Alphanumeric and graphical displays
BAMOWIZ

USER MANUAL

BAMO INTERNATIONAL
22, Rue de la Voie des Bans · Z.I. de la gare · 95100 ARGENTEUIL
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SUMMARY

1. PRECAUTIONS

- Installation, commissioning and maintenance must be performed by qualified personnel.
- The power supply must comply with the values specified in the technical features.
- Disconnect all sources of power to the display unit during works and maintenance tasks.
- The operation of the device must be in accordance with and strictly limited to the applications as mentioned below.

2. DESCRIPTION

The instrument has a colour touch screen to navigate through an intuitive and multilingual menu. BAMOWIZ converts analogue input signals (4-20 mA) and delivers clear information on its large alphanumeric and graphic screens for an easy reading of measurements, thresholds and status of relays.

The programme is keyword protected allowing access to settings of thresholds, scaling of measurements, operating modes, etc.

BAMOWIZ has a flexibility of use for analysis of input data such as the display of level, volume or a specific parameter (pressure, temperature, turbidity, etc.). The keyboard on the touch screen allows you to set the measuring unit (Example: µS, Ohm, Ω, °C, K, °F, bar, etc.)

Indicator and totalizer for flow, with 1 frequency input
BAMOWIZ receive signals of sensors such as our BAMOFLU up to 10 kHz as well as signals from counters M series.

To resume, BAMOWIZ allows:
- To choose the language
- To set the measurement ranges
- To choose the unit to display
- To calculate and display the volume inside square/ cylindrical tanks or specific tanks (Linearization with 20 steps)
- To calculate and display the differential between inputs 1 and 2
- To set 8 thresholds
- To assign each thresholds to relay outputs
- To calculate the flow-rate and totalizing (sensor with pulse output)

From graphic display you can access to:
- For each input: Identification (Name/ TAG) - Values - Unit
- Synoptic of measurements (Bar Graph)
- Identification and status of each relay
- Display of minima and maxima values

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3. TECHNICAL FEATURES

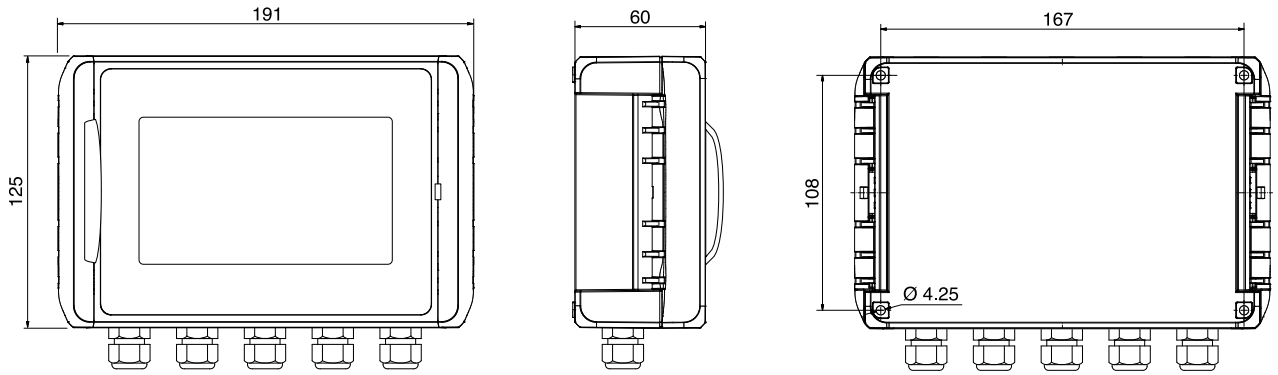
User interface	Graphic color touch screen, 4/3; Resolution of 480 x 272 pixels
Languages	English; French; German; Polish; Portuguese; Spanish
Alphanumeric touch keyboard	Dedicated for each language
Displayed measuring units	Set by type writing
Inputs:	
Analogue	2 for sensors 4–20 mA, power to 2-wire sensors, 24 V DC; Max. 3 W; 120 mA (load: 50 Ω)
Frequency	1 Frequency input, range 0.04 Hz to 10 kHz
Outputs:	
Analogue signal	1 output 4–20 mA (with or without linearization)
Relay outputs	3 N.O. contacts, potential free
Switching power	3A / 250 V AC
Hysteresis	To set between 0 and 100 %
Delay	To set between 0 and 9999 s
Communication	Serial interface RS485, MODBUS
Other Features	
Adjustable thresholds	Up to 8, shared between the 3 relays
Linearization	Through 20 steps
Differential	(input 1) - (input 2) : Available on display, thresholds, mA output
Flowmeter / Totalizer	With the frequency input signal (pulses) from 0.04 Hz to 10 kHz
Display	Bar-graph of each measured parameter Display of minima and maxima
Main power	100...240 V AC 50/60 Hz or 18...36 V DC
Consumption	Max. 10 W
Cable connections	Screw terminals
Cable glands	5 Cable glands (PG 9)
Mounting	Wall mount, IP 65 cabinet, in ABS
Operating temperature	-10 ... +50 °C

EC Conformity: The instrument meets the legal requirements of the current European Directives.

