Flow calculator
BAMOPHAR 759
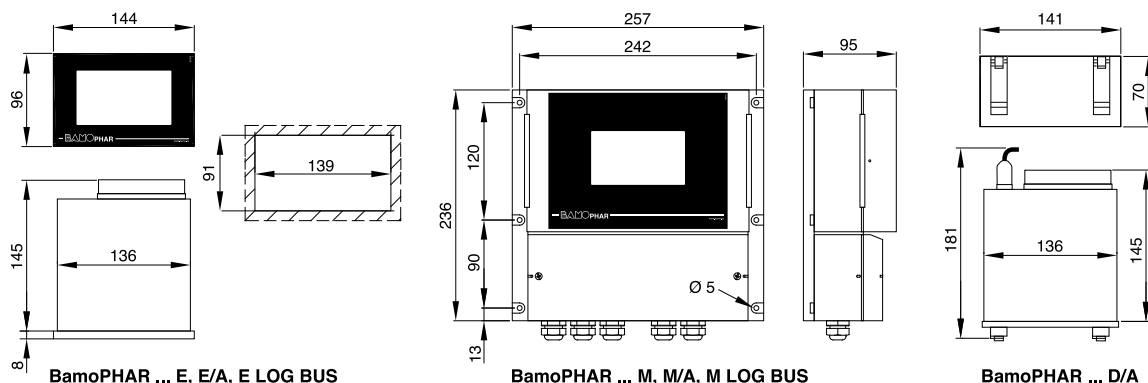
USER MANUAL

SUMMARY

1. DESCRIPTION

The reading is easy on the 4.3" color touch screen for flow-rate or height of liquid, as well as for totalization.
Through a user friendly menu, settings are easy for thresholds, alarms, sampler monitoring and all parameters.
BAMOPHAR 759 converts the input signal directly into flow rate, through a calculator and using formulas and calibration tables of our Venturi channels (ISO 4359) and our standard V or U channel weirs.

2. TECHNICAL FEATURES

End-user interface	Color touch screen 4.3'', resolution 480x272 pixels
	Display of measurements, flow rate, temperature, height of liquid, daily volume and totalization, status of relays
	Programming - Settings protection by keyword
Measuring scales	Water column (mm); Resolution of 1 mm
	Flow rate (m^3/h); Resolution of 0.1 m^3/h
	Totalization (m^3); Resolution of 1 m^3
Counters - Totalization	Daily volume; Capacity 8 digits - Reset to 0 by menu
	Totalization; Capacity 8 digits - No reset available
Signal inputs	4-20 mA proportionnal to water column
	Temperature Pt 100 Ω (-20 ... +160 °C)
Calculation formulas	Standard types in memory: Venturi channels, V-shaped and U-shaped weirs
Thresholds S1and S3	2 contacts, potential free, N.O.; Dedicated to flow rate measurement
	or to temperature, or to function of relay S3
	Adjustable hysteresis from 0 to 100 %; Adjustable delay from 0 to 9999 s
Sampler control S2	Programming in m^3 on volume (counter)
	1 contact, N.O., potential free.
	Adjustable timer from 0 to 9999 s
Pulse output S4	For a remote counter; 1 pulse/m^3
	1 contact, N.O., potential free
Contact initial resistance	100 mΩ max. (voltage drop 6 V DC 1 A)
Poles material	Silver alloy
Switching power	3 A, 277 V AC; 3 A, 30 V DC (nominal)
Switching capacity (min.)	100 mA, 5 V DC (depends of frequency, ambient conditions)
Analogue output (measurement)	0/4 - 20 mA (load max. 600 Ω) proportionnal to flow rate - Adjustable on any scale.
	Temperature (°C)
Analogue output (temperature)	0/4-20 mA (load 600 Ohm max.); any scale between 0 & 100 °C
Main power supply	230 V - 50/60 Hz - Other supplies on request - Consumption 10 VA
Models	Panel mounting, 96x144 mm, Front IP65, rear back 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	Record of cycle average measurement, programmable cycle time, 150 000 records max. on memory card

