EVS233 Digital controller for static refrigerating units, with HACCP and Energy Saving functions

GB ENGLISH

## 1 GETTING STARTED

1.1 Important
Read these instructions carefully before installing and using the instrument and follow all additional information for installation and electrical connection; keep these instructions close to the instrument for future consultations.

1.2 Installing the instrument
Panel mounting, with two screws Ø 2.9 mm (0.114 in) or M3; dimensions in mm (in).

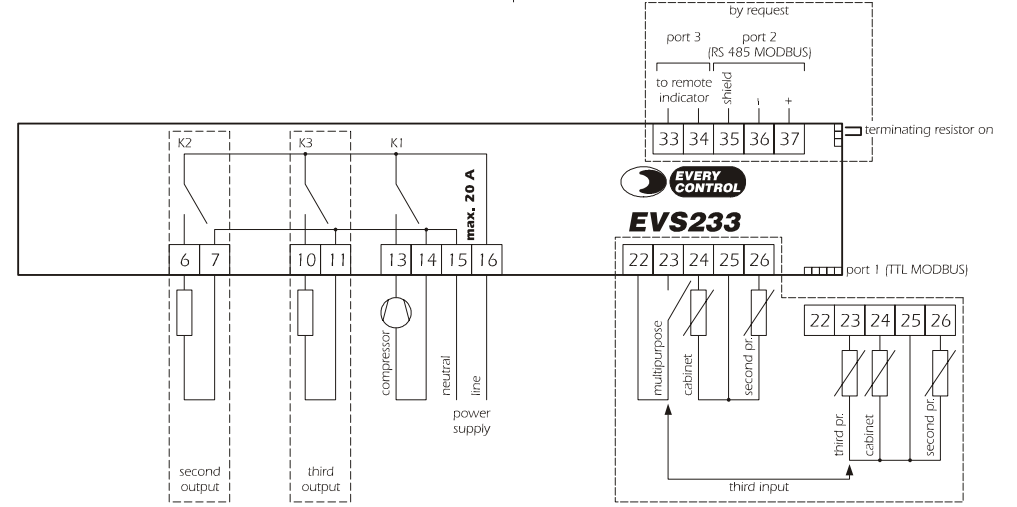38 (1.496)

89.5 (3.523)

185 (7.283)

panel cut out
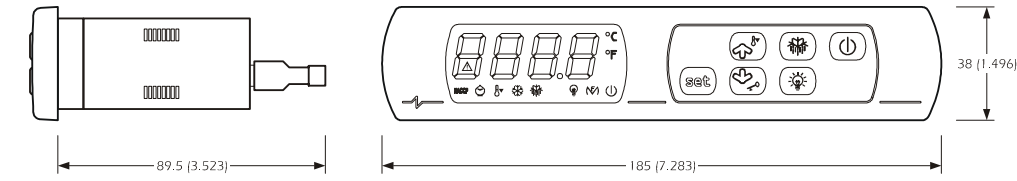
Independently on the kind of connections, the maximum depth is 89.5 mm (3.523 in) and refers to the models with faston (with straight female faston properly plugged).

2.5 maximum (0.098) 4.5 (0.177)
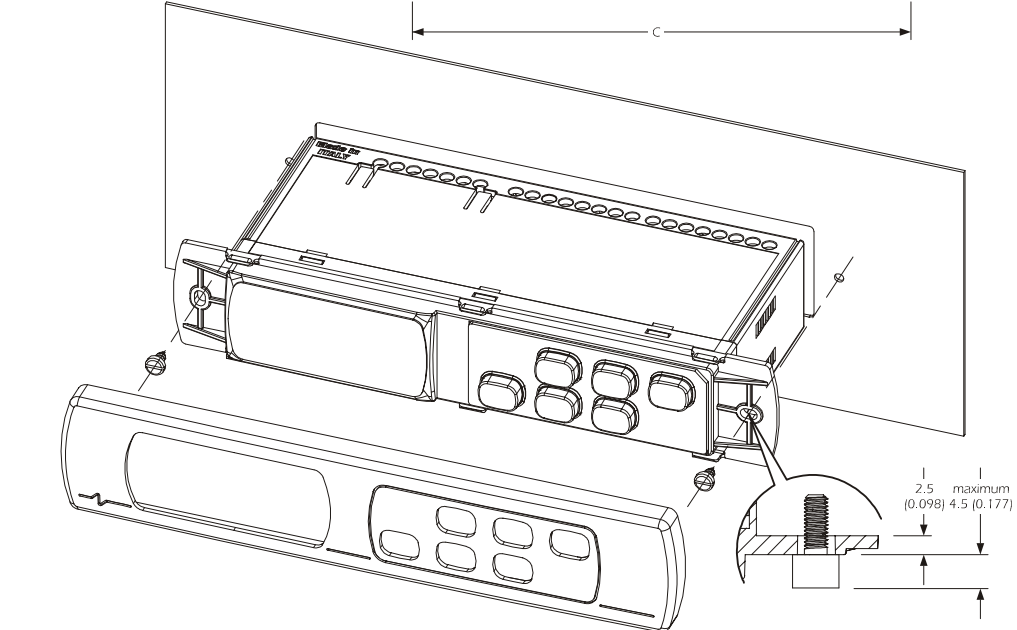
DIMENS.	MINIMUM	TYPICAL	MAXIMUM
A	150.0 (5.905)	150.0 (5.905)	150.5 (5.925)
B	31.0 (1.220)	31.0 (1.220)	31.5 (1.240)
C	164.0 (6.456)	165.0 (6.496)	166.0 (6.535)

