

Flow Measurement

Flow sensor SITRANS FM100

Overview



The SITRANS FM100 is an electromagnetic flow sensor in a compact design for basic applications in the process and OEM industry.

Benefits

- Connection ½", ¾", 1", 2"
- Flow- and temperature measurement
- IO-Link communication
- Dosing function with external control output
- Colored, multi-parameter configurable TFT display, rotatable 90°
- Bidirectional measuring
- Intuitive setup menu via 4 optical touch keys
- 2 freely configurable outputs
- All-metal design: stainless steel
- Included in Quick Ship Program (delivery time see PIA LCP)

Application

The main applications of the SITRANS FM electromagnetic flow sensors can be found in the following fields:

- OEM industry
- Process industry
- Small water cycles: e.g. cooling water, water leakage
- Dosing e.g. in chemical industry

Design

The SITRANS FM100 is designed to measure small- and medium sized flow of conductive liquids. The small build in length of 108 mm allows to fit the device in almost any space. The robust stainless-steel housing protects the device in changing surroundings.

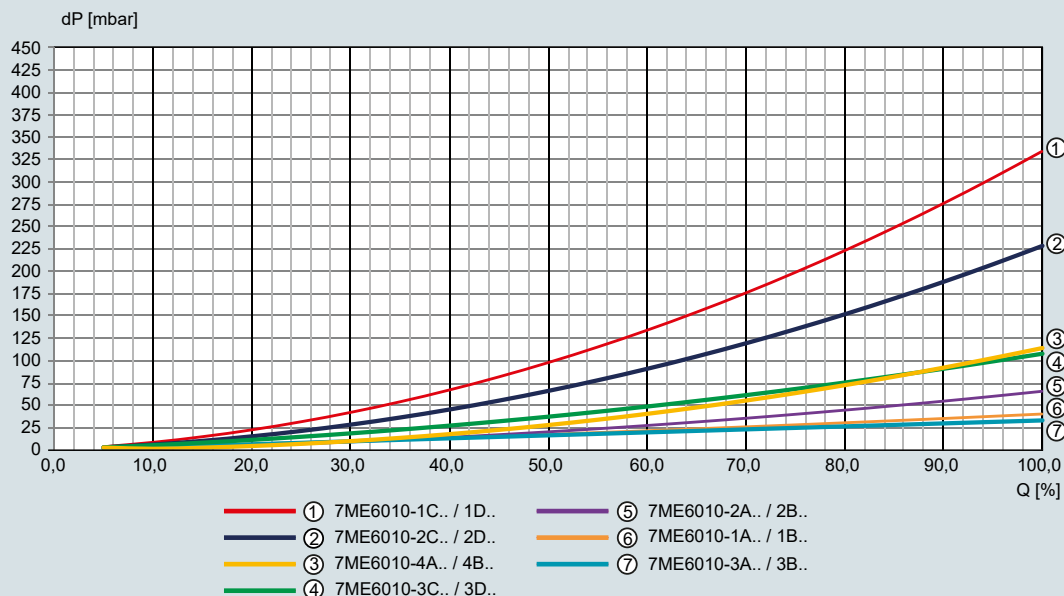
The measurement is displayed on the local screen as well as accessible via 2 freely configurable outputs (pulse-/frequency-/alarm- and analogue).

Mode of operation

The flow measuring principle is based on Faraday's law of electromagnetic induction according to which the sensor converts the flow into an electrical voltage proportional to the velocity of the flow.

