

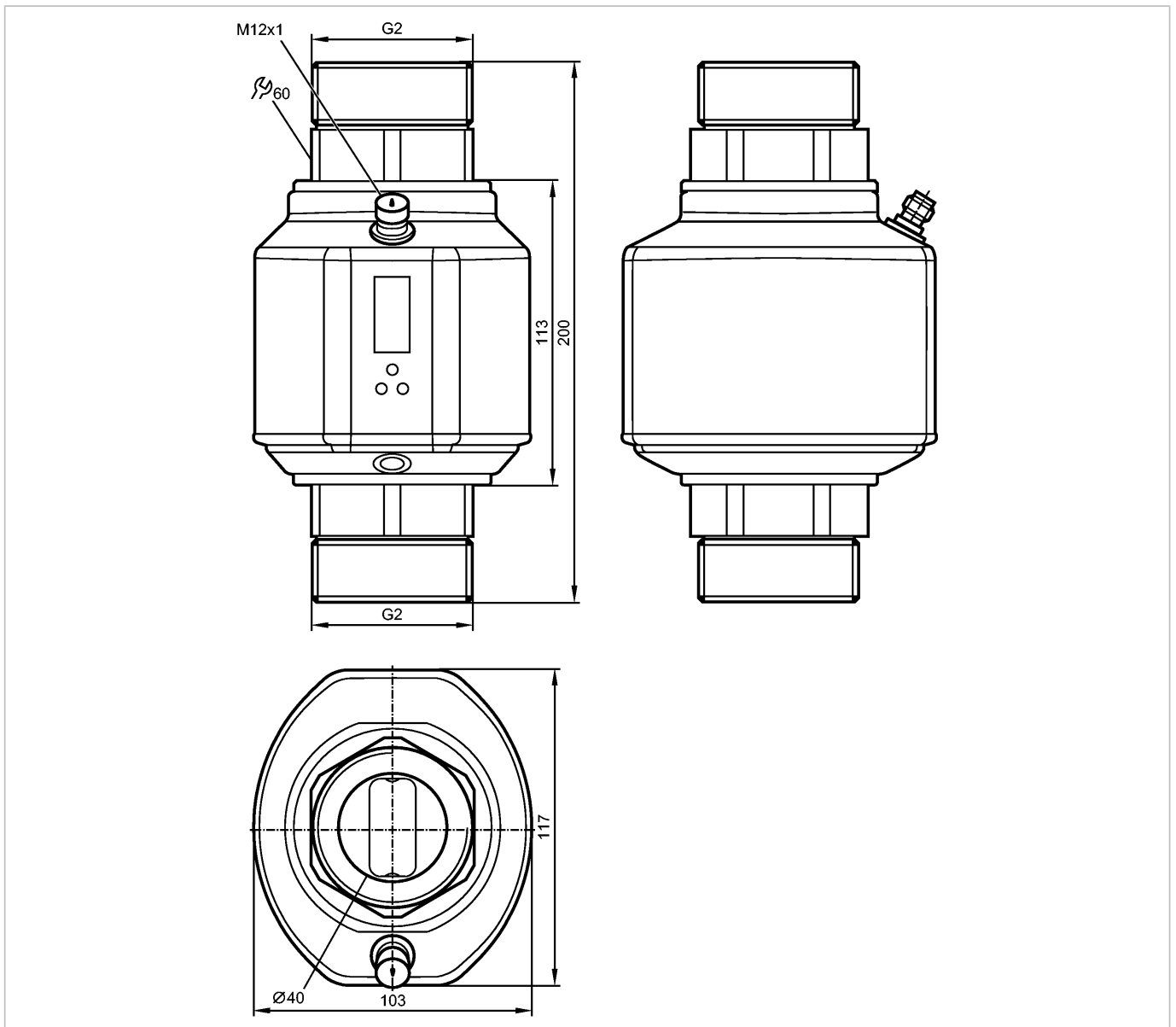


# SM2000

SMR21XGXFRKG/US



Flow sensors



## Product characteristics

Magnetic-inductive flow meter

Quick disconnect

Process connection: G2 flat seal

connection to pipe by means of an adapter

Function programmable

Totalizer function

Empty pipe detection

2 outputs

OUT1 = flow monitoring (binary), flow rate meter (pulse), preset meter (binary)

