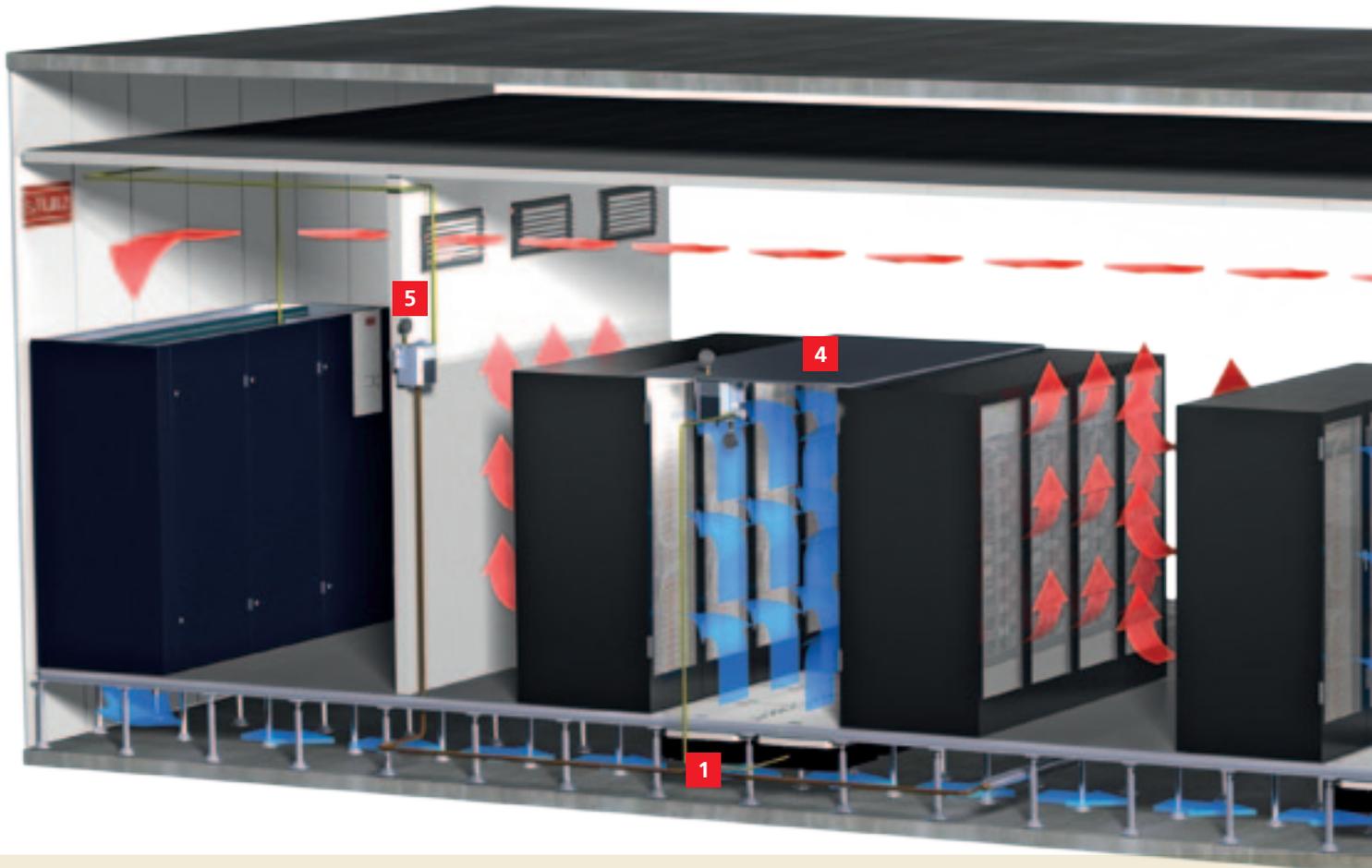
¹⁾ Nominal conditions

Return air temperature 35°C/RH 30%, DX units: condensing temperature 45°C, CW units: water temperature 10°C/15°C, 0% glycol

