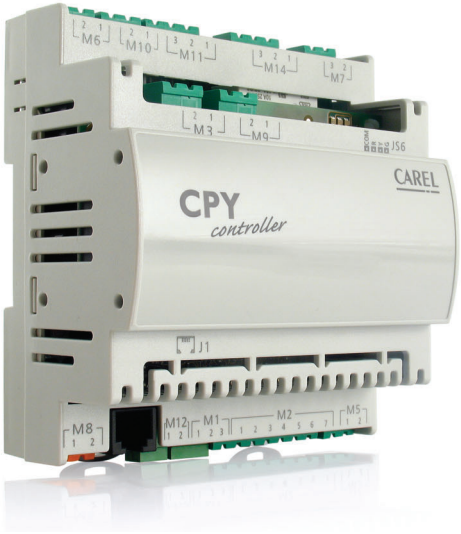
CPY controller

Control board for OEM humidifier kits KUE



ENG User manual

LEGGI E CONSERVA QUESTE ISTRUZIONI

READ AND SAVE THESE INSTRUCTIONS

NO POWER & SIGNAL CABLES TOGETHER

READ CAREFULLY IN THE TEXT!

High Efficiency Solutions

Content

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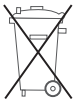

DISPOSAL OF THE PRODUCT: The appliance (or the product) must be disposed of separately in accordance with the local waste disposal legislation in force

The manual is available in other languages at www.carel.com

1. INTRODUCTION & MODELS

Electronic board for the control and management of CAREL KUE humidifier kits:

- features all the inputs and outputs required to completely and independently control the humidifier;
- features three LEDs to indicate active alarms present (red LED), steam production (yellow LED), 24 Vac power supply (green LED);
- can be connected to the CPY terminal, or to the supervisor network with Modbus® or CAREL proprietary protocol (code CPYTERM***).

CPY models for non-configured KUE humidifiers (to be configured using humiSet)

CPY	00	0	*	*	00
			0: protocoll CAREL	0 o 1	
			A: Modbus® 9600 Baud,	>=2	
			B: Modbus® 19200 Baud	>=2	

CPY models for KUE*R* humidifiers

CPY	**	*	*2	*	0
	R1: 1.5 kg/h reduced (3.3 lbs/hr)	U: 208 Vac 1-ph.; D: 230 Vac 1-ph.;		P: drain pump	
	R3: 3 kg/h reduced (6.6 lbs/hr)	C: 200Vac 1-ph.		V: drain valve	

CPY models for KUE*1* humidifiers

CPY	**	*	*2	*	0
	01: 1.5 kg/h (3.3 lbs/hr)	U: 208 Vac 1-ph. D: 230 Vac 1-ph.; C: 200Vac 1-ph.;		P: drain pump V: drain valve	
	03: 3 kg/h (6.6 lbs/hr)	U: 208 Vac 1-ph.; C: 200Vac 1-ph.; D: 230 Vac 1-ph.; J: 200 Vac 3-ph.; W: 208 Vac 3-ph. K: 230 Vac 3-ph.; L: 400 Vac 3-ph.; M: 460 Vac 3-ph.				

CPY models for KUE*2* humidifiers

CPY	**	*	*2	*	0
	05: 5 kg/h (11 lbs/hr)	C: 200Vac 1-ph.; U: 208 Vac 1-ph.; D: 230 Vac 1-ph.; J: 200 Vac 3-ph.; W: 208 Vac 3-ph.; K: 230 Vac 3-ph.; L: 400 Vac 3-ph.; M: 460 Vac 3-ph.;N: 575 Vac 3-ph.		P: drain pump V: drain valve		
	08: 8 kg/h (17 lbs/hr)	J: 200 Vac 3-ph.; W: 208 Vac 3-ph.; K: 230 Vac 3-ph.; L: 400 Vac 3-ph.; M: 460 Vac 3-ph.; N: 575 Vac 3-ph.				

CPY models for KUE*3 humidifiers

CPY	**	*	*2	*	0
	09: kg/h (20 lbs/hr)	U: 208 Vac 1-ph.; D: 230 Vac 1-ph. J: 200 Vac 3-ph.		P: drain pump V: drain valve	
	10: 10 kg/h (22 lbs/hr) 15: 15 kg/h (33 lbs/hr)	W: 208 Vac 3-ph.; K: 230 Vac 3-ph.; L: 400 Vac 3-ph.; M: 460 Vac 3-ph.; N: 575 Vac 3-ph.				
	18:18 kg/h (40 lbs/hr)	L: 400 Vac 3-ph.; M: 460 Vac 3-ph.; N: 575 Vac 3-ph.				

CPY models for KUE*4 humidifiers (pump only)

CPY	**	*	*2	*	0
	25: 25 kg/h (55 lbs/hr) 35: 35 kg/h (77 lbs/hr)	J: 200 Vac 3-ph. W: 208 Vac 3-ph.; K: 230 Vac 3-ph.; L: 400 Vac 3-ph.; M: 460 Vac 3-ph.; N: 575 Vac 3-ph.		P: drain pump V: drain valve	
	45: 45 kg/h (100 lbs/hr)	L: 400 Vac 3-ph.; M: 460 Vac 3-ph.; N: 575 Vac 3-ph.			

Options and accessories

	CAREL code
Terminal kit (not supplied with CPY board)	CPYCONN000
External CPY terminal with keypad	CPYTERM000 con CPY****000
	CPYTERM100 con CPY****100
	CPYTERM200 con CPY****2*0
humiSet (kit for programming CAREL humidifiers)	HUMISET0000
CAREL strip remote LED plate	UMKDP00000
External TAM	UEKTAM0001

2. ELECTRICAL CONNECTIONS

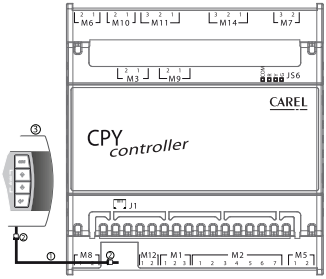

Fig. 2.a

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 flast-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.

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		NC
M14.2	OUT	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		NC
M114.2	Out	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.)

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.

3. CPY & KUE: CONFIGURATION & RATED DATA

KUE	kg/h(1) (2)	kW	Vac	Ph	Inom [A]	CPY board	TAM settings	Turns	TAM (fig. 3.1) for cylinder with snap-on connection	TAM (fig. 3.1) for cylinder with screw connection
KUESR*	1,5	1,13	200	1	5.6	CPYR1C*	100	1	a	a
			208	1	5.4	CPYR1U*	100	1	a	a
			230	1	4.9	CPYR1D*	100	2	d	d
	3,0	2,25	200	1	11.3	CPYR3C*	300	2	d	d
			208	1	10.8	CPYR3U*	300	2	d	d
			230	1	9.8	CPYR3D*	100	1	a	a
KUETR*	3,0	2,25	208	3	6.2	CPYR3W*	100	1	a	a
			230	3	5.6	CPYR3K*	100	1	a	a
			400	3	3.2	CPYR3L*	100	2	d	d
			460	3	2.8	CPYR3M*	100	2	d	d
KUE*1*	1,5	1,13	200	1	5.6	CPY01C*	100	1	a	a
			208	1	5.4	CPY01U*	100	1	a	a
			230	1	4.9	CPY01D*	100	2	d	d
	3,0	2,25	200	1	11.3	CPY03C*	300	2	d	d
			208	1	10.8	CPY03U*	300	2	d	d
			230	1	9.8	CPY03D*	100	1	a	a
			200	3	6.5	CPY03J*	100	1	a	a
			208	3	6.2	CPY03W*	100	1	a	a
			230	3	5.6	CPY03K*	100	1	a	a
			400	3	3.2	CPY03L*	100	2	d	d
			460	3	2.8	CPY03M*	100	2	d	d
KUES2*	5,0	3,75	200	1	18.8	CPY05C*	500	2	d(*)	d
			208	1	18.0	CPY05U*	500	2	d(*)	d
			230	1	16.3	CPY05D*	500	2	d(*)	d
KUES3*	8,7	6,52	208	1	31.4	CPY09U*	500	1	a	a
	9,0	6,75	230	1	29.3	CPY09D*	500	1	a	a
KUET2*	5,0	3,75	200	3	10.8	CPY05J*	300	2	d(*)	d
			208	3	10.4	CPY05W*	100	1	c	a
			230	3	9.4	CPY05K*	100	1	c	a
			400	3	5.4	CPY05L*	100	1	a	a
			460	3	4.7	CPY05M*	100	2	d	d
			575	3	3.8	CPY05N*	100	2	d	d
	8,0	6,00	200	3	17.3	CPY08J*	500	2	d(*)	d
			208	3	16.7	CPY08W*	500	2	d(*)	d
			230	3	15.1	CPY08K*	300	2	d(*)	d
			400	3	8.7	CPY08L*	100	1	a	a
			460	3	7.5	CPY08M*	100	1	a	a
			575	3	6.0	CPY08N*	100	1	a	a

KUE	kg/h[1] [2]	kW	Vac	Ph	Inom [A]	CPY board	TAM settings	Turns	TAM (fig. 3.1) for cylinder with snap-on connection	TAM (fig. 3.1) for cylinder with screw connection
KUET3*	10,0	7,50	200	3	21.7	CPY10J*	300	1	c	a
			208	3	20.8	CPY10W*	300	1	c	a
			230	3	18.8	CPY10K*	300	1	c	a
			400	3	10.8	CPY10L*	300	1	a	a
			460	3	9.4	CPY10M*	100	1	a	a
			575	3	7.5	CPY10N*	100	1	a	a
KUET3*	15,0	11,25	200	3	32.5	CPY15J*	500	1	c	a
			208	3	31.2	CPY15W*	500	1	c	a
			230	3	28.2	CPY15K*	300	1	c	a
			400	3	16.2	CPY15L*	300	1	a	a
			460	3	14.1	CPY15M*	300	1	a	a
			575	3	11.3	CPY15N*	300	1	a	a
	18,0	13,50	400	3	19.5	CPY18L*	300	1	a	a
			460	3	16.9	CPY18M*	300	1	a	a
			575	3	13.6	CPY18N*	300	2	d	d
KUET4*	25		200	3	54.1	CPY25J*	500	1	b	b
			208	3	52.0	CPY25W*	500	1	b	b
			230	3	47.1	CPY25K*	500	1	b	b
			400	3	27.1	CPY25L*	500	1	c	c
			460	3	23.5	CPY25M*	500	1	c	c
			575	3	18.8	CPY25N*	500	1	c	c
	35		200	3	75.8	CPY35J*	700	1	c	c
			208	3	72.9	CPY35W*	700	1	c	c
			230	3	65.9	CPY35K*	700	1	c	c
			400	3	37.9	CPY35L*	500	1	c	c
			460	3	32.9	CPY35M*	500	1	c	c
			575	3	26.4	CPY35N*	500	1	c	c
	45	33,75	400	3	48.7	CPY45L*	700	1	c	c
			460	3	42.4	CPY45M*	700	1	c	c
			575	3	33.9	CPY45N*	700	1	c	c

Tab. 3.a

(*): The TAM must be positioned upstream of the contactor when using cylinders with snap-on connection.

