

## DIMENSIONAL DATA

### OVERALL DIMENSIONS AND PANEL CUTOUT

The dimensions are expressed in millimetres and inches (third-scale drawing).

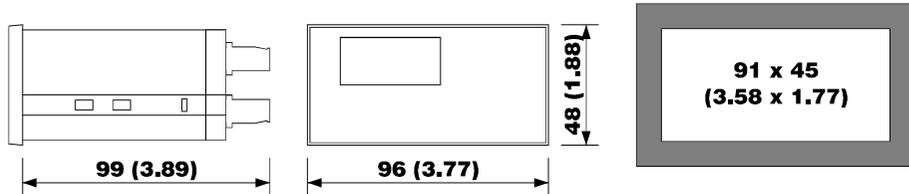


Fig. 3  
ds8-294e.wmf

## INSTALLATION

### WITH THE FIXING SYSTEM SUGGESTED BY THE BUILDER

Panel mounting, with the equipped screw brackets (third-scale drawing).

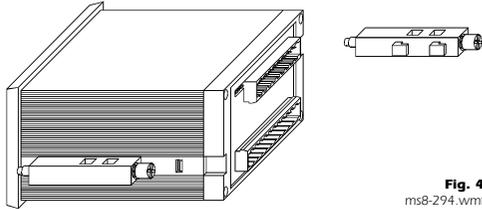


Fig. 4  
ms8-294.wmf

## ELECTRICAL CONNECTION

### CONNECTIONS TO DERIVE

Instance of typical application.

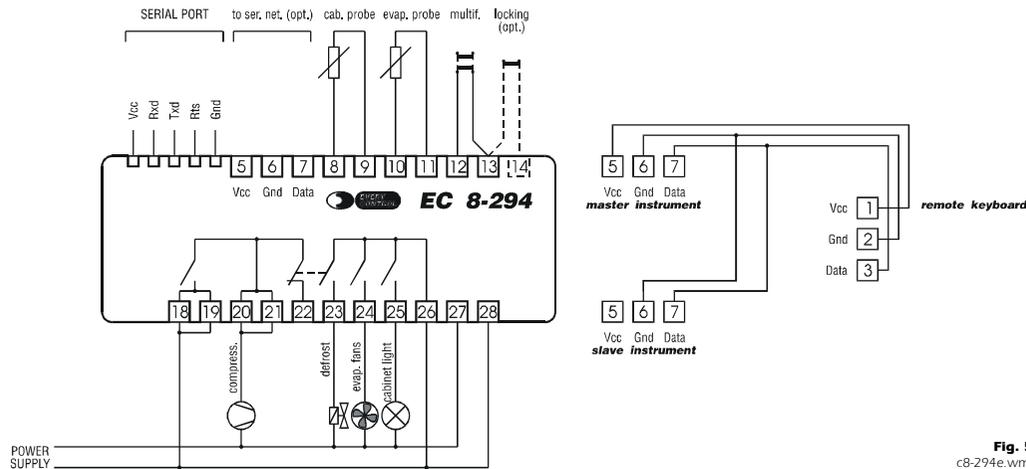


Fig. 5  
c8-294e.wmf

## BUILDER DATA

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# EC 8-294

## ON-OFF digital controller for one 1½ HP compressor, evaporator fans, defrost (for temperature-time) and cabinet light output management

Operating instructions

Version 1.01 of September twenty-ninth 2005

File ec8294\_eng\_v1.01.pdf

PT

### IMPORTANT:

The use of this new instrument is easy; but for safety reasons, it is important read these instructions carefully before the installation or before the use and follow all additional informations.

It is very important keep these instructions with the instrument for future consultations.



Fig. 1  
f8-294.wmf

## GENERAL INFORMATIONS

### WHAT IS THE USE

EC 8-294 is an ON-OFF digital controller studied for refrigerating systems management which basic characteristics are the one 1½ HP compressor, evaporator fans, defrost (for temperature-time), cabinet light output management and the "ON STAND-BY" key; besides, the instrument is provided with one multifunction digital input configurable to interact on the outputs activity (it presents a request of a defrost cycle, it forces the cabinet light output to the status ON, etc.).

In factory the instrument gets preset to accept at the measure inputs PTC/NTC probes used in refrigeration field at the moment.

EC 8-294 is available in the 96 x 48 mm (3.77 x 1.88 in.) case and it is studied for panel mounting with the equipped screw brackets.

## GETTING STARTED

### INSTALLATION

EC 8-294 was studied for panel mounting, panel cutout 91 x 45 mm (3.58 x 1.77 in.), with the equipped screw brackets (the overall dimensions and the panel cutout are related in Fig. 3, the fixing system suggested by the builder is related in Fig. 4).

### ADDITIONAL INFORMATIONS

- the panel thickness must be included from 1 to 5 mm (0.04 to 0.19 in.)
- verify if the using conditions (ambient temperature, humidity, etc.) are within the limits indicated by the builder (see the chapter TECHNICAL DATA)
- install the instrument in a location with a suitable ventilation, to avoid the internal overheating of the instrument
- do not install the instrument near surfaces that can obstruct the air-grating (carpets, covers, etc.), heating sources (radiators, hot air ducts, etc.), locations subject to direct sunlight, rain, humidity, excessive dust, mechanical vibrations or bumps, devices with strong magnetos (microwave ovens, big speakers, etc.)
- according with the safety norms, the protection against possible contacts with electrical parts and parts protected with functional insulation only must be ensured through a correct installation procedure of the instrument; all parts that ensure the protection must be fixed so that they can not be removed if not with a tool.

### ELECTRICAL CONNECTION

EC 8-294 is provided with two extractable screw terminal blocks for cables up to 2.5 mm<sup>2</sup> (0.38in.<sup>2</sup>, for the connection to the power supply, inputs and outputs) and it is provided with one five poles single line male connector (for the connection to the CLONE configurator/cloner and RICS supervision systems), located on the instrument back panel (the connections to derive are related in Fig. 5 and they are checkable on the polyester label stuck on the instrument case).

### ADDITIONAL INFORMATIONS

- if the instrument is brought from a cold to a warm location, the humidity may condense inside the instrument; wait about an hour before supply the instrument
- verify if the operating power supply voltage, electrical frequency and power of the instrument correspond to the local power supply (see the chapter TECHNICAL DATA)
- do not supply more instruments with the same transformer
- if the instrument is installed on a vehicle, its power supply must be derived directly from the battery of the vehicle
- give the instrument a protection able to limit the current absorbed in case of failure
- the instrument remains connected to the local power supply as long as the terminals 27 and 28 are derived to the local power supply, even if the instrument is apparently turned off
- if the instrument is supplied from low voltage use low voltage loads
- give the probes a protection able to insulate them against possible contacts with metal parts or use insulated probes
- give the outputs a protection able to protect them against short circuit and over-load

- do not try to repair the instrument; for the repairs apply to highly qualified staff
- if you have any questions or problems concerning the instrument please consult Every Control (see the chapter BUILDER DATA).

