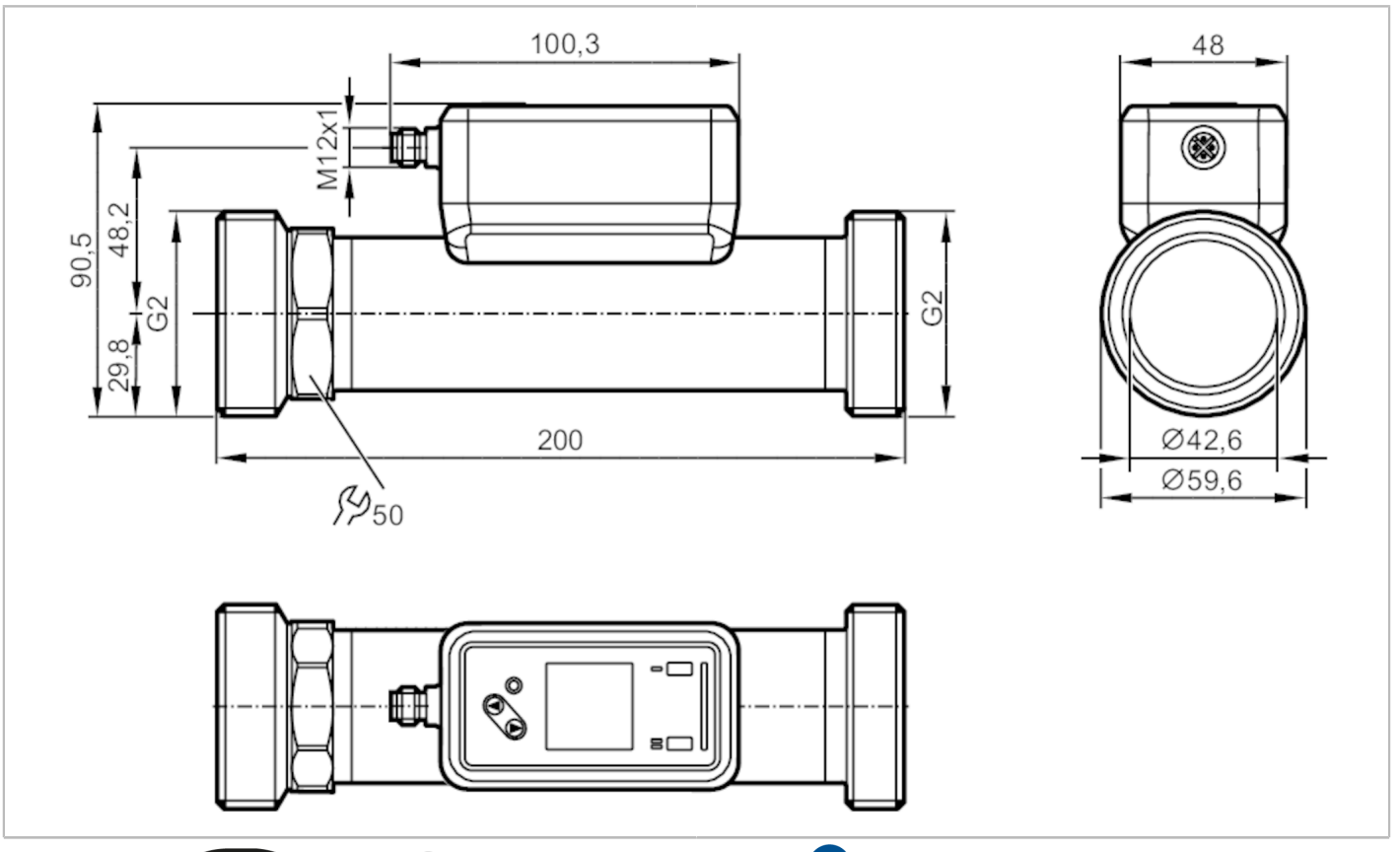
SU2021

Ultrasonic flow meter

SUR21XXBFRKG/US



ACS CE PA CRN cULus LISTED IO-Link KTW/W270 NSF Reg31

Product characteristics				
Measuring range	5...1000 l/min	0.3...60 m³/h	79...15850 gph	1.32...264.18 gpm
Process connection	threaded connection G 2 external thread DN50			
Application				
Special feature	Gold-plated contacts			
Media	ultra-pure water; water; hydrous media			
Note on media	hydrous media: for media with >10 % additives, the repeatability is the only available value			
Medium temperature	-20...100 °C	-4...212 °F		
Min. bursting pressure	150 bar	15 MPa		
Pressure rating	100 bar	10 MPa		
Vacuum resistance [mbar]	-1000			
MAWP for applications according to CRN	36.6 bar	3.66 MPa		
Electrical data				
Operating voltage [V]	18...32 DC; (to SELV/PELV)			
Current consumption [mA]	< 75			
Protection class	III			
Reverse polarity protection	yes			
Power-on delay time [s]	5			
Measuring principle	ultrasonic			
Inputs				
Inputs	counter reset			

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Outputs		
Total number of outputs		2
Output signal		switching signal; pulse signal; analogue signal; IO-Link; frequency signal; diagnostic signal; totaliser switching signal
Electrical design		PNP/NPN
Output function		normally open / normally closed; (parameterisable)
Max. voltage drop switching output DC	[V]	2
Permanent current rating of switching output DC	[mA]	100
Switching frequency DC	[Hz]	0...10000
Analogue current output	[mA]	4...20
Max. load	[Ω]	500
Pulse output		flow rate meter
Short-circuit protection		yes
Type of short-circuit protection		pulsed
Overload protection		yes

Measuring/setting range					
Measuring range		5...1000 l/min	0.3...60 m³/h	79...15850 gph	1.32...264.18 gpm
Display range		-1200...1200 l/min	-72...72 m³/h	-19020...19020 gph	-317...317 gpm
Resolution		0.1 l/min	0.001 m³/h	1 gph	0.01 gpm
Set point SP		10.5...1000 l/min	0.63...60 m³/h	166...15850 gph	2.77...264.17 gpm
Reset point rP		5.3...994.8 l/min	0.318...59.688 m³/h	84...15768 gph	1.4...262.8 gpm
Analogue start point ASP		-1000...800 l/min	-60...48000 m³/h	-15850...12680 gph	-264.17...211.34 gpm
Analogue end point AEP		-800...1000 l/min	-48...60 m³/h	-12680...15850 gph	-211.34...264.17 gpm
Low flow cut-off LFC		5...50 l/min	0.3...3 m³/h	79...793 gph	1.32...13.21 gpm
Frequency end point, FEP		200.6...1000 l/min	12.037...60 m³/h	3180...15850 gph	53...264.17 gpm
Frequency at the end point FRP	[Hz]	1...10000			
Volumetric flow quantity monitoring					
Pulse length	[s]	0.002...2			
Pulse value		0.1...99990000 l; 0.026...26414563.515 gal			
Temperature monitoring					
Measuring range		-20...100 °C		-4...212 °F	
Display range		-44...124 °C		-47.2...255.2 °F	
Resolution		0.1 °C		0.1 °F	
Set point SP		-19.6...100 °C		-3.2...212 °F	
Reset point rP		-20...99.6 °C		-4...211.2 °F	
Analogue start point		-20...76 °C		-4...168.8 °F	
Analogue end point		4...100 °C		39.2...212 °F	
Frequency start point, FSP		-20...76 °C		-4...168.8 °F	
Frequency end point, FEP		4...100 °C		39.2...212 °F	
Frequency at the end point FRP	[Hz]	1...10000			

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Accuracy / deviations			
Flow monitoring			
Accuracy (in the measuring range)		± (1,0 % MW + 0,5 % MEW)	
Repeatability		± 0,2 % MEW	
Temperature monitoring			
Accuracy	[K]	± 2,5 (Q > 5 % MEW)	
Temperature coefficient	[% of the span / 10 K]	0,2	
Response times			
Flow monitoring			
Response time	[s]	< 0.25; (dAP = 0, T09)	
Damping process value dAP	[s]	0...5	
Temperature monitoring			
Dynamic response T05 / T09	[s]	5,7 / 86	
Software / programming			
Diagnostic functions		direction of flow detection; signal quality	
Interfaces			
Communication interface		IO-Link	
Transmission type		COM2 (38,4 kBaud)	
IO-Link revision		1.1.3	
SDCI standard		IEC 61131-9: 2013-07	
Profiles		BLOB	Binary Large Object transfer
		Common - I&D	Identification and Diagnosis
Required master port type		A	
Process data analogue		3	
Process data binary		2	
Min. process cycle time	[ms]	9.6	
IO-Link process data (cyclical)		**function**	**bit length**
		totaliser	32
		Flow monitoring	32
		Temperature monitoring	32
		status	4
		Output 1	1
		Output 2	1
Supported DeviceIDs		**Type of operation**	**DeviceID**
		default	1464
Operating conditions			
Ambient temperature	[°C]	-20...60	
Storage temperature	[°C]	-25...80	
Protection		IP 67	
Tests / approvals			
EMC		DIN 61326-1:2021	
CPA approval		model number	002US
		accuracy class	1,5

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Shock resistance		DIN IEC 68-2-27	20 g (11ms)
Vibration resistance		DIN IEC 68-2-6	20 g (10...2000Hz)
MTTF	[years]	160	
UL approval		UL approval no.	I033
		File number UL	E174189
Pressure Equipment Directive		can be used for group 2 fluids; group 1 fluids on request	

Mechanical data

Weight	[g]	1173	
Housing		rectangular	
Type of mounting		inlet pipe length 5xDN; outlet pipe length 1xDN	
Dimensions	[mm]	200 x 59.6 x 90.5	
Materials		housing: stainless steel (316L/1.4404); Display: PFA; Sealing Display: FKM; connector: PBT	
Materials (wetted parts)		Pipe section: stainless steel (316L/1.4404); Process connection sealing: NBR reinforced fibre Flat seal	
Process connection		threaded connection G 2 external thread DN50	
Surface characteristics Ra/Rz of the wetted parts		Ra < 1.25 µm	

Displays / operating elements

Display			colour display 1,44", 128 x 128 pixels
		Switching function	2 x LED, yellow
		diagnosis	1 x LED, three-colour

Accessories

Items supplied	Flat seal 2, Centellen
	package insert

Remarks

Remarks	MW = measured value
	MEW = Final value of the measuring range
	pulse and totaliser signal are only available for one of the two outputs
	the accuracy indications are adhered to over the entire application area
Pack quantity	1 pcs.

Electrical connection

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

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Ultrasonic flow meter

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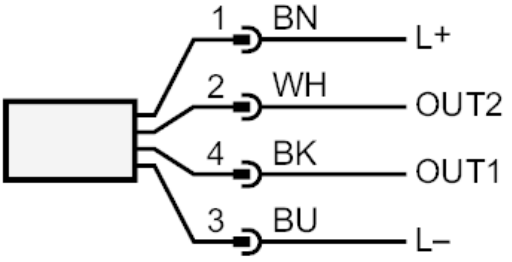
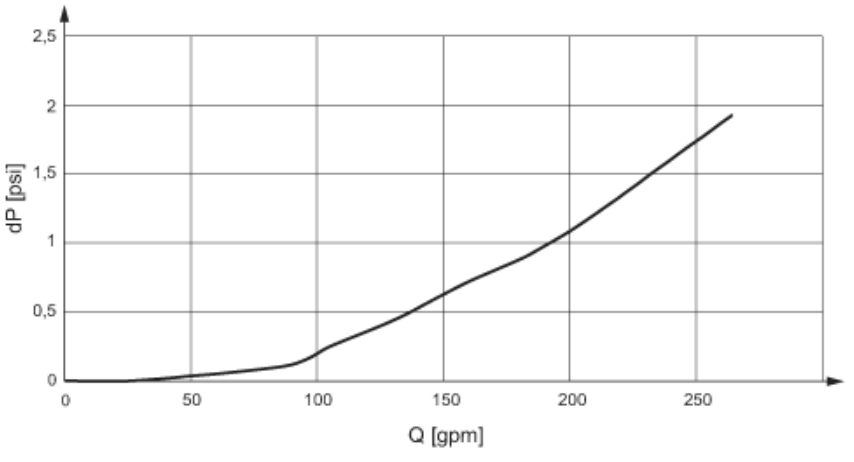
Connection



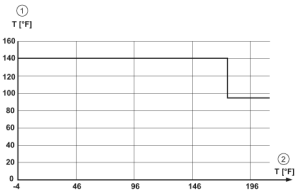
OUT1/IO-Link:	switching output volumetric flow quantity monitoring switching output Temperature monitoring Pulse output quantity meter frequency output volumetric flow quantity monitoring frequency output Temperature monitoring signal output Preset counter
OUT2/InD:	switching output volumetric flow quantity monitoring switching output Temperature monitoring Pulse output quantity meter analogue output flow analogue output temperature signal output Preset counter input counter reset
colours to DIN EN 60947-5-2	
Core colours	BK= black BN= brown BU= blue WH= white

Diagrams and graphs

Note on pressure loss



derating ambient temperature



1 Ambient temperature

2 Medium temperature

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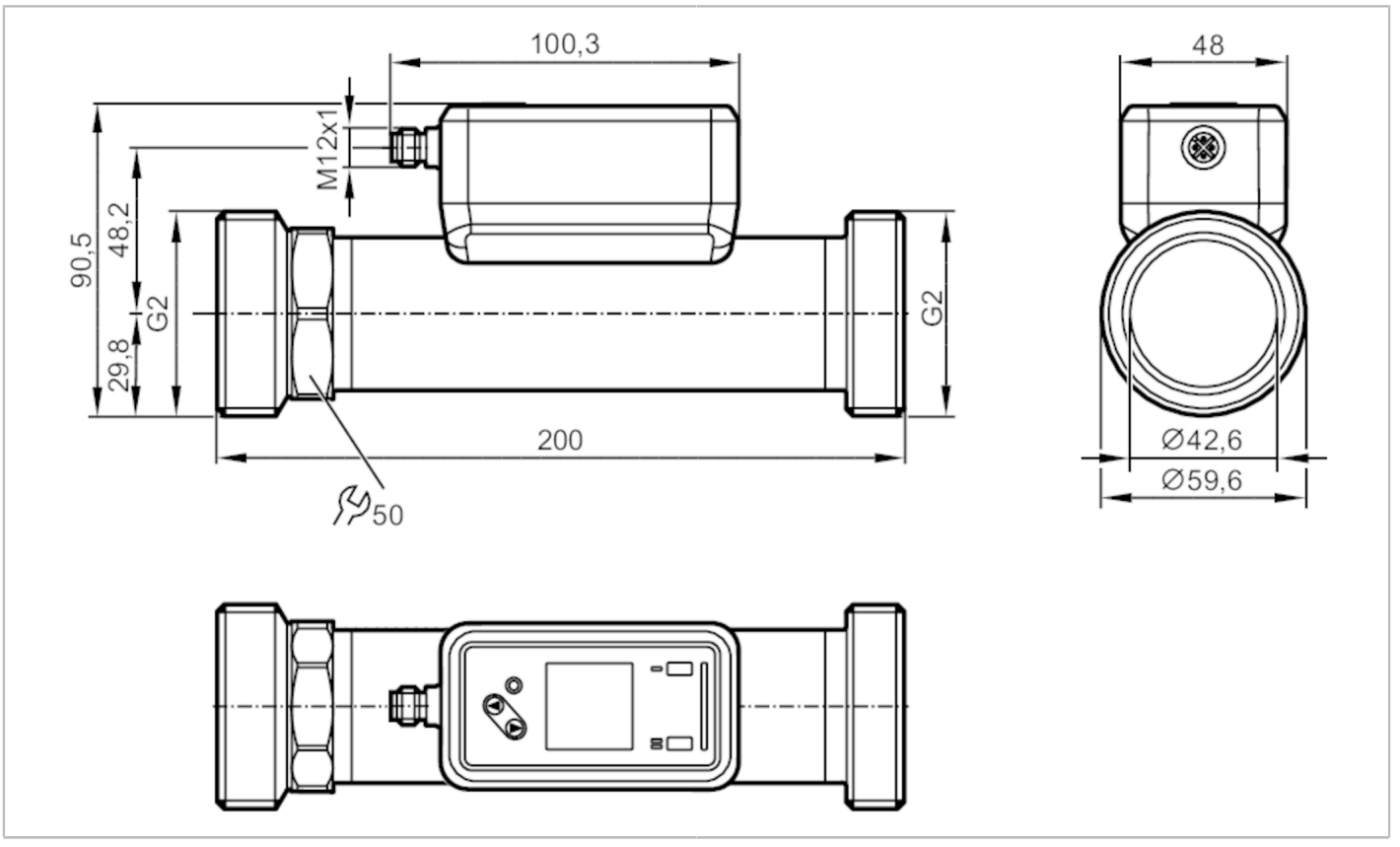

IO-Link

Product characteristics					
Measuring range		5...1000 l/min	0.3...60 m³/h	79...15850 gph	1.32...264.18 gpm
Process connection		threaded connection G 2 external thread DN50			
Application					
Special feature		Gold-plated contacts			
Media		ultra-pure water; water; hydrous media; glycol solutions; oils; coolants			
Note on media		hydrous media: for media with >10 % additives, the repeatability is the only available value			
		low-viscosity oils with viscosity: 7...40 mm²/s (40 °C)			
		high-viscosity oils with viscosity: 30...68 mm²/s (40 °C)			
Medium temperature		-20...100 °C		-4...212 °F	
Min. bursting pressure		150 bar		15 MPa	
Pressure rating		100 bar		10 MPa	
Vacuum resistance	[mbar]	-1000			
Electrical data					
Operating voltage	[V]	18...32 DC; (to SELV/PELV)			
Current consumption	[mA]	< 75			
Protection class		III			
Reverse polarity protection		yes			
Power-on delay time	[s]	5			
Measuring principle		ultrasonic			

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Ultrasonic flow meter

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Inputs				
Inputs	counter reset			
Outputs				
Total number of outputs	2			
Output signal	switching signal; pulse signal; analogue signal; IO-Link; frequency signal; diagnostic signal; totaliser switching signal			
Electrical design	PNP/NPN			
Output function	normally open / normally closed; (parameterisable)			
Max. voltage drop switching output DC [V]	2			
Permanent current rating of switching output DC [mA]	100			
Switching frequency DC [Hz]	0...10000			
Analogue current output [mA]	4...20			
Max. load [Ω]	500			
Pulse output	flow rate meter			
Short-circuit protection	yes			
Type of short-circuit protection	pulsed			
Overload protection	yes			
Measuring/setting range				
Measuring range	5...1000 l/min	0.3...60 m³/h	79...15850 gph	1.32...264.18 gpm
Display range	-1200...1200 l/min	-72...72 m³/h	-19020...19020 gph	-317...317 gpm
Resolution	0.1 l/min	0.001 m³/h	1 gph	0.01 gpm
Set point SP	10.5...1000 l/min	0.63...60 m³/h	166...15850 gph	2.77...264.17 gpm
Reset point rP	5.3...994.8 l/min	0.318...59.688 m³/h	84...15768 gph	1.4...262.8 gpm
Analogue start point ASP	-1000...800 l/min	-60...48000 m³/h	-15850...12680 gph	-264.17...211.34 gpm
Analogue end point AEP	-800...1000 l/min	-48...60 m³/h	-12680...15850 gph	-211.34...264.17 gpm
Low flow cut-off LFC	5...50 l/min	0.3...3 m³/h	79...793 gph	1.32...13.21 gpm
Frequency end point, FEP	200.6...1000 l/min	12.037...60 m³/h	3180...15850 gph	53...264.17 gpm
Frequency at the end point FRP [Hz]	1...10000			
Volumetric flow quantity monitoring				
Pulse length [s]	0.002...2			
Pulse value	0.1...99990000 l; 0.026...26414563.515 gal			
Temperature monitoring				
Measuring range	-20...100 °C	-4...212 °F		
Display range	-44...124 °C	-47.2...255.2 °F		
Resolution	0.1 °C	0.1 °F		
Set point SP	-19.6...100 °C	-3.2...212 °F		
Reset point rP	-20...99.6 °C	-4...211.2 °F		
Analogue start point	-20...76 °C	-4...168.8 °F		
Analogue end point	4...100 °C	39.2...212 °F		
Frequency start point, FSP	-20...76 °C	4...168.8 °F		
Frequency end point, FEP	4...100 °C	39.2...212 °F		
Frequency at the end point FRP [Hz]	1...10000			

