



CAREL

Product selection catalogue
air humidification products and systems

humidification for life

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CAREL humidification solutions

What is humidity?

Humidity is simply the presence of water vapour in the air.

Relative humidity is the quantity of moisture present in the air at a certain temperature (e.g., 50% rH @ 20 °C) as a proportion of the maximum quantity of water vapour that the air can hold at that temperature when it is saturated (100% rH @ 20 °C).

Why is dry air a problem?

When the outside temperature falls below the inside temperature, the cold and moist air that enters a heated building becomes hot and dry. This happens due to a phenomenon by which equilibrium is established between the moisture in the objects inside the building and in the air that these are in contact with.

The reduction in the moisture in the air may cause well known problems, such as:

- dryness of the upper airways
- cracks in wooden structures
- electrostatic discharges.

Air-conditioning or refrigeration systems may also cause an increase in the dryness of the air, as they cool the air below its dew point, remove moisture (dehumidification) and subsequently reheat the air.

Dew point: this is the temperature that air must reach (while maintaining a constant pressure and humidity) for the moisture to condense (saturation).

Dehumidification: process by which the moisture in the air can be decreased or removed.

Isothermal and adiabatic humidification

There are two different procedures that can be applied to increase the degree of moisture in the air:

- isothermal humidification;
- adiabatic humidification.

In the isothermal humidification process, the water vapour is dispersed in the environment after having been created by boiling water.

This procedure requires the contribution of an external source of energy to change the state of the water.



As the mass of the steam is much lower than the mass of the air it is absorbed into, the temperature of the air increases slightly. The adiabatic process does not involve the contribution of thermal energy from an external source: the water is finely atomised and introduced into the environment. The heat required to transform the water from liquid to vapour is supplied by the air, which consequently decreases in temperature and is humidified at the same time.

Why humidify

The need to humidify an environment is determined by a number of factors:

1. the presence of hygroscopic material (capable of absorbing moisture from the air);
2. the presence of static electricity;
3. the importance of well-being and comfort.

1. Hygroscopic materials

Hygroscopic is the term given to materials whose cells absorb moisture, leading to a variation in their dimensions.

This is different from hydrophilic absorption, in which case the water is absorbed into the cells of the material with NO consequent variation in dimensions. Hygroscopic materials tend to reach equilibrium with the surrounding environment.

It is therefore the variation in the dimensions of the materials, due to the change in relative humidity, that affects the workability of the materials and the production processes even more significantly than the temperature.

If a piece of wood in equilibrium with the moisture content in the outside air is brought into a heated room with a lower

humidity, the wood will start to release part of its moisture to the dry air in the room. As the wood releases its moisture, it will contract, leading to the formation of cracks or deformations. The same damage can be seen in paper, fabrics, some plastics materials, wax, fruit and vegetables and other materials that have the property to absorb or release moisture. The protection of hygroscopic material can be guaranteed only by the stability of the environment they are situated in. This objective can be achieved by humidification when the air is too dry and dehumidification when the air becomes too humid.

Printing

Paper reaches the printing facilities in reels, conditioned in the paper mill with a certain quantity of moisture and packaged in impermeable material to ensure that such moisture is maintained. As soon as the reels are placed in the printing press and unwound, the paper starts to lose moisture due to the heat produced by the printing press. A reel of paper may vary in size by a number of centimetres, in both width and length. When the reel of paper is placed in the printing press and unwound, it quickly loses moisture. This causes changes in dimensions that may lead to cause problems, mainly when printing with a number of different colours. One of the solutions is to adjust the rollers to compensate for this error, however if the humidity varies too quickly, the only reliable solution is the stabilisation of the ambient conditions, thanks to appropriate humidity control, ensuring that the dimensions of the paper remain constant and that the printing process will be faster, limiting downtime during production.

Woodworking

In this case too, the stabilisation of the environmental conditions ensures better results throughout the production process. In fact, without humidity control the cracks caused by the loss of moisture will be more frequent; the solvent used in the glues will be absorbed by the wood before the glue has the chance to polymerise, making the joints unstable; the paints may take on a granulose and matt appearance due to the solvent being absorbed by the wood before the paint has dried properly.

Textile industry

Appropriate humidification reduces the breakage of the fibres, the quantity of dust in the air and at the same time speeds up the operation of the looms.

Offices

With correct humidification in the winter, the concentration of dust can be reduced, due to a decreased fragmentation of fibres, as well as the increased tendency of particles to agglomerate and therefore be more effectively filtered.

Hi-tech microchip manufacturing

Chips are becoming increasingly smaller, and the distances are now measured in Angstroms. Even a slight variation in the dimensions of a silicon wafer during the photographic masking process causes unacceptable misalignments and the consequent malfunction of the components.

Museums

The correct stabilisation of the environment is essential for preserving works or art over time. If canvasses were to constantly change dimensions, paintings could be irreversibly damaged; in addition works made from wood or on parchment could start to deteriorate in a short time if the surrounding environment was too dry.

Food processing

Foodstuffs must be humidified from the moment they reach the store to when they are purchased by the consumer. Meats maintain their red colour without the addition of nitrates if they are preserved in suitable containers and appropriately humidified cold stores. If fruit or vegetables lose too much moisture, the cells of the vegetables dry out irreversibly.

2. Static electricity

Static electricity is reduced significantly when the relative humidity is maintained above 35%. There are many sectors of industry that are especially sensitive to this problem.

Computer rooms

The poor control of the humidity in a computer room involves the potential accumulation of static electricity, which when discharged may damage electronic components.

Printing presses

Printing presses may generate electrostatic charges when driving the paper (a newspaper press may generate up to 2,000,000 Volts when driving the paper), with consequent risks for personnel and due to the flammability of the vapours from the solvents in the printing ink.

Photography

Most photographic laboratories feature humidity control systems to prevent the

accumulation of charges on the films, which would make them unusable. This phenomenon is of special significance in relation to X-ray films in hospitals.

3. Well-being and comfort

In today's complex society, well-being and comfort have assumed crucial importance. Correct humidification, as well as a reduction in the amount of dust in suspension, ensures that the people present in closed rooms can breathe correctly, without problems deriving from the dryness of the upper airways. In addition, the reduction of cutaneous evaporation resulting from correct humidification reduces the feeling of cold and consequently allows the temperature of the room to be kept lower, saving on heating bills and limiting the dispersion of heat between the inside and the outside of the building.

Applications	Isothermal					Adiabatic		
	UE	CH	UR	UG	DS	UA	MC	UC
Pure environments								
sterile/aseptic environments	•	•	•	•	3			
clean environments	•	•	•	•	3	1	1	
hospitals/laboratories	•	•	•	•	3	1	1	
Civil environments								
houses	•	•	•	•				
steam bath	•		•	•				
offices	•	•	•	•	3	2	2	
libraries	•	•	•	•	3	2/3	2/3	
museums	•	•	•	•	3	2/3	2/3	
fan coils	•	•	•	•				
Food industry								
production lines					3	4	4	
cold rooms						•	•	•
ripening rooms						•	•	•
bread leavening	•	•	•	•	3			
cheese maturing	•	•	•	•	3			
wine cellars and wine barrels	•		•	•	3	•	•	•
Other industrial applications								
wood storage	•		•	•	3	•	•	
paper mills						•	•	
printing facilities	•		•	•	3	2	•	
photographic labs	•		•	•	3	2	2	
textiles						•	•	
tobacco ripening and storage	•	•	•	•	3	•	•	•
cigars storage	•	•	•	•	3	•	•	•
amusement parks						•	•	
Farming applications								
animal breeding						•	•	
hatching						•	•	
greenhouses						•	•	•

1. Humidify in duct, use demineralized water only and do regular maintenance according to ASHRAE 12-2000 and VDI6022.
2. Atomise water inside a duct only.
3. Steam/water containing treatments chemicals should not be used.
4. Demineralized water is recommended.

humiTOOLS

humiTOOLS is the on line help tool from CAREL that everyone has been waiting for, to simplify the choice of the humidifier and the corresponding accessories and documents.

humiTOOLS is available free-of-charge from the CAREL web site, after signing in, and includes:

- **Humidifier configuration tool:** this powerful software is used to size and choose the best humidifier, as described more in detail here above;
- **Water acceptability:** this software indicates which humidifier is most suitable for the type of water available;
- **Steam distributors:** this section suggests the linear distributor suitable for the duct/AHU, according to the required capacity and the duct data. It supplies also the absorption distance.



Humidifier configuration

The humiTOOLS humidifier configuration tool uses a historic climate database of hundreds of locations all over the world. The user simply chooses the location where the humidifier will be installed, the inside humidity and temperature set point and the type of application (ducted humidification or directly into the room, steam baths or centralised steam systems): humiTOOLS then automatically calculates the humidity requirement and lists the suitable humidifiers that the user can choose from for the application; the user can also download up-to-date documents (manuals, specifications, etc.), and select the probes, steam distributors and other accessories. Finally, a quotation can be requested via internet, with a simple click. There is also the possibility to choose the climate region where the humidifier will be used and manually enter the outside humidity and temperature values.



The most complete
range of Humidifiers

CAREL

humiSteam

Immersed electrode
steam humidifiers

heaterSteam

Electrical heater steam humidifiers

gaSteam

Gas fired humidifiers

humiFog

High pressure water
atomising humidifiers

humiDisk **65**

Centrifugal humidifiers

mc

Compressed air water atomiser



Successful solutions for Humidity control

Its complete, advanced and affordable range of products has positioned CAREL in the top humidifier manufacturers in the world. CAREL' systems for humidity control include steam humidifiers (electrode, heaters, gas), and adiabatic humidifiers (high pressure water, compressed air and centrifugal atomisers). An optimal solution for every kind of application.

humidification for life

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Isothermal humidifiers





Immersed electrode humidifiers

The operation of the immersed electrode humidifier is based on a very simple physical principle.

As common drinking water contains a certain quantity of dissolved mineral salts, and is consequently slightly conductive, applying a voltage to metal electrodes immersed in the water creates an electric current that heats the water until producing steam (Joule effect).

The quantity of steam produced is proportional to the electric current, which is in turn proportional to the level of water. This electric current is measured by a current transformer: by varying the level of water using a fill and drain electrovalve, the current, and consequently the steam production, can be precisely modulated.

Due to evaporation, the level of water decreases and must therefore be topped up. As the steam does not carry the mineral salts, the salt concentration in the water and therefore the conductivity increases, meaning that the water has to be periodically diluted by draining part of it using the drain solenoid valve or drain pump and replacing it with new water.

In addition, lime scale is deposited over time and covers part of the cylinder, which must be replaced or cleaned.

The principle is simple, however the development of an immersed electrode humidifier that ensures safe operation and reliability over time requires careful analysis and extended testing.

Compared to the complementary immersed element heater or gas humidifiers, immersed electrode humidifiers:

- are less expensive to purchase;
- operate with drinking water (not completely demineralised or softened);
- require the periodical replacement (or cleaning) of the cylinder;
- feature modulation suitable for comfort or industrial applications, without extreme requirements.

CAREL has been manufacturing immersed electrode humidifiers since the 1970s and can draw benefit from its know-how in the field of electronic controllers: precision control, reliable electronics and sophisticated and complete control software.

The CAREL solutions for the immersed electrode humidifiers are humiSteam and compactSteam.



compactSteam

CH*

In the rooms where we live and work, ensuring correct humidity is not a luxury but rather a factor of well-being, health and productivity. Humidity control also protects furniture and wooden floors, panels and antiques against the damage caused by dry air.

compactSteam is the new CAREL solution for the humidification of more prestigious residential environments, professional offices or small and medium retail premises.

compactSteam is an immersed electrode humidifier that contains all the best that CAREL experience has to offer, in compact dimensions.

The main features are:

- elegant and discrete design, ideal for installation in any environment;
- built-in steam distributor, with adjustable louvers and very silent fan;
- large graphic LCD for straightforward understanding;
- market-leading functionality, safety and user friendliness;
- models from 1.6 to 5.4 kg/h.

Considerable care has been paid to installation in "non-service" environments: the electrical and water connections can be completely hidden from view, and the drain water temperature never exceeds 60 °C.



In addition, if no humidification is required for more than 3 consecutive days, the water is automatically drained for maximum hygiene.

A version without built-in distributor is also available, designed for air-conditioning systems with steam distribution in the duct.

In this case, compactSteam may:

- use a special sensor to measure whether there is air flow in the duct, or alternatively;
- activate the fan in the duct using a dedicated relay.

A remote ventilated distributor is also available, which allows steam distribution in the room when the humidifier is installed in a service compartment.

Feature	homeSteam	compactSteam
user friendly LCD display		•
maximum capacity selectable in steps of 5%		•
proportional 0 to 10 V control and modulation 20 to 100%		•
diagnostics with numeric digits and graphic icons		•
automatic water concentration & foam management	•	•
remote enable & alarm relay	•	•
embedded fan for steam distribution		•
integrated drain tempering (60 °C)		•
automatic drain by inactivity (3 days)		•
cylinder lifetime counter		•
can hide hydraulic/electric connections from view		•



The sophisticated microprocessor control automatically manages all the functions of the unit, and includes a self-diagnostic system with simple and straightforward indications, both numeric and using icons, on the large LCD.

The controller allows a reduction in the maximum capacity so as to adapt the unit to the size of the environment being humidified.

It includes an ON/OFF and proportional 0 to 10 V input, a remote enabling input, an alarm relay, an input for a flow sensor and a 24 V power supply output.

The steam production is modulated continuously from 20% to maximum capacity, while the water level is controlled by two solenoid valves, fill and drain.

The built-in fan is only on when steam is being produced, and is stopped with a delay to prevent condensation.

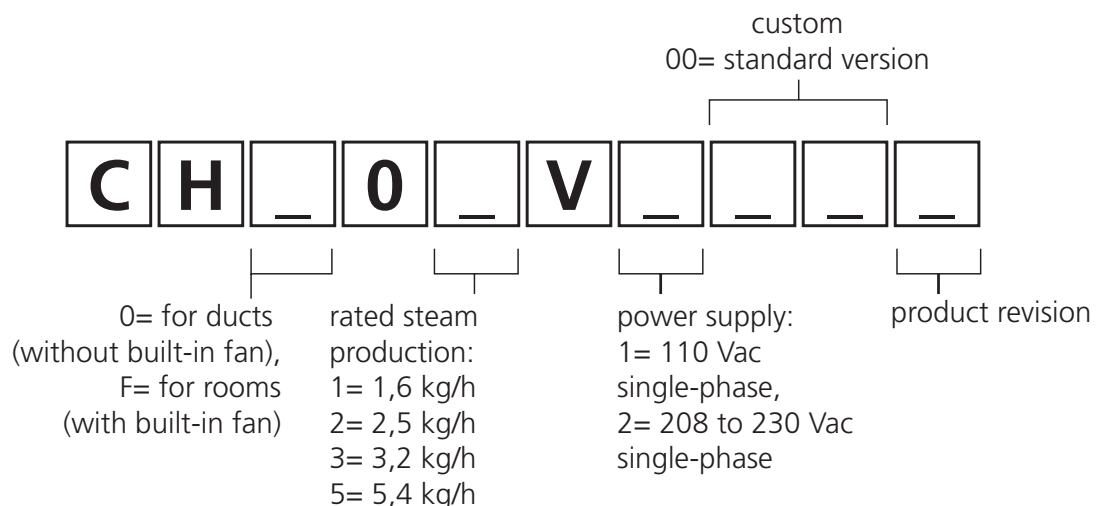
Ambient humidity control is managed by an external humidistat.

The best solution is installation together with the new CAREL CLIMA electronic humidistat, which can control the compactSteam in proportional mode, for even more precise and comfortable control of the humidity. CLIMA, which manages the temperature as well as the humidity, also handles the daily timer functions, and is even able to compensate the humidity set point depending on the outside climatic conditions.

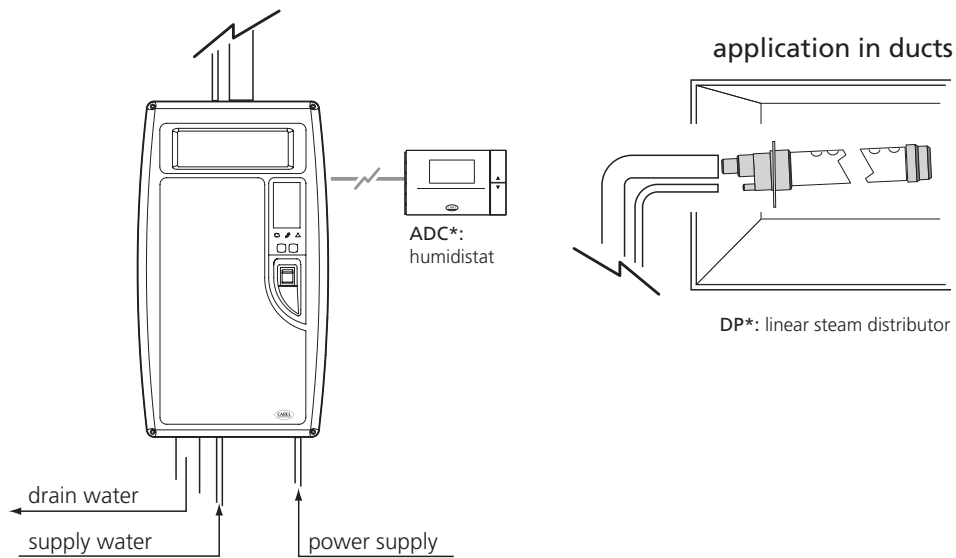
The 24 V supplied by compactSteam makes the installation of the humidistat easy and safe.

compactSteam is available with or without the ventilated steam distributor, with capacities from 1.6 to 5.4 kg/h.

The product concept, the completeness of the functions and the quality of construction make compactSteam the leader in its market segment.



OVERVIEW DRAWING



compactSteam table

Model	CH001*	CH002*	CH003*	CH005*	
general characteristics	Production kg/h (lbs/hr)	1.6 (3.5)	2.5 (5.5)	3.2 (7)	5.4 (12)
	Power input (kW)	1.18	1.86	2.36	4.05
	Power supply				
	• 110 Vac single-phase (-15% to 10%) 50/60 Hz	•	•		
	• 208/230 Vac single-phase (-15% to 10%) 50/60 Hz	•		•	•
	Steam outlet (outside diameter)	Ø 22			
	Steam pressure (Pa)				
	• built-in fan	400			
	• duct	1000			
	No. of boiler	1			
Operating conditions	1T40 °C 10 to 90% r.H. non-condensing				
Storage conditions	-10T70 °C 5 to 95% r.H. non-condensing				
Index of protection	IP20				
water fill	Water fill	3/4" G male			
	Temperature limits (°C)	1T40			
	Water pressure limits (MPa - bar)	0.1 to 0.8 - 1 to 8			
	Instant flow-rate (l/m)	0.6			
	Total hardness (°fH)	15 to 40			
	Conductivity @ 20 °C (µS/cm)	125 to 1250 µS/cm			
water discharge	Connection (outside diameter)	Ø 32			
	Temperature (°C)	<100			
	Instant flow-rate (l/m)	5			
weight and dimensions	Humidifier dimensions (mm)	360x268x620	360x268x620	360x268x620	360x268x620
	Weight (with water) (kg)	12	12	12	12
	Weight (empty) (kg)	8	8	8	8
	Packaging dimensions (mm)	520x380x740	520x380x740	520x380x740	520x380x740
	Weight of packaged humidifier (kg)	10	10	10	10
Ventilated distributor flow-rate (m³/h)	120				



humiSteam

UE*

The vast range of humiSteam immersed electrode humidifiers include units producing from 1.5 to 130 kg/h of steam, for civil environments, offices, hospitals, industrial facilities, steam baths, etc., designed both for installation in ducts and for direct humidification in the room.

Compared to the previous SD2000 range, completely replaced by humiSteam, this model offers significant advantages both in terms of performance, with a wider range of modulation and a more efficient antifoam system, and economics, with larger and longer lasting cylinders and an excellent quality/price ratio.

humiSteam works on mains water with a conductivity between 125 and 1250 $\mu\text{s}/\text{cm}$, and its control software automatically adjusts operation according to the characteristics of the water, so as to achieve the best compromise between energy savings and cylinder life.

Specifically, the new 65 kg/h (single cylinder) and 90 and 130 kg/h (twin cylinder) models feature new cylinders with a longer operating life and more compact outside dimensions than competing models.

Another plus of the humiSteam range is the 9 kg/h model with single-phase power supply, ideal for use as a steam generator in steam baths, where three-phase power

supply is usually not available. As well as the traditional "P" and "H" humiSteam, a top-of-the-line model has been created with "X" controller, with capacities from 1.5 to 130 kg/h (the 90 and 130 kg/h models only have the "X" controller). The "X" controller has the same functions as the "H" controller, however is based on pCO technology, with all the related advantages: these include the easy-to-read graphic display, the possibility to connect to control networks (e.g., LON[®], Modbus[®], BACnet[™]), and the management of daily and weekly time bands. The "X" line has also given rise to the humiSteam with "W" controller, featuring software dedicated to the management of steam baths.

humiSteam "W" for steam baths

The humiSteam "W" models are fitted with the new controller based on pCO technology, featuring software dedicated to the management of steam baths and a cylinder suitable for this type of application. As well as all the advantages of the "X" humidifiers (above all simplicity for the user, with the graphic display), these models include time bands for automatic operation (daily and weekly) that can be combined with different user-defined temperature set points. In this way, for example, the user can specify that from 8 a.m. to 12 noon the temperature of the steam bath must be 45 °C, and then

reduce it to 30 °C between 12 noon and 6 p.m., all automatically. The humiSteam "W" can also manage up to 3 different essences, 2 fans, and run a "sanitation" cycle".

Advantages:

- AFS system (Anti Foaming System): prevents the release of droplets together with the steam;
- large cylinders with galvanised electrodes and anti-scale filter on the bottom, for longer maintenance free operation. Openable and fireproof cylinders are also available;
- steam production with continuous modulation from 20% to the max. flow-rate (from 10% for the models with cylinders);
- built-in conductivity sensor and control software to optimise energy efficiency and operating life, with constant performance over the life of the cylinder;
- choice between 4 control types: "P" (proportional or ON/OFF from external controller and LED display), "H" (modulating with built-in controller and simple alphanumeric display), "X" (with all the features of the "H" controller but based on pHC technology, derived from the pCO controllers, with all the resulting advantages, such as connection to control networks, and with an easy-to-read graphic display), "W" (similar to the "X" controller, but dedicated to steam baths);
- the "X" and "H" models can manage a second "limit" probe, to avoid any condensate in the air duct, and support all operating modes: ON/OFF, proportional to an external signal, with relative humidity probe and limit probe, and with simple temperature control for steam baths and similar applications.



