

## Digital controller for CDU management XC10CX and XC30CX

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### 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.
- Dixell Srl reserves the right to change the composition of its products, even without notice, ensuring the same and unchanged functionality.

#### 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.r.l." (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

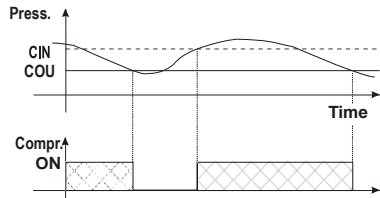
Model **XC30CX**, format 32x74mm, is a digital thermostat for condensing unit applications. It provides three digital (relay) outputs, one for the compressor and the other ones to control the fans. It is also provided with 2 NTC or ratiometric probe inputs, to be used on the suction and condenser line. Several digital inputs can operate to manage the condensing unit safeties. The **HOT-KEY** output allows to program the controller by means the **HOT-KEY** programming key. The instrument is fully configurable through special parameters that can be easily programmed through the keyboard.

Model **XC10CX** differs from the **XC30CX** on the digital output number. In fact, the **XC10CX** has only one digital output, which is used to control the compressor.

### 3. CONTROLLING LOADS

#### 3.1 COMPRESSOR

The regulation is performed according to the pressure measured by the suction probe P1. The compressor cut in is give by the **Cin** parameter. The compressor cut out is give by the **CoU** parameter.



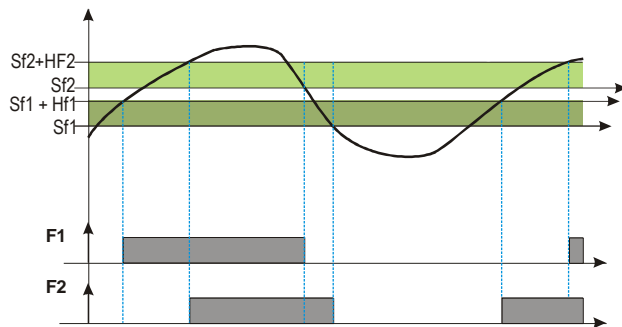
In case of fault in the regulation probe the start and stop of the compressor are timed through parameters **Con** and **CoF**.

#### 3.2 FAN MANAGEMENT (ONLY FOR XC30CX)

The **XC30CX** is able to control 1 or 2 condenser fans. A direct regulation is performed (cooling). It depends on the parameters:

|     |  |
|-----|--|
| SF1 | Set point for fan1 (with NTC probe: -40°C to SF2 or 40°F to SF2; with pressure probe: P2i to SF2 bar/PSI/kPa)  |
| HF1 | Differential for fan 1 (0.1 to 10.0°C/bar; 1 to 100°F/PSI)   |
| SF2 | Set point for fan2 (with NTC probe: SF1 to 110°C or SF1 to 230°F; with pressure probe: SF1 to P2E bar/PSI/kPa) |
| HF2 | Differential for fan 2 (0.1 to 10.0°C/bar; 1 to 100°F/PSI/kPa)   |

A fan is switched on when the temperature (pressure) is higher than **SF1+HF1** and switched off when it comes back to **SF1**, as explained in the following picture



#### 3.3 FAN CYCLING (ONLY FOR XC30CX)

To share the running hours between the 2 fans, the **XC30CX** will record the operating hours of each fan. The controller will rotate the fan activation and de-activation to share the operating hours between the 2 fans.

**Note:** with only one fan, it will be activated with **T>SF1+HF1** and switched off with **T<SF1**.

### 4. FRONT PANEL COMMANDS



|                |  |
|----------------|--|
| <b>SET</b>     | To display target set point; in programming mode it selects a parameter or confirm an operation.   |
| <b>Start</b>   | <b>(RESTART)</b> It depends on the <b>rSC</b> parameter; with <b>rSC=rSt</b> it allows a manual restart and a "dead band reset"; with <b>rSC=nP</b> only the dead band reset is allowed. |
| <b>UP</b>      | <b>(UP)</b> To see the condenser temperature for 5 sec; in programming mode it browses the parameter codes or increases the displayed value.   |
| <b>DOWN</b>    | <b>(DOWN)</b> To see the <b>dLt</b> temperature; in programming mode it browses the parameter codes or decreases the displayed value.  |
| <b>SERVICE</b> | <b>(SERVICE)</b> To enter the service menu.  |
| <b>ALARM</b>   | <b>(Alarm menu)</b> To enter the Alarm menu.   |

#### KEY COMBINATIONS:

|                   |  |
|-------------------|--|
| <b>UP + DOWN</b>  | To lock & unlock the keyboard.             |
| <b>SET + DOWN</b> | To enter in programming mode.              |
| <b>SET + UP</b>   | To return to the suction pressure display. |

#### 4.1 USE OF LEDS

Each LED function is described in the following table.

| LED        | MODE     | FUNCTION                         |
|------------|----------|----------------------------------|
| Compressor | ON       | Compressor enabled               |
|            | Flashing | Anti-short cycle delay enabled   |
| Fan 1      | ON       | Fan1 enabled (only for XC30CX)   |
|            | ON       | Fans enabled (only for XC30CX)   |
| kPa        | ON       | kPa display                      |
|            | Flashing | Programming mode                 |
| bar        | ON       | bar display                      |
|            | Flashing | Programming mode                 |
| PSI        | ON       | PSI display                      |
|            | Flashing | Programming mode                 |
| Service    | ON       | You're browsing the service menu |
|            | Flashing | A new alarm happened             |
| Alarm      | ON       | You're browsing the alarm menu   |
|            | ON       | An alarm is occurring            |

