

USER'S MANUAL

Series MPT60 M1



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1.0 GENERAL POINTS

The instruments of the family "MPT60" represent a series of " Single Loop" microprocessor temperature regulators in the standard 48x48 dimensions (96 mm. depth.)

The complete version of the MPT60 instrument has the following technical characteristics:

- 1- Input from Thermoresistance PT100 (scale $-40.0 \div 200.0^{\circ}\text{C}$ or $-40 \div 800^{\circ}\text{C}$), or from thermocoupling Fe/CO ($0 \div 600^{\circ}\text{C}$) and Cr/Al ($0 \div 1200^{\circ}\text{C}$) and Pt-Pt/Rh ($0 \div 1710^{\circ}\text{C}$), or from voltage ($0 \div 10 \text{ V}$) and current ($0/4 \div 20 \text{ mA}$) selectable from the keyboard.
- 2- One display to see Process Value and 4 keys for an easy programmability.
- 3- A contact relay for the regulation of the main intervention point, with regulation ON-OFF or PID.
- 4- Servomotor control drive (with alarm relay).
- 5- Soft Start and Self Tuning functions.

Available options:

- 1- A relay contact for (minimum or maximum) alarms signals or for the cooling process control.
- 2- Analogue output ($0 \div 10 \text{ V}$, $4 \div 20 \text{ mA}$ or $0 \div 20 \text{ mA}$) for PID control or read out value.

1.1 TECHNICAL CHARACTERISTICS

Table 1

Sensors used	thermoresistance PT100 at 2 or 3 wires: Pt r: $-40.0 \div 200.0^{\circ}\text{C}$; Pt E: $-40 \div 800^{\circ}\text{C}$; <u>Thermocouplings:</u> Fe/Co (J): $0 \div 600^{\circ}\text{C}$; Cr/Al (K): $0 \div 1200^{\circ}\text{C}$; Pt/Pt-10% Rh (S): $0 \div 1710^{\circ}\text{C}$
Analogue inputs	$0 \div 10 \text{ V} - 0 \div 20 \text{ mA} - 4 \div 20 \text{ mA}$
Input current resistance	5Ω
Input voltage resistance	$1 \text{ M}\Omega$
Data reading precision	$0.5\% \text{ F.S. } \pm 1 \text{ digit } \pm 1 \text{ degree}$
Controls	on-off / pid
On-Off Set Up	HY in the range $0 \div \text{F.S. } ^{\circ}\text{C}/^{\circ}\text{F}$
Pid Set Up	cycle time in the range: $1 \div 200 \text{ sec}$
	proportional band: $0 \div \text{F.S. } ^{\circ}\text{C}/^{\circ}\text{F}$
	integrative time: $0 \div 6000 \text{ sec.}$
	derivative time: $0 \div 600 \text{ sec}$
	cutback const.: $0 \div \text{F.S. } ^{\circ}\text{C}/^{\circ}\text{F}$

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Alarms	of min. or max in the range: 0 ÷ F.S. °C/°F
Main Output	relay contact 220V /5A
Alarm output	relay contact 220V /5A
Power supply	25Vac or 115Vac or 230Vac or 12÷30 Vdc
Analogue outputs	0 ÷ 10 V – 0 ÷ 20 mA – 4 ÷ 20 mA
Max load for current output	300 Ω
Min load for voltage output	1 KΩ
Max voltage given	10 V
Max current given	20 mA
Resolution	12 bits

1.2 DISPLAY MESSAGES

The following table shows a summary of all the messages that the instrument can show on the display. Some are operating signals, others are indications of anomalies or non performance. In these cases we ask you to consult the user manual and the service centre, as necessary.

Table 2

r01.2	Release Software
LO	temperature under input range, or connection error for the PT100 sensor
HI	temperature above input range
Err	sensor interrupted or malfunctioning input circuit
Err1, Err2, Err3, Err4	See “Self-Tuning function”
Abort	See “Soft Start” and “Self Tuning” functions

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1.3 MPT INSTRUMENT CONNECTION OVERVIEW DESCRIPTION OF THE FRONT COMMANDS



Display: temperature as read by sensor

Led AL: alarm status indication or cooling action or servomotor control drive (if requested)

Led ON: load control indication

Led = : the displayed temperature is coincident with set-point (± 2 degrees)

Led ◀ : the displayed temperature is lower than set-point for more than 2 degrees

Led ▶ : the displayed temperature is higher than set-point for more than 2 degrees

Key  : access to the programming functions

Key  : shows set-point. In program menu it increases the blinking digit.

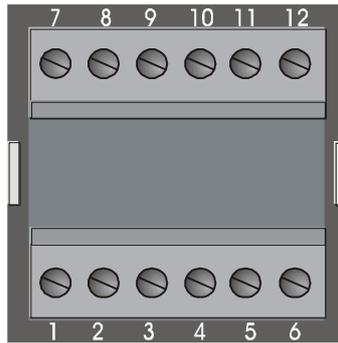
Key  : shows alarm (desable by menu). In program menu it increases the blinking digit.

Key  : fast exit from the menù.

Key  +  Keys : % power indication

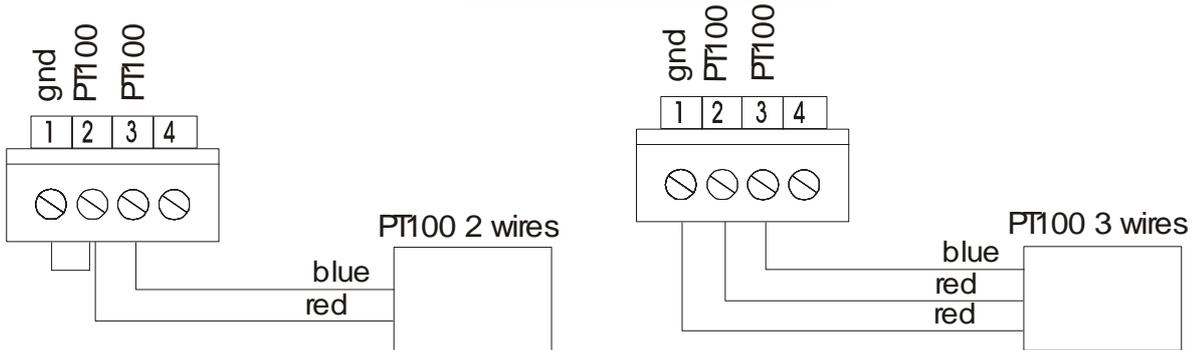
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DESCRIPTION OF THE TERMINAL BOARD



- Terminals 1 ÷ 3: inputs for sensor
- Terminal 3: transducer power supply (see configurations)
- Terminals 4 ÷ 6: analogue outputs (OAP option)
- Terminals 4, 6: enable remote second set-point (if RSP option is requested)
- Terminals 7, 8: instrument power supply. If Vcc the terminal 7 = +
- Terminals 9, 10: contact NO of main relay (A option) or static output (C option)
- Terminals 11, 12: contact NO of alarm relay (if requested: 03 option)

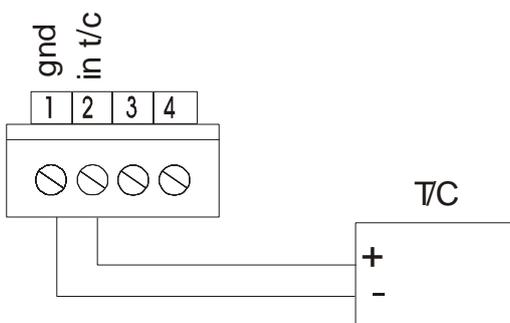
CONNECTIONS PT100



For thermoresistance connection pay attention to the line resistance: if it is too high there may be some errors in readout. Use the same kind of wire for the three connections. If shielded cable is used, connect the shield to ground at one end only.

Attention: control inside configuration

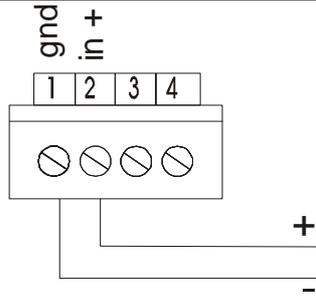
THERMOCOUPLING CONNECTIONS



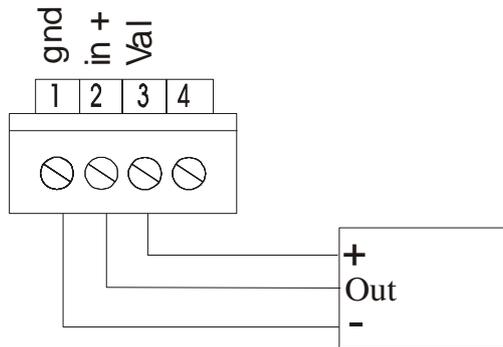
Thermocouplings must be isolated. For thermocoupling connection use only compensated wire for the type of thermocouple in use.

If shielded cable is used, connect the shield to ground at one end only.

VOLTAGE OR CURRENT INPUT CONNECTIONS

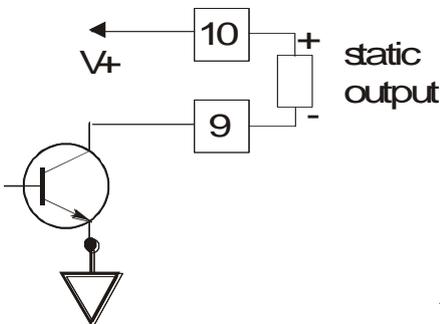


CURRENT/VOLTAGE INPUT CONNECTIONS WITH TRANSDUCER POWER SUPPLY



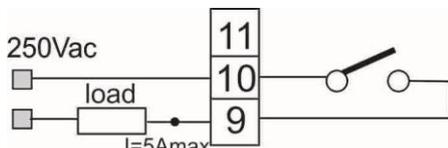
This connection can be used if the transducer power supply is configured (see TERMINAL 3 CONFIGURATION).

STATIC OUTPUTS CONNECTIONS

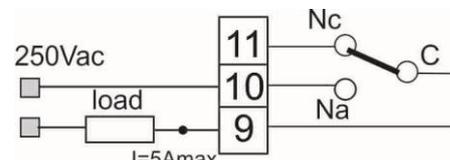


Be careful: this output is not isolated and should be used for an external solid state relay with double isolation between instrument and power line.

