IT Cooling Solutions

CyberAir 2 – Precision Cooling Solutions

Making more efficient use of your resources

STULZ

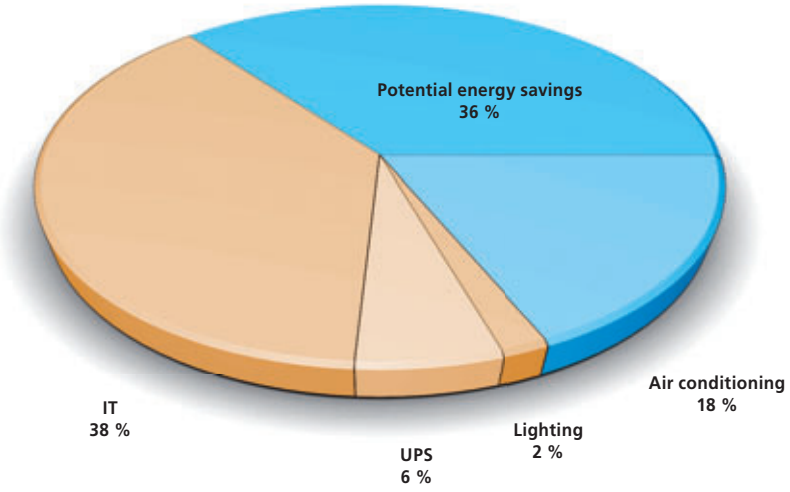
Maximum availability, minimum operating costs

Data centres are the hubs without which global real-time communication would be unthinkable. Therefore, today IT downtime due to overheating servers inevitably entails considerable losses in turnover. Precise control of the air conditioning ensures that this IT lifeblood of the communications world continues pumping around the clock.

Your investment in the STULZ CyberAir 2 precision air-conditioning system with energy-saving technology pays for itself in just a few years. Take a data centre in Berlin, for example, with a floor area of 300 m² and a heat load of 1 kilowatt per m². Here, the STULZ CyberAir 2 with free cooling system has cut annual running costs from € 102,397 to just € 49,989 a year*.

** Source: STULZ comparison of system costs*

Example of energy distribution in a data centre



Efficient environmental control with STULZ CyberAir 2

The new CyberAir 2 stand-alone air-conditioning system from STULZ controls the conditions in the data centre with utmost precision, maximum reliability and energy efficiency. An intelligent electronic processor ensures that the CyberAir 2 consumes up to 60 % less electricity than conventional precision air-conditioning systems.

German engineering powered by STULZ

The CyberAir 2 embodies more than three decades of project experience by STULZ. No other precision air-conditioning system offers more flexibility than the CyberAir 2, for each STULZ system is tailored to your requirements.

Designed for dependable, continuous operation over many years, the STULZ CyberAir 2 works quietly, reliably and exceptionally economically whilst keeping your IT available all the time.

Contents

Air-conditioning concepts for individual solutions

Engineers face various technical challenges when planning the construction of a data centre. The local climate, room configuration, environmental conditions, noise protection and safety – all these have a direct influence on the amount invested and running costs.

The STULZ CyberAir 2 precision air-conditioning system answers to all these demands. From a wealth of options, our STULZ specialist advisers put together an individual system solution, which precisely matches your project requirements.

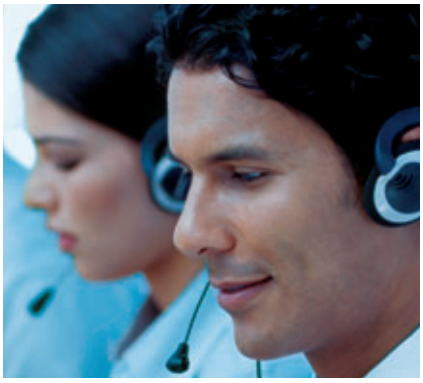
Whether you are refurbishing or running a legacy system or building a new one – choose energy-efficient air conditioning from STULZ.

Expert, punctual implementation

Project and site management during the construction phase, selecting and monitoring subcontractors, not to mention actual start-up – STULZ is your specialist partner for expert, punctual implementation of your air-conditioning system. Every STULZ air-conditioning system is fully certified to ISO 9001:2000. Start-up includes a meticulous process of adjustment to the customer's situation, which is precisely logged and documented.

Tailored to individual requirements

To enable you to accurately estimate your budget, STULZ draws up a detailed quotation based on your requirements in terms of performance, availability, space planning and operational cost. Your STULZ specialist adviser configures an individual air-conditioning system, and helps you to draw up service specifications and invitations to tender.



Service without delay

STULZ CyberAir 2 precision air-conditioning systems are manufactured from high-quality components. In the STULZ Test Centre, they undergo an extensive stress test at temperatures ranging from -20° to +45° Celsius. In this way, we at STULZ ensure that our air-conditioning systems work reliably in any climate on Earth. Nevertheless, should problems arise, our STULZ Service Support is available 24/7.

STULZ advice and support

» Individual planning assistance

» Specific performance data for individual projects

» Digital documentation

» Expert implementation and start-up

» Worldwide service

Superior technology that pays for itself

The STULZ CyberAir 2 precision air-conditioning system satisfies the most exacting demands for availability and energy efficiency. From a selection of 7 cooling systems, 6 sizes and numerous equipment options, our STULZ specialist advisers select and configure a tailored solution for your specific operational infrastructure.

Made in Germany

CyberAir 2 A/C units in standard door sizes are available as energy or space-saving versions. The six available unit sizes range from 1000 to 2900 mm in width. The minimal depth of 890 mm is the same as a server rack.

Control by microprocessor

Each STULZ CyberAir 2 A/C unit has its own electronic controller. The C7000 microprocessor controls all active components.

Seven cooling systems

From a choice of seven cooling systems, data centre operators will find the optimum balance between investment, running costs and energy efficiency. All systems are available as both upflow and downflow versions.

Save space and energy

STULZ CyberAir 2 A/C units are produced both as a space-saving standard version and an energy-optimised, low-energy version.

Three different refrigerants

In addition to water as the cooling medium, the STULZ CyberAir 2 can run with three different refrigerants: standard refrigerants R407C and R410A, and high-temperature refrigerant R134a.

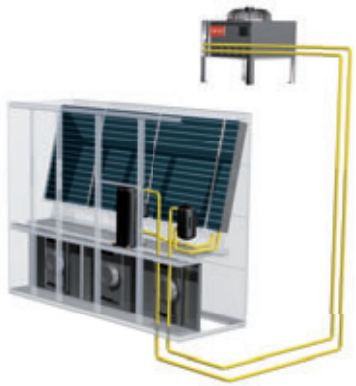
STULZ CyberAir 2

- Stand-alone precision air-conditioning system for data centres and equipment rooms
- Flexible: 7 cooling systems in both upflow and downflow format, 6 sizes, standard and low-energy versions
- Scalable to max. 20 air-conditioning modules per bus system
- Up to 60 % more energy efficiency with STULZ DFC automatic air conditioning
- The C7000 microprocessor efficiently regulates all system states, CW standby management, the EC fan and the electronic expansion valve
- Three refrigerants
- Reliability through built-in redundancy and automatic alarm notification via SMS or e-mail
- Compact dimensions
- Filter control management
- All parts requiring maintenance can be accessed from the front

Seven ways to maximum availability

Energy efficiency, capital investment, running costs, room size, noise protection, redundancy, local climate – every project has its own specific requirements when it comes to the precise air conditioning of sensitive data centres. The STULZ CyberAir 2 is therefore available with seven cooling systems: air or water-cooled, flexible mixed operation, backed up by indirect free cooling, and energy-saving with STULZ DFC automatic air conditioning.

1



1. A-system: Compressor cooling with compressor cooling system based on the direct evaporator principle (DX/direct expansion)

The refrigerant circuit of the A/C module consists of an evaporator, an expansion valve, a scroll compressor and an external air-cooled condenser.
The ambient air conveyed by the fan flows through the evaporator. As it does so, heat is removed from the air and is transferred to the refrigerant. The A/C unit and the external condenser are linked by means of a closed refrigerant circuit.

2

2. G-system: Simple heat dissipation via the water-glycol mixture

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

3

3. GE-system: Hybrid G-system with indirect free cooling

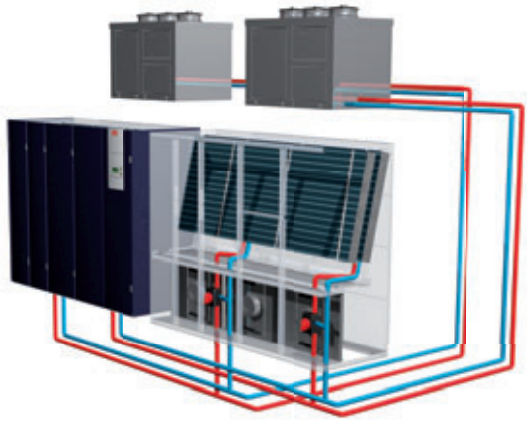
A hybrid cooling system, which combines a G-system with indirect free cooling. The GE system switches to energy-saving mode as soon as the outside temperature permits. The outside air is then utilised for indirect free cooling. GE systems form the basis of DFC (Dynamic Free Cooling).

