KOSMOS SERIES

INSTRUCTIONS MANUAL
DIGITAL PANEL INSTRUMENT FOR PROCESS CONTROL

CODE: 30727008 EDITION: 05-09-2006

ALPHA-P

MODBUS-RTU PROTOCOL COMPATIBLE

DITEL

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 s/n 205158

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:

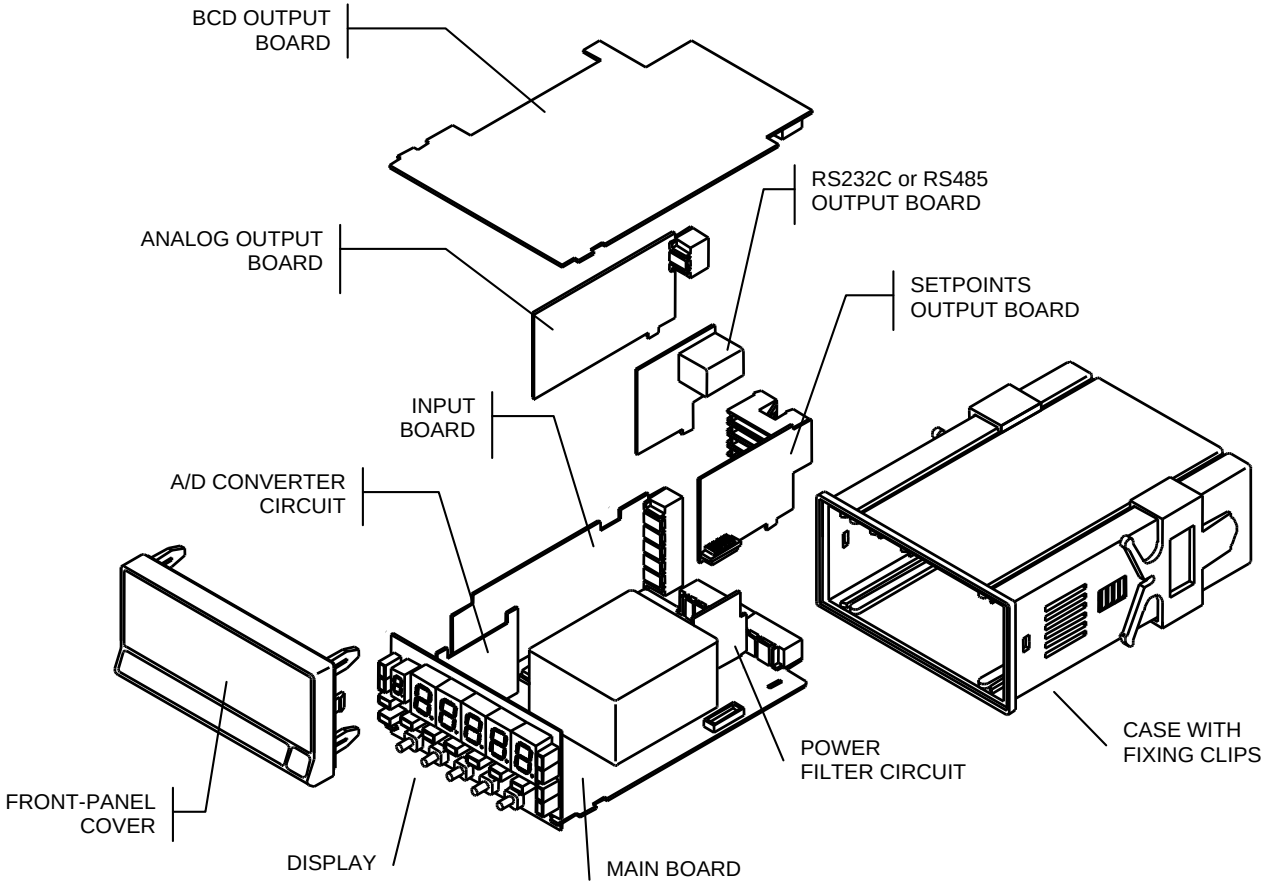
- CONNECTIONS via plug-in terminal blocks without Screws and CLEMP-WAGO clips cable retention system.
- DIMENSIONS
  Models ALPHA & BETA 96x48x120 mm DIN 43700
  Models MICRA & JR/JR20 96x48x60 mm DIN 43700
- CASE MATERIAL UL-94 V0-rated polycarbonate.
- PANEL INSTALLATION without screws by means of single part fastening clips.
- Splash-proof IP65 front cover (Indoor Use).

To guarantee the meter's technical specifications, it is recommended to recalibrate the meter at periodical intervals according to the ISO9001 standards for the particular application operating criteria. Calibration should be performed at the factory or in a qualified laboratory.

DIGITAL PANEL INSTRUMENT KOSMOS SERIES

MODEL ALPHA-P

INDEX


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

1. MODEL ALPHA-P OVERVIEW

The ALPHA-P model incorporates new technical and functional characteristics including ±32000 count display, signal linearization of up to 30 points and user programmable remote logic functions that provides an extraordinary flexibility to adapt to a wide range of indication and control needs.

The model ALPHA-P is a digital indicator for measurement and control of process variables with direct indication in engineering units.

The programming software allows selection of the transducer type (V, mA, potentiometer), two input levels for voltage inputs (1V or 10V), two input levels for current inputs (1mA or 20mA) and two excitation voltages (24V or 10/5V).

The meter provides two scaling methods (by keyboard or by input levels) that make easier the programming task, software selectable filtering levels and last digit resolution to help stabilizing the display according to the process type.

The basic instrument is a soldered assembly composed of the MAIN BOARD, the DISPLAY and the power FILTERING circuit, plus the A/D converter card and the INPUT card which are installed in their corresponding plug-in connectors (see figure in page 4).

Standard features of the basic instrument include the reading of the input variable, max and min readings detection, remote hold operation, tare function and reset 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

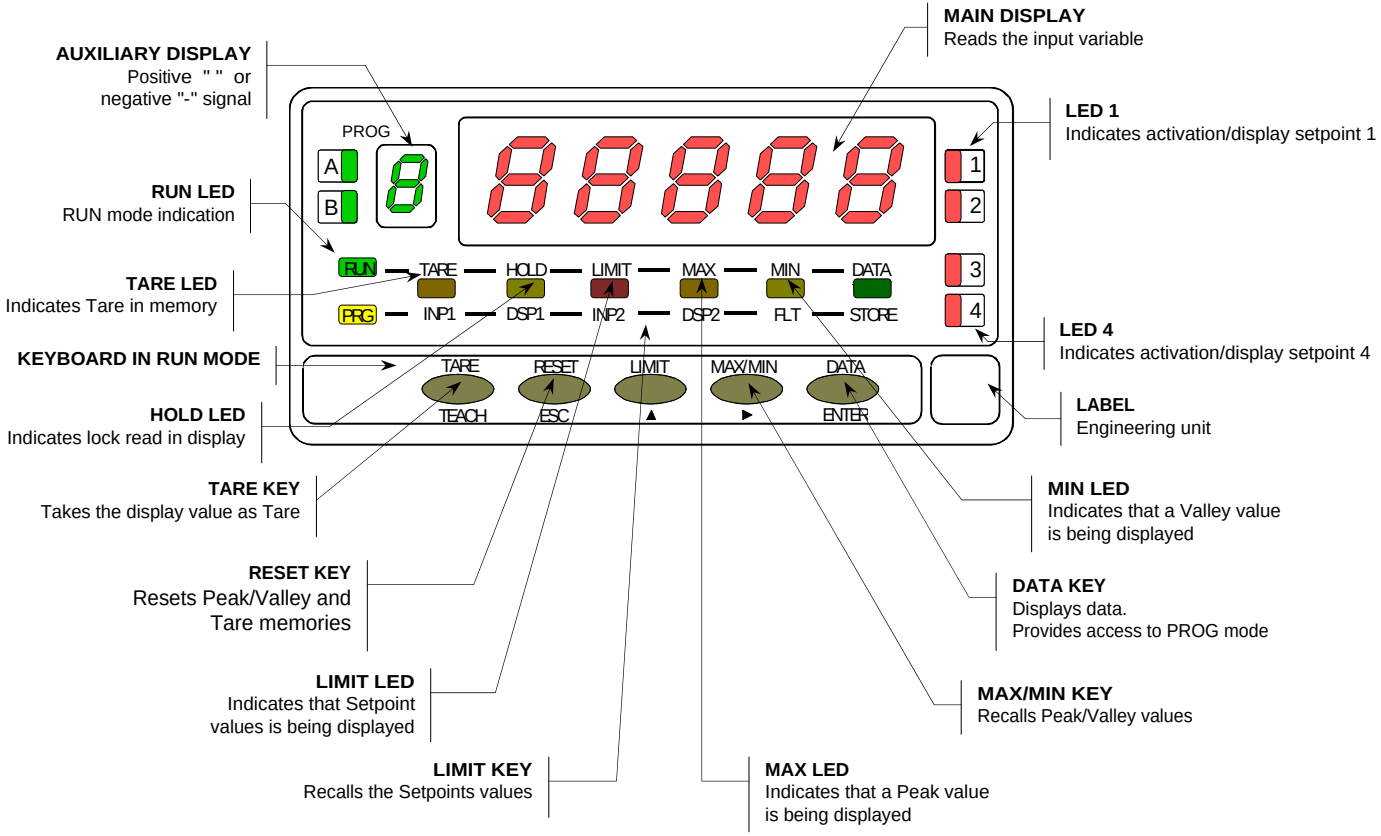
ANA	Analogue 4-20mA, 0-10V
2RE	2 SPDT relays 8A
4RE	4 SPST relays 5A*
4OP	4 NPN outputs
4OPP	4 PNP outputs

All the outputs are isolated with respect to the input signal and to the power supply.

