Vcolor 388

Controllers for steam tube deck ovens

ENGLISH

INSTALLER MANUAL ver. 1.0

CODE 144VC388E104

Important

Read this document carefully before installation and before using the device and take all the prescribed precautions. Keep this document with the device for future consultation.

Only use the device in the ways described in this document. Do not use the device as a safety device.

Disposal

The device must be disposed of according to local regulations governing the collection of electrical and electronic equipment.

Contents

1 INTRODUCTION

1.1 Product description

Vcolor 388 is a controller for steam tube deck ovens which have a centralised gas burner heating system. The controller has an open frame board and a remote user interface which consists of a 5-inch (M) or 7-inch (L) capacitive TFT touch-screen graphic display in glass which is installed vertically, either semi-recessed into the front or flush with the panel. It has 15 outputs with electro-mechanical relays (which can be expanded to 19 by fitting up to 2 optional modules in the dedicated slots on the main board) and can control from 3 to 5 decks: management of temperature and extraction of combustion and cooking fumes is centralised, whereas cycle duration, steam injection and venting are controlled separately for each deck.

The controller can save up to 99 recipes, each of which can be selected for any deck. Every recipe can have up to 8 phases, each with independent settings for duration, steam injection and venting. Recipes can be altered, overwritten and saved directly from the display and two different oven pre-heating setpoints can be set for every day of the week, with two start/stop times scheduled for each setpoint. Recipes can be compiled in an ODS file (complete with pictures in BMP or GIF format) and uploaded to the controller using a USB flash drive, thanks to the innovative programmable platform which allows users to customise their recipes and add new languages.

The controller has an oven cleaning function which uses pyrolysis, a self-cleaning mechanism that does not require chemical detergents as food residue is oxidised at high temperature.

Users can interact remotely with their equipment and start up/stop working cycles using the EPoCA® cloud platform with Wi-Fi or Ethernet connectivity (which also enables alternative or parallel control through MODBUS TCP). For more details, compare all the connectivity options in the Technical Data table and consult the Management and Monitoring Products/Systems and the Connectivity Products/Devices sections of our website.

1.2 Models available and technical features

The table below shows the technical features of the models available.

	Vcolor 388 M & L		**Optional expansion modules with 2 relays (max. 2)**	
	with J/K thermocouples	**with Pt 100 2 wires**	**Module 1**	**Module 2**
Power supply				
Control module	12 Vac	12 Vac		
User interface	Powered by the control module	Powered by the control module		
Expansion modules			Powered by the control module	
Analogue inputs (J/K or Pt100)				
Chamber probe	J/K thermocouples	Pt 100 2 wires		
Digital inputs for NO/NC contact (voltage-free)				
Safety thermostat for combustion and cooking chamber fumes (connected in series)	•	•		
Chimney adjustment rod	•	•		
Motorised chimney damper	•	•		
Burner door	•	•		
Digital inputs for NO/NC contact (high voltage 230 Vac)				
Burner block	•	•		
Fan block	•	•		
Digital outputs (electro-mechanical relays; A res. @ 250 Vac)				
Configurable K1 (default burner)	5 A	5 A		
Configurable K2 (default burner block)	5 A	5 A		
Configurable K3 (default combustion fume extraction)	5 A	5 A		
Configurable K4 (default steam injection deck 5)	5 A	5 A		
Configurable K5 (default chamber light)	5 A	5 A		
Configurable K6 (default suction hood)	5 A	5 A		
Configurable K7 (default electronics compartment fan)	5 A	5 A		

Configurable K8 (default sound)	5 A	5 A		
Configurable K9 (default burner power supply)	8 A	8 A		
Configurable K10 (default steam injection deck 1)	5 A	5 A		
Configurable K11 (default steam injection deck 2)	5 A	5 A		
Configurable K12 (default steam injection deck 3)	5 A	5 A		
Configurable K13 (default steam injection deck 4)	5 A	5 A		
Configurable K14 (default fan motor)	5 A	5 A		
Configurable K15 (default venting deck 1)	5 A	5 A		
Configurable K16 (default venting deck 2)			5 A	
Configurable K17 (default venting deck 3)			5 A	
Configurable K18 (default venting deck 4)				5 A
Configurable K19 (default venting deck 5)				5 A
Communications ports				
RS-485 MODBUS	•	•		
USB	•	•		
Connectivity				
RS-485 MODBUS RTU (built-in)	•	•		
Wi-Fi EPoCA/MODBUS TCP (optional through the EVlinking Wi-Fi module powered by controller)	•	•		
Ethernet EPoCA/MODBUS TCP (optional through EV3 Web gateway)	•	•		
Other features				
Clock	•	•		
Alarm buzzer	•	•		
Functions				
Cooking timer for every deck	•	•		
99 recipes	•	•		
Pre-heating delayed start	•	•		

For more information, see section 12 “TECHNICAL SPECIFICATIONS”.

The table below lists the purchasing codes of the available models:

Purchasing codes	**<u>Vcolor 388 M with J/K thermocouples</u>** **Vcolor 388 M (control module + 5" user interface kit):** **EVCMC38FJ2E** (flush fit installation from behind) **EVCMC38FJ2EF** (semi-recessed installation into the front) **Vcolor 388 L (control module + 7" user interface kit):** **EVCLC38FJ2E** (flush fit installation from behind) **EVCLC37FJ2EF** (semi-recessed installation into the front) **<u>Vcolor 388 with Pt 100 2 wires</u>** **Vcolor 388 M (control module + 5" user interface kit):** **EVCMC38FC2E** (flush fit installation from behind) **EVCMC38FC2EF** (semi-recessed installation into the front) **Vcolor 388 L (control module + 7" user interface kit):** **EVCLC38FC2E** (flush fit installation from behind) **EVCLC38FC2EF** (semi-recessed installation into the front) **<u>Optional</u>** **EVCLE322XXE**: expansion module with 2 relays (maximum 2 modules) **EVIF25SWX:** EVlinking Wi-Fi module **EV3W01:** IoT EV3 Web gateway

For more models, contact the EVCO sales network.

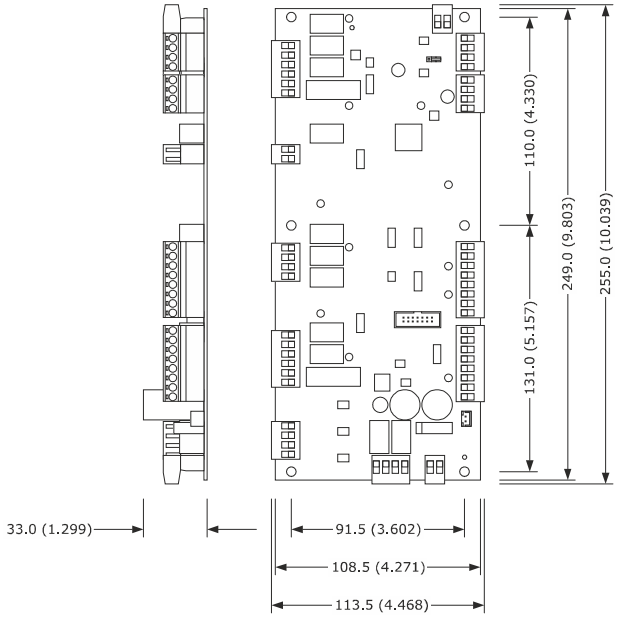
2 MEASUREMENTS AND INSTALLATION

2.1 Format features

The control module is available in a split version with an open frame board. User interfaces are available in 5 or 7-inch versions for vertical operation and have capacitive colour TFT touch-screen graphic displays.

2.2 Control module measurements and installation

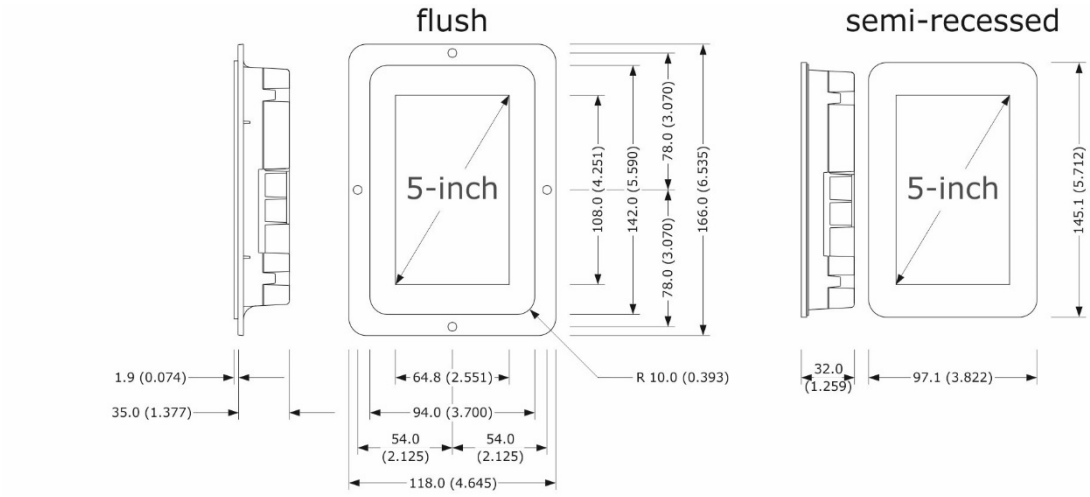
Measurements are expressed in mm (inches). Installation is on a flat surface with spacers.



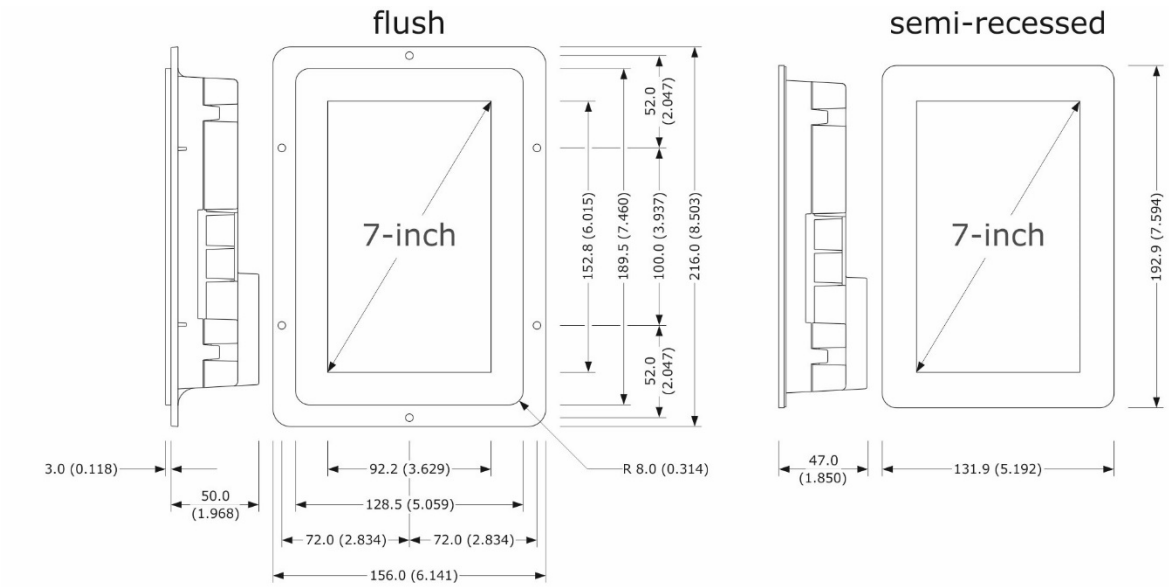
2.3 User interface measurements

The user interface is available in the model which is installed flush and the model which is semi-recessed into the front. The measurements vary according to the model, as illustrated below in mm (in).