4

4. CW system: Liquid-cooled system

CW units manage without a refrigerant circuit of their own, but require separate chilled water production. The ambient air conveyed by the fan flows through the direct cooling unit, which transfers heat to the water-glycol mixture. A chiller removes the heat from this water-glycol mixture. The A/C unit and the chiller are connected to one another by means of a closed water-glycol circuit.

5



5. CW2 system: Liquid-cooled system with built-in redundancy

High-security systems often require a second, independent chilled water supply. Therefore, in the CW2 system, two redundant CW systems are integrated in one A/C unit, saving valuable space in the data centre.

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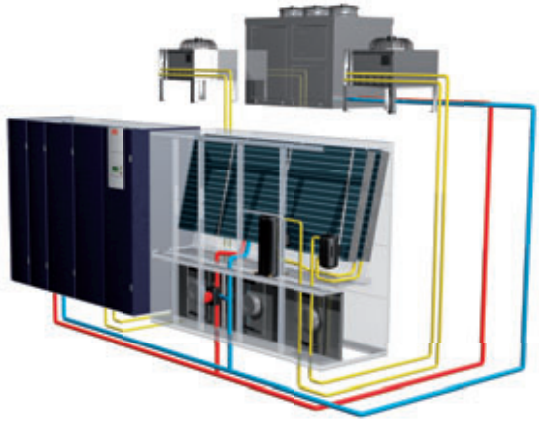


6. ACW system: CW system with redundant A-system (dual fluid)

Two independent cooling systems (CW and A) in one A/C module ensure maximum failure resistance. If the main, liquid-cooled system (CW) fails, the air-cooled A-system ensures that air conditioning continues without interruption.

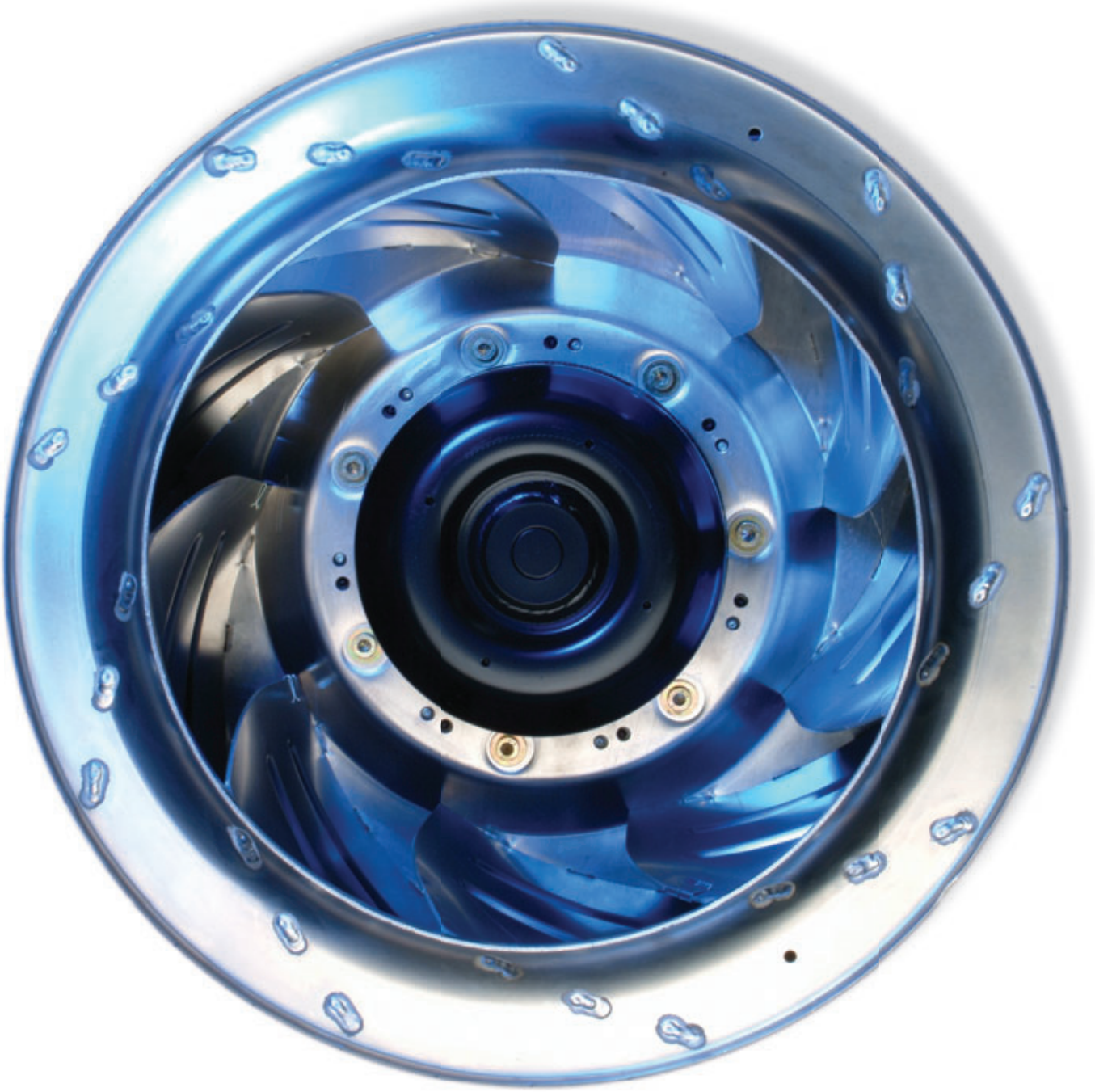
7

7. GCW system: CW system with redundant G-system (dual fluid)

Similar design to the ACW cooling system, but with a liquid-cooled G-system working in combination with the CW system, instead of the A-system.

Efficiency is a matter of intelligence

Most of the energy consumed in the data centre vanishes unused, because conventional air-conditioning systems react too slowly to changing load situations. But the intelligent electronic processor of the STULZ CyberAir 2 regulates the output of fans and cooling circuit valves as quick as a flash and with the utmost precision.



Adaptive ventilation with EC technology

The fans of the CyberAir 2 air-conditioning system are powered as standard by energy-saving EC DC motors. 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!

Greater efficiency with EEV

With its pinpoint reaction to temperature and pressure fluctuations, the electronic expansion valve (EEV) permanently increases the performance and efficiency of your air-conditioning system. In ideal operating conditions, efficiency is raised by up to 37 %! The valve makes sure that sensitive hardware is kept cool with a uniformly high volume of air, even during dehumidification.

Save with electronic load distribution at half the energy

All chilled water cooled versions of the STULZ CyberAir 2 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 2 are able to use up to 70 % less energy.

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.

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.

Fan with EC technology

» High efficiency of up to 92 %, reaping obvious savings in running costs

» Quiet running, long life, maintenance-free

Electronic expansion valve

» Achieve up to 37 % more efficiency by exploiting cool outside temperatures

CW-Standby-Management

» Energy-saving concept for CW systems

» Incorporation of standby units for energy-saving partial load mode

» Automatic switchover to full load in the event of problems

» Fans use up to 70 % less energy

Up to 60 % more economical with STULZ DFC automatic air conditioning

STULZ CyberAir 2 with DFC is the first precision air-conditioning system in the world that automatically switches to the best operating mode on the basis of the heat load in the data centre and seasonal variations in outside temperature. DFC (= Dynamic Free Cooling) was developed exclusively for the STULZ CyberAir 2 with indirect free cooling.

Full hybrid with indirect free cooling

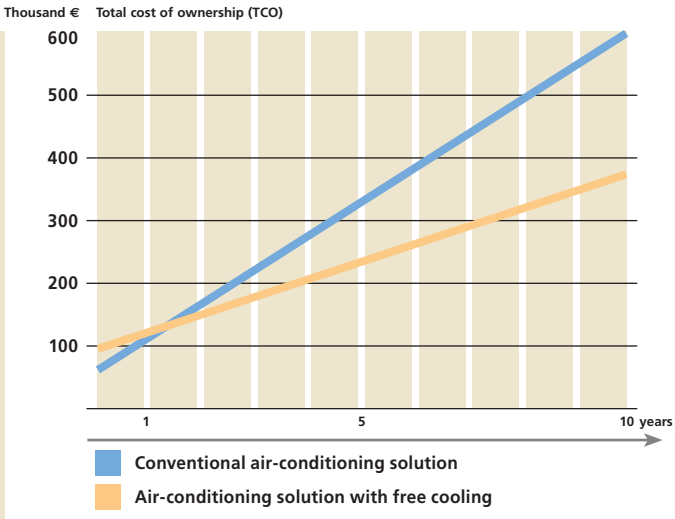
DFC combines compressor cooling and free cooling in four stages, and automatically searches for the most economical operating mode. In cool weather, DFC makes use of economical indirect free cooling, which extracts all its cooling power from the outside air. Energy-intensive compressor cooling (DX) is only switched on when absolutely necessary.