²⁾ Nominal conditions

Return air temperature 35°C/RH 30%, water temperature 10°C/15°C, 0% glycol

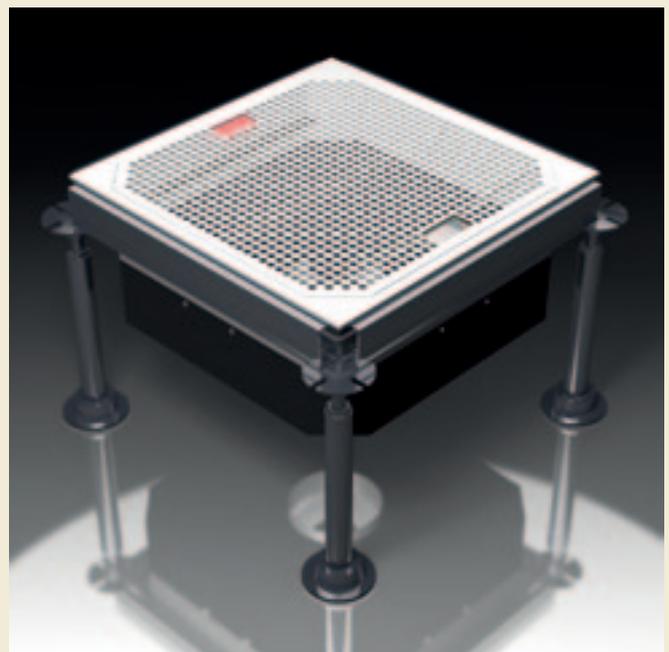
Greater flexibility for cooling data centre hot spots



Air flow management for data centres with closed-circuit air conditioning

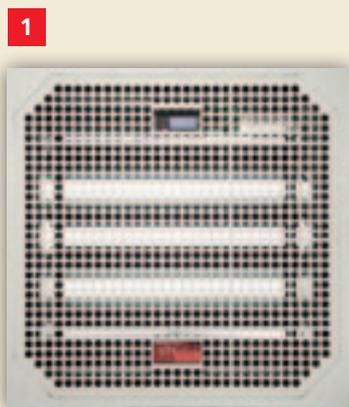
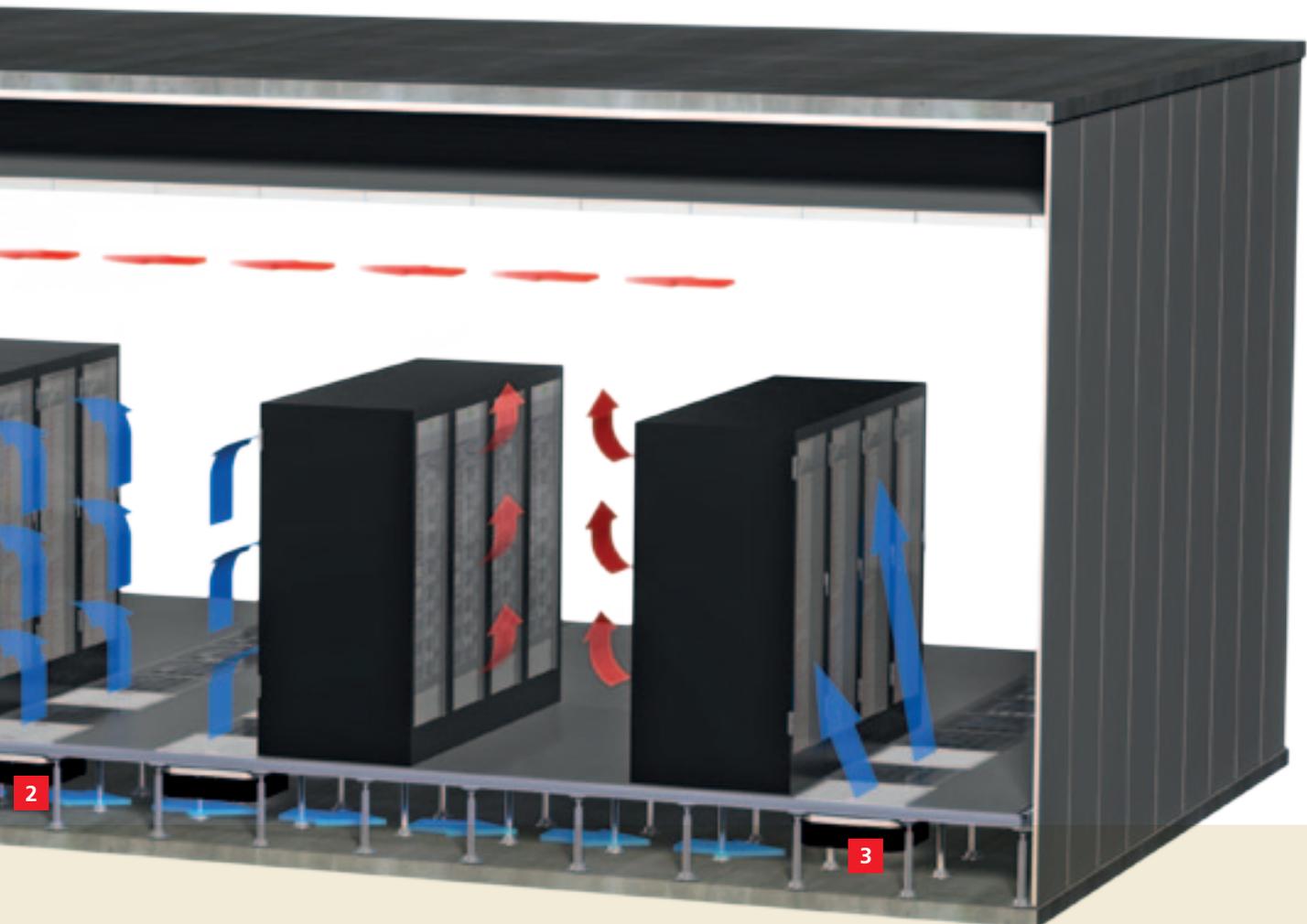
Air flow system solutions from the STULZ AirBooster series are installed directly in front of the server rack, in the raised floor. Integrated sensors ensure that cold air requirements are automatically determined, and exactly the right air flow rate is provided based on the required temperature.

