

eliwell

EW974



EN

Electronic controllers for refrigeration units

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CONDITIONS OF USE

Permitted use

For safety reasons the instrument must be installed and used according to the instruction provided and in particular, under normal conditions, parts bearing dangerous voltage levels must not be accessible.

The device must be adequately protected from water and dust as per the application and must also only be accessible via the use of tools (with the exception of the frontlet).

The device is ideally suited for use on household appliances and/or similar refrigeration equipment and has been tested with regard to the aspects concerning European reference standards on safety.

Improper use

Any other use other than that permitted is de facto prohibited. It should be noted that the relay contacts provided are of a practical type and therefore subject to fault. Any protection devices required by product standards or dictated by common sense due to obvious safety reasons should be applied externally.

LIABILITY AND RESIDUAL RISKS

ELIWELL CONTROLS SRL shall not be liable for any damages deriving from:

- installation/use other than that prescribed and, in particular, that which does not comply with safety standards anticipated by regulations and/or those given herein;
- use on boards which do not guarantee adequate protection against electric shock, water or dust under the conditions of assembly applied;
- use on boards which allow access to dangerous parts without the use of tools;
- tampering with and/or alteration of the products;
- installation/use on boards that do not comply with the standards and regulations in force.

DISCLAIMER

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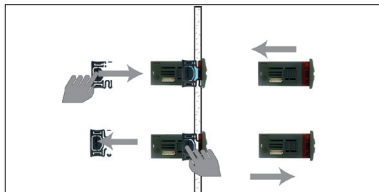
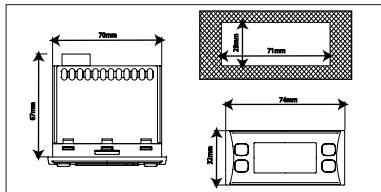
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MECHANICAL ASSEMBLY

The instrument is designed for panel mounting. Make a hole of 29x71 mm, insert the instrument and fix it using the brackets provided. Do not mount the instrument in humid and/or dirty places; it is suitable for use in ordinary polluted places. Ventilate the place in proximity to the instrument cooling slits.



ELECTRICAL WIRING

Attention! Never work on electrical connections when the machine is switched on.

The device is equipped with screw or removable terminals for connecting electric cables with a diameter of 2.5mm² (one wire per terminal for power connections). For the capacity of the terminals, see the label on the instrument.

Relay outputs are voltage-free.

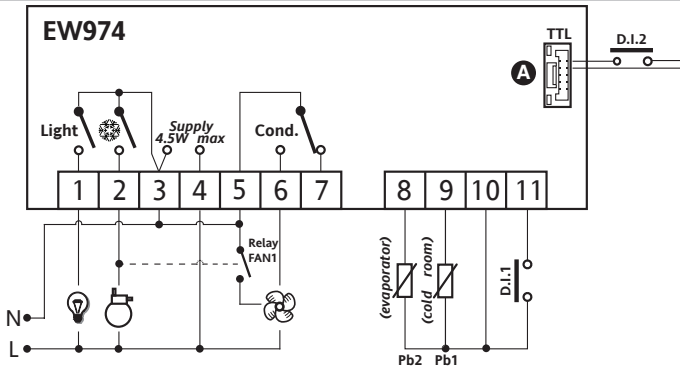
Do not exceed the maximum current allowed; in case of higher loads, use an appropriate contactor.

Make sure the power supply voltage complies with the one required by the instrument.

Probes have no connection polarity and can be extended using a regular bipolar cable (note that the extension of the probes affects the EMC electromagnetic compatibility of the instrument; pay extreme attention to wiring).

Probe cables, power supply cables and the TTL serial cables should be distant from power cables.

CONNECTIONS



MORSETTI

Light

Light relay

N-L

Power supply 230V~



Compressor relay

A

TTL input



Cond.

