

## Digital controller for medium-low temperature refrigeration applications XR75CX

### 1. GENERAL WARNING

#### 1.1 PLEASE READ BEFORE USING THIS MANUAL

- This manual is part of the product and should be kept near the instrument for easy and quick reference.
- The instrument shall not be used for purposes different from those described hereunder. It cannot be used as a safety device.
- Check the application limits before proceeding.

#### 1.2 SAFETY PRECAUTIONS

- Check the supply voltage is correct before connecting the instrument.
- Do not expose to water or moisture: use the controller only within the operating limits avoiding sudden temperature changes with high atmospheric humidity to prevent formation of condensation
- Warning: disconnect all electrical connections before any kind of maintenance.
- Fit the probe where it is not accessible by the End User. The instrument must not be opened.
- In case of failure or faulty operation send the instrument back to the distributor or to "Dixell S.p.A." (see address) with a detailed description of the fault.
- Consider the maximum current which can be applied to each relay (see Technical Data).
- Ensure that the wires for probes, loads and the power supply are separated and far enough from each other, without crossing or intertwining.
- In case of applications in industrial environments, the use of mains filters (our mod. FT1) in parallel with inductive loads could be useful.

### 2. GENERAL DESCRIPTION

Model XR75CX, format 32 x 74 mm, is microprocessor based controller, suitable for applications on medium or low temperature ventilated refrigerating units. It has 4 relay outputs to control compressor, fan, defrost, which can be either electrical or reverse cycle (hot gas) and light (configurable). It is also provided with two NTC or PTC probe inputs, the first one for temperature control, the second one, to be located onto the evaporator, to control the defrost termination temperature and to managed the fan. The fourth probe is used to signal the condenser temperature alarm or to display a temperature.

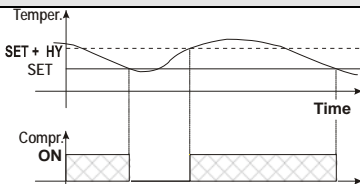
The RS485 serial output allows to connect the unit to a network line ModBUS-RTU compatible such as the dixell monitoring units of X-WEB family. The HOT key receptacle allows to program the controller by means the HOT KEY programming keyboard.

The instrument is fully configurable through special parameters that can be easily programmed through the keyboard.

### 3. CONTROLLING LOADS

#### 3.1 COMPRESSOR

The regulation is performed according to the temperature measured by the thermostat probe with a positive differential from the set point: if the temperature increases and reaches set point plus differential the compressor is started and then turned off when the temperature reaches the set point value again.



In case of fault in the thermostat probe the start and stop of the compressor are timed through parameters "CO<sub>n</sub>" and "CO<sub>F</sub>".

#### 3.2 2<sup>ND</sup> COMPRESSOR MANAGEMENT – XR72C ONLY

The relay of the second compressor is activated in parallel with the relay of the first compressor, with a possible delay set in the AC1 parameter. Both the compressors are switched off at the same time.

#### 3.3 DEFROST

Two defrost modes are available through the "tdF" parameter: defrost through electrical heater (tdF = EL) and hot gas defrost (tdF = in).

The functioning of the defrost relay depends on the oA1 parameter:

with oA1 (1-7/8) or oA2 (1-2) = dEF : the defrost relay will remain on only for the defrost time (MdF)

with oA1 (1-7/8) or oA2 (1-2) = HEt and tdF = in

the defrost relay will remain on for:

- Stc time (pre defrost)
- MdF time (defrost)
- Fdt time (dripping).

Other parameters are used to control the interval between defrost cycles (ldF), its maximum length (MdF) and two defrost modes: timed or controlled by the evaporator's probe (P2P).

At the end of defrost dripping time is started, its length is set in the Fdt parameter. With FSt = 0 the dripping time is disabled

#### 3.4 CONTROL OF EVAPORATOR FANS

The fan control mode is selected by means of the "FnC" parameter:

FnC = C\_n: fans will switch ON and OFF with the compressor and not run during defrost;

FnC = o\_n fans will run even if the compressor is off, and not run during defrost;

After defrost, there is a timed fan delay allowing for drip time, set by means of the "Fnd" parameter.

FnC = C\_Y fans will switch ON and OFF with the compressor and run during defrost;

FnC = o\_Y fans will run continuously also during defrost

An additional parameter "FSI" provides the setting of temperature, detected by the evaporator probe, above which the fans are always OFF. This is used to make sure circulation of air only if his temperature is lower than set in "FSI".

