

# Retarder proofing controller specifications

CT1SA0040101

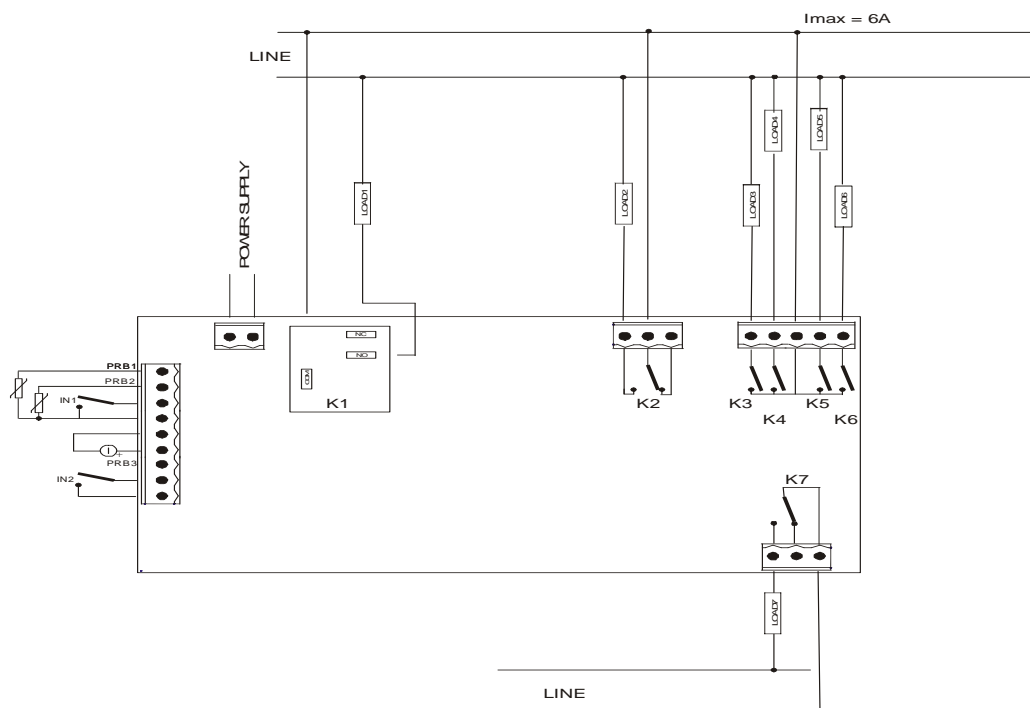
Vers. 1.11

## Index

1.	CONNECTION DIAGRAM	3
1.1.	Power Basic Connections	3
1.2.	Interface connections	4
2.	USER INTEFACE	4
2.1.	Keys	4
3.	GENERAL DESCRIPTION	5
4.	POWER SUPPLY	5
5.	OFF	5
6.	SWITCHING ON	5
7.	PRESET CYCLES	6
8.	MANUAL CYCLE	7
9.	AUTOMATIC CYCLE	8
10.	RUNNING AN AUTOMATIC CYCLE	9
11.	PRE-COOLING CYCLE	11
12.	START DEFROST	12
13.	TIME SET	12
14.	DAYLIGHT SAVING TIME	12
15.	LANGUAGE SELECTION	13
16.	SETUP MENU	14
16.1.	Parameters	15
16.2.	Inputs/Outputs	15
16.3.	Default parameter reset	16
16.4.	Fan speed adjustment	16
17.	steam generator	17
18.	humidification	17
18.1.	Humidification without humidity probe	17
18.2.	Humidification with humidity probe	18
19.	dehumidification	20
19.1.	Dehumidification with compressor	20
19.2.	Dehumidification without compressor	22
20.	cell temperature adjustment	23
21.	solenoid valve	24
22.	LIGHTS	24
23.	evaporator fan control	24
23.1.	Relay output control (P45 = 0)	24
23.2.	Phase cut control (P45 = 1)	25
24.	DEFROST	25
25.	SIGNALS AND ALARMS	26
26.	configuration parameterS	29
26.1.	List of Parameters	29
27.	APPENDIX	32
27.1.	General Description of the Synoptic	32
27.2.	Dimensions	34
27.3.	Electric Connection	34
27.4.	Visualization	35

# 1. CONNECTION DIAGRAM

## 1.1. Power Basic Connections



### Power supply

NAME	DESCRIPTION	TYPE
POWER SUPPLY	POWER SUPPLY	12VAC +/- 15% 50/60HZ

### Outputs

NAME	DESCRIPTION	TYPE
K1 (LOAD1)	COMPRESSOR	30A AC1 SPST
K2 (LOAD2)	DEFROST	8A AC1 SPDT
K3 (LOAD3)	SOLENOID VALVE/LIGHT/DEHUMIDIF	5A AC1 SPST
K4 (LOAD4)	STEAM GENERATING ENABLED	5A AC1 SPST
K5 (LOAD5)	EVAPORATOR FANS	5A AC1 SPST
K6 (LOAD6)	INJECTION SOLENOID VALVE	5A AC1 SPST
K7 (LOAD7)	RESISTANCES	8A AC1 SPDT

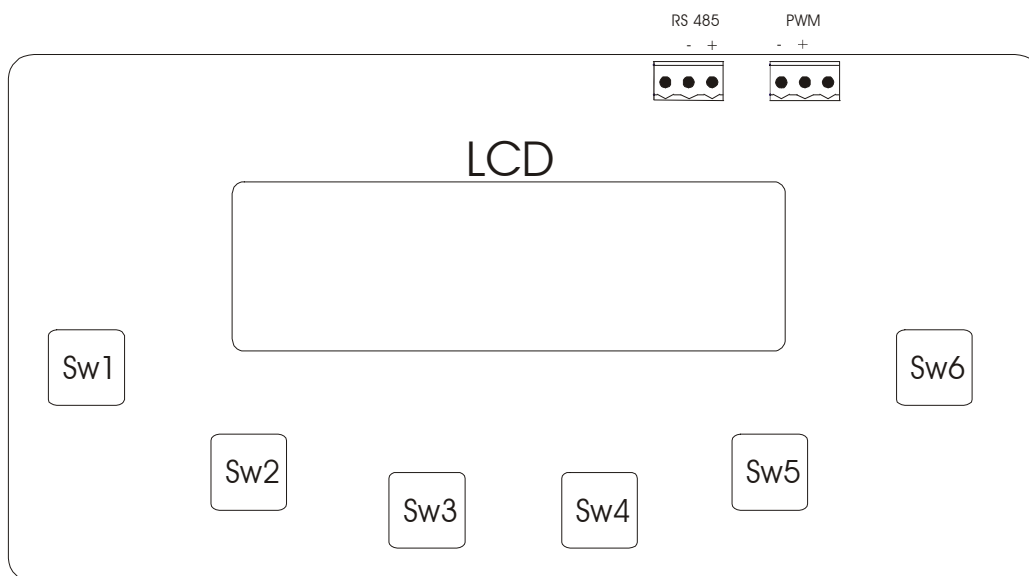
### Digital Inputs

NAME	DESCRIPTION	TYPE
IN1	SAFETY THERMOSTAT INPUT	Free voltage contact
IN2	DOOR MICRO SWITCH INPUT	Free voltage contact

### Analogue Inputs

NAME	DESCRIPTION	TYPE	RANGE
PRB1	CELL PROBE	NTC	-40°C – 100°C
PRB2	EVAPORATOR PROBE	NTC	-40°C – 100°C
PRB3	HUMIDITY PROBE	4-20mA (200Ohm)	0% - 100%

## 1.2. Interface connections



PWM terminal is a 0/10 Volt (1 kHz) output used for the phase cut control of the evaporator fans. This control is enabled by a parameter. For more details about its functioning see paragraphs 16.4 and 23.2.

## 2. USER INTERFACE

### 2.1. Keys

NAME	DESCRIPTION
SW1	ON-STANDBY key
SW2	ENTER key
SW3	MENU key
SW4	DECREASE key
SW5	INCREASE key
SW6	START/STOP key

### 3. GENERAL DESCRIPTION

This card provides the stop-rising cell control. Some automatic programs, a manual program and a cell pre-cooling cycle are available.

Each automatic program consists of five phases: stop rising, preservation, awakening, rising and slowing down.  
The manual program consists of three phases: cooling, heating and climatization.


### 4. POWER SUPPLY

When the card is on, the string "EVCO s.r.l." will be shown for eight seconds, and then the card will go in the Off mode, in stand-by or in a cycle mode, depending on the mode it was in when it was switched off.

The string "EVCO s.r.l." can be replaced with a neutral string: simply set up parameter P1 = zero.

### 5. OFF

If the card is on Off mode, the LCD display will show the following string:



OFF\_

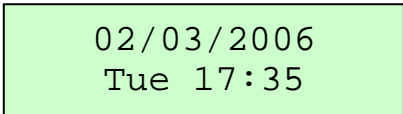
Press the ON-STANDBY key to switch the card on.

Press the MENU key to view the firmware ID for three seconds.

Regardless from the mode the card is in, by keeping the ON-STANDBY key pressed for three seconds the card will return to the Off mode.

### 6. SWITCHING ON

Current date and time will be shown on the display when the card is in standby mode.



02/03/2006  
Tue 17:35

The card status after a blackout depends on parameter P10 for the automatic parameters and parameter P12 in the case of manual programs.

The meaning of the parameter is:

P10 = 0 (P12=0): the current cycle will only resume if the duration of the blackout in question was shorter than the value set up by way of parameter P9 (P11), otherwise the card will go in standby mode.

P10 = 1 (P12 =1): the current cycle will always start again after a blackout.

## 7. PRESET CYCLES

The seven automatic cycles are preset for each day of the week:

STANDARD PROGRAM		P1	P2	P3	P4	P5	P6	P7
		Monday	Tuesday	Wednes.	Thursday	Friday	Saturday	Sunday
BLOCK	Duration	02:00	02:00	22:00	22:00	46:00	46:00	02:00
	Temperature	-2°C	-2°C	-18°C	-18°C	-18°C	-18°C	-2°C
	Humidity	70%	70%	70%	70%	70%	70%	70%
PRESERVATION	Temperature	5°C	5°C	5°C	5°C	5°C	5°C	5°C
	Humidity	85%	85%	85%	85%	85%	85%	85%
AWAKENING	Duration	06:00	06:00	06:00	06:00	06:00	06:00	06:00
	Temperature	10°C	8°C	10°C	8°C	10°C	8°C	10°C
	Humidity	90%	90%	90%	90%	90%	90%	90%
RISING	Duration	01:30	01:30	01:30	01:30	01:30	01:30	01:30
	Temperature	30°C	8°C	30°C	8°C	30°C	8°C	30°C
	Humidity	90%	90%	90%	90%	90%	90%	90%
END OF PROGRAM	Time	05:30	05:30	05:30	05:30	05:30	05:30	05:30
SLOWING DOWN	Temperature	30°C	8°C	30°C	8°C	30°C	8°C	30°C
	Humidity	90%	90%	90%	90%	90%	90%	90%

When the card is in standby, press START/STOP for three seconds to automatically start the program related to the day of the week on which the activation was performed. For instance, if, on a Wednesday, you keep the START/STOP button pressed for three seconds, program P3 will start automatically.