Condensator fan relay

TECHNICAL DATA (EN 60730-2-9)

Use:	control device (not a security one) to integrate
Mounting:	panel mounting with 71x29 mm (+0.2/-0.1 mm) drilling template.
Control type:	1.B
Pollution rating:	2
Material class:	IIIa
Overvoltage category class:	II
Nominal impulsive voltage:	2500V
Temperature:	Operating: -5 ... +55 °C - Storage: -30 ... +85 °C
Power supply:	230V~ (+10% / -10%) 50/60 Hz
Consumption:	4,5W max
Digital outputs (relé):	please refer to the device label
Fire resistance class:	D
Software class:	A

NOTE: check the power supply specified on the instrument label; for relay and power supply capacities contact the Sales Office.

FURTHER INFORMATION

Input characteristics

Display range:	NTC: -50.0°C ... +110°C; PTC: -55.0°C ... +140°C (on display with 3 digits + sign)
Accuracy:	Better than 0.5% of full-scale +1 digit.
Resolution:	0,1 °C
Buzzer:	YES (it depends from model)
Analogue Input:	2 NTC inputs
Digital Input:	2 voltage-free digital inputs (NOTE: the D.I.2, if active, is connectable on terminals 1 and 2 of TTL connector)

Output Characteristics

1 Fan relay:	N.O. 8(3)A - N.C. 6(3)A max 250V~
1 Compressor relay:	UL60730 2 Hp (12FLA - 72LRA) max 240V~
1 Light relay:	5(2)A max 250V~

Mechanical Characteristics

Housing:	PC+ABS UL94 V-0 resin plastic casing, polycarbonate glass, thermoplastic resin keys
Dimensions:	front 74x32 mm, depth 59 mm (excluding terminals)
Terminals:	screw terminals for cable with a diameter of 2,5mm ²
Connectors:	TTL for connection to Copy Card
Humidity:	Operating / storage: 10...90 % RH (not condensing)

Regulations

Electromagnetic compatibility:	The device complies with 2004/108/EC Directive
Security:	The device complies with 2006/95/EC Directive
Food safety:	The device complies with EN13485 standard as follows: - suitable for storage - climate range A - measurement class 1 with -35°C to 25°C range (*)

(* exclusively using Eliwell NTC probe)

NOTE: The technical data included in this document, related to measurement (range, accuracy, resolution, etc.) refer to the instrument itself, and not to its equipment such as, for example, sensors. This means, for example, that sensor(s) error(s) shall be added to the instrument's one.

KEYS AND LEDs

 UP Press and release Scrolls through menu items Increases values Press for at least 5 secs Activates the Manual Defrost function	eco Reduced SET / Economy ON: energy saving active OFF: otherwise
 DOWN Press and release Scrolls through menu items Decrease values	 Compressor LED ON: compressor active Flashing: delay, protection or blocked start-up OFF: otherwise
 STAND-BY (ESC) Press and release Returns to the previous menu level Confirms parameter value Press for at least 5 secs Activates the Stand-by function (when outside the menus)	 Defrost LED ON: defrost active Flashing: manual or D.I. activation OFF: otherwise
 SET (ENTER) Press and release Display alarms (if active) Opens the "Machine Status" menu Press for at least 5 secs Opens the "Programming" menu Confirms commands	 Condenser Fan LED ON: fans active OFF: otherwise
	 Alarm LED ON: alarm on Flashing: alarm acknowledge OFF: otherwise
NOTE: at the bottom left of the controller a LED is positioned which is not identified by any icon. The LED is ON if the light is turned on, OFF if the light is turned off (see parameter ESt, cases ESt = 1 or 3)	

COPY CARD

The Copy Card is an accessory connected to the TTL serial port used for quick programming of the device parameters (upload and download a parameter map to one or more devices of the same type). Upload (label UL) and copy card formatting (label Fr) operations should be performed as explained below:



To access the 'USER' menu hold down the **set** key for at least 5 seconds. Press the **^** and **v** keys to scroll the parameters until the required function (eg. UL) is displays.