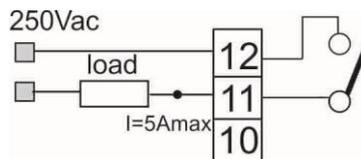
RELAY CONNECTIONS



OPTION "A"

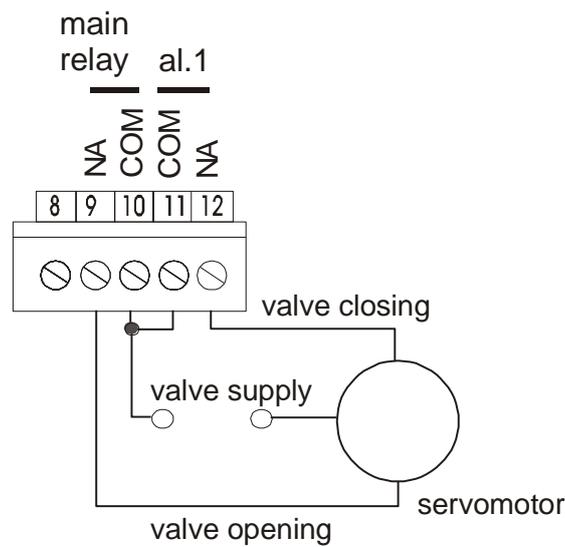


OPTION "F" or "G"



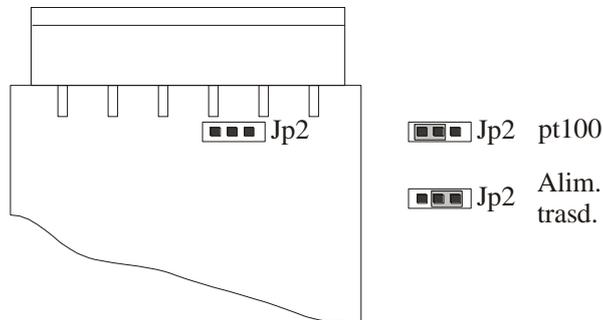
CONTACT ALARM (not available with "F" or "G" option)

SERVOMOTOR CONNECTIONS



1.4 TERMINAL 3 CONFIGURATION (TRANSDUCER POWER SUPPLY)

Open the instrument and set the jumper JP2 for a PT100 input (standard) or for a transducer power supply connection.



ANALOGUE OUTPUTS CONNECTIONS

See dedicated paragraph.



2.0 INSTALLATION NOTES

1. Copy the connection schemes on pages 7, 8 and 9 taking into account the following points:
 - a- the instrument can operate with analogue inputs or temperature sensors of both thermoresistance and thermocoupling types. Only one of this sensors can be connected (attach the connection only for the chosen sensor, leaving the other connections free.).
 - b- the connector diagram shows all the possible options that the instrument may have; if certain options are not required then the relative connections are not necessary.
2. Follow the instructions of the paragraph:
 - 2.1: for heating or cooling control
 - 2.2: for heating and cooling control
 - 2.3: for a servomotor control
 - 2.4: for a valves control
3. Follow the instructions of the paragraph "Regulations" to optimise control parameters.
4. If the instrument is requested with "OAP" option, it is necessary to consider the paragraph "ANALOGUE OUTPUT".

2.1 INSTRUMENT WITH HEATING OR COOLING

Heating (tCOn = in) or cooling (tCOn = dir) regulation is performed by main relay; it is possible to use two alarm outputs (if requested) and the analogue output (if requested) that varies with the temperature readout.

Program the instrument following the table below; by "Exit" key it is possible to escape immediately from the menu.

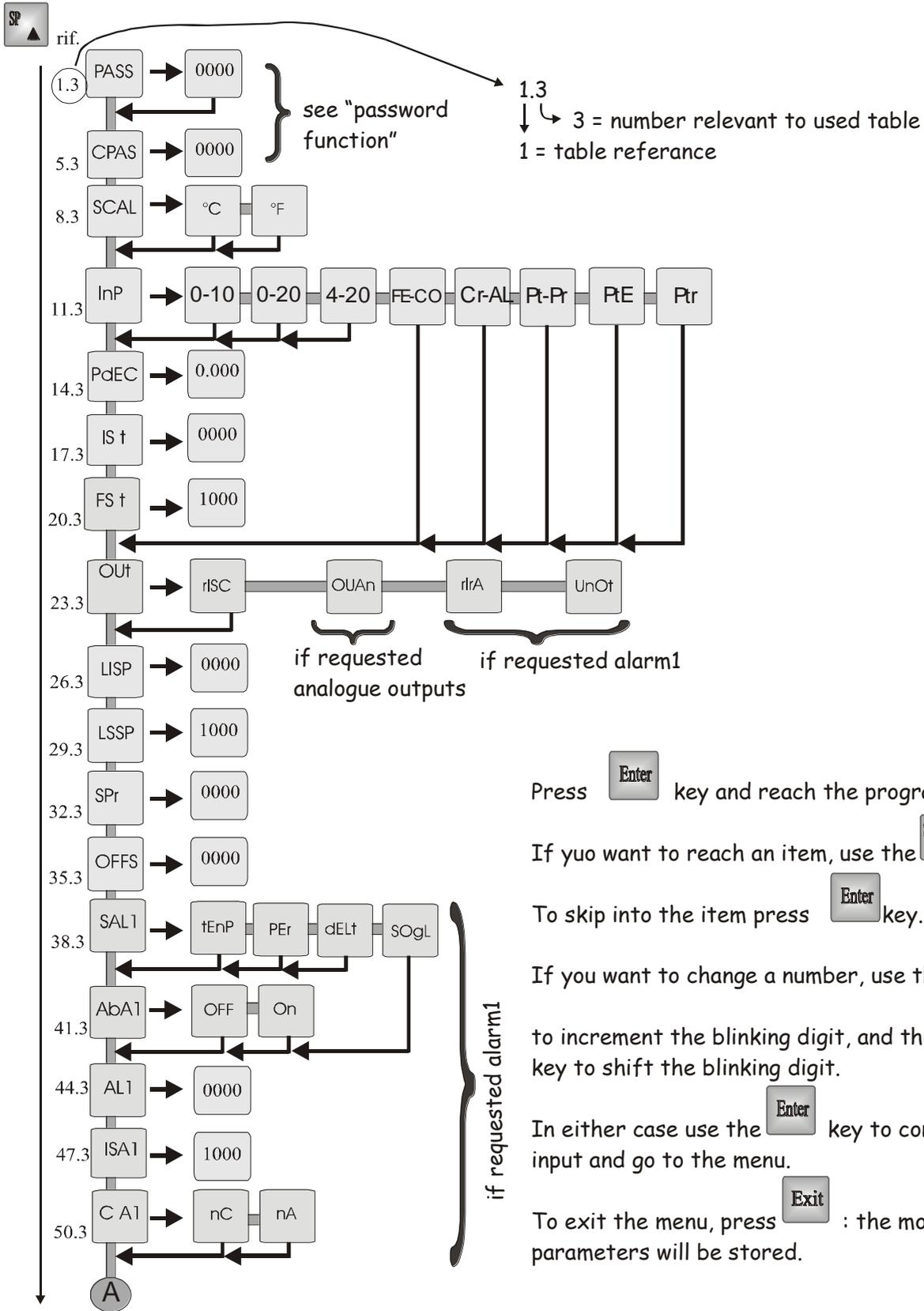
To set up control parameters see paragraph "Regulations".

Beware: If out of range menu's item are programmed, they are proposed again at the maximum or minimum possible value.

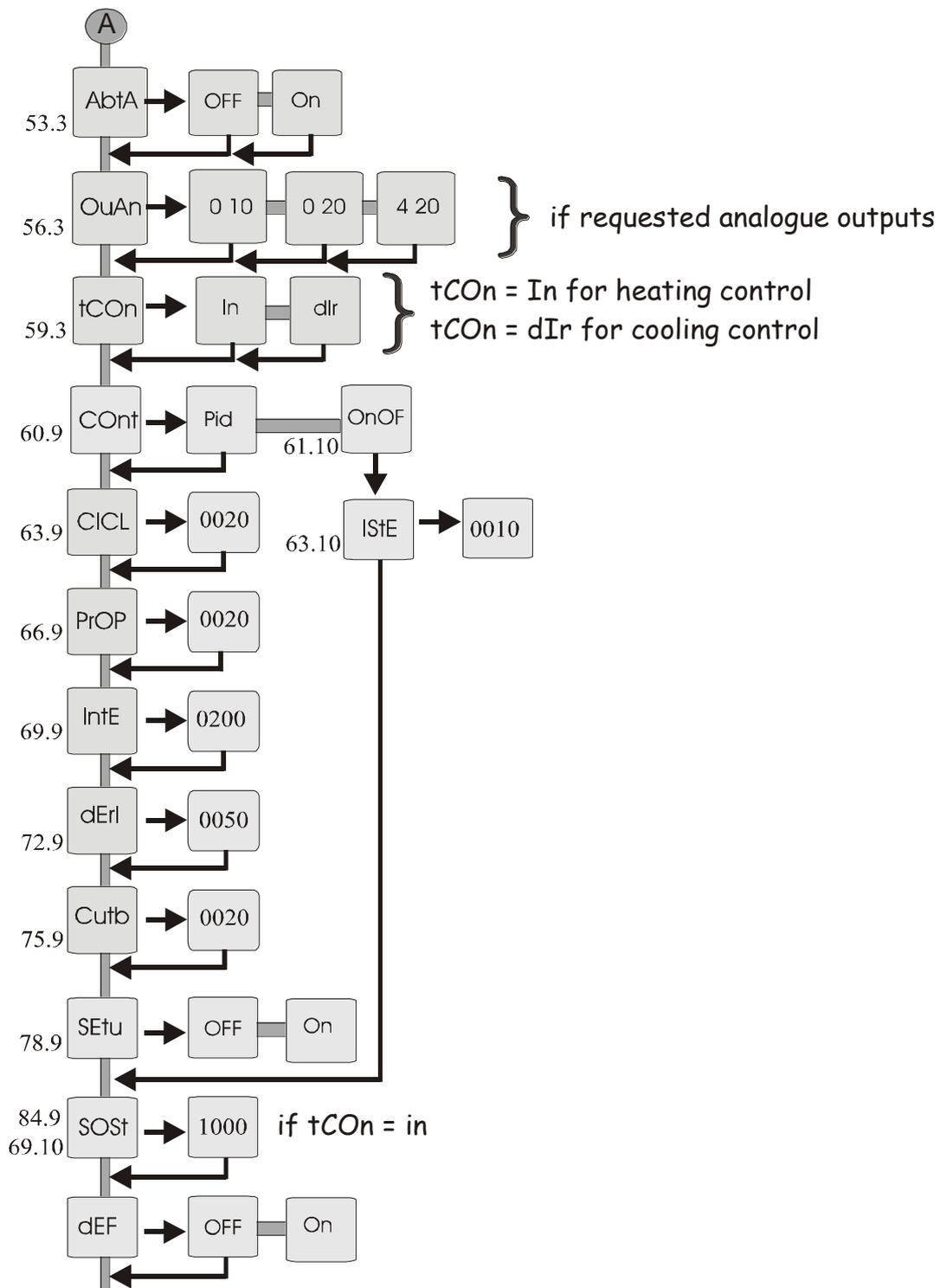
To reset to factory default parameters you can see the paragraph "Default parameters".

