# Operation Manual
# 0/4-20mA Input and Temperature Transmitter

***Note***: All the strings representing programming menus in this manual are indicative only. The strings displayed by the instrument have been shortened for proper readability and viewing on the display.

# GENERAL

## INFORMATION REGARDING THE MANUAL

Compliance with the operative procedures and the precautions described in this manual is an essential requirement for the correct operation of the instrument and to guarantee total operator safety.

Before using the instrument, the manual must be read in all of its parts, in the presence of the instrument itself, in order to ensure that the operating modes, the controls, the connections to the peripheral equipment and the precautions for safe and correct use are clearly understood.

The user manual must be stored, integral and legible in all parts, in a safe place which can be quickly and easily accessed by the operator during installation, use and/or installation revision operations.

CONVENTIONS

The present user manual uses the following conventions:

### NOTE

**The notes contain important information to be highlighted in comparison to the rest of the text. These generally contain information that is useful to the operator to carry out and optimize operating procedures of the equipment in a correct manner.**

### WARNING

**Warning messages appear in the manual before procedures or operations that must be observed in order to avoid any possible losses of data or damages to the equipment.**

### ATTENTION

**Attention messages appear in the manual in correspondence to description of procedures or operations which, if carried out incorrectly, may cause damages to the operator or users.**

## LIMITATIONS OF USE AND SAFETY PRECAUTIONS

In order to guarantee operator safety and correct device functionality, all of the usage limitations and precautions listed below must be respected:

### ATTENTION

**Make sure that all the safety requirements have been met before using the device. The device must not be powered on or connected to other devices until all of the safety conditions have been met.**

ELECTRICAL SAFETY

### ATTENTION

**All of the control unit's connections are isolated from the grounding system (non-insulated grounding conductor).**
**DO NOT connect any of these connections to the grounding connector.**

In order to guarantee maximum conditions of safety for the operator, it is recommended to follow all of the indications listed in this manual.

- **Only power the device using a mains power supply that complies with the device's specifications (85÷265Vac 50/60Hz or 12÷32Vdc (24Vac±10%)).**
- **Replace any damaged parts immediately.** Any cables, connectors, accessories or other parts of the device which are damaged or not functioning properly must be replaced immediately. In such cases, contact your nearest authorized technical assistance center.
- **Only use specified accessories and peripherals**. In order to guarantee all of the safety requirements, the device must only be utilized in conjunction with the accessories specified in this manual, which have been tested for use with the device itself. The use of accessories and consumption materials from other manufacturers or not specifically recommended by supplier will not guarantee the safety and correct operation of the equipment. Only use peripherals that comply with the regulations of their specific categories

SAFETY OF THE OPERATING ENVIRONMENT

- The panel of the control unit is resistant to liquids. The device must be protected against drips, sprays and/or immersion and should not be used in environments where such risks are present. Any devices into which liquids may have accidentally penetrated must be immediately shut off, cleaned and inspected by authorized and qualified personnel.
- The transparent panel should be closed once the device has been programmed.

## Protection

For **Wall Mounted** device **(1/2 DIN)**

- IP65 Complete
- EMI /RFI CEI EN55011 - 05/99 Class A

For **Panel Mounted** device **(1/4 DIN)**

- IP65 Front and IP20 Back
- EMI /RFI CEI EN55011 - 05/99 Class A

**The device must be utilized within the specified environmental temperature, humidity and pressure limits.** The instrument is designed to operate under the following environmental conditions:

- Temperature of the working environment -10 ÷ +50°C
- Storage and transport temperature -25°C ÷ +65°C
- Relative Humidity Box 96x96 (1/4 DIN) 0% ÷ 95% Non-Condensing
- Relative Humidity Box 144x144 (1/2 DIN) 0% ÷ 100% Condensing

### ATTENTION

**The device must be perfectly inserted into the system.**

**The system must be maintained operational in full compliance with the foreseen safety regulations.**

**The parameters set on the analyzer's control unit must comply with the current regulations.**

**The control unit's malfunction signals must be located in an area that is constantly supervised by the system's maintenance personnel or operators.**

**Failure to respect even just one of these conditions could cause the control unit's "logic" to operate in a potentially dangerous manner for the users of the service.**

**In order to avoid any potentially dangerous situations, therefore, the system's service and/or maintenance personnel are advised to work with the utmost care and to signal any alterations in the safety parameters in a timely manner.**

**As the above issues cannot be monitored by the product in question, the manufacturer shall bear no responsibility for any property damage or personal injury which may result from such malfunctions.**

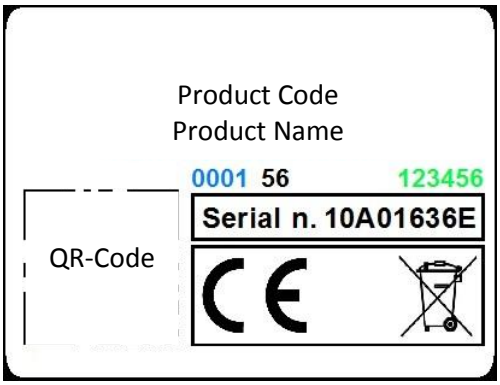
ATTENTION SYMBOL

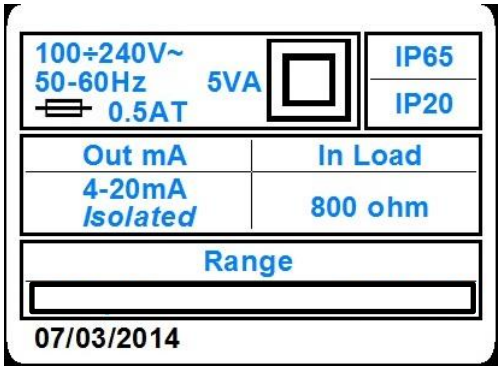
The symbol illustrated below represents the **ATTENTION** symbol and reminds the operator that he should read the user manual for important information, advice and suggestions regarding the correct and safe use of the equipment.

In particular, when it is positioned close to connection points to cables and peripheries, the symbol in question refers to careful reading of the user manual for instructions related to the nature of such cables and peripheries and the methods for correct and safe connection.

The reproductions of equipment panels, with relative commands, connections, symbols and labels are provided in this chapter. Each attention symbol is accompanied by a detailed explanation of its meaning.

PLATE DETAILS




# INFORMATION ON RECYCLING AND USE OF MATERIALS

The supplier, in accordance with specific European regulations, aims at constant improvement of development and of production procedures of its equipment with the objective of drastically reducing the negative impact on the environment caused by parts, components, consumption materials, packaging and the equipment itself at the end of its life cycle.

The packages are designed and produced to allow the reuse or recovery, including recycling, of the great part of the materials and to minimize the amount of waste or residues to be disposed. In order to assure a correct environmental impact, the equipment has been designed with the smallest circuit possible, with the lowest differentiation of materials and components, with a selection of substances that guarantee utmost recycling and maximum reuse of the parts and waste disposal free from ecological risks.

The equipment is made in such a way as to guarantee the easy separation or dismantling of the materials containing contaminants in comparison with others, in particular during maintenance operations and the replacement of components.

## ATTENTION

**The disposal/recycling of packages, consumption materials and of the equipment itself at the end of its life cycle must be carried out in accordance to the standards and regulations currently in force in the country where the equipment is used.**

SPECIAL ATTENTION TO CRITICAL COMPONENTS

The instrument is provided with a liquid crystal display LCD, which contains small amounts of toxic materials.

## GENERAL DESCRIPTION

The analyzer treated in this manual consists of an Electronic Control Unit and a Technical Manual.
It is powered from the mains (100 ÷ 240 Vac 50-60 Hz), with a power consumption of 5W, through a switching power supply.


**Figure 1 – Wall mounted Central Unit**

# MAIN CHARACTERISTICS

- mA input for 0/20mA or 4/20mA sensors with two or three wires.
- Temperature Measure with PT100 / PT1000 Probe
- Programming keyboard with 5 keys
- Graphic Display, 128x128 pixels, with three colors backlight (white, green and red)
- Serial Output RS485 MODBUS RTU/ASCII (upon request)
- 2 Programmable Analog Outputs
- 2 Frequency Programmable Digital Outputs
- 2 Relay Outputs for Intervention Thresholds, Wash and Remote Alarm
- 2 Digital Inputs for blocking the dosages

## TECHNICAL SPECIFICATIONS FOR THE mA MEASURE (PRIMARY)

| | |
|---|---|
| **Sensor** | Current Sensor with 2 or 3 wires |
| **Measure Range** | 0/20mA or 4/20mA |
| **Resolution** | ±1µA |
| **Precision** | ±10µA |

## TECHNICAL SPECIFICATIONS FOR THE TEMPERATURE MEASURE (SECONDARY)

| | |
|---|---|
| **Sensor** | PT100/PT1000 |
| **Measure Range** | -50 ÷ +150°C |
| **Resolution** | ± 0.1°C (°F) |
| **Precision** | PT100: ±0.5°C (±0.9°F) – PT1000: ±0.2°C (±0.4°F) |

## OPERATING SPECIFICATIONS

| | |
|---|---|
| **Power Supply** | 00÷240 Vac 50-60 Hz or 12÷32 Vdc (24Vac ±10%) |
| **Power Consumption** | < 5W (@100÷240Vac) and <3.5W (@12÷32Vdc) |
| **Relay Outputs:** | |
| **Alarms:** | |
| **Function** | Delay, Faults and Min./Max |
| **Delay Time** | 1÷3600sec |
| **Threshold disabling** | Enable / Disable |
| **Relay function** | Closed / Open |
| **Permanence Interval** | -99999 ÷ 99999 |
| **Permanence Time** | 1÷3600sec<br>For Alarm and Wash it is used the relay n. 2 with normally open contact. |
| **HOLD Digital Input:** | |
| **Input Voltage** | 12÷32 Vdc |
| **Absorption** | 10mA max |
| **Analog Outputs:** | |
| **Outputs** | n.2 4-20mA Programmable |
| **Maximum Load** | 800 Ohm |
| **NAMUR Alarm Output** | 3.6 mA or 22 mA |
| **Hold Alarm Value** | |

## CONTROLS, INDICATORS AND CONNECTIONS

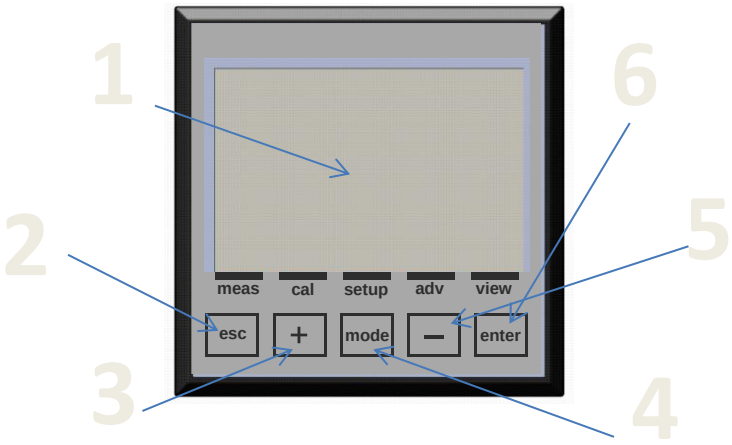



**Figure 2 – Instrument**

1. Visualizer with LCD Display
2. ESC key: Reject parameter or exit the programming menu
3. UP key: Increase value
4. MODE key: Select menu with icon on the status bar
5. DOWN key: Decrease value
6. ENTER key: Confirm parameter or access the programming menu

GRAPHIC DISPLAY SUBDIVISION AREAS IN RUN MODE

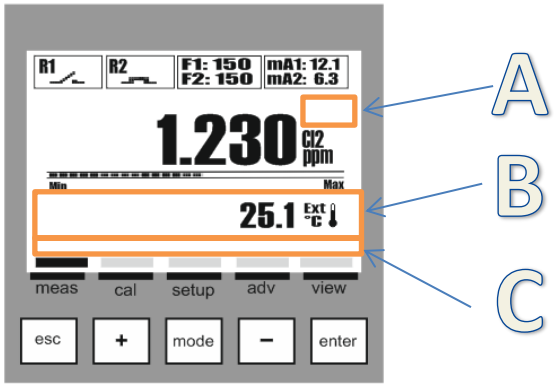



**Figure 3 – Graphic Display - Subdivision Areas**

In the standard view of the instrument we have three areas, as follows:

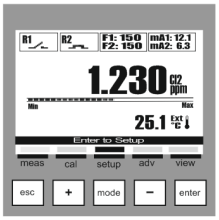
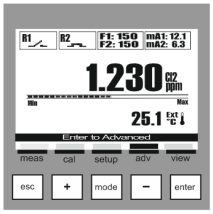
A) Service icons such as Danger, Maintenance, Wait Time, Data Transmission.
B) Text messages for Alarms and operation information or temperature value with external sensor (ext) or manually set value (man).
C) Menu name associated to the icon on the status bar

## GRAPHIC DISPLAY

The graphic display allows a series of views for the various menus, for programming and for viewing during operation (run).

LIST OF THE MAIN MENUS

The following table shows the screens visualized on the display representing the different menus

| VISUALIZATION<br><br>ON THE GRAPHIC DISPLAY | DESCRIPTION |
|---|---|
|  | VIEW MEASURE |
|  | CALIBRATION MENU<br><br>Sensor Calibration Procedure |
|  | SETUP MENU<br><br>Output Parameters Setup |
|  | ADVANCED MENU<br><br>Device Configuration Menu |
|  | VIEW MENU<br><br>Measure Visualization Setting |

**Note**: Automatic exit from menu after 5 minutes of inactivity without saving data.

# INSTALLATION

Before installing, read carefully what is written below.

## INSTALLING THE CENTRAL UNIT ON THE WALL

The wall must be very smooth to allow the perfect adhesion of the central unit.

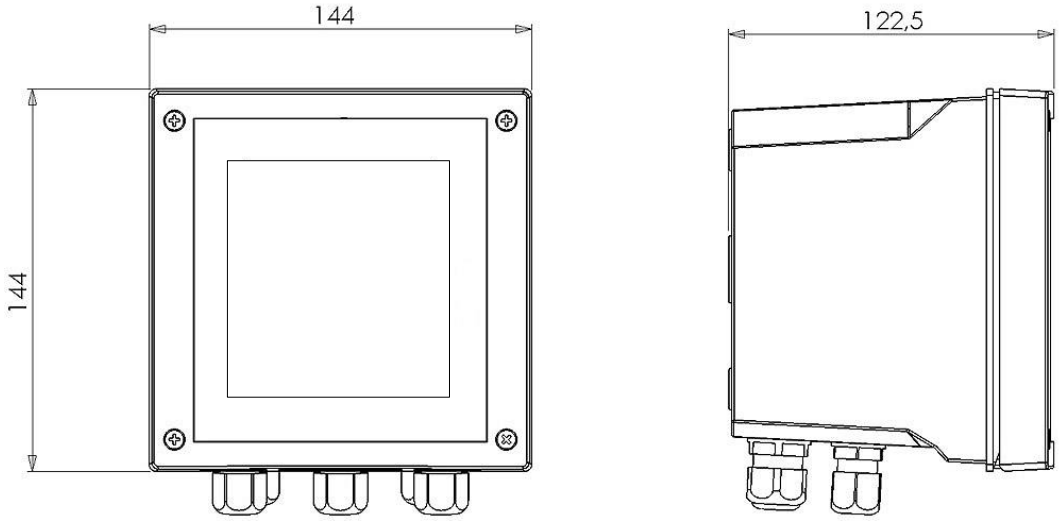



**Figure 4 – Dimensions and footprint for wall mounted central unit**

| Mechanical Dimensions | |
|---|---|
| Dimensions (L x H x P) | 144x144x122,5mm |
| Fixing depth | 122,5mm |
| Material | ABS |
| Mounting | Wall |
| Weight | 0,823 Kg |
| Front Panel | UV Resistant Polycarbonate |

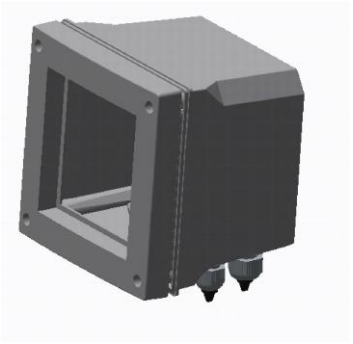
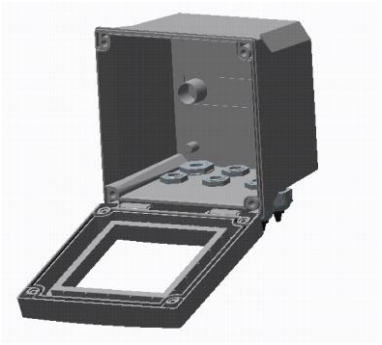
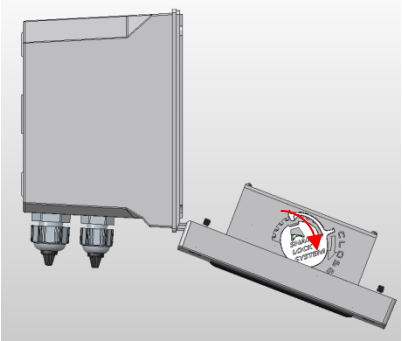
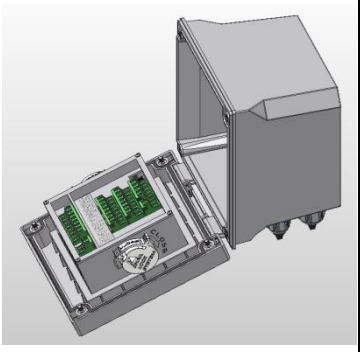
Open the instrument, drill the necessary holes and fasten the instrument to the wall. Cover the holes internally with the corresponding caps supplied with the instrument.

The cable glands for the electrical connections are located on the lower part of the control unit and therefore, in order to facilitate the connections, any other devices must be positioned at least at 15 cm away.

Protect the device against any drips and/or sprays of water from adjacent areas during the programming and calibration phases.

**Note:** The BOX 144x144 is a plastic accessory, an IP65 certified item to be purchased separately.

Example: Assembling the instrument 96x96 into the accessory Box 144x144 with IP65 protection

| | | |
|---|---|---|
|  Instrument 96x96 |  Accessory Box 144x144 |  Open the front door |
|  Secure the instrument and lock the snails. |  Verify locking from all sides |  Close the front door |

# INSTALLING THE CENTRAL UNIT ON A PANEL


The wall must be very smooth to allow the perfect adhesion of the electrical panel where the central unit will be fitted.
The fixing depth of the panel must be at least 130 mm.
The thickness of the panel must not exceed 5 mm.
The panel cutout must comply with the following layout:

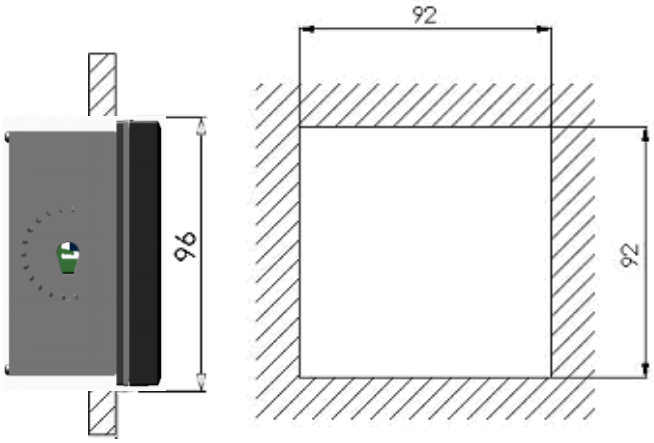



**Figure 5 – Panel cutout and dimensions**

| Mechanical Dimensions | |
|---|---|
| Dimensions (L x H x P) | 96x96x42mm |
| Fixing depth | 130mm |
| Material | ABS |
| Mounting | Panel |
| Weight | 0.4 Kg |
| Front Panel | UV Resistant Polycarbonate |

The central unit can be locked on the panel using the two clamps supplied with the unit, inserted in their seats and locked with corresponding screws.


**Figure 6 – Panel Mounted Central Unit with Snail Lock System**

# CONNECTION TO THE POWER SUPPLY

If possible, keep any high power cables away from the instrument and its connection cable (these could cause inductive disturbances, especially for the analogical part of the system.

Use an alternating 100Vac to 240Vac-50/60Hz power supply – or as specified on the plate. The power supply must be as stabilized as possible.

Absolutely avoid connecting the device to rebuilt power supplies, using transformers for example, where the same power supply is also used to power other systems (perhaps of an inductive typology); this could lead to the generation of high voltage spikes which, once emitted, are difficult to block and/or eliminate.

**ATTENTION**

**The electrical line must be equipped with an appropriate circuit breaker, in compliance with the proper installation standards**

It is nevertheless always a good idea to check the quality of the grounding connector. In industrial facilities, it is not uncommon to find grounding connectors that cause electrical disturbances instead of preventing them; wherever doubts should arise regarding the quality of the facility's grounding connectors, it is better to connect the control unit's electrical system to a dedicated grounding rod.

Electric connections to the dosing systems (Utilities)

**ATTENTION**

**Before connecting the instrument to the external Utilities, make sure that the electrical panel is turned off and that the wires from the Utilities are not live.**

The term "Utilities" refers to the relay outputs used in the control unit

- (SET1) for the operation of dosing pumps or control
- (SET2) for the operation of dosing pumps or control
- (ALARM) alarm command sent by the instrument to siren and/or flashing light
- (WASH) command to the washing device

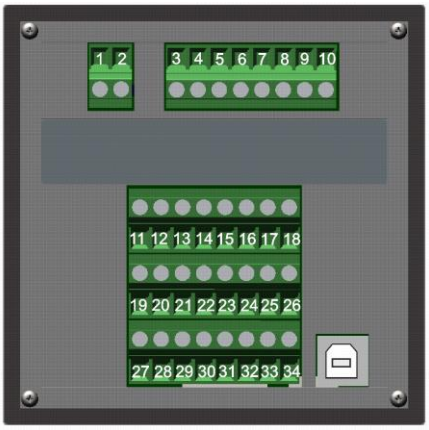
**WARNING**

**With a resistive load, each relay contact can sustain a maximum current of 5 Ampere at max. 230V.**

In case of higher powers, it is advisable to make the connection with the Utilities as indicated in Annex H.

If, on the contrary, the load to be controlled is in any case of a low power or of a resistive type, you can proceed as indicated in Annex H.

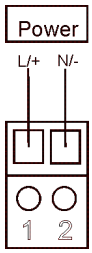
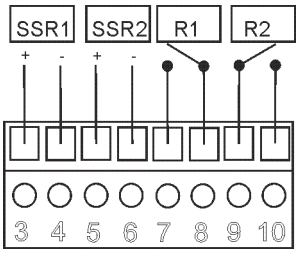
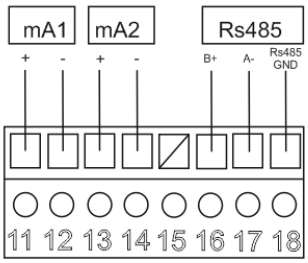
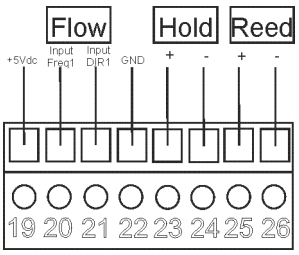
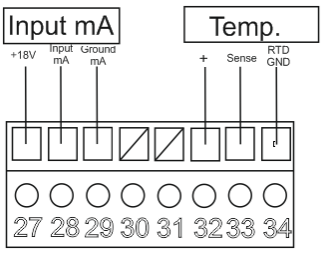
# CONNECTION TERMINAL BLOCK FOR THE WALL MOUNTED DEVICE




| N° (TERMINAL) | Symbols | DESCRIPTION |
|---|---|---|
| 1 | L / + | Power supply (Phase) |
| 2 | N / - | Power supply (Neutral) |
| 3 | SSR1 (+) | Frequency output 1 (SSR1 +) |
| 4 | SSR1 (-) | Frequency output 1 (SSR1 -) |
| 5 | SSR 2 (+) | Frequency output 2 (SSR 2 +) |
| 6 | SSR 2 (-) | Frequency output 2 (SSR 2 -) |
| 7 | RL1 NO | Relay 1 Contact |
| 8 | RL1 COM | Relay 1 Contact |
| 9 | RL2 COM | Relay 2 Contact |
| 10 | RL2 NO | Relay 2 Contact |
| 11 | OUT mA1 (+) | Current output 1 (OUT mA1 +) |
| 12 | OUT mA1 (-) | Current output 1 (OUT mA1 -) |
| 13 | OUT mA2 (+) | Current output 2 (OUT mA2 +) |
| 14 | OUT mA2 (-) | Current output 2 (OUT mA2 -) |
| 15 | NOT USED | Not Used |
| 16 | RS485 (B+) | Serial Port for Data (RS485 B+) (optional on request) |
| 17 | RS485 (A-) | Serial Port for Data (RS485 A-) (optional on request) |
| 18 | RS485 (GND) | Serial Port for Data (RS485 GND) (optional on request) |
| 19 | + 5VDC | (*) Flow Sensor Power Supply (+ 5VDC) |
| 20 | INPUT Freq1 | (*) Flow Measure Input (INPUT Freq1) |
| 21 | INPUT DIR1 | (*) Flow Measure Input (INPUT DIR1) |
| 22 | GND | (*) Flow Sensor Power Supply (GND) |
| 23 | HOLD (+) | 12÷32 VDC HOLD Signal Input (+) |
| 24 | HOLD (-) | 12÷32 VDC HOLD Signal Input (-) |
| 25 | REED (+) | REED Sensor Input (+) |
| 26 | REED (-) | REED Sensor Input (-) |
| 27 | +18V | Power supply output for sensor (Max. 50mA) |
| 28 | IN mA | Current input for sensor (0/20mA or 4/20mA) |
| 29 | GND mA | Used to connect the three-wire sensors |
| 30 | NOT USED | NOT USED |
| 31 | NOT USED | NOT USED |
| 32 | RTD (+) | PT100 or PT1000 Temperature Probe Input |
| 33 | RTD SENSE | PT100 or PT1000 Temperature Probe Input |
| 34 | RTD GND | PT100 or PT1000 Temperature Probe Input |
| USB | USB PORT | (*) USB Port for Software Update |

(*Input or Output unavailable)

Terminal block connections

| Description | Graphic |
|---|---|
| **Instrument Power Supply Input**:<br>100÷240 Vac or 12÷32 VDC (24Vac)<br>**Note:** Check the product label. |  |
| **Outputs**:<br>**SSR1 and SSR2**: Solid State Relays (400Vac/dc, 125mA)<br>**R1 and R2:** Electromechanical Relays (250Vac or 30VDC, 5A Resistive) |  |
| **Outputs**:<br>**mA1 and mA2:** Current Outputs 4÷20mA (800 ohm)<br>**RS485:** Serial Port for Data Communication (upon request) |  |
| **Inputs**:<br>**Flow:** Flow Sensor Input (upon request)<br>**Hold:** 12÷32 Vdc Signal Input<br>**Reed:** Dry Contact Signal Input |  |
| **Inputs**:<br>**mA Input**: Current Sensor with 2 or 3 wires<br>**Temp**: Temperature Measure Input PT100 or PT1000 |  |

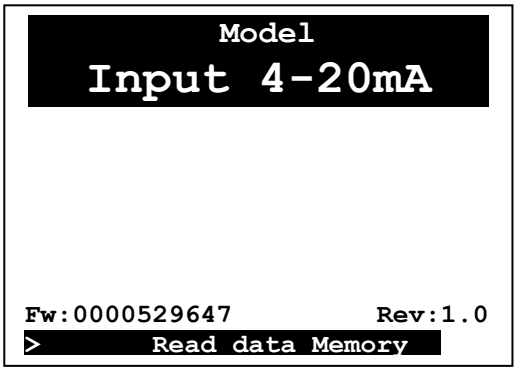
(Note: See ANNEX H for Wiring Examples)

SENSOR CONNECTION

Turn off the instrument. Connect the cable of the sensor to the terminal block of the instrument. It is also a good idea not to pass the cable near high power or inverter cables in order to avoid interference problems with the measure.

