



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.

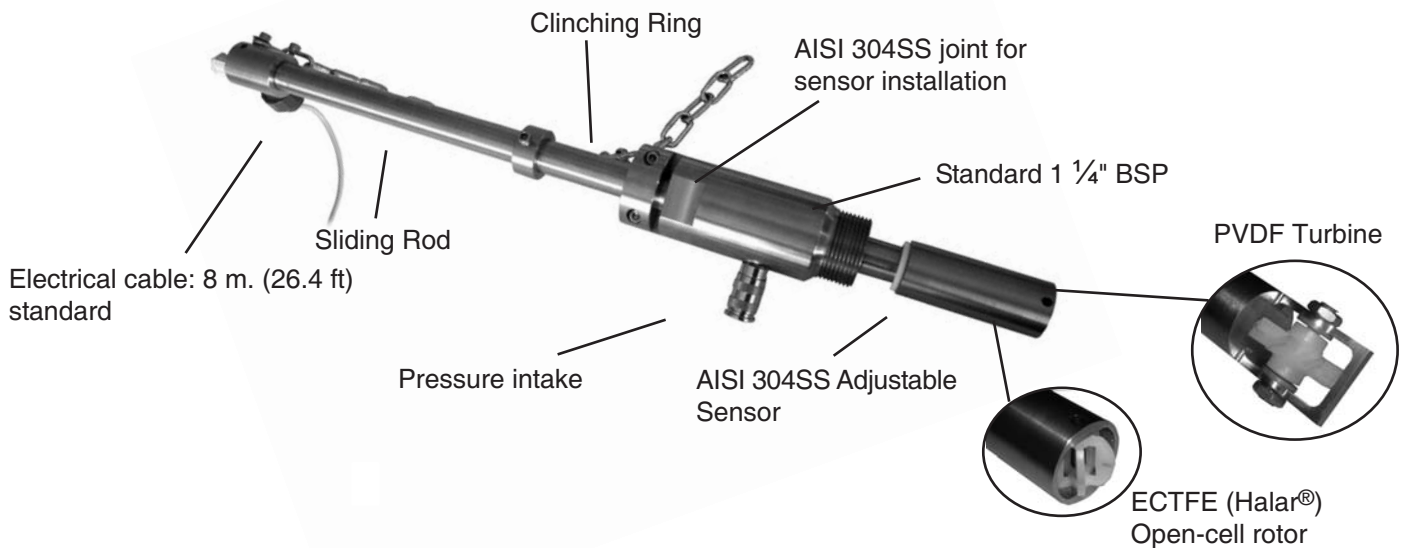
Main Features

- Adjustable sensor position.
- Stainless steel or brass construction.
- Paddlewheel or Turbine technology.
- Hot-Tap installation.
- Pressure intake.
- Standard 1 ¼" 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 encapsulated into the plastic. As the magnet passes close to 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.

Engineering Data

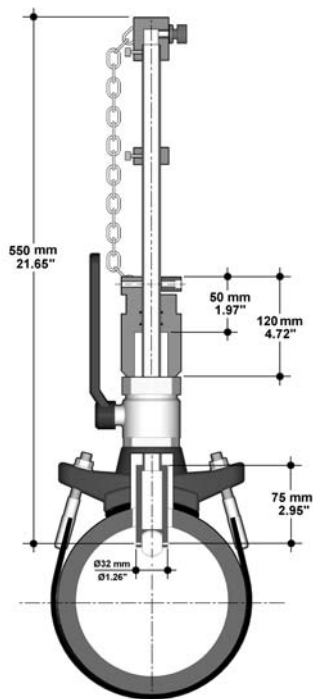
- The flow sensor is available with Hall effect transducer (standard or bi-directional electronic), Coil effect transducer (battery operated).
- The Hall sensor operates with a power supply from 5 to 24 VDC @ < 30 mA.
- The Coil sensor operates with a power supply from 3 to 5 VDC or 3.6 Volt Lithium 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).
- 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 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 1/4" 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

