XR420C

DUAL TEMPERATURE CONTROLLER

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 **XR420C**, 32x74 mm format, is a microcontroller based device, able to control 2 temperatures in an independent way. **Both sections** are suitable for applications on normal or medium temperature refrigerating units or cooking applications. It is provided with 3 relay outputs to control two compressors and one light. Defrost process is performed through simple stop of compressors. It is also provided with 2 NTC or PTC probe inputs, one for section 1 and the other one for section 2. There is one digital input (free voltage contact) completely configurable by parameter. The standard TTL output allows the user to connect, by means of a TTL/RS485 external module, a **ModBUS-RTU** compatible monitoring system and to programme the parameter list with the **"Hot Key".**
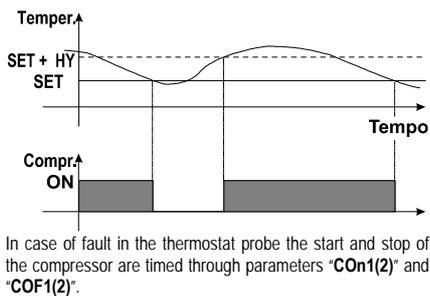
3. REGULATION

Two kinds of actions are available for both sections: cooling action and heating action. The type is selected through **cH1/cH2** section parameter.

3.1 HOW TO SET THE TYPE OF ACTION

By means of **CH1/2** parameters the kind of action can be set for each section: **cH1/cH2 = CL**: refrigerating action (1/2); **cH1/cH2 = Ht**: heating action (1/2)

3.2 CH1/CH2 = CL FOR COOLING ACTION

For each section, the regulation is performed according to the temperature measured by its own thermostat probe with a positive differential from the set point. If the temperature increases and reaches set point1 (2) plus differential1 (2) 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 "COn1(2)" and "COF1(2)".

3.3 CH1/CH2 = HT FOR HEATING ACTION

For each section, the regulation is performed according to the temperature measured by its own thermostat probe with a negative differential from the set point. If temperature decreases and reaches set point 1/2 minus differential 1/2 the output is activated and then turned off when the temperature reaches the set point value again and then turned off when the temperature reaches the set point value again.

NOTE: For turn-off defrost you can set MdF1/MdF2 = 0.
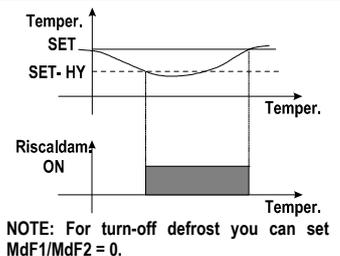
4. DEFROST

4.1 SECTION 1 (2)

Defrost is performed through a simple stop of the compressor for both sections. Different kinds of defrosts are available for each section.

4.2 RELATION BETWEEN DEFROSTS

The relation between defrosts is set by the **dFS** parameter: **relation between defrosts**.
4 relation between the 2 sections of the controller are available, to manage different kinds for applications:
- **in** = independent defrosts;
- **StS** = same defrost start, synchronised defrost end;
- **St** = same defrost start, independent defrost end;
- **SE** = sequential defrost;

4.2.1 dFS= in - independent defrosts
The defrosts of the 2 sections of controller are completely independent.
First section: defrost interval is set by **idF1** parameter.
Second section: defrost interval is set by **idF2** parameter.
The defrost interval is control by means of parameter "**EdF1(2)**":
- **in** the defrost is made every "**IdF1(2)**" time
- **Sd** the interval "IdF1(2)" is calculate through Smart Defrost algorithm (only when the compressor is ON)

Manual defrost activation, by pushing the DOWN key (defrost 1) or UP key (defrost 2).
By pushing the Down key or Up key for 3s, a defrost request is generated for section 1 or 2 respectively. The defrost interval is re-loaded.

4.2.2 dFS = StS – Same defrost start, end defrost synchronised or dFS = St - Same defrost start, end defrost independent.
The defrost of the 2 sections of controller starts at the same time. **idF1** parameter sets the defrost interval for both the sections. The defrosts are performed at regular interval if EdF1 = in or according to the Smartdefrost algorithm if EdF1 = Sd.

With **dFS = StS** regulation restarts only when defrost is finished for both the sections. The section that finishes the defrost before the other starts dripping time until also the other section has not finished its defrost.
Manual defrost activation, by pushing the DOWN key (defrost 1) or UP key (defrost 2).
By pushing the Down key or Up key for 3s, a defrost request is generated for both the sections 1 and 2.The defrost interval is re-loaded.
With **dFS = St** each section restarts regulation as soon as its defrost is finished.

