IT COOLING SOLUTIONS

STULZ

CLIMATE. CUSTOMIZED.

EcoAir3

Experience at the service of Data Centers

Data Centers require consistent ambient conditions in order to guarantee maximum reliability: IT equipment overheating, fluctuating temperatures, moisture and dust jeopardise both function and data stocks.

At the design stage it is therefore necessary to take into account several technical aspects: the local climate, room configuration, environmental conditions, noise protection and safety – all these factors have a direct influence on the amount invested and on running costs, as much as the air conditionig system's energy efficiency.

STULZ's long-time experience in critical cooling has led to the new EcoAir3 precision air conditiong range; the ideal solution to ensure:

- **extreme compactness and flexibility** to fit into tight spaces and small footprint
- **maximum energy efficiency** thanks to EC (Electronically Commutated) technology and direct free cooling on all models
- **accurate control of environmental parameters and business continuity** thanks to the STULZ SEC.blue electronic control

The new EcoAir3 models are designed for small or medium server rooms with a heat load of up to 35 kW. They are available in several versions:

- DX: direct expansion, with on-off compressor and cooling capacity from 6 to 32 kW
- DI: direct expansion, with modulating compressor and cooling capacity form 11to 34 kW
- DW: chilled water, with cooling capacity from 10 to 37 kW.

It is also possible to choose between three air flow configurations: upflow, downflow and displacement.
With the displacement configuration it is possible to use the unit without raised floor and without the air supply plenum additional footprint.

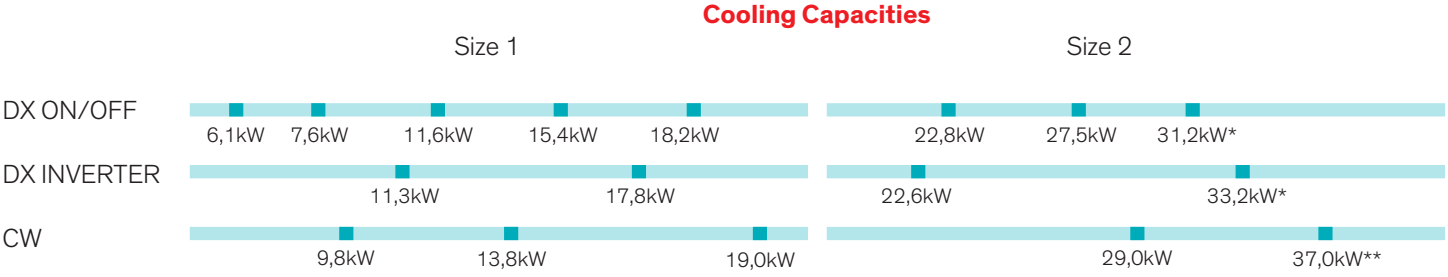
Direct Free Cooling version further expands the EcoAir3 range: custom-made to meet every cooling requirement.

Flexible Solution

Thanks to the compact design and the high levels of flexibility in configuration oprions, the new EcoAir3 range can be integrated seamlessly in existing server rooms. Allowing the creation of customised solutions, which perfectly fit any kind of operating environment, including the most critical ones.

3 different cooling systems: direct expansion with ON/OFF or EC compressor and chilled water
3 air flow configurations
Compact dimensions in 2 sizes (WxDxH): **750×607×1850mm** (height compatible with the most common lifting equipments) and **1000×802×1950mm**
Several optional features

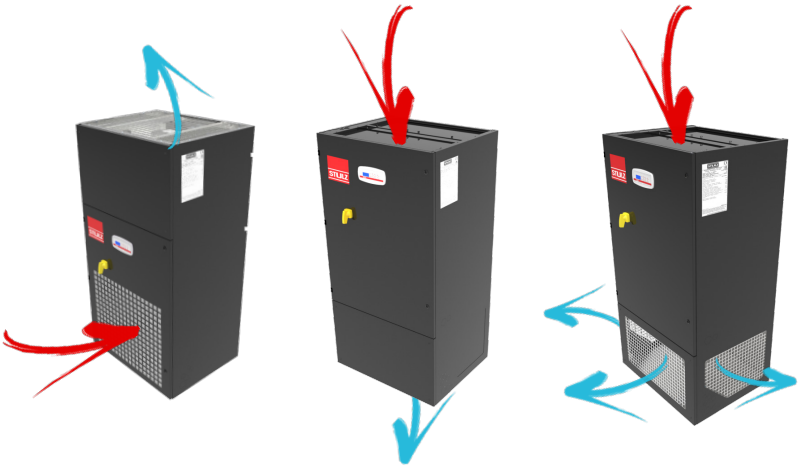
Cooling Capacities



*@Temperature/RH return air = 24°C/50%; Condensing Temperature = 45°C
**@Temperature/RH return air = 24°C/50%; Water Temperature IN/OUT = 7/12°C

More power in a smaller space
EcoAir3 compact dimensions free up space for servers and other equipment. The selection of high performance components and their optimised position allow it to obtain one of the highest cooling capacity/footprint ratio on the market: a unit with a floor space smaller than 0,45m^2 provides more than 18 kW of cooling capacity (Temperature/RH return air = 24°C/50%).

