

# TEMPERATURE CONTROLLER PROGRAMMER

1/8 DIN - 48 x 96

KX3 model

Quick Guide • ISTR-FKX3ENG06



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## DECLARATION OF CONFORMITY AND MANUAL RETRIEVAL

KX3 is a panel mounting, Class II instrument. It has been designed with compliance to the European Directives. All information about the controller use can be found in the Engineering Manual: ISTR-MKX-ENG0x ("x" is the revision). The Declaration of Conformity and the manual of the controller can be downloaded (free of charge) from the web-site: [www.ascontecnologic.com](http://www.ascontecnologic.com) Once connected to the web-site, search: **KX3** then click on **KX3**. In the lower part of the product page (in any language) is present the download area with links to the documents available for the controller (in the available languages).

### Warning!

- Whenever a failure or a malfunction of the device may cause dangerous situations for persons, things or animals, please remember that the plant must be equipped with additional devices which will guarantee safety.
- We warrant that the products will be free from defects in material and workmanship for 18 months from the date of delivery. Products and components that are subject to wear due to conditions of use, service life and misuse are not covered by this warranty.

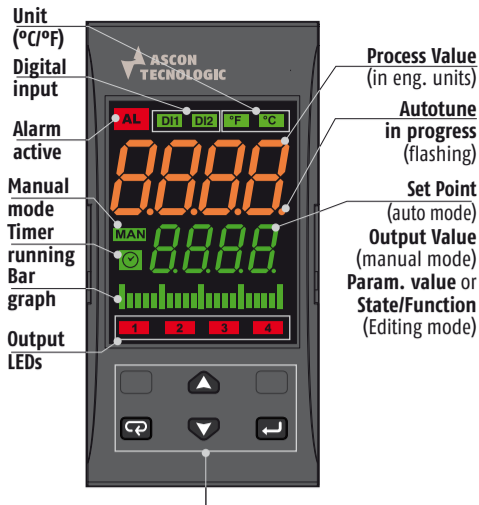
### Disposal

The appliance (or the product) must be disposed of separately in compliance with the local standards in force on waste disposal.

### Warning!

All the order codes not present in the tables that follow (Digit **A**: Code **P**, Digit **E**: Code **M**, Digit **F**: Code **M**) are fully described in the "Engineering Manual" that can be freely downloaded from ASCON Tecnologic web site.

## DISPLAY AND KEYS



## DIMENSIONS

Overall dimensions (W x H x D): 48 x 96 x 75.9 mm  
(1.89 x 3.78 x 2.99 in.)  
Panel Cut-out (W x H): 45+0.6 x 89+0.6 mm  
(1.78+0.023 x 3.50+0.023 in.)

Operator Mode	Editing Mode
Access to: - Operator Commands - Parameters - Configuration	Confirm and go to Next parameter
Access to: - Operator additional information - Set Point	Increase the displayed value/Selects the parameters list next element
Access to: - Set Point	Decrease the displayed value or select the previous element
Programmable key: Start the programmed function (Autotune, Auto/Man, Timer ...)	Exit from Operator commands/Parameter setting/Configuration

+ These 2 keys, pressed in sequence, allow to toggle between MANUAL and AUTO modes.

## MODEL CODE

The Hardware resources are identified by the following Model Code.

Model: **KX3** **A** **B** **C** **D** **E** **F** **G** **H** **I** - **0** **0** **0** **0**

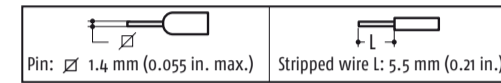
Line	KX	3
<b>Optional functions</b>		<b>A</b>
None	-	-
Timer	-	<b>T</b>
<b>Power Supply</b>		<b>B</b>
100... 240Vac (-15... +10%)	-	<b>H</b>
24Vac (-25... +12%) or 24Vdc (-15... +25%)	-	<b>L</b>
<b>Input</b>		<b>C</b>
TC, PT100, PT1000, mA, mV, V + Digital Input 1	-	<b>C</b>
TC, NTC, PTC, mA, mV, V + Digital Input 1	-	<b>E</b>
<b>Output OP1</b>		<b>D</b>
Relay (1 SPST NO, 4 A/250 Vac)	-	<b>R</b>
VDC for SSR (12 Vdc/20 mA)	-	<b>O</b>
Analogue Output (0/4... 20 mA, 0/2... 10 V)	-	<b>I</b>
<b>Output OP2</b>		<b>E</b>
None	-	-
Relay (1 SPST NO, 2 A/250 Vac)	-	<b>R</b>
VDC for SSR (12 Vdc/20 mA)	-	<b>O</b>