4.2.3 dFS = SE – sequential defrost
The defrost of 2 sections is synchronised. **idF1** parameter sets the defrost interval for both the sections. Defrosts are performed at regular interval if EdF = in or according to the Smartdefrost algorithm if EdF = Sd. Section 1 does its defrost first, at the end of the defrost of section 1, section 2 starts its defrost..
Manual defrost activation, by pushing the DOWN key (defrost 1) or UP key (defrost 2).
By pushing the Down key or Up key for 3s, a defrost request is generated for both the sections 1 and 2.The defrost interval is re-loaded.

5. THE DISPLAY

Temperature2
Temperatature1

The display is divided in **2 parts**:

Upper left part: to see the temperature2 **(upper display)**
Lower left part: to see the temperature1 **(lower display)**

SET	To display and modify target set point 1 and set point 2, in programming mode it selects a parameter or confirm an operation.
☼	light activation/deactivation.
▲/❄ 2	(**UP/DEFROST 2**) in programming mode it browses the parameter codes or increases the displayed value. By holding it pressed for 3s the defrost for section 2 is started.
▼/❄ 1	(**DOWN/DEFROST 1**) in programming mode it browses the parameter codes or decreases the displayed value. By holding it pressed for 3s the defrost for section 1 is started.
▲ + ▼	To lock and unlock the keyboard.
SET + ▼	To enter the programming mode.
SET + ▲	To exit the programming mode.

5.1 MEANING OF THE ICONS

Icon	FUNCTION	Meaning
°C	ON	Celsius degree
°F	ON	Fahrenheit degree
✳1	ON	Compressor 1 on
✳1	FLASHING	Anti-short cycle delay enabled for compressor 1
✳2	ON	Compressor 2 on
✳2	FLASHING	Anti-short cycle delay enabled for compressor 2
❄1	ON	Defrost 1 in progress
❄2	ON	Defrost 2 in progress
((•))	ON	ALARM signal

5.2 HOW TO SEE AND MODIFY THE SET-POINT

1. Push and release the **SET** key:
2. the **bottom display** shows the **St1** label
3. the **upper display** shows the Set point value flashing
4. To change the Set value push the ▲ or ▼;
5. To memorise the new set point value push the **SET** key again,
6. To change the **SET2** repeat this procedure.

5.3 HOW TO START MANUAL DEFROST FOR THE SECTION 1 OR SECTION 2

To start a defrost for the **section 1**: push the **DOWN** key(❄ **1**) for 3s.
To start a defrost for the **section 2**: push the **UP** key(❄ **2**) for 3s.

5.4 HOW TO ENTER THE "PR1" PARAMETER LIST

To change the parameter's value operate as follows:
1. Enter the Programming mode by pressing the **Set1** and **DOWN** key for 3s
2. The controller will show the first parameter present in the Pr1 menu:
- Bottom menu: label
- Upper menu: value

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

5.5 HOW TO ENTER IN PARAMETERS LIST "PR2"

To access parameters in "**Pr2**":
1. Enter the "**Pr1**" level.
2. Select "**Pr2**" – "**PAS**" parameter and press the "**SET**" key.
3. The flashing value "0 - - " is displayed. use ▲ or ▼ to input the security code and confirm the figure by pressing "**SET**" key.

> ### The security code is "321".

4. If the security code is correct the access to "Pr2" is enabled by pressing "**SET1**" on the last digit.

NOTE: Each parameter present in "**Pr2**" MENU can be removed or put into "**Pr1**", user level, by pressing "**SET1 + ▼**". In "**Pr2**" when a parameter is present in "**Pr1**" the decimal point LE of the bottom display is on.

5.6 HOW TO CHANGE A PARAMETER

To change a parameter value operates as follows:
1. Enter the **Programming mode**
2. Select the required parameter.
3. Press the "**SET**" key and the value starts blinking.
4. Use "**UP**" or "**DOWN**" to change its value.
5. Press "**SET**" to store the new value and move to the following parameter.

TO EXIT: Press **SET + ▲** 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.

5.7 HOW TO LOCK THE KEYBOARD
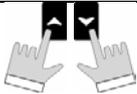
1. Keep pressed for more than 3 s the ▲ and ▼ keys.
2. The "**POF**" message will be displayed and the keyboard will be locked. At this point it will be possible only to see the set points.
3. If a key is pressed more than 3s the "**POF**" message will be displayed.

5.8 TO UNLOCK THE KEYBOARD

Keep pressed together for more than 3s the ▲ and ▼ keys, till the "**Pon**" message will be displayed.

