KOSMOS SERIE

CODE: 30727005 EDITION: 22-11-2010

MODEL ALPHA-T

TEMPERATURE DIGITAL PANEL METER

FIRMWARE 2.00 VERSION

MOD BUS

FAIL SAFE

SENSOR BREAK ALARM

DITEL

Firmware version 2.00

Modbus Compatible
See page 28

Fail Safe Function
See page 30

Sensor Break Alarm

Blinking Display
See page 29

19 Logical Functions
See page 21

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See page 25

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Pt100 4 Wires
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See page 29

Pt1000
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INTRODUCTION TO THE KOSMOS SERIES

This manual does not constitute a formal agreement. All information given in this manual is subject to change without notice.

The KOSMOS SERIES brings a new philosophy in digital panel instrumentation which is expressed by multipurpose, modular-concept devices providing a rich array of basic functions and advanced capabilities.

With a fully MODULAR DESIGN, it is possible to implement a wide variety of applications by only adding the adequate options.

Intelligence within allows the meter to recognize the options installed and ask for the necessary parameters to properly function within desired margins. The parameters related to non-installed options are removed from the program routines.

The instruments CALIBRATION is made at the factory eliminating the need for adjustment potentiometers.
Any circuit or option liable to be adjusted incorporates a memory where calibration parameters are stored, making it possible the optional cards be totally interchangeable without need of any subsequent adjust.

Valid for instruments from Firmware 2.00

Custom CONFIGURATION for specific applications can be made quickly and easily through five front panel keys, following structured choice menus aided by display prompts at each programming step.

Other features of the KOSMOS family include :

CONNECTIONS via plug-in terminal blocks without screws and CLEMP-WAGO clips cable retention system.

DIMENSIONS
Models ALPHA & BETA 96x48x120 mm DIN 43700
Models MICRA & JR/JR20 96x48x60 mm DIN 43700

CASE MATERIAL UL-94 V0-rated polycarbonate.

PANEL INSTALLATION without screws by means of single part fastening clips.

IMPERMEABILITY of the front panel IP65 (Indoor Use).

To guarantee the meter's technical specifications, it is recommended to recalibrate the meter at periodical intervals according to the ISO9000 standards for the particular application operating criteria. Calibration should be performed at the factory or in a qualified laboratory.

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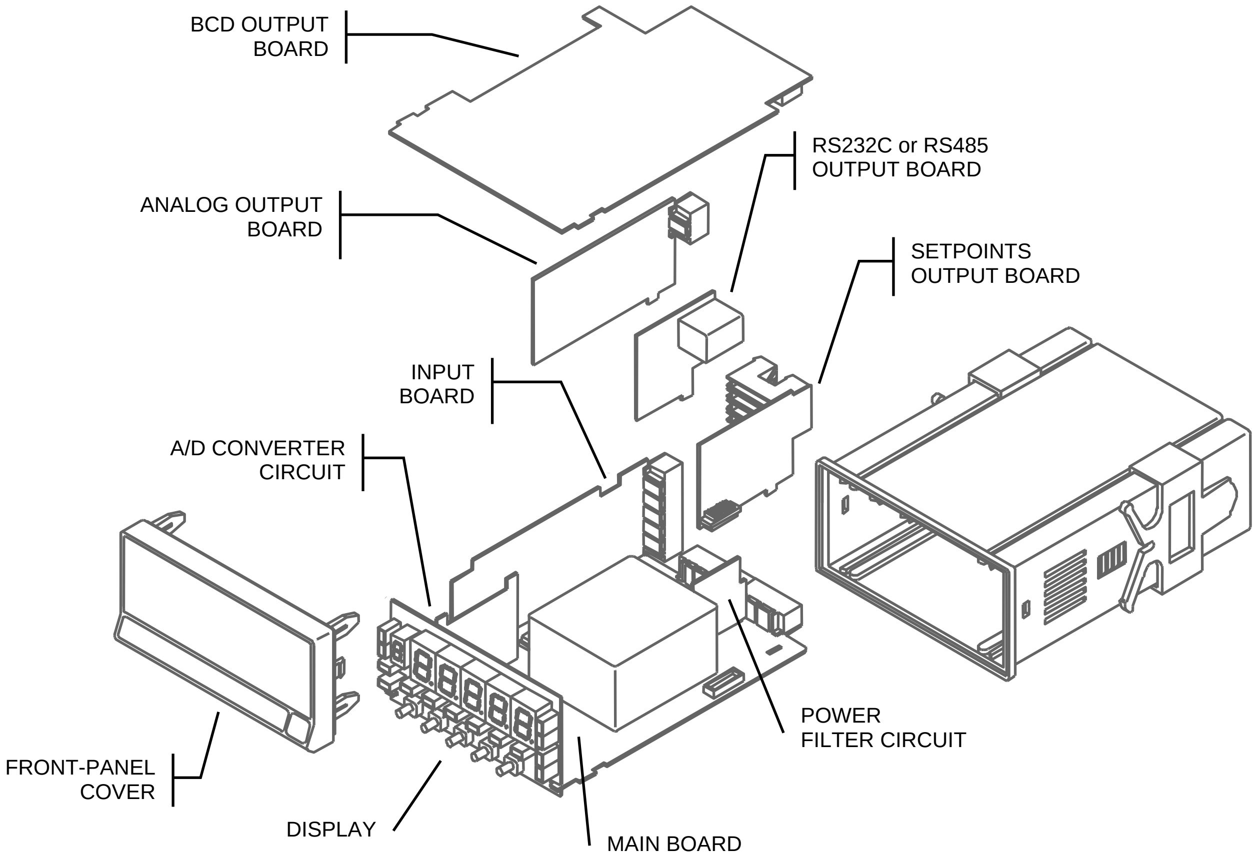


BCD OUTPUT BOARD
RS232C or RS485 OUTPUT BOARD
ANALOG OUTPUT BOARD
SETPOINTS OUTPUT BOARD
INPUT BOARD
A/D CONVERTER CIRCUIT
POWER FILTER CIRCUIT
FRONT-PANEL COVER
DISPLAY
MAIN BOARD

1. MODEL ALPHA-T OVERVIEW

The ALPHA-T version 2.00 model incorporates new technical and functional characteristics including programmable remote inputs and a variety of output performance capabilities that provides an extraordinary flexibility to adapt to a wide range of indication and control needs.

The **ALPHA-T** model is a digital indicator for temperature measurement in °C or °F that can be connected to several types of transducers such as Pt100, Pt1000 and thermocouples J, K, T, R, S and E.
The meter's configuration for a particular input type is made entirely by software.

Display readout in the centigrade or the Fahrenheit scale and resolution in degrees or tenths of degree are selectable in a single software step.
In addition, a programmable temperature offset from -99 to +99 counts of display allows the meter be adapted to match desired application.
More programmable options include 10 levels of input filtering.

The basic instrument is a soldered assembly composed of the main board, the display and keyboard module, the power filtering circuit and the input card

Standard features of the basic instrument include the reading of the input variable, max and min readings detection, remote hold operation and a full complement of programmable logic functions.

In addition, a variety of plug-in output cards can be installed at any time to meet further system requirements:

COMMUNICATION

RS2	Serial RS232C
RS4	Serial RS485
BCD	BCD 24V/TTL

CONTROL

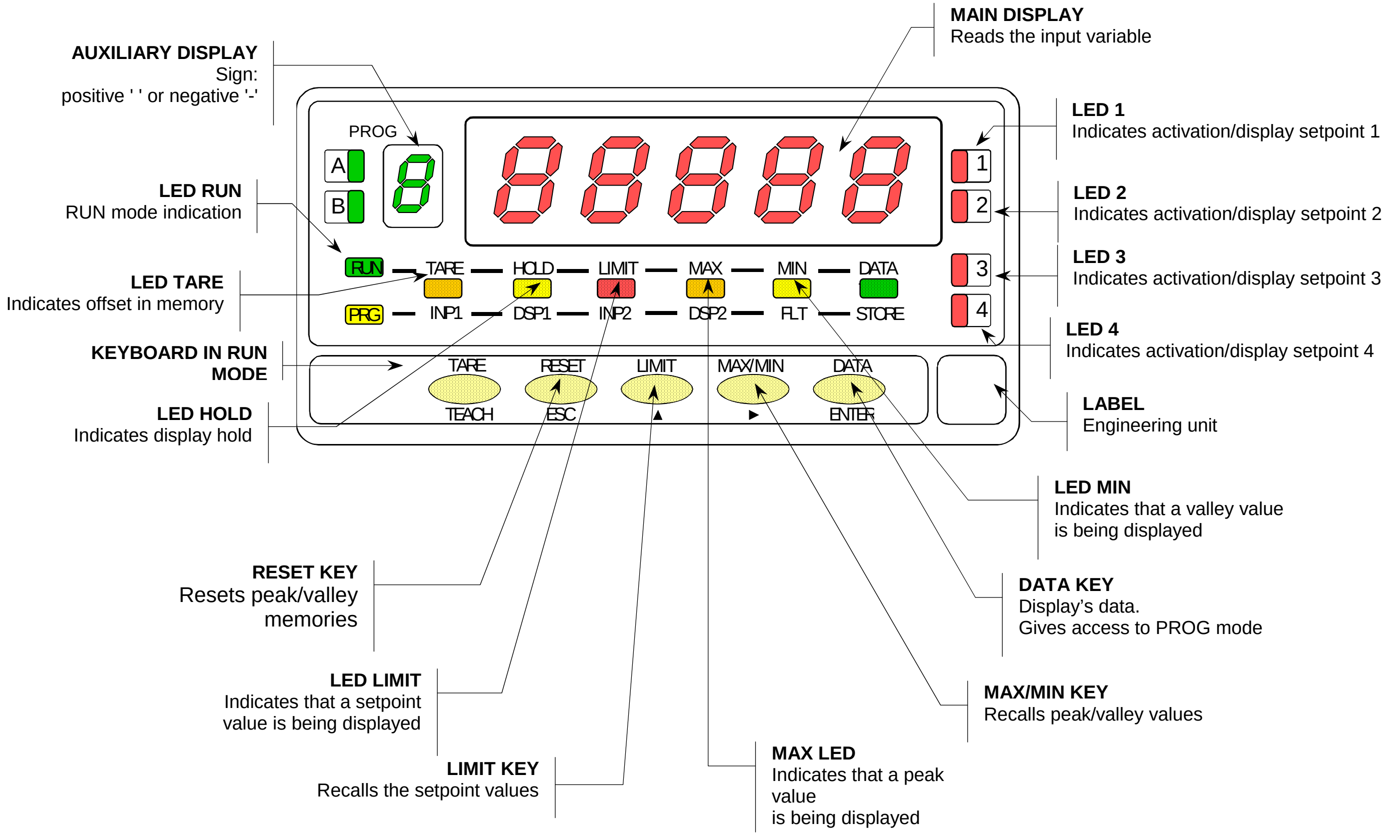
ANA	Analogue 4-20mA, 0-10V
2RE	2 Relays SPDT 8A
4RE	4 Relays SPST 5A*
4OP	4 Open-collector NPN outputs
4OPP	4 Open-collector PNP outputs

All output options are isolated from signal and power.

*From nº O5397

This instrument conforms to the following directives: 2004/108/CEE and 2006/95/CEE
Caution: Read complete instructions to ensure safety protections

RUN MODE: FRONT-PANEL FUNCTIONS



PROG MODE: FRONT-PANEL FUNCTIONS

AUXILIARY DISPLAY
Indicates program module

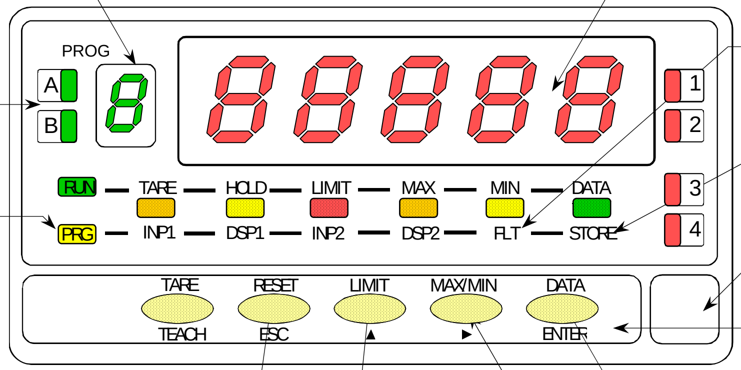
MAIN DISPLAY
Reads programming parameters

LED FLT
Indicates input filter programming

LED's A and B
Indicate program menu

LED STORE
Indicates exit from de program mode with data memory storage

LED PROG
Indicates programmation mode



LABEL
Engineering unit

KEYBOARD IN PROG MODE

ENTER KEY
Accepts data.
Advances program steps

ESC KEY
Returns to run mode at any program step

KEY ►
Moves de flashing digit to the right

KEY ▲
Increments the flashing digit value

2. GETTING STARTED

PACKING CONTENTS

- ❑ Instructions manual in English.
- ❑ Digital panel meter model Alpha-T.
- ❑ Accessories for panel mounting (sealing gasket and fixing clips).
- ❑ Accessories for wiring connections (plug-in terminal block connectors with a fingertip key).
- ❑ Wiring label stuck to the plastic case.
- ❑ One set of engineering units labels.

✓ **Check the packaging contents.**

CONFIGURATION

Power supply (pages 10 & 11)

- ❑ The instruments with 115/230V AC power supply, are set by default for a supply voltage of 230V (USA market 115 V AC).
- ❑ The instruments with 24/48V AC power supply, are set by default for a supply voltage of 24V.
- ❑ Instruments supplied for 10-30V DC can be powered from any voltage between 10 and 30 V DC without need of making changes.

✓ **Check wiring label before applying power to the instrument.**

Programming instructions (pages 12 & 13)

- ❑ The software is divided into several independently accessible modules for configuration of the input, the display, the setpoint outputs, the analog output, the communication output and the logic inputs.

✓ **Read carefully this section.**

Input types (pages 14 & 17)

✓ **Verify input configuration before connecting the input signal.**

Programming Lock-out (page 25)

- ❑ The instrument is set at the factory with the program routines totally accessible.

Warning! Keep your unlock code in a secure place. If you lost it, it is possible to reset it **(page 27)**.

2.1 POWER SUPPLY

Should any hardware modification be performed, remove the electronics from the case as shown in figure 10.1.

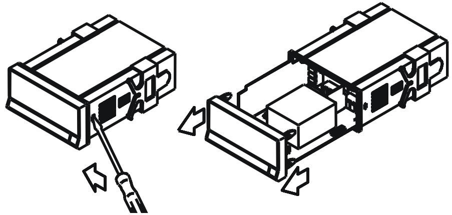


Fig. 10.1. Remove case

115/230 V AC: The instruments with 115/230 V AC power, are shipped from the factory for 230 V AC (USA market 115 V AC), see figure 10.2. To change supply voltage to 115 V AC, set jumpers as indicated in figure 10.3 (see table 1). The wiring label should be modified to match new setups.

24/48 V AC: The instruments with 24/48 V AC power supply, are shipped from the factory for 24 V AC, see figure 10.3 To change supply voltage to 48 V AC, set jumpers as indicated in figure 10.2 (see table 1). The wiring label should be modified to match new setups.

10-30V DC: The instruments for 10-30V DC power supply are prepared to withstand any voltage between 10 and 30V without need of wiring changes.

Table 1. Jumper settings.

<table>
<tr><td>Pin</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td></tr>
<tr><td>230V AC</td><td>-</td><td colspan="2">▬▬</td><td colspan="2">▬▬</td></tr>
<tr><td>115V AC</td><td colspan="2">▬▬</td><td colspan="2">▬▬</td><td>-</td></tr>
<tr><td>48V AC</td><td>-</td><td colspan="2">▬▬</td><td colspan="2">▬▬</td></tr>
<tr><td>24V AC</td><td colspan="2">▬▬</td><td colspan="2">▬▬</td><td>-</td></tr>
</table>

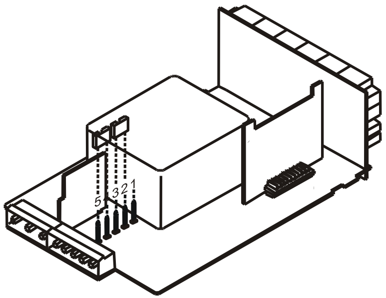


Fig. 10.2. Supply voltage 230 V or 48 V AC

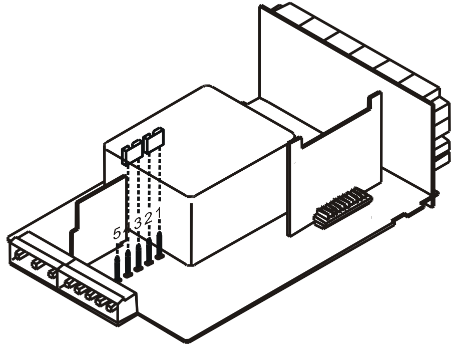
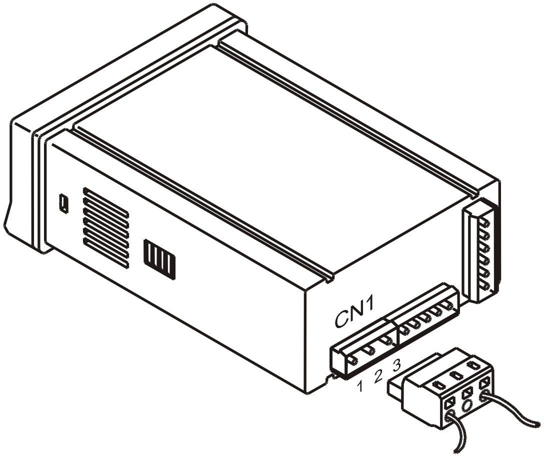


