EVCO
Advanced Controllers

EVJS 500 Split

Temperature/humidity controllers for refrigerated display units with remote user interface

⚠ WARNING

Make sure you read and fully understand the manual before using this device.

Non-observance of these instructions may result in death or serious injury.

Installer manual

114JS50E4.00 - 04/2022

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IMPORTANT INFORMATION

Liability and residual risks

EVCO assumes no liability for any damage caused by the following (by way of example; this is not an exhaustive list):

- Installation/use for purposes other than those specified and, in particular, not adhering to the safety provisions set out by current regulations in the country in which the product is installed and/or contained in this manual;
- Use in appliances that do not guarantee sufficient protection against electric shocks, water and dust within the installation conditions created;
- Use in appliances that allow access to hazardous parts without the use of a keyed or tooled locking mechanism when accessing the instrument;
- Tampering and/or modifying the product;
- Installation/use in appliances which do not comply with current regulations in the country in which the product is installed.

The customer/manufacturer is responsible for ensuring their machine complies with these regulations.
EVCO's responsibility is limited to the correct and professional use of the product in accordance with regulations and the instructions contained in this manual and other product support documents.

To comply with EMC standards, observe all the electrical connection instructions. As it depends on the wiring configuration as well as the load and the installation type, compliance must be verified for the final machine as specified by the relevant product standard.

Disclaimer

This document is the exclusive property of EVCO. It contains a general description and/or a description of the technical specifications for the services offered by the products listed herein. This document should not be used to determine the suitability or reliability of these products in relation to specific user applications. Each user or integration specialist should conduct their own complete and appropriate risk analysis, in addition to carrying out a product evaluation and test in relation to its specific application or use. Users can send us comments and suggestions on how to improve or correct this publication.

Neither EVCO nor any of its associates or subsidiaries shall be held responsible or liable for improper use of the information contained herein.

EVCO has a policy of continuous development; therefore, EVCO reserves the right to make changes and improvements to any product described in this document without prior notice.

The images in this document and other documentation supplied with the product are provided for illustrative purposes only and may differ from the product itself.

The technical data in this manual is subject to change without prior notice.

Terms and Conditions of use

Permitted use

The device must be installed and used in accordance with the instructions provided and, in particular, hazardous live parts must not be accessible under normal conditions.

The device must be suitably protected from water and dust with regard to its application and must also only be accessible with the aid of a tool (with the exception of the front panel).
Only qualified personnel may install the product or perform technical support procedures on it.

The customer must only use the product as described in the documentation relating to that product.

Prohibited use

Any use other than those described in the "**Permitted use**" section and in the product support documentation is prohibited.

Disposal

The device must be disposed of in accordance with local regulations regarding the collection of electrical and electronic appliances.

Consider the environment

The company works towards protecting the environment, while taking account of customer requirements, technological innovations in terms of materials and the expectations of the community to which we belong. EVCO places great importance on respecting the environment, encouraging all associates to become involved with company values and guaranteeing safe, healthy and functional working conditions and workplaces.
Please consider the environment before printing this document.

IMPORTANT SAFETY INFORMATION

Please read this document carefully before installation; study all the warnings before using the device. Only use the device in accordance with the methods described in this document. The following safety messages may be repeated several times in the document, to provide information regarding potential hazards or to attract attention to information which may be useful in explaining or clarifying a procedure.

This symbol is used to indicate a risk of electric shock.
It is a safety indication and as such, should be observed to avoid potential accidents or fatalities.

This symbol is used to indicate a risk of serious personal injury.
It is a safety indication and as such, should be observed to avoid potential accidents or fatalities.

⚠⚠ DANGER

DANGER indicates a situation of imminent danger which, if not avoided, **will lead to death or serious injury**.

⚠ WARNING

WARNING indicates a situation of imminent danger which, if not avoided, **may lead to death or serious injury**.

CAUTION

CAUTION indicates a potentially hazardous situation which, if not avoided, **could cause minor or moderate injury.**

NOTICE

NOTICE indicates a situation not related to physical injuries but which, if not avoided, could damage the equipment**.**

NOTE: the maintenance, repair, installation and use of electrical equipment must only be entrusted to qualified personnel.

QUALIFIED PERSONNEL

Only suitably trained and experienced personnel capable of understanding the content of this manual and all documentation regarding the product are authorised to work on and with this equipment. Furthermore, the personnel must have completed courses in safety and must be able to recognise and prevent the implied dangers. The personnel must have suitable training, knowledge and experience at a technical level, and be capable of anticipating and detecting potential risks caused by using the product, as well as changing the settings and modifying the mechanical, electric and electronic equipment for the entire system in which the product is used. All personnel working on and with the product must be entirely familiar with the relevant standards and directives, as well as safety regulations.

SAFETY INFORMATION RELATING TO THE PRODUCT

Before carrying out any work on the equipment, read these instructions carefully, making sure you understand everything.

⚠ ⚠ DANGER

RISK OF ELECTRIC SHOCK, EXPLOSION OR ELECTRIC ARC

- Only use electrically insulated measuring devices and equipment.
- Do not install the equipment while the power supply is connected.
- Cut off the power supply to all equipment, including any connected devices, before installing/uninstalling the device.
- Always use a properly calibrated Voltmeter to make sure the system is powered off.
- Do not touch the unshielded components or the terminals while they are live.
- Do not open, disassemble, repair or modify the product.
- Do not expose the equipment to liquids or chemicals.
- Before applying voltage to the equipment:
  - Make sure all protective elements, such as covers, hatches and grilles, are fitted and/or closed.
  - Check all wiring connections.

⚠ ⚠ DANGER

RISK OF ELECTRIC SHOCK AND FIRE

- Do not use the device with loads greater than those indicated in the technical data section.
- Do not exceed the temperature and humidity ranges indicated in the technical data section.
- Use the required safety interlocks (fuses and/or magnetothermal switches) of a suitable size.

⚠ ⚠ DANGER

RISK OF ELECTRIC SHOCK OR MALFUNCTIONING OF THE EQUIPMENT

Do not use damaged products or accessories.

⚠ WARNING

MALFUNCTIONING OF THE EQUIPMENT

- Perform the wiring carefully, in compliance with electromagnetic compatibility requirements.
- Make sure the wiring is correct for its application.
- Use shielded cables for all I/O signal and communication cables.
- Minimise the length of the connections as much as possible, to avoid winding the cables around electrically connected parts.
- The signal (digital and analogue inputs, communication and corresponding power supplies) and power cables for the device must be routed separately.
- Before applying the power supply, check all the wiring connections.
- Use the necessary safety interlocks wherever the risk of injury to personnel and/or equipment damage exists.
- Install and use this device in a cabinet of a suitable class for the intended environment, protected by a keyed locking mechanism or other suitable instruments.
- In terms of connection and the fuses used in the circuits for the power supply and output lines, observe local and national regulatory requirements relating to the nominal current and voltage for the equipment in use.
- Do not use this equipment for machine functions that are critical to safety.
- Do not disassemble, repair or modify the equipment.
- Do not connect wires to unused terminals and/or terminals marked with the text “No connection” (“N.C.”).

1. INTRODUCTION

1.1 DESCRIPTION

EVJS 500 Split controllers represent a complete solution by EVCO, suitable for the management of:

- Wine/patisserie cabinets;
- Refrigerated cabinets;
- Refrigerated cold rooms.

1.2 FEATURES

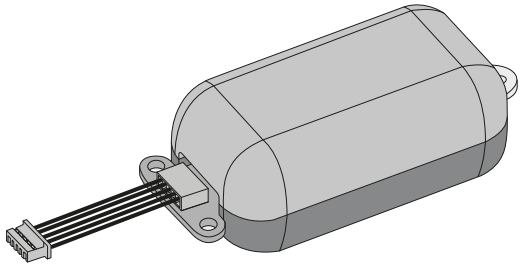
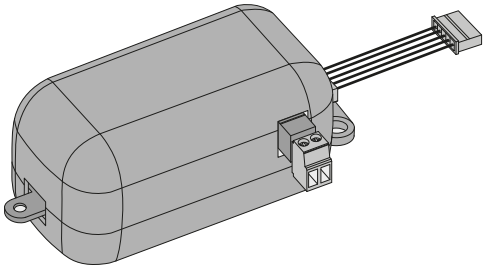
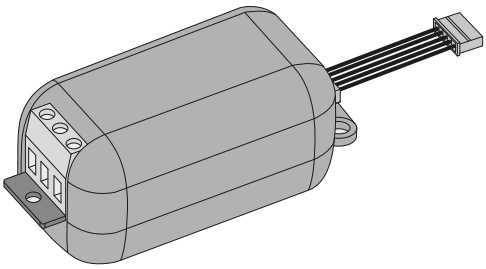
The main features of **EVJS 500 Split** controllers are:

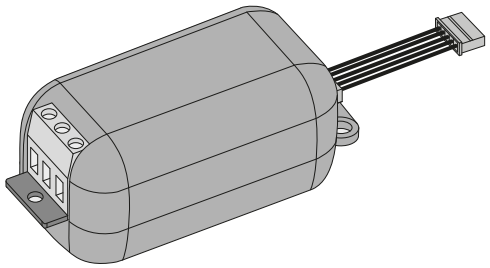
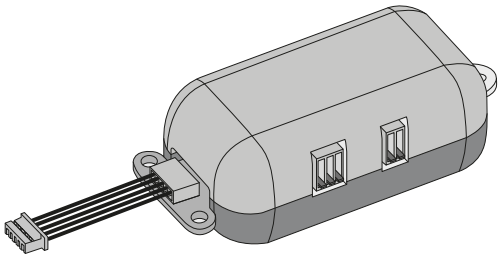
- 5 analogue inputs, of which:
  - 4 are analogue inputs for temperature;
  - 1 is an analogue input for humidity;
- 2 volt-free digital inputs that can be configured via parameter;
- 2 analogue outputs;
- 6 sealed relay outputs;
- 1 TTL serial port (on the user interface);
- 1 RS-485 serial port (on the user interface);
- ***EPoCA***-compatible;
- Compatible with BMS interfacing via Modbus protocol.

NOTE: for further information regarding input and output specifications, please refer to paragraph ***"2.1 Technical specifications" on page 10***.

1.3 ACCESSORIES

The accessories available for **EVJS 500 Split** controllers are:

Type	P/n	Description
	**EVHTP520**	Humidity and temperature transducers
	**EVTP**	NTC/PTC temperature probes
	**EVIF25TBX**	BLE module for connection to EVconnect APP
	**EVIF25TWX**	Wi-Fi module
	**EVIF24TSX**	Module for TTL/RS-485 serial interface

Type	P/n	Description
	**EVIF23TSX**	Module for TTL/RS-485 serial interface with built-in clock
	**EVJKEY**	Programming flash drive for EVJS models

2. TECHNICAL DATA

All the system components of **EVJS 500 Split** controllers satisfy European Community (EC) requirements for open systems. They must be installed in casing or another location designated on the basis of specific environmental conditions and in order to minimise the risk of involuntary contact with hazardous voltage. Use metal casing to improve **EVJS 500 Split** system immunity to electromagnetic fields. This equipment satisfies the EC requirements as indicated in the tables below.

⚠ WARNING

MALFUNCTIONING OF THE EQUIPMENT

Do not exceed any of the nominal values specified in this section.

2.1 TECHNICAL SPECIFICATIONS

2.1.1 EVJS 500 Split

Type	Description
The product complies with the following harmonised standards:	EN60730-1 and EN60730-2-9
Device construction:	Incorporated electronic device
Device purpose:	Operating control device
Type of action:	1
Pollution category:	2
Overvoltage category:	III
Nominal pulse voltage:	**Base board**: 4000 V **User interface**: 330 V
Power supply:	**Base board**: 115...230 Vac, ±10 %, 50/60 Hz **User interface**: 12 Vdc from base board
Consumption:	6 VA maximum
Ambient operating conditions:	0 ... 55 °C (32 ... 131 °F) 10 ... 90 % RH non-condensing
Transportation and storage conditions:	-25 ... 70 °C (-13 ... 158 °F) 10 ... 90 % RH non-condensing
Software class:	A
Ambient front protection:	**Base board**: IP00 **User interface**: IP65

2.2 I/O SPECIFICATIONS

2.2.1 Base board

Type	Description
Digital inputs:	2 voltage-free digital inputs
Analogue inputs for temperature:	5 analogue inputs for NTC or PTC or humidity probe
Analogue outputs:	2 configurable analogue outputs
Digital output (SELV):	6 digital outputs

Analogue input specifications

	Default	NTC 10 kΩ at 25 °C BETA 3435	PTC KTY 81-121 990 Ω at 25 °C	RH EVHTP500	RH EVHTP520
Pb1	Cold room probe	•	•	**Temperature**	**Temperature**
Pb2	Evaporator probe	•	•	---	---
Pb3	Disabled	•	•	---	---
Pb4	Disabled	•	•	---	---
Pb5	Humidity probe **EVHTP520**	---	---	•	•

Range	---	-50...120 °C (-58...248 °F)	-50...150 °C (-58...302 °F)	5 ...95 % RH
Solution	---	0.1 °C (1 °F)		1 %
Input impedance	---	10 kΩ	990 Ω	---

Digital output specifications

Relay output	Default	Description	Load (at 250 Vac)	Load type
Out1	Evaporator fans	SPST	8 A	Resistive
Out2	Condenser fans	SPST	8 A	Resistive
Out3	Door heaters	SPST	8 A	Resistive
Out4	Defrosting	SPST	16 A	Resistive
Out5	Light	SPST	16 A	Resistive
Out6	Compressor	SPDT	30 A	Resistive

2.3 REMOTE USER INTERFACE FEATURES

Type	Description
Display:	2.8" graphic TFT, 16 colours
Display resolution:	320 x 240 pixel
Display range:	-50...99 (large display decimals: -9.9...19.9)
Serial port:	1 TTL serial port

3. MECHANICAL ASSEMBLY

3.1 BEFORE YOU START

Read this manual carefully before installing the system.
In particular, the safety instructions, electrical requirements and current regulations for the machine or the process in which this device is involved must be observed. The use and application of the information contained herein requires experience in the design and programming of automated control systems. Only the user, integrator or manufacturer of the machine can be familiar with all the conditions and factors which arise during installation and configuration, operation and maintenance of the machine or the process, and as such can identify the relevant automation equipment and the corresponding interlocks and safety systems which can be used effectively and appropriately. When selecting automation and control equipment and other connected equipment and software, for a particular application, you must consider all applicable local, regional and national standards and/or regulations.

⚠ WARNING

REGULATORY INCOMPATIBILITY

Make sure all the equipment used and the systems conform to all applicable local, regional and national regulations and standards.

3.2 INFORMATION CONCERNING INSTALLATION AND THE SURROUNDING ENVIRONMENT

Before carrying out any work on the equipment, read these instructions carefully, making sure you understand everything.

⚠⚠ DANGER

RISK OF ELECTRIC SHOCK, EXPLOSION OR ELECTRIC ARC

- Only use electrically insulated measuring devices and equipment.
- Do not install the equipment while the power supply is connected.
- Cut off the power supply to all equipment, including any connected devices, before installing/uninstalling the device.
- Always use a properly calibrated Voltmeter to make sure the system is powered off.
- Do not touch the unshielded components or the terminals while they are live.
- Do not open, disassemble, repair or modify the product.
- Do not expose the equipment to liquids or chemicals.
- Before applying voltage to the equipment:
  - Make sure all protective elements, such as covers, hatches and grilles, are fitted and/or closed.
  - Check all wiring connections.

⚠ WARNING

MALFUNCTIONING OF THE EQUIPMENT

- Perform the wiring carefully, in compliance with electromagnetic compatibility and safety requirements.
- Make sure the wiring is correct for its application.
- Use shielded cables for all I/O signal and communication cables.
- Minimise the length of the connections as much as possible, to avoid winding the cables around electrically connected parts.
- The signal (digital and analogue inputs, communication and corresponding power supplies) and power cables for the device must be routed separately.
- Before applying the power supply, check all the wiring connections.
- Use the necessary safety interlocks wherever the risk of injury to personnel and/or equipment damage exists.
- Install and use this device in a cabinet of a suitable class for the intended environment, protected by a keyed locking mechanism or other suitable instruments.
- In terms of connection and the fuses used in the circuits for the power supply and output lines, observe local and national regulatory requirements relating to the nominal current and voltage for the equipment in use.
- Do not use this equipment for machine functions that are critical to safety.
- Do not disassemble, repair or modify the equipment.
- Do not connect wires to unused terminals and/or terminals marked with the text “No connection” (“N.C.”).

3.3 DIMENSIONS

3.3.1 Base board

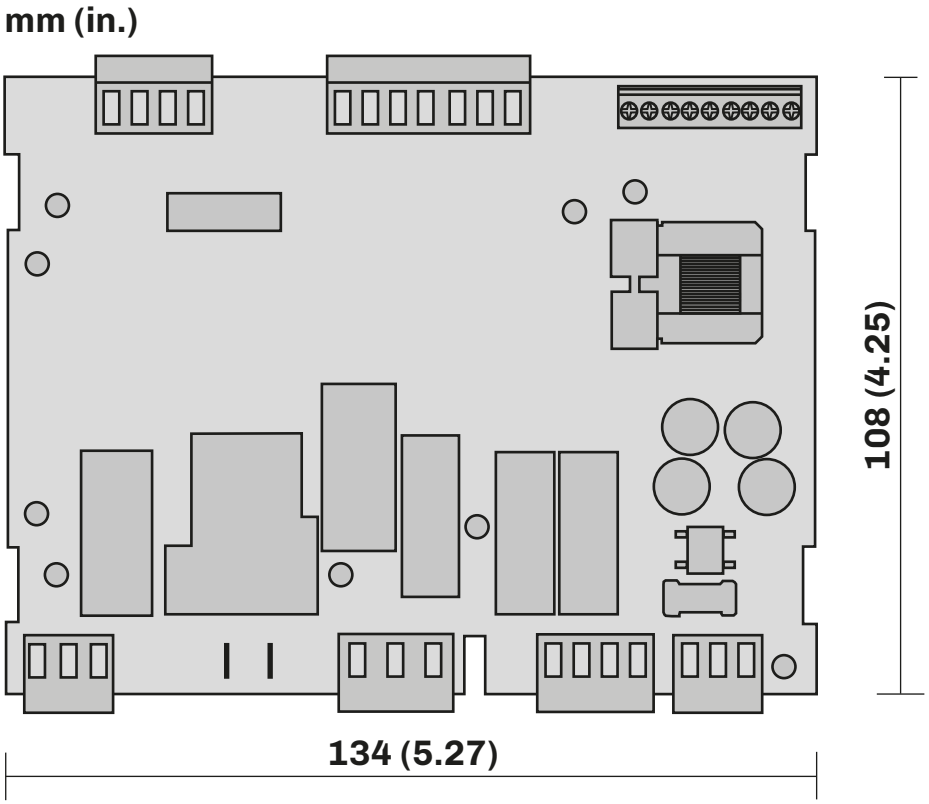


Fig. 1. ***EVJS 500 Split - Base board*** *dimensions*

3.3.2 User interface

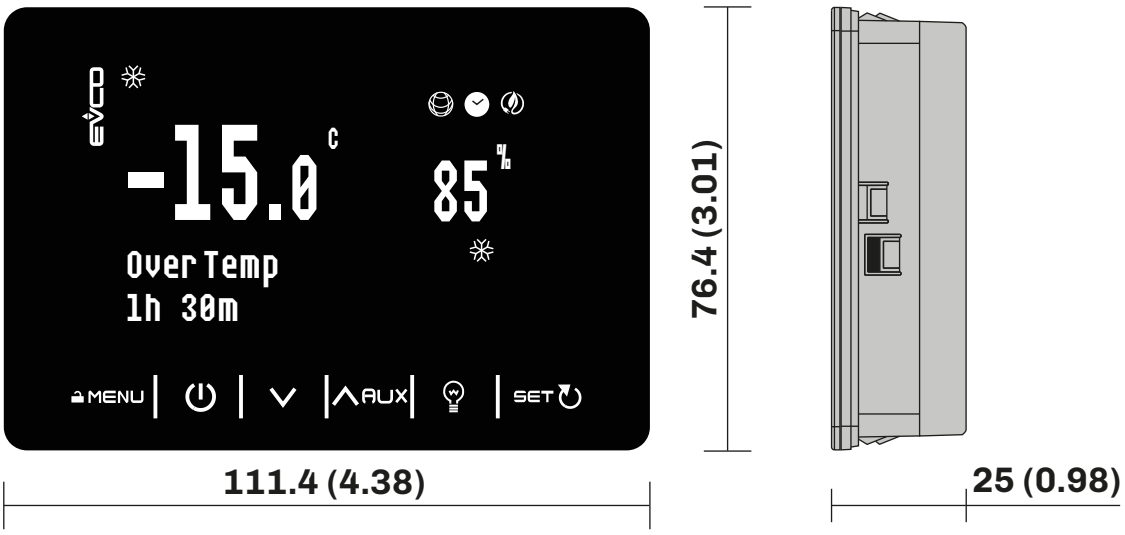


Fig. 2. ***EVJS 500 Split - User interface*** *dimensions*

3.4 INSTALLATION

3.4.1 Base board

Installation of the base board **EVJS 500 Split** anticipates the use of plastic spacers (not provided).
Make sure there is a minimum distance of 10 mm (0.39 in.) between the **EVJS 500 Split** mounting base and base board.