## 8. MANUAL CYCLE

The manual cycle consists of the following three phases:

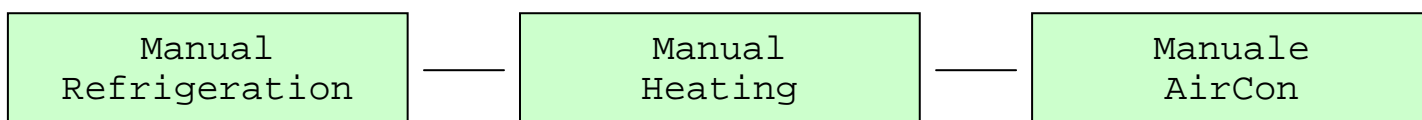
- cooling
- heating
- climatization.

Each phase is independent and no automatic switch from a phase to another phase is available.

When the machine is in standby mode, press the MENU key and select the MANUAL menu by way of the INCREASE and DECREASE keys, as follows:

Menu 01  
Manual

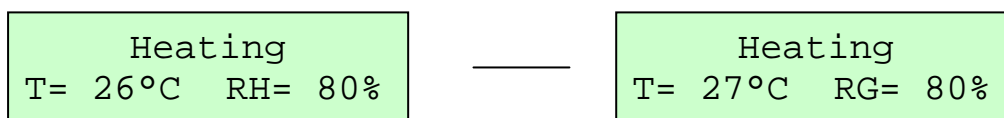
Press ENTER to access the Manual Cycle setting mode. By way of the INCREASE and DECREASE keys, you can switch from a phase to another. The cycle phase will be shown on the display, as follows:



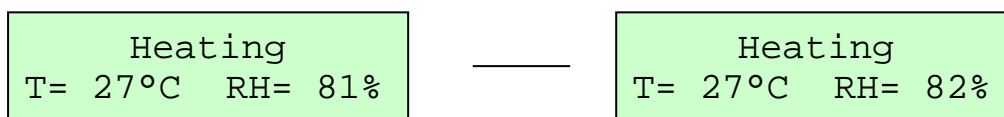
Press ENTER to select a phase and the following setpoint will be shown on the display:

Heating  
T=25°C RH=80%

Press ENTER to access the change mode. The value in question will start blinking. Use the INCREASE and DECREASE keys to change the value, as follows:



Press ENTER to confirm the setup value, which will stop blinking. You can now go to the humidity setpoint (if present) and change it as follows:



Press ENTER to confirm. The number will stop blinking.

Press MENU to return to the phase selection and change the setpoint of the other phases.

Press START/STOP to run the selected phase; the display will show:

Manual 13:39  
T= 5°C %rH= 63%

The first line shows that the heating phase of a manual cycle is being running and that it is 13:39.

The second line shows the temperature in the cell (5°C in this case), whether the use of the humidity probe is enabled and the humidity percentage measured by the probe (63% in this case).

Press the MENU key to return to the display and set change, if any. By pressing the MENU key again you can view the current phase. Use the START/STOP keys to start a new phase of the manual cycle.

## 9. AUTOMATIC CYCLE

There are 7 programs available, P01... P07, and each automatic cycle consists of the following five phases:

- stop rising
- preservation
- awakening
- rising
- slowing down

At the end of each phase, the next phase will start automatically.

When the machine is in standby mode, press the MENU key and select the AUTOMATIC menu by way of the INCREASE and DECREASE keys, as follows:

Menu 02  
Automatic

Press ENTER to access the automatic cycle selection mode. Use the INCREASE and DECREASE keys to switch from a program to another. The program number will be shown on the display, as follows:

Automatic P1	—	Automatic P7
-----------------	---	-----------------

Press ENTER to access the selected program-setting mode. This function is available only if parameter P69 = 1. Use the DECREASE key to switch from one phase to another. The display will show the cycle phase and the present setpoint values:

P2 EndProg 19:45	P2 Locking 04:00 - 5°C
P2 Preservation 2°C	P2 Awakening 12:30 20°C 80%
P2 Rising 12:45 30°C 80%	P2 Slowing 20°C 70%

Press ENTER to enter the change mode; the HOUR will start blinking and you can use the INCREASE and DECREASE buttons to change it:

P2 Rising 12:45 30°C 80%	P2 Rising 13:45 30°C 80%
-----------------------------	-----------------------------

Press ENTER to confirm. The number will stop blinking and you can now modify the minutes:

P2 Rising 13:47 30°C 80%	P2 Rising 13:50 30°C 80%
-----------------------------	-----------------------------

Press ENTER to confirm. The number will stop blinking and you can now modify the temperature:



```
P2 Rising
13:50 29°C 80%
```

```
P2 Rising
13:50 28°C 80%
```

Press ENTER to confirm. The number will stop blinking and you can now modify the humidity setpoint (if present):

```
P2 Rising
13:50 28°C 78%
```

```
P2 Rising
13:50 28°C 75%
```

Press ENTER to confirm. The number will stop blinking.

Use the INCREASE and DECREASE buttons to select the other phases and modify their setpoints.

Press MENU to save the program and return to the previous menu. Press the START/STOP key to start the program. The display will show:

```
EndProg
Mon 03/04/06
```

This means that, based on the settings done, the program will finish on 3 April 2006. If this is the desired date for the end of the program, press the START/STOP key to confirm and start the program. Otherwise press ENTER to change the date of the end of the program. This function is enabled if parameter P70 = 1.

The display will show:

```
EndProg 09 :05
Mon 03/04/06
```

The DAY will start blinking and you can use the INCREASE key to change the date of the end of the program. Press ENTER to confirm the new date, then press the START/STOP key to start the cycle.

## 10. RUNNING AN AUTOMATIC CYCLE

During an automatic cycle the display will show:

```
P2 Locking
T= 19°C
```

This includes the number of the current program, the ongoing phase, the current temperature in the cell and whether the phase provides probe-humidification, other than the percentage of humidity.

Press the INCREASE key to see both date and time of the current end of phase; press the INCREASE key to see both the date and the time of the next end of phase.

The display will show:

```
End F0 09:00
Mon 03/04/06
```

Where F0 shows that the program 0 phase is now running, namely the stop phase.

The other phases are identified as follows:

- F1 = preservation
- F2 = awakening
- F3 = rising

F4 = slowing down

Press the MENU key or wait for 10 seconds to return to the previous screen.

Press MENU to see the status of INPUT/OUTPUT:

Press MENU or wait for 5 seconds to return to the previous screen.

Press ENTER to display date and time:

08/02/2007 Mar 17:35
-------------------------

Press MENU or wait for 5 seconds to return to the previous screen.

Press the STA 

C	D	E	R	V	H	U
1	0	0	1	1	0	0

 the cycle. The cycle will remain selected.

## 11. PRE-COOLING CYCLE

You can run a pre-cooling cycle before executing any manual or automatic cycle.

While the machine is in standby mode, press the MENU key and select the COOL menu using the INCREASE and DECREASE keys:

```
Menu 03
Cool
```

Press ENTER to access the temperature SetPoint change mode, as follows:

```
SetTemperature
-12°C
```

Press ENTER to access the change mode. The value in question will start blinking. Use the INCREASE and DECREASE keys to change the value:

```
SetTemperature -11°C ——— SetTemperature -12°C
```

Press ENTER to confirm the setup value; the number will stop blinking. Press the START/STOP key to start the cycle.

With fans managing with output relay (parameter P45 = 0), during a pre cooling, the fans are activated parallel to compressor.

With the fans proportional managing (parameter P45 = 1), during a pre cooling, the fans have the speed set up by the parameter P58 when the compressor is on, otherwise the fans are off.

display will show:

```
Cool 06:18
T= -6°C
```

The first line shows that a cooling cycle is running and that it is 06:18.

The second line shows that the temperature in the cell is -6°C.

Press MENU to return to SetPoint change.

## 12. START DEFROST

While the card is in standby mode you can run a defrost cycle.

While the machine is in standby mode, press the MENU key and select the DEFROST menu using the INCREASE and DECREASE keys:

```
Menu 04
Defrost
```

Press ENTER to access the defrost request.

```
Start?
No      Ok
```

Press ENTER to exit the menu. No defrost will start.  
Press INCREASE to start a defrost cycle.

## 13. TIME SET

While the machine is in standby, press MENU and select the Set Time menu using the INCREASE and DECREASE keys:

```
Menu 05
Set Time
```

Press ENTER to access the time change mode.

```
Mon 16/11/06
14:22:46
```

The blinking number can be modified by the INCREASE and DECREASE buttons. Press ENTER to confirm and move on to the next setting.

Press MENU to return to the Home Menu.

## 14. DAYLIGHT SAVING TIME

While the machine is in standby, press MENU and select the DAYLIGHT SAVING TIME menu using the INCREASE and DECREASE keys:

```
Menu 06
Daylight Saving
```

Press ENTER to modify the hour.

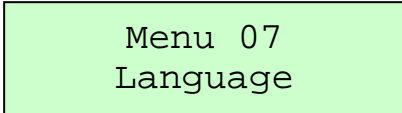
```
Sun 17:52
+1
```

Press the INCREASE and DECREASE keys to change the hour. Press ENTER to confirm.

Press MENU to return to the Home Menu.

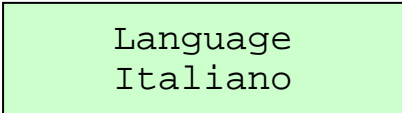
## **15. LANGUAGE SELECTION**

While the machine is in standby, press MENU and select the Language menu using the INCREASE e DECREASE keys:



Menu 07  
Language

Press ENTER. The display will show this message, in the first language available:



Language  
Italiano

Use the INCREASE and DECREASE keys to access the other languages. When the desired language appears on the display, press ENTER to confirm it or the MENU key to exit without changing the configuration.

## 16. SETUP MENU

While the machine is in standby, press MENU and select the SETUP menu using the INCREASE and DECREASE keys:

Menu 08  
Setup

When you press ENTER, you will be asked to enter the necessary password to access the setup submenus.

Set  
Password                      0

Select your password using the INCREASE and DECREASE keys and press ENTER.

The default password is -19.

If your password is correct, the first submenu will be displayed; otherwise you will exit from the menu.

Press MENU to return to the Home Menu.

The submenu windows are:

Setup 01  
Parameters

Parameters setup

Setup 02  
Input/Output

Inputs and Outputs status

Setup 03  
Reset

Default values reset

Setup 04  
Fans Min Max

Min and Max Fans speed  
Setup

Press the INCREASE and DECREASE keys to scroll through all submenus on the display.

