

Whatever Your Cooling Challenges, We Have The Right Solution



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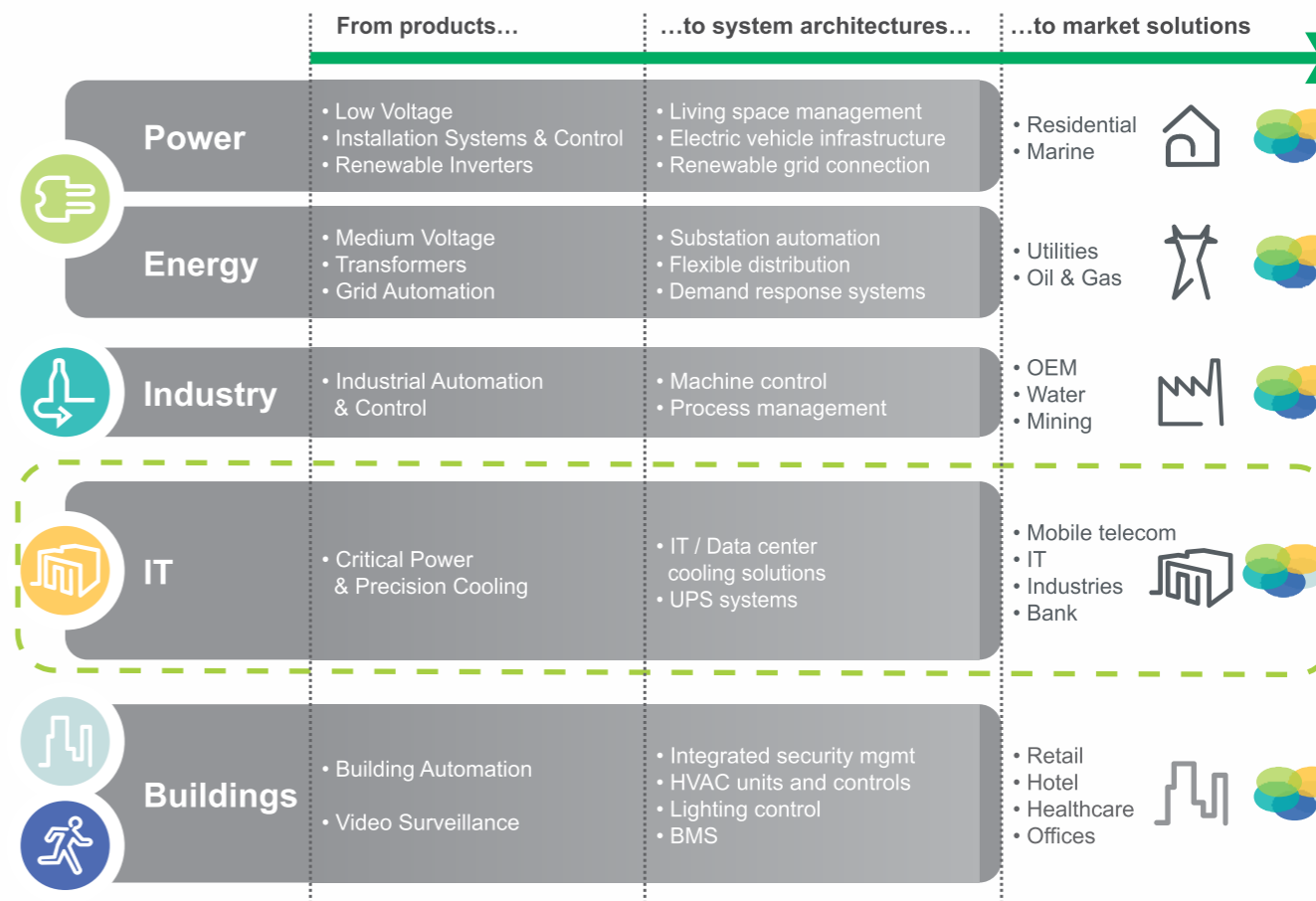


Schneider Electric Brings to you Best-of-Breed Cooling Solutions from APC, APW President and Uniflair S.p.A

As a global specialist in energy management with operations in more than 100 countries, Schneider Electric offers integrated solutions across multiple market segments, including Critical Power and Cooling Services. Focused on making energy safe, reliable and efficient, Schneider Electric achieved sales of more than \$26 billion in 2010, through an active commitment to help individuals and organizations “Make the most of their energy”.

The combination of its acquired brands, APC, APW President and Uniflair will create a great opportunity for the unified business to become the world leader in precision cooling solution, particularly in the sought-after customized room cooling solution space for data centers. Uniflair's robust R&D capabilities, proficiency in customized design, and their quality orientation will be a strong complement to APC's well regarded, standardized Row and Rack cooling offer.

