CAREL

air humidification and evaporative cooling solutions

isothermal humidification

heaterSteam

precision and reliability for all types of applications

carel.com

heaterSteam
electric heater humidifier

Reliable and precise humidification for high-tech applications. Precise modulation of steam production ensured by PWM system with built-in humidity controller, or temperature controller for wellness applications.

- models for steam production from 2 to 60 kg/h;
- precise control on set point, ±1% RH
- modulation from 0 to 100% of rated capacity;
- operates on drinking water from the mains, or demineralised water when needing to minimise periodical cleaning.

Immersed heater humidification represents the ideal solution when:

- humidity needs to be controlled with high precision (museums, laboratories, cleanrooms, data centers);
- needing to minimise periodical cleaning (with demineralised water)
- maximum hygiene is required (hospitals, pharmaceuticals industry)
- water quality is not constant over time or is problematic (for example, aboard ships).

Reliability

Embedded PTC temperature sensors protect the heaters against overheating

Precision

Precise control on the set point of ±1% RH and modulation from 0 to 100% of rated capacity.

Hygiene

Maximum hygiene guaranteed by the materials used. AISI304 steel cylinder.

Immersed heater humidifiers can operate on demineralised water.
Periodical maintenance can thus be reduced considerably, due to minimum scaling.

The heaters must be completely immersed in the water at all times, to avoid overheating.
Immersed heater humidifiers thus require level sensors to ensure complete heater immersion, as well as components (solid state relays) to modulate the quantity of heat delivered to the water so as to precisely control steam flow-rate.

These features mean heater humidifier operation is independent of water quality, while ensuring very precise flow-rate modulation.

The CAREL solution provides quality construction and top-level performance, meaning high reliability over time and extremely precise control for more difficult applications.

Controllers

Three different types of control are available:
- C: ON/OFF controller;
- H: built-in humidity controller;
- T: built-in temperature controller for stand-alone applications (for example, steam baths).

Type C: ON/OFF controller

The humidifier operates at 0% or 100% of maximum production, which can be set to 30%, 50%, 75% or 100% of rated capacity.

Type H: built-in humidity controller

The type H heaterSteam can be configured at any time to operate in the following modes:
- proportional to an external signal from BMS (0 to 1 V, 0 to 10 V, 2 to 10 V, 0 to 20 mA, 4 to 20 mA);
- modulating, based on an external humidity probe, and, where necessary, a limit probe in the duct.

Type T: built-in temperature controller

This operates in the same way as model H, with the difference that steam production is controlled based on temperature (ideal for steam baths).

For models H and T, steam flow-rate modulation is linear from 0 to 100% of maximum flow-rate, giving a precision of ±1% RH even with a high number of air changes.
Preheating (available on models H and T) keeps the water at a set temperature between 70 and 90 °C for instant steam production.

Strengths

	Objective	Feature
✓	Heater reliability	Heaters with die-cast aluminium housings
✓	Easy maintenance: non-stick and corrosion-proof	Niflon heater coating
✓	Protection against overheating and scale detection	PTC probe embedded in each heater
✓	Precision	Continuous capacity modulation from 0 to 100%.Precision of ±1% RH
✓	Avoid condensate in duct/AHU	Modulating limit probe input
✓	Avoid droplets forming	Patented Anti-foaming System.
✓	Rapid response for production	Preheating system

