

USER MANUAL



PROSENSE DPM3 SERIES

DIGITAL PANEL METER FOR PROCESS, TEMPERATURE AND LOAD CELL INPUT SIGNALS

Models:

- | | |
|----------------------|----------------------|
| DPM3-AT-H | DPM3-AT-L |
| DPM3-AT-2R-H | DPM3-AT-2R-L |
| DPM3-AT-4R-H | DPM3-AT-4R-L |
| DPM3-AT-A-H | DPM3-AT-A-L |
| DPM3-AT-A2R-H | DPM3-AT-A2R-L |

Scan or click the QR code for a series of Configuration and Programming videos for the ProSense DMP Series Panel Meters



In this Chapter...

General Information	4
Package Contents.....	4
Recycling Instructions.....	4
General Safety Considerations.....	4
Symbols Identification.....	4
Maintenance.....	5
Technical Support.....	5
Agency Approvals.....	5
Device Description	6
Dimensions and Mounting	7
Installation.....	7
Wiring Terminals	8
Wiring Examples	9
Process Input Signal Wiring Diagrams (mA).....	9
Process Input Signal Wiring Diagram (V).....	10
Load Cell Input Signal Wiring Diagram.....	10
Pt100 Sensor Input Wiring Diagram.....	10
Thermocouple (J, K, T, N) Sensor Input Wiring Diagram.....	11
Display and Key Pad	12
Configuration:	12
Programming numerical values.....	13
Input Configuration	14
Process input.....	15
Load cell input.....	15
Pt100 RTD Input.....	15
Thermocouple Input.....	16
Display Configuration	17
Scaling.....	17
Programming of the scale.....	18
SCAL method.....	19
tEACH method.....	19
Programming of a nonlinear process.....	19

Weighted Average Filter P	19
Round	19
Brightness	20
Eco	20
Input Error.....	20
Additional Functions.....	20
MAX/MIN function.....	22
Logic functions.....	23
Logic functions menu.....	24
Table of programmable functions	24
Configuration Lock Out.....	25
Lock-out menu diagram	26
Output Options.....	28
Relay Configuration.....	28
Description of Operation.....	28
Relay Configuration menu diagram	29
Direct access to the relay setpoints value programming	30
Analog output.....	30
Analog output menu diagram	31
Technical Specifications.....	32
Notes:.....	34

General Information

Package Contents

- DPM3 Series digital panel meter
- Quick start guide
- Mounting panel accessories (a sealing gasket and 2 fixing clips)
- Wiring accessories (plug-in terminal block connectors and 2 key tools for wire insertion)
- 4 adhesive engineering unit label sheets

Recycling Instructions



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

In order to protect the environment and in agreement with the European legislation regarding waste of electrical and electronic 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.

www.AutomationDirect.com

Agency Approvals



Device Description

The ProSense DPM3 series offers a simple, feature packed digital display of analog process signals, temperature in either Fahrenheit or Celsius from RTD or Thermocouple temperature sensors, load cell, or potentiometer inputs. The 5-digit tri-color red, green or amber LED display is easily scaled into any engineering units from -19999 to 39999 with a selectable decimal point location. Two point direct or reverse acting linear scaling values can be entered manually or by introducing actual sensed process values in Teach mode. Additionally non-linear processes can be scaled by entering up to 11 scaling points. Models are available with two SPDT or four SPST relay outputs that can be set to activate on an increasing or decreasing input signal with hysteresis or time delay operation. Additionally the display color can be set to change on relay operation. Models are also available with a 4-20mA analog output. The meter is powered from an external AC or DC power supply and provides both 24VDC and 10VDC for external sensor excitation. The 1/8 DIN housing is easy to install in a panel and the meter face has an IP65 rating. Configuration parameters can be totally or selectively locked out to prevent unauthorized or accidental changes to the meter's operation. Other features include memory and reset of minimum and maximum display values, three tare functions, display hold function, filtering to minimize display bounce, and display brightness adjustment. ProSense digital panel meters are backed by a 3 year warranty.

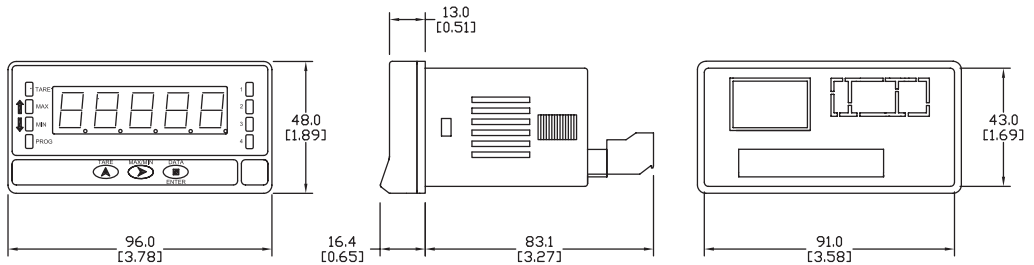
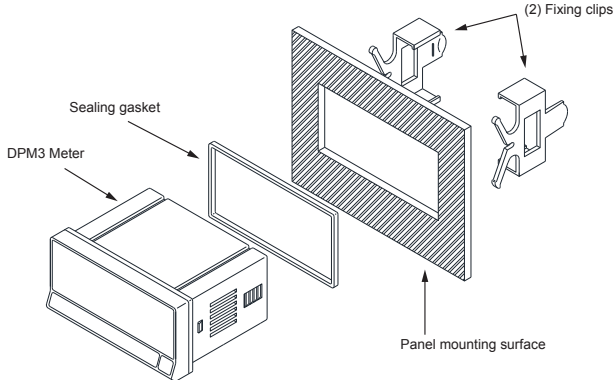
- 96 x 48mm 1/8 DIN
- Simple menu driven pushbutton configuration
- 5 digit (-19999 to 39999) tri-color (red, green, amber) LED display
- Selectable decimal point
- Process ($\pm 10V$, $\pm 20mA$)
- Temperature (RTD: Pt100, TC: J, K, T, N, Resolution: 1°F, 0.1°F, 1°C, 0.1°C)
- Potentiometer
- Load cell ($\pm 15mV$, $\pm 30mV$, $\pm 150mV$)
- AC or DC powered
- Sensor excitation voltage 24V and 10V
- Display scaling or process teaching modes
- Optional 4-20mA analog output
- Optional (2) Form C SPDT or (4) Form A SPST relays
 - Activation on increasing or decreasing input signal
 - Hysteresis or time delay operation
 - Display color change on relay operation
- Configuration for direct or reverse acting linear processes and up to 11 point non-linear processes
- Total or selective configuration lock out
- Programmable functions include:
 - Minimum and maximum value memory
 - Minimum and maximum value reset

Tare

Hold

- Filtering to minimize display bounce
- Display brightness adjustment
- 3 year warranty

Dimensions and Mounting



Installation

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.

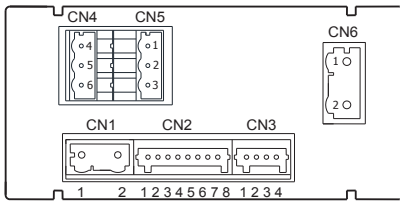
While holding the unit in place, put the fixing clips on both sides of the case and slide them through the guide tracks until they reach the panel at the rear side.

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.

To remove the instrument from the panel, pull the rear fixing clips latching tabs outwards until they are disengaged, then slide the fixing clips back over the case.