(1) The average steam production is affected by external factors, such as: ambient temperature, quality of the supply water and steam distribution system.

(2) Tolerance on the rated values: from -10% to +5 % (EN 60335-1).

3.1 TAM (current transformer) configurations

	one cable turn	one turn of the two cables of the same phase	two cable turns of the same phase	one cable in "double turn" mode	three cable turns of the same phase
CPY*					
	Fig. 1.a	Fig. 1.b	Fig. 1.c	Fig. 1.d	Fig. 1.e

4. SIGNAL LEDS

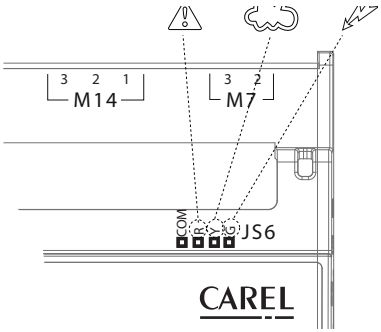

Fig. 4.a

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.

Diagrams describing the flashes

1. Steam production: yellow LED - Temporary production ("short flashes")

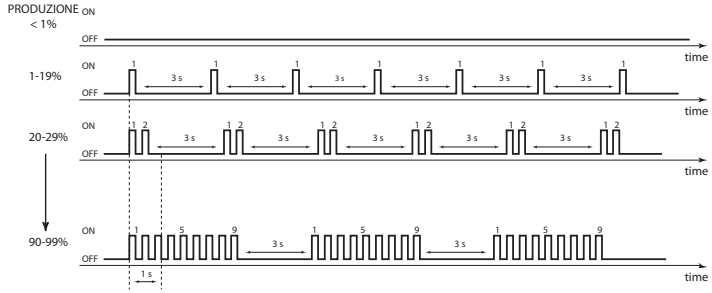

Fig. 4.b

2. Steam production: yellow LED - Steady production ("long flashes")

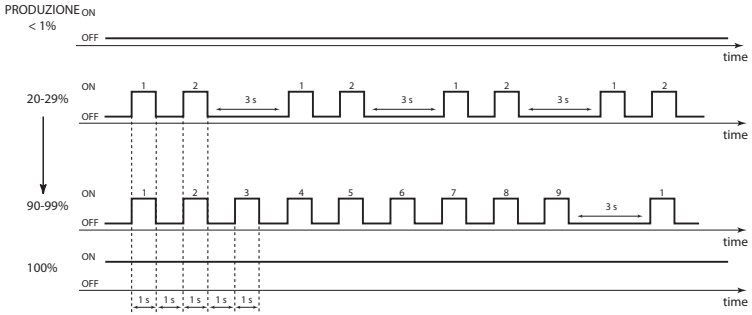

Fig. 4.c

Fast flash: 0.2 seconds ON and 0.2 seconds OFF; Slow flash: 1 second ON and 1 second OFF
Each set of impulses is separated from the next by a 3 second pause, to allow the user to count the impulses in each set: this allows the instant steam production to be identified.

5. USER TERMINAL (CODE CPYTERM*)

The CPY board - via terminal J1 - can be connected to the CPY terminal (CAREL code CPYTERM000) for displaying the status and alarms relating to the board and setting the operating parameters (useful for service or maintenance).

Fig. 5.a

Attention: the softwares of CPY* and CPYTERM* must match each other, i.e. the 8th digits of the respective codes must be equal. In case there is no match, some parameters di CPY* might not be accessible. If there is no match, on power-up after displaying the software release, and in normal operation when pressing UP+PRG, the red LED of CPY* will remain on for 5 seconds, and the following error message will be displayed: "X – Y", where "X" and "Y" are the 2 different 8th digits. Refer to the after-sales service.

Symbols on the terminal

drain	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 (red LED, not flashing) 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).
µS/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		

Tab. 5.a

5.2 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)

Tab. 5.b

5.3 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 (µS/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) (**)

To return to the basic display, press ESC.
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: ***set***)
- 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'.

5.4 Disabling

The humidifier can be disabled in 3 different ways:

- Opening contact M2.4 and M2.5 (enable) : the display shows C--;
- From serial (see Chap. 7 Digital 2) : the display shows S--;
- From terminal (see ESC button) : the display shows t--.

5.5 Manually drain the water in the cylinder

Total drain in operation
Press UP and DOWN together for 2 seconds (the message 'dr' on the display alternating with 'tot' indicates the function has been activated). Press UP and DOWN again for 2 seconds to stop the drain cycle. The drain cycle in any case ends automatically.

5.6 Reset cylinder hour counter

- access parameter 'dA'
- press UP & DOWN for 5 seconds

When the counter has been reset, the display shows 'res'.

5.7 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, Press ESC to return to the main screen.

5.8 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.

5.9 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.

5.10 CPY configuration from CPYTERM200 terminal (and higher)

The CPY boards with software release 8.1 or higher have all the configurations (kg/h, Vac) stored permanently in the memory; boards with release 8.0, on the other hand, receive the configuration from humiSet. The configurations can be activated at any time, as follows:
- CPY rel. 8.0, 8.1 and 8.2: from humiSet only. humiSet transfers the configurations to CPY 8.0, and activates those resident in the memory on CPY 8.1 and 8.2
- CPY rel. 8.3 and higher: from humiSet, from CPYTERM200 or 1tool module Mod_CPY (the following tables are to be used together with the 1tool module!)

KUE	kg/h	Vac	PH	Drain device	CFG NO.
KUESR	1.5	200	1	pump	1
	1.5	208	1	pump	2
	1.5	230	1	pump	3
KUES1	1.5	200	1	pump	4
	1.5	208	1	pump	5
	1.5	230	1	pump	6
KUESR	3	200	1	pump	7
	3	208	1	pump	8
	3	230	1	pump	9
KUETR	3	208	3	pump	10
	3	230	3	pump	11
	3	400	3	pump	12
	3	460	3	pump	120
KUES1	3	200	1	pump	13
	3	208	1	pump	14
	3	230	1	pump	15
KUET1	3	200	3	pump	16
	3	208	3	pump	17
	3	230	3	pump	18
	3	400	3	pump	19
	3	460	3	pump	20

KUE	kg/h	Vac	PH	Drain device	CFG NO.
KUES2	5	200	1	pump	21
	5	208	1	pump	22
	5	230	1	pump	23
KUET2	5	200	3	pump	24
	5	208	3	pump	25
	5	230	3	pump	26
	5	400	3	pump	27
	5	460	3	pump	28
	5	575	3	pump	29
KUET2	8	200	3	pump	30
	8	208	3	pump	31
	8	230	3	pump	32
	8	400	3	pump	33
	8	460	3	pump	34
	8	575	3	pump	35
KUES3	09	208	1	pump	36
	09	230	1	pump	37

KUE	kg/h	Vac	PH	Drain device	CFG NO.
KUET3	10	200	3	pump	38
	10	208	3	pump	39
	10	230	3	pump	40
	10	400	3	pump	41
	10	460	3	pump	42
	10	575	3	pump	43
	15	200	3	pump	44
	15	208	3	pump	45
	15	230	3	pump	46
	15	400	3	pump	47
	15	460	3	pump	48
	15	575	3	pump	49
	18	400	3	pump	50
	18	460	3	pump	51
	18	575	3	pump	52
KUET4	25	200	3	pump	53
	25	208	3	pump	54
	25	230	3	pump	55
	25	400	3	pump	56
	25	460	3	pump	57
	25	575	3	pump	58
	35	200	3	pump	59
	35	208	3	pump	60
	35	230	3	pump	61
	35	400	3	pump	62
	35	460	3	pump	63
	35	575	3	pump	64
	45	400	3	pump	65
	45	460	3	pump	66
	45	575	3	pump	67

Tab. 5.c

KUE	kg/h	Vac	PH	Drain device	CFG NO.
KUESR	1.5	200	1	valve	68
	1.5	208	1	valve	69
	1.5	230	1	valve	70
KUES1	1.5	200	1	valve	71
	1.5	208	1	valve	72
	1.5	230	1	valve	73
KUESR	3	200	1	valve	74
	3	208	1	valve	75
	3	230	1	valve	76
KUETR	3	208	3	valve	77
	3	230	3	valve	78
	3	400	3	valve	79
	3	460	3	valve	121
KUES1	3	200	1	valve	80
	3	208	1	valve	81
	3	230	1	valve	82
KUET1	3	200	3	valve	83
	3	208	3	valve	84
	3	230	3	valve	85
	3	400	3	valve	86
	3	460	3	valve	87
KUES2	5	200	1	valve	88
	5	208	1	valve	89
	5	230	1	valve	90
KUET2	5	200	3	valve	91
	5	208	3	valve	92
	5	230	3	valve	93
	5	400	3	valve	94
	5	460	3	valve	95
	5	575	3	valve	96
KUET2	8	200	3	valve	97
	8	208	3	valve	98
	8	230	3	valve	99
	8	400	3	valve	100
	8	460	3	valve	101
	8	575	3	valve	102
KUES3	09	208	1	valve	103
	09	230	1	valve	104