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Accuracy / deviations			
Flow monitoring			
Accuracy (in the measuring range)		glycol solutions (35%)	±(5,0 % MW + 0,5 % MEW)
		high-viscosity oils with viscosity 46mm2/s (40°C)	±(5,0 % MW + 0,5 % MEW)
		low-viscosity oils with viscosity 10mm2/s (40°C)	±(5,0 % MW + 0,5 % MEW)
		water	± (1,0 % MW + 0,5 % MEW)
Repeatability		± 0,2 % MEW	
Temperature monitoring			
Accuracy	[K]	± 2,5 (Q > 5 % MEW)	
Temperature coefficient [% of the span / 10 K]		0,2	
Response times			
Flow monitoring			
Response time	[s]	< 0.25; (dAP = 0, T09)	
Damping process value dAP	[s]	0...5	
Temperature monitoring			
Dynamic response T05 / T09	[s]	5,7 / 86	
Software / programming			
Diagnostic functions		direction of flow detection; signal quality	
Interfaces			
Communication interface		IO-Link	
Transmission type		COM2 (38,4 kBaud)	
IO-Link revision		1.1.3	
SDCI standard		IEC 61131-9: 2013-07	
Profiles		BLOB	Binary Large Object transfer
		Common - I&D	Identification and Diagnosis
Required master port type		A	
Process data analogue		3	
Process data binary		2	
Min. process cycle time	[ms]	9.6	
IO-Link process data (cyclical)		**function**	**bit length**
		totaliser	32
		Flow monitoring	32
		Temperature monitoring	32
		status	4
		Output 1	1
		Output 2	1
Supported DeviceIDs		**Type of operation**	**DeviceID**
		default	1763
Operating conditions			
Ambient temperature	[°C]	-20...60	
Storage temperature	[°C]	-25...80	
Protection		IP 67	

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Tests / approvals			
EMC		DIN 61326-1:2021	
Shock resistance		DIN IEC 68-2-27	20 g (11ms)
Vibration resistance		DIN IEC 68-2-6	20 g (10...2000Hz)
MTTF	[years]	160	
UL approval		UL approval no.	I033
Pressure Equipment Directive		can be used for group 2 fluids; group 1 fluids on request	

Mechanical data			
Weight	[g]	1140.6	
Housing		rectangular	
Type of mounting		inlet pipe length 5xDN; outlet pipe length 1xDN	
Dimensions	[mm]	200 x 59.6 x 90.5	
Materials		housing: stainless steel (316L/1.4404); Display: PFA; Sealing Display: FKM; connector: PBT	
Materials (wetted parts)		Pipe section: stainless steel (316L/1.4404); Process connection sealing: NBR reinforced fibre Flat seal	
Process connection		threaded connection G 2 external thread DN50	
Surface characteristics Ra/Rz of the wetted parts		Ra < 1.25 µm	

Displays / operating elements			
Display			colour display 1,44", 128 x 128 pixels
		Switching function	2 x LED, yellow
		diagnosis	1 x LED, three-colour
Display unit		l/min; l/h; m³/h; m/s; gpm; gph; ft/s; oz/min	

Accessories	
Items supplied	Flat seal 2, Centellen
	package insert

Remarks	
Remarks	MW = measured value
	MEW = Final value of the measuring range
	pulse and totaliser signal are only available for one of the two outputs
	the accuracy indications are adhered to over the entire application area
Pack quantity	1 pcs.

Electrical connection

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

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Ultrasonic flow meter

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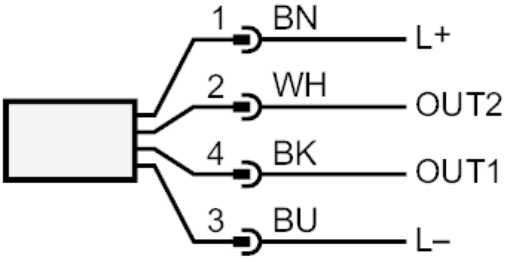
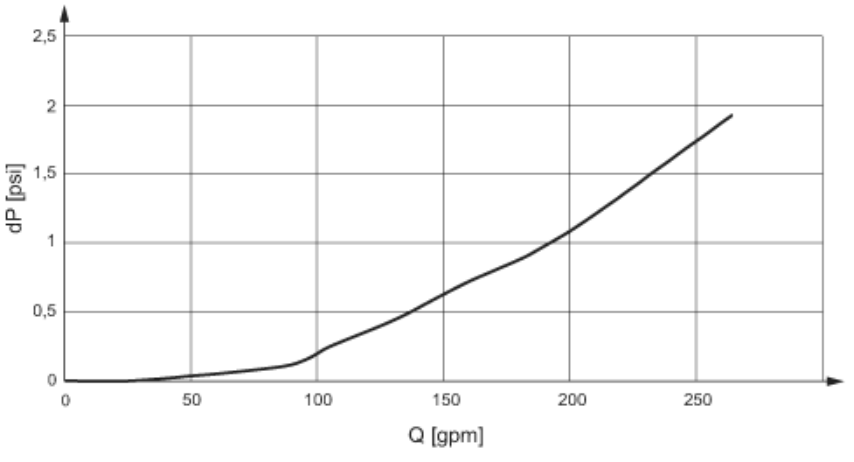
Connection

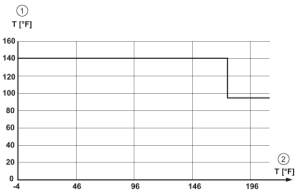


OUT1/IO-Link:	switching output volumetric flow quantity monitoring switching output Temperature monitoring Pulse output quantity meter frequency output volumetric flow quantity monitoring frequency output Temperature monitoring signal output Preset counter
OUT2/InD:	switching output volumetric flow quantity monitoring switching output Temperature monitoring Pulse output quantity meter analogue output flow analogue output temperature signal output Preset counter input counter reset
colours to DIN EN 60947-5-2	
Core colours	BK= black BN= brown BU= blue WH= white

Diagrams and graphs

Note on pressure loss



derating ambient temperature	 1 Ambient temperature 2 Medium temperature

SU2050

Ultrasonic flow meter

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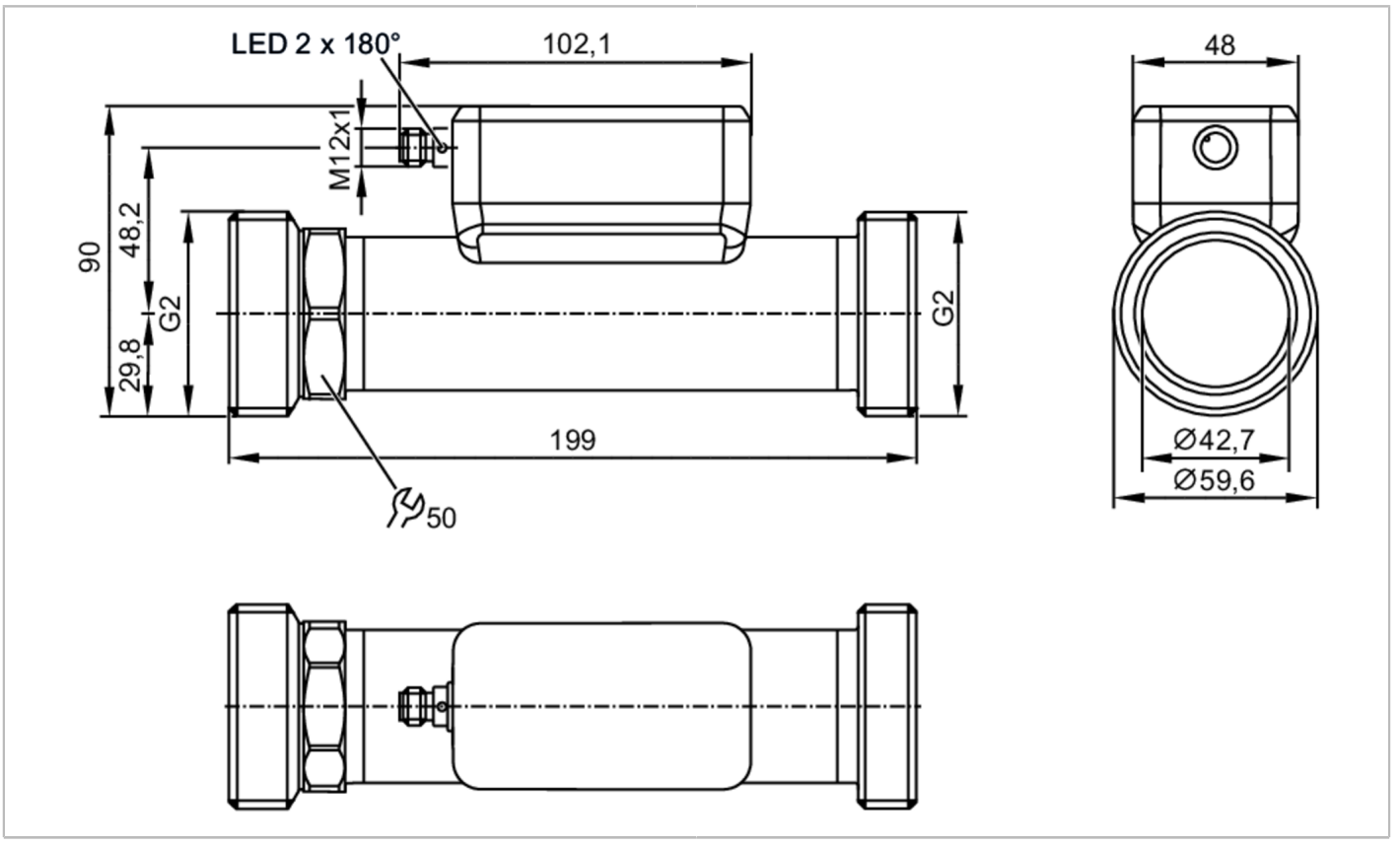

Product characteristics				
Number of inputs and outputs	Number of digital outputs: 2; Number of analogue outputs: 1			
Measuring range	5...1000 l/min	0.3...60 m³/h	79...15850 gph	1.32...264.18 gpm
Nominal diameter	DN50 (2“)			
Process connection	threaded connection G 2 external thread DN50			
Application				
Special feature	Gold-plated contacts			
Application	use in mobile and industrial applications			
Media	ultra-pure water; water; hydrous media; glycol solutions; oils (of high and low viscosity); coolants			
Note on media	hydrous media: for media with >10 % additives, the repeatability is the only available value			
	low-viscosity oils with viscosity: 7...40 mm²/s (40 °C)			
	high-viscosity oils with viscosity: 30...68 mm²/s (40 °C)			
Medium temperature	-40...120 °C		-40...248 °F	
Min. bursting pressure	150 bar		15 MPa	
Pressure rating	100 bar		10 MPa	
Vacuum resistance [mbar]	-1000			
Electrical data				
Operating voltage [V]	8...32 DC; (to SELV/PELV)			
Current consumption [mA]	< 175			
Protection class	III			
Reverse polarity protection	yes			

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Ultrasonic flow meter

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Power-on delay time	[s]	5			
Measuring principle		ultrasonic			
Inputs / outputs					
Total number of inputs and outputs		2			
Number of inputs and outputs		Number of digital outputs: 2; Number of analogue outputs: 1			
Inputs					
Inputs		OUT2	counter reset		
Outputs					
Total number of outputs		2			
Output signal		OUT1	switching signal; pulse signal; diagnostic signal; totaliser switching signal; frequency signal; IO-Link		
		OUT2	switching signal; pulse signal; diagnostic signal; totaliser switching signal; analogue signal		
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]	100			
Switching frequency DC	[Hz]	0...10000			
Number of analogue outputs		1			
Analogue current output	[mA]	4...20; (scalable)			
Max. load	[Ω]	500			
Analogue voltage output	[V]	0...10 / 0.5...4.5; (scalable)			
Min. load resistance	[Ω]	2000			
Pulse output		flow rate meter			
Short-circuit protection		yes			
Type of short-circuit protection		pulsed			
Overload protection		yes			
Measuring/setting range					
Measuring range		5...1000 l/min	0.3...60 m³/h	79...15850 gph	1.32...264.18 gpm
Resolution		0.1 l/min	0.001 m³/h	1 gph	0.01 gpm
Note on factory setting		l/min			
		°C			
Set point SP		10.5...1000 l/min	0.63...60 m³/h	166...15850 gph	2.77...264.17 gpm
Reset point rP		5.3...994.8 l/min	0.318...59.688 m³/h	84...15768 gph	1.4...262.8 gpm
Analogue start point ASP		-1000...800 l/min	-60...48000 m³/h	-15850...12680 gph	-264.17...211.34 gpm
Analogue end point AEP		-800...1000 l/min	-48...60 m³/h	-12680...15850 gph	-211.34...264.17 gpm
Low flow cut-off LFC		5...50 l/min	0.3...3 m³/h	79...793 gph	1.32...13.21 gpm
Frequency end point, FEP		200.6...1000 l/min	12.037...60 m³/h	3180...15850 gph	53...264.17 gpm
Frequency at the end point FRP	[Hz]	1...10000			

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Volumetric flow quantity monitoring			
Pulse length	[s]	0.002...2	
Pulse value		0.1...99990000 l; 0.03...26414563.515 gal	
Temperature monitoring			
Measuring range		-40...120 °C	-40...248 °F
Resolution		0.1 °C	0.1 °F
Set point SP		-40...119.4 °C	-40...247 °F
Reset point rP		-40...88 °C	-40...190.4 °F
Analogue start point		-8...120 °C	17.6...248 °F
Analogue end point		-40...88 °C	-40...190.4 °F
Frequency start point, FSP		-8...120 °C	17.6...248 °F
Frequency end point, FEP		-40...119.4 °C	-40...247 °F
Frequency at the end point FRP	[Hz]	1...10000	
Accuracy / deviations			
Flow monitoring			
Accuracy (in the measuring range)		only up to 100 °C; at higher temperatures, only the repeatability is within the specification.	
Accuracy (in the measuring range)		glycol solutions (35%)	±(5,0 % MW + 0,5 % MEW)
		high-viscosity oils with viscosity 46mm2/s (40°C)	±(5,0 % MW + 0,5 % MEW)
		low-viscosity oils with viscosity 10mm2/s (40°C)	±(5,0 % MW + 0,5 % MEW)
		water	± (1,0 % MW + 0,5 % MEW)
Repeatability		± 0,2 % MEW	
Temperature monitoring			
Accuracy	[K]	± 2,5 (Q > 5 % MEW)	
Temperature coefficient	[% of the span / 10 K]	0,2	
Response times			
Flow monitoring			
Response time	[s]	< 0.25; (dAP = 0, T09)	
Damping process value dAP	[s]	0...5	
Temperature monitoring			
Dynamic response T05 / T09	[s]	5,7 / 86	
Software / programming			
Diagnostic functions		direction of flow detection; signal quality	
Interfaces			
Communication interface		IO-Link	
Transmission type		COM2 (38,4 kBaud)	
IO-Link revision		1.1.3	
SDCI standard		IEC 61131-9: 2013-07	
Profiles		BLOB	Binary Large Object transfer
		Common - I&D	Identification and Diagnosis
Required master port type		A	
Process data analogue		3	

SU2050

Ultrasonic flow meter

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Process data binary		2	
Min. process cycle time	[ms]	9.6	
IO-Link process data (cyclical)		**function**	**bit length**
		totaliser	32
		Flow monitoring	32
		Temperature monitoring	32
		status	4
		Output 1	1
		Output 2	1
Supported DeviceIDs		**Type of operation**	**DeviceID**
		default	1841
Operating conditions			
Ambient temperature	[°C]	-25...60	
Storage temperature	[°C]	-40...80	
Protection		IP 67; IP 69K	
Tests / approvals			
EMC		DIN 61326-1:2021	
Shock resistance		DIN IEC 68-2-27	20 g (11ms)
Vibration resistance		DIN IEC 68-2-6	20 g (10...2000Hz)
MTTF	[years]	136	
UL approval		UL approval no.	I036
		File number UL	E174189
Pressure Equipment Directive		can be used for group 2 fluids; group 1 fluids on request	
Mechanical data			
Weight	[g]	1180	
Housing		rectangular	
Inlet pipe length		5 x DN	
Outlet pipe length		1 x DN	
Dimensions	[mm]	199 x 59.6 x 90	
Materials		housing: stainless steel (316L/1.4404); connector: PEI, FKM	
Materials (wetted parts)		Pipe section: stainless steel (316L/1.4404); Process connection sealing: NBR reinforced fibre	
Nominal diameter		DN50 (2“)	
Process connection		threaded connection G 2 external thread DN50	
Surface characteristics Ra/Rz of the wetted parts		Ra < 1.25 µm	
Displays / operating elements			
Display		operating status	1 x LED, green
Accessories			
Items supplied		Flat seal 2, NBR reinforced fibre	
		package insert	
Remarks			
Remarks		MW = measured value	
		MEW = Final value of the measuring range	
		pulse and totaliser signal are only available for one of the two outputs	
		the accuracy indications are adhered to over the entire application area	

SU2050

Ultrasonic flow meter

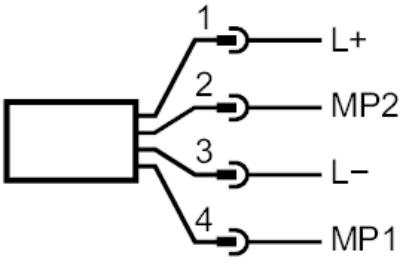
SUR21XJBFRKG/US

Pack quantity	1 pcs.

Electrical connection

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

Connection

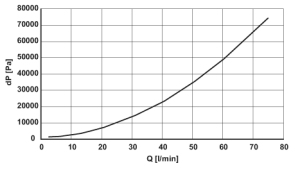


1 (L+)	L+	
2 (OUT2)	MP2	DO, AO, reset
3 (L-)	L-	
4 (OUT1)	MP1	DO, IO-Link

Electrical connection - plug

Diagrams and graphs

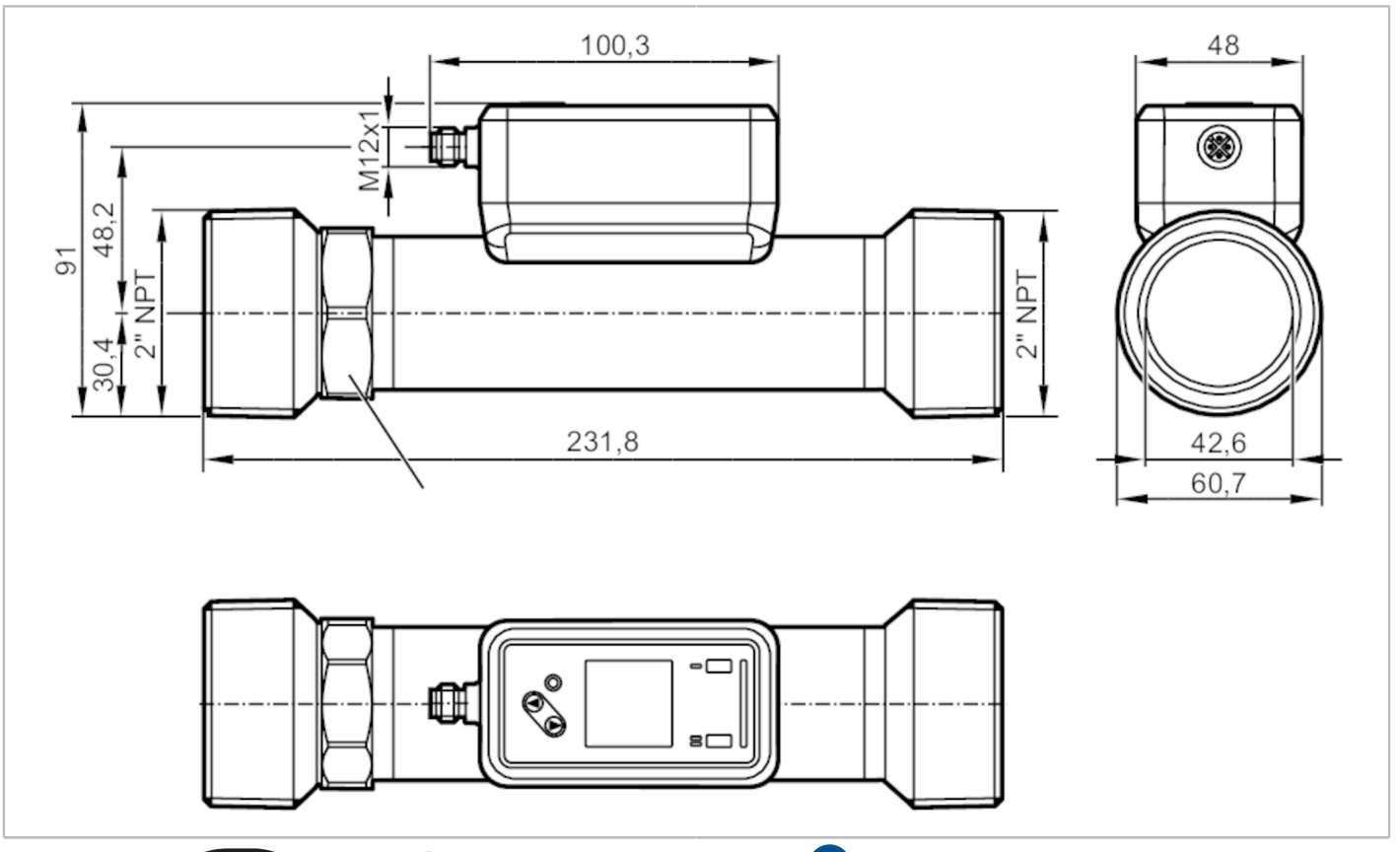
Note on pressure loss



SU2621

Ultrasonic flow meter

SUN21XFBFRKG/US



ACS CE PA CRN cULus LISTED IO-Link KTW/W270 NSF Reg31

Product characteristics					
Measuring range		5...1000 l/min	0.3...60 m³/h	79...15850 gph	1.32...264.18 gpm
Process connection		threaded connection 2" NPT external thread DN50			
Application					
Special feature		Gold-plated contacts			
Media		ultra-pure water; water; hydrous media			
Note on media		hydrous media: for media with >10 % additives, the repeatability is the only available value			
Medium temperature		-20...100 °C		-4...212 °F	
Min. bursting pressure		150 bar		15 MPa	
Pressure rating		100 bar		10 MPa	
Vacuum resistance	[mbar]	-1000			
MAWP for applications according to CRN		36.6 bar		3.66 MPa	
Electrical data					
Operating voltage	[V]	18...32 DC; (to SELV/PELV)			
Current consumption	[mA]	< 75			
Protection class		III			
Reverse polarity protection		yes			
Power-on delay time	[s]	5			
Measuring principle		ultrasonic			
Inputs					
Inputs		counter reset			