5.9 ON/OFF FUNCTION – HOW TO SWITCH ON AND OFF THE CONTROLLER

If the function is enabled (par. **onF=yES**), by pressing the **SET** key for more than 5s the controller is switched OFF. The stand-by function switches OFF all the relays and stops the regulation. During the stand by if a monitored unit is connected, it does not record the instrument data and alarms
To switch the instrument on again press the SET1 key for 5s.

NOTE1: When the instrument is under Stand-by, all the relays are under power supply. Don't connect any loads to the normal closed contact of the relays.
NOTE2: With the instrument in stand-by, it's possible to see and modify the set points and enter the programming mode.

6. PARAMETER LIST

DIFFERENTIALS

Hy1   **Differential1:** (0,1÷25,5°C; 1÷45°F): Intervention differential for set point1, always positive. Compressor1 Cut IN is Set Point Plus Differential1 (Hy1). Compressor1 Cut OUT is when the temperature reaches the set point1.

Hy2   **Differential2:** (0,1÷25,5°C; 1÷45°F): Intervention differential for set point2, always positive. Compressor2 Cut IN is Set Point2 Plus Differential2 (Hy2). Compressor2 Cut OUT is when the temperature reaches the set point2.

REGULATION – SECTION 1

LS1   **Minimum set point1 limit:** (-50,0°C÷SET1; -58°F÷SET1) Sets the minimum acceptable value for the set point1.

US1   **Maximum set point1 limit:** (SET1÷110°C; SET1÷230°F) Set the maximum acceptable value for set point1.

OdS1   **Outputs activation delay of section 1 at start up:** (0÷255 min) This function is enabled at the initial start up of the instrument and inhibits any output activation of the section 1 for the period of time set in the parameter. (Light can work)

AC1   **Anti-short cycle delay for compressor1:** (0÷30 min) interval between the compressor1 stop and the following restart.

Con1   **Compressor1 ON time with faulty probe1:** (0÷255 min) time during which the compressor1 is active in case of faulty thermostat probe. With COn=0 compressor1 is always OFF.

COF1   **Compressor1 OFF time with faulty probe1:** (0÷255 min) time during which the compressor is off in case of faulty thermostat probe. With COF=0 compressor is always active.

CH1   **Kind of action for section 1: CL =** cooling; **Ht =** heating

REGULATION – SECTION 2

LS2   **Minimum set point2 limit:** (-50,0°C÷SET2; -58°F÷SET2) Sets the minimum acceptable value for the set point2.

US2   **Maximum set point2 limit:** (SET2÷110°C; SET2÷230°F) Set the maximum acceptable value for set point2.

OdS2   **Outputs activation delay of section 2 at start up:** (0÷255 min) This function is enabled at the initial start up of the instrument and inhibits any output activation of the section 1 for the period of time set in the parameter.

Ac2   **Anti-short cycle delay for compressor2:** (0÷30 min) interval between the compressor2 stop and the following restart.

con2   **Compressor2 ON time with faulty probe2:** (0÷255 min) time during which the compressor2 is active in case of faulty thermostat probe. With COn=0 compressor2 is always OFF.

coF2   **Compressor2 OFF time with faulty probe2:** (0÷255 min) time during which the compressor is off in case of faulty thermostat probe. With COF=0 compressor2 is always active.

cH2   **Kind of action for section 2: CL =** cooling; **Ht =** heating

DISPLAY

CF   **Temperature measurement unit:** °C = Celsius; °F = Fahrenheit. When the measurement unit is changed the SET point and the values of some parameters have to be modified.

rES   **Resolution (for °C):** (in = 1°C; de = 0,1°C) allows decimal point display. **dE** = 0,1°C; **in** = 1 °C

Lod1   **Bottom display visualization:** select which probe is displayed by the instrument in the bottom display: **P1** = Thermostat1 probe; **P2** = Evaporator probe; **P2** = Thermostat2 probe

Lod2   **Upper display visualization:** select which probe is displayed by the instrument in the upper display: **P1** = Thermostat1 probe; **P2** = Evaporator probe; **P2** = Thermostat2 probe

DEFROST

dFS   **relation between defrosts.**4 relation between the 2 sections of the controller are available, to manage different kinds for applications: **in** = independent defrosts; **StS** = same defrost start, synchronised defrost end; **St** = same defrost start, independent defrost end; **SE** = sequential defrost;

EdF1   **Defrost mode, section 1: in** = **interval mode**. The defrost starts when the time "**If**" is expired.

IdF1   **Interval between defrosts, section 1:** (1÷120h) Determines the time interval between the beginning of two defrost cycles.