Installation	
Dimensions	96 x 48 x 83.1mm (1/8 DIN)
Panel Cutout	92 x 45mm (Max. panel thickness 10mm)
Case Material	Polycarbonate UL 94 V-0

Wiring Terminals



CN1	
AC Supply	DC Supply
1 Line	1 VDC
2 Neutral	2 VDC

Polarity insensitive for DC power

CN3	
1	Common
2	Tare
3	Tare reset
4	Hold

CN2				
	Input Signal / Excitation			
	Process	Temperature	Load Cell	
1	-EXC24V	---	-EXC10	
2	+EXC24V	---	---	
3	---	---	+EXC10	
4	---	Pt100 A	---	
5	+mA	---	---	
6	+V	---	---	
7	---	Pt100 B	+TC	+mV
8	-V / -mA (COM)	Pt100 B	-TC	-mV (COM)

2 SPDT Relays (-2R)

CN4 (Relay 2)	
4	NO2
5	CM2
6	NC2

CN5 (Relay 1)	
1	NO1
2	CM1
3	NC1

4 SPST Relays (-4R)

CN4	
4	NO4
5	Unused
6	CM (All)

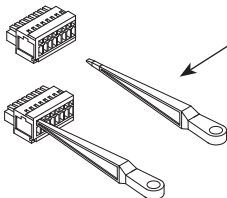
CN5	
1	NO1
2	NO2
3	NO3

NO: Normally open, CM: Common, NC: Normally closed

Terminals					
Connector	CN1	CN2	CN3	CN4 & CN5	CN6
Wire cross section	0.08 to 2.5mm ² (28 to 12 AWG)	0.08 to 0.5mm ² (28 to 20 AWG)	0.08 to 0.5mm ² (28 to 20 AWG)	0.08 to 2.5mm ² (28 to 12 AWG)	0.08 to 2.5mm ² (28 to 12 AWG)
Strip length	8 to 9mm	5 to 6mm	5 to 6mm	8 to 9mm	8 to 9mm
Manufacturer	Wago 231-202/026-000	Wago 733-108	Wago 733-104	Wago 231-303/026-000	Wago 231-302/026-000
Cage clamp connection	Insertion tool or screwdriver with 0.5 mm x 3.0 mm blade	Insertion tool or screwdriver with 0.3 mm x 1.8 mm blade	Insertion tool or screwdriver with 0.3 mm x 1.8 mm blade	Insertion tool or screwdriver with 0.5 mm x 3.0 mm blade	Insertion tool or screwdriver with 0.5 mm x 3.0 mm blade

CN6	
Analog Output	
1	(-) 4-20mA
2	(+) 4-20mA

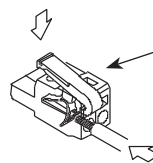
CN2 and CN3 Terminals



Insertion Tool (included with meter)

Insert wires into the proper terminal while using the insertion tool to open the clip inside the connector. Release the insertion tool to fix wire to the terminal.

CN1, CN4, CN5 and CN6 Terminals



Insertion Tool (included with meter)

Insert wires into the proper terminal while using the insertion tool to open the clip inside the connector. Release the insertion tool to fix wire to the terminal.

This instrument conforms with the following community directives: EMC 2004/108/CE and LVD 2006/95/CE.

Refer to the instructions in this manual to preserve safety protections.



WARNING: If this instrument is not installed and used in accordance with these instructions, the protection provided against hazards may be impaired.

To meet the requirements of EN 61010-1 standard, where the unit is permanently connected to main supply, it is obligatory to install a circuit breaking device easily reach by the operator and clearly marked as the disconnecting device.

To guarantee electromagnetic compatibility, the following guidelines should be kept in mind:

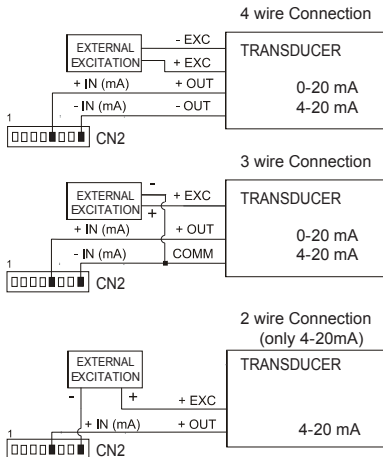
- Power supply wires should be separately routed from signal wires and never run in the same conduit.
- Use shielded cable for signal wiring.
- Cables section should be $\geq 0.25 \text{ mm}^2$.

Before connecting signal wires, signal type and input range should be verified to be within the right limits. Do not connect simultaneously more than one input signal to the meter.

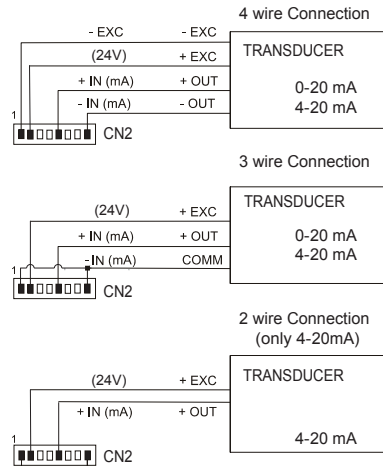
Wiring Examples

Process Input Signal Wiring Diagrams (mA)

CONNECTION WITH EXTERNAL EXCITATION

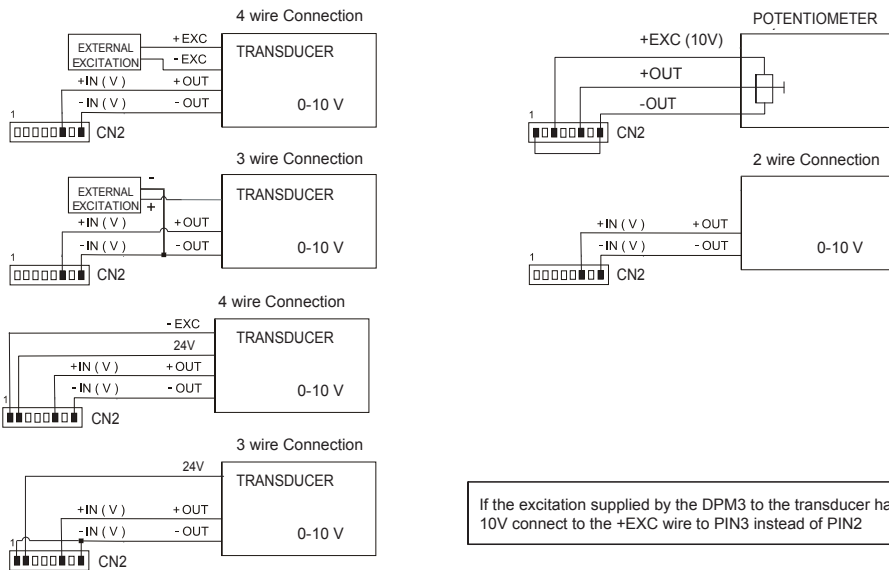


EXCITATION SUPPLIED BY DPM3



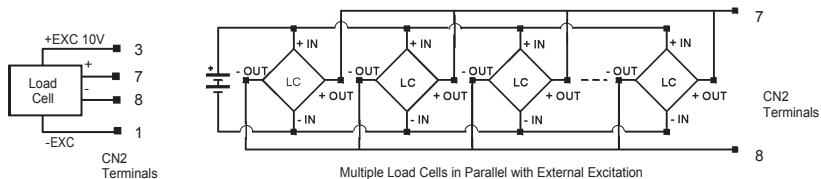
If the excitation supplied by the DPM3 to the transducer has to be 10V connect to the +EXC wire to PIN3 instead of PIN2

Process Input Signal Wiring Diagram (V)

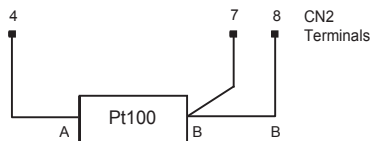


If the excitation supplied by the DPM3 to the transducer has to be 10V connect to the +EXC wire to PIN3 instead of PIN2

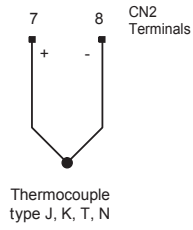
Load Cell Input Signal Wiring Diagram



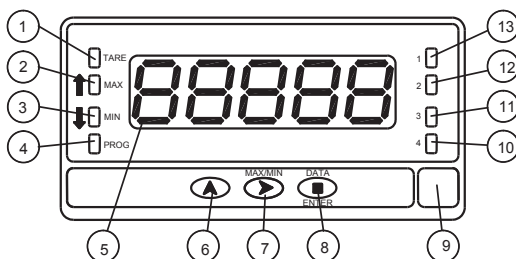
Pt100 Sensor Input Wiring Diagram



Thermocouple (J, K, T, N) Sensor Input Wiring Diagram



Display and Key Pad



Programming Panel			
#	Description	Run Mode	Programming Mode
1	TARE	Indicates tare in the memory	---
2	MAX	Indicates peak displayed	---
3	MIN	Indicates valley displayed	---
4	PROG	---	Indicates programming mode
5	DISPLAY	Displays the input variable	Displays programming parameters
6	TARE (UP) KEY	Takes on the display value as tare	Increments the value of the flashing digit
7	MAX/MIN (DOWN) KEY	Recalls Max/Min values	Moves to the right
8	ENTER KEY	Enters in PROG mode. Displays data	Accepts data. Advances program
9	Free space for units label	---	---
10	LED Output 4	Activation Output 4	Programming output 4
11	LED Output 3	Activation Output 3	Programming output 3
12	LED Output 2	Activation Output 2	Programming output 2
13	LED Output 1	Activation Output 1	Programming output 1