Additional information for installation:
- moderate the clamping torque of the screws, in order not to damage the box
- working conditions (working temperature, humidity, etc.) must be between the limits indicated in the technical data
- do not install the instrument close to heating sources (resistances, hot air ducts, etc.), devices provided with big magnetos (big speakers, etc.), locations subject to direct sunlight, rain, humidity, dust, mechanical vibrations or bumps
- according to the safety norms, the protection against electrical parts must be ensured by a correct installation of the instrument; the parts that ensure the protection must be installed so that you can not remove them if not by using a tool.

1.3 Wiring diagram
With reference to the options in the outlines:
- the operation of the second probe depends on parameter P3
- the operation of the third input depends on parameter P4
- the user managed by the second output depends on parameter u0
- the user managed by the third output depends on parameter u1
- port 1 is the serial port for the communication with the supervision system (through a serial interface) or with the programming key (via TTL, with MODBUS communication protocol); the port must not be used at the same time for the same purposes
- port 2 is the serial port for the communication with the supervision system (via RS 485, with MODBUS communication protocol; by request); port 2 must not be used at the same time to the same purpose of port 1
- port 3 is the port for the communication with the remote indicator (by request; the indicator shows the quantity you have set with parameter P6).

by request
port 3 port 2
(RS 485 MODBUS)
to remote
indicator shield
33 34 35 36 37
terminating resistor on

EVERY CONTROL

EVS233

port 1 (TTL MODBUS)

K2 K3 K1
max. 20 A
6 7 10 11 13 14 15 16
22 23 24 25 26
22 23 24 25 26

compressor
neutral
line
power supply
multipurpose
cabinet
second pr.
third pr.
cabinet
second pr.

second output
third output
third input

Additional information for electrical connection:
- do not operate on the terminal blocks with electrical or pneumatic screwers
- if the instrument has been moved from a cold location to a warm one, the humidity could condense on the inside; wait about an hour before supplying it
- test the working power supply voltage, working electrical frequency and working electrical power of the instrument; they must correspond with the local power supply
- disconnect the local power supply before servicing the instrument
- do not use the instrument as safety device
- for repairs and information on the instrument please contact Evco sales network.

2 USER INTERFACE

2.1 Turning on/off the instrument by hand
- make sure the keyboard is not locked and no procedure is running
- press ⏻ 2 s.
If the instrument is turned off, the regulators will be turned off; the possibility to turn on/off the cabinet light or the auxiliary output when the instrument is turned off depends on parameter u2.
Turning off means turning off the instrument via software (the instrument remains connected with the power supply).
Through the multipurpose input it is also possible to turn on/off the instrument at a distance.

2.2 The display
If the instrument is turned on, during the normal operation the display will show the quantity you have set with parameter P5:
- if P5 = 0, the display will show the cabinet temperature
- if P5 = 1, the display will show the working setpoint
- if P5 = 2, the display will show the temperature read by the second probe
- if P5 = 3, the display will show "cabinet temperature - temperature read by the second probe"
- if P5 = 4, the display will show the temperature read by the third probe (only if parameter P4 has value 1 or 2).
If the instrument is turned off, the display will be switched off.