4. CODE NUMBERS AND REFERENCES

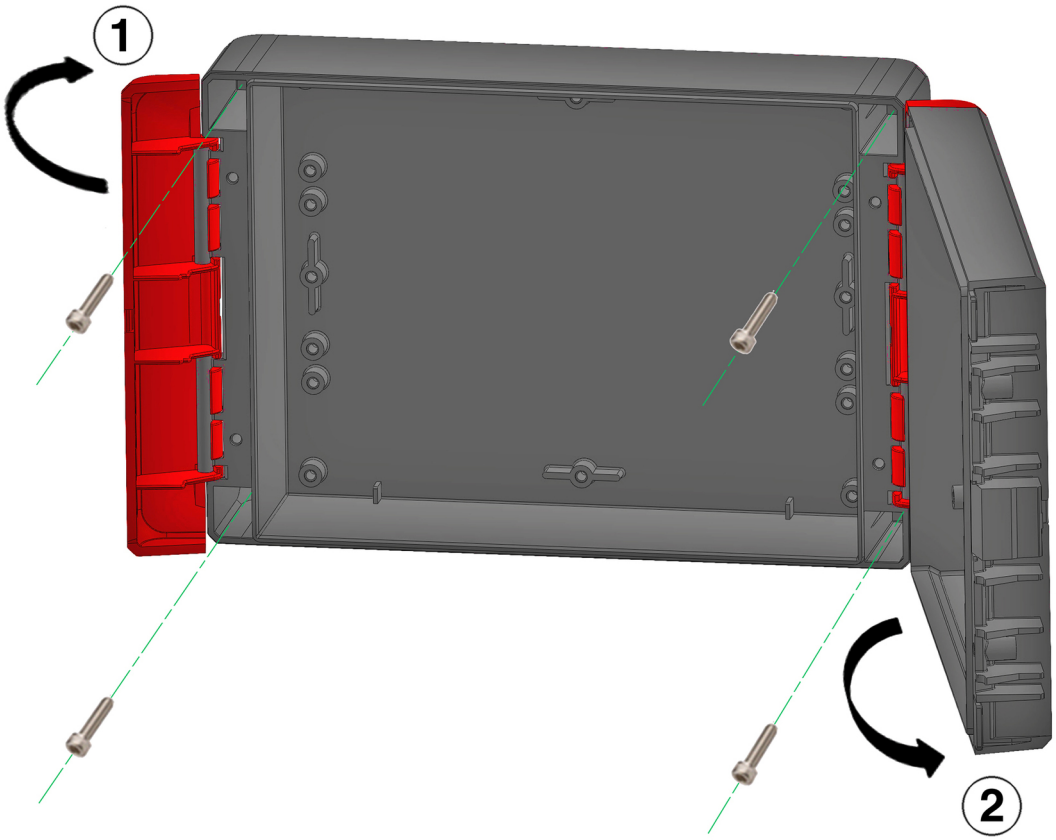
Code	Reference	Power supply
217 213	BAMOWIZ 213	100...240 V AC 50/60 Hz
217 214	BAMOWIZ 213/24	18...36 V DC