SU2621

Ultrasonic flow meter

SUN21XFBFRKG/US

Outputs		
Total number of outputs		2
Output signal		switching signal; pulse signal; analogue signal; IO-Link; frequency signal; diagnostic signal; totaliser switching signal
Electrical design		PNP/NPN
Output function		normally open / normally closed; (parameterisable)
Max. voltage drop switching output DC	[V]	2
Permanent current rating of switching output DC	[mA]	100
Switching frequency DC	[Hz]	0...10000
Analogue current output	[mA]	4...20
Max. load	[Ω]	500
Pulse output		flow rate meter
Short-circuit protection		yes
Type of short-circuit protection		pulsed
Overload protection		yes

Measuring/setting range					
Measuring range		5...1000 l/min	0.3...60 m³/h	79...15850 gph	1.32...264.18 gpm
Display range		-1200...1200 l/min	-72...72 m³/h	-19020...19020 gph	-317...317 gpm
Resolution		0.1 l/min	0.001 m³/h	1 gph	0.01 gpm
Set point SP		10.5...1000 l/min	0.63...60 m³/h	166...15850 gph	2.77...264.17 gpm
Reset point rP		5.3...994.8 l/min	0.318...59.688 m³/h	84...15768 gph	1.4...262.8 gpm
Analogue start point ASP		-1000...800 l/min	-60...48000 m³/h	-15850...12680 gph	-264.18...211.34 gpm
Analogue end point AEP		-800...1000 l/min	-48000...60 m³/h	-12680...15850 gph	-211.34...264.17 gpm
Low flow cut-off LFC		5...50 l/min	0.3...3 m³/h	79...793 gph	1.32...13.21 gpm
Frequency end point, FEP		200.6...1000 l/min	12.037...60 m³/h	3180...15850 gph	53...264.17 gpm
Frequency at the end point FRP	[Hz]	1...10000			
Volumetric flow quantity monitoring					
Pulse length	[s]	0.002...2			
Pulse value		0.1...99990000 l; 0.026...26414563.515 gal			
Temperature monitoring					
Measuring range		-20...100 °C		-4...212 °F	
Display range		-44...124 °C		-47.2...255.2 °F	
Resolution	[°C]	0.1			
Set point SP		-19.6...100 °C		-3.2...212 °F	
Reset point rP		-20...99.6 °C		-4...211.2 °F	
Analogue start point		-20...76 °C		-4...168.8 °F	
Analogue end point		4...100 °C		39.2...212 °F	
Frequency start point, FSP		-20...76 °C		4...168.8 °F	
Frequency end point, FEP		4...100 °C		39.2...212 °F	
Frequency at the end point FRP	[Hz]	1...10000			

SU2621

Ultrasonic flow meter

SUN21XFBFRKG/US

Accuracy / deviations			
Flow monitoring			
Accuracy (in the measuring range)		± (1,0 % MW + 0,5 % MEW)	
Repeatability		± 0,2 % MEW	
Temperature monitoring			
Accuracy	[K]	± 2,5 (Q > 5 % MEW)	
Temperature coefficient	[% of the span / 10 K]	0,2	
Response times			
Flow monitoring			
Response time	[s]	< 0.25; (dAP = 0, T09)	
Damping process value dAP	[s]	0...5	
Temperature monitoring			
Dynamic response T05 / T09	[s]	5,7 / 86	
Software / programming			
Diagnostic functions		direction of flow detection; signal quality	
Interfaces			
Communication interface		IO-Link	
Transmission type		COM2 (38,4 kBaud)	
IO-Link revision		1.1.3	
SDCI standard		IEC 61131-9: 2013-07	
Profiles		BLOB	Binary Large Object transfer
		Common - I&D	Identification and Diagnosis
Required master port type		A	
Process data analogue		3	
Process data binary		2	
Min. process cycle time	[ms]	9.6	
IO-Link process data (cyclical)		**function**	**bit length**
		totaliser	32
		Flow monitoring	32
		Temperature monitoring	32
		status	4
		Output 1	1
		Output 2	1
Supported DeviceIDs		**Type of operation**	**DeviceID**
		default	1464
Operating conditions			
Ambient temperature	[°C]	-20...60	
Storage temperature	[°C]	-25...80	
Protection		IP 67	
Tests / approvals			
EMC		DIN 61326-1:2021	
CPA approval		model number	002US
		accuracy class	1,5

SU2621

Ultrasonic flow meter

SUN21XFBFRKG/US

Shock resistance		DIN IEC 68-2-27	20 g (11ms)
Vibration resistance		DIN IEC 68-2-6	20 g (10...2000Hz)
MTTF	[years]	160	
UL approval		UL approval no.	I033
		File number UL	E174189
Pressure Equipment Directive		can be used for group 2 fluids; group 1 fluids on request	

Mechanical data

Weight	[g]	1384.5	
Housing		rectangular	
Type of mounting		inlet pipe length 5xDN; outlet pipe length 1xDN	
Dimensions	[mm]	231.8 x 60.7 x 91	
Materials		housing: stainless steel (316L/1.4404); Display: PFA; Sealing Display: FKM; connector: PBT	
Materials (wetted parts)		Pipe section: stainless steel (316L/1.4404)	
Process connection		threaded connection 2" NPT external thread DN50	
Surface characteristics Ra/Rz of the wetted parts		49.21 µin	

Displays / operating elements

Display			colour display 1,44", 128 x 128 pixels
		Switching function	2 x LED, yellow
		diagnosis	1 x LED, three-colour

Accessories

Items supplied		package insert

Remarks

Remarks		MW = measured value
		MEW = Final value of the measuring range
		pulse and totaliser signal are only available for one of the two outputs
		the accuracy indications are adhered to over the entire application area
Pack quantity		1 pcs.

Electrical connection

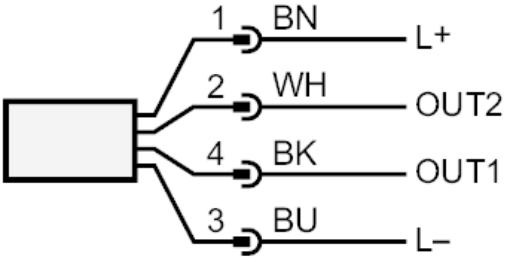
Connector: 1 x M12; coding: A; Contacts: gold-plated

SU2621

Ultrasonic flow meter

SUN21XFBFRKG/US

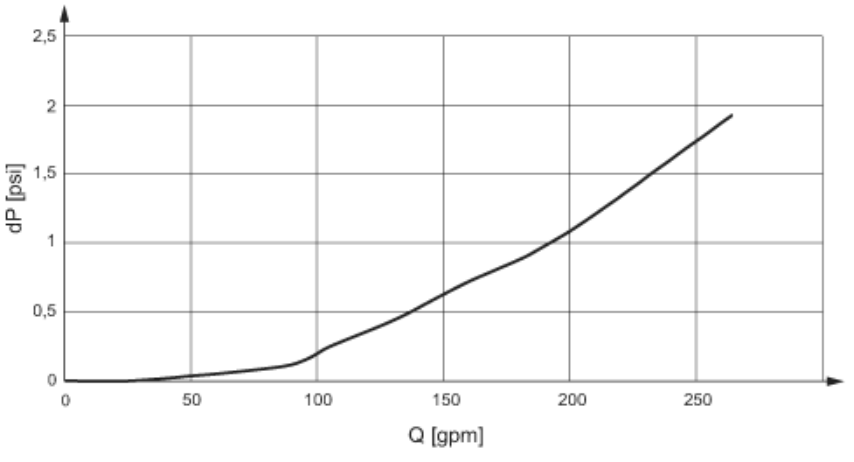
Connection

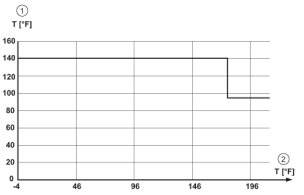


OUT1/IO-Link:	switching output volumetric flow quantity monitoring switching output Temperature monitoring Pulse output quantity meter frequency output volumetric flow quantity monitoring frequency output Temperature monitoring signal output Preset counter
OUT2/InD:	switching output volumetric flow quantity monitoring switching output Temperature monitoring Pulse output quantity meter analogue output flow analogue output temperature signal output Preset counter input counter reset
colours to DIN EN 60947-5-2	
Core colours	BK= black BN= brown BU= blue WH= white

Diagrams and graphs

Note on pressure loss

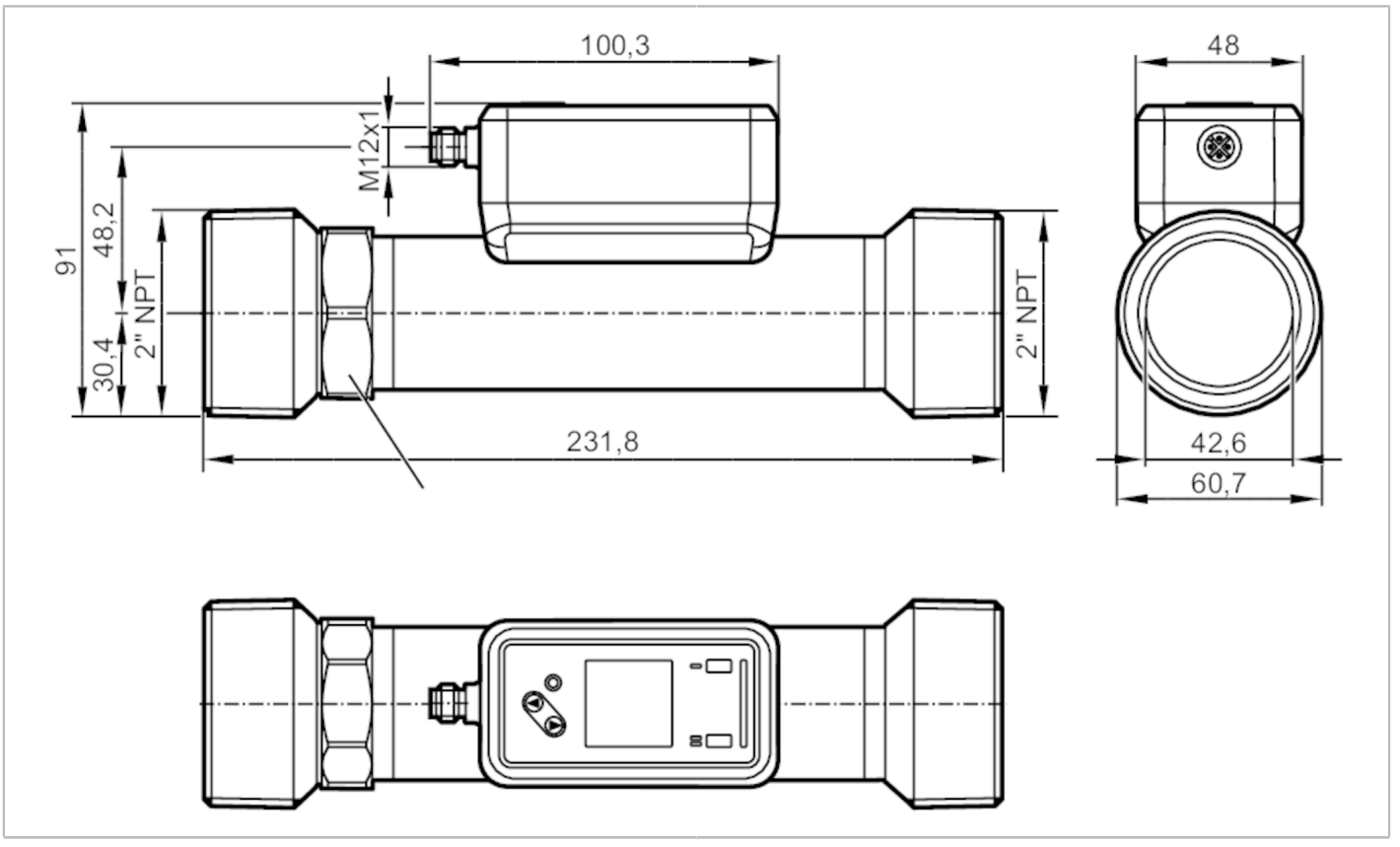


derating ambient temperature	 1 Ambient temperature 2 Medium temperature

SU2631

Ultrasonic flow meter

SUN21XFBFRKG/US



IO-Link

Product characteristics				
Measuring range	5...1000 l/min	0.3...60 m³/h	79...15850 gph	1.32...264.18 gpm
Process connection	threaded connection 2" NPT external thread DN50			
Application				
Special feature	Gold-plated contacts			
Media	ultra-pure water; water; hydrous media; glycol solutions; oils; coolants			
Note on media	hydrous media: for media with >10 % additives, the repeatability is the only available value			
	low-viscosity oils with viscosity: 7...40 mm²/s (40 °C)			
	high-viscosity oils with viscosity: 30...68 mm²/s (40 °C)			
Medium temperature	-20...100 °C		-4...212 °F	
Min. bursting pressure	150 bar		15 MPa	
Pressure rating	100 bar		10 MPa	
Vacuum resistance [mbar]	-1000			
Electrical data				
Operating voltage [V]	18...32 DC; (to SELV/PELV)			
Current consumption [mA]	< 75			
Protection class	III			
Reverse polarity protection	yes			
Power-on delay time [s]	5			
Measuring principle	ultrasonic			

SU2631

Ultrasonic flow meter

SUN21XFBFRKG/US

Inputs					
Inputs		counter reset			
Outputs					
Total number of outputs		2			
Output signal		switching signal; pulse signal; analogue signal; IO-Link; frequency signal; diagnostic signal; totaliser switching signal			
Electrical design		PNP/NPN			
Output function		normally open / normally closed; (parameterisable)			
Max. voltage drop switching output DC	[V]	2			
Permanent current rating of switching output DC	[mA]	100			
Switching frequency DC	[Hz]	0...10000			
Analogue current output	[mA]	4...20			
Max. load	[Ω]	500			
Pulse output		flow rate meter			
Short-circuit protection		yes			
Type of short-circuit protection		pulsed			
Overload protection		yes			
Measuring/setting range					
Measuring range		5...1000 l/min	0.3...60 m³/h	79...15850 gph	1.32...264.18 gpm
Display range		-1200...1200 l/min	-72...72 m³/h	-19020...19020 gph	-317...317 gpm
Resolution		0.1 l/min	0.001 m³/h	1 gph	0.01 gpm
Set point SP		10.5...1000 l/min	0.63...60 m³/h	166...15850 gph	2.77...264.17 gpm
Reset point rP		5.3...994.8 l/min	0.318...59.688 m³/h	84...15768 gph	1.4...262.8 gpm
Analogue start point ASP		-1000...800 l/min	-60...48000 m³/h	-15850...12680 gph	-264.18...211.34 gpm
Analogue end point AEP		-800...1000 l/min	-48000...60 m³/h	-12680...15850 gph	-211.34...264.17 gpm
Low flow cut-off LFC		5...50 l/min	0.3...3 m³/h	79...793 gph	1.32...13.21 gpm
Frequency end point, FEP		200.6...1000 l/min	12.037...60 m³/h	3180...15850 gph	53...264.17 gpm
Frequency at the end point FRP	[Hz]	1...10000			
Volumetric flow quantity monitoring					
Pulse length	[s]	0.002...2			
Pulse value		0.1...99990000 l; 0.026...26414563.515 gal			
Temperature monitoring					
Measuring range		-20...100 °C		-4...212 °F	
Display range		-44...124 °C		-47.2...255.2 °F	
Resolution	[°C]	0.1			
Set point SP		-19.6...100 °C		-3.2...212 °F	
Reset point rP		-20...99.6 °C		-4...211.2 °F	
Analogue start point		-20...76 °C		-4...168.8 °F	
Analogue end point		4...100 °C		39.2...212 °F	
Frequency start point, FSP		-20...76 °C		4...168.8 °F	
Frequency end point, FEP		4...100 °C		39.2...212 °F	
Frequency at the end point FRP	[Hz]	1...10000			

SU2631

Ultrasonic flow meter

SUN21XFBFRKG/US

Accuracy / deviations			
Flow monitoring			
Accuracy (in the measuring range)		glycol solutions (35%)	±(5,0 % MW + 0,5 % MEW)
		high-viscosity oils with viscosity 46mm2/s (40°C)	±(5,0 % MW + 0,5 % MEW)
		low-viscosity oils with viscosity 10mm2/s (40°C)	±(5,0 % MW + 0,5 % MEW)
		water	± (1,0 % MW + 0,5 % MEW)
Repeatability		± 0,2 % MEW	
Temperature monitoring			
Accuracy	[K]	± 2,5 (Q > 5 % MEW)	
Temperature coefficient	[% of the span / 10 K]	0,2	
Response times			
Flow monitoring			
Response time	[s]	< 0.25; (dAP = 0, T09)	
Damping process value dAP	[s]	0...5	
Temperature monitoring			
Dynamic response T05 / T09	[s]	5,7 / 86	
Software / programming			
Diagnostic functions		direction of flow detection; signal quality	
Interfaces			
Communication interface		IO-Link	
Transmission type		COM2 (38,4 kBaud)	
IO-Link revision		1.1.3	
SDCI standard		IEC 61131-9: 2013-07	
Profiles		BLOB	Binary Large Object transfer
		Common - I&D	Identification and Diagnosis
Required master port type		A	
Process data analogue		3	
Process data binary		2	
Min. process cycle time	[ms]	9.6	
IO-Link process data (cyclical)		**function**	**bit length**
		totaliser	32
		Flow monitoring	32
		Temperature monitoring	32
		status	4
		Output 1	1
		Output 2	1
Supported DeviceIDs		**Type of operation**	**DeviceID**
		default	1763
Operating conditions			
Ambient temperature	[°C]	-20...60	
Storage temperature	[°C]	-25...80	
Protection		IP 67	

SU2631

Ultrasonic flow meter

SUN21XFBFRKG/US

Tests / approvals			
EMC		DIN 61326-1:2021	
Shock resistance		DIN IEC 68-2-27	20 g (11ms)
Vibration resistance		DIN IEC 68-2-6	20 g (10...2000Hz)
MTTF	[years]	160	
UL approval		UL approval no.	I033
Pressure Equipment Directive		can be used for group 2 fluids; group 1 fluids on request	
Mechanical data			
Weight	[g]	1366.8	
Housing		rectangular	
Type of mounting		inlet pipe length 5xDN; outlet pipe length 1xDN	
Dimensions	[mm]	231.8 x 60.7 x 91	
Materials		housing: stainless steel (316L/1.4404); Display: PFA; Sealing Display: FKM; connector: PBT	
Materials (wetted parts)		Pipe section: stainless steel (316L/1.4404)	
Process connection		threaded connection 2" NPT external thread DN50	
Surface characteristics Ra/Rz of the wetted parts		49.21 µin	
Displays / operating elements			
Display			colour display 1,44", 128 x 128 pixels
		Switching function	2 x LED, yellow
		diagnosis	1 x LED, three-colour
Display unit		l/min; l/h; m³/h; m/s; gpm; gph; ft/s; oz/min	
Accessories			
Items supplied		package insert	
Remarks			
Remarks		MW = measured value	
		MEW = Final value of the measuring range	
		pulse and totaliser signal are only available for one of the two outputs	
		the accuracy indications are adhered to over the entire application area	
Pack quantity		1 pcs.	