MdF1   **Maximum duration of defrost, section 1:** (0÷255 min) When **P2P = no**, no evaporator probe, it sets the defrost duration, when **P2P = yES**, defrost end based on temperature, it sets the maximum length for defrost.

EdF2   **Defrost mode, section 2: in** = **interval mode**. The defrost starts when the time "**IdF**" is expired.

IdF2   **Interval between defrosts, section 2:** (1÷120h) Determines the time interval between the beginning of two defrost cycles.

MdF2   **(Maximum) duration of defrost, section 2:** (0÷255 min) it sets the defrost duration.

dFd   **Display during defrost:** **rt** = real temperature; **it** = temperature reading at the defrost start; **Set** = set point; **dEF** = "dEF" label; **dEG** = "dEG" label;

dAd   **Defrost display time out:** (0÷255 min) Sets the maximum time between the end of defrost and the restarting of the real room temperature display.

ALARMS

ALc1   **Temperature alarms configuration, section 1:** it determines if alarms are relative to set point 1 or referred to absolute values: **rE** relative to set point; **Ab** absolute temperature

ALu1   **Maximum alarm, section 1:**
with **ALc1=rE:** alarm relative to set point1, (0÷50°C) Maximum alarm is enabled when the probe values exceeds the "SET1+ALU" value.
with **ALc1=Ab:** absolute alarm, (Set1÷Full Sc.) Maximum alarm is enabled when the probe values exceeds the "ALU" value.

ALL1   **Minimum alarm, section 1:**
with **ALc1=rE:** relative to set point1, (0÷50°C) this value is subtracted from the set point1. The alarm signal is enabled when the probe values goes below the "SET1-ALL" value.
with **ALc1=Ab** absolute value, minimum alarm is enabled when the probe values goes below the "ALL1" value.

ALd1   **Temperature alarm delay, section 1:** (0÷255 min) time interval between the detection of an alarm condition and the corresponding alarm signalling.

dAo1   **Delay of temperature alarm at start-up, section 1:** (0min÷23h 50min) time interval between the detection of the temperature alarm condition in section after the instrument power on and the alarm signalling.

ALc2   **Temperature alarms configuration, section 2:** it determines if alarms are relative to set point 2 or referred to absolute values: **rE** relative to set point; **Ab** absolute temperature

ALu2   **Maximum alarm, section 2:**
with **ALc2=rE:** alarm relative to set point1, (0÷50°C) Maximum alarm is enabled when the probe values exceeds the "SET2+ALU" value.
with **ALc2=Ab:** absolute alarm, (Set2÷Full Sc.) Maximum alarm is enabled when the probe values exceeds the "ALU" value.

ALL2   **Minimum alarm, section 2:**
with **ALc2=rE:** relative to set point1, (0÷50°C) this value is subtracted from the set point2. The alarm signal is enabled when the probe values goes below the "SET2-ALL" value.
with **ALc2=Ab** absolute value, minimum alarm is enabled when the probe values goes below the "ALL2" value.

ALd2   **Temperature alarm delay, section 2:** (0÷255 min) time interval between the detection of an alarm condition and the corresponding alarm signalling.

dAo2   **Delay of temperature alarm at start-up, section 2:** (0min÷23h 50min) time interval between the detection of the temperature alarm condition in section after the instrument power on and the alarm signalling.

AFH   **Temperature alarm / defrost differential:** (0,1÷25,5°C; 1÷45°F) Intervention differential for temperature alarm set point and defrost set point.

EdA **Alarm delay at the end of defrost:** (0÷255 min) Time interval between the detection of the temperature alarm condition at the end of defrost and the alarm signalling.

dot **Delay of temperature alarm after closing the door :** (0÷255 min) Time delay to signal the temperature alarm condition after closing the door.

doA **Open door alarm delay:**(0÷255 min) delay between the detection of the open door condition and its alarm signalling: the flashing message "**dA**" is displayed.

PROBE INPUTS

Pbc **Kind of probe: Ptc =** = PTC; **ntc** = NTC

oFS1 **Thermostat1 probe calibration:** (-12.0÷12.0°C/ -21÷21°F) allows to adjust possible offset of the thermostat1 probe.

oFS2 **Thermostat2 probe calibration:** (-12.0÷12.0°C/ -21÷21°F) allows to adjust possible offset of the thermostat2 probe.

P2P **Thermostat2 probe presence : no**= not present; **yES=** present.

