EVX225 Digital controllers for double room refrigerated cabinets

EN ENGLISH

1 IMPORTANT

1.1 Important

Carefully read these instructions before installing and using the product. Pay close attention to the notes on installation and electrical wiring connections; save these instructions together with the instrument for future reference.

The instrument must be disposed of in accordance with local laws on the collection of electrical and electronic equipment.

2 INTRODUCTION

2.1 Introduction

EVX225 is a digital controller for the operation of double room refrigerated cabinets.
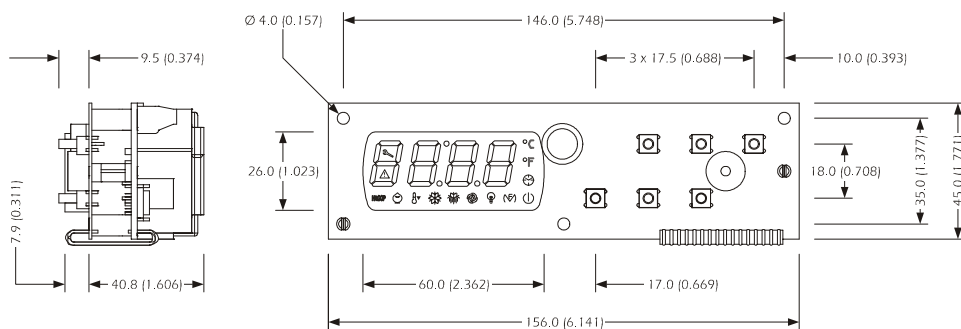
The controller is equipped with:
- 3 measure inputs (room 1 probe, room 2 probe and condenser probe) for NTC probes
- 2 digital inputs (high pressure switch and low pressure switch)
- 5 digital outputs (relays) for operation of the compressor (30 A @ 250 VAC), the room 1 valve, the room 2 valve, the evaporator fan and a fifth use (which can be set as cabinet light, demister heater, auxiliary output, alarm output or condenser fan); defrosting occours stopping the compressor, has effect on both the rooms and at the same time.

The model looks in open frame board; the user interface consists of a 4 digit custom display (with decimal point and functional icons) and by six buttons (SET, UP, DOWN, DEFROST, AUXILIARY and ON/STAND-BY).

Installation is by back panel, using M3 studs.

Using the EVKEY programming key (to be ordered separately) it is possible to carry out the uploading and downloading of the configuration parameters; it is also possible to connect the controller to the set-up software system Parameters Manager and to the supervision system RICS (through a serial interface, via TTL, with MODBUS communications protocol).
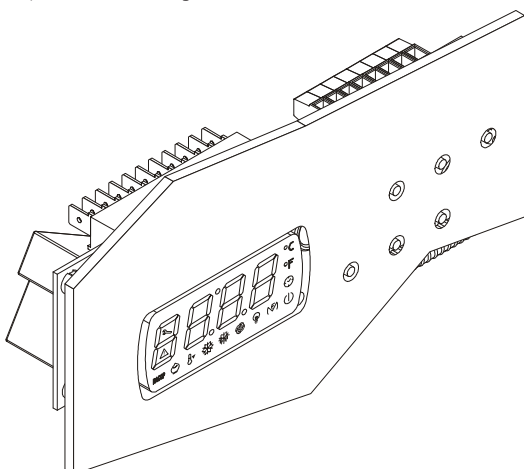
3 DIMENSIONS AND INSTALLATION

3.1 Dimensions

The dimensions are expressed in mm (in).

3.2 Installation

Back panel installation using M3 studs.

3.3 Installation notes

- make sure that the working conditions (operating temperature, humidity, etc.) fall within the limits inidcated in the technical specifications
- do not install the device near heat sources (heaters, hot air ducts, ect.), near devices with strong magneti (large diffusors etc.) and places subject to direct sunlight, rain, humidity, excessive dust, mechanical vibrations or shaking
- in accordance with laws on safety, protection against possible contact with electrical parts must be ensured via the correct installation of the instrument; all the parts that ensure such protection must be secured in such a way that they cannot be removed without the using a special tool.

