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2. GENERAL WARNINGS

PLEASE READ BEFORE USING THIS MANUAL

• This manual is part of the product and should be kept near the instrument for easy and quick use.
• 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.

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.
• Withdraw 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.
• Ensure that the wires for probes, loads and the power supply are separated and far enough from each other, without crossing or interfering.
• In case of applications in industrial environments, the use of mains filters (our mod. FT1) in parallel with inductive loads could be useful.

3. GENERAL DESCRIPTION

The XR06CX format 32 x 74 x 60 mm, is microprocessor based controller, suitable for applications on medium or low temperature ventilated refrigerating units. It has three relay outputs to control compressor, fans, and defrost which can be either electrical or reverse cycle (hot gas). The device is also provided with 2 NTC probe inputs, the first one for temperature control and the second one to be located onto the evaporator, to control the defrost termination temperature and to managed the fan and it’s provided with a configurable digital input. With the HOTKEY it’s possible to program the instrument in a quick and easy way.

4. REGULATION

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 the "Cy" parameter. With "Cy" parameter it can be selected the fans functioning:

→ fans OFF
→ fans will run only if the compressor is ON, and not run during defrost

5. DEFROST

Two defrost modes are available through the "fd" parameter:

→ t<qEL: defrost through electrical heater (compressor OFF)
→ t<qin = hot gas defrost (compressor ON)

Other parameters are used to control the interval between defrost cycles ("fd"), its maximum length ("Md") and two defrost modes: timed or controlled by the evaporator's probe. At the end of defrost dripping time is started, its length is set in the dt parameter. With dfin the dripping time is disabled.

6. FANS

With FC parameter it can be selected the fans functioning:

→ FC=on will switch ON and OFF with the compressor and not run during defrost
→ FC=OFF will switch ON and OFF with the compressor and run during defrost
→ FC=OFF will run continuously also during defrost.

An additional parameter "FS" 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 "FS".

7. FRONT PANEL COMMANDS

To display target set point, in programming mode it selects a parameter or confirms an operation.

To start a manual defrost

In programming mode it browses the parameter codes or increases the displayed value.

In programming mode it browses the parameter codes or decreases the displayed value.

8. FANS AND DIGITAL INPUT

When the digital input is configured as door switch (iF=do), fans and compressor status depends on the dC parameter value:

→ dC=fn = normal regulation;
→ dC=fc = fans OFF;
→ dC=fp = compressor OFF;
→ dC=fd = compressor and fans OFF.

When rdn", the regulation restart with door open alarm.

9. FANS MANAGEMENT

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8. PARAMETERS

REGULATION
Hy Differential: (0.1°C ÷ 25°C / 1°F ÷ 45°F) Intervention differential for set point. Compressor Cut IN is the set point + differential (hhy). Compressor Cut OUT is when the temperature reaches the set point.

LS Minimum SET POINT: [-55°C÷SET+67°F+SET] Sets the minimum value for the set point.

US Maximum SET POINT: [SET+99°C÷SET+99°F] Set the maximum value for set point.

ot First probe calibration: (-9÷9.9°C / -17°F ÷ 17°F) allows to adjust possible offset of the first probe.

P2 Evaporator probe presence: n≠ present; y≠ the defrost stops by temperature.

oE Second probe calibration: (-9÷9.9°C / -17°F ÷ 17°F) allows to adjust possible offset of the second probe.

od Outputs activation delay at start up: (0÷99min) This function is enabled at the initial start up of the instrument and inhibits any output activation for the period of time in the parameter.

AC Anti-short cycle delay: (0÷50 min) minimum interval between the compressor stop and the following restart.

Cv Compressor ON time with faulty probe: (099 min) time during which the compressor is active in case of faulty thermostat probe. With Cv≠0 compressor is always OFF.

Cn Compressor OFF time with faulty probe: (0÷99 min) time during which the compressor is OFF in case of faulty thermostat probe. With Cn≠0 compressor is always active.

DISPLAY
CF Measurement unit: (°C/°F) °C=Glausius; °F=Fahrenheit. WARNING: When the measurement unit is changed the SET point and the values of the parameters H, LS, US, Cv, Cn, AL, AU, AD have to be checked and modified if necessary.

rE Resolution (only for °C) (eE in = dE) decimal between -9.9 and 9.9, leE integer.