DIGITAL INPUTS

i1P **Digital input 1 polarity:**
CL : the digital input is activated by closing the contact;
OP : the digital input is activated by opening the door.

i1F **Digital input 1 operating mode:** configure the digital input function:
MP1 = door switch 1; **MP2** = doors witch 2, **MP**: door switch (it's used by both the sections);
EA1 = generic alarm section 1; **EA2 =** generic alarm section 2; **EAL** = generic alarm (it's used by both the sections); **bA1** = serious alarm mode section 1; **bA2** = serious alarm mode section 2; , **bAL** = serious alarm mode section (it's used by both the sections); **dF1** = Start defrost, section 1; **dF2** = Start defrost, section 2; **dEF** = Start defrost (it's used by both the sections); **oF1** = remote on/ off, section1; **oF2** = remote on/ off, section 2; **oFF =** = remote on/ off (it's used by both the sections); **ES** = Energy Saving

odc1 **Compressor and fan status when open door, section 1: no** = normal; **Fan** = Fan OFF; **CPr** = Compressor OFF;   **F_C** = Compressor and fan OFF.

rrd1 **Outputs restart after door open alarm, section 1: n =** status of outputs according to odc1; **Y=** outputs restart working.

did1 **Time interval delay for digital input alarm, section 1:**(0÷255 min.) With i1F or i2F = EAL1 or bAL1 (external alarms), "did" parameter defines the time delay between the detection and the successive signalling of the alarm.

odc2 **Compressor status when open door, section 2: no** ,**Fan** = normal;; **CPr, F_C** = Compressor OFF.

rrd2 **Outputs restart after door open alarm, section 2: n =** status of outputs according to odc2; **Y=** outputs restart working.

did2 **Time interval delay for digital input alarm, section 2:**(0÷255 min.) With i1F or i2F = EAL1 or bAL1 (external alarms), "did" parameter defines the time delay between the detection and the successive signalling of the alarm.

OTHER

HES1 **Temperature increase during the Energy Saving cycle, section 1:**
(-30÷30°C / -54÷54°F) sets the increasing value of the set point1 during the Energy Saving cycle.

HES2 **Temperature increase during the Energy Saving cycle, section 2:**
(-30÷30°C / -54÷54°F) sets the increasing value of the set point2 during the Energy Saving cycle.

Adr1 **RS485 serial address, section 1** (1÷247)**:** Identifies section 1 address when connected to a ModBUS compatible monitoring system.

Adr2 **RS485 serial address, section 2** (1÷247)**:** Identifies section 2 address when connected to a ModBUS compatible monitoring system.

OnF **Stand-by function: 0** = Stand-by function not enabled;   **1** = Stand-by function enabled (under SET key control).

rEL **Release software:** (read only) Software version of the microprocessor.

Ptb **Parameter table:** (read only) it shows the original code of the **dixell** parameter map.

Pr2 **Access to the protected parameter list** (read only).

7. DIGITAL INPUT

The instrument support 1 free contact digital input. This is programmable in different configurations by means of the "**I1F**" parameter.

7.1 DOOR SWITCH INPUT (I1F=MP1,MP2,MP)

It signals the door status: **MP1** = section 1 door is open; **MP2** = section 2 door is open; **MP** door open for both the sections. When the door is open the status of compressor depends on the "**odc1**" and "**odc2**"parameters: **no, Fan** = normal (no changes); **CPr, F_C** = Compressor OFF;
Since the door is opened, after the delay time set through parameter "**dOA**", the alarm output is enabled and the display shows the message "**dA**". The alarm stops as soon as the external digital input is disabled again. During this time and then for the delay "**dot**" after closing the door, the high and low temperature alarms are disabled.

7.2 CONFIGURABLE INPUT - GENERIC ALARM (i1F=EA1,EA2,EAL)

It signals to the controller:
EA1: generic alarm – section 1;
EA2: generic alarm – section 2;
EAL: generic alarm – it counts for both the sections.
As soon as the digital input is activated the unit will wait for "**did1**" time for section 1 and "**did2**" time for section 2 delay before signalling the "**EAL**" alarm message. The outputs status don't change. The alarm stops just after the digital input is de-activated.

7.3 CONFIGURABLE INPUT - SERIOUS ALARM MODE (i2F=bA1,bA2,bAL)

It signals to the controller:
bA1: serious alarm – section 1; **bA2**: serious alarm – section 2;
bAL: serious alarm – it counts for both the sections.
As soon as the digital input is activated the unit will wait for "**did1**" time for section 1 and "**did2**" time for section 2 delay before signalling the "**bAL**" alarm message. The relay outputs are switched OFF. The alarm will stop as soon as the digital input is de-activated.

