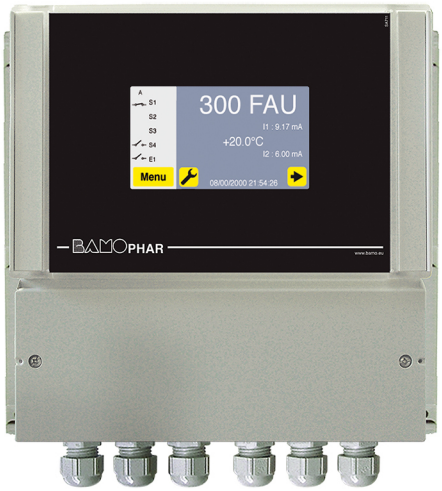
Turbidity monitor
BAMOPHAR 436



USER MANUAL

BAMO INTERNATIONAL
22, Rue de la Voie des Bans · Z.I. de la gare · 95100 ARGENTEUIL
Tel **+33 (0)1 30 25 83 20** **Web** **www.bamo.eu**
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SUMMARY

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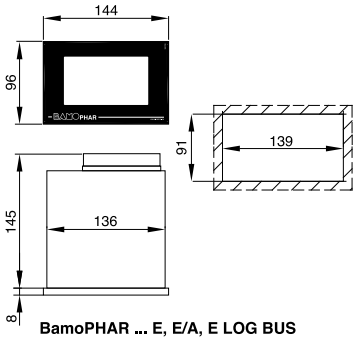
1. DESCRIPTION

BAMOPHAR 436 is designed for turbidity measurements for control and monitoring of water.
Connected to a transmitter TURBICUBE or TRUBOMAT GAB for in-line measurement or to a TURBISENS for measurement in immersion, BAMOPHAR will display and transmit 2 analogue signals, as 4-20 mA, for temperature and turbidity.
BAMOPHAR displays on a color touch-sensitive screen a multilingual friendly using menu.
The reading is easy for measurement, temperature and relay status.
It displays a menu with all parameters for configuration of analogue outputs and thresholds.
For a safe start-up a test menu allow a simulation of operation actuating all outputs and thresholds.

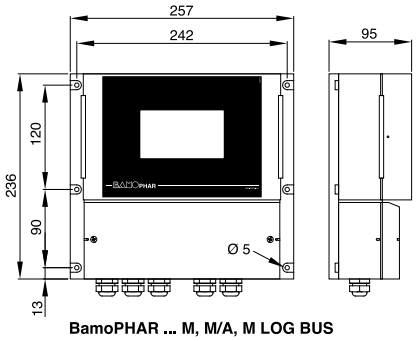
2. TECHNICAL FEATURES

End-user interface	Color touch screen 4.3", resolution 480x272 pixels Display of measurements, menus, temperature, relay status Configuration - Keyword protected
Measuring scales	To set up according the turbidity transmitter in use (from 0.001 to 9999 FNU, FAU, mg/l, g/l)
Input signal	For turbidity transmitter with 4-20 mA output signal.
Temperature display	When a Pt 100 Ω (3-wire) is connected: range 0 ... 100 °C Or manual set up
Relay outputs	4 contacts, potential free S1, threshold for measurement or temperature (N.O.) S2, threshold for measurement or temperature (N.O.) S3, threshold for measurement or temperature (N.O.) or assigned to an external contact S4, contact as alarm function (fault on Pt 100 loop) or over-riding measurement
Initial contact resistance	100 mΩ max. (voltage drop 6 V DC 1 A)
Switching power	831 VA AC / 3 A / 277 V AC 90 W / 3 A / 30 V DC
Switching capacity (min.)	100 mA, 5 V DC (depends of frequency, ambient conditions)
Mechanical lifetime (min.)	5 x 10^6 operations (180 op./min)
Electrical lifetime (min.)	2 x 10^5 (at 20 op./min) for 3 A 125 V AC, 3 A 30 V DC - 10^5 (estimated load) for 3 A 125 V AC
Output measurement signal	0/4 - 20 mA (max. 600 Ω), directly proportional to measurement
Power supply	230 V, 50/60 Hz (other on request); Consumption 10 VA
Models	Panel mounting, 96x144 mm, Front IP65, screw terminal IP40 Wall mounting, IP65, cable glands, screw terminals
OPTION (RS 422 + Logger)	
Interface	RS422 output, J-BUS link - Binary slave mode - 2400 to 9600 bauds Data Logger: Automatic record of cycle average measurement 150 000 records max. on memory card

