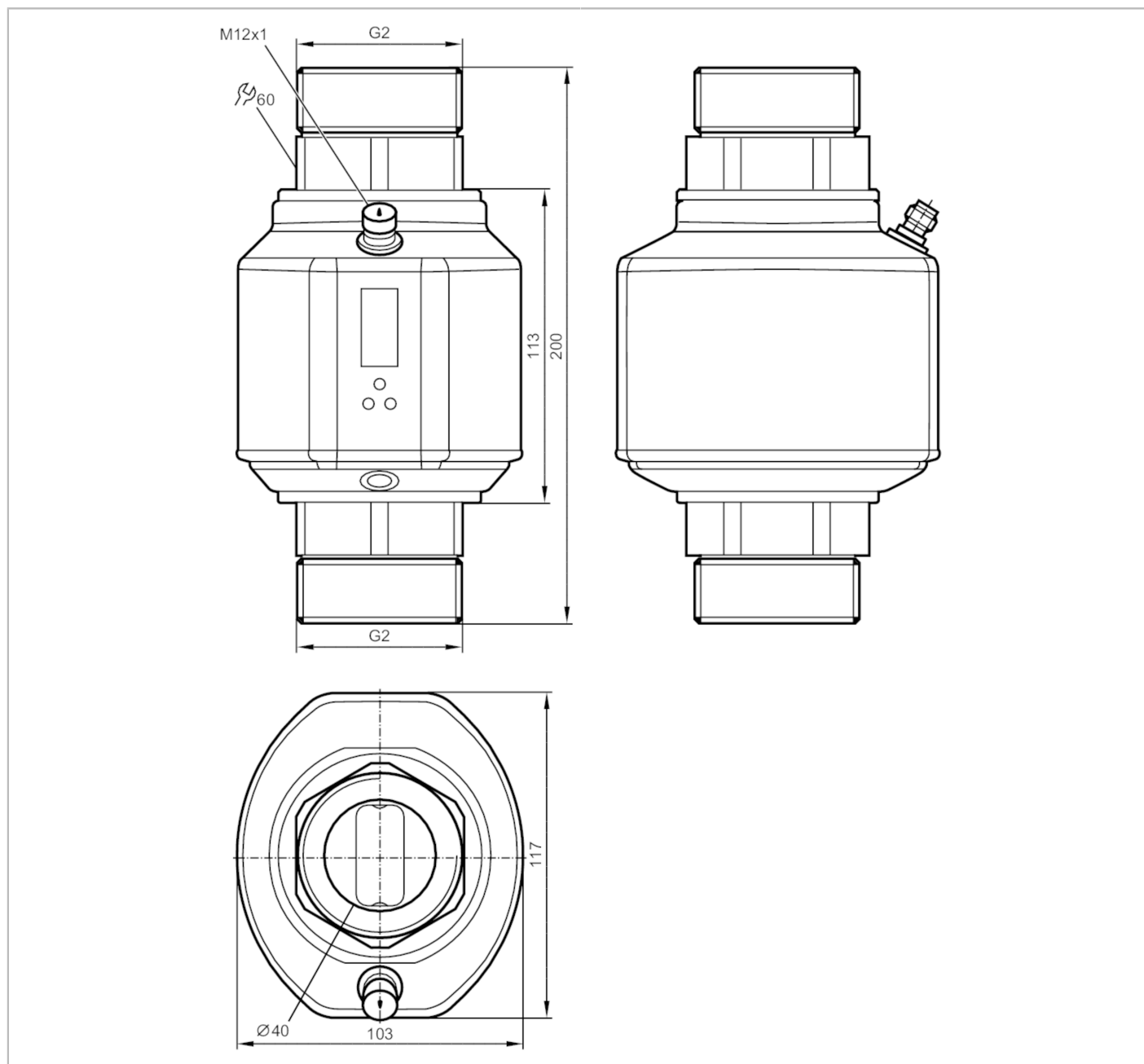


# SM2000



## Magnetic-inductive flow meter

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### Product characteristics

Number of inputs and outputs	Number of digital outputs: 2; Number of analog outputs: 1	
Measuring range	5...600 l/min	0.3...36 m³/h
Process connection	threaded connection G 2 DN50 flat seal	

### Application

System	gold-plated contacts	
Application	Totalizer function; empty pipe detection; for industrial applications	
Installation	connection to pipe by means of an adapter	
Media	Conductive liquids; water; water-based 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...90
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 analog outputs: 1
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### Inputs

Inputs	counter reset
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### Outputs

Total number of outputs	2
Output signal	switching signal; analog signal; pulse signal; frequency signal; IO-Link; (configurable)
Electrical design	PNP/NPN
Number of digital outputs	2
Output function	normally open / closed; (configurable)
Max. voltage drop switching output DC	[V] 2
Permanent current rating of switching output DC	[mA] 250; (per output)
Number of analog outputs	1
Analog current output	[mA] 4...20; (scalable)
Max. load	[Ω] 500
Analog voltage output	[V] 0...10; (scalable)
Min. load resistance	[Ω] 2000
Pulse output	flow rate meter
Short-circuit protection	yes
Type of short-circuit protection	yes (non-latching)
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
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

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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	
<b>Volumetric flow quantity monitoring</b>		
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	
<b>Temperature monitoring</b>		
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	
Analog start point [°C]	-20...60	
Analog end point [°C]	0...80	
In steps of [°C]	0.2	
<b>Accuracy / deviations</b>		
<b>Flow monitoring</b>		
Accuracy (in the measuring range)	± (0,8 % MW + 0,5 % MEW)	
Repeatability	± 0,2% MEW	
<b>Temperature monitoring</b>		
Temperature drift	± 0,0333 °C / K	
Accuracy [K]	± 1 (bei 25 °C, Q > 15 l/min)	
<b>Reaction times</b>		
<b>Flow monitoring</b>		
Response time [s]	0.35; (dAP = 0)	
Delay time programmable dS, dr [s]	0...50	
Damping process value dAP [s]	0...5	
<b>Temperature monitoring</b>		
Dynamic response T05 / T09 [s]	T09 = 3 (Q > 15 l/min)	
<b>Software / programming</b>		
Parameter setting options	Flow monitoring; quantity meter; Preset counter; Temperature monitoring; hysteresis / window; normally open / closed; switching logic; current/voltage/frequency/pulse output; Start-up delay; display can be deactivated; Display unit; empty pipe detection	
<b>Interfaces</b>		
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 class	A	

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Process data analog		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 number	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
Material	stainless steel (1.4404 / 316L); stainless steel (1.4571/316Ti); PEI; FKM; PBT-GF20; TPE-U	
Materials (wetted parts)	stainless steel (1.4404 / 316L); stainless steel (1.4571/316Ti); PEEK; Centellen; FKM	
Process connection	threaded connection G 2 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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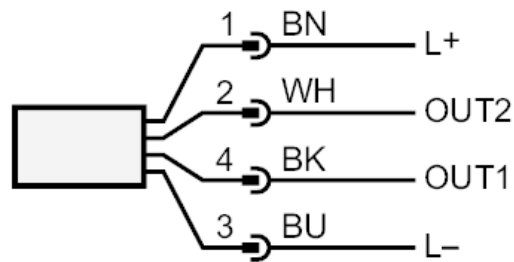
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### Electrical connection

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



### Connection



OUT1:	Colors 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 analog output Volumetric flow quantity monitoring analog output Temperature monitoring Input counter reset Core colors :
BK =	black
BN =	brown
BU =	blue
WH =	white

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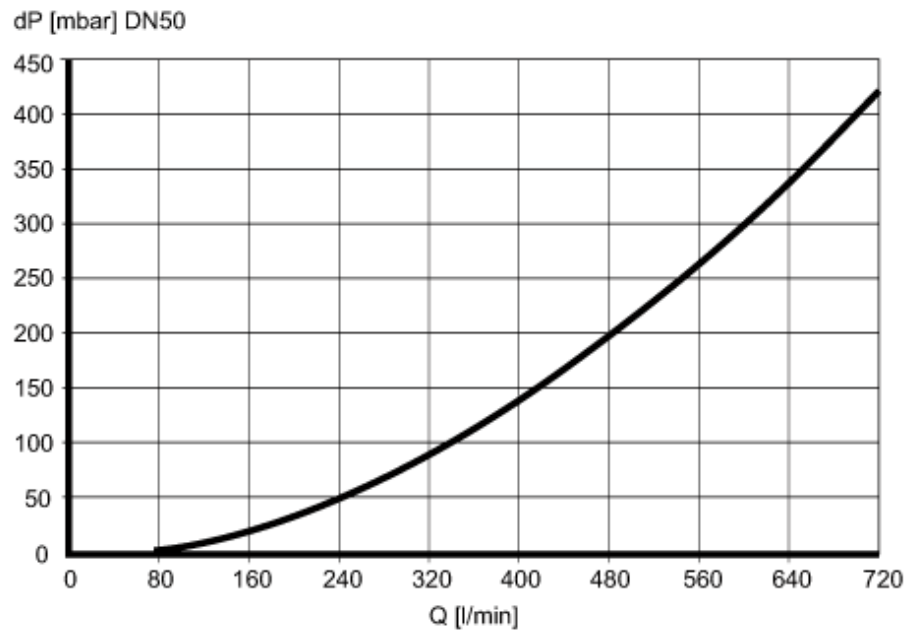
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### Diagrams and graphs

Pressure loss



dP Pressure loss

Q volumetric flow quantity