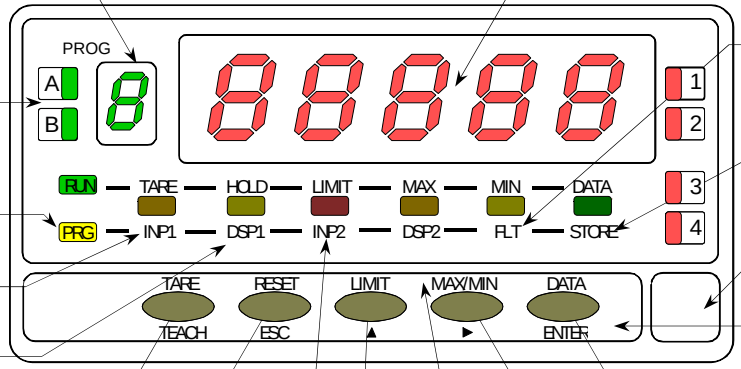
*From nº O5397

This instrument conforms to the following directives: 89/336/CEE and 73/23/CEE
Caution: Read complete instructions to ensure safety protections.

FRONT-PANEL FUNCTIONS IN RUN MODE



FRONT-PANEL FUNCTIONS IN PROG MODE



AUXILIARY DISPLAY
Indicates program module.

MAIN DISPLAY
Reads programming parameters

A and B LED's
Indicates program module letter.

FLT LED
Indicates input filter programming.

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

PROG LED
Indicates programming mode.

LABEL
Engineering unit.

INP1 LED
Indicates Input1 programming.

KEYBOARD IN PROG MODE

DSP1 LED
Indicates Display1 programming.

ENTER KEY
Accepts data.
Advances program steps

TEACH KEY
Reads the INP1, INP2, INP# value.

ESC KEY
Returns to run mode at any program step.

KEY ▶
Moves de flashing digit to the right.

INP2 LED
Indicates Input2 programming.
Indicates Input# programming.

DSP2 LED
Indicates Display2 programming.
Indicates Display# programming.

KEY ▲
Increments the flashing digit value.

2. GETTING STARTED

PACKAGE CONTENTS

- ❑ Instructions manual in English including Declaration of Conformity.
- ❑ D.P.M. model Alpha-P.
- ❑ Accessories for panel mounting (sealing gasket and fastening clips).
- ❑ Accessories for wiring connections (removable plug-in connectors and fingertip).
- ❑ Wiring label stuck to the Alpha-P case.
- ❑ Four sets of engineering units labels.

✓ **Check the package contents.**

CONFIGURATION

Power supply (page 9 and 10)

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

✓ **Check the wiring label before power connection.**

Programming instructions (page 11 and 12)

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

✓ **Read carefully this section.**

Input type (pages 13 to 16)

- ❑ The instrument provides three excitation voltages to supply the transducer; 5V or 10V and 24V, are set up at fabrication for 10V.

✓ **Check the transducer sensitivity, for more detailed information, please consult the transducer specifications**.

Programming Lock-out (page 38)

- ❑ The instrument is set at the factory with the switches on the OFF position (program routines are totally accessible).

Warning! Keep your unlock code in a secure place. If you lost it, it is possible to reset it (page 41).

2.1 - Power supply

Should any hardware modification be performed, remove the electronics from the case as shown in figure 9.1.

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 9.2. To change supply voltage to 115 V AC, set jumpers as indicated in figure 9.3 (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 9.3 To change supply voltage to 48 V AC, set jumpers as indicated in figure 9.2 (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.

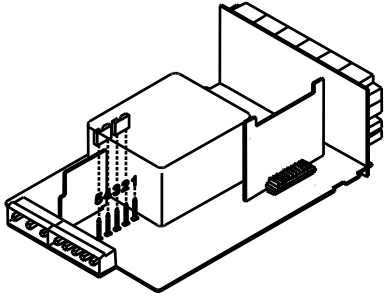


Fig. 9.2. Supply voltage 230 V or 48 V AC

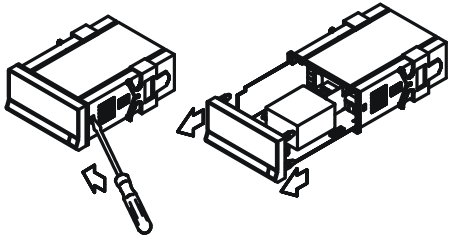


Fig. 9.1. Remove case

Table 1. Jumper settings

Pin	1	2	3	4	5
230V AC	-	▬		▬	
115V AC	▬		▬		-
48V AC	-	▬		▬	
24V AC	▬		▬		-

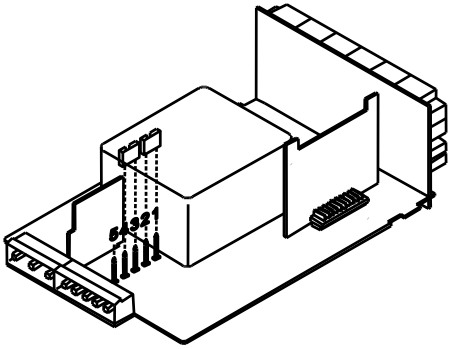
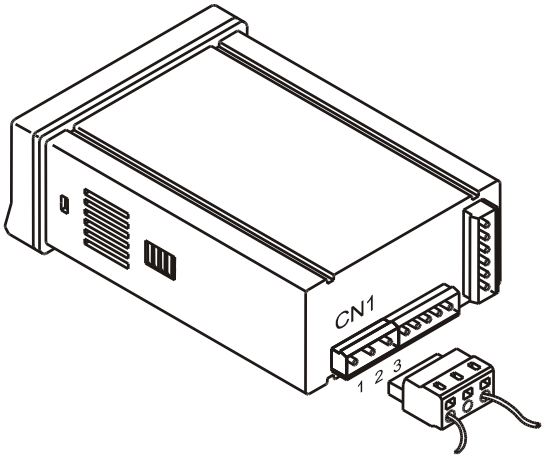


Fig. 9.3. Supply voltage 115 V or 24 V AC

POWER CONNECTION



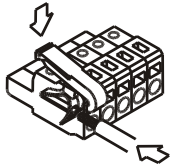
AC VERSIONS
PIN 1 - AC HI
PIN 2 - GND (GROUND)
PIN 3 - AC LO (NEUTRAL)

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 easy reachable to 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 ≥ 0.25 mm².

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 10mm 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 can admit cables of section comprised between 0.08mm² and 2.5mm² (AWG 26 ÷ 14).
The blocks provide removable adaptors into each terminal to allow proper fastening for cable sections of <0.5 mm².

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

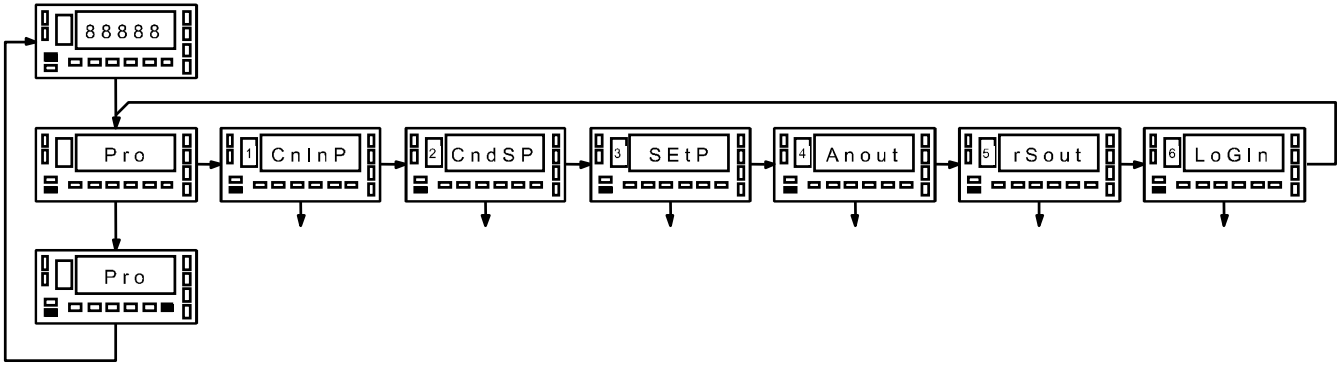
1. CnInP = Input configuration
2. CndSP = Display configuration
3. SetP = Setpoints
4. Anout = Analogical output
5. rSout = RS output
6. LoGIn = Remote inputs

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.

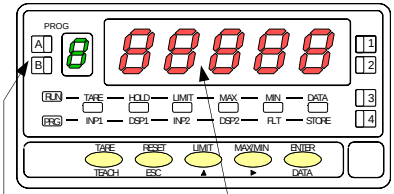
In the diagram, the key ▶ will allow you to cycle through the modules and the key ENTER will be used to input data and go to the next step.

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.

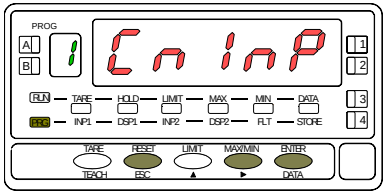
3./ A series of white "8" represents any numerical value that is programmed by using keys ▲ (Increments digit value) and ▶ (advances to the next digit).

2.3 - Input configuration

The Alpha-P provides a choice of three input types: volts (VoLt), milliamp (AMP) and potentiometer (Pot).
Programming menu of "VoLt" and "AMP" inputs (process indicator) include selection of input range and transducer excitation.
Programming menu of "Pot" input (displacement indicator) requires no further configuration. When entering this option the meter automatically sets the excitation to 10V. This voltage is used to feed the potentiometer so the input signal may take values between 0 and 10V.

