

FS SERIES

P/N [IFSXS1]

P/N [IFSS1]

P/N [FLU-M+-OEM]

P/N [FLU-L+-OEM]

Bidirectional flow sensor for industrial integration

Our FS series is a series of flow rate sensors. When combined with Fluigent pressure controllers, it permits pressure-based flow rate control. It allows for accurate and reproducible measurements of dynamic liquid flow rates from 0 – 1.5 $\mu\text{L}/\text{min}$ and up to 40 mL/min bi-directionally.



KEY FEATURES

High accuracy for various flow rate ranges

Highly precise flow measurement with an accuracy of less than 5% of the measured value

Plug and play

Thanks to internally developed electronics and algorithms, the sensors are directly recognized by Fluigent systems and SDK/software for starting experiments right away.

Compact & fast integration

The sensors were developed to be cost-effective and easily integrated into any system.

Air bubble detection*

In addition to liquid monitoring, it is possible to detect bubbles during an experiment

*Bubble detection is only available for the FS + series

KEY APPLICATIONS

Next-generation sequencing (NGS) applications using for instance microfluidic Digital PCR to quantify ctDNA in liquid biopsies for oncology

Microscopy for cell biology research, DNA-PAINT imaging, genomics research, live cell imaging

Drug discovery using microphysiological systems such as 3D-(co)-cultures, organoids, organ-on-chip models

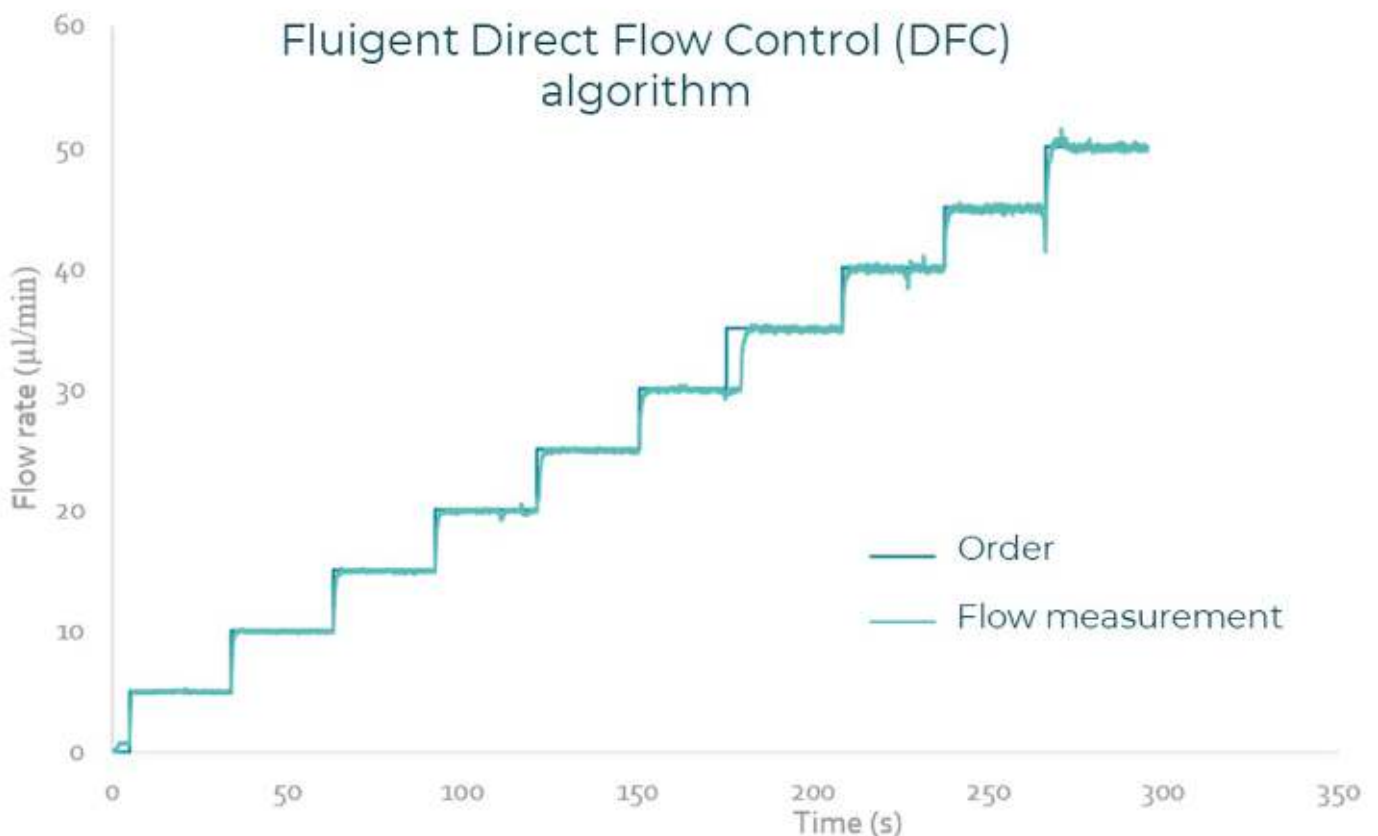
Molecular analysis using including microfluidic modulation spectroscopy or mass photometry