3.4.2 User interface

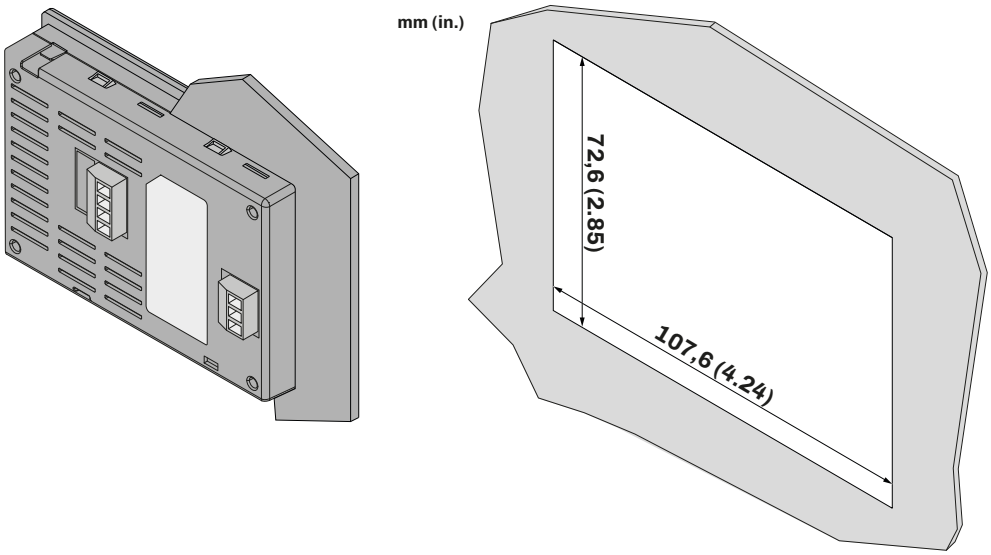


*Fig. 3. **EVJS 500 Split - User interface** installation*

3.4.3 Minimum installation distances for the base board

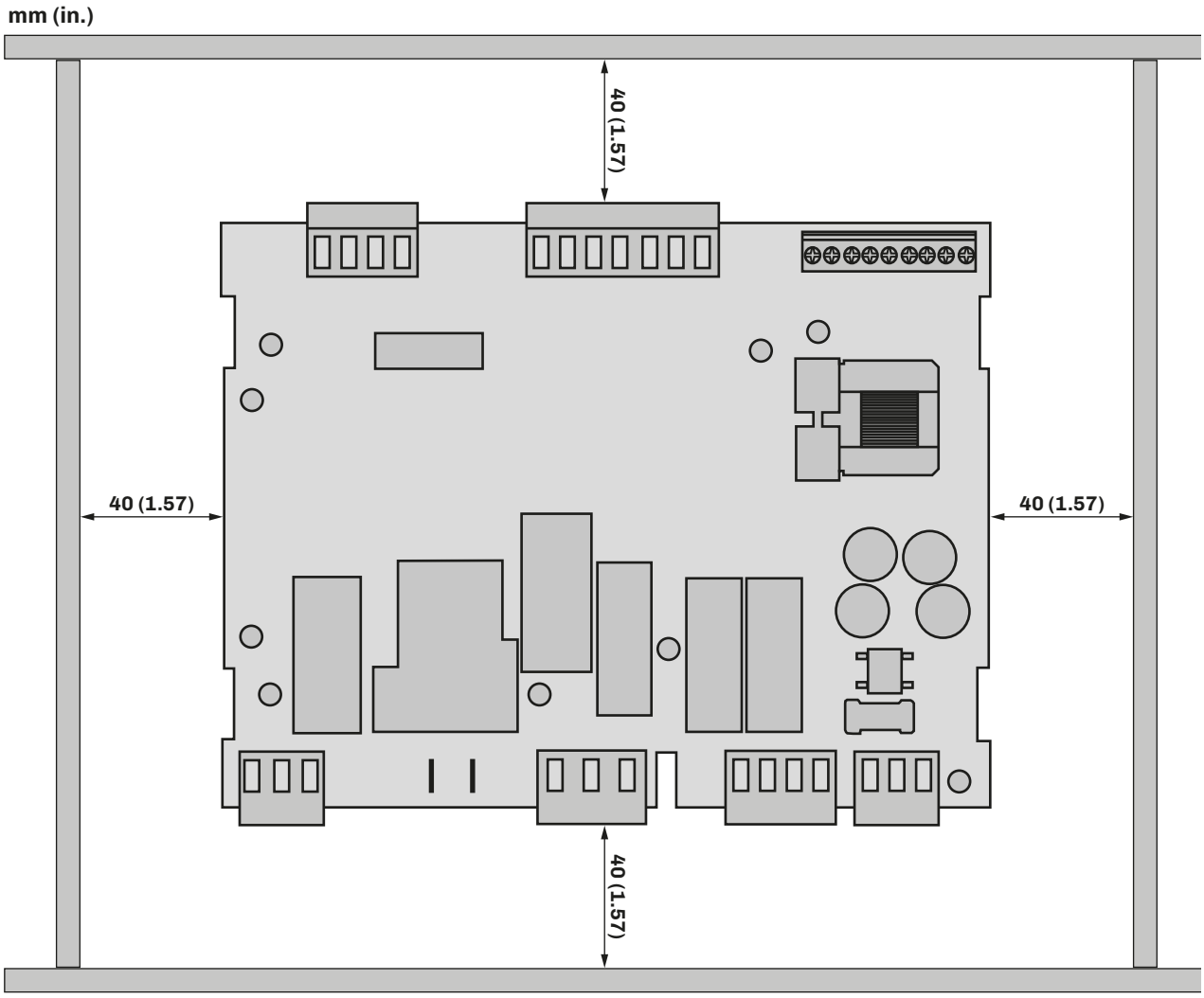


*Fig. 4. **EVJS 500 Split - Base board** minimum installation distances*

4. ELECTRICAL CONNECTIONS

4.1 WIRING BEST PRACTICES

The following information describes the wiring guidelines and best practices which should be observed when using the equipment described in this user manual.

⚠ ⚠ DANGER

RISK OF ELECTRIC SHOCK, EXPLOSION OR ELECTRIC ARC

- Only use electrically insulated measuring devices and equipment.
- Do not install the equipment while the power supply is connected.
- Cut off the power supply to all equipment, including any connected devices, before installing/uninstalling the device.
- Always use a properly calibrated Voltmeter to make sure the system is powered off.
- Do not touch the unshielded components or the terminals while they are live.
- Do not open, disassemble, repair or modify the product.
- Do not expose the equipment to liquids or chemicals.
- Before applying voltage to the equipment:
  - Make sure all protective elements, such as covers, hatches and grilles, are fitted and/or closed.
  - Check all wiring connections.

4.1.1 Wiring guidelines

When wiring the controllers, observe the following standards:

- The I/O and communication wiring must be kept separate from the power supply wiring. These two types of wiring must be routed in separate ducts.
- Make sure the operating environment and conditions fall within the specified values.
- Use wires with the correct diameter, suited to the voltage and current requirements.
- Use copper conductors (compulsory).
- Use shielded twisted pair cables for analogue/digital I/O connections.

Use correctly earthed shielded cables for all inputs or analogue outputs and for communication connections. If shielded cables are not used for these connections, electromagnetic interference may cause signal degradation. Degraded signals can result in unpredictable operation of the controller or the modules and connected equipment.

⚠ WARNING

MALFUNCTIONING OF THE EQUIPMENT

- Perform the wiring carefully, in compliance with electromagnetic compatibility and safety requirements.
- Make sure the wiring is correct for its application.
- Use shielded cables for all I/O signal and communication cables.
- Minimise the length of the connections as much as possible, to avoid winding the cables around electrically connected parts.
- The signal (digital and analogue inputs, communication and corresponding power supplies) and power cables for the device must be routed separately.
- Before applying the power supply, check all the wiring connections.
- Use the necessary safety interlocks wherever the risk of injury to personnel and/or equipment damage exists.
- Install and use this device in a cabinet of a suitable class for the intended environment, protected by a keyed locking mechanism or other suitable instruments.
- In terms of connection and the fuses used in the circuits for the power supply and output lines, observe local and national regulatory requirements relating to the nominal current and voltage for the equipment in use.
- Do not use this equipment for machine functions that are critical to safety.
- Do not connect wires to unused terminals and/or terminals marked with the text “No connection” (“N.C.”).

4.1.2 Guidelines for screw terminals

Suitable wiring for power supply and SELV I/O

Step 5.08 mm (0.199 in.)

mm / in. 7 / 0.28								
mm²	0.2…2.5	0.2…2.5	0.25…2.5	0.25…2.5	2 x 0.2…1	2 x 0.2…1.5	2 x 0.25…1	2 x 0.5...1.5
AWG	*24…14*	*24…14*	*22...14*	*22...14*	*2 x 24…18*	*2 x 24…16*	*2 x 22…18*	*2 x 20...16*

Ø 3.5 mm (*0.14 in.*)	C	N•m	0.5...0.6
		lb-in	*4.42...5.31*

Fig. 5. *Suitable wiring for power supply and SELV I/O*

Suitable wiring for the user interface

Step 3.5 mm (0.137 in.)

mm / in. 7 / 0.28								
mm²	0.14…1.5	0.14…1.5	0.25…1.5	0.25…0.5	2 x 0.08…0.5	2 x 0.08…0.5	2 x 0.25…0.34	2 x 0.5…0.5
AWG	*28…16*	*28…16*	*22…16*	*22…20*	*2 x 28…20*	*2 x 28…20*	*2 x 22…21*	*2 x 20…20*

Ø 2.5 mm (*0.09 in.*)	C	N•m	0.22…0.25
		lb-in	*1.94…2.21*

Fig. 6. *Suitable wiring for the user interface*

4.1.3 Permitted cable lengths

NOTICE

INOPERABLE EQUIPMENT

- When connecting the probes, the digital inputs and the power supply, use cables that are no longer than 10 m (32.80 ft.).
- When connecting the TTL serial port, use cables that are no longer than 1 m (3.28 ft.).
- When connecting the controller power supply and the relay outputs, use cables that are no longer than 10 m (32.80 ft.).

4.2 WIRING DIAGRAM

4.2.1 Base board

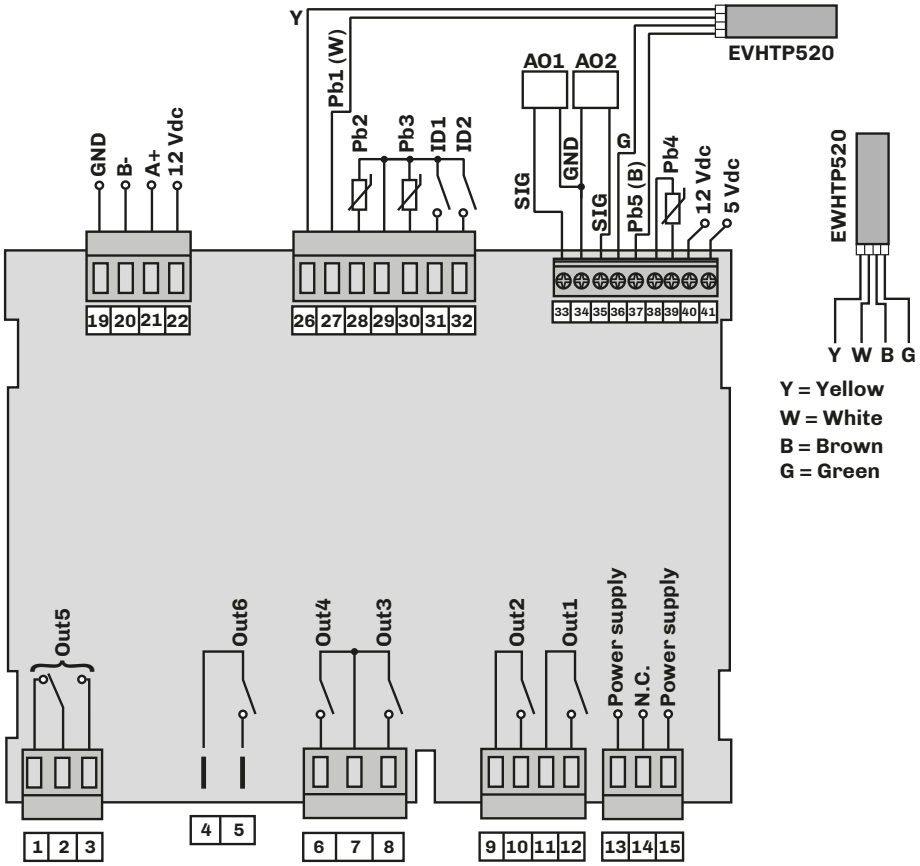


Fig. 7. *Wiring diagram -* ***Base board***

TERMINALS			
1-2-3	**Out5** relay output	**29-30**	Probe Pb3 input
4-5	**Out6** relay output	**29-31**	**ID 1** Digital input
6-7	**Out4** relay output	**29-32**	**ID 2** Digital input
7-8	**Out3** relay output	**33-34**	**AO1** analogue output
9-10	**Out2** relay output	**34-35**	**AO2** analogue output
11-12	**Out1** relay output	**36**	Humidity probe input (G)
13-15	Power supply input. **14 = N.C.**	**37**	Humidity probe input (B)
19..22	Connection to remote user interface	**38-39**	Probe Pb4 input
26	Humidity probe temperature input (Y)	**40**	Auxiliary 12 Vdc power supply output
27	Humidity probe temperature input (W)	**41**	Auxiliary 5 Vdc power supply output
28-29	Probe Pb2 input		

4.2.2 User interface

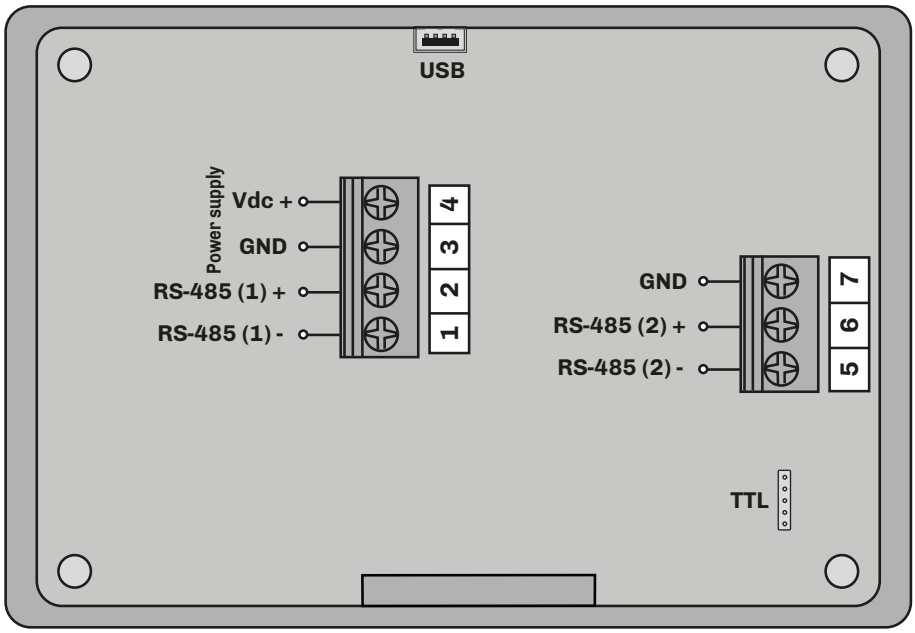


Fig. 8. *Wiring diagram -* ***User interface***

TERMINALS			
1-2	RS-485 serial (1) connection to base board	**USB**	Connection to USB
3-4	Power supply input	**TTL**	TTL serial connection for EPoCA
5...7	RS-485 serial (2) connection		

5. USER INTERFACE

5.1 INTERFACE

Fig. 9. *User interface*

5.2 TOUCH KEYS

The touch key functions are described below:

Keys...	Tap and release to...	Tap and hold for at least 3 seconds to...
MENU	---	• (**From home**) Access the configuration menu • (**From standby**) Access the programming menu
	• Go back a level • Exit a function	• Switch the instrument on/off • Stop regulation
	• Decrease a value • Navigate within the menus	---
AUX	• Increase a value • Navigate within the menus • Access the AUX menu	---
	Activate/Deactivate the Light relay	---
SET	• Confirm the selected value/function • Access the setpoint menu	---

5.3 ICONS

Icon	Lit steadily	Flashing	OFF
	• Cold request • Dehumidification request	Protection delay ON	Compressor OFF
	Defrost active	• Defrost delay ON • Dripping ON	---
	Evaporator fans ON	• Evaporator fan activation delay ON • Humidification/dehumidification cycle ON	Evaporator fans OFF
	• Humidification request • Humidification digital output ON	---	---
	• Dehumidification request • Dehumidification digital output ON	Dehumidification delay with compressor ON	---
	• Hot request • Hot digital output ON	---	---
HACCP	HACCP alarm in memory	New HACCP alarm registered	---
	Energy saving ON	---	Energy saving OFF
	Maintenance request	Remote connection	---
C	Temperature shown in °C	---	---
F	Temperature shown in °F	---	---
%	Humidity shown in %	---	---
AUX	• AUX function ON • AUX digital output ON	---	AUX function OFF

Icon	Lit steadily	Flashing	OFF
	Light relay ON from key	Light relay ON from door switch	Light relay OFF
	---	Alarm in progress	---
	• Probe value below the setpoint • Probe value above the setpoint	---	---
	Keypad locked	---	---
	Keypad unlocked	---	---
	Door switch open	Door switch closed	---
	Cycle active	Cycle suspended due to the activation of another function	Cycle not active
	Sanitising in progress with the instrument ON	Sanitising interval (if instrument is ON)	
	Demisting in progress	---	---

5.4 USING THE CONTROLLER

5.4.1 Controller ON/OFF

To switch the controller on/off, press and hold ⏻ for at least 3 seconds.