All elements of STULZ air flow solutions utilise the same air conduction system, from the air conditioners to the racks, and are controlled exactly in line with cooling requirements.

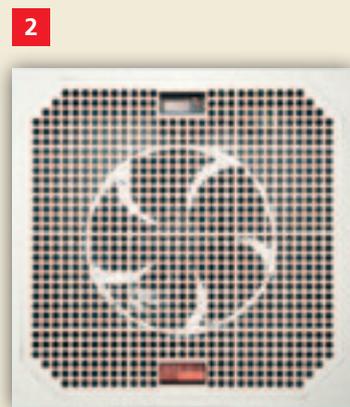


Straightforward and flexible: STULZ AirBooster and AirModulator cool data centre hot spots

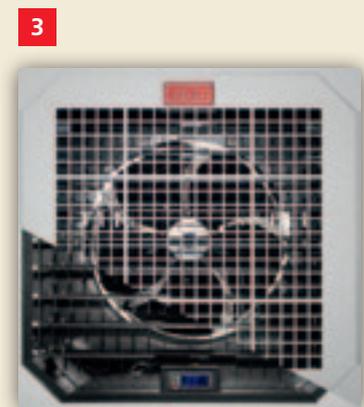
Are you operating a data centre with traditional closed-circuit air conditioning and want to cool hot spots quickly and simply? STULZ new air flow management solutions, AirModulator, AirBooster and AirBooster Pro, can be installed in minimal time in an existing raised floor and will immediately and reliably begin cooling hot spots.



AirModulator
with louvred dampers



AirBooster
with infinitely variable EC fan speed control



AirBooster Pro
with adjustable air transfer grille and variable speed EC fan

4 Sensor for differential pressure control housing (Pressure Transmitter Module - PTM)

5 For optimal server performance we recommend also using the STULZ differential pressure control to drive the closed-circuit air-conditioning unit.

STULZ Green Engineering

The STULZ CyberAir 2 with DFC was the first precision air-conditioning system in the world that automatically switches to the best operating mode depending on the heat load in the data centre and seasonal variations in ambient temperature. This is due to the combination of compressor cooling and free cooling in a total of four levels. In cool weather, DFC makes use of economical indirect free cooling, which obtains all its cooling power from the outside air. Energy-intensive compressor cooling (DX) is only switched on when absolutely necessary.

For the CyberAir 3, the DFC system has been further developed and improved.