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

3. DIMENSIONS

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

4. ELECTRICAL CONNECTIONS

PANEL MOUNT MODEL

Signal input 4-20 mA
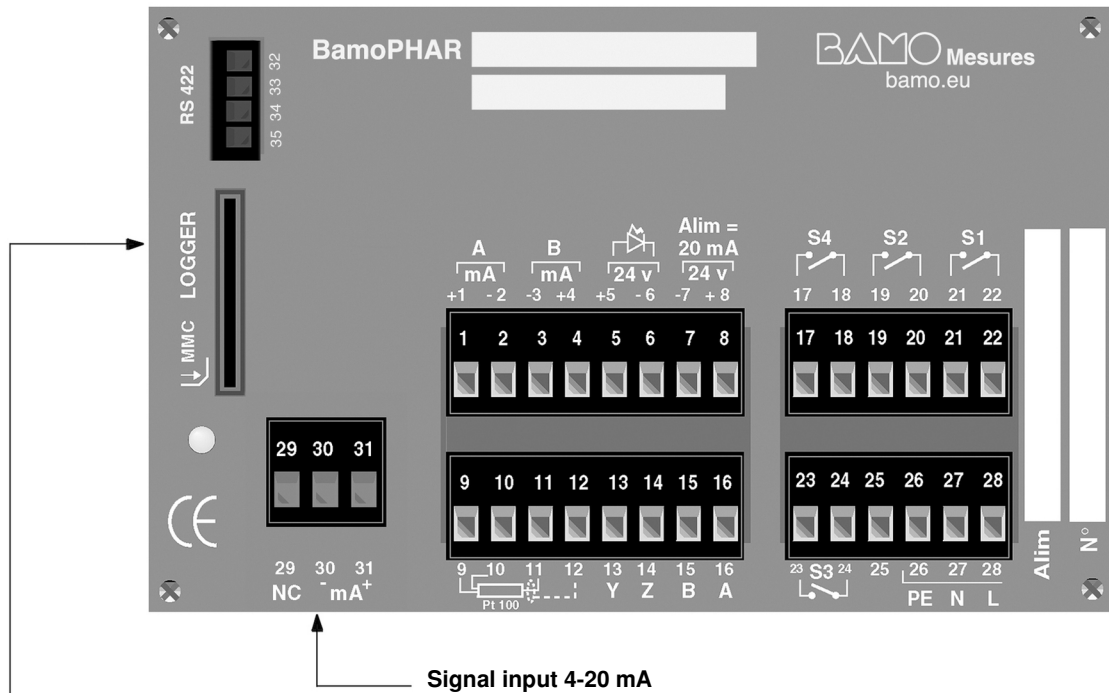
OPTION : LOGGER & RS 422

(On wall mount model, access to slot by removing the cover)