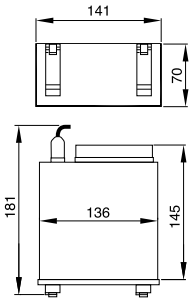
3. DIMENSIONS



BamoPHAR ... E, E/A, E LOG BUS



BamoPHAR ... M, M/A, M LOG BUS



BamoPHAR ... D/A

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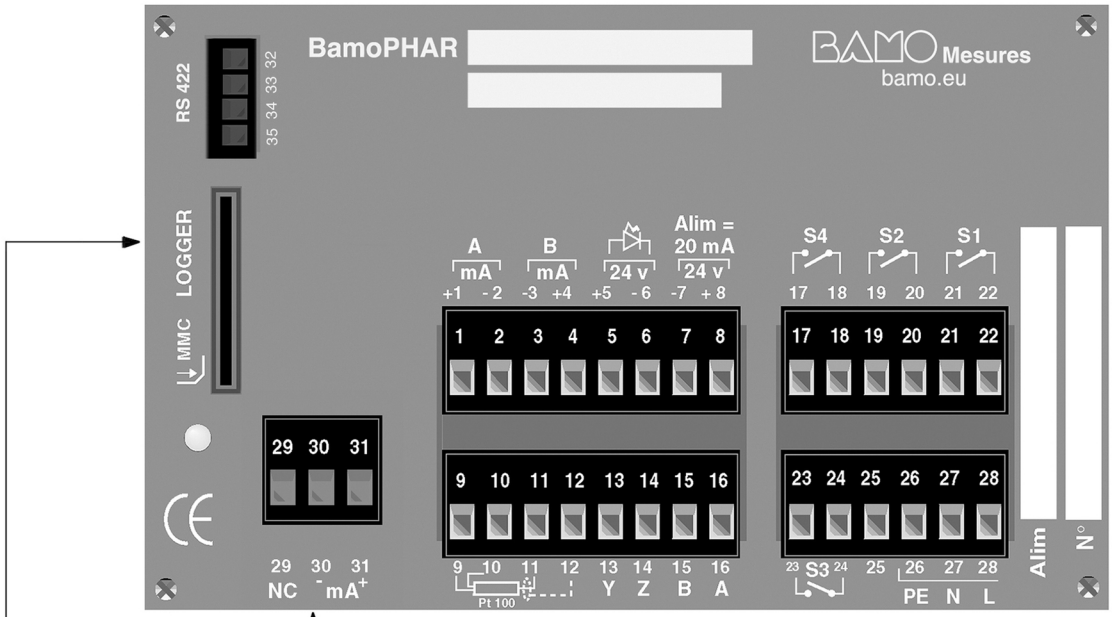
4. ELECTRICAL CONNECTIONS

PANEL MOUNT VERSION

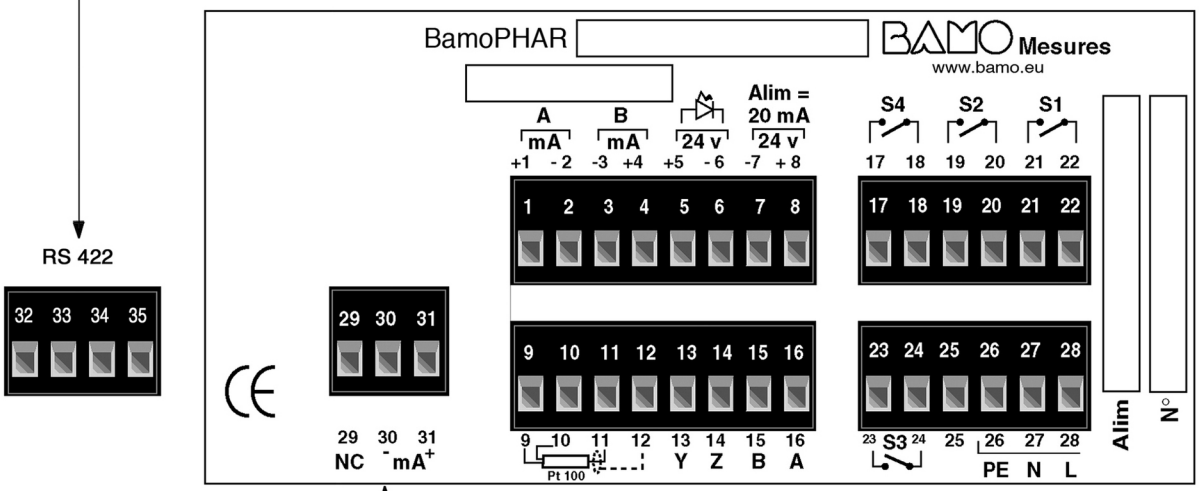


Measurement signal input 4-20 mA

OPTION : LOGGER & RS 422

(wall mount version: accessible after removing the top cover)