Complete electronic control for DFC savings

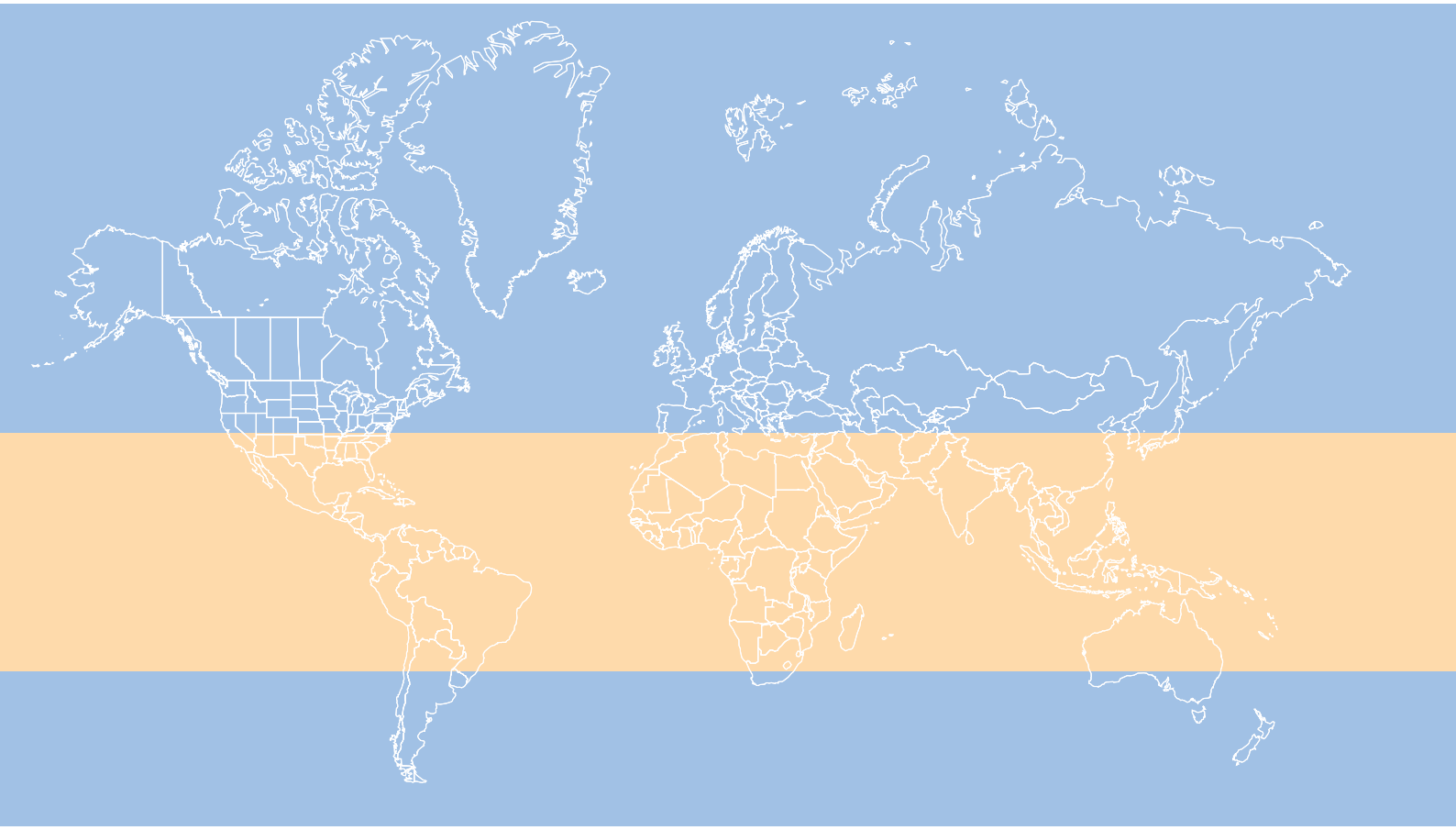
With utmost sensitivity and precision, DFC selects the most energy-saving mode, controls the speed of the EC fans in the A/C unit and those of the dry cooler, regulates the position of the control valves, reduces the electricity consumption of the pumps and ensures precise interior climate control. By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

Energy savings with DFC

- Up to 60 % energy savings
- The world's first system with automatic efficiency optimisation
- Automatic switch between compressor cooling and indirect free cooling
- Networking of all active components: A/C and standby units, control valves, compressors, EC fans, pumps, dry coolers



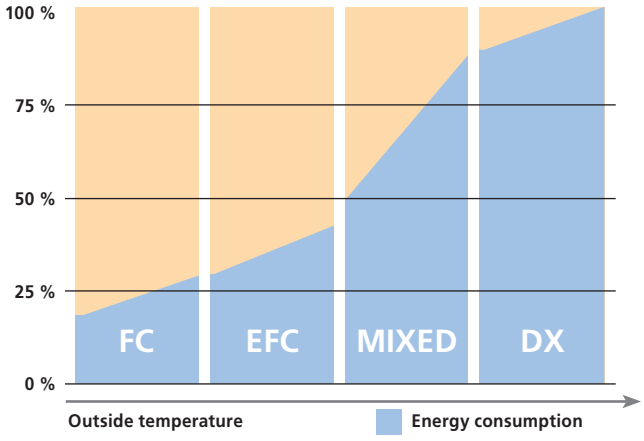
The higher capital investment in a STULZ CyberAir 2 with DFC compared with a conventional air-conditioning system is offset after just a few years.



In moderate climates north and south of the equatorial zone, the energy-saving advantages of the STULZ CyberAir 2 with DFC can be exploited to the full. Electricity consumption for data centre air conditioning falls by up to 60 %.

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



High-quality, reliable and scalable

STULZ CyberAir 2 A/C units are manufactured with care from high-quality components. They are compact and can be combined as desired – and so adapt flexibly to the space and characteristics of your data centre. Redundant standby units ensure maximum levels of availability.

STULZ CyberAir 2 allows for both central and distributed arrangement of A/C units. Every unit has its own intelligence. Up to 20 units work together in the system network.

Growing to suit the load

The resilient scalability of the STULZ CyberAir 2 range responds to rising heat loads caused by your expanding IT infrastructure. Further A/C units can even be added during ongoing operation. The C7000 microprocessor links up to 20 units in a network zone.

Targeted air conditioning

The A/C units can be located centrally in an air-conditioning room or distributed around the data centre. The refrigerant line of each A/C unit can be precisely adapted to the respective operating conditions. In all cases, the system enables optimum air distribution, which effectively prevents hotspots.

Small footprint, numerous possibilities

Designed to fit through a standard doorway, space can easily be found for every A/C unit without spending a great deal of time on transport and assembly. The system is preconfigured and ready for start-up once installed.

Size to suit requirements – choose between space-saving standard version ASD702A (BG4) or low-energy version ALD702A (BG5)

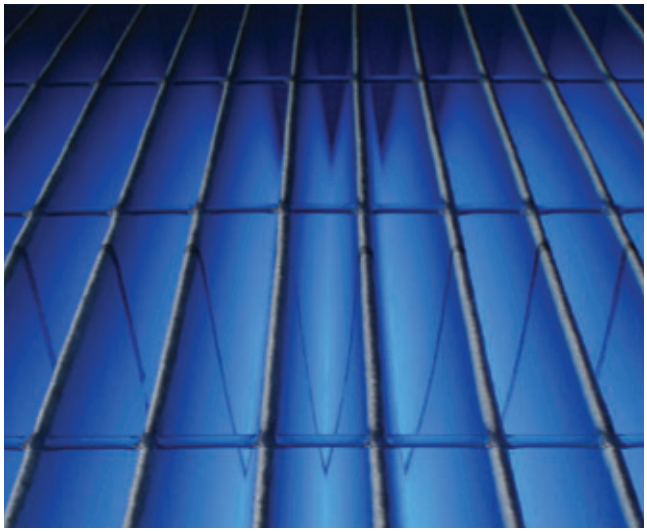
Quality workmanship

STULZ CyberAir 2 precision air-conditioning systems are manufactured from high-quality materials. Reliability and a long service life are guaranteed by comprehensive corrosion protection and continuous quality assurance. Each STULZ CyberAir 2 A/C unit is equipped with its own microprocessor, which automatically switches to a standby unit in the event of problems.

Made in Germany

Simple maintenance

All fine tuning can be accomplished smoothly using the operator terminal of the STULZ C7000 microprocessor. Maintainable components inside the A/C units are positioned so as to allow easy service access from the front.