2.3 Showing the cabinet temperature
- make sure the keyboard is not locked and no procedure is running
- press ☇ 2 s: the display will show the first available label
- press ⊙ or ⊙ to select "Pb1"
- press ☇
To quit the procedure:
- press ☇ or do not operate 15 s
- press ⏻ or do not operate 60 s.
If during the normal operation the display shows the cabinet temperature (parameter P5 = 0), the label "Pb1" will not be shown.

2.4 Showing the temperature read by the second probe
- make sure the keyboard is not locked and no procedure is running
- press ☇ 2 s: the display will show the first available label
- press ⊙ or ⊙ to select "Pb2"
- press ☇
To quit the procedure:
- press ☇ or do not operate 15 s
- press ⏻ or do not operate 60 s.
If the second probe is not enabled (parameter P3 = 0), the label "Pb2" will not be shown.

2.5 Showing the temperature read by the third probe (only if parameter P4 has value 1 or 2)
- make sure the keyboard is not locked and no procedure is running
- press ☇ 2 s: the display will show the first available label
- press ⊙ or ⊙ to select "Pb3"
- press ☇
To quit the procedure:
- press ☇ or do not operate 15 s
- press ⏻ or do not operate 60 s.
If the function of the third input is not the one of third probe (parameter P4 = 0 or 3), the label "Pb3" will not be shown.

2.6 Activating the defrost by hand
- make sure the keyboard is not locked, no procedure is running and function Overcooling is not running
- press ❄ 4 s.
If the function of the second probe is the one of defrost probe (parameter P3 = 1) and to the defrost activation the evaporator temperature is above the one you have set with parameter d2, the defrost will not be activated.

2.7 Turning on/off the on-off output (only if parameter u0 has value 0)
If the instrument is turned on, the on-off output will be turned on; If the instrument is turned off, the on-off output will be turned off.

2.8 Turning on/off the cabinet light by hand (only if parameter u1 has value 0)
- make sure no procedure is running
- press ☀
Through the multipurpose input it is also possible to turn off the cabinet light at a distance; also look at parameter u2.

2.9 Turning on the demisting resistances by hand (only if parameter u1 has value 1)
- make sure no procedure is running
- press ☀ 2 s: the resistances will be turned on the time you will have set with parameter b1.
It is not allowed to turn off the demisting resistances by hand.

2.10 Turning on/off the auxiliary output by hand (only if parameter u1 has value 2)
- make sure the keyboard is not locked and no procedure is running
- press ☀
Through the multipurpose input it is also possible to turn on/off the auxiliary output at a distance.
If the auxiliary output has been turned on by hand, it will be allowed to turn it off only in the same way (analogous matter if the auxiliary output has been turned on at a distance); also look at parameter u2.

2.11 Activating/deactivating function Overcooling (quick cooling)
- make sure the keyboard is not locked, no procedure is running and the defrost or the dripping are not running
- press ⊙ 4 s: the working setpoint will be increased of the temperature you will have set with parameter r5 (the time you will have set with parameter r6).
During function Overcooling the defrost is never activated; if the defrost interval expires when the function is running, the defrost will be activated to the end of the function.

2.12 Locking/unlocking the keyboard
To lock the keyboard:
- make sure no procedure is running
- press ☇ and ⏻ 2 s: the display will show "Loc" 1 s.
If the keyboard is locked, you will not be allowed to:
- turn on/off the instrument by hand
- show the temperature read by the second probe
- show the temperature read by the third probe
- activate the defrost by hand
- turn on/off the auxiliary output by hand
- activate/deactivate function Overcooling
- show the information on the HACCP alarms
- erase the HACCP alarms list
- modify the working setpoint with the procedure related in paragraph 4.1 (you also can modify the working setpoint through parameter SP).
These operations provoke the visualization of the label "Loc" 1 s.
To unlock the keyboard:
- press ☇ and ⏻ 2 s: the display will show "UnL" 1 s.

2.13 Silencing the buzzer
- make sure no procedure is running
- press a button (the first pressure of the button does not provoke its usual effect).

3 HACCP

3.1 Preliminary information
The instrument can store up to 2 HACCP alarms and supplies information on:
- the critical value
- the alarm duration (between 1 min and 99 h and 59 min, partial if the alarm is running).