Active Energy Management from Plant to Plug



A Complete Cooling Portfolio for Rack-Row-Room-Building

Rack



Dedicated cooling or air distribution for single racks or hot spots

- Rack Air Distribution
- InRack Direct Expansion
- Rear Door Heat Exchanger (RDHx)
- ChillRack



Row



Energy efficient cooling from low to high density racks and zones

- InRow Chilled Water
- InRow Direct Expansion Refrigerant
- InRow Pumped
- Hot Aisle and Cold Aisle Containment



Room



Energy efficient precision cooling for low and high density data centers, telecoms and industries

- Amico
- Leonardo
- Wall-mounted
- Monoblock
- Unisplit
- InRoom SC
- Room Air Distribution



Building

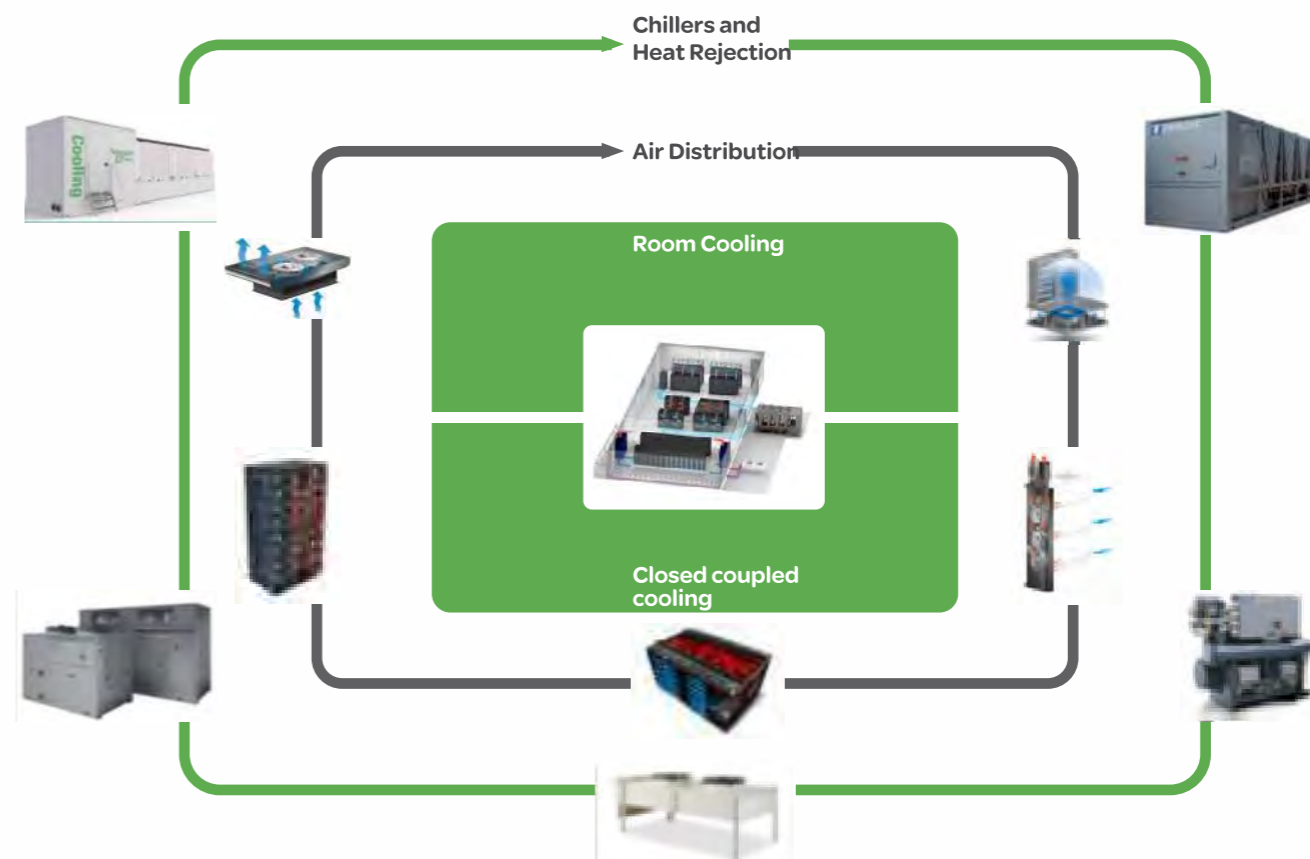


High performance cooling solutions for technological, industrial, and comfort applications

- Access Flooring
- Technical Chillers
- Free Cooling Chillers and Economizers
- Ecoflair®
- Heat Rejections



Addressing Any Critical Cooling Problems



Solutions to Address Any Density

	Close Coupled	InRow + Thermal containment
	InRow	InRow
	Ecobreeze	Ecobreeze + Thermal containment
	Uniflair	Room + Raised Floor + Active Floor + Containment
		Room + Active Air Distribution
		Room + Raised Floor
		0 5 10 15 20 25 >25



Room

By Far The Most Intelligent Precision Air Conditioning Units Around

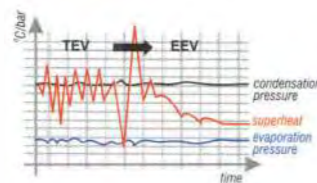
Uniflair's Precision air-conditioning products are equipped with unique 'intelligent' features offering maximum reliability, efficiency, precision and due respect for the environment. No wonder then some of the most respected companies across 5 continents and 60 countries rely on Uniflair's precision air conditioning solutions to power their mission critical businesses.

Intelligent Expansion Valve

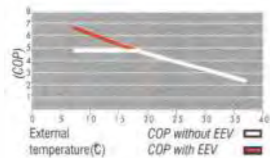
An Electronic Expansion Valve (EEV) that digitally senses heat through a microprocessor based pulse control and regulates flow of refrigerants in a precise and stable fashion unlike traditional mechanical expansion valve.

Lower Power Consumption

EEV regulates the operative parameters with high precision and accuracy, keeping constant superheat during transient variations (Heat load, ambient conditions, inside conditions)



EEV Increases the COP at lower ambient temperature by providing accurate control of refrigerant superheat



Intelligent De-humidification

De-humidification function operates only when actually required, without reduction in airflow rate. This ensures uniform air distribution and avoids sudden variations in supply air and room air temperatures.