Fig. 10. Main screen display

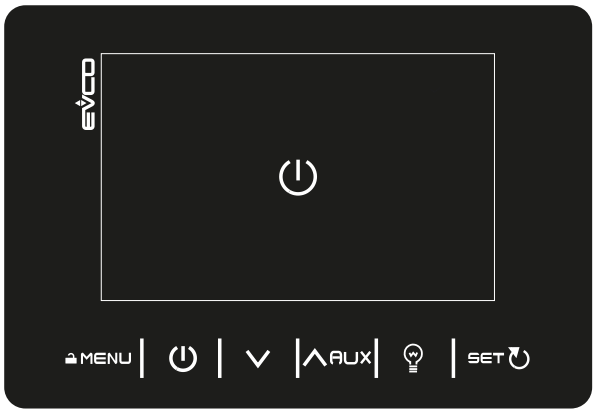


Fig. 11. Controller switching off display

NOTE: the display will show the ⏻ icon for a few seconds, as per ***"Fig. 11. Controller switching off display" on page 19***, and will then switch off. When one of the keys is pressed, the ⏻ icon appears.

5.4.2 Functions that can be activated via key

EVJS 500 Split controllers offer the option of activating, by tapping ∧AUX, the following functions:

- **Sanitising**; activates the sanitising function (if at least one **uc1**...**uc6** output = 18);
- **Defrost**; activates defrosting if the conditions allow (see ***6. Defrosting" on page 24***);
- **Over temp**; forces a setpoint 1 (temperature) other than the set value, timed;
- **Energy Saving**; activates the energy saving function;
- **AUX**; activates AUX relay (if **u6** = 2);
- **Demisting**; activates the glass demisting function (if at least one **uc1**...**uc6** output = 14).

Select the function by tapping SET ↻ and confirm by tapping SET ↻ again.

5.4.3 Changing the setpoint

To change the setpoint:

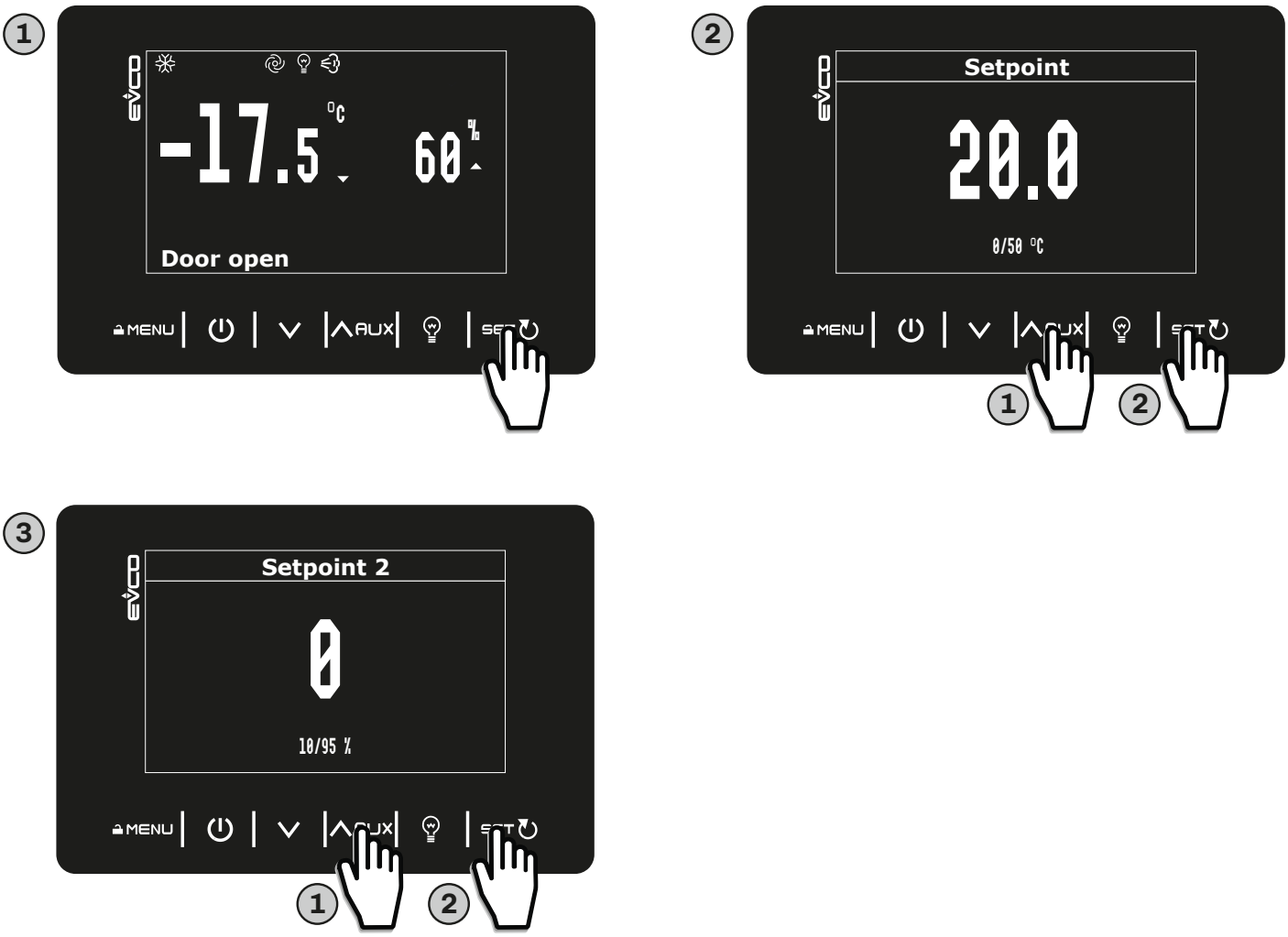


Fig. 12. *Changing the setpoint*

5.4.4 Changing the intensity of light 1 and 2

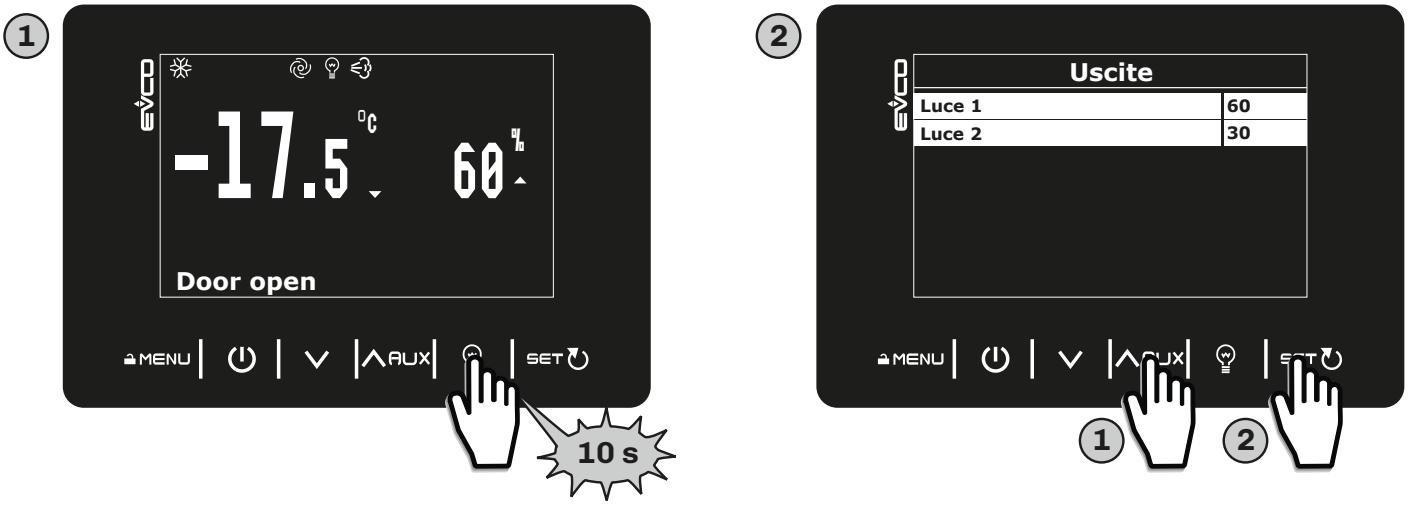


Fig. 13. *Changing the intensity of light 1 and 2*

5.4.5 Setting the clock

To set the instrument clock (date and time):

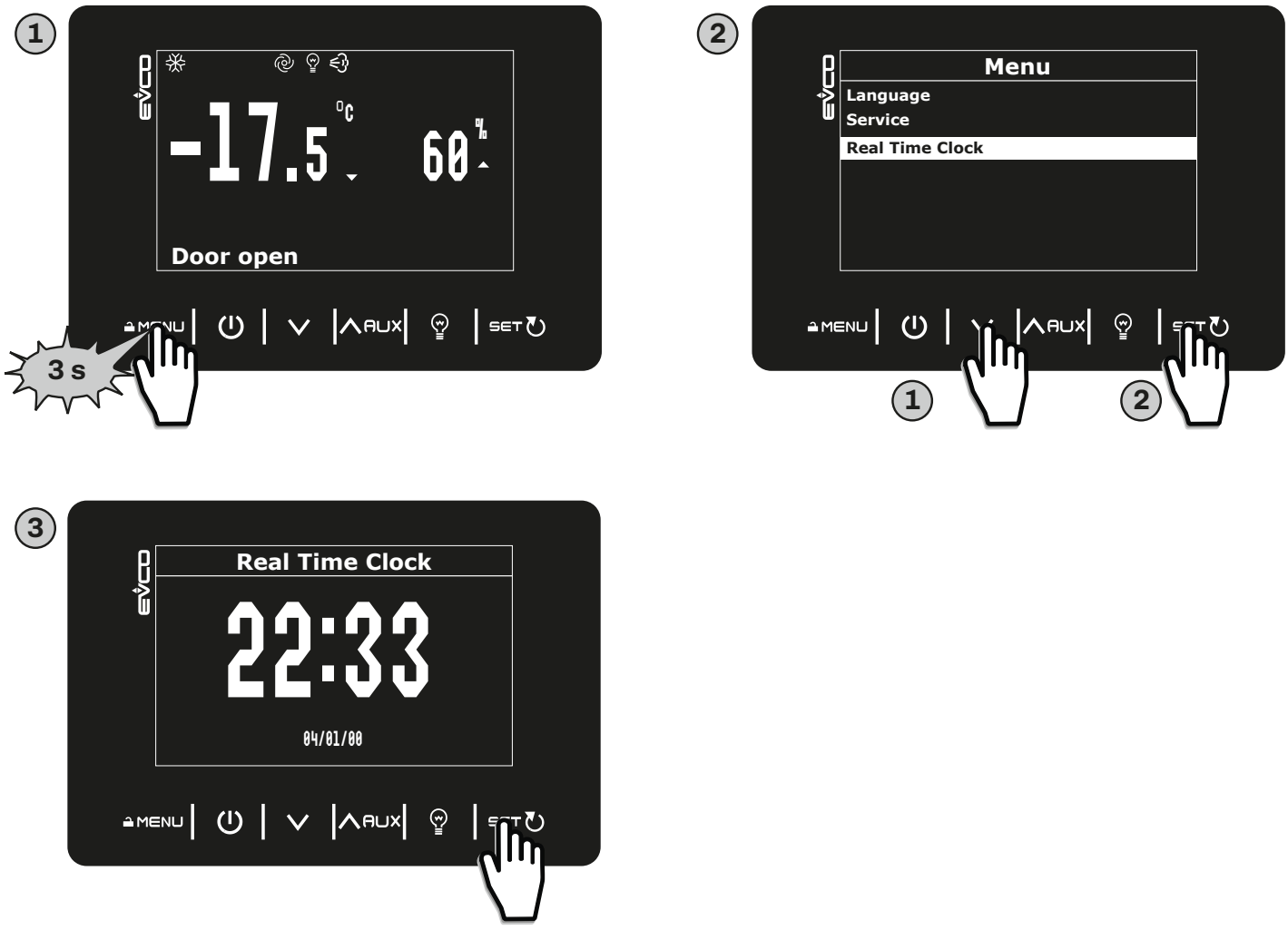


Fig. 14. *Configuring the clock*

Confirm with SET, then proceed with configuring the clock, in the following order (to scroll values, press SET):

1. Year;
2. Month;
3. Day;
4. Hours;
5. Minutes.

5.4.6 Accessing the parameters

To access the parameters and edit them:

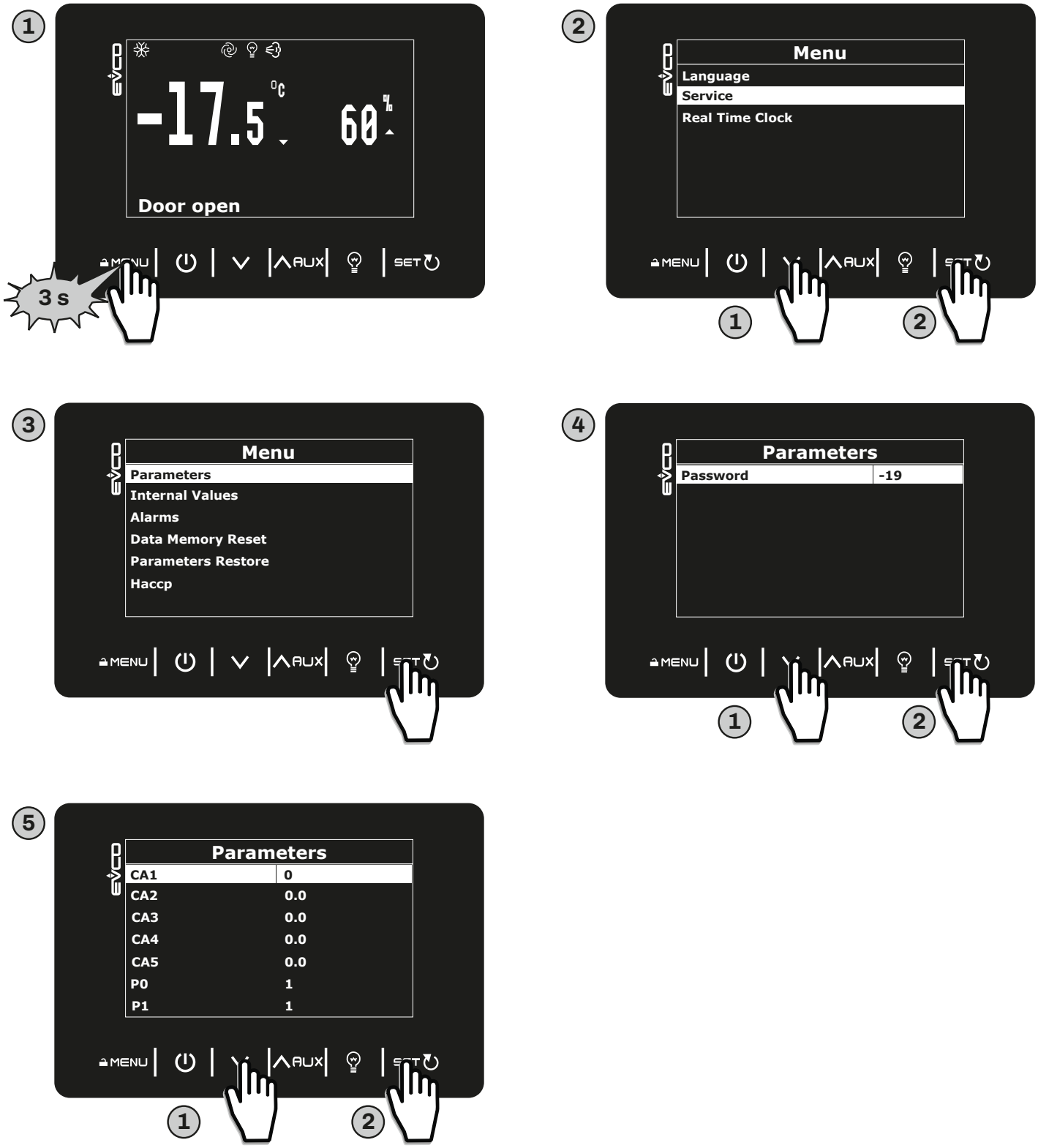


Fig. 15. *Accessing the parameters*

User parameters password: **1**
Installer parameters password: **-19**

5.4.7 Programming menu

To access the programming menu, press and hold MENU for at least 3 seconds. The following options will appear:

- **Language;**
- **Service;**
- **Real Time Clock.**

Language
Set the controller language in this section. Choose from:

- English;
- Italian;
- German;
- French;
- Spanish;
- Polish;
- Traditional Chinese;
- Simplified Chinese.

Service
The service menu offers the following options:

- **Parameters**, for accessing the list of parameters;
- **Internal Values**, for showing the temperature of the probes and statuses;
- **Alarms**, for showing current alarms;
- **Data Memory Reset**, for resetting the instrument to its factory values;
- **Parameters Restore**, for resetting the parameters to their factory values;
- **HACCP**, for viewing HACCP alarms registered with a date and time before the alarms are reset.

Real Time Clock
This section can be used to change the date and time on the instrument.

6. DEFROSTING

6.1 INTRODUCTION

Defrosting is used to remove ice from the surface of the evaporator.
By default defrost is set to take place automatically every 8 hours. For automatic operation, set **d0** > 0.

The defrost configuration parameters are:

Par.	Description	MU	Range
d0	Defrost interval.	h	0...99
d1	Defrost type. **0** = Electric heaters; **1** = Cycle inversion (hot gas); **2** = On compressor stoppage.	---	0...2
d2	Evaporator temperature over which defrost ends with evaporator probe (**Pb2** = 1).	°C/°F	-99.0...99.0
d3	Defrost duration.	min	0...99
d4	Enable defrost at device switch-on. **0** = No; **1** = Yes, activate defrost at switch-on.	---	0/1
d5	Time that elapses between device switch-on and the start of the defrost.	min	0...99
d6	Value shown on the display during a defrost. **0** = Regulation; **1** = Display locked; **2** = Reserved.	---	0...2
d7	Evaporator drip time after a defrost.	min	0...15
d11	Enable alert for defrost end due to maximum duration. **0** = No; **1** = Yes.	---	0/1
d15	Consecutive compressor ON time before hot gas defrost.	min	0...99

Defrost starts once the time set in **d0** has elapsed, with the method set by **d1**.

The defrost duration is determined by **d3**, while the temperature threshold for the end of defrosting is determined by **d2**, if **Pb2** = 1 (evaporator probe active).

To keep the coils clean, a forced defrost can be set for when the controller switches on using parameter **d4**.

Parameter **d5** can be used to set a delay in minutes between instrument switch-on and the start of a defrost.

With **d11** = 1, an alert appears on the display (**dFd**), if the defrost has a duration greater than **d3** (only if **Pb2** = 1).

When **d15** = 0, the function is disabled. If **d15** > 0, the compressor is forced to ON for the set time.