Vcolor 388M



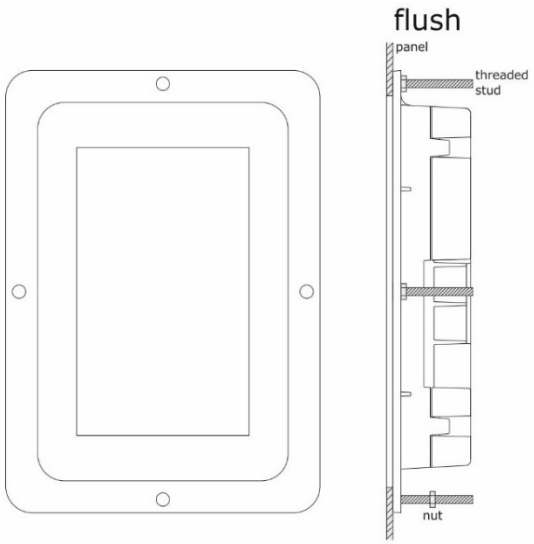
Vcolor 388L

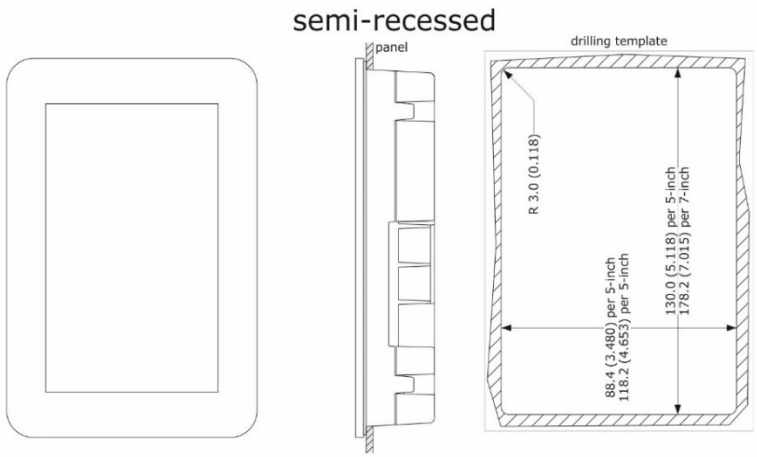

flush
semi-recessed
7-inch
7-inch
52.0 (2.047)
152.8 (6.015)
189.5 (7.460)
100.0 (3.937)
52.0 (2.047)
216.0 (8.503)
192.9 (7.594)
3.0 (0.118)
50.0 (1.968)
92.2 (3.629)
128.5 (5.059)
72.0 (2.834)
72.0 (2.834)
156.0 (6.141)
R 8.0 (0.314)
47.0 (1.850)
131.9 (5.192)

2.4 User interface installation

Depending on the model, installation can be:

- flush, from behind the panel with threaded studs (not provided) welded to hold it in place;
- semi-recessed, from the front of the panel with spring clips to hold it in place.





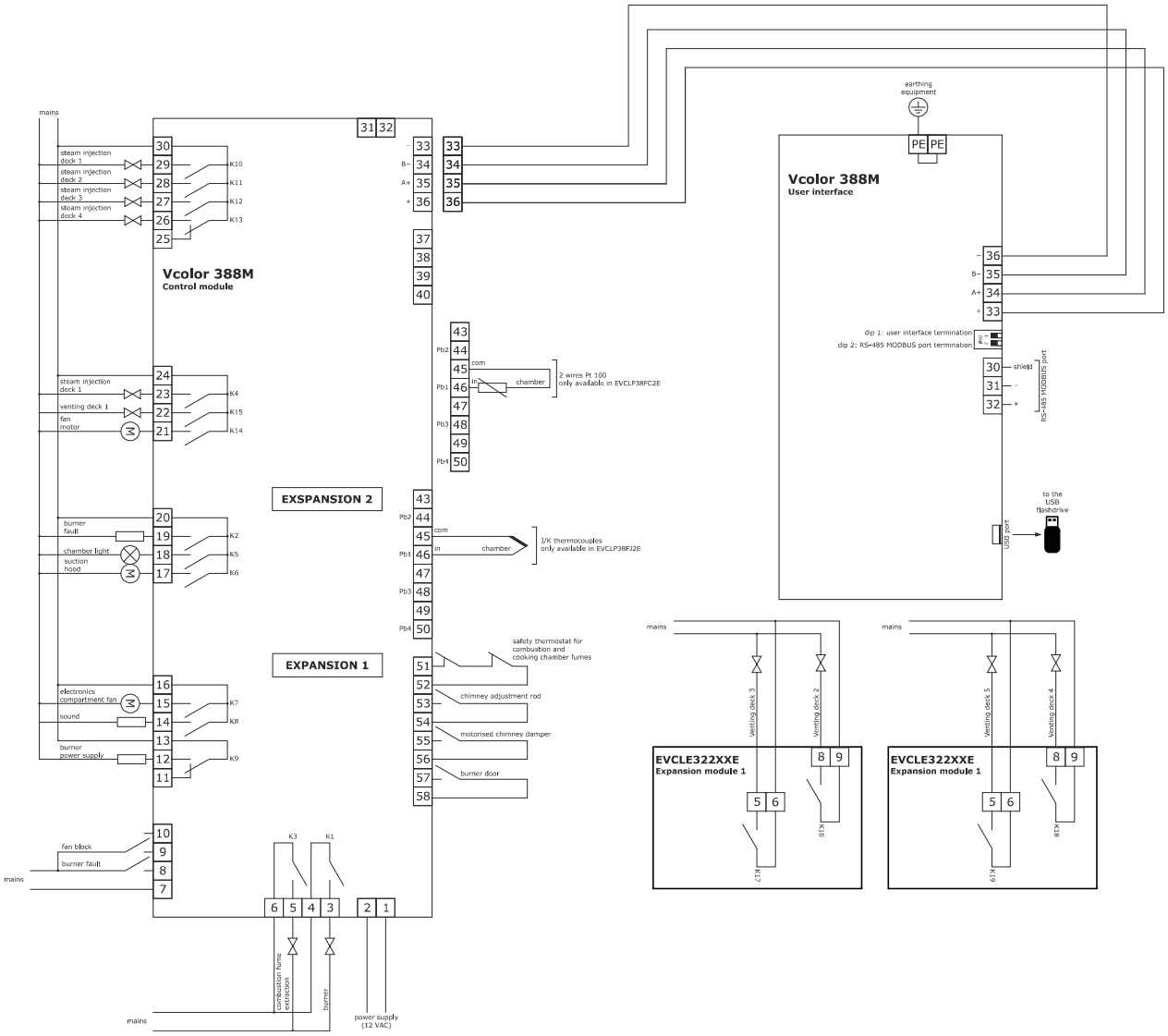
2.5 Installation precautions

- ensure that the working conditions for the device (operating temperature, humidity, etc.) are within the set limits. See section 12 "TECHNICAL SPECIFICATIONS"
- do not install the device close to heat sources (heaters, hot air ducts, etc.), equipment with a strong magnetic field (large diffusers, etc.), in places subject to direct sunlight, rain, damp, excessive dust, mechanical vibrations or shocks
- any metal parts close to the control module must be far enough away so as not to compromise the safety distance
- in compliance with safety regulations, the device must be installed properly to ensure adequate protection from contact with electrical parts. All protective parts must be fixed in such a way as to need the aid of a tool to remove them
- ensure that the thermocouple is properly insulated from contact with metal parts or use already insulated thermocouples.

3 ELECTRICAL CONNECTION

3.1 Vcolor 388M electrical connection

The diagram below shows the electrical connection of the control device with a 5-inch user interface.

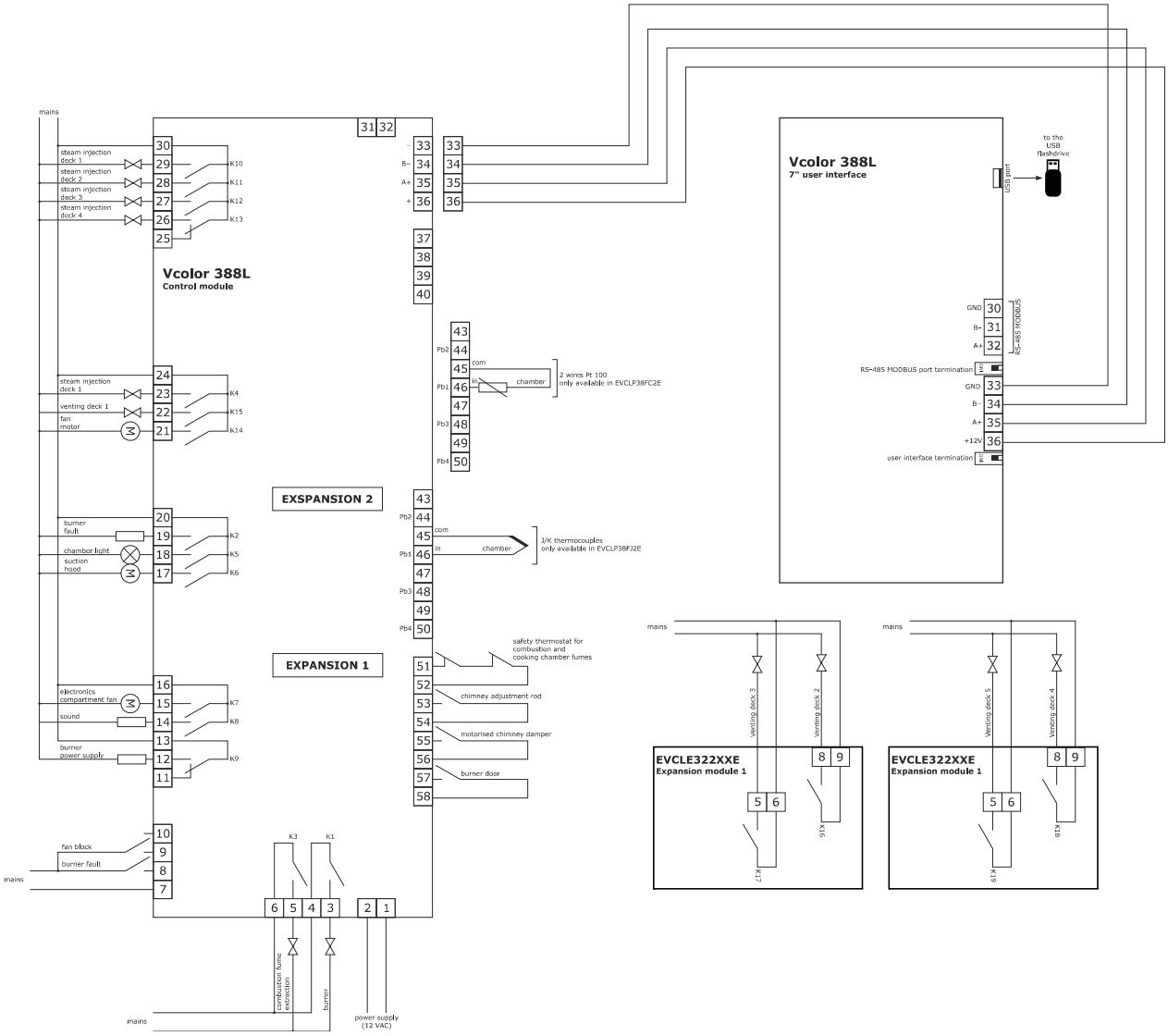


N.B.:

- The USB communications port makes it possible to upload and download the device settings and personalise the graphics, recipes and languages using an ordinary USB flash drive (see section 10 "USING THE USB PORT").
- The RS-485 MODBUS communications port enables connection to the Parameters Manager set-up software or to the modules for Wi-Fi or Ethernet connectivity to manage the unit using the EPoCA cloud platform or MODBUS TCP systems (see section 9 "CONNECTIVITY").