Press ENTER to access each submenu.

Press the MENU key to go back to the Home Menu.

### 16.1. Parameters

Press ENTER to access the parameter setup mode.

The first line of the display shows the first parameter with its current value and its unit of measurement.

P01 = -5°C

Use the INCREASE and DECREASE keys to scroll through all the control parameters.  
Press ENTER to access the parameter change:

P01 = -5°C  
-5

Use the INCREASE and DECREASE keys to change the parameter value. Press ENTER to confirm.

Press the MENU key to go back to the Home Menu.

### 16.2. Inputs/Outputs

Press ENTER to access the input/output display mode and use the INCREMENT and DECREMENT keys to scroll through the quantities to be displayed:

Cell            -6°C  
Evapor        -15°C

Cell and Evaporator  
temperature values

Humidity  
14%

Humidity probe value

C D E R V H U  
1 0 0 1 1 0 0

Outputs status:  
1 = relay enabled  
0 = relay disabled

C compressor  
D defrost  
E solenoid valve or  
light  
R resistances  
V fans  
H steam generator  
U humidifier

DI1    DI2    FAN  
0       1       95

DI1 Digital Input 1 status  
DI2 Digital Input 2 status  
FAN fans speed

### 16.3. Default parameter reset

Press ENTER to access the request for the default parameter reset.

```
Restore?
No      Ok
```

Press ENTER to exit the menu without resetting the parameters.  
Press the INCREASE key to reset the parameters.

### 16.4. Fan speed adjustment

Press ENTER to access the fan speed adjustment function, where you can select the minimum and maximum speed and the minimum speed during the dehumidification phase (present only if the humidity probe has been selected).

```
Min speed
0%
```

Use the INCREASE and DECREASE keys to scroll through the submenus. Press ENTER to enable the value change:

```
Min speed
16%
```

The value will start blinking and you can change it by pressing the INCREASE and DECREASE keys.  
Press ENTER to confirm the value.

Press the MENU key to go back to the Home menu.



## 17. STEAM GENERATOR

There is an output available to activate a steam generator. This output will be switched on for every phase requiring the humidification phase, apart from any P32 parameter value (selection of the humidification mode).

If parameter P72 has value 0, opening the door will result in no effect; if parameter P72 has value 1, when the door is opened the steam generator will be switched off.

If you are using a pot inside the cell, it is advisable not to connect this output and to control the pot through the humidifier output.

## 18. HUMIDIFICATION

Opening the door will immediately switch off the Humidification output.

There are three control modes for cell humidity generation and control, which can be selected by setting parameter P32 (see the following paragraphs).

### 18.1. Humidification without humidity probe

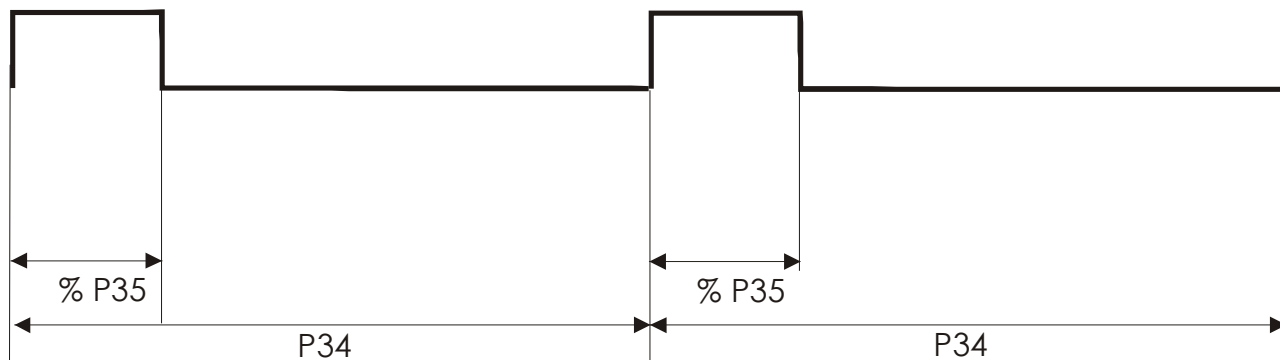
By setting P32 = 1 or 2, the humidity probe will be enabled and the humidification control will occur as follows.

**P32 = 1** A time control without the probe will occur. Two parameters are used, P34 and P35. Parameter P34 establishes the complete duration of the humidifier on/off cycle while P35 defines the duration of the humidifier activation cycle when a humidity percentage equal to 100% has been set.

Example:

P34 = 60 seconds and P35 = 50 seconds, setup percentage = 60%

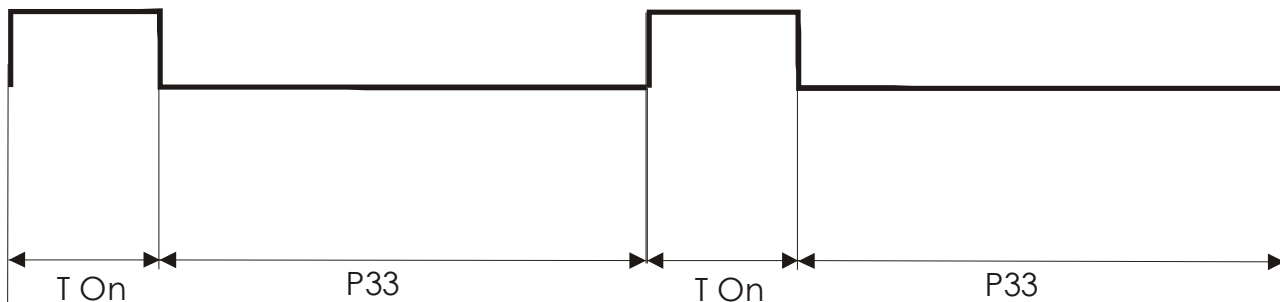
The humidifier is active for 30 seconds (60% of parameter P35) and then stays off for 30 seconds (P34 - 60% of P35). The cycle then starts again.



Inizio fase

Humidity injection is interrupted if the temperature in the cell is lower than the value determined by parameter P31 for both the manual and automatic cycles.

**P32 = 2** A time control for a maximum of 10 minutes will occur. During the program setting, you will have to choose a number between 0 and 10, meaning the minutes of humidification. Parameter P33 determines the pause between two humidifier-on cycles. The humidifier will remain on for the preset time and then go stay off for the pause period (parameter P33). The cycle will then start again. If the pause time is 0, the humidifier will always remain on, regardless of the preset time.



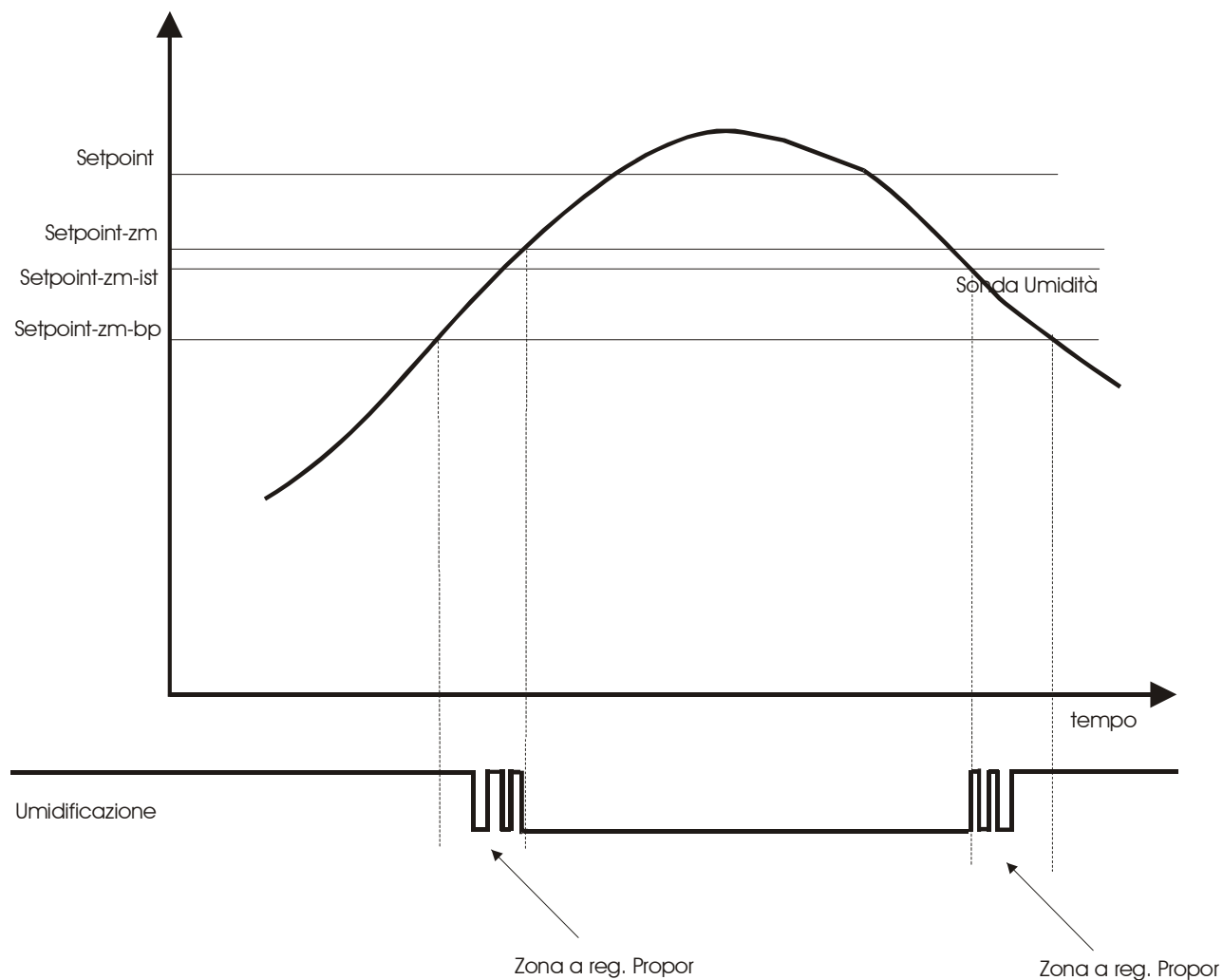
Inizio fase

Where T On is the preset number of minutes of activation.

Humidity injection is inhibited if the temperature in the cell is lower than the value determined by parameter P31 for both the automatic and manual cycles.

### 18.2. Humidification with humidity probe

You can enable the humidity probe by setting parameter P32 = zero. The humidifier output switching on/off follows the following curve.



Where:

Setpoint  
Zm

is the preset humidity setpoint

is the dead zone for humidification (parameter P38)

bp is the proportional adjustment band (parameter P39)  
ist is the humidification adjustment hysteresis (parameter P37)

This function is always active during the awakening, rising and slowing down phases, but it can also be enabled for the stop and preservation phases by way of parameter P36.

