Water atomiser through compressed air

CAREL

Integrated Control Solutions & Energy Savings

Water atomiser through compressed air

The **mc multizone** adiabatic humidification system is ideal for the humidification of medium/large industrial environments and large volumes of air, in the duct and for air handling units.
The operating principle of the **mc** system is to run compressed air and water through atomising nozzles so as to create a mist of very fine droplets.
This atomised water is readily absorbed by the air, humidifying and cooling it. In fact, evaporation occurs by "absorbing" sensible heat from the air that, as a consequence, is cooled.

The new microprocessor electronic controller on the **mc multizone** ensures completely automatic and reliable operation, guaranteeing the required humidity level at all times.

The graphic display makes the user interface extremely intuitive, meaning the **mc multizone** can be easily operated by less expert users.

Atomising nozzles made from AISI 316 stainless steel feature an exclusive self-cleaning system that reduces maintenance, even when the supply water has a significant mineral salt content.

The **mc multizone** system comes complete with nozzle installation kit, UV lamp sanitation system, and accessories for quick installation and commissioning.

New control cabinet, simple & powerful

System composition

Control cabinet

This manages the supply of water and compressed air to the nozzles. The water is atomised based on an external control signal or, in the case of independent control, so as to maintain the humidity/temperature set point. The system has the ability to control the humidity independently in multiple zones (rooms, AHUs, cold rooms) using a master-slave layout: one Master and up to 5 Slaves, connected in a pLAN (3 wires, digital communication). The Master is fitted with a display for accessing the readings, viewing the status and messages on the Master and the Slaves.

Special atomising nozzles

Can be installed in the AHU/duct or directly in the room being humidified/cooled.
Made completely from stainless steel, they atomise the water into very fine droplets, 5-10 µm in diameter, that are rapidly absorbed by the air.

Manifolds for installation in the duct (optional)

Supplied to measure for the AHU/duct, complete with stainless steel air/water lines, nozzles and valves. Fully tested with compressed air and water before delivery.

UV steriliser lamp and protective filters (optional)

Increases the hygiene of the water entering the humidifier. The operating principle is very simple: UV light is shone on the flow of supply water, its germicide action helping to eliminate any bacteria, mould, spores etc. that may be contained in the water.

user friendly

User interface with icons and easy-to-use menus.

guaranteed hygiene

Automatic procedures for avoiding stagnation of water. UV lamp sanitation system.

multizone

A series of cabinets can be connected in a master-slave layout for multizone applications.

Simple to use, guaranteed hygiene

Guaranteed hygiene

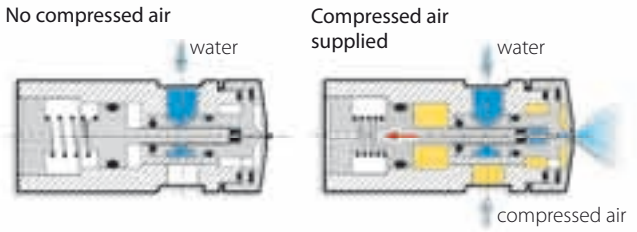
mc multizone ensures a very high level of hygiene, as a result of:

- automatic emptying of the water line whenever the unit stops;
- automatic periodical washing of the water line when the unit is not operating.

This prevents the nozzles from spraying stagnant water. In addition, an effective UV steriliser lamp, installed upstream of the **mc multizone**, shines UV light on the flow of supply water, helping to eliminate any biological contaminants that may be present, such as bacteria, viruses, mould, spores and yeast.

Automatic nozzle self-cleaning system

A special piston driven by a powerful spring periodically removes any mineral salts deposited in the opening of the nozzles, thus significantly reducing the frequency of cleaning operations. Each cabinet, Master and Slave, periodically activates a cycle for drying and cleaning the atomising nozzles.



INTUITIVE user interface

mc multizone is fitted with a large LCD that provides immediately understandable messages even with only partial knowledge of the product. The 3 buttons on the right have the following functions:

- set the set point;
- **i**: immediate access to the main information on the status of the unit (status of valves, calendar, etc);
- access any slave cabinets connected.