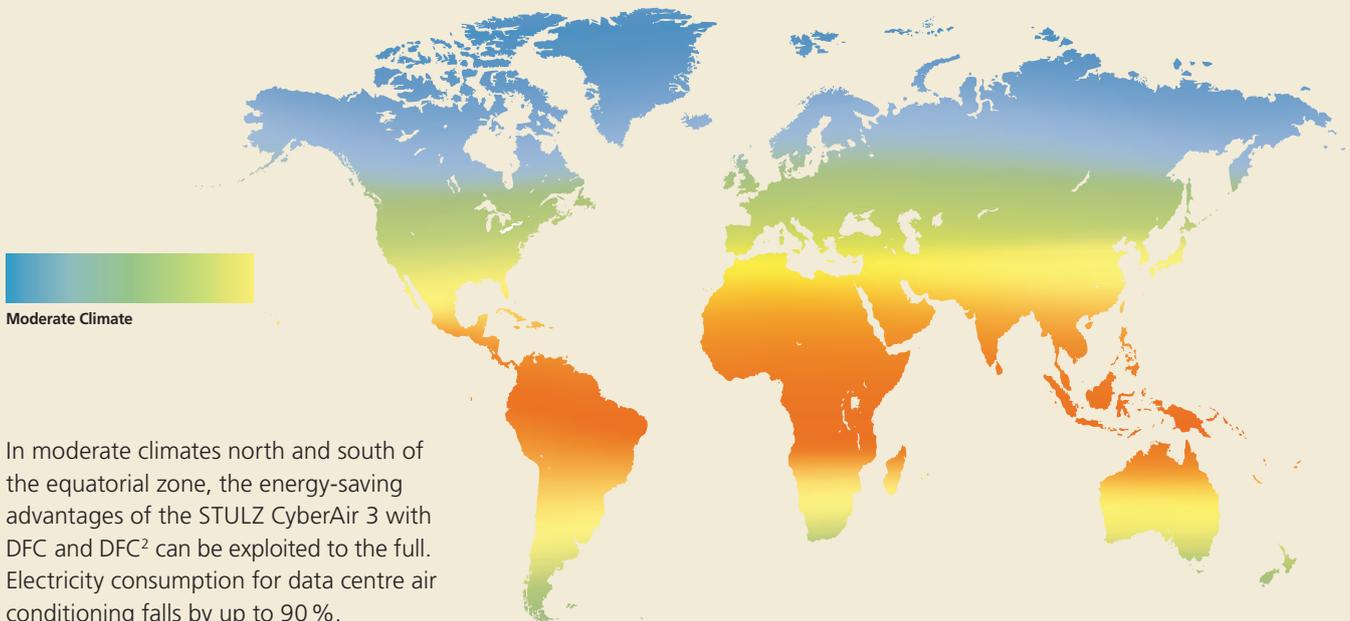
DFC Indirect Free Cooling – up to 60 % more energy-efficient

DFC selects the most energy-saving mode, controls the speed of the EC fans in the A/C unit and those of the dry cooler, regulates the position of the control valves, reduces the electricity consumption of the pumps and ensures precise interior climate control. By incorporating standby units as well, DFC keeps all units, pumps and dry coolers in perfect balance in energy-saving partial load mode.

DFC² Direct Free Cooling – up to 90 % more energy-efficient

With the newly developed DFC² (direct free cooling) system, we at STULZ are consistently pursuing our Mission Energy and offering you a further option for providing efficient and economical climate control with our precision air-conditioning systems.

With DFC² we are setting new standards for energy-efficient precision air-conditioning systems.



Adaptive ventilation with EC technology

With the introduction of the CyberAir 2, we were the first manufacturer to employ EC-driven fans for an entire product family. For the CyberAir 3 we went one step further, and entrusted ebm-papst with the task of developing a fibreglass-reinforced EC fan in a special size for the CyberAir 3, precisely in line with our specifications. The electronically controlled EC fans react steplessly to changing output requirements and are especially economical in partial load mode. EC fans consume up to 30 % less energy than conventional AC models!

More efficiency with EC compressor

The stepless drive of the EC compressors ensures fast changes in capacity in a range between 30 % and 100 %. Within this range, the system generates precisely the cooling capacity that is required to dissipate the actual heat load. EC compressors consume up to 24 % less energy than on/off controlled scroll compressors.

High-efficiency rear panel (optional for DX and GE systems downflow)

CyberAir 3 DX and GE systems can be equipped with an optional high-efficiency rear panel. This increases the depth of the units and ensures the surface area of the heat exchanger is used even more efficiently. To enable the units to still fit through normal standard doors, the rear panel can be removed and refitted with the greatest of ease.

Save with electronic load distribution at half the energy

All chilled water-cooled versions of the STULZ CyberAir 3 are available with the electronic CW standby manager as standard – keeping all A/C units in perfect balance in energy-saving partial load mode. In this way, the fans of the STULZ CyberAir 3 are able to use up to 70 % more economical.