5. DIMENSIONS



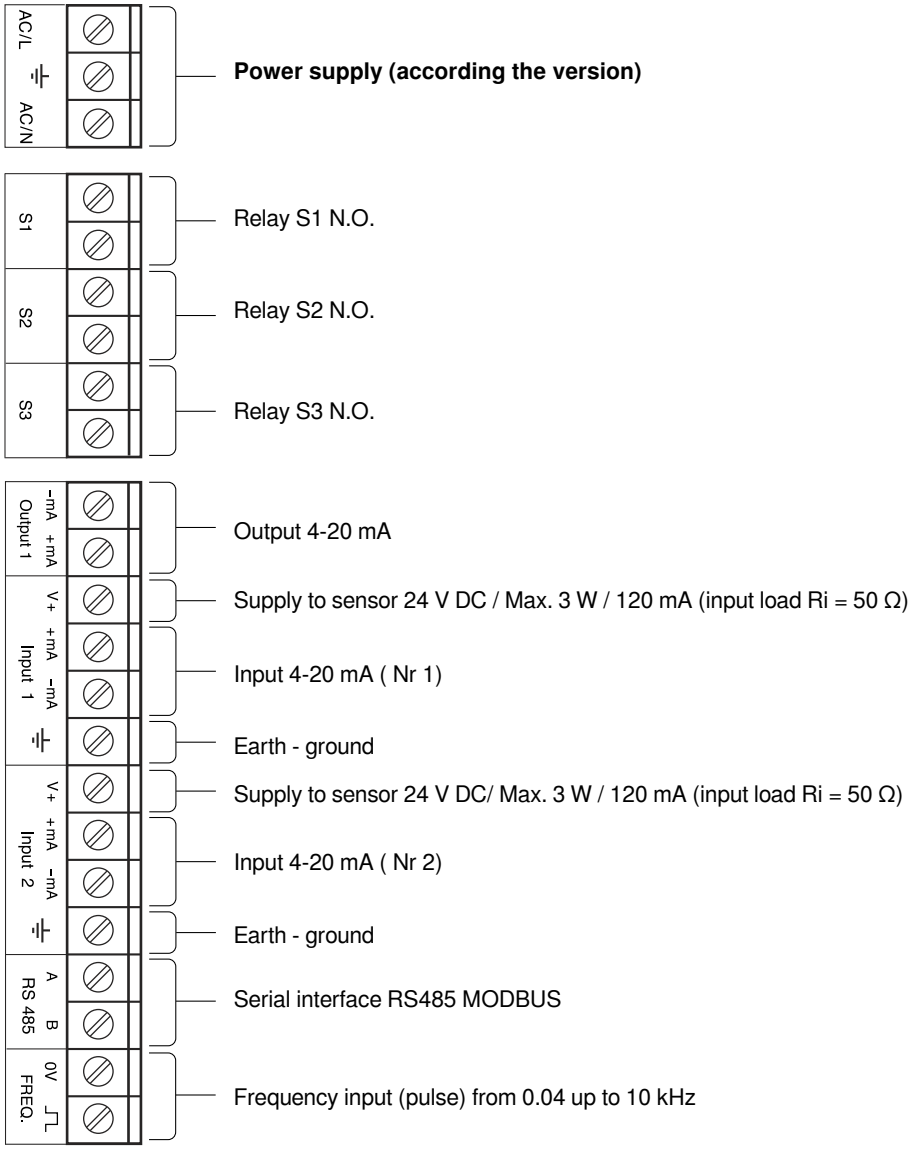
6. MOUNTING

The BAMOWIZ can be fixed directly to the wall with 4 screws (dia. 4 mm)



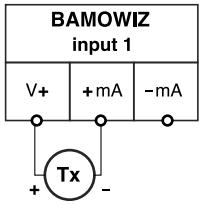
Caution: Do not drill the cabinet.

7. ELECTRICAL CONNECTIONS



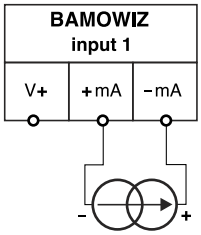
Sensor connections:

2-wire Transmitter

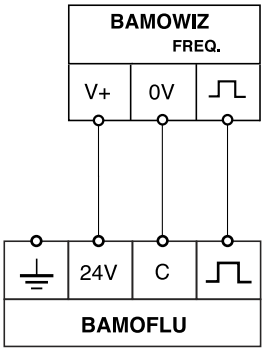


(Example for Input N° 1)