Intelligent Tandem Circuit

Tandem Circuit Results in improved Integrated Part Load Value (IPLV). During operation of one compressor, the system utilizes doubles size of evaporator and condenser surface area resulting in improved part load COP.

Intelligent EC Fan Motor

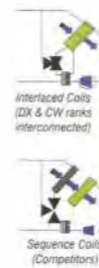
Electronically Commutated (EC) direct current motor has a number of advantages over traditional motors like:

- 45% & 60% power saving in CW & DXA units respectively
- Higher Part Load Efficiency
- Fan speed adjustment through microprocessor control while the unit is in operation

Intelligent Twins Coils (Interlaced)

A unique interlaced coil structure that provide;

- Enhanced heat exchange area in either case (CW or DXA)
- Reduced pressure drop across coils resulting in lower power consumption
- Compact unit size



Intelligent Connectivity

- Different fan configurations to cover wide range of requirements
- Range of filter types & grades can be specified
- Adaptable to variety of plant configurations
- Versions available with one or two independent circuits
- Minimal footprint
- Frontal access for ease of maintenance without any special tools
- Service clearance cut to the minimum
- Adaptability to wide range of supervision and network languages and protocols
- Flexibility in the simple onsite implementation of variety of configurations

Intelligent Versatility

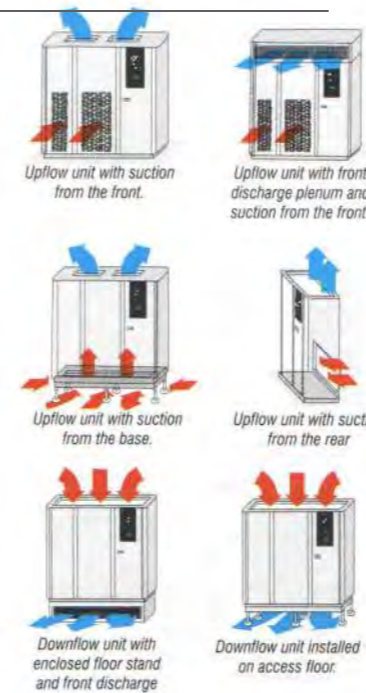
Uniflair PACs are compatible with most widely used Building Management systems, exchanging data via protocols like Modbus, TREND, BACnet, SNMP/TC IP, Lonworks, METASYS, through serial connections, LAN, Ethernet and modem links.

Built-in LAN card for local network connections | (up to 10 Units)



Intelligent Configurations

- DXA - Air cooled
- DXW - Water cooled
- CW - Chilled water
- Twin Cool - Chiller water and air cooled or water cooled
- Energy Saving - Intelligent Free Cooling with water/coolant cooled



Intelligent Supervision

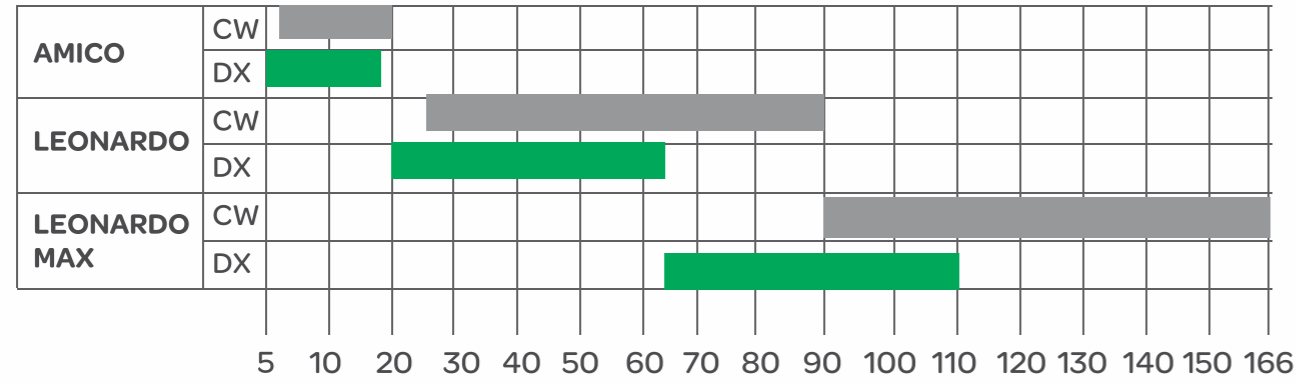
Uniflair equipment can be monitored from a central location, either onsite or offsite via connecting to a centralized supervision system. Some of the operations that can be carried out in real time for each individual unit include;

- Signaling of alarm or warning conditions
- Display and memorizing of environmental parameters
- Adjustment of set points
- Display of run hours for main components
- Customized after sales service/ maintenance schedules

Intelligent Reliability

- Monitoring of all components
- Precise & clear display of any malfunctions or abnormal operating conditions
- Capability to memorize a record of last 100 events
- Management of emergency conditions (facility to deactivate the heaters or de-humidifiers in pre-determined emergency situations, while maintaining basic cooling needs)





CW: chilled water units
 DX: direct expansion units



Uniflair DX Unit with Unique Tandem Technology

In many applications the room load can vary enormously during the course of a single day or from season to season.

This in turn will cause wide variations in the amount of cooling required at any given moment.

