

# XT420C

## Single Stage Digital Controller with timed cycle

CE

### 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.

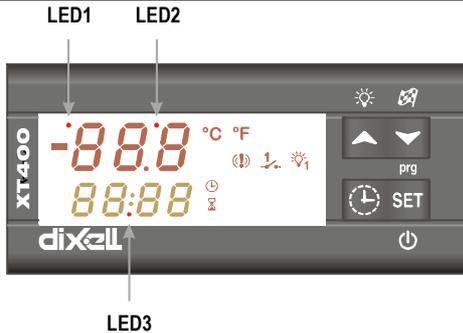
#### 1.2 SAFETY PRECAUTIONS

- 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.
- The instrument must not be opened.
- In case of failure or faulty operation send the instrument back to the distributor or to "DIXELL S.p.A." (see address) with a detailed description of the fault.
- Consider the maximum current which can be applied to each relay (see Technical Data).
- Ensure that the wires for probes, loads and the power supply are separated and far enough from each other, without crossing or intertwining.
- In case of applications in industrial environments, the use of mains filters (our mod. FT1) in parallel with inductive loads could be useful.

### 2. GENERAL DESCRIPTION

The XT420C is a single-stage ON/OFF controller for temperature applications with direct or inverse action and timed cycles. An additional relay is used to switch the light  
The analogue input type can be set by parameter PTC or NTC.

### 3. FRONT PANEL COMMANDS



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

**TO SWITCH THE INSTRUMENT ON/OFF:** If the function is enabled (par. onF=yES), by pressing the SET key for more than 4s the controller is switched OFF. To switch the instrument on again press the SET key.

**UP / Light:** to switch the light. In programming mode it browses the parameter codes or increases the displayed value. Hold it pressed for a faster change

**DOWN / Start:** to start and stop the cycle. In programming mode it browses the parameter codes or decreases the displayed value. Hold it pressed for a faster change

**CLOCK** To set the timer and to start/stop a cycle

#### KEY COMBINATIONS:

- ▲ + ▼ To lock & unlock the keyboard.
- SET + ▼ To enter in programming mode.
- SET + ▲ To return to the room temperature display.

#### 3.1 USE OF LEDS

A series of light points on the front panels is used to monitor the loads controlled by the instrument. Each LED function is described in the following table.

LED	MODE	FUNCTION
	ON	Output relay enabled
	ON	Light on
LED1	Flashing	- Programming Phase (flashing with LED2)
LED2	Flashing	- Programming Phase (flashing with LED1)
	ON	- The cycle is running
	ON	- ALARM signal - In "Pr2" indicates the parameter is also present in "Pr1"

#### 3.2 TO SEE AND CHANGE THE SETPOINT

1. Push and release the SET key:
  - the bottom display shows the label St1
  - the upper display shows the Set point value;
2. To come back to the normal display push again the SET key or wait 10s.
2. To change the Set value push the ▲ or ▼ arrows within 10s.
3. To memorise the new set point value push the SET key again or wait 10s.

### 4. TIMED CYCLE

#### 4.1 HOW TO SET THE TIMER

1. Push the CLOCK key, the bottom display shows the cycle duration, flashing, (h:mm or m:ss), while the hourglass icons starts flashing..
2. Use the UP and DOWN keys to adjust it.
3. Confirm the value pushing again the CLOCK key or waiting 10s.

#### 4.2 HOW TO START A CYCLE

Push and release the START key.  
The bottom display shows the count down of the cycle duration and the cycle is started.

#### 4.3 CYCLE END

The end of the cycle is signalled by the "End" message on the display and by the activation of the buzzer. The buzzer go on noising till a key is pressed..

#### 4.4 HOW TO MANUALLY STOP A CYCLE.

When a cycle is in progress push and release the START key. The controller come back to display the temperature and the timer is erased.

#### 4.5 HOW TO CHANGE THE TIMER WHEN A CYCLE IS RUNNING.

1. Push and release the CLOCK key, the remaining time starts blinking.
2. Use the UP and DOWN keys to adjust it.
3. Confirm the value pushing again the CLOCK key or waiting 10s.

#### 4.6 POSSIBILITY OF SELECTING THE KIND OF REGULATION: CONTINUOUS OR ONLY DURING THE CYCLE.

By means of the Ft parameter the kind of regulations is set:  
With Ft = tMd the regulation is enabled only during the cycle.  
With Ft = co the regulation is always active, the cycle consists of starting the timer and signalling when this is expired.