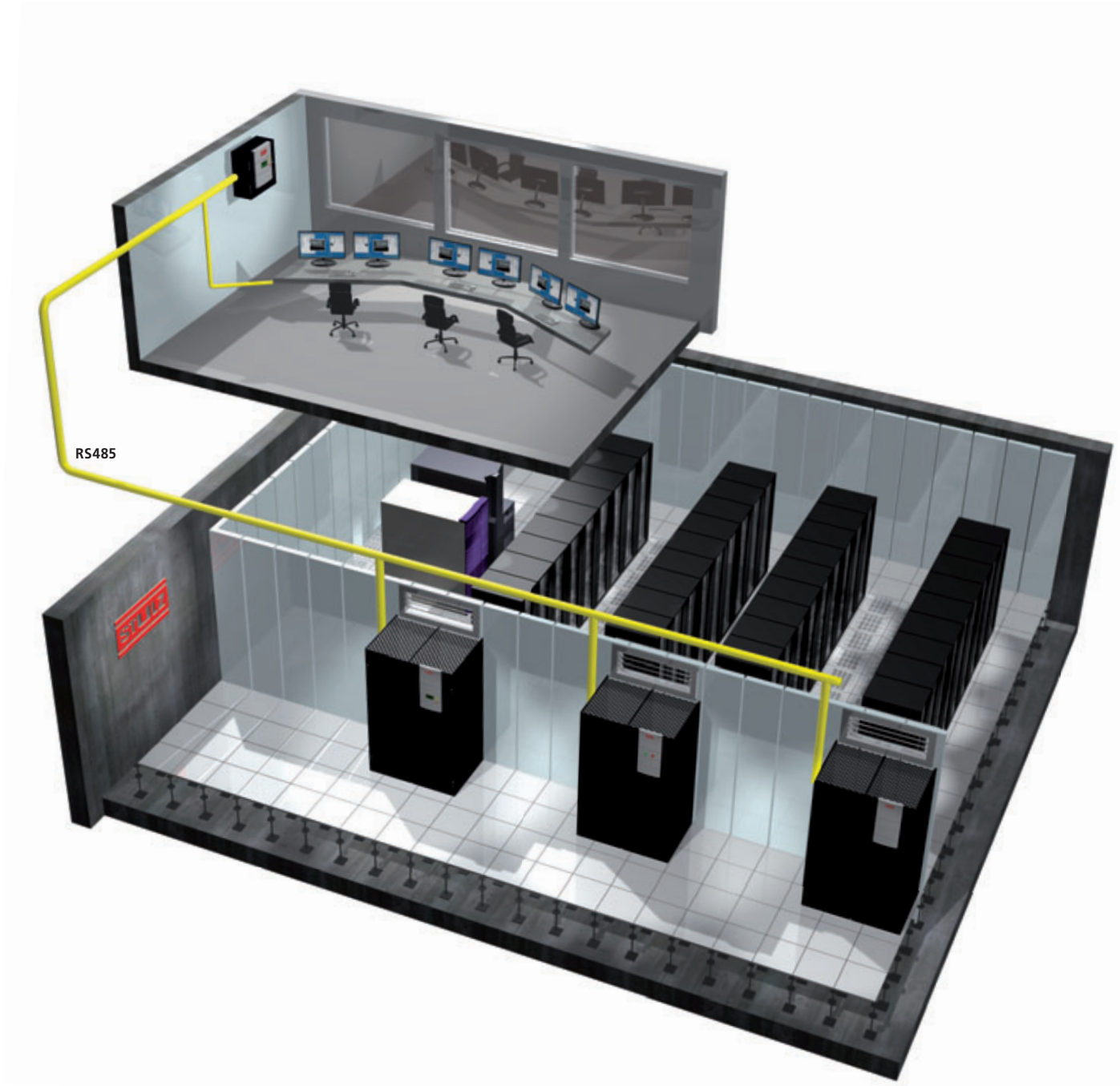
The filter system increases filter life while allowing minimal pressure losses. Filter class G4 (EU4) is standard

Quality down to the last detail

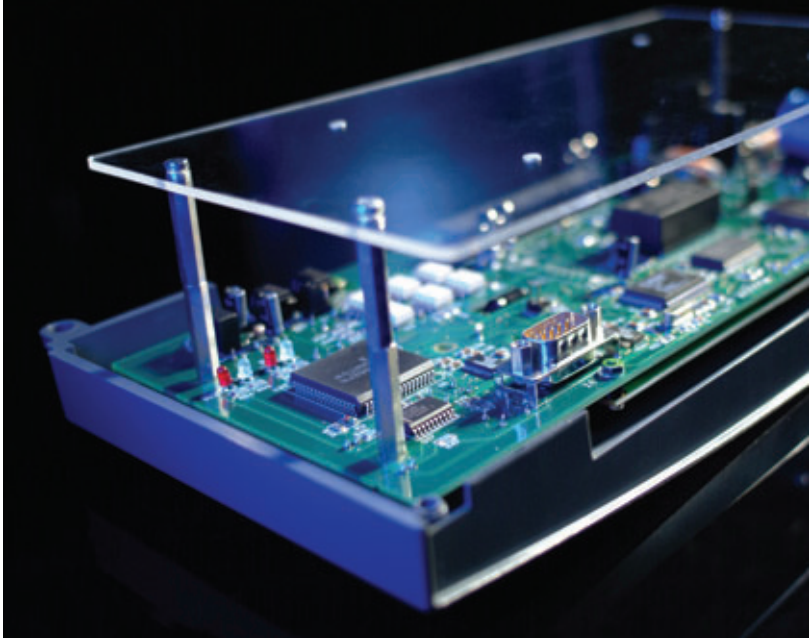
- A/C units in 6 sizes and with 7 cooling systems
- Precise air distribution, targeted removal of hotspots
- Scalable thanks to its modular construction, up to 20 units per room without additional hardware
- Automatic switchover to redundant standby units in the event of problems
- Perfect workmanship, superior materials
- Compact standard version or energy-optimised low-energy version
- Standard door size facilitates transport and assembly
- Convenient front only access for easy maintenance

Control by microprocessor

To achieve the precise, reliable control of air conditioning, standby reserves and energy consumption, the STULZ CyberAir 2 is based on highly developed electronics. The STULZ C7000 microprocessor, which is integrated in every A/C unit, is the nerve centre of our innovative control concepts.



Networked system based on the RS485 standard
Bus systems based on the RS485 standard protocol offer high transmission rates and good reliability. Unlike an open Ethernet network, the closed RS485 bus system hermetically seals off the air-conditioning system out of harms' way of viruses and faulty software. As the global industry standard, RS485 ensures compatibility with all common BMS systems now and in the future.



All active components in perfect balance

The microprocessor keeps all active components of the system in balance. It adapts various parameters such as airflow, external pressure, noise level and cooling capacity of each A/C unit precisely in line with the room conditions. In addition, it supplies the data for the remote control units, initiates service messages and alarms via e-mail or SMS and can be linked via interfaces to all common BMS systems and to the Internet.

C7000 basic version

This version comes equipped with all the necessary functions for controlling and monitoring the air-conditioning system. A service interface enables the C7000 to be precisely configured using a laptop. Optional signal lamps on the housing keep the user informed about the operating state of the A/C unit. The Modbus protocol frequently used for connection to BMS systems is already integrated in the microprocessor:

- High level of redundancy and availability thanks to autonomous controllers in every A/C module
- Sequencing with standby functions
- Control of up to 20 A/C modules per data bus system
- UPS operation with configurable components for low unit power consumption
- Recording the room conditions
- Event log
- Zone operation
- Service interface
- Modbus protocol preinstalled

C7000 Advanced user interface

This interface also features an external control panel with graphic display and an extended operator interface for connection to all common BMS systems. The Windows-type menu structure enables you to centrally control up to 20 A/C units. In addition to the functions of the basic version, the C7000 Advanced also offers the following:

- Large LCD graphic display for operation and control, either integrated in the A/C unit or as a separate remote control
- Simple adaptation to local conditions on start-up
- Several user languages
- Service interface for configuration and downloading software
- Manual mode for service purposes
- Suitable for connection to all common BMS systems. The RS485 and RS232 ports enable connection and interfacing to a BMS.
- Modbus and other data protocols preinstalled

Network connection for convenient control

With intelligent network solutions from STULZ, you will always be in control of your STULZ CyberAir 2 precision air-conditioning system. You can enter and adjust set-points, monitor the system and output operating data either using separate operator terminals, your PC or via a link to existing building management systems.

The serial interfaces RS485 and RS232 are compatible both with STULZ's own BMS system, TeleCompTrol, and all common BMS systems from other manufacturers. Enjoy the convenience of controlling your air-conditioning system by web browser using the STULZ WIB8000 Internet interface. And incorporate it in building management bus systems via the LonWorks®-based STULZ LIB7000 interface.