In these circumstances it is very important to use precision air conditioning units which very high energy-efficiency at part-load. LEONARDO models (with suffix **21) are specifically designed with part-load environments in mind; fitted with two compressors operating in parallel on the same circuit, these models offer two stages of cooling on a single circuit of refrigeration. As the evaporator coil surface area (designed for the capacity of two compressors) is fixed, one single compressor in operation (fig. B) benefits from the availability of a "double sized" evaporator coil - this maximiation of the cooling effect leads to obvious increases in part load efficiencies and resultant beneficial rise in the part-load COP (Coefficient Of Performance).

In order to compare part-load efficiencies of different units, a number of different parameters have been developed which take into account the COP at 25%, 50%, 75% and 100% load and calculate a weighted mean. These parameters (IPLV: Integrated Partial Load Value, EMPE: Efficienza Media Ponderata in Regime Estivo, ESEER: European Seasonal Energy Efficiency Ratio) differ in their weightings and the operating conditions at which the different COPs are calculated but they all follow the same formula. All figures for LEONARDO units are based on the ESEER system which uses the formula:

$$\frac{(W_{100\%} \times COP_{100\%}) + (W_{75\%} \times COP_{75\%}) + (W_{50\%} \times COP_{50\%}) + (W_{25\%} \times COP_{25\%})}{100}$$

Tandem / Double circuit	T	D	T	D	T	D
Cooling capacity [kW]	25	25	35	35	45	45
COP	3,2	3,2	3,3	3,3	3,6	3,6
ESEER	4,0	3,5	4,1	3,6	4,3	4,0



Comparison of part-load efficiencies for DXA units (TDAR).

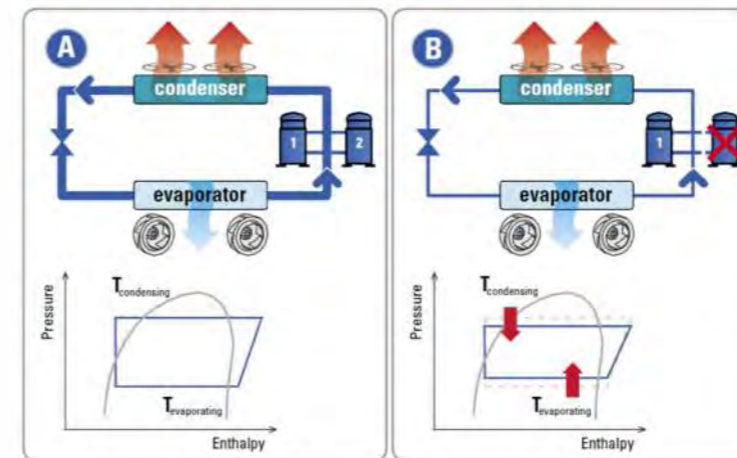
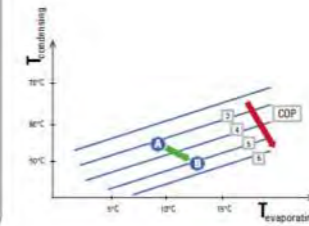


fig. A - 100% Operation

fig. B - part-load Operation



Perimeter, Chilled Water Cooling for Data Centers

Reliable, efficient, and flexible room-based cooling

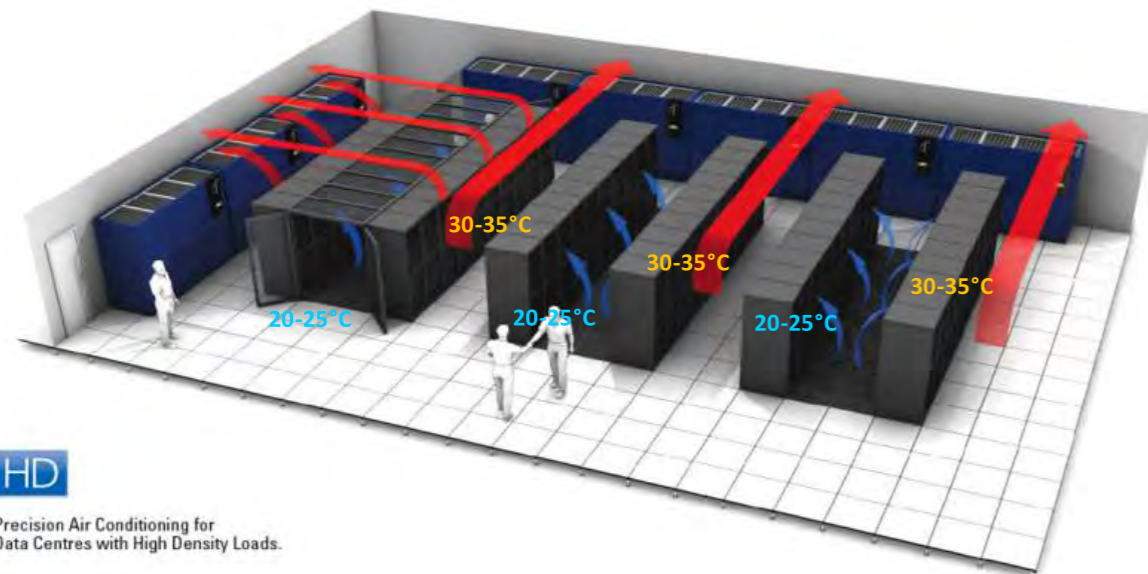
Uniflair Chilled Water products offer flexible cooling solutions perfect for any density racked and non racked IT loads. These products meet the diverse requirements of the data center environment to provide efficient cooling at the room level. Uniflair Chilled Water offers a flexible, assemble to order solution that provides variable fan technology and intelligent control for a more efficient solution.