WALL MOUNT VERSION



Measurement signal input 4-20 mA

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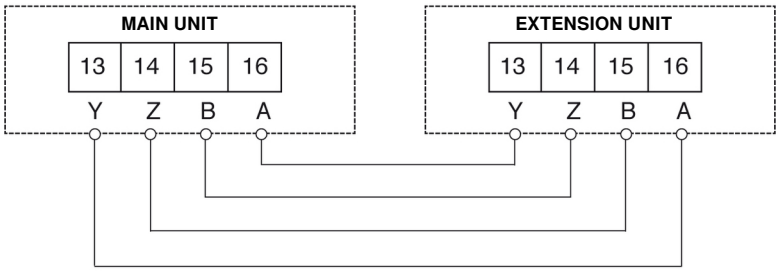
4.1 TERMINAL STRIP ASSIGNMENTS

Description		Terminal number	Connections
(A) Measurement signal output, mA		**1**	+ mA
		2	- mA
(B) Measurement signal output, mA		**3**	- mA
		4	+ mA
Blocking regulation	External sensor:	**5**	+ 24 V
	Inductive sensor (194 831)	**6**	- 24 V
Power supply to sensor: 20 mA		**7**	- 24 V
		8	+ 24 V
Temperature probe: Pt 100 Ω; 2-wire or 3-wire		**9**	+
		10	+
		11	-
		12	Shielding
Connection to an extension unit (blind version)		**13**	Y
		14	Z
		15	B
		16	A
Relay S4: Fault on Pt 100 loop and over-riding measurement		**17**	S4
		18	
Relay S2: N.O. contact; for measurement signal		**19**	S2
		20	
Relay 1: N.O. contact for measurement		**21**	S1
		22	
Relay 3: N.O. contact for measurement		**23**	S3
		24	
Not used		**25**	
Main power supply		**26**	PE = Earth (equipotential)
		27	N = Neutral
		28	L = Live
Sensor (2wire or 3 wire)		**29**	NC
		30	- mA
		31	+ mA

CONNECTIONS TO EXTENSION UNIT



Distance max. **500 m**
Required cable Network cable or shielded 4-wire cable (≥ 0.25 mm²)

