



humiFog Multizone Touch

The top-of-the-range of
hygienically-safe and
easy-to-install adiabatic atomisers

humiFog, a long tradition of reliability and efficiency in adiabatic solutions

humiFog Multizone Touch is the result of CAREL's decades of experience in the field of adiabatic humidification: the perfect combination of advanced control logic and a simple and intuitive interface.

humiFog Multizone Touch is an efficient choice:

- just 4 W for each l/h of atomised water;
- multi-zone control (up to 12 zones) with one single pumping station;
- exploits evaporative cooling;
- wide capacity range, up to 1350 kg/h.

Designed to exploit the enthalpy from the evaporation of water, humiFog combines an intelligent pumping station with a modular distribution system, equipped with special nozzles capable of maximising water atomisation and allowing a short absorption distance. Moreover, inverter modulation ensures very accurate control of pump speed, reducing energy consumption and optimising water use.

High humidification performance

- Flexible modulation logic: continuous or in steps;
- High reliability ensured by the advanced logics included in the CAREL proprietary controller;
- High accuracy: up to +/- 1% around the relative humidity set point;
- Many different sizes available: 150, 250*, 300, 500, 600*, 800, 1200, 1350*. (* for oil-free models);
- Very fine atomisation: droplet diameter down to 10 µm.

Minimum maintenance

Extended maintenance intervals, up to 8000 operating hours for oil-free models.



Hygiene

Periodic washing cycles, stainless steel distribution system with inclined manifolds for better drainage. VDI6022 hygiene certification, without the use of chemical biocides.



Energy saving

Low energy consumption: 4W per kg/h of humidity production, compared to around 800 W for a traditional steam humidifier.



Maintenance

Reduced maintenance thanks to the use of demineralised water. Routine maintenance and service contracts available through a network of local authorised service centres.

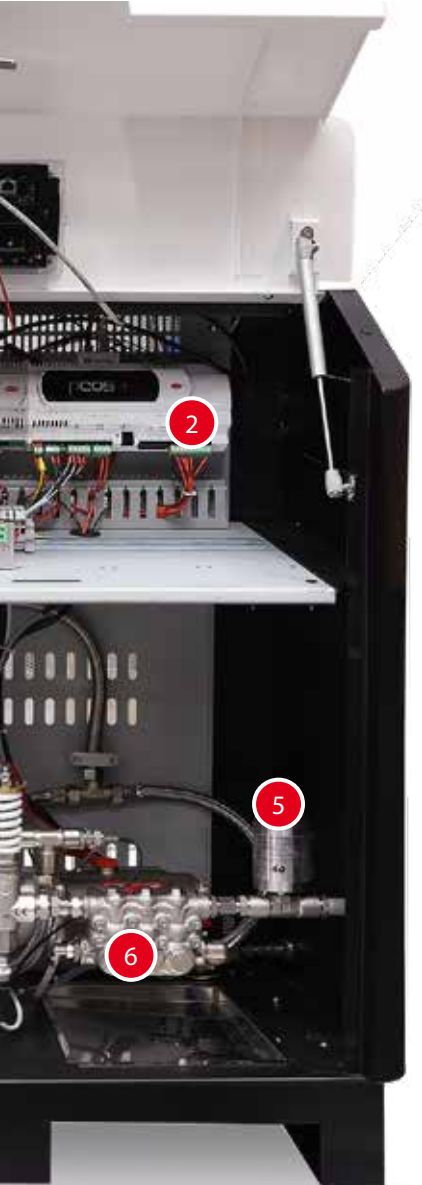


Simplified configuration with the 7" touch display and parameters loaded from USB pendrive

The new 7" touch display makes configuring and managing humiFog easy and intuitive.

The display shows graphic maps of humidification system, from where the individual components can be controlled at a touch, making maintenance and troubleshooting much faster.

The humiFog Multizone Touch initial configuration parameters can also be downloaded directly from the CAREL CPQ configuration tool, and then loaded onto the controller via the USB port, all guided by a step-by-step wizard. The configuration of even complex multizone systems can thus be completed from one single point of access in just a few minutes.

