User Manual

ProSense DPM4 Advanced High Speed Process Panel Meters
DPM4-A-HS-H / DPM4-A-HS-L

ProSense DPM4-A-HS-H/L - User Manual

General Information

Package Contents

- DPM4-A-HS
- Mounting panel accessories (a sealing gasket and 2 fixing clips)
- Wiring accessories (plug-in terminal block connectors and key tool for wire insertion)
- 2 adhesive engineering unit label sheets

Power supply

Note: Check the wiring label before power connection

Instruments supplied for 115 / 230 VAC power are factory set for 115 VAC.

Instruments supplied for 10 / 30 VDC can be powered from any voltage between 10 and 30 VDC without making changes.

Programming instructions

The software is divided into several independently accessible modules to configure the input, the display, the setpoints, the analogical output, the output communication and logic inputs.

Input type

Note: Check the correct configuration of the expected signal before connecting the input.

Programming lock

The instrument is supplied unlocked, giving access to all programming levels. Lockout is carried out by entering a security code that can be personalized.

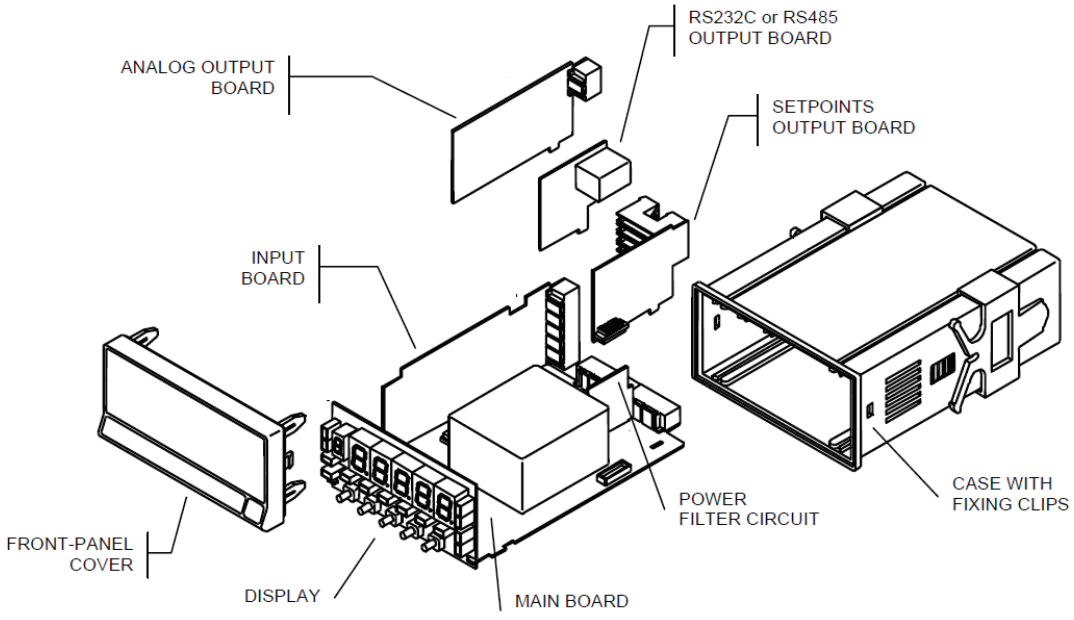
Output Options

The DPM-RELAY, DPM-NPN and DPM-PNP options are alternatives and only one of them can be mounted.

The DPM-RS232 and DPM-RS485 options are also alternatives and only one of them can be mounted.

Up to 3 output options can be present and operate simultaneously:

- ANALOG OUTPUT 4-20mA / 0-10V
- RS232C, RS485 (only one)
- 4 RELAYS, 4 NPN or 4 PNP (only one).



Recycling Instructions

This electronic instrument is covered by the 2002/96/CE European Directive so, it is properly marked with the cros]sed-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 equipment from products put on the market after August 13, 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.

General Safety Considerations

All instructions and guidelines for the installation and manipulation that are present in this manual must be considered to ensure personal safety and to prevent damage to either the instrument or any equipment connected to it.

Safety of any equipment incorporated to this instrument is the responsibility of the system installer.

If this electronic indicator is used in a manner not specified by the manufacturer in this manual, the protection provided by the instrument may be impaired.

Symbols Identification

Warning: Potential risk of danger.

Read complete instructions when this symbol appears in order to know the potential risk and know how to avoid it.

Warning: Risk of electric shock.

Instrument protected by double isolation or reinforced isolation.

Maintenance

To ensure instrument accuracy, it is recommended to check its performance according to the technical specifications listed in this manual.

For front cover cleaning, just wipe with a damp cloth and neutral soap product. DO NOT USE SOLVENTS!

Technical Support

We strive to make our manuals the best in the industry. We rely on your feedback to let us know if we are reaching our goal. If you cannot find the solution to your particular application, or, if for any reason you need technical assistance, please call us at:

1-800-633-0405

Our technical support group will work with you to answer your questions. They are available Monday through Friday from 9:00 A.M. to 6:00 P.M. Eastern Time. We also encourage you to visit our web site where you can find technical and non-technical information about our products and our company.

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Agency Approvals

CE

Device Description

The DPM4-A-HS is equipped for high speed and performance applications. Display range ±9999, scale linearization with a maximum of 30 points, direct access to setpoint value programming, 34 programmable logic functions, sensor overload protection and high conversion speed of 555 samples per second.

The DPM4-A-HS is an indicator for measurement and control with direct indication in engineering units. The multifunction input circuit allows the connection of Load Cells (mV) or Shunts to measure direct current, ±10 V or ±20 mA process signals or potentiometers to measure displacement.

The instrument supplies different excitation voltages for the sensors, 24V @ 30mA, 1.65 V @ 30 mA and 5 or 10V @ 120mA, allowing up to 4 load cells to be powered; these voltages being selected by means of internal jumpers. Thanks to the high conversion speed (555/s) you can read signal peaks and valleys with a minimum duration of 2.1 ms. An analog output (ANA option) with retransmission of 200 readings per second and an opto output (DPM-NPN or DPM-PNP) or 4 relays with a reaction time of 2.1 ms (NPN or PNP output only) as well as connection to PC through the DPM-RS232 or DPM-RS485 option through ASCII, ISO1745 or MODBUS RTU protocols with the possibility of a logic function that allows sending 200 display readings per second via serial.

In addition, the instrument has three types of filter that allow the stabilization of the reading of signals from different processes.

A special function no. 27 SAMPLE & HOLD allows to stop during the hold time the value reached in the measurement as well as the value of PEAK, VALLEY, PEAK-PEAK, also the comparison of the SETPOINTS (selectable). The basic device is made up of the base card, the display, the power supply filter and the input card. The basic functions of the instrument include the display of the input variable, the reading and storage of the peak and valley value as well as the peak-to-peak value, the Hold, Tare and reset functions of said variables.

The DPM4-A-HS model instruments can also incorporate the following output options:

Control	Communication
DPM-ANALOG - Analog 4-20 mA, 0-10 V	DPM-RS232 - Serial RS232C
DPM-RELAY - 4 SPST relays 5A	DPM-RS485 - Serial RS485
DPM-NPN - 4 NPN outputs	
DPM-PNP - 4 PNP outputs	

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

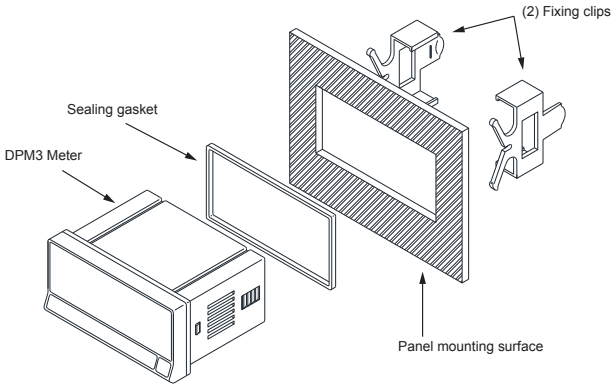
- 96 x 48mm 1/8 DIN
- Menu driven pushbutton configuration
- 5 digit (-9999 to 9999) red and 1 digit green auxiliary LED displays
- Selectable decimal point
- Process (±10V, ±20mA)
- Potentiometer
- Load cell (±30, ±60, ±120, ±300, ±500 mV)
- Display scaling or process teaching modes
- Configuration for direct or reverse acting linear processes and up to 30 point non-linear processes
- Total or selective configuration lock out
- Programmable functions
- 3 year warranty

Mounting

To install the instrument, prepare a 92mm x 45mm panel cut-out and slide the unit inwards making sure to place the sealing gasket between the front side panel and the front bezel.

While holding the unit in place, put the fixing clips on both sides of the case and slide them through the guide tracks until they reach the panel at the rear side.

Press slightly to fasten the clips to the latching slots on the case and get the unit fully assembled and close fitted to achieve a good seal.



CLEANING: The frontal cover should be cleaned only with a soft cloth soaked in neutral soap product.

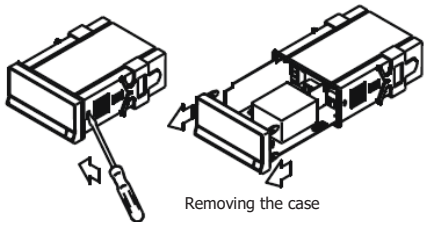
DO NOT USE SOLVENTS

Power Supply and Wiring

Should any hardware modification be performed, remove the electronics from the case as shown below.

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

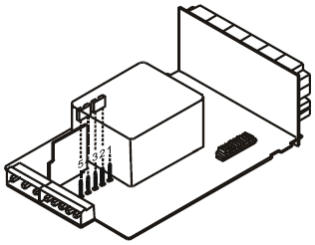
10-30 VDC: The instruments with 10-30 VDC power supply are intended for any voltage between 10 and 30V without need of wiring changes.



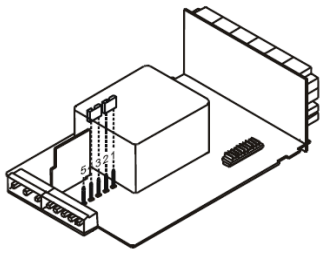
Removing the case

Pin	1	2	3	4	5
230V AC	-				
115V AC					-

Table 1. Jumper settings.

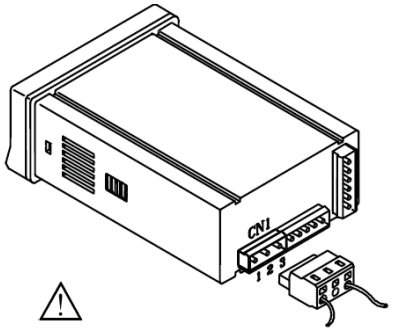


Supply voltage 230VAC (DPM4-A-HS-H)

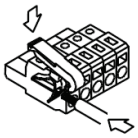


Supply voltage 115VAC (DPM4-A-HS-H)

Power Supply Wiring



AC VERSION
PIN 1 - LINE
PIN 2 - GND (GROUND)
PIN 3 - NEUTRAL



DC VERSION
PIN 1 - DC POSITIVE
PIN 2 - No connection
PIN 3 - DC NEGATIVE

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 ≥ 0.25 mm²

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

Connectors:

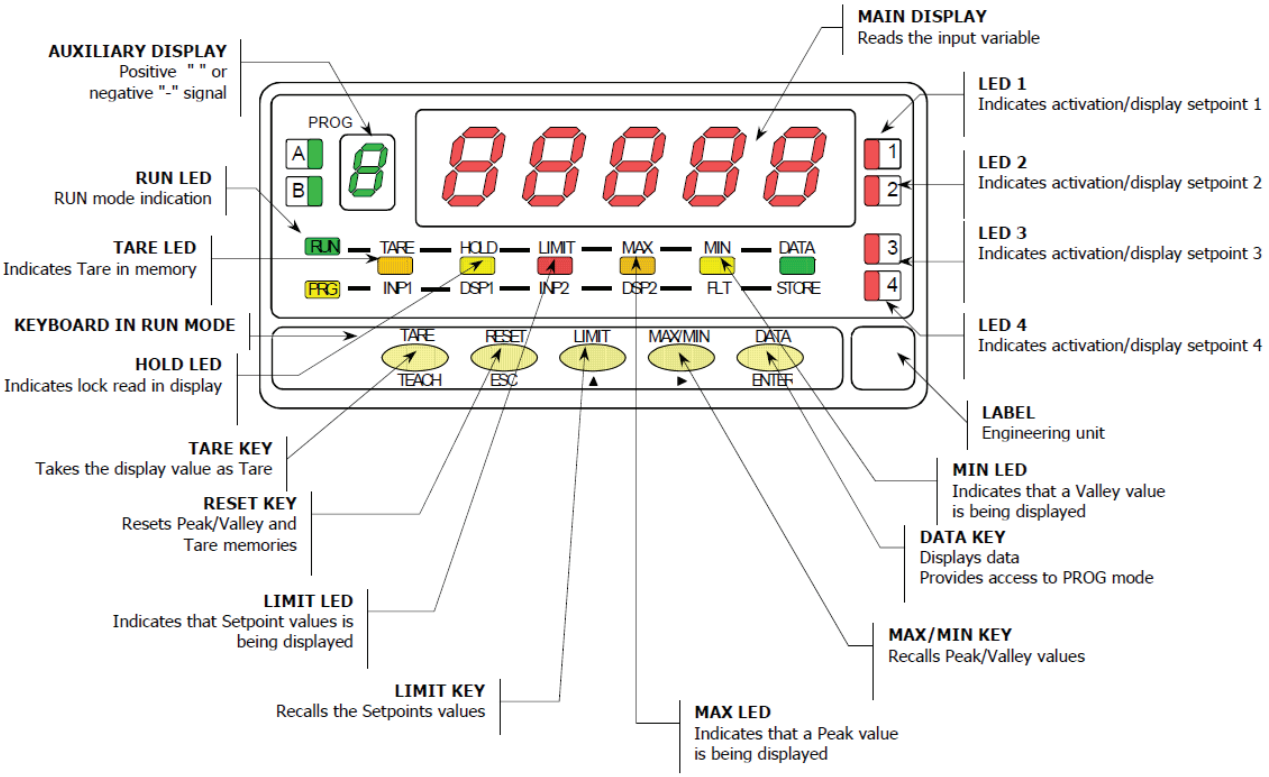
To perform wiring connections, remove the terminal block from the meter's connector, strip the wire leaving from 7 to 10 mm exposed and insert it into the proper terminal while pushing the fingertip down to open the clip inside the connector as indicated in the figure.

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

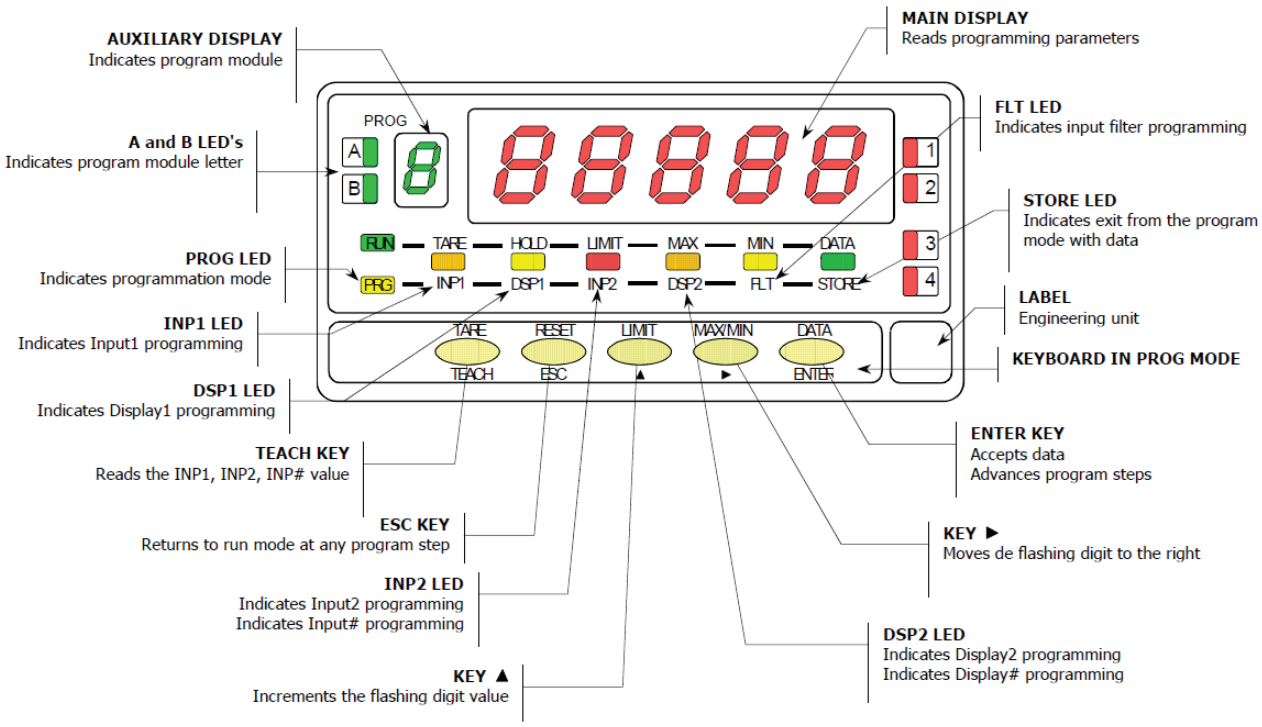
Each terminal can admit cables of section comprised between 0.08 mm² and 2.5 mm² (AWG 26 - 14).

The blocks provide removable adaptors into each terminal to allow proper fastening for cable sections of <0.5 mm².

Front-Panel Functions in Run Mode



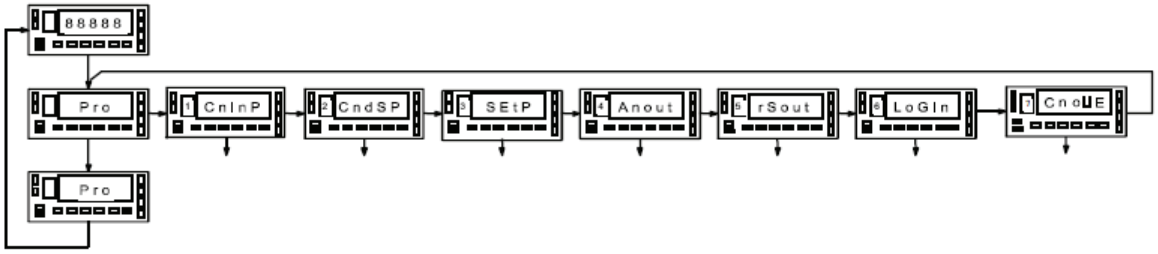
Front-Panel Functions in Prog Mode



Programming Instructions

Connect the instrument to the main supply. During a short period of time the digits, the decimal point and LEDs will turn on as a verification of the correct function of the instrument. After that the display will show the firmware version for 2 seconds. Example : M8.00

Press ENTER key to enter the programming mode and in the display will appear the indication -Pro-. The programming routine is divided in independent access modules that appear by pressing ▶ key from the -Pro- level in the following order:



The 3, 4 and 5 modules will be bypassed if the output options are not installed. The information related to its programming can be found in its own manual.

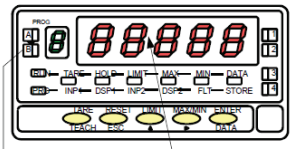
In the figure you can see how to enter the programming mode, the module selection level and the exit with or without saving data. Once in the display the desired module indication, the access to the different settings menu has to be done by pressing ENTER key.

In the global diagrams like the one in the picture, it is shown the procedure of the programming.

Reading the diagram left to right ▶ key represents selection or displacement. Reading the diagram up to down ENTER key represents the data input and advance.

ESC key put the instrument in run mode from any step of the programming without saving changes.

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.



Program module and menu step indicators

In general, when entering a programming menu, the normal sequence will be, at each step, to press ▶ a certain number of times to make changes and ENTER to store them in memory and continue programming. The figures have been arranged in this normal program progression, that is, each time the ENTER key is pressed, the instruement moves to the phase represented by the following figure. At the end of a complete sequence, the ENTER key returns the instruement to operating mode while the STORE LED lights up, indicating that the programmed parameters have been entered into memory.