Regarding the manual cycle, the humidification is only active during the heating and climatization phase.

In case the temperature in the cell is lower than parameter P31, the humidification function will be disabled.

If you are using a pot in the cell, the humidifier control time must be set in minutes and parameter P41 must be = 1.

## 19. DEHUMIDIFICATION

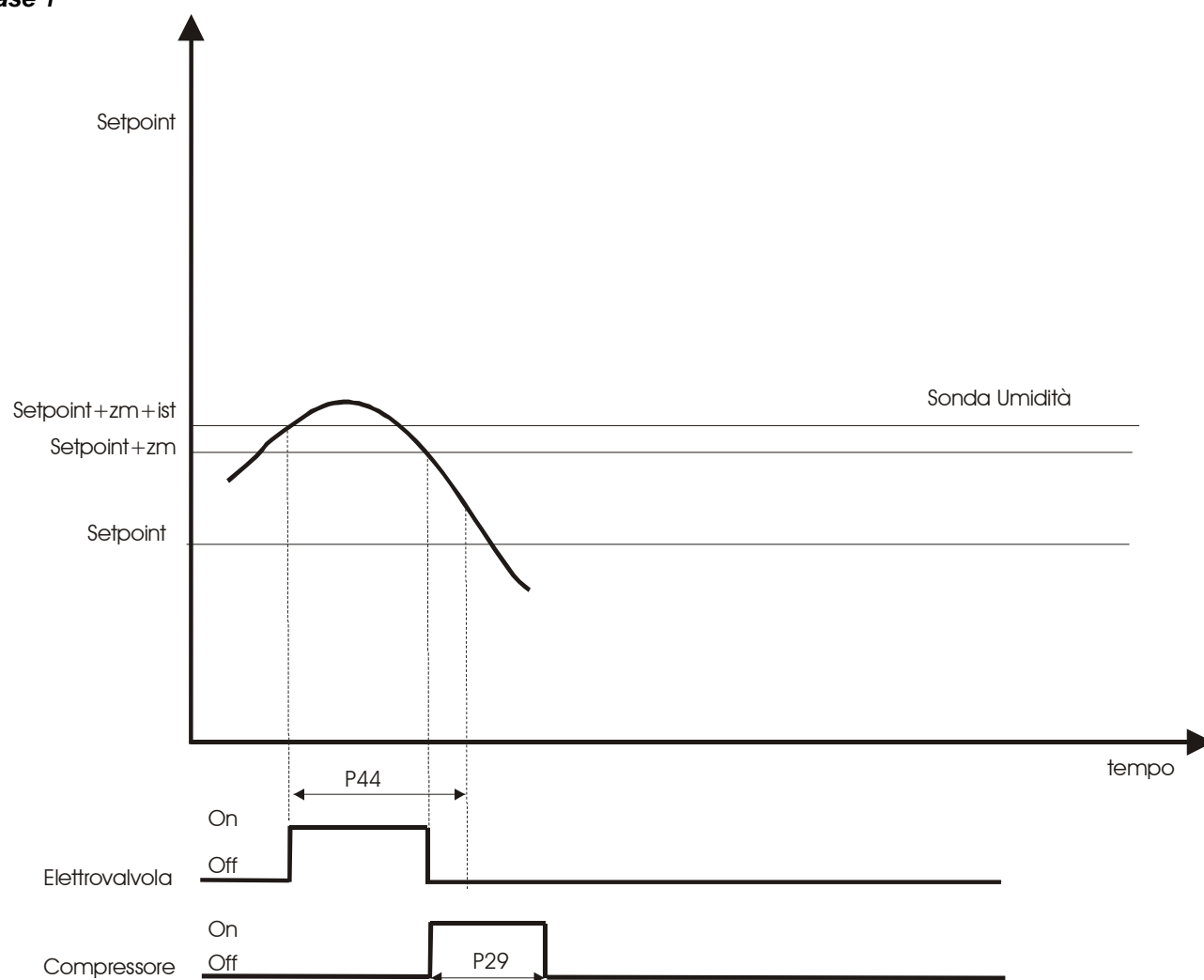
This function is always active when the humidity probe is enabled. By setting parameter P32 = zero, the humidity probe will be enabled. Dehumidification occurs by using the solenoid valve and the compressor switching on or by setting parameter P71 = 2, when output K3 can be used to control a humidity extraction fan or a dehumidifier..

### 19.1. Dehumidification with compressor

This type of dehumidification is possible when parameter P71 is different from 2.

The graphs below display the management modes.

#### Case 1

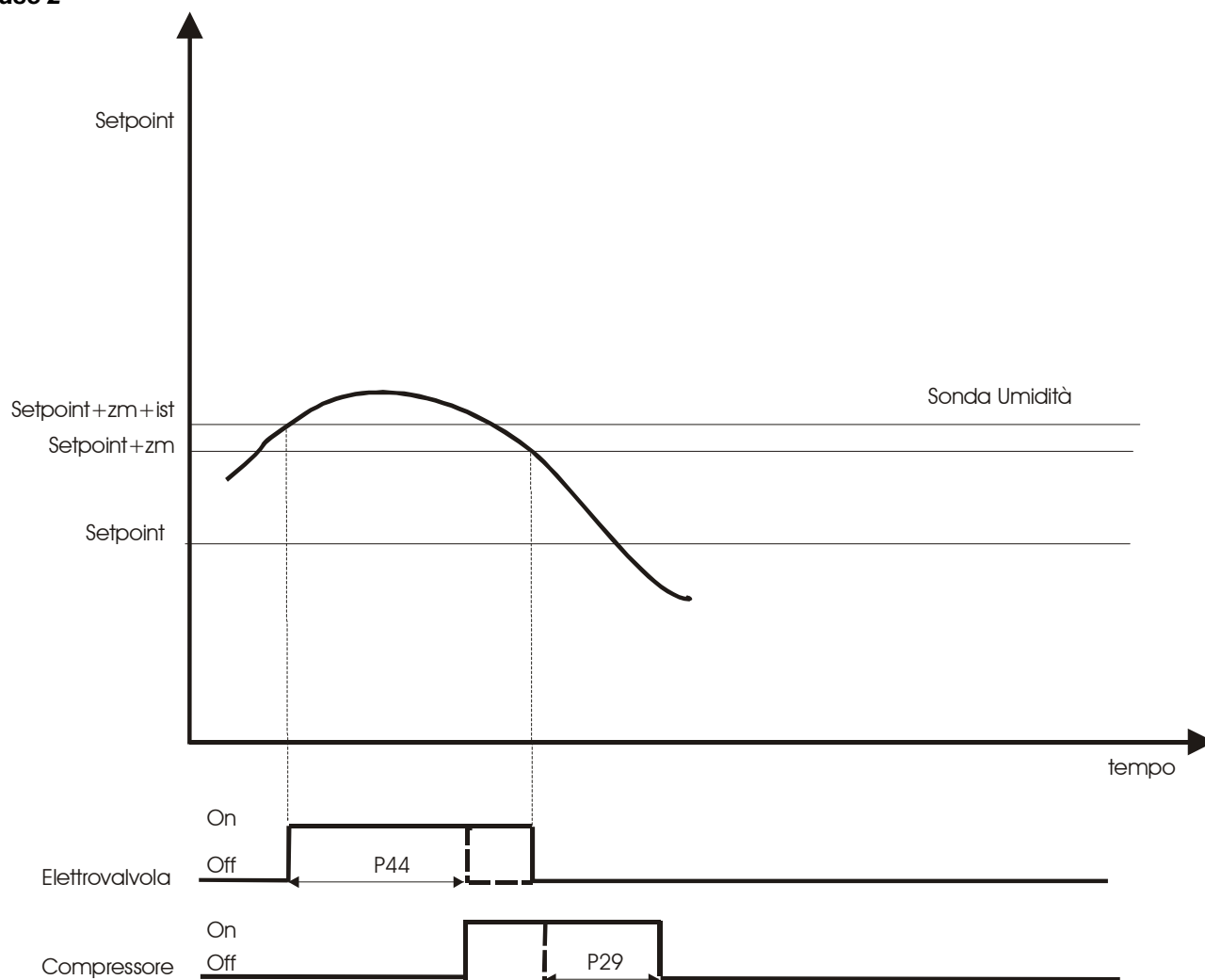


The solenoid valve is switched on for a period of time determined by parameter P44. If within this time the humidity probe drops below the setpoint + dead zone value, the solenoid valve will switch off and the compressor will switch on for the 'on' enforced time determined by parameter P29.

If the probe drops below the setpoint + dead zone value before time P44 is over, the solenoid valve will switch off and the compressor will switch on for the period of time determined by parameter P29.

If parameter P71 is set at 1 (output K3 does not manage the solenoid valve, only the light in the cell), dehumidification will only require the compressor, which will be activated P44 seconds after the dehumidification request.