### 5. OTHER FUNCTIONS

#### 5.1 PRESSURE PROBE ERROR BY-PASS AT START UP

If a pressure probe error occurs at start-up, it will be by-passed for the **P1d** time, and the compressor will be switched on when the following conditions are satisfied:

- **ods**, regulation delay at start up, is expired.
- With **di1=Y**, the thermostat digital input 14-17 is enabled.
- The **HP** digital input or the **dLt** temperature is not locking the regulation.

In this period the controller displays the flashing label **P1E**.

If during the **P1d** time the pressure probe error recovers, the standard regulation will start, otherwise, when **P1d** expires the pressure probe error **P1** will be signaled and the compressor will be switched on and off cyclically with **Con** and **CoF** period.

**5.2 PRESSURE PROBE ERROR BY-PASS WHEN THE COMPRESSOR IS NOT WORKING**

When the compressor is switched off the pressure probe error is not signalled. In this case if the pressure raises and exceeds the pressure probe range, the controller will display the last value flashing.

In this situation the compressor will restart when:

- a. With **di1=Y**: the thermostat digital input (14-17) is enabled.
- b. With **di1=n**: as soon as the delays for the compressor restart are expired.
- c. If the compressor was switched off because of **HP** safety digital input or because of a too high **dLT** temperature, it will be able to restart as soon as these conditions are removed.

**5.3 RESET DEAD BAND**

If the pressure value is in the range [Cou to Cin] and the compressor relay is off, it's possible to force it keeping the **RESTART** key pressed for 2 sec. The compressor will run till the **Cou** threshold is reached.

**5.4 EXTERNAL THERMOSTAT (14-17)**

**Function:** the thermostat input, if present, enables the regulation only when active.  
**Contacts:** 14-17 free voltage.

**Parameters:**

|            |  |
|------------|--|
| <b>di1</b> | <b>Thermostat digital input presence (14-17)</b><br>n = the regulation is performed independently from the status of digital input 14-17.<br>Y = the regulation is performed only when the digital input 14-17 is enabled. |
| <b>i1P</b> | <b>Thermostat digital input polarity 14-17</b><br>oP = the digital input is activated by opening the contacts 14-17.<br>CL = the digital input is activated by closing the contacts 14-17.                                 |

**5.5 HP SAFETY PRESSURE SWITCH (15-17)**

**Function:** the HP safety input, if present, switches off the compressor when active.  
**Contacts:** 15-17 free voltage

**Parameters:**

|            |   |
|------------|---|
| <b>di2</b> | <b>HP safety digital input presence 15-17</b><br>n = the regulation is performed independently from the status of digital input 15-17.<br>Y = the regulation is performed only when the digital input 15-17 is disabled.                                  |
| <b>i1P</b> | <b>HP safety digital input polarity 15-17</b><br>oP = the digital input is activated by opening the contacts 15-17.<br>CL = the digital input is activated by closing the contacts 15-17.   |
| <b>HPn</b> | <b>HP safety digital input activation before compressor lock</b><br>0 = always automatic restart<br>1 to 15 = when the number of activation of the digital input in an hour reaches HPn times, the regulation is locked and a manual restart is required. |
| <b>HPF</b> | <b>Minimum time of compressor off when the HP digital input is activated (0 to 15 min).</b>   |

**5.5.1 Functioning**

**NOTE:** the HP safety digital input is checked only when the compressor is running

If the **HP** safety digital input is activated, the following actions will be performed

- a. The compressor will be shut down.
- b. The display will show the "HP" message alternated with suction probe
- c. The HP alarm counter will be increased.

**5.5.2 Automatic restart**

If the **HP** digital input is switched off, the compressor will be able to restart only when the **HPF** and **AC** timers are expired.

If the **HP** digital input is activated **HPn** times in an hour, a manual restart will be required. In this situation:

- a. The compressor will be shut down.
- b. The display will show the "HPL" message alternated with suction probe.
- c. The HP alarm counter will be increased.

**5.5.3 Manual restart**

- a. Switch the controller off and on - or -
- b. With **rSC=rSt**, keep the **RESTART** key pressed more than 5 sec - or -
- c. Enter programming mode and set **rSt=Y**.

**5.6 BUMP START FUNCTION**

**Purpose:** the bump start function is useful to get the refrigerant out of the compressor, without losing all of the oil, in the event of a flooded start and when pump-down and crank-case heaters are not applicable or inadequate.

**Parameters:**

|            |   |
|------------|---|
| <b>bMP</b> | <b>Bump start enabling</b><br>n = bump start disabled.<br>Y = bump start enabled. |
| <b>on</b>  | <b>Compressor on time:</b> 1 to 15 sec.   |
| <b>oFF</b> | <b>Compressor off time:</b> 1 to 15 sec.  |
| <b>nub</b> | <b>Number of cycle during bump start:</b> 1 to 15.                                |
| <b>bEn</b> | <b>Compressor stop time for next bump start:</b> 1.0 to 23h50min, res. 10 min.    |

**5.6.1 Functioning**

At power on, after a power down or when the compressor remains off for the **bEn** time, it is activated for **on** seconds and switched off for **oFF** seconds **nub** times.