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.

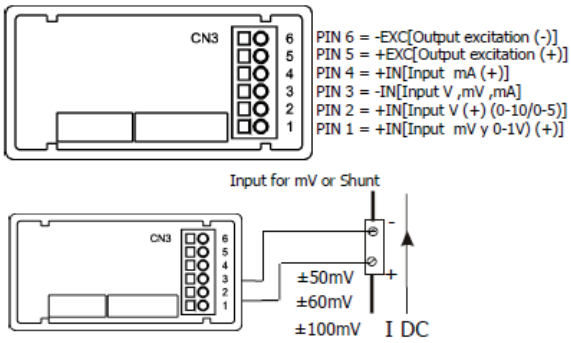
2./ A series of black "8" also represents the display indication of a previous choice, with the difference that it cannot be changed in the current step. If it is already the desired parameter, you may exit from the menu by a push of ESC without making changes or, if wanted to modify it, a push of ENTER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

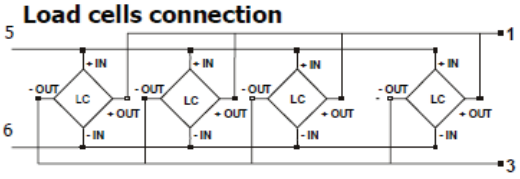
Input Configuration

FOR the DPM4-A-HS to work with **mV** (Load Cell, shunt or similar) we will choose LoAd in this input we can work with signals of up to 500 mV.
For the DPM4-A-HS to work with process signals in **V** or **mA**, we will select ProC and then U or mA as appropriate. If the 1 V input is used, it must be connected to the mV input according to the diagram. For use with **Pot**, it must be connected according to the diagram and set the excitation to 1.65 V in order to have a higher input impedance and better linearity. If used with 10 V excitation, it should be treated as a 10 V transducer and connected according to the diagram. If the DPM4-A-HS is to be used with a mA signal, select ProC and mA and pressing ENTER stores the configuration and returns to normal mode.

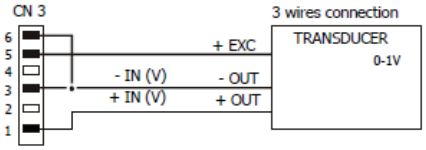
Input type connection



Load cells connection

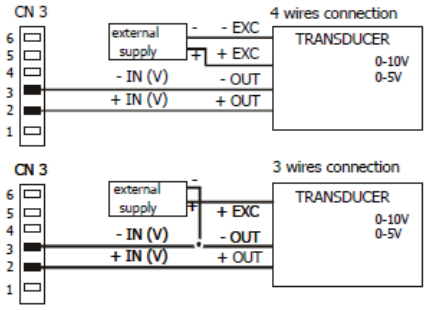


Transmitter connection 0-1V

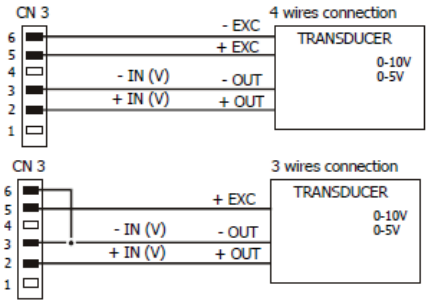


Transmitter connection 0-10V or 0-5V

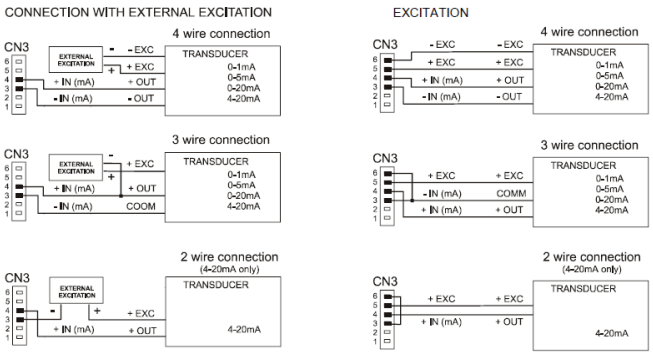
External power supply connection

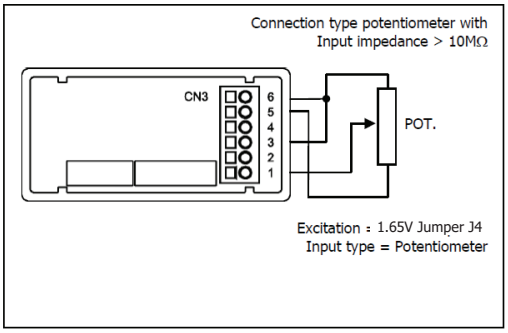


Excitation from DPM4



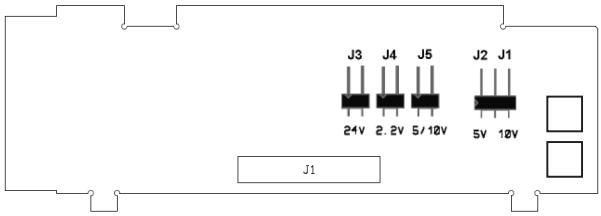
For input process signal mA





Excitation Jumper Settings

Select the appropriate excitation for the sensor used, through the jumpers located on the input board.

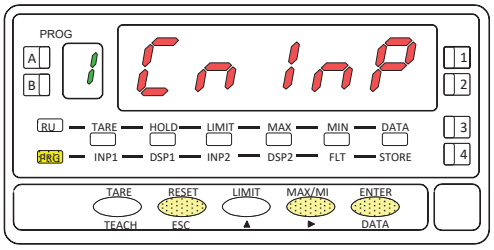


P2 = 10 V. fine regulation
P1 = 5 V. fine regulation

Exc. = 24 V DC (**J3**)
Exc. = 1.65 V DC (**J4**)
Exc. = 5 V DC (**J5** + **J2**)
Exc. = 10 V DC (**J5** + **J1**)
NOTE = J3, J4, J5 only one

Input Range Programming

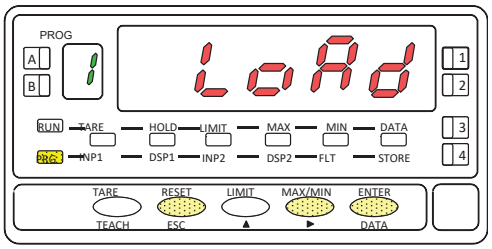
Input configuration



From the run mode, press ENTER key to enter in programming mode (the display shows the indication -Pro-). Press ▶ key and the display shows the indication in figure corresponding to the access level of the input programming module.

▶ Go to next programming step
ENTER Access the input type selection.
ESC Cancel programming and return to run mode.

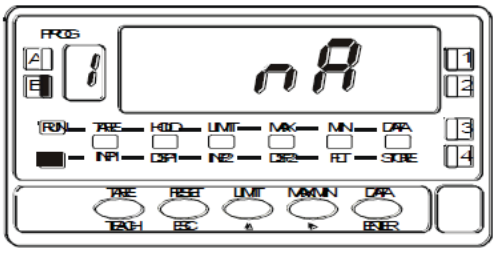
Input type



The display shows the input type to program. If you want to modify this parameter, press ▶ key until the desidered selection appears in the display [**LoAd**= mV input, load cel, **ProC**= mV, V, mA input or **Pot**= Potentiometer input], if you chosse **Pot** by pressing ENTER key the instrument will save the changes and go to run mode.

ENTER Access the input range selection.
ESC Cancel programming and return to run mode

Input range

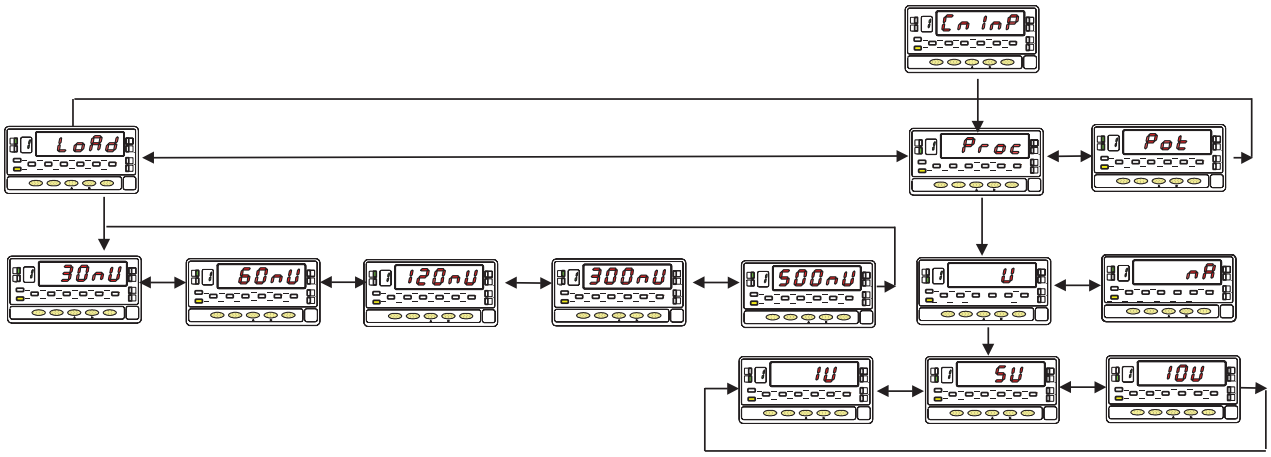


If **ProC** has been choosed, pushing ENTER will appear the kind of signal [**V**=Volt, **mA**=Current. If **LoAd** has been choosed, will appear the different ranges (see diagram). If **Pot** has been choosed , when push ENTER directly store into memory and pass to next step. Push ▶, until the desired option be displayed.

ENTER Store the value in memory and goes to next step.
ESC Cancel programming and goes to run mode

If the option was **LoAd,** pushing ▶ can choose among [±30mV, ±60mV, ±120mV, ±300mV y ±500mV] as a maximum input range. If the option was **V**, can choose among [**1**=±1V, **5**=±5V, **10**=±10V]. The rest of inputs are fixed range.

ENTER Save the value in memory and goes to run mode
ESC Cancel programming and goes to run mode.



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 provide 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.

Type of function	Nº os scaling points
Linear function	2 points
Non-linear function	Up to 30 points

1. Display scaling.

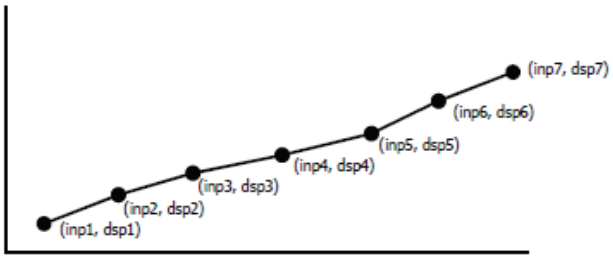
The procedure of scaling the display consists of programming a minimum of two points composed each by an input (INP#) and a display (DSP#) coordinates.

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.

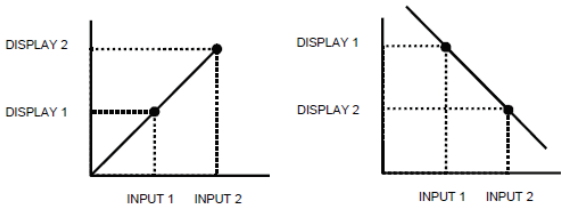
Linearizing function.

Example with six segments (7 points).



2. Action modes

The figure below represents two modes of operation

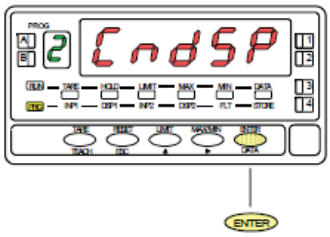


Forward operation:
- When input signal *increases*, the display *increases*.
- When input signal *decreases*, the display *decreases*.

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

Display Programming

Display configuration

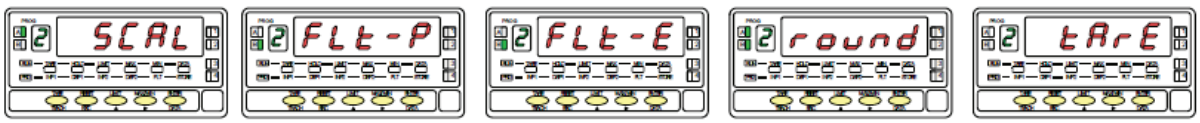


From the run mode, press ENTER to get access to the programming mode (the display shows -Pro-). Press two times the ▶ key to go to the entry stage of the display configuration module. To access the display configuration menus press ENTER key

▶ Continues to the next display configuration menu

ENTER Enters in the selected menu.

ESC Brings the instrument to the run mode.



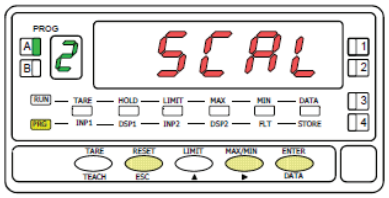
MENU 2A SCALE | MENU 2B BALANCED FILTER | MENU 2B DAMPING FILTER | MENU 2AB ROUND FILTER | MENU 2 TARE

Menu 2A - Scale

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 at INPUT programming phases.

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

Scaling configuration



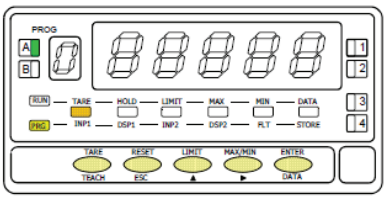
The figure shows the indication (**SCAL**) corresponding to entry stage into the scaling menu. Press ENTER to accede this menu.

ENTER To accede the scale configuration.

▶ To skip over this stage and go to the next programming menu.

ESC To exit from the programming mode without saving changes.

Input 1 value



Programming input value at point 1, led INP1 on.

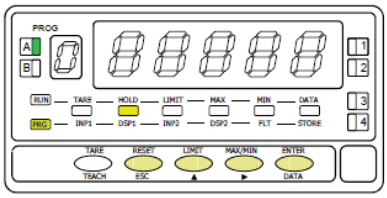
Key-in method: Select the blinking sign in the auxiliar display with ▲ key ["0" = positive, "-" = negative]. Press ▶ key to go to the main display. Enter the value digit by digit from left to right. Press repeatly ▲ key to change the value of the blinking digit and press ▶ key to move to the right digit up to complete the value.

Teach method: Press TEACH key to display the real input value.

ENTER Validates the data and proceed to the next programming step.

ESC To exit from the programming mode without saving changes.

Display 1 value

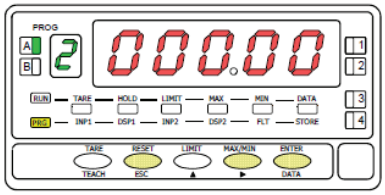


Programming of the display value for the first point, LED DSP1. Enter the value digit by digit from left to right. Press ▲ key to modify the blinking digit and press ▶ key to move to the right digit up to complete the value and the sign. If the programmed value exceeds from these limits, the meter indicates Error, then displays 32000 with the first digit in flash to allow reprogramming the 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.

Decimal point



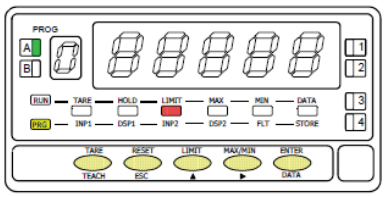
Programming the decimal point which apears blinking.

Press repeatedly the ▶ key to move it to the right until desired position. So 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.

Input 2 value



The previously programmed INP2 value appears on the display, LED INP2 activated.

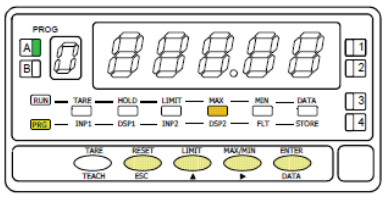
Key-in method: Select the blinking sign in the auxiliar display with ▲ key ["0" = positive, "-" = negative]. Press ▶ key to go to the main display. Enter the value digit by digit from left to right. Press repeatly ▲ key to change the value of the blinking digit and press ▶ key to move to the right digit up to complete the value.

Teach method: Press TEACH to view the actual signal value present at the input connector.

ENTER Validates the data and proceed to the next programming step.

ESC To exit from the programming mode without saving changes.

Display 2 value



Programming of the display value for the first point, activated LED DSP2. Enter the value digit by digit from left to right. Press ▲ key to change the value of the blinking digit and press ▶ key to go to the next digit to complete the desired value and sign.
The maximum value is +9999 points and the minimum value is –9999 points.
Enter the value:

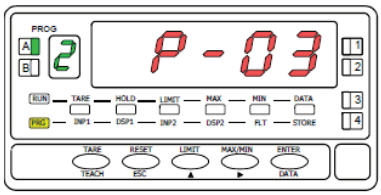
a) To save the entry into the memory and return to run mode, press ENTER ; or

b) To access to the scale linelization points, press ENTER 3 seconds.

ESC To exit from the programming mode without saving changes

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

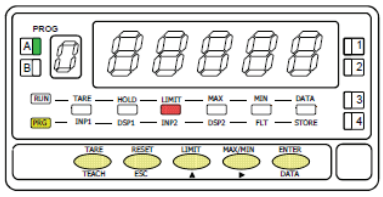
Point 3



1 second flag indication for scaling point 3

Multi-slope scaling sequence begins at this step.

Input 3 value



Programming the input value at point 3, led INP2 on.

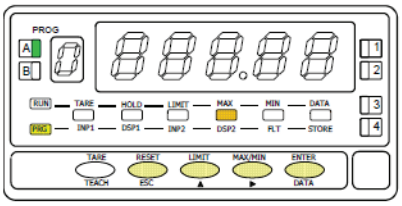
Key-in method: Use ▲ to switch between "0" (positive) and "-" (negative). Press ▶ to go to the main display. Enter the value digit by digit and from left to right. Press ▲ to modify the blinking digit and press ▶ key to move to the right digit to complete the value.

Teach method: Press TEACH to view the actual signal value present at the input connector

ENTER Press to accept this value as INP3 and go next step.

ESC To exit from the programming mode without saving changes.

Display 3 value

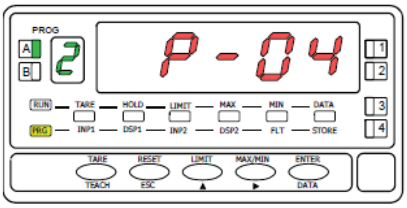


Programming of the display value for the third point, activated LED DSP2. Enter the value digit by digit from left to right. Press ▲ key to modify the blinking digit and press ▶ key to move to the right digit up to complete the value and the sign. The maximum value is +9999 points and the minimum value is –9999 points. Enter de value :

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 by three points), press and hold down ENTER for 3 seconds.

ESC To exit from the programming mode without saving changes.

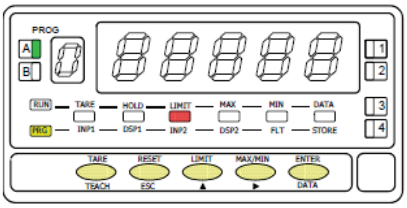
Point 4



1 second flag indication for scaling point 4.

NOTE: The instructions given for programming point 4 are applicable to the programming of points 5 to 30.

Input 4 value



The previously programmed INP4 value appears on the display, LED INP2 activated.

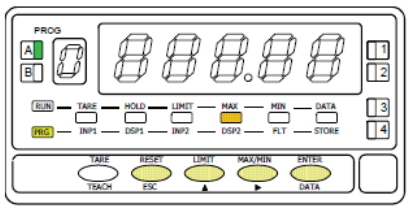
Key-in method: Select the blinking sign in the auxiliar display with ▲ key ["0" = positive, "-" = negative]. Press ▶ to move to the main display. Enter the value digit by digit and from left to right. Press ▲ key to modify the blinking digit and press ▶ key to move to the right digit up to complete the value.

Teach method: Press TEACH to view the actual signal value present at the input connector

ENTER Press ENTER to accept this value as INP4 and go next step

ESC To exit from the programming mode without saving changes.

