EVFTFT219

Controller for laboratory refrigerated cabinets, in split version and which can be integrated into the unit

Installation guide | ENGLISH

Code 144FTFT219E104

Important

Read this document thoroughly before installation and before use of the device and follow all recommendations; keep this document with the device for future consultation.

Only use the device in the way described in this document; do not use the same as a safety device.

Disposal

The device must be disposed of in compliance with local standards regarding the collection of electric and electronic equipment.

Indice

1   INTRODUCTION

1.1   Introduction

EVFTFT219 is a controller with elegant design for the management of laboratory refrigerated cabinets.

It is available in split version and can be mechanically and aesthetically integrated into the unit; the user interface consists of a colour TFT graphic display, touch keys and guarantees an IP65 protection rating, for easy cleaning.

Access to the controller functions is subject to user identification; any activity will be tracked and the temperatures read by the probes will be recorded.

The device is equipped with power failure management strategies, including a simulation function; thanks to a backup module and battery, it is possible to guarantee, for as long as the battery lasts, power to the user interface and the recording of the temperature value measured by a product probe that is electrically independent from the cabinet probe.

The device also has a three-point calibration function for the cabinet probe and the product probe, the "f: time-temperature" graphic function and a USB communication port accessible from the front of the user interface (to allow the upload and the download of the settings and the data recorded by the controller, through a common USB flash drive).

Installation is by back-panel, with threaded studs and guarantees flush mounting.

1.2   Technical features

	EVFTFT219Z9U
Power supply	
115… 230 VAC	•
Analogue inputs	
cabinet probe (2 wires Pt 1000)	•
evaporator probe (2 wires Pt 1000)	•
condenser probe (2 wires Pt 1000)	•
product probe (2 wires Pt 1000)	•
Digital inputs (for NA/NC contact)	
door switch	•
Digital outputs (electromechanical relays; A res. @ 250 VAC)	
compressor	16 A
defrosting	8 A
evaporator fan	8 A
condenser fan	8 A
cabinet light	8 A
alarm	8 A
door heaters	8 A
door lock	16 A
backup battery test	16 A
Communication ports	
RS-485 MODBUS	•
USB	•
Other characteristics	

clock	●
alarm buzzer	●
access to the functions through user identification, tracking of the activities and consequent recording of the temperature values	●
power failure management strategies	●
over-heated condenser alarm management	●
defrosting adaptive management	●
three-point calibration of the cabinet probe and product probe.	●
"HACCP" function	●
"f: time-temperature" graphic function	●

Notes

None.

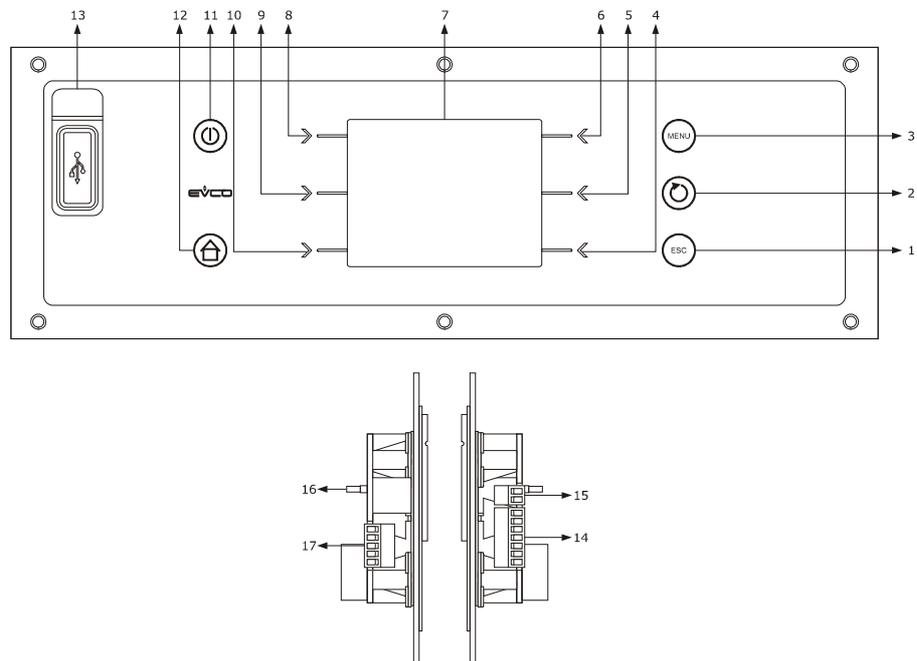**Available options**

None.

For additional information, please read chapter 13 "TECHNICAL DATA".

2   DESCRIPTION

2.1   User interface

The following drawing shows the layout of the user interface.

The following table describes the meaning of the parts of the device user interface.

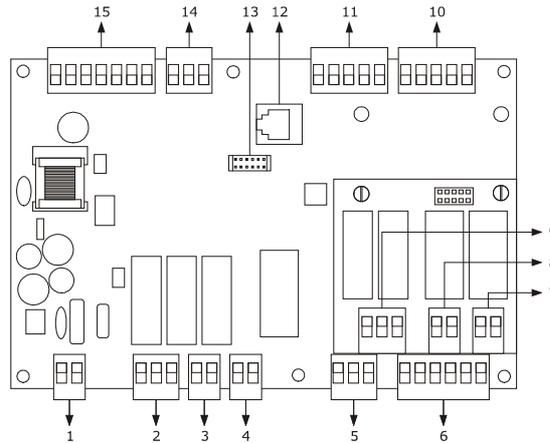| PART	MEANING
1	escape key, hereinafter also "ESCAPE" key
2	setting key, hereinafter also "SET" key
3	keypad lock/unlock key
4	interactive key
5	interactive key
6	interactive key
7	display
8	interactive key
9	interactive key
10	interactive key
11	on/off key, hereinafter also "ON/STAND-BY" key
12	preset key, hereinafter also "HOME" key"

13	USB port
14	control module communication port and RS-485 MODBUS port
15	functional earth
16	RS-485 MODBUS port termination resistor
17	product probe, backup battery status and power supply status analogue inputs

For additional information, please refer to the following chapters.

2.2   Control module

The following drawing shows the layout of the control module.

The following table shows the meaning of the parts of the device control module.

PART	MEANING
1	power supply
2	evaporator and condenser fan digital outputs
3	cabinet light digital output
4	alarm digital output
5	door switch digital input
6	door switch digital output
7	door lock digital output
8	backup battery test digital output
9	defrosting and door heaters digital outputs
10	cabinet probe, evaporator probe and condenser probe analogue inputs
11	reserved
12	reserved
13	reserved
14	reserved
15	user interface communication port

Per ulteriori informazioni si vedano i capitoli successivi.