6.1.1 Operating conditions

Defrosting starts automatically, if the following conditions are met:

- Pb2 temperature below **d2**;
- Interval **d0** elapsed and Pb2 temperature under **d2**.

If a manual defrost is active or one of these two conditions is not satisfied, defrosting **does not** start automatically.

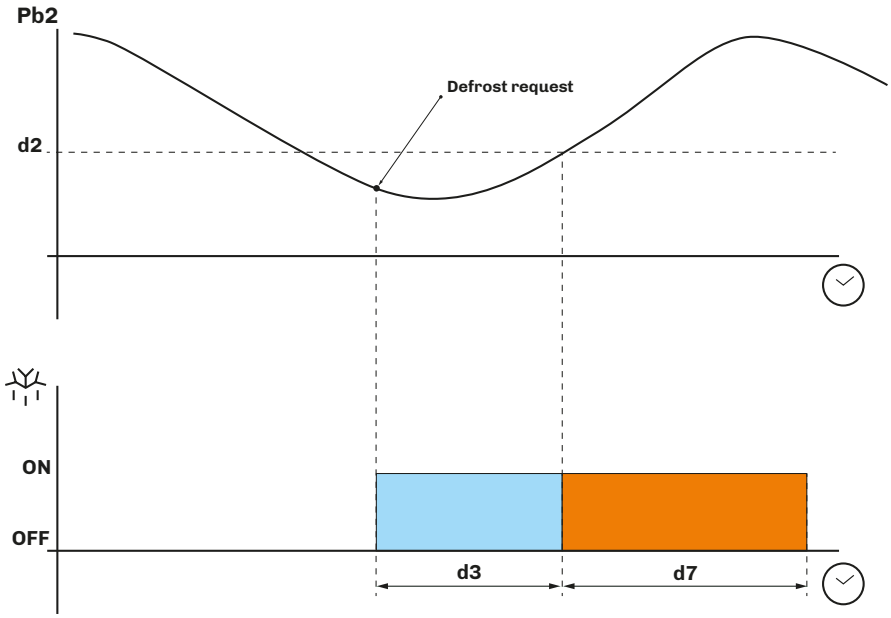


Fig. 16. *Defrost with **Pb2** = 1*

6.1.2 Dripping interval

A dripping interval can be set following a defrost, by setting **d7** > 0, to prevent water from accumulating inside the evaporator and then freezing.

6.1.3 Defrost types

The **EVJS 500 Split** series features 2 types of defrost:

- Modular defrost;
- Standard defrost.

6.2 MODULAR DEFROST: RTC

If parameters **hd1..hd6** > 0, defrosting is independent of the program in progress and, as such, intervenes every day in the same interval. In case of an rtc alarm, the defrost starts on the basis of interval **d0**.

The defrost configuration parameters are:

Par.	Description	MU	Range
Hd1	Defrost 1 activation time "**----**" = Disabled.	h	----, 0...23
Hd2	Defrost 2 activation time "**----**" = Disabled.	h	----, 0...23
Hd3	Defrost 3 activation time "**----**" = Disabled.	h	----, 0...23
Hd4	Defrost 4 activation time "**----**" = Disabled.	h	----, 0...23
Hd5	Defrost 5 activation time "**----**" = Disabled.	h	----, 0...23
Hd6	Defrost 6 activation time "**----**" = Disabled.	h	----, 0...23

6.3 STANDARD DEFROST

To use this mode, set parameter **d1**.
Defrosting takes place by means of evaporator heating using one of the following methods:

Par.	Description	MU	Range
d1	Defrost type. **0** = Electric heaters; **1** = Cycle inversion (hot gas); **2** = On compressor stoppage.	---	0...2

6.3.1 Electric heater defrost

Electric heater defrost is achieved by setting **d1** = 0.

Defrost activation
When defrosting is activated:

- The compressor stops;
- The relay output to which the electric heaters are connected (configured as a defrost output) is activated.

Defrost end conditions
The defrost end conditions are:

- The defrost duration **d3** is reached;
- The defrost end temperature **d2** is reached.

The electric heater defrost configuration parameters are:

Par.	Description	MU	Range
C0	Compressor ON delay from power-on.	min	0...240
C2	Minimum compressor OFF time.	min	0...240
d0	Defrost interval.	h	0...99
d1	Defrost type. **0** = Electric heaters; **1** = Cycle inversion (hot gas); **2** = On compressor stoppage.	---	0...2
d2	Evaporator temperature over which defrost ends with evaporator probe (**Pb2** = 1).	°C/°F	-99.0...99.0
d3	Defrost duration.	min	0...99
d7	Evaporator drip time after a defrost.	min	0...15

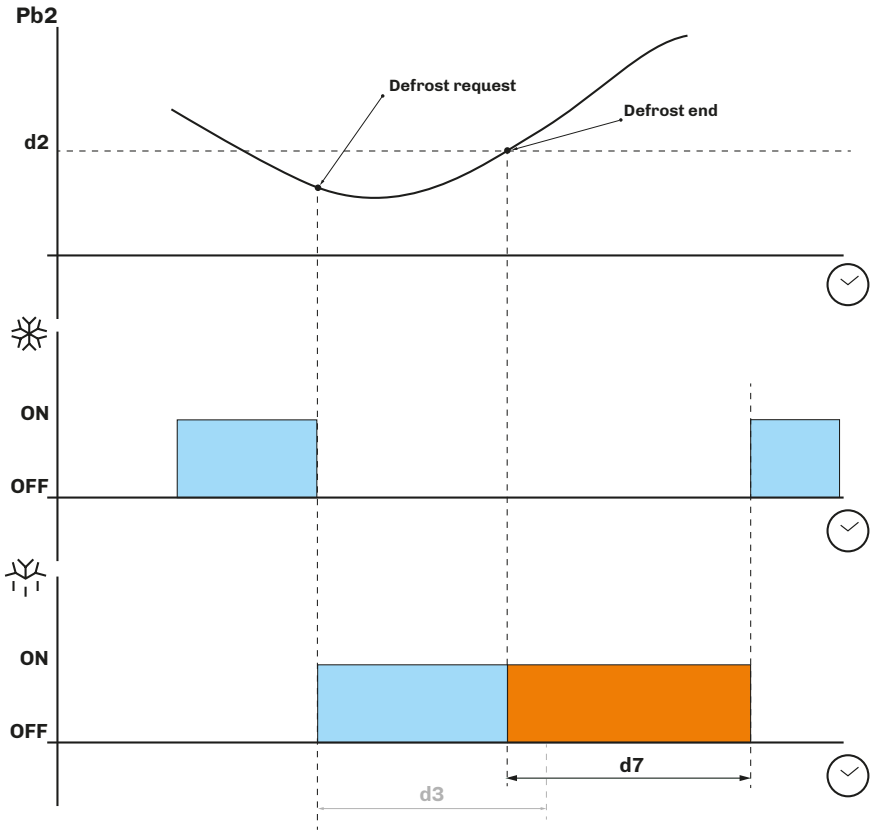


Fig. 17. *Electric heater defrost - Defrost end due to temperature*

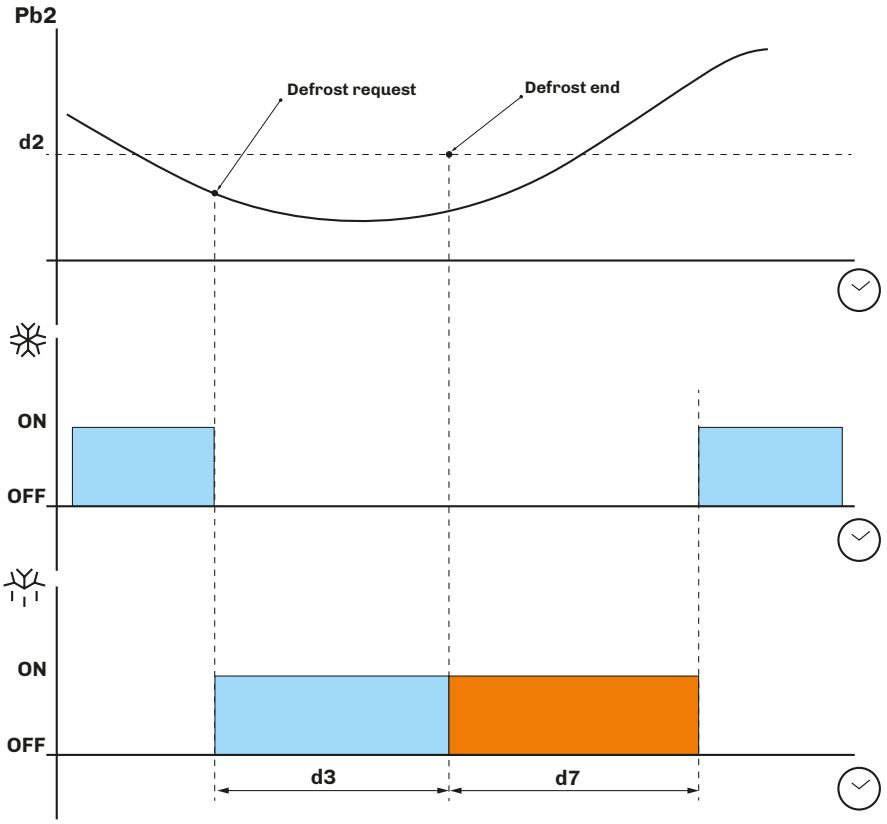


Fig. 18. *Electric heater defrost - Defrost end due to maximum time*

6.3.2 Cycle inversion (hot gas) defrost

Cycle inversion defrost is achieved by setting **d1** = 1.

Defrost activation

When defrosting is activated:

- The compressor is activated (or it has already been active for a time period **d15**) and remains so for the duration of the defrost;
- The relay output to which the valve is connected (solenoid if the system operates with a thermostatic valve) is activated.

Defrost end conditions

The defrost end conditions are:

- The maximum defrost duration, set via parameter **d3**, is reached;
- The defrost end temperature, set via parameter **d2**, is reached.

The cycle inversion defrost configuration parameters are:

Par.	Description	MU	Range
C0	Compressor ON delay from power-on.	min	0...240
C2	Minimum compressor OFF time.	min	0...240
d0	Defrost interval.	h	0...99
d1	Defrost type. **0** = Electric heaters; **1** = Cycle inversion (hot gas); **2** = On compressor stoppage.	---	0...2
d2	Evaporator temperature over which defrost ends with evaporator probe (**Pb2** = 1).	°C/°F	-99.0...99.0
d3	Defrost duration.	min	0...99
d7	Evaporator drip time after a defrost.	min	0...15
d15	Consecutive compressor ON time before hot gas defrost.	min	0...99

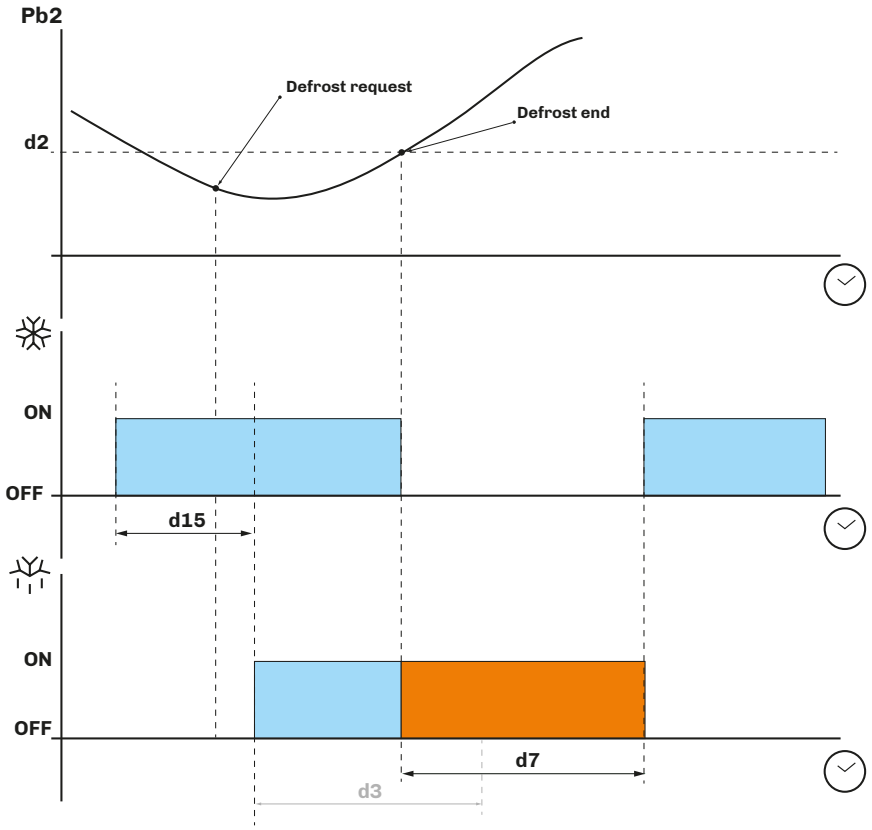


Fig. 19. *Cycle inversion defrost - Defrost end due to temperature*

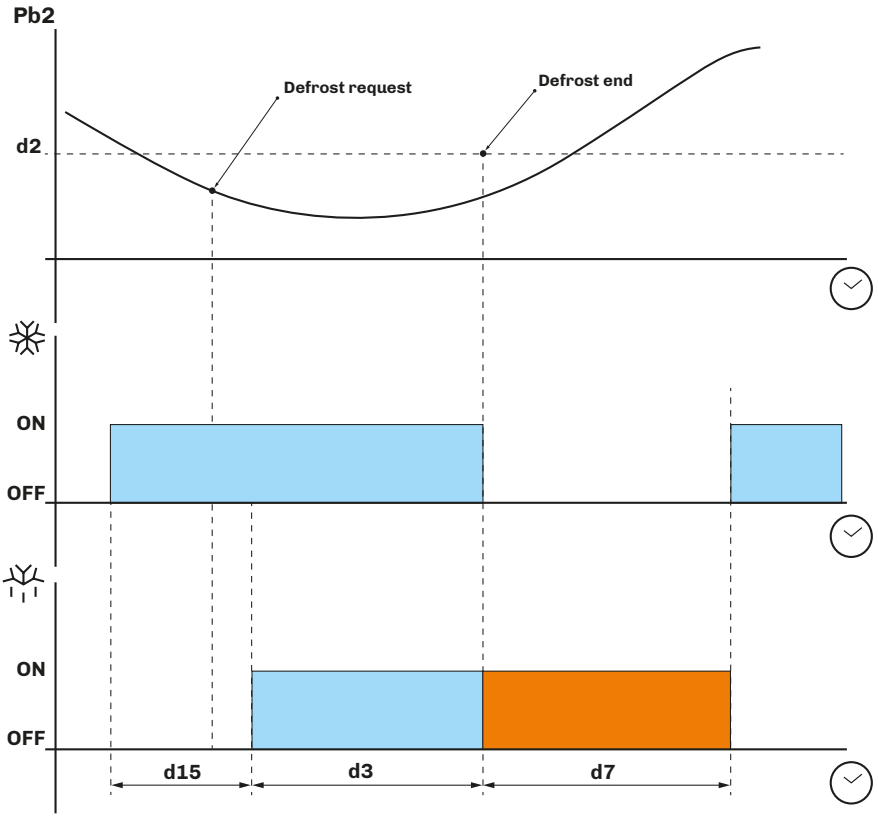


Fig. 20. *Cycle inversion defrost - Defrost end due to maximum time*

6.3.3 Defrost on compressor stoppage

Compressor stoppage defrost is achieved by setting **d1** = 2.

The compressor stoppage defrost configuration parameters are:

Par.	Description	MU	Range
d0	Defrost interval.	h	0...99
d1	Defrost type. **0** = Electric heaters; **1** = Cycle inversion (hot gas); **2** = On compressor stoppage.	---	0...2
d3	Defrost duration.	min	0...99
d7	Evaporator drip time after a defrost.	min	0...15

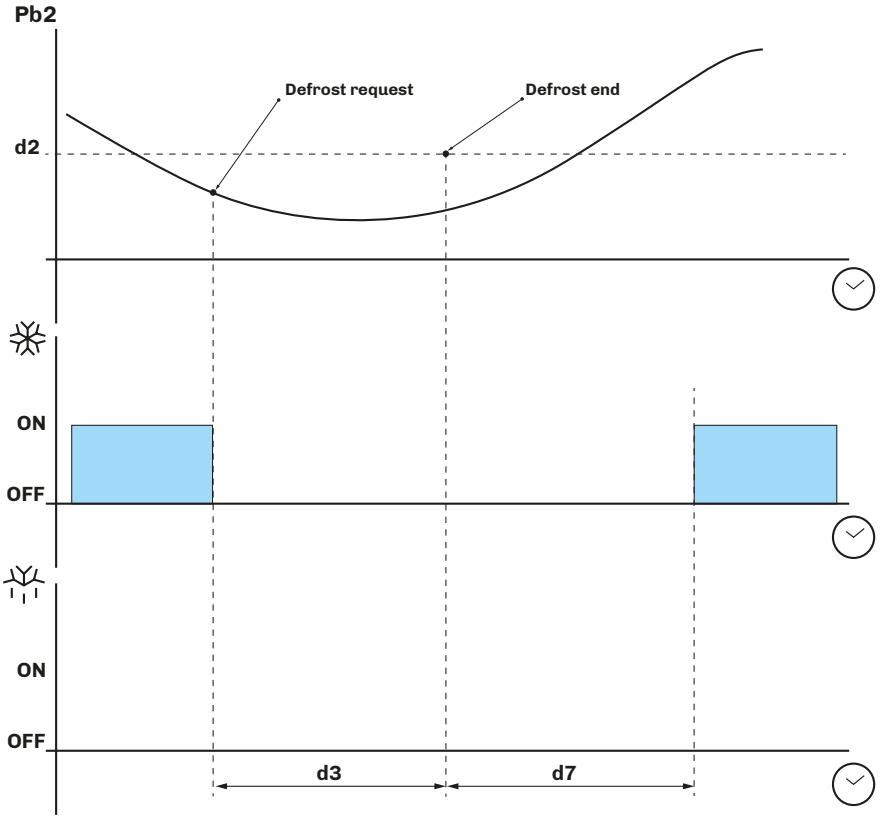


Fig. 21. *Defrost on compressor stoppage*

7. REGULATORS

7.1 HOT/COLD TEMPERATURE

The temperature regulation configuration parameters are:

Par.	Description	MU	Range
r0	Cold temperature regulation differential, to be added to setpoint 1 (setpoint 1 + **r0**).	°C/°F	0.1...25.0
r1	Minimum value that can be assigned to setpoint 1.	°C/°F	-99.9...**r2**
r2	Maximum value that can be assigned to setpoint 1.	°C/°F	**r1** = 199.0
r12	Hot temperature regulation differential, to be subtracted from setpoint 1 (setpoint 1 - **r12**).	°C/°F	-25.0...-0.1

7.1.1 Operation

The controller manages the temperature on the basis of the type of request (Hot/Cold).

