

FLOW SENSORS

SERIES FS

SIZES: 17, 30, 35



- User-friendly
- High sensibility
- Pressure reading
- Single connection for two sensors
- Digital and analogue Output

The Series FS is available for flows ranging from 0.5 to 2000 L/min, offered in three different sizes, also available with the pressure sensor version included.

The display is designed to be rotatable, thus allowing for easy reading of the monitored values.

The cumulative flow rate is immediately visible on the display.

Main features:

- Real-time monitoring: Allows for constant flow control at all times.
- Wide range of applications: Suitable for multiple uses, from small workshops to large industries.
- Painting robots: Ideal for managing the airflow in painting processes, contributing to the economization of technical gases.

FLOW SENSORS
SERIES FS - GENERAL DATA
GENERAL DATA

Mod.	FS (Flow sensors)	FSP (Flow sensor + Pressure sensor)
Sizes		01 (17mm) 02 (30mm) 03 (35mm)
Medium		Dry air, N ₂ , Non-corrosive / Non-flammable gas
Measured flow range		FS01 - FSP01 (0 ÷ 1 to 0 ÷ 200 L/min) FS02 - FSP02 (2 ÷ 500 to 10 ÷ 2000 L/min) FS03 - FSP03 (10 ÷ 2000 L/min)
Flow direction		Unidirectional
Rated pressure range		Not applicable
Display		4 digits * 4 digits, 7 segment screen (red/green/orange)
Flow istante range		FS01 - FSP01 (0 ÷ 1,050 to 0 ÷ 210 L/min) FS02 - FSP02 (0 ÷ 525 to 0 ÷ 1050 L/min) FS03 - FSP03 (0 ÷ 2100 L/min)
Minimum setting scale LPM		FS01 - FSP01 (1 ml/min to 1 L/min) FS02 - FSP02, FS03 - FSP03 (1 L/min)
Minimum setting scale CFM		FS01 - FSP01 (0.01 ft ³ /min to 1 ft ³ /min) FS02 - FSP02, FS03 - FSP03 (1 ft ³ /min)
Accumulated flow		FS01 - FSP01 (99999999 ml to 9999999.9 L) FS02 - FSP02, FS03 - FSP03 (9999999 L)
Resolution		FS01 - FSP01 (1ml to 1 L) FS02 - FSP02, FS03 - FSP03 (1 L)
Display range	Not applicable	-1 ÷ 10 bar
Minimum setting scale kPA	Not applicable	1
Minimum setting scale kfg/cm ²	Not applicable	0.01
Minimum setting scale bar	Not applicable	0.01
Minimum setting scale psi	Not applicable	0.1
Guaranteed range of flow display		2 ÷ 100 % F.S.
Accuracy of flow display indicators		FS01 - FSP01 (± 3% F.S. ± 1 digit *1) FS02 - FSP02, FS03 - FSP03 (± 3% F.S. ± 1 digit *5)
Analog output accuracy of the flow display		FS01, FSP01 (± 5% F.S. *1) FS02 - FSP02, FS03 - FSP03 (± 5% F.S. *5)
Repeatability of flow visualization		FS01 - FSP01 (± 1% F.S. ± 1 digit *2) FS02 - FSP02, FS03 - FSP03 (± 1% F.S. ± 1 digit *2), (± 2% F.S. when the response time is set to 50ms) *2
Linearity of flow visualization		± 3% F.S. *2
Variation with temperature of the flow display		FS01 - FSP01 ± 2% F.S. (15÷35°C); ± 5% F.S. (0÷15°, 35÷50°C), (compared with *2) FS02 - FSP02, FS03 - FSP03 ± 5% F.S. (compared with *2)
Variation with pressure		FS01 - FSP01 (± 5% F.S. ± 1 digit *3) FS02 - FSP02, FS03 - FSP03 (± 5% F.S. ± 1 digit *6)
Guaranteed range pressure accuracy	Not applicable	0 ÷ 100 % F.S.
Indicators accuracy	Not applicable	± 2% F.S. ± 1 digit *7
Analog output accuracy	Not applicable	± 2.5% F.S. *7
Repeatability pressure accuracy	Not applicable	± 0.2% F.S. ± 1 digit *7
Linearity pressure accuracy	Not applicable	± 1% F.S. *7
Variation with temperature precision pressure	Not applicable	± 2% F.S. (compared with *7)
General digital output		2
Digital output flow response time		800 ms (available 50, 80, 120, 200, 400, 1500ms)
Response time to digital output pressure	Not applicable	2.5 ms (available 25, 100, 250, 500, 1000, 1500 ms)
Digital flow output mod		Hysteresis Mode, Window Comparator Mode, Accumulated Output, Accumulated Pulse Output
Digital pressure output	Not applicable	Not applicable
Hysteresis		Adjustable
Short circuit protection		Yes
Accumulated pulse output		FS01 - FSP01 (10 ml/impulse to 2 L/impulse) FS02 - FSP02 (5 L/impulse to 10 L/impulse) FS03 - FSP03 (10 L/impulse)
Analog voltage output	1 ÷ 5 V - Output Impedance : 1 kΩ	1 ÷ 5 V; *8 - Output Impedance: 1 kΩ
Analog current output	4 ÷ 20 mA - Load Impedance: ≤ 300Ω	4 ÷ 20 mA; *8 - Load Impedance: ≤ 300Ω
Response time	≤ 100 ms	Pressure: ≤ 50 ms; Flow: ≤ 100 ms
External input		Input Open collector, ≤ 0.4V, ≥ 30ms
Communication interface		RS-485 *
Power supply voltage		12 ÷ 24V DC ± 10 % - Ripple (P-P) ≤ 10 %
Power Consumption		≤ 50 mA
Operating pressure range	Not applicable	FS01 (-0,9 ÷ 8 bar) FS02, FSP03 (0÷10 bar)
Withstand pressure	Not applicable	FS01 (10 bar) FS02, FSP03 (15 bar)
Protection class		IP40
Working fluid temperature		0÷50 °C (no condensation or freezing)
Ambient temperature range		Operation : 0÷50 °C; Storage : -10÷60 °C (no condensation or freezing)
Ambient humidity range		Operation / Storage : 35÷85 % R.H. (no condensation)
Insulation resistance	≥ 50 MΩ (500 V DC, between case and lead wire)	FS01 (≥ 2 MΩ - 50 VDC, between case and lead wire) FS02, FSP03 (≥ 50 MΩ - 500 VDC, between case and lead wire)
Maximum Voltage		
Vibration		Total amplitude 1.5 mm or 10 G, 10 Hz÷55 Hz÷10 Hz scan for 1 minute, 2 hours each direction of X, Y and Z
Shock		100 m/s ² (10 G), 3 times each in direction of X, Y and Z

