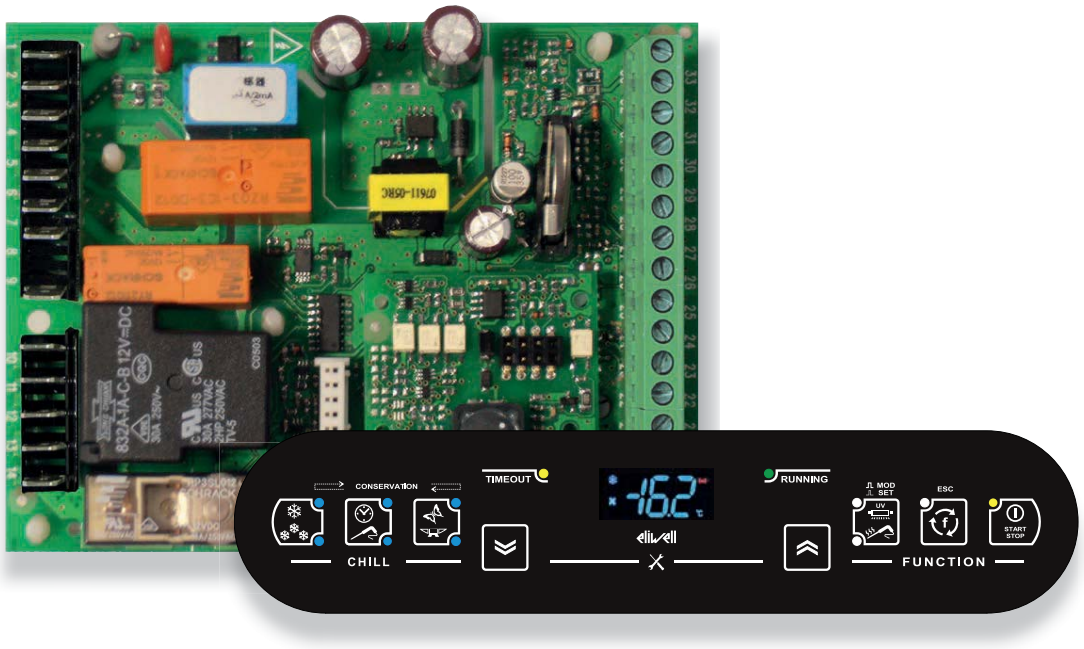
EWBC800

Controllers for blast chillers



Controllers for blast chillers with capacitive Touch keypad

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, or blast chilling correctly called cooling;
- Negative blast chilling, or blast chilling correctly called 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 SET POINT
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

STAND-BY STATUS
Status in which the blast chiller is not running a program or function, and the user interface is switched off.

STOP STATUS
Status in which the blast chiller is not running a program or function, and the user interface is switched on and enabled.

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. DISCLAIMER

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Eliwell Controls srl reserves the right to make changes or improvements at any time without notice.

1.3. 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.

1.4. CONDITIONS OF USE

1.4.1. Permitted use

This product should be used to control professional blast chillers.
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.

1.4.2. 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.

1.5. DISPOSAL

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

2. DESCRIPTION

EWBC800 (**Fig. 2 on page 7**) consists of an electronics control board, called the 'base', and a capacitive touch keypad with display, called the 'user interface'. **EWBC800** should be incorporated into Customer applications for controlling basic blast chiller functions. The base is supplied 'open', and is equipped with a microcontroller, inputs and outputs; the user interface is equipped with keys, LEDs and a display.

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.

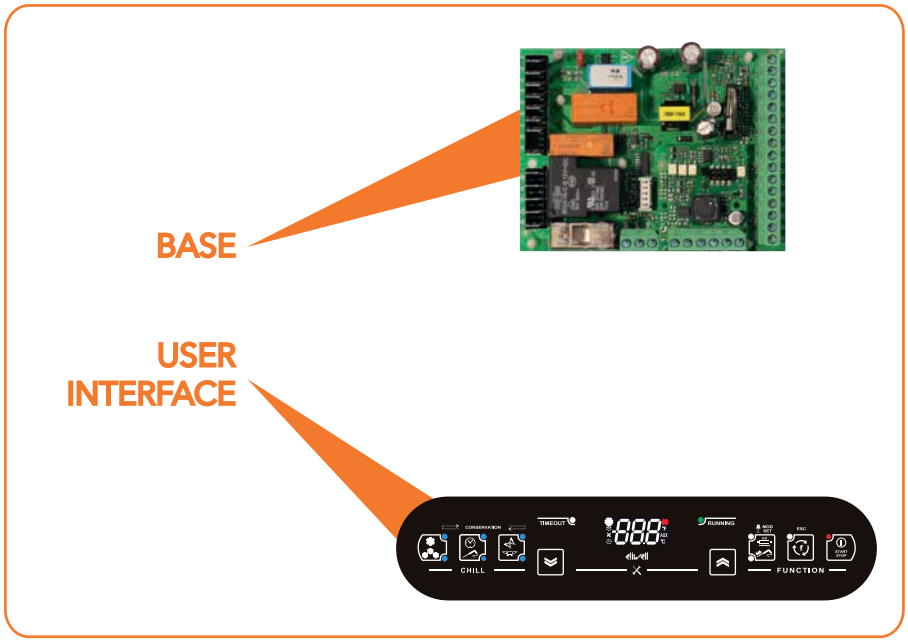


Fig. 2. **EWBC800**: base and user interface

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

2.1.1. Base technical data

	Range
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	-5 - 55°C
Ambient storage temperature	-30 - 85°C
Operating environment and storage environment humidity (non-condensing)	10% - 90%
Power supply voltage	100 - 240 V~ +/-10% 50/60 Hz (switching)
Maximum consumption	5.5 W
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 **EWBC800** *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.*

2.1.2. User interface technical data

	Range
Power supply voltage	From base
Insulation class	2
Ambient operating temperature	-5 - 55°C
Ambient storage temperature	-30 - 85°C
Operating environment and storage environment humidity (non-condensing)	10% - 90%

2.2. INPUT / OUTPUT / PORT CHARACTERISTICS

	#	Specifications	Initials	Description
Analogue inputs	1	NOT configurable, set as PTC needle probe KTY 83 - 121 1K 1% (code SN7FAF11502A4)	PB1	Needle probe
	3	Jointly configurable as PTC temperature probe KTY 83 - 121 1K 1% or as NTC temperature probe, Semitec type 103AT (10 kΩ / 25°C) Range of use: -50 - +99.9°C	PB2	Cold room probe
			PB3	Evaporator probe (defrost)
			PB4	Condenser probe
Digital inputs	2	Voltage-free with closing current for ground (closing current for ground: 0.5 mA)	DI	Microswitch controlling blast chiller door closure
			PB5	Pressure switch
Digital outputs	5	Relay **R1** SPST, NO, 30 A, max. 250 Vac	OUT1	Default compressor
		Relay **R2** SPDT, switching, 16 A, max. 250 Vac	OUT2	Default evaporator room fan
		Relay **R3** SPDT, switching, 8 A, max. 250 Vac	OUT3	Default condenser fan
		Relay **R4** SPST, NO, 8 A, max. 250 Vac	OUT4	Default door heating
		Opencollector **OC** for external relay connection, 12 Vdc, 20 mA	OUT5	Default NOT USED
Serial ports	2	TTL connector	TTL	Serial port See **'6. FUNCTIONS' on page 46**
		Screw connector on base side; click-fit on keypad side, 3-way	KEYB	Serial port for connection between base and user interface

There is a buzzer.

Analogue Inputs

The probe can break if outside the usage range.

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

- *±1.0° for temperatures below -30°C*
- *±0.5° for temperatures between -30°C and +25°C*
- *±1.0° for temperatures above +25°C*

Digital Outputs *are configurable and can be assigned to the following functions:*
Controlling the compressor, evaporator room fan, defrost heater, door heating, condenser fan, UV lamp, needle probe heating, room light

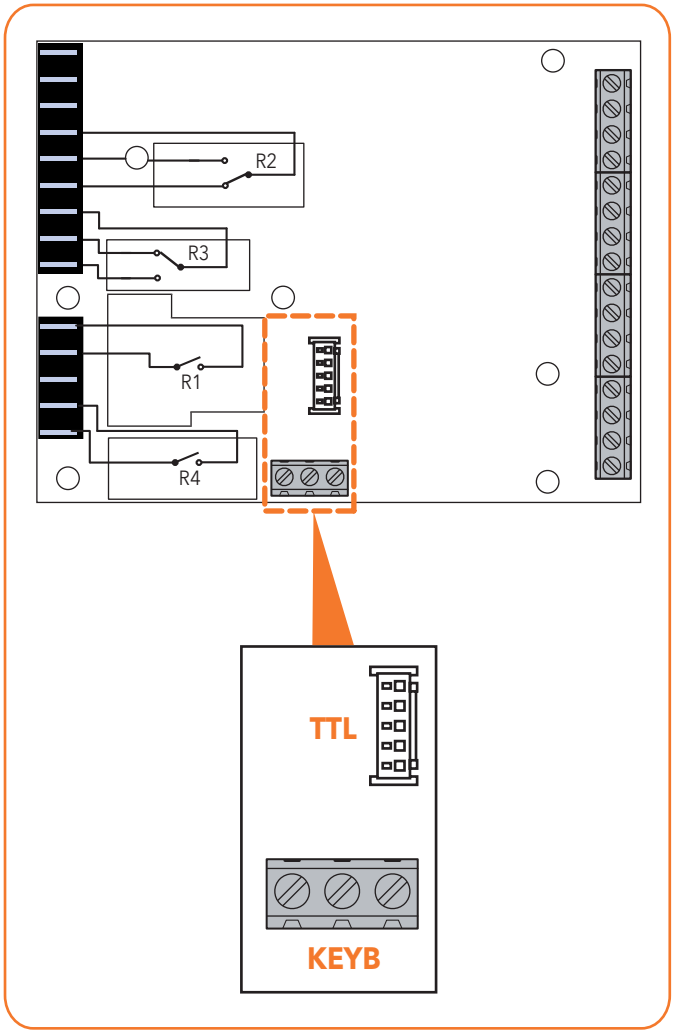


Fig. 3. Serial ports: TTL and KEYB

2.2.1. Buzzer

EWBC800 can produce two types of sound alerts:

- functional (alarm conditions, cycle stop, confirm, error, etc.), when the buzzer is managed by the base;
- to confirm key presses, only active for keys enabled for the specific application in progress, when the buzzer is managed with the user interface taking priority.

Key press confirmation tones last for 3 ms.

2.3. MECHANICAL INSTALLATION AND DIMENSIONS

Do not install **EWBC800** in places subject to high humidity and/or dirt; it is intended for use in sites with ordinary or normal levels of pollution. Keep the area around the chiller cooling slots adequately ventilated.

2.3.1. Base installation and dimensions

Base installation takes place inside the blast chiller, with plastic spacers applied to the holes (**A** - **Fig. 4 on page 11**) already present.

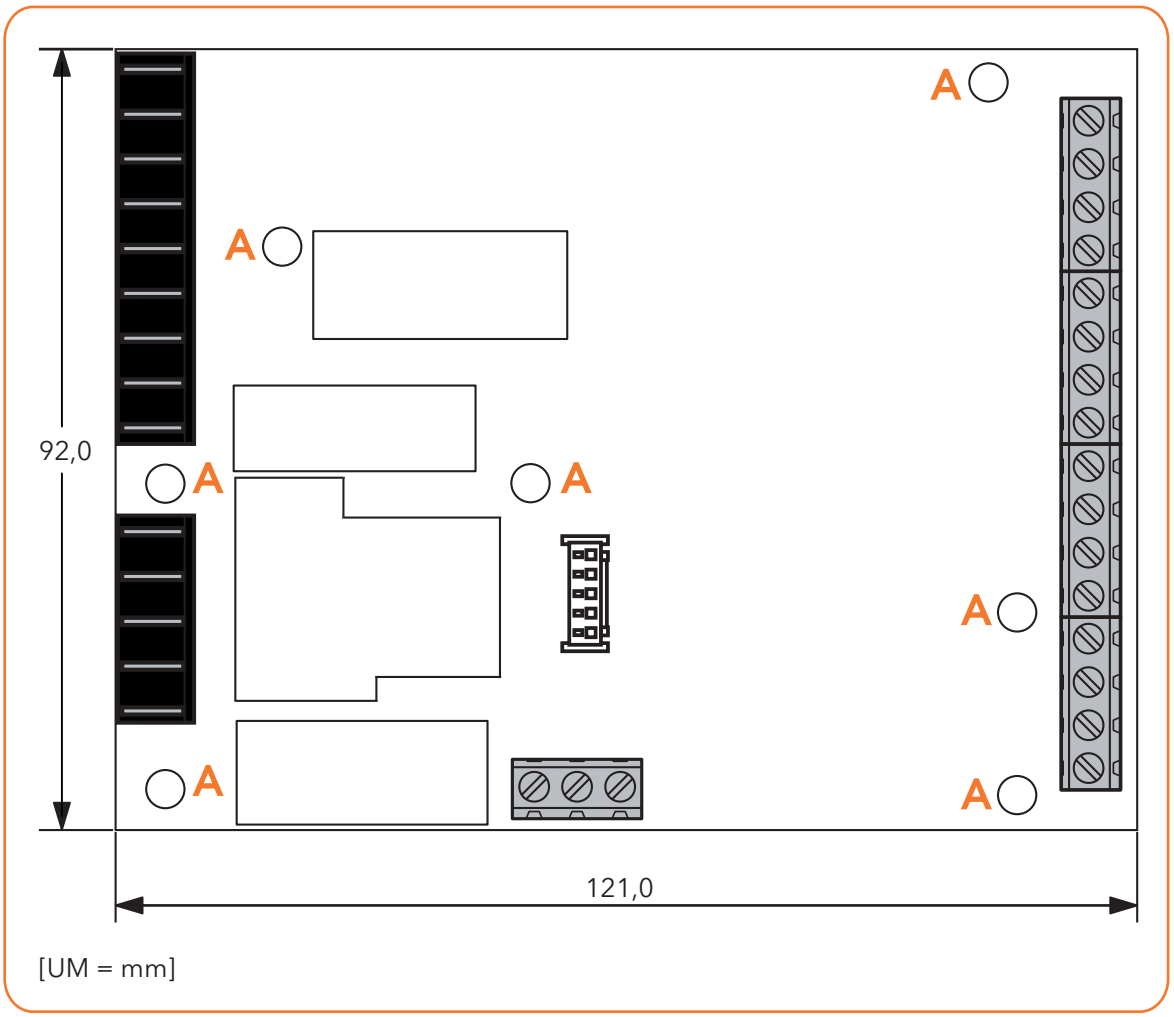


Fig. 4. Base installation and dimensions

2.3.2. User interface installation and dimensions

The user interface dimensions are given in **Fig. 5 on page 12**.

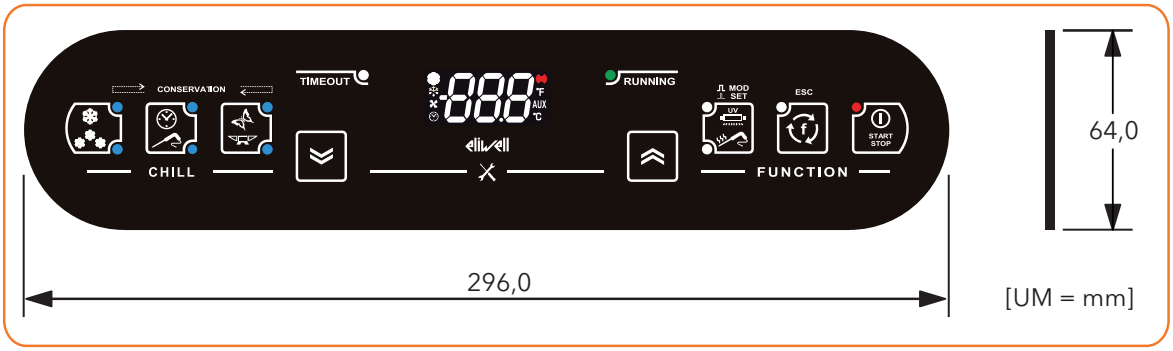


Fig. 5. User interface dimensions

The user interface should be fitted (**Fig. 6 on page 12**) to a drilled and suitably outlined surface on the blast chiller.
To install the user interface, proceed as follows:

1. clean the surface to remove any greasy, dusty or dirty residues;
2. remove the double-sided tape protection strip from the back of the user interface;
3. stick the user interface onto the drilled surface on the blast chiller;
4. remove the protective film from the front of the user interface.

The following conventions are used:

- *the blast chiller is indicated in grey, the protective film is indicated in green,*
- *the user interface is indicated in black and the double-sided tape protection strip is indicated in red.*

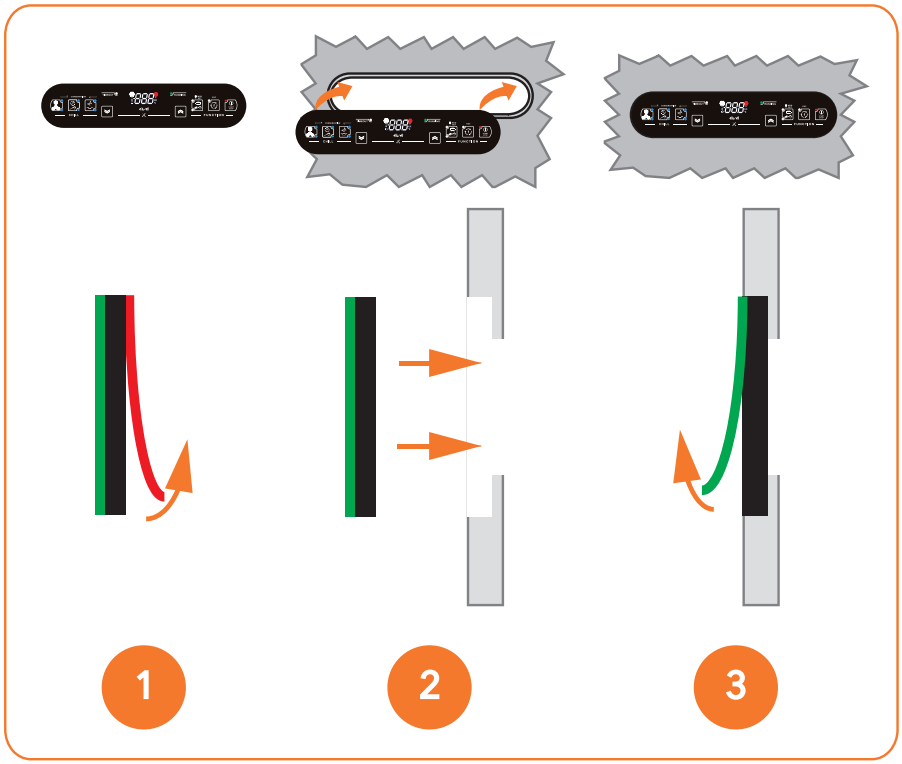


Fig. 6. User interface installation

2.4. ELECTRICAL CONNECTIONS

Always switch the blast chiller off before performing any maintenance on the electrical connections. Power up the blast chiller, base and user interface using the blast chiller main switch.

The **EWBC800** 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 **EWBC800** 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 **EWBC800** (and particularly above the microcontroller).

2.4.1. Connector and terminal block specifications

	Specifications
Power supply, relay outputs	Faston connectors for cables with 2.5 mm² cross-section
Analogue and digital inputs, opencollector digital output	Screw-type terminal block for cables with a cross-section of 2.5 mm²
TTL	5-way connector
KEYB	Screw-type terminal block for cables with a cross-section of 2.5 mm²

2.4.2. Base and user interface connection

When electrically connecting the base and user interface, refer to **Fig. 7 on page 13**: only one user interface can be connected to the base, via a suitable polarised connector (**B**), which connects to that base by means of a serial port (**KEYB**).

The KEYB serial port consists of terminals 15, 16, 17. For a description of the terminals, refer to the table in ***'2.4.3. Base connection diagram' on page 14***.

The maximum distance of the electrical connection between the base and the user interface is 3 m.

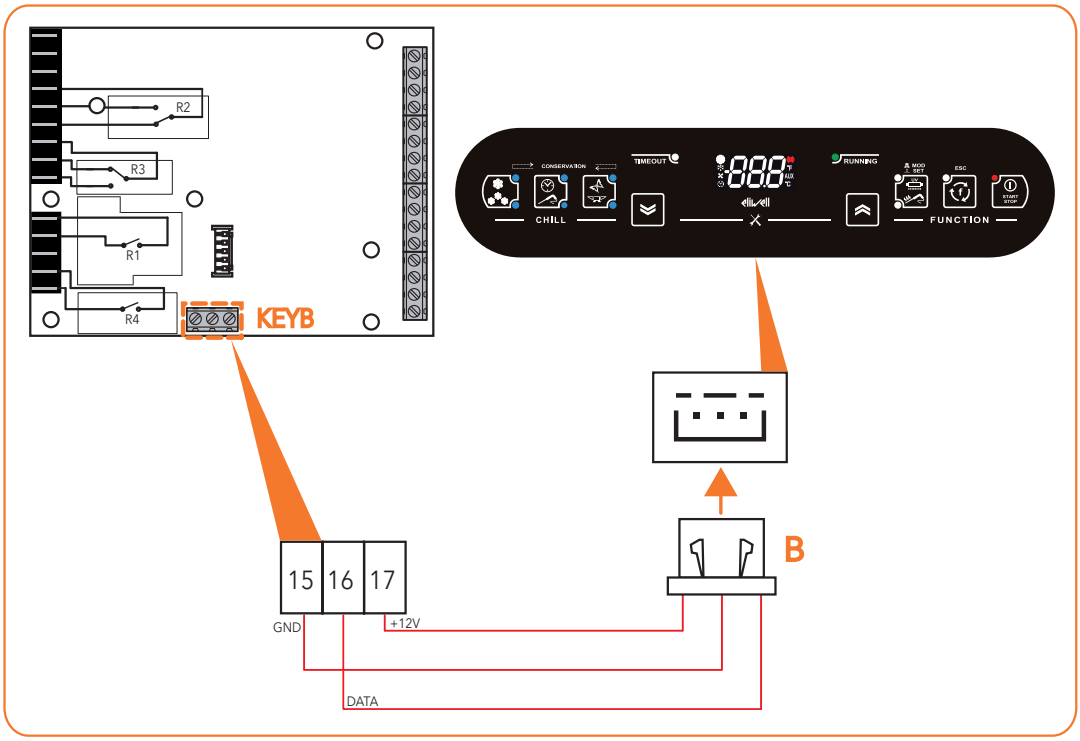


Fig. 7. Base and user interface connection diagram

2.4.3. Base connection diagram

The connection diagram for **EWBC800** is illustrated in **Fig. 8 on page 15**, where the loads and analogue inputs are represented according to the symbolism described in the table below.

The loads shown in **Fig. 8 on page 15** *are the pre-set types described in* **'2.2. INPUT / OUTPUT / PORT CHARACTERISTICS' on page 9**.

Symbol	Description
COMP	Compressor
CELL	Evaporator room fan
COND	Condenser fan
DOOR	Door heating
	Needle probe
CELL	Cold room probe
DEFROST	Evaporator probe (defrost)
COND	Condenser probe
SSR	Solid State Relay (SSR)

	Terminal	Naming	Description
Power supply	1-2	N	Neutral (Power supply)
	3	L	Phase (Power supply)
Relay digital outputs	4	C	Common loads
	5	NO2	Normally open (NO) contact for OUT2
	6	NC2	Normally closed (NC) contact for OUT2
	7	C	Common loads
	8	NC3	Normally closed (NC) contact for OUT3
	9	NO3	Normally open (NO) contact for OUT3
	10	C	Common loads
	11	NO1	Normally open (NO) contact for OUT1
	12	/	Terminal not used
	13	C	Common loads
	14	NO4	Normally open (NO) contact for OUT4
KEYB serial	15	GND	Ground for user interface
	16	D	Data signal for user interface
	17	12 V	Power output at 12 Vdc for user interface
Digital/analogue inputs	18	PB1	Needle probe
	20	PB2	Cold room probe
	22	PB3	Evaporator probe (defrost)
	19-21-23	CPB	Probes common
	24	PB4	Condenser probe
	25	PB5	Pressure switch
	26	DI	Door closing control microswitch
	27	GND	Ground
	28 - 31	/	Terminals not used
Opencollector digital output	32	OC	Signal for opencollector digital output
	33	12 V	12 Vdc power supply output for opencollector digital output

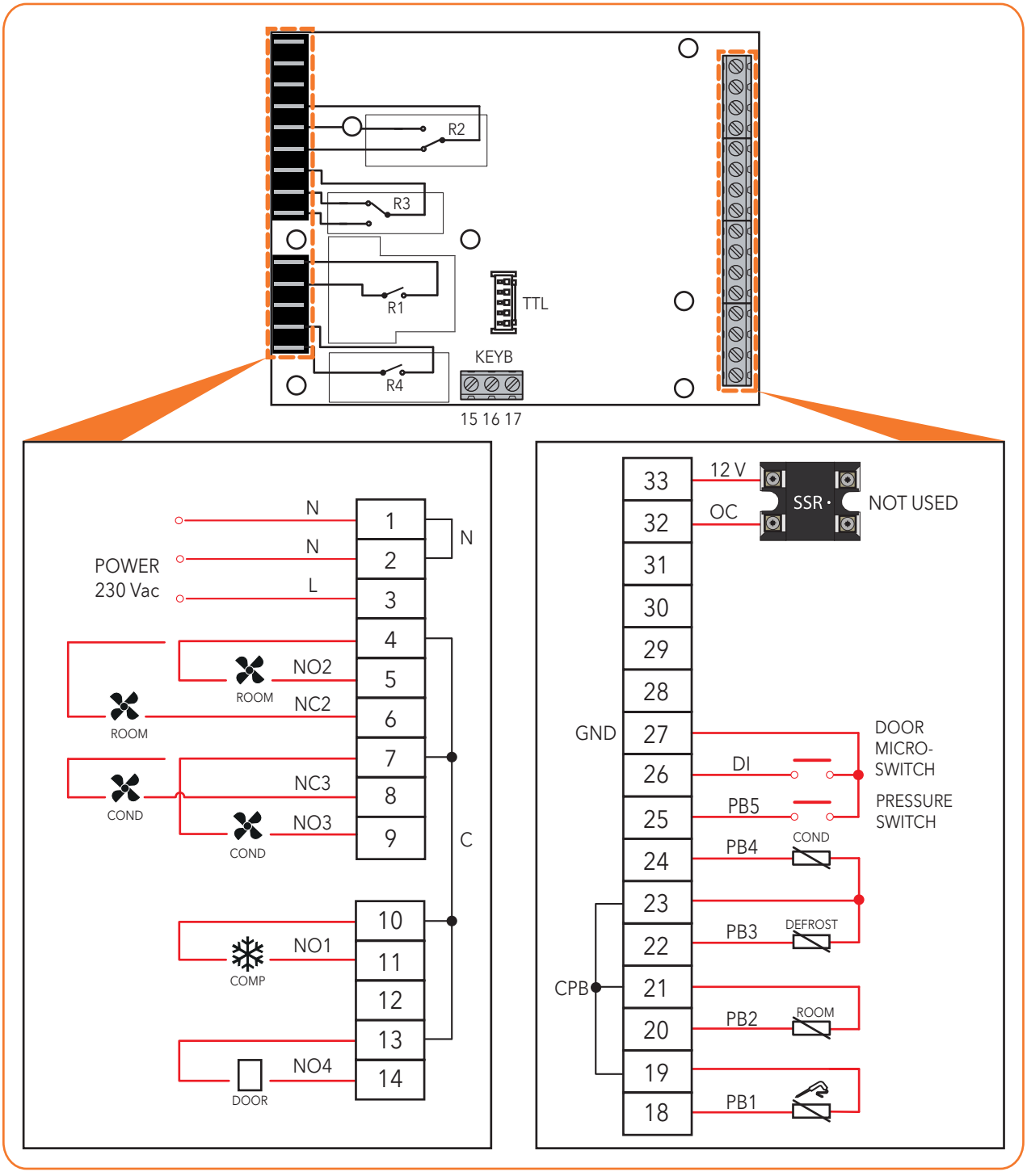


Fig. 8. Connection diagram example

3. USER INTERFACE

The user interface (**Fig. 9 on page 16**) consists of:

- a display (**D**),
- a keypad (**T**).

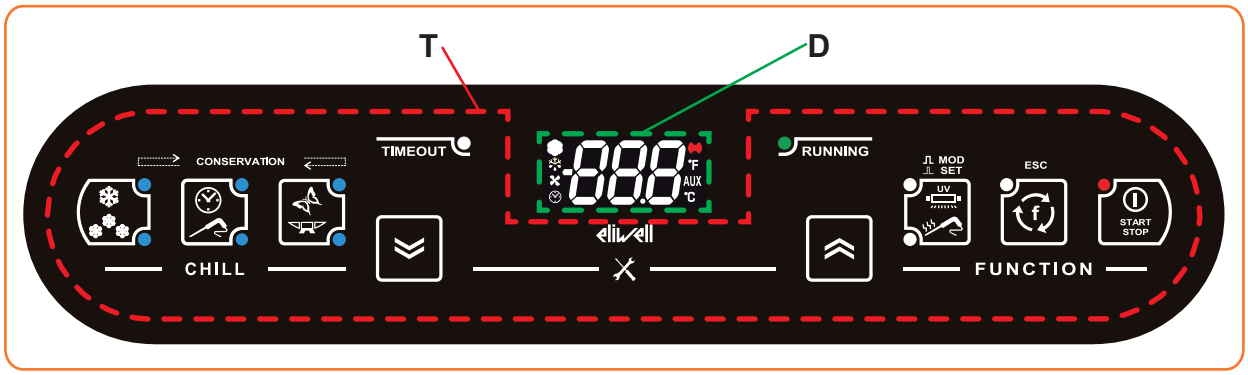


Fig. 9. User interface

3.1. DISPLAY

The display (**D - Fig. 9 on page 16**) features:

- 3 digits with sign and decimal point for viewing menus, operating variables, values and parameter labels;
- 8 icons for viewing units of measurement and blast chiller status.

3.1.1. Digits

The display (**D - Fig. 9 on page 16**) features 3 white digits, each formed of 7 segments, with a sign before the first digit and a decimal point before the last digit; it can be used to view menus, operating variables, values and parameter labels.

3.1.2. Icons

A description of the icons on the display (**D - Fig. 9 on page 16**) is provided in the table below.

Icon	Naming	Operation	Meaning
	Compressor	Permanently on	Compressor on
		Switched off	Compressor off
	Defrost	Permanently on	Defrost in progress
		Blinking	Defrost required but not in progress (in progress at the next useful event)
		Switched off	Defrost off
	Evaporator room fan	Permanently on	Evaporator room fan on
		Switched off	Evaporator room fan off
	Display time in min	Permanently on	Manual program in progress, a time is shown on the display
		Switched off	Manual program off
	Alarm	Permanently on	Alarm present
		Switched off	Alarm absent
°F	**Display temperature in °F**	Permanently on	Automatic program in progress, a temperature in °F (degrees Fahrenheit) is shown on the display
AUX	**AUX**		Reserved
°C	**Display temperature in °C**	Permanently on	Automatic program in progress, a temperature in °C (degrees Centigrade) is shown on the display

3.2. KEYPAD

The keypad (**T - Fig. 9 on page 16**) consists of:

- 8 keys created using capacitive touch technology, for navigating menus, setting programs, configuring parameters, acknowledging alarms, etc.
- 12 LEDs for indicating the status of the blast chiller and the programs in progress,
- symbols.

If the keypad is locked, **EWBC800** *ignores the pressing of any of the keys on the keypad. To unlock the keypad, press and hold any key for* 7 sec.

3.2.1. Keys / LEDs

Icon	Description	Action	Function
	**TEMP** key with 2 blue LEDs	Short press	In stop status, positive (parameter tP) or negative (parameter tn) blast chilling cycle selection, alternately. The corresponding LED comes on in accordance with the selected cycle
			While the blast chilling cycle is in progress, displays the current target value
			While a storage phase is in progress, displays the current storage set point value
	**TARGET** key with 2 blue LEDs	Short press	In stop status, manual or automatic blast chilling cycle selection, alternately. The corresponding LED comes on in accordance with the selected cycle
	**MODE** key with 2 blue LEDs	Short press	In stop status, soft or hard blast chilling cycle mode selection, alternately. The corresponding LED comes on in accordance with the selected mode
	**DOWN** key	Short press	Buzzer acknowledgment
			In parameter configuration, scroll through parameters
			Value decrease
	**UP** key	Short press	In parameter configuration, scroll through parameters
			Value increase
	**AUX** key with 2 white LEDs	Short press	In stop status, special sterilization function or needle probe heating selection, alternately. The corresponding LED comes on in accordance with the selected program. In parameter configuration, display parameter or confirm displayed parameter value
		Long press	In stop status, deselection of any special function selected, deactivation of the corresponding LEDs, with restore to default setting (dFP parameter)
	**ESC** key with 1 white LED	Short press	In stop status, selection of optional functions defrost, manual storage, room light alternately and LED activation. In parameter configuration, confirm displayed parameter value, exit parameter configuration or return to previous level
		Long press	In stop status, deselection of any optional function selected, deactivation of the LED, with restore to default setting (dFP parameter)
	**START/STOP** key with 1 red LED	Short press	Start or stop the selected program or function, alternately
		Long press	In stop status, switch to stand-by status with LED activation. In stand-by status, switch to stop status with LED activation

Icon	Description	Action	Function
TIMEOUT	**TIMEOUT** white LED	/	In automatic blast chilling cycle, lit and blinking indicates positive (parameter t1) or negative (parameter t2) timeout reached without the target temperature being reached (continues to blink during the following storage phase)
RUNNING	**RUNNING** green LED	/	If lit, indicates defrost program in progress
+	**DOWN** key and **UP** key	Long press (2 sec) x 2 sec	In stop status, **simultaneously** press the **DOWN** and **UP** keys for 2 seconds to access the configuration parameters.

The program is restored to its default setting (dFP parameter) through the display of LEDs corresponding to the **TEMP**, **TARGET**, **MODE** *keys (refer to* **'3.3.4. Selecting and starting a program' on page 23***).*

3.2.2. Symbols

Icon	Description
	To access the configuration parameters simultaneously press the **DOWN** and **UP** keys for at least 2 seconds
CONSERVATION	During the storage phase, the LEDs corresponding to the **TEMP**, **TARGET**, **MODE** keys come on in sequence, in line with the selected program
CHILL	Blast chilling cycle selection keys
FUNCTION	Function selection and program start keys
SET	Single press of **AUX** key to select a special function
MOD	Press and hold **AUX** key to deselect a special function
ESC	Single press of **ESC** to exit parameter configuration or return to previous level

3.3. USER INTERFACE USE

3.3.1. First switch-on

The first time it is switched on, **EWBC800** is in stand-by: the display (**D - Fig. 9 on page 16**) and the keypad LEDs (**T - Fig. 9 on page 16**) are all off, except the LED for the **START/STOP** key.

Every time it is switched on subsequently, to set **EWBC800** *to stand-by, press and hold the* **START/STOP** *key for 4 sec.*

3.3.2. Switching on after the first time

Every time it is switched on subsequently, or after the power supply has been restored, the user interface carries out a lamp-test (all segments, icons and LEDs blink for a few seconds); the **EWBC800** is then in the status indicated in the table below:

Case	Chill blast status before the power supply failure	Chill blast status at power supply restoration
1	Blast chiller in stand-by	Blast chiller in stand-by, ready for startup with default settings (dFP parameter = 0). The display will resume showing the same information that appeared prior to the power supply being cut off
2	Blast chiller running (program in progress), except in the following case (3)	The blast chiller restarts program operation from the point at which it was interrupted. The time count restarts from zero
3	Blast chiller running (due to needle probe error the blast chilling cycle in progress is manual, initially it was automatic)	Blast chiller resumes operation with automatic blast chilling cycle. The time count restarts from zero. If the needle probe error persists after the reset, the blast chiller resumes operation with a manual blast chilling cycle, lasting as long as the timeout

3.3.3. Operating principle

EWBC800 has **programs** for the management of the following blast chiller functions:

- automatic blast chilling,
- manual blast chilling.

The programs are divided into the following categories:

- positive program with soft blast chill mode,
- positive program with hard blast chill mode,
- negative program with soft blast chill mode,
- negative program with hard blast chill mode.

In a program, after a blast chilling there is a storage.
In the case of the **automatic program**, the reference value is the **temperature** detected by the needle probe.
In the case of the **manual program**, the reference value is the **time**. In this case blast chilling takes place within a specified time, regardless of the needle probe temperature which will adjust itself to the room temperature.
Both the automatic program and the manual program are constituted by a blast chilling cycle which is automatically followed by 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), and soft blast chill mode (**Fig. 10 on page 21**);

The numeric values shown in **Fig. 10 on page 21** *are the default values.*

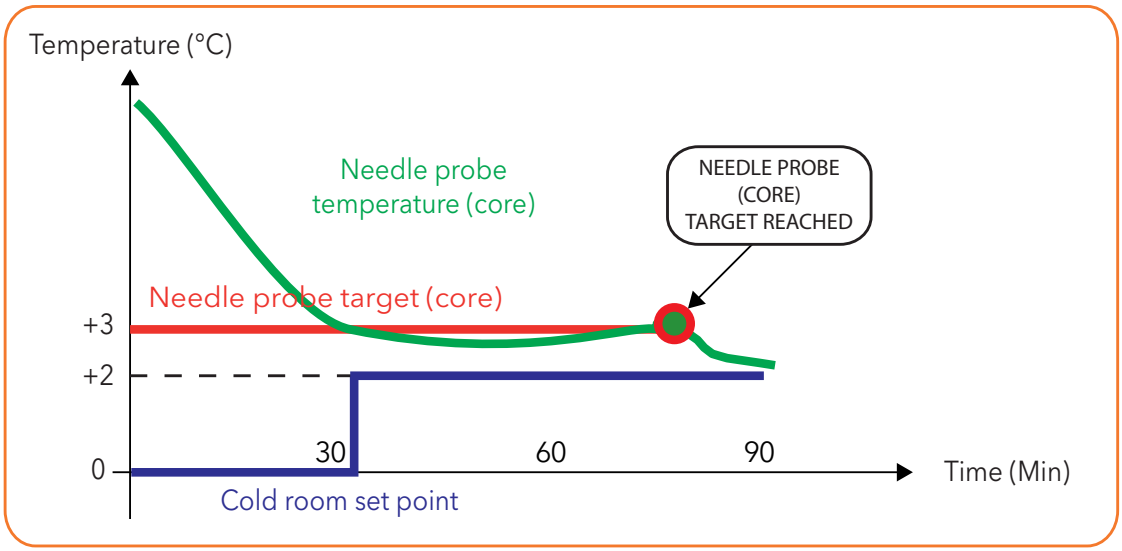


Fig. 10. Positive program with soft blast chill mode

- positive (cooling), with positive reference temperature (target temperature), and hard blast chill mode (**Fig. 11 on page 21**);

The numeric values shown in **Fig. 11 on page 21** *are the default values.*

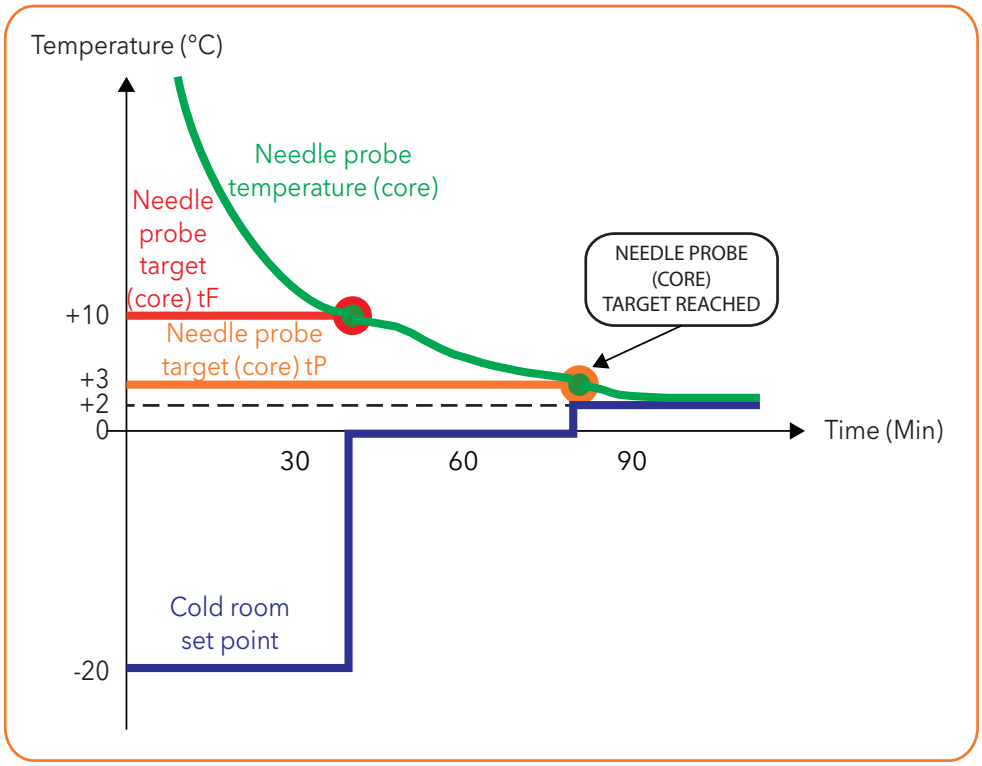


Fig. 11. Positive program with hard blast chill mode

- negative (freezing), with negative reference temperature (target temperature), and hard blast chill mode (**Fig. 12 on page 22**);

The numeric values shown in **Fig. 12 on page 22** *are the default values.*

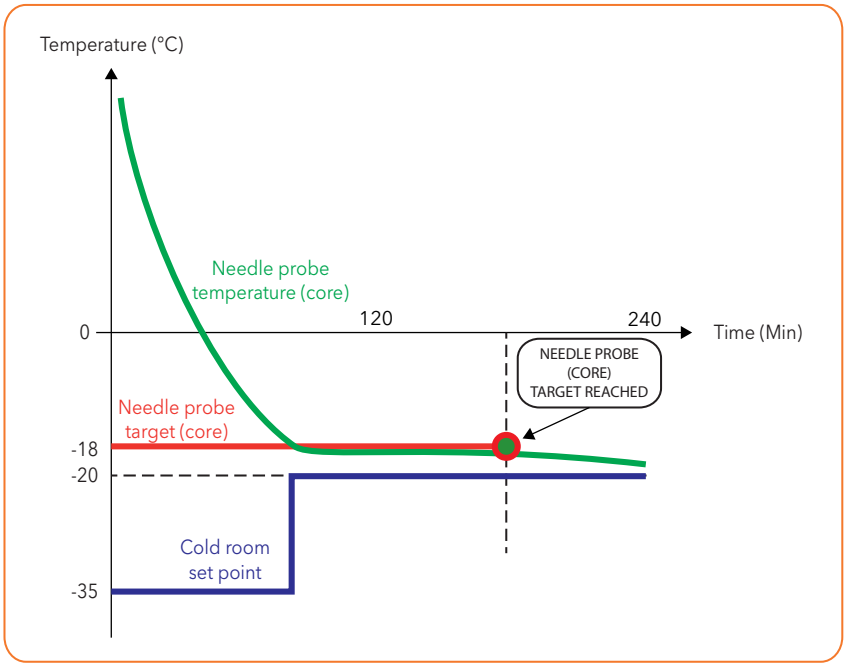


Fig. 12. Negative program with hard blast chill mode

- negative (freezing), with negative reference temperature (target temperature), and soft blast chill mode (**Fig. 13 on page 22**).

The numeric values shown in **Fig. 13 on page 22** *are the default values.*

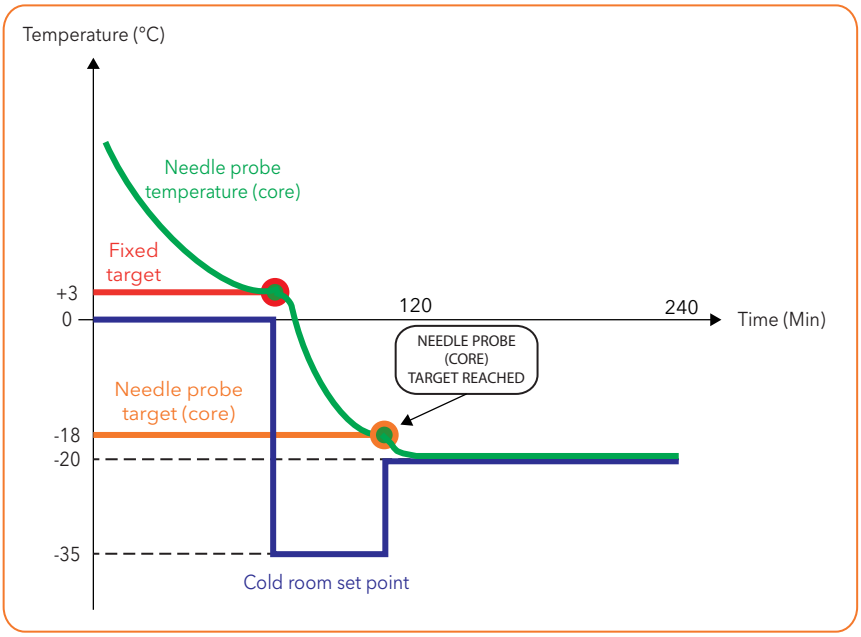


Fig. 13. Negative program with soft blast chill mode

At the end of the blast chilling cycle, when the storage phase is started automatically, the buzzer will sound continuously for 2 seconds.

3.3.4. Selecting and starting a program

There are three keys on the left-hand side of the keypad (refer to **'3.2. KEYPAD' on page 17**); these can be used to configure the blast chilling cycle by setting 3 criteria:

- blast chilling cycle target value. The **TEMP** key can be used to set a positive (freezing) or negative (deep-freezing) blast chilling cycle;
- blast chilling cycle target type. The **TARGET** key can be used to set an automatic or manual blast chilling cycle. The blast chilling duration is set in the manual blast chilling cycle, whereas in the automatic blast chilling cycle the duration is regulated until the target temperature for the needle probe has been reached;
- blast chilling mode. The **MODE** key can be used to set a blast chilling cycle that is hard (the temperature is lowered extremely rapidly) or soft (the temperature is lowered more slowly, avoiding incorrect freezing on the surface of the food to be cooled).

The combination of the three abovementioned criteria produces eight possible blast chilling cycles, summarised in the table below; depending on the blast chilling cycle set via the keypad, the dFP parameter assumes a value between 0 and 7.

In stop status (for example, when a program begins or ends), **EWBC800** *automatically loads the settings for the blast chilling cycle that corresponds to the current value of the dFP parameter.*
If the dFP parameter is equal to 8 in stop status,

- *the first time it is switched on* **EWBC800** *automatically loads the following pre-established settings:*
  - *blast chilling cycle target value: positive,*
  - *blast chilling cycle target type: manual (timed),*
  - *blast chilling mode: soft.*
- *every time it is switched on subsequently,* **EWBC800** *automatically loads the blast chilling cycle settings for the last program carried out.*

Blast chilling cycle target value	Blast chilling cycle target type	Blast chilling mode	Value of dFP parameter	String shown on the display
Positive	Manual (timed)	Hard	0	PMH
		Soft	1	PMS
	Automatic	Hard	2	PAH
		Soft	3	PAS
Negative	Manual (timed)	Hard	4	nMH
		Soft	5	nMS
	Automatic	Hard	6	nAH
		Soft	7	nAS
Previous retained	Previous retained	Previous retained	8	hLd

A single press of one of the **TEMP**, **TARGET**, **MODE** keys prompts the display to show the corresponding configuration (blinks for three seconds).

The 3 listed criteria do not need to be set in order when configuring the program; each criterion takes account of the values currently set for the other two.

3.3.4.1. Selecting a blast chilling cycle target value

To select the blast chilling cycle target value (refer to **Fig. 14 on page 24**, if the blast chilling cycle target value is initially positive), proceed as follows:

1. Press **TEMP** until one of the tP and tn parameter values is displayed.

Pressing the **TEMP** key repeatedly (at consecutive intervals of less than 3 sec) changes the displayed data (**D - Fig. 9 on page 16**) alternately, from the value set for the positive blast chilling cycle to the value set for the negative blast chilling cycle; the LED corresponding to the **TEMP** key comes on simultaneously.
The numeric value of the parameter appears on the display, while the unit of measurement (°C or °F) appears as an icon alongside it.

2. Press **UP** and/or **DOWN** within 3 sec if you want to change the temperature.

This procedure does not change the default settings stored by the **EWBC800**. *These settings are restored on completion of the program, or after it has been ended prematurely.*
The tP parameter is limited at its lower end by the SPS parameter; the tn parameter is limited at its lower end by the Snh parameter.

The temperature set for **EWBC800** becomes the last temperature displayed, then the display reverts to showing the room temperature.

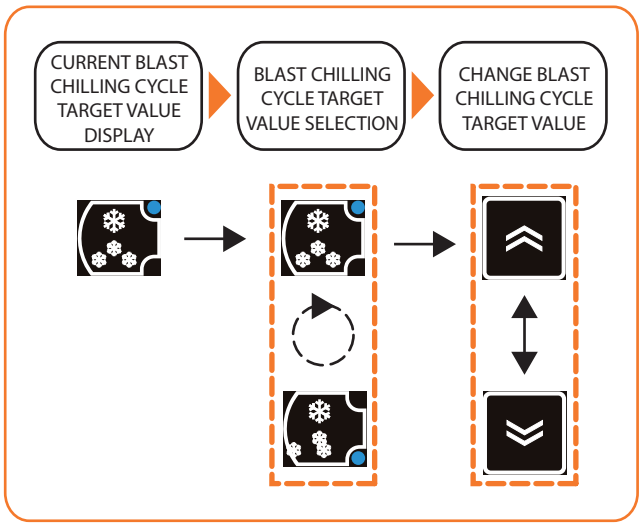


Fig. 14. Selecting a blast chilling cycle target value

To restore the blast chilling cycle target value to its default value (tP or tn parameter), press **TEMP** *three times in succession.*

3.3.4.2. Selecting a blast chilling cycle target type

To select the blast chilling cycle target type (refer to **Fig. 15 on page 25**, if the blast chilling cycle target type is initially manual), proceed as follows:

1. Press **TARGET** until you select one of the blast chilling cycle target types: manual or automatic.

Pressing the **TARGET** *key repeatedly (at consecutive intervals of less than 3 sec) changes the displayed data (***D - Fig. 9 on page 16***), alternately, from the value set for the manual target type to the value set for the automatic target type; the LED corresponding to the* **TARGET** *key comes on simultaneously. If manual (timed), the cycle duration - expressed in minutes - is shown, with the icon lit; if automatic, the maximum cycle duration timeout - expressed in minutes - is shown.*
The time value, expressed in minutes, depends on the current setting for the target value and parameter t1 applies for freezing, parameter t2 for deep-freezing.

2. Press **UP** and/or **DOWN** within 3 sec if you want to change the timeout period.

The time set for **EWBC800** becomes the last temperature displayed (even if at a second moment an automatic target type will be set), then the display reverts to showing the room temperature.

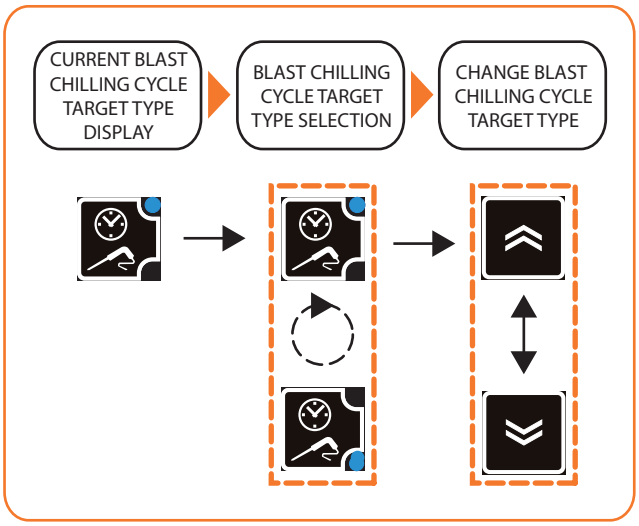


Fig. 15. Selecting a blast chilling cycle target type

To restore the blast chilling cycle target type to its default value (t1 or t2 parameter), press **TARGET** *three times in succession.*

3.3.4.3. Selecting the blast chilling mode

To select the blast chilling mode (refer to **Fig. 16 on page 25**, if the blast chilling cycle mode is initially soft), press **MODE** until you have selected one of the blast chilling modes: Hard or Soft.

Pressing the **MODE** *key repeatedly (at consecutive intervals of less than 3 sec) changes the displayed data (***D - Fig. 9 on page 16***) alternately, from the string 'Hrd' (Hard blast chill mode) to 'SFt' (Soft blast chill mode); the LED corresponding to the* **MODE** *key comes on simultaneously.*

The mode set for **EWBC800** becomes the one corresponding to the last string displayed, then the display reverts to showing the room temperature.

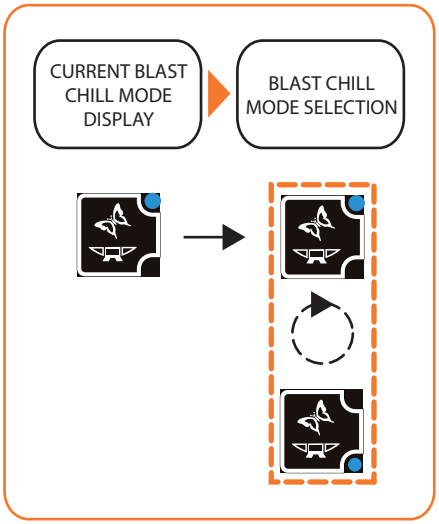


Fig. 16. Selecting the blast chilling mode

3.3.4.4. Starting and stopping a program

To start a program, press **START/STOP**: **EWBC800** emits a short beep (buzzer) and the LED RUNNING comes on.
If the program is automatic, the display (**D - Fig. 9 on page 16**) shows the temperature detected by the needle probe.
If the program is manual, the display shows the time remaining until the end of the cycle (in min) and the icon is lit.
The value displayed initially is parameter t1 or parameter t2. For details of other displayed information, please refer to **'3.3.5. Cyclical display' on page 27**.

During a blast chilling cycle, press **TEMP** *to view the current target value.*

The blast chilling cycle ends automatically if one of the following conditions arises:

- the selected time has elapsed, if the target type is manual;
- the selected needle probe (core) target has been reached, if the target type is automatic.

In an automatic blast chilling cycle, if the set timeout period is reached (parameter t1 for the positive blast chilling cycle or t2 for the negative blast chilling cycle) without the selected temperature target being achieved, the blast chilling cycle continues indefinitely and the LED TIMEOUT *will blink.*

Once the blast chilling cycle has finished, **EWBC800** emits a beep lasting 2 sec (buzzer) and automatically starts the storage phase.

To silence the buzzer in advance, press the **DOWN** *key.*

The storage phase starts automatically after a blast chilling cycle, but can also be started manually from the stop status (refer to **'3.3.7.3. Manual storage' on page 31**).
The automatic storage phase occurs:

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

During the storage phase, the display shows the room temperature (if the previous blast chilling cycle has a manual type target) or the temperature detected by the needle probe (if the previous blast chilling cycle has an automatic type target), with the LED RUNNING on. For details of other displayed information, please refer to **'3.3.5. Cyclical display' on page 27**.
During the storage phase, the LEDs corresponding to the **TEMP**, **TARGET**, **MODE** keys come on in sequence, in line with the selected program (refer to **Fig. 17 on page 26**).

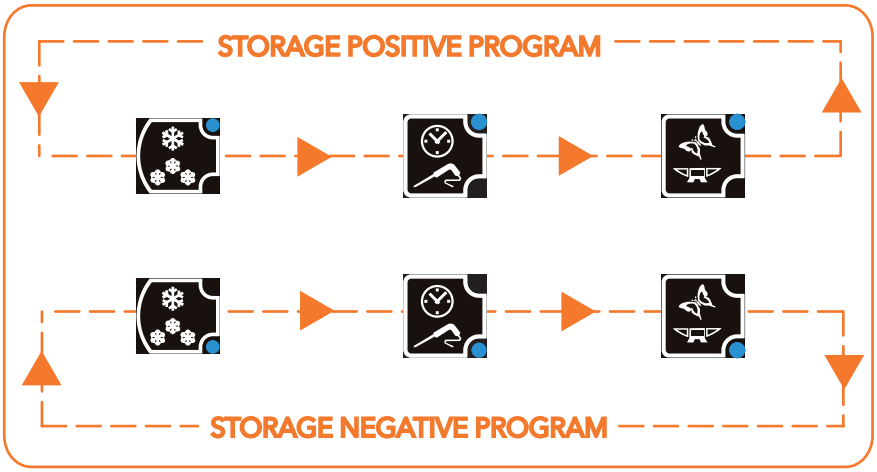


Fig. 17. Sequential LED display during the storage phase

During a storage phase, press TEMP to view the room probe temperature set point in storage mode, parameter SCP or parameter SCn, without affecting the LEDs.

To stop a program prematurely, press **START/STOP** to restore the program to its default settings (dFP parameter).

In stop status, the three LEDs for the **TEMP**, **TARGET**, **MODE** *keys are lit corresponding to the default settings (dFP parameter) and the display shows the room temperature.*

Pressing **START/STOP** again will restart the blast chilling cycle with the default settings applied (dFP parameter).

3.3.5. Cyclical display

Beginning with the current information on the display (**D - Fig. 9 on page 16**) when a blast chilling program in progress, press **UP** and/or **DOWN** to cyclically view the temperatures and times for that program.
Every time the **UP** key is pressed, the following information is displayed cyclically:

- needle probe temperature,
- time elapsed,
- time remaining,
- cold room temperature.

In stop status, the room temperature is the information displayed by default.

The cyclical display corresponding to repeated pressing of the **UP** key is conventionally illustrated in a clockwise direction in **Fig. 18 on page 27**.

The cyclical display corresponding to repeated pressing of the **DOWN** *key conventionally moves in an anticlockwise direction, with reference to* **Fig. 18 on page 27**.

The last information selected using the keys (**T - Fig. 9 on page 16**) remains on the display until the end of the program.

*While the program is in progress, in case of one or more malfunctions, the display shows the last value selected via the keypad (***T - Fig. 9 on page 16***) along with the malfunction(s) present in succession.*

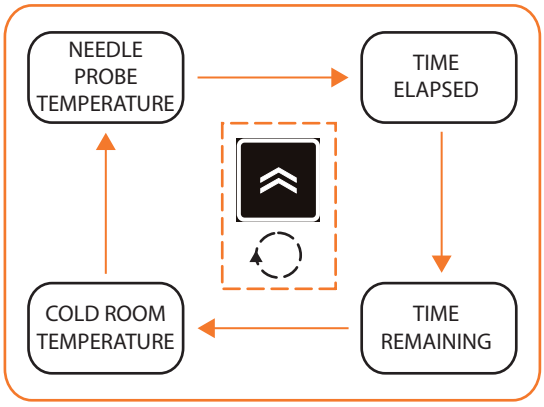


Fig. 18. Cyclical display during a program

In the cyclical display, the first information suggested at the beginning of the program will be:

- *the needle probe temperature, if the program in progress is automatic,*
- *the remaining time, if the program in progress is manual.*

During the storage phase, the elapsed time and remaining time are not shown; if the needle probe temperature is disabled (parameter EP1=0), the string '---' is displayed.

3.3.6. Selecting and starting a special function

EWBC800 has **special functions** for the management of the following blast chiller functions:

- cold room sterilization,
- needle probe heating.

A special function can be activated if one of the parameters FR1, FR2, FR3, FR4, FR5 is equal to 4 (cold room sterilization) or 3 (needle probe heating).

From the stop status, every single press of the **AUX** key selects an alternate special function, while simultaneously deselecting any program or optional function selected previously. Pressing and holding the **AUX** key deselects all special and optional functions, restoring the program selected previously.

3.3.6.1. Cold room sterilization

*To activate a sterilization cycle the blast chiller door must be closed. If the blast chiller door is opened during the sterilization cycle, the cycle stops and the display (**D - Fig. 9 on page 16**) will show the string 'dOr'.*

To select the sterilization cycle, press **AUX** until the special sterilization function has been selected.

*Repeated pressing of the **AUX** key changes the information shown on the display alternately, from the string 'StE' (sterilization) to 'Prb' (needle probe heating); the LED corresponding to the **AUX** key comes on simultaneously.*
*If one of the two special functions cannot be activated, there is a single selection and the alternate display does not occur. If neither of the two special functions can be activated, pressing the **AUX** key does not have any effect on function selection.*

To start the sterilization cycle, press **START/STOP**: the LED RUNNING comes on and the string 'StE' remains on the display.

The start and duration of the sterilization cycle are determined by parameters iSt, UUd, UUt.

*In the case of cold room probe error (refer to **'5. Alarms' on page 42**):*
- before the sterilization cycle begins, the sterilization cycle does not start and the string 'E2' blinks on the display;
- during the sterilization cycle, the sterilization cycle continues normally.

Once the sterlilization cycle has finished, **EWBC800** emits a beep lasting 2 sec (buzzer) and reverts to stop status.

*To silence the buzzer in advance, press the **DOWN** key.*

To stop the sterilization cycle prematurely, press the **START/STOP** key.
Pressing **START/STOP** again starts the blast chilling cycle with the default settings applied (dFP parameter).

Parameter	Description
iSt	Regulation hysteresis
UUd	Sterilization cycle duration
UUt	Sterilization temperature threshold

3.3.6.2. Needle probe heating

The door opening or closing has no effect on the needle probe heating.
To select needle probe heating, press **AUX** until the special needle probe heating function has been selected.

Repeated pressing of the **AUX** *key changes the information shown on the display (***D - Fig. 9 on page 16***) alternately, from the string 'StE' (sterilization) to 'Prb' (needle probe heating); the LED corresponding to the* **AUX** *key comes on simultaneously.*
If one of the two special functions cannot be activated, there is a single selection and the alternate display does not occur. If neither of the two special functions can be activated, pressing the **AUX** *key does not have any effect on function selection.*

To start needle probe heating, press **START/STOP**: the LED RUNNING comes on and the string 'Prb' remains on the display.

The start and duration of needle probe heating are determined by parameters Prd, Prt.
In the event of a needle probe error (refer to '5. Alarms' on page 42), needle probe heating continues as normal; the display shows the blinking strings 'E1' and 'Prb' alternately.

Once needle probe heating has finished, **EWBC800** emits a beep lasting 2 sec (buzzer) and reverts to stop status.

To silence the buzzer in advance, press the **DOWN** *key.*

To stop needle probe heating prematurely, press the **START/STOP** key.
Pressing **START/STOP** again starts the blast chilling cycle with the default settings applied (dFP parameter).

Parameter	Description
Prd	Maximum needle heating duration
Prt	Needle probe heating temperature set point

3.3.7. Selecting and starting an optional function

EWBC800 has **special functions** for the management of the following blast chiller functions:

- room light,
- defrost,
- manual storage.

An optional function can be activated if one of the parameters FR1, FR2, FR3, FR4, FR5 is equal to 5 (room light), 6 (defrost) or 8 (manual storage).

From the stop status, every single press of the **ESC** key selects an optional function, while simultaneously deselecting any main program or special function selected previously. Pressing and holding the **ESC** key deselects all special and optional functions, restoring the program selected previously.

The room light and defrost functions can be started while a program is already in progress (LED RUNNING on).

3.3.7.1. Room light (if enabled via parameter)

The room light can be controlled by one of the outputs, depending on which of the parameters FR1, FR2, FR3, FR4, FR5 is set to 5, in line with the following correspondence:

FR1 --> OUT1
FR2 --> OUT2
FR3 --> OUT3
FR4 --> OUT4
FR5 --> OUT5

To select the room light, press **ESC** until the optional room light function has been selected.

Pressing the **ESC** *key changes the displayed data (***D - Fig. 9 on page 16***) alternately, between the strings 'dEF' (defrost), 'Con' (storage) and 'LMP' (room light);* the LED corresponding to the **ESC** key comes on simultaneously.

If one of the three optional functions cannot be activated, you can select from the remaining options, i.e. only the functions to which the physical resource is associated.
If two of the three optional functions cannot be activated, there is a single selection and the alternate display does not occur. If none of the three special functions can be activated, pressing the **ESC** *key does not have any effect on function selection; the corresponding LED blinks for 3 sec.*

To start the room light for an indefinite period of time, press **START/STOP**: the string 'LMP' remains on the display.

If the power supply is cut off, the room light will be switched off when power is restored.

If the room light is on, it will be possible to select and view any other program. In this case, to switch off the room light, proceed as follows:

1. press **ESC** repeatedly until the string 'LMP' appears,
2. press **START/STOP**.

3.3.7.2. 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.
There are two types of defrost:

- manual (parameter dF2=0), activated via keypad (**T - Fig. 9 on page 16**),
- automatic (parameter dF2 not 0), activated automatically at pre-set time intervals, determined by the value of parameter dF2 (interval between defrosts): this parameter represents the timeout after which **EWBC800** automatically begins a new defrost.

To select manual defrosting, press **ESC** until the optional defrost function has been selected.

Pressing the **ESC** *key changes the displayed data (***D - Fig. 9 on page 16***) alternately, between the strings 'dEF' (defrost), 'Con' (storage) and 'LMP' (room light);* the LED corresponding to the **ESC** key comes on simultaneously.

If one of the three optional functions cannot be activated, you can select from the remaining options, i.e. only the functions to which the physical resource is associated.
If two of the three optional functions cannot be activated, there is a single selection and the alternate display does not occur. If none of the three special functions can be activated, pressing the **ESC** *key does not have any effect on function selection; the corresponding LED blinks for 3 sec.*

To start manual defrosting, press **START/STOP**: the string 'dEF' remains on the display and the icon begins to blink, to indicate the pending request.
The defrost begins:

- immediately if a storage phase is in progress,
- at the same time as the next storage phase.
- or as soon as a new blast chilling cycle begins (according to parameter dF5)

During the defrost, the string '*dEF*' appears on the display and the icon remains lit steadily.
Once the defrost has finished due to timeout (parameter dF4) or due to reaching the target temperature (parameter dF1), **EWBC800** emits a beep lasting 2 sec (buzzer) and reverts to stop status.

To silence the buzzer in advance, press the **DOWN** *key.*

To end the defrost (and the storage phase in progress) prematurely, press **START/STOP**.
Pressing **START/STOP** again starts the blast chilling cycle with the default settings applied (dFP parameter).

Parameter	Description
dF1	Enable/Maximum defrost duration (0= defrost disabled)
dF2	Interval between defrosts (0= automatic disabled, manual only)
dF3	Defrost type (0 = electric, 1 = hot gas, 2 = air)
dF4	Temperature threshold above which the defrost is considered concluded or, during checking, unnecessary
dF5	Defrost active even at the start of a blast chill program (0 = no)

3.3.7.3. Manual storage

To select manual storage, press **ESC** until the optional manual storage function has been selected: the LED corresponding to the **TEMP** key for positive storage begins to blink.

Pressing the **ESC** *key changes the displayed data (***D - Fig. 9 on page 16***) alternately, between the strings 'dEF' (defrost), 'Con' (storage) and 'LMP' (room light) if set via parameter;* the LED corresponding to the **ESC** key comes on simultaneously.

If one of the three optional functions cannot be activated, you can select from the remaining options, i.e. only the functions to which the physical resource is associated.

If two of the three optional functions cannot be activated, there is a single selection and the alternate display does not occur. If none of the three special functions can be activated, pressing the **ESC** *key does not have any effect on function selection; the corresponding LED blinks for 3 sec.*

To select manual storage, press the **TEMP** key repeatedly:

- the LED for the **TEMP** key corresponding to ❄ comes on, select 'positive storage',
- the LED for the **TEMP** key corresponding to ❄❄ comes on, select 'negative storage'.

The LEDs corresponding to the **TARGET** *and* **MODE** *keys are switched off.*

To start manual storage, press **START/STOP**: the display shows the room temperature and the LED RUNNING comes on.

During a storage phase, press the **TEMP** *key to view the cold room storage temperature set point, SCP parameter or SCn parameter, without affecting the corresponding LEDs in any way.Pressing the* **UP** *and/or* **DOWN** *keys repeatedly results in a cyclical display (***Fig. 18 on page 27***):* manual storage is considered started following a manual blast chilling cycle (timed).

During the storage phase, the LEDs corresponding to the **TEMP**, **TARGET**, **MODE** keys come on cyclically, in line with the selected program (refer to **Fig. 17 on page 26**).
To stop manual storage prematurely, press the **START/STOP** key.
Pressing **START/STOP** again starts the blast chilling cycle with the default settings applied (dFP parameter).

3.3.8. Blast chiller door presence

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

- if parameter SLd=0, door closing determines consent for the compressor to start;
- if parameter SLd=1 (default), the compressor is active even with the door open, while the cold room fan always stops when the door is open.

To silence the buzzer in advance, press the **DOWN** *key.*

The program or function is not interrupted.

3.3.9. Parameters configuration

EWBC800 has two types of parameter:

- visible parameters, aimed at the User,
- advanced parameters, aimed at the Installer.

To access the advanced parameters, enter a password (parameter PS2) (refer to **'3.3.9.2. Entering a password for advanced parameters' on page 33**).
To change a parameter, please refer to **'3.3.9.1. Configuring a parameter' on page 32**.

To configure the parameters, **EWBC800** *must be in stop status.*

To display the list of parameters,press and hold both the **UP** and **DOWN** keys simultaneously for at least 2 seconds: the display (**D - Fig. 9 on page 16**) shows parameter t1.

3.3.9.1. Configuring a parameter

To change the value of a parameter (**Fig. 19 on page 32**), proceed as described below:

1. press the **UP** or **DOWN** key until the display shows the name of the parameter to be changed;
2. press **AUX** to view the value of the parameter;

Press **ESC** *to return to the previous display (list of parameters) without making any changes.*

3. press the **UP** or **DOWN** key within 10 seconds to respectively increase or decrease the value of the parameter;
4. to confirm the change in parameter value:
   - press **SET**, or **ESC**
   - wait for 10 sec.

To exit the list of parameters view:

- press **ESC** once, or
- wait for 10 sec.

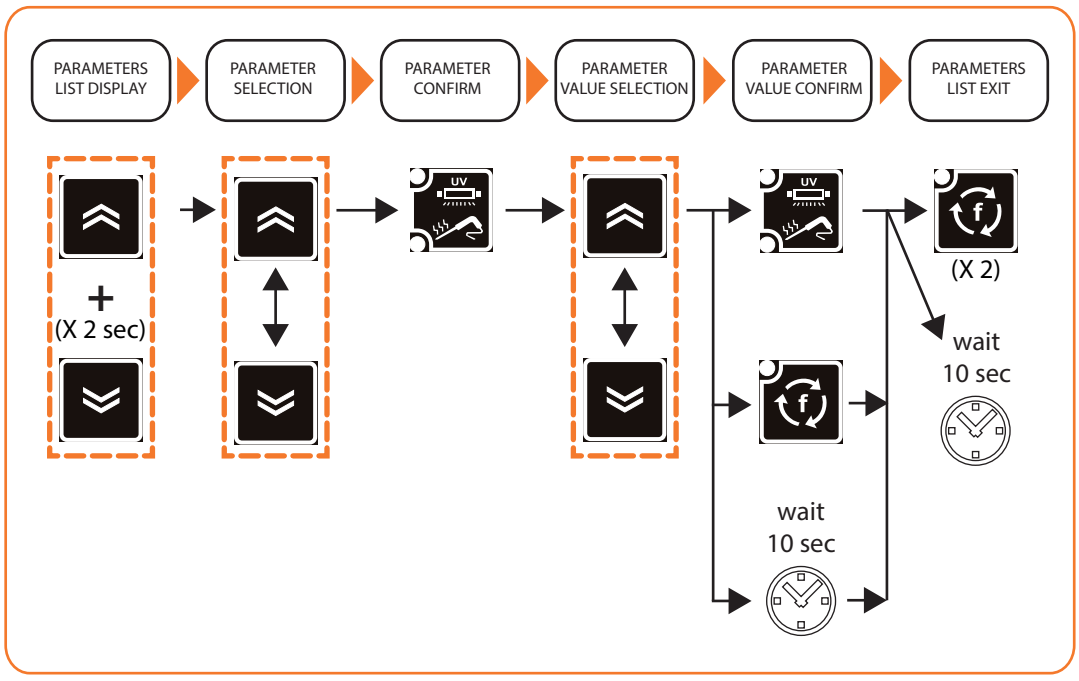


Fig. 19. Parameters configuration

3.3.9.2. Entering a password for advanced parameters

To enter the password, proceed as follows:

1. press the **UP** or **DOWN** key until the display shows the parameter 'PA2';
2. press the **SET** key;
3. the value '0' will appear on the display;

Press **ESC** *to return to the previous display (list of parameters) without entering any password.*

4. press the **UP** or **DOWN** key within 10 seconds to respectively increase or decrease the value of parameter 'PA2';

Press **ESC** *to cancel the changes and return to the previous display (list of parameters).*

5. to confirm the correct value has been entered for parameter 'PA2' and access the list of advanced parameters, press **SET** or wait for 10 sec.

To configure a parameter on the list of advanced parameters, please refer to **'3.3.9.1. Configuring a parameter' on page 32**.

For the advanced parameters description refer to **'3.4. Table of visible and advanced parameters' on page 34**.

If a password set to a value other than the default is lost, contact Eliwell to recover it.

Once the password for advanced parameters has been entered, the value for that password can also be changed

TABLE OF PARAMETERS

3.4. TABLE OF VISIBLE AND ADVANCED PARAMETERS

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

Visible parameters without password are highlighted in orange.
Advanced parameters are highlighted in white.

For the advanced parameters access mode refer to **'3.3.9.2. Entering a password for advanced parameters' on page 33**.

Par.	Description	Default	Range	U. M.
iSt	Regulation hysteresis	3	1.0...20.0	°C/°F
t1	Positive timed blast chilling duration (timeout for automatic program)	90	0...599	Min
t2	Negative timed blast chilling (deep-freezing) duration (timeout for automatic program)	240	0...599	Min
tP	Needle target for positive blast chilling	3	SPS...99.0	°C/°F
tn	Needle target for negative blast chilling	-18.0	Snh...99.0	°C/°F
SPS	Room set point for Soft positive blast chilling (single phase)	0	-50.0...tP	°C/°F
Snh	Room set point for Hard negative blast chilling (single phase)	-35.0	-50.0...tn	°C/°F
tF	Needle target for Phase 1 of automatic Hard positive blast chilling	10.0	-50.0...99.0	°C/°F
SPF	Room set point for Phase 1 of Hard positive blast chilling	-20.0	-50.0...99.0	°C/°F
SCP	Room set point for positive storage	2.0	-50.0...99.0	°C/°F
SCn	Room set point for negative storage	-20.0	-50.0...99.0	°C/°F
dOF	Compressor Protection Off/On (also valid at reset)	2	0...99	Min
dOn	Compressor Protection On/On	3	0...99	Min
dF1	Enable/Maximum defrost duration (0= defrost disabled)	30	0...99	Min
dF2	Interval between defrosts (0= automatic disabled, manual only)	8	0...99	hours
dF3	Defrost type EL (0) = electric, gAS (1) = hot gas, Air (2) = air	0	0...2	num
dF4	Temperature threshold above which the defrost is considered concluded or, during checking, unnecessary.	2.0	-50.0...99.0	°C/°F
dF5	Defrost active even at the start of a blast chill program no (0) = defrost NOT active, yES (1) = defrost active	0	0...1	num
dF6	Dripping duration	3	0...99	Min
dr1	Enable door heating. no (0) = disabled, yES (1) = enabled	1	0...1	num
dr2	Door heating activation threshold	6	-50.0...99.0	°C/°F
Fan	Fan in blast chill status (0=parallel to compressor, 1=always ON)	1	0...1	num
FR1	Configurability of digital output R1 OFF (0) = disabled, rdO (1) = door heater, C F (2) = condenser fan, H P (3) = needle probe heating, U u (4) = UV lamp, Lig (5) = room light, dEF (6) = defrost, E F (7) = evaporator fan, CMP (8) = compressor	8	0...8	num
FR2	Configurability of digital output R2. Same as FR1	7	0...8	num
FR3	Configurability of digital output R3. Same as FR1	2	0...8	num
FR4	Configurability of digital output R4. Same as FR1	1	0...8	num
FR5	Configurability of digital output R5. Same as FR1	0	0...8	num
tP0	Probe type Pb2, Pb3, Pb4. ntC (0) = NTC, PtC (1) = PTC	1	0...1	num
dEC	Decimal point °C. no (0) = display without decimal point, yES (1) = with decimal point	1	0...1	num
UCF	°C/°F selection. C (0) = °C, F (1) = °F	0	0...1	num
EP1	Enable core probe. no (0) = disabled, yES (1) = enabled	1	0...1	num
EP3	Enable evaporator probe. no (0) = disabled, yES (1) = enabled	1	0...1	num

Par.	Description	Default	Range	U. M.
Edo	Door present. 0 = absent; 1 = present	1	0...1	num
tdO	Timer for door alarm signal	0	0...999	sec
EnC	Enable negative blast chilling. 0= disabled; 1= enabled	1	0...1	num
SLd	Stop loads when door open. 0 = Compressor + Fan, 1 = Fan	1	0...1	num
dFP	Program default setting. PMH (0) = Positive Manual HARD, PMS (1) = Positive Manual SOFT, PAH (2)= Positive Automatic HARD, PAS (3) = Positive Automatic SOFT, nMH (4)= Negative Manual HARD, nMS (5) = Negative Manual SOFT, nAH (6)= Negative Automatic HARD, nAS (7)= Negative Automatic SOFT, HLd (8) = Previous case	0	0...8	num
Uud	Sterilization cycle duration	15	1...999	sec
Uut	Sterilization temperature threshold	5.0	-50.0...99.0	°C/°F
Prd	Maximum needle heating duration	2	0...10	Min
Prt	Needle probe heating temperature set point	4.0	0...90.0	°C/°F
SCF	Condenser temperature set point, for secondary fan	46.0	-50.0...99.0	°C/°F
EPS	Pressure switch setting. 0 = disabled.	0	0...4	num
PPS	Pressure switch polarity. nO (0) = normally open, nC (1) = normally closed	0	0...1	num
OFL	Offset subtracted from set point in storage to determine the low temperature alarm threshold	10.0	0...99.0	°C/°F
LAE	Enable room minimum temperature alarm (no (0) = disabled, yES (1) = enabled)	1	0...1	num
OFH	Offset added to set point in storage to determine the high temperature alarm threshold	10.0	0...1	°C/°F
HAE	Enable room maximum temperature alarm. no (0) = disabled, yES (1) = enabled	1	0...1	num
PS2	Password to access the advanced parameters Restricted to qualified personnel. Refer to the user manual available on Eliwell website in the restricted area or contact the technical support.	15	0...999	num
tAB	Reserved	1	0...65535	num

4. LOADS OPERATION LOGICS

The operating logics for the loads are illustrated below; each one can be controlled by any digital relay output, according to the following correspondence between parameters FR1, FR2, FR3, FR4, FR5 and the outputs:

FR1 --> OUT1
FR2 --> OUT2
FR3 --> OUT3
FR4 --> OUT4
FR5 --> OUT5

OUT5 is an open collector output, and therefore requires connection of an external relay.

4.1. COMPRESSOR

The compressor can be controlled by one of the outputs, depending on which of the parameters FR1, FR2, FR3, FR4, FR5 is set to 8.
Fig. 20 on page 36 illustrates the operating logic of relay R1 (refer to the pre-set types described in **'2.2. INPUT / OUTPUT / PORT CHARACTERISTICS' on page 9**), specifying when it activates and deactivates the compressor, according to the room temperature set point and regulation hysteresis.
If the blast chiller is fitted with a microswitch for door control closing (parameter EdO=1), the compressor can be activated:

- only with closed door, if the parameter SLd=0,
- also with door open, if the parameter SLd=1.

4.1.1. 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 dOF);
- minimum time that must elapse between two consecutive start ups of the compressor (parameter dOn).

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 the **EWBC800** *power supply is interrupted.*

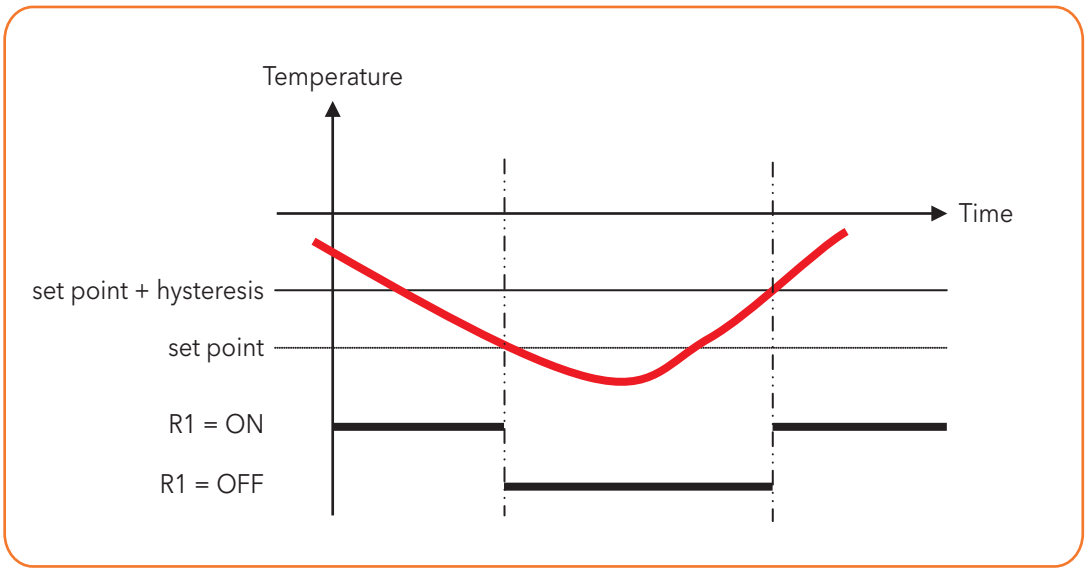


Fig. 20. Compressor operation

With reference to **Fig. 20 on page 36**, the following tables shows the operating logics of the compressor, specifying when it is switched on and off depending on the target value and blast chill mode selected.

Compressor operation depends on the blast chilling cycle target value and the blast chill mode, but it does not depend on the blast chilling cycle target type.
In the operating logics described in the following paragraphs, the storage phase starts automatically after a blast chilling cycle; alternatively, the storage phase can be started manually (refer to ***'3.3.7.3. Manual storage' on page 31****).*

4.1.2. Positive target value with soft blast chill mode

The compressor is activated or deactivated according to the operating logic indicated in the table below.

Positive program	temperature set point	hysteresis	Activated compressor if	Deactivated compressor if
blast chilling cycle	SPS	iSt	room temperature (PB2) higher or equal to set point + hysteresis	room temperature (PB2) less than or equal to set point
storage phase	SCP			

4.1.3. Positive target value with hard blast chill mode

This program consists of two consecutive stages, with timeouts calculated automatically by **EWBC800** according to the value of parameter t1 (default: 90 min):

- stage 1, with timeout duration equal to 2/3 of t1 (default: 60 min),
- stage 2, with timeout duration equal to 1/3 of t1 (default: 30 min).

STAGE 1
During stage 1, the compressor is activated or deactivated according to the operating logic indicated in the table below.

Positive program	temperature set point	hysteresis	Activated compressor if	Deactivated compressor if
hard blast chilling cycle - stage 1	SPF	iSt	room temperature (PB2) higher or equal to set point + hysteresis	room temperature (PB2) less than or equal to set point

Stage 1 ends automatically if one of the following conditions arises:

- timeout for stage 1 reached (2/3 of t1), if target type is manual;
- needle probe (core) target for stage 1 reached (parameter tF), if target type is automatic;
- temperature target for stage 1 not reached, but timeout for stage 1 reached (2/3 of t1), if target type is automatic.

If stage 1 has ended due to the timeout for stage 1 being reached, the LED TIMEOUT *will not blink during the subsequent stage 2.*

EWBC800 automatically moves on from stage 1 to stage 2.

STAGE 2
During stage 2, the compressor is activated or deactivated according to the operating logic indicated in the table below.

Positive program	temperature set point	hysteresis	Activated compressor if	Deactivated compressor if
hard blast chilling cycle - stage 2	SPS	iSt	room temperature (PB2) higher or equal to set point + hysteresis	room temperature (PB2) less than or equal to set point
storage phase - stage 2	SCP			

The blast chilling cycle for stage 2 ends automatically if one of the following conditions arises:

- timeout for stage 2 reached (1/3 of t1), if target type is manual;
- selected needle probe (core) target reached (parameter tP), if target type is automatic;
- selected temperature target not reached, but timeout for stage 2 reached (1/3 of t1), if target type is automatic.

If the blast chilling cycle (automatic) for stage 2 has ended due to the timeout for stage 2 being reached, the LED TIMEOUT *will blink during the subsequent storage phase.*
*Any information on the display (***D - Fig. 9 on page 16***) regarding the time elapsed since the start of the program or time remaining until the end of the program depends on the overall duration of the program (parameter t1) and not on the duration of stage 1 or the duration of stage 2. For example, the time remaining that can be seen on the display during stage 1 is the sum of the time required to complete stage 1 and the timeout for stage 2 (1/3 of t1).*

4.1.4. Negative target value with hard blast chill mode

The compressor is activated or deactivated according to the operating logic indicated in the table below.

Negative program	temperature set point	hysteresis	Activated compressor if	Deactivated compressor if
blast chilling cycle	Snh	iSt	room temperature (PB2) higher or equal to set point + hysteresis	room temperature (PB2) less than or equal to set point
storage phase	SCn			

4.1.5. Negative target value with soft blast chill mode

This program consists of two consecutive stages, with timeouts calculated automatically by **EWBC800** according to the value of parameter t2 (default: 240 min):

- stage 1, with timeout duration equal to 1/2 of t2 (default: 120 min),
- stage 2, with timeout duration equal to 1/2 of t2 (default: 120 min).

STAGE 1
During stage 1, the compressor is activated or deactivated according to the operating logic indicated in the table below.

Positive program	temperature set point	hysteresis	Activated compressor if	Deactivated compressor if
soft blast chilling cycle - stage 1	SPS	iSt	room temperature (PB2) higher or equal to set point + hysteresis	room temperature (PB2) less than or equal to set point

Stage 1 ends automatically if one of the following conditions arises:

- timeout for stage 1 reached (1/2 of t2), if target type is manual;
- fixed needle probe target for stage 1 reached (value at +3°C), if target type is automatic;
- temperature target for stage 1 not reached, but timeout for stage 1 reached (1/2 of t2), if target type is automatic.

If stage 1 has ended due to the timeout for stage 1 being reached, the LED TIMEOUT *will not blink during the subsequent stage 2.*

EWBC800 automatically moves on from stage 1 to stage 2.

STAGE 2

During stage 2, the compressor is activated or deactivated according to the operating logic indicated in the table below.

Negative program	temperature set point	hysteresis	Activated compressor if	Deactivated compressor if
blast chilling cycle - stage 2	Snh	iSt	room temperature (PB2) higher or equal to set point + hysteresis	room temperature (PB2) less than or equal to set point
storage phase - stage 2	SCn			

The blast chilling cycle for stage 2 ends automatically if one of the following conditions arises:

- timeout for stage 2 reached (1/2 of t2), if target type is manual;
- selected needle probe (core) target reached (parameter tn), if target type is automatic;
- selected temperature target not reached, but timeout for stage 2 reached (1/2 of t2), if target type is automatic.

If the blast chilling cycle (automatic) for stage 2 has ended due to the timeout for stage 2 being reached, the LED TIMEOUT *will blink during the subsequent storage phase.*

*Any information on the display (***D - Fig. 9 on page 16***) regarding the time elapsed since the start of the program or time remaining until the end of the program depends on the overall duration of the program (parameter t2) and not on the duration of stage 1 or the duration of stage 2. For example, the time remaining that can be seen on the display during stage 1 is the sum of the time required to complete stage 1 and the timeout for stage 2 (1/2 of t2).*

4.2. EVAPORATOR ROOM FAN

The evaporator room fan can be controlled by one of the outputs, depending on which of the parameters FR1, FR2, FR3, FR4, FR5 is set to 7.

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

- if the parameter FAn=1, the room fan is always on, both during the blast chilling cycle and during the storage phase;
- if the parameter FAn=0, the room fan is activated together with the compressor, following the operating logic of the compressor described in **'4.1. Compressor' on page 36**.

4.3. DEFROST

During the defrost, any open door alarms 'dOr' are ignored (refer to **'5. Alarms' on page 42***).*

The defrost heater can be controlled by one of the outputs, depending on which of the parameters FR1, FR2, FR3, FR4, FR5 is set to 6.

There are 3 types of defrost, each of which produces a specific behaviour in relays R1, R2, R3 (refer to the pre-set types described in **'2.2. INPUT / OUTPUT / PORT CHARACTERISTICS' on page 9**) on the basis of the value of parameter dF3, according to the operating logic indicated in the table below.

Parameter dF3	Type of defrost	R1 (Compressor)	R2 (Cold room fan)	R3 (Defrost heater)
0	Electric	Inactive	Inactive	Active
1	Hot gas	Active	Inactive	Active
2	Air	Inactive	Active	Active

The defrost is enabled or disabled according to the value of the parameter dF1:

- if the parameter dF1=0, the defrost is disabled,
- if parameter dF1 is not 0, the defrost is enabled and has a maximum duration, in min, equal to the value of parameter dF1.