KUE	kg/h	Vac	PH	Drain device	CFG NO.
KUET3	10	200	3	valve	105
	10	208	3	valve	106
	10	230	3	valve	107
	10	400	3	valve	108
	10	460	3	valve	109
	10	575	3	valve	110
	15	200	3	valve	111
	15	208	3	valve	112
	15	230	3	valve	113
	15	400	3	valve	114
	15	460	3	valve	115
	15	575	3	valve	116
	18	400	3	valve	117
	18	460	3	valve	118
	18	575	3	valve	119

Tab. 5.d

5.11 How to activate a configuration from CPYTERM200 (starting from release 8.3 only)

Proceed as follows:

1. Ritornare alla schermata principale
2. Press SEL + ↑ + ↓ together for at least 2 seconds until the display shows 00
3. Enter 64 using the arrows and press SEL to confirm
4. CFG is displayed
5. Press SEL
6. r1 is displayed: this is the first configuration, and refers to "r"educed cylinder 1.5 kg/h ("1")
7. Scroll the configurations until reaching the desired option, using the arrows
8. Press SEL to select the option in kg/h
9. 1PH is displayed if the kg/h selected supports both single-phase and three-phase power, otherwise 3PH is displayed for kg/h values that only accept three-phase power (VAC)
10. Select the VAC with the arrows and press SEL to confirm
11. P is displayed, referring to the drain pump
12. Select P or U (for drain valve) with the arrows, then confirm by pressing SEL
13. Press SEL to activate the chosen configuration
14. "Loading" is displayed during activation (around 10 s), after which CPY will begin normal operation

5.12 How to activate a configuration from 1tool module Mod_CPY (starting from release 8.3 only)

Send the configuration number read in the CFG NO. column of the table to CPY using the 1tool module Mod_CPY (see the corresponding manual for further information; the manual is included in 1tool together with the module).

6. CONFIGURATION PARAMETERS

6.1 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)

Tab. 6.a

6.2 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	

Tab. 6.b

(*) after 999 the display shows 100 to indicate 1000 (three digits plus a point at the top between the first and second digit are displayed).

6.3 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

Tab. 6.c

6.4 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			

Tab. 6.d

(*) after 999 the display shows 100 to indicate 1000 (three digits plus a point at the top between the first and second digit are displayed).

b1	Alarm relay oscillation when "CY" alarm is on	Dilution drain with contactor	Drain if new request ≤ 2/3 current request (contact open))	Total drain due to inactivity	Display of "CL" & "CP" alarms	Alarm relay activated if...	Periodical total drai	Enable management of steam request signal / external fan control relay M14
0 (def)	OFF	open	YES	ON (bF)	ON	alarms in progress	OFF	Disabled
1	ON	open	YES	ON (bF)	ON	alarms in progress	OFF	Disabled
2	OFF	closed	YES	ON (bF)	ON	alarms in progress	OFF	Disabled
3	ON	closed	YES	ON (bF)	ON	alarms in progress	OFF	Disabled
4	OFF	open	NO	ON (bF)	ON	alarms in progress	OFF	Disabled
5	ON	open	NO	ON (bF)	ON	alarms in progress	OFF	Disabled
6	OFF	closed	NO	ON (bF)	ON	alarms in progress	OFF	Disabled
7	ON	closed	NO	ON (bF)	ON	alarms in progress	OFF	Disabled
8	OFF	open	YES	OFF	ON	alarms in progress	OFF	Disabled
9	ON	open	YES	OFF	ON	alarms in progress	OFF	Disabled
10	OFF	closed	YES	OFF	ON	alarms in progress	OFF	Disabled
11	ON	closed	YES	OFF	ON	alarms in progress	OFF	Disabled
12	OFF	open	NO	OFF	ON	alarms in progress	OFF	Disabled
13	ON	open	NO	OFF	ON	alarms in progress	OFF	Disabled
14	OFF	closed	NO	OFF	ON	alarms in progress	OFF	Disabled
15	ON	closed	NO	OFF	ON	alarms in progress	OFF	Disabled
16	OFF	open	YES	ON (bF)	OFF	alarms in progress	OFF	Disabled
17	ON	open	YES	ON (bF)	OFF	alarms in progress	OFF	Disabled
18	OFF	closed	YES	ON (bF)	OFF	alarms in progress	OFF	Disabled
19	ON	closed	YES	ON (bF)	OFF	alarms in progress	OFF	Disabled
20	OFF	open	NO	ON (bF)	OFF	alarms in progress	OFF	Disabled
21	ON	open	NO	ON (bF)	OFF	alarms in progress	OFF	Disabled
22	OFF	closed	NO	ON (bF)	OFF	alarms in progress	OFF	Disabled
23	ON	closed	NO	ON (bF)	OFF	alarms in progress	OFF	Disabled
24	OFF	open	YES	OFF	OFF	alarms in progress	OFF	Disabled
25	ON	open	YES	OFF	OFF	alarms in progress	OFF	Disabled
26	OFF	closed	YES	OFF	OFF	alarms in progress	OFF	Disabled
27	ON	closed	YES	OFF	OFF	alarms in progress	OFF	Disabled
28	OFF	open	NO	OFF	OFF	alarms in progress	OFF	Disabled
29	ON	open	NO	OFF	OFF	alarms in progress	OFF	Disabled
30	OFF	closed	NO	OFF	OFF	alarms in progress	OFF	Disabled
31	ON	closed	NO	OFF	OFF	alarms in progress	OFF	Disabled
32	OFF	open	YES	ON (bF)	ON	no alarms in progress	OFF	Disabled
33	ON	open	YES	ON (bF)	ON	no alarms in progress	OFF	Disabled
34	OFF	closed	YES	ON (bF)	ON	no alarms in progress	OFF	Disabled
35	ON	closed	YES	ON (bF)	ON	no alarms in progress	OFF	Disabled
36	OFF	open	NO	ON (bF)	ON	no alarms in progress	OFF	Disabled
37	ON	open	NO	ON (bF)	ON	no alarms in progress	OFF	Disabled
38	OFF	closed	NO	ON (bF)	ON	no alarms in progress	OFF	Disabled
39	ON	closed	NO	ON (bF)	ON	no alarms in progress	OFF	Disabled
40	OFF	open	YES	OFF	ON	no alarms in progress	OFF	Disabled
41	ON	open	YES	OFF	ON	no alarms in progress	OFF	Disabled
42	OFF	closed	YES	OFF	ON	no alarms in progress	OFF	Disabled
43	ON	closed	YES	OFF	ON	no alarms in progress	OFF	Disabled
44	OFF	open	NO	OFF	ON	no alarms in progress	OFF	Disabled
45	ON	open	NO	OFF	ON	no alarms in progress	OFF	Disabled
46	OFF	closed	NO	OFF	ON	no alarms in progress	OFF	Disabled
47	ON	closed	NO	OFF	ON	no alarms in progress	OFF	Disabled
48	OFF	open	YES	ON (bF)	OFF	no alarms in progress	OFF	Disabled
49	ON	open	YES	ON (bF)	OFF	no alarms in progress	OFF	Disabled
50	OFF	closed	YES	ON (bF)	OFF	no alarms in progress	OFF	Disabled
51	ON	closed	YES	ON (bF)	OFF	no alarms in progress	OFF	Disabled
52	OFF	open	NO	ON (bF)	OFF	no alarms in progress	OFF	Disabled
53	ON	open	NO	ON (bF)	OFF	no alarms in progress	OFF	Disabled
54	OFF	closed	NO	ON (bF)	OFF	no alarms in progress	OFF	Disabled
55	ON	closed	NO	ON (bF)	OFF	no alarms in progress	OFF	Disabled