#### 3.4.1 Forced activation of fans

This function managed by the Fct parameter is designed to avoid short cycles of fans, that could happen when the controller is switched on or after a defrost, when the room air warms the evaporator. Functioning: if the difference of temperature between the evaporator and the room probes is more than the value of the Fct parameter, the fans are switched on. With Fct=0 the function is disabled.

#### 3.4.2 Cyclical activation of the fans with compressor off.

When Fnc = c-n or c-Y (fans in parallel to the compressor), by means of the Fon and FoF parameters the fans can carry out on and off cycles even if the compressor is switched off. When the compressor is stopped the fans go on working for the Fon time. With Fon = 0 the fans remain always off, when the compressor is off.

### 4. FRONT PANEL COMMANDS



**SET** : To display target set point; in programming mode it selects a parameter or confirm an operation.

(DEF) To start a manual defrost

(UP) : To see the max. stored temperature; in programming mode it browses the parameter codes or increases the displayed value.

(DOWN) To see the min stored temperature; in programming mode it browses the parameter codes or decreases the displayed value.

To switch the instrument off, if onF = oFF.

To switch the light, if oA3 = Lig.

#### KEY COMBINATIONS:

+ + + # To lock & unlock the keyboard.

**SET** + To enter in programming mode.

**SET** + + To return to the room temperature display.

#### 4.1 USE OF LEDS

Each LED function is described in the following table.

LED	MODE	FUNCTION
	ON	Compressor enabled
	Flashing	Anti-short cycle delay enabled
	ON	Defrost enabled
	Flashing	Drip time in progress
	ON	Fans enabled
	Flashing	Fans delay after defrost in progress.
	ON	An alarm is occurring
	ON	Continuous cycle is running
	ON	Energy saving enabled
	ON	Light on
<b>FLX</b>	ON	Auxiliary relay on
°C/°F	ON	Measurement unit
°C/°F	Flashing	Programming phase

### 5. MAX & MIN TEMPERATURE MEMORIZATION

#### 5.1 HOW TO SEE THE MIN TEMPERATURE

1. Press and release the key.
2. The "Lo" message will be displayed followed by the minimum temperature recorded.
3. By pressing the key again or by waiting 5s the normal display will be restored.

#### 5.2 HOW TO SEE THE MAX TEMPERATURE

1. Press and release the key.
2. The "Hi" message will be displayed followed by the maximum temperature recorded.
3. By pressing the key again or by waiting 5s the normal display will be restored.

#### 5.3 HOW TO RESET THE MAX AND MIN TEMPERATURE RECORDED

1. Hold press the SET key for more than 3s, while the max. or min temperature is displayed. (rSt message will be displayed)
2. To confirm the operation the "rSt" message starts blinking and the normal temperature will be displayed.

## 6. MAIN FUNCTIONS

### 6.1 TO SET THE CURRENT TIME AND DAY (ONLY FOR INSTRUMENTS WITH RTC)

When the instrument is switched on, it's necessary to program the time and day.

1. Enter the Pr1 programming menu, by pushing the SET +  $\blacktriangledown$  keys for 3s.
2. The rtc parameter is displayed. Push the SET key to enter the real time clock menu.
3. The Hur (hour) parameter is displayed.
4. Push the SET and set current hour by the UP and Down keys, then push SET to confirm the value..
5. Repeat the same operations on the Min (minutes) and dAy (day) parameters.

To exit: Push SET+UP keys or wait for 15 sec without pushing any keys.

### 6.2 HOW TO SEE THE SET POINT



1. Push and immediately release the SET key: the display will show the Set point value;
2. Push and immediately release the SET key or wait for 5 seconds to display the probe value again.

### 6.3 HOW TO CHANGE THE SET POINT

1. Push the SET key for more than 2 seconds to change the Set point value;
2. The value of the set point will be displayed and the "°C" or "°F" LED starts blinking;
3. To change the Set value push the  $\blacktriangle$  or  $\blacktriangledown$  arrows within 10s.
4. To memorise the new set point value push the SET key again or wait 10s.

### 6.4 HOW TO START A MANUAL DEFROST



Push the DEF key for more than 2 seconds and a manual defrost will start.

### 6.5 HOW TO CHANGE A PARAMETER VALUE

To change the parameter's value operate as follows:

1. Enter the Programming mode by pressing the Set +  $\blacktriangledown$  keys for 3s (the "°C" or "°F" LED starts blinking).
2. Select the required parameter. Press the "SET" key to display its value
3. Use "UP" or "DOWN" to change its value.
4. Press "SET" to store the new value and move to the following parameter.