4 USER INTERFACE

4.1 Preliminary signals

The user interface consists of a custom 4 digit display (with decimal point and function icons) and six keys (SET, UP, DOWN, DEFROST, AUXILIARY and ON/STAND-BY).
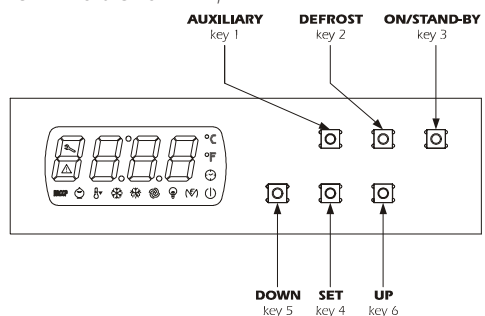
Operating statuses:
- "on" status (the instrument is powered and on: the regulators can be switched on)
- "stand-by" status (the instrument is powered but is switched off via software: the regulators are switched off; the possibility to manually switch on/switch off the cabinet light or auxiliary output depends on parameter u2)
- "off" status (the instrument is not powered).

Hereafter, with the word "switch on" means the passage from stand-by status to on status; the word "switch off" means the passage from on status to stand-by status.

When the power is switched back on, the instrument displays the status that it was in at the time it was disconnected.

4.2 Switching on/off of the instrument (switching on/off room 1 and room 2)

- make sure that the keyboard is not locked and that no other operation is in progress
- press and hold down the ON/STAND-BY key for 1 s: the on/stand-by LED will switch off/on.

4.3 Switching on/off room 1/room 2

To switch on/off room 1 operate as follows:
- make sure that the keyboard is not locked and that no other operation is in progress
- press and hold the UP and ON/STAND-BY key for 1 s: the display will show 3 s "On1" or "OFF1".

To switch on/off room 2 operate as follows:
- make sure that the keyboard is not locked and that no other operation is in progress
- press and hold the DOWN and ON/STAND-BY key for 1 s: the display will show 3 s "On2" or "OFF2".

4.4 The display

If the instrument is switched on, during normal operation, the display will show the temperature established with parameter P5:
- if P5 = 0, the display will show the room 1 temperature
- if P5 = 1, the display will show the room 2 temperature

except during defrosting, when the instrument will show the temperature established with parameter d6.

If the instrument is switched off, the display will be switched off.

4.5 Room 1 temperature display

- make sure that the keyboard is not locked and that no other operation is in progress
- press down the DOWN key for 1 sec: the display will show the first label available
- press and release the UP key or the DOWN key to select "Pb1"
- press and release the SET key.

To exit the procedure:
- press and release the SET key and then do not operate for 60 sec
- press and release the UP or DOWN key until the display shows the room 1 temperature and then do not operate for 60 sec.

Alternatively:
- press and release the ON/STAND-BY key.

4.6 Room 2 temperature display

- make sure that the keyboard is not locked and that no other operation is in progress
- press down the DOWN key for 1 sec: the display will show the first label available
- press and release the UP key or the DOWN key to select "Pb2"
- press and release the SET key.

To exit the procedure:
- press and release the SET key and then do not operate for 60 sec
- press and release the UP or DOWN key until the display shows the room 1 temperature and then do not operate for 60 sec.

Alternatively:
- press and release the ON/STAND-BY key.

4.7 Condenser temperature display

- make sure that the keyboard is not locked and that no other operation is in progress
- press down the DOWN key for 1 sec: the display will show the first label available
- press and release the UP key or the DOWN key to select "Pb3"
- press and release the SET key.

To exit the procedure:
- press and release the SET key and then do not operate for 60 sec
- press and release the UP or DOWN key until the display shows the room 1 temperature and then do not operate for 60 sec.

Alternatively:
- press and release the ON/STAND-BY key.

If the condenser probe is absent (parameter P4 = 0), the label "Pb3" will not be displayed.

4.8 Manual activation of defrosting

- make sure that the keyboard is not locked and that no other operation is in progress
- press and hold down the DEFROST key for 4 sec.

4.9 Switching on/off of the cabinet light (provided that parameter u11 is set to 0)

- make sure that no other procedure is in progress
- press and release the AUXILIARY key: the LED light will switch on/off.

See also parameter u2.

4.10 Switching on the demisting heater (provided that parameter u11 is set to 1)

- ensure that the instrument is switched on and that no other procedure is in progress.
- press the AUXILIARY key for 2 s: the multifunction LED will light up and the heater will be switched on, both for the amount of time established with parameter u6.

Manually switching off the demisting heater is not permitted (that is, before the time established with parameter u6 expires).

4.11 Manually switch on/off of the auxiliary output (provided parameter u11 is set to 2)

- ensure that the keyboard is not locked and that no other procedure is in progress
- press and release the AUXILIARY key.

See also parameter u2.

4.12 Locking/unlocking the keyboard

To lock the keyboard:
- make sure that no other procedure is in progress
- press and hold down the SET and ON/STAND-BY keys for 1 sec: the display will show the message "Loc" for 1 sec.