b1	Alarm relay oscillation when "CY" alarm is on	Dilution drain with contactor	Drain if new request ≤ 2/3 current request (contact open))	Total drain due to inactivity	Display of "CL" & "CP" alarms	Alarm relay activated if...	Periodical total drai	Enable management of steam request signal / external fan control relay M14
56	OFF	open	YES	OFF	OFF	no alarms in progress	OFF	Disabled
57	ON	open	YES	OFF	OFF	no alarms in progress	OFF	Disabled
58	OFF	closed	YES	OFF	OFF	no alarms in progress	OFF	Disabled
59	ON	closed	YES	OFF	OFF	no alarms in progress	OFF	Disabled
60	OFF	open	NO	OFF	OFF	no alarms in progress	OFF	Disabled
61	ON	open	NO	OFF	OFF	no alarms in progress	OFF	Disabled
62	OFF	closed	NO	OFF	OFF	no alarms in progress	OFF	Disabled
63	ON	closed	NO	OFF	OFF	no alarms in progress	OFF	Disabled
64	OFF	open	YES	ON (bF)	ON	alarms in progress	ON (bE)	Disabled
65	ON	open	YES	ON (bF)	ON	alarms in progress	ON (bE)	Disabled
66	OFF	closed	YES	ON (bF)	ON	alarms in progress	ON (bE)	Disabled
67	ON	closed	YES	ON (bF)	ON	alarms in progress	ON (bE)	Disabled
68	OFF	open	NO	ON (bF)	ON	alarms in progress	ON (bE)	Disabled
69	ON	open	NO	ON (bF)	ON	alarms in progress	ON (bE)	Disabled
70	OFF	closed	NO	ON (bF)	ON	alarms in progress	ON (bE)	Disabled
71	ON	closed	NO	ON (bF)	ON	alarms in progress	ON (bE)	Disabled
72	OFF	open	YES	OFF	ON	alarms in progress	ON (bE)	Disabled
73	ON	open	YES	OFF	ON	alarms in progress	ON (bE)	Disabled
74	OFF	closed	YES	OFF	ON	alarms in progress	ON (bE)	Disabled
75	ON	closed	YES	OFF	ON	alarms in progress	ON (bE)	Disabled
76	OFF	open	NO	OFF	ON	alarms in progress	ON (bE)	Disabled
77	ON	open	NO	OFF	ON	alarms in progress	ON (bE)	Disabled
78	OFF	closed	NO	OFF	ON	alarms in progress	ON (bE)	Disabled
79	ON	closed	NO	OFF	ON	alarms in progress	ON (bE)	Disabled
80	OFF	open	YES	ON (bF)	OFF	alarms in progress	ON (bE)	Disabled
81	ON	open	YES	ON (bF)	OFF	alarms in progress	ON (bE)	Disabled
82	OFF	closed	YES	ON (bF)	OFF	alarms in progress	ON (bE)	Disabled
83	ON	closed	YES	ON (bF)	OFF	alarms in progress	ON (bE)	Disabled
84	OFF	open	NO	ON (bF)	OFF	alarms in progress	ON (bE)	Disabled
85	ON	open	NO	ON (bF)	OFF	alarms in progress	ON (bE)	Disabled
86	OFF	closed	NO	ON (bF)	OFF	alarms in progress	ON (bE)	Disabled
87	ON	closed	NO	ON (bF)	OFF	alarms in progress	ON (bE)	Disabled
88	OFF	open	YES	OFF	OFF	alarms in progress	ON (bE)	Disabled
89	ON	open	YES	OFF	OFF	alarms in progress	ON (bE)	Disabled
90	OFF	closed	YES	OFF	OFF	alarms in progress	ON (bE)	Disabled
91	ON	closed	YES	OFF	OFF	alarms in progress	ON (bE)	Disabled
92	OFF	open	NO	OFF	OFF	alarms in progress	ON (bE)	Disabled
93	ON	open	NO	OFF	OFF	alarms in progress	ON (bE)	Disabled
94	OFF	closed	NO	OFF	OFF	alarms in progress	ON (bE)	Disabled
95	ON	closed	NO	OFF	OFF	alarms in progress	ON (bE)	Disabled
96	OFF	open	YES	ON (bF)	ON	no alarms in progress	ON (bE)	Disabled
97	ON	open	YES	ON (bF)	ON	no alarms in progress	ON (bE)	Disabled
98	OFF	closed	YES	ON (bF)	ON	no alarms in progress	ON (bE)	Disabled
99	ON	closed	YES	ON (bF)	ON	no alarms in progress	ON (bE)	Disabled
100	OFF	open	NO	ON (bF)	ON	no alarms in progress	ON (bE)	Disabled
101	ON	open	NO	ON (bF)	ON	no alarms in progress	ON (bE)	Disabled
102	OFF	closed	NO	ON (bF)	ON	no alarms in progress	ON (bE)	Disabled
103	ON	closed	NO	ON (bF)	ON	no alarms in progress	ON (bE)	Disabled
104	OFF	open	YES	OFF	ON	no alarms in progress	ON (bE)	Disabled
105	ON	open	YES	OFF	ON	no alarms in progress	ON (bE)	Disabled
106	OFF	closed	YES	OFF	ON	no alarms in progress	ON (bE)	Disabled
107	ON	closed	YES	OFF	ON	no alarms in progress	ON (bE)	Disabled
108	OFF	open	NO	OFF	ON	no alarms in progress	ON (bE)	Disabled
109	ON	open	NO	OFF	ON	no alarms in progress	ON (bE)	Disabled
110	OFF	closed	NO	OFF	ON	no alarms in progress	ON (bE)	Disabled
111	ON	closed	NO	OFF	ON	no alarms in progress	ON (bE)	Disabled
112	OFF	open	YES	ON (bF)	OFF	no alarms in progress	ON (bE)	Disabled
113	ON	open	YES	ON (bF)	OFF	no alarms in progress	ON (bE)	Disabled
114	OFF	closed	YES	ON (bF)	OFF	no alarms in progress	ON (bE)	Disabled
115	ON	closed	YES	ON (bF)	OFF	no alarms in progress	ON (bE)	Disabled
116	OFF	open	NO	ON (bF)	OFF	no alarms in progress	ON (bE)	Disabled
117	ON	open	NO	ON (bF)	OFF	no alarms in progress	ON (bE)	Disabled
118	OFF	closed	NO	ON (bF)	OFF	no alarms in progress	ON (bE)	Disabled
119	ON	closed	NO	ON (bF)	OFF	no alarms in progress	ON (bE)	Disabled
120	OFF	open	YES	OFF	OFF	no alarms in progress	ON (bE)	Disabled
121	ON	open	YES	OFF	OFF	no alarms in progress	ON (bE)	Disabled
122	OFF	closed	YES	OFF	OFF	no alarms in progress	ON (bE)	Disabled
123	ON	closed	YES	OFF	OFF	no alarms in progress	ON (bE)	Disabled
124	OFF	open	NO	OFF	OFF	no alarms in progress	ON (bE)	Disabled
125	ON	open	NO	OFF	OFF	no alarms in progress	ON (bE)	Disabled
126	OFF	closed	NO	OFF	OFF	no alarms in progress	ON (bE)	Disabled
127	ON	closed	NO	OFF	OFF	no alarms in progress	ON (bE)	Disabled

Tab. 6.e

b1	Alarm relay oscillation when "CY" alarm is on	Dilution drain with contactor	Drain if new request ≤ 2/3 current request (contact open))	Total drain due to inactivity	Display of "CL" & "CP" alarms	Alarm relay activated if...	Periodical total drai	Enable management of steam request signal / external fan control relay M14
128	OFF	open	YES	ON (bF)	ON	alarms in progress	OFF	Enabled
129	ON	open	YES	ON (bF)	ON	alarms in progress	OFF	Enabled
130	OFF	closed	YES	ON (bF)	ON	alarms in progress	OFF	Enabled
131	ON	closed	YES	ON (bF)	ON	alarms in progress	OFF	Enabled
132	OFF	open	NO	ON (bF)	ON	alarms in progress	OFF	Enabled
133	ON	open	NO	ON (bF)	ON	alarms in progress	OFF	Enabled
134	OFF	closed	NO	ON (bF)	ON	alarms in progress	OFF	Enabled
135	ON	closed	NO	ON (bF)	ON	alarms in progress	OFF	Enabled
136	OFF	open	YES	OFF	ON	alarms in progress	OFF	Enabled
137	ON	open	YES	OFF	ON	alarms in progress	OFF	Enabled
138	OFF	closed	YES	OFF	ON	alarms in progress	OFF	Enabled
139	ON	closed	YES	OFF	ON	alarms in progress	OFF	Enabled
140	OFF	open	NO	OFF	ON	alarms in progress	OFF	Enabled
141	ON	open	NO	OFF	ON	alarms in progress	OFF	Enabled
142	OFF	closed	NO	OFF	ON	alarms in progress	OFF	Enabled
143	ON	closed	NO	OFF	ON	alarms in progress	OFF	Enabled
144	OFF	open	YES	ON (bF)	OFF	alarms in progress	OFF	Enabled
145	ON	open	YES	ON (bF)	OFF	alarms in progress	OFF	Enabled
146	OFF	closed	YES	ON (bF)	OFF	alarms in progress	OFF	Enabled
147	ON	closed	YES	ON (bF)	OFF	alarms in progress	OFF	Enabled
148	OFF	open	NO	ON (bF)	OFF	alarms in progress	OFF	Enabled
149	ON	open	NO	ON (bF)	OFF	alarms in progress	OFF	Enabled
150	OFF	closed	NO	ON (bF)	OFF	alarms in progress	OFF	Enabled
151	ON	closed	NO	ON (bF)	OFF	alarms in progress	OFF	Enabled
152	OFF	open	YES	OFF	OFF	alarms in progress	OFF	Enabled
153	ON	open	YES	OFF	OFF	alarms in progress	OFF	Enabled
154	OFF	closed	YES	OFF	OFF	alarms in progress	OFF	Enabled
155	ON	closed	YES	OFF	OFF	alarms in progress	OFF	Enabled
156	OFF	open	NO	OFF	OFF	alarms in progress	OFF	Enabled
157	ON	open	NO	OFF	OFF	alarms in progress	OFF	Enabled
158	OFF	closed	NO	OFF	OFF	alarms in progress	OFF	Enabled
159	ON	closed	NO	OFF	OFF	alarms in progress	OFF	Enabled
160	OFF	open	YES	ON (bF)	ON	no alarms in progress	OFF	Enabled
161	ON	open	YES	ON (bF)	ON	no alarms in progress	OFF	Enabled
162	OFF	closed	YES	ON (bF)	ON	no alarms in progress	OFF	Enabled
163	ON	closed	YES	ON (bF)	ON	no alarms in progress	OFF	Enabled
164	OFF	open	NO	ON (bF)	ON	no alarms in progress	OFF	Enabled
165	ON	open	NO	ON (bF)	ON	no alarms in progress	OFF	Enabled
166	OFF	closed	NO	ON (bF)	ON	no alarms in progress	OFF	Enabled
167	ON	closed	NO	ON (bF)	ON	no alarms in progress	OFF	Enabled
168	OFF	open	YES	OFF	ON	no alarms in progress	OFF	Enabled
169	ON	open	YES	OFF	ON	no alarms in progress	OFF	Enabled
170	OFF	closed	YES	OFF	ON	no alarms in progress	OFF	Enabled
171	ON	closed	YES	OFF	ON	no alarms in progress	OFF	Enabled
172	OFF	open	NO	OFF	ON	no alarms in progress	OFF	Enabled
173	ON	open	NO	OFF	ON	no alarms in progress	OFF	Enabled
174	OFF	closed	NO	OFF	ON	no alarms in progress	OFF	Enabled
175	ON	closed	NO	OFF	ON	no alarms in progress	OFF	Enabled
176	OFF	open	YES	ON (bF)	OFF	no alarms in progress	OFF	Enabled
177	ON	open	YES	ON (bF)	OFF	no alarms in progress	OFF	Enabled
178	OFF	closed	YES	ON (bF)	OFF	no alarms in progress	OFF	Enabled
179	ON	closed	YES	ON (bF)	OFF	no alarms in progress	OFF	Enabled
180	OFF	open	NO	ON (bF)	OFF	no alarms in progress	OFF	Enabled
181	ON	open	NO	ON (bF)	OFF	no alarms in progress	OFF	Enabled
182	OFF	closed	NO	ON (bF)	OFF	no alarms in progress	OFF	Enabled
183	ON	closed	NO	ON (bF)	OFF	no alarms in progress	OFF	Enabled
184	OFF	open	YES	OFF	OFF	no alarms in progress	OFF	Enabled
185	ON	open	YES	OFF	OFF	no alarms in progress	OFF	Enabled
186	OFF	closed	YES	OFF	OFF	no alarms in progress	OFF	Enabled
187	ON	closed	YES	OFF	OFF	no alarms in progress	OFF	Enabled
188	OFF	open	NO	OFF	OFF	no alarms in progress	OFF	Enabled
189	ON	open	NO	OFF	OFF	no alarms in progress	OFF	Enabled
190	OFF	closed	NO	OFF	OFF	no alarms in progress	OFF	Enabled
191	ON	closed	NO	OFF	OFF	no alarms in progress	OFF	Enabled
192	OFF	open	YES	ON (bF)	ON	alarms in progress	ON (bE)	Enabled
193	ON	open	YES	ON (bF)	ON	alarms in progress	ON (bE)	Enabled
194	OFF	closed	YES	ON (bF)	ON	alarms in progress	ON (bE)	Enabled
195	ON	closed	YES	ON (bF)	ON	alarms in progress	ON (bE)	Enabled
196	OFF	open	NO	ON (bF)	ON	alarms in progress	ON (bE)	Enabled
197	ON	open	NO	ON (bF)	ON	alarms in progress	ON (bE)	Enabled
198	OFF	closed	NO	ON (bF)	ON	alarms in progress	ON (bE)	Enabled
199	ON	closed	NO	ON (bF)	ON	alarms in progress	ON (bE)	Enabled
200	OFF	open	YES	OFF	ON	alarms in progress	ON (bE)	Enabled