**Case 2**



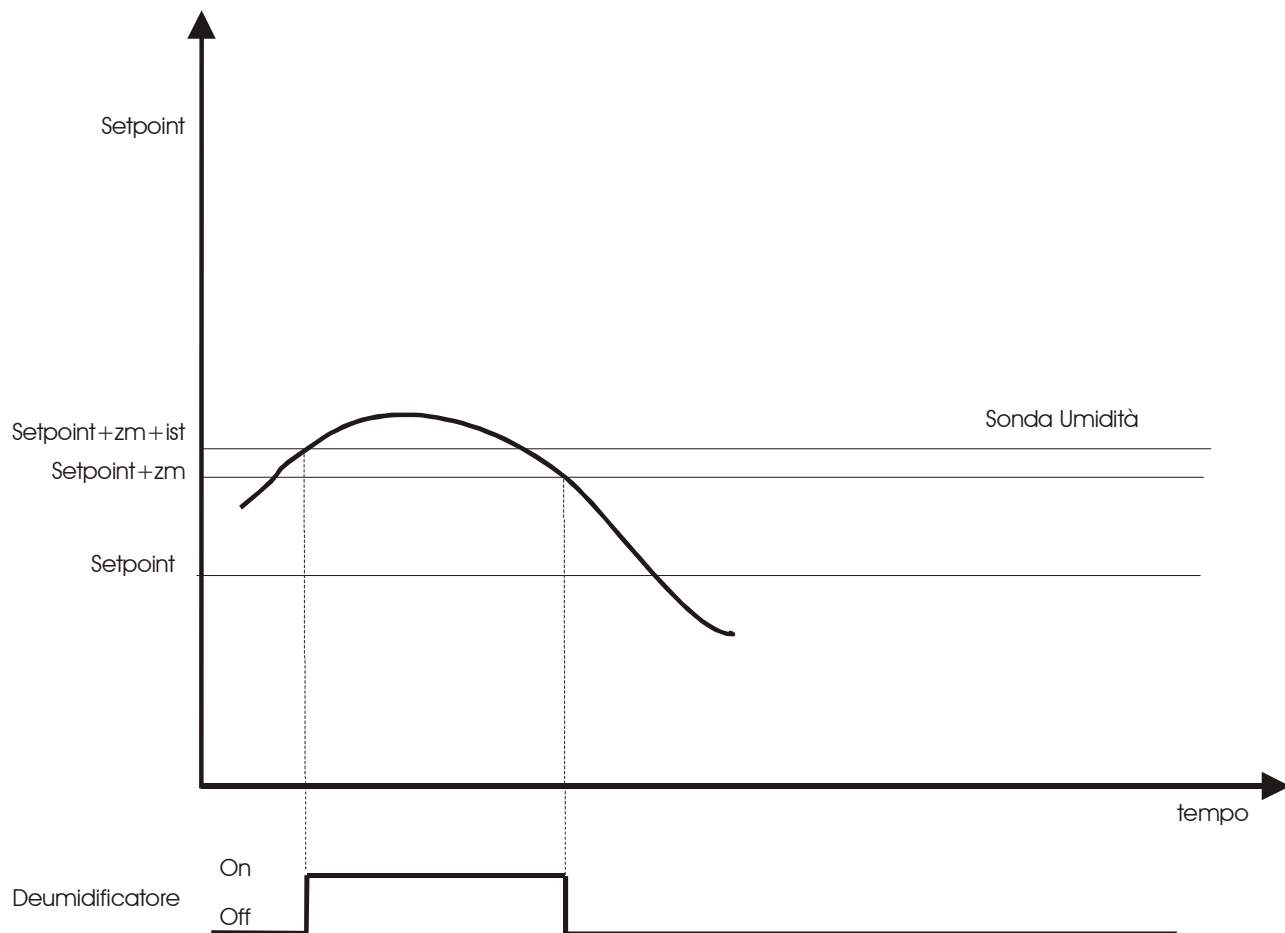
The solenoid valve is switched on for a period of time determined by parameter P44. If within this time the humidity probe drops below the setpoint + dead zone value, if the setpoint + dead zone value is not reached within this time, the solenoid valve will remain on and even the compressor will switch on until the setpoint + dead zone value is reached, then the solenoid valve will go off and the compressor will remain on for the 'on' enforced time determined by parameter P29.

If the temperature in the cell is lower than parameter P31, dehumidification will be disabled.

If parameter P71 = 1 (output K3 does not manage the solenoid valve, only the light in the cell), dehumidification will only require the compressor, which will be activated P44 seconds after the dehumidification request.

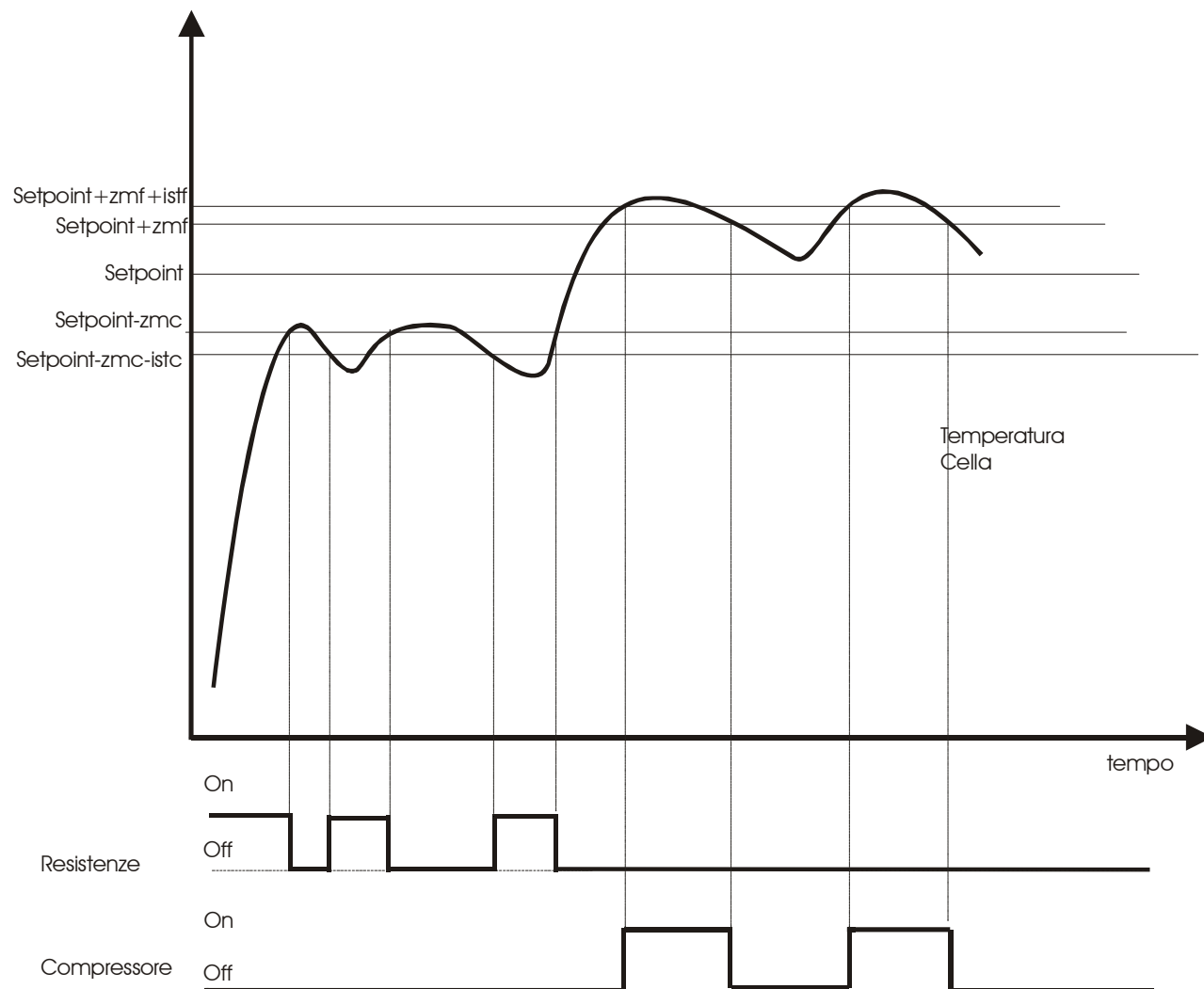
### 19.2. Dehumidification without compressor

If parameter P71 is set at 2, when the humidity probe exceeds the preset setpoint output K3 is activated for the dehumidification, as illustrated in the graph below.



## 20. CELL TEMPERATURE ADJUSTMENT

Refer to the following graphic for the resistance and compressor switching on/off.  
Both compressor and resistance activation are always enabled for all phases.



Where:

Setpoint	is the adjustment setup set for the ongoing phase
zmf	is the cold dead zone for the ongoing phase
istf	is the cold adjustment hysteresis (parameter P15)
zmc	is the hot dead zone for the ongoing phase
istc	is the hot adjustment hysteresis (parameter P21)

Never switch on resistances during the stop and preservation phases of an automatic cycle or during the refrigeration phase of a manual cycle. Resistances must be switched on for a minimum time, determined by parameter P30.

During the awakening and rising phases, the temperature increase is adjusted by dividing the temperature area by n steps (which are preset by means of parameters P24 and P25) so that the heating will be gradual according to setpoints that are close to the desired value, as follows:

If the temperature in the cell is 5°C at the awakening start, the setpoint that has been preset for the awakening phase is 25°C, the number of steps is 4 and the duration of the phase is 40 minutes; resistances work for 10 minutes at the 10°C temperature setpoint, for 10 minutes at the 15°C temperature setpoint, for 10 minutes at the 20°C temperature setpoint and for the last 10 minutes at the 25°C temperature setpoint.

Compressor activation may be enforced at the beginning of the awakening and rising phases; the duration of such enforced activation is determined by parameter P29.

Compressor activation is subject to the safety times (parameters P26, P27 and P28)

## 21. SOLENOID VALVE

Only present if P71 = 0. When P71 = 0, P44 must be configured correctly.

The solenoid output is always activated together with the compressor, except for when compressor activation is enforced, which happens at the beginning of the awakening and rising phases (the solenoid will remain disabled). The solenoid is also used whenever the cell requires dehumidification (see paragraph 19).

## 22. LIGHTS

The light output (present if parameter P71 has value 1) will be switched on when you open the door and switched off when you close the door.

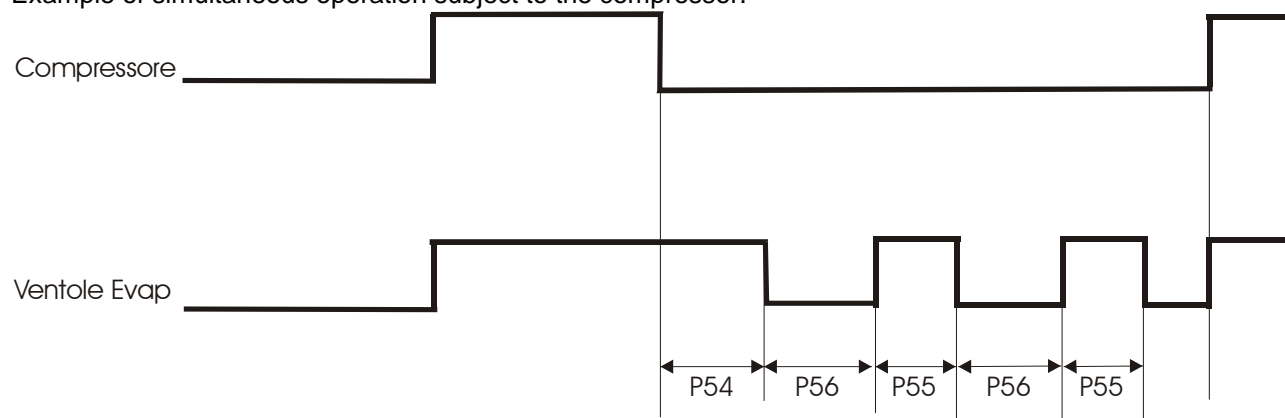
## 23. EVAPORATOR FAN CONTROL

You can choose the fan control output from one of the relay outputs and a phase cut output. This is done by means of parameter P45. If P45 = 0, fan control will be performed by output LOAD5. In this case, you can also establish whether is subject to the activation of the compressor and/or the resistances or if they must always remain on. If P45 = 1, a proportional adjustment through the phase cut will be chosen.

### 23.1. Relay output control (P45 = 0)

If you select the control simultaneous mode, fans will be activated at the same time as the compressor and/or resistances, but will be switched off with a delay determined by parameter P54. During the pauses, in case of simultaneous operation, fans will be cyclically switched on according to the value of two parameters (P55 and P56).

Example of simultaneous operation subject to the compressor.