Uniflair Chilled Water features

1. Backward curved EC fans
2. Immersed electrode humidifier
3. High efficiency air filters
4. Chilled water two- or three-way valve and actuator
5. Cooling coil
6. Temperature and humidity sensor
7. Manual disconnect switch
8. User interface
9. Microprocessor controller
10. Integrated airflow switches
11. Front service access



Discharge Temperature Control



HD

Precision Air Conditioning for Data Centres with High Density Loads.

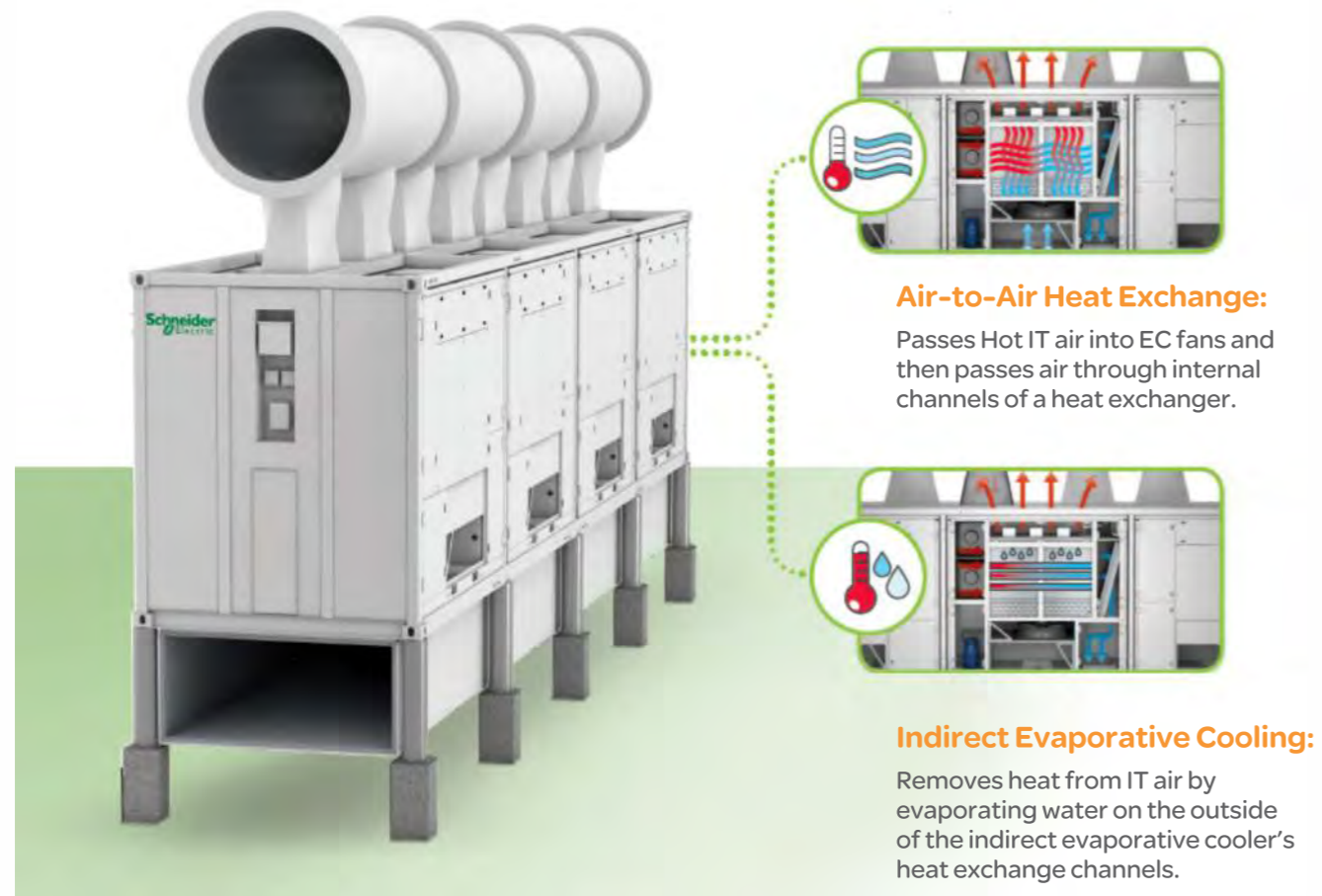
Chilled Water Close Control units equipped with discharge Temperature Control optimizes control of Cold Aisle and increases Energy Efficiency



Introducing Our Answer to Reducing Data Center Energy Costs: EcoBreeze

Only the modular EcoBreeze™ provides indirect evaporative cooling and air- to-air heat exchange in one footprint.