## USE

### PRELIMINARY INFORMATIONS

After derived the connections related in Fig. 5, the instrument reposes the last settings stored.

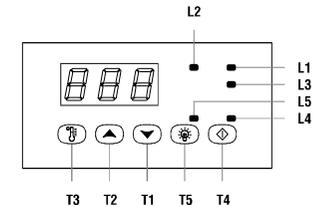


Fig. 2  
iu8294.wmf

Keeping pushed for two seconds at least the key T4 the instrument turning ON (status ON) or turning OFF (status STAND-BY) except during the working setpoint setting and the configuration parameters setting procedures; the LED L4 is associated to the instrument status, it is turned ON during the status STAND-BY and it is turned OFF during the status ON.

During the status STAND-BY the display is turned OFF and all outputs are forced to the status OFF.

During the status ON, in the course of the normal functioning the instrument displays the temperature read by the cabinet probe; if an alarm should be active the instrument displays the alarm code flashing and the buzzer utters an intermittent beep as long as the cause that has given it does not disappear (see the chapter SIGNALS AND ALARMS); pressure on the key T1 during an alarm permits to silence the buzzer.

EC 8-294 is provided with one working setpoint and with some configuration parameters that get stored in a non volatile memory and that permit to set the instrument according with one's requirements (see the chapter CONFIGURABILITY).

The output K 1 is associated to the compressor and to the working setpoint, it remains activated continuously as long as the temperature read by the cabinet probe reaches the working setpoint and when it rises above the working setpoint of the hysteresis value (differential) the output gets reactivated, except during a defrost and a dripping.

Passed the defrost interval from the moment of the instrument start or from the moment in which the instrument presents a request of a defrost cycle, if the conditions permit it (the temperature read by the evaporator probe must be below the defrost stopping setpoint) the instrument automatically presents the following request of a defrost cycle.

A defrost cycle provides three phases (defrost, dripping and evaporator fans stoppage) connected in cascade since the end of one automatically determines the passage to the following one.

The output K 2B is associated to the defrost and it remains continuously activated during the defrost as long as the temperature read by the evaporator probe reaches the defrost stopping setpoint when the defrost ends and the instrument automatically moves to the dripping; if the instrument was set to manage defrost to resistances (electrical) during a defrost the compressor output gets forced to the status OFF; if the instrument was set to manage hot gas defrost (reversal of cycle) during a defrost the compressor output remains continuously activated.

Passed the dripping length from the moment of the defrost end the instrument automatically moves to the evaporator fans stoppage; during a dripping the compressor output gets forced to the status OFF.

Passed the evaporator fans stoppage length from the moment of the dripping end the defrost cycle ends; during an evaporator fans stoppage the evaporator fans output activation gets disabled.

If the conditions permit it (the temperature read by the evaporator probe must be below the defrost stopping setpoint) keeping pushed the key T2 for four seconds at least the instrument

presents a request of a defrost cycle.

The output K 3 is associated to the evaporator fans and to the output deactivation setpoint, it remains continuously activated as long as the temperature read by the evaporator probe reaches the output deactivation setpoint, when it falls below the output deactivation setpoint of the hysteresis value (differential) the output gets reactivated and during the status OFF of the compressor output the output gets forced to the status OFF, except what established with the parameters of the family F.

The output K 4 is associated to the cabinet light: pushing and releasing the key **T5** the output gets activated or deactivated, except during the working setpoint setting and the configuration parameters setting procedures; the LED **L5** is associated to the output status, it is turned ON when the output is activated and it is turned OFF when the output is deactivated.

Activating the multifunction digital input and the locking digital input (available on request) the instrument interacts on the outputs activity according what established with the parameters of the family i.

#### WORKING SETPOINT SETTING (WORKING TEMPERATURE)

To modify the working setpoint value keep pushed the key **T3** (the instrument displays the actual value) and at the same time push and release over and over the key **T1** or **T2** as long as the instrument displays the desired value (keeping pushed the key **T1** or **T2** the value gets decreased or increased more quickly); after the modification release the key **T3** last; during the pressure of the key **T3** the LED **L1** flashes quickly to indicate that a working setpoint setting procedure is running (to the release of the key **T3** the instrument automatically turns out from the working setpoint setting procedure).

#### ADDITIONAL INFORMATIONS

- for the whole period of a corrupted memory data alarm the access to the working setpoint setting procedure is refused
- the working setpoint is programmable within the limits established with the parameters r1 and r2
- the working setpoint value gets stored in a non volatile memory even if a lack of power supply happens.

#### CONFIGURATION PARAMETERS SETTING

Configuration parameters are arranged on two levels, to protect the most tricky settings against undesirable violations and they are arranged in families that can be recognized through the initial letter of the label.

To gain access to the first level keep pushed at the same time for four seconds at least the keys **T1** and **T2** (passed four seconds the instrument displays the label **PA**).

To select a parameter of the first level push and release over and over the key **T1** or **T2** as long as the instrument displays the label of the desired parameter.

To modify the parameter value keep pushed the key **T3** (the instrument displays the actual value) and at the same time push and release over and over the key **T1** or **T2** as long as the instrument displays the desired value (keeping pushed the key **T1** or **T2** the value gets decreased or increased more quickly); after the modification release the key **T3** last (to the release of the key **T3** the instrument displays the label of the parameter again).

To gain access to the second level enter inside the first level and select the label **PA**.

Keep pushed the key **T3** (the instrument displays the actual value) and at the same time push and release over and over the key **T1** or **T2** as long as the instrument displays -19 (keeping pushed the key **T1** or **T2** the value gets decreased or increased more quickly); after the modification release the key **T3** last (to the release of the key **T3** the instrument displays the label **PA** again); keep pushed at the same time for four seconds at least the keys **T1** and **T2** (passed four seconds the instrument displays the first parameter of the second level).

To select a parameter of the second level push and release over and over the key **T1** or **T2** as long as the instrument displays the label of the desired parameter.

To modify the parameter value keep pushed the key **T3** (the instrument displays the actual value) and at the same time push and release over and over the key **T1** or **T2** as long as the instrument displays the desired value (keeping pushed the key **T1** or **T2** the value gets decreased or increased more quickly); after the modification release the key **T3** last (to the release of the key **T3** the instrument displays the label of the parameter again).

To turn out from the configuration parameters setting procedure keep pushed at the same time for four seconds at least the keys **T1** and **T2** or do not operate with the keys for fifty seconds at least (time-out exit).