Electrical connection

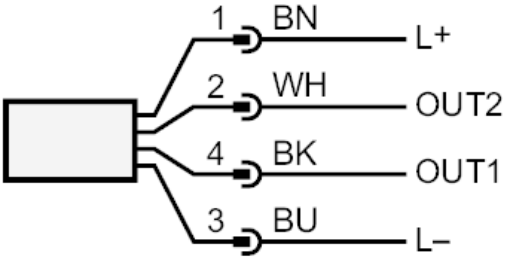
Connector: 1 x M12; coding: A; Contacts: gold-plated

SU2631

Ultrasonic flow meter

SUN21XFBFRKG/US

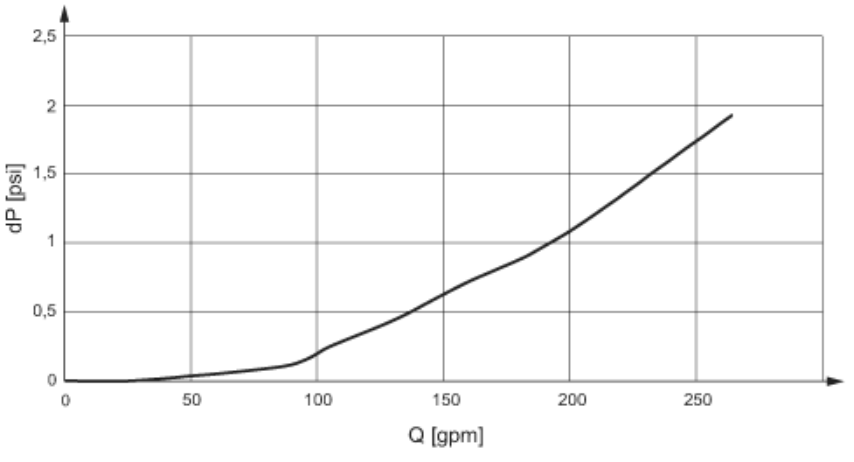
Connection



OUT1/IO-Link:	switching output volumetric flow quantity monitoring switching output Temperature monitoring Pulse output quantity meter frequency output volumetric flow quantity monitoring frequency output Temperature monitoring signal output Preset counter
OUT2/InD:	switching output volumetric flow quantity monitoring switching output Temperature monitoring Pulse output quantity meter analogue output flow analogue output temperature signal output Preset counter input counter reset
colours to DIN EN 60947-5-2	
Core colours	BK= black BN= brown BU= blue WH= white

Diagrams and graphs

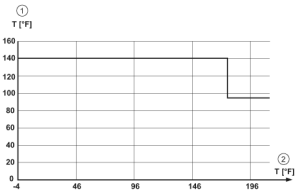
Note on pressure loss



SU2631

Ultrasonic flow meter

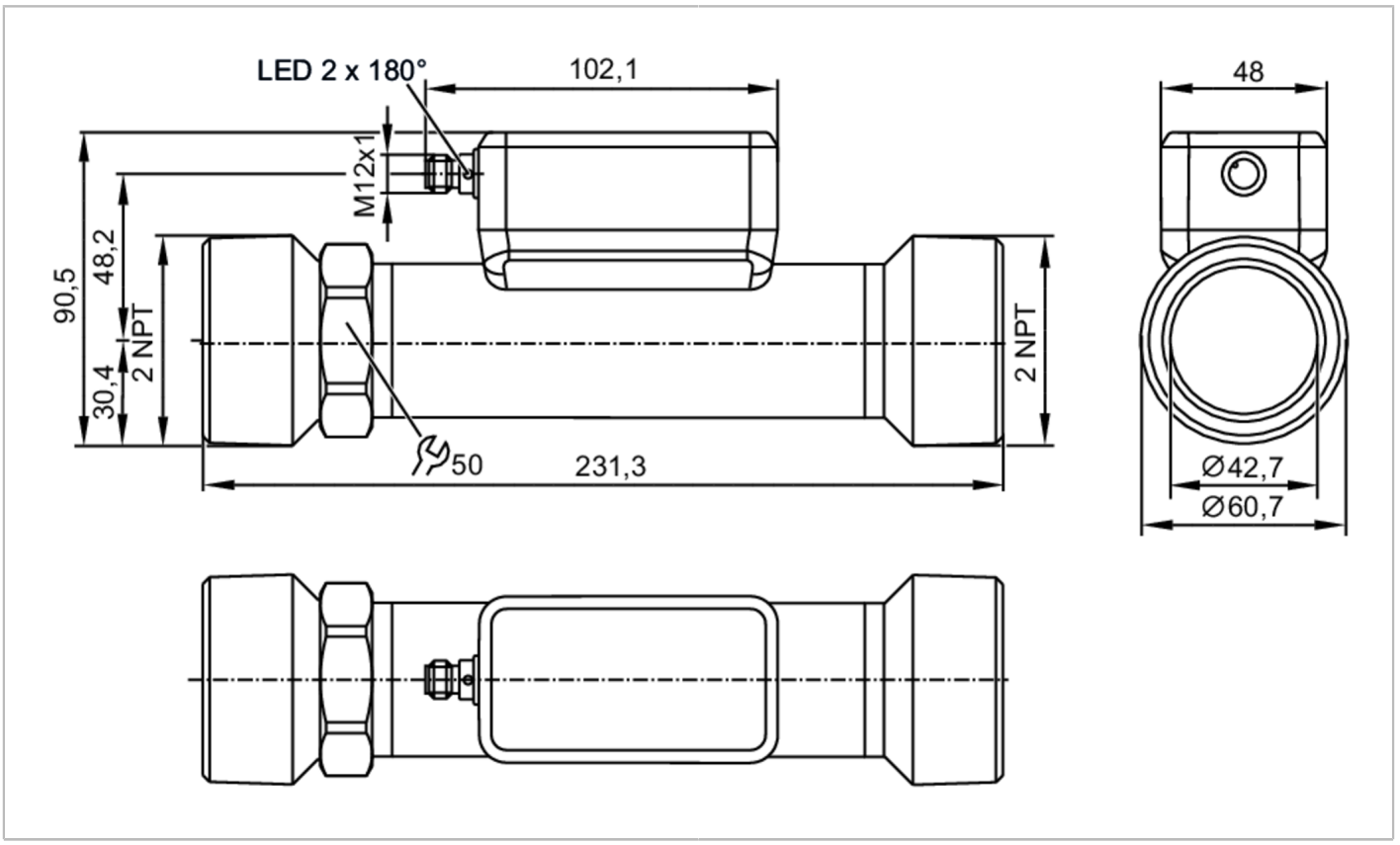
SUN21XFBFRKG/US

derating ambient temperature	 1 Ambient temperature 2 Medium temperature

SU2651

Ultrasonic flow meter

SUN21XJBFRKG/US



Product characteristics				
Number of inputs and outputs	Number of digital outputs: 2; Number of analogue outputs: 1			
Measuring range	5...1000 l/min	0.3...60 m³/h	79...15850 gph	1.32...264.18 gpm
Nominal diameter	DN50 (2“)			
Process connection	threaded connection 2" NPT external thread DN50			
Application				
Special feature	Gold-plated contacts			
Application	use in mobile and industrial applications			
Media	ultra-pure water; water; hydrous media; glycol solutions; oils (of high and low viscosity); coolants			
Note on media	hydrous media: for media with >10 % additives, the repeatability is the only available value			
	low-viscosity oils with viscosity: 7...40 mm²/s (40 °C)			
	high-viscosity oils with viscosity: 30...68 mm²/s (40 °C)			
Medium temperature	-40...120 °C		-40...248 °F	
Min. bursting pressure	150 bar		15 MPa	
Pressure rating	100 bar		10 MPa	
Vacuum resistance [mbar]	-1000			
Electrical data				
Operating voltage [V]	8...32 DC; (to SELV/PELV)			
Current consumption [mA]	< 175			
Protection class	III			
Reverse polarity protection	yes			

SU2651

Ultrasonic flow meter

SUN21XJBFRKG/US

Power-on delay time	[s]	5			
Measuring principle		ultrasonic			
Inputs / outputs					
Total number of inputs and outputs		2			
Number of inputs and outputs		Number of digital outputs: 2; Number of analogue outputs: 1			
Inputs					
Inputs		OUT2	counter reset		
Outputs					
Total number of outputs		2			
Output signal		OUT1	switching signal; pulse signal; diagnostic signal; totaliser switching signal; frequency signal; IO-Link		
		OUT2	switching signal; pulse signal; diagnostic signal; totaliser switching signal; analogue signal		
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]	100			
Switching frequency DC	[Hz]	0...10000			
Number of analogue outputs		1			
Analogue current output	[mA]	4...20; (scalable)			
Max. load	[Ω]	500			
Analogue voltage output	[V]	0...10 / 0.5...4.5; (scalable)			
Min. load resistance	[Ω]	2000			
Pulse output		flow rate meter			
Short-circuit protection		yes			
Type of short-circuit protection		pulsed			
Overload protection		yes			
Measuring/setting range					
Measuring range		5...1000 l/min	0.3...60 m³/h	79...15850 gph	1.32...264.18 gpm
Resolution		0.1 l/min	0.001 m³/h	1 gph	0.01 gpm
Note on factory setting		gpm			
		°F			
Set point SP		10.5...1000 l/min	0.63...60 m³/h	166...15850 gph	2.77...264.17 gpm
Reset point rP		5.3...994.8 l/min	0.318...59.688 m³/h	84...15768 gph	1.4...262.8 gpm
Analogue start point ASP		-1000...800 l/min	-60...48000 m³/h	-15850...12680 gph	-264.17...211.34 gpm
Analogue end point AEP		-800...1000 l/min	-48...60 m³/h	-12680...15850 gph	-211.34...264.17 gpm
Low flow cut-off LFC		5...50 l/min	0.3...3 m³/h	79...793 gph	1.32...13.21 gpm
Frequency end point, FEP		200.6...1000 l/min	12.037...60 m³/h	3180...15850 gph	53...264.17 gpm
Frequency at the end point FRP	[Hz]	1...10000			

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Ultrasonic flow meter

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Volumetric flow quantity monitoring			
Pulse length	[s]	0.002...2	
Pulse value		0.1...99990000 l; 0.03...26414563.515 gal	
Temperature monitoring			
Measuring range		-40...120 °C	-40...248 °F
Resolution		0.1 °C	0.1 °F
Set point SP		-40...119.4 °C	-40...247 °F
Reset point rP		-40...88 °C	-40...190.4 °F
Analogue start point		-8...120 °C	17.6...248 °F
Analogue end point		-40...88 °C	-40...190.4 °F
Frequency start point, FSP		-8...120 °C	17.6...248 °F
Frequency end point, FEP		-40...119.4 °C	-40...247 °F
Frequency at the end point FRP	[Hz]	1...10000	
Accuracy / deviations			
Flow monitoring			
Accuracy (in the measuring range)		only up to 100 °C; at higher temperatures, only the repeatability is within the specification.	
Accuracy (in the measuring range)		glycol solutions (35%)	±(5,0 % MW + 0,5 % MEW)
		high-viscosity oils with viscosity 46mm2/s (40°C)	±(5,0 % MW + 0,5 % MEW)
		low-viscosity oils with viscosity 10mm2/s (40°C)	±(5,0 % MW + 0,5 % MEW)
		water	± (1,0 % MW + 0,5 % MEW)
Repeatability		± 0,2 % MEW	
Temperature monitoring			
Accuracy	[K]	± 2,5 (Q > 5 % MEW)	
Temperature coefficient	[% of the span / 10 K]	0,2	
Response times			
Flow monitoring			
Response time	[s]	< 0.25; (dAP = 0, T09)	
Damping process value dAP	[s]	0...5	
Temperature monitoring			
Dynamic response T05 / T09	[s]	5,7 / 86	
Software / programming			
Diagnostic functions		direction of flow detection; signal quality	
Interfaces			
Communication interface		IO-Link	
Transmission type		COM2 (38,4 kBaud)	
IO-Link revision		1.1.3	
SDCI standard		IEC 61131-9: 2013-07	
Profiles		BLOB	Binary Large Object transfer
		Common - I&D	Identification and Diagnosis
Required master port type		A	
Process data analogue		3	

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Ultrasonic flow meter

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Process data binary		2	
Min. process cycle time	[ms]	9.6	
IO-Link process data (cyclical)		**function**	**bit length**
		totaliser	32
		Flow monitoring	32
		Temperature monitoring	32
		status	4
		Output 1	1
		Output 2	1
Supported DeviceIDs		**Type of operation**	**DeviceID**
		default	1840
Operating conditions			
Ambient temperature	[°C]	-25...60	
Storage temperature	[°C]	-40...80	
Protection		IP 67; IP 69K	
Tests / approvals			
EMC		DIN 61326-1:2021	
Shock resistance		DIN IEC 68-2-27	20 g (11ms)
Vibration resistance		DIN IEC 68-2-6	20 g (10...2000Hz)
MTTF	[years]	160	
UL approval		UL approval no.	I036
		File number UL	E174189
Pressure Equipment Directive		can be used for group 2 fluids; group 1 fluids on request	
Mechanical data			
Weight	[g]	1384.5	
Housing		rectangular	
Inlet pipe length		5 x DN	
Outlet pipe length		1 x DN	
Dimensions	[mm]	231.3 x 60.7 x 90.5	
Materials		housing: stainless steel (316L/1.4404); connector: PEI, FKM	
Materials (wetted parts)		Pipe section: stainless steel (316L/1.4404)	
Nominal diameter		DN50 (2“)	
Process connection		threaded connection 2" NPT external thread DN50	
Surface characteristics Ra/Rz of the wetted parts		49.21 µin	
Displays / operating elements			
Display		operating status	1 x LED, green
Accessories			
Items supplied		package insert	
Remarks			
Remarks		MW = measured value	
		MEW = Final value of the measuring range	
		pulse and totaliser signal are only available for one of the two outputs	
		the accuracy indications are adhered to over the entire application area	
Pack quantity		1 pcs.	

SU2651

Ultrasonic flow meter

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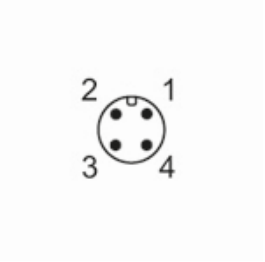
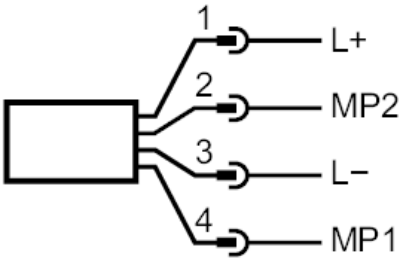
Electrical connection

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



Connection

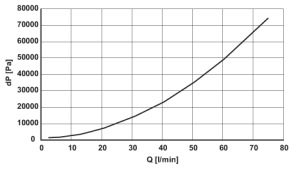


1 (L+)	L+	
2 (OUT2)	MP2	DO, AO, reset
3 (L-)	L-	
4 (OUT1)	MP1	DO, IO-Link

Electrical connection - plug

Diagrams and graphs

Note on pressure loss



SU6021

Ultrasonic flow meter

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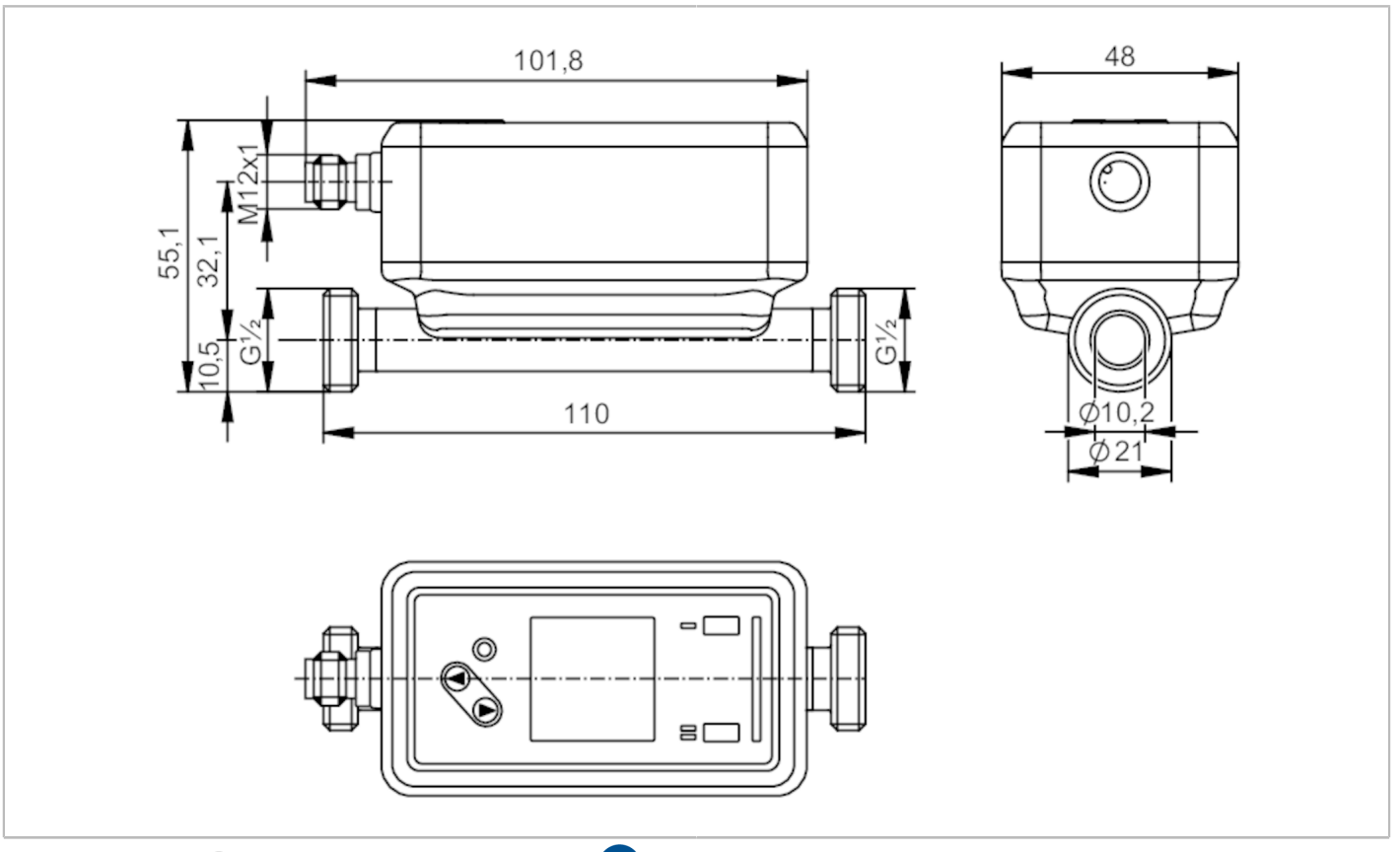


ACS CE cULus LISTED IO-Link KTW/W270 NSF Reg31

Product characteristics				
Measuring range	0.5...65 l/min	0.03...3.9 m³/h	8...1030 gph	0.13...17.17 gpm
Process connection	threaded connection G 1/2 external thread DN15			
Application				
Special feature	Gold-plated contacts			
Media	ultra-pure water; water; hydrous media			
Note on media	hydrous media: for media with >10 % additives, the repeatability is the only available value			
Medium temperature	-20...100 °C		-4...212 °F	
Min. bursting pressure	150 bar		15 MPa	
Pressure rating	100 bar		10 MPa	
Vacuum resistance [mbar]	-1000			
Electrical data				
Operating voltage [V]	18...32 DC; (to SELV/PELV)			
Current consumption [mA]	< 75			
Protection class	III			
Reverse polarity protection	yes			
Power-on delay time [s]	5			
Measuring principle	ultrasonic			
Inputs				
Inputs	counter reset			