WALL MOUNT MODEL
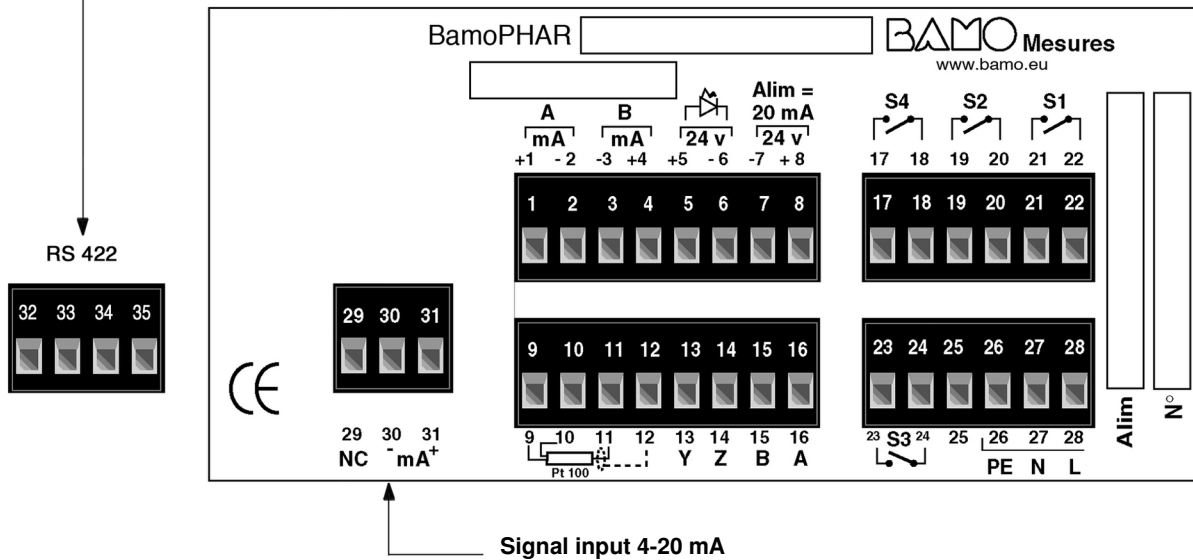
Signal input 4-20 mA

Flow calculator
BAMOPHAR 759

DEB

759-03/4

21-12-2018   M-759.03-EN-AB

4.1   TERMINAL STRIP ASSIGNMENTS

Description		Terminal	Connection
Output signal, mA, flow rate (A)		1	+ mA
		2	- mA
Output signal, mA, temperature (B)		3	- mA
		4	+ mA
To block the regulation	External sensor: - Inductive sensor (194 831) - Potential free switch	5	+ 24 V
		6	0V
Power 20 mA to sensor (2-wire)		7	0V
		8	+ 24 V
Temperature signal input: Pt 100 Ω sensor at 0 °C, (3-wire)		9	+
		10	+
		11	-
		12	Shielding
Connection with extension unit (blind version)		13	Y
		14	Z
		15	B
		16	A
Relay S4 / Pulse output 1 pulse/m³		17	S4
		18	
Threshold 2 (N.O. contact) / Sampler control		19	S2
		20	
Threshold S1 (N.O. contact) / Measurement of flow rate or temperature		21	S1
		22	
Threshold S3 (N.O. contact) / Flow rate or temperature measurement		23	S3
Available for assignment to external sensor: becomes a N.C. contact		24	
		25	
Main power supply		26	PE = Earth (equipotential)
		27	N = Neutral
		28	L = Live
Level transmitter (2 or 4 wire)		29	NC
		30	- mA
		31	+ mA

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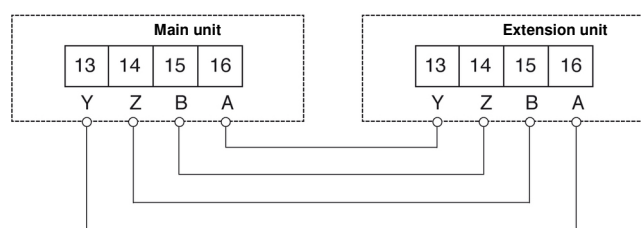
Distance max.	**500 m**
Required cable	Network cable or shielded 4-wire cable (≥ 0.25 mm²)

Flow calculator
BAMOPHAR 759

21-12-2018   M-759.03-EN-AB

DEB

759-03/5

Connection of a 2-wire transmitter
(Power to sensor 2-wire, through the 4-20 mA loop)

Connection of a 4-wire transmitter
(External power supply)

mA

NC   -   +

| 29 | 30 | 31 |

T2F

| 8 | 7 |

+   -

Alim 24 V = 20 mA

mA

NC   -   +

| 29 | 30 | 31 |

T4F

4-20 mA

External power supply

+1 -2 -3 +4 +5 -6 -7 +8

Brown

Black   Blue   Brown

Brown → +
Black → Output
Blue → -

–   +

Inductive sensor(194 831), NPN, N.C.

Connection of a N.C. flow controller; NPN (code 194831)

Flow calculator
BAMOPHAR 759

21-12-2018   M-759.03-EN-AB

DEB

759-03 /6

5.1 WITHOUT EXTENSION UNIT

Switching status of relays S1, S2, S3, S4
(Contact symbol appears if relay is set up)

Designation

Measured values display
m³/h and température
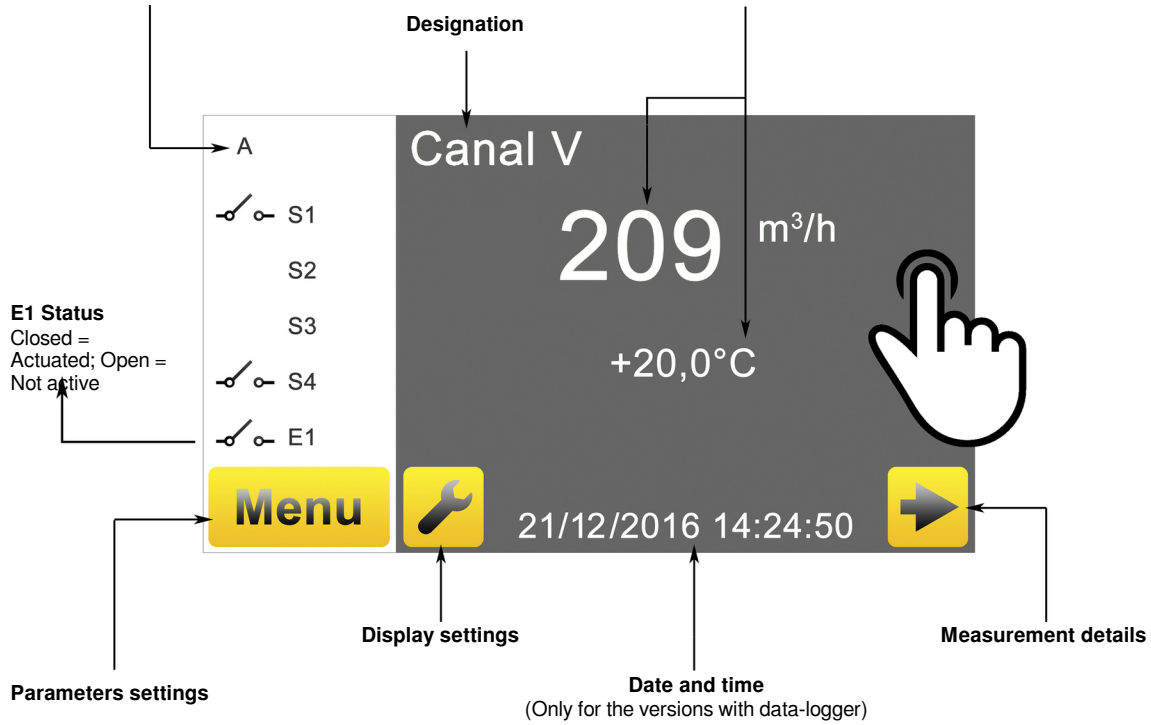
E1 Status
Closed =
Actuated; Open =
Not active

Canal V

209 m³/h

+20,0°C

Menu

21/12/2016 14:24:50

Display settings

Parameters settings

Date and time
(Only for the versions with data-logger)

Measurement details

5.2 WITH EXTENSION UNIT

Switching status of relays S1, S2, S3, S4
(Contact symbol appears if relay is set up)