Display 4 value

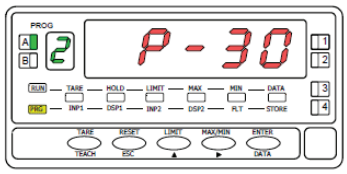


Programming of the display value for the fourth point activated LED DSP2. Enter the value digit by digit and left to right. Press ▲ key to modify the blinking digit and press ▶ key to move to the right digit up to complete the value and the sign. The maximum value is +9999 points and the minimum value is –9999 points. Enter de value :

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 by four points), press and hold down ENTER for 3 seconds.

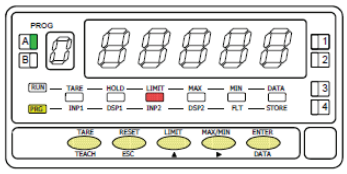
ESC Return to previous point

Point 30



1 second flag indication for scaling point 30.

Input 30 value



The previously programmed INP30 value appears on the display, LED INP2 activated.

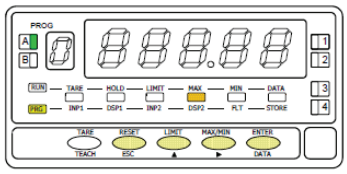
Key-in method: Select the blinking sign in the auxiliar display with ▲ key ["0" = positive, "-" = negative]. Press ▶ to move to the main display. Enter the value digit by digit and from left to right. Press ▲ key to modify the blinking digit and press ▶ key to move to the right digit up to complete the value.

Teach method: Press TEACH to view the actual signal value present at the input connector.

ENTER Press ENTER to accept this value as INP30 and go next step.

ESC To exit from the programming mode without saving changes.

Display 30 value



Program the display value for the point 30, LED DSP30 activated. Enter the value digit by digit and left to right. Press ▲ key to modify the blinking digit and press ▶ key to move to the right digit up to complete the value and the sign. The maximum value is +9999 points and the minimum value is –9999 points.
Enter de value .

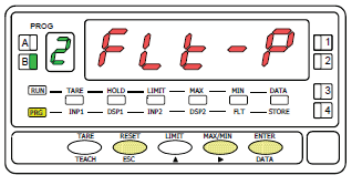
ENTER To save the entry into the memory and return to run mode.

ESC Return to previous point

Menu 2B - Balanced Filter

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

Balanced filter



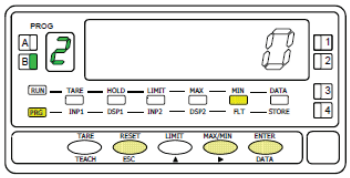
The figure shows the indication (**FLt-P**) corresponding to entry stage of the balanced filter menu. Press the ENTER key to accede this menu.

ENTER To accede to the programming filter.

▶ To skip over this menu and go to next one.

ESC To exit from the programming mode without saving changes

Filter value



The figure 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.

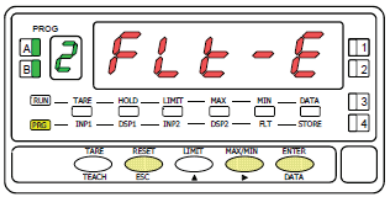
ENTER To save the entry into the memory and go to the next programming menu.

ESC To exit from the programming mode without saving changes.

Menu 2B - Dampting Filter

The damping filter cuts off input values exceeding from the limits of a symmetrical 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.

Damping filter



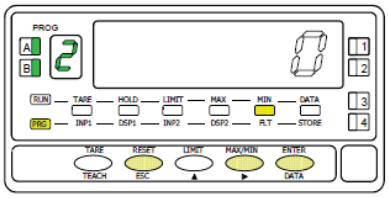
The figure shows the indication (**FLt-E**) corresponding to entry stage of the damping filter menu. Press the ENTER key to accede this menu.

ENTER To 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

Filter value



The figure shows the initially selected level for the filter -E (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.

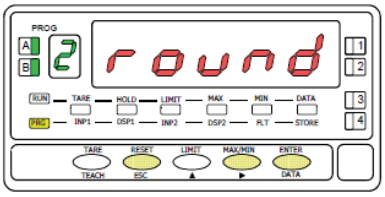
ENTER To save the entry into the memory and go to the next programming menu.

ESC To exit from the programming mode without saving changes.

Menu 2B - 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.

Round filter



The figure shows the indication (**round**) corresponding to the round menu.

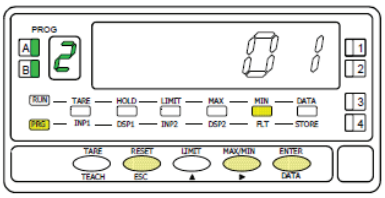
Press ENTER to access the configurations

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.

Rounding increment

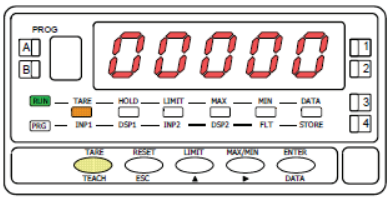


Program the rounding increment, LED FLT activated.
The display shows the previously selected round level. To change this parameter, press repeatedly the ▶ key to rotate around the different options: [**01** = no rounding, **02** = round to 2 counts, **05** = round to 5 counts, **10** = round to 10 counts].

ENTER To save the option present on display and return to the run mode.

ESC To exit from the programming mode without saving changes.

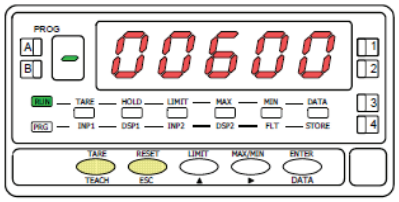
Keyboard Functions



Tare operation

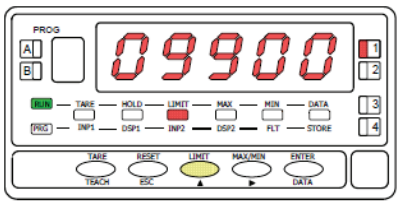
The front-panel keyboard includes the following function keys: **TARE**, **RESET**, **LIMIT** and **MAX/MIN**. The functionality of each one, which is available in the "RUN" mode, is described next.

TARE. A push of 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.



Tare reset

TARE RESET. 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.

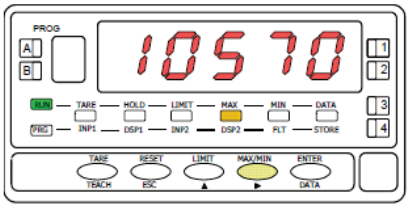


Setpoint 1 value

LIMIT. During the RUN mode, this key is only operative in case that the instrument incorporates one of the following output options: 4 relays (ref. **DPM-RELAY**), 4 NPN transistors (ref. **DPM-NPN**) or 4 PNP transistors (ref. **DPM-PNP**).

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 set-points with the corresponding LED (on the right) activated.

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.



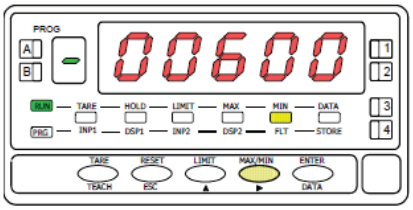
Peak

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.

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

A third push brings the meter to the normal reading.

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

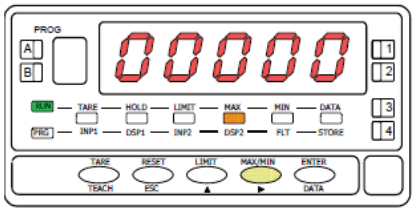


Valley

RESET. 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".

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

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

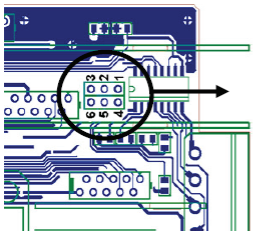


Reset of the peak memory

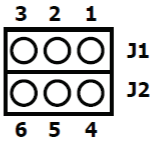
Remote Functions

The rear connector CN2 provides 4 user programmable optocoupled inputs that can be operated from external contacts or logic levels supplied by an electronic system. Four different functions may be 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 36 functions listed on the following pages.

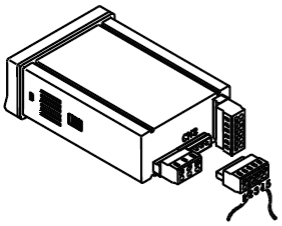
Factory default
As shipped from the factory, the CN2 connector allows the TARE, MAX/MIN and RESET operations be made in the same way as from the front-panel and incorporates one more function: the display HOLD.
The HOLD state, which is acknowledged by the LED "HOLD", freezes the display, the analog output 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.

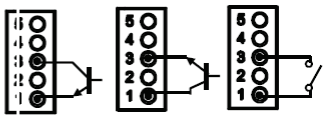


Logic Change CN2
CN2 Input
PNP J1 (2-3) & J2 (5-6)
NPN J1 (1-2) & J2 (5-6)



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





Terminals with respect to COMMON.

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. (*)

0 to 9: DISPLAY / MEMORY FUNCTIONS

Nº	Function	Description	Activation
0	None	Deactivated. He 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 display	Low level
9	HOLD2 (*)	Holds the display and the analogical outputs	Low level

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

Nº	Function	Description	Activation
10	INPUT	Displays the actual value of the input signal, in mV (blinking).	Low level
11	GROSS	Displays measured value + tare value = gross value	Low level
12	TARE	Shows the accumulated tare in 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 (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 OUTPUT

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 setpoint 1 value and its output status.	Falling edge
21	PRINT SET2	Prints the setpoint 2 value and its output status.	Falling edge
22	PRINT SET3	Prints the setpoint 3 value and its output status.	Falling edge
23	PRINT SET4	Prints the setpoint 4 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". Deactivates the setpoints output.	Falling edge

26 to 34: SPECIAL FUNCTIONS

Nº	Function	Description	Activation
26	S/H SETPOINTS	Authorizes the operation of the setpoints during the S/H function	Low level
27	SAMPLE & HOLD	When activating the function, the display values of the measurement variables, peak, valley, peak-peak, and the analog outputs, RS and setpoints are frozen except if function 26 is active	Low level
28	SEND ASCII	Transmission of the last 4 digits of the display to a remote serial indicator. By holding the pin to a low level, the display is continuously sent at a rate of 1/s.	Low level or Falling edge
29	Peak to Peak	Shows the PEAK-PEAK value on the display	Falling edge
30	Analog Peak-Peak	The analog output follows the PEAK-PEAK value	Low level
31	Quick RS	Sending the display value at 200 / second via RS2 or RS4	Low level
32	Relay inhibition	Leaves the relays in initial state and inhibits their operation while the function is activated	Low level
33	S / H + TARE	Combines function 27 (S/H) with TARE so that when the hold is deactivated, the internal value is tare	Low level
34	Function 27+32	Upon activation it resets the memorized peak. Records the maximum value of the measurement while the function is activated, and upon deactivation it freezes the last recorded value and prints it	Low level

Tare and Sample & Hold Functions

FUNCTION Nº 1 TARE

The instrument has an internal buffer, where stores a dinamic average of 18 last readings (@555/seg), renewed every 5 ms.

The scan of logical inputs is done every 5ms. For that reason when is detected the function nr1, the value of TARE corresponds to the average done max. 5ms before.

FUNCTION Nº 27 SAMPLE & HOLD

This function is useful to show and to process very quick phenomenons, holding on display and on the outputs the values registered just at the moment of activating this function until this be deactivated.

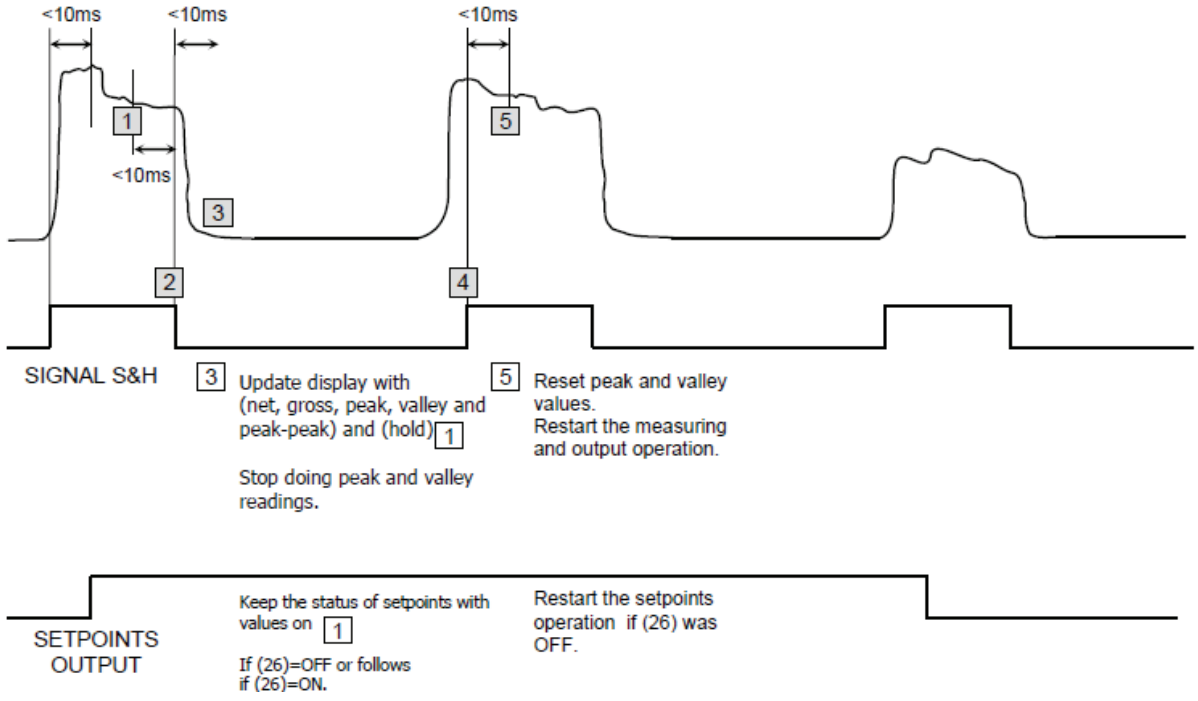
On activating this function, the measuring values peak,valley, peak-peak and actual value are hold on display as well as analog output, rs output and setpoints execpt if function 26 is active.

In the deactivation ,peak-peak, valley and peak values are reset.

To get all the advantages of this function the instrument should be used without filters, delay on setpoints and to have selected the relay function Quick.

To use in "Quick" mode the way of working setpoints have to be programmed with the **MENU 3B** the first digit to **1 or 2** and **fourth** digit to **0**.

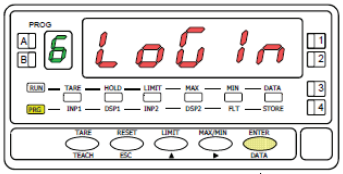
During the HOLD's time on display is possible to show the stored values net, gross, valley, peak or peak-peak, via keyboard or the specific logical function (nr 3, 4 or 29).



Logic Inputs Programming

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

Logic inputs

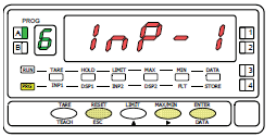


ENTER

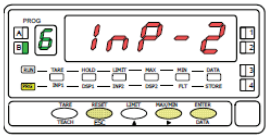
From the run mode, press ENTER to get access to the programming mode (the display shows -Pro-). Press six times the ▶ key to go to the entry stage of the logic inputs configuration module. This module provides four menus for pro-gramming the input pins. Press ENTER to accede to the first menu (InP1) and press repeatedly the ▶ key to rotate around the different menus.

▶ skips over this module and advances to the next one or to the -Pro- stage.

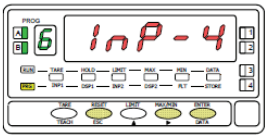
ENTER Exits from the programming routines and brings the instrument to the run mode.



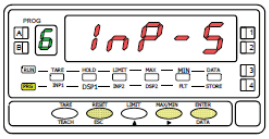
MENU 6A
PROGRAMMING PIN 1



MENU 6B
PROGRAMMING PIN 2



MENU 6AB
PROGRAMMING PIN 4

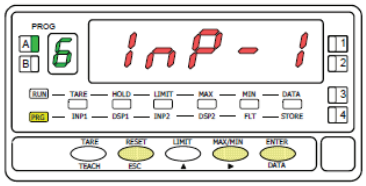


MENU 6
PROGRAMMING PIN 5

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 36. 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.

Menu PIN1



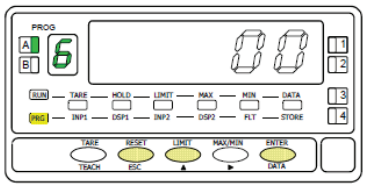
The figure shows the indication (**InP-1**) corresponding to the configuration menu for the PIN 1 function. Press the ENTER key to accede this configuration.

ENTER To access to the programming of the PIN1 function.

▶ To skip over this menu and go to PIN 2.

ESC To exit from the programming mode without saving changes.

Function number



Choose the function number [0-34], according to the table.

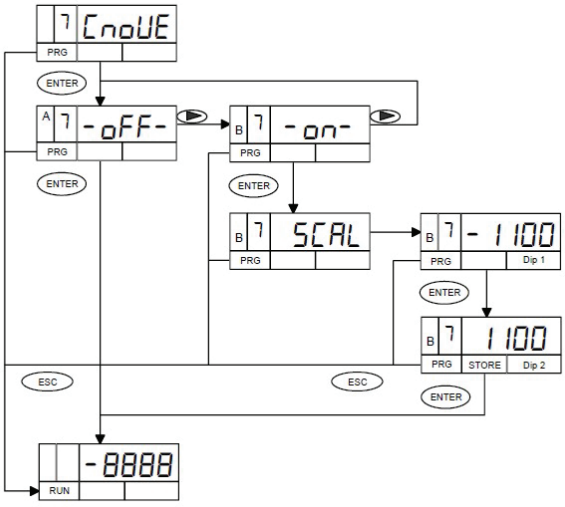
▲ To change number (hold down to increment automatically).

ENTER To save the entry into the memory and return to the run mode.

ESC To exit from the programming mode without saving changes.

Over-Load Function

MENU 7 CnoUE



Exemple:

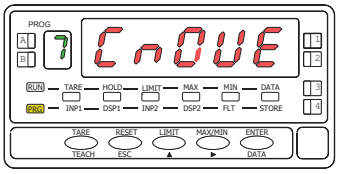
Sensor: 10 kN, 1.5 mV/V,
Maximum applicable load = 10.00 kN
DPM4-A-HS - Programming:
U excitation = 5 V, Ue = 30 mV

Signal provided by the sensor at maximum load = 5 V * 1.5 mV/V = 7.5 mV

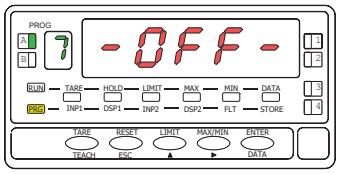
As the meter will not give an over-scale indication until the display reaches 99.99 kN or the signal at the input exceeds 30 mV, it will result that the sensor would be overloaded by 400% with possible breakage or permanent damage (30 / 7.5 = 4).

Through this menu we can program an over-scale indication, either high or low, in the example a value of 11.00 will allow us to have a signal when the sensor overload is only 10% indicating – H I- on the display and If we have activated the number 4 or 5 in digit 1 of menu 3B of the relay programming, we will have a warning of this situation.

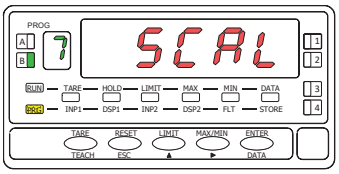
Menu 7 - Over-Load Programming



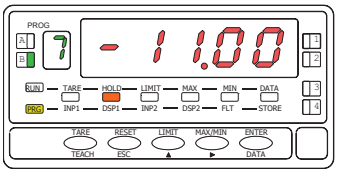
▶ : Go to programming module 7 - CnOVE-
ENTER : Activate the menu 7A OFF or ON
ESC : Cancel programming and return to work mode without saving changes.



▶ : Allows you to select between: **-OFF- / -ON-**
ENTER : Selecting -ON- continues programming, SCAL
ENTER : Selecting -OFF- returns to RUN mode
ESC : Cancel programming and return to work mode without saving changes.