3.2 Vcolor 388L electrical connection

The diagram below shows the electrical connection of the control device with a 7-inch user interface.



N.B.:

- The USB communications port makes it possible to upload and download the device settings and personalise the graphics, recipes and languages using an ordinary USB flash drive (see section 10 "USING THE USB PORT").
- The RS-485 MODBUS communications port enables connection to the Parameters Manager set-up software or to the modules for Wi-Fi or Ethernet connectivity to manage the unit using the EPoCA cloud platform or MODBUS TCP systems (see section 9 "CONNECTIVITY").

3.3 Precautions for electrical connection

- do not use electric or pneumatic screwdrivers on the terminal blocks of the device
- if the device is moved from a cold to a warm place, the humidity may cause condensation to form inside. Wait about an hour before switching on the power
- make sure that the supply voltage, electrical frequency and power of the device correspond to the local power supply. See section 1512 "TECHNICAL SPECIFICATIONS"
- disconnect the device from the power supply before doing any type of maintenance
- locate the power cables as far away as possible from those for the signal
- to reduce reflections on the signal transmitted along the cables connecting the user interface to the control module, it is necessary to fit a termination resistor
- ensure that the thermocouple is properly insulated from contact with metal parts or use already insulated thermocouples
- for repairs and for further information on the device, contact the EVCO sales network.

4 FIRST-TIME USE

4.1 First-time use

Proceed as follows:

1. Install the device as shown in section 2 "INSTALLATION", taking all the precautions mentioned in section 2.3 "Installation precautions".
2. Make the electrical connection as shown in section 3 "ELECTRICAL CONNECTION".
3. Connect the power supply to the device: the device will show a splash screen for a few seconds.
4. Set the time, date and day of the week. See section 5.5 "Configuration screen".
5. Configure the device in a consistent way, following the indications in section 7 "LIST OF CONFIGURATION PARAMETERS".

5 OPERATION

5.1 Initial information

The controller has the following operating modes:

- "OFF": no power to the device; the display and all the loads are switched off.
- "STAND-BY": the device is powered, the display is on and all the loads are switched off (except the chamber light which can be activated manually).
- "ON": the device is powered and the display is on; the loads may be switched on, depending on machine status.

5.2 Locked display

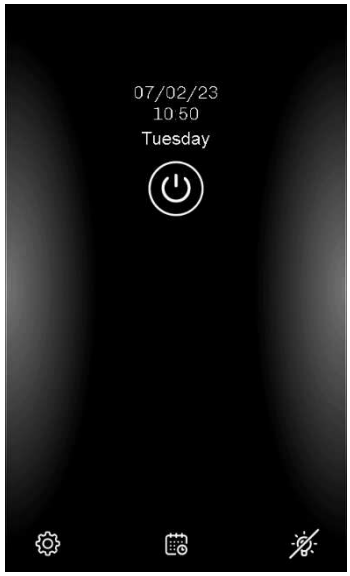
If the locked display function is active (e3≠0), once the set period of inactivity has elapsed, the screen goes into locked display mode but the information on the display remains the same. When the display is touched, the message "PRESS TO UNLOCK" appears: press anywhere on the screen for at least 4 seconds to unlock the display.

5.3 Splash screen

When the control module is powered up, it boots up then defaults to the EVCO splash screen for a few seconds.

5.4 Stand-by screen

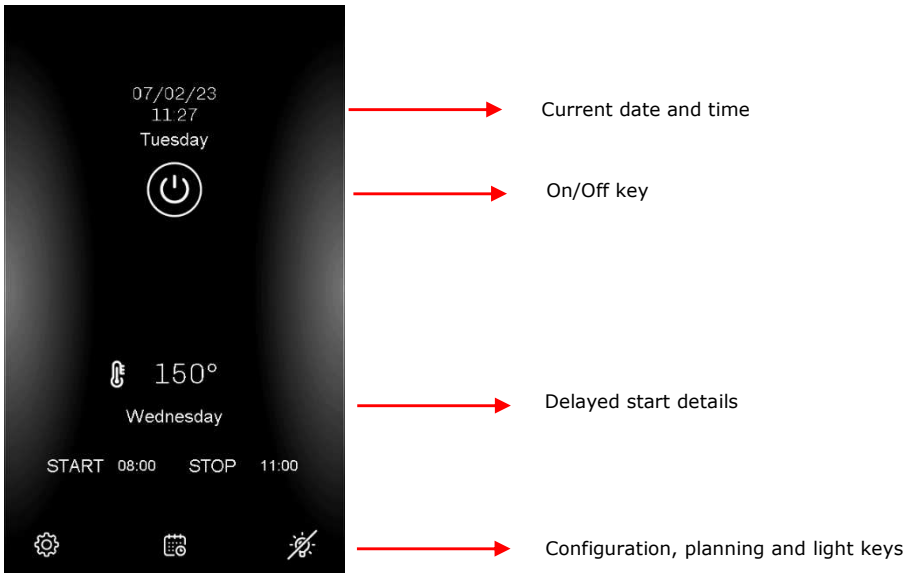
The device goes automatically from the splash screen to the stand-by screen.



The current date and time are displayed, as well as the following keys:

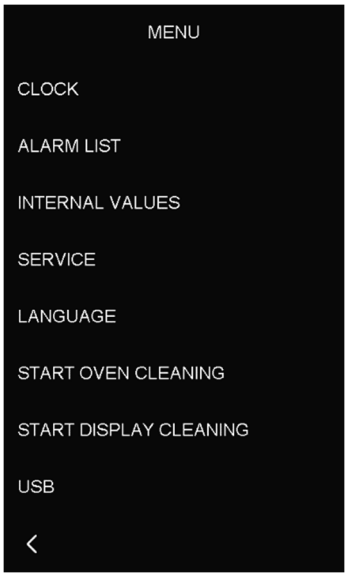
- The "On/Off" key, which takes the device from stand-by to ON when held down
- The "Configuration" key, which opens up a menu with multiple options to access different settings, displays and functions (see section 5.5 for a detailed description of all the possible options)
- The "Planning" key, which allows the user to set a pre-heating delayed start (see section 5.6). The key is displayed only when the function is enabled by the parameter (C5 = 1)
- The "Light" key, which switches the lights on all the decks on/off at the same time.

If the device goes into stand-by after a delayed start has been set, the stand-by screen will also display the pre-heating setpoint, the day of the week and the start and end time of the delayed start (if there are several delayed starts, the closest one will be displayed).



5.5 Configuration screen

The "Configuration" key on the stand-by screen gives access to a menu with multiple options for settings, status and other functions.



5.5.1 Clock

The current date and time, configured in either EUROPEAN or US format, are set in the "Clock" menu.

N.B.: if a non-existent day of the month is set by mistake (e.g. 31/02), the change will not be accepted and the last date saved will be displayed. If a non-existent value is set for the month (above 12) or hour/minutes (above 23 for hours and 59 for minutes), the highest allowed value will automatically be displayed.

5.5.2 Alarm list

This screen displays the alarms in progress and cannot be accessed when there are no active alarms. See the "Alarms" section for more details.

5.5.3 Internal status

This menu displays the values or status of all the inputs and outputs.

5.5.4 Service

When SERVICE is pressed on the menu, a screen opens with a keypad to enter the password (-19). Once access has been made, a sub-menu appears with the following functions:

- PARAMETERS: change configuration parameters
- RESTORE PARAMETERS: restore default parameter values (to access, enter the password 149)
- RESTORE SETTINGS: restore default parameter and recipe values (to access, enter the password -119)
- RESTORE RECIPES: restore default recipes (to access, enter the password 149)
- START OUTPUT TEST: manually activate/deactivate every digital output on the controller irrespective of the regulation in progress; each output can be activated/deactivated individually.

5.5.5 Language

By selecting this option, the device can be configured with the required language. One of the following languages can be selected: Italian, English, German, French or Spanish.

5.5.6 Start oven cleaning

If this option is selected, a pyrolytic cleaning programme starts instantly and a new screen opens with the following information: chamber temperature + cleaning cycle setpoint (c11), cleaning cycle countdown (c12).
During this cycle, all the heaters operate at full power until they reach the setpoint. Once the oven reaches the setpoint temperature c11, countdown c12 begins; during countdown, the temperature will be maintained considering the differential c13. Once the time has elapsed, the controller will automatically go back into stand-by. If the "stop" key is pressed, the cycle is interrupted, the stand-by page is displayed and the controller returns to its previous status.
If parameter C12=0, once setpoint c11 has been reached, the controller immediately goes back into stand-by.

5.5.7 Start display cleaning

If this option is selected, the display is deactivated for 15 seconds, during which time the glass may be cleaned without altering any of the settings on the screen.

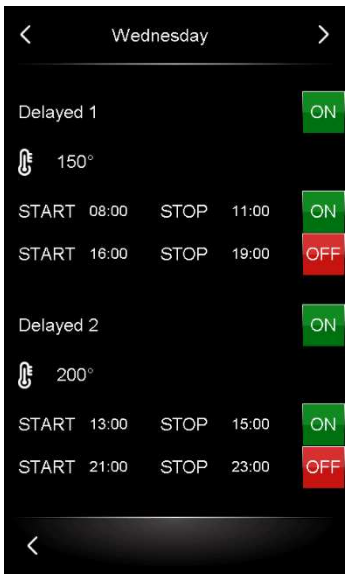
5.5.8 USB

If this option is selected, the map of parameters or the recipe book can be imported or exported. For more details, see section 10 "USING THE USB PORT".

