

ENGLISH

IMPORTANT

Read this document thoroughly before installation and before use of the device and follow all recommendations; keep this document with the device for future consultation.

Only use the device in the way described in this document; do not use the same as a safety device.

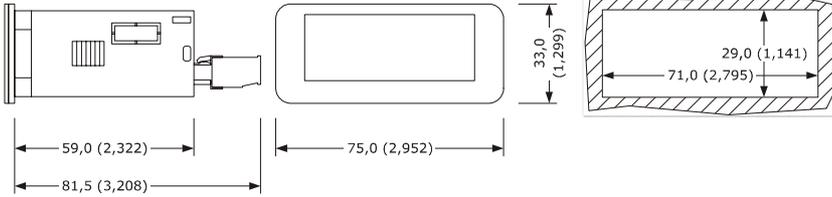
The device must be disposed of in compliance with local standards regarding the collection of electric and electronic equipment.

1 DIMENSIONS AND INSTALLATION

1.1 Dimensions

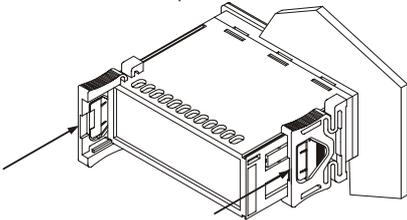
Dimensions are expressed in mm (in).

59.0 (2.322) is the depth with fixed screw connection terminal blocks; 81.5 (3.208) is the depth with removable screw connection terminal blocks.



1.2 Installation

Panel installation with snap-in brackets.

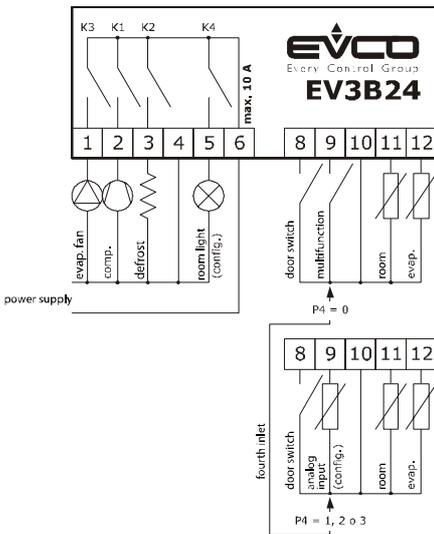


1.3 Installation warnings

- the thickness of the panel on which the device is to be installed must be between 0.8 and 2.0 mm (0.031 and 0.078 in)
- make sure that the device work conditions (temperature of use, humidity, etc.) lie within the limits indicated; see chapter 8
- do not install the device near to any heat sources (heating elements, hot air ducts etc.), equipment containing powerful magnets (large diffusers, etc.), areas affected by direct sunlight, rain, humidity, excessive dust, mechanical vibrations or shocks
- in compliance with safety standards, the device must be installed correctly and in a way to protect against any contact with electric parts; all parts that ensure protection must be fixed in a way that they cannot be removed without the use of tools.

2 ELECTRIC CONNECTION

2.1 Electric connection



2.2 Warnings for the electric connection

- do not use electric or pneumatic screwdrivers on the device terminal board
- if the device has been taken from a cold to hot place, humidity could condense inside; wait about 1 hour before powering it
- check that the power supply voltage, mains frequency and electric power fall within the set limits; see chapter 8

- disconnect the device power supply before proceeding with any type of maintenance
- position the power cables as far away as possible from the signal cables
- for repairs and information regarding the device, contact the EVCO sales network.

3 USER INTERFACE

3.1 Preliminary notes

Operating statuses:

- "on" status (the device is powered and is on; utilities may be on)
- stand-by" status (the device is powered but is switched off via software; utilities are off
- the "off" status: the device is not powered; utilities are off.

Hereafter, if the POF parameter is set to 0, with the word "switch-on" means the passage from "off" status to "on" status; the word "switch-off" means the passage from "on" status to "off" status.

If the POF parameter is set to 1, 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 device displays the status that it was in at the time it was disconnected.

3.2 Manual switch on/off of the device

If the POF parameter is set to 0:

1. Connect/disconnect the device power supply.
2. Make sure that the keyboard is not locked and that no procedure is in progress.
3. Touch the | | key for 4 s: the LED will flash, after which it will turn off/on.

3.3 The display

If the device is switched on, during normal operation, the display will show the magnitude established with P5, except during defrost, when the device will show the magnitude established with d6 parameter.

If the device is switched off ("stand-by" status), the display will be switched off; the LED shall be on.

If the device is in "low consumption" mode, the display will be switched off and the LED shall be on.

3.4 Temperature display as detected by the probes

1. Make sure that the keyboard is not locked and that no procedure is in progress.
2. Touch the | | key for 4 s: the display will show the first label available.
3. Touch the | | or | | key to select a label.
4. Touch the | | .

The following table shows the correspondence between the labels and the temperature displayed.

