

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).

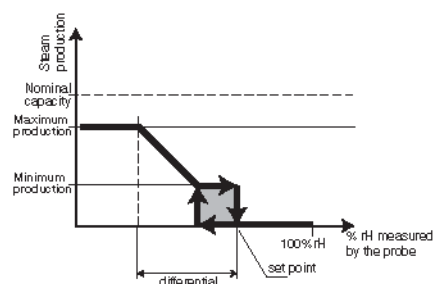
Steam production is modulated linearly from 10 to 100% of the maximum flow-rate (see the graph at the foot of the page), except in ON/OFF mode. heaterSteam type H and T models can accept a wide range of external signals, selected from the keypad: voltage-free contact i.e. humidistat, 0 to 1 V, 0 to 10 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.



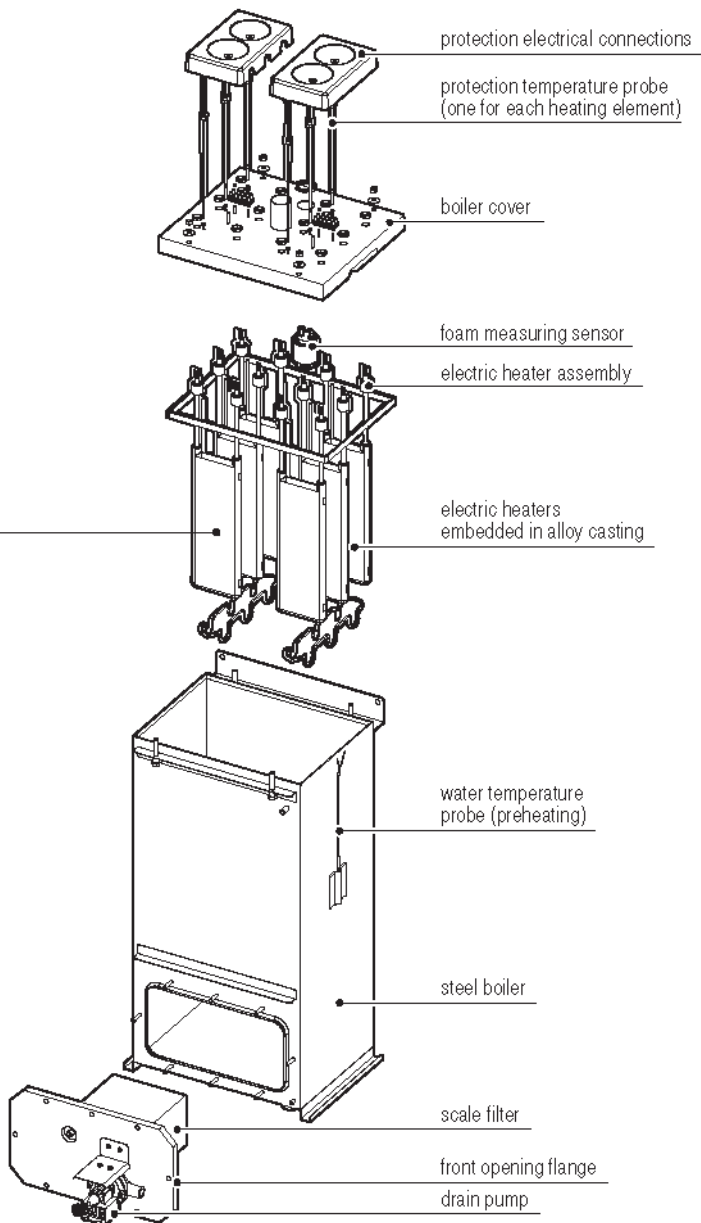
Heaters after 720 operating hours with water at 28 °F hardness (500 $\mu\text{S}/\text{cm}$). No manual cleaning has been performed. The layer of non-stick material assists the spontaneous separation of the lime scale, while the excellent heat conduction of the aluminium alloy avoids any localised overheating.

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.