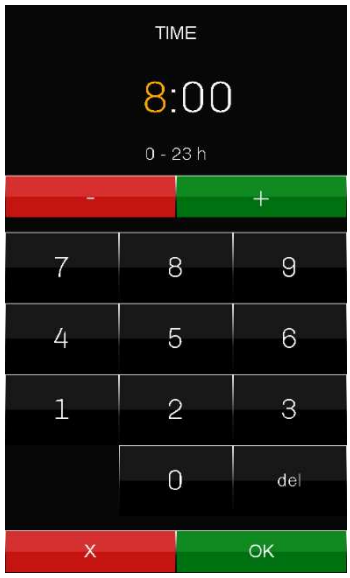
5.6 Delayed start screen

Two different chamber pre-heating setpoints can be set for every day of the week, with two start/stop times scheduled for each setpoint.

A delayed start is programmed by pressing the "Planning"  key in the middle of the stand-by screen at the bottom, which is only displayed if the function is enabled by the parameter (C5 = 1).



Press the arrows at the top of the screen to scroll through the days of the week. Two daily chamber setpoint programmes can be activated or deactivated for each day of the week, each with two scheduled start/end times.
When setpoint or time are pressed, a keypad appears to change the values. To alter the time, first change the hour value (in yellow to indicate it can be edited) and confirm by pressing the "OK" key. Next change the minute value, which will have become yellow. After confirming each of the individual values (hour and minutes), confirm the changes by pressing the OK key.



Individual scheduled timings can be enabled or disabled on the summary page using the ON-OFF keys.

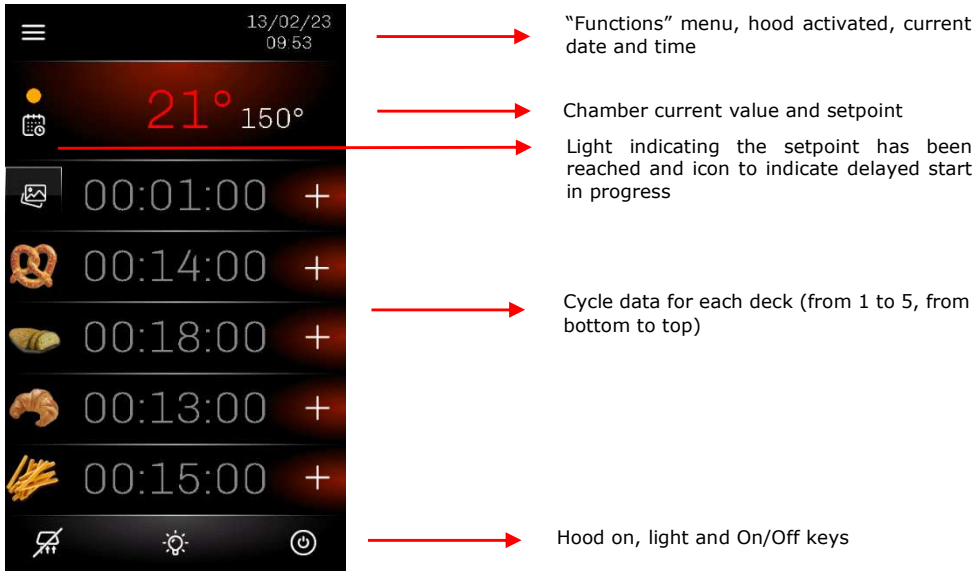
N.B.:

- if a non-existent value is set by mistake (above 23 for the hour and 59 for the minutes), the highest allowed value will automatically be displayed;
- if an inconsistent time is set (i.e. the delayed stop time falls on the next day), the time value will become yellow, indicating the setting is wrong and that the delayed start will not take place.

When the controller is switched off, the stand-by screen displays the day and time of the closest delayed start.

5.7 Home screen

To go from the stand-by screen to the home screen, keep the key pressed down for a few seconds. The example below shows the screen which is displayed when the device is configured to control five decks.



When the controller goes from stand-by to ON, it automatically activates temperature regulation: at the top of the screen is the current temperature of the chamber and, next to it, the chamber setpoint. By pressing the temperature values, a screen with a keypad opens to quickly change the setpoint (see next section).

The current temperature value becomes red when the heating output is activated (to reach the setpoint) and white when the heating output is deactivated (when the setpoint has been reached).

During pre-heating, an orange light is displayed to the left of the temperature to indicate the oven is heating up and this becomes green when the setpoint is reached.

If the delayed start function is in progress, its icon will come on under the light; by pressing this icon, the time of the automatic switch-off will be displayed.

The number of decks displayed on the home screen is set by parameter "MS6".

N.B.: the decks are numbered from the bottom upwards; remember this when configuring the regulation outputs.

The following information is given for each deck, from left to right:

- Image of the recipe set
- Timer to count down the cooking cycle (hh:mm:ss), which is white if the cycle is in progress and grey if not
- "+" symbol to access the deck settings.

At the end of the cooking cycle countdown, the message "END OF CYCLE" will be displayed for the relevant deck and a buzzer will sound.

The suction hood and light can be switched on and off at any time from the home screen by pressing the and keys. To switch the device off, hold down the On/Off key for a few seconds.

Pressing the "menu" key at the top left gives access to options on the "configuration" screen which have no effect on the normal running of the cycles, namely: ALARM LIST, INTERNAL VALUES and START DISPLAY CLEANING.

5.8 Change chamber setpoint screen

When the device is switched on, the chamber setpoint set by parameter r3 is displayed; at subsequent switch-ons, the device will display the last programmed setpoint or the last one used in a delayed start.

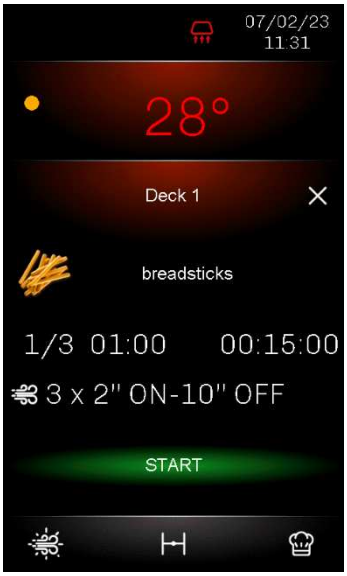
To change the setpoint rapidly without having to reconfigure parameter r3, touch the area in the home screen showing the temperature values: a numerical keypad will appear to set the new value. Press the "OK" key to confirm.

5.9 Cycle settings/start-up screen

From the home screen, press the key of the individual deck to change the settings of the preloaded default recipe, replace a recipe with another one from the recipe book and start up/stop the cooking cycle using the START and STOP keys. It is also possible to activate manual functions from this screen, like persistent steam injection (holding the key down for the desired time) and venting .

On screen

Settings/start-up screen



Current chamber temperature

Deck number and "back" key

Image and name of loaded recipe

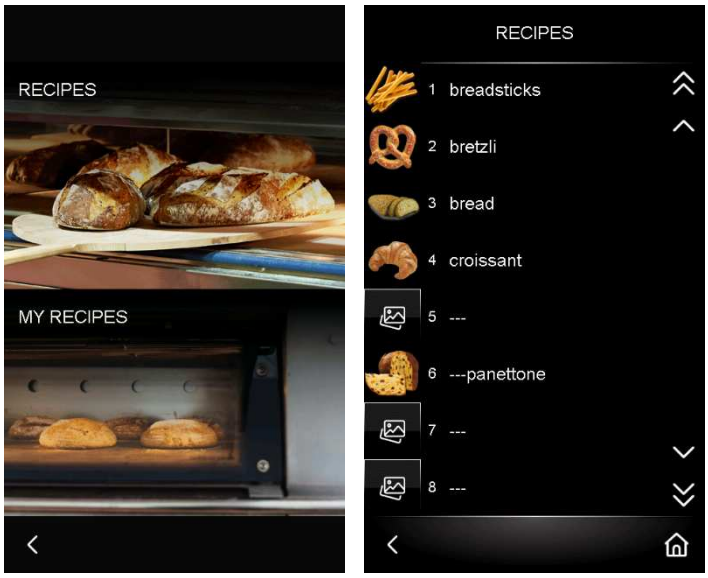
Data of first phase (no cycle running) or cycle in progress (cycle started)

Cycle start/stop key

Steam injection, opening vent and loading recipe keys

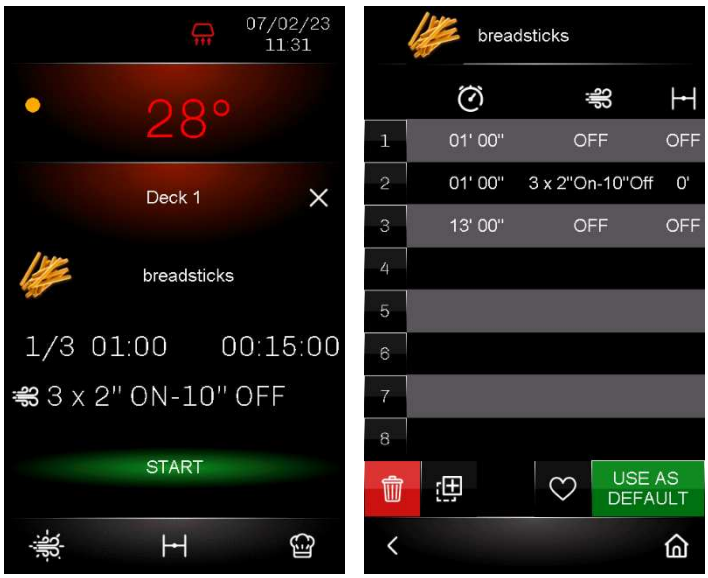
5.9.1 Setting a recipe

Different recipes can be programmed for each deck by retrieving them from the recipe book ("Recipes" and "My recipes") using the key.

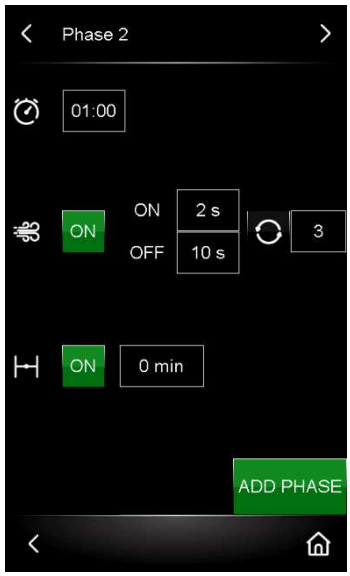


Alternatively, the default settings for each deck can be changed by pressing the area with the image and name of the recipe (where these are not specified, the following is displayed: ---).

A page appears with the name and image (if loaded) of the recipe and a summary of the cooking cycle, which is made up of one or several phases (up to 8).



By pressing the name of the recipe, a preloaded image can be retrieved and a name entered using the keypad; by pressing on the line corresponding to each phase, a page will open where it is possible to set the time and, when outputs are appropriately configured, also the steam injection cycles and vent opening.



