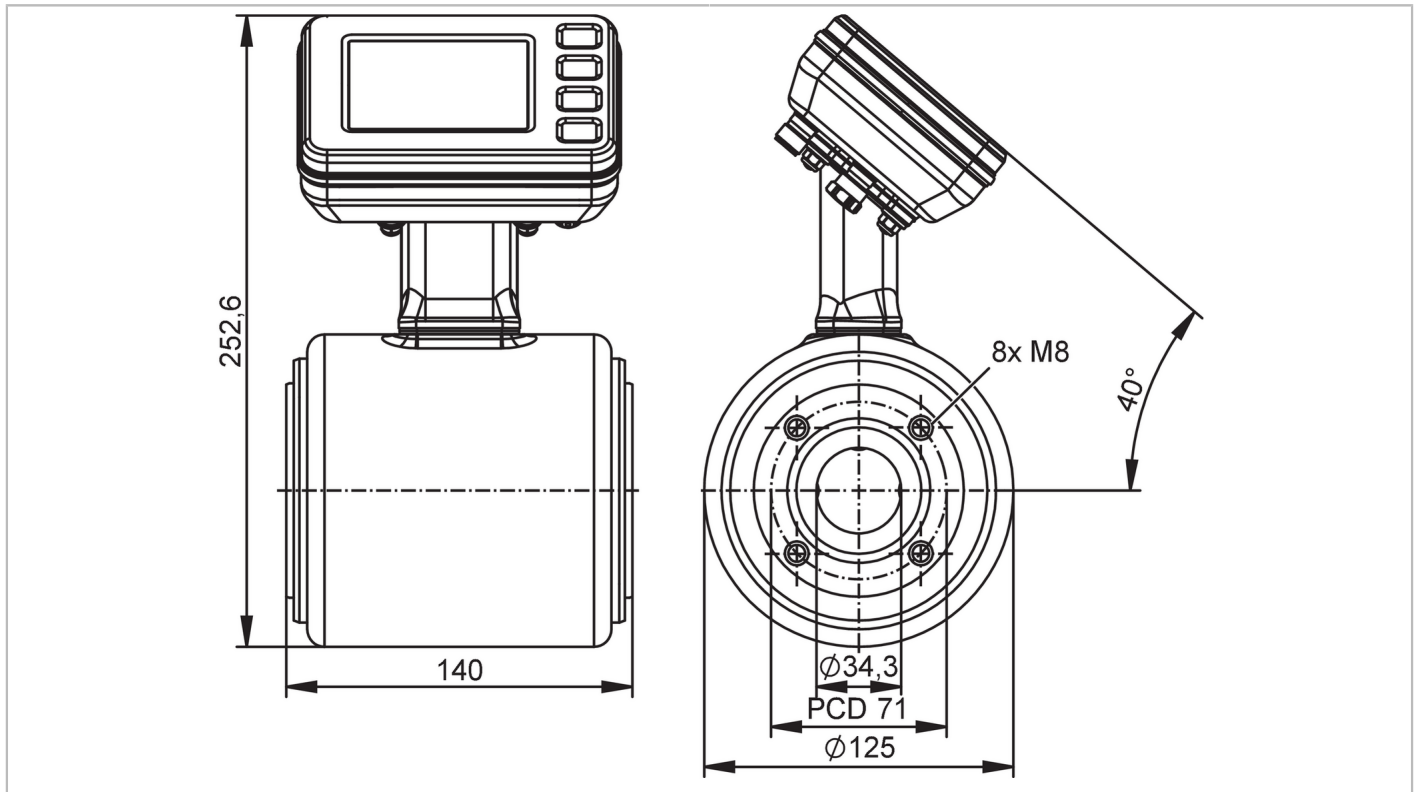


# SMF321



## Magnetic-inductive flow meter

SMG40KGFFRKG/USD



EC 1935/2004

FCM



### Product characteristics

Measuring range	5...750 l/min	300...45000 l/h	1.4...198.2 gpm	0.22...32.42 ft/s
Nominal diameter	DN40 (1 1/2")			
Process connection	ifm-specific device flange			

### Application

Special feature	gold-plated contacts			
Application	food and beverage industry			
Media	Conductive liquids; water; water-based media			
Note on media	food products such as beer, milk, fruit juices, soft drinks, ketchup, yogurt, yogurt toppings, ice cream conductivity: $\geq 5 \mu\text{S/cm}$			
Medium temperature	-20...150 °C		-4...302 °F	
Min. burst pressure	870 psi		6 MPa	
Pressure rating	580.1 psi		4 MPa	
MAWP (for applications according to CRN) [MPa]	4			