Using reserves sensibly

The CW standby manager controls the speed of the EC fans and incorporates redundant standby units in a combined system operation. If an A/C unit drops out, the standby manager automatically increases the cooling output of the remaining devices. To do so, it accesses information from the C7000 microprocessor, which regulates the individual units of the system in a peer-to-peer network.



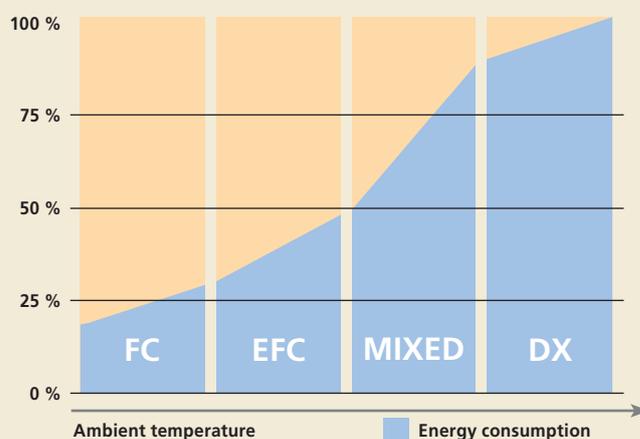
In conventional operating mode, the active A/C units run continuously at full load. The standby unit remains unused.



In partial load mode, the CW standby manager distributes the reserve capacity evenly between all A/C units. If individual units shut down or require maintenance, the remaining units automatically switch to controlled full load operation.

STULZ DFC automatic air conditioning

- Electronically controlled GE cooling system, combining compressor cooling and free cooling in four stages:
 - FC – Free cooling energy-saving mode
 - EFC – Extended free cooling
 - MIXED – Compressor and free cooling
 - DX – Compressor cooling
- Electronic load distribution for partial load mode
- The efficiency of the compressor is increased in mixed mode thanks to the electronic expansion valve



Reliable and cost-effective cooling with water

Water is the most efficient medium for heat transfer. This is why water is increasingly being used to cool technical equipment in IT and medical technology. Demand-based control concepts and a free cooling option ensure that energy consumption is low. This enables you to cut your operating costs and reduce the burden on the environment.

Air-cooled outdoor

Air-cooled chillers for outdoor installation are classical chilled water generating systems. The units are installed on roofs or close to the building. Air-cooled chilled water generators allow outside air to be put to optimum use in the relevant weather conditions.



CyberCool Outdoor Chiller CSO/CLO

Chilled water generator for closed circuit air-conditioning with water, up to 239 kW, for outdoor installation. With optional free cooling to increase energy efficiency.

Cooling capacity	kW	36 ~ 239
------------------	----	----------



CyberCool XT CEO (A)

Chilled water generator for closed circuit air-conditioning with water, up to 220 kW, for outdoor installation. From 24 kW with optional Free Cooling to increase energy efficiency. From 97 kW with energy-saving EC fans as standard.

Cooling capacity	kW	4 ~ 220
------------------	----	---------



CyberCool XT CFO (A)

Chilled water generator for closed circuit air-conditioning with water, up to 660 kW, for outdoor installation. With optional free cooling to increase energy efficiency.

Cooling capacity	kW	220 ~ 660
------------------	----	-----------



CyberCool XT CGO (A)

Chilled water generator for closed circuit air-conditioning with water, up to 1,525 kW, for outdoor installation. With optional free cooling up to 1,200 kW to increase energy efficiency.

Cooling capacity	kW	400 ~ 1,525
------------------	----	-------------

Air-cooled indoor

Air-cooled chillers for indoor installation are the system of choice if there is no suitable installation space outdoors. The condenser and fans in these chillers are connected to the outside air either directly through a weather-protection grille or by means of a duct system. The advantage of indoor installation is the ability to run a glycol-free water cooling system.

CyberCool XT CFI (A)

Chilled water generator for closed circuit air-conditioning with water, up to 257 kW, for indoor installation.

Cooling capacity	kW	173 ~ 257
------------------	----	-----------



Water-cooled indoor

Water-cooled chillers for indoor installation are so-called water/water units. They are ideal in noise-sensitive conditions or if there is no suitable installation space outdoors. They consist of an indoor unit and a dry cooler or cooling tower. The advantage of indoor installation is the ability to run a glycol-free water cooling system.

CyberCool CSI G/GE

Compact chilled water generator for the direct water cooling of high-density server racks and computer tomographs, cooling capacity up to 100 kilowatts. The GE version is suitable for indirect free cooling.