EMC	IEC 61000-6-2; IEC 61000-6-4
Cable	Ø4 Oil-resistance cable (PVC) - 26 AWG (0.15 mm ²) - 6 cores
Port sizes	FS01 - FSP01 (ø6 to ø8) FS02 - FSP02 (Rc1/2, G1/2) FS03 - FSP03 (Rc3/2, G3/4)
Weight (with 2 meter lead wire)	FS01 - FSP01 (109.3 g to 112.7 g approx.) FS02 - FSP02 (250 g to 325 g) FS03 - FSP03 (325 g)

TABLE NOTES:

- *1: **CONDITIONS:** inlet pressure: 3 bar, outlet pressure: atmospheric pressure, 25 °C
- *2: **CONDITIONS:** outlet pressure: atmospheric pressure, 25 °C
- *3: -0.9 ÷ 8 bar, outlet pressure: atmospheric pressure, 25 °C
- *4: Function available only for options -02 and -04
- *5: **CONDITIONS:** inlet pressure: 6 bar, outlet pressure: atmospheric pressure, 25 °C
- *6: 0÷10 bar, outlet pressure: atmospheric pressure, 25 °C
- *7: Outlet flow = 0 L/min, 25 °C
- *8: PWM output, corresponding to the pressure 0 ÷ 10 bar