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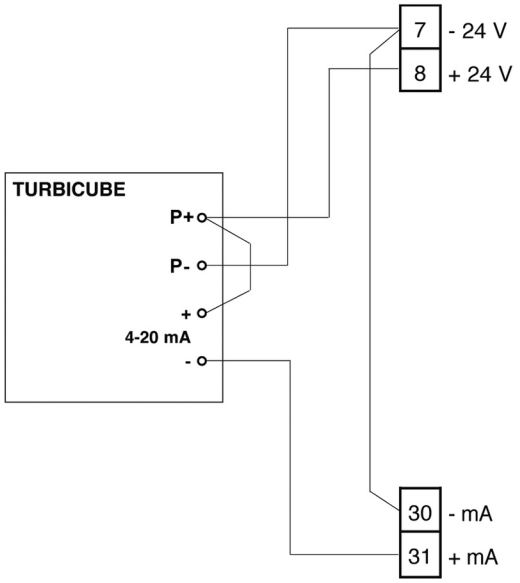
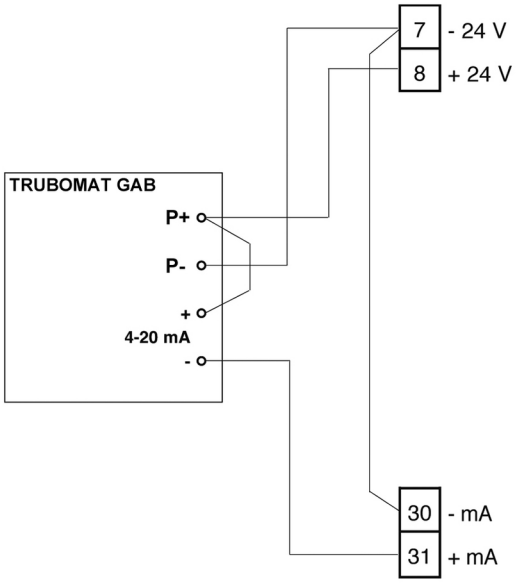
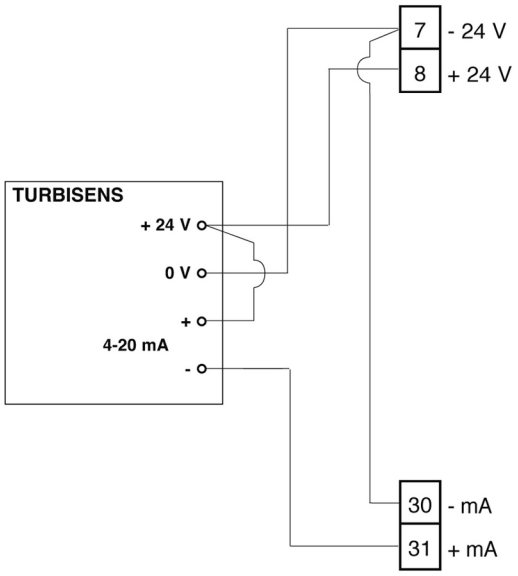
4.2 CONNECTION OF TURBIDITY TRANSMITTERS

