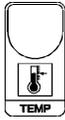


7) PRESET PROGRAMS



This processor is already programmed with the following (variable) settings. To return to these settings at any time, press **+ / -** and **ENTER** together for at least 1 second **boot** message is displayed:

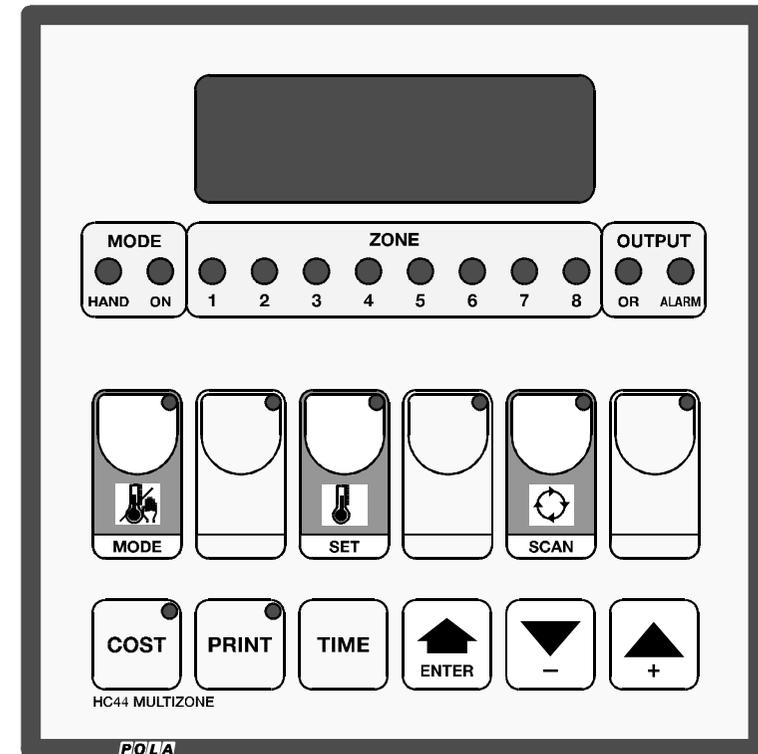
On this table are shown setting values at delivery, you are advised to record all the settings made in table below such as to have an immediate reference for the

Programming and run modes.

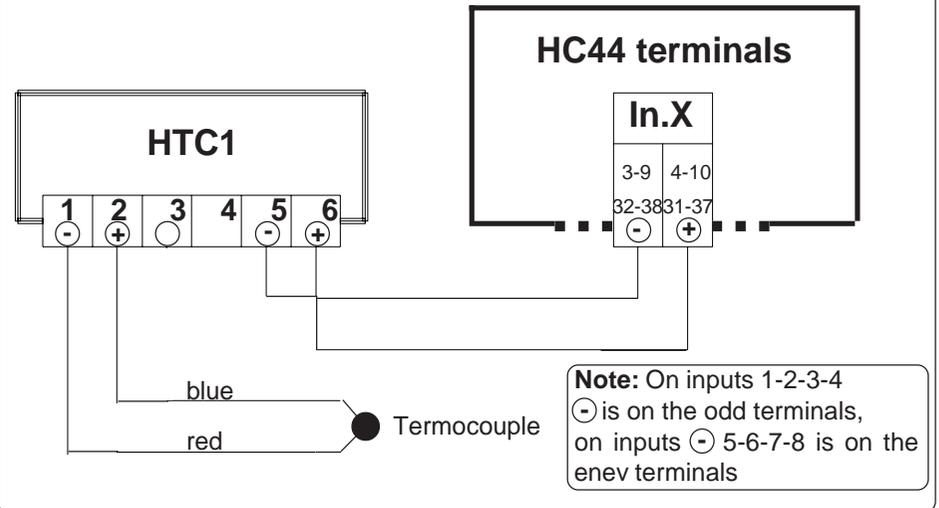
SETs	COSc	COSt	Print
SEt.1=	o. 1=	r. 1=	n.Prn=
AL. _ =	o. 2=	r. 2=	P.SET=
AL.- =	o. 3=	r. 3=	P.EvE=
SEt.2=	o. 4=	r. 4=	n.Loc=
AL. _ =	o. 5=	r. 5=	
AL.- =	o. 6=	r. 6=	
SEt.3=	o. 7=	r. 7=	
AL. _ =	o. 8=	r. 8=	
AL.- =	t. 1=	diF.1=	
SEt.4=	t. 2=	diF.2=	
AL. _ =	t. 3=	diF.3=	
AL.- =	t. 4=	diF.4=	
SEt.5=	t. 5=	diF.5=	
AL. _ =	t. 6=	diF.6=	
AL.- =	t. 7=	diF.7=	
SEt.6=	t. 8=	diF.8=	
AL. _ =	i. 1=	A. 1=	
AL.- =	i. 2=	A. 2=	
SEt.7=	i. 3=	A. 3=	
AL. _ =	i. 4=	A. 4=	
AL.- =	i. 5=	A. 5=	
SEt.8=	i. 6=	A. 6=	
AL. _ =	i. 7=	A. 7=	
AL.- =	i. 8=	A. 8=	
	n=4=		
	n=20=		
	d.P=		
	or.Lo=		
	ini.o=		
	End.o=		
	SCAn=		
	CALE=		