Starting from the selection **-ON-**
ENTER : Enters the low overload value programming mode.
ESC : Cancel programming and return to work mode without saving changes.



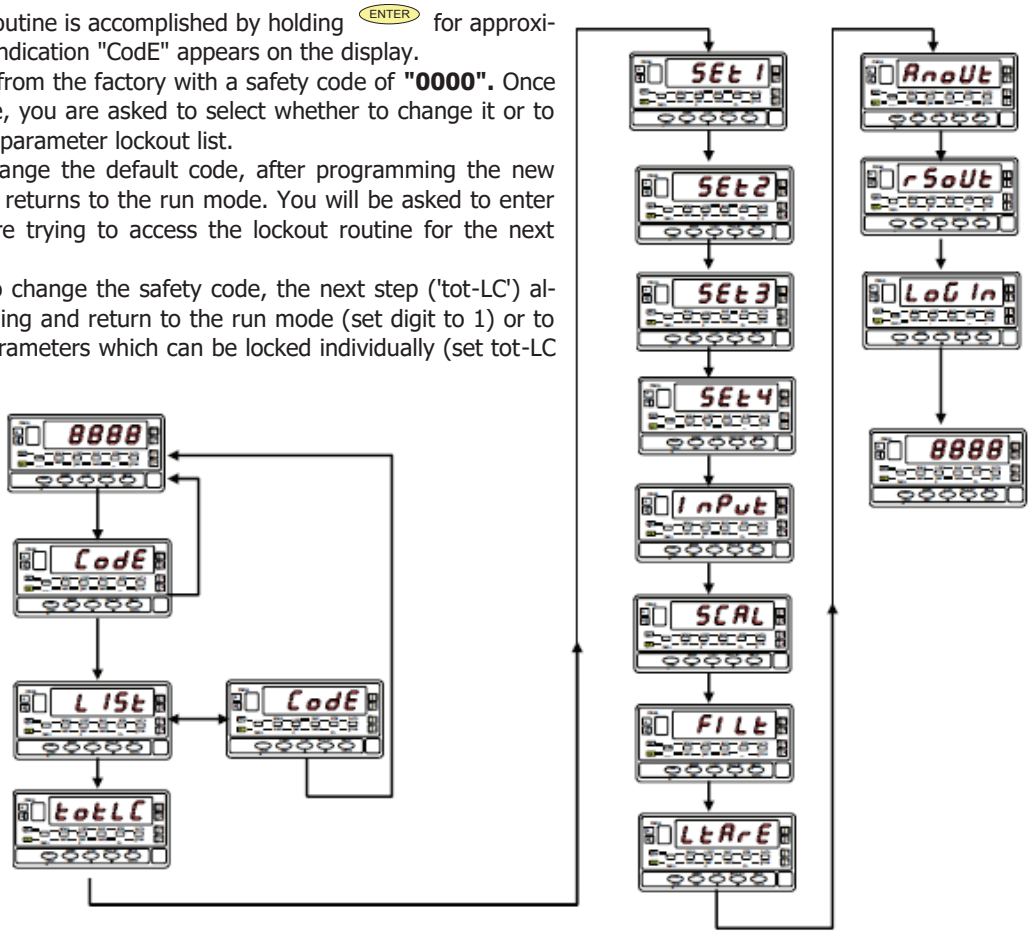
▲ ▶ : Low threshold value setting (negative overload)
ENTER : Accepts the programmed value and proceeds to programming the high threshold value
ESC : Cancel programming and return to work mode without saving changes.

The display shows **–LO-** if the measured value is below the allowed threshold (**-HI–** if it is above)
If an output option is available, for example 4OP, Menu 3B allows different programming
If digit 1 = **4**: it will activate due to overload, if digit 1 = **5**: it will activate due to overload with Latch function

Lock Out Programming

The diagram shows all phases of the lockout routine which allows to lockout the programming parameters and to change the safety code.

The access to this routine is accomplished by holding ENTER for approximately 3s until the indication "CodE" appears on the display.
The unit is shipped from the factory with a safety code of **"0000".** Once introduced this code, you are asked to select whether to change it or to enter directly in the parameter lockout list.
If you decide to change the default code, after programming the new one, the instrument returns to the run mode. You will be asked to enter the new code before trying to access the lockout routine for the next time.
If you decide not to change the safety code, the next step ('tot-LC') allows to lock everything and return to the run mode (set digit to 1) or to access the list of parameters which can be locked individually (set tot-LC to 0).



PARAMETERS THAT CAN BE LOCKED

totLC ...1=Total lock
0=Lock separately each step

SEt # ...Lock prog. Mode Setpoint #.

InPUt ...Lock prog. Input.

SCAL .....Lock prog. SCAL.

F iLt .....Lock prog. Filter.

AnoUt ...Lock prog. ANA output

rSoUt ...Lock prog. RS output

Log! n ...Lock prog. Logical Functions

SPuAL ...Lock prog. Direct access to Setpoints

tArE .....Lock keyTARE

tArE .....Lock keyTARE

NOTE: The TARE lock is only for the key.

The Logic Function is not blocked.

Output Options

Optionally, the model DPM4-A-HS can incorporate one or several output options for communications (this output should never be connected to the telephone lines) or control including:

COMMUNICATION

DPM-RS232	Serial RS232C
DPM-RS485	Serial RS485

CONTROL

DPM-ANALOG	Analog 4-20 mA, 0-10 V
DPM-RELAY	4 SPST relays 5 A
DPM-NPN	4 open-collector NPN outputs
DPM-PNP	4 open-collector PNP outputs

All options are optoisolated with respect to the input signal and they are supplied with a specific instruction manual describing their characteristics, installation and programming mode.

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 (4 relays, 4 NPN outputs or 4 PNP outputs) or analog output (4-20 mA or 0-10 V).
- Communication, data transmission and remote programming via serial interface.

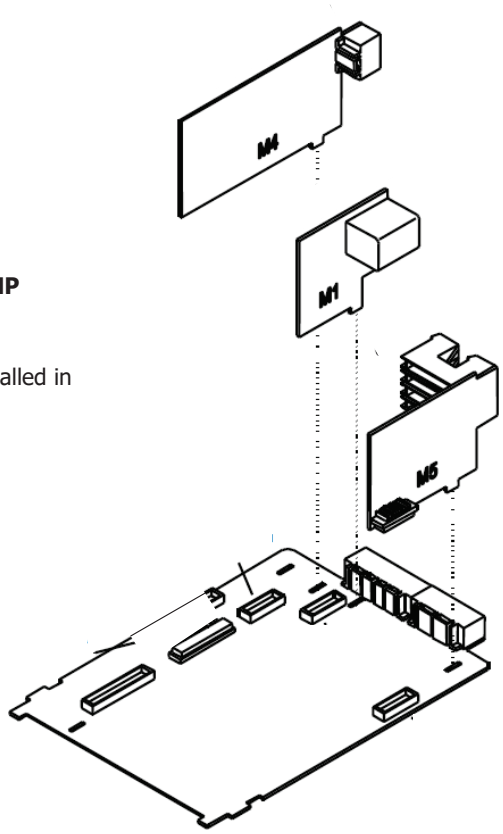
For more detailed information on characteristics, applications, mounting and programming, please refer to the specific manual supplied with each option.

The figure shows the different locations of the plug-in output cards.

Each location corresponds to a specific function: setpoints, analog and serial outputs.

The options **DPM-RELAY, DPM-NPN** and **DPM-PNP** are installed in the M5 connector.
The **DPM-ANALOG** option is installed in the M4 connector.
The options **DPM-RS232** and **DPM-RS485** 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:
- ANALOG
- RS232C or RS485
- 4 RELAYS, 4 PNP or 4 NPN



Functions in Setpoint Options

Digit 1	Digit 2	Digit 3	Digit 4 (*)	Digit 5
0= OFF 1= ON 2= ON LATCH 3= Set/Reset by RS* 4= Overload (Menu 7) 5= Overload + Latch	0= HI NO 1= LO NO	0= Delay 1= Hyst -1 2= Hyst -2 3= Activation Delay 4= Deactication delay	0= Fast 1= Net Value 2= Gross Value 3= Peak Value 4= Valley Value 5= Peak-peak Value	0= NO (Normally Open) 1= NC (Normally Closed)

(*)
When this function is used the HI-LO, DEL-HYS, Latch, NO-NC options are disabled.

BIESTABLE SETPOINTS ("LATCH")

These setpoints, once activated, remain in this state until an external reset of the setpoints is performed (see RESET setpoints no. 25, in the programmable functions table.

DIRECT ACCES TO SETPOINT VALUES

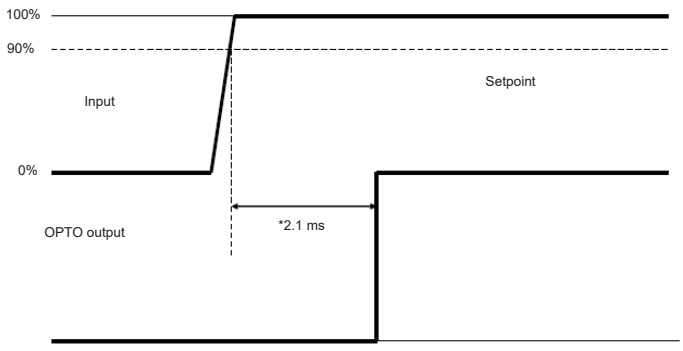
Starting from (RUN) mode, press the ENTER key, entering (PROG) mode, and pressing the LIMIT key you access the value of Setpoint 1.

The value of the Setpoints appears one after another by pressing ENTER. The LED lights up indicating the setpoint number, and the value on the main display with the digit on the left flashing. Using the ▶ and ▲ keys set the desired value between "-9999" and "+9999".
If access to programming is blocked, it is not possible to modify the value of the blocked setpoints, proceed according to the manual to unlock them.

ASSIGNMENT OF SETPOPINT TO:

NET, GROSS, PEAK, VALLEY, PEAK-PEAK value.

DPM-NPN/DPM-PNP OUTPUT RESPONSE TIME



* This time is without programming any filter and with the "fast" option (digit 4 = "0") in Setpoint programming

Description of Special Functions

· ANALOG OUTPUT (DPM-ANALOG)

Reaction time ..... 5 ms with OFF filter

Cutoff frequency ..... 10 Hz with OFF filter

Conversions .....200 / s

· SERIAL OUTPUTS (DPM4-RS232 and DPM4-RS485)

ADDITIONAL FUNCTIONS

ASCII	ISO	FUNCTION	Type of response
I	0I	Transmits logic input status	Returns value
Y	0Y	Transmits Peak-Peak value	
n	0n	Reset LATCH Relays	Only command, no response
y	0y	Reset Peak-Peak value	
a#	a#	Activates relay output no #	Only command, no response
d#	d#	Deactivates relay output nº #	
TS	TS	Enter a tare value through the serial channel, being recorded in memory. **See note**	

Note: The tare function performed by keyboard will take as tare the display value that exceeds the offset. There is no way to reset the offset directly; It will be necessary to send a new write command with an off set value equal to zero.
This value is recorded in the device's memory each time the "TS" command is sent.

LOGIC FUNCTION No 31

Fast transmmision via RS232C or RS485
As long as the input programmed with logic function No. 31 remains activated, the instrument will send the measured value through the serial output at 200/s, with the chosen transmission format:

Protocol ASCII: *1 start bit, 8 bit data, no parity, 1 stop bit.*
Protocol ISO1745: *1 start bit, 7 bit data, 1 bit parity even, 1 stop bit.*
Message format:

polarity	X	X	X	.	X	CR

The position of the decimal point is an example. It can be in any position.
This function allows you to capture data in a file for later analysis with software such as Excel.

DPM4-A-HS has the option to select the type of TrAnS 3 protocol = **MODBUS**

In **ANNEX 1** the Modbus commands and registers for **DPM4-A-HS** are given.

Technical Specifications

PROCESS INPUT
Voltage input (pin 2 versus 3) .....±(0-5/ 0-10)V
Impedance .....1 MΩ
Voltage input (pin 1 versus 3) .....± 0-1 V
Impedance .....100 MΩ
Current input .....±0-20 mA
Impedance 11.8Ω

LOAD CELL or mV INPUT
Voltage input .....±30,±60,±120,±300,±500 mV
4-wires, unipolar or bipolar
Impedance .....100 MΩ

POTENTIOMETER INPUT
Min. Resistance 120Ω
Excitation voltage .....1.65 V
Impedance (1 versus 3) .....>10 MΩ

EXCITATION
1.65 V @ 30 mA not adjustable
24 V @ 30 mA not stabilized.
5 V ±100 mV @ 120 mA fine adjust. (50 ppm / ºC)
10 V ±100 mV @120 mA fine adjust. (50 ppm / ºC)

ACCURACY @ 23 ºC ±5 ºC
Error max. .....±(0.1% reading+2 digits)
Temperature corfficient .....50 ppm/ºC
Warm-up time .....10 minutes

Maximum and minimum input signal ranges

Proc. V	Pins	min.	MAX.
0-10 V	2-3	-13.5	+13.5
0-5 V	2-3	-6.6	+6.5
0-1 V	1-3	-1.2	+1.2
Proc. mA	**Pins**	**min.**	**MAX.**
0-20 mA	4-3	-25	+25
Load	**Pins**	**min.**	**MAX.**
30 mV	1-3	-38	+38
60 mV	1-3	-75	+75
120 mV	1-3	-150	+150
300 mV	1-3	-305	+305
500 mV	1-3	-600	+600
Pot.	**Pins**	**min.**	**MAX.**
1.65 V	1-3	0	+2.0

REACTION TIMES
Peak value capture
Minimum input signal duration .....2.1 ms
Reaction times
Hold-Display ..... Max. 10 ms
Hold-Anallog output .....Max. 10 ms
Hold-RS .....Max. 10 ms
Logic inputs
All .....Max. 10 ms

CONVERSION
Minimum input signal duration
Technology .....ΣΔ
Resolution ..... ± 15 bits
Rate 555/s
Peak measurement resolution .....±15 bits

DISPLAY
Main .....-9999/9999, 5 red digits, 14 mm
Auxiliary .....1 green digit, 8 mm
Decimal point .....Programmable
LED's .....14 (Functions and Outputs)
Display update time ....10/s (100 ms)

ERROR INDICATIONS
Negative over range .....- OFLO
Positive over range .....+ OFLO

POWER SUPPLY
DPM4-A-HS-H .....115/230 V 50/60 Hz
DPM4-A-HS-L .....10-30 V DC

Consumption .....5W (w/o options), 10W (MÁX.)
Fuses (DIN 41661)
Recommended (not supplied)
115/230 VAC .....F 0.2 A/250 V
10 to 30 VDC ..... F 2 A/ 250 V

ENVIRONMENTAL
Indoor use
Operating temp .....-10ºC to 60ºC
Storage temperature .....-25 ºC to +85 ºC
Relative Humidity (non condensed) ..<95 %toa 40 ºC
Altitude .....2000 m

MECHANICAL
Dimensions .....96x48x120 mm
Panel cut -out .....92x45 mm
Weight .....600 g
Case material .....polycarbonate s/UL 94 V-0
Front sealed IP65

List of Commands ASCII/ISO/MODBUS

Commands

ASCII	ISO	MODBUS	Command
n	0n	n	Reset latched outputs
p	0p	p	Reset peak
v	0v	v	Reset valley
r	0r	r	Reset tare
t	0t	t	Tare the display
d	0d	d	Reset counter
z	0z	z	Reset totalizer
x	0x	x	Reset batch counter
a1	a1	a1	Activate setpoint 1
a2	a2	a2	Activate setpoint 2
a3	a3	a3	Activate setpoint 3
a4	a4	a4	Activate setpoint 4
d1	d1	d1	Deactivate setpoint 1
d2	d2	d2	Deactivate setpoint 2
d3	d3	d3	Deactivate setpoint 3
d4	d4	d4	Deactivate setpoint 4
I	0I	I	Transmits the status of logic inputs
Y	0Y	Y	Transmits the peak-peak value
y	0y	y	Resets the peak-peak value
TS	TS	TS	It introduces a tare value through the serial channel, being recorded in memory. **See note**

Note: The tare function performed by keyboard will take as tare the display value that exceeds the offset.
There is no way to reset the offset directly; it will be necessary to send a new write command with offset value equal to zero. This value is recorded in the device's memory each time the "TS" command is sent.

Address of the Variables in the Memory

PROGRAMMING DATA (READ/WRITE)

ISO		MODBUS	
0	INPUT POINT 1	0	digit 0
1			Digit 1
2		1	Digit 2
3			Digit 3
4		2	sign (0= +, 10= -)
5	INPUT POINT 2		Digit 0
6		3	Digit 1
7			Digit 2
8		4	Digit 3
9			sign
10	INPUT POINT 3	5	Digit 0
11			Digit 1
12		6	Digit 2
13			Digit 3
14		7	sign
15	INPUT POINT 4		Digit 0
16		8	Digit 1
17			Digit 2
18		9	Digit 3
19			sign
20	INPUT POINT 5	10	Digit 0
21			Digit 1
22		11	Digit 2
23			Digit 3
24		12	sign
25	INPUT POINT 6		Digit 0
26		13	Digit 1
27			Digit 2
28		14	Digit 3
29			sign

ISO		MO-DBUS	
30	INPUT POINT 7	15	Digit 0
31			Digit 1
32		16	Digit 2
33			Digit 3
34		17	Sign
35	INPUT POINT 8		Digit 0
36		18	Digit 1
37			Digit 2
38		19	Digit 3
39			Sign
40	INPUT POINT 9	20	Digit 0
41			Digit 1
42		21	Digit 2
43			Digit 3
44		22	Sign
45	INPUT POINT 10		Digit 0
46		23	Digit 1
47			Digit 2
48		24	Digit 3
49			Sign
50	INPUT POINT 11	25	Digit 0
51			Digit 1
52		26	Digit 2
53			Digit 3
54		27	Sign
55	INPUT POINT 12		Digit 0
56		28	Digit 1
57			Digit 2
58		29	Digit 3
59			Sign

PROGRAMMING DATA (READ/WRITE)

ISO		MODBUS	
60	INPUT POINT 13	30	digit 0
61			Digit 1
62		31	Digit 2
63			Digit 3
64		32	Sign
65	INPUT POINT 14		Digit 0
66		33	Digit 1
67			Digit 2
68		34	Digit 3
69			Sign
70	INPUT POINT 15	35	Digit 0
71			Digit 1
72		36	Digit 2
73			Digit 3
74		37	Sign
75	INPUT POINT 16		Digit 0
76		38	Digit 1
77			Digit 2
78		39	Digit 3
79			Sign
80	INPUT POINT 17	40	Digit 0
81			Digit 1
82		41	Digit 2
83			digit 3
84		42	Sign
85	INPUT POINT 18		Digit 0
86		43	Digit 1
87			Digit 2
88		44	Digit 3
89			sign

ISO		MODBUS	
90	INPUT POINT 19	45	digit 0
91			digit 1
92		46	digit 2
93			digit 3
94		47	Sign
95	INPUT POINT 20		Digit 0
96		48	Digit 1
97			Digit 2
98		49	Digit 3
99			Sign
100	INPUT POINT 21	50	Digit 0
101			Digit 1
102		51	Digit 2
103			Digit 3
104		52	Sign
105	INPUT POINT 22		Digit 0
106		53	Digit 1
107			Digit 2
108		54	Digit 3
109			Sign
110	INPUT POINT 23	55	Digit 0
111			Digit 1
112		56	Digit 2
113			Digit 3
114		57	Sign
115	INPUT POINT 24		Digit 0
116		58	digit 1
117			digit 2
118		59	digit 3
119			sign

PROGRAMMING DATA (READ/WRITE)

ISO		MODBUS	
180	DISPLAY POINT 7	90	digit 0
181			digit 1
182		91	digit 2
183			digit 3
184		92	Sign
185	DISPLAY POINT 8		Digit 0
186		93	Digit 1
187			Digit 2
188		94	Digit 3
189			Sign
190	DISPLAY POINT 9	95	Digit 0
191			Digit 1
192		96	Digit 2
193			Digit 3
194		97	Sign
195	DISPLAY POINT 10		Digit 0
196		98	Digit 1
197			Digit 2
198		99	Digit 3
199			Sign
200	DISPLAY POINT 11	100	Digit 0
201			Digit 1
202		101	Digit 2
203			Digit 3
204		102	Sign
205	DISPLAY POINT 12		Digit 0
206		103	Digit 1
207			Digit 2
208		104	Digit 3
209			sign