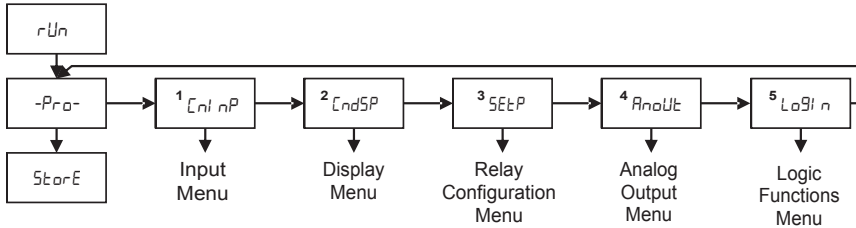
Configuration:

When the power is applied to the meter, a display test begins automatically to check the function of the LED's and digits. Once this test is finished the display shows the internal software version and then the unit goes to **RUN** mode.

Configuration follows a structure composed of a number of menus and submenus. By pressing the **ENTER** key, the display show "Pro". Pressing the **SHIFT** key repeatedly provides access to the main menu level which includes menus for input configuration (**CnInP**), display configuration (**CndSP**), relay configuration if present (**SEtP**), analog output configuration if

present (**Anout**), logic functions configuration (**LoGIn**). Press **ENTER** to access the submenus under each main menu.

If configuration has been totally locked-out, when pressing **ENTER** to access the main menu level, the display shows **dAtA** instead of **Pro**. This indicates that it is only possible to see programmed information and that it is not allowed to modify any parameter from the entire configuration. In this visualization mode, the meter automatically switches back to **RUN** mode after 15 seconds since the last key press.



Programming Key Pad

- ▣ **ENTER:** Vertical displacement.
- ▲ **UP:** Changes active digit.
- ▶ **SHIFT:** Horizontal displacement.

The progress through the programming routines is done by pressing **ENTER** key. In general, push **SHIFT** key a certain number of times to select an option and push **ENTER** key to validate the change and move forward to the next step of the program.

Programming numerical values

When the parameter is a numerical value, the display will show the first of the digit to be programmed blinking.

Digit selecting: Press repeatedly the **SHIFT** key to shift from left to right over all the display digits.

Changing the digit value: Press repeatedly the **UP** key to increase the value of blinking digit until it has the desired value.

The minus sign is programmed depending on the variable type. A variable that represents the value of an input will be able to take a value in the range -19999 to 99999, without taking into account the decimal point. When a digit is selected it shows values from (0) to (9), and then (-1), (-), and comes back to show values from 0 to 9. A variable that represents a display value will be able to take a value in the range -19999 to 39999, without taking into account the decimal point. In these case the first digit shows 0, 1, -1, 2, 3 or -.

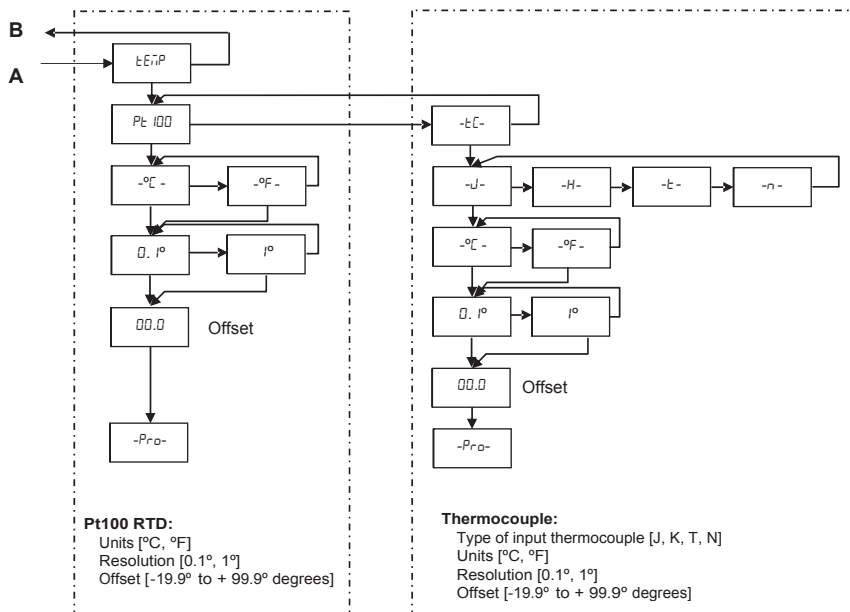
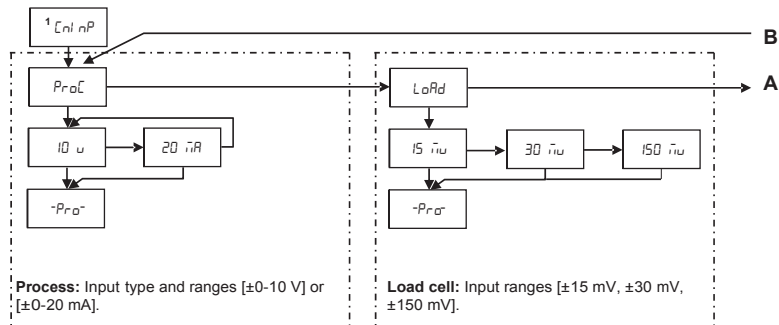
Completion of each submenu routine returns the meter to **Pro** mode. To save data entered or changed during configuration press the **ENTER** key while in **Pro** mode. **StorE** will be displayed for a few seconds while all of the configuration data is stored in memory. The meter will then return to **RUN** mode.

Input Configuration

The figure below shows the input configuration menu. Divided into four submenus, each one of them separated by the dotted line in the manual, each menu corresponds to the programming of the different types of input: process, load cell, Pt100 RTD and thermocouple.

Programming Keys (Bottom view)

- ▣ **ENTER:** Vertical displacement.
- ▲ **UP:** Changes active digit.



Process input

The DPM3 is designed to measure all kinds of process variable with direct indication in engineering units.

The parameter to configure as process indicator is the input type, in volts in a -10 V to 10 V range and in milliamperes in a -20 mA to 20 mA range.

Load cell input

Refer to cell manufacturers documentation, particularly with respect to the cell sensitivity and supply voltage specifications.

As load cell indicator the meters function is to measure forces (weight, pressure, torque...) when connected to several bridge type transducers such as load cell, which supply signal levels up to ± 150 mV. The excitation voltage supplied by this instrument is 10V. Up to 2 cells can be connected in parallel with 10 V excitation without need for an external source.

Example:

2 cells with 2 mV/V sensibility are supplied with an excitation voltage of 10 V; the voltage generated by each cell at full load is 20 mV, being 20 mV the maximum as the cells are connected in parallel.

Configuration requires selection of the input range which may be selected high enough for the maximum input signal to avoid overloads. There are three ranges: ± 15 mV, ± 30 mV and ± 150 mV

Example:

If a weighing process gives 12 mV to the meter input with maximum load, the best input range to select will be “15 mV”.

Pt100 RTD Input

When configuring the meter as thermometer for 3 wires Pt100 sensors, the temperature ranges and resolution available are:

Input	Range (res. 0.1°)	Range (res. 1°)
Pt100	-200.0 to +800.0°C	-200 to +800°C
	-328.0 to 1472.0°F	-328 to 1472°F

The Pt100 software menu allows selection of temperature units (Celsius or Fahrenheit), resolution (degree or tenth of degrees) and a display offset. Offset value is programmed for a known difference between the temperature under measurement and the temperature read by the sensor. This difference can be corrected by programming an offset from -19.9 to +99.9. **LED TARE will light up each time that an offset value is programmed.**

Example:

In a process of temperature control the Pt100 sensor is located in a part of the process where temperature is 10 degrees below than the point where the control has to be done. By programming an offset of 10 points, with 1 degree resolution, the deviation will be corrected.