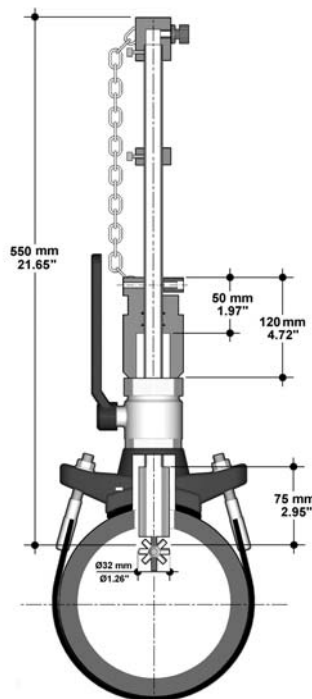
FLOWX3 Sensor	FLOW X3 Instruments								
	F9.00	F9.01	F9.02	F9.03	F9.00.BD	F9.20	F9.20.BD	F9.50	F9.51
F111.H	■	■	■	■				■	■
F111.C						■			
F111.HT	■	■	■	■				■	■
F111.HT.BD					■		■		

Dimensions

F111 Paddlewheel Sensor



F111 Turbine Sensor



Standard Pipe Range:

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

Installation Fittings

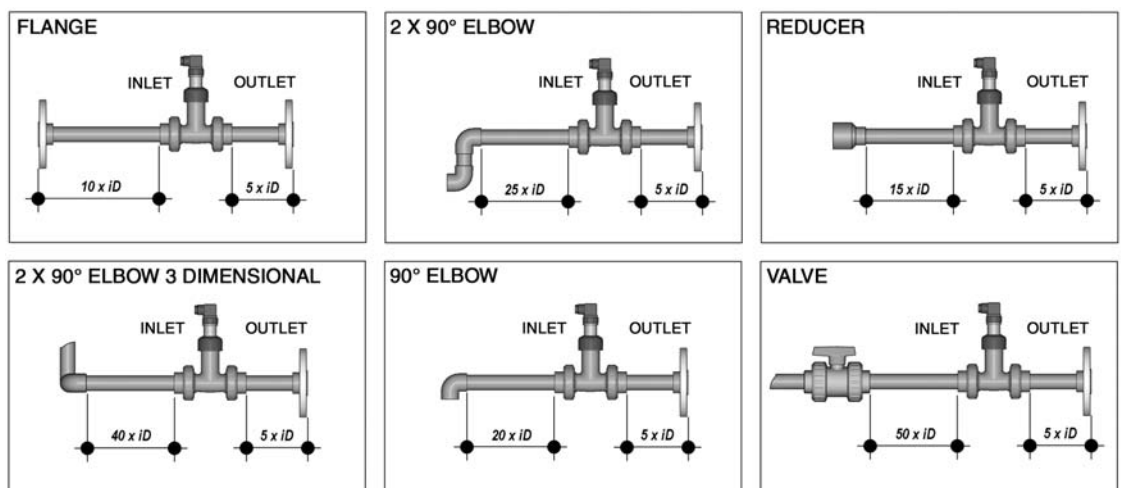
The sensor provides a 1 1/4" BSP male thread for connection to the pipe. All kinds of Hot-Tap clamp saddles or clamp saddles with isolation valve, with 1 1/4" BSP female connection, are suitable for the installation.

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.