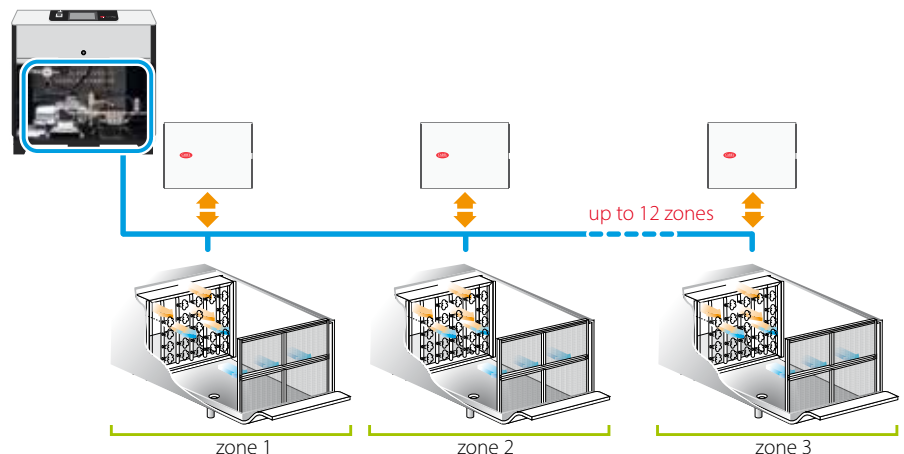


Optimised humidification costs in multi-AHU systems

Multizone mode: In this mode, one single humiFog pumping station can serve several distribution systems (racks) installed in the AHUs. This greatly reduces the system installation and maintenance costs, and facilitates management and configuration from one single point of access. humiFog can in fact manage up to 12 separate AHUs, a unique feature on the market.

The multizone configuration provides a single system capable of meeting humidification requirements in winter and delivering evaporative cooling during the hottest periods of the year.

- 1 user interface
- 2 electronic controller
- 3 inverter for pump capacity control
- 4 conductivity meter
- 5 vibration damper (replaced with non-return valve on oil-free models)
- 6 piston pump



Example of a multizone system with one pumping station and one zone control unit for each zone

A solution for every application

CAREL provides a complete solution for the installation of humiFog, for both duct and direct in-room applications.

humiFog can be combined with different types of distribution systems.

For air handling units, humidity is controlled by atomising the water through nozzles placed on special racks installed in the AHU.

Alternatively, humiFog can also supply blowers or nozzle manifolds that atomise the water directly into the room being humidified.

Solution for duct systems



Zone panel

Manages the distribution system in an individual AHU. Multiple panels (up to 12) can be connected to control several AHUs with one single humiFog pumping station.



Rack

High-pressure atomised water distribution system. Structure and nozzles made from stainless steel. Modular design and extremely flexible configuration (vertical or horizontal, assembled or semi-assembled, wired or not wired, ATEX option with external valves, extreme temperatures) for simple installation, suitable for different applications.



Droplet separator

Modular AISI 304 or fibreglass system to trap any droplets that did not evaporate in the air. Modular stainless steel frame for easy replacement of the separator modules.

Solution for direct in-room systems



Blower unit

The ideal solution for atomised water distribution directly in the room being cooled and humidified. Efficient technology, combined with a modern design.



Nozzle manifold

Plug&play manifolds for direct humidification. Flexible water flow-rate by combining the number of nozzles (up to 7 per manifold) and the size (1.45, 2.8, 4 kg/h).



Direct Box

Water circuit and electrical modules to divide blowers and manifolds into several independent zones.

No compromise on hygiene and safety

humiFog has been designed to meet the highest certification requirements in terms of hygiene, safety and quality. The humiFog atomisation system comes with multiple certifications that guarantee reliable performance and safe operation.

✓ VDI 6022

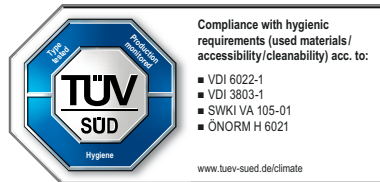
CAREL, ever attentive to the safety of its users, also takes special care regarding the hygiene aspects of humiFog. The built controller in fact automatically:

- fills the lines only when humidification is required;
- empties the lines when there is no humidification request for an extended time;
- washes the lines periodically when there is no humidification request for an extended time.

The washing cycle, unlike those on competing products, is performed using dedicated solenoid valves rather than spraying the water through the nozzles. humiFog Multizone Touch for use in AHUs/ducts has obtained the following certifications:

- VDI 6022 part 1 (01/2018)
- VDI 3803 part 1 (08/2010)
- SWKI VA 105-1 (08/2015)
- QNORM H 6021 (08/2016)

In Italy, these certifications are required by: "Guidelines for the definition of technical protocols for predictive maintenance in air conditioning systems" - Official Journal no. 256 of 3 November 2006, implementing VDI6022.



✓ Silicone-free certification

The humiFog pump is also available in the silicone-free stainless steel version. The absence of silicone is essential in paint spray booths, to avoid the finish defect known as fisheye. Certification has been accredited by an external laboratory and is available on request.



✓ ATEX

humiFog responds to the occupational health and safety requirements defined by ATEX regulations, important above all for paint booth and oil & gas applications. The version of the rack distribution system for ATEX applications is the result of a careful design and choice of the materials used, guaranteeing the absence of possible points of ignition in the presence of flammable substances.



Why demineralised water?