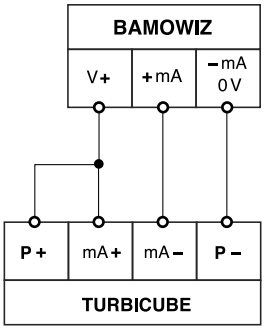
Transmitter active loop



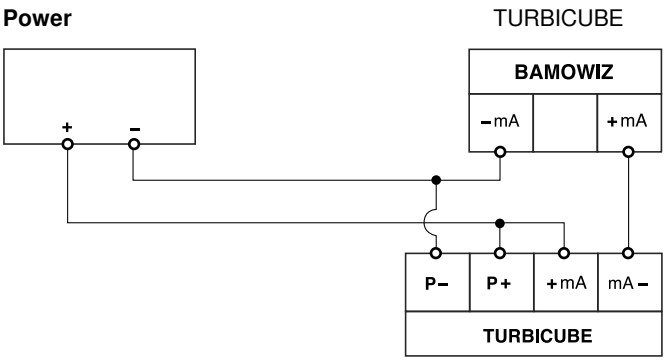
Frequency / Pulse



TURBICUBE

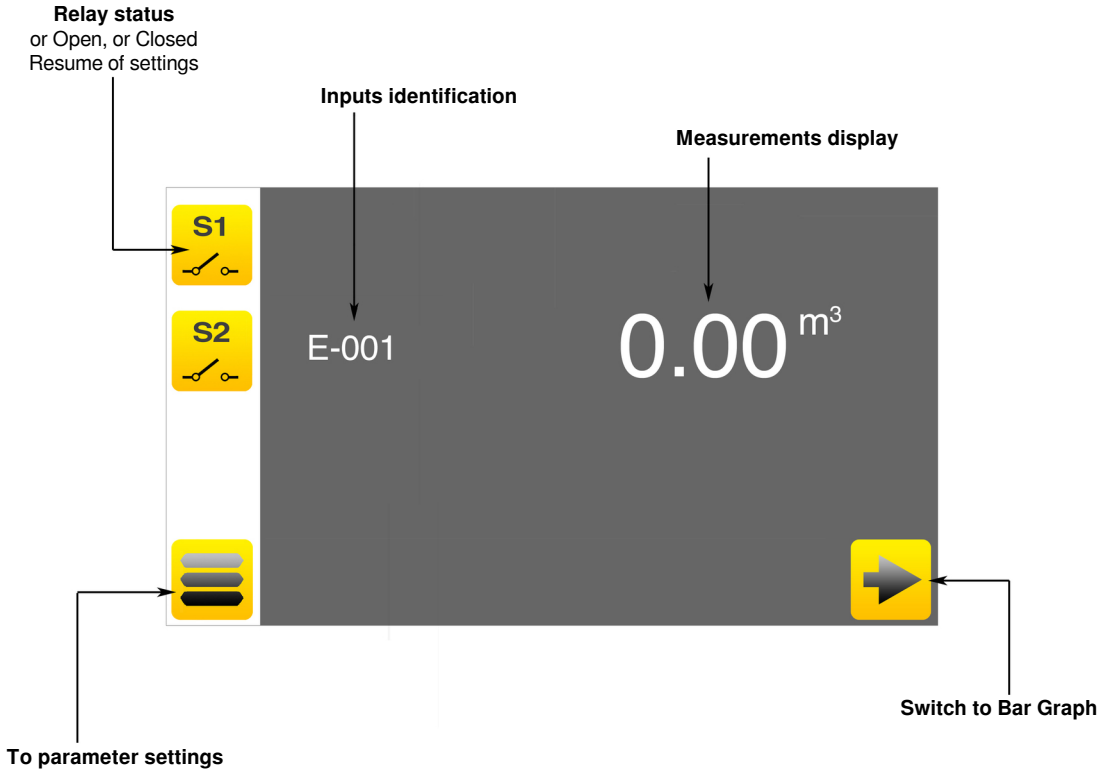


External supply

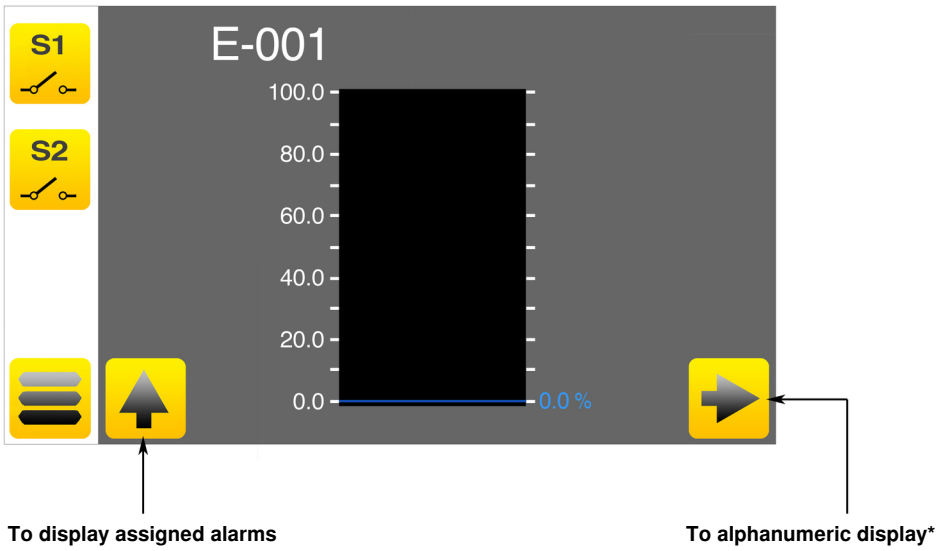


8. MAIN SCREENS

8.1 ALPHANUMERIC DISPLAY

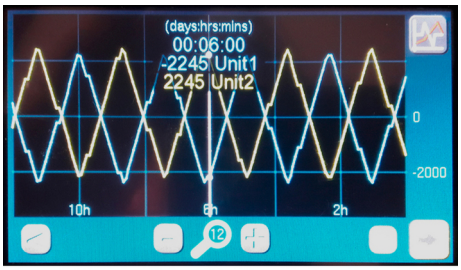


8.2 GRAPHICAL DISPLAY



* Each connected input has its own Bar Graph. Press on right arrow to see the next Bar Graph.

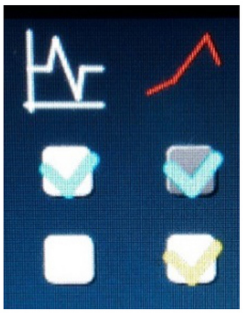
8.3 CHARTS DISPLAY



Pic. A

1) Features:

Backup capacity	96 Hours
RESET OF MEMORY	When main power switches off
Recording frequency	Each 5 min of the measurement average value
Number of charts displayed	2 Charts simultaneously
Number of data of charts	Max.: 300 points
Period scales	6 h / 12 h / 24 h
Time shift	Per hour
6-way recording:	Input I1 Display n° 1
	Input I1 Display n° 2
	Input I2 Display n° 1
	Input I2 Display n° 2
	Differential I1 - I2 Display n° 1
	Differential I1 - I2 Display n° 2



Pic. B

2) To choose the charts to display:

Press the key "CHARTS" (right top of screen) to display the selection (Pic. A).

Pic. B. First column: To choose the main chart; Second column: To choose the secundary chart.
Note that the scaling will be that of the main chart.

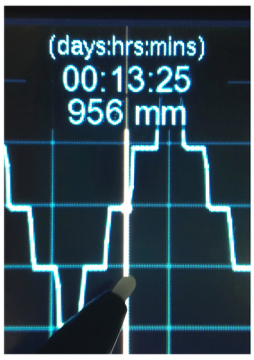
Pic. C

Pic. C: The selected charts are shown on the screen.

Pic. D

3) Setting the period scale:

Pic.D: Use the keys « - » et « + » to decrease or to increase the period (6 h ; 12 h ; 24 h).



Pic. E

4) Time shift:

Pic. E (example): Use the blue arrow keys to to shift the display area hour by hour.
Note that a long press (> 2 s) increases the shift speed.

Visualization of values on the charts:
It is possible to view the data of each point of the chart by pressing on it.
Use of a touch screen pen is highly recommended.

9. DESCRIPTION OF ICONS

The touch screen allows you to navigate within the menus and set up parameters according your applications.

HOME
Return to alfanumeric display

SETTINGS
Access to serial number and version of your BAMOWIZ
Access to screen saver (set up available only in MODIFICATION MODE)

LANGUAGES
Language selection

MENU
Access to parameter settings of the monitor

PADLOCK
Open: means MODIFICATION mode
Closed: means CONSULTATION (review) mode

RETURN
Back to the previous screen

ARROWS
Cursors to navigate within the menus

ON / OFF
To enable (ON) or disable (OFF) settings of an entry

SAVE
To save the settings

ESCAPE
To cancel any modification on the input settings

RELAY STATUS S1, S2, S3
Display relays status and settings resume

CURSOR
To navigate within the menus
Alternative display to Arrows in some menus

SELECTION
Scroll of choices

CHARTS
To choose the charts to display

BLUE ARROWS
To shift the display area hour by hour.

10. SCREEN SETTINGS

10.1 LANGUAGE SELECTION

Direct access to the language of your choice.

- From the main screen, go to MENU.
- Press "SETTINGS" to view the icon LANGUAGES
- Select your language, pressing the corresponding flag.

10.2 CONSULTATION mode or MODIFICATION mode

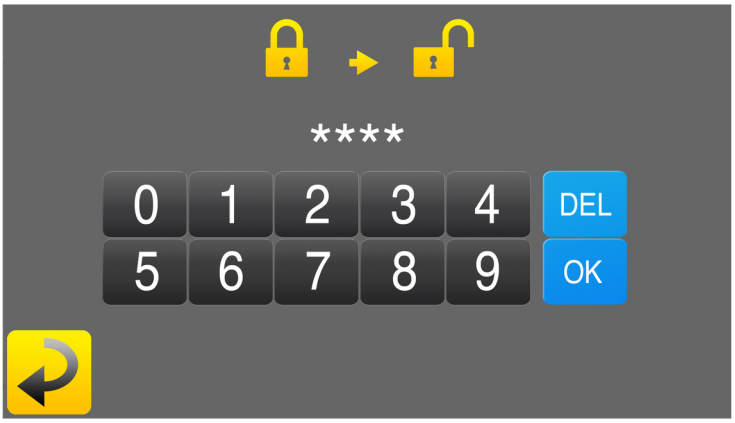
CONSULTATION mode allows the end-user to review all settings.
This mode corresponds to a closed padlock icon

To change settings, you have to use the MODIFICATION mode.
This mode is protected by a password: the last 4 numbers of the serial number.

Example : S/N : 20000-01
Password is: 0001

Note: Serial number of your BAMOWIZ is on the sticker on left side of the unit. You can find it as well through the menu SETTINGS.

- From the main screen, go to MENU.
- Press the padlock icon and type the last four number of S/N.
- Pressing "OK" the BAMOWIZ is set in MODIFICATION mode (Open padlock)



In case of mistyping, the display shows "ERROR".
After 30 minutes, the BAMOWIZ reset automatically in CONSULTATION mode.

10.3 SCREEN SAVER

Access from the menu SETTINGS (in MODIFICATION mode): allows to set the brightness of screen saver mode (it runs after 30 min of non activity)

11. SETTING THE INPUTS

3 types of measuring inputs are available on BAMOWIZ:
- Level
- Volume
- Specific, such as pressure, turbidity, temperature, etc.

11.1 SETTING A CHANNEL FOR LEVEL

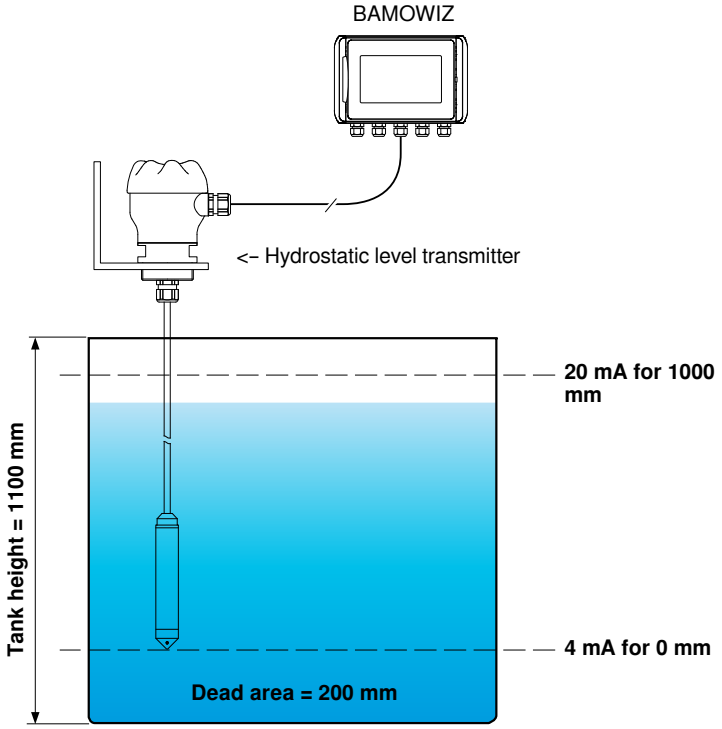
Below, set up of channel for LEVEL measurement:
Press icon MENU, choose the "Settings input I1 (or I2, or I3):

Start-up input?	On
Designation	Type the channel name with the keyboard
Measurement type	Level
Signal sensor unit	Select the unit, mbar, mm or mmH2O = water column
4 mA	Type the value in previous unit at 4 mA
20 mA	Type the value in previous unit at 20 mA
Dead area	Type the value in previous unit for the dead area
Tank height	Type the whole height for Bar Graph display (including the dead area)
Screen N° 1	Select the unit for the numeric display: m, cm, mm or %
Screen N° 2	Select the unit for Bar Graphical display: m, cm, mm or , %

Press RETURN , then SAVE to record all settings.

Example:
Use of an hydrostatique level transmitter with 4-20mA output signal corresponding to 0 ... 1000 mm WC (water column). The sensor is in inmersion in 1100 mm tank high at 200 mm above the bottom. The digital display will be in mm and graphic display in cm.

To show the height of liquid on BAR GRAPH, the height of tank is necessary (1100 mm) and display N°2 is in cm.



11.2 SETTING A CHANNEL FOR VOLUME

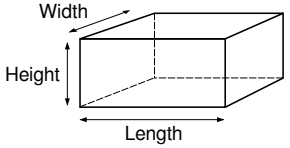
Below, set up of a channel for VOLUME monitoring:
Go to menu "SETTINGS" I1 or I2

Start-up input?	On
Designation	Type the channel name with the keyboard
Measurement type	Volume
Signal sensor unit	Select the unit, mbar, mm or mmH2O = water column
4 mA	Type the value in previous unit at 4 mA
20 mA	Type the value in previous unit at 20 mA
Dead area	Type the value in previous unit for the dead area
Tank type	Select the type: Parallelepipedic, cylindric & horizontal, cylindric & vertical or specific *Dimensions are requested according the type for volume calculation (See below standard tank shapes).* *Specific tanks: Opens a new menu for linearization curve with up to 20 steps.* Complete all parameters according your tank
Screen N° 1	Select the unit for the numeric display: m^3 (cubic metre) or l (litre)
Screen N° 2	Select the unit for graphical display: m^3 (cubic metre) or l (litre)

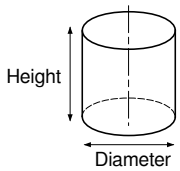
Press RETURN , then SAVE to record all settings.

Standard tank shapes:

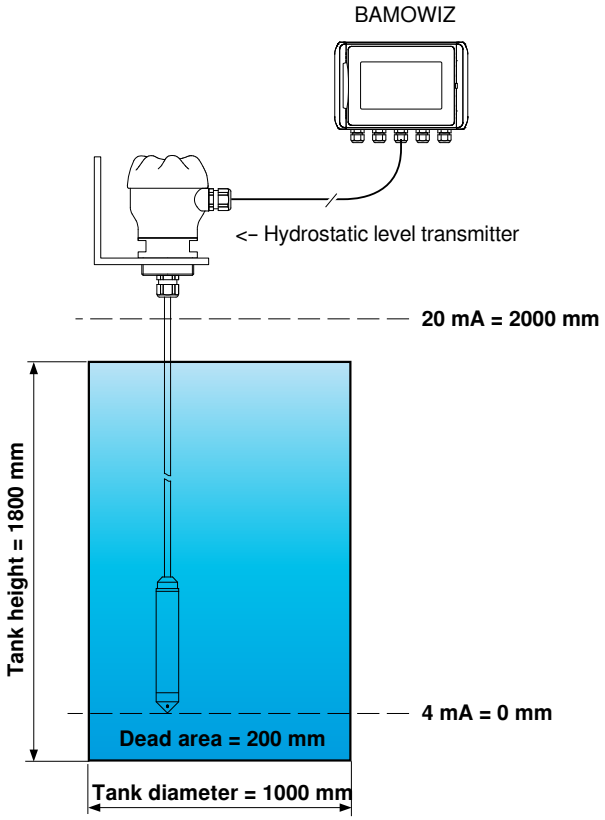
Parallelepipedic tank



Cylindric & vertical tank with flat bottom



Example:
Use of an hydrostatique level transmitter with 4-20mA output signal corresponding to 0 ... 2000 mm WC (water column). The sensor is in inmersion at 200 mm above the tank bottom; Tank is cylindric & vertical, 1800 mm high and diam. 1000 mm. The digital display will be in litre and graphic display in %.