Designation of each measuring systems

Measured values display
Main unit: flow and temperature; Extension: example with pH and temperature
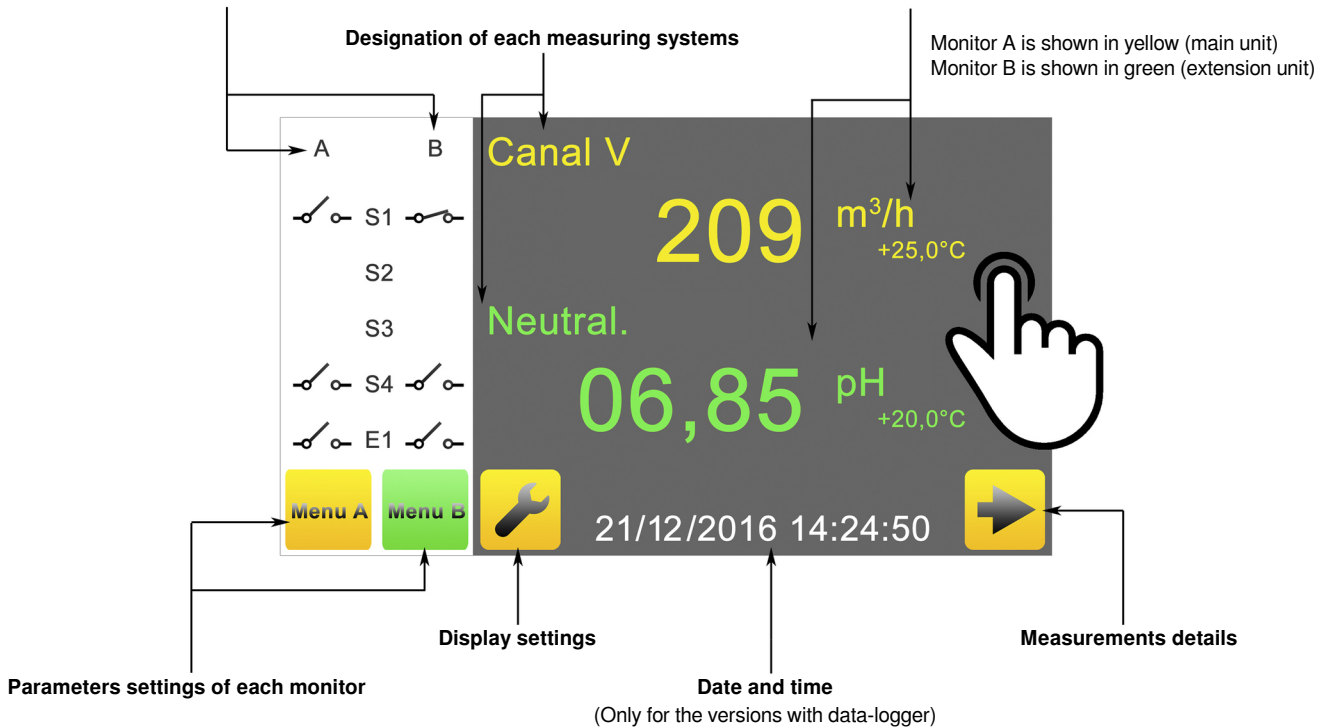
Monitor A is shown in yellow (main unit)
Monitor B is shown in green (extension unit)

Canal V

209 m³/h
+25,0°C

Neutral.

06,85 pH
+20,0°C

Menu A   Menu B

21/12/2016 14:24:50

Display settings

Parameters settings of each monitor

Date and time
(Only for the versions with data-logger)