After deciding the input range, we are ready to enter in the input configuration module (1 CnInP) to program this parameter.
Connect the instrument to the mains. The self-test routine starts: for a few seconds, the display illuminates all segments, decimal points and LED's, then shows the software version.

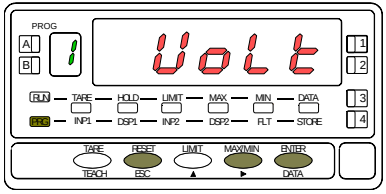
[13.1] Input configuration



From the run mode, press ENTER to get access to the programming mode (the -Pro- indication appears on display). Press the ▶ key to make the display show the indication given on figure 13.1 that corresponds to the entry stage of the input programming module.

▶ To skip over this stage and go to the display programming module.
ENTER To access the input type selection.
ESC To exit from the programming mode without saving changes.

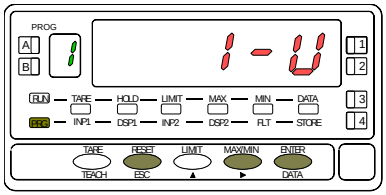
[13.2] Input type



The display shows the indication corresponding to the type of input. Press repeatedly the ▶ key until desired option appears on the display, [**VoLt**= process input in V, **AMP**= process input in mA, or **Pot**= potentiometer input]. If POT input is selected, the instrument goes to the run mode without passing through the following sequence.

ENTER To access the input range selection.
ESC To exit from the programming mode without saving changes.

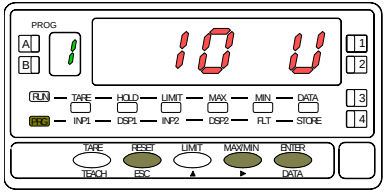
[14.1] Input range



Depending on the previous step selection, the meter presents a choice of two voltage levels [**1-V** or **10-V**] or two current levels [**1-mA** or **20-mA**]. Press the ▶ key to toggle to the level that matches the operating conditions.

ENTER To validate the choice and pass to the next phase.
ESC To exit from the programming mode without saving changes.

[14.2] Select excitation



Press the ▶ key to select the transducer excitation [**24V** or **10V**]. To use the 5V source, select the 10V option and place the internal jumper according to figure 14.3.

ENTER To save the entry into the memory and return to the run mode.
ESC To exit from the programming mode without saving changes.

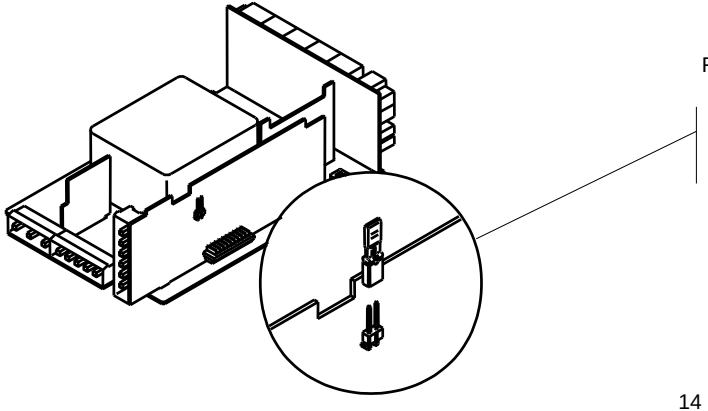
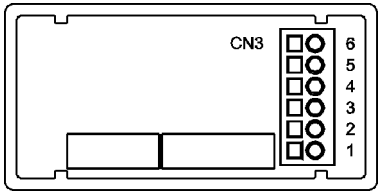


Fig. 14.3: Jumper excitation

Jumper ON = EXC. 5V
Jumper OFF = EXC.

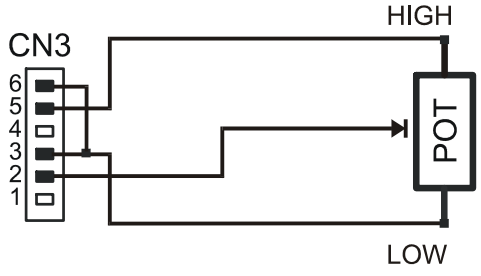
Input signal wiring schematics

See wiring advisements on page 10.
Instrument's rear view



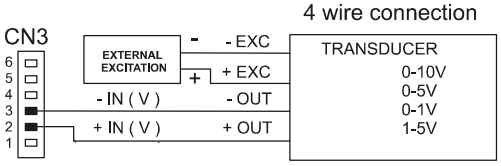
PIN 6 =	- EXC	[excitation output (-)]
PIN 5 =	+ EXC	[excitation output (+)]
PIN 4 =	+ IN	[mA input (+)]
PIN 3 =	- IN	[V or mA input (-)]
PIN 2 =	+ IN	[V input (+)]
PIN 1 =	N/C	(no connection)

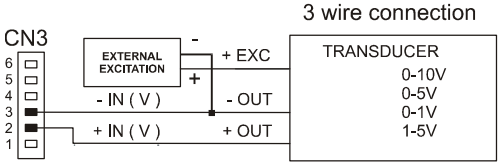
DISPLACEMENT INDICATORS



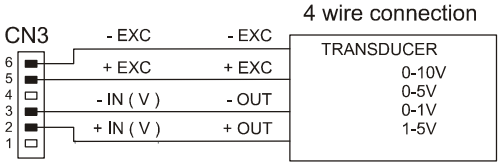
Process indicators with VOLTAGE INPUT

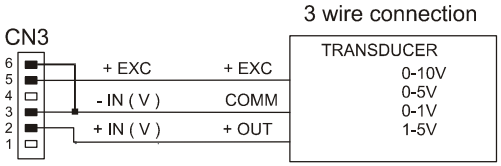
CONNECTION WITH EXTERNAL EXCITATION





EXCITATION SUPPLIED BY ALPHA-P

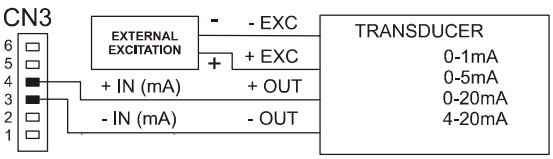




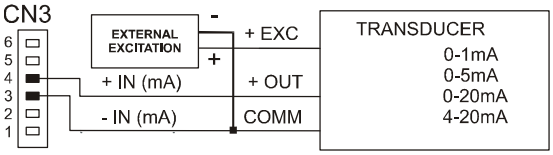
Process indicators with current input

CONNECTION WITH EXTERNAL EXCITATION

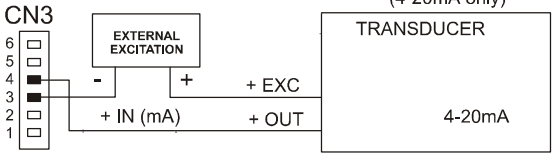
4 wire connection



3 wire connection

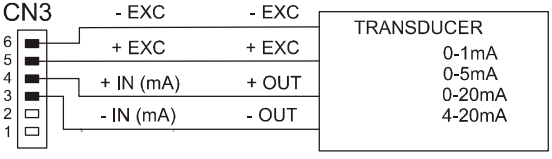


2 wire connection
(4-20mA only)

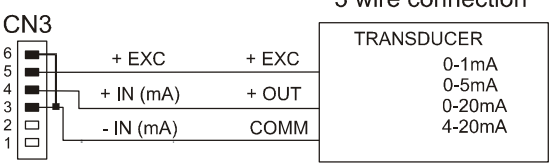


EXCITATION SUPPLIED BY ALPHA

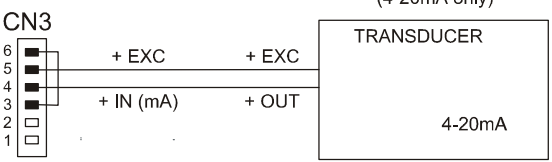
4 wire connection



3 wire connection



2 wire connection
(4-20mA only)



2.4 - Display configuration

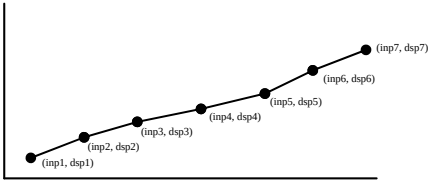
After selection of the input range, it may be necessary to scale the instrument for the particular application. For many common applications, single slope scaling (2 points) should be sufficient to have good readings over the entire process range. Other applications, in which non-linear devices are used may require linearizing the signal. This is accomplished by scaling the meter with more than two points (see fig. 17.1)

Type of function	**Nº of scaling points**
Linear function	2 points
Non-linear function	Max 30 points

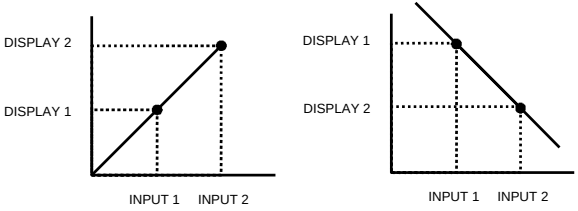
1./ Scaling the display.
The procedure of scaling the display consists of programming a minimum of two points composed each by an input (INP#) and a display (DSP#) coordinates.

When scaling the meter with two points (linear function), they should be located near the process limits for the best possible accuracy.
For multi-point scaling, it is recommended to use the most possible number of points and to reduce the segment length. **The input signal values of the scaling points must be all increasing or all decreasing. Avoid programming two different displays for two equal inputs.** The display values can be entered in any order and even be repeated for two or more input values.

Fig. 17.1: Linearizing function with 6 segments (7 points). Up to 29 segments are available.



2./ Action modes
The figure below represents two modes of operation obtained by programming increasing or decreasing display values for increasing input values.