CODING EXAMPLE

FS	01	-	201	-	031	-	R8
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FS	SERIES FS = Flow sensor FSP = Flow sensor + Pressure sensor
01	SIZE 01 = 17 mm 02 = 30 mm 03 = 35 mm
201	FLOW RATE RANGE 005 = 500 mL/min (only size 01) - Available on request 010 = 1000 mL/min (only size 01) 050 = 5 L/min (only size 01) - Available on request 100 = 10 L/min (only size 01) - Available on request 500 = 50 L/min (only size 01) 101 = 100 L/min (only size 01) - Available on request 201 = 200 L/min (only size 01) 501 = 500 L/min (only size 02) 102 = 1000 L/min (only size 02) 202 = 2000 L/min (only size 03)
031	OUTPUT SPECIFICATIONS 010 = 2 NPN output + Analog output 1 - 5 V 011 = 2 NPN output + Analog output 4 - 20 mA 020 = 2 NPN output + RS485 - Available on request 030 = 2 PNP output + Analog output 1 - 5 V 031 = 2 PNP output + Analog output 4 - 20 mA 040 = 2 PNP output + RS485 - Available on request
R8	PORT SIZE R6 = Ø6 mm for Flow Rate type 005, 010, 050, 100, 500 R8 = Ø8 mm for Flow Rate type 101, 201 F9C = G1/2 for Flow Rate Range 501/102 F12C = G3/4 for Flow Rate Range 202

AIR TREATMENT

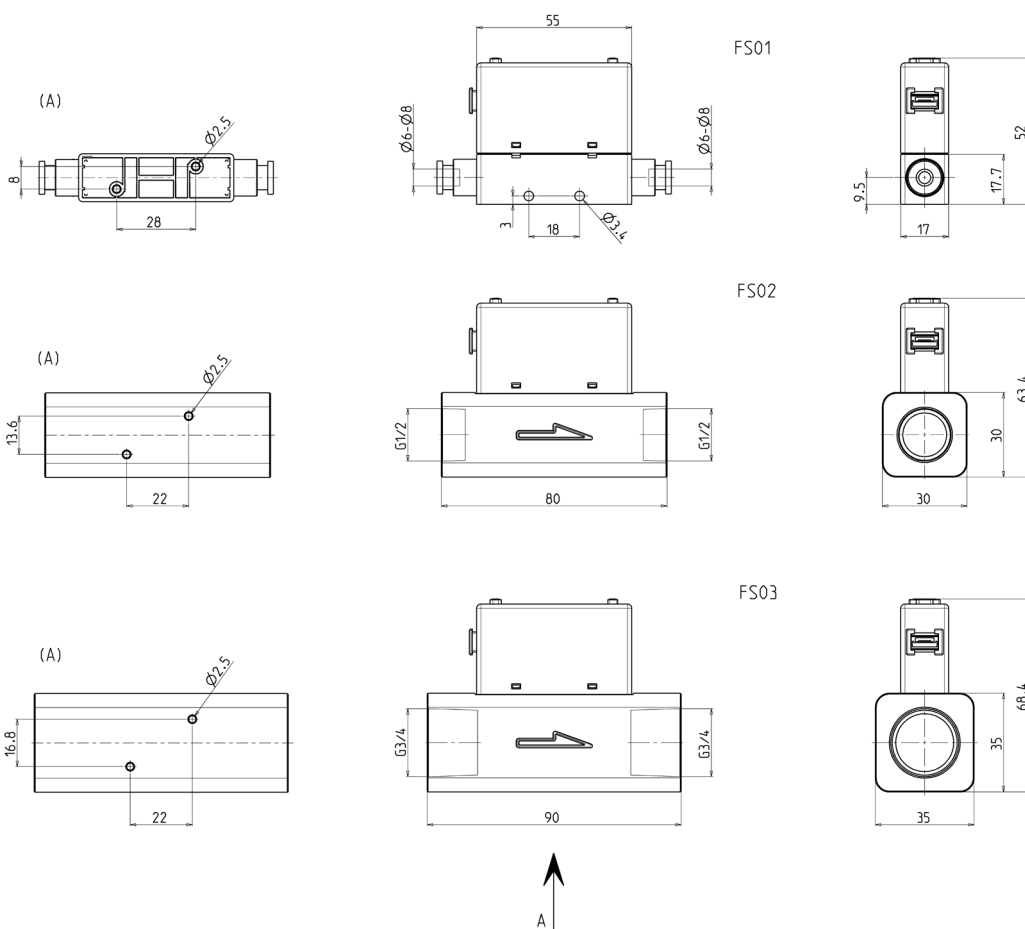
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FLOW SENSORS
SERIES FS - DIMENSIONAL CHARACTERISTICS

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FS sensor - Dimensions

The sensor is supplied WITHOUT cable.