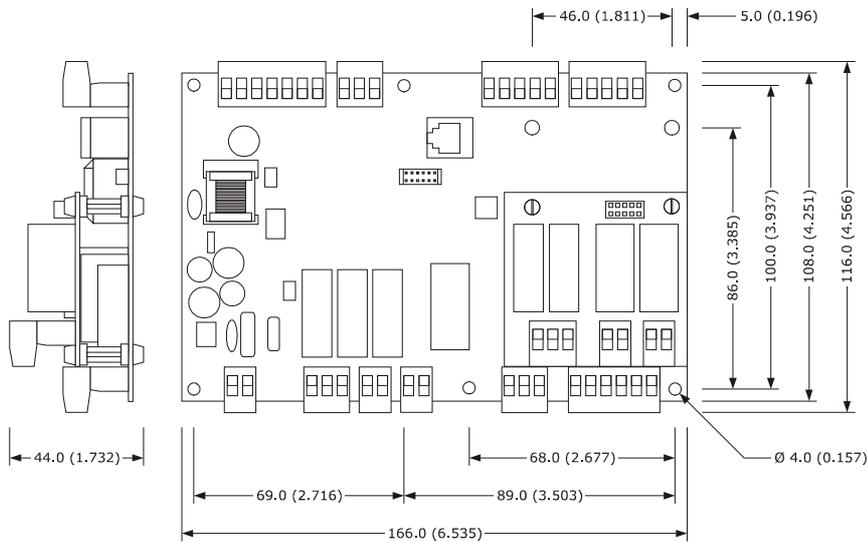# 3   DIMENSIONS AND INSTALLATION

3.1   User interface dimensions

The following drawing shows the measures of the user interface, in mm (in).
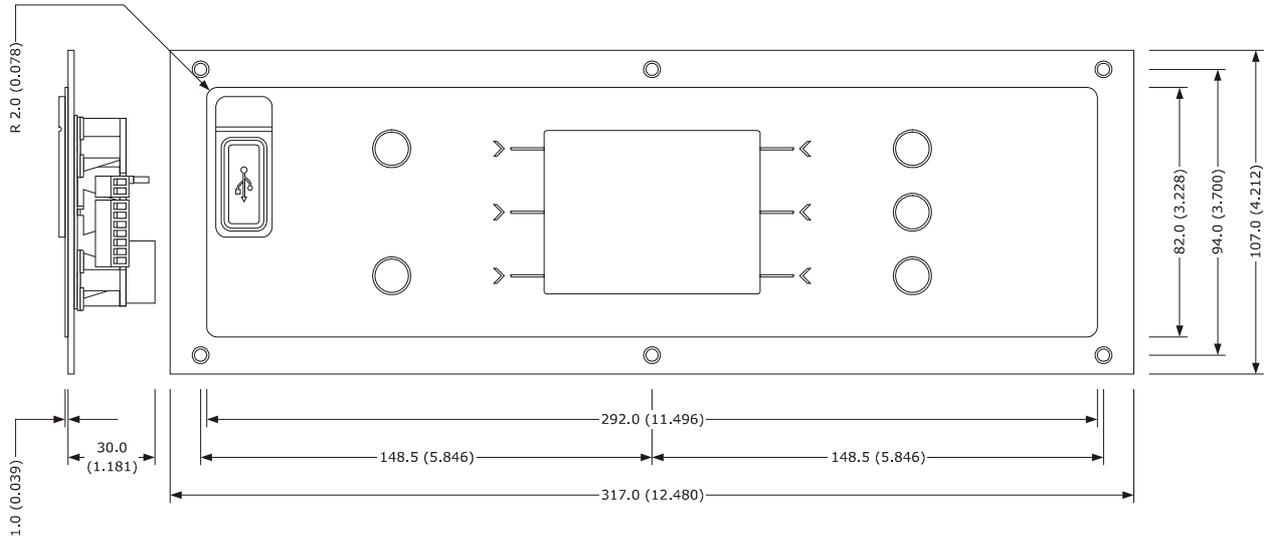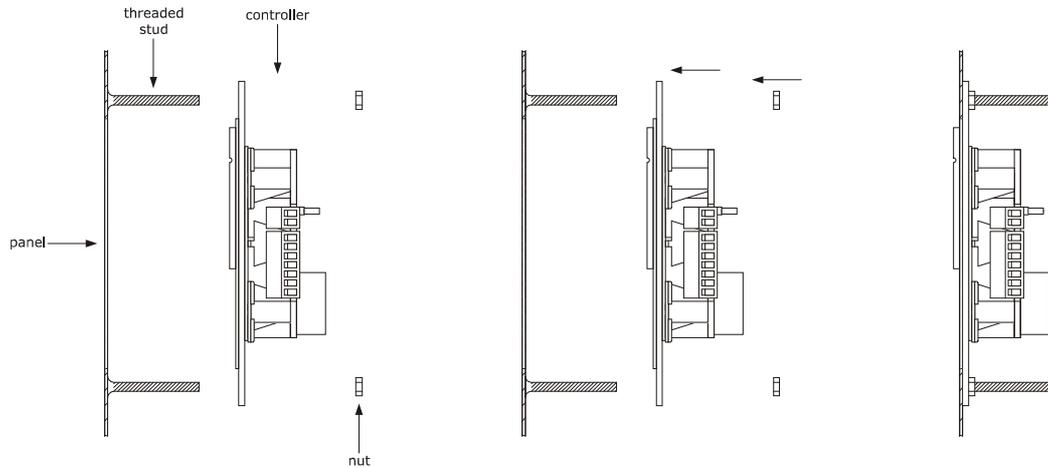

3.2   Control module dimensions

The following drawing shows the measures of the control module, in mm (in).

3.3   User interface installation

The following drawing explains how to install the user interface.

Installation is by back-panel, with threaded studs and guarantees flush mounting.

## 3.4   Control module installation

The control module is to be installed on a flat surface, with spacers.

3.5   Installation warnings

- make sure that the device work conditions (temperature of use, humidity, etc.) lie within the limits indicated; see chapter **Errore. L'origine riferimento non è stata trovata.** "**Errore. L'origine riferimento non è stata trovata.**"

- do not install the device near to any heat sources (heating elements, hot air ducts etc.), equipment containing powerful magnets (large diffusers, etc.), areas affected by direct sunlight, rain, humidity, excessive dust, mechanical vibrations or shocks

- any metal parts in proximity of the control module must be at a distance such that they do not compromise the safety distances.

- in compliance with Safety Standards, the device must be installed correctly and in a way to protect against any contact with electric parts; all parts that ensure protection must be fixed in a way that they cannot be removed without the use of tools.

4   WIRING

The following diagram shows the wiring connections of the device.
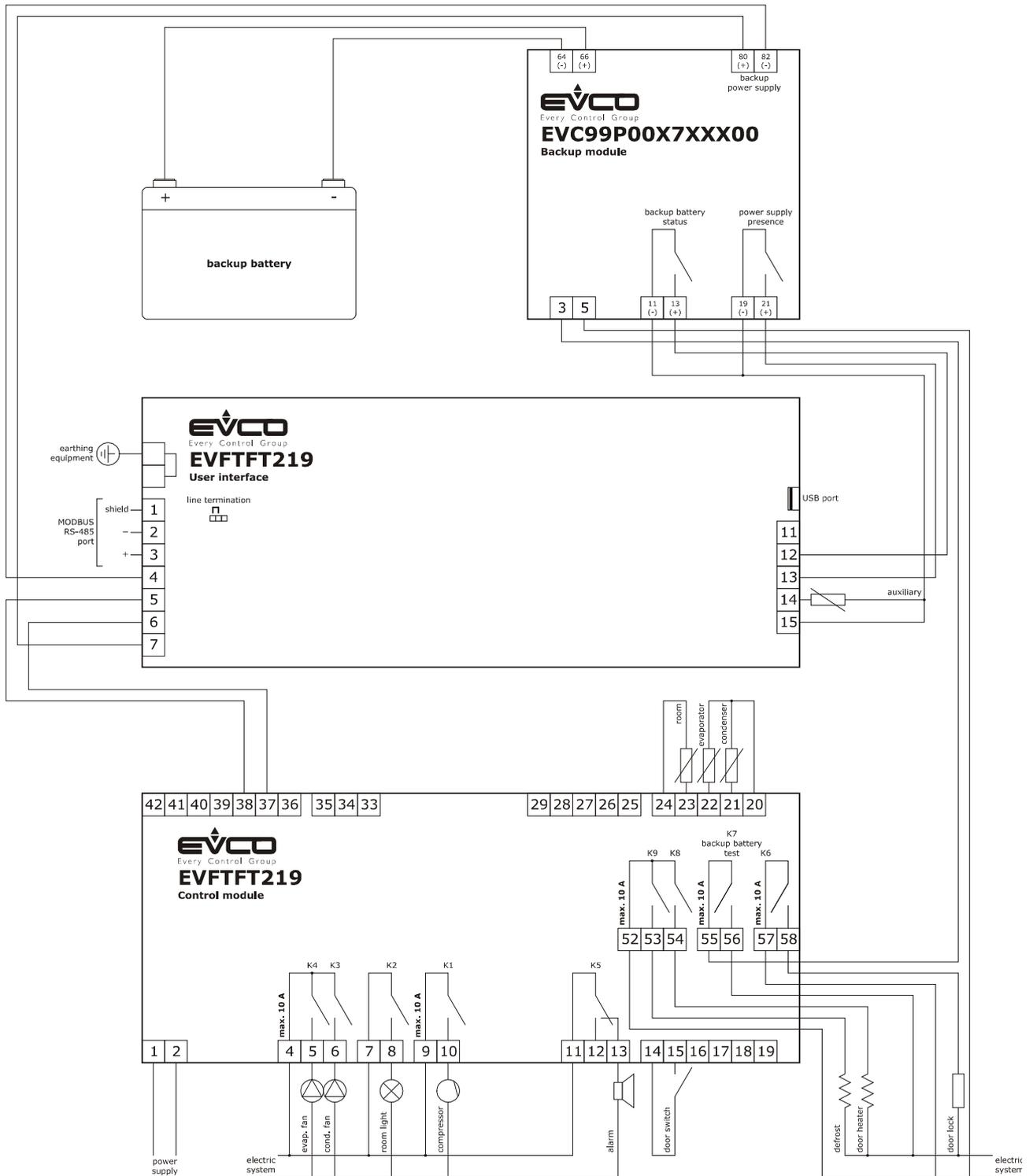
4.1   Warnings for the wiring

-        do not use electric or pneumatic screwdrivers on the device terminal board
-        if the device has been taken from a cold to hot place, humidity could condense inside; wait about 1 hour before powering it
-        make sure that the power supply voltage, the frequency and the operational electric power of the device correspond with those of the local power supply; see chapter "TECHNICAL DATA"
-        disconnect the device power supply before proceeding with any type of maintenance
-        connect the device to a RS-485 MODBUS network using a twisted pair
-        position the power cables as far away as possible from the signal cables

- for repair and information regarding the device, contact the EVCO sales network.

5   DEVICE USAGE

5.1   First usage

Operate as follows:

1.   Install the device as described in chapter 3 "DIMENSIONS AND INSTALLA", following all instructions listed under paragraph 3.5 "**Errore. L'origine riferimento non è stata trovata.**".