If the keyboard is locked, the following are not permitted:
- switch on/off of the instrument
- switch on/off room 1
- display of the room 1 temperature (via the procedure indicated in paragraph 4.5)
- display of the room 2 temperature (via the procedure indicated in paragraph 4.6)
- display of the condenser temperature (via the procedure indicated in paragraph 4.7)
- manual activation of defrosting
- manual switch on/off of the auxiliary output
- changing the working setpoints (with the procedures described in 5.1 and 5.2)
- display of compressor operation hours
- cancellation of compressor operation hours

The operations cause the display of the label "Loc" per 1 sec.

To unlock the keyboard:
- press and hold down the **DOWN** and **ON/STAND-BY** keys for 1 sec: the display will show the message "**UnL**" for 1 sec.

4.13 Silencing the buzzer
- ensure that no other procedure in is progress
- press a key (the first pressing of the key will not cause the effect associated with that key).

If parameter u11 is set to 3 and parameter u4 is set to 1, pressing the key will also disactivate the alarm output.

If parameter u9 is set to 0, the buzzer will not be activated.

5 SETTINGS
5.1 Setting the first working setpoint (room 1)
- ensure that the keyboard is not locked and that no other procedure is in progress
- press and release the **SET** key: the room 1 LED will flash
- press and release the **UP** or **DOWN** key within 15 sec; see also parameters r1, r2 and r3
- do not operate for 15 sec: the room 1 LED will switch off and then the instrument will exit the procedure.

The first working setpoint can also be set via parameter SP1.

5.2 Setting the second working setpoint (room 2)
- press and release the **SET** key during the modification of the first working setpoint: the room 2 LED will flash
- press and release the **UP** or **DOWN** key within 15 sec; see also parameters r7, r8 and r9
- press and release the **SET** key or do not operate for 15 sec: the room 2 LED will switch off and then the instrument will exit the procedure.

The second working setpoint can also be set via parameter SP2.

5.3 Setting the configuration parameters
To begin the procedure:
- ensure that no other procedure is in progress
- hold down the **UP** and **DOWN** keys for 4 sec: the display will show "**PA**"
- press and release the **SET** key
- press and release the **UP** or **DOWN** key within 15 sec to set "**-19**"
- press and release the **SET** key or do not operate for 15 sec
- hold down the **UP** and **DOWN** keys for 4 sec: the display will show "**SP**".

To select a parameter:
- press and release the **UP** or **DOWN** key.

To change a parameter:
- press and release the **SET** key.
- press and release the **UP** or **DOWN** key within 15 sec.
- press and release the **SET** key or do not operate for 15 sec.

To exit the procedure:
- hold down the **UP** and **DOWN** keys for 4 sec and do not operate for 60 sec (any changes will be saved).

After changing the parameters, suspend power supply flow to the instrument.

5.4 Restoring the manufacturer's settings
To begin the procedure:
- make sure that no other procedure is in progress.
- hold down the **UP** and **DOWN** key for 4 sec: the display will show "**PA**"
- press and release the **SET** key
- press and release the **UP** or **DOWN** key within 15 sec to set "**149**"
- press and release the **SET** key or do not operate for 15 sec
- hold down the **UP** and **DOWN** keys for 4 sec: the display will show "**dEF**"
- press and release the **SET** key
- press and release the **UP** or **DOWN** key within 15 sec to set "**1**"
- press and release the **SET** key or do not operate for 15 sec: the display will show "**dEF**" flashing for 4 sec, after which the instrument will exit the procedure.
- suspend the power supply to the instrument.

To exit the procedure before the operation is complete:
- hold down the **UP** and **DOWN** keys for 4 sec during the procedure (that is, before setting "**1**": the settings wil not be restored).

Make sure that the manufacturer's settings are appropriate (see chapter 11).

6 CALCULATING COMPRESSOR OPERATION HOURS
6.1 Preliminary notes
The instrument is able to store up to 9,999 hours of compressor operation, after which the number "**9999**" starts flashing.

6.2 Display of compressor operation hours
- make sure that the keyboard is not locked and that no other operation is in progress
- press and hold down the **DOWN** key for 1 sec: the display will show the first available label
- press and release the **UP** or down **DOWN** key to select "**CH**"
- press and release the **SET** key.

To exit the procedure:
- press and release the **SET** key or do not operate for 60 sec
- press and release the **UP** or down **DOWN** key until the display shows the temperature estabilshed with parameter P5 or do not operate for 60 sec.

Alternatively:
- press and release the **ON/STAND-BY** key.

