

XR110C**with built-in RS485****CONTENTS**

1. GENERAL WARNING	1
2. GENERAL DESCRIPTION	1
3. CONTROLLING LOADS	1
4. FRONT PANEL COMMANDS	1
5. LIST OF PARAMETERS	2
6. DIGITAL INPUTS	3
7. INSTALLATION AND MOUNTING	3
8. ELECTRICAL CONNECTIONS	3
9. ALARM SIGNALS	3
10. TECHNICAL DATA	3
11. CONNECTIONS	4
12. DEFAULT SETTING VALUES	4

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.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

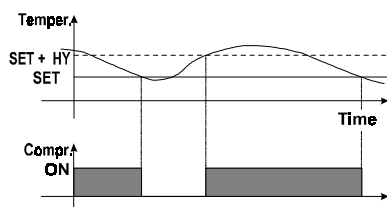
XR110C is connectable to the XJ500 monitoring system through the two terminals of serial port RS485.

Model **XR110C**, 32 x 74 mm format, is a single stage temperature controller suitable for applications in the field of refrigeration or heating. It is provided with a relay output and a PTC or NTC probe inputs configurable by the User.

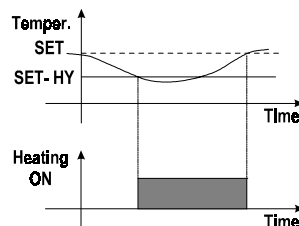
3. CONTROLLING LOADS**3.1 TYPE OF REGULATION**

The regulation is performed according to the temperature measured by the probe. The instruments are provided with the **CH** programmable parameter which enables the user to set the regulation both for heating or cooling applications:

- CH = 0 : cooling applications
- CH = 1 : heating applications

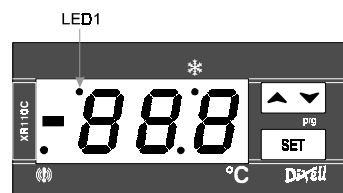
3.2 CH=0 : COOLING

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.

3.3 CH = 1: HEATING

The Hy value is automatically set under the Set Point. If the temperature decreases and reaches set point minus differential the regulation output is activated and then turned off when the temperature reaches the set point value again.

N.B. :In case of fault in the thermostat probe the start and stop of the compressor are timed through parameters "Con" and "COF".

4. FRONT PANEL COMMANDS

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

By holding it pressed for 5s the instrument Stand By started(If it is enable)
By holding it pressed for 3s when max or min temperature is displayed it will be erased.

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

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

KEY COMBINATIONS:

▲ + ▼ To lock & unlock the keyboard.

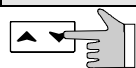
SET + ▼ To enter in programming mode.

SET + ▲ To return to the room temperature display.

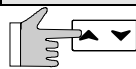
4.1 USE OF LEDS

Each LED function is described in the following table.

LED	MODE	Function
❄	ON	Compressor enabled
❄	FLASHING	- Programming Phase (flashing with LED1) - Anti-short cycle delay enabled
LED1	FLASHING	Programming Phase (flashing with LED ❄)
🔔	ON	- ALARM signal - In "Pr2" indicates the parameter is also present in "Pr1"

4.2 HOW TO SEE THE MIN TEMPERATURE

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

4.3 HOW TO SEE THE MAX TEMPERATURE

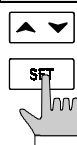
1. Press and release the ▲ key.
2. The "Hi" message will be displayed followed by the maximum temperature recorded.
3. By pressing the ▲ key or waiting for 5s the normal display will be restored.

4.4 HOW TO RESET THE MAX AND MIN TEMPERATURE RECORDED

To reset the stored temperature, when max or min temperature is displayed :

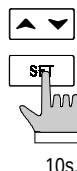
1. Press SET key until "rST" label starts blinking.

4.5 HOW TO SEE THE SET POINT



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

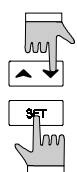
4.6 HOW TO CHANGE THE SET POINT



1. Push the **SET** key for 3 seconds to change the Set point value;
2. The value of the set point will be displayed and the * and LED1 start blinking;
3. To change the Set value push the ▲ or ▼ arrows within 10s.
4. To memorise the new set point value push the **SET** key again or wait 10s.