Configurable parameters for this input are:

- A) Reading units in degree Celsius “°C” or Fahrenheit “°F”.
- B) Resolution in tenth of degrees “0.1°” or in whole degrees “1°”.
- C) Offset. The instrument comes from factory with offset=0

After entering these parameters, the display range and linearization are adjusted automatically.

Thermocouple Input

When configuring the meter for thermocouple input, the temperature ranges and resolution available are:

Input	Range (res. 0.1°)	Range (res. 1°)
Thermocouple J	-150.0 to +1100.0°C	-150 to +1100°C
	-238.0 to +2012.0°F	-238 to +2012°F
Thermocouple K	-150.0 to +1200.0°C	-150 to +1200°C
	-238.0 to +2192.0°F	-238 to +2192°F
Thermocouple T	-200.0 to +400.0°C	-200 to +400°C
	-328.0 to +752.0°F	-328 to +752°F
Thermocouple N	-150.0 to +1300.0°C	-150 to +1300°C
	-238.0 to +2372.0°F	-238 to +2372°F

The thermocouple menu allows selection among several types of thermocouples, temperature units (Celsius or Fahrenheit), resolution (degree or tenth of degrees) and a display offset. Offset value is programmed for a known difference between the temperature under measurement and the temperature read by the sensor. This difference can be corrected by programming an offset from -19.9 to +99.9. **LED TARE will light up each time that an offset value is programmed.**

Example:

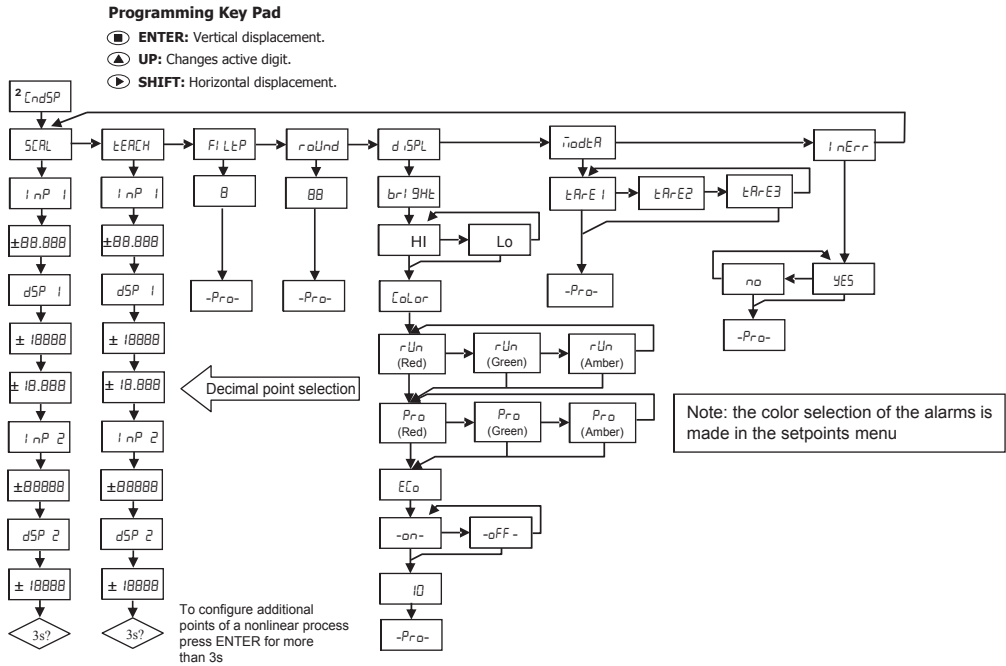
In a process of temperature control the thermocouple sensor is located in a part of the process where temperature is 5 degrees below than the point where the control has to be done. By programming an offset of 5 points, with 1 degree resolution, the deviation will be corrected.

Configurable parameters for this input are:

- A) Thermocouple type [J, K, T, N].
- B) Reading units in degree Celsius “°C” or Fahrenheit “°F”.
- C) Resolution in tenth of degrees “0.1°” or in whole degrees “1°”.
- D) Offset. The instrument comes from factory with offset=0

After introducing these parameters, the display range and linearization for the selected thermocouple input are adjusted automatically.

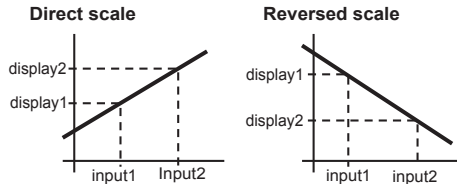
Display Configuration



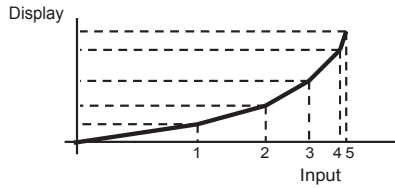
Scaling

It is only necessary to scale the meter when it has been configured for a process or a load cell input signal. When configured for temperature sensor input the meter is automatically scaled to a fixed range based on the temperature sensor. Scaling consists of assigning a display value to each input signal value.

In linear processes it is achieved by programming two coordinates (InP1, DSP1) and (InP2, dSP2), between which is established a linear relation where each input signal value corresponds to a display value. The relationship can be direct or reversed. In order to obtain more accuracy, points 1 and 2 should be located approximately at both extremes of the process.



In nonlinear processes it is possible to program up to 11 input to display points. Each two points are connected by a straight line and the whole is a curve that represents the relationship between the input value and the display value.

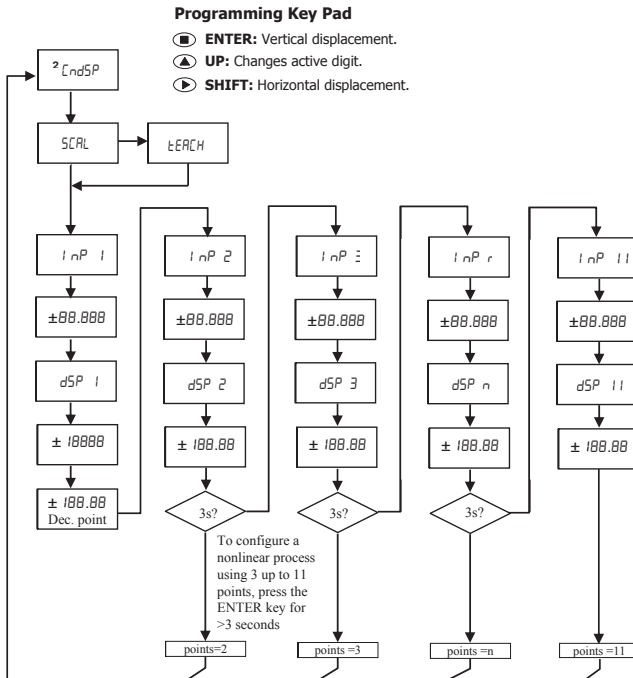


In order to obtain more accuracy it is recommended to program the highest possible number of points and reduce the segment length. **Input values must always be programmed in an increasing or decreasing order. Avoid assigning two different display values to two equal input values.** Display values can be entered in any order and even be repeated for different inputs.

Below the first point programmed, the relationship established between the two first points of the scale is followed. Above the last point programmed, the relationship established between the two last points of the scale is followed.

Programming of the scale

There are two methods for programming the scale, the **SCAL** method and the **tEACH** method.



SCAL method

The input and display values are programmed manually. This method can be used when the value of the signal supplied by the transducer at each points of the process is known.

tEACH method

The input values are introduced directly from actual process values. The input signal device must be connected to the meter and operational when each point is programmed. The display values are programmed manually. This method can be used when it is possible to bring the process to the conditions of each one of the points to be programmed.

Programming of a nonlinear process

Access the first two input-display points by pressing the **ENTER** key. To access the programming of the rest of the points, press **ENTER** key for 3s after entering the display value of point 2. From here the progression is achieved by pressing **ENTER** key. When enough points have been programmed to define the process, press **ENTER** for 3s after entering of the last DSP n value, to get out of the scale programming routine. The rest of the points, up to 11, that have not been programmed are omitted from the display calculation.