**5.7 COMPRESSOR SHUT DOWN WITH HIGH dLT TEMPERATURE ALARM**

**Purpose:** with **P3C=dLT**, it's possible to connect a NTC 86Kohm probe to the 16-17 terminals to monitor the discharge line temperature. When the temperature reaches the set threshold, the compressor will be shut down.

**Parameters:**

|            |   |
|------------|---|
| <b>doF</b> | <b>DLT alarm temperature to stop compressor:</b> don to 200°C; don to 392°F |
| <b>don</b> | <b>DLT temperature for compressor restart:</b> -30.0°C to doF; -22°F to doF |
| <b>ALd</b> | <b>Stop compressor delay:</b> 0 to 255 sec                                  |

|            |   |
|------------|---|
| <b>nPS</b> | <b>Number of activation of DLT alarm in a hour to lock compressor</b><br>0 = always automatic restart.<br>1 to 15 = when the DLT alarm happens nPS times in an hour, the regulation is locked and a manual restart is required. |
| <b>dLF</b> | <b>Minimum time of compressor off with dLT temperature alarm:</b> 0 to 15 min   |

**5.7.1 Functioning**

When the temperature detected by the **DLT** probe is higher than **doF** value, the following actions will be performed:

- a. The compressor will be shut down.
- b. The display will show the "dLT" message alternated with suction probe.
- c. The **dLT** alarm counter will be increased.

**5.7.2 Automatic restart**

When the temperature detected by the **dLT** probe is lower than the **don** value, the compressor will be able to restart only when both **dLF** and **AC** timers will expire.

If the temperature detected by the **dLT** probe reaches the **doF** value **nPS** times in an hour, a manual restart will be required.

In this situation:

- a. The compressor will be shut down.
- b. The display will show the "dLL" message alternated with suction probe.
- c. The **dLL** alarm counter will be increased.


**5.7.3 Manual restart**

- a. Switch controller off and on - or -
- b. With **rSC=rSt**, keep the **RESTART** key pressed more than 5 sec - or -
- c. Enter programming mode and set **rSt=Y**.


**NOTE:** In any case the compressor can restart only if the **dLT** temperature is less than **don** value.

**6. MAIN INTERFACE**

**6.1 HOW TO SEE THE SETPOINT**

- 
1. Push and immediately release the **SET** key: the display will show the **Cin** message.
  2. Push the **SET** key to see the value.
  3. Push and immediately release the **SET** key: the display will show the **Cou** message.
  4. Push the **SET** key to see the value.

**6.2 HOW TO MODIFY THE SETPOINT**

- 
1. Keep push the **SET** key since the display will show the **Cin** message.
  2. Push the **SET** key to see the value.
  3. Use **UP** or **DOWN** to change its value
  4. Push and immediately release the **SET** key: the display will show the **Cou** message.
  5. Push the **SET** key to see the value.
  6. Use **UP** or **DOWN** to change its value

**6.3 HOW TO CHANGE A PARAMETER VALUE**

To change a parameter value, operate as follows:

1. Enter the Programming mode by keeping **SET+DOWN** keys pressed 3 sec (the "PSI" or "bar" LED starts blinking).
2. Select the required parameter. Press **SET** key to display its actual 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 for 15 sec without pressing a key.

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

**6.4 THE HIDDEN MENU**

The hidden menu includes all the parameters of the instrument.

**6.4.1 HOW TO ENTER THE HIDDEN MENU**

1. Enter the Programming mode by pressing the **SET+DOWN** buttons for 3 sec (the °C or °F LED will start blinking).
2. Released the buttons and then push again the **SET+DOWN** buttons for more than 7 sec. The Pr2 label will be displayed immediately followed from the **HY** parameter.  
**Now it is possible to browse the hidden menu.**
3. Select the required parameter.
4. Press the **SET** button to display its value.
5. Use **UP** or **DOWN** to change its value.
6. Press **SET** to store the new value and move to the following parameter.

**To exit:** Press **SET+DOWN** or wait 15 sec without pressing a key.

**NOTE1:** if no parameter is present in Pr1 menu, after 3 sec the "noP" message will be displayed. Keep the buttons pushed till the Pr2 message will be displayed.

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

**6.4.2 HOW TO MOVE A PARAMETER FROM THE HIDDEN MENU TO THE FIRST LEVEL AND VICEVERSA**

Each parameter present in the hidden menu (Pr2) can be moved into the user level (Pr1) by pressing **SET+DOWN** buttons. If a parameter is part of the user level, when showed in the hidden menu the decimal point will be lit.

**6.5 HOW TO LOCK THE KEYBOARD**

1. Keep both **UP** and **DOWN** buttons pressed for more than 3 sec.

- 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
- If a button is pressed more than 3 sec the "PoF" message will be displayed.

**6.6 TO UNLOCK THE KEYBOARD**

Keep pressed together for more than 3 sec the **UP** and **DOWN** keys till the "Pon" message will be displayed.

**7. ALARM MENU**

The controller records in the Alarm menu the total number of activation of the following alarms.