Basic interface STULZ MIB7000

- MIB = Multifunctional Interface Board
- BMS interfaces to bus systems in conformity with RS485 and RS232 standard
- Interfaces RS485 and RS232

Internet interface STULZ WIB8000

- WIB = Web Interface Board
- Communication via SNMP and HTTP IP protocols
- Browser-based configuration and operation (HTTP)

LonWorks interface STULZ LIB7000

- LIB = Lon Interface Board, upgrade to MIB7000
- LonWorks® technology for STULZ air-conditioning systems

BMS suppliers	Data protocol						
Controller		C7000 IOC with E-bus	C7000 IOC	C7000 IOC with E-bus	C7000 IOC with E-bus	C7000 IOC with E-bus	C7000 IOC
Gateway			+ Advanced	+ MIB	+ WIB	+ MIB + LIB	+ CompTrol SMS
Various manufacturers	Modbus	●	●	●			
STULZ, TeleCompTrol	SDC			●			
Kieback & Peter	P90		●	●			
Saia	S-Bus		●				
Various manufacturers	BACnet	●	● ●				
LonWorks®	LonTalk®	●	●			●	
Various manufacturers	SNMP				●		
Various manufacturers	HTTP				●		
Various manufacturers	GSM						●

Cross-reference table: gateway – data protocol

● Full functionality ● A customised gateway solution with protocol converter is available for high transmission rates in larger bus systems

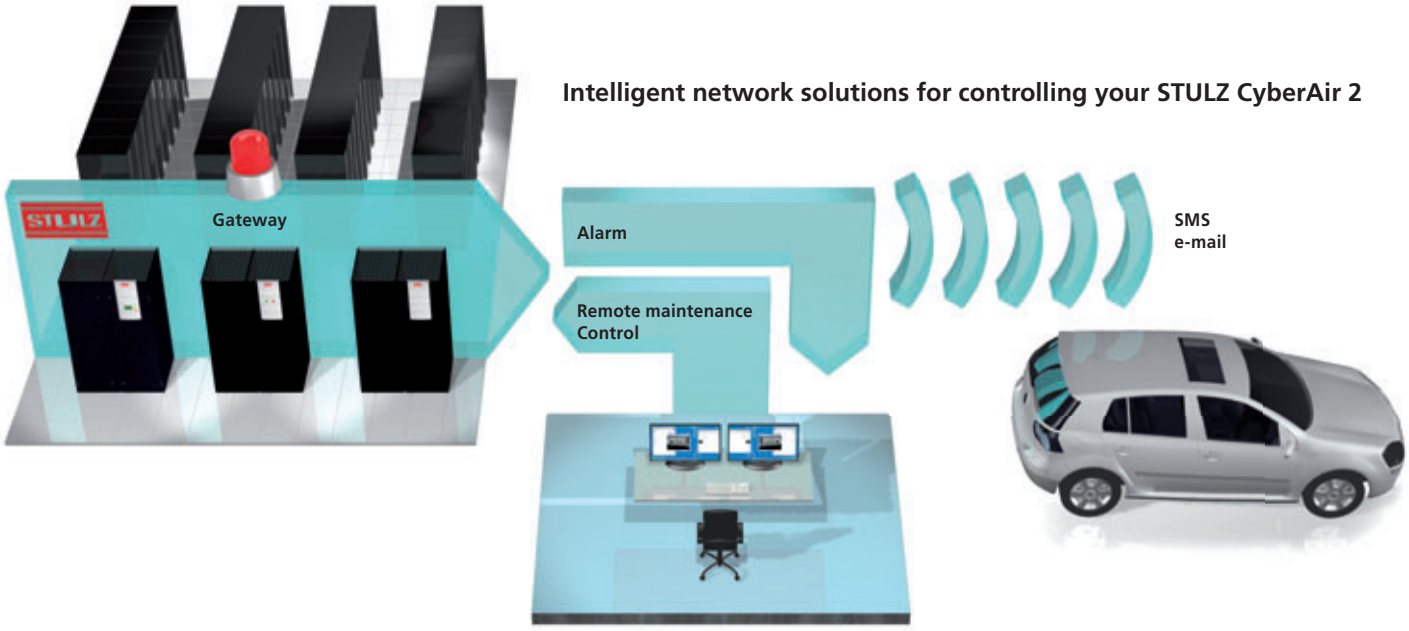
Fully networked with building management systems

» Link to all building management systems from well-known manufacturers

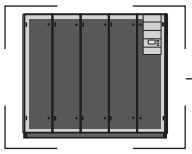
» Remote control via web browser and SNMP and HTTP Internet protocols

» SMS or e-mail alarm notification via mobile phone with GSM modem

Intelligent network solutions for controlling your STULZ CyberAir 2

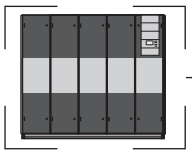


CyberAir 2 – Unlimited versatility with a diverse range of options



Mechanical and general options

» Raised floorstand
» Louvered shutters
» Flexible canvas fittings
» Fresh air connection
» Filter class F5 (EU5)
» Discharge Air Plenums
» Suction base for upflow units
» Duct fitting with pocket filter attachment F6, F7, F9
» Mufflers
» Dual wall design
» Condensate pump
» Special paint