To exit: Press SET + UP or wait 15s without pressing a key.

NOTE: the set value is stored even when the procedure is exited by waiting the time-out to expire.

### 6.6 THE HIDDEN MENU

The hidden menu Includes all the parameters of the instrument.

#### 6.6.1 HOW TO ENTER THE HIDDEN MENU

1. Enter the Programming mode by pressing the Set +  $\blacktriangledown$  keys for 3s (the "°C" or "°F" LED starts blinking).
2. Released the keys, then push again the Set+  $\blacktriangledown$  keys for more than 7s. The Pr2 label will be displayed immediately followed from the HY parameter.  
NOW YOU ARE IN THE HIDDEN MENU.
3. Select the required parameter.
4. Press the "SET" key to display its value
5. Use  $\blacktriangle$  or  $\blacktriangledown$  to change its value.
6. Press "SET" to store the new value and move to the following parameter.

To exit: Press SET +  $\blacktriangle$  or wait 15s without pressing a key.

NOTE1: if none parameter is present in Pr1, after 3s the "noP" message is displayed. Keep the keys pushed till the Pr2 message is displayed.

NOTE2: the set value is stored even when the procedure is exited by waiting the time-out to expire.

#### 6.6.2 HOW TO MOVE A PARAMETER FROM THE HIDDEN MENU TO THE FIRST LEVEL AND VICEVERSA.

Each parameter present in the HIDDEN MENU can be removed or put into "THE FIRST LEVEL" (user level) by pressing "SET +  $\blacktriangledown$ ".

In HIDDEN MENU when a parameter is present in First Level the decimal point is on.

### 6.7 HOW TO LOCK THE KEYBOARD

1. Keep pressed for more than 3 s the UP + DOWN keys.
2. The "POF" message will be displayed and the keyboard will be locked. At this point it will be possible only to see the set point or the MAX o Min temperature stored
3. If a key is pressed more than 3s the "POF" message will be displayed.

### 6.8 TO UNLOCK THE KEYBOARD

Keep pressed together for more than 3s the  $\blacktriangle$  and  $\blacktriangledown$  keys, till the "Pon" message will be displayed.

### 6.9 THE CONTINUOUS CYCLE

When defrost is not in progress, it can be activated by holding the " $\blacktriangle$ " key pressed for about 3 seconds. The compressor operates to maintain the "ccS" set point for the time set through the "CCt" parameter. The cycle can be terminated before the end of the set time using the same activation key " $\blacktriangle$ " for 3 seconds.

### 6.10 THE ON/OFF FUNCTION



With "onF = oFF", pushing the ON/OFF key, the instrument is switched off. The "oFF" message is displayed. In this configuration, the regulation is disabled.

To switch the instrument on, push again the ON/OFF key.

WARNING: Loads connected to the normally closed contacts of the relays are always supplied and under voltage, even if the instrument is in stand by mode.

## 7. PARAMETERS

### REGULATION

Hy Differential:  $(0,1 \pm 25,5^{\circ}\text{C} / 1+255^{\circ}\text{F})$  Intervention differential for set point. Compressor Cut IN is Set Point + differential (Hy). Compressor Cut OUT is when the temperature reaches the set point.

LS Minimum set point:  $(-100^{\circ}\text{C}+\text{SET}/148^{\circ}\text{F}+\text{SET})$ : Sets the minimum value for the set point.

US Maximum set point:  $(\text{SET}+110^{\circ}\text{C}/\text{SET}+230^{\circ}\text{F})$ . Set the maximum value for set point.

Ot Thermostat probe calibration:  $(-12,0\pm 12,0^{\circ}\text{C}; -120\pm 120^{\circ}\text{F})$  allows to adjust possible offset of the thermostat probe.

P2P Evaporator probe presence: n= not present: the defrost stops by time; y= present: the defrost stops by temperature.

OE Evaporator probe calibration:  $(-12,0\pm 12,0^{\circ}\text{C}; -120\pm 120^{\circ}\text{F})$ . allows to adjust possible offset of the evaporator probe.

Ods Outputs activation delay at start up:  $(0+255\text{min})$  This function is enabled at the initial start up of the instrument and inhibits any output activation for the period of time set in the parameter.