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2.1.1 DIAGRAM MENU' WITH HEATING OR COOLING CONTROL



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Table 3

ref.	touch key	appears on display	NOTE	See page
1	enter	PASS	PASSWORD	Pp 44
2	enter	0 000	In this phase the instrument asks for the Password in order to allow the changing in menù. The number memorized by the factory is 0, but any number between 0 and 9999 can be memorized by writing where "CPAS" appears (next displayed item).	
3	AL ▶	0 0 00	Set Up Procedure. To digit the desired number touch the key " AL ▶ " to move the flashing number to the right.	
4	SP ▲	0 1 00	Touch the key " SP ▲ " to increase the flashing number. Confirm by "enter"	
5		CPAS	CHANGE PASSWORD	Pp 44
6	enter	0000	Number of the access key to the programming of the instrument. The number written in this phase will be requested at "PASS". To digit the number follow the procedure described in points 3 and 4.	
7		CPAS		
8	SP ▲	SCAL	TEMPERATURE SCALE.	
9	enter	°C	Temperature scale: Choose the type of scale required. Set the requested scale (°C or °F) by "SP ▲" and confirm with "enter".	
10		SCAL		
11	SP ▲	InP	CHOOSE THE TYPE OF SENSOR REQUIRED.	
12	enter	FECO	Choose the type of sensor required. Touch the key "SP ▲ " until the chosen input appears on display: FECO = Fe/CO (0 ÷ 600 °C) (J) CrAL = Cr/Al (0 ÷ 1200 °C) (K) PtPr = Pt/Pt-Rh (0 ÷ 1710°C) (S) PtE = PT100 (-40 ÷ 800 °C) Ptr = PT100 (- 40.0 ÷ 200.0 °C) 0 10 = analogue input 0-10V 0 20 = analogue input 0-20mA	Pp 36

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ref.	touch key	appears on display	NOTE	See page
			4 20 = analogue input 4-20mA To change this item use the “SP ▲ “ key and confirm by “enter”	
13		InP		
14	SP ▲	P.dEC	DECIMAL POINT (if analog input)	
15	enter	0.000	Decimal point Touch the key “SP ▲ “ to set the decimal point and confirm with "enter"	
16		P.dEC		
17	SP ▲	IS t	BEGINNING OF THE ANALOGUE INPUT	Pp 36
18	enter	0000	Set the requested reading with the beginning of the analogue input. To digit the number see 3 and 4 paragraphs.	
19		IS t		
20	SP ▲	FS t	FULL SCALE OF ANALOGUE INPUT	Pp 36
21	enter	1000	Set the requested reading with the full scale of the analogue input. To digit the number see 3 and 4 paragraphs.	
22		FS t		
23	SP ▲	Out	REGULATION TYPE	
24	enter	rISC	Choose rISC for heating regulation with the main relay. Set the requested regulation by “SP ▲ ” and confirm with “enter“.	
25		Out		
26	SP ▲	LISP	LOWER LIMIT SET-POINT.	Pp 35
27	enter	0000	Lower limit set-point. To digit the number follow the procedure described in points 3 and 4	
28		LISP		
29	SP ▲	LSSP	UPPER LIMIT SET-POINT.	Pp 35
30	enter	0100	Upper limit set-point. To digit the number follow the procedure described in points 3 and 4	
31		LSSP		
32	SP ▲	SPr	SETPOINT REMOTE (if requested)	
33	enter	0010	Setpoint remote value set up (if requested). To digit the number follow the procedure described in points 3 and 4.	

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ref.	touch key	appears on display	NOTE	See page
34		SPr		
35	SP ▲	OFFS	CORRECTION OF READING TEMPERATURE	
36	enter	0010	Using the number "OFFS" it is possible to correct the displayed temperature by adding or subtracting a constant. To digit the number follow the procedure described in points 3 and 4.	
37		OFFS		
38	SP ▲	S.AL1	ALARM 1 SELECTION	Pp 36
39	enter	tEnP	Selection the kind of working Alarm1 tEnP = min or max absolute alarm value PEr = percentage alarm dELt = relative alarm at the set point SOGL = max absolute alarm value independent from Set Point To change this item use the "SP ▲" key and confirm by "enter"	
40	SP ▲	AbA1	MINIMUM ALARM 1 ENABLE.	Pp 36
41	enter	OFF	On: Minimum alarm relay is always enabled OFF: Minimum alarm relay is enabled after the first time the temperature reaches the alarm value To change this item use the "SP ▲" key and confirm by "enter"	
42		AbA1		
43		S.AL1		
44	SP ▲	AL1	ALARM VALUE SET UP This item can be modified directly by "AL ▶" key.	Pp 36
45	enter	0100	Alarm value set up (if requested). To digit the value see steps 3 and 4. An alarm can work as minimum alarm (if < set-point) or maximum alarm (if > set-point).	
46		AL1		
47	SP ▲	ISA1	ALARM 1 HISTERESIS SET UP	Pp 36
48	enter	0001	Alarm 1 hysteresis set up. To digit the number follow the procedure described in points 3 and 4	

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ref.	touch key	appears on display	NOTE	See page
49		ISA1		
50	SP ▲	C A1	POSSIBILITY OF INVERTING THE RELAY FUNCTION	Pp 36
51	enter	nA	Possibility of inverting the relay function nA = normally open nC = normally closed Set the requested regulation by “SP ▲” and confirm with “enter”.	
52		C A1		
53	SP ▲	AbtA	KEY ALARM 1 ENABLE.	
54	enter	OFF	On: key alarm 1 enabled OFF: key alarm1 disabled To change this item use the “SP ▲” key and confirm by “enter”	
55		AbtA		
56	SP ▲	OUn	ANALOG OUTPUT SELECTION (if required)	Pp 36
57	enter	0 10	If analogue outputs are requested touch the key "SP ▲" until the output required appears on the display and then confirm with "enter". 0 10 = output 0 ÷ 10 V 0 20 = output 0 ÷ 20 mA 4 20 = output 4 ÷ 20 mA	
58		OUn		
59	SP ▲	tCOn	CONTROL TYPE	Pp 36
60	enter	In	Control type: In = reverse function (main relay = heating) dIr = direct function To change this item use the “SP ▲” key and confirm by “enter”	
61		tCOn		
	Exit	Measure	EXIT TO THE MENU	

2.2 INSTRUMENT WITH HEATING AND COOLING CONTROL

The instrument with heating and cooling control can be used only if the instrument has the alarm relay. In this function, the main relay makes the heating regulation and the alarm relay makes the cooling regulation. The analogue outputs (if requested) change in according to the Process Value.

Program the instrument following the table below; by “Exit” key it is possible to escape immediately from the menu. Selecting heating-cooling control the instrument also gives the cooling dead-band item (bAnr).

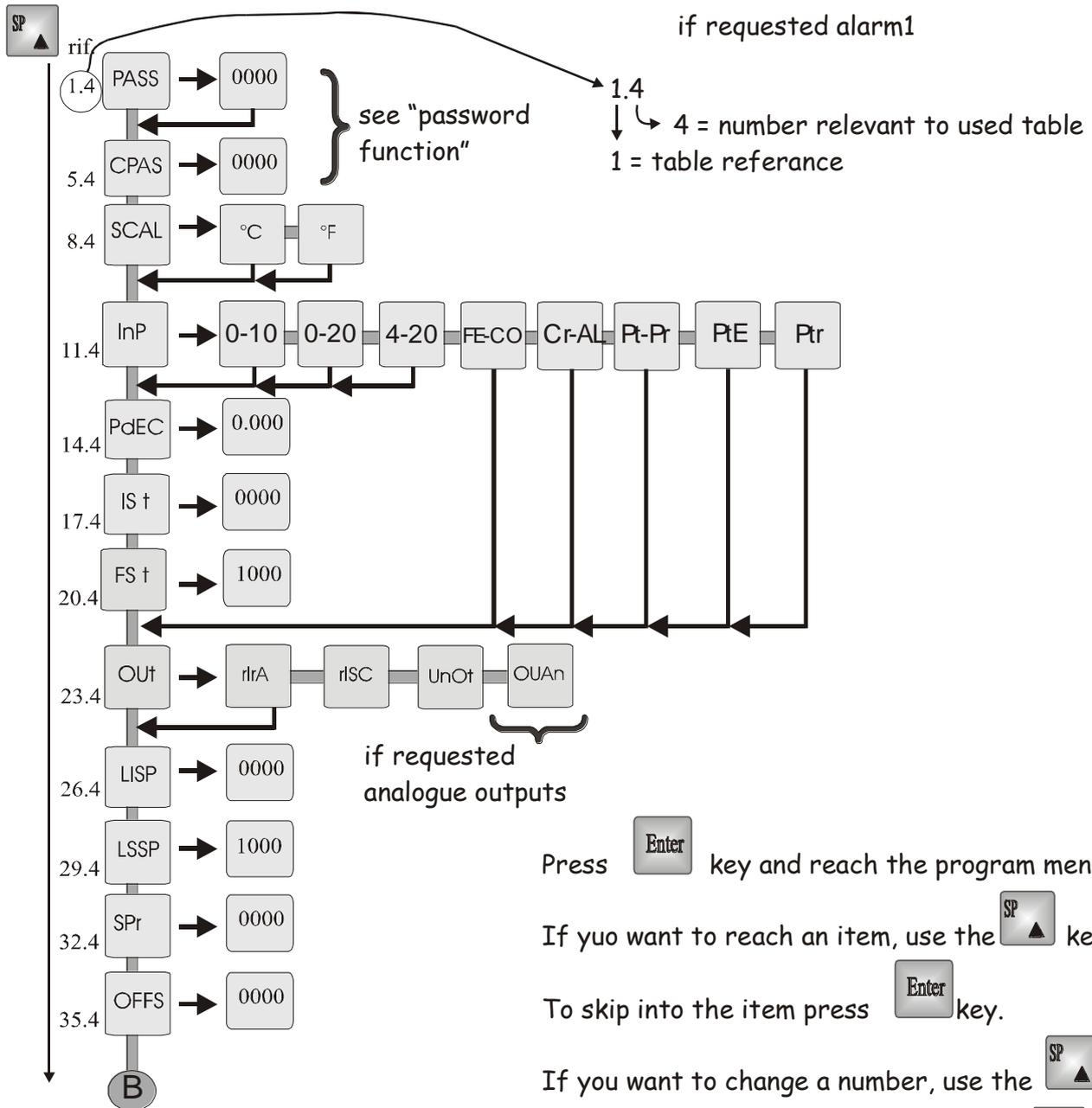
To set up control parameters see paragraph "Regulations".

Beware: If out of range menu's item are programmed, they are proposed again at the maximum or minimum possible value.

To reset to factory default parameters you can see the paragraph “Default parameters”.

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2.2.1 DIAGRAM MENU' WITH HEATING AND COOLING CONTROL



Press **Enter** key and reach the program menu.

If you want to reach an item, use the **SP ▲** key.

To skip into the item press **Enter** key.