Output OP3	F
None	-
Relay (1 SPST NO, 2 A/250 Vac)	<b>R</b>
VDC for SSR Vdc (12 Vdc/20 mA)	<b>O</b>
Output OP4	G
Digital I/O (see the Electrical Connections paragraph for details)	<b>D</b>
Serial Communications	H
TTL	-
RS485 Modbus	<b>S</b>
Terminal Type	I
Standard (screw type non removable terminal blocks)	-
With plug-in screw type terminal blocks	<b>E</b>
With plug-in clamp type terminal blocks	<b>M</b>
With plug-in terminal blocks (fixed part only)	<b>N</b>

Model Code example: **KX3-HCRRRD--**  
Controller KX3, no timer, 100... 240 Vac, TC/PT100/PT1000/mV/V + Digital Input 1, 3 Relay Outputs, Output 4, TTL, Non removable screw type terminals.

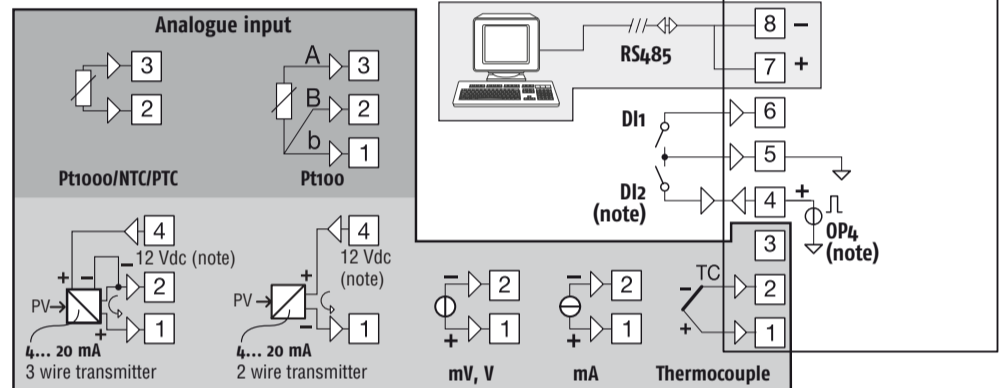
## ELECTRICAL CONNECTIONS

### Terminals



Note: Terminal 4 can be programmed as:

- **Digital Input (DI2)** connecting a free of voltage contact between terminals 4 and 5;
- **0... 12 V SSR Drive Output (OP4)** connecting the load between terminals 4 and 5;
- **12 Vdc (20 mA) transmitter power supply** connecting the 2 wire transmitter between terminals 4 and 1; for 3 wire transmitter connect terminal 4 to transmitter power supply input and terminal 1 and 2 to transmitter signal output.



## CONFIGURATION CODE

The KX3 can be easily configured by the "Code Configuration" method for the most common requirements, just entering two 4-digit codes: **Code 1 [LMNO]** for the Input Type and Control Mode selection and **Code 2 [PQRS]** for the Alarms and the Service Functions. For complete controller configuration see the Engineering Manual.