Pressing the prg button accesses the operating parameters, divided by type of user (user, installer and maintenance) to simplify access.

self-cleaning

Automatic cleaning cycles to minimise nozzle maintenance.

high capacity

A series of cabinets can be connected in a master-slave layout for high-capacity applications.

easy to install

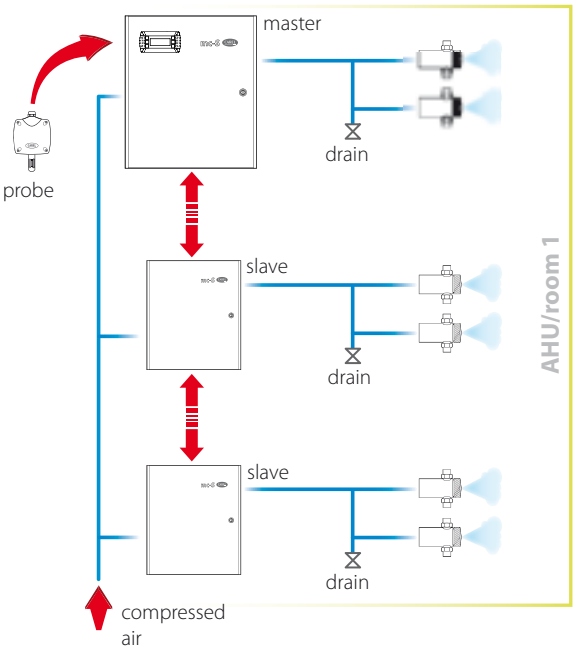
Automatically compensates for the pressure drop along the compressed air lines.

Simple installation for all types of application

Master-Slave configuration

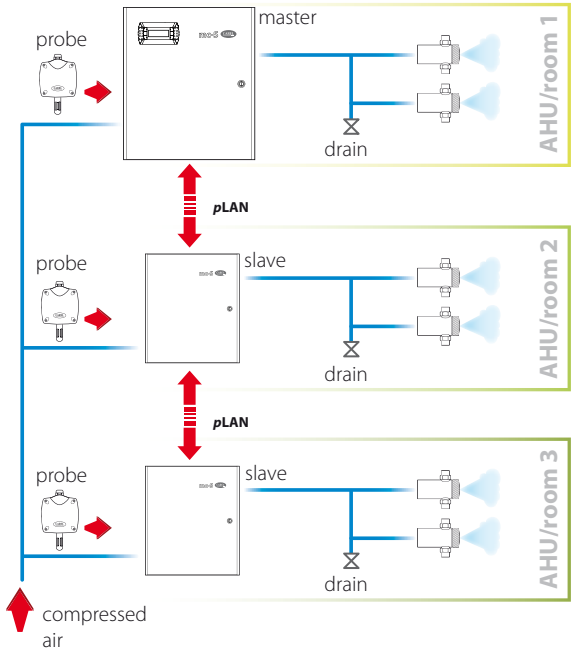
high capacity applications

applications in rooms or ducts where more than 230 kg/h of humidification is required, and thus more than one **mc** cabinet. The control signals (probes, external signals, limit probe) are connected to the Master only and all the cabinets generate a humidification and cooling capacity that is proportional to demand. In this way, a system can be developed with a capacity up to 1380 kg/h.