- HP safety pressure switch activation ( up to 999) - **HP** menu
- High **dLt** temperature alarm ( up to 999) - **dLt** menu
- Total number of manual restarts (HPL and dLL) up to 255 - **LOC** menu.

**7.1 HOW TO SEE THE ALARM COUNTERS**

- Push and release **ALR** key.
- The controller will show the "HP" label.
- Push **SET** key to see the number of activations.
- The controller will show the "dLt" label.
- Push the **SET** key to see the number of activations.
- The controller will show the "LoC" label.
- Push the **SET** key to see the number of activations.

**8. SERVICE MENU**

In the **SERVICE** menu are stored the following information:

- Number of compressor activations:** **StH** (0 to 999, res. 1000); **StL** (0 to 999, res. 1) ES: **StH=22** and **StL=568**: the total number of compressor activations is 22568.
- Compressor working time (hours):** **CHH** (0 to 65, res. 1000); **CHL** (0 to 999, res. 1). **NOTE:** When the 65535 value is reached, the storing will be locked and the **H\_C** alarm will appear. **To reset** the alarm: enter programming mode and set **rCh=Y**.
- Fan1 working time (hours):** **F1H** (0 to 65, res. 1000); **F1L** (0 to 999; res. 1). **NOTE:** When the 65535 value is reached, the storing will be locked and the **H\_F** alarm will appear. **To reset** the alarm: enter programming mode and set **rFh=Y**.
- Fan2 working time (hours):** **F2H** (0 to 65, res. 1000); **F2L** (0 to 999; res. 1). **NOTE:** When the 65535 value is reached, the storing will be locked and the **H\_F** alarm will appear. **To reset** the alarm: enter programming mode and set **rFh=Y**.

**8.1 HOW TO ENTER THE SERVICE MENU**

Keep **SERVICE** key pressed 3 sec. After that the menu **StH**, **StL**, **CHH**, **CHL**, **F1H**, **F1L**, **F2H** and **F2L** will be showed.

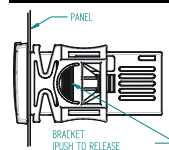
**To exit:** push and release **SERVICE** key or both **SET+UP** keys.

**9. PARAMETERS**

| LABEL                                   | DESCRIPTION                                       | RANGE   |
|---|---|---|
| <b>COMPRESSOR REGULATION</b>            |   |   |
| <b>Cin</b>                              | Compressor cut in                                 | CoU to US bar/PSI/kPA   |
| <b>CoU</b>                              | Compressor cut out                                | LS to Cin bar/PSI/kPA   |
| <b>LS</b>                               | Minimum set point                                 | P1i to Cou bar/PSI/kPA  |
| <b>US</b>                               | Maximum set point                                 | Cin to P1E bar/PSI/kPA  |
| <b>odS</b>                              | Outputs delay at start up                         | 0 to 255 sec  |
| <b>AC</b>                               | Anti-short cycle delay                            | 6 to 900 sec  |
| <b>ono</b>                              | Minimum time between two compressor starts        | 0 to 15 min   |
| <b>Con</b>                              | Compressor ON time with faulty probe              | 0 to 255 min  |
| <b>CoF</b>                              | Compressor OFF time with faulty probe             | 0 to 255 min  |
| <b>FAN REGULATION (ONLY FOR XC30CX)</b> |   |   |
| <b>SF1</b>                              | Set point for fan1                                | P2C=ntC: [-40.0°C to SF2] [-40°F to SF2] P2C=0-5: P2i to SF2 bar/PSI/kPA                            |
| <b>HF1</b>                              | Fan 1 differential                                | °C [0.1 to 10.0]<br>°F [1 to 100]<br>bar [0.1 to 100]<br>PSI [1 to 100]<br>kPA [1 tp 100]           |
| <b>SF2</b>                              | Set point for fan2                                | P2C=NTC: [SF1 to 110.0°C] [SF1 to 230°F]<br>P2C=0-5: SF1 to P2E bar/PSI/kPA                         |
| <b>HF2</b>                              | Fan 2 differential                                | °C [0.1 to 10.0]<br>°F [1 to 100]<br>bar [0.1 to 100]<br>PSI [1 to 100]<br>kPA [1 tp 100]           |
| <b>nFA</b>                              | Number of fans on with P2 fault                   | 0 to 2  |
| <b>PROBE SETTING</b>                    |   |   |
| <b>P1C</b>                              | Probe 1 configuration (9-10-11) (only for XC30CX) | 0-5 = ratiometric; ntC  |
| <b>P1i</b>                              | Start scale for probe 1                           | °C [-50 to 110]<br>°F [-58 to 230]<br>bar [-1.0 to P2E]<br>PSI [-15 to P2E]<br>kPA [-100 to P2E]    |
| <b>P1E</b>                              | End scale for probe 1                             | °C [-50 to 110]<br>°F [-58 to 230]<br>bar [P1i to 99.9]<br>PSI [P1i to 999]<br>kPA [P1i to 999]     |
| <b>P1F</b>                              | Probe 1 offset                                    | °C [-12.0 to 12.0]<br>°F [-21 to 21]<br>bar [-1.2 to 1.2]<br>PSI [-120 to 120]<br>kPA [-120 to 120] |
| <b>P1d</b>                              | Pressure probe error delay at start up            | 0 to 100 min  |
| <b>P2P</b>                              | Probe 2 presence                                  | no; YES   |