Fig. 10.3. Supply voltage 115 V or 24 V AC

POWER CONNECTION - CN1



AC VERSIONS
PIN 1 - AC HI
PIN 2 - GND (GROUND)
PIN 3 - AC LO (NEUTRAL)

DC VERSIONS
PIN 1 - DC POSITIVE
PIN 2 - N/C (not connected)
PIN 3 - DC NEGATIVE

INSTALLATION

To meet the requirements of the directive EN61010-1, where the unit is permanently connected to the mains supply it is obligatory to install a circuit breaking device easily reachable by the operator and clearly marked as the disconnect device.

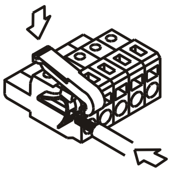
WARNING

In order to guarantee electromagnetic compatibility, the following guidelines for cable wiring must be followed:

- Power supply wires must be routed separated from signal wires. *Never* run power and signal wires in the same conduit.
- Use shielded cable for signal wiring and connect the shield to ground of the indicator (pin2 CN1).
- The cable section must be $\geq$ 0.25 mm^2

If not installed and used according to these instructions, protection against hazards may be impaired.

CONNECTORS



To perform wiring connections, remove the terminal block from the meter's connector, strip the wire leaving from 7 to 10 mm exposed and insert it into the proper terminal while pushing the fingertip down to open the clip inside the connector as indicated in the figure.

Proceed in the same manner with all pins and plug the terminal block into the corresponding meter's connector.

Each terminal accept cables of section between 0.08 mm^2 and 2.5 mm^2 (AWG 26 ÷ 14). The blocks provide removable adaptors into each terminal to allow proper fastening for cable sections of <0.5 mm^2.

2.2 - PROGRAMMING INSTRUCTIONS

When power is applied to the instrument, the display briefly illuminates all segments and LED's then shows the software version and finally enters in the normal reading mode.

Press ENTER to enter in the programming mode. The display shows the indication "-Pro-". The programming software is divided into 6 modules. From the -Pro- stage, press repeatedly ▶ to cycle around the existing modules

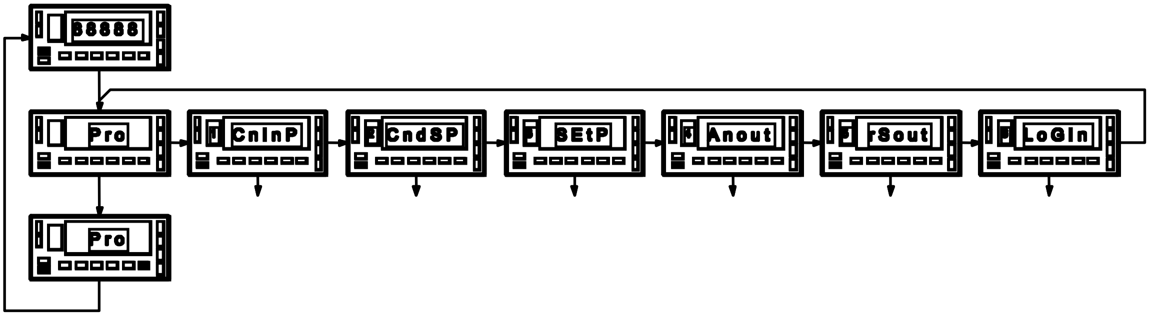
1. CnInP = Input configuration
2. CndSP = Display configuration
3. SEtP = Setpoints
4. AnoUt = Analogical output
5. rSoUt = RS output
6. LoGIn = Remote inputs

The modules 3, 4 and 5 will only be displayed if the option is installed. Read the manuals related to these options to configure them.

The figure below shows the programming diagram. You can accede to each module by pressing ENTER when its name appears in the display.

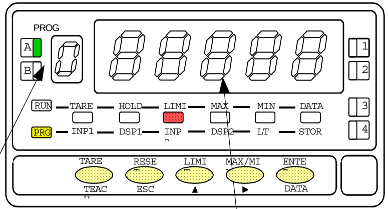
In the diagram, the key ▶ will allow you to cycle through the modules and the key ENTER will be used to input data and go to the next step.

From any step of the program routines, a push on ESC returns the meter to the run mode without saving.



The programming instructions are composed by a general description and a series of step-by-step instructions to be followed sequentially. Each menu step is represented by an illustration of the display and keyboard module with indicators (display and LED's), reference [page number . figure number] and a text describing the action of each key at that step.

[page nº / figure nº] Mnemo



Program module and menu step indicators

In the step-by-step instructions, you are given the action of the three buttons mainly used to program data. The normal procedure at each step is to push on ▶ a number of times to make changes and push on ENTER to validate changes and advance to the next programming step. At the end of a complete menu sequence the meter returns to the run mode saving changes in memory.

In general the following actions can be made during the program mode.

ENTER validate changes and advance to next step

ESC discard changes and go to the run mode

▶ select among a list of available options / shift to next digit to the right

▲ increment digit value

With respect to the figures in the step-by-step instructions, the display indications may have the following meanings :

1./ The display shows one of the available options with filled-out segments. That means that the display shows the choice made previously. The use of ▶ allows to select from available options.

2./ A series of black "8" also represents the display indication of a previous choice, with the difference that it cannot be changed in the current step. If it is already the desired parameter, you may exit from the menu by a push of ESC without making changes or, if wanted to modify it, a push of ENTER advances the meter to the next step where changes are allowed.

3./ A series of white "8" represents any numerical value that is programmed by using keys ▲ (increment digit value) and ▶ (advance to the next digit).

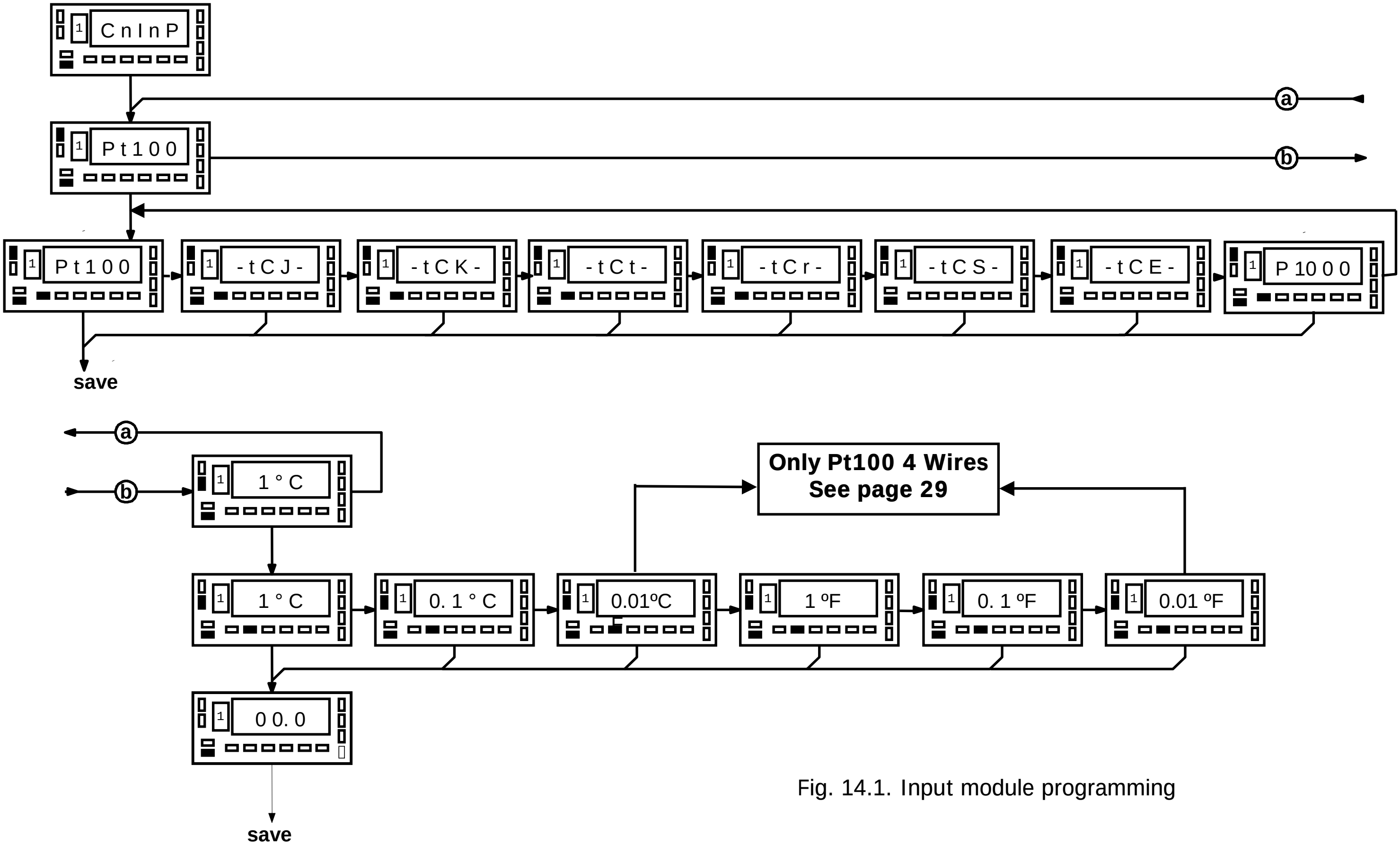
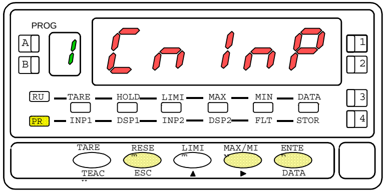