2.   **Refer to the wiring diagram shown under chapter** 4 when cabling the device.

3.   Connect the device to the power supply: An Evco splash screen will be displayed for 10 seconds (if D02 is set to 0, a "Loading..." screen will appear).

4.   The controller is now in stand-by mode and date and time are displayed on the screen. In the event that the controller is stored for a time longer than the backup battery capacity, date and time will have to be reset.

5.   Press the key ON/STAND-BY, as suggested by the backlight, to switch the device on: the home screen will be displayed as shown under paragraph 6.3.

6.   Follow the device setting procedure illustrated under chapter **Errore. L'origine riferimento non è stata trovata.**.

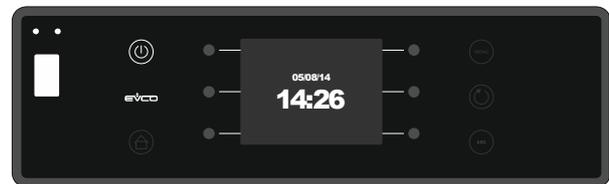7.   Connect the loads to the power supply.

For additional information, please refer to the following paragraphs

Splash screen
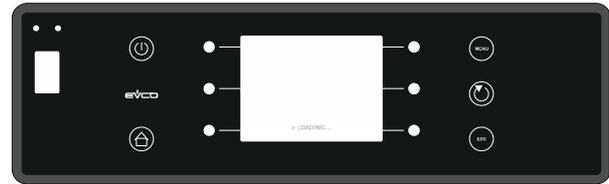
Loading screen

Stand-by mode

Home screen

6   USER INTERFACE

6.1   Preliminary notes

With "functioning mode", we refer to the following modes:

-        "on" mode (the device is powered and is on: the
         regulators can be switched on).
-        "stand-by" mode (the device is powered but
         software and regulators are switched off).
-        the "off" mode (the device is not powered).

Hereinafter, with "turn on" we indicate the switching from
"stand-by" mode to "on" mode; with "turn off" we indicate the
switching from "on" mode to "stand-by" mode.
Every time power is supplied back to the device, the device
will revert to the mode it was at the time of disconnection.

6.2   Turning the device on/off

To turn the device on/off, operate as follows:

1.   Make sure that the keypad is not locked and that
         no procedure is in progress.
2.   Press the key "ON/STAND-BY".

6.3   Display

When the device is on, during normal operation the home
screen showing the following information will be displayed:

-        date/time

-        keylock icon 🔒

-        battery charge status 🔋

-        cabinet temperature (main view if
         AUX10=0) 🌡

-        product temperature (main view if
         AUX10=1) ⊕

-        working setpoint

-        loads status icons

-        key "menu" ▦

-        key "light" 💡

If the device is turned off, only date and time will be
displayed.
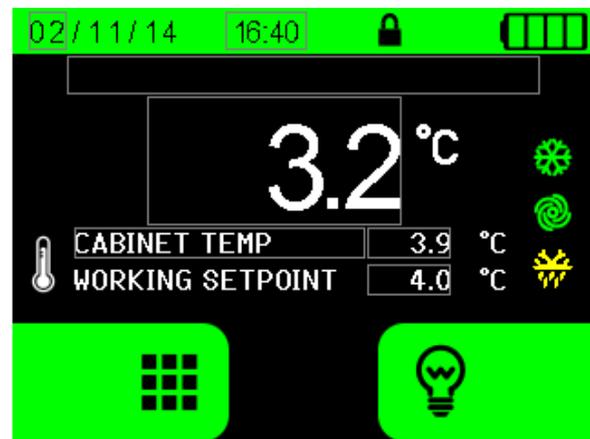
Display with cabinet temperature in the spotlight
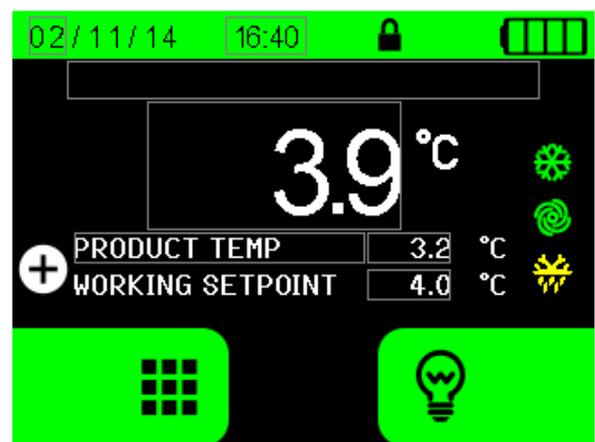
Display with product temperature in the spotlight

6.4   Battery status

The battery charge indicator is always shown on the top right of the display. When battery is fully charged (battery digital input closed), all indicator lines become green; while recharging (battery digital input open) the indicator has growing green lines. In the event of a power failure, the battery charge counter will estimate the battery operation time and will decrease the indicator accordingly: one line less every quarter of battery capacity used to supply the controller.

When the battery voltage drops to the extent that its correct functioning is hindered, the icon will appear on the display. Under such circumstances, operate as follows:

-        disconnect the battery
-        power off the system and wait a few seconds
-        power back on the device ensuring a proper mains voltage.

If that does not resolve the issue, contact the EVCO sales network.

6.5   Keypad lock/unlock

The keypad lock is enabled by parameter D08. If set to 0, the keypad cannot be locked; if set to 1, the lock can be manually activated from the HOME screen by pressing in succession the keys HOME and MENU: a closed padlock icon will be displayed for 3 seconds.

The keypad lock prevents the access to all menus and functions, except for the following ones:

-        turning on/off the light
-        silencing the buzzer

To unlock the keypad, press in succession the keys HOME and MENU: an open padlock icon will be displayed for 3 seconds. The procedure is facilitated by a pop-up displayed whenever a key is pressed while the keypad is locked and by the backlight on the key MENU which is lighted up after pressing the key HOME.

6.6   Turning on/off the cabinet light

The function is accessible manually no matter if the keypad is locked.

Parameter C05 enables the turning on/off of the cabinet light:

C05=0   the light is turned on /off by pressing the key "light" and following a door opening/closure if enabled by parameter C01.

C05=1   the light is turned on /off only by pressing the key "light".

6.7   Silencing the buzzer

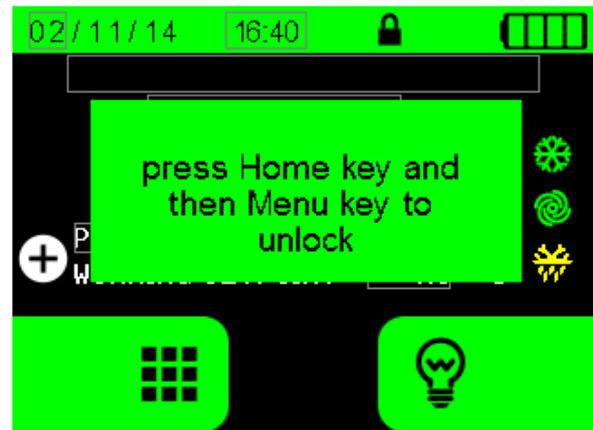To silence the buzzer, operate as follows:

1.   make sure no procedure is in progress.
2.   press any key (when pressing the key once, the relevant function is not activated).

When the key is pressed, the icon appears on the display and after G01 seconds the buzzer is reactivated. If G01=0, the buzzer will not be reactivated.
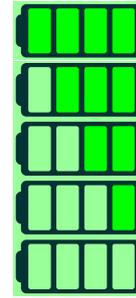
Battery charge status

Pop-up for the keypad unlock procedure

7 USER IDENTIFICATION FUNCTION

7.1 User identification function

The "user identification" function can be enabled/disabled by parameter ID.

It is possible to set up to 6 user codes and only user 1 (default code 111) is allowed to set and modify the login credentials of all other users. If the password of ID1 is forgotten, access to the device is enabled by code 666.

The controller will require to enter the user identification code any time one of the following actions is performed:

- turning on/off the device
- editing the working setpoint
- manual defrosting
- accessing parameters
- unlocking the door following an electronic locking

The actions performed will be recorded as special events in the historical data, with the indication of the user who carried them out. Each event will cause the sampling of the relevant temperatures and working setpoint, thus ensuring continuity in the historical results logging.

An example of how to enter the user code when turning on the device is given below:

- with the device in stand-by mode, press the key ON/STAND-BY
- when the user login screen appears, enter the correct code and press the key SET to confirm and gain access to the device.

Similarly, the same user identification procedure will be required to turn off the device.

After the log-in, any action performed within one minute form the code entering will not require a new authentication.

For the user identification procedure, refer to paragraph 9.2.6.5

8 BACKUP BATTERY

8.1 Battery functioning during a power failure

The controller features a backup battery, which is connected to EVC99P00 battery-charger. For as long as the battery lasts, it allows to save data related to the product probes and alarms.

