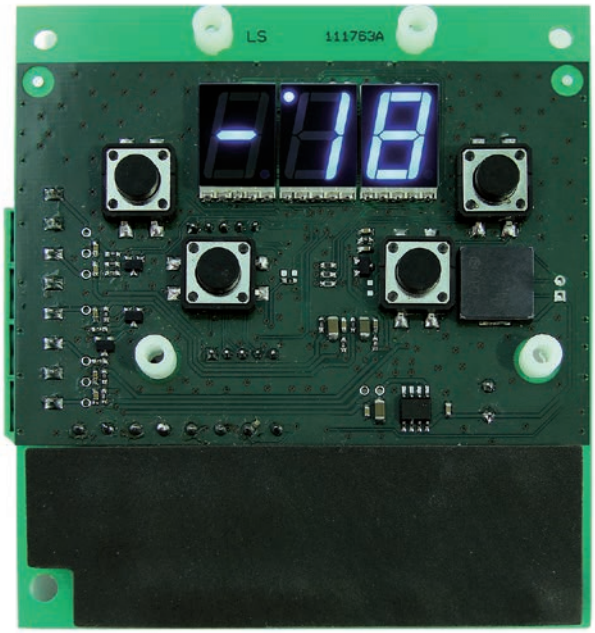
EWBC1400



Low End integrated controller for blast chillers

USER MANUAL

CONTENTS

1. INTRODUCTION

1.1. HOW TO USE THIS MANUAL

This manual uses the following conventions to highlight certain parts of the text:

Information that users must be aware of to prevent any damage to the system or hazards for people, devices, data, etc. Users must read and take note of these sections.

Indicates further information on the subject concerned that the user should take into account.

, * Provides further specifications on an explanation provided previously.

Fig. 1
1 - Fig. 1 Provides references to figures. References to figures indicated by using, in bold, the abbreviation "Fig." and a number that identifies the figure. To indicate specific parts within the figure, the references are given using a letter or number.

"1.1.1 Title" on page 1 Provides references to parts of the text. References to parts of the text are indicated using, in bold, the number and the title of the chapter, subchapter, paragraph or sub-paragraph in quotation marks, followed by "on page" with the corresponding page number.

1.1.1. Glossary

BLAST CHILLING
Process by which the temperature of the food products is lowered abruptly, cooling or freezing them. The sudden drop in temperature ensures compliance with the organoleptic qualities of the food product, which can then be stored.
It is divided into:

- Positive blast chilling, in the case of cooling;
- Negative blast chilling, in the case of freezing.

BLAST CHILLER
Machine used to run the blast chilling cycle and the subsequent storage of a food product.

STORAGE
Next step in the blast chilling cycle, in which the food product is maintained at a certain temperature in order to preserve its cooling or freezing.
It is divided into:

- Positive storage, in the case of cooling;
- Negative storage, in the case of freezing.

DEFROST
Process of ice and frost accumulations removal from the inner walls of the refrigeration plants.

"OPEN" BOARD
Board without protective casing.

COLD ROOM SETPOINT
Constant temperature value at which the cold room is maintained during the blast chilling cycle.

NEEDLE PROBE
Type of probe with "needle" shape (**Fig. 1 on page 5**) that allows to pierce a food product to detect the temperature of its core.

Fig. 1. Needle probe

STERILIZATION
Chemical or physical process that leads to the elimination of every living organism, both pathogenic and non-pathogenic, including spores and fungi. It is typically implemented through the use of a UV (Ultra Violet) lamp, i.e. that emits ultraviolet rays.

NEEDLE PROBE TARGET (CORE)
Temperature value, measured by the needle probe (core), at which the blast chilling cycle stops and the storage phase begins.

1.2. LIABILITY AND RESIDUAL RISKS

Eliwell Controls srl declines any liability for damage due to:

- unspecified installation/use and, in particular, in contravention of the safety requirements of the legislation in force in the Country of installation and/or specified in this document;
- use on blast chillers which do not provide adequate protection against electrocution, water and dust in the actual installation conditions;
- use on blast chillers allowing access to dangerous parts without having to use tools;
- tampering with and/or modification of the product;
- installation/use on blast chillers that do not comply with the regulations in force in the Country of installation.

1.3. CONDITIONS OF USE

1.3.1. Permitted use

For safety reasons, the product must be installed and used in accordance with the instructions provided. In particular, parts carrying dangerous voltages must not be accessible under normal conditions. It must be adequately protected from water and dust according to the application, and must be accessible only using a tool.
The product is suitable for use in a blast chiller for professional refrigeration appliances and has been tested for safety aspects in accordance with the harmonized European reference standards.

1.3.2. Prohibited use

Any use other than that expressly permitted is prohibited.
The relay contacts provided are mechanical and subject to failure: any protection devices required by reference standards, or suggested by good practice in view of obvious safety requirements, must be installed externally of the product.

1.4. DISCLAIMER

Every care has been taken in the preparation of this manual; however Eliwell Controls srl and any person or company involved in its creation and writing cannot accept any liability arising from the use thereof.
Eliwell Controls srl reserves the right to make changes or improvements at any time without notice.

1.5. DISPOSAL

The equipment (or product) must be subjected to separate waste collection in compliance with the local legislation on waste disposal.

2. DESCRIPTION

The Low End integrated controller (**EWBC1400**) is an electronic control board with microcontroller, provided "open" to be integrated in applications of the Customer to control the basic functions of a blast chiller.
EWBC1400 is equipped with inputs, outputs, as well as keys and the LED display that make up the user interface.

The technical specifications stated in this document regarding measurement (range, accuracy, resolution, etc.) refer to the instrument alone and not to any accessories provided, such as the probes. This means, for example, that the error introduced by the probe must be added to the characteristic error of the instrument.

2.1. TECHNICAL SPECIFICATIONS (EN 60730-2-9)

Classification	Electronic automatic control device (not safety) device to be integrated
Installation	On panel
Type of action	1.B
Pollution class	2
Material class	IIIa
Over voltage category	II
Nominal pulse voltage	2500 V
Ambient operating temperature	-10 °C ÷ +60 °C
Ambient storage temperature	-20 °C ÷ +85 °C
Ambient operating and ambient storage humidity (non-condensing)	10% ÷ 90%
Power supply voltage	230 V ± 15%
Power supply frequency	50/60 Hz ± 5%
Power consumption	1.8 VA
Insulation class	2
Fire resistance category	D
Software class	A

*The degree of protection (IP) to the User depends on the characteristics of the machine in which **EWBC1400** is integrated. It has high voltage contacts and must therefore be protected against User access complying with the measures provided by the law in force in the Country where the unit is installed.*

2.2. INPUT / OUTPUT CHARACTERISTICS

	Number	Specifications
Analogue inputs	1	**NOT configurable**, set as needle probe PTC KTY 83 - 121 1K 1% (code SN7FAF11502A4)
	3	**Independently configurable*** as temperature probe **NTC** type Semitec 103AT (10 kΩ / 25 °C) or as temperature probe **PTC** KTY 83 - 121 1K 1%
Digital input	1	Dry contact with ground closing (closing current referred to ground: 0.5 mA)
Digital outputs	4	Relay SPST NO 5 A resistive 250 Vac
Serial	1	TTL connector

* see parameters **tp2, tp3, tp4**. Refer to **"5.2. Table of advanced parameters" on page 26**.

There is a buzzer

2.2.1. Description of inputs

2.2.1.1. Analogue inputs

Naming	Description	Default type	Range of use
PB1	Needle probe	PTC KTY 83 - 121 1K 1%	-50°C ÷ +100°C
PB2	Cold room probe	NTC 103AT	-50°C ÷ +100°C
PB3	Condenser probe	NTC 103AT	-50°C ÷ +100°C
PB4*	Auxiliary / pressure-switch condenser probe	NTC 103AT	-50°C ÷ +100°C

* The analogue input PB4 can be configured as digital input (DI2) when the parameter **P27 >0**.
Refer to **"6.7. Auxiliary fan (OUT4)" on page 29** and **"4.2.2.1. Automatic program" on page 18**.

The probe can break if out of the operating range.

The resolution of the analogue inputs, according to Eliwell standard, is the tenth of a degree; the conversion precision is 1% FS (Full Scale).

2.2.1.2. Digital inputs

Naming	Description
DI1	Blast chiller door closing control microswitch
DI2*	Pressure switch

* The digital input DI2 can be configured as analogue input (PB4). Refer to **"6.7. Auxiliary fan (OUT4)" on page 29** and **"2.2.1.1. Analogue inputs" on page 8**.

2.2.2. Description of outputs

Naming	Description
OUT1	Compressor control
OUT2	Defrost heater and/or cold room fan
OUT3	External fan control on condenser
OUT4	UV lamp, needle probe heater or external auxiliary fan control on auxiliary condenser, if any

2.2.3. Serial

Naming	Description
COM1	Serial port to interface the parameters programming key (Copy Card) or for connection to PC (by appropriate interface)

2.3. DIMENSIONS

The dimensions of **EWBC1400** are shown in **Fig. 2 on page 9** and summarized in the following table.

