



INSTALLATION KUE HUMIDIFICATION UNIT 9124425



———— KUE Humidification kit



Controller

Terminal

- NOTICE -

This manual is prepared for the use of trained Service Technicians and should not be used by those not properly qualified.

The information presented in this document is only valid for standard Hot Counter Configurations and not intended to be all encompassing. The specifications for custom configurations may differ.

Technical data and specifications are subject to amendment without prior notice.

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Detailed description

This boiler type is based upon the following working description:

The isothermal humidification process consists of the introduction of
- by boiling water - resulting, water vapor into the room air.

This process requires an external energy source to change the physical state of the water.

Because much less vapor mass than air mass is present, the steam is from the air absorbed.

This absorption causes one slight decrease in air temperature.

This Process is considered (though not entirely correct);
"Isothermal humidification".

The steam humidifiers guarantee maximum hygiene security because of the temperature of the steam kills all potentially harmful micro organisms.



Detailed description

Operating principle:

Immersed electrode humidifier manufacture steam by boiling the water contained inside the cylinder.

The heat required to boil the water is produced by passing an electrical current through the cylinder.

This is done by applying a voltage to the electrodes immersed in the water. Initially, when the cylinder is new or has just been cleaned, the current depends almost exclusively on the type of supply water: the more salts in the water, the higher the current, and the required steam production is achieved quicker.

Over time the salt deposits in the cylinder increase (these do not evaporate with the water), helping achieve the rated production. In steady operation, the level of production required is maintained automatically by controlling the current input, adjusting the level of water in the cylinder.

The salts that deposit over time cause the progressive depletion of the cylinder. To avoid excessive accumulation, the humidifier automatically drains and replenishes a certain quantity of water at set intervals.

ON/OFF control:

The action is all or nothing, activated by an external contact that consequently determines the control set point and differential.

The external contact may be a humidistat, whose status determines the operation of the humidifier:

- contact closed: the humidifier produces steam if the remote ON/OFF contact is also closed;
- contact open: the production of steam ends.



Detailed description

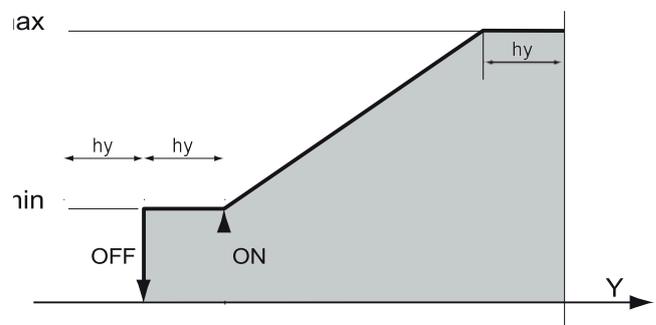
Steam production (proportional control):

The production of steam is proportional to the value of a signal “Y” from an external device.

The type of signal can be selected between the following standards:
0 to 10 Vdc, 2 to 10 Vdc, 0 to 20 mA, 4 to 20 mA.

The maximum production of the humidifier, corresponding to the value maximum of the external signal, can be set from 20% to 100% of the rated value of the humidifier (parameter P0).

The minimum production has an activation hysteresis, hy , equal to 5% of the proportional band of the external signal “Y” ($hy=5%$, non-modifiable).



Supply water conductivity:

Conductivity measurement and alarms.

The conductivity of the supply water is measured by the conductivity meter when the fill solenoid valve is opened (max value measurable 2000 $\mu\text{S}/\text{cm}$).

Two programmable alarm thresholds are available:

- b5: warning threshold (signal only without activating the alarm relay, automatic reset when the condition is no longer present) ;
- b6: alarm threshold (unit shutdown with activation of the alarm relay).

Drain to dilute:

The humidifier automatically drains and replaces some of the water contained in the cylinder, to prevent an excessive concentration of salts following the evaporation process.

The drain pump is opened for a set time whenever the conductivity exceeds the maximum limit; this situation is measured indirectly by evaluating the evaporation speed.

During the automatic draining phase, the electrodes are off, so as to prevent the drain water from carrying current (the display shows 'dr').



Replacing Cylinder Assembly

Turn off the water tap. Empty all the water by pressing the Up and Down button together for 2 seconds, in order to manually drain the water.



Press again for 2 seconds to stop the draining cycle

Turn off the main switch

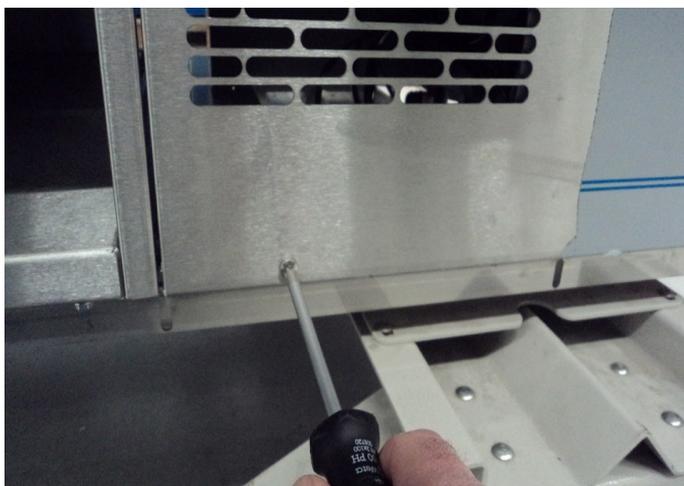
Disconnect the main power



Please take care:

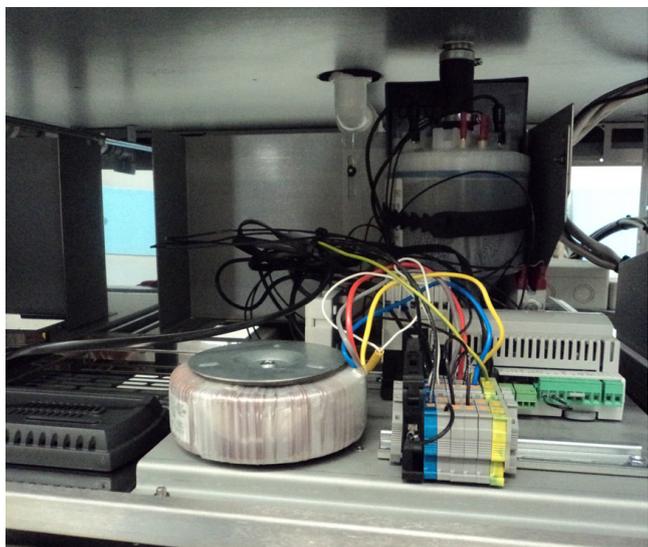
Loosen the screw. (1x)

Take out the back plate and wait for the humidifier and the cylinder to cool down





