

## IFM SM (Series 1) Data Sheets (6000/6004/6601/6604)



[SM6000](#)

[SM6004](#)

[SM6601](#)

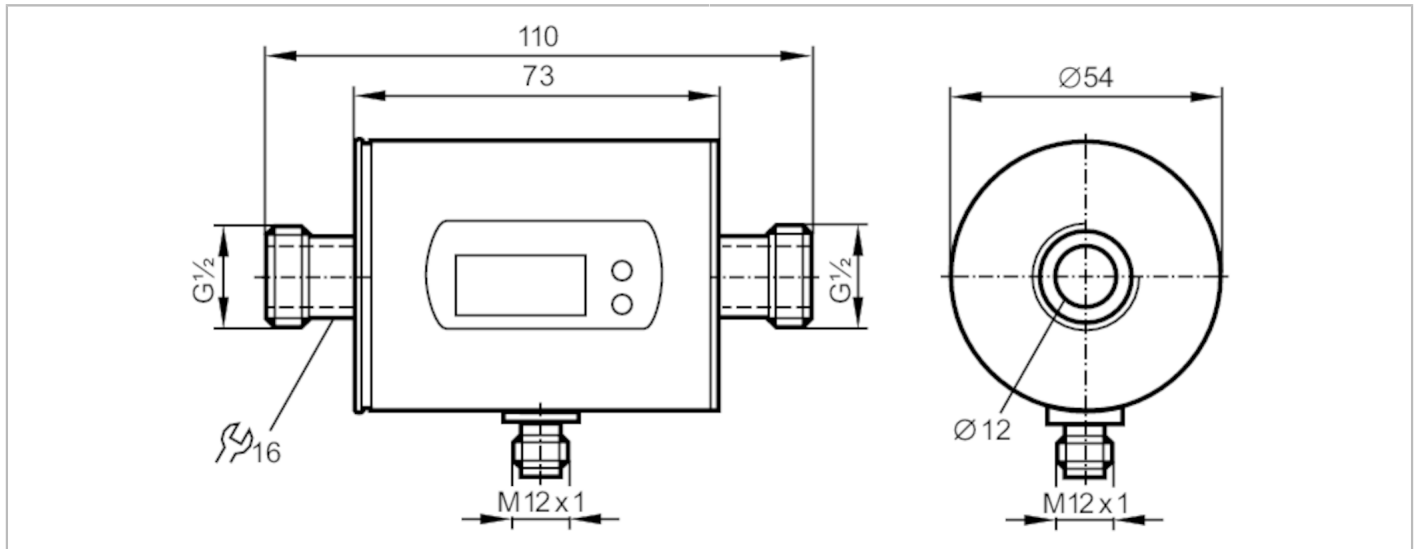
[SM6604](#)

# SM6000



## Magnetic-inductive flow meter

SMR12GGXFRKG/US-100



### Product characteristics

Number of inputs and outputs	Number of digital outputs: 2; Number of analog outputs: 1	
Measuring range	0.1...25 l/min	0.005...1.5 m <sup>3</sup> /h
Process connection	threaded connection G 1/2 DN15 flat seal	

### Application

System	gold-plated contacts	
Application	Totalizer function; for industrial applications	
Installation	connection to pipe by means of an adapter	
Media	Conductive liquids; water; water-based media	
Note on media	conductivity: $\geq 20 \mu\text{S/cm}$ viscosity: $< 70 \text{ mm}^2/\text{s}$ (40 °C)	
Medium temperature [°C]	-10...70	
Pressure rating [bar]	16	
Pressure rating [Mpa]	1.6	
MAWP (for applications according to CRN) [bar]	17.7	

### Electrical data

Operating voltage [V]	18...30 DC; (according to EN 50178 SELV/PELV)	
Current consumption [mA]	95; (24 V)	
Min. insulation resistance [MΩ]	100; (500 V DC)	
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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# SM6000



## Magnetic-inductive flow meter

SMR12GGXFRKG/US-100

Outputs		
Total number of outputs		2
Output signal		switching signal; analog signal; pulse 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]	200
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
Measuring/setting range		
Measuring range	0.1...25 l/min	0.005...1.5 m <sup>3</sup> /h
Display range	-30...30 l/min	-1.8...1.8 m <sup>3</sup> /h
Resolution	0.02 l/min	0.002 m <sup>3</sup> /h
Set point SP	0.25...25 l/min	0.015...1.5 m <sup>3</sup> /h
Reset point rP	0.1...24.9 l/min	0.005...1.495 m <sup>3</sup> /h
Analog start point ASP	0...20 l/min	0...1.2 m <sup>3</sup> /h
Analog end point AEP	5...25 l/min	0.3...1.5 m <sup>3</sup> /h
In steps of	0.02 l/min	0.002 m <sup>3</sup> /h
Volumetric flow quantity monitoring		
Pulse value		0.00001...30 000 m <sup>3</sup>
Pulse length	[s]	0,01...2
Temperature monitoring		
Measuring range	[°C]	-20...80
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
Accuracy / deviations		
Flow monitoring		
Accuracy (in the measuring range)		± (0,8 % MW + 0,5 % MEW)
Repeatability		± 0,2% MEW