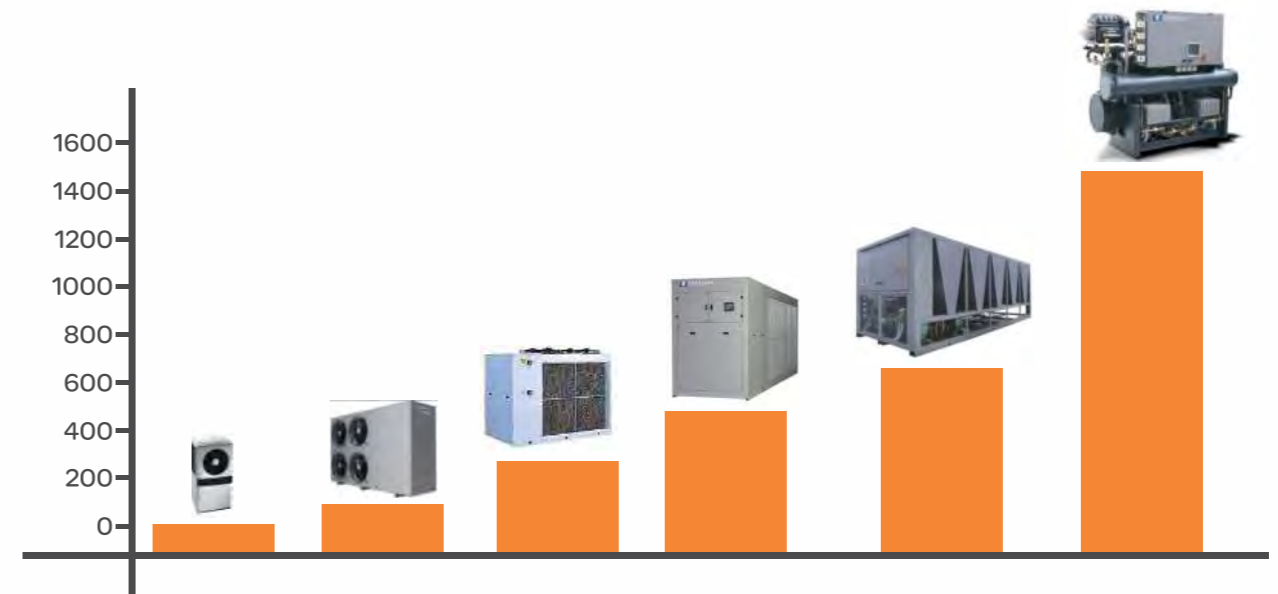
EcoBreeze uses two economizer modes of cooling depending on local weather and temperature conditions.



Air-to-Air Heat Exchange:
Passes Hot IT air into EC fans and then passes air through internal channels of a heat exchanger.

Indirect Evaporative Cooling:
Removes heat from IT air by evaporating water on the outside of the indirect evaporative cooler's heat exchange channels.

Uniflair Precision Chillers



- 6 – 1250 kW (1.5 TR to 360 TR)
- 145 models and 340 version to choose from
- Highest efficiency (IKW /TR for Air cooled as low as 0.97)
- Options of Scroll, Screw and Turbocor Compressors with Air cooled and water cooled versions
- Lowest IPVL of 0.34 IKW/TR for Turbocor chiller
- Eco-friendly Refrigerants
- Options of inbuilt Pump, Expansion Tank, BMS connectivity etc.



- Careful selection and optimisation of components
- Scroll and double-screw compressors
- Electronic Expansion Valve
- Efficiency at part load
- High efficiency refrigerants
- Free-cooling
- Extensive laboratory testing



Advanced Controls

Uniflair produces the software for its units internally. This enables the company to equip each machine with a "tailor made" control which manages all aspects of the unit.

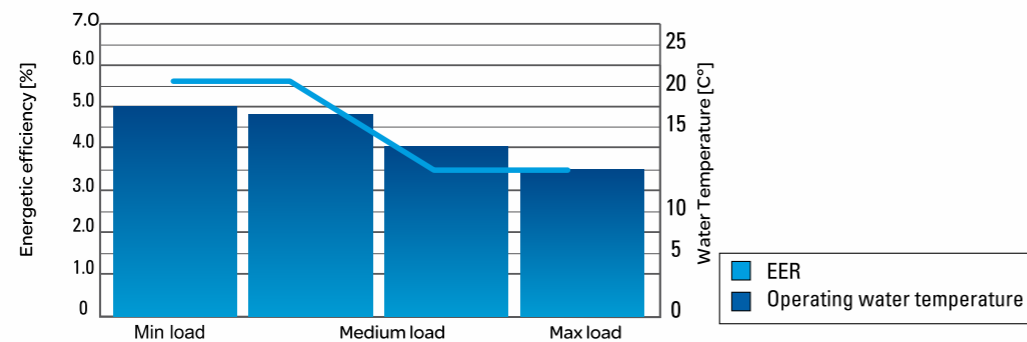
Absolute control means:

- **Precision:** The units use advanced algorithms to accurately control the temperature of the chilled water
- **Reliability:** each component is continuously monitored to guarantee it is always used within operating limits and will signal any faults before breakdown occurs
- **Local Area Network:** Aquaflair chillers can "talk" to each other, resulting in excellent control of multi-unit systems, managing all the cooling resources and units on stand-by (either on a time basis or alarm)
- **Connectivity:** Uniflair microprocessor controls can "talk" to the most common supervision systems (Building Management Systems) including: Modbus, Bacnet, LonWorks, Trend, Metasys, TCP/IP and SNMP



Optimized Management

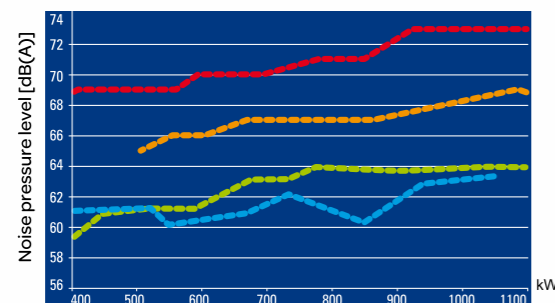
To be optimized and strategies of integrated control to be implemented which would otherwise not be possible. Uniflair 's precision air conditioning units, Active Floor modules and chillers can be linked together by a LAN, maximizing the operating parameters and the real needs of the system. Particular attention has been paid to the management logic which is aimed at reducing the energy requirement by means of a "tracking logic" for the current thermal load. The temperature of the chilled water varies dynamically in such a way as to minimize compressor consumption and the use of free-cooling, maintaining the desired temperature within the room.