- minimum maintenance;
- no clogging of the nozzles;
- no dust (using normal tap water, from 15 to 30 kg of dust is introduced into the rooms for every 100 m³ of water);
- greater hygiene (the membrane in the reverse osmosis system represents a physical barrier to the passage of bacteria, viruses and spores).



Water treatment systems (WTS)

CAREL supplies WTS reverse osmosis water treatment systems, complete with pre-filtration, dechlorination, reverse osmosis, storage tank, booster and UV disinfection. Supplied with mains drinking water, it generates demineralised water with characteristics suitable for operation of the humidifiers. WTS optimises costs and space and is easy to install on-site. The WTS Large model is recommended for use in combination with humiFog.

The most advanced features for humidity control

humiFog Multizone Touch is the result of CAREL's decades of experience in both high-pressure adiabatic humidification systems and programmable controllers, and uses the most advanced logic available to guarantee a high-performance humidification process.

Adaptive water saving in preheating

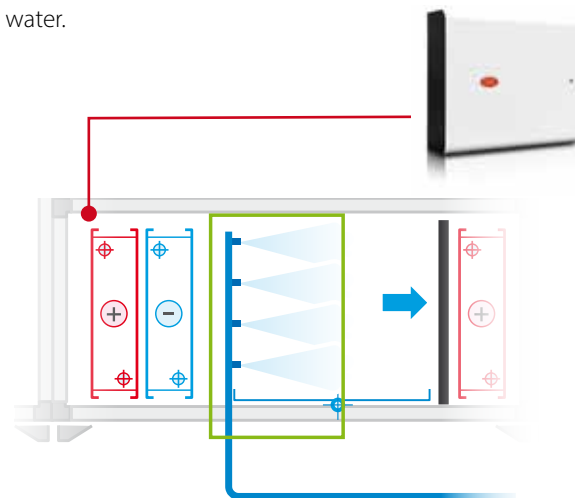
As absorption efficiency is closely related to the air temperature, water atomisation is limited by a probe that measures the inlet temperature, downstream of the rack, so as to determine the maximum amount of water that can be absorbed by the air stream.

In the event of low temperatures, absorption efficiency decreases, and therefore the controller, regardless of the humidification request, limits the atomised water production.

Spraying the right amount of water based on the air flow temperature and humidity guarantees:

- **Hygiene**, preventing the water from reaching the drain tank and stagnating.

- **Minimum water consumption**, the system identifies the exact operating conditions to avoid condensation and therefore wasted water.



Remote cloud and local supervision

Remote monitoring and interaction with the unit are available via the new DigitalHUM cloud portal, the plug&play solution for the remote management of humidifiers.

The humidifier operating data are available at all times on the cloud, as support for maintenance and to manage and reduce operating costs.

The humiFog humidification system can also be included in local supervision together with the rest of the HVAC system, using the boss local supervisor solutions.

Integrated web server pages are also available for controller the humidifier, using an Ethernet connection to the local network.

The image shows the physical humidifier unit on the left and a screenshot of the DigitalHUM cloud portal interface on the right. The interface displays the following data:

STATE INFO	
Unit status	ALARM
Current production	0.0 kg/h
Production request	0.0 kg/h

WORKING HOUR	
Total hours that the unit was on	1899 h
Pump production hours	1120 h
Time remaining until next maintenance	0 h
Pump production hours reset date	08:13 25/05/21

RELEASES	
Software release	1.9.004
Operating system release	4.6
Unit model	UA1500D500
User interface version (touch)	1.0.1

NETWORK	
IP	10.10.10.10
hostname	humiFogPump

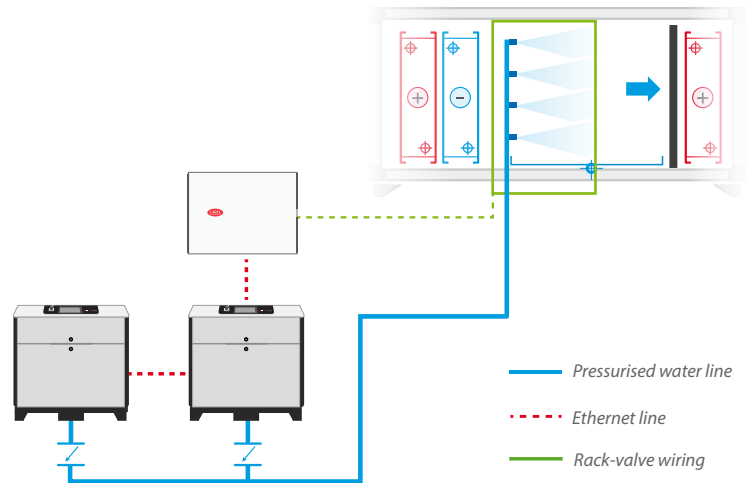
Maximum installation flexibility

The versatility of humiFog Multizone Touch makes it suitable for projects of all sizes: from a single AHU to complex multi-AHU systems.