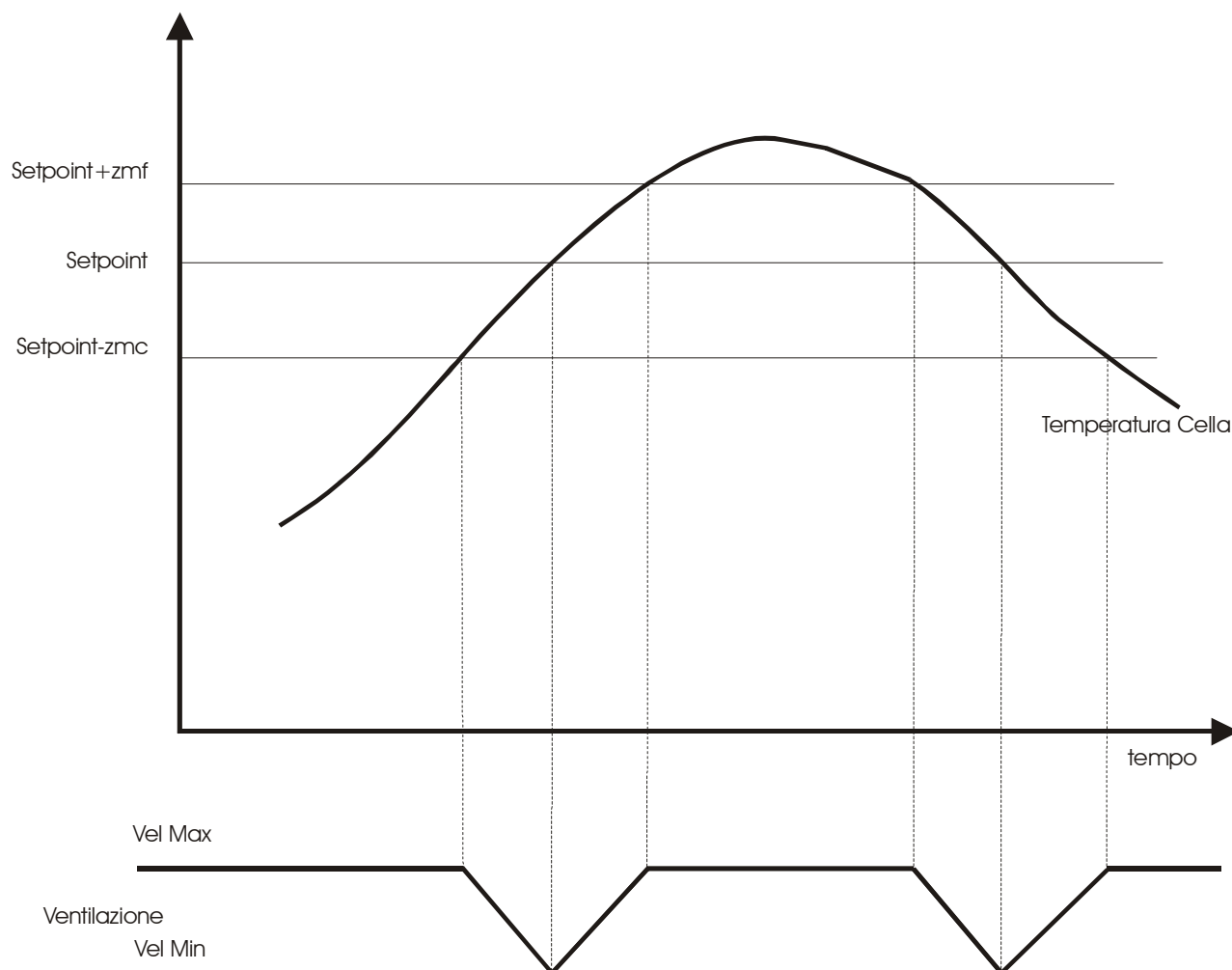


If parameters P55 e/or P56 are = zero, fans will remain off.  
 Pause/working time will always be reset when a cycle is started.  
 Opening the door will immediately switch off the fans.



### 23.2. Phase cut control (P45 = 1)

Refer to the following graphic regarding the fans.



Where:  
 Setpoint is the preset adjustment setpoint for the ongoing phase  
 zmf is the cold dead zone for the ongoing phase  
 zmc is the hot dead zone for the ongoing phase

Based on the temperature in the cell regarding the setpoint, fans will be kept at the maximum speed or will be proportionally adjusted according to the difference between the cell temperature and the setpoint.

The minimum speed (equal for all phases) is configurable by the parameter P57.

The maximum speed is configurable for each phase (for manual or automatic cycle) by the parameters P79, P80, P81, P82, P83, P84, P85, P86.

If a dehumidification cycle starts during the fan proportional adjustment, the minimum speed will no longer be determined by parameter P57 but by parameter P59 and the fans will remain on even if the door is opened.

## 24. DEFROST

Defrost is active only during the stop and preservation phases of the automatic cycle and during the refrigeration phase of the manual cycle. It can also be switched on by selecting its own menu. Both the automatic and the manual defrost will only occur if the evaporator probe temperature is lower than parameter P60.

The defrost mode is subject to parameter P73:

If parameter P73 = 0, during the defrost output K2 will be switched on.

If parameter P73 = 1, during the defrost both output K1 and output K2 will be switched on.

Fans are activated according to the value of parameter P64.

The defrost cycle, if automatic, is repeated regularly (parameter P61), and each defrost cycle may finish as follows:

- as soon as the parameter P62 time elapses

- alternatively, when the evaporator probe is higher than parameter P60.

All defrost cycles will be interrupted when passing from the preservation phase to the awakening phase of an automatic cycle.

At the end of the defrost cycle, you must wait for the end of the dripping time (parameter P63) before switching the compressor on, and for the end of the fan stop time (parameter P63+P64) before switching the fans on.

Regarding compressor activation, safety time (parameters P26, P27 and P28) is still the priority.

Opening the door will not stop the compressor, but will cause the fans to go off, regardless of P64.

## 25. SIGNALS AND ALARMS

Both visual and acoustic signals will be given in case of malfunction. Below is the complete list of alarms/signals.

### **Cell probe**

In case of a probe breakdown, a cell probe alarm will be given: the buzzer will sound and the display will show an error.

ALL CellSensor

The ongoing cycle will be interrupted and all outputs will be switched off. Press any key to silence the buzzer. The cycle will resume as soon as the error disappears.

### **Safety thermostat**

The thermostat input is set by parameter P8:

P8= 0: thermostat alarm on = open contact

P8= 1: thermostat alarm on = closed contact

As soon as the card detects an alarm: the buzzer will sound and the following alarm will be shown on the display:

ALL Thermostat

The ongoing cycle will be interrupted and all outputs will be switched off. Press any key to silence the buzzer. As soon as the error disappears, press the ON-STANDBY key to reset the card.

### **Evaporator probe**

A probe breakdown will cause an Evaporator Probe breakdown Alarm: the buzzer will sound and the following alarm will start blinking on the display:

ALL EvapSensor

The ongoing cycle will be interrupted and all outputs will be switched off. Press any key to silence the buzzer. The cycle will resume as soon as the error disappears.

### **High Temperature in the Evaporator**

When P75=1, the high temperature alarm of the evaporator is enabled; if the evaporator probe reaches the value of P74, the evaporator high temperature alarm will go off. The buzzer will sound and the display will show:

ALL Evap High T

Qualsiasi ciclo in corso viene bloccato e tutte le uscite disattivate. Il buzzer si può tacitare premendo qualsiasi tasto. Alla scomparsa dell'errore premere il tasto ON-STANDBY per riarmare la scheda.

#### **Humidity probe**

A probe breakdown causes a humidity probe breakdown alarm the buzzer will sound and the following alarm word will be blinking on display:

ALL HumiditySensor

The ongoing cycle will be interrupted and all outputs will be switched off. Press any key to silence the buzzer. The cycle will resume as soon as the error disappears.

This signal is valid only if the humidity probe has been enabled by means of parameter P32.

#### **Door micro switch**

The door micro switch input is set through parameter P7:

P7 = 0: closed door = closed contact

P7 = 1: closed door = open contact

Each time the door is opened, the words 'open door' will start blinking:

Door open

When the door is opened during a quick cooling cycle, the fan, the resistances and the humidifier will stop; the compressor and the steam generator will go off if parameter P72 has value 1 (otherwise they will remain on).

The buzzer will sound; press any key to silence it. The signal will automatically disappear as soon as the door is closed. If parameter P71 has value 1, every time you open the door the light will be switched on.

***RTC malfunction***

In case of RTC malfunction, an RTC alarm will be shown; the buzzer will sound and the following alarm message will start blinking on display:

ALL RTC

The ongoing cycle will be interrupted and all outputs will be switched off. Press any key to silence the buzzer. Access the Time Set menu and set the RTC current values: the card will return to the standby mode.

***EEPROM alarm***

In case of discrepancies in the data saved in Eeprom, an Eeprom alarm will be displayed; the buzzer will sound and the following alarm message will start blinking on the display:

ALL EEPROM

The ongoing cycle will be interrupted and all outputs will be switched off. Press any key to silence the buzzer. Press the ON-STANDBY key to reset the card: the card will return to the standby mode.

Note: After an Eeprom alarm occurs, all parameters will be reset to the default values.

## 26. CONFIGURATION PARAMETERS

### 26.1. List of Parameters

NAME	DESCRIPTION	MIN	MAX	DEF	UNIT
<b>General Configurations</b>					
P1	Display selection if power on 0 = none 1 = EVCO s.r.l.	0	1	1	---
P2	0 = Celsius 1 = Fahrenheit	0	1	0	---
P3	Cell probe offset	-15	15	0	°C
P4	Evaporator probe offset	-15	15	0	°C
P5	Humidity probe lower threshold	0	P6	0	%
P6	Humidity probe upper threshold	P5	200	100	%
P7	Input polarity for door contact 0 = NC 1 = NO	0	1	0	---
P8	LV input polarity for thermostat 0 = NC 1 = NO	0	1	1	---
P9	Power down duration for automatic program reset	1	60	15	minutes
P10	Selection after power down for automatic program 0 = an automatic cycle starts again only if power down is less than P9 minutes 1 = an automatic cycle always starts again	0	1	1	---
P11	Power down duration for manual program reset	1	60	15	minutes
P12	Status selection after power down for the manual program 0 = a manual cycle starts again only if power down is less than P11 minutes 1 = a manual cycle always starts again	0	1	1	---
<b>Setpoint</b>					
P13	Cold Min setpoint	-30	P14	-3	°C
P14	Cold Max setpoint	P13	90	15	°C
P15	Cold hysteresis	2	10	3	°C
P16	Cold dead zone for refrigeration, stop and preservation	0	10	1	°C
P17	Cold dead zone for heating, awakening and rising	0	10	3	°C
P18	Cold dead zone for climatization and slowing down	0	10	1	°C
P19	Hot Min setpoint	0	P20	0	°C
P20	Hot Max setpoint	P19	90	35	°C
P21	Hot hysteresis	2	10	3	°C
P22	Hot dead zone for heating, awakening and rising	0	10	1	°C
P23	Hot dead zone for climatization and slowing down	0	10	3	°C
P24	Number of steps for resistance adjustment in the awakening phase	1	10	3	---
P25	Number of steps for resistance adjustment in the rising phase	1	10	3	---
<b>Compressor Timing</b>					
P26	Delay between two successive compressor activations	0	60	2	minutes
P27	Delay between compressor activation and switch-off	0	60	2	minutes
P28	Compressor switch-on delay from power on	0	255	2	minutes
P29	Compressor enforced switching on duration at the awakening, rising and slowing down phase start	0	60	0	minutes
<b>Resistance Timing</b>					
P30	Resistance activation minimum time	0	255	0	seconds
<b>Humidification and dehumidification</b>					
P31	Cell temperature lower limit for humidification/dehumidification	0	90	10	°C
P32	Humidity control mode 0 = with humidity probe 1 = time cycles based on the setup percentage 2 = one-minute steps	0	2	0	---
P33	Pause time if P32 = 2	0	60	10	minutes
P34	Humidification cycle duration if P32 = 1	30	600	60	seconds
P35	Max. humidification time if P32 = 1	0	P34	30	seconds

