

Digital controller instruction manual
Notice d'utilisation regulateur digital
Manuale d'istruzioni controllore digitale
Bedienungsanleitungen Kühlstellenregler
Manual de instrucciones del regulador digital
Руководство по эксплуатации цифрового контроллера
数字控制器说明书



CE

ClimaSys

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Schneider
Electric

DIGITAL CONTROLLER

TX050

1. 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 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.

SAFETY PRECAUTIONS

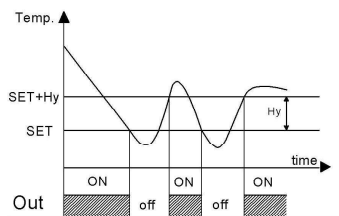
- Warning: disconnect all electrical connections before any kind of maintenance.
- The instrument must not be opened.
- In case of failure or faulty operation send the instrument back to Schneider Electric with a detailed description of the fault.
- Consider the maximum current which can be applied to each relay (see Technical Data).

2. GENERAL DESCRIPTION

The **TX050**, in **32x74x50mm** short format, is microprocessor based controller suitable for applications on normal temperature refrigerating units. It provides two relay output: one for compressor and the other one for alarm signalling or as auxiliary output. It provides an NTC probe input for thermostatic regulation and a digital input. The instrument is completely configurable thanks to its keyboard.

3. 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 (**Hy**) 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. FRONT PANEL COMMANDS



SET

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

AUX

To switch on/off the auxiliary relay in case it's present

Up Arrow

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

Down Arrow

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

KEYS COMBINATION

- Up Arrow** + **Down Arrow** To lock or unlock the keyboard
- SET** + **Up Arrow** To enter in programming mode
- SET** + **Down Arrow** To return to room temperature display

LED	MODE	MEANING
	On	Compressore enabled
	Flashing	Anti short cycle delay enabled (AC parameter)
	On	Measurement unit
	Flashing	Ended alarm or programming mode
	On	Measurement unit
	Flashing	Ended alarm or programming mode

In case of alarm showing with memory, when the alarm condition ends the measurement unit icon not selected by **CF** parameter will flash. For example if **CF=°C**, in case of alarm with memory, the **°F** led will flash.

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 5s to return to normal visualisation.

HOW TO CHANGE THE SETPOINT

1. Push the **SET** key for more than 3 seconds 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 **Up Arrow** or **Down Arrow** within 10s
4. To memorise the new set point value push the **SET** key again or wait 10s

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

HOW TO CHANGE A PARAMETER VALUE

1. Enter the Programming mode by pressing the **SET**+ **Up Arrow** keys for 3s ("**°C**" or "**°F**" led starts blinking).
2. Select the required parameter by pressing **Up Arrow** or **Down Arrow**
3. Press the **SET** key to display its value;
4. Use **Up Arrow** or **Down Arrow** to change its value
5. Press **SET** to store the new value and move to the following parameter

To exit: Press **SET**+ **Up Arrow** 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

PARAMETER PROGRAMMING LEVELS

The instrument shows 2 parameter programming levels. The parameters in level **L1** (user level) can be seen and modified according to the procedure described in the previous paragraph. The parameters in level **L2** (manufacturer level) can be seen and modified by the manufacturer or by authorized personnel, only

TO LOCK THE KEYBOARD

Keep pressed for more than 3s the **Up Arrow** and **Down Arrow** keys. The "**oF**" message will be displayed and the keyboard will be locked. If a key is pressed more than 3s the "**oF**" message will be displayed.

TO UNLOCK THE KEYBOARD

Keep pressed together for more than 3s the **Up Arrow** and **Down Arrow** keys till the "**on**" message will be displayed.