Lt Defrost time display: (P1 = P2) P1=Thermal probe; P2=Evaporator probe. SP=Set point (only XR04CX).

dy Display delay: (0÷15 min.) when the temperature increases, the display is updated 1°C/1°F after this time.

DEFROST
id Defrost type: (EL = EL) electric heater, compressor OFF; sH= hot gas, compressor ON.

dE Defrost termination temperature: (-5÷50° / -5÷99°F) If P2≠y it sets the temperature reference at which the evaporator stops after defrost, which causes the end of defrost.

Id Interval between defrost cycles: (0÷99 minutes) Determines the time interval between the beginning of two defrost cycles.

Md Maximum length for defrost: (099 min. with 0 no defrost) when P2≠n, (not evaporator probe: timed defrost) it sets the defrost duration, when P2≠y (defrost end based on temperature) it sets the maximum length for defrost.

sd Start defrost delay: (0÷99min) This is useful when different start defrost times are necessary to avoid overheating the plant.

dDisplay during defrost: (rt / it / SP / dF) rt real temperature, it= start defrost temperature; SP= present temperature; dF= label df.

dt Drip time: (0÷99 min) time interval between reaching defrost termination temperature and the restoration of the control’s normal operation. This time allows the evaporator to eliminate water drops that might have formed due to defrost.

dP Defrost at power-on: (y≠) power on defrost starts; m≠ defrost doesn’t start at power-on.

FANS
FC Fans operating mode: (on, on, on, on) on runs with the compressor, OFF during defrost; on continuous mode, OFF during defrost; onY runs with the compressor, ON during defrost.

Fd Fans delay after defrost: (0÷99 min) Interval between end of defrost and evaporator fans start.

FS Fans stop temperature: (-55÷50° / -67÷99°F) setting of temperature, detected by evaporator probe, above which fans are always OFF.

ALARMS
AU Maximum temperature alarm: (AL=+99°C/99°F) when this temperature is reached the alarm is enabled, after the "Ad" delay time.

AL Minimum temperature alarm: (AE=+5°C/AU=+67°F+AU) when this temperature is reached the alarm is enabled, after the "Ad" delay time.

Ad Temperature alarm delay: (099 min) time interval between the detection of an alarm condition and alarm signalling.

dA Exclusion of temperature alarm at startup: (099 min) time interval between the detection of the temperature alarm condition after instrument power on and alarm signalling.

DIGITAL INPUT
IP Digital input polarity: (p = L) p activated by closing the contact; L≠ activated by opening the contact.

IF Digital output configuration: (EA/bA/do/dF/Au/Hc) EA= external alarm; "EA" message is displayed; bA= serious alarm "CA" message is displayed; do= door switch function; dF= defrost activation; Au= not used; Hc= inversion of the kind of action.

di Digital input delay: (0÷99 min) with ifEA or bA delay between the detection of the external alarm and its condition and signalling. With ifDo it represents the delay to activate the door open alarm.

dC Compressor and fan status when open door: (m≠Fm) m≠ normal, Fm = Fans OFF, cP=cEvaporator OFF, Fm = Compressor and fans OFF.

dR Regulation with door open: (y≠) y≠ no regulation if door is opened; y≠ when di is elapsed regulation restarts even if door open alarm is present.

OTHER
d1 Thermostat probe display (read only).

d2 Evaporator probe display (read only).

Pt Parameter code table

R Software release

9. DIGITAL INPUTS (ONLY XR03CX)
The free voltage digital input is programmable in different configurations by the "if" parameter.

10. INSTALLATION AND MOUNTING

The instrument is provided with screw terminal block to connect cables with a cross section up to 2.5 mm². 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. ELECTRICAL CONNECTIONS

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 THE 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 "cA" key; the "up" message appears followed by a flashing "Ed".

3. Push "set key" and the "Ed" will stop flashing.

4. TURN OFF the instrument remove the “Hot Key”, then turn it ON again.

NOTE: the "Er" message is displayed for failed programming. In this case push again o 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 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 “do” message is blinking followed by a flashing “Ed”.

4. After 10 seconds the instrument will restart working with the new parameters.

5. Remove the “Hot Key”.

NOTE: the “Er” message is displayed for failed programming. In this case push again o key if you want to restart the upload again or remove the “Hot Key” to abort the operation.