Backup and rotation

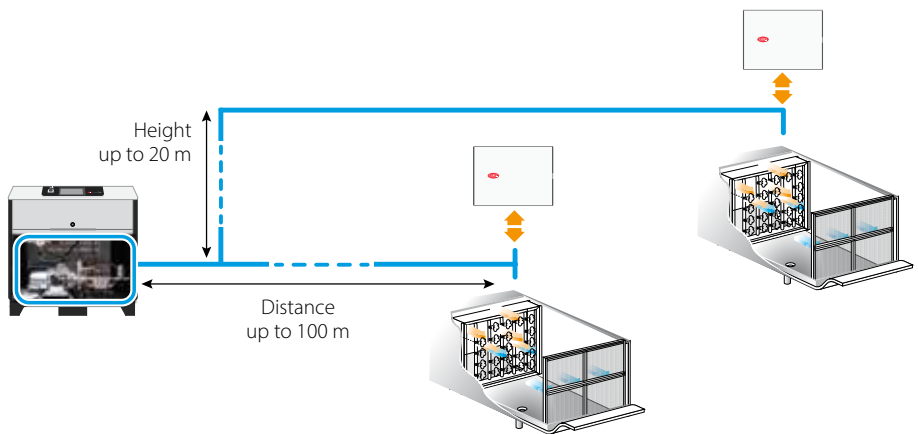
Two humiFog pumping stations can be connected to the same distribution system. In this way, humidity production is still guaranteed even if one of the units stops operating. Furthermore, with this option, the operating hours of the two pumps are balanced automatically.

In many industrial processes, there is a very close correlation between product quality and air humidity control. Service continuity in applications such as paint booths and clean rooms is essential.



You choose where to install the system

Remote control panel: humiFog manages each zone with a dedicated remote control panel that can be installed up to 100 metres from the pumping station. This means the pump can be safely installed in an equipment room near the other systems, while the smaller remote panel can be easily installed near the AHU.

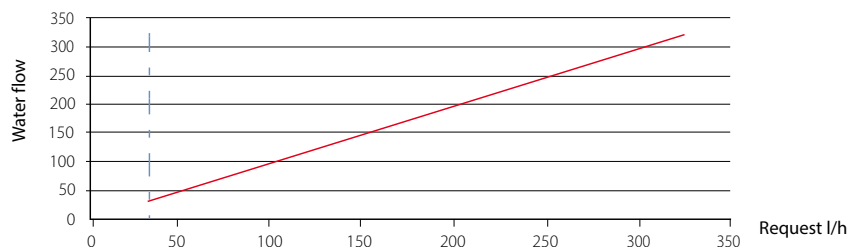


Choose the modulation that best suits your needs

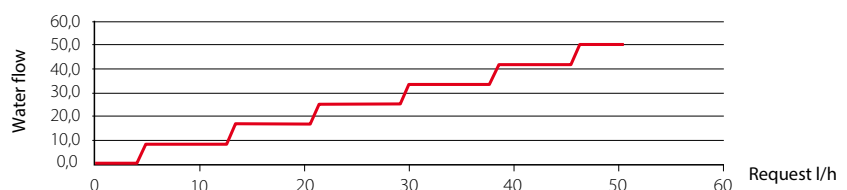
Continuous modulation: by managing the atomisation pressure linearly using an inverter, the set point can be maintained with extreme precision for single zone applications, especially suitable for clean rooms and laboratories.

Stepped modulation: managed by opening and closing groups of nozzles in steps, at a constant pressure of 70 bars. This modulation mode allows simultaneous humidification management of multiple AHUs with a single pump.