5. PARAMETERS

REGULATION

Hy Differential: (0,1+25°C / 1+45°F) Intervention differential for set point. Compressor Cut IN is set point + differential (**Hy**). Compressor Cut OUT is when the temperature reaches the set

- LS Minimum SET POINT:** $(-55^{\circ}\text{C} \div \text{SET} / -67^{\circ}\text{F} \div \text{SET})$: Sets the minimum value for the set point.
- US Maximum SET POINT:** $(\text{SET} + 99^{\circ}\text{C} / \text{SET} + 99^{\circ}\text{F})$. Set the maximum value for set point.
- ot First probe calibration:** $(-9.9 \div 9.9^{\circ}\text{C} / -17 \div 17^{\circ}\text{F})$ allows to adjust possible offset of the first probe.
- od Outputs activation delay at start up:** $(0 \div 99 \text{ min})$ 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.
- AC Anti-short cycle delay:** $(0 \div 50 \text{ min})$ minimum interval between the compressor stop and the following restart.
- Lt Minimum time compressor ON:** $(0 \div 99 \text{ s})$ When switched on, the compressor stays ON for **Lt** minimum time. In case of probe error this parameter doesn't work, in this case are considered only the **Cy** and **Cn** parameters;
- Cy Compressor ON time with faulty probe:** $(0 \div 99 \text{ min})$ time during which the compressor is active in case of faulty thermostat probe. With **Cy=0** compressor is always OFF. If **Cy=0** and **Cn=0** compressor is always OFF
- Cn Compressor OFF time with faulty probe:** $(0 \div 99 \text{ min})$ time during which the compressor is OFF in case of faulty thermostat probe. With **Cn=0** compressor is always active.
- CH Kind of Action:** **CL**=cooling action; **Ht**=heating action;

DISPLAY

- CF Measurement unit:** $(^{\circ}\text{C} \div ^{\circ}\text{F})$ **^{\circ}\text{C}**=Celsius; **^{\circ}\text{F}**=Fahrenheit. WARNING: When the measurement unit is changed the set point and the values of the regulations parameters have to be checked and modified if necessary.
- rE Resolution (only for ^{\circ}\text{C}):** $(\text{dE} \div \text{in})$ **dE**=decimal between -9.9 and 9.9°C ; **in**=integer
- dy Display delay:** $(0 \div 15 \text{ min.})$ when the temperature increases, the display is updated of $1^{\circ}\text{C} / 1^{\circ}\text{F}$ after **dy** time.

ALARMS

- AA Alarm configuration:** $(\text{rE} \div \text{Ab})$ **rE**=alarm threshold relative to set point; **Ab**=absolute alarm threshold;
- AU Maximum temperature alarm:** $(\text{AL} + 99^{\circ}\text{C} / 99^{\circ}\text{F})$ when this temperature is reached the alarm is enabled, after the **Ad** delay time.
- AL Minimum temperature alarm:** $(-55 \div \text{AU}^{\circ}\text{C} / -67 \div \text{AU}^{\circ}\text{F})$ when this temperature is reached the alarm is enabled, after the **Ad** delay time;
- AH Alarm differential:** $(0.1 \div 25.5^{\circ}\text{C} / 1 \div 45^{\circ}\text{F})$ intervention differential for temperature alarm recovery;
- Ad Temperature alarm delay:** $(0 \div 99 \text{ min})$ time interval between the detection of an alarm condition and alarm signalling.
- dA Exclusion of temperature alarm at startup:** $(0 \div 99 \text{ min})$ time interval between the detection of the temperature alarm condition after instrument power ON and alarm signalling.
- At Alarm showing mode:** $(\text{AU} \div \text{rS})$ **AU**=display without memory, the alarm is showed only if the alarm is present; **rS**=display alarm with memory. The alarm display symbol is showed till a key is pressed even if the alarm condition isn't present. See the explanatory table at page 25.
- rA Alarm Relay mode:** $(\text{AU} \div \text{rS})$ **AU**=relay activation without memory, the alarm is showed only if the alarm is present; **rS**=relay activation with memory. The alarm display symbol is showed till a key is pressed even if the alarm condition isn't present. See the explanatory table at page 25.
- tb Silencing alarm relay:** $(\text{n} \div \text{y})$ **n**=silencing disabled, alarm relay stays on till alarm conditions lasts; **y**=silencing enabled: alarm relay can be switched OFF by pressing a key during an alarm. See the explanatory table at page 25.