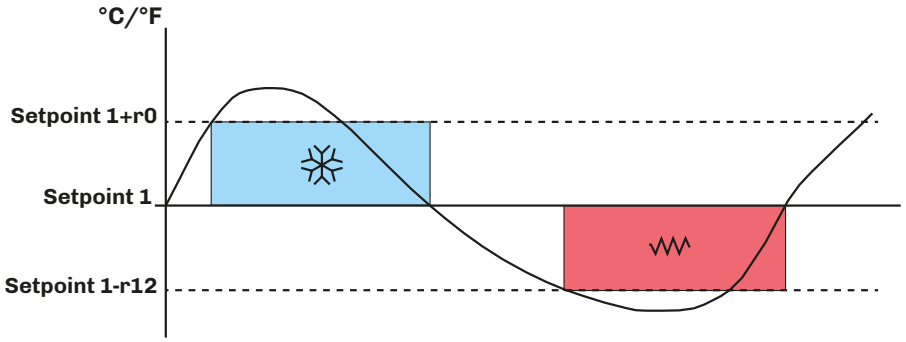


Fig. 22. *Temperature regulator operation*

Cold

If the controller receives a cold request:

- Cold output (compressor) between **Setpoint 1** and **Setpoint 1 + r0**.

When the temperature read by Pb1 reaches the value of **Setpoint 1 + r0**, the controller activates the compressor output to produce a cold effect until the temperature falls below the threshold set by **Setpoint 1**.

Hot

If the controller receives a hot request:

- Hot output (heaters) between **Setpoint 1** and **Setpoint 1 - r12**.

When the temperature read by Pb1 reaches the value of **Setpoint 1 - r12**, the controller activates the heater output to produce a hot effect until the temperature rises above the threshold set by **Setpoint 1**.

7.2 HOT/COLD TEMPERATURE WITH NEUTRAL ZONE

The temperature regulation configuration parameters for the neutral zone are:

Par.	Description	MU	Range
r0	Cold temperature regulation differential, to be added to setpoint 1 (Setpoint 1 + **r0**).	°C/°F	0.1...25.0
r1	Minimum value that can be assigned to Setpoint 1.	°C/°F	-99,9...**r2**
r2	Maximum value that can be assigned to Setpoint 1.	°C/°F	**r1** = 199.0
r11	Neutral zone value to be added to the differential. With **r11**>0 the value is active for hot (**r11**) and cold management (**r0**), with **r11**<0 for hot management only (**r12**).	°C/°F	0.0...10.0
r12	Hot temperature regulation differential, to be subtracted from setpoint 1 (Setpoint 1 - **r12**).	°C/°F	-25.0...-0.1

7.2.1 Operation

Regulation in the neutral zone occurs if **r11** ≠ 0 (if **r11** < 0, the neutral zone is activated in hot request).

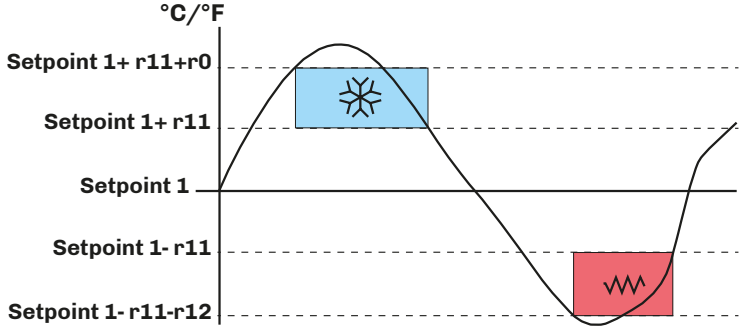


Fig. 23. *Temperature regulator operation in the neutral zone*

Cold

If the controller has received a cold request:

- Cold output (compressor) between **Setpoint 1 + r11 + r0** and **Setpoint 1 + r11**.

When the temperature read by Pb1 reaches the value of**Setpoint 1 + r11 + r0**, the controller activates the compressor output until the temperature falls below the threshold set by **Setpoint 1 + r11**.

Hot

If the controller has received a hot request:

- Hot output (heaters) between **Setpoint 1 - r11 - r12** and **Setpoint 1 - r11**.

When the temperature read by Pb1 reaches the value of **Setpoint 1 - r11 - r12**, the controller activates the heater output to produce a hot effect until the temperature rises above the threshold set by **Setpoint 1 - r11**.

7.3 TEMPERATURE AND DEHUMIDIFICATION WITH COMPRESSOR

The temperature regulation configuration parameters are:

Par.	Description	MU	Range
rd4	Compressor-only dehumidification or with compressor and heaters (hot). **0** = Disabled; **1** = Compressor; **2** = Compressor and hot.	---	0...2

7.3.1 Operation

- If **rd4** = 1, the dehumidification with compressor function is activated.
- If **rd4** = 2, the dehumidification with compressor function and the heaters output (hot) is activated.

7.3.2 Temperature priority over dehumidification

If **rd4** = 2, the dehumidification function is active and works in conjunction with the Compressor and Heaters outputs.
As a result, you need to set the regulation priority for the controller.

Parameter **r14** can be used to configure the regulation priority:

Par.	Description	MU	Range
r14	Temperature priority in relation to dehumidification with compressor and hot output. **0** = No priority, regulations are independent; **1** = Drift in hot takes priority over dehumidification until the temperature value is re-established; **2** = Drift in hot and cold takes priority over dehumidification until the temperature value is re-established; **3** = Drift in cold takes priority over dehumidification until the temperature value is re-established.	---	0...3

7.4 HUMIDITY

The humidity regulation configuration parameters are:

Par.	Description	MU	Range
rd0	Dehumidification regulation differential, to be added to setpoint 2 (setpoint 2 + **rd0**).	%	0...25
h1	Minimum value that can be assigned to setpoint 2.	%	0...**h2**
h2	Maximum value that can be assigned to setpoint 2.	%	**h1** = 100
rh0	Humidification regulation differential, to be added to setpoint 2 (setpoint 2 + **rh0**).	%	-25...-1

7.4.1 Operation

The controller manages humidification and dehumidification requests by setting parameters **rd0** and **rh0**.

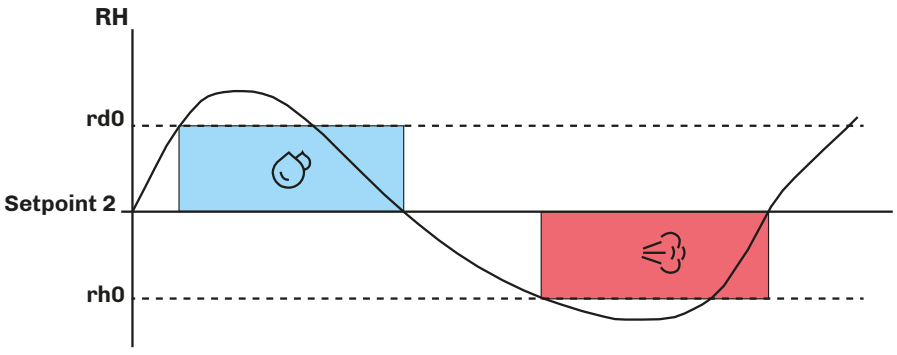


Fig. 24. *Humidity regulator operation*

7.5 HUMIDITY WITH NEUTRAL ZONE

The humidity regulation configuration parameters with a neutral zone are:

Par.	Description	MU	Range
rd0	Dehumidification regulation differential, to be added to setpoint 2 (Setpoint 2 + **rd0** + **rd1**).	%	0...25
h1	Minimum value that can be assigned to Setpoint 2.	%	0...**h2**
h2	Maximum value that can be assigned to Setpoint 2.	%	**h1** = 100
rh0	Humidification regulation differential, to be added to Setpoint 2 (Setpoint 2 + **rh0** + **rh1**).	%	-25...-1
rd1	Dehumidification neutral zone Setpoint 2 - **rd1**.	%	0...10
rh1	Humidification neutral zone Setpoint 2 - **rh1**.	%	0...10

7.5.1 Operation

Regulation in the neutral zone occurs if:

- For humidification, if **rh1** ≠ 0;
- For dehumidification, if **rd1** ≠ 0.

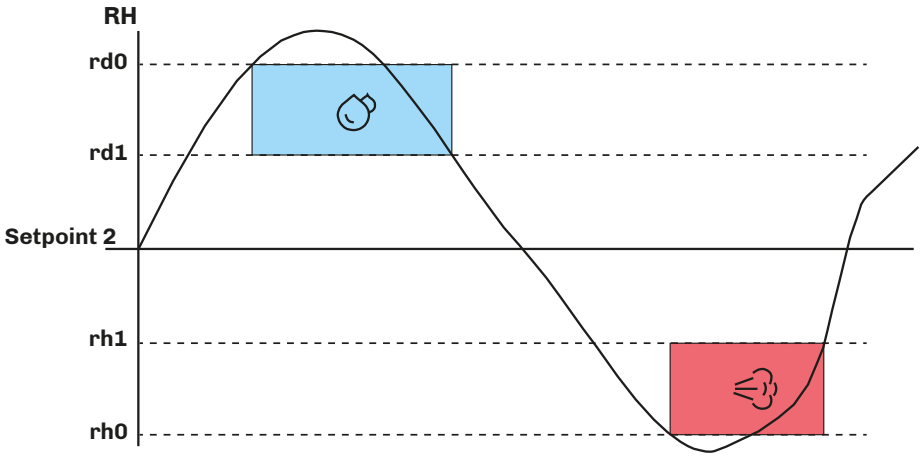


Fig. 25. *Humidity regulator operation in the neutral zone*

7.6 COMPRESSOR

The compressor regulator is running when at least one relay output is configured as compressor **uc1**...**uc6** = 4.

Compressor switch-on/off is regulated by:

- Temperature read by probe Pb1;
- Temperature adjustment configuration;
- Defrosting and dripping.

Activation conditions

The compressor is activated automatically, if the following conditions are met:

- The controller is on (regulation is inhibited while the controller is in standby);
- Probe Pb1 working;
- Compressor activation delay time from switch-on **C0** elapsed;
- Compressor switch-on delay time **C2** between 2 consecutive activations elapsed;
- If **d1** = 0, 2, defrosting and dripping must be completed.

If a delay time **C0** or **C2** is set and there is a compressor activation request, the controller waits for the delay time to elapse before activating the compressor. During this wait period, the ❄ icon flashes until the compressor is activated, after which it remains lit steadily.

The compressor regulation configuration parameters are:

Par.	Description	MU	Range
C0	Compressor ON delay from power-on.	min	0...240
C2	Minimum compressor OFF time.	min	0...240
C3	Minimum compressor ON time.	s	0...240
C4	Compressor OFF time in cold room probe alarm mode.	min	0...240
C5	Compressor ON time in cold room probe alarm mode.	min	0...240
C6	Condensation temperature over which the condenser overheat alarm is triggered.	°C/°F	0...199.0

Par.	Description	MU	Range
C7	Condenser temperature over which the compressor lock alarm is triggered, once time period **C8** has elapsed.	°C/°F	0...199.0
C8	Compressor lock alarm activation delay from when threshold **C7** was exceeded.	min	0...15
C10	Compressor maintenance days.	days	0...990
C11	Compressor 2 switch-on delay from compressor 1 switch-on.	s	0...240

7.6.1 Operating diagrams

Normal compressor operation

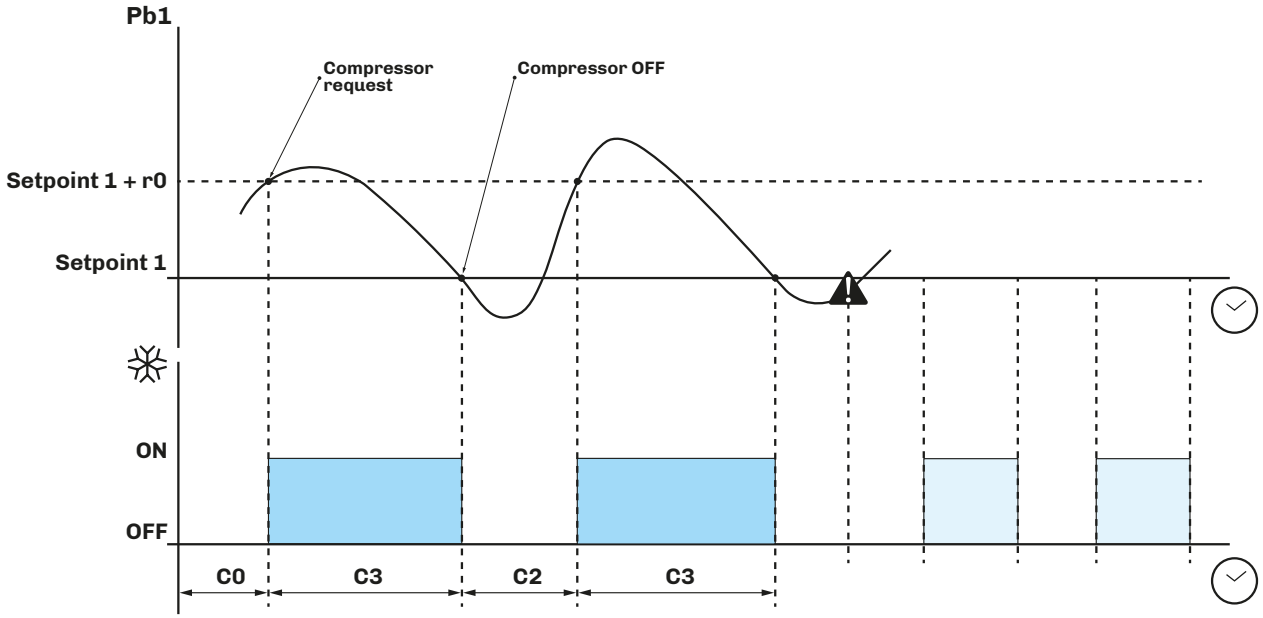


Fig. 26. Normal compressor operation

Compressor operation with probe alarm

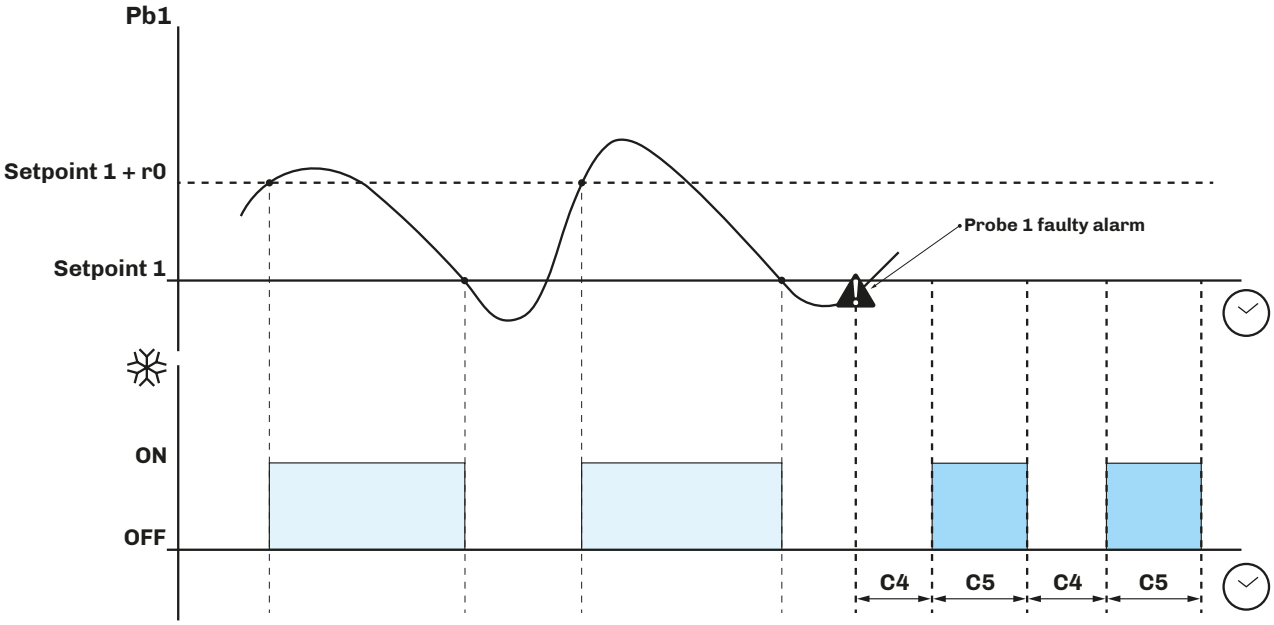


Fig. 27. Compressor operation with probe alarm

7.7 DUAL COMPRESSOR

If one of the digital outputs is set as compressor 2, **uc1**...**uc6** = 10, the controller manages 2 compressors.

Compressor 2 activation
Compressor 2 starts up after a delay period **C11** after compressor 1 is switched on.
If active, compressor 2 uses:

- Setpoints;
- Differentials;
- Delay periods;
- Protections;

set for compressor 1.

7.7.1 Operating diagram

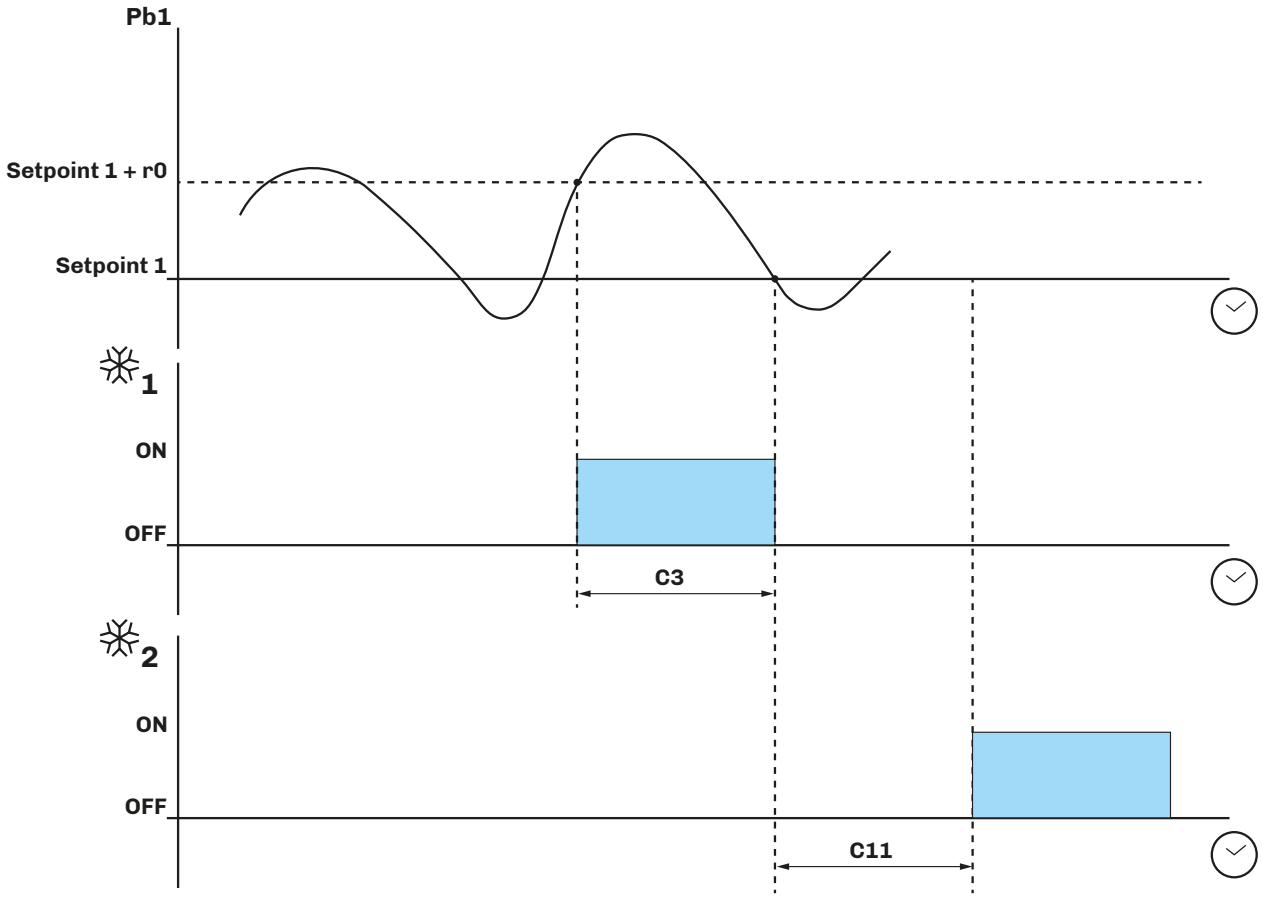


Fig. 28. *Normal compressor 2 operation*

7.8 EVAPORATOR FANS

The evaporator fan regulator is activated on the basis of the following conditions:

- Delay **F3** has elapsed in the event of dripping end;
- The temperature of evaporator probe Pb2 exceeds the threshold **F1** (if **F0** = 3, 4);
- The fans are not deactivated during defrost **F2** = 0;
- Dripping **d7** is not active.