Easy transport, easy installation, easy maintenance
The EcoAir3 is designed to fit through a standard doorway, EcoAir3 transport and installation are both easy and quick. Every unit is preconfigured, and once installed, is ready to use. Easy front access for any kind of maintenance intervention.



UPFLOW **DOWNFLOW** **DISPLACEMENT**

Air supply where necessary

EcoAir3 is available in 3 versions:

- **Upflow** (DXU, DIU, DWU);
- **Downflow** (DXD, DID, DWD);
- **Displacement** (DXF, DIF, DWF) with frontal and lateral air supply, or frontal air supply with a grill with adjustable fins.

For each of the three configurations our free cooling module is available.

Displacement air delivery integrated into the structure

Displacement units blow out the cold air at ground level at low speed, favouring its stratification, and ready to be discharged onto the server racks. Displacement configuration prevents hot and cold air from mixing, in this way the air conditioners can circulate the air at higher temperatures (30°C instead of 24°C as in upflow units), with substantial benefits in terms of energy efficiency.

In order to enhance the unit compactness STULZ has integrated the free cooling plenum in the EcoAir3 structure, helping to make it easier to comply with height restrictions.

Energy Efficiency

EER vs Annual Energy Efficiency

EC fans and the electronic expansion valve, standard on EcoAir3, increase the EER, that is to say the efficiency at rating conditions (Cooling Capacity/Absorbed Power at reference conditions).

In Data Centers the air conditioners work h 24/365 so other factors should be considered:

• external temperatures, which fluctuate daily and during the year

• data traffic and therefore the servers cooling needs, which can vary during the day.

For a direct effect on cooling energy consumption, it is necessary to improve the annual efficiency.
EcoAir3 options aim to meet the energy efficiency objective:

• free cooling and mix mode allow the use of the external air for cooling

• the EC compressor modulates the cooling cacapity at partial loads, adapting it instantaneously to the heat load.

SEC.blue
The new electronic control STULZ SEC.blue regulates the EcoAir3 components (EC fans, electronic expansion valve and EC compressor, if present) and optimises the operating modes.

The average EER of direct expansion units with ON/OFF compressor is over 3.3.
The efficiency of units with EC compressor is even greater at partial loads.

EC Compressor (optional):

EC compressors continuous monitoring guarantees:

• maximum efficiency at partial load;

• higher precision in supply air temperature control, offering a quick response to variations in the heat load;

• integrated soft start to suppress locked rotor current;

• long service life thanks to the continuous operation, which reduces the number of on/off cycles

EC Fans (standard):

Fans with high efficiency EC motors:

• respond continuously to changing power requirements;

• switch to in energy saving mode at partial loads;

• allow reduced energy consumption and offer low noise level compared to the conventional fans;

• accept a wider range of voltage supply;

• compliant to ErP2015 directive

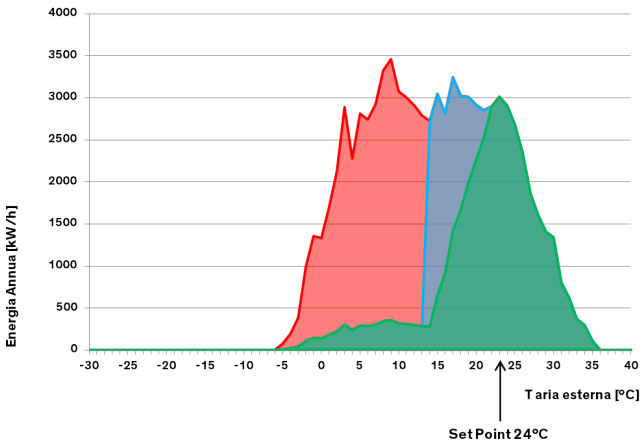
Direct Free Cooling and Mix Mode (optional)

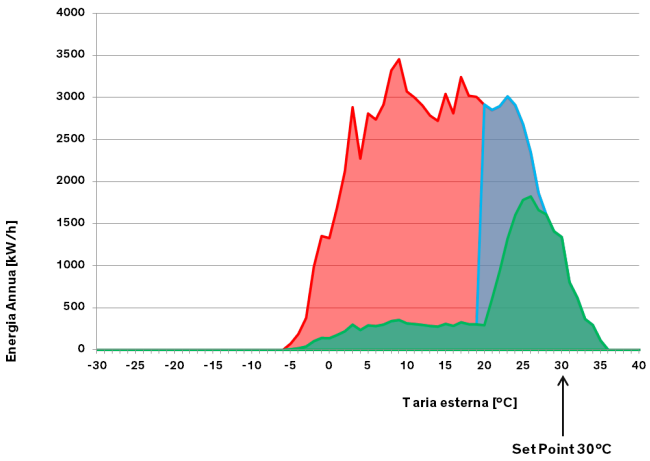
When outside conditions allow, the free cooling system makes additional use of outside air, suitably filtered, for room cooling and may even entirely replace the cooling circuit, allowing the compressor to shutdown. Specific motorized dampers mix the external and recirculating air flows, by modulating the free cooling capacity.