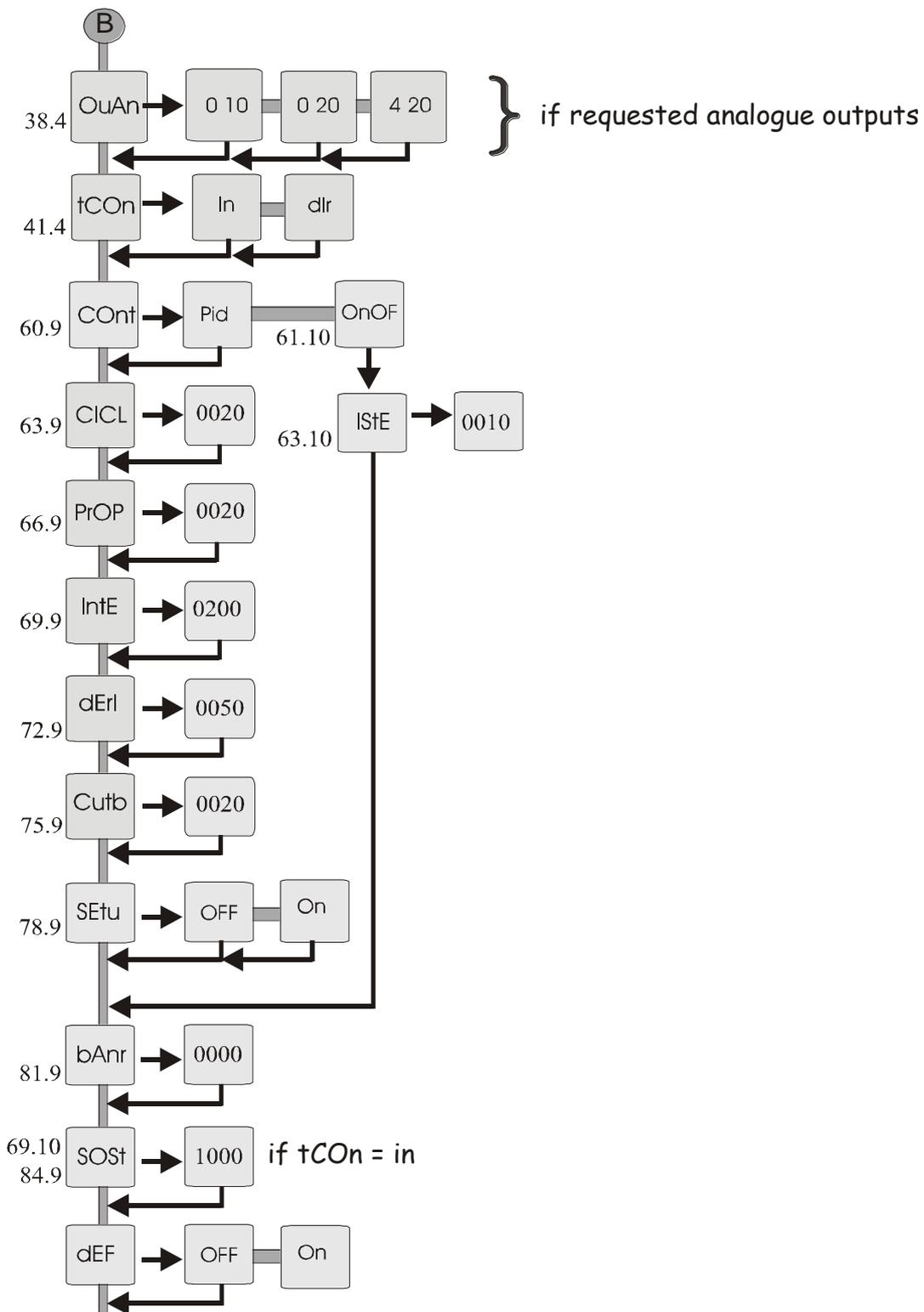
If you want to change a number, use the **SP ▲**

to increment the blinking digit, and the **AL ▶** key to shift the blinking digit.

In either case use the **Enter** key to confirm the input and go to the menu.

To exit the menu, press **Exit** : the modified parameters will be stored.

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Table 4

ref.	touch key	appears on display	NOTE	See page
1	enter	PASS	PASSWORD	Pp 44
2	enter	0 000	In this phase the instrument asks for the Password in order to allow the changing in menù. The number memorized by the factory is 0, but any number between 0 and 9999 can be memorized by writing where "CPAS" appears (next displayed item).	
3	AL ▶	0 0 00	Set Up Procedure. To digit the desired number touch the key "AL ▶" to move the flashing number to the right.	
4	SP ▲	0 1 00	Touch the key "SP ▲" to increase the flashing number. Confirm by "enter".	
5		CPAS	CHANGE PASSWORD	Pp 44
6	enter	0000	Number of the access key to the programming of the instrument. The number written in this phase will be requested at "PASS". To digit the number follow the procedure described in points 3 and 4.	
7		CPAS		
8	SP ▲	SCAL	TEMPERATURE SCALE.	
9	enter	°C	Temperature scale: Choose the type of scale required. Set the requested scale (°C or °F) by "SP ▲" and confirm with "enter".	
10		SCAL		
11	SP ▲	InP	CHOOSE THE TYPE OF SENSOR REQUIRED.	
12	enter	FECO	Choose the type of sensor required. Touch the key "SP ▲" until the chosen input appears on display: FECO = Fe/CO (0 ÷ 600 °C) (J) CrAL = Cr/Al (0 ÷ 1200 °C) (K) PtPr = Pt/Pt-Rh (0 ÷ 1710°C) (S) PtE = PT100 (-40 ÷ 800 °C) Ptr = PT100 (- 40.0 ÷ 200.0 °C) 0 10 = analogue input 0-10V	

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ref.	touch key	appears on display	NOTE	See page
			0 20 = analogue input 0-20mA 4 20 = analogue input 4-20mA To change this item use the “SP ▲ “ key and confirm by “enter”	Pp 36
13		InP		
14	SP ▲	P.dEC	DECIMAL POINT (if analog input)	
15	enter	0.000	Decimal point Touch the key “SP ▲ “ to set the decimal point and confirm with "enter"	
16		P.dEC		
17	SP ▲	IS t	BEGINNING OF THE ANALOGUE INPUT	Pp 36
18	enter	0000	Set the requested reading with the beginning of the analogue input. To digit the number see 3 and 4 paragraphs.	
19		IS t		
20	SP ▲	FS t	FULL SCALE OF ANALOGUE INPUT	Pp 36
21	enter	1000	Set the requested reading with the full scale of the analogue input. To digit the number see 3 and 4 paragraphs.	
22		FS t		
23	SP ▲	Out	REGULATION TYPE	
24	enter	rIrA	rIrA: heating-cooling Set the requested regulation by “SP ▲ ” and confirm with “enter“.	
25		Out		
26	SP ▲	LISP	LOWER LIMIT SET-POINT.	Pp 35
27	enter	0000	Lower limit set-point. To digit the number follow the procedure described in points 3 and 4	
28		LISP		
29	SP ▲	LSSP	UPPER LIMIT SET-POINT.	Pp 35
30	enter	0100	Upper limit set-point. To digit the number follow the procedure described in points 3 and 4	
31		LSSP		
32	SP ▲	SPr	SETPOINT REMOTE (if requested)	
33	enter	0010	Setpoint remote value set up (if requested). To digit the number follow the procedure described	

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ref.	touch key	appears on display	NOTE	See page
			in points 3 and 4.	
34		SPr		
35	SP ▲	OFFS	CORRECTION OF READING TEMPERATURE	
36	enter	0010	Using the number "OFFS" it is possible to correct the displayed temperature by adding or subtracting a constant. To digit the number follow the procedure described in points 3 and 4.	
37		OFFS		
38	SP ▲	OUn	ANALOG OUTPUT SELECTION (if required)	Pp 36
39	enter	0 10	If analogue outputs are requested touch the key "SP ▲ " until the output required appears on the display and then confirm with "enter". 0 10 = output 0 ÷ 10 V 0 20 = output 0 ÷ 20 mA 4 20 = output 4 ÷ 20 mA	
40		OUn		
41	SP ▲	tCOn	CONTROL TYPE	Pp 36
42	enter	In	In = reverse function (main relay = heating) dIr = direct function To change this item use the “SP ▲ “ key and confirm by “enter”	
43		tCOn		
81	enter	bAnr	Touch “enter” the key until the item bAnr appears = cooling dead band (see paragraph)	
	Exit	Measure	EXIT TO THE MENU	

2.3 INSTRUMENT WITH SERVOMOTOR CONTROL

The UnOt function can be used only if the instrument has the alarm relay. In this function, the main relay together with alarm relay control the servomotor. Selecting the item “ out = UnOt “, there are other two values to set up for the control: “ time “(time that the servomotor needs for its cycle) and “ bAnO “ (dead band for the servomotor). In “ time “ it is necessary to set the full scale time (in seconds and tenth of second) that the servomotor needs to complete its cycle, while in “bAnO“ it is possible to set an interval (expressed in percentage of “time “) where the servomotor doesn't have the control. Example: full scale “time “ 90 seconds, dead band: 10%. The displacements shorter than 9 seconds are inhibited.

The analogue outputs (if requested) change in according to the Process Value.

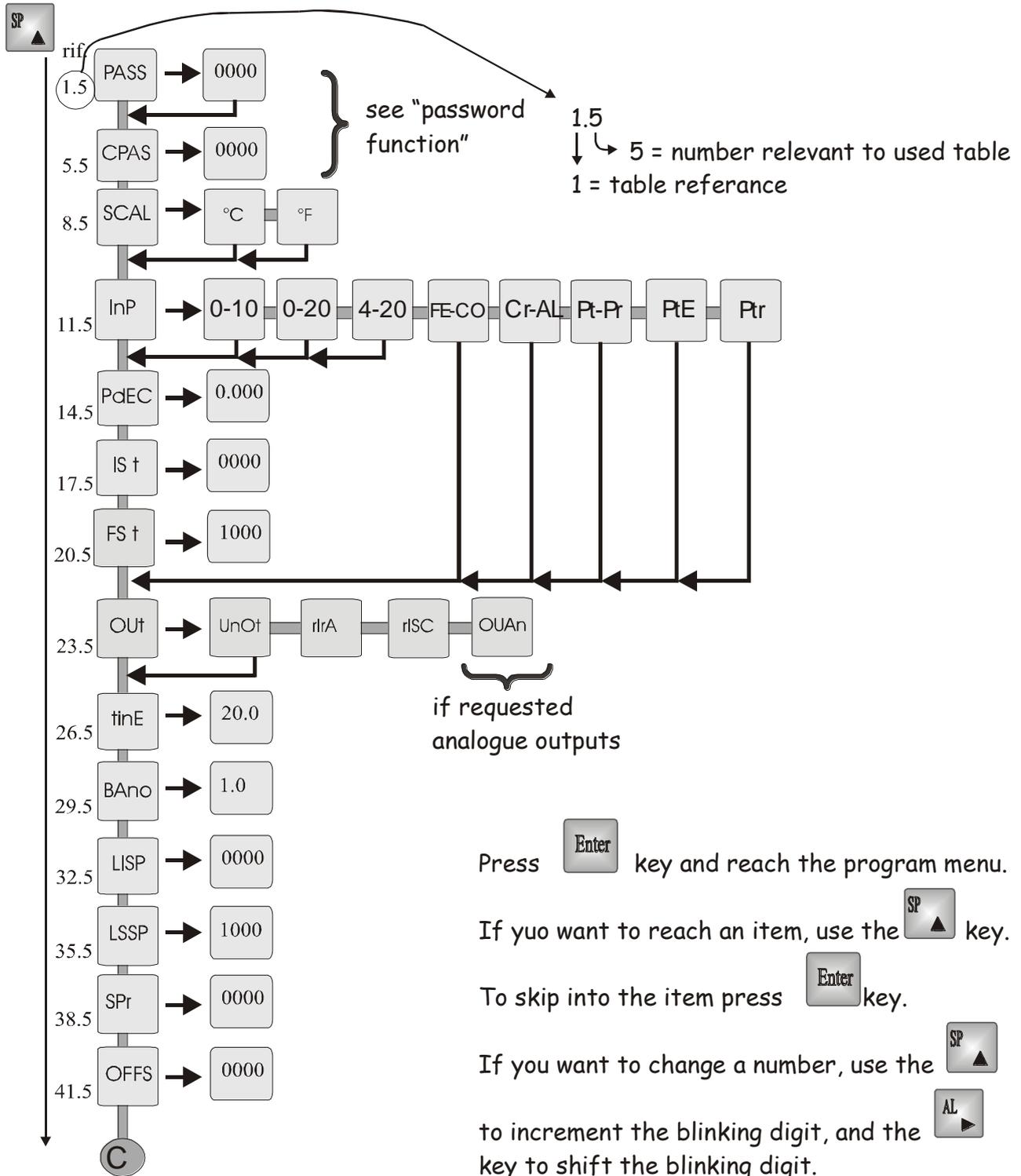
Program the instrument following the table below; by “Exit” key it is possible to escape immediately from the menu.