6.3 Cancelling compressor operation hours
- make sure that the keyboard is not locked and that no other procedure is in progress
- press and hold down the **DOWN** key for 1 sec: the display will show the first available label

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- press and release the **UP** or **DOWN** key to select "**rCH**"
- press and release the **SET** key
- press and release the **UP** or **DOWN** key within 15 sec to set "**149**"
- press and release the **SET** key or do not operate for 15 sec: the display will show a flashing "**- - -**" for 4 sec then the instrument will exit the procedure.

7 WARNING LIGHTS AND DIRECTIONS
7.1 Warning lights

LED	MEANING
❄	compressor LED light if the LED is on, then the compressor is on (one room at least asks for cooling) if the LED is flashing: ▪ compressor protection operation in progress: - parameters C0, C1, C2
❄❄	defrost LED If it is on: ▪ defrosting is in progress if it is flashing: ▪ dripping in progress: - parameter d7
🌀	evaporator fan LED light If it is on, the evaporator fan is on If it is flashing, the evaporator fan is disactivated - parameter F3
💡	cabinet light LED If it is on, the cabinet light has been switched on (provided that parameter u11 is set to 0)
(M)	multifunction LED light If it is on: ▪ the demisting heater is switched on (provided that parameter u11 is set to 1) ▪ the auxiliary output has been switched on (provided that parameter u11 is set to 2) ▪ the condenser fan will be switched on (provided that parameter u11 is set to 6) if it is flashing: ▪ a delay in switching off the condenser fan is in progress: - parameter F12 (provided that parameter u11 is set to 6)

⊖	room 1 LED
	if the LED is on, then the room 1 valve is on
	if the LED is flashing:
	▪ the first working setpoint is in the process of being changed (via the procedure described in paragraph 5.1)
	if the LED is flashing 1 s every 4 s:
	▪ room 1 has been switched off

🌡	room 2 LED
	if the LED is on, then the room 2 valve is on
	if the LED is flashing:
	▪ the second working setpoint is in the process of being changed (via the procedure described in paragraph 5.2)
	if the LED is flashing 1 s every 4 s:
	▪ room 2 has been switched off

🔧	maintenance LED if on, compressor maintenance is required: - parameter C10
⚠	alarms LED if on, an alarm or error is in progress
°C	Celsius grade LED if on, the temperatures will be displayed using the Celsius grade unit of measurement: - parameter P2
°F	Fahrenheit grade LED if on, the temperatures will be displayed using the Fahrenheit grade unit of measurement: - parameter P2
⏻	on/stand-by LED if on, the instrument is in stand-by mode

7.2 Signal Descriptions/Explanations

CODE	MEANING
Loc	the keyboard is locked: - see paragraph 4.12 the working setpoints are blocked: - parameters r3 and r9

8 ALARMS
8.1 Alarms

CODE	MEANING
AL1	First minimum alarm temperatures (room 1) Solutions: ▪ check the room 1 temperature ▪ refer to: - parameters A1 and A2 Main consequences: ▪ the alarm output will be activated (provided that parameter u11 is set to 3)
AH1	First maximum temperature alarm (room 1) Solutions: ▪ check the room 1 temperature ▪ refer to: - parameters A4 and A5 Main consequences: ▪ the alarm output will be activated (provided that parameter u11 is set to 3)

CODE	MEANING
AL2	Second minimum alarm temperatures (room 2) Solutions: ▪ check the room 2 temperature ▪ refer to: - parameters A11 and A12 Main consequences: ▪ the alarm output will be activated (provided that parameter u11 is set to 3)
AH2	Second maximum temperature alarm (room 2) Solutions: ▪ check the room 2 temperature ▪ refer to: - parameters A14 and A15 Main consequences: ▪ the alarm output will be activated (provided that parameter u11 is set to 3)
HP	High pressure switch input alarm Solutions: ▪ verify the cause of the input activation ▪ see parameters i0, i1 and i2 Main consequences: ▪ the effect established with parameter i0 ▪ the alarm output will be activated (provided that parameter u11 is set to 3)
LP	Low pressure switch input alarm Solutions: ▪ verify the cause of the input activation ▪ see parameters i5, i6 and i7 Main consequences: ▪ the effect established with parameter i5 ▪ the alarm output will be activated (provided that parameter u11 is set to 3)
COH	Condenser overheated alarm Solutions: ▪ check the condenser temperature ▪ parameter C6 is seen Main consequences: ▪ the alarm output will be activated (provided that parameter u11 is set to 3) ▪ if parameter u11 is set to 6, the condenser fan will be switched on
CSd	Compressor blocked alarm Solutions: ▪ check the condenser temperature ▪ parameter C7 seen ▪ switch off and re-start the instrument: if when the instrument is switched back on, the temperature of the condenser is still higher than that established in parameter C7, disconnect the power supply and clean the condenser Main consequences: ▪ the compresser and the evaporator fan will be switched off ▪ the alarm output will be activated (provided that parameter u11 is set to 3)

When the problem that caused the alarm disappears, the instrument returns to normal function, with the exception of the compressor blocked by condenser temperature alarm (code "**CSd**") which requires the switching off of the instrument or the temporary suspension of the power supply.

