



F3.60M.S Electromagnetic Insertion Flow Sensor with USB programming

INSTRUCTION MANUAL

EN 12-09

Table of Contents

1. Introduction.....	2
1.1. Safety Instructions.....	2
1.2. Unpacking.....	2
2. Description.....	3
2.1. Design.....	3
2.2. Technical Features.....	3
2.3. Operating Principle.....	3
2.4. Connection to FlowX3 Instruments.....	4
3. Specifications.....	4
3.1. Technical Data.....	4
3.2. Dimensions.....	5
4. Installation.....	6
4.1. Location.....	6
4.2. Mounting Position.....	6
4.3. Wiring.....	7
4.4. Earthing.....	11
5. Calibration.....	12
5.1. Diameter Setting	12
5.2. Output Setting.....	12
5.3. USB Setting.....	13
6. Installation Fittings.....	14
7. K-Factor Table.....	15
8. Ordering Data.....	22

1. Introduction



CAUTION

1.1. Safety Instructions

General Statements

- ❑ The sensor F3.60M.S has only been designed to measure the flow of liquids.
- ❑ Do not install and service the sensor without following the Instruction Manual.
- ❑ This sensor is designed to be connected to other instruments which can be hazardous if used improperly. Read and follow all associated instrument manuals before using with this sensor.
- ❑ Sensor installation and wiring connections should only be performed by qualified staff.
- ❑ Do not modify product construction.

Installation and Commissioning Statements

- ❑ Remove power to the sensor before wiring any connection.
- ❑ Depressurize and vent the system before installing or removing the sensor.
- ❑ Check and confirm the chemical compatibility of the materials in contact with the liquid.
- ❑ Do not exceed maximum temperature/pressure data.
- ❑ To clean the sensor, use only chemical compatible products.

1.2. Unpacking

Please verify that the product is complete and without any damage. The following items must be included:

- F3.60M.S Electromagnetic Flow Sensor
- Instruction Manual for F3.60M.S Flow Sensor
- USB Manual Instruction downloadable www.flshnet.it

2. Description

2.1. Design

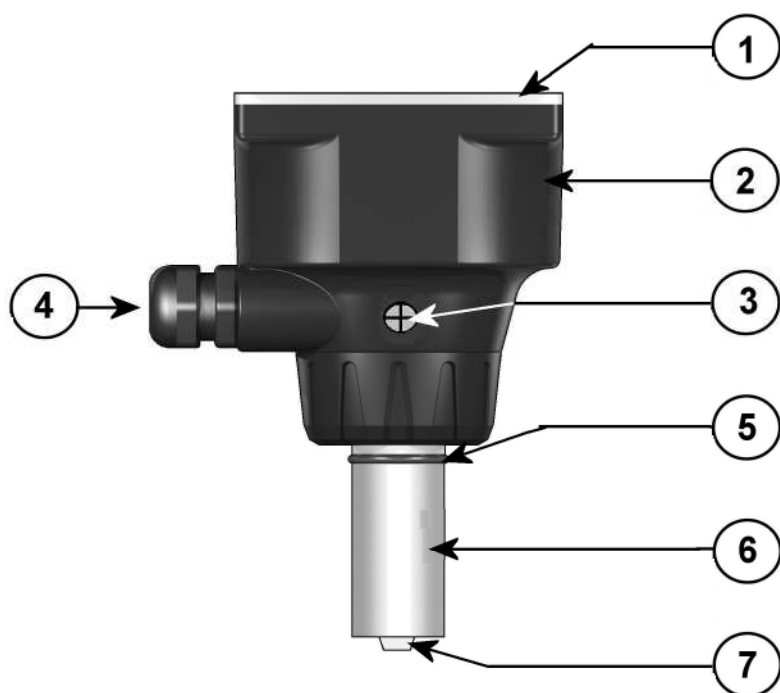
The FLOWX3 NEW F3.60M.S Insertion Magmeter is suitable to measure flow rate in both metal and thermoplastic pipelines.

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 F3.60M.S offer frequency output for use with FLS flow instrumentation or 4-20 mA output for long distance transmission and PLC connection.

2.2. Technical Features



- 1) Electronic box
- 2) PC box
- 3) External Earth Ground Terminal
- 4) Cable Gland
- 5) O-Ring (EPDM or FPM)
- 6) Sensor body 316L SS or CuNi
- 7) PVDF or PEEK reading head

2.3. 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.

The voltage is converted into a flow proportional 4-20 mA output signal or frequency output signal.

2.4. Connections to FlowX3 Instruments

FlowX3 Sensors	FlowX3 Instruments					
	F9.00	F9.02	F9.03	F9.20	F9.50	F9.51
F3.60M.S		X	X		X	X

3. Specifications

3.1. 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: 0.05 to 8 m/s (0.15 to 25 ft/s).
- Full Scale Range : 5 m/s (16,4 ft/s) standard (others available on request).
- Linearity: $\pm 1\%$ of reading + 1,0 cm/s
- Repeatability: $\pm 0.5\%$ of reading
- Enclosure: IP65
- Materials:
 - Case: PC/PVC
 - Gasket: EPDM
- Wetted Materials:
 - Sensor body: 316L SS/PVDF or 316L SS/PEEK or CuNi/PVDF
 - O-rings: EPDM or FPM
 - Electrodes: 316L SS or CuNi

Electrical

- Power Supply:
 - 24 VDC $\pm 10\%$ regulated (reverse polarity and short circuit protected)
 - Maximum current consumption: 150 mA
 - Protective earth: $< 10 \Omega$
- Current output:
 - 4 – 20 mA, isolated
 - Max. loop impedance: 600 Ω @ 24 VDC
 - Positive or negative flow indication
- Frequency output:
 - Type: Open Collector NPN
 - Frequency: 0 – 500 Hz
 - Max. Pull-up Voltage: 24 VDC
 - Max. Current: 50 mA, current limited
 - Compatible with FLOWX3 F9.02, F9.03, F9.50 and F9.51
- Digital outputs:
 - Type: Open Collector NPN
 - Max. Pull-up Voltage: 24 VDC
 - Max. Current: 50 mA, current limited
 - Flow direction: 0 VDC arrow-wise
+ VDC anti arrow-wise
 - Empty pipe: 0 VDC for normal working condition
+ VDC for empty pipe alarm



**EMPTY PIPE Function
NOT available in this
release**

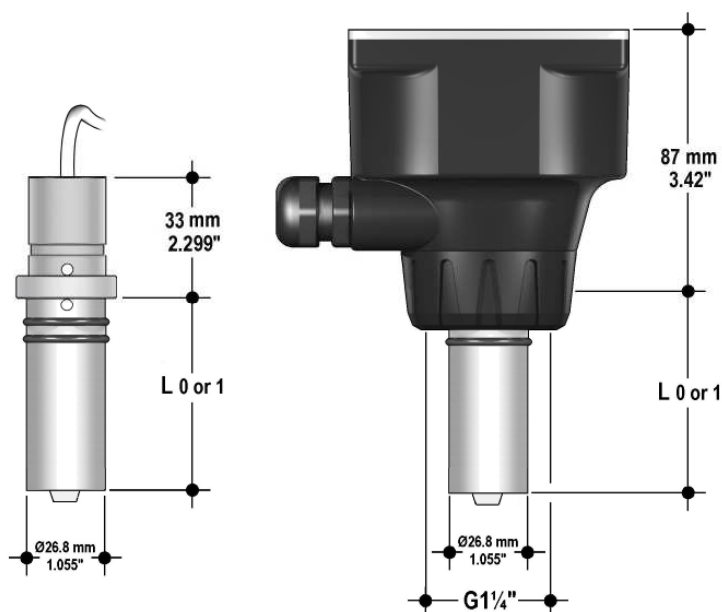
Environmental

- Storage Temperature: -10°C to +60°C (14°F to 140°F)
- Ambient Temperature: 0°C to +60°C (32°F to 140°F)
- Relative Humidity: 0 to 95% (non-condensing)
- Fluid conditions:
 - homogeneous liquids, pastes or slurries, also with solid content
 - Min Electrical Conductivity: 20 μ S
 - Temperature: -10°C to 60°C (14°F to 140°F) with PVDF reading head
 - Temperature: -10°C to 150°C (14°F to 302°F) with PEEK reading head
- Max. operating pressure:
 - 16 bar @ 25°C (232 psi @ 77°F)
 - 8.6 bar @ 60°C (124 psi @ 140°F)