Integration

Pressure loss



Technical specifications

Flow sensor SITRANS FM100		Flow sensor SITRANS FM100	
Product characteristic	FM100	Design	
Measuring principle	Electromagnetic induction	Weight	See dimensional drawings
Media	Conductive liquid with $\leq 20 \mu\text{S}/\text{cm}$	Housing material	Stainless steel 1.4404
Accuracy	$< \pm(0.8 \% \text{ of reading} + 0.5 \% \text{ of full scale})^1$	Electrode material	Stainless steel 1.4404
Repeatability	$\pm 0.2 \% \text{ of full scale}$	Connection fitting	Stainless steel 1.4404
Response time flow t_{90}		Insulation parts	PEEK
• Alarm/pulse/frequency output	$< 100 \text{ ms}$	Seals	FKM (Option: EPDM)
• Current output	$< 1 \text{ s}$	Display	PMMA
Temperature measurement			Operation via 4 optical touch sensors (operation with hand gloves)
Sensor	PT1000		TFT display, 128×128 pixels, 1.4" display, orientation in 90° steps adjustable, repetition rate adjustable 0.5 ... 10 s
Accuracy	$\leq \pm 2 \text{ }^\circ\text{C}$ (flow $> 0.2 \text{ m/s}$)	Cable entries	M12x1, 4-pin connection
Measuring range	Temperature range of media	Dimensions	See dimensional drawings
Response time temperature t_{90} (signal output)	$< 20 \text{ s}$	Electrical data	
Process connection		Power supply	19 ... 30 V DC
Nominal size	G $\frac{1}{2}$ " ... G 2" Compatible NPT adapter available ($\frac{1}{4}$ " ... 2")	Power consumption	Max. 200 mA
Process connection	Threaded fitting	Outputs	
Rated operation conditions		• Frequency	Push-Pull, freely scalable, 2kHz @ overflow $f_{\text{min}} @ \text{FS} = 50 \text{ Hz}$ $f_{\text{max}} @ \text{FS} = 1000 \text{ Hz}$
Mounting position	In all directions, bidirectional measuring	• Pulse	Push-Pull, freely scalable, configurable for partial and accumulated totalizer
In-/outlet	$3 \times \text{diameter} / 2 \times \text{diameter}$	• Alarm	NPN, PNP, Push-Pull, configurable max. 30 V DC, max. 200 mA short-circuit proof
Ambient temperature		• Current	0(4) ... 20 mA (active) or 0(2) ... 10 V DC Max. load 500 Ω
• Standard compact sensor	$-20 \dots +70 \text{ }^\circ\text{C}$ ($-4 \dots +158 \text{ }^\circ\text{F}$)	Input	
• Remote version with ETFE-Cable	$-20 \dots +140 \text{ }^\circ\text{C}$ ($-4 \dots +284 \text{ }^\circ\text{F}$)	• Control	Active signal U_{high} max. 30 V DC $0 < \text{Low} < 10 \text{ V DC}$ $15 \text{ V DC} < \text{High} < V_{\text{s}}$
• Remote version with PVC-Cable	$-20 \dots +85 \text{ }^\circ\text{C}$ ($-4 \dots +185 \text{ }^\circ\text{F}$)	Dosing function	Dosing output OUT2: Push-Pull, High active Control input OUT1: START/STOP $0.5 \text{ s} < t_{\text{high}} < 4 \text{ s}$ RESET $t_{\text{high}} > 5 \text{ s}$
Enclosure rating	IP67	Communication	IO-Link
Operating pressure	Max. 16 bar	• Manufacturer ID	42 (decimal), 0x002A (hex)
Pressure drop	See pressure loss diagram	• Manufacturer name	Siemens AG
Mechanical load		• Version	V1.1
• Shock resistance	DIN EN 60068-2-27:2010: 20 g (11 ms)	• Bitrate	COM3
• Vibration resistance	DIN EN 60068-2-6:2008: 5 g (10 ... 2000 Hz)	• Minimal cycle time	1.1 ms
• Environmental testing	DIN EN 60068-2-30:2006: severity level b	• SIO-Mode	Yes (OUT1 in configuration IO-Link)
EMC	2014/30/EU	• Block parameterization	Yes
		• Operational readiness	10 s
		• Max. cable length	20 m

1) Under reference conditions:

- Media temperature: 15 ... 30 $^\circ\text{C}$
- Ambient temperature: 15 ... 30 $^\circ\text{C}$
- 1 cST
- 500 $\mu\text{S}/\text{cm}$
- 1 bar

Flow Measurement

Flow sensor SITRANS FM100

Selection and Ordering data

Article No.