Press the **set** key to execute the upload. If the operation is successful, the display will show 'y', if not it will show 'n'.

Upload (UL) This function uploads the programming parameters from the device.

UPLOAD: Device $\longrightarrow$ Copy Card

Format: (Fr) This command is used to format the copy card, an operation which is necessary when using the card for the first time. **Important:** when the copy card has been programmed, the parameter 'Fr' will delete all data that have been entered. This operation cannot be cancelled.

Download from reset:

Connect the copy card when the device is switched off. When the device is switched on, the download from the copy card will begin automatically. At the end of the lamp test, the display will show 'dLy' if the operation was successful and 'dLn' if not.

DOWNLOAD: Copy Card $\longrightarrow$ Device



NOTES:

- after the parameters have been downloaded, the device uses the downloaded parameter map setting.
- see 'FPr' folder in Parameters Table and Parameters Description.

PASSWORD

The "PA1" password allows to access to the 'USER' menu parameters. In the standard configuration the password is disabled (value = 0). To enable it (value $\neq 0$) enter the 'USER' menu, by pressing the  and  keys, scroll the parameters until 'PS1' label is displayed, press the  key to display the current value, change it by using the  and  keys and then press the  key to save it. If the password is already enabled, you will be required to enter it to access the 'USER' menu. To enter it:



If the password is incorrect, the instruments display the PA1 label and you will have to repeat the entry procedure.

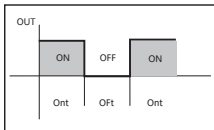
MANUAL DEFROST CYCLE ACTIVATION

To manually activate the defrost cycle, hold down the  key for at least 5 seconds.

If the defrost conditions are not satisfied

- the parameter **OdO** $\neq 0$
 - the evaporator probe Pb2 temperature is higher than the defrost end temperature (**Pb2** > **dSt**)
- the display will flash 3 times, to indicate that the operation will not be carried out.

DUTY CYCLE



The instrument uses the **Ont** and **OFFt** parameters set for Duty Cycle. An error condition on Pb1 (cold room) causes one of the following actions:

- The '**E1**' label is displayed
- The regulator is activated as indicated by parameters **Ont** and **OFFt** if set for Duty Cycle.

Ont	OFFt	Regulator output
0	0	OFF
0	>0	OFF
>0	0	ON
>0	>0	Duty Cycle

Related parameters: **Ont** and **OFFt**.

PRESSURE SWITCH

To connect the pressure switch to the Digital Input 2 (D.I.2) you need to set the parameter H12 = ± 8 (Pressure switch). Whenever the pressure switch input is activated, the compressor will be immediately switched off. The activation number will be saved. If the maximum number of activation (**PEn**) is achieved the compressor, the fans and the defrost will be de-activated. Once an alarm is activated, you have to switch the device off and on or you have to reset the alarm by using the **rAP** function (pressure switch alarm reset) in the 'USER' menu.

Related parameters: **PEn**, **PEi** and **PEt**.

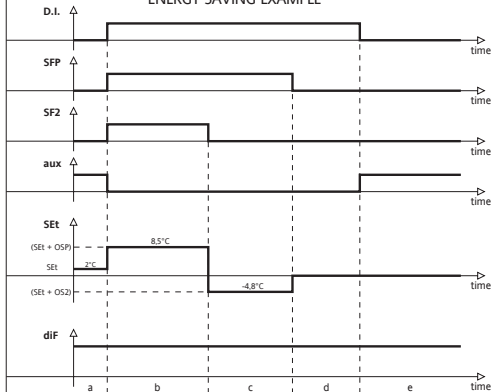
ENERGY SAVING

The Energy Saving function allows a reduction of the electric consumption and costs during the period in which the Bottle-Cooler night blind is closed (at night or during holidays). The functioning type is set by **ESt** parameter and set to add to 'SEt', to 'diF' or to both, the value **OSP/OS2** (for 'SEt') and **OdF/Od2** (for 'diF') for a time **SF2/(SFP-SF2)**.