CODE	KIND OF ALARM (AND CRITICAL VALUE)
AL	lower temperature alarm (the lowest temperature during a whatever alarm of this type)
AH	upper temperature alarm (the highest temperature during a whatever alarm of this type)

PAY ATTENTION:
- **the instrument stores the lower temperature alarm and the upper temperature alarm on condition that the temperature joined to the alarm is the cabinet one (parameters A0 and A3 = 1) or the one read by the third probe, on condition that its function is the one of display probe (parameters A0 and A3 = 1 and parameter P4 = 1)**
- **the instrument updates the information on the alarm on condition that the critical value of the new alarm is more critical than the one the instrument has stored or on condition that the information has already been shown**
- **the alarm duration refers to the one that has provoked the update of the critical value**
- **if the instrument is turned off, it will store no alarm.**
When the cause that has provoked the alarm disappears, the display restores the normal operation.

3.2 Showing the information on the alarms
- make sure the keyboard is not locked and no procedure is running
- press ☇ 2 s: the display will show the first available label
- press ⊙ or ⊙ to select "LS"
- press ☇: the display will show one of the codes related in the chart of paragraph 3.1
- press ⊙ or ⊙ to select a code, for example "AH".
To show the information on the alarm:
- press ☇ LED HACCP will stop flashing to remain lit up permanently and the display will show in succession (for example):

EXAMPLE	MEANING
8	the critical value is 8 °C/°F
dur	the display is about to show the alarm duration
h 1	the alarm has lasted 1 h (to be continued …)
n15	the alarm has lasted 1 h and 15 min
AH	the code you had selected

Each information lasts 1 s.
To escape from the succession of information:
- press ⏻ the display will show the code you had selected.
To quit the procedure:
- press ⏻ twice or do not operate 15 s.

3.3 Erasing the alarms list
- make sure the keyboard is not locked and no procedure is running
- press ☇ 2 s: the display will show the first available label
- press ⊙ or ⊙ to select "rLS"
- press ☇
- press ⊙ or ⊙ in 15 s to set "149"
- press ☇ or do not operate 15 s: the display will show "----" flashing 4 s and LED HACCP will go out, after which the instrument will quit the procedure.

4 SETTINGS

4.1 Setting the working setpoint
- make sure the instrument is turned on, the keyboard is not locked and no procedure is running
- press ☇ LED ❄ will flash
- press ⊙ or ⊙ in 15 s; also look at parameters r1, r2 and r3
- press ☇ or do not operate 15 s.
You also can modify the working setpoint through parameter SP.

4.2 Setting configuration parameters
To gain access the procedure:
- make sure no procedure is running
- press ⊙ and ☇ 4 s: the display will show "PA".
- press ☇
- press ⊙ or ⊙ in 15 s to set "-19"
- press ☇ or do not operate 15 s
- press ⊙ and ☇ 4 s: the display will show "SP".
To select a parameter:
- press ⊙ or ⊙
To modify a parameter:
- press ☇
- press ⊙ or ⊙ in 15 s
- press ☇ or do not operate 15 s.
To quit the procedure:
- press ⊙ and ☇ 4 s or do not operate 60 s.
Switch off/on the power supply of the instrument after the modification of the parameters.

4.3 Restoring the default value of configuration parameters
To gain access the procedure:
- make sure no procedure is running
- press ⊙ and ☇ 4 s: the display will show "PA".
- press ☇
- press ⊙ or ⊙ in 15 s to set "743"
- press ☇ or do not operate 15 s
- press ⊙ and ☇ 4 s: the display will show "dEF"
- press ☇
- press ⊙ or ⊙ in 15 s to set "149"
- press ☇ or do not operate 15 s: the display will show "dEF" flashing 4 s, after which the instrument will quit the procedure.
Make sure the default value of the parameters is appropriate, in particular if the probes are PTC probes.

5 SIGNALS

5.1 Signals

LED	MEANING
❄	LED compressor if it is lit, the compressor will be turned on if it flashes: ▪ the modification of the working setpoint will be running ▪ a comp. prot. will be running (parameters C0, C1 and C2)
❅	LED defrost if it is lit, the defrost will be running if it flashes: ▪ the dripping will be running (parameter d7)
☀	LED cabinet light if it is lit, the cabinet light will be turned on
⌇	LED multipurpose **if parameter u1 has value 1 (or the user managed by the third output are the demisting resistances):** if it is lit, the demisting resistances will be turned on because of the regulator (parameter b0) if it flashes, the demisting resistances will have been turned on by hand (parameter b1) **if parameter u1 has value 2 (or the user managed by the third output is the auxiliary output):** if it is lit, the aux. output will have been turned on by hand if it flashes, the auxiliary output will have been turned on at a distance (parameter i5)
⚠	LED alarm if it is lit, an alarm will be running
&⃝	LED Overcooling if it is lit, function Overcooling will be running (parameters r5 and r6)
⊘	LED Energy Saving if it is lit, function Energy Saving will be running (parameters r4 and i5)
HACCP	LED HACCP if it is lit, the instrument will have stored one HACCP alarm at least and you will have already shown all the information on the alarms if it flashes, the instrument will have stored one HACCP alarm at least but you will not have shown all the information on the alarms