# SM6000



## Magnetic-inductive flow meter

SMR12GGXFRKG/US-100

Temperature monitoring		
Accuracy	[K]	± 2,5 (Q > 1 l/min)
<b>Reaction times</b>		
Flow monitoring		
Response time	[s]	0.15; (dAP = 0, T19)
Delay time programmable dS, dr	[s]	0...50
Damping for the switching output dAP	[s]	0...5
Temperature monitoring		
Dynamic response T05 / T09	[s]	T09 = 20 (Q > 1 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/pulse output; Start-up delay; display can be deactivated; Display unit	
<b>Interfaces</b>		
Communication interface	IO-Link	
Transmission type	COM2 (38,4 kBaud)	
IO-Link revision	1.1	
SDCI standard	IEC 61131-9	
IO-Link device ID	569 / 00 02 39 h	
Profiles	Smart Sensor: Process Data Variable; Device Identification, Device Diagnosis	
SIO mode	yes	
Required master port class	A	
Process data analogue	3	
Process data binary	2	
Min. process cycle time	[ms]	5
<b>Operating conditions</b>		
Ambient temperature	[°C]	-10...60
Storage temperature	[°C]	-25...80
Protection	IP 67	
<b>Tests / approvals</b>		
EMC	DIN EN 60947-5-9	
Shock resistance	DIN IEC 68-2-27	20 g (11 ms)
Vibration resistance	DIN IEC 68-2-6	5 g (10...2000 Hz)
MTTF	[years]	162
Pressure equipment directive	sound engineering practice; can be used for group 2 fluids; group 1 fluids on request	
<b>Mechanical data</b>		
Weight	[g]	542.5
Material	stainless steel (1.4404 / 316L); PBT-GF20; PC; FKM; TPE	
Materials (wetted parts)	stainless steel (1.4404 / 316L); PEEK; FKM	
Process connection	threaded connection G 1/2 DN15 flat seal	

# SM6000



## Magnetic-inductive flow meter

SMR12GGXFRKG/US-100

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	alphanumeric display, 4-digit
	Programming	alphanumeric display, 4-digit

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

### Electrical connection

Connector: 1 x M12; Contacts: gold-plated



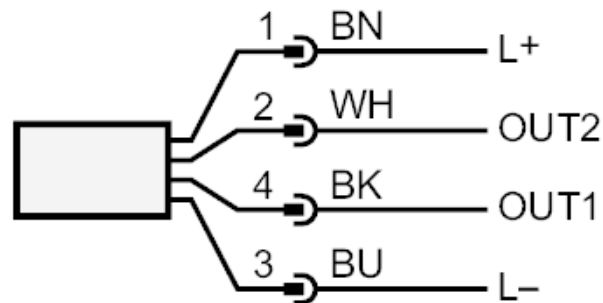
# SM6000



## Magnetic-inductive flow meter

SMR12GGXFRKG/US-100

### Connection



Colours to DIN EN 60947-5-2

#### OUT1:

- Switching output Volumetric flow quantity monitoring
- Pulse output quantity meter
- signal output Preset counter
- IO-Link