8.2 Battery test management

A simulation of a power failure to the control system is required to check the battery. To this aim, the "battery test" output deactivation will cause a power cut-off to the battery-charger but not to the control module: this allows to regain the control of the system after 10 seconds by stimulating the relay.

The buzzer sounds all along the test, which is successful when the indication "TEST OK" is displayed at the end, meaning that the power failure has been detected by the digital input and that the battery power is full, while with low battery the system is shut down. When restoring the session, the indication "FAILED" will be displayed to report that the battery is not working properly. The normal operations will be recovered only after the key OK is pressed.

Refer to the procedure shown under paragraph **Errore. L'origine riferimento non è stata trovata.**. to perform the test.

9   SETTINGS

9.1   Preliminary notes

To access the menu functions on the display, operate as shown in the paragraphs below.

The following is a list of the main selection keys:

- key HOME: it allows to display the main screen

- key ESCAPE ● : it allows to revert to the previous screen

- keys ↑ and ↓ : they allow to scroll the items

- keys + and - : they allow to set the desired value

- key SET ⊚ : it allows to confirm the set value

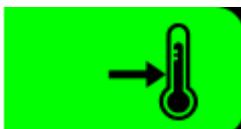## 9.2   Main menu

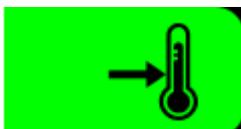Press the key   to access the main menu:
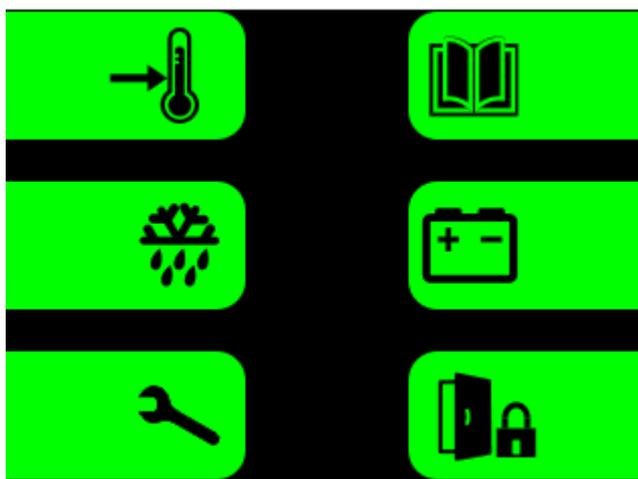
9.2.1   Setpoint settings

By pressing the key   the temperature setpoint editing mode is activated.

9.2.2   Start up of a defrosting cycle
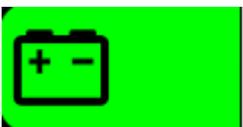

Press the key   to start up a manual defrosting cycle:

Note : if parameter S01 is not properly configured, no defrosting cycle is allowed when pressing this key.

9.2.3   Battery test
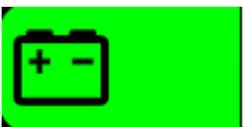
Press the key   to perform the buttery function overall test.

When restoring the session after the device has been shut down due to low battery, the following screen is displayed. Press the key OK to recover the normal operations.

9.2.4   "Historical Data / Alarms" menu

Press the key [icon] to access the "Historical data /Alarms" sub-menu, which consists of the following functions/screens:

9.2.4.1   Alarm list

Press the key [icon] to access the alarms display mode.
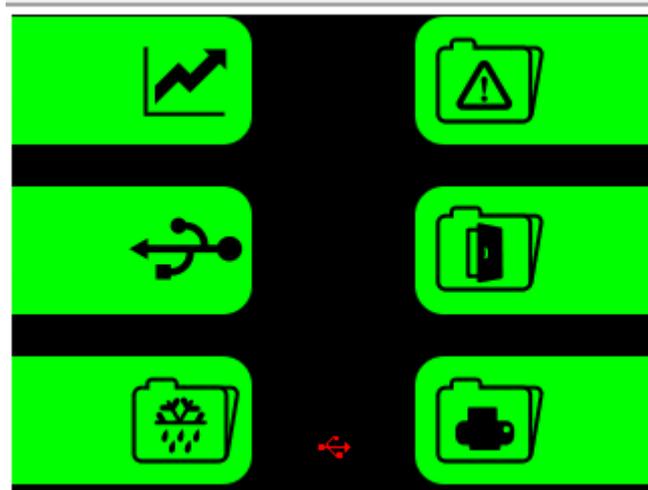
It is possible to record up to 30 alarms with related information. When recorded, the display shows the information related to the latest alarm occurred, as shown below; the remaining alarms can be viewed by scrolling with the keys ↑ and ↓ and selecting them.

- for "Open door", "High cabinet temperature" and "Low battery" alarms, the maximum temperature reached in the cabinet during the alarm is recorded as well.
- for "Low cabinet temperature" the minimum temperature reached in the cabinet during the alarm is recorded as well.
- if the alarm is not over yet, the message "IN PROGRESS" will be displayed.
- if no alarm has been recorded, the message: "NO ALARMS" will be displayed.

9.2.4.2   Graph

Press the key [icon] to display the temperature graph of the cabinet and product probe (the latter only if enabled by the related parameter).
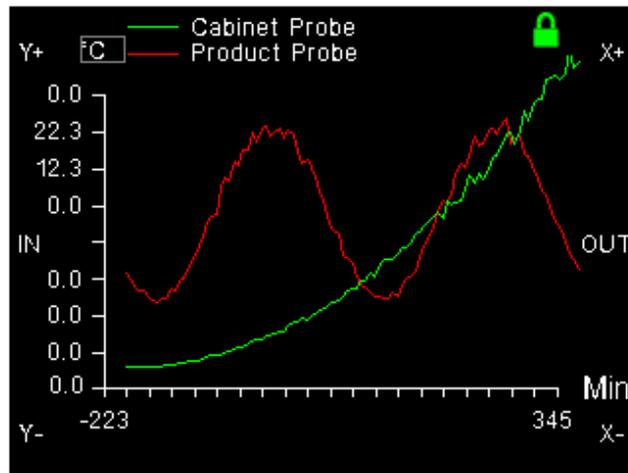
It is possible to edit the graph by using the following keys:

- Y+ e Y- : to change the scale of the ordinate axis (Y zooming)
- X+ e X- : to shift the scale along the abscissa axis
- IN e OUT : to change the scale of the abscissa axis (X zooming)

On the abscissa axis, the time is expressed in minutes up to 600 minutes, beyond this limit it is expressed in hours.

Sampling time is set by parameter PR1.

9.2.4.3   Operating time counter

Press the key _____ to display the machine operating time.

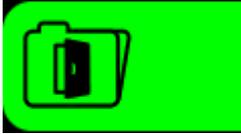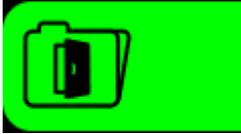The following data will be displayed:

- refrigerator operating time
- compressor operating time
- compressor switching on/off avarage time
- compressor opearting time percentage, on a daily and hourly basis

Counters cannot be cancelled by the users.

9.2.4.4   Door opening time

Press the key   to display the door opening record of the current day. Records of other days may be viewed by scrolling with the arrow keys.

A dedicated memory location is assigned to each day the machine is operating: it stores the records of the door opening events total number, of the door opening events that last more than parameter C03 minutes and of the door opening total time. The assigned memory space allows to record the door opening events up to 50 days on a rotation basis: once the memory is exhausted, the oldest data are cancelled in order to save the new ones. Parameter C01, if not equal to zero, enables the door switch input.

9.2.4.5   Defrosting data

Press the key   to display the latest 16 defrosting cycles.

Provided that a defrosting cycle has been recorded, the display will show the defrosting record number, starting time and date and duration in minutes.

The item "Type" indicates the defrosting start up modes:

1   started manually from keypad.

2   started one hour after the refrigerator switch-on.

3   started by time intervals based on refrigeration working times.

4   started by time intervals based on compressor working time.

6   started by automatic defrosting

7   started by evaporator low temperature

8   started by time protection

9   started by an alarm

9.2.4.6   Recorded data setup/deletion/download management

Press the key ![USB icon] to display the screen that allows to choose inputs, outputs and status to be displayed, as well as to delete the previous records.

By choosing "select data", the following screen will appear:
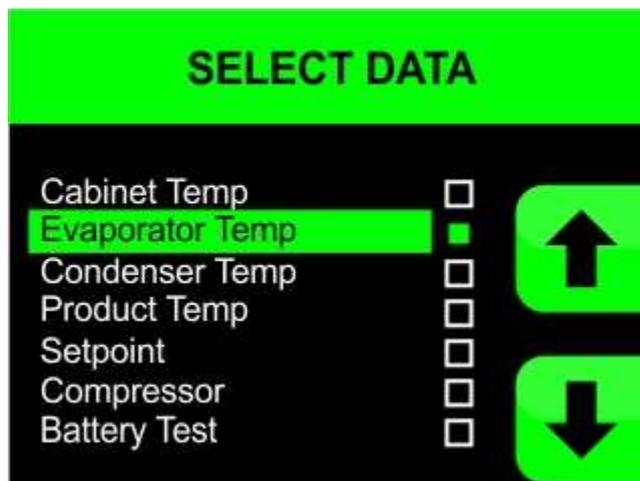
Scroll the list and press the key SET to select/unselect a record.