b1	Alarm relay oscillation when "CY" alarm is on	Dilution drain with contactor	Drain if new request ≤ 2/3 current request (contact open))	Total drain due to inactivity	Display of "CL" & "CP" alarms	Alarm relay activated if...	Periodical total drai	Enable management of steam request signal / external fan control relay M14
201	ON	open	YES	OFF	ON	alarms in progress	ON (bE)	Enabled
202	OFF	closed	YES	OFF	ON	alarms in progress	ON (bE)	Enabled
203	ON	closed	YES	OFF	ON	alarms in progress	ON (bE)	Enabled
204	OFF	open	NO	OFF	ON	alarms in progress	ON (bE)	Enabled
205	ON	open	NO	OFF	ON	alarms in progress	ON (bE)	Enabled
206	OFF	closed	NO	OFF	ON	alarms in progress	ON (bE)	Enabled
207	ON	closed	NO	OFF	ON	alarms in progress	ON (bE)	Enabled
208	OFF	open	YES	ON (bF)	OFF	alarms in progress	ON (bE)	Enabled
209	ON	open	YES	ON (bF)	OFF	alarms in progress	ON (bE)	Enabled
210	OFF	closed	YES	ON (bF)	OFF	alarms in progress	ON (bE)	Enabled
211	ON	closed	YES	ON (bF)	OFF	alarms in progress	ON (bE)	Enabled
212	OFF	open	NO	ON (bF)	OFF	alarms in progress	ON (bE)	Enabled
213	ON	open	NO	ON (bF)	OFF	alarms in progress	ON (bE)	Enabled
214	OFF	closed	NO	ON (bF)	OFF	alarms in progress	ON (bE)	Enabled
215	ON	closed	NO	ON (bF)	OFF	alarms in progress	ON (bE)	Enabled
216	OFF	open	YES	OFF	OFF	alarms in progress	ON (bE)	Enabled
217	ON	open	YES	OFF	OFF	alarms in progress	ON (bE)	Enabled
218	OFF	closed	YES	OFF	OFF	alarms in progress	ON (bE)	Enabled
219	ON	closed	YES	OFF	OFF	alarms in progress	ON (bE)	Enabled
220	OFF	open	NO	OFF	OFF	alarms in progress	ON (bE)	Enabled
221	ON	open	NO	OFF	OFF	alarms in progress	ON (bE)	Enabled
222	OFF	closed	NO	OFF	OFF	alarms in progress	ON (bE)	Enabled
223	ON	closed	NO	OFF	OFF	alarms in progress	ON (bE)	Enabled
224	OFF	open	YES	ON (bF)	ON	no alarms in progress	ON (bE)	Enabled
225	ON	open	YES	ON (bF)	ON	no alarms in progress	ON (bE)	Enabled
226	OFF	closed	YES	ON (bF)	ON	no alarms in progress	ON (bE)	Enabled
227	ON	closed	YES	ON (bF)	ON	no alarms in progress	ON (bE)	Enabled
228	OFF	open	NO	ON (bF)	ON	no alarms in progress	ON (bE)	Enabled
229	ON	open	NO	ON (bF)	ON	no alarms in progress	ON (bE)	Enabled
230	OFF	closed	NO	ON (bF)	ON	no alarms in progress	ON (bE)	Enabled
231	ON	closed	NO	ON (bF)	ON	no alarms in progress	ON (bE)	Enabled
232	OFF	open	YES	OFF	ON	no alarms in progress	ON (bE)	Enabled
233	ON	open	YES	OFF	ON	no alarms in progress	ON (bE)	Enabled
234	OFF	closed	YES	OFF	ON	no alarms in progress	ON (bE)	Enabled
235	ON	closed	YES	OFF	ON	no alarms in progress	ON (bE)	Enabled
236	OFF	open	NO	OFF	ON	no alarms in progress	ON (bE)	Enabled
237	ON	open	NO	OFF	ON	no alarms in progress	ON (bE)	Enabled
238	OFF	closed	NO	OFF	ON	no alarms in progress	ON (bE)	Enabled
239	ON	closed	NO	OFF	ON	no alarms in progress	ON (bE)	Enabled
240	OFF	open	YES	ON (bF)	OFF	no alarms in progress	ON (bE)	Enabled
241	ON	open	YES	ON (bF)	OFF	no alarms in progress	ON (bE)	Enabled
242	OFF	closed	YES	ON (bF)	OFF	no alarms in progress	ON (bE)	Enabled
243	ON	closed	YES	ON (bF)	OFF	no alarms in progress	ON (bE)	Enabled
244	OFF	open	NO	ON (bF)	OFF	no alarms in progress	ON (bE)	Enabled
245	ON	open	NO	ON (bF)	OFF	no alarms in progress	ON (bE)	Enabled
246	OFF	closed	NO	ON (bF)	OFF	no alarms in progress	ON (bE)	Enabled
247	ON	closed	NO	ON (bF)	OFF	no alarms in progress	ON (bE)	Enabled
248	OFF	open	YES	OFF	OFF	no alarms in progress	ON (bE)	Enabled
249	ON	open	YES	OFF	OFF	no alarms in progress	ON (bE)	Enabled
250	OFF	closed	YES	OFF	OFF	no alarms in progress	ON (bE)	Enabled
251	ON	closed	YES	OFF	OFF	no alarms in progress	ON (bE)	Enabled
252	OFF	open	NO	OFF	OFF	no alarms in progress	ON (bE)	Enabled
253	ON	open	NO	OFF	OFF	no alarms in progress	ON (bE)	Enabled
254	OFF	closed	NO	OFF	OFF	no alarms in progress	ON (bE)	Enabled
255	ON	closed	NO	OFF	OFF	no alarms in progress	ON (bE)	Enabled

Tab. 6.f

7. CONTROLLING THE BOARD VIA NETWORK

The variables shown in the list are only some of the total variables available. DO NOT CONFIGURE VARIABLES THAT ARE NOT SHOWN IN THE TABLE, OTHERWISE THE OPERATION OF THE HUMIDIFIER MAY BE AFFECTED.

NOTE: The software release is made up of 4 digits and is shown on the sticker on the back of the controller. For example, the code "1.080" indicates: hardware release "1.0" and software release "8.0". Make sure the correct network address has been set for parameter C3 (internal variable I13) before setting the address of the CPY controllers. Each humidifier is configured by default with address 1, two units cannot have the same address.

"A"	analogue variables* (Modbus® RTU: REGISTERS)
CAREL - Modbus®	
3	param. d9: rated capacity in kg/h (see the table of parameters)
4	param. d7: maximum production in kg/h (see the table of parameters)
15	param. d3: instant steam flow-rate in kg/h; read-only. Format "#### = #### (100 = 100 kg/h)".
30	param. d6: current (A); read-only. Format "#### = #### (16 = 16a)".
33	param. C8: maximum time with no data (sent to controller) over RS485 to generate stop production and "SU" alarm (see parameters table)

Tab. 7.a

* I dati provenienti dal controllo vanno interpretati con una cifra decimale. Es: var. 3=150 significa 15.0 kg/h