Fig. 14.1. Input module programming

Access to the input module

[15.1] Input module



From the run mode, press ENTER to enter in the programming mode (the display shows -Pro- and the LED 'PROG' illuminates). Press ▶ to reach the stage represented in figure 14.1 corresponding to the input configuration module.

Press ENTER to accede this module. It is divided into two independent menus to select the input type, units and resolution and program a display offset.

Menu 1A - Input Selection

[15.2] Access to the menu

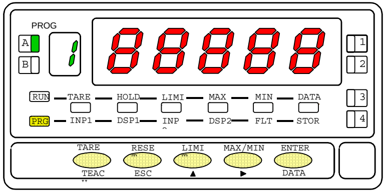


Figure 15.2 shows the indication corresponding to the entry level of the input select menu. The 8's represent any previously programmed input type but cannot be changed at this step.

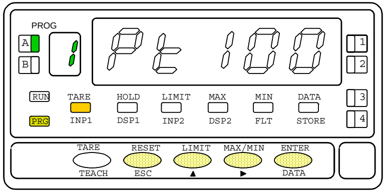
The following actions are available at this stage :

ENTER Access to the input type selection (fig. 15.3).

▶ Pass to the second menu (1B) to set readout parameters (fig. 16.1).

ESC Exit from this routine and return to the run mode.

[15.3] Type of input



Select input type

The display shows the previous configuration [**P1000** = sensor Pt1000, **Pt100** = Pt100 sensor, **-tCJ-** = thermocouple type J, **-tCK-** = thermocouple type K, **-tCt-** = thermocouple type T,

-tCr- = thermocouple type R, **-tCS-** = thermocouple type S, **-tCE-** = thermocouple type E]. Press ▶ to rotate around available options until desired input appears on the display.

ENTER Save changes and return to the run mode.

ESC Exit from this routine without saving changes and return to the run mode.

[16.1] Access to the menu

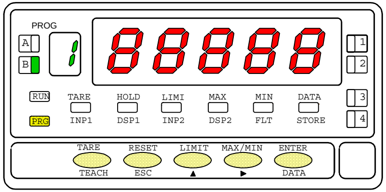


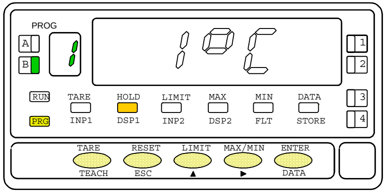
Figure 15.1 shows the entry level of the readout configuration menu where the 8's represent the previously programmed units and resolution but cannot be changed at this step. The following actions are available at this stage :

ENTER Access to change this menu parameters (figs. 15.2 & 15.3).

▶ Pass to the first menu (1A) to set input type (fig. 14.2).

ESC Exit from this routine and return to the run mode.

[16.2] Units



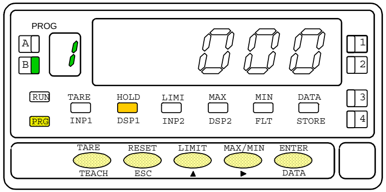
Select units and resolution

The display shows the previous configuration [**1°C**, **0.1°C**, **0.01°C**, **1°F, 0.1°F** or **0.01°F**]. Press ▶ to rotate around available options until desired choice appears on the display.

ENTER Save changes and advance to the next step (fig. 16.3).

ESC Exit from this routine without saving changes and return to the run mode.

[16.3] Offset



Program the display offset

The previously programmed offset appears on the display with the first digit in flash. To change the value, press ▲ to increment the active digit value (the first digit can only be '0' or a minus sign). Press ▶ to shift to the next digit to be modified and repeat these operations until desired offset is completed on the display (max values are ±99° with resolution 1°, ±9.9° with resolution 0.1° and ±0.99 with resolution 0.01°.

The "TARE" LED lights whenever the programmed offset is a non-zero value.

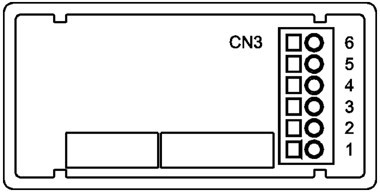
ENTER Save changes in memory and return to the run mode.

ESC Exit from this routine without saving changes and return to the run mode.

Input connections

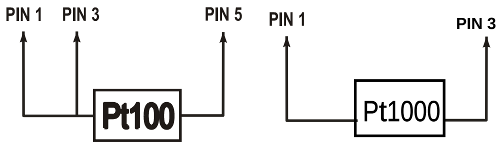
Refer to wiring guidelines in page 11.

Instrument's rear view



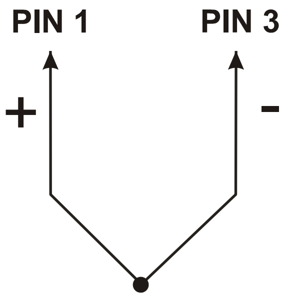
	Pt100	/ Pt100 (2 Wires)	/ Thermocouple
PIN 6 =	Not connected	/ Not connected	/ Not connected
PIN 5 =	Pt100 COMM	/ Not connected	/ Not connected
PIN 4 =	Not connected	/ Not connected	/ Not connected
PIN 3 =	Pt100	/ Pt1000	/ – TC
PIN 2 =	Not connected	/ Not connected	/ Not connected
PIN 1 =	Pt100	/ Pt1000	/ + TC

Signal wiring schematic for:
Pt100 3 wires and Pt1000 2 wires.



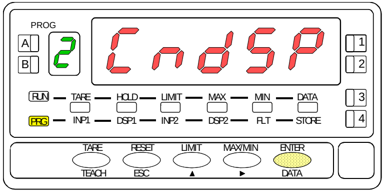
Nota: When using **Pt1000** sensor with 2 wires should be taken into account that every 0,385 ohms of wires resistance means a reading error of 0,1 ºC.

Signal wiring schematic for
Thermocouples J, K, T, R, S and E with 2 wires



2.4 – DISPLAY CONFIGURATION

[18.1] Display module



From the run mode, press ENTER to enter in the programming mode (the display shows -Pro- and the LED 'PROG' illuminates). Press ▶ twice to reach the stage represented in figure 17.1 corresponding to the display configuration module.
Press ENTER to accede this module. It has only one menu which allows to set an input filter level from 0 to 9. The effect of incrementing the filter level results in a delay of the display response to quick input variations. Level '0' means no filter action.