OUTPUTS CONFIGURATION

- o0 Output 1 configuration:** $(\text{nU} / \text{CP} / \text{Fn} / \text{AL} / \text{AU} / \text{db})$
nU=relè off; **CP**=thermostatic regulation; **Fn**=Fan control;
AL=Alarm; **AU**=auxiliary; **db**=neutral zone;
- o1 Output 2 configuration:** $(\text{nU} / \text{CP} / \text{Fn} / \text{AL} / \text{AU} / \text{db})$
nU=relè off; **CP**=thermostatic regulation; **Fn**=Fan control;
AL=Alarm; **AU**=auxiliary; **db**= neutral zone;
- AP Alarm relay polarity (CL-OP):** **CL**=when active is closed;
OP=when active is opened

DIGITAL INPUT

- iP Digital input polarity:** $(\text{OP} \div \text{CL})$ **OP**=activated by closing the contact; **CL**=activated by opening the contact;
- iF Digital input configuration:** $(\text{EA} / \text{bA} / \text{do} / \text{Sb} / \text{AU} / \text{HC})$ **EA**=external alarm "EA" message is displayed; **bA**=serious alarm "CA" message is displayed; **do**=door open; **Sb**=stand-by function activation; **AU**=auxiliary relay activation; **HC**=reverse action;
- di Digital input delay:** $(0 \div 99 \text{ min})$ with **iF=EA** or **bA** delay between the detection of the external alarm condition and its signalling. . With **iF=do** it represents the delay to activate the door open alarm.

OTHER

- Pt Parameter code table**
- rL Firmware release**

6. DIGITAL INPUTS

The free voltage digital input is programmable in different configurations by the **iF** parameter.

EXTERNAL ALARM (iF=EA)

As soon as the digital input is activated the unit will wait for **di** time delay before signalling the "EA" alarm message. The outputs status don't change. The alarm stops just after the digital input is de-activated.

SERIOUS ALARM (iF=bA)

When the digital input is activated, the unit will wait for **di** delay before signalling the "CA" alarm message. The relay outputs are switched OFF. The alarm will stop as soon as the digital input is de-activated.

DOOR SWITCH (iF=do)

It signals the door status. Since the door is opened, after the delay time set through parameter **di**, the door alarm is enabled, the display shows the message "dA". With the door open, the high and low temperature alarms are disabled.

START STANDBY (iF=Sb)

The activation of this digital input permits to switch on/off the devices. When the instrument is in StandBy the display shows **Sb** label

SWITCHING SECOND RELAY ON (iF=AU)

When **o1=AU** it switches on and off the second relay.

7. 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
"EA"	External alarm	Outputs unchanged
"CA"	Serious external alarm	All outputs OFF.
"dA"	Door Open	

ALARM RECOVERY

Probe alarm "P1" starts some seconds after the fault in the related probe; it automatically stops 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.

8. TECHNICAL DATA

Housing: self extinguishing ABS.

Case: frontal 32x74 mm; depth 50mm

Mounting: panel mounting in a 71x29mm panel cut-out

Protection: IP20

Frontal protection: IP65

Connections: disconnectable terminal block $\leq 2,5 \text{ mm}^2$ wiring

Power supply: 230Vac $\pm 10\%$, 50/60Hz

Power absorption: 3.5 VA max

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

Inputs: 1 NTC probe

Digital input: free voltage contact

Relay outputs: **Output 1:** SPDT 12A 250Vac

Output 2: SPST 5A 250Vac

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: $0 \div +60 \text{ }^\circ\text{C}$