9 ERRORS
9.1 Errors

CODE	MEANING
Pr1	Room 1 probe error Solutions: ▪ verify that the probe is a type NTC ▪ verify that the probe is intact ▪ verify the instrument-probe connection ▪ check the room 1 temperature Main consequences: ▪ room 1 valve activity will depend on parameters C4 and C5 ▪ the defrost will not be activated ▪ the alarm output will be activated (provided that parameter u11 is set to 3)
Pr2	Room 2 probe error Solutions: ▪ room 2 valve activity will depend on parameters C4 and C5 Main consequences: ▪ the same as the preceeding case
Pr3	Condenser probe error Solutions: ▪ the same as the preceeding case but with respect to the condenser probe Main consequences: ▪ condenser overheated alarm (code "**COH**") will never be activated ▪ compressor blocked by condenser temperature alarm (code "**CSd**") will never be activated ▪ the alarm output will be activated (provided that parameter u11 is set to 3)

▪ if parameter u11 is set to 6, the condenser fan will operate in parallel with the condenser

When the problem that caused the alarm disappears, the instrument returns to normal operation.

10 TECHNICAL DATA

10.1 Technical data

Case: open frame board.

Frontal protection degree: IP 00.

Connections: 6.3 mm faston connectors (0.248 in, power and outputs), screw terminal board (inputs), 6-poles connector (serial port).

Operating temperature: from 0 to 55 °C (from 32 to 131 °F, 10 ... 90% relative humidity without condensaton).

Power supply: 230 VCA, 50/60 Hz or 115 VCA, 50/60 Hz.

Alarm buzzers: incorporated.

Measure inputs: 3 (room 1 probe, room 2 probe and condenser probe) for NTC probe.

Digital inputs: 2 (high pressure switch and low pressure switch) for normally open/normally closed contact (free contact, 5 V 1 mA).

Measurement field: from -40 to 105 °C (from -40 to 220 °F).

Resolution: 0.1 °C/1 °C/1 °F.

Digital outputs: 5 relays:
- **compressor relay:** 30 A res. @ 250 VCA (normally open contact)
- **evaporator fan relay:** 8 A res. @ 250 VCA (exchange contact)
- **room 1 valve relay:** 8 A res. @ 250 VCA (normally open contact)

- **room 2 valve relay:** from 8 A res. @ 250 VCA (normally open contact)
- **fifth output relay:** from 5 A res. @ 250 VCA (normally open contact).

The maximum load current allowed is 16 A.

Serial port: port for communicating with the programming key, the set-up software system or the supervision system (through a serial interface, via TTL, with a MODBUS communications protocol).

11 WORKING SETPOINT AND CONFIGURATION PARAMETERS

11.1 Working setpoint

	MIN.	MAX.	U.M.	DEFAULT	WORKING SETPOINT
	r1	r2	°C/°F (1)	10.0	first working setpoint (room 1); see also r0
	r7	r8	°C/°F (1)	2.0	second working setpoint (room 2); see also r6