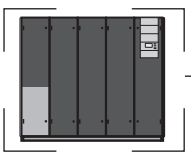


Heating options

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

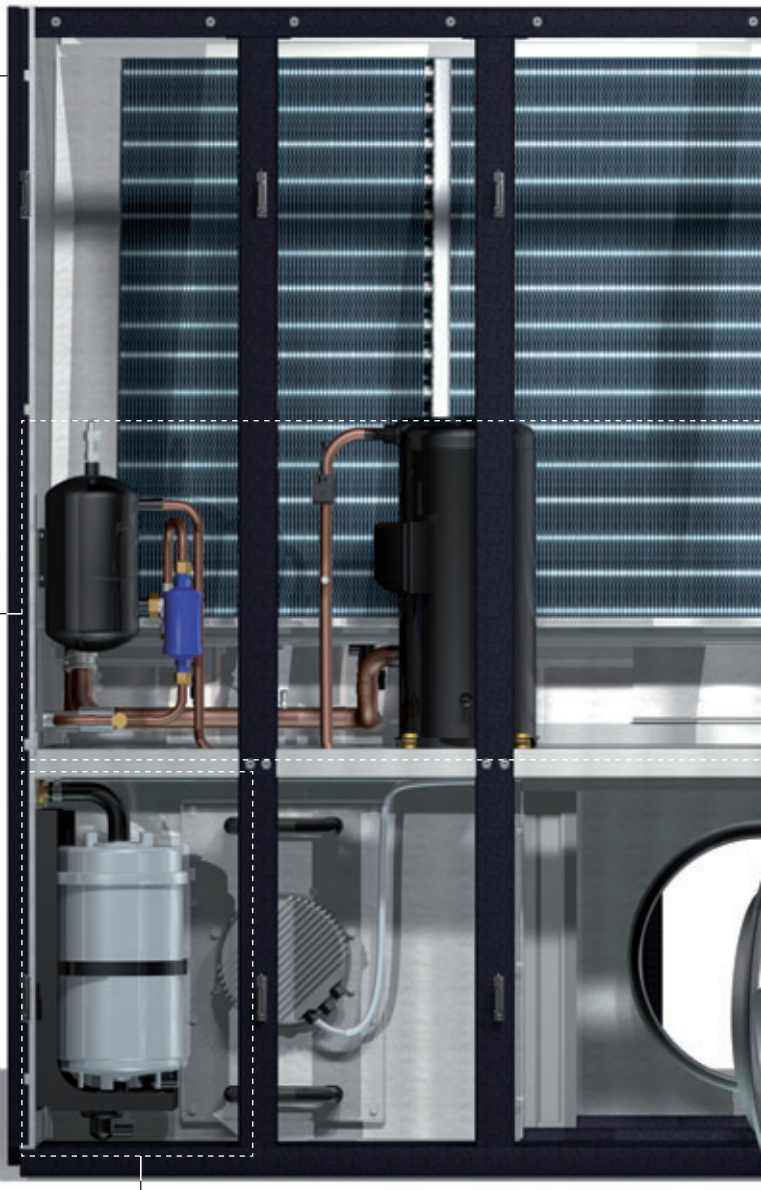
Options for air-cooled condensers

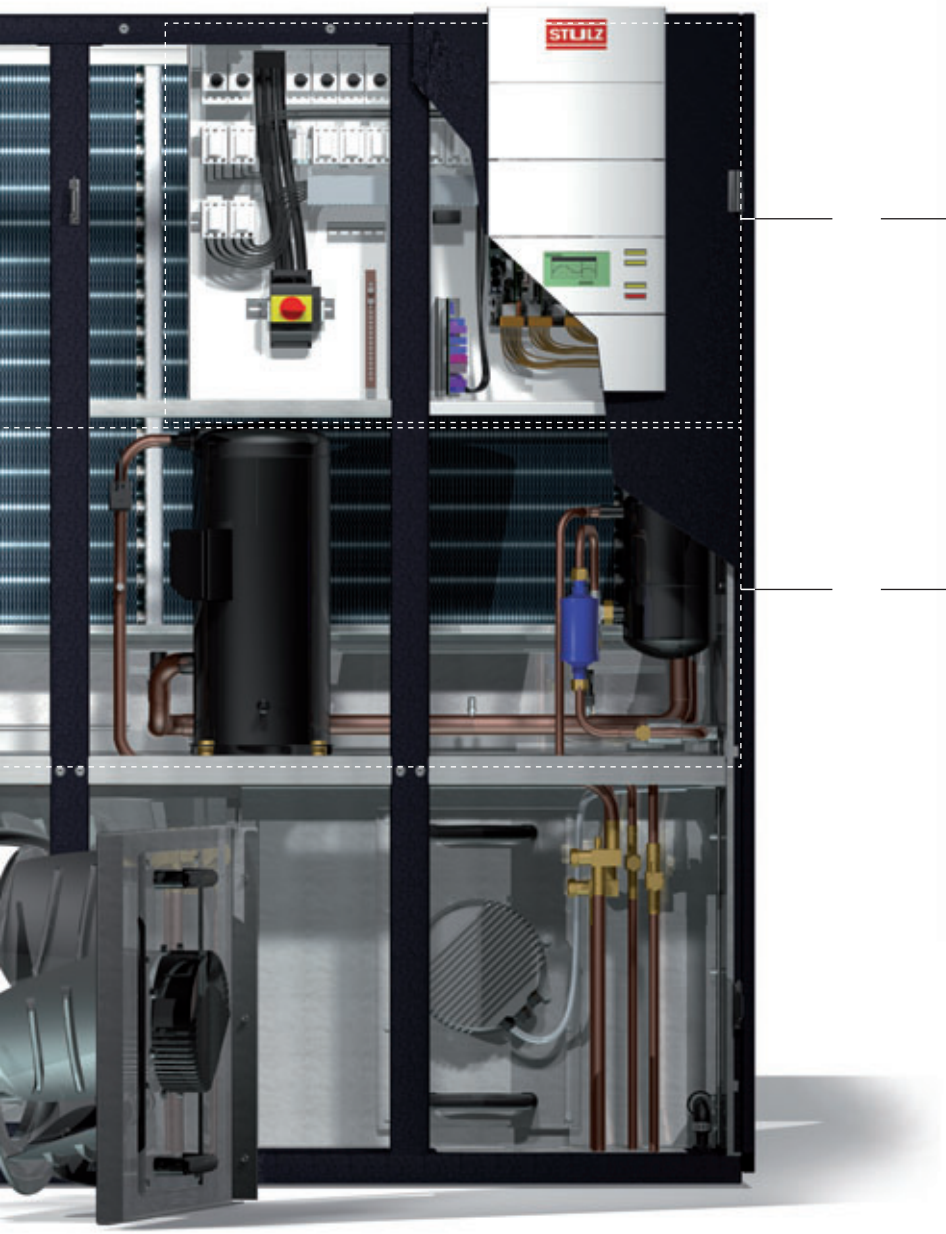
» Fan speed control
» Winter set-up for operation at temperatures down to -45 °C
» Anti-corrosive coating of heat exchanger pipes

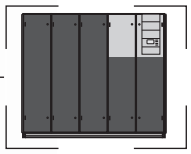


Humidifier options

» Continuous steam humidification
» External ultrasonic humidification function

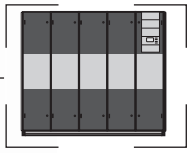






Electrotechnical options:

» Fire alarms
» Smoke alarms
» Emergency fire shut-down
» 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

Technical data

CyberAir 2 CW

CW units (1 chilled water circuit)

ASD xxx CW		**310**	**410**	**540**	**680**	**760**	**910**	**1020**	**1150**	**1210**	**1510**	**1860**	**2120**
Air flow	m³/h	6,500	8,500	10,000	13,000	16,000	19,000	19,500	22,000	24,000	29,000	34,000	39,000
CW cooling capacity (total)[1] Water temperature: 7 °C/12 °C	kW	31.3	40.4	54.1	68.1	84.3	100.5	113.1	127.4	134.5	158.6	179.2	204.0
CW cooling capacity (sensible)[1] Water temperature: 7 °C/12 °C	kW	26.2	34.0	43.0	54.9	67.5	80.3	87.2	97.8	104.8	125.7	144.3	164.8
Hydraulic pressure drop[1] Water temperature: 7 °C/12 °C	kPa	36	61	63	100	36	51	60	75	94	132	71	93
CW cooling capacity (total)[1) 3)] Water temperature: 10 °C/15 °C	kW	24.1	29.8	37.9	46.0	54.7	64.0	76.7	84.1	83.3	101.3	103.0[5)]	103.0[5)]
CW cooling capacity (sensible)[1) 3)] Water temperature: 10 °C/15 °C	kW	22.9	28.7	35.7	44.2	54.7	64.0	71.5	79.2	82.5	98.8	96.1[5)]	96.1[5)]
Hydraulic pressure drop Water temperature: 10 °C/15 °C [1) 3)]	kPa	89	131	132	188	39	52	91	109	64	93	59[5)]	59[5)]
Max. available ESP	Pa	450	390	450	450	420	160	330	70	450	180	270	20
Noise level[2)]	dBA	49.5	56.6	50.8	57.3	54.4	58.1	62.9	65.8	60.7	65.5	64.9	68.4
Fan absorbed power[4)]	kW	0.8	1.7	1.4	2.9	3.0	5.0	3.7	5.3	4.1	7.2	8.1	12.1
Weight	kg	276	276	378	378	487	487	577	577	673	673	804	804
Number of fans		1		2						3		4	
Dimensions (Width x Height x Depth)	mm	950 x 1,980 x 890		1,400 x 1,980 x 890		1,750 x 1,980 x 890		2,200 x 1,980 x 890		2,550 x 1,980 x 890		3,000 x 1,980 x 890	
Humidifier output and heating capacity													
Max. humidifier capacity	kg/h	8				15							
Max. no of heating steps		1		2						3			
Max. overall heating capacity	kW	9		18						27			

ASU xxx CW		**310**	**410**	**540**	**680**	**760**	**910**	**1020**	**1150**	**1210**	**1510**
Air flow	m³/h	6,500	8,500	10,000	13,000	16,000	19,000	19,500	22,000	24,000	28,000
CW cooling capacity (total)[1] Water temperature: 7 °C/12 °C	kW	29.0	37.3	51.1	67.1	77.7	92.9	101.9	115.9	126.9	147.5
CW cooling capacity (sensible)[1] Water temperature: 7 °C/12 °C	kW	25.2	32.7	41.7	54.2	64.9	77.2	82.3	92.7	101.9	118.6
Hydraulic pressure drop[1] Water temperature: 7 °C/12 °C	kPa	33	55	60	103	35	48	58	75	74	101
CW cooling capacity (total)[1) 3)] Water temperature: 10 °C/15 °C	kW	22.8	28.5	34.5	45.5	52.6	61.5	70.2	78.7	83.5	96.1
CW cooling capacity (sensible)[1) 3)] Water temperature: 10 °C/15 °C	kW	22.2	28.0	34.4	44.3	52.6	61.5	68.0	76.0	83.5	96.1
Hydraulic pressure drop Water temperature: 10 °C/15 °C [1) 3)]	kPa	77	117	93	158	36	48	72	90	55	72
Max. available ESP	Pa	300	300	300	300	300	220	300	150	300	300
Noise level[2)]	dBA	50.3	57.0	50.5	56.6	55.0	57.8	62.0	64.6	56.5	59.9
Fan absorbed power[4)]	kW	0.9	1.8	1.1	2.3	2.9	4.7	3.5	4.9	4.0	6.2
Weight	kg	277	277	384	384	504	504	589	589	710	710
Number of fans		1		2						3	
Dimensions (Width x Height x Depth)	mm	950 x 1,980 x 890		1,400 x 1,980 x 890		1,750 x 1,980 x 890		2,200 x 1,980 x 890		2,550 x 1,980 x 890	
Humidifier output and heating capacity											
Max. humidifier capacity	kg/h	8				15					
Max. no of heating steps		1		2						3	
Max. overall heating capacity	kW	9		18						27	

CW2 units (2 chilled water circuits)