Note: Before starting the configuration code setting, please define and write down **Code 1** and **Code 2** as needed:

Input Type and Range	L	M
TC J	0	0
TC K	0	1
TC S	0	2
TC R	0	3
TC T	0	4
Infrared J	0	5
Infrared K	0	6
PT 100/PTC KTY81-121	0	7
PT 1000/NTC 103-AT2	0	8
Linear 0... 60 mV	0	9
Linear 12... 60 mV	1	0
Linear 0... 20 mA (this selection forces Out 4 = TX)	1	1
Linear 4... 20 mA (this selection forces Out 4 = TX)	1	2
Linear 0... 5 V	1	3
Linear 1... 5 V	1	4
Linear 0... 10 V	1	5
Linear 2... 10 V	1	6
TC J	1	7
TC K	1	8
TC S	1	9
TC R	2	0
TC T	2	1
Infrared J	2	2
Infrared K	2	3
PT 100/PTC KTY81-121	2	4
PT 1000/NTC 103-AT2	2	5

Alarm 3	P	Q	R
Alarm 2			
Alarm 1			
Not used	0	0	0
Sensor break	1	1	1
Absolute High	2	2	2
Absolute Low	3	3	3
Absolute High/Low External High/Low	4	4	4
Absolute High/Low Internal High/Low	5	5	5
Deviation Deviation high	6	6	6
Deviation Deviation low	7	7	7
Band External band	8	8	8
Band Internal band	9	9	9

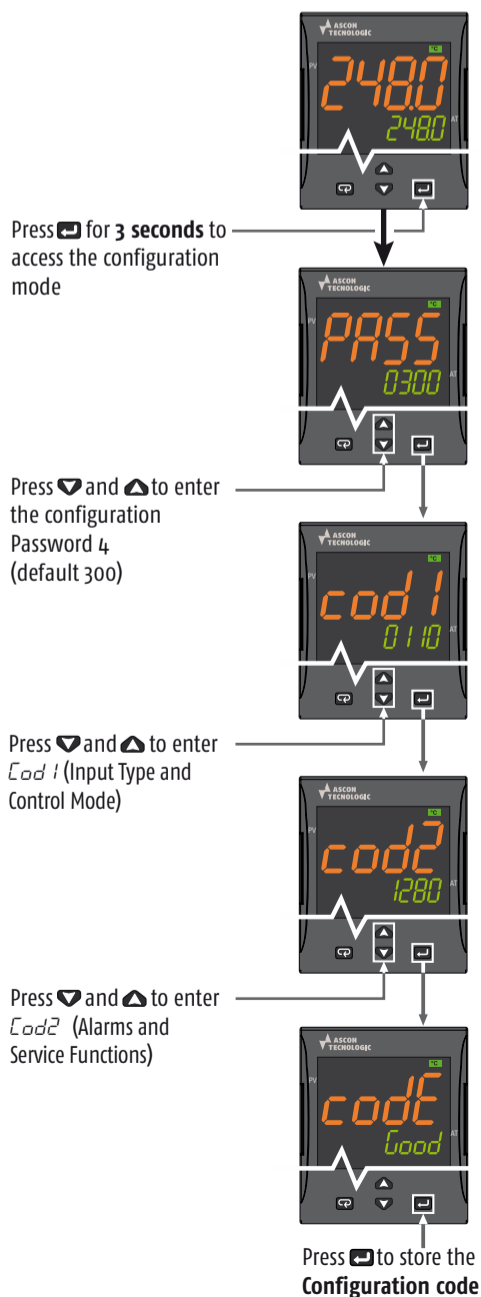
Control mode	OP1	OP2	OP3	OP4	N	O
ON/OFF heating = H	H	AL1	AL2	AL3	0	0
ON/OFF cooling = C	NU	AL1	AL2	H	0	1
ON/OFF with neutral zone (H/C)	C	AL1	AL2	AL3	0	2
PID heating = H	H	AL1	AL2	AL3	1	0
PID cooling = C	C	AL1	AL2	AL3	1	2
PID double action (H/C)	H	C	AL2	AL3	1	4
	NU	H	AL2	C	1	7
	C	AL1	AL2	H	1	8
	NU	C	AL2	H	1	9

Note: As default, when the alarms are active, only AL1 threshold is available at "Operator Command" level to perform non critical tasks. To protect the AL2 and AL3 thresholds against undesired changes, they are available only at "Parameters list" level (password: 20). For different configurations, see the Engineering Manual.

