

Technical Catalogue

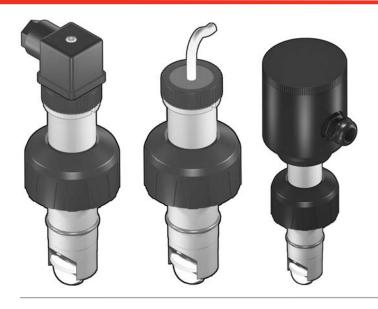


Flow Sensors

page	2
page	18
page	24
page	30
page	36
page	40
page	44
page	54
page	58
page	64
page	68
page	82
page	88
page	96
page	100
page	112
page	113
page	114
page	128
page	131
page	134
	page page page page page page page page

FLOWX3 F3.00 Paddlewheel Flow Sensor





The simple and reliable paddlewheel flow sensor type F3.00 is designed for use with every kind of solid-free liquids.

The sensor can measure flow from 0.15 m/s (0.5 ft/s) producing a frequency output signal highly repeatable.

A rugged construction and a proven technology guarantee exceptional performances with little or no maintenance required.

A new electronic, with a push-pull output, is now available for a safe connection to any kind of PLC/Instrument digital input.

A specially designed family of fittings ensures an easy and quick installation into all pipe materials in sizes from DN15 to DN600 (0.5" to 24").

Main Features

- CPVC, PVDF, Brass or Stainless Steel sensor body.
- Easy insertion system.
- Different versions for remote and compact installations.
- Measurement range over 50:1.

- High chemical resistance.
- Battery powered version.
- 4-20 mA output.
- MIN alarm relay output.
- Push-Pull output for universal electrical connection.

Applications

- Water treatment and regeneration.
- Industrial wastewater treatment and recovery.
- Textile finishing.
- Water distribution.
- Processing and manufacturing industry.
- Filtration systems.

- Chemical production.
- Liquid delivery systems.
- Cooling water monitoring.
- Heat Exchangers.
- Swimming pools.
- Pump protection.

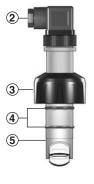
Technical Features



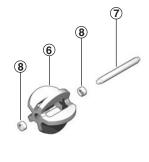
Sensor for compact installation (F3.01) with field-mount transmitter (sold separately)



Sensor for remote installation in IP68 configuration



Sensor for remote installation in IP65 configuration



Paddlewheel system

- 1) Electrical cable: 8 m. (26.4 ft) standard
- 2) 4 pole cable plug according to DIN 43650-B/ISO 6952
- 3) UPVC cap for installation into fittings
- 4) O-Ring seals available in EPDM or FPM
- 5) CPVC, PVDF, Brass or Stainless Steel sensor body
- 6) ECTFE (Halar®) Open-cell rotor
- 7) Ceramic shaft
- 8) Ceramic bearings

Halar® is a registered trademark of Ausimont-Solvay.

Operating principle

The flow sensor consists of a transducer and a five-blade open cell paddlewheel using insertion technology. The paddlewheel is equipped with a permanent magnet integrated into each blade. As the magnet passes close to the transducer a pulse is generated.

When liquid flows into the pipe, the paddlewheel is set in rotation producing a square wave output signal. The frequency is proportional to the flow velocity. The sensor is installed into the pipe using a wide range of insertion type fittings supplied by the flow sensor manufacturer.

Engineering Data

- The flow sensor is available with Hall effect transducer (standard) and Coil effect transducer (battery operated).
- The Hall sensor operates with a power supply from 5 to 24 VDC @ < 30 mA.
- The Coil sensor operates with a power supply from 3 to 5 VDC @ < 10 μ A or with a 3.6V Lithium Battery.
- The P version operates with power supply from 12 to 24 VDC @ < 30 mA.
- The standard output is a square wave with a frequency of 45 Hz per m/s (13.7 Hz per ft/s) nominal.
- The output signal is provided directly via electric cable or via a cable plug according to DIN 43650-B/ISO 6952. Supplied cable is standard 8 m (26.4 ft) long, with a maximum length of 300 m (990 ft) for Hall sensor and 16 m (52.8 ft) for Coil sensor
- In the versions with 4-20 mA or MIN alarm output, an additional IP65 housing is plugged onto the sensor. Output signals are available on a terminal strip inside via a PG11 cable gland.
- The sensor F3.30 with 4-20 mA output and the sensor F3.15 with MIN alarm output require a power supply from 12 to 24 VDC.
- The nominal measuring range is from 0.15 to 8 m/s (0.5 to 25 ft/s).

Connections to FlowX3 Instruments

FLOWX3 Sensors	FLOW X3	FLOW X3 Instruments							
	F9.00.L	F9.02.L	F9.03	F9.20	F9.50.L	F9.51.L	PLC/ other brand		
F3.00.H	•								
F3.00.C									
F3.01.H									
F3.01.C									
F3.00.P							-		
F3.15.H*									
F3.30.H*									

^{*} with Output Kit mounted.

Dimensions

F3.00 IP68 Remote Sensor



Sensor length: L0 = 68.3 mm (2.69") L1 = 98.5 mm (3.88")

F3.00 IP65 Remote Sensor



F3.01 Compact Sensor



F3.01 Compact Sensor + Transmitter (sold separately)



Installation Fittings

Please refer to Installation Fittings section for more details and a complete listing of items.

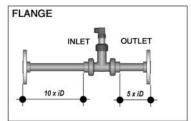
	Туре	Description
	Plastic Tees	Size: D20 to D50 (0.5" to 1.5") Materials: UPVC, CPVC, PP, PVDF
	CPVC Clamp Saddles	Size: D63 to D225 (2" to 8") Insert materials: CPVC, PVDF
	PP Clamp Saddles	Size: D250 to D315 (10" to 12") Insert material: CPVC
O	UPVC Wafer Fittings	Size: D280 and D315 (10" and 12")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

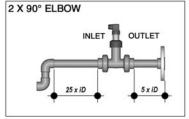
F3.00**F**L

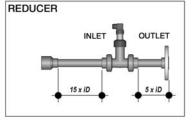
Installation Guidelines

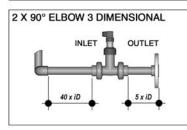
Different pipe configurations and obstacles in the flow line such as valves, elbows, pipe bends and strainers create variations on the flow profile.

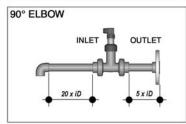
- The six most common installation configurations are shown to help in selecting the best location in the pipeline for paddlewheel flow sensor.
- For more information, please refer to EN ISO 5167-1.
- Always maximize distance between flow sensors and pumps.

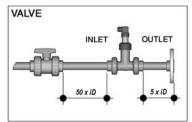












Mounting Positions

Make sure the pipeline is always full.

■ Horizontal pipe runs:

Fig.1: installation with no sediments present

Fig.2: installation with no air bubbles present

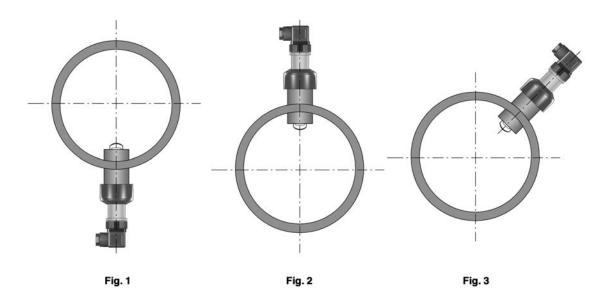
Fig.3: installation if sediments or air bubbles

may be present.

■ Vertical pipe runs:

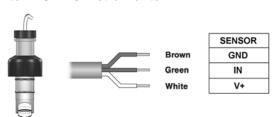
Install sensor in any orientation.

Upward flow is preferred to ensure full pipe.

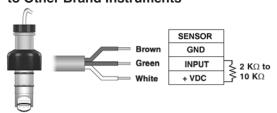


Wiring

F3.00.H IP68 Sensor Connection to FLOWX3 Instruments

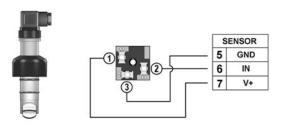


F3.00.H IP68 Sensor Connection to Other Brand Instruments

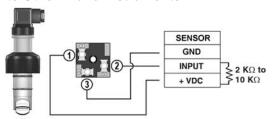


 $2 \text{ K}\Omega$ to 10 K Ω Pull-up resistor may be required.

F3.00.H IP65 Sensor Connection to FLOWX3 Instruments

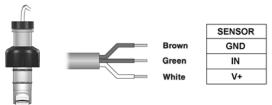


F3.00.H IP65 Sensor Connection to Other Brand Instruments

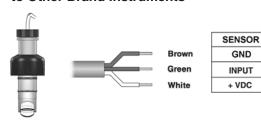


2 K Ω to 10 K Ω Pull-up resistor may be required.

F3.00.C IP68 Sensor Connection to FLOWX3 Instruments

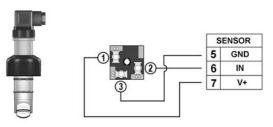


F3.00.C IP68 Sensor Connection to Other Brand Instruments

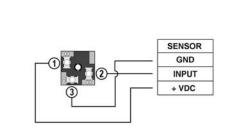


Pull-up resistor is never required.

F3.00.C IP65 Sensor Connection to FLOWX3 Instruments

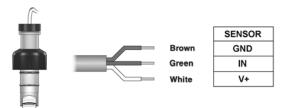


F3.00.C IP65 Sensor Connection to Other Brand Instruments

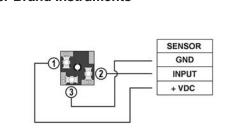


Pull-up resistor is never required.

F3.00.P IP68 Sensor Connection to Other Brand Instruments



F3.00.P.IP65 Sensor Connection to Other Brand Instruments



Pull-up resistor is never required.



Technical Data

General (for F3.00.H, F3.00.C and F3.00.P)

- Pipe Size Range: DN15 to DN600 (0.5" to 24"). Please refer to Installation Fittings section for more details.
- Flow Rate Range: 0.15 to 8 m/s (0.5 to 25 ft./s).
- Linearity: ± 0.75 % of full scale.
- Repeatability: ± 0.5 % of full scale.
- Minimum Reynolds Number Required: 4500.
- Enclosure: IP68 or IP65.
- Wetted Materials:
- Sensor Body: CPVC, PVDF, Brass or 316L SS
- O-rings: EPDM or FPM - Rotor: ECTFE (Halar®)
- Shaft: Ceramic (Al2O3)
- Bearings: Ceramic (Al₂O₃).

Specific for F3.00.H

- Supply voltage: 5 to 24 VDC ± 10% regulated.
- Supply current: < 30 mA @ 24 VDC.
- Output signal:
- square wave.
- frequency: 45 Hz per m/s nominal (13.7 Hz per ft/s nominal).
- type: transistor NPN open collector.
- Output current: 10 mA max.
- Cable length: 8 m (26.4 ft) standard, 300 m (990 ft) maximum.

Specific for F3.00.C

- Supply voltage: 3 to 5 VDC regulated or 3.6 Volt Lithium battery.
- Supply current: < 10 µA max.
- Output signal:
- square wave.
- frequency: 45 Hz per m/s nominal (13.7 Hz per ft/s nominal).
- Min. input impedance: 100 kΩ.
- Cable length: 8 m (26.4 ft) standard, 16 m (52.8 ft) maximum.

Specific for F3.00.P

- Supply voltage: 12 to 24 VDC ± 10% regulated.
- Supply current: < 30 mA @ 24 VDC
- Output signal:
- square wave.
- frequency: 45 Hz per m/s nominal (13.7 Hz per ft/s nominal).
- type: Push-Pull (for connection to NPN and PNP inputs).
- Output current: 20 mA max.
- Cable length: 8 m (26.4 ft) standard, 300 m (990 ft) maximum.

Standards & Approvals

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

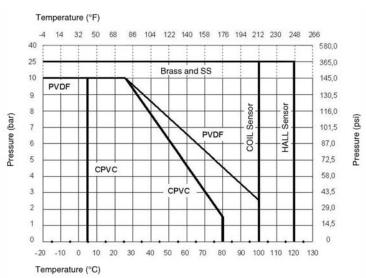
Maximum Operating Pressure / Temperature (25 years lifetime) F3.00.H or F3.00.P Sensor

■ CPVC body:

- 10 bar (145 psi) @ 25°C (77°F)
- 1,5 bar (22 psi) @ 80° C (176°F).
- PVDF body:
- 10 bar (145 psi) @ 25°C (77°F)
- 2,5 bar (36 psi) @ 100°C (212°F).
- Brass or SS body:
- 25 bar (363 psi) @ 120°C (248°F).

F3.00.C Sensor

- CPVC body:
- 10 bar (145 psi) @ 25°C (77°F)
- 1,5 bar (22 psi) @ 80° C (176°F).
- PVDF body:
- 10 bar (145 psi) @ 25°C (77°F)
- 2,5 bar (36 psi) @ 100°C (212°F).
- Brass or SS body:
- 25 bar (363 psi) @ 100°C (212°F).



Output Devices

K315 - Frequency Output & MIN alarm KIT



Main Features

- Highly visible Local Bicolour Status Indicator.
- Easy and quick threshold regulation.
- Open collector frequency output.
- Relay output mechanical SPDT.

This Kit consists of an additional IP65 housing plugged on the sensor. It is equipped with an open collector frequency output and a mechanical SPDT contact.

The MIN alarm set-point can be freely set by a potentiometer from 0.15 to 1 m/s (0.5 to 3.3 ft/s).

When the flow velocity drops below the adjusted limit the relay output opens and the Local Status Indicator changes colour. It has been designed to protect a pump from running dry or pumping against a closed valve in the main pipeline.

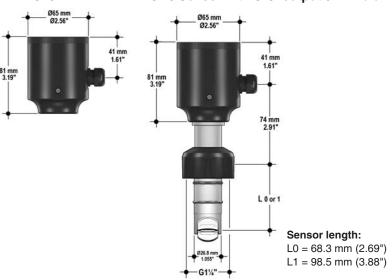
Applications

- Pump protection.
- Industrial water and wastewater treatment.
- Cooling water systems.
- Swimming pools.

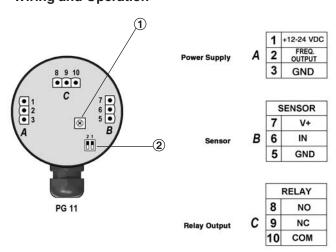
Dimensions

KIT K315

F3.15 Sensor with O.C. output & MIN alarm



Wiring and Operation



■ Operative mode:

the trimmer.

■ Calibration mode:

Switch 1 is in ON position and the module ready to work. Switch 2 can be used to select the most suitable switch delay (3 seconds or 10 seconds).

The output module is characterized

Switch 1 is in OFF position and the MIN. Set-point is fixed by acting on

by two operation modes:

- 1) Calibration trimmer for MIN alarm set-point.
- 2) Setting switches.



Output **Devices**

Technical Data

- Associated Flow Sensor: Hall effect (F3.01.H.XX Compact version).
- Supply voltage: 12 to 24 VDC ± 10% regulated.
- Output signal:
- square wave
- frequency: 45Hz per m/s nominal (13.7 Hz per ft/s nominal)
- type: transistor NPN open collector
- Output current: 10 mA max.
- Relay Output: mechanical SPDT contact, 3A @ 30 VDC, 3A @ 250 VAC resistive load.
- Flow trip point: 0.15 to 1 m/s (0.5 to 3 ft/s) freely adjustable.

- Local Status Indicator:
- GREEN Led = Flow
- RED Led = No Flow.
- Enclosure: IP65.
- Operating temperature: 0°C to 60°C (32°F to 140°F).
- Relative humidity: 0 to 95% non-condensing.
- Housing material: UPVC.

Standards & Approvals

■ Manufactured under ISO 9001 (Quality).

This Kit consists of an additional IP65 housing plugged on the sensor. It is a blind transmitter designed to convert the signal from the sensor

into a 4-20 mA signal for long distance

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

K330 - 4-20 mA Output KIT



Applications

transmission.

- Flow control and monitoring.
- Water treatment.
- Industrial wastewater treatment and recovery.
- Water regeneration plant.
- Processing and manufacturing industry.
- Water distribution.

Main Features

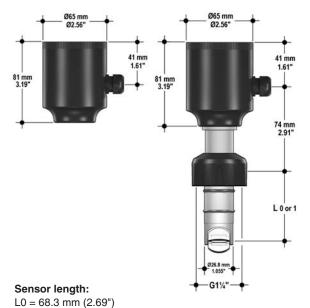
- Easy 4-20 mA output calibration.
- Three wire output technology.

Dimensions

L1 = 98.5 mm (3.88")

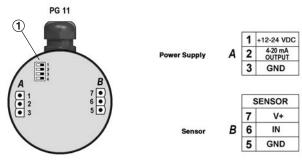
K330 KIT

F3.30 Sensor with 4-20 mA Output



Output Devices

Wiring and Operation



1) Calibration switch.

The full scale range, corresponding to Switch 4-20 mA output, is set by means of switches 2, output. 3 and 4.

Switch 1 is used to set a filter on the current output.

Technical Data

- Associated Flow Sensor: Hall effect (F3.01.H.XX Compact version).
- Supply voltage: 12 to 24 VDC ± 10% regulated
- Supply current: < 50 mA.
- Output signal: 4 to 20 mA, adjustable.
- Max load impedance: 800 Ω @ 24 VDC, 300 Ω @ 12 VDC.
- Enclosure: IP65.

- Operating temperature: 0°C to 60°C (32°F to 140°F).
- Relative humidity: 0 to 95% non-condensing.
- Housing material: UPVC.

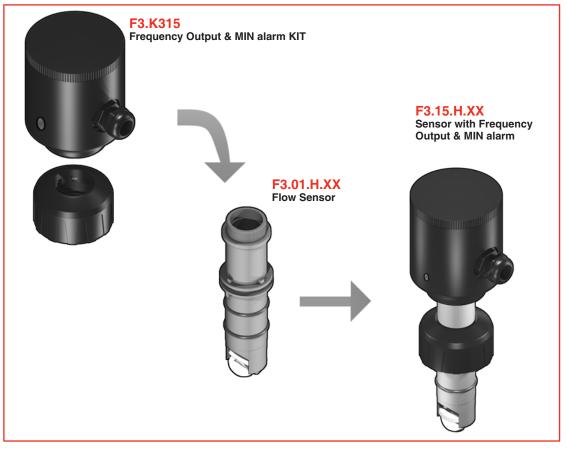
Standards & Approvals

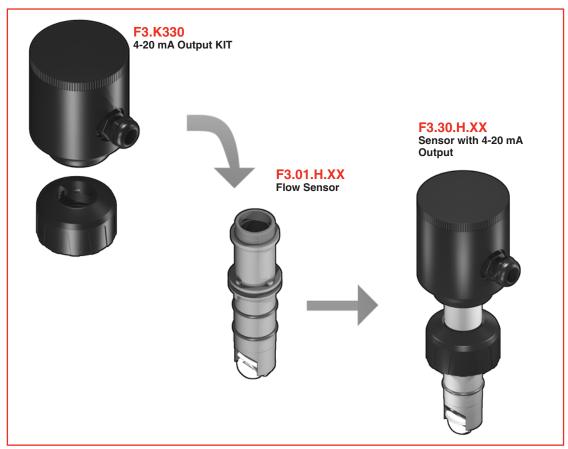
- Manufactured under ISO 9001 (Quality).
- Manufactured under ISO 14001 (Environmental Management).
- CE.

Installation

The K315 and K330 Kits can be ordered directly mounted on top of the flow sensor or separately and then simply installed on the proper sensor.

Please refer to Ordering Data section for a complete listing of part numbers.





FLOWX3 F3.00.H.XX (Remote version)

Part No.	Version	Power supply	Length	Body	O-rings	Enclosure
F3.00.H.01	Hall	5 - 24 VDC	LO	C-PVC	EPDM	IP68
F3.00.H.02	Hall	5 - 24 VDC	LO	C-PVC	FPM	IP68
F3.00.H.03	Hall	5 - 24 VDC	L1	C-PVC	EPDM	IP68
F3.00.H.04	Hall	5 - 24 VDC	L1	C-PVC	FPM	IP68
F3.00.H.05	Hall	5 - 24 VDC	LO	PVDF	EPDM	IP68
F3.00.H.06	Hall	5 - 24 VDC	LO	PVDF	FPM	IP68
F3.00.H.07	Hall	5 - 24 VDC	L1	PVDF	EPDM	IP68
F3.00.H.08	Hall	5 - 24 VDC	L1	PVDF	FPM	IP68
F3.00.H.09	Hall	5 - 24 VDC	LO	316L SS	EPDM	IP68
F3.00.H.10	Hall	5 - 24 VDC	LO	316L SS	FPM	IP68
F3.00.H.11	Hall	5 - 24 VDC	L1	316L SS	EPDM	IP68
F3.00.H.12	Hall	5 - 24 VDC	L1	316L SS	FPM	IP68
F3.00.H.25	Hall	5 - 24 VDC	LO	BRASS	EPDM	IP68
F3.00 H.26	Hall	5 - 24 VDC	LO	BRASS	FPM	IP68
F3.00.H.27	Hall	5 - 24 VDC	L1	BRASS	EPDM	IP68
F3.00.H.28	Hall	5 - 24 VDC	L1	BRASS	FPM	IP68
F3.00.H.13	Hall	5 - 24 VDC	LO	C-PVC	EPDM	IP65
F3.00.H.14	Hall	5 - 24 VDC	LO	C-PVC	FPM	IP65
F3.00.H.15	Hall	5 - 24 VDC	L1	C-PVC	EPDM	IP65
F3.00.H.16	Hall	5 - 24 VDC	L1	C-PVC	FPM	IP65
F3.00.H.17	Hall	5 - 24 VDC	LO	PVDF	EPDM	IP65
F3.00.H.18	Hall	5 - 24 VDC	LO	PVDF	FPM	IP65
F3.00.H.19	Hall	5 - 24 VDC	L1	PVDF	EPDM	IP65
F3.00.H.20	Hall	5 - 24 VDC	L1	PVDF	FPM	IP65
F3.00.H.21	Hall	5 - 24 VDC	L0	316L SS	EPDM	IP65
F3.00.H.22	Hall	5 - 24 VDC	L0	316L SS	FPM	IP65
F3.00.H.23	Hall	5 - 24 VDC	L1	316L SS	EPDM	IP65
F3.00.H.24	Hall	5 - 24 VDC	L1	316L SS	FPM	IP65
F3.00.H.25	Hall	5 - 24 VDC	LO	BRASS	EPDM	IP65
F3.00.H.26	Hall	5 - 24 VDC	L0	BRASS	FPM	IP65
F3.00.H.27	Hall	5 - 24 VDC	L1	BRASS	EPDM	IP65
F3.00.H.28	Hall	5 - 24 VDC	L1	BRASS	FPM	IP65

FLOWX3 F3.00.C.XX (Remote version)

Part No.	Version	Power supply	Length	Body	O-rings	Enclosure
F3.00.C.01	Coil	3 - 5 VDC	L0	C-PVC	EPDM	IP68
F3.00.C.02	Coil	3 - 5 VDC	LO	C-PVC	FPM	IP68
F3.00.C.03	Coil	3 - 5 VDC	L1	C-PVC	EPDM	IP68
F3.00.C.04	Coil	3 - 5 VDC	L1	C-PVC	FPM	IP68
F3.00.C.05	Coil	3 - 5 VDC	L0	PVDF	EPDM	IP68
F3.00.C.06	Coil	3 - 5 VDC	LO	PVDF	FPM	IP68
F3.00.C.07	Coil	3 - 5 VDC	L1	PVDF	EPDM	IP68
F3.00.C.08	Coil	3 - 5 VDC	L1	PVDF	FPM	IP68
F3.00.C.09	Coil	3 - 5 VDC	L0	316L SS	EPDM	IP68
F3.00.C.10	Coil	3 - 5 VDC	LO	316L SS	FPM	IP68
F3.00.C.11	Coil	3 - 5 VDC	L1	316L SS	EPDM	IP68
F3.00.C.12	Coil	3 - 5 VDC	L1	316L SS	FPM	IP68
F3.00.C.25	Coil	3 - 5 VDC	LO	BRASS	EPDM	IP68
F3.00.C.26	Coil	3 - 5 VDC	LO	BRASS	FPM	IP68
F3.00.C.27	Coil	3 - 5 VDC	L1	BRASS	EPDM	IP68
F3.00.C.28	Coil	3 - 5 VDC	L1	BRASS	FPM	IP68
F3.00.C.13	Coil	3 - 5 VDC	L0	C-PVC	EPDM	IP65
F3.00.C.14	Coil	3 - 5 VDC	L0	C-PVC	FPM	IP65
F3.00.C.15	Coil	3 - 5 VDC	L1	C-PVC	EPDM	IP65
F3.00.C.16	Coil	3 - 5 VDC	L1	C-PVC	FPM	IP65
F3.00.C.17	Coil	3 - 5 VDC	L0	PVDF	EPDM	IP65
F3.00.C.18	Coil	3 - 5 VDC	L0	PVDF	FPM	IP65
F3.00.C.19	Coil	3 - 5 VDC	L1	PVDF	EPDM	IP65
F3.00.C.20	Coil	3 - 5 VDC	L1	PVDF	FPM	IP65
F3.00.C.21	Coil	3 - 5 VDC	L0	316L SS	EPDM	IP65
F3.00.C.22	Coil	3 - 5 VDC	L0	316L SS	FPM	IP65
F3.00.C.23	Coil	3 - 5 VDC	L1	316L SS	EPDM	IP65
F3.00.C.24	Coil	3 - 5 VDC	L1	316L SS	FPM	IP65
F3.00.C.25	Coil	3 - 5 VDC	LO	BRASS	EPDM	IP65
F3.00.C.26	Coil	3 - 5 VDC	LO	BRASS	FPM	IP65
F3.00.C.27	Coil	3 - 5 VDC	L1	BRASS	EPDM	IP65
F3.00.C.28	Coil	3 - 5 VDC	L1	BRASS	FPM	IP65

FLOWX3 F3.00.P.XX (Remote version)

Part No.	Version	Power supply	Length	Body	O-rings	Enclosure
F3.00.P.01	Push-Pull	12 -24 VDC	LO	C-PVC	EPDM	IP68
F3.00.P.02	Push-Pull	12 -24 VDC	LO	C-PVC	FPM	IP68
F3.00.P.03	Push-Pull	12 -24 VDC	L1	C-PVC	EPDM	IP68
F3.00.P.04	Push-Pull	12 -24 VDC	L1	C-PVC	FPM	IP68
F3.00.P.05	Push-Pull	12 -24 VDC	LO	PVDF	EPDM	IP68
F3.00.P.06	Push-Pull	12 -24 VDC	LO	PVDF	FPM	IP68
F3.00.P.07	Push-Pull	12 -24 VDC	L1	PVDF	EPDM	IP68
F3.00.P.08	Push-Pull	12 -24 VDC	L1	PVDF	FPM	IP68
F3.00.P.09	Push-Pull	12 -24 VDC	L0	316L SS	EPDM	IP68
F3.00.P.10	Push-Pull	12 -24 VDC	LO	316L SS	FPM	IP68
F3.00.P.11	Push-Pull	12 -24 VDC	L1	316L SS	EPDM	IP68
F3.00.P.12	Push-Pull	12 -24 VDC	L1	316L SS	FPM	IP68
F3.00.P.25	Push-Pull	12 -24 VDC	LO	BRASS	EPDM	IP68
F3.00.P.26	Push-Pull	12 -24 VDC	LO	BRASS	FPM	IP68
F3.00.P.27	Push-Pull	12 -24 VDC	L1	BRASS	EPDM	IP68
F3.00.P.28	Push-Pull	12 -24 VDC	L1	BRASS	FPM	IP68
F3.00.P.13	Push-Pull	12 -24 VDC	LO	C-PVC	EPDM	IP65
F3.00.P.14	Push-Pull	12 -24 VDC	LO	C-PVC	FPM	IP65
F3.00.P.15	Push-Pull	12 -24 VDC	L1	C-PVC	EPDM	IP65
F3.00.P.16	Push-Pull	12 -24 VDC	L1	C-PVC	FPM	IP65
F3.00.P.17	Push-Pull	12 -24 VDC	LO	PVDF	EPDM	IP65
F3.00.P.18	Push-Pull	12 -24 VDC	LO	PVDF	FPM	IP65
F3.00.P.19	Push-Pull	12 -24 VDC	L1	PVDF	EPDM	IP65
F3.00.P.20	Push-Pull	12 -24 VDC	L1	PVDF	FPM	IP65
F3.00.P.21	Push-Pull	12 -24 VDC	LO	316L SS	EPDM	IP65
F3.00.P.22	Push-Pull	12 -24 VDC	LO	316L SS	FPM	IP65
F3.00.P.23	Push-Pull	12 -24 VDC	L1	316L SS	EPDM	IP65
F3.00.P.24	Push-Pull	12 -24 VDC	L1	316L SS	FPM	IP65
F3.00.P.25	Push-Pull	12 -24 VDC	LO	BRASS	EPDM	IP65
F3.00.P.26	Push-Pull	12 -24 VDC	LO	BRASS	FPM	IP65
F3.00.P.27	Push-Pull	12 -24 VDC	L1	BRASS	EPDM	IP65
F3.00.P.28	Push-Pull	12 -24 VDC	L1	BRASS	FPM	IP65

FLOWX3 F3.01.X.XX (Compact version)

Part No.	Version	Power supply	Length	Body	O-rings	Enclosure
F3.01.H.01	Hall	5 - 24 VDC	LO	C-PVC	EPDM	IP68
F3.01.H.02	Hall	5 - 24 VDC	LO	C-PVC	FPM	IP68
F3.01.H.03	Hall	5 - 24 VDC	L1	C-PVC	EPDM	IP68
F3.01.H.04	Hall	5 - 24 VDC	L1	C-PVC	FPM	IP68
F3.01.H.05	Hall	5 - 24 VDC	LO	PVDF	EPDM	IP68
F3.01.H.06	Hall	5 - 24 VDC	LO	PVDF	FPM	IP68
F3.01.H.07	Hall	5 - 24 VDC	L1	PVDF	EPDM	IP68
F3.01.H.08	Hall	5 - 24 VDC	L1	PVDF	FPM	IP68
F3.01.H.09	Hall	5 - 24 VDC	LO	316L SS	EPDM	IP68
F3.01.H.10	Hall	5 - 24 VDC	LO	316L SS	FPM	IP68
F3.01.H.11	Hall	5 - 24 VDC	L1	316L SS	EPDM	IP68
F3.01.H.12	Hall	5 - 24 VDC	L1	316L SS	FPM	IP68
F3.01.H.25	Hall	5 - 24 VDC	LO	BRASS	EPDM	IP68
F3.01.H.26	Hall	5 - 24 VDC	LO	BRASS	FPM	IP68
F3.01.H.27	Hall	5 - 24 VDC	L1	BRASS	EPDM	IP68
F3.01.H.28	Hall	5 - 24 VDC	L1	BRASS	FPM	IP68
F3.01.C.01	Coil	3 - 5 VDC	LO	C-PVC	EPDM	IP68
F3.01.C.02	Coil	3 - 5 VDC	LO	C-PVC	FPM	IP68
F3.01.C.03	Coil	3 - 5 VDC	L1	C-PVC	EPDM	IP68
F3.01.C.04	Coil	3 - 5 VDC	L1	C-PVC	FPM	IP68
F3.01.C.05	Coil	3 - 5 VDC	LO	PVDF	EPDM	IP68
F3.01.C.06	Coil	3 - 5 VDC	LO	PVDF	FPM	IP68
F3.01.C.07	Coil	3 - 5 VDC	L1	PVDF	EPDM	IP68
F3.01.C.08	Coil	3 - 5 VDC	L1	PVDF	FPM	IP68
F3.01.C.09	Coil	3 - 5 VDC	LO	316L SS	EPDM	IP68
F3.01.C.10	Coil	3 - 5 VDC	LO	316L SS	FPM	IP68
F3.01.C.11	Coil	3 - 5 VDC	L1	316L SS	EPDM	IP68
F3.01.C.12	Coil	3 - 5 VDC	L1	316L SS	FPM	IP68
F3.01.C.25	Coil	3 - 5 VDC	LO	BRASS	EPDM	IP68
F3.01.C.26	Coil	3 - 5 VDC	LO	BRASS	FPM	IP68
F3.01.C.27	Coil	3 - 5 VDC	L1	BRASS	EPDM	IP68
F3.01.C.28	Coil	3 - 5 VDC	L1	BRASS	FPM	IP68

FlowX3 F3.15.H.XX (with O.C. output & MIN alarm)

Part No.	Version	Power supply	Length	Body	O-rings	Enclosure
F3.15.H.01	Hall	12 - 24 VDC	LO	C-PVC	EPDM	IP65
F3.15.H.02	Hall	12 - 24 VDC	LO	C-PVC	FPM	IP65
F3.15.H.03	Hall	12 - 24 VDC	L1	C-PVC	EPDM	IP65
F3.15.H.04	Hall	12 - 24 VDC	L1	C-PVC	FPM	IP65
F3.15.H.05	Hall	12 - 24 VDC	LO	PVDF	EPDM	IP65
F3.15.H.06	Hall	12 - 24 VDC	LO	PVDF	FPM	IP65
F3.15.H.07	Hall	12 - 24 VDC	L1	PVDF	EPDM	IP65
F3.15.H.08	Hall	12 - 24 VDC	L1	PVDF	FPM	IP65
F3.15.H.09	Hall	12 - 24 VDC	LO	316L SS	EPDM	IP65
F3.15.H.10	Hall	12 - 24 VDC	LO	316L SS	FPM	IP65
F3.15.H.11	Hall	12 - 24 VDC	L1	316L SS	EPDM	IP65
F3.15.H.12	Hall	12 - 24 VDC	L1	316L SS	FPM	IP65
F3.15.H.13	Hall	12 - 24 VDC	LO	BRASS	EPDM	IP65
F3.15.H.14	Hall	12 - 24 VDC	L0	BRASS	FPM	IP65
F3.15.H.15	Hall	12 - 24 VDC	L1	BRASS	EPDM	IP65
F3.15.H.16	Hall	12 - 24 VDC	L1	BRASS	FPM	IP65

FlowX3 F3.30.H.XX (with 4-20 mA output)

Part No.	Version	Power supply	Length	Body	O-rings	Enclosure
F3.30.H.01	Hall	12 - 24 VDC	LO	C-PVC	EPDM	IP65
F3.30.H.02	Hall	12 - 24 VDC	LO	C-PVC	FPM	IP65
F3.30.H.03	Hall	12 - 24 VDC	L1	C-PVC	EPDM	IP65
F3.30.H.04	Hall	12 - 24 VDC	L1	C-PVC	FPM	IP65
F3.30.H.05	Hall	12 - 24 VDC	LO	PVDF	EPDM	IP65
F3.30.H.06	Hall	12 - 24 VDC	LO	PVDF	FPM	IP65
F3.30.H.07	Hall	12 - 24 VDC	L1	PVDF	EPDM	IP65
F3.30.H.08	Hall	12 - 24 VDC	L1	PVDF	FPM	IP65
F3.30.H.09	Hall	12 - 24 VDC	LO	316L SS	EPDM	IP65
F3.30.H.10	Hall	12 - 24 VDC	LO	316L SS	FPM	IP65
F3.30.H.11	Hall	12 - 24 VDC	L1	316L SS	EPDM	IP65
F3.30.H.12	Hall	12 - 24 VDC	L1	316L SS	FPM	IP65
F3.30.H.13	Hall	12 - 24 VDC	LO	BRASS	EPDM	IP65
F3.30.H.14	Hall	12 - 24 VDC	LO	BRASS	FPM	IP65
F3.30.H.15	Hall	12 - 24 VDC	L1	BRASS	EPDM	IP65
F3.30.H.16	Hall	12 - 24 VDC	L1	BRASS	FPM	IP65

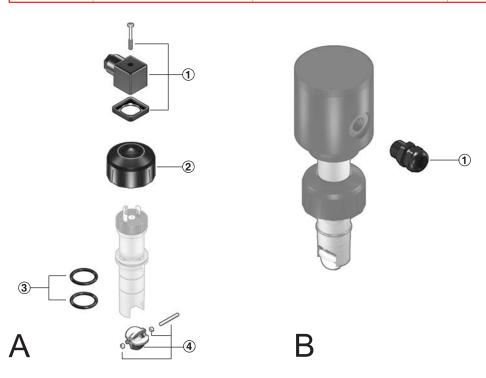


Output devices

Part No.	Housing	Gaskets	Enclosure	Description
F3.K315	PVC	EPDM	IP65	Frequency Output & MIN Alarm KIT
F3.K330	PVC	EPDM	IP65	4-20 mA Output KIT

Spare Parts

Item	Part No.	Name	Description
A-1	F3.SP1	4 pole Cable Plug	Cable Plug according to DIN 43650
A-2	F3.SP2.1	Sensor Cap	Black Sensor Cap, for Hall version
A-2	F3.SP2.2	Sensor Cap	Red Sensor Cap, for Coil version
A-2	F3.SP2.3	Sensor Cap	Yellow Sensor Cap, for push-pull version
A-2	F3.SP2.5	Sensor Cap	Brass Sensor Cap, for Hall and Coil versions
A-2	F3.SP2.6	Sensor Cap	SS Sensor Cap, for Hall and Coil versions
A-3	F3.SP3.1	O-Rings	EPDM Sensor body O-rings
A-3	F3.SP3.2	O-Rings	FPM Sensor body O-rings
A-4	F3.SP4.2	Rotor KIT	ECTFE (Halar®) rotor with New Machined Ceramic Shaft and Bearings
	F3.SP4.3	Rotor KIT	ECTFE (Halar®) rotor with SS Shaft
	F3.SP5.1	Sensor Plug	CPVC Sensor Plug
	F3.SP5.2	Sensor Plug	PVDF Sensor Plug
	F3.SP5.3	Sensor Plug	Stainless Steel Sensor Plug
	F3.SP6	Electrical cable	Cable (per meter), 22AWG, 3 cond.
B-1	F3.SP7	PG11	PG11 Cable Gland for K315 or K330 Kit



FLOWX3 F111 Hot Tap Flow Sensor

1999



The metal flow sensor type F111 offers high strength and mechanical resistance applied to hot-tap insertion technology.