Measurements details

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
Fax   +33 (0)1 34 10 16 05   E-mail   export@bamo.fr
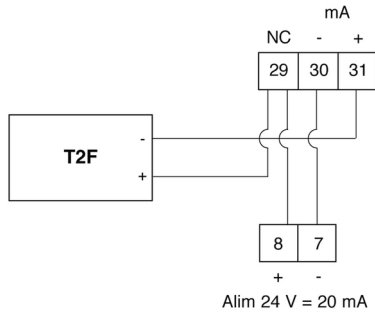
Flow calculator
BAMOPHAR 759
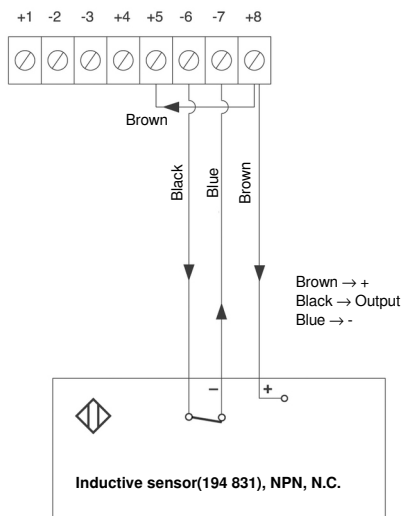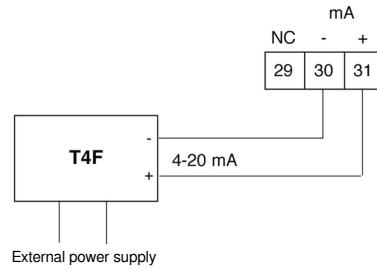21-12-2018   M-759.03-EN-AB

DEB

759-03/7

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 your 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

Note: 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 of your choice.
The display automatically returns to previous view.
Press icon "HOME" to go back to MENU.

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
Fax +33 (0)1 34 10 16 05 E-mail export@bamo.fr

Flow calculator
BAMOPHAR 759
21-12-2018   M-759.03-EN-AB

DEB

759-03 /8

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 (padlock open)
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 OF MEASUREMENT PARAMETERS

		Calculation tables in memory:	
V ISO 28°4	Memorized flow rate tables (Venturi channels, Weirs, ...) *(A specific flow rate table -on request- will be indicated as SPECIFIQUE N ° - - - -)* Select one table, then confirm.	LIN. 2.000 m3 /h	4/20 mA
		LIN. 20.00 m3 /h	4/20 mA
		LIN. 200.0 m3 /h	4/20 mA
		LIN. 2000 m3 /h	4/20 mA
		LIN. 2.000 m3 /s	4/20 mA
		LIN. 20.00 m3 /s	4/20 mA
LEVEL SENSOR	Confirm to access to next step	DF7	96 mm
LOWER : 04.00 mA	Enter the value in mA of current from sensor for lowest level, then confirm.	DF20	122 mm
		DF100	285 mm
		DF250	327 mm
HIGHER : 20.00 mA	Enter the value in mA of current from sensor for highest level, then confirm. *(With a transmitter BAMOBUL, currents min. and max. are respectively 4 and 20 mA)*	DF500	395 mm
		DF1000	545 mm
		DF1500	622 mm
		DF2500	621 mm
		ISMA TYPE I	
		ISMA TYPE II	
		ISMA TYPE III	
		ISMA TYPE IV	
SCALE 0365 mm	This step allows to enter the scale of the level sensor associated with your BAMOPHAR. Enter the value, then confirm	ISMA TYPE V	
		ISMA TYPE VI	
		ISMA TYPE VII	
SAVE ?	To record the settings, press the icon SAVE	V ISO 28°4	299 mm
		V ISO 53°8	299 mm
		V ISO 90°	299 mm
		DEVERSOIR U 10	250 mm
		DEVERSOIR U 20	250 mm
		DEVERSOIR U 30	250 mm
		DEVERSOIR U 40	250 mm
		DEVERSOIR U 50	250 mm
		DEVERSOIR U 60	250 mm
		VENTURI 94 FL001	58 mm
		VENTURI 94 FL002	82 mm
		VENTURI 94 FL005	111 mm
		VENTURI 94 FL010	146 mm
		VENTURI 94 FL025	205 mm
		VENTURI 94 FL050	268 mm
		VENTURI 94 FL100	365 mm
		VENTURI 94 FL250	536 mm
		VENTURI 94 FL500	717 mm
		V 20° BAMO	150 mm
		V 30° BAMO	150 mm
		V 45° BAMO	150 mm
		V 60° BAMO	150 mm
		V 90° BAMO	150 mm
		AV07 BAMO	100 mm
		AV25 BAMO	142 mm