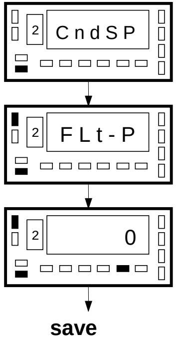


fig. 18.2. Display module diagram

MENU 2A – SELECT FILTER

[18.3] Access to the menu

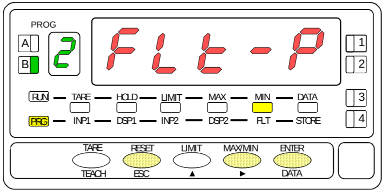
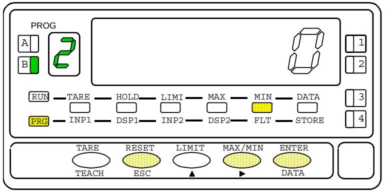


Figure 18.3 shows the indication corresponding to the entry level of the filter select menu. The following actions are available at this stage :

ENTER Access to program filter level (fig. 18.4).
ESC Exit from this menu and return to the run mode.

[18.4] Filter level



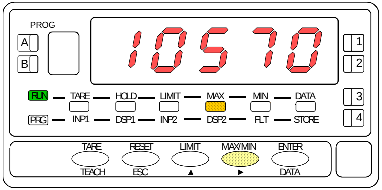
Select filter level
The display shows any number from 0 to 9 corresponding to the previously programmed level. Press ▶ to change this parameter if desired (level '0' disables the filter).

ENTER Save the entry in the memory and return to the run mode.
ESC Exit from this menu without saving changes and return to the run mode.

3. FRONT-PANEL AND REMOTE INPUT FUNCTIONS

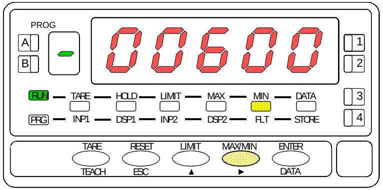
3.1 – FRONT PANEL FUNCTIONS

MAX/MIN. This key is used to call up the peak and valley values contained in memory. Any selected parameter is displayed permanently and continuously updated if no action is taken. First push recalls peak and activates the "MAX" LED.



[19.1] Peak

The second push recalls valley and activates the "MIN" LED.



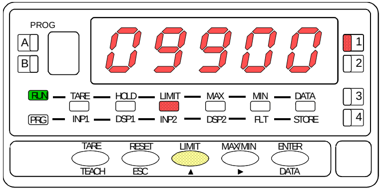
[19.2] Valley

A third push brings the meter to the normal reading.

TO CLEAR PEAK OR VALLEY MEMORIES:

Press "MAX/MIN" until desired parameter appears on the display. Hold down the "RESET" key and press "MAX/MIN". Release first "MAX/MIN", then "RESET".

LIMIT. During the RUN mode, this key is only operative in case that the instrument incorporates one of the following output options : 2 relays (ref. 2RE), 4 relays (ref. 4RE), 4 NPN transistors (ref. 4OP) or 4 PNP transistors (ref.4OPP).
The first push of "LIMIT" indicates the setpoint 1 in the display and illuminates the LED indicators "LIMIT" and "1" (SET1). Each new stroke of the LIMIT key recall successively the following setpoints to the display and activates the corresponding LED (on the right).



[19.3] Setpoint 1 value

The setpoint values are shown at each push of the "LIMIT" key independently of whether they are enabled or inhibited. 15 seconds after the last key operation or by a push of "LIMIT" from the last setpoint indication, the meter returns to the normal reading.

3.2 - REMOTE INPUTS LOGIC FUNCTIONS

The rear connector CN2 provides 4 user programmable opto coupled inputs that can be operated from external contacts or logic levels supplied by an electronic system. Four different functions may be then added to the functions available from the front-panel keys. Each function is associated to one of the CN2 connector pins (PIN 1, PIN 2, PIN 4 and PIN 5) and is activated by applying a falling edge or a low level pulse to the corresponding pin with respect to common (PIN 3).
Each pin can be assigned one of the 19 functions listed on the following pages.

Default configuration

As shipped from the factory, the CN2 connector allows the TARE, MAX/MIN and RESET operations be made in the same way as from the front-panel keyboard and incorporates one more function: the display HOLD.
The HOLD state, which is acknowledged by the LED "HOLD", freezes the display, the BCD and the analog outputs but does not halt the meter's internal operation nor the alarm outputs.
The HOLD state is maintained as long as pin2 is kept to a low level with respect to pin 3.

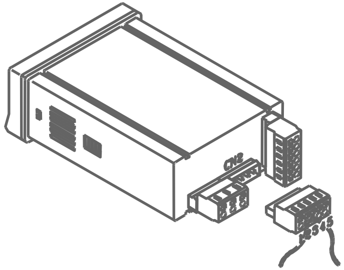
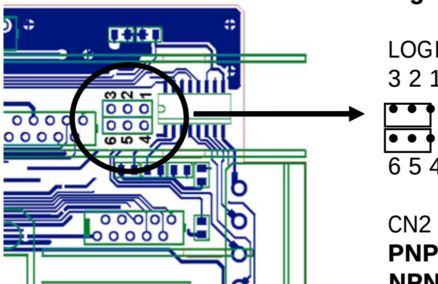


Fig. 20.1

CN2 : Default configuration

PIN (INPUT)	Function	Number
PIN 1 (INP-1)	PEAK	Function nº 3
PIN 2 (INP-2)	VALLEY	Function nº 4
PIN 3	COMMON	
PIN 4 (INP-4)	RESET PEAK/VALLEY	Function nº 5
PIN 5 (INP-5)	HOLD2	Function nº 9



LOGIC CHANGE CN2
3 2 1 J1
6 5 4 J2

CN2 input type
PNP J1 (2-3) & J2 (5-6)
NPN J1 (1-2) & J2 (4-

The external electronics applied to the CN2 connector must be capable of withstanding 40 V and 20 mA present at all terminals with respect to COMMON. In order to guarantee the electromagnetic compatibility, please refer to the instructions given on page 10.

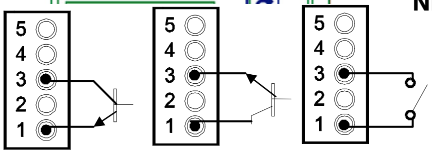


Fig.. 20.2 Examples of connexion. PNP, NPN or contact closure

3.3 - TABLE OF PROGRAMMABLE FUNCTIONS

- Nº: Function number.
- Function: Function name.
- Description : Description and characteristics of the function.
- Activation :
  - Falling edge : The operation is performed on a falling edge applied to the pin with respect to COMMON.
  - Low level : The function remains activated while the corresponding pin is held at a low level with respect to COMMON.
- (*) Default factory configuration. It can be restored by programming all pins to '0'.

0 to 10: DISPLAY / MEMORY FUNCTIONS

Nº	Function	Description	Activation
0	Inhibit	No function	
1	Inhibit		
2	Inhibit		
3	PEAK	Recalls peak value	Falling edge
4	VALLEY	Recalls valley value.	Falling edge
5	RESET PICO/VALLE	Clears the peak or valley memory (if the values are on display)	Falling edge
6	PICO/VALLE (*)	1st push recalls peak, 2nd push recalls valley. Last push returns to the normal reading.	Falling edge
7	RESET (*)	In combination with (6) clears peak or valley memories	Falling edge combined with (6)
8	HOLD1	Holds the display while the outputs remain active	Low level
9	HOLD2 (*)	Holds the display, the BCD and the analog outputs	Low level
10	INPUT	Show the input value in mV or ohms	Low level

13 to 16: FUNCTIONS ASSOCIATED WITH THE ANALOG OUTPUT

Nº	Function	Description	Activation
13	Inhibit		
14	ZERO ANA	Puts the analog output to the zero state (0 V for 0-10 V, 4 mA for 4-20 mA)	Low level
15	ANA PEAK	Makes the analog output follow the peak value	Low level
16	ANA VALLEY	Makes the analog output follow the valley value	Low level

17 to 23: FUNCTIONS FOR USE WITH A PRINTER VIA THE RS OUTPUTS

Nº	Function	Description	Activation
17	PRINT NET	Prints the temperature and units.	Falling edge
18	Inhibit		
19	Inhibit		
20	PRINT SET1	Prints the setpoint1 value and its output status	Falling edge
21	PRINT SET2	Prints the setpoint2 value and its output status	Falling edge
22	PRINT SET3	Prints the setpoint3 value and its output status	Falling edge
23	PRINT SET4	Prints the setpoint4 value and its output status	Falling edge

24 to 25: FUNCTIONS ASSOCIATED WITH THE SETPOINTS AND RS OUTPUTS

Nº	Function	Description	Activation
24	FALSE SETPOINTS	Exclusively for instruments WITHOUT relays/transistors control outputs card. Allows programming and operation of 4 setpoints without physical output.	Low level
25	RESET SETPOINTS	Exclusively for instruments with 1 or more setpoints programmed as "latched setpoints" (That is, the setpoints that once energized remain on the ON status although the alarm condition disappears). Resets the latched setpoints.	Falling edge