Controllers

The humiSteam series humidifiers are available with 4 different types of control unit:

- type "P" (from 1.5 to 65 kg/h): managed by a humidistat or an external controller;
- type "H" (from 1.5 to 65 kg/h): built-in controller for stand-alone applications or dependent on external controller;
- type "X" (entire range): as for the "H" models but based on pH technology, derived from the pCO, with all the consequent advantages;
- type "W": as for the "X" models, but designed for steam baths.

All models are fitted with a remote enabling input and an alarm relay.

Type P controller: ON/OFF or proportional

Steam production is controlled by an external signal:

- ON/OFF mode: a simple contact (for example, a humidistat) provides the on/off signal for steam production;
- proportional mode: the humidifier produces a quantity of steam that is directly proportional to the 0 to 10 V signal generated by the external controller, always between 20% and 100% of maximum capacity.

The type "P" humidifiers have a simple 3 LED display that shows the normal operating conditions and any diagnostic information.

Type H controller: modulating with built-in controller

The type "H" humiSteam humidifiers are fitted with a built-in controller plus

display and keypad for programming and managing operation. The following operating modes can be selected at any time:

- ON/OFF from external humidistat;
- Proportional to an external signal;
- Modulating based on the set point and the reading from an external humidity probe;
- Modulating based on the set point, the reading from an external humidity probe and from a limit probe in the duct;
- Modulating based on the set point and the reading from a temperature probe (e.g. steam baths).

The steam flow-rate is modulated continuously from 20% to 100% of the maximum (10% to 100% in the 90 and 130 kg/h models), except for in ON/OFF mode, where steam production is all-or-nothing. The type "H" humiSteam humidifiers accept the following external signals, selected on the keypad: voltage-free contact, i.e. humidistat, 0 to 1 V, 0 to 10 V, 2 to 10 V, 0 to 20 mA, 4 to 20 mA.

Type X controller: modulating with built-in controller and graphic display

The type "X" humiSteam humidifiers have same control algorithms as the "H" humidifiers, plus the advantages of pH technology (pCO):

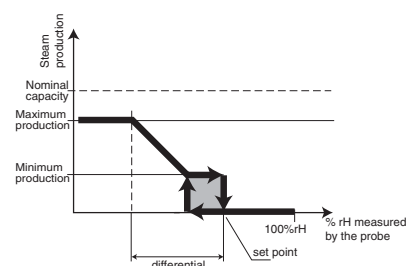
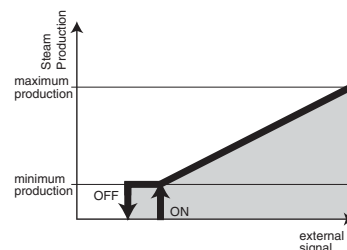
- simplicity for the user thanks to the graphic display with clear messages and icons;
- definition of daily and weekly time bands;
- connectivity via various types of LAN (e.g.: Modbus®, BACnet™, LON®);

- ON/OFF from the keypad;
- alarm log management;
- remote diagnostics via GSM (optional).

Type W controller: same as the type X model, but for steam baths

The type "W" humiSteam humidifiers derive from the type "X" models (see above), however are designed for steam baths. As well as the advantages listed above, these models also feature:

- definition of daily and weekly time bands;
- definition of different temperature set points for the different time bands;
- management of essences (3) and a "sanitation" cycle;
- management of fans (inside and exhaust) and the light.



humiSteam table

Model		UE001*	UE003*	UE005*	UE008*	UE009*
general characteristics	Rated steam production (kg/h)	1,5	3	5	8	9
	Power input (kW)	1.12	2.25	3.75	6.00	6.75
	Power supply	•	•	•	•	•
	• 200, 208 or 230 Vac (+10 to -15%), 50/60 Hz single-phase					
	• 200, 208, 230, 400, 460, 575 Vac (+10 to -15%), 50/60 Hz three-phase (*)					
	• 400, 460, 575 Vac (+10 to -15%), 50/60 Hz, three-phase					
	Steam connection (mm)	Ø 22/30	Ø 22/30	Ø 30	Ø 30	Ø 30
	Steam pressure (Pa)	0 to 2000	0 to 2000	0 to 1600	0 to 1600	0 to 1700
	No. of boiler	1				
	Operating conditions	1T40 °C, 10 to 90% r.H. non-condensing				
Storage conditions	-10T70 °C, 5 to 95% r.H. non-condensing					
Index of protection	IP20					
water fill	Connection	3/4" G male				
	Temperature limits (°C)	1T40				
	Water pressure limits (MPa-bar)	0.1 to 0.8 - 1 to 8				
	Instant flow-rate (l/m)	0.6				
	Total hardness (°fH)	15 to 40				
	Conductivity limits (µS/cm)	125 to 1250				
water discharge	Connection	Ø 40				
	Temperature (°C)	≤100				
	Instant flow-rate (l/m)	5				
weight and dimensions	Humidifier dimensions (mm)	365x275x620	365x275x620	365x275x620	365x275x620	365x275x710
	Weight (empty) (kg)	13.5	13.5	13.5	13.5	17
	Packaging dimensions (mm)	520x380x730	520x380x730	520x380x730	520x380x730	520x410x870
	Weight of packaged humidifier (kg)	16	16	16	16	20
ventilated steam distributor	No. of ventilated steam distributor	1	1	1	1	1
	Type	VSDU0A*	VSDU0A*	VSDU0A*	VSDU0A*	VSDU0A*
	Power supply (Vac)	24	24	24	24	24
	Rated power (W)	37	37	37	37	37
	Rated air flow (m³/h)	192	192	192	192	192
Network	Network connection	UEH*: RS485, Modbus® (with optional Gateway) UEX* and UEW*: RS485, Modbus®, BACnet™, LON®, RS232 + GSM (optional)				
	Controller	UEX*/UEW*/UEH*/UEP*				

UE010*	UE015*	UE025*	UE035*	UE045*	UE065*	UE090*	UE130*
10	15	25	35	45	65	90	130
7.50	11.25	18.75	26.25	33.75	48.75	67.50	97.50
•	•	•	•	•	•	•	•
Ø 30	Ø 30	Ø 40	Ø 40	Ø 40	Ø 2x40	Ø 2x40	Ø 4x40
0 to 1700	0 to 1700	0 to 2300	0 to 2300	0 to 2300	0 to 2300	0 to 2300	0 to 2300
1	1	1	1	1	1	2	2
1T40 °C, 10 to 90% r.H. non-condensing							
-10T70 °C, 5 to 95% r.H. non-condensing							
IP20							

3/4" G male							
1T40							
0,1 to 0,8 - 1 to 8							
1,2	1,2	4	4	4	7	14	14
15 to 40							
125 to 1250							

Ø 40							
≤100							
5	5	22.5	22.5	22.5	22.5	45	45

365x275x710	365x275x710	555x360x890	555x360x890	555x360x890	650x455x945	1150x465x890	1150x465x890
17	17	34	34	34	44	70	74
520x410x870	520x410x870	680x460x1090	680x460x1090	680x460x1090	820x520x1070	1210x505x1020	1210x505x1020
20	20	39	39	39	51	77	81

1	1	1	1	1	2	2	3
VSDU0A*	VSDU0A*	VRDXL*	VRDXL*	VRDXL*	VRDXL*	VRDXL*	VRDXL*
24	24	230	230	230	230	230	230
37	37	35	35	35	35	35	35
192	192	650	650	650	650	650	650

UEH*: RS485, Modbus® (with optional Gateway)
 UEX* and UEW*: RS485, Modbus®, BACnet™, LON®, RS232 + GSM (optional)

UEX*/UEW*/UEH*/UEP*	UEX*
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The range of humiSteam cylinders

All the CAREL immersed electrode humidifiers feature sophisticated control software that automatically adapts the operating parameters to the characteristics of the water; nonetheless, the optimum balance between cylinder life, variation of steam production and speed of response depending on the type of water and the power supply can only be achieved by changing the shape and the position of the electrodes. For this reason, the CAREL immersed electrode humidifiers today feature the widest choice of cylinders, with specific electrodes for water with conductivity between 125 $\mu\text{S}/\text{cm}$ and 1250 $\mu\text{S}/\text{cm}$, for capacities between 1 and 65 kg/h, and for power supply voltages between 208 V and 575 V.

This extraordinary range of cylinders is the result of years of research and tens of thousands of hours of tests in the CAREL Humidification Laboratory under the widest possible range of uses. This ensures the right solution in every circumstance.

All the humiSteam cylinders feature large galvanised electrodes, positioned inside the cylinder so as to optimise duration and constant performance over the working life of the cylinder.

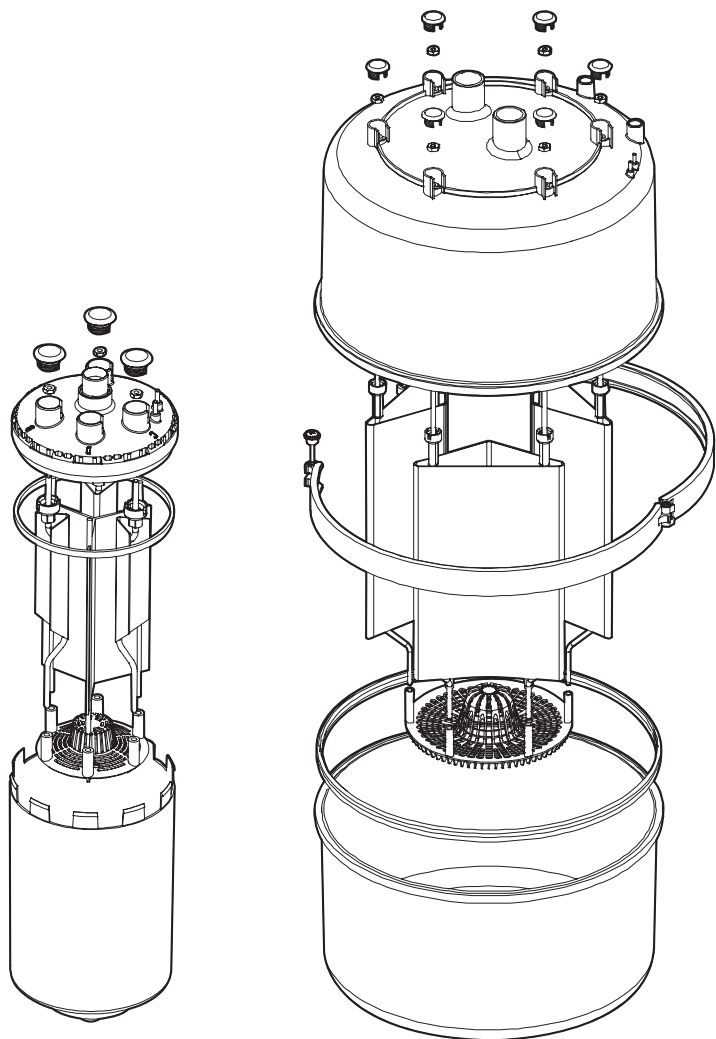
In addition, significant attention has been paid to operation on water with more critical characteristics, to reduce the phenomenon of arcing.

All cylinders are also fitted with filters to avoid the formation of lime scale in the base, preventing the blockage of the drain.

Openable cylinders

The new humidifiers can be fitted with "disposable" cylinders made from flame-retardant plastic, class HB according to UL94, or alternatively openable and therefore cleanable cylinders, made from class V0 flame-retardant plastic (UL94 standard).

The openable cylinders feature quick click-on closing, with a rubber gasket to ensure perfect water-tight seal between the two parts of the cylinder.



Disposable cylinders (HB according to UL 94)

humiSteam three-phase 400 V (from 380 to 415 V)

Capacity kg/h	Water conductivity		
	Low	Medium	High
	125/350 µS/cm	350/750 µS/cm	750/1250 µS/cm
3	BL0T1A00H1	BL0T1C00H1	BL0T1D00H1
5, 8	BL0T2B00H0	BL0T2C00H0	BL0T2D00H0
10, 15	BL0T3B00H0	BL0T3C00H0	BL0T3D00H0
25, 35	BL0T4C00H0	BL0T4D00H0 (*)	
45, 90 (2x)	BL0T4B00H0	BL0T4C00H0 (*)	
65, 130 (2x)	BL0T5B00H0	BL0T5C00H0	

humiSteam single-phase 230 V (from 220 to 240 V)

Capacity kg/h	Water conductivity		
	Low	Medium	High
	125/350 µS/cm	350/750 µS/cm	750/1250 µS/cm
1, 3 compact	BLOSRE00H1	BLOSRF00H1	
1, 3	BLOS1E00H1	BLOS1F00H1	
5	BLOS2E00H0	BLOS2F00H0	
9	BLOS3E00H0	BLOS3F00H0	

humiSteam three-phase 208 and 230 V

Capacity kg/h	Water conductivity		
	Low	Medium	High
	125/350 µS/cm	350/750 µS/cm	750/1250 µS/cm
1, 3	BL0T1A00H1	BL0T1B00H1	
5, 8	BL0T2A00H0	BL0T2B00H0	
10, 15	BL0T3A00H0	BL0T3B00H0	
25	BL0T4B00H0	BL0T4C00H0 (*)	
35	BL0T4B00H0 (*)		
45	BL0T5A0010 (*)		

humiSteam single-phase 208 V

Capacity kg/h	Water conductivity		
	Low	Medium	High
	125/350 µS/cm	350/750 µS/cm	750/1250 µS/cm
1, 3 compact	BLOSRE00H1	BLOSRF00H1	
1, 3	BLOS1E00H1	BLOS1F00H1	
5	BLOS2E00H0	BLOS2F00H0	
9	BLOS3E00H0	BLOS3F00H0	

humiSteam three-phase 460 V

Capacity kg/h	Water conductivity		
	Low	Medium	High
	125/350 µS/cm	350/750 µS/cm	750/1250 µS/cm
3	BL0T1C00H1	BL0T1D00H1	
5, 8	BL0T2C00H0	BL0T2D00H0	
10, 15	BL0T3C00H0	BL0T3D00H0	
25	BL0T4D00H0 (*)		
35, 45, 90 (2x)	BL0T4C00H0	BL0T4D00H0 (*)	
65, 130 (2x)	BL0T5C00H0	BL0T5D00H0	

humiSteam three-phase 575 V

Capacity kg/h	Water conductivity		
	Low	Medium	High
	125/350 µS/cm	350/750 µS/cm	750/1250 µS/cm
1, 3	BL0T1C00H1	BL0T1D00H1	
5, 8	BL0T2C00H0	BL0T2D00H0	
10, 15	BL0T3C00H0	BL0T3D00H0	
25, 35, 45, 90 (2x)	BL0T4D00H0 (*)		
65, 130 (2x)	BL0T5D00H0		

Openable cylinders (V0 according to UL 94) (**)

humiSteam three-phase 400 V (from 380 to 415 V)

Capacity kg/h	Water conductivity		
	Low	Medium	High
	125/350 µS/cm	350/750 µS/cm	750/1250 µS/cm
5, 8	BLCT2B00W0	BLCT2C00W0	BLCT2D00W0
10, 15	BLCT3B00W0	BLCT3C00W0	BLCT3D00W0
25, 35	BLCT4C00W0	BLCT4D00W0	
45, 90 (2x)	BLCT4B00W0	BLCT4C00W0	
65, 130 (2x)	BLCT5B00W0	BLCT5C00W0	

humiSteam single-phase 230 V (from 220 to 240 V)

Capacity kg/h	Water conductivity		
	Low	Medium	High
	125/350 µS/cm	350/750 µS/cm	750/1250 µS/cm
5	BLCS2E00W0	BLCS2F00W0	
9	BLCS3E00W0	BLCS3F00W0	

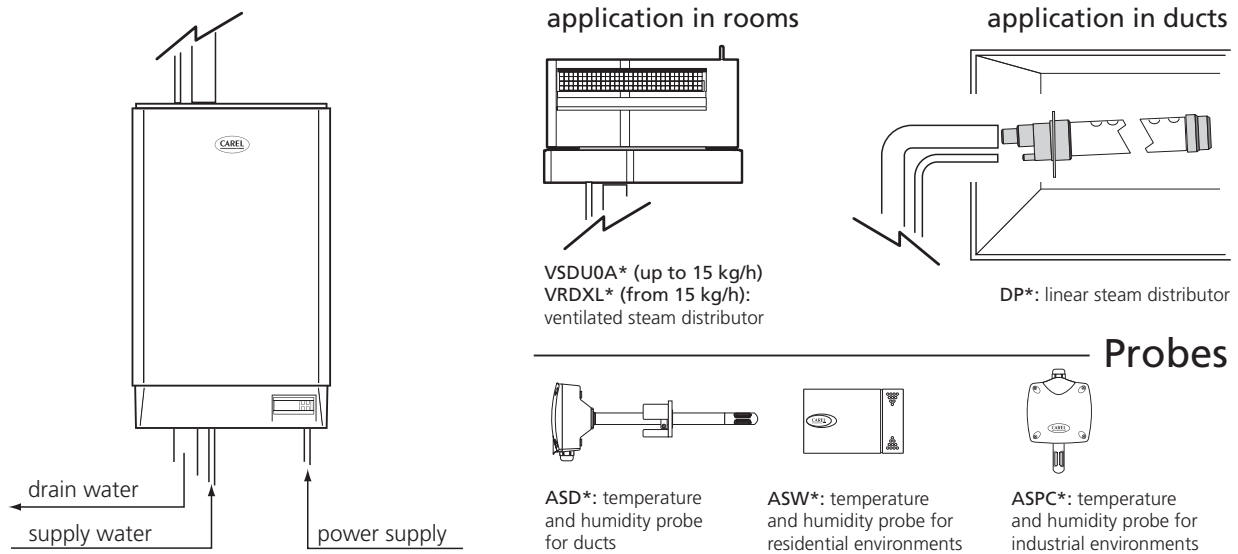
Note: the codes in bold are factory-fitted as standard.

Important

(*) models UE 25, 35, 45 kg/h with serial numbers before 501,000 use the BL0T4000H0 cylinder, with 30 mm diameter steam outlets still available.

(**) as well as the voltages shown here, openable cylinders are available for: 208 V single-phase, 230 V three-phase, 460 V three-phase and 575 V three-phase.

OVERVIEW DRAWING



different only for custom products

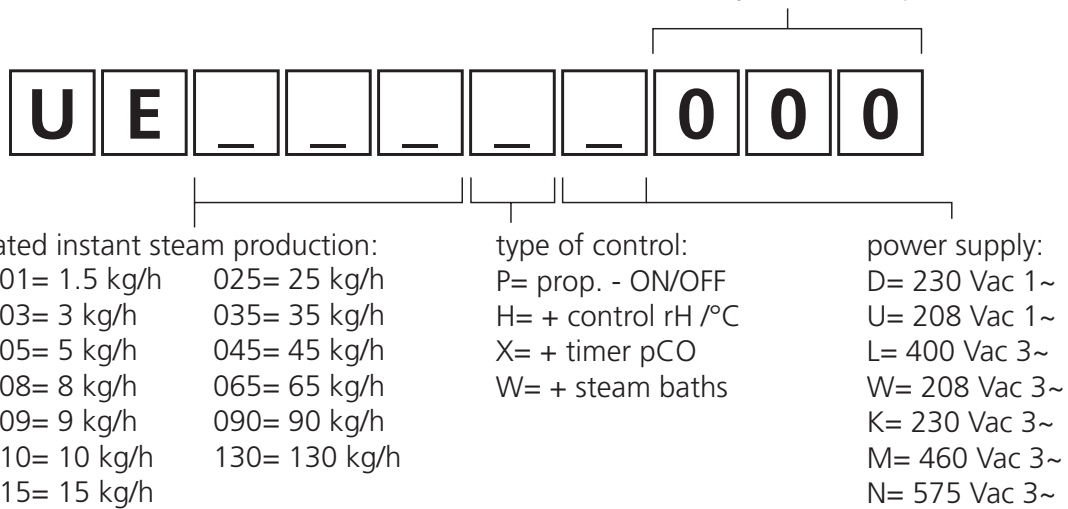


Table of humiSteam controllers

Model	UEP*	UEH*	UEX* and UEW*
Inputs	0 to 10 Vdc	0 to 1 Vdc; 0 to 10 Vdc; 2 to 10 Vdc; 0 to 20 mA; 4 to 20 mA	0 to 1 Vdc; 0 to 10 Vdc; 2 to 10 Vdc; 0 to 20 mA; 4 to 20 mA; 0 to 135 Ω; NTC 135 Ω to 1 kΩ
Input impedance	15 kΩ	60 kΩ (with 0 to 1 Vdc; 0 to 10 Vdc; 2 to 10 Vdc signal); 50 Ω (with 0 to 20 mA; 4 to 20 mA signal)	min. 20 kΩ (with 0 to 1 Vdc; 0 to 10 Vdc; 2 to 10 Vdc signal); 100 Ω (with 0 to 20 mA; 4 to 20 mA signal)
Alarm relay	250 Vac, 5 (2) A	250 Vac, 8 (2) A	250 Vac, 8 (2) A
Communication	-	RS485, Modbus® (with optional Gateway)	RS485, Modbus®, BACnet™; LON®
Power to active probes	-	24 Vdc (24 Vac rectified) Imax 250 mA; 12 Vdc Imax 50 mA	15 Vdc, max 100 mA protected
Remote input enabled		voltage-free contact; max resistance 50 Ω; Vmax 24 Vdc; Imax 5 mA	voltage-free contact; Vmax 20 Vdc; Imax 6 mA

The avant-garde solution

CAREL



heaterSteam

The sophisticated range of heaterSteam immersed heater humidifiers, which can operate on drinkable demineralised or mains water, is the ideal solution when:

- the level of humidity needs to be controlled with considerable precision (high-tech systems, clean rooms);
- periodical maintenance needs to be reduced to the minimum (using demineralised water);
- the quality of the water is problematical or not constant (for example, aboard ships).