The sensor can be assembled in pressurized pipes using a proper clamp saddle for a precise positioning into the pipe and get the maximum accuracy.

The sensor is available with both paddlewheel and turbine technologies.

The paddlewheel sensor can measure flow from 0.15 m/s (0.5 ft/s) while the turbine one can start measuring from 0.08 m/s (0.26 ft/s) and is able (bi-directional version) to recognize the direction of the flow.

Main Features

- Adjustable sensor position.
- Stainless steel or brass construction.
- Paddlewheel or Turbine technology.
- Hot-Tap installation.

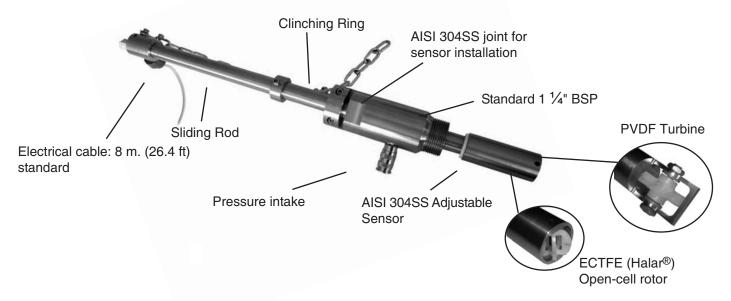
- Pressure intake.
- Standard 1 1/4" BSP process connection.
- Battery powered version.
- Compatible with most Data Loggers.

Applications

- Water distribution.
- Leak Detection or Monitoring.
- Irrigation.

- ■Water treatment and regeneration.
- Ground Water Remediation.
- Filtration systems.

Technical Features



Halar® is a registered trademark of Ausimont-Solvay.

Operating principle

The flow sensor consists of a transducer and a five-blade open cell paddlewheel or an eight-blade turbine using insertion technology. Both the paddlewheel and the turbine are equipped with permanent magnets completely incapsulated into the plastic. As the magnet passes closeto the transducer a pulse is generated.

The liquid flowing in the pipe makes the paddlewheel or the turbine rotating, producing a square wave output signal. The frequency is proportional to the flow velocity.

The Hot-Tap sensor can be installed without system shutdown using any kind of Hot-Tap clamp saddles or clamp saddles with isolation valve.

F111**F**L_s

Engineering Data

- The flow sensor is available with Hall effect transducer (standard or bi-directional electronic), Coil effect transducer (battery operated).
- The Hall sensor operates with a power supply from 5 to 24 VDC @ < 30 mA.
- The Coil sensor operates with a power supply from 3 to 5 VDC or 3.6 Volt Lithium battery and a current consumption < 10 μ A.
- The bi-directional sensor operates with a power supply from 4 to 5 VDC @ < 0.6 mA.
- The paddlewheel standard output is a square wave with a frequency of 45 Hz per m/s (13.7 Hz per ft/s) nominal.
- The turbine standard output is a square wave with a frequency of 10 Hz per m/s (3.05 Hz per ft/s) for bi-directional version and 20 Hz per m/s (6.1 Hz per ft/s) for mono-directional version.

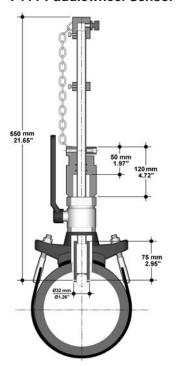
- The output signal is provided directly via electric cable. Supplied cable is standard 8 m (26.4 ft) long, with a maximum length of 300 m (990 ft) for Hall sensor, 100 m (330 ft) for bi-directional sensor and 16 m (52.8 ft) for Coil sensor.
- The sensor provides a 1 ¼" BSP male thread for connection to the pipe. All kinds of Hot-Tap clamp saddles or clamp saddles with isolation valve, with 1 ¼" BSP female connection, are suitable for the installation.
- The paddlewheel sensor nominal measuring range is from 0.15 to 8 m/s (0.5 to 25 ft/s).
- The turbine sensor nominal measuring range is from 0.08 to 8 m/s (0.26 to 25 ft/s) for standard version and from 0.08 to 1.5 m/s (0.26 to 4.9 ft/s) for bi-directional version.

Connections to FlowX3 Instruments

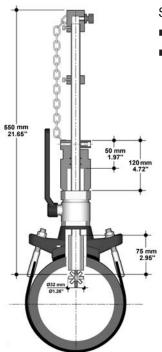
FLOWX3 Sensor	FLOW X	3 Instrume	ents					
Selisoi	F9.00.L	F9.02.L	F9.03	F9.00.BD	F9.20	F9.20.BD	F9.50.L	F9.51.L
F111.H	-		-					
F111.C								
F111.HT								
F111.HT.BD								

Dimensions

F111 Paddlewheel Sensor



F111 Turbine Sensor



Standard Pipe Range:

- DN50 to DN900 (2" to 36").
- Special order for other sizes.

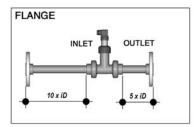
Installation Fittings

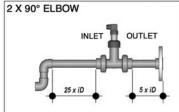
The sensor provides a 1 $\frac{1}{4}$ " BSP male thread for connection to the pipe. All kinds of Hot-Tap clamp saddles or clamp saddles with isolation valve, with 1 $\frac{1}{4}$ " BSP female connection, are suitable for the installation.

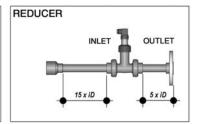
Please refer to Installation Fittings section for more details and the complete list of items available in our range.

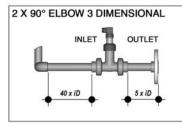
Installation Guidelines

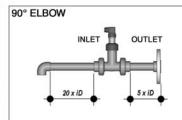
- Different pipe configurations and obstacles in the flow line such as valves, elbows, pipe bends and strainers create variations on the flow profile.
- The six most common installation configurations are shown to help in selecting the best location in the pipeline for paddlewheel flow sensor.
- For more information, please refer to EN ISO 5167-1.
- Always maximize distance between flow sensors and pumps.

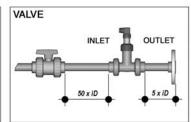












Mounting Positions

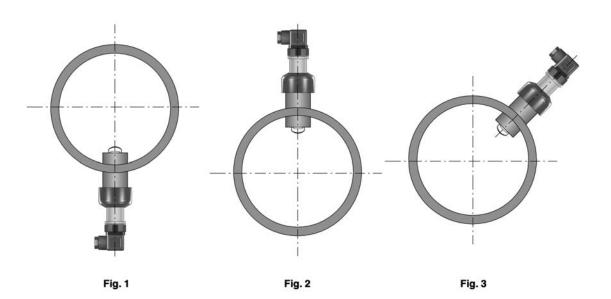
Make sure the pipeline is always full.

■ Horizontal pipe runs:

Fig.1: installation with no sediments present Fig.2: installation with no air bubbles present Fig.3: installation if sediments or air bubbles may be present.

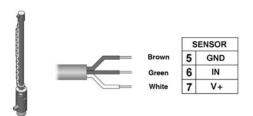
■ Vertical pipe runs:

Install sensor in any orientation.
Upward flow is preferred to ensure full pipe.

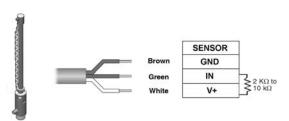


Wiring

F111.H and F111.HT Sensor Connection to FLOWX3 Instruments

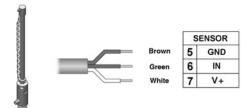


F111.H and F111.HT Sensor Connection to Other Brand Instruments

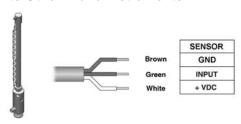


2 K Ω to 10 K Ω Pull-up resistor may be required.

F111.C Sensor Connection to FLOWX3 Instruments

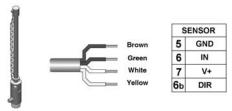


F111.C Sensor Connection to Other Brand Instruments

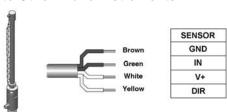


Pull-up resistor is never required.

F111.HT.BD Sensor Connection to FLOWX3 Instruments



F111.HT.BD Sensor Connection to Other Brand Instruments



Pull-up resistor is never required.

Technical Data

Technical General (for all version)

- Pipe Size Range: DN50 to DN900 (2" to 36"). Special versions on request for other sizes.
- Linearity: ± 0.75 % of full scale.
- Repeatability: ± 0.5 % of full scale.
- Minimum Reynolds Number Required: 4500.
- Enclosure: IP68.
- Maximum operating pressure/temperature: 20 bar (290 psi) @ 80°C (176°F).
- Sensor fitting joint: 1 ¼" BSP (male).
- Pressure Intake: quick connection 3/8".
- Wetted Materials:
- Sensor Body: AISI 304 Stainless Steel
- Sensor joint: AISI 304 Stainless Steel
- O-rings: EPDM
- Rotor: ECTFE (Halar®)
- Turbine: PVDF
- Shaft: Ceramic (Al₂O₃)
- Bearings: Ceramic (Al₂O₃).

Specific for F111.H

- Flow Rate Range: 0.15 to 8 m/s (0.5 to 25 ft/s)
- Supply voltage: 5 to 24 VDC ±10%, regulated.
- Supply current: < 30mA @ 24 VDC.
- Output signal:
- square wave
- output frequency: 45 Hz per m/s nominal (13.7 Hz per ft/s nominal)
- output type: transistor NPN open collector.
- output current: 10 mA max.
- Cable length: m (26.4 ft) standard, 300 m (990 ft) maximum.

Specific for F111.HT

- Flow Rate Range: 0.08 to 8 m/s (0.26 to 25 ft/s).
- Supply voltage: 5 to 24 VDC ± 10%, regulated.
- Supply current: < 30mA @ 24 VDC.
- Output Signal:
- square wave
- output frequency: 20 Hz per m/s nominal (6.1 Hz per ft/s)
- output type: transistor NPN open collector
- output current: 10 mA max.
- Cable length: 8 m (26.4 ft) standard, 300 m (990 ft) maximum.

Specific for F111.C

- Flow Rate Range: 0.15 to 8 m/s (0.5 to 25 ft/s).
- Supply voltage: 3 to 5 VDC ±10%, regulated or 3.6 Volt Lithium battery.
- Supply current: < 10 µA.
- Output signal:
- square wave
- output frequency: 45 Hz per m/s nominal (13.7 Hz per ft/s nominal)
- min. input impedance: 100 k Ω .
- Cable length: 8 m (26.4 ft) standard, 16 m (52.8 ft) maximum.

Specific for F111.HT.BD

- Flow Rate Range: 0.08 to 1.5 m/s (0.26 to 4.9 ft/s).
- Supply voltage: 4 to 5 VDC ±10%, regulated.
- Supply current: 0.6 mA @ 5 VDC
- Output Signal:
- square wave
- output frequency: 10 Hz per m/s nominal (3.05 Hz per ft/s nominal)
- output type: CMOS active output.
- Cable length: 8 m (26.4 ft) standard, 100 m (330 ft) maximum.

Standards & Approvals

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

FLOWX3 F111.X Sensor

Part No.	Version	Power supply	Description
F111.H.01	Hall Paddlewheel	5 - 24 VDC	AISI 304 SS Hot Tap Hall Paddlewheel Flow Sensor
F111.H.02	Hall Paddlewheel	5 - 24 VDC	Brass Hot Tap Hall Paddlewheel Flow Sensor
F111.C.01	Coil Paddlewheel	3 - 5 VDC	AISI 304 SS Hot Tap Coil Paddlewheel Flow Sensor
F111.C.02	Coil Paddlewheel	3 - 5 VDC	Brass Hot Tap Coil Paddlewheel Flow Sensor
F111.HT.01	Hall Turbine	5 - 24 VDC	AISI 304 SS Hot Tap Hall Turbine Flow Sensor
F111.HT.BD	Turbine Bi-directional	4 - 5 VDC	AISI 304 SS Hot Tap Turbine Bi-directional Flow Sensor

Spare Parts

Part No.	Name	Description
F3.SP4	Rotor KIT	ECTFE (Halar®) rotor with Ceramic Shaft and Bearings
F3.SP8	Turbine KIT	PVDF Turbine with ceramic shaft and bearings + fixing bushings
F1.SP1.01	Hall Paddlewheel Sensor Body	Stainless Steel Hall Paddlewheel Flow Sensor
F1.SP1.02	Hall Paddlewheel Sensor Body	Brass Hall Paddlewheel Flow Sensor
F1.SP1.HT	Hall Turbine Sensor Body	Stainless Steel Hall Turbine Sensor Body
F1.SP1.BD	Bi-directional Turbine Sensor Body	Stainless Steel Bi-directional Turbine Sensor Body
F1.SP2.01	Coil Paddlewheel Sensor Body	Stainless Steel Coil Paddlewheel Flow Sensor
F1.SP2.02	Coil Paddlewheel Sensor Body	Brass Coil Paddlewheel Flow Sensor
F1.SP3	Isolation Valve	2" Brass Ball Valve
F1.SP5	Isolation Valve	1 1/4" Brass Ball Valve
F1.SP6	Reduction 2" to 1 1/4"	Reduction 2" BS male to 1 1/4" BS female
F1.SP7	Reduction 2" to 1 1/4"	Reduction 2" NPT male to 1 1/4" BS female
F3.SP6	Electrical Cable	Cable (per meter), 22AWG, 3 cond.

FLOWX3 F3.60M Insertion Magmeter





The FLOWX3 F3.60M & F3.63M 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 F3.60M & F3.63 offer frequency output for use with FLS flow instrumentation and 4-20 mA output for long distance transmission and PLC connection.

Main Features

- No moving parts, no wear, maintenance free.
- High mechanical resistance.
- For DN15 (0.5") to DN600 (24") pipes.
- Flow Rate Range:
- F3.60M: from 0.05 to 8 m/s (0.15 to 25 ft/s)
- F3.63M: from 0.15 to 8 m/s (0.5 to 25 ft/s).
- Accurate measurement of dirty liquids.
- Blind 4-20 mA or frequency output.
- Bi-directional flow measurement (F3.60M).
- Low pressure drop.
- Special versions for salt-water applications (high concentrations of chlorides like sea water) and for high temperature conditions.

Applications

- Water and waste water treatment.
- Raw water intake.
- Industrial water distribution.
- Textile industry.

- Pools, spas and aquariums.
- HVAC.
- Processing and manufacturing industry.
- Sea water applications.

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.

Connections to FLOWX3 Instruments

F3.6XM Frequency output is compatible with the list of instruments marked into the following table.

FLOWX3 Magmeter	FLOWX3 I	FLOWX3 Instruments					
	F9.00.L	F9.02.L	F9.03	F9.20	F9.50.L	F9.51.L	
F3.60M							
F3.63M							

Installation Fittings

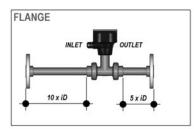
Please refer to installation Fittings section for more details and complete listing of items

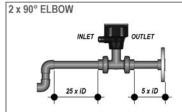
	Туре	Description
	Plastic Tees	Size: D20 to D50 (0.5" to 1.5") Materials: UPVC, CPVC, PP, PVDF
	CPVC Clamp Saddles	Size: D63 to D225 (2" to 8") Insert materials: CPVC, PVDF
	PP Clamp Saddles	Size: D250 to D315 (10" to 12") Insert material: CPVC
O	PVC Wafer Fittings	Size: D280 and D315 (10" and 12") Insert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

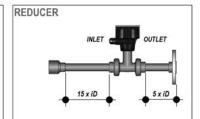
Installation

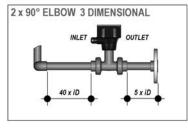
Different pipe configurations and obstacles in the flow line such as valves, elbows, pipe bends and strainers create variations on the flow profile.

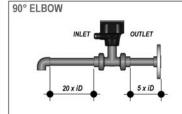
- The six most common installation configurations are shown to help selecting the best location in the pipe line for the flow sensor.
- For more information, please refer to EN ISO 5167-1.
- Always maximize the distance between flow sensor and pump.

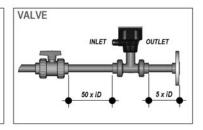






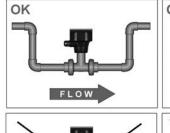






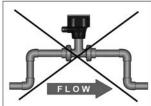
The first three configurations ensure that the pipe is always full: for a correct measurement the sensor can NOT be exposed to air bubbles at any time.

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





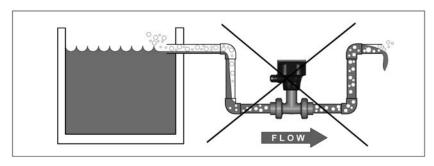








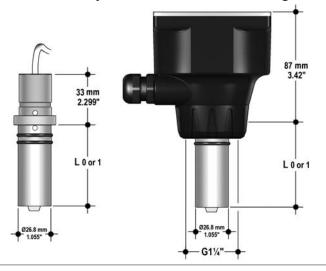
In gravity-flow systems the connection to the tank must be designed so the level does not drop below the outlet: this to avoid pipe to draw air in from the tank causing an erratic measurement of the Magmeter.



Dimensions

Sensor Body

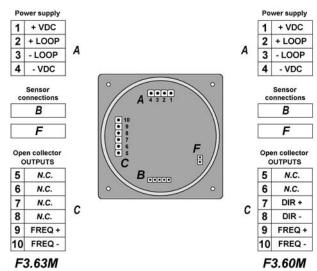
F3.60M & F3.63M Magmeter



Sensor length:

L0 = 68.5 mm (2.70") L1 = 98.5 mm (3.88")

Terminal View



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:
- F3.60M: from 0.05 to 8 m/s (0.15 to 25 ft/s)
- F3.63M: from 0.15 to 8 m/s (0.5 to 25 ft/s).
- Full Scale Range : 5 m/s (16,4 ft/s) standard (others available on request).
- Linearity: ± 1% of reading + 1,0 cm/s.
- Repeatability: ± 0.5% of reading.
- Enclosure: IP65.
- Materials:
- Case: PC/UPVC
- Gasket: EPDM.
- Wetted Materials:
- Sensor body:
 316L SS/PVDF
 316L SS/PEEK
 CuNi alloy/PVDF
- O-rings: EPDM or FPM
- Electrodes: 316LSS CuNi alloy

Electrical

- Power Supply:
- 12 to 24 VDC ± 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:
- Open Collector NPN
- Frequency: 0 500 Hz
- Max. Pull-up Voltage: 24 VDC
- Max. Current: 50 mA, current limited
- Compatible with FLOWX3 F9.02.L,F9.03, F9.50.L and F9.51.L.
- Digital output (F3.60M only):
- Type: Open Collector NPN
- Max. Pull-up Voltage: 24 VDC
- Max. Current: 50mA, current limited
- Flow direction:
 - 0 VDC arrow-wise
 - + VDC anti arrow-wise

Technical Data

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 μS

- Temperature:
 - PVDF bottom version: -10 $^{\circ}$ C to +60 $^{\circ}$ C (14 $^{\circ}$ F to 140 $^{\circ}$ F)
 - PEEK bottom version: -10 °C to 150 °C (14 °F to 302 °F).
- 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.

Ordering Data

FLOWX3 NEW F3.60M.XX

Part No.	Power Supply	Flow Rate Range	Length	Body/Electrodes	O-ring	Enclosure
F3.60M.09	12 - 24 VDC	0,05 – 8 m/s bi-directional	L0	316L SS & PVDF 316L SS	EPDM	IP65
F3.60M.10	12 - 24 VDC	0,05 – 8 m/s bi-directional	L0	316L SS & PVDF 316L SS	FPM	IP65
F3.60M.11	12 - 24 VDC	0,05 – 8 m/s bi-directional	L1	316L SS & PVDF316L SS	EPDM	IP65
F3.60M.12	12 - 24 VDC	0,05 – 8 m/s bi-directional	L1	316L SS & PVDF316L SS	FPM	IP65
F3.60M.33	12-24 VDC	0,05 – 8 m/s bi-directional	L0	CuNi & PVDF CuNi	EPDM	IP65
F3.60M.34	12-24 VDC	0,05 – 8 m/s bi-directional	LO	CuNi & PVDF CuNi	FPM	IP65
F3.60M.35	12-24 VDC	0,05 – 8 m/s bi-directional	L1	CuNi & PVDF CuNi	EPDM	IP65
F3.60M.36	12-24 VDC	0,05 – 8 m/s bi-directional	L1	CuNi & PVDF CuNi	FPM	IP65
F3.60M.38	12-24 VDC	0,05 – 8 m/s bi-directional	LO	316L SS & PEEK 316L SS	FPM	IP65
F3.60M.40	12-24 VDC	0,05 – 8 m/s bi-directional	L1	316L SS & PEEK 316L S	FPM	IP65

FLOWX3 NEW F3.63M.XX

Part No.	Power Supply	Flow Rate Range	Length	Body/Electrodes	O-ring	Enclosure
F3.63M.09	12 - 24 VDC	0,15 - 8 m/s mono-directional	L0	316L SS & PVDF316L SS	EPDM	IP65
F3.63M.10	12 - 24 VDC	0,15 - 8 m/s mono-directional	L0	316L SS & PVDF 316L SS	FPM	IP65
F3.63M.11	12 - 24 VDC	0,15 - 8 m/s mono-directional	L1	316L SS & PVDF 316L SS	EPDM	IP65
F3.63M.12	12 - 24 VDC	0,15 - 8 m/s mono-directional	L1	316L SS & PVDF 316L SS	FPM	IP65
F3.63M.33	12-24 VDC	0,15 - 8 m/s mono-directional	L0	CuNi & PVDF CuNi	EPDM	IP65
F3.63M.34	12-24 VDC	0,15 - 8 m/s mono-directional	L0	CuNi & PVDF CuNi	FPM	IP65
F3.63M.35	12-24 VDC	0,15 - 8 m/s mono-directional	L1	CuNi & PVDF CuNi	EPDM	IP65
F3.63M.36	12-24 VDC	0,15 - 8 m/s mono-directional	L1	CuNi & PVDF CuNi	FPM	IP65
F3.63M.38	12-24 VDC	0,15 - 8 m/s mono-directional	L0	316L SS & PEEK 316L SS	FPM	IP65
F3.63M.40	12-24 VDC	0,15 - 8 m/s mono-directional	L1	316L SS & PEEK 316L SS	FPM	IP65

Spare Parts

Mechanical Replacements

mechanical neplacements						
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			

Spare Parts

F3.60M Electronic Replacements

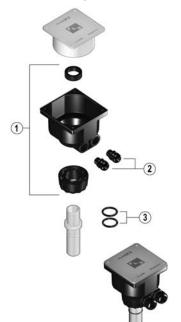
Item	Part No.	Name	Description
1	F3.60M.SP1	Electronic device	Magmeter electronic device with 4-20 mA output and freq. outputfor bi-directional sensor
2	F3.60M.SP09	Magmeter bi-directional flow sensor	316L SS/PVDF body - EDPM O-Rings - L0 length
2	F3.60M.SP10	Magmeter bi-directional flow sensor	316L SS/PVDF body - FPM O-Rings - L0 length
2	F3.60M.SP11	Magmeter bi-directional flow sensor	316L SS/PVDF body - EDPM O-Rings - L1 length
2	F3.60M.SP12	Magmeter bi-directional flow sensor	316L SS/PVDF body - FPM O-Rings - L1 length
2	F3.60M.SP33	Magmeter bi-directional flow sensor	CuNi/PVDF body - EPDM O-Ring - L0 lenght
2	F3.60M.SP34	Magmeter bi-directional flow sensor	CuNi/PVDF body - FPM O-Ring - L0 lenght
2	F3.60M.SP35	Magmeter bi-directional flow sensor	CuNi/PVDF body - EPDM O-Ring - L1 lenght
2	F3.60M.SP36	Magmeter bi-directional flow sensor	CuNi/PVDF body - FPM O-Ring - L1 lenght
2	F3.60M.SP38	Magmeter bi-directional flow sensor	AISI 316L/PEEK body - FPM O-Ring - L0 lenght
2	F3.60M.SP40	Magmeter bi-directional flow sensor	AISI 316L/PEEK body - FPM O-Ring - L1 lenght

F3.63M Electronic Replacements

Item	Part No.	Name	Description
1	F3.63M.SP1	Electronic device	Magmeter electronic device with 4-20 mA output and freq. output for mono-directional sensor
2	F3.63M.SP09	Magmeter mono-directional flow sensor	316L SS/PVDF body - EDPM O-Rings - L0 length
2	F3.63M.SP10	Magmeter mono-directional flow sensor	316L SS/PVDF body - FPM O-Rings - L0 length
2	F3.63M.SP11	Magmeter mono-directional flow sensor	316L SS/PVDF body - EDPM O-Rings - L1 length
2	F3.63M.SP12	Magmeter mono-directional flow sensor	316L SS/PVDF body - FPM O-Rings - L1 length
2	F3.63M.SP33	Magmeter mono-directional flow sensor	CuNi/PVDF body - EPDM O-Ring - L0 lenght
2	F3.63M.SP34	Magmeter mono-directional flow sensor	CuNi/PVDF body - FPM O-Ring - L0 lenght
2	F3.63M.SP35	Magmeter mono-directional flow sensor	CuNi/PVDF body - EPDM O-Ring - L1 lenght
2	F3.63M.SP36	Magmeter mono-directional flow sensor	CuNi/PVDF body - FPM O-Ring - L1 lenght
2	F3.63M.SP38	Magmeter mono-directional flow sensor	AISI 316L/PEEK body - FPM O-Ring - L0 lenght
2	F3.63M.SP40	Magmeter mono-directional flow sensor	AISI 316L/PEEK body - FPM O-Ring - L1 lenght

Replacement must be done in factory exclusively due to recalibration necessity of the whole instrument.

Mechanical Replacements



Electronic Replacements



FLOWX3 F9.60M Insertion Magmeter with Display







The FLOWX3 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 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.
- Bi-directional flow measurement (F9.60M only).
- Low pressure drop.
- Special versions for salt-water applications (high concentrations of chlorides like sea water) and for high temperature conditions

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.
- Sea water applications.

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

F9.6XM Frequency output is compatible with the list of instruments marked into the following table.

FLOWX3 Magmeter	FLOWX3 I	FLOWX3 Instruments					
	F9.00.L	F9.02.L	F9.03	F9.20	F9.50.L	F9.51.L	
F9.60M							
F9.63M							

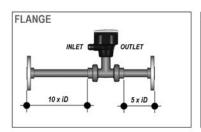
Installation Fittings

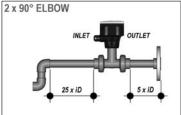
	Туре	Description
	Plastic Tees	Size: D20 to D50 (0.5" to 1.5") Materials: UPVC, CPVC, PP, PVDF
	CPVC Clamp Saddles	Size: D63 to D225 (2" to 8") Insert materials: CPVC, PVDF
	PP Clamp Saddles	Size: D250 to D315 (10" to 12") Insert material: CPVC
O	PVC Wafer Fittings	Size: D280 and D315 (10" and 12") Insert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

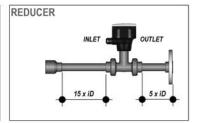
Installation

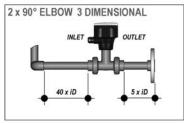
Different pipe configurations and obstacles in the flow line such as valves, elbows, pipe bends and strainers create variations on the flow profile.

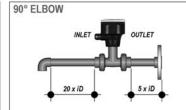
- The six most common installation configurations are shown to help selecting the best location in the pipe line for the flow sensor.
- For more information, please refer to EN ISO 5167-1.
- Always maximize the distance between flow sensor and pump.

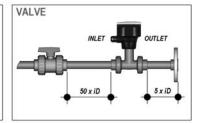






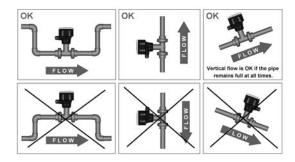




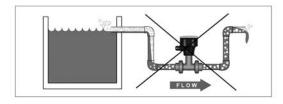


The first three configurations ensure that the pipe is always full: for a correct measurement the sensor can NOT be exposed to air bubbles at any time.

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



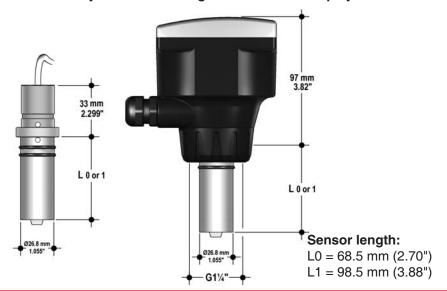
In gravity-flow systems the connection to the tank must be designed so the level does not drop below the outlet: this to avoid pipe to draw air in from the tank causing an erratic measurement of the Magmeter.



Dimensions

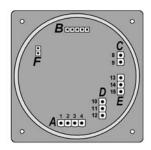
Sensor body

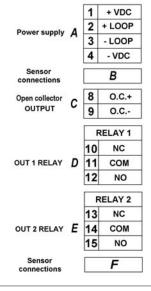
F9.6XM Magmeter with LCD display



F9.60MF_L

Terminal View





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: ± 1% of reading + 1,0 cm/s.
 - Full Scale Range: 5 m/s (16,4 ft/s) standard (others available on request).
- Repeatability: ± 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.
- Wetted Materials:
- Sensor body:
 316L SS/PVDF
 316L SS/PEEK
 CuNi alloy/PVDF
- O-rings: EPDM or FPM
- Electrodes: 316LSS CuNi alloy.

Electrical

- Power Supply:
- 12 to 24 VDC ± 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 Ω @ 24 VDC
- Positive, negative or bi-directional flow indication.
- Open Collector output (OPT):
- Type: solid state NPN, optically isolated
- Output modes: Off, MIN, MAX, Window (available only for F9.63M), Proportional Pulse.
- Max. Frequency: 500 Hz
- Max. Pull-up Voltage: 24 VDC
- Max. Current: 50 mA, current limited
- Compatible with FLOWX3 F9.02.L, F9.03, F9.50.L and F9.51.L
- Hysteresis: User selectable plus timer delay
- Trigger delay: adjustable
- Relay Output (OUT1 and OUT2):
- Type: mechanical SPDT contact
- Output modes: Off, MIN, MAX, Window (available only for F9.63M), 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): 10⁷
- Expected electrical life (min. operations):
 1. N.O. switching capacity 5A 250VAC:
 5 x 10⁴
 - 2. N.C. switching capacity 2A 250VAC: 2 x 10⁵.

F9,60M

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:

PVDF bottom version: -10 $^{\circ}\text{C}$ to +60 $^{\circ}\text{C}$

(14 °F to 140 °F)

PEEK bottom version: -10 °C to 150 °C

(14 °F to 302 °F)

- 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.

Ordering Data

FLOWX3 NEW F9.60M.XX

Part No.	Power supply	Flow Rate	Output	Sensor Length	Body/Electrodes	Sensor O-rings	Enclosure
F9.60M.09	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
F9.60M.10	12-24 VDC	0,05-8 m/s bi-directional	1 (4-20 mA) 1 (Open Collector), 2 (Relay)	LO	316L SS & PVDF 316L SS	FPM	IP65
F9.60M.11	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
F9.60M.12	12-24 VDC	0,05-8 m/s bi-directional	1 (4-20 mA) 1 (Open Collector), 2 (Relay)	L1	316L SS & PVDF	FPM	IP65
F9.60M.33	12-24 VDC	0,05-8 m/s bi-directional	1 (4-20 mA) 1 (Open Collector), 2 (Relay)	L0	CuNi & PVDF CuNi	EPDM	IP65
F9.60M.34	12-24 VDC	0,05-8 m/s bi-directional	1 (4-20 mA) 1 (Open Collector), 2 (Relay)	LO	CuNi & PVDF CuNi	FPM	IP65
F9.60M.35	12-24 VDC	0,05-8 m/s bi-directional	1 (4-20 mA) 1 (Open Collector), 2 (Relay)	L1	CuNi & PVDF CuNi	EPDM	IP65
F9.60M.36	12-24 VDC	0,05-8 m/s bi-directional	1 (4-20 mA) 1 (Open Collector), 2 (Relay)	L1	CuNi & PVDF CuNi	FPM	IP65
F9.60M.38	12-24 VDC	0,05-8 m/s bi-directional	1 (4-20 mA) 1 (Open Collector), 2 (Relay)	LO	316L SS & PEEK 316L SS	FPM	IP65
F9.60M.40	12-24 VDC	0,05-8 m/s bi-directional	1 (4-20 mA) 1 (Open Collector), 2 (Relay)	L1	316L SS & PEEK 316L SS	FPM	IP65

FLOWX3 NEW F9.63M.XX

Part No.	Power supply	Flow Rate	Output	Sensor Length	Body/Electrodes	Sensor O-rings	Enclosure
F9.63M.09	12-24 VDC	0,15-8 m/s mono-directional	1 (4-20 mA) 1 (Open Collector), 2 (Relay)	LO	316L SS & PVDF 316L SS	EPDM	IP65
F9.63M.10	12-24 VDC	0,15-8 m/s mono-directional	1 (4-20 mA) 1 (Open Collector), 2 (Relay)	LO	316L SS & PVDF 316L SS	FPM	IP65
F9.63M.11	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
F9.63M.12	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
F9.63M.33	12-24 VDC	0,15-8 m/s mono-directional	1 (4-20 mA) 1 (Open Collector), 2 (Relay)	LO	CuNi & PVDF CuNi	EPDM	IP65
F9.63M.34	12-24 VDC	0,15-8 m/s mono-directional	1 (4-20 mA) 1 (Open Collector), 2 (Relay)	LO	CuNi & PVDF CuNi	FPM	IP65
F9.63M.35	12-24 VDC	0,15-8 m/s mono-directional	1 (4-20 mA) 1 (Open Collector), 2 (Relay)	L1	CuNi & PVDF CuNi	EPDM	IP65
F9.63M.36	12-24 VDC	0,15-8 m/s mono-directional	1 (4-20 mA) 1 (Open Collector), 2 (Relay)	L1	CuNi & PVDF CuNi	FPM	IP65
F9.63M.38	12-24 VDC	0,15-8 m/s mono-directional	1 (4-20 mA) 1 (Open Collector), 2 (Relay)	LO	316L SS & PEEK 316L SS	FPM	IP65
F9.63M.40	12-24 VDC	0,15-8 m/s mono-directional	1 (4-20 mA) 1 (Open Collector), 2 (Relay)	L1	316L SS & PEEK 316L SS	FPM	IP65

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
2	F3.60M.SP33	Magmeter bi-directional flow sensor	CuNi/PVDF body EPDM O-Ring - L0 lenght
2	F3.60M.SP34	Magmeter bi-directional flow sensor	CuNi/PVDF body FPM O-Ring - L0 lenght
2	F3.60M.SP35	Magmeter bi-directional flow sensor	CuNi/PVDF body EPDM O-Ring - L1 lenght
2	F3.60M.SP36	Magmeter bi-directional flow sensor	CuNi/PVDF body FPM O-Ring - L1 lenght
2	F3.60M.SP38	Magmeter bi-directional flow sensor	AISI 316L/PEEK body FPM O-Ring - L0 lenght
2	F3.60M.SP40	Magmeter bi-directional flow sensor	AISI 316L/PEEK body FPM O-Ring - L1 lenght

Replacement must be done in factory exclusively due to recalibration necessity of the whole instrument.