Standards & Approvals

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

3.2. Dimensions

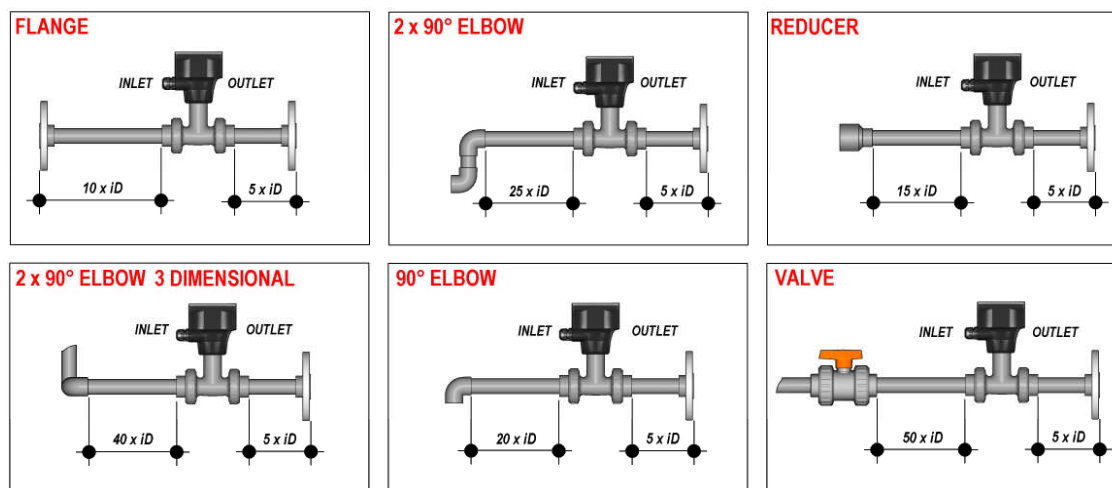


4. Installation

4.1. Location

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

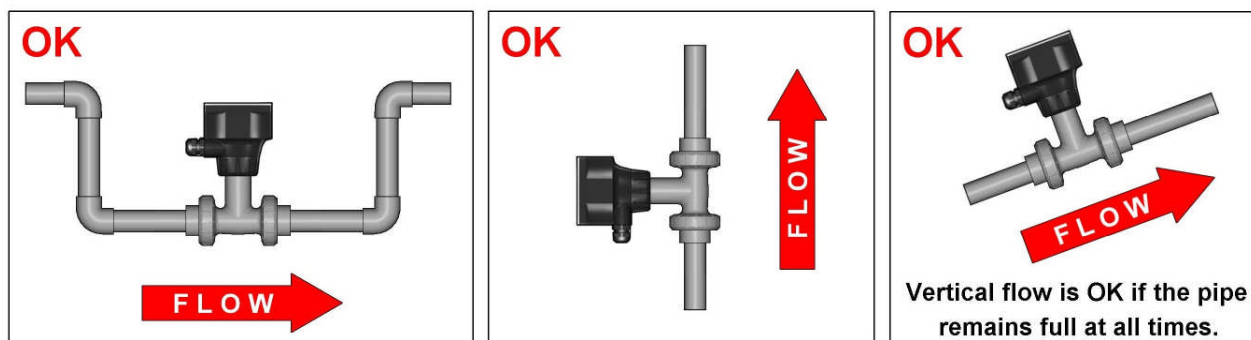
Whenever possible follow the EN ISO 5167-1 installation recommendations to locate the sensor.



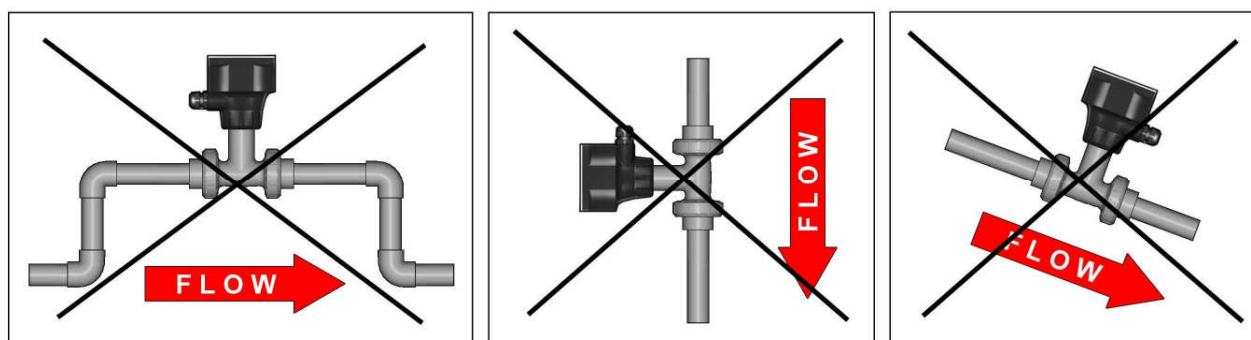
Always maximize distance between flow sensor and pump.

4.2. Mounting Position

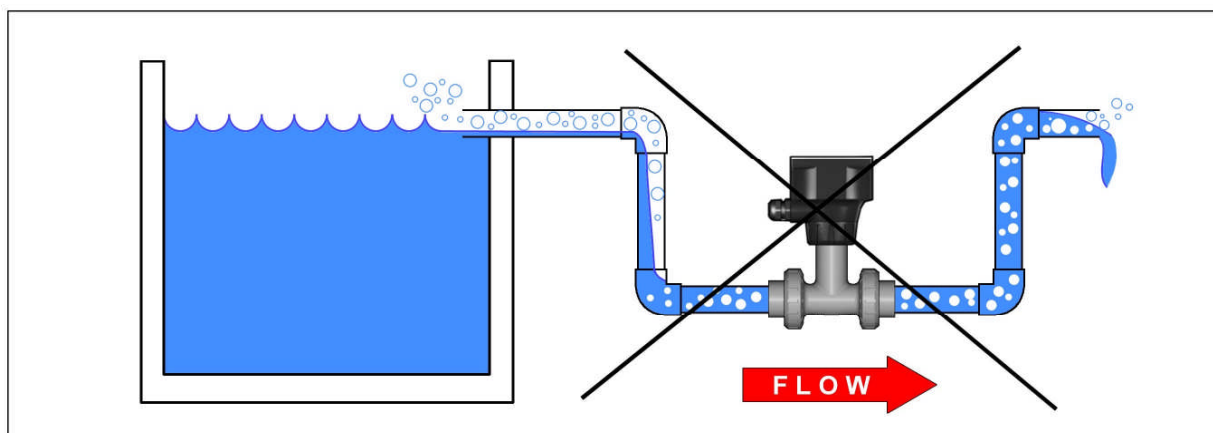
The following configurations ensure that the pipe is always full: for a correct measurement the sensor can NOT be exposed to air bubbles at any time.



Avoid the following 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.