EXPERTISE

Highly stable, and responsive real-time flow rate control

By connecting a flow rate sensor to Fluigent pressure controllers, it is possible to monitor or control the flow rate in real time. The algorithm includes a continuous optimization of the parameters, allowing it to adapt to the interactions between fluidic channels in complex situations.

- No overshoot/undershoot, allowing for an immediate response
- Adapts to any reservoir size
- Useful over a wide pressure or vacuum range



FS+ SERIES

Mid to high flow rate ranges (7 μ L/min – 40 mL/min)

For applications that require flow rates ranging from 7 μ L/min to 40 mL/min, we recommend our latest flow sensor series. It consists of a sensor and electronics integrated into a compact casing. Standard M3 sized screws can be used for fixing the device. Using these flow sensors, one can also monitor the liquid temperature and detect air bubbles that pass through the sensor.



FS series M+

H₂O full-scale flow rate: 0 - \pm 2 mL/min

Accuracy : \pm 5 % of measured value if flow rate > 10 μ L/min, 0.5 μ L/min if flow rate < 10 μ L/min

*Additional specifications available on the specification table

FS series L+

H₂O full-scale flow rate: 0 - \pm 40 mL/min

Accuracy : \pm 5 % of measured value if flow rate > 1 mL/min, 50 μ L/min if flow rate < 1 mL/min

*Additional specifications available on the specification table



"WARNING: Avoid voltage difference between sensor and medium as there is no electrical isolation from the flow channel."

FS SERIES

Low volumes applications (<10µL/min)

For applications that require flow rates ranging lower than 10 µL/min, we recommend our original flow sensor series.



FS series XS

H₂O full-scale flow rate: 0 - ± 1.5 µL/min

Accuracy : ±10 % of measured value if flow rate > 75 nL/min, 7.5 nL/min if flow rate < 75 nL/min

*Additional specifications available on the specification table

FS series S

H₂O full-scale flow rate: 0 - ± 7 µL/min

Accuracy : ±5 % of measured value if flow rate > 0.42 µL/min, 21 nL/min if flow rate < 0.42 µL/min

*Additional specifications available on the specification table

Note: FS Series M (H₂O full-scale flow rate: 0 - ± 80 µL/min), L (H₂O full-scale flow rate: 0 - ± 1000 µL/min) and XL (H₂O full-scale flow rate: 0 - ± 5000 µL/min) are also available for specific usage. For more information, please contact us.

SPECIFICATIONS

Sensor performance

Sensor model	FS series		FS+ series	
	XS	S	M+	L+
Calibrated media	Water	Water Isopropyl Alcohol (IPA)	Water Isopropyl Alcohol (IPA)	Water Isopropyl Alcohol (IPA)
Range	Water: 0±1.5 µL/min	Water: 0±7 µL/min IPA: 0±70 µL/min	Water and IPA: 0 to +/-2ml/min	Water and IPA: 0 to +/- 40ml/min
Accuracy at 23°C (m.v = measured value)	Water: 10% m.v. above 75 nL/min 7.5 nL/min below 75 nL/min	Water: 5% m.v.above 0.42 µL/min 21 nL/min below 0.42 µL/min IPA: 20% m.v. above 4.2 µL/min 210 nL/min below 4.2 µL/min	Water: 5% mv above 10µL/min 0.5µl/min below 10 µL/min IPA: 10% mv above 50 µL/min 5 µL/min below 50 µL/min	Water: 5% mv above 10µL/min 0.5µl/min below 10 µL/min IPA: 10% mv above 50 µL/min 5 µL/min below 50 µL/min
Lowest detectable flow increment	3.7 nL/min	10 nL/min	/	/

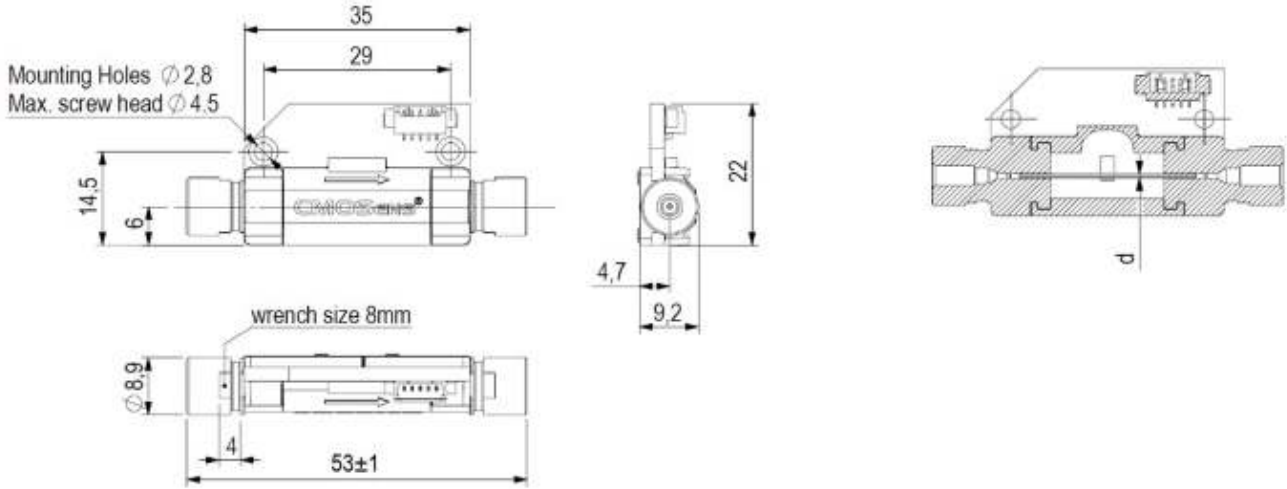
Mechanical specifications

Sensor model	FS series		FS+ series	
	XS	S	M+	L+
Dimensions	53 x 22 x 9 mm	53 x 22 x 9 mm	65 x 36 x 25 mm	65 x 36 x 25 mm
Length of the electrical cable	1,5m	1,5m	1,5m	1,5m
Maximum pressure	200 bar	200 bar	12 bar	12 bar
Lowest detectable flow increment	PEEK and Quartz Glass	PEEK and Quartz Glass	PPS, stainless steel 316L Fittings :PEEK/ETFE	PPS, stainless steel 316L Fittings :PEEK/ETFE
Total mass	10 g	10 g	50 g	50 g
Inner volume	1 µL	1.5 µL	~ 28 µL	~ 28 µL
Sensor inner diameter	25 µm	150 µm	400 µm	400 µm
Fluid connector ports	UNF 6-40 for 1/32" OD tubing	UNF 6-40 for 1/32" OD tubing	UNF ¼"-28 flat bottom for 1/16" OD tubing	UNF ¼"-28 flat bottom for 1/16" OD tubing