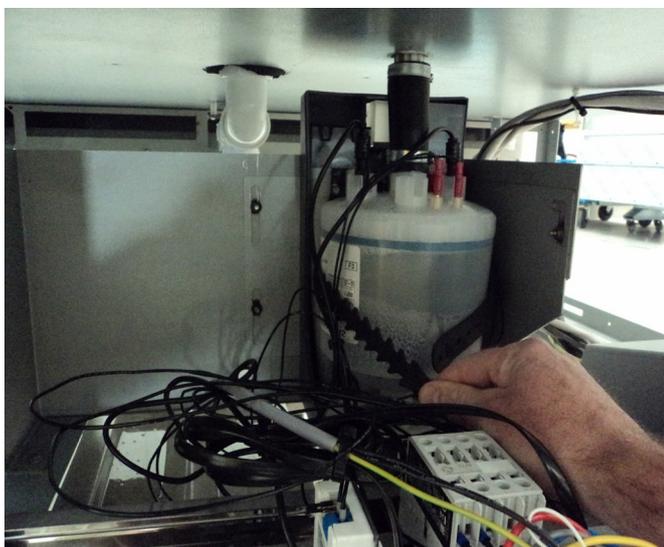
Replacing Cylinder Assembly



Be careful not to damage the internal cables



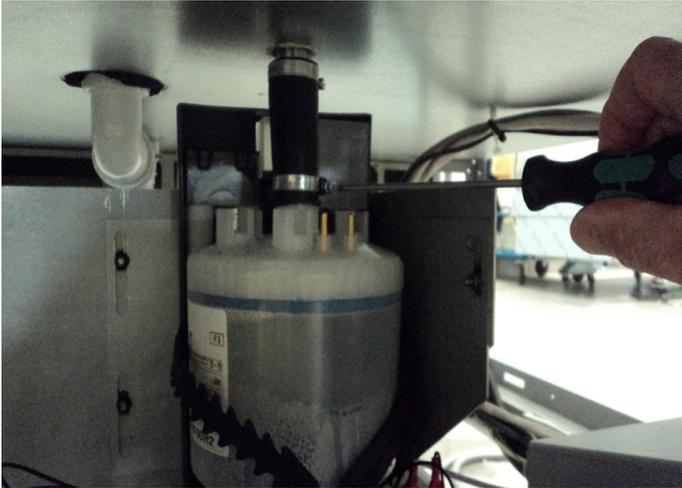
Disconnect all 4 cables from the cylinder



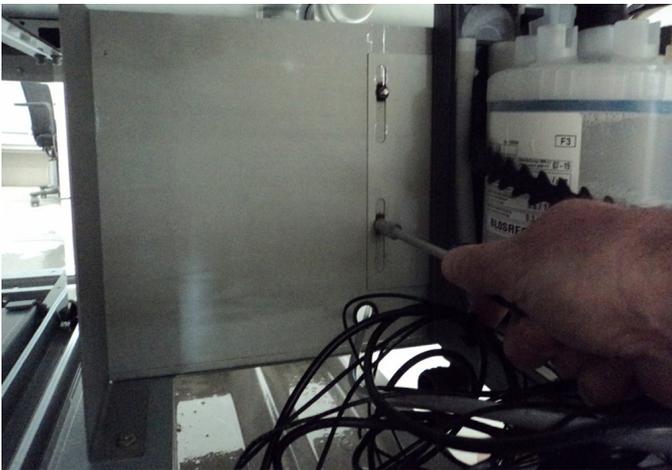
Release the locking device (rubber band)



Replacing Cylinder Assembly



Loosen the hose clamp



Loosen the 3 nuts in order to be able to move the unit downwards



Release the “old” cylinder and lift it to remove.

Put the new cylinder in the same position.
If needed turn in position for the cables to fit in place.

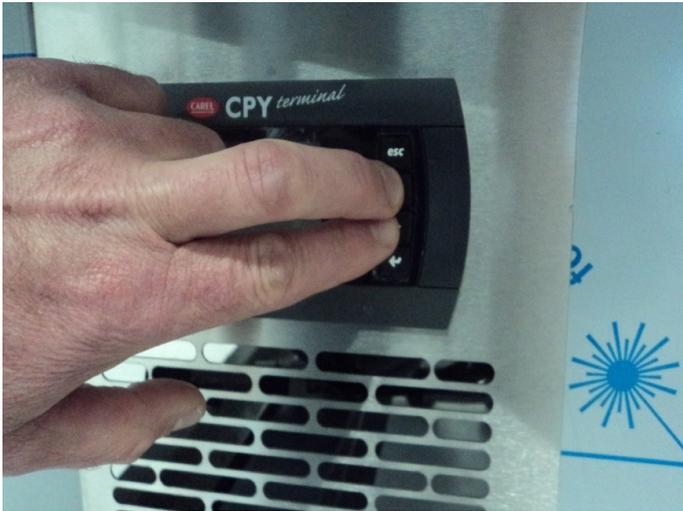
Move the unit upwards and tighten the hose clamp.

Tighten the unit in place with the 3 nuts.

Re - connect 4 cables, tighten the strap.
Put back the back plate (1 screw)



Replacing Cylinder Assembly



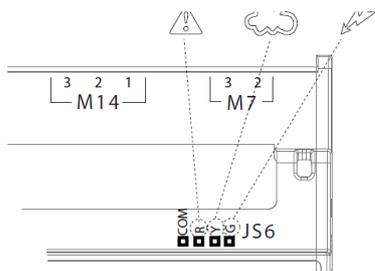
Reset the cylinder hour counter:

- * press the PRG button for 2 seconds
- * Go to 77 by using the UP and DOWN buttons
- * confirm with PRG and use the UP or DOWN button to enter the "dA" parameter.
- * confirm with the PRG button

Activate: "wash new cylinder" procedure by pressing UP + DOWN for 5 seconds



Error messages



Legenda

LED on board	Terminal Symbols	Meaning
(R) Red		alarm active (the alarm can be identified by the type of flashing, see the table of alarms)
(Y) Yellow		steam production in progress(LED always on 100% production, 2 flashes 20%, 3 flashes 30%, ...)
(G) Green		24 Vac power connected

Note: The yellow and red LEDs are active only if the display is disconnected.

Red LED on board (if terminal not connected) (*)	CPY terminal	var. code I89	description	cause	solution	reset (press)	alarm relay activation	action
2 fast flashes	EH	A	1010Hex Excess electrode current: current > maximum limits	Conductivity of the water too high, errata configuration TAM	The water conductivity must be between 75 and 1250 $\mu\text{S}/\text{cm}$. Softening the water may worsen the problem	AUTO	yes	humidif. stopped
				TAM electrical circuit not configured correctly Malfunction in the TAM electrical circuit	Switch unit off and configure TAM jumper. Switch unit on and check if the alarm is repeated. Check the correct operation of the TAM circuit: 1. Check the signal generated by the TAM: this must be between 0-2 Vac. 2. Check the correct connection between the TAM and the board: restore the connection if necessary. 3. Replace the TAM. 4. Replace the board			
3 fast flashes	E0	-	1008Hex Internal memory error	The software or the configuration parameters are corrupted.	Download the correct configuration via humiSet; replace the board.	-	yes	humidif. stopped
4 fast flashes	E1	-	1004Hex Configuration parameter error.	The configuration parameters are corrupted		-	yes	humidif. stopped
5 fast flashes	EC	$\mu\text{S}/\text{cm}$	1002Hex Conductivity of the water too high. The alarm occurs: • After 1 hour if conductivity > b6 for more than 1 hour, OR • Immediately if conductivity > 3x b6	High water conductivity alarm threshold.	Increase the high water conductivity alarm threshold with parameter "b6".	AUTO	yes	signal only humidif. stopped
				Conductivity of the water higher than 1250 $\mu\text{S}/\text{cm}$.	Treat the supply water with RO and ensure the minimum supply water requirements (see the KUE manual). The water conductivity must be between 75 and 1250 $\mu\text{S}/\text{cm}$. Softening the water may worsen the problem.			
				Conductivity probes short-circuited.	Clean the probes			
				Malfunction in the conductivity meter electrical circuit	a. Check the correct operation of the conductivity meter electrical circuit: 1. Check the electrical connections between the conductivity meter and the board: if necessary, restore the connection. 2. Replace the conductivity meter/fill tank. 3. Replace the board. 4. Replace the board..			