Label	Displayed temperature
Pb1	if the P4 parameter is set to 0, 1 or 2, room temperature if the P4 parameter is set to 3, incoming air temperature
Pb2	evaporator temperature
Pb3	if the P4 parameter is set to 1, condenser temperature if the P4 parameter is set to 2, critical temperature if the P4 parameter is set to 3, outgoing air temperature
Pb4	CPT temperature

To exit the procedure:

5. Touch the | | key or do not operate for 60 s.
6. Touch the | | key.

If the evaporator probe is absent (that is to say, if the P3 parameter is set to 0), the "Pb2" label shall not be displayed. If the fourth inlet function is to be a multifunction inlet (that is to say, if the P4 parameter is set to 0) the "Pb3" label shall not be displayed.

If the fourth inlet function is not to be an outgoing air probe (that is to say, if the P4 parameter is not set to 3) the "Pb4" label shall not be displayed.

3.5 Compressor operation hours

To show the compressor operation hours:

1. Make sure that the keyboard is not locked and that no procedure is in progress.
2. Touch the | | key for 4 s: the display will show the first label available.
3. Touch the | | or | | key to select "CH".
4. Touch the | | key.

To exit the procedure:

5. Touch the | | key or do not operate for 60 s.
6. Touch the | | key.

To cancel the compressor operation hours:

7. From step 3. touch the | | or | | key to select "rCH".
8. Touch the | | key.
9. Touch the | | or | | key within 15 s to set "149".
10. Touch the | | key or do not operate for 15 s: the display will show a flashing "--" for 4 s, after which the device will exit the procedure.

3.6 "Rapid cooling" function enabling/disabling

1. Make sure that the keyboard is not locked and that no procedure is in progress, that the "rapid cooling" function is not in progress, that there are no defrosting, dripping or evaporator fan stop operations in progress, that the r5 parameter is set to 0 and that the r8 parameter is set to 1.
2. Touch the | | key : the °C LED or the °F LED will flash/stop flashing; see also r6 e r7 parameters.

3.7 "Rapid heating" function enabling/disabling

1. Make sure that the keyboard is not locked and that no procedure is in progress, and that the r5 and r8 parameters are set to 1.
2. Touch the | | key : the °C LED or the °F LED will flash/stop flashing; see also r6 e r7 parameters.

3.8 "Energy saving" function enabling/disabling in manual mode

1. Make sure that the keyboard is not locked and that no procedure is in progress, that the r5 parameter is set to 0 and that the r8 parameter is set to 2.
2. Touch the | | key : the LED will turn on/off; see also r4, F4, F5 e HE2 parameters.

3.9 Defrost manual activation

1. Make sure that the keyboard is not locked and that no procedure is in progress, that the "rapid cooling" function is not in progress.
2. Touch the | | key for 4 s.

If the evaporator probe functions as a defrost probe (that is to say, if the P3 parameter is set to 1) and when the defrost starts the evaporator temperature exceeds the value set with the d2 parameter, the defrost shall not be activated.

3.10 Room light switch-on/off in manual mode

1. Make sure that no procedure is in progress and that the u1 parameter is set to 0; see also u2 parameter.
2. Touch the | | key: the "AUX" LED will turn on/off.

3.11 Demister heating elements activation

1. Make sure that no procedure is in progress and that the u1 parameter is set to 1.
2. Touch the | | key for 4 s: the "AUX" LED will turn on; see also u6 parameter.

3.12 Turning on/off the auxiliary output in manual mode

1. Make sure that the keyboard is not locked, that no procedure is in progress and that the u1 parameter is set to 2; see also u2 parameter.
2. Touch the | | key: the "AUX" LED will turn on/off.

3.13 Keyboard locking/unlocking

To lock the keyboard proceed as follows:

1. Make sure no procedure is in progress.
2. Do not operate for 30 s: the display will show the message "Loc" for 1 s and the keyboard shall lock automatically.

To unlock the keyboard:

3. Touch a key for 1 s: the display will show the message "UnL" for 1 s.

4 SETTINGS

4.1 Setting the working setpoint

1. Make sure that the keyboard is not locked and that no procedure is in progress.
2. Touch the | **ASET** | key: the LED  will flash.
3. Touch the |  | or | **FNC** | key within 15 s; see also r1 and r2 parameters.
4. Touch the | **ASET** | key or do not operate for 15 s: the LED  will switch off after which, the device will exit the procedure.

To exit the procedure before the operation is complete:

5. Touch the |  | (any changes will not be saved).
- The working setpoint can also be set via SP parameter.

4.2 Setting the configuration parameters

To access the procedure:

1. Make sure no procedure is in progress.
2. Touch the | **ASET** | key for 4 s: the display will show "PA".
3. Touch the | **ASET** | key.
4. Touch the |  | or | **FNC** | key within 15 s to set the value determined with the "PAS" parameter (the parameter is set at "-19" by default).
5. Touch the | **ASET** | key or do not operate for 15 s: the display will show "SP".

To select a parameter:

6. Touch the |  | or | **FNC** | key.
7. Touch the | **ASET** | key.
8. Touch the |  | or | **FNC** | key within 15 s.
9. Touch the | **ASET** | key or do not operate for 15 s.

To exit the procedure:

10. Touch the | **ASET** | key for 4 s or do not operate for 60 s (any changes will be saved).

After setting the parameters, suspend power supply flow to the device.

4.3 Manufacturer's settings

To access the procedure:

1. Make sure no procedure is in progress.
2. Touch the | **ASET** | key for 4 s: the display will show "PA".
3. Touch the | **ASET** | key.