P36	Enables the humidification cycle during the stop phases of rising and preservation phases 0 = disabled 1 = enabled	0	1	0	---
P37	Hysteresis for humidification	1	100	5	%
P38	Humidification dead zone	0	100	2	%
P39	Proportional Adjustment Band for Humidification	0	20	10	%
P40	Cycle time for Humidification Proportional Adjustment	1	255	30	seconds/minutes
P41	Time base for Cycle Time in proportional regulation humidifying 0 = seconds 1 = minutes	0	1	0	---
P42	Dehumidification hysteresis	1	100	5	%
P43	Dehumidification dead zone	0	100	13	%
P44	Duration of Dehumidification attempt with solenoid valve	1	255	1	seconds
<b>Fans</b>					
P45	Evaporator Fan Proportional Adjustment Enabling 0 = ON/OFF adjustment 1 = proportional adjustment	0	1	0	--
P46	Evaporator fan operation for rising stop 0 = simultaneous operation 1 = continuous operation	0	1	0	--
P47	Evaporator fan operation for preservation 0 = simultaneous operation 1 = continuous operation	0	1	0	--
P48	Evaporator fan operation for awakening 0 = simultaneous operation 1 = continuous operation	0	1	1	--
P49	Evaporator fan operation for rising 0 = simultaneous operation 1 = continuous operation	0	1	1	--
P50	Evaporator fan operation for slowing down 0 = simultaneous operation 1 = continuous operation	0	1	1	--
P51	Evaporator fan operation for refrigeration 0 = simultaneous operation 1 = continuous operation	0	1	0	--
P52	Evaporator fan operation for heating 0 = simultaneous operation 1 = continuous operation	0	1	1	--
P53	Evaporator fan operation for climatization 0 = simultaneous operation 1 = continuous operation	0	1	1	--
P54	Evaporator fan off delay in simultaneous operation	0	255	1	minutes
P55	Evaporator fan working time in simultaneous operation	0	255	3	minutes
P56	Evaporator fan pause time in simultaneous operation	0	255	1	minutes
P57	Evaporator fan minimum speed	0	100	0	%
P58	Evaporator fan speed during pre cooling cycle	P57	100	100	%
P59	Evaporator fan minimum speed during dehumidification	P57	100	20	%
<b>Defrost</b>					
P60	Evaporator temperature for defrost end	-40	99	2	°C
P61	Time between two consecutive defrost cycles 0 = no defrost will be repeated	0	10	6	ore
P62	Defrost cycle max. duration	1	120	30	minutes
P63	Dripping time	0	30	2	minutes
P64	Fan status during the defrost cycle	0	1	0	--
P65	Fan stop duration after dripping	0	15	3	minutes
<b>Cooling</b>					
P66	Minimum setpoint for cooling	-30	P67	-3	°C
P67	Maximum setpoint for cooling	P66	30	10	°C
P68	Cooling preset	P66	P67	2	°C
<b>Program setting and change</b>					
P69	Enable program setting	0	1	1	--
P70	Enable program change	0	1	1	--

P71	K3 management: 0 = solenoid valve; 1= light; 2 = dehumidification	0	2	1	--
P72	Compressor management with door open: 0 = no effect; 1 = switch off compressor	0	1	0	--
P73	Defrost mode: 0 = resistances; 1 = hot gas	0	1	1	--
P74	Evaporator high temperature alarm	0	70	55	°C
P75	Enable evaporator high temperature alarm: 0 = not enabled; 1= enabled	0	1	1	--
P79	Maximum evaporator fans speed in heating	P57	100	100	%
P80	Maximum evaporator fans speed in air conditioning	P57	100	100	%
P81	Maximum evaporator fans speed in block	P57	100	100	%
P82	Maximum evaporator fans speed in preservation	P57	100	100	%
P83	Maximum evaporator fans speed in awaking	P57	100	100	%
P84	Maximum evaporator fans speed in rising	P57	100	100	%
P85	Maximum evaporator fans speed in slowing down	P57	100	100	%
P86	Maximum evaporator fans speed in cooling	P57	100	100	%

#### NOTE

- Check the compressor protection time, as it is zero by default.
- Parameters P5 and P6 are used to establish the humidity probe range. Parameter P5 must be equal to the humidity percentage corresponding to 4mA and parameter P6 must be equal to the humidity percentage corresponding to 20mA.
- Check the automatic and manual program humidity setpoint after changing parameter P32

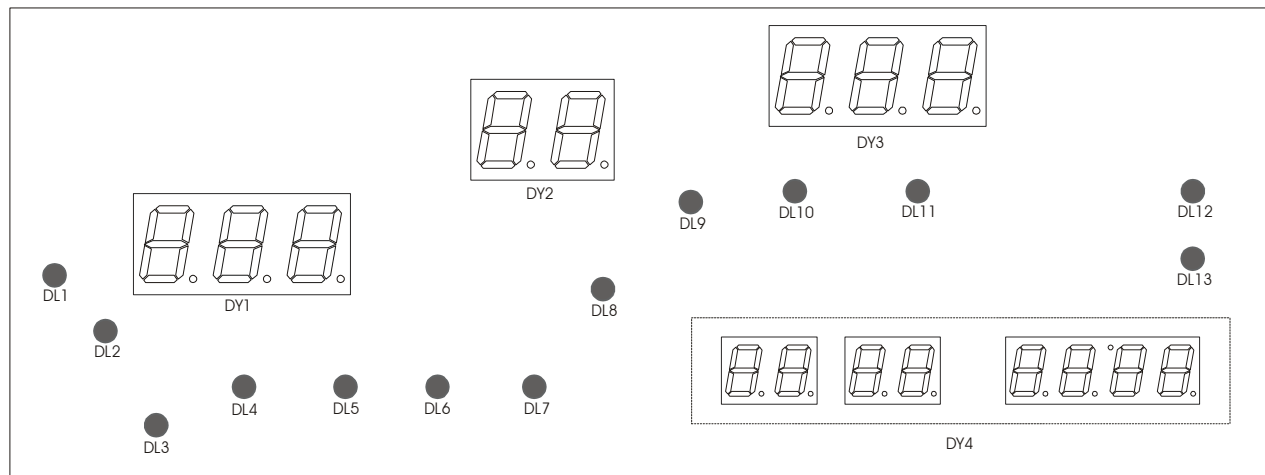
## 27. APPENDIX

### 27.1. General Description of the Synoptic

Using the serial RS485 communication port you can connect a synoptic which will display temperature and humidity in the cell and the status of the ongoing program.

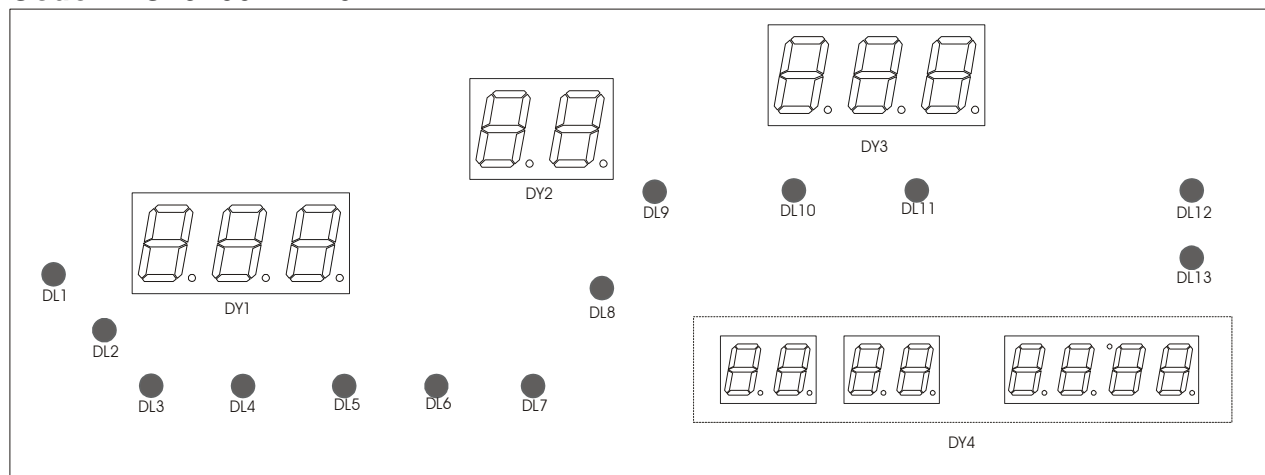
The four available models differ from each other in the dimensions of the display and the position of the LEDs, more precisely:

#### Code EVC25T007XXX00



Temperature/humidity display (DY1, DY2, DY3) H20 mm and synoptic SOFT.

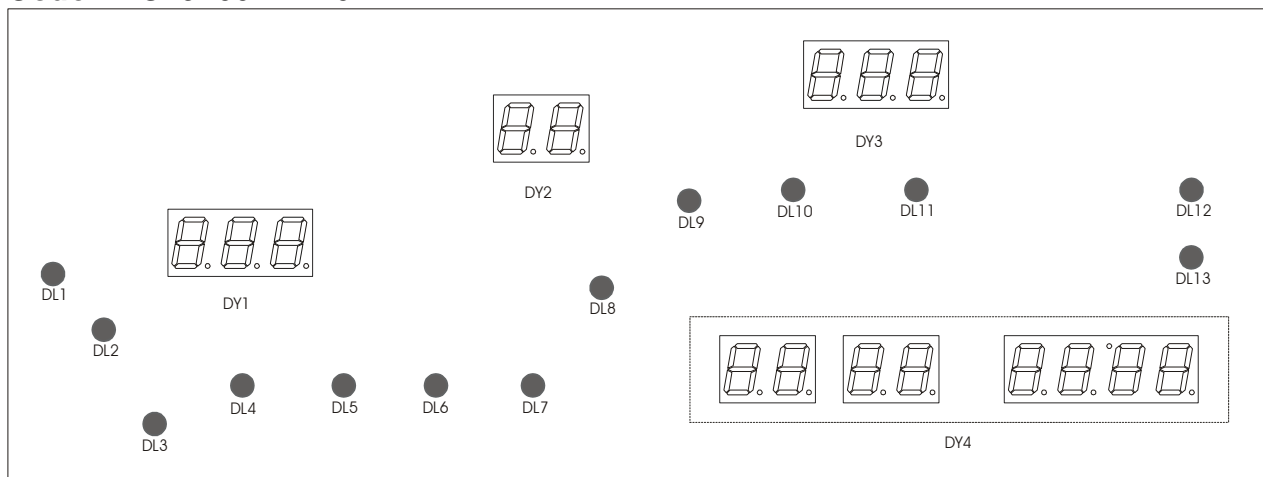
#### Code EVC25T007XXX02



Temperature/humidity display (DY1, DY2, DY3) H20 mm and synoptic HARD.