Input Points

- 19999 to 99999

Display Points

- 19999 to 39999

Display decimal point

0 0.0 0.00 0.000 0.0000

Accessible from the **SCAL** or **tEACH** menu, following the first display point. Once accessed, it will start to blink in its present position. Use the **SHIFT** key to shift to another position.

The selected decimal point location will be applied to all display points and if present relay setpoints and analog output scale.

Weighted Average Filter P

0 to 9 (4Hz to 0.05 Hz)

Sets low-pass filter cutoff frequency (Fc) which allows the meter to smooth out undesirable display reading fluctuations. The value can be modified through the **SHIFT** key. This parameter will set in reverse order the cut-off frequency of the low pass filter, getting the filter deactivated for 0 value. **Not available when the instrument is configured for temperature measurement.**

Round

01 05 10

Will take each one of the values by pressing successively on the **SHIFT** key. with 01 there will be no round, 05 will round the display value at 0 to 5, and with 10 will round at 0 to 10. Not available when the instrument is configured for temperature measurement.

Brightness

Hi Lo

Display brightness level selection.

Hi: high brightness

Lo: low brightness

Display color selection between green, red or amber is possible for both **RUN** and **Pro** modes.

Eco

on off

Allows choosing an operative mode with an up to 45% of ENERGY SAVING*

on: After a programmable time without pressing any key, display will turn off leaving only the right decimal point flashing; all functions remain active. Display will be again active after pressing any key.

oFF: Deactivates the function.

* Measured at 230V AC power supply, display 100.00, amber colour and with no options.

Input Error

YES: If Process or Load Cell input signal is lower than the minimum, display will show “-----”.

No: Without indication.

Additional Functions

Several functions can be controlled via Key Pad that will produce different actions depending on the instrument operating mode:

TARE and Reset TARE functions

Three different tare modes are available in the DPM3 and their functions are described below. The desired tare mode can be selected in the Display Configuration **CndSP** / **ModtA** menu.

TARE 1

To configure the meter for Tare 1 mode, select **tArE1** under the **ModtA** menu in Display Configuration **CndSP**. After saving the Tare 1 mode configuration and returning to **RUN** mode, pressing the **UP** key will store the currently displayed value as the tare value (unless it is over scaled) and the **TARE** Led will light. From this point the value displayed on the meter is the net value, i.e., the measured value minus the stored tare value. If a tare value has been stored,

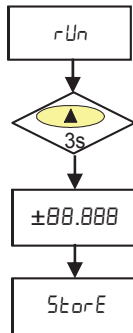
pressing the **UP** key again will add the currently displayed value to the previously stored tare value resulting in a new stored tare value. To reset the tare value to zero, press the **UP** key for 3 seconds. The **TARE** Led will turn off and the displayed value will be the gross value (without the tare).

tArE 2

To configure the meter for Tare 2 mode, select **tArE2** under the **ModtA** menu in Display Configuration **CndSP**. After saving the Tare 2 mode configuration and returning to **RUN** mode, pressing the **UP** key for 3 seconds will allow access to manually enter and store a tare value. After the tare value has been manually entered and saved, the meter returns to **RUN** mode, **TARE** Led will light and from this point the value displayed on the meter is the net value, i.e., the measured value minus the stored tare value. To reset the tare value to zero, press the **UP** key for 3 seconds and manually enter and store a new tare value of zero. The **TARE** Led will turn off and the displayed value will be the measured value (without the tare value applied).

tArE 3

To configure the meter for Tare 3 mode, select **tArE3** under the **ModtA** menu in Display Configuration **CndSP**. After saving the Tare 3 mode configuration and returning to **RUN** mode, pressing the **UP** key for 3 seconds will allow access to manually enter and store a tare value. After the tare value has been manually entered and saved the meter returns to **RUN** mode but the stored value is not yet applied to the displayed value. To apply the stored tare value press the **UP** key, the **TARE** Led will light and from this point the value displayed on the meter is the measured value plus the stored tare value. To reset the tare value to zero, press the **UP** key for 3 seconds and manually enter and store a new tare value of zero or enter the Configuration Display **CndSP** / **ModtA** menu and reselect tare3. Upon returning to **RUN**, the **TARE** Led will turn off and the displayed value will be the measured value (without the tare value applied).



Process to manually enter a tare value in Tare 2 or Tare 3 modes

MAX/MIN function

With the meter in **RUN** mode: Activated after pressing the **SHIFT** key. From **RUN** mode, a press shows the maximum value read by the instrument since the last time it has been switched on, unless a **RESET MAX/MIN** is done, the **MAX** led will light up. A second press shows the minimum value in the same conditions as before, with the consequent minimum indication through the **MIN** led. A third press brings the instrument back to **RUN** mode.

Reset MAX/MIN

With the meter in **RUN** mode: Pressing the **SHIFT** key for 3 seconds, while the meter shows the peak value (**MAX**), will produce a reset of the value. Pressing **SHIFT** key for 3 seconds while the meter shows the valley value (**MIN**) will produce a reset of the value.

Configuration Lockout

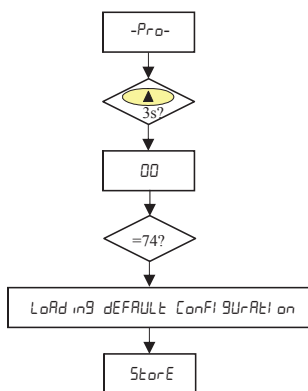
In mode **RUN** if the **ENTER** key is pressed for 3 seconds, the meter will show the indication **Code**, and following **0000**, allowing the user to introduce the security code. If the code that has been introduced is wrong, the meter will go back to **RUN** mode, if it is correct, it will allow the access to the security menu. See section detailing Configuration Lockout.

Programming Mode

One press on the **ENTER** key will bring the instrument to the Programming Mode **-Pro-** mode.

Return to Factory Configuration

After accessing programming mode, **Pro**. Allows entering a code of access to the reset of the configuration parameters, this code is 74. When entering this code the instrument shows the *Load inS dEFAULT ConFiGURAtion* legend, and then *StorE*, which means that they have been stored in the non volatile memory of the meter.



Factory configuration
 INPUT: Process 0 - 10V
 DISPLAY
 Input 1: +00.000 Display 1: +00.000
 Input 2: +10.000 Display 2: +10.000
 Filter P: 0
 Round 01
 Tare mode: 1
 Brightness: High
 DISPLAY COLORS Run Mode: Green, Prog Mode.: Amber
 SETPOINTS
 Setpoint 1: +01.000, Setpoint 2: +02.000
 Setpoint 3: +03.000, Setpoint 4: +04.000
 Compared with: Net
 Mode: HI
 Dly: 00.0
 Alarm Color: No Change
 ANALOG OUTPUT CONFIGURATION
 Display HI: +10.000
 Display LO: +00.000
 LOGIC FUNCTIONS PIN 2=function 1, PIN 3=function 2 and
 PIN 4=function 6

Direct Access to Relay Setpoints

If the DPM3 has relay outputs present the meter allows direct access to the programming of the setpoint values. After accessing programming mode, **Pro**, pressing the **UP** key provides access to each relay setpoint value.

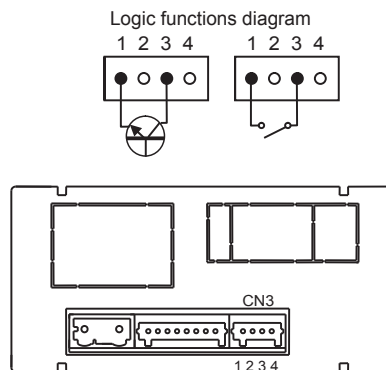
Logic functions

The connector CN3 provides 3 optocoupled inputs that can be operated from external switches. Three different functions may be assigned to the inputs using the front panel keys. Each function is associated to a pin (PIN 2, PIN 3 or PIN 4) that is activated by applying an external switch closure with respect to PIN 1 or COMMON. Function assignments to the inputs are achieved through the programming of a number between 0 and 15 corresponding to one of the functions listed in the following table.