NOTE: if SFP=0 or SF2=0 the regulation always refers to (SEt+OSP) and (diF+OdF)

If necessary, it is also possible to switch off the light by using the AUX output. Whenever the function is activated, the timers for **SFP** and **SF2** counting are 'reset'. The ECO led stays ON for all the time the Digital Input is active (the night blind of Bottle-Cooler is closed). Below an operating example of the algorithm:

ENERGY SAVING EXAMPLE



VALUE of EXAMPLE

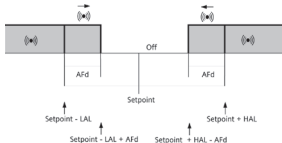
ESt = 1
 SFP = 10 hours
 SF2 = 7 hours
 SEt = 2 °C
 diF = 8 °C
 H11 = 6
 OSP = 6,5 °C
 OS2 = -6,8 °C
 OdF = 0 °C
 Od2 = 0 °C

- | | | | |
|----------------|---------------------|-----------------------|-----------|
| a) D.I. = OFF; | Setpoint = SEt; | hysteresis = diF; | aux = ON |
| b) D.I. = ON; | Setpoint = SEt+OSP; | hysteresis = diF+OdF; | aux = OFF |
| c) D.I. = ON; | Setpoint = SEt+OS2; | hysteresis = diF+Od2; | aux = OFF |
| d) D.I. = ON; | Setpoint = SEt; | hysteresis = diF; | aux = OFF |
| e) D.I. = OFF; | Setpoint = SEt; | hysteresis = diF; | aux = ON |

Related parameters: **ESt**, **SFP**, **SF2**, **SEt**, **diF**, **H11**, **OSP**, **OS2**, **OdF** and **Od2**.

MAX/MIN TEMPERATURE ALARMS

**Relative Temperature
Value to setpoint (Att=1)**



Minimum temperature alarm

$$\text{Temp.} \leq \text{Set} + \text{LAL} *$$

Maximum temperature alarm

Temp. $\geq$ **Set+HAL** **

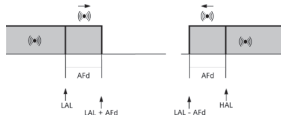
Returning from minimum temp. alarm

$$\text{Temp.} \geq \begin{matrix} \text{Set} + \text{LAL} + \text{AFd} \\ \text{Set} - |\text{LAL}| + \text{AFd} \end{matrix}$$

Returning from maximum temp. alarm

$$\text{Temp.} \leq \text{Set} + \text{HAL} - \text{AFd}$$

**Absolute Temperatura
Value (Att=0)**



Temp. $\leq$ **LAL** (**LAL** with sign)

Temp. $\geq$ HAL (HAL with sign)

$$\text{Temp.} \geq \text{LAL} + \text{AFd}$$
$$\text{Temp.} \leq \text{HAL} - \text{AFd}$$

- * if LAL is negative, $\text{Set} + \text{LAL} < \text{Set}$

**** if HAL is negative, Set + HAL < Set**

Related parameters: **Att**, **AFd**, **HAL**, **LAL**, **PAO**, **dAO**, **OAo** and **tAO**.

ACCESSING AND USING THE MENUS

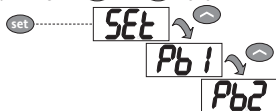
Resources are organised into 2 menus which are accessed as explained below:

- 'MACHINE STATUS' menu: press and release the **set** key.
- 'USER' menu: press for at least 5 secs the **set** key.

Either do not press any keys for 15 seconds (time-out) or press the **ⓘ** key once, to confirm the last value displayed and return to the previous screen.

'MACHINE STATUS' MENU

Access the 'Machine Status' menu by pressing and releasing the **set** key. If no alarms are active, the 'SEt' label appears. By pressing the **⬆** and **⬇** keys you can scroll all folders in the "Machine Status" menu:



- AL: alarms folder (**only visible if an alarm is active**);
- SEt: Set-point setting folder;
- Pb1: probe 1 folder;
- Pb2: probe 2 folder;

Setting the Set-point: To display the Set point value press the **set** key when the 'SEt' label is displayed. The Set point value appears on the display. To change the Set point value, press the **⬆** and **⬇** keys within 15 seconds. Press **set** to confirm the modification.