#### 4.7 TO ENTER THE PARAMETERS LIST "Pr1"

- To enter the parameter list "Pr1" (user accessible parameters) operate as follows:
1. Push for 3s the SET + ▼ keys (LED1 & 2 start blinking).
  2. The controller will show the first parameter present in the Pr1 menu:
- SET
- Bottom menu: label
  - Upper menu: value

#### 4.8 TO ENTER IN PARAMETERS LIST "Pr2"

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

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

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

#### Another possibility is the following:

After switching ON the instrument, within 30 seconds, push SET + ▼ keys together for 3s: the Pr2 menu will be entered.

#### 4.9 HOW TO MOVE A PARAMETER FROM THE "Pr2" MENU TO "Pr1" AND VICEVERSA.

Each parameter present in "Pr2" MENU can be removed or put into "Pr1", user level, by pressing "SET + ▼".

In "Pr2" when a parameter is present in "Pr1" the LED (🔔) is on.

#### 4.10 HOW TO CHANGE A PARAMETER

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

**TO EXIT:** Press SET + ▲ or wait 15s without pressing a key.

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

#### 4.11 HOW TO LOCK THE KEYBOARD



1. Keep pressed for more than 3 s the ▲ and ▼ keys.
2. The "POF" message will be displayed and the keyboard will be locked. At this point it will be possible only to see the set point or the MAX o Min temperature stored
3. If a key is pressed more than 3s the "POF" message will be displayed.

**4.12 TO UNLOCK THE KEYBOARD**

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

**4.13 ON/OFF FUNCTION**

**TO SWITCH THE INSTRUMENT ON/OFF:** If the function is enabled (par. onF=yES), by pressing the SET key for more than 4s the controller is switched OFF. To switch the instrument on again press the SET key.

**5. LIST OF PARAMETERS**

**REGULATION**

- Hy1 Differential:** (-Full Sc. / Full Sc.) Intervention differential for set point. It can be set with positive value or with negative value. The kind of action (direct or inverse) depends on the S1C parameter (in or di).
- Ft Regulation setting**  
oFF the regulation is enabled only during the cycle.  
on the regulation is always active, the cycle consists of starting the timer and signalling when this has expired.
- ods Outputs activation delay at start up:** (0÷255 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. (Light can work)
- LS1 Minimum set point:** (-50÷Set) Sets the minimum acceptable value for the set point.
- US1 Maximum set point:** (Set÷ 150°C) Sets the maximum acceptable value for set point.
- Ac1 Anti-short cycle delay:** (0÷250 sec) Minimum time between the switching off and the following switching on
- con Output ON time with faulty probe:** (0÷255 min) time during which the output is active in case of faulty thermostat probe. With CO=0 compressor is always OFF.
- coF Output OFF time with faulty probe:** (0÷255 min) time during which the output is off in case of faulty thermostat probe. With COF=0 compressor is always active.
- cH Action type:** Ht= inverse action (heating); cL direct action (cooling).

**DISPLAY**

- CF Temperature measurement unit:** °C = Celsius; °F = Fahrenheit. When the measurement unit is changed the SET point and the values of some parameters have to be modified.
- rES Resolution (for °C):** (in = 1°C; de = 0,1°C) allows decimal point display. de = 0,1°C; in = 1 °C

**ALARMS**

- ALC Temperature alarms configuration:** it determines if alarms are relative to set point or referred to absolute values: rE relative to set point; Ab absolute temperature
- ALL Minimum alarm:**  
with ALC=rE: relative to set point, (0÷50°C) this value is subtracted from the set point. The alarm signal is enabled when the probe values goes below the "SET-ALL" value.  
with ALC=Ab absolute value, minimum alarm is enabled when the probe values goes below the "ALL" value.
- ALU Maximum alarm:**  
with ALC=rE: alarm relative to set point, (0÷50°C) Maximum alarm is enabled when the probe values exceeds the "SET+ALU" value.  
with ALC=Ab: absolute alarm, (Set÷Full Sc.) Maximum alarm is enabled when the probe values exceeds the "ALU" value.
- ALH Differential for alarm recovery:** (0,1÷Full scale) the alarm recovers when probe value is higher than Alarm value + ALH.
- ALd Alarm delay:**(0÷999 min) time interval between the detection of an alarm condition and alarm signalling.
- dAO Delay of alarm at start-up:** (0÷23.5h) time interval between the detection of the alarm condition after instrument power on and alarm signalling.

**PROBES**

- Pbc Kind of probe:** Ptc = PTC; ntc = NTC
- oF1 Probe calibration:** (-12÷12°C) allows to adjust possible offset of the probe.