ASD/ASU xxx CW2		**330**	**560**	**650**	**950**	**1200**
Air flow	m³/h	7,500	13,000	16,000	20,000	26,000
CW cooling capacity (total)[1] Water temperature: 7 °C/12 °C	kW	26.0	48.8	62.7	78.6	103.0
CW cooling capacity (sensible)[1] Water temperature: 7 °C/12 °C	kW	24.0	43.5	55.1	69.0	89.3
Hydraulic pressure drop Water temperature: 7 °C/12 °C[1]	kPa	69	88	98	113	131
CW cooling capacity (total)[1) 3)] Water temperature: 10 °C/15 °C	kW	21.8	36.9	47.1	57.8	75.5
CW cooling capacity (sensible)[1) 3)] Water temperature: 10 °C/15 °C	kW	21.8	36.9	47.1	57.8	75.5
Hydraulic pressure drop Water temperature: 10 °C/15 °C [1) 3)]	kPa	82	67	93	98	142
CW system, downflow						
Max. available ESP	Pa	430	380	270	120	240
Noise level[2)]	dBA	51.4	55.4	56.4	58.8	58.1
Fan absorbed power[5)]	kW	1.5	2.9	4.3	5.4	6.8
Weight	kg	357	422	577	608	795
Number of fans		1	1	2	2	3
Dimensions (Width x Height x Depth)	mm	1,000 x 1,980 x 890	1,400 x 1,980 x 890	1,750 x 1,980 x 890	2,150 x 1,980 x 890	2,550 x 1,980 x 890
CW system, upflow						
Max. available ESP	Pa	280	300	210	110	230
Noise level[2)]	dBA	54.9	56.3	57.2	61.7	58.5
Fan absorbed power[5)]	kW	1.9	3.4	4.9	5.7	7.2
Weight	kg	357	422	577	608	795
Number of fans		1	1	2	2	3
Dimensions (Width x Height x Depth)	mm	1,000 x 1,980 x 890	1,400 x 1,980 x 890	1,750 x 1,980 x 890	2,150 x 1,980 x 890	2,550 x 1,980 x 890
Humidifier output and heating capacity						
Max. humidifier capacity	kg/h	8			15	
Max. no of heating steps		3		3[6)]	3	
Max. overall heating capacity	kW	12	18	18	27[7)]	27

Remarks: All data apply at 400 V/3 ph/50 Hz with 20 Pa ESP (external static pressure) for downflow units and 50 Pa ESP for upflow units

[1)] Return air conditions: 24 °C, 50 % r. h.; glycol: 0% [2)] Noise level at 2 m distance, free field [3)] Data apply to units with optional high-powered cooler

[4)] The electric power input of the fans must be added to the room load [5)] Data with reduced air flow, details provided on request

[6)] Max 2 heating steps for downflow units, dimensions 1,750 x 1,980 x 890 [7)] Max. heating capacity 18 kW for upflow, dimensions 2,150 x 1,980 x 890 Technical data subject to change without notice.

Technical data

CyberAir 2 DX

DX and Dual-Fluid units, single-circuit (1 compressor)											
ASD/ASU xxx A/G/ACW/GCW		**181**	**211**	**261**	**291**	**311**	**361**	**401**	**411**	**451**	**531**
Air flow	m³/h	5,500	6,500	7,200	7,500	9,000	10,000	10,000	11,000	13,400	14,000
DX cooling capacity (total)[1] R407C	kW	18.2	21.0	27.2	29.7	30.9	36.2	40.1	40.8	45.1	53.5
DX cooling capacity (sensible)[1] R407C	kW	18.2	21.0	24.7	26.2	30.9	33.7	35.2	37.8	45.1	47.8
Compressor power R407C	kW	3.7	4.2	5.6	6.3	6.3	7.5	8.4	8.4	9.6	11.6
DX cooling capacity (total)[1] R410A	kW	18.7	24.7	27.0	30.4	32.0	36.5	40.3	41.2	46.6	53.2
DX cooling capacity (sensible)[1] R410A	kW	18.7	22.3	24.7	26.5	30.3	33.8	35.3	38.0	44.1	47.7
Compressor power R410A	kW	3.9	5.2	5.6	6.4	6.4	7.4	8.5	8.5	9.3	11.0
DX cooling capacity (total)[1] R134a	kW	17.5	19.9	25.3	26.2	27.5	32.5	37.3	37.9	–	–
DX cooling capacity (sensible)[1] R134a	kW	17.5	19.9	24.0	24.9	27.5	32.5	34.1	37.9	–	–
Compressor power R134a	kW	3.3	3.9	5.0	5.3	5.3	6.7	7.7	7.7	–	–
CW cooling capacity (total)[2]	kW	20.3	23.9	26.4	27.5	34.0	37.8	37.8	42.4	51.4	53.7
CW cooling capacity (sensible)[2]	kW	18.6	21.7	23.9	24.8	30.8	34.0	34.0	38.0	45.5	47.3
A, G-system, downflow											
Max. available ESP	Pa	450	450	440	410	450	330	330	450	450	450
Noise level[3]	dBA	48.3	51.8	54	54.9	56.5	58.7	58.7	51.3	55.4	56.4
Fan absorbed power[4]	kW	0.7	1.1	1.4	1.6	1.4	1.9	1.9	1.4	2.5	2.8
A, G-system, upflow											
Max. available ESP	Pa	450	450	430	380	450	310	310	450	450	420
Noise level[3]	dBA	49.6	52.9	54.9	55.8	56.9	59.1	59.1	52.5	56.4	57.3
Fan absorbed power	kW	0.8	1.2	1.6	1.8	1.6	2.1	2.1	1.7	2.9	3.2
ACW, GCW downflow											
Max. available ESP	Pa	450	450	380	320	430	270	270	450	430	370
Noise level[3]	dBA	49.5	53.1	55.2	56.1	56.8	59.1	59.1	52.5	56.7	57.6
Fan absorbed power[4]	kW	0.8	1.3	1.7	1.9	1.6	2.2	2.2	1.7	3.0	3.4
ACW, GCW upflow											
Max. available ESP	Pa	450	450	340	290	410	240	240	450	400	340
Noise level[3]	dBA	50.8	54.1	56.2	57	57.4	59.6	59.6	53.7	57.7	58.6
Fan absorbed power[4]	kW	0.9	1.4	1.9	2.2	1.8	2.4	3.1	2.0	3.4	3.8
Size		1	1	1	1	2	2	2	3	3	3

DX and Dual-Fluid units, dual-circuit (2 compressors)										
ASD/ASU xxx A/G/ACW/GCW		**402**	**452**	**512**	**552**	**612**	**702**	**802**	**862**	**1062**
Air flow	m³/h	11,000	13,000	14,000	16,000	18,500	19,000	21,000	22,500	24,000
DX cooling capacity (total)[1] R407C	kW	40.8	46.4	53.3	54.4	61.3	70.9	81.3	89.5	104.5
DX cooling capacity (sensible)[1] R407C	kW	37.8	43.4	47.7	54.4	61.3	64.8	74.4	80.3	88.9
Compressor power R407C	kW	8.4	9.6	11.2	11.2	12.6	15.0	16.8	19.2	23.0
DX cooling capacity (total)[1] R410A	kW	43.0	49.3	52.9	53.8	61.3	72.1	81.4	90.4	104.2
DX cooling capacity (sensible)[1] R410A	kW	38.6	44.5	47.6	53.8	61.3	65.2	74.5	80.7	88.7
Compressor power R410A	kW	9.0	10.4	11.2	11.2	12.8	14.8	17.0	18.6	22.0
DX cooling capacity (total)[1] R134a	kW	37.9	43.5	49.4	51.1	54.7	63.6	76.4	–	–
DX cooling capacity (sensible)[1] R134a	kW	37.9	43.5	46.2	51.1	54.7	63.6	72.5	–	–
Compressor power R134a	kW	7.8	8.6	10.2	10.0	10.6	13.2	15.4	–	–
CW cooling capacity (total)[2]	kW	40.4	47.8	51.4	57.2	66.4	69.9	77.9	83.3	88.7
CW cooling capacity (sensible)[2]	kW	36.8	43.0	46.1	52.0	59.7	62.7	69.7	74.2	78.6
A, G-system, downflow										
Max. available ESP	Pa	450	450	440	440	220	190	450	390	300
Noise level[3]	dBA	51.3	54.8	56.4	57.3	60.4	61	57.3	58.8	60.2
Fan absorbed power[4]	kW	1.4	2.3	2.8	3.0	4.5	4.9	4.0	4.9	5.9
A, G-system, upflow										
Max. available ESP	Pa	450	450	420	420	200	250	450	370	280
Noise level[3]	dBA	52.5	55.8	57.3	58.1	61.1	61.7	58.3	59.7	61.0
Fan absorbed power[4]	kW	1.7	2.6	3.2	3.3	5.0	5.4	4.5	5.5	6.6
ACW, GCW downflow										
Max. available ESP	Pa	450	450	360	370	130	90	400	310	210
Noise level[3]	dBA	52.5	56.1	57.6	58.3	61.4	62.0	58.6	60.1	61.5
Fan absorbed power[4]	kW	1.7	2.7	3.4	3.5	5.3	5.7	4.7	5.8	7.0
ACW, GCW upflow										
Max. available ESP	Pa	450	430	340	350	100	50	380	280	180
Noise level[3]	dBA	53.7	57.1	58.6	59.1	62.2	62.7	59.6	61.0	62.3
Fan absorbed power[4]	kW	2.0	3.1	3.8	3.9	5.9	6.3	5.4	6.5	7.8
Size		3	3	3	4	4	4	5	5	5

Remarks: All data apply at 400 V/3 ph/50 Hz with 20 Pa ESP (external static pressure) for downflow units and 50 Pa ESP for upflow units

[1] DX cooling capacity for A, G, ACW and GCW units; return air conditions: 24 °C, 50 % r. h.; condensing temperature 45 °C

[2] CW cooling capacity for ACW and GCW units; return air conditions: 24°, 50 % r. h.; water temperature: 7 °C/12 °C; glycol: 0%

[3] Noise level at 2 m distance, free field

[4] The electric power input of the fans must be added to the room load

Technical data subject to change without notice.