Factory configuration

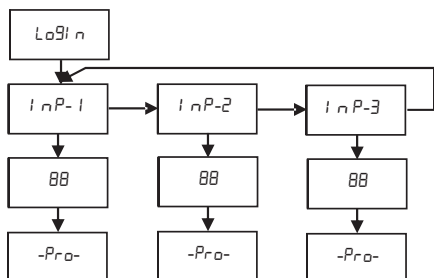
As shipped from the factory, the CN3 connector allows remote control of the TARE, RESET TARE functions as well as the HOLD function. When a HOLD is made, the display value remains frozen while the corresponding pin is activated. The HOLD state affects neither the meter internal operation nor the analog and relay outputs if present.

PIN (INPUT)	Factor Default Functions	Function
PIN 1	COMMON	
PIN 2 (INP-1)	TARE	Function No. 1
PIN 3 (INP-2)	RESET TARE	Function No. 2
PIN 4 (INP-3)	HOLD	Function No. 6



The external electronics applied to the CN3 connector inputs must be capable of withstanding a potential of 40V / 20 mA present at all terminals with respect to COMMON. In order to guarantee the electromagnetic compatibility please refer to the connection instructions in the Wiring Terminal section.

Logic functions menu



Programming Key Pad

- ▣ **ENTER:** Vertical displacement.
- ▲ **UP:** Changes active digit.
- ▶ **SHIFT:** Horizontal displacement.

Table of programmable functions

- **Nº:** Number to select the function.
- **Function:** Function name.
- **Description:** Description and characteristics of the function.
- **Activation by:**

Falling edge: the function is activated applying a falling edge to the corresponding pin with respect to common.

Low level: the function will remain activated as long as the corresponding pin is held at a low level.

No.	Function	Description	Activation By
0	Deactivated	None	None
1	TARE*	Adds the current display value to the tare memory and sets the display to zero.	Falling edge
2	TARE RESET*	Adds the tare memory to the display value and clears the tare memory.	Falling edge
3	LIST RESET*	Performs a reset of the peak (MAX.) or the valley (MIN.), depending on selection.	Falling edge
4	SEE LIST	Displays peak value (MAX.), valley value (MIN.), tare value, net value (NET) or gross value (GROSS) depending on selection.	Low level
5	Not Used		
6	HOLD	Freezes the display while all the outputs remain active	Low level
7	BRIGHTNESS	Changes the display brightness from Hi to Low	Low level
8	DISPLAY COLOR	Changes display color (green, red or amber)	Low level
9	SETP PROG/TARE	Configures Setpoints or Tare depending on Selection List (TARE, SET1, SET2, SET3 and SET4)	Falling edge
10	Not Used		
11	KEYB. EMULATION	Emulates key pad (Input 1=ENTER, Input 2=SHIFT, Input 3=UP)	Low level
12	Not Used		

* Only with mode TARE 1 and TARE 3

Configuration Lock Out

The meter is delivered with the programming not locked out, giving access to all the programming levels. Once completed the meter programming the following security measures are recommended:

1. Lock out the programming access to prevent from programmed parameters modifications.
2. Lock out Key Pad functions to prevent from accidental modifications.
3. There are two lockout modes: selective and total. If the parameters are going to be readjusted frequently, make a selective lockout. If no adjustment is going to be made, make a total lockout. Key Pad functions lockout is always possible.
4. The access to the lockout routine is allowed by entering a personalised code. We recommend changing the code set at factory and to write down your personalised code and keep it in a safe place.

TOTAL LOCKOUT

The access to the programming routines to read data is allowed even if all parameters are locked out totLC=1, but **it won't be possible to enter or modify data**. In this case, when entering in the programming mode, the display shows the indication “-dAtA-”.

PARTIAL LOCKOUT

When only some parameters are locked out, all configuration data can be read but **only non protected parameters can be modified**. In such case, when entering in the programming mode, the display shows the indication -Pro- “.

Menus or submenus that can be locked out are:

- Relay 1 configuration (SEt 1). If present in meter.
- Relay 2 configuration (SEt 2). If present in meter.
- Relay 3 configuration (SEt 3). If present in meter.
- Relay 4 configuration (SEt 4). If present in meter.
- Input configuration (InPut).
- Display (diSP).
- Display color (CoLor).
- Relay setpoints value (SPVAL). If present in meter.
- Analog output configuration (Anout). If present in meter.
- Logic inputs configuration (LoGIn).
- Programming of the key TARE (tArE).
- Direct access to MAX. and MIN values (MAHMn).

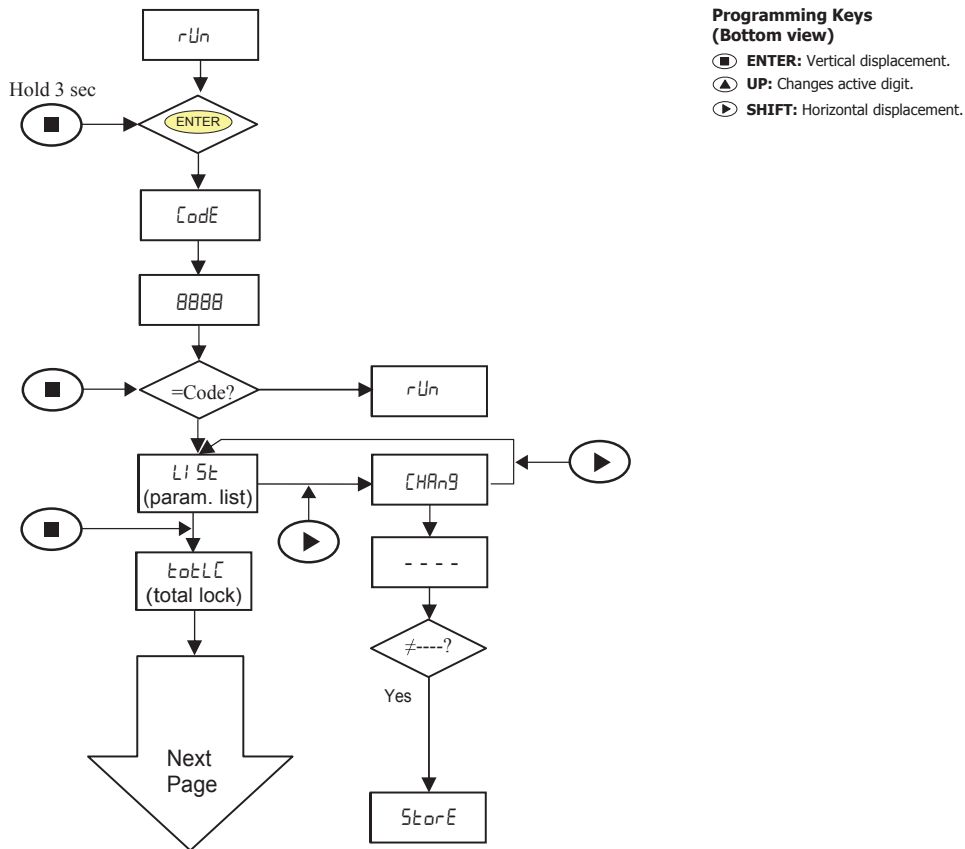
“diSP” , “FiltP” and “tArE” do not appear when the instruments configured for temperature measurement.