#### OUT2:

- 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

# SM6000

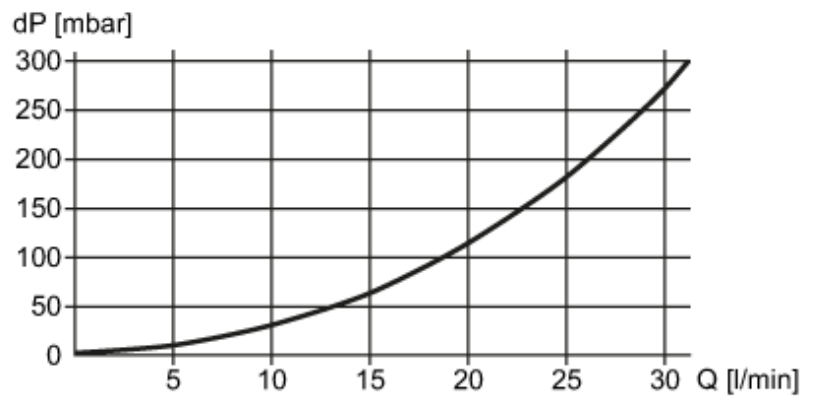


## Magnetic-inductive flow meter

SMR12GGXFRKG/US-100

### Diagrams and graphs

Pressure loss



dP Pressure loss

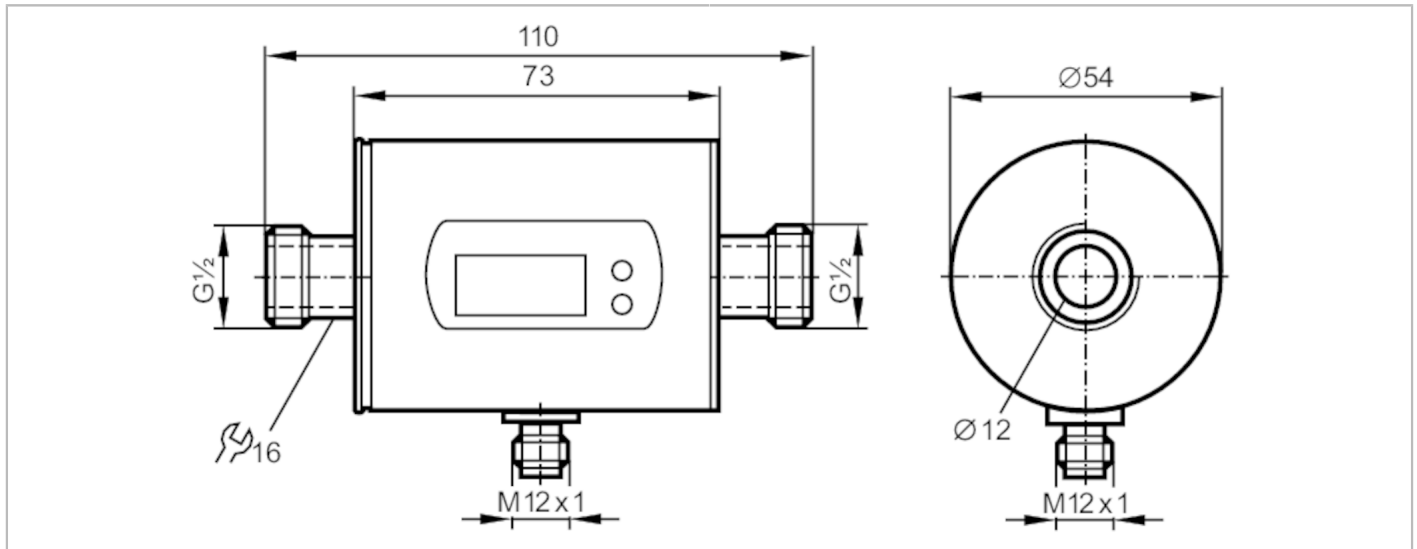
Q volumetric flow quantity

# SM6004



## Magnetic-inductive flow meter

SMR12GGX50KG/US-100



Product characteristics	
Number of inputs and outputs	Number of analog outputs: 2
Process connection	threaded connection G 1/2 DN15 flat seal
Temperature monitoring	
Measuring range	[°C] -20...80
Application	
System	gold-plated contacts
Application	for industrial applications
Installation	connection to pipe by means of an adapter
Media	Conductive liquids; water; water-based media
Note on media	conductivity: $\geq 20 \mu\text{S/cm}$ viscosity: $< 70 \text{ mm}^2/\text{s}$ (40 °C)
Medium temperature	[°C] -10...70
Pressure rating	[bar] 16
Pressure rating	[Mpa] 1.6
MAWP (for applications according to CRN)	[bar] 17.7
Electrical data	
Operating voltage	[V] 20...30 DC; (according to EN 50178 SELV/PELV)
Current consumption	[mA] 120; (24 V)
Protection class	III
Reverse polarity protection	yes
Power-on delay time	[s] 5
Inputs / outputs	
Number of inputs and outputs	Number of analog outputs: 2