Service functions activation	S
None	0
Wattmeter (instantaneous power expressed in kW) (note 1)	1
Wattmeter (Power consumption expressed in kWh/h) (note 2)	2
Absolute worked time (expressed in days) (note 3)	3
Absolute worked time (expressed in hours) (note 3)	4

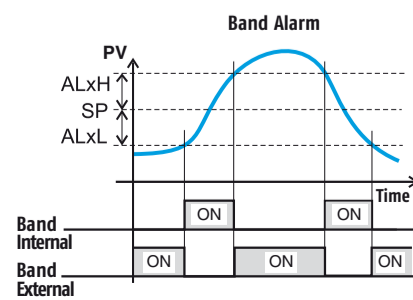
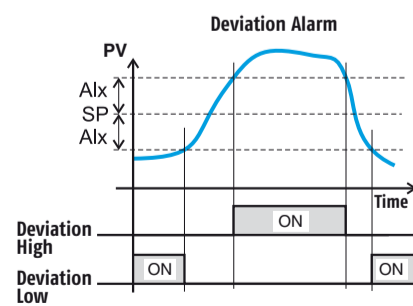
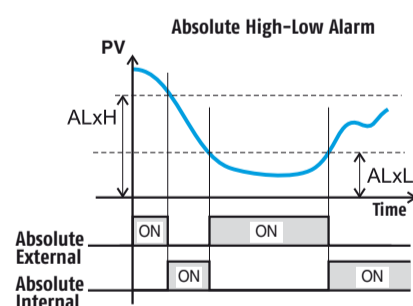
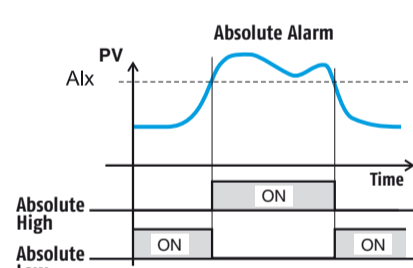
- Wattmeter Instantaneous power** is continuously computed as multiplication of the Load Voltage, Load Current parameter values and the controller output instantaneous value.
- Wattmeter power consumption** is the estimated hourly energy consumption (using Load Voltage and Load Current parameter values), computed on the previous 15 minutes period. The readout is updated every 15 minutes.
- Worked Time counter** is continuously increased when the controller is turned ON.

## HOW TO SET THE CONFIGURATION CODE

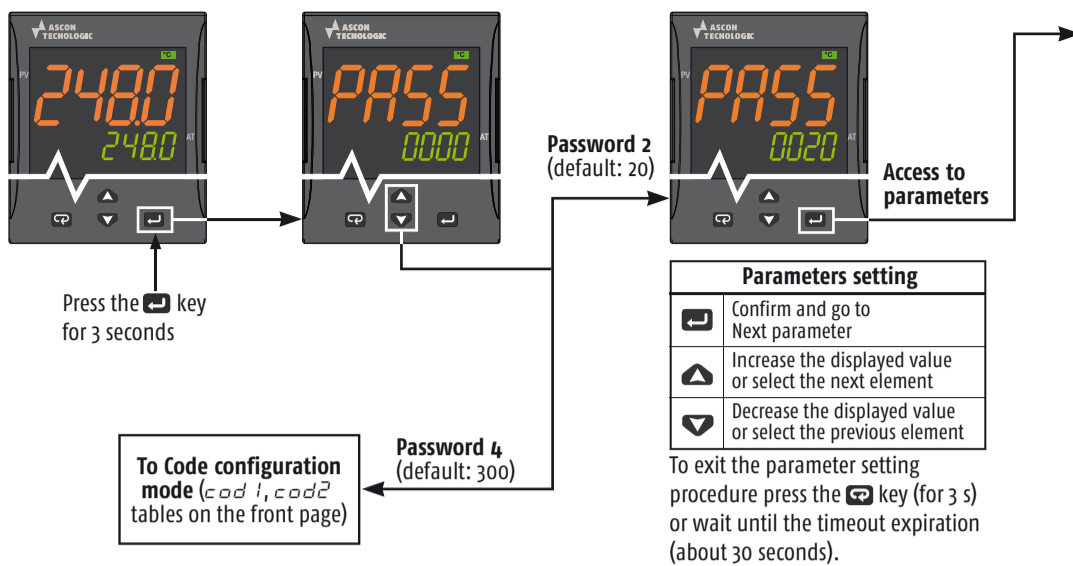


Note: To leave the Configuration session without saving the settings made, press the button