Acoustic Impact

Reduction in sound pollution is one of the most critical factors designers are called on to solve when choosing plant systems. Uniflair chillers offer low-noise solutions with extremely low acoustic impact thanks to:

- Acoustic-composite fans with high efficiency and low acoustic impact
- Extra-large air side exchangers
- Specially devised and implemented algorithms which control the rotation speed of the fans
- Tested, optimized compressor insulation and housing

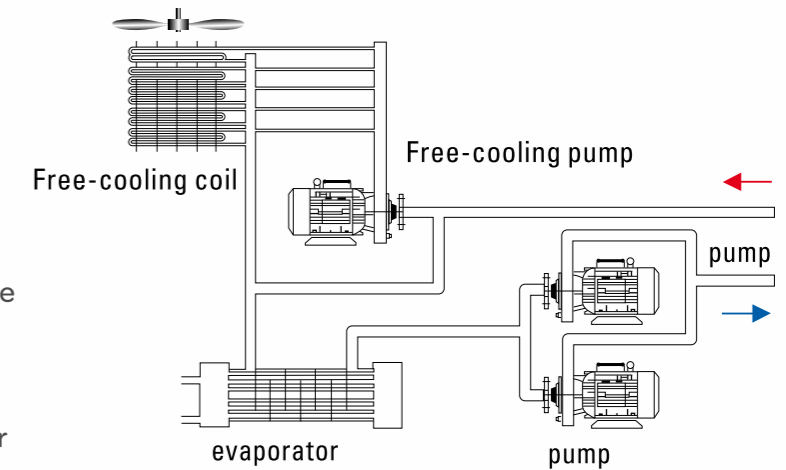


Uniflair unit comparison (blue line) with its main competitors

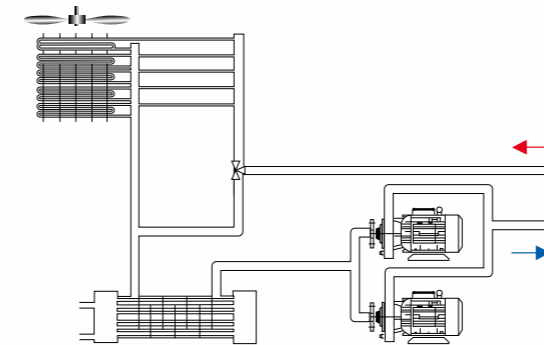
Acoustic levels for a basic high capacity unit, *T*_{ambient}: 35°C, *T*_{water in/out}: 12/7°C, distance 10 m, Q=2, condensing coil side

Free - Cooling

When a system is used for technological or industrial processes which operate all year round, it is important in terms of energy saving to use solutions which exploit these conditions. Chillers equipped with free-cooling devices not only reduce energy consumption compared to traditional systems but also limit CO emissions into the atmosphere, contributing therefore to reducing global warming. When the external temperature is low enough, the free-cooling system produces chilled water using external air only, significantly reducing energy consumption since it is limited to the fans.



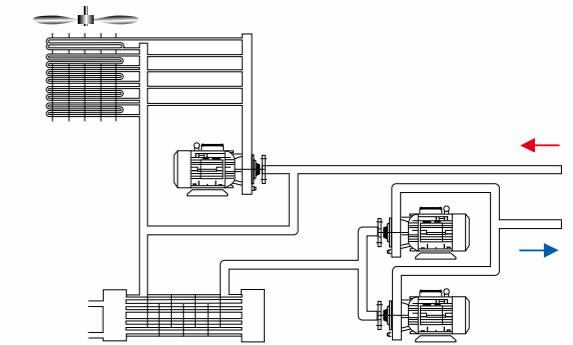
Traditional Free-Cooling



Limits

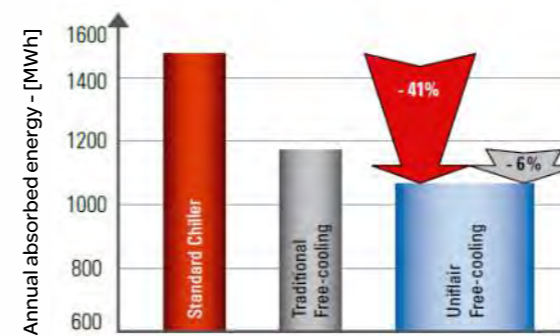
- Pumps sized 24/7 to overcome resistance of Free-cooling coil and the 3-way valve
- 3-way valve low reliability

Uniflair Free-Cooling



Benefits

- Main Pumps sized only to overcome resistance of standard evaporator
- Extremely reliable free-cooling pump
- No 3-way valve
- Capacity with in-built free-cooling up to 1200 kW



Annual energy saving	Standard Chiller	Traditional Free-cooling	Free-cooling Uniflair
Energy absorbed (yearly) Mwh	1370445	994434	969760
Energy Saving (yearly) %	0	38%	41%
Annual Saving €	€ 0	- € 41361	- € 44075