SU6021

Ultrasonic flow meter

SUR12XXBFRKG/US

Outputs		
Total number of outputs		2
Output signal		switching signal; pulse signal; analogue signal; IO-Link; frequency signal; diagnostic signal; totaliser switching signal
Electrical design		PNP/NPN
Output function		normally open / normally closed; (parameterisable)
Max. voltage drop switching output DC	[V]	2
Permanent current rating of switching output DC	[mA]	100
Switching frequency DC	[Hz]	0...10000
Analogue current output	[mA]	4...20
Max. load	[Ω]	500
Pulse output		flow rate meter
Short-circuit protection		yes
Type of short-circuit protection		pulsed
Overload protection		yes

Measuring/setting range					
Measuring range		0.5...65 l/min	0.03...3.9 m³/h	8...1030 gph	0.13...17.17 gpm
Display range		-78...78 l/min	-4.68...4.68 m³/h	-1236...1236 gph	-20.61...20.61 gpm
Resolution		0.1 l/min	0.002 m³/h	1 gph	0.01 gpm
Set point SP		0.9...65 l/min	0.052...3.9 m³/h	14...1030 gph	0.23...17.17 gpm
Reset point rP		0.5...64.7 l/min	0.032...3.88 m³/h	8...1025 gph	0.14...17.08 gpm
Analogue start point ASP		-65...52 l/min	-3.9...3.12 m³/h	-1030...824 gph	-17.17...13.74 gpm
Analogue end point AEP		-52...65 l/min	-3.12...3.9 m³/h	-824...1030 gph	-13.74...17.17 gpm
Low flow cut-off LFC		0.5...3.2 l/min	0.03...0.195 m³/h	8...52 gph	0.13...0.86 gpm
Frequency end point, FEP		13...65 l/min	0.782...3.9 m³/h	207...1030 gph	3.44...17.17 gpm
Frequency at the end point FRP	[Hz]	1...10000			
Volumetric flow quantity monitoring					
Pulse length	[s]	0.002...2			
Pulse value		0.02...99990000 l; 0.005...26414563.515 gal			
Temperature monitoring					
Measuring range		-20...100 °C		-4...212 °F	
Display range		-44...124 °C		-47.2...255.2 °F	
Resolution		0.1 °C		0.1 °F	
Set point SP		-19.6...100 °C		-3.2...212 °F	
Reset point rP		-20...99.6 °C		-4...211.2 °F	
Analogue start point		-20...76 °C		-4...168.8 °F	
Analogue end point		4...100 °C		39.2...212 °F	
Frequency start point, FSP		-20...76 °C		4...168.8 °F	
Frequency end point, FEP		4...100 °C		4...212 °F	
Frequency at the end point FRP	[Hz]	1...10000			

SU6021

Ultrasonic flow meter

SUR12XXBFRKG/US

Accuracy / deviations			
Flow monitoring			
Accuracy (in the measuring range)		± (2,0 % MW + 0,5 % MEW)	
Repeatability		± 0,2 % MEW	
Temperature monitoring			
Accuracy	[K]	± 2,5 (Q > 5 % MEW)	
Temperature coefficient	[% of the span / 10 K]	0,2	
Response times			
Flow monitoring			
Response time	[s]	< 0.25; (dAP = 0, T09)	
Damping process value dAP	[s]	0...5	
Temperature monitoring			
Dynamic response T05 / T09	[s]	5,7 / 86	
Software / programming			
Diagnostic functions		direction of flow detection; signal quality	
Interfaces			
Communication interface		IO-Link	
Transmission type		COM2 (38,4 kBaud)	
IO-Link revision		1.1.3	
SDCI standard		IEC 61131-9: 2013-07	
Profiles		BLOB	Binary Large Object transfer
		Common - I&D	Identification and Diagnosis
Required master port type		A	
Process data analogue		3	
Process data binary		2	
Min. process cycle time	[ms]	9.6	
IO-Link process data (cyclical)		**function**	**bit length**
		totaliser	32
		Flow monitoring	32
		Temperature monitoring	32
		status	4
		Output 1	1
		Output 2	1
Supported DeviceIDs		**Type of operation**	**DeviceID**
		default	1462
Operating conditions			
Ambient temperature	[°C]	-20...60	
Storage temperature	[°C]	-25...80	
Protection		IP 67	
Tests / approvals			
EMC		DIN 61326-1:2021	
Shock resistance		DIN IEC 68-2-27	20 g (11ms)
Vibration resistance		DIN IEC 68-2-6	20 g (10...2000Hz)

SU6021

Ultrasonic flow meter

SUR12XXBFRKG/US

MTTF	[years]	160	
UL approval		UL approval no.	I034
Pressure Equipment Directive		can be used for group 2 fluids; group 1 fluids on request	

Mechanical data

Weight	[g]	476.9	
Housing		rectangular	
Type of mounting		inlet pipe length 5xDN; outlet pipe length 1xDN	
Dimensions	[mm]	110 x 48 x 55.1	
Materials		housing: stainless steel (316L/1.4404); Display: PFA; Sealing Display: FKM; connector: PBT	
Materials (wetted parts)		Pipe section: stainless steel (316L/1.4404); Process connection sealing: NBR reinforced fibre Flat seal	
Process connection		threaded connection G 1/2 external thread DN15	
Surface characteristics Ra/Rz of the wetted parts		Ra < 1.25 µm	

Displays / operating elements

Display		colour display 1,44", 128 x 128 pixels
	Switching function	2 x LED, yellow
	diagnosis	1 x LED, three-colour

Accessories

Items supplied	Flat seal 2, Centellen
	package insert

Remarks

Remarks	MW = measured value
	MEW = Final value of the measuring range
	pulse and totaliser signal are only available for one of the two outputs
	the accuracy indications are adhered to over the entire application area
Pack quantity	1 pcs.

Electrical connection

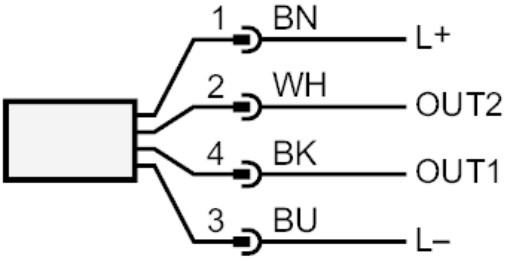
Connector: 1 x M12; coding: A; Contacts: gold-plated

SU6021

Ultrasonic flow meter

SUR12XXBFRKG/US

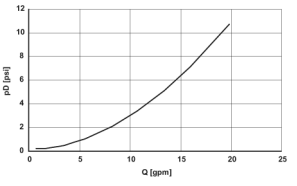
Connection



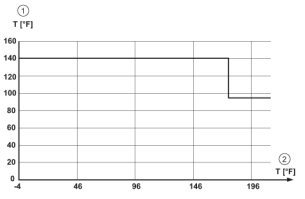
OUT1/IO-Link:	switching output volumetric flow quantity monitoring switching output Temperature monitoring Pulse output quantity meter frequency output volumetric flow quantity monitoring frequency output Temperature monitoring Diagnostic output direction of flow detection / signal quality signal output Preset counter
OUT2/InD:	switching output volumetric flow quantity monitoring switching output Temperature monitoring Pulse output quantity meter analogue output flow analogue output temperature Diagnostic output direction of flow detection / signal quality signal output Preset counter input counter reset
colours to DIN EN 60947-5-2	
Core colours	BK= black BN= brown BU= blue WH= white

Diagrams and graphs

Note on pressure loss



derating ambient temperature



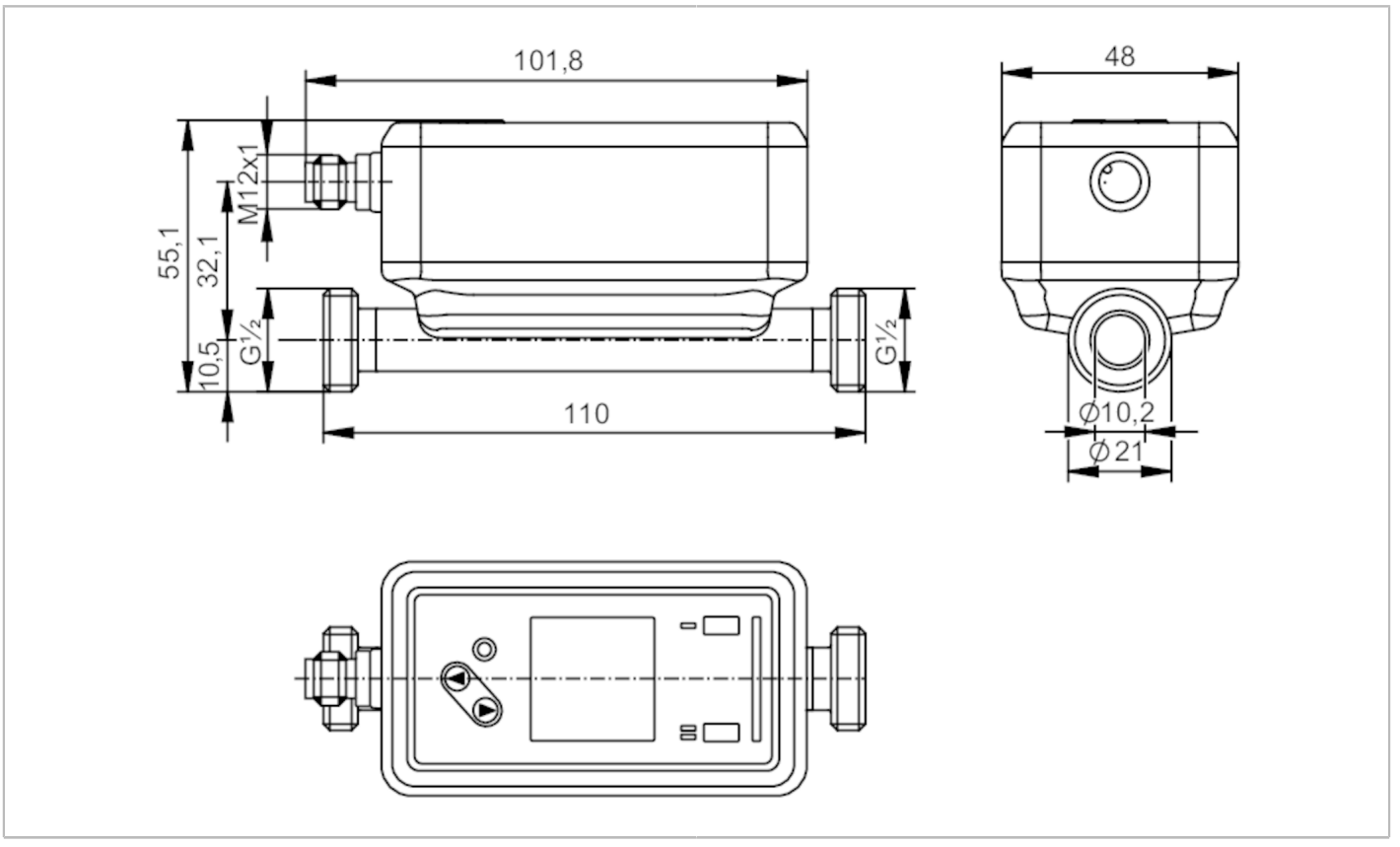
1 Ambient temperature

2 Medium temperature

SU6031

Ultrasonic flow meter

SUR12XFBFRKG/US



Product characteristics				
Measuring range	0.5...65 l/min	0.03...3.9 m³/h	8...1030 gph	0.13...17.17 gpm
Process connection	threaded connection G 1/2 external thread DN15			
Application				
Special feature	Gold-plated contacts			
Media	ultra-pure water; water; hydrous media; glycol solutions; oils; coolants			
Note on media	hydrous media: for media with >10 % additives, the repeatability is the only available value			
	low-viscosity oils with viscosity: 7...40 mm²/s (40 °C)			
	high-viscosity oils with viscosity: 30...68 mm²/s (40 °C)			
Medium temperature	-20...100 °C		-4...212 °F	
Min. bursting pressure	150 bar		15 MPa	
Pressure rating	100 bar		10 MPa	
Vacuum resistance [mbar]	-1000			
Electrical data				
Operating voltage [V]	18...32 DC; (to SELV/PELV)			
Current consumption [mA]	< 75			
Protection class	III			
Reverse polarity protection	yes			
Power-on delay time [s]	5			
Measuring principle	ultrasonic			

SU6031

Ultrasonic flow meter

SUR12XFBFRKG/US

Inputs				
Inputs	counter reset			
Outputs				
Total number of outputs	2			
Output signal	switching signal; pulse signal; analogue signal; IO-Link; frequency signal; diagnostic signal; totaliser switching signal			
Electrical design	PNP/NPN			
Output function	normally open / normally closed; (parameterisable)			
Max. voltage drop switching output DC [V]	2			
Permanent current rating of switching output DC [mA]	100			
Switching frequency DC [Hz]	0...10000			
Analogue current output [mA]	4...20			
Max. load [Ω]	500			
Pulse output	flow rate meter			
Short-circuit protection	yes			
Type of short-circuit protection	pulsed			
Overload protection	yes			
Measuring/setting range				
Measuring range	0.5...65 l/min	0.03...3.9 m³/h	8...1030 gph	0.13...17.17 gpm
Display range	-78...78 l/min	-4.68...4.68 m³/h	-1236...1236 gph	-20.61...20.61 gpm
Resolution	0.1 l/min	0.002 m³/h	1 gph	0.01 gpm
Set point SP	0.9...65 l/min	0.052...3.9 m³/h	14...1030 gph	0.23...17.17 gpm
Reset point rP	0.5...64.7 l/min	0.032...3.88 m³/h	8...1025 gph	0.14...17.08 gpm
Analogue start point ASP	-65...52 l/min	-3.9...3.12 m³/h	-1030...824 gph	-17.17...13.74 gpm
Analogue end point AEP	-52...65 l/min	-3.12...3.9 m³/h	-824...1030 gph	-13.74...17.17 gpm
Low flow cut-off LFC	0.5...3.2 l/min	0.03...0.195 m³/h	8...52 gph	0.13...0.86 gpm
Frequency end point, FEP	13...65 l/min	0.782...3.9 m³/h	207...1030 gph	3.44...17.17 gpm
Frequency at the end point FRP [Hz]	1...10000			
Volumetric flow quantity monitoring				
Pulse length [s]	0.002...2			
Pulse value	0.02...99990000 l; 0.005...26414563.515 gal			
Temperature monitoring				
Measuring range	-20...100 °C	-4...212 °F		
Display range	-44...124 °C	-47.2...255.2 °F		
Resolution	0.1 °C	0.1 °F		
Set point SP	-19.6...100 °C	-3.2...212 °F		
Reset point rP	-20...99.6 °C	-4...211.2 °F		
Analogue start point	-20...76 °C	-4...168.8 °F		
Analogue end point	4...100 °C	39.2...212 °F		
Frequency start point, FSP	-20...76 °C	4...168.8 °F		
Frequency end point, FEP	4...100 °C	4...212 °F		
Frequency at the end point FRP [Hz]	1...10000			

SU6031

Ultrasonic flow meter

SUR12XFBFRKG/US

Accuracy / deviations			
Flow monitoring			
Accuracy (in the measuring range)		glycol solutions (35%)	±(5,0 % MW + 0,5 % MEW)
		high-viscosity oils with viscosity 46mm2/s (40°C)	±(5,0 % MW + 1,0 % MEW)
		low-viscosity oils with viscosity 10mm2/s (40°C)	±(5,0 % MW + 1,0 % MEW)
		water	± (2,0 % MW + 0,5 % MEW)
Repeatability		± 0,2 % MEW	
Temperature monitoring			
Accuracy	[K]	± 2,5 (Q > 5 % MEW)	
Temperature coefficient [% of the span / 10 K]		0,2	
Response times			
Flow monitoring			
Response time	[s]	< 0.25; (dAP = 0, T09)	
Damping process value dAP	[s]	0...5	
Temperature monitoring			
Dynamic response T05 / T09	[s]	5,7 / 86	
Software / programming			
Diagnostic functions		direction of flow detection; signal quality	
Interfaces			
Communication interface		IO-Link	
Transmission type		COM2 (38,4 kBaud)	
IO-Link revision		1.1.3	
SDCI standard		IEC 61131-9: 2013-07	
Profiles		BLOB	Binary Large Object transfer
		Common - I&D	Identification and Diagnosis
Required master port type		A	
Process data analogue		3	
Process data binary		2	
Min. process cycle time	[ms]	9.6	
IO-Link process data (cyclical)		**function**	**bit length**
		totaliser	32
		Flow monitoring	32
		Temperature monitoring	32
		status	4
		Output 1	1
		Output 2	1
Supported DeviceIDs		**Type of operation**	**DeviceID**
		default	1755
Operating conditions			
Ambient temperature	[°C]	-20...60	
Storage temperature	[°C]	-25...80	
Protection		IP 67	

SU6031

Ultrasonic flow meter

SUR12XFBFRKG/US

Tests / approvals			
EMC		DIN 61326-1:2021	
Shock resistance		DIN IEC 68-2-27	20 g (11ms)
Vibration resistance		DIN IEC 68-2-6	20 g (10...2000Hz)
MTTF	[years]	160	
UL approval		UL approval no.	I034
Pressure Equipment Directive		can be used for group 2 fluids; group 1 fluids on request	
Mechanical data			
Weight	[g]	475.8	
Housing		rectangular	
Type of mounting		inlet pipe length 5xDN; outlet pipe length 1xDN	
Dimensions	[mm]	110 x 48 x 55.1	
Materials		housing: stainless steel (316L/1.4404); Display: PFA; Sealing Display: FKM; connector: PBT	
Materials (wetted parts)		Pipe section: stainless steel (316L/1.4404); Process connection sealing: NBR reinforced fibre Flat seal	
Process connection		threaded connection G 1/2 external thread DN15	
Surface characteristics Ra/Rz of the wetted parts		Ra < 1.25 µm	
Displays / operating elements			
Display			colour display 1,44", 128 x 128 pixels
		Switching function	2 x LED, yellow
		diagnosis	1 x LED, three-colour
Display unit		l/min; l/h; m³/h; m/s; gpm; gph; ft/s; oz/min	
Accessories			
Items supplied		Flat seal 2, Centellen	
		package insert	
Remarks			
Remarks		MW = measured value	
		MEW = Final value of the measuring range	
		pulse and totaliser signal are only available for one of the two outputs	
		the accuracy indications are adhered to over the entire application area	
Pack quantity		1 pcs.	

