DIGITAL CONTROLLER
XR02CX

1   GENERAL WARNINGS

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

2   GENERAL DESCRIPTION

Model **XR02CX**, **format 32 x 74 x 50 mm**, is a digital thermostat, with off cycle defrost, designed for refrigeration applications at normal temperature. It provides a relay output to drive the compressor. It is also provided with 1 NTC probe input. The instrument is fully configurable through special parameters that can be easily programmed through the keyboard or the by **HOT-KEY**.

3   REGULATION

3.1 THE REGULATION OUTPUT

The regulation is performed according to the temperature measured by the thermostat probe with a positive differential from the set point: if the temperature increases and reaches set point plus differential the compressor is started and then turned off when the temperature reaches the set point value again.
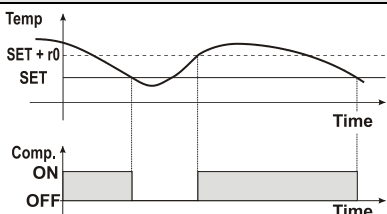
In case of fault in the thermostat probe the start and stop of the compressor are timed through parameters **CY** and **Cn**.

4   DEFROST

Defrost is performed through a simple stop of the compressor. Parameter **id** controls the interval between defrost cycles, while its length is controlled by parameter **Md**.

5   FRONT PANEL COMMANDS

SET	To display target set point, in programming mode it selects a parameter or confirm an operation
❄	(**DEF**) To start a manual defrost
⌃	(**UP**) In programming mode it browses the parameter codes or increases the displayed value
⌄ AUX	(**DOWN**) In programming mode it browses the parameter codes or decreases the displayed value

KEYS COMBINATION

⌄ + ⌃	To lock or unlock the keyboard
SET + ⌄	To enter in programming mode
SET + ⌃	To return to room temperature display

LED	MODE	MEANING
❄	On	Compressore enabled
	Flashing	Anti short cycle delay enabled (AC parameter)

	On	Defrost in progress
❄💧	Flashing	Dripping in progress
°C	On	Measurement unit
	Flashing	Programming mode
°F	On	Measurement unit
	Flashing	Programming mode

5.1   HOW TO SEE THE SET POINT

1. Push and immediately release the **SET** key, the set point will be showed;
2. Push and immediately release the **SET** key or wait about 5 sec to return to normal visualisation.

5.2   HOW TO CHANGE THE SETPOINT

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

5.3 HOW TO START A MANUAL DEFROST

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

5.4 HOW TO CHANGE A PARAMETER VALUE

To change the parameter's, value operate as follows:
1. Enter the Programming mode by pressing the **SET+DOWN** keys for 3 sec ("°C" or "°F" LED starts blinking).
2. Select the required parameter. Press the **SET** key to display its value
3. Use **UP** or **DOWN** to change its value.
4. Press **SET** to store the new value and move to the following parameter.

To exit: press **SET+UP** buttons or wait for 15 sec without pressing any key.
NOTE: the set value is stored even when the procedure is exited by waiting the time-out to expire.

5.5 TO LOCK THE KEYBOARD

1. Keep pressed for more than 3 sec the **UP** and **DOWN** keys.
2. The "OF" message will be displayed and the keyboard will be locked. If a key is pressed more than 3 sec the "OF" message will be displayed.