To restore the manufacturer's settings:

4. Touch the |  | or | **FNC** | key within 15 s to set "149".
5. Touch the | **ASET** | key or do not operate for 15 s: the display will show "dEF".
6. Touch the | **ASET** | key.
7. Touch the |  | or | **FNC** | key within 15 s to set "4".
8. Touch the | **ASET** | key or do not operate for 15 s: the display will show a flashing "--" for 4 s, after which the device will exit the procedure.
9. Cut the device power supply off.

Make sure that the manufacturer's settings are appropriate; see chapter 9.

To store customized settings as manufacturer's:

10. Set the configuration parameters (with the procedure described in paragraph 4.2).
 11. From step 4. touch the |  | or | **FNC** | key within 15 s to set "161".
 12. Touch the | **ASET** | key or do not operate for 15 s: the display will show "MAP".
 13. Repeat steps 6. 7. 8. and 9.
- To exit the procedure in advance:
14. Touch the | **ASET** | key for 4 s during the procedure (i.e. before setting "4": Restore will not be performed).

5 WARNING LIGHTS AND DIRECTIONS

5.1 Signals

LED	Meaning
	Compressor LED - If the LED is on, the compressor is on - If the LED is flashing: - the working setpoint is in the process of being set (via the procedure described in paragraph 4.1) - a compressor protection will be in progress
	Defrost LED - If the LED is on, defrost is in progress - pre-dripping is in progress If the LED is flashing: - defrost will be requested but a compressor protection will be in progress - dripping will be in progress - defrost will be requested but a compressor minimum switch-on shall be in progress
	Evaporator fan LED If the LED is on the evaporator fan will be on If the LED is flashing evaporator fan standstill will be in progress
AUX	Auxiliary LED If the LED is on: - the room light will be on in manual mode - the demister heating elements will be on

-	the auxiliary output will have been turned on in manual mode
-	the alarm output will be active
-	the door heating elements will be on
-	the neutral area operation heating elements will be on
-	the condenser fan will be on
-	the on/stand-by output shall be active
	Energy saving LED If the LED is on and the display is switched on, the "energy saving" function is in progress If the LED is on and the display is switched off, the "low consumption" function is in progress; touch a key to restore normal display
	Maintenance LED if it is on, the compressor must be maintained
°C	Celsius degrees LED If the LED is on, the unit of measurement for temperature is Celsius degrees If it is flashing, the "rapid cooling" or "rapid heating" function will be in progress
°F	Fahrenheit degrees LED If the LED is on, the unit of measurement for temperature is Fahrenheit degrees If it is flashing, the "rapid cooling" or "rapid heating" function will be in progress
	LED on/stand-by If the LED is on, the device is switched off ("stand-by" status)

5.2 Signals

Code	Meaning
Loc	the keyboard is blocked; see paragraph 3.13
- - -	the operation requested is not available
dEF	defrost is in progress

6 ALARMS

Code	Meaning
AL	Minimum temperature alarm Solutions: - check the room temperature or CPT temperature; see A1 parameter Main consequences: - the alarm output will be switched on
AH	Maximum temperature alarm Solutions: - check the room temperature or CPT temperature; see A4 parameter Main consequences: - the alarm output will be switched on
id	Door switch input alarm Solutions: - check the causes of the activation of the input; see i0 and i1 parameters Main consequences: - the effect established with the i0 parameter - the alarm output will be switched on
iA	Multifunction input alarm Solutions: - check the causes of the activation of the input; see i5 and i6 parameters Main consequences: - the effect established with the i5 parameter - the alarm output will be switched on
COH	Condenser overheated alarm Solutions: - check the condenser temperature; see C6 parameter Main consequences: - the alarm output will be switched on - the condenser fan will be switched on
CSd	Compressor shut down alarm Solutions: - check the condenser temperature; see C7 parameter - switch the device off and back on again: if when the device is switched back on, the temperature of the condenser is still higher than that established in C7 parameter, disconnect the power supply and clean the condenser Main consequences: - the compressor will be switched off - the alarm output will be switched on - the condenser fan will be switched on

Cth	Compressor thermal protection alarm Solutions: - check the causes of the activation of the multifunction input; see i5 and i6 parameters Main consequences: - the compressor will be switched off - the alarm output will be switched on
th	Global thermal protection alarm Solutions: - check the causes of the activation of the multifunction input; see i5 and i6 parameters - check that the cause that triggered the alarm has been eliminated and switch the device off and back on again or disconnect the power supply Main consequences: - all utilities will be switched off - the alarm output will be switched on
dFd	Defrost alarm switched off because maximum time has been reached Solutions: - check the integrity of the evaporator probe; see d2, d3 and d11 parameters - touch a key to restore normal display Main consequences: - the device will continue to operate normally

When the cause of the alarm disappears, the device restores normal operation, except for the following alarms:

- the compressor blocked alarm (code "CSd") and the global thermal protection alarm (code "th"), which both need to be reset by turning the device off or switching off the power supply.
- defrost alarm switched off because maximum time has been reached (code "dFd") which requires the touching of a key.