#### ADDITIONAL INFORMATIONS

- for the whole period of a corrupted memory data alarm the access to the configuration parameters setting procedure is refused
- the modification of the parameter A value has not immediate effect; to obtain this effect, after the modification turn OFF and turn ON again the instrument
- the modification of a parameter value which unit of measure is the hour or the minute or the second has not immediate effect; to obtain this effect it must not be executed during the course of the value
- the modification of the parameters u1, u2, u3, u4 and u5 value has immediate effect; to avoid damages to the connected users, it must be executed during the status STAND-BY
- the configuration parameters values get stored in a non volatile memory even if a lack of power supply happens.

## NETWORK USE

#### PRELIMINARY INFORMATIONS

On request the instrument can be preset to work in a serial network of instruments (slaves) managed from a master instrument in order to implement some resources in the slaves instruments in correspondence with the implementation of the same resources in the master instrument (compressor output status during the normal functioning, presentation of a request of a defrost cycle, etc.).

After derived the connections related in Fig. 5, the master instrument repropose the last settings stored (see the chapter USE), the resources management of the slaves instruments locally happens (see the chapter USE), except what established with the parameters of the family n.

## USE WITH REMOTE KEYBOARD

#### PRELIMINARY INFORMATIONS

On request the instrument can be preset to work with a remote keyboard in order to manage the resources of the instrument even through the remote keyboard.

After derived the connections related in Fig. 5, the instrument repropose the last settings stored (see the chapter USE), the remote keyboard repeats the display of the instrument.

## NETWORK USE WITH REMOTE KEYBOARD

#### PRELIMINARY INFORMATIONS

On request the instrument can be preset to work in a serial network of instruments (slaves) managed from a master instrument in order to implement some resources in the slaves instruments in correspondence with the implementation of the same resources in the master instrument (compressor output status during the normal functioning, presentation of a request of a defrost cycle, etc.); the resources management of the master instrument can happen even through the remote keyboard.

After derived the connections related in Fig. 5, the master instrument repropose the last settings stored (see the chapter USE), the resources management of the slaves instruments locally happens (see the chapter USE), except what established with the parameters of the family n; the remote keyboard repeats the display of the master instrument.

## CONFIGURABILITY

#### WORKING SETPOINT

LABEL	MIN.	MAX.	U.M.	ST.	WORKING SETPOINT
r1	r2	(*)	0		working setpoint

It establishes the temperature associated to the compressor output.

#### CONFIGURATION PARAMETERS

LABEL	MIN.	MAX.	U.M.	ST.	PASSWORD
PA	-55	99	---	0	password (\$)

It is the password that permits to gain access to the second level.

LABEL	MIN.	MAX.	U.M.	ST.	MEASURE INPUTS
/0	1	4	---	1	kind of probe

It establishes the kind of probe that the instrument must recognize to its measure inputs, as indicated:

1 = PTC probe                    2 = reserved  
3 = NTC probe                    4 = reserved.

/1	-55	+99	(*)/8	0	calibration (\$)
----	-----	-----	-------	---	------------------

It establishes a threshold to add algebraically to the signals coming from the measure inputs (for instance to correct the signals).

/2	0	6	---	3	digital filter
----	---	---	-----	---	----------------

It establishes a time constant to apply to the signals coming from the measure inputs, as indicated:

0 = 0 sec.                            1 = 0.4 sec.  
2 = 1.2 sec.                        3 = 3.0 sec.  
4 = 8.0 sec.                        5 = 19.8 sec.  
6 = 48.0 sec.

/8	0	1	---	1	unit of measure
----	---	---	-----	---	-----------------

It establishes the unit of measure with which the temperature gets displayed, as indicated:

0 = the unit of measure is the Fahrenheit degree  
1 = the unit of measure is the Celsius degree.

/A	0	1	---	1	evaporator probe enabling (@)
----	---	---	-----	---	-------------------------------

It establishes if to enable the evaporator probe, as indicated:

0 = the evaporator probe is disabled  
1 = the evaporator probe is enabled.

LABEL	MIN.	MAX.	U.M.	ST.	ON-OFF TEMPERATURE REGULATOR ASSOCIATED TO THE WORKING SETPOINT AND TO THE COMPRESSOR OUTPUT
r0	+1	+15	(*)	+2	hysteresis (differential) (\$)

It establishes the hysteresis (differential) relative to the working setpoint.

r1	-55	+99	(*)	-50	minimum working setpoint programmable
----	-----	-----	-----	-----	---------------------------------------

It establishes the minimum working setpoint programmable; the instrument automatically verifies if the value established with the parameter r1 is below the maximum working setpoint programmable established with the parameter r2.

r2	-55	+99	(*)	+50	maximum working setpoint programmable
----	-----	-----	-----	-----	---------------------------------------

It establishes the maximum working setpoint programmable; the instrument automatically verifies if the value established with the parameter r2 is above the minimum working setpoint programmable established with the parameter r1.

LABEL	MIN.	MAX.	U.M.	ST.	COMPRESSOR OUTPUT PROTECTION
C0	0	240	(**)	1	disabling time to the output activation from the instrument start

It establishes the time that disables the output activation from the moment of the instrument start.

C1	0	240	(**)	5	disabling time to the output activation from the previous activation
----	---	-----	------	---	--

It establishes the time that disables the output activation from the moment of the previous output activation.

C2	0	240	(**)	3	disabling time to the output activation from the previous deactivation
----	---	-----	------	---	--

It establishes the time that disables the output activation from the moment of the previous output deactivation.

C4	0	1	---	0	disabling time to the output activation and deactivation
----	---	---	-----	---	--

It establishes if to disable the output activation and deactivation for a fixed time, as indicated:  
0 = inactive

<b>Ambient temperature:</b>	from 0 to +60 °C (+32 to +140 °F, 10 ... 90 % of not condensing relative humidity).
<b>Power supply:</b>	230 Vac or 115 Vac or 12-24 Vac/dc, 50/60 Hz, 4 VA.
<b>Insulation class:</b>	II.
<b>Alarm buzzer:</b>	incorporated.
<b>Measure inputs:</b>	2 (cabinet and evaporator probe) configurable for PTC/NTC probes.
<b>Digital inputs:</b>	1 multifunction (5 V, 1 mA) configurable to interact on the outputs activity and for NO or NC contact.
<b>Working range:</b>	from -50 a +150 °C (-58 to +302 °F) for PTC probe, from -40 to +110 °C (-40 to + 230 °F) for NTC probe.
<b>Setting range:</b>	from -55 to +99 °C (-55 to +99 °F).
<b>Resolution:</b>	1 °F with unit of measure in Fahrenheit, 1 °C with unit of measure in Celsius.
<b>Display:</b>	3-digit display 12,5 mm (0.49 in.) high red LED display with automatic minus sign, output status indicators, instrument status indicator.
<b>Outputs:</b>	4 NO relays: one 16 A @ 250 Vac relay (16 A @ 30 Vdc) to manage the compressor, one 5 A @ 250 Vac relay (5 A @ 30 Vdc) to manage the defrost system and two 5 A @ 250 Vac relays (5 A @ 28 Vdc) to manage the evaporator fan and control the cabinet light.
<b>Kind of defrost managed:</b>	to resistances (electrical) and to hot gas (reversal of cycle), automatic, manual and remote.
<b>Defrost management:</b>	for interval, stopping temperature and maximum length.
<b>Serial port:</b>	TTL with EVCOBUS protocol communication.

1 =	the output activation and deactivation get disabled for 3 sec.
<b>C5</b>	<b>1 240 (**)</b> <b>10</b> <b>cycle time for the output activation during a cabinet probe failure alarm</b>
	It establishes the cycle time for the output activation due to the contribution of the percentage established with the parameter C6 during a cabinet probe failure alarm.
<b>C6</b>	<b>0 100 % 50</b> <b>percentage of the cycle time during which the output gets activated during a cabinet probe failure alarm</b>
	It establishes the percentage of the cycle time established with the parameter C5 during which the output must remain continuously activated in the course of the cycle time during a cabinet probe failure alarm, except what established with the disabling times to the compressor output activation.
<b>LABEL MIN. MAX. U.M. ST. DEFROST REGULATOR</b>	
<b>d0</b>	<b>0 99 (**)</b> <b>8</b> <b>defrost interval</b>
	It establishes the time interval that pass from the moment of the instrument start or from the moment in which the instrument presents a request of a defrost cycle to the moment in which the instrument automatically presents the following request of a defrost cycle.
	If the parameter d0 has value 0 the instrument never automatically presents a request of a defrost cycle, except what established with the parameter d4.
<b>d1</b>	<b>0 1 --- 1</b> <b>kind of defrost</b>
	It establishes the kind of defrost that the instrument must manage, as indicated: 0 = to resistances (electrical) 1 = to hot gas (reversal of cycle).
<b>d2</b>	<b>-55 +99 (*) +2</b> <b>defrost stopping setpoint</b>
	It is significant exclusively if the parameter /A has value 1, it establishes the temperature to which a defrost gets stopped and it is referred to the evaporator probe.
<b>d3</b>	<b>1 99 (**)</b> <b>15</b> <b>defrost maximum length</b>
	It establishes the defrost maximum length.
	Passed the defrost maximum length from the moment in which the instrument activates a defrost cycle, if the temperature read by the evaporator probe is below the setpoint established with the parameter d2 the defrost ends.
<b>d4</b>	<b>0 1 --- 0</b> <b>defrost cycle at the instrument start</b>
	It establishes if the instrument automatically must present a request of a defrost cycle at the moment of the instrument start, as indicated: 0 = inactive 1 = the instrument automatically presents a request of a defrost cycle at the moment of the instrument start.
<b>d5</b>	<b>0 99 (**)</b> <b>0</b> <b>delay to a defrost cycle activation from the instrument start</b>
	It is significant exclusively if the parameter d4 has value 1 or if the parameter i0 has value 1, it establishes the delay with which the instrument automatically presents a request of a defrost cycle from the moment of the instrument start and from the moment of the multifunction digital input activation.
	A manual presentation of a request of a defrost cycle during the count of the delay established with the parameter d5 clears the delay.
<b>d6</b>	<b>0 1 --- 1</b> <b>locking of the displayed temperature from a defrost cycle activation</b>
	It establishes if to lock the displayed temperature from the moment in which the instrument activates a defrost cycle, as indicated: 0 = inactive 1 = during a defrost, a dripping and as long as the temperature read by the cabinet probe reaches the working setpoint, the instrument displays the temperature read by the cabinet probe in the moment in which the instrument activates a defrost cycle.
<b>d7</b>	<b>0 15 (**)</b> <b>2</b> <b>dripping length</b>
	It establishes the dripping length.
<b>d9</b>	<b>0 1 --- 0</b> <b>disabling times to the compressor output activation override</b>
	It is significant exclusively if the parameter d1 has value 1, it establishes if to clear the disabling times to the compressor output activation in the moment in which the instrument presents a request of a defrost cycle, as indicated: 0 = inactive 1 = in the moment in which the instrument presents a request of a defrost cycle the disabling times to the compressor output activation get cleared.
<b>dA</b>	<b>--- --- (*) ---</b> <b>evaporator probe reading (S)</b>
	It permits to display the temperature read by the evaporator probe.
<b>dB</b>	<b>0 1 --- 0</b> <b>times base</b>
	It establishes the unit of measure of the parameters expressed in time intervals, except for the parameters L3 and n4, as indicated: 0 = the unit of measure of the parameter d0 is the hour and the unit of measure of the parameters C0, C1, C2, C5, d3, d5, d7, A3, A5, A6, A7, F5, i4 and i5 is the minute 1 = the unit of measure of the parameter d0 is the minute and the unit of measure of the parameters C0, C1, C2, C5, d3, d5, d7, A3, A5, A6, A7, F5, i4 and i5 is the second.
<b>LABEL MIN. MAX. U.M. ST. ALARM REGULATOR</b>	
<b>A0</b>	<b>+1 +15 (*) +2</b> <b>hysteresis (differential)</b>
	It establishes the hysteresis (differential) relative to the parameters A1 and A2.
<b>A1</b>	<b>-55 0 (*) -10</b> <b>lower temperature alarm set relative to the working setpoint</b>
	It establishes a threshold to add algebraically to the working setpoint; the value so obtained establishes the temperature below which the lower temperature alarm gets activated and it is referred to the cabinet probe. If the parameter A1 has value 0 the lower temperature alarm never gets activated.
<b>A2</b>	<b>0 +99 (*) +10</b> <b>upper temperature alarm set relative to the working setpoint</b>
	It establishes a threshold to add algebraically to the working setpoint; the value so obtained establishes the temperature above which the upper temperature alarm gets activated and it is referred to the cabinet probe.

	If the parameter A2 has value 0 the upper temperature alarm never gets activated.
<b>A3</b>	<b>0 240 (**)</b> <b>120</b> <b>disabling time to the temperature alarm activation from the instrument start</b>
	It establishes the time that disables the temperature alarm activation from the moment of the instrument start.
<b>A5</b>	<b>-1 120 (**)</b> <b>30</b> <b>disabling time to the buzzer activation for the multifunction digital input alarm indication</b>
	It is significant exclusively if the parameter i0 has values different to 0, it establishes the time that disables the buzzer activation for the multifunction digital input alarm indication from the moment in which the multifunction digital input alarm happens. If the parameter A5 has value -1 during a multifunction digital input alarm the buzzer gets not activated.
<b>A6</b>	<b>0 240 (**)</b> <b>5</b> <b>disabling time to the temperature alarm activation</b>
	It establishes the time that disables the temperature alarm activation from the moment in which the temperature alarm happens.
<b>A7</b>	<b>0 240 (**)</b> <b>15</b> <b>disabling time to the temperature alarm activation from the defrost cycle end</b>
	It establishes the time that disables the temperature alarm activation from the moment of the defrost cycle end.
<b>LABEL MIN. MAX. U.M. ST. EVAPORATOR FANS REGULATOR ASSOCIATED TO THE EVAPORATOR FANS OUTPUT</b>	
<b>F1</b>	<b>-55 +99 (*) -1</b> <b>output deactivation setpoint</b>
	It is significant exclusively if the parameter /A has value 1 and if the parameter F7 has value 3 or 4, according with the modality established with the parameter F6, it establishes the temperature to which the output gets deactivated and it is referred to the evaporator probe.
<b>F2</b>	<b>+1 +15 (*) +2</b> <b>hysteresis (differential)</b>
	It is significant exclusively if the parameter /A has value 1 and if the parameter F7 has value 3 or 4, it establishes the hysteresis (differential) relative to the parameter F1.
<b>F4</b>	<b>0 2 --- 0</b> <b>output functioning during the defrost and the dripping</b>
	It establishes the output functioning during a defrost and a dripping, as indicated: 0 = during a defrost and a dripping the output gets forced to the status OFF 1 = during a defrost and a dripping the output gets forced to the status ON 2 = the output functioning during a defrost and a dripping gets established with the parameter F7.
<b>F5</b>	<b>0 15 (**)</b> <b>2</b> <b>evaporator fans stoppage length</b>
	It establishes the evaporator fans stoppage length.
<b>F6</b>	<b>0 1 --- 0</b> <b>kind of output deactivation setpoint</b>
	It is significant exclusively if the parameter /A has value 1 and if the parameter F7 has value 3 or 4, it establishes the kind of output deactivation setpoint that the instrument must manage, as indicated: 0 = absolute (the output deactivation setpoint establishes the temperature to which the output gets deactivated) 1 = relative to the temperature read by the cabinet probe (the value obtained subtracting the absolute value of the output deactivation setpoint to the temperature read by the cabinet probe establishes the temperature to which the output gets deactivated).
<b>F7</b>	<b>0 4 --- 4</b> <b>output functioning during the normal functioning</b>
	It establishes the output functioning during the normal functioning, as indicated: 0 = during the normal functioning the output gets forced to the status OFF 1 = during the normal functioning the output gets forced to the status ON 2 = during the normal functioning the output gets forced to the status ON and during the status OFF of the compressor output the output gets forced to the status OFF 3 = during the normal functioning the output is associated to the setpoint established with the parameter F1, it remains continuously activated as long as the temperature read by the evaporator probe reaches the setpoint established with the parameter F1 and when it falls below the setpoint established with the parameter F1 of the hysteresis value (differential) established with the parameter F2 the output gets reactivated 4 = during the normal functioning the output is associated to the setpoint established with the parameter F1, it remains continuously activated as long as the temperature read by the evaporator probe reaches the setpoint established with the parameter F1, when it falls below the setpoint established with the parameter F1 of the hysteresis value (differential) established with the parameter F2 the output gets reactivated and during the status OFF of the compressor output the output gets forced to the status OFF
<b>LABEL MIN. MAX. U.M. ST. DIGITAL INPUTS</b>	
<b>i0</b>	<b>0 5 --- 4</b> <b>action given during the multifunction digital input activation</b>
	It establishes the action given during the multifunction digital input activation, as indicated: 0 = inactive 1 = if the conditions permit it (the temperature read by the evaporator probe must be below the setpoint established with the parameter d2) activating the multifunction digital input the instrument presents a request of a defrost cycle 2 = during the multifunction digital input activation the cabinet light output gets forced to the status ON 3 = during the multifunction digital input activation the compressor output, except what established with the disabling times to the compressor output activation and the cabinet light output get forced to the status ON 4 = during the multifunction digital input activation the compressor and evaporator fans outputs get forced to the status OFF and the cabinet light output gets forced to the status ON 5 = during the multifunction digital input activation the evaporator fans output gets forced to the status OFF and the cabinet light output gets forced to the status ON.
	If the parameter i0 has value 2, 3, 4 or 5 pressure on the key <b>T5</b> during a multifunction digital input alarm does not modify the cabinet light output status but it is indicated from the turning ON (if before the multifunction digital input alarm activation the cabinet light output was deactivated) or from the flashing (if before the multifunction digital input alarm activation the cabinet light output was activated) of the LED <b>L5</b> .
	If the parameter i0 has value 3 or 4 the multifunction digital input alarm activation that happens during a defrost cycle interacts on the compressor output status from the moment of the defrost cycle end.

<b>i1</b>	<b>0</b>	<b>1</b>	<b>---</b>	<b>0</b>	<b>kind of contact of the multifunction digital input</b>
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It establishes the kind of contact of the multifunction digital input, as indicated:  
0 = NO contact  
1 = NC contact.

<b>i2</b>	<b>0</b>	<b>2</b>	<b>---</b>	<b>0</b>	<b>action given during the locking digital input activation</b> (®)
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It establishes the action given during the locking digital input activation, as indicated:  
0 = inactive  
1 = during the locking digital input activation the compressor output gets forced to the status OFF  
2 = during the locking digital input activation the compressor output gets forced to the status OFF, from the moment of the locking digital input deactivation the compressor output activation gets disabled for the time established with the parameter i5, in the moment in which the compressor output gets reactivated the instrument increases a locking digital input alarms counter, when the locking digital input alarms counter reaches the number established with the parameter i3 the compressor output gets definitively forced to the status OFF (instrument locking); to obtain the instrument unlocking turn OFF and turn ON again the instrument.

<b>i3</b>	<b>0</b>	<b>15</b>	<b>---</b>	<b>0</b>	<b>number of locking digital input alarms enough to give the instrument locking</b> (®)
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It establishes the number of locking digital input alarms enough to give the instrument locking. If the parameter i3 has value 0 the instrument locking never happens.  
The increasing of the locking digital input alarms counter that gives the instrument locking happens in the moment of the locking digital input activation.

<b>i4</b>	<b>0</b>	<b>240</b>	<b>(**)</b>	<b>0</b>	<b>time required to clear the locking digital input alarms counter</b> (®)
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It establishes the time that must pass from the moment of the previous locking digital input deactivation in order that the locking digital input alarms counter get cleared.

<b>i5</b>	<b>0</b>	<b>15</b>	<b>(**)</b>	<b>0</b>	<b>disabling time to the compressor output activation from the previous locking digital input deactivation</b> (®)
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It establishes the time that disables the compressor output activation from the moment of the previous locking digital input deactivation.

LABEL	MIN.	MAX.	U.M.	ST.	USER-OUTPUT CONFIGURATION
<b>u1</b>	<b>0</b>	<b>6</b>	<b>---</b>	<b>0</b>	<b>user to associate to the output K 1</b> (®)

It establishes the user to associate to the output K 1, as indicated:  
0 = compressor  
1 = defrost  
2 = evaporator fans  
3 = cabinet light  
4 = alarm  
5 = ON-OFF  
6 = reserved.

<b>u2</b>	<b>0</b>	<b>6</b>	<b>---</b>	<b>1</b>	<b>user to associate to the output K 2B</b> (®)
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It has the same significance of the parameter u1.

<b>u3</b>	<b>0</b>	<b>6</b>	<b>---</b>	<b>2</b>	<b>user to associate to the output K 3</b> (®)
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It has the same significance of the parameter u1.

<b>u4</b>	<b>0</b>	<b>6</b>	<b>---</b>	<b>3</b>	<b>user to associate to the output K 4</b> (®)
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It has the same significance of the parameter u1.

<b>u5</b>	<b>0</b>	<b>6</b>	<b>---</b>	<b>4</b>	<b>user to associate to the output K 5</b> (®)
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It has the same significance of the parameter u1.

LABEL	MIN.	MAX.	U.M.	ST.	CONNECTION IN A SERIAL NETWORK WITH EVCOBUS PROTOCOL COMMUNICATION
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<b>L1</b>	<b>1</b>	<b>15</b>	<b>---</b>	<b>1</b>	<b>instrument address</b>
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It establishes the address to which the instrument (slave) answers when it is connected to a serial network with EVCOBUS protocol communication managed from a master (for instance a Personal Computer).

<b>L2</b>	<b>0</b>	<b>7</b>	<b>---</b>	<b>0</b>	<b>instrument group</b>
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It establishes the group to which the instrument (slave) answers when it is connected to a serial network with EVCOBUS protocol communication managed from a master (for instance a Personal Computer).

<b>L3</b>	<b>7</b>	<b>240</b>	<b>sec.</b>	<b>7</b>	<b>time-out link</b>
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It establishes for which time interval the instrument must store a connection to a serial network with EVCOBUS protocol communication from the moment in which an interruption of the connection happens.

<b>L4</b>	<b>0</b>	<b>3</b>	<b>---</b>	<b>1</b>	<b>baud rate</b>
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It establishes the speed with which the data get transmitted in a serial network with EVCOBUS protocol communication, as indicated:

0 =	1,200	baud
1 =	2,400	baud
2 =	4,800	baud
3 =	9,600	baud.

LABEL	MIN.	MAX.	U.M.	ST.	CONNECTION IN A SERIAL NETWORK WITH EVCONET PROTOCOL COMMUNICATION
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<b>n0</b>	<b>0</b>	<b>2</b>	<b>---</b>	<b>0</b>	<b>instrument functioning in the network</b> (®)
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It establishes the instrument functioning when it is connected to a serial network with EVCONET protocol communication, as indicated:

0 =	the instrument is not enabled to work in the network
1 =	the instrument is set as master instrument
2 =	the instrument is set as slave instrument.

<b>n1</b>	<b>0</b>	<b>8</b>	<b>---</b>	<b>0</b>	<b>instrument address</b> (®)
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It is significant exclusively if the parameter n0 has value 1 or 2, it establishes the instrument address when it is connected to a serial network with EVCONET protocol communication, as indicated:

0 =	first instrument address
1 =	first slave instrument address
2 =	second slave instrument address

3 =	third slave instrument address
4 =	fourth slave instrument address
5 =	fifth slave instrument address
6 =	sixth slave instrument address
7 =	seventh slave instrument address
8 =	eighth slave instrument address.

<b>n3</b>	<b>0</b>	<b>1</b>	<b>---</b>	<b>0</b>	<b>enabling to work as slave instrument</b> (§) (®)
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It is significant exclusively if the parameter n0 has value 2 and if the parameter n1 has values different to 0, it establishes if to enable the instrument to work as slave instrument, as indicated:

0 =	the instrument is not enabled to work as slave instrument
1 =	the instrument is enabled to work as slave instrument.

<b>n4</b>	<b>0</b>	<b>240</b>	<b>sec.</b>	<b>0</b>	<b>delay to the resources implementation in the slave instrument</b> (®)
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It is significant exclusively if the parameter n0 has value 2, if the parameter n1 has values different to 0 and if the parameter n3 has value 1, it establishes a time interval to multiply for the address established with the parameter n1; the value so obtained establishes the delay with which the resources get implemented in the slave instrument from the moment of the implementation of the same resource in the master instrument, except for the resource turning ON and turning OFF that gets implemented immediately.

<b>nA</b>	<b>0</b>	<b>15</b>	<b>---</b>	<b>0</b>	<b>resources to implement in the slave instrument</b> (®)
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It is significant exclusively if the parameter n0 has value 2, if the parameter n1 has values different to 0 and if the parameter n3 has value 1, it establishes the resources to implement in the slave instrument in correspondence with the implementation of the same resources in the master instrument, except what established with the disabling times to the compressor output activation of the slave instrument, as indicated:

0 =	no resources implemented
1 =	compressor output status during the normal functioning
2 =	presentation of a request of a defrost cycle
3 =	compressor output status during the normal functioning and presentation of a request of a defrost cycle
4 =	turning ON and turning OFF
5 =	compressor output status during the normal functioning, turning ON and turning OFF
6 =	presentation of a request of a defrost cycle, turning ON and turning OFF
7 =	compressor output status during the normal functioning, presentation of a request of a defrost cycle, turning ON and turning OFF
8 =	reserved
9 =	compressor output status during the normal functioning
10 =	presentation of a request of a defrost cycle
11 =	compressor output status during the normal functioning and presentation of a request of a defrost cycle
12 =	turning ON and turning OFF
13 =	compressor output status during the normal functioning, turning ON and turning OFF
14 =	presentation of a request of a defrost cycle, turning ON and turning OFF
15 =	compressor output status during the normal functioning, presentation of a request of a defrost cycle, turning ON and turning OFF.