°C	LED Celsius degree if it is lit, the unit of measure of the temperatures will be Celsius degree (parameter P2)
°F	LED Fahrenheit degree if it is lit, the unit of measure of the temperatures will be Fahrenheit degree (parameter P2)
⏻	LED on/stand-by if it is lit, the instrument will be turned off

CODE	MEANING
Loc	the keyboard and/or the working setpoint are locked (parameter r3); also look at paragraph 2.12
----	the quantity to show is not available (for example because the probe is not enabled)

6 ALARMS

6.1 Alarms

CODE	MEANING
AL	Lower temperature alarm (**HACCP alarm**) Remedies: ▪ check the temperature joined to the alarm ▪ look at parameters A0, A1 and A2 Effects: ▪ if the critical value is lower than the one the instrument has stored, if you have already shown the information on the alarm or if the instrument has stored no alarm, the instrument will store the alarm ▪ the alarm output will be turned on (if present)
AH	Upper temperature alarm (**HACCP alarm**) Remedies: ▪ check the temperature joined to the alarm ▪ look at parameters A3, A4 and A5 Effects: ▪ if the critical value is higher than the one the instrument has stored, if you have already shown the information on the alarm or if the instrument has stored no alarm, the instrument will store the alarm ▪ the alarm output will be turned on (if present)
iA	Multipurpose input alarm (only if parameter P4 has value 3) Remedies: ▪ check the reasons that have provoked the activation of the input ▪ look at parameters i5 and i6 Effects: ▪ if parameter i5 has value 4, the alarm output will be turned on (if present) ▪ if parameter i5 has value 5, the compressor will be turned off and the alarm output will be turned on (if present)
iSd	Instrument locked alarm (only if parameter P4 has value 3) Remedies: ▪ check the reasons that have provoked the activation of the multipurpose input ▪ turn off/on the instrument or switch off/on its power supply ▪ look at parameters i5, i6, i7, i8 and i9 Effects: ▪ the regulators will be turned off ▪ the alarm output will be turned on (if present)
COH	Overheated condenser alarm (only if parameter P4 has value 2) Remedies: ▪ check the condenser temperature ▪ look at parameter C6 Effects: ▪ the alarm output will be turned on (if present)
CSd	Compressor locked alarm (only if parameter P4 has value 2) Remedies: ▪ check the condenser temperature ▪ turn off/on the instrument: if the condenser temperature is still above the one you have set with parameter C7, you will have to disconnect the power supply and clean the condenser ▪ look at parameter C7 Effects: ▪ the compressor will be turned off ▪ the alarm output will be turned on (if present)

When the cause that has provoked the alarm disappears, the instrument restores the normal operation, except for the instrument locked alarm (code "iSd") and the compressor locked alarm (code "CSd") that need you turn off/on the instrument or switch off/on its power supply.

7 INTERNAL DIAGNOSTICS

7.1 Internal diagnostics

CODE	MEANING
Pr1	Cabinet probe error Remedies: ▪ look at parameter P0 ▪ check the integrity of the probe ▪ check the connection instrument-probe ▪ check the cabinet temperature Effects: ▪ the compressor activity will depend on parameters C4 and C5 ▪ the alarm output will be turned on (if present)

Pr2	Second probe error Remedies: ▪ the same you saw in the previous case but related to the second probe Effects: ▪ the defrost will last the time you will have set with parameter d3 ▪ if parameter d8 has value 2, the instrument will work as if parameter had value 0 ▪ the alarm output will be turned on (if present)
Pr3	Third probe error (only if parameter P4 has value 1 or 2) Remedies: ▪ the same you saw in the previous case but related to the third probe Effects: ▪ if parameter P4 has value 2, the overheated condenser alarm (code "**COH**") and the compressor locked alarm (code "**CSd**") will never be activated ▪ the alarm output will be turned on (if present)

When the cause that has provoked the alarm disappears, the instrument restores the normal operation.