| LABEL  | DESCRIPTION   | RANGE   |
|--|---|---|
| <b>P2C</b>                                   | Probe 2 configuration   | 0-5=ratiometric; ntC=NTC probe  |
| <b>P2i</b>                                   | Start scale for probe 2   | °C [-50 to 110]<br>°F [-58 to 230]<br>bar [-1.0 to P2E]<br>PSI [-15 to P2E]<br>kPA [-100 to P2E]    |
| <b>P2E</b>                                   | End scale for probe 2   | °C [-50 to 110]<br>°F [-58 to 230]<br>bar [P1i to 99.9]<br>PSI [P1i to 999]<br>kPA [P1i to 999]     |
| <b>P2F</b>                                   | Probe 2 offset  | °C [-12.0 to 12.0]<br>°F [-21 to 21]<br>bar [-1.2 to 1.2]<br>PSI [-120 to 120]<br>kPA [-120 to 120] |
| <b>P3C</b>                                   | Probe 3 configuration (16-17)                                       | nu; dLt = probe NTC (86kohm); CPA = do not set it   |
| <b>P3F</b>                                   | Probe 3 offset  | °C [-12.0 to 12.0]<br>°F [-21 to 21]  |
| <b>MEASUREMENT UNIT</b>                      |   |   |
| <b>Unt</b>                                   | Measurement unit for pressure: PSI, bar, kPA                        | PSI; bar; kPA   |
| <b>CF</b>                                    | Measurement unit for temperature                                    | °C; °F  |
| <b>rES</b>                                   | Resolution for °C : decimal point, integer                          | dE(0); in(1)  |
| <b>dLy</b>                                   | Pressure display delay  | 0 to 255 sec  |
| <b>BUMP START FUNCTION</b>                   |   |   |
| <b>bMP</b>                                   | Bump start enabling   | no; YES   |
| <b>on</b>                                    | Compressor on time  | 1 to 15 sec   |
| <b>oFF</b>                                   | Compressor off time   | 1 to 15 sec   |
| <b>nuB</b>                                   | Number of cycle during bump start                                   | 1 to 15   |
| <b>bEn</b>                                   | Compressor stop time for next bump start                            | 1.0 to 23h50min, res. 10 min  |
| <b>DLT INPUT MANAGEMENT</b>                  |   |   |
| <b>doF</b>                                   | DLT alarm temperature to stop compressor                            | [don to 200°C] [don to 392°F]   |
| <b>don</b>                                   | DLT temperature for compressor restart                              | [-30.0°C to doF] [-22°F to doF]   |
| <b>ALd</b>                                   | Stop compressor delay   | 0 to 255 sec  |
| <b>nPS</b>                                   | Number of activation of DLT alarm in a hour to lock compressor      | 0 to 15; 0 = always automatic restart   |
| <b>dLF</b>                                   | Minimum time of compressor off with dLL alarm                       | 0 to 15 min   |
| <b>HIGH CONDENSER TEMPERATURE</b>            |   |   |
| <b>AU2</b>                                   | Condenser Temperature/Pressure threshold for high alarm             | P2C=ntC: [AH2 to 110.0°C] [AH2 to 230°F] P2C=0-5: AH2 to P2E bar/PSI/kPA                            |
| <b>AH2</b>                                   | Differential for high Condenser Temperature/Pressure alarm recovery | P2C=ntC: [-40.0°C to AU2] [-40°F to AU2] P2C=0-5: P2i to AU2 bar/PSI/kPA                            |
| <b>Ad2</b>                                   | High condenser temperature alarm delay                              | 0 to 255min   |
| <b>RELAY CONFIGURATION (ONLY FOR XC30CX)</b> |   |   |
| <b>tbA</b>                                   | Buzzer muting   | no; YES   |
| <b>oA2</b>                                   | Relay 1-2 configuration   | FAn=Fan 1 Fn2=Fan 2 ALr=Alarm relay   |
| <b>DIGITAL INPUT MANAGEMENT</b>              |   |   |
| <b>di1</b>                                   | Thermostat digital input presence 14-17                             | no; YES   |
| <b>i1P</b>                                   | Thermostat digital input polarity 14-17                             | oP; CL  |
| <b>di2</b>                                   | HP safety digital input presence 15-17                              | no; YES   |
| <b>i2P</b>                                   | HP safety digital input polarity 15-17                              | oP; CL  |
| <b>HPn</b>                                   | HP safety digital input activation before compressor lock           | 0 to 15; 0 = always automatic restart   |
| <b>HPF</b>                                   | Minimum time of compressor off with HP d.i. alarm                   | 0 to 15 min   |
| <b>COUNTER RESET</b>                         |   |   |
| <b>rSt</b>                                   | Regulation restart with dLL and HPL alarm (only for XC30CX)         | no; YES   |
| <b>rSA</b>                                   | Alarm counters reset ( dLT, HP)                                     | no; YES   |
| <b>rCA</b>                                   | Compressor activation counter reset                                 | no; YES   |
| <b>rCH</b>                                   | Compressor running hours reset                                      | no; YES   |
| <b>rFH</b>                                   | Fan running hours reset (only for XC30CX)                           | no; YES   |
| <b>OTHERS</b>                                |   |   |
| <b>dP1</b>                                   | P1 probe display  | (Probe value)   |
| <b>dP2</b>                                   | P2 probe display  | (Probe value)   |
| <b>dP3</b>                                   | P3 probe display  | (Probe value)   |
| <b>rEL</b>                                   | Firmware Release  | Readable only   |
| <b>Ptb</b>                                   | Map code  | Readable only   |