Advantages:

- Models for steam production from 2 to 60 kg/h, all very compact;
- built-in controller (with optional active probe), or alternatively ON/OFF control;

- electric heaters embedded in corrosion-proof alloy casting with a large surface area, featuring integrated temperature sensors to prevent overheating;
- heaters have a non-stick lining that prevents the adhesion of lime scale (optional);
- patented "Anti Foaming System";
- water preheating system (modulating version);
- possibility to connect a second limit probe and a dehumidification device;
- electrical load always balanced on the 3 phases;
- thermally insulated for energy savings, and descaler bag (optional);
- RS485 serial output;
- optional infrared remote control.

humidification for life

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Heater humidifiers

Immersed heater humidification is becoming increasingly required in work specifications where:

- humidity must be controlled precisely (museums, laboratories, clean rooms);
- the quality of the water is not constant or is problematic (for example, aboard ships);
- periodical maintenance needs to be minimised (using demineralised water).

The immersed heater humidifiers, unlike the immersed electrode units, can operate on demineralised water, as they do not exploit the electrical conductivity of the water.

Periodical maintenance can therefore be greatly reduced, due to the minimum formation of lime scale.

Weighing against this, the resistive elements must always be completely immersed in the water, to avoid overheating, unlike the situation with electrodes, in which the water level is adjusted to modulate the flow-rate of steam.

The operation of an immersed heater humidifier then requires water level sensors to ensure the complete immersion of the electrodes, as well as components (solid state relays) that adjust the amount of heat transferred to the water so as to precisely modulate the steam flow-rate.

These characteristics make the heater units more complex than their counterparts with electrodes, yet independent of the characteristics of the water, and with much more precise modulation of the flow-rate. In addition, as heater humidifiers are intrinsically subject to overheating, the quality of design and the presence of safety systems are essential to ensure reliable service over time.

The CAREL solution in this market segment offers the maximum in constructional quality and performance, meaning excellent reliability over time and extreme precision of control for the more critical applications.



heaterSteam

UR*

The new range of heaterSteam immersed heater humidifiers includes models producing from 2 to 60 kg/h of steam, and can operate on drinking water or demineralised water. The use of demineralised water practically eliminates the need for maintenance.

heaterSteam features exclusive and patented technological solutions, such as the electric heaters embedded in corrosion-proof aluminium alloy casting with a large heat exchange surface, and built-in temperature sensors to prevent overheating. The temperature sensor has the dual function of protection against overheating, for maximum reliability over time, and detecting excessive lime scale deposits amply in advance, so as to allow correct preventive maintenance. The modulating control with solid state relays ensures high precision humidity control, making heaterSteam the ideal solution even for more demanding applications.

For each model there are two variants: basic and full optional. The full optional units, compared to the basic versions, have heat insulation around the boiler for maximum energy savings, and heating elements coated in non-stick material to facilitate the separation of lime scale.

In addition, a water temperature sensor is fitted for managing the useful preheating function, giving a rapid response to all humidification demands.

All models have an automatic system for measuring the conductivity of the supply water, which optimises the management of the drain cycles without requiring the analysis of the water in the installation. This function also means energy savings and a reduction in maintenance.

The models from 2 to 10 kg/h have a cylindrical stainless steel boiler, which is easy to remove for cleaning. The larger models, from 20 to 60 kg, have a stainless steel boiler with a rectangular base and large openings (front and top) for easy maintenance without having to remove the boiler.

heaterSteam is particularly compact for its capacity. The smaller models, 2 and 4 kg/h, the only units of their type available, are the perfect solution for smaller applications (specialist clinics, professional studios) where high electrical power ratings are often not available.

Advantages:

- extreme precision, up to $\pm 1\%$ rH in rooms with 500 vol/h air change;
- the electric heaters are embedded in a corrosion-proof light alloy casting with a large surface area, guaranteeing perfect diffusion of the heat and exceptional reliability over time (CAREL patent);
- temperature sensors inserted into the heating elements prevent any overheating, and detect well in advance the need for cleaning any lime scale deposits (CAREL patented method);
- heating elements coated with non-stick material (full optional models) are very easy to clean;
- models H and T, with solid state relays, allow continuous modulation of steam production starting from 10% of capacity, with very precise control; model C provides ON/OFF operation;
- the patented "Anti Foaming System" detects foam and prevents the release of any droplets of water together with the steam;
- type H control supports the limit probe to prevent any condensate forming in the duct (better hygiene!);
- in models H and T the preheating function allows a rapid response to the request for steam production;
- model H can also control a dehumidification device for even greater precision.



Controllers

All the heaterSteam series humidifiers are available with three different types of control unit, identified by a letter:

- C: ON/OFF control;
- H: built-in humidity control and serial port;
- T: built-in temperature control and serial port for stand-alone applications (for example, steam baths).

The heaterSteam humidifiers are fitted for communication with external monitoring and control networks. In fact, all the units have a serial port for connection to Modbus® and Ethernet™ networks via an external gateway. Alternatively, the same serial port can be used to connect up to 4 humiSteam, heaterSteam, gaSteam and humiFog humidifiers (including mixed configurations), via a proprietary network, to humiVisor, the small yet complete CAREL supervisor that can control the operation and configuration of the units over distances of up to 1 km.

Type C: ON/OFF control

The unit works at 0% or 100% of maximum production, which can be set to 30%, 50%, 75% or 100% of the rated capacity. The controller comes with a straightforward icon-based display.

Type H: built-in humidity control

The built-in controller features a display and keypad for programming. The type H control can be configured at any time to operate in the following modes:

- ON/OFF, from an external humidistat;
- proportional to an external signal;
- modulating based on the reading from an external humidity probe;
- modulating based on the reading from an external humidity probe and a limit probe in the duct.

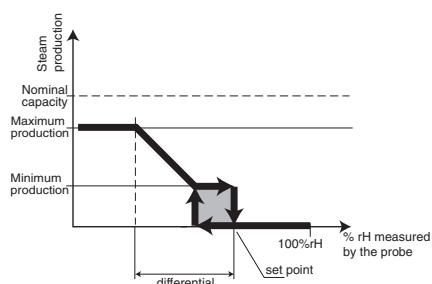
At all times, the special software prevents disturbance to steam production by optimally managing all the normal activities of an isothermal humidifier, such as water fill and drain cycles, foam detection, etc. This ensures precision of $\pm 1\%$ rH even with a large number of air changes (up to 500 vol/h). Steam production is modulated linearly from 10 to 100% of the maximum flow-rate (see the graph at the foot of the page), except in ON/OFF mode. heaterSteam type H and T models can accept a wide range of external signals, selected from the keypad: voltage-free contact i.e. humidistat, 0 to 1 V, 0 to 10 V, 2 to 10 V, 0 to 20 mA, 4 to 20 mA.

The preheating function (models H and T) can be activated to maintain the water at a set temperature (from 70 to 90 °C) so as to ensure an immediate start of steam production. In addition, heaterSteam provides clear indications of any malfunctions, using a complete set of alarms and an alarm relay. Finally, the dehumidification relay means that type H models can call the activation of an external dehumidifier if the humidity is too high (dedicated set point).

The vast range of accessories also includes the infrared remote control.

Type T: built-in temperature control

This works in the same way as model H, with the difference that production is controlled according to the temperature rather than the relative humidity (suitable for steam baths).



1. heater with integrated PTC;
2. descaler bag;
3. boiler thermal lining.



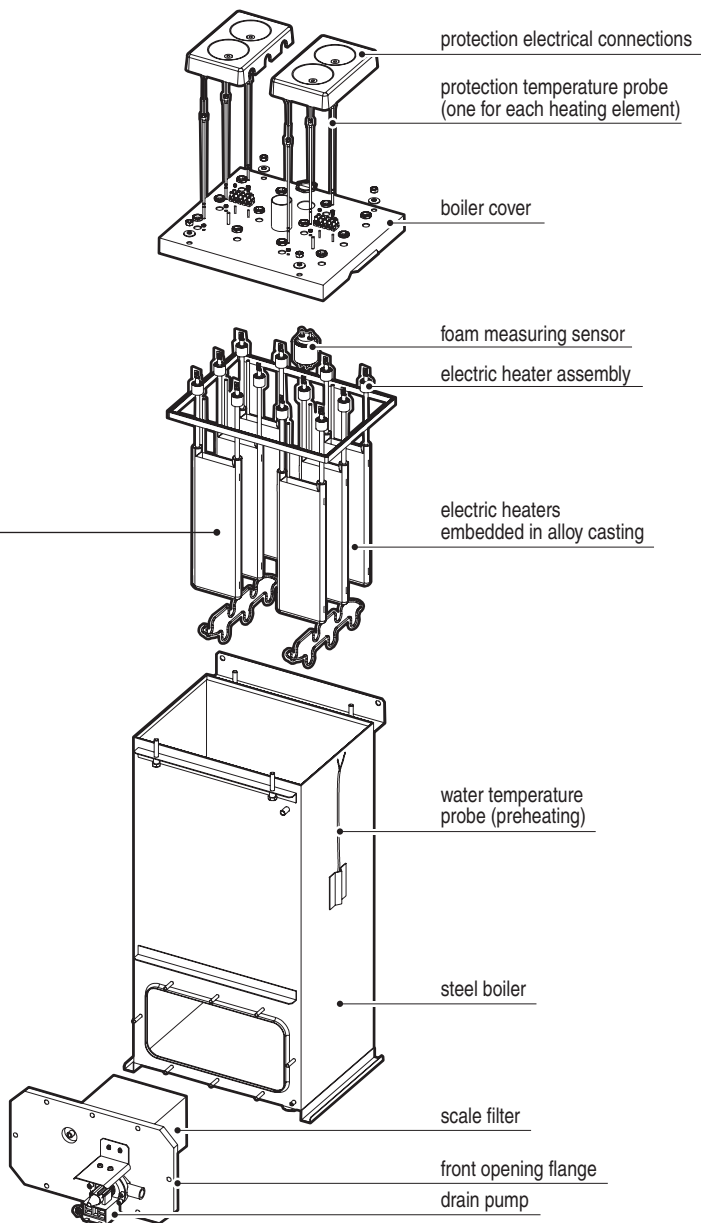
Heaters after 720 operating hours with water at 28 °F hardness (500 $\mu\text{S}/\text{cm}$). No manual cleaning has been performed. The layer of non-stick material assists the spontaneous separation of the lime scale, while the excellent heat conduction of the aluminium alloy avoids any localised overheating.

Models with rectangular boiler

The heaterSteam 20, 27, 40 and 60 kg/h models feature, for maximum compactness, a boiler with a rectangular base, and with multiple heaters (9 for the 60 kg/h model, 6 for the other models). The full optional models have heaters coated in non-stick material and heat insulation around the boiler.

Cleaning is performed in these models by removing the large front cover of the boiler, which holds the electric drain pump and the scale filter.

The top cover, which supports the heaters, is very easy to remove, as is the top panel of the body, guaranteeing optimum accessibility.

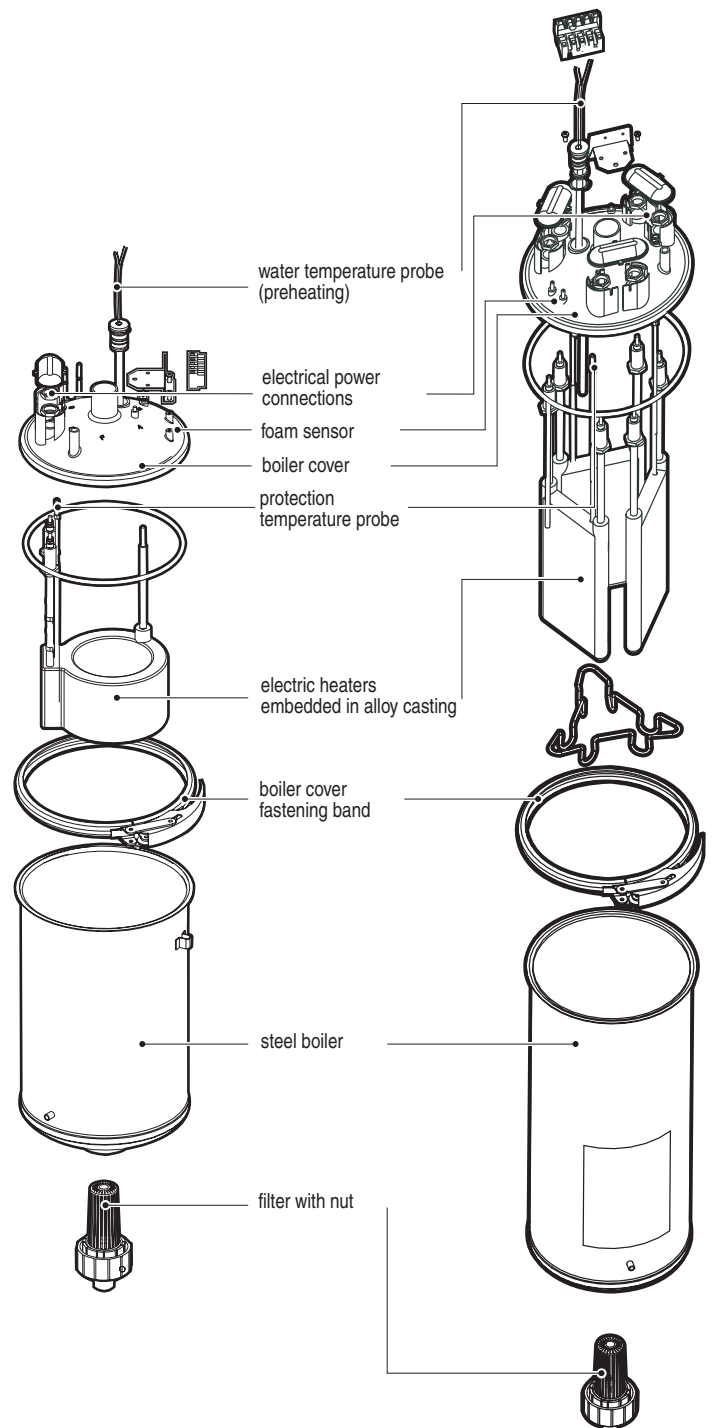


Models with cylindrical boiler

The heaterSteam 2 and 4 kg/h (single-phase) models, the 6 kg/h (single-phase and three-phase) model and the 10 kg/h (three-phase) model, are all made with a cylindrical stainless steel boiler, which can be easily dismantled for cleaning outside of the unit.

Every boiler features a level sensor and each heating element is protected by a PTC temperature sensor inserted in the light alloy casting.

The full optional models (code ending in 10*) have non-stick elements, insulation around the cylinder to limit the dispersion of heat, and a removable descaler bag on the inside, to simplify cleaning.



Model		UR002*	UR004*	UR006*	UR010*	UR020*	UR027*
general characteristics	Rated steam production (kg/h)	2	4	6	10	20	27
	Power input (kW)	1.5	3	4.5	7.5	15	22.5
	Power supply (other voltages upon request)	•	•	•	•	•	•
	• 230 Vac (-15 to +10%), 50/60 Hz single-phase						
	• 400 Vac (-15 to +10%), 50/60 Hz three-phase			•	•	•	•
	Steam connection (mm)	Ø 30	Ø 30	Ø 30	Ø 30	Ø 40	Ø 40
	Steam pressure (Pa)	0 to 1500	0 to 1500	0 to 1500	0 to 1500	0 to 3600	0 to 3600
	Number of heaters	1	1	3	3	6	6
	Operating conditions	1T40 °C, 10 to 90% rH non-condensing					
	Storage conditions	-10T70 °C, 5 to 95% rH non-condensing					
Index of protection	IP20						
water fill	Connection	3/4" G male					
	Temperature limits (°C)	1T40					
	Water pressure limits (MPa-bar)	0 0.1 to 0.8 - 1 to 8					
	Instant flow-rate (l/m)	0.6	0.6	1.2	1.2	4	4
	Total hardness (°fH) (*)	5 to 40					
	Conductivity limits (µS/cm) (*)	0 to 1500					
water discharge	Connection	Ø 40					
	Temperature (°C)	<100					
	Instant flow-rate (l/m)	5	5	5	5	22.5	22.5
weight and	Humidifier dimensions (mm)	365x275x620	365x275x620	365x275x710	365x275x710	690x438x887	690x438x887
	Weight (empty) (kg)	21	21	26	26	63	63
	Packaging dimensions (mm)	520x380x730	520x380x730	520x410x870	520x410x870	680x460x1090	680x460x1090
	Weight of packaged humidifier (kg)	26	26	31	31	73	73
ventilated steam distributor	No.	1	1	1	1	1	1
	Type	VSDU0A*	VSDU0A*	VSDU0A*	VSDU0A*	VRDXL*	VRDXL*
	Power supply (Vac)	24	24	24	24	230	230
	Rated power (W)	37	37	37	37	35	35
	Rated air flow (m³/h)	192	192	192	192	650	650
net-work	Network connection	RS485, Modbus® (with optional Gateway)					

(*) heaterSteam can be supplied with completely demineralised water (0 °fH). If supplied with softened water, the minimum hardness value indicated must be observed, and the instructions described in the manual must be followed.

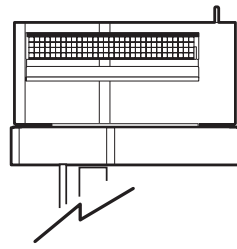
Controller	C	H	T
Continuous modulation (with SSR)	-	10 to 100%	10 to 100%
Built-in control (probes not included)	-	• (rH)	• (temp.)
External ON/OFF signal	•	•	•
External proportional signal	-	•	•
Limit probe supported	-	•	•
Dehumidification control	-	•	•
Remote ON/OFF	•	•	•
Alarm relay	•	•	•
Type of signal (probe or external controller)	-	0 to 10 V; 0 to 1 V; 2 to 10 V; 0 to 20 mA; 4 to 20 mA	
Alphanumeric display	-	•	•
RS485 interface	-	•	•

Versions
Heaters embedded in aluminium casting
Heaters with non-stick coating
Heat insulation
Preheating function
Descaler bag

UR040*	UR060*
40	60
30	45
•	•
Ø 40	2x Ø 40
0 to 2350	0 to 2350
6	9
4	10
22,5	22,5
690x438x887	876x438x887
67	87
680x460x1090	946x510x1050
77	98
1	2
VRDXL*	VRDXL*
230	230
35	35
650	650

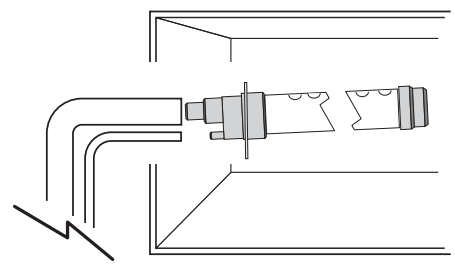
OVERVIEW DRAWING

application in rooms

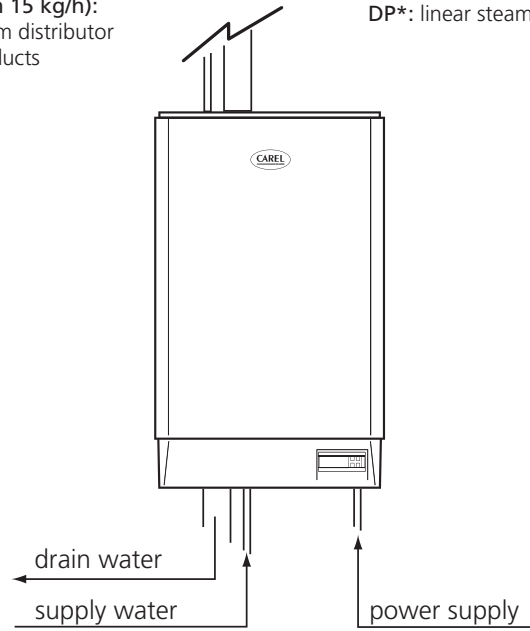


VSDU0A* (up to 15 kg/h)
VRDXL* (from 15 kg/h):
ventilated steam distributor
application in ducts

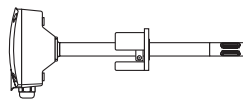
application in ducts



DP*: linear steam distributor



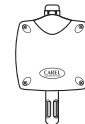
Probes



ASD*: temperature and humidity probe for ducts

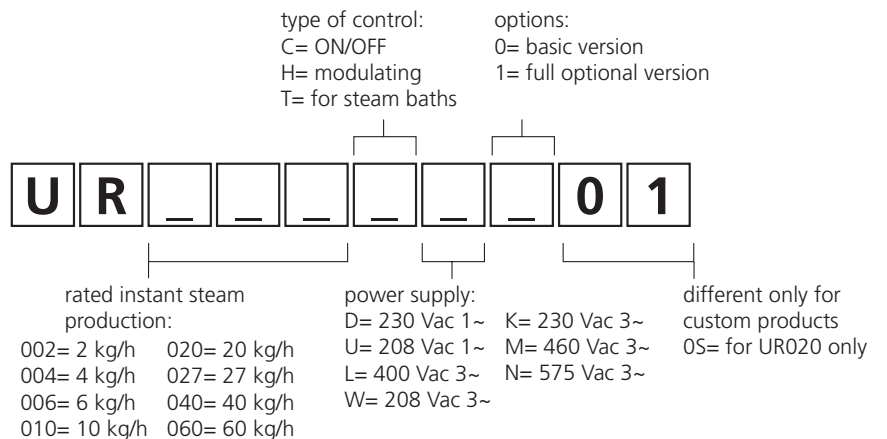


ASW*: temperature and humidity probe for residential environments



ASPC*: temperature and humidity probe for industrial environments

basic model	full optional model
•	•
-	•
-	•
•	•
-	up to 10 kg/h



NB: not all the code combinations are available.



Gas-fired humidifiers

CAREL's extensive experience in the humidification sector, combined with Ecoflam technology in the field of gas heating, has allowed the development of the gaSteam range of humidifiers that run on gas, a source of energy that is more economical than electricity. The humidifiers now have updated controllers, and the smallest model has now been upgraded to 45 kg/h (still below the 5 kW limit). The range thus now features the 45 kg/h, 90 kg/h and 180 kg/h models.

The CAREL gas-fired humidifiers can run on both natural gas and LPG: the changeover is made by simply modifying a number of parameters, without the need to replace any parts.

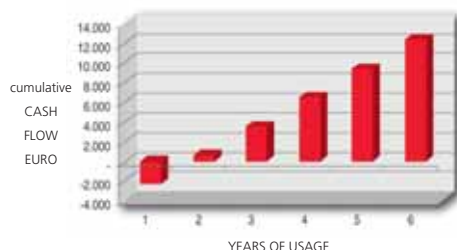
Cost effectiveness

To generate 1 kg of steam at atmospheric pressure, considering all the various factors, requires around 750 Wh of energy, either electrical or from other sources.