Storage temperature: $-25 \div +60 \text{ }^\circ\text{C}$

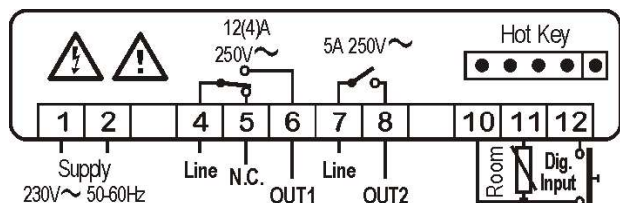
Relative humidity: $20 \div 85\%$ (no condensing)

Measuring and regulation range: **NTC probe:** $-40 \div +110 \text{ }^\circ\text{C}$

Resolution: $0,1 \text{ }^\circ\text{C}$ or $1 \text{ }^\circ\text{C}$ or $1 \text{ }^\circ\text{F}$ (selectable)

Accuracy (ambient temp. 25°C): $\pm 0,1^\circ\text{C} \pm 1 \text{ digit}$

9. WIRING DIAGRAM



10. DEFAULT SETTING VALUES

LABEL	DESCRIPTION	RANGE	DEFAULT	LEV.
REGULATION				
-	Set Point	$LS \div US$	35°C	-
Hy	Differential	$0,1 \div 25^\circ\text{C} / 1 \div 45^\circ\text{F}$	$2,0^\circ\text{C}$	L1
LS	Minimum Set Point	$-55^\circ\text{C} \div SET / -67^\circ\text{F} \div SET$	20°C	L2
US	Maximum Set Point	$SET \div 99^\circ\text{C} / SET \div 99^\circ\text{F}$	50°C	L2
ot	First probe calibration	$-9,9 \div 9,9^\circ\text{C} / -17 \div 17^\circ\text{F}$	0.0	L2
od	Outputs activation delay at start up	$0 \div 99 \text{ min}$	0	L2
AC	Anti-short cycle delay	$0 \div 50 \text{ min}$	4	L2
Lt	Minimum time compressor ON	$0 \div 99 \text{ s}$	90	L2
Cy	Compressor ON time faulty probe	$0 \div 99 \text{ min}$	1	L2
Cn	Compressor OFF time faulty probe	$0 \div 99 \text{ min}$	0	L2
CH	Kind of Action	$CL \div Ht$	CL	L1
DISPLAY				
CF	Measurement units	$^\circ\text{C} \div ^\circ\text{F}$	$^\circ\text{C}$	L1
rE	Resolution (only for $^\circ\text{C}$)	$dE \div in$	dE	L1
di	Digital input delay	$0 \div 99 \text{ min}$	0	L2

ALARMS

AA	Alarm configuration	$rE \div Ab$	rE	L1
AU	Maximum temperature alarm	$AL \div 99^\circ\text{C} / AL \div 99^\circ\text{F}$	10°C	L1
AL	Minimum temperature alarm	$-55^\circ\text{C} \div AU / -67^\circ\text{F} \div AU$	10°C	L1
AH	Alarm differential	$0,1^\circ\text{C} \div 25,5^\circ\text{C} / 1^\circ\text{F} \div 45^\circ\text{F}$	$1,0^\circ \text{C}$	L1
Ad	Temperature alarm delay	$0 \div 99 \text{ min}$	0	L1
dA	Exclusion of temperature alarm at startup	$0 \div 99 \text{ min}$	60	L2
At	Alarm showing mode	$AU \div rS$	rS	L1
rA	Alarm relay mode	$AU \div rS$	rS	L1
tb	Alarm relay silencing	$n \div y$	n	L1

OUTPUTS CONFIGURATION

o0	Output 1 configuration	$nU / CP / Fn / AL / AU / db$	CP	L2
o1	Output 2 configuration	$nU / CP / Fn / AL / AU / db$	AL	L1
AP	Alarm relay polarity	$CL - OP$	OP	L1

DIGITAL INPUT

iP	Digital input polarity	$CL - OP$	OP	L1
iF	Digital input configuration	$EA / bA / do / Sb / AU / HC$	bA	L1
di	Digital input delay	$0 \div 99 \text{ min}$	0	L1

OTHER

Pt	Parameter code table	Read only	- - -	L2
rL	Firmware release	Read only	- - -	L2