11.2 Configuration parameters

PAR.	MIN.	MAX.	U.M.	DEFAULT	WORKING SETPOINT
SP1	r1	r2	°C/°F (1)	10.0	first working setpoint (room 1); see also r0
SP2	r7	r8	°C/°F (1)	2.0	second working setpoint (room 2); see also r6
PAR.	**MIN.**	**MAX.**	**U.M.**	**DEFAULT**	**MEASUREMENT INPUTS**
CA1	-25.0	25.0	°C/°F (1)	0.0	offset room 1 probe
CA2	-25.0	25.0	°C/°F (1)	0.0	offset room 2 probe
CA3	-25.0	25.0	°C/°F (1)	0.0	offset condenser probe
P1	0	1	----	1	Celsius degree decimal point (for size displayed during normal operation) 1 = YES
P2	0	1	----	0	temperature unit of measurement (2) 0 = °C 1 = °F
P4	0	1	----	1	enabling of condenser probe 1 = YES
P5	0	1	----	0	temperature shown during the normal operation 0 = room 1 temperature 1 = room 2 temperature
P8	0	250	ds	5	delay in display of variations in temperature detected by the probes
PAR.	**MIN.**	**MAX.**	**U.M.**	**DEFAULT**	**MAIN REGULATOR**
r0	0.1	15.0	°C/°F (1)	4.0	first working setpoint differential (room 1)
r1	-99.0	r2	°C/°F (1)	-50.0	minimum first working setpoint (room 1)
r2	r1	99.0	°C/°F (1)	50.0	maximum first working setpoint (room 1)
r3	0	1	----	0	locking of first working setpoint calibration (using the procedure described in paragraph 5.1) 1 = YES
r6	0.1	15.0	°C/°F (1)	4.0	second working setpoint differential (room 2)
r7	-99.0	r8	°C/°F (1)	-50.0	minimum second working setpoint (room 2)
r8	r7	99.0	°C/°F (1)	50.0	maximum second working setpoint (room 2)
r9	0	1	----	0	locking of second working setpoint calibration (using the procedure described in paragraph 5.2) 1 = YES
PAR.	**MIN.**	**MAX.**	**U.M.**	**DEFAULT**	**COMPRESSROR PROTECTION SYSTEM**
C0	0	240	min	0	delay in switching on of compressor after the insturment switches on (3)
C1	0	240	min	5	minimum time between two consecutive compressor start-ups; also delay in compressor start-up after conclusion of room 1 (or room 2) probe error (code "**Pr1**") (4) (5)
C2	0	240	min	3	minimum duration of compressor switch off time (4)
C3	0	240	sec	0	minimum duration of compressor switch on time
C4	0	240	min	10	duration of room 1 valve (and room 2 valve) switch off during room 1 (or room 2) probe error (code "**Pr1**"); see also C5
C5	0	240	min	10	duration of room 1 valve (and room 2 valve) switch on during room 1 (or room 2) probe error (code "**Pr1**"); see also C4
C6	0.0	199.0	°C/°F (1)	80.0	condenser temperature is higher than that at which the condenser overheating alarm is activated (code "**COH**") (6)
C7	0.0	199.0	°C/°F (1)	90.0	condenser temperature is higher than the limit at which the compressor blocked alarm is activated (code "**CSd**")
C8	0	15	min	1	compressor alarm delay locked (code "**CSd**") (7)
C10	0	9.999	hr	0	number of operating hours is higher than the limit at which the need for maintenance is signaled. 0 = function absent
PAR.	**MIN.**	**MAX.**	**U.M.**	**DEFAULT**	**DEFROSTING (it has effect on both the rooms and at the same time)**
d0	0	99	hr	4	defrost interval (8) 0 = interval defrosting will never be activated
d3	0	99	min	20	defrosting duration 0 = defrosting will not be activated
d4	0	1	----	0	defrosting when instrument is switched on (3) 1 = YES
d5	0	99	min	0	if d4 = 0, minimum time between switching on of instrument and activation of defrosting (3) if d4 = 1, delay in activation of defrosting after instrument is switched on (3)
d6	0	1	----	1	temperature displayed during defrosting 0 = room 1 (or room 2) temperature 1 = if at the time of defrosting activation, the room 1 (or room 2) temperature is lower than the "first working setpoint + r0" (or "second working setpoint + r6)", at most "first working setpoint + r0" (or "second working setpoint + r6"); if at the time of defrosting activation, the room 1 (or room 2) temperature is higher than the "first working setpoint + r0" (or "second working setpoint + r6"), at most the room 1 (or room 2) temperature when defrosting is activated (9)
d7	0	15	min	2	dripping duration (during dripping the compressor will remain switched off)
d8	0	1	----	0	defrosting activation methods 0 = AT INTERVALS - defrosting will be activated once the instrument has altogether been running for time d0 1 = AT INTERVALS - defrosting will be activated once the compressor has altogether been switched on for time d0
PAR.	**MIN.**	**MAX.**	**U.M.**	**DEFAULT**	**TEMPERATURE ALARMS**
A1	-99.0	99.0	°C/°F (1)	-10.0	temperature below that at which the first minimum temperature alarm is activated (room 1, code "**AL1**"); see also A2 and A19
A2	0	2	----	1	type of minimum first temperature alarm (code "**AL1**") 0 = alarm absent 1 = relative to working setpoint (that is "first working setpoint - A1"; consider A1 without sign) 2 = absolute (that is A1)
A4	-99.0	99.0	°C/°F (1)	10.0	temperature higher than that at which the first maximum temperature alarm is activated (room 1, code "**AH1**"); see also A5 and A19
A5	0	2	----	1	type of maximum first temperature alarm (code "**AH1**") 0 = alarm absent 1 = relative to working setpoint (that is "first working setpoint + A4"; consider A4 without sign)) 2 = absolute (that is A4)
A6	0	240	min	120	delay in first maximum temperature alarm (room 1, code "**AH1**") after the instrument is switched on (3)