# SM6004



## Magnetic-inductive flow meter

SMR12GGX50KG/US-100

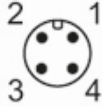
Outputs		
Total number of outputs		2
Output signal		analog signal
Number of analog outputs		2
Analog current output	[mA]	4...20; (scalable)
Max. load	[Ω]	500
Overload protection		yes
Measuring/setting range		
Measuring range	0.1...25 l/min	0.03...6.6 gpm
Display range	-30...30 l/min	-7.92...7.92 gpm
Resolution	0.02 l/min	0.01 gpm
Analog start point ASP	0...20 l/min	0...5.28 gpm
Analog end point AEP	5...25 l/min	1.32...6.6 gpm
In steps of	0.02 l/min	0.01 gpm
Temperature monitoring		
Measuring range	[°C]	-20...80
Resolution	[°C]	0.2
Analog start point	[°C]	-20...60
Analog end point	[°C]	0...80
In steps of	[°C]	0.2
Accuracy / deviations		
Flow monitoring		
Accuracy (in the measuring range)		± (2 % MW + 0,5 % MEW)
Repeatability		± 0,2% MEW
Temperature monitoring		
Accuracy	[K]	± 2,5 (Q > 1 l/min)
Reaction times		
Flow monitoring		
Response time	[s]	0.15; (dAP = 0, T19)
Damping for the switching output dAP	[s]	0...3
Temperature monitoring		
Dynamic response T05 / T09	[s]	T09 = 20 (Q > 1 l/min)
Operating conditions		
Ambient temperature	[°C]	-10...60
Storage temperature	[°C]	-25...80
Protection		IP 67
Tests / approvals		
EMC	DIN EN 60947-5-9	500 V withstand voltage (V DC)
Shock resistance	DIN IEC 68-2-27	20 g (11 ms)
Vibration resistance	DIN IEC 68-2-6	5 g (10...2000 Hz)
MTTF	[years]	175
Pressure equipment directive		sound engineering practice; can be used for group 2 fluids; group 1 fluids on request

# SM6004



## Magnetic-inductive flow meter

SMR12GGX50KG/US-100

Mechanical data		
Weight [g]	516.5	
Material	stainless steel (1.4404 / 316L); PBT-GF20; PC; FKM; TPE	
Materials (wetted parts)	stainless steel (1.4404 / 316L); PEEK; FKM	
Process connection	threaded connection G 1/2 DN15 flat seal	
Displays / operating elements		
Display	Display unit	6 x LED, green (l/min, m <sup>3</sup> /h, gpm, gph, °C, °F)
	Measured values	alphanumeric display, 4-digit
	Programming	alphanumeric display, 4-digit
Display unit	l/min; m <sup>3</sup> /h; gpm; gph; °C; °F	
Remarks		
Remarks	MW = Measured value	
	MEW = Final value of the measuring range	
Pack quantity	1 pcs.	
Electrical connection		
Connector: 1 x M12; Contacts: gold-plated		
		

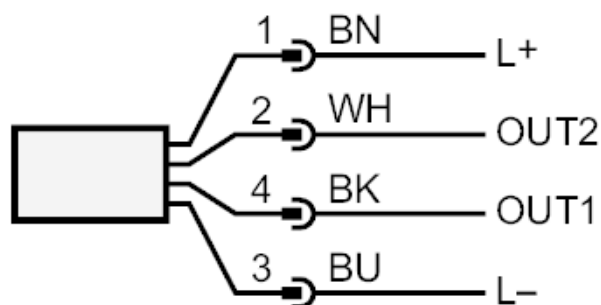
# SM6004



## Magnetic-inductive flow meter

SMR12GGX50KG/US-100

### Connection



Colours to DIN EN 60947-5-2

OUT1: analog output Temperature monitoring

OUT2: analog output Volumetric flow quantity monitoring

Core colors :