One of the main factors when choosing solutions in the field of isothermal humidification is therefore the cost of energy, particularly for heavy-duty uses.

To completely exploit the advantage of gas in terms of energy costs, a system with high thermal efficiency is required, capable of minimising the loss of heat.

Thanks to Ecoflam know-how, the efficiency of our humidifiers is between 92 and 95%. The graph shows the economic comparison between a gaSteam and an immersed electrode humidifier, expressed in terms of total cash flow in euro, including purchase, energy and of maintenance costs. Even considering the higher purchase price compared to an immersed electrode humidifier, the break even point for gas-fired humidifiers is reached quite quickly.



This graph compares the costs based on 2000 operating hours/year using 90 kg/h humidifiers, and with the costs of gas and electricity applied in Italy. The break-even point is easily reached before two years, after which there are significant savings. In many other countries, the break-even point is reached even earlier, making gaSteam even more cost effective.

Certification

CAREL has paid significant attention to the certification of gaSteam, so as to be able to guarantee the complete safety of the product and achieve all major certification. gaSteam is approved according to the European CE standards, the German TÜV standards and the American ETL standards. For Europe, specific DVGW certification has been obtained for appliances operating on gas.

In addition, thanks to the low NOx emissions, gaSteam is approved as a class 5 appliance for models UG045 and UG090, and class 4 for model UG180: this means it can be installed in countries with very strict legislation in force.

As regards the applications refer to the following:

- 90/396/EEC standard;
- for the premises subject to certification by the relevant bodies, the reference Italian standard is: Min. Decree dated 12 April 1996;
- for the gas line the reference is: UNI -CIG7129 of 1972.



gaSteam

UG*

The family of gaSteam humidifiers includes the 45, 90 and 180 kg/h models. Each of these features the highest thermal efficiency, so as to fully exploit the cost savings of gas. The heat exchanger, which is easily removable for cleaning, is made from aluminium alloy coated with a special corrosion-proofing and non-stick treatment that prevents the adhesion of lime scale. The gaSteam humidifiers all come with the new pHc electronic microprocessor controller that adopts all the best features of the pCO programmable controllers, one of CAREL's main points of excellence. The user interface is made up of a backlit display that features the simultaneous and flexible use of graphic icons and texts in various languages. The pHc controller also comes with network connection: via the pCO family pLAN protocol (RS485 interface included), or the Modbus®, Echelon®, BACnet™, RS485 and GSM communication protocols using optional interfaces. The controller includes the independent control loop (humidity or temperature) with active probe and optional second limit probe, as well as the ON/OFF and proportional operating modes with signal from an external controller. It can also manage a dehumidifier, and includes a complete set of diagnostics for maintenance.

Safety

gaSteam is fitted with various safety devices, including:

- pre-mix, room-sealed burner with forced ventilation;
- an air/gas control valve with double closing;

- safety negative pressure switch on combustion air intake;
- temperature sensor in the flue gas outlet that checks for malfunctions, and signals excessive accumulation of lime scale on the exchanger in advance;
- a flame detector in the burner that closes the gas valve in the event of operating anomalies;
- the patented AFS antifoam system with corresponding sensor;
- a multi-stage water level sensor;
- an automatic water conductivity control system to avoid corrosion.

Added advantages

- continuous modulation from 25 to 100% (12.5% for the 180 kg/h model);
- low NO_x emissions;
- boiler and components in contact with the water in AISI 304L stainless steel;
- pre-heating function for a faster response;
- supply with mains water or demineralised water. The control can be set for use with softened water, within the limits described in the reference tables;
- antifreeze function;
- precision $\pm 2\%$ rH.



Heat exchanger:

The advanced design with a large heat exchange surface, both inside and outside, ensures unparalleled energy efficiency (between 92% and 95%, depending on the model); made from aluminium alloy with a special corrosion-resistant coating and non-stick properties to prevent scale formation, the heat exchanger can be easily dismantled for cleaning on the work bench.



Burner head (90 kg/h model):

Including ignition and flame detection device. The controller manages the production of steam by adjusting the burner fan speed. The gas inlet valve controls the flow of gas as a consequence. The flame sensor controls both the automatic ignition device and gas valve: with no flame the flow of gas is shut off.



Accessories for installation

Various accessories are available, including:

- EXHP080500 (in the photo) 500 mm extension, dia. 80 mm;
- EHX0800000 dia. 80 mm air intake terminal
- EXHK0A0000 dia. 80 mm vertical coaxial flue gas discharge kit;
- EXHA0C0000 adapter for split chimneys, 2 x dia. 80 mm to 1 x dia. 80 mm;
- UGKINST090 UG045 and UG090 installation kit in countries using imperial units of measure;
- UGKINST180 UG180 installation kit in countries using imperial units of measure.

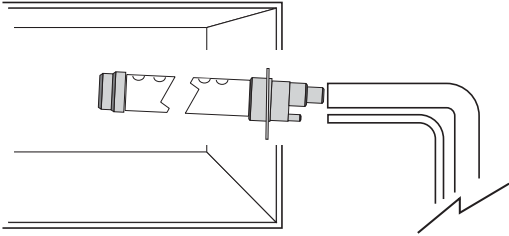
Other flue accessories are available for complete assembly.

Model		UG045*	UG090*	UG180*
general characteristics	Rated steam production (kg/h)	45	90	180
	Modulation of steam production	25 to 100%	25 to 100%	12.5 to 100%
	Heat input - gross input power (kW)	34.8	65	130
	Heat output - net output power (kW)	33	62.5	125
	Power supply	230 Vac (-15 to +10%), 50/60 Hz single-phase		
	Power input at rated voltage (W)	250	285	201
	Steam outlet pressure limits (Pa)	0 to 2000	0 to 2000	0 to 2000
	Steam connection (Ø mm)	2x40	2x40	4x40
	Gas connection	1" G	1" G	1" 1/4 G
	Types of gas	natural gas (G20 e G25); propane (G31); butane (G30)		
	Flow-rate/pressure on natural gas (G20) (m³St/h...Pa)	3.68/2000	7.21/2000	13.4/2000
	Flow-rate/pressure on natural gas (G25) (m³St/h...Pa)	4.2/2000	8.7/2000	17.5/2000
	Flow-rate/pressure on propane (G31) (m³St/h...Pa)	1.43/3000	2.68/3000	5.36/3000
	Flow-rate/pressure on butane (G30) (m³St/h...Pa)	1.10/3000	2.06/3000	4.12/3000
	Operating conditions	1T40 °C, 10 to 90% rH non-condensing		
	Storage conditions	-10T70 °C, 5 to 95% rH non-condensing		
Index of protection	IP20			
water fill	Connection	3/4" G male		
	Temperature limits (°C)	1T40		
	Water pressure limits (MPa-bar)	0.1 to 08 - 1 to 8		
	Instant flow-rate (l/m)	10	10	18
	Total hardness (°fH) (*)	5 to 50		
	Maximum conductivity limits (µS/cm) (*)	1500		
water discharge	Connection (Ø mm)	40		
	Temperature (°C)	≤100		
	Instant flow-rate (l/m)	25		
flue gas	Intake duct (Ø mm)	80	80	2x 80
	Flue (Ø mm)	80	80	2x 80
	Flue gas flow-rate (natural gas G20) (kg/s)	0.0163	0.0303	0.606
	Flue gas temperature (natural gas G20) (°C)	123	175	165
	NO _x emission class	5	5	4
weight and dimensions	Humidifier dimensions (WxLxH mm)	1020x570x1200	1020x570x1200	1020x930x1200
	Weight (empty) (kg)	150	150	240
	Packaging dimensions (WxLxH mm)	1090x620x1270	1090x620x1270	1090x980x1270
	Weight of packaged humidifier (kg)	165	165	270
network	Network connection	pLAN over RS485 included; Modbus®, Echelon®, BACnet™ and RS232+GSM optional		
controller	Control with built-in controller	•	•	•
	ON/OFF or proportional to external control signal	•	•	•
	Preheating	•	•	•
	Alphanumeric display	•	•	•
	Remote ON/OFF; alarm relay	•	•	•
	Limit probe supported	•	•	•

(*) gaSteam can run on completely demineralised water (0 °fH). If supplied with softened water, observe the minimum hardness value indicated and follow the instructions contained in the manual.

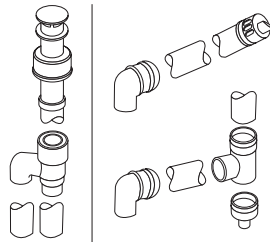
OVERVIEW DRAWING

Duct applications

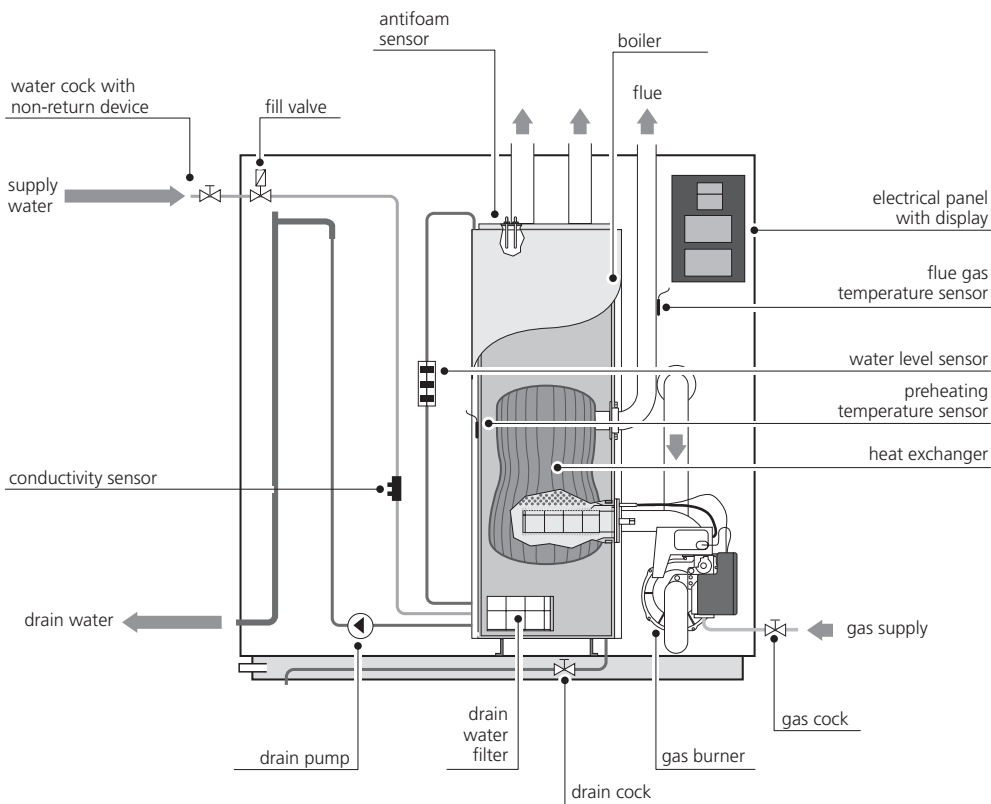


DP*: linear steam distributor

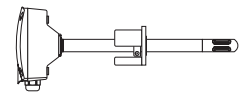
Flue accessories



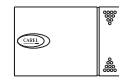
EXH*: various flue pipes and fittings



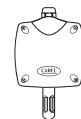
Probes



ASD*: temperature and humidity probe for duct



ASW*: temperature and humidity probe for residential ambient



ASPC*: temperature and humidity probe for industrial environments

type of control: H= modulating

U G _ _ _ H D 0 0 1

rated instant steam production kg/h:
045= 45 kg/h
090= 90 kg/h
180= 180 kg/h

power supply:
D= 230 Vac 1~



Accessories

These accessories are available for the humiSteam, compactSteam, heaterSteam and gaSteam humidifiers.

The CAREL range of accessories for isothermal humidifiers have been especially developed to allow the designer to create humidification systems that are complete and suitable for all types of application. The fundamental idea is to guarantee the optimum operation of the humidification system by providing the installer, maintenance personnel and user all the auxiliary components that simplify installation, the distribution of steam, operation and control of the humidifier.

The accessories, described in the following paragraphs, are divided into:

- steam distribution accessories: steam hoses and distributors, for rooms and ducts;
- plumbing components, for filling and draining the water;
- probes and external controllers (described in the chapter "Probes and control devices").



Linear steam distributors for ducts (DP*)



Fittings (UEKY*)



Steam nozzles (SDP*)

The wide range of linear steam distributors for ducts in the "DP" series is made up of perforated stainless steel pipes supported by a fastening bracket in Ryton®.

This material combines excellent mechanical characteristics with extraordinary resistance to high temperatures.

The new fastening bracket allows the steam distributor to be fastened vertically to a wall, guaranteeing the correct incline of the distributor for the drainage of the condensate.

The stainless steel linear steam distributors are available in 3 different diameters (35, 45 and 60 mm), which couple respectively to the 22, 30 and 40 mm diameter steam hoses used on the entire range of CAREL humidifiers.

The linear distributors are designed to release the steam in a uniform manner along the entire length of the distributor, so as to minimise the absorption distance.

The table describes the recommended models for each type of humidifier; the sizes in brackets (double) are to be used in the event of small ducts, however require the branching of the steam hoses. In this regard, two stainless steel Y fittings are available, one with a 40 mm inlet and two 30 mm outlets (UEKY000000) and one with a 40 mm inlet and two 40 mm outlets (UEKY40X400).

A range of steam nozzles is also available for distributing the steam in small ducts or steam baths (SDPOEM0012, SDPOEM0022, SDPOEM0000).

- UE CH UR UG

code/description	DP030D22R0	DP035D22R0	DP045D22R0	DP060D22R0	DP085D22R0	DP030D30R0	DP035D30R0	DP045D30R0	DP045D30R0	DP060D30R0	DP060D30R0	DP085D30R0	DP105D30R0	DP125D30R0	DP165D30R0	DP060D40R0	DP085D40R0	DP105D40R0	DP125D40R0	DP165D40R0	DP205D40R0
inlet Ø (C)	22 mm					30 mm										40 mm					
cross-section (B)	35 mm					45 mm										60 mm					
length (A)	300	350	450	600	850	300	350	450	450	600	600	850	1050	1250	1650	600	850	1050	1250	1650	2050
CH001 - CH005	1	1	1	1	1																
UE001	1	1	1	1	1																
UE003	1	1	1	1	1																
UE005						1	1	1	1	1	1										
UE008						1		1	1	1	1	1									
UE009						1		1	1	1	1	1	1								
UE010						1		1	1	1	1	1	1								
UE015											1	1	1	1	1						
UE025											(2)	(2)	(2)	(2)	(2)	1	1	1			
UE035													(2)	(2)	(2)	1	(2)	1	1		
UE045																1	(2)	(2)	1	1	1
UE065																2	(4)	2	2	2	
UE090																2	(4)	(4)	2	2	2
UE130																4			4	4	4
UR002						1	1	1	1												
UR004						1	1	1	1	1	1										
UR006								1	1	1	1	1									
UR010									1	1	1	1	1								
UR020																1	1	1	1		
UR027																1	1	1	1		
UR040																1	(2)	1	1	1	1
UR060																2	(4)	2	2	2	
UG045																2	2	2	2	2	
UG090																2	(4)	(4)	2	2	2
UG180																4			4	4	4



- UE
- CH
- UR
- UG

New ventilated steam distributors

The new ventilated steam distributors for rooms (VSDU0A0001), for humidifiers up to 15 kg/h, are powered at 24 Vac directly from the humidifier that they are combined with, via relative terminal block. The ventilated distributor can be fitted directly onto the humidifier, or in a remote position. In the latter case, a support is required for mounting the fan (VSDBAS0001), as well as a steam hose to connect the fan to the humidifier (see below). The ventilated steam distributor works in ON/OFF mode, and is controlled by a thermal device that is activated when steam is produced. When the production of steam ceases, the ventilated distributor continues to operate for a short time to avoid condensation of the remaining steam.

For the humidifiers larger than 15 kg/h, the ventilated steam distributors code VRDXL00000 are available, with 230 Vac power supply. The VRDXL0000 distributors are designed for installation in a remote position from the humidifier, and require two steam hoses with a diameter of 30 mm.

Both models of ventilated steam distributors are designed to drain the condensate using a 7 mm diameter hose (see further on).



- UE
- CH
- UR
- UG

Fill hoses

FWHDCV0000: water fill kit
 FWH3415000: hose L=1.5 m
 FWH3430000: hose L=3 m
 9997*ACA: straight and 90° quick connection
 1312350APN: hose with 6 mm ID and 8 mm OD

The FWHDCV0000 kit includes the FWH3415000 hose and a double non-return valve. The kit has been designed both to ensure conformity to standards that require the use of a double non-return valve upstream of the humidifier (WRAC), and to avoid breakages of the fill valve due to direct connection to the metal mains water pipes. The plastic fill solenoid valve may be damaged if connected directly to the metal mains water pipes: using the hoses with plastic fittings, FWH3***000, eliminates this risk.

The FWH3***000 are available in two lengths: 1.5 m and 3 m, with two ¾" GAS female fittings (one straight and one elbow). Alternatively, the 6 mm pipe and the quick connectors described below can be used. The straight or elbow connection (999572*ACA) is screwed onto the fill solenoid valve and can be quickly fitted by tightening a nut to the 6 mm water fill hose (1312350APN).



- UE
- CH
- UR
- UG

Steam pipes and hoses (1312360AXX - 1312365AXX - 1312367AXX pipe for cylinders with 22/30/40 mm fitting and harmonic steel coil - outside diameter 32/41/52 mm)

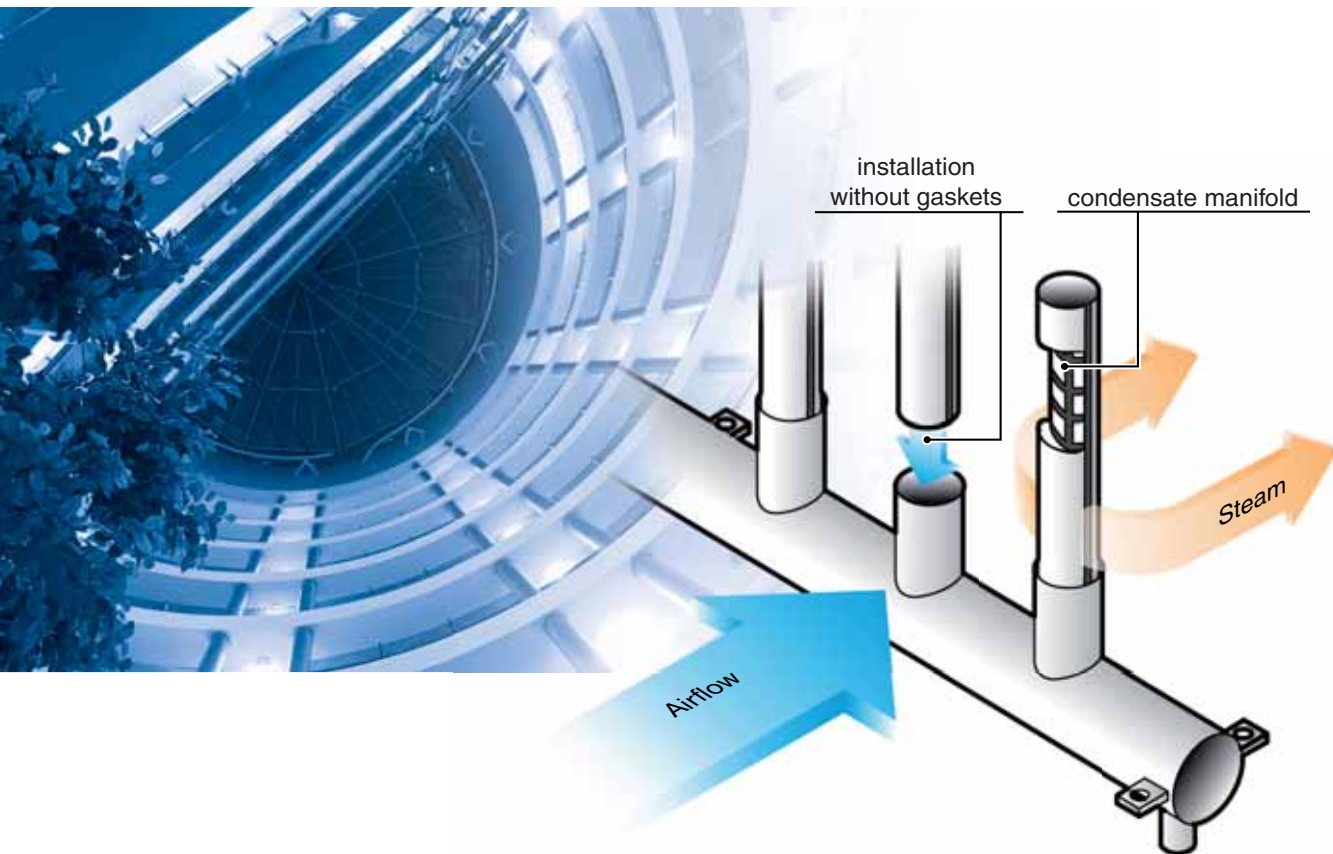
The new steam distribution hoses are made from rubber resistant to 105 °C in continuous operation without the emission of odours, and suitable for use with foodstuffs. The harmonic steel coil immersed in the rubber gives the hose flexibility and strength, preventing it from being choked and blocking the flow of steam.



- UE
- CH
- UR
- UG

Drain pipes and hoses
 1312353APG: 7 mm condensate drain pipe
 1312368AXX: 10 mm condensate drain pipe
 1312357APG: 40 mm water drain hose (1 m)

The condensate that forms inside the steam distributors must be drained using the 7 mm hose for the ventilated steam distributors, and the 10 mm hose for the linear distributors for ducts, "DP". The water drain hose is the same for all isothermal humidifiers and is made from rubber resistant to 100 °C.



Centralised steam distributors

The ultimateSteam direct steam humidifiers are designed to receive pressurised steam from a centralised system, treat it to remove all the condensate, and finally distribute the dry steam directly into the duct or air handling unit. ultimateSteam is covered by various patents, and ensures excellent performance for use in the more critical conditions, above all where limited distance is available for the absorption of the steam. The steam flow-rate ranges from 1 to 990 kg/h, while the dimensions vary from 300 mm to 3000 mm in both width and height. ultimateSteam can be supplied complete with steam valve and electronic or pneumatic actuator, as well as a condensate drain.