This page also allows the user to add more phases by pressing the ADD PHASE key, without having to confirm using other keys; go back to the summary page using the key and access the created phase to set the values.

N.B.:

- new phases will always be placed at the end, irrespective of the position where the phase was added;
- if the countdown time of the phase is set to 0, the controller will save a minimum time of 1 second.

Once the changes have been made, the following options can be selected from the summary page:

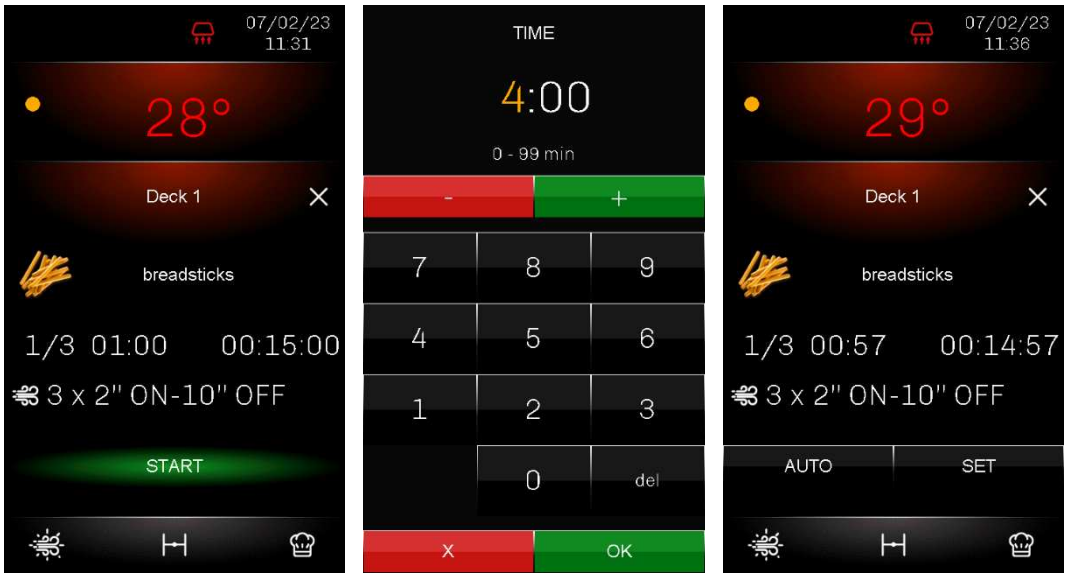
- use the new settings only for the deck they have been set for by pressing the key (if a recipe has been retrieved and then changed, the original recipe will not be overwritten);
- save the new settings in "Recipes" by pressing the key and selecting the position to place it in (from 1 to 99). Confirm the choice using the relative keys (if a position is selected which is already occupied by a recipe, it will be overwritten). If the user also wishes to store the new recipe in "My recipes" (where "favourites" are stored, allowing quick access to the most frequently used recipes), press the key which will then turn white , press the key and confirm using the and keys;
- cancel all the settings and revert to the default settings by pressing the key;

Press the key to go back to the previous page or the key to return to the home page.

Recipes stored in "Recipes" can also be copied in "My recipes". To do this, access "Recipes" by pressing the key, select the desired recipe and press the key which will turn white ; next press the key and confirm using the and keys. To delete a recipe from the favourites, go to "My recipes" and proceed in the same way from the key.

5.9.2 Quick setting of phase in progress

Certain settings regarding the phase in progress (if the cycle has started) or the first phase (if the cycle has not yet started) can be changed quickly by pressing the values on the display, namely the time count and steam injection cycles (press SET for the settings and AUTO for manual activation/deactivation of automatic start-up).



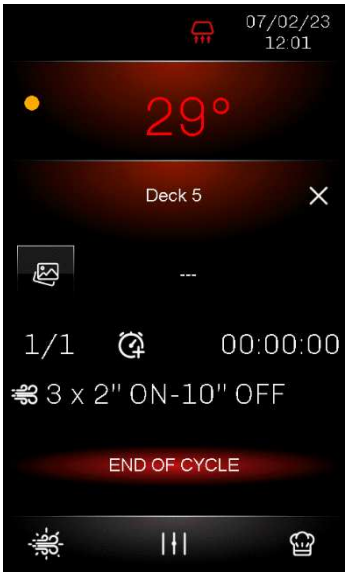
5.9.3 Starting up/stopping a cycle

To start up/stop a cooking cycle, press the START and STOP keys. If a cooking cycle is interrupted by pressing the STOP key before the end of the countdown, the next time it is started up, the cycle will not resume from where it was interrupted but will start all over again from the beginning.

While the cycle is running, it is possible to exit the deck settings/start-up screen at any time by pressing the key and go back to the home screen to start up the cycles of the other decks.

At the end of the cycle, the message END OF CYCLE is displayed and the buzzer sounds for the time set by c0; it may be silenced by pressing on the message. Extra cooking time can be set for a deck from its settings page (the time is added to the final phase) by

pressing the flashing icon next to the countdown. The end of the extra time will be signalled in the same way until the cycle is terminated by pressing the END OF CYCLE message.
The cycle can always be stopped, even if the countdown is still in progress.



6 MANAGING LOADS

6.1 Initial information

The controller manages steam tube deck ovens (with 3-5 decks) which have a centralised gas burner heating system. Some functions are shared by all decks, while others are independent for each deck. A detailed list is given below:

Shared functions

- General switching on/off of the oven
- Temperature regulation with shared chamber temperature setpoint
- Activation of the chimney damper to extract combustion fumes (if a relay has been configured accordingly)
- Activation of the suction hood both automatically when one of the venting valves is opened (if a relay has been configured accordingly) and manually using the dedicated key
- Manual switching on/off of the lights of all the decks

Independent functions for each deck

- Start-up of cycle which starts the cooking timer and, if relays are configured accordingly, activates the steam injection solenoid valves (for the time set) and the ON/OFF valves to open the vent
- Manual steam injection and opening/closing of the vent using the dedicated keys

6.2 Burner

Oven temperature is regulated by a relay which activates/deactivates the burner to heat it.
This relay is always deactivated when the controller is in stand-by and always activated when it is on, except for specific alarm situations when the relay is deactivated.
Temperature regulation is always ON-OFF: the output is switched on until the temperature detected by the chamber probe reaches the working setpoint r3 and is switched off until the temperature goes below r3 - r0.
There is also a digital input to detect a burner block and a key on the display which operates a relay to reset the burner.

6.3 Chimney damper for combustion fume extraction

The chimney damper for the extraction of combustion fumes cannot be controlled manually by the user on the display but is opened and closed automatically when a relay is configured for this purpose (uxc=2). It works as follows:

- every time a request is received to switch on the burner, the relay to open the damper is activated; the burner is activated only when the opening of the damper is detected by the relative digital input;
- if the oven is switched off or the chamber temperature setpoint is reached, the damper closes with a delay set by parameter u8.

6.4 Suction hood

The suction hood is always off when the controller is in stand-by. It can only be activated manually by pressing the  key at the bottom left of the home screen.

6.5 Chamber light

The chamber light is switched on and off manually using the  key which is in the middle of the home screen at the bottom. This single light illuminates all the decks.
The status of the light when the device goes from stand-by to ON and vice versa can be changed by setting parameters e0 and e1.

6.6 Steam injection

A relay for automatic steam injection can be configured for each deck. The dedicated solenoid valves are activated with or without constraint between cyclical steam injection and start/stop of the cooking timer (see parameters t4 and t5).
The number of cycles and the injection time ON and OFF are set by parameters t10 (up to 20 cycles can be set per phase with the possibility of continuous cycles or solely manually activated cycles), t8 (time ON) and t9 (time OFF) respectively.
Steam injection cycles can be set quickly and directly for each deck in the relevant page of the recipe phase, and changes have no effect on the default value set in the parameters. Parameter t7 defines which steam injection settings can be customised quickly and easily.

Steam can also be injected manually on each deck by pressing the dedicated  key at the bottom left of the cycle settings/start-up screen. The activation mode of this manual steam injection can be customised using parameter t0.

6.7 Venting

The "venting" function only operates if optional expansion modules with two relays are installed.
It is possible to configure a relay to automatically open the vent on each deck by activating the ON/OFF valves.

The vent can also be opened and closed manually by pressing the dedicated key in the middle of the cycle settings/start-up screen at the bottom.

6.8 Buzzer

The buzzer is activated in the following situations:

- at the end of the cooking cycle (if enabled with parameter c0≠0)
- for one second at the end of a cooking cycle phase (if enabled with parameter c1=1)
- on activation of an alarm.

N.B.: buzzer activation can be linked to a relay if configured as "Sound" (uxc=11).
The buzzer can also be placed outside the electronics compartment using an expansion device, supplied as an accessory (CT1ES0070000), which must be connected to the relevant connector on the power board (see section 3 "ELECTRICAL CONNECTION").

6.9 Sound

When an output is configured as a sound relay, the relay will behave as follows every time the buzzer is activated:

- if the buzzer is switched on, the relay will switch on
- if the buzzer is switched off, the relay will switch off

6.10 Electronics compartment fan

Management of the electronics compartment fan depends mainly on the status of the device:

- if the device is switched on, the fan will switch on
- if the device is switched off, the fan will switch off

N.B.: the fan may remain on when the device is switched off if the operating temperature of the control module is above the u6 threshold.

6.11 Fan motor

If a relay output is configured as "fan motor" (uxc=19), it is activated when the controller goes from stand-by to ON and deactivated when it goes from ON to stand-by.
This output is linked to the high voltage digital input (fan motor block) which sets off the fan block alarm: if there is a fan block alarm, the message "FAN MOTOR BLOCK" will appear on the display, the relays of the fan motor, the burner/heating and the burner power supply will go off and steam injection will be stopped.
If this alarm is set off when a cycle is running, the cycle will continue.
Normal regulation resumes when the alarm stops.

6.12 Type 1 or 2 burner block reset

Burner block reset management is only active if one of the relays is configured as "Burner block reset" (uxc=12); the type of burner (1 or 2 according to parameter i13) depends on the high voltage input (230 Vac) which the burner is connected to.
In the event of a burner block alarm, in both cases, a key is displayed to the side of the alarm signal which, when pressed, activates the relay output for 5 seconds, resetting the gas control unit and restoring normal operation.

TYPE 1 BURNER BLOCK – heating and steam injection are deactivated but the cycle, if running, continues; the message "BURNER BLOCK" is displayed on the device and the buzzer sounds (until the input is deactivated). It is possible to reset the alarm by pressing the alarm key which will activate the relative relay output for 5 seconds, resetting the gas control unit and restoring normal operation.

TYPE 2 BURNER BLOCK – steam injection is deactivated, heating remains activated and the cycle, if running, continues; the message "BURNER BLOCK" is displayed on the device and the buzzer sounds (until the input is deactivated). It is possible to reset the alarm by pressing the alarm key which will activate the relative relay output for 5 seconds, resetting the gas control unit and restoring normal operation.