#### ADDITIONAL INFORMATIONS

- the symbol (\*) indicates that the unit of measure depends from the parameter /B
- the symbol (§) indicates that the parameter is of the first level
- the symbol (®) indicates that the parameter is available on request only
- the symbol (\*\*) indicates that the unit of measure depends from the parameter dB
- a temperature alarm activation that does not disappear at the end of the time established with the parameter A3 gets further disabled for the time established with the parameter A6
- a temperature alarm activation that happens before that the instrument activate a defrost cycle gets disabled for the time established with the parameter A6 but it does not interact on the defrost cycle
- a temperature alarm activation that happens during or at the end of a defrost cycle and that does not disappear at the end of the time established with the parameter A7 gets further disabled for the time established with the parameter A6
- a temperature alarm activation that happens during a multifunction digital input alarm gets disabled for the time established with the parameter A6 from the moment in which the multifunction digital input alarm disappears
- do not set more instruments as master instrument
- if among the resources to implement in the slave instrument there is the compressor output status during the normal functioning, the slave instrument displays the indication "nE1"; to display the temperature read by the cabinet probe of the slave instrument keep pushed the key T1
- if among the resources to implement in the slave instrument there is the compressor output status during the normal functioning, in the slave instrument the parameters C5 and C6 has not significance
- if among the resources to implement in the slave instrument there is the presentation of a request of a defrost cycle the parameter d5 establishes a delay to add to the value established with the parameters n1 and n4; the value so obtained establishes the delay with which the resource gets implemented in the slave instrument from the moment of the implementation of the same resource in the master instrument
- if among the resources to implement in the slave instrument there is the presentation of a request of a defrost cycle the slave instrument implements the resource even if the conditions do not permit at the master instrument to activate a defrost cycle
- if among the resources to implement in the slave instrument there is not the turning ON and the turning OFF during the status STAND-BY of the master instrument the resources management of the slave instrument locally happens.

## SIGNALS AND ALARMS

#### SIGNALS

If the LED L1 is turned ON it means that the compressor output is activated.

If the LED L2 is turned ON it means that the defrost output is activated

If the LED L3 is turned ON it means that the evaporator fans output is activated.

If the LED L4 is turned ON it means that the instrument is in the status STAND-BY.

If the LED L5 is turned ON it means that the cabinet light output is activated.

If the LED L1 flashes it means that a count of a disabling time to the compressor output activation is running (see the parameters C0, C1, C2 and C4) or that the instrument is set as slave instrument, with a proper address, it is enabled to work as slave instrument, among the resources to implement in the slave instrument there is the compressor output status during the normal functioning and that a count of a delay time to the resource implementation is running (see the parameters n1 and n4).

If the LED L2 flashes it means that a count of a delay time to a defrost cycle activation is running (see the parameters C0, C1, C2 and C4), that a dripping is running (see the parameter d7) or that the instrument is set as slave instrument, with a proper address, it is enabled to work as slave instrument, among the resources to implement in the slave instrument there are the compressor output status during the normal functioning and the presentation of a request of a defrost cycle and that a count of a delay time to the resource implementation is running (see the parameters n1 and n4).

If the LED L3 flashes it means that an evaporator fans stoppage is running (see the parameter F5).

If the LED L4 flashes it means that the instrument is set as slave instrument, with a proper address and it is not enabled to work as slave instrument (see the parameter n3).

If the LED L4 flashes every four seconds it means that the instrument is set as slave instrument, with a proper address, it is enabled to work as slave instrument and among the resources to implement in the slave instrument there is the turning ON and the turning OFF (see the parameter nA).

If the instrument displays the indication "nE1" it means that the instrument is set as slave instrument, with a proper address, it is enabled to work as slave instrument and among the resources to implement in the slave instrument there is the compressor output status during the normal functioning (see the parameter nA).

If the instrument displays the indication "nE1" flashing every four seconds it means that the instrument is set as slave instrument, with a proper address, it is enabled to work as slave instrument, among the resources to implement in the slave instrument there is the compressor output status during the normal functioning but there is not the turning ON and the turning OFF and both the master instrument and the slave instrument are in the status STAND-BY (see the parameter nA).

If the instrument displays the temperature read by the cabinet probe and the indication "nE1" flashing every four seconds it means that the instrument is set as slave instrument, with a proper address, it is enabled to work as slave instrument, among the resources to implement in the slave instrument there is the compressor output status during the normal functioning but there is not the turning ON and the turning OFF, the master instrument is during the status STAND-BY and the slave instrument is during the status ON (see the parameter nA).

#### ALARMS

If the instrument displays the indication "E2" flashing and the buzzer utters an intermittent beep (**corrupted memory data alarm**) it means that there is a corruption of the configuration data in the memory (turn OFF and turn ON again the instrument: if to the turning ON again the alarm does not disappear the instrument must be replaced); during this alarm the access to the working setpoint setting and the configuration parameters setting procedures is refused, all outputs get forced to the status OFF and if the instrument is set as master instrument the resources management of the slave instrument locally happens.

If the instrument displays the indication "E3" flashing and the buzzer utters an intermittent beep (**instrument locking**) it means that there was a number of locking digital input alarm enough to give the instrument locking (turn OFF and turn ON again the instrument, see the parameters i2, i3, i4 and i5); during this alarm the compressor output gets forced to the status OFF, if a defrost cycle is running the defrost cycle ends and the instrument never activates a defrost cycle.

If the instrument displays the indication "E3" flashing alternated to the indication "E0" and the buzzer utters an intermittent beep (**locking digital input alarm and cabinet probe failure alarm**) it means that the locking digital input is active (deactivate the locking digital input, see the parameters i2, i3, i4 and i5) and that; the kind of connected cabinet probe is not proper (see the parameter /O), the cabinet probe is faulty (verify the cabinet probe integrity), there is a mistake in the instrument-cabinet probe connection (verify the instrument-cabinet probe connection integrity), the temperature read by the cabinet probe is outside the limits permitted by the cabinet probe in use (verify that the temperature near the cabinet probe be inside the limits permitted by the cabinet probe); during this alarm the compressor output gets forced to the status OFF, if a defrost cycle is running the defrost cycle ends and the instrument never activates a defrost cycle.

If the instrument displays the indication "E3" flashing alternated to the temperature read by the cabinet probe and the buzzer utters an intermittent beep (**locking digital input alarm**) it means that the locking digital input is active (deactivate the locking digital input, see the parameters i2, i3, i4 and i5); during this alarm the compressor output gets forced to the status OFF, if a defrost cycle is running the defrost cycle ends and the instrument never activates a defrost cycle.