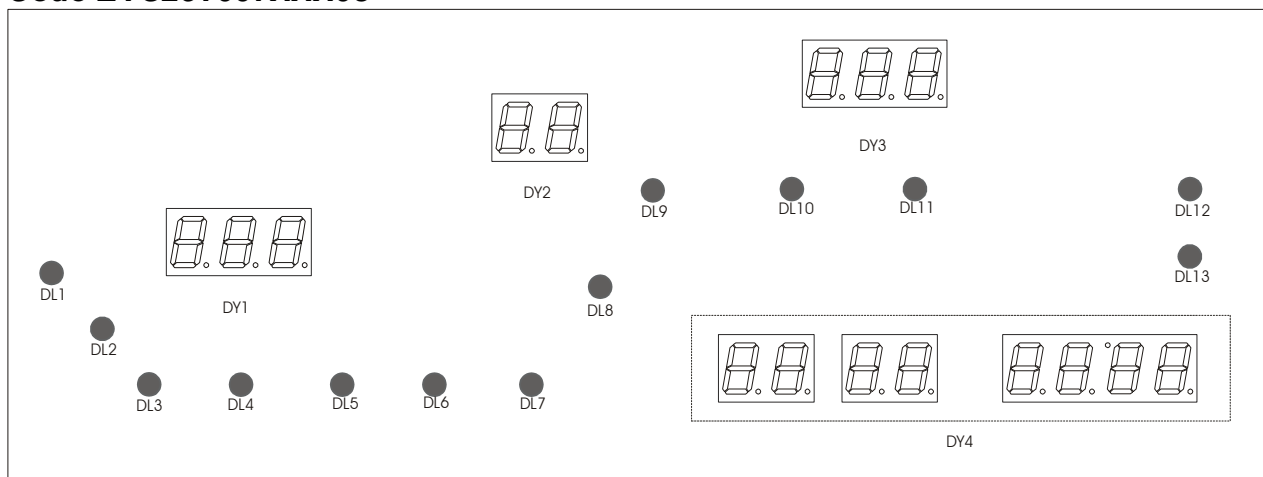


**Code EVC25T007XXX01**



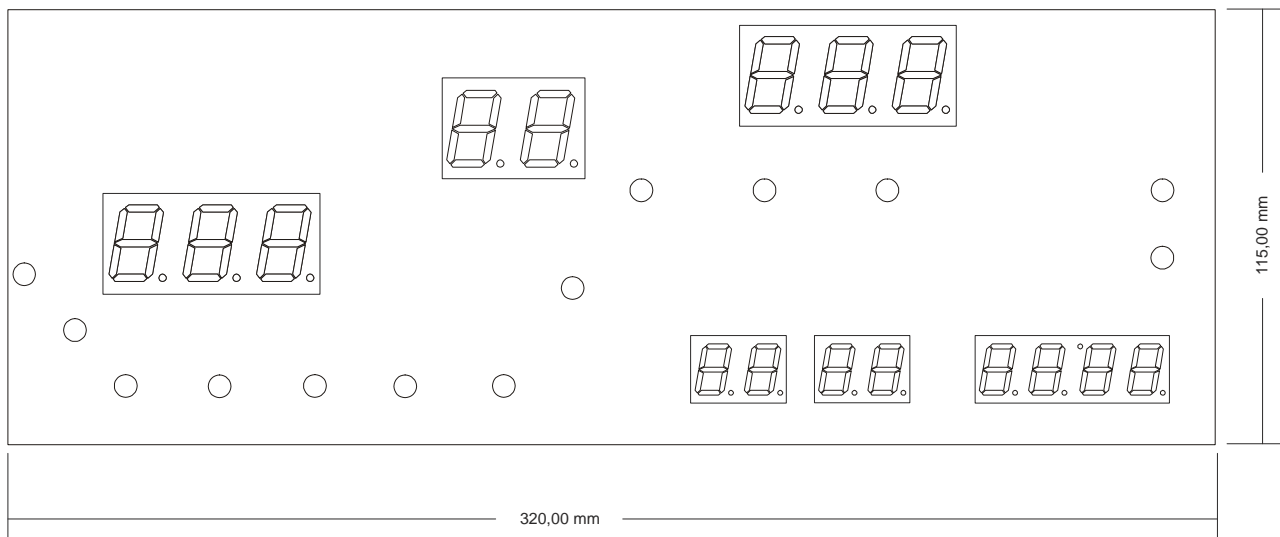
Temperature/humidity display (DY1, DY2, DY3) H13 mm and synoptic SOFT.

**Code EVC25T007XXX03**

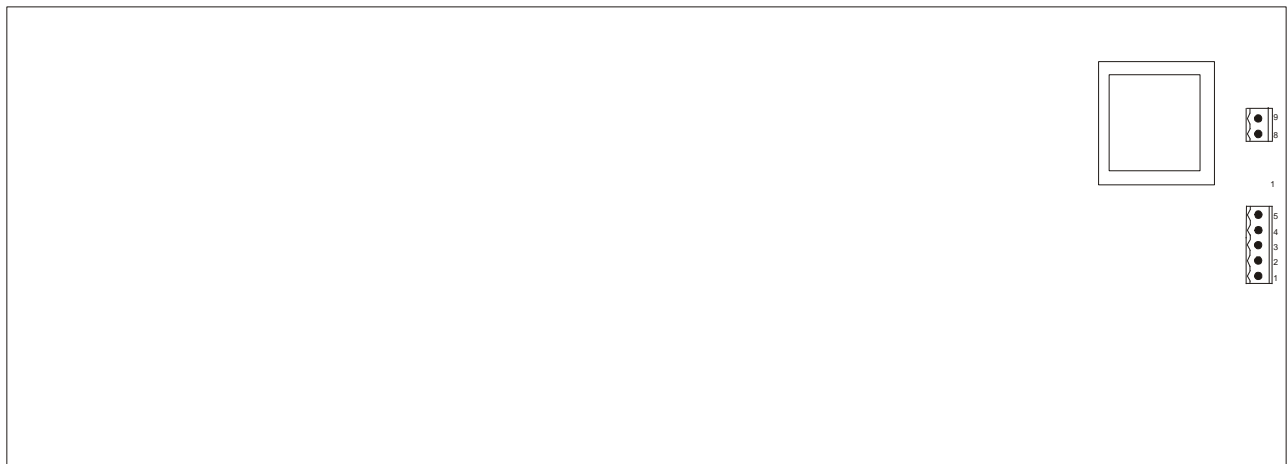


Temperature/humidity display (DY1, DY2, DY3) H13 mm and synoptic HARD.

## 27.2. Dimensions



## 27.3. Electric Connection



- 1-2 Buzzer expansion
- 3 RS 485 +
- 4 RS 485 -
- 5 RS 485 RIF
- 8-9 Power supply 230Vac

## 27.4. Visualization

### **DISPLAY DY1**

Displays the temperature in the cell.

This is on during the cooling phase of a manual cycle, in the locking phase of the rising and during the preservation phase of an automatic cycle.

### **DISPLAY DY2**

Displays the relative humidity in the cell.

It will remain on during all phases which require humidity control.

### **DISPLAY DY3**

Displays the temperature in the cell.

This is on during the heating and air conditioning phase of a manual cycle and in the awakening, rising and slowing down phases of an automatic cycle.

### **DISPLAY DY4 UNIT**

Displays date and time.

Displays date, month and real time with the card in standby or manual cycle.

Displays date, month and end of cycle time if the ongoing cycle is automatic.

## **LED SERIES**

- **MANUAL CYCLE**

### **Cooling**

DL1, DL2, DL3, DL4, DL5, DL6 and DL7 on during cooling phase configuration.

DL1, DL2 on, DL3 blinking during cooling phase if the temperature setpoint was not reached.

DL1, DL2, DL3, DL4, DL5, DL6, DL7 on during a cooling phase if the temperature setpoint was reached.

### **Heating**

DL7, DL8, DL9, DL10, DL11 on during heating phase configuration.

DL7, DL8 on, DL9 blinking during heating phase if the temperature setpoint was not reached.

DL7, DL8, DL9, DL10, DL11 on during a heating phase if the temperature setpoint was reached

### **Air conditioning**

DL11, DL12, DL13 on during air conditioning phase configuration.

DL11 on, DL12 and DL13 blinking during air conditioning phase if the temperature setpoint was not reached.

DL11, DL12, DL13 on during an air conditioning phase if the temperature setpoint was reached.

- **AUTOMATIC CYCLE**

### **Blocking**

DL1, DL2, DL3 on during blocking phase configuration.

DL1, DL2 on, DL3 blinking during blocking phase if the temperature setpoint was not reached.

DL1, DL2, DL3 on during a blocking phase if the temperature setpoint was reached.

### **Preservation**

DL3, DL4, DL5, DL6, DL7 on during preservation phase configuration.

DL4, DL5 on, DL6, DL7 blinking during preservation phase if the temperature setpoint was not reached.

DL4, DL5, DL6, DL7 on during a preservation phase if the temperature setpoint was reached.

### **Awakening**

DL7, DL8, DL9 on during awakening phase configuration.

DL8 on, DL9 blinking during awakening phase if the temperature setpoint was not reached.

DL8, DL9 on on during an wakening phase if the temperature setpoint was reached.

### **Rising**

DL9, DL10, DL11 on during rising phase configuration.

DL10 on, DL11 blinking during rising phase if the temperature setpoint was not reached.  
DL10, DL11 on during a rising phase if the temperature setpoint was reached.

**Slowing down**

DL11, DL12, DL13 on during slowing down phase configuration.

DL12 on and DL13 off during slowing down phase if the temperature setpoint is equal to or higher than the temperature setpoint of the rising phase.

DL12 off and DL13 on if the temperature setpoint is lower than the preset temperature setpoint for the rising phase.

**NOTE:** The LEDs which refer to concluded phases will remain on while the next phases are running.