Air bubbling level transmitter
BAMOBUL

BAMOBUL (code 758121)

USER MANUAL

BAMO INTERNATIONAL
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SUMMARY

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1. PRECAUTIONS

- The operation of the device must be in accordance with and strictly limited to the applications as mentioned below.
- Installation, commissioning and maintenance must be performed by qualified personnel.
- The power supply must comply with the values specified in the technical features.
- The BAMOBUL must be fixed on a support free from vibrations and in an environment temperature between 0 and 50 °C, protected from direct sun light.
- Check the quality of the pneumatic connections before commissioning the BAMOBUL, improper tightenings may cause measurement errors.

- **BAMO Mesures cannot be held responsible for any damage caused by improper use or modification of the instrument.**

2. APPLICATION

- Level measurement in Venturi open channel and weir.

3. DESCRIPTION

The BAMOBUL is designed for measuring low levels up to 500 mm. This device is used for its reliability and its insensitivity to disturbances in liquids such as suspended particles or foaming above the surface.

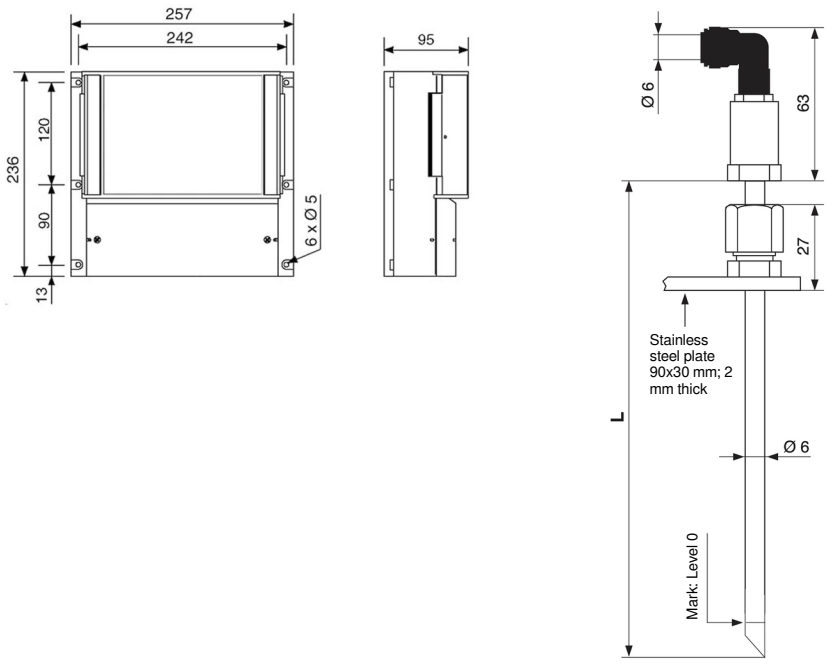
Measurements in open channel requires a high accuracy, since the relationship between level and flow is an exponential function. The device combines an air generator with an extremely accurate pressure sensor. On the air circuit, the sensor measures the pressure necessary for the effective escape of air bubbles. The pressure is then equal to the hydrostatic pressure of the water column at the point of air evacuation. In order to minimize the measurement error due to a variation in the air flow between the high and low levels, the injection pump includes a micro-valve. The settings for "0" and full scale are accessible to the end-user. Level transmission is then possible in the form of a 4-20 mA signal.

The BAMOBUL level transmitter consists of an IP55 cabinet, wall mounting, a pressure sensor, a specific electronic and an air generator. Pneumatic connectors are instant fittings for rilsan tube Ø 6x4 between the cabinet and the air probe. Electrical connections are on screw terminal block. The air probe immersion depth is adjustable on site. Its fixing is secured with a stainless steel plate to fit the channel.

4. INSTALLATION

4.1 Installation of BAMOBUL cabinet

The BAMOBUL is to be fixed on a wall with 4 screws.