Typical IT Installation - London / 24 hours, 7 days per week operation 10°C/15°C chilled water

Intelligent Free-Cooling

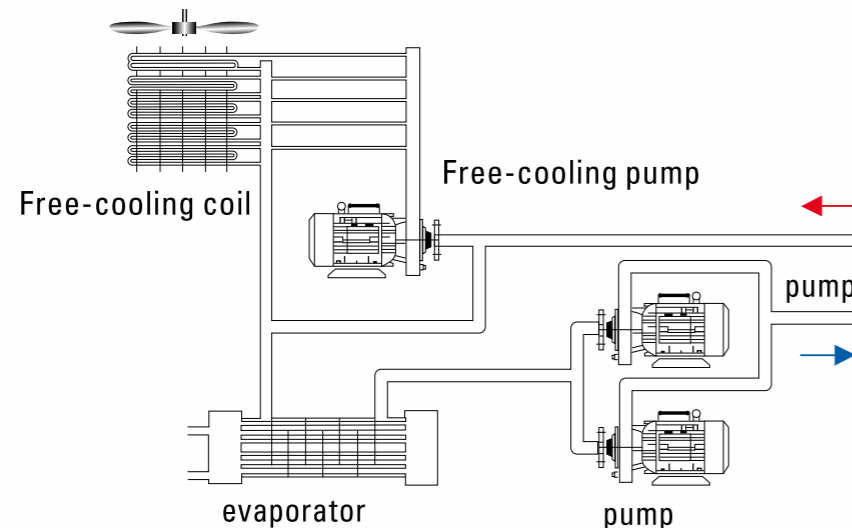
The need to install a stand-by unit can be exploited to increase the free-cooling capacity. By interconnecting the circuits of the free-cooling units it is possible to make the water flow through all of the available exchangers therefore further decreasing energy consumption. Additional annual energy saving Compared to traditional Free-cooling: up to 7% depending on the climate

- Compared to a traditional system: up to 50% up to 7% depending on the climate

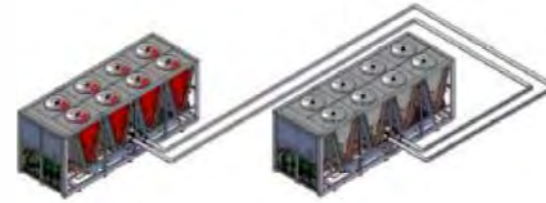
Annual energy saving		
	Uniflair Free-cooling	Uniflair Intelligent Free-cooling
	Energy saving [kWh]	Economic saving
Frankfurt	34.560	- 5 %
Milan	29.132	- 4 %
Paris	36.954	- 4 %
Amsterdam	42.558	- 7 %
Madrid	36.743	- 4 %
Berlin	31.525	- 4 %
London	31.525	- 6 %

Glycol-Free Solution

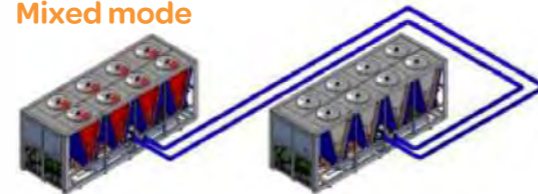
Created for applications where the use of anti-freeze solutions are not permitted, this solution, thanks to an intermediate heat exchanger, isolates the principal hydraulic circuit from the free-cooling circuit. Careful selection of the intermediate heat exchanger allows the DeltaT to be limited to only 2°C, reducing therefore the energy drops which are intrinsic to this system.



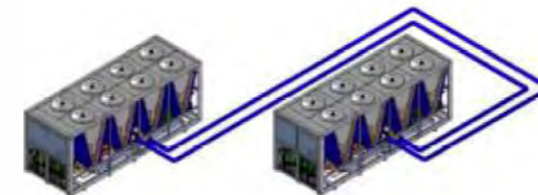
Direct expansion mode



Mixed mode



Free-cooling mode



Close Control - Precision Air Conditioning

Advanced technological applications need accurate and precise management of the thermo-hygrometric environmental conditions which are necessary to ensure correct operation and increased reliability. In order to respond to continuous technological evolution, a precise and accurate air conditioning system is fundamental since it is able, thanks to new technological solutions and component innovation, to create the correct conditions for optimum operation of the whole system. Uniflair precision air conditioning units are extremely reliable in terms of operation and precision, they are environmentally friendly and particular attention has been paid to energy efficiency.



Technical Cooling - Cooling Systems

Combining avant-garde technology with energy efficiency while protecting the environment at the same time is the challenge which has inspired Uniflair to produce these products designed for "technical cooling". Air conditioning technological environments, cooling industrial processes and providing comfort cooling combined with high levels of performance are all types of applications where the ideal solutions are chillers and heat pumps belonging to the technical cooling series. Many years of experience combined with the company's position as a market leader in the air conditioning sector has enabled Uniflair's designers to make the technical and operational choices necessary to create optimum technical excellency.



Modular Access Floors

The development of new technology combined with the need to create new spaces and modify environments has led to new architectural and operational demands for designers. Uniflair has an avant-garde Modular Access Floor production line which is able to meet each client's specific needs. The annual production capacity is more than 1,500,000 square meters and quality is ensured by a continuous supervision control system at each manufacturing stage. The aesthetic-functional value of each building is increased by a wide range of flexible, innovative, practical and elegant solutions suitable for any type of building context, ensuring added value for the client.