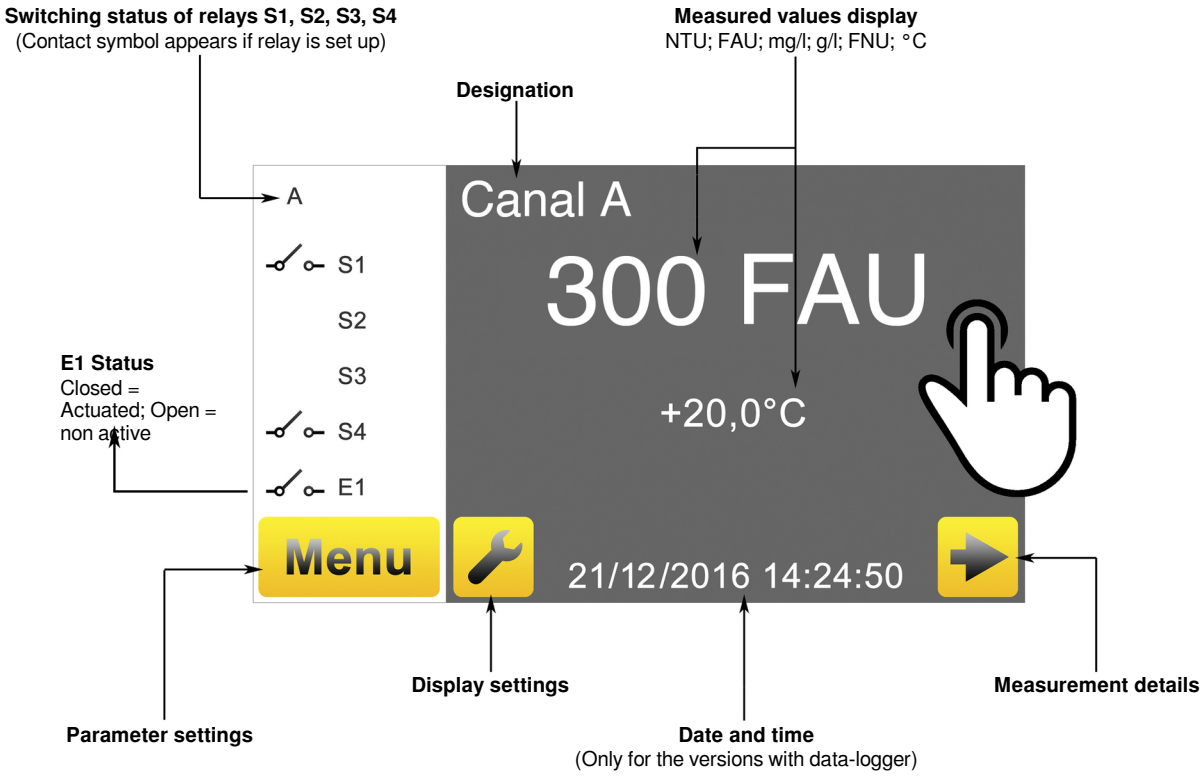




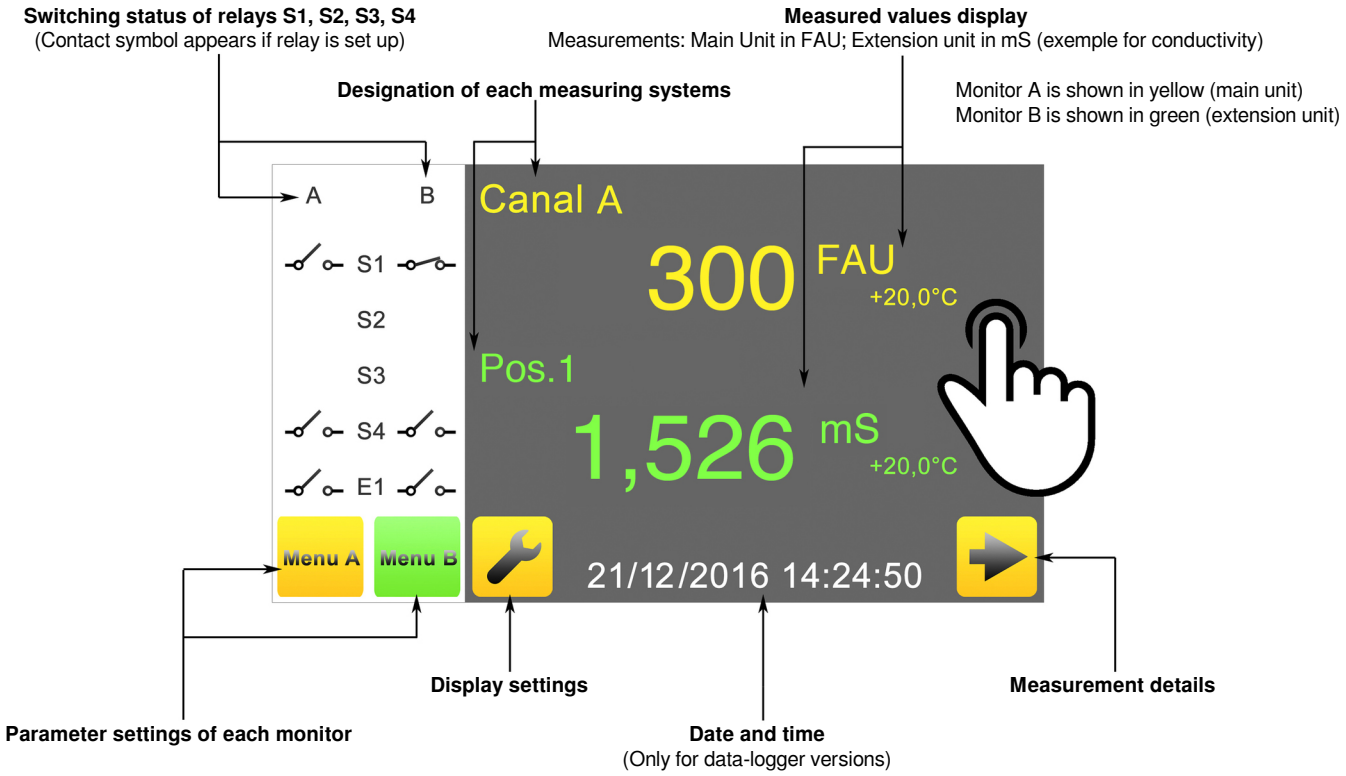


5. DISPLAY MENU

5.1 WITHOUT EXTENSION UNIT



5.2 WITH EXTENSION UNIT



6. ICONS FUNCTIONS

Use the touch screen to navigate through the menus and set the display according to your application.
For each yellow button dedicated to the main unit, there is a green variant dedicated to the extension unit.