### Electrical data

Operating voltage [V]	18...32 DC			
Current consumption [mA]	250; (24V)			
Protection class	III			
Reverse polarity protection	yes			
Power-on delay time [s]	< 5			
Measuring principle	magnetic-inductive			

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Inputs / outputs				
Total number of inputs and outputs	2			
Inputs				
Inputs	OUT2	external totalizer reset		
Outputs				
Total number of outputs	2			
Output signal	OUT1	pulse signal; totalizer switching signal; diagnostic signal; IO-Link		
	OUT2	analog signal; pulse signal; totalizer switching signal; diagnostic signal		
Electrical design	PNP/NPN			
Pulse output	flow rate meter			
Short-circuit protection	yes			
Type of short-circuit protection	yes (non-latching)			
Overload protection	yes			
Analog				
Number of analog outputs	1			
Analog current output [mA]	4...20; (skalierbar)			
Max. load [ $\Omega$ ]	500			
Resolution of analog output	0.38 $\mu$ A			
Digital				
Number of digital outputs	2			
Max. voltage drop switching output DC [V]	2			
Permanent current rating of switching output DC [mA]	100			
Switching frequency DC [Hz]	0...10000			
Measuring/setting range				
Measuring range	5...750 l/min	300...45000 l/h	1.4...198.2 gpm	0.22...32.42 ft/s
Display range	-900...900 l/min	-54000...54000 l/h	-237.75...237.75 gpm	-39.4...39.4 ft/s
Resolution	0.01 l/min	50 l/h	0.01 gpm	0.01 ft/s
Note on factory setting	0...50 gpm			
Analog start point ASP	-750...600 l/min	-45000...36000 l/h	-198.15...158.52 gpm	-32.8...26.24 ft/s
Analog end point AEP	-600...750 l/min	-36000...45000 l/h	-158.52...198.15 gpm	-26.24...32.8 ft/s
Low flow cut-off LFC	0...600 l/min	0...36000 l/h	0...158.52 gpm	0...26.24 ft/s
Pulse length [s]	0.00005...2			
Pulse value	0.004...99990000 l			
Temperature monitoring				
Measuring range	-20...150 $^{\circ}$ C		-4...302 $^{\circ}$ F	
Display range	-20...150 $^{\circ}$ C		-4...302 $^{\circ}$ F	
Resolution	0.01 $^{\circ}$ C		0.1 $^{\circ}$ F	
Analog start point	-20...116 $^{\circ}$ C		-4...240.8 $^{\circ}$ F	
Analog end point	14...150 $^{\circ}$ C		57.2...302 $^{\circ}$ F	
Conductivity monitoring				
Measuring range [ $\mu$ S/cm]	100...100000			

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Display range	[ $\mu$ S/cm]	0...10000000
Resolution	[ $\mu$ S/cm]	1
Analog start point	[ $\mu$ S/cm]	0...80000
Analog end point	[ $\mu$ S/cm]	20000...100000

### Accuracy / deviations

Volumetric flow monitoring		
Accuracy (under reference conditions)	with optional factory calibration (availability is being planned)	$\pm (0,2 \% \text{ MW} + 2 \text{ mm/s})$
	standard	$\pm (0,5 \% \text{ MW} + 1,5 \text{ mm/s})$
Repeatability		0,1% MW
Temperature monitoring		
Accuracy	[K]	$\pm 1 (v > 0,5 \text{ m/s})$
Repeatability	[K]	$\pm 0,5 (v > 0,5 \text{ m/s})$
Conductivity monitoring		
Accuracy (in the measuring range)	in the range of 100...20000 $\mu$ S/cm	$\pm 10\% \text{ MW}$
	in the range of 20000...100000 $\mu$ S/cm	$\pm 20\% \text{ MW}$
Repeatability		$\pm 5\% \text{ MW}$

### Reaction times

Volumetric flow monitoring		
Response time	[s]	< 0.3
Damping process value dAP	[s]	0...5
Temperature monitoring		
Response time	[s]	< 3; ( $v > 0,5 \text{ m/s}$ )
Conductivity monitoring		
Response time	[s]	< 2

### Software / programming

Diagnostic functions	direction of flow detection; liquid detection
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### Interfaces