By selecting "delete data", all the data hitherto recorded will be deleted. To this purpose, the user login screen will be displayed if enabled by parameter ID.

To download the data recorded on the device and to download/upload setup parameters, turn off the device and insert a USB key into the keypad USB port. The following screen will be displayed.

Select the desired option and press the key SET.

If you wish to download the historical records, when pressing the key SET you will be required to indicate the date from which the download should start. The file thus created will have .csv extension and can be opened by MS OFFICE viewer or other appropriate programs.

Wait for the key removal message that will be displayed when the operation is completed.

9.2.5   Electronic door lock

Press the key [image] to activate [image] or deactivate [image] the electronic door lock output. The user login screen will be displayed.
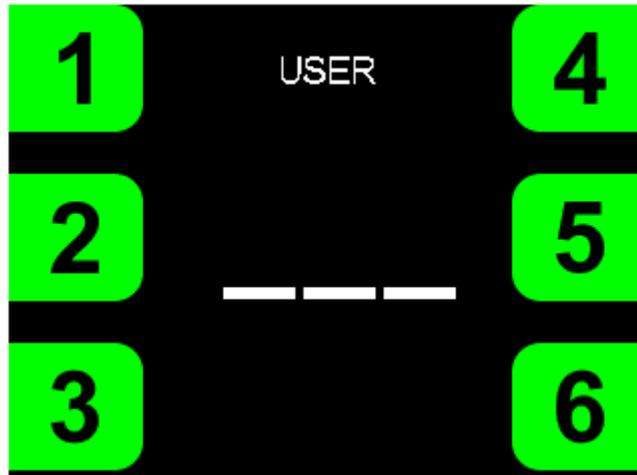
9.2.6   "SERVICE" menu

Press the key [icon] to access the sub-menu "service" consisting of the following functions/screens:
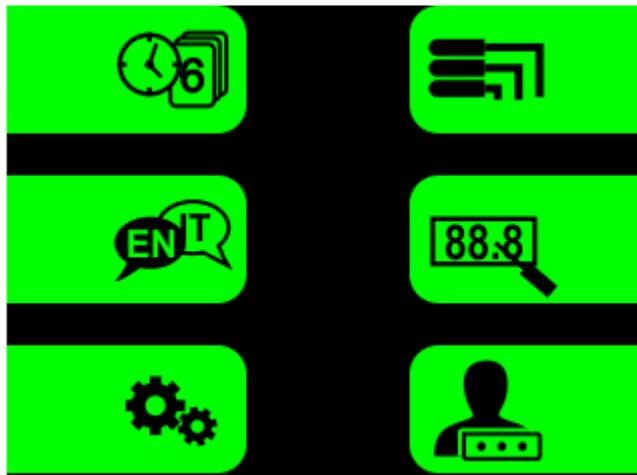
9.2.6.1   Date and time setup
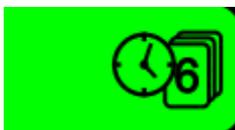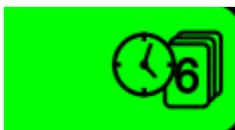
Press the key [icon] to enter the clock edit mode:
the arrow keys allow to select the desired field of the clock, while the keys + e –allow to modify the values; the key SET will confirm the new time and date setup.

9.2.6.2   Language choice

Press the key [icon] to select the language of your choice.
The available options are: ITALIAN and ENGLISH.

9.2.6.3   Probe readings

Press the key [image] to display the values detected by the probes.

9.2.6.4   Cabinet and product probe calibration

This function allows to calibrate the cabinet and product probe according to the machine specific range of temperatures.
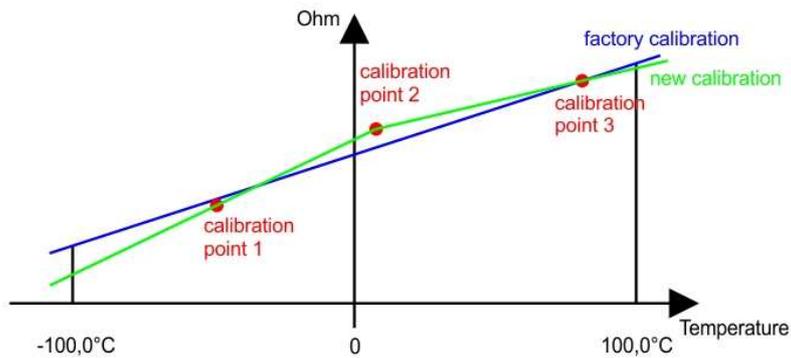
To start the procedure, press the key [image] and enter a screen allowing a calibration on three points, both of the cabinet probe and of the product probe.
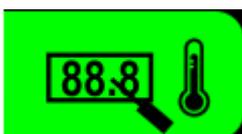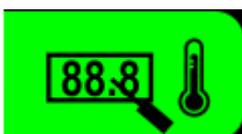
Press the key [image] to access the calibration setting screen for the cabinet probe.

If no calibration has been performed before, the following screen will be displayed:
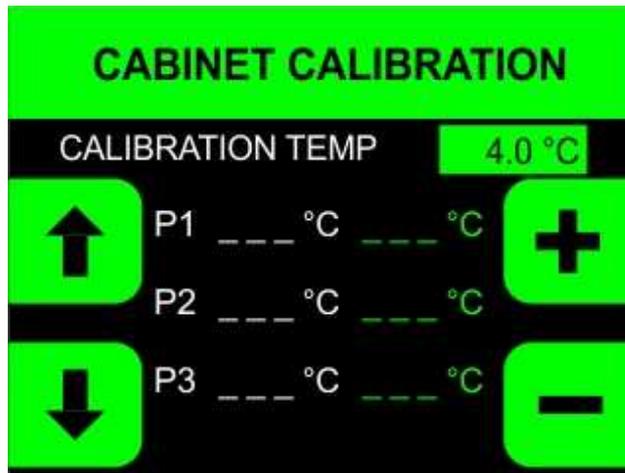
Press the keys + e – to set the proper value and press the key SET to start up the machine with the new setpoint value. The following screen will be displayed:
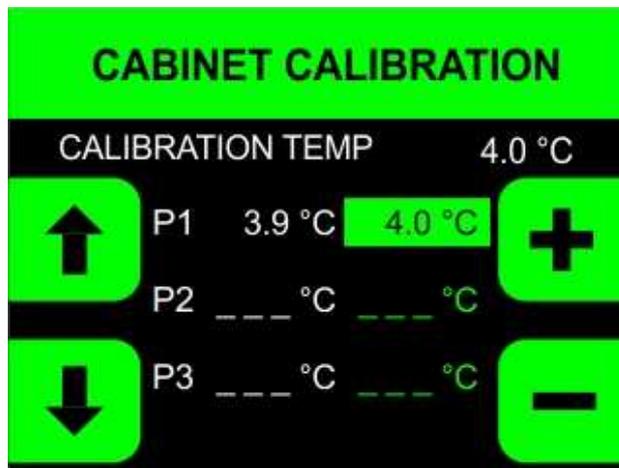
The real temperature is displayed on the left, while the calibration temperature is displayed in green on the right. Before starting the calibration, the two figures are identical.

Wait until the temperature is stable, then press the keys + e – to edit the values starting from P1; through the arrow keys move to the second and third point P2 and P3 and perform calibration likewise. By pressing the key ↑, it is possible to change any time the calibration set. Once the values have been modified, the key SET allows to go back to the position previously reached. After completing the third point, the key ↓ confirms the values entered and save the calibration: a "calibration completed" screen as shown below will be displayed:

After a few seconds, a summary screen disclosing the calibration values and the current probe temperature will be displayed:
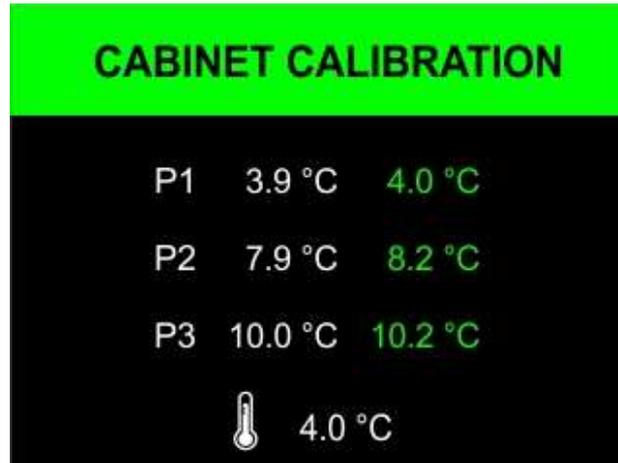
During calibration, it is not possible to go back and recalibrate a point whose value has been already set. Should a new calibration be required, the procedure must be re-performed from the beginning by pressing ESC and going back to the desired probe selection screen. If a calibration has already been performed, a summary screen will be displayed when entering the calibration mode. If you wish to modify the calibration, press the key and repeat the procedure.
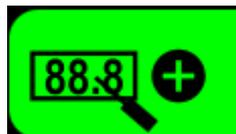
To enter the product probe calibration mode, press the key and follow the instructions as described for the cabinet probe.