8 TECHNICAL DATA

8.1 Technical data
Box: self-extinguishing grey.
Frontal protection: IP 65.
Connections: faston 6.3 mm (0.248 in) wide (power supply and outputs), screw terminal block (inputs), 5 poles connector (serial port); extractable terminal blocks or screw terminal blocks (power supply and outputs) by request.

Working temperature: from 0 to 55 °C (32 to 131 °F, 10 ... 90% of relative humidity without condensate).
Power supply: 230 Vac, 50/60 Hz, 3.5 VA; 115 Vac, 50/60 Hz, 3.5 VA by request.
Alarm buzzer: by request.
Measure inputs: 2 (cabinet probe and second probe configurable for evaporator probe or display probe) for PTC/NTC probes.
Digital inputs: third input configurable for measure input (display probe or condenser probe, for PTC/NTC probes) or digital input (multipurpose, free of voltage, 5 V 1 mA).
Working range: from -50 to 150 °C (-50 to 300 °F) for PTC probe, from -40 to 105 °C (-40 to 220 °F) for NTC probe.
Resolution: 0.1 °C/1 °C/1 °F.
Relay outputs: 3 relays:
- **compressor relay:** 20 A @ 250 Vac (NO contact)
- **on-off/alarm relay:** 8 A @ 250 Vac (NO contact)
- **cabinet light/demisting resistances/auxiliary output relay:** 8 A @ 250 Vac (NO contact).

The maximum current allowed on the loads is 20 A.
Serial port: port for the communication with the supervision system (through a serial interface) or with the programming key (via TTL, with MODBUS communication protocol).
Further communication ports (by request): port for the communication with the supervision system (via RS 485, with MODBUS communication protocol), port for the communication with the remote indicator.

9 WORKING SETPOINTS AND CONFIGURATION PARAMETERS

9.1 Working setpoints

	MIN.	MAX.	U.M.	DEF.	WORKING SETPOINTS
	r1	r2	°C/°F (1)	0.0	working setpoint

9.2 Configuration parameters

PARAM.	MIN.	MAX.	U.M.	DEF.	WORKING SETPOINTS
SP	r1	r2	°C/°F (1)	0.0	working setpoint

PARAM.	MIN.	MAX.	U.M.	DEF.	MEASURE INPUTS
CA1	-25.0	25.0	°C/°F (1)	0.0	cabinet probe offset
CA2	-25.0	25.0	°C/°F (1)	0.0	second probe offset
CA3	-25.0	25.0	°C/°F (1)	0.0	third probe offset (only if P4 = 1 or 2)
P0	0	1	- - -	1	kind of probe / 0 = PTC / 1 = NTC
P1	0	1	- - -	1	decimal point Celsius degree (for the quantity to show during the normal operation) / 1 = YES
P2	0	1	- - -	0	unit of measure temperature (2) / 0 = °C / 1 = °F
P3	0	2	- - -	1	second probe function / 0 = probe not enabled / 1 = defrost probe / 2 = display probe
P4	0	3	- - -	3	third input function / 0 = input not enabled / 1 = measure input (third probe, display probe) / 2 = measure input (third probe, condenser probe) / 3 = digital input (multipurpose input)
P5	0	4	- - -	0	quantity to show during the normal operation / 0 = cabinet temperature / 1 = working setpoint / 2 = temperature read by the second probe / 3 = "cabinet temperature - temperature read by the second probe" / 4 = temperature read by the third probe (only if P4 = 1 or 2)
P6	0	4	- - -	0	quantity shown by the remote indicator / 0 = cabinet temperature / 1 = working setpoint / 2 = temperature read by the second probe / 3 = "cabinet temperature - temperature read by the second probe" / 4 = temperature read by the third probe (only if P4 = 1 or 2)

PARAM.	MIN.	MAX.	U.M.	DEF.	MAIN REGULATOR
r0	0.1	15.0	°C/°F (1)	2.0	working setpoint differential
r1	-99.0	r2	°C/°F (1)	-50.0	minimum working setpoint
r2	r1	99.0	°C/°F (1)	50.0	maximum working setpoint
r3	0	1	- - -	0	locking the working setpoint modification (with the procedure related in paragraph 4.1) / 1 = YES
r4	0.0	99.0	°C/°F (1)	0.0	temperature increase during function Energy Saving (only if P4 = 3); also look at i5
r5	0.0	99.0	°C/°F (1)	0.0	temperature decrease during function Overcooling; also look at r6
r6	0	99	min	30	duration of function Overcooling; also look at r5

PARAM.	MIN.	MAX.	U.M.	DEF.	COMPRESSOR PROTECTIONS
C0	0	240	min	0	compressor delay since you turn on the instrument (3)
C1	0	240	min	5	minimum time between two activations in succession of the compressor; also compressor delay since the end of the cabinet probe error (4) (5)
C2	0	240	min	3	minimum time the compressor remains turned off (4)
C3	0	240	s	0	minimum time the compressor remains turned on
C4	0	240	min	10	time the compressor remains turned off during the cabinet probe error; also look at C5
C5	0	240	min	10	time the compressor remains turned on during the cabinet probe error; also look at C4
C6	0.0	200.0	°C/°F (1)	80.0	condenser temperature above which the overheated condenser alarm is activated (only if P4 = 2) (6)
C7	0.0	200.0	°C/°F (1)	90.0	condenser temperature above which the compressor locked alarm is activated (only if P4 = 2)
C8	0	15	min	1	compressor locked alarm delay (only if P4 = 2) (7)

PARAM.	MIN.	MAX.	U.M.	DEF.	DEFROST
d0	0	99	h	8	defrost interval; also look at d8 (8) / 0 = the defrost at intervals will never be activated
d2	-99.0	99.0	°C/°F (1)	2.0	defrost cutoff temperature (only if P3 = 1)
d3	0	99	min	30	defrost duration if P3 = 0; defrost maximum duration if P3 = 1 / 0 = the defrost will never be activated
d4	0	1	- - -	0	defrost when you turn on the instrument (3) / 1 = YES
d5	0	99	min	0	defrost delay when you turn on the instrument (if d4 = 1); also look at i5 (3)
d6	0	1	- - -	1	temperature shown during the defrost / 0 = cabinet temperature / 1 = if to the defrost activation the cabinet temperature is below "working setpoint + r0", at most "working setpoint + r0"; if to the defrost activation the cabinet temperature is above "working setpoint + r0", at most the cabinet temperature to the defrost activation (9)
d7	0	15	min	2	dripping duration
d8	0	2	- - -	0	kind of defrost interval / 0 = the defrost will be activated when the instrument will have remained turned on the time d0 / 1 = the defrost will be activated when the compressor will have remained turned on the time d0 / 2 = the defrost will be activated when the evaporator temperature will have remained below the temperature d9 the time d0 (10)
d9	-99.0	99.0	°C/°F (1)	0.0	evaporator temperature above which the count of the defrost interval is suspended (only if d8 = 2)

PARAM.	MIN.	MAX.	U.M.	DEF.	ALARMS
A0	0	2	- - -	0	temperature joined to the lower temperature alarm / 0 = cabinet temperature / 1 = temperature read by the third probe (only if P4 = 1 or 2) (11) / 2 = temperature read by the second probe (12)
A1	-99.0	99.0	°C/°F (1)	-10.0	temperature below which the lower temperature alarm is activated; also look at A0 and A2 (6)
A2	0	2	- - -	1	kind of lower temperature alarm / 0 = alarm not enabled / 1 = relative to the working setpoint (or "working setpoint - A1"; consider A1 without sign) / 2 = absolute (or A1)
A3	0	1	- - -	0	temperature joined to the upper temperature alarm / 0 = cabinet temperature / 1 = temperature read by the third probe (only if P4 = 1 or 2) (11)
A4	-99.0	99.0	°C/°F (1)	10.0	temperature above which the upper temperature alarm is activated; also look at A3 and A5 (6)
A5	0	2	- - -	1	kind of upper temperature alarm / 0 = alarm not enabled / 1 = relative to the working setpoint (or "working setpoint + A4"; consider A4 without sign) / 2 = absolute (or A4)
A6	0	240	min	120	upper temperature alarm delay since you turn on the instrument (only if A3 = 0 or if A3 = 1 and P4 = 1) (3)
A7	0	240	min	15	temperature alarm delay
A8	0	240	min	15	upper temperature alarm delay since the end of the dripping (only if A3 = 0 or if A3 = 1 and P4 = 1) (13)

PARAM.	MIN.	MAX.	U.M.	DEF.	DIGITAL INPUTS
i5	0	7	- - -	4	effect provoked by the activation of the multipurpose input (only if P4 = 3) (14) / 0 = no effect / 1 = SYNCHRONIZING THE DEFROSTS - spent the time d5 the defrost will be activated / 2 = ACTIVATING THE ENERGY SAVING - function Energy Saving will be activated (as long as the input will be deactivated), on condition that function Overcooling is not running; also look at r4 / 3 = CLOSING THE LOCK - the cabinet light will be turned off (only if it will have been turned on by hand) and function Energy Saving will be activated (as long as the input will be deactivated), on condition that function Overcooling is not running; also look at r4 / 4 = ACTIVATING THE EXTERNAL ALARM - spent the time i7 the display will show the code "**IA**" flashing and the buzzer will be activated (as long as the input will be deactivated) / 5 = ACTIVATING THE MANOSTAT - the compressor will be turned off, the display will show the code "**IA**" flashing and the buzzer will be activated (as long as the input will be deactivated); also look at i7, i8 and i9 / 6 = ACTIVATING THE AUXILIARY OUTPUT - the auxiliary output will be turned on (as long as the input will be deactivated) / 7 = TURNING OFF THE INSTRUMENT - the instrument will be turned off (as long as the input will be deactivated)
i6	0	1	- - -	0	kind of contact multipurpose input (only if P4 = 3) / 0 = NO (the input will be active if you close the contact) / 1 = NC (the input will be active if you open the contact)
i7	0	120	min	0	if i5 = 4, delay to signal the multipurpose input alarm (only if P4 = 3) / if i5 = 5, compressor delay since the deactivation of the multipurpose input (only if P4 = 3) (15)
i8	0	15	- - -	0	number of multipurpose input alarm such as to provoke instrument locked alarm (only if P4 = 3 and i5 = 5) / 1 = alarm not enabled
i9	1	999	min	240	time without multipurpose input alarm in order that the alarm counter is cleared (only if P4 = 3 and i5 = 5)

PARAM.	MIN.	MAX.	U.M.	DEF.	OUTPUTS
u0	0	1	- - -	0	user managed by the second output (16) / 0 = on-off / 1 = alarm
u1	0	2	- - -	0	user managed by the third output (16) / 0 = cabinet light / 1 = demisting resistances / 2 = auxiliary output
u2	0	1	- - -	0	possibility to turn on/off the cabinet light or the auxiliary output by hand when the instrument is turned off (17) / 1 = YES

PARAM.	MIN.	MAX.	U.M.	DEF.	DEMISTING RESISTANCES (only if u1 = 1)
b0	-99.0	99.0	°C/°F (1)	-1.0	cabinet temperature above which the demisting resistances are turned off (only if the resistances have been turned on because of the regulator, not by hand) (6)
b1	0	120	min	5	time the demisting resistances remain turned on (only if the resistances have been turned on by hand)

PARAM.	MIN.	MAX.	U.M.	DEF.	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 measure depends on parameter P2
(2) **set the parameters related to the regulators appropriately after the modification of the parameter**
(3) the parameter also has effect after an interruption of power supply that arises when the instrument is turned on
(4) the time you have set with the parameter is also counted when the instrument is turned off
(5) if parameter C1 has value 0, the delay since the end of the cabinet probe error will however be 2 min
(6) the differential of the parameter is 2 °C/4 °F
(7) if (when you turn on the instrument) the condenser temperature is above the one you have set with parameter C7, parameter C8 will have no effect
(8) the instrument stores the count of the defrost interval every 30 min; the modification of parameter d0 has effect since the end of the previous defrost interval or since the activation of a defrost by hand
(9) the display restores the normal operation as soon as the dripping ends and the cabinet temperature falls below the one that has locked the display (or if a temperature alarm arises)
(10) if parameter P3 has value 0, the instrument will work as if parameter d8 had value 0
(11) if parameter P4 has value 0 or 3, the instrument will work as if the parameter had value 0 (but it will not store the alarm)
(12) if parameter P3 has value 0, the instrument will work as if parameter A0 had value 0 (but it will not store the alarm)
(13) during the defrost and the dripping the temperature alarms are not enabled
(14) if parameter i5 has value 1, 2, 3, 6 or 7, the effect will not be signalled
(15) make sure the time you have set with parameter i7 is shorter than the one you have set with parameter i9
(16) to avoid damaging the connected user, modify the parameter when the instrument is turned off
(17) if parameter u2 has value 0, when you turn off the instrument the cabinet light or the auxiliary output will also be turned off; next time you turn on the instrument the user will be turned off.