OUT2 = flow monitoring or temperature monitoring (analog or binary)

Input for counter reset

4-digit alphanumeric display

Measuring range

5...600 l/min

## Application



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Application	conductive liquids of the fluid group 2 according to the Pressure Equipment Directive (PED) (conductivity: $\geq 20 \mu\text{S/cm}$ / viscosity: $< 70 \text{ mm}^2/\text{s}$ at $40^\circ\text{C}$ )	
Pressure rating [bar]	16	
Medium temperature [°C]	-10...70	

Electrical data		
Electrical design	DC PNP/NPN	
Operating voltage [V]	18...32 DC <sup>1)</sup>	
Current consumption [mA]	$< 150$	
Insulation resistance [MΩ]	$> 100$ (500 V DC)	
Protection class	III	
Reverse polarity protection	yes	

Outputs		
Output function	OUT1: normally open / normally closed programmable or pulse or frequency or empty pipe detection or IO-Link OUT2: normally open / normally closed programmable or analogue (4...20 mA; 0...10 V, scalable) or empty pipe detection	
Current rating [mA]	2 x 250	
Voltage drop [V]	$< 2$	
Short-circuit protection	yes (non-latching)	
Overload protection	yes	
Analog output	4...20 mA; 0...10 V	
Max. load [Ω]	500 (4...20 mA)	
Min. load [Ω]	2000 (0...10 V)	
Pulse output	flow rate meter	
Frequency range [Hz]	0.1...10000	

Measuring / setting range		
Empty pipe detection	normally closed / open	
Flow monitoring		
Measuring range	5...600 l/min	0.3...36 m <sup>3</sup> /h
Display range	-720...720 l/min	-43.2...43.2 m <sup>3</sup> /h
Resolution	0.5 l/min	0.02 m <sup>3</sup> /h
Set point, SP	8...600 l/min	0.5...36 m <sup>3</sup> /h
Reset point, rP	5...597 l/min	0.3...35.8 m <sup>3</sup> /h
Analog start point, ASP	0...480 l/min	0...28.8 m <sup>3</sup> /h
Analog end point, AEP	120...600 l/min	7.2...36 m <sup>3</sup> /h
Flow end point, FEP	20...600 l/min; 1.2...36 m <sup>3</sup> /h	
Low flow cut-off, LFC	5...15 l/min	0.3...0.9 m <sup>3</sup> /h
in steps of	0.5 l/min	0.02 m <sup>3</sup> /h
Frequency end point, FrEP	0.01...10 kHz	
in steps of	10 Hz	
Measuring dynamics	1:120	
Volumetric flow quantity monitoring		
Pulse value	0.0001...600x10 <sup>3</sup> m <sup>3</sup>	
in steps of	0.0001 m <sup>3</sup>	
Pulse length [s]	0.008...2	
Temperature monitoring		



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Measuring range	[°C]	-20...80
Display range	[°C]	-40...100
Resolution	[°C]	0.2
Set point, SP	[°C]	-19.2...80.0
Reset point, rP	[°C]	-19.6...79.6
Analog start point, ASP	[°C]	-20...60
Analog end point, AEP	[°C]	0...80
in steps of	[°C]	0.2

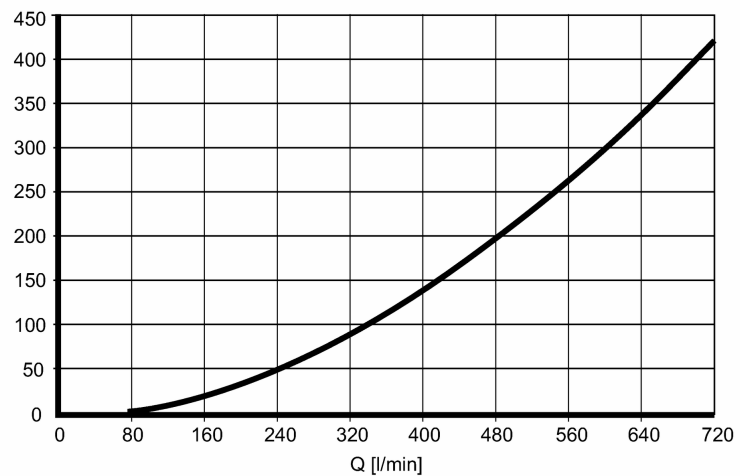
## Accuracy / deviations

### Flow monitoring

Accuracy	$\pm (0.8\% \text{ MW} + 0.5\% \text{ MEW})^2$
Repeatability	$\pm 0.2\% \text{ MEW}$