Spare Parts

Electronic Replacements

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
2	F3.63M.SP33	Magmeter mono-directional flow sensor	CuNi/PVDF body EPDM O-Ring - L0 lenght
2	F3.63M.SP34	Magmeter mono-directional flow sensor	CuNi/PVDF body FPM O-Ring - L0 lenght
2	F3.63M.SP35	Magmeter mono-directional flow sensor	CuNi/PVDF body EPDM O-Ring - L1 lenght
2	F3.63M.SP36	Magmeter mono-directional flow sensor	CuNi/PVDF body FPM O-Ring - L1 lengh
2	F3.63M.SP38	Magmeter mono-directional flow sensor	AISI 316L/PEEK body FPM O-Ring - L0 lenght
2	F3.63M.SP40	Magmeter mono-directional flow sensor	AISI 316L/PEEK body FPM O-Ring - L1 lenght

Replacement must be done in factory exclusively due to recalibration necessity of the whole instrument.

Mechanical Replacements



Electronic Replacements



FLOWX3 F3.61M Hot Tap Insertion Magmeter





The FLOWX3 F3.61M Hot Tap Insertion Magmeter is suitable to measure flowrate in both metal and thermoplastic pipelines.

The sensor can be assembled in pressurized pipes simply using a standard clamp saddle and an isolation ball valve.

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 new design allows an accurate flow measurement over a wide dynamic range in pipe sizes from DN50 (2") to DN900 (36"). The F3.61M offer frequency output for use with FLS flow instrumentation or 4-20 mA output for long distance transmission and PLC connection.

Main Features

- Adjustable sensor position.
- Hot-Tap installation.
- Pressure intake.
- Standard 1 ¼" BSP process connection.
- No moving parts, no wear, maintenance free.
- Flow range from 0.05 to 8 m/s (0.15 to 25 ft/s).
- Accurate measurement of dirty liquids.
- User selectable blind 4-20 mA or frequency output.
- Zero flow output with empty pipe.
- Bi-directional flow measurement.

Applications

- Water distribution.
- Leak Detection or Monitoring.
- Raw water intake.

- Water and waste water treatment.
- Ground water remediation.
- Irrigation.

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.

The Hot-Tap magmeter can be installed without system shutdown using any kind of Hot-Tap clamp saddle or clamp saddle with isolation valve.

Connections to FLOWX3 Instruments

F3.61M Frequency output is compatible with the list of instruments marked into the following table.

FLOWX3 Magmeter	FLOWX3 Ir	FLOWX3 Instruments				
	F9.00.L F9.02.L F9.03 F9.20 F9.50.L F9.51.L			F9.51.L		
F3.61M						

Installation Fittings

The sensor provides a 1 ¼" BSP male thread for connection to the pipe. All kinds of Hot-Tap clamp saddles or clamp saddles with isolation valve, with 1 ¼" BSP female connection, are suitable for the installation.

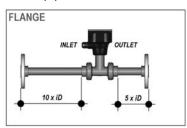
Please refer to Installation Fitting section for more details and a complete list of items available in our range.

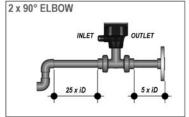
F3.61MF_L

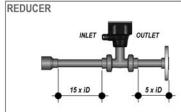
Installation

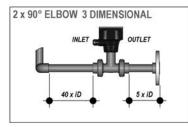
Different pipe configurations and obstacles in the flow line such as valves, elbows, pipe bends and strainers create variations on the flow profile.

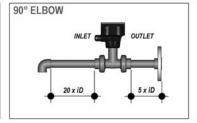
- The six most common installation configurations are shown to help selecting the best location in the pipe line for the flow sensor.
- For more information, please refer to EN ISO 5167-1.
- Always maximize the distance between flow sensor and pump.

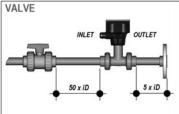






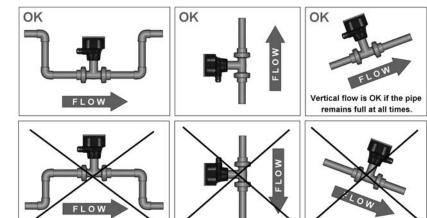




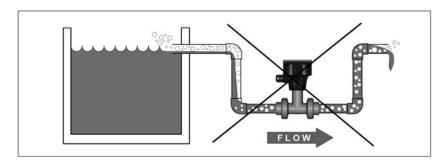


The first three configurations ensure that the pipe is always full: for a correct measurement the sensor can NOT be exposed to air bubbles at any time.

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.



F3,61M

Technical Data

General

- Pipe Size Range: DN50 to DN900 (2" to 36"). Special versions on request for other sizes.
- 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: ± 1% of reading + 1,0 cm/s.
- Repeatability: ± 0.5% of reading.
- Enclosure: IP65.
- Sensor fitting joint: 1 1/4" BSP (male).
- Pressure intake: quick connection 3/8".
- Materials:
- Case: PC/UPVCGasket: EPDM.
- Wetted Materials:
- Sensor body: 304 SS/PVDF
- O-rings: EPDMElectrodes: 316L SS.

Electrical

- Power Supply:
- 12 to 24 VDC ± 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.L, F9.03, F9.50.L and F9.51.L.
- 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.

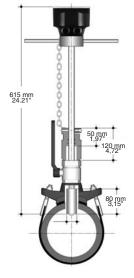
Environmental

- 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 µS
- Temperature: -10°C to +70°C (14°F to 158°F).
- Max. operating pressure:
- 20 bar @ 25°C (290 psi @ 77°F).

Standards & Approvals

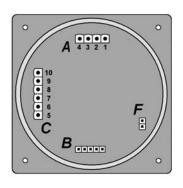
- Manufactured under ISO 9001 (Quality).
- Manufactured under ISO 14001 (Environmental Management).
- CE.

Dimensions and Terminal View



Standard Pipe Range:

- DN50 (2") to DN900 (36")
- Special order for other sizes.



1 + VDC 2 + LOOP 3 - LOOP 4 - VDC

Power supply

Sensor connections

B F

Open collector OUTPUTS

	5	N.C.
	6	N.C.
^	7	DIR+
C	8	DIR -
	9	FREQ +
	10	FREQ -
	_	

Ordering Data

FLOWX3 NEW F3.61M.XX

Part No.	Power supply	Body	Electrodes	Enclosure	Description
F3.61M.01	12 - 24 VDC	304 SS/PVDF	AISI 316L	IP65	AISI 304 SS Hot-Tap Magmeter

Spare Parts

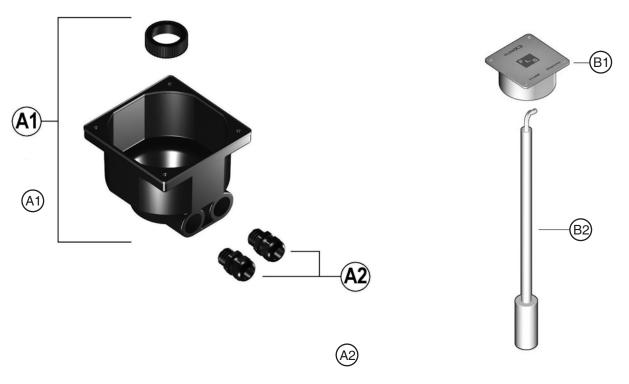
Mechanical Replacements

Item	Part No.	Name	Description
A1	F3.KC1	Magmeter Compact mounting Kit	Plastic adapter with gasket, locking ring and 4 fixing screws
A2	F9.SP4.1	PG 13.5	PG 13.5 Cable Gland for Compact Kit
A2	F9.SP4.2	PG 11	PG 11 Cable Gland for Compact Kit
	F1.SP3	Isolation valve	2" Brass Ball Valve
	F1.SP5	Isolation Valve	1 1/4" Brass Ball Valve
	F1.SP6	Reduction 2" to 1 1/4"	Reduction 2" BS male to 1 1/4" BS female
	F1.SP7	Reduction 2" to 1 1/4"	Reduction 2" NPT male to 1 1/4" BS female

Electronic Replacements

Item	Part No.	Name	Description
B1	F3.60M.SP1	Electronic device	Magmeter electronic device with 4-20mA output and freq. output for bi-directional sensor
B2	F3.61M.SP01	Hot-Tap Magmeter flow sensor	304 SS/PVDF sensor body

Replacement must be done in factory exclusively due to recalibration necessity of the whole instrument.



FLOWX3 F3.11.H.BD Bi-directional Turbine Flow Sensor





The turbine flow sensor F3.11.H.BD is designed for use with every kind of solid-free liquids. The sensor can measure flow from 0.08 m/s (0.26 ft/s) producing a frequency output signal highly repeatable and it is able to recognize the direction of the flow. A stainless steel rugged construction and a proven technology guarantee exceptional performances with little or no maintenance required. An innovative insertion system ensures an easy and safe hot-tap installation into all pipes with sizes from DN50 (2").

Main Features ■ Hot-Tap installation.

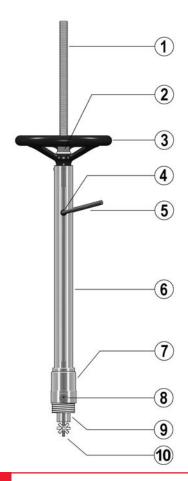
- Bi-directional flow indication.
- Minimum flow velocity: 0,08 m/s (0.26 ft/s).
- Minimum pressure drop.
- Pipe Size Range: DN50 (2") to DN 300 (12").
- Standard 1 ¼" BSP process connection.

Applications

- Water distribution.
- Leak Detection or Monitoring.
- Irrigation.

- Ground Water Remediation.
- Filtration systems.

Technical Features



- 1) SS AISI 304 threaded rod
- 2) Brass locking nuts
- 3) Regulating wheel
- 4) Cable gland
- 5) Electric cable
- 6) SS AISI 304 external guiding rod
- 7) SS AISI 304 installation joint
- 8) Pressure intake
- 9) SS AISI 304 adjustable sensor
- 10) PVDF turbine with ceramic shaft and bearings

F3.11.H.BD



Operating principle

The flow sensor consists of a transducer and an eight-blade turbine.

The turbine is equipped with a permanent magnet integrated in two of the eight blades. As the magnet passes close to the transducer a pulse is generated.

The liquid flowing in the pipe makes the turbine rotating, producing a square wave output with duty cycle 50 %.

The frequency is proportional to the flow velocity. A flag signal (0 for positive and 1 for negative flow) provides information about the direction of the flow. The sensor can be installed without system shutdown using any kind of Hot-Tap clamp saddles or clamp saddles with isolation valve.

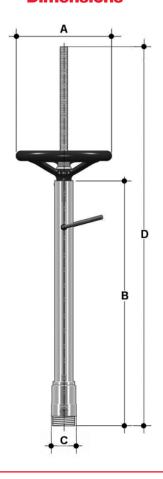
Engineering Data

- The flow sensor F3.11.H.BD is available with a Hall effect transducer.
- The sensor operates with a power supply from 4 to 5 VDC @ < 0.6 mA.
- The standard output is a square wave with a frequency of 10 Hz per m/s (3.05 Hz per ft/s).
- The output signal is provided directly via electric cable. Supplied cable is standard 8 m (26.4 ft) long, with a maximum length of 100 m (330 ft).
- The sensor provides a 1 ¼" BSP male thread for connection to the pipe. All kinds of Hot-Tap clamp saddles or clamp saddles with isolation valve, with 1 ¼" BPS connection, are suitable for the installation.
- The nominal measuring range is from 0.08 to 1.5 m/s (0.26 to 4.9 ft/s).

Connections to FLOWX3 Instruments

FLOWX3 Sensor	FLOWX3 Instruments						
	F9.00.L F9.00.BD F9.02.L F9.03 F9.20 F9.20.BD F9.50.L						
F3.11.H.BD		-					

Dimensions



A = 200 mm

B = 512 mm

C = 46 mm

D = 900 mm

F3.11.H.BD

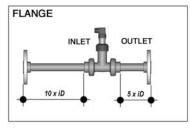
Installation Fittings

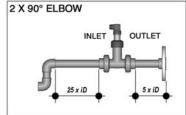
Please refer to Installation Fittings sections for more details and a complete listing of items.

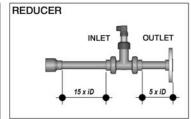
Туре	Description
Hot-Tap metal Strap-on Saddles	Size: DN 80 to DN 450 Special order for other sizes
Hot-Tap SS 316L Weld-on Adapters	Size: from External Diameter > 400 mm

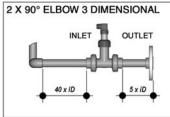
Installation Guidelines

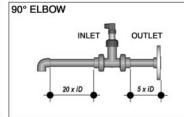
- Different pipe configurations and obstacles in the flow line such as valves, elbows, pipe bends and strainers create variations on the flow profile.
- The six most common installation configurations are shown to help in selecting the best location in the pipeline for the flow sensor.
- For more information, please refer to EN ISO 5167-1.
- Always maximize distance between flow sensors and pumps.
- Make sure the pipe is always full. In vertical pipe runs, upward flow is preferred to ensure full pipe.

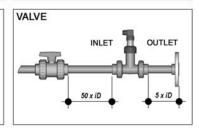






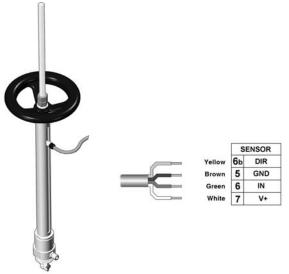






Wiring

F3.11.H.BD Sensor Connection to Flow Monitors



F3.11.H.BDF_L

Technical Data

General

Pipe Size Range: DN50 (2") to DN300 (12").

■ Flow Rate Range: 0.08 to 1,5 m/s (0.26 to 4.9 ft/s).

■ Linearity: 0.75 % of full scale.

■ Repeatability: 0.5 % of full scale.

■ Max Pressure/Temperature:

 25 bar (363 psi) @ 70°C (158°F) during installation.

- 40 bar (580 psi) @ 70°C (158°F) operating

■ Working Temperature: -10°C to +70°C (14°F to 158°F).

■ Enclosure: IP68.

■ Minimum Reynolds Number Required: 4500.

■ Sensor fitting joint: 1 1/4" BSP (male).

■ Pressure Intake: quick connection 3/8".

■ Wetted Materials:

- Sensor body: AISI 304

O-rings: EPDMTurbine: PVDF

Shaft: Ceramic (Al₂O₃)
Bearings: Ceramic (Al₂O₃)

- Bushings: C-PVC.

Electrical

■ Supply Voltage: 4 to 5 VDC ±10%, regulated.

■ Supply Current: 0,6 mA @ 5 VDC.

■ Output signal:

- square wave

- max frequency: 20 Hz

- output type: CMOS active (Zout = 1 K Ω)

- output current: 10 mA max.

■ Cable length: 8 m (26.4 ft) standard, 100 m (330 ft) max.

Standards and Approvals

■ Manufactured under ISO 9001 (Quality).

■ Manufactured under ISO 14001 (Environmental Management).

■ CE.

Ordering Data

FLOWX3 F3.11.H.BD (Bi-directional turbine Flow Sensor)

Part No.	Version	Power Supply	Body	O-ring	Enclosure
F3.11.H.BD*	Hall	4 - 5 VCC	SS AISI 304	EPDM	IP68

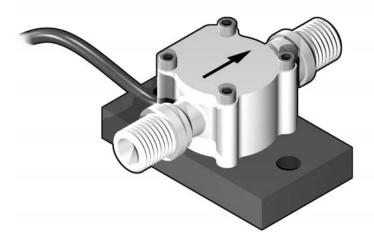
^{*}Mono-directional versions available on request with flow range from 0.08 to 8 m/s

Spare Parts

Part No.	Name	Description
F1.SP3	Isolation Valve	2" Brass Ball Valve
F1.SP5	Isolation Valve	1 ¼" Brass Ball Valve
F1.SP6	Reduction 2" to 1 11/4"	Reduction 2" BS male to 1 1/4" BS female
F1.SP7	Reduction 2" to 1 1/4"	Reduction 2" NPT male to 1 1/4" BS female
F3.SP6	Electrical Cable	Cable (per meter), 22AWG, 3 cond.
F3.SP8	Turbine KIT	PVDF Turbine with ceramic shaft and bearings + fixing bushings

FLOWX3 ULF Ultra Low Flow Sensor





The compact ultra-low flow sensor type ULF is designed for use with every kind of aggressive and solid-free liquids. The sensor can be fixed to flexible or rigid pipes via 1/4" GAS threaded process connections. The paddlewheel sensor produces a frequency output proportional to the flow velocity that can be easily transmitted and processed. The ULF sensor offers two different flow ranges starting from 1.5 or 6 l/h (0.0066 or 0.0264 gpm). The construction materials, POM or ECTFE (Halar®), provide high strength and chemical resistance.

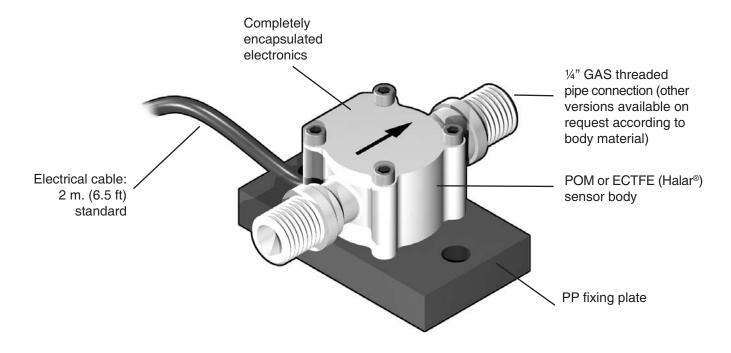
- Main Features POM or ECTFE (Halar®) wetted parts.
 - Two flow ranges available:
 - 1.5 100 l/h (0.0066 0.44 gpm)
 - 6 250 l/h (0.0264 1.1 gpm).
- High chemical resistance.
- Easy mounting.
- 4-20 mA output.
- MIN alarm relay output.

Applications

- Water treatment.
- Chemical industry.
- Pharmaceutical industry.

- Dosing systems.
- Laboratory plants.

Technical Features





Operating principle

The flow sensor consists of a transducer and a paddlewheel with a permanent magnet integrated into each blade.

As the magnet passes close to the transducer a pulse is generated.

When liquid flows into the sensor body, the paddlewheel is set in rotation producing a square wave output signal.

The frequency is proportional to the flow velocity.

Engineering Data

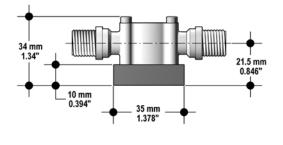
- The flow sensor is available with Hall effect transducer (standard) and Reed effect transducer (battery operated).
- The Hall sensor operates with a power supply from 5 to 24 VDC @ < 15 mA.
- The Reed sensor requires no power supply.
- The standard output signal is a square wave output with frequency proportional to flow velocity.
- The output signal is provided directly via electric cable. Supplied cable is standard 2 m (6.5 ft) long.
- In the versions with 4-20 mA or MIN alarm output, an additional IP65 housing is added to the sensor. Output signals are available on a terminal strip inside via a PG 11 cable gland.
- The sensor ULF3.30 with 4-20 mA output and the sensor ULF3.15 with MIN alarm output require a power supply from 12 to 24 VDC.
- The nominal measuring ranges are from 1.5 to 100 l/h (0.0066 to 0.44 gpm) for ULF01 version and from 6 to 250 l/h (0.0264 to 1.1 gpm) for ULF03 version.

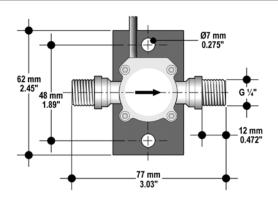
Connections to FlowX3 Instruments

FLOWX3 Sensors	FLOWX3 I	FLOWX3 Instruments					
	F9.00.L	F9.02.L	F9.03	F9.20	F9.50.L	F9.51.L	
ULF01.H							
ULF01.R	•						
ULF03.H							
ULF03.R	•						
ULF3.15*							
ULF3.30*							

^{*} with Output Kit mounted.

Dimensions





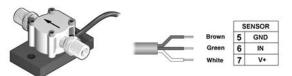
Installation **Guidelines**

- The sensor can be installed in any position, both horizontally or vertically, although horizontal flow is preferred. A non horizontal installation may cause a greater error in the lower part of the measurement range.
- Install the sensor with the arrow pointing the direction of the flow.
- Always maximize distance between sensor and pump. Do not install the sensor immediately downstream of valves, elbows or any kind of obstacles: 150 mm of straight pipe are suggested before and after the sensor.

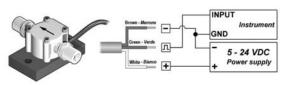


Wiring

ULFXX.H Sensor Connection to FLOWX3 Instruments



ULFXX.H Sensor Connection to other instruments



ULFXX.R Sensor Connection to FLOWX3 Instruments



SENSOR
5 GND
6 IN
7 V+

ULFXX.R Sensor Connection to other instruments



Technical Data

General (Hall and Reed)

- Flow Rate Range:
- ULF01 version: 1.5 to 100 l/h (0.0066 to 0.44 gpm)
- ULF03 version: 6 to 250 l/h (0.0264 to 1.1 gpm).
- Linearity: ± 1 % of full scale.
- Repeatability: ± 0.5 % of full scale.
- Working Temperature: -10°C to 80°C (14°F to 176°F)
- Working Pressure: 5 bar (70 psi) max @ 22°C (72°F).
- Viscosity of fluid: 1 to 10 cST.
- Enclosure: IP65.

- Wetted materials:
- □ POM version:
- Sensor Body: POM
- O-ring: FPM
- Rotor: POM
- Shaft: corepoint
- Magnets: ceramic.
- □ ECTFE version:
- Sensor Body: ECTFE (Halar®)
- O-ring: FPM or KALREZ
- Rotor: ECTFE (Halar®)
- Shaft: Sapphire
- Bearings: Sapphire.
- Connections: ¼" GAS male threaded.
- Cable length: 2 m (6.5 ft) standard.

Standards & Approvals

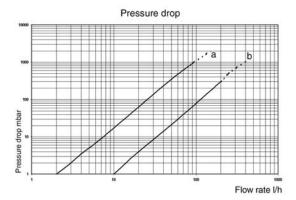
- Manufactured under ISO 9001 (Quality).
- Manufactured under ISO 14001 (Environmental Management).
- CE.

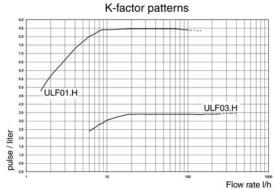
Specific for ULF01.H / ULF03.H (Hall version)

- Supply voltage: 5 to 24 VDC ±10%, regulated.
- Supply current: < 15 mA @ 24 VDC.
- Output signal: square wave.

■ K-factor:

- ULF01 version: 8431 Pulses/Liter (31569 Pulses/U.S. Gallon) in linear range from 8 to 100 l/h
- ULF03 version: 3394 Pulses/Liter (12846 Pulses/U.S. Gallon)in linear range from 15 to 250 l/h.







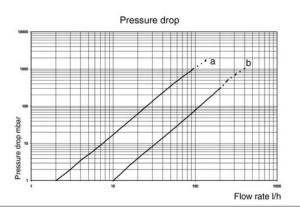
Technical Data

Specific for ULF01.R / ULF03.R (Reed version)

■ Supply voltage: none.

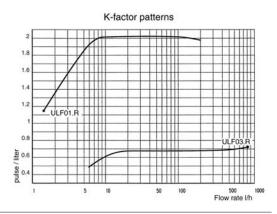
■ Output signal: square wave.

■ Output type: Reed Contact.



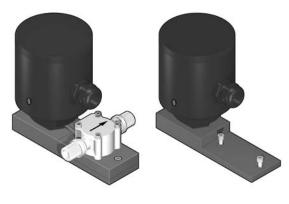
K-factor:

- ULF01 version: 2108 Pulses/Liter (7978 Pulses/U.S. Gallon) in linear range from 8 to 100 l/h.
- ULF03 version: 848 Pulses/Liter (3210 Pulses/U.S. Gallon) in linear range from 15 to 250 l/h.



Output Devices

K315U - Frequency Output & MIN alarm KIT



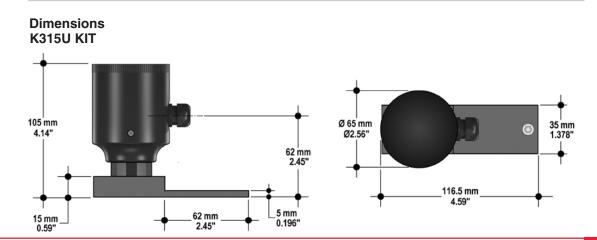
This Kit consists of an additional IP65 housing mounted aside the sensor via a UPVC plate. It is equipped with an open collector frequency output and a mechanical SPDT contact. The MIN alarm set-point can be freely set by a potentiometer up to 21 l/h (0.09 gpm) for ULF01 and 53 l/h (0.23 gpm) for ULF03. When the flow velocity drops below the adjusted limit the relay output opens and the Local Status Indicator changes colour. It has been designed to protect a pump from running dry or pumping against a closed valve in the main pipeline.

Main Features

- Highly visible Local Bicolour Status Indicator.
- Easy and quick threshold regulation.
- Open collector frequency output.
- Relay output mechanical SPDT.

Applications

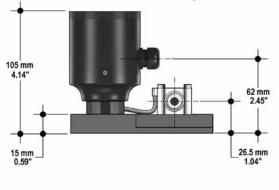
- Pump protection.
- Water treatment.
- Cooling water systems.

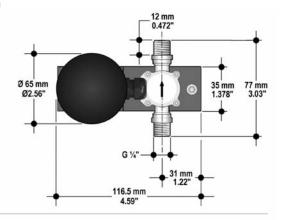




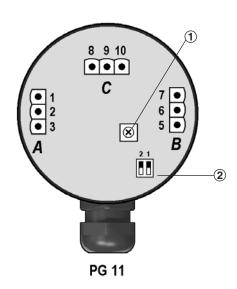
Dimensions

ULF3.15 Sensor with O.C. output & MIN alarm





Wiring and Operation



Power Supply

1	+12-24 VDC
2	FREQ. OUTPUT
3	GND

Α

Sensor

	5	SENSOR			
	7	7 V+			
3	6	6 IN			
	GND				

Relay Output

	RELAY				
	8	NO			
,	9	NC			
	10	сом			

- 1) Calibration trimmer for MIN alarm set-point
- 2) Setting switches

The output module is characterized by two operation modes:

- Calibration mode
- Switch 1 is in OFF position and the MIN set-point is fixed by acting on the trimmer.
- Operative mode
- Switch 1 is in ON position and the module ready to work
- Switch 2 can be used to select the most suitable switch delay (3 seconds or 10 seconds).

C

Technical Data

- Associated Flow Sensor: Hall effect (ULFXX.H).
- Supply voltage: 12 to 24 VDC ±10%, regulated.
- Output signal: square wave.
- Output type: transistor NPN open collector.
- Output current: 10 mA max.
- Relay Output: mechanical SPDT contact, 3 A @ 30 VDC, 3 A @ 230 VAC resistive load.
- Flow trip point: freely adjustable
- up to 21 l/h (0.09 gpm) for ULF01
- up to 53 l/h (0.23 gpm) for ULF03.

■ Local Status Indicator:

GREEN Led = Flow

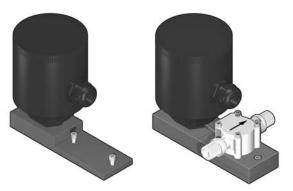
RED Led = No Flow.

- Enclosure: IP65.
- Operating temperature: 0°C to 60°C (32°F to 140°F).
- Relative humidity: 0 to 95% non-condensing.
- Housing material: UPVC.

Standards & Approvals

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

K330U - 4-20 mA Output KIT



This Kit consists of an additional IP65 housing mounted aside the sensor via a UPVC plate. It is a blind transmitter designed to convert the signal from the sensor into a 4-20 mA output for long distance transmission.

Main Features

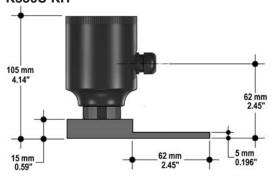
- Easy 4-20 mA output calibration.
- Three wire output technology.

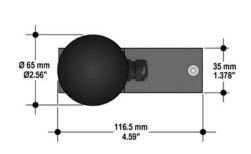
Applications

- Flow control and monitoring.
- Water treatment.
- Dosing systems.

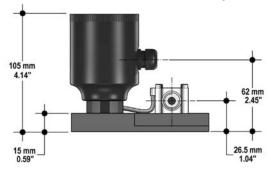
Dimensions

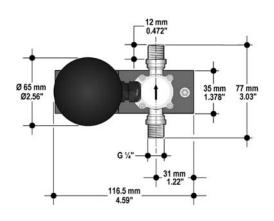
K330U KIT





ULF3.30 Sensor with 4-20 mA Output

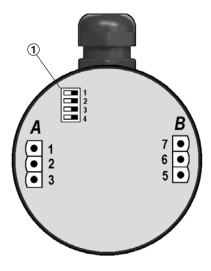






Wiring and Operation

PG 11



Power Supply

1 +12-24VDC 2 4-20 mA OUTPUT 3 GND

Sensor

	SENSOR			
	7 V+			
В	6 IN			
	5 GND			

1) Calibration switch.

The full scale range, corresponding to 4-20 mA output is set by means of switches 2, 3 and 4.

Switch 1 is used to set a filter on the current output.

Technical Data

- Associated Flow Sensor: Hall effect (ULFXX.H).
- Supply voltage: 12 to 24 VDC ±10%, regulated.
- Supply current: < 50 mA.
- Output signal: 4 to 20 mA, adjustable.
- Max load impedance: 800 Ω @ 24 VDC, 300 Ω @ 12 VDC.
- Enclosure: IP65.

- Operating temperature: 0°C to 60°C (32°F to 140°F).
- Relative humidity: 0 to 95% non-condensing.
- Housing material: UPVC.

Standards & Approvals

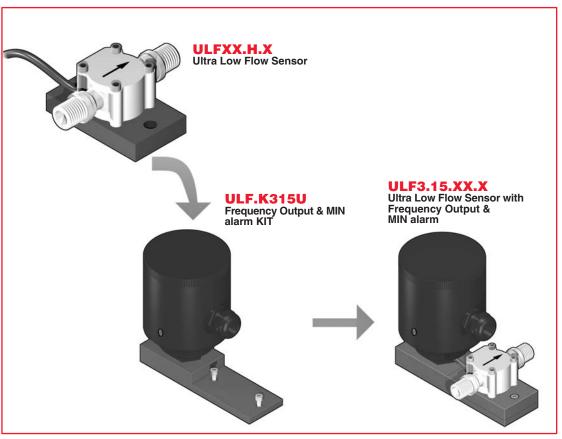
- Manufactured under ISO 9001 (Quality).
- Manufactured under ISO 14001 (Environmental Management).
- CE.

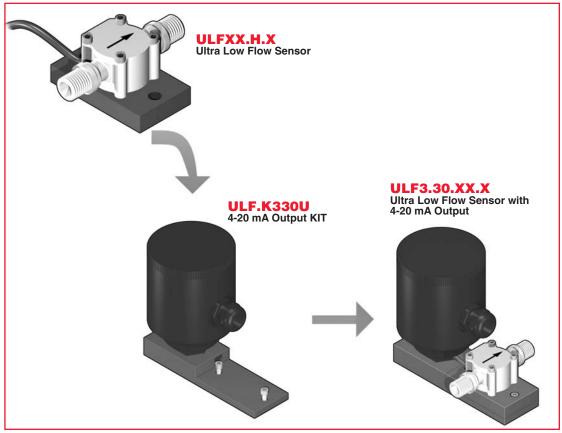


Installation

The K315U and K330U Kits can be ordered directly mounted aside the flow sensor or separately and then simply installed on the proper sensor.

Please refer to Ordering Data section for a complete listing of part numbers.