Displaying the probes: When the Pb1 or Pb2 label is displayed, press **set** and the associated probe value will appear

KEYPAD LOCK

It is possible to disable the keypad on this device.

The keypad can be locked by programming the 'LOC' parameter.

With the keypad locked you can still access the 'Machine Status' menu by pressing **set** to display the Set point and the value read by Pb1 and Pb2 probes, but you cannot edit them.

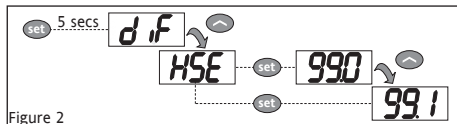
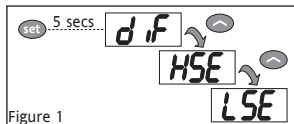
To disable the keypad lock, repeat the locking procedure.

'USER' MENU

To access the 'USER' menu hold down the **set** key for at least 5 seconds.

If enabled, the 'PA1' access PASSWORD will be requested (see 'PASSWORD' paragraph).

Press the **set** key to modify the values. The display will show the first parameter in the menu (e.g.: the 'diF' parameter). By pressing the **↑** and **↓** keys you can scroll all parameters in the 'USER' menu (Figure 1):



Select the desired parameter by using the **↑** and **↓** keys ("HSE" in the example in Figure 2).

Press the **set** key to see the current value of the selected parameter.

Press the **↑** and **↓** keys to change the value and then press the **set** key to save it.

NOTE: It is strongly recommended that you switch the device off and on again each time the parameter configuration is changed, in order to prevent malfunctioning of the configuration and/or ongoing timings.

'USER' MENU PARAMETERS TABLE

PAR.	DESCRIPTION	RANGE	DEFAULT	U.M.
SEt	Temperature SEt-point	LSE ... HSE	2,0	°C/°F
	COMPRESSOR			
diF	differential. Relay compressor tripping differential. The compressor stops on reaching the Setpoint value (as indicated by the adjustment probe), and restarts at temperature value equal to the Setpoint plus the value of the differential. Note: the value 0 cannot be assumed.	0,1 ... 30,0	8,0	°C/°F
HSE	Higher SEt. Maximum possible setpoint value.	LSE ... +302	10,0	°C/°F
LSE	Lower SEt. Minimum possible setpoint value.	-58,0 ... HSE	-5,0	°C/°F
OSP	Offset SetPoint. Temperature Value to be added to SEt for time SF2 . The parameter is used if H11 = 6 (reduced set enabled) and ESt = 1, 3 or 4.	-30,0 ... 30,0	6,5	°C/°F
OS2	Offset SetPoint 2. Temperature Value to be added to SEt for time (SFP - SF2). The parameter is used if H11 = 6 (reduced set enabled) and ESt = 1, 3 or 4.	-30,0 ... 30,0	-6,8	°C/°F
OdF	Offset diFferential. Temperature Value to be added to diF for time SF2 . The parameter is used if H11 = 6 (reduced set enabled) and ESt = 1, 2 or 4.	0,0 ... 30,0	0,0	°C/°F
Od2	Offset diFferential 2. Temperature Value to be added to diF for time (SFP - SF2). The parameter is used if H11 = 6 (reduced set enabled) and ESt = 1, 2 or 4.	0,0 ... 30,0	0,0	°C/°F
dOd	digital (input) Open door. Digital input that allow you to switch off loads. Valid if H11 = ±4 (door switch). n = does not switch off loads; y = switch off loads.	n/y	n	flag
dAd	digital (input) Activation delay. Delay time in activating the Digital Inputs D.I.1 and D.I.2	0 ... 255	0	min
Ont	Compressor activation time in the event of faulty probe. If set to "1" with OFt=0 the compressor always remain on whereas if OFt>0 it operates in duty cycle mode.	0 ... 250	0	min

PAR.	DESCRIPTION	RANGE	DEFAULT	U.M.
Oft	Compressor deactivation time in the event of faulty probe. If set to "1" with Ont=0 the compressor always remain off whereas if Ont>0 it operates in duty cycle mode.	0 ... 250	1	min
dOn	Delay time for compressor relay activation on call.	0 ... 250	10	secs
dOF	Delay after shut-down; between compressor relay shut-down and subsequent start-up the specified time must elapse.	0 ... 250	2	min
dbi	Delay between power-on. Delay between switch-ons; the specified time must elapse between two subsequent switch-ons.	0 ... 250	2	min
OdO (!)	Delay in enabling outputs after start-up of instrument or after a power failure (only for Compressor and Fans). 0 = not active.	0 ... 250	0	min
DEFROST				
dtY	Type of defrosting. 0 = electric defrost - compressor off (OFF) during defrosting 1 = reverse cycle defrost (hot gas); compressor on (ON) during defrosting; 2 = Free defrost; defrosting independently from compressor.	0/1/2	0	num
dit	Period of time elapsing between the start of two defrosts.	0 ... 250	10	hours
dCt	Selection of defrosting time count mode. 0 = compressor operating hours (DIGIFROST® method); Defrost activated ONLY with compressor on; 1 = Real Time - equipment operating hours; counting of the defrost cycle is always activated with the machine on and at every start-up; 2 = compressor stop. Each time the compressor stops a defrosting cycle is performed according to parameter dtY.	0/1/2	1	num

PAR.	DESCRIPTION	RANGE	DEFAULT	U.M.
dOH	Delay time for start up of first defrost on call.	0 ... 59	0	min
dEt	Defrosting time-out; determines maximum duration of defrosting.	1 ... 250	45	min
dSt	Defrost stop temperature (defined by evaporator probe).	-50,0...150,0	7,0	°C/°F
dPO	Determines if at start-up the instrument must start defrosting (if the temperature measured by Pb2 allows this operation). y = yes; n = no.	n/y	y	flag
ALARMS				
Att	Allow you to select if the parameters HAL and LAL will have absolute (Att=0) or relative (Att=1) value.	0/1	1	flag
Afd	Alarm fan diFFerential. Alarm differential.	1,0 ... 50,0	1,0	°C/°F
HAL	Higher ALarm. Maximum temperature alarm. Temperature value (in relative value) which if exceeded in an upward direction triggers the activation of the alarm signal.	LAL...150,0	9,5	°C/°F
LAL	Lower ALarm. Minimum temperature alarm. Temperature value (in relative value), which if exceeded in a downward direction triggers the activation of the alarm signal.	-50,0...HAL	-2,0	°C/°F
PAO	Power-on Alarm Override. Alarm exclusion time after instrument switch on, after a power failure.	0 ... 10	2	hours
DAO	Temperature alarm exclusion time after defrost.	0 ... 999	60	min
OAo	Alarm signal delay after disabling the digital input (door closed). Alarm is intended as high and low temperature alarms.	0 ... 10	0	hours
tdO	time out door Open. Open door alarm activation delay time.	0 ... 250	0	min
tAO	Temperature alarm signal delay time.	0 ... 250	30	min
dAt	defrost Alarm time. Alarm for defrosting ended due to time out. n = alarm deactivated; y = alarm activated.	n/y	n	flag
PRESSURE-SWITCH				
PEn	Number of errors allowed per maximum/minimum pressure switch input. 0= disabled.	0 ... 15	1	num