### Pressure loss (dP) / flow rate (Q)

dP [mbar] DN50



### Temperature monitoring

Accuracy	[K]	$\pm 1$ (bei 25 °C, Q > 15 l/min)
Temperature drift		$\pm 0.0333 \text{ °C / K}$

## Reaction times

Power-on delay time	[s]	5
Flow monitoring		
Start-up delay	[s]	0...50
Response time	[s]	< 0.35 (dAP = 0)
Damping, dAP	[s]	0...5
Temperature monitoring		
Response time	[s]	T09 = 3 (Q > 15 l/min)

## Software / programming

Programming options	Hysteresis / window; NO / NC; output logic; current / voltage / frequency / pulse output; start-up delay; display can be deactivated; display unit; empty pipe detection
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## Interfaces

IO-Link Device	
Transfer type	COM2 (38.4 kBaud)
IO-Link revision	1.1
SDCI standard	IEC 61131-9 CDV
IO-Link Device ID	389d / 00 01 85h
Profiles	Smart Sensor: Process Data Variable; Device Identification



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SIO mode	yes
Required master port class	A
Process data analogue	3
Process data binary	2
Min. process cycle time [ms]	5

Environment	
Ambient temperature [°C]	-10...60
Storage temperature [°C]	-25...80
Protection	IP 65 / IP 67

Tests / approvals	
Pressure equipment directive	article 3, section 3 - sound engineering practice
EMC	DIN EN 60947-5-9
Shock resistance	DIN EN 60068-2-27 20 g (11 ms)
Vibration resistance	DIN EN 60068-2-6 5 g (10...2000 Hz)
MTTF [Years]	78

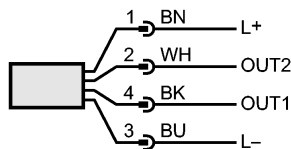
Mechanical data	
Process connection	G2 flat seal
Materials (wetted parts)	stainless steel 316L / 1.4404; stainless steel 316Ti / 1.4571; PEEK (polyether ether ketone); Hastelloy C-4 (2.4610); Centellen; FKM
Housing materials	stainless steel 316L / 1.4404; stainless steel 316Ti / 1.4571; PEI; FKM; PBT-GF 20; elastolan
Weight [kg]	3.071

Displays / operating elements	
Display	Display unit 6 x LED green (l/min, m <sup>3</sup> /h, l, m <sup>3</sup> , 10 <sup>3</sup> , °C) Switching status 2 x LED yellow Measured values 4-digit alphanumeric display Programming 4-digit alphanumeric display

Electrical connection	
Connection	M12 connector; gold-plated contacts

### Wiring

Core colors  
 BK black  
 BN brown  
 BU blue  
 WH white



### Colours to DIN EN 60947-5-2

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 OUT1: 6 options:  
 switching output empty pipe detection  
 switching output flow rate monitoring  
 frequency output flow rate monitoring  
 pulse output quantity meter  
 signal output preset counter  
 IO-Link  
 OUT2: 6 options:  
 switching output empty pipe detection  
 switching output flow rate monitoring  
 switching output temperature monitoring  
 analogue output flow rate



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analogue output temperature  
Input for counter reset

## Accessories

Accessories (included)	2 x packing washer (Centellen); Label
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## Remarks

Remarks	1) to DIN EN 50178, SELV, PELV 2) $Q > 15\text{/min}$ , medium and ambient temperature $+22\text{ }^{\circ}\text{C} \pm 4\text{ K}$ MW = measured value MEW = final value of the measuring range
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Pack quantity	[piece]	1
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