9.2.6.5   User identification setting
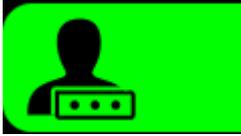
Press the key to enter the screen allowing the setting/activation of the 6 USER IDs who will have access to functions requiring login credentials. Only user 1 is entitled to define and modify all other users login credentials (refer to paragraph **Errore. L'origine riferimento non è stata trovata.**).
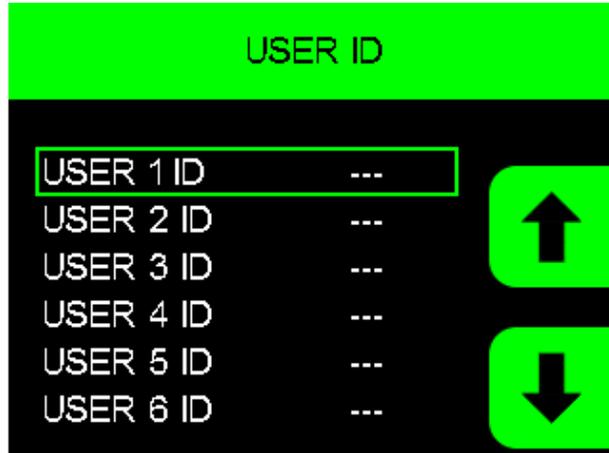
Scroll the USER ID with the arrow keys and select the ID you wish to enable/modify/disable; press the key SET to confirm or the key ESC to go back to the previous menu.
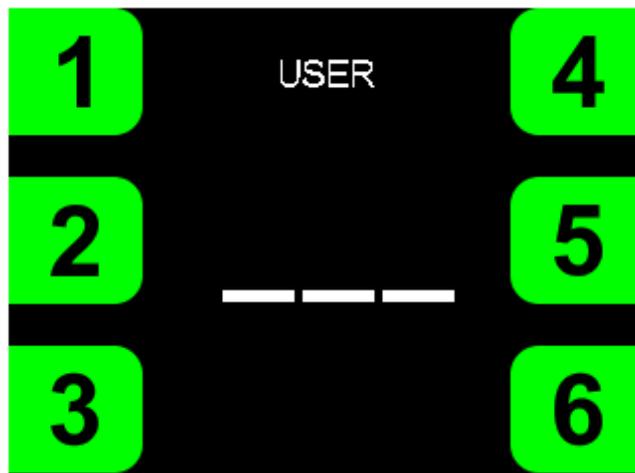
Press keys 1 to 6 to set the new USER ID , then press SET to confirm or ESC to go back to the previous menu.

In order to disable a USER ID, press the key ON/STAND-BY : the display of "_ _ _" indicates that the user has been disabled..

9.2.6.6   Parameters
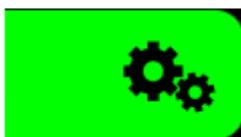
Press the key in the "service" menu to gain access to the device internal parameters. If enabled by parameter, a user code will be required.
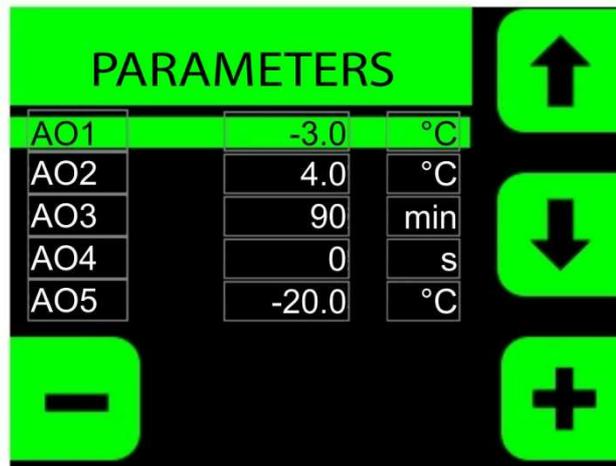
The parameters list may be scrolled by means of the arrow keys, while the keys + e – will modify the values. The newly set value is automatically saved by moving to the next or previous parameter.

9.3   List of configuration parameters

La seguente tabella illustra il significato dei parametri di configurazione dei dispositivi.

PARAM.	DEFAULT	MIN.	MAX.	M.U.	ALARMS
A01	-3	-50	0	°C/°F [1]	low cabinet temperature alarm offset (related to the setpoint)
A02	4	0	50	°C/°F [1]	high cabinet temperature alarm offset (related to the setpoint)
A03	90	0	300	min	high and low temperature alarm delay since device switch-on or defrosting end
A04	0	0	900	s	high and low temperature alarm delay
A05	-20	-50	0	°C/°F [1]	minimum evaporator temperature (related to the setpoint)
A06	60	0	90	°C/°F [1]	maximum condenser temperature (related to the setpoint)
A07	25	0	60	°C/°F [1]	temperature offset for dirty condenser alarm
A08	2	0	20	°C/°F [1]	low temperature alarm hysteresis (related to A01)
A09	2	0	20	°C/°F [1]	high temperature alarm hysteresis (related to A02)
PARAM.	DEFAULT	MIN.	MAX.	M.U.	DISPLAY
D01	0	0	1	- - - -	temperature units of measurement 0 = Celsius 1 = Fahrenheit
D02	1	0	1	- - - -	display of the initial splash screen 0 = none 1 = EVCO
D03	1	0	1	- - - -	backlight 0 = ON by pressing any key; after one minute, the backlight turns off and only the HOME key will be lighted up 1 = always ON
D05	0	0	1	- - - -	pre-alarm display 0 = not enabled 1 = enabled
D06	1	0	1	- - - -	cabinet temperature display lock during a defrosting cycle 0 = not enabled 1 = enabled
D07	5	1	300	min	inactivity time before the keypad is locked

D08	2	0	2	- - - -	Keypad lock 0 = not enabled 1 = lock/unlock enabled by key 2 = lock enabled by timeout or key, unlock enabled by key
D09	0	-10	10	°C/°F [1]	cabinet probe offset
D10	0	-10	10	°C/°F [1]	evaporator probe offset
D11	0	-10	10	°C/°F [1]	condenser probe offset
D12	0	-10	10	°C/°F [1]	product probe offset
D13	30	5	240	s	delay time for the display of the alarm message since the power failure is detected
PARAM.	DEFAULT	MIN.	MAX.	M.U.	DEFROSTING
S01	3	0	25	?	defrosting start up modes 1 = MANUAL –defrosting is started by keypad through the "Defrosting" menu 2 = BY INTERVALS – ON A TIME BASIS – defrosting is started every S04 h of refrigerator operation 4 = BY INTERVALS – ON COMPRESSOR SWITCH-ON BASIS – defrosting is started every S04 h of compressor operation 8 = 1 HOUR AFTER SWITCH-ON –- defrosting is started 1h after refrigerator switch-on 128 = ADAPTIVE –- defrosting is started by time intervals depending case by case on how long the compressor remains switched on and how cold the evaporator temperature is (that is to say: defrosting is started when the compressor operating time with evaporator T° < setpoint exceeds the value set with parameter S08); the recorded data are deleted when the device is turned off or if high condenser T° alarms or evaporator probe errors occur. MULTIPLE. – more types of defrosting cycles can be started simultaneously by configuring the parameter with a value given by summing up the values of each defrosting type (eg. MANUAL and ON A TIME BASIS→S01=1+2=3) TIME PROTECTION – if a defrosting cycle is not started within 72h since the previous one, a protection defrosting is forced on. If the evaporator probe is enabled (C07=1), a defrosting cycle is started only when the evaporator T° is lower than S02-3°C
S02	6	-10	30	°C/°F [1]	defrosting end temperature
S03	20	1	300	min	defrosting maximum duration

S04	8	1	48	h	time span between two defrosting cycles
S05	1	0	2	- - - -	defrosting types 0 = VIA STOPPING OF COMPRESSOR - during defrosting, the compressor will remain off and the defrosting output will remain deactivated 1 = ELECTRIC - during defrosting, the compressor will remain off and the defrosting output will be activated all along the defrosting cycle 2 = BY HOT GAS - during defrosting, the defrosting output will be activated and after S07 the compressor is switched on too. During a defrosting cycle, the evaporator fan is activated depending on parameter F05, while the condenser fan is activated depending on parameter F06
S06	120	0	300	s	dripping time
S07	0	0	300	s	compressor switch-on delay for hot gas defrosting
S08	5	1	48	h	Compressor operating time for automatic defrosting start up
PARAM.	DEFAULT	MIN.	MAX.	M.U.	CONFIGURATION
C01	2	0	2	- - - -	door switch function 0 = input is disabled 1 = compressor and evaporator fans are off when the door is open 2 = evaporator fans are off when the door is open
C02	1	0	1	- - - -	door switch polarity 0 = door is closed = contact is open 1 = door is closed = contact is closed
C03	30	0	600	s	open door alarm delay
C04	1	0	1	- - - -	buzzer 0 = disabled 1 = enabled
C05	1	0	1	- - - -	light relay 0 = enabled by key and door switch 1 = enabled by key
C07	1	0	1	- - - -	evaporator probe 0 = disabled 1 = enabled
C08	1	0	1	- - - -	condenser probe 0 = disabled 1 = enabled