Error messages

Red LED on board (if terminal not connected) (*)	CPY terminal	var. code l89	description	cause	solution	reset (press)	alarm relay activation	action	
6 fast flashes	E2		3010Hex	memory backup fails	internal memory error	if the problem persists, contact the CAREL service center	--	no	signal only
7 fast flashes	CY		3001Hex	Maintenance time expired. This is displayed when: hour counter > bb (default 3000 hours).	Maintenance time expired.	Replace /clean the cylinder, then set the hour counter to zero via RS485.	ESC	no	signal only
8 fast flashes	Mn		1001Hex	Life timer expired. This is displayed when the hour counter > 1.5xbb (default 1.5x3000 = 4500 h)	Life timer expired.	Replace /clean the cylinder, then set the hour counter to zero.	counter reste	yes	humidif. stopped
2 slow flashes	SU	-	2040hEX	serial disconnected	Cable broken / disconnected / not properly connected after the previous set.	check the connection of electricity and their supervisor	AUTO	si	humidif. stopped if enabling (see "1" 62)
3 slow flashes	EF		2004Hex	No supply water: the humidifier tries to add water but the level inside the cylinder does not increase at the expected speed (the level of water is estimated by the TAM electrical circuit).	Low supply water pressure.	The water supply pressure must be between 0.1 and 0.8 MPa (1-8 bars).	automatic (after 10 minute delay)	yes (in 10 minute delay)	humidif. stopped only for 10 minutes
					Steam hose bent, choked or blocked by condensate: this may cause high backpressure that prevents the water from being filled into the cylinder	Check and reposition/replace			
					Excessive backpressure in the hoses	To check this, switch the unit off, remove the steam hose from the cylinder and switch the unit on: fill water into the cylinder, then reconnect the steam hose.			
					Internal fill hoses bent, choked or blocked	Check and reposition / clean/replace			
					The drain valve leaks	Check and clean			
Fill valve blocked or malfunctioning.	Check the correct operation of the fill valve: 1. Switch the unit off and on again: can the noise of the valve opening be heard? YES: go to "2"; NO: go to "3". 2. Clean/replace. If the internal flow limiter, installed at the valve outlet, is detached from the valve, the water may flow directly to the drain through the fill tank as the flow-rate is too high. If this is the case, replace the valve. 3. Replace the board.								



Error messages

Red LED on board (if terminal not connected) (*)	CPY terminal	var. code I89	description	cause	solution	reset (press)	alarm relay activation	action
4 slow flashes	EP	 	1020Hex Low steam flow-rate during reduced production. The steam flow-rate is estimated by the TAM circuit	Conductivity of the mains water too low.	The water conductivity must be between 75 and 1250 µS/cm.	ESC	yes	humidif. stopped
				Too much foam in the cylinder.	Perform the pre-wash (see "Advanced functions")			
				Excess scale in the cylinder.	Clean/replace the cylinder.			
				TAM electrical circuit not config. correctly. Malfunction in the TAM electrical circuit.	See solution to EF (relating to TAM electrical circuit not configured)			
5 slow flashes	Ed		2008Hex	Drain problem	Check the drain pump and fill connection	ESC	yes	humidif. stopped
					Check that the drain valve is working correctly: 1. Switch unit off; 2. short-circuit M2.5 with M2.6; 3. switch unit on; 4. can noise of the drain valve opening be heard? YES: remove drain valve and clean; NO: replace the valve.			
				Manifold blocked	Remove cylinder and valve and clean manifold.			
				Cylinder filter blocked	Replace the cylinder.			
6 slow flashes	CP		3004Hex The cylinder requires maintenance due to the accumulation of lime scale. The "Cylinder almost depleted" and "Cylinder depleted" warnings can be disabled by b1-parameter	The lime scale limits steam production.	Routine maintenance: check the correct operation of the cylinder, clean it and, if necessary, replace it.	ESC	no	signal only
7 slow flashes	E3	-	2002Hex External control signal not connected correctly (2-10V only); or - for control via serial (variable I62 bit2=1) - no data over 485 serial connection (cable probably disconnected).	Cable broken/ disconnected/ not connected correctly.	Check and connect correctly.	ESC	yes	humidif. stopped
				Incorrect voltage of external control signal.	Set A0 =1; based on external signal set A2 = 0: 0-1V, A2=1 0-10V, A2=2 2-10V, A2=3 0-20mA, A2=4 4-20mA			
8 slow flashes	EU		2001Hex High water level without humidification demand. Alarm ON if the water reaches the high level electrodes when the humidifier is shutdown or disabled (contactor open, fill & drain valves closed)	Leaks from the fill valve.	Check for any leaks from the fill valve and clean/replace	AUTO	yes	humidif. stopped
				High level sensor short-circuited.	If possible, open the cylinder and clean it.			
				Malfunction of the high level sensor electrical circuit .	Make sure the electrical connections between the sensor and the board are correct: reconnect if necessary or replace the board.			



Error messages

Red LED on board (if terminal not connected) (*)	CPY terminal	var. code I89	description	cause	solution	reset (press)	alarm relay activation	action
9 slow flashes	EA 	3002Hex	Foam	Lubricants, solvents, detergents in the supply water (at times the water hoses are dirty after installation).	Wash all water supply hoses thoroughly. The water conductivity must be between 75 and 1250 µS/cm. Softening the water may worsen the problem.	ESC	no	signal only
				Softened water.				
				High level sensor short-circuited. Malfunction of the high level sensor electrical circuit.				
10 slow flashes	CL	3008Hex	Cylinder depleted. The alarm is displayed when the cylinder is almost depleted - and production cannot satisfy demand within 3 hours from the cylinder almost depleted warning. The "Cylinder almost depleted" and "Cylinder depleted" warnings can be disabled by b1-parameter.	The cylinder is full of flakes.	Replace the cylinder	--	no	signal only
none	Pre/ Cln	-		Cylinder cleaning phase started signal		--	--	--
none	dr	-		Cylinder drain in progress		--	--	--
(both codes displayed alternating)	dr / TOT	-		Complete drain due to inactivity		--	--	--
none	AF			Antifoam active		--	--	--

To reset the alarms, press ESC once to mute the buzzer, press ESC a second time to reset the alarm itself.

(*) Fast flash: 0.2 seconds ON and 0.2 seconds OFF; Slow flash: 1 second ON and 1 second OFF (see the alarm diagrams).