Forward operation:
- When input signal increases, the display increases.
- When input signal decreases, the display decreases.

Reverse operation:
- When input signal increases, the display decreases.
- When input signal decreases, the display increases.

3./ Scaling the indicator.

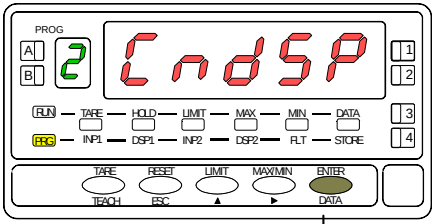
After deciding the values for INPUT and DISPLAY and the decimal point position, we are ready to enter in the display configuration module (2 CndSP) to effectively scale the meter. The scaling procedure is completed with digital filters and display rounding.

[18.1] Display configuration

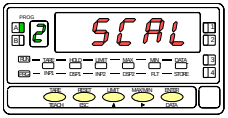
From the run mode, press ENTER to get access to the programming mode (the display shows -Pro-). Press two times the ▶ key to go to the entry stage of the display configuration module, represented in fig. 18.1. This module provides five menus: scaling, balanced filter, damping filter, round and tare (lockout). Press ENTER to accede to the first menu (SCAL) and press repeatedly the ▶ key if you want to shift around the different menus (See next pages for instructions on each menu).

ENTER To get access to the menu select.

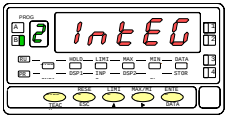
ESC To exit from the programming routines and brings the instrument to the run mode.



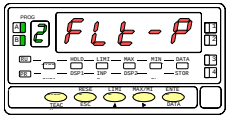
ENTER



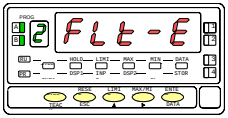
MENU 2A
SCALING



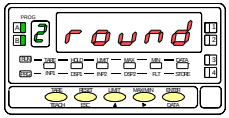
MENU 2B
INTEGRATOR



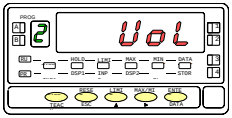
MENU 2AB
BALANCED FILTER



MENU 2AB
DAMPING FILTER



MENU 2AB
ROUND FILTER



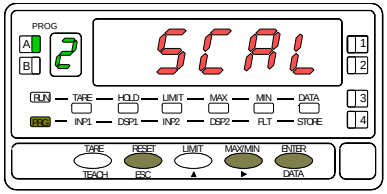
MENU 2
VOLUME

MENU 2A - SCALING

This menu allows programming the necessary parameters to determine the display range (INP1 - DSP1 - Decimal Point - INP2 - DSP2 - INP3 - DSP3 -...). As a default, these values are expected to be introduced by keyboard. To use the actual signal input values as INP# parameters, it is sufficient to push on the TEACH key while in the INPUT programming phases.

VERY IMPORTANT: Scaling the meter with a tare value different from zero may cause false readings when exiting to the run mode. Before trying to program the scale, check the TARE LED and, if activated proceed to clear the tare memory (Fig. 30.2)

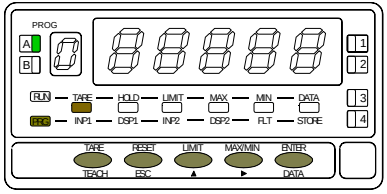
[19.1] Scaling configuration



The figure 19.1 shows the indication (SCAL) corresponding to entry stage into the scaling menu. Press ENTER to accede this menu.

ENTER To accede the scaling configuration.
▶ To skip over this stage and go to the next programming menu.
ESC To exit from the programming mode without saving changes.

[19.2] Input 1 value



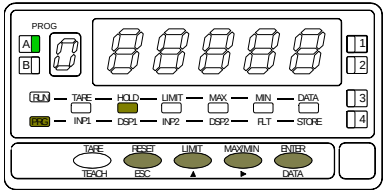
The previously programmed INP1 value appears on the display, LED INP1 activated, with the auxiliary digit (sign) in flash. There are two methods to program input values:

Key-in method: Use ▲ to switch between "0" (positive) and "-" (negative). Press ▶ to advance to the next digit to the right which goes in flash. Press repeatedly ▲ to increment the active digit until it takes desired value. Proceed in the same manner with all the digits until desired value is completed on the display with sign. Press ENTER to accept this value as INP1 and go next step.

Teach method: Apply signal to the meter input. Press TEACH to view the actual signal value present at the input connector (LED INP1 flashes). Press ENTER to accept this value as INP1 and go next step.

ESC To exit from the programming mode without saving changes.

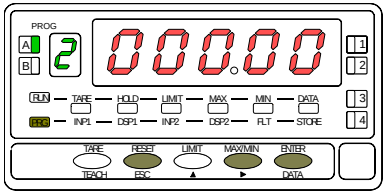
[19.3] Display 1 value



The previously programmed DSP1 value appears on the display, LED DSP1 activated, with the auxiliary digit (sign) in flash. By means of the ▲ and ▶ procedure, program desired DSP1 value and press ENTER. The limits of the span are -32000 and 32000 points. If the programmed value exceeds from these limits, the meter indicates Error, then displays 32000 to allow reprogramming the DSP1 value within limits.

ENTER To save the entry into the memory and go to the next programming menu.
ESC To exit from the programming mode without saving changes.

[20.1] Decimal point

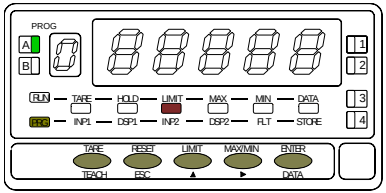


The decimal point goes in flash. Press repeatedly the ► key to move it to the right until desired position. If no decimal point is required, it must be placed to the right side of the display. The decimal point remains in the selected position in all programming phases and the run mode.

ENTER To save the entry into the memory and go to the next programming menu

ESC To exit from the programming mode without saving changes.

[20.2] Input 2 value



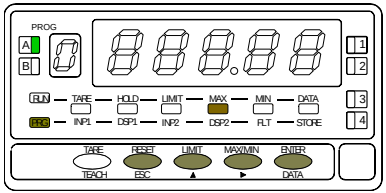
The previously programmed INP2 value appears on the display, LED INP2 activated, with the auxiliary digit (sign) in flash. There are two methods:

Key-in method: Use ▲ to switch between "0" (positive) and "-" (negative). Press ► to advance to the next digit to the right which goes in flash. Press repeatedly ▲ to increment the active digit until it takes desired value. Proceed in the same manner with all the digits until desired value is completed on the display with sign. Press ENTER to accept this value as INP2 and go next step.

Teach method: Apply signal to the meter input. Press TEACH to view the actual signal value present at the input connector (LED INP2 flashes). Press ENTER to accept this value as INP2 and go next step.

ESC To exit from the programming mode without saving changes.

[20.3] Display 2 value



VERY IMPORTANT: Scaling the meter with a tare value different from zero may cause false readings when exiting to the run mode. Before trying to program the scale, check the TARE LED and, if activated proceed to clear the tare memory (Fig. 30.2)

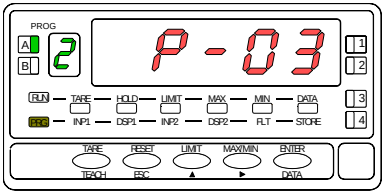
The previously programmed DSP2 value appears on the display, LED DSP2 activated, with the auxiliary digit (sign) in flash. By means of the ▲ and ► procedure, program desired DSP2 value and press ENTER. The limits of the span are -32000 and 32000 points. If the programmed value exceeds from these limits, the meter indicates Error, then displays 32000 to allow reprogramming the DSP2 value within limits.

a) To validate data and access to multi-slope scaling, press ENTER for 3 seconds; or

b) To save the entry into the memory and return to run mode, press ENTER

ESC To exit from the programming mode without saving changes.

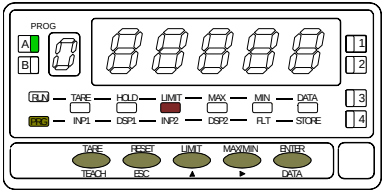
[21.1] Point 3



1 second flag indication for scaling point 3.

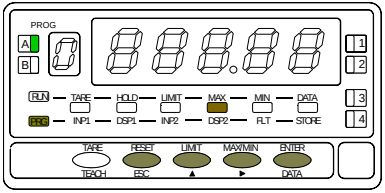
Multi-slope scaling sequence begins at this step.

[21.2] Input 3 value



The previously programmed INP3 value appears on the display, LED INP2 activated, with the auxiliary digit (sign) in flash. There are two methods to program input values:
Key-in method: Use **Displ** to switch between "0" (positive) and "-" (negative). Press ► to advance to the next digit to the right. Press repeatedly ▲ to increment the active digit until it takes desired value. Proceed in the same manner with all the digits until desired value is completed on the display with sign. Press ENTER to accept this value as INP3 and go next step.
Teach method: Apply signal to the meter input. Press TEACH to view the actual signal value present at the input connector, LED INP2 flashes. Press ENTER to accept this value as INP3 and go next step.

[21.3] Display 3 value

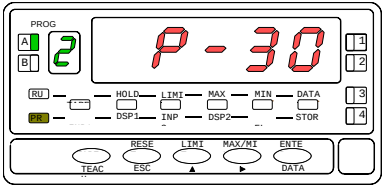


The previously programmed DSP3 value appears on the display, LED DSP2 activated, with the auxiliary digit (sign) in flash. By means of the ▲ and ► procedure, program desired DSP3 value and press ENTER. The limits of the span are -32000 and 32000 points. If the programmed value exceeds from these limits, the meter indicates Error, then displays 32000 to allow reprogramming the DSP3 value within limits.

a) To validate data and advance to the next point, press ENTER; or
b) To save the programmed data in the memory and return to the run mode, the meter is scaled with two segments, press and hold down ENTER for 3 seconds.