**DIGITAL INPUT**

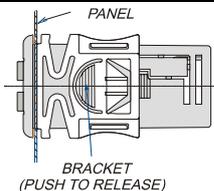
- i1P Digital input polarity:**  
CL : the digital input is activated by closing the contact;  
OP : the digital input is activated by opening the contact
- i1F Digital input operating mode:** digital input function:  
oFF = to switch the controller off.; EAL = generic external alarm; bAL = serious external alarm: it switches off the loads; dor = door switch function
- odc Output status with open door alarm:**  
no = normal; CPr or c\_o= output OFF;
- rrd Regulation restart with door open alarm:**  
YES = regulation restarts; no = regulation according to odc parameter.
- did Digital input alarm delay:** (0÷255 min) delay between the detection of the external alarm condition (i1F= EAL or i1F = bAL) and its signalling.
- tcM Timer resolution:** H-M = hour/minute; M-S = minute/second

**OTHER**

- Adr RS485 serial address** (0÷247) identifies the instrument within a control or supervising system.
- onF Switching ON/OFF enabling from keyboard:** (no = disabled; yES=enabled) It permits the switching ON/OFF of the instrument by pressing the SET key for more than 4s.
- Ptb Parameters table:** (read only) Shows the code of the parameters map.
- rEL Software release:** (read only)
- Pr2 To access the Pr2** parameter programming menu.

**6. INSTALLATION AND MOUNTING**

Instrument XT420C shall be mounted on vertical panel, in a 29x71 mm hole, and fixed using the special brackets supplied. To obtain an IP65 protection grade use the front panel rubber gasket (mod. RG-C) as shown in figure. The temperature range allowed for correct operation is 0÷60 °C. Avoid places subject to strong vibrations, corrosive gases, excessive dirt or humidity. The same recommendations apply to probes. Let air circulate by the cooling holes.



**7. 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 input connection 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. SERIAL CONNECTIONS**

All models can be connected to the monitoring and supervising system XJ500 using the serial port. The external XJ485 serial module to interface the instrument with the monitoring and supervising system XJ500 is required.  
The standard ModBus RTU protocol it is used.

**9. HOW TO USE THE HOT KEY**

**9.1 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 ▲ key; the "uPL" message appears followed a by flashing "End"
3. Push "SET" key and the End will stop flashing.
4. Turn OFF the instrument remove the "Hot Key", then turn it ON again.

**NOTE:** the "Err" message is displayed for failed programming. In this case push again ▲ key if you want to restart the upload again or remove the "Hot key" to abort the operation.

**9.2 HOW TO PROGRAM AN INSTRUMENT USING A 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 "doL" message is blinking followed a by flashing "End".
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.

**10. DIGITAL INPUT**

XT420C has 1 free contact digital input. It is programmable in 4 different configurations by the "i1F" parameter.

**10.1 DOOR SWITCH INPUT**

It signals the door status and the corresponding relay output status through the "odc" parameter:  
no = normal (any change);  
CPr and c\_o= output OFF;  
Since the door is opened, after the delay time set through parameter "doA", the alarm output is enabled and the display shows the message "dA". The alarm stops as soon as the external digital input is disabled again.

**10.2 REMOTE ON/OFF (I1F = OFF)**

This function allows to switch ON and OFF the instrument.

**10.3 GENERIC ALARM (I1F = EAL)**

As soon as the digital input is activated the unit will wait for "did" time delay before signalling the "EAL" alarm message. The outputs status don't change. The alarm stops just after the digital input is deactivated.

**10.4 SERIOUS ALARM MODE (I1F = BAL)**

When the digital input is activated, the unit will wait for "did" delay before signalling the "bAL" alarm message. The relay outputs are switched OFF. The alarm will stop as soon as the digital input is deactivated.

**11. ALARM SIGNALS**

Message	Cause	Outputs
"PF1"	Probe broken or absence	Alarm output ON; Output according to parameter "con" and "coF".
"HA"	Maximum alarm	Alarm output ON; Other outputs unchanged.
"LA"	Minimum alarm	Alarm output ON; Other outputs unchanged.
"EAL"	External alarm	Output unchanged.
"bAL"	Serious external alarm	Output OFF.
dA	Door open	According to rrd parameter

**11.1 SILENCING BUZZER**

Once the alarm signal is detected the buzzer, if present, can be disabled by pressing any key. The display signal remains as long as the alarm condition remains.

**11.2 ALARM RECOVERY**

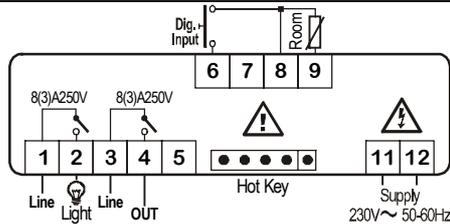
Probe alarms "P1" starts few seconds after the fault in the probe; they automatically stop few seconds after the probe restarts normal operation. Check connections before replacing the probe. Max. and min. alarms "HA" and "LA" automatically stop as soon as the variable returns to normal values. Alarms "bAL" "dA" and "EAL" recover as soon as the digital input is disabled.