BK = black

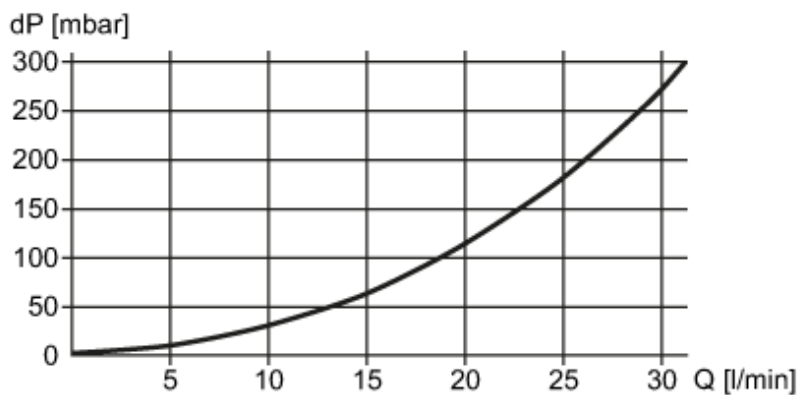
BN = brown

BU = blue

WH = white

### Diagrams and graphs

Pressure loss



dP Pressure loss

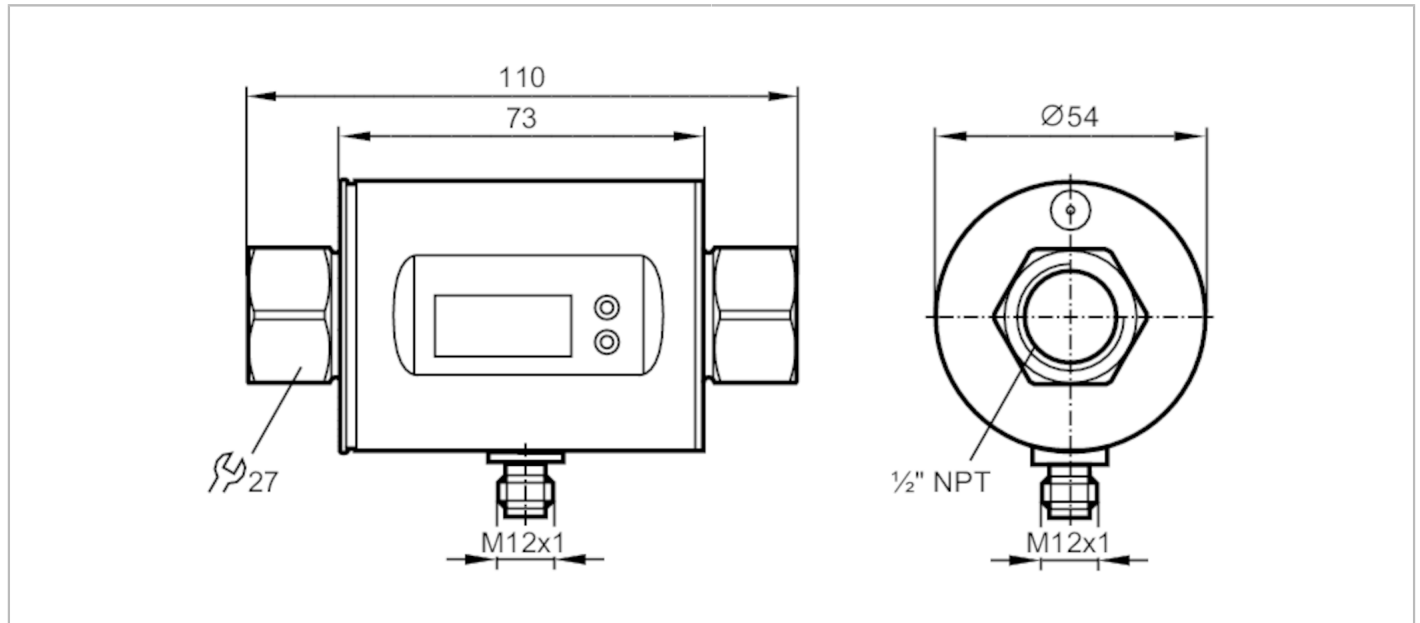
Q volumetric flow quantity

# SM6601



## Magnetic-inductive flow meter

SMN12GGXFRKG/US-100



Product characteristics	
Number of inputs and outputs	Number of digital outputs: 2; Number of analog outputs: 1
Process connection	threaded connection 1/2" NPT DN15
Temperature monitoring	
Measuring range	[-4...176] [°F]
Application	
System	gold-plated contacts
Application	Totalizer function; for industrial applications
Media	Conductive liquids; water; water-based media
Note on media	conductivity: $\geq 20 \mu\text{S/cm}$ viscosity: $< 70 \text{ mm}^2/\text{s}$ (40 °C)
Medium temperature	14...158 [°F]
Pressure rating	16 [bar]
Pressure rating	232 [psi]
MAWP (for applications according to CRN)	17.7 [bar]
Electrical data	
Operating voltage	18...30 DC; (according to EN 50178 SELV/PELV) [V]
Current consumption	95; (24 V) [mA]
Min. insulation resistance	100; (500 V DC) [MΩ]
Protection class	III
Reverse polarity protection	yes
Power-on delay time	5 [s]
Inputs / outputs	
Number of inputs and outputs	Number of digital outputs: 2; Number of analog outputs: 1

# SM6601



## Magnetic-inductive flow meter

SMN12GGXFRKG/US-100

Inputs		
Inputs		counter reset
Outputs		
Total number of outputs		2
Output signal		switching signal; analog signal; pulse 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]	200
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
Measuring/setting range		
Measuring range	1.5...396 gph	0.03...6.6 gpm
Display range	-475.5...475.5 gph	-7.925...7.925 gpm
Resolution	0.5 gph	0.01 gpm
Set point SP	3.5...396.5 gph	0.06...6.6 gpm
Reset point rP	1.5...394 gph	0.03...6.57 gpm
Analog start point ASP	0...318 gph	0...5.3 gpm
Analog end point AEP	78...396 gph	1.3...6.6 gpm
In steps of	0.5 gph	0.01 gpm
Volumetric flow quantity monitoring		
Pulse value		0.01...30 000 000 gal
Pulse length	[s]	0,01...2
Temperature monitoring		
Measuring range	[°F]	-4...176
Resolution	[°F]	0.1
Set point SP	[°F]	-2.5...176
Reset point rP	[°F]	-3.5...175
Analog start point	[°F]	-4...140.5
Analog end point	[°F]	31.5...176
In steps of	[°F]	0.5