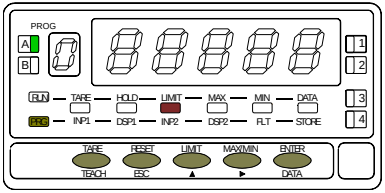
ESC To exit from the programming mode without saving changes.

[22.1] Point 30



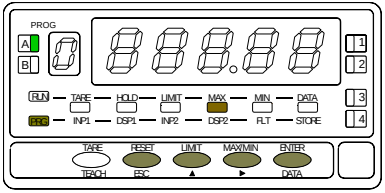
1 second flag indication for scaling point 30.

[22.2] Input 30 value



The previously programmed INP30 value appears on the display, LED INP2 activated, with the auxiliary digit (sign) in flash. There are two methods to program input values:
Key-in method: Use ▲ to switch between "0" (positive) and "-" (negative). Press ▶ to advance to the next digit to the right which goes in flash. Press repeatedly ▲ to increment the active digit until it takes desired value. Proceed in the same manner with all the digits until desired value is completed on the display with sign. Press ENTER to accept this value as INP30 and go next step.
Teach method: Apply signal to the meter input. Press TEACH to view the actual signal value present at the input connector, LED INP2 flashes. Press ENTER to accept this value as INP12 and go next step.
ESC To exit from the programming mode without saving changes.

[22.3] Display 30 value



The previously programmed DSP30 value appears on the display, LED DSP2 activated, with the auxiliary digit (sign) in flash. By means of the ▲ and ▶ procedure, program desired DSP30 value and press ENTER. The limits of the span are -32000 and 32000 points. If the programmed value exceeds from these limits, the meter indicates Error, then displays 32000 to allow reprogramming the DSP30 value within limits.
ENTER To save the entry into the memory, the meter is scaled with eleven segments, and return to run mode.
ESC Return to previous point.

MENU 2B - INTEGRATOR

The instruments has a counter of 8 digits (or 7 with a negative sign) that can be use whether to count quantities with a totalizer + batch counter mode or to integrate through time.

The integration mode is activated in the Display menu (page 18). When activated it deactivates the totalizer + batch counter mode.

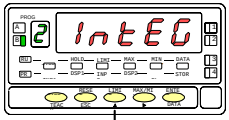


Fig. 23.1: Diagram of the integrator, menu 2B

The figure 23.1 represents the diagram of the integrator (IntEG). Press ENTER to enter the configuration menu.

- **no**
- **yES**
  - **S**
  - **M**
  - **H**
  - **d**
    - **00.000** ***Point.Dec.***
    - **00001** **Factor**
    - **00001.** ***Fact.Dec***
    - **-32.000** **Low-Cut**

There are 5 steps to configure the integrator:

1. Deactivation (**no**) or Activation (**yES**).
2. Time unit used to integrate: seconds, minutes, hours or days (**S**, **M**, **H**, **D**).
3. Position of the decimal point of the display.
4. Factor of multiplication (between 0.0001 and 9999) and its decimal point.
5. **Low-cut** Level from which the integrator starts to integrate. If the dynamic measure is below this level, the function will not integrate.

At each step, press the following keys to configure the integrator:

▶ Modify a value.

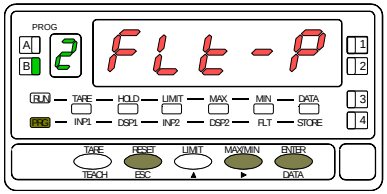
ENTER Go to next step (at the last step, save the new configuration and go back to run mode)

ESC Cancel the configuration and return to the run mode without saving.

MENU 2B - BALANCED FILTER

The balanced filter acts as a delay on the display response to signal variations produced at the input. The effect of incrementing this filter level results in a softer response of the display to the input variations.
The filtering level is programmable from 0 to 9. Level 0 disables the filter.

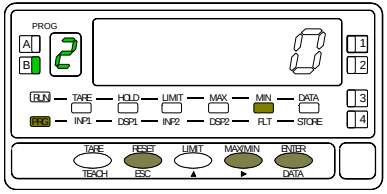
[24.1] Balanced filter



The figure 24.1 shows the indication (FLt-P) corresponding to entry stage of the balanced filter menu. Press the ENTER key to accede this menu.

ENTER To get access to program filter level.
▶ To skip over this menu and go to next one.
ESC To exit from the programming mode without saving changes.

[24.2] Filter value



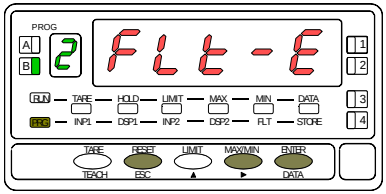
The figure 24.2 shows the initially selected level for the filter-P (any number between 0 and 9) with the FLT LED activated.
Press repeatedly the ▶ key to change the digit until desired value appears on the display.

ENTER To save the entry in the memory and go to the next programming menu.
ESC To exit from the programming mode without saving changes.

MENU 2B - DAMPING FILTER

The damping filter cuts off input values exceeding from the limits of a moving band. This band becomes more selective as the filter level is increased.
The filtering level is programmable from 0 to 9. Level 0 disables the filter.

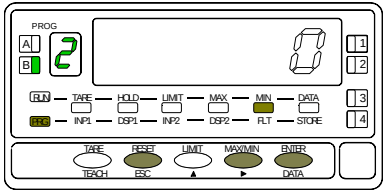
[25.1] Damping filter



The figure 25.1 shows the indication (FLt-E) corresponding to entry stage of the damping filter menu. Press the ENTER key to accede this menu.

ENTER To get access to program the filter level.
▶ To skip over this menu and go to next one.
ESC To exit from the programming mode without saving changes.

[25.2] Filter value



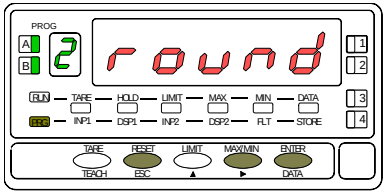
The figure 25.2 shows the initially selected level for the E-filter (any number between 0 and 9) with the FLT LED activated.
Press repeatedly the ▶ key to change the digit until desired value appears on the display.

ENTER To save the entry in the memory and go to the next programming menu.
ESC To exit from the programming mode without saving changes.

MENU 2AB - ROUND FILTER

This menu allows selection among 4 levels of display rounding. When resolution is not critical, a rounding increment higher than 1, may help to stabilize the display.

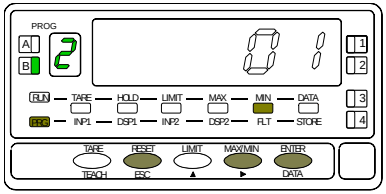
[26.1] Round filter



The figure 26.1 shows the indication corresponding to the round menu. Press ENTER to access the configuration.

ENTER To get access to the round level selection.
▶ To Skip over this menu and pass to the next one.
ESC To exit from the programming mode without saving changes.

[26.2] Rounding increment



Programming of the rounding increment, LED FLT activated.
The display shows the previously selected round level. To change this parameter, press repeatedly the ▶ key to rotate around the different options: [**01** = no rounding, **02** = round to 2 counts, **05** = round to 5 counts, **10** = round to 10 counts].

ENTER To save the option present on display and return to the run mode.
ESC To exit from the programming mode without saving changes.

MENU 2 – CALCULATE A VOLUME

PRESENTATION

There a several ways to calculate a volume of a liquid within a container. By using a pressure-sensor fixed at the bottom of the container, it is possible to know the height of the liquid by adopting the adequate scale (page 19).

There are two ways to calculate a volume:

1. Fill the container with pre-defined quantities and look at the value of the output signal. Introduce these values in the scaling menu (page 17). The more points are introduced the more precise will be the indicator.
2. If the shape of the container is regular (vertical roll, cube) then the volume will be proportional to the height and thus to the pressure. By introducing a multiplicative factor in the scaling (page 17), it is possible to have the volume directly.

AUTOMATIC CALCULATION

The Alpha-P1.00 offers the possibility of calculating directly volumes for container having the shape of a sphere, a cylinder or a combination of both, as well as SILO containers (figures 27). All the user has to do is to introduce the dimensions following the corresponding menu.

To use this function fix a pressure-sensor at the bottom of the container and scale the instrument so that the output signal indicates the height of the volume in meters. The height is proportional to the pressure, it is thus sufficient to introduce only two points into the scaling menu (page 19 to 22): for each signal introduce the corresponding height in meters.

Example: Silo with total high of 10 meters, Pressure sensor with 4- 20 mA output signal corresponding to 0-1 bar. On **SCAL** menu will be programmed INP1 = 4.000 mA, DSP1 = 0.00 m; INP2 = 20.000 mA, DSP2 = 10.00 m.

After in menu PROGRAMMING AUTOMATIC CALCULATION page 29 put the information asked for this menu according to the shape chosen.