Electrical connection

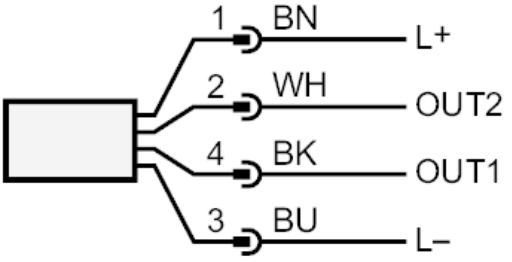
Connector: 1 x M12; coding: A; Contacts: gold-plated

SU6031

Ultrasonic flow meter

SUR12XFBFRKG/US

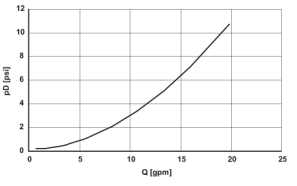
Connection



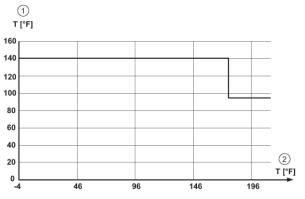
OUT1/IO-Link:	switching output volumetric flow quantity monitoring switching output Temperature monitoring Pulse output quantity meter frequency output volumetric flow quantity monitoring frequency output Temperature monitoring Diagnostic output direction of flow detection / signal quality signal output Preset counter
OUT2/InD:	switching output volumetric flow quantity monitoring switching output Temperature monitoring Pulse output quantity meter analogue output flow analogue output temperature Diagnostic output direction of flow detection / signal quality signal output Preset counter input counter reset
colours to DIN EN 60947-5-2	
Core colours	BK= black BN= brown BU= blue WH= white

Diagrams and graphs

Note on pressure loss



derating ambient temperature



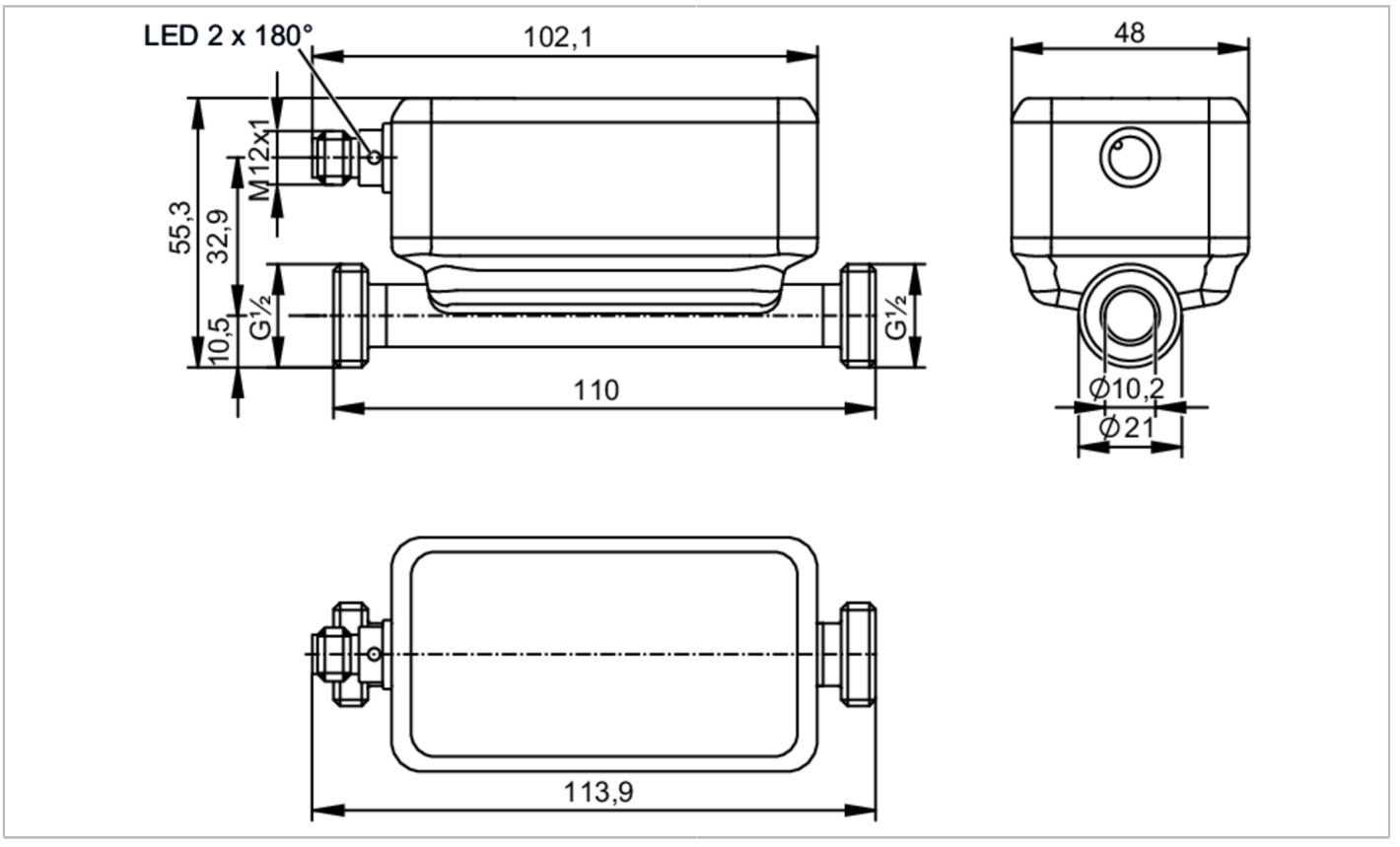
1 Ambient temperature

2 Medium temperature

SU6050

Ultrasonic flow meter

SUR12XJBFRKG/US



Product characteristics				
Number of inputs and outputs	Number of digital outputs: 2; Number of analogue outputs: 1			
Measuring range	0.5...65 l/min	0.03...3.9 m³/h	8...1030 gph	0.13...17.17 gpm
Nominal diameter	DN15 (1/2“)			
Process connection	threaded connection G 1/2 external thread DN15			
Application				
Special feature	Gold-plated contacts			
Application	use in mobile and industrial applications			
Media	ultra-pure water; water; hydrous media; glycol solutions; oils (of high and low viscosity); coolants			
Note on media	hydrous media: for media with >10 % additives, the repeatability is the only available value			
	low-viscosity oils with viscosity: 7...40 mm²/s (40 °C)			
	high-viscosity oils with viscosity: 30...68 mm²/s (40 °C)			
Medium temperature	-40...120 °C		-40...248 °F	
Min. bursting pressure	150 bar		15 MPa	
Pressure rating	100 bar		10 MPa	
Vacuum resistance [mbar]	-1000			
Electrical data				
Operating voltage [V]	8...32 DC; (to SELV/PELV)			
Current consumption [mA]	< 175			
Protection class	III			
Reverse polarity protection	yes			

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Ultrasonic flow meter

SUR12XJBFRKG/US

Power-on delay time	[s]	5			
Measuring principle		ultrasonic			
Inputs / outputs					
Total number of inputs and outputs		2			
Number of inputs and outputs		Number of digital outputs: 2; Number of analogue outputs: 1			
Inputs					
Inputs		OUT2	counter reset		
Outputs					
Total number of outputs		2			
Output signal		OUT1	switching signal; pulse signal; diagnostic signal; totaliser switching signal; frequency signal; IO-Link		
		OUT2	switching signal; pulse signal; diagnostic signal; totaliser switching signal; analogue signal		
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]	100			
Switching frequency DC	[Hz]	0...10000			
Number of analogue outputs		1			
Analogue current output	[mA]	4...20; (scalable)			
Max. load	[Ω]	500			
Analogue voltage output	[V]	0...10 / 0.5...4.5; (scalable)			
Min. load resistance	[Ω]	2000			
Pulse output		flow rate meter			
Short-circuit protection		yes			
Type of short-circuit protection		pulsed			
Overload protection		yes			
Measuring/setting range					
Measuring range		0.5...65 l/min	0.03...3.9 m³/h	8...1030 gph	0.13...17.17 gpm
Resolution		0.1 l/min	0.002 m³/h	1 gph	0.01 gpm
Note on factory setting		l/min			
		°C			
Set point SP		0.9...65 l/min	0.052...3.9 m³/h	14...1030 gph	0.23...17.17 gpm
Reset point rP		0.5...64.7 l/min	0.032...3.88 m³/h	8...1025 gph	0.14...17.08 gpm
Analogue start point ASP		-65...52 l/min	-3.9...3.12 m³/h	-1030...824 gph	-17.17...13.74 gpm
Analogue end point AEP		-52...65 l/min	-3.12...3.9 m³/h	-824...1030 gph	-13.74...17.17 gpm
Low flow cut-off LFC		0.5...3.2 l/min	0.03...0.195 m³/h	8...52 gph	0.13...0.86 gpm
Frequency end point, FEP		13...65 l/min	0.782...3.9 m³/h	207...1030 gph	3.44...17.17 gpm
Frequency at the end point FRP	[Hz]	1...10000			

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Ultrasonic flow meter

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Volumetric flow quantity monitoring			
Pulse length	[s]	0.002...2	
Pulse value		0.1...99990000 l; 0.03...26414563.515 gal	
Temperature monitoring			
Measuring range		-40...120 °C	-40...248 °F
Resolution		0.1 °C	0.1 °F
Set point SP		-40...119.4 °C	-40...247 °F
Reset point rP		-40...88 °C	-40...190.4 °F
Analogue start point		-8...120 °C	17.6...248 °F
Analogue end point		-40...88 °C	-40...190.4 °F
Frequency start point, FSP		-8...120 °C	17.6...248 °F
Frequency end point, FEP		-40...119.4 °C	-40...247 °F
Frequency at the end point FRP	[Hz]	1...10000	
Accuracy / deviations			
Flow monitoring			
Accuracy (in the measuring range)		only up to 100 °C; at higher temperatures, only the repeatability is within the specification.	
Accuracy (in the measuring range)		glycol solutions (35%)	±(5,0 % MW + 0,5 % MEW)
		high-viscosity oils with viscosity 46mm2/s (40°C)	±(5,0 % MW + 1,0 % MEW)
		low-viscosity oils with viscosity 10mm2/s (40°C)	±(5,0 % MW + 1,0 % MEW)
		water	± (2,0 % MW + 0,5 % MEW)
Repeatability		± 0,2 % MEW	
Temperature monitoring			
Accuracy	[K]	± 2,5 (Q > 5 % MEW)	
Temperature coefficient	[% of the span / 10 K]	0,2	
Response times			
Flow monitoring			
Response time	[s]	< 0.25; (dAP = 0, T09)	
Damping process value dAP	[s]	0...5	
Temperature monitoring			
Dynamic response T05 / T09	[s]	5,7 / 86	
Software / programming			
Diagnostic functions		direction of flow detection; signal quality	
Interfaces			
Communication interface		IO-Link	
Transmission type		COM2 (38,4 kBaud)	
IO-Link revision		1.1.3	
SDCI standard		IEC 61131-9: 2013-07	
Profiles		BLOB	Binary Large Object transfer
		Common - I&D	Identification and Diagnosis
Required master port type		A	
Process data analogue		3	

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Ultrasonic flow meter

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Process data binary		2	
Min. process cycle time	[ms]	9.6	
IO-Link process data (cyclical)		**function**	**bit length**
		totaliser	32
		Flow monitoring	32
		Temperature monitoring	32
		status	4
		Output 1	1
		Output 2	1
Supported DeviceIDs		**Type of operation**	**DeviceID**
		default	1835
Operating conditions			
Ambient temperature	[°C]	-25...60	
Storage temperature	[°C]	-40...80	
Protection		IP 67; IP 69K	
Tests / approvals			
EMC		DIN 61326-1:2021	
Shock resistance		DIN IEC 68-2-27	20 g (11ms)
Vibration resistance		DIN IEC 68-2-6	20 g (10...2000Hz)
MTTF	[years]	160	
UL approval		UL approval no.	I037
		File number UL	E174189
Pressure Equipment Directive		can be used for group 2 fluids; group 1 fluids on request	
Mechanical data			
Weight	[g]	477.9	
Housing		rectangular	
Inlet pipe length		5 x DN	
Outlet pipe length		1 x DN	
Dimensions	[mm]	113.9 x 48 x 55.3	
Materials		housing: stainless steel (316L/1.4404); connector: PEI, FKM	
Materials (wetted parts)		Pipe section: stainless steel (316L/1.4404); Process connection sealing: NBR reinforced fibre	
Nominal diameter		DN15 (1/2“)	
Process connection		threaded connection G 1/2 external thread DN15	
Surface characteristics Ra/Rz of the wetted parts		Ra < 1.25 µm	
Displays / operating elements			
Display		operating status	1 x LED, green
Accessories			
Items supplied		Flat seal 2, NBR reinforced fibre	
		package insert	
Remarks			
Remarks		MW = measured value	
		MEW = Final value of the measuring range	
		pulse and totaliser signal are only available for one of the two outputs	
		the accuracy indications are adhered to over the entire application area	

SU6050

Ultrasonic flow meter

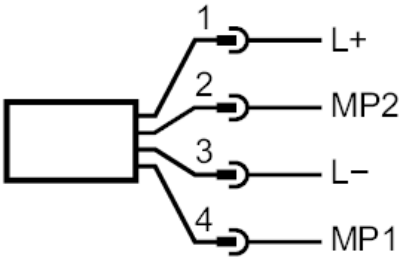
SUR12XJBFRKG/US

Pack quantity	1 pcs.

Electrical connection

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

Connection

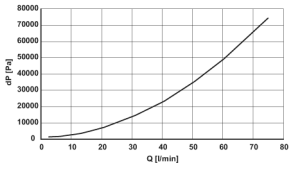


1 (L+)	L+	
2 (OUT2)	MP2	DO, AO, reset
3 (L-)	L-	
4 (OUT1)	MP1	DO, IO-Link

Electrical connection - plug

Diagrams and graphs

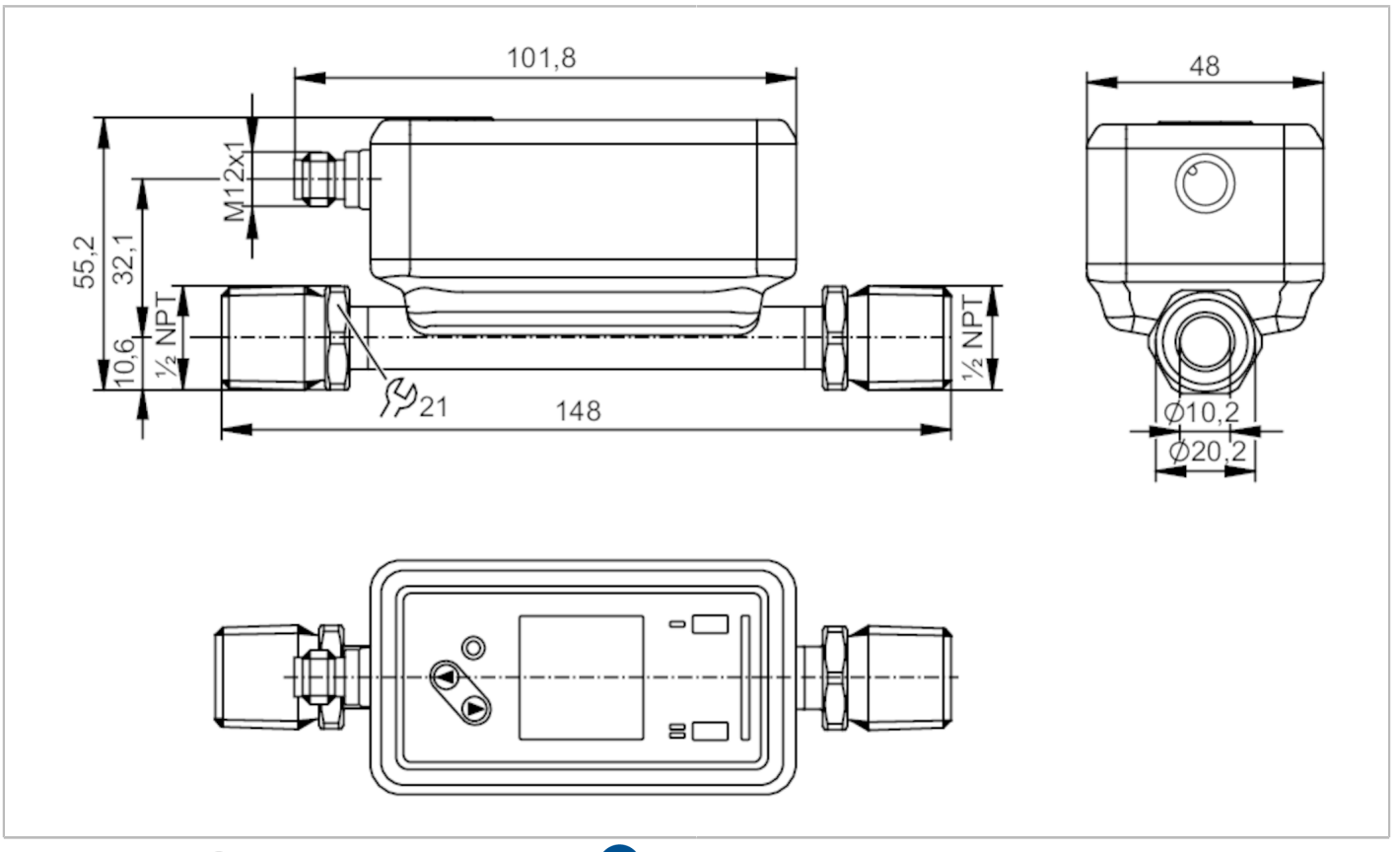
Note on pressure loss



SU6621

Ultrasonic flow meter

SUN12XXBFRKG/US



ACS CE cULus LISTED IO-Link KTW/W270 NSF Reg31

Product characteristics				
Measuring range	0.5...65 l/min	0.03...3.9 m³/h	8...1030 gph	0.13...17.17 gpm
Process connection	threaded connection 1/2" NPT external thread DN15			
Application				
Special feature	Gold-plated contacts			
Media	ultra-pure water; water; hydrous media			
Note on media	hydrous media: for media with >10 % additives, the repeatability is the only available value			
Medium temperature	-20...100 °C	-4...212 °F		
Min. bursting pressure	150 bar	15 MPa		
Pressure rating	100 bar	10 MPa		
Vacuum resistance [mbar]	-1000			
Electrical data				
Operating voltage [V]	18...32 DC; (to SELV/PELV)			
Current consumption [mA]	< 75			
Protection class	III			
Reverse polarity protection	yes			
Power-on delay time [s]	5			
Measuring principle	ultrasonic			
Inputs				
Inputs	counter reset			

SU6621

Ultrasonic flow meter

SUN12XXBFRKG/US

Outputs		
Total number of outputs		2
Output signal		switching signal; pulse signal; analogue signal; IO-Link; frequency signal; diagnostic signal; totaliser switching signal
Electrical design		PNP/NPN
Output function		normally open / normally closed; (parameterisable)
Max. voltage drop switching output DC	[V]	2
Permanent current rating of switching output DC	[mA]	100
Switching frequency DC	[Hz]	0...10000
Analogue current output	[mA]	4...20
Max. load	[Ω]	500
Pulse output		flow rate meter
Short-circuit protection		yes
Type of short-circuit protection		pulsed
Overload protection		yes

Measuring/setting range					
Measuring range		0.5...65 l/min	0.03...3.9 m³/h	8...1030 gph	0.13...17.17 gpm
Display range		-78...78 l/min	-4.68...4.68 m³/h	-1236...1236 gph	-20.61...20.61 gpm
Resolution		0.1 l/min	0.002 m³/h	1 gph	0.01 gpm
Set point SP		0.9...65 l/min	0.052...3.9 m³/h	14...1030 gph	0.23...17.17 gpm
Reset point rP		0.5...64.7 l/min	0.032...3.88 m³/h	8...1025 gph	0.14...17.08 gpm
Analogue start point ASP		-65...52 l/min	-3.9...3.12 m³/h	-1030...824 gph	-17.17...13.74 gpm
Analogue end point AEP		-52...65 l/min	-3.12...3.9 m³/h	-824...1030 gph	-13.74...17.17 gpm
Low flow cut-off LFC		0.5...3.2 l/min	0.03...0.195 m³/h	8...52 gph	0.13...0.86 gpm
Frequency end point, FEP		13...65 l/min	0.782...3.9 m³/h	207...1030 gph	3.44...17.17 gpm
Frequency at the end point FRP	[Hz]	1...10000			
Volumetric flow quantity monitoring					
Pulse length	[s]	0.002...2			
Pulse value		0.02...99990000 l; 0.005...26414563.515 gal			
Temperature monitoring					
Measuring range		-20...100 °C		-4...212 °F	
Display range		-44...124 °C		-47.2...255.2 °F	
Resolution		0.1 °C		0.1 °F	
Set point SP		-19.6...100 °C		-3.2...212 °F	
Reset point rP		-20...99.6 °C		-4...211.2 °F	
Analogue start point		-20...76 °C		-4...168.8 °F	
Analogue end point		4...100 °C		39.2...212 °F	
Frequency start point, FSP		-20...76 °C		4...168.8 °F	
Frequency end point, FEP		4...100 °C		4...212 °F	
Frequency at the end point FRP	[Hz]	1...10000			

SU6621

Ultrasonic flow meter

SUN12XXBFRKG/US

Accuracy / deviations			
Flow monitoring			
Accuracy (in the measuring range)		± (2,0 % MW + 0,5 % MEW)	
Repeatability		± 0,2 % MEW	
Temperature monitoring			
Accuracy	[K]	± 2,5 (Q > 5 % MEW)	
Temperature coefficient	[% of the span / 10 K]	0,2	
Response times			
Flow monitoring			
Response time	[s]	< 0.25; (dAP = 0, T09)	
Damping process value dAP	[s]	0...5	
Temperature monitoring			
Dynamic response T05 / T09	[s]	5,7 / 86	
Software / programming			
Diagnostic functions		direction of flow detection; signal quality	
Interfaces			
Communication interface		IO-Link	
Transmission type		COM2 (38,4 kBaud)	
IO-Link revision		1.1.3	
SDCI standard		IEC 61131-9: 2013-07	
Profiles		BLOB	Binary Large Object transfer
		Common - I&D	Identification and Diagnosis
Required master port type		A	
Process data analogue		3	
Process data binary		2	
Min. process cycle time	[ms]	9.6	
IO-Link process data (cyclical)		**function**	**bit length**
		totaliser	32
		Flow monitoring	32
		Temperature monitoring	32
		status	4
		Output 1	1
		Output 2	1
Supported DeviceIDs		**Type of operation**	**DeviceID**
		default	1462
Operating conditions			
Ambient temperature	[°C]	-20...60	
Storage temperature	[°C]	-25...80	
Protection		IP 67	
Tests / approvals			
EMC		DIN 61326-1:2021	
Shock resistance		DIN IEC 68-2-27	20 g (11ms)
Vibration resistance		DIN IEC 68-2-6	20 g (10...2000Hz)

SU6621

Ultrasonic flow meter

SUN12XXBFRKG/US

MTTF	[years]	160	
UL approval		UL approval no.	I034
Pressure Equipment Directive		can be used for group 2 fluids; group 1 fluids on request	

Mechanical data

Weight	[g]	524.7	
Housing		rectangular	
Type of mounting		inlet pipe length 5xDN; outlet pipe length 1xDN	
Dimensions	[mm]	148 x 48 x 55.2	
Materials		housing: stainless steel (316L/1.4404); Display: PFA; Sealing Display: FKM; connector: PBT	
Materials (wetted parts)		Pipe section: stainless steel (316L/1.4404)	
Process connection		threaded connection 1/2" NPT external thread DN15	
Surface characteristics Ra/Rz of the wetted parts		49.21 µin	

Displays / operating elements

Display		colour display 1,44", 128 x 128 pixels
	Switching function	2 x LED, yellow
	diagnosis	1 x LED, three-colour

Accessories

Items supplied	package insert

Remarks

Remarks	MW = measured value
	MEW = Final value of the measuring range
	pulse and totaliser signal are only available for one of the two outputs
	the accuracy indications are adhered to over the entire application area
Pack quantity	1 pcs.