Easy maintenance

Large, flat heaters with Niflon non-stick coating for easy descaling

Flexibility

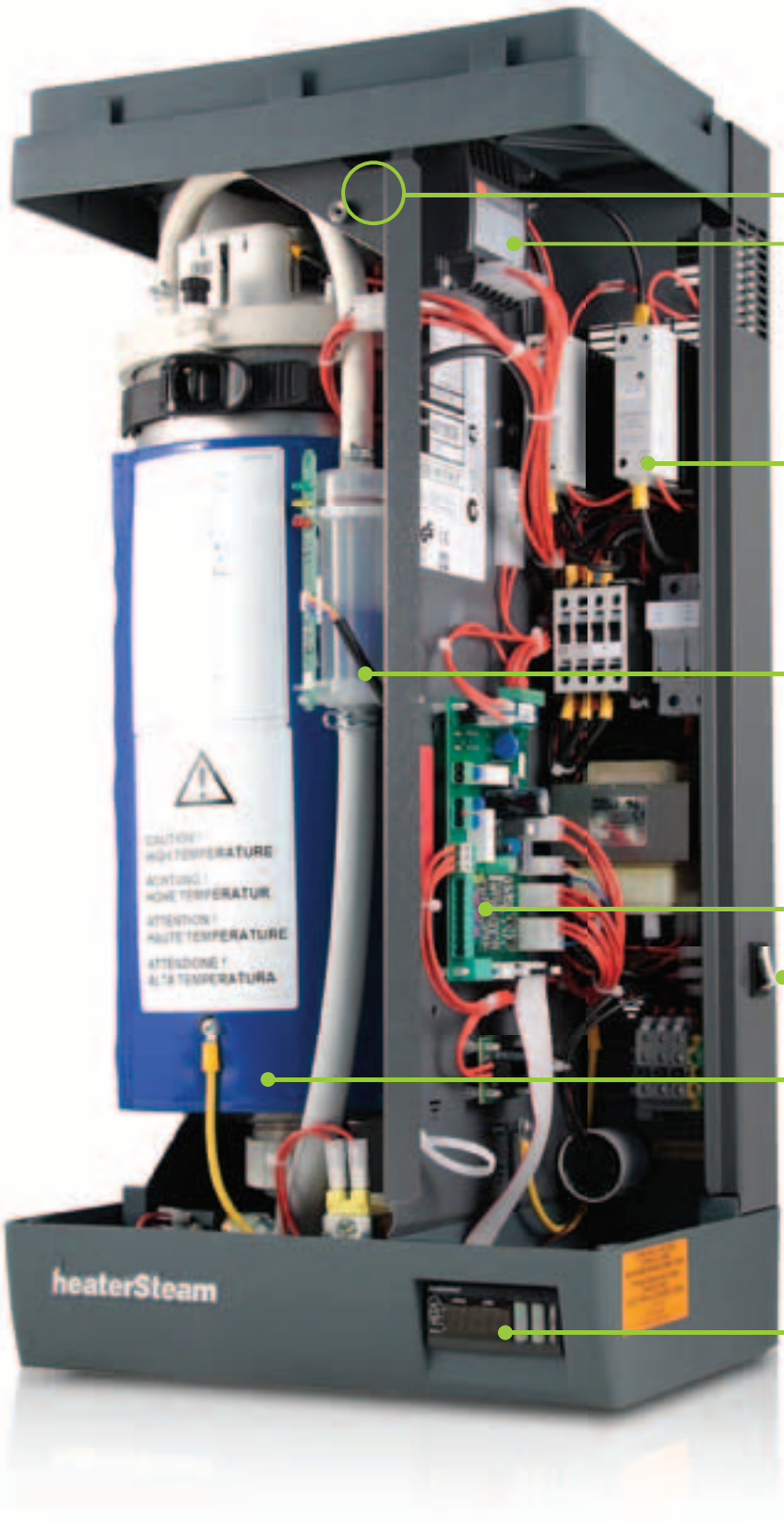
Can be used with both mains water and demineralised water.

Completeness of range

Three types of controllers: ON/OFF, modulating with built-in humidity controller and modulating with built-in temperature controller. Rated capacity from 2 to 60 kg/h.

The avant-garde solution

Ideal for humidifying technological or medical environments, where the maximum purity of steam and extended maintenance-free operation are required.



Feed tank

Conductivity meter: measures water conductivity to optimise management of drain cycles and reduce water wastage

Thermal protector relay: protection against excess heater temperature

Solid state relay (SSR) to modulate steam flow-rate

Level sensor to guarantee complete heater immersion

Main control board

ON/OFF switch and manual water drain switch

Cylinder: AISI304 steel lined with heat insulation

CAREL humicontrol: built-in control unit

Certification

American market

European certification

German certification

Easy maintenance

- heaters coated with Niflon (full-optional model), a non-stick and corrosion-proof material that simplifies cleaning;
- possibility to use demineralised water to minimise scale build-up;
- for models up to 10 kg/h, bag inside the cylinder for removing scale (no additional gaskets required);
- openable cylinder for complete removal of the heaters for cleaning, or cylinder with inspection and cleaning cover (models ≥ 20kg/h);
- drain pump, with access from the front (models ≥ 20kg/h);

Reliability

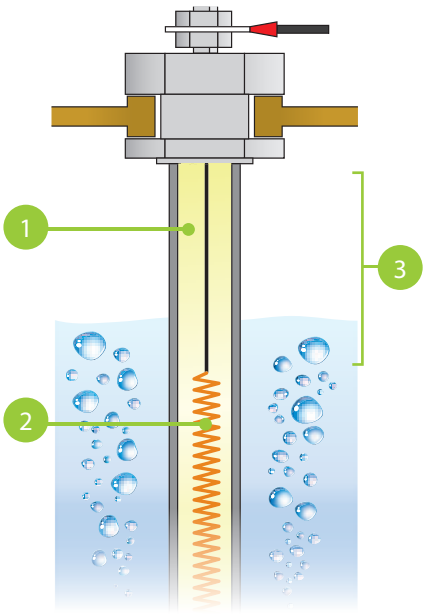
The heaters are embedded in an aluminium alloy to guarantee protection against overheating. If for some reason the heaters are not completely immersed in the water, the aluminium housing guarantees perfect heat distribution across the entire surface of the heater.
The heater temperature control system uses a PTC probe placed directly on the heating elements. This ensures protection against overheating.
The same system also measures the amount of scale that builds up on the heaters and that reduces heat exchange with the water.
Where necessary, heaterSteam sets off an automatic maintenance alarm (patented Carel system).