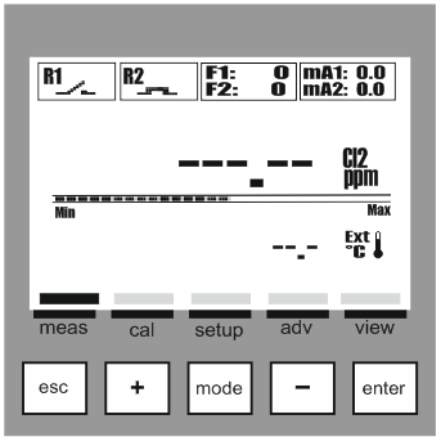
## STARTUP

The instrument performs a hardware test of the internal memory and displays the message "***Read data memory***"

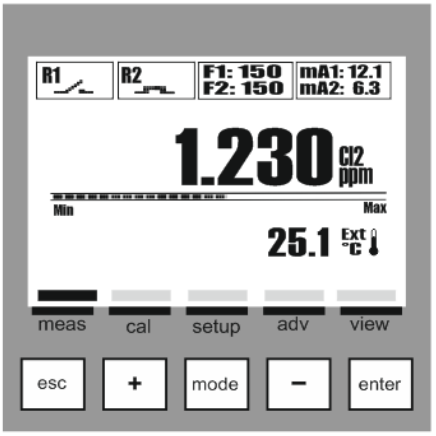



**Wait**

The instrument enables all the measure functions within 5 seconds.



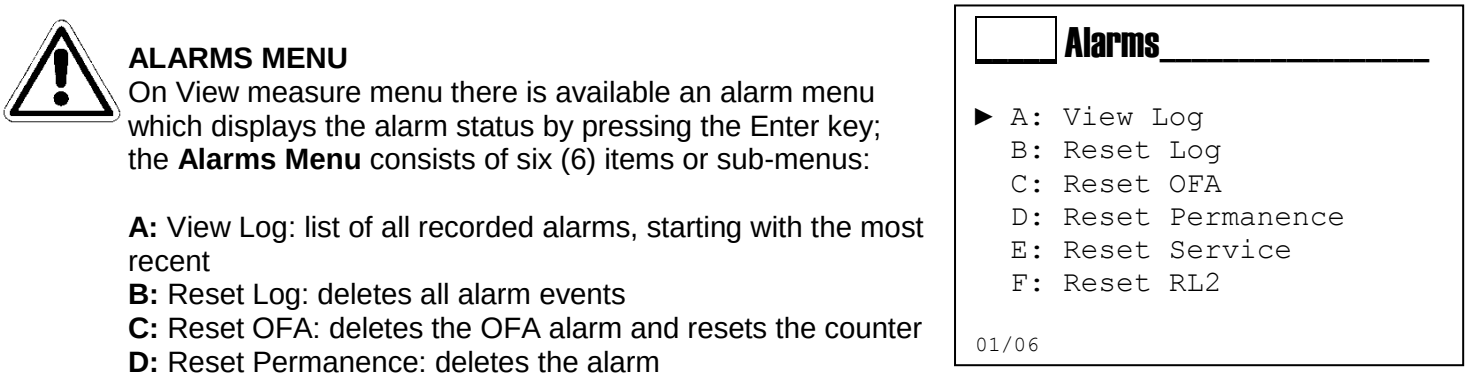

**View Measure and Outputs Activation**



**ALARMS MENU**
On View measure menu there is available an alarm menu which displays the alarm status by pressing the Enter key; the **Alarms Menu** consists of six (6) items or sub-menus:

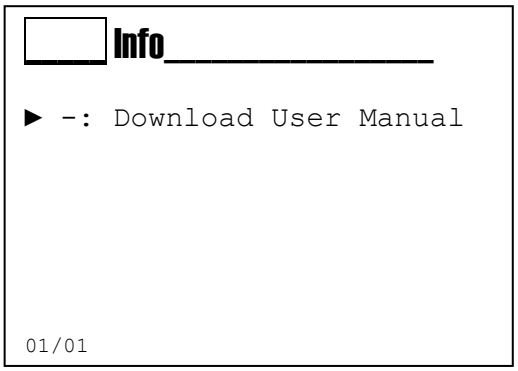
**A:** View Log: list of all recorded alarms, starting with the most recent
**B:** Reset Log: deletes all alarm events
**C:** Reset OFA: deletes the OFA alarm and resets the counter
**D:** Reset Permanence: deletes the alarm
**E:** Reset Service: deletes the alarm and resets the counter
**F:** Reset RL2 (used as alarm):

Scroll through the menu using the **(+)** or **(-) key**, select the item and confirm with the **Enter key**.




**INFO MENU**
In view measure mode, press the ESC key to access the Info menu.

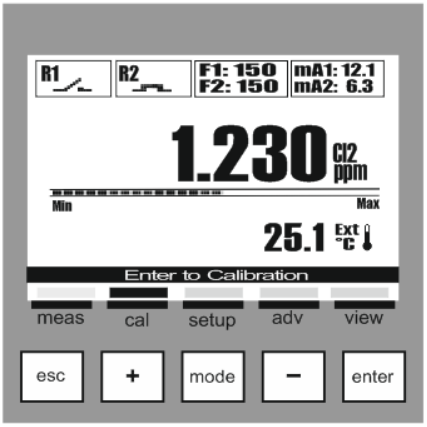
Select the item “Download Manual” and press the Enter key.




On the screen will be displayed the QR Code with which you can start downloading the user manual in pdf format.

## CALIBRATION MENU (INDEX MENU 1)

Use the MODE key to scroll through the icons on the status bar, from left to right, select the **Calibration** menu.




**Calibration Menu 1**
The Calibration menu consists of two (2) items or sub-menus:

**A:** Measure
**B:** Temperature

Scroll through the menu using the **(+)** or **(-) key**, select the item and confirm with the **Enter key**.

```
1 CALIBRATION
► A: Measure
  B: Temperature


01/02
```

**Calibration Menu 1** Measure (*Menu 1A*)

The Measure Calibration menu consists of five (5) items or sub-menus:

**1A1:** 1 Point Cal: One measure point calibration.
**1A2:** 2 Points Cal: Two measure points calibration.
**1A3:** Reference: Allows you to refine the calibration by adding or subtracting an offset
**1A4:** Report: Will be displayed a summary of the last calibration.
**1A5:** Reset Calibration: The calibrations can be deleted and restored the default values.

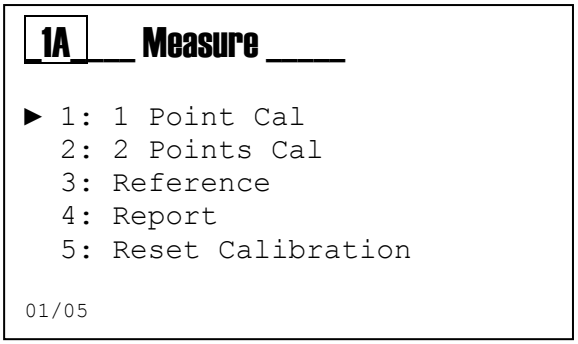
Scroll through the menu using the **(+)** or **(-) key**, select the item and confirm with the **Enter key**.

```
1A Measure
► 1: 1 Point Cal
  2: 2 Points Cal
  3: Reference
  4: Report
  5: Reset Calibration

01/05
```

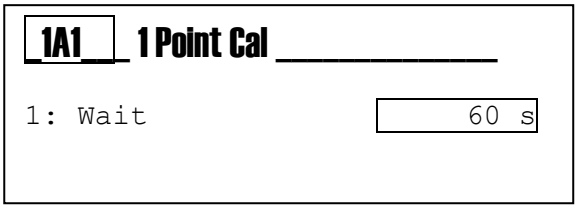
**CALIBRATION PROCEDURE**

**Calibration Menu** Measure (*Menu 1A*)

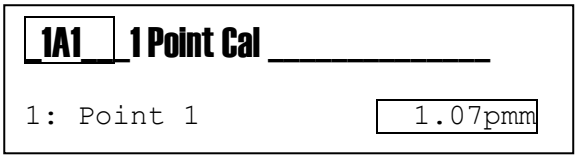



**Menu 1A1** One Point Calibration

Check that the sensor is properly installed and it is measuring.
Press the **Enter** key when ready.
Wait for 60 seconds.

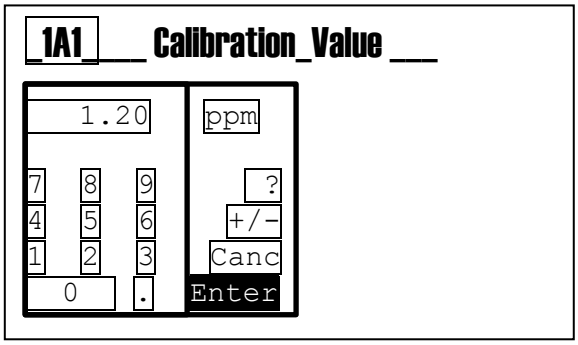



At the end of the countdown, insert the calibration value.

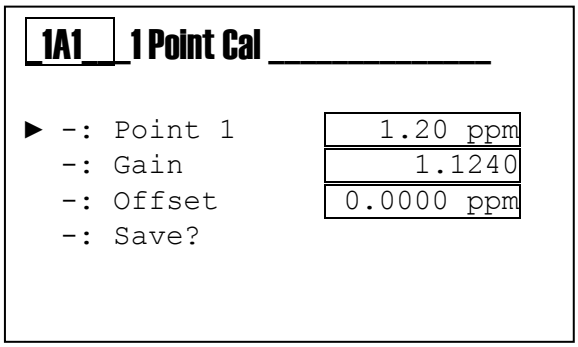



The instrument displays a numeric keypad to insert the known value.

Press the **Enter** key when ready.

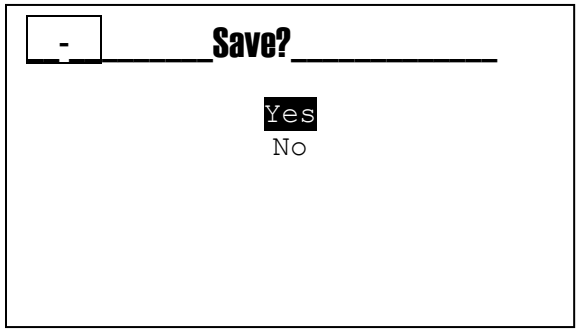



The instrument displays:
1: The calibration value used.
2: The calculated Gain value.
3: The calculated Offset value.
4: Enter to confirm and save all the calibration parameters.



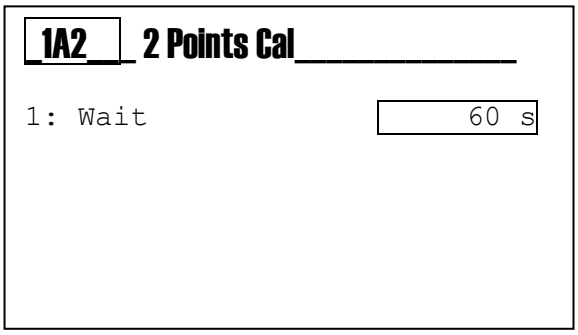

The instrument displays the question to confirm and save all the calibration data.

At the end the instrument returns to Calibration menu 1.

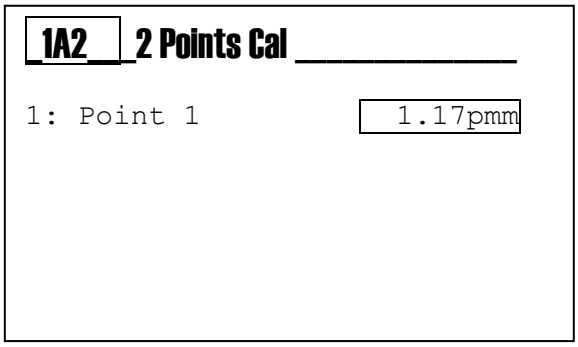


**Menu 1A2** Two Points Calibration

Check that the sensor is properly installed and it is measuring.
Press the **Enter** key when ready.
Wait for 60 seconds.

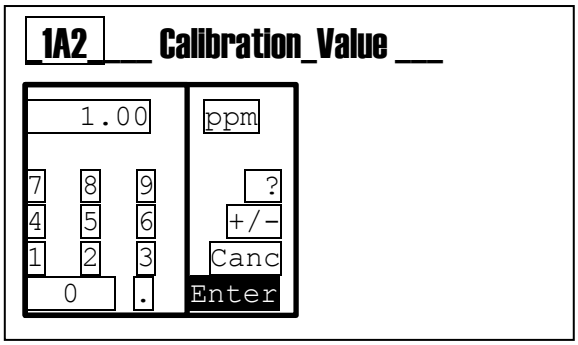



At the end of the countdown, insert the first calibration value.

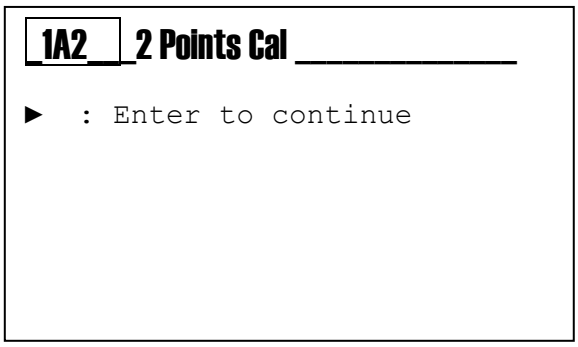



The instrument displays a numeric keypad to insert the known value.

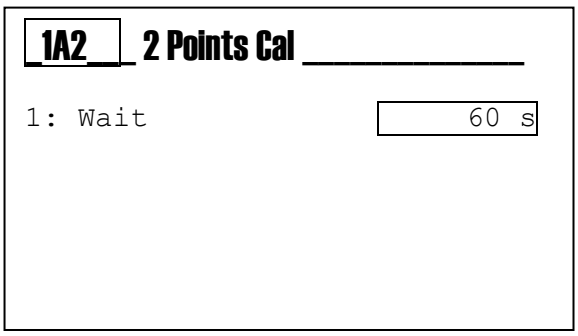
Press the **Enter** key when ready.



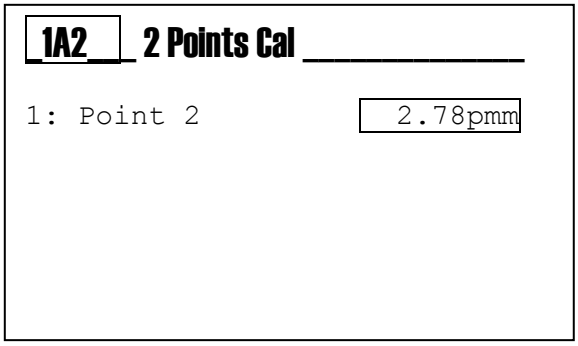

Prepare the second calibration point of the sensor.
Insert the sensor into the second buffer solution.
Press the **Enter** key when ready.




Wait for 60 seconds.

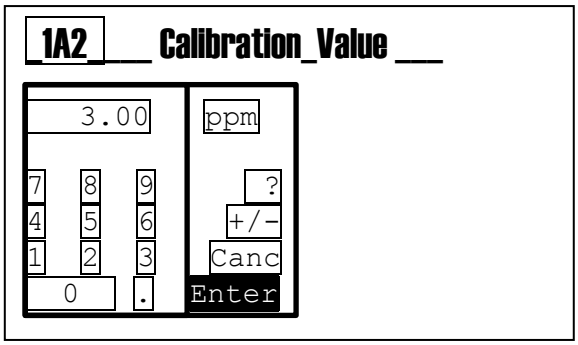


At the end of the countdown, insert the second calibration value.

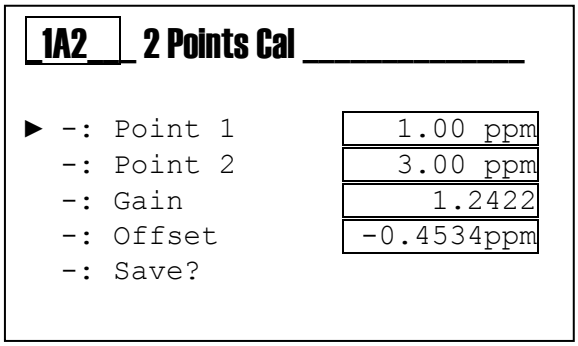



The instrument displays a numeric keypad to insert the known value.

Press the **Enter** key when ready.

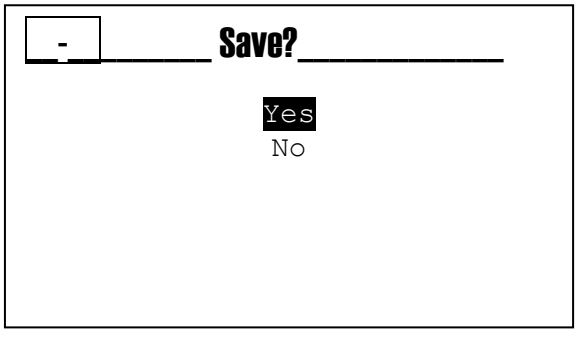



The instrument displays:
1: The calibration value used for the first point.
2: The calibration value used for the second point.
3: The calculated Gain value.
4: The calculated Offset value.
5: Enter to confirm and save all the calibration parameters.



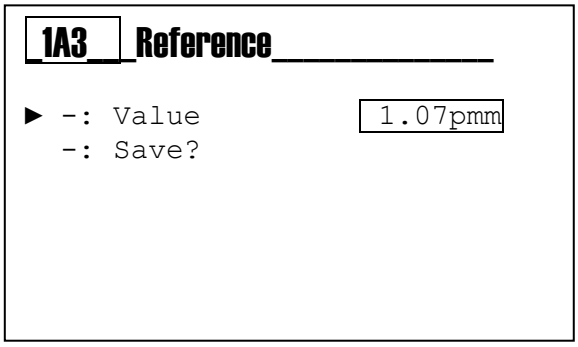

The instrument displays the question to confirm and save all the calibration data.

At the end the instrument returns to Calibration menu 1.



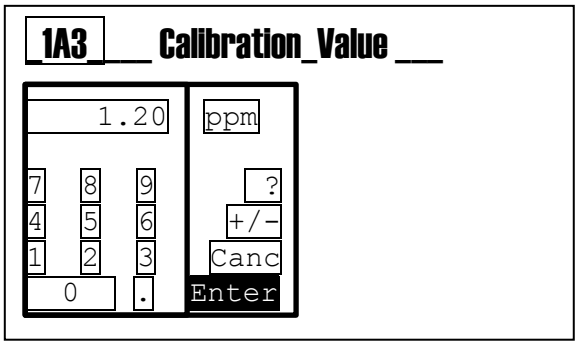
**Menu 1A3** Reference Calibration

Check that the sensor is properly installed and it is measuring.
Press the **Enter** key when ready.

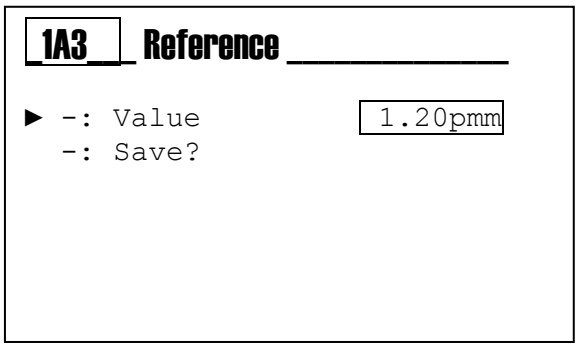



The instrument displays a numeric keypad to insert the known value.

Press the **Enter** key when ready.

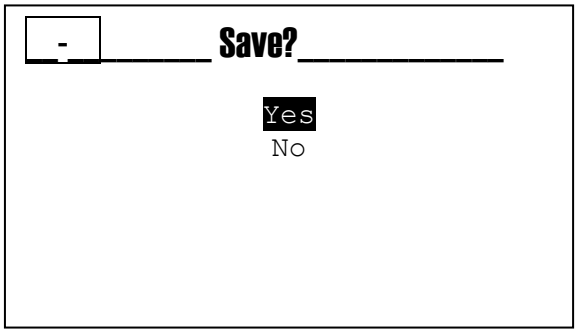



The instrument displays:
1: The calibration value.
2: Enter to confirm and save all the calibration parameters..




The instrument displays the question to confirm and save all the calibration data.

At the end the instrument returns to Calibration menu 1.

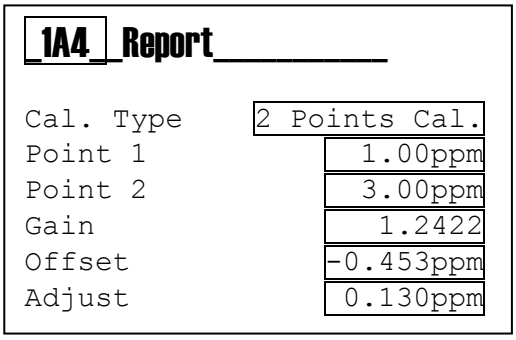


**Menu 1A4** Report

The calibration report displays all the parameters related to the last calibration.
**Calibration Type:** Indicates the calibration type,

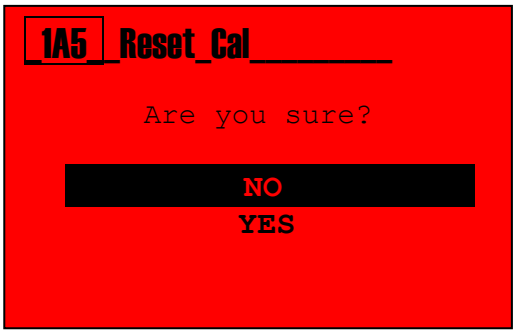
- None
- 1 Point
- 2 Points

**Point 1:** Indicates the value entered for point 1.
**Point 2:** Indicates the value entered for point 2.
**Gain:** Indicates the calculated angular coefficient.
**Offset:** Indicates the calculated offset value.
**Adjust:** Indicates the offset value memorized through the “Reference” calibration type.




**Note:** When the calibration is performed for 1 Point or 2 Points, the "Adjust" value is automatically reset to zero.

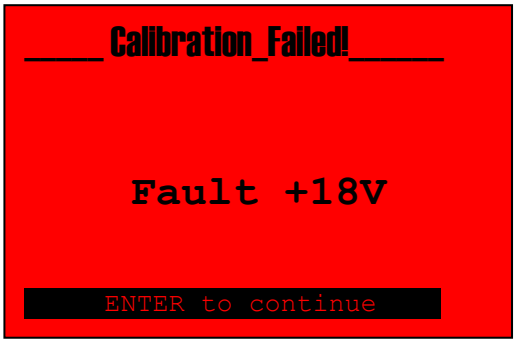
**Menu 1A5** Reset Calibration
This function allows the user to delete all the calibrations and to restore the default values.



**CALIBRATION ERRORS**

**Power Supply +18V is in Short:**

- Damaged wiring
- Sensor is in Short

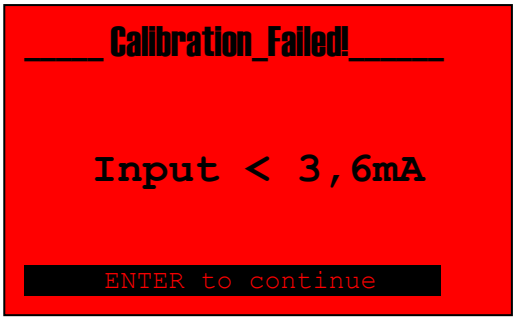



**mA Input less than 3.6mA:**

- Damaged wiring
- Sensor missing

**Note: This alarm is active only if:**

- **The input current is lower than 3.6mA**
- **The menu 3E1 is set to 4-20mA**
- **The menu 3E5 is set to 3.6mA**

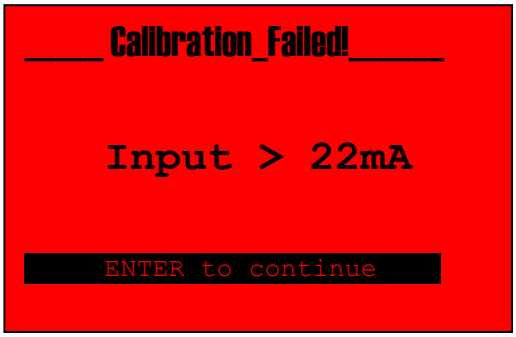



**mA Input greater than 22mA:**

- Damaged wiring
- Sensor missing

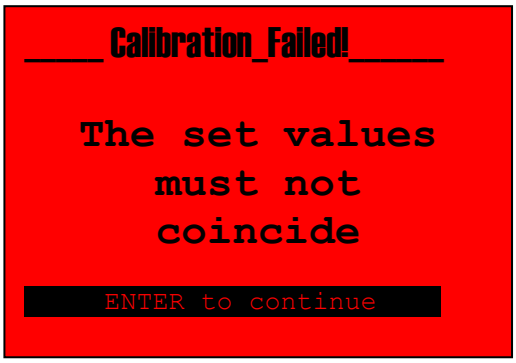
**Note: This alarm is active only if:**

- **The input current is higher than 22mA**
- **The menu 3E4 is set to 22mA**



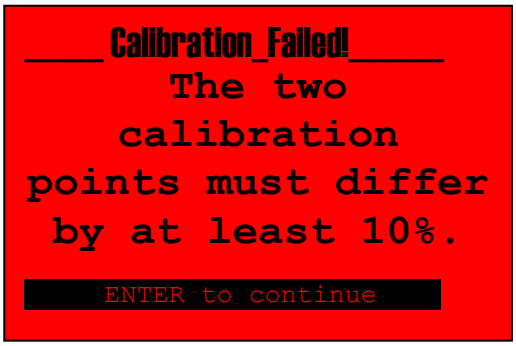

**The set values must not coincide:**

- Only for the 2 points calibration, the values set from numeric keypad must not coincide.



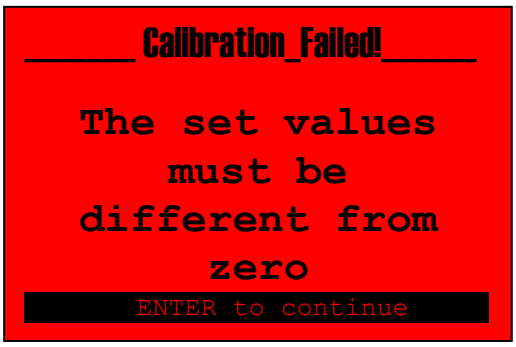

**The two calibration points must differ by at least 10%:**

- The second calibration point must be greater with at least 10% compared to the first calibration point.



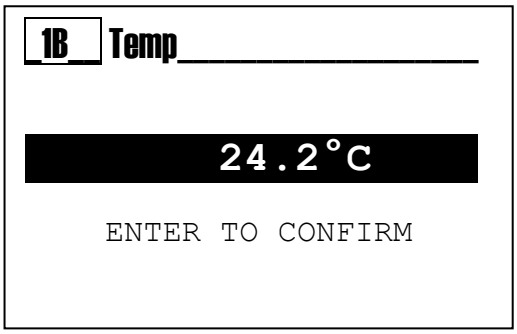
**The set values must be different from zero:**

- Only for the 1 point calibration, the values set from numeric keypad must be different from zero.