AC Anti-short cycle delay:  $(0+50\text{ min})$  minimum interval between the compressor stop and the following restart.

AC1 2<sup>nd</sup> compressor delay at start up  $(0+255\text{s})$  Time interval between the switching on of the first compressor and the second one.

CCt Compressor ON time during continuous cycle:  $(0,0+24,0\text{h}; \text{res. } 10\text{min})$  Allows to set the length of the continuous cycle: compressor stays on without interruption for the CCt time. Can be used, for instance, when the room is filled with new products.

CCS Set point for continuous cycle:  $(-100\pm 150^{\circ}\text{C})$  it sets the set point used during the continuous cycle.

CO<sub>n</sub> Compressor ON time with faulty probe:  $(0+255\text{ min})$  time during which the compressor is active in case of faulty thermostat probe. With CO<sub>n</sub>=0 compressor is always OFF.

COF Compressor OFF time with faulty probe:  $(0+255\text{ min})$  time during which the compressor is OFF in case of faulty thermostat probe. With COF=0 compressor is always active.

### DISPLAY

CF Temperature measurement unit: °C=Celsius; °F=Fahrenheit. WARNING: When the measurement unit is changed the SET point and the values of the parameters Hy, LS, US, Ot, ALU and ALL have to be checked and modified if necessary).

rES Resolution (for °C):  $(\text{in} = 1^{\circ}\text{C}; \text{dE} = 0,1^{\circ}\text{C})$  allows decimal point display.

Lod Instrument display: (P1; P2, P3, P4, SET, dtr): it selects which probe is displayed by the instrument: P1 = Thermostat probe; P2 = Evaporator probe; P3 = Third probe(only for model with this option enabled); P4 = Fourth probe, SET = set point; dtr = percentage of visualization.

### DEFROST

tdF Defrost type: EL = electrical heater; in = hot gas

dtE Defrost termination temperature:  $(-50+50^{\circ}\text{C} / -58+122^{\circ}\text{F})$  (Enabled only when EdF=Pb) sets the temperature measured by the evaporator probe, which causes the end of defrost.

ldF Interval between defrost cycles:  $(0+120\text{h})$  Determines the time interval between the beginning of two defrost cycles.

MdF (Maximum) length for defrost:  $(0+255\text{min})$  When P2P = n, (not evaporator probe: timed defrost) it sets the defrost duration, when P2P = y (defrost end based on temperature) it sets the maximum length for defrost.

dSd Start defrost delay:  $(0+99\text{min})$  This is useful when different defrost start times are necessary to avoid overloading the plant.

Stc Stc Pre defrost time (only for hot gas defrost)  $(0+15\text{min}; \text{with } 0\text{ function disabled})$  With tdF =in (hot gas defrost) the dripping heater are activated for this time with the compressor off, before a defrost

dFd Temperature displayed during defrost:  $(\text{rt} = \text{real temperature}; \text{it} = \text{temperature at defrost start}; \text{SEt} = \text{set point}; \text{dEF} = \text{"dEF" label})$

dAd MAX display delay after defrost:  $(0+255\text{min})$ . Sets the maximum time between the end of defrost and the restarting of the real room temperature display.

Fdt Drip time:  $(0+120\text{ min})$  time interval between reaching defrost termination temperature and the restoring of the control's normal operation. This time allows the evaporator to eliminate water drops that might have formed due to defrost.

dPo First defrost after start-up:  $(\text{y} = \text{immediately}; \text{n} = \text{after the ldF time})$

dAF Defrost delay after continuous cycle:  $(0+23,5\text{h})$  time interval between the end of the fast freezing cycle and the following defrost related to it.

### FANS

Fnc Fans operating mode: C=n= runs with the compressor, OFF during defrost;

o-n = continuous mode, OFF during defrost;

C-Y = runs with the compressor, ON during defrost;

o-Y = continuous mode, ON during defrost;

Fnd Fans delay after defrost:  $(0+255\text{min})$  Interval between end of defrost and evaporator fans start

Fct Temperature differential avoiding short cycles of fans  $(0+59^{\circ}\text{C}; \text{Fct}=0\text{ function disabled})$ . If the difference of temperature between the evaporator and the room probes is more than the value of the Fct parameter, the fans are switched on.

FSt Fans stop temperature:  $(-50+50^{\circ}\text{C}/122^{\circ}\text{F})$  setting of temperature, detected by evaporator probe, above which fans are always OFF.