7 ERRORS

Code	Meaning
Pr1	Room temperature probe or inlet air probe error Solutions: - check that the probe is the PTC or NTC type; see P0 parameter - check the device-probe connection - check room temperature/CPT temperature Main consequences: - compressor activity will depend on C4 and C5 parameters - if the P4 parameter is set at 3, the temperature associated with the regulation and the temperature alarms shall be the outgoing air temperature - the defrost will not be activated - the alarm output will be switched on - the door heating elements shall be turned off - the neutral area operation heating elements will be turned off
Pr2	Evaporator probe error Solutions: - the same as in the previous example, but with regard to the evaporator probe Main consequences: - if P3 parameter is set at 1, the defrost interval will last for the amount of time set with d3 parameter - if P3 parameter is set at 1 and d8 parameter is set at 2 or to 3, the device will operate as if d8 parameter were set at 0 - if P3 parameter is set at 1 or 2 and F0 parameter is set at 3 to 4, the device will operate as if parameter were set at 2 - the alarm output will be switched on
Pr3	Condenser probe error, critical temperature probe or outflowing air probe Solutions: - the same as in the previous example, but with regard to the condenser probe, the critical temperature probe or the outflowing air probe Main consequences: - if P4 parameter is set at 1, the condenser overheated alarm (code "COH") will never be activated - if P4 parameter is set at 1, the compressor shut down alarm (code "CSd") will never be activated - if P4 parameter is set at 1, the condenser fan shall work in parallel with the compressor - if the P4 parameter is set at 3, the temperature associated with the temperature alarms shall be the inflowing air temperature - the alarm output will be switched on

When the cause of the error disappears, the device restores normal operation.

8 TECHNICAL DATA

8.1 Technical data

Purpose of the command device: operating command device.

Construction of the command device: built-in electronic device.

Container: grey self-extinguishing.

Heat and fire protection class: D.

Dimensions: according to model:

- 75,0 x 33,0 x 59,0 mm (2,952 x 1,299 x 2,322 in; L x H x P) with fixed screw connection terminal blocks
- 75,0 x 33,0 x 81,5 mm (2,952 x 1,299 x 3,208 in; L x H x P) with removable screw connection terminal blocks.

Method of mounting the command device: on panel, with snap-in brackets.

Shell protection rating: IP65 (the front one).

Connection method: according to model:

- fixed screw connection terminal blocks for wires up to 2.5 mm² (0.0038 in²): power supply, analog inputs, digital inputs and digital outputs
- removable screw connection terminal blocks for wires up to 2.5 mm² (0.0038 in²): power supply, analog inputs, digital inputs and digital outputs.

The maximum lengths of the connection cables are:

- power supply: 10 m (32.8 ft)
- analog inputs: 10 m (32.8 ft)
- digital inputs: 10 m (32.8 ft)
- digital outputs: 10 m (32.8 ft).

Operating temperature: from 0 to 55 °C (from 32 to 131 °F).

Storage temperature: from -25 to 70 °C (from -13 to 158 °F).

Humidity for use: from 10 to 90 % relative humidity without condensate.

Command device pollution situation: 2.

Environmental standards:

- RoHS 2011/65/CE
- WEEE 2012/19/EU
- REACH (CE) regulation n. 1907/2006.

EMC standards:

- EN 60730-1
- IEC 60730-1.

Power supply: 115... 230 VAC (+10 % -15 %), 50... 60 Hz (±3 Hz), 3.2 VA max.

Control device grounding method: none.

Rated impulse voltage: 2.5 KV.

Overvoltage category: II.

Class and structure of software: A.

Analog inputs: 2 inputs (room temperature probe or inlet air probe and evaporator probe) configurable via configuration parameter for PTC or NTC probes.

Analog inputs PTC (990 Ω @ 25 °C, 77 °F)

Type of sensor: KTY 81-121.

Measurement field: from -50 to 150 °C (from -58 to 302 °F).

Resolution: 0,1 °C (1 °F).

Analog inputs NTC (10 KΩ @ 25 °C, 77 °F)

Type of sensor: B3435.

Measurement field: from -40 to 105 °C (from -40 to 221 °F).

Resolution: 0,1 °C (1 °F).

Digital inputs: 1 input (door switch input).

Digital inputs (free of voltage contact 5 VDC 2 mA)

Other inputs: 1 input settable by way of a configuration parameter for analog (condenser probe, critical temperature probe or outflowing air probe) or digital (multifunction input) inputs.

Displays: 3 digit custom display, with function icons.

Digital outputs:

- 1 output (SPST electromechanical relay with 16 A res. @ 250 VAC) for compressor management
- 1 output (SPST electromechanical relay with 8 A res. @ 250 VAC) for defrost management
- 1 output (SPST electromechanical relay with 5 A res. @ 250 VAC) for evaporator fan management
- 1 output (SPST electromechanical relay with 5 A res. @ 250 VAC) for the management of room lighting, demister heating elements, auxiliary output, alarm output, door heating elements, neutral area operation heating elements , condenser fan or the on/stand-by output.

The maximum allowable current on the loads is 10 A.

The device guarantees double insulation between each connector of the digital outputs and the other parts of the device.

Type 1 or Type 2 actions: type 1.

Complementary features of Type 1 or Type 2 actions: C.