"I"		integer variables (Modbus® RTU: REGISTERS)
CAREL	Modbus®	
1	256	param. P0: maximum production (see the table of parameters)
2	257	param. A0: operating mode (see the table of parameters)
3	258	param. A1: unit of measure (see the table of parameters)
4	259	param. A2: type of production request (see the table of parameters)
5	260	param. b1: additional functions (see the table of parameters)
6	261	param. b2: off delay time (see the table of parameters)
7	262	param. b4: override water conductivity (see the table of parameters)
8	263	param. b5: conductivity pre-alarm threshold (see the table of parameters)
9	264	param. b6: conductivity alarm threshold (see the table of parameters)
10	265	param. b7: foam control threshold (see the table of parameters)
11	266	param. b8: conductivity control inside the cylinder in steady operation compared to rated value
12	267	param. C0: rated value displayed (see the table of parameters)
13	268	param. C3: serial port address (see the table of parameters)
14	269	param. C4: baud rate (see the table of parameters)
15	270	param. C5: supervisor: frame (see the table of parameters)
16	271	param. C6: serial response transmission delay (see the table of parameters)
17	272	param. b9: reduce duration of drain to dilute cycle (see the table of parameters)
18	273	param. bb: cylinder maintenance limit time in hours (see the table of parameters)
19	274	param. bE: time limit between two periodical drain cycles (see the table of parameters)
20	275	param. bF: days delay for drain due to inactivity (see the table of parameters)
44	299	param. d1: external control signal - see paragraph "controlling production using variables I62 and I63, read-only; example format " #### = #### (0%-100%, step 1%)"
46	301	humidifier status (read-only)0 = not active (no request, shutdown or disabled); 1 = start evaporation cycle; 2 = water fill in progress; 3 = evaporation in progress ; 4 = AFS drain ; 5 = water drain (to dilute or manual); 6 = end of water drain; 7 = complete drain for long inactivity; 8 = complete drain from manual or network control; 9 = no water management; 10 = pre-wash; 11 = periodical drain
47	302	type of humidification stage (read-only) 0 = not active; 1 = soft start; 2 = start of steady production the reduced production; 3 = steady production; 4 = reduced production; 5, 6, 7 = soft start
49	304	param. d5: conductivity of supply water (µS/cm) read-only, see the table of parameters
54	309	param. db: unit hour counter (not resettable, see the table of parameters)
55	310	param. dA: cylinder hour counter (resettable, see the table of parameters)
62	317	controls via RS485 ; bit 0: reset alarm log; bit 1: reset counter dA; bit 2: production request via variable I63; bit 3: pre-wash; bit 4: reset active alarms; Bit 6: flag to enable stop production + alarm for serial disconnected; Bit 7: flag to request oldest alarm; Bit 8: flag to request most recent alarm; Bit 9: flag to load first alarm in log; Bit 12: flag to enable create user backup. Except for bit2, the others are always read as 0. On power-up, all the bits are equal to 0.
63	318	production request via network (when I62 bit2 = 4) (0%-100%, step 1%).
64	319	control board match-digit (read-only)
67	322	param. c7 (see the table of parameters)
83	338	alarm status: Bit 0: at least one BLOCK alarm present ; Bit 1:at least one DISAB alarm present; Bit 2: at least one WARN alarm present
84	339	alarms with shutdown (read-only) bit n=0 alarm not active, bit n=1 alarm active. See table of alarms: bit 0: alarm Mn; bit 1: alarm EC; bit 2: alarm E1; bit 3: alarm E0; bit 4: alarm EH; bit 5: alarm EP; bit 6: not used; bit 7: not used.
85	340	alarms with disabling (read-only) bit n=0 alarm not active, bit n=1 alarm active. See table of alarms: bit 0: alarm EU (automatic reset); bit 1: alarm E3; bit 2: alarm EF (automatic reset); bit 3: alarm Ed; bit 4: not used; bit 5: not used; bit 6: Alarm SU; bit 7: not used.

86	341	warnings (read-only) bit n=0 alarm not active, bit n=1 alarm active. See table of alarms: bit 0: pre-alarm CY; bit1: warning EA; bit 2: warning CP; bit 3: warning CL; bit 4: warning E2; bit 5, bit 6, bit 7: not used
89	344	read line in alarm log (see variable I62, bit7-8-9)

Tab. 7.b

"D"	DIGITAL VARIABLES (Modbus® RTU: COILS)
CAREL - Modbus®	
1	humidifier disabled by remote ON/OFF (terminals M2.4 M2.5) read-only
2	disabling control signal: D2=1 => CPY disabled; D2=0 => CPY enabled (similar to remote ON/OFF)
3	humidifier ready and awaiting request (read-only)
4	contactor status: 0 = open, 1 = closed (read-only)
5	status of 24 Vac drain output: 0 = no drain, 1 = drain (read-only)
6	status of drain relay output: 0 = no drain, 1 = drain (read-only)
7	cumulative alarm relay: 0 = not energised, 1 = energised (read-only)
8	status of 24 Vac fill output: 0 = no fill, 1 = fill (read-only)
10	high water level: 0 = probes not activated, 1 = probes activated (read-only)
17	manual drain control: 0 = not active, 1 = active; if set to 1 via the network, the drain will be performed until maximum time or variable 'D17' is reset
19	CPY terminal connected and on-line: 0 = not on-line, 1 = on-line (read-only)
21	enable/disable humidifier from ESC key (0/1=enable/disable)

Tab. 7.c

7.1 Controlling production using variables I62 and I63

1. Via network, immediately after start-up, set D2 = 0 (D2 does not need to be set again if the board is not switch off).
2. Set I2 = 0 for ON/OFF control (A0 = 0), I2 = 1 for proportional control (A0 = 1)
3. Set I62 = 4 to send the request via variable I63. If A0=0, if I63 ≤50: OFF; if I63≥51: ON
4. Write the production request to variable I63, format 000 to 100 (0% to 100%).

Note: if bit6=1 in variable I62, steam production will stop when there is no control data flow over the RS485 serial link for a period exceeding the time set for parameter C8. Production can resume when new data is sent.

7.2 Read alarm log via the network

Supervisor variable I89 shows the alarms saved in the log, one at a time. Normally this variable will always show the code of the most recent alarm; to scroll all the alarms saved, set the following bits of variable I62:

Variable I62 - bit7: Flag to request previous alarm (write-only)
Loads the code of the alarm saved prior to the current alarm displayed into variable I89.
If the current alarm is the oldest, the value 0 is loaded.

Variable I62 - bit8: Flag to request next alarm (write-only)
Loads the code of the alarm saved immediately after the current alarm displayed into variable I89.
If the current alarm is the most recent (for example after having set bit 0x0200), the value 0 is loaded

Variable I62 - bit9: Flag to load the last alarm in the log (write-only)
Loads the code of the most recent alarm into variable I89

Note: if I89 is showing the most recent alarm, when a new alarm is activated, this new alarm will be shown.
If on the other hand it is showing any alarm prior to the most recent, the same alarm will continue to be shown.
The log can contain a maximum of 366 alarms.

7.3 Loss of network communication

If there is a loss in network communication, CPY stops the KUE unit by opening the contactor; CPY then goes into standby, without producing steam, and alarm E3 is displayed. Steam production resumes as follows:

- Communication is restored with the external controller: CPY automatically responds to the request from the external controller, and alarm E3 disappears.

CPY is switched off and on again: CPY responds to the request from the external controller (if communication has been restored) or from the external signal (0-10 V, 4-20 mA, etc.) sent to terminals M2:1-2-3. In this way, if communication with the external controller is interrupted, steam production can be started again by switching CPY off an on again and sending the

request using an external signal, 0-10 V (4-20 mA, etc.).

7.4 Modbus® RTU protocol on the CPY boards

The Modbus® protocol can be selected using parameter C7 (see "Serial connection parameters").
Chapter 7 shows a list of variables and the corresponding addresses.
For multiple read/writes, the maximum number of "Register" or "Coil" variables is 20.
The following functions are available:

MB_READ_COIL_STATUS	1:	used to request the status (ON or OFF) of a certain number of "Coil" variables (binary, 1 bit), starting from the specified address. Broadcast mode is not allowed.
MB_READ_INPUT_STATUS	2:	operationally identical to the above.
MB_READ_HOLDING_REG	3:	used to request the value of a consecutive block of "Register" variables (numeric, 16 bit). Broadcast mode is not allowed.
MB_READ_INPUT_REG	4:	operationally identical to the above.
MB_FORCE_SINGLE_COIL	5:	used to set the status of an individual "Coil" variable (binary, 1 bit) to ON or OFF (specifying the address of the bit in question). Broadcast mode is allowed.
MB_PRESET_SINGLE_REG	6:	used to set the value of an individual "Register" variable (numeric, 16 bit). Broadcast mode is allowed.
MB_FORCE_MULTIPLE_COIL	15:	used to set the status of a consecutive block of "Coil" variables (binary, 1 bit) (specifying the number of bits and number of bytes). Broadcast mode is allowed
MB_PRESET_MULTIPLE_REG	16:	used to set the value of a consecutive block of "Register" variables (numeric, 16 bit). Broadcast mode is allowed.

Tab. 7.d

7.5 Exceptions managed

01 illegal fuction
02 lillegal data address
03 illegal data value

8. ADVANCED FUNCTIONS

8.1 Reset: cylinder hour counter "dA", active alarms and alarm log

The counter can be reset via terminal M2.7, or via network or from the terminal.
The cylinder hour counter "dA" must be set to zero when changing cylinder to ensure rapid restart.
The unit hour counter "db" cannot be set to zero, because it records the total life of the unit.

8.2 Reset alarms and hour counter dA via terminal M2.7

Short-circuit M2.7 with terminal M2.5 using a voltage-free contact, observing the following times:
mode: reset alarms only, no reset cylinder hour counter dA
M2.7: ON = closed; OFF = open

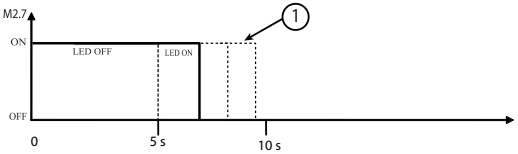

Fig. 8.a

① Opening after 5 seconds and before the 10 second limit: reset (not counter dA); after 5 seconds the red LED stays on steady to await the opening of the contact.

mode: no reset alarms, only reset cylinder hour counter dA
M2.7: ON = closed; OFF = open

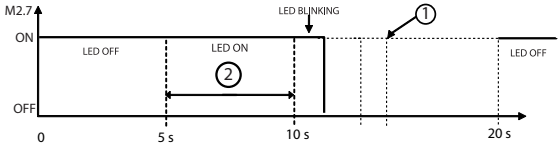

Fig. 8.b

① Opening after 10 seconds and before the 20 second limit: reset the hour counter dA (not the active alarms); red LED flashing awaiting the opening of the contact. Opening after 20 seconds: operation cancelled.
② Red LED on steady.
Terminal M2.7 can be used to reset the active alarms, but not delete the alarm log. The alarm log can be deleted via network (see below) or from the CPY terminal (CPYTERM000).

8.3 Reset via network

Reset alarms and alarm log: write bit 0 of integer variable I62 to 1 to delete the alarm log; the active alarms are not reset. Write bit 4 of integer variable I62 to 1 to delete the active alarms; the alarm log is not reset. Reset cylinder hour counter: write bit 1 of integer variable I62 to 1 to reset the hour counter dA. Counter db cannot be reset.

8.4 Reset from CPY terminal (parameter 'dA')

See the chapter on the CPY terminal.