PAR.	DESCRIPTION	RANGE	DEFAULT	U.M.
PEi	Minimum/maximum pressure switch error count time. ATTENTION: PEi interval is divided into 32 parts and the counter is increased by one unit if one or more interventions occur inside one of part of the whole PEi interval. For example, if PEi = 32', the interval requested for the storage of the interventions will be 1 minute (32/32) and all the interventions occurred within one minute will be counted as one and the possible alarm will be activated when the sampling interval is over.	1 ... 99	1	min
PEt	Compressor activation delay after a pressure switch de-activation	0 ... 255	1	min
DISPLAY				
LOC	Basic Commands edit lock. However, you can enter parameter programming modify them along with the status of this parameter in order to allow unlocking. y = yes; n = no.	n/y	n	flag
PS1	PAssword 1. When enabled (value $\neq$ 0) it constitutes the access key for the 'USER' menu parameters.	0 ... 250	0	num
ndt	Display with decimal point. y = yes; n = no.	n/y	y	flag
CA1	CALibration 1. Positive or negative temperature value added to the value read by probe Pb1.	-12,0...+12,0	0,0	°C/°F
CA2	CALibration 2. Positive or negative temperature value added to the value read by probe Pb2.	-12,0...+12,0	0,0	°C/°F
ddl	Visualization mode during defrosting. 0 = display the temperature read by the cold room probe (Pb1); 1 = locks the reading on the temperature value read by room probe when defrosting starts, and until the next time the Setpoint value is reached; 2 = displays the label 'dEF' during defrosting, and until the next time the Set-point value is reached.	0/1/2	0	num

PAR.	DESCRIPTION	RANGE	DEFAULT	U.M.
dro	Select if the temperatures read by Pb1 and Pb2 have to be display as °C or °F. (0=°C,1=°F). NOTE: the switch between °C and °F or vice versa DO NOT modify setpoint, differential, etc. (for example set=10°C become 10°F)	0/1	0	flag
ddd	Selection of type of value to be displayed. 0 = Setpoint; 1 = cold room probe (Pb1); 2 = evaporator probe (Pb2).	0 ... 255	1	min
CONFIGURATION				
H06	key/input aux/door switch light active when instrument is OFF (but supplied)	n/y	y	flag
H08	Stand-by operating mode. 0 = display switch off; 1 = display switch off, loads and alarms stopped; 2 = display with OFF label, loads and alarms stopped.	0/1/2	2	num
H11	Configuration of Digital Inputs/Polarity (D.I.1). 0 = disabled; ±1 = defrosting; ±2 = reduced set; ±3 = AUX; ±4 = door microswitch; ±5 = external alarm; ±6 = Energy Saving; ±7 = Stand-by (ON-OFF); ±8 = Pressure switch. PLEASE NOTE!: - The '+' sign indicates that the input is activated when the contact is closed - The '-' sign indicates that the input is activated when the contact is open.	-8 ... 8	6	num
H12	Configuration of Digital Inputs/Polarity (D.I.2). Analogue to H11	-8 ... 8	8	num
H42	Evaporator probe present. n = not present; y = present.	n/y	y	flag
rel	Evaporator probe present. n = not present; y = present.	/	/	/
tab	Evaporator probe present. n = not present; y = present.	/	/	/

PAR.	DESCRIPTION	RANGE	DEFAULT	U.M.
	ENERGY SAVING			
ES _t	Energy Saving type. Energy saving operating mode. 0 = disabled; 1 = add the offsets to SE_t and diF and switch off the light (AUX); 2 = add the offsets to diF ; 3 = add the offsets to SE_t and switch off the light (AUX); 4 = add the offsets to SE_t and diF .	0 ... 4	1	num
SFP	Safe Function Protection1. Depending on the ES_t value, the following values will be added or not to SE_t and diF respectively: 1) Initial period SF2 : values OSP and OdF , 2) Period (SFP-SF2) : values OS2 and Od2 . NOTE: if SFP=0 or SF2=0 the regulation always refers to: (SE_t+OSP) and (diF+OdF)	0 ... 24	10	hours
SF2	Safe Function Protection2. Period during which, depending on the ES_t value, the OSP and OdF values will be added or not to SE_t and diF respectively. NOTE: if SFP=0 or SF2=0 the regulation always refers to: (SE_t+OSP) and (diF+OdF)	0 ... 24	7	hours
	FUNCTIONS			
rAP	Reset pressure switch alarm. By pressing the  key corresponding to this label, the pressure switch PAL alarm manual reset will be executed.	/	/	/
	COPY CARD			
UL	Upload. Transfer of programming parameters from instrument to Copy Card.	/	/	/
Fr	Formatting. Deletes all data on Copy Card	/	/	/