MAIN MENU
Return to main menu
Example with green icon for the extension unit

SETTINGS
Access to the display settings (language and monitor designation)

LANGUAGES
Language selection

MENU
Access to monitoring parameters

INFO
Access to serial number and version of BAMOPHAR

PADLOCK
Open = MODIFICATION MODE
Closed = CONSULTATION MODE (Query mode)

RETURN KEY
Return to previous screen

ARROWS
Display cursor for navigating within the menus

SELECTION
Scroll through the selection list

CONFIRM
Access to the next line of menu

SAVE
Save settings

7. DISPLAY SETTINGS

To access to the display settings, BAMOPHAR must be in MODIFICATION mode (See § CONSULTATION / MODIFICATION).

7.1 SCREEN INFORMATION

Screen identification number and its version are available in this menu.

7.2 SCREENSAVER

Screensaver brightness is adjusted by moving the cursor: decreasing by the left, increasing by the right.

7.3 LANGUAGE SELECTION

Select the flag according to your choice.
The display automatically returns to previous view.
Press icon "HOME" to go back to MENU

7.4 DESIGNATION

It is recommended to name each channel (main unit A and Extension unit B):

1) Press on icon A or B according to the instrument you wish to rename.
2) A keyboard appears, enter the new name.
3) Save to record the new designation.

8. CONSULTATION / MODIFICATION

CONSULTATION mode allows the operator to check out all working parameters.
This mode is represented by the closed padlock icon.

To change the settings of the BAMOPHAR, you need to enter in the MODIFICATION mode.
This mode is protected by a password identical to the last 4 digits of the serial number.

On the main display, press MENU icon.
Press the padlock icon and type the 4 last digits of Serial Number.
To confirm, press "OK"; BAMOPHAR is now in MODIFICATION mode
If the entered keyword is wrong, an error message appears (****), pending correct keyword.

After 30 minutes the mode MODIFICATION switches back to CONSULTATION mode.

Where can we find the serial number?
The serial number (SN) is written on the identification label of the BAMOPHAR
It appears as well in "MENU", icon " i " (INFORMATION).

9. SETTINGS

9.1 SETTING THE MEASUREMENT

Go to the menu MEASURE DATA

NTU	This sequence is used to select a type of unit in relation to the working range of the sensor connected to the device. Select the unit NTU, FAU,mg/l, g/l, FNU, then save) then confirm in order to proceed to the next parameter.
x-xxxx	Setting this parameter informs the instrument on the scale in use on the turbidity transmitter. Example: For a working scale of 0.1 to 100 FNU, the comma (decimal point) should be set such that display is x - xxx,x For a working scale of 100 to 1000 FAU the comma (decimal point) should be deleted such as follows: x - xxxx Set this parameter, then confirm.
SCALE	This parameter specifies the values min. & max. of the working scale. Confirm to follow up to next sequence.
MINI : 0000	Type the value min. of working scale (keyboard appears), then confirm.
MAXI : 0000	Type the value max. of working scale, then confirm.
SENSOR	This parameter is used to enter the current values 0/4 ... 20 mA signal from the turbidity transmitter. Confirm to follow up to next sequence.
MINI : 00,00 mA	Type the value 0 or 4 (keyboard appears), then confirm.
MAXI : 00,00 mA	Type the value 20 (for 20 mA max.), then confirm.
SAVE ?	To record the settings, press the icon SAVE.

9.2 THRESHOLDS SETTING FOR S1, S2, S3

As an example, below is a detailed description of the steps to set the threshold S1:
Go to the menu ADJUST ALARM 1.