11.3 SETTING A CHANNEL IN SPECIFIC MODE

Below, set up of a channel for a specific input:
Go to the menu "Settings input I1 or I2

Start-up input?	On
Designation	Type the channel name with the keyboard
Measurement type	Specific
Signal sensor unit	Type measuring unit with the keyboard (symbols on keys µ and Ohm)
4 mA	Type the value in previous unit at 4 mA
20 mA	Type the value in previous unit at 20 mA
Dead area	Type the value in previous unit for the dead area

Press RETURN , then SAVE to record all settings.
Note: Measuring unit and scale range are directly set on both displays, numeric and Bar Graph.

12. DIFFERENTIAL MODE BETWEEN 1st & 2nd INPUTS

Note: It is necessary to have identical measurement parameter on both channels (or level, or volume, or specific). For settings, go to "Settings input I1" and complete the sequences.

BAMOWIZ will show on display 3, the difference between displayed value for input 1 and displayed value for input 2 (Delta).

Below, details to set up the differential mode:
Go to menu "Settings" I1 - I2

Start-up input?	On
Designation	Type the channel name with the keyboard
Start-up input (I1) - (I2)?	On
Delta range	Select the range of displayed delta on bar graph for channel 3
Zero Offset	Once both sensors (I1 & I2) are in same operating conditions (e.g. same pressure), press icon "selection" to set the offset.

Press RETURN , then SAVE to record all settings.

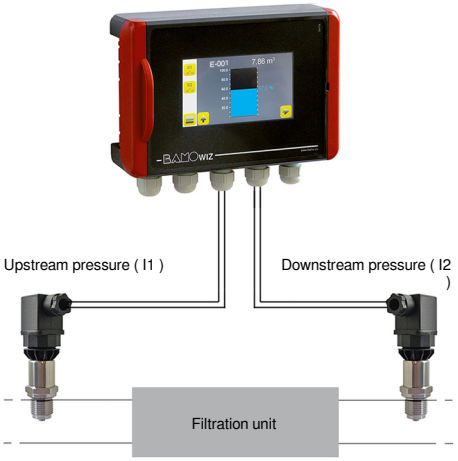
Example : Differential pressure to monitor the clogging of a filtration unit

- *Upstream: Pressure transmitter 0 ... 10 bar on channel 1 (I1)*
- *Downstream: Pressure transmitter 0 ... 10 bar on channel 2 (I2)*
- *Delta display: -10 ... +10 bar*

Settings will be:

Menu "Settings input"	I1	I2	I3
Start-up input?	*On*	*On*	*On*
Designation	*Upstream*	*Downstream*	*Differential*
Start-up I3 (I1-I2)?	-	-	*On*
Measurement type	*Specific*	*Specific*	-
Signal sensor unit	bar	*bar*	-
4 mA	*0*	*0*	-
20 mA	*10*	*10*	-
Dead area	*0*	*0*	-
Delta range	-	-	*20*

When upstream Pressure is 6.1 bar and downstream Pressure is 4.5 bar, display is +1.6 bar



13. FREQUENCY SIGNAL INPUT

Note: To set this function the differential function must be disabled.

-> Go to the menu "Pulse input"
Following are the steps to activate and set up the frequency function:

Activation ?	On
Designation	Type the channel name (Nr 3) with the keyboard
Signal sensor unit	Select the unit according the sensor output
Frequency	Type the maximum frequency in Hz
Displayed value	Type the value to display for the maximum frequency
Damping	Select the filter time for the average of measurements. Available times: 0.5, 1, 2, 5, 10 and 20 s
Delay zero	Select the time in seconds that the last reading is displayed before returning to 0 when the signal disappears. Times available: 2.5, 5, 10 and 25 s
Totalizer	Default: "OFF" If "ON", below steps are added:
Unit Tot.	Enter the unit corresponding to the totalization Example : m^3
Pulse value	Enter the number of pulses for each increment (Example: 1000 pulses = 1 m^3)

How to determine the values?

For all types of settings, the method is as follows:

1. Calculate the frequency (in Hertz) that the sensor will produce for the desired display value
Type this frequency as well as the desired display value in the BAMOWIZ

Example:

Suppose a sensor producing 400 pulses per litre, the maximum flow average is 65 l/min; you wish to display results in litres per minute.
First step: convert the number of pulses into frequency.

Frequency = (400x65) / 60 = 433.33

In BAMOWIZ, type the frequency 433.33 Hz and the displayvalue of 65; Then the unit corresponding to the sensor, here in litre.

Note:
For irregular frequency signals, you can improve the display stability by increasing the filter time.

Tip for a BAMOFLU sensor
To find out the frequency value corresponding to the actual flow:

1. Type the number 1 as the frequency and display value.
2. Start the pump
3. The displayed frequency will correspond to the actual flow rate (pump flow rate or any other measurement available)
4. Note the value that will be displayed on the BAMOWIZ main screen
5. Enter these new values in the BAMOWIZ

The value in Hz corresponds to the value displayed on the main screen of BAMOWIZ
The display value corresponds to the flow rate you have noted previously.