Fon Fan ON time:  $(0+15\text{ min})$  with Fnc = C\_n or C\_y, (fan activated in parallel with compressor). it sets the evaporator fan ON cycling time when the compressor is off. With Fon =0 and FoF  $\neq$  0 the fan are always off, with Fon=0 and FoF =0 the fan are always off.

FoF Fan OFF time:  $(0+15\text{ min})$  with Fnc = C\_n or C\_y, (fan activated in parallel with compressor). it sets the evaporator fan off cycling time when the compressor is off. With Fon =0 and FoF  $\neq$  0 the fan are always off, with Fon=0 and FoF =0 the fan are always off.

### ALARMS

ALC Temperature alarms configuration: (Ab; rE)

Ab= absolute temperature: alarm temperature is given by the ALL or ALU values. rE = temperature alarms are referred to the set point. Temperature alarm is enabled when the temperature exceeds the "SET+ALU" or "SET-ALL" values.

ALU MAXIMUM temperature alarm:  $(\text{SET}+150^{\circ}\text{C}; \text{SET}+302^{\circ}\text{F})$  when this temperature is reached the alarm is enabled, after the "ALd" delay time.

ALL Minimum temperature alarm:  $(-100 \pm \text{SET } ^{\circ}\text{C}; -148\pm 230^{\circ}\text{F})$  when this temperature is reached the alarm is enabled, after the "ALd" delay time.

- AFH Differential for temperature alarm/ fan recovery: (0,1+25,5°C; 1+45°F) Intervention differential for recovery of temperature alarm. It's also used for the restart of the fan when the FSt temperature is reached
- ALd Temperature alarm delay: (0+255 min) time interval between the detection of an alarm condition and alarm signalling.
- daO Exclusion of temperature alarm at start-up: (from 0.0 min to 23.5h) time interval between the detection of the temperature alarm condition after instrument power on and alarm signalling.

**AUXILIARY RELAYS**

- oA1 Relay configuration (1-7/8): dEF: defrost; FAN: fan. ALr: alarm; Lig: light; AuS: Auxiliary relay; onF: always on with instrument on; db= neutral zone; cP2 = compressor 2!; dEF2: do not select it!; HEt.: drip heater
- oA3 Relay configuration (1-2): dEF: defrost; FAN: fan. ALr: alarm; Lig: light; AuS: Auxiliary relay; onF: always on with instrument on; db= neutral zone; cP2 = compressor 2!; dEF2: do not select it!; HEt.: drip heater

**DIGITAL INPUT**

- i1P Digital input polarity: oP: the digital input is activated by opening the contact; CL: the digital input is activated by closing the contact.
- i1F Digital input configuration:; EAL= external alarm: "EA" message is displayed; bAL= serious alarm "CA" message is displayed. PAL= pressure switch alarm, "CA" message is displayed; dor= door switch function; dEF= activation of a defrost cycle; ES = energy saving; AUS=auxiliary relay activation with 0A3 = AUS; Htr= kind of action inversion (cooling – heating);
- did (0+255 min) with i1F= EAL or i1F = bAL digital input alarm delay: delay between the detection of the external alarm condition and its signalling.  
with i1F= PAL: time for pressure switch function: time interval to calculate the number of the pressure switch activation.
- nPS Pressure switch number: (0 ÷15) Number of activation of the pressure switch, during the "did" interval, before signalling the alarm event (i2F= PAL).  
If the nPS activation in the did time is reached, switch off and on the instrument to restart normal regulation.
- odc Compressor and fan status when open door: no = normal; Fan = Fan OFF; CP1 = Compressor OFF; F\_C = Compressor and fan OFF.
- rrd Outputs restart after doA alarm: no= outputs not affected by the doA alarm; yES = outputs restart with the doA alarm.
- HES Temperature increase during the Energy Saving cycle:  
(-30,0°C+30,0°C) it sets the increasing value of the set point during the Energy Saving cycle.

**OTHER**

- Adr Serial address (1+244): Identifies the instrument address when connected to a ModBUS compatible monitoring system.
- PbC Type of probe: it allows to set the kind of probe used by the instrument: Pt1 = Pt1000 probe, ntc = NTC probe.
- dP1 Thermostat probe display
- dP2 Evaporator probe display
- rEL Software release for internal use.
- Ptb Parameter table code: readable only.

**8. DIGITAL INPUT**

The free voltage digital input is programmable in different configurations by the "i1F" parameter.