7 LIST OF CONFIGURATION PARAMETERS

PARAM.	MIN.	MAX.	M.U.	DEF.	ANALOGUE INPUTS
P0	0	1	- - -	0	type of probe 0 = J thermocouple (only for J/K power board) 1 = K thermocouple (only for J/K power board) 2 = Pt 100 (only for Pt 100 power board)
P1	0	1	- - -	0	temperature measurement unit 0 = °C 1 = °F N.B.: moving from °C to °F automatically adapts the parameter values; please note that this parameter does not affect recipe configuration
CA1	-25	25	°C(1)	0	top probe offset
PARAM.	MIN.	MAX.	M.U.	DEF.	MAIN REGULATOR
r0	1	99	°C(1)	5	chamber setpoint differential
r1	0	r2	°C(1)	0	minimum chamber setpoint
r2	r1	999	°C(1)	300	maximum chamber setpoint
r3	r1	r2	°C(1)	130	chamber setpoint (also for delayed starts)
PARAM.	MIN.	MAX.	M.U.	DEF.	MISCELLANEOUS
c0	-1	120	s	15	duration of buzzer activation on completion of the cooking cycle -1 = until silenced manually
c1	0	1	- - -	0	buzzer status at the end of a cooking cycle phase 0 = deactivated 1 = activated for 1 s
c3	0	99	°C(1)	10	temperature above which the temperature detected by the chamber probe cannot be displayed (referring to the working setpoint, i.e. "working setpoint + c3") 0 = function absent
c4	0	99	°C(1)	10	temperature below which the temperature detected by the chamber probe cannot be displayed (referring to the working setpoint, i.e. "working setpoint - c4") 0 = function absent
c5	0	1	- - -	0	enable "pre-heating delayed start" function 0 = no 1 = yes
c11	0	999	°C(1)	450	setpoint for oven cleaning cycle start-up
c12	0	240	min	45	oven cleaning cycle duration (after setpoint c11 has been reached) if c12=0, when the setpoint is reached, the controller goes immediately into stand-by.
c13	0	99	°C(1)	5	oven cleaning cycle differential
PARAM.	MIN.	MAX.	M.U.	DEF.	STEAM INJECTION
t0	0	1	- - -	1	MANUAL steam injection activation mode 0 = FOR Ton + PERSISTENCE – pressing and releasing the "MANUAL STEAM INJECTION" key will cause steam injection for the Ton time (set by parameter t8) or for the length of time the key is pressed

					1 = PERSISTENCE – pressing and releasing the "MANUAL STEAM INJECTION" key will cause steam injection for the length of time the key is pressed only
t4	0	1	- - -	1	enable cyclical steam injection when the cooking timer starts up 0 = no 1 = yes
t5	0	1	- - -	1	enable constraint between cyclical steam injection and the cooking timer stop 0 = no 1 = yes – when the cooking timer stops, cyclical steam injection will be deactivated; press and release the "AUTO" key to reactivate it
t7	0	3	- - -	2	quick setting of automatic steam injection cycles 0 = injection time ON 1 = injection time ON and OFF 2 = injection time ON and OFF + number of automatic cycles 3 = injection time ON + number of automatic cycles
t8	1	99	s	2	steam injection time ON with quick setting
t9	1	550	s	10	steam injection time OFF with quick setting
t10	-1	20	- - -	3	number of automatic steam injection cycles for each phase -1 = the on-off cycles continue to the end of the phase or until switched off using the key 0 = no cycle, only if pressed down
PARAM.	MIN.	MAX.	M.U.	DEF.	TEMPERATURE ALARMS
A0	1	99	°C(1)	10	A1 differential
A1	0	500	°C(1)	0	absolute chamber temperature threshold above which the CHAMBER HIGH TEMPERATURE alarm is activated (if A3=1); see also A0
A2	0	240	min	0	CHAMBER HIGH TEMPERATURE alarm delay (referred to A1 if A3=1, to A8 if A3=2)
A3	0	2	- - -	0	type of CHAMBER HIGH TEMPERATURE alarm 0 = alarm absent 1 = absolute (A1) 2 = relative to the chamber setpoint (i.e. "chamber setpoint+A8")
A4	0	80	°C(1)	70	absolute operating temperature threshold of the control module above which the BOARD HIGH TEMPERATURE alarm is activated 0 = alarm absent
A5	-1	240	min	240	duration of a power failure during the cooking cycle sufficient to interrupt it -1 = returns to previous status without activating the POWER FAILURE alarm 0 = the controller is forced into stand-by without signalling the POWER FAILURE alarm 1÷240 = the POWER FAILURE alarm is activated (if the interruption is less than A5, the cycle resumes from the beginning of the current phase; if it is more than A5, the cycle is interrupted) N.B.: if the PF alarm is still activated when going from one day to the next, the controller is forced into stand-by.
A8	0	500	°C(1)	0	chamber setpoint temperature threshold above which the maximum temperature alarm is activated (if A3=2); see also A0

PARAM.	MIN.	MAX.	M.U.	DEF.	DIGITAL INPUTS
i0	0	1	- - -	1	polarity digital input safety thermostats for combustion fumes + cooking chamber (connected in series on input 51-52) 0 = normally open (input active with contact closed) 1 = normally closed (input active with contact open)
i1	0	1	- - -	0	polarity digital input chimney adjustment rod (input 53-54) 0 = normally open (input active with contact closed) 1 = normally closed (input active with contact open)
i2	0	1	- - -	0	polarity digital input motorised chimney damper (input 55-56) 0 = normally open (input active with contact closed) 1 = normally closed (input active with contact open)
i3	0	1	- - -	0	polarity digital input burner door (input 57-58) 0 = normally open (input active with contact closed) 1 = normally closed (input active with contact open)
i6	0	120	s	5	inputs i1 and i2 alarm signal delay
i11	0	1	- - -	0	polarity input 230 Vac fan motor block (terminal 7-9) 0 = normally open (input active with contact closed) 1 = normally closed (input active with contact open)
i12	0	1	- - -	0	polarity input 230 Vac burner block (terminal 7-8) 0 = normally open (input active with contact closed) 1 = normally closed (input active with contact open)
i13	0	1	- - -	0	type of burner connected 0 = type 1 (heating output deactivated in event of burner block) 1 = type 2 (heating output activated in event of burner block) N.B.: see also "burner block alarm" in the "ALARMS" section
PARAM.	MIN.	MAX.	M.U.	DEF.	DIGITAL OUTPUTS
u0	0	1	- - -	0	venting output contact type (for all decks) 0 = normally open (venting open with contact closed) 1 = normally closed (venting open with contact open)
u6	20	65	°C(1)	60	absolute operating temperature threshold of the control module above which the electronics compartment fan comes on irrespective of controller status; see also u7
u7	1	99	°C(1)	10	u6 differential
u8	0	240	min	10	delay in closing chimney damper for combustion fume extraction from deactivation of burner output
u1c	0	19	- - -	1	K1 relay 0 = Unused 1 = Burner 2 = Chimney damper for combustion fume extraction 3 = Steam injection deck 1 4 = Steam injection deck 2 5 = Steam injection deck 3 6 = Steam injection deck 4 7 = Steam injection deck 5 8 = Suction hood 9 = Electronics compartment fan (see also parameters u6 and u7) 10 = Burner power supply 11 = Sound 12 = Burner block reset

					13 = Chamber light 14 = Venting deck 1 15 = Venting deck 2 16 = Venting deck 3 17 = Venting deck 4 18 = Venting deck 5 19 = Fan motor
u2c	0	19	- - -	12	K2 relay same configurations as u1c
u3c	0	19	- - -	2	K3 relay same configurations as u1c
u4c	0	19	- - -	7	K4 relay same configurations as u1c
u5c	0	19	- - -	13	K5 relay same configurations as u1c
u6c	0	19	- - -	8	K6 relay same configurations as u1c
u7c	0	19	- - -	9	K7 relay same configurations as u1c
u8c	0	19	- - -	11	K8 relay same configurations as u1c
u9c	0	19	- - -	10	K9 relay same configurations as u1c
u10c	0	19	- - -	3	K10 relay same configurations as u1c
u11c	0	19	- - -	4	K11 relay same configurations as u1c
u12c	0	19	- - -	5	K12 relay same configurations as u1c
u13c	0	19	- - -	6	K13 relay same configurations as u1c
u14c	0	19	- - -	19	K14 relay same configurations as u1c
u15c	0	19	- - -	0	K15 relay same configurations as u1c
u16c	0	19	- - -	0	K16 relay 0 = Unused 1 = DO NOT USE 2 = Chimney damper for combustion fume extraction 3 = DO NOT USE 4 = DO NOT USE 5 = DO NOT USE 6 = DO NOT USE 7 = DO NOT USE 8 = Suction hood 9 = Electronics compartment fan (see also parameters u6 and u7) 10 = Burner power supply 11 = Sound 12 = Burner block reset

					13 = DO NOT USE 14 = Venting deck 1 15 = Venting deck 2 16 = Venting deck 3 17 = Venting deck 4 18 = Venting deck 5 19 = Fan motor
u17c	0	19	- - -	0	K17 relay same configurations as u16c
u18c	0	19	- - -	0	K18 relay same configurations as u16c
u19c	0	19	- - -	0	K19 relay same configurations as u16c
PARAM.	MIN.	MAX.	M.U.	DEF.	DATA-LOGGING
rE0	1	240	min	5	internal data sampling time
PARAM.	MIN.	MAX.	M.U.	DEF.	SERIAL NETWORK
bLE	0	99	- - - -	1	serial port configuration for connectivity 0 = free for MODBUS RTU 1-99 = EPoCA local network address (in this case the baud rate is automatically configured to 19,200 baud irrespective of the Lb value) N.B.: if connectivity comes from EVlinking Wi-Fi, the only value that can be set is 1
LA	1	247	- - -	247	device address
Lb	0	3	- - -	3	baud rate (the parameter is relevant only if bLE = 0) 0 = 2,400 baud 1 = 4,800 baud 2 = 9,600 baud 3 = 19,200 baud
LP	0	2	- - -	2	parity 0 = none 1 = odd 2 = even
PA1	-999	999	- - - -	426	EPoCA level 1 password (User)
PA2	-999	999	- - - -	824	EPoCA level 2 password (Administrator)
PARAM.	MIN.	MAX.	M.U.	DEF.	OTHERS
MS6	3	5	- - - -	5	number of decks
e0	0	1	---	0	behaviour of light when going from STD-BY to ON 0 = light on 1 = maintains the status it had in STD-BY
e1	0	1	---	0	behaviour of light when going from ON to STD-BY 0 = light off 1 = maintains the status it had in ON
e3	0	240	s	60	locked display activation delay 0 = not locked

(1) Temperatures are given in °C; refer to the conversion table for minimum and maximum settable values in °F. If the unit of measurement is set in °F (see parameter P1), temperatures are automatically converted on the device.