Humidifier capacity vs. request



Humidifier capacity vs. request

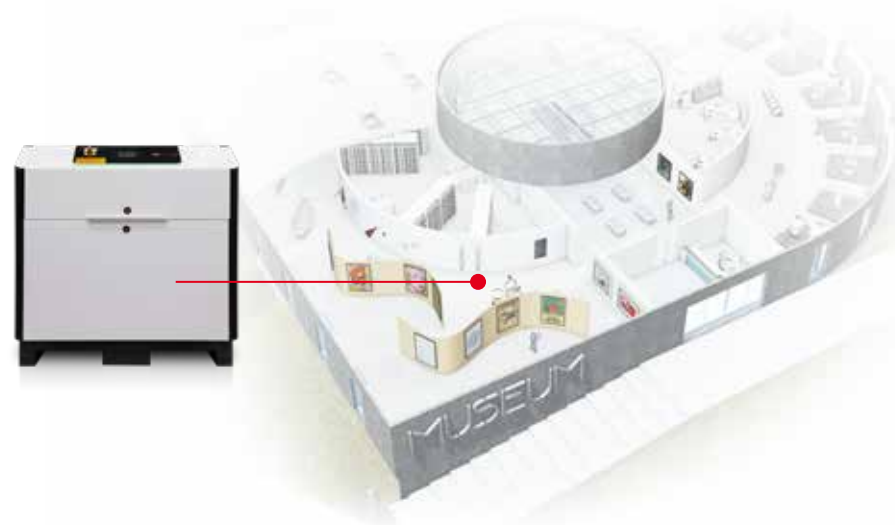
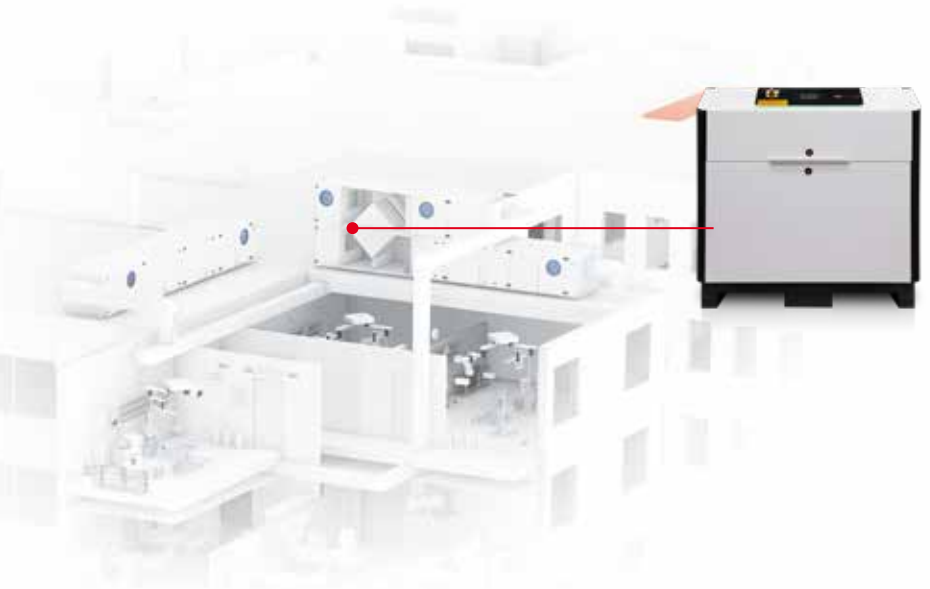


Applications

humiFog Multizone Touch is the best choice for health and comfort applications in which the building's air handling system is divided into several units.

Hospitals

A low level of air humidity negatively affects people's health, especially in hospital applications, as it increases the transmission capacity of airborne viruses and lowers the natural defences of the upper respiratory system. humiFog is the ideal humidification solution for the large capacities required in hospitals (note: isothermal humidification is mandatory in operating theatres in some countries).



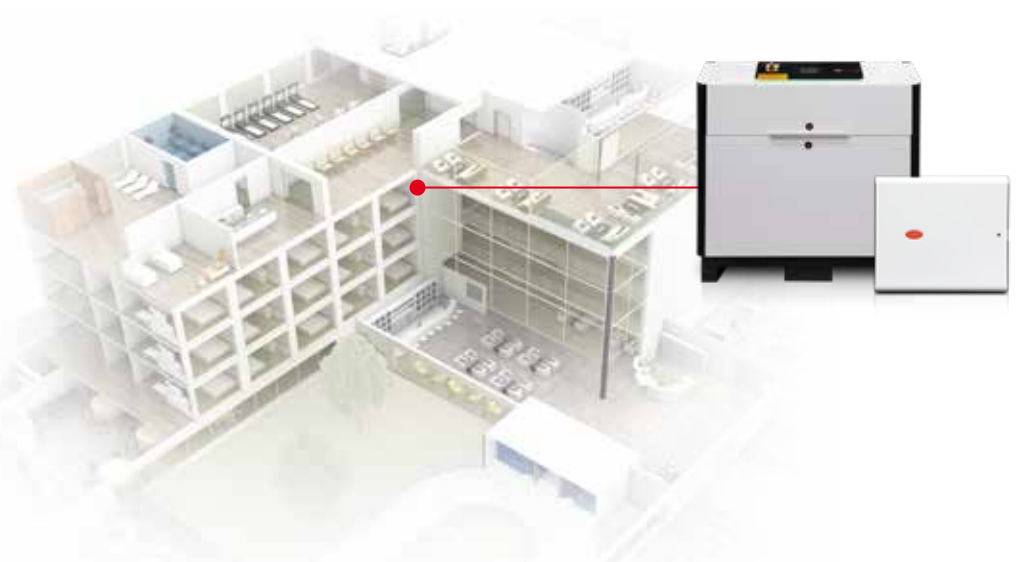
Museums

Controlling air temperature and humidity is fundamental in museums and, more generally, in places where precious works and objects of art are kept for long periods.