Advantages

- minimum absorption distance: the outlet of steam through continuous slits (rather than through nozzles, as in most of the

competing systems) creates a thin layer of steam that flows uniformly from both sides of the distributor, creating a large surface of contact with the air, allowing a minimum absorption distance (typically half the distance of conventional systems);

- minimum losses due to condensation: the distributors are coated with a layer of very high tech ceramic insulation (deriving from aerospace applications), which reduces by up to 90% the losses due to condensate and the heating of the surrounding air. The lining of the distributor, 0.8 mm thick, reduces the temperature of the outside surface to no more than 50 °C, even when the steam inside reaches 120 °C. This insulation also allows lower steam pressure to be used, with advantages both in economic and safety terms;
- no emission of droplets of condensate: the vertical distributors feature a special herringbone condensate separator, which traps and returns any droplets of condensate back to the centre, where these evaporate again. This is possible due to the herringbone constructional shape of the vertical pipes;
- long periods without maintenance: all the parts of the distributor are made from steel, without gaskets, nozzles or plastic parts that may be affected by thermal stress.

Components

The ultimateSteam direct steam humidification system includes:

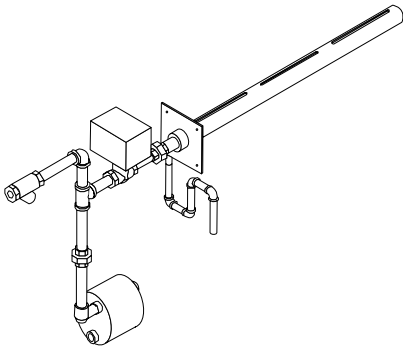
- the ultimateSteam supply manifold (top and/or bottom);
- vertical distribution manifolds;
- steam inlet filter and pipes;
- steam valve with pneumatic or electronic control;
- thermostat socket with float.

Method of installation

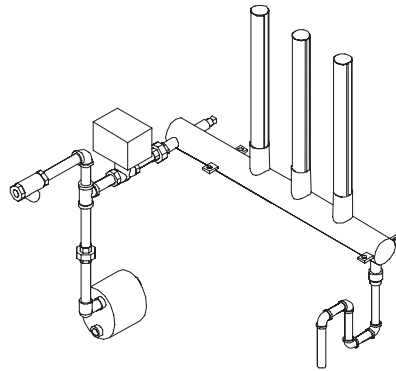
The ultimateSteam direct steam humidification system is sized based on the actual dimensions of the duct.

The valve and condensate drain can be fitted inside or outside the duct (to be specified for the configuration).

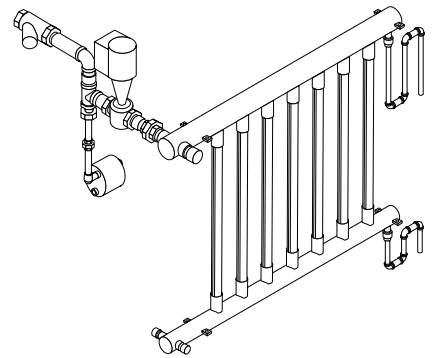
Single traditional manifold D50*



Multiple manifold with quick absorption DSB* supplied from below



Multiple manifold with quick absorption DST* supplied from above



Capacity of the model (kg/h)

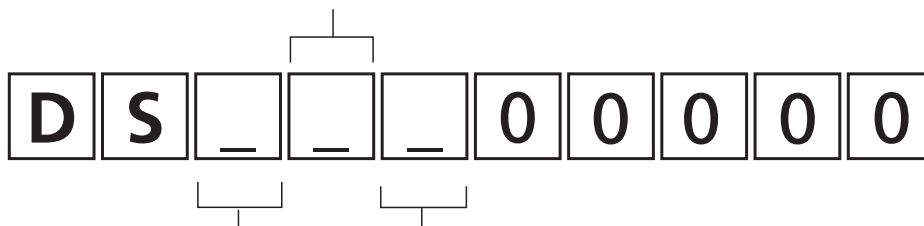
		Rated width – mm											
		Model	300*	450*	600	900	1200	1500	1800	2100	2400	2700	3000
Rated height – mm	300*	DS0	23	23	45	45	45	45	45	N/A	N/A	N/A	N/A
		DSB	N/A	45	68	113	159	204	245	245	245	245	245
	450*	DST	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
		DSB	N/A	68	102	170	238	245	245	245	245	245	245
	600	DST	N/A	N/A	N/A	295	408	544	635	635	635	635	635
		DSB	N/A	68	102	170	238	245	245	245	245	245	245
	900	DST	N/A	N/A	N/A	454	635	816	990	990	990	990	990
		DSB	N/A	68	102	170	238	245	245	245	245	245	245
	1200	DST	N/A	N/A	N/A	454	635	816	990	990	990	990	990
		DSB	N/A	68	102	170	238	245	245	245	245	245	245
	1500	DST	N/A	N/A	N/A	454	635	816	990	990	990	990	990
		DSB	N/A	68	102	170	238	245	245	245	245	245	245
	1800	DST	N/A	N/A	N/A	454	635	816	990	990	990	990	990
		DSB	N/A	68	102	170	238	245	245	245	245	245	245
	2100	DST	N/A	N/A	N/A	454	635	816	990	990	990	990	990
		DSB	N/A	68	102	170	238	245	245	245	245	245	245
	2400	DST	N/A	N/A	N/A	454	635	816	990	990	990	990	990
		DSB	N/A	68	102	170	238	245	245	245	245	245	245
	2700	DST	N/A	N/A	N/A	454	635	816	990	990	990	990	990
		DSB	N/A	68	102	170	238	245	245	245	245	245	245
	3000	DST	N/A	N/A	N/A	454	635	816	990	990	990	990	990

* = the 300 mm and 450 mm models must be fitted with the socket and the valve outside of the duct.

Duct/AHU width (mm):

A= 300 C= 600 E= 1.200 G= 1.800 I= 2.400 M= 3.000

B= 450 D= 900 F= 1.500 H= 2.100 L= 2.700



0= single

B= supplied from below

T= supplied from above

Duct/AHU height (mm):

0 con UST singolo

A= 300 C= 600 E= 1.200 G= 1.800 I= 2.400 M= 3.000

B= 450 D= 900 F= 1.500 H= 2.100 L= 2.700

Adiabatic humidifiers





Pressurised water atomisers

humiFog represents a new generation of economical adiabatic atomisers with a power input of just 4 Watts for each litre/hour of atomised water. humiFog is suitable for all applications that require a high humidification capacity, up to 500 kg/h. Custom models are also available for capacities up to 5000 kg/h.

humiFog uses a special pump to deliver water at high pressure through stainless steel nozzles and produce a very fine and uniform fog. The droplets generated then spontaneously evaporate, humidifying and cooling the air.

The humiFog system, unlike the classic air/water atomisation systems, does not require the use of a compressor or the installation of a compressed air line. In addition, as a further guarantee of hygiene, humiFog does not atomise recirculated water, in compliance with the main guidelines and international standards (ASHRAE 12-2000, VDI6022, VDI3803, L8).

Advantages

- **low energy consumption:** just 4 W/(kg/h), equal to 1150 W for the 250 kg/h model;
- **high capacity:** standard models are available with capacities from 60 kg/h to 500 kg/h, and custom models up to 5000 kg/h;
- very fine atomisation that requires minimum space for evaporation);
- **wide range of models for all requirements:**
 - with inverter: can be configured to humidify in the AHU/duct or to supply water at a constant pressure, with high precision (multi-point applications);
 - without inverter: the capacity is modulated in steps, while the water pressure is fixed (70 bar): this mode is used for direct humidification in the room or multiple zones;
- **adiabatic cooling:** humidifies and the cools the air (even up to 10 °C);
- **hygiene:** in the AHU/duct applications humiFog is certified according to the most recent European standards (VDI6022); for ambient humidification the water distribution lines downstream of the pump can be automatically emptied and washed.

Characteristics of the supply water:

For correct operation, the humiFog system should be supplied with treated water that has the characteristics described on the following pages. To reach these values, in normal circumstances a reverse osmosis system is required for the treatment of mains water. The principle that the operation of this system is based on involves sending the water through a special membrane that is only permeable to molecules that are the same size as H₂O, thus removing most of the mineral salts present. These systems have with outputs that range from a few litres to several cubic metres of water per hour, and can therefore be used to supply a series of humiFog appliances. When the water characteristics are correct, the risks of blocking the nozzles and conveying dust into the environment are reduced significantly. On the other hand, using tap water that can contain up to 500 mg/l of dissolved salts, in one year up to 100 kg of very fine mineral dust (small solid particles from 0.5 to 1 µm in diameter) will be deposited and may block the atomising nozzles.



humiFog for AHU/ducts

UA*HD*

System composition

humiFog for AHU/ducts is made up of

- pump assembly with continuous modulation (with inverter);
- rack with water atomisation nozzles;
- drop separator (compulsory for certified installations);
- high pressure connection pipes;
- humidity probes;
- water treatment system (reverse osmosis), not supplied by CAREL.

Pump assembly with continuous modulation for AHU/ducts (with inverter)

The pump assembly used for AHU/duct applications features an inverter that continuously changes the speed of the high pressure pump, thus adjusting the flow-rate of the sprayed water.

Combining the continuous modulation of the pump speed with control of the number of nozzles that are open, using solenoid valves, the flow-rate can vary from around 15 to 100% of the rated flow of the pump, while maintaining the water pressure between 25 and 75 bar, guaranteeing the production of very fine droplets. The maximum capacity of the pump assembly available is 60, 120, 180, 250, 350, 500 kg/h (custom versions up to 5000 kg/h).

Duct-mounted humidification rack

Supplied to measure for the AHU/duct, this is made up of nozzle manifolds, atomising nozzles, manifold on-off valves, manifold drain valves, ventilation valve and the main drain valve. All the metal parts are made from stainless steel. The ON/OFF solenoid valves control of the number of nozzles that are open, while the drain and ventilation solenoid valves are used to empty the rack whenever the humidifier stops humidifying.

Absorption distance

humiFog generates a very fine mist containing droplets with an average diameter of just 10 to 15 µm, using nozzles with an opening of only 0.2 mm operating at high pressure (25 to 75 bar). This very fine mist is quickly absorbed by the air, requiring a minimum free space for evaporation of just 700 mm. Typically just 1000 to 1200 mm is required for more than 95% of the atomised water to be absorbed by the air.

Drop separator (compulsory for certified installations)

The drop separator has the purpose of trapping the droplets of water that are not completely evaporated, so as to prevent them from leaving the humidification chamber.

This is available in two versions: with fibreglass or AISI304 steel filters, the latter required for VDI6022 certified installations. The structure of the drop separator is always in stainless steel. The drop separator is supplied in standard modules that can be assembled to cover the cross-section of the AHU/duct.

Certified hygiene

The implementation of the

- special stainless steel atomising rack that allows the pipes to be drained;
- fully stainless steel mist eliminator made by CAREL

has allowed the humiFog for AHU/ducts to obtain VDI6022 certification: "Hygienic standards for ventilation and air conditioning systems, Offices and assembly rooms", issued by ILH Berlin. In addition, the appliance has also been certified in accordance with DIN1946, VDI3803, SWKI2003-5 (CH), ÖNORM H 6021 (A).





humiFog for direct humidification in the room

UA*SL*

humiFog for direct humidification in the room is an adiabatic system that atomises the water directly into the environment being humidified. Another important application is adiabatic cooling: a 100 kg/h humiFog can cool the air with an equivalent cooling capacity of 70 kW, with an energy consumption of just 955 W.

Thanks to the low energy consumption, the large capacity, and the low maintenance, humiFog is the ideal solution for direct humidification in rooms.

System composition

The main components of the humidification system are:

- pump assembly;
- water distribution and atomisation system:
 - distributors in the room;
 - nozzles;
 - solenoid valves;
 - connection pipes and fittings;
- water treatment system (reverse osmosis), not supplied by CAREL.

Pump assembly for direct humidification in the room

The pump assembly used for direct humidification in rooms has a constant speed volumetric pump that pressurises the water to 70 bar.

A special regulating valve is used to maintain the pressure constant as the water flow-rate delivered by the pump assembly changes.

The built-in controller completely manages the operation of the unit, using water pressure (in and out), temperature, conductivity sensors, etc.

In addition, it can independently control the humidity of the air in the room by simply connecting an external humidity probe. Alternatively, it can be controlled by a signal coming from an external control system.

The capacity is controlled directly by the humiFog unit, with stepped modulation. The pump assemblies are available with various maximum capacities, 60, 120, 180, 250, 350, 500 kg/h (custom versions up to 5000 kg/h).

A pump assembly is also available with multiple distribution systems located in different rooms: in this case, the pump assembly acts simply as a generator of water at constant pressure, while the distribution systems in the various rooms are managed by external controllers.

Nozzles

Independently of the distribution system used, the water is always delivered at constant pressure, 70 bar, to ensure that the nozzles always produce very fine droplets, with an average diameter of 10 to 15 µm, that are quickly absorbed by the air.

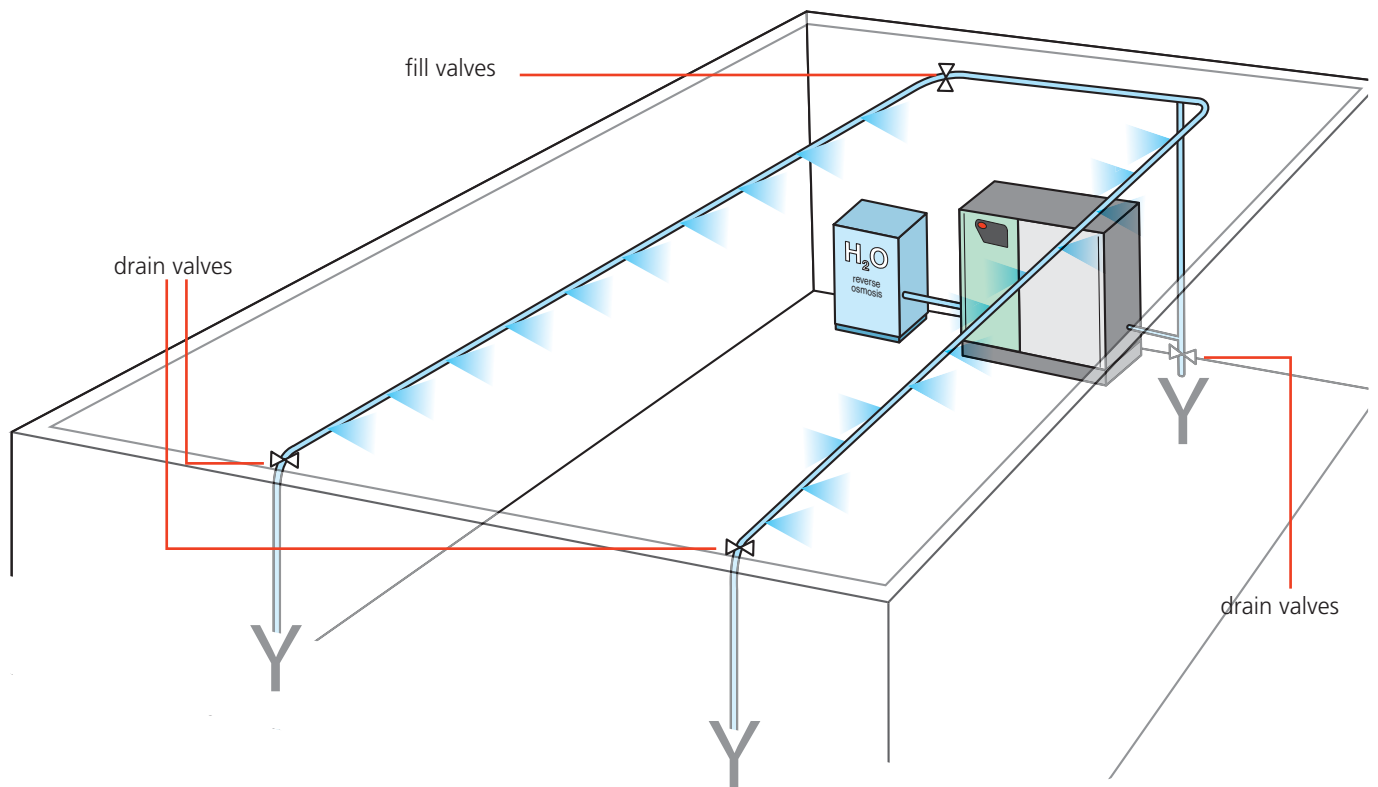
The nozzles are available with capacities of 1.45 kg/h, 2.8 kg/h and 4 kg/h at 70 bar.

Room distributor

This consists of stainless steel manifolds (pipes) with nozzles that are installed inside the room being humidified/cooled. The manifolds are available in various models, to fit nozzles from one side only or on two opposing sides. A series of manifolds make up a **line** in the distribution system.

Ventilated room distributor

This consists of a tangential fan located behind a manifold (pipe) with nozzles. The tangential fan generates a flow of air that assists the evaporation of the droplets and the sustains the droplets with a cushion of air, so as to produce an essentially horizontal trajectory. The ventilated distributors have capacities that reach 32 kg/h in just 1.5 m in length!



The ventilated distributors can be connected in series to make up a distribution **line**.

Capacity control and drain solenoid valves

Each distribution line, with or without ventilated distributors, can be connected directly to the pump assembly or shutoff by a solenoid valve. By controlling these solenoid valves, humiFog manages the capacity of the distribution system, thus obtaining stepped modulation in the capacity (up to 4 steps). Each line has a drain valve that is mainly used to quickly discharge the water pressure when the line stops atomising: when opening the drain valve, the pressure quickly drops from 70 to 0 bar and the line is emptied, preventing the nozzles from dripping. In addition, the drain valves are used for the periodical automatic washing cycles managed by humiFog. The main drain valve, installed at the lowest point in the installation, is also managed by humiFog.

Connection pipes and fittings

CAREL provides hoses or stainless steel pipes and compression fittings suitable for pressures of up to 100 bar.

Observations on installation

humiFog is the ideal system for direct humidification into rooms because, by maintaining the water pressure constantly at 70 bar, it generates very fine droplets with an average diameter of 10 to 15 μm that are quickly absorbed by the air, humidifying and cooling it. Each nozzle creates a cone of droplets that requires a certain time and distance to be completely evaporated. This depends on the air conditions: for example, at 20 °C and 50% rH and with no air flow, the droplets will have a parabolic trajectory that will cause some of the droplets to carry up to 2.5 m horizontally and 4 m in height. This clearly means there are limits in the installation to prevent the droplets from wetting objects, machinery and people in the room. When these limits are not satisfied, use the ventilated distributors that, due to the cushion of air generated by the built-in tangential fan, carry the droplets of water in a substantially horizontal trajectory.

Hygiene aspects

Special attention has been paid to the hygiene aspects of the humiFog.

The built-in controller automatically manages the following operations:

- fills the lines only when humidification is required;
- empties the lines when no humidification is required;
- automatically washes the lines at periodical intervals, when no humidification is required for an extended period.

This all ensures high hygiene standards, without requiring manual washing and/or emptying procedures.

Applications

Humidification:

- printing industry;
- textiles industry;
- timber industry;
- fruit/vegetable cold stores;
- paper, timber stores, etc.

Cooling:

- industrial, especially in the textiles industry;
- outdoor cooling.



Controllers

The control system integrated into the humiFog pump assembly can be set in the following modes:
Version for AHU/ducts:

- continuous modulation of the flow-rate (single AHU/duct);
 - constant pressure (multi AHU/ducts).
- Room version:
- continuous modulation of the flow-rate (single AHU/duct);
 - constant pressure (multi AHU/ducts).

The following operating modes are available by simply setting the parameters:

- modulating control (UA*H*) or stepped control (UA*S*) with input signal from external humidity probe;
- modulating control (UA*H*) or stepped control (UA*S*) with input signal from external humidity probe and limit probe;
- modulating control (UA*H*) or stepped control (UA*S*) with proportional input signal, voltage or current, from external controller;
- modulating control (UA*H*) or stepped control (UA*S*) with proportional input signal, voltage or current, from external controller and limit probe;
- ON/OFF control (UA*H* and UA*S*) with input signal from external mechanical contact or from humidistat;
- constant pressure control (UA*H*) with proportional input signal from external controller.



Pump assembly

In the standard version the pump is brass, ideal for non-aggressive water, with a conductivity from 30 to 50 $\mu\text{S}/\text{cm}$. The version with stainless steel pump is also available for use when the conductivity of the water is 5 to 50 $\mu\text{S}/\text{cm}$. In this case, all the parts in contact with the water are made from stainless steel. The maximum capacity of the pump assembly available is 60, 120, 180, 250, 350, 500 kg/h (custom versions up to 5000kg/h).



Pulsation damper

The damper reduces the peaks in pressure generated by the pump pistons so as to limit pulsation along the pipes and the distribution system. Recommended for high capacity systems starting from 180 kg/h.



Connection pipes (UAKT*)

CAREL can provide hoses or stainless steel pipes for connection between the pump assembly and the rack or the room distribution system, as well as high pressure compression fittings for stainless steel pipes.



Valve and gasket kits for pumps

(1309611AXX, 1309612AXX - 1309613AXX, 1309614AXX, 1309615AXX, 1309616AXX)

The valve kit for the pump pistons includes the valves and the gaskets for the three pistons. The valves should be replaced approximately every 4,000 operating hours.

To avoid water leaks, the pump gaskets should be replaced approximately every 4,000 operating hours.

Each kit contains all the items required



Filter kit (UAKFW0000)

I due filtri utilizzati per eliminare le eventuali impurità dall'acqua, posti nella stazione di pompaggio, vanno sostituiti se si osserva una caduta di pressione tra i filtri maggiore di 0.5 bar.

The kit includes:

- 1x5 μm water filter, height 9";
- 1x1 μm water filter, height 9".



Pump oil (5024646AXX)

Special oil is available for the pump. A 1 litre bottle is sufficient for a complete oil change



Liquid Teflon (5024612AXX)

Liquid Teflon for high pressure water fittings, 100 ml package.



Atomisation rack for AHU/ducts

The atomisation racks for AHU/ducts are made to measure to cover the entire cross-section of the AHU/duct.

By providing the following data, CAREL can size the rack: temperature and humidity of the air coming into the humidifier, outlet air humidity, air flow-rate, inside dimensions of the AHU/duct, length of the humidification chamber.