HC44 SL 6.0

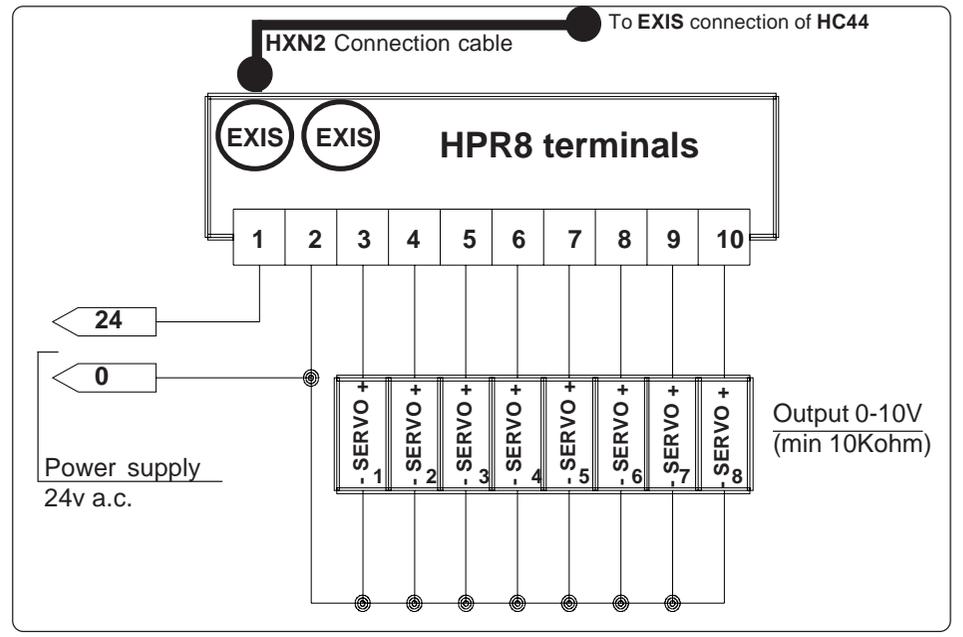
MULTI-ZONES CONTROLLER



HTC1 THERMOCOUPLE WIRING DIAGRAM



HPR8 0-10V WIRING DIAGRAM



4-20 mA WIRING DIAGRAM

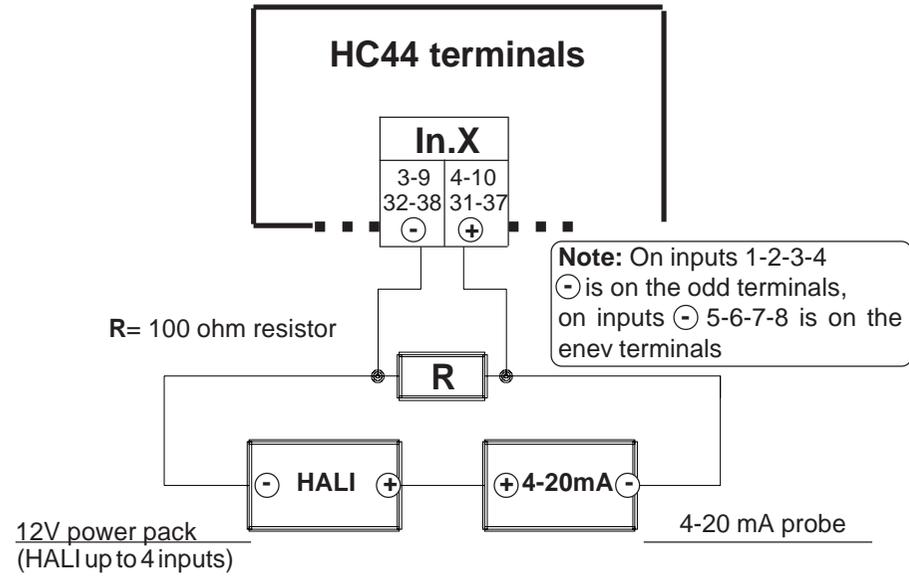


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1) INTRODUCTION

The **HC44** is a multizone programmable controller for 8 zones with the possibility of programming the type of operation and the type of input for each individual area. Most of the instructions below cover made-to-measure programming. When the controller has been programmed, the user only needs to carry out a few easy settings to run the system.

The display is specially designed to be user-friendly. It shows both the set and current values. The main keys have a built-in light to make programming easier.

For each controlled zone (max 8) it is possible to specify the type of input (7 standard inputs provided to fit any type of sensor available on the market) and the type of operation (normal, proportional, incrementing, decrementing).

Settings can be either absolute or relative, i.e. referring to a GUIDE setting, so that running with either the preset values or the GUIDE setting variations shifts the whole setting block. This means you only need to program once for the entire running cycle.

You can program a temperature setting calendar to set the temperature curve required during the various stages (up to 9 stages, max 99 days per stage).

Programming can also be protected by an external key.

The temperature alarm controls the minimum and maximum temperature level for each zone and comes on whenever the system malfunctions.

The **HC44** can be connected to a printer to record all the operating parameters, or to a PC for full remote control.