**10. INSTALLATION AND MOUNTING**



**XC10CX** and **XC30CX** shall be mounted on vertical panel, in a 29x71mm hole, and fixed using the special bracket supplied. The temperature range allowed for correct operation is -10 to 55°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 2.5mm². 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 UP button; the "uPL" message appears followed a by a flashing "End" label.
3. Push SET button and the "End" will stop flashing.
4. Turn OFF the instrument, remove the "HOT-KEY" and then turn it ON again.

**NOTE:** the "Err" message appears in case of a failed programming operation. In this case push again button 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 pre-programmed "HOT-KEY" into the 5-PIN receptacle and then turn the Controller ON.
3. The parameter list of the "HOT-KEY" will be automatically downloaded into the Controller memory. The "doL" message will blink followed a by a flashing "End" label.
4. After 10 seconds the instrument will restart working with the new parameters.
5. Remove the "HOT-KEY".

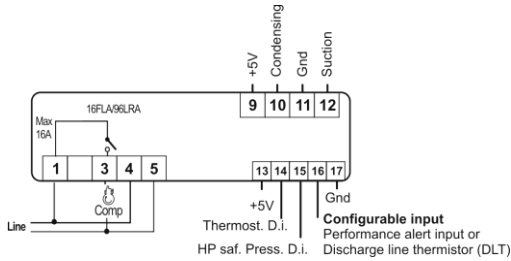
**NOTE:** the message "Err" is displayed for failed programming. In this case turn the unit off and then on if you want to restart the download again or remove the "HOT-KEY" to abort the operation.

**13. ALARM SIGNALS**

| LABEL | MEANING   | MODE             |
|-------|---|------------------|
| PoF   | Keyboard locked   | Flashing (3 sec) |
| Pon   | Keyboard unlocked   | Flashing (3 sec) |
| P1    | Suction probe failure   | Flashing         |
| P2    | Condenser probe failure   | Flashing         |
| P3    | DLT probe failure   | Flashing         |
| HA    | High condenser temperature alarm  | Flashing         |
| dLt   | DLT temperature alarm   | Flashing         |
| dLL   | DLT lock alarm  | Flashing         |
| HP    | Safety HP pressure switch alarm   | Flashing         |
| HPL   | Safety HP pressure switch lock alarm  | Flashing         |
| C-H   | Compressor working hour counter alarm   | Flashing         |
| F-H   | Fan working hour counter alarm  | Flashing         |
| HdL   | 255LOC, 999HP or 999dLt has been reached. It is necessary to reset the counters | Flashing         |
| EE    | EE alarm  | Flashing         |

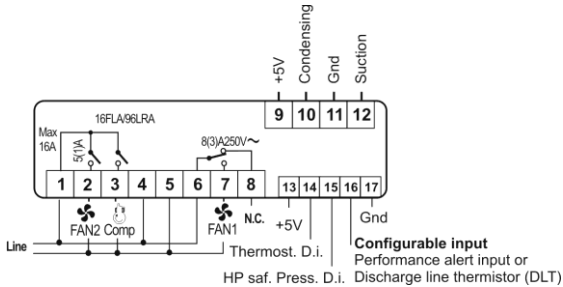
**14. WIRING DIAGRAMS**

**14.1 XC10CX, 110 OR 230VAC**



**NOTE:** terminal 4 and 5 are for power supply at 110VAC or 230VAC depending on the model.

**14.2 XC30CX, 110 OR 230VAC**



**NOTE:** terminal 4 and 5 are for power supply at 110VAC or 230VAC depending on the model.

**14.3 IN-OUT DESCRIPTION**

**Suction probe:** the controller is able to manage both NTC 10K and ratiometric probes.  
**NTC:** set par. P1C=ntC; connect the probe to the terminal 11 and 10.  
**Ratiometric:** set par. P1C=0-5; use the terminal 9 (+5V) for supply, terminal 11 for gnd and 12 for Signal.

**Condenser probe:** the controller is able to manage both NTC 10K and ratiometric probes.  
**NTC:** set par. P2C=ntC; connect the probe to the terminal 11 and 10.  
**Ratiometric:** set par. P2C=0-5; use the terminal 9 (+5V) for supply, terminal 11 for gnd and 10 for Signal.

**Thermostat input:** use terminals 14-17.  
**HP input:** use terminals 15-17.  
**DLT NTC 86ohm sensor:** set P3C=dLt, then connect the probe to terminals 16-17.  
**CPA connection:** not available.  
**Power supply:** use terminals 4-5.

**Compressor:** use terminals 1-3.  
**FAN 1:** use terminals 6-7 (only for XC30CX).  
**FAN 2:** use terminals 1-2 (only for XC30CX).

