



The FLOWX3 NEW F9.60M & F9.63M Insertion Magmeters are suitable to measure flowrate in both metal and thermoplastic pipelines. No moving mechanical parts and the high quality materials allow the measurement of liquids where suspended solids can be present or of abrasive liquids as long as they are conductive and homogeneous. The sensor can be assembled into the standard FLS fitting range so it is perfectly interchangeable with the paddlewheel sensors. The new design allows an accurate flow measurement over a wide dynamic range in pipe sizes from DN15 (0.5") to DN600 (24"). The NEW F9.60M & F9.63M with built in display provide a local indication of instant flow-rate, permanent and resettable totalizer. A complete choice of analog and digital outputs plus the bi-directional flow indication make them very complete and updated devices suitable for a wide range of applications.

## Main Features

- No moving parts, no wear, maintenance free.
- High mechanical resistance.
- For DN15 (0.5") to DN600 (24") pipes.
- Flow Rate Range:
  - F9.60M: from 0.05 to 8 m/s (0.15 to 25 ft/s)
  - F9.63M: from 0.15 to 8 m/s (0.5 to 25 ft/s).
- Accurate measurement of dirty liquids.
- Zero flow output with empty pipe.
- Bi-directional flow measurement (F9.60M only).
- Low pressure drop.

## Applications

- Water and waste water treatment.
- Raw water intake.
- Industrial water distribution.
- Textile industry.
- Pools, spas and aquariums.
- HVAC.
- Chemical industry.
- Metal treatments.
- Processing and manufacturing industry.

## Operating Principle

If an electrical conductor is caused to move in a magnetic field, such movement induces a voltage in the conductor (Faraday's law). The magnetic coil in the body of the instrument generates a magnetic field perpendicular to the flow direction.

The magnetic field and the velocity induce a voltage between the electrodes. The voltage is directly proportional to the flow velocity.

## Connections to FLOWX3 Instruments

F9.60M Frequency output is compatible with the list of instruments marked into the following table.

FLOWX3 Magmeter	FLOWX3 Instruments						
	F9.00	F9.01	F9.02	F9.03	F9.20	F9.50	F9.51
<b>F9.60M</b>		■	■	■		■	■
<b>F9.63M</b>		■	■	■		■	■

## Installation Fittings

F9.60M Frequency output is compatible with the list of instruments marked into the following table.

	Type	Description
	Plastic Tees	Size: D20 to D50 (0.5" to 1.5") Materials: PVC, CPVC, PP, PVDF
	CPVC Clamp Saddles	Size: D63 to D225 (2" to 8") Insert materials: CPVC, PVDF
	PP Clamp Saddles	Size: D250 to D315 (10" to 12") Insert material: CPVC
	PVC Wafer Fittings	Size: D280 and D315 (10" and 12") Insert material: CPVC
	GR-PP Wafer Fittings	Size: D280 and D315 (10" and 12") Insert material: CPVC
	Plastic Weld-on Adapters	Size: D63 to D315 Materials: PVC, CPVC, PP, PE
	316L SS Tees	Size: D25 to D40 BSP Female Threaded
	Metal Strap-on Saddles	Size: DN80 to DN450 Insert material: CPVC Special order for other sizes
	316L SS Weld-on Adapters	Size: D50 to D600 (1.5" to 24")