4.7 TO ENTER IN PARAMETERS LIST "PR1"

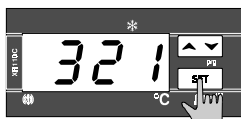
To enter the parameter list "Pr1" (user accessible parameters) operate as follows:



1. Enter the Programming mode by pressing the Set and UP key for few seconds (LED1 and * start blinking).
2. The instrument will show the first parameter present in "Pr1"

4.8 TO ENTER IN PARAMETERS LIST "PR2"

To enter in the parameter list "Pr2" (installer level) operate as follows:



To access parameters in "Pr2" a security code is required.

1. To enter in "Pr1" level.
2. Select "Pr2" parameter and press the **SET** key.
3. The "PAS" flashing message is displayed, shortly followed by "0 - -" with a flashing zero.
4. Use ▲ or ▼ to input the security code in the flashing digit; confirm the figure by pressing **SET**. The security code is "321".
5. If the security code is correct the access to "Pr2" is enabled by pressing **SET** on the last digit.

NOTE: each parameter in "Pr2" can be removed or put into "Pr1" (user level) by pressing **SET** + ▼. When a parameter is present in "Pr1" LED (i) is on.

4.9 HOW TO CHANGE THE PARAMETER VALUE

To change the parameter's value operate as follows:

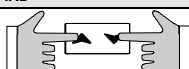


1. Enter the Programming mode.
2. Select the required parameter with ▲ or ▼.
3. Press the **SET** key to display its value (* and LED1 starts blinking).
4. Use ▲ or ▼ to change its value.
5. Press **SET** to store the new value and move to the following parameter.

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

NOTE: the new programming is stored even when the procedure is exited by waiting the time-out.

4.10 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 is locked. At this point it is only possible the viewing of the set point or the MAX o Min temperature stored.

4.10.1 TO UNLOCK THE KEYBOARD

Keep pressed together for more than 3s the ▲ and ▼ keys.

4.11 STAND BY FUNCTION

If the stand-by function is enabled (Onf = 1), by holding pressed the SET key for 5s., the instrument shows "OFF". The stand-by function switches OFF all the relays and stops the regulation. During the stand by if a XJ500 is connected, it does not record the instrument data and alarms.

N.B. 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.

5. LIST OF PARAMETERS

Pbc Type of probe: (0 = PTC probe; 1 = NTC probe).

Hy Differential: (0,2°C ÷ 30,0°C / 1°F÷54°F): Intervention differential for set point, always positive. Compressor Cut IN is Set Point Plus Differential (Hy). Compressor Cut OUT is when the temperature reaches the set point.

LS Minimum set point limit: (- 50.0°C÷SET/ -58°F÷SET) Sets the minimum acceptable value for the set point.

US Maximum set point limit: (SET÷ 150°C / SET ÷302°F) Set the maximum acceptable value for set point.

AC Anti-short cycle delay: (0÷30 min) interval between the compressor stop and the following restart.

ALCTemperature alarm configuration :

0 = Related to Set Point ; 1 = Alarms related to the absolute temperature.

ALUHigh temperature alarm:

ALC= 0 , da 0 ÷ 50°C o 90°F

ALC= 1 , da ALL ÷ 150°C o 302°F

when this temperature is reached the alarm is enabled, after the ALd delay time.

ALL Low temperature alarm:

ALC = 0 , da 0 a 50 °C o 90°F

ALC = 1 , da - 50.0°C o -58°F a ALU

when this temperature is reached the alarm is enabled, after the ALd delay time.

ALd Temperature alarm delay: (0÷250 min) time interval between the detection of an alarm condition and alarm signalling.

dAO Delay of temperature alarm at start-up: (0÷720 min) time interval between the detection of the temperature alarm condition after instrument power on and the alarm signalling.

dot Delay of temperature alarm after closing the door : (0÷250 min) Time interval between the detection of the temperature alarm condition after closing the door.

OdSOutputs activation delay at start up: (0÷250 min) This function is enabled at the initial start up of the instrument and inhibits any output activation for the period of time set in the parameter.

Ot Thermostat probe calibration: (-12.0÷12.0°C/ -20÷20°F) allows to adjust possible offset of the thermostat probe.

rES Resolution (for °C): allows decimal point display.