ISO		MODBUS	
210	DISPLAY POINT 13	105	Digit 0
211			Digit 1
212		106	Digit 2
213			Digit 3
214		107	sign
215	DISPLAY POINT 14		Digit 0
216		108	Digit 1
217			Digit 2
218		109	Digit 3
219			sign
220	DISPLAY POINT 15	110	Digit 0
221			Digit 1
222		111	Digit 2
223			Digit 3
224		112	sign
225	DISPLAY POINT 16		Digit 0
226		113	Digit 1
227			Digit 2
228		114	Digit 3
229			sign
230	DISPLAY POINT 17	115	Digit 0
231			Digit 1
232		116	Digit 2
233			Digit 3
234		117	sign
235	DISPLAY POINT 18		Digit 0
236		118	Digit 1
237			Digit 2
238		119	Digit 3
239			sign

PROGRAMMING DATA (READ/WRITE)

ISO		MODBUS	
240	DISPLAY POINT 19	120	Digit 0
241			Digit 1
242		121	Digit 2
243			Digit 3
244		122	sign
245	DISPLAY POINT 20		Digit 0
246		123	Digit 1
247			Digit 2
248		124	Digit 3
249			sign
250	DISPLAY POINT 21	125	Digit 0
251			Digit 1
252		126	Digit 2
253			Digit 3
254		127	sign
255	DISPLAY POINT 22		Digit 0
256		128	Digit 1
257			Digit 2
258		129	Digit 3
259			sign
260	DISPLAY POINT 23	130	Digit 0
261			Digit 1
262		131	Digit 2
263			Digit 3
264		132	sign
265	DISPLAY POINT 24		Digit 0
266		133	Digit 1
267			Digit 2
268		134	Digit 3
269			sign

ISO		MODBUS	
270	DISPLAY POINT 25	135	Digit 0
271			Digit 1
272		136	Digit 2
273			Digit 3
274		137	sign
275	DISPLAY POINT 26		Digit 0
276		138	Digit 1
277			Digit 2
278		139	Digit 3
279			sign
280	DISPLAY POINT 27	140	Digit 0
281			Digit 1
282		141	Digit 2
283			Digit 3
284		142	sign
285	DISPLAY POINT 28		Digit 0
286		143	Digit 1
287			Digit 2
288		144	Digit 3
289			Sign
290	DISPLAY POINT 29	145	Digit 0
291			Digit 1
292		146	Digit 2
293			Digit 3
294		147	Sign
295	DISPLAY POINT 30		Digit 0
296		148	Digit 1
297			Digit 2
298		149	Digit 3
299			sign

PROGRAMMING DATA (READ/WRITE)

ISO		MODBUS	
300	SETPOINT 1	150	Digit 0
301			Digit 1
302		151	Digit 2
303			Digit 3
304		152	Sign
305	SETPOINT 2		Digit 0
306		153	Digit 1
307			Digit 2
308		154	Digit 3
309			Sign
310	SETPOINT 3	155	Digit 0
311			Digit 1
312		156	Digit 2
313			Digit 3
314		157	Sign
315	SETPOINT 4		Digit 0
316		158	Digit 1
317			Digit 2
318		159	Digit 3
319			Sign
320	MODE SETPOINT 1	160	0=normally OFF, 1=normally ON
321			0=net, 2=gross, 3=peak, 4=valley, 5=peak-to-peak
322		161	0=dly, 1=hys_1, 2=hys_2, 3=dly_ON, dly_OFF
323			0=hi, 1=lo
324		162	0=off, 1=on, 2=latch, 3=rscom, 4=over, 5=latch over
325	MODE SETPOINT 2		0=normally OFF, 1=normally ON
326		163	0=net, 1=track set, 2=gross, 3=peak, 4=valley, 5=peak-to-peak
327			0=dly, 1=hys_1, 2=hys_2, 3=dly_ON, dly_OFF
328		164	0=hi, 1=lo
329			0=off, 1=on, 2=latch, 3=rscom, 4=over, 5=latch over

PROGRAMMING DATA (READ/WRITE)

330	MODE SETPOINT 3	165	0=normally OFF, 1=normally ON
331			0=net, 2=gross, 3=peak, 4=valley, 5=peak-to-peak
332		166	0=dly, 1=hys_1, 2=hys_2, 3=dly_ON, dly_OFF
333			0=hi, 1=lo
334		167	0=off, 1=on, 2=latch, 3=rscom, 4=over, 5=latch over
335	MODE SETPOINT 4		0=normally OFF, 1=normally ON
336		168	0=net, 1=track set, 2=gross, 3=peak, 4=valley, 5=peak-to-peak
337			0=dly, 1=hys_1, 2=hys_2, 3=dly_ON, dly_OFF
338		169	0=hi, 1=lo
339			0=off, 1=on, 2=latch, 3=rscom, 4=over, 5=latch over
340	DELAY / HYSTERESIS SETPOINT 1	170	digit 0
341			digit 1
342		171	digit 2
343			digit 3
344	DELAY / HYSTERESIS SETPOINT 2	172	digit 0
345			digit 1
346		173	digit 2
347			digit 3
348	DELAY / HYSTERESIS SETPOINT 3	174	digit 0
349			digit 1
350		175	digit 2
351			digit 3
352	DELAY / HYSTERESIS SETPOINT 4	176	digit 0
353			digit 1
354		177	digit 2
355			digit 3
356	ANALOG OUTPUT LO	178	digit 0
357			digit 1
358		179	digit 2
359			digit 3
360		180	Sign
361	ANALOG OUTPUT HI		Digit 0
362		181	Digit 1
363			Digit 2
364		182	Digit 3
365			Sign

PROGRAMMING DATA (READ/WRITE)

366	ANA OUTPUT TYPE	183	0=Vdc, 1=Idc
367	ANA OUTPUT FILTER		0=off, 1=on
368	INPUT TYPE	184	0=LOAD, 1=PROCESS, 2=POT
369	PROCESS TYPE V/mA		0=V, 1=mA
370	PROCESS RANGE V	185	0=1V, 1=5V, 2=10V
371	LOAD RANGE mV		0=30mV, 1=60mV, 2=120mV, 3=300mV, 4=500mV
372	FILTER P	186	0 to 9
373	FILTER E		0 to 9
374	DECIMAL POINT	187	0=88888, 1=8888.8, 2=888.88, 3=88.888, 4=8.8888
375	ROUND		0=no round, 1=2 digit, 2=5 digit, 3=10 digit
376	TARE KEY LOCK	188	0=unlock, 1=lock
377	Nº LINEARIZATION PTS		2 to 30
378	LOGIC FUNC. CN2.1	189	0 to 34
379	LOGIC FUNC. CN2.2		0 to 34
380	LOGIC FUNC. CN2.4	190	0 to 34
381	LOGIC FUNC. CN2.5		0 to 34
382	LOCK SET1	191	0=unlocked, 1=locked
383	LOCK SET2		0=unlocked, 1=locked
384	LOCK SET3	192	0=unlocked, 1=locked
385	LOCK SET4		0=unlocked, 1=locked
386	LOCK INPUT	193	0=unlocked, 1=locked
387	LOCK SCAL		0=unlocked, 1=locked
388	LOCK FILTERS/ROUND	194	0=unlocked, 1=locked
389	LOCK TARE MENU		0=unlocked, 1=locked
390	LOCK ANA OUTPUT	195	0=unlocked, 1=locked
391	LOCK RS OUTPUT		0=unlocked, 1=locked
392	LOCK LOGIC FUNC	196	0=unlocked, 1=locked
393	TOTAL LOCK		0=unlocked, 1=locked
394	USER CODE	197	digit 0
395			digit 1
396		198	digit 2
397			digit 3

398	DISPLAY MIN	199	digit 0
399			digit 1
400		200	digit 2
401			digit 3
402		201	sign (0=positive, 10=negative)
403	DISPLAY MAX		digit 0
404		202	digit 1
405			digit 2
406		203	digit 3
407			sign (0=positive, 10=negative)
408	MENU 7 OVER	204	0=off, 1=on
409	PRINT DATE TIME		0=off, 1=on
410	-	205	-
411	-		-
412	ADDRESS UNITS	206	0 to 9
413	ADDRESS TENS		0 to 9
414	-	207	-
415	BAUD RATE		1=1200, 2=2400, 3=4800, 4=9600, 5=19200
416	RS485 DELAY	208	1=30ms, 2=60ms, 3=100ms, 4=300ms, 5=no delay
417	PROTOCOL		1=ASCII, 2=iso1745, 3=modbus
418	-	209	-
419	-		-

DYNAMIC VARIABLES (READ ONLY)

420	Tare Set	210	signed integer (2 bytes)
421			
422	Tare Value	211	signed integer (2 bytes)
423			
424	Peak value	212	signed integer (2 bytes)
425			
426	Valley Value	213	signed integer (2 bytes)
427			
428	Peak-valley Value	214	signed integer (2 bytes)
429			

DYNAMIC VARIABLES (READ ONLY)

430 431	Gross Value	215	signed integer (2 bytes)
432 433	Net Value	216	signed integer (2 bytes)
434 435	Input signal Value	217	signed integer (2 bytes)
436 437	Display Value	218	signed integer (2 bytes)
438 439	Fast Net Value	219	signed integer (2 bytes)
440 441	Setpoint 1	220	signed integer (2 bytes)
442 443	Setpoint 2	221	signed integer (2 bytes)
444 445	Setpoint 3	222	signed integer (2 bytes)
446 447	Setpoint 4	223	signed integer (2 bytes)
448	Setpoints and logic Functions Status	224	bit 0 = setpoint 1 status (0=OFF, 1=ON) bit 1 = setpoint 2 status (0=OFF, 1=ON) bit 2 = setpoint 3 status (0=OFF, 1=ON) bit 3 = setpoint 4 status (0=OFF, 1=ON) bit 4 = logic input 1 status (0=OFF, 1=ON) bit 5 = logic input 2 status (0=OFF, 1=ON) bit 6 = logic input 3 status (0=OFF, 1=ON) bit 7 = logic input 4 status (0=OFF, 1=ON)
449	Display overflow		0=no over, 1=display overflow

DPM-ANALOG APPENDIX

Programming

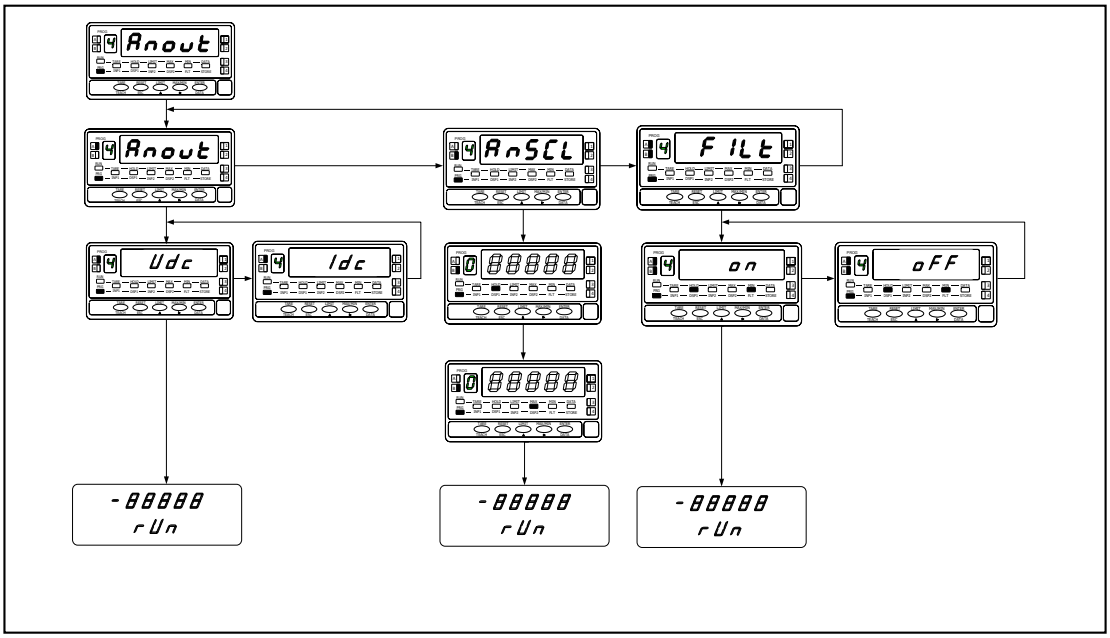
ACCESS TO THE PROGRAMMING OF THE ANALOG OUTPUT:

Press the "ENTER" key to go from the working mode to the programming mode (indication -Pro-, led PROG) and repeatedly press the " ▶ " key until you reach the level : 4 AnAOUt

Menu 4A Anout: Selection of the type of output (0-10V or 4-20mA).

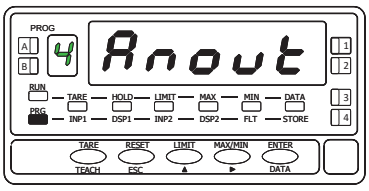
Menu 4B SCAL: Programming the display values that will produce the extreme values of the output signal range.

Menu 4AB FILt: Output presentation selection to the rhythm of the display (filter ON) or at the rate of input signal conversion (filter OFF).



ACCESS TO THE PROGRAMMING OF THE ANALOG OUTPUT

Press the "ENTER" button to pass from the run mode to the programming mode (-Pro- indication, PROG led) and press repeatedly the ▶ button until the display shows the indication represented in figure.



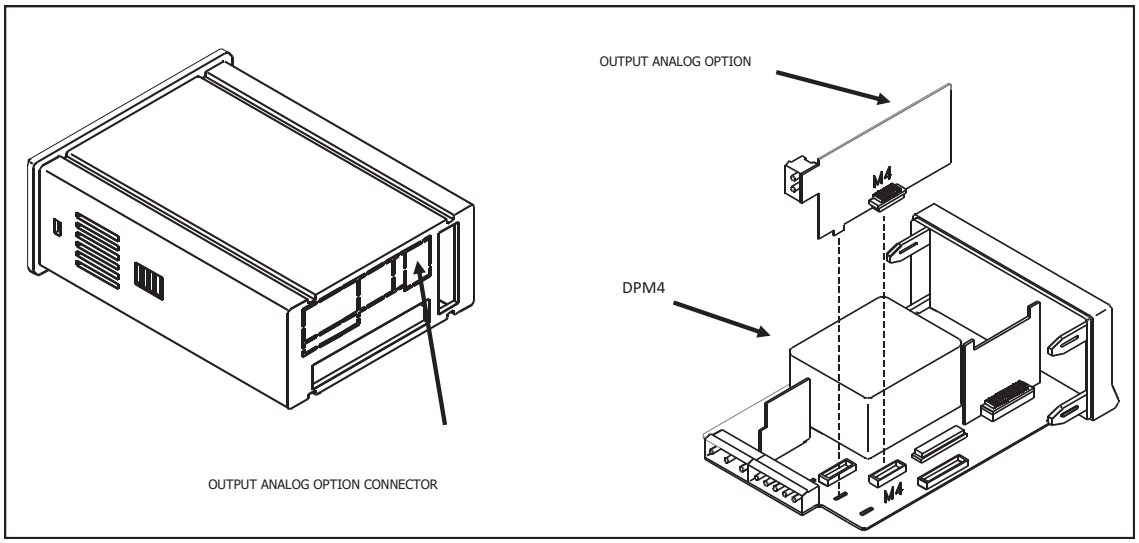
Press ENTER to access the first programming menu, or

▶ : To move on to the next program module,

ESC : To go back to the run mode.

ASSEMBLY

Remove the electronic assembly from the box and break the joints in the marked area of the connector to separate it from the box. Install the option card in the M4 connector. Insert the foot of the card into the slot on the base, applying slight pressure so that the connector on the card is perfectly seated in the one on the base. If vibrations may occur under the instrument's working conditions, it is advisable to solder the card to the base, taking advantage of the copper tracks on both sides of the card base and around the groove on the base's weld face.

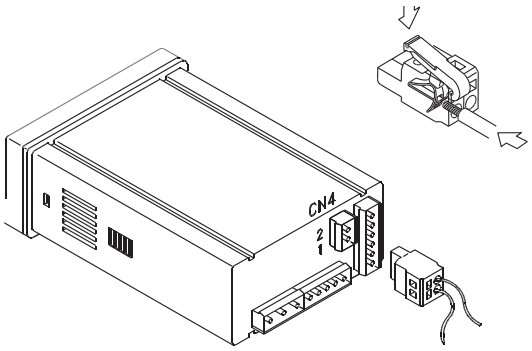


CONNECTIONS

CONNECTOR CN4

PIN 2 = (-) 0-10V / 4-20mA

PIN 1 = (+) 0-10V / 4-20mA



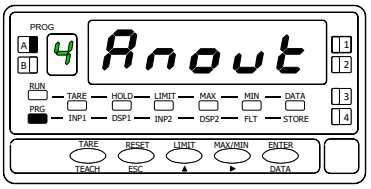
TECHNICAL SPECIFICATIONS

	0-10V	4-20mA
Resolution	12 bits	12 bits
Accuracy	0.1% F.E. ±1 bit	0.1% F.E. ±1 bit
Thermal drift	0.2mV/ºC	0.5uA/ºC
Maximum load	≥500Ω	≤800Ω
Response time	60ms	60ms

DPM-ANALOG

OUTPUT TYPE SELECTION

The figure shows the input stage of the 4A menu (the A led energizes). This menu allows selection of one of two available output ranges: 0-10V or 4-20mA.

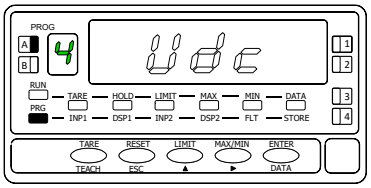


Press the ENTER key if you want to modify the initial choice, or

▶ : To pass to the following programming menu

ESC : To return to the normal operation.

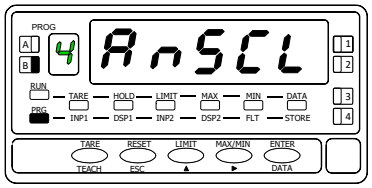
An "ENTER" made at previous step, makes the display read the indication "**Udc**" (corresponding to 0-10V) or "**Idc**" (corresponding to 4-20mA). The figure shows one of these options.



To change the output type, press ▶ to toggle the display to the desired option and press ENTER to store changes in memory and automatically return to the normal operation

SCALE PROGRAMMING

By pressing "ENTER" then ▶ from the programming stage shown before, the meter displays the indication AnSCL and LED B illuminates (see figure at right). This is the entry stage of the **4B** menu, which programmable items are the display values corresponding to both extremes of the analog output range.

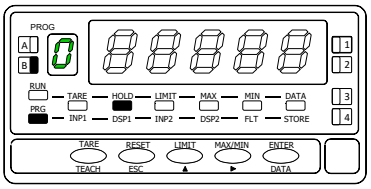


Press ENTER to set up these parameters, or

▶ : To pass to the **4AB** menu,

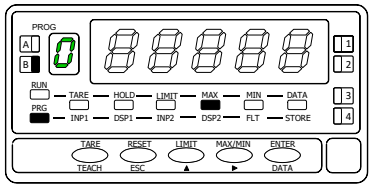
ESC : To return to the normal operation.

At this step, the **DSP1** LED activates and the display shows the previously programmed display value corresponding to the low analog output (0V or 4mA depending on output type) with the auxiliary digit (sign) in flash. Use ▶ to switch between **"0"** (positive) and **"-"** (negative). Press ▶ to advance to the next key to advance to the right which goes in flash. Press repeatedly ▲ to increment the active digit until it takes desired value. Repeat this operation until the display reads the desired value and press ENTER to validate the entry and go to the next programming step.



ESC : Returns the meter to the normal operation.