Cooling capacity	kW	20 ~ 100
------------------	----	----------



CyberCool XT CFI (W)

Chilled water generator for closed circuit air-conditioning with water, up to 560 kW, for indoor installation.

Cooling capacity	kW	195 ~ 560
------------------	----	-----------

Compact system separation with Pump&Transfer

Some data centres have a central chilled water supply. Direct water cooling of high-density server racks via the central water supply seems an obvious solution, but does not meet the requirements of the racks and also carries a major risk of leakage.

STULZ CyberCool Pump&Transfer ensures that the system is separated into two circuits, keeping the volume of water and pressure in the rack as low as possible. In the primary circuit between the central chilled water supply and the transfer station, CyberCool Pump&Transfer works with a water/glycol mixture at low temperature. In the secondary circuit, the transfer station feeds glycol-free water to the server racks, while adapting the temperature to the level required by the racks.

CyberCool Pump&Transfer stations are available as single or dual circuit systems. The dual circuit system ensures 100 % redundancy whilst taking up the same space. The integrated microprocessor monitors all functions, processes signals from water warning systems when required, and enables the CyberCool Pump&Transfer to be incorporated in the central building services management system.



CyberCool CPI-CW series, single circuit

Cooling capacity	kW	20 ~ 100
------------------	----	----------

CyberCool CPI-CW2 series, dual circuit

Cooling capacity	kW	2x20 ~ 2x100
------------------	----	--------------

Air-cooled indoor split

Split-version air-cooled chillers for indoor installation are the systems of choice for applications that are sound-sensitive or if there is no suitable installation space outdoors. They consist of the indoor unit and an air-cooled outdoor condenser. The advantage of indoor installation is the ability to run a glycol-free water cooling system.



CyberCool CSI A

Compact chilled water generator for direct water cooling of high-density server racks and computer tomographs, cooling capacity up to 100 kilowatts.

Cooling capacity	kW	20 ~ 100
------------------	----	----------

More information: [Stulz.com](https://www.stulz.com) → Products → **Chillers**

Pump stations

The new CyberCool pump stations work alongside our air-conditioning systems to provide even greater reliability and optimised use of space. Fully assembled and containing all the components required for pumping chilled water.



CyberCool CPP-CW pump station

Compact pump cabinet with two speed controlled pumps, for indoor installation. The CyberCool station exactly matches the design and dimensions of the CyberAir 2 precision air-conditioning systems.

Water volume in flow	(m ³ /h)	10 ~ 50
----------------------	---------------------	---------

Download Brochure : Stulz.com → Products → **Chillers**



STULZ – the natural choice:



The Telecom line from STULZ

- **Wall-Air Displacement Evolution**
- **Tel-Air-2**
- **Split-Air**
- **Free-Air**



For telecommunications

With its Telecom line, STULZ offers a range of professional air-conditioning solutions for telecommunications infrastructure and switch cabinets. All units are designed for 24/7 operation, 365 days a year, and offer maximum reliability and availability. In the unlikely event that a problem does arise, STULZ's network of expert partners and branches guarantees fast, trouble-free service.



Stable level for transmission technology

Mobile phone base stations are installed in the tiniest space on roofs, towers or masts. Compact Telecom air-conditioning systems in switch cabinets, containers and shelters keep the operating temperature of the sensitive transmission technology stable.

Wall-Air Displacement Evolution

In telecommunications containers, space is at a premium. Wall-Air units are installed outside the container, therefore enabling the space inside the container to be used to the full. Wall-Air is available in two versions – upflow and displacement.



- Energy saving operation thanks to proportional free cooling facility
- Available as WDE version with scroll compressor and as WDI version with EC compressor
- C2020 microprocessor control
- 48V DC backup operation
- Condenser with microchannel technology

Cooling capacity, total	kW	4.0 ~ 17.0
Cooling capacity, sensible	kW	4.0 ~ 15.0
Volumetric air flow	m³/h	1,000 ~ 3,600

Tel-Air-2

Tel-Air-2 is designed for installation in telecommunications containers and equipment rooms. As they are installed indoors, noise is kept to a minimum and the units are protected against environmental influences and vandalism. Tel-Air-2 is available in upflow and downflow versions, and as an energy efficient displacement version.