7.4 CONFIGURABLE INPUT - START DEFROST (i1F=dF1,dF2,dEF)

It executes a defrost if there are the right conditions, respectively for:

dF1: section 1; **dF2**: section 2; **dEF**: both the sections.
After the defrost is finished, the normal regulation will restart only if the digital input is disabled otherwise the instrument will wait until the "**Mdf1**" and "**MdF2**" safety time is expired.

7.5 CONFIGURABLE INPUT - ENERGY SAVING (i1F=ES)

The Energy Saving function allows to change the set point value as the result of the SET1+HES1 for section and SET2 + HES2 fro section 2. This function is enabled until the digital input is activated.

7.6 CONFIGURABLE INPUT - REMOTE ON/OFF (i1F=oF1,F2,oFF)

This function allows to switch ON and OFF a sections of the instrument or the whole instrument according to the following setting: .
oF1: section 1; **oF2**: section 2; **onF**: it counts for both the sections.
When the digital input is de-activated, the corresponding section restarts working.

7.7 DIGITAL INPUTS POLARITY

The digital inputs polarity depends on "**I1P**". **CL** : the digital input is activated by closing the contact.
OP : the digital input is activated by opening the contact

8. INSTALLATION AND MOUNTING

PANEL

BRACKET
(PUSH TO RELEASE)
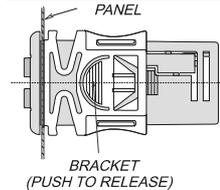
Instruments shall be mounted on panel, in a 29x71 mm hole, and fixed using the special brackets supplied.
To obtain an IP65 protection grade use the front panel rubber gasket (mod. RG-C) as shown in figure.

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.

BRACKETS

PANEL

RUBBER GASKET
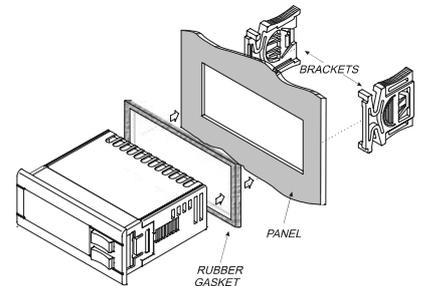
9. ELECTRICAL CONNECTIONS

The instrument are provided with screw terminal block to connect cables with a cross section up to 2,5 mm². Heat-resistant cables have to be used. 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.

9.1 PROBE CONNECTION

The probes shall be mounted with the bulb upwards to prevent damages due to casual liquid infiltration. It is recommended to place probe away from air streams to correctly measure the average room temperature.

10. SERIAL LINE

The optional RS485 output allows the unit to connect to a network line ModBUS-RTU compatible as the **dixell** monitoring system.

11. USE OF THE PROGRAMMING "HOT KEY "

The unit can UPLOAD or DOWNLOAD the parameter list from its own E2 internal memory to the **"Hot Key"** and vice-versa.

11.1 DOWNLOAD (FROM THE "HOT KEY" TO THE INSTRUMENT)

1. Turn OFF the instrument, insert the **"Hot Key"** and then turn the instrument ON.
2. Automatically the parameter list of the **"Hot Key"** is downloaded into the memory, the "**doL**" message is blinking. After 10 seconds the instrument will restart working with the new parameters.
3. Turn OFF the instrument remove the **"Hot Key"**, plug in the TTL serial cable, then turn it ON again.
At the end of the data transfer phase the instrument displays the following messages:
"**end** " for right programming. The instrument starts regularly with the new programming.
"**err**" 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.

11.2 UPLOAD (FROM THE INSTRUMENT TO THE "HOT KEY")

1. When the unit is ON, insert the "**Hot key**" and push ^{c2} key; the **"uPL"** message appears.
2. Push "**SET**" key to start the UPLOAD; the "**uPL**" message is blinking.
3. Turn OFF the instrument remove the **"Hot Key"**, plug in the TTL serial cable, then turn it ON again.
At the end of the data transfer phase the instrument displays the following messages:
"**end** " for right programming.
"**err**" for failed programming. In this case push "SET" key if you want to restart the programming again or remove the not programmed "**Hot key**".

12. ALARM SIGNALS

Message	Cause	Outputs
"P1"	Thermostat probe 1 failure	Output 1 according to parameters "Con1" and "COF1"
"P2"	Thermostat probe 2 failure	Output 2 according to parameters "Con2" and "COF2"
"HA"	High temperature alarm	Outputs unchanged

Label	Description	Output
"LA"	Low temperature alarm	Outputs unchanged
"EE"	Some memory problems	
"dA"	Door switch alarm	Outputs unchanged
"EAL"	External alarm	Outputs unchanged
"bAL"	Serious external alarm	Regulation outputs deactivated
"POF"	Keyboard locked	Outputs unchanged
"POn"	Keyboard unlocked	Outputs unchanged

The alarm message is displayed until the alarm condition is recovery.