Ordering Data

FLOWX3 ULF01.X.X

Part No.	Version	Power supply	Material	Flow Rate Range
ULF01.H.0	Hall	5 - 24 VDC	POM / FPM	1.5 to 100 l/h (0.0066 to 0.44 gpm)
ULF01.H.2	Hall	5 - 24 VDC	ECTFE / FPM	1.5 to 100 l/h (0.0066 to 0.44 gpm)
ULF01.H.3	Hall	5 - 24 VDC	ECTFE / KALREZ	1.5 to 100 l/h (0.0066 to 0.44 gpm)
ULF01.R.0	Reed	None	POM / FPM	1.5 to 100 l/h (0.0066 to 0.44 gpm)
ULF01.R.2	Reed	None	ECTFE / FPM	1.5 to 100 l/h (0.0066 to 0.44 gpm)
ULF01.R.3	Reed	None	ECTFE / KALREZ	1.5 to 100 l/h (0.0066 to 0.44 gpm)

FLOWX3 ULF03.X.X

Part No.	Version	Power supply	Material	Flow Rate Range
ULF03.H.0	Hall	5 - 24 VDC	POM / FPM	6 to 250 l/h (0.0264 to 1.1 gpm)
ULF03.H.2	Hall	5 - 24 VDC	ECTFE / FPM	6 to 250 l/h (0.0264 to 1.1 gpm)
ULF03.H.3	Hall	5 - 24 VDC	ECTFE / KALREZ	6 to 250 l/h (0.0264 to 1.1 gpm)
ULF03.R.0	Reed	None	POM / FPM	6 to 250 l/h (0.0264 to 1.1 gpm)
ULF03.R.2	Reed	None	ECTFE / FPM	6 to 250 l/h (0.0264 to 1.1 gpm)
ULF03.R.3	Reed	None	ECTFE / KALREZ	6 to 250 l/h (0.0264 to 1.1 gpm)

FLOWX3 ULF3.15.XX.X (with O.C. output & MIN alarm)

Part No.	Version	Power supply	Material	Flow Rate Range
ULF3.15.01.0	Hall	12 - 24 VDC	POM / FPM	1.5 to 100 l/h (0.0066 to 0.44 gpm)
ULF3.15.01.2	Hall	12 - 24 VDC	ECTFE / FPM	1.5 to 100 l/h (0.0066 to 0.44 gpm)
ULF3.15.01.3	Hall	12 - 24 VDC	ECTFE / KALREZ	1.5 to 100 l/h (0.0066 to 0.44 gpm)
ULF3.15.03.0	Hall	12 - 24 VDC	POM / FPM	6 to 250 l/h (0.0264 to 1.1 gpm)
ULF3.15.03.2	Hall	12 - 24 VDC	ECTFE / FPM	6 to 250 l/h (0.0264 to 1.1 gpm)
ULF3.15.03.3	Hall	12 - 24 VDC	ECTFE / KALREZ	6 to 250 l/h (0.0264 to 1.1 gpm)

FLOWX3 ULF3.30.XX.X (with 4-20 mA output)

Part No.	Version	Power supply	Material	Flow Rate Range
ULF3.30.01.0	Hall	12 - 24 VDC	POM / FPM	1.5 to 100 l/h (0.0066 to 0.44 gpm)
ULF3.30.01.2	Hall	12 - 24 VDC	ECTFE / FPM	1.5 to 100 l/h (0.0066 to 0.44 gpm)
ULF3.30.01.3	Hall	12 - 24 VDC	ECTFE / KALREZ	1.5 to 100 l/h (0.0066 to 0.44 gpm)
ULF3.30.03.0	Hall	12 - 24 VDC	POM / FPM	6 to 250 l/h (0.0264 to 1.1 gpm)
ULF3.30.03.2	Hall	12 - 24 VDC	ECTFE / FPM	6 to 250 l/h (0.0264 to 1.1 gpm)
ULF3.30.03.3	Hall	12 - 24 VDC	ECTFE / KALREZ	6 to 250 l/h (0.0264 to 1.1 gpm)



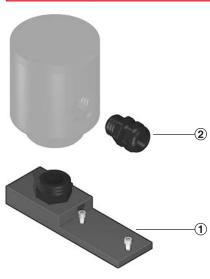
Ordering Data

Output Devices

Part No.	Housing	Gaskets	Enclosure	Description
ULF.K315U	UPVC	EPDM	IP65	Frequency Output & MIN Alarm KIT
ULF.K330U	UPVC	EPDM	IP65	4-20 mA Output KIT

Spare Parts

Item	Part No.	Name	Description		
1	ULF.SP1U UPVC Plate		UPVC Adapter for K315U or K330U Kit		
	F3.SP6	Electrical cable	Cable (per meter), 22AWG, 3 cond.		
2	F3.SP7	PG11	PG11 Cable Gland for K315U or K330U Kit		



FLOWX3 F3.80 Oval Gear Flow Sensor





The oval gear flow sensors F3.80 has been designed following the main industrial application requirements: high mechanical resistance and reliable performances. These sensors are suitable to measure a wide range of liquid viscosities with a very high accuracy and repeatability. The sensors can be fixed to flexible or rigid pipes via 1/4" GAS threaded process connections. The construction materials, ECTFE (Halar®) or PP or Stainless steel, provide high strength and chemical resistance.

- Main Features Compact dimensions.
 - Easy installation.
 - High chemical resistance.

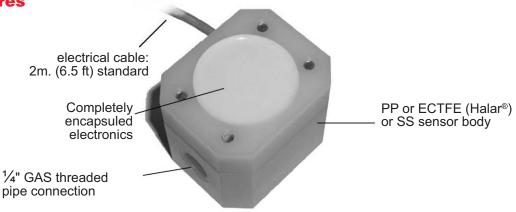
- High viscosity fluids measurement.
- Low pressure loss.

Applications

- Chemical industry
- Laboratory plants
- Dosing systems

- Pulsating flows measurement
- High viscosity and not conductive fluid measurement
- Oil measurement

Technical Features



Operating Principle

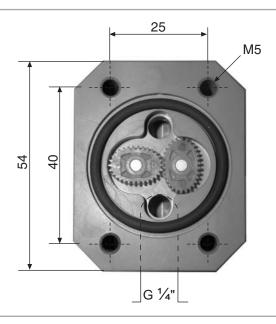
The sensor body contains two oval gears set into rotation by a flowing fluid. The two gears are meshed at 90° to define a fixed fluid volume pumped out every rotation.

Two permanent magnets are positioned into each gear and a Hall effect sensor detects the magnetic field generating a square wave signal output with frequency proportional to the number of fluid volumes pumped out.

Connections to FlowX3 Instruments

FLOWX3 Sensor	FLOW X3 Instruments						
	F9.00.L	F9.02.L	F9.03	F9.20	F9.50.L	F9.51.L	
F3.81.H							
F3.82.H			•		-		

Dimensions

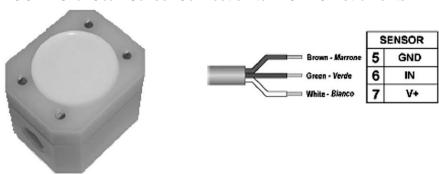


Installation Guidelines

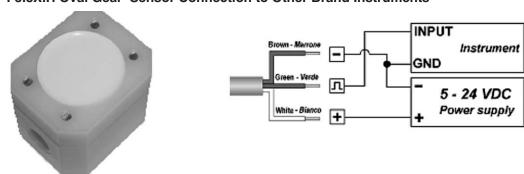
- The sensor can be installed in any position, both horizontally or vertically, although horizontal flow is preferred. A non horizontal installation may cause a greater error in the lower part of the measurement range.
- Install the sensor with the arrow pointing the direction of the flow.
- Always maximize distance between sensor and pump. Do not install the sensor immediately downstream of valves, elbows or any kind of obstacles: 150 mm of straight pipe are suggested before and after the sensor.

Wiring

F3.8X.H Oval Gear Sensor Connection to FLOWX3 Instruments



F3.8X.H Oval Gear Sensor Connection to Other Brand Instruments



Technical Data

General

- Flow Rate Range:
- F3.81.H: 10 to 100 l/h (0.044 up to 0.44 gpm)
- F3.81.H: 25 to 150 l/h (0.11 up to 0.66 gpm).
- Linearity: 1 % of full scale.
- Repeatability: < 0,3% of full scale.
- Working Temperature: -10°C to 60°C (14°F to 140°F).
- Max. Fluid Viscosity: 1000 cP (mPas).
- Working Pressure:
- PP body:
 - 6 bar (87 psi) @ 25°C (77°F) 3 bar (44 psi) @ 60°C (140°F)
- ECTFE body:
 - 8 bar (116 psi) @ 25°C (77°F) 5 bar (73 psi) @ 60°C (140°F)
- SS body:
 - 8 bar (116 psi) @ 60°C (140°F).
- Enclosure: IP65.

- Wetted Materials:
- PP version:
- Sensor Body: PP O-ring: FPM
- Gear: ECTFE (Halar)
- Shaft: zircone
- ECTFE version:
 - Sensor Body: ECTFE (Halar)
 - O-ring: FPM
 - Gear: ECTFE (Halar)
 - Shaft: zircone
- Stainless Steel:
 - Sensor Body: SS AISI 316L
 - O-ring: FPM
 - Gear: ECTFE (Halar)
 - Shaft: Stainless Steel.
- Connections: ¼" GAS female.
- Cable length: 2 m (6.5 ft) standard.

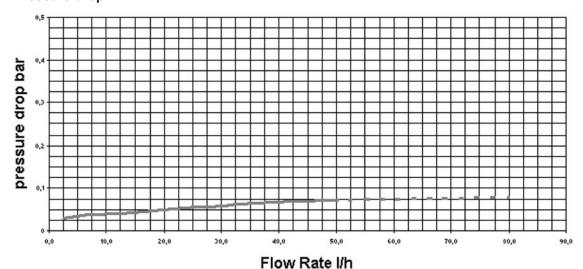
Standards & Approvals

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

Specific for F3.81.H

- Supply voltage: 5 to 24 VDC ±10%, regulated
- Supply current: < 15 mA @ 24 VDC
- Output signal: square wave Cmos
- (NPN / PNP)
- K-factor = 5950 Pulses/Liter (22521 Pulses/U.S. Gallon)

Pressure drop

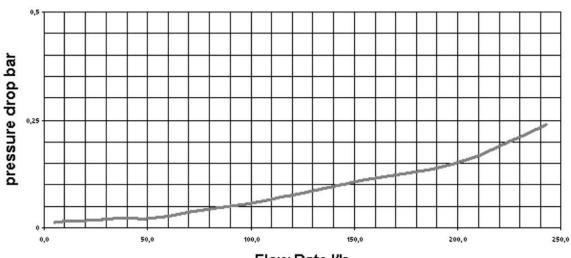


Technical Data

Specific for F3.82.H

- Supply voltage: 5 to 24 VDC ±10%, regulated
- Supply current: < 15 mA @ 24 VDC
- Output signal: square wave Cmos
- (NPN / PNP)
- K-factor = 3400 Pulses/Liter (12869 Pulses/U.S. Gallon)

Pressure drop



Flow Rate I/h

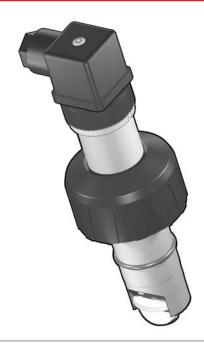
Ordering Data

FLOWX3 F3.8X.H.0X

Part No.	Material	Flow Rate Range
F3.81.H.01	PP / ECTFE gears	10 to 100 l/h (0.044 to 0.44 gpm)
F3.81.H.02	ECTFE / ECTFE gears	10 to 100 l/h (0.044 to 0.44 gpm)
F3.81.H.03	SS AISI 316L / ECTFE gears	10 to 100 l/h (0.044 to 0.44 gpm)
F3.82.H.01	PP / ECTFE gears	25 to 150 l/h (0.11 to 0.66 gpm)
F3.82.H.02	ECTFE / ECTFE gears	25 to 150 l/h (0.11 to 0.66 gpm)
F3.82.H.03	SS AISI 316L / ECTFE gears	25 to 150 l/h (0.11 to 0.66 gpm)

FLOWX3 F3.05 Paddlewheel Flow Switch





The simple insertion paddlewheel flow switch type F3.05 is designed to protect a pump from running dry or pumping against a closed valve. It is equipped with a mechanical SPST contact activated when the flow velocity drops below the factory preset value of 0.15 m/s (0.5 ft/s). A specially designed family of fitting ensures an easy and quick installation into all pipe materials in sizes from DN15 to DN600 (0.5" to 24").

Main Features

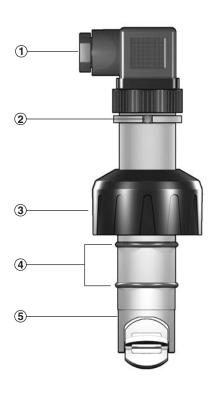
- CPVC, PVDF, Stainless Steel or Brass sensor body
- Easy insertion system.
- High chemical resistance.
- No-Flow alarm relay output.

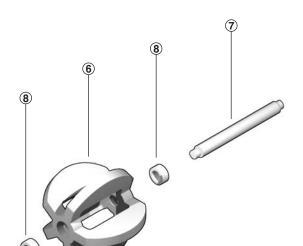
- Highly visible Local Bicolour Status Indicator.
- Maintenance free.
- Very low pressure drop.

Applications

- Pump protection.
- Filtration systems.
- Cooling water systems.

Technical Features





- 1) 4 pole cable plug according to DIN 43650-B/ISO 6952
- 2) Local Bicolour Status LED
- 3) UPVC cap for installation into fittings
- 4) O-Ring seals available in EPDM or FPM
- 5) CPVC, PVDF or Stainless Steel sensor body
- **6)** ECTFE (Halar®) Open-cell rotor, brass sensor body
- 7) Ceramic shaft
- 8) Ceramic bearings

Operating principle

The flow switch consists of a transducer and a five-blade open cell paddlewheel using insertion technology. The paddlewheel is equipped with a permanent magnet integrated into each blade. As the magnet passes close to the transducer an output pulse is generated.

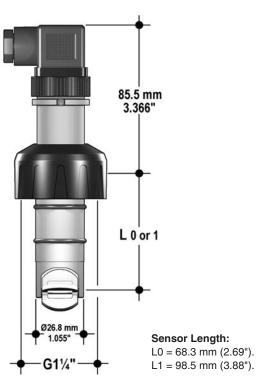
That pulse is monitored by a missing signal circuit, that trips an internal relay when the pulse frequency drops below the factory preset frequency of 0.15 m/s (0.5 ft/s). The switch is installed into the pipe using a wide range of insertion type fittings supplied by the flow switch manufacturer.

Engineering Data

- The flow switch is available with C-PVC, PVDF, Brass or AISI 316L SS body.
- The switch operates with a power supply from 12 to 24 VDC @ < 50 mA.
- The No-Flow threshold is factory preset at 0.15 m/s (0.5 ft/s).
- The flow switch provides the alarm output via an SPST mechanical contact (No-Flow = Open Contact). The Maximum Voltage Rating is 1A @ 24 VDC, 0.1A @ 230 VAC.
- The output signal is provided via a 4 pole cable plug according to DIN 43650-B/ISO 6952.
- The flow switch is equipped with a Local Bicolour Status Indicator:
 GREEN = Flow,
 RED = No-Flow.

Dimensions

F3.05 Flow Switch



Installation Fittings

Please refer to Installation Fittings section for more details and a complete listing of items.

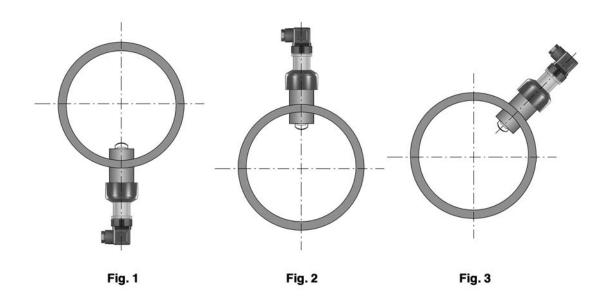
	Туре	Description
	Plastic Tees	Size: D20 to D50 (0.5" to 1.5") Materials: UPVC, CPVC, PP, PVDF
	CPVC Clamp Saddles	Size: D63 to D225 (2" to 8") Insert materials: CPVC, PVDF
	PP Clamp Saddles	Size: D250 to D315 (10" to 12") Insert material: CPVC
Ô	UPVC Wafer Fittings	Size: D280 and D315 (10" and 12")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

Installation Guidelines

- The flow switch can be installed in any position, both horizontally or vertically.
- No special installation configurations are required to install the sensor downstream of valves, fittings or any kind of obstacles.

Mounting Positions

- Horizontal pipe runs:
- Fig. 1: installation with no sediments present or not completely full pipeline
- Fig. 2: installation with no air bubbles present
- Fig. 3: installation if sediments or air bubbles may be present.
- Vertical pipe runs: Install flow switch in any orientation.



+12 / 24 VDC —1 2— Relay * GND

^{*} Please note: Pin # 4 is marked on the connector with "ground" sign but it is not a ground.

Technical Data

- Pipe Size Range: DN15 to DN600 (0.5" to24"). Please refer to Installation Fittings section for more details.
- Supply voltage: 12 to 24 VDC ± 10% regulated.
- Supply current: < 50 mA.
- Relay Output: mechanical SPST contact, 1A @ 24 VDC, 0.1A @ 230 VAC.
- Local Status Indicator:
- GREEN Led = Flow
- RED Led = No Flow.
- No-Flow Rate Point: 0.15 m/s (0.5 ft./s).
- Enclosure: IP65.

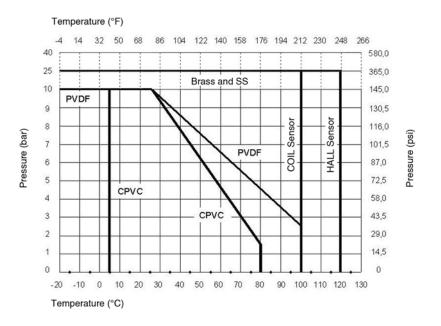
- Wetted Materials:
- Sensor Body: C-PVC, PVDF, 316L SS or Brass
- O-rings: EPDM or FPM
- Rotor: ECTFE (Halar®)
- Shaft: Ceramic (Al2O3)
- Bearings: Ceramic (Al2O3).

Standards & Approvals

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

Maximum Operating Pressure / Temperature (25 years lifetime)

- CPVC body:
- 10 bar (145 psi) @ 25°C (77°F)
- 1,5 bar (22 psi) @ 80° C (176°F).
- PVDF body:
- 10 bar (145 psi) @ 25°C (77°F)
- 2,5 bar (36 psi) @ 100°C (212°F).
- Brass or SS body:
- 25 bar (363 psi) @ 120°C (248°F).



F3.05 F_L

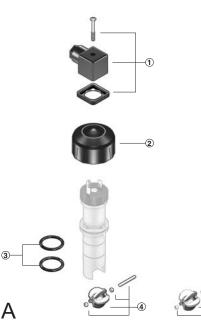
Ordering Data

FLOWX3 F3.05.XX

Part No.	Power Supply	Length	Body	O-rings	Enclosure
F3.05.01	12 to 24 VDC	LO	CPVC	EPDM	IP65
F3.05.02	12 to 24 VDC	L0	CPVC	FPM	IP65
F3.05.03	12 to 24 VDC	L1	CPVC	EPDM	IP65
F3.05.04	12 to 24 VDC	L1	CPVC	FPM	IP65
F3.05.05	12 to 24 VDC	LO	PVDF	EPDM	IP65
F3.05.06	12 to 24 VDC	L0	PVDF	FPM	IP65
F3.05.07	12 to 24 VDC	L1	PVDF	EPDM	IP65
F3.05.08	12 to 24 VDC	L1	PVDF	FPM	IP65
F3.05.09	12 to 24 VDC	L0	316L SS	EPDM	IP65
F3.05.10	12 to 24 VDC	LO	316L SS	FPM	IP65
F3.05.11	12 to 24 VDC	L1	316L SS	EPDM	IP65
F3.05.12	12 to 24 VDC	L1	316L SS	FPM	IP65
F3.05.13	12 to 24 VDC	L0	BRASS	EPDM	IP65
F3.05.14	12 to 24 VDC	L0	BRASS	FPM	IP65
F3.05.15	12 to 24 VDC	L1	BRASS	EPDM	IP65
F3.05.16	12 to 24 VDC	L1	BRASS	FPM	IP65

Spare Parts

Item	Part No.	Name	Description		
A-1	F3.SP1	4 pole Cable Plug	Cable Plug according to DIN 43650		
A-2	F3.SP2.1	Sensor Cap	Black Sensor Cap		
A-2	F3.SP2.5	Sensor Cap	Brass Sensor Cap		
A-2	F3.SP2.6	Sensor Cap	SS Sensor Cap		
A-3	F3.SP3.1	O-Rings	EPDM Sensor body O-rings		
A-3	F3.SP3.2	O-Rings	FPM Sensor body O-rings		
A-4	F3.SP4	Rotor KIT	ECTFE (Halar®) rotor with Ceramic Shaft and Bearings		
A-5	F3.SP4.2	Rotor KIT	ECTFE (Halar®) rotor with New Machined Ceramic Shaft and Bearings		
	F3.SP5.1	Sensor Plug	CPVC Sensor Plug		
	F3.SP5.2	Sensor Plug	PVDF Sensor Plug		
	F3.SP5.3	Sensor Plug Stainless Steel Sensor Pl			







The simple and reliable paddlewheel technology has been moved into this new MINIFLOW sensor type F3.10, designed for use with every kind of solid-free liquids. The sensor can measure flow from 0.25 m/s (0.8 ft/s) producing a frequency output signal highly repeatable. A rugged construction and a proven technology guarantee exceptional performances with little or no maintenance required. The very small dimension and a special design make it suitable for installation on FIP standard Tee-fittings from DN15 to DN40 (0.5 to 1.5 in.).

Main Features

- IP 68 enclosure.
- ABS body with EPDM or FPM seal.
- ABS 4-blade paddlewheel (no bearings).
- Mono-directional design.
- Installation on standard FIP tees.
- PVDF body version on request

Applications

- Water treatment.
- Filtration systems.
- Pure water production.

- Water monitoring.
- Fertigation.

Operating principle

The flow sensor consists of a transducer and a four-blade paddlewheel using insertion technology. The paddlewheel is equipped with a permanent magnet integrated in two blades. As the magnet passes close to the transducer a pulse is generated.

When liquid flows into the pipe, the paddlewheel is set in rotation producing a square wave output signal. The frequency is proportional to the flow velocity.

Connections to FlowX3 Instruments

FLOWX3 Sensor	FLOW X3 Instruments								
Consor	F9.00.L	F9.02.L	F9.03	F9.20	F9.50.L	F9.51.L			
F310.H									

Dimensions



Length = 41 mm (1,6") Width = 20 mm (0,8") Cap = $\frac{3}{4}$ "

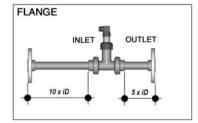
Installation Fittings

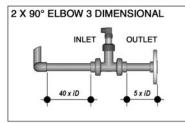
Please refer to Installation Fittings section for more details and a complete listing of items.

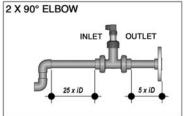
	Туре	Description
E3	Plastic Tees	Size: D20 to D50 (0.5" to 1.5") Materials: UPVC, CPVC
C	Brass Tees	Internal diameter: 23 mm Process connection: 11/4" BSP Male Threads

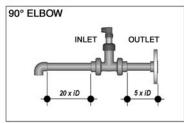
Installation Guidelines

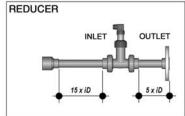
- Different pipe configurations and obstacles in the flow line such as valves, elbows, pipe bends and strainers create variations on the flow profile.
- The six most common installation configurations are shown to help in selecting the best location in the pipeline for paddlewheel flow sensor.
- For more information, please refer to EN ISO 5167-1.
- Always maximize distance between flow sensors and pumps.

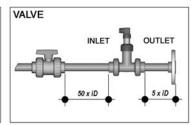












Mounting Positions

Make sure the pipeline is always full.

■ Horizontal pipe runs:

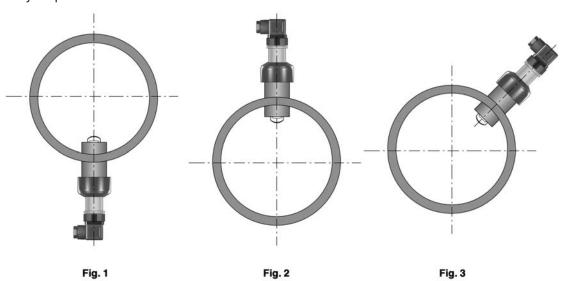
Fig.1: installation with no sediments present

Fig.2: installation with no air bubbles present

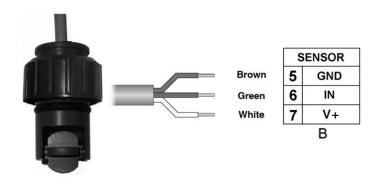
Fig.3: installation if sediments or air bubbles may be present.

■ Vertical pipe runs:

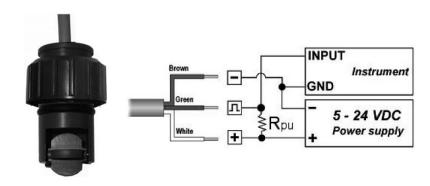
Install sensor in any orientation.
Upward flow is preferred to ensure full pipe.



Wiring F3.10.H IP68 Sensor Connection to FlowX3 Instruments



F3.10.H IP68 Sensor Connection to Other Brand Instruments



2 K Ω to 10 K Ω Pull-up resistor may be required.

Technical Data

General

- Pipe Size Range: DN15 to DN40 (0.5 to 1 1/2"). Please refer to Installation Fittings section for more details.
- Flow Rate Range: 0.25 to 4 m/s (0.8 to 12,5 ft./s).
- Linearity: ± 1 % of full scale.
- Repeatability: ± 0.5 % of full scale.

Minimum Reynolds Number Required: 4500.

- Enclosure: IP68.
- Operating Pressure:
- max 10 bar (145 psi) @ 20 °C (68°F).
- max 2 bar (30 psi) @ 70 °C (158°F).
- Operating Pressure: -20°C to 70°C (-4°F to 158°F).
- Wetted Materials:
- Sensor Body: ABS (PVDF for special version)
- O-rings: EPDM or FPM
- Rotor: ABS (PVDF for special version)
- Shaft: AISI 316L.Magnets: SmCo5.

Electrical ectrical

- Supply current: < 30 mA @ 24 VDC.
- Output signal:
- square wave
- Output frequency: 15 Hz per m/s nominal (4,6 Hz per ft/s nominal)
- Output type: transistor NPN open collector
- Output current: 10 mA max.
- Cable length: 2 m (6,5 ft) standard, 300 m (990 ft) maximum.

Standards & Approvals

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

Ordering Data

FLOWX3 F3.10.H.XX Sensor

Part No.	Version	Power supply	Length	Body	O-rings	Enclosure
F3.10.H.01	Hall	5 - 24 VDC	41 mm	ABS	EPDM	IP68
F3.10.H.02	Hall	5 - 24 VDC	41 mm	ABS	FPM	IP68

Spare Parts

Item	Part No.	Name	Description
A-1	F3.SP2.7	Sensor Cap	Gray Sensor Cap
A-2	F3.SP3.3	O-Rings	EPDM Sensor body O-rings
A-3	F3.SP3.4	O-Rings	FPM Sensor body O-rings
A-4	F3.SP4.3	Rotor KIT	ABS rotor with AISI 316L Shaft
	F3.SP5.4	Sensor Plug	ABS Sensor Plug
	F3.SP6	Electrical cable	Cable (per meter), 3 cond., 22AWG



FLOWX3 F9.00 Flow Monitor & Transmitter







FLS FLOWX3 F9.00 Flow Monitors & Transmitters are designed to convert the signal from all FLOWX3 flow sensors into a display indication and a 4-20 mA signal for long distance transmission. A very simple and complete choice of options are granted by single or dual input/output, two solid state relays output and one relay output.

The high flexibility is also maximized with only one packaging for compact pipe mount, panel orwall installation.

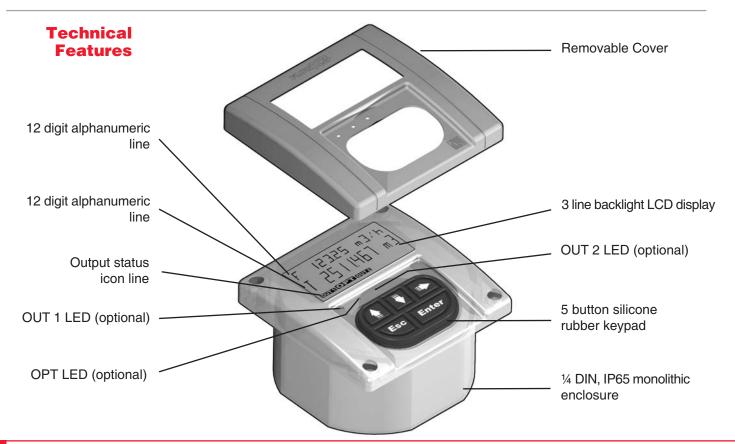
Self explaining calibration menus allow a customized setup of all measuring parameters and the state of the art electronic design ensures long-term reliable and stable signals.

Main Features

- Permanent and resettable totalizer.
- Adjustable outputs.
- Relay, Open Collector and olid State Relay options.
- Installation flexibility.
- 3 line aphanumeric backlight LCD (except F9.03).
- IP65 monolithic packaging.
- 5 button keypad.
- Output simulion for system testing.
- One packaging for compact/pipe, panel or wall installation.
- Self explaining calibration menus.
- Auto-calibration.

Applications

- Flow control and measuring.
- Water treatment and regeneration.
- Industrial wastewater treatment and recovery.
- Water distribution.
- Leak detection.
- Processing and manufacturing industry.
- Textile finishing.
- Filtration systems.
- Chemical Industry.
- Liquid delivery systems.
- Auxiliary plants.
- Swimming pools & Spas.



Technical Features

Flow Monitor	Part No.	Wire	Associated	Sensor	4-20 mA	Digital	Relay
		Power Tech.	Sensor	Input	Output	Output	Output
	F9.00.L	2 wire	Hall Effect	1	1	1 S.S.R MIN,	
						MAX, Pulse,	
FLOWX3						Window, Freq., Off	
F 123.25 32/h T 25114.61 3	F9.02.L	3/4 wire	Hall Effect	1	1	2 S.S.R MIN, MAX, Pulse,	1 - MIN, MAX, Pulse,
Esc Enter						Window, Freq., Off	Window,Off
	F9.03	3/4 wire	Hall Effect	2	2	1 O.C MIN,	2 - MIN
						MAX, Pulse,	MAX, Pulse,
						Freq., Off	Off

O.C.= Open Collector - S.S.R. = Solid State Relay.

Engineering Data

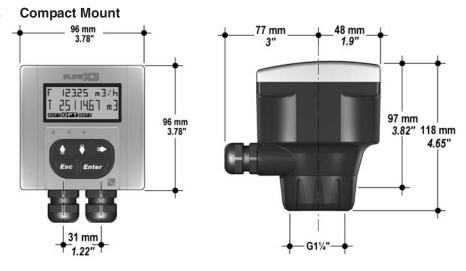
- The flow transmitter is designed with only one packaging for compact/pipe, panel or wall installation.
- The flow transmitter has ¼ DIN panel mount standard dimensions: 96 x 96 mm (3.8 x 3.8 inch).
- The instrument meets IP65 standards.
- The instrument provides flow rate indication and dual totalization with fully scaleable engineering units.
- The flow transmitter is equipped with a 3 line LCD: 2 x 12 alphanumeric lines and 1 icon line
- Backlight LCD Display (except for F9.03)
- The flow transmitter is equipped with a silicone rubber 5 button keypad.
- The flow transmitter is compatible with all FLS FLOWX3 Hall Effect Flow Sensor.
- The instrument provides auto-calibration and simulation options.

Connections to FLOWX3 Sensors

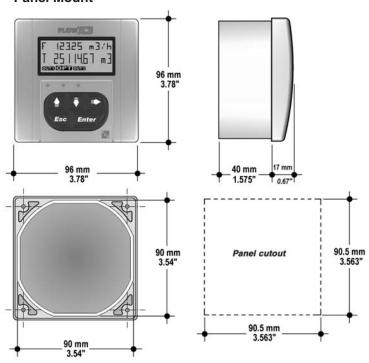
FLOWX3 Monitors	FLOWX3	FLOWX3 Sensors													
	F3.00.H	F3.00.C	F3.01.H	F3.01.C	F3.10.H	F3.15.H*	F3.30.H*	ULF.H	ULF.R	ULF3.15*	ULF3.30*	F3.80	F111.H	F111.C	F3.60M F3.63M
F9.00.L													-		
F9.02.L															
F.9.03															

^{*} with Output Kit mounted.

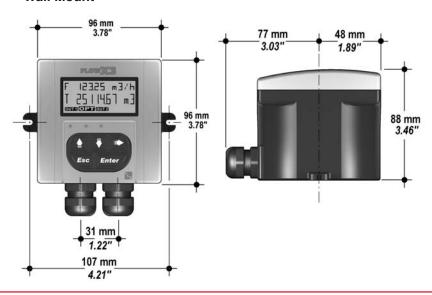
Dimensions



Panel Mount



Wall Mount



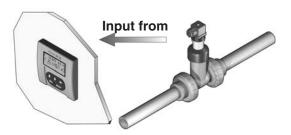
F9.00F_L

Installation

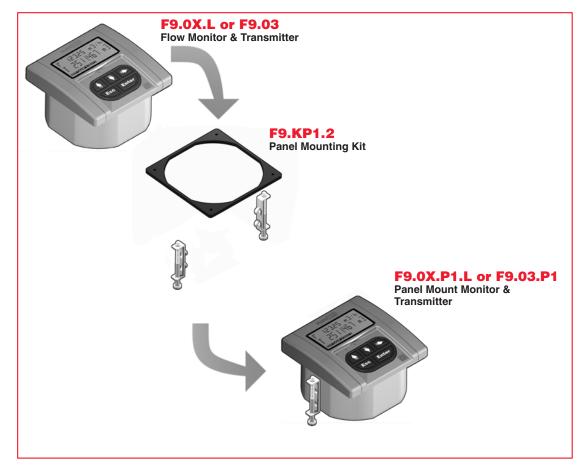
The flow monitor & transmitter is available just in one packaging for compact field version, panel or wall installation. The compact field version is mounted on top of the sensor using the compact mounting kit (F9.KC1), the panel version is installed using the panel mounting kit (F9.KP1.2), while the wall mounting version is fixed to the wall by the mounting kit (F9.KWX).

The mounting kits can be ordered directly connected to the monitor or separately and then simply installed on it. Please refer to Ordering Data section for a complete listing of part numbers.

Panel Mount



The panel mounting version consists of the monitor and the mounting bracket kit F9.KP1.2 with gasket for IP65 watertight panel installation. The monitor perfectly fits into a standard ¼ DIN panel cutout. The instrument and the kit can be ordered separately (code F9.0X.L or F9.03) or together using the code F9.0X.P1.L or F9.0X.P1.



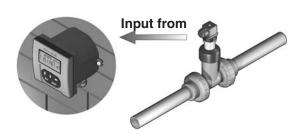
Input from



FLS FLOWX3 Flow Sensor (sold separately)

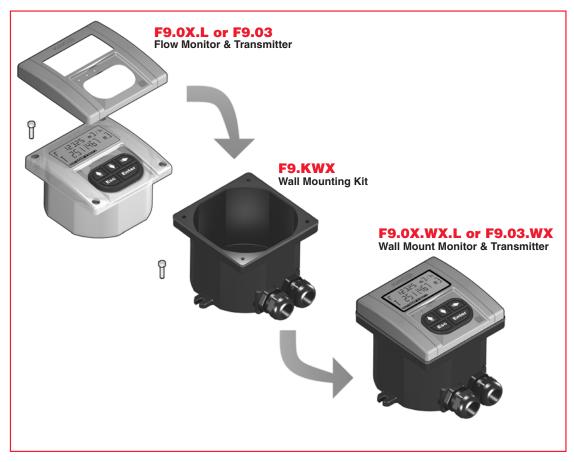
F3.00.H.XX - F3.10.H.XX- F3.15.H.XX ULF01.H.X - ULF3.15.XX.X ULF03.H.X - F111.H F3.80 - New F3.60M & F3.63M

Installation Wall Mount



The wall mounting version consists of the monitor and the wall mounting kit. The F9.KW1 kit includes the plastic adapter, the gasket for IP65 watertight wall installation and the fixing screws.

The F9.KW2 includes also a 110/230 VAC to 24 VDC power supply directly mounted into the plastic adapter to provide a low voltage regulated output to the flow monitor. The instrument and the kit can be ordered separately (code F9.0X.L or F9.03 for the monitor and code F9.KWX for the kit) or together using the code F9.0X.WX.L or F9.03.WX.



Input from



FLS FLOWX3 Flow Sensor (sold separately)

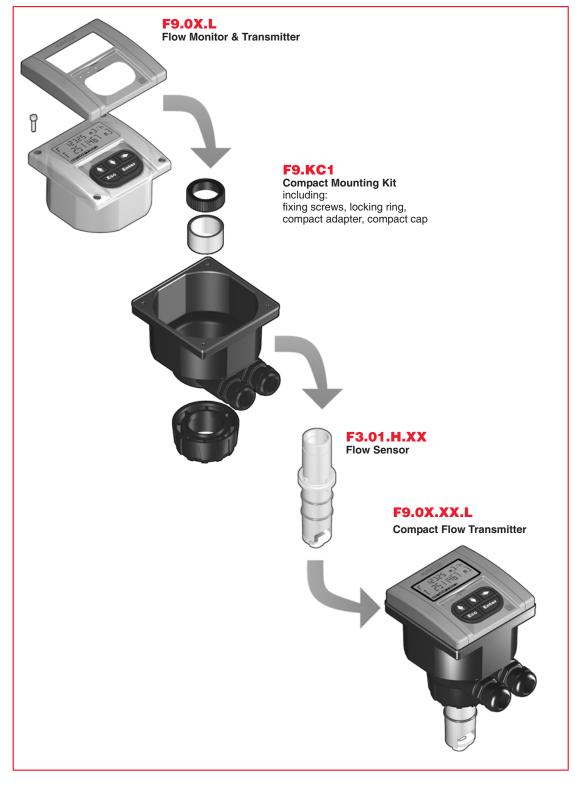
F3.00.H.XX - F3.10.H.XX - F3.15.H.XX ULF01.H.X - ULF3.15.XX.X ULF03.H.X - F111.H F3.80 - New F3.60M & F3.63M

Installation Compact Mount



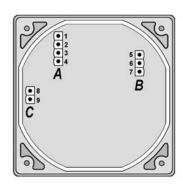
The compact mounting kit F9.KC1 includes the compact plastic adapter with gasket for IP65 watertight installation, the compact cap, the locking ring and four fixing screws for mounting the monitor directly onto the sensor. The instrument and the kit can be ordered separately (code F9.0X.L for the monitor and

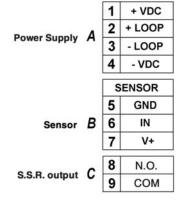
The instrument and the kit can be ordered separately (code F9.0X.L for the monitor and code F9.KC1 for the kit) or together using the code F9.0X.XX.L.