5.6 TO UNLOCK THE KEYBOARD

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

6   PARAMETERS

REGULATION

Hy	**Differential:** (0.1 to 25°C; 1 to 45°F) differential for set point. Compressor Cut IN is SET POINT + differential (Hy). Compressor Cut OUT is when the temperature reaches the set point.
LS	**Minimum SET POINT:** (-55°C to SET; -67°F to SET) sets the minimum value for the set point.
US	**Maximum SET POINT:** (SET to 99°C; SET to 99°F) set the maximum value for set point.
ot	**First probe calibration:** (-9.9 to 9.9°C; -17 to 17°F) allows to adjust possible offset of the first probe.
F5	**Filter probe enabling:** (nu; AL; do) set the field of action of the internal measurement filter. **nu**=not used; **AL**=the filter will always works on all probes; **do**=the filter will only works on all probes for 30 sec after opening of the door.
od	**Outputs activation delay at start up:** (0 to 99min) this function is enabled at the initial start up of the instrument and inhibits any output activation for the period of time set in the parameter.
AC	**Anti-short cycle delay:** (0 to 50 min) minimum interval between the compressor stop and the following restart.
Cy	**Compressor ON time with faulty probe:** (0 to 99min) time during which the compressor is active in case of faulty thermostat probe. With Cy=0 compressor is always OFF.
Cn	**Compressor OFF time with faulty probe:** (0 to 99min) 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** =Celsius; **°F** =Fahrenheit. **WARNING**: When the measurement unit is changed the SET point and the values of the parameters Hy, LS, US, oE, o1, AU, AL have to be checked and modified if necessary.
rE	**Resolution (only for °C):** (dE; in) **dE**= decimal between -9.9 and 9.9°C; **in**= integer.
dy	**Display delay:** (0 to 15min) when the temperature increases, the display is updated of 1°C or 1°F after this time.

DEFROST

id	**Interval between defrost cycles:** (0 to 99min) Determines the time intervals between two consecutives cycles of defrost.
Md	**Maximum length for defrost:** (0 to 99min, 0 means 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.
dF	**Display during defrost:** (rt; it; SP; dF) **rt**= real temperature; **it**= start defrost temperature; **SP**= SET-POINT; **dF**= label **dF**.

ALARMS

AU	**Maximum temperature alarm:** (AL to 99°C; AL to 99°F) when this temperature is reached the alarm is enabled, after the "**Ad**" delay time.
AL	**Minimum temperature alarm:** (-55°C to AU; -67°F to AU) when this temperature is reached the alarm is enabled, after the **Ad** delay time.
Ad	**Temperature alarm delay:** (0 to 99min) time interval between the detection of an alarm condition and alarm signalling.
dA	**Exclusion of temperature alarm at startup:** (0 to 99min) time interval between the detection of the temperature alarm condition after instrument power on and alarm signalling.

DIGITAL INPUT

|	
iP	**Digital input polarity:** (oP; CL) **oP**=activated by closing the contact; **CL**=activated by opening the contact.
di	**Digital input alarm relay:** (0 to 99 min) it represents the delay to activate the door open alarm.

OTHER

d1	Room probe instant value (read only)
rS	Real Set Poin value (read only)
Pt	Parameter code table (read only)
rL	Software release (read only)

7 DIGITAL INPUT

7.1 DOOR SWITCH

When the door is open and after the delay time set through parameter **di**, the door alarm will be enabled: the display will show the message "**dA**". The alarm will stop as soon as the external digital input is disabled again. With the door open, the high and low temperature alarms are disabled.

8 INSTALLATION AND MOUNTING

PANEL

BRACKET
!PUSH TO RELEASE
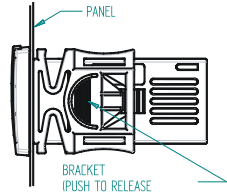
Instrument **XR02CX** shall be mounted on vertical panel, in a 29x71 mm hole, and fixed using the special bracket supplied.
The temperature range allowed for correct operation is 0 to 60°C. Avoid places subject to strong vibrations, corrosive gases, excessive dirt or humidity. The same recommendations apply to probes. Let air circulate by the cooling holes.

9 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.

9.1 PROBES

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.

10 HOW TO USE THE HOT KEY

10.1 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 **UP** key; the "**uP**" message appears followed a by flashing "**En**"
3. Push "**SET**" key and the "**En**" will stop flashing.
4. Turn OFF the instrument and then remove the "**Hot-key**". After that 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.

10.2 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 a by flashing "**En**".
4. After 10 sec 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.

11 ALARM SIGNALLING

Mess.	Cause	Outputs
P1	Room probe failure	Compressor output according to **Cy** e **Cn**
HA	Maximum temperature alarm	Outputs unchanged
LA	Minimum temperature alarm	Outputs unchanged

5.1 ALARM RECOVERY

Probe alarm "**P1**" starts 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.
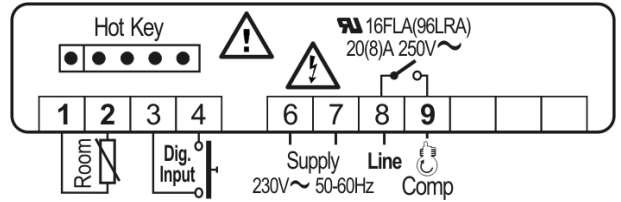
12 TECHNICAL DATA

Housing: self extinguishing ABS
Case: frontal 32x74 mm; depth 60mm
Mounting: panel mounting in a 71x29mm panel cut-out
Protection: IP20
Frontal protection: IP65
Connections: disconnectable terminal block ≤ 2.5 mm² wiring and 6.3mm fast-on
Power supply: according to the model ±10%; 230Vac ±10%, 50/60Hz, 110Vac ±10%, 50/60Hz
Power absorption: 3.5 VA max
Display: 2 digits, red LED, 14.2 mm high; **Inputs:** 2 NTC
Relay outputs: compressor: 20(8)A 250Vac
Data storing: on the non-volatile memory (EEPROM).
Kind of action: 1B
Pollution degree: 2
Software class: A
Rated impulsive voltage: 2500V
Overvoltage Category: II
Operating temperature: 0 to 60°C (32 to 140°F)

Storage temperature: -30 to 85°C (-22 to 185°F)
Relative humidity: 20 to 85% (not condensing)
Measuring and regulation range: NTC -40 to 110°C (-40 to 230°F).
Resolution: 0.1°C or 1°C or 1°F (selectable)
Accuracy (ambient temp. 25°C): ±0.7°C ±1 digit

13 CONNECTIONS

13.1 20A COMPRESSOR RELAY

Hot Key

⚠ 🔲 16FLA(96LRA) 20(8)A 250V ~

1	2	3	4		6	7	8	9		
Room		Dig. Input			Supply 230V~ 50-60Hz		Line	Comp		

NOTE: in case of 110Vac model, connect power supply to terminals 6-7.

14 DEFAULT SETTING VALUES

LABEL	DESCRIPTION	RANGE
Hy	Differential	0.1 to 25°C; 1 to 45°F
LS	Minimum Set Point	-55°C to SET; -67°F to SET
US	Maximum Set Point	SET to 99°C; SET to 210°F
ot	First probe calibration	-9.9 to 9.9°C; -17 to 17°F
F5	Filter probe enabling	nu; AL; do
od	Outputs activation delay at start up	0 to 99 min
AC	Anti-short cycle delay	0 to 50 min
Cy	Compressor ON time faulty probe	0 to 99 min
Cn	Compressor OFF time faulty probe	0 to 99 min
CF	Measurement units	°C; °F
rE	Resolution (only for °C)	dE; in
dy	Display delay	0 to 15 min
id	Interval between defrost cycles	0 to 99 hours
Md	Maximum length for defrost	0 to 99 min.
dF	Display during defrost	rt; in; dE
AU	Maximum temperature alarm	ALL to 99°C; ALL to 210°F
AL	Minimum temperature alarm	-55°C to ALU; -67°F to ALU
Ad	Temperature alarm delay	0 to 99 min
dA	Exclusion of temperature alarm at startup	0 to 99 min
iP	Digital input polarity	oP; CL
di	Digital input alarm delay	0 to 99 min
d1	Room probe display	Read Only
rS	Real set point	Read Only
Pt	Parameter code table	Read Only
rL	Firmware release	Read Only

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