**12. TECHNICAL DATA**

**Housing:** self extinguishing ABS; **Case:** frontal 32x74 mm; depth 60mm;  
**Mounting:** panel mounting in a 71x29 mm panel cut-out.  
**Protection:** IP20; **Frontal protection:** IP65 with frontal gasket RG-C (optional).  
**Connections:** Screw terminal block  $\leq 2,5 \text{ mm}^2$  heat-resistant wiring.  
**Power supply:** 12Vac/dc,  $\pm 10\%$  or: 24Vac/dc  $\pm 10\%$   
 or 230Vac  $\pm 10\%$ , 50/60Hz or 110Vac,  $\pm 10\%$ , 50/60Hz  
**Power absorption:** 3VA max.  
**Display:** Dual display with icons  
**Inputs:** according to the order: NTC/PTC  
**Relay outputs:** **Load** relay SPDT 8(3)A, 250Vac  
**Light:** relay SPDT 8(3)A, 250Vac  
**Other output:** buzzer (optional)  
**Kind of action:** 1B; **Pollution grade:** normal, **Software class:** A.  
**Data storing:** on the non-volatile memory (EEPROM).  
**Operating temperature:** 0÷60 °C (32÷140°F).  
**Storage temperature:** -30÷85 °C (-22÷185°F).  
**Relative humidity:** 20÷85% (no condensing)  
**Measuring and regulation range:** according to the probe  
**Controller Accuracy a 25°C:** better than  $\pm 0,5\%$  of full scale

**13. CONNECTIONS**

**13.1 XT420C – 230V AC OR 115V AC**



115Vac supply: connect to the 7-8 terminals.

**14. DEFAULT SETTING VALUES**

COD	°C/°F	Lev	Name	Range
Set	3	---	Set point	LS1 ÷ uS1
Hy1	2	Pr1	Differential	0.1 ÷ 25.0 °C / 1 ÷ 45 °F
trM	co	Pr2	Regulation setting	co = always / tMd = only during the cycle
ods	0	Pr2	Output delay at power on	0÷255min
LS1	-50	Pr2	Minimum set point	-50.0 °C o -58°F ÷ St1
uS1	110	Pr2	Maximum set point	St1 ÷ 150 °C o 302 °F
Ac1	0	Pr2	Anti-short cycle delay:	0 ÷ 30
con	0	Pr2	output on time with faulty probe	0 ÷ 250
coF	0	Pr2	output of time with faulty probe	0 ÷ 250
cH	Ht	Pr2	Action type output	Ht = heating/ cL = cooling
CF	°C	Pr2	Measurement unit	°C=°C; °F= °F;
rES	in	Pr1	Resolution	in= integer; dE = decimal point
ALC	Ab	Pr2	Alarm configuration	rE=relat.; Ab= absolute
ALL	-50	Pr1	Minimum alarm (ALC=rE) (ALC=Ab)	0 ÷ 50°C -50.÷ ALu
ALU	110	Pr1	Maximum alarm (ALC=rE) (ALC=Ab)	0 ÷ 50°C ALL÷ 150°C
ALh	1	Pr2	Alarm recovery differential	0÷Full scale
ALd	15	Pr1	Alarm delay	0÷999 min
dAO	1.3	Pr2	Alarm delay at start up	0÷23h 50min
PbC	ntc	Pr2	Kind of probe	Ptc = PTC / ntc = NTC
oF1	0	Pr2	Probe calibration	-12 ÷ 12 °C / -22 ÷ 22 °F
i1P	cL	Pr2	Digital input polarity	cL=closed; oP=open
i1F	dor	Pr2	Digital input configuration	dor / EAL / bAL / oFF
odc	no	Pr2	Output status with door open	no / cPr / c-o
rrd	no	Pr2	Output restart after door open alarm dA	no = no / YES = yES
did	0	Pr2	Alarm delay for dig. input	0 ÷ 250 ( nu = 251 )
tcM	H-M	Pr2	Timer resolution	H-M = h:m / M-S = m:s
Adr	1	Pr2	Serial address	0÷247
OnF	no	Pr2	oFF function enabling	no=not enabled; yES=enabled
Ptb	--	Pr2	Parameter table	Readable only
rEL	---	Pr2	Software release	Readable only
Pr2	321	Pr1	To access the Pr2	Readable only

Dixell S.p.A. 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