- Energy saving operation thanks to proportional free cooling facility
- Available as upflow, downflow and displacement version
- C2020 microprocessor control
- 48V DC backup operation

Cooling capacity, total	kW	4.0 ~ 13.0
Cooling capacity, sensible	kW	4.0 ~ 13.0
Volumetric air flow	m³/h	1,000 ~ 3,200



Split-Air

Split-Air is the energy and space saving option for reliable cooling of telecommunication containers – consisting of a free cooling function and an evaporator and compressor/condenser unit. The indoor unit can be mounted on the ceiling or a wall, i.e. Split-Air is ideal where space is at a premium. Thanks to its low noise level, the outdoor unit can also be used in residential areas with no problems.



- Energy saving operation thanks to proportional free cooling facility
- C2020 microprocessor control
- 48V DC backup operation

Cooling capacity, total	kW	3.0 ~ 11.0
Cooling capacity, sensible	kW	3.0 ~ 11.0
Volumetric air flow	m³/h	1,000 ~ 3,000

Free-Air

In base stations that use comfort air-conditioning units for cooling, the possibilities of free cooling are not exploited. Now, with our Free-Air free cooling unit, these telecommunication networks can be retrofitted with an energy-efficient system. The existing comfort air-conditioning units are monitored and controlled by the STULZ C102 microprocessor. Whenever the ambient temperature allows, free cooling mode is activated and the comfort air-conditioning units are switched off.



- C102 microprocessor control
- Energy efficient operation
- 48V DC backup operation
- EC fan
- Available as FCL version for outdoor installation and as FCL-IN version for indoor installation

Cooling capacity, total	kW	3.0 ~ 6.0
Volumetric air flow	m³/h	2,300 ~ 3,400

Intelligent control and central monitoring of precision air-conditioning

Intelligent control concepts ensure reliable operation of precision air-conditioning units and chillers. Setpoint entry and adjustment, unit monitoring and operating data output using separate control units, PC or connection to existing building services systems. This allows you to maintain an overview and keep control at all times.

Interfaces to building services and Internet

The STULZ MIB7000 (Multifunctional Interface Board) has an integrated sequencing function for up to 32 units. The RS485/RS232 serial interfaces support all standard building services systems. The STULZ WIB8000 (Web Interface Board) communicates using the IP protocols SNMP and HTTP. Configuration and operation are browser-based. The STULZ LIB7000 (Lon Interface Board) enables all units to be integrated into LonWorks® technology.



Network connection for convenient control

With intelligent network solutions from STULZ, you will always be in control of your precision air-conditioning system.

C1002

- Standard controller with 4-digit, 7-segment LED display
- Key pad
- Integrated sequencing for connecting two units

C2020

- 4-line text based LC display
- Sequencing for up to 5 units
- Continuous condensation pressure regulation
- Software update and system

configuration using hardware key (optional)

- Separate control unit for remote control (optional)

C6000 Chiller

- LCD graphic display
- Integrated sequencing for up to 6 units
- High pressure management
- Free cooling management
- Continuous condensation pressure regulation

C7000

- High redundancy and availability thanks to independent controllers
- Integrated sequencing for up to 20 units
- Zone operation
- Filter control management
- CW standby management
- Free cooling control
- User interface with graphic display and remote control (optional)



Gateways for STULZ controller systems

ALARM

Remote monitoring and control



**SMS/
E-mail**



**Alarm/Voltage
free contacts**



**HTTP/
SNMP**



**Display/
Visualisation**



Operation



**Remote
maintenance**

CUSTOMER

CyberCool XT “small” controller:

- For units with one compressor
- Up to a cooling capacity of approx. 30 kW
- Key pad with LED status display
- On some units, only available as remote control

CyberCool XT “medium” controller:

- For units with 2 compressors and one refrigerant circuit
- Up to a cooling capacity of approx. 30-80 kW
- 7-digit, 7-segment display plus 12 LEDs
- Key pad
- Sequencing for up to 3 units (optional)

CyberCool XT “large” controller:

- For all units with cooling capacity above 80 kW
- Graphic display
- High redundancy and availability thanks to modular design of autarkic controllers
- Sequencing for up to 7 units (optional)
- Free cooling management

STULZ quality. Or: Precision climate control put to the test!



High availability under test: Even during the planning phase, with temperatures ranging from $-20\text{ }^{\circ}\text{C}$ to $+55\text{ }^{\circ}\text{C}$, the STULZ Air-Conditioning Test Centre simulates the load conditions of the planned A/C system. Fully assembled air-conditioning systems undergo extensive practical testing in the climate chamber.