8.5 Initial pre-wash of the lines and the cylinder

This procedure is used to clean the water lines and the cylinder, above all after having completed the water connections and/or replaced the cylinder. The cylinder is filled (with the contactor closed) and emptied 3 times to remove any impurities in the hoses and in the cylinder. The pre-washing of the lines and the cylinder can be performed at any time, via terminal M2.7 or the network. Pre-wash via terminal M2.7: 1) turn the CPY board off; 2) short-circuit M2.7 with M2.5; 3) switch the CPY board on; 4) start the pre-wash. Pre-wash via network: write bit 3 of integer variable I62 to 1.

8.6 Reset e pre-lavaggio attraverso il terminale CPY -

See the chapter on the CPY terminal.

8.7 Description of alarms CY and Mn

The CPY board has a pre-alarm (warning) and a maintenance alarm with shutdown, set respectively to 3000 and a 4500 hours:
- the warning (no shutdown, CY) recalls the attention of the operator to the need to carry out the periodical check of the cylinder, by the flashing of the red LED (7 fast flashes) and the intermittent activation of the alarm relay (activated intermittently if no other warnings or alarms are active);
- the alarm (shutdown, Mn) obliges the operator to check and, if necessary, replace the cylinder after 4500 operating hours from the last maintenance operation (8 fast flashes of the red LED and alarm relay on steady; the warning is shown for 50% of 'bb' hours before shutdown.

These signals have been introduced to prevent a lack of maintenance on the cylinders from damaging the units. Both the warning and the alarm can be reset by setting the hour counter to zero.The enabling/disabling of the function and the setting of the timeouts at 3000 and 4500 hours can usually be performed from the terminal or via network, by modifying parameter 'bb'; the warning is generated after 'bb' hours, the shutdown alarm after "1.5x bb" hours.

8.8 Istruzioni per visualizzare release software

1) On power-up:
   a) flashes of the yellow and red LEDs (see below);
   b) the display shows "rel. x.y" (e.g. rel. 1.0).
2) during operation:
   a) display: from the main screen, press ESC and UP at the same time;
   b) via network using integer variable 81. Format "## = #.#" (e.g. 13 = release 1.3)".

Flashes of yellow and red LED to display the software release.
With the CPY board off:

a) Switch the CPY board on;
b) The green LED comes on, indicating that the board is powered;
c) Count the number of flashes of the yellow LED (e.g. 1 flash);
d) Count the number of flashes of the red LED (e.g. 7 flashes). The count ends when the 3 LEDs come on together.
In the example, the software release is 1.7.

8.9 Operating principle

Immersed electrode humidifiers 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.

8.10 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.

8.11 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 entire range is indicated as the proportional band. 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).

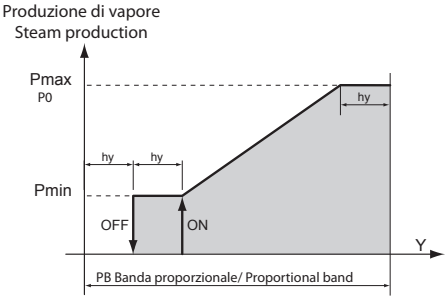

Fig. 8.c

8.12 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 µS/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).

The alarm is activated when the reading exceeds one of the two thresholds continuously for 60 minutes, or alternatively instantly if the value read is 3 times higher than the threshold.

8.13 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').

8.14 Manual calibration of the drain to dilute cycles

The drain to dilute cycles are performed automatically so as to manage the concentration of mineral salts contained in the cylinder (internal concentration):

a) if the internal concentration is too high, phenomena will arise such as foam, corrosion of the electrodes and electric discharges between the electrodes through the water;

b) sif the internal concentration is too low the humidifier will be slow in following variations in the demand for steam production.

CPY performs the drain to dilute cycles so as to maintain an optimum internal concentration.

The production of steam increases the concentration of salts in the water inside the cylinder, as the water evaporates without carrying away the salts: with the drain to dilute cycles, CPY can return the internal concentration to the optimum values, as during each drain cycle some of the water in the cylinder is replaced with mains water, thus diluting the water inside the cylinder.

The algorithm on the CPY is suitable for almost all types of water available around the world; nonetheless, in some cases the drain to dilute cycles may need to be calibrated manually.

Manual calibration is necessary if CPY cannot correct/eliminate the following phenomena: foam, corrosion of the electrodes, discharges between the electrodes through the water. It is recommended to wait a few hours from such phenomena occur before performing the manual calibration procedure, so as to allow CPY to act independently, unless the safety of people, animals and things is endangered.

The manual calibration should be performed by firstly increasing the frequency of the drain to dilute cycles and, only if this is not sufficient, by also increasing the duration of the cycles. Each drain cycle, in fact, affects the production of steam and reduces the efficiency of humidity control, as:

- if the contactor is open during the drain cycle, steam production stops for the entire drain time;
- during the next fill cycle, the mains water added reduces the water temperature inside the cylinder, thus further decreasing steam production. This effect occurs even if the contactor is closed during the drain cycle (see parameter b1 regarding drain with/without power to the electrodes).

It is clear that, from the point of view of humidity control, it is preferable to have more frequent yet shorter drain cycles.

The calibration can be performed using the following settings:

1. frequency of the drain cycles: parameter b8 (this can be set via network or from the display);
2. duration of the drain cycles: parameter b9 (this can be set via network or from the display);

The manual calibration procedure, explained in detail in the following sections, is a process that occurs slowly because the effects of the changes to the frequency and/or the duration of the drain to dilute cycles take time to be seen. Phenomena such as foam, corrosion and electrical discharges through the water cannot be resolved in a short time: the manual calibration procedure should be performed with care and patience.

b8 and b9 can be used to set the frequency and the duration of the drain to dilute cycles respectively:

- increasing b8 decreases the frequency of the drain cycles and vice-versa;
- increasing b9 increases the duration of the drain cycles and vice-versa.

b8 and b9 can be set via network or on the terminal

- b8: range 50%-200%, default 100%;
- b9: range 50%-200%, default 100%.

The recommended calibration procedure is described below. Always wait a couple of a drain to dilute cycles after each change to monitor the effect:

1. Set b8 = 110%b9: range 50%-200%, default 100%.
2. Increase b8 in steps of 10% (maximum value 200%)
3. Wait a couple of a drain to dilute cycles:
   a) if the phenomena disappear, stop here;
   b) otherwise if:
      b8 < 200% , repeat from step 2)
      b8 = 200% (maximum), continue on as below
4. If b9 < 200%, increase b9 in steps of 10% (maximum value 200%) and repeat from step 1).

The calibration procedure is explained schematically below:

CAREL parameter b8: increase frequency of drain to dilute cycles	CAREL parameter b9 increase duration of drain to dilute cycles
100% Wait a couple of a drain to dilute cycles (may take up to 30 min): • problems resolved → end • problems still occurring → continue on below	100%
110% Wait a couple of a drain to dilute cycles (may take up to 30 min): • problems resolved → end • problems still occurring → continue on below	100%
120% Wait a couple of a drain to dilute cycles (may take up to 30 min): • problems resolved → end • problems still occurring → continue on below	100%
…	…
200% Wait a couple of a drain to dilute cycles (may take up to 30 min): • problems resolved → end • problems still occurring → continue on below	100%
100% Wait a couple of a drain to dilute cycles (may take up to 30 min): • problems resolved → end • problems still occurring → continue on below	110%
110% Wait a couple of a drain to dilute cycles (may take up to 30 min): • problems resolved → end • problems still occurring → continue on below	110%
…	…
200% Wait a couple of a drain to dilute cycles (may take up to 30 min): • problems resolved → end • problems still occurring → continue on below	200%
If the problem persists, contact your nearest CAREL representative or service@carel.com	

8.15 Drain due to inactivity

If the humidifier does not operate for an extended time (it remains on but does not produce steam), the water in the cylinder is drained automatically, to avoid stagnation and hygiene risks. The inactivity time is set using parameter "bF" (default 3 days). The function can be disabled by setting parameter b1.

8.16 Powered draining

When running an automatic drain cycle due to excessive salt, the electrodes are not powered and the production of steam is thus reduced. To keep the electrodes powered during the drain cycle set parameter b1.

8.17 Draining due to a significant reduction in the request for production

In the event of a significant reduction in the request for steam production, the humidifier, rather than wait for the level of water (and thus the production) to decrease due to the effect of the production itself, performs a drain cycle. The reduction in the request for steam production is considered significant if the current is 33% higher than that relating to the requested level. This function can be disabled. Set parameter b1.

8.18 Periodical drain

When using water rich in substances such as humus and lime, a periodical drain cycle should be set for the cylinder to avoid accumulating residues. To enable the periodical drain, set parameter b1 bit7=1. In this way, every 24 h the humidifier will drain all the stagnant water in the cylinder, and the display will show code "dP" (periodical drain). If the periodical drain is enabled, the number of hours between two periodical drain cycles can be set using parameter "bE".

8.19 Automatic insufficient supply water management

The humidifier checks whether there is no supply water (or the flow-rate of supply water is too low), by controlling if the current at the electrodes increases after opening the fill solenoid valve. In this case, the humidifier:
- displays alarm "EF"
- activates the alarm relay,
opens the contactor and closes the fill solenoid valve for 10 minutes.
After the 10 minutes, the fill solenoid valve is opened, the contactor closed and the phase current measured: if it increases the alarm is deactivated, otherwise the procedure is repeated. Note: the alarm is reset automatically and is managed according to the procedure described above.

8.20 Auxiliary contact management (active fan request)

The auxiliary contact can be used to:
- remote signalling of steam production request (but not the actual value);
- activation/deactivation of an external fan unit, based on whether the steam production request is present.

Activating this function by parameter b1 (see par. 11.6), the contact is activated during steam production, with a delay of A6 seconds, and deactivated with a delay of A7 seconds. During A6 and A7 the symbol (fan) will flash on the display, during activation the symbol (fan) will be on steady. **Note:** only two exceptions for the operation, are:
- During the manual drain (see Chap. 6.12) the contact will be deactivated (always after the delay A7)
- During pre-wash (see Chap. 6.1) the contact be activated, with the corresponding delays.