Drop separator for AHU/ducts

CAREL can supply a drop separator designed especially for humiFog: supplied in easy to assemble modular panels. Both the width and the length of the drop separator are multiples of 152 mm. The drop separator comes in two versions: with fibreglass or stainless steel filtering material. The latter version is compulsory for installations compliant with the VDI6022 standard. The pressure drop is very low and, with air speeds up to 3.5-4m/s, varies from 30 Pa when dry to around 70 Pa when wet.



Junction box (UAKDER*0000)

Junction box for the solenoid valves fitted on the atomising rack in the duct. Used when there are from 4 to 8 solenoid valves.



Room distributors (UAKC*FP*)

These are stainless steel pipes measuring 2450 mm in length, outside diameter 16 mm, with 1/4" GAS fittings, and 1/8" NPT holes for the nozzles. There are manifolds with 4 nozzle holes on one side or with 4 holes on one side and 3 on the opposite side, spaced equal distances apart.



Ventilated room distributors (DL*)

These are made up of a stainless steel pipe with nozzles, behind which a tangential fan creates a flow of air to carry the droplets. The entire assembly is enclosed in a metal structure that also contains the on-off and solenoid drain valve.

Available in two lengths with various capacities and air flows.

The "Master" version, with a built-in pressure switch, can independently manage the ON/OFF and drain solenoid valve.



Solenoid valve for rooms (UAKCD*, UAKVAL*)

Stainless steel on-off solenoid valves, normally closed, pressure rating up to 100 bar, flow-rate up to 150 litres/h, 1/8" GAS F fittings.

The drain solenoid valves are normally open, and available in brass or stainless steel, open automatically at around 15 bar, flow-rate up to 250 litres per hour, 1/4" GAS F fittings.

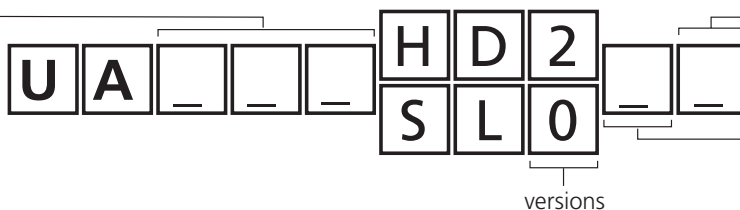


Nozzles (UAKMTP*)

Stainless steel, 1/8 NPT M fittings, with 60 µm filter and non-return valves. Available with capacities of 1.45, 2.8 and 4 kg/h.

Model		UA*H* for AHU/ducts	UA*S* for rooms
general characteristics	Rated atomisation capacity (kg/h - lb/hr)	EU: 60, 120, 180, 250, 350, 500 USA: 72, 144, 216, 300, 420, 600	
	Power supply	EU: 230 Vac single-phase, 50 Hz USA: 230 Vac single-phase, 60 Hz	EU: 400 Vac three-phase, 50 Hz
	Electricity consumption (W)	955 - 955 - 955 - 1150 - 1150 - 1800	
	Operating conditions	1T40 °C, 20 to 90% rH non-condensing	
	Storage conditions	-10T50 °C, 20 to 90% rH non-condensing	
	Index of protection	IP20	
water fill	Connection	Ø 1/4" G female / Ø 1/2" G female depending on the model	
	Temperature limits (°C)	1T50	
	Water pressure limits (MPa/bar)	0.3 to 0.8/3 to 8	
	Total hardness (ppm CaCO ₃)	0 to 25	
	Conductivity limits (µS/cm)	5 to 50 µS/cm (stainless steel pump) - 30 to 50 µS/cm (brass pump)	
water outlet	Connection	Ø 1/4" G female	
	Water pressure (MPa/bar)	2 to 8/20 to 80	
water discharge	Connection	Stainless steel pipe external Ø 10 mm/ 0.4 inch	
	Temperature (°C)	56	
weight and dim.	Humidifier dimensions (mm)	930x425x860h	
	Packaging dimensions (mm)	1000x450x980h	
	Weight of packaged humidifier (kg)	78 to 90 depending on the model	
network	Network connection	RS485; Modbus® (with optional gateway)	
controller	Type	UAH* (modulating)	UAS* (step)
	Inputs	0 to 1 V (default), 0 to 10 V, 2 to 10 V, 0 to 20 mA, 4 to 20 mA	
	• selectable signal	voltage 60 kOhm, current 50 Ohm	
	• input impedance	8 to 24 Vac max 40 mA	
	• power supply for active probes		

Capacity:
 060= 60 kg/h
 120= 120 kg/h
 180= 180 kg/h
 250= 250 kg/h
 350= 350 kg/h
 500= 500 kg/h



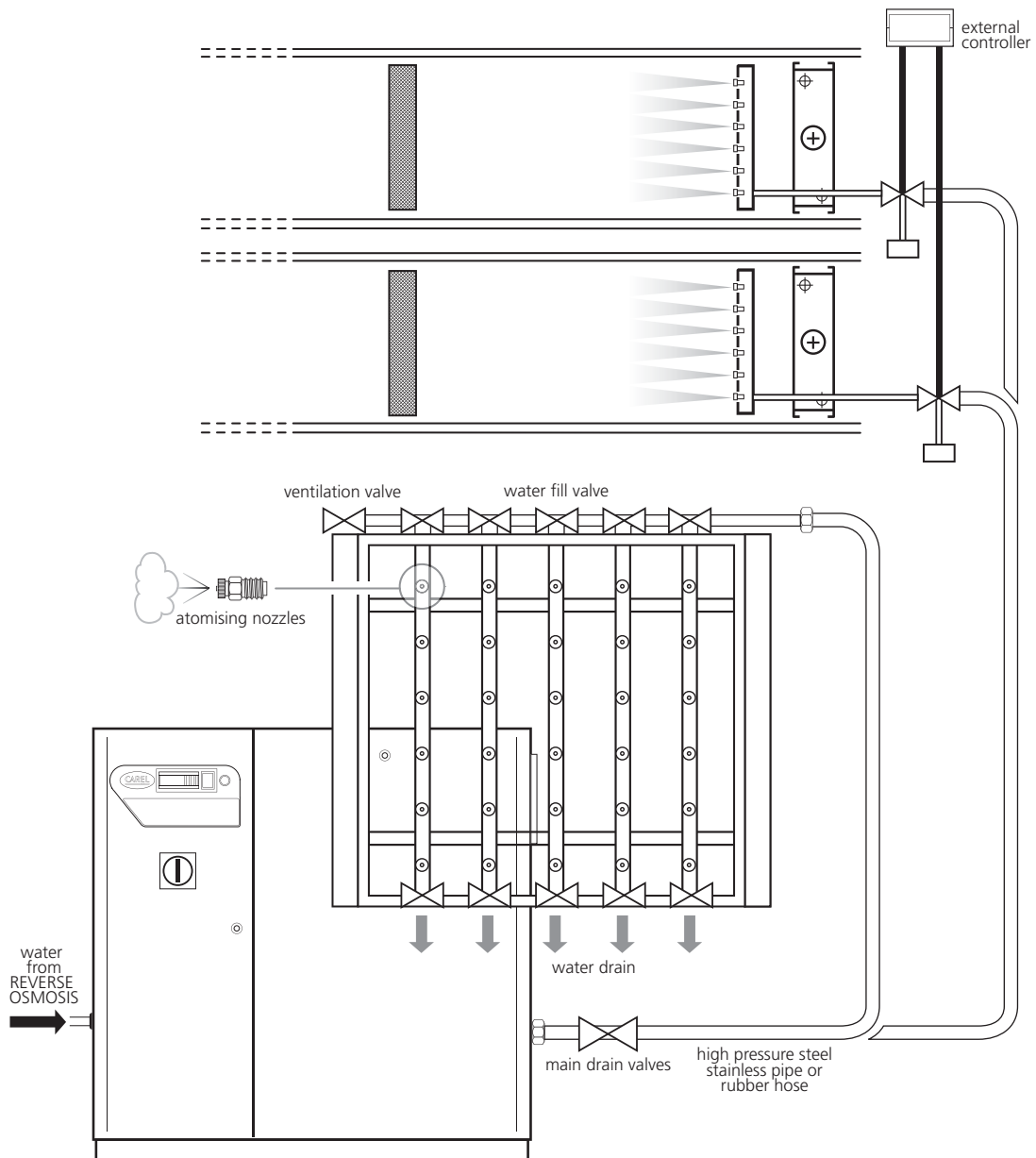
Material:
 0= parts in brass and stainless steel
 1= parts entirely in stainless steel

Pulsation damper:
 0= without damper
 1= with damper

Description		DL*
room distributors	Water inlet	for high pressure CAREL hose 1/8" G
	Water outlet	1/8" G or TNF Ø 6 to 8 mm
	Fan power supply	230 Vac, 50 Hz
	Capacity (kg/h)	5, 11, 16, 22, 32
	Air flow-rate	700 m³/h model with 4 nozzles, 1500 m³/h model with 8 nozzles
	Dimensions	850 model with 4 nozzles, 1500 model with 8 nozzles, 200x200 mm
	Material	stainless steel
	Capacity of the nozzles at 70 bar (kg/h)	MTP0= 1.45 kg/h, MTP1= 2.8 kg/h, MPT2= 4 kg/h
	Nozzle openings	4 or 7
	Manifold fittings	1/4" G female
	Manifold dimensions	2,450 mm, Ø 14 mm
	Maximum length of distribution lines (m)	50 (contact CAREL for longer lines)

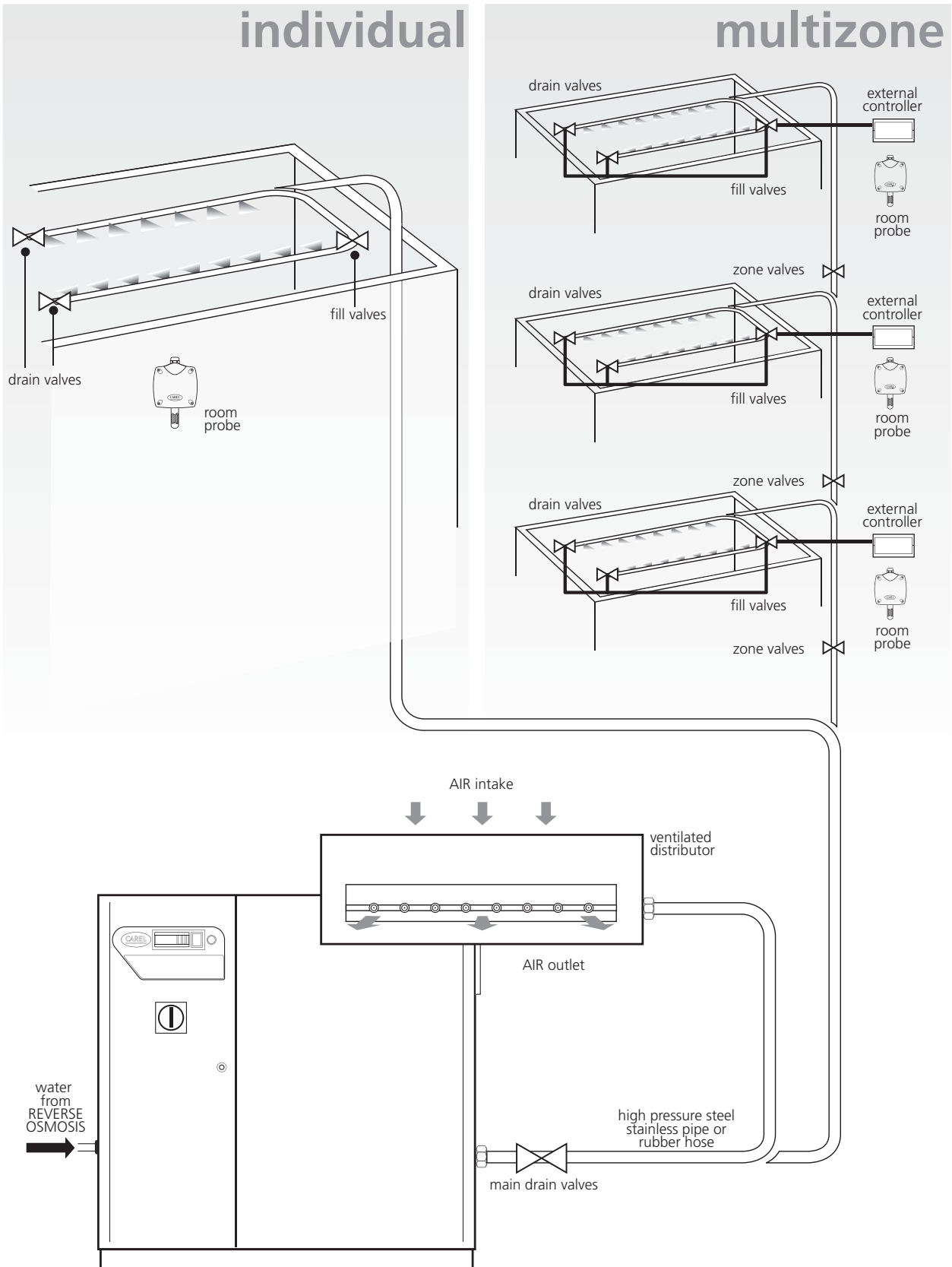
OVERVIEW DRAWING

humiFog DUCT



OVERVIEW DRAWING

humiFog ROOM





Compressed air and water atomisers

The mc adiabatic humidification system is ideal for humidifying medium/large industrial environments and significant volumes of air, in ducts and air handling units.

The principle of the mc system involves sending a mixture of water and compressed air through atomising nozzles to create a fine fog made up of very small droplets.

The atomised water is easily absorbed by the air and, as a side effect to the humidification process, the air temperature decreases: therefore, the mc system can also be used to cool the air.

The appliances are fitted with an exclusive self-cleaning system that drains the water from the pipes and cleans the nozzles with compressed air when the system is deactivated; the opening of the nozzles is then closed by a needle to prevent dripping. The self-cleaning system, as well as ensuring hygienic operation, also minimises the need for maintenance.

Advantages

- **capacity:** models are available up to 230 kg/h;
- simple installation;
- extremely low running costs (energy consumption around 100 W per l/h of atomised water, including the air compressor);
- **adiabatic cooling:** humidifies and cools the air (even up to 10 °C cooling);
- high efficiency stainless steel nozzles that atomise the water into very small droplets that are readily absorbed by the air (droplet diameter around 8 to 10 µm);
- **modulation of the water flow-rate:** ON/OFF or proportional, with limit probe for duct applications;
- **supply water:** mains or demineralised (the use of demineralised water reduces the mineral dust introduced into the air and the maintenance of the nozzles);
- **hygiene advantages:** automatic periodical self-cleaning cycle on each nozzle;
- lines emptied when the humidifier is off;
- reduced maintenance thanks to the self-cleaning cycle.

Hygienically safe

Special attention has been paid to the hygiene aspects of the mc, in fact:

- the water is not recirculated;
- the water is drained automatically when the nozzles are off, to prevent the formation of stagnant water;
- a short automatic cleaning cycle cleans the nozzles from the water and limits lime scale deposits (every 1/2 hour);
- the opening of the nozzles is plugged by a mechanical needle when there is no compressed air, to prevent dripping.

Air compressor

The mc system 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, compressed to a pressure between 4 and 10 bar.

The energy consumption of the air compressor depends on the type of compressor, its efficiency and the pressure that the air is compressed to. Generally, the power input is between 70 W and 110 W per litre of atomised water per hour.



mc

MC*

System composition

The mc humidification system is made up of a cabinet, manifolds, atomising nozzles, filters for the removal of any impurities in the air and water and humidity probes. The mc system is designed for both room

and duct installations. In room installations, the nozzles are installed inside the environment. These should be positioned so that the cone of droplets generated does not wet any objects in the room and on the floor. The atomised water is then distributed directly into the room, and a humidity probe is connected directly to the mc controller. In duct installations, the mc nozzles are installed inside a humidification

chamber, where the atomised water has enough time to evaporate, humidifying and cooling the air. As well as the humidity probe for the return air, the mc controller can also be connected to a limit probe, downstream of the humidification chamber, to prevent the phenomena of condensation.

Cabinet

The mc cabinet is supplied with compressed air at 4 to 10 bars and water at 2 to 4 bars. Mains water pressure is usually within these limits, so direct connection between the mains and the cabinet is often possible. The cabinet is available in two models, for mains water and demineralised water. In the version for demineralised water, all parts in contact with the water are made from stainless steel and corrosion resistant plastic. This product is therefore recommended for treated water, with conductivity less than 30 µS/cm. For the compression of the air, on the other hand, a compressor is required (not supplied by CAREL).

Filters

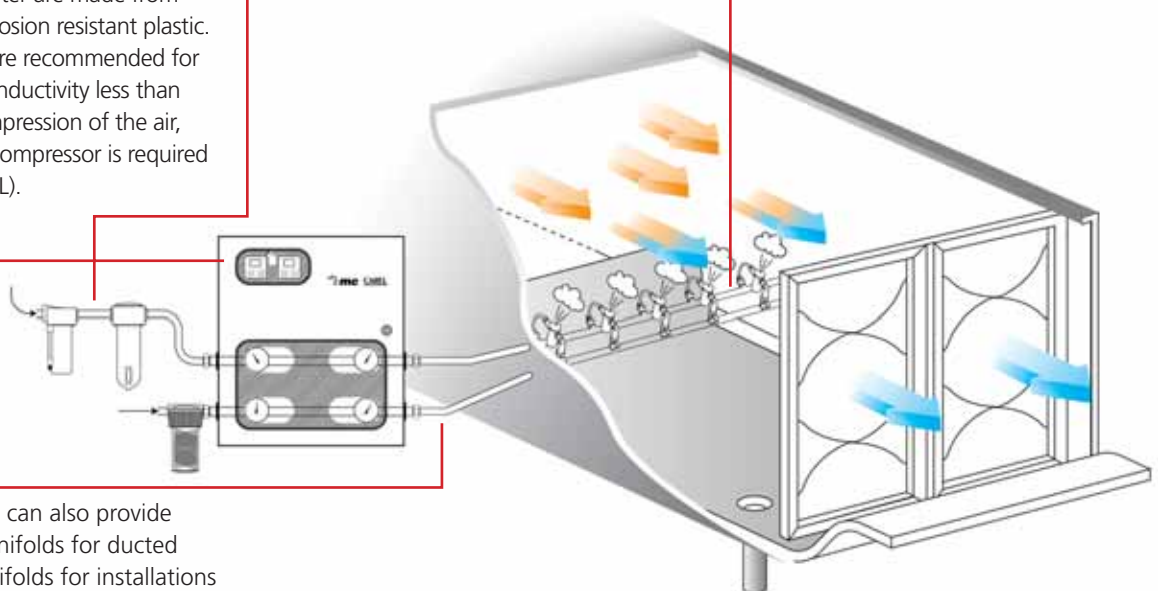
For optimum operation, CAREL proposes a water filter and a filtering cartridge installed directly in the water line. For the compressed air line, CAREL provides a filter to prevent solid particles from reducing or blocking the flow to the nozzles. In addition, an oil filter is available to remove any oil from the compressed air.

Nozzles

CAREL provides the special mc nozzles, plus an assembly kit for the installation of each nozzle. The mc nozzles atomise the water to create an extremely fine mist of minute droplets, with an average diameter of 10 µm, which are easily absorbed by the surrounding air, humidifying and cooling it.

Manifolds

Upon request, CAREL can also provide the stainless steel manifolds for ducted installations (the manifolds for installations in the room are not supplied by CAREL).





Controllers (CR7214*)

The mc cabinets have a control unit available with ON/OFF or proportional modulation. In the systems with ON/OFF control, the air pressure at the nozzle is always at the maximum when the cabinet is on (around 2.1 bar) and so the capacity of the humidifier is either 0 or 100%. With proportional control, the humidification capacity can be modulated continuously up to 100%, allowing precise control of the air humidity level and thus making the system ideal for applications in which precise humidity is required.



Nozzles and assembly kit (MCA* and MCK1AW0000)

The nozzles, machined from AISI316 stainless steel, are available for five different flow-rates, 2.7 - 4.0 - 5.4 - 6.8 - 10kg/h, but all with the same external dimensions. The automatic mechanical nozzle self-cleaning system prevents the depositing of lime scale and other impurities. Dripping is avoided thanks to the closing mechanism in periods of inactivity. The nozzle assembly kit includes the components required for assembly of a nozzle between a manifold in the water line and a manifold in the compressed air line, and is suitable for all types of mc nozzles.



Water filters (MCFILWAT05 and MCC05PP005 - cartridge filter)

The water filter is made from propylene and is used to remove particles up to 5 µm. The filter should be replaced approximately every 6,000 operating hours to avoid the accumulation of germs or an excessive pressure drop due to the accumulation of impurities. The water filter cartridge is made from plastic and should be fitted in the water supply line before the cabinet. The filter cartridge is supplied separately.



Air/water lines
 98C150P013 - 14 - 17 - 18 (air lines)
 98C150P015 - 16 - 19 - 20 (water lines)

Spare air and water lines are available for the mc cabinets, including filters, pressure gauges to control the pressure of the compressed air or water, and valves.