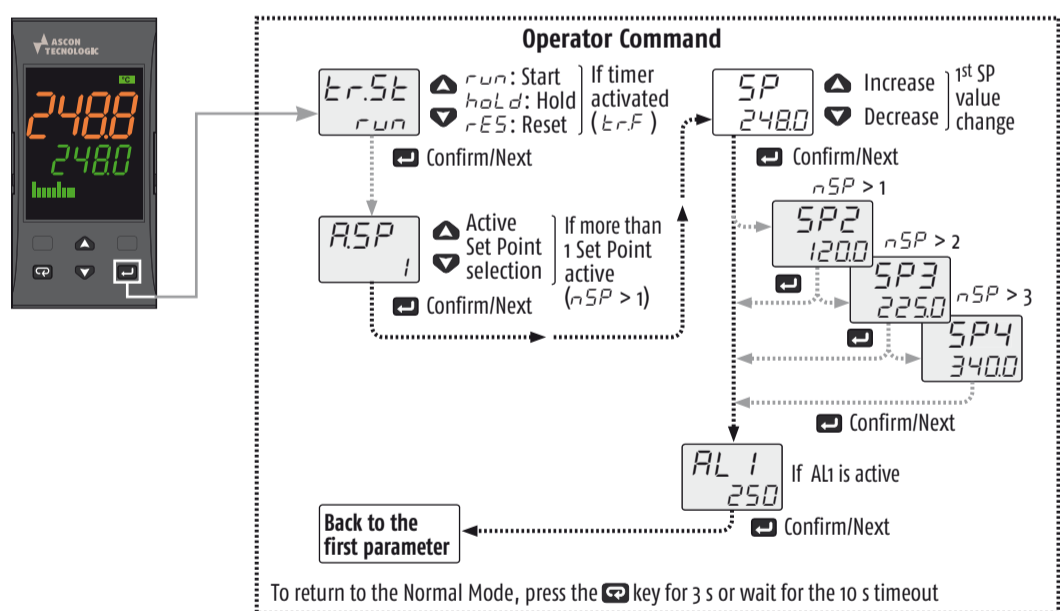
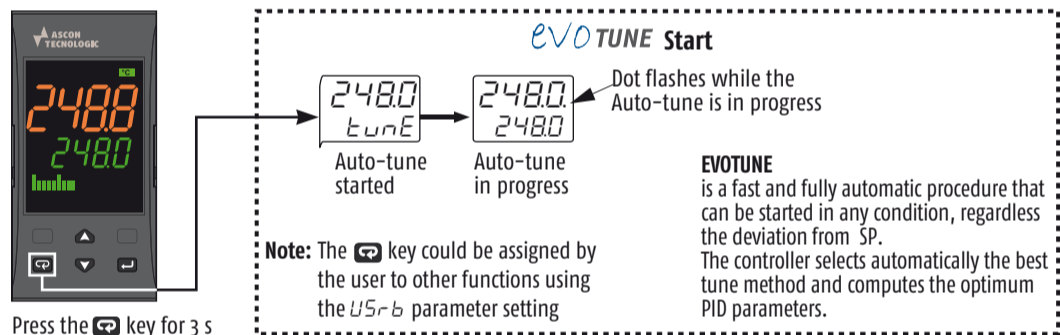
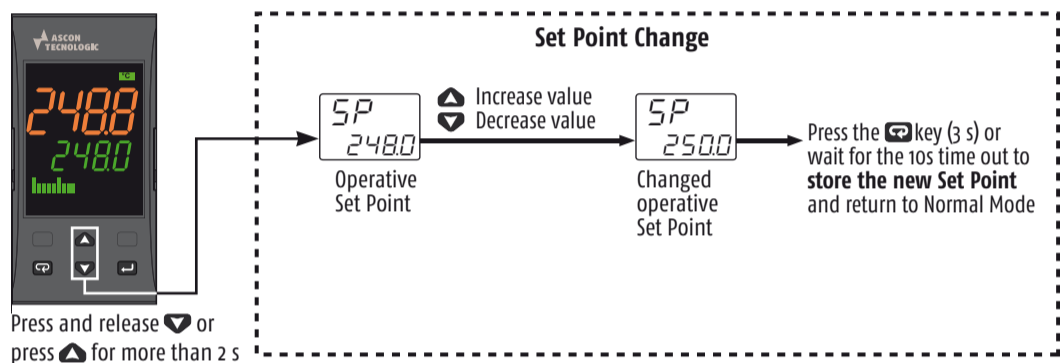
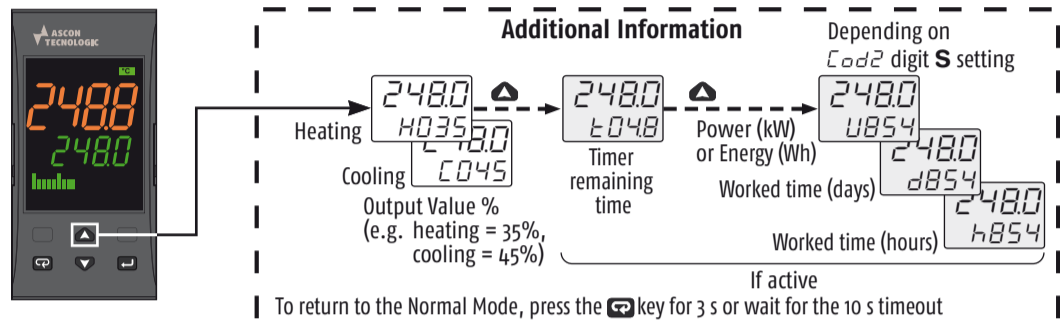
## ALARM TYPES (Code 2 digits: P, Q, R)