# SM6601



## Magnetic-inductive flow meter

SMN12GGXFRKG/US-100

Accuracy / deviations			
Flow monitoring			
Accuracy (in the measuring range)		$\pm (0,8 \% MW + 0,5 \% MEW)$	
Repeatability		$\pm 0,2\% MEW$	
Temperature monitoring			
Accuracy	[K]	$\pm 4,5 (Q > 0,26 \text{ gpm})$	
Reaction times			
Flow monitoring			
Response time	[s]	0.15; (dAP = 0, T19)	
Delay time programmable dS, dr	[s]	0...50	
Damping for the switching output dAP	[s]	0...5	
Temperature monitoring			
Dynamic response T05 / T09	[s]	T09 = 20 (Q > 0,26 gpm)	
Software / programming			
Parameter setting options		Flow monitoring; quantity meter; Preset counter; Temperature monitoring; hysteresis / window; normally open / closed; switching logic; current/voltage/pulse output; Start-up delay; display can be deactivated; Display unit	
Interfaces			
Communication interface		IO-Link	
Transmission type		COM2 (38,4 kBaud)	
IO-Link revision		1.1	
SDCI standard		IEC 61131-9	
IO-Link device ID		570 / 00 02 3a h	
Profiles		Smart Sensor: Process Data Variable; Device Identification, Device Diagnosis	
SIO mode		yes	
Required master port class		A	
Process data analogue		3	
Process data binary		2	
Min. process cycle time	[ms]	5	
Operating conditions			
Ambient temperature	[°F]	14...140	
Storage temperature	[°F]	-13...176	
Protection		IP 67	
Tests / approvals			
EMC		DIN EN 60947-5-9	
Shock resistance		DIN EN 68000-2-27	20 g (11 ms)
Vibration resistance		DIN EN 60068-2-6	5 g (10...2000 Hz)
MTTF	[years]	145	
Pressure equipment directive		sound engineering practice; can be used for group 2 fluids; group 1 fluids on request	

# SM6601



## Magnetic-inductive flow meter

SMN12GGXFRKG/US-100

### Mechanical data

Weight	[g]	586.5
Material		stainless steel (1.4404 / 316L); PBT-GF20; PC; FKM; TPE
Materials (wetted parts)		stainless steel (1.4404 / 316L); PEEK; FKM
Process connection		threaded connection 1/2" NPT DN15

### Displays / operating elements

Display	Display unit	6 x LED, green (gpm, gph, gal, °F, 10 <sup>3</sup> , 1000 x 10 <sup>3</sup> )
	Switching status	2 x LED, yellow
	Measured values	alphanumeric display, 4-digit
	Programming	alphanumeric display, 4-digit