Communication interface	IO-Link	
Transmission type	COM3 (230,4 kBaud)	
IO-Link revision	1.1.3	
SDCI standard	IEC 61131-9	
Profiles	Smart Sensor - SSP 4.3.4	Measuring and Switching Sensor, floating point, 4 channel
	BLOB	Binary Large Object transfer
	Common - I&D	Identification and Diagnosis
	Extension	Sensor Control Wide
	Extension	Quantity detection, switches when value exceeds the setpoint
	Function	Locator
	Function	ProductURI
	SIO mode	yes
Required master port class	A	
Process data analog	6	
Process data binary	8	

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Min. process cycle time [ms]	1.9	
IO-Link process data (cyclical)	<b>Function</b>	<b>bit length</b>
	totalizer	32
	flow	32
	temperature	32
	conductivity	32
	status	4
	binary switching information	8
IO-Link functions (acyclical)	direction of flow detection; totalizer; memory; operating hours counter; internal temperature; simulation function	
Supported DeviceIDs	<b>Type of operation</b>	<b>DeviceID</b>
	default	1790

### Operating conditions

Ambient temperature	-20...65 °C	-4...149 °F
Storage temperature	-20...80 °C	-4...176 °F
Protection	IP 67; IP 69; (to DIN EN 60529)	

### Tests / approvals

EMC	DIN 61326-1	
CPA approval	model number	SMF
	accuracy class	0,5
Shock resistance	DIN IEC 68-2-27	20 g (18ms)
Vibration resistance	DIN IEC 68-2-6	5 g (10...2000Hz)
MTTF [years]	81	
UL approval	UL approval number	I031
Pressure equipment directive	sound engineering practice; can be used for group 2 fluids; group 1 fluids on request	

### Mechanical data

Weight [g]	5354.45	
Housing	tubular	
Inlet pipe length	5 x DN	
Outlet pipe length	2 x DN	
Dimensions [mm]	Ø 125 / L = 140	
Material	housing: stainless steel (1.4404 / 316L); flange: stainless steel (1.4301 / 304); electronics fixture: stainless steel (1.4301 / 304); electronics: stainless steel (1.4404 / 316L); Display: polysulfone; Display-sealing: FKM; LED ring: PP	
Materials (wetted parts)	Pipe section: PFA; electrodes: stainless steel (1.4435 / 316L)	
Nominal diameter	DN40 (1 1/2")	
Process connection	ifm-specific device flange	
Surface characteristics Ra/Rz of the wetted parts	Ra < 0.4 µm	

### Displays / operating elements

Display	process value	full graphics TFT display, multi-color 3,5" 320 x 240 Pixel
		display layouts: 4
		display rotation: 4 x 90°
	operating status	LED ring, three-color
Display unit	l/min; l/h; hl/min; hl/h; m³/min; m³/h; m/s; gpm; gph; ft/s; °C; °F; µS/cm; S/m; ms/cm	
Factory setting	gpm; °F; µS/cm	

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Language	German; English; Spanish; French; Italian; Japanese; Korean; Portuguese; Chinese	
Operating elements	4	capacitive pushbuttons

### Remarks

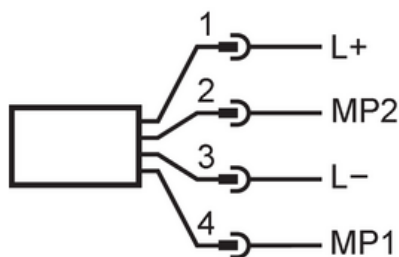
Remarks	MW = Measured value	
	MEW = Final value of the measuring range	
	pulse and totalizer signal are only available for one of the two outputs	
	reference conditions (1/2): water (free of gas bubbles), 15...35 °C, process connection: DIN32676 series A, pipe standard suitable for process connection	
	reference conditions (2/2): inlet pipe length 10xDN, outlet pipe length 5xDN, device settling time: 30 minutes, device orientation: horizontal, display orientation: up	
accuracy specifications according to factory certificate on delivery		
Pack quantity	1 pcs.	

### Electrical connection

Connector: 1 x M12; coding: A; Contacts: 4, gold-plated



### Connection



### Electrical connection - plug

1	L+	
2	MP2	DO2, AO, Reset
3	L-	
4	MP1	DO1, IO-Link

AO: analog output; DO: digital output; MP: multi-function connection