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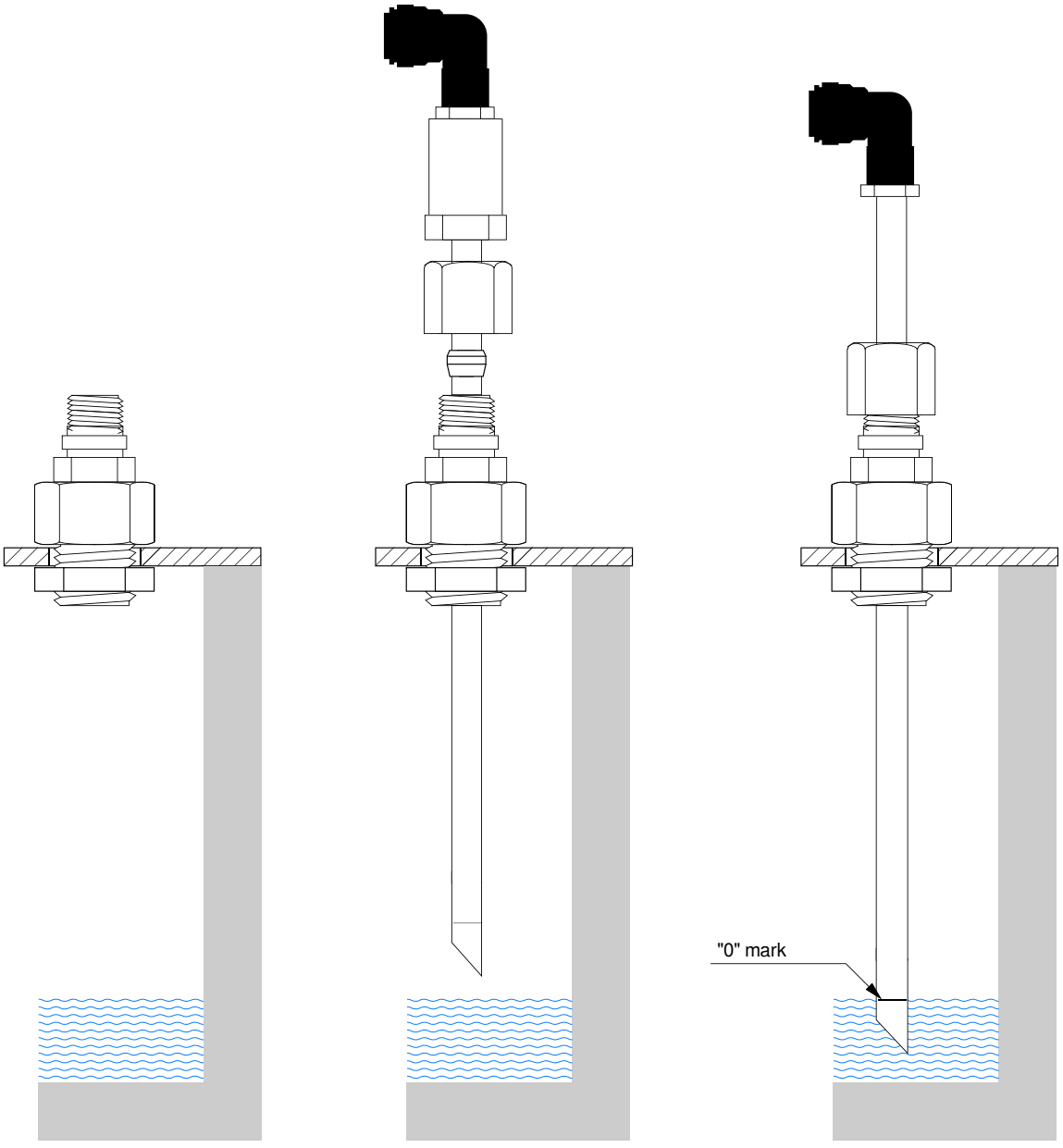
The device should not be exposed to vibrations or to excessive temperatures. Once it is installed, the tubing in Rilsan coming out of the cabinet must not be subjected to tensions, stresses (bends or other).
On the channel, the air probe is placed in the well located on the side of the channel. The support carrying the probe must be rigid to avoid measurement errors due to possible vibrations of the probe with the flow of water. When the probe is fitted, its end must be constantly in the liquid and up to the Mark 0 when there is no flow. Without flow (Q=0) the liquid surface must be flush with the “0” mark engraved on the probe.

The probe is fixed by its fitting BSP-M ½ '' and its counter-nut. The height is adjusted (sliding fitting) to correspond to the mark "0". The air inlet is for a tubing in Rilsan Ø 6x4

4.2 Installation of the air probe

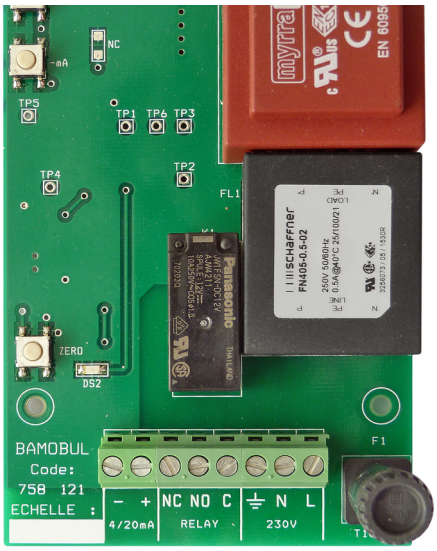
- 1) Fix the adhustable fitting on the plate.
- 2) Pass the nut then the gland on the probe, insert the probe into the adjustable fitting.
- 3) When in exact position (mark "0"): tighten the nut to crimp the ring using 2 wrenches.



- Once the nut is tightened, the gland should be crimped onto the probe; The height adjusted will be the same after probe disassembly for cleaning, without re-adjustment.

5. ELECTRICAL CONNECTIONS

Remove the lower cover of the cabinet to access to the terminal block.



5.1 Power supply

The standard power supply is 230 V - 50/60 Hz with a consumption of 8 VA. The proper power supply for your BAMOBUL is confirmed inside the cabinet.

5.2 Analogue output

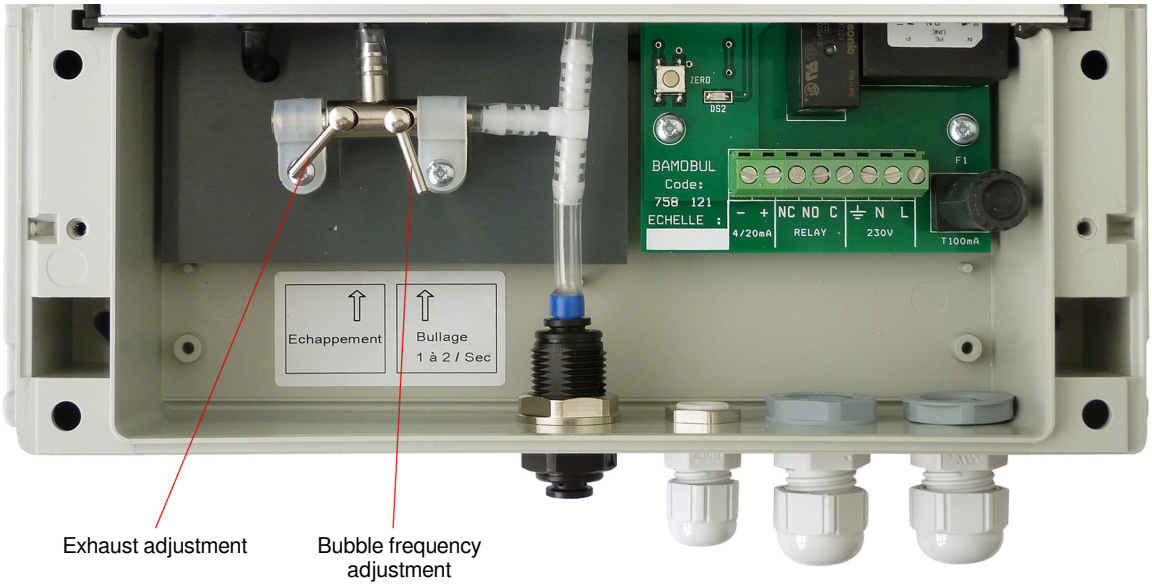
The output signal is 4-20 mA image of the height of liquid. We recommend to use a shielded cable, 2-wire, 2 x 0.75 mm² ; Connect the shield to earth on one side only.

5.3 Relay output

BAMOBUL has an alarm threshold to alert in case of clogging or rupture of the air supply tubing to the air probe. When the level image (in mA) reaches below 4 mA, the device detects a rupture of the piping. Likewise, above 20 mA, there is a detection of clogged tubing.
This threshold, connected to a horn or a flashing light, is useful for alerting of a fault. Note that this relay output has been set at the factory and cannot be configured by the user.

6. PNEUMATIC CONNECTIONS

Connection between air probe and BAMOBUL is a tubing in Rilsan Ø 6x4 ; Insert the tubing into the fitting of the air probe and on the air outlet of the device. Be careful not to pinch or pierce the tube, which would cause measurement errors. The tubing must be installed in such a way as to avoid bends and low points as much as possible in order to have as little condensation as possible in the pneumatic circuit.
For this, it is advisable to use as little tubing length as possible.
To remove the tubing, push the ring in front of the fitting, using the nails or pliers, to extract the tubing. When cutting a tubing, it must be a perpendicular cut and without burrs to guarantee a tight connection.
At the outlet of this fitting, the tubing must be straight for a few centimeters to guarantee a good seal.



Exhaust adjustment

Bubble frequency adjustment

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7. ADJUSTMENTS

The device is factory set, but it is necessary to make commissioning settings as explained below.

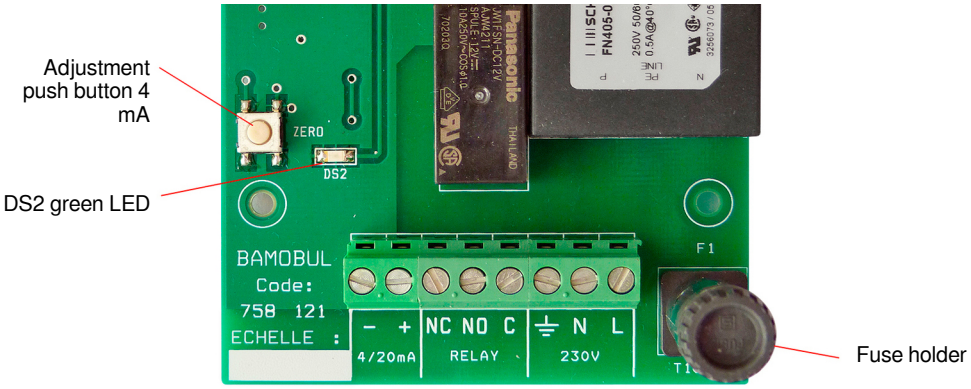
7.1 Air flow adjustment

By removing the protective cover, two valves are visible. One is used for exhaust and the other for flow. Set the exhaust valve to a corresponding clock hand position at 8 o'clock. Adjust the quantity of bubbles by acting on the flow adjustment valve. The flow should correspond to and between one or two bubbles per second at the outlet of the air probe at the maximum height to be measured. The adjustment is done by immersing the air probe at the maximum level of the liquid column. In the event of a very rapid level change, it will be necessary to slightly increase the flow in order to compensate for the speed of immersion of the air probe. Similarly, for a liquid with suspended particles, increase the flow rate if the air probe tends to be clogged too often; Be careful, however, not to create an excess pressure by an excessive flow of air.

7.2 Analog output setting

BAMOBUL is delivered calibrated in factory for a specified range in mm of water column; Refer to its identification label. After installing the air probe, it is necessary to set the “0” for a zero flow; Of course the probe is in liquid with liquid level at mark "0".

To adjust the zero level, use the 4 mA adjustment push button located to the left of the electrical terminal block.



8. TECHNICAL FEATURES

Pressure sensor - Level ranges

Measuring ranges	0... 100 / 0 ... 300 / 0 ... 500 mm WC
Temperature limits	0... +50 °C
Accuracy	≥ 1 %
Response time	<1 s

Air pump

Flow rate	250 l/h without load
Maximum pressure	50 mbar (approx. 500 mm WC)
Pump body	ABS
Air flow adjustment	From 0 to Max. flow - Regulation for constant flow
Power supply	230 V - 50/60 Hz - 8 VA

Specific features

0setting	Push button and LED indication
Faults detection	Clogged or cut tubing
	Output on potential free changeover contact (switching power: 230 V - 5 A)
Sensor supply	Integrated
Analogue output	Activ 4-20 mA - Max. load 600 Ω - Limited to 23 mA
Main power supply	230 V - 50/60 Hz
Cabinet	IP55 - Wall mounting

9. MAINTENANCE

It is recommended to use the fault detection threshold, this allows rapid detection of a pneumatic failure. The air probe should be cleaned from time to time to avoid measurement errors due to deposits inside. Disconnect the air tubing before any cleaning routine.

Spare parts: air probes and tubing in Rilsan Ø 4x6

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