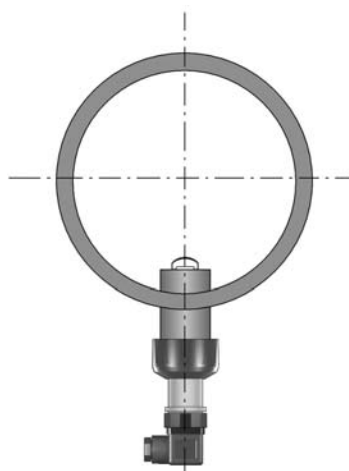


Fig. 1

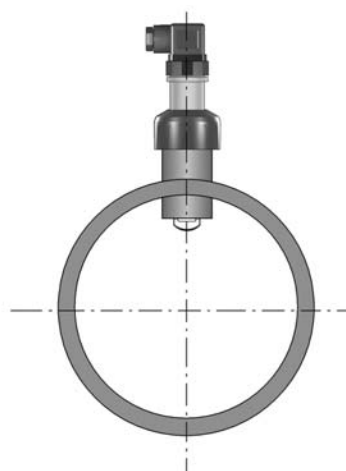


Fig. 2

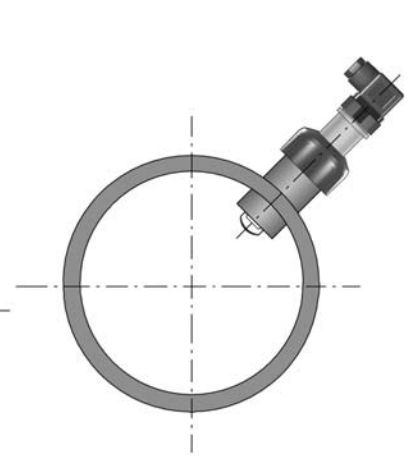
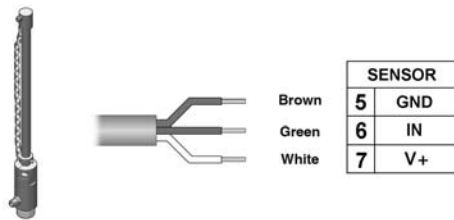


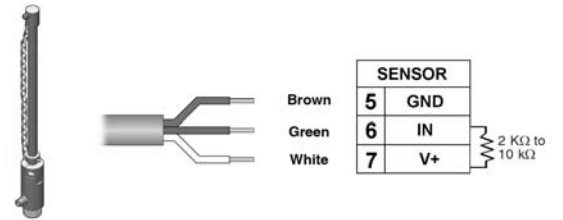
Fig. 3

Wiring

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

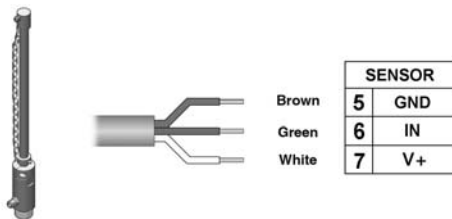


F111.H and F111.HT Sensor Connection to Other Brand Instruments

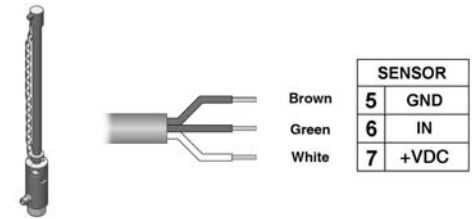


2 K Ω to 10 K Ω Pull-up resistor may be required.

F111.C Sensor Connection to FLOWX3 Instruments

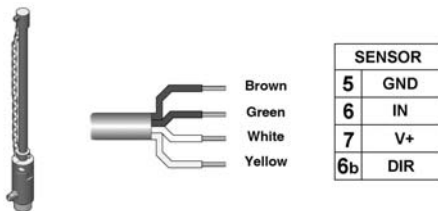


F111.C Sensor Connection to Other Brand Instruments



Pull-up resistor is never required.

F111.HT.BD Sensor Connection to FLOWX3 Instruments



Technical Data

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 1/4" 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 $\pm 10\%$, 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 $\pm 10\%$, regulated.
- Supply current: < 30mA @ 24 VDC.
- Output Signal:
 - square wave
 - output frequency: 10 Hz per m/s nominal (3.05 Hz per ft/s nominal)
 - 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 $\pm 10\%$, regulated or 3.6 Volt Lithium battery.
- Supply current: < 10 μ A.
- 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 $\pm 10\%$, 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.

Ordering Data

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.