Electrical connection

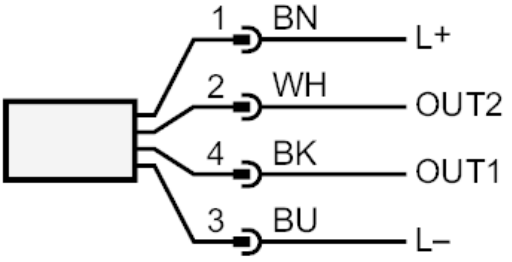
Connector: 1 x M12; coding: A; Contacts: gold-plated

SU6621

Ultrasonic flow meter

SUN12XXBFRKG/US

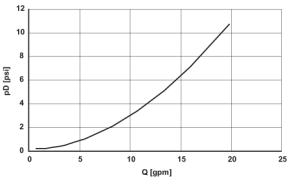
Connection



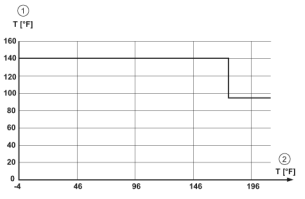
OUT1/IO-Link:	switching output volumetric flow quantity monitoring switching output Temperature monitoring Pulse output quantity meter frequency output volumetric flow quantity monitoring frequency output Temperature monitoring Diagnostic output direction of flow detection / signal quality signal output Preset counter
OUT2/InD:	switching output volumetric flow quantity monitoring switching output Temperature monitoring Pulse output quantity meter analogue output flow analogue output temperature Diagnostic output direction of flow detection / signal quality signal output Preset counter input counter reset
colours to DIN EN 60947-5-2	
Core colours	BK= black BN= brown BU= blue WH= white

Diagrams and graphs

Note on pressure loss



derating ambient temperature



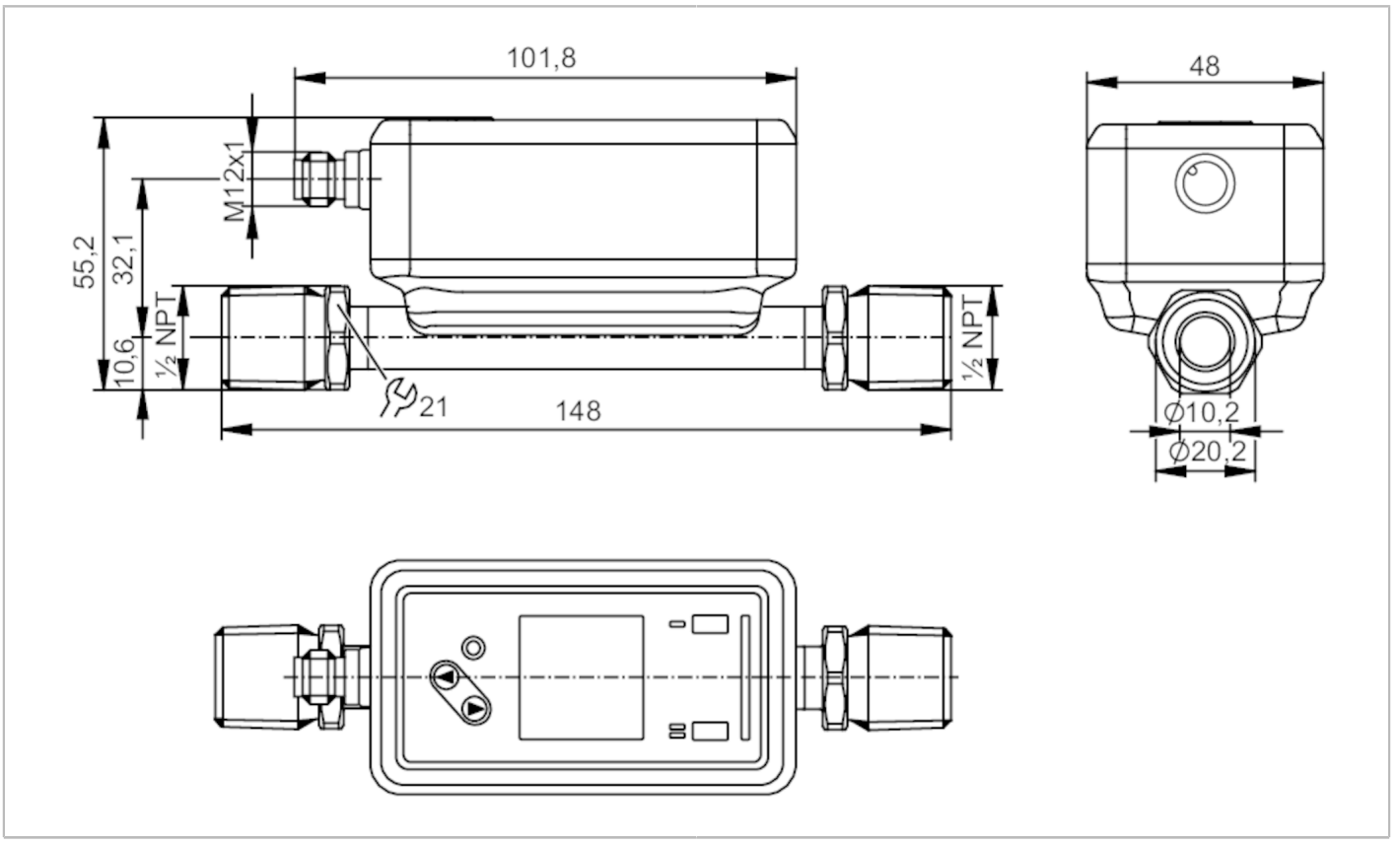
1 Ambient temperature

2 Medium temperature

SU6631

Ultrasonic flow meter

SUN12XFBFRKG/US



Product characteristics				
Measuring range	0.5...65 l/min	0.03...3.9 m³/h	8...1030 gph	0.13...17.17 gpm
Process connection	threaded connection 1/2" NPT external thread DN15			
Application				
Special feature	Gold-plated contacts			
Media	ultra-pure water; water; hydrous media; glycol solutions; oils; coolants			
Note on media	hydrous media: for media with >10 % additives, the repeatability is the only available value			
	low-viscosity oils with viscosity: 7...40 mm²/s (40 °C)			
	high-viscosity oils with viscosity: 30...68 mm²/s (40 °C)			
Medium temperature	-20...100 °C		-4...212 °F	
Min. bursting pressure	150 bar		15 MPa	
Pressure rating	100 bar		10 MPa	
Vacuum resistance [mbar]	-1000			
Electrical data				
Operating voltage [V]	18...32 DC; (to SELV/PELV)			
Current consumption [mA]	< 75			
Protection class	III			
Reverse polarity protection	yes			
Power-on delay time [s]	5			
Measuring principle	ultrasonic			

SU6631

Ultrasonic flow meter

SUN12XFBFRKG/US

Inputs					
Inputs		counter reset			
Outputs					
Total number of outputs		2			
Output signal		switching signal; pulse signal; analogue signal; IO-Link; frequency signal; diagnostic signal; totaliser switching signal			
Electrical design		PNP/NPN			
Output function		normally open / normally closed; (parameterisable)			
Max. voltage drop switching output DC	[V]	2			
Permanent current rating of switching output DC	[mA]	100			
Switching frequency DC	[Hz]	0...10000			
Analogue current output	[mA]	4...20			
Max. load	[Ω]	500			
Pulse output		flow rate meter			
Short-circuit protection		yes			
Type of short-circuit protection		pulsed			
Overload protection		yes			
Measuring/setting range					
Measuring range		0.5...65 l/min	0.03...3.9 m³/h	8...1030 gph	0.13...17.17 gpm
Display range		-78...78 l/min	-4.68...4.68 m³/h	-1236...1236 gph	-20.61...20.61 gpm
Resolution		0.1 l/min	0.002 m³/h	1 gph	0.01 gpm
Set point SP		0.9...65 l/min	0.052...3.9 m³/h	14...1030 gph	0.23...17.17 gpm
Reset point rP		0.5...64.7 l/min	0.032...3.88 m³/h	8...1025 gph	0.14...17.08 gpm
Analogue start point ASP		-65...52 l/min	-3.9...3.12 m³/h	-1030...824 gph	-17.17...13.74 gpm
Analogue end point AEP		-52...65 l/min	-3.12...3.9 m³/h	-824...1030 gph	-13.74...17.17 gpm
Low flow cut-off LFC		0.5...3.2 l/min	0.03...0.195 m³/h	8...52 gph	0.13...0.86 gpm
Frequency end point, FEP		13...65 l/min	0.782...3.9 m³/h	207...1030 gph	3.44...17.17 gpm
Frequency at the end point FRP	[Hz]	1...10000			
Volumetric flow quantity monitoring					
Pulse length	[s]	0.002...2			
Pulse value		0.02...99990000 l; 0.005...26414563.515 gal			
Temperature monitoring					
Measuring range		-20...100 °C		-4...212 °F	
Display range		-44...124 °C		-47.2...255.2 °F	
Resolution		0.1 °C		0.1 °F	
Set point SP		-19.6...100 °C		-3.2...212 °F	
Reset point rP		-20...99.6 °C		-4...211.2 °F	
Analogue start point		-20...76 °C		-4...168.8 °F	
Analogue end point		4...100 °C		39.2...212 °F	
Frequency start point, FSP		-20...76 °C		4...168.8 °F	
Frequency end point, FEP		4...100 °C		4...212 °F	
Frequency at the end point FRP	[Hz]	1...10000			

SU6631

Ultrasonic flow meter

SUN12XFBFRKG/US

Accuracy / deviations			
Flow monitoring			
Accuracy (in the measuring range)		glycol solutions (35%)	±(5,0 % MW + 0,5 % MEW)
		high-viscosity oils with viscosity 46mm2/s (40°C)	±(5,0 % MW + 1,0 % MEW)
		low-viscosity oils with viscosity 10mm2/s (40°C)	±(5,0 % MW + 1,0 % MEW)
		water	± (2,0 % MW + 0,5 % MEW)
Repeatability		± 0,2 % MEW	
Temperature monitoring			
Accuracy	[K]	± 2,5 (Q > 5 % MEW)	
Temperature coefficient [% of the span / 10 K]		0,2	
Response times			
Flow monitoring			
Response time	[s]	< 0.25; (dAP = 0, T09)	
Damping process value dAP	[s]	0...5	
Temperature monitoring			
Dynamic response T05 / T09	[s]	5,7 / 86	
Software / programming			
Diagnostic functions		direction of flow detection; signal quality	
Interfaces			
Communication interface		IO-Link	
Transmission type		COM2 (38,4 kBaud)	
IO-Link revision		1.1.3	
SDCI standard		IEC 61131-9: 2013-07	
Profiles		BLOB	Binary Large Object transfer
		Common - I&D	Identification and Diagnosis
Required master port type		A	
Process data analogue		3	
Process data binary		2	
Min. process cycle time	[ms]	9.6	
IO-Link process data (cyclical)		**function**	**bit length**
		totaliser	32
		Flow monitoring	32
		Temperature monitoring	32
		status	4
		Output 1	1
		Output 2	1
Supported DeviceIDs		**Type of operation**	**DeviceID**
		default	1755
Operating conditions			
Ambient temperature	[°C]	-20...60	
Storage temperature	[°C]	-25...80	
Protection		IP 67	

SU6631

Ultrasonic flow meter

SUN12XFBFRKG/US

Tests / approvals			
EMC		DIN 61326-1:2021	
Shock resistance		DIN IEC 68-2-27	20 g (11ms)
Vibration resistance		DIN IEC 68-2-6	20 g (10...2000Hz)
MTTF	[years]	160	
UL approval		UL approval no.	I034
Pressure Equipment Directive		can be used for group 2 fluids; group 1 fluids on request	
Mechanical data			
Weight	[g]	540.4	
Housing		rectangular	
Type of mounting		inlet pipe length 5xDN; outlet pipe length 1xDN	
Dimensions	[mm]	148 x 48 x 55.2	
Materials		housing: stainless steel (316L/1.4404); Display: PFA; Sealing Display: FKM; connector: PBT	
Materials (wetted parts)		Pipe section: stainless steel (316L/1.4404)	
Process connection		threaded connection 1/2" NPT external thread DN15	
Surface characteristics Ra/Rz of the wetted parts		49.21 µin	
Displays / operating elements			
Display			colour display 1,44", 128 x 128 pixels
		Switching function	2 x LED, yellow
		diagnosis	1 x LED, three-colour
Display unit		l/min; l/h; m³/h; m/s; gpm; gph; ft/s; oz/min	
Accessories			
Items supplied		package insert	
Remarks			
Remarks		MW = measured value	
		MEW = Final value of the measuring range	
		pulse and totaliser signal are only available for one of the two outputs	
		the accuracy indications are adhered to over the entire application area	
Pack quantity		1 pcs.	

Electrical connection

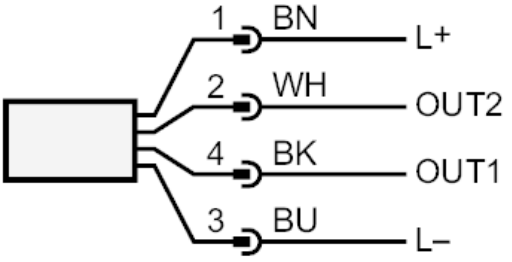
Connector: 1 x M12; coding: A; Contacts: gold-plated

SU6631

Ultrasonic flow meter

SUN12XFBFRKG/US

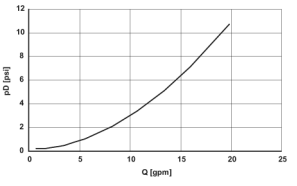
Connection



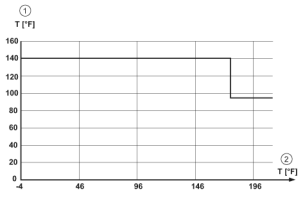
OUT1/IO-Link:	switching output volumetric flow quantity monitoring switching output Temperature monitoring Pulse output quantity meter frequency output volumetric flow quantity monitoring frequency output Temperature monitoring Diagnostic output direction of flow detection / signal quality signal output Preset counter
OUT2/InD:	switching output volumetric flow quantity monitoring switching output Temperature monitoring Pulse output quantity meter analogue output flow analogue output temperature Diagnostic output direction of flow detection / signal quality signal output Preset counter input counter reset
colours to DIN EN 60947-5-2	
Core colours	BK= black BN= brown BU= blue WH= white

Diagrams and graphs

Note on pressure loss



derating ambient temperature



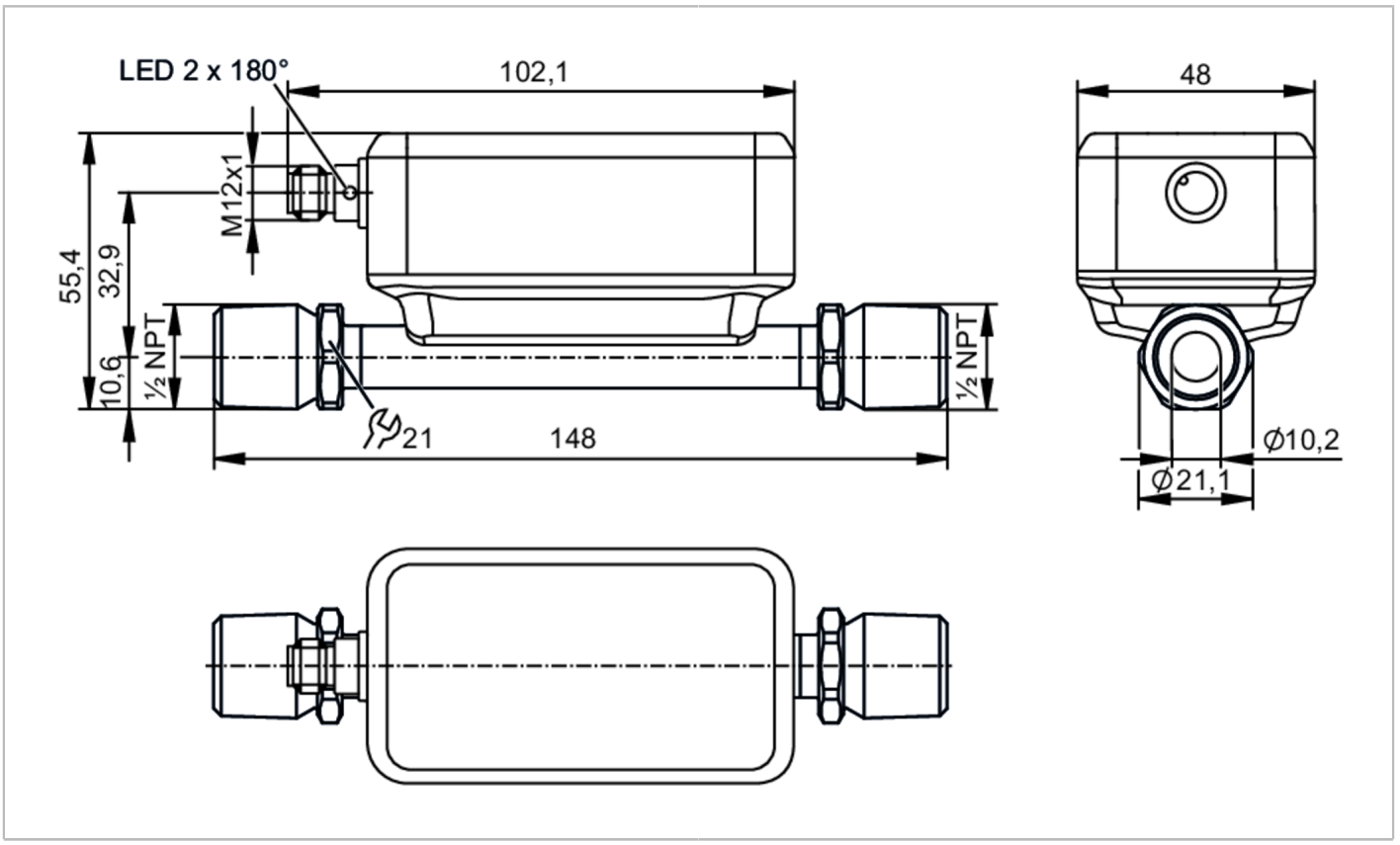
1 Ambient temperature

2 Medium temperature

SU6651

Ultrasonic flow meter

SUN12XJBFRKG/US



Product characteristics				
Number of inputs and outputs	Number of digital outputs: 2; Number of analogue outputs: 1			
Measuring range	0.5...65 l/min	0.03...3.9 m³/h	8...1030 gph	0.13...17.17 gpm
Nominal diameter	DN15 (1/2“)			
Process connection	threaded connection 1/2" NPT external thread DN15			
Application				
Special feature	Gold-plated contacts			
Application	use in mobile and industrial applications			
Media	ultra-pure water; water; hydrous media; glycol solutions; oils (of high and low viscosity); coolants			
Note on media	hydrous media: for media with >10 % additives, the repeatability is the only available value			
	low-viscosity oils with viscosity: 7...40 mm²/s (40 °C)			
	high-viscosity oils with viscosity: 30...68 mm²/s (40 °C)			
Medium temperature	-40...120 °C		-40...248 °F	
Min. bursting pressure	150 bar		15 MPa	
Pressure rating	100 bar		10 MPa	
Vacuum resistance [mbar]	-1000			
Electrical data				
Operating voltage [V]	8...32 DC; (to SELV/PELV)			
Current consumption [mA]	< 175			
Protection class	III			
Reverse polarity protection	yes			