Fig. 28.1: Sphere Typ 1

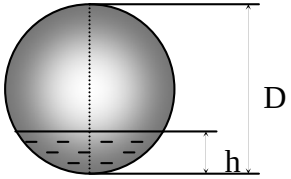


Fig. 28.2: Cylinder Typ 2

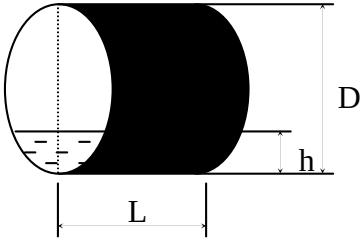
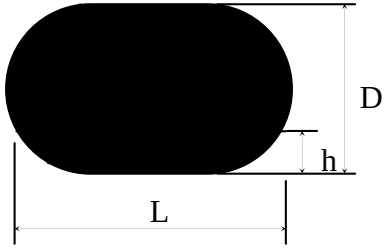
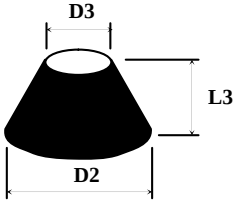


Fig. 28.3: Sphere + Cylinder Typ 3





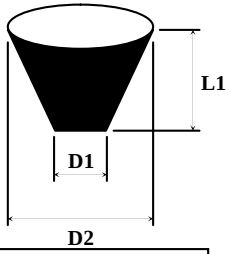


Fig. 28.4: Silo 1 Typ 4

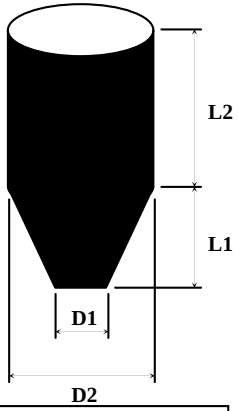


Fig. 28.5: Silo 2 Typ4

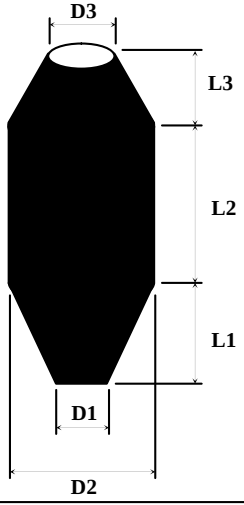


Fig. 28.6: Silo 3 Typ 4

MENU 2 – CALCULATE A VOLUME

MENU AUTOMATIC

The figure 29.1 represents the diagram of the calculator (VoL). Press ENTER to enter the configuration menu.

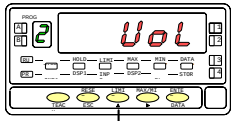
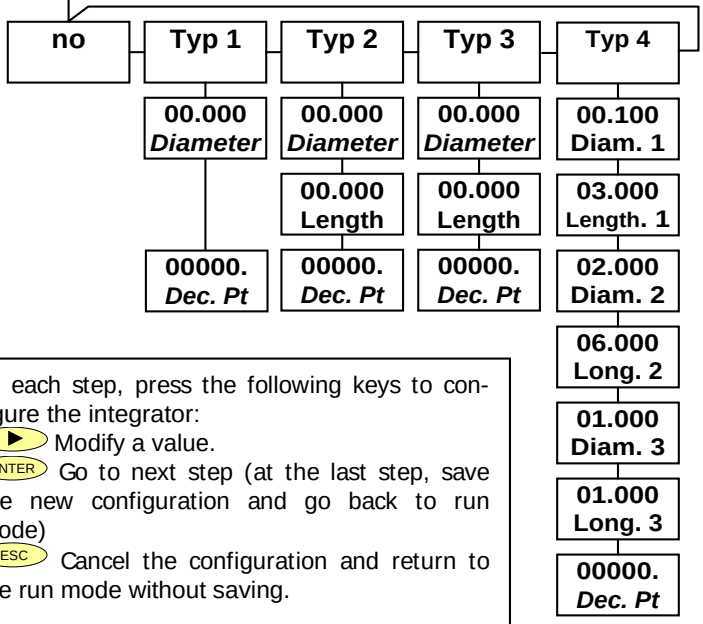


Fig. 29.1: Diagram of the calculator, menu 2



At each step, press the following keys to configure the integrator:

▶ Modify a value.

ENTER Go to next step (at the last step, save the new configuration and go back to run mode)

ESC Cancel the configuration and return to the run mode without saving.

To calculate a volume you have to configure the following steps:

a) Deactivation (no) or Activation by choosing the shape of the container (see page 28):
   tyP 1 = sphere
   tyP 2 = cylinder
   tyP 3 = sphere + cylinder
   tyP 4 = silo,

b) Diameter (in meters) or Diameter1 for the SILO.

c) Length only for **tyP 2** and (in meters) or Lenght1 for the **tyP 4**.

d) Diameter2 only for the **tyP 4**.

e) Length2 only for the **tyP 4**.

f) Diameter3 only for the **tyP 4**.

g) Length3 only for the **tyP 4**.

h) Position of the decimal point of the display (in meters).

The display will indicate the volume in liter.

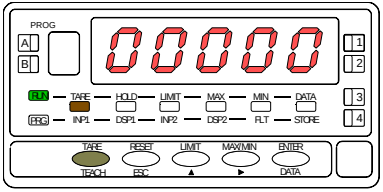
For the **tyP 4**, if some parameters are equal to zero than it will change its shape. Example: if D3 and L3 are equal to zero, than we will have the silo of the figure 28.5

3. KEYBOARD AND REMOTE CONTROLS

3.1 - Keyboard functions

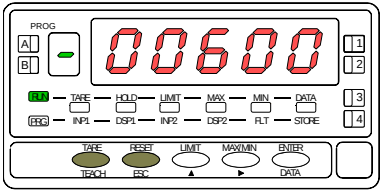
The front-panel keyboard includes the following function keys: TARE, RESET, LIMIT and MAX/MIN. The functionality of each one, which is available in the "RUN" mode is described next.

TARE. Pressing this key adds the current display value to the tare memory and brings the display to zero. The "TARE" LED indicates that a tare value different from zero is contained in the tare memory.



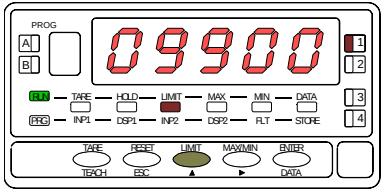
[30.1] Tare operation

RESET TARE. Press and hold down the "RESET" key, then press the "TARE" key. Release first "TARE" then "RESET". To take a tare or reset it back to zero, be sure these functions are enabled by software (see Fig. 22.2, TARE menu, UnLoCK option).



[30.2] Tare reset

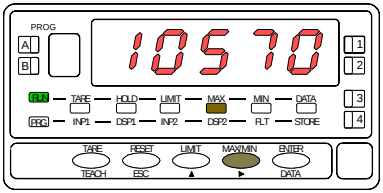
LIMIT. During the RUN mode, this key is only operative in case that the instrument incorporates one of the following output options: 2 relays (ref. 2RE), 4 relays (ref. 4RE), 4 NPN transistors (ref. 4OP) or 4 PNP transistors (ref.4OPP).
At one push of "LIMIT" key the display illuminates the "limit" LED and reads the first programmed setpoint value with the LED 1 activated. New strokes on the LIMIT key recall successively the rest of the setpoints with the corresponding LED (on the right) activated.



[30.3] Setpoint 1 value

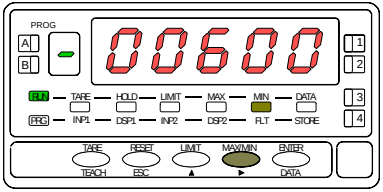
The setpoint values are shown at each push of the "LIMIT" key independently of whether they are enabled or inhibited. 15 seconds after the last key operation or by a push of "LIMIT" from the visualisation of the last setpoint, the auxiliary display blanks and the meter returns to the normal reading.

MAX/MIN. This key calls up the peak and valley values contained in memory. The first push recalls the maximum value reached for the variable since the last reset operation (peak) and activates the "MAX" LED.



[31.1] Peak

The second push recalls the minimum value registered after the last reset (valley) and activates the "MIN" LED.



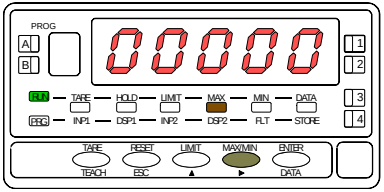
[31.2] Valley

A third push, the meter shows, if integrator activated, alternatively and with 4 digits format, the high and low value of the 8 digits total. Indicated by an **H** and with **L** on green digit on the left of display figure 31.1

A fourth push brings the instrument to display actual value, but if instead of integrator, the logical function 30 is active, the display green shows **b** and the batch number. Next push brings the instrument to show actual value.

The peak and valley values are updated even when they are registered on the display.

To erase the peak and/or valley memories, press "MAX/MIN" one or two times to display the value to be reset. Press and hold down the "RESET" key and simultaneously press "MAX/MIN". Release "MAX/MIN" then "RESET".

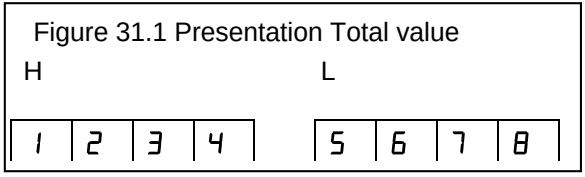


[31.3] Reset of the peak memory

RESET. The "RESET" key is used in conjunction with "TARE" and "MAX/MIN" to erase the memories of tare, peak, valley, total and batch respectively.

When a tare or a tare reset operation is performed, the peak and valley are updated with the new display value.

Figure 31.1 Presentation Total value



FACTORY CONFIGURATION

See page 41

3.2 - Remote 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 28 functions listed on the following pages.

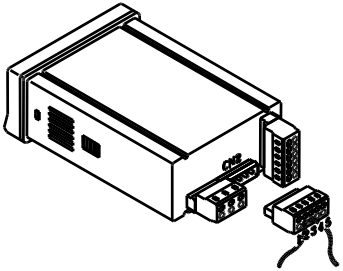
- Default configuration

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.