DIAGNOSTICS

Alarms are always indicated by the buzzer (if present) and the alarm icon (🔊).

To switch off the buzzer, press and release any key, the relative icon will continue to flash.

NOTES: If alarm exclusion times have been set (see 'AL' folder in the parameters table) the alarm will not be signalled.

A probe 1 (Pb1) malfunction alarm will appear directly on the display with the indication E1.

E1

A probe 2 (Pb2) malfunction alarm will appear directly on the display with the indication E2.

E2

ALARMS

Label	Fault	Cause	Effects	Remedy
E1	Probe1 faulty (cold room)	• reading of out of range operating values • probe faulty / short-circuited / open	• Display label E1 • Alarm icon permanently ON • Min/max alarm regulator disabled • Compressor operation according to 'Ont' and 'Oft' parameters.	• check that the probe is a NTC probe • check the probe wiring • replace probe
E2	Probe2 faulty (defrost)	• reading of out of range operating values • probe faulty / short-circuited / open	• Display label E2 • Alarm icon permanently ON • The defrost cycle will end due to Time-out (Parameter "dEt")	• check that the probe is a NTC probe • check the probe wiring • replace probe
AH1	Probe1 HIGH Temperature alarm	• value read by Pb1 $\geq$ SEt+HAL after time of 'tAO' (if HAL > 0) (see MAX/MIN TEMPERATURE ALARMS)	• Recording of AH1 label in AL folder • No effect on regulation	• Wait until temperature value read by probe 1 returns below: Pb1 $\leq$ SEt + HAL - AFd.

Label	Fault	Cause	Effects	Remedy
AL1	Probe1 LOW Temperature alarm	• value read by Pb1 $\leq$ SEt+LAL after time of 'tAO' (if LAL < 0) (see MAX/MIN TEMPERATURE ALARMS)	• Recording of AL1 label in AL folder • No effect on regulation	• Wait until temperature value read by probe 1 returns above: Pb1 $\geq$ SEt + HAL + AFd.
EA	External alarm	• Digital input activation (H11 set as external alarm)	• Recording of EA label in AL folder • Alarm icon permanently on • Regulation blocked if EAL = y	• to check and to remove the external cause which generate alarm on D.I.
Opd	Door Open alarm	• attivazione dell'ingresso digitale (H11 set as door switch) (for a longer time than td0)	• Recording of Opd label in AL folder • Alarm icon permanently on • Regulation blocked if dOd = y	• close the door • delay function defined by OAO
Ad2	Defrosting for time-out	• end of defrosting because of time instead of because of reaching the defrost end temperature detected by the Pb2 probe.	• Recording of Ad2 label in AL folder • Alarm icon permanently on	• wait until the next defrost for automatic return
nPA	General Pressure switch alarm	Activation of pressure alarm by general pressure switch.	If the number N of pressur switch activation is N < PEn : • recording of nPA folder in AL folder with the number of pressure switch activation • Regulation blocked (Compressor & Fans)	• to check and to remove the cause which generate alarm on D.I. (Automatic reset)
PAL	General Pressure switch alarm	Activation of pressure alarm by general pressure switch.	If the number N of pressur switch activation is N = PEn : • Display label PAL • Recording of PA label in AL folder delete of nPA folder from AL folder • Alarm icon permanently on • Regulation blocked (Compressor & Fans)	• Switch the device off and on again • Reset alarms by entering in functions folder and press rPA function (Manual reset)



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