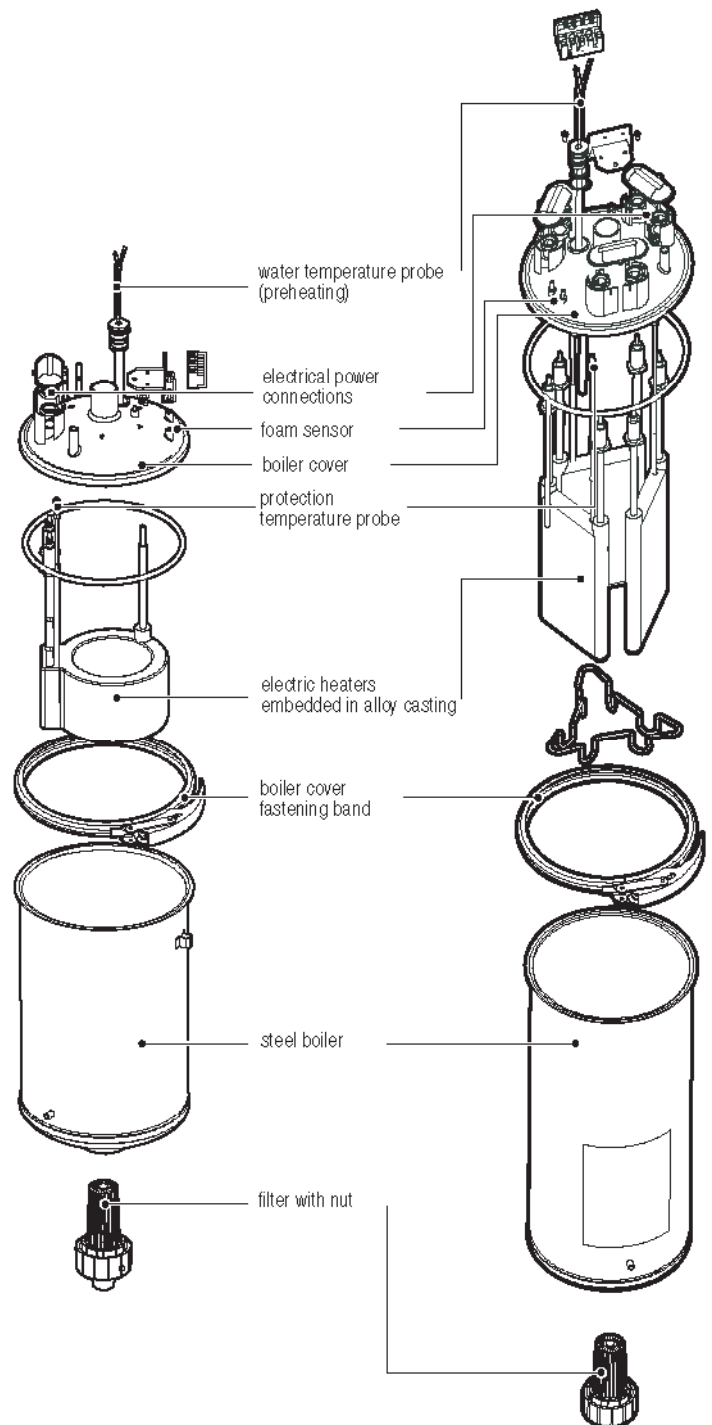


Models with cylindrical boiler

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	-	•	•

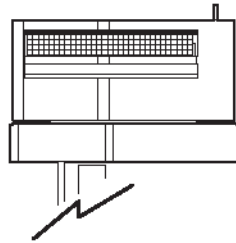
Versions
Heaters embedded in aluminium casting
Heaters with non-stick coating
Heat insulation
Preheating function
Descaler bag

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

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

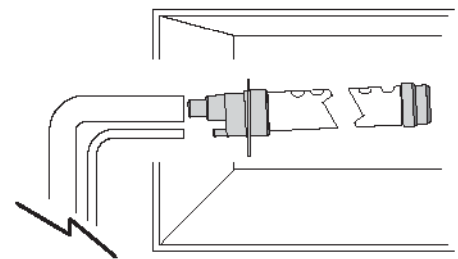
OVERVIEW DRAWING

application in rooms

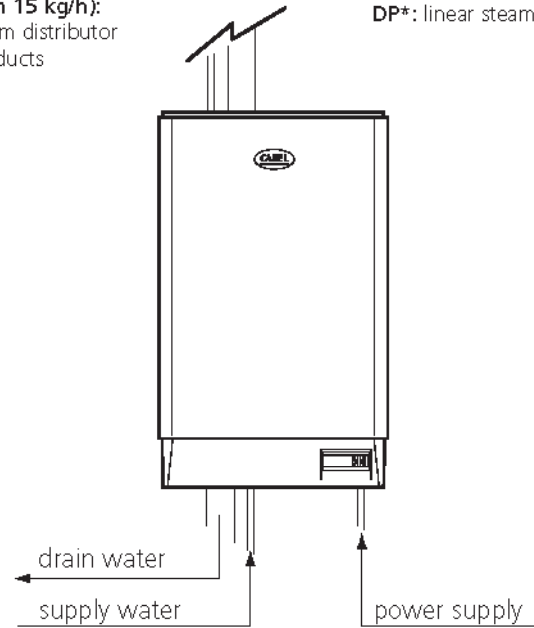


VSDU0A* (up to 15 kg/h)
VRDXL* (from 15 kg/h):
ventilated steam distributor
application in ducts

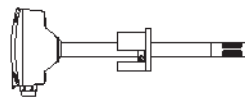
application in ducts



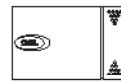
DP*: linear steam distributor



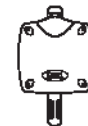
Probes



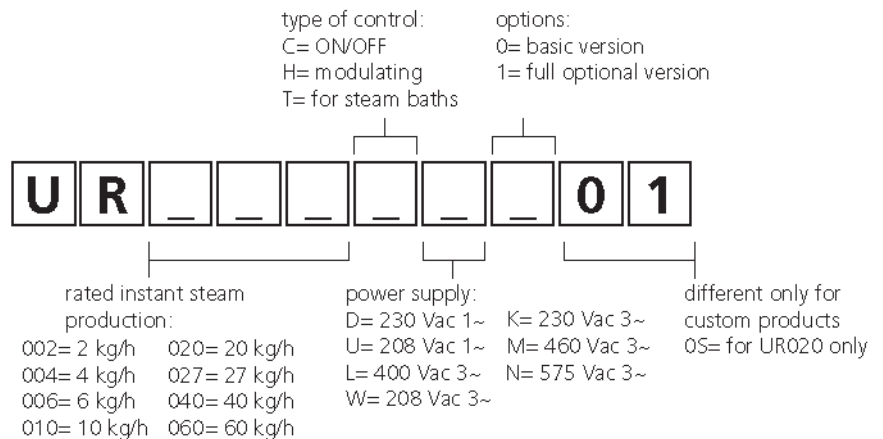
ASD*: temperature and humidity probe for ducts



ASW*: temperature and humidity probe for residential environments



ASPC*: temperature and humidity probe for industrial environments



NB: not all the code combinations are available.