Thanks to their high direct free cooling air flow, STULZ EcoAir3 cools the Data Centers with an energy saving up to 90%, if installed in cold climates.

DIRECT FREE COOLING	INDIRECT FREE COOLING
Uses external air to cool the data center	Intermediate heat-exchange with a water-glycol mixture
Lower energy7operational costs	More control over internal air parameters (humidity and quality)
More efficient in free cooling mode	
Quick return on investment	

The mix mode consists of simultaneous use of free cooling and compressor cooling. It allows the use of external air, even at temperatures close to the set-point, when the free cooling capacity can not fully cover the requested capacity. Mix mode provides the greatest possible benefit in units with EC modulating compressor; the cooling circuit, working at partial loads with high efficiency, provides the part of cooling capacity which is achivable with free cooling only.





Annual energy consumption [kW/h] vs External air Temperature [°C] in Milan (DX_C4)

- without free cooling
- with free cooling
- with free cooling + mix mode

In this example, in Milan, the free cooling mode allows an energy saving of 40% and 60% (with a set point of 24 and 30°C respectively). The savings come to 60% and 75% with the integration of mix mode.

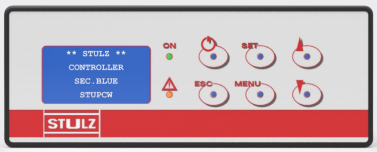
SEC.blue & CyberHub ECO.DC: control, monitoring and designing

To achieve precise, reliable control of air conditioning systems, STULZ has designed and developed the SEC.blue. SEC.blue controls and puts in-row units, chillers, air conditioners and ventilation equipment in communication with one another, allowing integrated management of the entire Data Center cooling system.

The EcoAir3 units guarantee:
- Precise temperature control, thanks to EC technology
- Optimal air quality for IT equipment, even in free cooling mode: G4 filters standard and M5 filter as optional
- Security, redundancy, monitoring for IT and TLC equipments h 24/365

Precision and perfomance:

- precise temperature control up to +/-0.5K in stable load conditions in units equipped with EC compressor (option). Air flow, hydraulic head, cooling capacity are set according to the actual load
- management of the following operating mode: cooling, free cooling, mix mode, heating, dehumidification and humidification
- multi-stage activation up to maximum 10 air conditioners in 5 different working areas
- balancing of operating hours
- priority to energy saving operating modes (free cooling, mix mode)
- stand-by management: EC compressor or water valve partialization for each unit in sequencing for maximum efficiency



Connectivity as standard:

- Ethernet port on RJ45 connector, for communication with HTTP, SNMP, ModBus TCP protocols and remote software update
- RS485 port, for ModBus RTU communication protocol
- MicroSD slot, to store the chronology of events and for software updates
- Dbus port, to connect monitoring devices in series

Maintenance and safety:

- sequencing with activation of stand by units replacing the units in alarm or supporting the other units in case of an increased thermal load
- smart alarm management in order to minimize the service operations
- manual operation setting during the maintenance
- monitoring via web page, alerts via email
- PC connection interface during maintenance
- parameters and functions created according to site needs: thanks to the new highly flexible operating system, updates via web page

CyberHub ECO.*DC*

SEC.blue is the new generation STULZ control, designed to connect directly to CyberHub ECO.DC platform.

CyberHub ECO.*DC* is a next-generation solution for Data Center infrastructure management: monitors, plans and manages the air conditioning system and the related infrastructures. Operational reliability and energy efficiency at high level, thanks to centrally managed software solution.

With CyberHub monitoring it is child's play

- **Operational cost savings**
  Identifies potential savings and immediately implements them.
- **Maximum reliability**
  H24 Data Centre paramenters monitoring (in order to avoid hot spot or overloads).
- **One system for all data**
  Data collection from all sources of energy consumption (electricity, gas, thermal or refrigeration sources) with collective analysis for the whole Data Center.
- **Scalable, for quick ROI**
  CyberHub ECO.DC suits the Data Center size and the requested features.
  The software can be tested before installation.
- **Browser based**
  Implementation doesn't depend on the operating system. Easy to use on desktop and mobile devices.