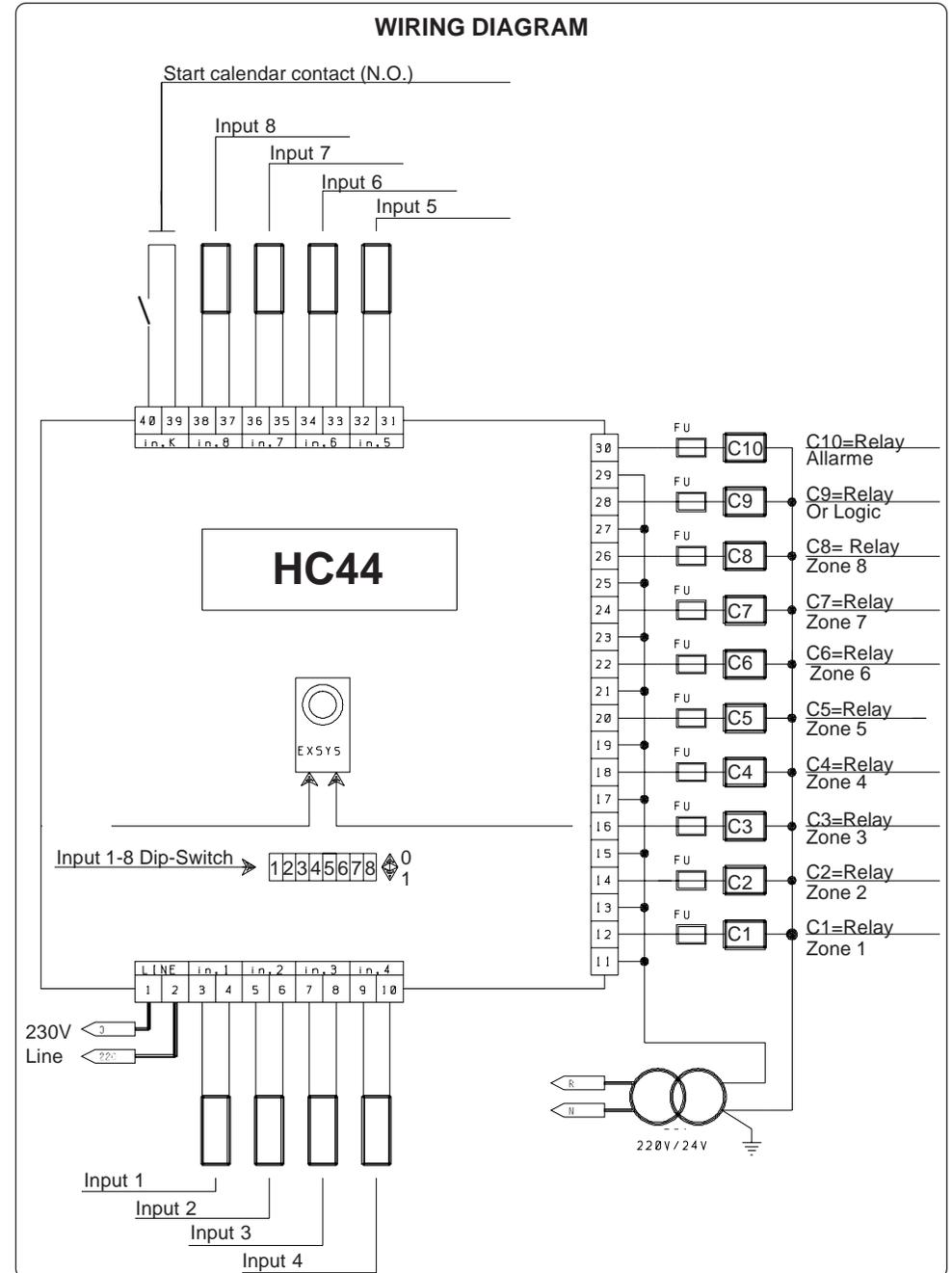
There are three **HC44** programming levels:

COSc: plant configuration (operation and setting mode)

COST: "hidden" settings which are not accessible for the final user.

MAIN SETTINGS: These are the only settings the operator has access to.

Instructions for setting these three levels are set out below.



6) INSTALLATION

For correct installation, follow the instructions below very carefully.
You are recommended to install the controller properly so that it complies with current regulations, and also to use a max **4Amp.F** fuse to prevent the relay output contacts from getting damaged and ensure they stay in perfect running order (terminals **11...30** of the **HC44** module connector).

How to secure the unit

Secure the module to a 138x138 mm slot (max thickness 3 mm) using the columns and wing nuts provided.

Mains connection

Connect terminals **1-2** (LINE) of the terminal block to a 220V output. For different voltages use an adaption transformer of at least 20VA.

How to connect the sensors

Connect the sensors provided as shown in the diagram (see following page). For remote connections use a standard 1.5-square millimetre two-pole wire for each sensor, taking great care over the connections, by insulating and sealing the joins carefully.

How to connect the contacts

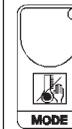
Connect terminals **11-12...29-30** on the terminal block (contacts up to 4AMP.AC1) to the loads as shown in the diagram (see overleaf).

This system has been designed and built to reduce electrical disturbance as far as possible.

However, for better protection, only connect 24V loads to the relay contacts and, if necessary, apply RC-type filters in parallel to the inductive loads (contactor coils, etc.) controlled by the module relays.

2.1) MAIN SETTINGS (RUN MODE)

These settings are the only ones concerning the user and are made as follows.



AUTO/MAN SELECTION

Press **MODE** several times to move to the Zone required (Zone light comes on), then press **ENTER**. This message, referring to the set condition, will be displayed.

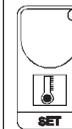
(**Auto**=automatic, **HAnd**= Manual).

Auto

Press **+** or **-** to modify. If you select **HAnd** and press **ENTER**, **-On-** (always ON) or **-oF-** (always OFF) will be displayed *1). Press **+** or **-** to modify. Press **ENTER** to escape.

-On-

-oF-



SET MODE

Press **SET** several times to move to the zone to program (Zone light comes on) *2), then press **ENTER** to enter the programming mode. This message will appear in place of the Set Zone value selected.

Press **+** or **-** to modify *3). Press **ENTER** to confirm.

SET.1

Example with SET.1

At this point this message will be displayed instead of the set Min. Alarm value.

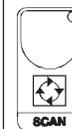
Press **+** or **-** to modify. Press **ENTER** to confirm.

AL.1

At this point, this message will be displayed instead of the set Max. Alarm value.

Press **+** or **-** to modify. Press **ENTER** to escape.

AL.1



INPUT DISPLAY

Press **SCAN** several times to move to the Zone to display (Zone light comes on). The display will show the value measured by the sensor of the selected area *2). If you press **SCAN** for more than one second, it is automatically activated (light ON). Press **SCAN** again to stop automatic scanning. Scanning time is programmed in COSc (para. 2.2).

23.25

Press the relevant flashing key to escape from programming at any time and return to the running mode

- *1) With proportional operation, the manual value ranges from 0 to 100.
- *2) This scan only shows the Zones with Absolute setting (see 2.1).
- *3) This is possible for Absolute setting. For relative settings, when you press + or -, the message rELA appears to inform you that this setting is made in COSc (para 2.2).

2.4 PRESET PROGRAMS



This processor is ready programmed with the following (variable) settings. To return to these settings at any time; press **ENTER / + / -** simultaneously for at least one second (Bootstrap function).

SEt.1=20.0 AL._.=0.0 AL.--=50.0 SEt.2=20.0 AL._.=0.0 AL.--=50.0
SEt.3=20.0 AL._.=0.0 AL.--=50.0 SEt.4=20.0 AL._.=0.0 AL.--=50.0
SEt.5=20.0 AL._.=0.0 AL.--=50.0 SEt.6=20.0 AL._.=0.0 AL.--=50.0
SEt.7=20.0 AL._.=0.0 AL.--=50.0 SEt.8=20.0 AL._.=0.0 AL.--=50.0

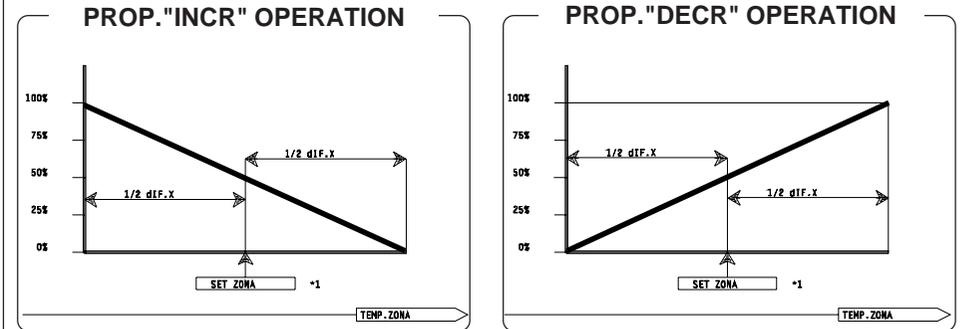
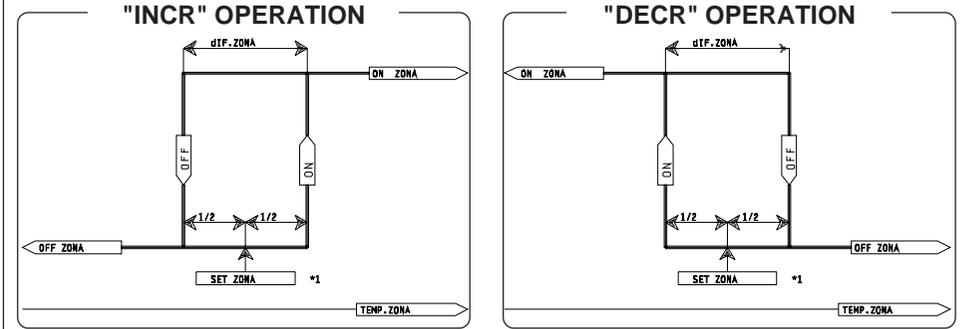
The COSc and COSl values are shown in paragraphs 2.2 and 2.3.

2.5) STATE INDICATION LIGHTS

The lights situated at the bottom of the display show the state of the various relays as set out below.

Lamp	Description
HAND	Zone selected on Manual
ON	Zone selected with output ON
1..8	Number of zone selected (1-8)
OR	Logic Or relay ON
ALARM	Min-Max Alarm ON

5) OPERATING DIAGRAM



*1= If you have to make relative settings:

SEt. ZONE= SEt Reference Zone (See COSc 2.2) + r.X (1...8 See COSl 2.3).

4) PRINTING

The functions described below are only active when the **PR24** printer is installed. Otherwise, press **PRINT** and *null* message is displayed.

4.1 AUTOMATIC PRINT MODE



Press **PRINT** and **ENTER** together. The message *Print* will be displayed. Proceed as described under **COSc** (paragraph 2.2) to switch variables.

Mess.	Value	Meaning	Note
<i>n.Prn</i>	2	Daily print number (0=none)	*1)
<i>P.SET</i>	0	Setting print selection (0=no, 1=yes)	*2)
<i>P.EvE</i>	1	Event print selection (0=no, 1=yes)	*3)
<i>n.Loc</i>	1	Zone identification number	

- *1) Each day starts at **00.00** hours
- *2) All the settings are printed together with the inputs.
- *3) Events printed: power failure time, power return time, temperature alarm condition.

4.2) MANUAL PRINT MODE



If you require an immediate printout, proceed as follows:
SETTING PRINTOUT: press **PRINT** then **COST** to print all the settings (Sets, COSc, COST, Print).



PARAMETER PRINTOUT: press **PRINT** then **ENTER** to print all the operating parameters (Temperature, Humidity, etc.).

2.2) COSc PROGRAMMING (Configuration constants)



Press **COST** / - / + together for at least one second - the message COSc will be displayed.

The **COSc** values are displayed in sequence if you press + to go forward or - to go back.

When you reach the value required (see table below), press **ENTER** and the value will be displayed.

Press + or - to set a new value and then **ENTER** to confirm. The next value will then appear. You can press **COST** at any time to escape and return to the RUN MODE (2.1).

Mess.	Value	Meaning	Note
<i>o. 1</i>	=0	Zone 1 setting mode	*1)
<i>o. 2</i>	=0	Zone 2 setting mode	*1)
<i>o. 3</i>	=0	Zone 3 setting mode	*1)
<i>o. 4</i>	=0	Zone 4 setting mode	*1)
<i>o. 5</i>	=0	Zone 5 setting mode	*1)
<i>o. 6</i>	=0	Zone 6 setting mode	*1)
<i>o. 7</i>	=0	Zone 7 setting mode	*1)
<i>o. 8</i>	=0	Zone 8 setting mode	*1)
<i>t. 1</i>	=1	Type of operation Zone 1	*2)
<i>t. 2</i>	=1	Type of operation Zone 2	*2)
<i>t. 3</i>	=1	Type of operation Zone 3	*2)
<i>t. 4</i>	=1	Type of operation Zone 4	*2)
<i>t. 5</i>	=1	Type of operation Zone 5	*2)
<i>t. 6</i>	=1	Type of operation Zone 6	*2)
<i>t. 7</i>	=1	Type of operation Zone 7	*2)
<i>t. 8</i>	=1	Type of operation Zone 8	*2)
<i>i. 1</i>	=1	Zone 1 input selection	*3)
<i>i. 2</i>	=1	Zone 2 input selection	*3)
<i>i. 3</i>	=1	Zone 3 input selection	*3)
<i>i. 4</i>	=1	Zone 4 input selection	*3)
<i>i. 5</i>	=1	Zone 5 input selection	*3)
<i>i. 6</i>	=1	Zone 6 input selection	*3)
<i>i. 7</i>	=1	Zone 7 input selection	*3)
<i>i. 8</i>	=1	Zone 8 input selection	*3)
<i>n= 4</i>	0	Value represented at 4mA	*4)
<i>n=20</i>	100	Value represented at 20mA	*4)
<i>d.P</i>	0	4-20mA decimal representation point	*4)
<i>or.Lo</i>	=8	Number of Zones enabling Logic Or	*5)
<i>ini.o</i>	0.0"	Logic Or On delay in seconds	*5)
<i>End.o</i>	0.0"	Logic Or Off delay in seconds	*5)
<i>Scan</i>	2.0"	Scanning in seconds (see 2.3 SCAN Key)	*6)
<i>Cale</i>	=0	Calendar-time programs	*7)

***1) =0 Absolute setting:** the setting values of these variables are programmed in the RUN Mode under the **SET** key (see para. 2.1).

=1/8 Relative setting: this setting refers to an Absolute Setting. The relative setting value is programmed in **COST** (see 2.3) under the relative function.

For example, if you enter **o.2=1**, the Zone Setting is Relative and refers to the Absolute Setting of SET.1.

Setting the value 2.0 in **COST (r.2=2.0°)**, SET.2 positions at 2.0°C with respect to the Absolute Setting of SET.1.

For example, you can make an Absolute reference Setting (**SET.1**) and several other Relative Settings, so that when you change **SET.1**, the seven other Relative Settings change as well.

All the other combinations are possible even with several Absolute Reference SET values (e.g. 4 Absolute and 4 Relative SETs).

If you use a working with Calendari Sets (see par. 3.2) the SET with calendar is always the SET 1.

=-1/-8 Relative setting with specific work's probe:

All is like explain in the previous case (**=1/8**); the only difference is that in the previous case the work's probe was one of the absolute zone of reference, while in this case the work's probe is specific for every single zone.

Also the example of the previous case is valid, with the difference that the work's probes are 8 (one for every single zone).

***2) Type of operation:** Five types of operation can be selected for each zone.

2=	Proportional function	(INCR)	*A)
1=	ON-OFF thermostat function	(INCR)	*A)
0=	Non type of operation	(Zone OFF)	
-1=	ON-OFF thermostat function	(DECR)	*B)
-2=	Proportional function	(DECR)	*B)

***A)** The INCR functions refer to HEAT type loads.

***B)** The DECR functions refer to COOL type loads.

Proportional operation (**2** and **-2**) requires connection of the **HPR8** (0-10V) slot. Under this condition, the differential (see **COST** function **diF.x**) represents the proportional band. See para. 5 for further information (Operating Diagrams).

When you have programmed the last Stage, enter the next Stage, set the End-of-Cycle Temperature and set the duration in days to 0.

To deactivate the calendar, set the duration of Stage 1 to 0 (du-1=0). Press COST to escape from programming at any time and return to the RUN mode.

Note: With this programming activated, when you enter the **Set.1** programming (see 2.1), the current temperature value set will appear in place of the message **d..x** showing the current day, where x is the current day (1st day = **d.0**).

Press **+** or **-** to modify the number of the current day (for modifications to the animal growth table). The day number will stop at the last day set on the calendar.

Reset this value to **0** at the next animal growth cycle.

Day shift always takes place at **00.00** hours.

EXAMPLE OF CALENDAR SETTING

Let us suppose you wish to set 3 temperature decrement stages:

STAGE 1 starts at **30.0°C** and stops at **28.5°C** in **5** days

STAGE 2 starts at **28.5°C** and stops at **24.5°C** in **20** days

STAGE 3 starts at **24.5°C** and stops at **19.5°C** in **50** days

Proceed as follows: enter **COST** (see 2.2) and program the following values:

tE-1=30.0°C du-1=5 tE-2=28.5°C du-2=20 tE-3=24.5°C

du-3=50 tE-4=19.5°C du-4=0.

As you can see, the finishing temperature of one stage must be the same as the starting temperature of the next stage.

With these values programmed, the temperature setting (**t.SET**) will drop by 0.3° per day for the first five days (to go from 30.0° to 28.5°), then by 0.2° per day for the next 20 days (to go from 28.5° to 24.5°), and then by 0.1° per day for 50 days (to go from 28.5° to 19.5°), after which the temperature will remain constant up to the last stage (19.5°).

In the RUN mode (para. 2.1), reset the cycle (initialization). From this point on, the SET Calendar will move ahead one day when switching from **23.59** to **00.00** hours.

Together with temperature setting (**t.SET**), all the Relative settings will decrease (i.e. referring to **Set.1** - see para 2.3) but not the Absolute ones.

3) REAL-TIME OPERATION

The functions below are only active if you use calendar set or printer. Otherwise, press **TIME** and null is displayed.

3.1) TIME (Clock Setting)

TIME

Press **TIME** and **ENTER** together.
 This message is displayed. Press + or - to set the current Hour and Minutes.
 Press **ENTER** to confirm.

HH.nn

This message will now appear.
 Press + or - to set the current Day.
 Press **ENTER** to confirm.

d=

This message will now appear.
 Press + or - to set the current Month.
 Press **ENTER** to confirm.

n=

This message will now appear.
 Press + or - to set the current Year
 Press **ENTER** to confirm.

y=

3.2) SETs CALENDAR ENTRY

Set.1 can be programmed with variable time settings.
 To do this proceed as follows: Enter the **COSt** mode (see 2.2), then:
 Press + until this message appears
 (Stage 1 Starting Temperature SET in °C)
 Press **ENTER** and + or - to modify. Then:

TE-1

Press **ENTER** to display this message
 (Stage 1 Duration in Days)
 Press **ENTER** and + or - to modify. Then:

du-1

Press **ENTER** to display this message
 (Stage 2 Starting Temperature SET)
 Press **ENTER** and + or - to modify. Then:

TE-2

Press **ENTER** to display this message
 (Stage 2 Duration in Days)
 Press **ENTER** and + or - to modify. Then:

du-2

Press **ENTER** and continue programming as above up to the last stage required (max 9).

*3) These types of input can be set for each zone:

	Input Connect	Range	Resolution	Dip Switch	Slot Connect.
1=	SX Pola (°C)	-50.0°C...+115.0°C	0.1°C	0	Nobody
2=	SX Pola (°F)	-58.0°F...+239.0°F	0.1°F	0	Nobody
3=	PT100 (°C)	-200°C...+800°C	1°C	1	Nobody
4=	PT100 (°F)	-328°F...+1472°F	2°F	1	Nobody
5=	PT1000 (°C)	-200°C...+800°C	1°C	1	Nobody
6=	PT1000 (°F)	-328°F...+1472°F	2°F	1	Nobody
7=	Termocouple (°C)	-250°C...+1500°C	1°C	1	HTC1
8=	Termocouple (°F)	-418°F...+2732°F	2°F	1	HTC1
9=	4-20mA standard	0.0...100.0	0.1	0	100ohm
10=	4-20mA custom	Custom flexible	Flexible	0	100ohm

CAUTION : Selected the pertaining slide/channel (Dip Switch) see page 17.

*4) If you select the 4/20mA inputs (*i.x=10*), the 4/20mA values can be represented by the following three specifications.

E.g. with a sensor that must display **10.0** at 4mA and **50.0** at 20mA, set **n=4** to 100 **n=20** to 500 and **d.P** to 1.

*5) **or.Lo** - Starting from Zone 1 and programming for example **or.Lo=4**, activation of the zones from **1** to **4** will energize the Logic CLOCK relay (see page 17).

ini.o: When you set positive values (seconds and tenths of a second), the Logic Clock delay is implemented at the start (i.e. on the first Zone activated).

When negative values are set, the delay occurs on the relay of the first zone to activate (First Zone ON), whereas the Logic CLOCK relay activates immediately at the first start-up (First Zone ON).

End.o: When positive values are set, the delay occurs on deactivation (Last Zone OFF).

When negative values are set, the delay occurs on the last zone relay is off (last OFF) and the Logic Clock deactivates immediately at the last Off.

*6) With a set time different to **0.0"** in normal condition (not in setting) on display alternately appears the input of each zone for the time setting in **SCAN** (the zone viewing is showed from lighting of zone's relative lamp), see **SCAN** key par. 2.1)

*7) **=0** : Set calendar not operative (disabled).

=1 : Set calendar with clock-time in Days (**d.xxx**).

=2 : Set calendar with clock-time in Hours (**h.xxx**).

=2 : Set calendar with clock-time in Minutes (**'.xxx**).