CN2: DEFAULT CONFIGURATION

PIN (INPUT)	**Function**	**Number**
PIN 1 (INP-1)	RESET	Function nº 7
PIN 2 (INP-2)	HOLD	Function nº 9
PIN 3	COMMON	
PIN 4 (INP-4)	TARE	Function nº 1
PIN 5 (INP-5)	PEAK/VALLEY	Function nº 6

The external electronics (see fig. 32.1) applied to the CN2 connector must be capable of withstanding 40V and 20mA present at all terminals with respect to COMMON. In order to guarantee the electromagnetic compatibility, please refer to the instructions given on page 10.



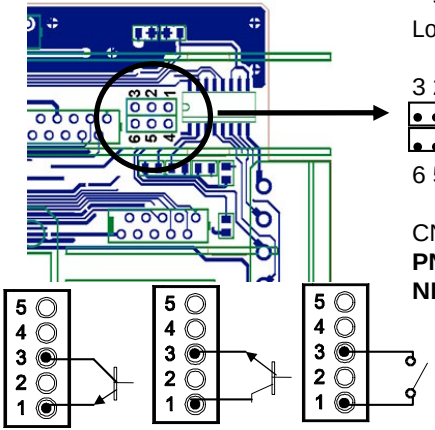


Fig. 32.1

Logic Change CN2

3 2 1 J1

6 5 4 J2

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

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 9: DISPLAY / MEMORY FUNCTIONS

Nº	Function	Description	Activation
0	None	Deactivated. The pin has no function	None
1	TARE (*)	Adds the current display value to the tare memory. The display goes to zero	Falling edge
2	RESET TARE	Adds the tare memory contents to the display value and clears the tare memory	Falling edge
3	PEAK	Recalls peak value. A new falling edge returns to normal reading	Falling edge
4	VALLEY	Recalls valley value. A new falling edge returns to normal reading	Falling edge
5	RESET PEAK/VALLEY	Clears the peak or valley memory (if the values are on display)	Falling edge
6	PEAK/VALLEY (*)	1st push recalls peak, 2nd push recalls valley, 3rd push brings the meter to the indication of the variable being measured	Falling edge
7	RESET (*)	Combined with (1) clears the tare memory Combined with (6) clears the peak or valley memories	Falling edge combined with (1) or (6)
8	HOLD1	Holds the display while the outputs remain active	Low level
9	HOLD2 (*)	Holds the display, the BCD, RS and the analog outputs	Low level

10 to 12 : FUNCTIONS ASSOCIATED WITH THE DISPLAY OF THE INPUT VARIABLE

Nº	Function	Description	Activation
10	INPUT	Displays the actual input signal value in V or mA (flashing)	Low level
11	GROSS	Displays the measured value + the tare value = gross	Low level
12	TARE	Displays the amount of tare contained in the memory	Low level

13 to 16: FUNCTIONS ASSOCIATED WITH THE ANALOG OUTPUT

Nº	Function	Description	Activation
13	ANA GROSS	Makes the analog output follow the gross value (measured value + tare)	Low level
14	ZERO ANA	Puts the analog output to the zero state (0V for 0-10V, 4mA for 4-20mA)	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 net value	Falling edge
18	PRINT GROSS	Prints the gross value	Falling edge
19	PRINT TARE	Prints the tare value	Falling edge
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	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). Deactivates the setpoints output	Falling edge

26 to 28: SPECIAL FUNCTIONS

Nº	Function	Description	Activation
26	ROUND RS	The display value as sent via the RS output, includes no filtering or rounding	Low level
27	ROUND BCD	Makes the BCD output follow the display value without rounding	Low level
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

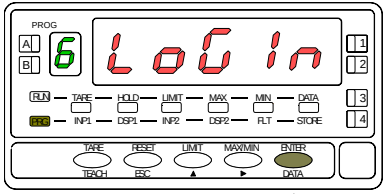
29 to 36: NEW FUNCTIONS

Nº	Function	Description	Activated by
29	Deactivate Setpoints	Deactivates the activity of the setpoints and leaves the outputs at still	Low level
30	Batch	Adds the present value of the display to the totalizer and increments the batch counter once.	Impulse
31	Visualize Total	The value of the totalizer appears in the display, alternating its high part and low part of four digits each. The auxiliary display shows "H" or "L", depending of which part we are looking to.	Low level
32	Visualize Batch	The display shows the value of the batch counter. The auxiliary display indicates "b".	Low level
33	Reset Total and Batch	Reset the totalizer and batch counter	Impulse
34	Stop integrator	Stop the integration function.	Low level
35	Print Total and Batch	Prints the value of the totalizer and batch counter	Impulse
36	Hold and print the Max.	When activated it resets the value of the Max. Then it saves the maximal value while the function is still activated. Finally it prints it when the function is deactivated	Low level

3.4 – Remote functions programming

After deciding the functions for each connector pin, we are ready to enter in the logic inputs configuration module (6 LoGIn) to effectively program the logic inputs.

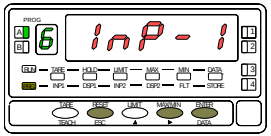
[36.1] Logic inputs



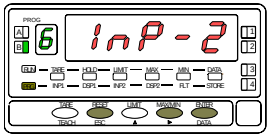
From the run mode, press ENTER to get access to the programming mode (the display shows -Pro-). Press six times the ▶ key to go to the entry stage of the logic inputs configuration module, represented in fig. 36.1. This module provides four menus for programming the input pins. Press ENTER to accede to the first menu (InP1) and press repeatedly the ▶ key if you want to select to different pins.

ENTER To access to select menu.
ESC To exit from the programming routines and bring the instrument to the run

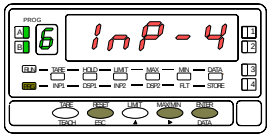
ENTER



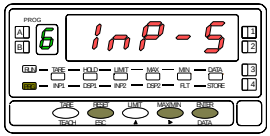
MENU 6A
PIN 1 PROGRAMMING



MENU 6B
PIN 2 PROGRAMMING



MENU 6AB
PIN 4 PROGRAMMING

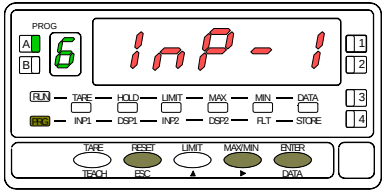


MENU 6
PIN 5 PROGRAMMING

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 36. Consult tables pages 33 to 35 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.

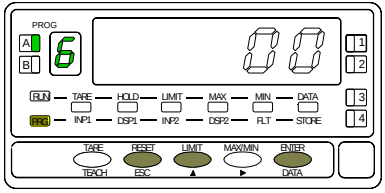
[37.1] Menu PIN 1



The figure 37.1 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.

[37.2] Function number



Choose the function number [0-36], according to the table.

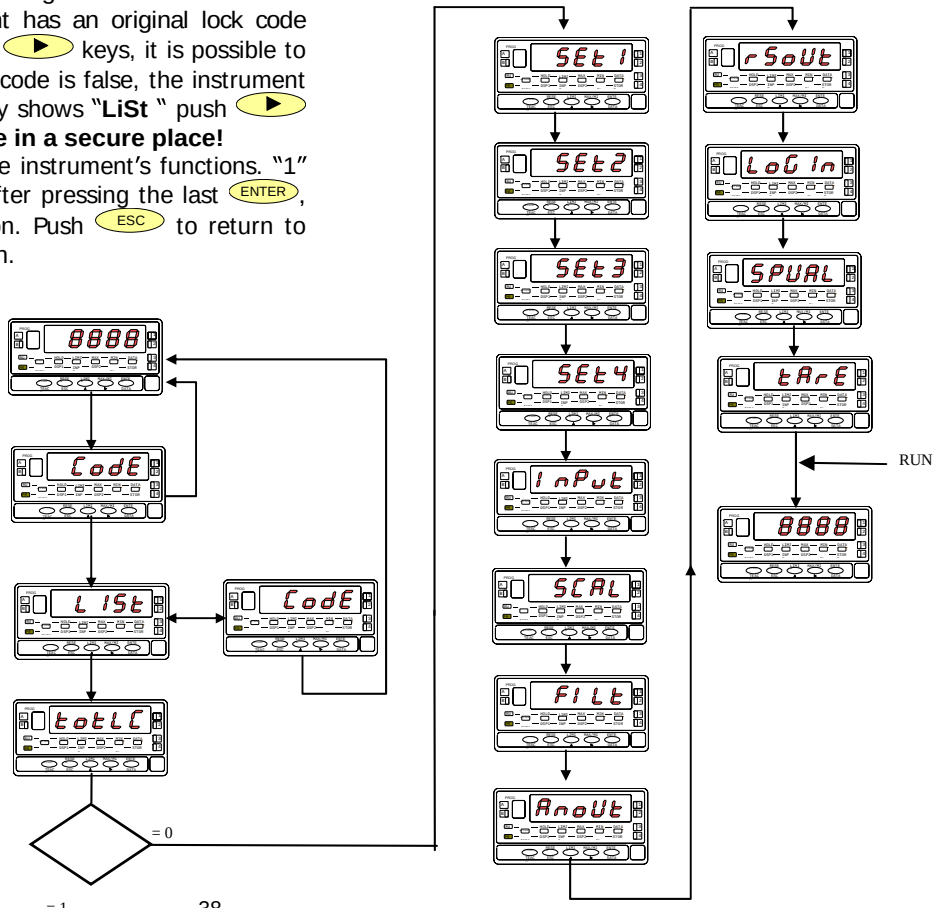
▲ To change number (hold down to increment automatically).
ENTER To save the entry into the memory and return to the run mode.
ESC To exit from the programming mode without saving changes.

3.5 - Programming lock out / access levels

In the RUN mode pulse the ENTER key during 3 second to access 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 C**odE**. If the introduced code is false, the instrument goes back in RUN mode. When the display shows "**LiSt** " push ▶ 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. Push ESC to return to RUN mode without saving the configuration.

totLC 1 = Total Lock, 0 = It's possible to lock partially next steps.