In addition:

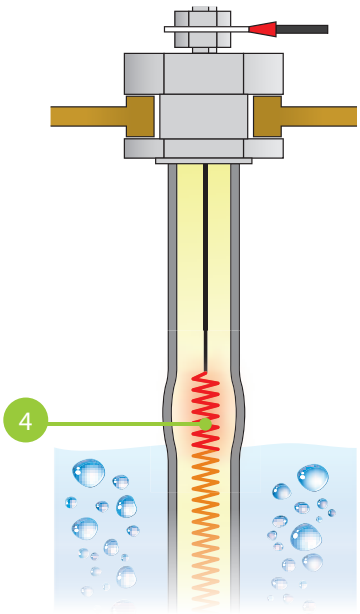
- AISI 304 steel cylinder;
- "Anti Foaming System" algorithm with foam sensor for perfect foam management (Carel patent)
- input for modulating limit probe to avoid condensate formation in the duct (model H);

heater

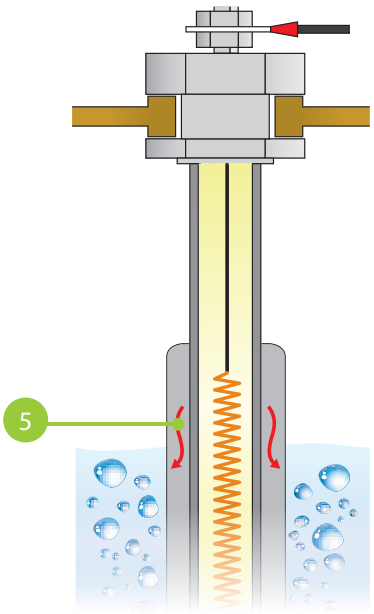
Standard tubular heater



Standard tubular heater, not completely immersed



Heater with aluminium housing, not completely immersed



1 *insulation*

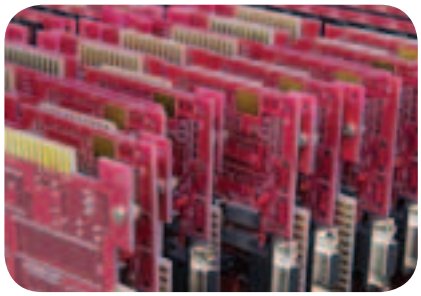
2 *heater*

3 *cold part*

4 *local overheating*

5 *heat redistribution*

Applications



Electronics industry

In the electronics industry, low humidity causes potential accumulation of static electricity, which can damage electronic components.

Hi-tech microchip manufacturing

As the photoresist viscosity is extremely sensitive to relative humidity, semi-conductor processing requires precise humidity control limits.

Data centers and telecommunications

The heat generated by the computers can easily cause relative humidity to fall below 35%, the limit value to avoid the risk of electrical discharges.

Pharmaceutical industry

The production process requires constant humidity levels. The speed of many chemical reactions in fact depends on relative humidity.

Cleanrooms

Relative humidity is one of the environmental parameters that define the normal operating conditions of a cleanroom, where often the specified tolerances are very strict (even as little as 1%).

Hospitals and operating theatres

Health, well-being, safety and compliance with standards on humidification of hospital wards and operating theatres.

Wellness centres

Steam humidifiers are essential in ensuring the desired air conditions inside steam baths (40-43 °C, 100% RH).

Food industry

Humidification in places where biscuits, pasta and any other hygroscopic materials and ingredients are processed.

Museums

Correct stabilisation of the environment is essential to conserve valuable works of art and objects for long periods of time.