To set up control parameters see paragraph "Regulations".

Beware: If out of range menu's item are programmed, they are proposed again at the maximum possible value.

To reset to factory default parameters you can see the paragraph “Default parameters”.

2.3.1 DIAGRAM MENU WITH SERVO MOTOR CONTROL



Press **Enter** key and reach the program menu.

If you want to reach an item, use the **SP** key.

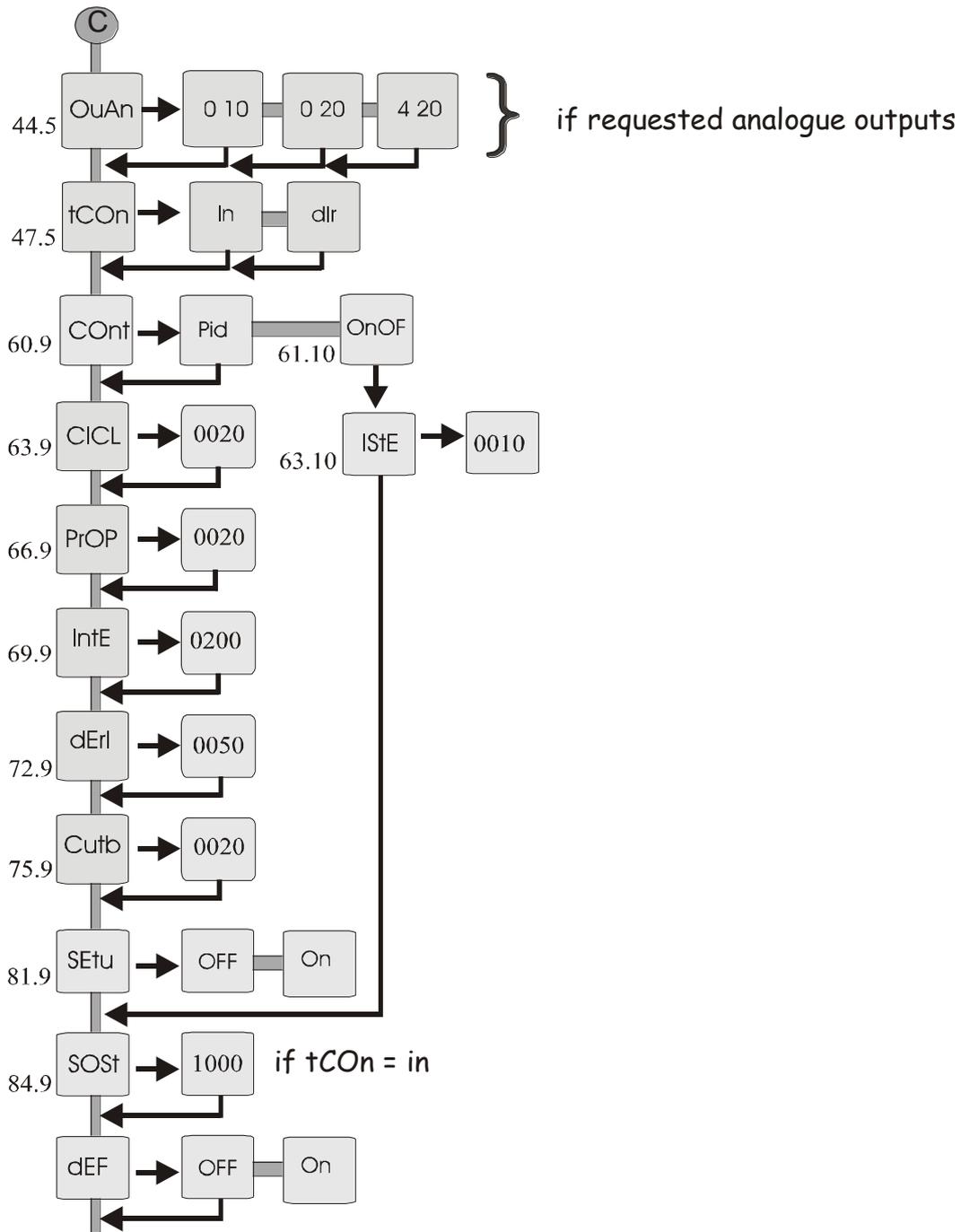
To skip into the item press **Enter** key.

If you want to change a number, use the **SP** key to increment the blinking digit, and the **AL** key to shift the blinking digit.

In either case use the **Enter** key to confirm the input and go to the menu.

To exit the menu, press **Exit** : the modified parameters will be stored.

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Table 5

ref.	touch key	appears on display	NOTE	See page
1	enter	PASS	PASSWORD	Pp 44
2	enter	0 000	In this phase the instrument asks for the Password in order to allow the changing in menù. The number memorized by the factory is 0, but any number between 0 and 9999 can be memorized by writing where "CPAS" appears (next displayed item).	
3	AL ▶	0 <u>0</u> 00	Set Up Procedure. To digit the desired number touch the key " AL ▶ " to move the flashing number to the right.	
4	SP ▲	0 <u>1</u> 00	Touch the key " SP ▲ " to increase the flashing number. Confirm by "enter"	
5		CPAS	CHANGE PASSWORD	Pp 44
6	enter	0000	Number of the access key to the programming of the instrument. The number written in this phase will be requested at "PASS". To digit the number follow the procedure described in points 3 and 4.	
7		CPAS		
8	SP ▲	SCAL	TEMPERATURE SCALE.	
9	enter	°C	Temperature scale: Choose the type of scale required. Set the requested scale (°C or °F) by "SP ▲" and confirm with "enter".	
10		SCAL		
11	SP ▲	InP	CHOOSE THE TYPE OF SENSOR REQUIRED.	
12	enter	FECO	Choose the type of sensor required. Touch the key "SP ▲ " until the chosen input appears on display: FECO = Fe/CO (0 ÷ 600 °C) (J) CrAL = Cr/Al (0 ÷ 1200 °C) (K) PtPr = Pt/Pt-Rh (0 ÷ 1710°C) (S) PtE = PT100 (-40 ÷ 800 °C) Ptr = PT100 (- 40.0 ÷ 200.0 °C) 0 10 = analogue input 0-10V 0 20 = analogue input 0-20mA	Pp 36

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ref.	touch key	appears on display	NOTE	See page
			4 20 = analogue input 4-20mA To change this item use the “SP ▲ “ key and confirm by “enter”	
13		InP		
14	SP ▲	P.dEC	DECIMAL POINT (if analog input)	
15	enter	0.000	Decimal point Touch the key “SP ▲ “ to set the decimal point and confirm with "enter"	
16		P.dEC		
17	SP ▲	IS t	BEGINNING OF THE ANALOGUE INPUT	Pp 36
18	enter	0000	Set the requested reading with the beginning of the analogue input. To digit the number see 3 and 4 paragraphs.	
19		IS t		
20	SP ▲	FS t	FULL SCALE OF ANALOGUE INPUT	Pp 36
21	enter	1000	Set the requested reading with the full scale of the analogue input. To digit the number see 3 and 4 paragraphs.	
22		FS t		
23	SP ▲	Out	REGULATION TYPE	
24	enter	UnOt	UnOt: servomotor control. Set the requested regulation by “SP ▲ ” and confirm with “enter“.	
25		Out		
26	SP ▲	tInE	SERVOMOTOR TIME.	
27	enter	999.9	Program the servomotor’s time in seconds and tenth of second and confirm with “enter”	
28		tInE		
29	SP ▲	bAnO	DEAD BAND	
30	enter	10.0	Dead band, expressed in %, in which the servomotor is not actuated. Confirm with “enter”.	
31		bAnO		
32	SP ▲	LISP	LOWER LIMIT SET-POINT.	Pp 35
33	enter	0000	Lower limit set-point. To digit the number follow the procedure described in points 3 and 4	
34		LISP		

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ref.	touch key	appears on display	NOTE	See page
35	SP ▲	LSSP	UPPER LIMIT SET-POINT.	Pp 35
36	enter	0100	Upper limit set-point. To digit the number follow the procedure described in points 3 and 4	
37		LSSP		
38	SP ▲	SPr	SETPOINT REMOTE (if requested)	
39	enter	0010	Setpoint remote value set up (if requested). To digit the number follow the procedure described in points 3 and 4.	
40		SPr		
41	SP ▲	OFFS	CORRECTION OF READING TEMPERATURE	
42	enter	0010	Using the number "OFFS" it is possible to correct the displayed temperature by adding or subtracting a constant. To digit the number follow the procedure described in points 3 and 4.	
43		OFFS		
44	SP ▲	OUn	ANALOG OUTPUT SELECTION (if required)	Pp 36
45	enter	0 10	If analogue outputs are requested touch the key "SP▲" until the output required appears on the display and then confirm with "enter". 0 10 = output 0 ÷ 10 V 0 20 = output 0 ÷ 20 mA 4 20 = output 4 ÷ 20 mA	
46		OUn		
47	SP ▲	tCOn	CONTROL TYPE	Pp 36
48	enter	In	In = reverse function (main relay = heating) dIr = direct function To change this item use the "SP▲" key and confirm by "enter"	
49		tCOn		
	Exit	Measure	EXIT TO THE MENU	

2.4 INSTRUMENT WITH A VALVE CONTROL

The OUA function can be used only if the instrument has the analogue outputs. See paragraph "Analogue outputs".