SITRANS FM100 flowmeter

7ME6010- [] [] [] [] 0

➤ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.

Process connection, measuring range

Male thread G1/2", 0.015 ... 3 l/min	1 A
Male thread G1/2", 0.25 ... 48 gal/h	1 B
Male thread G1/2", 0.04 ... 10 l/min	1 C
Male thread G1/2", 0.011 ... 2.6 gal/min	1 D
Male thread G3/4", 0.1 ... 25 l/min	2 A
Male thread G3/4", 0.025 ... 6.6 gal/min	2 B
Male thread G3/4", 0.2 ... 50 l/min	2 C
Male thread G3/4", 0.053 ... 13 gal/min	2 D
Male thread G1", 0.2 ... 50 l/min	3 A
Male thread G1", 0.053 ... 13 gal/min	3 B
Male thread G1", 0.4 ... 100 l/min	3 C
Male thread G1", 0.1 ... 26 gal/min	3 D
Male thread G2", 1.5 ... 350 l/min	4 A
Female thread 2" NPT, 0.4 ... 92 gal/min	4 B

Transmitter design

Compact design without cable

A

Gasket material

FKM/FPM

0

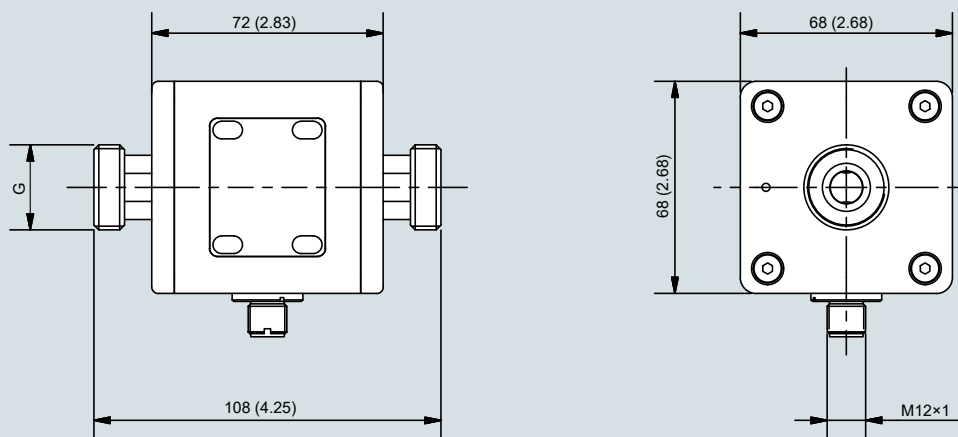
EPDM