0 = 0,1°C

1 = 1 °C

CF Temperature measurement unit:

0 = Celsius

1 = Fahrenheit.

WARNING: When the measurement unit is changed the SET point and the values of the parameters Hy, LS, US, ALU, ALL, dtE, Fst, Ot and OE have to be modified

CH Type of regulation: 0 = cooling; 1 = heating.

Con Compressor ON time with faulty probe: (0÷250 min) time during which the compressor is active in case of faulty thermostat probe. With Con=0 compressor is always OFF.

COF Compressor OFF time with faulty probe: (0÷250 min) time during which the compressor is off in case of faulty thermostat probe. With COF=0 compressor is always active.

dIC Digital input operating mode: configure the digital input function

0 = Not used

1 = Enabling energy saving mode

2 = Pressure switch

3 = Door open switch

4 = Not used

5 = generic alarm

6 = serious alarm mode

dIP Digital input polarity : determine if the digital inputs are activated for open or closed contact.

0 or 2 : Active if closed

1 or 3 : Active if open

odc Compressor and fan status when open door:

0,1 = Compressor not affected

2,3 = Compressor OFF

doA Open door alarm delay:(0÷250 min) delay between the detection of the open door condition and its alarm signalling: the flashing message "dA" is displayed.

HESTemperature increase during the Energy Saving cycle : (0,2°C ÷ 30,0°C / 1÷54°F) Sets the increase of the set point during the Energy Saving cycle. If, for instance, SET = -20°C and HES = 2, the operation set point during the Energy Saving cycle will be SET = -18°C.

nPS Pressurestat switching number: (0 ÷15) Number of activation of the pressure switch, during the "did" interval, before signalling the alarm event (dIC=2).

did Time interval/delay for digital input alarm:(0-250 min.) Time interval to calculate the number of activation of the pressure switch (dIC=2). If configured as external alarm (dIC=5), the did parameter defines the time delay between the detection and the signalling.

OnF Stand-by function:

0 = Stand-by function not enabled.

1 = Stand-by function enabled (under SET key control).

Ad1 RS485 serial address (0÷16): Identifies the instrument when it is connected to a monitoring system.

Ad2 RS485 serial address (0÷16): Identifies the instrument when it is connected to a monitoring system.

Ptb Parameter table: (read only) shows the factory default settings.

Rel Release software: (read only)

Pr2 Access to parameter list protected (read only)

6. DIGITAL INPUTS

These instruments can support a free contact digital inputs. It is programmable in seven different configuration by the "dic" parameter.

6.1 DOOR SWITCH INPUT (DIC=1)

It signals the door status to the instrument and with the "odc" parameter the relay output can be:

0,1 = Compressor not affected

2,3 = Compressor OFF

After a delay time (set through parameter "dOA") since the door is opened the alarm is enabled and the display shows the message "dA". The alarm stops as soon as the external digital input is disabled. The high and low temperature alarms are disabled when the door is open and during the delay "dot" after closing it.

6.2 CONFIGURABLE INPUT - PRESSURE SWITCH (DIC=2)

If during the interval time set by "did" parameter, the pressure switch has reached the number of activation of the "nPS" parameter, the "dAL", alarm of digital input, will be activated. the compressor is switched OFF and the regulation will be stopped. The alarm can be reset by switching OFF the whole device.

6.3 CONFIGURABLE INPUT - ENERGY SAVING (DIC=3)

The Energy Saving function allows an operative set point which is higher than the usual set point. During Energy Saving the set point is as SET+HES. This function is enabled until the digital input is activated.

6.4 CONFIGURABLE INPUT - GENERIC ALARM (DIC=5)

When the digital input is activated, the unit waits for "did" delay before signalling the "dAL" alarm message. The outputs status don't change, then the alarm will stop as soon as the digital input won't never be activated.

6.5 CONFIGURABLE INPUT - SERIOUS ALARM MODE (DIC=6)

When the digital input is activated, the unit waits for "did" delay before signalling the "dAL" alarm message. The relay outputs are switched OFF, then alarm will stop as soon as the digital input won't never be activated.