Lock-out menu diagram

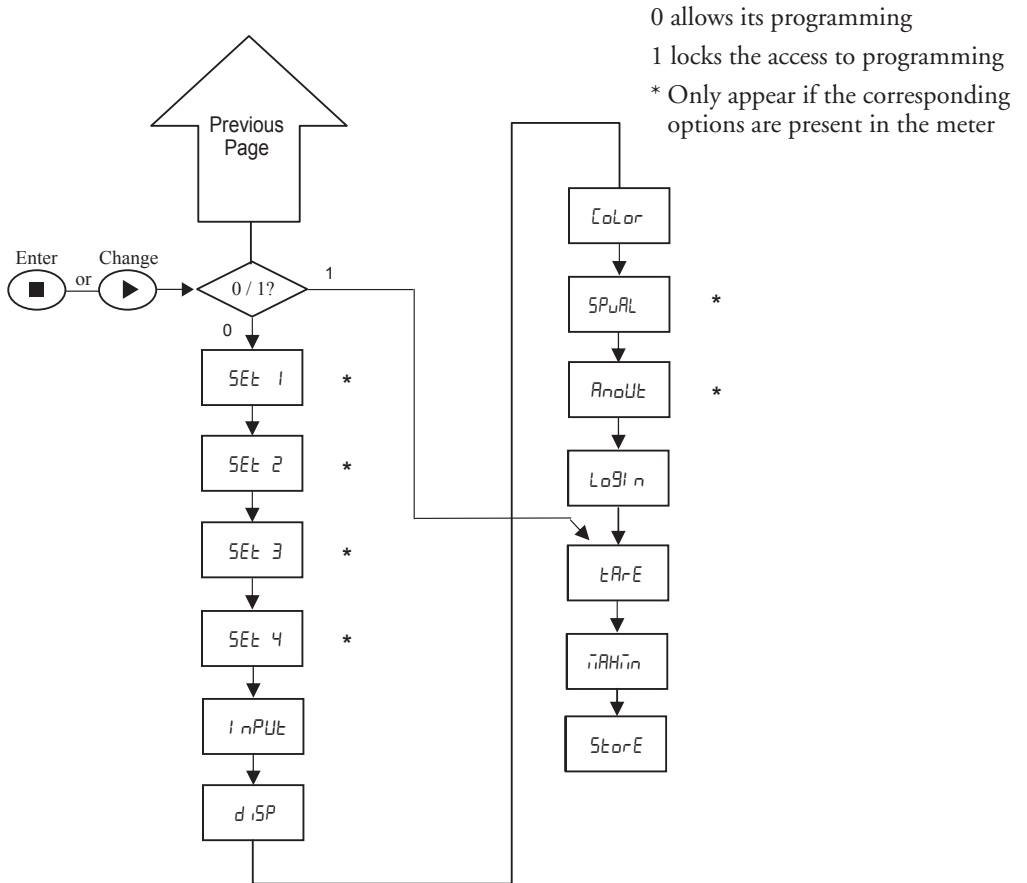
The following figure shows the lock-out menu. The access to this menu is accomplished from the run mode by pressing the **ENTER** key for 3 seconds, until the “**Code**” indication appears. The instrument is shipped from factory with the following default code: “**0000**”. Once this code is entered, the **LISt** indication will appear, from which lockout parameters will be entered. Accessing the “**CHAnG**” menu a new personal code is entered. Write down and keep this code in a safe place (**Do not count on your memory**).

If an incorrect code is entered, the meter will return automatically to the run mode. Total lockout programming is achieved by changing the “**totLC**” variable to 1, changing it to 0, will lead to the selective lockout of the programming variables. Programming each one of the parameters to 1 will activate the lockout, if they are set to 0 programming will be accessible. Though the programming is locked out, it remains possible to visualise the current programming.

The “**StorE**” indication informs that the modifications effectuated have been stored correctly.



Lock-out menu diagram continued



Output Options

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

Relay Configuration

Introduction

Some DPM3 models are equipped with either 2 or 4 relays that can provide individual alarm and control capabilities. All relays can be configured to function based on independent setpoint values within the full configured display range, time delay (in seconds), hysteresis (in counts of display) and selectable HI/LO acting.

Description of Operation

The relay outputs activate when the display value reaches the corresponding programmed relay setpoint value. The following relay operational parameters must also be set:

a. COMPARISON NET/ GROSS

In “NET” mode will compare the setpoint value with the display net value. In “GROSS” mode, the comparison will be with the sum net + tare.

b. HI/ LO ACTING MODE.

In HI mode, the output activates when the display value exceeds the setpoint level and in LO mode, the output activates when the display value falls below the setpoint

c. RELAYS CONTACT DEFAULT STATE NO/NC.

Defines relays contact status by default: “NO” (normally open) or “NC” (normally closed). NC status can be used as a FAIL SAFE function, allowing the power supply or device failure detection sending a signal to the PLC or main monitoring system.

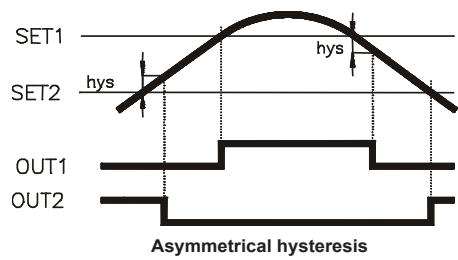
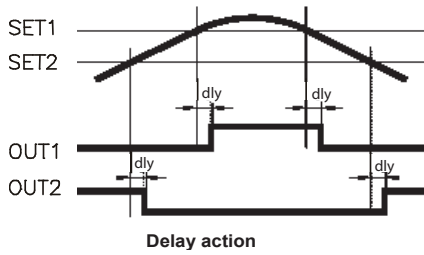
d. PROGRAMMABLE TIME DELAY or HYSTERESIS.

Each output action can be deferred by a programmable time delay or hysteresis level.

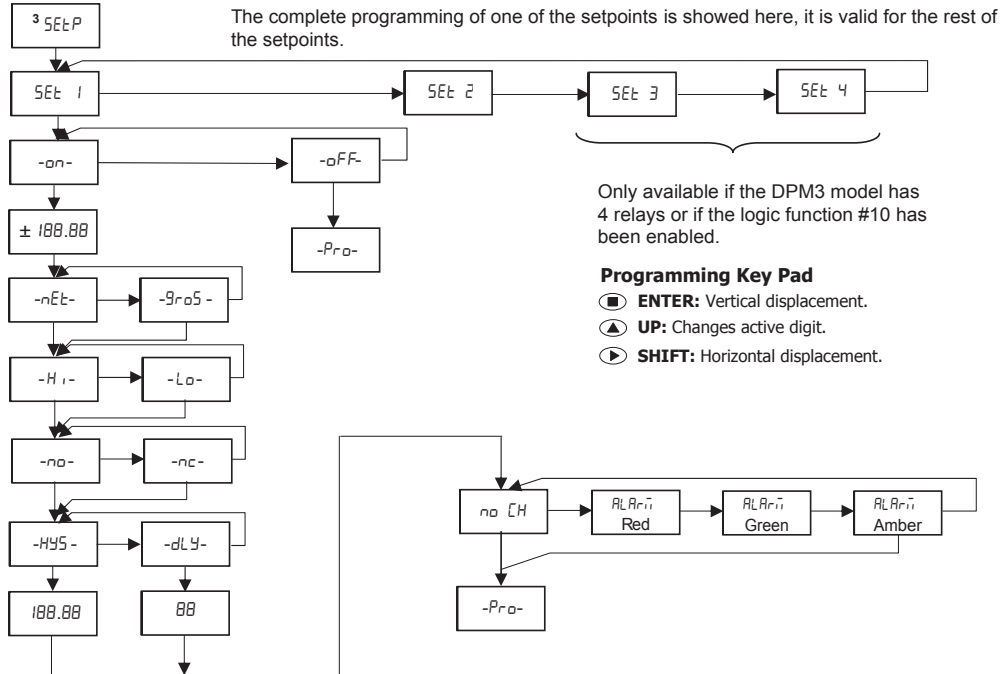
The time delay is the time that takes the output to activate after passing through the setpoint in the up or down direction, while the hysteresis band will be selected asymmetrical i.e. only acts on the output deactivation edge. The delay is programmable in seconds, from 0 to 99.

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.

The figures 1 and 2 show the time delay action (dly) and the hysteresis action (hys) of two alarms (SET1 and SET2) programmed to activate in HI mode (OUT1) and LO mode (OUT2)

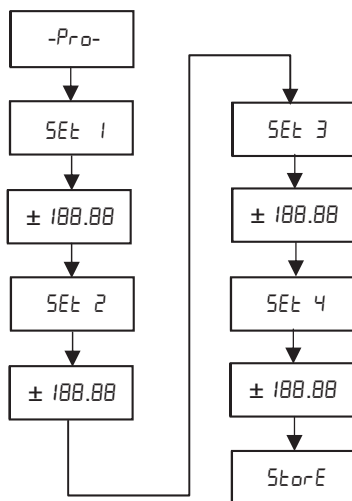


Relay Configuration menu diagram



Direct access to the relay setpoints value programming

It is possible to directly access the relay setpoint values without the need to go through the programming menu just by pressing the **UP** key in **Pro** mode, as shown in diagram below. **Setpoints configured at “off” do not appear on the list”.**



Remember that the decimal point position is determined by what has been programmed in the SCAL menu.