13. ALARM SIGNALLING

Probe alarms P1 and 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” and “LA” automatically stop as soon as the temperature returns to normal values.

Alarms “EA” and “CA” (with ifbA) recover as soon as the digital input is disabled.

14. TECHNICAL DATA

Housing: self extinguishing ABS.

Case: frontal 32x34 mm, depth 60mm;
Mounting: panel mounting in a 71x29mm panel cut-out
Protection: IP20; Frontal protection: IP65
Connections: according to the model 230Vac ±10%, 50/60Hz --- 110Vac ±10%, 50/60Hz
Power supply: to 2,5 mm² wiring.
Display: 2 digits, red LED, 14.2 mm high. Inputs: Up to 2 NTC.
Digital input: free voltage contact
Relay outputs: compressor SPST 8(3) A, 250Vac; SPST 16(6)A 250Vac or 20(8)A 250Vac
  defrost: SPDT 8(3) A, 250Vac
fan: SPST 8(3) A, 250Vac or SPST 5(2) A
Data storing: on the non-volatile memory (EEPROM).
Kind of action: 1B; Pollution grade: 2; Software class: A.
Rated impulsive voltage: 2500V; Overvoltage Category: II
Operating temperature: 0÷60 °C; Storage temperature: -25÷60 °C.
Relative humidity: 20 ÷ 85% (no condensing)
Measuring and regulation range: NTC -40÷110°C; Resolution: 0.1 °C or 1°F (selectable); Accuracy (ambient temp. 25°C): ±0.1 °C ±1 digit

15. CONNECTIONS

15.1 XR06CX – 20+8+5A OR 16+8+5A – 110VAC OR 230VAC

NOTE: The compressor relay is 20(8)A or 16(6)A depending on the model.
NOTE: Connect the 120Vac power supply to 4-5