STULZ – expertise and partnership for tailor-made solutions

STULZ precision air-conditioning systems feature optimum quality and reliability. From individual units with a cooling capacity from 0.3 kW through to modular systems with several megawatts of capacity, STULZ offers a complete range of products that provide optimum solutions for every situation.

Air-conditioning experts support you in design, realization, installation and maintenance of your system. In case of emergency, STULZ's global service organisation provides rapid assistance and maximum availability.

Reliable air-conditioning available worldwide

Whether it is in Rio, New York, Shanghai or London: Operators of ICT systems throughout the world rely on precision air-conditioning technology from STULZ. Trust STULZ's 40 years of experience, high availability quality products, expert advice and reliable service. Wherever you need us, we are not far away.

www.stulz.com/global

STULZ Company Headquarters

D **STULZ GmbH**
Holsteiner Chaussee 283 · 22457 Hamburg
Tel.: +49(40)55 85-0 · Fax: +49(40)55 85 352 · products@stulz.de

STULZ Subsidiaries

AUS **STULZ AUSTRALIA PTY. LTD.**
34 Bearing Road · Seven Hills NSW 21 47
Tel.: +61(2)96 74 47 00 · Fax: +61(2)96 74 67 22 · sales@stulz.com.au

AT **STULZ AUSTRIA GmbH**
Lamezanstraße 9 · 1230 Wien
Tel.: +43(1)615 99 81-0 · Fax: +43(1)616 02 30 · info@stulz.at

CN **STULZ AIR TECHNOLOGY AND SERVICES SHANGHAI CO., LTD.**
Room 5505, 1486 West Nanjing Road, JingAn · Shanghai 200040 · P.R. China
Tel.: +86(21)3360 7133 · Fax: +86(21)3360 7138 · info@stulz.cn

E **STULZ ESPAÑA S.A.**
Avenida de los Castillos 1034 · 28918 Leganés (Madrid)
Tel.: +34(91)517 83 20 · Fax: +34(91)517 83 21 · info@stulz.es

F **STULZ FRANCE S. A. R. L.**
107, Chemin de Ronde · 78290 Croissy-sur-Seine
Tel.: +33(1)34 80 47 70 · Fax: +33(1)34 80 47 79 · info@stulz.fr

GB **STULZ U. K. LTD.**
First Quarter · Blenheim Rd. · Epsom · Surrey KT 19 9 QN
Tel.: +44(1372)74 96 66 · Fax: +44(1372)73 94 44 · sales@stulz.co.uk

I **STULZ S.P.A.**
Via Torricelli, 3 · 37067 Valeggio sul Mincio (VR)
Tel.: +39(045)633 16 00 · Fax: +39(045)633 16 35 · info@stulz.it

IN **STULZ-CHSPL (INDIA) PVT. LTD.**
006, Jagruti Industrial Estate · Mogul Lane, Mahim · Mumbai - 400 016
Tel.: +91(22)56 66 94 46 · Fax: +91(22)56 66 94 48 · info@stulz.in

NL **STULZ GROEP B. V.**
Postbus 75 · 1180 AB Amstelveen
Tel.: +31(20)54 51 111 · Fax: +31(20)64 58 764 · stulz@stulz.nl

NZ **STULZ NEW ZEALAND LTD.**
Office 71, 300 Richmond Rd. · Grey Lynn · Auckland
Tel.: +64(9)360 32 32 · Fax: +64(9)360 21 80 · sales@stulz.co.nz

PL **STULZ POLSKA SP. Z O.O.**
Budynek Mistral · Al. Jerozolimskie 162 · 02 – 342 Warszawa
Tel.: +48(22)883 30 80 · Fax: +48(22)824 26 78 · info@stulz.pl

SG **STULZ SINGAPORE PTE LTD.**
33 Ubi Ave 3 #03-38 Vertex · Singapore 408868
Tel.: +65 6749 2738 · Fax: +65 6749 2750 · andrew.peh@stulz.sg

USA **STULZ AIR TECHNOLOGY SYSTEMS (SATS), INC.**
1572 Tilco Drive · Frederick, MD 21704
Tel.: +1(301)620 20 33 · Fax: +1(301)662 54 87 · info@stulz-ats.com

ZA **STULZ SOUTH AFRICA PTY. LTD.**
Unit 18, Jan Smuts Business Park · Jet Park · Boksburg · Gauteng, South Africa
Tel.: +27(0)11 397 2363 · Fax: +27(0)11 397 3945 · aftersales@stulz.co.za

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.