**15. TECHNICAL DATA**

**Housing:** self-extinguishing ABS  
**Dimensions:** frontal 32x74 mm; depth 70mm  
**Mounting device:** panel mounting in a 71x29mm panel cut-out  
**Degree of protection:** NEMA – UL 50e: Indoor use, type 1 enclosure  
**IEC 60529:** Front panel: IP65, Rear housing: IP00

**Power supply:** according to the model: 230Vac ±10%, 50/60Hz, 110Vac ±10%, 50/60Hz  
**Overvoltage Category:** II  
**Rated power:** 3VA max  
**Rated Impulse Voltage:** 4000V  
**Display:** 3 digits, red LED, 14.2 mm high  
**Software class:** A  
**Terminal connections:** spade on terminal blocks 6.2mm, wire section < 2.5mm<sup>2</sup>  
**Data storing:** on the non-volatile memory (EEPROM)  
**Type of action:** 1B  
**Pollution degree:** 2  
**Ambient operating temperature:** 0T60°C (ENEC) / -20T60°C (UL)  
**Shipping and storage temperature:** -30 to 85°C (-22 to 185°F)  
**Relative humidity:** 20 to 85% (no condensing)  
**Measuring and regulation range:** NTC probe: -40 to 110°C (-40 to 230°F)  
 NTC 86kohm probe: -30 to 190 °C (-22 to 374°F)

**Resolution:** 0.1°C or 1°C or 1°F (selectable)  
**Accuracy (ambient temp. 25°C):** ±0.7°C ±1 digit  
**Inputs:** up to 3 probes  
 free voltage contact  
**Relay outputs:** Compressor: SPST 20(8) A, 250Vac  
 Fan2: SPST 5A, 250Vac or SPST 16(6)A 250Vac (only for XC30CX)  
 Fan1: SPDT 8(3) A, 250Vac or SPST 16(6)A 250Vac (only for XC30CX)

**Purpose of control:** operating control  
**Construction of control:** incorporated control, intended to be used in Class I or Class II equipment

**16. DEFAULT SETTING VALUES**

| LABEL | RANGE  | XC10CX |       | XC30CX |       |
|-------|--|--------|-------|--------|-------|
|       |  | Value  | Level | Value  | Level |
| Cin   | CoU to US bar/PSI/kPA  | 3.3    | Pr1   | 3.3    | Pr1   |
| CoU   | LS to Cin bar/PSI/kPA  | 2.6    | Pr1   | 2.6    | Pr1   |
| LS    | P1i to Cou bar/PSI/kPA   | 0.5    | Pr2   | 0.5    | Pr2   |
| US    | Cin to P1E bar/PSI/kPA   | 7.0    | Pr2   | 7.0    | Pr2   |
| odS   | 0 to 255 sec   | 30     | Pr2   | 30     | Pr2   |
| AC    | 6 to 900 sec   | 60     | Pr2   | 60     | Pr2   |
| ono   | 0 to 15 min  | 5      | Pr2   | 5      | Pr2   |
| Con   | 0 to 255 min   | 5      | Pr2   | 5      | Pr2   |
| CoF   | 0 to 255 min   | 5      | Pr2   | 5      | Pr2   |
| SF1   | P2C=ntC: [-40.0°C to SF2] [-40°F to SF2] P2C=0-5: P2i to SF2 bar/PSI/kPA<br>°C [0.1 to 10.0]<br>°F [1 to 100]<br>bar [0.1 to 100]<br>PSI [1 to 100]<br>kPA [1 tp 100]    | -      | -     | 13.0   | Pr2   |
| HF1   | P2C=NTC: [SF1 to 110.0°C] [SF1 to 230°F]<br>P2C=0-5: SF1 to P2E bar/PSI/kPA<br>°C [0.1 to 10.0]<br>°F [1 to 100]<br>bar [0.1 to 100]<br>PSI [1 to 100]<br>kPA [1 tp 100] | -      | -     | 14.5   | Pr2   |
| SF2   | P2C=NTC: [SF1 to 110.0°C] [SF1 to 230°F]<br>P2C=0-5: SF1 to P2E bar/PSI/kPA<br>°C [0.1 to 10.0]<br>°F [1 to 100]<br>bar [0.1 to 100]<br>PSI [1 to 100]<br>kPA [1 tp 100] | -      | -     | 14.5   | Pr2   |
| HF2   | P2C=NTC: [SF1 to 110.0°C] [SF1 to 230°F]<br>P2C=0-5: SF1 to P2E bar/PSI/kPA<br>°C [0.1 to 10.0]<br>°F [1 to 100]<br>bar [0.1 to 100]<br>PSI [1 to 100]<br>kPA [1 tp 100] | -      | -     | 14.5   | Pr2   |
| nFA   | 0 to 2   | -      | -     | 1      | Pr2   |
| P1C   | °C [-50 to 110]<br>°F [-58 to 230]<br>bar [-1.0 to P2E]<br>PSI [-15 to P2E]<br>kPA [-100 to P2E]   | -      | -     | 0-5    | Pr2   |
| P1i   | °C [-50 to 110]<br>°F [-58 to 230]<br>bar [P1i to 99.9]<br>PSI [P1i to 999]<br>kPA [P1i to 999]  | 0      | Pr2   | 0      | Pr2   |
| P1E   | °C [-12.0 to 12.0]<br>°F [-21 to 21]<br>bar [-1.2 to 1.2]<br>PSI [-120 to 120]<br>kPA [-120 to 120]  | 15.0   | Pr2   | 15.0   | Pr2   |
| P1F   | °C [-50 to 110]<br>°F [-58 to 230]<br>bar [-1.0 to P2E]<br>PSI [-15 to P2E]<br>kPA [-100 to P2E]   | 0      | Pr2   | 0      | Pr2   |
| P1d   | 0 ro 100 min   | 15     | Pr2   | 15     | Pr2   |
| P2P   | no(0); YES(1)  | YES    | Pr2   | YES    | Pr2   |
| P2C   | 0-5 = ratiometric; nTC   | 0-5    | Pr2   | 0-5    | Pr2   |
| P2i   | °C [-50 to 110]<br>°F [-58 to 230]<br>bar [-1.0 to P2E]<br>PSI [-15 to P2E]<br>kPA [-100 to P2E]   | 0.0    | Pr2   | 0.0    | Pr2   |
| P2E   | °C [-50 to 110]<br>°F [-58 to 230]<br>bar [P1i to 99.9]<br>PSI [P1i to 999]<br>kPA [P1i to 999]  | 30.0   | Pr2   | 30.0   | Pr2   |
| P2F   | °C [-12.0 to 12.0]<br>°F [-21 to 21]<br>bar [-1.2 to 1.2]<br>PSI [-120 to 120]<br>kPA [-120 to 120]  | 0.0    | Pr2   | 0.0    | Pr2   |