PCB Base x Height	95x105 mm (± 0.2 mm)
PCB thickness	1.6 mm (± 0.16 mm)

3. INSTALLATION

3.1. MECHANICAL INSTALLATION

EWBC1400 is equipped with 4 spacers (**A - Fig. 2 on page 9**) to ensure the correct distance between the PCB and the panel of the blast chiller, which must be 5 mm.

The values shown in **Fig. 2 on page 9** *are expressed in millimetres.*

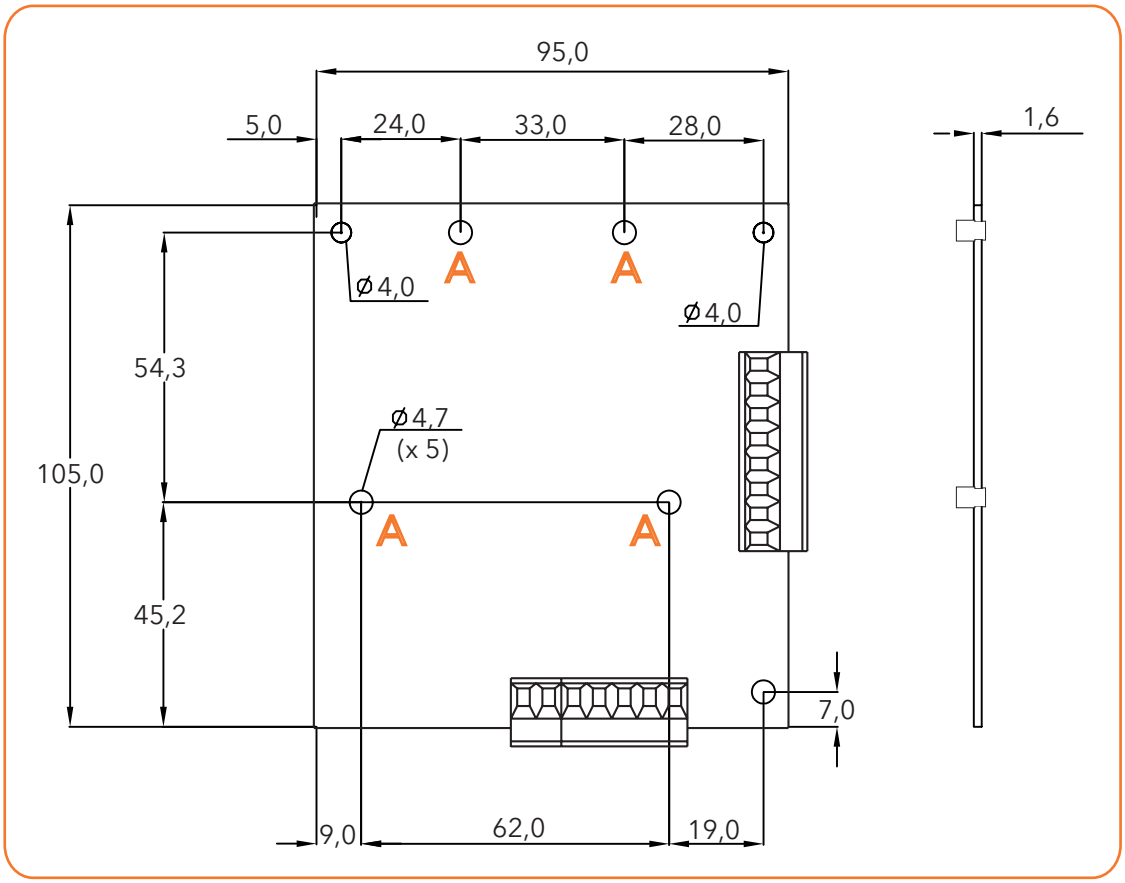


Fig. 2. Mechanical installation - measurements

The mechanical installation (**Fig. 3 on page 10**) of **EWBC1400** can be made:

1. by 4 screws to fit in the holes (**F**) of the blast chiller panel and to secure with the appropriate nuts on the back of **EWBC1400**;
2. by 4 stud bolts integrated in the blast chiller panel, to secure with the appropriate nuts on the back of **EWBC1400**.

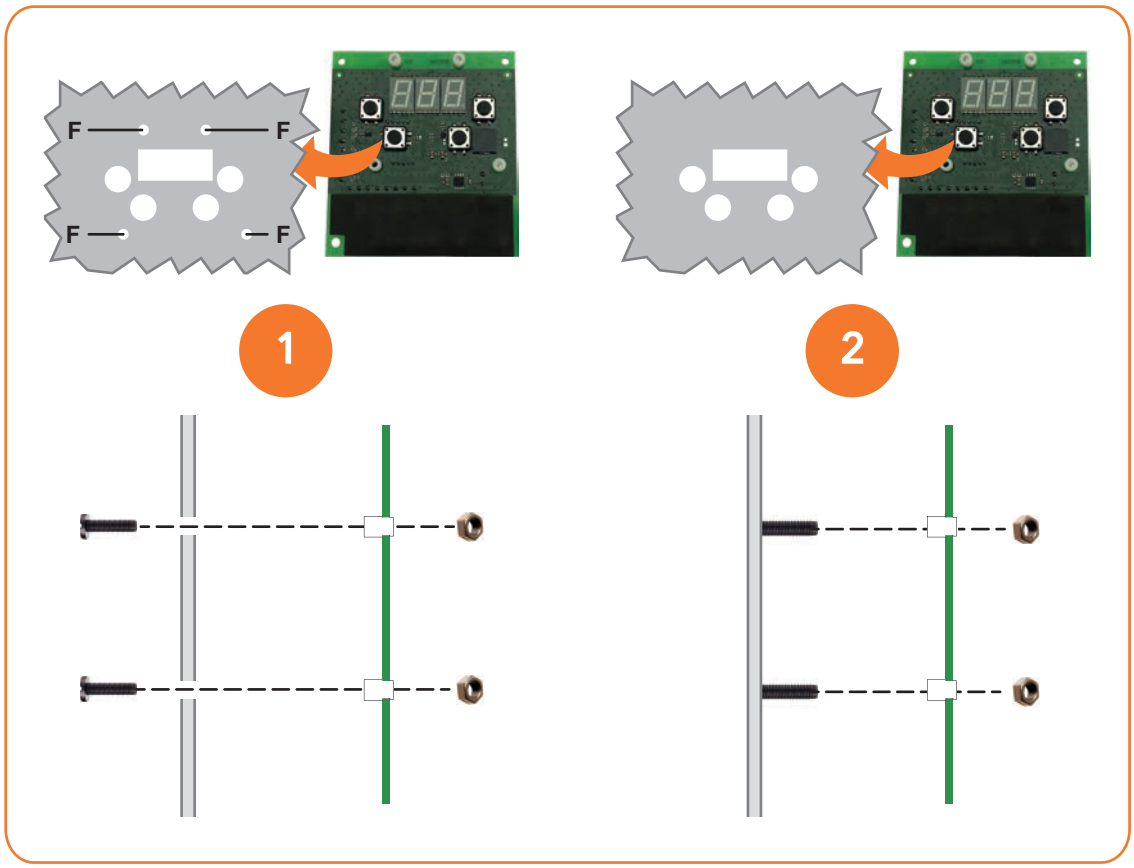


Fig. 3. Mechanical installation - modes

3.2. ELECTRICAL CONNECTIONS

Always switch the blast chiller off before performing any maintenance on their electrical connections.

The **EWBC1400** must be installed in compliance with the following requirements:

- the wiring must comply with the safety regulations and according to the procedures given below, so as not to compromise the **EWBC1400** good stability with respect to electromagnetic interference;
- it is necessary to wire separately the sensor and power supply cables or use shielded cables to avoid interference phenomena;
- avoid the passage of wires (although isolated) above the **EWBC1400** (and particularly above the microcontroller).

3.2.1. Connectors specifications

Connectors	Specifications
Terminal boards (power supply, digital/ analogue inputs, digital outputs)	Male screw connectors 5.08 mm pitch or, upon request, disconnectable connectors with female screw to be coupled, 5.08 mm not included
TTL serial	5-way Molex connector

Referring to **Fig. 4 on page 12**, the following table describes the layout of the connectors.

	Terminal	Naming	Description
Power supply	1	L	Phase (Power supply 230 Vac)
	2	N	Neutral (Power supply 230 Vac)
Digital outputs	3	C	Common loads
	4	OUT1	Compressor
	5	OUT2	Defrost heater / Cold room fan
	6	OUT3	Condenser fan
	7	OUT4	Auxiliary output
Digital/ analogue inputs	8	PB1	Needle probe
	9	GND	Ground
	10	PB2	Cold room probe
	11	DI1	Blast chiller door closing microswitch
	12	GND	Ground
	13	PB3	Condenser probe
	14	GND	Ground
	15	PB4 / DI2	Auxiliary probe / Pressure-switch

3.2.2. Connection diagram

The connection diagram of **EWBC1400** is shown in **Fig. 4 on page 12**, where the loads and the analogue inputs are summarized using the symbols shown in the following table.