7.8.1 Operation

Evaporator fan regulator activation can take place according to requests made by other regulators in the following ways:

- On the compressor's request, to encourage the production and distribution of cold temperatures (temperature control function);
- On defrost request, to regulate/limit the distribution of hot air;
- On the humidifying/dehumidifying regulator's request, to propagate or limit the distribution of humidity.

7.8.2 Operating modes

The evaporator fans run in accordance with parameter **F0**:

Par.	Description	MU	Range
F0	Evaporator fans in normal operating mode. With **F0** = 0 the cycles can be managed by setting **F11**, **F12**, **rd2**, **rd3**, **rh2**, **rh3**. **0** = Cyclical; **1** = Always ON; **2** = Active depending on loads; **3** = Temperature-controlled (**F1** relating to temperature regulation); **4** = Active depending on loads and temperature-controlled (**F1** relating to temperature regulation).	---	0...4

Cyclical evaporator fans with F11 > 0

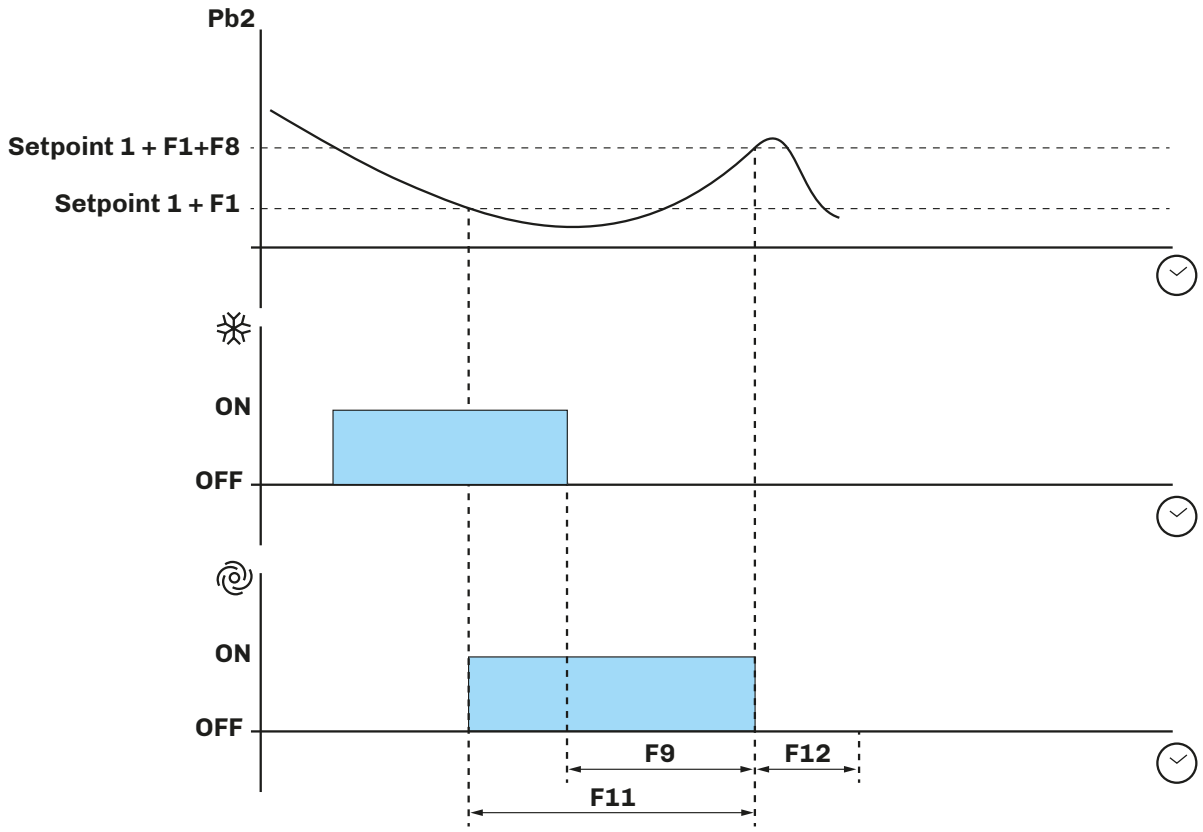


Fig. 29. *Evaporator fan operation with **F11** > 0*

7.8.3 Operation during a defrost

Evaporator fan operation during a defrost depends on **F2**.

Par.	Description	MU	Range
F2	Evaporator fan mode during defrosting. **0** = OFF; **1** = ON; **2** = Depends on **F0**.	---	0...2

7.8.4 Evaporator fan operation during dripping

During a dripping phase, the evaporator fans remain off for the time set in **d7**, plus a further delay **F3** can be set for the activation of evaporator fans after dripping. In this case the fans will be activated once **F3** has elapsed.

7.9 CONDENSER FANS

7.9.1 Operation

The condenser fans are activated on the basis of the following conditions:

- A digital output **uc1**...**uc6** = 6 (configured as condenser fans);
- If **Pb3** ≠ 1, the condenser fans are activated in parallel with the compressor;
- If **Fc3** = 0, the fans are activated at the threshold **Fc1+Fc2** and switch off at the threshold **Fc1** (Operation in parallel with the compressor and temperature-controlled);
- If **Fc3** > 0, the fans are activated at the threshold **Fc1+Fc2** and switch off at the threshold **Fc1** (Operation independent of the compressor and temperature-controlled);
- During hot gas defrosting, they are activated if the temperature of Pb3 exceeds alarm threshold **C6**.

7.10 ENERGY SAVING

7.10.1 Operation

Energy saving can be activated via:

- Digital input **iC2** = 3
- Key (see ***"5.4.2 Functions that can be activated via key" on page 19***);
- Door open duration if > **i10** energy saving is activated for a time period **HE2**;
- RTC, by enabling energy saving every day, at the time **H01** for a time period **H02**.

With energy saving active:

- **Setpoint 1** ***should be replaced by*** **Setpoint 1 + r4**.

The energy saving configuration parameters are:

Par.	Description	MU	Range
r4	Offset setpoint in energy saving added to the setpoint value.	°C/°F	0.0...99.0
HE2	Manual energy saving duration.	min	0...999
H01	Energy saving temperature daily start schedule.	h	0...23
H02	Energy saving temperature daily duration.	h	0...24

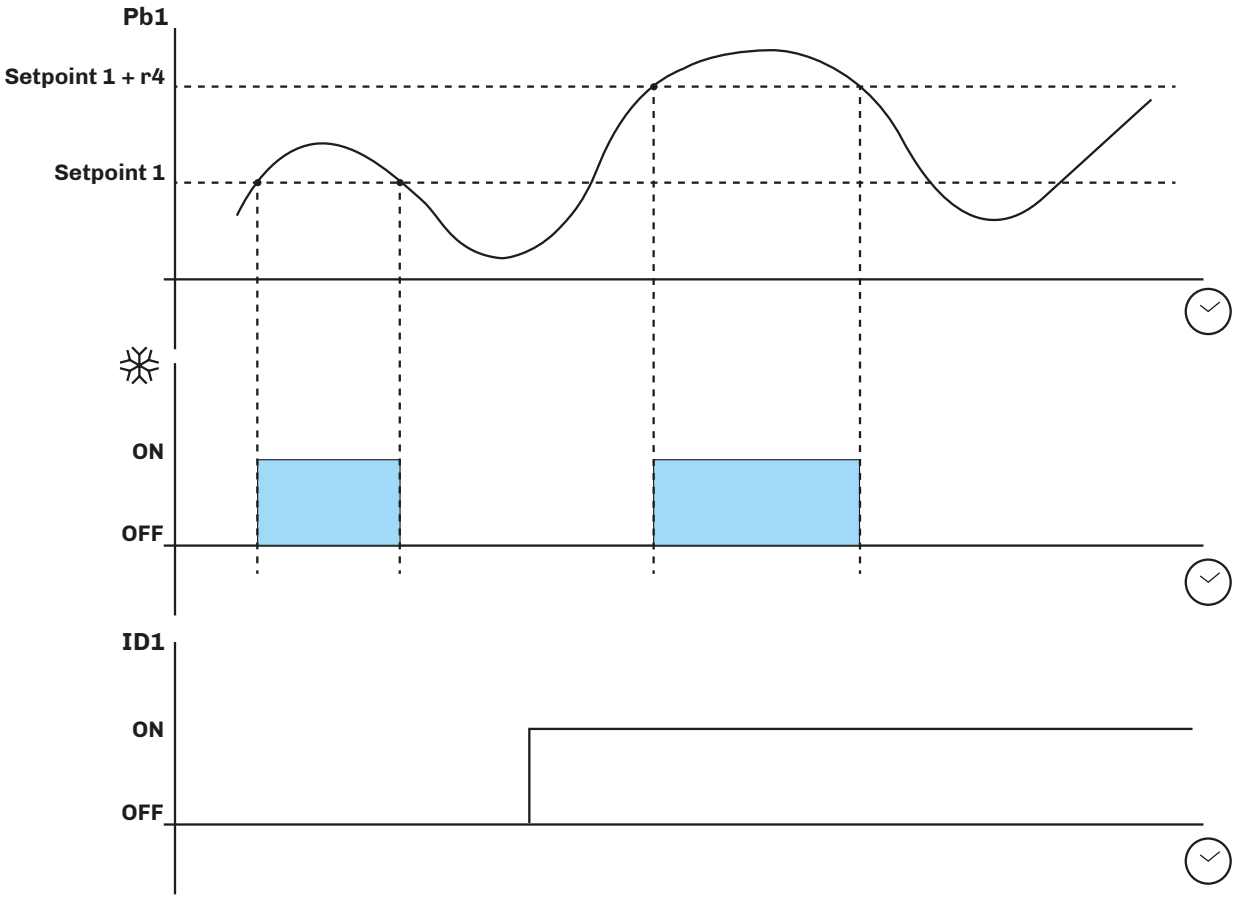


Fig. 30. *Operation in energy saving mode*

8. FUNCTIONS

8.1 SANITISING

The sanitising cycle can be used to:

- Sanitise food using UV-C lamps;
- Sterilise cold rooms using ozone generators.

Sanitising using UV-C lamps eliminates viruses and bacteria from food without contaminating it.

Sterilising using ozone generators stops the proliferation of viruses and bacteria inside the cold room, keeping it hygienic.

Sanitising is activated through functions, via a key (see *"5.4.2 Functions that can be activated via key" on page 19"*) and can be used if at least one relay output is configured as Sanitising (**uc1**...**uc6** = 18).

During the sanitising process, the ⫩ icon is lit steadily, while during the interval between two consecutive sanitising cycles, the ⫩ icon flashes.

The sanitising configuration parameters are:

Par.	Description	MU	Range
u10	Sanitising cycle duration.	min	0...99
u11	Interval between 2 consecutive sanitising cycles.	min	0...999
u12	Evaporator fan status during sanitising. **0** = Independent; **1** = Active.	---	0/1
u13	Sanitising in standby. **0** = UV lamps; **1** = Ozone generator in standby, temperature/humidity regulation off; **2** = Ozone generator in standby and running, temperature/humidity regulation paused.	---	0...2

8.2 ANALOGUE OUTPUTS

Analogue outputs **AO1** and **AO2** can be configured with 6 values that are used by the instrument for the various functions.

8.2.1 Humidity control

If **P20** = 2 and **AO1** = 0, **EVJS 500 Split** associates an output value with the regulator status; the output behaves as ventilation, with the following logic:

Status	Value AO1
Cold	**1A1**
Pause	**1A2**
Hot	**1A3**
Humidify	**1A4**
Dehumidify	**1A5**
Defrosting	**1A6**

8.2.2 Dimmed light

With **AO1** and **AO2** = 2 you can choose between 6 voltage levels for controlling an external dimmer.

8.2.3 Modulating condensation

Status	Value AO1	Condensation
1A1	**2A1**	Maximum **Fc1**+**Fc2**
1A2	**2A2**	Minimum **Fc1**
1A3	**2A3**	In error Pb3
1A4	**2A4**	Energy saving value in place of **Fc1**+**Fc2**

Fig. 31. *Evaporator fan operation with **F11** > 0*

8.2.4 Humidification

With **AO1** or **AO2** = 3, the analogue output varies between minimum (upper band limit) and maximum (lower band limit) in humidify request mode. If the humidification cycle **rh2** > 0 - **rh3** > 0 is also active with a humidification request, the output is only active in the time period **rh2**, while in the interval **rh3** it remains off.

NOTE: if **rh2** > 0 and **rh3** = 0, as per the default, the output is active when the humidification request is active.

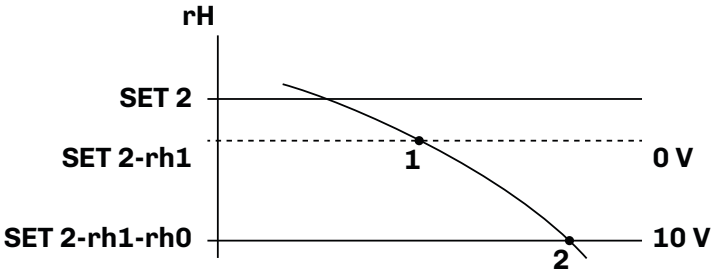


Fig. 32. *Humidification regulation analogue output*

8.3 COPYING PARAMETERS

8.3.1 Introduction

EVJKEY connects to the TTL serial port and can be used to upload and/or download the parameters map.

For further information, refer to the instruction sheet for p/n ***104JKEYA304***.

8.3.2 Uploading parameters from the controller to EVJKEY

While **EVJKEY** is connected to the TTL serial port:

1. Set DIP switches 1, 2 and 3 to OFF;
2. Power the controller;
3. The EVJKEY recognition process begins automatically (the OK and ERROR LEDs are lit steadily);
4. Once recognition is compete, data uploading takes place automatically.

The process can take a few seconds.

If the procedure is successful, the OK LED remains lit steadily while the ERROR LED switches off; otherwise if the procedure is not successful, the OK LED switches off while the ERROR LED remains lit steadily; repeat the procedure.

8.3.3 Downloading the EVJKEY parameters to the controller

While **EVJKEY** is connected to the TTL serial port:

1. Set DIP switches 1, 2 and 3 to ON;
2. Power the controller;
3. The EVJKEY recognition process begins automatically (the OK and ERROR LEDs are lit steadily);
4. Once recognition is compete, data uploading takes place automatically.

The process can take a few seconds.

If the procedure is successful, the OK LED remains lit steadily while the ERROR LED switches off; otherwise if the procedure is not successful, the OK LED switches off while the ERROR LED remains lit steadily; repeat the procedure.

9. REMOTE COMMUNICATION

EVJS 500 Split remote communication can be used in 3 ways:

- Communication with **EPoCA** via TTL serial;
- Communication with **EPoCA** via TTL serial and communication with BMS via RS-485 serial;
- Communication with **EPoCA** via RS-485 serial and **EV Web**.

NOTICE
REMOTE COMMUNICATION NOT WORKING Do not use the TTL port and the RS-485 serial for communication with EPoCA at the same time.

9.1 EPOCA COMMUNICATION VIA TTL SERIAL

EVJS 500 Split communication with **EPoCA** can take place using the TTL serial on the user interface.

In this case the RS-485 serial should not be used to communicate with the **EPoCA** remote management and monitoring system.

To communicate with **EPoCA** via TTL serial, use a *TTL/RS-485* or *TTL/Wi-Fi* converter (see paragraph ***"1.3 Accessories" on page 8)*** and configure the parameter **BLE** ≠ 0.