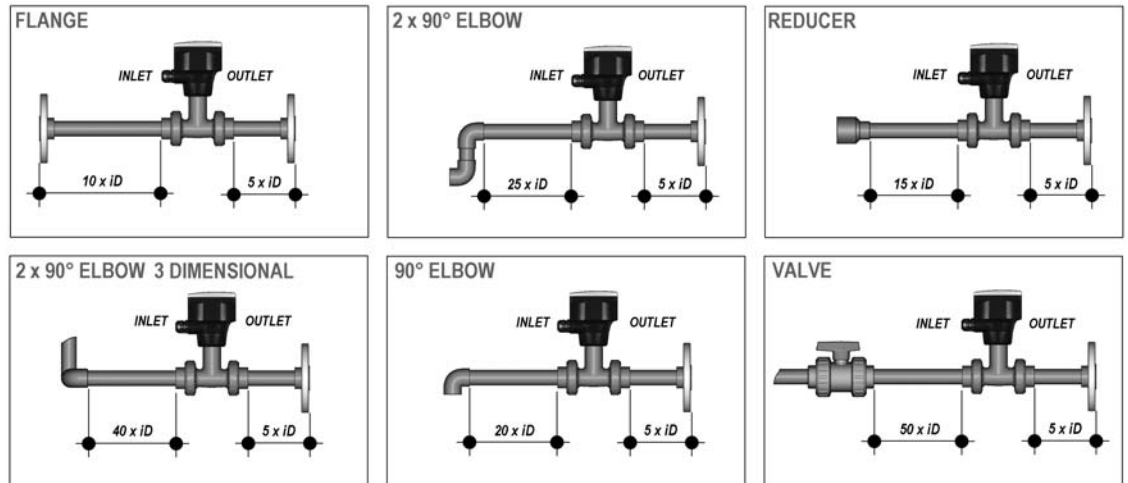
## Installation

Different pipe configurations and obstacles in the flow line such as valves, elbows, pipe bends and strainers create variations on the flow profile.

■ The six most common installation configurations are shown to help selecting the best location in the pipe line for the flow sensor.

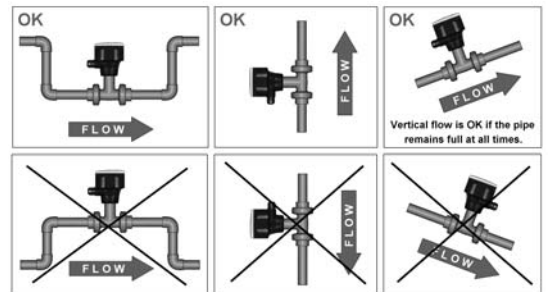
■ For more information, please refer to EN ISO 5167-1.

■ Always maximize the distance between flow sensor and pump.

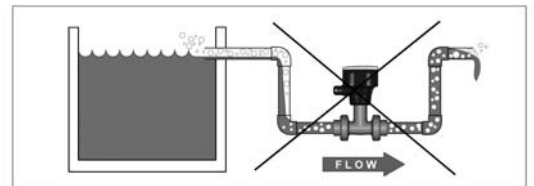


The first three configurations ensure that the pipe is always full: for a correct measurement the sensor can NOT be exposed to air bubbles at any time.

Avoid the other three situations unless you are absolutely sure the sensor is not exposed to air bubbles.



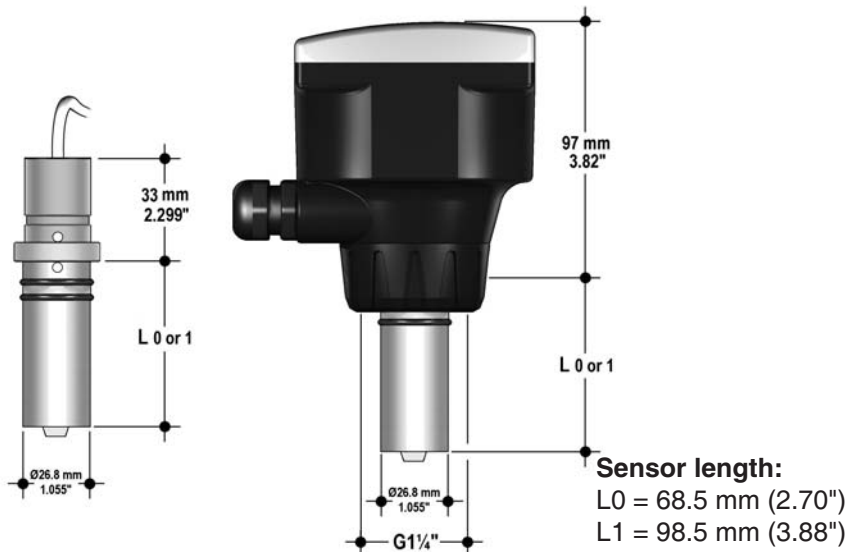
In gravity-flow systems the connection to the tank must be designed so the level does not drop below the outlet: this to avoid pipe to draw air in from the tank causing an erratic measurement of the Magmeter.



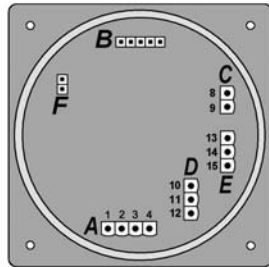
## Dimensions

Sensor body

F9.60M Magmeter with LCD display



## Terminal View



Power supply	A	1	+ VDC
		2	+ LOOP
		3	- LOOP
		4	- VDC
Sensor connections		B	
Open collector OUTPUT	C	8	O.C.+
		9	O.C.-
OUT 1 RELAY	D	RELAY 1	
		10	NC
		11	COM
		12	NO
OUT 2 RELAY	E	RELAY 2	
		13	NC
		14	COM
		15	NO
Sensor connections		F	

## Technical Data

### General

- Pipe Size Range: DN15 to DN600 (0.5" to 24"). Please refer to Installation Fitting section for more details.
- Flow Rate Range:
  - F9.60M: from 0.05 to 8 m/s (0.15 to 25 ft/s)
  - F9.63M: from 0.15 to 8 m/s (0.5 to 25 ft/s)
- Linearity:  $\pm 1\%$  of reading + 1,0 cm/s.
- Repeatability:  $\pm 0.5\%$  of reading.
- Enclosure: IP65.
- Materials:
  - Case: PC
  - Gasket: EPDM
  - Keypad: 5 button silicone rubber.
- Display:
  - 3 line LCD: 2 x 12 alphanumeric lines and 1 icon line
  - Update rate: 1 second
  - Contrast: User adjustable with 5 levels
  - Backlight version available.
- Wetted Materials:
  - Sensor body: 316L SS/PVDF
  - O-rings: EPDM or FPM
  - Electrodes: 316L SS.

### Electrical

- Power Supply:
  - 12 to 24 VDC  $\pm 10\%$  regulated (reverse polarity and short circuit protected)
  - Maximum current consumption: 300 mA
  - Protective earth:  $< 10 \Omega$
- Current output:
  - 4 - 20 mA, isolated, fully adjustable
  - Max. loop impedance:  $600 \Omega @ 24 \text{ VDC}$
  - Positive, negative or bi-directional flow indication.
- Open Collector output (OPT):
  - Type: solid state NPN, optically isolated
  - Output modes: Off, MIN, MAX, Window, Proportional Pulse, Freq.
  - Max. Frequency: 500 Hz
  - Max. Pull-up Voltage: 24 VDC
  - Max. Current: 50 mA, current limited
  - Compatible with FLOWX3 F9.01, F9.02, F9.03, F9.50 and F9.51
  - Hysteresis: User selectable plus timer delay
  - Trigger delay: adjustable
- Relay Output (OUT1 and OUT2):
  - Type: mechanical SPDT contact
  - Output modes: Off, MIN, MAX, Window, Proportional Pulse
  - Max voltage rating: 3A @ 30VDC, 3A @ 250VAC resistive load
  - Hysteresis: User selectable plus timer delay
  - Trigger delay: adjustable
  - Expected mechanical life (min. operations):  $10^7$
  - Expected electrical life (min. operations):
    1. N.O. switching capacity 5A 250VAC:  $5 \times 10^4$
    2. N.C. switching capacity 2A 250VAC:  $2 \times 10^5$

## Technical Data

### Environmental

- Storage Temperature: -15°C to +80°C (5°F to 176°F).
- Ambient Temperature: -10°C to +70°C (14°F to 158°F).
- Relative Humidity: 0 to 95% (non-condensing).
- Fluid conditions:
  - homogeneous liquids, pastes or slurries, also with solid content
  - Min Electrical Conductivity: 20 µS
  - Temperature: -10°C to + 70°C (14°F to 158°F).
- Max. operating pressure:
  - 16 bar @ 25°C (232 psi @ 77°F)
  - 8.6 bar @ 70°C (124 psi @ 158°F).

### Standards & Approvals

- Manufactured under ISO 9001 (Quality).
- Manufactured under ISO 14001 (Environmental Management).
- CE.