Electrical connections

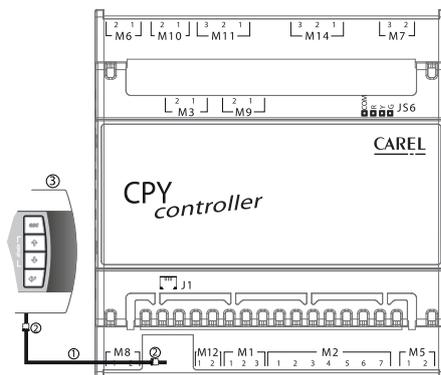


Fig. 2.a

Note: use copper conductors only.

J1 - tLAN connection and 30 Vdc power supply connection for CPY terminal

- ① CAREL telephone cable code S90CONN000, already supplied with the CPY terminal (if other cables are used, do not exceed the length of 10 m (33 ft)⁽¹⁾);
- ② two anti-EMI filters (code 0907858AXX) to be applied at the ends of the telephone cable, if the terminal is installed permanently;
- ③ CPY terminal (CAREL code CPYTERM***).

M8 - Power supply connection

M8.1	In	24 Vac power supply (fit a 1A fast-blow fuse in the line - installer's responsibility)
M8.2	-	G0

24 Vac +10%/ -15%, 10 VA max, excluding solenoid valve

M12 - tLAN network connection 9600 baud (default) / 19200 baud

M12.1	In/Out	tLAN data line
M12.2	-	G0

Maximum cable length: 10 m (33 ft)⁽¹⁾, laid in separate conduits from power cables.

M1 - RS485 network connection 9600 baud (default) / 19200 baud

for CPY*000 e CPY*100

M1.1	In/Out	+
M1.2		-
M1.3		G0

for CPY*200

M1.1	In/Out	Rx - / Tx -
M1.2		Rx + / Tx +
M1.3		G0

Shielded cable, laid in separate conduits from power cables.

Note: maximum shielded cable length: specified by the EIA RS485 protocol, equivalent to European standard CCITT V11, using shielded twisted pair cable, AWG26, 485 input stage impedance 1/8 unit-load (with this configuration, a maximum of 256 devices can be connected) laid in separate conduits from the power cables.

M2 - Control signals (controller & ON/OFF)

M2.1	Out	+15 Vdc for power supply to active probe max 30 mA, protected against temporary short-circuit (max 1 minute)
M2.2	In	Control signal: ON/OFF contact between M2.2 and M2.3: open max 5 Vdc, closed max 7 mA 0 to 10 V & 2 to 10 V: impedance 20kΩ 0 to 20 & 4 to 20mA: impedance 100Ω
M2.3	-	G0

Ensure compliance with the electrical specifications shown in the table above, shielded cable; laid in separate conduits from power cables.



Electrical connections

M2 - Enable operation

M2.4	In	Input from external contact free; max 5 Vdc (open), max 5 mA (closed)
M2.5	In	

Maximum cable length: 10 m (33 ft)(1), laid in separate conduit from power cables.

M2 - Manual drain

M2.6	In	Input from external contact (to G0); max 5 Vdc (open), max 5 mA (closed)
M2.5	In	

Maximum cable length: 10 m (33 ft)(1), laid in separate conduit from power cables.

M2 - Reset 'dA' cylinder hour counter and alarms

M2.7	In	Input from contact; max 5 Vdc (open), max 5 mA (closed)
M2.5	In	

Maximum cable length: 10 m (33 ft)(1), laid in separate conduit from power cables.

M5 - Alarm

M5.1	Out	NO contact (*)
M5.2	Out	

EN60730: 250 Vac 5 A res / 2 A ind (cosφ=0.4) UL: 1 FLA / 6 LRA, C300 P.D. (*) The CPY board can be programmed so that the coil is energised when there are no alarms (see parameter 'b1').

M7 - Current transformer input for measuring immersed electrode current (TAM)

M7.2	In	TAM input
M7.3	In	

Maximum cable length: 10 m, laid in separate conduits from power cables.

M14 - AUX Relay

M14.1	OUT	NC
M14.2		C
M14.3		NO

EN 60730: 250 Vac 8 A res / 2 A ind (cosφ=0.4) UL: 2A FLA / 12A LRA, C300 P.D. (N.O./N.C.)

M11 - Fill and drain water solenoid valve control

M11.1	Out	fill solenoid valve: TRIAC connects 24Vac to ground G0;
M11.2	-	24Vac, max: 0.75 A
M11.3	Out	drain control: TRIAC connects 24Vac to ground G0;

Maximum cable length: 10 m (33 ft)⁽¹⁾

M6 - Drain pump activation

M6.1	Out	NO contact
M6.2		

EN60730: 250 Vac 5 A res / 2 A ind (cosφ=0.4)

UL: 1 FLA / 6 LRA, C300 P.D.

Maximum cable length: 10 m (33 ft)⁽¹⁾ (1)

M10 - Contactor activation contact for immersed electrode voltage

M10.1	Out	NO contact
M10.2		

EN60730: 250 Vac 5 A res / 2 A ind (cosφ=0.4)

UL: 1 FLA / 6 LRA, C300 P.D.

Observe specifications of the loads, lay in separate conduits from power cables.

M14 - Relè aux (ventilated steam distributor or indication of humidifier in production)

M114.1	Out	NC
M114.2		C
M114.3		NO

EN 60730: 250 Vac 8 A res / 2 A ind (cosφ=0.4) UL: 2A FLA / 12A LRA, C300 P.D. (N.O./N.C.)



Electrical connections

M3 - Conductivity meter

M3.1	In		Connection to CAREL conductivity meter
M3.2	In		

Maximum cable length 10 m, laid in separate conduits from power cables.

M9 - High water level sensor

M9.1	In		Connection to CAREL cylinder level sensor
M9.2	In		

Maximum cable length 10 m, laid in separate conduits from power cables.

JS6 - CAREL strip connection for remote LED plate

JS6.1		Out	Common +5 Vdc	_____
JS6.2			Red LED	_____
JS6.3			Yellow LED	_____
JS6.4			Green LED	_____

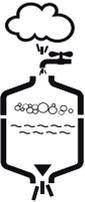
⁽¹⁾ For lengths greater than 10 m (33 ft) use shielded cable with the shield connected to PE both on the terminal side and the controller side.



Symbols on Terminal



Symbols on the terminal

<i>drain</i>	manual cylinder drain	kg/h	steam flow-rate (international system, default)
	power supply (green LED)	set	parameter programming in progress (parameter setup)
	humidifier operating (yellow LED) Flashing: steam production not yet in steady operation Steady: steam production in steady operation		maintenance request (alarm in progress) or display alarm log (HYS)
	alarm activated: LED flashing and buzzer active If an alarm is active pressing ESC mutes the buzzer and the LED comes on steady, pressing ESC again resets the alarms (see Chap. 8)	888	3 digits, after 999 it displays 100 to indicate 1000 (displays three digits with a point at the top between the first and the second digit).
$\mu\text{S/cm}$	conductivity value		steam production in progress
sec	time in seconds		cylinder filling in progress
A	instant current in amperes		foam in the cylinder
h	hours		water present
%	steam production as a percentage of rated capacity		cylinder water drain in progress
	on steady: external fan or steam production active. Flashing: external fan or steam production awaiting start/stop		

Keypad

button	function
Esc	return to the previous display from the main screen: pressed for 5 seconds disables/enables the humidifier
 UP	from the main screen: display the humidification values (current, conductivity,...), from the list of parameters: circular navigation of the parameters and set the values
 DOWN	from the main screen: display the humidification values (current, conductivity,...), from the list of parameters: circular navigation of the parameters and set the values
 ENTER (and PRG)	for 2 seconds: access the list of parameters from the list of parameters: select and confirm (like the "Enter" key on a computer keyboard)



User terminal settings

Accessing and setting the parameters:

The configuration parameters are used to select and control the functions and the status of the humidifier.