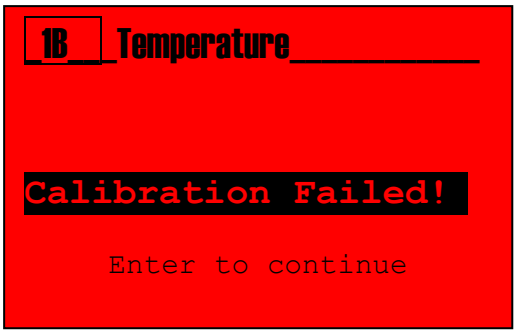



**Temperature Measure Calibration Menu** (M*enu 1B*)

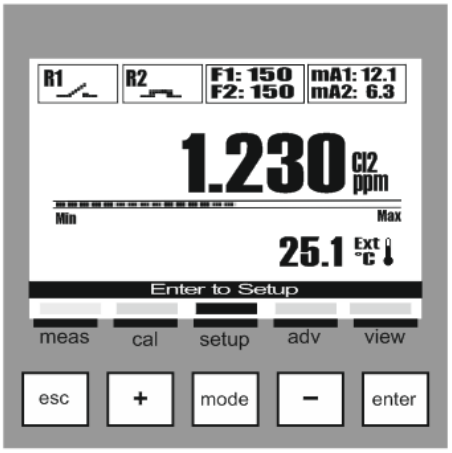
**Menu 1B**
Calibration of the Temperature Measure with an external reference value, manually set.
The instrument performs a correction of the value by adding an offset value to the real measure.




**Menu 1B**
The instrument displays the message "Calibration Failed" if the probe is damaged or disabled from the menu 3E1; see manual, the Advanced Menu section.



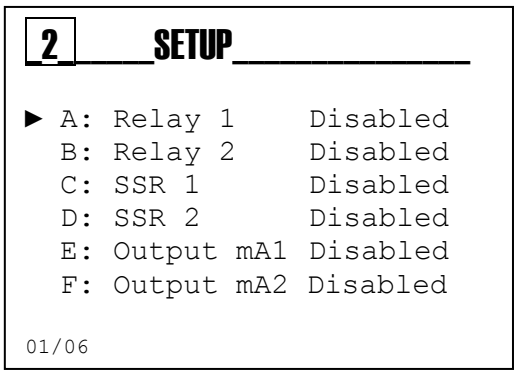
## SETUP MENU (INDEX MENU 2)




Use the **MODE key** to scroll through the icons on the status bar, from left to right, select the **setup** menu and confirm with the **Enter key**.

The Setup menu consists of six (6) items or sub-menus:

2A: Relay 1
2B: Relay 2
2C: SSR1 (Solid State Relay)
2D: SSR2 (Solid State Relay)
2E: Output mA1 (Range 4÷20 mA)
2F: Output mA2 (Range 4÷20 mA)

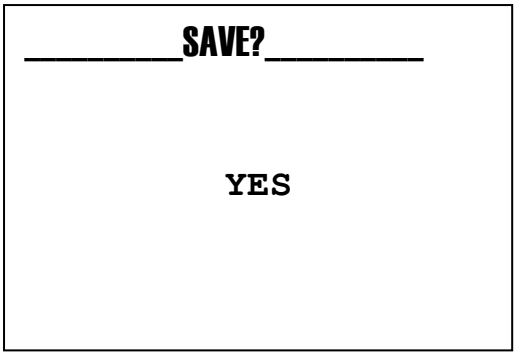



**Note:** To set the relative function to each output, read the manual at the ***Advanced Menu\Outputs Configuration*** section (INDEX MENU 3H).

Below are illustrated the settings required for each sub-menu indicated above.

To exit the menu, press the **Esc key**; when at least one parameter has been changed, the instrument will display the question "save?"; confirm with the **Enter key**.

For not saving, select NO using the **(+)** or **(-)** key and confirm with the **Enter key**.



## SETUP MENU \ RELAY 1 (ONE) (INDEX MENU 2A)

Scroll through the menu using the **(+)** or **(-) key**, select the item Relay 1 and confirm with the **Enter key**.

Scroll through the menu using the **(+)** or **(-) key**, select the item and confirm with the **Enter key**.

The **Relays 1** and **2** can be set either for mA Measure or for Temperature Measure with the following activation methods:

***ON/OFF Method***
(Activation on threshold, with maintenance of the state)
2A1 **SetPoint**: value to maintain into the process
2A2 **Activation Type**: **Low** as the minimum value to maintain
**High** as the maximum value to maintain
2A3 **Hysteresis**: Incremental or decremental value of the SetPoint
2A4 **Hysteresis Time**: Time activated on the hysteresis value
2A5 **Delay Start**: Delay time for relay activation
2A6 **Delay End**: Delay time for relay deactivation
2A7 **OFA**: Relay maximum activation time
2A8 **Over Range**: A value that is subtracted from and added to the SetPoint value and defines a measuring range of operation, outside of which the measure error message is displayed.
2A9 **Permanence**: Control on the variation of measure
2A9A: **Status**: Enables or disables the function
2A9B: **Interval**: A value that is subtracted from and added to the value
2A9C: **Time**: Maximum permanence time of the measure

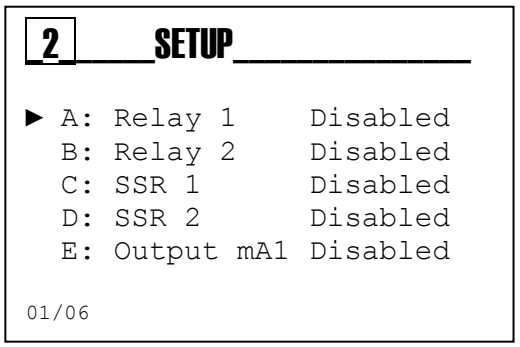
**Note**: See **ANNEX A** for a graphical example on using

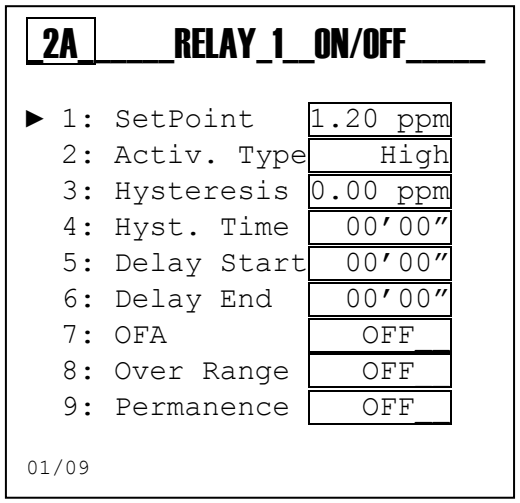
***Timed Method***
(Timed activation on threshold)
We have all the items described in the ON/OFF method.
In addition we have:
2A10 **Time On**: Relay closing time
2A11 **Time Off**: Wait time with the relay open

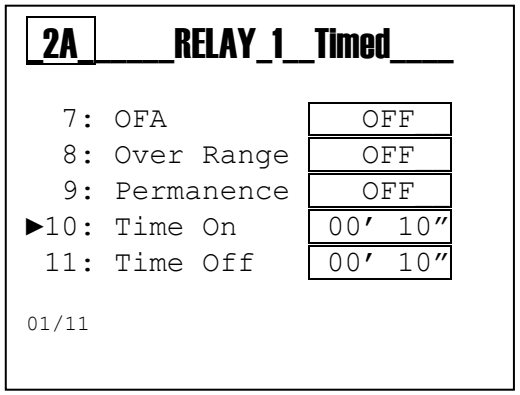
**Note:** See **ANNEX B** for a graphical example on using

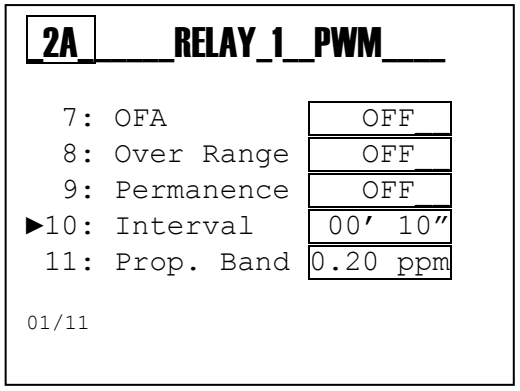
***Proportional (PWM) Method***
(Timed activation on proportional threshold)
We have all the items described in the ON/OFF method.
In addition we have:
2A10 **Period**: Maximum time to modulate according to the measure
2A11 **Proportional Band**: A value that is subtracted from or added to the SetPoint value, within the range the instrument calculates the relay closing time proportional to the measure according to the distance from the SetPoint.

**Note:** See **ANNEX C** for a graphical example on using



## SETUP MENU \RELAY 2 (TWO) (INDEX MENU 2B)

Scroll through the menu using the **(+)** or **(-) key**, select the item Relay 2 and confirm with the **Enter key**.

Scroll through the menu using the **(+)** or **(-) key**, select the item and confirm with the **Enter key**.

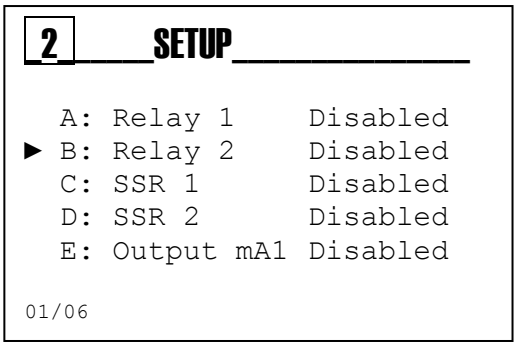
Relay 2 (two) can be set for the mA Measure or Temperature as indicated in the relay 1 menu (see the previous page), it is also possible to set the Wash and Alarm mode as follows:

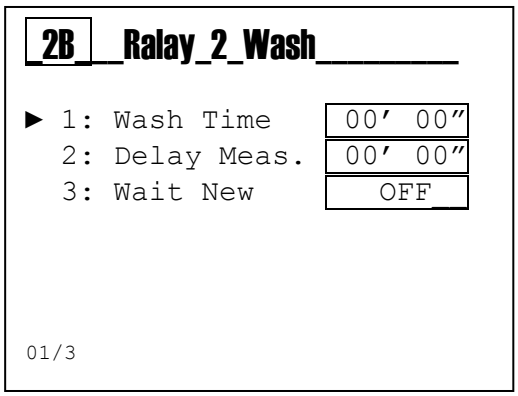
**Wash Method**
Activation of a washing system for the probe
2B1 **Wash Time**: Value in minutes and seconds for washing the probe.
2B2 **Delay Measure**: Value in minutes and seconds to wait for the stability of measure.
2B3 **Wait New Wash**: Value in hours and minutes of waiting for a new washing action.

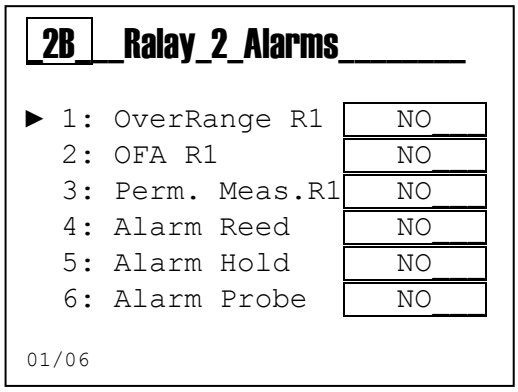
**Note:** See **ANNEX D** for a graphical example on using

**Alarm Method**
Remote repetition of the alarm through relay 2 (two).
below is the list of the alarm events:
2B1 Over Range R1: measure out of range Relay 1
2B2 OFA R1: Maximum dosing time expired
2B3 Permanence Measure: measure blocked (frozen)
2B4 Reed Alarm: Alarm for the Reed sensor activation
2B5 Hold Alarm: Alarm for the Hold signal activation
2B6 Temperature Probe Alarm: Alarm for probe disconnected

**Note:** See **ANNEX E** for a graphical example on using

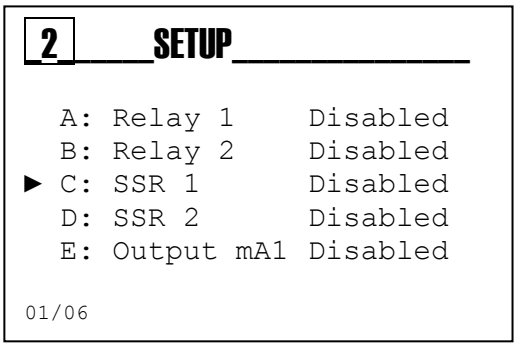


## SETUP MENU SSR1 AND SSR2 (INDEX MENU 2C AND 2D)

Scroll through the menu using the **(+)** or **(-) key**, select the item SSR1 and 2 and confirm with the **Enter key**.

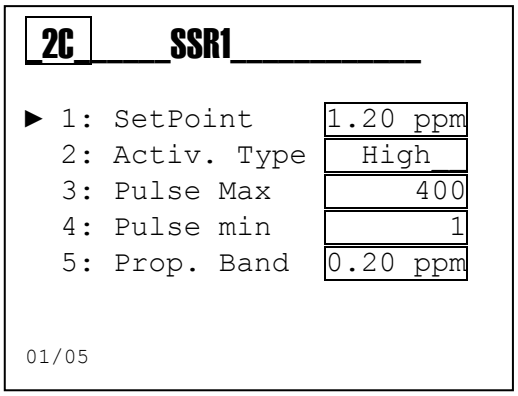



Scroll through the menu using the **(+)** or **(-) key**, select the item and confirm with the **Enter key**.

The outputs SSR1 (one) and SSR2 (two) are two solid state relays used as frequency outputs.

The outputs SSR1 and SSR2 can be set either for mA Measure or for Temperature Measure

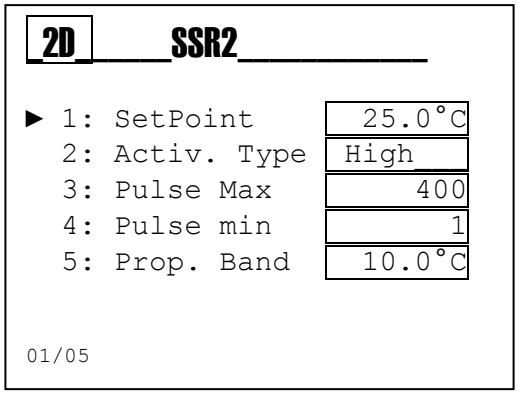
### SSR1 Setup (INDEX MENU 2C)




2C1 **SetPoint**: value to maintain into the process
2C2 **Activation Type**:
**Low** as the minimum value to maintain
**High** as the maximum value to maintain
2C3 **Pulse Max**: Maximum value of pulses (range:20÷400)
2C4 **Pulse min**: Minimum value of pulses (range:1÷100)
2C5 **Proportional Band**: A value that is subtracted from or added to the SetPoint value, within the range the instrument calculates the number of pulses proportional to the measure according to the distance from the SetPoint.

**Note:** See **ANNEX F** for a graphical example on using

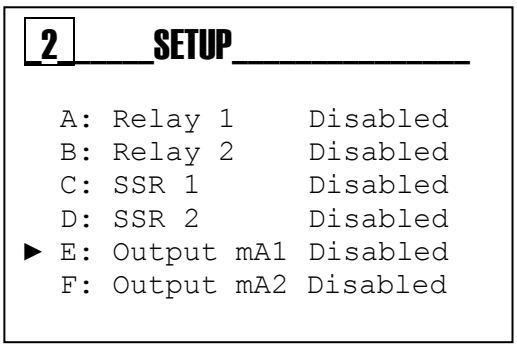
### SSR2 Setup (INDEX MENU 2D)




2D1 **SetPoint**: value to maintain into the process
2D2 **Activation Type**:
**Low** as the minimum value to maintain
**High** as the maximum value to maintain
2D3 **Pulse Max**: Maximum value of pulses (range:20÷400)
2D4 **Pulse min**: Minimum value of pulses (range:1÷100)
2D5 **Proportional Band**: A value that is subtracted from or added to the SetPoint value, within the range the instrument calculates the number of pulses proportional to the measure according to the distance from the SetPoint.

**Note:** See **ANNEX F** for a graphical example on using

## SETUP MENU \ OUTPUT MA1 AND MA2 (INDEX MENU 2E AND 2F)

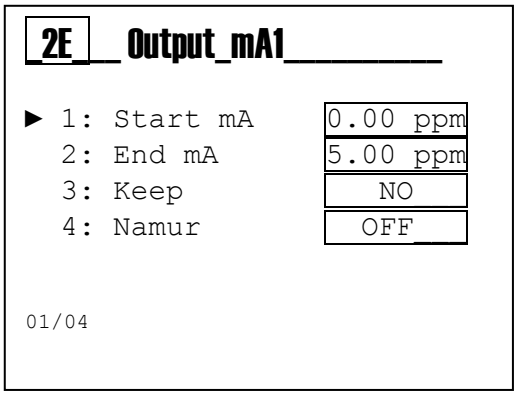



Scroll through the menu using the **(+)** or **(-) key**, select the item mA1 and 2 and confirm with the **Enter key**.

Scroll through the menu using the **(+)** or **(-) key**, select the item and confirm with the **Enter key**

The outputs mA1 (one) and mA2 (two) are two current outputs in mA (milliAmpere), in active configuration with the range 4÷20 mA.

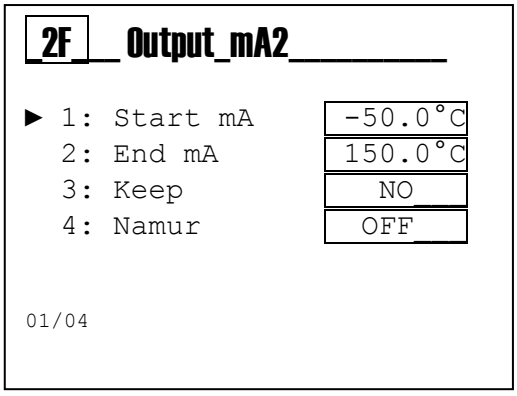
The **Outputs mA1** and **mA2** can be set either for mA Measure or for Temperature Measure.




**Output mA1 Setup (INDEX MENU 2E)**

2E1 **Start mA**: Measure value associated to the 4 mA value
2E2 **End mA**: Measure value associated to the 20 mA value
2E3 **Keep**: Freezes the current value in case of Holding Alarm
2E4 **Namur**: Sets the current value to 3.6 mA or
22 mA in case of Alarm

**Note**: See **ANNEX G** for a graphical example on using



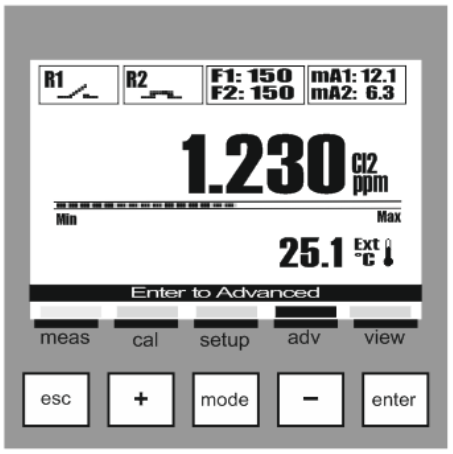

**Output mA2 Setup (INDEX MENU 2F)**

2F1 **Start mA**: Measure value associated to the 4 mA value
2F2 **End mA**: Measure value associated to the 20 mA value
2F3 **Keep**: Freezes the current value in case of Holding Alarm
2F4 **Namur**: Sets the current value to 3.6 mA or
22 mA in case of Alarm

**Note**: See **ANNEX G** for a graphical example on using

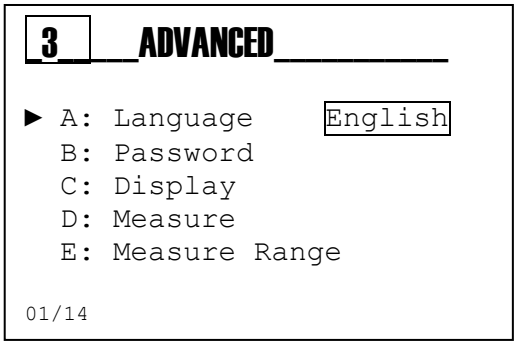
## ADVANCED MENU (INDEX MENU 3)

Use the **MODE key** to scroll through the icons on the status bar, from left to right, select the **adv** menu and confirm with the **Enter key**.




The **Advanced** menu consists of forteen (14) items or sub-menus, as follows:

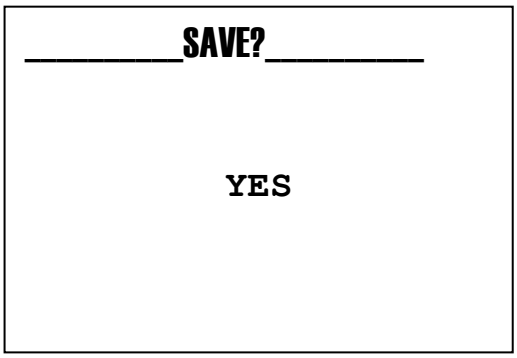
A: Language
B: Password
C: Display
D: Measure
E: Measure Range
F: Temperature Measure
G: Alarms Setting
H: Outputs Setting
I: RS485 Setting
L: USB Setting
M: Control Panel
N: Statistics
O: System Reset
P: Firmware Revision




Below are illustrated the settings required for each sub-menu indicated above.

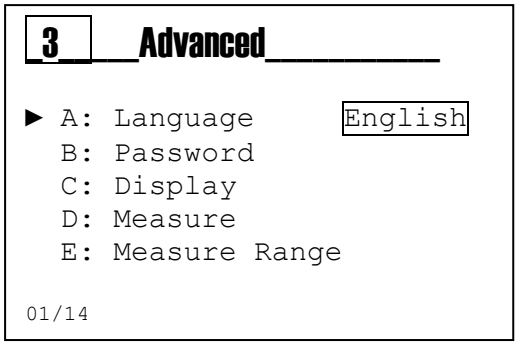
To exit the menu, press the **Esc key**; when the parameters have been changed, the instrument will display the question "save?"; confirm with the **Enter key**.

For not saving, select NO using the **(+)** or **(-)** key and confirm with the **Enter key**.



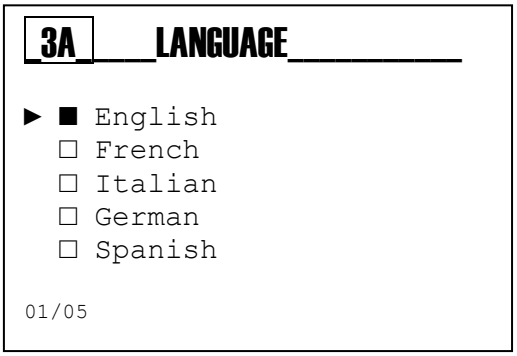
## ADVANCED MENU \ LANGUAGE (INDEX MENU 3A)

The menu consists of five (5) items that allow to select the dialog language for the instrument's menus and messages.




Scroll through the menu using the **(+)** or **(-) key**, select the item Language and confirm with the **Enter key**.

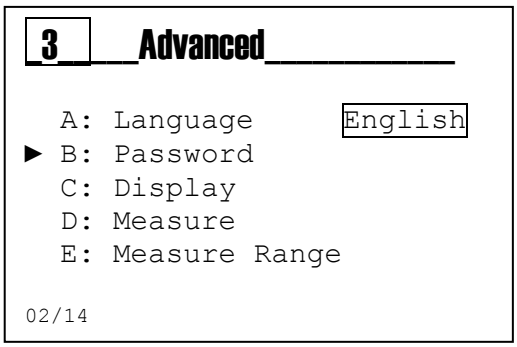
Scroll through the menu using the **(+)** or **(-) key**, select the item and confirm with the **Enter key**.




The instrument automatically changes the language of the menu and returns to the previous level, menu 3.

## ADVANCED MENU \ PASSWORD (INDEX MENU 3B)

The menu consists of three (3) items that allows to select the menu protection Password and enable the Calibration menu or the Setup menu.




Scroll through the menu using the **(+)** or **(-) key**, select the item and confirm with the **Enter key**.

**Password Function**

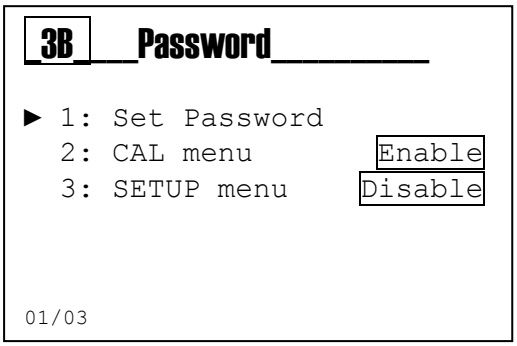
3B1 Set Password: set the numeric value

**Note:** If the password is present it will be displayed

Example: *"Old Password 1234"*

3B2 Calibration Menu: Enable or Disable the Calibration menu

3B3 Setup Menu: Enable or Disable the Setup menu

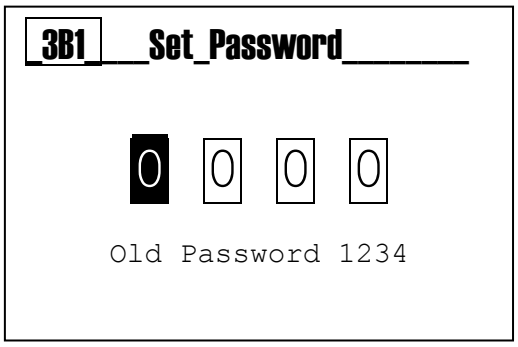



**Note:** To remove the password set four zeros (0000) and confirm with the **Enter key**.

The following are examples of the sub-menus shown above.

**Menu 3B1**

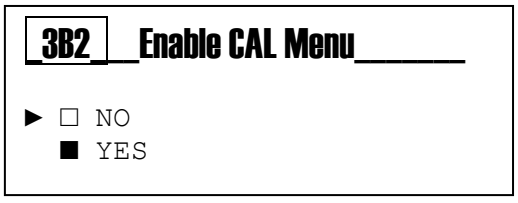
Set the value for password, other than 0000 using **(+)** and **(-)** keys and move to the right using the **Mode key**.




**Menu 3B2**

YES= Menu Enabled

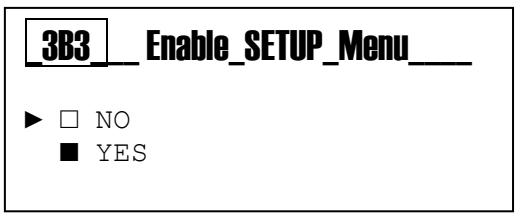
NO= Menu Disabled; can be accessed by entering the password



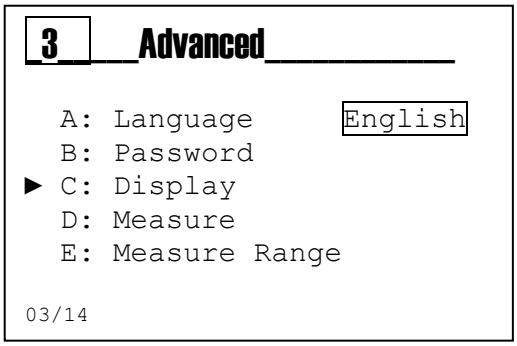

**Menu 3B3**

YES= Menu Enabled

NO= Menu Disabled; can be accessed by entering the password

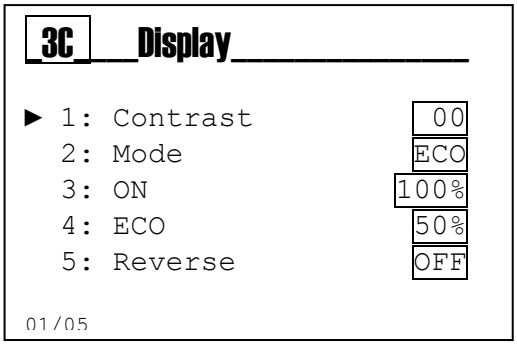


## ADVANCED MENU \ DISPLAY (INDEX MENU 3C)




The menu consists of five (5) items that allow to select Contrast, Mode, Mode ON, Mode ECO, Reverse.