8 ALARM MANAGEMENT

If an alarm situation occurs, the buzzer is activated and the alarm icon  appears.
Pressing this key will silence the buzzer and the page with the active alarms will automatically be displayed.
If the alarm is automatically reset, once the alarm situation has been resolved, the signal will no longer be displayed; if, on the other hand, the alarm must be manually reset, another icon will appear to manually reset it. An example of an active alarm display is given below:

If an alarm can be reset manually, the  key appears on the right of the active alarm. Press it to activate the reset alarm procedure.

The table below shows the meaning of the device's various alarm codes.

ALARM CODE	DESCRIPTION
RTC	Clock alarm to correct: - set the date and time
CHAMBER PROBE	Faulty chamber probe alarm to correct: - check the type of probe; see parameter P0 - check the device-probe connection - check the chamber temperature main results: - the BURNER POWER SUPPLY and HEATING outputs will be switched off
POWER FAILURE	Power failure alarm to correct: - check the device-power supply connection main results: - if the alarm occurs when the device is in stand-by, it is not signalled - if the alarm occurs when the device is on, see parameter A5 in cases "-1" and "0" - if the alarm occurs during a cooking cycle with A5>0 and the interruption lasts for a shorter time than that set by parameter A5, when power is restored the cycle will be resumed from the start of the phase in which the power failed (if the interruption lasts longer than the time set by parameter A5, the cycle will be interrupted when power is restored).

NO COMMUNICATION	No communication alarm between the interface and the control module to correct: - check the user interface-control module connection main results: - the loads will be deactivated
INCOMPATIBLE COMMUNICATION	Incompatibility alarm between the interface and the control module To correct: - check the user interface-control module FIRMWARE versions Main results: - the loads will be deactivated
CHAMBER HIGH TEMPERATURE	Chamber maximum temperature alarm To correct: - check the temperature detected by the chamber probe. See parameters A0, A1 and A3 Main results: - no effect
BOARD HIGH TEMPERATURE	Control module operating temperature alarm To correct: - check the operating temperature of the control module. See parameter A4 Main results: - the vents will open, the electronics compartment fan will switch on, the heating output and steam generator will be switched off
SAFETY THERMOSTATS	Activation of safety thermostats for combustion and cooking chamber fumes alarm To correct: - check if one of the safety thermostats has been activated. Main results: - the burner power supply relay, the heating relay and steam injection are deactivated, whereas the cycle, if running, continues.
ROD (CHIMNEY CLOSED)	Chimney closed alarm (if a manual adjustment rod is used) To correct: - check the position of the chimney adjustment rod. Main results: - the heating relay and steam injection are deactivated, whereas the cycle, if running, continues.
DAMPER (CHIMNEY CLOSED)	Chimney closed alarm (if a motorised damper is used) To correct: - check the position of the motorised chimney damper. Main results: - the heating relay and steam injection are deactivated, whereas the cycle, if running, continues.
BURNER DOOR OPEN	Burner door open alarm To correct: - check if the burner door is open. Main results: - the burner power supply relay, the heating relay and steam injection are deactivated, whereas the cycle, if running, continues.
BURNER BLOCK	Chamber burner block alarm To correct: - check the burner. Main results: - if i13=0: the heating relay and steam injection are deactivated, whereas the cycle, if running, continues. - if i13=1: the heating relay remains activated, steam injection is deactivated, whereas the cycle, if running, continues.

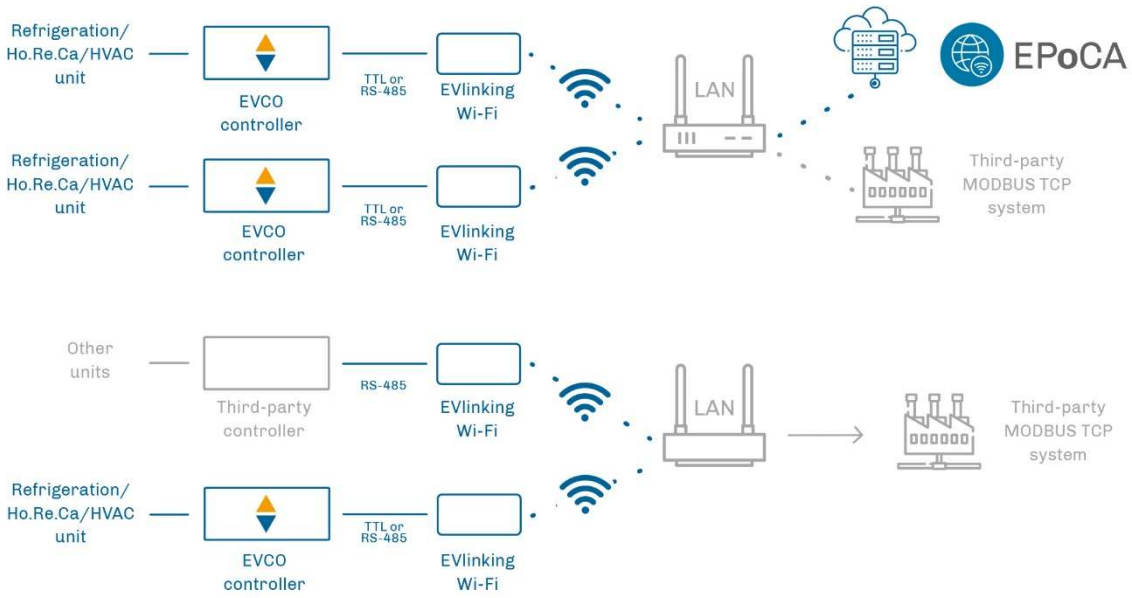
FAN MOTOR BLOCK	Fan motor block alarm To correct: - check the fan motor. Main results: - the burner power supply relay, the heating relay and steam injection are deactivated, whereas the cycle, if running, continues.
BOARD PROBE	Faulty board probe alarm to correct: - replace the control module. main results: - all loads will be switched off.

9 CONNECTIVITY

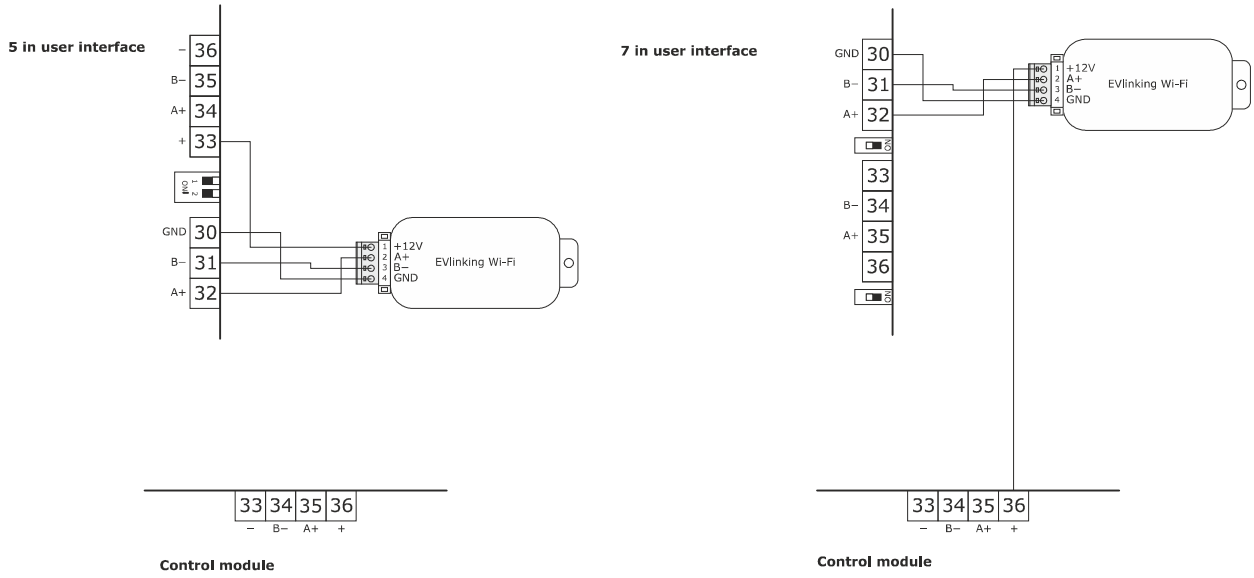
9.1 Initial information

Users can interact remotely with their equipment and start up/stop working cycles using the EPoCA cloud platform with Wi-Fi or Ethernet connectivity (which also enable alternative or parallel control through MODBUS TCP). For more details, compare the connectivity options in the "Models available and technical features" table and consult the Management and Monitoring Products/Systems and the Connectivity/Devices sections of our website www.evco.it.

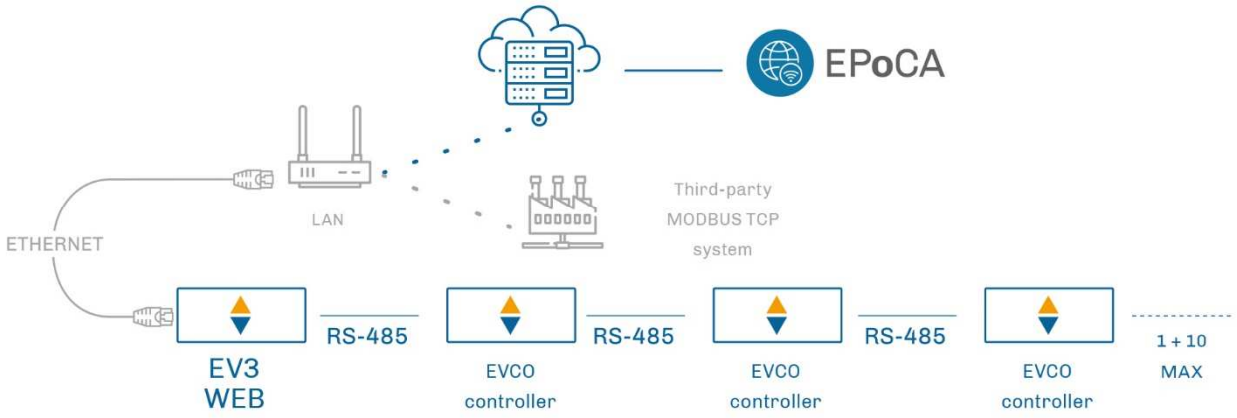
Schematic diagram for operation with EVlinking Wi-Fi (Wi-Fi connectivity)



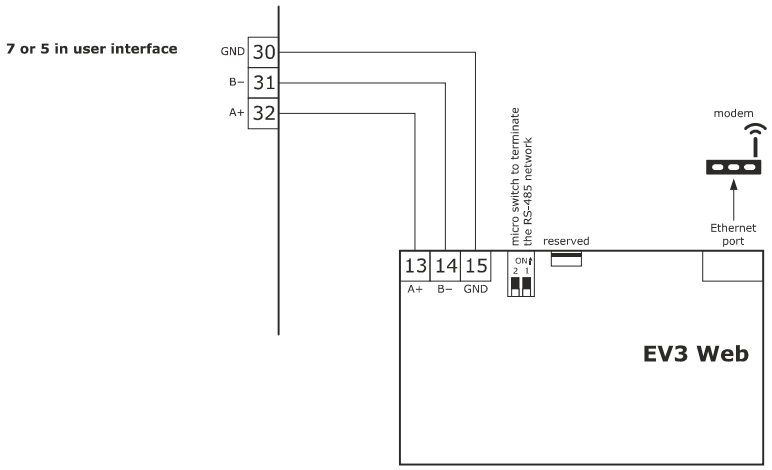
Detail of electrical connection of EVlinking Wi-Fi to Vcolor 388



Schematic diagram for operation with EV3 Web (Ethernet connectivity)



Detail of electrical connection of EV3 Web to Vcolor 388



9.2 EPoCA cloud platform

EPoCA® is a remote management and monitoring system based on a cloud platform. Originally developed to meet the management needs of the food preservation and cooking sector, it has been expanded to HVAC units in response to market demand.