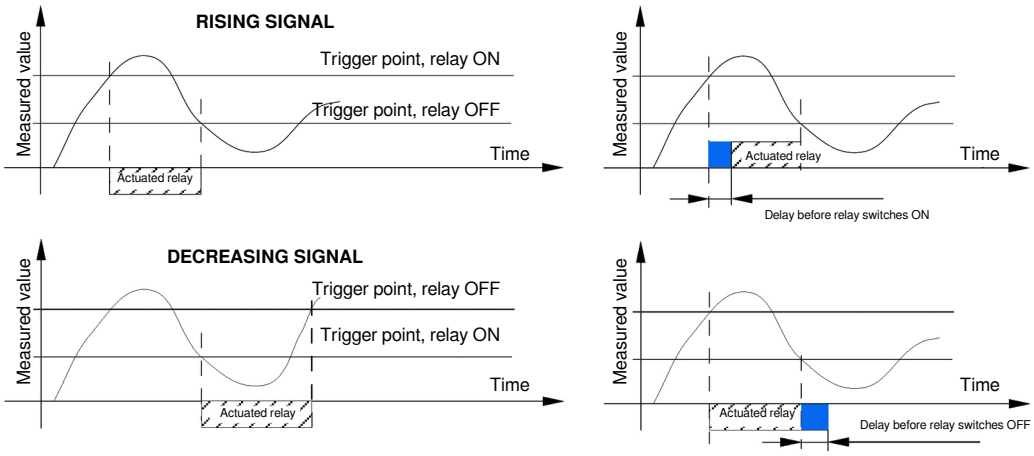
ALARM 1 ON / OFF	For programming the relay S1, select the ON mode, then confirm To unable the use of relay S1, select OFF mode, then confirm and save (Icon SAVE)
ALARM 1 MEASURE / TEMP	In the ON mode, threshold 1 can be set for signal MEASUREMENT or TEMPERATURE: MEASUREMENT = Threshold dedicated to the monitoring of turbidity signal TEMPERATURE = Threshold dedicated to the monitoring of temperature signal Select your mode, then confirm.
ALARM 1 HIGH / LOW	By selecting HIGH, triggering takes place as soon as the measured value is greater than the selected limit valuefor S1. By selecting LOW, triggering takes place as soon as the measured value is less than the selected limit value for S1. Select the right triggering mode, then confirm
ON 000.0	Enter the value at which relay S1 will be actuated, then confirm.
OFF 000,0	Enter the value at which relay S1 will be deactivated, then confirm.
DELAY UP ON / OFF	With (ON) or without (OFF) pick-up delay for relay S1, then confirm.
TIME 0000 Sec	Enter a delay duration for relay S1, then confirm.
DELAY DOWN ON / OFF	With or without dropout delay for relay S1
TIME 0000 Sec	Enter a delay duration for relay S1, then confirm
SAVE ?	To record the settings, press the icon SAVE

The parameters for S2 and S3 are available in the respective “ALARM 2” and “ALARM 3” menus.

9.3 ASSIGNING S3 TO AN EXTERNAL SIGNAL

Go to the menu ADJUST ALARM 3

ALARM 3 ON / OFF	For programming the relay S3, select the ON mode, then confirm
EXTERN. NO / YES	NO = next parameters to set up are identical as for as previous relays S1 and S2 YES = assignment of external sensor signal to actuate relay S3 Relay S3 becomes N.C. (normally closed contact) and it opens when the external sensor is activated. Then confirm
SAVE ?	To record the settings, press the icon SAVE



9.4 SETTING THE TEMPERATURE

Go to the menu TEMPERATURE

MEASURE : AUTO / MANUAL	AUTO : Temperature is displayed if a Pt 100 sensor is connected, confirm, then save. MANUAL : Without Pt 100 sensor connected, enter the temperature manually. Confirm
FLUID T. +000.0 °C	In the MANUAL mode, enter the temperature of the liquid, then confirm.
SAVE ?	To record the settings, press the icon SAVE

9.5 mA OUTPUT SETTINGS FOR THE MEASUREMENT

Go to the menu OUTPUT mA TURB

HIGHER 2000	Enter the measured value for which the output is 20 mA, then confirm.
LOWER 0000	Enter the measured value for which the output is 0 or 4 mA, then confirm
OUTPUT 4/20 mA or 0/20 mA	Select the output signal type, then confirm
SAVE ?	To record the settings, press the icon SAVE

9.6 mA OUTPUT SETTINGS FOR THE TEMPERATURE

Go to the menu OUTPUT mA TEMP.

HIGHER +160.0 °C	Enter the temperature value for which the output is 20 mA, then confirm.
LOWER +000.0 °C	Enter the temperature value for which the output is 0 or 4 mA, then confirm.
OUTPUT 4/20 mA or 0/20 mA	Select the output signal type, then confirm
SAVE ?	To record the settings, press the icon SAVE

9.7 SIMULATION OF RELAYS

With the menu FORCED RELAY, it is possible to manually test (force) relays S1, S2, S3 and S4.
Last one, S4, is N.O. by default. The test begins by relay S1.
The respective relay can be switched from OFF (open) to ON (closed).
Confirm to go to the next relay, then to go back to previous menu.

9.8 SIMULATION OF MEASUREMENT

Go to the menu FORCED MEASURE

0.000	Simulation at this measured value. First displayed value is the current measurement. Confirm, then enter the value you wish to test.

Note: The value is immediately considered by the monitor and actuates thresholds, 4-20mA outputs, etc.