## Ordering Data

### FLOWX3 NEW F9.60M.XX

Part No.	Power supply	Flow Rate	Output	Sensor Length	Body/Electrodes	Sensor O-rings	Enclosure
<b>F9.60M.09</b>	12-24 VDC	0,05-8 m/s bi-directional	1 (4-20 mA) 1 (Open Collector), 2 (Relay)	L0	316L SS & PVDF 316L SS	EPDM	IP65
<b>F9.60M.10</b>	12-24 VDC	0,05-8 m/s bi-directional	1 (4-20 mA) 1 (Open Collector), 2 (Relay)	L0	316L SS & PVDF 316L SS	FPM	IP65
<b>F9.60M.11</b>	12-24 VDC	0,05-8 m/s bi-directional	1 (4-20 mA) 1 (Open Collector), 2 (Relay)	L1	316L SS & PVDF 316L SS	EPDM	IP65
<b>F9.60M.12</b>	12-24 VDC	0,05-8 m/s bi-directional	1 (4-20 mA) 1 (Open Collector), 2 (Relay)	L1	316L SS & PVDF 316L SS	FPM	IP65

Backlight version available: just add "L" at the end of Part No. Example: F9.60M.09.L

### FLOWX3 NEW F9.63M.XX

Part No.	Power supply	Flow Rate	Output	Sensor Length	Body/Electrodes	Sensor O-rings	Enclosure
<b>F9.63M.09</b>	12-24 VDC	0,15-8 m/s mono-directional	1 (4-20 mA) 1 (Open Collector), 2 (Relay)	L0	316L SS & PVDF 316L SS	EPDM	IP65
<b>F9.63M.10</b>	12-24 VDC	0,15-8 m/s mono-directional	1 (4-20 mA) 1 (Open Collector), 2 (Relay)	L0	316L SS & PVDF 316L SS	FPM	IP65
<b>F9.63M.11</b>	12-24 VDC	0,15-8 m/s mono-directional	1 (4-20 mA) 1 (Open Collector), 2 (Relay)	L1	316L SS & PVDF 316L SS	EPDM	IP65
<b>F9.63M.12</b>	12-24 VDC	0,15-8 m/s mono-directional	1 (4-20 mA) 1 (Open Collector), 2 (Relay)	L1	316L SS & PVDF 316L SS	FPM	IP65

Backlight version available: just add "L" at the end of Part No. Example: F9.63M.09.L

## Spare Parts

### Mechanical Replacements

Item	Part No.	Name	Description
1	F9.SP2	Cover	Cover frontale in PC, 3 led
2	F3.KC1	Magmeter Compact mounting kit	Plastic adapter with gasket, compact cap, locking ring and 4 fixing screws
3	F9.SP4.1	PG 13.5	PG 13.5 Cable Gland for Compact kit
3	F9.SP4.2	PG 11	PG 11 Cable Gland for Compact kit
4	F3.SP3.1	O-Rings	EPDM Sensor body O-rings
4	F3.SP3.2	O-Rings	FPM Sensor body O-rings

### Electronic Replacements

Item	Part No.	Name	Description
1	F9.60M.SP1	Electronic device	Magmeter electronic device with LCD display + 4-20 mA, Open Collector and Relay outputs for bi-directional flow
2	F3.60M.SP09	Magmeter flow sensor for bi-directional flow	316L SS/PVDF body EPDM O-Rings – L0 length
2	F3.60M.SP10	Magmeter flow sensor for bi-directional flow	316L SS/PVDF body FPM O-Rings – L0 length
2	F3.60M.SP11	Magmeter flow sensor for bi-directional flow	316L SS/PVDF body EPDM O-Rings – L1 length
2	F3.60M.SP12	Magmeter flow sensor for bi-directional flow	316L SS/PVDF body FPM O-Rings – L1 length

Item	Part No.	Name	Description
1	F9.63M.SP1	Electronic device	Magmeter electronic device with LCD display + 4-20 mA, Open Collector and Relay outputs for mono-directional flow
2	F3.63M.SP09	Magmeter flow sensor for mono-directional flow	316L SS/PVDF body EPDM O-Rings – L0 length
2	F3.63M.SP10	Magmeter flow sensor for mono-directional flow	316L SS/PVDF body FPM O-Rings – L0 length
2	F3.63M.SP11	Magmeter flow sensor for mono-directional flow	316L SS/PVDF body EPDM O-Rings – L1 length
2	F3.63M.SP12	Magmeter flow sensor for mono-directional flow	316L SS/PVDF body FPM O-Rings – L1 length