Symbol	Description
COMP	Compressor
DEF	Defrost heater
CELL	Cold room fan
COND	Condenser fan
AUX	Auxiliary fan
UV	UV lamp
	Needle probe heater
	Insulation transformer
	Needle probe
CELL	Cold room probe
COND	Condenser probe
COND AUX	Auxiliary condenser probe

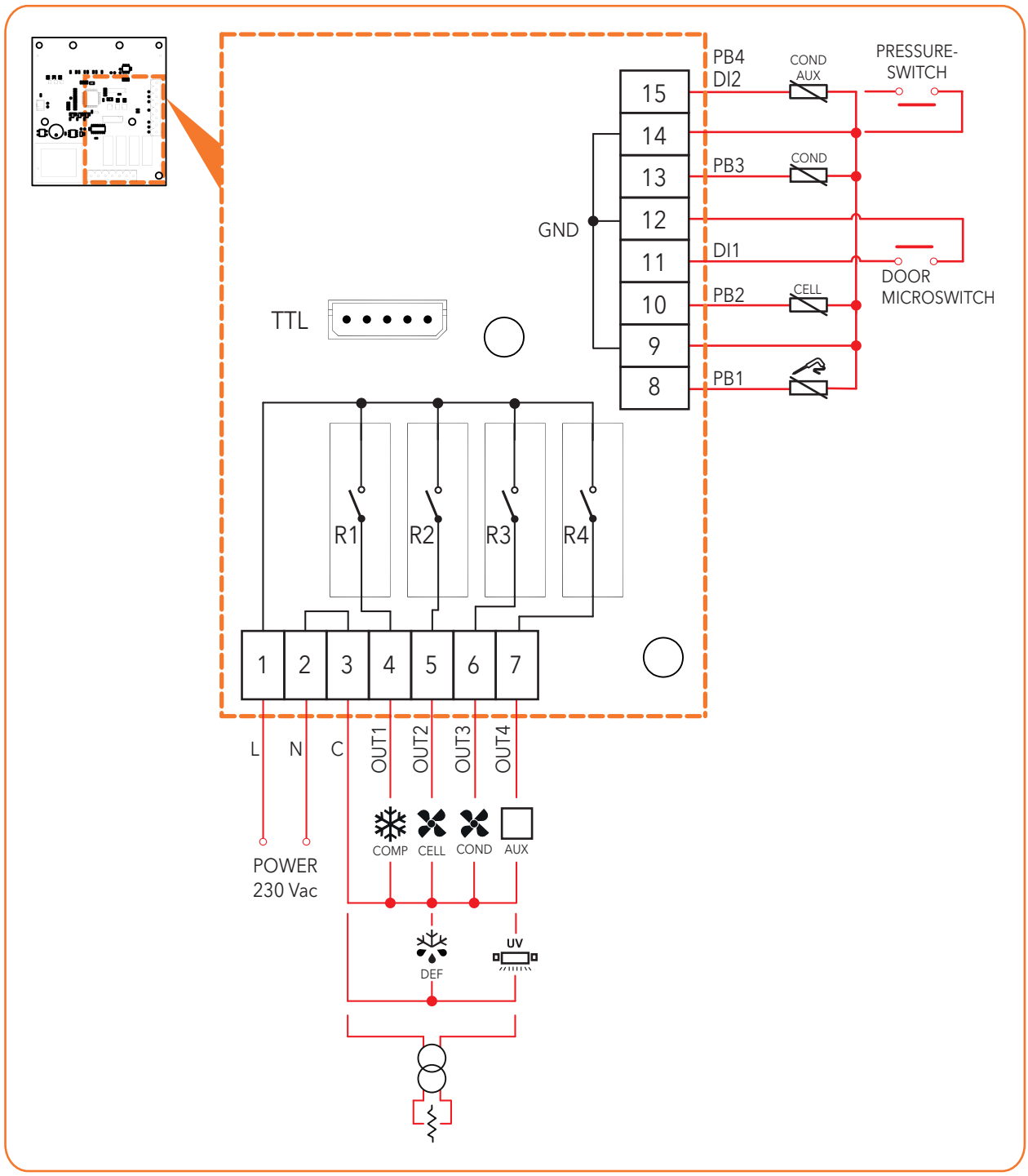


Fig. 4. Connection diagram

4. USER INTERFACE

4.1. USER INTERFACE DESCRIPTION

The user interface (**Fig. 5 on page 13**) consists of the following elements:

- Keys (**SET**, **DOWN**, **UP**, **SEL**) for menu navigation, by setting the parameters for the alarms acknowledgement.
- Display (**D1**) to display menus and parameters.
- LED (**L1**, **L2**, **L3**) for signalling the blast chiller and resources (sensors, etc.) statuses.

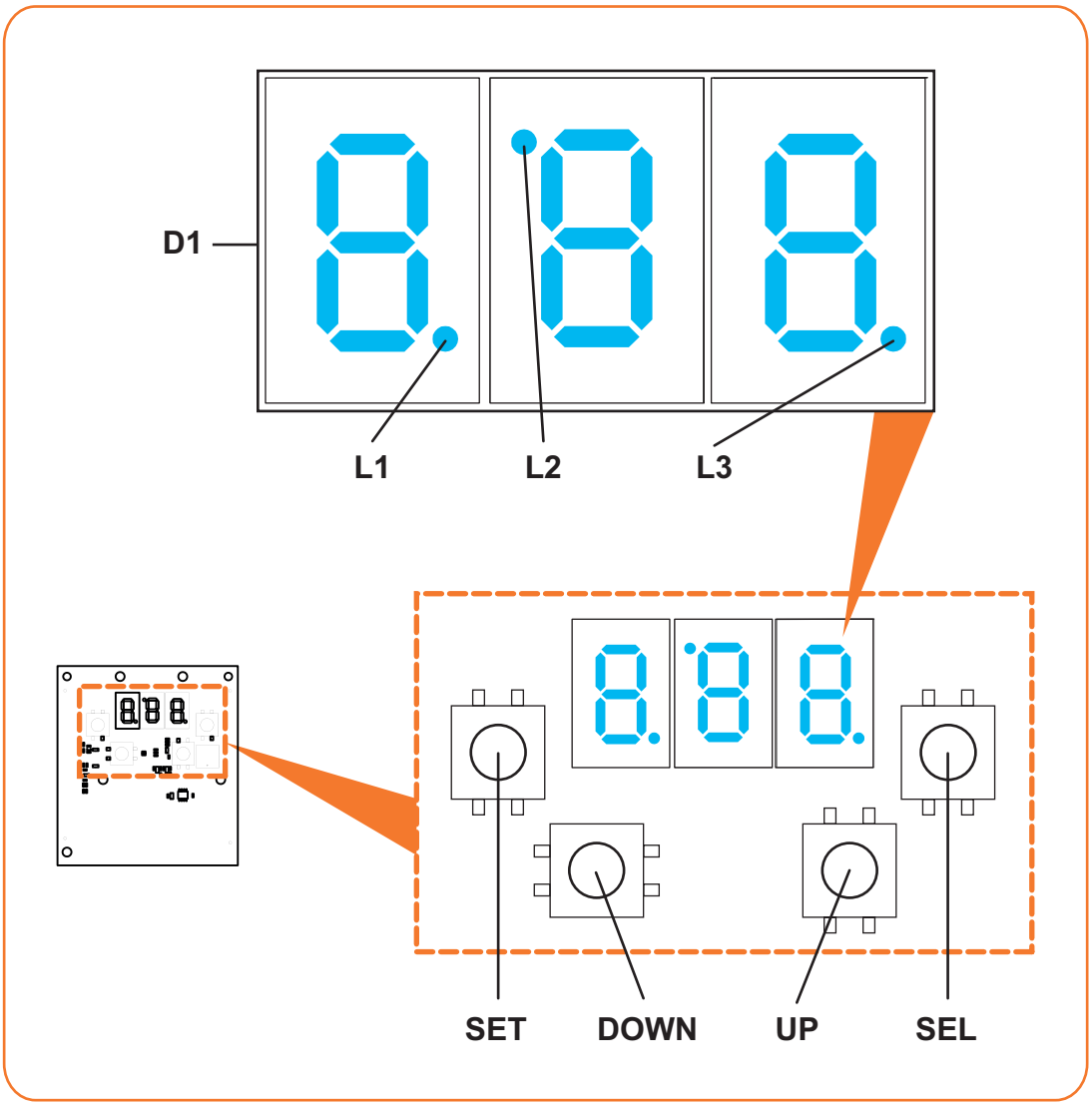
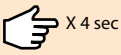
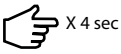
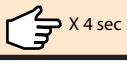
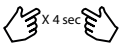


Fig. 5. User interface

4.1.1. Keys

Naming	Mode	Description
SET	Short press 	Blast chiller start/stop operation and confirmation
DOWN	Short press 	Slow decrease of the value and buzzer switch off During a program it displays the cold room probe temperature
	Long press (4 seconds) 	Fast decrease of the value and defrost activation
UP	Short press 	Slow increase of the value and cold room temperature display
	Long press (4 seconds) 	Fast increase of the value and load activation on the auxiliary output (UV lamp for sterilization, needle probe heater or auxiliary condenser fan)
SEL	Short press 	Program selection alternately positive and negative
	Continuous press 	Display of the elapsed time from the blast chilling cycle beginning or the duration of the blast chilling cycle **until the key is released**
	Long press (4 seconds) 	Stand-by enable
DOWN+ UP	Long press (4 seconds) 	To access the configuration parameters **simultaneously** press the **DOWN** and **UP** keys for 4 seconds. (only with blast chiller in stop phase or if there are no programs in progress).