**8.1 DOOR SWITCH INPUT (i1F = dor)**

It signals the door status and the corresponding relay output status through the "odc" parameter: no = normal (any change); Fan = Fan OFF; CP1 = Compressor OFF; F\_C = Compressor and fan OFF. Since the door is opened, after the delay time set through parameter "did", the door alarm is enabled, the display shows the message "dA" and the regulation restarts is rtr = yES. The alarm stops as soon as the external digital input is disabled again. With the door open, the high and low temperature alarms are disabled.

**8.2 GENERIC ALARM (i1F = EAL)**

As soon as the digital input is activated the unit will wait for "did" time delay before signalling the "EAL" alarm message. The outputs status don't change. The alarm stops just after the digital input is de-activated.

**8.3 SERIOUS ALARM MODE (i1F = bAL)**

When the digital input is activated, the unit will wait for "did" delay before signalling the "CA" alarm message. The relay outputs are switched OFF. The alarm will stop as soon as the digital input is de-activated.

**8.4 PRESSURE SWITCH (i1F = PAL)**

If during the interval time set by "did" parameter, the pressure switch has reached the number of activation of the "nPS" parameter, the "CA" pressure alarm message will be displayed. The compressor and the regulation are stopped. When the digital input is ON the compressor is always OFF. If the nPS activation in the did time is reached, switch off and on the instrument to restart normal regulation.

**8.5 START DEFROST (i1F = dFr)**

It starts a defrost if there are the right conditions. After the defrost is finished, the normal regulation will restart only if the digital input is disabled otherwise the instrument will wait until the "MdF" safety time is expired.

**8.6 INVERSION OF THE KIND OF ACTION: HEATING-COOLING (i1F = Htr)**

This function allows to invert the regulation of the controller: from cooling to heating and viceversa.

**8.7 ENERGY SAVING (i1F = ES)**

The Energy Saving function allows to change the set point value as the result of the SET+ HES (parameter) sum. This function is enabled until the digital input is activated.

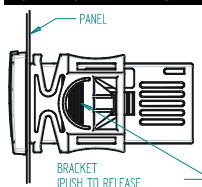
**8.8 DIGITAL INPUTS POLARITY**

The digital input polarity depends on the "i1P" parameter.  
i1P=CL: the input is activated by closing the contact.  
i1P=OP: the input is activated by opening the contact

**9. RS485 SERIAL LINE – FOR MONITORING SYSTEMS**

The RS485 serial line, allows to connect the instrument to a monitoring system ModBUS-RTU compatible such as the X-WEB500/3000/300.

**10. INSTALLATION AND MOUNTING**



Instrument XR75CX shall be mounted on vertical panel, in a 29x71 mm hole, and fixed using the special bracket supplied. The temperature range allowed for correct operation is 0÷60 °C. Avoid places subject to strong vibrations, corrosive gases, excessive dirt or humidity. The same recommendations apply to probes. Let air circulate by the cooling holes.

**11. ELECTRICAL CONNECTIONS**

The instrument is provided with screw terminal block to connect cables with a cross section up to 2,5 mm<sup>2</sup>. Before connecting cables make sure the power supply complies with the instrument's requirements. Separate the probe cables from the power supply cables, from the outputs and the power connections. Do not exceed the maximum current allowed on each relay, in case of heavier loads use a suitable external relay.

**11.1 PROBE CONNECTION**

The probes shall be mounted with the bulb upwards to prevent damages due to casual liquid infiltration. It is recommended to place the thermostat probe away from air streams to correctly measure the average room temperature. Place the defrost termination probe among the evaporator fins in the coldest place, where most ice is formed, far from heaters or from the warmest place during defrost, to prevent premature defrost termination.

**12. HOW TO USE THE HOT KEY**

**12.1 HOW TO PROGRAM A HOT KEY FROM THE INSTRUMENT (UPLOAD)**

1. Program one controller with the front keypad.
2. When the controller is ON, insert the "Hot key" and push ▲ key; the "uPL" message appears followed a by flashing "End"
3. Push "SET" key and the End will stop flashing.
4. Turn OFF the instrument remove the "Hot Key", then turn it ON again.

NOTE: the "Err" message is displayed for failed programming. In this case push again ▲ key if you want to restart the upload again or remove the "Hot key" to abort the operation.