26 to 29: SPECIAL FUNCTIONS

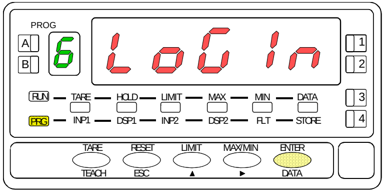
Nº	Function	Description	Activation
26	Inhibit		
27	Inhibit		
28	SEND ASCII	Transmits the four last digits of the display to a remote ASCII indicator. By holding the input to a low level, transmission takes place every second.	Falling edge / Low level
29	Deactivate Setpoints	Deactivates the activity of the setpoints and leaves the output at still.	Low level

Note : function from 10 to 12 are inhibited

3.4 - PROGRAM REMOTE INPUTS

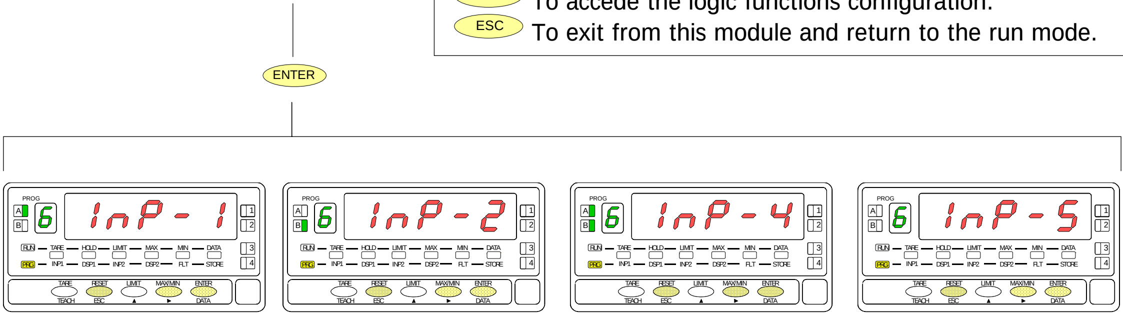
This menu allows selecting the logic function for PIN 1. Available functions are represented by a number from 0 to 29. Consult tables to find the number corresponding to the desired function. The instructions given below apply to pin function 1. Follow the same procedure to configure the rest of the pins.

[23.1] Logic functions module



From the run mode, press ENTER to get access to the programming mode (the display shows -Pro-). Press repeatedly the ► key until the indication shown in figure 22.1 appears on the display. This module provides four menus for programming the logic functions to input pins 1, 2, 4 and 5 of the rear CN2 connector. Press ENTER to access to the first menu (InP-1, corresponding to PIN1). The different menus appear by pressing the ► key.

ENTER To accede the logic functions configuration.
ESC To exit from this module and return to the run mode.



MENU 6A
PROGRAM PIN 1

MENU 6B
PROGRAM PIN 2

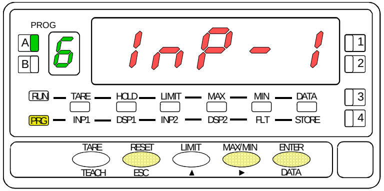
MENU 6AB
PROGRAM PIN 4

MENU 6
PROGRAM PIN 5

MENU 6A - PIN 1 programming

This menu allows selecting the logic function for PIN 1. Available functions are represented by a number from 0 to 29. Consult tables to find the number corresponding to the desired function (pages 22 & 23). The instructions given below apply to pin function 1. Follow the same procedure to configure the rest of the pins.

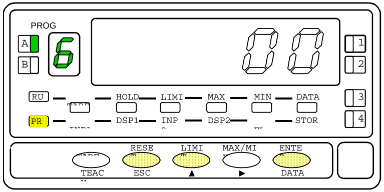
[24.1] Menu PIN 1



The figure 24.1 shows the indication (**InP-1**) corresponding to the configuration menu for the PIN 1 function. Press the ENTER key to accede this configuration.

ENTER To accede to the programming of the PIN 1 function.
▶ To skip over this menu and go to PIN 2.
ESC To exit from the programming mode without saving changes.

[24.2] Function number



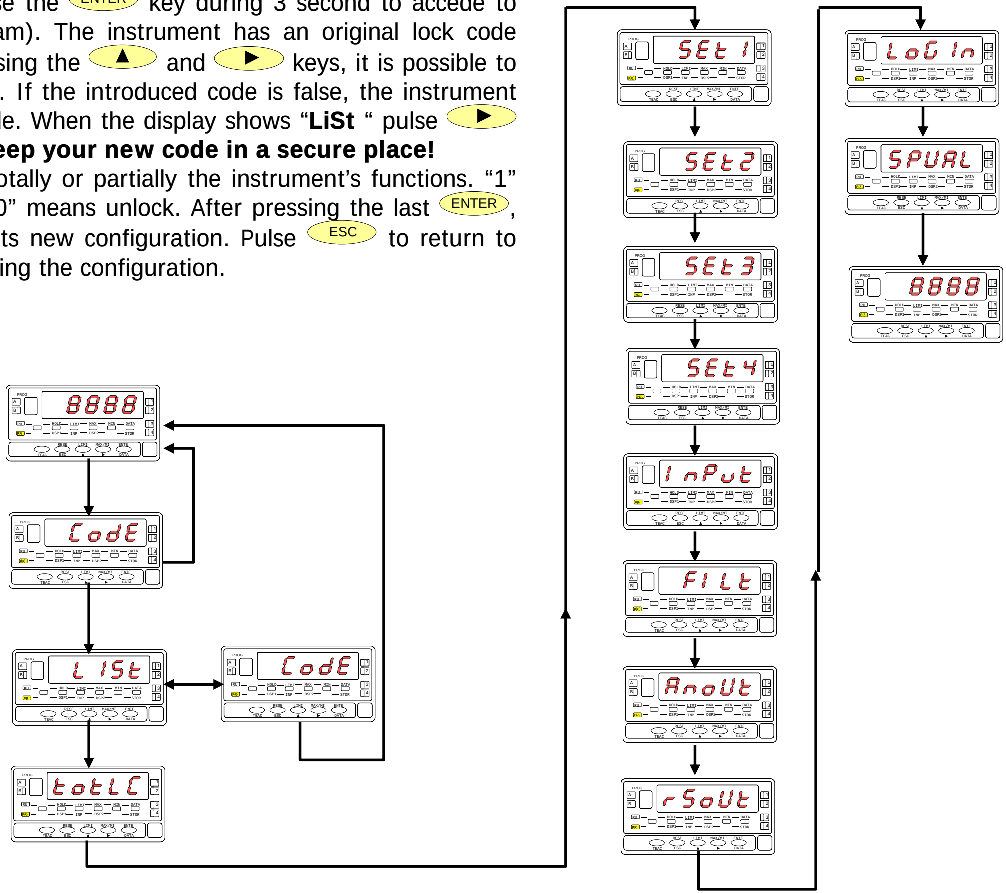
Choose the function number [0-29], according to the table.

▲ To change number (hold down to increment automatically).
ENTER To save the entry into the memory and return to the run mode.
ESC To exit from the programming mode without saving changes.

3.5 – PROGRAMMING LOCK OUT / ACCESS LEVELS

In the RUN mode pulse the ENTER key during 3 second to accede to the lock menu (diagram). The instrument has an original lock code which is "**0000**". By using the ▲ and ▶ keys, it is possible to enter a new lock code. If the introduced code is false, the instrument goes back in RUN mode. When the display shows "**LiSt** " pulse ▶ to change the code. **Keep your new code in a secure place!**

It is possible to lock totally or partially the instrument's functions. "1" means lock whereas "0" means unlock. After pressing the last ENTER, the instrument saves its new configuration. Pulse ESC to return to RUN mode without saving the configuration.



4. OUTPUT OPTIONS

Optionally, model Alpha-T can incorporate one or several output options for communications (this output should never be connected to the telephone lines) or control including :

- Control and processing of limit values via ON/OFF logic outputs (2 relays, 4 relays, 4 NPN outputs or 4 PNP outputs) or proportional output (4-20 mA or 0-10 V).

  ANA Analogue 4-20 mA, 0-10 V
  2RE 2 SPDT relays 8 A
  4RE 4 SPST relays 5 A
  4OP 4 open-collector NPN outputs
  4OPP 4 open-collector PNP outputs

- Communication, data transmission and remote programming via serial interface.

  RS2 Serial RS232C
  RS4 Serial RS485
  BCD BCD 24V/TTL

All options are opto isolated from signal ground.

The output cards are easily installed on the meter's main board by means of plug-in connectors. Complete configuration of the outputs is provided by software routines which are accessible after installing the options.

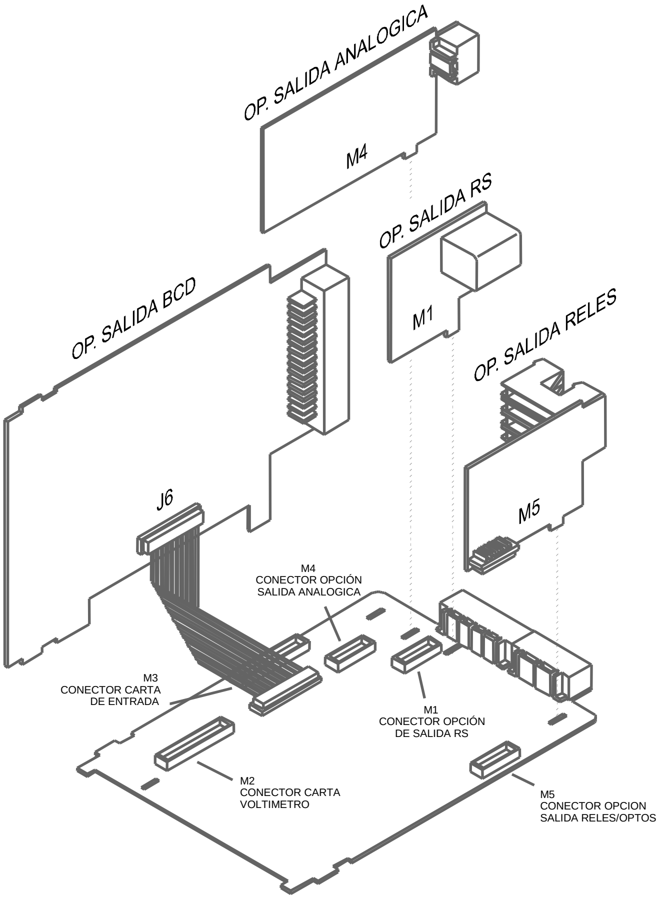
The figure next page shows the different locations of the plug-in output cards. Each location corresponds to a specific function: setpoints, analogue and serial outputs.

The options 2RE, 4RE, 4OP and 4OPP are installed in the M5 connector.
The ANA option is installed in the M4 connector.
The options RS2 and RS4 are installed in the M1 connector.

Up to three output options can be present at a time and operate simultaneously, but only one from each category:
- ANALOGUE
- RS232C or RS485
- 2 RELAYS, 4 RELAYS, 4 PNP or 4 NPN

The BCD output is exclusive and do not allow installation of any other card. This option is connected to the main board by means of a 18-pin FLAT cable.

For more detailed information on characteristics, applications, mounting and programming, please refer to the specific manual supplied with each option.



4.1 NEW FUNCTIONS

The new ALPHA-P provides improved functionality and incorporates new functions from which the following refer to the output options:

RESET CONFIGURATION

To restore the original configuration, press ENTER and RESET at the same time during 5 seconds. The lock code will also be put to zero.

SETPOINTS

1. Each setpoint can be programmed for **auto reset or latched operation**. Latched setpoints require a manual reset to deactivate (see logic function 25, page 21). This may be useful in installations where permanent visual control is not made.

2. Each setpoint can be programmed to **activate** on either the measured net value, gross value, the peak or the valley.

3. Each setpoint may be programmed to **blink** the display when alarm is active. The LED indicator still lights in either case.

4. **Quick access** to program the setpoint values.

5. **Activate or deactivate relay / opto (+LED) via an order from rs232C or rs485.**

This function is available by introducing "3" in the first digit of the parameter mode setpoints (3B ModE).

3	**0**	**0**	**0**	**0**

In this configuration the rest of the options (HI-LO, RET-HYS...) are deactivated except the blink option (last digit of the parameter).
Once activated, these options does not deactivate by overflow or by programming, it only wait an order via RS2 or RS4.

RS232

Compatible with ModBus-RTU protocol (see ModBus manual).

RS485

This output can be used to print several data on the panel printer DITEL Print K180 (see logic functions page 30).
Once chosen the print function, the next step presents on / off to activate the function TIME which prints the time and date.
Compatible with ModBus-RTU protocol (see ModBus manual).

OUTPUT SERIAL

The function 10 (write) is now available in the ModBus protocol, whereas the 01 and 0F are no longer available.

New functions:

Command	Function
Orders	
a#	Activate setpoint nº#
d#	Deactivate setpoint nº#
Parameter Modification	
S#	Change the value of setpoint nº# without saving it

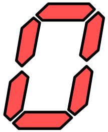
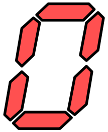
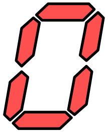
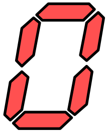
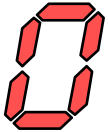
ANALOGICAL
See remote inputs, page 21 & 22.

BCD

See remote inputs, page 22 & 23.

4.2 NEW FUNCTIONS IN SETPOINT OPTION

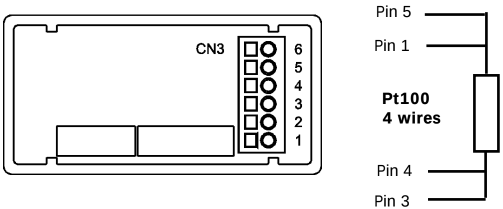
Available on programming menu 3B-MODE (new function in bold letter)

Digit 1	Digit 2	Digit 3	Digit 4 (*)	Digit 5
				
0= OFF 1= ON 2= ON LATCH 3= RS COM (serial port command)	0= HI NO 1= LO NO **2= HI FAIL SAFE** **3= LO FAIL SAFE**	0= Delay 1= Hyst -1 2= Hyst -2	0= Neto 1= Track Set 2= Bruto 3= Peak 4= Valley 5= Track Auto 6= Max 7= Max Filtered **9= r.o.C.**	0= Alarm LED 1= Alarm LED + Blink Display

(*) The options in the digit 4 depend on the setpoint number. According to the setpoints, are the following:
SET1: 0, 3, 4, 9 **SET2:** 0, 1, 3, 4, 9 **SET3**: 0, 3, 4, 9 **SET4**: 0, 1, 3, 4, 9

4.3 Pt100 4 wires 0,01º resolution

Wiring



Note: If have been programmed Pt100 and 0.01º resolution, is mandatory to connect the sensor Pt100 with 4 wires, if not, the display shows error "-----"

FAIL SAFE

Function that allows detecting the power suply fault or an instrument fault and in this way can be informed the PLC or another general system of supervision using the relay option programmed in this way.

r.o.C.

The function **r.o.C (option 9)** is useful to detect the changing speed of display value, depending on programmed setpoint polarity we detect the increasing or decreasing.

In mode **r.o.C**., if the setpoint values is, for example = 1000, that means that the alarm will be activated when the display value increase more than 1000 points per second.
If the setpoint value were, for example = -1000, the alarm would be activated when the display value decrease with a speed greater than 1000 points per second.

The **r.o.C**. alarms have the same programmable options than the rest of alarms, namely, you can choose the mode of action, HI-LO, NO-NC, Latch, delay-histeresys, LED-LED+blink. The only difference is if delay is selected, on the **r.o.C**. alarms not apply to the activation and deactivation, but only to the deactivation of the alarm. This function is applicable separately to activate each of setpoints.

Note: The **ovflo** situation (be by sensor break, or excess of input signal, or incorrect programming) leads to the relays to the rest situation that corresponds according to the program established.

5. TECHNICAL SPECIFICATIONS

INPUT SIGNAL

- Configuration .... differential asymmetrical
- Cold junction compensation .... -10 ºC to +60 ºC
- Pt100 excitation current................................ < 1 mA DC
- Max. cable resistance .... 40 Ω/ cable (balanced)

ACCURACY

- Max. error..see table
- Cold junction coefficient.............. ±(0.05 ºC/ ºC +0.1 ºC)
- Temperature coefficient.............................. 100ppm/ ºC
- Warm-up ....15 minutes

FUSES (DIN 41661) - recommended

- Alpha-T (230/ 115 V AC)............................F 0.2A/ 250 V
- Alpha-T1 (10-30 V DC) ....F 2A/ 250 V
- Alpha-T2 (24/48 V AC) ....F 0.5A/ 250 V

Note: Using Pt1000 sensor 2 wires have to be taken into account that each 0,385 ohms of wires resistance produce an error of 0,1 ºC

Input	Range (0.1 º)	Resolution (0.1º)	Range (1º)	Resolution (1º)
TC J	-200.0 to +1100.0 ºC	0.4% L ±0.6 ºC	-200 to +1100 ºC	0.4% L ±1 º C
	-328.0 to +2012.0 ºF	0.4% L ±1 ºF	-328 to +1472 ºF	0.4% L ±2 º F
TC K	-200.0 to +1200.0 ºC	0.4% L ±0.6 ºC	-200 to +1200 ºC	0.4% L ±1 º C
	-328.0 to +2192.0 ºF	0.4% L ±1 ºF	-328 to +2192 ºF	0.4% L ±2 º F
TC T	-150.0 to +400.0 ºC	0.4% L ±0.6 ºC	-150 to +400 ºC	0.4% L ±1 º C
	-302.0 to +752.0 ºF	0.4% L ±1 ºF	-302 to +752 ºF	0.4% L ±2 º F
TC R	-50.0 to 1700.0 ºC	0.5% L ±2 ºC	-50 to 1700 ºC	0.5% L ±4 º C
	-58.0 to +3092.0 ºF	0.5% L ±4 ºF	-58 to +3092 ºF	0.5% L ±7 º F
TC S	-50,0 to 1700,0 ºC	0.5% L ±2 ºC	-50 to 1700 ºC	0.5% L ±4 º C
	-58.0 to +3092.0 ºF	0.5% L ±4 ºF	-58 to +3092 ºF	0.5% L ±7 º F
TC E	-200.0 to 1000.0 ºC	0.4% L ±1 ºC	-200 to 1000 ºC	0.4% L ±2 ºC
	-328.0 to +1832.0 ºF	0.4% L ±2 ºF	-328 to +1832 ºF	0.4% L ±4 ºF
Pt100 Pt1000	-100.0 to +800.0 ºC	0.2% L ±0.6 ºC	-100 to +800 ºC	0.2% L ±1 ºC
	-148.0 to +1472.0 ºF	0.2% L ±1 ºF	-148 to +1472 ºF	0.2% L ±2 ºF

Pt100 4 hilos	Resolution	0.01ºC/ 0.01ºF
	Measure range	0.00 to 70.00 ºC /32.00 to 158.00 ºF
	Accuracy @ 25 ºC± 2ºC	0.2 % L ± 0.05 ºC
	Thermal drift	0.02 ºC / ºC
	Operating temperature	10ºC to 40 ºC

A/D CONVERSION

- Technique .... Sigma-delta
- Resolution ....(24 bit)
- Conversion rate 18/s

DISPLAY

- Main...5 digits 14mm red
- Auxiliary ....1 digit 7.6mm green
- Decimal point..fixed
- LED's.............................. 14 (programming and control)
- Display update time 55.5ms
- Positive over range .... +oVFLo
- Negative over range.. -oVFLo
- Sensor Break .... “-----“

POWER SUPPLY

- AC Voltages .....115V/230V, 24V/48V (±10%) 50/60Hz AC
- DC voltages ....10-30V DC
- Consumo .... 5W (without options), 10W (max.)

ENVIRONMENTAL

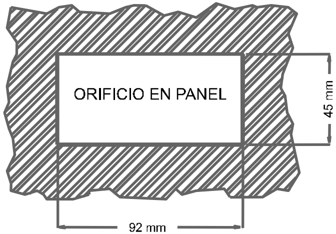
- Indoor use
- Operating temp.................................. -10 ºC to +60 ºC
- Storage temperature .... -25 ºC to +85 ºC
- Relative humidity .... <95 % at 40 ºC
- Max. altitude... 2000 meters

MECHANICAL

- Dimensions..96x48x120 mm
- Panel cut out ....92x45 mm
- Weight .... 600 g
- Case material............................ UL 94 V-0 policarbonato
- Front sealing...IP65

5.1 - DIMENSIONS AND MOUNTING

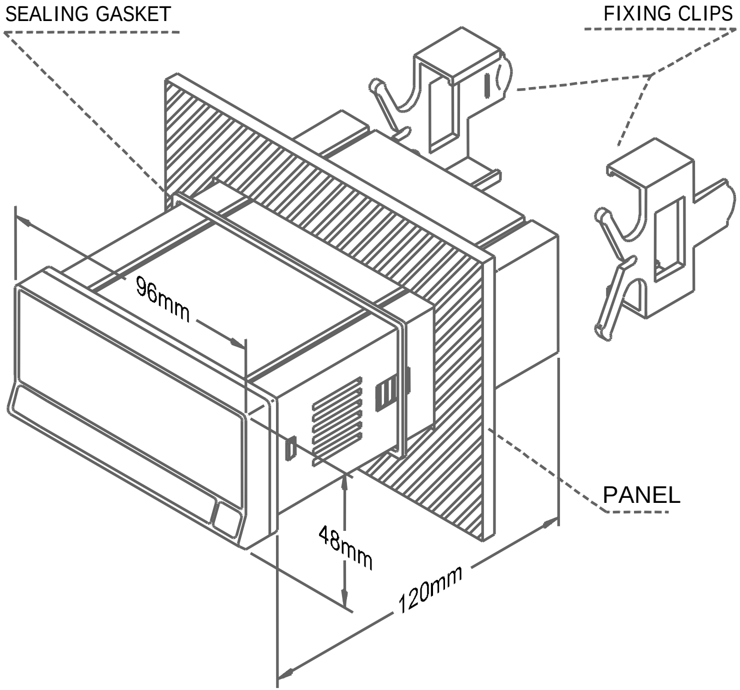
Para montar el instrumento en panel, abrir un orificio de dimensiones 92x45mm e introducir el instrumento en el orificio por la parte delantera colocando la junta de estanqueidad entre éste y el papel.



Colocar las pinzas de sujeción en las guías laterales de la caja (una a cada lado) y deslizarlas hasta que hagan contacto con la parte posterior del panel.

Presionar ligeramente para ajustar la carátula frontal y dejar las pinzas sujetas en las uñas de retención de la caja.

Para desmontar el instrumento del panel, desbloquear las pinzas levantando ligeramente las lengüetas traseras y deslizarlas en el sentido inverso al de montaje.



CLEANING: The frontal cover should be cleaned only with a soft cloth soaked in neutral soap product. **DO NOT USE SOLVENTS**

The instruments are warranted against defective materials and workmanship for a period of three years from date of delivery.

If a product appears to have a defect or fails during the normal use within the warranty period, please contact the distributor from which you purchased the product.

This warranty does not apply to defects resulting from action of the buyer such as mishandling or improper interfacing.

The liability under this warranty shall extend only to the repair of the instrument. No responsibility is assumed by the manufacturer for any damage which may result from its use.

All the DITEL products benefit from an unlimited and unconditional warranty of THREE (3) years from the date of their purchase. Now you can extend this period of warranty up to FIVE (5) years from the product commissioning, only by fulfilling a form.

Fill out the form from our website:
http://www.ditel.es/warranty

7. CERTIFICATE OF CONFORMITY

Manufacturer: DITEL - Diseños y Tecnología S.A.

Address: Polígono Industrial Les Guixeres
C/ Xarol 8 C
08915 BADALONA-SPAIN

Declares, that the product:

Description: Digital panel meter

Model: **ALPHA-T**

Conforms with the directives:: EMC 2004/108/CEE
LVD 2006/95/CEE

Date: Novenber 16, 2010
Signed: José M. Edo
Charge: Technical Manager

Applicable Standards : **EN50081-1** Generic emission
EN55022/CISPR22 Class B

Applicable Standards : **EN50082-1** Generic immunity
IEC1000-4-2 Level 3 Criteria B
Air Discharge 8kV
Contact Discharge 6kV

IEC1000-4-3 Level 2 Criteria A
3V/m 80..1000MHz

IEC1000-4-4 Level 2 Criteria B
1kV Power Lines
0.5kV Signal Lines

Applicable Standards : **EN61010-1** Generic Safety
IEC1010-1 Installation Category II
Transient Voltages <2.5kV
Pollution Degree 2
Conductive pollution excluded
Insulation Type
Enclosure: Double
Inputs/Outputs: Basic

INSTRUCTIONS FOR THE RECYCLING

This electronic instrument is covered by the **2002/96/CE** European Directive so, it is properly marked with the crossed-out wheeled bin symbol that makes reference to the selective collection for electrical and electronic equipment which indicates that at the end of its lifetime, the final user cannot dispose of it as unsorted municipal waste.

In order to protect the environment and in agreement with the European legislation regarding waste of electrical and electronic equipments from products put on the market after 13 August 2005, the user can give it back, without any cost, to the place where it was acquired to proceed to its controlled treatment and recycling.

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