A painting generally has a wooden frame and the painted canvas (or wooden board): these are hygroscopic materials, which change dimensions when relative humidity of the air varies. This can be the cause of cracks forming in the paint, with possible detachment from the support, irreparably damaging the work.

Hotels

Low humidity also increases the spread of typical ailments and, last but not least, affects the perceived temperature. When humidity is controlled within a suitable range of values, the temperature can usually be lowered by 1-2 °C. Relative humidity control therefore guarantees better air quality and energy savings.



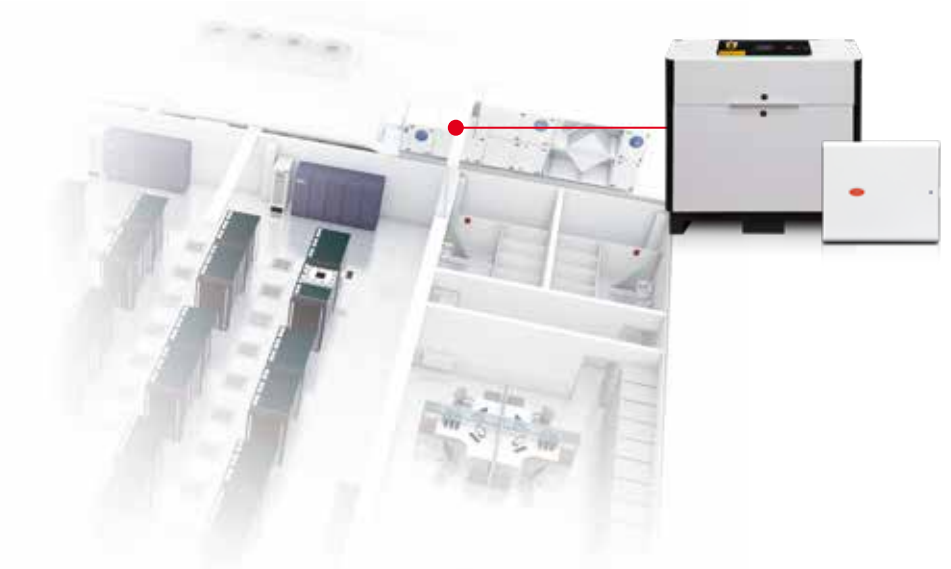
humiFog Multizone Touch is the perfect choice for process applications where reliability and service continuity must be ensured, together with precise humidity control.

Data centres

Humidity needs to be controlled in data centres to prevent electrostatic discharges from damaging electronic components. The drier the air, i.e. the lower the relative humidity, the greater the risk.

In data centres humidity is typically low, due to the large amount of heat generated by electronic equipment. As the air heats up, relative humidity falls and thus the risk of electrostatic discharges increases.

Keeping relative humidity above 30% allows a film of liquid to deposit on the surfaces, invisible to the naked eye, which discharges static electricity to earth.



Paint spray booths

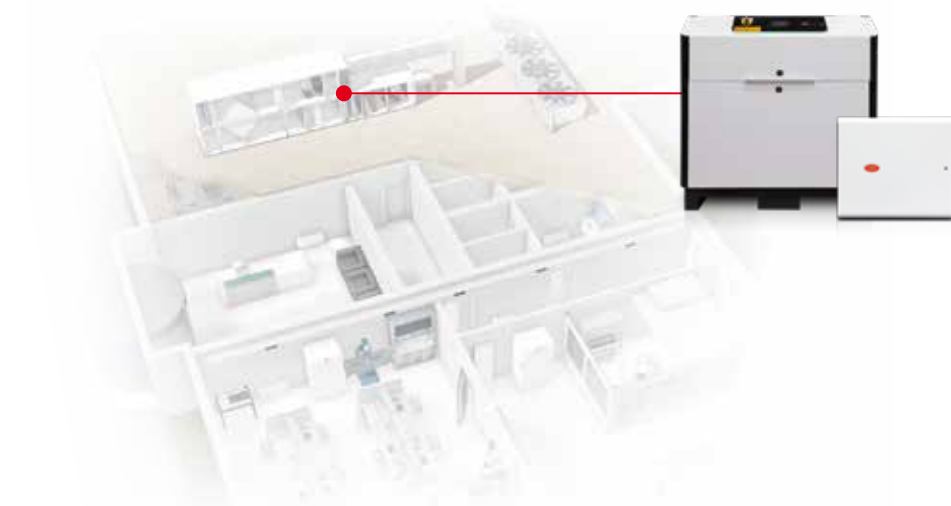
The need for industrial processes with a low environmental impact has driven the aeronautical and automotive sectors to adopt water-based paints. These products require strict relative humidity control all year round.