Scroll through the menu using the **(+)** or **(-) key**, select the item and confirm with the **Enter key**.

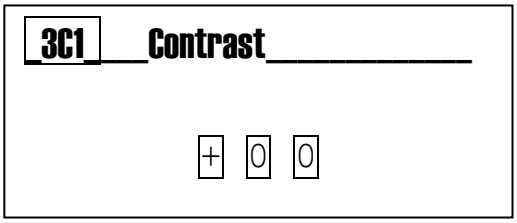



**Display Function**:

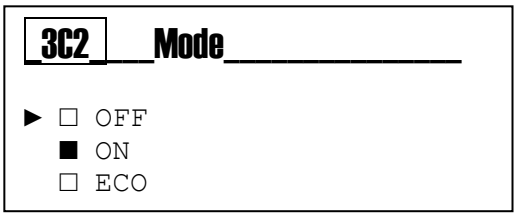
3C1 **Contrast:** Balance value between the menu writings and the background brightness
3C2 **Mode:** Turned on, Turned off, “ECO” Adjustment
3C3 **On:** Light value function always on
3C4 **ECO:** Light value function of electronic regulation
3C5 **Reverse:** Inverted display, white writings on black background.

The following are examples of the sub-menus shown above.

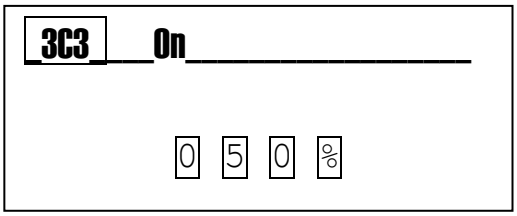
**Menu 3C1**
Adjusts the background brightness



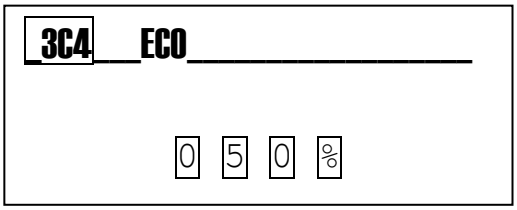

**Menu 3C2**
Select the Backlight function:
OFF= Turned off; ON= Turned on; ECO= Fade



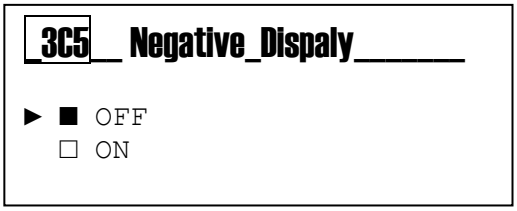

**Menu 3C3**
Select the brightness value for ON mode




**Menu 3C4**
Select the brightness value for ECO mode

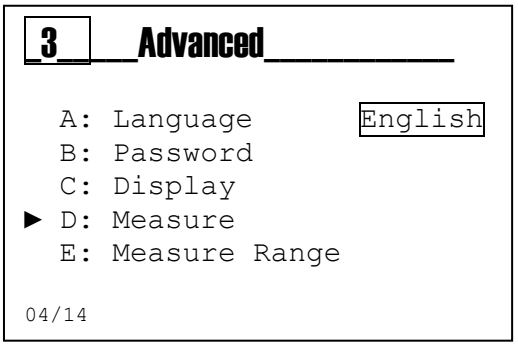



**Menu 3C5**
Invert the writings on the display to obtain a high contrast



## ADVANCED MENU \ MEASURE (INDEX MENU 3D)

The menu consists of six (6) items that allow to select Measure.



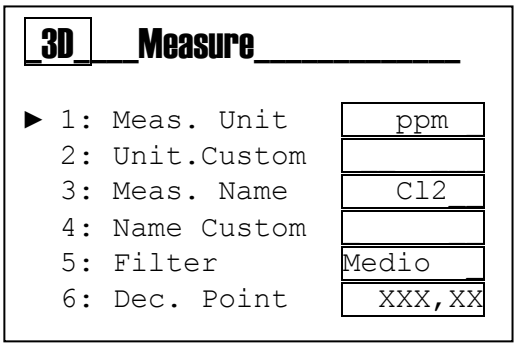

Scroll through the menu using the **(+)** or **(-) key**, select the item and confirm with the **Enter key**.

**Measure** Function (Index menu 3D)

3D1 **Measure Unit**: Select the measure unit.
3D2 **Custom Unit**: Possibility to write any custom measure unit. Maximum 4 characters/symbols.
**Note**: This measure unit will be displayed only if the menu 3D1 is set as "*Custom*".
3D3 **Measure Name**: Select the measure name.
3D4 **Custom Name**: Possibility to write any custom name to match the measure. Maximum 4 characters/symbols.
**Note**: This name will be displayed only if the menu 3D3 is set as "*Custom*".
3D5 **Measure Filter**: The measure is filtered with arithmetic mean.

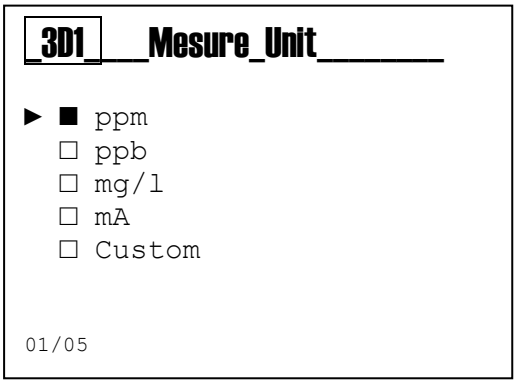
- Low= arithmetic mean every 4 seconds
- Medium= arithmetic mean every 8 seconds
- High= arithmetic mean every 16 seconds

3D6 **Decimal Point**: set the position of the decimal point for the measure.

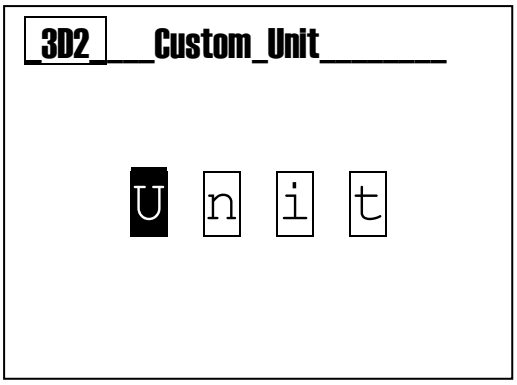



The following are examples of the sub-menus shown above.

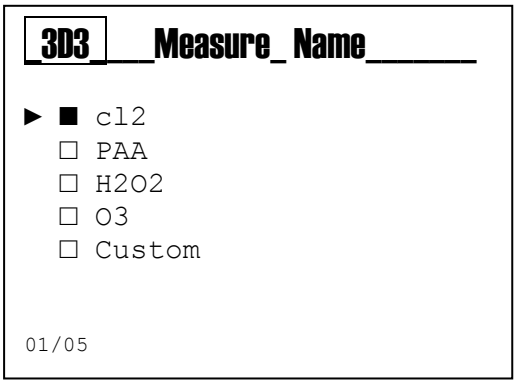
**Menu 3D1**
Select the measure unit. By selecting "**Custom**" the measure unit is displayed as set in the menu 3D2.



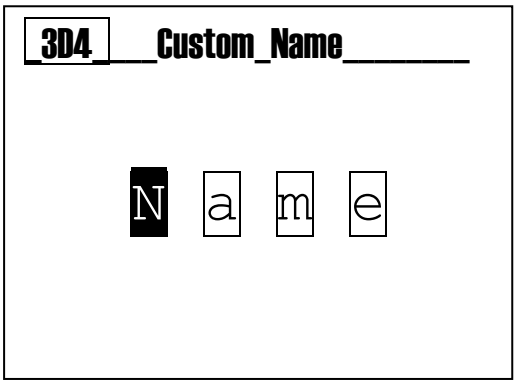

**Menu 3D2**
Possibility to write the custom measure unit, max. 4 characters.



**Menu 3D3**
Select the measure name. By selecting "**Custom**" the measure name is displayed as set in the menu 3D4.

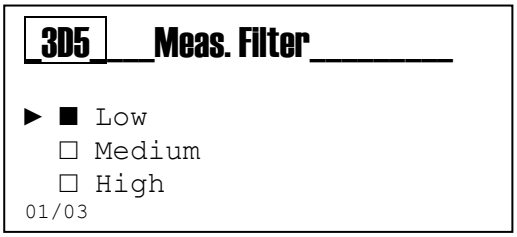



**Menu 3D4**
Possibility to write the custom measure name, max. 4 characters.




**Menu 3D5**
The measure is filtered with arithmetic mean.

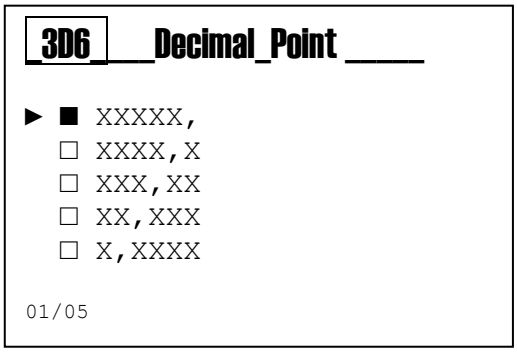
- Low= arithmetic mean every 4 seconds
- Medium= arithmetic mean every 8 seconds
- High= arithmetic mean every 16 seconds




**Menu 3D6**

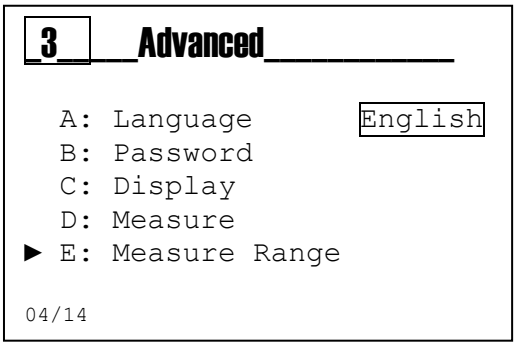
Set the position of the decimal point for the measure to highlight the decimal value.

Scroll through the menu using the **(+)** or **(-) key**, select the item and confirm with the **Enter key**.



## ADVANCED MENU \ MEASURE RANGE (INDEX MENU 3E)

The menu consists of five (5) items that allow to select Measure.




Scroll through the menu using the **(+)** or **(-) key**, select the item and confirm with the **Enter key**.

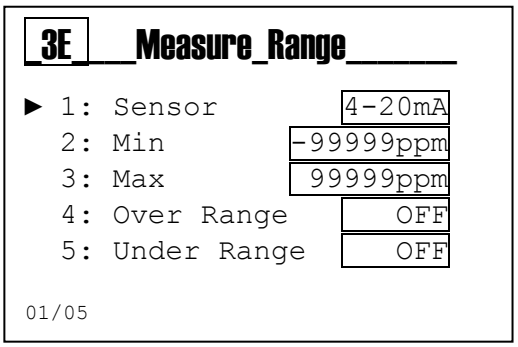
**Measure Range** Function (Index menu 3E)

3E1 **Sensor Type**: Select the type of sensor used, 0/20mA or 4/20mA.
3E2 **Min Range**: Set the value corresponding to 0 mA or 4 mA. Value between -99999 and 99999.
3E3 **Max Range**: Set the value corresponding to 20 mA. Value between -99999 and 99999.
3E4 **Over Range**:

- OFF: Over Range Alarm disabled.
- 22mA: If the input current to the instrument is higher than 22mA, the Over range alarm is activated.

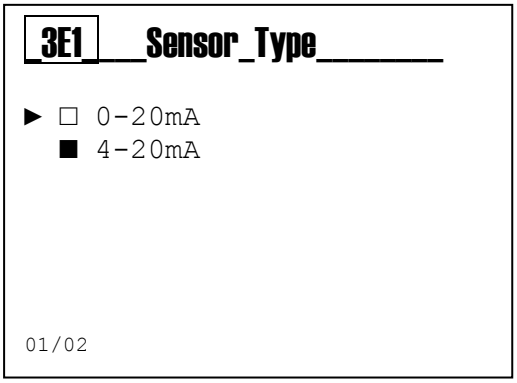
3E5 **Under Range**:

- OFF: Over Range Alarm disabled.
- 3.6mA: If the input current to the instrument is lower than 3.6mA, the Under range alarm is activated.

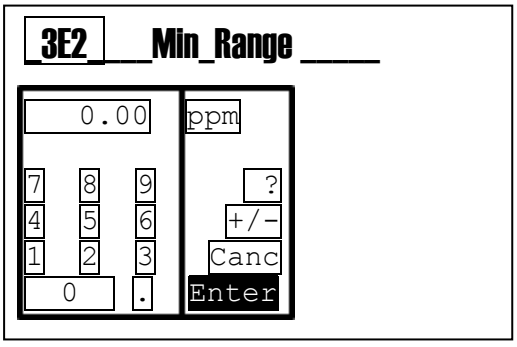



The following are examples of the sub-menus shown above.

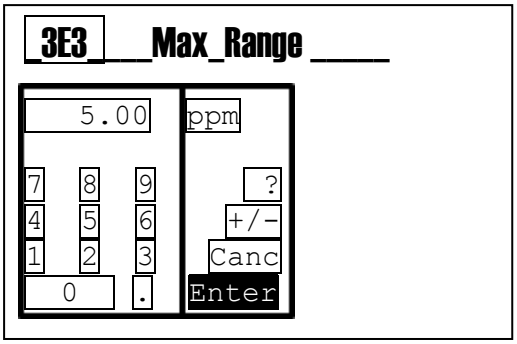
**Menu 3E1**
Select the type of sensor used, 0/20mA or 4/20mA.




**Menu 3E2**
Set the value corresponding to 0 mA or 4 mA. Value between -99999 and 99999.

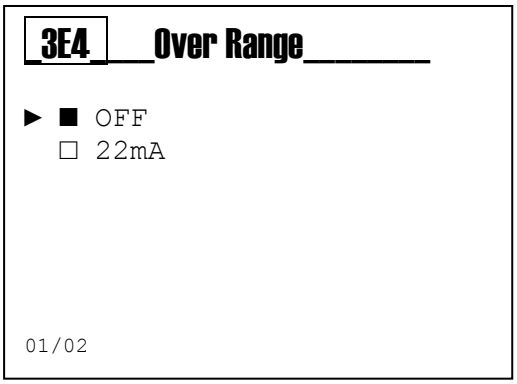


**Menu 3E3**
Set the value corresponding to 20 mA.
Value between -99999 and 99999.




**Menu 3E4**
Set the Over Range Alarm.

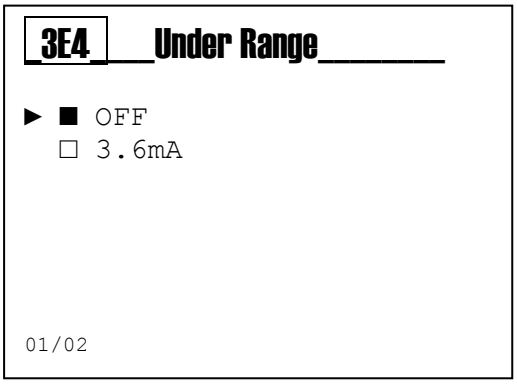
- OFF: Over Range Alarm disabled.
- 22mA: If the input current to the instrument is higher than 22mA, the Over range alarm is activated.




**Menu 3E5**
Set the Under Range Alarm.

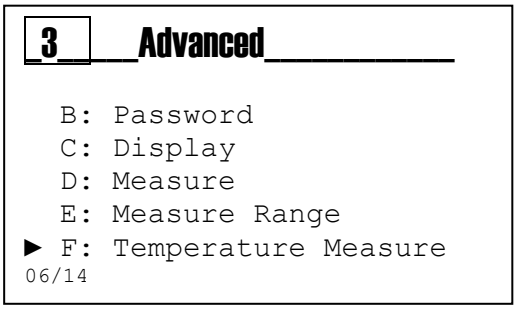
- OFF: Under Range Alarm disabled.
- 3.6mA: If the input current to the instrument is lower than 3.6mA, the Under range alarm is activated.

**Note**: The Under Range Alarm can only be activated if the menu 3E1 is set as 4-20mA. If the menu 3E1 is set as 0-20mA, the Under Range menu is configured to OFF and cannot be changed.



## ADVANCED MENU \ TEMPERATURE MEASURE (INDEX MENU 3F)

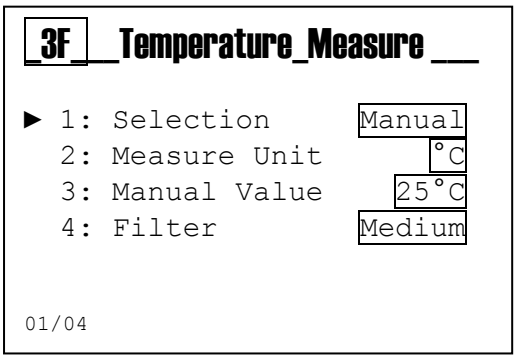
Scroll through the menu using the **(+)** or **(-) key**, select the item and confirm with the **Enter key**.




**Temperature Measure Function** (INDEX MENU 3F)

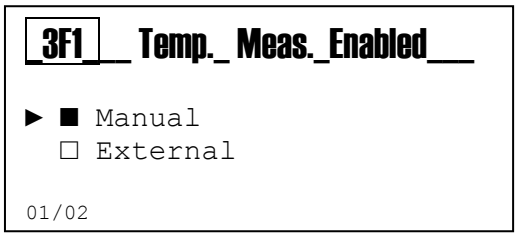
**3F1 Selection**: PT100 or PT1000 temperature sensor connected or using a manual temperature value.
**3F2 Measure Unit**: Set Celsius (°C) or Fahrenheit (°F) unit
**3F3 Manual Value**: Set the temperature value without PT100 or PT1000 temperature sensor.
**3F4 Filter:** The measure is filtered with arithmetic mean.

- Low= arithmetic mean every 4 seconds
- Medium= arithmetic mean every 8 seconds
- High= arithmetic mean every 16 seconds

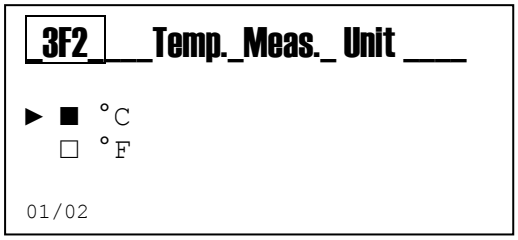



The following are examples of the sub-menus shown above.

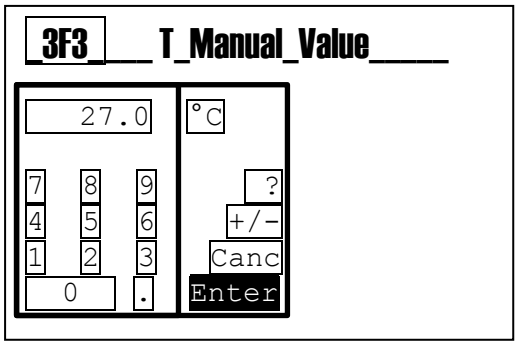
**Menu 3F1**
Select between manual temperature value function and external temperature measure through PT100 or PT1000 temperature sensor.




**Menu 3F2**
Select the measure unit.

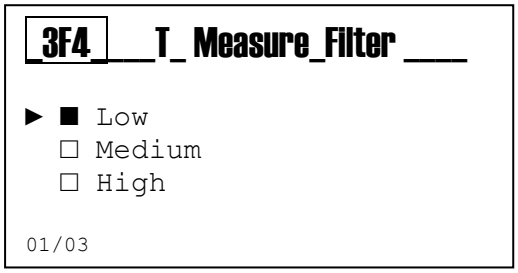



**Menu 3F3**
Set the temperature value as manual value.



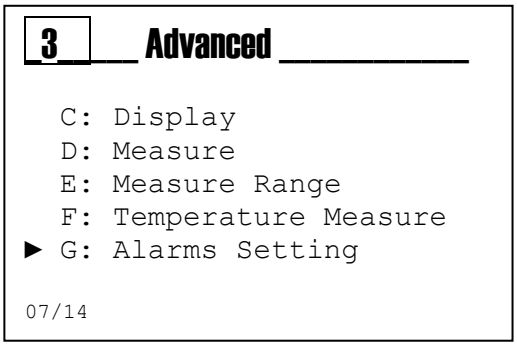

**Menu 3F4**
The measure is filtered with arithmetic mean.

- Low= arithmetic mean every 4 seconds
- Medium= arithmetic mean every 8 seconds
- High= arithmetic mean every 16 seconds



## ADVANCED MENU \ ALARMS SETTING (INDEX MENU 3G)

Scroll through the menu using the **(+)** or **(-) key**, select the item and confirm with the **Enter key**.




### Alarms Setting Function

**3G1 Reed Logic**: Set the sensor logic
- Reed NO (Normally Open)
- Reed NC (Normally Close)

**3G2 Delay Reed**: Set the delay time for alarm activation to change REED status

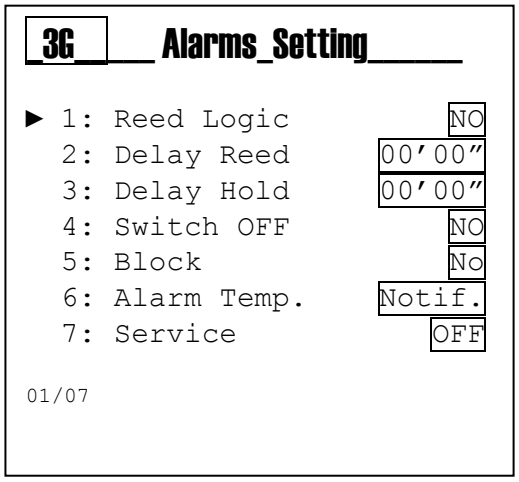
**3G3 Delay Hold**: Set the delay time for alarm activation for HOLD signal presence

**3G4 Power Supply Interruption**: Enables a visual alarm in case a power supply interruption took place in precedence.

**3G5 Instrument blocking**: Enables instrument blocking in case of alarm. The outputs are automatically set on the programmed alarm state.

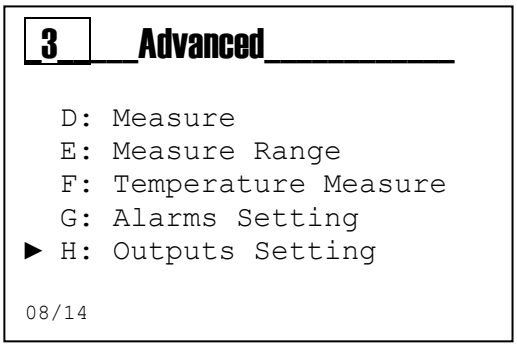
**3G6 Alarm Temp.**: Enables a visual alarm or a instrument block in case the temperature probe is broken or disconnected.

**3G7 Service**: Set a value in days to display a message of “Service Required”.



## ADVANCED MENU \ OUTPUTS SETTING (INDEX MENU 3H)

Scroll through the menu using the **(+)** or **(-) key**, select the item and confirm with the **Enter key**.

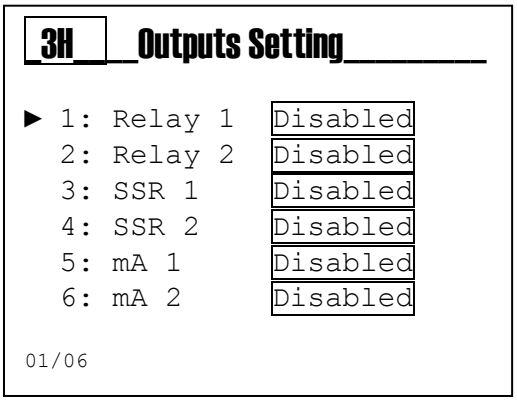



**Outputs Setting Function**

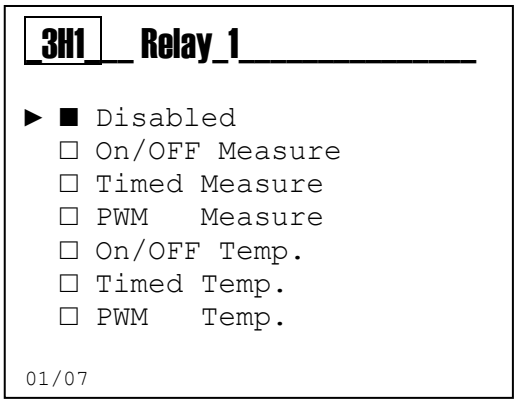
**3H1 Relay 1**: Disabled, On/OFF (threshold), Timed, Proportional PWM, either for Measure or for Temperature Measure

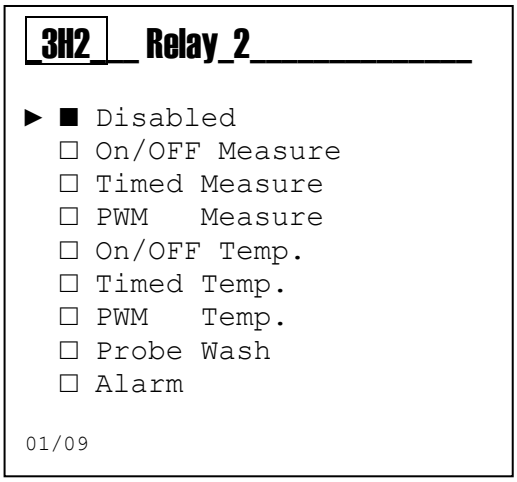
**3H2 Relay 2**: Disabled, On/OFF (threshold), Timed, Proportional PWM, either for Measure or for Temperature Measure, and also Probe Wash, Remote Alarm

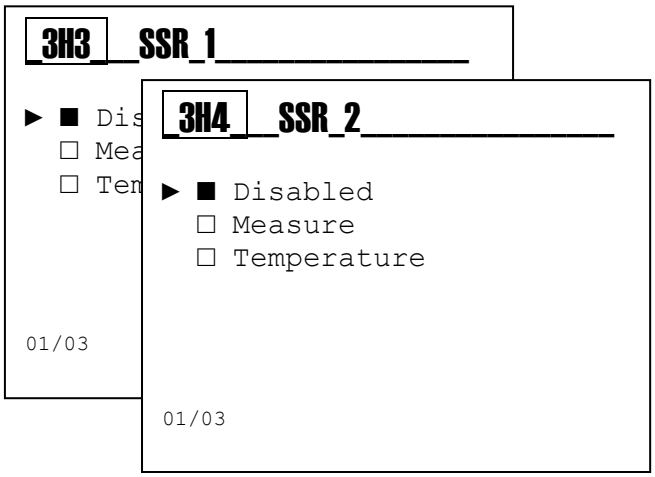
**3H3 SSR 1:** Disabled, Measure, Temperature Measure
**3H4 SSR 2:** Disabled, Measure, Temperature Measure
**3H5 mA 1:** Disabled, Measure, Temperature Measure
**3H6 mA 2:** Disabled, Measure, Temperature Measure

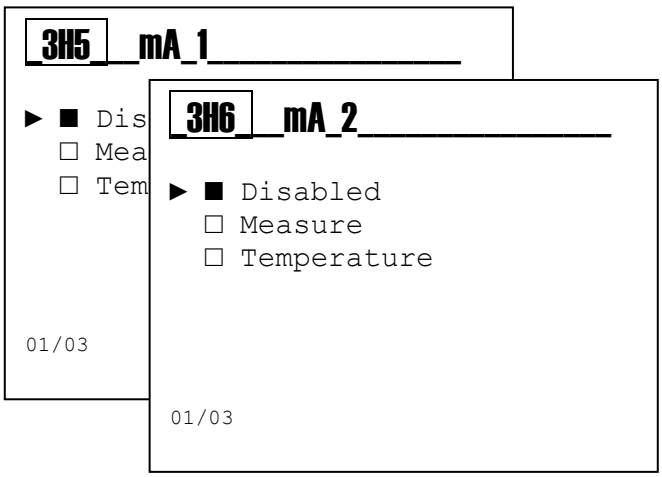



**Note**: On the Setup menu (INDEX MENU 2) it is possible to set the parameters for each selected function.



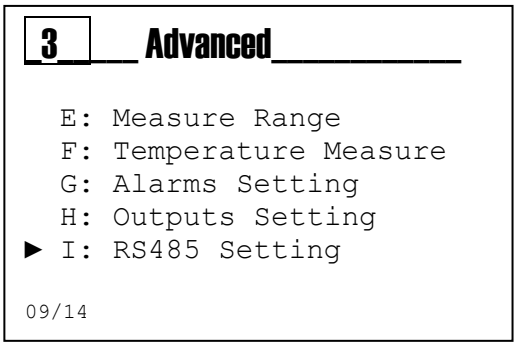



## ADVANCED MENU \ RS485 PORT SETTING (INDEX MENU 3I)

Scroll through the menu using the **(+)** or **(-) key**, select the item and confirm with the **Enter key**.