NFX 10-311

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
Fax +33 (0)1 34 10 16 05 E-mail export@bamo.fr

Flow calculator
BAMOPHAR 759

21-12-2018 M-759.03-EN-AB

DEB

759-03 /9

9.2   THRESHOLD S1 AS ON/OFF MODE

ALARM 1 ON / OFF	To set in function the relay, select the ON mode, then confirm. To disable the relay, select OFF mode, then confirm and save (Icon SAVE)
ALARM 1 MEASUREMENT / TEMP.	MEASUREMENT: Threshold dedicated to the flow rate measurement TEMP.: Threshold dedicated to the temperature measurement Select your mode, then confirm.
ALARM HIGH / LOW	HIGH: Triggering takes place as soon as measurement is greater than the threshold LOW: Triggering takes place as soon as the measurement is lower than the threshold Select the right triggering mode, then confirm
ON 1000 m³	Enter the value at which relay S1 will be actuated, then confirm.
OFF 0950 m³	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; 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; then confirm.
SAVE ?	To record the settings, press the icon SAVE

9.3   THRESHOLD S3 SET AS ON/OFF MODE AND ASSIGNMENT TO EXTERNAL SENSOR

Go to the menu ALARM 3

Setting sequences of S3 are identical to settings of S1 (see previous chapter)
THRESHOLD S3 has a second function: assignment to an external sensor (see further on)

ALARM 3 ON / OFF	Select the "ON" mode in order to activate the relay; Then confirm.
EXTERN NO / YES	NO: Setting will follow same sequences as per relays S1 in mode ON/OFF YES = assignment of signal from external sensor to relay S3 The relay S3 becomes a N.C. contact; It will open when the function Regulation is in standby.
SAVE ?	To record the settings, press the icon SAVE

9.4   SETTING THE SAMPLER CONTROL (Relay S2)

Go to the menu SAMPLER CONTROL

SAMP. CONT. ON / OFF	To set the sampler control select ON ; then confirm.
ON 005.0 m³	Enter the value at which relay S2 will be actuated (sampling begins); then confirm.
PULSE SIGNAL	Confirm
TIME 0001 Sec	Enter the value at which relay S2 keeps actuated (pulse duration), then confirm and SAVE.

9.5   SETTING THE TEMPERATURE

Go to the menu TEMPERATURE

MEASURE : AUTO / MANUAL	AUTO : Temperature is displayed if a Pt 100 sensor is connected MANUAL : Without Pt 100 sensor connected, enter the temperature manually. Confirm
FLUID T. +025.0 °C	In the MANUAL mode, enter the temperature of the liquid, then confirm.
SAVE ?	To record the settings, press the icon SAVE

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
Fax   +33 (0)1 34 10 16 05   E-mail   export@bamo.fr

Flow calculator	DEB
BAMOPHAR 759	
21-12-2018 M-759.03-EN-AB	**759-03** /10

9.6 mA OUTPUT SETTINGS FOR THE MEASUREMENT

Go to the menu OUTPUT mA FLOW

HIGHER 0360 m3	Enter the measured value for which the output is 20 mA, then confirm.
LOWER 0000 m3	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

9.7 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

9.8 SIMULATION ON 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.

9.9 RESET THE DAILY VOLUME TO ZERO

Go to the menu RAZ Volume Jour = Rest daily volume to zero.

RESET D.V. YES / NO	Sélect YES to reset the counter to 0 on daily volume, then confirm, and SAVE.