From the main screen press:

- ENTER for 2 seconds, enter the password: “77” using the UP or DOWN button,
- ENTER to confirm and access the list of parameters,
- UP or DOWN to scroll the list cyclically,
- ENTER to select a parameter (display: ‘set’),
- UP to modify (increase) the value of the parameter.
To scroll the values faster press UP together with DOWN,
- DOWN: as for UP to decrease the value
- ENTER to save the new value and return to the list of parameters, or ESC to return to the list without saving the new value,

Recalling the manufacturer defaults:

From the main screen press:

ENTER until the password screen is shown:

- Enter the password: 50
- The message dEF is displayed, flashing
Confirm by pressing ENTER or exit by pressing ESC

If no button is pressed for 30 seconds, the display returns to the main screen.



User terminal settings

Parameters: Saving/recalling the user settings:

From the main screen, a copy of the user settings can be saved at any time, and then later recalled.

To save the settings:

From the main screen press:

- ENTER for 2 seconds,
- enter the password 51 using the UP or DOWN button and press ENTER, the message UbP (Backup User parameters) flashes,
- press ENTER: the message -L- is displayed, flashing,
- press UP or DOWN, the message -S- (Save) is displayed, flashing,
- press ENTER to save a copy of the user settings, or press ESC to cancel the operation.

NOTE:

The copy of the user parameters saved previously will be overwritten with current user settings.

To recall the settings:

From the main screen press:

- ENTER for 2 seconds,
- enter the password 51 using the UP or DOWN button and press ENTER, the message UbP (Backup User parameters) flashes,
- press ENTER: the message -L- (Loading) is displayed flashing,
- press ENTER to recall the previously saved copy of the user settings, or press ESC to cancel the operation.

If no button is pressed for 30 seconds, the display returns to the main screen, without performing the operation.



User terminal settings

Main display (parameter P0)

The display normally shows the current steam production (kg/h, basic display).
To display other values, press UP or DOWN and scroll the following list:

- current (A)
 - supply water conductivity (μ S/cm)
 - cylinder hour counter (h)
 - input signal (0-100%, or ON / OFF if A0=0)
 - maximum steam production control (parameter P0) (*)
 - access alarm log (HIS) (**)
- Press ESC to return to the main screen.

Parameter C0 can be used to change the value of the basic display
(default: current steam production).

(*) To modify the maximum steam output (P0) press:

- ENTER (display: xxx)
 - UP or DOWN to set the production as a percentage (from 20 to100%)
 - ENTER to confirm the new value
- Press ESC to return to the main screen

Parameter P0 can also be accessed from the list of parameters.

(**) To display the alarm log (HIS) press:

- ENTER (the most recent alarm is shown)
 - UP or DOWN to scroll the list of alarms in chronological order
- Press ESC to return to the main screen.
To delete the list of alarms press UP and DOWN for 5 seconds
(inside the alarm log), when the list has been reset the display will show 'res'.
Press ESC to return to the main screen.

Disabling

The humidifier can be disabled in 3 different ways:

- Opening contact M2.4 and M2.5 (enable) : the display shows C--;
 - From serial : the display shows S--;
 - From terminal : the display shows t--.;
- Press ESC to return to the main screen.



User terminal settings

Basic parameters

		UoM	Range	DEF	Note
P0	maximum production (see prev. page "main display")	%	20...100	100	
A0	operating mode: 0= ON/OFF control; 1= proportional	-	0...1	1	
A1	unit of measure: 0= kg/h; 1= lb/h	-	0...1	0	
A2	type of production request signal (the parameter can be displayed when A0=1): 1=0 to 10 V; 2= 2 to 10 V; 3= 0 to 20 mA; 4= 4 to 20 mA	-	1...4	1	
A6	Relay M14 activation delay for signalling presence of steam production request / activating external fan	s	0...300	0	
A7	Relay M14 deactivation delay for signalling presence of steam production request / deactivating external fan	s	0...300	180	Visible only if function activated (parameter b1, see par 11.6)
C0	value normally displayed 1= input/control signal displayed; 2= steam production; 3= hour counter; 4 = conductivity; 5= current	-	1...5	2	Visible only if function activated (parameter b1, see par 11.6)

Advanced parameters

		UoM	Range	DEF	Note
b1	optional functions (see following paragraph)	-	0...255	0	
b2	off delay time	s	0...120	0	
b4	Override conductivity of the water 0= automatic measurement; >0 = conductivity forced by b4	µS/cm	0...1250	0	
b5	conductivity pre-alarm threshold (*)	µS/cm	0...2000	1500	
b6	conductivity alarm threshold (*)	µS/cm	0...2000	2000	
b7	foam control threshold 0= no foam detection; 1= max. foam detection sensitivity; 100= min. foam detection sensitivity	%	0...100	50	
b8	conductivity control inside the cylinder in steady operation compared to rated value (less than 100%: the conductivity increases)	%	50...200	100	
b9	adjust duration of the drain to dilute cycle	%	50...200	100	
bb	cylinder maintenance limit time (in hours): 0= the cylinder life alarm "CY" and maintenance required alarm "Mn" are not shown. (*)	h	0...4000	3000	
bE	time limit between two periodical drain cycles (available only if the periodical drain is enabled, 64 set for b1)	h	1...240	24	
bF	days delay for drain due to inactivity (not available if the drain due to inactivity has been disabled, 8 set for b1)	days	1...199	3	

(*) after 999 the display shows $\overline{999}$ to indicate 1000 (three digits plus a point at the top between the first and second digit are displayed).

Serial connection parameters (active when restarted)

		UoM	Range	DEF	Note
C3	serial address	-	1...207	1	
C4	baud rate: 0= 9,600; 1= 19,200	-	0...1	0	
C5	supervisor: frame (character bits, parity, stop bits) 0=8,N,2 1=8,N,1 2=8,E,2 3=8,E,1 4=8,O,2 5=8,O,1 6=7,N,2 7=7,N,1 8=7,E,2 9=7,E,1 10=7,O,2 11=7,O,1	-	0...11	0	
C6	serial response transmission delay	ms	0...199	0	
C7	protocol: 0= CAREL supervisor; 1=Modbus®	-	0...1	0	
C8	maximum time with no data (sent to controller) over RS485 to generate stop production and "SU" alarm	0.1s (es: 50=5s)	0...300	5.0	see table "I" 62



User terminal settings

Display-only parameters

		UM	Range	DEF	Note
d1	display external request signal (only if A0=1)	%	0.0...100	-	
d3	display instant steam flow-rate (instant value)	kg/h	0.0...199	-	
d5	supply water conductivity (*)	µS/cm	0...1500	-	
d6	current	A	0.0...199	-	
d7	display maximum production (corresponding to value set for P0)	kg/h	0.0...199	-	
d9	rated steam production	kg/h	0.0...199	-	
dA	cylinder hour counter (can be reset)	h			
dB	unit hour counter (cannot be reset, read only)	h			

(*) after 999 the display shows 1000 to indicate 1000 (three digits plus a point at the top between the first and second digit are displayed).