4.3. Wiring

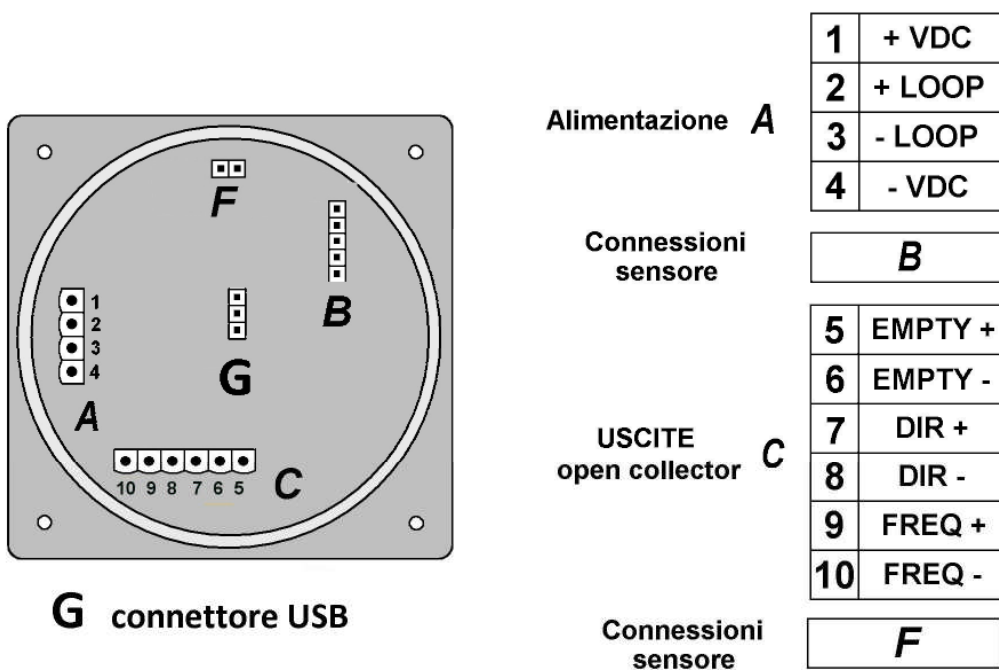
All wiring connections to F3.60M.S are made via removable terminals. Flow sensor terminals are orange, all other terminals are green.



General recommendation

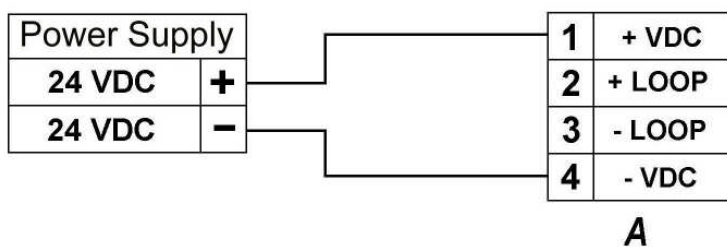
- ❑ Always ensure the power supply is switched off before working on the device.
- ❑ Terminals accept 26 to 12 AWG (0.08 to 2.5 mm²)
- ❑ Strip around 10 mm (0.4") of insulation from the wire tips and tin bare ends to avoid fraying.
- ❑ Ferrules are suggested when connecting more than one wire to a single terminal.
- ❑ Remove the upper part of the terminals for an easy cabling.
- ❑ Insert wire tip or ferrule completely into the terminal and fix with the screw until finger tight.
- ❑ The Magmeter output signal may be unstable immediately after the installation. Install the sensor in a full pipe for 24 hours will stabilize the performance. With a very low Electrical Conductivity could be necessary a longer conditioning period.
- ❑ Use electrical cables with the proper external diameter for the liquid tight connector:
 - PG11: external diameter between 2-7 mm (0.079-0.276")
 - PG13,5: external diameter between 5-12 mm (0.197-0.472")

Rear Terminal View

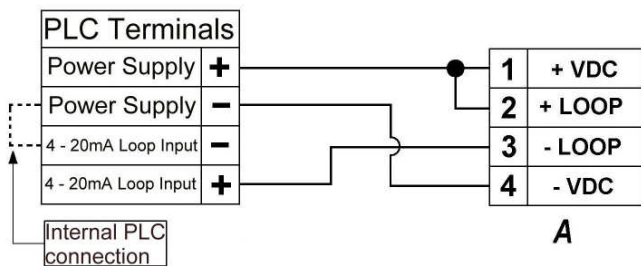


Power / Loop Wiring Diagram

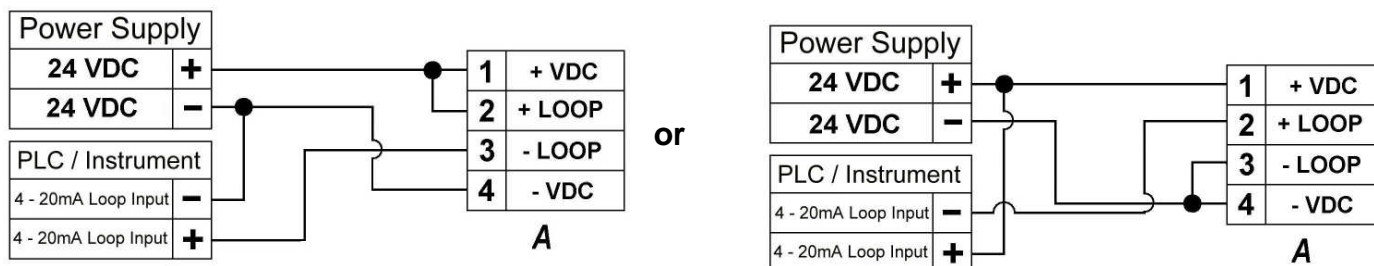
Only Frequency output version



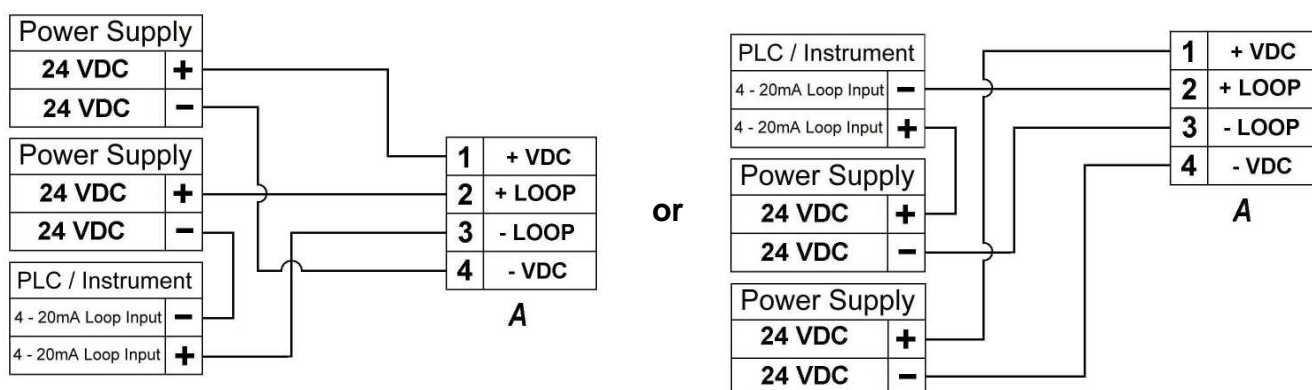
Connection to a PLC with built-in power supply (3 wire connection)