If the air humidity is too high, defects such as blistering and sagging may occur. On the contrary, when the relative humidity is too low, the paint loses gloss, and defects such as orange peel and graininess may occur, due to the water contained in the paint particles evaporating before depositing on the surface being coated.



Clean rooms

Relative humidity is one of the parameters that determine the operating conditions of a clean room. There are many reasons why such precise humidity control is necessary, and in certain applications reaches tolerance limits of just 1%, due to the influence of relative humidity in physical/chemical terms on the processing and storage of materials. Close humidity control therefore means greater process control.



Humidity control meets energy saving

Evaporative cooling ensures lower operating and investment costs

-15 kW
of chiller power
consumption

By atomising 100 kg/h of water at the intake, the supply air is cooled by 4 °C, reducing power consumption of the refrigerant circuit by 15 kW while consuming just 1 kW of electricity for humiFog.

the data refer to the case study reported below

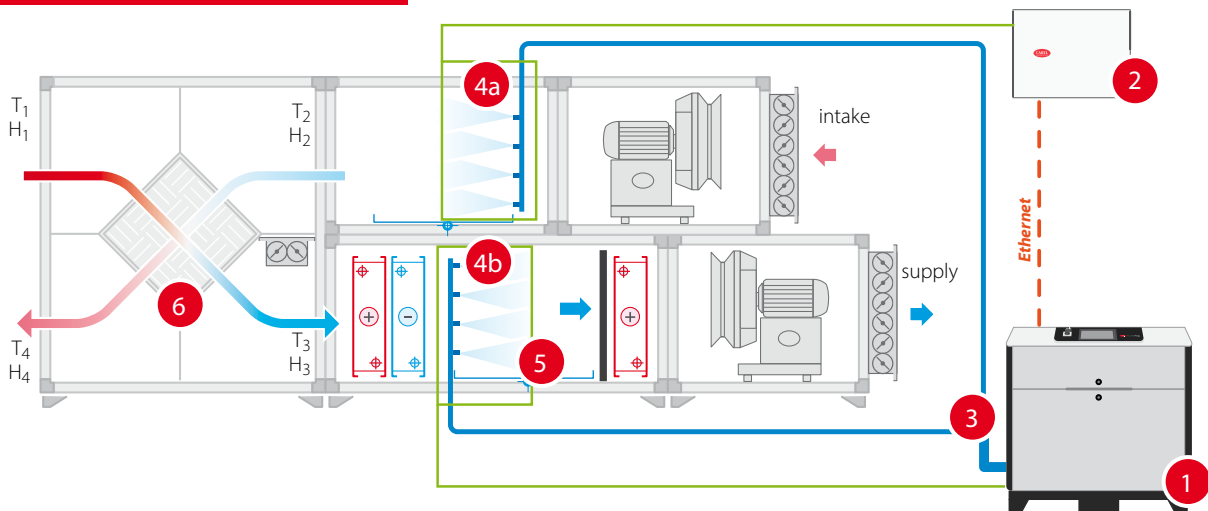
humiFog is an adiabatic humidifier that atomises water into very fine droplets to humidify the air. In doing so, these change state from liquid to gas, absorbing energy from the air, which consequently is cooled. 100 kg/h of water, when evaporating, absorbs 68 kW of heat from the air.

This cooling effect can be used in two different ways:

- IEC indirect evaporative cooling (4a): the return air is cooled before flowing into a heat recovery unit.

This increases the cooling capacity supplied to the incoming outside air, reducing the load and size of the chiller.

- DEC direct evaporative cooling (4b): in hot and dry climates, the supply air is cooled directly. The need for humidity and cooling are thus met by one single unit, eliminating the high energy consumption associated with chillers.



1 pumping station and zone controller for humidification in winter and direct evaporative cooling

2 zone controller for indirect evaporative cooling

3 pressurised water line

4 a: rack for indirect evaporative cooling
b: rack for direct evaporative cooling

5 droplet separator

6 heat recovery unit

	Outside air (30,000 m ³ /h)		Exhaust air (30,000 m ³ /h)		Cooled outside air		Outlet air		Cooling capacity *
	T ₁	H ₁	T ₂	H ₂	T ₃	H ₃	T ₄	H ₄	P
WITHOUT evaporative cooling	35 °C	40% RH	25 °C	50% RH	29 °C	56% RH	31 °C	36% RH	58 kW
WITH evaporative cooling	35 °C	40% RH	18 °C	saturation	25 °C	70% RH	28 °C	55% RH	100 kW

Increase in capacity 42 kW

In the example shown in the table, the exhaust air is pre-cooled to 18 °C and used by the heat exchanger to cool the outside air from 35 to 25 °C, without increasing the absolute humidity.

*: the cooling capacity is calculated with an outside air flow of 30000 m³/h, atomising 100 kg/h of water, and a heat recovery unit efficiency of 58%.