### Remarks

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

### Electrical connection

Connector: 1 x M12; Contacts: gold-plated



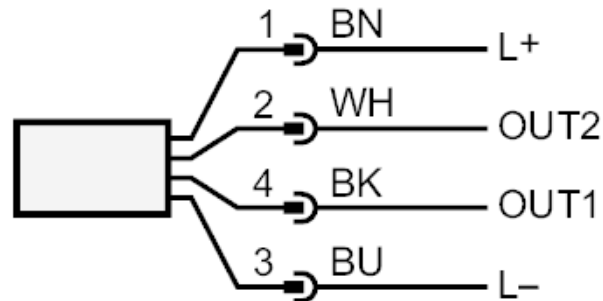
# SM6601



## Magnetic-inductive flow meter

SMN12GGXFRKG/US-100

### Connection



Colours to DIN EN 60947-5-2

OUT1: Switching output Volumetric flow quantity monitoring

Pulse output quantity meter

signal output Preset counter

IO-Link

OUT2: 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



# SM6601

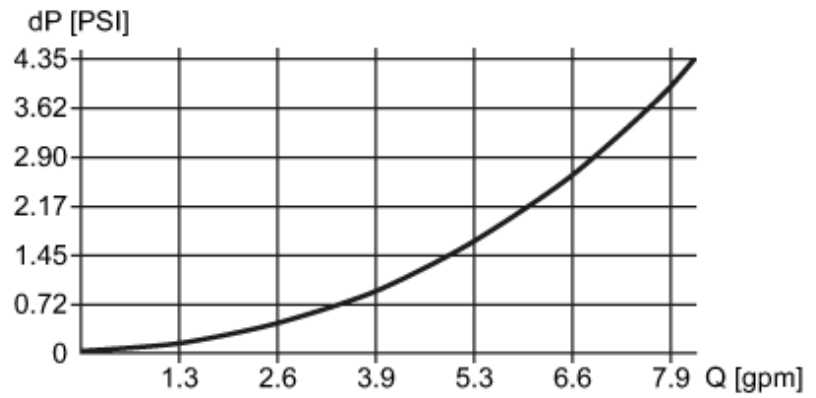


## Magnetic-inductive flow meter

SMN12GGXFRKG/US-100

### Diagrams and graphs

Pressure loss



dP Pressure loss

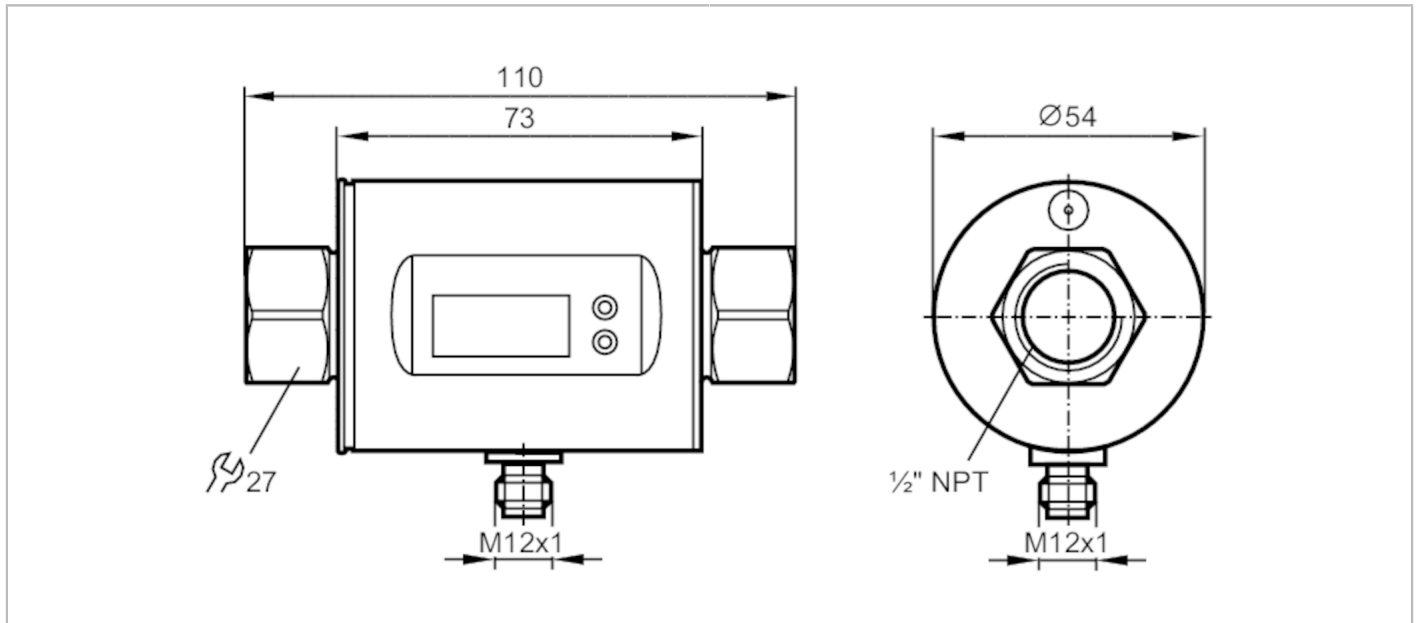
Q volumetric flow quantity

# SM6604



## Magnetic-inductive flow meter

SMN12GGX50KG/US-100



### Product characteristics

Number of inputs and outputs	Number of analog outputs: 2
Process connection	threaded connection 1/2" NPT DN15
Temperature monitoring	
Measuring range [°C]	-20...80

### Application

System	gold-plated contacts
Application	for industrial applications
Media	Conductive liquids; water; water-based media
Note on media	conductivity: $\geq 20 \mu\text{S/cm}$ viscosity: $< 70 \text{ mm}^2/\text{s}$ (40 °C)
Medium temperature [°C]	-10...70
Pressure rating [bar]	16
Pressure rating [Mpa]	1.6
MAWP (for applications according to CRN) [bar]	17.7

### Electrical data

Operating voltage [V]	20...30 DC; (according to EN 50178 SELV/PELV)
Current consumption [mA]	120; (24 V)
Protection class	III
Reverse polarity protection	yes
Power-on delay time [s]	5

### Inputs / outputs

Number of inputs and outputs	Number of analog outputs: 2
------------------------------	-----------------------------