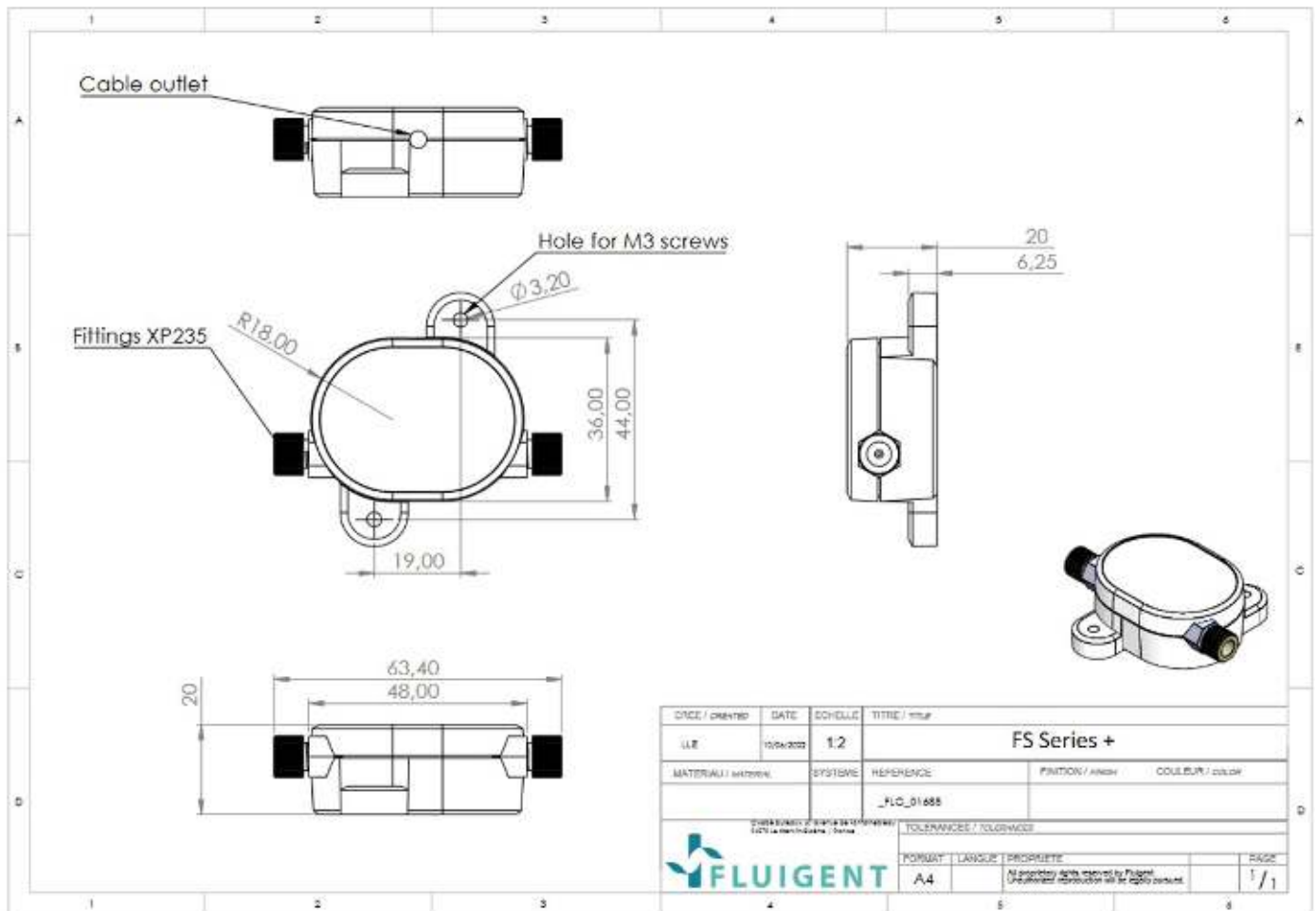
SCHEMATICS

FS series

All dimensions in mm



FS+ series



DATE / created	DATE	REVISED	TITRE / title
UE	10/04/2022	1.2	FS Series +
MATERIAL / materiau	SYSTEME	REFERENCE	FINITION / finish COULEUR / color
		_FLC_01688	
		TOLERANCES / TOLERANCES FORMAT / LANGUE / PROPRIETE A4 All proprietary rights reserved by Fluigent. Unauthorised reproduction will be legally pursued.	
			PAGE 1 / 1

CERTIFICATION

The FS Series are CE and RoHS compliant
FLUIGENT SA is ISO 9001 certified since 2010



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