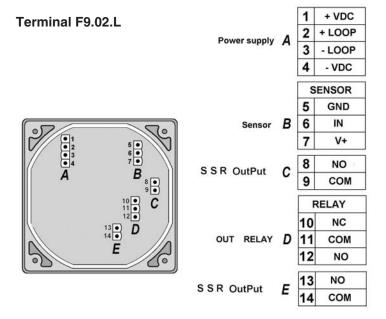


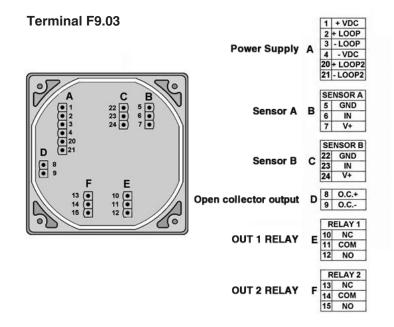
Rear Terminal View

Terminal F9.00.L









Technical Data

General

- Associated flow sensor:
- FLS FLOWX3 Hall effect with frequency output.
- FLS FLOWX3 New Electromagnetic flow sensor*.
- Materials:
- Case: PC
- Panel gasket: Neoprene
- Wall and Field gasket: EPDM
- Keypad: 5 button silicone rubber.
- Display:
- backlight configuration (not available for F9.03)
- 3 line LCD: 2 x 12 alphanumeric lines and 1 icon line
- Update rate: 1 second
- Contrast: User adjustable with 5 levels.
- Enclosure: IP65 front.

Electrical

- Supply Voltage: 12 to 24 VDC ±10%, regulated.
- Sensor Input (Frequency):
- Sensor power: 3.8 ÷ 5 VDC @ < 30 mA*
- Range: F9.00.L-F9.03 → 0.5 to 500 Hz F9.02 → 0.5 to 1000 Hz
- Optically isolated from current loop (only 4 wires version)
- Short circuit protected.
- Accuracy: ±0,5%.
- Current output:
- 4-20 mA, isolated, fully adjustable and reversible. (Not available for F9.00.L when backlight configuration is on).
- Max loop impedance: 150 Ω @ 12 VDC, 330 Ω @ 18 VDC, 600 Ω @ 24 VDC.

- Open Collector output or Solid State Relay output:
- User selectable as MIN alarm, MAX alarm, Pulse Out, Freq Out, Off, Window
- Optically isolated, 50 mA MAX sink, 24 VDC maximum pull-up voltage
- Max pulse/min: 300 (180 for F9.00.L)
- Hysteresis: User selectable.
- Relay output:
- User selectable as MIN alarm, MAX alarm, Window, Pulse Out, Off
- Mechanical SPDT contact
- Max voltage rating: 8A @ 24 VDC, 8A @ 240 VAC, resistive load
- Max pulse/min: 60 for F9.00, 180 for F9.03
- Hysteresis: User selectable.
- Expected mechanical life (min. operations): 10⁷
- Expected electrical life (min. operations): 10⁵, for F9.03 N.O.: 5 X 10⁴ / N.C.: 2 X 10⁵ N.O./N.C.switching capacity 8A@240 VAC, for F9.03 N.O. 5A @ 250VAC / N.C. 2A @ 250VAC

Environmental

- Operating temperature: -10°C to +70°C (14°F to 158°F).
- Storage temperature: -15°C to +80°C (5°F to 176°F).
- Relative humidity: 0 to 95% non condensing.

Standards & Approvals

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

^{*} For F3.60M & F3.63M power supply must be provided separately.

F9.0X.L or F9.03

Part No.	Description	Wire Power Tech.	Power Supply	Input	Output
F9.00.L	Flow Monitor & Transmitter	2 wire	12 to 24 VDC	1 (Freq.)	1 (4-20mA) 1 (solid state relays)
F9.02.L	Flow Monitor & Transmitter	3/4 wire	12 to 24 VDC	1 (Freq.)	1 (4-20mA) 2 (open collector relays) 1 (relay)
F9.03	Flow Monitor & Transmitter	3/4 wire	12 to 24 VDC	2 (Freq.)	2 (4-20mA) 1 (open collector relays) 2 (relay)

F9.0X.P1.L or F9.03.P1 (Panel Mount version)

Part No.	Description	Wire Power Tech.	Power Supply	Input	Output
F9.00.P1.L	Panel Mount Flow Monitor & Transmitter	2 wire	12 to 24 VDC	1 (Freq.)	1 (4-20mA) 1 (solid state relays)
F9.02.P1.L	Panel Mount Flow Monitor & Transmitter	3/4 wire	12 to 24 VDC	1 (Freq.)	1 (4-20mA) 2 (solid state relays) 1 (relay)
F9.03.P1	Panel Mount Flow Monitor & Transmitter	3/4 wire	12 to 24 VDC	2 (Freq.)	2 (4-20mA) 1 (open collector relays) 2 (relay)

F9.0X.WX.L or F9.03.WX (Wall Mount version)

Part No.	Description	Wire Power Tech.	Power Supply	Input	Output
F9.00.W1.L	Wall Mount Flow Monitor & Transmitter	2 wire	12 to 24 VDC	1 (Freq.)	1 (4-20mA) 1 (solid state relays)
F9.02.W1.L	Wall Mount Flow Monitor & Transmitter	3/4 wire	12 to 24 VDC	1 (Freq.)	1 (4-20mA) 2 (solid state relays) 1 (relay)
F9.03.W1	Wall Mount Flow Monitor & Transmitter	3/4 wire	12 to 24 VDC	2 (Freq.)	2 (4-20mA) 1 (open collector) 2 (relay)
F9.00.W2.L	Wall Mount Flow Monitor & Transmitter	2 wire	110 to 230 VAC	1 (Freq.)	1 (4-20mA) 1 (solid state relays)
F9.02.W2.L	Wall Mount Flow Monitor & Transmitter	3/4 wire	110 to 230 VAC	1 (Freq.)	1 (4-20mA) 2 (solid state relays) 1 (relay)
F9.03.W2	Wall Mount Flow Monitor & Transmitter	3/4 wire	110 to 230 VAC	2 (Freq.)	2 (4-20mA) 1 (open collector) 2 (relay)

FLOWX3 F9.00.XX.L (Compact Field Mount version)

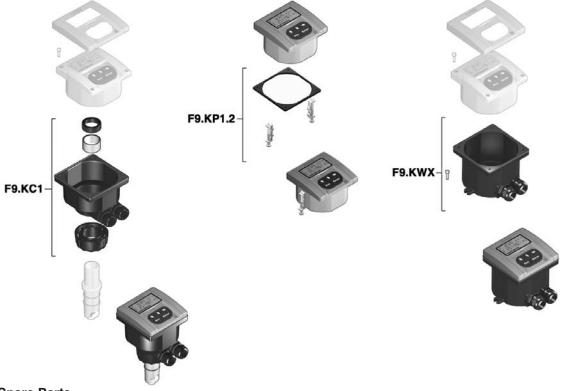
Part No.	Description	Wire Power Tech.	Power Supply	Input	Output	Sensor Length	Sensor Body	Sensor O-rings
F9.00.01.L	Field Mount Flow Monitor & Transmitter	2 wire	12 to 24 VDC	1 (Freq.)	1 (4-20mA) 1 (solid state relays)	LO	CPVC	EPDM
F9.00.02.L	Field Mount Flow Monitor & Transmitter	2 wire	12 to 24 VDC	1 (Freq.)	1 (4-20mA) 1 (solid state relays)	LO	CPVC	FPM
F9.00.03.L	Field Mount Flow Monitor & Transmitter	2 wire	12 to 24 VDC	1 (Freq.)	1 (4-20mA) 1 (solid state relays)	L1	CPVC	EPDM
F9.00.04.L	Field Mount Flow Monitor & Transmitter	2 wire	12 to 24 VDC	1 (Freq.)	1 (4-20mA) 1 (solid state relays)	L1	CPVC	FPM
F9.00.05.L	Field Mount Flow Monitor & Transmitter	2 wire	12 to 24 VDC	1 (Freq.)	1 (4-20mA) 1 (solid state relays)	LO	PVDF	EPDM
F9.00.06.L	Field Mount Flow Monitor & Transmitter	2 wire	12 to 24 VDC	1 (Freq.)	1 (4-20mA) 1 (solid state relays)	LO	PVDF	FPM
F9.00.07.L	Field Mount Flow Monitor & Transmitter	2 wire	12 to 24 VDC	1 (Freq.)	1 (4-20mA) 1 (solid state relays)	L1	PVDF	EPDM
F9.00.08.L	Field Mount Flow Monitor & Transmitter	2 wire	12 to 24 VDC	1 (Freq.)	1 (4-20mA) 1 (solid state relays)	L1	PVDF	FPM
F9.00.09.L	Field Mount Flow Monitor & Transmitter	2 wire	12 to 24 VDC	1 (Freq.)	1 (4-20mA) 1 (solid state relays)	LO	316L SS	EPDM
F9.00.10.L	Field Mount Flow Monitor & Transmitter	2 wire	12 to 24 VDC	1 (Freq.)	1 (4-20mA) 1 (solid state relays)	LO	316L SS	FPM
F9.00.11.L	Field Mount Flow Monitor & Transmitter	2 wire	12 to 24 VDC	1 (Freq.)	1 (4-20mA) 1 (solid state relays)	L1	316L SS	EPDM
F9.00.12.L	Field Mount Flow Monitor & Transmitter	2 wire	12 to 24 VDC	1 (Freq.)	1 (4-20mA) 1 (solid state relays)	LO	316L SS	FPM
F9.00.13.L	Field Mount Flow Monitor & Transmittera	2 wire	12 to 24 VDC	1 (Freq.)	1 (4-20mA) 1 (solid state relays)	LO	BRASS	EPDM
F9.00.14.L	Field Mount Flow Monitor & Transmitter	2 wire	12 to 24 VDC	1 (Freq.)	1 (4-20mA) 1 (solid state relays)	L1	BRASS	FPM
F9.00.15.L	Field Mount Flow Monitor & Transmitter	2 wire	12 to 24 VDC	1 (Freq.)	1 (4-20mA) 1 (solid state relays)	L1	BRASS	EPDM
F9.00.16.L	Field Mount Flow Monitor & Transmitter	2 wire	12 to 24 VDC	1 (Freq.)	1 (4-20mA) 1 (solid state relays)	L1	BRASS	FPM

FLOWX3 F9.02.XX.L (Compact Field Mount version)

Part No.	Description	Wire Power Tech.	Power Supply	Input	Output	Sensor Length	Sensor Body	Sensor O-rings
F9.02.01.L	Field Mount Flow Monitor & Transmitter	3/4 wire	12 to 24 VDC	1 (Freq.)	1 (4-20mA) 2 (solid state relays) 1 (Relay)	L0	CPVC	EPDM
F9.02.02.L	Field Mount Flow Monitor & Transmitter	3/4 wire	12 to 24 VDC	1 (Freq.)	1 (4-20mA) 2 (solid state relays) 1 (Relay)	LO	CPVC	FPM
F9.02.03.L	Field Mount Flow Monitor & Transmitter	3/4 wire	12 to 24 VDC	1 (Freq.)	1 (4-20mA) 2 (solid state relays) 1 (Relay)	L1	CPVC	EPDM
F9.02.04.L	Field Mount Flow Monitor & Transmitter	3/4 wire	12 to 24 VDC	1 (Freq.)	1 (4-20mA) 2 (solid state relays) 1 (Relay)	L1	CPVC	FPM
F9.02.05.L	Field Mount Flow Monitor & Transmitter	3/4 wire	12 to 24 VDC	1 (Freq.)	1 (4-20mA) 2 (solid state relays) 1 (Relay)	LO	PVDF	EPDM
F9.02.06.L	Field Mount Flow Monitor & Transmitter	3/4 wire	12 to 24 VDC	1 (Freq.)	1 (4-20mA) 2 (solid state relays) 1 (Relay)	LO	PVDF	FPM
F9.02.07.L	Field Mount Flow Monitor & Transmitter	3/4 wire	12 to 24 VDC	1 (Freq.)	1 (4-20mA) 2 (solid state relays) 1 (Relay)	L1	PVDF	EPDM
F9.02.08.L	Field Mount Flow Monitor & Transmitter	3/4 wire	12 to 24 VDC	1 (Freq.)	1 (4-20mA) 2 (solid state relays) 1 (Relay)	L1	PVDF	FPM
F9.02.09.L	Field Mount Flow Monitor & Transmitter	3/4 wire	12 to 24 VDC	1 (Freq.)	1 (4-20mA) 2 (solid state relays) 1 (Relay)	L0	316L SS	EPDM
F9.02.10.L	Field Mount Flow Monitor & Transmitter	3/4 wire	12 to 24 VDC	1 (Freq.)	1 (4-20mA) 2 (solid state relays) 1 (Relè)	L0	316L SS	FPM
F9.02.11.L	Field Mount Flow Monitor & Transmitter	3/4 wire	12 to 24 VDC	1 (Freq.)	1 (4-20mA) 2 (solid state relays) 1 (Relay)	L1	316L SS	EPDM
F9.02.12.L	Field Mount Flow Monitor & Transmitter	3/4 wire	12 to 24 VDC	1 (Freq.)	1 (4-20mA) 2 (solid state relays) 1 (Relay)	L1	316L SS	FPM
F9.02.13.L	Field Mount Flow Monitor & Transmitter	3/4 wire	12 to 24 VDC	1 (Freq.)	1 (4-20mA) 2 (solid state relays) 1 (Relay)	L0	BRASS	EPDM
F9.02.14.L	Field Mount Flow Monitor & Transmitter	3/4 wire	12 to 24 VDC	1 (Freq.)	1 (4-20mA) 2 (solid state relays) 1 (Relay)	L0	BRASS	FPM
F9.02.15.L	Field Mount Flow Monitor & Transmitter	3/4 wire	12 to 24 VDC	1 (Freq.)	1 (4-20mA) 2 (solid state relays) 1 (Relay)	L1	BRASS	EPDM
F9.02.16.L	Field Mount Flow Monitor & Transmitter	3/4 wire	12 to 24 VDC	1 (Freq.)	1 (4-20mA) 2 (solid state relays) 1 (Relay)	L1	BRASS	FPM

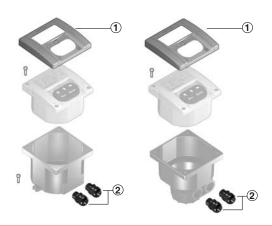
Mounting Kits

Part No.	Name	Description
F9.KC1	Compact mounting Kit	Plastic adapter with gasket, compact cap, locking ring and 4 fixing screws
F9.KP1.2	Panel mounting Kit	Mounting bracket with gasket
F9.KW1	Wall mounting Kit	Plastic adapter with gasket and fixing screws
F9.KW2	Wall mounting Kit with Power Supply	Plastic adapter with gasket, fixing screws and 110/230VAC to 24VDC power supply included



Spare Parts

Item	Part No. Name		Description		
1	F9.SP2	Cover	PC front cover, 3 LED		
1	F9.SP3	Cover	PC front cover, no LED		
2	F9.SP4.1	PG 13.5	PG13.5 Cable Gland for Compact or Wall mounting Kit		
2	F9.SP4.2	PG 11	PG11 Cable Gland for Compact or Wall mounting Kit		



FLOWX3 F9.00.BD Bi-directional Flow Monitor & Transmitter





The FLS FLOWX3 F9.00.BD Flow Monitor and Transmitter is designed to convert the signal from the bi-directional flow sensors (F111.HT.BD & F3.11.H.BD) into a display indication and a 4-20mA signal for long distance transmission and it also perform a fully programmable Open Collector digital output. Only one packaging for panel or wall installation makes the device very flexible.

Self explaining calibration menus allow a customized setup of all measuring parameters and the state of the art electronic design ensures long-term reliable and stable signals.

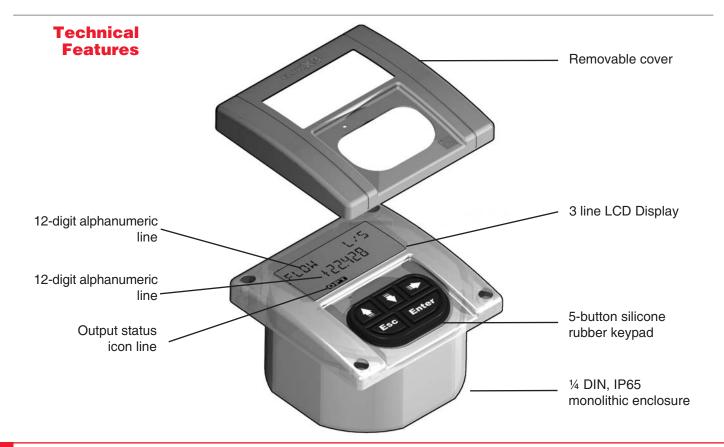
Main Features

- Wall or Panel installation
- Adjustable analog output.
- Flow rate and direction display.
- 2 resettable totalizers (6 digit).
- 2 permanent totalizers (10 digit).
- Digital Open Collector output.
- Output simulation for system testing.
- IP65 monolithic packaging.
- Auto-calibration.

Applications

- Flow control and monitoring.
- Water distribution.
- Leak detection.
- Water treatment.

- Filtration systems.
- Groundwater remediation.
- Irrigation.



Technical Features

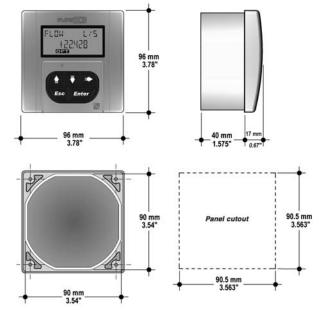
Flow Monitor	Part. No.	Wire Power Tech.	Associated Sensor	4-20mA Output	Open Collector Output	Relay Output
FLDH L/S +22928 0228	F9.00.BD	2 wire	Bi-directional Hall Effect F3.11.H.BD F111.HT.BD	1 Positive Flow, Negative Flow, Bi-directional Flow	1 - MIN, MAX, Pulse, Off	

Engineering Data

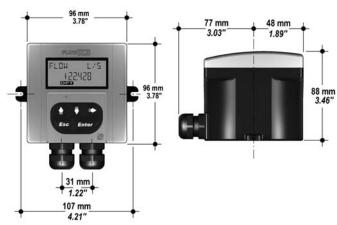
- The flow transmitter is designed with only one packaging for panel or wall installation.
- The flow transmitter has ¼ DIN panel mount standard dimensions: 96 x 96 mm (3.6 x 3.8 inch).
- The instrument provides bi-directional flow rate indication and dual totalization (resettable and permanent) for each flow direction.
- The 4-20mA output can be proportional to positive flow, negative flow or bi-directional flow with elevated zero (4 12 –20 mA).
- The instrument provides auto-calibration and simulation options.

Dimensions

Panel Mount



Wall Mount



F9,00,BD

Installation

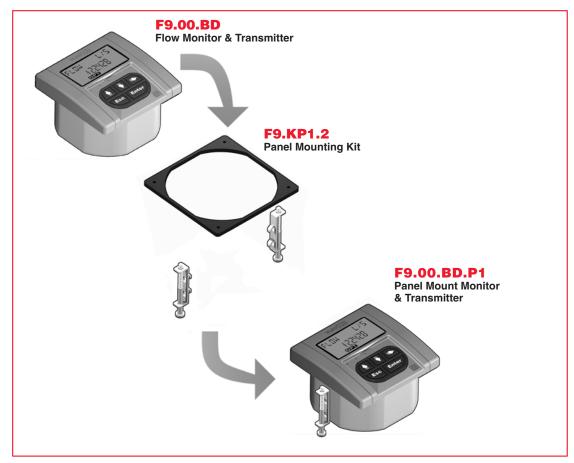
The flow monitor & transmitter is available just in one packaging for panel or wall installation. The panel version is installed using the panel mounting kit (F9.KP1.2), while the wall mounting version is fixed to the wall by the mounting kit (F9.KWX).

The mounting kits can be ordered directly connected to the monitor or separately and then simply installed on it. Please refer to Ordering Data section for a complete listing of part numbers.

Panel Mount



The panel mounting version consists of the monitor and the mounting bracket kit F9.KP1.2 with gasket for IP65 watertight panel installation. The monitor perfectly fits into a standard ¼ DIN panel cutout. The instrument and the kit can be ordered separately (code F9.0X for the monitor and code F9.KP1.2 for the mounting bracket) or together using the code F9.0X.P1.



Input from



FLS FLOWX3 Flow Sensor (sold separately)

F3.11.H.BD F111.HT.BD

F9.00.BDF_Ls

Installation

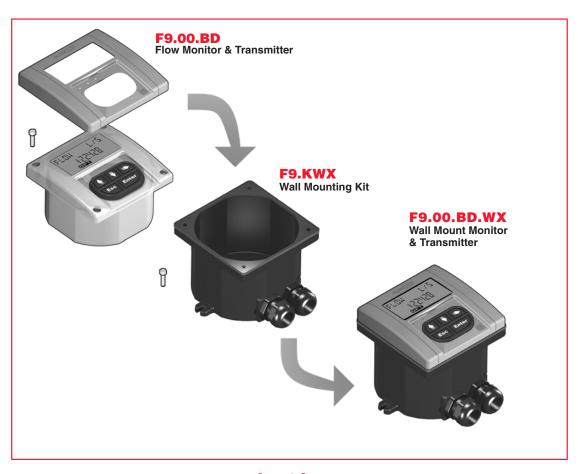
Wall Mount



The wall mounting version consists of the monitor and the wall mounting kit.

The F9.KW1 kit includes the plastic adapter, the gasket for IP65 watertight wall installation and the fixing screws.

The F9.KW2 includes also a 110/230 VAC to 24 VDC power supply directly mounted into the plastic adapter to provide a low voltage regulated output to the flow monitor. The instrument and the kit can be ordered separately (code F9.0X for the monitor and code F9.KWX for the kit) or together using the code F9.0X.WX.



Input from



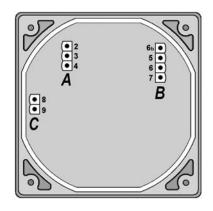
FLS FLOWX3 Flow Sensor (sold separately)

F3.11.H.BD F111.HT.BD

F9,00,BD

Rear Terminal View

Terminal F9.00.BD



Sensor B

6b DIR 5 GND 6 IN 7 V+

Open collector output C

5	8	O.C.+
	9	O.C

Technical Data

General

- Associated flow sensor:
- FLS F3.11.H.BD
- FLS F111.HT.BD.
- Materials:
- Case: PC
- Panel gasket: Neoprene
- Wall 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.
- Enclosure: IP65 front.

Electrical

- Supply Voltage: 12 to 24 VDC±10%, regulated.
- Sensor Input (Frequency):
- Sensor power: 4 VDC @ < 20 mA
- Range: 0 ÷ 100 Hz
- Optically isolated from current loop
- Short circuit protected.
- Accuracy: ±0,5 Hz.

Output current:

- 4-20 mA, isolated, fully adjustable and reversible
- Max. loop impedance: 150 @ 12 VDC, 330 @ 18 VDC, 600 @ 24 VDC.
- Open Collector output:
- User selectable as MIN alarm, MAX alarm, Pulse Out, Off
- Optically isolated, 50 mA MAX sink, 24 VDC maximum pull-up voltage
- Max pulse/min.: 300
- Hysteresis: user selectable.

Environmental

- Operating temperature: -10°C to +70°C (14°F to 158°F).
- Storage temperature: -15°C to +80°C (5°F to 176°F).
- Relative Umidity: 0 to 95% non condensing.

Standard & Approvals

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

Ordering Data

FLOWX3 F9.00.BD

Part No.	Description	Wire Power Tech.	Power Supply	Input	Output
F9.00.BD	Bi-directional Flow Monitor and Transmitter	2 wire	12 to 24 VDC	1 (Freq.)	1 (4-20mA) 1 (Open Collector)

FLOWX3 F9.00.BD.P1 (Panel Mount Version)

,							
Part No.	Description	Wire Power Tech.	Power Supply	Input	Output		
F9.00.BD.P1	Panel Mount Bi-directional Flow Monitor and Transmitter	2 wire	12 to 24 VDC	1 (Freq.)	1 (4-20mA) 1 (Open Collector)		

FLOWX3 F9.00.BD.WX (Wall Mount Version)

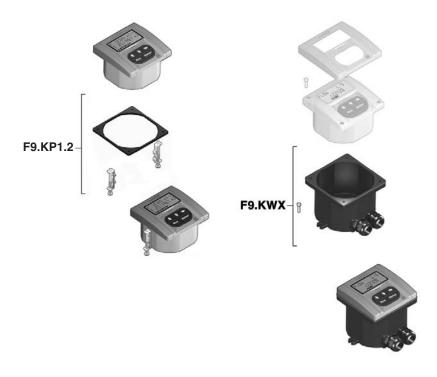
Part No.	Description	Wire Power Tech.	Power Supply	Input	Output
F9.00.BD.W1	Wall Mount Bi-directional Flow Monitor and Transmitter	2 wire	12 to 24 VDC	1 (Freq.)	1 (4-20mA) 1 (Open Collector)
F9.00.BD.W2	Wall Mount Bi-directional Flow Monitor and Transmitter	2 wire	110 to 230 VAC	1 (Freq.)	1 (4-20mA) 1 (Open Collector)

F9.00.BDF_L

Ordering Data

Mounting Kits

Part No. Name		Description		
F9.KP1.2	Panel mounting Kit	Mounting bracket with gasket		
F9.KW1 Wall mounting Kit		Plastic adapter with gasket and fixing screws		
F9.KW2	Wall mounting Kit with Power Supply	Plastic adapter with gasket, fixing screws and 110/230VAC to 24VDC power supply included		



Spare Parts

Item	Part No.	Name	Description
1	F9.SP1	Cover	PC front cover, 1 LED
2	F9.SP4.1	PG 13.5	PG13.5 Cable Gland for Wall mounting Kit
2	F9.SP4.2	PG 11	PG11 Cable Gland for Wall mounting Kit



FLOWX3 F9.20 Battery Powered Flow Monitor







FLS FLOWX3 F9.20 Battery Powered Flow Monitor is equipped with two long life lithium batteries and integrates the power supply for the sensor. It is designed to show on the LCD display flow rate and totalized flow volume with no external power supply required. One of the two totalizers is resettable while the other is non-resettable and it is used to permanently record volume consumption. Self explaining calibration menus allow a customized setup of all measuring parameters and the state of the art electronic design ensures long-term reliable and stable indications. The high flexibility is maximized with only one packaging for compact pipe mount, panel or wall installation.

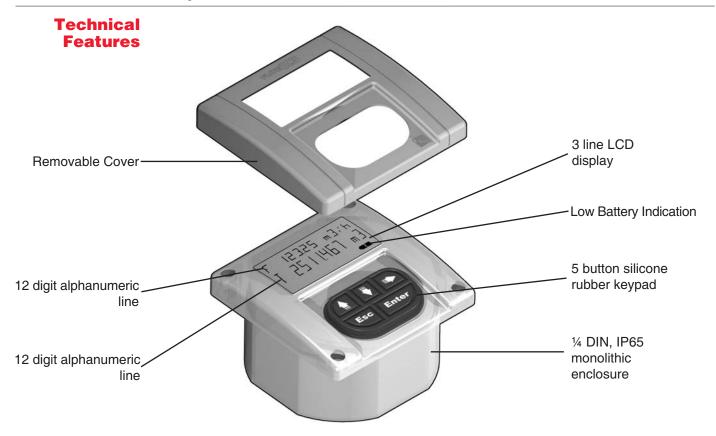
Main Features

- Battery Operated.
- Long-lasting 3.6 Volt lithium batteries included.
- 3 line alphanumeric LCD.
- IP65 monolithic packaging.
- 5 button keypad.
- No information lost during battery replacement.
- One packaging for compact/pipe, panel or wall installation.
- Self explaining calibration menus.
- Two totalizers: 10 digit permanent and 6 digit resettable.
- 5 digit flow rate indication.

Applications

- Water treatment and regeneration systems.
- Mobile wastewater treatment and recovery.
- Water distribution.
- Leak detection.
- Irrigation.

- Groundwater remediation.
- Filtration systems.
- Liquid delivery systems.
- Swimming pools & Spas.



F9.20 F_L

Engineering Data

- The flow monitor is designed with only one packaging for compact/pipe, panel or wall installation.
- The flow monitor has ¼ DIN panel mount standard dimensions: 96 x 96 mm (3.8 x 3.8 inch).
- The instrument meets IP65 standards.
- The instrument provides flow rate indication and dual totalization with fully scaleable engineering units.
- The flow monitor is equipped with a 3 line LCD: 2 x 12 alphanumeric lines and 1 icon line.

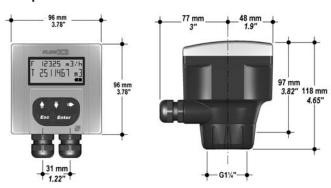
- The LCD display provides a 5 digit flow rate indication, a 6 digit resettable totalizer indication and a 10 digit permanent totalizer indication.
- The flow monitor is equipped with a silicone rubber 5 button keypad.
- The instrument is compatible with all FLS FLOWX3 Coil and Reed sensors.
- The flow monitor is equipped with internal 3.6 Volt, 2.8 Amp/hour, lithium batteries with a nominal life expectation of 5 years.
- The instrument provides a low battery indication and a system to retain all calibration settings during battery replacement.

Connections to FLOWX3 Sensors

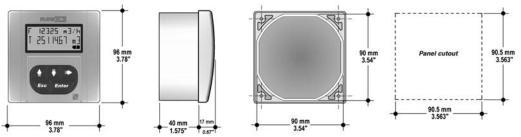
Flow X3 Monitors	FLOWX3	LOWX3 Sensors													
	F3.00.H	3.00.H F3.00.C F3.01.H F3.01.C F3.10.H F3.15.H* F3.30.H* ULF.H ULF.R L	ULF3.15*	ULF3.30*	F3.80	F111.H	F111.C	F3.60M F3.63M							
F9.20															

^{*} with Output Kit mounted.

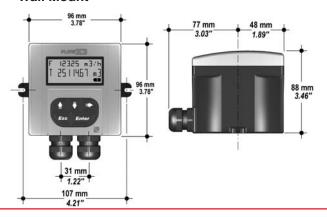
Dimensions Compact Mount



Panel Mount



Wall Mount



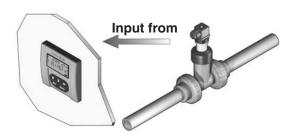
Installation

The flow monitor is available just in one packaging for compact field version, panel or wall installation. The compact field version is mounted on top of the sensor using the compact mounting kit (F9.KC1), the panel version is installed using the panel mounting kit (F9.KP1.2), while the wall mounting version is fixed to the wall by the mounting kit (F9.KW1).

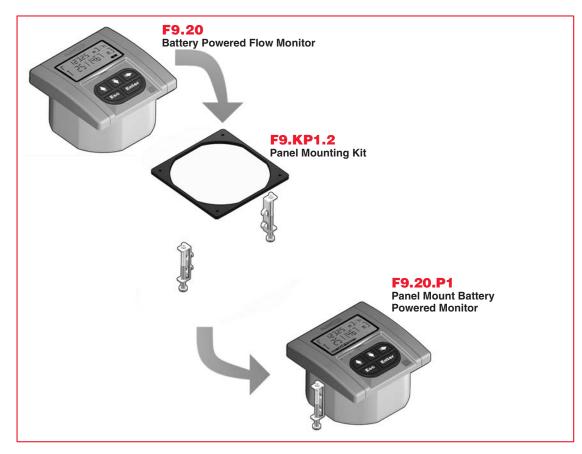
The mounting kits can be ordered directly connected to the monitor or separately and then simply installed on it.

Please refer to Ordering Data section for a complete listing of part numbers.

Panel Mount



The panel mounting version consists of the monitor and the mounting bracket kit F9.KP1.2 with gasket for IP65 watertight panel installation. The monitor perfectly fits into a standard ½ DIN panel cutout. The instrument and the kit can be ordered separately (code F9.20 for the monitor and code F9.KP1.2 for the mounting bracket) or together using the code F9.20.P1.



Input from

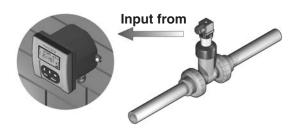


FLS	FlowX3	Flow	Sensor
(sol	d separa	ately)	

F3.00.C.XX ULF01.R.X ULF03.R.X F111.C

Installation

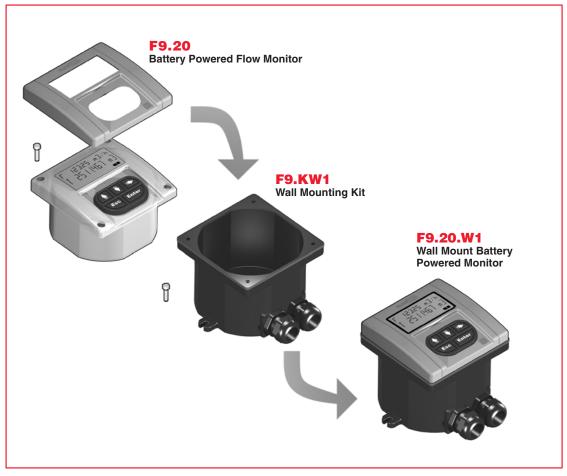
Wall Mount



The wall mounting version consists of the monitor and the wall mounting kit.

The F9.KW1 kit includes the plastic adapter, the gasket for IP65 watertight wall installation and the fixing screws.

The instrument and the kit can be ordered separately (code F9.20 for the monitor and code F9.KW1 for the kit) or together using the code F9.20.W1.



Input from



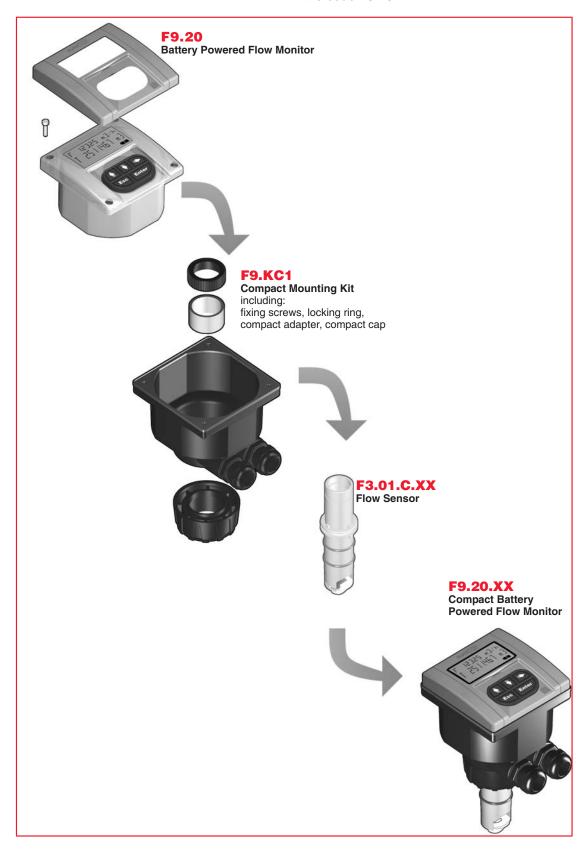
FLS FlowX3 Flow Sensor (sold separately)

F3.00.C.XX ULF01.R.X ULF03.R.X F111.C

Installation Compact Mount

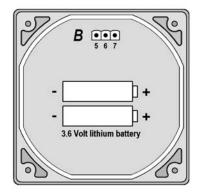


The compact mounting kit F9.KC1 includes the compact plastic adapter with gasket for IP65 watertight installation, the compact cap, the locking ring and four fixing screws for mounting the monitor directly onto the sensor. The instrument and the kit can be ordered separately (code F9.20 for the monitor and code F9.KC1 for the kit) or together using the code F9.20.XX.