## PARAMETERS SETTING

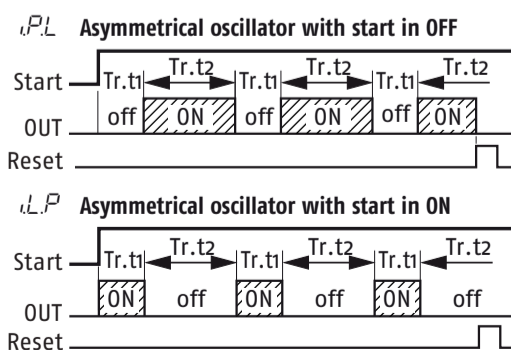
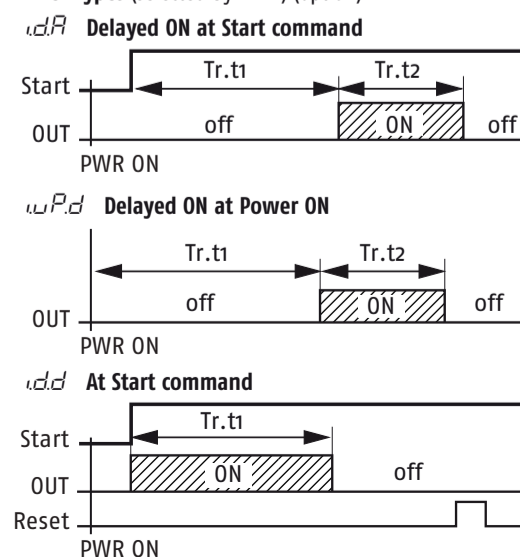