Technical specifications

Specifications	UR002*	UR004*	UR006*	UR010*	UR020*	UR027*	UR040*	UR060*
General								
Rated steam production (kg/h)	2	4	6	10	20	27	40	60
Power consumption (kW)	1,5	3	4,5	7,5	15	22,5	30	45
Power supply (other voltages on request) • 230 Vac -15/10%, 50/60 Hz single-phase • 400 Vac -15/10%, 50/60 Hz three-phase	●	●	● ●	●	●	●	●	●
Steam connection (mm)	Ø 30				Ø 40			2x Ø 40
Steam pressure (Pa)	0 to 1500				0 to 2000			
Number of heaters	1	1	3	3	6	6	6	9
Operating conditions	1T40 °C, 10 to 60% RH non-condensing							
Storage conditions	-10T70 °C, 5 to 95% RH non-condensing							
Ingress protection	IP20							
Water fill								
Connection (mm)	3/4"G male							
Temperature limits (°C)	1T40							
Water pressure limits (MPa - bars)	0.1 to 0.8 - 1 to 8							
Instant flow-rate (l/m)	0.6	0.6	1.2	1.2	4	4	4	10
Total hardness (°fH) (*)	5 to 40							
Conductivity limits (µS/cm) (*)	0 to 1500							
Water drain								
Connection	Ø 40							
Temperature (°C)	<100							
Instant flow-rate (l/m)	5				22.5			
Steam blower								
Number	1							2
Type	VSDU0A*				VRDXL*			
Power supply (Vac)	24				230			
Nominal power (W)	37				35			
Nominal air flow-rate (m3/h)	192				650			
Network								
Network connection	RS485, Modbus® (with Gateway optional)							

(*) heaterSteam can be supplied with completely demineralised water (0 °µS/cm). If supplied with softened water, the minimum hardness value specified must be met, in accordance with the instructions contained in the manual.

Control

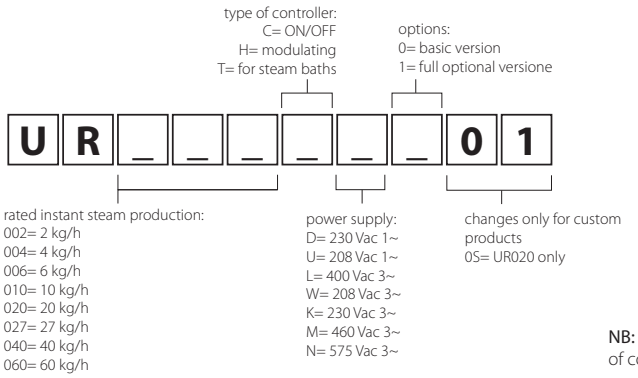
Specifications	C	H	T
Continuous modulation (with SSR)		0 to 100%	0 to 100%
Built-in controller (probes not included)		● (RH.)	● (temp.)
External ON/OFF signal	●	●	●
External proportional signal		●	●
Limit probe supported		●	●
Dehumidification control		●	●
Remote ON/OFF	●	●	●
Alarm relay	●	●	●
Type of signal (probe or external control)		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

Specifications	basic	full option
Heaters embedded in aluminium casting	●	●
Heaters with non-stick coating		●
Heat insulation on cylinder		●
Preheating function	●	●
Descaler bag		up to 10 kg/h

● standard

Unit code



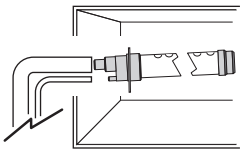
NB: not all the combinations of codes are available.

OVERVIEW DRAWING heaterSteam

room applications

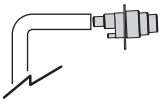
VSDU0A0001 & VRDXL0000: steam blower
VSDBAS0001: remote support for VSDU0A*

duct applications

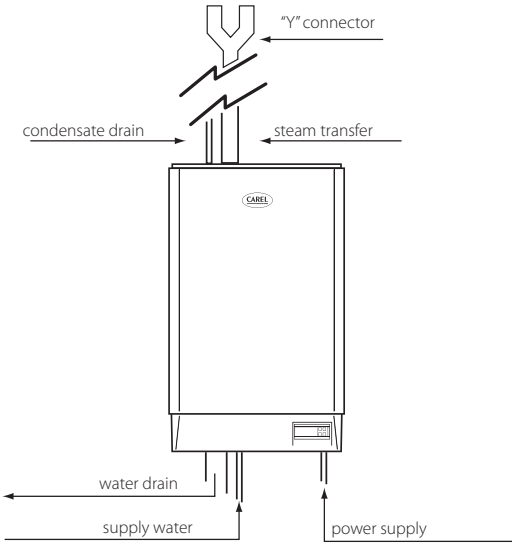


DP*: linear steam distributor (inlet Ø 22 mm, Ø 30 mm, Ø 40 mm)

steam bath applications



SDP*: plastic nozzle up to 15 kg/h steam

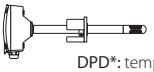


Probes

DPW*: temperature and humidity probe for civil environments

DPP*: temperature and humidity probe for industrial environments

ASET*: temperature and humidity probe for steam baths



DPD*: temperature and humidity probe for ducts

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