Data collection, analysis and documentation.
For optimum transparency.
CyberHub ECO.*DC* collects all the relevant operational data, analysing it and presenting the results simply and clearly. This provides you with an up-to-date overview of all of the relevant data, such as the cooling and the power supply of your Data Center, providing you complete control over the cooling system and the whole infrastructure.

Features

Standard

- Remote condenser electrical power supply;
- EC fan;
- Electronic thermostatic valve (EEV) (DX and DI units);
- 2 or 3 ways water valve (DW units);
- Hydrophilic treatment of the evaporator;
- G4 air filter (according EN 779) a monte della batteria, with clogged filter alarm;
- Filter monitoring;
- SEC.blue electronic control with RS485 and TCP/IP interface;
- Automatic restart after a failure of the supply voltage;
- Contacts for various alarm signals for connection to a monitoring system ;
- Smoke-fire alarm, remote ON/OFF.

Options

- Direct Free cooling with mix mode;
- Electrical heaters 1,5kW or 3kW or 4,5kW size 1 or 6kW (only for size 2);
- Hot gas reheating (DX and DI units);
- Hot water reheating (DW units);
- Steam humidifier (not available for DI units);
- Softstart for DX ON/OFF units;
- Voltage/phase sequence monitoring for DX ON/OFF units;
- Temperature/humidity/ floor water remote sensor;
- Condensate discharge pump;
- M5 air filter (according EN 779);
- Supply-air grille with adjustable fins (displacement units);
- Frame for raised floor;
- Distribution Plenum for upflow units.

Technical Data

DX ON-OFF

Unit		DXU / D / F							
		60	80	A2	A6	A9	B4	B9	C4
Total Cooling Capacity *	kW	**6,1**	**7,6**	**11,6**	**15,4**	**18,2**	**22,8**	**27,5**	**31,2**
Sensible Cooling Capacity *	kW	5,8	7,6	11,6	14,2	15,4	21,8	26,1	28,1
Air Flow	m³/h	2000	4000	4500	4500	5000	7500	8000	8000
Power Supply	V/ph/Hz	400/3+N/50**		400/3+N/50					
Compressor Consumption *	kW	1,65	1,9	2,7	3,9	4,6	5,7	6,5	7,7
Fan Consumption *	kW	0,2	0,5	0,6	0,6	0,75	0,9	1,1	1,1
Sound Pressure Level * ***	dB(A)	47	47	50	51	51	52	54	54
Refrigerant gas		R410a							
Degree of air filtration		G4							
		Dimensions							
Width	mm	750					1000		
Depth	mm	607					802		
Height (without free cooling)	mm	1850					1950		
Weight	kg	200	200	210	210	220	250	260	260

* @ Temperature/RH return air = 24°C/50% ; Condensing temperature = 45°C

** Power Supply 230V / 1 ph / 50 Hz optional

*** @ 5m unit in a free field

Technical Data

DX INVERTER

Unit		DIU / D / F			
		A2	A9	B4	C4
Total Cooling Capacity *	kW	**11,3**	**17,8**	**22,6**	**33,2**
Sensible Cooling Capacity *	kW	11,3	16,9	22,2	31,2
Air Flow	m³/h	4500	5000	7500	8000
Power Supply	V/ph/Hz	400/3+N/50			
Compressor Consumption * **	kW	3,1	5,2	6,8	10,4
Fan Consumption *	kW	0,6	0,75	0,9	1,1
Sound Pressure Level * ***	dB(A)	50	52	52	54
Refrigerant gas		R410A			
Degree of Air Filtration		G4			
Dimensions					
Width	mm	750		1000	
Depth	mm	607		802	
Heigth (without free cooling)	mm	1850		1950	
Weight	kg	210	220	250	260

* @ Temperature/RH return air = 24°C/50% ; Condensing Temperature = 45°C
** @ maximum speed
*** @ 5m unit in a free field

CW

Unit		DWU / D / F				
		A0	A5	B0	C0	D0
Total Cooling Capacity *	kW	**9,8**	**13,8**	**19,0**	**29,0**	**37,0**
Sensible Cooling Capacity *	kW	8,6	12,8	16,5	25,0	32,0
Air Flow	m³/h	2700	4600	5000	7400	9000
Water Flow	m³/h	1,68	2,38	3,27	4,97	6,41
Power Supply	V/ph/Hz	230/1/50			400/3+N/50	
Fan Consumption *	kW	0,25	0,7	0,75	1,1	1,6
Sound Pressure Level * **	dB(A)	48	49	51	51	54
Degree of Air Filtration		G4				
Dimensions						
Width	mm	750			1000	
Depth	mm	607			802	
Hiegth (without free cooling)	mm	1850			1950	
Weight	kg	170	170	180	265	280

* @ Temperature/RH return air = 24°C/50% ; Water Temperature IN/OUT = 7/12°C
** @ 5m unit in a free field

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