Rear Terminal View

Terminal F9.20



B Sensor 5 GND 6 IN 7 V+

Technical Data

General

- Associated flow sensor:
- FLS FlowX3 Coil effect with frequency output
- FLS FlowX3 Reed effect.
- Materials:
- Case: PC
- Panel gasket: Neoprene
- Wall and Field gasket: EPDM
- Keypad: 5 button silicone rubber.
- Display:
- 3 line LCD: 2 x 12 alphanumeric lines and 1 icon line
- Update rate: 1 second.
- Enclosure: IP65 front.

Electrical

- Supply Voltage: 2 x 3.6 Volt Lithium thionylchloride battery, 2.8 AHr.
- Battery life: nominal 5 years.
- Sensor Input (Frequency):
- Sensor power: 3.6 Volt
- Range: 1 to 500 Hz.
- Accuracy: ±0,5 Hz.

Environmental

- Operating temperature: -5°C to +60°C (23°F to 140°F).
- Storage temperature: -1°C to +80°C (14°F to 176°F).
- Relative humidity: 0 to 95% non condensing.

Standards & Approvals

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

FLOWX3 F9.20.XX

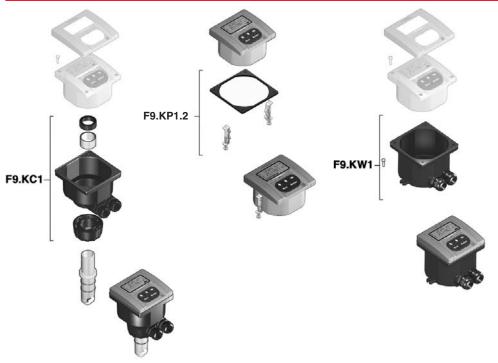
Part No	Description
F9.20	Battery Powered Flow Monitor
F9.20.W1	Panel Mount Battery Powered Flow Monitor
F9.20.P1	Wall Mount Battery Powered Flow Monitor

FlowX3 F9.20.XX (Compact Field Mount version)

Part No.	Description	Sensor Length	Sensor Body	Sensor O-rings	
F9.20.01	Field Mount Battery Powered Flow Monitor	LO	CPVC	EPDM	
F9.20.02	Field Mount Battery Powered Flow Monitor	LO	CPVC	FPM	
F9.20.03	Field Mount Battery Powered Flow Monitor	L1	CPVC	EPDM	
F9.20.04	Field Mount Battery Powered Flow Monitor	L1	CPVC	FPM	
F9.20.05	Field Mount Battery Powered Flow Monitor	LO	PVDF	EPDM	
F9.20.06	Field Mount Battery Powered Flow Monitor	LO	PVDF	FPM	
F9.20.07	Field Mount Battery Powered Flow Monitor	L1	PVDF	EPDM	
F9.20.08	Field Mount Battery Powered Flow Monitor	L1	PVDF	FPM	
F9.20.09 Field Mount Battery Powered Flow Monitor		LO	316L SS	EPDM	
F9.20.10	Field Mount Battery Powered Flow Monitor	LO	316L SS	FPM	
F9.20.11	Field Mount Battery Powered Flow Monitor	L1	316L SS	EPDM	
F9.20.12	Field Mount Battery Powered Flow Monitor	L1	316L SS	FPM	
F9.20.13	Field Mount Battery Powered Flow Monitor	LO	BRASS	EPDM	
F9.20.14 Field Mount Battery Powered Flow Monitor		LO	BRASS	FPM	
F9.20.15 Field Mount Battery Powered Flow Monitor		L1	BRASS	EPDM	
F9.20.16	Field Mount Battery Powered Flow Monitor	L1	BRASS	FPM	

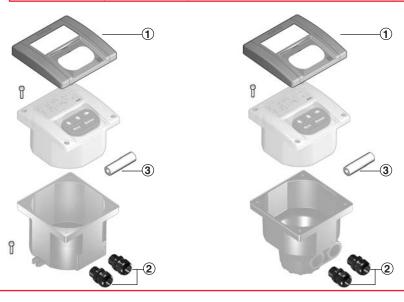
Mounting Kits

Part No.	Name	Description		
F9.KC1	Compact mounting Kit	Plastic adapter with gasket, compact cap, locking ring and 4 fixing screws		
F9.KP1.2	Panel mounting Kit	Mounting bracket with gasket		
F9.KW1	Wall mounting Kit	Plastic adapter with gasket and fixing screws		



Spare Parts

Item	Part No.	Name	Description
1	F9.SP3	Cover	PC front cover, no LED
2	F9.SP4.1	PG 13,5	PG13,5 Cable Gland for Compact or Wall mounting Kit
	F9.SP4.2	PG 11	PG11 Cable Gland for Compact or Wall mounting Kit
3	F9.SP6	Replacement battery	3.6 Volt Lithium thionyl chloride battery



FLOWX3 F9.20.BD Bi-directional Battery Powered Flow Monitor





The FLS FLOWX3 F9.20.BD Bi-directional Battery Powered Flow Monitor is equipped with two long life lithium batteries and integrates the power supply for the sensor. It is designed to show on the LCD display flow rate and totalized flow volume with no external power supply required. The instant flow rate can be positive or negative, according to flow direction. Two totalizers (resettable and permanent) are available for positive flow and two totalizers (resettable and permanent) are available for negative flow. Self explaining calibration menus allow customized setup of all measuring parameters and the state of the art electronic design ensures long-term reliable and stable indications.

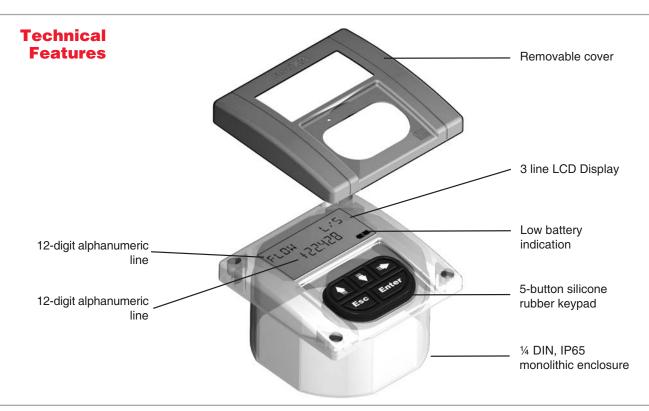
Main Features

- Wall installation.
- Battery operated.
- No information lost during battery replacement.
- Flow rate and direction display.
- 2 resettable totalizers (6 digit).
- 2 permanent totalizers (10 digit).
- Self explaining calibration menu.
- IP65 monolithic packaging.

Applications

- Flow monitoring.
- Water distribution.
- Leak detection.

- Irrigation.
- Filtration systems.
- Groundwater remediation.

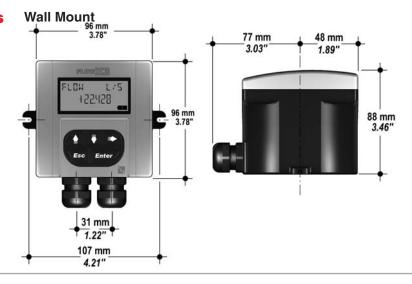


Engineering Data

- The flow monitor is designed for wall installation.
- The instrument is compatible with F111.HT.BD & F3.11.H.BD flow sensors.
- The instrument provides bi-directional flow rate indication and dual totalization (resettable and permanent) for each flow direction.
- The monitor provides a low battery indication and a system to retain all calibration settings during battery replacement.
- The instrument meets IP65 standards.

F9.20.BD**F**_s

Dimensions



Installation

The flow monitor & transmitter is available just in one packaging for wall installation.

Wall Mount

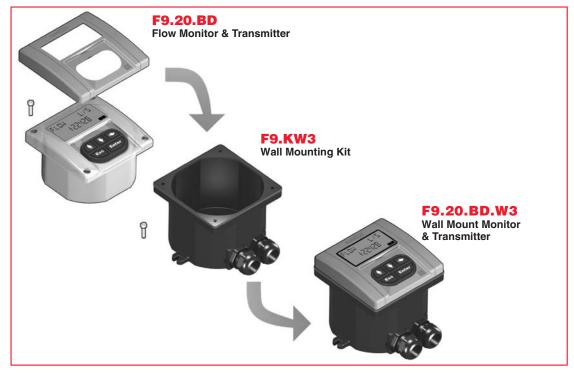


The wall mounting version consists of the monitor and the wall mounting kit.

The F9.KW3 kit includes the plastic adapter, the gasket for IP65 watertight wall installation, the fixing screws and the batteries.

The instrument and the kit can be ordered separately (code F9.0X for the monitor and code F9.KP1.2 for the mounting bracket) or

together using the code F9.0X.P1.



Input from

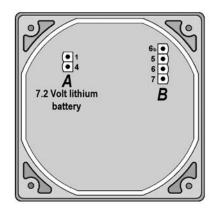


FLS FLOWX3 Flow Sensor (sold separately)

F3.11.H.BD F111.HT.BD

Rear Terminal View

Terminal F9.20.BD



SENSOR 6_b DIR 5 GND Sensor 6 IN 7 V+ 1 + VDC 7.2 Volt lithium battery 4 - VDC

Technical Data

General

- Associated flow sensor:
- FLS F 3.11.H.BD
- FLS F111.HT.BD.
- Materials:
- Case: PC
- Panel gasket: Neoprene
- Wall gasket: EPDM
- Keypad: 5 button silicone rubber.
- Display:
- 3 line LCD: 2 x 12 alphanumeric lines and 1 icon line
- Update rate: 1 second.
- Enclosure: IP65 front.

Electrical

- Supply Voltage: 2 x 3.6 Volt Lithium thionyl chloride battery, 16.5 Ahr.
- Battery life: nominal 2 years.
- Sensor Input (Frequency):
- Sensor power: 4 Volt
- Range: 1 ÷ 500 Hz.
- Accuracy: ±0,5 Hz.

Environmental

- Operating temperature: -5°C to +60°C (23°F to 140°F).
- Storage temperature: -10°C to +80°C (14°F to 176°F).
- Relative Umidity: 0 to 95% non condensing.

Standard & Approvals

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

Ordering Data

FLOWX3 F9.20.BD

Part No.	Description
F9.20.BD	Bi-directional Battery Powered Flow Monitor

FLOWX3 F9.20.BD.W3 (Wall Mount Version)

	- (,
Part No	Description
F9.20.BD.W3	Wall Mount Bi-directional Battery Powered Flow Monitor

Mounting Kits

Part No.	Name	Description
F9.KW3	Wall mounting Kit with batteries included	Plastic adapter with gasket, fixing screws and batteries included





Spare Parts

Item	Part No.	Name	Description
1	F9.SP3	Cover	PC front cover, no LED
2	F9.SP4.1	PG 13.5	PG13.5 Cable Gland for Wall mounting Kit
2	F9.SP4.2	PG 11	PG11 Cable Gland for Wall mounting Kit
3	F9.SP5	Battery Kit replacement	2x3.6 Volt, two Lithium thionyl chloride battery Kit



FLOWX3 F9.50.L Batch Controller





The FLS FlowX3 F9.50.L Batch Controller family is designed for accurate and reliable batching or blending of a variety of liquids. The instrument combines complex control capability with easy calibration and operation. Simple and Advanced mode are available to customize the unit to the specific batch requirements providing simple and quick changes of batch volumes and settings. The F9.50.L, with two relays, a solid state relay and an analog output, ensure accurate batch operation reducing the possibility of water hammer into the system. While with the F9.51.L is possible to store up to 10 different batch parameters batching different volumes and different liquids in the same pipeline always with the same accuracy. The high flexibility is maximized with only one packaging for compact pipe mount, panel or wall installation. Self explaining calibration menus and 5-button keypad allow a user friendly setup of all the batch parameters while the high visible backlight LCD display can show batch in progress, instant and totalized flow.

Main Features

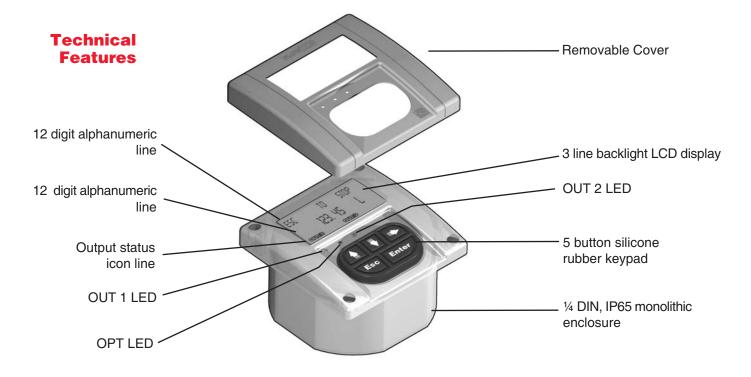
- Easy Batch Volume setting.
- Simple and Advanced operating modes.
- External Start, Stop and Resume.
- Self explaining calibration menus.
- Auto-calibration.
- Two Stage Shutdown Control (F9.50.L).
- Overrun Alarm.
- Missing Signal Alarm.
- End-of-Batch Pulse Output.
- Output simulation for system testing.
- Count-up or Count-down batch indication (F9.50.L).
- Permanent and Resettable totalizer.

- 3 line alphanumeric backlight LCD.
- IP65 monolithic packaging.
- 5 button keypad.
- One packaging for compact/pipe, panel or wall installation.
- Automatic or Manual Overrun Compensation (F9.50.L).
- Advanced Valve Control (F9.50.L).
- Count-up or Count-down batch indication (F9.50.L).
- Store up to ten different batch parameters (F9.51.L).
- Count-up batch indication (F9.51.L).

Applications

- Batch Processes.
- Chemicals Addition.

- Filling Processes.
- Blending Applications.



Batch Controller	Part No.	Associated Flow Sensor	Storable batches	4-20 mA Output	Solid state relay LED	Relay Output		
r.ov)X3	F9.50.L	1 Hall Effect	1 1 Hall Effect		1 – START Batch, END Batch, Off	2 – Batch & Option		
	F9.51.L	1 (Effect Hall)	10	-	-	2 – Batch & Option		

Engineering Data

- The batch controller is designed with only one packaging for compact/pipe, panel or wall installation.
- The batch controller has ¼ DIN panel mount standard dimensions: 96 x 96 mm (3.8 x 3.8 inch).
- The instrument meets IP65 standards.
- The instrument provides flow rate indication, one permanent and one resettable totalizer with fully scaleable engineering units.
- The batch controller provides two SPDT relays. One relay for batch-in-progress indication, the other configurable for end-of-batch pulse, overrun alarm or missing signal alarm in F9.50.L and F9.51.L, and two-stage shutdown only in F9.50.L version.
- The instrument F9.50.L provides a 4..20mA analog output configurable for valve control, or batch completion.
- The batch controller F9.50.L also provides an SSR output configurable as START Batch or END Batch.
- The instrument provides also additional functions as: External Start, Stop and Resume.
- The batch controller is compatible with all FLS FlowX3 Hall Effect Flow Sensor.
- The batch controller is equipped with a 3 line backlight LCD: 2 x 12 alphanumeric lines & 1 icon line.
- The batch controller is equipped with a Silicone rubber 5 button keypad.
- The instrument provides auto-calibration and simulation options.

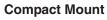
Connections to FLOWX3 Sensors

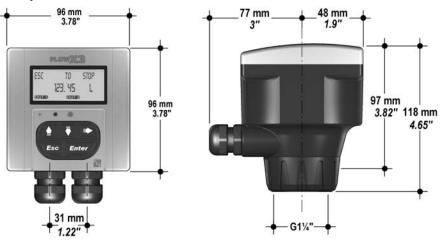
Batch Controllers FLOWX3	FLOW	FLOWX3 Sensor													
	F3.00.H	F3.00.C	F3.01.H	F3.01.C	F3.10.H	F3.15.H*	F3.30.H*	ULF.H	ULF.R	ULF3.15*	ULF3.30*	F3.80	F111.H	F111.C	F3.60M F3.63M
F9.50.L	-							•				•			-
F9.51.L															

^{*} with Output Kit mounted.

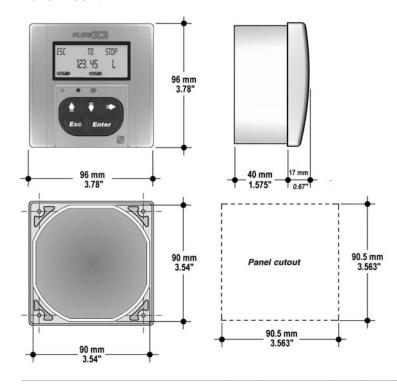
F9.50.L

Dimensions

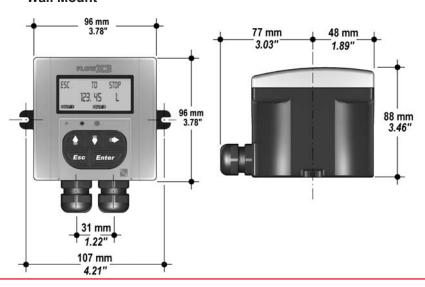




Panel Mount



Wall Mount



F9.50. FLs

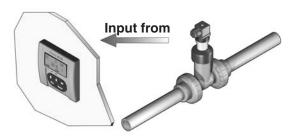
Installation

The batch controller is available just in one packaging for compact field version, panel or wall installation. The compact field version is mounted on top of the sensor using the compact mounting kit (F9.KC1), the panel version is installed using the panel mounting kit (F9.KP1.2), while the wall mounting version is fixed to the wall by the mounting kit (F9.KWX).

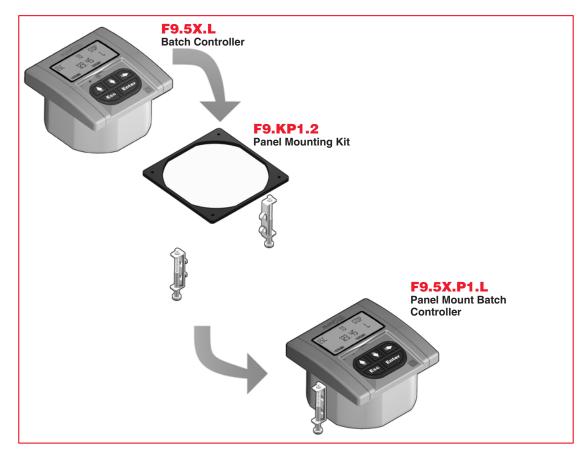
The mounting kits can be ordered directly connected to the controller or separately and then simply installed on it.

Please refer to Ordering Data section for a complete listing of part numbers.

Panel Mount



The panel mounting version consists of the batch controller and the mounting bracket kit F9.KP1 with gasket for IP65 watertight panel installation. The controller perfectly fits into a standard ¼ DIN panel cutout. The instrument and the kit can be ordered separately (code F9.5X.L for the monitor and code F9.KP1 for the mounting bracket) or together using code F9.5X.P1.L.



Input from

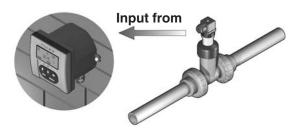


FLS FlowX3 Flow Sensor (sold separately)

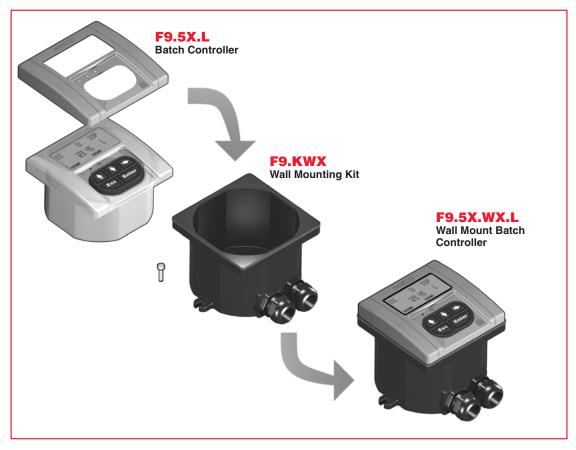
F3.00.H.XX - F3.10.H.XX -F3.15.H.XX -ULF01.H.X - ULF3.15.XX.X- ULF03.H.X -F111.H - F3.80 - New F3.60M & F3.63M

Installation

Wall Mount



The wall mounting version consists of the batch controller and the wall mounting kit. The F9.KW1 kit includes the plastic adapter, the gasket for IP65 watertight wall installation and the fixing screws. The F9.KW2 includes also a 110/230 VAC to 24 VDC power supply directly mounted into the plastic adapter to provide a low voltage regulated output to the controller. The instrument and the kit can be ordered separately (code F9. 5X.L for the controller and code F9.KWX for the kit) or together using code F9.5X.WX.L.



Input da



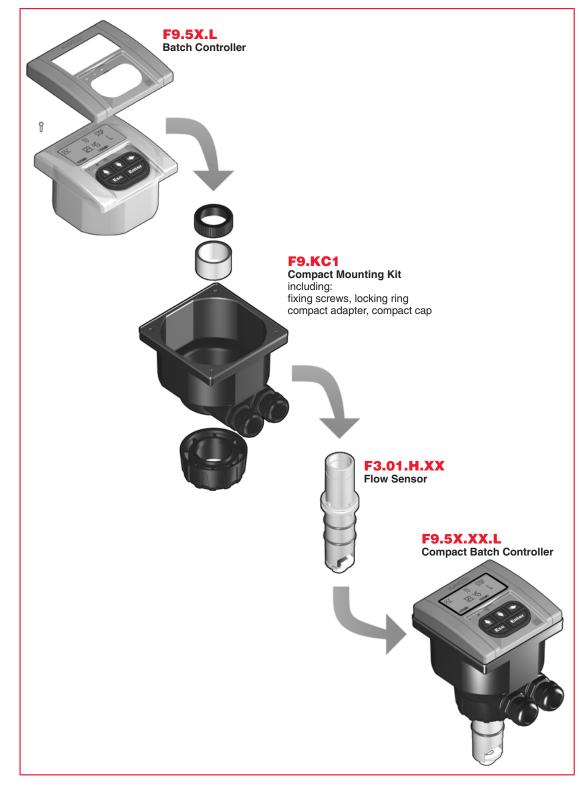
FLS FlowX3 Flow Sensor (sold separately)

F3.00.H.XX - F3.15.H.XX - F3.30.H.XX ULF01.H.X - ULF3.15.XX.X - ULF03.H.X -F111.H - F3.80 - New F3.60M & F3.63M

Installation Compact Mount



The compact mounting kit F9.KC1 includes the compact plastic adapter with gasket for IP65 watertight installation, the compact cap, the locking ring and four fixing screws for mounting the batch controller directly onto the sensor. The instrument and the kit can be ordered separately (code F9. 5X.L for the controller and code F9.KC1 for the kit) or together using code F9. 5X.XX.L.



+ VDC

+ LOOP

- LOOP - VDC

SENSOR GND

> IN V+

NO

COM

NC

COM

NO

NC

COM NO

GND RESUME

> START STOP

RELAY 2

RELAY 1

10

11

12

13

14

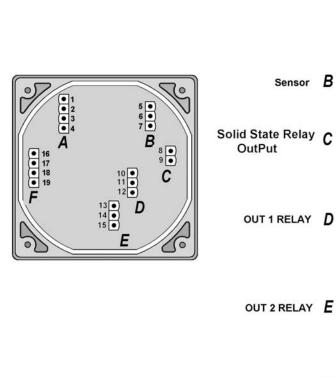
16

Remote control **F**

2

Power supply A

Rear Terminal View



Technical Data

General

- Associated flow sensor:
- FLS FLOWX3 Hall effect with frequency output
- FLS FLOWX3 New Electromagnetic flow sensor*.
- Materials:
- Case: PC
- Panel gasket: Neoprene
- Wall & Field gasket: EPDM
- Keypad: 5-button silicone rubber.
- Display:
- backlight configuration
- 3 line LCD: 2 x 12 alphanumeric lines + 1 icon line
- Update rate: 1 second
- Contrast: User adjustable with 5 levels.
- Enclosure: IP65 front

Electrical

- Supply Voltage: 12 to 24 VDC ±10% regulated.
- Sensor Input (Frequency):
- Sensor power: 3.8 –12 VDC @ < 30 mA
- Range: 0.5 to 1000 Hz
- Optically isolated from current loop
- Short circuit protected
- Accuracy: ± 0,50 Hz.
- Relay output:
- Mechanical SPDT contact
- Expected mechanical life (min. operations): 10⁷
- Expected electrical life (min. operations):
 □ N.O./N.C. switching capacity
 8 A @ 240 VAC
 n° of operations 10 x 10⁴
- OUT1 Batch: Batch in progress indication
- OUT2 Option: End of batch, overrun alarm, missing signal alarm.
- Additional Functions:
- External Start, Stop and Resume.

F9.50.L specific

- Relay output:
- OUT2 Option: Two-stage shutdown
- Current output:
- 4...20 mA, isolated, fully adjustable and reversible
- Max loop impedance: 150 Ω @ 12 VDC, 330 Ω @ 18 VDC, 600 Ω @ 24 VDC
- Configurations: Valve control, batch completion
- Solid state relays:
- User selectable as START Batch, END Batch, OFF
- Optically isolated, 50 mA MAX sink, 24 VDC MAX pull-up voltage
- Max puls e/min: 300.
- Additional Functions:
- End of batch pulse.

Environmental

- Operating temperature: -10°C to +70°C (14°F to 158°F)
- Storage temperature: -15°C to +80°C (5°F to 176°F)
- Relative humidity: 0 to 95% non condensing.

Standards and Approvals

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

^{*} For F3.60M & F3.63M power supply must be supplied separately.

Ordering Data

FlowX3 F9.5X.L

Part No.	Description	Power Supply	Input		
F9.50.L	Batch Controller	12 to 24 VDC	1 (Freq.)		
F9.51.L	Batch Controller	12 to 24 VDC	1 (Freq.)		

FlowX3 F9.5X.P1.L (Panel Mount version)

Part No.	Description	Power Supply	Input	
F9.50.P1.L	Panel Mount Batch Controller	12 to 24 VDC	1 (Freq.)	
F9.51.P1.L	Panel Mount Batch Controller	12 to 24 VDC	1 (Freq.)	

FlowX3 F9.5X.WX.L (Wall Mount version)

Part No.	Description	Power Supply	Input	
F9.50.W1.L	Wall Mount Batch Controller	12 to 24 VDC	1 (Freq.)	
F9.51.W1.L	Wall Mount Batch Controller	12 to 24 VDC	1 (Freq.)	
F9.50.W2.L	Wall Mount Batch Controller	110 to 230 VAC	1 (Freq.)	
F9.51.W2.L	Wall Mount Batch Controller	110 to 230 VAC	1 (Freq.)	

Ordering Data

FlowX3 F9.5X.XX.L (Compact Field Mount version)

Part No.	Description	Power Supply	Sensor Length	Sensor Body	Sensor O-rings
F9.50.01.L	Field Mount Batch Controller	12 to 24 VDC	LO	CPVC	EPDM
F9.50.02.L	Field Mount Batch Controller	12 to 24 VDC	LO	CPVC	FPM
F9.50.03.L	Field Mount Batch Controller	12 to 24 VDC	L1	CPVC	EPDM
F9.50.04.L	Field Mount Batch Controller	12 to 24 VDC	L1	CPVC	FPM
F9.50.05.L	Field Mount Batch Controller	12 to 24 VDC	LO	PVDF	EPDM
F9.50.06.L	Field Mount Batch Controller	12 to 24 VDC	LO	PVDF	FPM
F9.50.07.L	Field Mount Batch Controller	12 to 24 VDC	L1	PVDF	EPDM
F9.50.08.L	Field Mount Batch Controller	12 to 24 VDC	L1	PVDF	FPM
F9.50.09.L	Field Mount Batch Controller	12 to 24 VDC	LO	316L SS	EPDM
F9.50.10.L	Field Mount Batch Controller	12 to 24 VDC	LO	316L SS	FPM
F9.50.11.L	Field Mount Batch Controller	12 to 24 VDC	L1	316L SS	EPDM
F9.50.12.L	Field Mount Batch Controller	12 to 24 VDC	L1	316L SS	FPM
F9.50.13.L	Field Mount Batch Controller	12 to 24 VDC	LO	BRASS	EPDM
F9.50.14.L	Field Mount Batch Controller	12 to 24 VDC	LO	BRASS	FPM
F9.50.15.L	Field Mount Batch Controller	12 to 24 VDC	L1	BRASS	EPDM
F9.50.16.L	Field Mount Batch Controller	12 to 24 VDC	L1	BRASS	FPM

Ordering Data

FlowX3 F9.5X.XX.L (Compact Field Mount version)

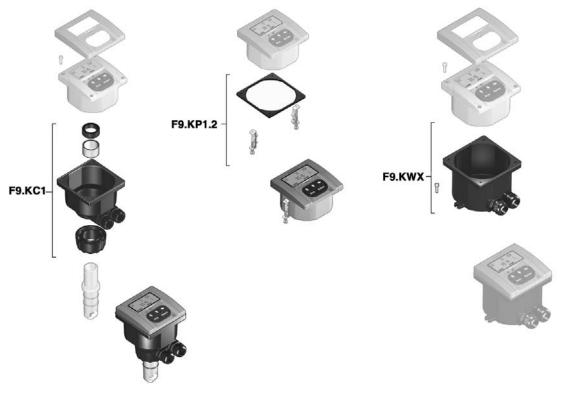
Part No.	Description	Power Supply	Sensor Length	Sensor Body	Sensor O-rings
F9.51.01.L	Field Mount Batch Controller	12 to 24 VDC	LO	CPVC	EPDM
F9.51.02.L	Field Mount Batch Controller	12 to 24 VDC	LO	CPVC	FPM
F9.51.03.L	Field Mount Batch Controller	12 to 24 VDC	L1	CPVC	EPDM
F9.51.04.L	Field Mount Batch Controller	12 to 24 VDC	L1	CPVC	FPM
F9.51.05.L	Field Mount Batch Controller	12 to 24 VDC	LO	PVDF	EPDM
F9.51.06.L	Field Mount Batch Controller	12 to 24 VDC	LO	PVDF	FPM
F9.51.07.L	Field Mount Batch Controller	12 to 24 VDC	L1	PVDF	EPDM
F9.51.08.L	Field Mount Batch Controller	12 to 24 VDC	L1	PVDF	FPM
F9.51.09.L	Field Mount Batch Controller	12 to 24 VDC	LO	316L SS	EPDM
F9.51.10.L	Field Mount Batch Controller	12 to 24 VDC	LO	316L SS	FPM
F9.51.11.L	Field Mount Batch Controller	12 to 24 VDC	L1	316L SS	EPDM
F9.51.12.L	Field Mount Batch Controller	12 to 24 VDC	L1	316L SS	FPM
F9.51.13.L	Field Mount Batch Controller	12 to 24 VDC	LO	BRASS	EPDM
F9.51.14.L	Field Mount Batch Controller	12 to 24 VDC	LO	BRASS	FPM
F9.51.15.L	Field Mount Batch Controller	12 to 24 VDC	L1	BRASS	EPDM
F9.51.16.L	Field Mount Batch Controller	12 to 24 VDC	L1	BRASS	FPM

F9.50.1F_L

Ordering Data

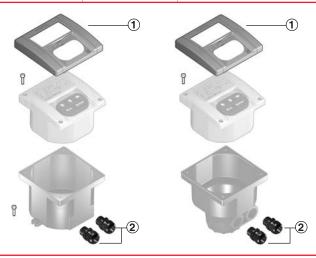
Mounting Kits

Part No.	Name	Description				
F9.KC1	Compact mounting Kit	Plastic adapter with gasket, compact cap, locking ring and 4 fixing screws				
F9.KP1.2	Panel mounting Kit	Mounting bracket with gasket				
F9.KW1	Wall mounting Kit	Plastic adapter with gasket and fixing screws				
F9.KW2	Wall mounting Kit with Power Supply	Plastic adapter with gasket, fixing screws and 110/230VAC to 24VDC power supply included				



Spare Parts

Item	Part No.	Name	Description		
1	F9.SP2	Cover	PC front cover, 3 LED		
2	F9.SP4.1	PG 13.5	PG 13.5 Cable Gland for Compact or Wall mounting Kit		
2	F9.SP4.2	PG 11	PG11 Cable Gland for Compact or Wall mounting Kit		





FlowX3 24VDC Single Phase Switching Power Supply



The switching power supply units provided by FLS are designed and developed for industrial uses where safety, ease of use and reliability are essential.

The low working temperature at full power, combined with the use of first quality components ensure a very high lifetime. This power supply is very compact and meets IP20 standards according to IEC 529. All the functions are located on the front panel and marked with IEC symbols for a very simple use even on site. Providing an output capacity of 1.2 A, these power supplies are suitable for systems including FLS instruments or other devices requiring 24VDC operation.

Main Features

- Universal AC input: 90 264 VAC.
- Regulated 24 VDC output.
- Fused input.
- Output capacity: 1.2 A.

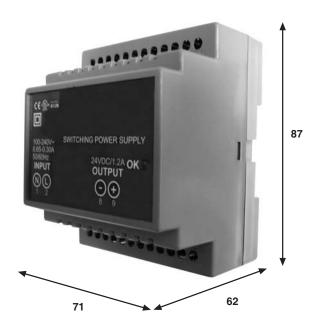
- Compact dimensions.
- Low noise.
- DIN rail mounting.
- Functions and descriptions on the

Applications

Suitable for use with:

- Flow Sensors: F3.00.H, F3.15.H, F3.30.H, F111.H,F3.10.H.
- Ultra Low Flow Sensors: ULF01.H, ULF03.H, ULF3.15, ULF3.30.
- Magmeters: F3.63M, F3.60M, F9.63M, F9.60M.
- Flow switches F3.05.
- Oval gear Flow Sensor F3.80.
- Flow Monitor & Transmitters F9.0X.
- Batch Controllers F9.5X.

Technical Data and Dimensions



Dimensions in mm.

G(G(B)S(S(O)[

Technical Data

Input

■ Input Voltage: 90 – 264 VAC.

■ Frequency: 50 – 60 Hz.

■ Input current @ nominal load:

0.65 A @ 100 VAC, 0.30 mA @ 240 VAC.

■ Inrush current: < 13 A.

■ Power factor: > 0.6 @ full load.

■ Protection Fuse: T 2 A / 250 V.

Output

■ Voltage: 24 VDC ± 1% (not adjustable).

■ Max. Output Current: 2.2 A.

■ Continuous Output Current: 1.2 A.

■ Load regulation: < 0.5%.

■ Ripple @ I max: < 50 mVpp.

■ Hold up time @ full load:

> 60 ms @ 240 VAC, > 20 ms @ 120 VAC.

■ Overload/Short circuit protection: Hiccup circuit, auto reset.

■ Parallel connection: possible with external protection diode.

General

■ Efficiency: ≥ 87% @ 240 VAC,

≥85% @ 120 VAC.

■ Dissipated power: < 6 W.

■ Working temperature:

 $-10^{\circ}\text{C} \div 60^{\circ}\text{C} \text{ (14°F to 140°F)},$

-0.033 A/°C (-0.018 A/°F) over 45°C (113°F).