MULTIZONE applications

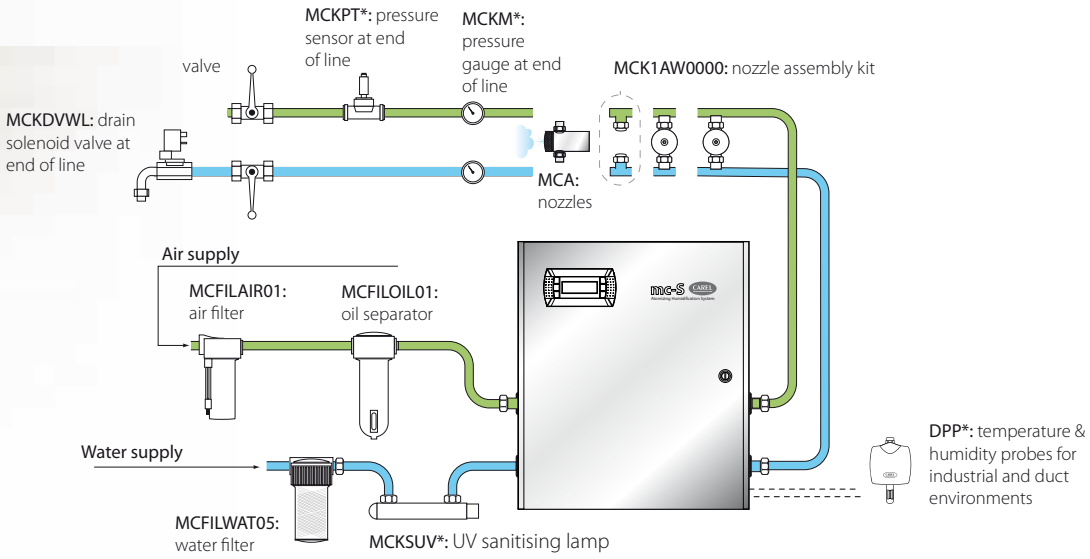
applications in multiple zones, rooms or ducts, each with its own humidity/temperature set point. Each cabinet, Master and Slave, receives the signals (probes or external signals) from the corresponding zone, and generates the capacity required to reach its own set point. Note that, in the case of installations in large spaces, these can be divided into zones, each with their own humidity/temperature probe, using a multizone Master-Slave system.



Applications

With more than 5,000 installations all over the world, **mc multizone** is one of best selling and amply tested adiabatic humidification systems on the market for medium/high capacity installations.
Typical applications include:
1. textiles industry;
2. paper processing/stores;
3. cold rooms for fruit and vegetables;
4. wine and barrel cellars;
5. wood/timber processing/stores;
6. tobacco processing/stores;
7. printing facilities.

Simple installation



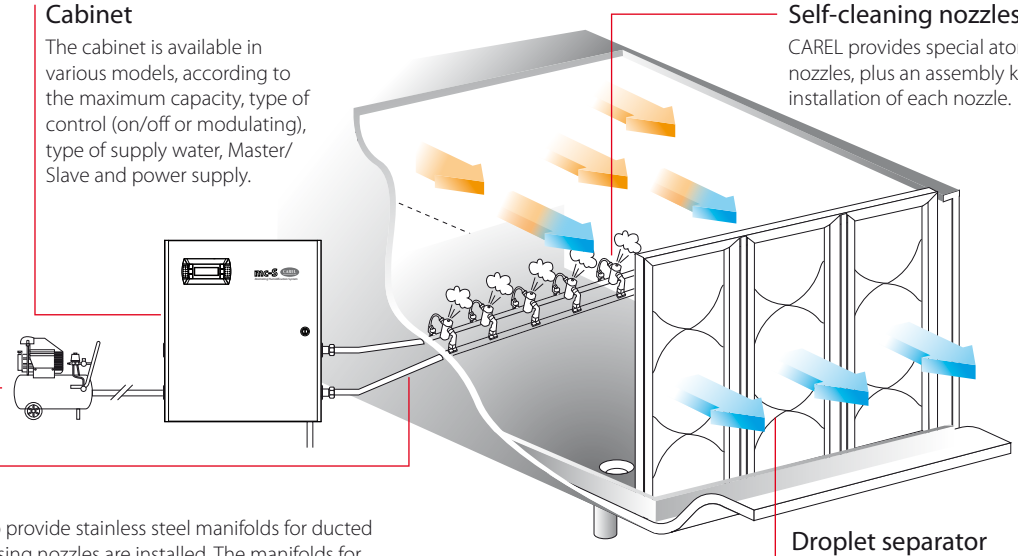
New accessories are available to simplify the installation and commissioning of the **mc multizone**.
The main accessories are:

- **pressure sensor at the end of the line - automatic pressure balance:** if this is installed at the end of the longest compressed air line that supplies the nozzles, the controller can regulate the air pressure at the optimum value (2.1 bars) for the nozzle that is furthest away, thus making up for the pressure drop. This enormously simplifies the setup of the installation, which will work perfectly right from the very first time.
- **drain valve at the end of the line - anti-stagnation:** this is installed at the end of the water line that supplies the nozzles. In this way, **mc multizone** can empty the line when the unit is off and perform the automatic periodical wash cycles. These procedures ensure a high level of hygiene by avoiding stagnated water in the line.