9 WORKING SETPOINT AND CONFIGURATION PARAMETERS

9.1 Working Setpoint

	MIN.	MAX.	U.M.	DEF.	WORKING SETPOINT
r1	r2	°C/°F (1)	0,0	working setpoint; see also r0 and r12	

9.2 Configuration parameters

PARAM.	MIN.	MAX.	U.M.	DEF.	WORKING SETPOINT
SP	r1	r2	°C/°F (1)	0,0	working setpoint; see also r0 and r12
ANALOG INPUTS					
CA1	-25	25,0	°C/°F (1)	0,0	if P4 = 0, 1 or 2, room probe offset if P4 = 3, incoming air probe offset
CA2	-25	25,0	°C/°F (1)	0,0	evaporator probe offset
CA3	-25	25,0	°C/°F (1)	0,0	if P4 = 1, condenser probe offset if P4 = 2, critical temperature probe offset if P4 = 3, outgoing air probe offset
P0	0	1	- - -	1	probe type 0 = PTC 1 = NTC
P1	0	1	- - -	1	degree Celsius decimal point (during normal operation) 1 = YES
P2	0	1	- - -	0	unit of measurement for temperature (2) 0 = °C (Celsius degree; resolution depends on P1 parameter) 1 = °F (Fahrenheit degree; resolution is 1 °F)
P3	0	2	- - -	1	evaporator probe function 0 = absent probe 1 = defrost probe and probe determining the activity of the evaporator fan 2 = probe determining the activity of the evaporator fan
P4	0	3	- - -	0	fourth inlet function 0 = multifunction input (digital input) 1 = condenser probe (analog input) 2 = critical temperature probe (analog input) 3 = outlet air probe (analog input) (3)
P5	0	4	- - -	0	magnitude displayed during normal operation 0 = if P4 = 0, 1 or 2, room temperature if P4 = 3, CPT temperature 1 = working setpoint 2 = evaporator temperature