4.1.2. Display

Naming	Description
D1	Display with 3 digits, each consisting of 7 segments, for displaying menus and operating variables (temperature and time*)

* The temperature is displayed without decimal places, i.e. with a resolution of 1 °C; the time is displayed in the form of a decimal number, where the integer part represents the hours and the decimal part the minutes (for example, "3,41" indicates the time 3 hours and 41 minutes).

4.1.3. LED

Naming	Description
L1	LED with decimal point functions to display the time.
L2	LED with function of indicating the negative blast chilling cycle selected
L3	**steady on** LED which has the function of indicating the blast chilling cycle in progress; **flashing** LED which has the function of indicating the storage phase in progress

4.2. USER INTERFACE USE

4.2.1. Switch on

When switching on the display (**D1 - Fig. 5 on page 13**) it performs a lamp-test (flashing of all segments and dots for 5 seconds).
When switched on for the first time, **EWBC1400** is in stand-by mode (refer to **"4.2.6. Stand-by mode" on page 23**).
When it is switched on the next times, or power supply is restored, the blast chiller status varies according to the status in which it was before the power supply failure, as described in the following table.

Chill blast status before the power supply failure	Chill blast status at power supply restoration
Chill blast stopped or in parameters configuration mode	Chill blast stopped
Chill blast in operation (program in progress)	The chill blast restarts the program operation from the point at which it was interrupted. The time count restarts from zero

When switched on, **EWBC1400** indicates the pressure switch alarm "PrS" if the DI2 pressure switch is open, as this input is normally closed (NC). Refer to **"7. Alarms" on page 30**

4.2.2. Selecting and starting a program

EWBC1400 has **programs** for the management of the blast chiller following functions:

- positive blast chilling or cooling,
- negative blast chilling or freezing,

which is divided into the following categories:

- automatic,
- manual.

In a program, after a blast chilling there is a storage.
In case of **automatic program**, the reference value is the **temperature** detected by the needle probe.
In case of **manual program**, the reference value is the **time**.
Both the automatic program and the manual program are constituted by a blast chilling cycle to which automatically follows a storage phase, positive or negative depending on the blast chilling cycle performed.

The blast chilling cycle can be:

- positive (cooling), with positive reference temperature (target temperature) (**Fig. 6 on page 16**);

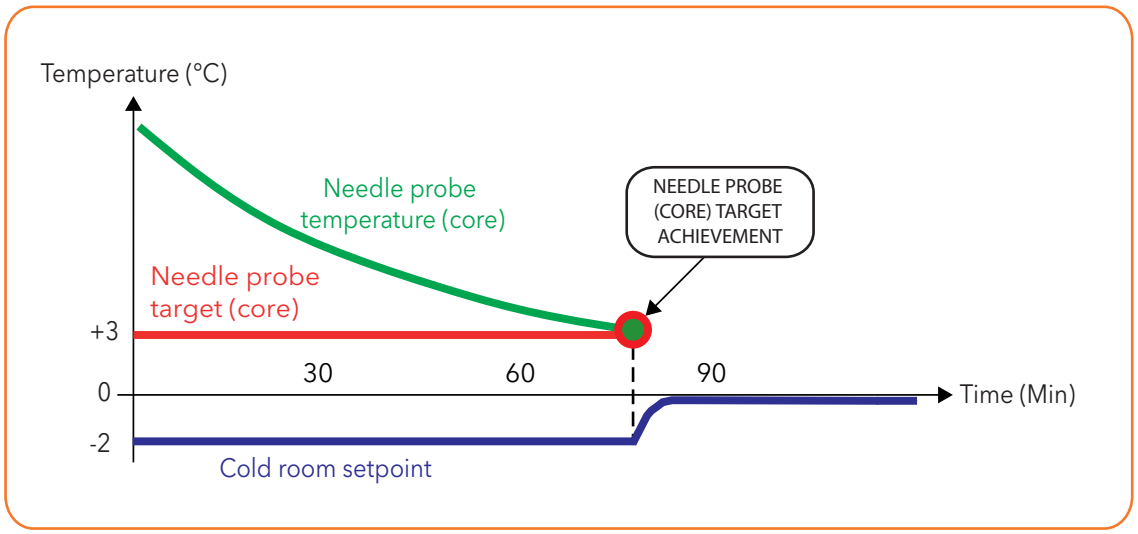


Fig. 6. Positive program

- negative (freezing), with negative reference temperature (target temperature) (**Fig. 7 on page 16**).

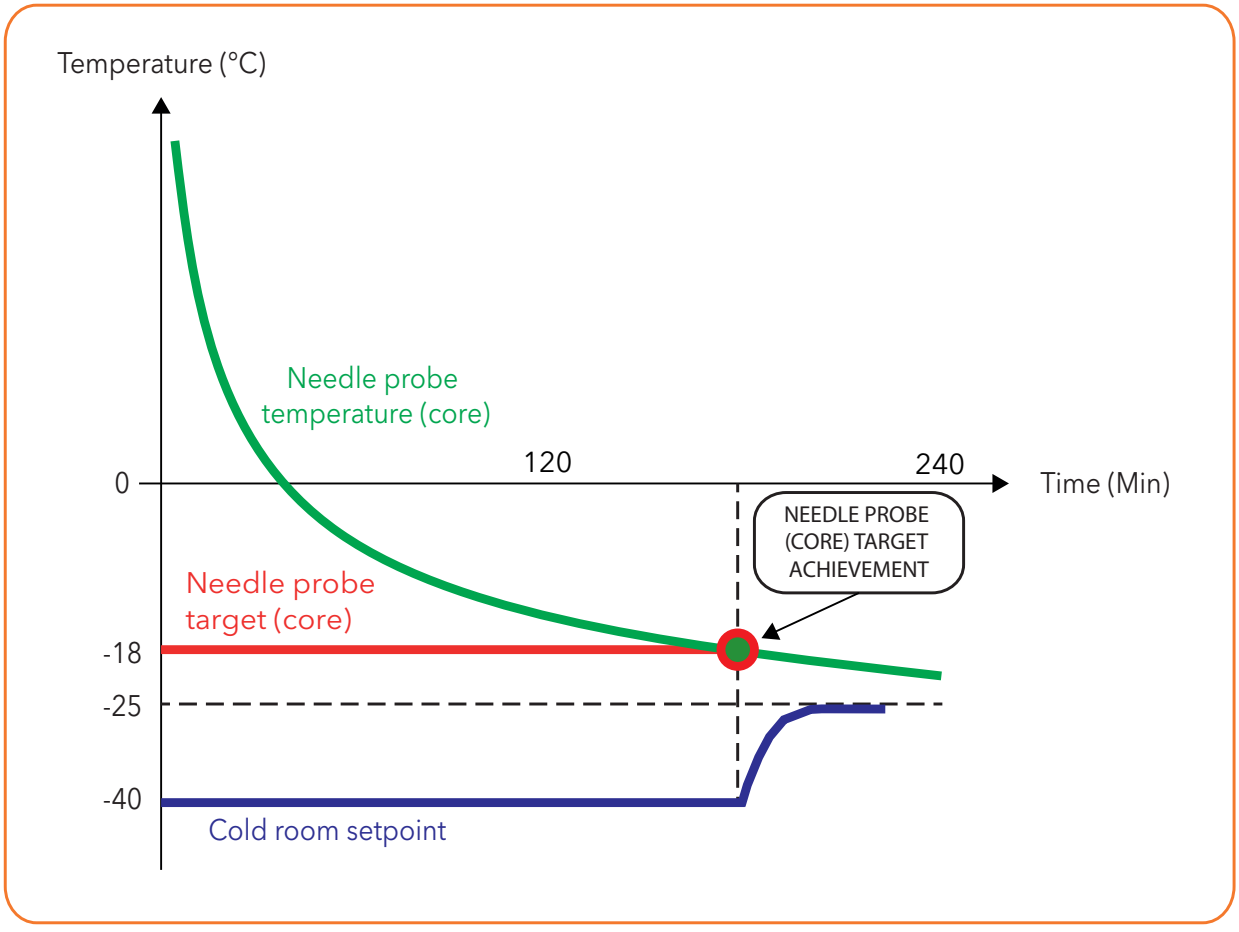


Fig. 7. Negative program

At the end of the blast chilling cycle, when the storage phase is started automatically, the buzzer will sound intermittently for the set time (parameter P 0).
To silence the buzzer in advance, press the **DOWN** key.

During the execution of a program:

- LED **L2** (**Fig. 5 on page 13**) is off if a positive blast chilling cycle was selected, or is on if a negative blast chilling cycle was selected;
- the **L3** LED is on during the blast chilling cycle and flashing during the storage phase;
- pressing the **UP** key determines the displaying (**D1- Fig. 5 on page 13)** of the temperature measured by the cold room probe for a duration of 5 seconds;
- pressing and holding the **SET** key determines, until the key is released, the display of the time that elapsed from the blast chilling cycle start if the blast chilling cycle is still in progress, the duration of the previous blast chilling cycle if the storage phase is still in progress.

At the end of a program, before starting the next program, the display shows the data related to the last program run.