Par.	Description	MU	Range
BLE	TTL serial operating mode. **0** = Reserved; **1...10** = EPoCA network address (**1** = Wi-Fi converter only).	---	0...10

BLE configuration with TTL/RS485 converter

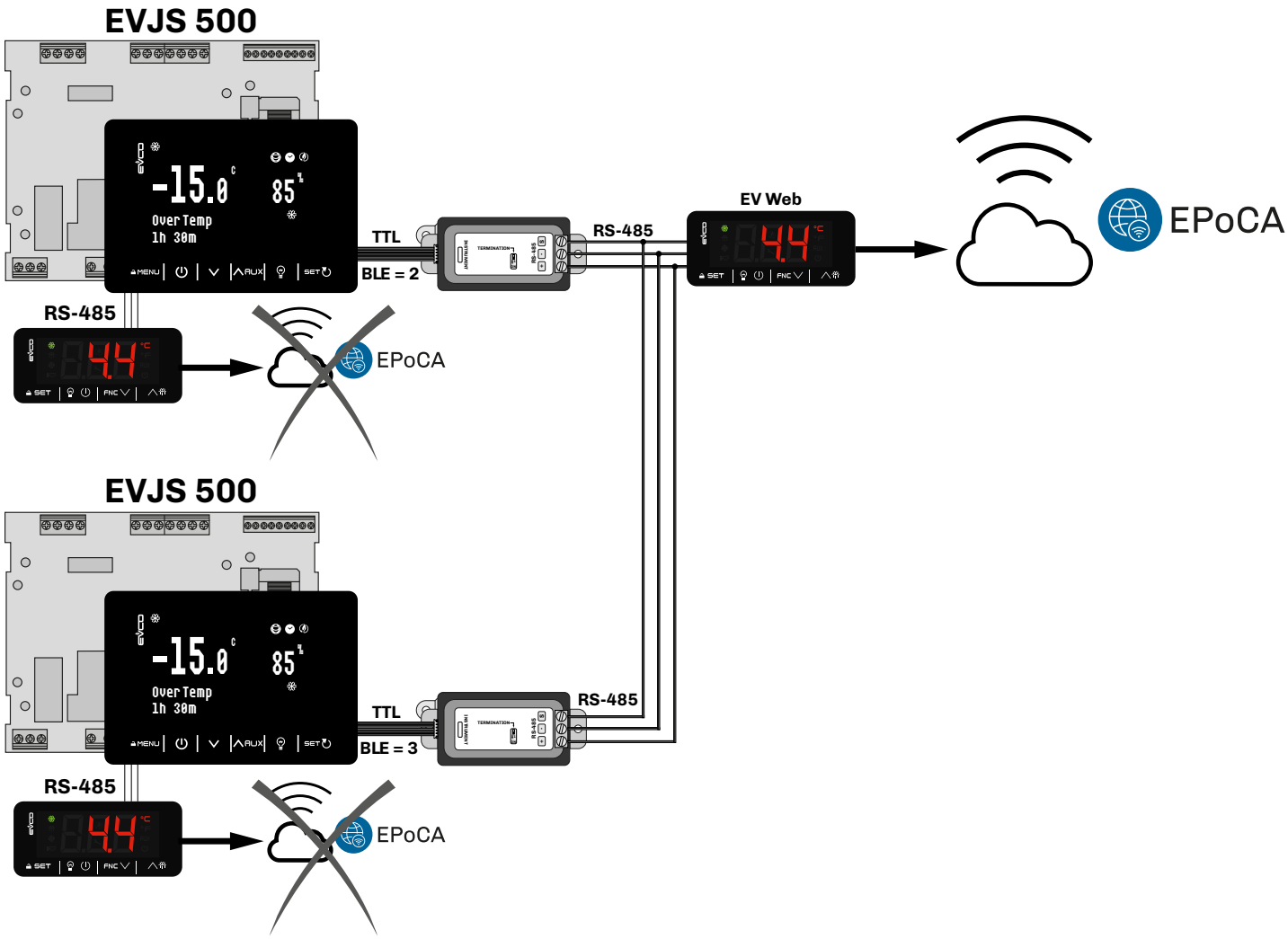


Fig. 33. Communication with EPoCA via TTL serial using a TTL/RS485 converter

BLE configuration with TTL/Wi-Fi converter

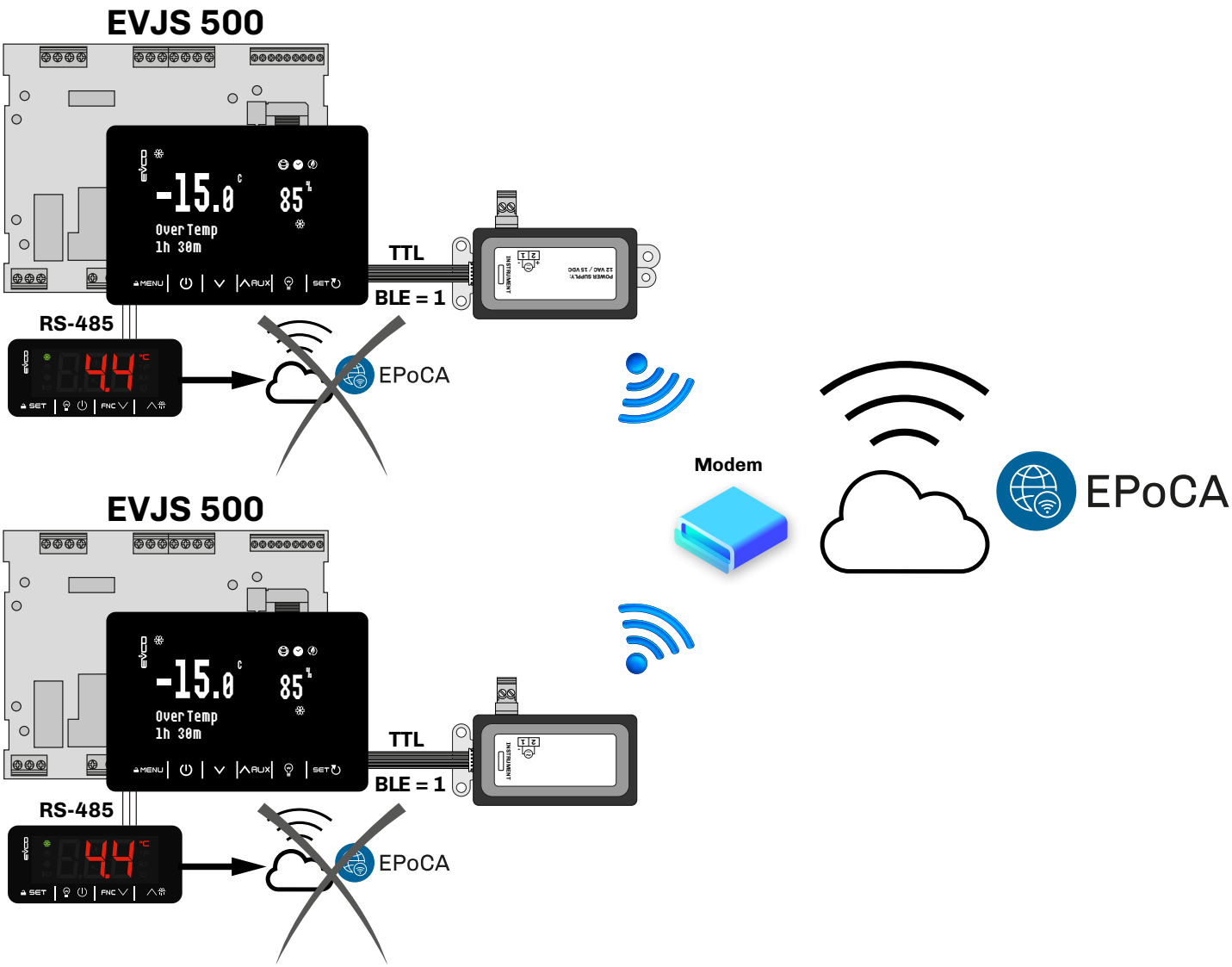


Fig. 34. *Communication with EPoCA via TTL serial using a TTL/Wi-Fi converter*

9.2 EPOCA AND THIRD-PARTY BMS COMMUNICATION

If using EPoCA and a third-party BMS (Building Management System):

- Use the TTL serial for communication with EPoCA (using a *TTL/Wi-Fi* or *TTL/RS-485* converter);
  - Depending on the signal converter used, configure the BLE parameter (see ***"BLE configuration with TTL/RS485 converter" on page 39*** and ***"BLE configuration with TTL/Wi-Fi converter" on page 40***);
- Use the RS-485 serial to communicate with the third-party BMS. Configure the following parameters on each device:

Par.	Description	MU	Range	Default
LA	RS-485 modbus serial protocol controller address.	---	0...247	xxx
Lb	RS-485 modbus transmission speed (baud rate). **0** = 2400; **1** = 4800; **2** = 9600; **3** = 19200.	---	0...3	3
LP	RS-485 modbus serial parity bit. **0** = None; **1** = Odd; **2** = Even.	---	0...2	2

NOTE: each device should have a different **LA** communication address.

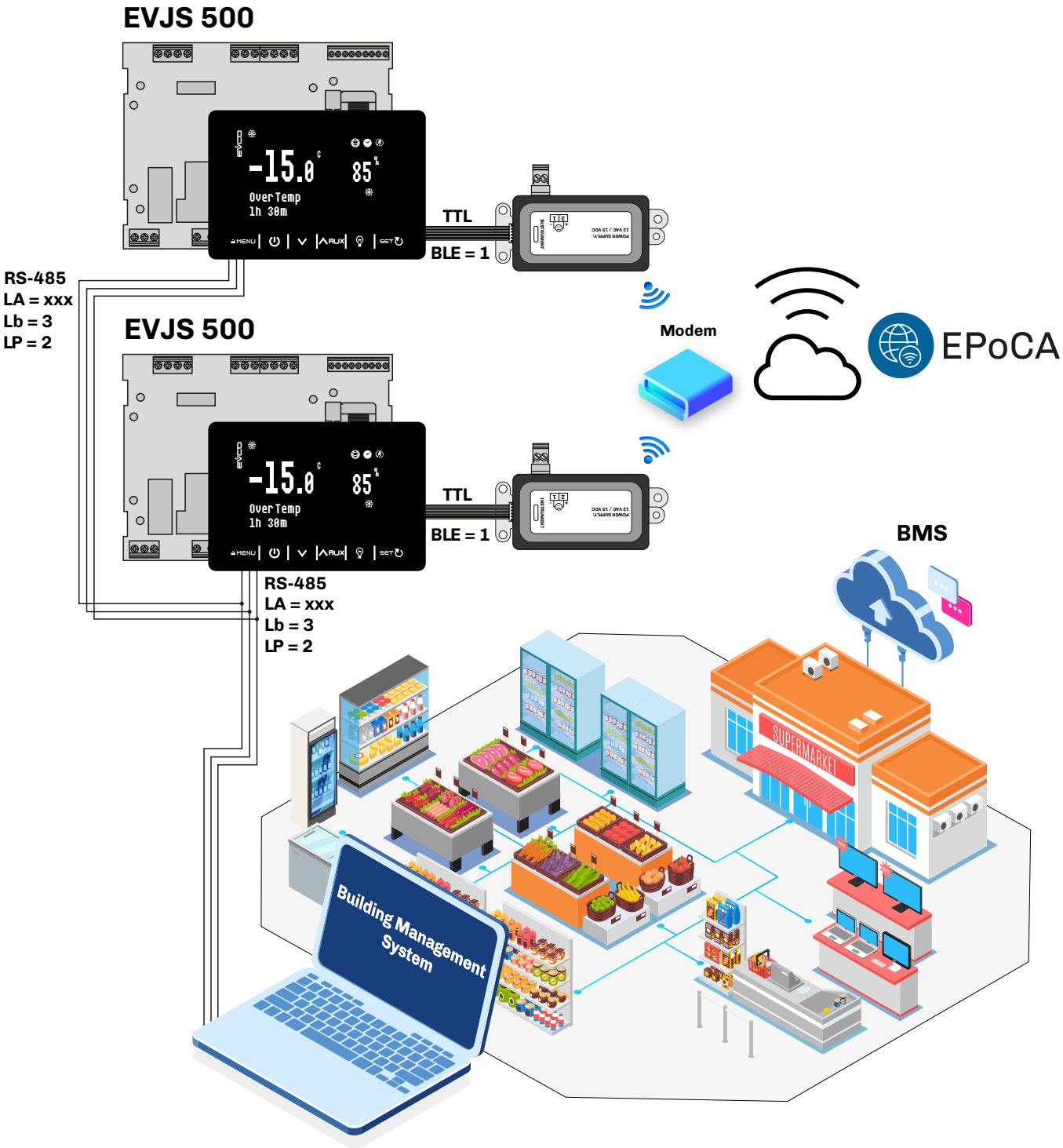


Fig. 35. *Communication with EPoCA and third-party BMS*

9.3 EPOCA COMMUNICATION VIA RS-485 SERIAL

EVJS 500 Split communication with **EPoCA** can take place using the RS-485 serial on the user interface.

In this case the TTL serial should not be used to communicate with the **EPoCA** remote management and monitoring system.

To communicate with **EPoCA** via RS-485 serial, configure the following parameters on each device:

Par.	Description	MU	Range	Default
LA	RS-485 modbus serial protocol controller address.	---	0...247	xxx
Lb	RS-485 modbus transmission speed (baud rate). **0** = 2400; **1** = 4800; **2** = 9600; **3** = 19200.	---	0...3	3
LP	RS-485 modbus serial parity bit. **0** = None; **1** = Odd; **2** = Even.	---	0...2	2

NOTE: each device should have a different **LA** communication address.

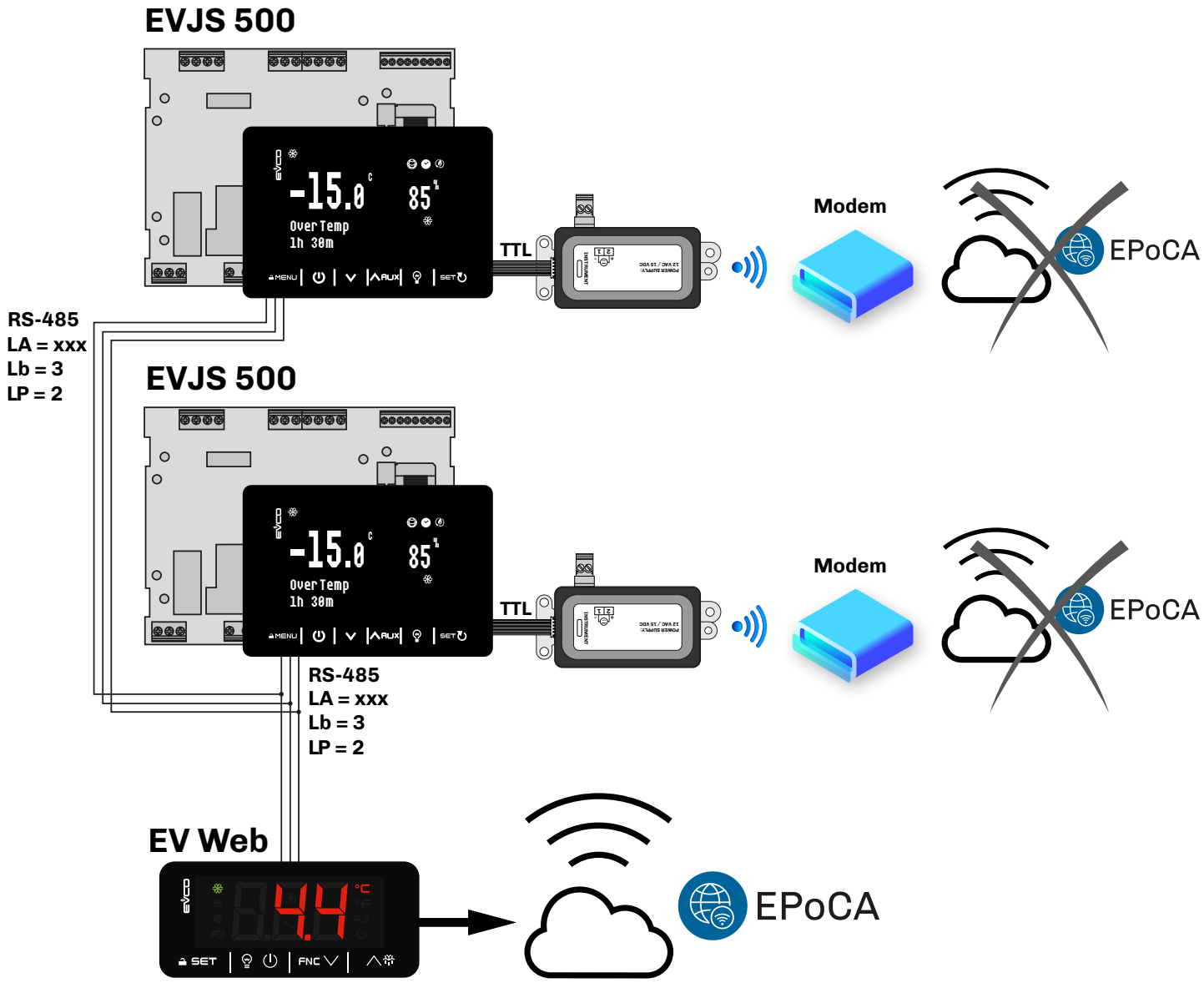


Fig. 36. *Communication with EPoCA via RS-485 serial*

10. PARAMETERS

Description of columns in the Table of Parameters

- **Par.**: list of configurable device parameters;
- **Description**: indicates parameter operation and any possible selections;
- **MU**: measurement unit relating to the parameter;
- **Range**: describes the interval of values that the parameter can assume. This can be correlated with other instrument parameters (indicated with the parameter code).
  ***NOTE**: if the actual value is outside the permitted limits for that parameter (for example, because other parameters defining the aforementioned limits have been altered), the value of the violated limit is displayed instead of the actual value;*
- **Default**: indicates the pre-set factory configuration;
- **PW**: indicates the access level for the parameter.

10.1 TABLE OF CONFIGURATION PARAMETERS

Par.	Description	MU	Range	Default	PW
	SETPOINT group				
SET	Temperature Setpoint 1.	°C/°F	**r1**...**r12**	10.0	---
SET2	Humidity Setpoint 2.	%	**h1**...**h2**	70	---
	ANALOGUE INPUT group				
CA1	Temperature probe offset.	°C/°F	-25.0...25.0	0.0	1
CA2	Evaporator probe offset.	°C/°F	-25.0...25.0	0.0	1
CA3	Probe Pb3 offset.	°C/°F	-25.0...25.0	0.0	2
CA4	Probe Pb4 offset.	°C/°F	-25.0...25.0	0.0	2
CA5	Humidity probe offset.	°C/°F	-25.0...25.0	0.0	2
P0	Probe type. **0** = PTC; **1** = NTC.	---	0...3	1	2
P1	Enable decimal point in °C. **0** = No; **1** = Yes.	---	0/1	1	2
P2	Temperature measurement unit (***N.B.**: This parameter does not convert the values, therefore they need to be changed manually).* **0** = °C; **1** = °F.	---	0/1	0	2
Pb2	Enable evaporator probe (**Pb2**). **0** = Disabled; **1** = Enabled.	---	0/1	1	2
Pb3	Probe 3 (**Pb3**) configuration. **0** = Disabled; **1** = Condensation probe; **2** = Auxiliary probe.	---	0...2	0	2
Pb4	Probe 4 (**Pb4**) configuration. **0** = Disabled; **1** = Defrost 2; **2** = Critical probe; **3** = Auxiliary probe 2; **4** = Reserved.	---	0...4	0	2
Pb5	Enable humidity probe (**Pb5**). **0** = Disabled; **1** = EVHTP520; **2** = EVHTP500.	---	0...2	1	2
P3	Reserved.	---	0...100	0	2
P4	Reserved.	---	0...100	100	2
P5	Large display 1 value. **0** = No display (display off); **1** = Analogue input 1; **2** = Analogue input 2; **3** = Analogue input 3; **4** = Analogue input 4; **5** = Analogue input 5; **6** = Setpoint 1 (Temperature); **7** = Setpoint 2 (Humidity).	---	0...7	1	2
P6	Small display 2 value. Same as **P5.**	---	0...7	5	2
P8	Display 1 refresh time. Increases or decreases by 1 digit per interval selected.	1/10 s	0...250	5	2
P9	Display 2 refresh time. Increases or decreases by 1 digit per interval selected.	1/10s	0...250	5	2