					3 = if P4 = 0, "- - -" if P4 = 1, condenser temperature if P4 = 2, critical temperature if P4 = 3, outlet air temperature
					4 = if P4 = 0, 1 o 2, "- - -" if P4 = 3, inlet air temperature
P7	0	100	%	50	inflowing air temperature percentage for the calculation of the CPT temperature
P8	0	250	0,1 s	5	delayed display of temperature changes as detected by the probes
PARAM.	MIN.	MAX.	U.M.	DEF.	MAIN REGULATOR
r0	0,1	15,0	°C/°F (1)	2,0	working setpoint differential; see also r12
r1	-99	r2	°C/°F (1)	-40	minimum working setpoint
r2	r1	199,0	°C/°F (1)	50,0	maximum working setpoint
r4	0,0	99,0	°C/°F (1)	0,0	working setpoint increase during the "energy saving" function; see also i5, i10 and HE2
r5	0	1	- - -	0	cooling or heating operation (4) 0 = cooling 1 = heating
r6	0,0	99,0	°C/°F (1)	0,0	if r5 = 0, working setpoint decrease during the "rapid cooling" function (only if r8 = 1); see also r7 if r5 = 1, working setpoint increase during the "rapid heating" function (only if r8 = 1); see also r7
r7	0	240	min	30	if r5 = 0, "rapid cooling" function duration (only if r8 = 1); see also r6 if r5 = 1, "rapid heating" function duration (only if r8 = 1); see also r6
r8	0	2	- - -	0	this function can be enabled/disabled with the key FUNC  0 = none 1 = if r5 = 0, "Rapid cooling" function if r5 = 1, "Rapid heating" function 2 = "energy saving" function (only if r5 = 0)
r12	0	1	- - -	1	working setpoint differential type 0 = asymmetric 1 = symmetric
PARAM.	MIN.	MAX.	U.M.	DEF.	COMPRESSOR PROTECTION SYSTEM
C0	0	240	min	0	delay in switching on of compressor after the device switches on (5)
C2	0	240	min	3	minimum compressor switch-off duration (6)
C3	0	240	s	0	minimum duration of compressor switch on time
C4	0	240	min	10	duration of compressor switch off time during a room temperature probe error or inlet air probe error (code " Pr1 "); see also C5
C5	0	240	min	10	duration of compressor switch on time during a room temperature probe error or inlet air probe error (code " Pr1 "); see also C4
C6	0,0	199	°C/°F (1)	80,0	condenser temperature is higher than that at which the condenser overheating alarm is activated (code " COH ") (7)
C7	0,0	199	°C/°F (1)	90,0	condenser temperature above which the compressor shut down alarm is activated (code " CSd ")
C8	0	15	min	1	compressor shut down alarm delay (code " CSd ") (8)
C10	0	999	10 h	0	number of compressor operation hours above which the request for maintenance is triggered 0 = the request shall never be triggered
PARAM.	MIN.	MAX.	U.M.	DEF.	DEFROST
d0	0	99	h	8	if d8 = 0, 1 or 2, defrost interval 0 = interval defrost will never be activated if d8 = 3, maximum defrost interval
d1	0	2	- - -	0	type of defrost 0 = ELECTRIC - during defrost the compressor will remain off and the defrost output will be activated; evaporator fan activity will depend on F2 parameter 1 = BY HOT GAS - during defrost the compressor will be switched on and the defrost output will be activated; evaporator fan activity will depend on F2 parameter 2 = VIA STOPPING OF COMPRESSOR - during defrost the compressor will remain switched off and the defrost output will remain deactivated; evaporator fan activity will depend on F2 parameter
d2	-99	99,0	°C/°F (1)	2,0	evaporator temperature at end of defrost; see also d3
d3	0	99	min	30	if P3 = 0 or 2, defrost duration if P3 = 1, maximum defrost duration; see also d2 0 = defrost will not be activated
d4	0	1	- - -	0	defrost when device is switched on (5) 1 = YES
d5	0	99	min	0	if d4 = 0, minimum time between switching on of device and activation of defrost (5) if d4 = 1, delay in activation of defrost after device is switched on (5)
d6	0	2	- - -	1	magnitude displayed during defrost (only if P5 = 0) 0 = room temperature or CPT temperature 1 = if on activation of defrost, the room temperature or CPT temperature is below the "work setpoint + Δt ", at maximum "work setpoint + Δt "; if on activation of defrost, the room temperature or CPT temperature is above "work setpoint + Δt ", at maximum the room temperature or CPT temperature on activation of defrost (9) (10) 2 = label " dEF "
d7	0	15	min	2	dripping duration (during dripping the compressor will remain switched off and the defrost output will remain deactivated; if d16 = 0, evaporator fan activity will depend on F2 parameter); if d16 \neq 0, the evaporator fan shall remain off)
d8	0	3	- - -	0	defrost activation methods 0 = AT INTERVALS - FOR TIME - defrost will be activated once the device has altogether been running for time d0 1 = AT INTERVALS - FOR COMPRESSOR SWITCH-ON - defrost will be activated once the compressor has altogether been switched on for time d0 2 = AT INTERVALS - FOR EVAPORATOR TEMPERATURE - defrost will be activated when the evaporator temperature has remained below the temperature d9 for a total time of d0 (11) 3 = ADAPTIVE - defrost will be activated at intervals, whose duration will each time depend on the duration of compressor switch-ons, the evaporator temperature and the door switch input activation; see also d18, d19, d20, d22, i13 and i14 (11)
d9	-99	99,0	°C/°F (1)	0,0	evaporator temperature is higher than that at which the defrost interval counter is suspended (only if d8 = 2)
d11	0	1	- - -	0	defrost alarm switches off once maximum time limit has been reached (code " dFd "; only if P3 = 1 and in absence of evaporator probe error (code " Pr2 ") 1 = YES
d15	0	99	min	0	minimum time that the compressor must be switched on before defrost can be activated (only if d1 = 1) (12)
d16	0	99	min	0	pre-dripping duration (during dripping the compressor will remain switched off, the defrost output will be activated and the evaporator fan shall remain off)
d18	0	999	min	40	defrost interval (defrost will be activated when the compressor has been on totally, with the evaporator temperature below that of d22, for time d18; only if d8 = 3) 0 = defrost will never be activated due to the effect of this condition
d19	0,0	40,0	°C/°F (1)	3,0	evaporator temperature below which the defrost is activated (relative to the evaporator temperatures average, or "evaporator temperatures average - d19"; only if d8 = 3)
d20	0	999	min	180	minimum consecutive time the compressor must be switched on such as to provoke the defrost activation 0 = defrost will never be activated due to the effect of this condition
d21	0	500	min	200	minimum duration of compressor continuous operation from the switching on of the device (provided that the "cell temperature - working setpoint" or "CPT temperature - working setpoint" difference exceeds 10 °C/20 °F) and from the activation of the "rapid cooling" function so as to start the defrost 0 = defrost shall never be activated as a consequence of this condition