Technical specifications

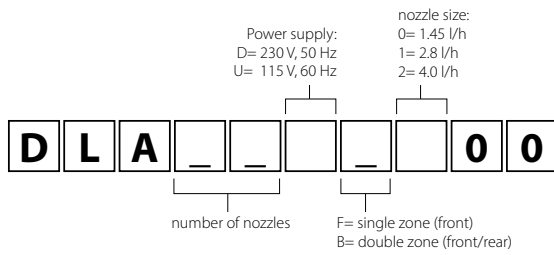
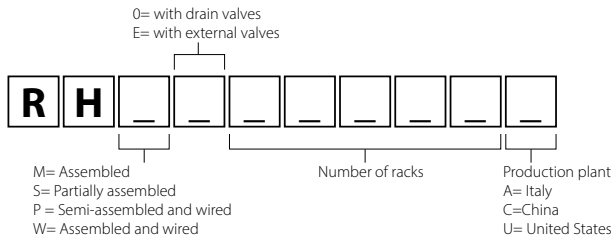
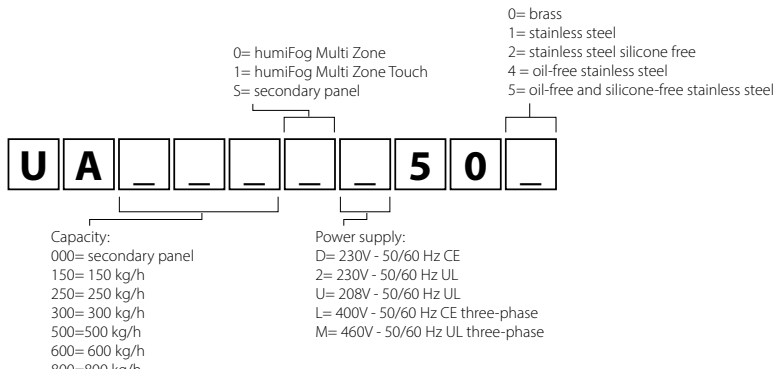
humiFog Multizone Touch

Technical specifications	UA1501D5**	UA2501D5*4	UA3001D5**	UA5001D5**	UA6001D5*4	UA8001L5**	UA1K21L5**	UA1K31L5*4
		oil free			oil free			oil free
Installation conditions								
Ambient temperature	5T40 °C (41T104 °F)							
Ambient relative humidity	0-90% rH							
Water circuit data								
Flow-rate (kg/h) (gal/d)	150 (951)	250 (1585)	300 (1902)	500 (3170)	600 (3804)	800 (5072)	1200 (7608)	1350 (8560)
Feedwater conductivity (µS/cm)	< 50							
Feedwater pressure (bars) (PSI)	2 to 5 (40 to 100)	2 to 4 (29 to 58)	2 to 5 (40 to 100)	2 to 5 (40 to 100)	2 to 4 (29 to 58)	2 to 5 (40 to 100)	2 to 5 (40 to 100)	2 to 4 (29 to 58)
Feedwater temperature (°C) (°F)	5 to 40 (41 to 104)							
Water inlet connections to the cabinet	G3/4" F							
Water connections from the cabinet to the rack	M16x1.5 M					M22x1.5 M		
Water drain connections	G1/4" F							
Physical specifications								
Weight (kg) (lb)	94 (207)	95 (209)	95 (209)	105 (231)	102 (225)	117 (258)	116 (256)	116 (256)
Dimensions mm (inch)	width: 850 (33); depth: 480 (19); height: 945 (37)							
Clearance required (mm) (inch): top - sides - front	500 (20) - 500 (20) - 1000 (40)							
Ingress protection (IP)	IP20							
Electrical specifications								
Voltage (Vac)	230 (±10%)					400 (±10%)		
Electrical phases	1					3		
Frequency (Hz)	50/60 (±1%)							
Power consumption (kW)	0.65	1.25	1.25	1.65	1.65	3.35	4.35	4.35
Current (A)	4.8	7.4	7.4	10	10	3.9	4.9	6

Zone control panel

Specifications	UA000SD500	UA000S2500	UA000SU500
Installation conditions			
Ambient temperature	5T40 °C (41T104 °F)		
Ambient relative humidity (rH)	0-90% rH		
Physical specifications			
Weight (kg) (lb)	19.6 [43]		
Dimensions mm (inch)	width: 491 (19.3); depth: 155 (6.1); height: 433 (17)		
Clearance required (mm) (inch): top - sides - front	500 (20) - 500 (20) - 1000 (40)		
Ingress protection (IP)	IP20		
Electrical specifications			
Voltage (Vac)	230 (±10%)		208 (±10%)
Electrical phases	1		
Frequency (Hz)	50 (±1%)	60 (±1%)	60 (±1%)
Power consumption (kW)	0.5		
Current (A)	2.2		2.5

Component part numbers



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