**12.2 HOW TO PROGRAM AN INSTRUMENT USING A HOT KEY (DOWNLOAD)**

1. Turn OFF the instrument.
2. Insert a programmed "Hot Key" into the 5 PIN receptacle and then turn the Controller ON.
3. Automatically the parameter list of the "Hot Key" is downloaded into the Controller memory, the "doL" message is blinking followed a by flashing "End".
4. After 10 seconds the instrument will restart working with the new parameters.
5. Remove the "Hot Key"..

NOTE the message "Err" is displayed for failed programming. In this case turn the unit off and then on if you want to restart the download again or remove the "Hot key" to abort the operation.

**13. ALARM SIGNALS**

Message	Cause	Outputs
"P1"	Room probe failure	Compressor output acc. to par. "Con" and "COF"
"P2"	Evaporator probe failure	Defrost end is timed
"HA"	Maximum temperature alarm	Outputs unchanged.
"LA"	Minimum temperature alarm	Outputs unchanged.
"dA"	Door open	Compressor and fans restarts
"EA"	External alarm	Output unchanged.
"CA"	Serious external alarm (i1F=bAL)	All outputs OFF.
"CA"	Pressure switch alarm (i1F=PAL)	All outputs OFF

**13.1 ALARM RECOVERY**

Probe alarms P1", "P2" start some seconds after the fault in the related probe; they automatically stop some seconds after the probe restarts normal operation. Check connections before replacing the probe.

Temperature alarms "HA", "LA" automatically stop as soon as the temperature returns to normal values.

Alarms "EA" and "CA" (with i1F=bAL) recover as soon as the digital input is disabled.

Alarm "CA" (with i1F=PAL) recovers only by switching off and on the instrument.

**13.2 OTHER MESSAGES**

Pon	Keyboard unlocked.
PoF	Keyboard locked
noP	In programming mode: none parameter is present in Pr1 On the display or in dP2, dP3, dP4: the selected probe is nor enabled

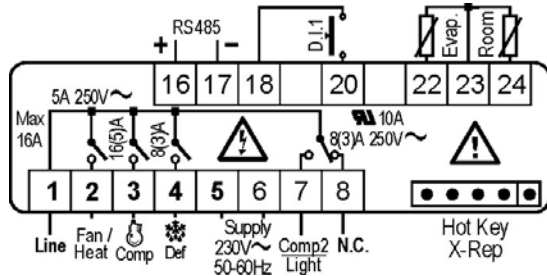
**14. TECHNICAL DATA**

Housing: self extinguishing ABS.  
Case: frontal 32x74 mm; depth 60mm;  
Mounting: panel mounting in a 71x29mm panel cut-out  
Protection: IP20; Frontal protection: IP65  
Connections: Screw terminal block ≤ 2,5 mm<sup>2</sup> wiring.  
Power supply: according to the model 24Vac, ±10%; 230Vac ±10%, 50/60Hz, 110Vac ±10%, 50/60Hz  
Power absorption: 3VA max

Display: 3 digits, red LED, 14,2 mm high; Inputs: Up to 4 NTC or PT1000 probes.  
 Digital inputs: free voltage contact  
 Relay outputs: compressor SPST 8(3) A, 250Vac or SPST 16A 250Vac  
 defrost: SPDT 8(3) A, 250Vac  
 fan: SPST 5A, 250Vac  
 aux: SPDT 8(3) A, 250Vac or SPST 16(6)A 250Vac  
 Data storing: on the non-volatile memory (EEPROM).  
 Internal clock back-up: 24 hours  
 Kind of action: 1B; Pollution grade: 2; Software class: A.;  
 Rated impulsive voltage: 2500V; Overvoltage Category: II  
 Operating temperature: 0+55°C; Storage temperature: -30+85 °C.  
 Relative humidity: 20+85% (no condensing)  
 Measuring and regulation range: NTC probe: -40+110°C (-40+230°F);  
 PTC probe: -100+150°C (-148+302°F)  
 Resolution: 0,1 °C or 1°C or 1 °F (selectable); Accuracy (ambient temp. 25°C): ±0,7 °C ±1 digit

Label	Name	Range	Value	Level
i1F	Digital input 1 configuration (18-20)	dor; dEF;	EAL	Pr2
did	Digital input alarm delay (18-20)	0+255min	0	Pr2
Nps	Number of activation of pressure switch	0 +15	0	Pr2
odc	Compress and fan status when open door	no; Fan; CPR; F_C	no	Pr2
rrd	Regulation restart with door open alarm	n - Y	n	Pr2
HES	Differential for Energy Saving	(-30°C+30°C) (-54°F+54°F)	0	Pr2
Adr	Serial address	1+247	1	Pr2
PbC	Kind of probe	Pt1000; ntc	ntC	Pr2
dP1	Room probe display	--	-	Pr2
dP2	Evaporator probe display	--	-	Pr2
rEL	Software release	--	4.4	Pr2
Ptb	Map code	--	-	Pr2