# SM6604



## Magnetic-inductive flow meter

SMN12GGX50KG/US-100

Outputs		
Total number of outputs		2
Output signal		analog signal
Number of analog outputs		2
Analog current output	[mA]	4...20; (scalable)
Max. load	[Ω]	500
Overload protection		yes
Measuring/setting range		
Measuring range	0.1...25 l/min	0.03...6.6 gpm
Display range	-30...30 l/min	-7.92...7.92 gpm
Resolution	0.02 l/min	0.01 gpm
Analog start point ASP	0...20 l/min	0...5.28 gpm
Analog end point AEP	5...25 l/min	1.32...6.6 gpm
In steps of	0.02 l/min	0.01 gpm
Temperature monitoring		
Measuring range	[°C]	-20...80
Resolution	[°C]	0.2
Analog start point	[°C]	-20...60
Analog end point	[°C]	0...80
In steps of	[°C]	0.2
Accuracy / deviations		
Flow monitoring		
Accuracy (in the measuring range)		± (2 % MW + 0,5 % MEW)
Repeatability		± 0,2% MEW
Temperature monitoring		
Accuracy	[K]	± 2,5 (Q > 1 l/min)
Reaction times		
Flow monitoring		
Response time	[s]	0.15; (dAP = 0, T19)
Damping for the switching output dAP	[s]	0...3
Temperature monitoring		
Dynamic response T05 / T09	[s]	T09 = 20 (Q > 1 l/min)
Operating conditions		
Ambient temperature	[°C]	-10...60
Storage temperature	[°C]	-25...80
Protection		IP 67
Tests / approvals		
EMC	DIN EN 60947-5-9	500 V withstand voltage (V DC)
Shock resistance	DIN EN 60068-2-27	20 g (11 ms)
Vibration resistance	DIN EN 68000-2-6	5 g (10...2000 Hz)
MTTF	[years]	175
Pressure equipment directive		sound engineering practice; can be used for group 2 fluids; group 1 fluids on request

# SM6604



## Magnetic-inductive flow meter

SMN12GGX50KG/US-100

Mechanical data	
Weight [g]	566.5
Material	stainless steel (1.4404 / 316L); PBT-GF20; PC; FKM; TPE
Materials (wetted parts)	stainless steel (1.4404 / 316L); PEEK; FKM
Process connection	threaded connection 1/2" NPT DN15

Displays / operating elements		
Display	Display unit	6 x LED, green (l/min, m <sup>3</sup> /h, gpm, gph, °C, °F)
	Measured values	alphanumeric display, 4-digit
	Programming	alphanumeric display, 4-digit
Display unit	l/min; m <sup>3</sup> /h; gpm; gph; °C; °F	

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

### Electrical connection

Connector: 1 x M12; Contacts: gold-plated



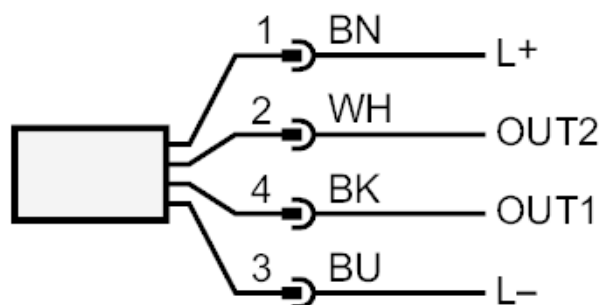
# SM6604



## Magnetic-inductive flow meter

SMN12GGX50KG/US-100

### Connection



Colours to DIN EN 60947-5-2

OUT1: analog output Temperature monitoring

OUT2: analog output Volumetric flow quantity monitoring

Core colors :

BK = black

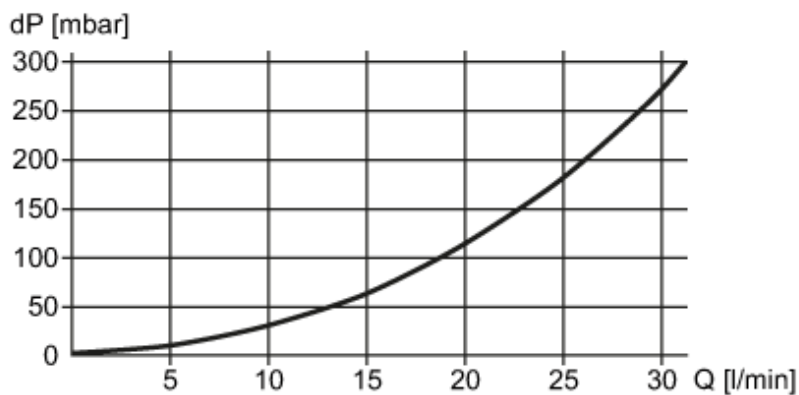
BN = brown

BU = blue

WH = white

### Diagrams and graphs

Pressure loss



dP Pressure loss

Q volumetric flow quantity