## CONTROLLER OPERATION



## FUNCTION SELECTION

### Timer Types (selected by *t.r.f*) (option)



## Parameters List (*PASS*: 20) (in gray the parameters related to optional features)

Group	Param.	Description	Range value or selection list elements	Default	User value	Note
Commands	<i>t.r.st</i>	Timer status				Option
	<i>o.p.e.r</i>	Operative Mode Selection	reg = Auto, oplo = Manual, stdy = Standby			
	<i>R.SP</i>	Set Point Selection	0 = SP, 1 = SP2, 2 = SP3, 3 = SP4	0 = SP		
	<i>t.unE</i>	Start Auto Tune	0 = OFF, 1 = start	0 = OFF		evoTUNE
Control	<i>Pb</i>	Proportional Band	1... 9999 (Engineering Units = E.U.)	20		
	<i>t.i</i>	Integral Time	0... 10000 s	200		<i>Cod 1</i> Digit <b>N</b> = 1
	<i>t.d</i>	Derivative Time	0... 1000 s	50		
	<i>HSEt</i>	Hysteresis ON/OFF Control	0... 9999 (E.U.)	1		<i>Cod 1</i> Digit <b>N</b> = 0
	<i>t.c.H</i>	Heating output cycle time	0.2... 130 s	20.0		<i>Cod 1</i> Digit <b>N</b> = 1
	<i>r.c.G</i>	Relative Cooling Gain	0.01... 99.99	1.00		<i>Cod 1</i> Digit <b>N</b> = 1 <i>Cod 1</i> Digit <b>O</b> > 4
	<i>t.c.c</i>	Cooling output cycle time	0.2... 130 s	20.0		<i>Cod 1</i> Digit <b>N</b> = 1 <i>Cod 1</i> Digit <b>O</b> > 1
Set Point	<i>SP</i>	Set Point 1	-1999... +9999 (E.U.)			
	<i>SP2</i>	Set Point 2				If <i>n.SP</i> > 1
	<i>SP3</i>	Set Point 3	-1999... +9999 (E.U.)			If <i>n.SP</i> > 2
	<i>SP4</i>	Set Point 4				If <i>n.SP</i> > 3
Alarms	<i>SP.LL</i>	Set Point min. Value	-1999... SP.H (E.U.)			
	<i>SP.HL</i>	Set Point max. Value	SP.LL... 9999 (E.U.)			
	<i>n.SP</i>	No. of Set Points	1... 4	1		
	<i>AL 1</i>	Alarm 1 threshold	AL1L... AL1H			
	<i>AL 1L</i>	Alarm 1 low threshold/Low limit	-1999... +9999 (E.U.)	-1999		If digit <b>P</b> of <i>Cod 2</i> is > 1
	<i>AL 1H</i>	Alarm 1 high threshold/High limit		9999		
	<i>HAL 1</i>	AL1 hysteresis	1... 9999 (E.U.)	1		
	<i>AL 2</i>	Alarm 2 threshold	AL2L... AL2H			
	<i>AL 2L</i>	Alarm 2 low threshold/Low limit	-1999... +9999 (E.U.)	-1999		If digit <b>Q</b> of <i>Cod 2</i> is > 1
	<i>AL 2H</i>	Alarm 2 high threshold/High limit		9999		
	<i>HAL 2</i>	AL2 hysteresis	1... 9999 (E.U.)	1		
	Soft Start	<i>SS.P</i>	Soft Start Output value	-100... 100%	0	
<i>SS.t</i>		Soft Start Time	0.00... 8.00 (hh.mm)	0		
Input		<i>SS.c</i>	Low Scale readout	-1999... 9999	-1999	
	<i>FS.c</i>	High Scale readout	-1999... 9999	9999		
	<i>d.P</i>	Number of decimals	0... 3 (linear inputs); 0... 1 (other inputs)	0		
	<i>F.iL</i>	Measured value Digital filter	OFF; 0.1... 20.0 s	0 = OFF		
Timer	<i>t.r.f</i>	Timer Type	nonE = Timer not used i.d.A = Delayed ON at start command i.u.P.d = Activation ON at Power ON i.d.d = At start command i.P.L = Asymmetrical oscillator, start in OFF i.L.P = Asymmetrical oscillator, start in ON	none		Timer management (Start, Stop, Reset) can be done using the <i>t.r.st</i> command or the  key (if programmed) or by the Dh/Dl2 digital inputs (if programmed).
	<i>t.r.u</i>	Timer Units	0 = hh.mm 1 = mm.ss 2 = sss.d	1 = mm.ss		
	<i>t.r.t 1</i>	Time 1	00.01... 995.9	1.00		
	<i>t.r.t 2</i>	Time 2	00.00... 995.9	1.00		
If the ordered controller is equipped with the Programmer option, see the "ISTR-FIX3P" Addendum						
I/O	<i>i.o.4.F</i>	I/O 4 Function	ON = Transmitter Power Supply OUT4 = SSR out Di2C = Dig. In. from contact Di2U = 24 VDC Digital Input	ON		
Digital Inputs	<i>d.i.F.1</i>	Digital Input 1 Function	0... 21	0		See the Dh, Dl2 functions table
	<i>d.i.F.2</i>	Digital Input 2 Function	0... 21	0		
Display	<i>u5rb</i>	Key  Function	nonE, tunE, oplo, aac, asi, chsp, str.t, He.co	tunE		See the  Key function table
	<i>d.c.L</i>	Colour of the Process Value display	0 = Change 1 = Red 2 = Green 3 = Orange	2		If Change, the colour is green if PV differs from SP less than <i>AdE</i> , red if higher than <i>AdE</i> and orange if is lower than <i>AdE</i>
	<i>AdE</i>	Display change color threshold (when <i>d.c.L</i> = 0)	0 (OFF)... 9999 (e.u.)			
	<i>d.s.t</i>	Display Power OFF time (mm.ss)	OFF (display ON) 0.1... 99.59	OFF		
Serial communications	<i>b.G.F</i>	Bar graph Function	nonE, Pou, Po.h, Pr.tu, Pr.td, Pr.tS, ti.uP, ti.du, r.iSP	Pou		
	<i>Ad.d</i>	Instrument Address	1... 254	1		Modbus RTU slave protocol
Wattmeter	<i>Uo.Lt</i>	Load Voltage	1... 999 (V)	230		If digit <b>S</b> of <i>Cod 2</i> is > 1
	<i>c.u.r</i>	Load Current	1... 9999 (A)			
Password	<i>PAS4</i>	Configuration access Password	0... 999	300		
	<i>PAS2</i>	Parameters access Password	0... 999	20		