All the alarm messages are showed alternating with the room temperature except for the "P1" which is flashing. To reset the "EE" alarm and restart the normal functioning press any key, the "**rSt**" message is displayed for about 3s.

12.1 SILENCING BUZZER

Once the alarm signal is detected the buzzer can be silenced by pressing any key.

12.2 "EE" ALARM

The **dixell** instruments are provided with an internal check for the data integrity. Alarm "EE" flashes when a failure in the memory data occurs. In such cases the alarm output is enabled.

12.3 ALARM RECOVERY

Probe alarms : "**P1**" (probe1 faulty), "**P2**"; they automatically stop 10s after the probe restarts normal operation. Check connections before replacing the probe. Door switch alarm "**dA**" stop as soon as the door is closed. External alarms "**EAL**", "**BAL**" stop as soon as the external digital input is disabled "**PAL**" alarm is recovered by switching OFF the instrument.

13. 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 with frontal gasket RG-C (optional).
Connections: Screw terminal block ≤ 2,5 mm^2 heat-resistant wiring.
Power supply: 110Vac ±10%; 230Vac ±10%;
Power absorption: 5VA max. **Inputs:** 2 NTC or PTC probes
Relay outputs: **compressor 1:** SPST relay 8(3) A, 250Vac
       light/alarm: SPDT relay 8(3) A, 250Vac
       compressor 2: SPDT relay 8(3) A, 250Vac
Other output: Alarm buzzer
Kind of action: 1B.; **Pollution grade:** normal; **Software class:** A.
Data storing: on the non-volatile memory (EEPROM).
Operating temperature: 0÷60 °C (32÷140°F). **Storage temperature:** -30÷85 °C (-22÷185°F).
Relative humidity: 20÷85% (no condensing)
Measuring and regulation range: PTC probe: -50÷150°C (-58÷302°F); **NTC** probe**:** -40÷110°C (-58÷230°F)
Accuracy (ambient temp. 25°C): range -40÷50°C (-40÷122°F): ±0,5 °C ±1 digit

14. WIRING CONNECTIONS
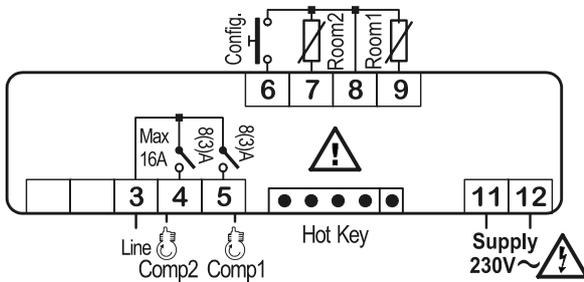
Power supply 110Vac: connect to 11-12 terminals

15. DEFAULT SETTING VALUES

Label	Nome	Limiti	Default	Livello
	REGULATION			
Set1	Set point 1	LS1÷US1	3	- - -
Set2	Set point 2	LS2÷US2	3	- - -
Hy1	Differential 1	0,1÷25,5 °C / 1÷45°F	2	Pr1
Hy2	Differential 2	0,1÷25,5 °C / 1÷45°F	2	Pr1
	REGULATION – SECTION 1			
LS1	Minimum set point1 limit	-50,0°C÷SET1 / -58°F÷SET1	-50	Pr2
US1	Maximum set point1 limit	SET1 ÷ 150°C / SET1 ÷ 302°F	110	Pr2
odS1	Outputs activation delay of sect. 1 at start up	0÷255 min.	0	Pr2
Ac1	Anti-short cycle delay for compressor1	0÷30 min.	1	Pr1
con1	Compressor1 ON time with faulty probe1	0÷255 min.	15	Pr2
coF1	Compressor1 OFF time with faulty probe1	0÷255 min.	30	Pr2
cH1	Kind of action for section 1	cL / Ht	cL	Pr2
	REGULATION – SECTION 2			
LS2	Minimum set point2 limit	-50,0°C÷SET2 / -58°F÷SET2	-50	Pr2
US2	Maximum set point2 limit	SET2 ÷ 150°C / SET2 ÷ 302°F	110	Pr2
odS2	Outputs activation delay of sect. 2 at start up	0÷255 min.	0	Pr2
Ac2	Anti-short cycle delay for compressor2	0÷30 min.	1	Pr1
con2	Compressor2 ON time with faulty probe2	0÷255 min.	15	Pr2
coF2	Compressor2 OFF time with faulty probe2	0÷255 min.	30	Pr2
cH2	Kind of action for section 2	cL / Ht	cL	Pr2
	DISPLAY			