Configuration parameters CC

Standard Configuration settings for CC:

Press PRG + Button DOWN and UP for 2 seconds, Go to 64 and press PRG
Config r1:

- 1 PH
- 230 V
- P = Pump

Advanced (77)

- b1=1
- b2=0 off delay time = 0
- b5=1000 conductivity pre-alarm threshold
- b6=1500 conductivity alarm threshold
- b8=150 conductivity control
- bb=2000 cylinder maintenance limit time (hours)

Manually drain the water in the cylinder:

- Press UP and DOWN together for 2 seconds
- The message 'dr' on the display will show up
- Press UP and DOWN for 2 seconds to stop the drain cycle.
Note that the drain cycle in any case ends automatically

Reset cylinder hour counter:

- Press the PRG button for 2 seconds
- Go to 77 using the UP and DOWN button and confirm with PRG
- Use the UP and DOWN button to select the 'da' parameter and confirm with PRG.
- Press the UP and DOWN simultaneously button for 5 seconds to activate a new cylinder.

Accessing and setting the parameters:

- Press enter for 2 seconds, select 77 using the UP and DOWN button, confirm with PRG
- Use the UP and DOWN to scroll the list.
- Use the enter button to select a parameter
- Use Up / DOWN to modify the value of the parameter.
- Use PRG to save the new value



Maintenance

Important:

**The cylinder may be hot.
Let it cool down before touching it or use protective gloves!**

Cylinder replacement (See procedure Replacing Cylinder Assembly page 6)

- completely drain the water contained in the cylinder;
- turn the appliance off and disconnect the main power line (safety procedure);
- remove the steam hose from the cylinder;
- disconnect the electrical connections from the top of the cylinder;
- release the cylinder from the fastening device and lift it up to remove it;
- fit the new cylinder in the humidifier by performing the previous operations in reverse.

Cylinder maintenance:

The life of the cylinder depends on several factors, including:

The complete filling with lime scale and / or the partial or complete corrosion of the electrodes,

The correct use and sizing of the humidifier,

The output, and the quality of the water, as well as careful and regular maintenance.

Due to the aging of the plastic and the consumption of the electrodes, even an open-able steam cylinder has a limited life, and it is therefore recommended to replace it after 5 years or 10,000 operating hours.

Important:

The humidifier and its cylinder contain live electrical components and hot surfaces, and therefore all service and /or maintenance operations must be performed by expert and qualified personnel, who are aware of and have taken the necessary precautions.

Before performing any operations on the cylinder, check that the humidifier is disconnected from the power supply; carefully read and follow the instructions

Remove the cylinder from the humidifier only after having drained it completely.

Check that the model and the power supply voltage of the new cylinder correspond to the one being replaced.



Maintenance

- After one hour of operation: for both disposable and open-able cylinders, check that there are no significant water leaks.
- Every fifteen days and no more than 300 operating hours: for both disposable and open-able cylinders check operation, that there are no significant water leaks and the general condition of the casing.
Check that during operation there are no arcs or sparks between the electrodes.
- Every three months and no more than 1000 operating hours: for disposable cylinders, check operation, that there are no significant water leaks and, if necessary, replace the cylinder; for open-able cylinders, check that there are no markedly blackened parts on the casing: if this is the case, check the condition of the electrodes, and if necessary replace them together with the O-rings and the cover gasket.
- Annually and no more than 2500 operating hours: for disposable cylinders, replace the cylinder; for open-able cylinders check operation, that there are no significant water leaks, the general conditions of the container, check that there are no markedly blackened parts on the casing; replace the electrodes together with the O-rings and the cover gasket.
- After five years and no more than 10,000 operating hours: for both disposable and open-able cylinders, replace the cylinder.

After extended use or alternatively when using water with a high salt content, the solid deposits that naturally form on the electrodes may reach the stage where they also stick to the inside wall of the cylinder;

IN THE EVENT OF ESPECIALLY CONDUCTIVE DEPOSITS, THE CONSEQUENT HEAT PRODUCED MAY OVER HEAT THE PLASTIC AND MELT IT.

IN MORE SEVERE CASES, PUNCTURE THE CYLINDER, ALLOWING WATER TO LEAK BACK INTO THE TANK.

As a precaution, check, at the frequency recommended further on, for deposits and the blackening of the wall of the cylinder, and replace the cylinder if necessary.

Warning:

Always disconnect the appliance before touching the cylinder in the event of leaks, as current may be running through the water.



Maintenance

Replacement and maintenance of other components:

Fill solenoid valve :

After having disconnected the cables and the tubing, remove the solenoid valve and check the condition of the inlet filter; clean if necessary using water and a soft brush.

Supply and drain manifold (drain solenoid valve / pump assembled):

Check there are no solid residues in the cylinder attachment, remove any impurities.

Check the gasket (O-ring) is not damaged or cracked; if necessary, replace it.

Drain solenoid valve / pump:

Disconnect the power supply, remove the coil (solenoid valve version) , unscrew the fastening screws and remove the valve body (pump version); remove any impurities and rinse.

Supply tank & conductivity meter:

Check if there are no obstructions or solid particles and that the electrodes for measuring the conductivity are clean, remove any impurities and rinse.

Hose kit:

Check if the hoses are free and do not contain impurities; remove any impurities and rinse.



Trouble Shooting

Problem	Cause	Solution
The humidifier does not turn on	<ul style="list-style-type: none"> • no electrical power supply; • controller connectors plugged in incorrectly; • fuses blown; • transformer fault 	<ul style="list-style-type: none"> • check the protection device up stream of the humidifier and if the power supply is present; • make sure the connectors are properly connected; • check the fuses
The humidifier does not start operation	<p>remote ON / OFF contact open or control signal not compatible with the type set</p> <ul style="list-style-type: none"> • manual supply valve closed, fill solenoid valve fault or inlet filter dirty valve, replace the fill solenoid valve • the steam hose is blocked or not installed correctly, blocked by condensate or choked (pocket that fills with condensate) 	<ul style="list-style-type: none"> • make sure the controller is working correctly • open the manual valve, check or clean the inlet filter to the fill solenoid • check the positioning of the steam hose with reference to the assembly
The humidifier fills with water without producing steam	<ul style="list-style-type: none"> • excessive back pressure in steam outlet; • cylinder inlet filter blocked; • lime scale in the supply tank; • drain solenoid valve / pump fault 	<ul style="list-style-type: none"> • check the steam outlet hose is not bent or choked; • clean the filter; • clean the fill/supply tank; • check for presence of voltage 24 Vac / 230 Vac at the drain solenoid valve / pump and / or replace the drain solenoid valve /pump
The line circuit breaker is activated	<ul style="list-style-type: none"> • the circuit breaker is under-rated; • excess current at the electrodes 	<ul style="list-style-type: none"> • check the circuit breaker is rated for a current equal at least 1.5 times the rated current of the humidifier; • check the operation of the drain solenoid valve / pump, the seal of the fill solenoid valve when not energized, drain some of the water and re-start
The humidifier wets the duct	<ul style="list-style-type: none"> • the steam distributor is not installed correctly (too near the top of the duct or the condensate return is blocked); • the system is oversized; • humidifier on when the fan in the duct is off 	<ul style="list-style-type: none"> • make sure the steam distributor has been installed correctly; • decrease the steam production, CP / CPY board; • check the connection of the device (flow switch or differential pressure switch) slaving the operation of the humidifier to the fan in the duct; • check the remote ON/OFF input