Humidifier output and heating capacity						
Size		**1**	**2**	**3**	**4**	**5**
Max. humidifier capacity	kg/h	8	8	15	15	15
Max. no of heating steps		1	2	2	3	3
Max. overall heating capacity	kW	9	18	18	27	27

Size		**1**	**2**	**3**	**4**	**5**
Width	mm	1,000	1,400	1,750	2,150	2,550
Height	mm	1,980	1,980	1,980	1,980	1,980
Depth	mm	890	890	890	890	890
Weight A/ACW (max. per size)	kg	376/396	455/482	589/633	682/742	808/885
Weight G/GCW, GE (max. per size)	kg	383/403	461/491	597/641	694/754	827/916
Number of fans		1	1	2	2	3

Technical data

CyberAir 2 DX

Low-Noise DX and Dual-Fluid units, single-circuit (1 compressor)

ALD/ALU xxx A/G/GE		181	211	261	291	311	361	401	411	451	531
Air flow	m³/h	5,500	6,500	7,200	7,500	9,000	10,000	10,000	11,000	13,400	14,000
DX cooling capacity (total)[1] R407C	kW	18.6	21.6	27.6	30.2	31.3	36.6	40.6	41.7	46.4	54.4
DX cooling capacity (sensible)[1] R407C	kW	18.6	21.6	25.5	27.0	31.3	34.4	36.0	38.8	46.4	49.2
Compressor power R407C	kW	3.7	4.2	5.6	6.3	6.3	7.5	8.4	8.4	9.7	11.6
DX cooling capacity (total)[1] R410A	kW	18.9[4]	25.1	27.2	30.8	31.5[4]	36.8	40.5	41.6	46.2	53.9
DX cooling capacity (sensible)[1] R410A	kW	17.3[4]	23.2	25.3	27.2	29.5[4]	34.5	35.9	38.8	46.2	48.9
Compressor power R410A	kW	3.9[4]	5.2	5.6	6.4	6.4[4]	7.4	8.5	8.5	9.3	11.0
DX cooling capacity (total)[1] R134a	kW	17.7	20.4	25.3	26.2	27.8	33.1	37.8	38.7	–	–
DX cooling capacity (sensible)[1] R134a	kW	17.7	20.4	25.3	26.2	27.8	33.1	34.9	38.7	–	–
Compressor power R134a	kW	3.3	3.8	5.0	5.3	5.3	6.7	7.7	7.7	–	–
CW cooling capacity (total)[2]	kW	19.6	22.5	26.9	28.9	32.2	36.6	38.9	39.0	46.0	51.2
CW cooling capacity (sensible)[2]	kW	18.5	21.4	24.8	26.3	29.9	33.5	35.0	36.4	42.9	46.7
A, G-system, downflow											
Max. available ESP	Pa	450	450	450	450	450	450	450	450	450	450
Noise level[3]	dBA	45.9	49.4	51.6	52.5	47.1	49.3	49.3	49.4	53.5	54.5
Fan absorbed power[5]	kW	0.3	0.6	0.7	0.8	0.8	1.1	1.1	1.0	1.8	2.0
A, G-system, upflow											
Max. available ESP	Pa	450	450	450	450	450	450	450	450	450	450
Noise level[3]	dBA	46.9	50.1	52.2	53.0	48.7	50.7	50.7	50.6	54.5	55.4
Fan absorbed power[5]	kW	0.4	0.7	0.9	1.0	1.0	1.3	1.3	1.2	2.1	2.3
GE downflow											
Max. available ESP	Pa	450	450	450	450	450	450	450	450	450	450
Noise level[3]	dBA	46.3	49.9	52.0	52.9	48.4	50.5	50.5	50.4	54.5	55.5
Fan absorbed power[5]	kW	0.4	0.6	0.8	0.9	1.0	1.3	1.3	1.2	2.1	2.3
GE upflow											
Max. available ESP	Pa	450	450	450	450	450	450	450	450	450	450
Noise level[3]	dBA	47.5	50.7	52.8	53.6	49.9	51.9	51.9	51.7	55.5	56.4
Fan absorbed power[5]	kW	0.5	0.7	1.0	1.1	1.2	1.5	1.5	1.4	2.4	2.7
Size		2	2	2	2	3	3	3	4	4	4

Low-Noise DX and Dual-Fluid units, dual-circuit (2 compressors)

ALD/ALU xxx A/G/GE		402	452	512	552	612	702	802[6]	862[6]	1062[6]
Air flow	m³/h	11,000	13,000	14,000	16,000	18,500	19,500	21,000	22,500	24,000
DX cooling capacity (total)[1] R407C	kW	41.7	47.3	54.4	56.1	63.3	72.6	81.3	89.5	104.5
DX cooling capacity (sensible)[1] R407C	kW	38.8	44.6	49.2	56.1	63.3	68.3	74.4	80.3	88.9
Compressor power R407C	kW	8.4	9.6	11.2	11.2	12.6	15.0	16.8	19.2	23.0
DX cooling capacity (total)[1] R410A	kW	43.1	49.9	53.9	54.7[4]	63.0[4]	63.3	81.4	90.4	104.2
DX cooling capacity (sensible)[1] R410A	kW	39.4	45.7	48.9	50.9[4]	59.0[4]	59.8	74.5	80.7	88.7
Compressor power R410A	kW	9.0	10.4	11.2	11.2[4]	12.8[4]	12.8	17.0	18.6	22.0
DX cooling capacity (total)[1] R134a	kW	38.7	44.3	50.1	52.5	56.0	66.0	76.4	–	–
DX cooling capacity (sensible)[1] R134a	kW	38.7	44.3	47.5	52.5	56.0	66.0	72.5	–	–
Compressor power R134a	kW	7.8	8.6	10.0	10.0	10.6	13.4	15.4	–	–
CW cooling capacity (total)[2]	kW	41.7	45.4	51.2	56.5	64.3	71.3	77.1	86.5	95.6
CW cooling capacity (sensible)[2]	kW	38.8	42.1	46.7	52.2	59.2	64.3	69.1	75.7	81.7
A, G-system, downflow										
Max. available ESP	Pa	450	450	450	450	450	450	–	–	–
Noise level[3]	dBA	49.4	52.9	54.5	51.6	54.7	55.8	–	–	–
Fan absorbed power[5]	kW	1.0	1.6	2.0	1.8	2.8	3.2	–	–	–
A, G-system, upflow										
Max. available ESP	Pa	450	450	450	450	450	450	–	–	–
Noise level[3]	dBA	50.6	53.9	55.4	52.9	55.8	56.8	–	–	–
Fan absorbed power[5]	kW	1.2	1.9	2.3	2.2	3.2	3.7	–	–	–
GE downflow										
Max. available ESP	Pa	450	450	450	450	450	450	410	320	220
Noise level[3]	dBA	50.4	53.9	55.5	52.9	55.9	57	58.6	60.1	61.5
Fan absorbed power[5]	kW	1.2	1.9	2.3	2.2	3.3	3.8	4.7	5.8	7.0
GE upflow										
Max. available ESP	Pa	450	450	450	450	450	450	280	280	180
Noise level[3]	dBA	51.7	54.9	56.4	54.1	57.0	58.1	61.0	61.0	62.3
Fan absorbed power[5]	kW	1.4	2.2	2.7	2.5	3.8	4.4	6.5	6.5	7.8
Size		4	4	4	5	5	5	5	5	5

Remarks: All data apply at 400 V/3 ph/50 Hz with 20 Pa ESP (external static pressure) for downflow units and 50 Pa ESP for upflow units

[1] DX cooling capacity for A, G and GE units; return air conditions: 24 °C, 50 % r. h.; dew point: 45 °C

[2] CW cooling capacity for GE units; return air conditions: 24 °C, 50 % r. h.; incoming water temperature: 7 °C; glycol: 30%

[3] Noise level at 2 m distance, free field

[4] Data with reduced air flow, details provided on request

[5] The electric power input of the fans must be added to the room load

[6] Only available as GE unit

Technical data subject to change without notice.

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