Note: To access all the instrument features, please see the "Complete configuration procedure" in the "Engineering Manual". Complete Configuration and Parameter setting can be easily updated from the controller and downloaded to other controllers using the Configuration Key and Communication Adapter model: A-01.

### *d.i.F.* Digital Inputs Dh and Dl2 Functions

Code displayed	Description
0	Disabled (OFF) (default)
1	Alarm Reset
2	Alarm Acknowledge (ACK)
3	Hold of the measured value
4	Stand by mode
5	Manual Mode
6	Heat with "SP" and Cool with "SP2"
7	Timer Run/Hold/Reset [on transition]
8	Timer Run [on transition]
9	Timer Reset [on transition]
10	Timer Run/Hold
11	Timer Run/Reset
12	Timer Run/Reset with lock at the end of the time count
18	Sequential Set Point selection [on transition]
19	SP/SP2 selection
20	Binary coding for Set Point selection on Dh and Dl2 (00 = SP, 01 = SP2, 10 = SP3, 11 = SP4)
21	Digital inputs in parallel to  and  keys (Dh = , Dl2 = )

### *u5rb* Key Function

Code displayed	Description
nonE	Not used
<i>t.unE</i>	Starts auto tuning functions (default)
<i>o.p.l.o</i>	Manual mode
<i>AR.c</i>	Alarm Reset
<i>AS.v</i>	Alarm Acknowledge
<i>ch.SP</i>	Circular Set Point Selection (shows SP, SP2, SP3)
<i>St.by</i>	Stand-by mode
<i>St.r.t</i>	Starts/Stop/Reset timer
<i>HE.co</i>	Heat with "SP"/Cool with "SP2"