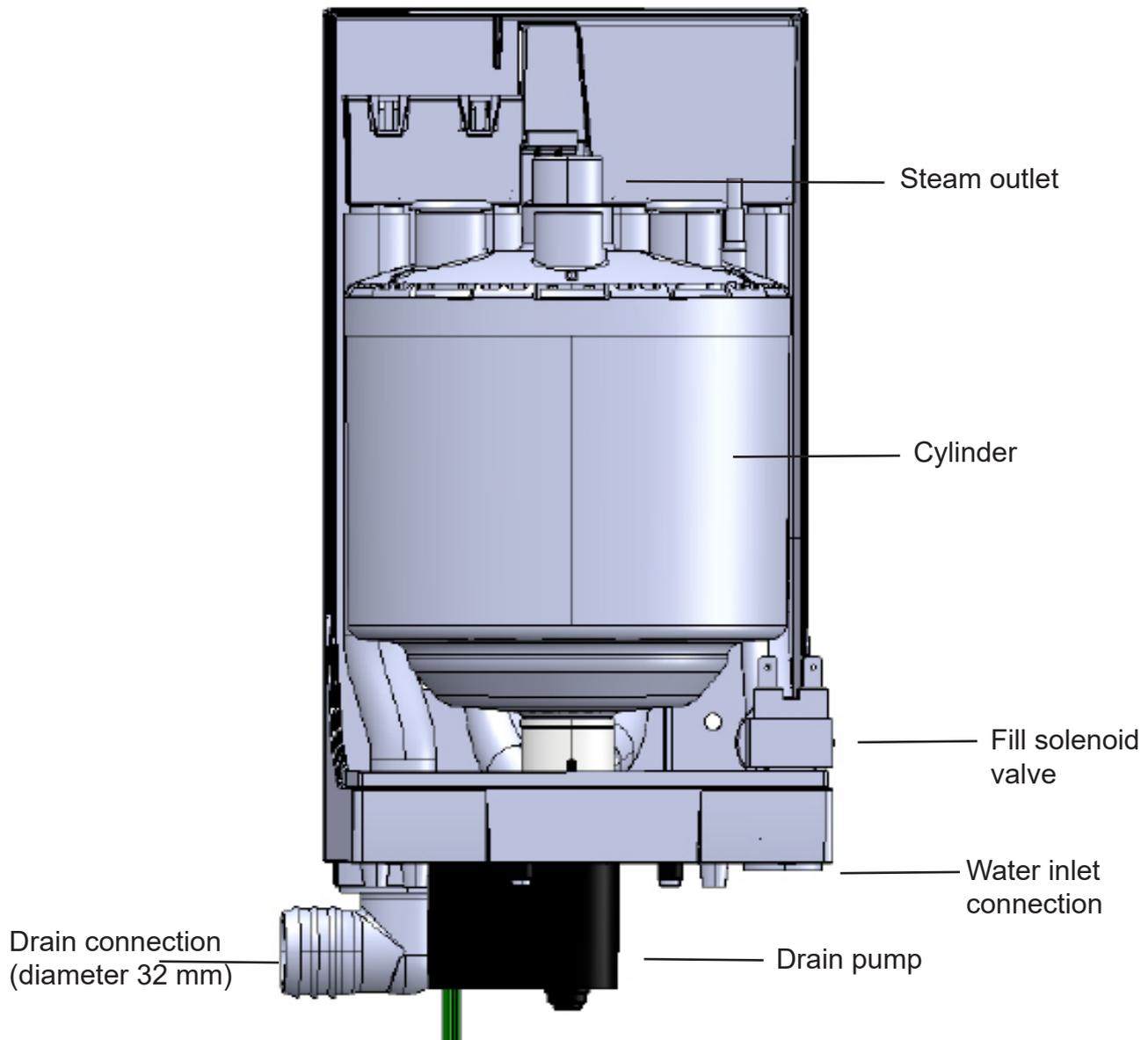


Trouble Shooting

Problem	Cause	Solution
The humidifier wets the floor below	<ul style="list-style-type: none">• the supply or overflow circuit has leaks;• the steam outlet hose is not properly secured to the cylinder	<ul style="list-style-type: none">• check the entire water circuit;• check the clamp on the steam outlet is tight



Humidification unit



The humidifier is an immersed-electrode steam unit, which can generate up to 3 kg/h of steam per hour.

The unit is capable of modulating a steam flow from 20 - 100%.

Humidification of the Custom Counter will start approx. 5 minutes after the unit is switched on.



Water connections

Supply water

Only use mains drinking water with:

- Pressure between 0.1 and 0.8 MPa (1 and 8 bars), temperature between 1 and 40 °C and an instant flow-rate no lower than the rated flow of the fill solenoid valve, the connection is G 3/4" M;
- Hardness no greater than 400 ppm of CaCO₃ (40 °fH), conductivity range: 75-1250 µS/cm;
- no organic compounds.

supply water characteristics	unit of measure	normal water		water with low salt content	
		Min.	Max.	Min.	Max.
Hydrogen ions (pH)		7	8,5	7	8,5
Specific conductivity at 20 °C (σR, 20 °C)	µS/cm	350	1250	75	350
Total dissolved solids (TDS)	mg/l	(1)	(1)	(1)	(1)
Dry residue at 180°C (R180)	mg/l	(1)	(1)	(1)	(1)
Total hardness (TH)	mg/l CaCO ₃	100 (2)	400	50 (2)	160
Temporary hardness	mg/l CaCO ₃	60 (3)	300	30 (3)	100
Iron + Manganese	mg/l Fe + Mn	0	0,2	0	0,2
Chlorides	ppm Cl-	0	30	0	20
Silica	mg/l SiO ₂	0	20	0	20
Residual chlorine	mg/l Cl ₂	0	0,2	0	0,2
Calcium sulphate	mg/l CaSO ₄	0	100	0	60
Metallic impurities	mg/l	0	0	0	0
Solvents, thinners, detergents, lubricants	mg/l	0	0	0	0

(1) = values depend on the specific conductivity; in general: TDS ≈ 0,93 * σR, 20 °C;
R180 ≈ 0,65 * σR, 20 °C

(2) = not less than 200% of the chloride content in mg/l CL-

(3) = not less than 300% of the chloride content in mg/l CL-

There is not reliable relationship between hardness and conductivity of the water.

Important:

- Do not treat the water with softeners, this may cause the entrainment of foam, affecting the operation of the unit;
- Do not add disinfectants or anticorrosive compounds to the water, as these are potential irritants;
- The use of well water, industrial water or water from cooling circuits and, in general, any potentially chemically or bacteriologically contaminated water is not recommended.