Solid particle filters for compressed air (MCFILAIR01)

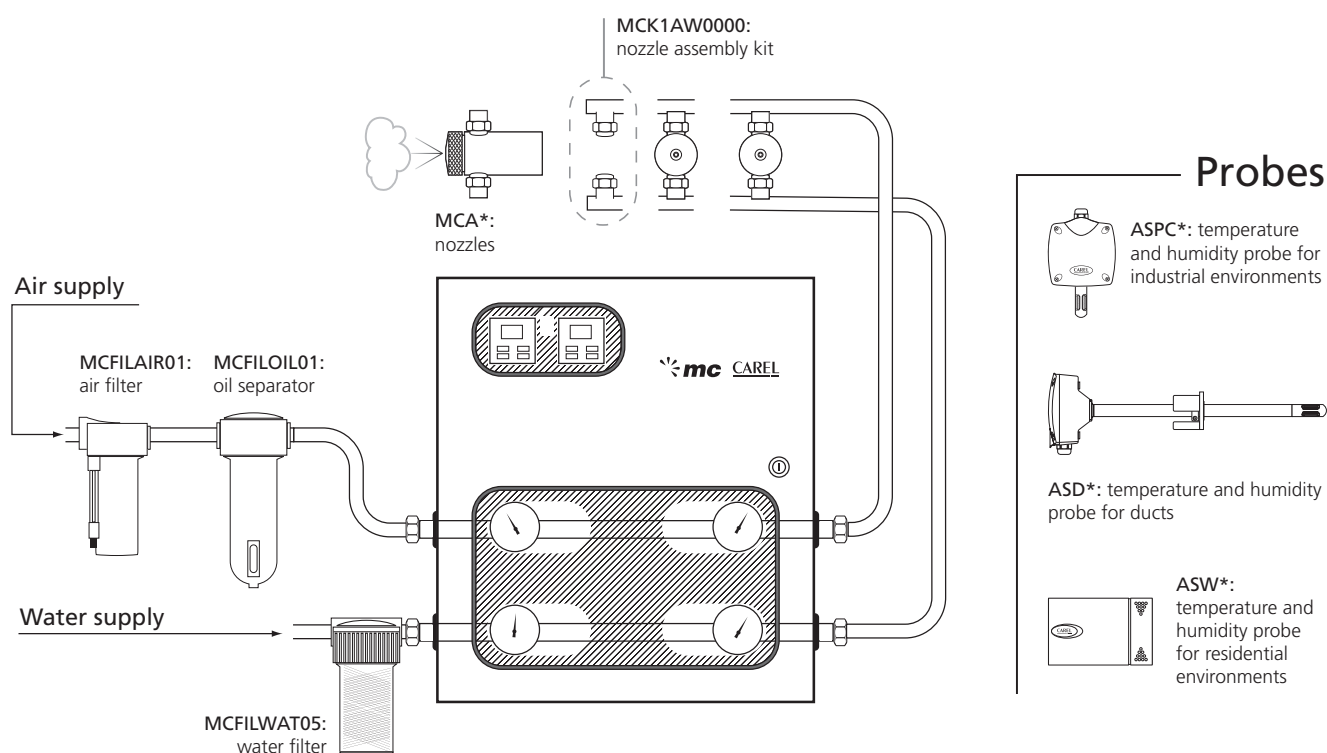
The solid particle filter is used to eliminate solid particles and impurities up to 5 µm from the compressed air. It is always recommended that the air filter is used so as to prevent the impurities from reducing or blocking the flow through the nozzles. This filter should be installed in the air-line after the compressor and before the cabinet.



Oil filter for compressed air (MCFILOIL01)

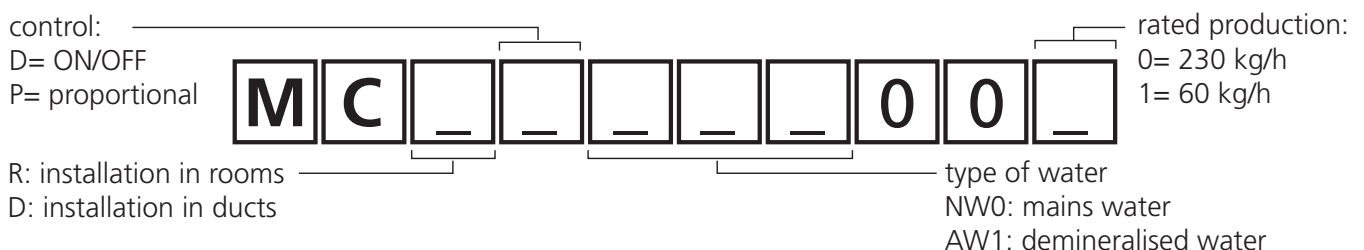
The oil filter is used to eliminate any oil from the compressed air, so as to ensure the correct operation of the atomising nozzles. The oil filter also contains an air filter and consequently must be installed in the air-line after the solid particle filter.

OVERVIEW DRAWING



Model		MC060*	MC230*
general characteristics	Maximum humidification capacity (kg/h)	60	230
	Power supply	230 Vac single-phase, 50/60 Hz	
	Operating conditions	1T50 °C, 0 to 90% rH non-condensing	
	Storage conditions	-10T70 °C, 0 to 90% rH non-condensing	
	Index of protection	IP55	
water fill	Connection	1/4" G	1/2" G
	Temperature limits (°C)	1T50	
	Water pressure limits (MPa/bar)	0.2 to 0.4/2 to 4	
	Instant flow-rate (l/min)	1	3,8
	Total hardness (ppm CaCO ₃) (*)	0 to 400	
	Conductivity limits (µS/cm) (*)	0 to 1250	
air inlet	Connection	1/4" G	1/2" G
	Air pressure (MPa/bar)	0.4 to 1.0/4 to 10	
water/air outlet	Connection	1/4" G	1/2" G
	Water pressure (MPa/bar)	0.035 + 0.01 x Δh/0.35 + 0.1 x Δh (Δh: difference in height in metres between cabinet and nozzles)	
	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)	
weight and dimen.	Humidifier dimensions (mm)	515x165x580	550x165x630
	Packaging dimensions (mm)	600x200x640	650x200x700
	Weight of packaged humidifier (kg)	23 to 26 depending on the model	27 to 32 depending on the model
nozzles	Material	stainless steel (AISI 316)	
	Capacity of the nozzles at 2.1 bar (kg/h)	2.7 - 4.0 - 5.4 - 6.8 - 10	
net-work	Network connection	RS422; Modbus® (with optional gateway)	
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	

(*) The constructional and functional features of the mc system 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. For optimum operation, demineralised supply water by reverse should be used osmosis. Softened water, on the other hand, should not be used as it does not reduce the concentration of mineral salts. In any case, observe the provisions of the UNI8884 standard "Characteristics and treatment of the water in cooling and humidification circuits", according to which the main characteristics of the water are conductivity < 100 µS/cm and total hardness <5 °fH (50ppm CaCO₃).





Centrifugal humidifiers

humiDisk₆₅ is a small humidifier that uses a spinning disk to atomise the water and transform it into millions of very small drops that, blown by a built-in fan, are introduced into the environment, where they evaporate, humidifying and cooling the air.

This is a simple, economic and easy to maintain humidification system, with an energy consumption of just 220 W per 6.5 kg/h of capacity.

The water tank inside the humiDisk₆₅ contains just 0.055 litres of water, which is atomised, at maximum capacity, in just 30s. The water in the tank is therefore changed 120 times per hour, meaning the humidifier substantially works with running water, so as to guarantee the best hygiene conditions. The operation of the humidifier is controlled by an electronic board inside the humidifier that, as well as managing the normal operation of the appliance, also performs a tank washing cycle when starting the unit, and an emptying cycle at the end of the humidification request. This avoids having stagnated water inside the unit.

IMPORTANT: to ensure a higher level of hygiene, when using the CAREL electrical control panels, the humidifier also washes the water tank at the start of each humidification cycle.

The electronic board also features a trimmer to set the capacity of the humidifier.

Electrical panels

Each humiDisk₆₅ centrifugal humidifier must be connected to an electrical control panel, supplied by CAREL, for the control of one or two humidifiers in parallel. The humidity probe, supplied separately, can be connected to the electrical panel, which then manages the humidifier so as to maintain the air humidity at the desired level.

Antifreeze device

humiDisk₆₅ can be supplied with an optional antifreeze device: an electric immersion heater, controlled by the electronic board and a temperature sensor that is activated when the temperature inside the unit approaches 0 °C. The appliance can operate at temperatures down to around 1 °C without the antifreeze device, and down to -2 °C with the device (optional).

Water used

humiDisk₆₅ operate on both mains water or treated water (see the technical specifications).

Advantages

- simplicity: requires just the 230 Vac power supply and the mains water and drain lines. Operation is ON/OFF;
- hygienically safe:
 - very small water tank, only 55 millilitres!;
 - washing procedure at unit start;
 - washing procedure at the beginning of every cycle (with CAREL control panel only).

- modularity: 1 or 2 humiDisk₆₅ units can be controlled in parallel using the special control panel supplied by CAREL.

Installation

humiDisk₆₅ can be installed on wall or hung by chains from the ceiling.

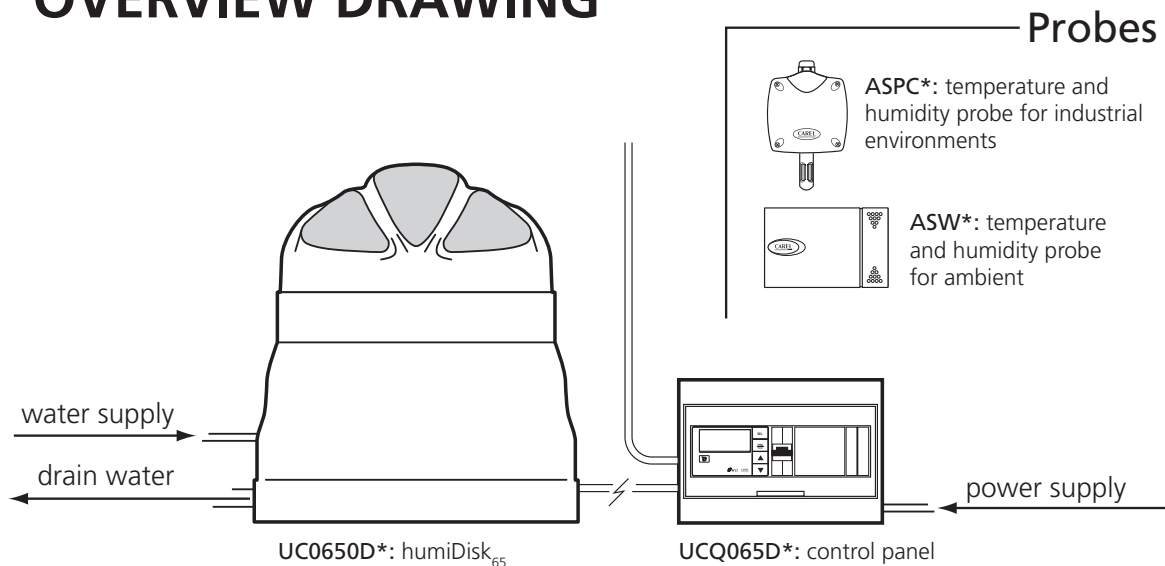
Applications:

- cold rooms, storage facilities and ripening rooms for products, such as wine, fruit and vegetables, where low humidity level causes weight loss and product spoilage;
- printing facilities, where the correct level of humidity must be maintained to avoid variation in paper size and consequent misprints;
- textile industries, where the maintenance of the required humidity according to the production process and the type of material used is fundamental.

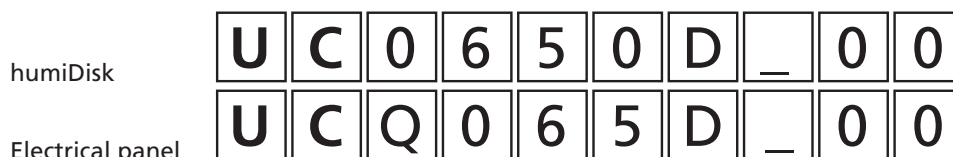
Model		UC0650D*
general characteristics	Maximum humidification capacity (kg/h)	0.85 to 6.5
	Power supply	230 Vac, 50 Hz, 0,22 kW (0.29 kW with antifreeze heater)
	Operating conditions	1T35 °C, 0 to 100% rH non-condensing (without antifreeze heater) -2T35 °C, 0 to 100% rH non-condensing (with antifreeze heater)
	Storage conditions	-10T60 °C, 0 to 90% rH non-condensing
	Index of protection	IP14
water fill	Connection	3/4" G male
	Temperature limits (°C)	1T50
	Water pressure limits (MPa/bar)	0.10 to 1/1 to 10
	Instant flow-rate (l/min)	0 to 0.11
	Tank (l)	0.055
	Total hardness (*)	30 °fH, 300 ppm CaCO ₃ (not less than 200% di Cl- in mg/l)
	Conductivity limits (µS/cm)	100 to 1200
water discharge	Connection	Ø 10
	Overflow	Ø 10
weight and dimen.	Humidifier dimensions (mm)	505x610x565
	Weight (kg)	17,6
	Packaging dimensions (mm)	530x650x600
	Weight of packaged humidifier (kg)	18
electrical panel	Type	UCQ065D100 (for one humiDisk) - UCQ065D200 (for two humiDisk)
	Power supply	230 Vac (-15% to +10%), 50/60 Hz single-phase
	Operating conditions	0T50 °C, 0 to 90% rH non-condensing
	Storage conditions	-10T70 °C, 0 to 90% rH non-condensing

(*) The quantity and quality of the minerals dissolved in the water affect the frequency of the routine maintenance operations and the amount of dust generated. For best operation, use demineralised water. Do not use softened water, as this does not reduce the content of minerals dissolved in the water

OVERVIEW DRAWING



0= without antifreeze heater - 1= with antifreeze heater



1= electrical panel for 1 humiDisk₆₅ - = electrical panel for 2 humiDisk₆₅ units

Probes and control devices





Temperature and humidity probes

CAREL offers increasingly advanced and complete global solutions.

For this reason, CAREL has designed an entire range of probes that respond to the needs of HVAC/R installers and manufacturers, as well as for the control of its own line of humidifiers.

The range includes temperature and humidity sensors for various applications, with installation in sockets or ducts, in residential or industrial environments, guaranteeing high performance and compatibility with all CAREL controllers.

The range has been enriched with the most innovative technological solutions, offering new international standards at increasingly competitive prices.

Advantages

CAREL probes, as well as featuring the recognised performance that sets them apart, are very versatile and can satisfy various market requirements. Indeed, all the probes have been especially designed to be compatible not only with all CAREL controllers, but also with the most commonly used standards around the world.

The temperature and humidity probes are available with different operating ranges and in special versions for corrosive or polluting environments.

High quality probes are available for ambient installation, duct installation and for industrial applications where special conditions may occur. It is recommended to consider all relevant parameters such as probe protection index, the operating air conditions, the power supply and range of the output signal when choosing the choice the probe to use.



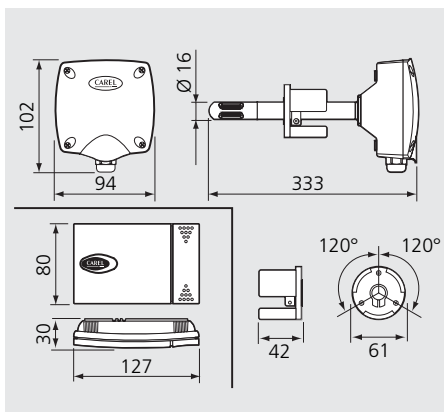
Active temperature, humidity and temperature/humidity probes

ASW*: for installations in rooms
ASD*: for installations in ducts

These probes are particularly suitable for residential and commercial environments with precise design requirements. They are used in ducted heating and air-conditioning systems.

The possibility to select the output signal, either voltage or current, allows remote installation at up to 200 m from the controller, without affecting precision.

The ASD* models, fitted with mobile flanges, can also be installed in very small ducts, allowing the sensor to be kept in the optimum position for reading.



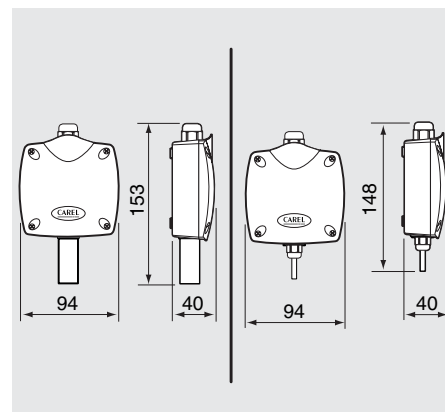
Active temperature/humidity probes

ASP*: for industrial environments

Specifically designed to measure high humidity levels with great precision.

The high index of protection of the sensor (IP54) and the casing (IP55) makes these especially suitable for measuring the temperature and humidity in special environments, such as cold rooms, pools and industrial environments in general.

The possibility to select the output signal, either voltage or current, allows remote installation at up to 200m from the controller, without affecting precision.



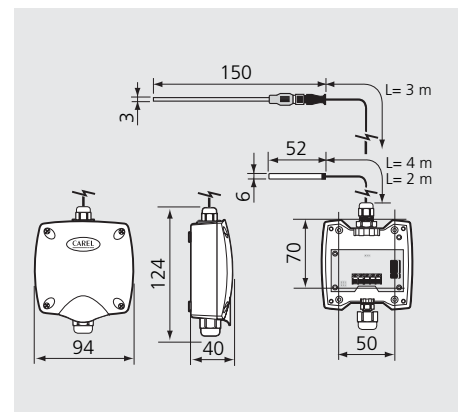
Universal temperature probes

ASET*

These probes can be used in a multitude of applications; indeed, the sensor fitted with 2 or 4 metre cable allows installation in environments such as steam baths where the need to operate in saturation conditions (humidity at 100%) would affect the electronics, in this case located outside of the saturated environment.

The plastic container guarantees the electronics IP55 protection and is designed for wall-mounting.

The possibility to select the output signal, either voltage or current, allows remote installation at up to 200 m from the controller, without affecting precision.



Model	Power supply	Operating conditions	Range temperature humidity	Precision temperature
ASW* temperature and humidity probes for rooms				
ASWH100000	9 to 30 Vdc 12 to 24 Vac	-10T70 °C 10 to 90% rH non-cond.	10 to 90% rH	
ASWT030000	9 to 30 Vdc 12 to 24 Vac	-10T70 °C 10 to 90% rH non-cond.	-10T70 °C	25 °C: ±0.2 °C, -10T70 °C: ±0.7 °C
ASWT011000	9 to 30 Vdc 12 to 24 Vac	-10T70 °C 10 to 90% rH non-cond.	-10T70 °C	25 °C: ±0.25 °C, 0T50 °C: ±0.5 °C
ASWC110000	9 to 30 Vdc 12 to 24 Vac	0T50 °C 10 to 90% rH non-cond.	0T50 °C 10 to 90% rH	25 °C: ±0.4 °C, 0T50 °C: ±1.2 °C
ASWC111000	9 to 30 Vdc 12 to 24 Vac	0T50 °C 10 to 90% rH non-cond.	0T50 °C 10 to 90% rH	25 °C: ±0.25 °C, 0T50 °C: ±0.5 °C
ASWC112000	24 Vac/dc	0T50 °C 10 to 90% rH non-cond.	0T50 °C 10 to 90% rH	25 °C: ±0.4 °C, 0T50 °C: ±1.2 °C

ASD* temperature and humidity probes for ducts				
ASDH100000	9 to 30 Vdc 12 to 24 Vac	-10T70 °C <90% rH non-cond.	10 to 90% rH	
ASDH200000	9 to 30 Vdc 12 to 24 Vac	-10T70 °C <90% rH non-cond.	0 to 100% rH	
ASDT030000	9 to 30 Vdc 12 to 24 Vac	-10T70 °C <90% rH non-cond.	-10T70 °C	25 °C: ±0.2 °C, -10T70 °C: ±0.7 °C
ASDT011000	9 to 30 Vdc 12 to 24 Vac	-10T70 °C <90% rH non-cond.	-10T70 °C	25 °C: ±0.25 °C, 0T50 °C: ±0.5 °C
ASDC111000	9 to 30 Vdc 12 to 24 Vac	-10T70 °C <90% rH non-cond.	0T50 °C 10 to 90% rH	25 °C: ±0.25 °C, 0T50 °C: ±0.5 °C
ASDC230000	9 to 30 Vdc 12 to 24 Vac	-10T70 °C <90% rH non-cond.	-10T70 °C 0 to 100% rH	25 °C: ±0.2 °C, -10T70 °C: ±1.2 °C

ASP* temperature and humidity probes for industrial environments				
ASPT011000	9 to 30 Vdc 12 to 24 Vac	-10T70 °C <90% rH non-cond.	-10T70 °C	25 °C: ±0.25 °C, 0T50 °C: ±0.5 °C
ASPC110000	9 to 30 Vdc 12 to 24 Vac	0T50 °C 10 to 90% rH non-cond.	0T50 °C 10 to 90% rH	25 °C: ±0.4 °C, 0T50 °C: ±1.2 °C
ASPC230000	9 to 30 Vdc 12 to 24 Vac	-10T70 °C 0 to 100% rH non-cond.	-10T70 °C 0 to 100% rH	25 °C: ±0.2 °C, -10T70 °C: ±1.2 °C

ASET* universal temperature probes				
ASET030000	9 to 30 Vdc 12 to 24 Vac	-10T70 °C <90% rH non-cond.	-30T90 °C	25 °C: ±0.5 °C, -30T90 °C: ±1 °C
ASET030001	9 to 30 Vdc 12 to 24 Vac	-10T70 °C <90% rH non-cond.	-30T90 °C	25 °C: ±0.5 °C, -30T90 °C: ±1 °C
ASET030002	9 to 30 Vdc 12 to 24 Vac	-10T70 °C <90% rH non-cond.	-30T150 °C	25 °C: ±0.5 °C, -30T150 °C: ±1.7 °C

* resistive NTC: compatible with CAREL controllers

Precision humidity	Output signals temperature humidity	Constant (time) temperature	Constant (time) humidity	IP frame sensor
25 °C: ±3%, 0T50 °C: ±6%	0 to 1 V; 4 to 20 mA		60 s (still air) 20 s (3 m/s)	IP30 IP30
	0 to 1 V; 4 to 20 mA	250 s (still air) 25 s (3 m/s)		IP30 IP30
	*	300 s (still air) 110 s (3 m/s)		IP30 IP30
25 °C: ±3%, 0T50 °C: ±6%	0 to 1 V; 4 to 20 mA 0 to 1 V; 4 to 20 mA	250 s (still air) 25 s (3 m/s)	60 s (still air) 20 s (3 m/s)	IP30 IP30
25 °C: ±3%, 0T50 °C: ±6%	*	250 s (still air) 25 s (3 m/s)	60 s (still air) 20 s (3 m/s)	IP30 IP30
25 °C: ±3%, 0T50 °C: ±6%	0 to 10 V 0 to 10 V	250 s (still air) 25 s (3 m/s)	60 s (still air) 20 s (3 m/s)	IP30 IP30

25 °C: ±3%, 0T50 °C: ±6%	0 to 1 V; 4 to 20 mA		15 s (still air) 10 s (3 m/s)	IP55 IP40
25 °C: ±3%, -10T70 °C: ±5%	0 to 1 V; 4 to 20 mA		15 s (still air) 10 s (3 m/s)	IP55 IP40
	0 to 1 V; 4 to 20 mA	200 s (still air) 60 s (3 m/s)		IP55 IP40
	*	300 s (still air) 120 s (3 m/s)		IP55 IP40
25 °C: ±3%, 0T50 °C: ±6%	*	200 s (still air) 60 s (3 m/s)	15 s (still air) 10 s (3 m/s)	IP55 IP40
25 °C: ±3%, -10T70 °C: ±5%	0 to 1 V; 4 to 20 mA 0 to 1 V; 4 to 20 mA	200 s (still air) 60 s (3 m/s)	15 s (still air) 10 s (3 m/s)	IP55 IP40

	*	330 s (still air) 200 s (3 m/s)		IP55 IP54
25 °C: ±3%, 0T50 °C: ±6%	0 to 1 V; 4 to 20 mA 0 to 1 V; 4 to 20 mA	330 s (still air) 200 s (3 m/s)	20 s (still air) 15 s (3 m/s)	IP55 IP54
25 °C: ±3%, -10T70 °C: ±5%	0 to 1 V; 4 to 20 mA 0 to 1 V; 4 to 20 mA	330 s (still air) 200 s (3 m/s)	20 s (still air) 15 s (3 m/s)	IP55 IP54

	-0.3 to 1 V; 4 to 20 mA	200 s (still air) 45 s (water)		IP55 IP67
	-0.3 to 1 V; 4 to 20 mA	200 s (still air) 45 s (water)		IP55 IP67
	-0.3 to 1.5 V; 4 to 20 mA	200 s (still air) 45 s (water)		IP55 IP67



Control devices

The wide range of control units offered by CAREL, including the Infrared Universal series humidistats, has been further enriched by the development of Clima, the new thermostat/humidistat for residential use, with built-in temperature and humidity sensor.