The **DSP2** LED activates and the initial display value corresponding to the high analog output (10V or 20mA) appears on the display. Repeat the process described for the previous step (▶ and ▲ buttons) to program the desired value. *Reverse operation is accomplished by programming the low display in this step and the high display in the previous one.*



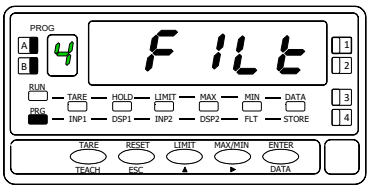
ENTER : Validates the entry and goes to the normal operation

ESC : Returns the meter to the run mode without saving changes.

DPM-ANALOG

FILTER

From the program step indicated in figure1, press once the "ENTER" key to acced to the top menu level and three times the ▶ key to bring the meter to the entry stage of the **4AB** menu (FILtr indication, A and B leds activated).
This menu offers the possibility of selecting whether the analog output should be transmitted at the same rythm as the display updating or at the input signal conversion rate.

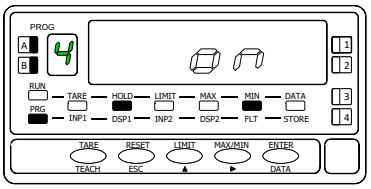


Press ENTER to get access to the programming of this parameter.

▶ : Skips over this menu and pass to the output type selection

ESC : Returns the meter to the run mode.

Under some conditions, the rate at which the input signal is conevrted may result so fast, thus making the analog output reflect all variations and even unwanted phenomena present at the input. In such cases it is convenient to increase the output response time by filtering the output signal to the same level as it has been selected for the display.
At this menu step the display shows one of the following options; the **"OFF"** option will make the analog output be updated at the same rythm as the input conversion (without filter) and the **"ON"** option will allow to use the output as a display image, presenting the same filtered values.



If it is desired to modify the existing configuration, press ▶ to alternate the display indication **["-on-" /"-oFF-"]** and ENTER to validate the choice and go to the normal operation.

If the existing configuration is already the desired one, press ESC to return to the normal operation without saving changes

ENGLISH

DPM-RELAY/DPM-NPN/DPM-PNP

OPERATING MODES

All the setpoints can operate independently or in association with another in a variety of combinations to suit specific operating conditions.

INDEPENDENT SETPOINTS

As programmed like independent setpoints, the alarm outputs activate when the display value reaches the user-programmed value. The independent alarms programming requires definition of the following basic parameters :

a. HI/LO ACTING MODE.
In HI mode, the output activates when the display rises above the setpoint level and in LO mode, the output activates when the display falls below the setpoint.

b. PROGRAMMABLE TIME DELAY or HYSTERESIS.
Each output action can be deferred by a programmable time delay or hysteresis level.
The time delay is the time that takes the output to activate after passing through the setpoint in the up or down direction, while the hysteresis band can be selected asymmetrical (only acts on the output deactivation edge) or symmetrical (operates on both sides of the setpoint).

The time delay can be set from 0 to the maximum displayable value in seconds and can have a decimal place.
The hysteresis can be programmed, in counts, within the full display range. The decimal point appears in the same position as programmed in the display configuration module.

Figures 1 and 2 show the delayed activation by time delay (dly) and by asymmetrical hysteresis (hys-1) of two alarms (SET1 and SET2) programmed in HI mode (OUT1) and in LO mode (OUT2).

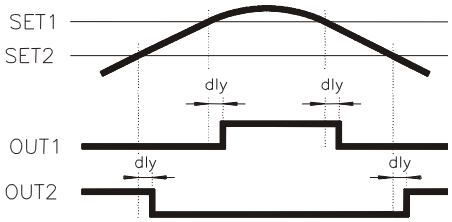


Fig. 1 Delay action (dly)

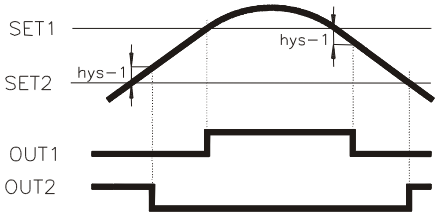
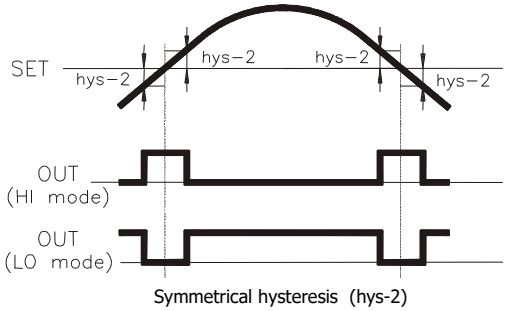


Fig. 2 Asymmetrical hysteresis (hys-1)

The figure below shows the action of the symmetrical hysteresis. In order to clarify the drawing, it has been represented one only alarm in the cases of HI and LO acting. The 100% of the programmed hysteresis (hys-2) is added to each side of the setpoint, thus creating a band around the setpoint within which the output is activated (mode HI) or deactivated (mode LO). This band can be as large as twice the maximum number of counts of the display.

The hold up of the alarm action by means of this type of hysteresis can be useful in operations in which it is necessary to keep the alarm condition between two specified points.

As an example, let's suppose that it is wanted to control a quantity composed of two other in proportion of 1000 and 2000 kg. By programming the first setpoint at 500 with hys-2 = 500 and the second setpoint at 2000 with hys-2 = 1000, the alarm output should control the first quantity from 0 to 1000 and the second quantity from 1000 to 3000.

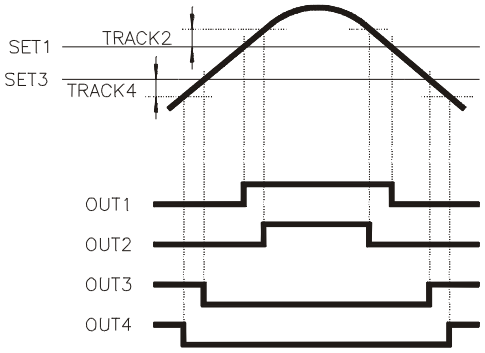


Symmetrical hysteresis (hys-2)

ASSOCIATED SETPOINTS

The SET2 and SET4 setpoints can be programmed to "track" SET1 and SET3 respectively. This type of alarms does not activate as compared with a preprogrammed display value but at a programmable fixed distance from the activation of their pre-alarms.

The programming of these alarms requires to determine first the pre-alarm setpoint value (for example SET1 = 200). Then, instead of programming the SET2, it is assigned an offset between this and the first alarm (for example TRACK2 = 50). Although SET1 is changed, the alarm 2 (if not changed) will always activate 50 counts above SET1. If a negative tracking value should have been programmed (-50), the alarm 2 would activate 50 counts below the SET1.
The figure shows an example of positive (TRACK2) and negative tracking (TRACK4).



Tracking Setpoints

AUTO - TRACK

In some measurement systems and particularly in weighing and dosage applications, the mechanical parts and the system structure makes it impossible to shut off operations at a given point (due to response times, weight in flight) this causing an extra quantity of material be settled after the interrupting action.

As an application example of the "AUTO TRACK" function, let's comment the effect known as "weight in flight".
The "weight in fly" effect is produced in those systems in which some kind of recipient is to be filled with a preprogrammed quantity of material. Each time this quantity is reached, an alarm output stops the filling mechanism.
However, the quantity of material which is still on air at the moment of shutting off the process, is deposited in the recipient exceeding from the desired measure.

The automatic track function (AUTO TRACK) is specially designed to compensate for this out of limit quantity.

This function is based on controlling the quantity in which the programmed limit is surpassed and using this excess to activate the shut off signal so that, including the out of limit quantity, the final measure suits the desired value.

Only the alarm 2 provides automatic track function. The auto tracking is implemented by programming SET1 for the desired limit value and SET2 for "AUTO TRACK" operation (initially it takes the same value as SET1).

SET1 = Desired setpoint value
SET2 = AUTO TRACK

When, despite the alarm that shuts off the process activates, still a little quantity of material exceeding from SET1 is deposited, the excess is registered in the peak memory as "TRACK" value and subtracted from SET2.

This way, in successive measurements the output of SET2 will take charge of interrupting the operations one moment before the display reaches the programmed value. The extra quantity will then complete the measure until the required level.

We remark that the track value is continuously updated according to process needs.

DPM-RELAY/DPM-NPN/DPM-PNP

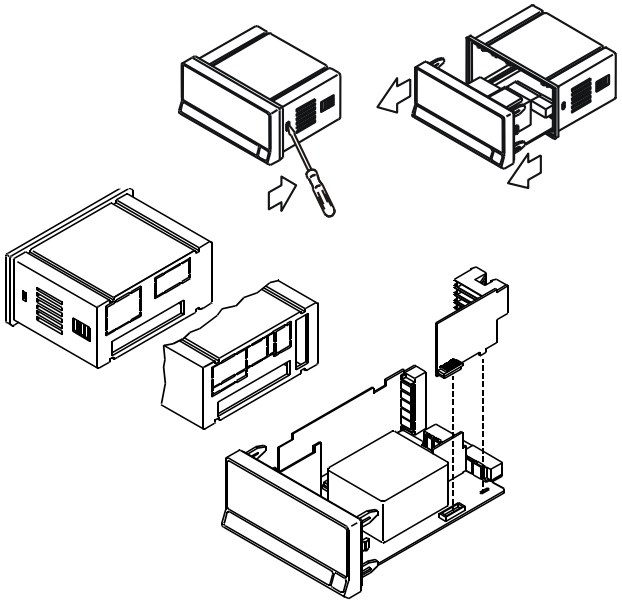
OPTION INSTALLATION

Lift out the electronics assembly from the case and use a screw-driver to push on the junctions between the case and the shadow areas to detach them from the case. The so performed orifice will allow any of the setpoints board output connectors be brought out at the rear of the instrument.

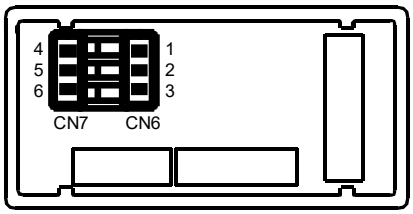
The option is installed by plugging the connector in the main board location as shown in figure.
Insert the card pin in the corresponding main board slot (see figure) and push down to attach both connectors.

If the instrument is to be installed in high vibrating environments, it is recommended to solder the card to the main board making use of the copper tracks on both sides of the card pin and around the main board hole on its solder side.

Before inserting the electronics in the case, you should verify that the access to the setpoints programming module is enabled, as this is the first operation to be made once the instrument is powered up.



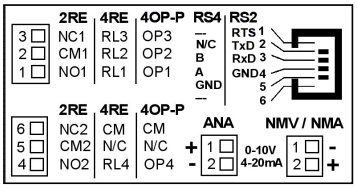
WIRING



Rear view of basic instrumment with Relay / Opto output option.

Each output card is delivered with a self-adhesive label on which is indicated the connection of all the options.

For better identification of the device, this label must be affixed to the lower part of the box, next to the base label



Need updated version

DPM-RELAY -4 RELAYS OPTION

PIN 4 = RL4 PIN 1 = RL1
PIN 5 = N/C PIN 2 = RL2
PIN 6 = COMM PIN 3 = RL3

DPM-NPN - 4 OPTOS NPN OPTION

PIN 4 = OP4 PIN 1 = OP1
PIN 5 = N/C PIN 2 = OP2
PIN 6 = COMM PIN 3 = OP3

DPM-PNP - 4 OPTOS PNP OPTION

PIN 4 = OP4 PIN 1 = OP1
PIN 5 = N/C PIN 2 = OP2
PIN 6 = COMM PIN 3 = OP3

NOTE : In case that the outputs are used to drive inductive loads, it is recommended to add an RC network between the coil terminals (preferably) or between the relay contacts to limit electromagnetic effects.

DPM-RELAY/DPM-NPN/DPM-PNP

TECHNICAL SPECIFICATIONS

FEATURES

DPM-RELAY Option

MAX. CURRENT (RESISTIVE LOAD) 5A

MAX. POWER ..... 1250VA / 150W

MAX. VOLTAGE ..... 277VAC / 125VDC

CONTACT RESISTANCE ..... Max. 30mΩ

SWITCHING TIME ..... Max. 10ms

DPM-NPN and DPM-PNP Option

MAX. VOLTAGE 50VDC

MAX. CURRENT 50mA

LEAKAGE CURRENT ..... 100μA (max.)

RESPONSE TIME ..... 1ms (max.)

DPM-RELAY/DPM-NPN/DPM-PNP

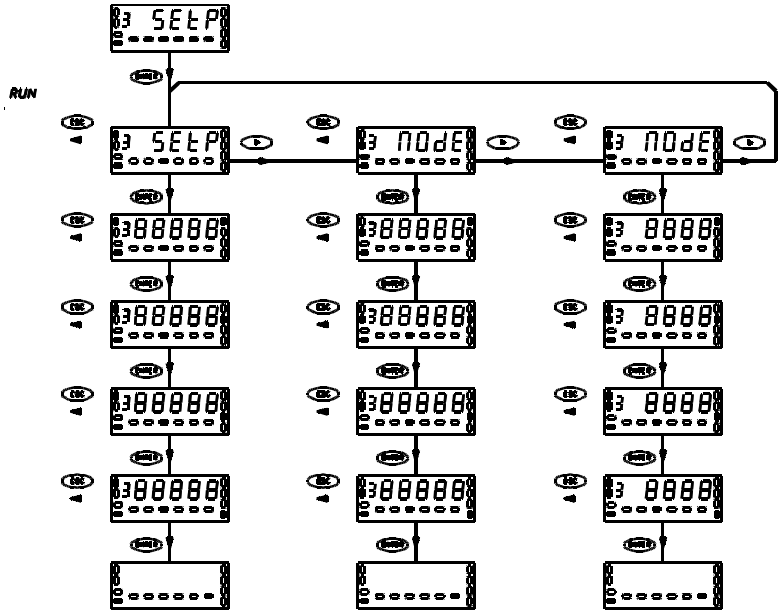
SETPOINTS PROGRAMMING DPM4-A-HS-H/L

The diagram shows the entire MODULE 3 that allows to program the alarm/setpoint operation and is activated when one of the following output options DPM-RELAY, DPM-NPN, or DPM-PNP are installed.

Each one of the three menus is dedicated to a specific configuration parameter and is composed of four levels corresponding to each four of the setpoints.

The configuration of the parameters relating one of the setpoints is made in a single step of each menu. The LEDs 1, 2, 3 and 4 illuminate by turn as the program advances one step of the menu, to indicate which of the setpoints is being treated at each time.

At the end of a complete sequence, a press of "ENTER" causes deactivation of all the LED indicators except "PROG" and activates the "STORE" LED for a few seconds. The programmed data is stored in the memory and the instrument returns to the reading of the variable under measure.



CONSIDERATIONS PRIOR TO THE PROGRAMMING INSTRUCTIONS

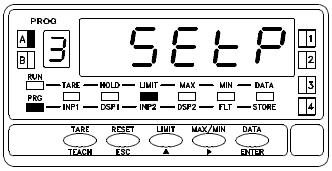
The different setpoints have identical programming. In the instructions on the following pages, only the first step of each menu is indicated, i.e. the step corresponding to the programming of threshold 1 (LED 1 lit).
Once the necessary changes have been made in this step, the “ENTER” key allows access to the programming of threshold 2 (with LED 2 lit) and so on for each threshold.

DPM-RELAY/DPM-NPN/DPM-PNP

SETPOINTS VALUE PROGRAMMING

Press the ENTER key to move from the run mode to the programming mode.

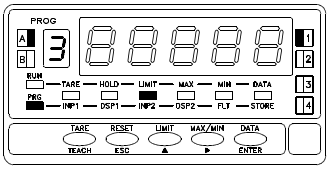
Press three time the ▶ and press again ENTER to access to the programming menus.



Each menu activates a different combination of the "A" and "B" LEDs. From this stage, the ▶ key permits selection of a specific menu and the ENTER key provides access to the programming of the parameters contained in the selected menu.

The figure shows the setpoint 1 programming step. The rest of the setpoints are programmed in the same manner, each one activating its corresponding LED.

By means of the ▲ key (modify value of the active digit) and the ▶ key (advances to the next digit to the right), compose the desired setpoint value with sign between -32000 and +32000. It is not necessary to program the value of the setpoint 2 when it is going to have automatic track function, for its value will not be taken into account.



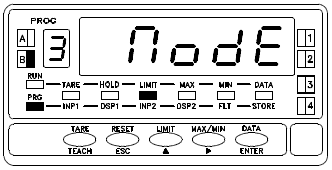
Remember that, if the alarm is going to have manual track function (setpoints 2 or 4), the programmable value is not the setpoint value but the offset between this and its main alarm.

ENTER : Validates the programmed value and goes to the programming of the next setpoint.

ESC : Returns the meter to the normal operation.

RELAYS OPERATION MODE CONFIGURATION (*)

From the entry stage of the module 3, press the ENTER key to access to the menus and the ▶ key to move to the stage of entry into the menu "3B - MODE" indicated .
This menu allows to determine the features applied to each alarm. The "PROG" LED (programming mode indicator), "LIMIT" LED (setpoint programming indicator) and "B" LED (menu indicator) remain active during the whole phases of this menu.

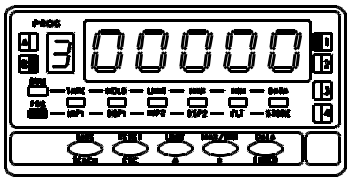


Press ENTER if you want to access this menu.

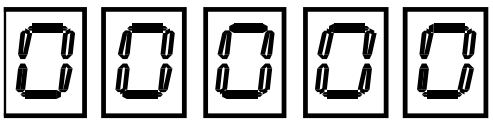
▶ : Skips over this menu and goes to the menu 3AB for programming the delay or hysteresis levels.

ESC : Returns the meter to the normal operation.

The figure at left represents the first menu step corresponding to the setpoint 1 (LED 1 energized). The rest of the setpoints are accessible by pressing ENTER key once programmed the preceding one. Each digit represents one different operating parameter which is activated with a numbers according to the table. Starting from the left :



1st digit : Allows disabling the setpoint "**0**", enabling the setpoint "**1**" or enabling the setpoint latch "**2**".
2nd digit : Mode HIGH "**0**" or LOW "**1**".
3rd digit : Alarm activation with time delay (DLY) "**0**", asymmetrical hysteresis (HYS-1) "**1**" or symmetrical hysteresis (HYS-2) level "**2**".
4th digit : Activation by **net** value "**0**", by manual **Track** "**1**", by **gross** value "**2**", by **peak** value "**3**", by **valley** value "**4**" or by **auto-track** "**5**".
5th digit : Alarm indication by LED "**0**" or by LED plus display blinking "**1**".

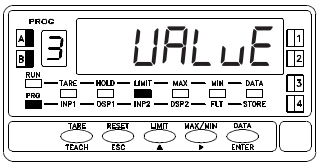


First digit	*Second digit*	*Third digit*	*Fourth digit*	*Fifth digit*
0 = OFF 1 = ON 2 = ON (latch)	0 = HI 1 = LO	0 = Delay 1 = Hyst_1 2 = Hyst_2	0 = Valor neto 1 = Track manual 2 = Gross value 3 = Peak value 4 = Valley value 5 = Track auto	0 = activ. LED 1 = activ. LED and flash display

ENTER : Validates and goes to the next setpoint configuration.

ESC : Returns the meter to the normal operation.

DELAY HYSTERESIS VALUE PROGRAMMING



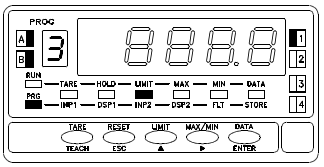
From the entry level in module 3, press "ENTER" to access the menus and twice on

▶ to go to the entry level of the "3AB – VALUE" menu indicated.
In this menu, the delay or hysteresis value will be programmed, depending on the configuration made in menu 3B. The LEDs "PROG" (indication of programming mode), "LIMIT" (indication of threshold programming) and "A", B" (menu indicators) will be permanently lit during all the steps of this menu.

Press ENTER to access this menu.

▶ : Skip this menu and go to menu 3A for programming setpoint values.

ESC : Returns to the working model.