PAR.	MIN.	MAX.	U.M.	DEFAULT	
A7	0	240	min	15	first temperature alarm delay (room 1, code "**AL1**" and code "**AH1**")
A8	0	240	min	15	delay in first maximum temperature alarm (room 1, code "**AH1**") following the conclusion of evaporator fan disactivation (10)
A11	-99.0	99.0	°C/°F (1)	-10.0	temperature below that at which the second minimum temperature alarm is activated (room 2, code "**AL2**"); see also A12 and A19
A12	0	2	- - - -	1	type of minimum second temperature alarm (code "**AL2**") 0 = alarm absent 1 = relative to working setpoint (that is "second working setpoint - A11"; consider A11 without sign) 2 = absolute (that is A11)
A14	-99.0	99.0	°C/°F (1)	10.0	temperature higher than that at which the second maximum temperature alarm is activated (room 2, code "**AH2**"); see also A15 and A19
A15	0	2	- - - -	1	type of maximum second temperature alarm (code "**AH2**") 0 = alarm absent 1 = relative to working setpoint (that is "second working setpoint + A14"; consider A14 without sign)) 2 = absolute (that is A14)
A16	0	240	min	120	delay in second maximum temperature alarm (room 2, code "**AH2**") after the instrument is switched on (3)
A17	0	240	min	15	second temperature alarm delay (room 2, code "**AL2**" and code "**AH2**")
A18	0	240	min	15	delay in second maximum temperature alarm (room 2, code "**AH2**") following the conclusion of evaporator fan disactivation (10)
A19	0.1	15.0	°C/°F (1)	2.0	differential of parameters A1, A4, A11 and A14
PAR.	MIN.	MAX.	U.M.	DEFAULT	EVAPORTOR FAN
F0	0	2	- - - -	1	evaporator fan activity during normal operation 0 = switched off 1 = switched on 2 = in parallel with the compressor; see also F9
F2	0	2	- - - -	0	evaporator fan activity during defrosting and dripping 0 = switched off 1 = switched on (setting parameter d7 to 0 is recommended) 2 = dependent on F0
F3	0	15	min	2	maximum duration of evaporator fan disactivation; (during evaporator fan desactivation the compressor can be switched on and the evaporator fan will remain switched off)
F9	0	240	sec	0	delay in the switching off of evaporator fan following the switching off of the compressor (only if F0 = 2)
F11	0.0	99.0	°C/°F (1)	15.0	condenser temperature above that at which the condenser fan is switched on ("F11 + 2.0 °C/4 °F, only if u11 = 6 and provided the compressor is switched on); see also F12 (11)
F12	0	240	sec	30	delay in switching off of the condenser fan following the switching off of the condenser (only if u11 = 6); see also F11
PAR.	MIN.	MAX.	U.M.	DEFAULT	DIGITAL INPUTS
i0	0	1	- - - -	1	effect caused by the activation of the high pressure switch 0 = no effect 1 = the compressor and the evaporator fan will be switched off and the condenser fan (only if u11 = 6) will be switched on, once time i2 has passed the display will show the flashing code "**HP**" and the buzzer will be activated (until the input is disactivated)
i1	0	1	- - - -	0	type of high pressure switch input contact 0 = normally open (active input with closed contact) 1 = normally closed (active input with open contact)
i2	-1	240	s	5	high pressure switch input alarm delay (code "**HP**") -1= the alarm will not be signaled
i5	0	1	- - - -	1	effect caused by the activation of the low pressure switch 0 = no effect 1 = the compressor and the evaporator fan will be switched off, once time i7 has passed the display will show the flashing code "**LP**" and the buzzer will be activated (until the input is disactivated)
i6	0	1	- - - -	0	type of low pressure switch input contact 0 = normally open (active input with closed contact) 1 = normally closed (active input with open contact)
i7	-1	240	s	5	low pressure switch input alarm delay (code "**LP**") -1= the alarm will not be signaled
PAR.	MIN.	MAX.	U.M.	DEFAULT	DIGITAL OUTPUTS
u2	0	1	- - - -	0	enabling of manual switch on/switch off of the cabinet light or the auxiliary output when the instrument is switched off (only if u11 = 0 or 2) (13) 1 = YES
u4	0	1	- - - -	1	enabling of alarm output disactivation with the silencing of the buzzer (only if u11 = 3) 1 = YES
u6	1	120	min	5	operating time of demistor heater (only if u11 = 1)
u9	0	1	- - - -	1	enabling of buzzer 1 = YES
u11	0	6	- - - -	0	operation controlled by fifth output (12) 0 = <u>CABINET LIGHT</u> - in this case the **AUXILIARY** key and parameter u2 will be activated 1 = <u>DEMISTER HEATER</u> - in this case the **AUXILIARY** key and parameter u6 will be activated 2 = <u>AUXILIARY OUTPUT</u> - in this case the **AUXILIARY** key and parameters u2 will be activated 3 = <u>ALARM OUTPUTS</u> - in this case parameter u4 will be activated 4 = reserved 5 = reserved 6 = <u>CONDENSER FAN</u> - in this case parameters P4, F11 and F12 will be activated
PAR.	MIN.	MAX.	U.M.	DEFAULT	SERIAL NETWORK (MODBUS)
LA	1	247	- - - -	247	instrument address
Lb	0	3	- - - -	2	baud rate (0 = 2,400 baud, 1 = 4,800 baud, 2 = 9,600 baud, 3 = 19,200 baud)
LP	0	2	- - - -	2	parity (0 = none, 1 = odd, 2 = even)