If the instrument displays the indication "E0" flashing and the buzzer utters an intermittent beep (**cabinet probe failure alarm**) it means that: the kind of connected cabinet probe is not proper (see the parameter /O), the cabinet probe is faulty (verify the cabinet probe integrity), there is a mistake in the instrument-cabinet probe connection (verify the instrument-cabinet probe connection integrity), the temperature read by the cabinet probe is outside the limits permitted by the cabinet probe in use (verify that the temperature near the cabinet probe be inside the limits permitted by the cabinet probe); during this alarm the compressor output functioning gets established with the parameters C5 and C6, if a defrost cycle is running the defrost cycle ends and the instrument never activates a defrost cycle.

If the instrument displays the indication "E1" flashing and the buzzer utters an intermittent beep (**evaporator probe failure alarm**) it means that there is one of the faults saw in the previous case but referred to the evaporator probe; during this alarm, if the parameter F7 has value 3 or 4 the evaporator fans output gets forced to the same status of the compressor output, except what established with the parameter F5 and the defrost ends passed the defrost maximum length.

If the instrument displays the temperature read by the cabinet probe and the buzzer utters an intermittent beep (**multifunction digital input alarm**) it means that the multifunction digital input is active (deactivate the multifunction digital input, see the parameters i0 and i1); during this alarm, if the conditions permit it (the temperature read by the evaporator probe must be

below the defrost stopping setpoint) the instrument presents a request of a defrost cycle.

If the instrument displays the temperature read by the cabinet probe, the buzzer utters an intermittent beep and the LED L5 flashes or it is turned ON (**multifunction digital input alarm**) it means that the multifunction digital input is active (deactivate the multifunction digital input, see the parameters i0 and i1); during this alarm the cabinet light output gets forced to the status ON.

If the instrument displays the temperature read by the cabinet probe flashing, the indication "Ain" flashing every four seconds, the buzzer utters an intermittent beep and the LED L5 flashes or it is turned ON (**multifunction digital input alarm and temperature alarm**) it means that the multifunction digital input is active (deactivate the multifunction digital input, see the parameters i0 and i1) and that the temperature read by the cabinet probe is outside the limit established with the parameter A1 or A2 (see the parameters A0, A1 and A2); during this alarm gets given the action established with the parameter i0 and if the parameter i0 has value 3 or 4 the instrument never activates a defrost cycle, except if the instrument is set as slave instrument, with a proper address, it is enabled to work as slave instrument and among the resources to implement in the slave instrument there is the presentation of a request of a defrost cycle.

If the instrument displays the temperature read by the cabinet probe, the indication "Ain" flashing every four seconds, the buzzer utters an intermittent beep and the LED L5 flashes or it is turned ON (**multifunction digital input alarm**) it means that the multifunction digital input is active (deactivate the multifunction digital input, see the parameters i0 and i1); during this alarm gets given the action established with the parameter i0 and if the parameter i0 has value 3 or 4 the instrument never activates a defrost cycle, except if the instrument is set as slave instrument, with a proper address, it is enabled to work as slave instrument and among the resources to implement in the slave instrument there is the presentation of a request of a defrost cycle.

If the instrument displays the temperature read by the cabinet probe flashing and the buzzer utters an intermittent beep (**temperature alarm**) it means that the temperature read by the cabinet probe is outside the limit established with the parameter A1 or A2 (see the parameters A0, A1 and A2); inactive.

If the instrument displays the indication "nE1" and the buzzer utters an intermittent beep (**slave instrument alarm**) it means that the instrument is set as slave instrument, with a proper address, it is enabled to work as slave instrument, among the resources to implement in the slave instrument there is the compressor output status during the normal functioning and that there is one of the alarms saw in the previous cases; to display the alarm code flashing of the slave instrument keep pushed the key T1.

If the instrument displays an alarm code flashing and the indication "nE1" flashing every four seconds it means that the instrument is set as slave instrument, with a proper address, it is enabled to work as slave instrument, among the resources to implement in the slave instrument there is the compressor output status during the normal functioning but there is not the turning ON and the turning OFF, the master instrument is during the status STAND-BY, the slave instrument is during the status ON and there is one of the alarms saw in the previous cases.

If the instrument displays the temperature read by the cabinet probe, the indication "nE1" flashing every four seconds and the buzzer utters an intermittent beep (**serial network alarm**) it means that: the instrument is set as slave instrument, with a proper address, it is enabled to work as slave instrument and the master instrument is not enabled to work in the network (see the parameter n0 of the master instrument, during this alarm the resources management of the slave instrument locally happens), the instrument is set as slave instrument, with a proper address, it is enabled to work as slave instrument and the master instrument is set as slave instrument (see the parameter n0 of the master instrument, during this alarm the resources management of the slave instrument locally happens), the instrument is not enabled to work in the network, it is set with a proper address and it is enabled to work as slave instrument (see the parameter n0 of the slave instrument, during this alarm the resources management of the slave instrument locally happens), the instrument is set as master instrument, with a slave instrument address and it is enabled to work as slave instrument (see the parameter n0 of the master instrument, during this alarm the resources management of the slave instrument locally happens), the instrument is set as slave instrument, with a proper address, it is enabled to work as slave instrument and the master instrument has the same address of the slave instrument (see the parameter n1 of the master instrument, during this alarm the resources management of the slave instrument locally happens), the instrument is set as slave instrument, with a proper address and it is enabled to work as slave instrument (see the parameter n3 of the master instrument, inactive), the instrument is set as slave instrument, with a proper address, it is enabled to work as slave instrument and there is a mistake in the connection to the serial network of instruments (verify the integrity of the connection to the serial network of instruments, during this alarm the resources management of the slave instrument locally happens) or the instrument is set as slave instrument, with a proper address, it is enabled to work as slave instrument and the master instrument is not connected to the local power supply (verify that the master instrument be connected to the local power supply, during this alarm the resources management of the slave instrument locally happens).

#### ADDITIONAL INFORMATIONS

- if the parameter F7 has value 0, 1 or 2 during an evaporator fans stoppage the LED L3 does not flash

- the alarm codes are related in order of precedence.

## TECHNICAL DATA

TECHNICAL DATA	
<b>Case:</b>	plastic black (PPO), self-extinguishing.
<b>Size:</b>	96 x 48 x 99 mm (3.77 x 1.88 x 3.89 in.), with terminal blocks.
<b>Installation:</b>	panel mounting, panel cutout 91 x 45 mm (3.58 x 1.77 in.), with the equipped screw brackets.
<b>Type of protection:</b>	IP 54.
<b>Connections:</b>	extractable screw terminal blocks with pitch 5 mm (0.19 in., power supply, inputs and outputs) for cables up to 2.5 mm <sup>2</sup> (0.38 in. <sup>2</sup> ), five poles single line male connector with pitch 2.5 mm (0.09 in., serial port).