The voltage heating regulation can be linked to 6 (+) and 4 (-) terminals, the current heating regulation can be linked to 5 (+) and 4 (-) terminals.

Program the instrument following the table below; by "Exit" key it is possible to escape immediately from the menu.

For an heating control set "tCO_n = In" and for a cooling control set "tCO_n = dIr".

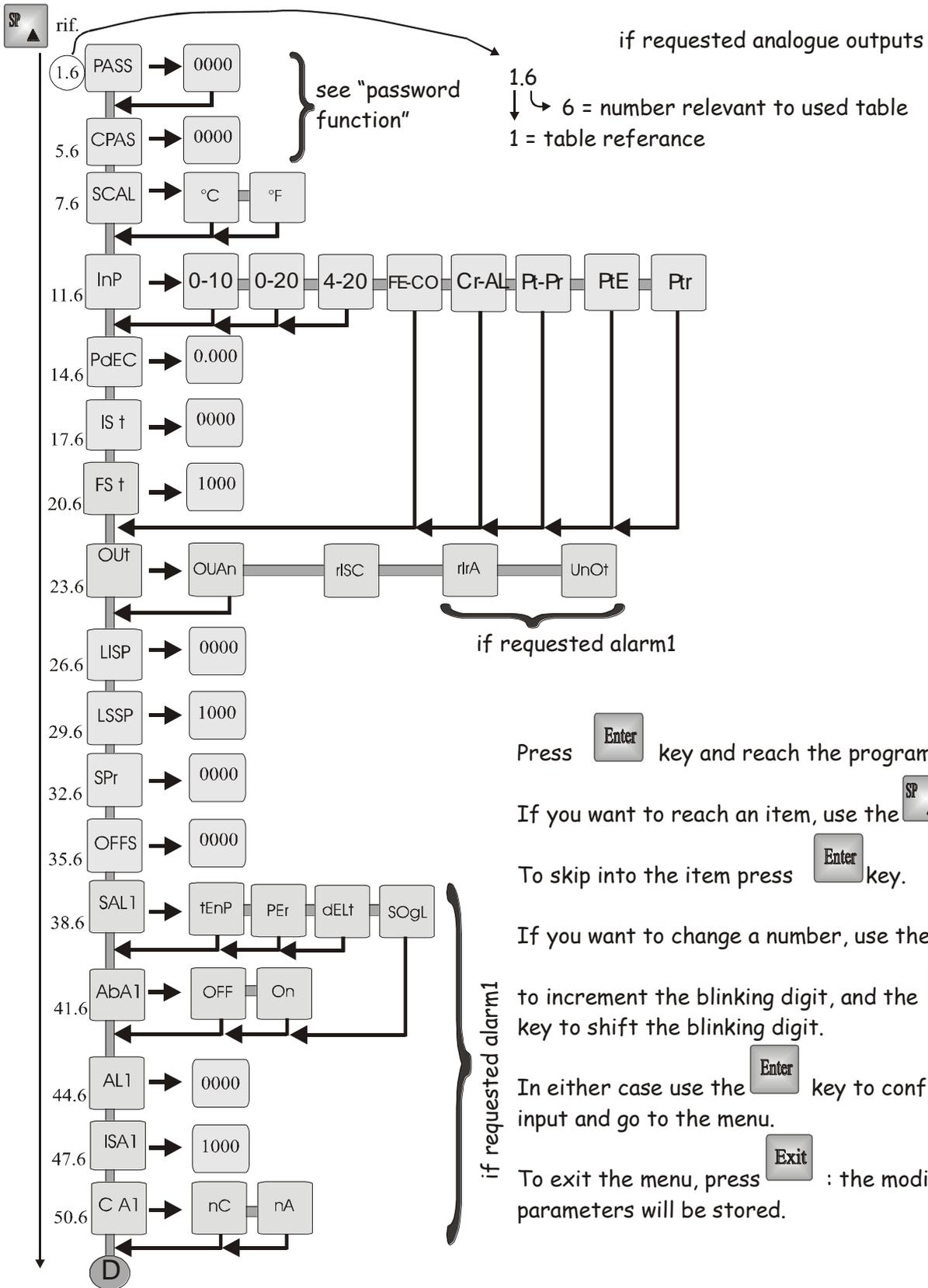
To set up control parameters see paragraph "Regulations".

Beware: If out of range menu's item are programmed, they are proposed again at the maximum possible value.

To reset to factory default parameters you can see the paragraph "Default parameters".

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2.4.1 DIAGRAM MENU' WITH VALVE CONTROL



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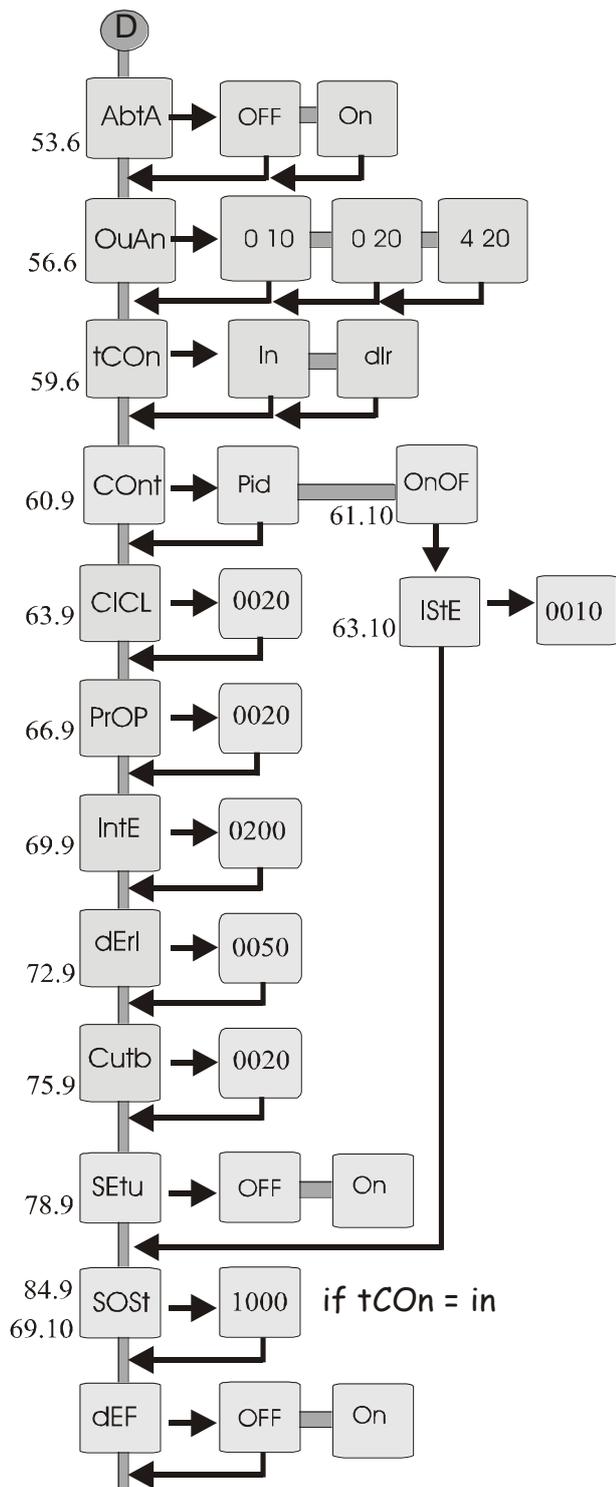


Table 6

ref.	touch key	appears on display	NOTE	See page
1	enter	PASS	PASSWORD	Pp 44
2	enter	0 000	In this phase the instrument asks for the Password in order to allow the changing in menù. The number memorized by the factory is 0, but any number between 0 and 9999 can be memorized by writing where "CPAS" appears (next displayed item).	
3	AL ▶	0 <u>0</u> 00	Set Up Procedure. To digit the desired number touch the key "AL ▶" to move the flashing number to the right.	
4	SP ▲	0 <u>1</u> 00	Touch the key "SP ▲" to increase the flashing number. Confirm by "enter"	
5		CPAS	CHANGE PASSWORD	Pp 44
6	enter	0000	Number of the access key to the programming of the instrument. The number written in this phase will be requested at "PASS". To digit the number follow the procedure described in points 3 and 4.	
7		CPAS		
8	SP ▲	SCAL	TEMPERATURE SCALE.	
9	enter	°C	Temperature scale: Choose the type of scale required. Set the requested scale (°C or °F) by "SP ▲" and confirm with "enter".	
10		SCAL		
11	SP ▲	InP	CHOOSE THE TYPE OF SENSOR REQUIRED.	
12	enter	FECO	Choose the type of sensor required. Touch the key "SP ▲" until the chosen input appears on display: FECO = Fe/CO (0 ÷ 600 °C) (J) CrAL = Cr/Al (0 ÷ 1200 °C) (K) PtPr = Pt/Pt-Rh (0 ÷ 1710°C) (S) PtE = PT100 (-40 ÷ 800 °C) Ptr = PT100 (- 40.0 ÷ 200.0 °C) 0 10 = analogue input 0-10V	Pp 36

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ref.	touch key	appears on display	NOTE	See page
			0 20 = analogue input 0-20mA 4 20 = analogue input 4-20mA To change this item use the “SP ▲ “ key and confirm by “enter”	
13		InP		
14	SP ▲	P.dEC	DECIMAL POINT (if analog input)	
15	enter	0.000	Decimal point Touch the key “SP ▲ “ to set the decimal point and confirm with "enter"	
16		P.dEC		
17	SP ▲	IS t	BEGINNING OF THE ANALOGUE INPUT	Pp 36
18	enter	0000	Set the requested reading with the beginning of the analogue input. To digit the number see 3 and 4 paragraphs.	
19		IS t		
20	SP ▲	FS t	FULL SCALE OF ANALOGUE INPUT	Pp 36
21	enter	1000	Set the requested reading with the full scale of the analogue input. To digit the number see 3 and 4 paragraphs.	
22		FS t		
23	SP ▲	Out	REGULATION TYPE	
24	enter	OUn	OUn: analogue outputs for motorized valves. Set the requested regulation by “SP+ ▲ ” and confirm with “enter“.	
25		Out		
26	SP ▲	LISP	LOWER LIMIT SET-POINT.	Pp 35
27	enter	0000	Lower limit set-point. To digit the number follow the procedure described in points 3 and 4	
28		LISP		
29	SP ▲	LSSP	UPPER LIMIT SET-POINT.	Pp 35
30	enter	0100	Upper limit set-point. To digit the number follow the procedure described in points 3 and 4	
31		LSSP		
32	SP ▲	SPr	SETPOINT REMOTE (if requested)	
33	enter	0010	Setpoint remote value set up (if requested). To digit the number follow the procedure described	

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ref.	touch key	appears on display	NOTE	See page
			in points 3 and 4.	
34		SPr		
35	SP ▲	OFFS	CORRECTION OF READING TEMPERATURE	
36	enter	0010	Using the number "OFFS" it is possible to correct the displayed temperature by adding or subtracting a constant. To digit the number follow the procedure described in points 3 and 4.	
37		OFFS		
38	SP ▲	S.AL1	ALARM 1 SELECTION	Pp 36
39	enter	tEnP	Selection the kind of working Alarm1 tEnP = min or max absolute alarm value PEr = percentage alarm dELt = relative alarm at the set point SOGL = max absolute alarm value independent from Set Point To change this item use the "SP ▲" key and confirm by "enter"	
40		S.AL1		
41	SP ▲	AL1	ALARM VALUE SET UP This item can be modified directly by "AL ▶" key.	Pp 36
42	enter	0100	Alarm value set up (if requested). To digit the value see steps 3 and 4. An alarm can work as minimum alarm (if < set-point) or maximum alarm (if > set-point).	
43		AL1		
44	SP ▲	ISA1	ALARM 1 HISTERESIS SET UP	Pp 36
45	enter	0001	Alarm 1 hysteresis set up. To digit the number follow the procedure described in points 3 and 4	
46		ISA1		
47	SP ▲	C A1	POSSIBILITY OF INVERTING THE RELAY FUNCTION	Pp 36
48	enter	nA	Possibility of inverting the relay function nA = normally open nC = normally closed Set the requested regulation by "SP ▲" and confirm with "enter".	