PARAM.	DEFAULT	MIN.	MAX.	U.M.	REGULATION
C09	1	0	2	- - - -	evaporator fans control 0 = enabled depending on evaporator temperature: the fans are activated depending on F03 during normal operation and depending on F07 following a defrosting or a device switch-on 1 = enabled in parallel with the compressor during the normal operation or depending on F07 following a defrosting or a device switch-on 2 = the fans are always activated during normal operation and depend on F07 following a defrosting or a device switch-on No matter what the value given to parameter C09 is, the ventilation is stopped under the following circumstances: - door opening (see C01); the fans can be reactivated 10 seconds after closing the door or if the door remains open for more than C03 seconds - high condenser T° or dirty condenser alarm (see paragraph 11.1)
C12	-7	-25	20	°C/°F [1]	door heaters switch-on temperature - door heaters output activated if cabinet T° ≤ C12 - door heaters output deactivated if cabinet T° ≥ C12+2°C
C13	0	0	1	- - - -	product probe 0 = disabled 1 = enabled
PARAM.	**DEFAULT**	**MIN.**	**MAX.**	**U.M.**	**REGULATION**
R01	2	0	20	°C/°F [1]	hysteresis related to the compressor regulation setpoint: - Compressor activated if cabinet T° ≥ Setpoint+R01 - Compressor deactivated if cabinet T° ≤ Setpoint
R02	1	0	30	min	minimum time span between two successive compressor switch-ons
R03	0	0	300	s	compressor activation delay since the device switch-on
R04	10	0	300	s	minimum time span between compressor switch-on and switch-off
R05	0	0	300	min	compressor ON time allowed when compressor use alarm or cabinet probe error alarm are in progress
R06	0	0	300	min	compressor OFF time allowed when compressor use alarm or cabinet probe error alarm are in progress
R07	100	0	100	%	maximum percentage limit allowed for compressor operation
R08	15	-50	50	°C/°F [1]	maximum value allowed for the setpoint
R09	2	-50	50	°C/°F [1]	minimum value allowed for the setpoint

PARAM.	DEFAULT	MIN.	MAX.	M.U.	FANS
F01	1	0	1	- - - -	evaporator fans 0 = disabled 1 = enabled refer also to parameter C09
F02	0	0	1	- - - -	condenser fans 0 = disabled 1 = enabled refer also to parameter C08
F03	5	5	50	°C/°F [1]	evaporator fans setpoint during normal operation - fans are activated if evaporator T° ≤ F03 - fans are deactivated if evaporator T° ≥ F03+5°C
F04	15	0	50	°C/°F [1]	condenser fans setpoint - fans are activated when compressor is on and if condenser T° ≥ F04+5°C - fans are deactivated if evaporator T° ≤ F04 or when compressor is switched off, with delay time set by parameter F08 If the condenser probe is faulty or not installed, fans are switched on/off in parallel with the compressor and depending on F08
F05	0	0	1	- - - -	evaporator fans during defrosting 0 = disabled 1 = enabled
F06	0	0	2	- - - -	condenser fans during defrosting 0 = disabled 1 = enabled 2 = thermoregulated according to the setpoint given by F04
F07	4	-40	50	°C/°F [1]	evaporator fans activation temperature following the defrosting end or the device switch-on
F08	0	0	300	s	condenser fan delay
PARAM.	DEFAULT	MIN.	MAX.	M.U.	GENERAL
G01	0	0	900	s	buzzer reactivation after silencing 0 = disabled
PARAM.	DEFAULT	MIN.	MAX.	M.U.	ENERGY SAVING
ES1	24	0	24	h	energy saving start time 24h = disabled

ES2	24	0	24	h	energy saving end time 24h = disabled
ES3	2	0	20	°C/°F [1]	setpoint increase under energy saving
PARAM.	**DEFAULT**	**MIN.**	**MAX.**	**U.M.**	**SAMPLING**
PR1	1	1	60	min	sampling time
PR2	0	0	1	- - - -	USB 0 = disabled 1 = enabled
PARAM.	**DEFAULT**	**MIN.**	**MAX.**	**U.M.**	**COMMUNICATION**
ADD	1	1	247	- - - -	device address
MB1	2	0	2	- - - -	baud rate 0 = 2400 1 = 4800 2 = 9600
MB2	2	0	2	- - - -	parity 0 = no parity 1 = odd 2 = even
PARAM.	**DEFAULT**	**MIN.**	**MAX.**	**M.U.**	**ALARM RELAY**
RLA	0	0	1	- - - -	digital output status when an alarm is in progress 0 = disabled 1 = enabled
PARAM.	**DEFAULT**	**MIN.**	**MAX.**	**M.U.**	**PRODUCT ALARM**
AUX1	-3	-50	0	°C/°F [1]	low product temperature alarm offset (related to the setpoint)
AUX2	4	0	50	°C/°F [1]	high product temperature alarm offset (related to the setpoint)
AUX3	2	0	20	°C/°F [1]	low product temperature alarm hysteresis (related to AUX1)
AUX4	2	0	20	°C/°F [1]	high product temperature alarm hysteresis (related to AUX2)
AUX8	0	0	300	min	high or low product temperature alarm delay
AUX9	90	0	300	min	product temperature alarm delay since device switch-on

AUX10	0	0	1	- - - -	main view on display 0 = cabinet probe 1 = product probe
I0	0	0	1	- - - -	display contrast
ID	0	0	1	- - - -	user identification code 0 = deactivated 1 = activated

Notes:

(1)   the unit of measurement is given by parameter D01. If you wish to shift the parameter from °C to °F or vice versa, it is advisable to delete the records in order to prevent inconsistent data.

10   SIGNALS

10.1   Signals

The following table describes the device signal ICONS.

| ICON	MEANING
❄	compressor ICON If on: - the compressor is on
❄	defrosting ICON If on: - a defrosting is in progress - the counting of parameters S07 is in progress - the counting of parameters S06 is in progress
❂	evaporator fan ICON If on: - the evaporator fan is on
⚠ ⚠	alarm ICON If on: - an alarm is in progress If on with crossed-out symbol: - an alarm is in progress with the buzzer already silenced

11   ALARMS

11.1   Alarms

The pre-alarm warnings are displayed in green, while the alarm warnings are displayed in red. The pre-alarm warnings depend on parameter D05 and are provided only for the open–door alarm and high and low cabinet temperature alarms.

When an alarm occurs, the alarm type description and the icon ⚠ are displayed, while the alarm relay (if RLA=1) and the buzzer (if C04=1) are activated. To silence the buzzer, press any key: the icon ⚠🔇 is displayed and after G01 seconds the buzzer is re-activated. The alarm output depends on parameter RLA and it is the only output that will be activated in the event of a power failure.

When the condition causing the alarm no longer apply, the device normal operation will be restored, except where the following table specifies otherwise.
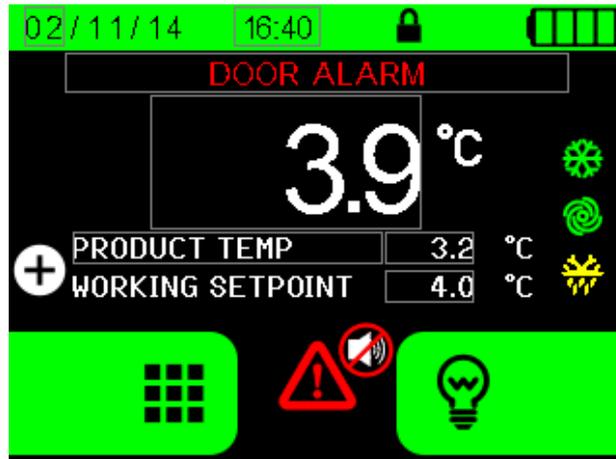
Alarm display example

The following tables describes the meaning of the device alarm codes.