|     |   |      |     |      |     |
|-----|---|------|-----|------|-----|
| P3C | nu; dLt = DLT Probe NTC 86kohm;<br>CPA = do not set it                      | nu   | Pr2 | nu   | Pr2 |
| P3F | [-12.0 to 12.0] [-21 to 21°F]   | 0    | Pr2 | 0    | Pr2 |
| Unt | PSI; bar; kPA   | bar  | Pr2 | bar  | Pr2 |
| CF  | °C; °F  | °C   | Pr2 | °C   | Pr2 |
| rES | dE(0); in(1)  | dE   | Pr2 | dE   | Pr2 |
| dLy | 0 to 255 sec  | 0    | Pr2 | 0    | Pr2 |
| bMP | no(0); YES(1)   | no   | Pr2 | no   | Pr2 |
| on  | 1 to 15 sec   | 2    | Pr2 | 2    | Pr2 |
| oFF | 1 to 15 sec   | 5    | Pr2 | 5    | Pr2 |
| nub | 1 to 15   | 3    | Pr2 | 3    | Pr2 |
| bEn | 1.0 to 23h50min; res. 10 min  | 4.0  | Pr2 | 4.0  | Pr2 |
| doF | [don to 200°C] [don to 392°F]   | 105  | Pr2 | 105  | Pr2 |
| don | [-30.0°C to doF] [-22°F to doF]   | 75   | Pr2 | 75   | Pr2 |
| ALd | 0 to 255 sec  | 10   | Pr2 | 10   | Pr2 |
| nPS | 0 to 15, 0 = always automatic restart                                       | 4    | Pr2 | 4    | Pr2 |
| dLF | 0 to 15 min   | 5    | Pr2 | 5    | Pr2 |
| AU2 | P2C=ntC: [AH2 to 110.0°C] [AH2 to 230°F]<br>P2C=0-5: AH2 to P2E bar/PSI/kPA | 23.0 | Pr2 | 23.0 | Pr2 |
| AH2 | P2C=ntC: [-40.0°C to AU2] [-40°F to AU2] P2C=0-5:<br>P2i to AU2 bar/PSI/kPA | 19.0 | Pr2 | 19.0 | Pr2 |
| Ad2 | 0 to 255 min  | 0    | Pr2 | 0    | Pr2 |
| tbA | no(0); YES(1)   | -    | -   | YES  |     |
| oA2 | FAn; Fn2; ALr   | -    | -   | Fn2  | Pr2 |
| di1 | no(0); YES(1)   | YES  | Pr2 | no   | Pr2 |
| i1P | OP; CL  | CL   | Pr2 | CL   | Pr2 |
| di2 | no(0); YES(1)   | no   | Pr2 | no   | Pr2 |
| i2P | OP; CL  | CL   | Pr2 | CL   | Pr2 |
| HPn | 0 to 15, 0 = always automatic restart                                       | 5    | Pr2 | 5    | Pr2 |
| HPF | 0 to 15 min   | 5    | Pr2 | 5    | Pr2 |
| rSt | no(0); YES(1)   | -    | -   | no   | Pr2 |
| rSA | no(0); YES(1)   | no   | Pr2 | no   | Pr2 |
| rCA | no(0); YES(1)   | no   | Pr2 | no   | Pr2 |
| rCH | no(0); YES(1)   | no   | Pr2 | no   | Pr2 |
| rFH | no(0); YES(1)   | -    | -   | no   | Pr2 |
| dP1 | (Probe value)   | -    | Pr2 | -    | Pr2 |
| dP2 | (Probe value)   | -    | Pr2 | -    | Pr2 |
| dP3 | (Probe value)   | -    | Pr2 | -    | Pr2 |
| rEL | Readable only   | -    | Pr2 | -    | Pr2 |
| Ptb | Readable only   | -    | Pr2 | -    | Pr2 |