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ref.	touch key	appears on display	NOTE	See page
49		C A1		
50	SP ▲	AbA1	MINIMUM ALARM 1 ENABLE.	Pp 36
51	enter	OFF	On: Minimum alarm relay is always enabled OFF: Minimum alarm relay is enabled after the first time the temperature reaches the alarm value To change this item use the "SP ▲ " key and confirm by "enter"	
52		AbA1		
53	SP ▲	AbtA	KEY ALARM 1 ENABLE.	
54	enter	OFF	On: key alarm 1 enabled OFF: key alarm1 disabled To change this item use the "SP ▲ " key and confirm by "enter"	
55		AbtA		
56	SP ▲	OUAn	ANALOG OUTPUT SELECTION (if required)	Pp 36
57	enter	0 10	If analogue outputs are requested touch the key "SP ▲ " until the output required appears on the display and then confirm with "enter". 0 10 = output 0 ÷ 10 V 0 20 = output 0 ÷ 20 mA 4 20 = output 4 ÷ 20 mA	
58		OUAn		
59	SP ▲	tCO n	CONTROL TYPE	Pp 36
60	enter	In	Control type: In = reverse function (main relay = heating) dIr = direct function To change this item use the "SP ▲ " key and confirm by "enter"	
61		tCO n		
	Exit	Measure	EXIT TO THE MENU	

2.5 SET POINT MODIFICATIONS +REMOTE SET-POINT (RSP OPTION)

To modify the set-point value, press "SP+ ▲ " key. The last digit is blinking.

Touch the "SP+ ▲ " key to increase the digit and " AL ▶ " key to move toward another digit. Confirm by "enter" key.

In order to block the movement of the set point between two limits, programme the menu where "LISP" appears for the lower limit and "LSSP" for the upper limit.

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If RSP option is requested, it is possible to set the second set-point, shortcircuiting 4 and 6 terminals. To set the second set-point use the item menu "SPr". Also the second set-point is confined from "LISP" to "LSSP". Using the remote set point, the Sp[▲] key is disabled. The instrument works on the visualized set-point.

2.6 ANALOGUE INPUTS

The instruments of the "MPT60" series work with these analogue inputs:

- Current input "4 ÷ 20 mA"
- Current input "0 ÷ 20 mA"
- Voltage input "0 ÷ 10 V"

For each inputs it is possible to set any reading value in the range: -999 ÷ 2000.

To set these inputs the "IS t" and "FS t" items will be used for the beginning scale and full scale of the requested input. The programmed value could be corrected with "OFFS" item of the menu. With analogue inputs it is possible to set the decimal point by "PDEC" menu item. The voltage or current input must be linked to terminals number 2 (positive input) and 1 (gnd).

2.7 FUNCTION OFF-SET (OFFS)

If during the normal functioning of the thermoregulator you see a constant difference between the value measured by the sensor or analogue input and the real value, it is sufficient to write the difference in the "OFFS" function.

ATTENTION: the offset must be within -19.9 e 19.9 °C in the scale Pt r (-40.0 ÷ 200.0 °C) otherwise between -199 e 199 °C for all the other scales and is added to the temperature measured by the sensor.

2.8 SET UP AL1

The thermoregulator MPT60 offers the possibility to use one programmable alarm. This alarm can work with the following set up:

S.AL1 = tEnP. The alarm value (AL1) is set up with the absolute value. If $AL1 < SP$ the alarm works when the temperature goes under the AL1 value (it can be enabled at the first switching on if AbA1 = on or after that the temperature has come to the alarm value for the first time if AbA1 = off); if $AL1 > SP$ the alarm works when the temperature goes over the AL1 value.

S.AL1 = Per. The alarm value (AL1) is set up with the percentage value based on the set-point (from 0 to ± 100.0% of the set point). If AL1 is set up between -0.1% and -100.0% the alarm works when the temperature goes under the SP value - SP percentage (it can be enabled at the first switching on if AbA1 = on or after that the temperature has come to the alarm value for the first time if AbA1 = off); if AL1 is set up between +0.1% and +100.0% the alarm works when the temperature goes over the SP value + SP percentage.

S.AL1 = dELt. The alarm value (AL1) is set up in °C offset respect the set point. If AL1 is set up between -0 and - F.S. °C the alarm works when the temperature goes under the SP value - set up offset (it can be enabled at the

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first switching on if AbA1 = on or after that the temperature has come to the alarm value for the first time if AbA1 = off); if AL1 is set up between + 0 and + F.S. °C the alarm works when the temperature goes over the SP value + set up offset.

S.AL1 = SOGL. The alarm value is set up in absolute value between 0 and F.S. and the alarm works when the processing temperature goes over the AL1 set up temperature independently from the Set Point.

The alarm contact is configurable as “normally open” or as “normally closed” by the “CA1” item while the alarm relay hysteresis is programmable from 0 to F.S. value (digits/degrees) by the “ISA1” item.

The led on the frontal does not follow the contact programming but it follows the alarm function.

The described functioning is active for alarm 1 just at the moment when “Out” = “rISC” or “Out” = “OUAn”. If “Out” = “rIrA” or “Out” = “UnOt” the alarm 1 respectively works for the cooling or for the servomotor function so the alarm 1 output changes the type of functioning depending on the requested regulation.



3.0 ANALOGUE OUTPUT (option)

The thermoregulator MPT50 offers the possibility to supply the analogue outputs. The instrument is able to supply 3 types of outputs: “ 0 ÷ 20 mA “, “4 ÷ 20 mA “, “0 ÷ 10 V “ to transmit the read out or to control the motorized valves.

Table 7

Analogue outputs	0÷10 V - 0÷ 20 mA - 4÷20 mA
Max load for current output	300 Ω
Min load for voltage output	1KΩ
Max voltage output	10 V
Max current output	20 mA
Resolution	12 bits

3.1 ANALOGUE OUTPUT FOR MOTORIZED VALVE

To use analogue output for motorized valve it is necessary to set the item “ Out “ = “ OUAn “ (see paragraph “ Instrument with a valve control”).

The analogue output is working as heating regulation if “tCOn” item = “In” or as cooling regulation if “tCOn” item = “dIr”. The analogue output can be selected in current (0/4 ÷ 20 mA: terminals 5 (+) and 4 -gnd-) or voltage (0 ÷ 10 V: terminals 6 (+) and 4 -gnd-). At the end of the cycle time (“CICL”) the analogue outputs are refreshed from the PID control.

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3.2 ANALOGUE OUTPUT FOR READOUT

If the instrument has the analogue output (OAP option) and the voice “Out “ is selected as “rISC “, “rIrA “, or “UnOt “, the analogue output is proportional to the readout value.

The output can be selected in voltage or current mode. The terminals for voltage output are 6 (+) and 4 (gnd), while the terminals for current output are 5 (+) and 4 (gnd). The next table shows the couplings of the readout with the analogue outputs.

Table 8

ANALOGUE OUTPUT RANGE	BEGINNING SCALE OF ANALOGUE OUTPUT	FULL SCALE OF ANALOGUE OUTPUT
0÷10V for Pt r	0V ≡ -40.0 °C	10V ≡ 200,0 °C
0÷10V for Pt E	0V ≡ 0 °C	10V ≡ 800 °C
0÷10V for FE-CO	0V ≡ 0 °C	10V ≡ 600 °C
0÷10V for Cr-Al	0V ≡ 0 °C	10V ≡ 1200 °C
0÷10V for PtPr	0V ≡ 0 °C	10V ≡ 1710 °C
0÷10V for analogue input	0V ≡ IS t	10V ≡ FS t
0÷20 mA for Pt r	0 mA ≡ -40.0 °C	20 mA ≡ 200,0 °C
0÷20 mA for Pt E	0 mA ≡ 0 °C	20 mA ≡ 800 °C
0÷20 mA for FE-CO	0 mA ≡ 0 °C	20 mA ≡ 600 °C
0÷20 mA for Cr-Al	0 mA ≡ 0 °C	20 mA ≡ 1200 °C
0÷20 mA for PtPr	0 mA ≡ 0 °C	20 mA ≡ 1710 °C
0÷20mA for analogue input	0 mA ≡ IS t	20 mA ≡ FS t
4÷20 mA for Pt r	4 mA ≡ -40.0 °C	20 mA ≡ 200,0 °C
4÷20 mA for Pt E	4 mA ≡ 0 °C	20 mA ≡ 800 °C
4÷20 mA for FE-CO	4 mA ≡ 0 °C	20 mA ≡ 600 °C
4÷20 mA for Cr-Al	4 mA ≡ 0 °C	20 mA ≡ 1200 °C
4÷20 mA for PtPr	4 mA ≡ 0 °C	20 mA ≡ 1710 °C
4÷20 mA for analogue input	4 mA ≡ IS t	20 mA ≡ FS t

4.0 REGULATIONS - "CONT" function

4.1 PID TYPE REGULATION

The PID regulation, if selected, allows the direct programming of the following keyboard parameters:

- - cycle time (CICL) 1÷200 sec

Attention: with the cycle time = 1÷200 sec only the static output works, with the cycle time = 10 ÷ 200 sec the static output works coupled with the main relay.

- - proportional band (ProP) 0 ÷ F.S. °C/°F
- - time req. for integrative action (IntE) 0 ÷ 6000 sec

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- - time req. for derivative action (dErI) 0 ÷ 600 sec
- - constant Cutback (CUtb) 0 ÷ F.S. °C/°F

A quick way which guarantees correct operation is automatic parameter calculation by the machine itself using the "SELF-TUNING" function.

The enumerated parameters are valid for the heating control and for the cooling control too. If the instrument is used for a cooling control, a parameter is added and it defines the dead band (bAnr) in which is programmed the % of power under which the control is cancelled.

4.1.1 CUTBACK FUNCTION

With the function "CUTBACK" it is possible to reduce the temperature overshoot that can occur in certain processes. The number "Cutb" that can be programmed is expressed in °C/°F in the range 0÷F.S. of the chosen input. The insertion of this function avoids overshoot.

There are two methods to programme this function:

- 1) AUTOMATIC MODE: launch the self tuning command which calculates the constants P, I, D, and CUTBACK.
- 2) MANUAL MODE: Check manually how many degrees, during the first power on, are above the set-point (regulation made with parameters P - I - D - in line with the controlled thermal system). Write this data in the "CUTBACK" function. To exclude the function described it is sufficient to write "0" in "Cutb" menu item.

Table 9

ref.	touch key	appears on display	NOTE	See page
1	enter	PASS	PASSWORD	Pp 44
2	enter	0 000	In this phase the instrument asks for the Password in order to allow the changing in menù. The number memorized by the factory is 0, but any number between 0 and 9999 can be memorized by writing where "CPAS" appears (next displayed item).	
3	AL ▶	0 <u>0</u> 00	Set Up Procedure. To digit the desired number touch the key "AL ▶" to move the flashing number to the right.	
4	SP ▲	0 <u>1</u> 00	Touch the key "SP ▲" to increase the flashing number. Confirm by "enter"	
5		CPAS	CHANGE PASSWORD	Pp 44
6	enter	0000	Number of the access key to the programming of the instrument. The number written in this phase will be requested at "PASS". To digit the	

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ref.	touch key	appears on display	NOTE	See page
			number follow the procedure described in points 3 and 4.	
7		CPAS		
60	SP ▲	Cont	Press the key " SP ▲ " until to reach the desired menu item "Cont"	
61	enter	Pid	On OF = on-off control Pid = pid control Selecting Pid control the instrument will allow the following items. Confirm by "enter"	
62		Cont		
63	SP ▲	CICL	CYCLE TIME	
64	enter	0020	Set up the cycle time required for the control. Under 10 sec. only the static output is guided, over 10 sec., the static output and relay. To input the number follow the procedure described in points 3 and 4	
65		CICL		
66	SP ▲	ProP	PROPORTIONAL BAND	
67	enter	0020	Set up of the proportional band. To input the number follow the procedure described in points 3 and 4	
68		ProP		
69	SP ▲	IntE	INTEGRATIVE CONSTANT	
70	enter	0600	Set up of the integrative constant. To input the number follow the procedure described in points 3 and 4	
71		IntE		
72	SP ▲	dErI	DERIVATIVE CONSTANT	
73	enter	0200	Set up of the derivative constant. To input the number follow the procedure described in points 3 and 4	
74		dErI		
75	SP ▲	CUtb	CUTBACK	
76	enter	0023	Set up of the temperature overshoot. For all these set ups follow the description of points 3 and 4	
77		CUtb		

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ref.	touch key	appears on display	NOTE	See page
78	SP ▲	SEtU	SELF TUNING	pp 41
79	enter	on	Function for the automatic calculation of the control constants "Pid". on = enable function oFF = disable To insert this procedure press the "SP ▲ " key until the written "on" appears.	
80		SEtU		
81	SP ▲	bAnr	COOLING DEAD BAND	
82	enter	0010	Cooling dead band. Only if Out = rIrA or Out = OUAn If you control Pid, put in the % of power under which the cooling control is cancelled. For all these set ups follow the description of points 3 and 4	
83		bAnr		
84	SP ▲	SoSt	SOFT START	pp 44
85	enter	0050	Set up of the temperature value under which the load becomes 30% guided. For all these set ups follow the description of points 3 and 4	
86		SoSt		

4.1.2 SELF-TUNING FUNCTION (setu)

The self-tuning function calculates the parameters of the Pid regulation (proportional band, integrative time, derivative time and CUTBACK function). The calculations of the self tuning function, if set-up in the programming phase, can be seen on the flashing display. The calculation of the parameters consists of a heating cycle that the thermoregulator must follow with the working set point taking account of the thermal system installation. To use the self-tuning function remember that:

1. the self-tuning action can provoke an overshoot and depending on the thermal system used; the test can last from a few minutes to several hours.
2. eventual "soft-start" programming is not considered but comes into use at the end of self-tuning.
3. for a correct calculation of the parameters it is better from the users point of view to begin the self tuning procedure at room temperature and as far away as possible from the set point.
4. There exist certain conditions in which is not possible to finalize the parameter calculations. In these situations the instrument blocks the "self-tuning" action and displays an error code that defines the type of anomaly found:

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- a) temperature \geq at set-point (Err 1)
- b) sensor broken or over range condition (Err 2)
- c) set-point too closed to initial temperature (starting temperature higher than 90% of the set-point) (Err 4)

In these conditions the instrument follows the abort function, showing on the display the message relating to the displayed error and deactivating the actuators. The instrument will work again only when the operator press the "enter" key and corrects the anomaly.

5. The self tuning function is, however, annullable at any moment, it being sufficient to touch "enter", inserting the password number and when the "abort" signal appears, press the "SP+▲" key to make "on" appear and then confirm with "enter".
6. After the self tuning phase it is necessary, to set up the cycle time (if the programming control = "PID" and cycle time = 0 the instrument works like a thermometer).

4.2 ON-OFF TYPE REGULATION

The ON-OFF regulation, if selected, allows hysteresis programming. The hysteresis must be set up in "degrees" relative to the set-point and the variation should be symmetric in relation to the desired temperature.

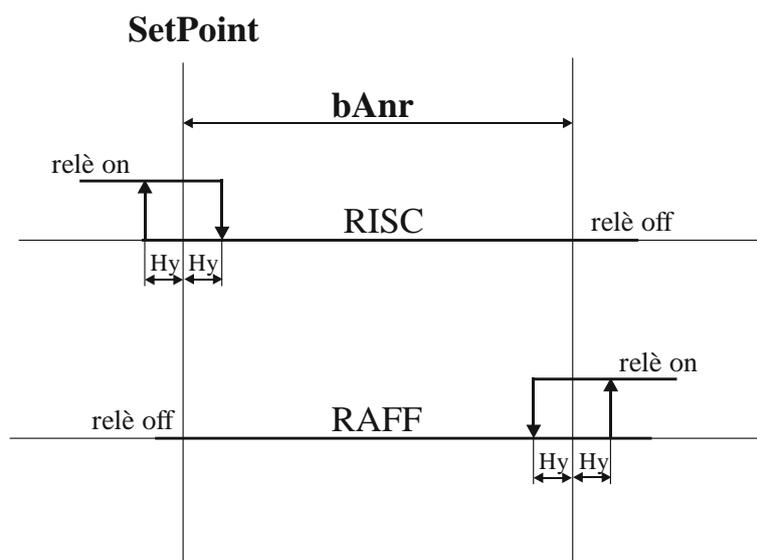
EXAMPLE: set-point = 300 °C

$$Hy = 10 \text{ °C}$$

the main working relay (RL 1) is on until 310 °C, and it will be on again at 290 °C.

You can set up the values in degrees from 1 (0,1 for the Ptr scale) to F.S. as requested.

The On-OFF control, with heating-cooling regulation, inserts a new item to define a dead band (bAnr). The functioning of this control is described in the following figure.



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Table 10

ref.	touch key	appears on display	NOTE	See page
1	enter	PASS	PASSWORD	Pp 44
2	enter	0 000	In this phase the instrument asks for the Password in order to allow the changing in menù. The number memorized by the factory is 0, but any number between 0 and 9999 can be memorized by writing where CPAS appears (next displayed item).	
3	AL ▶	0 <u>0</u> 00	Set Up Procedure. To digit the desired number touch the key "AL ▶" to move the flashing number to the right.	
4	SP ▲	0 <u>1</u> 00	Touch the key "SP ▲" to increase the flashing number. Confirm by "enter"	
5		CPAS	CHANGE PASSWORD	Pp 44
6	enter	0000	Number of the access key to the programming of the instrument. The number written in this phase will be requested at "PASS". To digit the number follow the procedure described in points 3 and 4.	
7		CPAS		
60	SP ▲	Cont	Press the key "SP ▲" until to reach the desired menu item "Cont"	
61	enter	OnOF	On OF = on-off control Pid = pid control Selecting OnOF control the instrument will allow the following items	
62		Cont		
63	SP ▲	ISTE	HYSTERESIS	
64	enter	0003	Set up hysteresis. To digit the number follow the procedure described in points 3 and 4.	
65		ISTE		
81	SP ▲	bAnr	COOLING DEAD BAND	
82	enter	0010	In degrees. For functioning see fig. p. 45	
83		bAnr		
69	SP ▲	SoSt	SOFT START	
70	enter	0050	Set up of the temperature value under which the	

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ref.	touch key	appears on display	NOTE	See page
			load becomes 30% guided. For all these set ups follow the description of points 3 and 4	
71		SoSt		

4.3 SOFT-START FUNCTION (*sost*)

The function soft-start guarantees a "cold" departure of the thermoregulator with a command of the heating elements not above 30% of maximum power, in the range of temperature set up at the "SOSt" command. The value, which can be programmed, is between 0÷F.S. °C/°F, and as a consequence, a higher initial temperature automatically excludes the function. After having set up this system please put off and then start up again the instrument to set working this function.

Also with the "On-Off" regulation it is possible to use the "soft-start" option; this is used with a fixed cycle time of 10 sec.

If the type of control is set up in direct function ("tcon = dir") the soft start function is not available.

After setting up the programme, the soft-start function is, however, annullable at any moment, it being sufficient to press "enter", inserting the password number and when the "abort" signal appears, press the "SP▲" key to make "on" appear and then confirm with "enter".

The soft-start function, if set up, is shown by led and display flashing.



5.0 PASSWORD FUNCTION

The user can protect the programmed parameters from untoward changes by using the "Password" function.

The instrument is delivered with the password = 0, but any number between 0 and 9999 can be set up as access point to change the functioning data.

In fact the password is requested each time the user enters the programming menu.

The instrument, after receiving the password number, can behave in two different ways.

1- correct Password number. The user can gain access to the programming menu and modify any number or functioning.

2- incorrect Password number. The user is allowed to gain access to the programming menu only in order to see the numbers and the functions, but not to modify them.

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ATTENTION. The number which will be programmed under the "CPAS" by the user, must be written under the "PASS" heading each time that one goes to the programming menu for the changing of the variables.

If the user cannot recognize the exact "secret" number, it is necessary to call the customer service centre to check the instrument.

6.0 DEFAULT PARAMETERS (dEF)

To reset to factory default parameters you can use the "dEF" function, which sets up all the programming parameters at the factory value, eliminating all the error situation .

BE CAREFUL: all previous programmed values will be lost.



7.0 NOTES

The instrument does not have a power on switch and an internal fuse, but it immediately switches on when the correct voltage is applied (see the operating voltage on the instrument label). Keep the power line separate from the signal lines.

For security reasons, it is necessary to provide externally a two phases switch and a protective fuse near the instrument with easy access for the user.

Avoid the presence of other power elements, humidity, acid, heat sources, etc..

Mect srl is not responsible for damages to humans or goods for an improper use of the instrument or not conforming to the characteristics of its instrument..

In mect srl there has a customer service.