



CAREL



Compressed air and water spray humidifier

The adiabatic humidification system **mc** is designed for humidification of **medium to large industrial rooms** and considerable air volumes in **ducts** and **air handling units**.

The correct mixture of compressed air and water produces a **highly atomised water spray**, which evaporates absorbing the necessary energy directly from the environment.

The **microprocessor controlled cabinet** permits precise, and completely automatic, operation of the **mc** system regulating the flow rate depending on the actual and required humidity level.

Atomising nozzles made in AISI 316 stainless steel feature an exclusive **self-cleaning mechanism** and the controller manages an **automatic cleaning cycle** which reduces maintenance.



Applications

With more than 5,000 installations world-wide, the **mc** system is one of the best selling and best tested adiabatic humidification systems on the market for medium-high capacity installations.

Typical installations can be divided into two groups: industries where compressed air already is available and industries where optimal hygienic conditions and precise humidity control is requested.

Industries where compressed air is available:

- textile;
- wood-working;
- paper;
- tobacco;
- leather;
- print on paper.

Industries where compressed air is not available:

- hospitals;
- offices;
- museums;
- test rooms;
- clean rooms;
- microchip production.

The **mc** humidification system is also suitable for positive-temperature refrigerating rooms for ripening, seasoning, food preservation and wine aging.

Automatic cleaning cycle

The automatic cleaning cycle is activated every $\frac{1}{2}$ hour during operation and immediately upon shut-down when the requested humidity level has been reached. The cleaning cycle consists of two steps. Firstly the water supply is stopped while the air continues to dry the nozzle, secondly the compressed air supply is stopped momentarily to eliminate lime scale in the orifice by the self-cleaning nozzle mechanism. In this way hygienic operation is secured and maintenance minimised.

Air compressor

The **mc** system requires compressed air to operate supplied by an external air compressor. The air volume at standard atmospheric pressure required to atomise one litre of water is 1,27 Nm³ compressed to an air pressure between 4 and 10 bar. The power consumption of the air compressor depends on the compressor type, the efficiency and the pressure the air is compressed to. Typically the power consumption is in the range from 70 W to 110 W per litre atomised water per hour.

Fine atomising

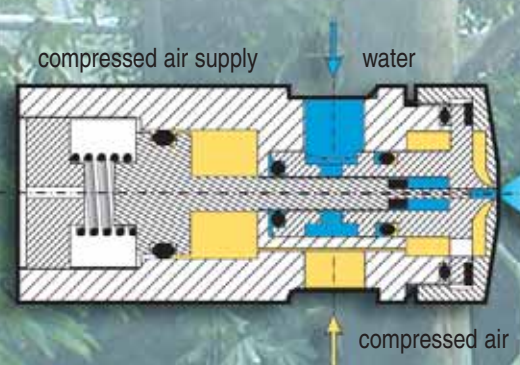
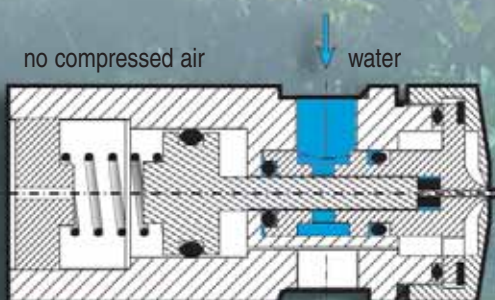
The particular shape of the nozzles allows atomising of hundreds of litres, atomised to droplets with diameters at just 5 to 10 microns, creating fast absorption of the water mist into the air. The absorption process extracts energy from the air equal to 700 W per litre of water absorbed by the air, every hour, which cools the air significantly. Depending on the air conditions the cooling effect can be up to 10 °C.



Hygienic operation

CAREL's **mc** systems represent the safest atomising humidifiers, as:

- no water is re-circulated;
- the water line is drained automatically when the nozzles are not atomising to avoid stagnant water;
- a short automatically controlled cleaning cycle cleans the nozzles for water and limits the lime scale (every $\frac{1}{2}$ hour);
- the nozzle orifice is blocked by a mechanical pin when no compressed air is supplied to avoid dripping.



Water filter and plastic case

The water filter in wrapped propylene eliminates particles down to 5 µm and is contained in a plastic case mounted in the water supply line before the cabinet. It should be noted that the water filter is a standard replaceable part and comes without the plastic case, required for operation.

Solid particle filter for compressed air

The solid particle filter is used to remove particles and impurities down to 5 µm from the compressed air to avoid impurities reducing or blocking the flow through the nozzles.