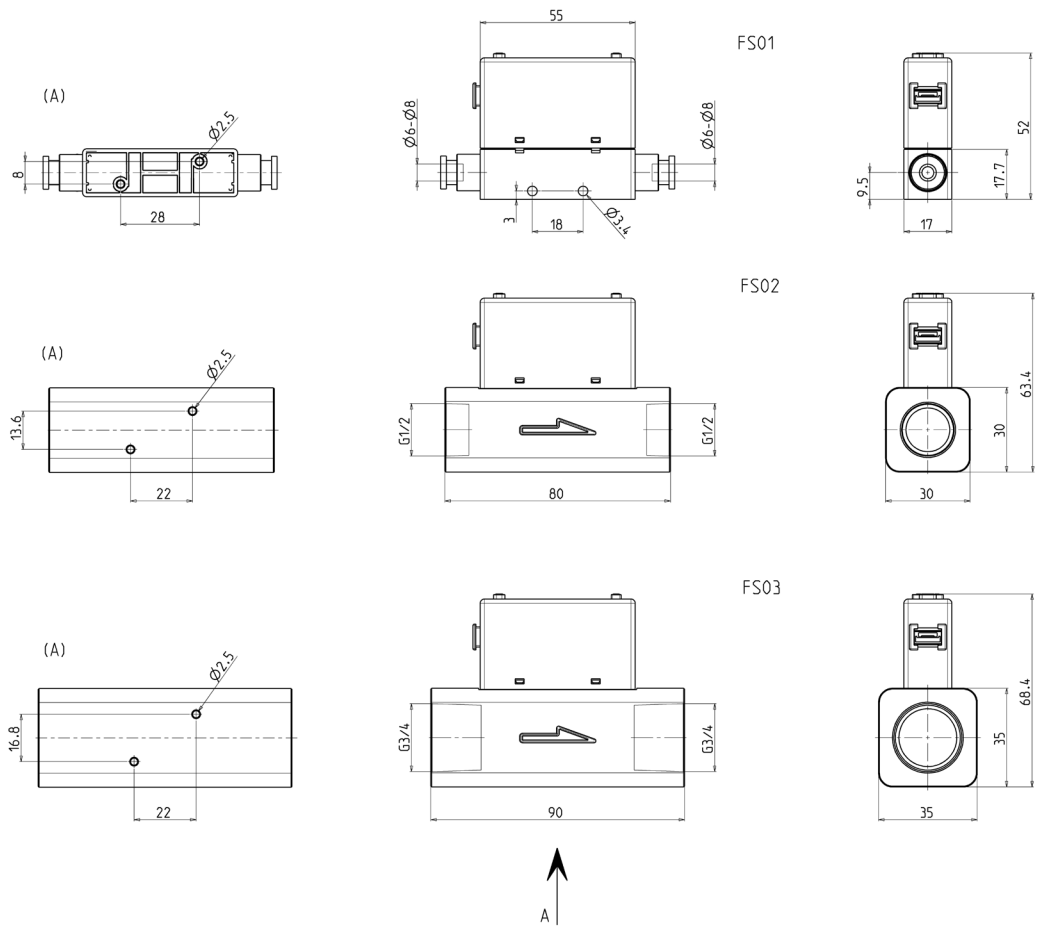
AIR TREATMENT

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Mod.	Flow rate (L/min)	Output	Ports	Dimensions
FS01-500-031-R6	50 L/min	2 PNP ANALOG 4-20mA	Ø 6	17
FS01-500-030-R6	50 L/min	2 PNP ANALOG 1-5 V DC	Ø 6	17
FS01-201-031-R8	200 L/min	2 PNP ANALOG 4-20mA	Ø 8	17
FS01-201-030-R8	200 L/min	2 PNP ANALOG 1-5 V DC	Ø 8	17
FS02-501-031-F9C	500 L/min	2 PNP ANALOG 4-20mA	1/2G	20
FS02-501-030-F9C	500 L/min	2 PNP ANALOG 1-5 V DC	1/2G	20
FS02-102-030-F9C	1000 L/min	2 PNP ANALOG 1-5 V DC	1/2G	20
FS02-102-031-F9C	1000 L/min	2 PNP ANALOG 4-20mA	1/2G	20
FS03-202-031-F12C	2000 L/min	2 PNP ANALOG 4-20mA	3/4G	30
FS03-202-030-F12C	2000 L/min	2 PNP ANALOG 1-5 V DC	3/4G	30

FSP sensor - Dimensions

The sensor is supplied WITHOUT cable.



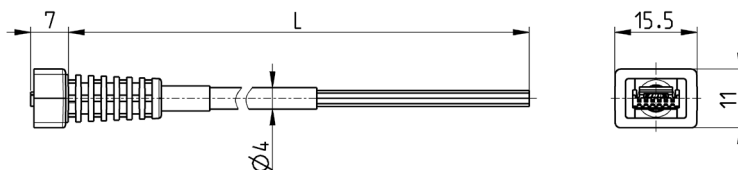
Mod.	Flow rate (L/min)	Output	Ports	Flow rate (L/min)
FSP01-010-031-R6	1 L/min	2 PNP ANALOG 4-20mA	Ø 6	17
FSP01-500-031-R6	50 L/min	2 PNP ANALOG 4-20mA	Ø 6	17
FSP01-500-030-R6	50 L/min	2 PNP ANALOG 1-5 V DC	Ø 8	17
FSP01-201-031-R8	200 L/min	2 PNP ANALOG 4-20mA	Ø 8	17
FSP01-201-030-R8	200 L/min	2 PNP ANALOG 1-5 V DC	1/2G	17
FSP02-501-031-F9C	500 L/min	2 PNP ANALOG 4-20mA	1/2G	20
FSP02-501-030-F9C	500 L/min	2 PNP ANALOG 1-5 V DC	1/2G	20
FSP02-102-030-F9C	1000 L/min	2 PNP ANALOG 1-5 V DC	1/2G	20
FSP02-102-031-F9C	1000 L/min	2 PNP ANALOG 4-20mA	1/2G	20
FSP03-202-031-F12C	2000 L/min	2 PNP ANALOG 4-20mA	3/4G	30
FSP03-202-030-F12C	2000 L/min	2 PNP ANALOG 1-5 V DC	3/4G	30

Cables for FS

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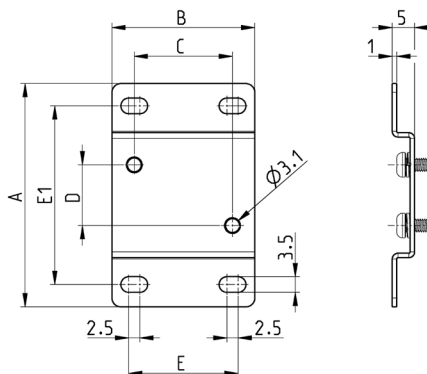
Material: PVC
 The cable is not included in the sensor package.



Mod.	L = length cable
GM6X-2	2 m
GM6X-5	5 m

Mounting brackets for FS and FSP

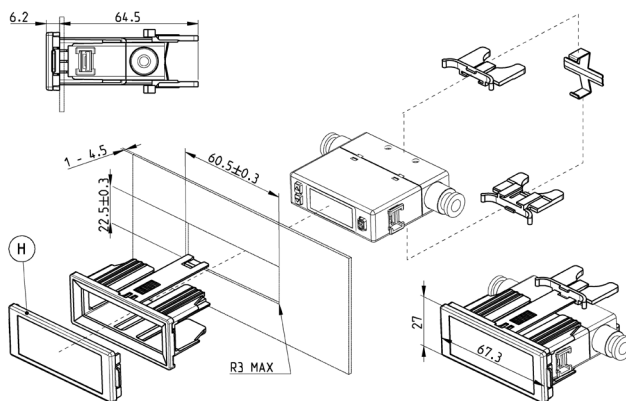
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Mod.	A	B	C	D	E	E1
FS-BT-26	33,6	40	28	8	32,2	26
FS-BT-27	50	32	22	13,6	24,5	40
FS-BT-28	58	42	22	16,8	24,5	48

Kit panel adapter for FS and FSP

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Mod.	H
FS-PA-H	Yes
FS-PA-G	No