To connect to the cloud system and remotely control machinery from a PC, tablet or smartphone, all users need is an EVCO controller with native EPoCA® technology and connectivity which is either built-in or provided by external hardware modules. All devices are configured using the dedicated "EPoCA Start" mobile app.

The responsive design and the graphic interface conceived to provide a pleasant user experience make EPoCA® a "ready-to-use" solution for easily accessible management and monitoring operations, even for entry-level users, while offering all the typical functions of professional platforms.

With the appropriate protection measures for access and data, the system makes it possible for one or more enabled users to operate remotely on the unit to configure its parameters, activate cycles, receive automatic alerts, view data (also as a graph) and download records in the most popular formats, such as XLSX, CSV and PDF.

10 USING THE USB PORT

10.1 Initial information

Uploading and downloading can be carried out through the USB port on the user interface. Uploading means transferring data from a USB flash drive to the display and downloading transferring data from the display to the USB flash drive. The following operations can be performed:

- upload and download recipe settings
- upload and download configuration parameter settings
- upload CSV files to personalise the graphics, recipes and languages.

These operations are guaranteed by using the EVUSB4096M USB key.

The uploading operations are only possible if the firmware of the device from which it originates and the firmware of the destination device are the same.

10.2 Uploading the recipe settings

The recipe settings can be uploaded as follows:

1. Go to the stand-by screen, press the key to access the configuration menu and press the option USB.
2. Insert the USB flash drive containing the recipe file with the name "prog.bin" (previously downloaded from another device) in the USB port of the device and wait a few seconds.
3. Press the "UPLOAD RECIPES" key.
4. When the upload is complete, remove the USB flash drive from the USB port of the device.

10.3 Downloading the recipe settings

The recipe settings can be downloaded as follows:

1. Go to the stand-by screen, press the key to access the configuration menu and press the option USB.
2. Insert a USB flash drive in the USB port of the device and wait for a few seconds.
3. Press the "DOWNLOAD RECIPES" key.
4. When the operation is complete, a "prog.bin" file will be generated which can be used to upload the contents to other controllers.

10.4 Uploading the settings in the configuration parameters

The parameter settings can be uploaded as follows:

1. Go to the stand-by screen, press the key to access the configuration menu and press the option USB.
2. Insert the USB flash drive containing the recipe file with the name "param.bin" (previously downloaded from another device) in the USB port of the device and wait a few seconds.
3. Press the "UPLOAD PARAMETERS" key.
4. When the upload is complete, remove the USB flash drive from the USB port of the device.

10.5 Downloading the settings in the configuration parameters

The parameter settings can be downloaded as follows:

1. Go to the stand-by screen, press the key to access the configuration menu and press the option USB.
2. Insert a USB flash drive in the USB port of the device and wait for a few seconds.
3. Press the "DOWNLOAD PARAMETERS" key.
4. When the upload is complete, remove the USB flash drive from the USB port of the device.

10.6 Uploading CSV files to personalise the graphics, recipes and languages

For the procedure to compile the ODS file, convert it to CSV, transfer to a USB flash drive and upload it to the controller, please refer to "Personalisation of the Vcolor platform".

11 ACCESSORIES

11.1 2 relay expansion

EVCLE322XXE

Expansion module with 2 electro-mechanical relays, 5 A res. @ 250 Vac type SPST

11.2 Safety transformer

ECTSFD004

The transformer can power the user interface.

11.3 Non-optoisolated RS-485/USB serial interface

EVIF20SUXI

The interface enables the device to be connected to the Parameters Manager set-up software system.

11.4 USB plug for panel installation

0812000002

The plug makes the USB communications port of the device more accessible.

To connect the device to the plug, connecting cable 0810500018 or 0810500020 must be used (to be ordered separately).

11.5 Connecting cables

0810500018/0810500020

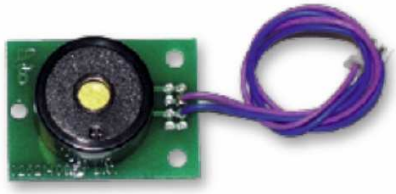
These cables are used to connect the USB plug for panel installation 0812000002 to the device.

Cable 0810500018 is 2 m long; cable 0810500020 is 0.5 m long.

11.6 Buzzer expansion

CT1ES0070000

The buzzer can be placed outside the electronics compartment using an expansion device which can be connected to the control module.



11.7 4GB USB flash drive

EVUSB4096M

The flash drive makes it possible to upload and download the settings and the data recorded by the device.

11.8 EVlinking Wi-Fi RS-485 module

EVIF25SWX

Through the RS-485 communications port, the module provides the controller with Wi-Fi connectivity which enables remote management and monitoring from the Internet using the EPoCA® cloud system.

11.9 EV3 Web gateway

EV3W01

IoT gateway with Ethernet connectivity and data logging functions to remotely monitor and control an RS-485 MODBUS RTU network with up to 10 EVCO controllers with EPoCA® technology using the EPoCA® cloud platform.

12 TECHNICAL SPECIFICATIONS

12.1 Technical data

Purpose of the control device:	function controller	
Construction of the control device:	built-in electronic device	
Housing:	user interface	control module
	plastic housing	open frame board
Category of heat and fire resistance:	D	
Measurements:	user interface M	user interface L
	flush fit installation: 118.0 x 166.0 x 35.0 mm (4.645 x 6.535 x 1.377 in; L x H x D) Semi-recessed installation: 97.1 x 145.1 x 32.0 mm (3,822 x 5,712 x 1,259 in; L x H x D)	flush fit installation: 156.0 x 216.0 x 50.0 mm (6.141 x 8.503 x 1.968 in; L x H x D) Semi-recessed installation: 131.9 x 192.9 x 47.0 mm (5,192 x 7,594 x 1,850 in; L x H x D)
Mounting methods for the control device:	user interface	control module
	flush with the panel from behind with threaded studs (not provided) to hold it in place or semi-recessed from the front of the panel using the spring clips	on a flat surface with spacers
Degree of protection:	user interface	control module
	IP65 (front)	IP00.
Connection method:	user interface	control module
	plug-in screw terminal blocks for wires up to 1.5 mm², type A female USB connector (USB port)	plug-in screw terminal blocks for wires up to 2.5 mm²
	maximum permitted length for connection cables: - user interface-control module connection: 10 m (32.8 ft) - power supply: 10 m (32.8 ft) - analogue inputs: 10 m (32.8 ft) - digital inputs: 10 m (32.8 ft) - digital outputs: 100 m (329 ft) - RS-485 MODBUS port: 1,000 m (3,280 ft) - USB port: 1 m (3.28 ft)	
Operating temperature:	from 0 to 55 °C (from 32 to 131 °F)	
Storage temperature:	from -10 to 70 °C (from 14 to 158 °F)	
Operating humidity:	relative humidity without condensate from 10 to 90%	
Pollution status of the control device:	2.	
Environmental standards:	- RoHS 2011/65/EC - WEEE 2012/19/EU - REACH (EC) Regulation no. 1907/2006	
EMC standards:	- EN 60730-1 - IEC 60730-1	

Power supply:	user interface	control module
	powered by the control module	12 Vac (±15%), 50/60 Hz (±3 Hz), 20 VA max.
Rated impulse withstand voltage:	4 KV	
Overvoltage category:	III	
Software class and structure:	A	
Clock:	built-in (with secondary lithium battery)	
	clock drift: ≤ 60 s/month at 25 °C (77 °F)	
	clock battery autonomy in the absence of a power supply: > 6 months at 25 °C (77 °F)	
	clock battery charging time: 24 h (the battery is charged by the power supply of the device)	
Analogue inputs:	1 input for J/K thermocouples or Pt 100 according to the power board used.	
	J thermocouple analogue input Sensor type: iron/constantan Measurement field: from -50 to 700 °C (from -58 to 1,292 °F) Resolution: 1 °C (1 °F) Protection: none	
	K thermocouple analogue input Sensor type: chromel/alumel Measurement field: from -50 to 1,100 °C (from -58 to 2,012 °F) Resolution: 1 °C (1 °F) Protection: none.	
	Pt 100 analogue input Type of sensor: Pt 100 class A Measurement field: from -50 to 550 °C (from -58 to 1,022 °F) Resolution: 1 °C (1 °F) Protection: none.	
Digital inputs:	6 inputs: - 4 for normally open/normally closed contact (voltage-free, 5 Vdc, 0.5 mA) - 2 for normally open/normally closed contact (high voltage contact, 230 Vac)	
	voltage-free digital inputs Power supply: none Protection: none.	
	digital inputs for high voltage contact Power supply: 230 Vac Protection: none.	

Digital outputs:	13 electro-mechanical relay outputs (configurable): - 1 5 A res. @ 250 Vac type SPST (K1) output - 1 5 A res. @ 250 Vac type SPST (K2) output - 1 5 A res. @ 250 Vac type SPST (K3) output - 1 5 A res. @ 250 Vac type SPST (K4) output - 1 5 A res. @ 250 Vac type SPST (K5) output - 1 5 A res. @ 250 Vac type SPST (K6) output - 1 5 A res. @ 250 Vac type SPST (K7) output - 1 5 A res. @ 250 Vac type SPDT (K8) output - 1 8 A res. @ 250 Vac type SPST (K9) output - 1 5 A res. @ 250 Vac type SPST (K10) output - 1 5 A res. @ 250 Vac type SPST (K11) output - 1 5 A res. @ 250 Vac type SPST (K12) output - 1 8 A res. @ 250 Vac type SPDT (K13) output - 1 5 A res. @ 250 Vac type SPST (K14) output - 1 5 A res. @ 250 Vac type SPST (K15) output * The relays do not control LED or fluorescent lights
Displays:	5- or 7-inch TFT touch-screen graphic display, 16K colours, 800 x 480 pixel resolution. The presence of imperfection points on the display is within the tolerance limits as established by the reference standards.
Type 1 or Type 2 actions:	type 1.
Additional features of Type 1 or Type 2 actions:	C
Communications ports:	2 ports: - 1 RS-485 MODBUS port - 1 USB port
Warning and alarm buzzer:	built-in

Notes

Vcolor 388

Controller for steam tube deck ovens

Installer manual ver. 1.0

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