Programming Keys (Bottom view)

- ⏏ **ENTER**: Vertical displacement.
- ▲ **UP**: Changes active digit.
- ▶ **SHIFT**: Horizontal displacement.

Analog output

Introduction

Some DPM3 models include an analog output (4-20 mA).

The output is optoisolated with respect to the signal input and the power supply.

The meter provides a two terminal connector [(+) and (-)] that drives out a signal variation from 4mA to 20mA proportional to a user-defined display range.

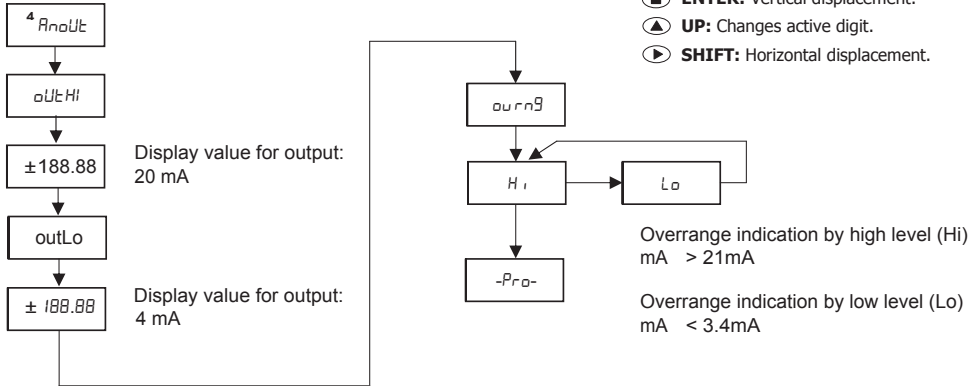
The signal can be used to transmit display information to a variety of terminal equipment such as graphic recorders, controllers, remote displays or other devices that accept input data in analog form.

The display values producing the full scale output (**OUT-HI** and **OUT-LO**) are introduced via front-panel buttons in the same programming module. The analog output then follows the display variation between the **HI** and **LO** programmed points.

The output signal can be set up for reverse action by programming the low display for the high output (**OUT-HI**) and the high display for the low output (**OUT-LO**).

In case of 'display overflow', 'sensorbreak' or 'input error', the output signal can be configured to be fixed at a high level 'Hi' or a low level 'Lo'.

Analog output menu diagram



Technical Specifications

Technical Specifications

	<i>Range</i>	<i>Input Impedance</i>	<i>Accuracy</i>	<i>Resolution</i>	
<i>Process</i>	±10VDC	1MΩ	±(0.1% rdg + 1 digit)	1mV	
	±20mA DC	15Ω	±(0.1% rdg + 1 digit)	1μA	
<i>Sensor Excitation</i>	24V@60mA, 10V @ 60mA				
<i>Potentiometer</i>	<i>Range</i>	<i>Input Impedance</i>	<i>Accuracy</i>	<i>Resolution</i>	
	200Ω minimum	1MΩ	±(0.1% rdg + 1 digit)	0.005%	
<i>Sensor Excitation</i>	10V @ 60mA				
<i>Load Cell</i>	<i>Range</i>	<i>Input Impedance</i>	<i>Accuracy</i>	<i>Resolution</i>	
	±15mV, ±30mV, ±150mV	100MΩ	±(0.1% rdg + 1 digit)	1μV	
<i>Sensor Excitation</i>	10V @ 60mA				
<i>Temperature</i>	<i>RTD</i>	<i>Pt100 (3-Wire)</i>			
	Fixed display range / resolution	-200.0°C to 800.0°C / 0.1°C -200°C to 800°C / 1°C -328.0°F to 1472.0°F / 0.1°F -328°F to 1472°F / 1°F			
	Accuracy / resolution	±(0.2% rdg+0.6°C) / 0.1°C ±(0.2% rdg+1°C) / 1°C ±(0.2% rdg+1°F) / 0.1°F ±(0.2% rdg+2°F) / 1°F			
	Pt100 sensor excitation	<1mA DC			
	Max lead resistance	40Ω / cable (balanced)			
	<i>Thermocouple</i>	<i>J</i>	<i>K</i>	<i>T</i>	<i>N</i>
	Fixed display range / resolution	-150.0°C to 1100.0°C / 0.1°C -150°C to 1100°C / 1°C -238.0°F to 2012.0°F / 0.1°F -238°F to 2012°F / 1°F	-150.0°C to 1200.0°C / 0.1°C -150°C to 1200°C / 1°C -238.0°F to 2192.0°F / 0.1°F -238°F to 2192°F / 1°F	-200.0°C to 400.0°C / 0.1°C -200°C to 400°C / 1°C -328.0°F to 752.0°F / 0.1°F -328°F to 752°F / 1°F	-150.0°C to 1300.0°C / 0.1°C -150°C to 1300°C / 1°C -238.0°F to 2372.0°F / 0.1°F -238°F to 2372°F / 1°F
	Accuracy / resolution	±(0.4% rdg+0.6°C) / 0.1°C ±(0.4% rdg+1°C) / 1°C ±(0.4% rdg+1°F) / 0.1°F ±(0.4% rdg+2°F) / 1°F	±(0.4% rdg+0.6°C) / 0.1°C ±(0.4% rdg+1°C) / 1°C ±(0.4% rdg+1°F) / 0.1°F ±(0.4% rdg+2°F) / 1°F	±(0.4% rdg+0.6°C) / 0.1°C ±(0.4% rdg+1°C) / 1°C ±(0.4% rdg+1°F) / 0.1°F ±(0.4% rdg+2°F) / 1°F	±(0.4% rdg+0.6°C) / 0.1°C ±(0.4% rdg+1°C) / 1°C ±(0.4% rdg+1°F) / 0.1°F ±(0.4% rdg+2°F) / 1°F
	Cold junction compensation range	-10°C to 60°C (14°F to 140°F)			
	Offset programmable	-19.9° / +99.9°			

Technical Specifications			
Conversion	Technique	Sigma-Delta	
	Resolution	±15 bits	
	Conversion rate	20 times per second	
Accuracy Conditions	Temperature coefficient	100 ppm/°C	
	Warm-up time	10 minutes	
	Temperature	23°C±5°C	
Display	Range	-19999 / +39999, 5 LED digits 14mm (Programmable color Red, Green, Amber)	
	LEDs	8, functions and outputs status	
	Display refresh rate	Process / Load cell	20 times per second
		Pt100	20 times per second
		TC	10 times per second
Display / Input overrange indication	"oUEr", "oUEr"		
Relays	-2R: (2) Form C SPDT		
	-4R: (4) Form A SPST Normally Open with shared common		
	Nominal contact rating.....	8A at 250VAC / 24VDC	5A at 250VAC / 30 VDC
	Maximum switching current (resistive load).....	8A	5A
	Maximum switching power.....	2000VA / 192W	1250VA / 150W
	Maximum switching voltage.....	400VAC / 125VDC	250VAC / 30VDC
	Contact resistance.....	≤100mΩ at 6VDC at 1A	≤100mΩ at 6VDC at 1A
Operate time.....	≤10ms	≤10ms	
Analog Output -A & -A2R Only	Type	4-20 mA Sourcing	
	Maximum load	≤500Ω	
	Resolution	13 bits	
	Accuracy	0.1%FS ±1 bit	
	Response time	10ms	
	Thermal drift	0.5µA / °C	
Power Supply and Fuses	-H High Voltage: 85-265 VAC 50/60 Hz (100-300 VDC), (recommended fusing 0.5A/250V, DIN 41661) -L Low Voltage: 22-53 VAC 50/60 Hz (10.5 - 70 VDC), (recommended fusing 2A/250V, DIN 41661)		
Power Consumption	5W without options, 8W max.		
Filter	Cutoff frequency	4Hz to 0.05Hz	
	Slope	-20dB/Dec.	
Environmental Conditions	Operating temperature	-10°C to +60°C (14°F to 140°F)	
	Storage temperature	-25°C to +85°C (-13°F to 185°F)	
	Relative humidity (non-condensing)	<95% @ 40°C (104°F)	
	Maximum altitude	2000m	
	Frontal protection degree	IP65	
Environmental Air	No corrosive gases permitted		
Agency Approvals	CE		

Notes: