



# THE DATASHEET OF SM2000

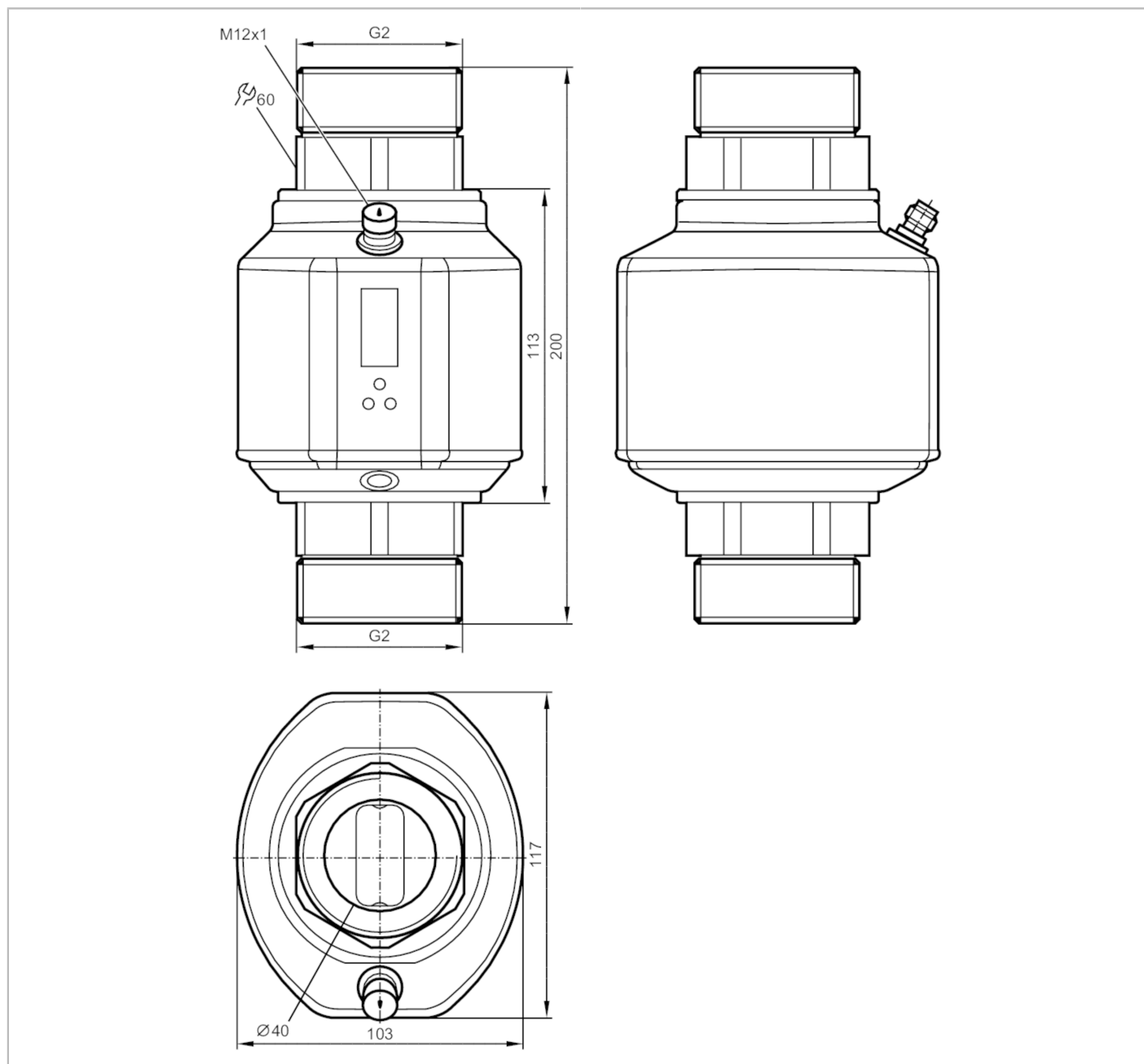


# SM2000



## Magnetic-inductive flow meter

SMR21XGXFRKG/US



Product characteristics	
Number of inputs and outputs	Number of digital outputs: 2; Number of analogue outputs: 1
Measuring range	5...600 l/min      0.3...36 m³/h
Process connection	threaded connection G 2 external thread DN50 flat seal
Application	
Special feature	Gold-plated contacts
Application	totaliser function; empty pipe detection; for industrial applications
Installation	connection to pipe by means of an adapter
Media	conductive liquids; water; hydrous media