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Dimensional drawings

SITRANS FM100 flowmeter with compact transmitter

Process connection G1/2", G3/4" and G1

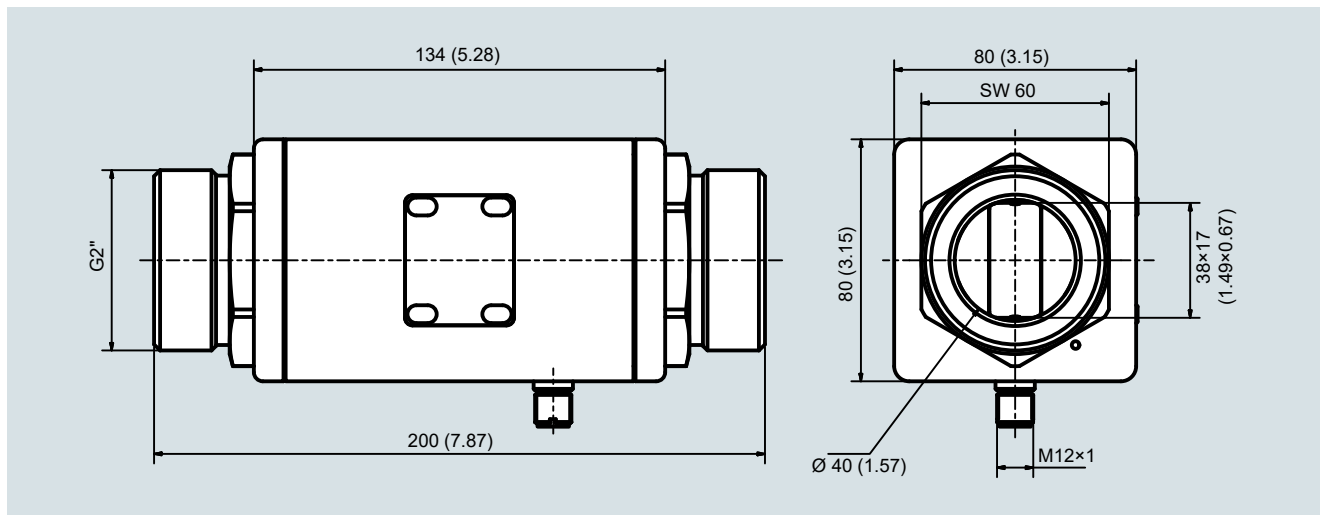


SITRANS FM100 with compact transmitter, process connection G1/2", G3/4" and G1"; dimensions in mm (inch)

Process connection	Nominal size	Weight (g)
Male thread	G1/2"	998
Male thread	G3/4"	988
Male thread	G1"	1010

Dimensional drawings (continued)

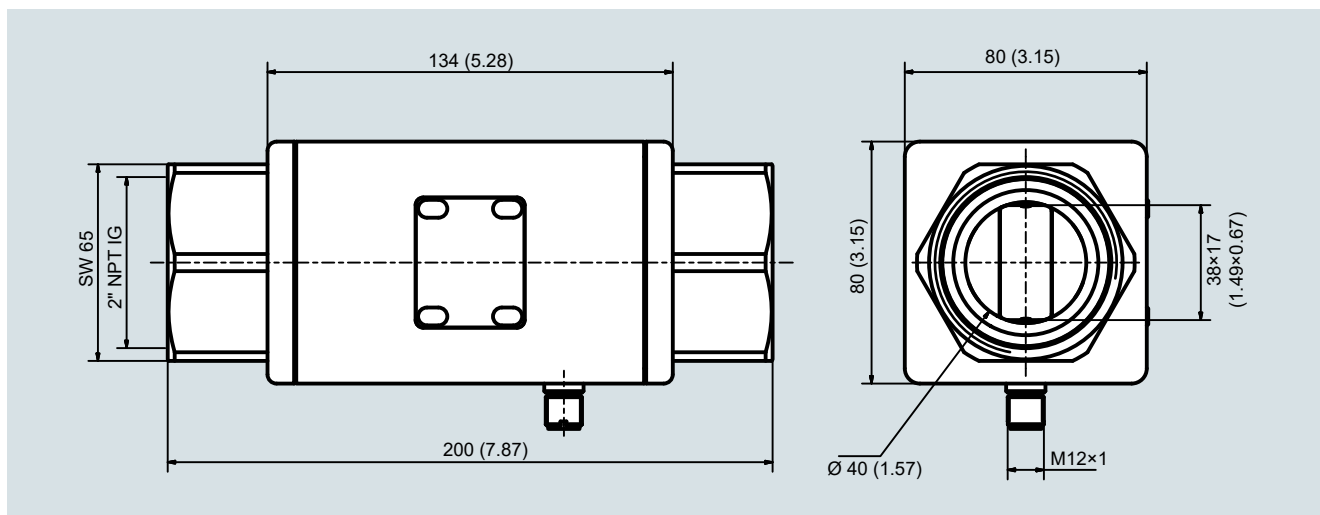
Process connection G2"



SITRANS FM100 with compact transmitter, process connection G2"; dimensions in mm (inch)

Process connection	Nominal size	Weight (g)
Male thread	G2"	2420

Process connection 2" NPT IG



SITRANS FM100 with compact transmitter, process connection 2" NPT (female); dimensions in mm (inch)

Process connection	Nominal size	Weight (g)
Female thread	2" NPT IG	2140