■ Input/output isolation: 3 kVCA / 60 s.

■ Input/ground isolation: > 1.5 kVCA / 60 s.

■ Output/ground isolation: Class 2 insulation device, no PE required.

■ Protection class: IP20.

■ Connection terminal blocks: 2.5 mm², pluggable screw type header.

■ Housing material: polyamide UL94V-0.

■ Mounting information: vertical on DIN rail.

Standards & Approvals

■ Safety Directives: EN 60950, IEC950, UL 1950, UL508C.

■ EMC Directives: EN 50081-1, EN 50082-2, EN 61000-3-2.

■ Surge immunity: EN61000-4-2, EN 61000-4-4, EN 61000-4-5.





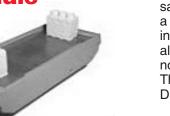


Ordering Data

Switching Power Supply

Part No.	Input	Output	Description
F.PSCS4	90 – 264 VAC	24 VDC regulated	Single Phase Power Supply 24VDC, 1 A

F.IMSP1 Interface Module Flow Sensor - PLC



The F.IMSP1 module is designed to make a safe connection of a F3.10.XX, F111.H.XX or a F111.HT.01 to all PLC/Instruments digital inputs as well as to protect the sensor from almost any kind of electric or electromagnetic noises on the main power supply.

The plastic and lightweight housing can be DIN rail mounted.

Technical Data

■ Supply voltage: 12 to 24 VDC ± 10% regulated.

■ Supply current: I_{Alim} = 11 mA @ I_{Out} = 0.

■ Output signal: square wave.

■ Output type: Push – Pull

(for connection to NPN and PNP inputs).

■ Output current: IOut Max < 20 mA.

■ Mounting information: on DIN rail.

Standard & Approvals

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

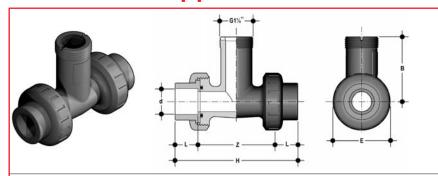
Ordering Data

Modulo di interfaccia sensore - PLC

Part No	Input	Output	Description
F.IMSP1	All F3.10.XX, F111.H.XX, F111.HT.01 Hall Effect flow sensors	Push-Pull	Interface module flow sensor - PLC

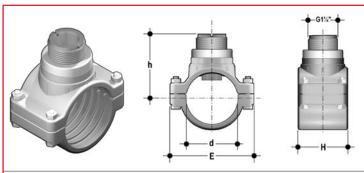


Installation on PVC pipes



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

		• `		· · · · · · · · · · · · · · · · · · ·					
Part No	DN	d	O-Ring	Н	Z	L	В	E	Sensor Length
TFIV20B	15	20	EPDM	113	81	16	73	53	LO
TFIV25B	20	25	EPDM	126	88	19	80	62	LO
TFIV32B	25	32	EPDM	139.5	95.5	22	81	71	LO
TFIV40B	32	40	EPDM	170	118	26	84	84	LO
TFIV50B	40	50	EPDM	199	137	31	82.5	98	LO
TFIV20D	15	20	FPM	113	81	16	73	53	LO
TFIV25D	20	25	FPM	126	88	19	80	62	LO
TFIV32D	25	32	FPM	139.5	95.5	22	81	71	LO
TFIV40D	32	40	FPM	170	118	26	84	84	L0
TFIV50D	40	50	FPM	199	137	31	82.5	98	LO

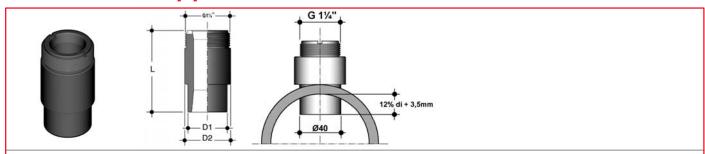


ISO Metric Clamp Saddles

Part No	DN	d	O-Ring	Body	Insert	E	h	Н	Drilling hole	Sensor Length
SCIC063BVC	50	63	EPDM	CPVC	CPVC	116	86.7	105	35	L0
SCIC075BVC	65	75	EPDM	CPVC	CPVC	134	90.8	105	35	L0
SCIC090BVC	80	90	EPDM	CPVC	CPVC	152	95.9	105	40	LO
SCIC110BVC	100	110	EPDM	CPVC	CPVC	176	102.8	105	40	L0
SCIC125BVC	110	125	EPDM	CPVC	CPVC	190	137.9	112	40	L1
SCIC140BVC	125	140	EPDM	CPVC	CPVC	214	143.1	114	40	L1
SCIC160BVC	150	160	EPDM	CPVC	CPVC	238	149.9	120	40	L1
SCIC200BVC	180	200	EPDM	CPVC	CPVC	300	163.7	133	40	L1
SCIC225BVC	200	225	EPDM	CPVC	CPVC	333	172.3	125	40	L1
SCIC063DVC	50	63	FPM	CPVC	CPVC	116	86.7	105	35	L0
SCIC075DVC	65	75	FPM	CPVC	CPVC	134	90.8	105	35	L0
SCIC090DVC	80	90	FPM	CPVC	CPVC	152	95.9	105	40	L0
SCIC110DVC	100	110	FPM	CPVC	CPVC	176	102.8	105	40	LO
SCIC125DVC	110	125	FPM	CPVC	CPVC	190	137.9	112	40	L1
SCIC140DVC	125	140	FPM	CPVC	CPVC	214	143.1	114	40	L1
SCIC160DVC	150	160	FPM	CPVC	CPVC	238	149.9	120	40	L1
SCIC200DVC	180	200	FPM	CPVC	CPVC	300	163.7	133	40	L1
SCIC225DVC	200	225	FPM	CPVC	CPVC	333	172.3	125	40	L1
SMIC250IVC*	225	250	NBR	PP	CPVC	324	203.5	79	40	L0
SMIC280IVC*	250	280	NBR	PP	CPVC	385	212.2	88	40	L1
SMIC315IVC*	280	315	NBR	PP	CPVC	385	220.1	88	40	L1

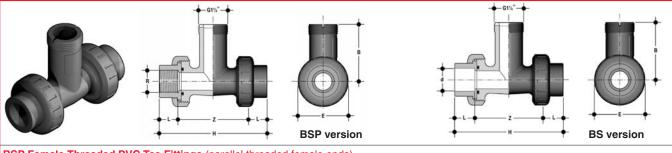
^{*} For IP68 sensors or compact monitors only

Installation on PVC pipes



PVC Glue-on Fittings

Part No	DN	d	L	D1	D2	Drilling hole	Sensor Length
WAIV063	50	63	68.5	40	50	40	L0
WAIV075	65	75	68.5	40	50	40	L0
WAIV090	80	90	68.5	40	50	40	L0
WAIV110	100	110	68.5	40	50	40	L0
WAIV125	110	125	68.5	40	50	40	L0
WAIV140	125	140	68.5	40	50	40	L0
WAIV160	150	160	68.5	40	50	40	L0
WAIV200	180	200	68.5	40	50	40	L0
WAIV225	200	225	68.5	40	50	40	L0
WAIV250	225	250	98.5	40	50	40	L1
WAIV280	250	280	98.5	40	50	40	L1
WAIV315	280	315	98.5	40	50	40	L1



BSP Female Threaded PVC Tee Fittings (parallel threaded female ends)

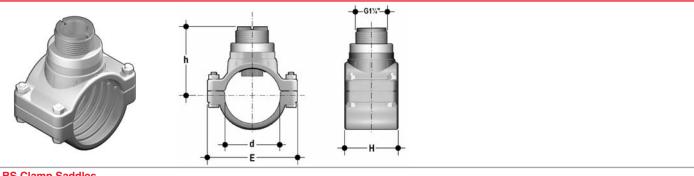
Part No	DN	R	O-Ring	Н	Z	L	В	E	Sensor Length
TFFV20B	15	1/2"	EPDM	118.5	88.5	15	73	53	LO
TFFV25B	20	3/4"	EPDM	127.5	94.9	16.3	80	62	L0
TFFV32B	25	1"	EPDM	146	107.8	19.1	81	71	L0
TFFV40B	32	1 1/4"	EPDM	177	134.2	21.4	84	84	L0
TFFV50B	40	1 1/2"	EPDM	191	148.2	21.4	82.5	98	L0
TFFV20D	15	1/2"	FPM	118.5	88.5	15	73	53	L0
TFFV25D	20	3/4"	FPM	127.5	94.9	16.3	80	62	L0
TFFV32D	25	1"	FPM	146	107.8	19.1	81	71	L0
TFFV40D	32	1 1/4"	FPM	177	134.2	21.4	84	84	L0
TFFV50D	40	1 1/2"	FPM	191	148.2	21.4	82.5	98	L0

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

Part No	DN	d	O-Ring	н	Z	L	В	E	Sensor Length
TFLV20B	15	1/2"	EPDM	113	80	16.5	73	53	LO
TFLV25B	20	3/4"	EPDM	126	88	19	80	62	LO
TFLV32B	25	1"	EPDM	139.5	94.5	22.5	81	71	L0
TFLV40B	32	1 1/4"	EPDM	170	118	26	84	84	L0
TFLV50B	40	1 1/2"	EPDM	199	139	30	82.5	98	L0
TFLV20D	15	1/2"	FPM	113	80	16.5	73	53	L0
TFLV25D	20	3/4"	FPM	126	88	19	80	62	L0
TFLV32D	25	1"	FPM	139.5	94.5	22.5	81	71	L0
TFLV40D	32	1 1/4"	FPM	170	118	26	84	84	L0
TFLV50D	40	1 1/2"	FPM	199	139	30	82.5	98	L0

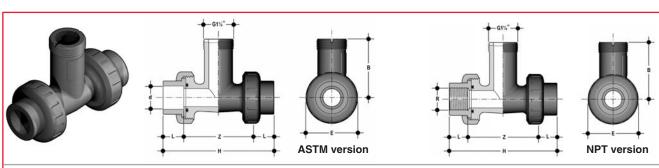
Imstallatiom

Installation on PVC pipes



BS Clamp Saddles

Part No	DN	d	O-Ring	Body	Insert	E	h	Н	Drilling hole	Sensor Length
SCLC2.0BVM	50	2"	EPDM	CPVC	CPVC	116	85.3	105	35	L0
SCLC3.0BVM	80	3"	EPDM	CPVC	CPVC	152	95.0	105	40	L0
SCLC4.0BVM	100	4"	EPDM	CPVC	CPVC	176	103.5	105	40	L0
SCLC6.0BVM	150	6"	EPDM	CPVC	CPVC	238	151.7	120	40	L1
SCLC8.0BVM	200	8"	EPDM	CPVC	CPVC	333	169.8	125	40	L1
SCLC2.0DVM	50	2"	FPM	CPVC	CPVC	116	85.3	105	35	L0
SCLC3.0DVM	80	3"	FPM	CPVC	CPVC	152	95.0	105	40	L0
SCLC4.0DVM	100	4"	FPM	CPVC	CPVC	176	103.5	105	40	L0
SCLC6.0DVM	150	6"	FPM	CPVC	CPVC	238	151.7	120	40	L1
SCLC8.0DVM	200	8"	FPM	CPVC	CPVC	333	169.8	125	40	L1



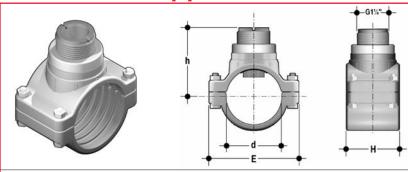
ASTM SCH. 80 PVC Tee Fittings (female ends for solvent welding)

Part No	Size	d	O-Ring	Н	Z	L	В	E	Sensor Length
TFAV20B	0.50"	0.85"	EPDM	4.92"	3.15"	0.89"	2.87"	2.09"	L0
TFAV25B	0.75"	1.06"	EPDM	5.51"	3.50"	1.00"	3.15"	2.44"	L0
TFAV32B	1.00"	1.33"	EPDM	6.04"	3.78"	1.13"	3.19"	2.80"	LO
TFAV40B	1.25"	1.67"	EPDM	7.34"	4.80"	1.26"	3.31"	3.31"	L0
TFAV50B	1.50"	1.91"	EPDM	8.15"	5.39"	1.38"	3.25"	3.86"	LO
TFAV20D	0.50"	0.85"	FPM	4.92"	3.15"	0.89"	2.87"	2.09"	LO
TFAV25D	0.75"	1.06"	FPM	5.51"	3.50"	1.00"	3.15"	2.44"	LO
TFAV32D	1.00"	1.33"	FPM	6.04"	3.78"	1.13"	3.19"	2.80"	LO
TFAV40D	1.25"	1.67"	FPM	7.34"	4.80"	1.26"	3.31"	3.31"	LO
TFAV50D	1.50"	1.91"	FPM	8.15"	5.39"	1.38"	3.25"	3.86"	L0

NPT Female Threaded PVC Tee Fittings (NPT threaded female ends)

Part No	Size	R	O-Ring	Н	Z	L	В	E	Sensor Length
TFNV20B	0.50"	1/2"	EPDM	4.67"	3.26"	0.70"	2.87"	2.09"	L0
TFNV25B	0.75"	3/4"	EPDM	5.02"	3.60"	0.71"	3.15"	2.44"	L0
TFNV32B	1.00"	1"	EPDM	5.75"	3.97"	0.89"	3.19"	2.80"	L0
TFNV40B	1.25"	1 1/4"	EPDM	6.97"	5.12"	0.93"	3.31"	3.31"	L0
TFNV50B	1.50"	1 1/2"	EPDM	7.52"	5.28"	1.12"	3.25"	3.86"	L0
TFNV20D	0.50"	1/2"	FPM	4.67"	3.26"	0.70"	2.87"	2.09"	L0
TFNV25D	0.75"	3/4"	FPM	5.02"	3.60"	0.71"	3.15"	2.44"	L0
TFNV32D	1.00"	1"	FPM	5.75"	3.97"	0.89"	3.19"	2.80"	L0
TFNV40D	1.25"	1 1/4"	FPM	6.97"	5.12"	0.93"	3.31"	3.31"	L0
TFNV50D	1.50"	1 1/2"	FPM	7.52"	5.28"	1.12"	3.25"	3.86"	LO

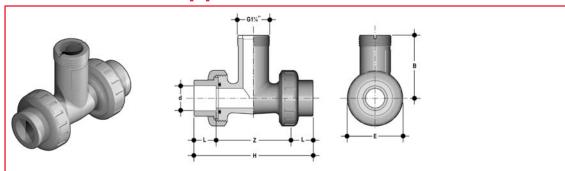
Installation on PVC pipes



ASTM SCH. 80 Clamp Saddles

Part No	Size	d	O-Ring	Body	Insert	E	h	Н	Drilling hole	Sensor Length
SCAC2.0BVM	2.00"	2.375"	EPDM	CPVC	CPVC	4.57"	3.3"	4.13"	1.38"	LO
SCAC2.5BVM	2.50"	2.875"	EPDM	CPVC	CPVC	5.28"	3.4"	4.13"	1.38"	L0
SCAC3.0BVM	3.00"	3.500"	EPDM	CPVC	CPVC	5.98"	3.6"	4.13"	1.57"	L0
SCAC4.0BVM	4.00"	4.500"	EPDM	CPVC	CPVC	6.93"	4.0"	4.13"	1.57"	L0
SCAC5.0BVM	5.00"	5.520"	EPDM	CPVC	CPVC	8.43"	5.6"	4.49"	1.57"	L1
SCAC6.0BVM	6.00"	6.625"	EPDM	CPVC	CPVC	9.37"	5.9"	4.72"	1.57"	L1
SCAC8.0BVM	8.00"	8.625"	EPDM	CPVC	CPVC	13.11"	6.6"	4.92"	1.57"	L1
SCAC2.0DVM	2.00"	2.375"	FPM	CPVC	CPVC	4.57"	3.3"	4.13"	1.38"	L0
SCAC2.5DVM	2.50"	2.875"	FPM	CPVC	CPVC	5.28"	3.4"	4.13"	1.38"	L0
SCAC3.0DVM	3.00"	3.500"	FPM	CPVC	CPVC	5.98"	3.6"	4.13"	1.57"	L0
SCAC4.0DVM	4.00"	4.500"	FPM	CPVC	CPVC	6.93"	4.0"	4.13"	1.57"	L0
SCAC5.0DVM	5.00"	5.520"	FPM	CPVC	CPVC	8.43"	5.6"	4.49"	1.57"	L1
SCAC6.0DVM	6.00"	6.625"	FPM	CPVC	CPVC	9.37"	5.9"	4.72"	1.57"	L1
SCAC8.0DVM	8.00"	8.625"	FPM	CPVC	CPVC	13.11"	6.6"	4.92"	1.57"	L1

Installation on CPVC pipes

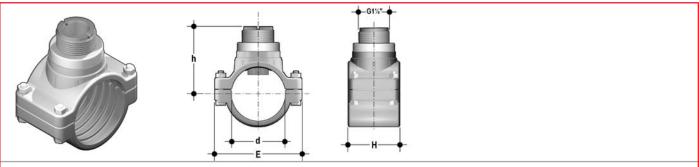


ISO Metric CPVC Tee Fittings (female ends for solvent welding)

Part No	DN	d	O-Ring	Н	Z	L	В	E	Sensor Length
TFIC20B	15	20	EPDM	113	81	16	73	53	L0
TFIC25B	20	25	EPDM	126	88	19	80	62	LO
TFIC32B	25	32	EPDM	139.5	95.5	22	81	71	LO
TFIC40B	32	40	EPDM	170	118	26	84	84	L0
TFIC50B	40	50	EPDM	199	137	31	82.5	98	L0
TFIC20D	15	20	FPM	113	81	16	73	53	LO
TFIC25D	20	25	FPM	126	88	19	80	62	L0
TFIC32D	25	32	FPM	139.5	95.5	22	81	71	LO
TFIC40D	32	40	FPM	170	118	26	84	84	LO
TFIC50D	40	50	FPM	199	137	31	82.5	98	L0

Imstallation

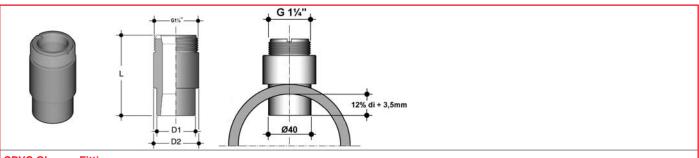
Installation on CPVC pipes



ISO Clamp Saddle

Part No	DN	d	O-Ring	Body	Insert	E	h	Н	Drilling hole	Sensor Length
SCIC063BVC	50	63	EPDM	CPVC	CPVC	116	86.7	105	35	L0
SCIC075BVC	65	75	EPDM	CPVC	CPVC	134	90.8	105	35	L0
SCIC090BVC	80	90	EPDM	CPVC	CPVC	152	95.9	105	40	LO
SCIC110BVC	100	110	EPDM	CPVC	CPVC	176	102.8	105	40	L0
SCIC125BVC	110	125	EPDM	CPVC	CPVC	190	137.9	112	40	L1
SCIC140BVC	125	140	EPDM	CPVC	CPVC	214	143.1	114	40	L1
SCIC160BVC	150	160	EPDM	CPVC	CPVC	238	149.9	120	40	L1
SCIC200BVC	180	200	EPDM	CPVC	CPVC	300	163.7	133	40	L1
SCIC225BVC	200	225	EPDM	CPVC	CPVC	333	172.3	125	40	L1
SCIC063DVC	50	63	FPM	CPVC	CPVC	116	86.7	105	35	L0
SCIC075DVC	65	75	FPM	CPVC	CPVC	134	90.8	105	35	L0
SCIC090DVC	80	90	FPM	CPVC	CPVC	152	95.9	105	40	L0
SCIC110DVC	100	110	FPM	CPVC	CPVC	176	102.8	105	40	L0
SCIC125DVC	110	125	FPM	CPVC	CPVC	190	137.9	112	40	L1
SCIC140DVC	125	140	FPM	CPVC	CPVC	214	143.1	114	40	L1
SCIC160DVC	150	160	FPM	CPVC	CPVC	238	149.9	120	40	L1
SCIC200DVC	180	200	FPM	CPVC	CPVC	300	163.7	133	40	L1
SCIC225DVC	200	225	FPM	CPVC	CPVC	333	172.3	125	40	L1
SMIC250IVC*	225	250	NBR	PP	CPVC	324	203.5	79	40	LO
SMIC280IVC*	250	280	NBR	PP	CPVC	385	212.2	88	40	L1
SMIC315IVC*	280	315	NBR	PP	CPVC	385	220.1	88	40	L1

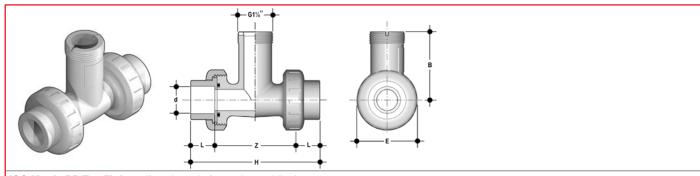
^{*} For IP68 sensors or compact monitors only



CPVC Glue-on Fittings

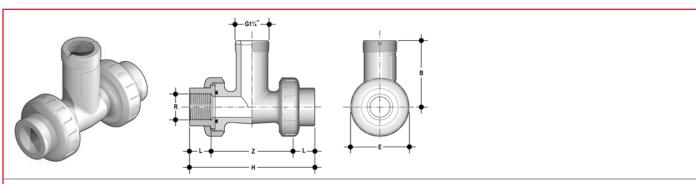
Part No	DN	d	L	D1	D2	Drilling hole	Sensor Length
WAIC063	50	63	68.5	40	50	40	L0
WAIC075	65	75	68.5	40	50	40	L0
WAIC090	80	90	68.5	40	50	40	L0
WAIC110	100	110	68.5	40	50	40	L0
WAIC125	110	125	68.5	40	50	40	L0
WAIC140	125	140	68.5	40	50	40	L0
WAIC160	150	160	68.5	40	50	40	L0
WAIC200	180	200	68.5	40	50	40	L0
WAIC225	200	225	68.5	40	50	40	L0
WAIC250	225	250	98.5	40	50	40	L1
WAIC280	250	280	98.5	40	50	40	L1
WAIC315	280	315	98.5	40	50	40	L1

Installation on PP pipes



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

Part No	DN	d	O-Ring	Н	Z	L	В	E	Sensor Length
TFIM20B	15	20	EPDM	111	73	14.5	73	53	L0
TFIM25B	20	25	EPDM	120.5	80	16	80	62	L0
TFIM32B	25	32	EPDM	133.5	81	18	81	71	L0
TFIM40B	32	40	EPDM	163.5	84	20.5	84	84	L0
TFIM50B	40	50	EPDM	195	82.5	23.5	82.5	98	L0
TFIM20D	15	20	FPM	111	73	14.5	73	53	L0
TFIM25D	20	25	FPM	120.5	80	16	80	62	L0
TFIM32D	25	32	FPM	133.5	81	18	81	71	L0
TFIM40D	32	40	FPM	163.5	84	20.5	84	84	L0
TFIM50D	40	50	FPM	195	82.5	23.5	82.5	98	L0

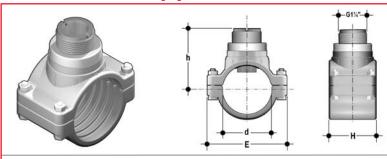


BS Female Threaded PP Tee Fittings (parallel threaded female ends)

Part No	DN	R	O-Ring	Н	Z	L	В	E	Sensor Length
TFFM20B	15	1/2"	EPDM	113	83	15	73	53	L0
TFFM25B	20	3/4"	EPDM	126	93.4	16.3	80	62	L0
TFFM32B	25	1"	EPDM	139.5	101.3	19.1	81	71	L0
TFFM40B	32	1 1/4"	EPDM	170	127.2	21.4	84	84	L0
TFFM50B	40	1 1/2"	EPDM	199	156.2	21.4	82.5	98	L0
TFFM20D	15	1/2"	FPM	113	83	15	73	53	L0
TFFM25D	20	3/4"	FPM	126	93.4	16.3	80	62	L0
TFFM32D	25	1"	FPM	139.5	101.3	19.1	81	71	L0
TFFM40D	32	1 1/4"	FPM	170	127.2	21.4	84	84	L0
TFFM50D	40	1 1/2"	FPM	199	156.2	21.4	82.5	98	L0

Imstallation

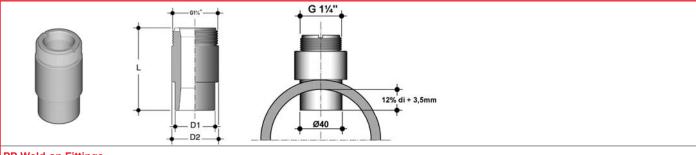
Installation on PP pipes



ISO Clamp Saddles

Part No	DN	d	O-Ring	Body	Insert**	E	h	Н	Drilling hole	Sensor Length
SCIC063BME	50	63	EPDM	CPVC	CPVC	116	84.3	105	35	L0
SCIC075BME	65	75	EPDM	CPVC	CPVC	134	88.0	105	35	L0
SCIC090BME	80	90	EPDM	CPVC	CPVC	152	92.6	105	40	L0
SCIC110BME	100	110	EPDM	CPVC	CPVC	176	98.8	105	40	L0
SCIC125BME	110	125	EPDM	CPVC	CPVC	190	133.3	112	40	L1
SCIC140BME	125	140	EPDM	CPVC	CPVC	214	138.0	114	40	L1
SCIC160BME	150	160	EPDM	CPVC	CPVC	238	144.1	120	40	L1
SCIC200BME	180	200	EPDM	CPVC	CPVC	300	156.4	133	40	L1
SCIC225BME	200	225	EPDM	CPVC	CPVC	333	164.1	125	40	L1
SCIC063DME	50	63	FPM	CPVC	CPVC	116	84.3	105	35	L0
SCIC075DME	65	75	FPM	CPVC	CPVC	134	88.0	105	35	L0
SCIC090DME	80	90	FPM	CPVC	CPVC	152	92.6	105	40	L0
SCIC110DME	100	110	FPM	CPVC	CPVC	176	98.8	105	40	L0
SCIC125DME	110	125	FPM	CPVC	CPVC	190	133.3	112	40	L1
SCIC140DME	125	140	FPM	CPVC	CPVC	214	138.0	114	40	L1
SCIC160DME	150	160	FPM	CPVC	CPVC	238	144.1	120	40	L1
SCIC200DME	180	200	FPM	CPVC	CPVC	300	156.4	133	40	L1
SCIC225DME	200	225	FPM	CPVC	CPVC	333	164.1	125	40	L1
SMIC250IME*	225	250	NBR	PP	CPVC	324	189.9	79	40	L0
SMIC280IME*	250	280	NBR	PP	CPVC	385	200.2	88	40	L1
SMIC315IME*	280	315	NBR	PP	CPVC	385	209.3	88	40	L1

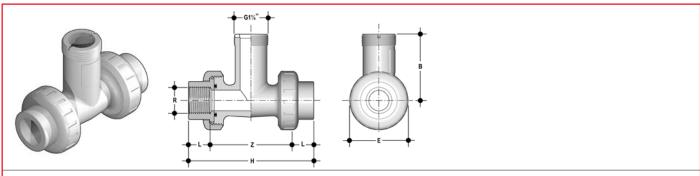
^{*} For IP68 sensors or compact monitors only ** PVDF insert available on request



PP Weld-on Fittings

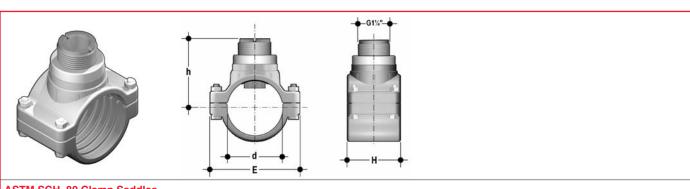
Part No	DN	d	L	D1	D2	Drilling hole	Sensor Length
WAIM063	50	63	68.5	40	50	40	L0
WAIM075	65	75	68.5	40	50	40	L0
WAIM090	80	90	68.5	40	50	40	L0
WAIM110	100	110	68.5	40	50	40	L0
WAIM125	110	125	68.5	40	50	40	L0
WAIM140	125	140	68.5	40	50	40	L0
WAIM160	150	160	68.5	40	50	40	L0
WAIM200	180	200	98.5	40	50	40	L1
WAIM225	200	225	98.5	40	50	40	L1
WAIM250	225	250	98.5	40	50	40	L1
WAIM280	250	280	98.5	40	50	40	L1
WAIM315	280	315	98.5	40	50	40	L1

Installation on PP pipes



NPT Female Threaded PP Tee Fittings (NPT threaded female ends)

Part No	Size	R	O-Ring	Н	Z	L	В	E	Sensor Length
TFNM20B	0.50"	1/2"	EPDM	4.45"	3.05"	0.70"	2.87"	2.09"	L0
TFNM25B	0.75"	3/4"	EPDM	4.96"	3.54"	0.71"	3.15"	2.44"	L0
TFNM32B	1.00"	1"	EPDM	5.49"	3.71"	0.89"	3.19"	2.80"	L0
TFNM40B	1.25"	1 1/4"	EPDM	6.69"	4.84"	0.93"	3.31"	3.31"	L0
TFNM50B	1.50"	1 1/2"	EPDM	7.83"	5.59"	1.12"	3.25"	3.86"	L0
TFNM20D	0.50"	1/2"	FPM	4.45"	3.05"	0.70"	2.87"	2.09"	L0
TFNM25D	0.75"	3/4"	FPM	4.96"	3.54"	0.71"	3.15"	2.44"	L0
TFNM32D	1.00"	1"	FPM	5.49"	3.71"	0.89"	3.19"	2.80"	L0
TFNM40D	1.25"	1 1/4"	FPM	6.69"	4.84"	0.93"	3.31"	3.31"	L0
TFNM50D	1.50"	1 1/2"	FPM	7.83"	5.59"	1.12"	3.25"	3.86"	L0



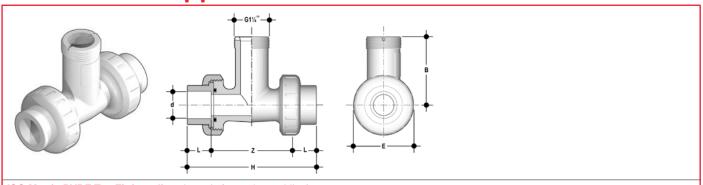
ASTM SCH. 80 Clamp Saddles

Part No	Size	d	O-Ring	Body	Insert**	E	h	Н	Drilling hole	Sensor Length
SCAC2.0BVM	2.00"	2.375"	EPDM	CPVC	CPVC	4.57"	3.29"	4.13"	1.38"	L0
SCAC2.5BVM	2.50"	2.875"	EPDM	CPVC	CPVC	5.28"	3.43"	4.13"	1.38"	L0
SCAC3.0BVM	3.00"	3.500"	EPDM	CPVC	CPVC	5.98"	3.65"	4.13"	1.57"	L0
SCAC4.0BVM	4.00"	4.500"	EPDM	CPVC	CPVC	6.93"	4.00"	4.13"	1.57"	L0
SCAC5.0BVM	5.00"	5.520"	EPDM	CPVC	CPVC	8.43"	5.55"	4.49"	1.57"	L1
SCAC6.0BVM	6.00"	6.625"	EPDM	CPVC	CPVC	9.37"	5.91"	4.72"	1.57"	L1
SCAC8.0BVM	8.00"	8.625"	EPDM	CPVC	CPVC	13.11"	6.61"	4.92"	1.57"	L1
SCAC2.0DVM	2.00"	2.375"	FPM	CPVC	CPVC	4.57"	3.29"	4.13"	1.38"	L0
SCAC2.5DVM	2.50"	2.875"	FPM	CPVC	CPVC	5.28"	3.43"	4.13"	1.38"	L0
SCAC3.0DVM	3.00"	3.500"	FPM	CPVC	CPVC	5.98"	3.65"	4.13"	1.57"	L0
SCAC4.0DVM	4.00"	4.500"	FPM	CPVC	CPVC	6.93"	4.00"	4.13"	1.57"	L0
SCAC5.0DVM	5.00"	5.520"	FPM	CPVC	CPVC	8.43"	5.55"	4.49"	1.57"	L1
SCAC6.0DVM	6.00"	6.625"	FPM	CPVC	CPVC	9.37"	5.91"	4.72"	1.57"	L1
SCAC8.0DVM	8.00"	8.625"	FPM	CPVC	CPVC	13.11"	6.61"	4.92"	1.57"	L1

^{**} PVDF insert available on request

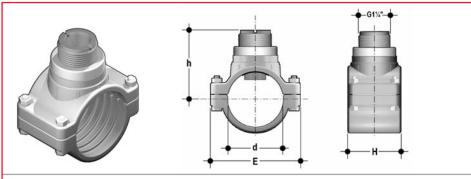
Imstallatiom

Installation on PVDF pipes



ISO Metric PVDF Tee Fittings	(female ends	for socke	t welding)	
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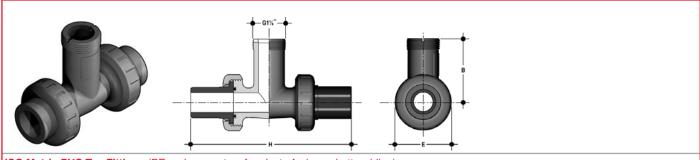
Part No	DN	d	O-Ring	Н	Z	L	В	E	Sensor Length
TFIF20B	15	20	EPDM	111	82	14.5	73	53	L0
TFIF25B	20	25	EPDM	120.5	88.5	16	80	62	L0
TFIF32B	25	32	EPDM	133.5	97	18	81	71	L0
TFIF40B	32	40	EPDM	161.5	120.5	20.5	84	84	L0
TFIF50B	40	50	EPDM	193.5	146.5	23.5	82.5	98	L0
TFIF20D	15	20	FPM	111	82	14.5	73	53	L0
TFIF25D	20	25	FPM	120.5	88.5	16	80	62	L0
TFIF32D	25	32	FPM	133.5	97	18	81	71	L0
TFIF40D	32	40	FPM	161.5	120.5	20.5	84	84	L0
TFIF50D	40	50	FPM	193.5	146.5	23.5	82.5	98	L0



ISO Clamp Saddles

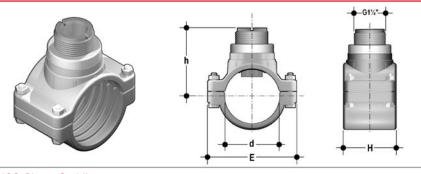
Part No	DN	d	O-Ring	Body	Insert	E	h	Н	Drilling hole	Sensor Length
SCIF063BF	50	63	EPDM	CPVC	PVDF	116	87.2	105	35	LO
SCIF075BF	65	75	EPDM	CPVC	PVDF	134	91.5	105	35	L0
SCIF090BF	80	90	EPDM	CPVC	PVDF	152	96.8	105	40	L0
SCIF110BF	100	110	EPDM	CPVC	PVDF	176	104.0	105	40	L0
SCIF125BF	110	125	EPDM	CPVC	PVDF	190	139.3	112	40	L1
SCIF140BF	125	140	EPDM	CPVC	PVDF	214	144.6	114	40	L1
SCIF160BF	150	160	EPDM	CPVC	PVDF	238	151.8	120	40	L1
SCIF200BF	180	200	EPDM	CPVC	PVDF	300	165.9	133	40	L1
SCIF225BF	200	225	EPDM	CPVC	PVDF	333	174.9	125	40	L1
SCIF063DF	50	63	FPM	CPVC	PVDF	116	87.2	105	35	L0
SCIF075DF	65	75	FPM	CPVC	PVDF	134	91.5	105	35	L0
SCIF090DF	80	90	FPM	CPVC	PVDF	152	96.8	105	40	L0
SCIF110DF	100	110	FPM	CPVC	PVDF	176	104.0	105	40	L0
SCIF125DF	110	125	FPM	CPVC	PVDF	190	139.3	112	40	L1
SCIF140DF	125	140	FPM	CPVC	PVDF	214	144.6	114	40	L1
SCIF160DF	150	160	FPM	CPVC	PVDF	238	151.8	120	40	L1
SCIF200DF	180	200	FPM	CPVC	PVDF	300	165.9	133	40	L1
SCIF225DF	200	225	FPM	CPVC	PVDF	333	174.9	125	40	L1