d22	0,0	19,9	°C/°F (1)	2,0	evaporator temperature above which the defrost interval count shall be suspended (relating to the average of evaporator temperatures, that is to say, "evaporator temperatures average + d22"; only if d8 = 3); see also d18
PARAM.	MIN.	MAX.	U.M.	DEF.	TEMPERATURE ALARMS
A1	0,0	99,0	°C/°F (1)	10,0	room temperature or CPT temperature below which the minimum temperature alarm is triggered (code "AL"; it concerns the working setpoint, that is to say, "working setpoint - A1"); see also A11 0 = alarm absent
A4	0,0	99,0	°C/°F (1)	10,0	room temperature or CPT temperature above which the maximum temperature alarm is triggered (code "AH"; it concerns the working setpoint, that is to say, "working setpoint + A4"); see also A11 0 = alarm absent
A6	0	99	10 min	12	delay in maximum temperature alarm (code "AH") after the device is switched on (5)
A7	0	240	min	15	minimum temperature alarm delay (code "AL") and maximum temperature alarm delay (code "AH")
A8	0	240	min	15	delay in maximum temperature alarm (code "AH") from the conclusion of evaporator fan standstill (13)
A9	0	240	min	15	delay in maximum temperature alarm (code "AH") following the deactivation of the door switch input (14)
A11	0,1	15,0	°C/°F (1)	2,0	differential of A1 and A4 parameters
PARAM.	MIN.	MAX.	U.M.	DEF.	EVAPORATOR FAN AND CONDENSATOR FAN
F0	0	4	- - -	3	evaporator fan activity during normal operation 0 = switched off 1 = switched on; see also F4, F5, i10 and HE2 (15) 2 = in parallel with the compressor; see also F4, F5, F9, F15, F16, i10 and HE2 (16) 3 = depending on F1; see also F4, F5, i10 and HE2 (17) (18) 4 = switched off if the compressor is switched off, depending on F1 if the compressor is switched on; see also F4, F5, i10 and HE2 (17) (19)
F1	-99	99,0	°C/°F (1)	-1,0	evaporator temperature above (if r5 = 0) or below (if r5 = 1) which the evaporator fan is switched off (only if F0 = 3 or 4) (7)
F2	0	2	- - -	0	evaporator fan activity during defrost and dripping 0 = switched off 1 = switched on 2 = depending on F0
F3	0	15	min	2	maximum duration of the evaporator fan stop; see also F7 (during the evaporator fan stop the compressor can remain on, the defrost outlet shall remain deactivated and the evaporator fan shall remain off)
F4	0	240	10 s	30	duration of the evaporator fan switch off during the "energy saving function"; see also F5, i5, i10 and HE2
F5	0	240	10 s	30	duration of the evaporator fan switch on during the "energy saving function"; see also F4, i5, i10 and HE2
F7	-99	99,0	°C/°F (1)	5,0	evaporator temperature below which the evaporator fan is restarted (in respect to the working setpoint, that is to say "working set-point + F7"); see also F3
F9	0	240	s	10	evaporator fan stop delay after the stop of the compressor (only if F0 = 2)
F11	0,0	99,0	°C/°F (1)	15,0	condenser temperature above which the condenser fan is switched on (7) (20) (21)
F12	0	240	s	30	condenser fan stop delay after the stop of the compressor
F15	0	240	s	60	duration of the evaporator fan stop when the compressor is turned off; see also F8 (only if F0 = 2)
F15	0	240	s	10	duration of the evaporator fan operation when the compressor is turned off; see also F7 (only if F0 = 2)
PARAM.	MIN.	MAX.	U.M.	DEF.	DIGITAL INPUTS
i0	0	5	- - -	5	effect caused by the activation of the door micro input; see also i2 0 = no effect 1 = COMPRESSOR AND EVAPORATOR FAN SWITCH-OFF - the compressor and evaporator fan will be switched off (for the duration of the i3 time max. or until the input is deactivated; in the latter case the evaporator fan shall be turned on 5 s after input deactivation) (22) 2 = EVAPORATOR FAN SWITCH-OFF - the evaporator fan shall be switched off (for the duration of the i3 time max. or until 5s after input deactivation) 3 = ROOM LIGHTING SWITCH-ON - the room lighting shall be switched on (until 10 s after input deactivation) 4 = COMPRESSOR AND EVAPORATOR FAN SWITCH-OFF AND ROOM LIGHTING SWITCH-ON - the compressor and evaporator fan will be switched off (for the duration of the i3 time max. or until the input is deactivated; in the latter case the evaporator fan shall be turned on 5 s after the input deactivation) and the room lighting shall be switched on (until 10 s after input deactivation) (22) 5 = EVAPORATOR FAN SWITCH-OFF AND ROOM LIGHTING SWITCH-ON - the evaporator fan will be switched off (for the duration of the i3 time max. or until 5 s after input deactivation) and the room lighting shall be switched on (until 10 s after input deactivation) (22)
i1	0	1	- - -	0	type of door switch input contact 0 = normally open (active input with closed contact) 1 = normally closed (active input with open contact)
i2	-1	120	min	30	delay in signalling of door switch input alarm (code "id") -1 = the alarm will not be signalled
i3	-1	120	min	15	maximum duration of the effect caused by the activation of the door micro on the compressor and evaporator fan -1 = the effect shall last until the input is deactivated
i5	0	6	- - -	2	effect caused by the activation of the multifunction input 0 = no effect 1 = "ENERGY SAVING" FUNCTION ACTIVATION - the "energy saving" function shall be activated (until the input is deactivated), provided that the "rapid cooling" function is not in progress; see also r4 2 = MULTIFUNCTION INPUT ALARM ACTIVATION (code "iA") - the device shall continue working regularly; see also i7 3 = AUXILIARY OUTPUT SWITCH-ON - the auxiliary output shall be switched on (until the input is deactivated) 4 = DEVICE SWITCH-OFF - the device shall be switched off ("stand-by" mode, until the input is deactivated) 5 = COMPRESSOR THERMAL PROTECTION ALARM ACTIVATION (code "Cth") - the compressor shall be switched off (until the input is deactivated); see also i7 6 = GLOBAL THERMAL PROTECTION ALARM ACTIVATION (code "th") - all the utilities shall be switched off (until the input is deactivated and the device shall be switched off ("stand-by" mode) and switched back on or the power supply is cut); see also i7
i6	0	1	- - -	0	type of multifunction input contact 0 = normally open (active input with closed contact) 1 = normally closed (active input with open contact)
i7	-1	120	min	0	if i5 = 2, delay in signalling of multifunction input alarm (code "iA") -1 = the alarm will not be signalled if i5 = 5 or 6, delay in switching on of compressor after the deactivation of the maximum pressure switch alarm (code "Cth") and after the deactivation of the global protection alarm (code "th") -1 = reserved
i10	0	999	min	0	time that must pass in absence of door switch input activations (after the room temperature or CPT temperature has reached the working setpoint) for the "energy saving" function to be activated; see also r4, F4, F5 and HE2 0 = the function will never be activated due to the effect of this condition
i13	0	240	- - -	180	number of door switch input activations such as to provoke the defrost activation 0 = defrost will never be activated due to the effect of this condition
i14	0	240	min	32	minimum duration of the door switch input activation such as to provoke the defrost activation 0 = defrost will never be activated due to the effect of this condition
PARAM.	MIN.	MAX.	U.M.	DEF.	DIGITAL OUTPUTS
u1	0	7	- - -	0	utility managed through the K4 digital output (23) 0 = ROOM LIGHTING - see parameters i0 and u2 1 = DEMISTER HEATING ELEMENTS - see parameter u6 2 = AUXILIARY OUTPUT - see parameters i5 and u2 3 = ALARM OUTPUT