Oil filter for compressed air

The oil filter is used to eliminate any oil in the compressed air, so as to ensure the correct operation of the atomising nozzles.

The oil filter also contains a 1 µm air filter and it is therefore important that the oil filter is installed on the air line after the solid particle filter.



mc system components

A complete **mc** system is composed of an air compressor, an **mc** cabinet, nozzles and mounting kits, air and water filters, a humidity probe or humidistat, and pipe-work to distribute compressed air and water from the cabinet to the nozzles. For some applications a water treatment system is also required to reduce the water mineral content.

Nozzle mounting kit

A complete mounting kit is available for easy installation of one nozzle between the air line and the water line. The kit contains a manual valve for the air line as well as one for the water line to facilitate maintenance of the nozzles.

Self-cleaning nozzles

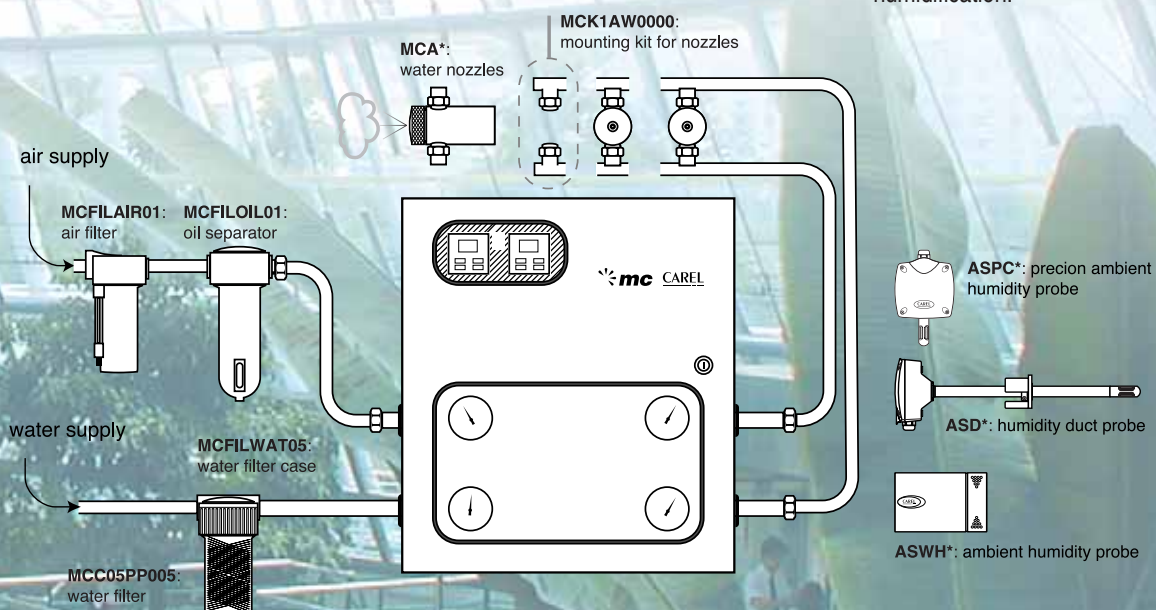
The long lasting nozzles are made in stainless steel AISI 316 and available with five capacities from 2,7 to 10 kg/h. The self-cleaning nozzles feature a pin mechanism that blocks the nozzle orifice when no compressed air is supplied to the nozzle. In this way any lime scale in the orifice is eliminated partly each time the **mc** system is switched off.

Cabinet types

An **mc** cabinet is available for every kind of application.

- Flow rates up to 60 and 230 kg/h.
- For mains water and for demineralised water. The components in contact with water in the demineralised water cabinet are in stainless steel and resistant plastic.
- The control options available are for proportional humidity control or ON/OFF regulation. Proportional control is recommended for duct applications whereas ON/OFF regulation usually is recommended for direct room humidification.