Water connections

Inlet:

Water connection: G 3/4"
aerated
Water hardness: 5-20 ph
Temperature range: Maximum 50 °C
Water pressure: 1-6 bar



The humidifier needs to be connected via the non return valve.
This non return valve **must be** connected with PVC cable gland mounted with gel or Teflon tape

Please note:

This is a one way water connection!

Outlet:

Drain connection: 32 mm high temperature hose for temperatures up to 100 °C

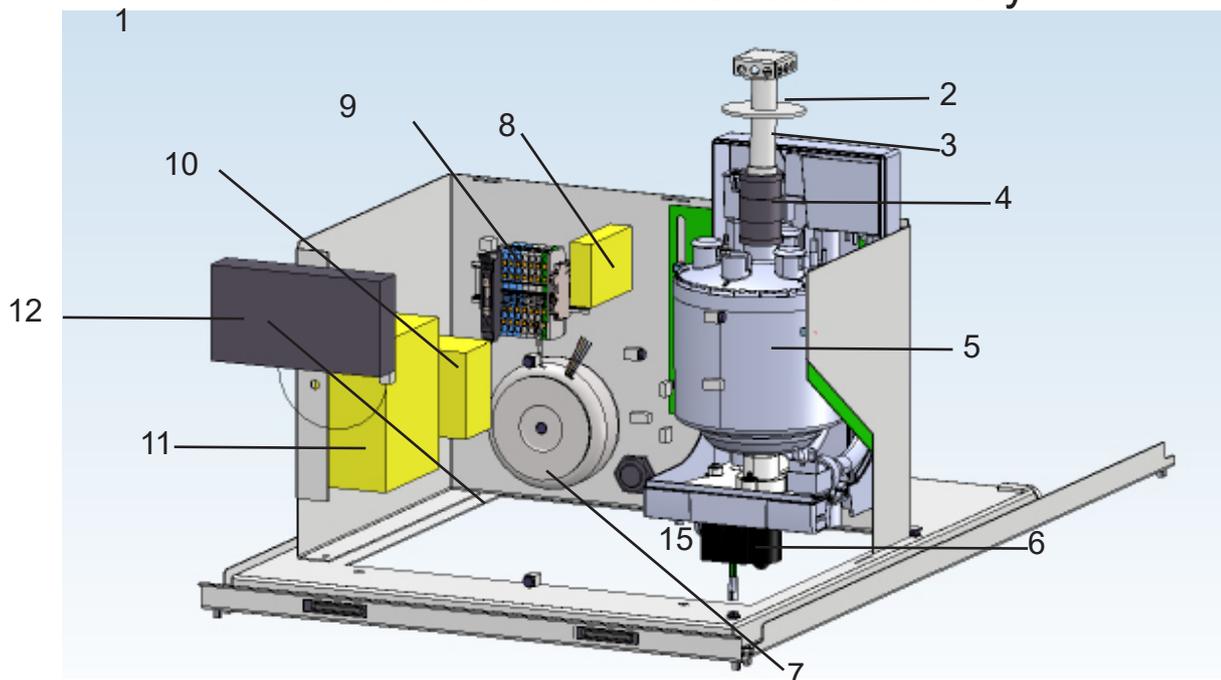
Drain Water:

- * This contains the same substances dissolved in the supply water, however in larger quantities
- * It may reach a temperature of 100 °C
- * It is non toxic and can be drained into the sewerage system, category 3, EN 1717

All plumbing connections must comply with local sanitary, safety and plumbing codes.



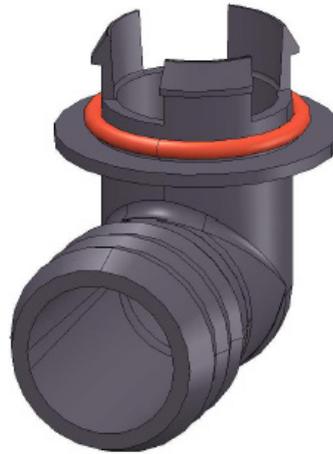
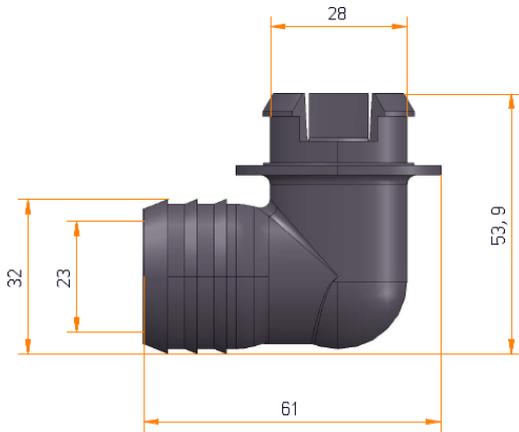
Parts Humidification assembly



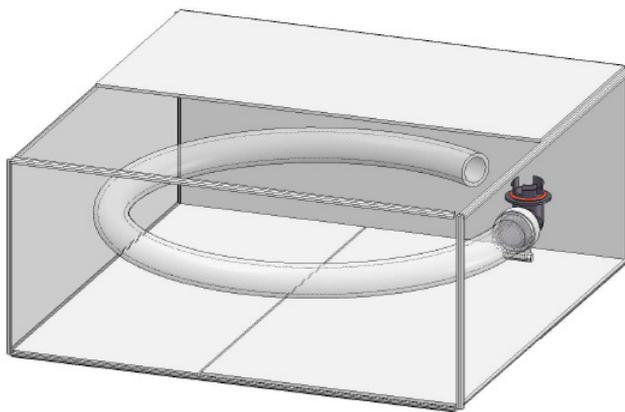
Position number	Part number	Description
1	30003526	Assembly Humidification
2	30001139	Steam pipe stop
3	30003538	Steam pipe
4	30009350	Tube connection
5	30009341	230V Cylinder 1 - 3 kg BL0SRF00H2 Normal water
5 Special	30131063	230V Cylinder 1 - 3 kg BL0SRE00H2 Soft water
6	30009346	Carel kit, fill valve, drain pump
7	9171049	Trafo 24 V
8	30009340	Current transformer
9	9191241	Connection block terminal BU
	9191240	Connection block terminal GY
	9191197	Fuse 10 A
	9191239	Connection block terminal GN / YE
10	30009342	Contactora
11	30009347	Carel CPY controller
12	30009348	Carel CPY terminal
	30009354	Hose, water inlet
	30009356	Connection cable CPY terminal
15	30129998S	Angled drain connection including Gasket



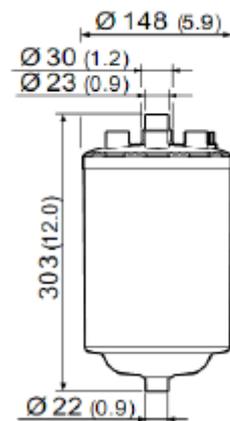
Parts Drain Humidification assembly



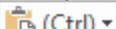
Part number:
30131447s



Also available with silicon hose.
Part number 30131198



Cylinder details

	Water conductivity		
	Soft	Normal	Hard
Capacity	75/350 $\mu\text{S}/\text{cm}$	350/750 $\mu\text{S}/\text{cm}$	750/1250 $\mu\text{S}/\text{cm}$
1 – 3 Kg/H	30131063 Ref: BLOSREOC 	30009341 Ref: BLOSRF00H2	



Electrical scematic