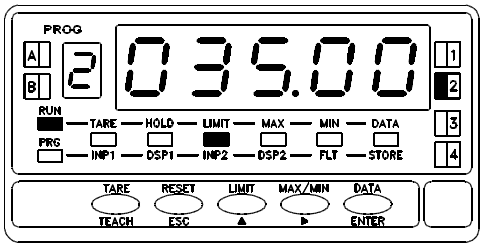
Compose, using the keys ▲ (modification of the value of the active digit) and ▶ (advance of the active digit to the right) the value of the delay from 0 to 999.9 seconds, or the hysteresis from 0 to 32000 display points .

If the threshold has been configured for a timed action (third digit=0 in menu 3B), the decimal point appears fixed at the second decade so that the delay is stored with one decimal. If activated with hysteresis (third digit=1 or 2 in menu 3B), the decimal point is also fixed and appears in the position programmed in the display configuration (module 2)

ENTER : Validates the data entered and goes to the configuration of the next threshold

ESC : Returns to work mode.

RUN MODE INDICATIONS



The DPM4-A-HS-H/L models provide four LED's for alarm status indication.

The LED's are labeled 1 to 4 although during the normal operation, these indicators are activated when the corresponding setpoint output goes active and, in the programming mode, they allow to identify the setpoint that is being programmed.

The programmed setpoint values (even if they are inhibited) can be viewed during the meter's normal operation by successively pressing the "LIMIT" key.

Each press of "LIMIT" causes the main display to read one of the setpoints. The setpoint number is indicated by the LED's 1, 2, 3 or 4 while the "LIMIT" LED activates for as long as the setpoints are being displayed.

An example of what indications are present during the display of a setpoint is show in the above figure, in this case, the SET2 is being displayed.

In case that the SET2 or SET4 alarms are configured for tracking operation, the value displayed is not the setpoint value but the offset between this and the one of their corresponding main alarm.

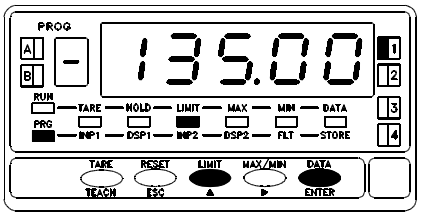
When positive over-range (+oVFLo) or negative over-range occurs (-oVFLo), all the outputs and LED indicators corresponding to the setpoints de-energize.

DPM-RELAY/DPM-NPN/DPM-PNP

FAST ACCESS TO THE PROGRAMMING SETPOINTS VALUES

From the work mode (RUN), by pressing the ENTER key you enter the programming mode (PROG) then by LIMIT you immediately access the configuration of the preselection values of the setpoints.

Also, it is possible to configure and use these same values, even if no option card is installed, if function 24 is associated with a logic input of the incoming connector.



The values of each setpoint appear in ascending order with their left digit flashing and the corresponding setpoint LED lit.
The configuration procedure is the same as the description before.

Check the programming access blocking level. If access is blocked at all programming levels, it will not be possible to enter any data but only read previous data. There is a restricted access level which prohibits all programming but only allows the modification of setpoint values.

DPM-RS232 Appendix

RS232C SERIAL OUTPUT OPTION

The RS232C output option consists of an additional card that is installed in the M1 plug connector on the instrument's motherboard.
The card incorporates a 4-way telephone connector with output on the back of the device.

The serial output allows establishing a communication line through which a master device can request the sending of data such as display value, setpoint value, peak, valley and tare (or offset in the case of thermometers) and also execute remote functions such as display tare, reset of peak, valley or tare memories and modification of setpoint values.

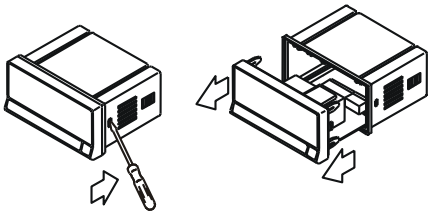
The output option is fully configurable by software in terms of baud rate (1200, 2400, 4800, 9600 or 19200 baud), device address (between 00 and 99) and type of communication protocol (ASCII, ISO 1745, MODBUS-RTU).
The RS232C output allows the instrument to be connected to a master device with RS232C output (exemple a PC)

The operating mode is half-duplex, normally remaining in reception mode until the arrival of a message.
The reception of a valid message can mean the immediate performance of an action (display tare, reset of the peak, valley or tare memories, change of setpoint values), or the transmission of a response by the instrument interrogated (display value, of any of the setpoints or value of the peak, valley or tare / offset memories).

Transmission of the display value (only) can be requested via an external pushbutton.

DPM-RS232

OPTION INSTALLATION

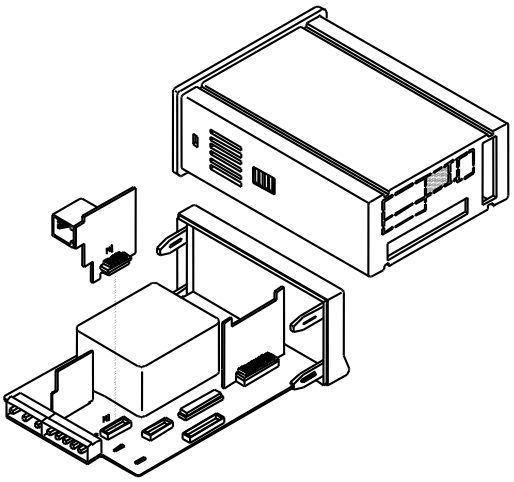


Extract the electronic assembly from the box and break the joints in the gray area of the figure to separate it from the box.

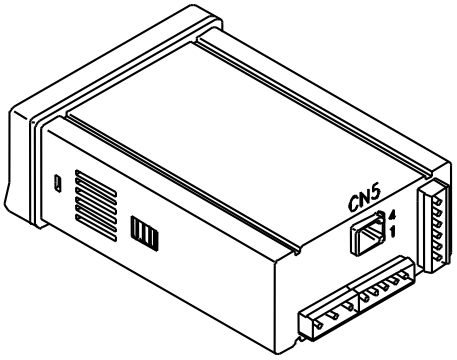
The hole made will allow the output at the back of the instrument, of the RS232C output connector.

Install the option card in the M1 connector.
Insert the foot of the card into the slot on the base applying light pressure so that the connector on the card is perfectly fitted into the connector on the base.

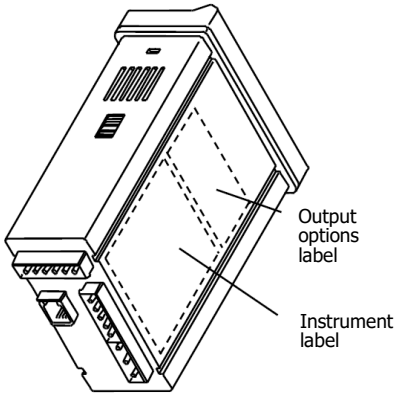
If vibrations can occur under the working conditions of the instrument, it is advisable to solder the card to the base, taking advantage of the copper tracks on both sides of the foot of the



WIRING

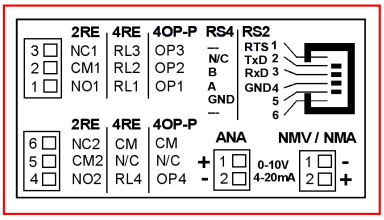


Rear view of base instrument with RS232C output option



RS232C OUTPUT OPTION (CN5 CONNECTOR)

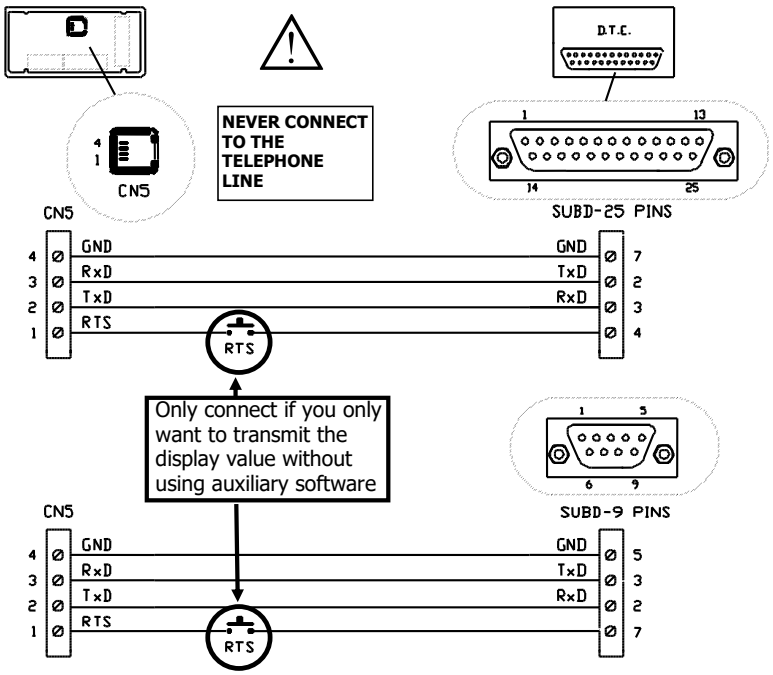
PIN 1 = RTS (request to send)
PIN 2 = TxD (transmission)
PIN 3 = RxD (receiving)
PIN 4 = GND



Each output card is supplied with an adhesive label indicating the connection of each of the options.

DPM-RS232

WIRING DIAGRAMS



The display value can be requested through the RTS button according to diagrams.

If the button is kept closed, the display value will be transmitted automatically with a cadence of 1 second and the instrument will not respond to any command from external software.

DPM-RS232

PROTOCOLS DESCRIPTION

Three modes of communication are provided; The ASCII mode uses a simple protocol utilizing ASCII text over. serial which allows communication with most PLC platforms and other industrial devices. The ISO mode, in accordance with the ISO 1745 standard, enables more effective communication in noisy environments as it checks the validity of messages both on transmission and receptions and also the MODBUS RTU protocol.
As can be seen in the table of functions, the ASCII protocol uses 1 or 2 bytes depending on the type of command and the ISO 1745 protocol imposes the use of two bytes per command.

- **ASCII PROTOCOL**

The word format is 1 START bit, 8 DATA bits, NO parity and 1 STOP bit.

FORMAT OF THE MESSAGE TO SEND
A message addressed to the instrument must consist of the following series of ASCII characters:

*	D	d	C	C	X X	CR

A character "*" [ASCII 42] to start the message.
Two address digits (between 00 and 99).
One or two ASCII characters corresponding to the desired command according to the function table.
If the command is of the parameter modification type, the new value will be sent in the form of a sign byte + [ASCII 43] or - [ASCII 45] followed by a block of "N" ASCII characters (depending on the model), including the decimal point.
A "CR" [ASCII 13] end-of-message character.

INSTRUMENT RESPONSE MESSAGE FORMAT
The format of the messages sent from the instrument in response to a data request type command is as follows:

SP	X X	CR

One byte of white space [ASCII 32].
A text (required value) consisting of a sign byte + [ASCII 43] or - [ASCII 45] followed by a block of "N" ASCII characters (depending on the model) including the decimal point.
A "CR" [ASCII 13] end-of-message character.
If the command is of the command or parameter change type, the instrument does not send any response.

- **ISO 1745 PROTOCOL**

The word format is 1 START bit, 7 DATA bits, 1 EVEN PARITY bit, and 1 STOP bit.

FORMAT OF THE MESSAGE TO SEND
A message from the master device must consist of the following sequence of characters:

SOH	D	d	STX	C	C	X X	ETX	BCC	

One SOH start-of-message byte [ASCII 01].
Two bytes corresponding the first to the tens and the second to the units of the address of the device to be interrogated.
One byte STX start of text [ASCII 02].
Two command bytes according to the function table
In case of parameter change commands, a block of N bytes corresponding to the numerical value including sign and decimal point.
One ETX end of text byte [ASCII 03].
A control BCC byte calculated as follows:
Carry out an exclusive-OR of all the bytes included between the STX (not included) and the ETX (yes included).
- If the byte obtained in ASCII is greater than 32, it can be taken as BCC.
- If the result in ASCII is less than 32, the BCC control byte will be obtained by adding 32.

DPM-RS232

PROTOCOLS DESCRIPTION

- **ISO 1745 PROTOCOL**

INSTRUMENT RESPONSE MESSAGE FORMAT

The typical format of messages sent from the instrument in response to a command from the master device is as follows:

In the case of commands that request the return of a value (of the data request type):

SOH	D	d	STX	X X	ETX	BCC

One SOH start-of-message byte [ASCII 01].
Two address bytes.
One byte STX start of text [ASCII 02].
"N " bytes corresponding to the requested value (including sign and decimal point).
One ETX end of text byte [ASCII 03].
A control BCC byte.

In the case of commands that do not imply the return of a value (type commands or change of parameters):

D	d	ACK

or

D	d	NAK

The instrument will send a confirmation that the message has been received.
If the message has been correctly received and interpreted, the response will consist of two address bytes and one "ACK" byte [ASCII 06].

If the received message has not been acknowledged or errors have been detected, the response will consist of two address bytes and one "NAK" byte [ASCII 21].

When the master device transmits a message to address 00, the command will be interpreted by all devices on the network and there will be no response.

- **MODBUS RTU PROTOCOL**

ASCII / ISO1745 COMMAND TABLE

Command		Function	Type function
Protocol ASCII	Protocol ISO1745		
D	ØD	Transmission display value	Trans
T	ØT	Transmission TARA value (offset in thermometers, preset in ALPHA-D)	Trans
P	ØP	Transmission Peak value	Trans
V	ØV	Transmission Valley value	Trans
Y	ØY	Transmission Peak-Peak value	Trans
L1	L1	Transmission setpoint 1 value	Trans
L2	L2	Transmission setpoint 2 value	Trans
L3	L3	Transmission setpoint 3 value	Trans
L4	L4	Transmission setpoint 4 value	Trans
M1	M1	Modify setpoint 1 value	Modif
M2	M2	Modify setpoint 2 value	Modif
M3	M3	Modify setpoint 3 value	Modif
M4	M4	Modify setpoint 4 value	Modif
I	ØI	Transmission active logical inputs	Trans

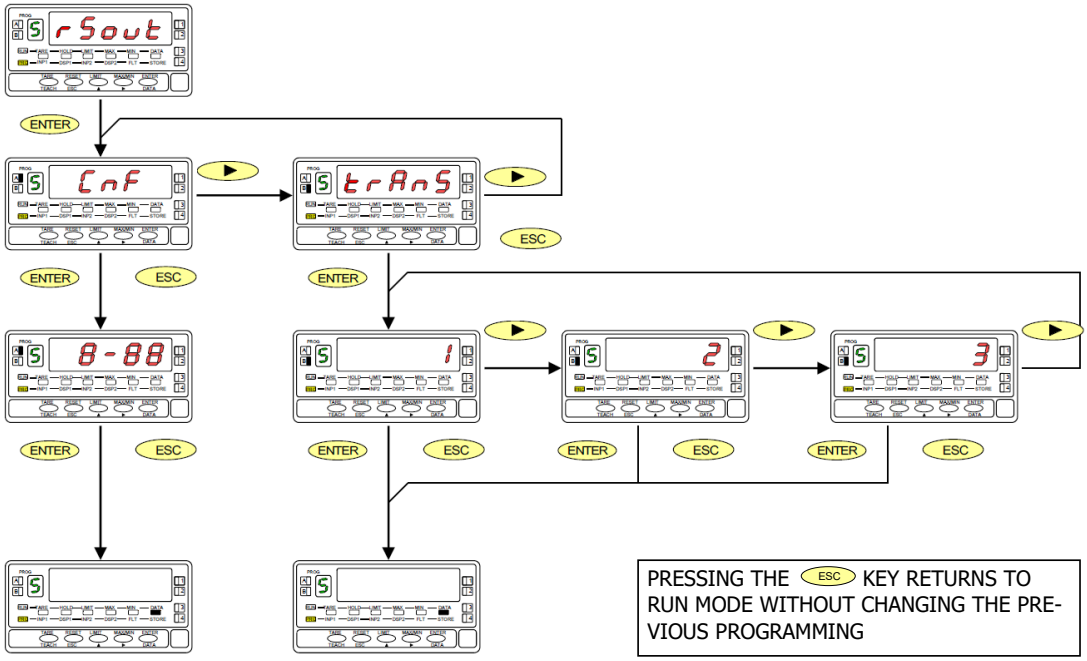
Command		Función	Type function
Protocol ASCII	Protocol ISO1745		
t	Øt	Make tare	order
r	Ør	Reset tare (or preset in Alpha-D)	order
p	Øp	Reset peak	order
v	Øv	Reset valley	order
y	Øy	Reset peak-peak	order
z	Øz	Reset 1 group of variables	order
n	Øn	Reset setpoints latch	order
	TT	Transmission type of instrument	Trans

DPM-RS232

DPM-RS232 PROGRAMMING

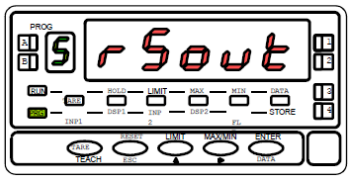
The module consists of 2 independent access menus that allow the configuration of the following parameters:

- **Menu 5A CnF** : Setting the baud rate and address of the device.
- **Menu 5B trAnS** : Selection between ASCII, ISO 1745 and MODBUS protocols.



ACCESS TO PROGRAMMING THE SERIAL OUTPUT

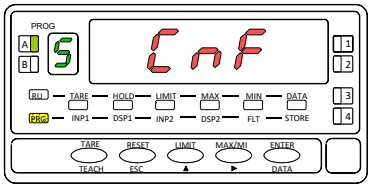
Press the "ENTER" key to go from the work mode to the programming mode (indication -Pro-, PROG led) and repeatedly press the key ▶ until reaching the level shown in the figure corresponding to the entry in the programming module of the serial output.



Press ENTER to access the different programming menus,

▶ : to go to the next programming module.
ESC : to return to work mode.

The figure shows the indication corresponding to entering the transmission speed and address configuration menu (display **5 CnF**, leds **A** and **PROG** active).



Press ENTER to enter this menu, or

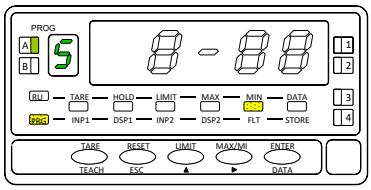
▶ : to go to the next programming module.

ESC : to return to work mode.

DPM-RS232

SPEED TRANSMISSION & ADRESS SELECTION

An "ENTER" in the previous step makes two numbers appear on the display separated by a hyphen with the first one flashing.
The number on the left (1 digit) corresponds to the baud rate:
[1 = 1200, 2 = 2400, 3 = 4800, 4 = 9600 and 5 = 19200 baud.]
The number on the right (2 digits) corresponds to the address of the instrument, which can be programmed between 00 and 99.

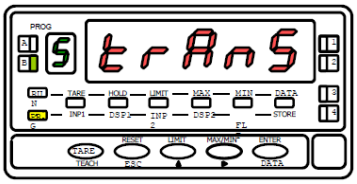


Successively press the key ▲ to vary the value of the flashing digit and press ▶ to proceed to programming the next digit.
Carry out these operations until the desired parameters are displayed on the display and press ENTER to save the programmed data in memory and return to work mode.

NOTE: If address 00 is programmed, the instrument only accepts commands that do not return data or change parameters. For example the TARE.

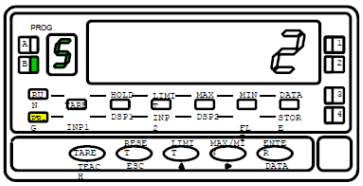
PROTOCOL SELECTION

Press "ENTER" to access the programming menus and twice ▶ to place the instrument in the phase represented in the figure
(indication **5 trAnS**, leds **B** and **PROG** lit). In this menu the communication mode between the instrument and the D.T.E. will be selected. (Data Terminal Equipment)



Press ENTER to enter this menu, or
▶ : to skip from this menu and return to the CnF menu.
ESC : to return to work mode.