(1) the unit of measurement depends on P2

(2) properly set the parameters corresponding to the regulators after modifying parameter P2

(3) the parameter has effect even after an interruption in the power supply that occurs while the instrument is switched on

(4) the time established with the parameter is counted even when the instrument is switched off

(5) if parameter C1 is set to 0, the delay after the end of the room 1 and room 2 probe error will be 2 min

(6) the parameter differential is 2.0 °C/4 °F

(7) if when the instrument is switched on, the condenser temperature is already above that established in parameter C7, then parameter C8 will not have effect

(8) the instrument stores the defroster interval count every 30 min; the modification of parameter d0 takes effect following the end of the preceeding interval or following the activation of manual defrosting.

(9) the display returns to normal operation when, at the end of evaporator fan disactivation, the room 1 (or the room 2) temperature falls below that at which the display was initally blocked (or if a temperature alarm is signaled)

(10) during defrosting and dripping and when the evaporator fan is stopped, the temperature alarms are absent, provided that these were signaled after the activation of defrosting

(11) if parameter P4 is set to 0, the condenser fan will function in parallel with the compressor

(12) to avoid damaging the unit connected to the instrument, change the parameter setting when the instrument is switched off

(13) if parameter u2 is set to 0, switching off the instrument may cause the cabinet light and/or the auxiliary output to switch off (the next time the instrument is switched on the unit connected will remain switched off); if parameter u2 is set to 1, switching off the instrument will not cause the cabinet light and/or the auxiliary output to switch off (the next time the instrument is switched on the unit connected will remain switched on).

12   ELECTRIC CONNECTION

12.1   Preliminary notes

With reference to the electrical wiring diagrams:

▪ the unit connected to and operated by the fifth outpt depends on parameter u11

▪ the serial port is the port for communicating with the programming key, the set-up software system and the supervision system (through a serial interface, via TTL, with MODBUS communications protocol); the port must not be used for these purposes simultaneously.

12.2   Electrical wiring
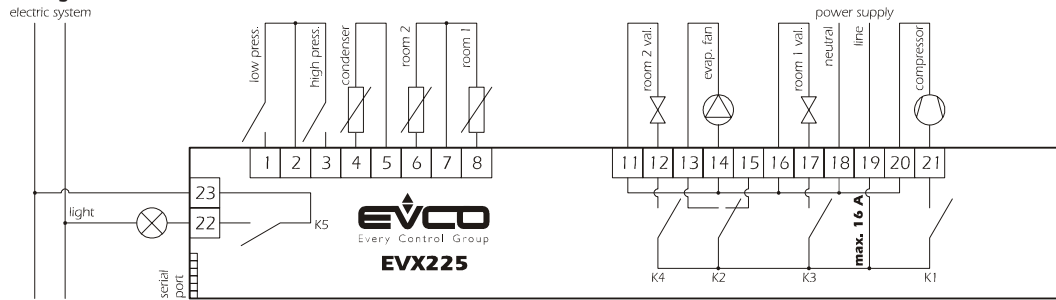
12.3   Electrical wiring warnings

▪ do not use electric or pneumatic screwers on the terminal blocks

▪ if the instrument was brought from a cold place to a hot one, humidity may condense inside the instrument; wait approximately one hour before switching on the power

▪ make sure that the power supply voltage, frequency, and the electric operating power of the instrument are compatible with the those of the local power voltage

▪ disconnect the power before performing any type of maintenance operation

▪ do not use the instrument as a safety device

▪ for information about the instrument and repairs contact a member of the EVCO sales network.