ALARM CODES	MEANING
Cabinet Probe Err. ALARM	cabinet probe error alarm corrective measures: - check the device-probe connection - check the cabinet temperature main consequences: - the alarm is memorized - the buzzer and the alarm relay are activated (if enabled) - regulation takes place according to the compressor ON/OFF duty cycles, based on the times given by the related parameters R05 and R06
High Temperature ALARM	high cabinet temperature alarm - if cabinet T° > setpoint+A02→ pre-alarm (only if D05=1) - if cabinet T° > setpoint when A03 and A04 delay time has elapsed→ alarm corrective measures: - the same as above main consequences: - the alarm is memorized - the buzzer and the alarm relay are activated (if enabled) - the alarm is automatically withdrawn when the temperature drops A09° below the threshold

Low Temperature ALARM	low cabinet temperature alarm - if cabinet T° < setpoint+A01 → pre-alarm (only if D05=1) - if cabinet T° < setpoint when A03 and A04 delay time has elapsed→ alarm corrective measures: - the same as above main consequences: - the alarm is memorized - the buzzer and the alarm relay are activated (if enabled) - the alarm is automatically withdrawn when the temperature rises A08° above the threshold
PF High Temp ALARM	Power Failure high cabinet temperature alarm If cabinet T° > setpoint following a device switch-off due to power failure corrective measures: - the same as above main consequences: - power failure and power restoration time is memorized - the buzzer and the alarm relay are activated (if enabled) - alarm is deactivated by pressing any key
Evaporator Probe Err. ALARM	evaporator probe fault alarm (if C07=1) corrective measures: - the same as above but with reference to the evaporator main consequences: - defrosting cannot be ended and evaporator fans cannot be activated - the alarm is memorized while the adaptive defrosting data are deleted - the buzzer and the alarm relay are activated (if enabled) - regulation takes place as if the evaporator probe is not installed: defrosting cycles end on a time basis and fans are activated according to the cabinet T° (if C09=0)
Low Evapor. T° ALARM	low evaporator temperature alarm - if evaporator T° < setpoint+A05 when the door is closed corrective measures: - the same as above main consequences: - the alarm is memorized - the buzzer and the alarm relay are activated (if enabled) - regulation remains unaffected and a protection defrosting is forced on - the alarm is automatically withdrawn when the temperature rises 2°C above the alarm value
Condenser Probe Err. ALARM	condenser probe fault alarm (if C08=1) corrective measures: - the same as above but with reference to the condenser main consequences: - the alarm is memorized - the buzzer and the alarm relay are activated (if enabled) - regulation takes place as if the condenser probe is not installed and condenser fans are activated in parallel with the condenser

Condens. High T° ALARM	condenser high temperature alarm if condenser T° > A06 corrective measures: - the same as above main consequences: - the alarm is memorized while the adaptive defrosting data are deleted - the buzzer and the alarm relay are activated (if enabled) - the evaporator fans and the compressor are switched off, while the condenser fans are forced on - if the alarm is triggered during a defrosting, the condenser fans are forced on no matter what the value of parameter F06 is - the alarm is automatically withdrawn when the temperature drops below value A06 – 10°C
Dirty Condens. ALARME	dirty condenser alarm - occurring when the difference between condenser T° min and max value > A07 for two successive compressor switch-ons corrective measures: - the same as above main consequences: - the same as above
Compressor Use ALARM	compressor use alarm - if daily operation % > R07 corrective measures: - check the efficiency status of the refrigerator system main consequences: - the alarm is memorized - the buzzer and the alarm relay are activated (if enabled) - regulation takes place according to the compressor ON/OFF duty cycles, based on the times given by the related parameters R05 and R06
Product Probe Err. ALARM	product probe fault alarm corrective measures: - the same as the Cabinet Probe Err alarm, but with reference to the product probe main consequences: - the alarm is memorized - the buzzer and the alarm relay are activated (if enabled)
High Product T° ALARM	high product temperature alarm - if product T° > setpoint + AUX2 when AUX9 andAUX8 delay time has elapsed corrective measures: - the same as above main consequences: - the alarm is memorized - the buzzer and the alarm relay are activated (if enabled) - the alarm is automatically withdrawn when the temperature drops AUX4°C° below the threshold

Low Product T° ALARM	low product temperature alarm - if product T° < setpoint + AUX2 when AUX9 andAUX8 delay time has elapsed corrective measures: - the same as above main consequences: - the alarm is memorized - the buzzer and the alarm relay are activated (if enabled) - the alarm is automatically withdrawn when the temperature rises AUX3°C above the threshold
Open Door ALARM	door switch input alarm (parameters C01, C02, C03) - if door opening time > C03 corrective measures: - check the conditions causing the input activation main consequences: - the alarm is memorized - the buzzer and the alarm relay are activated (if enabled) - the compressor regulation resumes as if the door is closed, provided that C01=2 - the alarm is automatically withdrawn upon closing of the door
Defrosting Timeout ALARM	defrosting timeout alarm (only if C07=1) - if evaporator probe T° < S02 defrosting end T° when S03 maximum defrosting time has elapsed corrective measures: - check the device-probe connection - check the evaporator temperature main consequences: - defrosting is stopped - the alarm is memorized - the buzzer and the alarm relay are activated (if enabled) - the buzzer is silenced by pressing any key and is reset by the pressing the key a second time
Power Failure ALARM	power failure alarm corrective measures: - check that power is supplied by the mains electricity - check the device connection to the mains electricity main consequences: - the power detection digital input opens up, the outputs are deactivated and all loads are turned off - the buzzer and the alarm relay (if enabled), as well as the display backlight, are activated according to a 4 sec ON and 6 OFF sequence - values and alarms are memorized for as long as the backup battery lasts

12   ACCESSORIES

12.1   Backup module EVC99P00X7XXX00

12.1.1 Preliminary notes

The module guarantees, for as long as a backup battery lasts, power to the user interface and the recording of the temperature value measured by a product probe in the event of a power failure to the controller.

12.2   Non optoisolated RS-485/USB serial interface EVIF20SUXI

12.2.1 Preliminary notes

The interface makes it possible to connect the device to the Parameters Manager set-up software system.

12.3   4 GB USB flash drive EVUSB4096M

12.3.1 Preliminary notes

Using the flash drive it is possible to upload and download the controller configuration parameters, the settings and the data recorded by the controller.

13   TECHNICAL DATA

13.1   Technical data

Purpose of the command device:	operating command device
Construction of the command device:	built-in electronic device
Container:	user interface: open frame board on methacrylate plate control module: open frame board
Dimensions:	user interface: 317,0 x 107,0 x 31,0 mm (12,480 x 4,212 x 1,220 in; L x H x D) control module: 166,0 x 116,0 x 44,0 mm (6,535 x 4,566 x 1,732 in; L x H x D)
Command device mounting method:	user interface: by back-panel, with threaded studs control module: on flat surface, with spacers
Shell protection grade:	user interface: IP65 control module: IP00
Connection method:	removable screw terminal blocks the maximum lengths of the connection cables are: - power supply: 100 m (328 ft) - anlogue inputs: 100 m (328 ft) - digital inputs: 100 m (328 ft) - digital outputs: 100 m (328 ft) - RS-485 MODBUS port: 1.000 m (3.280 ft); refer also to MODBUS *"specifications and implementation guides"* available at http://www.modbus.org/specs.php. the maximum length of user interface-control module connection is 10 m (32,808 ft).
Operating temperature:	from 0 to 55 °C (from32 to 131 °F)
Storage temperature:	from -10 to 70 °C (from 14 to 158 °F)
Usage humidity:	from 10 to 90 % relative humidity without condensate
Command device pollution class:	2.
Environmental standards:	- RoHS 2011/65/CE - WEEE 2012/19/EU - REACH (CE) regulation n. 1907/2006.
EMC standards:	- EN 60730-1 - IEC 60730-1.

Power supply:	user interface: supplied by the control module control module: 115... 230 VAC (±15%), 50 / 60 Hz (±3 Hz), 10 VA max.
Rated impulse voltage:	4 KV.
Overvoltage category:	III.
Class and structure of software:	A.
Real time clock:	embedded (with supercap battery). battery capacity in the event of a power failure: 24 h when fully charged battery recharging time: 2 min (the battery is recharged via the device power supply).
Analogue inputs:	4 Pt 1000 2 wires probe inputs (cabinet probe, evaporator probe, condenser probe and product probe) Pt 1000 analogue inputs (1 KΩ @ 0 °C, 32 °F) Measurement field: from -99 to 150 °C (from -99 to 300 °F)
Digital Inputs:	1 input, configurable via configuration parameter for NA or NC contact (door switch) digital inputs at 5 VDC 2 mA (clean contact) power supply: none protection: none
Displays:	TFT colour graphic display
Digital outputs	9 outputs: - 3 SPST electromechanical relays with 16 A res. @ 250 VAC (compressor, door lock and backup battery test) - 5 SPST electromechanical relays with 8 A res. @ 250 VAC (defrosting, evaporator fan, condenser fan, cabinet light and door heaters) - 1 SPDT electromechanical relay with 8 A res. @ 250 VAC (alarm).
Type 1 or Type 2 actions:	type 1.
Complementary features of Type 1 or Type 2 actions:	C
Communication port:	2 ports, one of which is RS-485 type with MODBUS slave communication protocol, one is USB type

| **Signal buzzer and alarm:** | embedded |

EVFTFT219

Controller for laboratory refrigerated cabinets, in split version
and which can be integrated into the unit
Installation guide ver. 1.0
GA - 07/15
Code 144FTFT219E104

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