**RS485 Serial Port Setting Function**:

**3I1 RS485**: Enables the serial port (Enable/Disable)
**3I2 Mode**: Standard protocol used (RTU/Ascii)
**3I3 Address**: Communication Address (ID 1÷247)
**3I4 Baud rate**: Communication speed (1200÷115200 bps)
**3I5 Parity**: Parity bit for checking transmission (none, odd, even)
**3I6 Bit stop**: Stop bits to set waiting time (1, 2)

**Note**: The RS485 function on the standard code is not available.

**Note:** the communication always takes place (RTU/ASCII) with 8 data bits

- The minimum polling time is set to 200ms.
- The accepted commands are:
  a) Report Slave ID
  b) Write Multiple Registers (max 4 registers per interrogation)
  c) Read Holding Registers (max 4 registers per interrogation)
- The system always responds to these commands.
- If you are not in View Level mode or in RS485 Control Panel, cases in which you receive in response an error code and the command is not executed.
- Each writing operation which occurs in the registers with positive results, writes on the specific register a certain value.
  To save on the memory of the instrument the value written into the register you must execute a write memory command realized with a Write Multiple Registers operation (amount of data to be written 1) at the address of the command register (4000), with parameter 2.
  Alternatively, if you exit the programming, the system itself will ask you to save the changes you made to the parameters in memory because the system automatically reveals that the parameters in memory have been modified and it proposes to save them.
  If the instrument is turned off WITHOUT having saved the written registers, the system will restart with the values previously set in memory.

*Example:*
Relay 1 set as "*ON/OFF Measure*".
Setpoint to be set [index 2A1]: *950,52ppm*

Conversion Decimal → Hexadecimal:
95052 → 0x1734C
Number of decimals for Setpoint: 2

Below are the values to be written in the registers related to Setpoint RL1 [index menu 2A1]:

Address 3100: *0x734C (Setpoint L)*
Address 3101: *0x0001 (Setpoint H)*
Address 3102: *0x0002 (Decimal Setpoint)*

**Write Multiple Registers command**

| Addr | Func | Start Addr H | Start Addr L | Data Word H | Data Word L | Data Byte Count | Data 3100 H | Data 3100 L | Data 3101 H | Data 3101 L | Data 3102 H | Data 3102 L | CRC H | CRC L |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0x01 | 0x10 | 0x0C | 0x1C | 0x00 | 0x03 | 0x06 | 0x73 | 0x4C | 0x00 | 0x01 | 0x00 | 0x02 | 0xD2 | 0xB6 |

To complete the writing operation of the Setpoint RL1 into the EEPROM of the instrument, run the following command:

Address 4000: 0x02 (Write to Eeprom)*

**Write Multiple Registers command**

| Addr | Func | Start Addr H | Start Addr L | Data Word H | Data Word L | Data Byte Count | Data 4000 H | Data 4000 L | CRC H | CRC L |
|---|---|---|---|---|---|---|---|---|---|---|
| 0x01 | 0x10 | 0x0F | 0xA0 | 0x00 | 0x01 | 0x02 | 0x00 | 0x02 | 0xC0 | 0x31 |

* In case of setting more parameters, it is recommended to run the command 4000 only once after the set parameters.

To read the Setpoint RL1, run the following command:

**Read Holding Registers command**

| Addr | Func | Start Addr H | Start Addr L | Data Word H | Data Word L | CRC H | CRC L |
|---|---|---|---|---|---|---|---|
| 0x01 | 0x03 | 0x0C | 0x1C | 0x00 | 0x03 | 0xC7 | 0x5D |

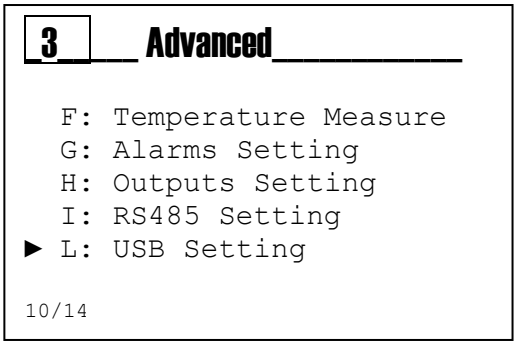
The read Setpoint will be formatted as follows:

Address 3100: *0x734C (Setpoint L)*
Address 3101: *0x0001 (Setpoint H)*
Address 3102: *0x0002 (Decimal Setpoint)*

Reconstructing the data we will have the following value: *950,52ppm*
To verify the set data, check the menu item Setpoint RL1 to the index 2A1.

## ADVANCED MENU \ USB PORT SETTING (INDEX MENU 3L)

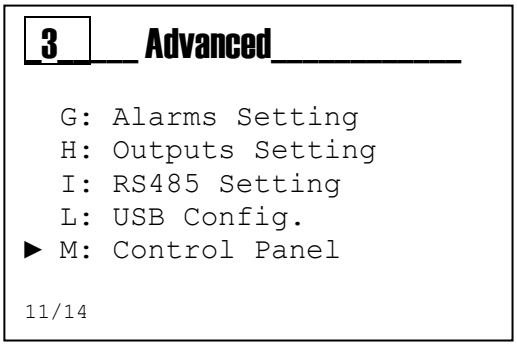
The function is intended for internal use, to test and verify the instrument

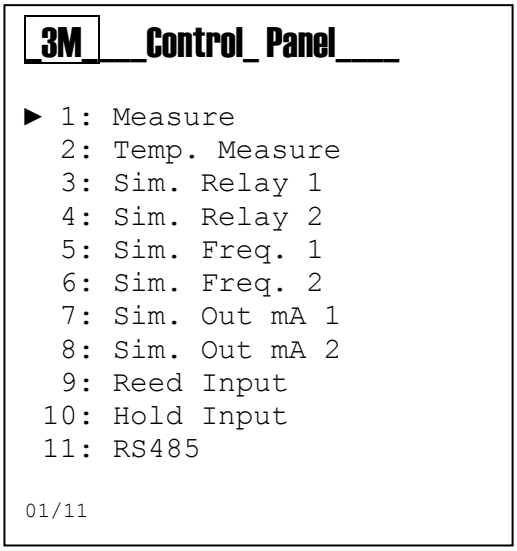



## ADVANCED MENU \ CONTROL PANEL (INDEX MENU 3M)

**Menu 3M Control Panel**
Scroll through the menu using the **(+)** or **(-) key**, select the item and confirm with the **Enter key**.

**3M1** Measure: Displays the unfiltered measure in µA.
**3M2** Temp. Measure: Displays the unfiltered measure in °C/°F
**3M3** Sim. Relay 1: Manual closing of the relay contact
**3M4** Sim. Relay 2: Manual closing of the relay contact
**3M5** Simulation Frequency 1: Simulates an output value
**3M6** Simulation Frequency 2: Simulates an output value
**3M7** Simulation Current Output 1: Simulates an output value
**3M8** Simulation Current Output 2: Simulates an output value
**3M9** Reed Input: Displays the Reed Input status
**3M10** Hold Input: Displays the Hold Input status
**3M11** View the sent and received Modbus frames.



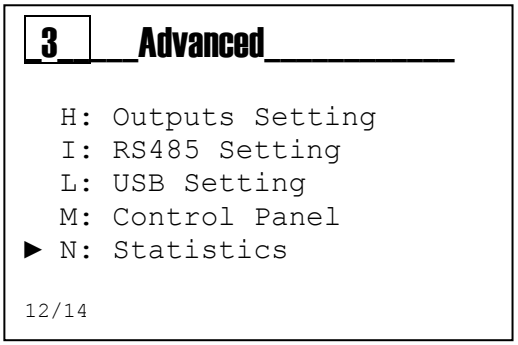



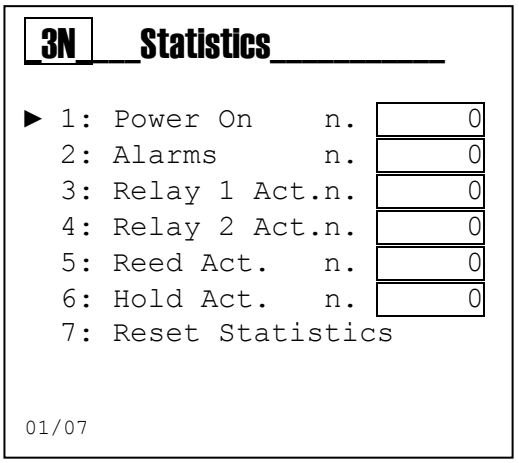

**Note**: The instrument allows the simultaneously simulation of multiple outputs, all the set values will be cleared on exiting the menu **3M Control Panel**.

## ADVANCED MENU \ STATISTICS (INDEX MENU 3N)

**Menu 3N Statistics**
Scroll through the menu using the **(+)** or **(-) key**, select the item and confirm with the **Enter key**.

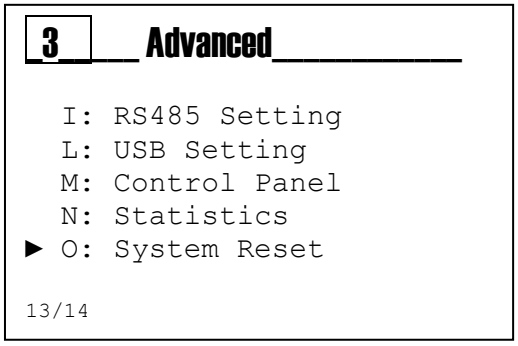
**3N1** Number of registered Power On
**3N2** Number of registered Alarms
**3N3** Number of activations Relay 1
**3N4** Number of activations Relay 2
**3N5** Number of activations Reed
**3N6** Number of activations Hold
**3N7** Reset all values recorded in the statistics menu

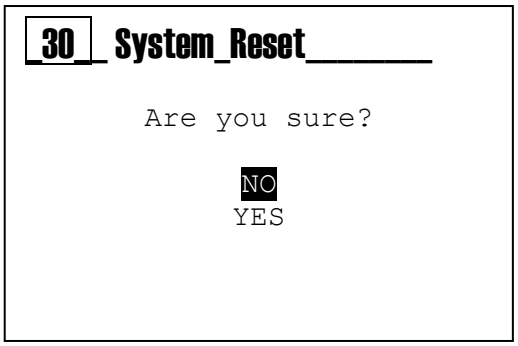


## ADVANCED MENU \ SYSTEM RESET (INDEX MENU 3O)

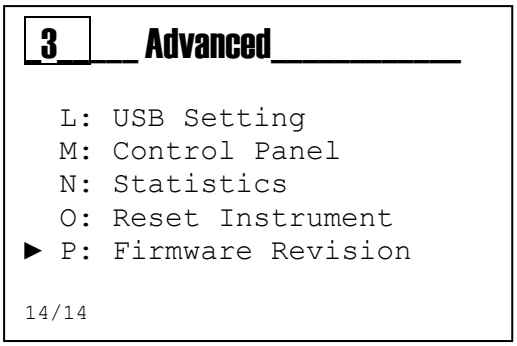
**Menu 3O** Reset Instrument
The instrument allows to delete all the parameters and restore the default values.

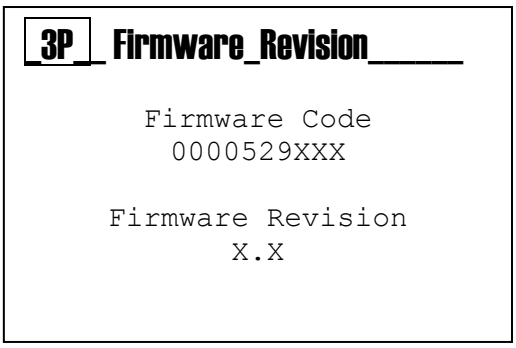



## ADVANCED MENU \ FIRMWARE REVISION (INDEX MENU 3P)

**Menu 3P** Firmware Revision
The instrument displays the Firmware code and revision of the device.

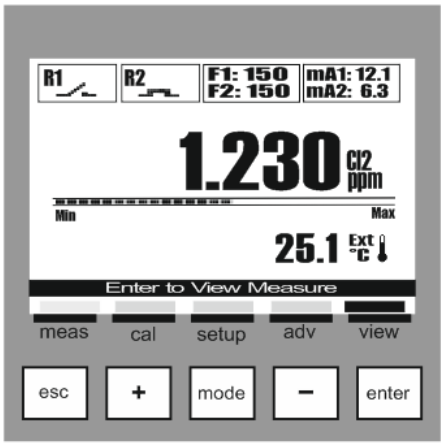


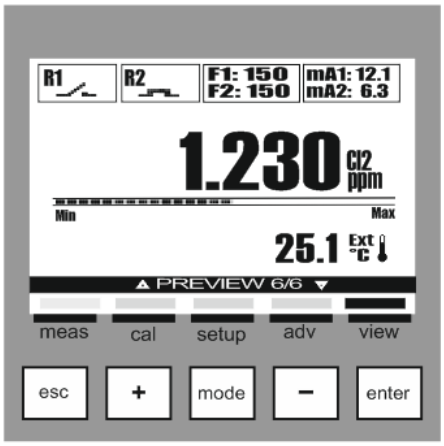



## VIEW MENU (INDEX MENU 4)

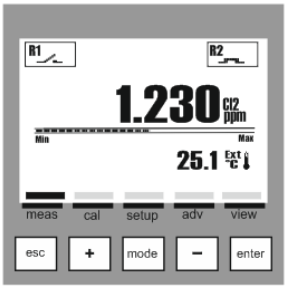
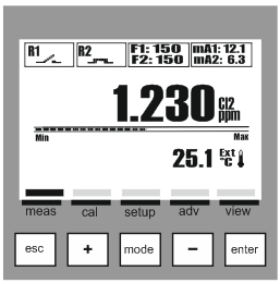
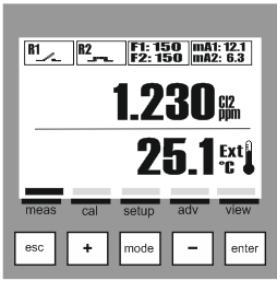
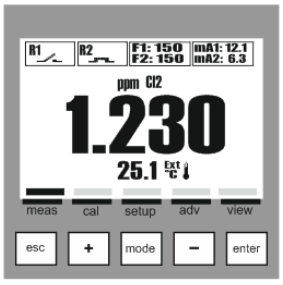
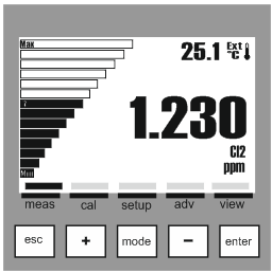
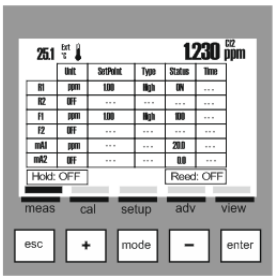
Use the **MODE key** to scroll through the icons on the status bar, from left to right, select the **view** menu and confirm with the **Enter key**.

The **Preview Menu** consists of 6 views
Scroll through the menu using the **(+)** or **(-) key**, select the item and confirm with the **Enter key**.




***Views Table***

| | | |
|---|---|---|
|  **Preview 1/6 Standard** |  **Preview 2/6 Complete** |  **Preview 3/6 Two Big Measures** |
|  **Preview 4/6 One Big Measure** |  **Preview 5/6 Analog** |  **Preview 6/6 Outputs and Inputs Table** |

## GENERAL SPECIFICATIONS

| **Specifications mA Input** | |
|---|---|
| Sensor type | Sensor with two or three wires |
| Sensor power supply 4/20mA 2 wires | (*)18Vdc ±5%, max 30mA |
| Short circuit protection | Active |
| Measure Range | from 0 to 20 mA or from 4 to 20 mA |
| Error Condition | OFF, 3.6 mA, 22 mA |
| Resolution | ± 1 µA |
| Accuracy | ± 0,2 % |
| Isolation | Functional |
| **Pt100/ Pt1000 Specifications** | |
| Temperature Input | Pt100/Pt1000 |
| Pt100/Pt1000 Detection | Automatic |
| Error Condition | Automatic detection of disconnected/damaged probe |
| Driving Current | 1 mA |
| Temperature Measure Range | –50.0 to 150.0 °C (–58.0 to 302.0 °F) |
| Sensor Maximum Distance | 10 to 20 m (33 to 65 ft) depending on sensor |
| Temperature Resolution | 0.1°C (°F) |
| Temperature Accuracy | Pt100: ± 0.5°C (± 0.9 °F) - Pt1000: ± 0.2°C (± 0.4 °F) |
| Insulation | Functional |

** DO NOT exceed the maximum allowable current limit, RISK of damaging the apparatus

## MECHANICAL SPECIFICATIONS FOR VERSION 1/4DIN

| | |
|---|---|
| Dimensions (chassis – A x L x P)* | 92 x 92 x 57,3 mm |
| Front Bezel – (A x L) | 96 x 96 mm |
| Max. Depth | 42 mm |
| Weight | 400 g (0,88 lb) |
| Material | ABS/polycarbonate |
| Protection | IP 65 (front)/IP 20 (chassis) |
| Relative Humidity | 0 to 95% non-condensing |

* L = Width, A = Height, P = Depth

## MECHANICAL SPECIFICATIONS FOR VERSION 1/2DIN

| | |
|---|---|
| Dimensions (chassis – A x L x P)* | 144 x 144 x 122.5 mm |
| Front Bezel – (A x L) | 144 x 144 mm |
| Weight | 823 g (1.81 lb) |
| Material | ABS/polycarbonate |
| Protection | IP 65 |
| Relative Humidity | 0 to 100% condensing |

* L = Width, A = Height, P = Depth

## ENVIRONMENTAL SPECIFICATIONS FOR VERSION 1/2DIN & 1/4DIN

| | |
|---|---|
| Storage Temperature | – 25 to 65 °C (– 13 to 149 °F) |
| Environmental temperature range of operation | –10 to 50 °C (14 to 122 °F) |
| Emissions | According to EN55011 Class A specifications |

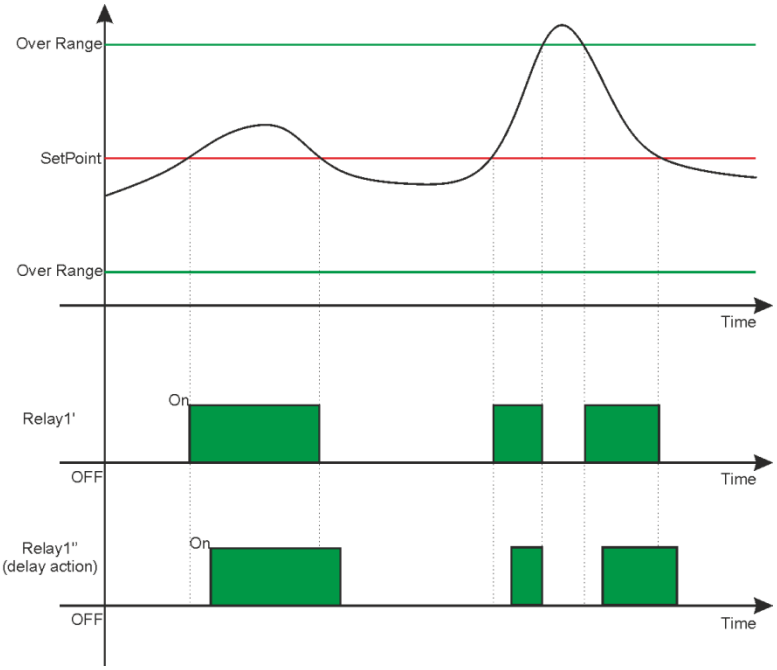
## ELECTRICAL SPECIFICATIONS

| | |
|---|---|
| **Power Supply (version 100÷240 VCA)** | |
| Electrical requirements | from 100 to 240 VAC ±10%, 5 W |
| Frequency | 50 to 60 Hz |
| Power Supply Fuse | 500 mA delay not recoverable |
| Short Circuit Protection | Active |
| **Power Supply (version 12÷32 VCC)** | |
| Electrical requirements | from 12 to 32 VCC, or 24Vac ±10%, 3,5W |
| Power Supply Fuse | 1 A delay not recoverable |
| Short Circuit Protection | Active |
| Reverse Polarity Protection | Active |
| **Relay Outputs** | |
| RL1 and RL2 | 2-SPST mechanical 250 VAC/5A, 30 VCC/3 A |
| Relay RL1 Configuration | Load Activation |
| Relay RL2 Configuration | Load Activation, Probe Wash, Alarm Repetition |
| Cycle time | 1sec to 3600sec |
| Delay time | 1sec to 3600sec |
| Test Mode | ON, OFF |
| **SSR Outputs (Solid State Relays)** | |
| SSR1 and SSR2 | 2-SPST 400 VAC, max 125 mA, Bidirectional, NPN, PNP |
| Resistance in ON State | 26 ohm @ 50mA |
| Leakage Current in OFF State | 200 nA max |
| SSR1 and SSR2 Configuration | Pulse output |
| Frequency Range | 0 to 400 imp/min |
| Pulse Duration | 100 msec |
| Test Mode | 0 to 400 imp/min |
| **Outputs 4÷20 mA** | |
| Analog Output Signals | 2 outputs 4÷20 mA, galvanically isolated from one another and from the power supply. |
| Measure Error | +/– 0,01 mA |
| Load | max. 800 Ω |
| Error Condition | NAMUR: OFF, 3.6 mA, 22 mA |
| Test Mode | 3 to 23 mA |
| **Digital Inputs** | |
| FREQ1 Digital Input | (*) Input for external counter |
| DIR1 Digital Input | (*) Digital input direction for external counter |
| REED Digital Input | Input for dry contact 5 VCC, max 6 mA |
| HOLD Digital Input | Powered Input 12÷32 VCC, max 10 mA |
| **Communication Ports** | |
| USB Digital Communication Port | (*)USB Port, type B connector |
| RS485 Digital Communication Port | Optional (on request) |
| **Output 5 Vdc** | |
| Voltage | (**) 5 V CC ±2%, max. 20 mA |
| Short Circuit Protection | Active |
| **User Interface** | |
| Connection Terminals | Removable screw terminals AWG 14 < 2.5 $mm^2$ |
| Machine Cycle Time | ca. 1 s |
| Keyboard | 5 tactile feedback keys |
| Display | Graphic LCD 128x128 pixels, Transflective, Backlit |
| Display Refresh | 500 msec |
| Backlight | White, Green and Red with energy saving function |

* This function is currently not used
** DO NOT exceed the maximum allowable current limit, RISK of damaging the apparatus

## ANNEX A: ON/OFF RELAY SETUP

Below is an example of settings for the Relay 1 or 2 to adjust the Measure using the pulse/pause method (on/off).




Example:

**2A RELAY 1 ON/OFF**

| | | |
|---|---|---|
| ► | 1: SetPoint | 1.20ppm |
| | 2: Activ. Type | High |
| | 3: Hysteresis | 0.00ppm |
| | 4: Hyst. Time | 00'00" |
| | 5: Delay Start | 00'00" |
| | 6: Delay End | 00'00" |
| | 7: OFA | OFF |
| | 8: Over Range | 0.50ppm |
| | 9: Permanence | OFF |

01/09

**Note**:

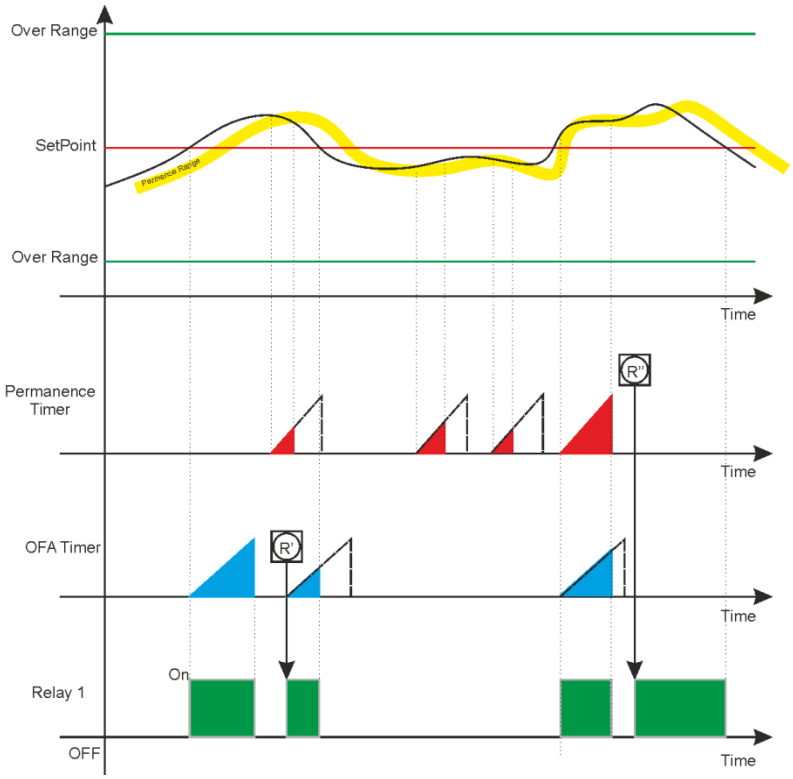
- **Relay Activation**: When the measure (black line) exceeds the SetPoint the relay is activated and this status is maintained until the measure decreases at the SetPoint value (see relay 1').
- **Delay Activation**: By setting the menu items "5" and "6" the relay activation will be delayed equal to the set time (see relay 1").
- **Measure out of range**: When the measure (black line) exceeds the maximum or minimum Over Range value (green line), the system displays a visual alarm and blocks the dosage by changing the status of the relay 1 or 2.

**Low Function**: By setting the menu item "2" with the variable Low the relays activations are inverted compared to the above diagram.

**Hysteresis Function**: By setting the menu items "3" and "4" the instrument maintains the relay activation status both for the measure value and for the time.

## ANNEX A: ON/OFF RELAY SETUP WITH PERMANENCE TIME AND OFA FUNCTION.

Below is an example of settings for the Relay 1 or 2 to adjust the Measure using the pulse/pause method (on/off) with OFA timers and Permanence Measure.




| 2A RELAY_1_ON/OFF | |
|---|---|
| ► 1: SetPoint | 1.20ppm |
| 2: Activ. Type | High |
| 3: Hysteresis | 0.00ppm |
| 4: Hyst. Time | 00'00" |
| 5: Delay Start | 00'00" |
| 6: Delay End | 00'00" |
| 7: OFA | 00h 10m |
| 8: Over Range | 0.50ppm |
| 9: Permanence | On |

01/09

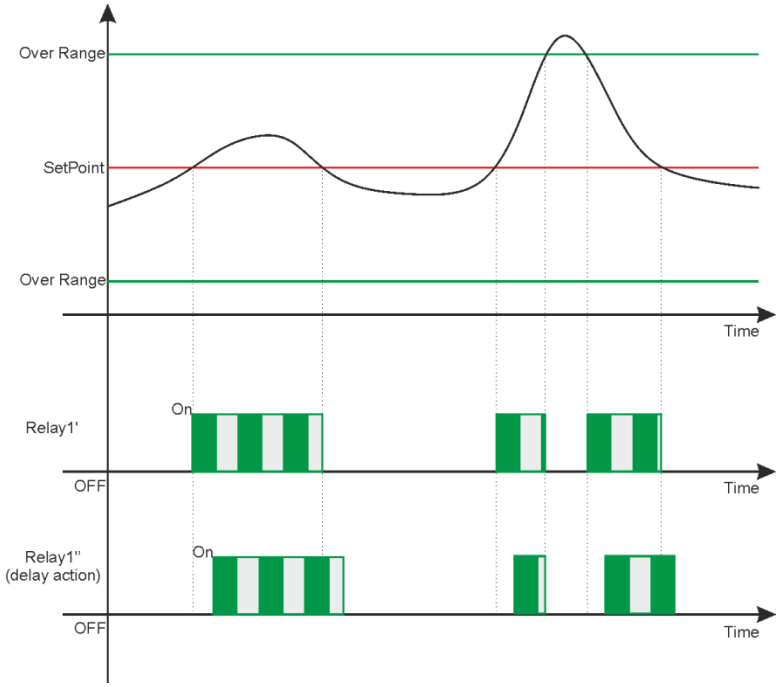
All the settings described on the previous page remain valid.

**Note**:

- **OFA (Over Feed Alarm):** By setting the function "7" OFA with a time in hours and minutes a control timer is activated in parallel to the relay activation. The function checks the activated relay persistence times and generates a visual prealarm at 70% of set value and a blocking alarm (R') at the end of the set time (100%). A manual intervention will be required to remove the blocking with the reset of the OFA function on the alarms menu (see alarms section).
- **Measure Permanence:** By setting the function "9" Permanence, represented on the graph with a yellow line, a function is activated to check the repetitive measure around the set interval. The measure persistence equal to the set time generates an alarm with instrument blocking; the permanence time (R") is represented with the red color. A manual intervention will be required to remove the blocking with the reset of the Permanence function on the alarms menu (see alarms section).

## ANNEX B: TIMED RELAY SETUP

Below is an example of settings for the Relay 1 or 2 to adjust the Measure using the timed method.




**2A RELAY_1_Timed**

| | | |
|---|---|---|
| ► | 1: SetPoint | 1.20ppm |
| | 2: Activ. Type | High |
| | 3: Hysteresis | 0.00ppm |
| | 4: Hyst. Time | 00’00” |
| | 5: Delay Start | 00’00” |
| | 6: Delay End | 00’00” |
| | 7: OFA | OFF |
| | 8: Over Range | 0.50ppm |
| | 9: Permanence | OFF |
| | 10: Time On | 01’ 00” |
| | 11: Time Off | 01’ 00” |

01/11

**Note**:

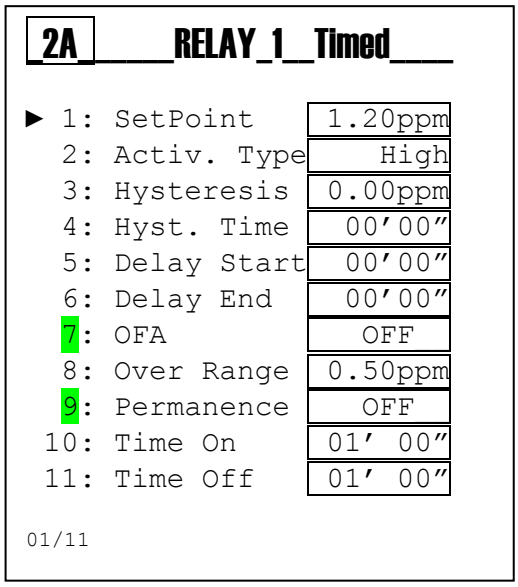
- **Relay Activation**: When the measure (black line) exceeds the SetPoint the relay is activated and the times On and Off are executed as set on the menu items “10” and “11”; this status is maintained until the measure decreases at the SetPoint value (see relay 1’).
- **Delay Activation**: By setting the menu items "5" and "6" the relay activation will be delayed equal to the set time (see relay 1”)
- **Measure out of range**: When the measure (black line) exceeds the maximum or minimum Over Range value (green line), the system displays a visual alarm and blocks the dosage by changing the status of the relay 1 or 2.

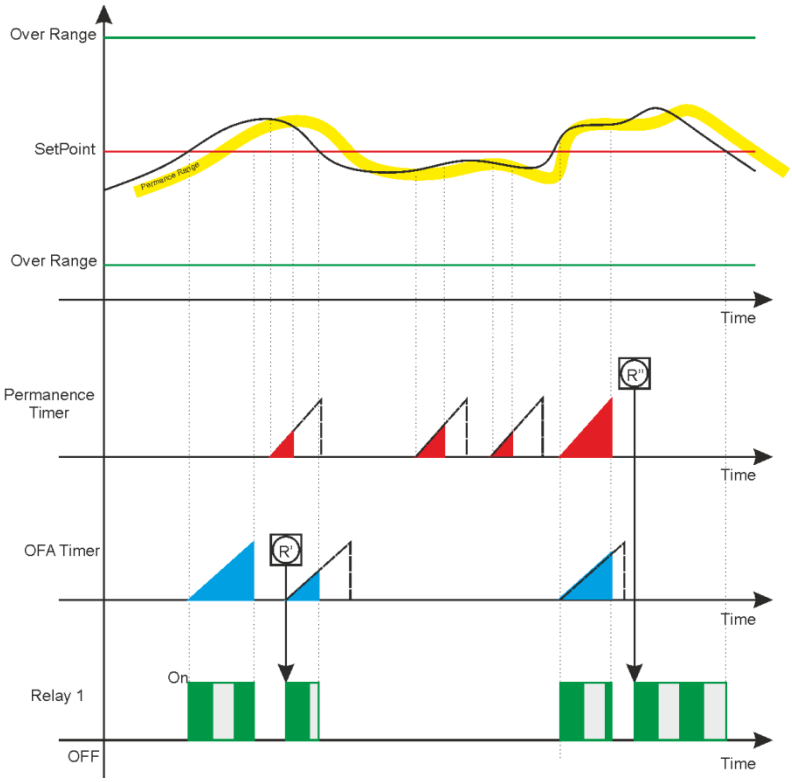
**Low Function**: By setting the menu item "2" with the variable Low the relays activations are inverted compared to the above diagram.

**Hysteresis Function**: By setting the menu items "3" and "4" the instrument maintains the relay activation status both for the measure value and for the time.

## ANNEX B: TIMED RELAY SETUP WITH PERMANENCE TIME AND OFA FUNCTION.

Below is an example of settings for the Relay 1 or 2 to adjust the Measure using the timed method with OFA timers and Permanence Measure.



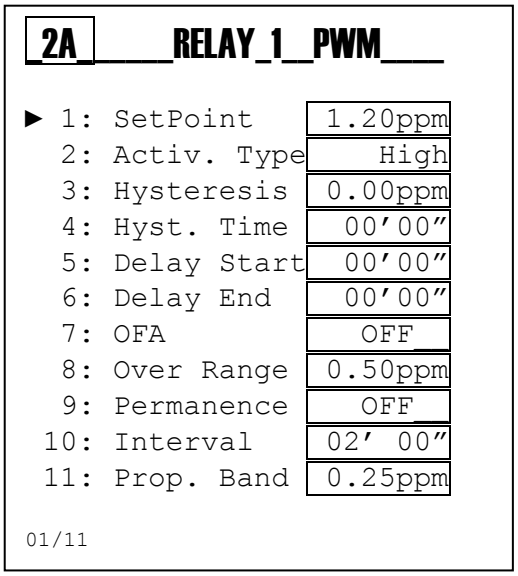

All the settings described on the previous page remain valid.

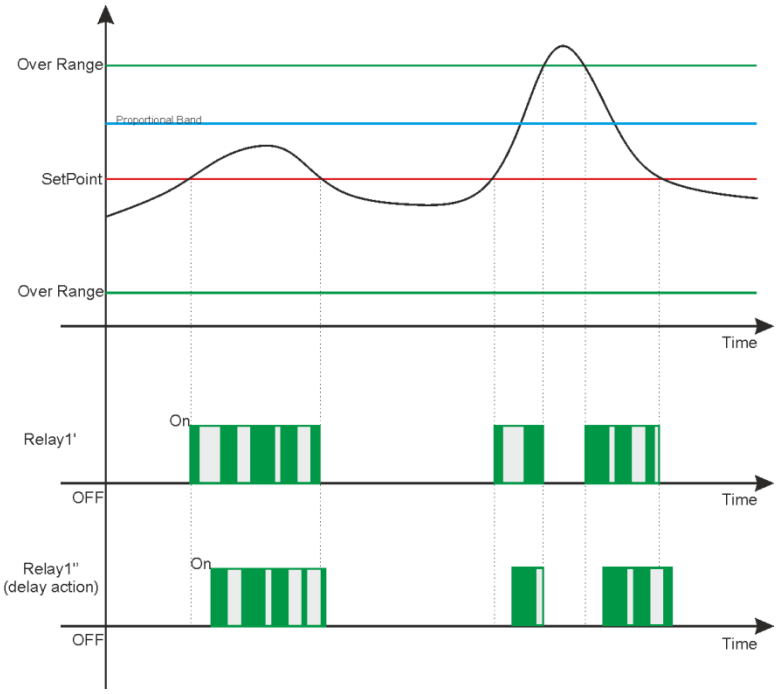
**Note**:

- **OFA (Over Feed Alarm):** By setting the function "7" OFA with a time in hours and minutes a control timer is activated in parallel to the relay activation. The function checks the activated relay persistence times and generates a visual prealarm at 70% of set value and a blocking alarm (R') at the end of the set time (100%). A manual intervention will be required to remove the blocking with the reset of the OFA function on the alarms menu (see alarms section).
- **Measure Permanence:** By setting the function "9" Permanence, represented on the graph with a yellow line, a function is activated to check the repetitive measure around the set interval. The measure persistence equal to the set time generates an alarm with instrument blocking; the permanence time (R") is represented with the red color. A manual intervention will be required to remove the blocking with the reset of the Permanence function on the alarms menu (see alarms section).

## ANNEX C: PROPORTIONAL (PWM) RELAY SETUP

*Below is an example of settings for the Relay 1 or 2 to adjust the Measure using the proportional (PWM) method.*




**Note**:

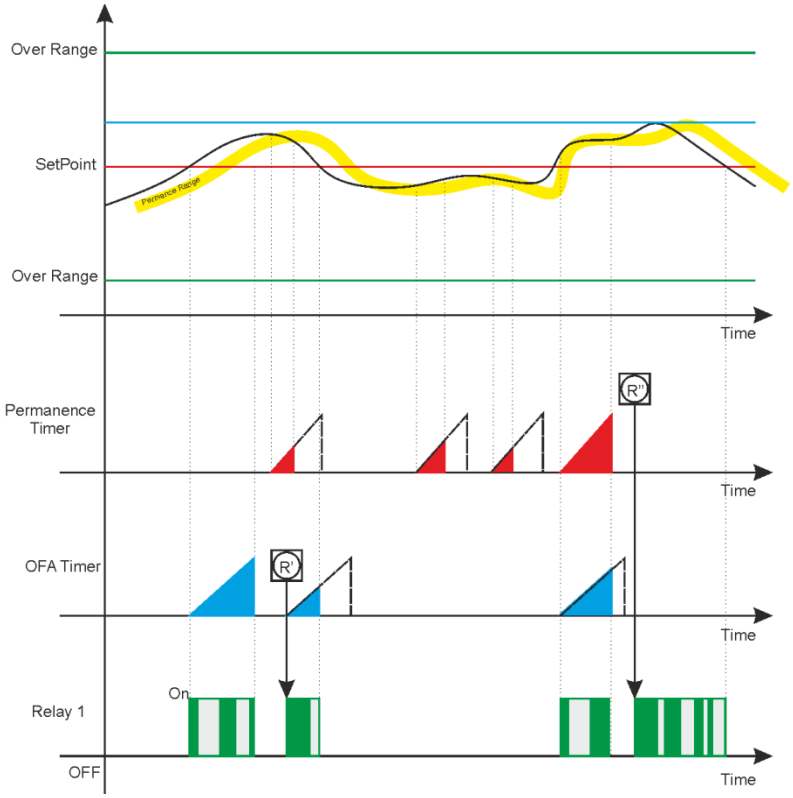
- **Relay Activation**: When the measure (black line) exceeds the SetPoint the relay is activated and the proportional times On and Off are executed as calculated in relation to the proportional band set in the menu items "10" and "11"; this status is maintained until the measure decreases at the SetPoint value (see relay 1').
- **Delay Activation**: By setting the menu items "5" and "6" the relay activation will be delayed equal to the set time (see relay 1")
- **Measure out of range**: When the measure (black line) exceeds the maximum or minimum Over Range value (green line), the system displays a visual alarm and blocks the dosage by changing the status of the relay 1 or 2.

**Low Function**: By setting the menu item "2" with the variable Low the relays activations are inverted compared to the above diagram.

**Hysteresis Function**: By setting the menu items "3" and "4" the instrument maintains the relay activation status both for the measure value and for the time.

## ANNEX C: PROPORTIONAL (PWM) RELAY SETUP WITH PERMANENCE TIME AND OFA FUNCTION.

Below is an example of settings for the Relay 1 or 2 to adjust the Measure using the proportional (PWM) method with OFA timers and Permanence Measure.




| 2A RELAY_1_PWM | |
|---|---|
| ► 1: SetPoint | 1.20ppm |
| 2: Activ. Type | High |
| 3: Hysteresis | 0.00ppm |
| 4: Hyst. Time | 00'00" |
| 5: Delay Start | 00'00" |
| 6: Delay End | 00'00" |
| 7: OFA | OFF |
| 8: Over Range | 0.50ppm |
| 9: Permanence | OFF |
| 10: Interval | 02' 00" |
| 11: Prop. Band | 0.25ppm |

01/11

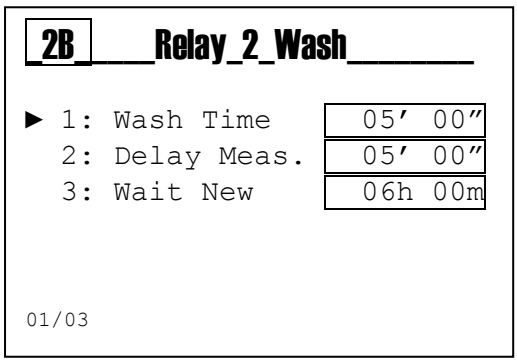
All the settings described on the previous page remain valid.

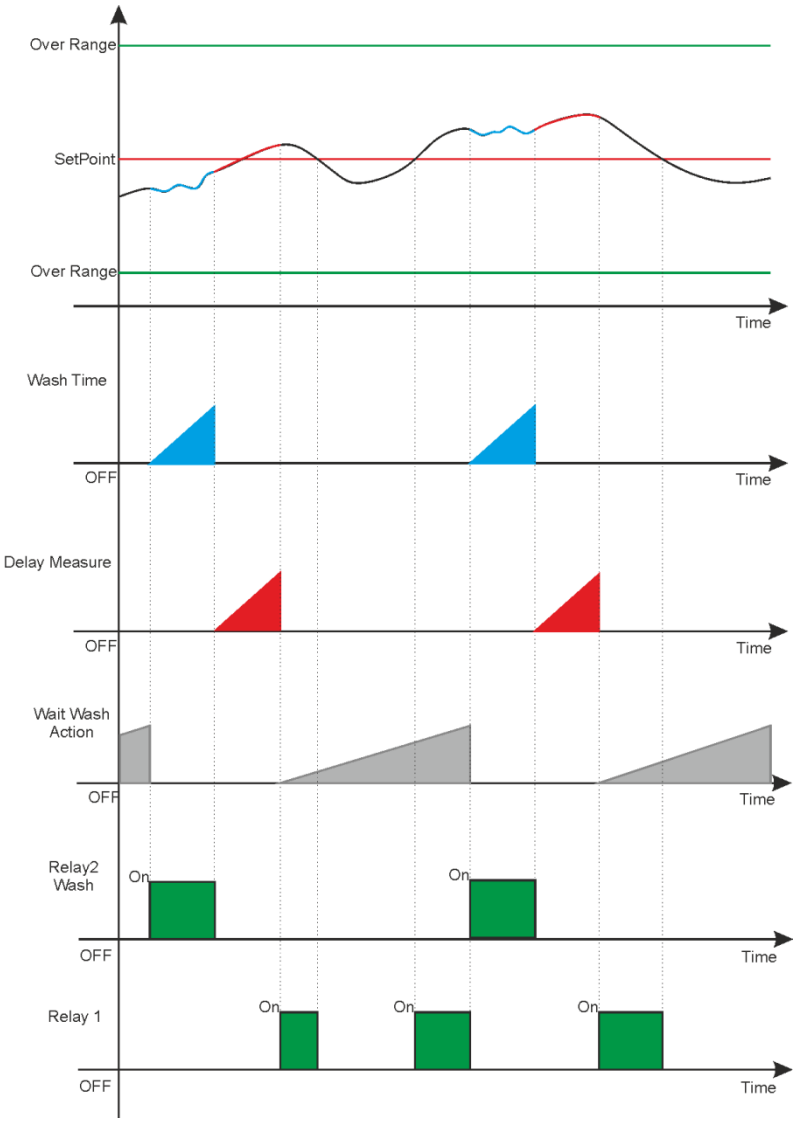
**Note**:

- **OFA (Over Feed Alarm):** By setting the function "7" OFA with a time in hours and minutes a control timer is activated in parallel to the relay activation. The function checks the activated relay persistence times and generates a visual prealarm at 70% of set value and a blocking alarm (R') at the end of the set time (100%). A manual intervention will be required to remove the blocking with the reset of the OFA function on the alarms menu (see alarms section).
- **Measure Permanence:** By setting the function "9" Permanence, represented on the graph with a yellow line, a function is activated to check the repetitive measure around the set interval. The measure persistence equal to the set time generates an alarm with instrument blocking; the permanence time (R") is represented with the red color. A manual intervention will be required to remove the blocking with the reset of the Permanence function on the alarms menu (see alarms section).

## ANNEX D: RELAY 2 SETUP FOR AUTOMATIC WASHING

*Below is an example of settings for Relay 2 with Washing function to automate the probe cleaning with an external device(*).*




**Note**:

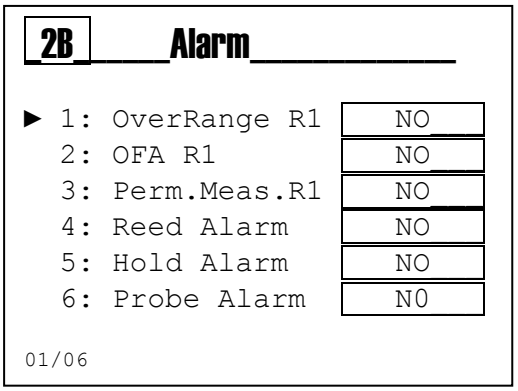
- **Wash Time**: Relay 2 is activated at the end of "Wait New Wash" timer and starts operating an external device to the set time. The instrument displays a service message by deleting the displayed measure and blocking all the instrument's functions (Amber color Backlight).
- **Delay Measure**: Relay 2 is turned off for the set time by displaying the measure and maintaining all the instrument's functions blocked (Amber color Backlight).
- **Wait New Wash**: The instrument counts the set time by performing the normal functions of measure and control; when the time expires, the "Wash Time" is activated.

(* The external washing system is not supplied with the instrument)

## ANNEX E: RELAY 2 SETUP TO REPEAT REMOTE ALARM.

(*To set the Relay 2 for Remote Alarm see Advanced Setup Menu 3H)

On Setup Menu 2B it is possible to set the alarm conditions to be repeated by Relay 2; attention, check the Advanced Menu "3G" Alarms Configuration.



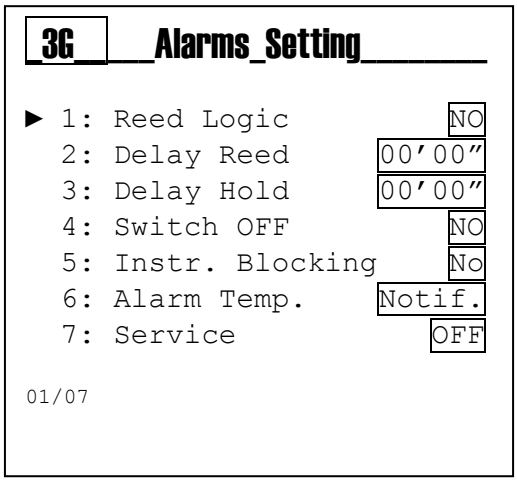




Table with the alarm messages displayed by the instrument.

| Number | Alarm | Message | Status |
|---|---|---|---|
| 1 | Not Present | No Item | |
| 2 | External Hold Input Active | Hold | Alarm with instrument blocking (*) |
| 3 | External Reed Input Active | Reed | Alarm with instrument blocking (*) |
| 4 | Temperature Sensor Broken or Disconnected | Alarm Fault Temp. | Alarm with instrument blocking (**) |
| 5 | 5V Output in Short Circuit | Fault 5V | Visual alarm |
| 6 | Registered the absence of Power Supply | Switch OFF | Visual alarm |
| 7 | Service Timer Expired | Service | Visual alarm |
| 8 | Relay 1 Timer decreased at 70% | OFA1 R1 | Preliminary Alarm |
| 9 | Relay 1 Timer decreased at 100% | OFA2 R1 | Alarm with instrument blocking (*) |
| 10 | Measure outside of working range | Over Range R1 | Alarm with instrument blocking (*) |
| 11 | Permanent measure to a fixed value | Holding R1 | Alarm with instrument blocking (*) |
| 12 | Relay 2 Timer decreased at 70% | OFA1 R2 | Preliminary Alarm |
| 13 | Relay 2 Timer decreased at 100% | OFA2 R2 | Alarm with instrument blocking (*) |
| 14 | Measure outside of working range | OverRange R2 | Alarm with instrument blocking (*) |
| 15 | Permanent measure to a fixed value | Holding R2 | Alarm with instrument blocking (*) |
| 16 | Output 18V in short | Fault Vout mA | Alarm with instrument blocking |
| 17 | Input current higher than 22mA | Over Range Input mA | Alarm with instrument blocking (***) |
| 18 | Input current lower than 3.6mA | Under Range Input mA | Alarm with instrument blocking (***) |

(*All the alarms with blocking function are valid if the menu item 3G5 is equal to YES)
(**The temperature sensor breakage alarm blocks the instrument if the menu item 3G6 is equal to HOLD)
(***The alarm blocks the instrument if the menu items 3E4 and 3E5 are different than OFF.)

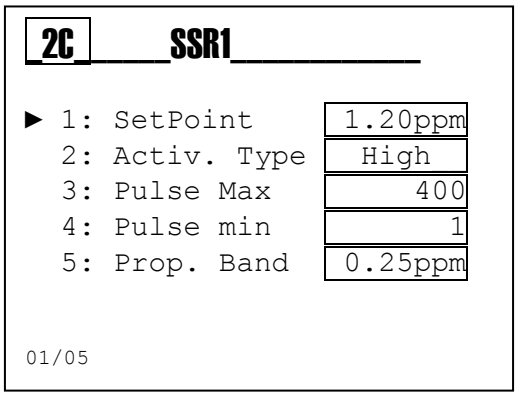
**Note**:

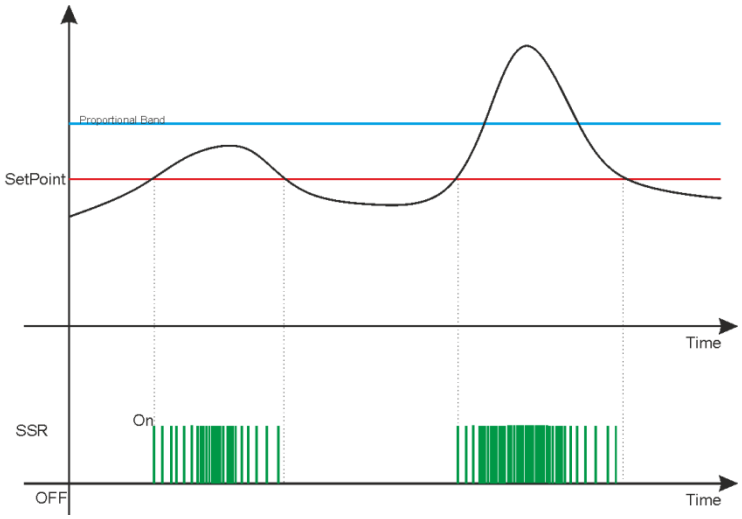
- **Backlight**: In case of alarm the instrument turns on the Red backlight.
- **Reset Alarms Log**: On view Measure (Meas Icon) there is available an Alarm status menu; by pressing the **Enter** key, the **Alarms Menu** will be displayed.

**Nota**: Note: Alarms are stored in memory every 15 minutes, watch if the instrument is switched off loses alarms displayed in the last 14 minutes.

## ANNEX F: SSR1 AND SSR2 SETUP

Proportional frequency output with independent Proportional Band and SetPoint.



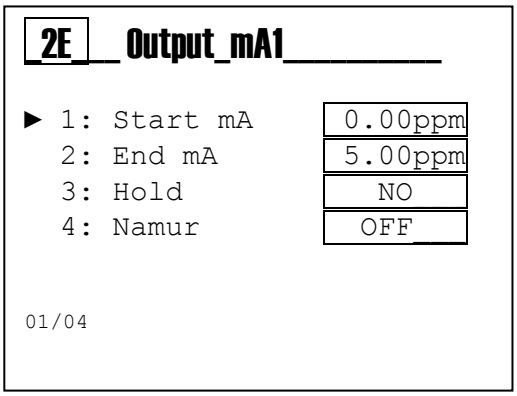

**Note**:

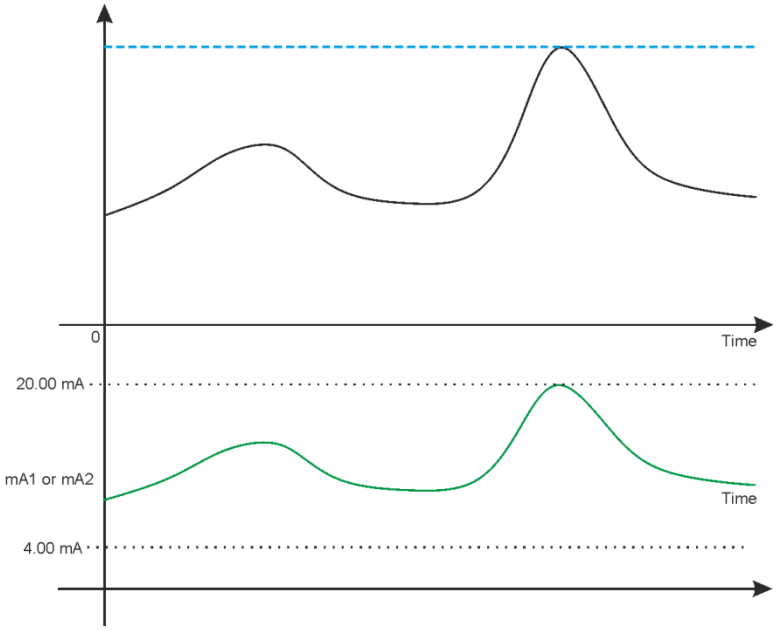
- **Pulse Max**: Set the maximum value of pulses for measure higher than the proportional band value.
- **Pulse min**: Set the minimum value of pulses for measure near the SetPoint value.
- **Pulse Technical Data**: Pulse On duration is fixed at 100mSeconds and time Off duration varies from 50mS (400 pulses per minute) to 59900mS (1 pulse per minute).

**Notes**: The Alarm Over Range function is not present on frequency output.

## ANNEX G: MA1 AND MA2 SETUP

Current output proportional to the measure with range from 4 mA to 20 mA.

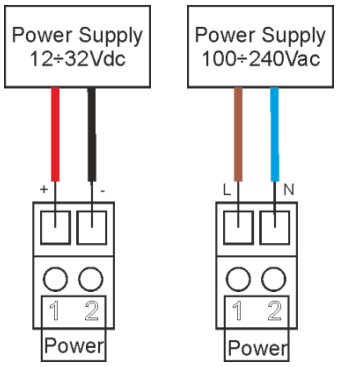



**Note**:

- **Start mA**: Minimum value of measure associated to 4 mA
- **End mA**: Maximum value of measure associated to 20 mA
- **Keep**: By setting the variable to YES, in case of alarm the instrument freezes the mA output to the last calculated value.
- **Namur**: By setting the variable to the value of 3.6 mA or 22 mA, in case of alarm the instrument sets the current output to the selected value.

## ANNEX H: WIRING EXAMPLES

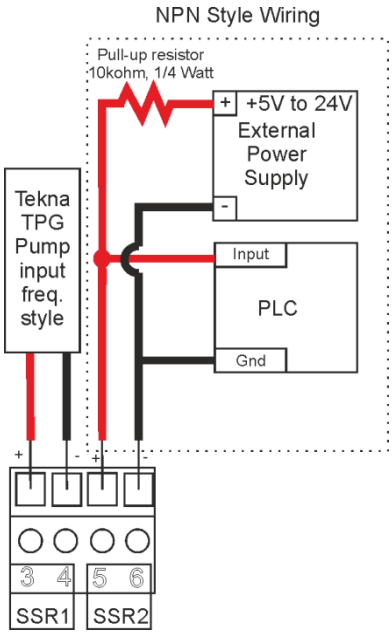


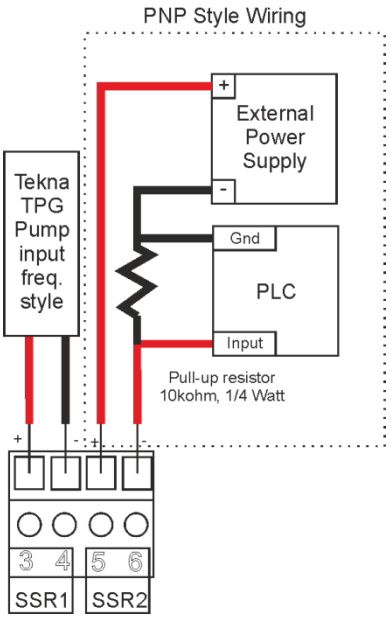

**Power Supply:**

- 12÷32Vdc or 100÷240Vac; Check the product label
- Observe the polarity
- Maximum Power Consumption 3.5 W or 5W

**Frequency outputs SSR1 and SSR2:**

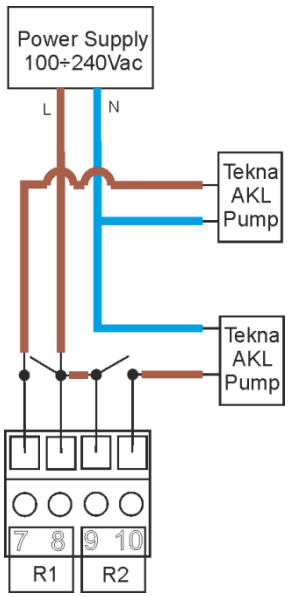
- Contact closed 26Ω to 50mA, 125mA maximum load with an impedance of 36Ω.



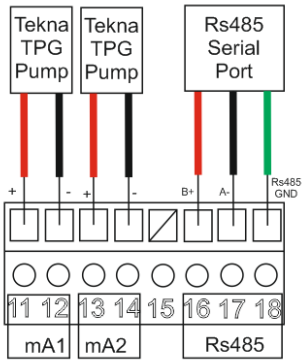

**Relay outputs 1 and 2:**

- Maximum load 5 A resistive



**Current outputs mA 1 and 2**:

- 4÷20mA with a maximum load of 800 ohm
- Observe the polarity of the cables




**RS485 serial port output**:

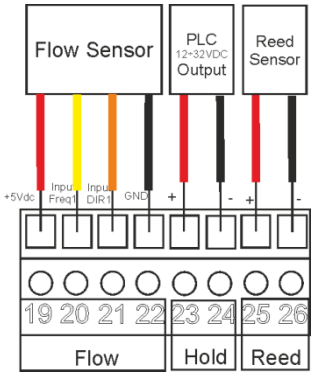
- Communication protocol ModBus RTU/ASCII.
- Add 120Ω termination resistor between A and B.
- Observe the polarity of the cables

**Rotor flow sensor input**:

- Observe the polarity

**Reed sensor input**:

- Input for dry contact or semiconductor (Open Collector) 5Vcc, max 6mA.
- Maximum distance of the Reed sensor 20 meters of cable.

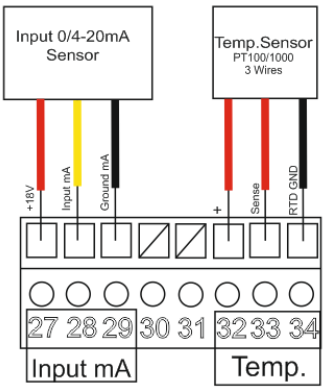



**Hold signal input**:

- Voltage signal from 12 to 32 Vdc
- Observe the polarity

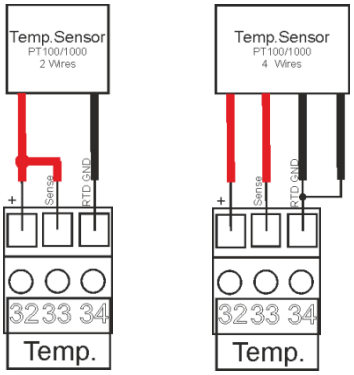
**Sensor Measure input**:

- Attention, connect the probes with metal terminals
- Observe the polarity




**Temperature measure input**:

- Attention, connect the probes with metal terminals
- Observe the polarity
- Maximum distance of the PT100/PT1000 sensor 20 meters of cable
- Observe the wiring for the sensor, with 2, 3 and 4 wires; connect as indicated.




**USB Port Input**:

- USB Type B
- Power via USB port with activation of the microprocessor and display without back light.

**ANNEX I: TROUBLESHOOTING.**

| Problem | Possible Cause |
|---|---|
| The display shows the symbol  | • See ANNEX E |
| Calibration Errors | • Contaminated buffer solutions (old)<br>• Probe damaged or old<br>• Probe cables damaged<br>• Measure input of the instrument damaged |
| Data Memory Error | • Internal memory broken |
| Password Error | • Error value |
| Temperature Measure Error<br>the display shows ---.-°C | • Temperature probe broken or disconnected |
| Measure Error | • Sensor not calibrated<br>• Sensor not installed correctly<br>• The sensor or the cable is defective<br>• Electronic measure input damaged<br>• The sensor cable exceeds the maximum length |
| Measure reading not stable | • Sensors or cables installed too close to devices that generate electrical noise.<br>• Sensor installed on flow with hydraulic turbulence.<br>• Average measure set too low.<br>• Probe cables excessively long |
| Unable to display the Calibration or Setup menu | • User excluded for safety reasons |
| The display is turned off | • The instrument does not receive correct power supply.<br>• LCD contrast is not set correctly.<br>• The fuse has blown.<br>• Hardware fault. |
| The display shows in the upper right corner “Diagnostic” | • Turn the instrument off and then on again; if the problem persists, contact your provider |
| Output 18V in short | • Wiring damaged |

# ANNEX L: DEFAULT PARAMETERS TABLE AND RESET TO DEFAULT

| ADVANCED MENU | | | | | |
|---|---|---|---|---|---|
| **Parameter** | **Sub-parameter** | **Default Value** | **Min Value** | **Max Value** | **Unit** |
| **Language** | --- | EN (English) | EN,FR,IT,DE,ES | | |
| **Password** | Password | 0000 | 0000 | 9999 | |
| | Cal Menu | NO | NO | YES | |
| | Setup Menu | NO | NO | YES | |
| **Display** | Contrast | 0 | -15 | +15 | |
| | Mode | ECO | OFF, ON, ECO | | |
| | ON | 100 | 10 | 100 | % |
| | ECO | 50 | 0 | 50 | % |
| | Inversion | OFF | OFF | ON | |
| **Measure** | Measure Unit | ppm | ppm, ppb, mg/l, mA, Custom | | |
| | Custom unit | (4 spaces) | up to 4 characters can be edited | | |
| | Measure Name | Cl2 | Cl2, PAA, H2O2, O3, Custom | | |
| | Custom Name | (4 spaces) | up to 4 characters can be edited | | |
| | Filter | Medium | Low, Medium, High | | |
| | Decimal Point | XXX,XX | XXXXX, / XXXX,X / XXX,XX / XX,XXX / X,XXXX | | |
| **Measure Range** | Sensor Type | 4-20mA | 0-20mA | 4-20mA | |
| | Range Min | 0 | -99999 | 99999 | XXXX |
| | Range Max | 99999 | -99999 | 99999 | XXXX |
| | Over Range | OFF | OFF | 22 mA | |
| | Under Range | OFF | OFF | 3,6 mA | |
| **Temperature Meas.** | Sensor Type | Manual | Manual | External | |
| | Measure Unit | °C | °C | °F | |
| | Manual Value | 25,0 (77,0) | -50,0 (-58,0) | +150,0 (302,0) | °C (°F) |
| | Filter | Medium | Low, Medium, High | | |
| **Alarms Setting** | Reed Logic | NO | NO | NC | |
| | Delay Activation REED | OFF | OFF (00':00") | 60':59" | min:sec |
| | Delay Activation HOLD | OFF | OFF (00':00") | 60':59" | min:sec |
| | Power Supply Interruption | NO | NO | YES | |
| | Instrument blocking | NO | NO | YES | |
| | Temperature Alarm | Notification | Notification | Block | |
| | Service | OFF | OFF (0) | 365 | Days |
| **Outputs Setting** | Relay 1 | OFF | OFF, Meas ON/OFF, Meas Timed, Meas. PWM, Temp. ON/OFF, Temp. Timed, Temp. PWM | | |
| | Relay 2 | OFF | OFF, Meas ON/OFF, Meas Timed, Meas. PWM, Temp. ON/OFF, Temp. Timed, Temp. PWM, Probe Wash, Alarm | | |
| | SSR1 | OFF | OFF, Measure, Temp. | | |
| | SSR2 | OFF | | | |
| | mA1 | OFF | OFF, Measure, Temp. | | |
| | mA2 | OFF | | | |
| **RS485 Setting** | Activation | ON | OFF | ON | |
| | Mode | RTU | RTU | ASCII | |
| | Address | 1 | 1 | 247 | |
| | Speed | 19200 | 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200 | | bps |
| | Parity | Even | None, Odd, Even | | |
| | Stop Bit | 1 | | | |
| **USB Setting** | Reserved for future use | | | | |
| **Control Panel** | Measure | --- | 0 | 24000 | µA |
| | Temperature Measure | --- | -50,0 | +150,0 | °C |
| | Simul. Relay 1 | OFF | OFF | ON | |
| | Simul. Relay 2 | OFF | OFF | ON | |
| | Simul. Freq 1 | 0 | 0 | 400 | Imp/min |
| | Simul. Freq 2 | 0 | 0 | 400 | Imp/min |
| | Simul. Out mA 1 | 4,00 | 3,00 | 23,00 | mA |
| | Simul. Out mA 2 | 4,00 | 3,00 | 23,00 | mA |
| | REED Input | --- | OFF | ON | |
| | HOLD Input | --- | OFF | ON | |
| **Statistics** | No. Powen ON | 0 | 0 | 9999999 | Activations |
| | No. Alarms | 0 | 0 | 9999999 | Activations |
| | No. RL1 Activations | 0 | 0 | 9999999 | Activations |
| | No. RL2 Activations | 0 | 0 | 9999999 | Activations |
| | No. REED Activations | 0 | 0 | 9999999 | Activations |
| | No. HOLD Activations | 0 | 0 | 9999999 | Activations |
| | Reset Statistics | NO | NO | YES | |
| **System Reset** | --- | NO | NO | YES | |
| **Firmware Revision** | --- | --- | --- | --- | |

| SETUP MENU | Relay 1 = OFF, Relay 2 = OFF, SSR1 = OFF, SSR2 = OFF, mA1 = OFF, mA2 = OFF | | | | |
|---|---|---|---|---|---|
| **Parameter** | **Sub-parameter** | **Default Value** | **Min Value** | **Max Value** | **Unit** |
| Relay 1 | --- | OFF | --- | --- | |
| Relay 2 | --- | OFF | --- | --- | |
| SSR1 | --- | OFF | --- | --- | |
| SSR2 | --- | OFF | --- | --- | |
| mA1 | --- | OFF | --- | --- | |
| mA2 | --- | OFF | --- | --- | |

| SETUP MENU | Measure Unit: xxxx | | | | | |
|---|---|---|---|---|---|---|
| **Parameter** | **Sub-parameter 1** | **Sub-parameter 2** | **Default Value** | **Min Value** | **Max Value** | **Unit** |
| Relay 1 / Relay 2 xxxx ON/OFF | SetPoint | --- | 0 | -99999 | 99999 | xxxx |
| | Type | --- | Low | Low | High | |
| | Hysteresis | --- | 0 | 0,0000 | 99999 | xxxx |
| | Hysteresis Time | --- | OFF | OFF (00':00") | 2':59" | min:sec |
| | Delay Start | --- | 00':01" | OFF (00':00") | 60':59" | min:sec |
| | Delay End | --- | 00':01" | OFF (00':00") | 60':59" | min:sec |
| | OFA | --- | OFF | OFF (00h:00') | 23h:59' | hours:min |
| | Over Range | --- | 0 | 0,0000 | 99999 | xxxx |
| | Permanence | Status | OFF | OFF | ON | |
| | | Interval | 0 | -99999 | 99999 | xxxx |
| | | Time | 01':00" | OFF (00':00") | 60':59" | min:sec |
| Relay 1 / Relay 2 xxxx TIMED | Time On | --- | 00':10" | OFF (00':00") | 60':59" | min:sec |
| | Time Off | --- | 00':10" | OFF (00':00") | 60':59" | min:sec |
| Relay 1 / Relay 2 xxxx PWM | Interval | --- | 02':00" | OFF (00':00") | 60':59" | min:sec |
| | Proportional Band | --- | 0 | 0,0000 | 99999 | xxxx |

| SETUP MENU | Temperature Measure Unit: °C | | | | | |
|---|---|---|---|---|---|---|
| **Parameter** | **Sub-parameter 1** | **Sub-parameter 2** | **Default Value** | **Min Value** | **Max Value** | **Unit** |
| Relay 1 / Relay 2 °C ON/OFF | SetPoint | --- | 25,0 | -50,0 | 150,0 | °C |
| | Type | --- | Low | Low | High | |
| | Hysteresis | --- | 0,0 | 0,0 | 10,0 | °C |
| | Hysteresis Time | --- | OFF | OFF (00':00") | 2':59" | min:sec |
| | Delay Start | --- | 00':01" | OFF (00':00") | 60':59" | min:sec |
| | Delay End | --- | 00':01" | OFF (00':00") | 60':59" | min:sec |
| | OFA | --- | OFF | OFF (00h:00') | 23h:59' | hours:min |
| | Over Range | --- | OFF | OFF (0,0) | 150,0 | °C |
| | Permanence | Status | OFF | OFF | ON | |
| | | Interval | 0,0 | -50,0 | 150,0 | °C |
| | | Time | 01':00" | OFF (00':00") | 60':59" | min:sec |
| Relay 1 / Relay 2 °C TIMED | Time On | --- | 00':10" | OFF (00':00") | 60':59" | min:sec |
| | Time Off | --- | 00':10" | OFF (00':00") | 60':59" | min:sec |
| Relay 1 / Relay 2 °C PWM | Interval | --- | 02':00" | OFF (00':00") | 60':59" | min:sec |
| | Proportional Band | --- | 10,0 | 1,0 | 50,0 | °C |

| SETUP MENU | Temperature Measure Unit: °F | | | | | |
|---|---|---|---|---|---|---|
| **Parameter** | **Sub-parameter 1** | **Sub-parameter 2** | **Default Value** | **Min Value** | **Max Value** | **Unit** |
| Relay 1 / Relay 2 °F ON/OFF | SetPoint | --- | 77,0 | -58,0 | 302,0 | °F |
| | Type | --- | Low | Low | High | |
| | Hysteresis | --- | 0,0 | 0,0 | 18,0 | °F |
| | Hysteresis Time | --- | OFF | OFF (00':00") | 2':59" | min:sec |
| | Delay Start | --- | 00':01" | OFF (00':00") | 60':59" | min:sec |
| | Delay End | --- | 00':01" | OFF (00':00") | 60':59" | min:sec |
| | OFA | --- | OFF | OFF (00h:00') | 23h:59' | hours:min |
| | Over Range | --- | OFF | OFF (0,0) | 270,0 | °F |
| | Permanence | Status | OFF | OFF | ON | |
| | | Interval | 0,0 | -58,0 | 302,0 | °F |
| | | Time | 01':00" | OFF (00':00") | 60':59" | min:sec |
| Relay 1 / Relay 2 °F TIMED | Time On | --- | 00':10" | OFF (00':00") | 60':59" | min:sec |
| | Time Off | --- | 00':10" | OFF (00':00") | 60':59" | min:sec |
| Relay 1 / Relay 2 °F PWM | Interval | --- | 02':00" | OFF (00':00") | 60':59" | min:sec |
| | Proportional Band | --- | 18,0 | 1,8 | 90,0 | °F |

| SETUP MENU | Relay 2 = Probe Wash | | | | | |
|---|---|---|---|---|---|---|
| **Parameter** | **Sub-parameter 1** | **Sub-parameter 2** | **Default Value** | **Min Value** | **Max Value** | **Unit** |
| Relay 2 pH/mV Wash | Wash Time | --- | OFF | OFF (00':00") | 60':59" | min:sec |
| | Delay Stabilization | --- | 01':00" | OFF (00':00") | 60':59" | min:sec |
| | Wait New Wash | --- | 24h:00' | OFF (00h:00') | 99h:59' | hours:min |

| SETUP MENU | Relay 2 = Alarm | | | | | |
|---|---|---|---|---|---|---|
| **Parameter** | **Sub-parameter 1** | **Sub-parameter 2** | **Default Value** | **Min Value** | **Max Value** | **Unit** |
| Relay 2 Alrm | Over Range R1 | --- | NO | NO | YES | |
| | OFA R1 | --- | NO | NO | YES | |
| | Measure Permanence R1 | --- | NO | NO | YES | |
| | Alarm REED | --- | NO | NO | YES | |
| | Alarm HOLD | --- | NO | NO | YES | |
| | Alarm Temperature Probe | --- | NO | NO | YES | |

| SETUP MENU | Measure Unit: ppm | | | | |
|---|---|---|---|---|---|
| **Parameter** | **Sub-parameter 1** | **Default Value** | **Min Value** | **Max Value** | **Unit** |
| SSR1 / SSR2 xxxx | SetPoint | 0 | -99999 | 99999 | xxxx |
| | Type | Low | Low | High | |
| | Max Pulses | 400 | 20 | 400 | Imp/min |
| | Min Pulses | 1 | 1 | 100 | Imp/min |
| | Proportional Band | 0 | 0,0000 | 99999 | xxxx |

| SETUP MENU | Temperature Measure Unit: °C | | | | |
|---|---|---|---|---|---|
| **Parameter** | **Sub-parameter 1** | **Default Value** | **Min Value** | **Max Value** | **Unit** |
| SSR1 / SSR2 °C | SetPoint | 25,0 | -50,0 | 150,0 | °C |
| | Type | Low | Low | High | |
| | Max Pulses | 400 | 20 | 400 | Imp/min |
| | Min Pulses | 1 | 1 | 100 | Imp/min |
| | Proportional Band | 10,0 | 1,0 | 50,0 | °C |

| SETUP MENU | Temperature Measure Unit: °F | | | | |
|---|---|---|---|---|---|
| **Parameter** | **Sub-parameter 1** | **Default Value** | **Min Value** | **Max Value** | **Unit** |
| SSR1 / SSR2 °F | SetPoint | 77,0 | -58,0 | 302,0 | °F |
| | Type | Low | Low | High | |
| | Max Pulses | 400 | 20 | 400 | Imp/min |
| | Min Pulses | 1 | 1 | 100 | Imp/min |
| | Proportional Band | 18,0 | 1,8 | 90,0 | °F |

| SETUP MENU | Measure Unit: xxxx | | | | |
|---|---|---|---|---|---|
| **Parameter** | **Sub-parameter 1** | **Default Value** | **Min Value** | **Max Value** | **Unit** |
| mA1 / mA2 xxxx | Start mA | -99999 | -99999 | 99999 | xxxx |
| | End mA | 99999 | -99999 | 99999 | xxxx |
| | Hold Measure | NO | NO | YES | |
| | Namur | OFF, 3,6mA, 22 mA | | | |

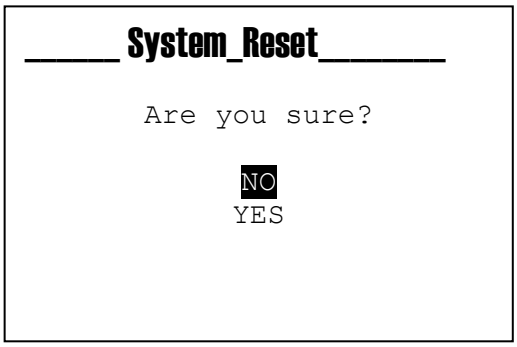
| SETUP MENU | Temperature Measure Unit: °C | | | | |
|---|---|---|---|---|---|
| **Parameter** | **Sub-parameter 1** | **Default Value** | **Min Value** | **Max Value** | **Unit** |
| mA1 / mA2 °C | Start mA | -50,0 | -50,0 | 150,0 | °C |
| | End mA | 150,0 | -50,0 | 150,0 | °C |
| | Hold Measure | NO | NO | YES | |
| | Namur | OFF, 3,6mA, 22 mA | | | |

| SETUP MENU | Temperature Measure Unit: °F | | | | |
|---|---|---|---|---|---|
| **Parameter** | **Sub-parameter 1** | **Default Value** | **Min Value** | **Max Value** | **Unit** |
| mA1 / mA2 °F | Start mA | -58,0 | -58,0 | 302,0 | °F |
| | End mA | 302,0 | -58,0 | 302,0 | °F |
| | Hold Measure | NO | NO | YES | |
| | Namur | OFF, 3,6mA, 22 mA | | | |

## RESET THE DEFAULT PARAMETERS OF THE INSTRUMENT

To load all the default parameters of the instrument and also remove the password, proceed as follows:

A) Disconnect the instrument from the power supply
B) Press and hold simultaneously **Down** and **Enter** and power the instrument.
C) At startup the instrument will execute a hidden menu
D) Will be displayed the following message (picture on the Side)
E) Select “YES” to perform the **RESET TO DEFAULT**.
F) The instrument turns on and performs the **STARTUP** function .



