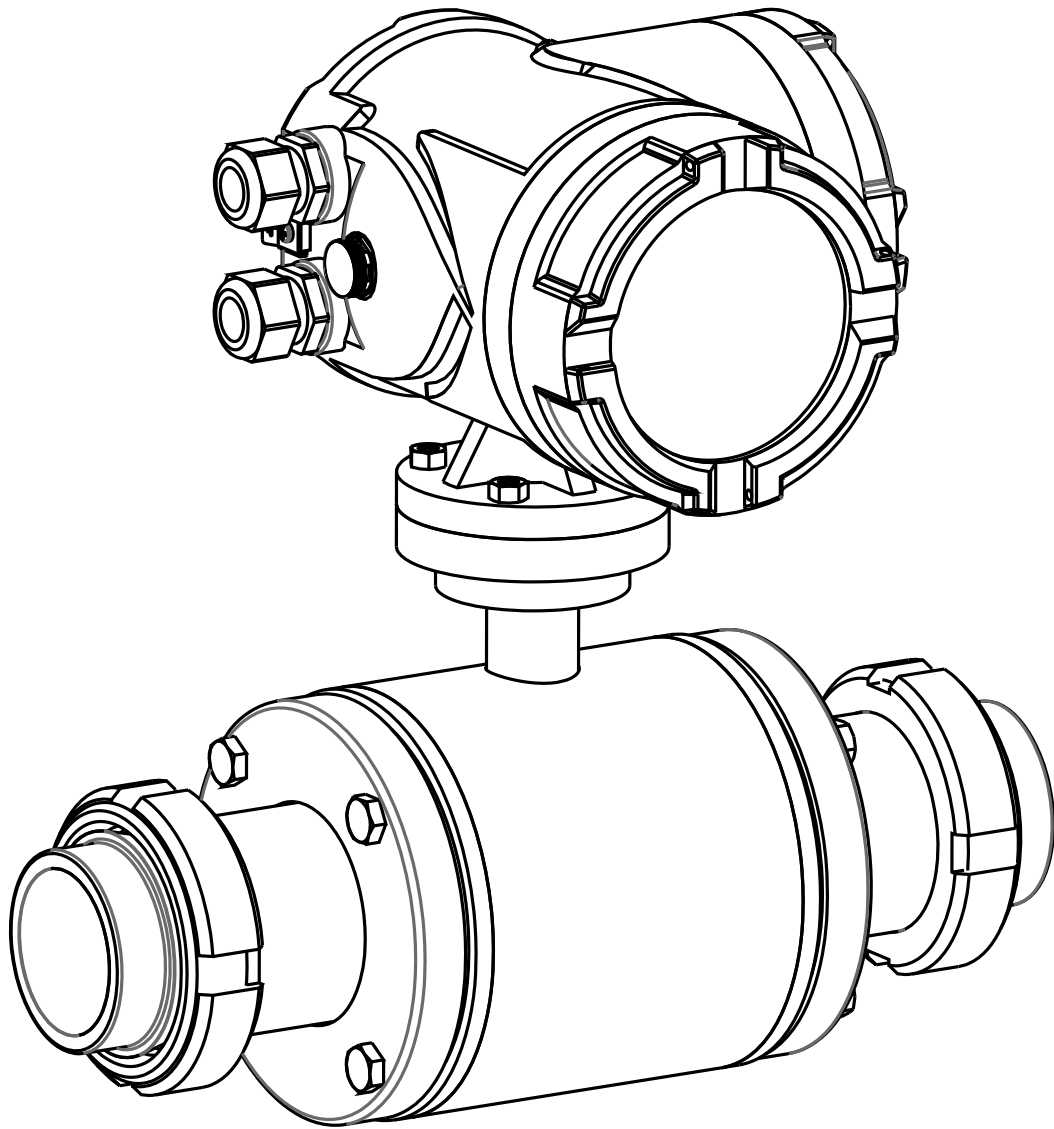


Rsmag

electromagnetic induction flow measurement with data logger



technical documentation EN Rev. A

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1-WARRANTY

Products supplied by SGM LEKTRA are guaranteed for a period of 12 (twelve) months from delivery date according to the conditions specified in our sale conditions document.

SGM LEKTRA can choose to repair or replace the Product.

If the Product is repaired it will maintain the original warranty terms, whereas if the Product is replaced it will have 12 (twelve) months of warranty.

The warranty will be null if the Client modifies, repair or uses the Products for other purposes than the normal conditions foreseen by instructions or Contract.

In no circumstances shall SGM LEKTRA be liable for direct, indirect or consequential or other loss or damage whether caused by negligence on the part of the company or its employees or otherwise howsoever arising out of defective goods

2-CALIBRATION CERTIFICATE

All the electromagnetic flowmeter are tested by 3 point rigs calibration.

The producer releases a document on letterhead certifying the average error of the 3-point calibration.

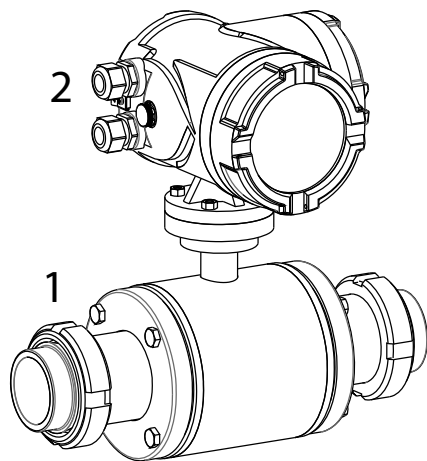
The calibration certificate is supplied with the unit.

The company archives the test data of each electromagnetic flowmeter.

The calibration rig is certificated by N.I.M. (National Institute of Metrology), which is internationally recognized by B.I.P.M. (Bureau International des Poids et Metrologie) and complies with NTC ISO IEC 17025 standard.

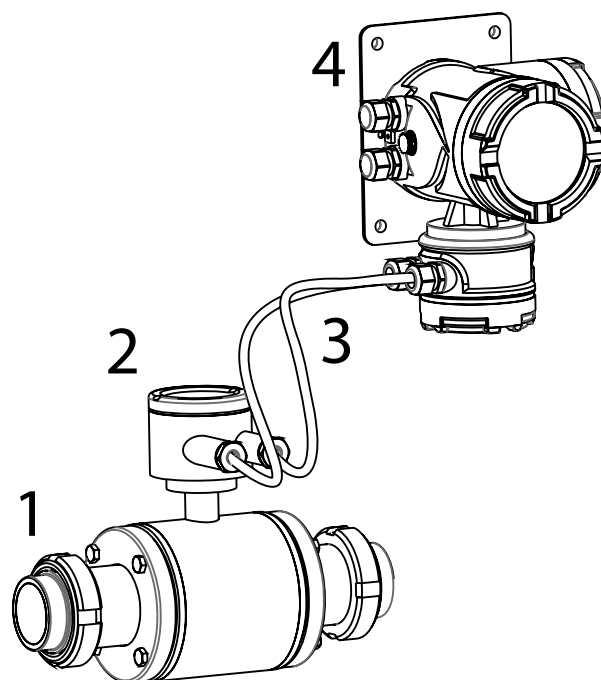
All calibrations are made in accordance to EN 45001 standards and with an accuracy better than 99.97%

3- PRODUCT



COMPACT VERSION

- 1. Sensor
- 2. Converter

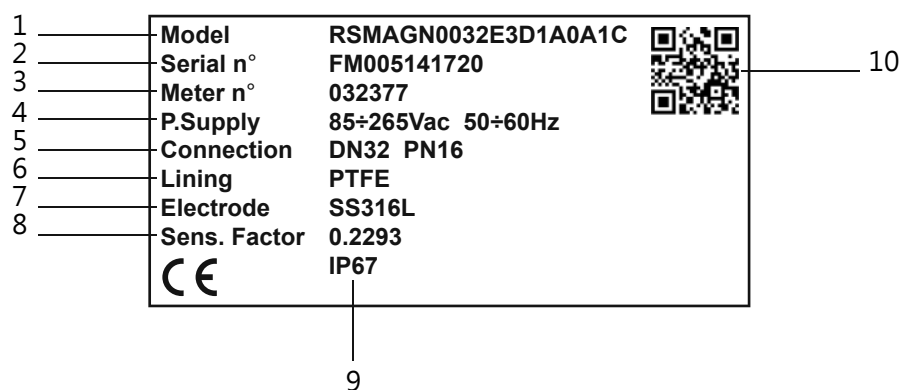


REMOTE VERSION

- 1. Sensor
- 2. Connection housing
- 3. Connection cables
- 4. Converter, wall mouting

3.1 IDENTIFICATION

Each meter has an adhesive identification plate on which are the meter main data. The following picture describes the information and data on the identification plate.



- 1. Product code
- 2. Serial number
- 3. Production batch
- 4. Power supply

- 5. Process connection
- 6. Lining material
- 7. Electrodes material
- 8. Sensor factor

- 9. Protection
- 10. QR code, connecting a product web page

4-FEATURES

Flow rate range

RPmag is able to process signals from fluids with flow rates of up to 10m / s in both directions (bidirectional meter).

Range dimension / lining material

PTFE/PFA DN10 ÷ DN150

Sensor material

SS321

Housing material

epoxy painting aluminium

Electrodes material

SS316L - Hastelloy C - Titanium - Tantalum - Platinum

Measure range

<0,1m³/h ÷ >110000m³/h

Accuracy

±0,5% standard; ±0,2% optional

Repeatability

±0,1%

Fluid conductivity

>5µS/cm.

Power supply

85÷265Vac, 24Vac/dc, 12Vdc.

Consumption

6W, max. 8W.

Ambient Temperature Limits

Remote version operating temperature: RUBBER -10 ÷ +80°C; PTFE -40 ÷ +150°C

Compact version operating temperature: RUBBER -10 ÷ +80°C; PTFE -40 ÷ +100°C

Storage temperature: -40÷85°C

Communication protocol

Modbus RTU or Bluetooth App Android (opt.) or Hart (opt.)

Data Logger

Internal data logger to USB pen drive for flow measurements and analog inputs storing;

the measurement storage interval can be set from 15 to 3600 seconds

Output

4÷20mA: 0÷500Ω

Frequency output: 0,1÷10000 Hz

Pulse output: 24Vdc galvanically isolated or open collector galvanically isolated 24V 20mA (opt)

Alarm output: 2 relays, 3A 230Vac N.O.

Input signals

RPmag has 2 active analog inputs at 24Vdc for 2-wire transmitters connection (eg. Temperature or pressure) and 1 digital input for an external contact connection for the integrated batch function restart and for partial totalizer management.

Reverse Flow

Allows measure and totalization of reverse flow.

Output Testing

Relays output: Transmitter can switch relays at testing value.

Current Source: Transmitter can be commanded to supply a specified test current between 4.0 and 20.0 mA.

Frequency Source: Transmitter can be commanded to supply a specified test frequency between 1 and 10000 Hz.

Low Flow Cutoff

Adjustable. Below selected value, instantaneous flow and outputs are driven to the zero flow rate signal level.

Humidity Limits

0-100% RH to 150 °F (65 °C), not condensing.

Damping

Adjustable between 1 and 99 seconds.

Compact version IP rating

IP67

Remote version IP rating

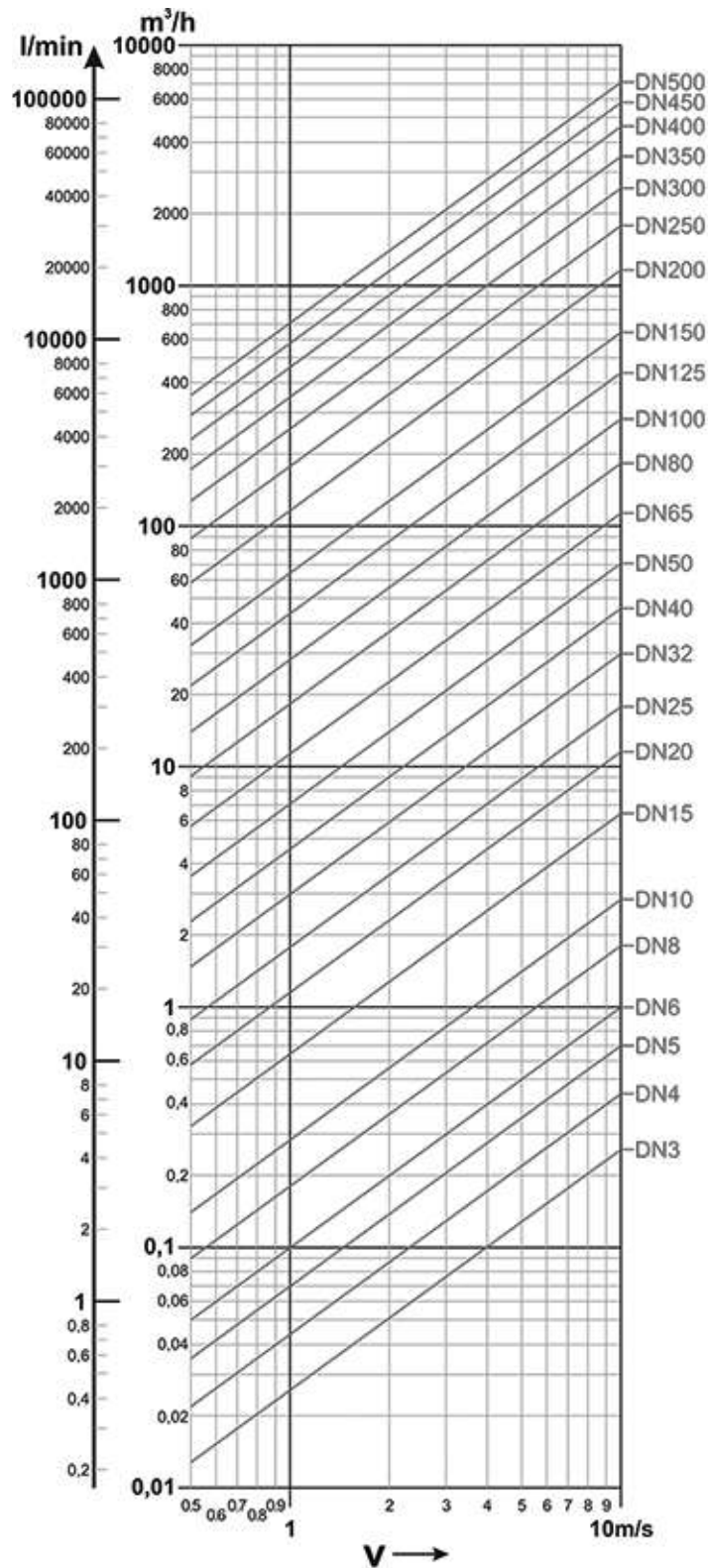
sensor IP67 / IP68 (by request) - converter IP67

Anti-condensation filter

5-FLOW RANGE

5.1 FLOW RANGE GRAPHIC

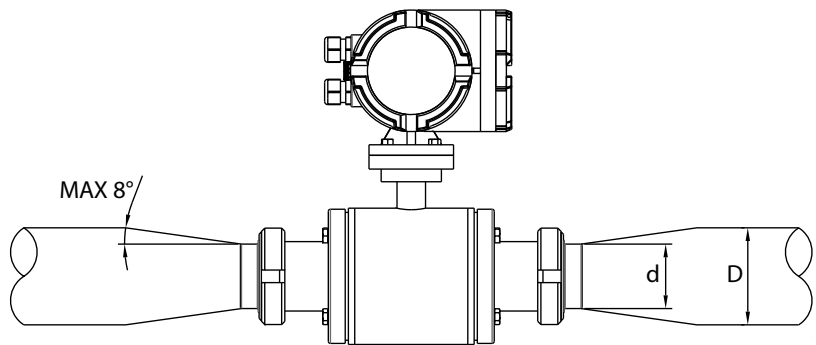
Flow range from DN3 to DN500 (starting from DN10)



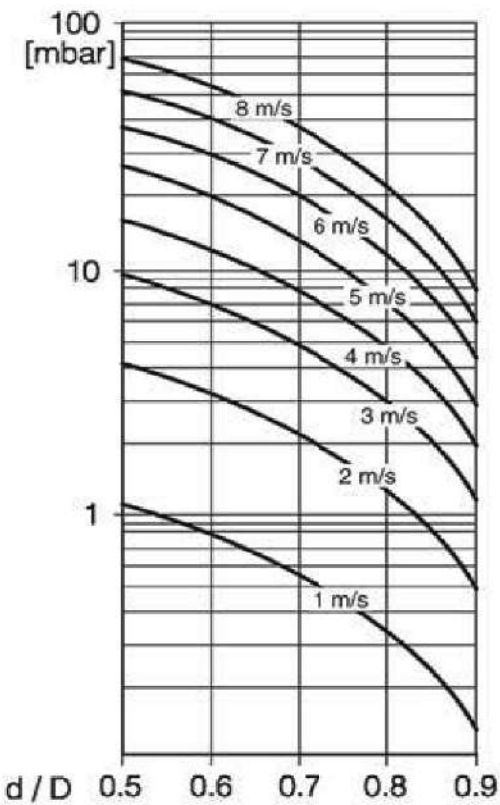
5.2 FLOW RANGE TABLES

DN10 ÷ 300	
DN (mm)	Range: Minimum (0,5 m/s) / Maximum (10 m/s)
10	0.14 ÷ 2.9 m3/h
15	0.3 ÷ 6 m3/h
20	0.5 ÷ 12 m3/h
25	0.6 ÷ 18 m3/h
32	1 ÷ 30 m3/h
40	1.8 ÷ 42 m3/h
50	3 ÷ 66 m3/h
65	5.8 ÷ 120 m3/h
80	8.9 ÷ 180 m3/h
100	11 ÷ 282 m3/h
125	20 ÷ 450 m3/h
150	30 ÷ 600 m3/h

5.3 LOAD LOSS

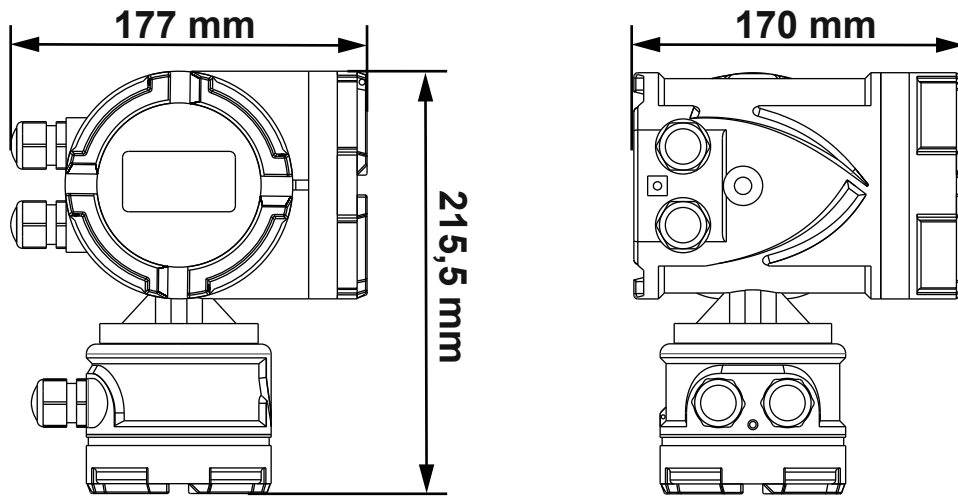


Adaptation cones

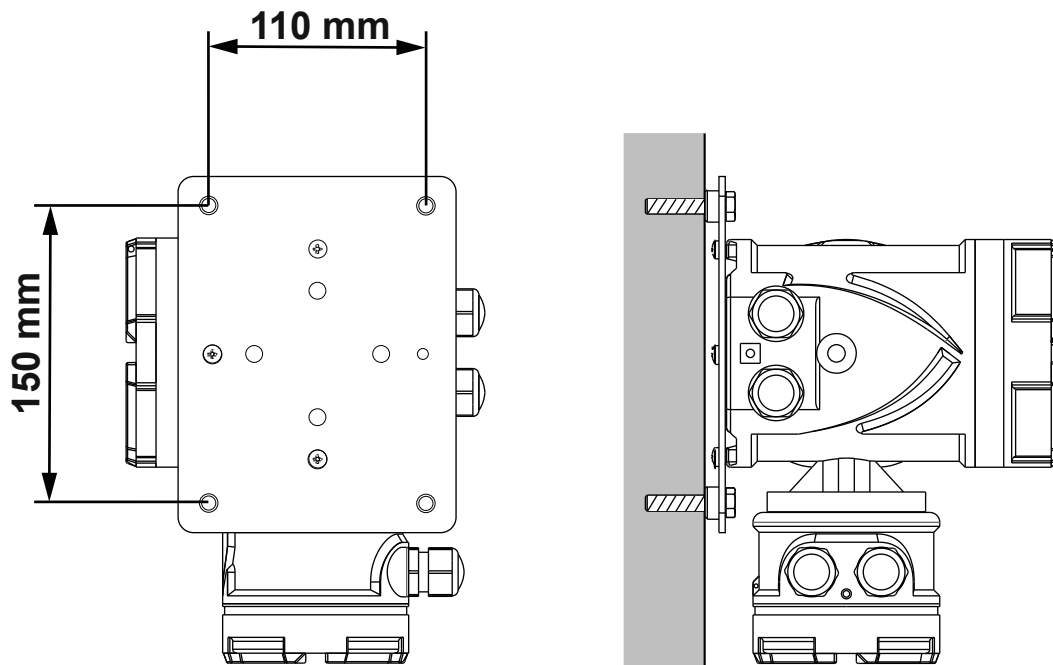


6-DIMENSIONS

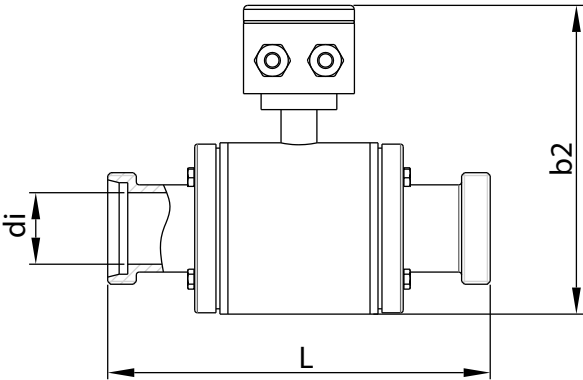
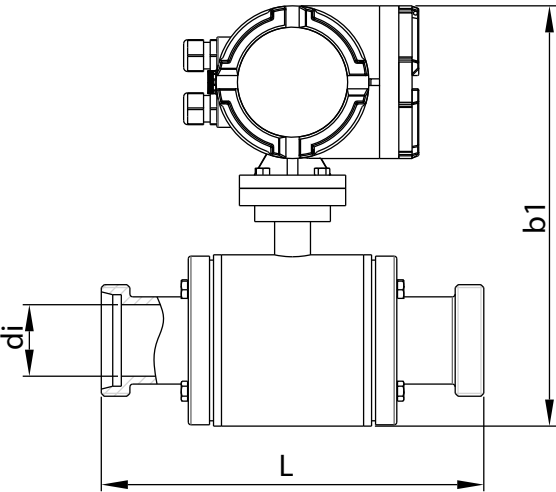
6.1 REMOTE VERSION CONVERTER



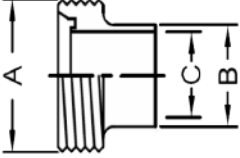
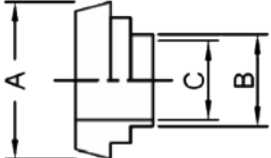
6.2 WALL MOUNTING REMOTE VERSION CONVERTER

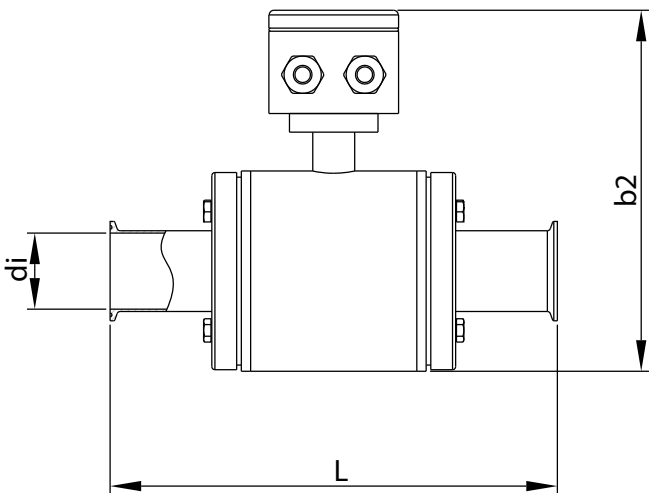
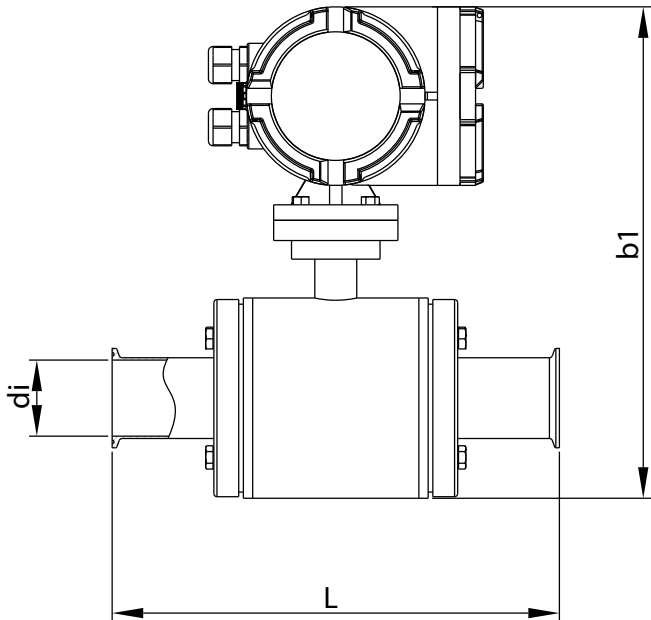


6.3 COMPACT VERSION DN10 ÷ DN80 PN16 - PN40



DN (mm)	di (mm)	L (mm)	b1 (mm)	b2 (mm)
10	10	168	250	165
15	16	168	258	173
20	20	168	258	173
25	26	191	260	175
32	32	192	270	185
40	38	284	315	230
50	50	288	315	230
65	66	296	330	245
80	81	366	350	265
100	100	384	370	285

Tabella DIN 11851									
	SIZE	A mm	B mm	C mm		SIZE	A mm	B mm	C mm
	10	28	13	10		10	22	13	10
	15	34	19	16		15	28	19	16
	20	44	23	20		20	36	23	20
	25	52	29	26		25	44	29	26
	32	58	35	32		32	50	35	32
	40	65	41	38		40	56	41	38
	50	78	53	50		50	68	53	50
	65	95	70	66		65	86	70	66
	80	110	85	81		80	100	85	81
	100	130	104	100		100	121	104	100



DN (mm)	di (mm)	L (mm)	b1 (mm)	b2 (mm)
10	9	168	250	165
15	15	168	258	173
20	19	168	258	173
25	25	191	260	175
32	31	192	270	185
40	37	284	315	230
50	49	288	315	230
65	66	296	330	245
80	81	366	350	265
100	100	384	370	285

Tabella CLAMP DIN32676					
	SIZE	L mm	F mm	S mm	ø interno
	10	34.0	12	1.5	9
	15	34.0	18	1.5	15
	20	34.0	22	1.5	19
	25	50.4	28	1.5	25
	32	50.4	34	1.5	31
	40	50.4	40	1.5	37
	50	64.0	52	1.5	49
	65	90.9	70	2.0	66
	80	106.0	85	2.0	81
	100	118.8	104	2.0	100

7-INSTALLATION

7.1 SAFETY MEASURE

Instructions and procedures in this section may require special precautions to ensure the safety of the personnel performing the operations. Information that raises potential safety issues is indicated by a warning symbol. Please refer to the following safety messages before performing an operation preceded by this symbol. ⚠

7.2 WARNINGS

7.2.1 Explosions could result in death or serious injury

- Verify that the operating atmosphere of the sensor pipe and transmitter is consistent with the appropriate hazardous locations certifications.
- Do not remove the transmitter cover in explosive atmospheres when the circuit is alive.

7.2.2 Failure to follow safe installation and servicing guidelines could result in death or serious injury

- Make sure only qualified personnel perform the installation.
- Do not perform any service other than those contained in this manual unless qualified.

7.2.3 High voltage that may be present on leads could cause electrical shock

- Avoid contact with leads and terminals.

7.3 PRE-INSTALLATION

There are several pre-installation steps that make the installation process easier. They include identifying the options and configurations that apply to your application, setting the hardware switches if necessary, and consideration of mechanical, electrical, and environmental requirements. Please remember that the sensor pipe liner is vulnerable to handling damage. Never place anything through the sensor pipe for the purpose of lifting or gaining leverage. Damaged liner can render the sensor pipe useless.

7.3.1 Identify Options and Configurations

Standard application of the RSmag includes control of the sensor pipe coils and one or more of the following configurations or options:

- 4÷20mA output
- Pulse output
- Alarm output
- Data logger

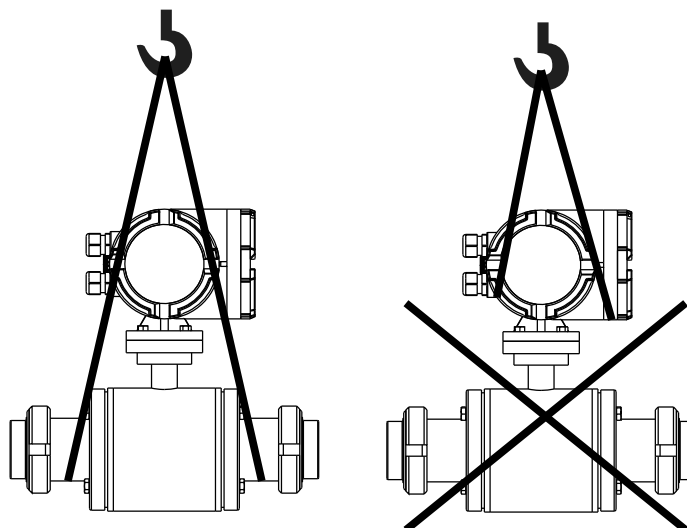
Be sure to identify the options and configurations that apply to your situation, and keep a list of them nearby during the installation and configuration procedures.

7.3.2 Mechanical Considerations

The mounting site for the RSmag Integral Mount Transmitter should provide enough room for secure mounting, easy access to the conduit ports, full opening of the transmitter covers, and easy readability of the local operator interface (LOI) screen. The LOI can be rotated in 90° increments.

7.3.3 Lift

The flowmeter can be lifted using the lift as shown in following pictures. The safe load and measure for the lift should reach to the relative requirement. Don't lift the flowmeter using the rope to tie the connection between the sensor and the transmitter (compact version) or the connecting box (remote version)



7.4 INSTALLATION GENERAL CRITERIA

The flowmeter can test automatically flow direction. Because the direction arrow marked on the nameplate is flow direction when calibrated in factory, you should install the flowmeter to make the actual flow direction same as the flow direction arrow marked on the nameplate. If this is not possible, simply reverse the direct flow direction through the "Indication" (see par. 10.4.3.4.1)

The upstream straight pipe should be longer than $5 \times DN$ and the downstream straight pipe should be more than $3 \times DN$ in order to guarantee the accuracy of measurement.

7.5 INSTALLATION IN PIPELINE

Installation may be horizontal or vertical, but make sure no deposit on the electrodes when horizontal installation. See **Fig.13-A**.

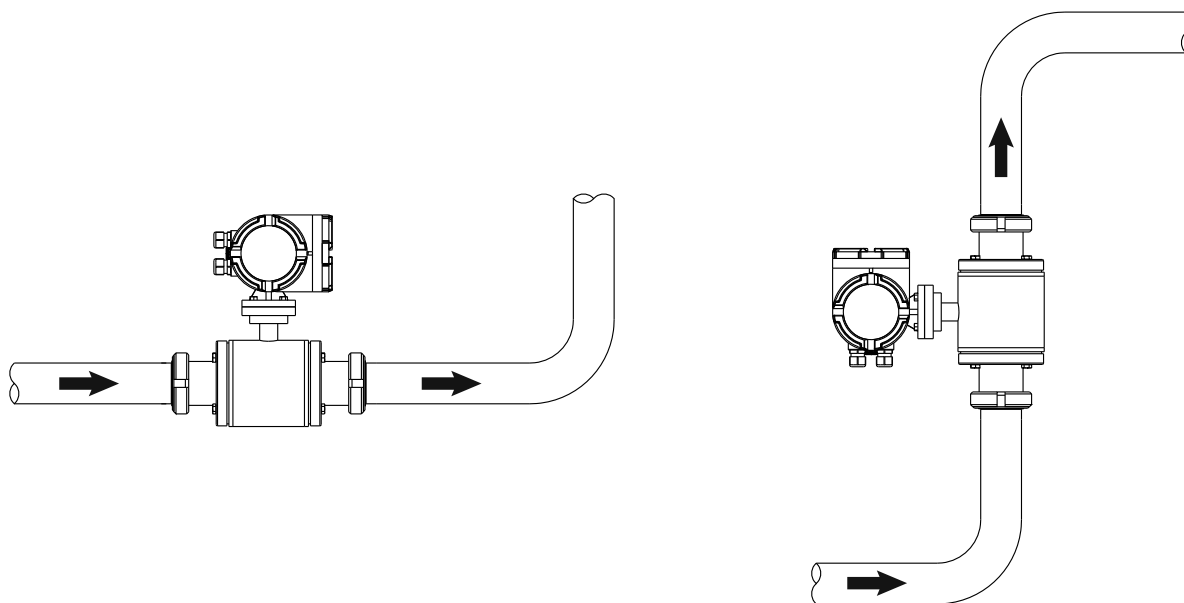


Fig.13-A. Installation in horizontal or vertical pipeline

To install an rectifier or straight pipe is necessary to normalize the flow profile if there are pipe elbow, flow regulation valve or half-open ball valve in front of the sensor. See **fig.13-B**.

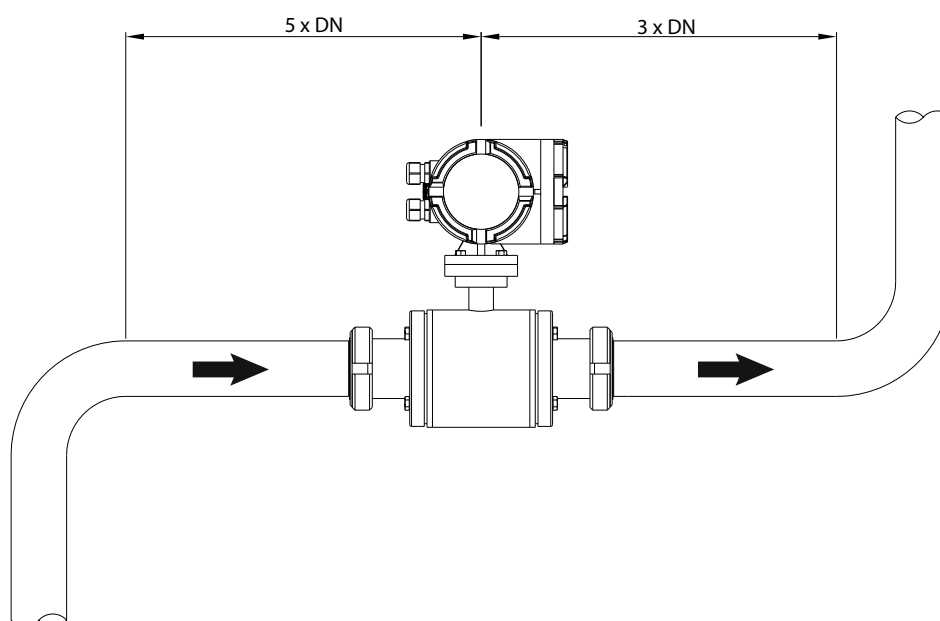


Fig.13-B. Requirement to install the flowmeter straight pipes

The electromagnetic flowmeter must be installed so that the pipe is always completely filled with fluid. In partially filled pipe case, the flowmeter must be installed with the siphon phenomenon, for which the pipe stretch where the meter is installed is kept always full. See **Fig.14-A**.

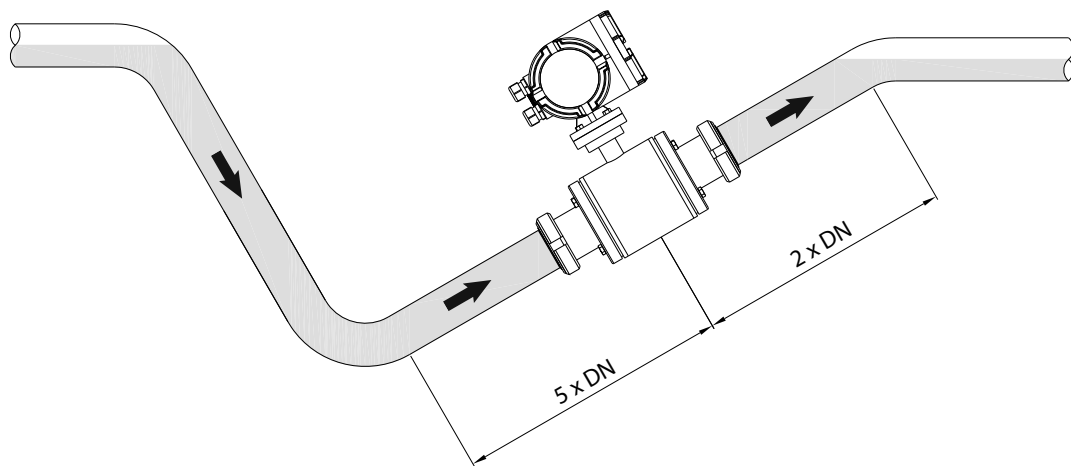


Fig.14-A Installation in partially filled pipes

The electromagnetic flowmeter must not be installed in the pipe section with a free pipe outlet that could run empty. When installing in a downstream pipe, please make sure the pipe is always fully filled with medium. See **Fig.14-B**.

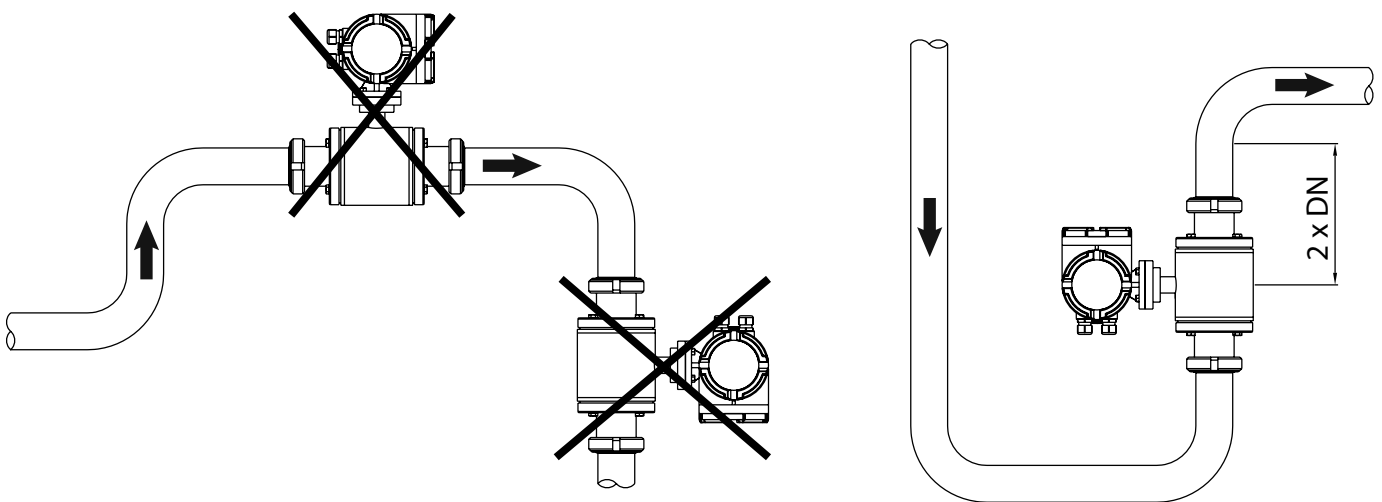


Fig.14-B Installation in pipe without emptying

The electromagnetic flowmeter can not be installed at the pipe highest point, because air or gas accumulations may occur in the measuring pipe. See **Fig.15-A**

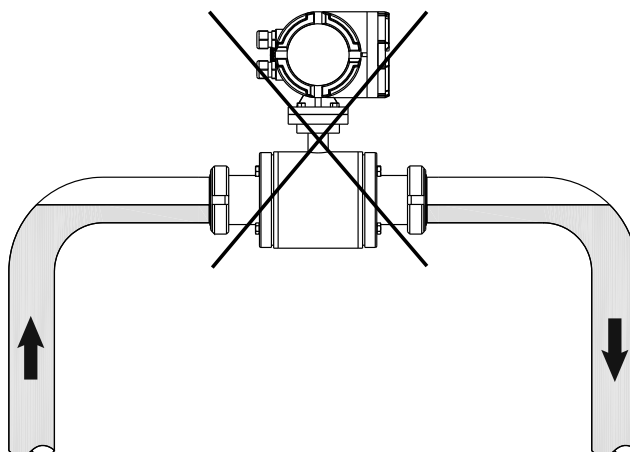


Fig.15-A Installation at highest point

The electromagnetic flowmeter can not be installed upstream of a pump to prevent cavitation, which can damage the sensor lining. See **Fig.15-B**

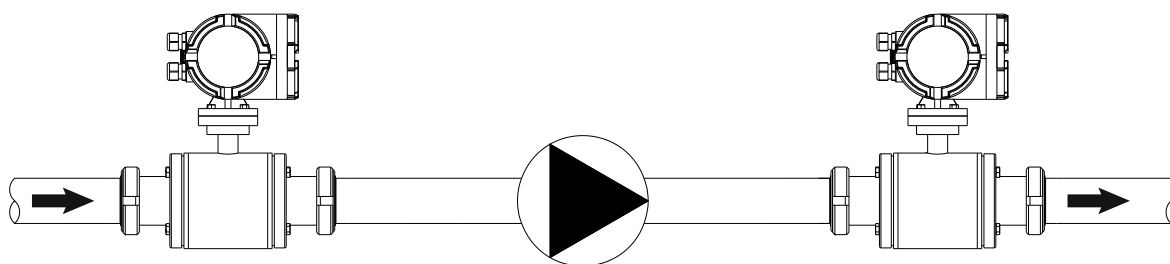


Fig.15-B Pump proximity installation

Install a siphon (a) with a vent valve (b) downstream of the sensor in down pipes longer than 5 meters. This precaution is to avoid low pressure and the consequent risk of damage to the lining of the measuring tube. See **Fig.15-C**

WARNING: all the phenomena that generate a strong depression inside the pipe can irretrievably damage the insulating coating of the sensor tube itself.

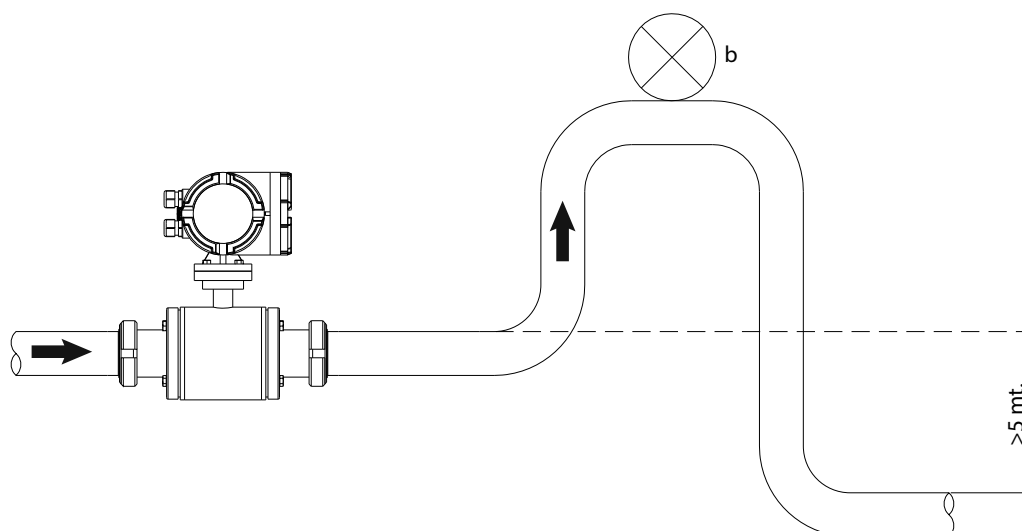
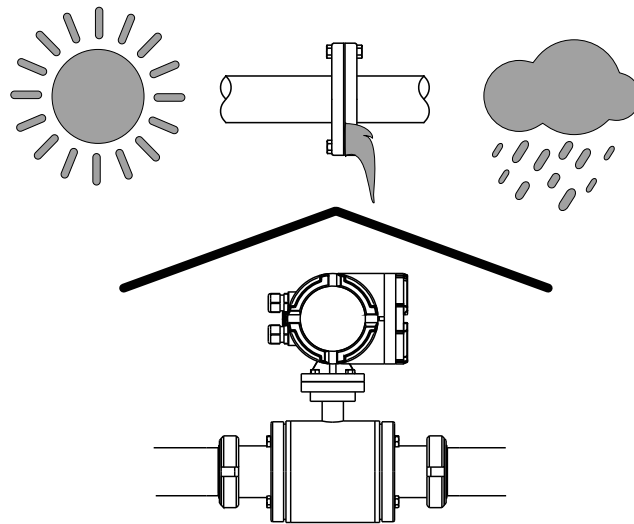


Fig.15-C Installation in proximity of a > 5m down pipe section

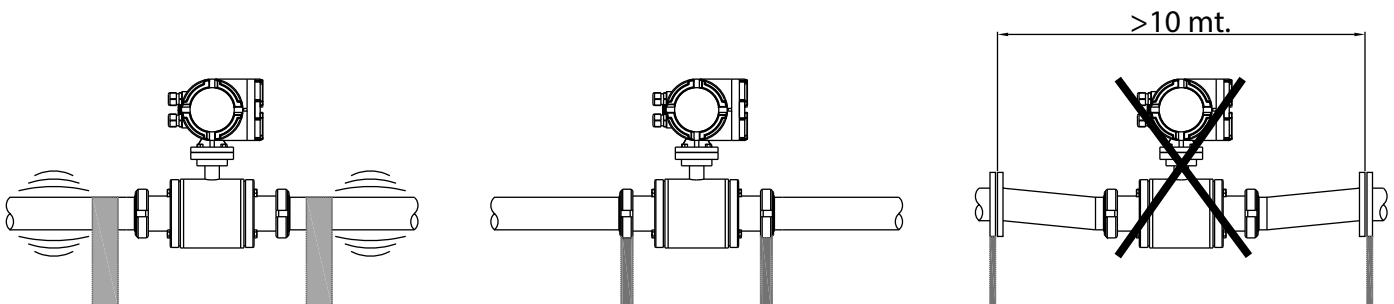
7.6 INSTALLATION PRECAUTIONS

An all-weather cover should be used to prevent the housing from the direct sunlight or rain when the device is outdoors. The flowmeter should be protected from excessive vibrations, large ambient temperature changing and long-time shower. It should be prevented from the leakage of the corrosive liquid.



7.7 PIPE CONNECTION

The sensor should be supported by the connecting pipes, it cannot withstand its own weight. Mechanical and thermal stress must be avoided.



7.8 MOUNTING REQUIREMENTS

- a) The sensor pipe and the line pipes must have the same axis. For the sensors under DN50, the axial difference between the measuring tube and operating pipe should be less than 1.5mm; for the sensors from DN65 to DN300, it should be less than 2mm; for the sensor over DN350, it should be less than 4mm.
- b) The gasket between flanges should have a good corrosive resistance. The gasket must not extend to the pipe inside.
- c) The threads of the fasten bolts and nuts should be in good condition. The bolts should be fastened using torque spanner with certain torque according the size of flange.
- d) It should take separate measure to prevent the lining from heat when weld or flame cutting in the pipe closed to sensor. If the sensor is installed in a well or immersed in water, the connecting box for sensor must be filled and sealed with sealing glue after commissioning.

7.9 EQUIPOTENTIALITY AND ELECTRICAL INTERFERENCE REDUCTION

The measuring circuit assumes the fluid at ground potential, as it is in most of application with conductive pipes.

The sensor is isolated from the fluid because of the lining, therefore it's necessary to connect the grounding cables to the pipe's flanges, as shown in fig. 18. The resistance for grounding connection should be less than 10ohm.

Most of application do not require special precautions for installation, the only requirement is to keep the signal cable separate from the main cable. In case of sensor with cathodic protection or electrolysis processes, the main current shall not flow through the measured fluid..

The following measure should be taken in order to reduce the influence of magnetic field:

- a) With conductive pipes, potential equalization is made by connecting sensor and the adjoining pipes as shown in figure. The bolt connection for flanges can not be used instead of the electric connection, it must have an additional electric connection as shown in **Fig.18**.

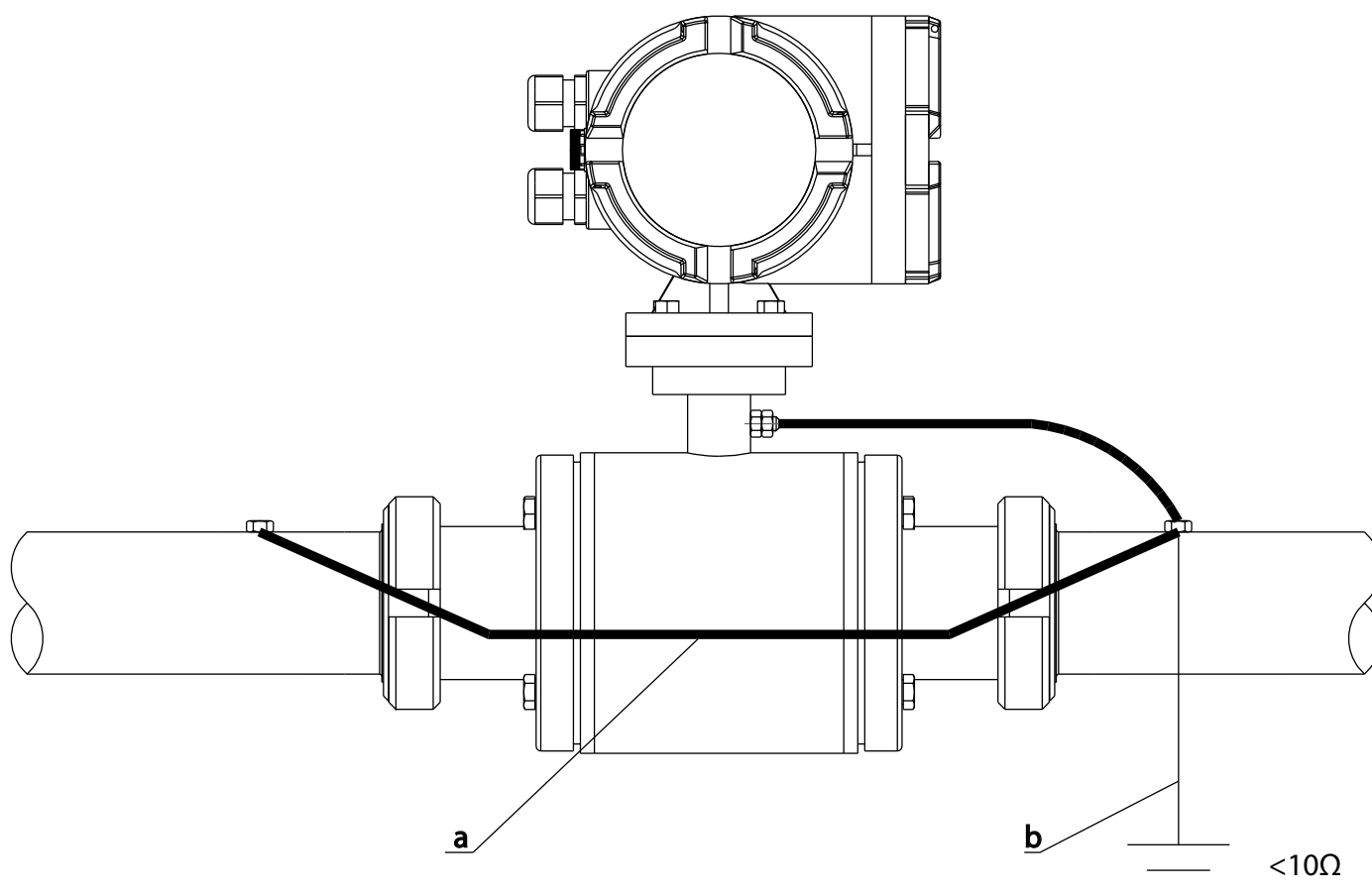


Fig.18 Sensor equipotentiality

7.10 PREPARATION FOR OPERATION

Strictly check the instalment and wirings before it gets into operation!

It shall be pointed out that the instrument, including the sensor and converter has been fully adjusted, calibrated with actual flow, and inspected under strict measures. All the units are certified. No further adjustments are required when put it into operation. Observing the contents in this manual, to check and analyze any malfunction

The following steps are to be followed to get the instrument into operation.

- 1) Make sure that the sensor is completely filled with fluid.
- 2) Turn the power supply ON. After approx. one minute, the display will show a value which indicates that the wire connection is correct. If the flow value is negative, it can be adjusted
- 3) Zero verification. Shut off the valve tight in downstream first and then the valve in upstream, to let the liquid stops to flow in the pipeline. The displayed value should be 0. The value displayed can be corrected at the converter if the value is different than 0.

7.11 MAINTENANCE

Generally, no extraordinary maintenance is needed on magnetic flowmeter.

Only in case the product can adhere to the inner wall of the sensor, and its electrodes, it is necessary to perform periodic cleaning operations.

Be careful not to damage the lining and the electrodes.

8-ELECTRICAL CONNECTIONS

8.1 CABLE ENTRY

The compact version converter enclosure has n. 2 M20x1.5 cable glands.

The converter enclosure remote version has n.2 M20x1.5 cable glands for power supply and outputs signal, and 2 M16x1.5 cable glands for sensor pipe connection

8.2 ELECTRICAL CONNECTION REQUIREMENTS

Before making the electrical connections, consider the following standards and be sure to have the correct power supply, ducts and other accessories.

8.2.1 Power supply voltage

RPmag transmitter is designed to be powered with $85 \div 265\text{Vac}$ (50 to 60 Hz), 24Vac/dc , 12Vdc voltage.

8.2.2 Power supply voltage interruption

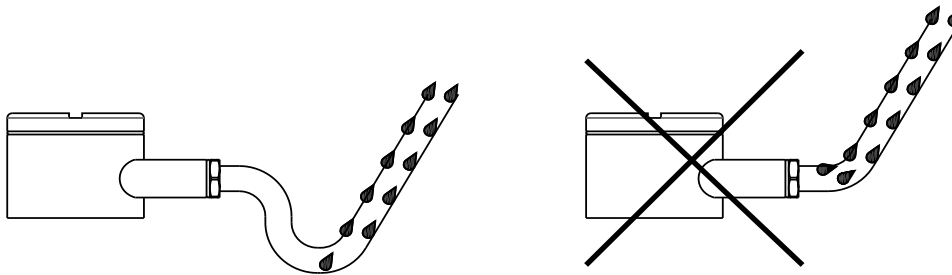
Power supply wires must be connected to the device via a circuit breaker or an external disconnecting switch.

The switch or circuit breaker should be clearly labeled and located close to the transmitter

8.2.3 Infiltration and humidity prevention

To avoid the humidity infiltration inside the converter and sensor pipe is recommended:

- fully well tighten the cap and the cable glands
- position the cable so that it forms a downward curve at the M20x1.5 and/or M16x1.5 output (see below figure); in this way the condensation and/or rain water will tend to drip from the curve bottom.



8.3 POWER CONNECTION

To connect the power supply to the meter, complete the following steps:

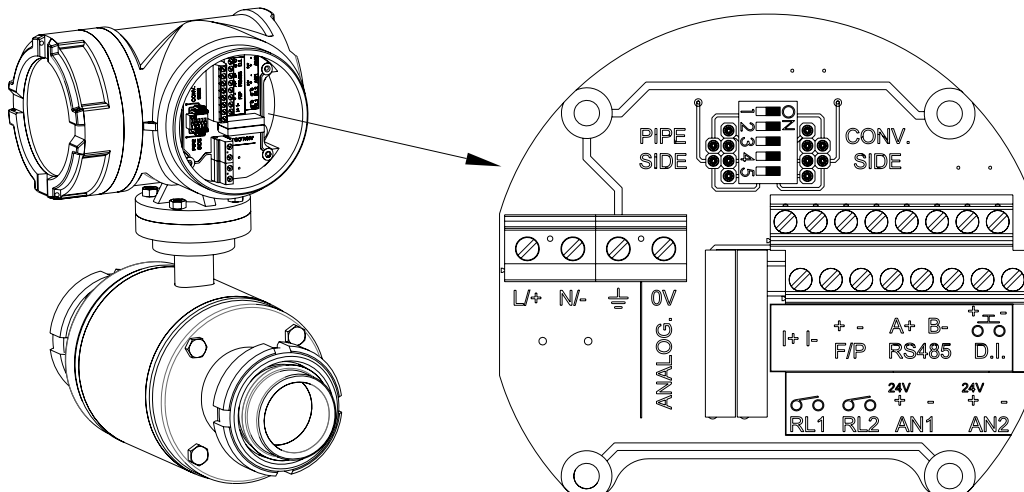
- 1) Open the box connections cover.
- 2) Insert the power supply cable through the cable gland.
- 3) Follow the sequent list to connect the power supply cable:

AC Units:

- Connect the GND grounding terminal \perp
- Connect the wire to terminal **N**.
- Connect the phase to terminal **L**.

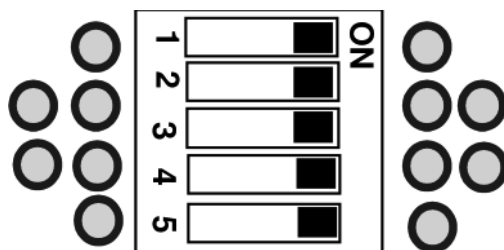
DC Units:

- Connect the GND grounding terminal \perp
- Connect + 24Vdc or 12Vdc to terminal **L (+)**.
- Connect 0V to terminal **N (-)**.



8.4 Dip-Switch configuration

For the Rpmag flowmeter proper operation, the dip-switch relative to the interface connection to the external diagnostic unit must be set to "ON" as shown in the following drawing



8.5 OUTPUT

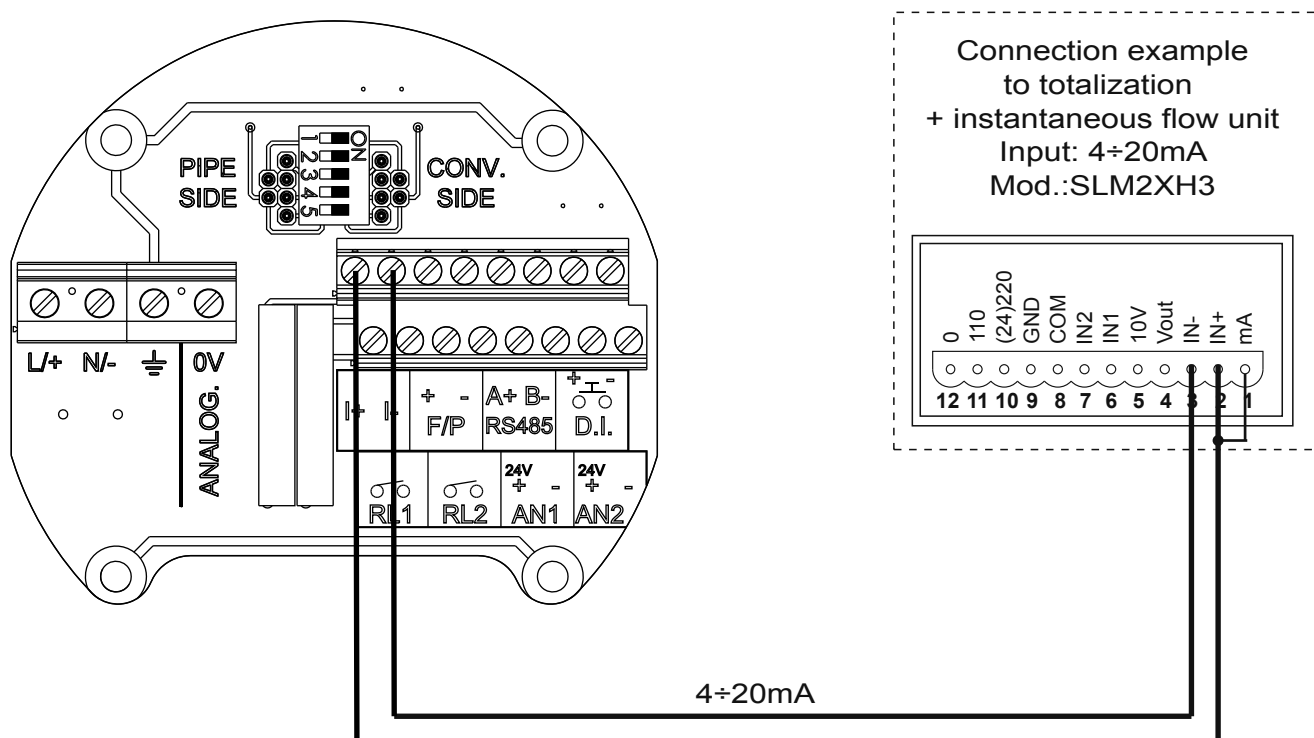
To connect the analog and/or impulsive output follow the instructions of the following points

8.5.1 Analog output

The current output is powered from the transmitter. The circuit resistance must be equal to or less than 500ohm. Follow the below steps to connect the signal cable to the transmitter:

- 1) Insert the signal cable through the cable gland.
- 2) Connect the two wires to I+ and I- terminals

The below drawing shows the connection diagram between the RPMAG flowmeter and SLM2XH3 flow totalizer unit.



8.5.2 Digital output

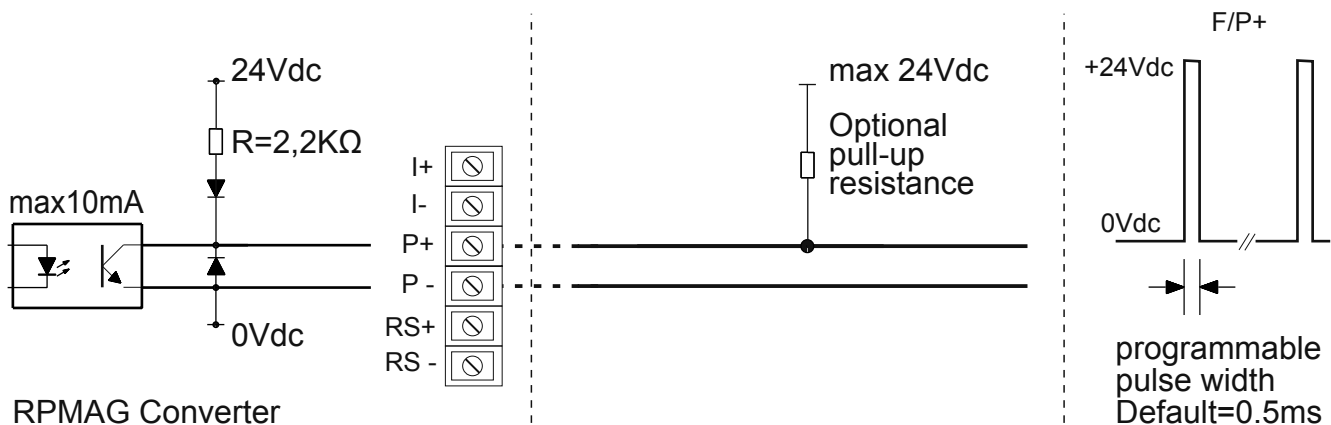
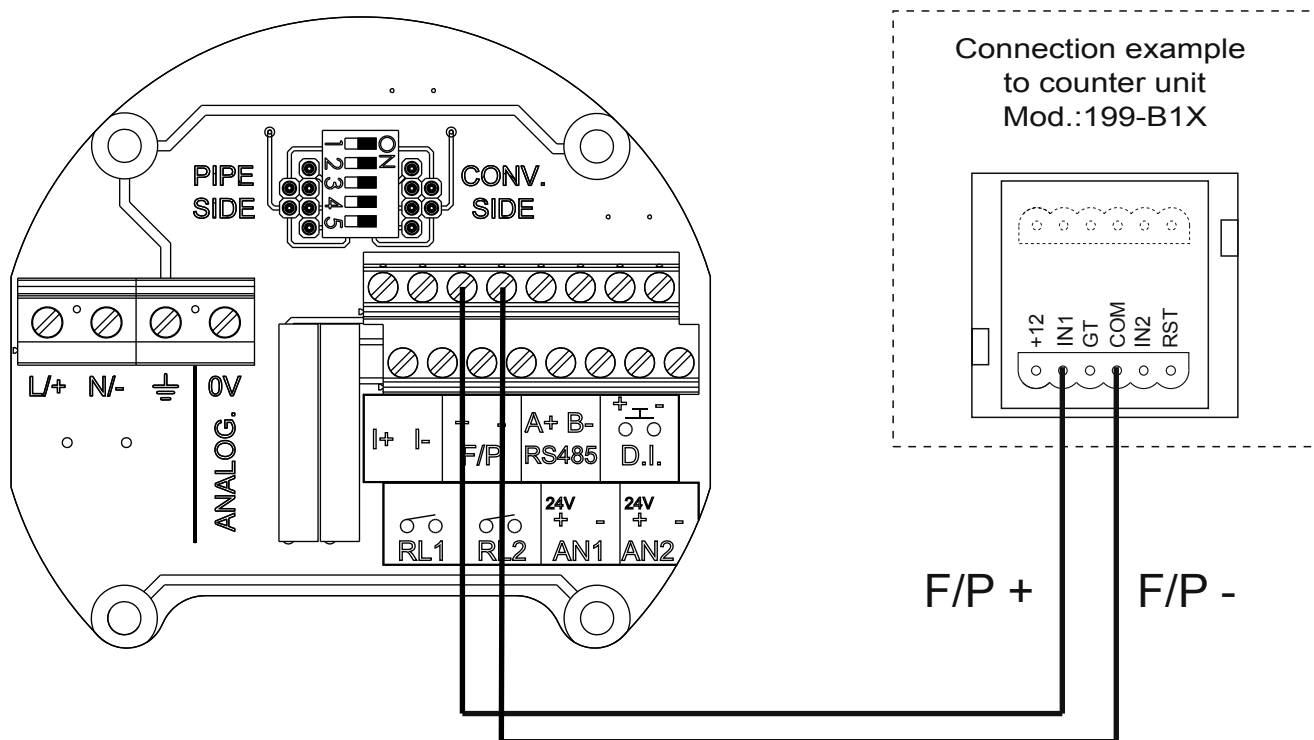
When digital output is set in frequency mode, it generates an $0.1 \div 10000\text{Hz}$ output signal proportional to the measured flow rate; however if it's set in pulsed mode generates an output signal in relation to the totalized volume increase. The signal is normally used in combination with an external totalizer, a pulse counter or an acquisition system. The resistance in the circuit must be equal to or greater than 100Kohms .

Follow the below steps to connect the signal cable to the transmitter:

- 1) Insert signal cable through the cable gland.
- 2) Connect two wires to F/P+ and F/P- terminals

N.B. - When the Rpmag pulse output is connected to an acquisition system that requires a current higher than 11mA , a properly sized pull-up resistor must be connected to ensure the minimum current required by the acquisition system connected (see drawing below); example: if the acquisition system requires a min. current of 15mA , a $1,6\text{ Kohm}$ pull-up resistor must be connected (according to the calculation $R = V / I = 24\text{V} / 15\text{mA} = 1,6\text{Kohm}$) between an external power supply of 24 Vdc and the acquisition system input terminal

The below drawing shows the connection diagram between the RPMAG flowmeter and the 199-B1X counter unit

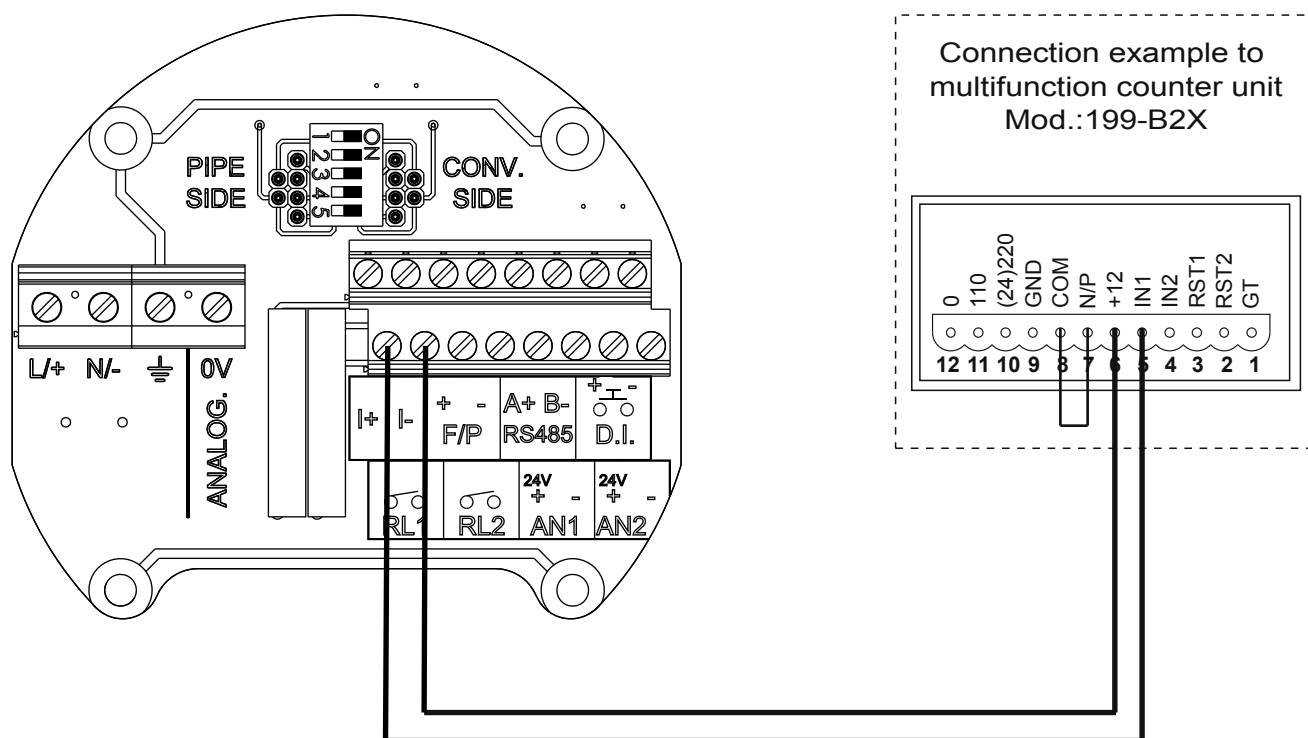


8.5.3 Alarm output

Follow the below steps to connect the signal cable to the transmitter:

- 1) Insert the signal cable through cable gland.
- 2) Connect two wires to **RL1**, for the #1 alarm threshold, and **RL2** terminals for #2 alarm threshold.

The below drawing shows the connection diagram between the RPMAG flowmeter and the 199-B2X multifunction counter unit.

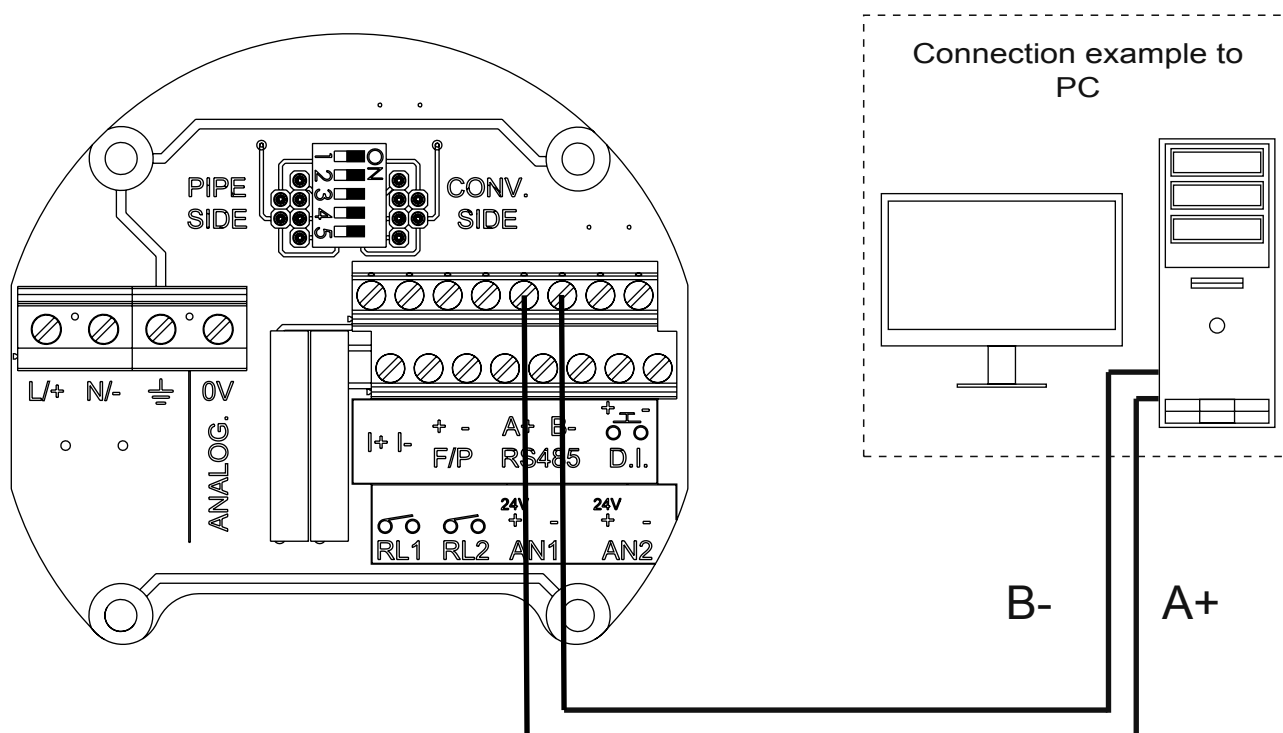


8.5.4 RS485 serial output

Communicate via MODBUS RTU is possible in models with RS485 serial port.

Connect the serial cable to **A+** and **B-** terminals

The below drawing shows connection example diagram between RPMAG flowmeter and a PC.



8.6 INPUTS

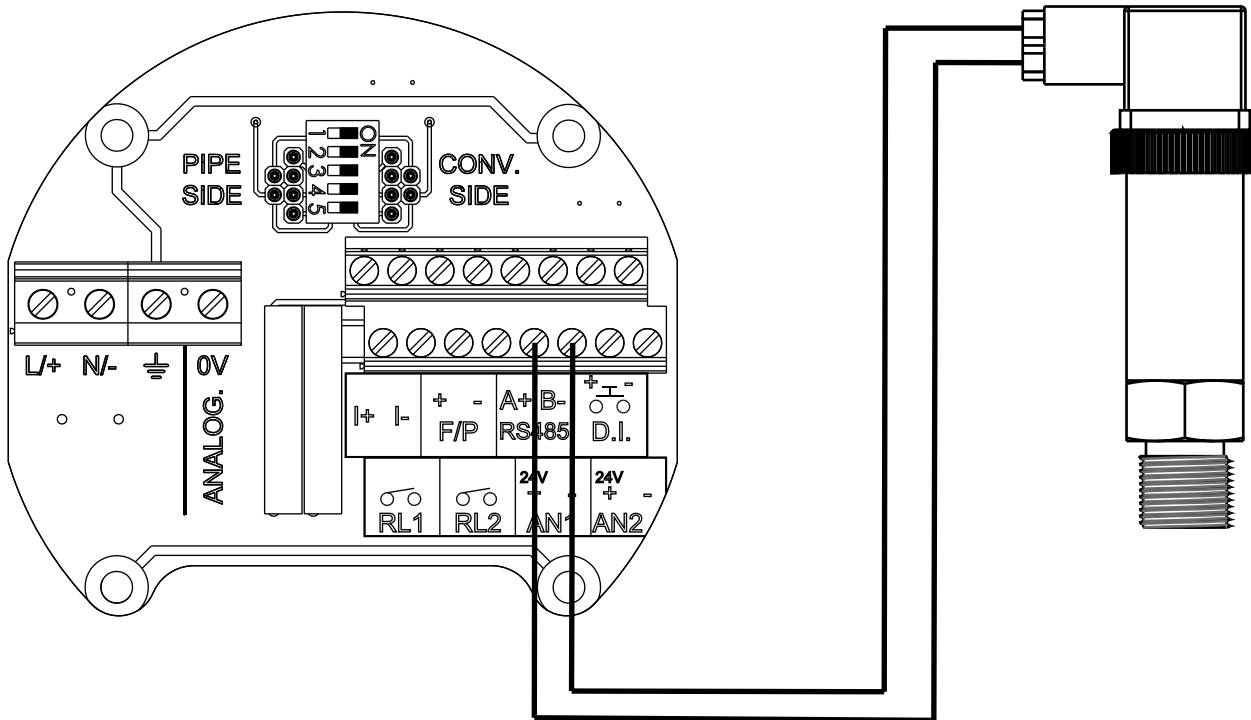
8.5.1 AN1 and AN2 analog inputs

The two analogue current inputs have a 100ohm input impedance.

To connect the signal cable to the transmitter, follow the steps below:

- 1) Insert the signal cable through the cable gland.
- 2) Connect the two wires to AN1 + and AN1- (or AN2 + and AN2-)

In the drawing below it shows the wiring diagram of the flow meter “RPMAG” and the pressure transmitter “KPT”.

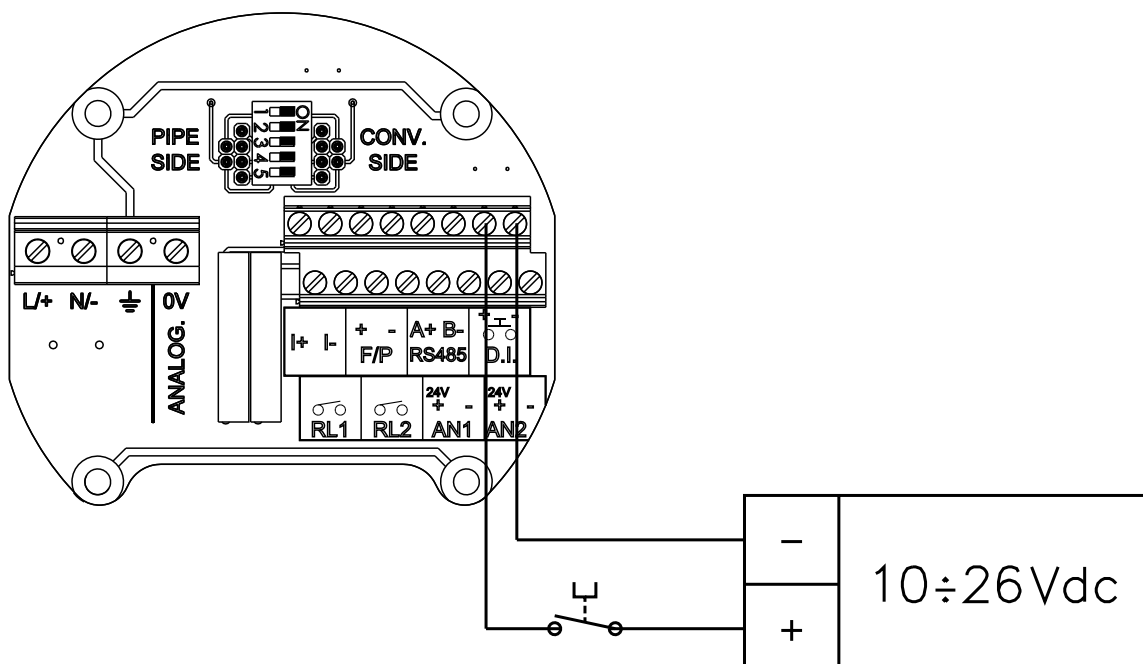


8.6.2 D.I. digital input

The “D.I.” optically isolated digital input can be driven by a normally open contact, with a minimum voltage of 10Vdc up to a maximum of 26Vdc.

Closing the contact as “DI” terminals, the batch counter will be reset and the RL1 output will again be energized with closed contact.

N.B. - The batch counter can be reset only when its value is equal or greater than the threshold set (see “BATCH” parameter). Activating the partial totalizer function (PARTIAL TOT), it is possible, closing the contact, in order: start, stop and reset the counting.

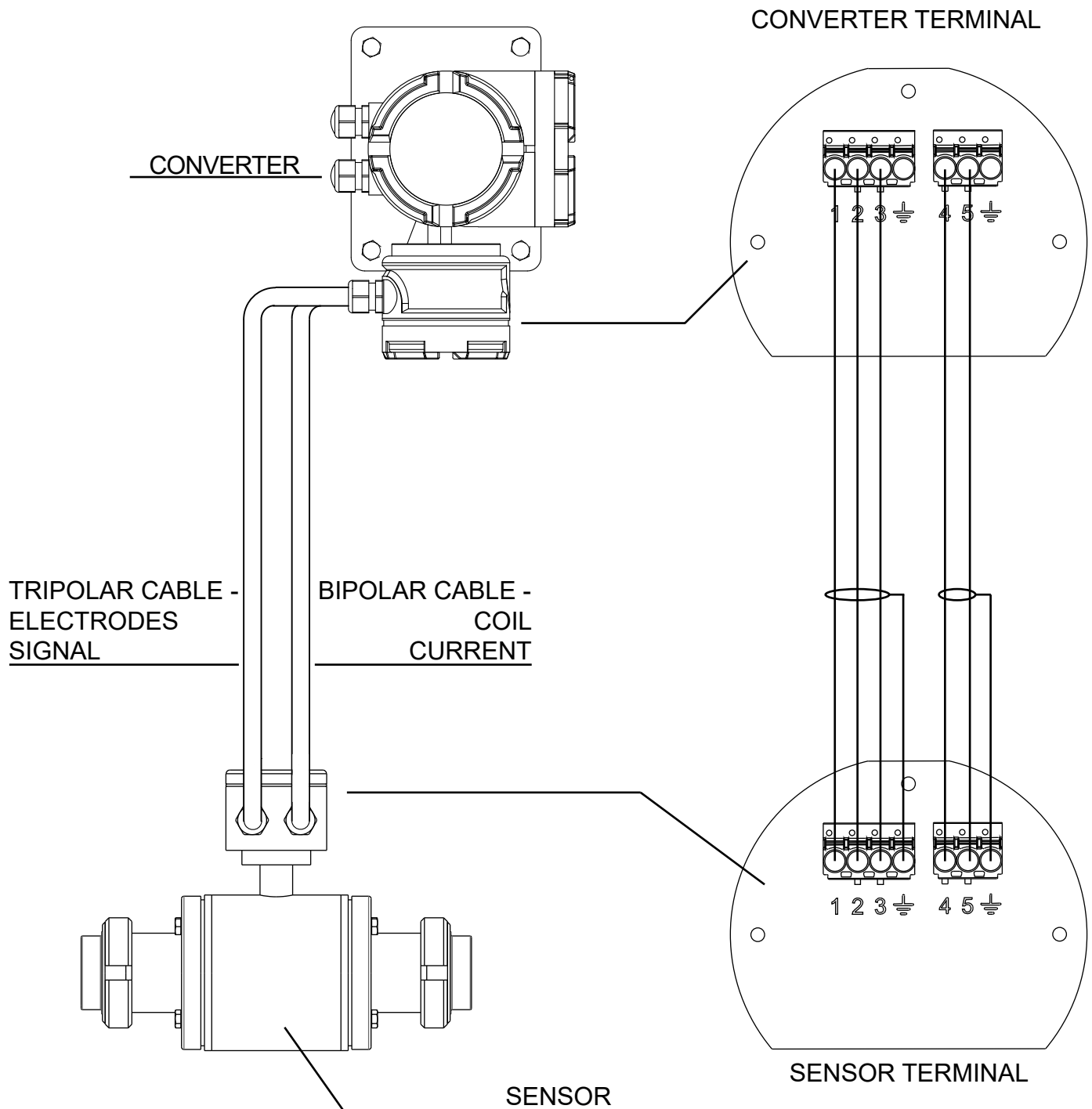


8.7 REMOTE VERSION

During the remote version installation comply with the following information to ensure correct measurements:

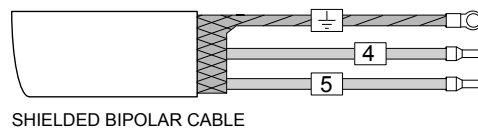
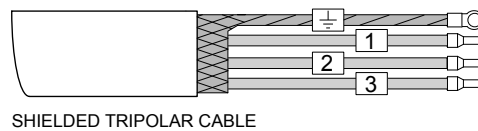
- 1) The cables must be as short as possible, especially with low conductivity fluids.
- 2) The cables should be far from electrical machinery and switching devices such as contactors or solenoid valves.
- 3) The cables must not be in conduit with power cables or cables for the switching devices control.
- 4) When necessary, ensure the equipotential between sensor and transmitter.
- 5) The maximum cable length is a fluid conductivity function. Refer to paragraph 8.7.2.

Connect the sensor to the converter according to the below diagram.



8.7.1 Remote version wiring

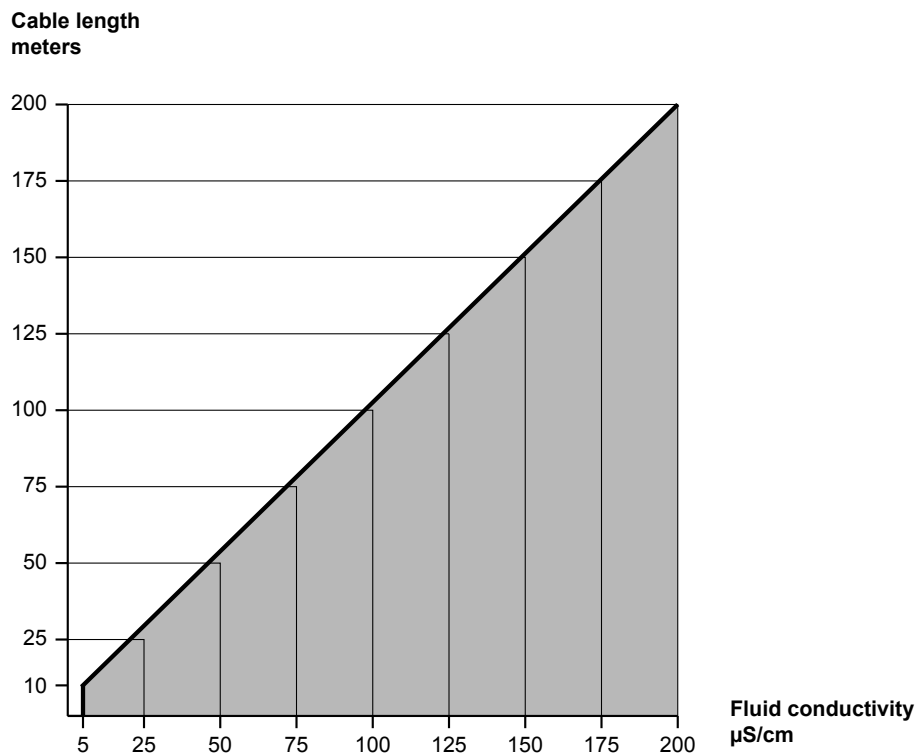
Cable	Wire		Function	Terminal position
	Num.	Color		
Bipolar	4	black	coil	4
	5	brown	coil	5
	braid		shield	\perp
Tripolar	1	white	electrode 1	1
	2	yell./green	common GND	2
	3	brown	electrode 2	3
	braid		shield	\perp



8.7.2 Connecting cables length

Maximum length of the connecting cables between the sensor and the convertor is determined by the fluid conductivity value.

In the graph below the gray highlighted area indicates the allowed cable length in relation to the fluid conductivity value. With an 150 microS fluid conductivity, for example, the connection cables will have a maximum length of 150 meters.



8.7.3 Connectiong cables

8.5.3.1 - Coil cable technical specification

Shielded bipolar cable FR20H2R 2x1.5 section	
Conductors	Tinned copper stranded wire, class 5
Insulations	PVC R2 Ø 2,8mm ± 0,1
Conductors Colors	Black - Brown
Cable stranding	Concentric with polyester tape
Shielding	Tinned copper braid
Sheath	PVC RZ resistant to hydrocarbons; Ø 8,2mm ± 0,30; RAL5015 blue color
Marking	SGM-LEKTRA RODANO MILANO ITALY - 525B005A
Operating temperature	-25÷+70°C (fixed installation)
Test voltage	3KV V.c.a.
Working voltage	450/750V
Conductors electrical resistance	CEI 20-29
Reference Standards	CEI 20-22 II-IEC 332.3A-ROHS 2011/65/UE(ROHS 2)

8.7.3.2 - Electrodes signal cable technical specification


Shielded tripolar cable FR20H2R 3x1.5 section	
Conductors	Tinned copper stranded wire, class 5
Insulations	PVC R2 Ø 2,8mm ± 0,1
Conductors Colors	White - Brown - Yellow/Green
Cable stranding	Concentric with polyester tape
Shielding	Tinned copper braid
Sheath	PVC RZ resistant to hydrocarbons; Ø 8,2mm ± 0,30; RAL5015 blue color
Marking	SGM-LEKTRA RODANO MILANO ITALY - 525B005A
Operating temperature	-25÷+70°C (fixed installation)
Test voltage	3KV V.c.a.
Working voltage	450/750V
Conductors electrical resistance	CEI 20-29
Reference Standards	CEI 20-22 II-IEC 332.3A-ROHS 2011/65/UE(ROHS 2)

9-LOCAL OPERATOR INTERFACE (LOI)

LOI is an operator communications center for the RPlmag. Through the LOI, the operator can access any transmitter function for changing configuration parameter settings, checking totalized values, or other functions.

9.1 SAFETY MESSAGES

Instructions and procedures in this section may require special precautions to ensure the safety of the personnel performing the operations. Information that raises potential safety issues is indicated by a warning symbol.

Please refer to the following safety messages before performing an operation preceded by this symbol: 

9.2 WARNINGS

Explosions could result in death or serious injury

- Verify that the area of installation and operation comply with the characteristics of the measuring tube and the transmitter.
- Make sure only qualified personnel perform the installation.
- Do not perform any service other than those contained in this manual unless qualified.










High voltage that may be present on leads could cause electrical shock

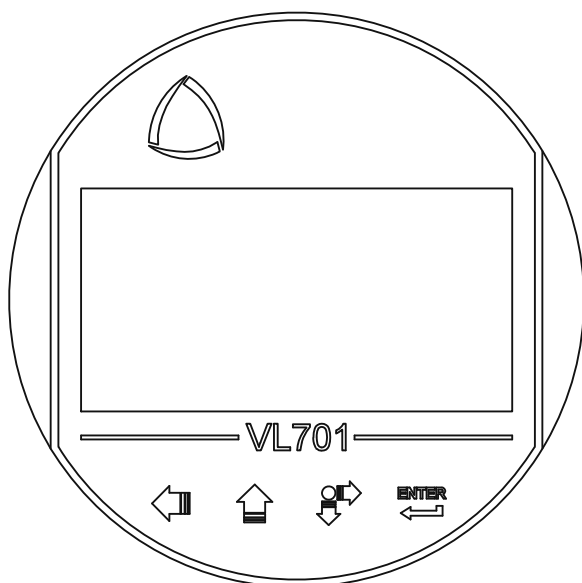
- Avoid contact with leads and terminals.

9.3 LOI Features

The LOI has the VL701 program module has 4 buttons which allow to perform all operational, control and programming instrument functions.

In the configuration menus, is possible:

1. Submenus and parameters access; press  to select and press  to access.
2. Parameter options choice: press  to select the option and press  to store the option. Press  to exit without saving.
3. Configure the parameter values; in some parameters the configuration is done by setting a value (eg, in the MAX FLOW parameter is possible to change the number):
press  to select the digit to be modified (the digit is highlighted in inverse), press  to change the highlighted digits number, press  save the set value and exit automatically. Press  to exit without saving.



- Exit configuration
- Back to previous menu



- Parameters values modification



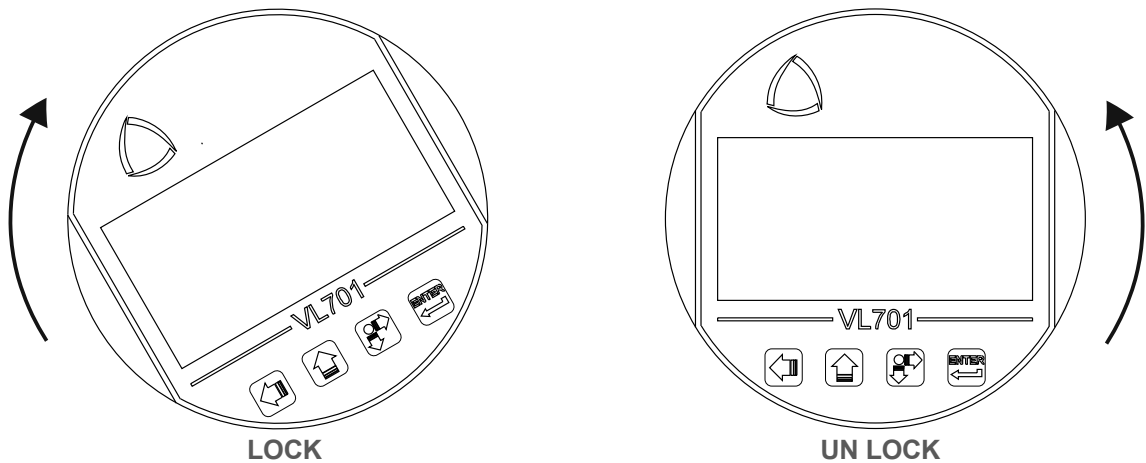
- Scroll cursor (to the right)
- Scroll parameters



- Configuration access
- Options confirmation
- Parameters values confirmation

9.4 VL701 DISPLAY MODULE

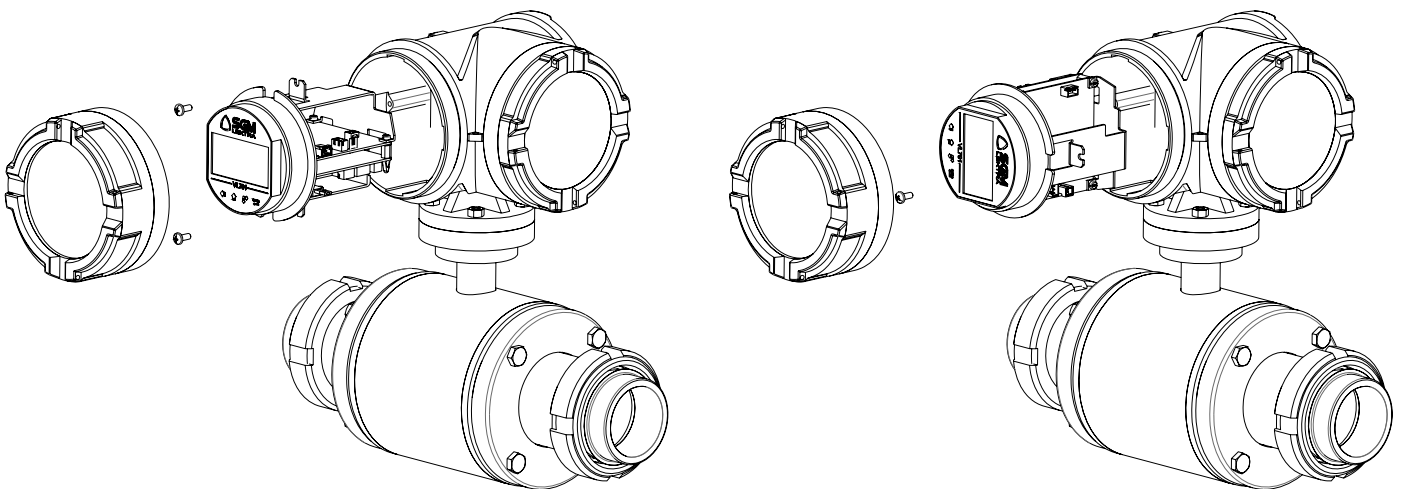
The VL701 programming module can be mounted and removed from the Rpmag without affecting the unit operation. Unscrewing the cover, the VL701 module can be mounted (by clockwise rotation until it clicks) or dismounted (by rotation counterclockwise) as shown in figure.



9.5 DISPLAY ROTATION

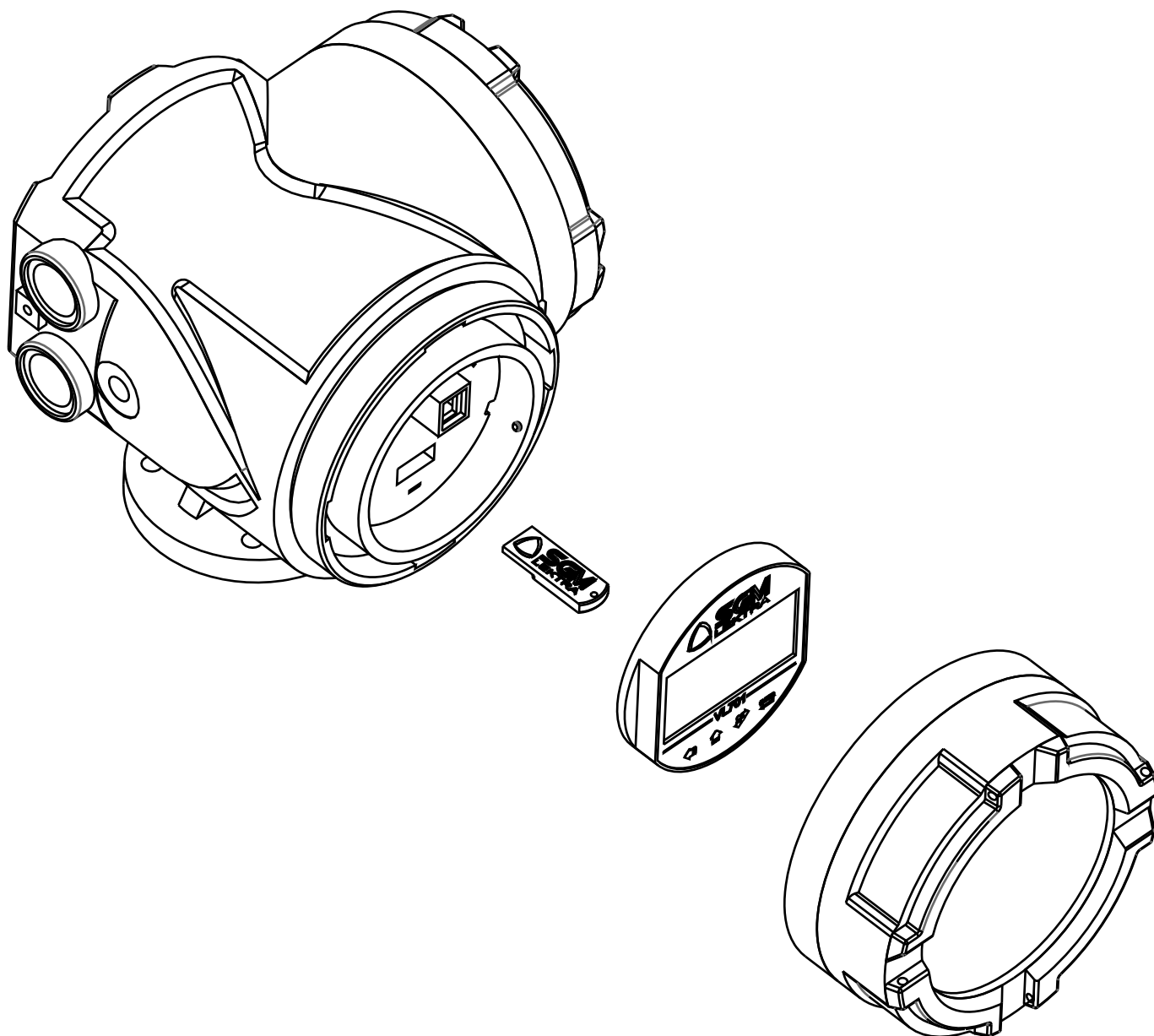
If it is necessary the display can be rotated, as indicated in the following procedure:

1. ⚠ Disconnect power supply from transmitter.
2. Unscrew the transparent cover.
3. Remove the two screws that secure the "display/electronics" bracket to the container, paying attention to the wiring between the electronics and the terminal.
4. Rotate the display / electronics bracket to set the position (minimum 90° rotation).
5. Tighten the two screws that secure the "display/electronics" bracket to the container.
6. Tighten the transparent cover.




9.6 DATA LOGGER USB PORT

To access the USB port it is necessary to dismount the VL701 module display (see par. 9.4).
The USB port is used to connect the pen drive, necessary for the internal data logger functioning.

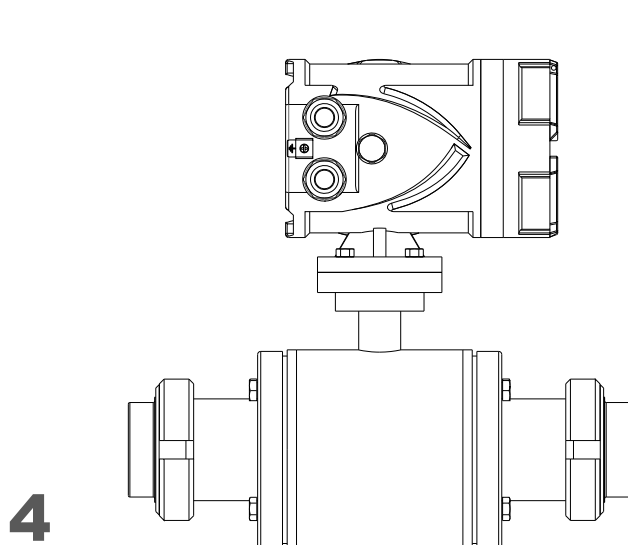
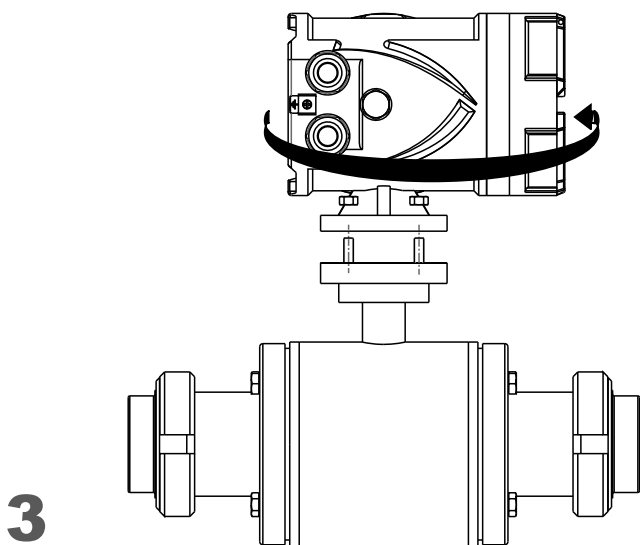
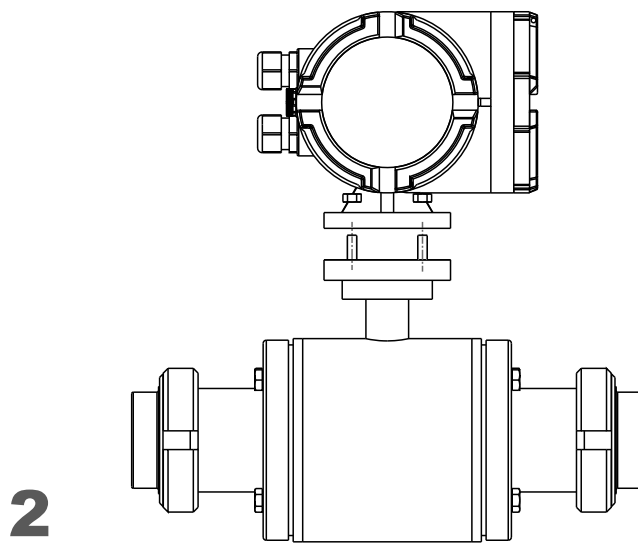
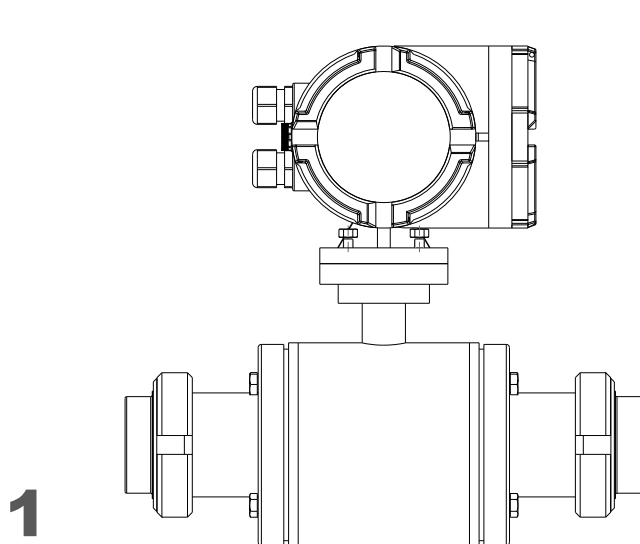


9.7 CONVERTER ROTATION

To a greater functionality and adaptation to the application the entire converter, in addition to the display, can be rotated. By following the below steps:

 Disconnect the power supply voltage.

1. Remove the four screws that secure the converter to the sensor pipe.
2. Slightly lift the converter paying attention to the electrical connections between the sensor pipe and the terminal.
3. Turn the converter (minimum 90° rotation) bringing it to the desired position.
4. Fix the converter to the sensor with the 4 fixing screws.



10-PROGRAMMING

10.1 DATA ENTRY

The LOI keypad has no numerical keys. Enter numerical data using the following procedure:

1. Access the appropriate function.
2. Use SCROLL to highlight the digit you want to enter or change.
3. For numerical data, UP ARROW scrolls the digits from 0 to 9
(UP ARROW or SCROLL are also used to toggle pre-determined choices that do not require data entry).
4. Use SCROLL to highlight and change other digits you want to change.
5. Push ENTER to confirm data entry.

10.2 KEYBOARD LOCK

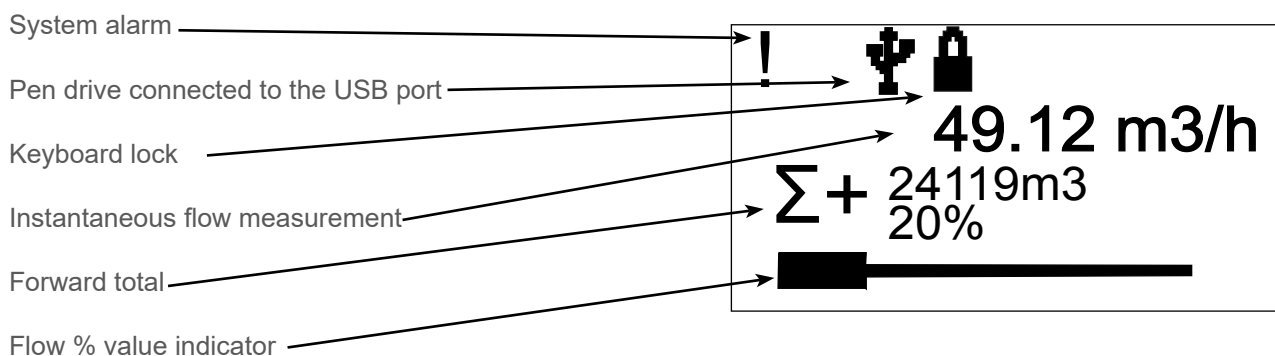
Simultaneously pressing the LEFT ARROW and SCROLL keys from RUN mode, for 5 seconds, keyboard will be locked. Display will show PADLOCK symbol.

Simultaneously pressing the LEFT ARROW and SCROLL keys from RUN mode, for 5 seconds, keyboard will be un-locked.

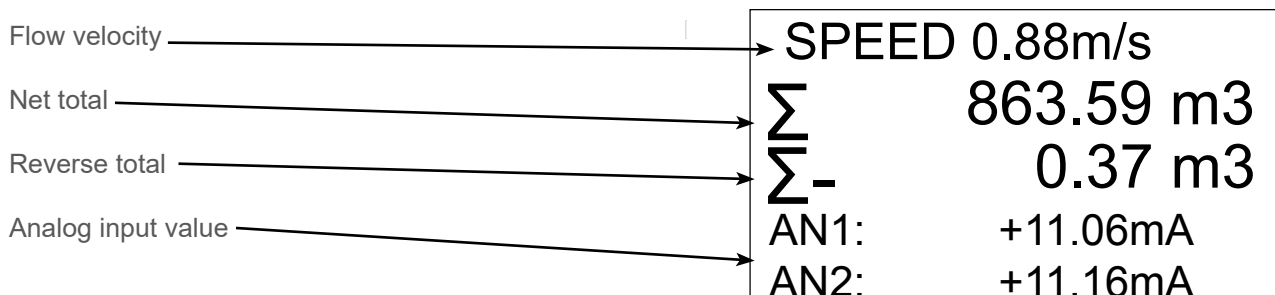
10.3 DISPLAY PAGES

The Rpmag, in RUN mode, has six pages to display data and status, press UP ARROW or SCROLL to change page

10.3.1 MAIN PAGE



10.3.2 SECOND PAGE



10.3.3 ALARMS PAGE

The symbol “!” will be displayed when there are system alarms.

Press SCROLL to access the alarms page.

Press SCROLL again to return to the main page (MAIN)

Press ENTER to clear the error history (CLEAN)

EMPTY PIPE

MAIN CLEAN

10.3.4 BATCH PAGE

Preset value

Increase in the batch partial counter

Relay output status (closed contact)

Instantaneous flow rate indicator



BATCH

0.500m3

0.500 m3

49.08m3/h



Preset value

The increase value of batch partial counter is highlighted when it reaches the preset value

Relay output status (open contact)

Instantaneous flow rate indicator



BATCH

0.500m3

0.500 m3

49.08m3/h



10.3.5 PARTIAL TOTALIZER PAGE

Increase in the partial totalizer.

Press START to begin the totalization:
STOP to arrest
RESET to reset the totalizer



PARTIAL TOTAL

0.000 m3

START

10.3.6 INFO PAGE

- Instrument serial number
- Event counter of the sensor fundamental parameters
- Pipe diameter (DN)
- Current Firmware revision
- Configuration index of the product
- Q3/Q1 ratio
- Sensor K

SN FM0123456789

Enter Counter=0

DN 100 mm

FW 2.06

IC 1.0.04

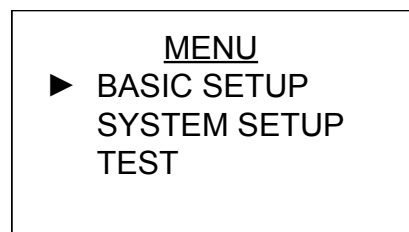
Q3/Q1 200.00

SENSOR K 0,05755

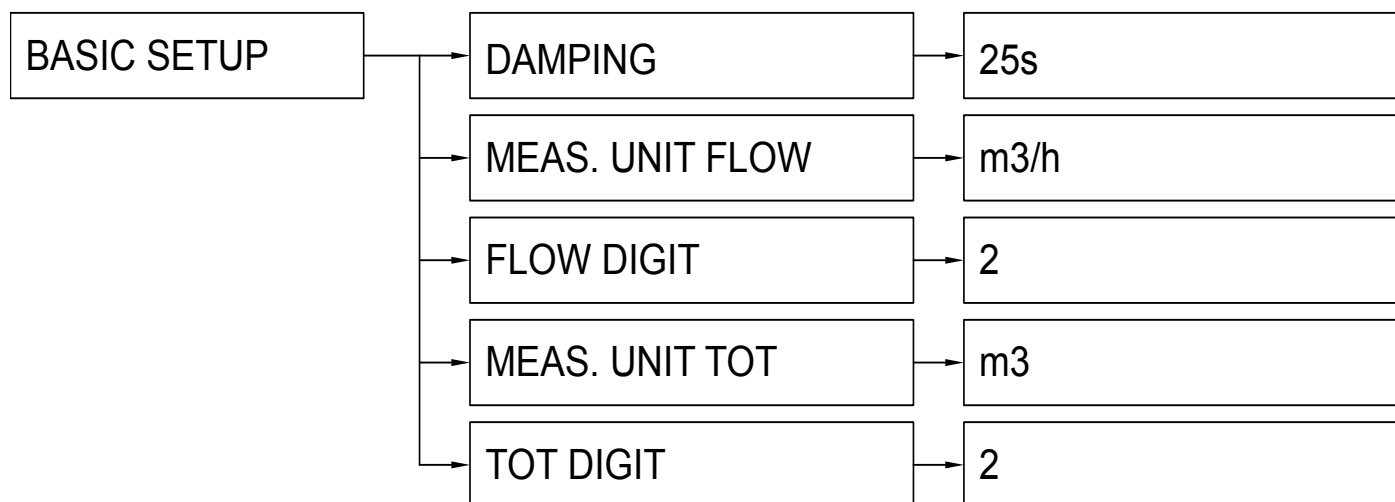
10.4 LOI MENÙ

Press ENTER key from run mode: display will show the list of configuration menu as shown here next.

Press UP ARROW or SCROLL keys to select the desired menu, then press ENTER key to access.



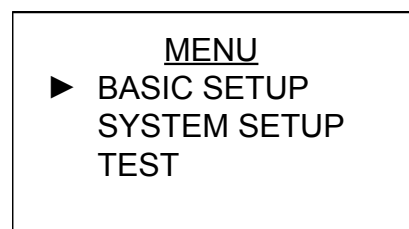
10.4.1 BASIC SETUP menu



10.4.2 BASIC CONFIGURATION (BASE SETUP)

Press ENTER key from run mode, the display will be as shown here next, then press ENTER to enter in "BASIC SETUP" menu.

Press UP ARROW or SCROLL keys to select the desired function and press ENTER key to access.

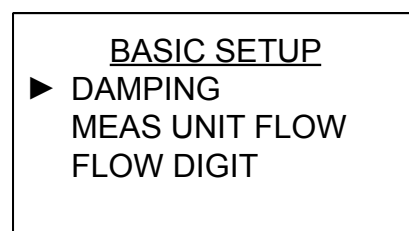


10.4.2.1 –DAMPING

It sets the integration time for measurement.
Lower values mean fast response, higher values are suggested for reduction of fluctuations in flow measurement.
Default: 25s;
Range: 1÷100s

Press ENTER key, the display will be as shown here next.
With UP ARROW or SCROLL select the option.

Press ENTER to confirm. The ☺ to confirm the parameter edit storage.



10.4.2.2 MEAS. UNIT FLOW

It specifies the instantaneous flow measurement unit. Default: m3/h.

Range: l/s; l/m; l/h; l/D; m3/s; m3/m; m3/h; m3/D; GAL/s;

GAL/m; GAL/H; GAL/D; FT3/s; FT3/m; FT3/H; FT3/D;

IMPGAL/s; IMPGAL/m; IMPGAL/H; IMPGAL/D; MI/D;

MGAL/D; TON/H; KG/H.

Press ENTER key, the display will be as shown here next.

With UP ARROW or SCROLL select the option.

Press ENTER to confirm. The ☺ to confirm the parameter edit storage.

BASIC SETUP

- MEAS. UNIT FLOW
- FLOW DIGIT
- MEAS. UNIT TOT.

MEAS. UNIT FLOW

m3/h**10.4.2.3 FLOW DIGIT**

It indicates how many decimals are displayed after the decimal point.

Default: 2

Range: 1÷3

Press ENTER key, the display will be as shown here next.

With UP ARROW or SCROLL select the option.

Press ENTER to confirm. The ☺ to confirm the parameter edit storage.

BASIC SETUP

- MEAS. UNIT FLOW
- FLOW DIGIT
- MEAS. UNIT TOT.

FLOW DIGIT

2**10.4.2.4 – MEAS. UNIT TOT**

It specifies how many decimals are displayed after the decimal point. Default: m3

Range: l; m3; gal; ft3;impGal; MI; Mgal;

Press ENTER key, the display will be as shown here next.

With UP ARROW or SCROLL select the option.

Press ENTER to confirm. The ☺ to confirm the parameter edit storage.

BASIC SETUP

- MEAS. UNIT FLOW
- FLOW DIGIT
- MEAS. UNIT TOT.

MEAS. UNIT TOT.

l

m3

- gal

10.4.2.5 –TOT DIGIT

It specifies how many decimals are displayed after decimal point.

Default: 0

Range: 1÷3

Press ENTER key, the display will be as shown here next.

With UP ARROW or SCROLL select the option.

Press ENTER to confirm. The ☺ to confirm the parameter edit storage.

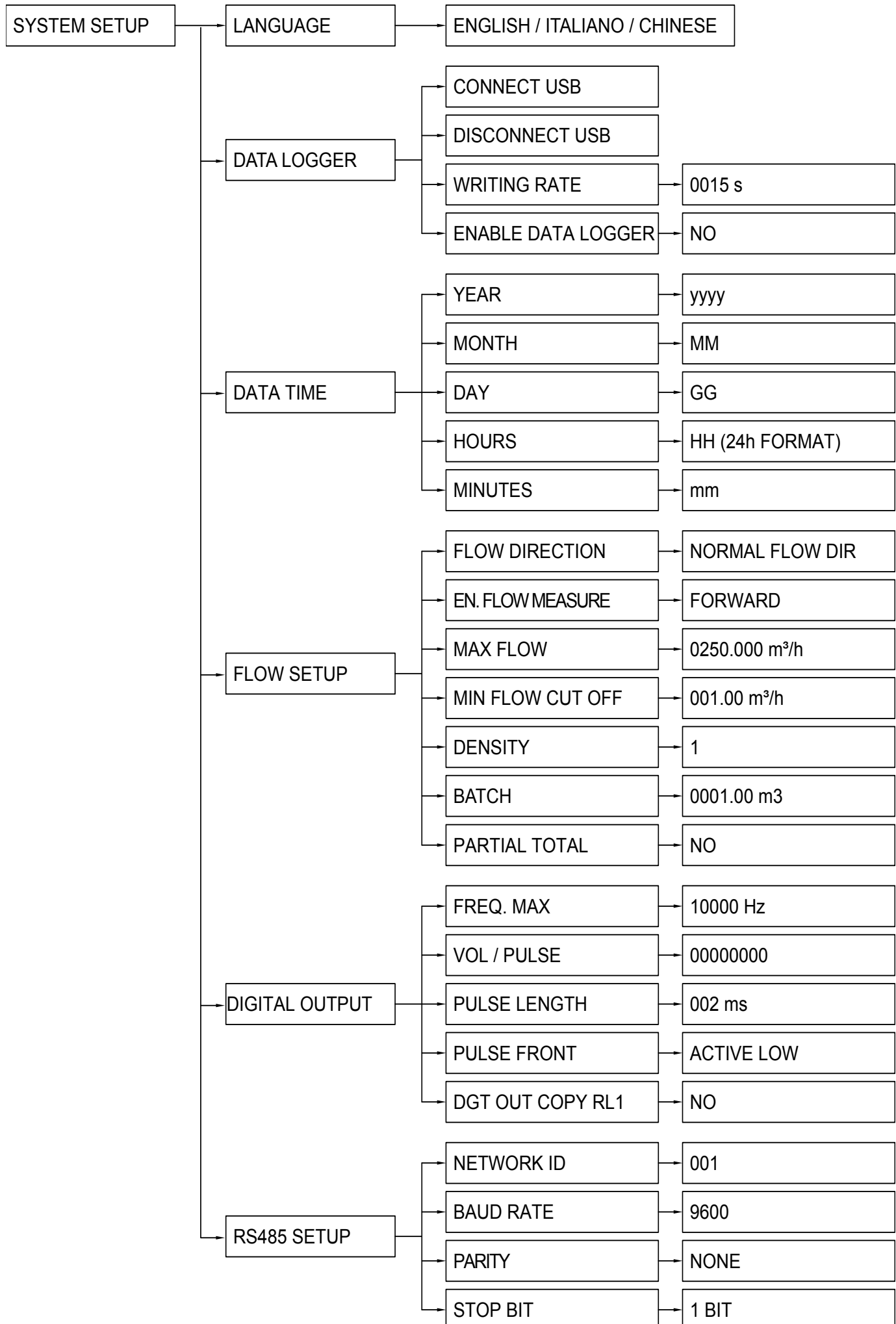
BASIC SETUP

- FLOW DIGIT
- MEAS. UNIT TOT.
- TOT. DIGIT

TOT. DIGIT

0

10.4.3 SYSTEM SETUP



10.4.4 SYSTEM CONFIGURATION (SYSTEM SETUP)

Press ENTER key from run mode: the display will be as shown here next, then press SCROLL key to select "SYSTEM SETUP" menu and press ENTER to enter.

Press UP ARROW or SCROLL keys to select the desired function and press ENTER key to access.

10.4.4.1 LANGUAGE

Allows menu language selection.

Default: ENGLISH; Range: ENGLISH - ITALIANO – CHINESE

Press ENTER key, the display will be as shown here next.

With UP ARROW or SCROLL select the option.
Press ENTER to confirm.

The ☺ to confirm the parameter edit storage.

10.4.4.2 - DATA LOGGER

The USB pen drive data logger function is set in this menu.
Press ENTER to confirm.

The display will be as shown here next.
Press UP ARROW or SCROLL keys to select the desired function and press ENTER key to access.

10.4.4.2.1 CONNECT USB

Connect the pen drive to the USB port.

Press ENTER, after the "WAIT" message, the "USB CONNECTED" message will appear. If the "USB NOT FOUND" message is displayed, verify that the pen drive is inserted correctly into the USB port.

MENU
BASIC SETUP
▶ SYSTEM SETUP
TEST

SYSTEM SETUP
▶ LANGUAGE
DATA LOGGER
DATA TIME

LANGUAGE
▶ ENGLISH
ITALIANO
CHINESE

SYSTEM SETUP
LANGUAGE
▶ DATA LOGGER
DATA TIME

DATA LOGGER
▶ CONNECT USB
DISCONNECT USB
WRITING RATE

DATA LOGGER
▶ CONNECT USB
DISCONNECT USB
WRITING RATE

USB CONNECTED

10.4.4.2.2 - DISCONNECT USB

Disconnect the pen drive to the USB port.

Press ENTER ,after the “WAIT” message, the “REMOVE USB “ message will appear”.

10.4.4.2.3 WRITING RATE

Set the time interval between a storage and the next.

Default: 60s

Range: 15÷3600s

Press ENTER key, the display will be as shown here next.

With UP ARROW change the digit, with SCROLL moves the cursor

Press ENTER to confirm.

The ☺ to confirm the parameter edit storage.

10.4.4.2.4 ENABLE DATALOGGER

Enables or disables the data logger function.

Press ENTER key, the display will be as shown here next.

With UP ARROW or SCROLL select the option.

Press ENTER to confirm.

The ☺ to confirm the parameter edit storage.

10.4.4.3 - DATE TIME

In the system clock and the calendar are set in this menu.

The display will be as shown here next.

Press UP ARROW or SCROLL keys to select the desired function and press ENTER per accedervi.

10.4.4.3.1 YEAR

Sets the year in the yyyy format.

Press ENTER key, the display will be as shown here next.

With UP ARROW change the digit, with SCROLL moves the cursor.

Press ENTER to confirm.

The ☺ to confirm the parameter edit storage.

DATA LOGGER
CONNECT USB
▶ DISCONNECT USB
WRITING RATE

REMOVE USB

DATA LOGGER
CONNECT USB
DISCONNECT USB
▶ WRITING RATE

WRITING RATE

0060s

DATA LOGGER
DISCONNECT USB
WRITING RATE
▶ ENABLE DATA LOGGER

ENABLE DATA LOGGER

NO
▶ YES

SYSTEM SETUP
LANGUAGE
DATA LOGGER
▶ DATA TIME

DATA TIME
▶ YEAR
MONTH
DAY

DATA TIME
▶ YEAR
MONTH
DAY

YEAR

2016

10.4.4.3.2 MONTH

Sets the month in the MM format.

Press ENTER key, the display will be as shown here next.

With UP ARROW change the digit, with SCROLL moves the cursor.

Press ENTER to confirm.

The ☺ to confirm the parameter edit storage.

10.4.4.3.3 DAY

Sets the day in the dd format.

Press ENTER key, the display will be as shown here next.

With UP ARROW change the digit, with SCROLL moves the cursor.

Press ENTER to confirm.

The ☺ to confirm the parameter edit storage.

10.4.4.3.4 HOURS

Sets the hours in the HH format.

Press ENTER key, the display will be as shown here next.

With UP ARROW change the digit, with SCROLL moves the cursor.

Press ENTER to confirm.

The ☺ to confirm the parameter edit storage.

10.4.4.3.5 MINUTES

Sets the minutes in the mm format.

Press ENTER key, the display will be as shown here next.

With UP ARROW change the digit, with SCROLL moves the cursor.

Press ENTER to confirm.

The ☺ to confirm the parameter edit storage.

DATA TIME

YEAR

► MONTH

DAY

MONTH

02DATA TIME

YEAR

MONTH

► DAY

DAY

12DATA TIME

MONTH

DAY

► HOURS

HOURS

16DATA TIME

DAY

HOURS

► MINUTES

MINUTES

48

10.4.4.4 FLOW SETUP

The configuration parameters of the flow measurement are set in this menu.

Press ENTER to access.

The display will be as shown here next.

Press UP ARROW or SCROLL keys to select the desired function and press ENTER key to access

SYSTEM SETUP
DATA LOGGER
DATA TIME
▶ FLOW SETUP

FLOW SETUP
▶ MAX FLOW
MIN FLOW CUT OFF
EN. FLOW MEASURE

10.4.4.4.1 FLOW DIRECTION

Set what is the positive flow direction compared to the arrow on the sensor pipe.

Default: NORMAL FLOW DIR

Range: NORMAL FLOW DIR; INVERT FLOW DIR

FLOW SETUP
MIN FLOW CUT OFF
EN. FLOW MASURE
▶ FLOW DIRECTION

Press ENTER key, the display will be as shown here next.

With UP ARROW or SCROLL select the option.

Press ENTER to confirm.

The ☺ to confirm the parameter edit.

FLOW DIRECTION
▶ NORMAL FLOW DIR.
INVERT FLOW DIR.

10.4.4.4.2 EN. FLOW MEASURE

This parameter enables the flow direction measurement and its related totalizer

Default: BIDIREC (bidirectional)

Range: FORWARD; REVERSE; BIDIREC (bidirectional).

FLOW SETUP
MAX FLOW
MIN FLOW CUT OFF
▶ EN. FLOW MEASURE

Press ENTER key, the display will be as shown here next.

With UP ARROW or SCROLL select the option.

Press ENTER to confirm.

The ☺ to confirm the parameter edit.

EN. FLOW MASURE
FORWARD
REVERSE
▶ BIDIREC

10.4.4.4.3 MAX FLOW

Set the flow measurement 100%. This value adjusts the analog output end scale (20mA) and the frequency output end scale. The range is related to the sensor DN.

The default value is the maximum flow rate for the MID approval according to the sensor pipe DN.

Press ENTER key, the display will be as shown here next.

With UP ARROW change the digit, with SCROLL moves the cursor.

Press ENTER to confirm.

The ☺ to confirm the parameter edit storage.

FLOW SETUP
▶ MAX FLOW
MIN FLOW CUT OFF
EN. FLOW MEASURE

MAX FLOW
000250.00
m3/h

10.4.4.4.4 MIN FLOW CUT OFF

It specifies the Qmax% value below which the instantaneous flow measurement reading (direct or reverse) and the outputs are forced to zero. The default is 1% of the declared maximum flow rate for the MID approval according to the sensor pipe DN.

Press ENTER key, the display will be as shown here next.
With UP ARROW change the digit, with SCROLL moves the cursor.
Press ENTER to confirm.
The ☺ to confirm the parameter edit storage.

FLOW SETUP
MAX FLOW
► MIN FLOW CUT OFF
EN. FLOW MEASURE

MIN FLOW CUT OFF

000.00
m³/h

10.4.4.4.5 DENSITY

Sets the fluid specific weight (g/l) to convert the measured volume value by weight.
Default: 1000.0 G/L;
Range: 0000.0÷4000.0 G/L.

Press ENTER key, the display will be as shown here next.
With UP ARROW change the digit, with SCROLL moves the cursor.
Press ENTER to confirm.
The ☺ to confirm the parameter edit storage.

FLOW SETUP
EN. FLOW MEASURE
FLOW DIRECTION
► DENSITY

DENSITY

1000.0
G/L

10.4.4.4.6 BATCH

Activating the batch function, the system automatically sets:

- RL1 alarm when the partial batch counter value reaches the set threshold value (relay de-energized with open contact).
- DI is the input for a normally open button; it has the restart function of the batch counter and, at the same time, the resetting of the RL1 contact (energized relay with closed contact)

The unit volume is a function of the MEAS. UNIT TOT parameter setting (totalisers unit)
Default: 0 (disabled BATCH function);
Range: 0000.00÷9999.99.

Press ENTER key, the display will be as shown here next.
With UP ARROW change the digit, with SCROLL moves the cursor.
Press ENTER to confirm.
The ☺ to confirm the parameter edit storage.

FLOW SETUP
FLOW DIRECTION
DENSITY
► BATCH

BATCH

0001.0
m³

In RUN mode, pressing the UP ARROW key, is possible to monitor the count, and the output relay status:

- a) Predetermined batch value
- b) Counted value
- c) Instantaneous flow rate value
- d) RL1 relay output state (energized with closed contact)

When the counter (b) reaches the batch predetermined value (a), RL1 is de-energized instantaneously, and the display shows:

- a) Predetermined batch value
- b) The counted value is highlighted to indicate that the predetermined batch value has been reached (or exceeded)
- c) Instantaneous flow rate value
- d) RL1 relay output state (de-energized with closed contact)

By pressing the button (normally open) connected to DI, the batch is restarted, the counter is reset (b) and RL1 output is rearmed (relay energized with closed contact).

10.4.4.4.7 PARTIAL TOTAL

Activating the PARTIAL TOTALIZER function, the system automatically sets the DI input for normally open button or the LEFT ARROW to start, stop and reset of the totalizer. The unit volume is a function of the MEAS. UNIT TOT parameter setting (totalizer unit).

Default: NO (Disabled poartial totalizer)

Range: NO;SI.

Press ENTER key, the display will be as shown here next.

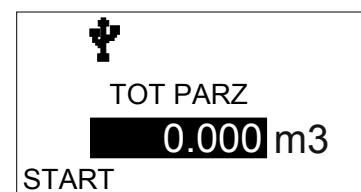
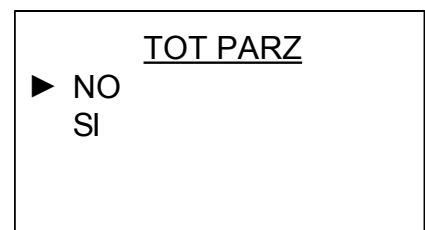
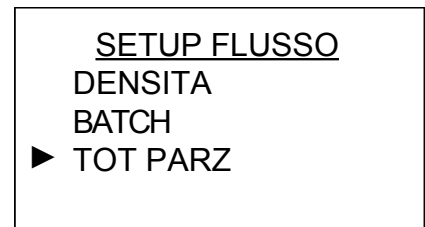
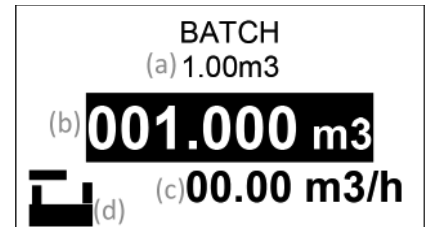
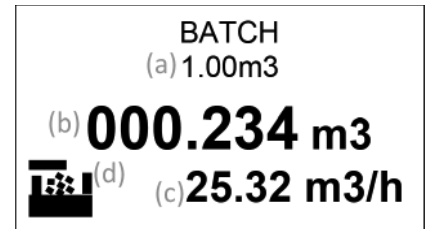
With UP ARROW changes the digit, with SCROLL moves the cursor.

Press ENTER to confirm.

The ☺ to confirm the parameter edit storage.

In run mode, pressing the UP ARROW key is possible to monitor the count.

Press the button (N.O.) connected to the DI input or the LEFT ARROW to get start the counting: pressing again the button, the counter is stopped and pressing once again the button, the partial totalizer will be resetted.



10.4.4.5 DIGITAL OUTPUT

The F/P digital output parameters are set in this menu.

Press ENTER to access.

The display will be as shown here next.

Press UP ARROW or SCROLL keys to select the desired function and press ENTER key to access

10.4.4.5.1 FREQ. MAX

Sets the maximum frequency in relation to MAX FLOW.

The digital output is active as a frequency output only when the parameter "VOL/PULSE" is set to 0

Default: 10000Hz;

Range: 100÷10000 Hz.

Press ENTER key, the display will be as shown here next.

With UP ARROW change the digit, with SCROLL moves the cursor.

Press ENTER to confirm.

The ☺ to confirm the parameter edit storage.

10.4.4.5.2 VOLUME/PULSE

Sets the volume per pulse. When this parameter is set to 0, the digital output is active as a frequency output (see "FREQ. MAX").

The measurement unit depends on the setting to MEAS. UNIT TOT parameter.

Default: 0000.00; Range: 0000.00÷9999.99

Press ENTER key, the display will be as shown here next.

With UP ARROW change the digit, with SCROLL moves the cursor.

Press ENTER to confirm.

The ☺ to confirm the parameter edit storage.

10.4.4.5.3 PULSE LENGTH

Sets the pulse width in ms.

Default: 0002ms; Range: 0001÷100ms

Press ENTER key, the display will be as shown here next.

With UP ARROW change the digit, with SCROLL moves the cursor.

Press ENTER to confirm.

The ☺ to confirm the parameter edit storage.

SYSTEM SETUP
DATA TIME
FLOW SETUP
▶ DIGITAL OUTPUT

DIGITAL OUTPUT
▶ FREQ. MAX
VOL / PULSE
PULSE LENGHT

DIGITAL OUTPUT
▶ FREQ. MAX
VOL / PULSE
PULSE LENGHT

FREQ. MAX

10000
Hz

DIGITAL OUTPUT
FREQ. MAX
▶ VOL / PULSE
PULSE LENGHT

VOL/PULSE

0000.00
M3

DIGITAL OUTPUT
FREQ. MAX
VOL / PULSE
▶ PULSE LENGHT

PULSE LENGHT

002
ms

10.4.4.5.4 PULSE FRONT

Sets the pulse output energy level. When set ACTIVE LOW the pulse count is low, when set ACTIVE HIGH, the pulse count is high.
Default: ACTIVE LOW; Range: ACTIVE LOW; ALTO.

DIGITAL OUTPUT
VOL / PULSE
PULSE LENGHT
► PULSE FRONT

Press ENTER key, the display will be as shown here next.
With UP ARROW or SCROLL select the option.
Press ENTER to confirm.

The ☺ to confirm the parameter edit storage.

10.4.4.5.5 DGT OUT COPY RL1

Associated to the RL1 exit (default), or to the F/P open collector output, the function set to the DGT OUT COPY RL1 parameter.
The available functions are:

- NO; the RL1 output is associated with the function set to the parameter "RL1 FUNC" (default setting)
 - YES; the F/P open collector output is associated with the function set to the parameter "RL1 FUNC"; eg. with "RL1 FUNC" set to "MAX", the F/P output state is low (0Vdc) during the non-alarm condition, and is high (24Vdc) during the alarm condition.
- N.B. - Selecting the "YES" function the F/P output can not be used as an pulse counter or frequency output
Default: NO; Range: YES; NO

PULSE FRONT
► ACTIVE LOW
ACTIVE HIGH

DIGITAL OUTPUT
PULSE LENGHT
PULSE FRONT
► DGT OUT COPY RL1

Press ENTER key, the display will be as shown here next.
With UP ARROW or SCROLL select the option.
Press ENTER to confirm.

The ☺ to confirm the parameter edit storage.

DGT OUT COPY RL1
► NO
YES

10.4.4.6 RS485 SETUP

The configuration parameters of the RS485 port are set in this menu.
Press ENTER to access.

SYSTEM SETUP
FLOW SETUP
DIGITAL OUTPUT
► RS485 SETUP

The display will be as shown here next.
Press UP ARROW or SCROLL keys to select the desired function and press ENTER key to access

RS485 SETUP
► NETWORK ID
BAUD RATE
PARITY

10.4.4.6.1 NETWORK ID

Set the unity UID in RS485 network

Default: 001

Range: 001÷247.

Press ENTER key, the display will be as shown here next.

With UP ARROW change the digit, with SCROLL moves the cursor.

Press ENTER to confirm.

The ☺ to confirm the parameter edit storage.

10.4.4.6.2 BAUD RATE

Sets the RS485 output Baud Rate.

Default: 9600; Range: 9600; 19200; 38400; 56000; 57600; 115200.

Press ENTER key, the display will be as shown here next.

With UP ARROW or SCROLL select the option.

Press ENTER to confirm.

The ☺ to confirm the parameter edit.

10.4.4.6.3 PARITY

Sets the RS485 output Parity.

Default: NONE

Range: NONE; ODD; EVEN.

Press ENTER key, the display will be as shown here next.

With UP ARROW or SCROLL select the option.

Press ENTER to confirm.

The ☺ to confirm the parameter edit.

10.4.4.6.4 STOP BITS

Sets the RS485 output Stop Bit

Default: 1 BIT

Range: 1 BIT; 2 BITS.

Press ENTER key, the display will be as shown here next.

With UP ARROW or SCROLL select the option.

Press ENTER to confirm.

The ☺ to confirm the parameter.

RS485 SETUP

► NETWORK ID
BAUD RATE
PARITY

UID

001

RS485 SETUP

NETWORK ID
► BAUD RATE
PARITY

BAUD RATE

► 9600
19200
38400

RS485 SETUP

NETWORK ID
BAUD RATE
► PARITY

PARITY

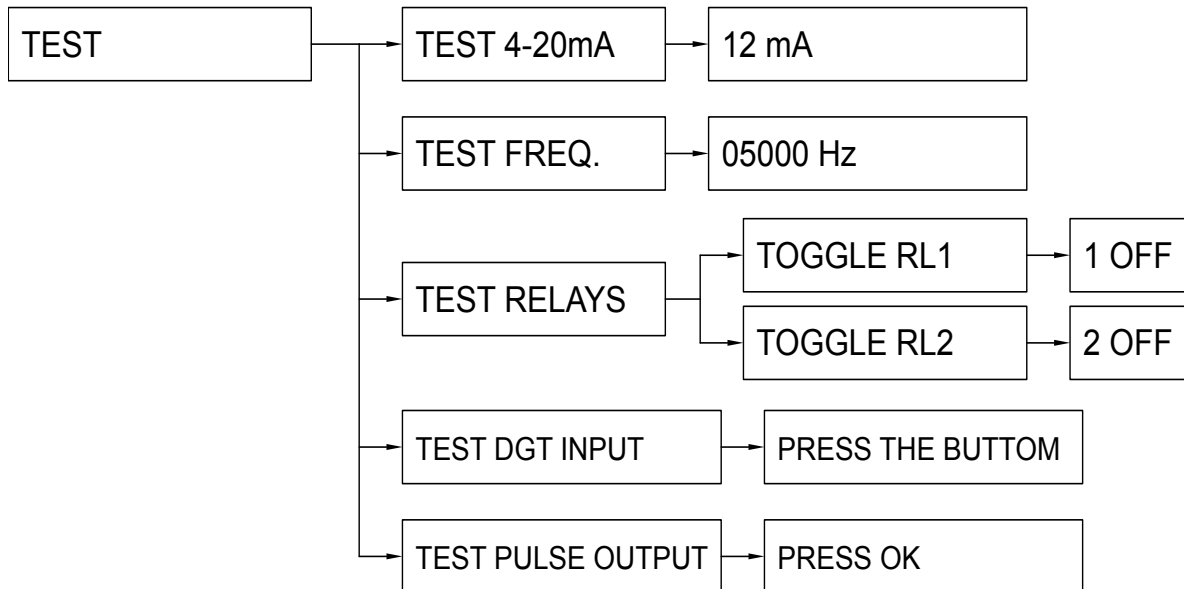
► NONE
ODD
EVEN

RS485 SETUP

BAUD RATE
PARITY
► STOP BITS

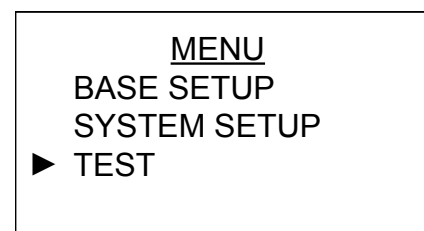
STOP BITS

► 1 BIT
2 BITS

10.4.5 TEST menu**10.4.6 OUTPUT SIGNAL TEST (TEST)**

Press ENTER key from run mode: the display will be as shown here next, then press SCROLL key to select “SYSTEM SETUP” menu and press ENTER to enter.

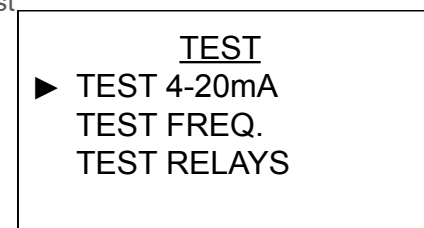
Press UP ARROW or SCROLL keys to select the desired function and press ENTER key to access.

**10.4.6.1 TEST 4-20mA**

“TEST 4-20mA” force the 4÷20mA signal output to the value set for the test

Example: Setting the testing value at 16.2 mA, the actual output signal value is forced to 16.2mA. When exiting the TEST function, the 4-20mA output signal returns to be in compliance with the actual measurement FLOW set function..

Default: 12mA. Range: 4÷20mA

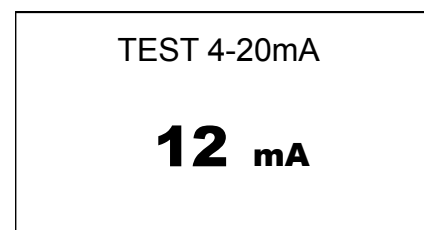


Press ENTER key, the display will be as shown here next.

With UP ARROW change the digit, with SCROLL moves the cursor.

Press ENTER to confirm the test value.

Press LEFT ARROW to exit.



10.4.6.2 TEST FREQ

“TEST FREQ” force the frequency signal output to the value set for the test.

Example: Setting the testing value at 2000Hz, the actual output signal value is forced to 2000Hz. When exiting the TEST function, the frequency output signal returns to be a in compliance with the actual measurement flow set function.. Default: 5000 Hz.

Range: 0÷10000 Hz

Press ENTER key, the display will be as shown here next.

With UP ARROW change the digit, with SCROLL moves the cursor.

Press ENTER to confirm the test value.

Press LEFT ARROW to exit.

TEST
TEST 4-20mA
▶ TEST FREQ.
TEST RELAYS

TEST FREQ.

05000
Hz

10.4.6.3 TEST RELE

Test the RL1 and RL2 relay outputs is possible in this menu.

Press ENTER to access.

The display will be as shown here next.

Press UP ARROW or SCROLL keys to select the desired function and press ENTER key to access.

TEST
TEST 4-20mA
TEST FREQ.
▶ TEST RELAYS

TEST RELAYS
▶ TOGGLE RL1
TOGGLE RL2

10.4.6.3.1 TOGGLE RL1/2

Forcing the status change of the output RL1/2 relay

Press ENTER key, the display will be as shown here next.

Press ENTER to switch from the OFF state to the ON state.

Press LEFT ARROW to exit.

TEST RELAYS
▶ TOGGLE RL1
TOGGLE RL2

1 OFF / ON

10.4.6.4 TEST DGT INPUT

To verify the “D.I.” digital input funcion.

Not available on this instruments.

TEST

TEST FREQ.
TEST RELAYS
TEST DGT INPUT



PUSH THE BUTTON

10.4.6.5 TEST PULSE OUTPUT

To verify the F/P pulse output funcionalitiy.

Each time the ENTER key is pressed, the F/P output generates a pulse with a length equal to what set in the “PULSE LENGTH ms” parameter, and simultaneously increments the test counter shown in the display center.

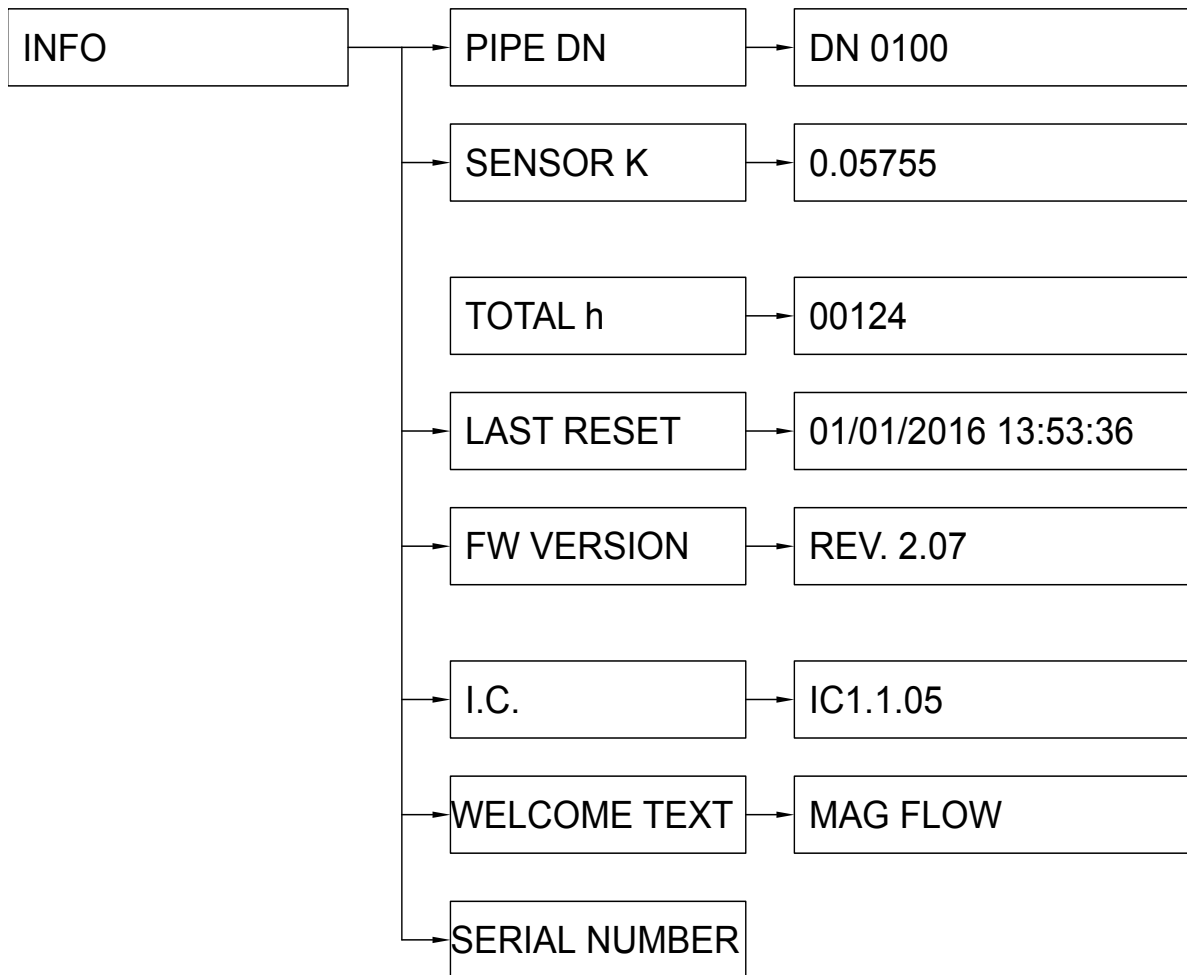
TEST

TEST RELAYS
TEST DGT INPUT
TEST PULSE OUTPUT

01

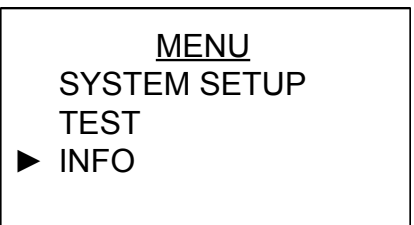
PRESS OK

10.4.7 Menù. INFO

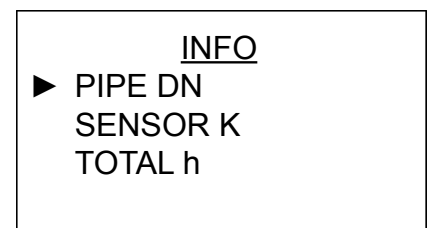


10.4.8 SYSTEM INFORMATION (INFO)

Press ENTER key from run mode: the display will be as shown here next, then press SCROLL key to select "INFO" menu and press ENTER to enter.



Press UP ARROW or SCROLL keys to select the desired function and press ENTER key to access.



10.4.8.1 PIPE DN

Press ENTER to access.

It is useful to check correspondence with the “Connection” data reported on the adhesive rating plate located on the sensor pipe. The display shows the set DN of the measuring pipe.

INFO

► PIPE DN
SENSOR K
TOTAL h

PIPE DN

DN0100

10.4.8.2 SENSOR K

Press ENTER to access.

It is useful to check correspondence with the “SENSOR K” data reported on the adhesive rating plate located on the sensor pipe. The display shows the set SENSOR K of the measuring pipe.

INFO

PIPE DN
► SENSOR K
TOTAL h

SENSOR K

0.05755

10.4.8.3 TOTAL h

Press ENTER to access.

The display shows the total hours of the flowmeter operation.

INFO

PIPE DN
SENSOR K
► TOTAL h

TOTAL h

00251

10.4.8.4 LAST RESET

Press ENTER to access.

The display shows the date and time of the last reset of the totalizer.

INFO

SENSOR K
TOTAL h
► LAST RESET

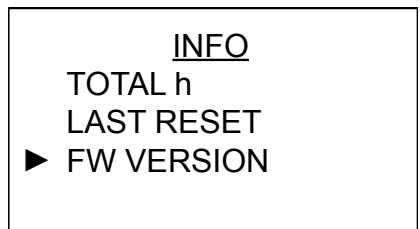
LAST RESET

01/01/2016 13:53:36

10.4.8.5 FW VERSION

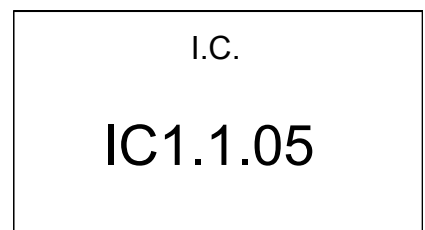
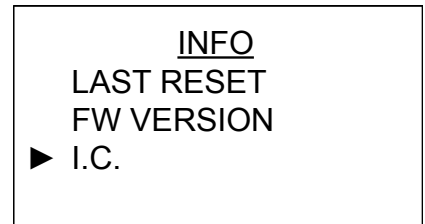
Press ENTER to access.

The display shows the firmware version.

**10.4.8.6 I.C.**

Press ENTER to access.

The display shows the configuration index (I.C.) of the flowmeter.

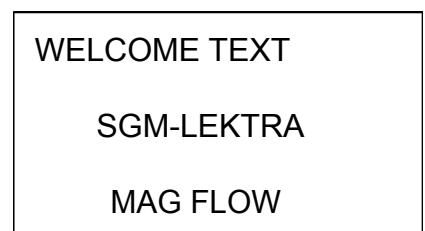
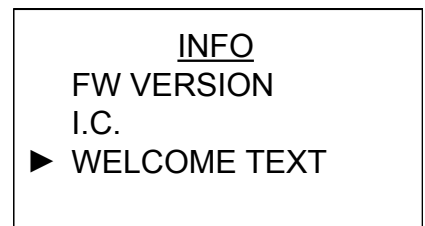
**10.4.8.7 WELCOME TEXT**

Press ENTER to access.

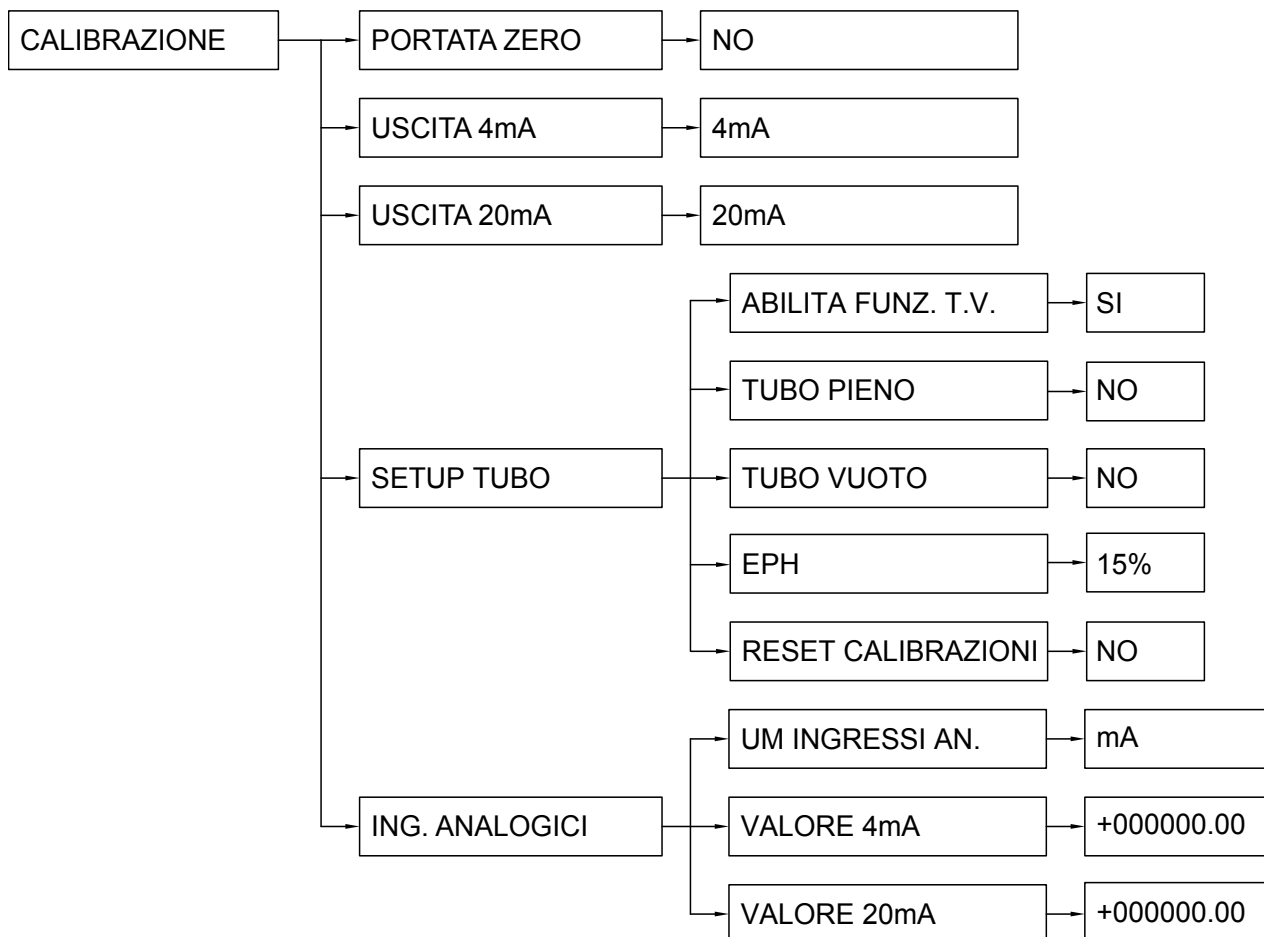
The display will be as shown here next.

With UP ARROW/SCROLL change the digit, with ENTER moves the cursor.

To confirm press ENTER until the cursor reaches the end of second row and automatically comes back to info menu.

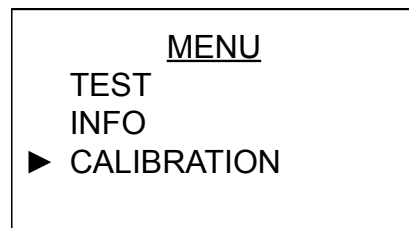


10.4.9 CALIBRATION Menu.

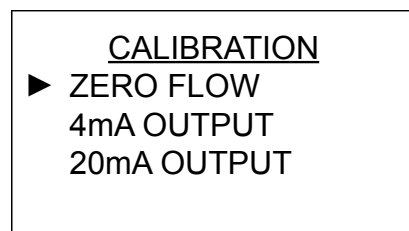


10.4.10 SYSTEM CALIBRATION (CALIBRATION)

Press ENTER key from run mode: the display will be as shown here next, then press SCROLL key to select “CALIBRATION” menu and press ENTER key to access.



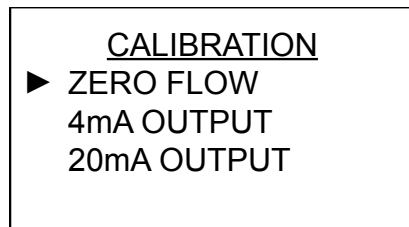
Press UP ARROW or SCROLL keys to select the desired function and press ENTER key to access.



10.4.10.1 ZERO FLOW

Zero flow measurement calibrate. The sensor must be full and the flow stopped.

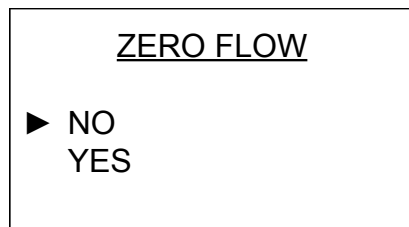
Default: NO Range: YES - NO.



Press ENTER key, the display will be as shown here next.

With UP ARROW or SCROLL select the option.

Press ENTER to confirm.



10.4.10.2 4mA OUTPUT

Performs calibration of 4mA

Press ENTER key, the display will be as shown here next.

Connect a mA meter to the analog output; if the detected current measurement is different from 4 mA it is possible to correct the value of the output current with UP ARROW (UP) or SCROLL (DOWN).

Press ENTER (OK) to confirm.

CALIBRATION
ZERO FLOW
► 4mA OUTPUT
20mA OUTPUT

4mA

UP DOWN OK

10.4.10.3 20mA OUTPUT

Performs calibration of 20mA.

Press ENTER key, the display will be as shown here next.

Connect a mA meter to the analog output; if the detected current measurement is different from 20 mA it is possible to correct the value of the output current with UP ARROW (UP) or SCROLL (DOWN).

Press ENTER (OK) to confirm.

CALIBRATION
ZERO FLOW
4mA OUTPUT
► 20mA OUTPUT

20mA

UP DOWN OK

10.4.10.4 PIPE SETUP

Performs the calibration of empty pipe sensitivity press.

ENTER to access.

The display will be as shown here next.

press UP arrow or SCROLL keys to select the desired function and press ENTER key to access.

CALIBRATION
4mA OUTPUT
20mA OUTPUT
► PIPE SETUP

PIPE SETUP
► ENABLE E.P. FUNCT.
FULL PIPE
EMPTY PIPE

10.4.10.4.1 ENABLE E.P. FUNCT.

Enables or disables the empty pipe detection.

Default: YES

Range: YES - NO

Press ENTER key, the display will be as shown here next.

With UP arrow or SCROLL select the option.

Press ENTER to confirm.

PIPE SETUP
► ENABLE E.P. FUNCT.
FULL PIPE
EMPTY PIPE

ENABLE E.P. FUNCT.
► NO
YES

10.4.10.4.2 FULL PIPE

ATTENTION: pipe must be full before continue.

Performs a full pipe recognition self calibration.

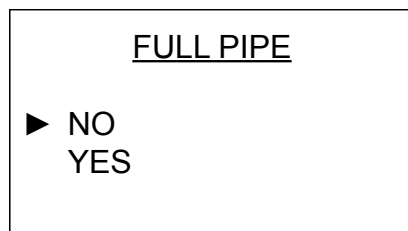
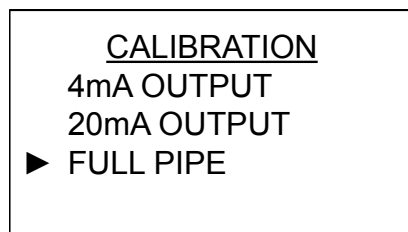
Default: NO Range: YES - NO.

Press ENTER key, the display will be as shown here next.

With UP ARROW or SCROLL select the option.

Press ENTER to confirm.

The successful calibration is confirmed by the **OK** symbol.

**10.4.10.4.3 EMPTY PIPE**

ATTENTION: pipe must be empty before continue.

Performs an empty pipe recognition self calibration.

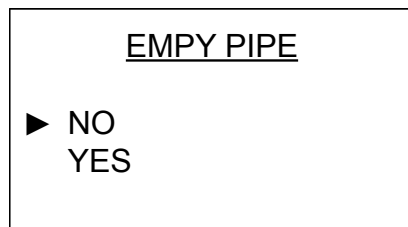
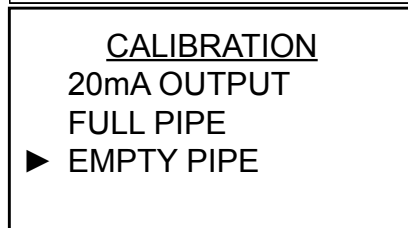
Default: NO Range: YES - NO.

Press ENTER key, the display will be as shown here next.

With UP ARROW or SCROLL select the option.

Press ENTER to confirm.

The successful calibration is confirmed by the **OK** symbol.

**10.4.10.4.4 EPH**

Sets the system sensibility level to recognize the air presence in the sensor: the higher the value, the greater the sensitivity.

Default: 15%

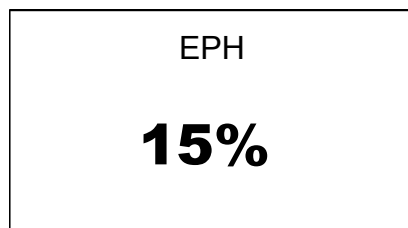
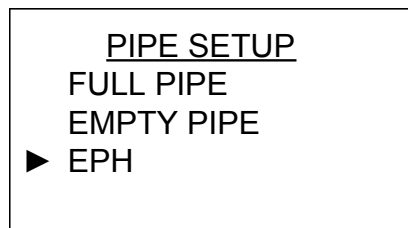
Range: 010÷90%.

Press ENTER key, the display will be as shown here next.

With UP ARROW change the digit, with SCROLL moves the cursor.

Press ENTER to confirm.

The ☺ to confirm the parameter edit storage.



10.4.10.5 ANALOG INPUT

The measuring ranges of the analog inputs can be set in this menu.
Press ENTER to access.

CALIBRATION
20mA OUTPUT
PIPE SETUP
► ANALOG INPUT

The display will be as shown here next.
Press UP ARROW or SCROLL keys to select the desired function and press ENTER key to access.

ANALOG INPUT
► ANALOG INPUT UM
4mA VALUE
20mA VALUE

10.4.10.5.1 ANALOG INPUT UM

Specifies the measurement unit of analog signals to AN1 and AN2 inputs.
Default: mA; Range: mA; C; F; KPa; Pa; bar; mbar; psi; mH2O;
mmH2O; mmHg; atm.

ANALOG INPUT
► ANALOG INPUT UM
4mA VALUE
20mA VALUE

Press ENTER key, the display will be as shown here next.
With UP ARROW or SCROLL select the option.
Press ENTER to confirm.
The ☺ to confirm the parameter edit storage.

ANALOG INPUT UM
► mA
C
F

10.4.10.5.2 4mA VALUE

Set the value to be associated to the begin scale of the analog inputs.
Default: +000000.00
Range: -999999.99÷+999999.99.

ANALOG INPUT
ANALOG INPUT UM
► 4mA VALUE
20mA VALUE

Press ENTER key, the display will be as shown here next.
With UP ARROW change the digit, with SCROLL moves the cursor.
Press ENTER to confirm.

4mA VALUE
+000000.00
mA

The ☺ to confirm the parameter edit storage.

10.4.10.5.3 20mA VALUE

Set the value to be associated to the end scale of the analog inputs.
Default: +000000.00
Range: -999999.99÷+999999.99.

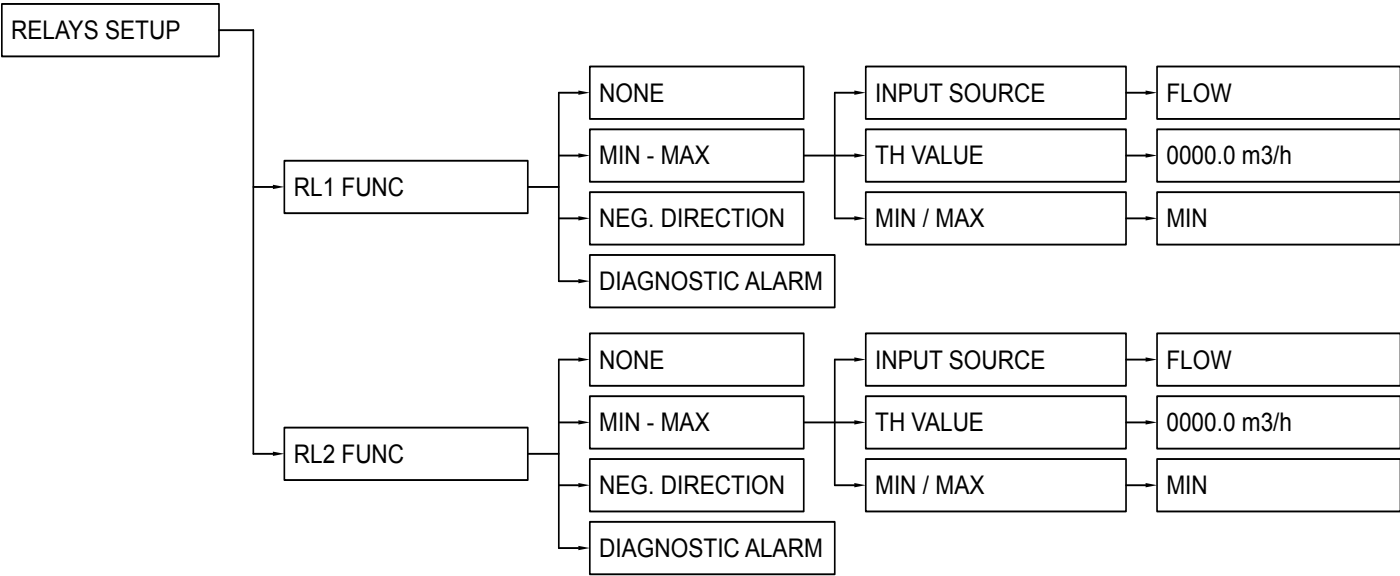
ANALOG INPUT
ANALOG INPUT UM
4mA VALUE
► 20mA VALUE

Press ENTER key, the display will be as shown here next.
With UP ARROW change the digit, with SCROLL moves the cursor.
Press ENTER to confirm.

20mA VALUE
+000000.00
mA

The ☺ to confirm the parameter edit storage.

10.4.11 RELAYS SETUP MENU



10.4.12 RELAY CONFIGURATION (RELAYS SETUP)

Press ENTER key from run mode: the display will be as shown here next, then press SCROLL key to select “RELAYS SETUP” menu and press ENTER to enter.

Press UP ARROW or SCROLL keys to select the desired function and press ENTER key to access.

10.4.12.1 RL1/RL2 FUNC

Submenu for output relay RL1/RL2 settings.

Press UP ARROW or SCROLL keys to select the desired function and press ENTER key to access.

10.4.12.1.1 NONE

Disable the RL1/RL2 output
Press ENTER to confirm.

MENU

INFO
CALIBRATION
► RELAYS SETUP

RELAYS SETUP

► RL1 FUNC
RL2 FUNC

RELAYS SETUP

► RL1 FUNC
RL2 FUNC

RL1/RL2 FUNC

► NONE
MIN-MAX
NEG. DIRECTION

RL1/RL2 FUNC

► NONE
MIN-MAX
NEG. DIRECTION

10.4.12.1.2 MIN-MAX

Settings for the activation of the RL1/RL2 alarm

RL1/RL2 FUNC
NONE
► MIN-MAX
NEG. DIRECTION

Press UP ARROW or SCROLL keys to select the desired function and press ENTER key to access.

MIN-MAX
► INPUT SOURCE
TH VALUE
MIN/MAX

10.4.12.1.2.1 INPUT SOURCE

Associates the alarm signal to a measured variable

Default: FLOW Range: FLOW; ANALOG 1; ANALOG 2;
ANALOG 1- ANALOG 2

MIN-MAX
► INPUT SOURCE
TH VALUE
MIN/MAX

Press ENTER key, the display will be as shown here next.

With UP ARROW or SCROLL select the option.

Press ENTER to confirm.

INPUT SOURCE
► FLOW
ANALOG 1
ANALOG 2

The ☺ to confirm the parameter edit storage.

10.4.12.1.2.2 TH VALUE

Set the alarm threshold.

The associated measurement unit is in relation to the
“ INPUT SOURCE “ setting”.

MIN-MAX
INPUT SOURCE
► TH VALUE
MIN/MAX

Press ENTER key, the display will be as shown here next.

With UP ARROW change the digit, with SCROLL moves the cursor.

Press ENTER to confirm.

TH VALUE
0010.00
m3/h

The ☺ to confirm the parameter edit storage.

10.4.12.1.2.3 MIN/MAX

Set the relay operation mode: minimum or maximum alarm
with relay de-energized and open contact

Default: MIN Range: MIN – MAX

MIN-MAX
INPUT SOURCE
TH VALUE
► MIN/MAX

Press ENTER key, the display will be as shown here next.

With UP ARROW or SCROLL select the option.

Press ENTER to confirm.

MIN/MAX
► MIN
MAX

The ☺ to confirm the parameter edit storage.

10.4.12.1.3 NEG. DIRECTION

Activate the RL1/RL2 output as a reverse instantaneous negative flow rate alarm.

Press ENTER to confirm.

RL1 FUNC

NONE

MIN-MAX

► NEG. DIRECTION

10.4.12.1.4 ALARM

Activate the RL1/RL2 output for diagnostic alarm: coil connection interruption; empty pipe

Press ENTER to confirm.

RL1 FUNC

MIN-MAX

NEG. DIRECTION

► DIAGNOSTIC ALARM

11-TROUBLESHOOTING

Problems in the magnetic flowmeter system are usually indicated by incorrect output readings from the system, error messages, or failed tests. Consider all sources when identifying a problem in your system.

Symptom	Potential Cause	Corrective Action
Output at 0 mA.	No power to transmitter.	Check power source and connections to the transmitter.
	Analog output improperly configured.	Check the connections
	Electronics failure.	Replace the electronics boards
Output at 4mA	Min Flow Cutoff set too high	Configure the Min flow cutoff to a lower value or increase the flowrate above the min flow cut off value.
	Flow is in reverse direction	Enable Invert Flow Dir function
	Shorted coil	Check coil
	Empty pipe	Fill pipe
	Electronics failure	Replace the electronics boards
Pulse output at zero, regardless of flow	No power to transmitter	Check power source and connection to the transmitter
	Wrong wiring	Check pulse output wiring at digital output terminals. Refer to wiring diagram for pulse output
	Reverse flow	Enable Invert Flow Dir function
	Electronics failure	Replace the electronics boards
Reading doesn't appear to be within rated accuracy	Transmitter, control system, or other receiving device not configured properly	Check all configuration variables for the transmitter, flowpipe, communicator, and/or control system. Perform a loop test to check the integrity of the circuit
	Electrode Coating	Downsize flowtube to increase flowrate above 3 m/s. Periodically clean flowpipe
	Air in line	Move the flowpipe to another location in the process line to ensure that it is full under all conditions
	Flow rate is below 0.3 m/s (specification issue)	See accuracy requirement for specific transmitter and flowpipe
	The "Zero flow" calibration was not performed when the flowpipe is full, or flowrate is zero	Perform the "zero flow" function
	Empty pipe Error	Perform the full pipe and empty pipe calibration
	Coil Error	Check the coil connection
	Transmitter failure	Replace the electronics boards

In some circumstances, process conditions themselves can cause the meter output to be unstable. The basic procedure for addressing a noisy process situation is outlined below. Complete them in order. When the output attains the desired stability, no further steps are required:

1. Increase the Damping
2. Check the Ground connection

If the basic steps for troubleshooting are not sufficient contact our technical support.

Symptom	Potential Cause	Corrective Action
Noisy Process	Chemical additives upstream of magnetic flowmeter	Move injection point downstream of magnetic flowmeter.
	Sludge flows—Mining/Coal/Sand/Slurries (other slurries with hard particles)	Decrease flow rate.
	Styrofoam or other insulating particles in process	Consult factory
	Electrode coating	Downsize flowtube to increase flow rate. Periodically clean Sensor pipe.
	Air in line	Move the Sensor pipe to another location in the process line to ensure that it is full under all conditions
Meter output is unstable	Electrode incompatibility	Check the chemical compatibility with electrode material
	Improper grounding	Check ground wiring. See wiring and grounding procedures
	High local magnetic or electric fields nearby	Move magnetic flowmeter far from the electromagnetic noise sources
	Sticky valve (look for periodic oscillation of meter output)	Correct valve sticking
	Analog output loop problem	Check that the 4–20 mA loop matches the digital value. Perform loop test

12-FACTORY TEST AND QUALITY CERTIFICATE



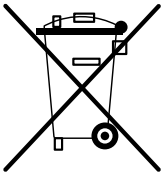
In conformity to the company and check procedures I certify that the equipment:



(Electromagnetic induction flow measurement)

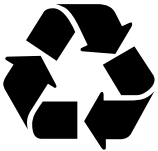
is conform to the technical requirements on Technical Data and it is made in conformity to the procedure

Quality Control Manager: Production and check date:



This mark on the instrument indicates that the product and its electronic accessories must not be disposed of with other household waste at the end of their useful life.

To avoid possible damage to the environment or human health resulting from uncontrolled waste disposal, please return the equipment directly to a specialized recycling company, in compliance with local regulations.



NI - MH

This instrument is powered by a battery type 2,4V triple-A, 0.6Ah NiMH; at the end of the life of the battery or the instrument, do not disperse it in the environment. The battery must be disposed of in the appropriate collection centers.