N.B. : DIC = 0 e DIC=4 are not used

6.6 DIGITAL INPUTS POLARITY

The digital inputs polarity depends to "diP" parameter:

0 or 2 : Active if closed

1 or 3 : Active if open

7. INSTALLATION AND MOUNTING

Instruments **XR110C** shall be mounted on panel, in a 29x71 mm hole, and fixed using the special bracket supplied. The temperature range allowed for correct operation is 0 - 60 °C. Avoid places subject to strong vibrations, corrosive gases, excessive dirt or humidity. The same recommendations apply to probes. Let air circulate by the cooling holes.

8. ELECTRICAL CONNECTIONS

The instruments are 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.

8.1 PROBE CONNECTION

The probe 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.

9. ALARM SIGNALS

Message	Cause	Outputs
"P1"	Thermostat probe failure	Compressor output according to parameters "CON" and "COF"
"HA"	Maximum temperature alarm	Outputs unchanged
"LA"	Minimum temperature alarm	Outputs unchanged
"EE"	Data or memory failure	Outputs unchanged
"dA"	Defrost timeout alarm	Outputs unchanged
"dAL"	Digital input alarm	Outputs unchanged

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

All the alarm messages are showed alternating with room temperature except "P1" which is flashing.

"EE" can be erased to press any key then message "rES" is displayed for about 3s before normal operation is restored.

9.1 SILENCING BUZZER

Once the alarm signal is detected the buzzer (if present) can be muted by pressing any key.

9.2 ALARM RECOVERY

Probe alarm : "P1" (probe1 faulty); it automatically stops 30s after the probe restarts normal operation. Check connections before replacing the probe.

Temperature alarms "HA" and "LA" automatically stop as soon as the thermostat temperature returns to normal values and when defrost starts.

External alarms "dAL" and "dA" stop as soon as the external digital input is disabled.

10. TECHNICAL DATA

Housing: self extinguishing ABS.

Case : frontal 32x74 mm; depth 60mm

Mounting : panel mounting in a 71x29 mm panel cut-out.

Frontal protection : IP65

Connections: Screw terminal block ≤ 2,5 mm² wiring.

Power supply: 12Vac/dc, -10%, +15%

110230Vac, ± 10%, 50/60Hz

230Vac, ± 10%, 50/60Hz

24 Vac/dc, ± 10%, 50/60Hz

Power absorption: 3VA max.

Display: 3 digits, red LED, 14,2 mm high.

Inputs: 1 PTC or NTC configurable.

Relay outputs

compressor

relè SPDT 8(3) A, 250Vac

relè SPST 20(8) A, 250Vac

Other output

XR110C (alim.12Vac/dc) buzzer for an acoustic signal of alarms

Serial Port : RS485

Data storing : on the non-volatile memory (EEPROM).

Operating temperature: 0÷60 °C.

Relative humidity: 20÷85% (no condensing)

Storage temperature: -30÷85 °C.

Measuring and regulation range:

PTC: -50÷150°C (-58÷302°F)

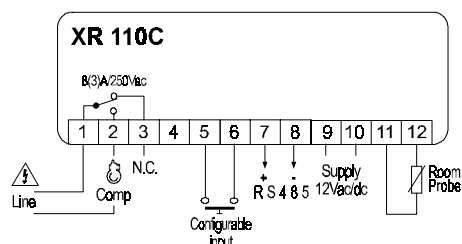
NTC: -40÷110°C (-58÷230°F)

Resolution: 0,1 °C or 1 °F (selectable).

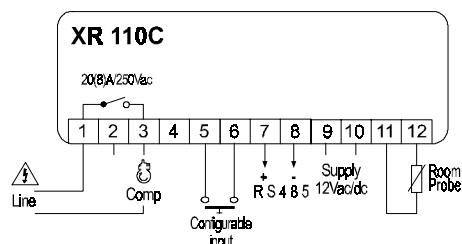
Accuracy of the controller at 25°C: range -40÷50°C (-40÷122°F): ±0,3 °C ±1 digit