The new Clima allows the complete management of residential heating/cooling and humidification/dehumidification systems, with dedicated ON/OFF or proportional outputs and the automatic day/night function.

The ir Universal controllers, available with 1, 2 or 4 outputs and with 9 control programs saved and pre-configured, allow all types of control actions to be developed for the management of CAREL humidifiers. The humidistats are also ready for network connection via a serial board (except for model IR32V*H).

Advantages

- extremely compact dimensions;
- high reliability;
- simple wiring;
- excellent versatility;
- ease of use.



IR32 and IRDR: universal humidistats with 1, 2, 4 outputs

IR32V*, IR32W*, IR32Z*
and IRDRV*, IRDRW*, IRDRZ*

These ir Universal series models can be connected to any transducer able to supply a current (0 to 20 mA or 4 to 20 mA) or voltage signal (0 to 1 Vdc) for the measurement and control of physical values such as the temperature, pressure and humidity.

The models with voltage inputs, using the additional CONV0/1000 module, can also accept transducers with a 0 to 10 Vdc output signal. They feature one digital input (two in the DIN rail version) that can be configured to manage functions such as remote ON/OFF or the variation of the set point from external timer or switch. The models with 2 or 4 outputs (IR**W*, IR**Z*) allow the rotation of the outputs, an especially useful function for optimising the operating hours of a series of humidifiers managed in cascading.

IR32D*, IR32A*, IRDRA*

These ir Universal series controllers can be connected to any transducer able to supply a current (0 to 20 mA or 4 to 20 mA) or voltage signal (0 to 1 Vdc) for the measurement and control of physical values.

The models with voltage inputs, using the additional CONV0/1000 module, can also accept transducers with a 0 to 10 Vdc output signal. The fundamental characteristic of this series is the possibility to control the commonly available solid state relays or alternatively the optional CAREL modules (CONVONOFF0 and CONV0/10A0).

Each output can be connected to a different module CONV*, thus allowing the management of mixed configurations (relay, 0 to 10 Vdc, 4 to 20 mA, solid state relay).

Clima

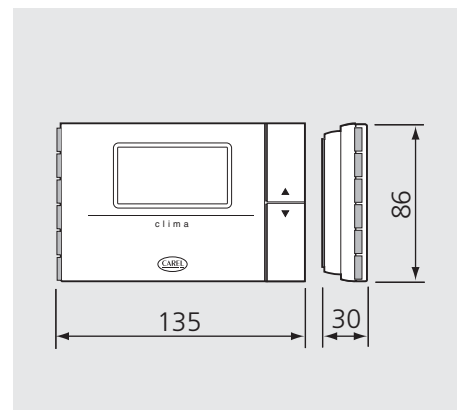
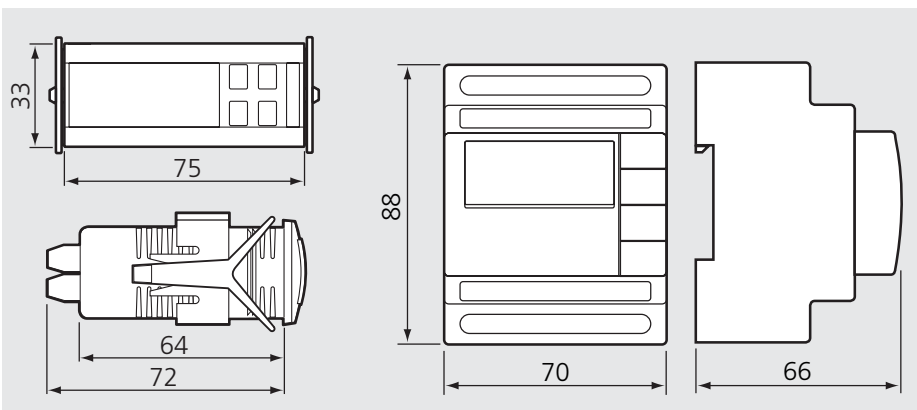
ADC*

The new room humidistat with built-in humidity sensor, or remote sensor for applications, is fitted with an LCD with alphanumeric characters and icon graphics for simple use. The 24 Vac supply allows direct connection to the humidifier without the need for additional transformers.

The functions that can be selected range from simple thermostat and humidistat with ON/OFF or modulating logic, to the management of temperature and humidity with compensation, using an external sensor.

The built-in clock allows the automatic management of an ON and OFF period over a 24 h interval. The same function can be managed by an external timer, by the digital input which, alternatively, can be used for the alarm signal from the humidifier.

In the hotel type applications, the LOCK terminal function, selectable by parameter is very useful, as it allows the terminal to be locked at various levels.



**СИСТЕМА СЕРТИФИКАЦИИ ГОСТ Р
ГОССТАНДАРТ РОССИИ**

СЕРТИФИКАТ СООТВЕТСТВИЯ

№ РОСС ИТ.АЯ46.В19732
Срок действия с 19.04.2005 г. по 19.04.2007 г.

8674765

ОРГАН ПО СЕРТИФИКАЦИИ РОСС RU.0001.11АЯ46
ПРОМЫШЛЕННОЙ ПРОДУКЦИИ РОСТЕСТ-МОСКВА
Юридический адрес: 119048, Москва, ул. Жиганя, д.14, стр.1
Почтовый адрес: 117418, Москва, Нахичеванский проспект, д. 31. Телефон (095)129-28-00

ПРОДУКЦИЯ
Увлажнители воздуха "Carel"
Модели: SD, homeSteam (UE), humidSteam (UE), heaterSteam (SR), ultimateSteam (DS), humidFog (UA), MC, HumiDisk (HCU)
Серийный выпуск

код ОК 005 (ОКП): 51 3871

СООТВЕТСТВУЕТ ТРЕБОВАНИЯМ НОРМАТИВНЫХ ДОКУМЕНТОВ
ГОСТ Р ИСО 90204-1-99, ГОСТ 12.1.003-83, ГОСТ 12.2.028-84

код ТН ВЭД: Россия 8416 82 890 0

ИЗГОТОВИТЕЛЬ
Фирма "CAREL s.p.a."
Via dell'Industria, 11 - 35020 Brugine-Padova, Италия

СЕРТИФИКАТ ВЫДАН
Фирма "CAREL s.p.a."
Via dell'Industria, 11 - 35020 Brugine-Padova, Италия

НА ОСНОВАНИИ
Протокол испытания № 128/283 от 18.04.2005 г. Испытательный центр промышленной продукции "Ростест-Москва" (рег. № РОСС RU.0001.21АЯ43 от 30.12.2003 г.)

ДОПОЛНИТЕЛЬНАЯ ИНФОРМАЦИЯ
Маркировка: Продукция по ГОСТ Р 50460-92

Руководитель органа: *И.И. Герман*
Эксперт: *О.М. Круглова*

Сертификат имеет юридическую силу на всей территории Российской Федерации

**СИСТЕМА СЕРТИФИКАЦИИ ГОСТ Р
ГОССТАНДАРТ РОССИИ**

СЕРТИФИКАТ СООТВЕТСТВИЯ

№ РОСС ИТ.МГ01.В01331
Срок действия с 09.12.2003 г. по 09.12.2006 г.

№ 5697616

ОРГАН ПО СЕРТИФИКАЦИИ РОСС RU.0001.11МГ01
ВИНИНМАШ. ОРГАН ПО СЕРТИФИКАЦИИ БЫТОВЫХ АППАРАТОВ И ТЕХНОЛОГИЧЕСКОГО
ОБОРУДОВАНИЯ, РАБОТАЮЩИХ НА ГАЗООБРАЗНОМ, ЖИДКОМ И ТВЕРДОМ
ВИДАХ ТОПЛИВА (ОС БТА) Тел.: 256-54-03

123007 г. Москва, ул. Шенюгина, 4.

ПРОДУКЦИЯ
ГАЗОВЫЕ ПАРОГЕНЕРАТОРЫ (увлажнители воздуха) низкого
давления марки «aSteam» моделей: UG040..., UG090..., UG180...
Природный газ по ГОСТ 5542 и сжиженный газ по ГОСТ 20448.
Серийный выпуск.

код ОК 005 (ОКП): 48 6341

СООТВЕТСТВУЕТ ТРЕБОВАНИЯМ НОРМАТИВНЫХ ДОКУМЕНТОВ
ГОСТ 12.2.096-83 (п.п. 1.8; 1.11 - 1.13; 3.16);
ГОСТ 20548-87 (п. 1.4);
ГОСТ 21204-97 (п.п. 4.2.1 - 4.2.9; 4.2.11 - 4.2.15; 4.5.2; 4.5.5; 4.5.6; 4.6;
5.5; 5.12).

код ТН ВЭД: 8402 19 100 9

ИЗГОТОВИТЕЛЬ
«CAREL S.p.A.»
Via dell'Industria, 11 - 35020 Brugine, Padova, Italy

СЕРТИФИКАТ ВЫДАН
«CAREL S.p.A.»
Via dell'Industria, 11 - 35020 Brugine, Padova, Italy

НА ОСНОВАНИИ
Сертификата соответствия системы качества требованиям UNI EN ISO 9001 № 9115.CAR.1 от 10.06.1996 г., выданного CISQ.
Протокола № 82-7-03 от 04.12.2003 г. Испытательного центра АНО «ГАЗСЕРТ».
Регистрационный номер РОСС RU.0001.21МГ02 от 17.01.2002 г.
193019, г. Санкт-Петербург, ул. Проф. Качалова, 3.

ДОПОЛНИТЕЛЬНАЯ ИНФОРМАЦИЯ
Продукция маркируется Знаком соответствия по ГОСТ Р 50460-92 на фирменной табличке,
вручную в процессе эксплуатации, на упаковке.
Сфера сертификации: 3

Руководитель органа: *А.С. Пальчиков*
Эксперт: *Н.М. Подольнов*

Сертификат имеет юридическую силу на всей территории Российской Федерации

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ZERTIFIKAT

Zertifikat

No.: Z1A 02 06 16006 016



Carel S.p.A.
Via dell'Industria, 11
I - 35020 Brugine (PD)

mit der(n) Fertigungsstätte(n)
16006

ist berechtigt, nachfolgend genanntes Produkt mit dem „TUV Mark P“ wie umseitig abgedruckt zu kennzeichnen. Mit diesem Zertifikat wird auch die Übereinstimmung des geprüften Produktes mit den Anforderungen des deutschen Gerätesicherheitsgesetzes in der Fassung vom 23. Oktober 1992 bescheinigt. Das Produkt kann auch mit dem TÜV Product Service GS-Zeichen A oder B gekennzeichnet werden. Umseitige Hinweise sind zu beachten.

Produkt: Klimageräte (Luftbefeuchter)

Modell: UMXXXXD000
wo XXX = Danioferzeugung: 001, 003
wo Y = Steuerung: C

Kenndaten: Nennspannung: 230 VAC (1ph)
Nennfrequenz: 50/60 Hz
Nennaufnahme: von 1.12 bis 2.4 kW
Schutzklasse: I
Schutzart: IP 20
Nenn dampferzeugung: von 1.5 bis 3.2 Kg/h

Das oben genannte Produkt wurde auf freiwilliger Basis auf die Einhaltung der folgenden grundlegenden Anforderungen geprüft:
EN 60335-2-88:1997

Bericht Nr.: SIC01011.02, E-(Z1A 01 05 16006 009)

Freigegeben mit der obigen Zertifikatsnummer durch die Zertifizierstelle von TÜV PRODUCT SERVICE GMBH.



Abteilung: TECIT / an
Datum: 12-06-2002 *[Signature]*

ZERTIFICADO

Certificate

No.: Z1A 03 04 16006 018



Carel S.p.A.
Via dell'Industria, 11
I - 35020 Brugine (PD)
with production facility(ies)
16006

is authorised to label the following product with the „TUV Mark P“ as shown overleaf. This certificate also covers the compliance of the tested product with the German Equipment Safety Law requirements of October 23, 1992. The product can also be labelled with the TÜV Product Service GS-Mark A or B. See also notes overleaf.

Product: Air conditioning equipment (Humidifiers)

Model: URXXXXDZZZ, URXXXXKZZZ, URXXXXLZZZ
Where XXX = instant rated steam production: 002 to 060
Where Y = type of control: C, H or T
Where ZZZ = client personalization (not involving safety)
Where D, K, L = 230V 1ph version (D), 230V 3ph version (K), 400V 3ph version (L)

Parameters: Rated voltage: 230V (1ph), 230V (3ph), 400V (3ph)
Rated frequency: 50/60 Hz
Rated power: from 1.8 to 45.3 kW
Protection class: I
Degree of protection against liquid: IP20
Vapour capacity: from 2.4 to 60.5 Kg/h

This certificate replace also the certificate Z1A 02 06 16006 015

The compliance of the above-mentioned product with the following essential requirements was tested on a voluntary basis:
EN 60335-2-88:2002

Report No.: SIC03040.01, E-(Z1A 02 06 16006 014)



Released with the above certificate number by the Certification Body of TÜV PRODUCT SERVICE GMBH.

Department: TECIT / mm
Date: 2003-06-27 *[Signature]*

Translation of the German original

ZERTIFIKAT

CERTIFICATE

No. Z1A 04 03 16006 019



Holder of Certificate: CAREL S.p.A.
Via dell'Industria, 11
35020 Brugine (PD)
Italy

Certification Mark:




Product: Air conditioning equipment

The product was tested on a voluntary basis and complies with the essential requirements. It meets the requirements of May 11, 2001 of the German Equipment Safety Law. The certification marks shown above can be affixed on the product. See also notes overleaf.

Test report no.: SIC03175.01

Date: 2004-03-10 *[Signature]*



Page 1 of 2

TÜV PRODUCT SERVICE GMBH • Zertifizierstelle • Ridlerstrasse 65 • D-80339 München
Gruppe TÜV Süddeutschland

TUV

PRODUCT SERVICE

Intertek ETL SEMKO

AUTHORIZATION TO MARK

This authorizes the application of the Certification Marks shown below to the Product Covered (also to the multiple listed model identified on the correlation page of the Listing Report where applicable) when made in accordance with the Description and under the conditions set forth in the Certification Agreement and Listing Report:

Applicant: Carel S.p.A.
Via dell'Industria, 11
35020 Brugine (PD) - ITALY

Contact: Name: Miss Sara Caccioneello Phone: +39 049 971 66 11

Manufacturer: Same as applicant

Party Authorized To Apply Mark: Same as Manufacturer

Report Issuing Office: INTERTEK Campofornido (Udine), ITALY

Report No.: 0011208

Product Covered: Humidifier series, models:

- U.E. followed by 001, 001, 007 or 009 followed by H or P, followed by U or D followed by 0, followed by two alphanumeric characters.
- U.E. followed by 001 followed by H or P, followed by W, K or M followed by 0, followed by two alphanumeric characters.
- U.E. followed by 005, 008, 010, 013, 023, 025 or 043 followed by H or P, followed by W, K, M or N, followed by 0, followed by two alphanumeric characters.
- U.E. followed by 063 followed by H or P, followed by M or N, followed by 0, followed by two alphanumeric characters.
- U.E. followed by 090 or 130, followed by H, followed by M or N, followed by 0, followed by two alphanumeric characters.

Description: Products covered are permanently connected electrode type steam humidifiers. All units are provided with back flow prevention device. Models have provisions for mounting to an ordinary brick wall or other equivalent structure. The humidifier is to be connected to a branch circuit equipped with a manually operated nonlocking circuit breaker or safety switch (not furnished as part of the humidifier).

Standard(s): Standard for Safety for Humidifiers, ANSI/UL 998, Issue 2001/11/17, ILSA Rev: 2003/06/21 & Humidifiers General Instruction No. 1, CSA C22.2 No. 104, Issue 1993/01/01 Rev: 1999/01/01, (R1999)

This document is the property of Intertek Testing Services and is not transferable. Only the Applicant may reproduce this document. The certification mark(s) may be applied only at the above noted location of the Party Authorized To Apply Mark.



Authorized by: *William T. Starr* Date: 22 June 2005
Eira Sopanen for
William T. Starr, Certification Manager

Control Number: 3011208

Intertek Testing Services NA Inc.
165 Main Street, Cortland, NY 13843
Telephone 800-345-3851 or 607-753-8711 Fax 607-756-6699

Intertek ETL SEMKO

AUTHORIZATION TO MARK

This authorizes the application of the Certification Marks shown below to the Product Covered (also to the multiple listed model identified on the correlation page of the Listing Report where applicable) when made in accordance with the Description and under the conditions set forth in the Certification Agreement and Listing Report:

Applicant: Carel S.p.A.
Via dell'Industria, 11
35020 Brugine (PD)
ITALY

Contact: Name: Miss Sara Caccioneello Phone: +39 049 971 66 11

Manufacturer: Same as applicant

Party Authorized To Apply Mark: Same as Manufacturer

Report Issuing Office: INTERTEK ETL SEMKO Campofornido (Udine), ITALY


Report No.: 0051017

Product Covered: UR followed by 020 or 027, followed by C, H or T, followed by W, K, M or N, followed by 0 or 1 followed by 0 and one digit.
UR followed by 040 or 060, followed by C, H or T, followed by M or N, followed by 0 or 1 followed by 1 and one digit.

Description: The products covered by this Report are permanently connected humidifiers

Standard(s): Standard for Safety for Humidifiers, ANSI/UL 998, Issue 2001/11/17
Ed:4 Rev: 2003/06/21 & Humidifiers General Instruction No. 1, CSA C22.2 No. 104, Issue: 1993/01/01 Rev: 1999/01/01, (R1999)

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Authorized by: *Eira Sopanen* Date: 31 March 2005
Eira Sopanen for
William T. Starr, Certification Manager

Control Number: 3011209

Intertek Testing Services NA Inc.
165 Main Street, Cortland, NY 13843
Telephone 800-345-3851 or 607-753-8711 Fax 607-756-6699

Intertek ETL SEMKO

AUTHORIZATION TO MARK

This authorizes the application of the Certification Marks shown below to the Product Covered (also to the multiple listed model identified on the correlation page of the Listing Report where applicable) when made in accordance with the Description and under the conditions set forth in the Certification Agreement and Listing Report:

Applicant: Carel S.p.A.
Via dell'Industria, 11
35020 Brugine (PD)
Italy

Contact: Name: Miss Sara Caccioneello Phone: +39 049 9716611

Manufacturer: Ecoflam S.p.A.
Via Roma, 64
31021 Sasans (TV)
Italy

Party Authorized To Apply Mark: Same as Manufacturer

Report Issuing Office: INTERTEK Campofornido (Udine), ITALY


Report No.: 10336023

Product Covered: Gas-Fired Humidifier models: UG090HD, UG180HD

Description: The product covered in this report is a 250 Vac - 60 Hz, single phase Gas-Fired Humidifier intended to be installed indoors. Appliance is suitable for use with Natural gas or Lp-gas but is not convertible and is to be factory set for use with Natural gas or Lp-gas and it is to be factory marked for operation with the specific gas (See markings N°8-15). Unit is to be connected to a standard humidistat and vented outside of the building. Unit is to be operated at atmospheric pressure.

Standard(s): Gas-Fired Humidifiers (IAS 12-94; Dated August 4, 1995)

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Authorized by: *Eira Sopanen* Date: 22 December 2004
Eira Sopanen for
William T. Starr, Certification Manager

Control Number: 3036906

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CE 0085



EG-Baumusterprüfbescheinigung
EC type examination certificate

CE-0085BM0395
Produkt-Identifikationsnummer
product identification no.

Anwendungsbereich field of application	EG-Gasgeräte-Richtlinie (90/396/EWG) EC Gas Appliances Directive (90/396/EEC)
Zertifikatinhaber owner of certificate	CAREL S.r.l. Via dell'Industria, 11, I-35020 Brugine (PD)
Vertreiber distributor	CAREL S.r.l. Via dell'Industria, 11, I-35020 Brugine (PD)
Produktart product category	Heiz- oder Klimaaggregate: Absorptionsklimagerät (3661)
Produktbezeichnung product description	Gasbefeuchter Raumluftbefeuchter in modulierender Betriebsweise mit Gas-Luft-Verbundregelung und geschlossener Brennkammer
Modell model	Gasbeam...
Bestimmungsländer countries of destination	AT, BE, CH, CZ, DE, DK, ES, FI, FR, GB, GR, HU, IE, IS, IT, LU, NL, NO, PT, SE
Prüfberichte test reports	Baumusterprüfung: GB42003E4 vom 05.11.2004 (TRG) Baumusterprüfung: GB42003E3 vom 05.11.2004 (TRG)
Prüfgrundlagen basis of type examination	EU/90/396/EWG (29.06.1990) DIN EN 483 (01.06.2000)- in Anlehnung
Aktenzeichen file number	05-0085-GER

08.02.2015
Handwritten signature

DIN EN 483
DIN EN 483 (01.06.2000)- in Anlehnung



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des Gas- und Wasserfachmännern
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Concept: CAREL
Photo: **Salmaso Foto (PD)**
Styling: CAREL

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