8.21 Manual procedure

This procedure is used to manually control the devices on the humidifier.
- from the main screen, press the PRG button for 2 seconds.
- enter the password 70 using UP or DOWN.
- the display will show **MAn**
- press PRG.
- the display will show **tlr**

Then scroll the various devices using UP and DOWN:
- **tlr** = Contactor
- **drn** = Drain pump
- **FiL** = Fill EV
- **drt** = Draintempering EV
- **ALr** = Alarm relay
- **FAn** = Auxiliary contact (steam production/external fan)

Pressing PRG from any these options shows:
ON: if the device is currently active
OFF: if the device is currently inactive
Press PRG; the display starts flashing
- Press UP or DOWN to modify the value;
- Press PRG to confirm.

Press ESC to return to the previous display.

Note: The mode can only be exited using the esc button from the man display or by switching off the humidifier.

8.22 Alarm relay switching

Once the operating hours corresponding to the cylinder maintenance request have been reached ("CY" alarms), the alarm relay (if there are no other alarms active) will switch for 10 seconds every 12 hours, until reaching the "Mn" alarm. This function is activated using parameter b1; normally disabled.

8.23 Management of high level and foam

When water or foam activate the high level sensor, the CPY board runs a partial drain cycle, after which it attempts to guarantee the steam demand by concentrating the water at the new level, lower than before the drain cycle.
Before reaching demand, production at the level lower is called "reduced production". If the high level sensor is activated too frequently by foam, the CPY board runs a number of partial drain cycles followed from fill cycles with mains water so as to reduce the concentration of substances that generate the foam and thus eliminate it. If the partial drain cycles do not manage to eliminate the foam, the CPY completely drains the cylinder and production restarts with an empty cylinder.

8.24 Chattering of the drain valve during the fill cycles (not available with drain pump)

The chattering of the drain valve during the fill cycle is aimed at eliminating any leaks through the drain due to residual lime scale that keeps the drain valve partially open (KUE*R*-KUE*3* only). During the fill cycle, if the current does not reach the desired value in a certain time, the CPY board assumes there is a leak through the drain (which would in fact cause a slow increase in the current): as a consequence, the drain valve is opened/closed 5 times in rapid succession (chattering) so as to eliminate any debris that keeps the drain valve open. This operation is performed only once during the full cycle: when the chattering is terminated, if the current still does not reach the desired value within the timeout, the automatic management of supply water interruption procedure is started. This function is only available for the KUE with drain valves and not for the models with drain pump: chattering, in fact, is not allowed for the pump and, in addition, the use of the pump and of the drain column together prevent leaks through the drain due to residual lime scale.

8.25 Current limits for the electrodes: with & without current peaks in the first 20s after the contactor closes

1. param. b2=0 (default): phase current limits without current peaks in the first 20s after the contactor closes.

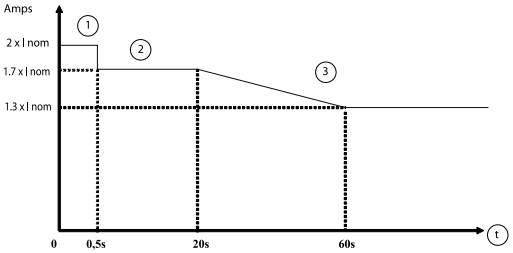

Fig. 8.d

(1) Peak: 2 brief flashes of red LED (EH); shutdown
(2) No peak
(3) Peak: 5 second discharge; max 5 drain cycles in the same evaporation cycle > automatic restart, otherwise 2 brief flashes of red LED (EH) and shutdown
(t) Contactor closing time

2. param. b2=0 (default): phase current limits with current peaks in the first 20s after the contactor closes.

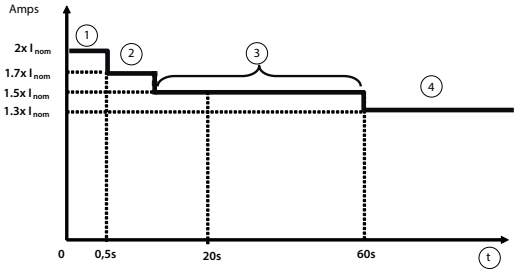

Fig. 8.e

(1) Peak: 2 brief flashes of red LED (EH); shutdown
(2) 1st peak: 10 second discharge; automatic restart
(3) 2nd peak: 30 second discharge, 2 brief flashes of red LED (EH); shutdown
(4) Max. value: 5 seconds discharge; max 5 drain cycles in the same evaporation cycle > automatic restart, otherwise 2 brief flashes of red LED (EH) and shutdown
(t) Contactor closing time

8.26 Current limits for the electrodes: with & without current peaks in the first 20s after the contactor closes

3. Param. b2>0:

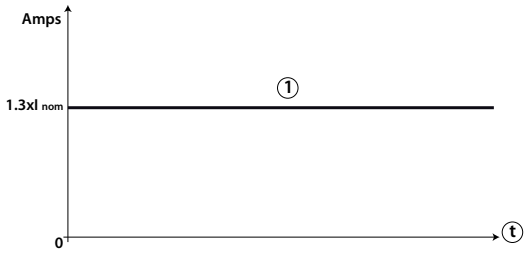

Fig. 8.f

(1) Peak: 5 second discharge; max. 5 drain cycles in the same evaporation cycle > automatic restart, otherwise 2 brief flashes of red LED (EH) and shutdown

(t) Contactor closing time

9. TECHNICAL SPECIFICATIONS

Power supply:	24 Vac, from -15 % to +10 %, 50/60 Hz (protect with a 1 A fast-blow fuse, installer's responsibility, to be connected in series with terminal M8.1)
Power input:	10 VA (not including utilities) - 40 VA max. (including utilities)
Inputs and outputs:	see electrical connections
Operating conditions:	0T60 °C; <90% rH non-condensing
Storage conditions:	-10T70 °C; <90% rH non-condensing
Environmental pollution:	class 2
External TAM	code 09C412A017 / 09C565A042
Software class	class A
Type of action	1.C - 1.Y
Assembly	DIN rail
Class according to protection against electric shock	double insulation
Dimensions (in mm)	6-DIN plastic casing (W x H x D = 105.3 x 111.3 x 48.9)
Index of protection	IP00

Tab. 9.a

CPYTERM dimensions:

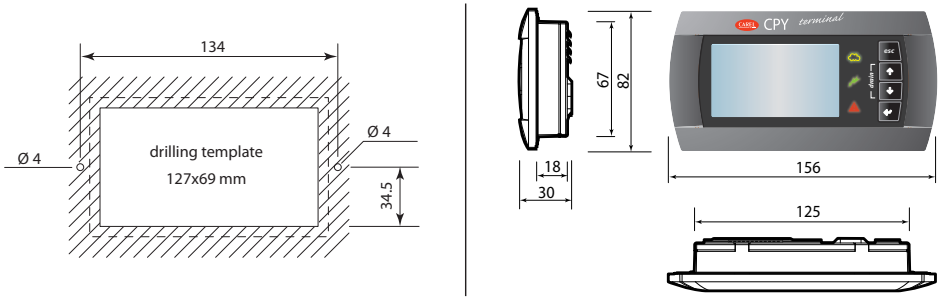

Fig. 9.a

10. ALARMS

Alarm diagram (red LED) "short flashes"

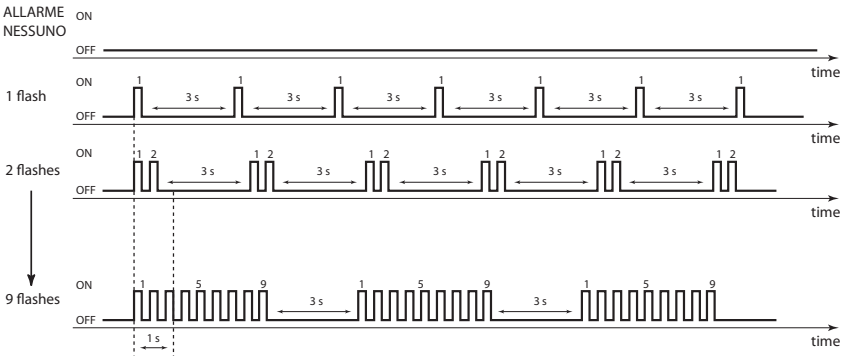

Fig. 9.a

Alarm diagram (red LED) "long flashes"

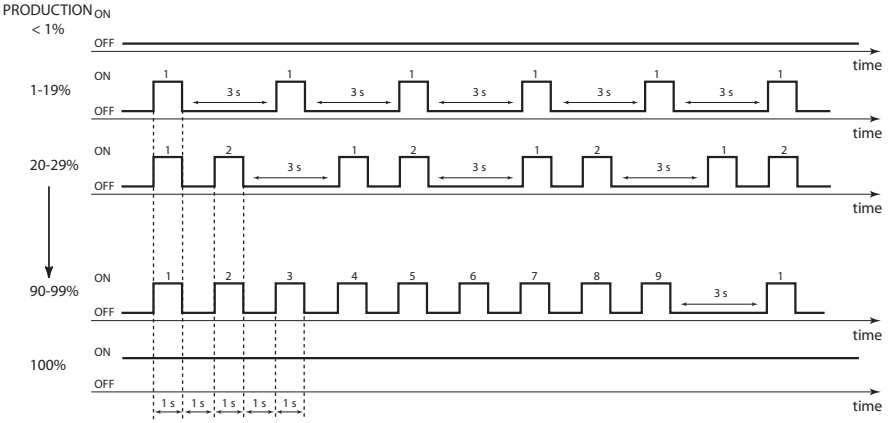

Fig. 9.b

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 and1250 µS/cm. Softening the water may worsen the problem	AUTO	yes	humidif. stopped
					TAM electrical circuit not configured correctly	Switch unit off and configure TAM jumper. Switch unit on and check if the alarm is repeated.			
					Malfunction in the TAM electrical circuit	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	***µS/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 µS/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 µS/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..			

Red LED on board (if terminal not connected) (*)	CPY terminal		var. code I89	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 "I" 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.			

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 and1250 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.	See solution to EF (relating to TAM electrical circuit not configured)			
					Malfunction in the TAM electrical circuit.				
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.			

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 and1250 µS/cm. Softening the water may worsen the problem.	ESC	no	signal only
					Softened water.				
					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; if necessary replace the board			
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).

CAREL

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+040000032 – rel. 2.9 – 13.12.2017