11. CONNECTIONS

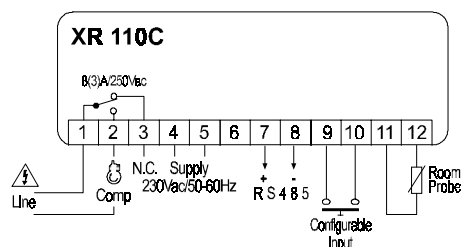
11.1 XR110C: 12VAC/DC; COMPRESSOR 8A



11.2 XR110C: 12VAC/DC; COMPRESSOR 20A



11.3 XR110C: 230VAC; COMPRESSOR 8A



12. DEFAULT SETTING VALUES

Label	Name	Range	Level	Cooling °C/°F	Heating °C/°F
SP	Set Point	LS ÷ US	---	5/41	5/41
Pbc	Type of probe	0 = PTC 1 = NTC	Pr2	0 or 1	0 or 1
hy	Differential	0,2°C ÷ 30,0°C 1°F ÷ 54°F	Pr1	2/4	2/4
LS	Minimum set point limit	50,0°C ÷ SP - 58°F ÷ SP	Pr2	-50/-58	-50/58
US	Maximum set point limit	SP ÷ 150°C SP ÷ 302°F	Pr2	150/302	150/302
Ac	Anti-short cycle delay	0 ÷ 30	Pr1	1	0
Alc	Temperature alarm configuration	0 = Related to Set Point 1 = Absolute temperature	Pr2	0	0
ALU	High temperature alarm	0 ÷ 50°C ÷ 90°F ALL ÷ 150°C ÷ 302°F	Pr1	10/20	15/27
ALL	Low temperature alarm	0 ÷ 50°C ÷ 90°F - 50,0°C ÷ - 58°F ÷ ALU	Pr1	10/20	15/27
Ald	Temperature alarm delay	0' ÷ 250'	Pr2	15	5
dAo	Delay of temperature alarm at start-up	0' ÷ 720'	Pr2	60	30
dot	Delay of temperature alarm after closing the door	0' ÷ 250'	Pr2	15	15
odS	Outputs activation delay at start up	0' ÷ 250'	Pr2	1	0
ot	Thermostat probe calibration	-12,0°C ÷ 12,0 °C - 20°F ÷ 20°F	Pr1	0	0
rES	Resolution	0 = With decimal point 1 = Without decimal point	Pr1	0	0
cF	Temperature measurement unit	0 = ° Celsius 1 = ° Fahrenheit	Pr2	0	0
CH	Type of regulation	0 = Cooling 1 = Heating	Pr1	0	1
Con	Compressor ON time with faulty probe	0' ÷ 250'	Pr2	30	0
CoF	Compressor OFF time with faulty probe	0' ÷ 250'	Pr2	30	5
dic	Digital input operating mode	0 = Start defrost 1 = Energy saving mode 2 = Pressure switch 3 = Door open switch 4 = Relay AUX actuation 5 = generic alarm 6 = serious alarm mode	Pr2	5	5
diP	Digital input polarity	0 = Both active if closes 1 = Door switch activates if close, configurable input activates if open 2 = Door switch activates if open, configurable input activates if closes 3 = Both active if opens	Pr2	0	0

Label	Name	Range	Level	Cooling °C/°F	Heating °C/°F
odc	Compressor and fan status when open door	0 = normal 1 = Fan OFF 2 = Compressor OFF 3 = Compressor and fan OFF	Pr2	1	1
doA	Open door alarm delay	0' ÷ 250'	Pr2	15	15
HES	Temperature increase during the Energy Saving cycle	0,2°C ÷ 30,0°C 1°F ÷ 54°F	Pr2	0,2	0,2
nPS	Pressure switch activation number	0 ÷ 15	Pr2	0	0
did	Time interval for digital input alarm	0' ÷ 250'	Pr2	5	5
onF	Enabling OFF device	0 = Not enable 1 = Enable	Pr2	0	0
Ad1	Serial address1 for RS485	0 ÷ 16	Pr1	0	0
Ad2	Serial address2 for RS485	0 ÷ 16	Pr1	1	1
Ptb	Parameters table	---	Pr2	---	---
rEL	Release SW	---	Pr2	---	---
Pr2	Parameters at installer level	---	Pr2	---	---

Dixell s.r.l. Z.I. Via dell'Industria, 27
32010 Pieve d'Alpago (BL) ITALY
tel. +39 - 0437 - 98 33 - fax +39 - 0437 - 98 93 13
E-mail: dixell@dixell.com - <http://www.dixell.com>