Overview drawing



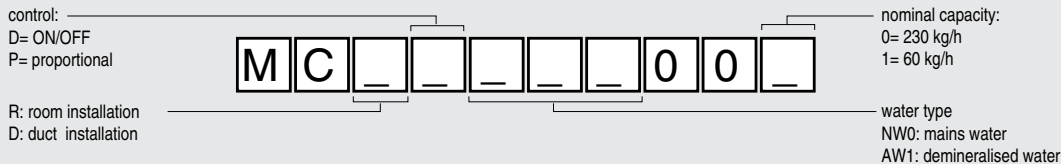


Technical specifications

Cabinet	MC60	MC230
Nominal humidification capacity	60 kg/h	230 kg/h
Minimum humidification capacity	1 nozzle	
Power supply	230 Vac, 50/60 Hz, single phase	
Air consumption	1.27 Nm ³ /h / (kg/h)	
Air inlet pressure	0.4 to 1.0 MPa / 4 to 10 bar	
Water inlet pressure	0.2 to 0.4 MPa / 2 to 4 bar	
Air inlet connection	1/4" G	1/2" G
Water inlet connection	1/4" G	1/2" G
Air outlet connection	1/4" G	1/2" G
Water outlet connection	1/4" G	1/2" G
Water drain connection	TNF Ø 8/10 mm	
Water temperature limits	1T50 °C / 34T122 °F	
Operation temperature	1T50 °C / 34T122 °F	
Operating humidity	0 to 90% r.H., non condensing	
Storage temperature	-10T 70 °C / 14T158 °F	
Storage humidity	0 to 90% r.H., non condensing	
Index of protection	IP55	
Weight	23 to 26 kg depending on the model	27 to 32 kg depending on the model
Control signal from probe	-1 V to 1 V (default)	
Power output to active probe	8 to 24 Vac, max. 40 mA	
Active CAREL humidity probes	For duct: ASDC* or ASDH*, for room: ASPC* or ASWH*	

The constructional and functional characteristics of the mc system allow the use of untreated drinking water. Nonetheless, the quantity and quality of the minerals dissolved in the water affect the frequency of the routine maintenance operations (mainly involving the periodical cleaning of the nozzles) and the amount of dust released by the droplets of water when these have completely evaporated. For best operation, use demineralised water from a reverse osmosis system. Do not use softened water, as this does not reduce the content of minerals dissolved in the water. At any rate, it is suggested to follow the specifications of the UNI 8884 standard, "Characteristics and treatment of the water in cooling and humidification circuits", which specifies water conductivity <100 µS/cm; total hardness <5 °fH (50 ppm CaCO₃).

How to select your cabinet



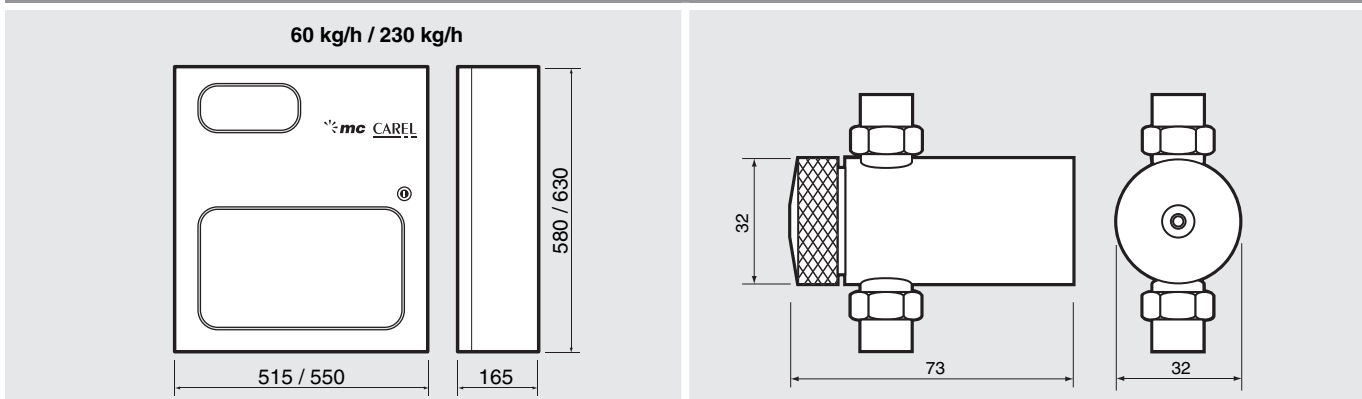
Nozzles

MCAA200000	Atomising nozzle in AISI 316, capacity 2.7 kg/h
MCAB200000	Atomising nozzle in AISI 316, capacity 4.0 kg/h
MCAC200000	Atomising nozzle in AISI 316, capacity 5.4 kg/h
MCAD200000	Atomising nozzle in AISI 316, capacity 6.8 kg/h
MCAE200000	Atomising nozzle in AISI 316, capacity 10 kg/h
MCK1AW0000	Mounting kit for one nozzle

Filters

MCFILAIR01	Solid particle filter for compressed air, 5 µm
MCFILOIL01	Oil filter for compressed air
MCFILWAT05	Water filter case
MCC05PP005	Water filter, 5 µm

Dimensions



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