Installation in AHU/duct

Air compressor
The mc multizone requires compressed air, provided by an external compressor, not supplied by CAREL. The volume of air at standard atmospheric pressure required to atomise one litre of water is 1.27 Nm3/h, compressed to a pressure between 4 and 10 bars.

Cabinet
The cabinet is available in various models, according to the maximum capacity, type of control (on/off or modulating), type of supply water, Master/ Slave and power supply.



Self-cleaning nozzles
CAREL provides special atomising nozzles, plus an assembly kit for the installation of each nozzle.

Manifolds
Upon request, CAREL can also provide stainless steel manifolds for ducted installations, where the atomising nozzles are installed. The manifolds for installations in the room are not supplied by CAREL.

Droplet separator
With fibreglass or AISI304 filtering mesh.

Table of technical specifications

Specifications	MC060*	MC230*
General		
Maximum humidification capacity (kg/h)	60	230
Power supply	230 Vac single-phase, 50/60 Hz / 110 Vac single-phase 60 Hz, 37 to 48 W	
Operating conditions	1T40 °C, 0 to 80% rH non-condensing	
Storage conditions	-1T50 °C, 0 to 80% rH non-condensing	
Index of protection	IP40	
Water fill		
Connection	1/2" G	1/2" G
Temperature limits (°C)	1T50 °C	
Water pressure limits (MPa/bar)	0.3 to 0.7/3 to 7	
Instant flow-rate (l/h)	60	230
Total hardness (ppm $CaCO_3$) [1]	0 to 400	
Conductivity limits (µS/cm) [1]	0 to 1250	
Water drain		
Connection	TCF 8/10 or TCF 6/8 mod. with normal water TCF 8/10 mod. with demineralised water	
Water outlet		
Connection	1/2" G	1/2" G
Water pressure (MPa/bar)	0.035 + 0.01 x Δh/0.35 + 0.1 Δh (Δh: difference in height in metres between cabinet and nozzles)	
Air line		
Connection	1/2" G	1/2" G
Temperature limits (°C)	1T50 °C	
Water pressure limits (MPa/bar)	0.5 to 07/5 to 7	
Outlet	1/2" G	1/2" G
Air pressure (MPa/bar)	0.12 to 0.21 / 1.2 to 2.1 (only in the modulating versions does the pressure have intermediate values between the limits)	
Nozzles		
Material	stainless steel (AISI 316)	
Capacity of the nozzles at 2.1 bars (kg/h)	2.7 - 4.0 - 5.4 - 6.8 - 10	
Network		
Network connections	Modbus®, LON, TCP/IP, SNMP	
Air filter		
Dimensions	Ø 62 mm, H= 180 mm, weight= 0.4 kg	
Connections (inlet/outlet)	1/2" G female	
Filtering	5 µm	
Oil filter		
Dimensions	Ø 85 mm, H= 267 mm, weight= 2.1 kg	
Connections (inlet/outlet)	3/8" G female	
Filtering	1 µm	
Water filter		
Dimensions	Ø 50 mm, H= 175 mm, weight= 0.4 kg	
Connections (inlet/outlet)	1/2" G female	
Filtering	5 µm	
UV sanitising lamp		
Dimensions	270x80 mm	
Connections	1/4" gas	
Power supply	25/50 Hz	

([1]) Water quality for mc multizone systems:
The constructional and functional features of the mc multizone allow the use of untreated drinking water. Nonetheless, the quantity and the quality of dissolved minerals affect the frequency of the routine maintenance operations (mainly involving the periodical cleaning of the nozzles) and the quantity of mineral dust deposited by the droplets of water after these have completely evaporated. Demineralised supply water by reverse osmosis should be used. This is also recommended by the main standards, such as UNI 8884, VDI6022 and VDI3803.

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