Label	Nome	Limiti	Default	Livello
cF	Temperature measurement unit	°C / °F	°C	Pr2
rES	Resolution (for °C)	in ÷ de	dE	Pr1
Lod1	Bottom display visualization	P1 ÷ P4	P1	Pr2
Lod2	Upper display visualization	P1 ÷ P4	P2	Pr2
	DEFROST			
dFS	relation between defrosts	ind; StS; Sti, SE	ind	Pr2
EdF1	Defrost mode, section 1	In, Sd,RTC	In	Pr2
idF1	Interval between defrosts, section 1	1÷120ore	8	Pr1
MdF1	Maximum duration of defrost, section 1	0÷255 min.	20	Pr1
EdF2	Defrost mode, section 2:	In, Sd, RTC	In	Pr2
idF2	Interval between defrosts, section 2	1÷120ore	8	Pr1
MdF2	(Maximum) duration of defrost, section 2	0÷255 min.	20	Pr1
dFd	Display during defrost	rt, it, SEt, dEF, dEG	it	Pr2
dAd	Defrost display time out	0÷255 min.	20	Pr2
	ALARM			
ALc1	Temperature alarms configuration, section 1	rE / Ab	Ab	Pr2
ALu1	Maximum alarm, section 1	-50,0÷150°C/ -58÷302°F	110	Pr1
ALL1	Minimum alarm, section 1	-50,0÷150°C/ -58÷302°F	-50	Pr1
ALd1	Temperature alarm delay, section 1	0÷255 min.	15	Pr2
dAo1	Delay of temp. alarm at start-up, section 1	0 ÷ 23h 50 min.	1,3	Pr2
ALc2	Temp. alarms configuration, section 2	re ÷ Ab	Ab	Pr2
ALu2	Maximum alarm, section 2	-50,0÷150°C/ -58÷302°F	110	Pr1
ALL2	Minimum alarm, section 2	-50,0÷150°C/ -58÷302°F	-50	Pr1
ALd2	Temperature alarm delay, section 2	0÷255 min.	15	Pr2
dAo2	Delay of temp. alarm at start-up, section 2	0 ÷ 23h 50 min.	1,3	Pr2
AFH	Temperature alarm and fan differential	0,1÷25,5 °C / 1÷45°F	1	Pr2
EdA	Alarm delay at the end of defrost	0÷255 min.	20	Pr2
dot	Delay of temp. alarm after closing the door	0÷255 min.	20	Pr2
doA	Open door alarm delay	0÷254 min., nu	15	Pr2
Pbc	Kind of probe	PTC/ntc	ntc	Pr2
	ANALOG INPUTS			
oFS1	Thermostat1 probe calibration	-12,0÷12,0°C / -21÷21°F	0	Pr2
oFS2	Thermostat2 probe calibration	-12,0÷12,0°C / -21÷21°F	0	Pr2
P2P	Thermostat2 probe presence	n / y	y	Pr2
	DIGITAL INPUTS			
i1P	Digital input 1 polarity	cL÷OP	cL	Pr2
i1F	Digital input 1 operating mode	MP1; MP2; MP; EA1; EA2; EAL; bA1; bA2; , bAL; dF1; dF2; dEF; oF1; oF2; oFF; ES	EAL	Pr2
odc1	Comp. and fan status when open door, sect 1	no, Fan, CPr, F_C	no	Pr2
rrd1	Outputs restart after door open alarm, sect. 1	n, y	y	Pr2
did1	Time interval delay for digital input alarm, sect. 1	0÷255 min.	5	Pr2
odc2	Comp. status when open door, section 2:	no, Fan, CPr, F_C	no	Pr2
rrd2	Outputs restart after door open alarm, sect. 2	n, y	y	Pr2
did2	Time interval delay for digital input alarm, sect. 2	0÷255 min.	5	Pr2
	OTHER			
HES1	Temp. increase during the Energy Saving cycle, sect. 1	-30÷30°C / -54÷54°F	0	Pr2
HES2	Temp. increase during the Energy Saving cycle, section 2	-30÷30°C / -54÷54°F	0	Pr2
Adr1	RS485 serial address, section 1	1÷247	1	Pr2
Adr2	RS485 serial address, section 2	1÷247	1	Pr2
onF	Stand-by function	y, n	n	Pr2
rEL	Release software	---	- - -	Pr2
Ptb	Parameter table	- - -	1	Pr2
Pr2	Access to the protected parameter list		- - -	Pr1