Connection to a PLC / Instrument with ONE separate power supply

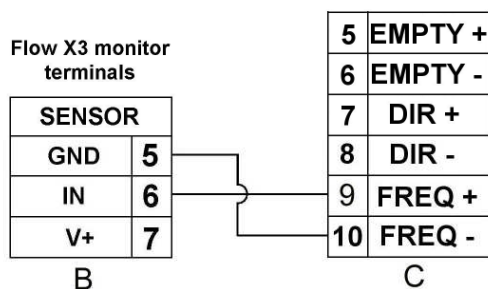


Connection to a PLC / Instrument with TWO separate power supply

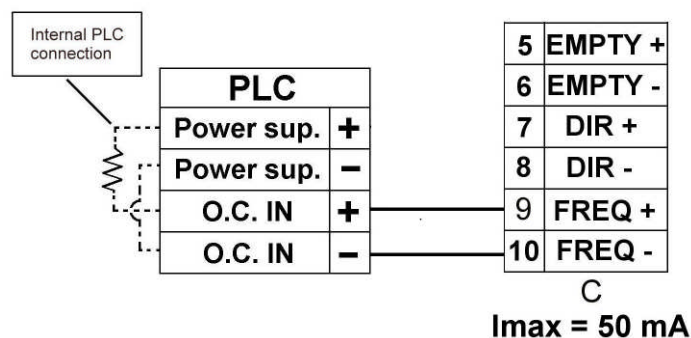


Open Collector Wiring Diagram

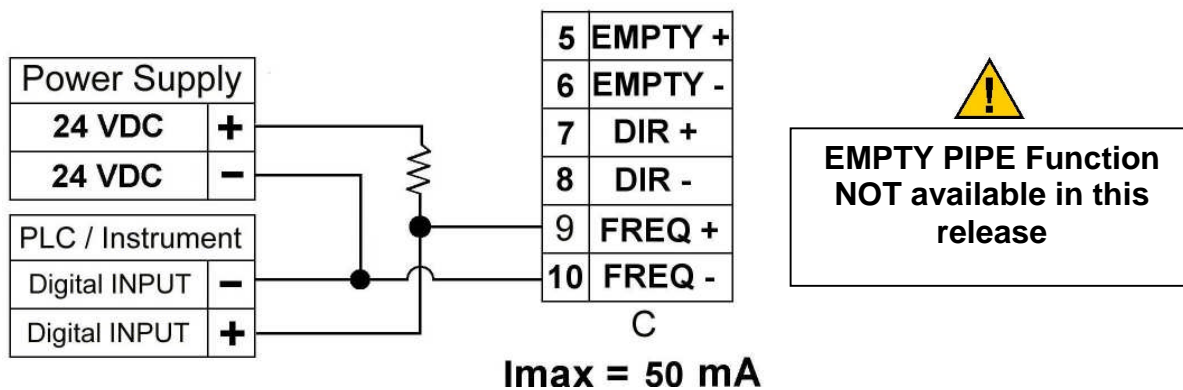
Connection to FlowX3 Instruments (Only with Frequency Output)



Connection to a PLC NPN Open Collector input



Connection to a PLC / Instrument digital input with separate Power Supply

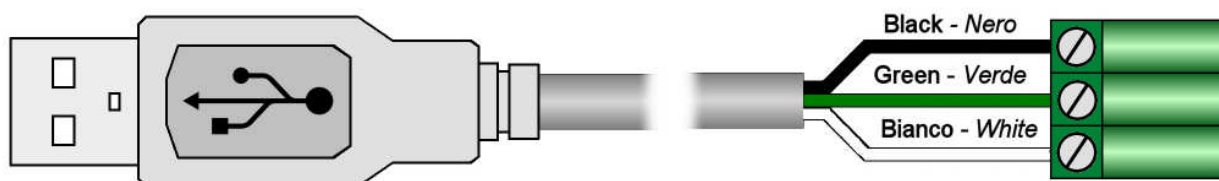


All Open Collector wiring diagrams to PLC repeat for Flow Direction and Empty pipe.

Connection PC – USB Magmeter

USB connector

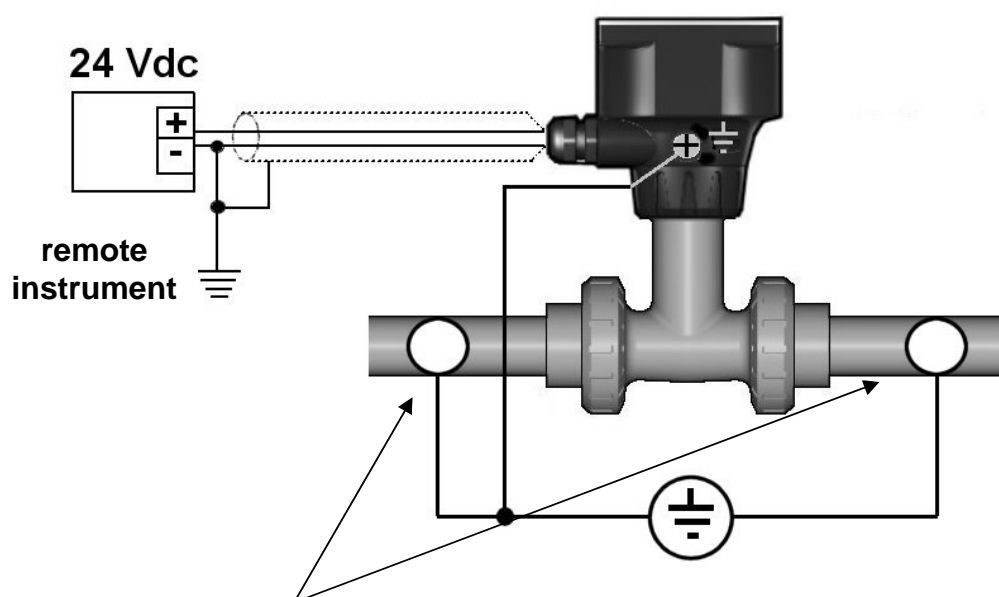
Connector
Magmeter
G



4.4 Earthing

The magmeter normally is uninfluenced by low levels of electrical noise. In some applications it is necessary to connect the sensor to earth to eliminate electrical noise. The earthing can be done in one or more of these different ways:

- connect a ground wire to the External Earth Ground Terminal, this terminal is internally connected to the sensor body .
- Insert metallic piping parts (such as flanged earthing rings) into the plastic pipe before and after the magmeter and earth them together. Connect at the same earth the External Earth Ground Terminal. Fluid earths must be in direct contact with the fluid near to the magmeter.



**Metallic devices (valve, pump and earthing rings)
For plastic pipe applications**

Note: If present the shield from the output cable must be terminated only at the remote instrument. Do not connect this shield at both ends

5. Calibration

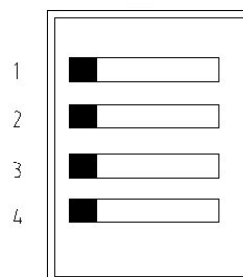
The setting has to be done before powering up the instrument.