15.2 XR06CX – 8+8+8A – 110VAC OR 230VAC

NOTE: Connect the 120Vac power supply to 6-7

16. DEFAULT SETTING VALUES

<table>
<thead>
<tr>
<th>LAB</th>
<th>DESCRIPTION</th>
<th>RANGE</th>
<th>DEFAULT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hy</td>
<td>Differential</td>
<td>0.1 ÷ 25°C/1 ÷ 45°F</td>
<td>2.0°C / 4 °F</td>
</tr>
<tr>
<td>LS</td>
<td>Minimum Set Point</td>
<td>-55°C/SET+67°F+SET</td>
<td>-55°C / 55°F</td>
</tr>
<tr>
<td>US</td>
<td>Maximum Set Point</td>
<td>SET+99°C/ SET+99°F</td>
<td>99 °C / 99°F</td>
</tr>
<tr>
<td>ot</td>
<td>First probe calibration</td>
<td>-9.9÷9.9°C/-17÷17°F</td>
<td>0.0</td>
</tr>
<tr>
<td>P2</td>
<td>Second probe presence</td>
<td>n - Y</td>
<td>y</td>
</tr>
<tr>
<td>oE</td>
<td>Second probe calibration</td>
<td>-9.9÷9.9°C/-17÷17°F</td>
<td>0.0</td>
</tr>
<tr>
<td>od</td>
<td>Outputs activation delay at start up</td>
<td>0 ÷ 99 min</td>
<td>0</td>
</tr>
<tr>
<td>AC</td>
<td>Anti-short cycle delay</td>
<td>0 ÷ 50 min</td>
<td>1</td>
</tr>
<tr>
<td>Cy</td>
<td>Compressor ON time faulty probe</td>
<td>0 ÷ 99 min</td>
<td>15</td>
</tr>
<tr>
<td>Cn</td>
<td>Compressor OFF time faulty probe</td>
<td>0 ÷ 99 min</td>
<td>30</td>
</tr>
<tr>
<td>CF</td>
<td>Measurement units</td>
<td>°C / °F</td>
<td>°C / °F</td>
</tr>
<tr>
<td>rE</td>
<td>Resolution (only for °C)</td>
<td>dE = in</td>
<td>dE</td>
</tr>
<tr>
<td>Ld</td>
<td>Default Display</td>
<td>P1 - P2 - SP</td>
<td>P1</td>
</tr>
<tr>
<td>dy</td>
<td>Display delay</td>
<td>0 ÷ 15 min</td>
<td>0</td>
</tr>
<tr>
<td>id</td>
<td>Interval between defrost cycles</td>
<td>0 ÷ 99 hours</td>
<td>6</td>
</tr>
<tr>
<td>Md</td>
<td>Maximum length for defrost</td>
<td>0 ÷ 99 min.</td>
<td>30</td>
</tr>
<tr>
<td>dd</td>
<td>Start defrost delay</td>
<td>0 ÷ 99 min.</td>
<td>0</td>
</tr>
<tr>
<td>dF</td>
<td>Display during defrost</td>
<td>rt – in – SP – dF</td>
<td>it</td>
</tr>
<tr>
<td>dt</td>
<td>Drip time</td>
<td>0 ÷ 99 min</td>
<td>0</td>
</tr>
<tr>
<td>dP</td>
<td>Defrost at power-on</td>
<td>y - n</td>
<td>n</td>
</tr>
<tr>
<td>FC</td>
<td>Fans operating mode</td>
<td>cn – on – cY – oY</td>
<td>on</td>
</tr>
<tr>
<td>Fd</td>
<td>Fans delay after defrost</td>
<td>0 ÷ 99 min</td>
<td>10</td>
</tr>
<tr>
<td>FS</td>
<td>Fans stop temperature</td>
<td>-55÷50°C/-67÷99°F</td>
<td>2.0 °C / 36 °F</td>
</tr>
<tr>
<td>AU</td>
<td>Maximum temperature alarm</td>
<td>ALL÷99°C / ALL÷99°F</td>
<td>99 °C / 99 °F</td>
</tr>
<tr>
<td>AL</td>
<td>Minimum temperature alarm</td>
<td>-55°C÷ALU/-67°F÷ALU</td>
<td>-55 °C / -55 °F</td>
</tr>
<tr>
<td>Ad</td>
<td>Temperature alarm delay</td>
<td>0 ÷ 99 min</td>
<td>15</td>
</tr>
<tr>
<td>dA</td>
<td>Exclusion of temperature alarm at startup</td>
<td>0 ÷ 99 min</td>
<td>90</td>
</tr>
<tr>
<td>iP</td>
<td>Digital input polarity</td>
<td>cL - oP</td>
<td>cL</td>
</tr>
<tr>
<td>iF</td>
<td>Digital input configuration</td>
<td>EA - bA - dA - dF - Au - Hc</td>
<td>EA</td>
</tr>
<tr>
<td>di</td>
<td>Digital input delay</td>
<td>0 ÷ 99 min</td>
<td>5</td>
</tr>
<tr>
<td>dC</td>
<td>Compressor and fan status when open door</td>
<td>no / Fn / cP / Fc</td>
<td>FC</td>
</tr>
<tr>
<td>rd</td>
<td>Regulation with door open</td>
<td>n - Y</td>
<td>y</td>
</tr>
<tr>
<td>dF</td>
<td>Defrost at power-on</td>
<td>y - n</td>
<td>n</td>
</tr>
</tbody>
</table>

FANS

| FC  | Fans operating mode | cn – on – cY – oY | on |
| Fd  | Fans delay after defrost | 0 ÷ 99 min | 10 |
| FS  | Fans stop temperature | -55÷50°C/-67÷99°F | 2.0 °C / 36 °F |

ALARMS

| AU  | Maximum temperature alarm | ALL÷99°C / ALL÷99°F | 99 °C / 99 °F |
| AL  | Minimum temperature alarm | -55°C÷ALU/-67°F÷ALU | -55 °C / -55 °F |
| Ad  | Temperature alarm delay | 0 ÷ 99 min | 15 |
| dA  | Exclusion of temperature alarm at startup | 0 ÷ 99 min | 90 |

DIGITAL INPUT

| iP  | Digital input polarity | cL - oP | cL |
| iF  | Digital input configuration | EA - bA - dA - dF - Au - Hc | EA |
| di  | Digital input delay | 0 ÷ 99 min | 5 |
| dC  | Compressor and fan status when open door | no / Fn / cP / Fc | FC |
| rd  | Regulation with door open | n - Y | y |

OTHER

| d1  | Thermostat probe display | Read Only | - - - |
| d2  | Evaporator probe display | Read Only | - - - |
| Pt  | Parameter code table | Read Only | - - - |
| rL  | Firmware release | Read Only | - - - |