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Note on media		conductivity: $\geq 20 \mu\text{S/cm}$ viscosity: $< 70 \text{ mm}^2/\text{s}$ (40 °C)
Medium temperature	[°C]	-10...80
Pressure rating	[bar]	16
Pressure rating	[MPa]	1.6
MAWP (for applications according to CRN)	[bar]	16

### Electrical data

Operating voltage	[V]	18...32 DC; (to SELV/PELV)
Current consumption	[mA]	$< 150$
Protection class		III
Reverse polarity protection		yes
Power-on delay time	[s]	5

### Inputs / outputs

Number of inputs and outputs	Number of digital outputs: 2; Number of analogue outputs: 1
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### Inputs

Inputs	counter reset
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### Outputs

Total number of outputs		2
Output signal		switching signal; analogue signal; pulse signal; frequency signal; IO-Link; (configurable)
Electrical design		PNP/NPN
Number of digital outputs		2
Output function		normally open / normally closed; (parameterisable)
Max. voltage drop switching output DC	[V]	2
Permanent current rating of switching output DC	[mA]	250; (per output)
Number of analogue outputs		1
Analogue current output	[mA]	4...20; (scalable)
Max. load	[ $\Omega$ ]	500
Analogue voltage output	[V]	0...10; (scalable)
Min. load resistance	[ $\Omega$ ]	2000
Pulse output		flow rate meter
Short-circuit protection		yes
Type of short-circuit protection		pulsed
Overload protection		yes
Frequency of the output	[Hz]	0.1...10000

### Measuring/setting range

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
Analogue start point ASP	0...480 l/min	0...28.8 m <sup>3</sup> /h
Analogue end point AEP	120...600 l/min	7.2...36 m <sup>3</sup> /h

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Low flow cut-off LFC	< 15 l/min	< 0.9 m <sup>3</sup> /h
In steps of	0.5 l/min	0.02 m <sup>3</sup> /h
Measuring dynamics	1:120	
Volumetric flow quantity monitoring		
Pulse value	0.0001...600 x 10 <sup>3</sup> m <sup>3</sup>	
In steps of	0.0001 m <sup>3</sup>	
Pulse length [s]	0,008...2	
Temperature monitoring		
Measuring range [°C]	-20...80	
Display range [°C]	-40...100	
Resolution [°C]	0.2	
Set point SP [°C]	-19.2...80	
Reset point rP [°C]	-19.6...79.6	
Analogue start point [°C]	-20...60	
Analogue end point [°C]	0...80	
In steps of [°C]	0.2	

### Accuracy / deviations

Flow monitoring		
Accuracy (in the measuring range)	± (0,8 % MW + 0,5 % MEW)	
Repeatability	± 0,2% MEW	
Temperature monitoring		
Temperature drift	± 0,0333 °C / K	
Accuracy [K]	± 1 (bei 25 °C, Q > 15 l/min)	

### Response times

Flow monitoring		
Response time [s]	0.35; (dAP = 0)	
Delay time programmable dS, dr [s]	0...50	
Damping process value dAP [s]	0...5	
Temperature monitoring		
Dynamic response T05 / T09 [s]	T09 = 3 (Q > 15 l/min)	

### Software / programming

Parameter setting options	Flow monitoring; quantity meter; Preset counter; Temperature monitoring; hysteresis / window; normally open / normally closed; switching logic; current/voltage/frequency/pulse output; start-up delay; display can be deactivated; Display unit; empty pipe detection
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### Interfaces

Communication interface	IO-Link
Transmission type	COM2 (38,4 kBaud)
IO-Link revision	1.1
SDCI standard	IEC 61131-9 CDV
Profiles	Smart Sensor: Process Data Variable; Device Identification
SIO mode	yes
Required master port type	A

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Process data analogue		3
Process data binary		2
Min. process cycle time [ms]		5
Supported DeviceIDs	<b>Type of operation</b>	<b>DeviceID</b>
	default	389

Operating conditions		
Ambient temperature [°C]		-10...60
Storage temperature [°C]		-25...80
Protection		IP 65; IP 67

Tests / approvals		
EMC	DIN EN 60947-5-9	
CPA approval	model number	004MI
	accuracy class	-
	maximum allowable error	± 1,5 % FS
	Q (min)	0,3 m³/h
	Q (t)	-
	Q (max)	36 m³/h
	Medium temperature	-10...70°C
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]		85
UL approval	UL Approval no.	I008
	File number UL	E174189
Pressure Equipment Directive	Sound engineering practice; can be used for group 2 fluids; group 1 fluids on request	

Mechanical data		
Weight [g]		3208
Dimensions [mm]		117 x 103 x 200
Materials	stainless steel (316L/1.4404); stainless steel (316Ti/1.4571); PEI; FKM; PBT-GF20; TPE-U	
Materials (wetted parts)	stainless steel (316L/1.4404); stainless steel (316Ti/1.4571); PEEK; Centellen; FKM	
Process connection	threaded connection G 2 external thread DN50 flat seal	

Displays / operating elements		
Display	Display unit	6 x LED, green (l/min, m³/h, l, m³, 10³, °C)
	switching status	2 x LED, yellow
	measured values	alphanumeric display, 4-digit
	programming	alphanumeric display, 4-digit

Accessories		
Items supplied	sealings: 2, Centellen	
	Label	

Remarks		
Remarks	MW = measured value	
	MEW = Final value of the measuring range	
Pack quantity	1 pcs.	

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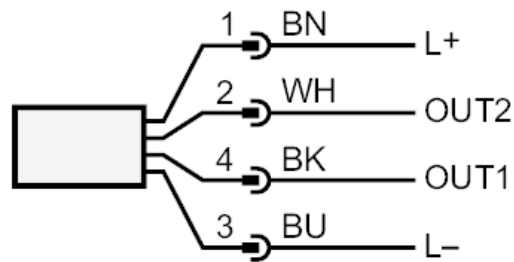
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### Electrical connection

Connector: 1 x M12; coding: A; Contacts: gold-plated



### Connection



- OUT1: colours to DIN EN 60947-5-2  
switching output empty pipe detection  
switching output volumetric flow quantity monitoring  
frequency output volumetric flow quantity monitoring  
Pulse output quantity meter  
signal output Preset counter  
IO-Link
- OUT2: switching output empty pipe detection  
switching output volumetric flow quantity monitoring  
switching output Temperature monitoring  
analogue output volumetric flow quantity monitoring  
analogue output Temperature monitoring  
input counter reset  
Core colours :

BK = black  
BN = brown  
BU = blue  
WH = white

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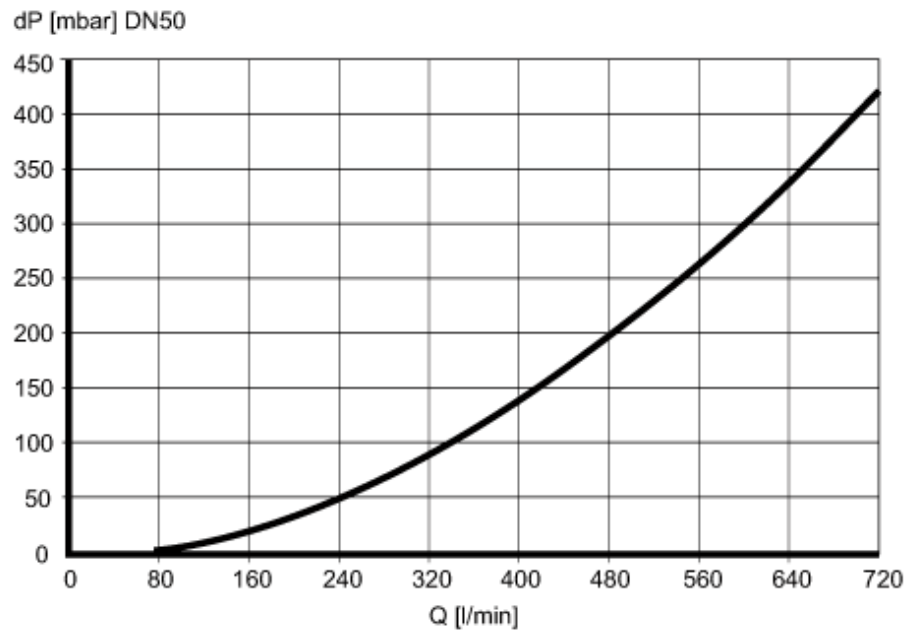


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### Diagrams and graphs

Pressure loss





dP Pressure loss



Q volumetric flow quantity

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