4.2.2.1. Automatic program

To select and start an automatic program (**Fig. 8 on page 18**), proceed as described below:

1. Press the **SEL** key until the display shows (**D1 - Fig. 5 on page 13**) the positive blast chilling cycle (display of P13 parameter, default +3 °C) or negative blast chilling cycle (display of P14 parameter, default -18 °C).

The repeated pressure of the **SEL** *key changes the flashing displaying alternately from the value set for the positive blast chilling cycle to the value set for the negative blast chilling cycle.*

2. Wait 5 seconds or press the **SET** key to confirm (the temperature displaying becomes fixed).
3. Press the **SET** key to start the program.

The program operates according to the values set for the parameters P 8, P13 or P14, P17 or P18, P19 or P20, which can be modified by the User.

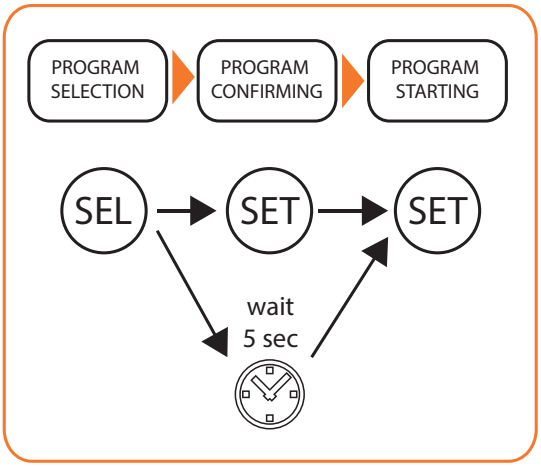


Fig. 8. Selecting and starting an automatic program

During the execution of an automatic program the display shows the temperature measured by the needle probe.

At the end of the blast chilling cycle the display shows the temperature measured by the needle probe, flashing if the target set has not been reached for timeout (parameter P13 or P14).
The duration of the blast chilling cycle is determined by one of the following conditions:

- reaching the selected temperature setpoint (parameter P13 or P14);
- failure to reach the target temperature selected but the cycle time set is reached for timeout (parameter P19 or P20).

The **storage phase** occurs:

- after a positive blast chilling cycle, at a cold room temperature equal to the value set for P17 parameter;
- after a negative blast chilling cycle, at a cold room temperature equal to the value set for the parameter P18.

Parameter	Description	Default	Range	UM
P 0	Buzzer sound time setting	10	0…60	sec
P 8	Hysteresis setting	3	1…20	°C
P13	Needle probe target setting in the positive blast chilling cycle	3	-50...99	°C
P14	Needle probe target setting in the negative blast chilling cycle	-18	-50…99	°C
P15	Cold room probe temperature setpoint setting in the positive blast chilling cycle	-2	-50…99	°C
P16	Cold room probe temperature setpoint setting in the negative blast chilling cycle	-40	-50…99	°C
P17	Setpoint setting of the cold room probe in positive storage	0	-50…99	°C
P18	Setpoint setting of the cold room probe in negative storage	-25	-50…99	°C
P19	Positive blast chilling cycle duration setting	90	0…599	Min
P20	Negative blast chilling cycle duration setting	270	0…599	Min

4.2.2.2. Manual program (by time)

To select and start a manual program (**Fig. 9 on page 20**) proceed as described below:

1. Press the **SEL** key until the display shows (**D1 - Fig. 5 on page 13**) the positive blast chilling cycle (display of P13 parameter, default +3 °C) or negative blast chilling cycle (display of P14 parameter, default -18 °C).

*The repeated pressure of the **SEL** key changes the flashing displaying alternately from the value set for the positive blast chilling cycle to the value set for the negative blast chilling cycle.*

2. Wait 5 seconds or press the **SET** key to confirm (the temperature displaying becomes fixed).
3. Press the **UP** or **DOWN** key to select the time (duration) of the blast chilling cycle (the starting value displayed is the one set by default, parameter P19 or P20 respectively for positive blast chilling cycle or negative blast chilling cycle).

The cycle time modification does not change the default values of the parameters P19 and P20. At its next setting always the default values will be shown.

4. Wait 5 seconds or press the **SET** key to confirm (the cycle time displaying becomes fixed).
5. Press the **SET** key to start the program.

During the blast chilling cycle the display shows the total time of the cycle (parameter P19 or P20 respectively for positive blast chilling cycle or negative blast chilling cycle).
The time is displayed in the form of a decimal number, where the integer part represents the hours and the decimal part represents the minutes (for example, "1.30" indicates the time 90 minutes, i.e. 1 hour and 30 minutes).

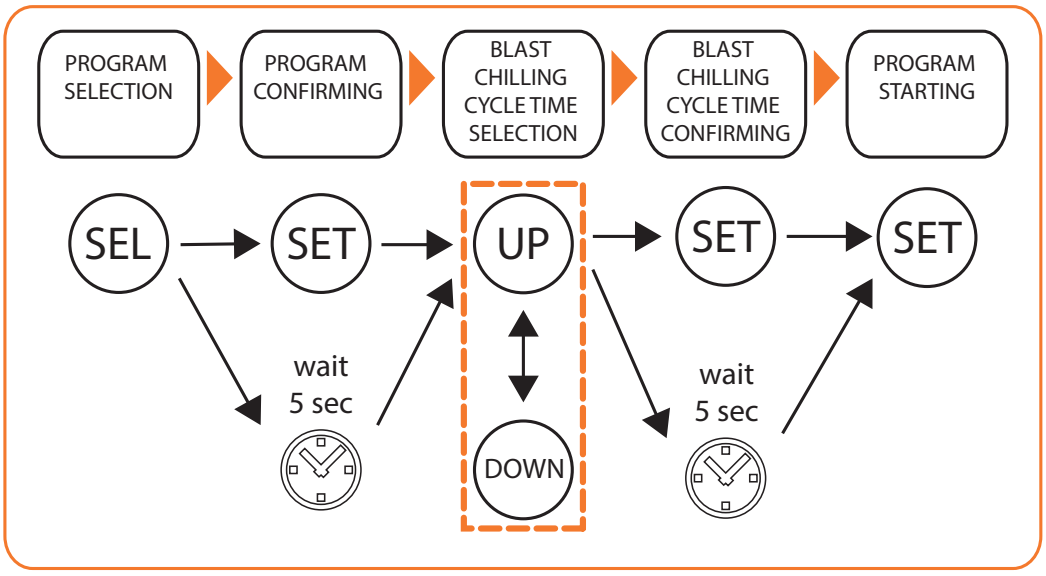


Fig. 9. Selecting and starting a manual program

The storage phase starts at the end of the blast chilling cycle and the display shows the temperature measured by the cold room probe.
The **storage phase** takes place at the end of the timeout:

- after a positive blast chilling cycle (parameter P19), with a cold room temperature setting equal to the value set for P17 parameter;
- after a negative blast chilling cycle (parameter P20), with a cold room temperature setting equal to the value set for P18 parameter.

During the storage phase the display shows the temperature measured by the cold room probe.

Parameter	Description	Def	Range	UM
P 0	Buzzer sound time setting	10	0…60	sec
P 8	Hysteresis setting	3	1…20	°C
P13	Needle probe setpoint setting in the positive blast chilling cycle	3	-50…99	°C
P14	Needle probe setpoint setting in the negative blast chilling cycle	-18	-50…99	°C
P17	Setpoint setting of the cold room probe in positive storage	0	-50…99	°C
P18	Setpoint setting of the cold room probe in negative storage	-25	-50…99	°C
P19	Positive blast chilling cycle duration setting	90	0…599	min
P20	Negative blast chilling cycle duration setting	270	0…599	min

4.2.3. Selecting and starting a special function

EWBC1400 is provided with **special functions** for the management of the following blast chilling functions:

- manual defrost,
- cold room sterilization (optional, if provided by the blast chiller),
- needle probe heating (optional, if provided by the blast chiller).

The storage phase starts automatically at the end of the special function and the buzzer will sound intermittently for the set time (parameter P 0).
To silence the buzzer in advance, press the **DOWN** key.

4.2.3.1. Manual defrost

The defrost is normally carried out by the User with the blast chiller door open (cold room heating). The door opening or closing has no effect on the defrost execution.
To start the defrost press and hold the **DOWN** key for 4 seconds.

The defrost configuration and duration are determined by the parameters P 5, P 7, P11, which can be modified by the User.
*During the defrost, the display (***D1 - Fig. 5 on page 13***) shows the "dEF" string.*

Parameter	Description	Def	Range	UM
P 5	Defrost enable	1	0…1	flag
P 7	Selection loads activated by relay 2	1	0…1	flag
P11	Defrost time setting	10	0…99	Min

4.2.3.2. Cold room sterilization

The sterilization can be enabled if the value of parameter P23 is equal to 1.

To activate a sterilization cycle it is necessary that:

- there is no program or other special function in progress;
- the blast chiller door is closed.

To start the sterilization cycle hold down the **UP** key for 4 seconds.

The sterilization cycle start and duration are determined by the parameters P 8, P24, P25, which can be modified by the User.
*During the sterilization cycle the display (***D1- Fig. 5 on page 13***) shows the "StE" string.*
In the case of cold room probe error "Er2" (refer to **"7. Alarms" on page 30***):*
- before the sterilization cycle start, the sterilization cycle does not start;
- during the sterilization cycle, the sterilization cycle continues normally.
If at the start up or during the sterilization cycle the cold room temperature is lower than the reference value (parameter P25), the display will show the "cLd" string.

Parameter	Description	Def	Range	UM
P 8	Hysteresis setting	3	1…20	°C
P23	Selection loads activated by relay 4	1	0…3	num
P24	Sterilization duration setting	15	1…999	sec
P25	Sterilization temperature threshold setting	5	-50…99	°C

4.2.3.3. Needle probe heating

The needle probe heating can be activated if the value of parameter P23 is equal to 2.
The door opening or closing has no effect on the needle probe heating.

To activate the needle probe heating it is necessary that no program or other special function is in progress.

To start the needle probe heating hold down the **UP** key for 4 seconds.

The needle probe heating configuration is determined by the parameters P28 and P29, which can be modified by the User.
*During the needle probe heating, the display (***D1 - Fig. 5 on page 13***) shows the "Prb" string.*

Parameter	Description	Def	Range	UM
P23	Selection loads activated by relay 4	1	0...3	num
P28	Needle probe heating duration setting	2	1…10	min
P29	Needle probe heating setpoint setting	4	0…90	°C

4.2.4. Stopping and restarting a program or a special function

During the execution of a program or a special function, press the **SET** key to stop it.
If a program has been completed, press the **SET** key again to restart from the point in which it was interrupted.

If the restarted program is of manual type, the cycle starts from the beginning for the cycle time set.

If a special function was not completed, it is not possible to restart from the point where it was interrupted.

4.2.5. Blast chiller door presence

If the closing control microswitch (parameter P 1 = 1) is present on the blast chiller door, the digital input DI1 input is managed as input related to the microswitch. In this case:

- if P 6=0, if the door is opened during a program, the compressor and cold room fan stop;
- if P 6=1 (default), the compressor is active even with the door open, while the cold room fan stops always with open door.

During the execution of a program or a special function, if the door is opened and its presence has been enabled (parameter P 1=1), the display (**D1 - Fig. 5 on page 13**) shows the "dOr" string and the LED (**L3** - **Fig. 5 on page 13**) switches on. The execution of the program or the special function is not stopped (**except in the case of sterilization cycle**), but the loads are deactivated. Once closed the door, the loads are reactivated (refer to **"6. Loads Operation Logics" on page 27**).

If after opening the door the **SET** *key is pressed to stop the program or the special function, the display no longer shows the "dOr" string.*
The door opening has no effect in the defrost program.

Parameter	Description	Def	Range	UM
P 1	Door closing control microswitch presence selection	1	0…1	flag
P 6	Loads switch off enable upon activation of the blast chiller door microswitch	1	0…1	flag

4.2.6. Stand-by mode

If there is no program in progress it is possible to activate the stand-by mode: on the display (**D1 - Fig. 5 on page 13**) are shown three horizontal dashes "---", one for each digit.
To change the stand-by mode, press and hold the **SEL** key for 4 seconds.

4.2.7. Parameters configuration

To configure the parameters it is necessary that no program or other special function is in progress.

Refer to **Fig. 10 on page 23**.
To display the list of parameters hold down simultaneously both the **UP** and **DOWN** key for 4 seconds: the display (**D1 - Fig. 5 on page 13**) shows the name of the first visible parameter (parameter P 0).
To change the value of a visible parameter, proceed as described below:

1. press the **UP** or **DOWN** key until the display shows the parameter to be changed;
2. press the **SEL** key;
3. press the **UP** or **DOWN** key to respectively increase or decrease the value of the parameter;
4. press the **SEL** key to confirm the change of the parameter value.

To exit the parameters list displaying, hold the **UP** and **DOWN** keys pressed for 4 seconds or wait 10 seconds.

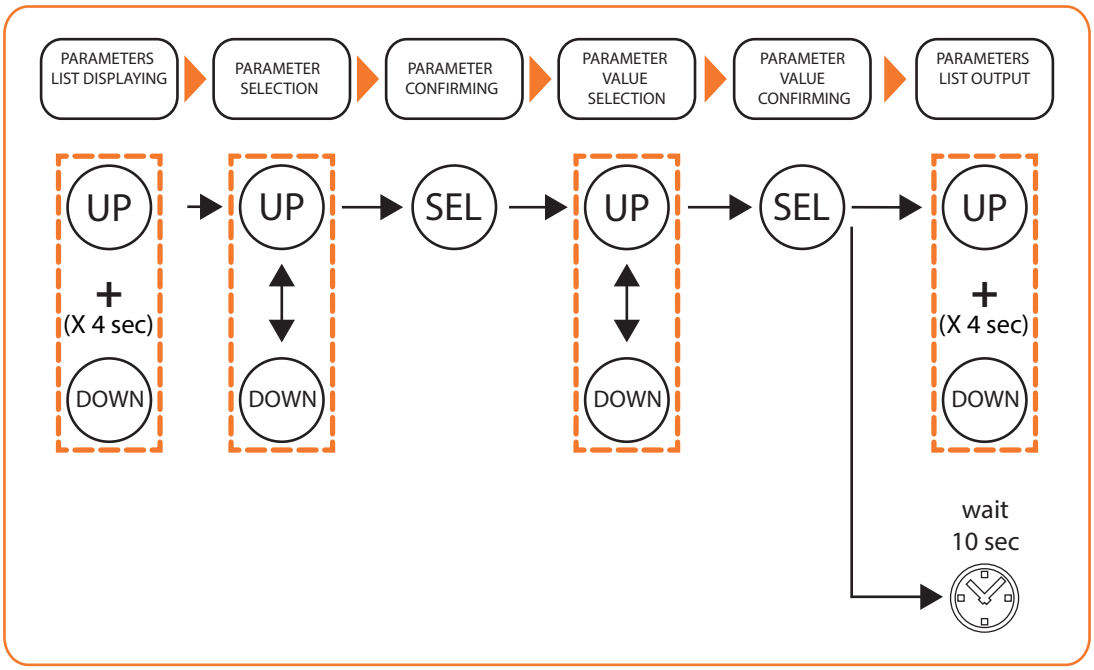


Fig. 10. Visible parameters configuration

For the visible parameters setting description refer to **"5.1. Visible parameters table" on page 25.**
After scrolling through the list of visible parameters from P0 to P30, the display shows the "PAS" string to enter the password for access to the advanced parameters setting.

The password consists of a 3-digit number from 000 to 255.
*The default value set by the factory is **11** and corresponds to the value of the advanced parameter PS1.*

To change the value of an advanced parameter, proceed as described below:

1. press the **UP** or **DOWN** key until the display shows the **PAS** string;
2. press the **SEL** key;
3. verify that the display shows the "0" value;
4. press the **UP** or **DOWN** key to respectively increase or decrease the numerical value of the password to be entered. The factory default value is **11**, but it can be changed by setting the PS1 parameter, visible among the advanced parameters. Refer to **"5.2. Table of advanced parameters" on page 26**.
5. press the **SEL** key to confirm the password entry;
6. press the **UP** or **DOWN** key until the display shows the advanced parameter to be modified;
7. press the **SEL** key;
8. press the **UP** or **DOWN** key to respectively increase or decrease the value of the advanced parameter;
9. press the **SEL** key to confirm the change of the advanced parameter value.

For the advanced parameters description refer to **"5.2. Table of advanced parameters" on page 26**.

*Once the display of the advanced parameters has been enabled by entering the password, they will be visible until power supply is disconnected to the **EWBC1400**. Every time the **EWBC1400** is restarted it is necessary to re-enter the password to display the advanced parameters.*

5. TABLE OF PARAMETERS

5.1. VISIBLE PARAMETERS TABLE

Par	Description	Default	Range	U. M.
P 0	Buzzer sound time setting **0** = buzzer disabled	10	0...60	Sec
P 1	Door closing control microswitch presence selection **0** = absent; **1** = present	1	0...1	flag
P 2	Cold room fan operation during the programs execution (it is irrelevant if P 7=0) **0** = in parallel to the compressor; **1** = always on	1	0...1	flag
P 3	Needle probe presence selection **0** = absent; **1** = present	1	0...1	flag
P 4	Negative blast chilling cycle enable **0** = disabled; **1** = enabled	1	0...1	flag
P 5	Defrost enable **0** = disabled; **1** = enabled	1	0...1	flag
P 6	Loads switch off enable upon activation of the blast chiller door microswitch **0** = compressor + cold room fan; **1** = cold room fan	1	0...1	flag
P 7	Selection of loads driven by relay 2 **0** = defrost heater (P 2 is irrelevant); **1** = cold room fan in defrost function	1	0...1	flag
P 8	Hysteresis setting	3	1...20	°C
P 9	Setting of minimum time between the compressor switching off and subsequent switching on	2	0...99	Min
P10	Compressor protection: setting of minimum time that must elapse between two consecutive start ups of the compressor	3	0...99	Min
P11	Defrost time setting	10	0...99	Min
P12	Dripping time setting	3	0...99	Min
P13	Needle probe temperature target setting in the positive blast chilling cycle	3	-50...99	°C
P14	Needle probe temperature target setting in the negative blast chilling cycle	-18	-50...99	°C
P15	Cold room probe temperature setpoint setting in the positive blast chilling cycle	-2	-50...99	°C
P16	Cold room probe temperature setpoint setting in the negative blast chilling cycle	-40	-50...99	°C
P17	Cold room probe temperature setpoint setting in positive storage	0	-50...99	°C
P18	Cold room probe temperature setpoint setting in negative storage	-25	-50...99	°C
P19	Positive blast chilling cycle duration setting (timeout)	90	0...599	Min
P20	Negative blast chilling cycle duration setting (timeout)	270	0...599	Min
P21	Condenser fan activation setpoint setting	60	-50...99	°C
P22	Condenser fan enable **0** = disabled; **1**= enabled	1	0...1	flag
P23	Selection of loads driven by relay 4 **0** = relay 4 disabled; **1** = UV lamp; **2** = needle probe heating; **3** = auxiliary fan	1	0...3	num
P24	Sterilization duration setting	15	1...999	Sec
P25	Sterilization temperature threshold setting	5	-50...99	°C
P26	Auxiliary condenser temperature threshold setting	51	-50...99	°C
P27	Pressure switch setting **0** = pressure switch disabled; **1**, **2**, **3**, **4** = count of alarm events before locking the loads	0	0...4	num
P28	Needle probe heating duration setting	2	1...10	Min
P29	Needle probe heating temperature setpoint setting	4	0...90	°C
P30	Pressure switch polarity selection **1** = open active switch; **0** = closed active	0	0...1	flag

5.2. TABLE OF ADVANCED PARAMETERS

The access to advanced parameters is password-protected and restricted to qualified personnel only.

For the advanced parameters access mode refer to **"4.2.7. Parameters configuration" on page 23**.

Par	Description		Default	Range	UM
tP2	Selection of analogue input type 2	2* = NTC; 3* = PTC	2	2...3	num
tP3	Selection of analogue input type 3		2	2...3	num
tP4	Selection of analogue input type 4		2	2...3	num
PS1	Password to access the advanced parameters		11	0...255	num
bAU	Baudrate selection **0** = 9600 baud; **1** = 19200 baud; **3** = 38400 baud		0	0...3	num
PtY	Parity bit selection for MODBUS communication **0** = none; **1** = even; **2** = odd		1	0...2	num
Adr	Controller address selection for MODBUS communication		1	0...255	num

* Other values are not allowed: if entered they correspond to the probe non-configuration. For the PB4 input, the probe is configurable only if the input is set as analogue input (parameter P27=0).

6. LOADS OPERATION LOGICS

The operating logics of loads, each driven by a specific relay, are described below.

6.1. COMPRESSOR (OUT1)

The compressor is driven by the relay R1.
When a program or a special function are in progress (and the cold room probe is not in error), the compressor can be activated, but if no program or special function are in progress, the compressor is deactivated.
If the blast chiller is fitted with a microswitch for door control closing (parameter P 1=1), the compressor can be activated:

- only with closed door, if the parameter P 6=0,
- even with the door open and the cold room fan stopped, if the parameter P 6=1.

With reference to **Fig. 11 on page 27**, the following table shows the logic of operation of the compressor, specifying when it is switched on and off depending on the program selected.

Program		setpoint temperature	Hysteresis	Activated compressor if	Deactivated compressor if
blast chilling cycle	**Positive**	P 15	P 8	cold room temperature (PB2) greater than or equal to setpoint + hysteresis	cold room temperature (PB2) less than or equal to setpoint
	Negative	P 16			
storage status	**Positive**	P 17			
	Negative	P 18			

6.1.1. Compressor protections

To protect the compressor, the following timeframes have been provided:

- minimum time that must elapse between the compressor switching off and the subsequent switching on (parameter P 9);
- minimum time that must elapse between two consecutive start ups of the compressor (parameter P10).

If a timeout is already in progress, both times, if greater than the counting, will be reset.

*The minimum time that must elapse between the compressor switching off and the subsequent switching on is counted even after a power interruption of the **EWBC1400**.*

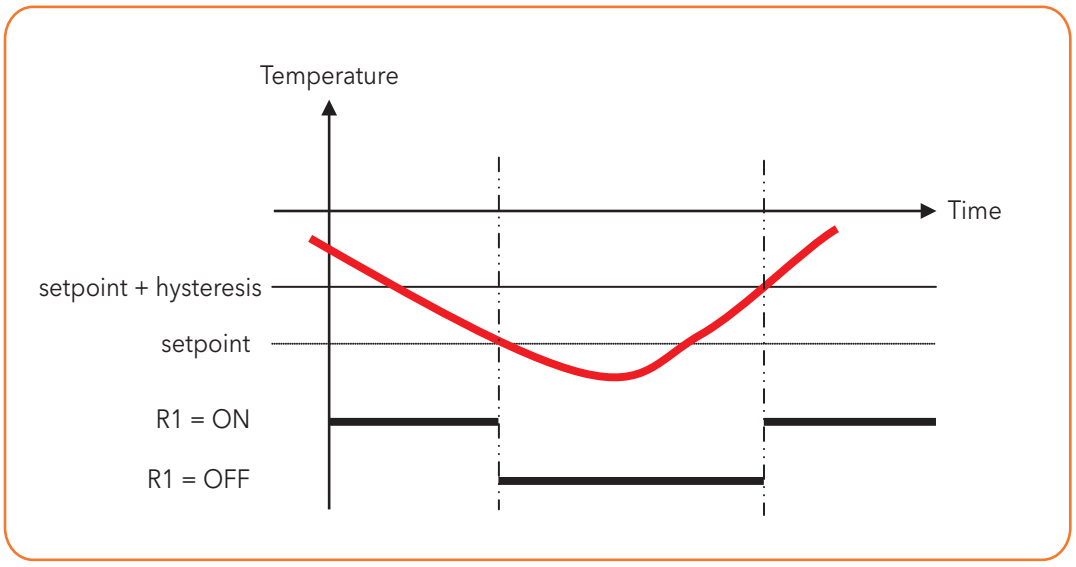


Fig. 11. Compressor operation

6.2. DEFROST (OUT2)

The defrost is enabled or disabled according to the value of the parameter P 5:

- if the parameter P 5=0, the defrost is disabled,
- if the parameter P 5=1, the defrost is enabled,

and has a duration equal to the value of parameter P11.

The heater for the defrost is controlled by the relay R2.
During the defrost:

- The defrost heater is activated,
- the compressor is switched off,
- any open door alarms "d'Or" are ignored (refer to **"7. Alarms" on page 30**).

At the end of the defrost cycle, the compressor can be activated only when the greatest of the following times has elapsed:

- dripping time (P12 parameter),
- minimum time that must elapse between the compressor switching off and the subsequent switching on (parameter P 9).

The defrost cycle cannot be activated from the stand-by mode.

6.3. COLD ROOM FAN (OUT2)

The cold room fan is enabled or disabled according to the value of parameter P 7:

- if the parameter P 7=0 the cold room fan is not enabled,
- if the parameter P 7=1 the cold room fan is enabled.

If the parameter P 7=0, the relay R2 can control the heater for defrost (refer to **"EWBC1400" on page 1**), if the parameter P 7=1 the relay R2 controls the cold room fan with defrost function, i.e. it uses the fan to heat therefore to defrost.

The cold room fan, if provided, is activated during the execution of a program, according to the value of parameter P 2:

- if the parameter P 2=1, the fan is always on, both during the blast chilling cycle and during the storage phase;
- if the parameter P 2=0, the fan is activated together with the compressor, following the logic of operation of the compressor described in **"6.1. Compressor (OUT1)" on page 27**.

6.4. CONDENSER FAN (OUT3)

The condenser fan is enabled or disabled axccording to the value of the parameter P22:

- if the parameter P22=0, the condenser fan is disabled,
- if the parameter P22=1, the condenser fan is enabled.

The condenser fan is controlled by the relay R3.
The condenser fan is activated or deactivated regardless of whether there is a program in progress, according to the logic of operation shown in the following table.

The condenser fan is activated if	The condenser fan is deactivated if
condenser temperature (PB3) => condenser temperature setpoint (parameter P21) + hysteresis (parameter P 8)	condenser temperature (PB3) <= condenser temperature setpoint (parameter P21) + hysteresis (parameter P 8)

If the condenser probe is in error and its "Er3" alarm is reported (refer to **"7. Alarms" on page 30**), the condenser fan is kept active until the alarm persists.

6.5. UV LAMP - STERILIZATION (OUT4)

If the parameter P23=1 the relay R4 controls the UV lamp.
During the sterilization the UV lamp (OUT4) and the cold room fan (OUT2) are activated for a time, in seconds, equal to the value of the parameter P24. The sterilization is activated or deactivated according to the following logic of operation

The sterilization is activated if	The sterilization is deactivated if
cold room temperature (PB2) => sterilization temperature threshold (parameter P25).	cold room temperature (PB2) <= sterilization temperature threshold (P25) - hysteresis (parameter P 8)

6.6. NEEDLE PROBE HEATING (OUT4)

If the parameter P23=2 the relay R4 controls, on the related output, the heater of the needle probe for its heating.
The heater of the needle probe is activated for a time, in minutes, equal to the needle probe maximum heating time (parameter P28).
If the needle probe temperature (PB1) => needle probe heating temperature setpoint (parameter P29)
the heater of the needle probe is deactivated before the expiry of needle probe maximum heating time (parameter P28).

6.7. AUXILIARY FAN (OUT4)

If the parameter P23=3, the relay R4 controls the auxiliary fan, associated with a possible additional condenser.
The auxiliary fan is activated or deactivated, regardless of whether there is a program in progress, in relation to the pressure switch setting (parameter P27) and the auxiliary condenser temperature setpoint (parameter P26), according to the logic of operation shown in the following table.

Pressure switch setting	The auxiliary fan is activated if	The auxiliary fan is deactivated if
P27=0	auxiliary condenser temperature (PB4) => auxiliary condenser temperature setpoint (parameter P26) + hysteresis (parameter P 8)	auxiliary condenser temperature (PB4) <= auxiliary condenser temperature setpoint (parameter P26)
P27>0	pressure switch digital input (DI2) = open*	pressure switch digital input (DI2) = closed*

* The polarity of activation of the pressure switch is determined by parameter P30: 1 = open active pressure switch, 0 = closed active (refer to **"7. Alarms" on page 30**).

If the auxiliary condenser probe is in error and the related "Er4" alarm is shown (refer to **"7. Alarms" on page 30**), the auxiliary fan is kept active until the alarm persists.

7. ALARMS

The **EWBC1400** is able to perform a complete diagnostics of the blast chiller, reporting any malfunctions with specific alarms, showing the related code on the display (**D1 - Fig. 5 on page 13**).

No beep sounds when an alarm occurs.

The following table lists the alarms, with related code, indicating the causes, effects and solutions.

Part Number	Alarm	Cause	Effects	Solutions
Er1*	Needle probe error	Needle probe not connected properly	If an automatic program is in progress, switch to manual program	Check the connection of the needle probe to the **EWBC1400**
		Faulty needle probe		Replace the needle probe
Er2*	Cold room probe error	Cold room proble not connected properly	If a manual program is in progress with the presence of the needle probe (parameter P 3=1), the manual program continues using the needle probe as a cold room probe If a manual program is in progress with the absence of the needle probe (parameter P 3=0), the manual program stops If an automatic program is in progress, the automatic program stops	Check the connection of the cold room probe to the **EWBC1400**
		Cold room probe failure		Replace the cold room probe
Er3	Condenser probe error	Condenser probe not connected properly	/	Check the connection of the condenser probe to the **EWBC1400**
		Condenser probe failure		Replace the condenser probe
Er4	Auxiliary condenser probe error	The auxiliary condenser probe is not connected properly	/	Check the connection of the auxiliary probe to the **EWBC1400**
		Auxiliary condenser probe failure		Replace the auxiliary probe
dOr	Door open	Blast chiller door opening with program or special function (except the defrost) in progress	Cold room fan deactivation Compressor deactivation (if parameter P 6=0)	Close the blast chiller door to normally resume the program

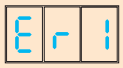
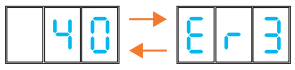
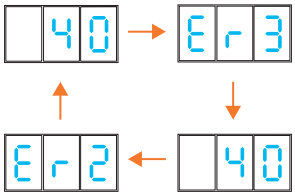
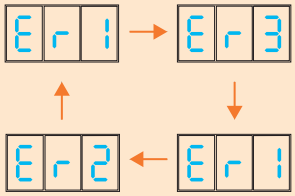
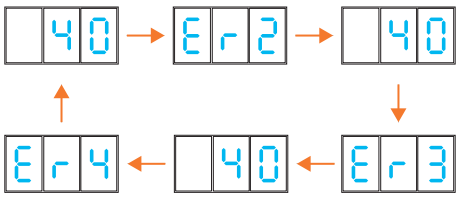
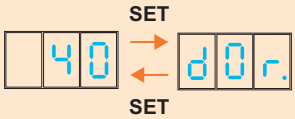
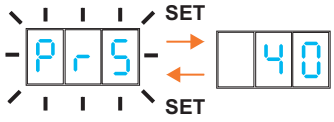
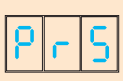
Part Number	Alarm	Cause	Effects	Solutions
PrS	Pressure switch alarm without loads locking	- Opening of the pressure switch DI2 (if parameter P27 is other than 0) - Pressure switch alarm events counting <parameter P27	Increase of one unit of the alarm counter (initially zero) Blast chiller in stand-by status: - compressor deactivation (OUT1) - cold room fan deactivation (OUT2) - condenser fan activation (OUT3) - auxiliary fan activation (OUT4), if parameter P23=3 - time counting stand-by, if a manual program is in progress	Close the pressure switch DI2 and wait the safety times of the compressor (parameter P 9 and parameter P10)
	Pressure switch alarm with loads locking	- Opening of the pressure switch DI2 (if parameter P27 is other than 0) - pressure switch alarm events counting = parameter P27	Deactivation of all loads (OUT1, OUT2, OUT3, OUT4)	Press the **SET** key**

* Er1, Er2 not displayed if **EWBC1400** is in stand-by mode.
* When the **SET** key is pressed the program or the special function in progress stops and the alarm events count is reset.

When switched on, **EWBC1400** indicates the pressure switch alarm "PrS" if the DI2 pressure switch is open, as this input is normally closed (NC). The pressure switch alarm has priority over the open door alarm.

The following table summarizes the different display views depending on the alarms that occur in the case in which the display shows the PB1 probe temperature.

The probe PB1 temperature information displayed is equal to 40 °C.

Type of error	On-screen display
None (continuous display of the probe PB1 temperature)	
Probe PB1 error (continuous display of "Er1"). In case the probe PB2 temperature is displayed, cyclic display in succession of "Er1" and probe PB2 temperature	
Probe PB2, PB3 and PB4 error (e.g. probe PB3 error: cyclic display in succession of "Er3"-"40")	
Error of two probes, one of which is PB1 (e.g. probe PB1 and PB3 error: cyclic display in succession of "Er3"-"Er1")	
Error of the two probes, excluding PB1 (e.g. probe PB2 and PB3 error: cyclic display in succession of "Er3"-"40"-"Er2"-"40")	
Error of three probes, one of which is PB1 (e.g. probe PB1, PB2 and PB3 error: cyclic display in succession of "Er1"-"Er3"-"Er1"-"Er2")	
Error of three probes, excluding PB1 (probe PB2, PB3 and PB4 error: cyclic display in succession of "Er2"-"40"-"Er3"-"40"-"Er4"-"40")	
Open door, with P 1 = 1 (continuous display of "dOr"; each time the **SET** key is pressed, alternately "40" or "dOr" is displayed.)	
Open pressure switch with P27 other than 0 and alarm events counting less than P27 (flashing display of "PrS" every time the **SET** key is pressed "40" or "PrS" are displayed alternatively)	
Open pressure switch with P27 other than 0 and alarm events counting equal to P27 (continuous display of "PrS")	

8. ACCESSORIES

8.1. POLYCARBONATE FRONT PANEL

Upon request, Eliwell can provide the front panel made of polycarbonate (**Fig. 12 on page 33**) as accessory of the User interface.

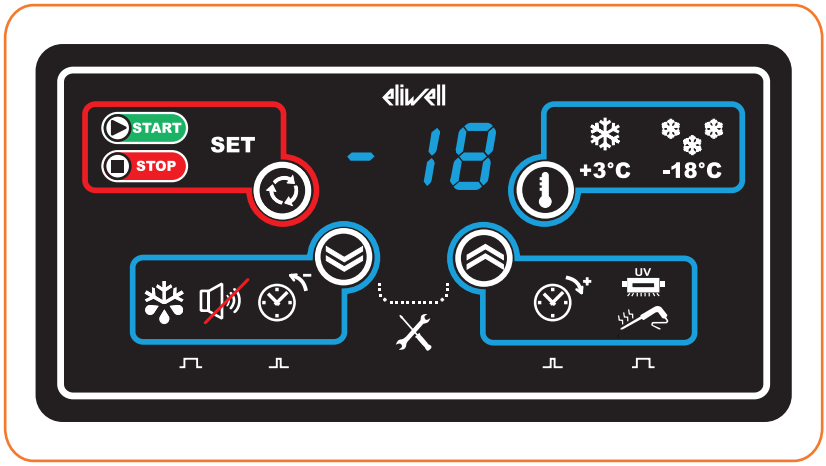


Fig. 12. Polycarbonate front panel

The symbols of the polycarbonate front panel are described in the following table.

Key	Description of key	Symbol associated with the key	Symbol description
	**SET** Blast chiller start/ stop operation and confirmation		Blast chiller operation start
			Blast chiller operation stop
			Confirm
	**DOWN** Decrease in value, Buzzer switch off and defrost activation		Defrost
			Buzzer switch off
			Value decrease
	**UP** Value increase, cold room temperature display, load activation on auxiliary output		Value increase
			UV lamp for sterilization
			Needle probe heater
	**SEL** Program selection and stand-by enable		Positive blast chilling
			Negative blast chilling
/	/		Key press and hold (4 seconds)
			Key short press
			Simultaneous pressing of **DOWN** and **UP** keys
			Parameters configuration

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