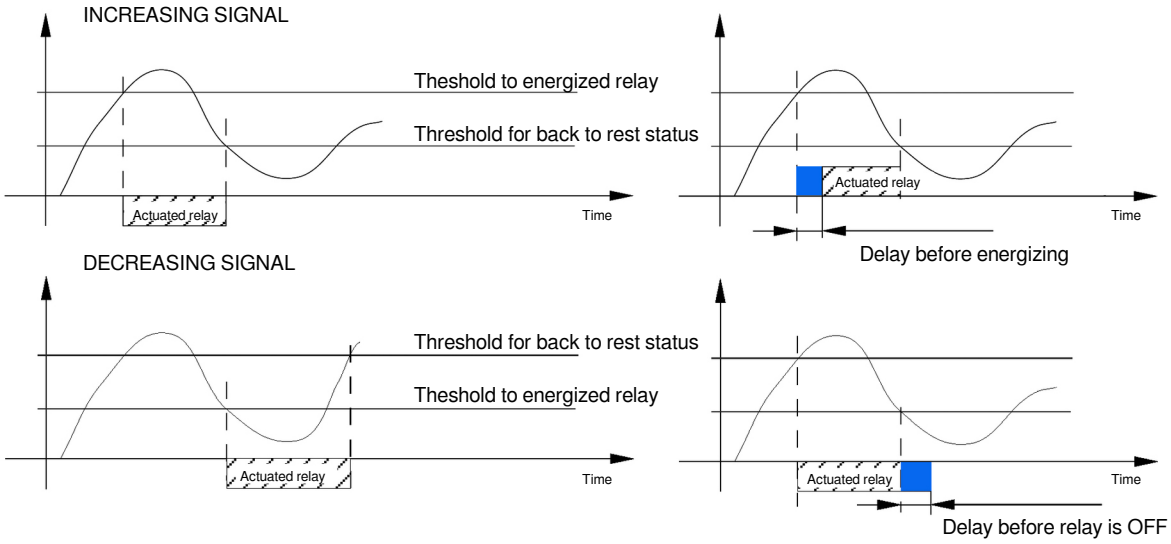
14. THRESHOLDS SETTING (Maximum 8)

Below, example to set up a threshold
Go to the menu "THRESHOLDS"

To add one threshold click on " + ", then click on the threshold to set up.

Designation	Type the threshold name with the keyboard
Input selection	Select the channel I1 or I2 or I3 to assign to this threshold
Unit selection	Select the measuring unit: mm, % or m^3 *The selection is not available when the "specific mode" is in use on the assigned channel.*
Direction	Increasing = Actuated when measurement value is higher than threshold. Note : Threshold for "rest status" (relay back to OFF) will be lower than threshold for energized relay (see diagram below) Decreasing = Relay actuates when measurement value is lower than threshold. Note : Threshold for "rest status" (relay back to OFF) will be higher than threshold for energized relay (see diagram below)
Energized relay	Type the value for which the relay will be energized
Rest status	Type the value for which the relay will be back to "rest status"
Delay before actuation	ON / OFF: with or without delay to energize the relay
Time (ON)	When a delay is desired, type the duration of delay before relay is energized.
Delay before "rest status"	ON / OFF: with or without delay to set back relay S1 in rest status
Time (ON)	When a delay is desired, type the duration of delay before relay get back to rest position.
Threshold action	To assign threshold to a relay (or S1 or S2), or to one relay plus display, or display threshold on screen without actuating any relay.

When thresholds are set, press RETURN , then SAVE to record all settings
NOTE: On Bar Graph, set thresholds are displayed on request.



15. TEST OF RELAYS

In MODIFICATION mode, this menu allows you to test relays by manual actuation. When entering, relays are OFF mode (rest status). Press the icon on the key "selection" to test the relay: it switches to ON status.

16. SET UP OF INTERFACE MODBUS

Below are the details of settings for the interface MODBUS:
Go to the menu "MODBUS"

Data	8 bits
Baud rates	Choose between: 2400, 4800, 9600, 19200 bauds
Parity	Select between: None, even, odd
Stop bits	Select or 1 or 2
Address Nr	Type the Address through the keyboard.

17. SETTINGS OF ANALOGUE OUTPUT mA:

Below are the details of settings for output 4-20 mA:
Go to the menu "Output mA".

Start-up input	On
Choose the input	Select the output 4-20 mA to assign it at desired input (i1, i2 or i1-i2).
Choose the unit	Select the measurement unit
4 mA	Type the corresponding value for the 4 mA signal.
20 mA	Type the corresponding value for the 20 mA signal.

18. HISTORICAL OF MIN. & MAX. VALUES

BAMOWIZ always keeps in memory the Min. and Max. values of each input.
Push on "Reset" to erase the Max. & Min. values for each necessary input.
NOTE: On graphical display, Max. & Min. values may be displayed or hidden on request.

19. CHOOSE THE COLOURS

This setting is accessible from the COLOR menu in MODIFICATION mode; Tis menu allows you to individually change the colors of the displayed values.

1) From the main display, go to "MENU"
2) Go to the menu "COLOUR"
3) Select the input and the type of display desired to choose the colour.

- Confirm your choice by pressing the "SAVE" key
- Do the same for the other inputs if necessary, then press the "RETURN" key to exit the meu "COLOUR".
- Press the SAVE key to save your settings.