SEt #	Lock prog. Mode Setpoint #.
InPut	Lock prog. Input typ.
SCAL	Lock prog. SCAL.
FiLt	Lock prog. Filtrers.
AnoUt	Lock prog. ANA output
rSoUt	Lock prog. RS output
LoGIn	Lock prog. Logical inputs
SPVAL	Lock prog. Setpoints direct access
tArE	Lock key TARE



4. OUTPUT OPTIONS

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

COMMUNICATION

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

CONTROL

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

All options are isolated with respect to the input signal and the power supply.

* from nº O5397

The options are supplied with a specific instructions manual describing characteristics, installation, connections and programming. The output cards are easily installed on the meter's main board by means of plug-in connectors and each one activates its own programming module that provides complete software configuration.
Additional capabilities of the unit with output options:

- 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 (4-20mA or 0-10V).
- Communication, data transmission and remote programming via serial interface.

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

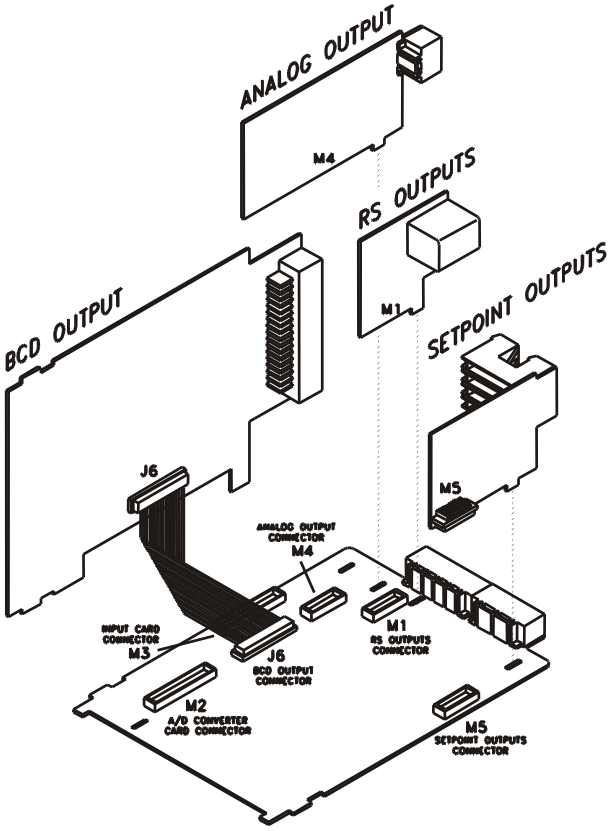
The figure page shows the different locations of the plug-in output cards. Each location corresponds to a specific function: setpoints, analogue and serial outputs.

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.



4.1 NEW FUNCTIONS

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

FACTORY CONFIGURATION

To restore the original configuration, press RESET and then ENTER during 3 seconds. The lock C**odE** 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 29). This may be useful in installations where permanent visual control is not made.

2. Each setpoint can be programmed to **activate** on eithe the measured net value, gross value, the peak the valley or. if activated the totalizer or integrator, with the TOTAL.

   This function is activated by introducing "8" in the fourth digit of the parameter mode setpoints (3B ModE).

1	**0**	**0**	**8**	**0**

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

4. 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.

5. **Use setpoint2 to detect a peak.**

This function is activated by introducing "6" or "7" in the fourth digit of the parameter mode setpoints (3B ModE).

1	**0**	**0**	**6**	**0**

"6" is for the detection of a peak without a filter, and "7" is for the detection of a peak filtered. In this configuration all the other options are activated (Latch, HI-LO, RET-HYS, Blink).

The value parameter of the setpoint (3A SEtP) will be the value from which the peak starts to be evaluated.

The value parameter of the delay / hysteresis parameter (3AB ModE) indicates how long will the relay / opt be activated when the peak is reached. (Except in latch mode)

The relay / opto output will be activated when the display stops increasing (once reached the value of setpoint2) during a number of evaluations programmable by the user and between 0 and 99.

The selection of the number of evaluations appears at the continuation of the configuration of setpoint2 after introducing "6" or "7" in the fourth digit.

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 33).

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 SERIE

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

New functions:

Command	Function

Data Request	
Z	Totalizer value
B	Batch Counter value

Orders	
z	Reset Totalizer
x	Reset Batch Counter
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 34.

BCD

See remote inputs, page 33 and 34.

5. TECHNICAL SPECIFICATIONS

INPUT SIGNAL

- Configuration ..... differential asymmetrical

INPUT PROCESS	**VOLTAGE**	**CURRENT**
Input	±10V DC	20mA DC
Resolution	0.1mV	0.1µA
Input impedance	1MΩ	15Ω
Excitation	24V @ 30mA, 10/ 5V @ 120mA	

INPUT POTENTIOMETER

Applicable voltage ..... 10V DC
Input impedance 1MΩ
Excitation ..... 10V @ 120mA

ACCURACY

- Max. error ..... ± (0.1% of the reading +2 digits)
- Temperature coefficient ..... 100ppm/ ºC
- Warm-up ..... 10 minutes

FUSES (DIN 41661) - (recommended)

- Alpha-P (230/115V AC) ..... F 0.2A/ 250 V
- Alpha-P1 (10-30V DC) ..... F 2A/ 250 V
- Alpha-P2 (24/48V) ..... F 0.5A/ 250 V

FILTERS

Filter P

- Cut -off frequency (-3 dB) ..... from 4Hz to 0.05Hz
- Slope ..... from 14 to 37 dB/10

Filter E

- Programmable ..... 10 levels

A/D CONVERSION

- Technique ..... dual slope
- Resolution ..... (±16 bit)
- Read rate 16/s

DISPLAY

- Main ..... -32000/32000, 5 digits 14mm red
- Auxiliary ..... 1 digit 7.62mm green
- Decimal point ..... programmable
- LED's ..... 14 (programming and control)
- Display update time 62ms
- Positive over range ..... +oVFLo
- Negative over range ..... -oVFLo

POWER SUPPLY

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

ENVIRONMENTAL

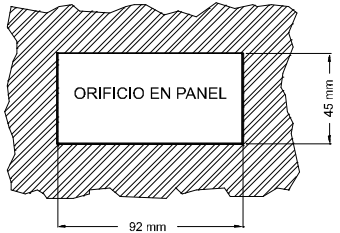
- Splash-proof ..... Indoor Use
- Operating temp. ..... -10 ºC to 60 ºC
- Storage temperature ..... -25ºC to +85ºC
- Relative humidity ..... <95% at 40ºC
- Max. altitude ..... 2000 m

MECHANICAL

- Dimensions 96x48x120mm
- Panel cut out 92x45mm
- Weight 600g
- Case material ..... UL 94 V-0 rated polycarbonate
- Front Sealed IP65

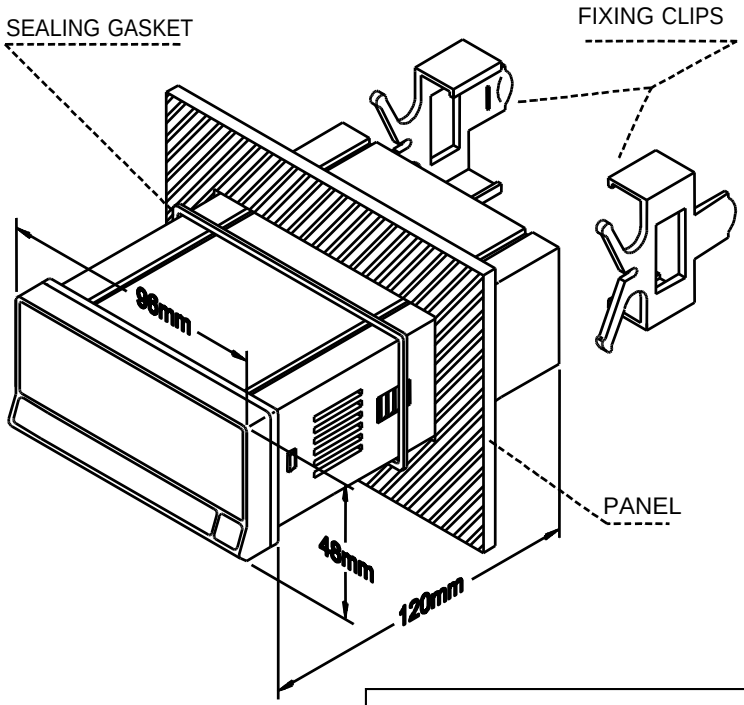
5.1 - Dimensions and mounting

To install the instrument into the panel, make a 92x45mm cut out and insert the instrument into the panel from the front, placing the sealing gasket between this and the front bezel.



Place the fixing clips on both sides of the case and slide them over the guide tracks until they touch the panel at the rear side.
Press slightly to fasten the bezel to the panel and secure the clips at the retention protruding.

To take the instrument out of the panel, pull outwards the rear tabs of the fixing clips to disengage and slide them back over the case.



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 in our website:
http://www.ditel.es/warranty

7. DECLARATION OF CONFORMITY

Manufacture : DITEL - Diseños y Tecnología S.A.

Address: Travessera de les Corts, 180
08028 Barcelona
ESPAÑA

Declares, that the product:

Name: Digital panel meter

Model: **ALPHA-P**

Conforms to: EMC 89/336/CEE
LVD 73/23/CEE

Date: March 20th 2003
Signed: José M. Edo
Charge: Technical Manager

Applicable Standards: EN55022/CISPR22	**EN50081-1** Generic emission Class B
Applicable Standards: IEC1000-4-2	**EN50082-1** Generic immunity 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: IEC1010-1	**EN61010-1** Generic Safety 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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