Installation on PE pipes



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

Part No	DN	d	O-Ring	н	В	E	Sensor Length
TFIV20BE	15	20	EPDM	183	73	53	L0
TFIV25BE	20	25	EPDM	223	80	62	LO
TFIV32BE	25	32	EPDM	237	81	71	LO
TFIV40BE	32	40	EPDM	266	84	84	LO
TFIV50BE	40	50	EPDM	295	82.5	98	L0
TFIV20DE	15	20	FPM	183	73	53	L0
TFIV25DE	20	25	FPM	223	80	62	L0
TFIV32DE	25	32	FPM	237	81	71	L0
TFIV40DE	32	40	FPM	266	84	84	LO
TFIV50DE	40	50	FPM	295	82.5	98	L0



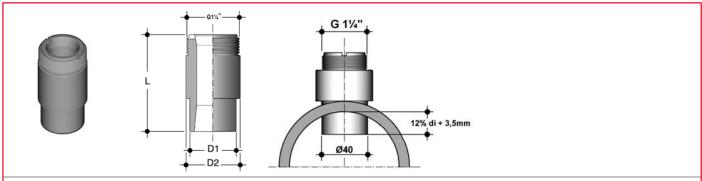
ISO Clamp Saddles

Part No	DN	d	O-Ring	Body	Insert	E	h	Н	Drilling hole	Sensor Length
SCIC063BME	50	63	EPDM	CPVC	CPVC	116	84.3	105	35	L0
SCIC075BME	65	75	EPDM	CPVC	CPVC	134	88.0	105	35	L0
SCIC090BME	80	90	EPDM	CPVC	CPVC	152	92.6	105	40	L0
SCIC110BME	100	110	EPDM	CPVC	CPVC	176	98.8	105	40	L0
SCIC125BME	110	125	EPDM	CPVC	CPVC	190	133.3	112	40	L1
SCIC140BME	125	140	EPDM	CPVC	CPVC	214	138.0	114	40	L1
SCIC160BME	150	160	EPDM	CPVC	CPVC	238	144.1	120	40	L1
SCIC200BME	180	200	EPDM	CPVC	CPVC	300	156.4	133	40	L1
SCIC225BME	200	225	EPDM	CPVC	CPVC	333	164.1	125	40	L1
SCIC063DME	50	63	FPM	CPVC	CPVC	116	84.3	105	35	L0
SCIC075DME	65	75	FPM	CPVC	CPVC	134	88.0	105	35	L0
SCIC090DME	80	90	FPM	CPVC	CPVC	152	92.6	105	40	L0
SCIC110DME	100	110	FPM	CPVC	CPVC	176	98.8	105	40	L0
SCIC125DME	110	125	FPM	CPVC	CPVC	190	133.3	112	40	L1
SCIC140DME	125	140	FPM	CPVC	CPVC	214	138.0	114	40	L1
SCIC160DME	150	160	FPM	CPVC	CPVC	238	144.1	120	40	L1
SCIC200DME	180	200	FPM	CPVC	CPVC	300	156.4	133	40	L1
SCIC225DME	200	225	FPM	CPVC	CPVC	333	164.1	125	40	L1
SMIC250IME*	225	250	NBR	PP	CPVC	324	189.9	79	40	L0
SMIC280IME*	250	280	NBR	PP	CPVC	385	200.2	88	40	L1
SMIC315IME*	280	315	NBR	PP	CPVC	385	209.3	88	40	L1

^{*} For IP68 sensors or compact monitors only

Imstallatiom

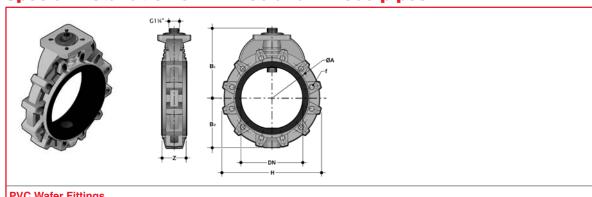
Installation on PE pipes



PE Weld-on Fittings

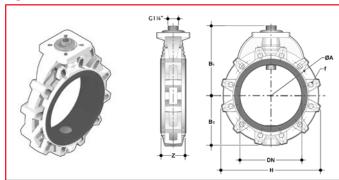
Part No	DN	d	L	D1	D2	Drilling hole	Sensor Length
WAIE063	50	63	68.5	40	50	40	LO
WAIE075	65	75	68.5	40	50	40	LO
WAIE090	80	90	68.5	40	50	40	LO
WAIE110	100	110	68.5	40	50	40	L0
WAIE125	110	125	68.5	40	50	40	L0
WAIE140	125	140	68.5	40	50	40	L0
WAIE160	150	160	68.5	40	50	40	L0
WAIE200	180	200	98.5	40	50	40	L1
WAIE225	200	225	98.5	40	50	40	L1
WAIE250	225	250	98.5	40	50	40	L1
WAIE280	250	280	98.5	40	50	40	L1
WAIE315	280	315	98.5	40	50	40	L1

Special installation on DN 250 and DN 300 pipes



Part No	DN	d	O-ring	Body	Insert	Н	Z	B1	B2	Φ A min.	ФА тах	f.	Sensor Length
WVIC280B	250	280	EPDM	PVC	CPVC	405	114	270	210	335	362	25.4	L0
WVIC315B	300	315	EPDM	PVC	CPVC	475	114	327	245	390	432	29	L0
WVIC280D	250	280	FPM	PVC	CPVC	405	114	270	210	335	362	25.4	LO
WVIC315D	300	315	FPM	PVC	CPVC	475	114	327	245	390	432	29	LO

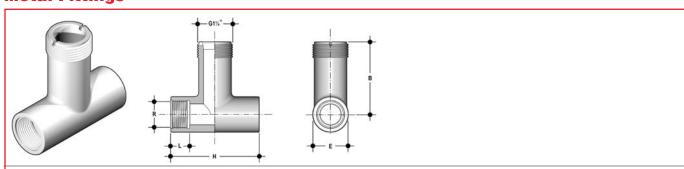
Special installation on DN 250 and DN 300 pipes



PP Wafer Fittings

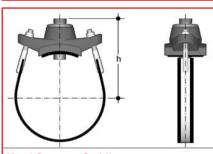
Part No	DN	d	O-ring	Body	Insert	Н	Z	B1	B2	Φ A min.	ФА тах	f.	Sensor Length
WFIC280B	250	280	EPDM	GR-PP	CPVC	405	114	270	210	335	362	25.4	L0
WFIC315B	300	315	EPDM	GR-PP	CPVC	475	114	327	245	390	432	29	L0
WFIC280D	250	280	FPM	GR-PP	CPVC	405	114	270	210	335	362	25.4	L0
WFIC315D	300	315	FPM	GR-PP	CPVC	475	114	327	245	390	432	29	L0

Metal Fittings



316L SS Threaded Tees (BSP Parallel Female Threads)

	· · · · · · · · · · · · · · · · · · ·						
Part No	DN	R	Н	L	В	E	Sensor Length
TFFX25	20	0.75"	95	20	81.2	42	L0
TFFX32	25	1.00"	105	22.5	81.2	42	L0
TFFX40	32	1.25"	120	20.5	83.8	54	L0



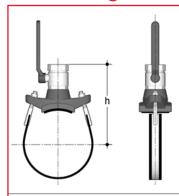
Metal Strap-on Saddles

Part No*	DN	O. D. min	O. D. max	Body	Insert	O-ring	h	Drilling hole	Sensor Length
SZIC080I	80	88	104	Cast iron + SS	UPVC	NBR	153	40	L0
SZIC100I	100	112	126	Cast iron + SS	UPVC	NBR	160	40	L0
SZIC125I	125	140	154	Cast iron + SS	UPVC	NBR	170	40	L0
SZIC150I	150	168	184	Cast iron + SS	UPVC	NBR	180	40	L0
SZIC200I	200	218	244	Cast iron + SS	UPVC	NBR	228	40	L1
SZIC250I	250	272	295	Cast iron + SS	UPVC	NBR	247	40	L1
SZIC300I	300	322	354	Cast iron + SS	UPVC	NBR	266	40	L1
SZIC350I	350	356	414	Cast iron + SS	UPVC	NBR	305	40	L1
SZIC400I	400	406	472	Cast iron + SS	UPVC	NBR	324	40	L1
SZIC450I	450	457	534	Cast iron + SS	U PVC	NBR	343	40	L1

^{*} For IP68 sensors or compact monitors only

Imstallation

Metal Fittings

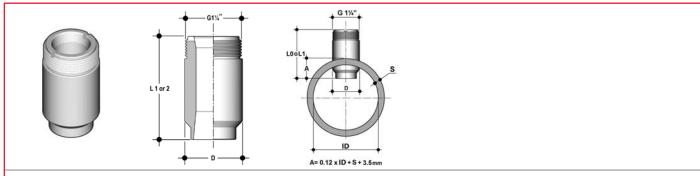


Hot-Tap Metal Strap-on Saddles

Part No	DN	O. D. min	O. D. max	Body	Size (BSP)	O-ring	h
SZIC080IHT	80	88	104	Cast iron + SS	2.00"	NBR	160
SZIC100IHT	100	112	126	Cast iron + SS	2.00"	NBR	170
SZIC125IHT	125	140	154	Cast iron + SS	2.00"	NBR	172
SZIC150IHT	150	168	184	Cast iron + SS	2.00"	NBR	172
SZIC200IHT	200	218	244	Cast iron + SS	2.00"	NBR	177
SZIC250IHT	250	272	295	Cast iron + SS	2.00"	NBR	175
SZIC300IHT	300	322	354	Cast iron + SS	2.00"	NBR	178
SZIC350IHT	350	356	414	Cast iron + SS	2.00"	NBR	178
SZIC400IHT	400	406	472	Cast iron + SS	2.00"	NBR	171
SZIC450IHT	450	457	534	Cast iron + SS	2.00"	NBR	180

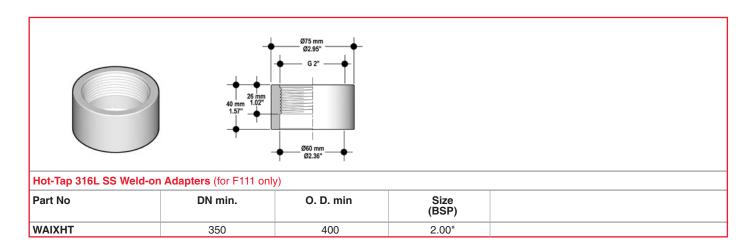
Big sizes available on request

Metal Fittings



316L SS Weld-on Adapters

Part No	DN min	DN max	L	D	Sensor Length
WAIXL0	40	200	68.5	43.8	L0
WAIXL1	225	600	98.5	43.8	L1



FlowX3 Technical Information



Insertion Technology Main Features

- All the insertion technology flow sensors are velocity-based flow measurement devices.
- The installation typically requires only a small hole in the pipe for sensor perpendicular mounting.
- Sensors' dimensions are not pipe size specific: almost independent from pipe cross section.

Insertion Technology Theory

Insertion technology is based on fluid speed meters, properly installed in a cylindrical straight pipe, and used to measure the local flow velocity V_m to calculate the average velocity V_a and the volumetric flow rate Q_v .

These flow sensors are theoretically supported by fluid-dynamic laws applicable to any circular cross section pipe when some physical conditions (fully developed turbulent flow) are respected.

Those laws state the relationship between the measured local flow velocity and the average flow velocity (UNI 10727; ISO 7145).

The relationship between average velocity V_a and measured velocity is usually expressed through the "Profile Factor":

$$F_p = V_a / V_m$$

Using the above mentioned factor:

$$Q_v = V_a * ID^2 / 4 = F_p * V_m * ID^2 / 4$$

ID = pipe inside diameter

Two different positions are suitable for the flow velocity measuring point:

1. Critical position: the velocity sensor is inserted in a peculiar point where the local velocity correspond to the average velocity:

$$V_a = V_m \implies F_p = 1$$
.

2. Central position: the velocity sensor is placed exactly in the centre of the pipe cross section. The local velocity correspond to the maximum velocity:

$$V_m = V_{max} \implies F_p < 1$$
.

Fully Developed Turbulent Flow

All velocity based flow sensors provide an accurate and reliable indication only when they are measuring a fully developed turbulent flow. Fully developed turbulent flow occurs in every Newtonian fluid when the Reynolds Number is greater than 4500.

Fully developed turbulent flow can be more difficult to achieve with high viscosity liquids, low flow rates or large pipes.

Quite often a reduction of the pipe size to increase the local flow velocity is enough to produce a proper Reynolds Number:

$$Re = V \times ID \times Sg / \mu$$

where:

V = flow velocity in m/s ID = pipe inside diameter in meter Sg = Specific Gravity in Kg/m3 μ = Dynamic Viscosity in Pa*s $(1 \text{ Pa*s} = 10^3 \text{ cP})$

or, converting flow velocity in flow rate:

Re = 1.2732 x
$$Q_V x Sg / \mu x ID$$

where:

 $\mathbf{Q}_{\mathbf{V}}$ = flow rate in I/s

Sg = Specific Gravity in Kg/m3

 μ = Dynamic Viscosity in Pa*s

 $(1 \text{ Pa*s} = 10^3 \text{ cP})$

ID = pipe inside diameter in meter

$$Re = 3162.76 \times Q_V \times Sg / \mu \times ID$$

where:

Qv = flow rate in gpm

Sg = Specific Gravity in Kg/m3

 μ = Dynamic Viscosity in centipoises

 $(1 \text{ Pa*s} = 10^3 \text{ cP})$

ID = pipe inside diameter in inches

Imformation F_Ls

Flow Sensor Installation

The placement of a flow meter is critical to get an accurate and reliable reading. For a flow meter proper performance it is necessary to check:

- full pipe at every time
- uniform flow velocity into the pipe.

Full Pipe Condition

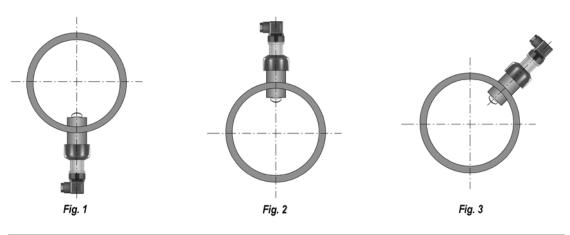
If the pipe is not full the flow meter will give inaccurate reading even if the sensor is always completely submerged. The meter will make the flow rate calculation on the assumption that the pipe is full, leading to overestimation of the flow. A pump intake or an outlet on the bottom of a tank does not necessary ensure the pipe always running full; air can be sucked by pumps or it could remain entrapped when the pipe was empty.

Anyway the flowmeter should be always situated in the lowest point of the pipe and there should be downstream the flowmeter a part of the pipe placed 1 x ID higher than where the flow meter is located.

Mounting Positions

The reading accuracy of paddlewheel flow sensors can be also affected by sediments present into the liquid and by mounting angle due to the effect of gravity increasing the friction between shaft and bearings.

- Horizontal pipe runs: the mounting position to get the best performances is vertical or at a maximum 45° angle to avoid air bubbles. Do not mount the sensor on the bottom of the pipe if sediments are likely.
- Vertical pipe runs: install sensor in any orientation. Upward flow is preferred to ensure full pipe.

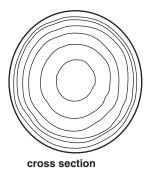


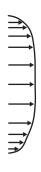
Uniform Flow Velocity

Insertion flow meters measure the velocity of the liquid. It is important the velocity is uniform across the entire cross section of the pipe in the location of the sensor. Flow patterns are distorted both downstream and upstream of any disturbance. In a pipe, liquid at the edge of the pipe moves slower than towards the center because of friction along the walls.

In a straight run of pipe, area with similar velocities can be depicted as concentric rings.







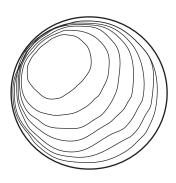
side view

Technical

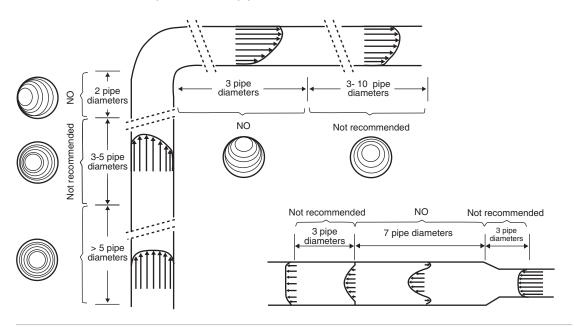
Flow Sensor Installation

The next diagram depicts the distortion in the velocity profile that occurs just after the flow has gone through an elbow or a tee junction.

The liquid on one side of the profile is moving much faster than in the rest of the pipe.

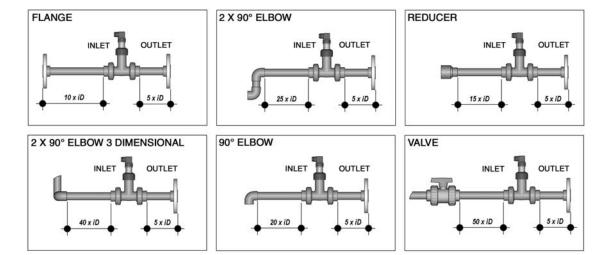


Typical distorted flow velocity patterns related to different disturbances present in the pipeline:



Installation Guidelines

- The six most common installation configurations are shown to help in selecting the best location in the pipeline for paddlewheel flow sensor.
- For more information, please refer to EN ISO 5167-1.
- Always maximize distance between flow sensors and pumps.



Imformation F_Ls

Velocity / Flow rate Conversion Tables

Voloci	Velocity [m/s] =	Flow	Rate [l/	s] x 127	73.2			Elev	Doto	[]/0]	Veloci	ty [m/s] x ID ²		
veloci	iy [m/s] =		ID²	2				FIO	w Rate	[1/8] = -		1273.2		-	
								Velo	city						
	ft/sec	0,16	0,33	0,5	0,7	1,6	2,6	3,3	6,6	9,8	13,1	16,4	20	23	26,2
	m/s	0,05	0,1	0,15	0,2	0,5	0,8	1	2	3	4	5	6	7	8
D [mm]	DN [mm]							Flow F	Rate I/s						
20	15	0,01	0,02	0,03	0,04	0,09	0,14	0,18	0,35	0,53	0,71	0,88	1,06	1,24	1,41
25	20	0,02	0,03	0,05	0,06	0,16	0,25	0,31	0,63	0,94	1,26	1,57	1,89	2,20	2,51
32	25	0,02	0,05	0,07	0,10	0,25	0,39	0,49	0,98	1,47	1,96	2,45	2,95	3,44	3,93
40	32	0,04	0,08	0,12	0,16	0,40	0,64	0,80	1,61	2,41	3,22	4,02	4,83	5,63	6,43
50	40	0,06	0,13	0,19	0,25	0,63	1,01	1,26	2,51	3,77	5,03	6,28	7,54	8,80	10,05
63	50	0,10	0,20	0,29	0,39	0,98	1,57	1,96	3,93	5,89	7,85	9,82	11,78	13,74	15,71
75	65	0,17	0,33	0,50	0,66	1,66	2,65	3,32	6,64	9,96	13,27	16,59	19,91	23,23	26,55
90	80	0,25	0,50	0,75	1,01	2,51	4,02	5,03	10,05	15,08	20,11	25,13	30,16	35,19	40,21
110	100	0,39	0,79	1,18	1,57	3,93	6,28	7,85	15,71	23,56	31,42	39,27	47,13	54,98	62,83
125	110	0,48	0,95	1,43	1,90	4,75	7,60	9,50	19,01	28,51	38,01	47,52	57,02	66,53	76,03
140	125	0,61	1,23	1,84	2,45	6,14	9,82	12,27	25,54	36,82	49,09	61,36	73,63	85,91	98,18
160	150	0,88	1,77	2,65	3,53	8,84	14,14	17,67	35,34	53,02	70,69	88,36	106,03	123,70	141,38
200	180	1,27	2,54	3,82	5,09	12,72	20,36	25,45	50,90	76,34	101,79	127,24	152,69	178,13	203,58
225	200	1,57	3,14	4,71	6,28	15,71	25,13	31,42	62,83	94,25	125,67	157,08	188,50	219,92	251,34
250	225	1,99	3,98	5,96	7,95	19,88	31,81	39,76	79,52	119,29	159,05	198,81	238,57	278,33	318,10
280	250	2,45	4,91	7,36	9,82	25,54	39,27	49,09	98,18	147,27	196,36	245,44	294,53	343,62	392,71
315	280	3,08	6,16	9,24	12,32	30,79	49,26	61,58	123,15	184,73	246,31	307,89	369,46	431,04	492,62

Valasi	# . [/o.]	Flow	Rate [/m] x 2	1.16			⊑ le:	Data	[]/1	Veloci	ty [m/s] x ID ²		
veloci	i ty [m/s] =		ID	2				FIO	w Hate	[l/m] =		21.16		-	
								Velo	city						
	ft/sec	0,16	0,33	0,5	0,7	1,6	2,6	3,3	6,6	9,8	13,1	16,4	20	23	26,2
	m/s	0,05	0,1	0,15	0,2	0,5	0,8	1	2	3	4	5	6	7	8
D [mm]	DN [mm]							Flow R	ate I/m						
20	15	0,5	1,1	1,6	2,1	5,3	8,5	10,6	21,3	31,9	42,5	53,2	63,8	74,4	85,1
25	20	0,9	1,9	2,8	3,8	9,5	15,1	18,9	37,8	56,7	75,6	94,5	113,4	132,3	151,2
32	25	1,5	3,0	4,4	5,9	14,8	23,6	29,5	59,1	88,6	118,1	147,7	177,2	206,8	236,3
40	32	2,4	4,8	7,3	9,7	24,2	38,7	48,4	96,8	145,2	193,6	242,0	290,4	338,8	387,1
50	40	3,8	7,6	11,3	15,1	37,8	60,5	75,6	151,2	226,8	302,5	378,1	453,7	529,3	604,9
63	50	5,9	11,8	17,7	23,6	59,1	94,5	118,1	236,3	354,4	472,6	590,7	708,9	827,0	945,2
75	65	10,0	20,0	30,0	39,9	99,8	159,7	199,7	399,3	599,0	798,7	998,3	1198,0	1397,7	1597,4
90	80	15,1	30,2	45,4	60,5	151,2	242,0	302,5	604,9	907,4	1209,8	1512,3	1.814,7	2117,2	2419,7
110	100	23,6	47,3	70,9	94,5	236,3	378,1	472,6	945,2	1417,8	1890,4	2362,9	2835,5	3308,1	3780,7
125	110	28,6	57,2	85,8	114,4	285,9	457,5	571,8	1143,7	1715,5	2287,3	2859,2	3431,0	4002,8	4574,7
140	125	36,9	73,8	110,8	147,7	369,2	590,7	738,4	1476,8	2215,3	2953,7	3692,1	4430,5	5169,0	5907,4
160	150	53,2	106,3	159,5	212,7	531,7	850,7	1063,3	2126,7	3190,0	4253,3	5316,6	6380,0	7443,3	8506,6
200	180	76,6	153,1	229,7	306,2	765,6	1225,0	1531,2	3062,4	4593,6	6124,8	7656,0	9187,1	10718,3	12249,
225	200	94,5	189,0	283,6	378,1	945,2	1512,3	1890,4	3780,7	5671,1	7561,4	9451,8	11342,2	13232,5	15122,
250	225	119,6	239,2	358,9	478,5	1196,2	1914,0	2392,5	4785,0	7177,5	9569,9	11962,4	14354,9	16747,4	19139,
280	250	147,7	295,4	443,1	590,7	1476,8	2362,9	2953,7	5907,4	8861,1	11814,7	14768,4	17722,1	20675,8	23629,
315	280	185,3	370,5	555,8	741,0	1852,6	2964,1	3705,1	7410,2	11115,3	14820,4	18525,5	22230,6	25935,7	29640,8

Techmical

Velocity / Flow rate Conversion Tables

Valocity	Velocity [m/s] =	Flow	Rate [l/	h] x 0.3	5344			Elov	w Rate	[]/b]	Veloci	ity [m/s] x ID ²		
velocity	<i>y</i> [111/5] –		ID	2				1100	v nate	[1/11] — -	(0.35344	ļ		
								Velo	city						
	ft/sec	0,16	0,33	0,5	0,7	1,6	2,6	3,3	6,6	9,8	13,1	16,4	20	23	26,2
	m/s	0,05	0,1	0,15	0,2	0,5	0,8	1	2	3	4	5	6	7	8
D [mm]	DN [mm]							Flow R	ate I/h						
20	15	32	64	95	127	318	509	637	1273	1910	2546	3183	3820	4456	5093
25	20	57	113	170	226	566	905	1132	2263	3395	4527	5659	6790	7922	9054
32	25	88	177	265	354	884	1415	1768	3537	5305	7073	8842	10610	12378	14147
40	32	145	290	435	579	1449	2318	2897	5794	8692	11589	14486	17383	20281	23178
50	40	226	453	679	905	2263	3622	4527	9054	13581	18108	22635	27162	31689	36215
63	50	354	707	1061	1415	3537	5659	7073	14147	21220	28293	35367	42440	49513	56587
75	65	598	1195	1793	2391	5977	9563	11954	23908	35862	47816	59770	71724	83678	95632
90	80	905	1811	2716	3622	9054	14486	18108	36215	54323	72431	90539	108646	126754	144862
110	100	1415	2829	4244	5659	14147	22635	28293	56587	84880	113173	141467	169760	198053	226347
125	110	1712	3423	5135	6847	17117	27388	34235	68470	102705	136940	171175	205410	239645	273880
140	125	2210	4421	6631	8842	22104	35367	44208	88417	132625	176833	221042	265250	309458	353667
160	150	3183	6366	9549	12732	31830	50928	63660	127320	190980	254640	318300	381960	445620	509280
200	180	4584	9167	13751	18334	45835	73336	91670	183341	275011	366682	458352	550023	641693	733364
225	200	2659	11317	16976	22635	56587	90539	113173	226347	339520	452694	565867	679040	792214	905387
250	225	7162	14324	21485	28647	71618	114588	143235	286470	429705	572940	716175	859410	1002645	1145880
280	250	8842	17683	26525	35367	88417	141467	176833	353667	530500	707334	884167	1061000	1237834	1414667
315	280	11091	22182	33273	44364	110910	177456	221820	443640	665459	887279	1109099	1330919	1552739	1774559

Valaa:	t r. [/o]	Flow	Rate [l/	h] x 0.3	5344			Flee	Data	[]/b]	Veloci	ty [m/s] x ID ²		
veloci	ty [m/s] =		ID	2				FIO	w Rate	[I/N] = -	().35344	ŀ	-	
								VeVe	locity						
	ft/sec	0,16	0,33	0,5	0,7	1,6	2,6	3,3	6,6	9,8	13,1	16,4	20	23	26,2
	m/s	0,05	0,1	0,15	0,2	0,5	0,8	1	2	3	4	5	6	7	8
D [mm]	DN [mm]							Flow F	ate I/h						
20	15	0,03	0,06	0,10	0,13	0,32	0,51	0,64	1,27	1,91	2,55	3,18	3,82	4,46	5,09
25	20	0,06	0,11	0,17	0,23	0,57	0,91	1,13	2,26	3,40	4,53	5,66	6,79	7,92	9,05
32	25	0,09	0,18	0,27	0,35	0,88	1,41	1,77	3,54	5,31	7,07	8,84	10,61	12,38	14,15
40	32	0,14	0,29	0,43	0,58	1,45	2,32	2,90	5,79	8,69	11,59	14,49	17,38	20,28	23,18
50	40	0,23	0,45	0,68	0,91	2,26	3,62	4,53	9,05	13,58	18,11	22,63	27,16	31,69	36,22
63	50	0,35	0,71	1,06	1,41	3,54	5,66	7,07	14,15	21,22	28,29	35,57	42,44	49,51	56,59
75	65	0,60	1,20	1,79	2,39	5,98	9,56	11,95	23,91	35,86	47,82	59,77	71,72	83,68	95,63
90	80	0,91	1,81	2,72	3,62	9,05	14,49	18,11	36,22	54,32	72,43	90,54	108,65	126,75	144,86
110	100	1,41	2,83	4,24	5,66	14,15	22,63	28,29	56,59	84,88	113,17	141,47	169,76	198,05	226,35
125	110	1,71	3,42	5,14	6,85	17,12	27,39	34,23	68,47	102,70	136,94	171,17	205,41	239,64	273,88
140	125	2,21	4,42	6,63	8,84	22,10	35,37	44,21	88,42	132,63	176,83	221,04	265,25	309,46	353,67
160	150	3,18	6,37	9,55	12,73	31,83	50,93	63,66	127,32	190,98	254,64	318,30	381,96	445,62	509,28
200	180	4,58	9,17	13,75	18,33	45,84	73,34	91,67	183,34	275,01	366,68	458,35	550,02	641,69	733,36
225	200	5,66	11,32	16,98	22,63	56,59	90,54	113,17	226,35	339,52	452,69	565,87	679,04	792,21	905,39
250	225	7,16	14,32	21,49	28,65	71,62	114,59	143,24	286,47	429,71	572,94	716,18	859,41	1002,65	1145,88
280	250	8,84	17,68	26,53	35,37	88,42	141,47	176,83	353,67	530,50	707,33	884,17	1061,00	1237,83	1414,67
315	280	11,09	22,18	33,27	44,36	110,91	177,46	221,82	443,64	665,46	887,28	1109,10	1330,92	1552,74	1774,56

Imformation F_Ls

Velocity / Flow rate Conversion Tables

		Flow	/ Rate [gpm] x	0.4085	i						city [f/s	s] x ID ²		
Veloci	ty [f/s] =			ID ²		_		FIO	w Rate	[gpm] =	=	0.4085	j		
								Velo	city						
	ft/sec	0,16	0,33	0,5	0,7	1,6	2,6	3,3	6,6	9,8	13,1	16,4	20	23	26,2
	m/s	0,05	0,1	0,15	0,2	0,5	0,8	1	2	3	4	5	6	7	8
D [inch]	DN [mm]						Fl	ow Rate	e US-gp	m					
1/2	15	0,14	0,28	0,42	0,56	1,40	2,25	2,81	5,62	8,43	11,24	14,05	16,85	19,66	22,47
3/4	20	0,25	0,50	0,75	1,00	2,50	4,00	4,99	9,99	14,98	19,98	24,97	29,96	34,96	39,95
1	25	0,39	0,78	1,17	1,56	3,90	6,24	7,80	15,61	23,41	31,21	39,01	46,82	54,62	62,42
1 1/4	32	0,64	1,28	1,92	2,56	6,39	10,23	12,78	25,57	38,35	51,14	63,92	76,70	89,49	102,27
1 1/2	40	1,00	2,00	3,00	4,00	9,99	15,98	19,98	39,95	59,93	79,90	99,88	119,85	139,83	159,80
2	50	1,56	3,12	4,68	6,24	15,61	24,97	31,21	64,42	93,63	124,85	156,06	187,27	218,48	249,69
2 1/2	65	2,64	5,27	7,91	10,55	26,37	42,20	52,75	105,49	158,24	210,99	263,74	316,48	369,23	421,98
3	80	4,00	7,99	11,99	15,98	39,95	63,92	79,90	159,80	239,70	319,60	399,50	479,41	559,31	639,21
4	100	6,24	12,48	18,73	24,97	62,42	99,88	124,85	249,69	374,54	499,38	624,23	749,07	873,92	998,76
5	125	9,75	19,51	29,26	39,01	97,54	156,06	195,07	390,14	585,21	780,28	975,35	1170,42	1365,49	1560,56
6	150	14,05	28,09	42,14	56,18	140,45	224,72	280,90	561,80	842,70	1123,61	1404,51	1685,41	1966,31	2247,21
8	200	24,97	49,94	74,91	99,88	249,69	399,50	499,38	998,76	1498,14	1997,52	2496,90	2996,28	3495,66	3995,04
10	225	31,60	63,20	94,80	126,41	316,01	505,62	632,03	1264,06	1896,08	2528,11	3160,14	3792,17	4424,20	5056,23
12	300	48,94	97,88	146,82	195,76	489,39	783,03	978,79	1957,57	2936,36	3915,14	4893,93	5872,71	6851,50	7830,28

Main Conversion Factors

	To convert	Into	Multiply by
VOLUME	US Gallon	fl. oz. (U.S.)	128
		cubic inch	231
		cubic ft.	0.134
		liter	3.785
		cubic meter	0.00379
		Imp. gallon	0.833
		pound	8.33
	Imperial Gallon	U.S. gallon	1.2
	Cubic Foot	U.S. gallon	7.48
		Cubic meter	0.0283
	Liter	U.S. gallon	0.2642
	Cubic meter	cubic ft.	35.314
		U.S. gallon	264.2
LENGTH	Inch	centimeter	2.5400
	Foot	meter	0.3048
	Yard	meter	0.9144
	Mile	kilometer	1.6093
WEIGHT	Ounce	gram	28.3495
	Pound	gram	453.59
FLOW RATE	US gallon per minute (gpm)	liter per second	0.063
	US gallon per minute (gpm)	cubic meter per hr.	0.227
	UK gallon per minute (gpm)	cubic meter per hr.	0.273
PRESSURE	Atmosphere	bar	1.0133
	Psi [lb/inch ²]	bar	0.0689
	Pascal [Newton/m ²]	bar	10-5
	MegaPascal	bar	10
TEMPERATURE	Kelvin [°K]	celsius [°C]	°C = °K – 273
	Fahrenheit [°F]	celsius [°C]	$^{\circ}$ C = ($^{\circ}$ F - 32) x 5/9

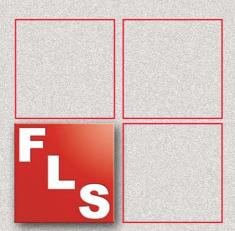
Assistance Application Form

Please provide as more details as possible for a prompt assistance.

Acti	vity:						
	Distributor						
	First Name:						
	Last Name:						
	Company Name:						
	Customer Name:						
	Customer Address:						
	City:						
	Country:					Zip Code: _	
	Telephone:		Fax:			E-mail:	
	End user						
	First Name:						
	Last Name:						
	Company Name:						
	Address:						
	City:						
	Country:					Zip Code: _	
	Telephone:		Fax:		!	E-mail:	
	Activity Field:						
	☐ Agriculture						
	■ Water distribution						
	☐ Water treatment & re	generation					
	□ Process industry						
	☐ Other (specify):						
Арр	lication details:						
Pipe Material:		Pipe Size	Pipe Size:			Pipe Schedule:	
Worl	king Pressure:		MIN:		MAX:		TYP:
Worl	king Temperature: $_$ $_$		MIN:		MAX:		TYP:
Fluid type:		Clean	☐ Dirty			ation:	
Fluid viscosity (centipoises):					Fluid specific gravity (Kg/m ³):		
Flow	Rate:	MIN:	MAX:		TYP:		
Insti	rumentation description	n:					
Sensor type: Body material:			terial: $_$ $_$ $_$ $_$	O-ring material:			
Sensor location Distance upst			upstream of: _	eam of: Distance downstream of:			
Insta	ıllation Fitting: $_$ $_$ $_$ $_$						
Indic	ator type:	☐ Local (on the					
		☐ Remote	Distance	(from senso	r to indicator	·):	
		□ None					
Power Supply:		☐ 110VAC	☐ 230VAC	☐ 12V	DC 🗆	24VDC	□ Battery

Please, fax the fulfilled form to FLS Technical Assistance at fax: +39 010 9621209. We kindly suggest to enclose disfunctioning detailed description as well as skid drawings. The form is also available on our web site www.flsnet.it





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