# MODBUS PROFILE

| Read Only Registers | | | | Range of Data | | | |
|---|---|---|---|---|---|---|---|
| Address | Index Menu | Type of Register | Description | min | max | Type of data | Note |
| 1000 | - | **Status Register** | Status Register L ** | 0x00000000 | 0x0001FFFF | Unsigned 32bit | |
| 1001 | - | **Status Register** | Status Register H *** | | | | |
| 1002 | - | **Output Register** | Relay 1 * | 0 | 3 | Unsigned 16bit | |
| 1003 | - | **Output Register** | Relay 2 * | 0 | 3 | Unsigned 16bit | |
| 1004 | - | **Output Register** | SSR 1 * | 0 | 400 | Unsigned 16bit | Pulse/minute |
| 1005 | - | **Output Register** | SSR 2 * | 0 | 400 | Unsigned 16bit | Pulse/minute |
| 1006 | - | **Output Register** | mA 1 * | 360 | 2200 | Unsigned 16bit | Nr. Decimals = 2 |
| 1007 | - | **Output Register** | mA 2 * | 360 | 2200 | Unsigned 16bit | Nr. Decimals = 2 |
| 1008 | - | **Measure** | Main Measure L | -99999 | 99999 | Signed 32bit | |
| 1009 | - | **Measure** | Main Measure H | | | | |
| 1010 | - | **Measure** | Dec Main Measure | 0 | 4 | Unsigned 16bit | |
| 1011 | - | **Temp Measure** | Temp Measure | -500(°C),-580(°F) | 1500(°C),3020(°F) | Signed 16bit | Nr. Decimal = 1 |
| 1012 | - | **Temp Measure** | Temp Measure Dec Point | 1 | 1 | Unsigned 16bit | |
| 1013 | 3D1 | **Measure** | Main Measure Unit | 0-4(ppm, ppb, mg/l, mA, Custom) | | Unsigned 16bit | |
| 1014 | 3F2 | **Temp Measure** | Temp Measure Unit | 0(°C) | 1(°F) | Unsigned 16bit | |
| 1015 | 3H1 | **Output Configuration** | Relay 1 **** | 0 | 6 | Unsigned 16bit | |
| 1016 | 3H2 | **Output Configuration** | Relay 2 **** | 0 | 8 | Unsigned 16bit | |
| 1017 | 3H3 | **Output Configuration** | SSR1 ***** | 0 | 2 | Unsigned 16bit | |
| 1018 | 3H4 | **Output Configuration** | SSR2 ***** | 0 | 2 | Unsigned 16bit | |
| 1019 | 3H5 | **Output Configuration** | mA1 ***** | 0 | 2 | Unsigned 16bit | |
| 1020 | 3H6 | **Output Configuration** | mA2 ***** | 0 | 2 | Unsigned 16bit | |
| 1021 | 3M1 | **Control Panel** | Raw Main Measure L | 0 | 24000 | Unsigned 32bit | µA |
| 1022 | | **Control Panel** | Raw Main Measure H | | | | |
| 1023 | 3M2 | **Control Panel** | Raw Temp Measure | -500(°C),-580(°F) | 1500(°C),3020(°F) | Signed 16bit | Nr. Decimal = 1 |
| 1024 | 3N1 | **Statistics** | Nr. Power On L | 0 | 9999999 | Unsigned 32bit | |
| 1025 | | **Statistics** | Nr. Power On H | | | | |
| 1026 | 3N2 | **Statistics** | Nr. Alarms L | 0 | 9999999 | Unsigned 32bit | |
| 1027 | | **Statistics** | Nr. Alarms H | | | | |
| 1028 | 3N3 | **Statistics** | Nr. Activations RL1L | 0 | 9999999 | Unsigned 32bit | |
| 1029 | | **Statistics** | Nr. Activationsi RL1H | | | | |
| 1030 | 3N4 | **Statistics** | Nr. Activations RL2L | 0 | 9999999 | Unsigned 32bit | |
| 1031 | | **Statistics** | Nr. Activations RL2H | | | | |
| 1032 | 3N5 | **Statistics** | Nr. Activations REEDL | 0 | 9999999 | Unsigned 32bit | |
| 1033 | | **Statistics** | Nr. Activations REEDH | | | | |
| 1034 | 3N6 | **Statistics** | Nr. Activations HOLDL | 0 | 9999999 | Unsigned 32bit | |
| 1035 | | **Statistics** | Nr. Activations HOLDH | | | | |
| 1036 | 3M9 | **Control Panel** | REED | 0(Inactive) | 1(Active) | Unsigned 16bit | |
| 1037 | 3M10 | **Control Panel** | HOLD | 0(Inactive) | 1(Active) | Unsigned 16bit | |
| 1038 | - | **Not Used** | Not Used | 0 | 0 | Unsigned 16bit | |
| 1039 | | | | | | | |
| 1040 | | | | | | | |
| 1041 | 1A4 | **Calibrations** | Calibration Type | 0(None), 1(One Point), 2(Two Points) | | Unsigned 16bit | |
| 1042 | | **Calibrations** | Point 1 L | -99999 | 99999 | Signed 32bit | |
| 1043 | | **Calibrations** | Point 1 H | | | | |
| 1044 | | **Calibrations** | Dec Point 1 | 0 | 4 | Unsigned 16bit | |
| 1045 | | **Calibrations** | Point 2 L | -99999 | 99999 | Signed 32bit | |
| 1046 | | **Calibrations** | Point 2 H | | | | |
| 1047 | | **Calibrations** | Dec Point 2 | 0 | 4 | Unsigned 16bit | |
| 1048 | | **Calibrations** | Gain L | 0 | 99999 | Unsigned 32bit | |
| 1049 | | **Calibrations** | Gain H | | | | |
| 1050 | | **Calibrations** | Dec Gain | 0 | 4 | Unsigned 16bit | |
| 1051 | | **Calibrations** | Offset L | -99999 | 99999 | Signed 32bit | |
| 1052 | | **Calibrations** | Offest H | | | | |
| 1053 | | **Calibrations** | Dec Offset | 0 | 4 | Unsigned 16bit | |
| 1054 | | **Calibrations** | Adjust L | -99999 | 99999 | Signed 32bit | |
| 1055 | | **Calibrations** | Adjust H | | | | |
| 1056 | | **Calibrations** | Dec Adjust | 0 | 4 | Unsigned 16bit | |
| 1057 | 3D2 | **Measure** | Measure Unit Custom L | 0x2020 | 0x7A7A | Unsigned 32bit | View Example 1 |
| 1058 | | **Measure** | Measure Unit Custom H | 0x2020 | 0x7A7A | | |
| 1059 | 3D3 | **Measure** | Main Measure Name | 0-4(Cl2,PAA,H2O2,O3, Custom) | | Unsigned 16bit | |
| 1060 | 3D4 | **Measure** | Measure Name Custom L | 0x2020 | 0x7A7A | Unsigned 32bit | View Example 2 |
| 1061 | | **Measure** | Measure Name Custom H | 0x2020 | 0x7A7A | | |
| 1062 | 3E1 | **Measure** | Sensor Type | 0(0-20mA) | 1(4-20mA) | Unsigned 16bit | |
| 1063 | 3E2 | **Measure** | Range Min L | -99999 | 99999 | Signed 32bit | |
| 1064 | | **Measure** | Range Min H | | | | |
| 1065 | | **Measure** | Dec Range Min | 0 | 4 | Unsigned 16bit | |
| 1066 | 3E3 | **Measure** | Range Max L | -99999 | 99999 | Signed 32bit | |
| 1067 | | **Measure** | Range max H | | | | |
| 1068 | | **Measure** | Dec Range Max | 0 | 4 | Unsigned 16bit | |
| 1069 | 3E4 | **Measure** | Over Current Alarm | 0(OFF) | 1(ON) | Unsigned 16bit | |
| 1070 | 3E5 | **Measure** | Under Current Alarm | 0(OFF) | 1(ON) | Unsigned 16bit | |

| | | | |
|---|---|---|---|
| * | **Relay 1** | **Value** | |
| | | 0 | OFF |
| | | 1 | ON |
| | | 2 | OFF (timed) |
| | | 3 | ON (timed) |
| * | **Relay 2** | **Value** | |
| | | 0 | OFF |
| | | 1 | ON |
| | | 2 | OFF (timed) |
| | | 3 | ON (timed) |
| * | **SSR1** | **Value** | Pulse Minute |
| * | **SSR2** | **Value** | Pulse Minute |
| * | **mA1** | **Value** | Out mA Value |
| * | **mA2** | **Value** | Out mA Value |

| | | | |
|---|---|---|---|
| ** | **Status Register L** | **Bit** | |
| | | 0 | 5V Fault |
| | | 1 | Hold Status |
| | | 2 | Reed Status |
| | | 3 | Service |
| | | 4 | Power Line Interruption |
| | | 5 | Temp Probe Fault |
| | | 6 | OUT 1 Over Range |
| | | 7 | OUT 2 Over Range |
| | | 8 | OUT 1 OFA 1 |
| | | 9 | OUT 2 OFA 1 |
| | | 10 | OUT 1 OFA 2 |
| | | 11 | OUT 2 OFA 2 |
| | | 12 | OUT 1 Holding Alarm |
| | | 13 | OUT 2 Holding Alarm |
| | | 14 | Input mA < 3,6 mA |
| | | 15 | Input mA > 22 mA |
| *** | **Status Register H** | **Bit** | |
| | | 0 | Fault +18V |
| | | 1-15 | Not Used |

| | | | |
|---|---|---|---|
| ***** | **Relay Configuration** | Value | |
| | | 0 | Disable |
| | | 1 | ON_OFF Measure |
| | | 2 | Timed Measure |
| | | 3 | PWM Measure |
| | | 4 | ON_OFF Temp |
| | | 5 | Timed Temp |
| | | 6 | PWM Temp |
| | **ONLY RELE 2** | 7 | Probe Washing |
| | **ONLY RELE 2** | 8 | Alarm |

| | | | |
|---|---|---|---|
| ****** | **SSR/mA Configuration** | Value | |
| | | 0 | Disable |
| | | 1 | Measure |
| | | 2 | Temp |

## Example 1, Measure Unit Custom

**es. m3/h**

| Character 4 | Character 3 | Character 2 | Character 1 |
|---|---|---|---|
| **h** | **/** | **3** | **m** |
| 0x68 | 0x2F | 0x33 | 0x6D |

Measure Unit Custom L = 0x336D
Measure Unit Custom H = 0x682F

Measure Unit Custom = 0x682F336D (m3/h)

## Example 2, Measure Name Custom

**es. Flow**

| Character 4 | Character 3 | Character 2 | Character 1 |
|---|---|---|---|
| **w** | **o** | **l** | **F** |
| 0x77 | 0x6F | 0x6C | 0x46 |

Measure Name Custom L = 0x6C46
Measure Name Custom H = 0x776F

Measure Name Custom = 0x776F6C46 (Flow)

## ASCII Table

| Simbol | Dec | Hex |
|---|---|---|
| (space) | 32 | 20 |
| ! | 33 | 21 |
| " | 34 | 22 |
| # | 35 | 23 |
| $ | 36 | 24 |
| % | 37 | 25 |
| & | 38 | 26 |
| ' | 39 | 27 |
| ( | 40 | 28 |
| ) | 41 | 29 |
| * | 42 | 2A |
| + | 43 | 2B |
| , | 44 | 2C |
| - | 45 | 2D |
| . | 46 | 2E |
| / | 47 | 2F |
| 0 | 48 | 30 |
| 1 | 49 | 31 |
| 2 | 50 | 32 |
| 3 | 51 | 33 |
| 4 | 52 | 34 |
| 5 | 53 | 35 |
| 6 | 54 | 36 |
| 7 | 55 | 37 |
| 8 | 56 | 38 |
| 9 | 57 | 39 |
| : | 58 | 3A |
| ; | 59 | 3B |
| < | 60 | 3C |
| = | 61 | 3D |

| Simbol | Dec | Hex |
|---|---|---|
| > | 62 | 3E |
| ? | 63 | 3F |
| @ | 64 | 40 |
| A | 65 | 41 |
| B | 66 | 42 |
| C | 67 | 43 |
| D | 68 | 44 |
| E | 69 | 45 |
| F | 70 | 46 |
| G | 71 | 47 |
| H | 72 | 48 |
| I | 73 | 49 |
| J | 74 | 4A |
| K | 75 | 4B |
| L | 76 | 4C |
| M | 77 | 4D |
| N | 78 | 4E |
| O | 79 | 4F |
| P | 80 | 50 |
| Q | 81 | 51 |
| R | 82 | 52 |
| S | 83 | 53 |
| T | 84 | 54 |
| U | 85 | 55 |
| V | 86 | 56 |
| W | 87 | 57 |
| X | 88 | 58 |
| Y | 89 | 59 |
| Z | 90 | 5A |
| [ | 91 | 5B |

| Simbol | Dec | Hex |
|---|---|---|
| \ | 92 | 5C |
| ] | 93 | 5D |
| ^ | 94 | 5E |
| _ | 95 | 5F |
| ` | 96 | 60 |
| a | 97 | 61 |
| b | 98 | 62 |
| c | 99 | 63 |
| d | 100 | 64 |
| e | 101 | 65 |
| f | 102 | 66 |
| g | 103 | 67 |
| h | 104 | 68 |
| i | 105 | 69 |
| j | 106 | 6A |
| k | 107 | 6B |
| l | 108 | 6C |
| m | 109 | 6D |
| n | 110 | 6E |
| o | 111 | 6F |
| p | 112 | 70 |
| q | 113 | 71 |
| r | 114 | 72 |
| s | 115 | 73 |
| t | 116 | 74 |
| u | 117 | 75 |
| v | 118 | 76 |
| w | 119 | 77 |
| x | 120 | 78 |
| y | 121 | 79 |
| z | 122 | 7A |

| Read Write Registers | | | | ppm,ppb,mg/l,mA,Custom | | °C | | °F | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Address | Index Menu | Type of Register | Description | min | max | min | max | min | max | Type of Data | Note |
| 3000 | - | **NOT USED** | NOT USED | 0 | 0 | 0 | 0 | 0 | 0 | Unsigned 16bit | |
| 3001 | - | **NOT USED** | NOT USED | 0 | 0 | 0 | 0 | 0 | 0 | Unsigned 16bit | |
| 3002 | - | **NOT USED** | NOT USED | 0 | 0 | 0 | 0 | 0 | 0 | Unsigned 16bit | |
| 3003 | - | **NOT USED** | NOT USED | 0 | 0 | 0 | 0 | 0 | 0 | Unsigned 16bit | |
| 3004 | 3E1 | **Temp Senor Type** | Temp Enalbe | 0(manual) | 1(probe) | 0(manual) | 1(probe) | 0(manual) | 1(probe) | Unsigned 16bit | |
| 3005 | 3E3 | **Manual Temp** | Manual Temperature L | ------ | ------ | -500 | 1500 | -580 | 3020 | Signed 32bit | Nr. Decimals = 1 |
| 3006 | | **Manual Temp** | Manual Temperature H | | | | | | | | |
| 3007 | 3G5 | **Alarm Config.** | Instrument Block | 0(Disable) | 1(Enable) | 0(Disable) | 1(Enable) | 0(Disable) | 1(Enable) | Unsigned 16bit | |
| 3008 | 3G6 | **Alarm Config.** | Temperature Alarm | 0(Notify) | 1(Block) | 0(Notify) | 1(Block) | 0(Notify) | 1(Block) | Unsigned 16bit | |
| 3100 | 2A1 | **RELAY 1** | Setpoin tL | -99999 | 99999 | -500 | 1500 | -580 | 3020 | Signed 32bit | |
| 3101 | | **RELAY 1** | Setpoint H | | | | | | | | |
| 3102 | | **RELAY 1** | Dec Setpoint | 0 | 4 | 1 | 1 | 1 | 1 | Unsigned 16bit | |
| 3103 | 2A2 | **RELAY 1** | Type | 0(High) | 1(Low) | 0(High) | 1(Low) | 0(High) | 1(Low) | Unsigned 16bit | |
| 3104 | 2A3 | **RELAY 1** | Hysteresis L | 0 | 99999 | 0 | 100 | 0 | 180 | Signed 32bit | |
| 3105 | | **RELAY 1** | Histeresis H | | | | | | | | |
| 3106 | | **RELAY 1** | Decimal Hysteresis | 0 | 4 | 1 | 1 | 1 | 1 | Unsigned 16bit | |
| 3107 | 2A4 | **RELAY 1** | Hysteresis Time L | 0 | 120 | 0 | 120 | 0 | 120 | Unsigned 32bit | Seconds |
| 3108 | | **RELAY 1** | Hysteresis Time H | | | | | | | | |
| 3109 | 2A5 | **RELAY 1** | Delay Start L | 1 | 3600 | 1 | 3600 | 1 | 3600 | Unsigned 32bit | Seconds |
| 3110 | | **RELAY 1** | Delay Start H | | | | | | | | |
| 3111 | 2A6 | **RELAY 1** | Delay End L | 1 | 3600 | 1 | 3600 | 1 | 3600 | Unsigned 32bit | Seconds |
| 3112 | | **RELAY 1** | Delay End H | | | | | | | | |
| 3113 | 2A7 | **RELAY 1** | OFA L | 0 | 1439 | 0 | 1439 | 0 | 1439 | Unsigned 32bit | Minutes |
| 3114 | | **RELAY 1** | OFA H | | | | | | | | |
| 3115 | 2A8 | **RELAY 1** | Over Range L | 0 | 99999 | 0 | 1500 | 0 | 2700 | Signed 32bit | |
| 3116 | | **RELAY 1** | Over Range H | | | | | | | | |
| 3117 | | **RELAY 1** | Decimal Over Range | 0 | 4 | 1 | 1 | 1 | 1 | Unsigned 16bit | |
| 3118 | 2A9A | **RELAY 1** | Permanece Status | 0(Disable) | 1(Enable) | 0(Disable) | 1(Enable) | 0(Disable) | 1(Enable) | Unsigned 16bit | |
| 3119 | 2A9B | **RELAY 1** | Permanece Range L | -99999 | 99999 | -500 | 1500 | -580 | 3020 | Signed 32bit | |
| 3120 | | **RELAY 1** | Permanece Range H | | | | | | | | |
| 3121 | | **RELAY 1** | Permanence Range Dec | 0 | 4 | 1 | 1 | 1 | 1 | Unsigned 16bit | |
| 3122 | 2A9C | **RELAY 1** | Permanece Time L | 0 | 3600 | 0 | 3600 | 0 | 3600 | Unsigned 32bit | Seconds |
| 3123 | | **RELAY 1** | Permanece Time H | | | | | | | | |
| 3124 | 2A10 | **RELAY 1** | Time On L | 0 | 3600 | 0 | 3600 | 0 | 3600 | Unsigned 32bit | Seconds |
| 3125 | | **RELAY 1** | Time On H | | | | | | | | |
| 3126 | 2A11 | **RELAY 1** | Time Off L | 0 | 3600 | 0 | 3600 | 0 | 3600 | Unsigned 32bit | Seconds |
| 3127 | | **RELAY 1** | Time Off H | | | | | | | | |
| 3128 | 2A10 | **RELAY 1** | Period L | 0 | 3600 | 0 | 3600 | 0 | 3600 | Unsigned 32bit | Seconds |
| 3129 | | **RELAY 1** | Period H | | | | | | | | |
| 3130 | 2A11 | **RELAY 1** | Proportional Band L | 0 | 99999 | 10 | 500 | 18 | 900 | Signed 32bit | |
| 3131 | | **RELAY 1** | Proportional Band H | | | | | | | | |
| 3132 | | **RELAY 1** | Proportional Band Dec | 0 | 4 | 1 | 1 | 1 | 1 | Unsigned 16bit | |
| 3200 | 2B1 | **RELAY 2** | Setpoin tL | -99999 | 99999 | -500 | 1500 | -580 | 3020 | Signed 32bit | |
| 3201 | | **RELAY 2** | Setpoint H | | | | | | | | |
| 3202 | | **RELAY 2** | Dec Setpoint | 0 | 4 | 1 | 1 | 1 | 1 | Unsigned 16bit | |
| 3203 | 2B2 | **RELAY 2** | Type | 0(High) | 1(Low) | 0(High) | 1(Low) | 0(High) | 1(Low) | Unsigned 16bit | |
| 3204 | 2B3 | **RELAY 2** | Hysteresis L | 0 | 99999 | 0 | 100 | 0 | 180 | Signed 32bit | |
| 3205 | | **RELAY 2** | Histeresis H | | | | | | | | |
| 3206 | | **RELAY 2** | Decimal Hysteresis | 0 | 4 | 1 | 1 | 1 | 1 | Unsigned 16bit | |
| 3207 | 2B4 | **RELAY 2** | Hysteresis Time L | 0 | 120 | 0 | 120 | 0 | 120 | Unsigned 32bit | Seconds |
| 3208 | | **RELAY 2** | Hysteresis Time H | | | | | | | | |
| 3209 | 2B5 | **RELAY 2** | Delay Start L | 1 | 3600 | 1 | 3600 | 1 | 3600 | Unsigned 32bit | Seconds |
| 3210 | | **RELAY 2** | Delay Start H | | | | | | | | |
| 3211 | 2B6 | **RELAY 2** | Delay End L | 1 | 3600 | 1 | 3600 | 1 | 3600 | Unsigned 32bit | Seconds |
| 3212 | | **RELAY 2** | Delay End H | | | | | | | | |
| 3213 | 2B7 | **RELAY 2** | OFA L | 0 | 1439 | 0 | 1439 | 0 | 1439 | Unsigned 32bit | Minutes |
| 3214 | | **RELAY 2** | OFA H | | | | | | | | |
| 3215 | 2B8 | **RELAY 2** | Over Range L | 0 | 99999 | 0 | 1500 | 0 | 2700 | Signed 32bit | |
| 3216 | | **RELAY 2** | Over Range H | | | | | | | | |
| 3217 | | **RELAY 2** | Decimal Over Range | 0 | 4 | 1 | 1 | 1 | 1 | Unsigned 16bit | |
| 3218 | 2B9A | **RELAY 2** | Permanece Status | 0(Disable) | 1(Enable) | 0(Disable) | 1(Enable) | 0(Disable) | 1(Enable) | Unsigned 16bit | |
| 3219 | 2B9B | **RELAY 2** | Permanece Range L | -99999 | 99999 | -500 | 1500 | -580 | 3020 | Signed 32bit | |
| 3220 | | **RELAY 2** | Permanece Range H | | | | | | | | |
| 3221 | | **RELAY 2** | Permanence Range Dec | 0 | 4 | 1 | 1 | 1 | 1 | Unsigned 16bit | |
| 3222 | 2B9C | **RELAY 2** | Permanece Time L | 0 | 3600 | 0 | 3600 | 0 | 3600 | Unsigned 32bit | Seconds |
| 3223 | | **RELAY 2** | Permanece Time H | | | | | | | | |
| 3224 | 2B10 | **RELAY 2** | Time On L | 0 | 3600 | 0 | 3600 | 0 | 3600 | Unsigned 32bit | Seconds |
| 3225 | | **RELAY 2** | Time On H | | | | | | | | |
| 3226 | 2B11 | **RELAY 2** | Time Off L | 0 | 3600 | 0 | 3600 | 0 | 3600 | Unsigned 32bit | Seconds |
| 3227 | | **RELAY 2** | Time Off H | | | | | | | | |
| 3228 | 2B10 | **RELAY 2** | Interval L | 0 | 3600 | 0 | 3600 | 0 | 3600 | Unsigned 32bit | Seconds |
| 3229 | | **RELAY 2** | Interval H | | | | | | | | |

| Read Write Registers | | | | ppm,ppb,mg/l,mA,Custom | | °C | | °F | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Address | Index Menu | Type of Register | Description | min | max | min | max | min | max | Type of Data | Note |
| 3230 | 2B11 | **RELAY 2** | Proportional Band L | 0 | 99999 | 10 | 500 | 18 | 900 | Signed 32bit | |
| 3231 | | **RELAY 2** | Proportional Band H | | | | | | | | |
| 3232 | | **RELAY 2** | Proportional Band Dec | 0 | 4 | 1 | 1 | 1 | 1 | Unsigned 16bit | |
| 3233 | 2B1 | **RELAY 2** | Wash Time L | 0 | 3600 | 0 | 3600 | 0 | 3600 | Unsigned 32bit | Seconds |
| 3234 | | **RELAY 2** | Wash Time H | | | | | | | | |
| 3235 | 2B2 | **RELAY 2** | Delay Stabilization L | 0 | 3600 | 0 | 3600 | 0 | 3600 | Unsigned 32bit | Seconds |
| 3236 | | **RELAY 2** | Delay Stabilization H | | | | | | | | |
| 3237 | 2B3 | **RELAY 2** | Wait New Wash L | 0 | 5999 | 0 | 5999 | 0 | 5999 | Unsigned 32bit | Minutes |
| 3238 | | **RELAY 2** | Wait New Wash H | | | | | | | | |
| 3239 | 2B1 | **RELAY 2** | Over Range R1 | 0(Disable) | 1(Enable) | 0(Disable) | 1(Enable) | 0(Disable) | 1(Enable) | Unsigned 16bit | |
| 3240 | 2B2 | **RELAY 2** | OFA R1 | 0(Disable) | 1(Enable) | 0(Disable) | 1(Enable) | 0(Disable) | 1(Enable) | Unsigned 16bit | |
| 3241 | 2B3 | **RELAY 2** | Measure Permanence R1 | 0(Disable) | 1(Enable) | 0(Disable) | 1(Enable) | 0(Disable) | 1(Enable) | Unsigned 16bit | |
| 3242 | 2B4 | **RELAY 2** | REED Alarm | 0(Disable) | 1(Enable) | 0(Disable) | 1(Enable) | 0(Disable) | 1(Enable) | Unsigned 16bit | |
| 3243 | 2B5 | **RELAY 2** | HOLD Alarm | 0(Disable) | 1(Enable) | 0(Disable) | 1(Enable) | 0(Disable) | 1(Enable) | Unsigned 16bit | |
| 3244 | 2B6 | **RELAY 2** | Temp. Probe Alarm | 0(Disable) | 1(Enable) | 0(Disable) | 1(Enable) | 0(Disable) | 1(Enable) | Unsigned 16bit | |
| 3300 | 2C1 | **SSR 1** | Setpoint L | -99999 | 99999 | -500 | 1500 | -580 | 3020 | Signed 32bit | |
| 3301 | | **SSR 1** | Setpoint H | | | | | | | | |
| 3302 | | **SSR 1** | Decimal Setpoint | 0 | 4 | 1 | 1 | 1 | 1 | Unsigned 16bit | |
| 3303 | 2C2 | **SSR 1** | Type | 0(High) | 1(Low) | 0(High) | 1(Low) | 0(High) | 1(Low) | Unsigned 16bit | |
| 3304 | 2C3 | **SSR 1** | Max Pulses | 20 | 400 | 20 | 400 | 20 | 400 | Unsigned 16bit | Pulse/minutes |
| 3305 | 2C4 | **SSR 1** | Min Pulses | 1 | 100 | 1 | 100 | 1 | 100 | Unsigned 16bit | Pulse/minutes |
| 3306 | 2C5 | **SSR 1** | Proportional Band L | 0 | 99999 | 10 | 500 | 18 | 900 | Signed 32bit | |
| 3307 | | **SSR 1** | Proportional Band H | | | | | | | | |
| 3308 | | **SSR 1** | Decimal Proportional Band | 0 | 4 | 1 | 1 | 1 | 1 | Unsigned 16bit | |
| 3400 | 2D1 | **SSR 2** | Setpoint L | -99999 | 99999 | -500 | 1500 | -580 | 3020 | Signed 32bit | |
| 3401 | | **SSR 2** | Setpoint H | | | | | | | | |
| 3402 | | **SSR 2** | Decimal Setpoint | 0 | 4 | 1 | 1 | 1 | 1 | Unsigned 16bit | |
| 3403 | 2D2 | **SSR 2** | Type | 0(High) | 1(Low) | 0(High) | 1(Low) | 0(High) | 1(Low) | Unsigned 16bit | |
| 3404 | 2D3 | **SSR 2** | Max Pulses | 20 | 400 | 20 | 400 | 20 | 400 | Unsigned 16bit | Pulse/minutes |
| 3405 | 2D4 | **SSR 2** | Min Pulses | 1 | 100 | 1 | 100 | 1 | 100 | Unsigned 16bit | Pulse/minutes |
| 3406 | 2D5 | **SSR 2** | Proportional Band L | 0 | 99999 | 10 | 500 | 18 | 900 | Signed 32bit | |
| 3407 | | **SSR 2** | Proportional Band H | | | | | | | | |
| 3408 | | **SSR 2** | Decimal Proportional Band | 0 | 4 | 1 | 1 | 1 | 1 | Unsigned 16bit | |
| 3500 | 2E1 | **mA1** | Start mA L | -99999 | 99999 | -500 | 1500 | -580 | 3020 | Signed 32bit | |
| 3501 | | **mA1** | Start mA H | | | | | | | | |
| 3502 | | **mA1** | Decimal Start mA | 0 | 4 | 1 | 1 | 1 | 1 | Unsigned 16bit | |
| 3503 | 2E2 | **mA1** | End mA L | -99999 | 99999 | -500 | 1500 | -580 | 3020 | Signed 32bit | |
| 3504 | | **mA1** | End mA H | | | | | | | | |
| 3505 | | **mA1** | Decimal End mA | 0 | 4 | 1 | 1 | 1 | 1 | Unsigned 16bit | |
| 3506 | 2E3 | **mA1** | Hold Measure | 0(Disable) | 1(Enable) | 0(Disable) | 1(Enable) | 0(Disable) | 1(Enable) | Unsigned 16bit | |
| 3507 | 2E4 | **mA1** | Namur | 0(OFF), 1(3,6mA),2(22mA) | | 0(OFF), 1(3,6mA),2(22mA) | | 0(OFF), 1(3,6mA),2(22mA) | | Unsigned 16bit | |
| 3508 | 2F1 | **mA2** | Start mA L | -99999 | 99999 | -500 | 1500 | -580 | 3020 | Signed 32bit | |
| 3509 | | **mA2** | Start mA H | | | | | | | | |
| 3510 | | **mA2** | Decimal Start mA | 0 | 4 | 1 | 1 | 1 | 1 | Unsigned 16bit | |
| 3511 | 2F2 | **mA2** | End mA L | -99999 | 99999 | -500 | 1500 | -580 | 3020 | Signed 32bit | |
| 3512 | | **mA2** | End mA H | | | | | | | | |
| 3513 | | **mA2** | Decimal End mA | 0 | 4 | 1 | 1 | 1 | 1 | Unsigned 16bit | |
| 3514 | 2F3 | **mA2** | Hold Measure | 0(Disable) | 1(Enable) | 0(Disable) | 1(Enable) | 0(Disable) | 1(Enable) | Unsigned 16bit | |
| 3515 | 2F4 | **mA2** | Namur | 0(OFF), 1(3,6mA),2(22mA) | | 0(OFF), 1(3,6mA),2(22mA) | | 0(OFF), 1(3,6mA),2(22mA) | | Unsigned 16bit | |

**Write Only Register**

| | | | | | |
|---|---|---|---|---|---|
| 4000 | | **Command Register** | Command | MODBUS_REG_CMD *** | |

***

| MODBUS_REG_CMD | Value to send to request a command execution |
|---|---|
| 0 | None |
| 1 | Read Eeprom and copy in Ram |
| 2 | Write in Eeprom the Ram Data |
| 3 | Reset Statistics Data |