The defrost can be manually or automatically activated according to the value of the parameter dF2:

- if the parameter dF2=0, the defrost can be activated manually,
- if parameter dF2 is not 0, the defrost can be activate automatically at intervals between two consecutive defrosts, in hours, with a duration equal to dF2.

The evaporator probe PB3 can be enabled or disabled according to the value of the parameter EP3:

- if parameter EP3=0, evaporator probe PB3 is disabled: the defrost can only be activated automatically,
- if parameter EP3=1, evaporator probe PB3 is enabled: the defrost can be activated both automatically and manually (parameter dF2).

The defrost is activated or deactivated according to the operating logic indicated in the table below.

Activated defrost if	Deactivated defrost if
evaporator temperature (PB3) <= evaporator temperature threshold (parameter dF4)	evaporator temperature (PB3) => evaporator temperature threshold (parameter dF4)

If the defrost is activated, the icon blinks; if the defrost is activated and the blast chiller is in its storage phase, the defrost will become operative and the icon is lit steadily.
If parameter dF5=1 the defrost is also carried out at the beginning of - but never during - a blast chilling cycle.

If the defrost request is generated during a blast chilling cycle, the defrost will take place at the end of the blast chilling cycle, at the same time as the subsequent storage phase starts up.
If the defrost request is generated in stop status, the next time a program is started the defrost is carried out beforehand.

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

- dripping time (parameter dF6),
- minimum time that must elapse between the compressor switching off and the subsequent switching on (parameter dOF).

4.4. DOOR HEATING

Door heating can only be activated through parameter configuration (refer to ***'3.3.9. Parameters configuration' on page 32****).*

Door heating is enabled or disabled according to the value of the parameter dR1:

- if parameter dR1=0, door heating is disabled, if parameter dR1=1, door heating is enabled.

Door heating can be activated if one of the parameters FR1, FR2, FR3, FR4, FR5 is set to 1.

Door heating can be controlled by one of the outputs, depending on which of the parameters FR1, FR2, FR3, FR4, FR5 is set to 1.

Door heating, if enabled, is always active and not dependent on the operating logic of other loads or on other programs in progress.

Door heating is activated or deactivated according to the operating logic indicated in the table below.

Door heating activated if	Door heating deactivated if
cold room temperature (PB2) <= door heating temperature threshold (parameter dR2) - hysteresis (parameter iSt)	cold room temperature (PB2) => door heating temperature threshold (parameter dR2)

4.5. CONDENSER FAN

The condenser fan can be controlled by one of the outputs, depending on which of the parameters FR1, FR2, FR3, FR4, FR5 is set to 2.

EWBC800 *automatically deactivates the condenser probe PB4 if the condenser fan is not controlled by any output, i.e. if none of the parameters FR1, FR2, FR3, FR4, FR5 is set to 2.*

The condenser fan is activated or deactivated according to the operating logic indicated in the table below.

The condenser fan is activated along with the compressor if	The condenser fan is permanently activated and the compressor deactivated if
condenser probe temperature (PB4) <= condenser temperature threshold (parameter SCF)	condenser probe temperature (PB4) => condenser temperature threshold (parameter SCF)

The condenser fan is activated at the same time as the compressor during a program (blast chilling cycle or storage phase).

If the compressor is deactivated, the display (**D - Fig. 9 on page 16)** shows the blinking PB4 condenser probe temperature along with the alarm icon.

In this alarm condition, press **START/STOP** *to stop the program in progress and remove the alarm condition.*

Any program in progress will be paused, to resume when the condenser threshold temperature (PB4) drops back under the condenser temperature threshold (parameter SCF).

If the condenser probe temperature (PB4) exceeds the condenser temperature threshold (parameter SCF) during stop status, the operating logic described in the table above is not applied; this check is carried out the next time the program is started.

4.6. UV LAMP - STERILIZATION

Opening the door stops sterilization and generates the door open alarm 'dOr' (refer to **'5. Alarms' on page 42**).

The UV lamp for sterilization can be controlled by one of the outputs, depending on which of the parameters FR1, FR2, FR3, FR4, FR5 is set to 4.

During sterilization the UV lamp and the evaporator fan are activated for a time, in seconds, equal to the value of parameter UUd.

Sterilization is activated or deactivated according to the operating logic indicated in the table below.

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

4.7. NEEDLE PROBE HEATING

The needle probe heater can be controlled by one of the outputs, depending on which of the parameters FR1, FR2, FR3, FR4, FR5 is set to 3.

The needle probe heater is activated for a time, in minutes, equal to the maximum needle probe heating time (parameter Prd).

If

needle probe temperature (PB1) => needle probe heating temperature set point (parameter Prt)

the needle probe heater is deactivated before the maximum needle probe heating time has elapsed (parameter Prd).

5. ALARMS

The **EWBC800** is able to perform a complete diagnostics of the blast chiller, reporting any malfunctions with specific alarms, showing the corresponding code on the display (**D1 - Fig. 5 on page 12**).

No beep sounds when an alarm occurs.

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

Code	Alarm	Cause	Effects	Solutions
E1	Needle probe error	- Needle probe present (parameter EP1=1) - 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 **EWBC800**
		- Needle probe present (parameter EP1=1) - Faulty needle probe		Replace the needle probe
E2	Cold room probe error	Cold room probe not connected properly	If a manual program is in progress with the needle probe present (parameter EP1=1), the manual program continues using the needle probe as a cold room probe If a manual program is in progress with the needle probe absent (parameter EP1=0), the manual program stops (stop status) If an automatic program is in progress, the automatic program stops (stop status)	Check the connection of the cold room probe to the **EWBC800**
		Cold room probe failure		Replace the cold room probe
E3	Evaporator probe error (defrost)	- Evaporator probe present (parameter EP3=1) - Evaporator probe not connected properly	If a defrost is in progress, it continues without checking the evaporator probe temperature	Check the connection of the evaporator to the **EWBC800**
		Faulty evaporator probe		Replace the evaporator probe
E4	Condenser probe error	- Condenser probe not connected properly	/	Check the connection of the auxiliary probe to the **EWBC800**
		Condenser probe failure		Replace the auxiliary probe

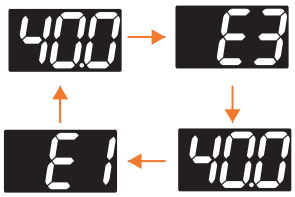
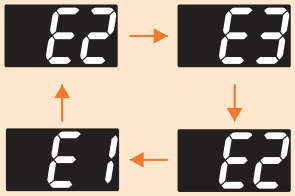
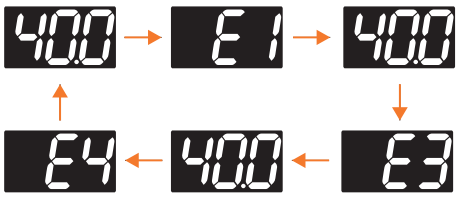
Code	Alarm	Cause	Effects	Solutions
AL	Low temperature alarm	If a storage phase is in progress with: - parameter LAE=1 - error E2 absent, - room probe temperature (PB2) <= room storage temperature set point (parameter ScP or Scn) - low temperature alarm offset (parameter OFL)	/	/
AH	High temperature alarm	If a storage phase is in progress with: - parameter HAE=1 - error E2 absent, - room probe temperature (PB2) => room storage temperature set point (parameter ScP or Scn) - high temperature alarm offset (parameter OFH)	/	/
dOr	Door open	- Door open (function of parameter tdO) - Blast chiller door opening with program or optional function (except defrost) in progress	The program or function is in progress Cold room fan deactivation Compressor deactivation (depending on parameters SLd and tdO)	Close the blast chiller door to reactivate the evaporator room fan (if parameter SLd=0) When the program or function is in progress, press **START/STOP** to stop the program or function, remove 'dOr' and revert to stop status
PrS	Pressure switch alarm without loads locking	- Opening of the pressure switch DI2 (if parameter EPS is anything other than 0) - Pressure switch alarm events count < parameter EPS	Increase by one unit of the alarm counter (initially zero) Blast chiller in stand-by status: - compressor deactivation - evaporator room fan deactivation - condenser fan activation - time counting stand-by, if a manual program is in progress	Close the pressure switch DI2 and wait for the safety times of the compressor (parameter dOF and parameter dOn)
	Pressure switch alarm with loads locking	- Opening of the pressure switch DI2 (if parameter EPS is anything other than 0) - Pressure switch alarm events count = parameter EPS	Deactivation of all loads	Press **START/STOP***

* When the **START/STOP** key is pressed the program or the special function in progress stops and the alarm events count is reset.

When switched on, **EWBC800** *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 if the display shows the PB2 probe temperature.

The PB2 probe temperature information displayed is equal to 40°C (main display).

Type of error	On-screen display
None (continuous display of the PB2 probe temperature)	
PB2 probe error (continuous display of 'E2'). If the PB1 probe temperature is displayed, cyclic display in succession of 'E2' and PB1 probe temperature	
PB1, PB3 or PB4 probe error (e.g. PB3 probe error: cyclic display in succession of 'E3'-'40')	
Error of two probes, one of which is PB2 (e.g. probe PB2 and PB3 error: cyclic display in succession of 'E3'-'E2')	
Error of two probes, excluding PB2 (e.g. probe PB1 and PB3 error: cyclic display in succession of 'E3'-'40'-'E1'-'40')	
Error of three probes, one of which is PB1 (e.g. probe PB1, PB2 and PB3 error: cyclic display in succession of 'E2'-'E3'-'E2'-'E1')	
Error of three probes, excluding PB2 (probe PB1, PB3 and PB4 error: cyclic display in succession of 'E1'-'40'-'E3'-'40'-'E4'-'40')	
Low temperature alarm AL (cyclic display in succession of 'AL'-'40'). In the case of other errors (excluding E2), display in succession with each of them	
High temperature alarm AH (cyclic display in succession of 'AH'-'40'). In the case of other errors (excluding E2), display in succession with each of them	
Door open, with Edo=1 (fixed display of 'dOr.')	
Open pressure switch with EPS other than 0 and alarm events count under EPS (blinking display of 'PrS')	

Open pressure switch with EPS other than 0 and alarm events count equal to EPS (cyclical display of 'PrS' and LED lit steadily)	

With the program in progress,

- In case of one or more malfunctions, the display shows the last value selected via the keypad (**T - Fig. 9 on page 16**) along with the malfunction(s) present in succession (refer to **'3.3.5. Cyclical display' on page 27**);
- in case of a PB1 probe error with displaying of the current PB1 probe temperature, 'E1' appears steadily on the display and other values can be viewed cyclically (refer to **'3.3.5. Cyclical display' on page 27**);
- in case of a PB2 probe error with displaying of the current PB2 probe temperature, 'E2' appears steadily on the display and other values can be viewed cyclically (refer to **'3.3.5. Cyclical display' on page 27**).

6. FUNCTIONS

6.1. MULTI FUNCTION KEY

The Multi Function key can be used to update the firmware. The device must be powered.

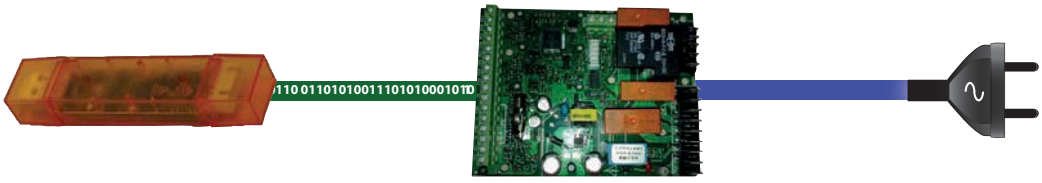
6.2. UNICARD

The Unicard, like the Multi Function key, can be used to update the device firmware.
It is a versatile tool that also allows you to quickly and easily customize devices.
It differs from the Multi Function key in the following ways:

- it can be connected directly to a computer via USB
- it can be plugged into a USB socket or USB battery, to power the device directly during upload/download procedures.

The Unicard can be powered in the following ways:

A) Bench powered



UNICARD Controller Controller power supply

B) Site powered

USB power supply unit UNICARD Controller

USB battery UNICARD Controller

6.3. BOOT LOADER FIRMWARE

The device is equipped with a Boot Loader, so it is possible to update the Firmware directly on site.
Updating may be carried out using UNICARD or MULTI FUNCTION KEY (MFK).

Updating procedure:

- Connect the UNICARD/MFK equipped with the application
- Power the device if it is off, otherwise switch it off and on again

NOTE: the UNICARD/MFK can be connected even with the device powered.

- Wait until the LED of the UNICARD/MFK is blinking (operation in progress);
- The operation will be concluded when the LED of the UNICARD/MFK is:
  - **ON**: operation concluded correctly
  - **OFF**: operation not performed (application not compatible...)

WARNING: the LED display is guaranteed only for UNICARDS produced from week 18-12 onward.

In order to download the Firmware application on the UNICARD (in CLONE mode as used for parameters maps) you must use the Device Manager (version 05.00.06 or later), which you can download from the Eliwell site after having registered at level 2.

NOTE: with this version of the Device Manager the UNICARD can be connected DIRECTLY without using the DMI.

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