A flashing number appears on the display (1,2 or 3 depending on the previous selection) corresponding to the current communication protocol
[1 = ASCII protocol, 2 = ISO 1745 protocol and 3 = MODBUS].
If the value on the display corresponds to the desired option, press



ENTER or ESC to return to work mode.
Otherwise, press the key
▶ : to change the number and
ENTER : to save the data in memory and go to work mode.

DPM-RS485 Appendix

DPM-RS485

RS485 SERIAL OUTPUT OPTION

The RS485 output option consists of an additional card that is installed in the M1 plug connector on the instrument's motherboard.
The card incorporates a 6-way / 4-contacts telephone connector with output on the back of the device.

The serial output allows establishing a communication line through which a master device can request the sending of data such as display value, setpoint value, peak, valley and tare (or offset in the case of thermometers) and also execute remote functions such as display tare, reset of peak, valley or tare memories and modification of setpoint values.

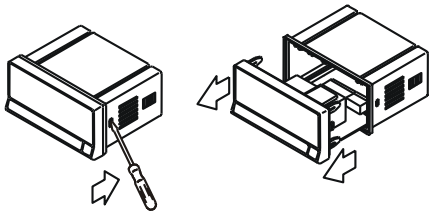
The output option is fully configurable by software in terms of baud rate (1200, 2400, 4800, 9600 or 19200 baud), device address (between 00 and 99) and type of communication protocol (ASCII, ISO 1745, MODBUS-RTU) and device response delay.

The RS485 output allows up to 31 devices to be connected to a master device with RS485 output.
The operating mode is half-duplex and the serial channel is active when the instrument is in working mode, normally remaining in reception mode until the arrival of a message, always in **slave mode**).

The reception of a valid message can mean the immediate performance of an action (display tare, tare of the peak, valley or tare memories, change of setpoint values), or the transmission of a response by the instrument interrogated (display value, of any of the setpoints or value of the peak, valley or tare / offset memories).

DPM-RS485

OPTION INSTALLATION

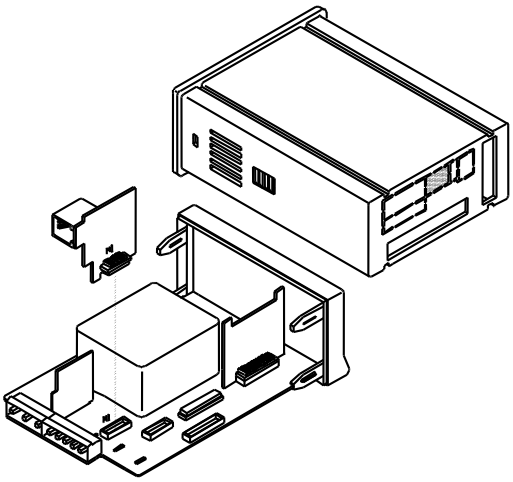


Extract the electronic assembly from the box and break the joints in the gray area of the figure to separate it from the box.

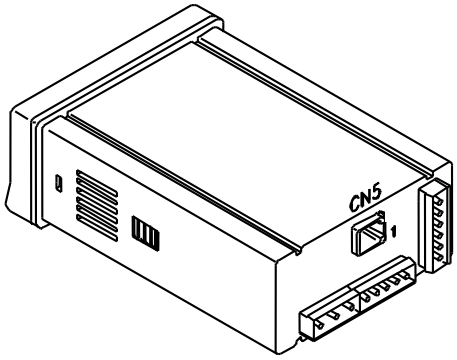
The hole made will allow the output at the back of the instrument, of the RS232C output connector.

Install the option card in the M1 connector.
Insert the foot of the card into the slot on the base applying light pressure so that the connector on the card is perfectly fitted into the connector on the base.

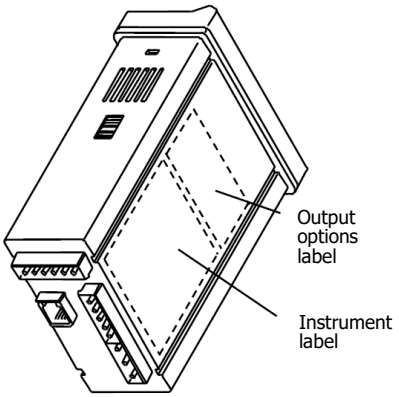
If vibrations can occur under the working conditions of the instrument, it is advisable to solder the card to the base, taking advantage of the copper tracks on both sides of the foot of the



WIRING

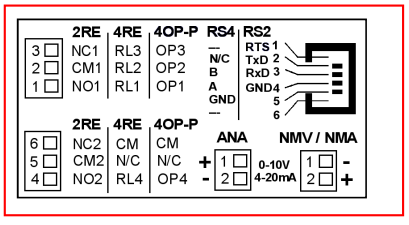


Rear view of base instrument with RS485 output option



DPM-RS485-RS485 OUTPUT OPTION (CN5 CONNECTOR)

PIN 1 = -
PIN 2 = N/C
PIN 3 = B (+TxD / +RxD)
PIN 4 = A (-TxD / -RxD)
PIN 5 = GND
PIN 6 = -

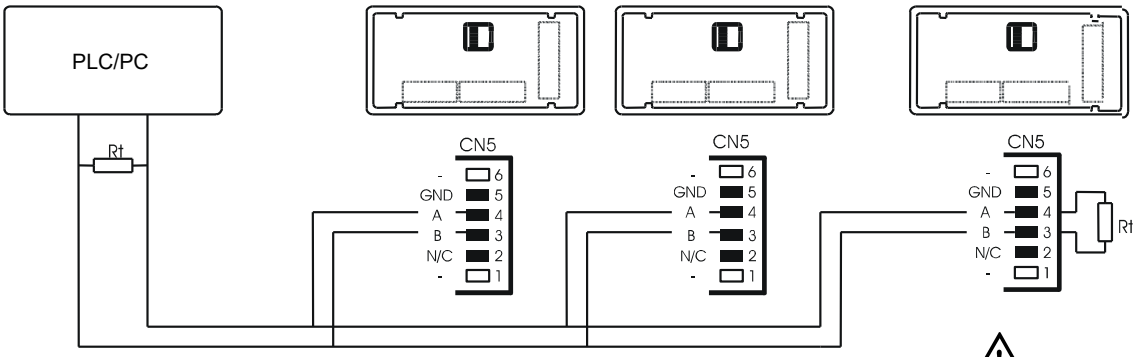


Each output card is supplied with an adhesive label indicating the connection of each of the options.

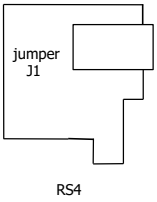
For a better identification of the instrument, this label should be placed at the bottom of the box, next to the label with the basic functions of the instrument.

DPM-RS485

WIRING DIAGRAMS



Up to 31 ProSense indicators can be connected on the same line with a PLC/PC by assigning each of them a unique address between 00 and 99.
Address 00 is common to all the instruments on the line and can be used by the master device to give an order to tare the display, reset the memories or modify the set points, that is, those that do not imply the return of a value by the interrogated device.

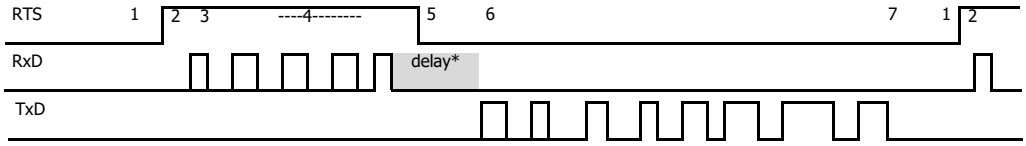


NEVER CONNECT TO THE TELEPHONE LINE

The order sent with address 00 will be executed simultaneously by all the devices.
For the connection of multiple instruments through the RS485 link, it is necessary to add a 120 Ohm termination resistor (Rt) at both ends of the communication line.
The indicators incorporate the internal resistance Rt that remains connected between terminals 3 and 4 of connector CN5 by placing jumper J1 on the RS4 card.
The connection of the signal and the resistance Rt at the end of the PLC/PC may vary depending on the type of card installed in the computer. It is recommended to consult the technical manual.

CONTROL CONVERTER RS232C to RS485 Type IC485S

Timing diagram Evolution of the signals (example with ASCII Protocol)



Pos	RTS	Direction	Data	Remark
1	0	←		PC initial situation (RS-485 Converter Data-PC Direction)
2	1	→		PC initial situation (RS-485 Converter Data-PC Direction)
3	1	→	RxD	Start signal(*), Address(xx), Command(y), End signal (CR) sent to the Device
4	1	→		Waiting time for the entire buffer to be sent
5	0	←		Change address in the converter for data input (Data in Address to PC)
6	0	←	TxD	The data is stored in the PC buffer
7	0	←		Pause

Note: Between points 4 and 6 the DPM4 instrument adds a dLY (delay = delay) indicated with the label delay. Delay is between the last bit of the last byte of the message sent and the first bit of the response sent by the ins-trument (not related to the RTS edge).
If you cannot control the RTS signal from your PC with your available software, you should use an RS232C to RS485 adapter of the so-called **automatic** type, available on the market.

DPM-RS485

PROTOCOLS DESCRIPTION

Three modes of communication are provided; A simple ASCII mode, the ISO mode, in accordance with the ISO 1745 standard, enables more effective communication in noisy environments as it checks the validity of messages both on transmission and reception.
And also the MODBUS RTU protocol.
As can be seen in the table of functions, the ASCII protocol uses 1 or 2 bytes depending on the type of command and the ISO 1745 protocol imposes the use of two bytes per command.

- **ASCII PROTOCOL**

The word format is 1 START bit, 8 DATA bits, NO parity and 1 STOP bit.

FORMAT OF THE MESSAGE TO SEND
A message addressed to the instrument must consist of the following series of ASCII characters:

*	D	d	C	C	X X	CR

A character "*" [ASCII 42] to start the message.
Two address digits (between 00 and 99).
One or two ASCII characters corresponding to the desired command according to the function table.
If the command is of the parameter modification type, the new value will be sent in the form of a sign byte + [ASCII 43] or - [ASCII 45] followed by a block of "N" ASCII characters (depending on the model), including the decimal point.
A "CR" [ASCII 13] end-of-message character.

INSTRUMENT RESPONSE MESSAGE FORMAT
The format of the messages sent from the instrument in response to a data request type command is as follows:

SP	X X	CR

One byte of white space [ASCII 32].
A text (required value) consisting of a sign byte + [ASCII 43] or - [ASCII 45] followed by a block of "N" ASCII characters (depending on the model) including the decimal point.
A "CR" [ASCII 13] end-of-message character.
If the command is of the command or parameter change type, the instrument does not send any response.

- **ISO 1745 PROTOCOL**

The word format is 1 START bit, 7 DATA bits, 1 EVEN PARITY bit, and 1 STOP bit.

FORMAT OF THE MESSAGE TO SEND
A message from the master device must consist of the following sequence of characters:

SOH	D	d	STX	C	C	X X	ETX	BCC

One SOH start-of-message byte [ASCII 01].
Two bytes corresponding the first to the tens and the second to the units of the address of the device to be interrogated.
One byte STX start of text [ASCII 02].
Two command bytes according to the function table
In case of parameter change commands, a block of N bytes corresponding to the numerical value including sign and decimal point.
One ETX end of text byte [ASCII 03].
A control BCC byte calculated as follows:
Carry out an exclusive-OR of all the bytes included between the STX (not included) and the ETX (yes included).
- If the byte obtained in ASCII is greater than 32, it can be taken as BCC.
- If the result in ASCII is less than 32, the BCC control byte will be obtained by adding 32.

DPM-RS485

PROTOCOLS DESCRIPTION

- **ISO 1745 PROTOCOL**

INSTRUMENT RESPONSE MESSAGE FORMAT

The typical format of messages sent from the instrument in response to a command from the master device is as follows:

In the case of commands that request the return of a value (of the data request type):

SOH	D	d	STX	X X	ETX	BCC

One SOH start-of-message byte [ASCII 01].
Two address bytes.
One byte STX start of text [ASCII 02].
"N " bytes corresponding to the requested value (including sign and decimal point).
One ETX end of text byte [ASCII 03].
A control BCC byte.

In the case of commands that do not imply the return of a value (type commands or change of parameters):

D	d	ACK

or

D	d	NAK

The instrument will send a confirmation that the message has been received.
If the message has been correctly received and interpreted, the response will consist of two address bytes and one "ACK" byte [ASCII 06].

If the received message has not been acknowledged or errors have been detected, the response will consist of two address bytes and one "NAK" byte [ASCII 21].

When the master device transmits a message to address 00, the command will be interpreted by all devices on the network and there will be no response.

- **MODBUS RTU PROTOCOL**

ASCII / ISO1745 COMMAND TABLE

Command		Function	Type function
Protocol ASCII	Protocol ISO1745		
D	ØD	Transmission display value	Trans
T	ØT	Transmission TARA value (offset in thermometers, preset in ALPHA-D)	Trans
P	ØP	Transmission Peak value	Trans
V	ØV	Transmission Valley value	Trans
Y	ØY	Transmission Peak-Peak value	Trans
L1	L1	Transmission setpoint 1 value	Trans
L2	L2	Transmission setpoint 2 value	Trans
L3	L3	Transmission setpoint 3 value	Trans
L4	L4	Transmission setpoint 4 value	Trans
M1	M1	Modify setpoint 1 value	Modif
M2	M2	Modify setpoint 2 value	Modif
M3	M3	Modify setpoint 3 value	Modif
M4	M4	Modify setpoint 4 value	Modif
I	ØI	Transmission active logical inputs	Trans

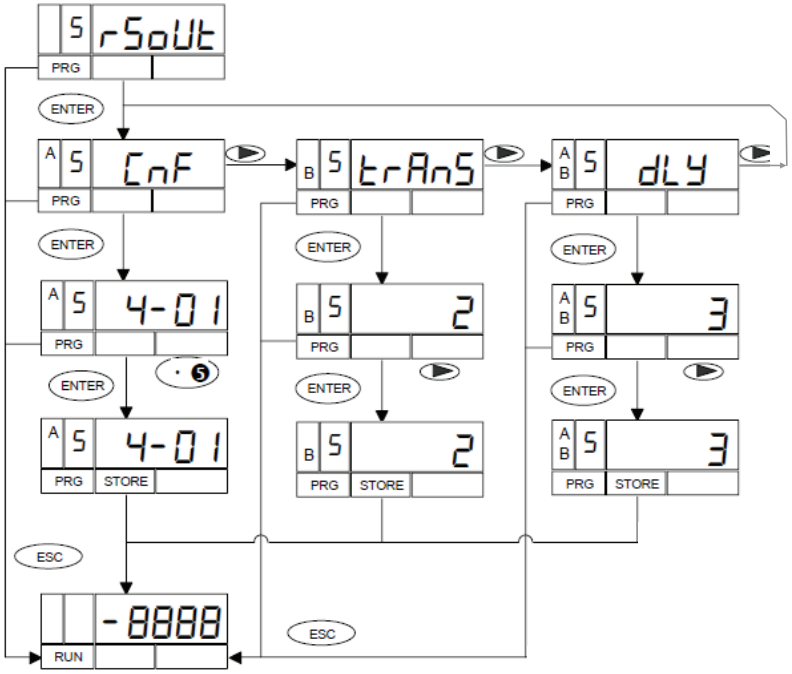
Command		Function	Type function
Protocol ASCII	Protocol ISO1745		
t	Øt	Make tare	order
r	Ør	Reset tare (or preset in Alpha-D)	order
p	Øp	Reset peak	order
v	Øv	Reset valley	order
y	Øy	Reset peak-peak	order
n	Øn	Reset setpoints latch	order
	TT	Transmission type of instrument	Trans

DPM-RS485

DPM-RS485 PROGRAMMING

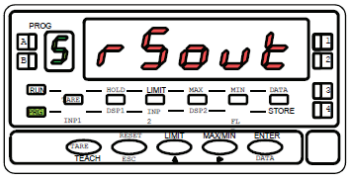
The module adds 3 independent access menus that allow the configuration of the following parameters:

Menu 5A CnF: Setting the baud rate and address of the device.
Menu 5B trAnS: Selection between ASCII, ISO 1745 and MODBUS protocols.
Menu 5AB dLy: Selection of the delay applicable to the response time of the device from the receipt of an order.



ACCESS TO PROGRAMMING THE SERIAL OUTPUT

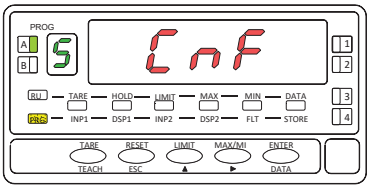
Press the "ENTER" key to go from the work mode to the programming mode (indication -Pro-, PROG led) and repeatedly press the key ▶ until reaching the level shown in the figure corresponding to the entry in the programming module of the serial output.



Press ENTER to access the different programming menus,

▶ : to go to the next programming module.
ESC : to return to work mode.

The figure shows the indication corresponding to entering the transmission speed and address configuration menu (display **5 CnF**, leds **A** and **PROG** active).



Press ENTER to enter this menu, or

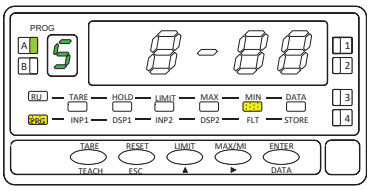
▶ : to go to the next programming module.

ESC : to return to work mode.

DPM-RS485

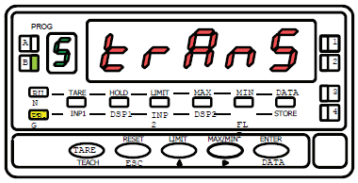
SPEED TRANSMISSION & ADRESS SELECTION

An "ENTER" in the previous step makes two numbers appear on the display separated by a hyphen with the first one flashing.
The number on the left (1 digit) corresponds to the baud rate:
[1 = 1200, 2 = 2400, 3 = 4800, 4 = 9600 and 5 = 19200 baud.]
The number on the right (2 digits) corresponds to the address of the instrument, which can be programmed between 00 and 99.
Successively press the key ▲ to vary the value of the flashing digit and press ► to proceed to programming the next digit.
Carry out these operations until the desired parameters are displayed on the display and press ENTER to save the programmed and return to RUN mode.



PROTOCOL SELECTION

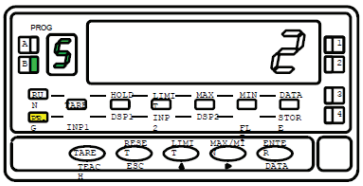
Press "ENTER" to access the programming menus and twice ► to place the instrument in the phase represented in the figure
(indication **5 trAnS**, leds **B** and **PROG** lit). In this menu the communication mode between the instrument and the D.T.E. will be selected. (Data Terminal Equipment)



Press ENTER to enter this menu, or
► : to skip from this menu and return to the CnF menu.
ESC : to return to work mode.

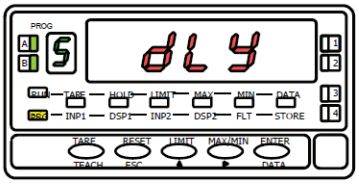
A flashing number appears on the display (1,2 or 3 depending on the previous selection) corresponding to the current communication protocol
[1 = ASCII protocol, 2 = ISO 1745 protocol and 3 = MODBUS].
If the value on the display corresponds to the desired option, press
ENTER or ESC to return to RUN mode.

Otherwise, press the key ► to change the number and ENTER to save the data in memory and go to RUN mode.



DELAY SELECTION

Starting from the entry in module 5 press ENTER to access the programming menus and twice the key ► to place the instrument in the phase represented in the figure (indication **5 dLy**, leds **A**, **B** and **PROG** lit)
This menu allows you to enter a delay that will act when the instrument responds to a command. The purpose of this delay is to prevent information from being lost when the response is produced before the master device is able to receive it [This case can occur in half-duplex type links since the transmission and reception of messages is carried out along the same line].



Press ENTER to enter this menu, or
► : to skip this menu and go to menu 5A
ESC : to return to RUN mode.

An ENTER in the previous step, it flashes a number (between 1 and 4 according to previous programming) on the display [**1** = 30ms delay, **2** = 60ms delay **3** = 100ms delay **4** = 300ms delay] Press the key ► successively until the display shows the number corresponding to the desired response time and press ENTER to save the data in memory and automatically go to RUN mode.