					4 = NEUTRAL AREA OPERATION HEATING ELEMENTS - see parameter u7
					6 = CONDENSER FAN - see parameters P4, F11 and F12
					7 = ON/STAND-BY OUTPUT - see parameter POF
u2	0	1	- - -	0	room lighting switch on/off and auxiliary output enabling in manual mode when the device is switched off ("stand-by" mode) 1 = YES
u4	- - -	- - -	- - -	- - -	reserved
u5	-99	99,0	°C/°F (1)	-1,0	room temperature or CPT temperature below which the door heating elements are switched on (7)
u6	1	120	min	5	duration of demister heating elements operation
u7	-99	99,0	°C/°F (1)	-5,0	room temperature or CPT temperature below which the neutral area operation heating elements are switched on (with regard to the working setpoint, that is to say, "working setpoint + u7") (7)
PARAM.	MIN.	MAX.	U.M.	DEF.	ENERGY SAVING
HE2	0	999	min	0	maximum duration of the "energy saving" function activated in manual mode due to the effect of absence of door micro switch input activation; see also r4, F4, F5 and i10 0 = the function will last until the input is activated
HE3	0	240	min	2	time interval with no key strokes, after which the "low consumption" function is activated 0 = the mode shall never be activated
PARAM.	MIN.	MAX.	U.M.	DEF.	VARIOUS
POF	0	1	- - -	1	 key activation 1 = YES
PAS	-99	999	min	-19	access password for the configuration parameters 0 = the password need not be set

Notes:

- (1) the unit of measurement depends on P2
- (2) properly set the parameters corresponding to the regulators after setting P2 parameter
- (3) the temperature associated with regulation and the temperature alarms is the CPT temperature; the formula to calculate the CPT temperature is as follows:
CPT temperature = {[(parameter P7) × (inflowing air temperature)] + [(100 - parameter P7) × (outflowing air temperature)]:100}
- (4) if r5 parameter is set at 1, the "energy saving" function and the defrost management will be switched off; see also F1 parameter
- (5) the parameter has effect even after an interruption in the power supply that occurs while the device is switched on
- (6) the time set by parameter C2 is counted also when the device is off ("stand-by" status)
- (7) the differential of parameter is 2.0°C/4°F
- (8) if when the device is switched on, the condenser temperature is already above that established in C7 parameter, then C8 parameter will not have effect
- (9) the value Δt depends on r12 parameter (r0 if r12 = 0, r0/2 if r12 = 1)
- (10) the display restores normal operation when, at the end of the dripping phase, room temperature or CPT temperature falls below the value that locked the display (or if a temperature alarm is triggered)
- (11) if P3 parameter is set at 0 or 2, the device will function as if d8 parameter were set at 0
- (12) if when defrost is activated, the operating duration of the compressor is less than the time established with d15 parameter, the compressor will remain on for the amount of time necessary to complete defrost, then the defrost shall be activated
- (13) during defrost, dripping and evaporator fan standstill, the maximum temperature alarm is absent, provided that it was triggered after defrost activation.
- (14) during activation of the door switch input, the maximum temperature alarm is absent, provided the alarm was signalled after the activation of the input
- (15) F4 and F5 parameters have effect when the compressor is off
- (16) F4 and F5 parameters have effect when the compressor is on
- (17) if P3 parameter is set at 0, the device will function as if F0 parameter were set at 2
- (18) F4 and F5 parameters have effect when the evaporator temperature is below the temperature established with F1 parameter
- (19) F4 and F5 parameters have effect when the compressor is on and the temperature of the evaporator is below the temperature established with F1 parameter
- (20) if the P4 parameter is set at 0, 2 or 3, the condenser fan shall work in parallel with the compressor
- (21) the condenser fan is switched on provided that the compressor is switched on and is switched off when the condenser temperature falls below the value set with parameter F11 provided that the compressor is switched off
- (22) the compressor is switched off 10 s after the activation of the input; if the input is activated during defrost or when the evaporator fan is deactivated, the activation will not have any effect on the compressor
- (23) to avoid damaging the connected load, set the parameter when the device is switched off ("stand-by" status).