15. CONNECTIONS



16. DEFAULT SETTING VALUES

Label	Name	Range	Value	Level
Set	Set point	LS+US	-23	-
Hy	Differential	0,1±25,5°C/ 1± 255°F	1	Pr1
LS	Minimum set point	-100C±SET/-58°F±SET	-25	Pr2
US	Maximum set point	SET±110°C/ SET ± 230°F	-20	Pr2
Ot	Thermostat probe calibration	-12±12°C /-120±120°F	-3	Pr1
P2P	Evaporator probe presence	n=not present; Y=pres.	n	Pr2
OE	Evaporator probe calibration	-12±12°C /-120±120°F	0	Pr2
OdS	Outputs delay at start up	0+255 min	0	Pr2
AC	Anti-short cycle delay	0 ÷ 50 min	0	Pr1
AC1	2 <sup>nd</sup> compressor delay	0 ÷ 255s	0	Pr1
CCt	Continuous cycle duration	0,0+24,0h	0,0	Pr2
CCS	Set point for continuous cycle	(-100±150,0°C) (-67±302°F)	-23	Pr2
CO <sub>n</sub>	Compressor ON time with faulty probe	0 ÷ 255 min	30	Pr2
CO <sub>F</sub>	Compressor OFF time with faulty probe	0 ÷ 255 min	5	Pr2
CF	Temperature measurement unit	°C ÷ °F	°C	Pr2
rES	Resolution	in=integer; dE= dec.point	in	Pr1
Lod	Probe displayed	P1;P2	P1	Pr2
tdF	Defrost type	EL=el. heater; in= hot gas	in	Pr2
dtE	Defrost termination temperature	-50 ÷ 50 °C	4	Pr1
ldF	Interval between defrost cycles	1 ÷ 120 ore	72	Pr1
MdF	(Maximum) length for defrost	0 ÷ 255 min	15	Pr1
dSd	Start defrost delay	0+99min	0	Pr2
Stc	Pre-defrost time	0+15min	5	Pr2
dFd	Displaying during defrost	rt, it, SEt, DEF	it	Pr2
dAd	MAX display delay after defrost	0 ÷ 255 min	60	Pr2
Fdt	Draining time	0+120 min	5	Pr2
dPo	First defrost after start-up	n=after ldF; y=immed.	no	Pr2
dAF	Defrost delay after fast freezing	0 ÷ 23h e 50'	0,0	Pr2
Fnc	Fan operating mode	C-n, o-n, C-y, o-Y	O_n	Pr2
Fnd	Fan delay after defrost	0+255min	0	Pr2
Fct	Differential of temperature for forced activation of fans	0+50°C	0	Pr2
FSt	Fan stop temperature	-50+50°C/-58±122°F	50	Pr2
Fon	Fan on time with compressor off	0+15 (min.)	0	Pr2
Fof	Fan off time with compressor off	0+15 (min.)	0	Pr2
ALc	Temperat. alarms configuration	rE= related to set; Ab= absolute	rE	Pr2
ALU	MAXIMUM temperature alarm	Set±110,0°C; Set±230°F	8	Pr1
ALL	Minimum temperature alarm	-100°C±Set/ -58°F±Set	7	Pr1
AFH	Differential for temperat. alarm recovery	(0,1°C±25,5°C) (1°F±45°F)	1	Pr2
ALd	Temperature alarm delay	0 ÷ 255 min	150	Pr2
dAO	Delay of temperature alarm at start up	0 ÷ 23h e 50'	24,0	Pr2
oA1	Fourth relay configuration	ALr = alarm; dEF = do not select it; Lig =Light; AUS =AUX; onF=always on; Fan= do not select it; db = neutral zone; cP2 = second compressor; dF2 = do not select it; HES = night blind	Lig	Pr2
oA2	Fourth relay configuration	ALr = alarm; dEF = do not select it; Lig =Light; AUS =AUX; onF=always on; Fan= do not select it; db = neutral zone; cP2 = second compressor; dF2 = do not select it; HES = night blind	HEt	Pr2
i1P	Digital input polarity (18-20)	oP=opening;CL=closing	CL	Pr2

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