Par.	Description	MU	Range	Default	PW
P20	Humidity management mode. **0** = Disabled; **1** = Humidity probe; **2** = Humidity + analogue 1 probe; **3** = Fixed analogue 1.	---	0...3	0	2
	TEMPERATURE MANAGEMENT group				
r0	Setpoint cold differential.	°C/°F	0.1...15.0	2.0	1
r1	Minimum setpoint.	°C/°F	-99.0...**r2**	0.0	2
r2	Maximum setpoint.	°C/°F	**r1**...199.0	50.0	2
r4	Offset setpoint in energy saving added to the setpoint value.	°C/°F	0.0...99.0	0.0	2
r5	Disables humidity regulation in OverTemp function. **0** = No; **1** = Yes.	---	0/1	0	2
r6	Threshold relating to temperature Setpoint 1 in OverTemp function.	°C/°F	-40.0...99.0	0.0	2
r7	Duration of the OverTemp function.	min	0...240	0.0	2
r11	Neutral zone value to be added to the differential.	°C/°F	-10.0...10.0	0.0	2
r12	Hot differential.	°C/°F	-25.0...-0.1	-2.0	1
r13	Throttle Hot output. **60** = Always ON.	s	0...60	60	2
r14	Temperature priority. **0** = No priority, regulations are independent; **1** = Hot regulation takes priority over dehumidification until the temperature falls within the set values; **2** = Hot and cold regulation takes priority over dehumidification until the temperature falls within the set values; **3** = Cold regulation takes priority over dehumidification until the temperature falls within the set values.	---	0...3	2	2
	HUMIDIFICATION/DEHUMIDIFICATION group				
h1	Humidity setpoint 2 minimum.	%	0...**h2**	10	2
h2	Humidity setpoint 2 maximum.	%	**h1**...100	95	2
rd0	Dehumidification differential.	%	1...25	3	1
rd1	Dehumidification neutral zone.	%	0...10	0	2
rd2	Fans ON duration in dehumidification with **F0** = 0. **0** = fans stopped.	s	0...240	60	2
rd3	Fans OFF duration in dehumidification with **F0** = 0. If **rd3** = 0 and **rd2** ≠ 0 the fans are always on.	s	0...240	0	2
rd4	Dehumidifies with compressor or with compressor and hot. **0** = Disabled; **1** = Compressor; **2** = Compressor and hot.	---	0...2	1	2
rh0	Humidification differential.	%	-25...-1	-3	1
rh1	Humidification neutral zone.	%	0...10	0	2
rh2	Humidification output on duration (or fans if RH output not configured). With **rh2** = 0 the fans are stopped.	s	0...240	60	2
rh3	Humidification output off duration (or fans if RH output not configured). With **rh3** = 0 and **rh2** > 0 the fans are always on.	s	0...240	0	2
	COMPRESSOR group				
C0	Compressor ON delay from power-on.	min	0...240	0	2
C2	Minimum compressor OFF time.	min	0...240	3	2
C3	Minimum compressor ON time.	s	0...240	0	2
C4	Compressor OFF time in cold room probe alarm mode.	min	0...240	10	2
C5	Compressor ON time in cold room probe alarm mode.	min	0...240	10	2
C6	Condensation temperature over which the condenser overheat alarm is triggered.	°C/°F	0...199.0	80.0	2
C7	Condenser temperature over which the compressor lock alarm is triggered, once time period **C8** has elapsed.	°C/°F	0...199.0	90.0	2
C8	Compressor lock alarm activation delay from when threshold **C7** was exceeded.	min	0...15	0	2
C10	Compressor maintenance days.	days	0...990	0	2
C11	Compressor 2 switch-on delay from compressor 1 switch-on.	s	0...240	10	2
	DEFROST group				
d0	Defrost interval.	h	0...99	8	1

Par.	Description	MU	Range	Default	PW
d1	Defrost type. **0** = Electric heaters; **1** = Cycle inversion (hot gas); **2** = On compressor stoppage.	---	0...2	0	2
d2	Evaporator temperature over which defrost ends with evaporator probe (**Pb2** = 1).	°C/°F	-99.0...99.0	8.0	2
d2b	Evaporator temperature over which defrost 2 ends with evaporator probe (**Pb4** = 1).	°C/°F	-99.0...99.0	8.0	2
d3	Defrost duration.	min	0...99	30	1
d4	Enable defrost at device switch-on. **0** = No; **1** = Yes, enable defrost at switch-on.	---	0/1	0	2
d5	Time that elapses between device switch-on and the start of the defrost.	min	0...99	0	2
d6	Value shown on the display during a defrost. **0** = Regulation; **1** = Display locked; **2** = Reserved.	---	0...2	1	2
d7	Evaporator drip time after a defrost.	min	0...15	0	2
d11	Enable alert for defrost end due to maximum duration (code **dFd**). **0** = No; **1** = Yes.	---	0/1	0	2
d15	Compressor ON time before hot gas defrost.	min	0...99	0	2
d17	Enable sending of evaporator frozen indication. **0** = Do not send indication; **1** = Send indication; **2** = Start defrost.	---	0...2	0	2
d18	Adaptive defrost duration.	min	0...999	0	2
d19	Temperature threshold for adaptive defrost.	°C/°F	0.0...40.0	0.0	2
d20	Consecutive time compressor ON for defrost.	min	0...999	0	2
	ALARMS group				
A1	Low temperature alarm threshold.	°C/°F	-99.0...99.0	0.0	2
A2	Low temperature alarm type. **0** = Disabled; **1** = Corresponding SET; **2** = Absolute.	---	0...2	2	2
A4	High temperature alarm threshold.	°C/°F	-99.0...99.0	50.0	2
A5	High temperature alarm type. **0** = Disabled; **1** = Corresponding SET; **2** = Absolute.	---	0...2	2	2
A6	Temperature and humidity alarm activation delay from when threshold was exceeded at device startup.	min	0...240	120	2
A7	Minimum and maximum temperature alarms delay.	min	0...240	15	2
A8	Delay in alarm activation to indicate threshold exceeded after a defrost.	min	0...240	15	2
A9	Delay in alarm activation to indicate threshold exceeded after door closure.	min	0...240	15	2
A10	Power failure duration for alarm recording.	min	0...240	15	2
A11	Hysteresis referring to **A1** and **A4** for determining alarm reset threshold.	°C/°F	0.1...15	1.0	2
AH1	Alarm relating to SET2 low humidity.	%	0...100	50	2
AH4	Alarm relating to SET2 high humidity.	%	0...100	50	2
AH7	Humidity and probe saturation alarm delay.	min	0...240	30	2
	EVAPORATOR/CONDENSER FAN group				
F0	Evaporator fans in normal operating mode. With **F0** = 0 the cycles can be managed by setting **F11**, **F12**, **rd2**, **rd3**, **rh2**, **rh3**. **0** = Cyclical; **1** = Always ON; **2** = Active depending on loads; **3** = Temperature-controlled (**F1** relating to temperature regulation); **4** = Active depending on loads and temperature-controlled if compressor ON (**F1** relating to temperature regulation).	---	0...4	1	2
F1	Evaporator fan regulation threshold with **F0** = 3, 4 (relative to the setpoint).	°C/°F	-99.0...99.0	5.0	2

Par.	Description	MU	Range	Default	PW
F2	Evaporator fan mode during defrosting. **0** = OFF; **1** = ON; **2** = Depends on **F0**.	---	0...2	0	2
F3	Maximum evaporator fan post-dripping stoppage time.	min	0...15	0	2
F7	Threshold relative to the setpoint for fan restart after a defrost.	°C/°F	-99.0...99.0	99.0	2
F8	Evaporator setpoint differential.	°C/°F	0.1...15.0	2.0	2
F9	Evaporator fan switch-off delay from compressor switch-off.	s	0...240	0	2
F11	Fan ON time in the absence of regulation with **F0** = 0. **F11** = 0 fans remain stopped.	s	0...240	60	2
F12	Fan OFF time in the absence of regulation with **F0** = 0. **F12** = 0 and **F11** > 0 fans are always on.	s	0...240	0	2
F13	Evaporator fan activation delay after compressor ON.	s	0...240	0	2
Fc1	Condenser fans OFF threshold.	°C/°F	0.0...99.0	25.0	2
Fc2	Condenser fans ON differential.	°C/°F	0.1...15.0	5.0	2
Fc3	Condenser fans switch-off delay.	s	0...240	5	2
Fc4	Duration of fans at maximum speed at startup.	s	0...10	0	2
	DIGITAL INPUT PROPERTIES group				
iC1	Digital input 1 function. **0** = Disabled; **1** = Multifunctional alarm; **2** = Compressor and fans OFF; **3** = Fans OFF; **4** = Standby; **5** = Thermal switch 1; **6** = Defrost activation; **7** = Compressor and fans OFF, Light ON; **8** = Fans OFF, Light ON; **9** = Light ON.	---	0...9	7	2
iP1	Digital input 1 (Polarity) activation. **0** = On closed contact (NC); **1** = On open contact (NO).	---	0/1	0	2
iC2	Digital input 2 function. **0** = Disabled; **1** = High pressure switch; **2** = AUX; **3** =Energy saving; **4** = Thermal switch 2; **5** = Compressor lock alarm.	---	0...5	0	2
iP2	Digital input 2 (Polarity) activation. **0** = On closed contact (NC); **1** = On open contact (NO).	---	0/1	0	2
i1	Lock display with door open and after closing.	min	0...240	5	2
i2	Alarm indication delay from door opening. **-1** = Disabled.	min	-1...120	15	2
i3	Maximum regulation inhibition time with door open if **iC1** = 2, 3, 7, 8, 9. **-1** = Disabled.	min	-1...120	15	2
i5	Multifunctional digital input alarm delay (**iC1** = 5 or **iC2** = 1, 4, 5).	min	0...120	0	2
i6	High pressure events count interval **iC2** = 1. From the first intervention, **i8** events are counted for a manual reset.	min	0...120	60	2
i7	Thermal switch events count interval **iC1** = 5 and/or **iC2** = 4. From the first intervention, **i8** events are counted for a manual reset.	min	0...120	60	2
i8	Digital input events count for pressure switch and/or thermal switch alarm. **0** = Always automatic; **1** = Always manual.	---	0...15	1	2
i9	Compressor ON delay after alarm activation from digital input (**iC1** = 5 or **iC2** = 1, 4, 5).	min	1...60	0	2
i10	Door closed for energy saving hours.	min	0...999	0	2
u4	Demisting output on time.	min	0...600	0	2
u5	Door heater activation threshold.	°C/°F	-99.0...99.0	0.0	2
u6	Auxiliary output configuration. Manual control is via the AUX key. **0** = Hot; **1** = Cold; **2** = Manual.	---	0...2	0	2

Par.	Description	MU	Range	Default	PW
u7	Auxiliary setpoint if **u6** = 0, 1.	°C/°F	-99.0...99.0	0.0	2
u8	Differential for auxiliary set **u7**.	°C/°F	0.1...15.0	1.0	2
u10	Sanitising cycle duration.	min	0...99	0	2
u11	Interval between 2 consecutive sanitising cycles.	min	0...999	0	2
u12	Evaporator fan status during sanitising. **0** = Independent; **1** = Active.	---	0/1	0	2
u13	Sanitising in standby. **0** = UV lamps; **1** = Ozone generator in standby, temperature/humidity regulation off; **2** = Ozone generator in standby and running, temperature/humidity regulation paused.	---	0...2	0	2
u14	Standby output forcing duration from switch-off.	s	0...999	0	2
	DIGITAL OUTPUT CONFIGURATION group				
uc1	Configure **out1** relay output. **0** = Disabled; **1** = Humidity (RH); **2** = Dehumidify (dRH); **3** = Alarm; **4** = Compressor 1; **5** = Hot; **6** = Condenser fan; **7** = ON/OFF; **8** = Door heater; **9** = Light; **10** = Compressor 2; **11** = Evaporator 1 fans; **12** = Defrost; **13** = Defrost 2; **14** = Demisting; **15** = AUX; **16** = Evaporator 1 2nd fan; **17** = Energy saving; **18** = Sanitising; **19** = Evaporator 2 fans.	---	0...19	11	2
uc2	Configure **out2** relay output. Same as **uc1**.	---	0...19	6	2
uc3	Configure **out3** relay output. Same as **uc1**.	---	0...19	5	2
uc4	Configure **out4** relay output. Same as **uc1**.	---	0...19	12	2
uc5	Configure **out5** relay output. Same as **uc1**.	---	0...19	9	2
uc6	Configure **out6** relay output. Same as **uc1**.	---	0...19	4	2
	ANALOGUE OUTPUT CONFIGURATION group				
AO1	Configure analogue output **AO1**. **0** = RH probe; **1** = Light; **2** = Condenser fans; **3** = Humidifier.	---	0...3	0	2
AO2	Configure analogue output **AO2**. **0** = Disabled; **1** = Light; **2** = Condenser fans; **3** = Humidifier.	---	0...3	0	2
1A1	Analogue output 1 value 1.	%	0...100	50	2
1A2	Analogue output 1 value 2.	%	0...100	60	2
1A3	Analogue output 1 value 3.	%	0...100	70	2
1A4	Analogue output 1 value 4.	%	0...100	80	2
1A5	Analogue output 1 value 5.	%	0...100	90	2
1A6	Analogue output 1 value 6.	%	0...100	100	2
2b1	Analogue output 2 value 1.	%	0...100	50	2
2b2	Analogue output 2 value 2.	%	0...100	60	2
2b3	Analogue output 2 value 3.	%	0...100	70	2
2b4	Analogue output 2 value 4.	%	0...100	80	2

Par.	Description	MU	Range	Default	PW
2b5	Analogue output 2 value 5.	%	0...100	90	2
2b6	Analogue output 2 value 6.	%	0...100	100	2
	KEY CONFIGURATION group				
POF	Enable standby key (ON/OFF). **0** = Disabled; **1** = Enabled.	---	0/1	1	2
PLi	Enable light key in standby. **0** = Disabled; **1** = Enabled.	---	0/1	1	1
PSr	Deactivate alarm output with buzzer silencing. **0** = Do not deactivate; **1** = Deactivate.	---	0/1	1	2
Pbu	Buzzer operation configuration. **0** = Buzzer deactivated; **1** = Alarm indication only; **2** = Alarm indication and keypad feedback.	---	0...2	2	1
SEn	Capacitive keypad threshold (**DO NOT CHANGE**).		40...120	70	2
	PASSWORD group				
PAS	Level 2 (Installer) parameters password.	---	-99... 999	-19	2
PS1	Level 1 (User) parameters password.	---	-99... 999	1	2
PA1	EVlink/EVconnect user password (not via instrument).	---	-99... 999	426	2
PS2	EVlink/EVconnect password service.	---	-99... 999	824	2
	CLOCK group				
Hr0	Enable clock. **0** = Disabled; **1** = Enabled.	---	0/1	0	2
	TTL REMOTE COMMUNICATION group				
BLE	TTL serial operating mode. **0** = Reserved; **1...10** = EPoCA network address (**1** = Wi-Fi only).	---	0...10	1	2
rE0	Recording interval.	min	0...240	15	2
rE1	Value to record. **0** = No value to record; **1** = Probe Pb1 value only; **2** = Probe Pb2 value only; **3** = Probe Pb3 value only; **4** = Probe Pb1 and Pb2 value; **5** = Value of all probes.	---	0...5	4	2
	DEFROST RTC CONFIGURATION group				
Hd1	Defrost 1 activation time "**----**" = Disabled.	h	----, 0...23	----	2
Hd2	Defrost 2 activation time "**----**" = Disabled.	h	----, 0...23	----	2
Hd3	Defrost 3 activation time "**----**" = Disabled.	h	----, 0...23	----	2
Hd4	Defrost 4 activation time "**----**" = Disabled.	h	----, 0...23	----	2
Hd5	Defrost 5 activation time "**----**" = Disabled.	h	----, 0...23	----	2
Hd6	Defrost 6 activation time "**----**" = Disabled.	h	----, 0...23	----	2
	RS-485 MODBUS serial CONFIGURATION group				
LA	RS-485 modbus serial protocol controller address.	---	0...247	247	2
Lb	RS-485 modbus serial transmission speed (baud rate). **0** = 2400; **1** = 4800; **2** = 9600; **3** = 19200.	---	0...3	3	2
LP	RS-485 modbus serial parity bit. **0** = None; **1** = Odd; **2** = Even.	---	0...2	2	2
	ENERGY SAVING group				
HE2	Manual energy saving duration.	min	0...999	0	2
H01	Energy saving temperature daily start schedule.	h	0...23	0	2
H02	Energy saving temperature daily duration.	h	0...24	0	2

11. DIAGNOSTICS

The table below lists alarms with corresponding solutions. Indication takes place via the alarm LED ⚠ and the buzzer. Each alarm is recorded in the Alarms menu.

11.1 TABLE OF ALARMS

Description	Cause	Effects	Solution
Probe 1 faulty	• Probe not working • Probe not connected properly • Incorrect probe type	• Alarm shown on display • Compressor regulation based on **C4** and **C5** • Hot regulation paused	• Check the probe type (**PO**) • Check the probe wiring • Change the probe type
Probe 2 faulty		• Alarm shown on display • If **Pb2** = 1, defrost end is due to timeout	
Probe 3 faulty		• Alarm shown on display • If **Pb3** = 1, the condenser fans run in parallel with the compressor • If **Pb3** = 3, AUX OFF	
Probe 4 faulty		• Alarm shown on display • AUX regulation paused	• Check probe type (**PO** if **Pb4** = 1...3 or **Pb4** if **Pb4** = 4 or 5) • Check the probe wiring • Change the probe type
Probe 5 faulty		• Alarm shown on display • Humid./dehumid. paused. For saturation the regulator applies a time period **AH7** before generating the alarm	• Check the probe type (**Pb5**) • Check the probe wiring • Change the probe type
Minimum temp. alarm	Temperature Pb1 < **A1** for time period = **A7**	• Alarm shown on display • No effect on regulation	Wait for the temperature read by Pb1 to rise above the alarm threshold (**A1**+**A11**)
Maximum temp. alarm	Temperature Pb1 > **A4** for time period = **A7**	• Alarm shown on display • No effect on regulation	Wait for the temperature read by Pb1 to fall below the alarm threshold (**A4**-**A11**)
Low humidity alarm	Humidity Pb5 > **SET2**-**AH1** for time period = **AH7**	• Alarm shown on display • No effect on regulation	Wait for the humidity read by Pb5 to fall below the alarm threshold (**SET2**-**AH1**)
High humidity alarm	Humidity Pb5 < **SET2**+**AH4** for time period = **AH7**	• Alarm shown on display • No effect on regulation	Wait for the humidity read by Pb5 to rise above the alarm threshold (**SET2**+**AH4**)
Compressor inhibited (high condensation)	Condenser temperature > **C7** for time period = **C8**	• Alarm shown on display • Compressor inhibited	• Switch the instrument off and on again; • Check **C7** and **C8**
Condenser overheat	Condenser temperature > **C6**	• Alarm shown on display • Condenser fan ON • No effect on regulation	Check **C6**
Defrost timeout alarm	Defrost ended due to timeout instead of temperature **d2** being reached	• Alarm shown on display • Alarm icon ⚠ flashing • No effect on regulation	• Tap any key • Check **d2**, **d3** and **d11**
Door open alarm	Digital input activated for a time period > **i2**	• Alarm shown on display • Inhibits regulators on the basis of the function active in **iC1**	• If **i2** = -1 the alarm is disabled; • Check **i2** and **iP1**
Multifunctional input alarm	Digital input activated (**iC1** = 2) for a time period = **i5**	• Alarm shown on display • No effect on regulation	Check **i5**
Digital pressure switch alarm	Pressure switch alarm caused by the digital pressure switch	• Alarm shown on display • Compressor and dehumidification inhibited • The regulator counts, from the first event, the number of events **i8** within the time period **i6**	Check for and remove the cause of the alarm on the digital input (automatic reset with **i6** = 0)
Thermal protection 1	Digital input activated (**iC1** = 5)	• Alarm shown on display • The regulator counts, from the first event, the number of events **i8** within the time period **i7**	If **i7** = 0 resetting is always automatic
Thermal protection 2	Digital input activated (**iC2** = 4)		

Description	Cause	Effects	Solution
RTC faulty	RTC not working alarm	Functions connected to the RTC not present or not synchronised with the actual time	Set the correct time. If the error persists, replace the instrument (RTC battery exhausted)
Power Failure	Power failure for time period > **A10**	Recording of code **PF**	Check the power supply wiring
Compressors inhibited	Digital input activated (**iC2** = 5) for a time period = **i5**	• Alarm shown on display • Compressors inhibited	Check for and remove the cause of the alarm on the digital input (automatic reset with **i6** = 0)
Communication alarm	No communication between base board and user interface	• Alarm shown on display • No effect on regulation	• Restore communication between base board and user interface • Automatic reset

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