5.1. Diameter Setting

The diameter can be set from DN15 to DN 600 by the 1, 2 and 3 switches according to the following table:

SWITCH1	SWITCH2	SWITCH3	OD
OFF	OFF	OFF	20
OFF	OFF	ON	25
OFF	ON	OFF	32
OFF	ON	ON	40
ON	OFF	OFF	50
ON	OFF	ON	FROM 63 TO 110
ON	ON	OFF	FROM 125 TO 400
ON	ON	ON	> 400

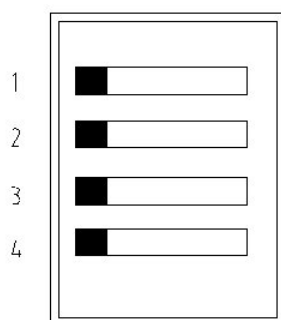
OFF ON



5.2. Output Setting

The analog (4 – 20 mA) or digital (frequency) output can be selected by the switch 4:

OFF ON



Switch 4

ON : Analog (4 – 20 mA)

OFF : Digital (Frequency / Pulse Output)

5.3. USB Settings

Through the USB interface you can change some settings of the electromagnetic. The parameters that can be varied are the following:

- Full Scale
- Average Filter
- Sensibility Filter
- Cut Off
- Kind Digital Output
- Digital Filter
- Bi-directional
- Adjust 4 mA
- Adjust 20 mA

For more details download the executable and the user interface software from the site www.flsnet.it

6. Installation Fittings

	Type	Description
	Plastic Tees	<ul style="list-style-type: none"> • Size: D20 to D50 (0.5" to 1.5") • Materials: PVC, CPVC, PP, PVDF
	CPVC Clamp Saddles	<ul style="list-style-type: none"> • Size: D63 to D225 (2" to 8") • Insert Materials: CPVC, PVDF
	PP Clamp Saddles	<ul style="list-style-type: none"> • Size: D250 to D315 (10" to 12") • Insert Material: CPVC
	PVC Wafer Fittings	<ul style="list-style-type: none"> • Size: D280 and D315 (10" and 12") • Insert Material: CPVC
	GR-PP Wafer Fittings	<ul style="list-style-type: none"> • Size: D280 and D315 (10" and 12") • Insert Material: CPVC
	Plastic Weld-on Adapters	<ul style="list-style-type: none"> • Size: D63 to D315 • Materials: PVC, CPVC, PP, PE
	316L SS Tees	<ul style="list-style-type: none"> • Size: D25 to D40 • BSP Female Threaded
	Metal Strap-on Saddles	<ul style="list-style-type: none"> • Size: DN80 to DN450 • Insert Material: CPVC • Special order for other sizes
	316L SS Weld-on Adapters	<ul style="list-style-type: none"> • Size: D50 to D600 (1.5" to 24")

7. K-Factor Table (only for frequency output)

K-Factor is the number of pulses a sensor produces for one liter of fluid measured. Here all K-Factors for water at ambient temperature are listed.

K-Factor values can depend upon the installation conditions. Please contact your dealer for K-Factor values not included in the table. F.S. is the Flow rate value (L / s) at 5 m/sec.

All K-Factor is calculated with the Full Scale 5 m / sec (to calculate the new k-factor for different full scale follow the formula described on page 21).

Installation on PVC pipes

ISO Metric PVC Tee Fittings for ISO SDR 21 pipes
(female ends for solvent welding)

Part No.	DN	d	K-Factor	F.S. l/s
TFIV20B	15	20	462,04	0,88
TFIV25B	20	25	272,89	1,57
TFIV32B	25	32	157,86	2,45
TFIV40B	32	40	101,60	4,02
TFIV50B	40	50	63,72	6,28
TFIV20D	15	20	462,04	0,88
TFIV25D	20	25	272,89	1,57
TFIV32D	25	32	157,86	2,45
TFIV40D	32	40	101,60	4,02
TFIV50D	40	50	63,72	6,28

PVC Glue-on Fittings				
Part No.	DN	d	K-Factor	F.S. l/s
WAIV063	50	63	on request	12,54
WAIV075	65	75	on request	17,73
WAIV090	80	90	on request	25,58
WAIV110	100	110	on request	38,18
WAIV125	110	125	on request	49,44
WAIV140	125	140	on request	62,05
WAIV160	150	160	on request	80,98
WAIV200	180	200	on request	126,67
WAIV225	200	225	on request	160,40
WAIV250	225	250	on request	198,46
WAIV280	250	280	on request	248,60
WAIV315	280	315	on request	315,19

BSP Female Threaded PVC Tee Fittings for BS PN12 pipes
(parallel threaded female ends)

Part No.	DN	R	K-Factor	F.S. l/s
TFFV20B	15	1/2"	462,04	0,88
TFFV25B	20	3/4"	272,89	1,57
TFFV32B	25	1"	157,86	2,45
TFFV40B	32	1 1/4"	101,60	4,02
TFFV50B	40	1 1/2"	63,72	6,28
TFFV20D	15	1/2"	462,04	0,88
TFFV25D	20	3/4"	272,89	1,57
TFFV32D	25	1"	157,86	2,45
TFFV40D	32	1 1/4"	101,60	4,02
TFFV50D	40	1 1/2"	63,72	6,28

ISO Metric Clamp Saddles for ISO SDR 21 pipes
(PN10 up to d 90mm, PN12,5 from d 110mm)

Part No.	DN	d	K-Factor	F.S. l/s
SCIC063BVC	50	63	39,88	12,54
SCIC075BVC	65	75	28,19	17,73
SCIC090BVC	80	90	19,55	25,58
SCIC110BVC	100	110	13,10	38,18
SCIC125BVC	110	125	10,11	49,44
SCIC140BVC	125	140	5,24	62,05
SCIC160BVC	150	160	4,01	80,98
SCIC200BVC	180	200	2,57	126,67
SCIC225BVC	200	225	2,03	160,40
SCIC063DVC	50	63	39,88	12,54
SCIC075DVC	65	75	28,19	17,73
SCIC090DVC	80	90	19,55	19,55
SCIC110DVC	100	110	13,10	38,18
SCIC125DVC	110	125	10,11	49,44
SCIC140DVC	125	140	5,24	62,05
SCIC160DVC	150	160	4,01	80,98
SCIC200DVC	180	200	2,57	126,67
SCIC225DVC	200	225	2,03	160,40
SMIC250IVC	225	250	1,64	198,46
SMIC280IVC	250	280	1,31	248,60
SMIC315IVC	280	315	1,03	315,19

BS Solvent Welding PVC Tee Fittings for BS PN12 pipes
(female ends for solvent welding)

Part No.	DN	d	K-Factor	F.S. l/s
TFLV20B	15	1/2"	462,04	0,88
TFLV25B	20	3/4"	272,89	1,57
TFLV32B	25	1"	157,86	2,45
TFLV40B	32	1 1/4"	101,60	4,02
TFLV50B	40	1 1/2"	63,72	6,28
TFLV20D	15	1/2"	462,04	0,88
TFLV25D	20	3/4"	272,89	1,57
TFLV32D	25	1"	157,86	2,45
TFLV40D	32	1 1/4"	101,60	4,02
TFLV50D	40	1 1/2"	63,72	6,28

NPT Female Threaded PVC Tee Fittings for ASTM SCH. 80 pipes
(NPT threaded female ends)

Part No.	SIZE	R	K-Factor	F.S. l/s
TFNV20B	0.50"	1/2"	462,04	0,88
TFNV25B	0.75"	3/4"	272,89	1,57
TFNV32B	1.00"	1"	157,86	2,45
TFNV40B	1.25"	1 1/4"	101,60	4,02
TFNV50B	1.50"	1 1/2"	63,72	6,28
TFNV20D	0.50"	1/2"	462,04	0,88
TFNV25D	0.75"	3/4"	272,89	1,57
TFNV32D	1.00"	1"	157,86	2,45
TFNV40D	1.25"	1 1/4"	101,60	4,02
TFNV50D	1.50"	1 1/2"	63,72	6,28

ASTM SCH. 80 PVC Tee Fittings for ASTM SCH. 80 pipes
(female ends for solvent welding)

Part No.	SIZE	d	K-Factor	F.S. l/s
TFAV20B	0.50"	0,85"	462,04	0,88
TFAV25B	0.75"	1,06"	272,89	1,57
TFAV32B	1.00"	1,33"	157,86	2,45
TFAV40B	1.25"	1,67"	101,60	4,02
TFAV50B	1.50"	1,91"	63,72	6,28
TFAV20D	0.50"	0,85"	462,04	0,88
TFAV25D	0.75"	1,06"	272,89	1,57
TFAV32D	1.00"	1,33"	157,86	2,45
TFAV40D	1.25"	1,67"	101,60	4,02
TFAV50D	1.50"	1,91"	63,72	6,28

BS Clamp Saddles for BS PN12 pipes

Part No.	DN	d	K-Factor	F.S. l/s
SCLC2.0BVM	50	2"	43,50	11,49
SCLC3.0BVM	80	3"	20,04	24,95
SCLC4.0BVM	100	4"	12,17	41,10
SCLC6.0BVM	150	6"	3,64	89,19
SCLC8.0BVM	200	8"	2,10	154,74
SCLC2.0DVM	50	2"	43,50	11,49
SCLC3.0DVM	80	3"	20,04	24,95
SCLC4.0DVM	100	4"	12,17	41,10
SCLC6.0DVM	150	6"	3,64	89,19
SCLC8.0DVM	200	8"	2,10	154,74

ASTM SCH. 80 Clamp Saddles for ASTM SCH. 80 pipes

Part No.	SIZE	d	K-Factor	F.S. l/s
SCAC2.0BVM	2.00"	2,375"	53,93	9,27
SCAC2.5BVM	2.50"	2,875"	37,67	13,27
SCAC3.0BVM	3.00"	3,500"	24,06	20,78
SCAC4.0BVM	4.00"	4,500"	17,84	28,03
SCAC5.0BVM	5.00"	5,520"	13,77	36,31
SCAC6.0BVM	6.00"	6,625"	3,93	82,57
SCAC8.0BVM	8.00"	8,625"	2,24	145,00
SCAC2.0DVM	2.00"	2,375"	53,93	9,27
SCAC2.5DVM	2.50"	2,875"	37,67	13,27
SCAC3.0DVM	3.00"	3,500"	24,06	20,78
SCAC4.0DVM	4.00"	4,500"	17,84	28,03
SCAC5.0DVM	5.00"	5,520"	13,77	36,31
SCAC6.0DVM	6.00"	6,625"	3,93	82,57
SCAC8.0DVM	8.00"	8,625"	2,24	145,00

Installation on C-PVC pipes

ISO Metric CPVC Tee Fittings for ISO SDR 21 pipes (female ends for solvent welding)

Part No.	DN	d	K-Factor	F.S. l/s
TFIC20B	15	20	462,04	0,88
TFIC25B	20	25	272,89	1,57
TFIC32B	25	32	157,86	2,45
TFIC40B	32	40	101,60	4,02
TFIC50B	40	50	63,72	6,28
TFIC20D	15	20	462,04	0,88
TFIC25D	20	25	272,89	1,57
TFIC32D	25	32	157,86	2,45
TFIC40D	32	40	101,60	4,02
TFIC50D	40	50	63,72	6,28

CPVC Glue-on Fittings

Part No.	DN	d	K-Factor	F.S. l/s
WAIC063	50	63	on request	
WAIC075	65	75	on request	
WAIC090	80	90	on request	
WAIC110	100	110	on request	
WAIC125	110	125	on request	
WAIC140	125	140	on request	
WAIC160	150	160	on request	
WAIC200	180	200	on request	
WAIC225	200	225	on request	
WAIC250	225	250	on request	
WAIC280	250	280	on request	
WAIC315	280	315	on request	

ISO Clamp Saddles for ISO SDR 21 pipes

Part No.	DN	d	K-Factor	F.S. l/s
SCIC063BVC	50	63	39,88	12,54
SCIC075BVC	65	75	28,19	17,73
SCIC090BVC	80	90	19,55	25,58
SCIC110BVC	100	110	13,10	38,18
SCIC125BVC	110	125	10,11	49,44
SCIC140BVC	125	140	5,24	62,05
SCIC160BVC	150	160	4,01	80,98
SCIC200BVC	180	200	2,57	126,67
SCIC225BVC	200	225	2,03	160,40
SCIC063DVC	50	63	39,88	12,54
SCIC075DVC	65	75	28,19	17,73
SCIC090DVC	80	90	19,55	25,58
SCIC110DVC	100	110	13,10	38,18
SCIC125DVC	110	125	10,11	49,44
SCIC140DVC	125	140	5,24	62,05
SCIC160DVC	150	160	4,01	80,98
SCIC200DVC	180	200	2,57	126,67
SCIC225DVC	200	225	2,03	160,40
SMIC250IVC	225	250	1,64	198,46
SMIC280IVC	250	280	1,30	248,60
SMIC315IVC	280	315	1,03	315,19

Installation on PP pipes

ISO Metric PP Tee Fittings for ISO SDR 11 pipes (female ends for socket welding)

Part No.	DN	d	K-Factor	F.S. l/s
TFIM20B	15	20	510,01	0,88
TFIM25B	20	25	321,51	1,57
TFIM32B	25	32	192,77	2,45
TFIM40B	32	40	124,34	4,02
TFIM50B	40	50	79,18	6,28
TFIM20D	15	20	510,01	0,88
TFIM25D	20	25	321,51	1,57
TFIM32D	25	32	192,77	2,45
TFIM40D	32	40	124,34	4,02
TFIM50D	40	50	79,18	6,28

BSP Female Threaded PP Tee Fittings for BS pipes (parallel threaded female ends)

Part No.	DN	R	K-Factor	F.S. l/s
TFFM20B	15	1/2"	510,01	0,88
TFFM25B	20	3/4"	321,51	1,57
TFFM32B	25	1"	192,77	2,45
TFFM40B	32	1 1/4"	124,34	4,02
TFFM50B	40	1 1/2"	79,18	6,28
TFFM20D	15	1/2"	510,01	0,88
TFFM25D	20	3/4"	321,51	1,57
TFFM32D	25	1"	192,77	2,45
TFFM40D	32	1 1/4"	124,34	4,02
TFFM50D	40	1 1/2"	79,18	6,28

ISO Clamp Saddles for ISO SDR 21 pipes

Part No.	DN	d	K-Factor	F.S. l/s
SCIC063BME	50	63	42,40	11,79
SCIC075BME	65	75	29,86	16,75
SCIC090BME	80	90	20,71	24,14
SCIC110BME	100	110	13,84	36,12
SCIC125BME	110	125	10,68	46,83
SCIC140BME	125	140	5,50	59,12
SCIC160BME	150	160	4,23	76,75
SCIC200BME	180	200	2,71	119,99
SCIC225BME	200	225	2,14	151,79
SCIC063DME	50	63	42,40	11,79
SCIC075DME	65	75	29,86	16,75
SCIC090DME	80	90	20,71	24,14
SCIC110DME	100	110	13,84	36,12
SCIC125DME	110	125	10,68	46,83
SCIC140DME	125	140	5,50	59,12
SCIC160DME	150	160	4,23	76,75
SCIC200DME	180	200	2,71	119,99
SCIC225DME	200	225	2,14	151,79
SMIC250IME	225	250	1,73	187,83
SMIC280IME	250	280	1,38	235,53
SMIC315IME	280	315	1,09	298,07

PP Glue-on Fittings

Part No.	DN	d	K-Factor	F.S. l/s
WAIM063	50	63	on request	
WAIM075	65	75	on request	
WAIM090	80	90	on request	
WAIM110	100	110	on request	
WAIM125	110	125	on request	
WAIM140	125	140	on request	
WAIM160	150	160	on request	
WAIM200	180	200	on request	
WAIM225	200	225	on request	
WAIM250	225	250	on request	
WAIM280	250	280	on request	
WAIM315	280	315	on request	

NPT Female Threaded PP Tee Fittings for ASTM SCH.80 pipes

(NPT threaded female ends)

Part No.	DN	R	K-Factor	F.S. l/s
TFNM20B	0.50"	1/2"	510,01	0,88
TFNM25B	0.75"	3/4"	321,51	1,57
TFNM32B	1.00"	1"	192,77	2,45
TFNM40B	1.25"	1 1/4"	124,34	4,02
TFNM50B	1.50"	1 1/2"	79,18	6,28
TFNM20D	0.50"	1/2"	510,01	0,88
TFNM25D	0.75"	3/4"	321,51	1,57
TFNM32D	1.00"	1"	192,77	2,45
TFNM40D	1.25"	1 1/4"	124,34	4,02
TFNM50D	1.50"	1 1/2"	79,18	6,28

ASTM SCH. 80 Clamp Saddles for ASTM SCH. 80 pipes

Part No.	SIZE	d	K-Factor	F.S. l/s
SCAC2.0BME	2.00"	2,375"	53,93	9,27
SCAC2.5BME	2.50"	2,875"	37,67	13,27
SCAC3.0BME	3.00"	3,500"	24,06	20,78
SCAC4.0BME	4.00"	4,500"	13,77	36,31
SCAC5.0BME	5.00"	5,520"	8,68	57,57
SCAC6.0BME	6.00"	6,625"	6,06	82,57
SCAC8.0BME	8.00"	8,625"	3,45	145,00
SCAC2.0DME	2.00"	2,375"	53,93	9,27
SCAC2.5DME	2.50"	2,875"	37,67	13,27
SCAC3.0DME	3.00"	3,500"	24,06	20,78
SCAC4.0DME	4.00"	4,500"	13,77	36,31
SCAC5.0DME	5.00"	5,520"	5,64	57,57
SCAC6.0DME	6.00"	6,625"	3,99	82,57
SCAC8.0DME	8.00"	8,625"	2,24	145,00

Installation on PVDF pipes

ISO Metric PVDF Tee Fittings for ISO SDR 33 pipes
(female ends for socket welding)

Part No.	DN	d	K-Factor	F.S. l/s
TFIF20B	15	20	510,01	0,88
TFIF25B	20	25	294,29	1,57
TFIF32B	25	32	178,60	2,45
TFIF40B	32	40	105,74	4,02
TFIF50B	40	50	67,60	6,28
TFIF20D	15	20	510,01	0,88
TFIF25D	20	25	294,29	1,57
TFIF32D	25	32	178,60	2,45
TFIF40D	32	40	105,74	4,02
TFIF50D	40	50	67,60	6,28

ISO Clamp Saddles for ISO SDR 33 pipes

Part No.	DN	d	K-Factor	F.S. l/s
SCIC063BF	50	63	37,20	13,44
SCIC075BF	65	75	26,06	19,19
SCIC090BF	80	90	18,09	27,64
SCIC110BF	100	110	12,09	41,34
SCIC125BF	110	125	9,38	53,30
SCIC140BF	125	140	4,84	67,08
SCIC160BF	150	160	3,70	87,77
SCIC200BF	180	200	2,37	136,89
SCIC225BF	200	225	1,87	173,68
SCIC063DF	50	63	37,20	13,44
SCIC075DF	65	75	26,06	19,19
SCIC090DF	80	90	18,09	27,64
SCIC110DF	100	110	12,09	41,34
SCIC125DF	110	125	9,38	53,30
SCIC140DF	125	140	4,84	67,08
SCIC160DF	150	160	3,70	87,77
SCIC200DF	180	200	2,37	136,89
SCIC225DF	200	225	1,87	173,68

Installation on PE pipes

ISO Metric PVC Tee Fittings for PE SDR 11 pipes
(PE end connectors for electrofusion or butt welding)

Part No.	DN	d	K-Factor	F.S. l/s
TFIV20BE	15	20	510,01	0,88
TFIV25BE	20	25	318,30	1,57
TFIV32BE	25	32	194,27	2,45
TFIV40BE	32	40	122,80	4,02
TFIV50BE	40	50	78,79	6,28
TFIV20DE	15	20	510,01	0,88
TFIV25DE	20	25	318,30	1,57
TFIV32DE	25	32	194,27	2,45
TFIV40DE	32	40	122,80	4,02
TFIV50DE	40	50	78,79	6,28

ISO Clamp Saddles for PE SDR 11 pipes

Part No.	DN	d	K-Factor	F.S. l/s
SCIC063BME	50	63	49,53	10,09
SCIC075BME	65	75	34,67	14,42
SCIC090BME	80	90	23,50	21,27
SCIC110BME	100	110	16,07	31,11
SCIC125BME	110	125	12,48	40,06
SCIC140BME	125	140	6,41	50,68
SCIC160BME	150	160	4,95	65,55
SCIC200BME	180	200	3,17	102,55
SCIC225BME	200	225	2,50	129,80
SCIC063DME	50	63	49,53	10,09
SCIC075DME	65	75	34,67	14,42
SCIC090DME	80	90	23,50	21,27
SCIC110DME	100	110	16,07	16,07
SCIC125DME	110	125	12,48	40,06
SCIC140DME	125	140	6,41	50,68
SCIC160DME	150	160	4,95	65,55
SCIC200DME	180	200	3,17	102,55
SCIC225DME	200	225	2,50	129,80
SMIC250IVC	225	250	2,01	161,83
SMIC280IVC	250	280	1,61	201,29
SMIC315IVC	280	315	1,27	254,96

PE Glue-on Fittings

Part No.	DN	d	K-Factor	F.S. l/s
WAIE063	50	63	on request	
WAIE075	65	75	on request	
WAIE090	80	90	on request	
WAIE110	100	110	on request	
WAIE125	110	125	on request	
WAIE140	125	140	on request	
WAIE160	150	160	on request	
WAIE200	180	200	on request	
WAIE225	200	225	on request	
WAIE250	225	250	on request	
WAIE280	250	280	on request	
WAIE315	280	315	on request	

Special Installation on DN 250 and DN 300 pipes

PVC Wafer Fittings				
Part No.	DN	d	K-Factor	F.S. l/s
WVIC280B	250	280	on request	
WVIC315B	300	315	on request	
WVIC280D	250	280	on request	
WVIC315D	300	315	on request	

PP Wafer Fittings				
Part No.	DN	d	K-Factor	F.S. l/s
WFIC280B	250	280	on request	
WFIC315B	300	315	on request	
WFIC280D	250	280	on request	
WFIC315D	300	315	on request	

Metal Fittings

316L SS Threaded Tees (BSP Female Threads)				
Part No.	DN	R	K-Factor	F.S. l/s
TFFX25	20	3/4"	308,21	1,57
TFFX32	25	1"	177,84	2,45
TFFX40	32	1 1/4"	88,85	4,02

Metal Strap-on Saddles mounted on Cast Iron pipes				
Part No.	DN	K-Factor	F.S. l/s	
SZIC080I	80	20,22	24,72	
SZIC100I	100	12,99	38,50	
SZIC125I	125	5,31	61,20	
SZIC150I	150	3,67	88,55	
SZIC200I	200	2,03	160,40	
SZIC250I	250	1,31	248,60	
SZIC300I	300	0,90	362,76	
SZIC350I	350	0,67	480,66	
SZIC400I	400	0,53	620,20	
SZIC450I	450	0,40	801,10	

Metal Strap-on Saddles mounted on Other Metal pipes				
Part No.	DN	K-Factor	F.S. l/s	
SZIC080I	80	19,02	26,29	
SZIC100I	100	11,28	44,32	
SZIC125I	125	4,83	67,30	
SZIC150I	150	3,31	98,13	
SZIC200I	200	1,95	166,92	
SZIC250I	250	1,24	261,85	
SZIC300I	300	0,88	369,74	
SZIC350I	350	0,73	447,12	
SZIC400I	400	0,54	600,82	
SZIC450I	450	-----	-----	

316L SS Weld-on Adapters mounted on Cast Iron pipes				
Part No.	DN	K-Factor	F.S. l/s	
WAIXL0	40	-----	-----	
WAIXL0	50	-----	-----	
WAIXL0	60	37,23	13,43	
WAIXL0	65	-----	-----	
WAIXL0	80	20,22	24,72	
WAIXL0	100	12,99	38,50	
WAIXL0	110	-----	-----	
WAIXL0	125	5,31	61,20	
WAIXL0	150	3,67	88,55	
WAIXL0	175	-----	-----	
WAIXL0	200	2,03	160,40	
WAIXL1	225	-----	-----	
WAIXL1	250	1,31	248,60	
WAIXL1	300	0,90	362,84	
WAIXL1	350	0,68	480,77	
WAIXL1	400	0,53	620,35	
WAIXL1	450	0,40	801,28	
WAIXL1	500	0,34	961,54	
WAIXL1	600	0,23	1373,63	

316L SS Weld-on Adapters mounted on Other Metal pipes				
Part No.	DN	K-Factor	F.S. l/s	
WAIXL0	40	53,74	9,30	
WAIXL0	50	43,60	11,47	
WAIXL0	60	-----	-----	
WAIXL0	65	26,22	19,07	
WAIXL0	80	19,02	26,29	
WAIXL0	100	11,28	44,32	
WAIXL0	110	-----	-----	
WAIXL0	125	4,83	67,30	
WAIXL0	150	3,31	98,13	
WAIXL0	175	-----	-----	
WAIXL0	200	1,95	166,92	
WAIXL1	225	-----	-----	
WAIXL1	250	1,24	261,85	
WAIXL1	300	0,88	369,82	
WAIXL1	350	0,73	447,23	
WAIXL1	400	0,54	600,96	
WAIXL1	450	-----	-----	
WAIXL1	500	0,34	961,54	
WAIXL1	600	-----	-----	

Correction formula for K-Factor calculation according to real internal diameter:

$$K\text{-Factor}_{\text{NEW}} = (K\text{-Factor} \times ID^2) / ID_{\text{NEW}}^2$$

where:

ID = Value in the table for the internal diameter (in mm)

ID_NEW = New value for the real internal diameter (always in mm)

K-Factor = Value in the table

K-Factor_NEW = New K-Factor value for the specified internal diameter

EXAMPLE:

Nominal Pipe Size (DN) = 100 mm

New Internal Diameter = 104 mm

Using the formula: $K\text{-Factor}_{\text{NEW}} = (51.02 \times 100^2) / 104^2 = 20,52$

Correction formula for K-Factor calculation according to the new full scale :

$$K\text{-Factor} (\text{New Full Scale}) = (5 \text{ m/sec} / \text{New Full Scale}) * K\text{-Factor}$$

where:

New Full Scale = New Full Scale set by USB interface

K-Factor = Value in the table (Standard to 5 m/sec)

K-Factor (NEW Full Scale) = New K-Factor value for the New Full Scale

EXAMPLE:

Full Scale Standard = 5 m/sec

New Full Scale = 8 m/sec

K-factor for Pipe OD 110 and PVC material = 13.10

$$K\text{-Factor} (\text{New Full Scale}) = (5 \text{ m/sec} / 8 \text{ m/sec}) * 13.10 = 8.19$$

8. Ordering Data

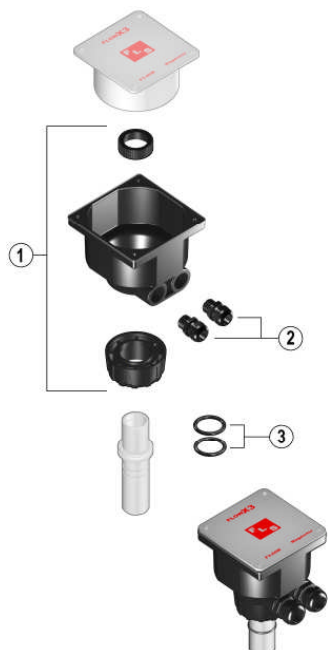
FLOWX3 NEW F3.60M.XX.S

Part No.	Power supply	Length	Body	Electrodes	O-rings	Enclosure
F3.60M.09.S	24 VDC	L0	316L SS/PVDF	316L SS	EPDM	IP65
F3.60M.10.S	24 VDC	L0	316L SS/PVDF	316L SS	FPM	IP65
F3.60M.11.S	24 VDC	L1	316L SS/PVDF	316L SS	EPDM	IP65
F3.60M.12.S	24 VDC	L1	316L SS/PVDF	316L SS	FPM	IP65
F3.60M.33.S	24 VDC	L0	CuNi/PVDF	CuNi	EPDM	IP65
F3.60M.34.S	24 VDC	L0	CuNi /PVDF	CuNi	FPM	IP65
F3.60M.35.S	24 VDC	L1	CuNi /PVDF	CuNi	EPDM	IP65
F3.60M.36.S	24 VDC	L1	CuNi /PVDF	CuNi	FPM	IP65
F3.60M.38.S	24 VDC	L0	316L SS/PEEK	316L SS	FPM	IP65
F3.60M.40.S	24 VDC	L1	316L SS/PEEK	316L SS	FPM	IP65

Spare Parts

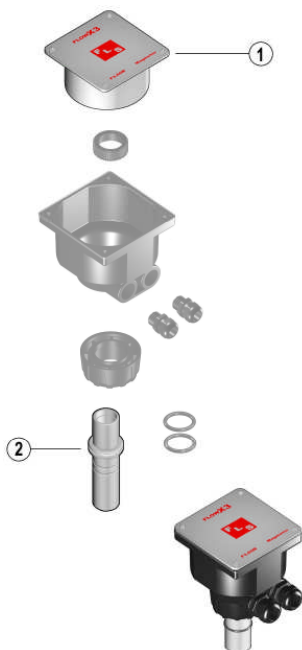
Mechanical Replacements

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



Electronic Replacements

Item	Part No.	Name	Description
1	F3.60M.SP1.S	Electronic device	Magmeter electronic device with 4-20mA output and freq. output,
2	F3.60M.SP09	Magmeter flow sensor	316L SS/PVDF body – EPDM O-Rings – L0 length
2	F3.60M.SP10	Magmeter flow sensor	316L SS/PVDF body – FPM O-Rings – L0 length
2	F3.60M.SP11	Magmeter flow sensor	316L SS/PVDF body – EPDM O-Rings – L1 length
2	F3.60M.SP12	Magmeter flow sensor	316L SS/PVDF body – FPM O-Rings – L1 length
2	F3.60M.SP13	Magmeter flow sensor	CuNi/PVDF body – EPDM O-Rings – L0 length
2	F3.60M.SP14	Magmeter flow sensor	CuNi/PVDF body – FPM O-Rings – L0 length
2	F3.60M.SP15	Magmeter flow sensor	CuNi/PVDF body – EPDM O-Rings – L1 length
2	F3.60M.SP16	Magmeter flow sensor	CuNi/PVDF body – FPM O-Rings – L1 length
2	F3.60M.SP17	Magmeter flow sensor	316L SS/PEEK body – FPM O-Rings – L0 length
2	F3.60M.SP18	Magmeter flow sensor	316L SS/PEEK body – FPM O-Rings – L1 length



F.I.P. Formatura Iniezione Polimeri S.p.A.
Loc. Pian di Parata, 16015 Casella (GE) – Italy
Tel +39 010 96211 – Fax +39 010 9621209
www.flsnet.it