SU6651

Ultrasonic flow meter

SUN12XJBFRKG/US

Power-on delay time	[s]	5			
Measuring principle		ultrasonic			
Inputs / outputs					
Total number of inputs and outputs		2			
Number of inputs and outputs		Number of digital outputs: 2; Number of analogue outputs: 1			
Inputs					
Inputs		OUT2	counter reset		
Outputs					
Total number of outputs		2			
Output signal		OUT1	switching signal; pulse signal; diagnostic signal; totaliser switching signal; frequency signal; IO-Link		
		OUT2	switching signal; pulse signal; diagnostic signal; totaliser switching signal; analogue signal		
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]	100			
Switching frequency DC	[Hz]	0...10000			
Number of analogue outputs		1			
Analogue current output	[mA]	4...20; (scalable)			
Max. load	[Ω]	500			
Analogue voltage output	[V]	0...10 / 0.5...4.5; (scalable)			
Min. load resistance	[Ω]	2000			
Pulse output		flow rate meter			
Short-circuit protection		yes			
Type of short-circuit protection		pulsed			
Overload protection		yes			
Measuring/setting range					
Measuring range		0.5...65 l/min	0.03...3.9 m³/h	8...1030 gph	0.13...17.17 gpm
Resolution		0.1 l/min	0.002 m³/h	1 gph	0.01 gpm
Note on factory setting		gpm			
		°F			
Set point SP		0.9...65 l/min	0.052...3.9 m³/h	14...1030 gph	0.23...17.17 gpm
Reset point rP		0.5...64.7 l/min	0.032...3.88 m³/h	8...1025 gph	0.14...17.08 gpm
Analogue start point ASP		-65...52 l/min	-3.9...3.12 m³/h	-1030...824 gph	-17.17...13.74 gpm
Analogue end point AEP		-52...65 l/min	-3.12...3.9 m³/h	-824...1030 gph	-13.74...17.17 gpm
Low flow cut-off LFC		0.5...3.2 l/min	0.03...0.195 m³/h	8...52 gph	0.13...0.86 gpm
Frequency end point, FEP		13...65 l/min	0.782...3.9 m³/h	207...1030 gph	3.44...17.17 gpm
Frequency at the end point FRP	[Hz]	1...10000			

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Ultrasonic flow meter

SUN12XJBFRKG/US

Volumetric flow quantity monitoring			
Pulse length	[s]	0.002...2	
Pulse value		0.1...99990000 l; 0.03...26414563.515 gal	
Temperature monitoring			
Measuring range		-40...120 °C	-40...248 °F
Resolution		0.1 °C	0.1 °F
Set point SP		-40...119.4 °C	-40...247 °F
Reset point rP		-40...88 °C	-40...190.4 °F
Analogue start point		-8...120 °C	17.6...248 °F
Analogue end point		-40...88 °C	-40...190.4 °F
Frequency start point, FSP		-8...120 °C	17.6...248 °F
Frequency end point, FEP		-40...119.4 °C	-40...247 °F
Frequency at the end point FRP	[Hz]	1...10000	
Accuracy / deviations			
Flow monitoring			
Accuracy (in the measuring range)		only up to 100 °C; at higher temperatures, only the repeatability is within the specification.	
Accuracy (in the measuring range)		glycol solutions (35%)	±(5,0 % MW + 0,5 % MEW)
		high-viscosity oils with viscosity 46mm2/s (40°C)	±(5,0 % MW + 1,0 % MEW)
		low-viscosity oils with viscosity 10mm2/s (40°C)	±(5,0 % MW + 1,0 % MEW)
		water	± (2,0 % MW + 0,5 % MEW)
Repeatability		± 0,2 % MEW	
Temperature monitoring			
Accuracy	[K]	± 2,5 (Q > 5 % MEW)	
Temperature coefficient	[% of the span / 10 K]	0,2	
Response times			
Flow monitoring			
Response time	[s]	< 0.25; (dAP = 0, T09)	
Damping process value dAP	[s]	0...5	
Temperature monitoring			
Dynamic response T05 / T09	[s]	5,7 / 86	
Software / programming			
Diagnostic functions		direction of flow detection; signal quality	
Interfaces			
Communication interface		IO-Link	
Transmission type		COM2 (38,4 kBaud)	
IO-Link revision		1.1.3	
SDCI standard		IEC 61131-9: 2013-07	
Profiles		BLOB	Binary Large Object transfer
		Common - I&D	Identification and Diagnosis
Required master port type		A	
Process data analogue		3	

SU6651

Ultrasonic flow meter

SUN12XJBFRKG/US

Process data binary		2	
Min. process cycle time	[ms]	9.6	
IO-Link process data (cyclical)		**function**	**bit length**
		totaliser	32
		Flow monitoring	32
		Temperature monitoring	32
		status	4
		Output 1	1
		Output 2	1
Supported DeviceIDs		**Type of operation**	**DeviceID**
		default	1834
Operating conditions			
Ambient temperature	[°C]	-25...60	
Storage temperature	[°C]	-40...80	
Protection		IP 67; IP 69K	
Tests / approvals			
EMC		DIN 61326-1:2021	
Shock resistance		DIN IEC 68-2-27	20 g (11ms)
Vibration resistance		DIN IEC 68-2-6	20 g (10...2000Hz)
MTTF	[years]	136	
UL approval		UL approval no.	I037
		File number UL	E174189
Pressure Equipment Directive		can be used for group 2 fluids; group 1 fluids on request	
Mechanical data			
Weight	[g]	533.8	
Housing		rectangular	
Inlet pipe length		5 x DN	
Outlet pipe length		1 x DN	
Dimensions	[mm]	148 x 48 x 55.4	
Materials		housing: stainless steel (316L/1.4404); connector: PEI FKM	
Materials (wetted parts)		Pipe section: stainless steel (316L/1.4404)	
Nominal diameter		DN15 (1/2“)	
Process connection		threaded connection 1/2" NPT external thread DN15	
Surface characteristics Ra/Rz of the wetted parts		49.21 µin	
Displays / operating elements			
Display		operating status	1 x LED, green
Accessories			
Items supplied		package insert	
Remarks			
Remarks		MW = measured value	
		MEW = Final value of the measuring range	
		pulse and totaliser signal are only available for one of the two outputs	
		the accuracy indications are adhered to over the entire application area	
Pack quantity		1 pcs.	

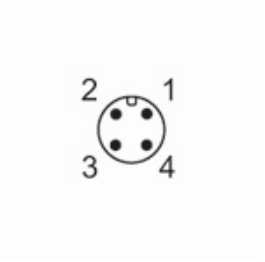
SU6651

Ultrasonic flow meter

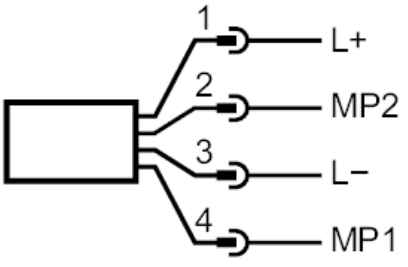
SUN12XJBFRKG/US

Electrical connection

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



Connection

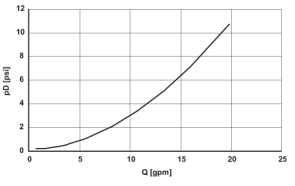


1 (L+)	L+	
2 (OUT2)	MP2	DO, AO, reset
3 (L-)	L-	
4 (OUT1)	MP1	DO, IO-Link

Electrical connection - plug

Diagrams and graphs

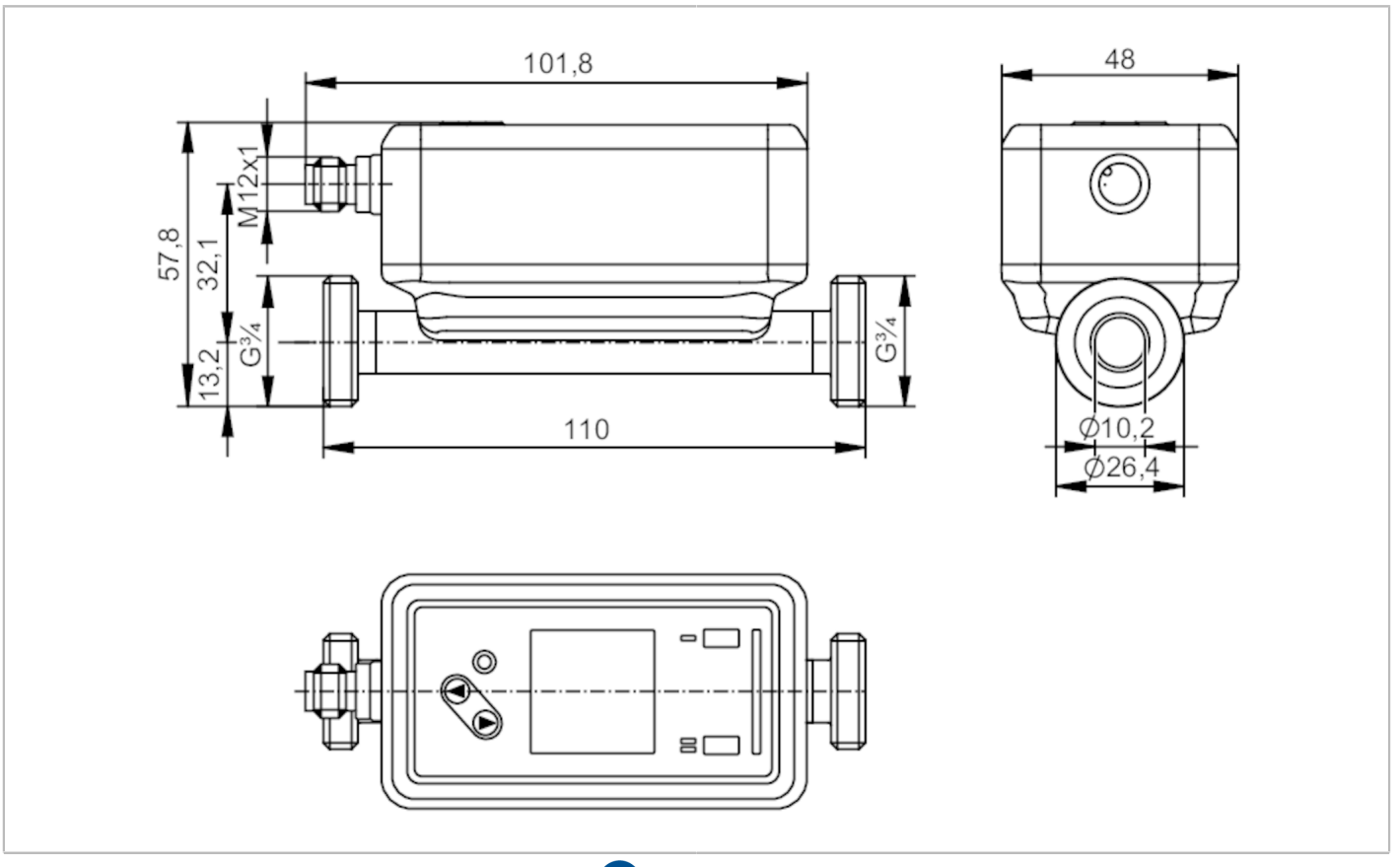
Note on pressure loss



SU7021

Ultrasonic flow meter

SUR34XXBFRKG/US



ACS CE cULus LISTED IO-Link KTW/W270 NSF Reg31

Product characteristics				
Measuring range	0.5...75 l/min	0.03...4.5 m³/h	8...1189 gph	0.13...19.81 gpm
Process connection	threaded connection G 3/4 external thread DN20			
Application				
Special feature	Gold-plated contacts			
Media	ultra-pure water; water; hydrous media			
Note on media	hydrous media: for media with >10 % additives, the repeatability is the only available value			
Medium temperature	-20...100 °C	-4...212 °F		
Min. bursting pressure	150 bar	15 MPa		
Pressure rating	100 bar	10 MPa		
Vacuum resistance [mbar]	-1000			
Electrical data				
Operating voltage [V]	18...32 DC; (to SELV/PELV)			
Current consumption [mA]	< 75			
Protection class	III			
Reverse polarity protection	yes			
Power-on delay time [s]	5			
Measuring principle	ultrasonic			
Inputs				
Inputs	counter reset			

SU7021

Ultrasonic flow meter

SUR34XXBFRKG/US

Outputs					
Total number of outputs		2			
Output signal		switching signal; pulse signal; analogue signal; IO-Link; frequency signal; diagnostic signal; totaliser switching signal			
Electrical design		PNP/NPN			
Output function		normally open / normally closed; (parameterisable)			
Max. voltage drop switching output DC	[V]	2			
Permanent current rating of switching output DC	[mA]	100			
Switching frequency DC	[Hz]	0...10000			
Analogue current output	[mA]	4...20			
Max. load	[Ω]	500			
Pulse output		flow rate meter			
Short-circuit protection		yes			
Type of short-circuit protection		pulsed			
Overload protection		yes			
Measuring/setting range					
Measuring range		0.5...75 l/min	0.03...4.5 m³/h	8...1189 gph	0.13...19.81 gpm
Display range		-90...90 l/min	-5.4...5.4 m³/h	-1427...1427 gph	-23.78...23.78 gpm
Resolution		0.1 l/min	0.002 m³/h	1 gph	0.01 gpm
Set point SP		0.9...75 l/min	0.055...4.5 m³/h	15...1189 gph	0.24...19.81 gpm
Reset point rP		0.5...74.6 l/min	0.032...4.477 m³/h	9...1183 gph	0.14...19.71 gpm
Analogue start point ASP		-75...60 l/min	-4.5...3.6 m³/h	-1189...951 gph	-19.81...15.85 gpm
Analogue end point AEP		-60...75 l/min	-3.6...4.5 m³/h	-951...1189 gph	-15.78...19.81 gpm
Low flow cut-off LFC		0.5...3.2 l/min	0.03...0.195 m³/h	8...59 gph	0.13...0.99 gpm
Frequency end point, FEP		15...75 l/min	0.903...4.5 m³/h	238...1189 gph	3.97...19.81 gpm
Frequency at the end point FRP	[Hz]	1...10000			
Volumetric flow quantity monitoring					
Pulse length	[s]	0.002...2			
Pulse value		0.02...99990000 l; 0.005...26414563.515 gal			
Temperature monitoring					
Measuring range		-20...100 °C		-4...212 °F	
Display range		-44...124 °C		-47.2...255.2 °F	
Resolution		0.1 °C		0.1 °F	
Set point SP		-19.6...100 °C		-3.2...212 °F	
Reset point rP		-20...99.6 °C		-4...211.2 °F	
Analogue start point		-20...76 °C		-4...168.8 °F	
Analogue end point		4...100 °C		39.2...212 °F	
Frequency start point, FSP		-20...76 °C		4...168.8 °F	
Frequency end point, FEP		4...100 °C		4...212 °F	
Frequency at the end point FRP	[Hz]	1...10000			

SU7021

Ultrasonic flow meter

SUR34XXBFRKG/US

Accuracy / deviations			
Flow monitoring			
Accuracy (in the measuring range)		± (2,0 % MW + 0,5 % MEW)	
Repeatability		± 0,2 % MEW	
Temperature monitoring			
Accuracy	[K]	± 2,5 (Q > 5 % MEW)	
Temperature coefficient	[% of the span / 10 K]	0,2	
Response times			
Flow monitoring			
Response time	[s]	< 0.25; (dAP = 0, T09)	
Damping process value dAP	[s]	0...5	
Temperature monitoring			
Dynamic response T05 / T09	[s]	5,7 / 86	
Software / programming			
Diagnostic functions		direction of flow detection; signal quality	
Interfaces			
Communication interface		IO-Link	
Transmission type		COM2 (38,4 kBaud)	
IO-Link revision		1.1.3	
SDCI standard		IEC 61131-9: 2013-07	
Profiles		BLOB	Binary Large Object transfer
		Common - I&D	Identification and Diagnosis
Required master port type		A	
Process data analogue		3	
Process data binary		2	
Min. process cycle time	[ms]	9.6	
IO-Link process data (cyclical)		**function**	**bit length**
		totaliser	32
		Flow monitoring	32
		Temperature monitoring	32
		status	4
		Output 1	1
		Output 2	1
Supported DeviceIDs		**Type of operation**	**DeviceID**
		default	1636
Operating conditions			
Ambient temperature	[°C]	-20...60	
Storage temperature	[°C]	-25...80	
Protection		IP 67	
Tests / approvals			
EMC		DIN 61326-1:2021	
Shock resistance		DIN IEC 68-2-27	20 g (11ms)
Vibration resistance		DIN IEC 68-2-6	20 g (10...2000Hz)

SU7021

Ultrasonic flow meter

SUR34XXBFRKG/US

MTTF	[years]	160	
UL approval		UL approval no.	I034
Pressure Equipment Directive		can be used for group 2 fluids; group 1 fluids on request	

Mechanical data

Weight	[g]	494.4	
Housing		rectangular	
Type of mounting		inlet pipe length 5xDN; outlet pipe length 1xDN	
Dimensions	[mm]	110 x 48 x 57.8	
Materials		housing: stainless steel (316L/1.4404); Display: PFA; Sealing Display: FKM; connector: PBT	
Materials (wetted parts)		Pipe section: stainless steel (316L/1.4404); Process connection sealing: NBR reinforced fibre Flat seal	
Process connection		threaded connection G 3/4 external thread DN20	
Surface characteristics Ra/Rz of the wetted parts		Ra < 1.25 µm	

Displays / operating elements

Display		colour display 1,44", 128 x 128 pixels
	Switching function	2 x LED, yellow
	diagnosis	1 x LED, three-colour

Accessories

Items supplied	Flat seal 2, Centellen
	package insert

Remarks

Remarks	MW = measured value
	MEW = Final value of the measuring range
	pulse and totaliser signal are only available for one of the two outputs
	the accuracy indications are adhered to over the entire application area
Pack quantity	1 pcs.

Electrical connection

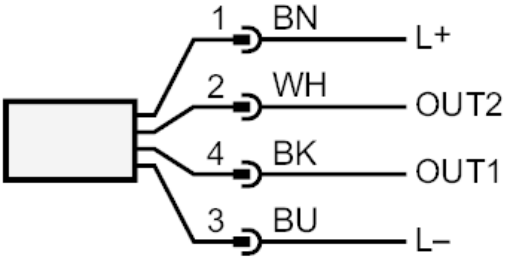
Connector: 1 x M12; coding: A; Contacts: gold-plated

SU7021

Ultrasonic flow meter

SUR34XXBFRKG/US

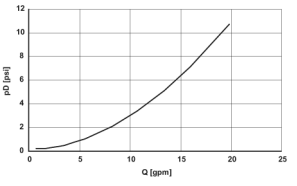
Connection



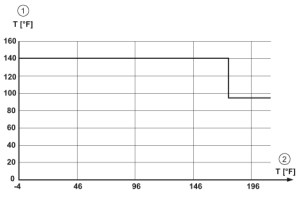
OUT1/IO-Link:	switching output volumetric flow quantity monitoring switching output Temperature monitoring Pulse output quantity meter frequency output volumetric flow quantity monitoring frequency output Temperature monitoring Diagnostic output direction of flow detection / signal quality signal output Preset counter
OUT2/InD:	switching output volumetric flow quantity monitoring switching output Temperature monitoring Pulse output quantity meter analogue output flow analogue output temperature Diagnostic output direction of flow detection / signal quality signal output Preset counter input counter reset
colours to DIN EN 60947-5-2	
Core colours	BK= black BN= brown BU= blue WH= white

Diagrams and graphs

Note on pressure loss



derating ambient temperature



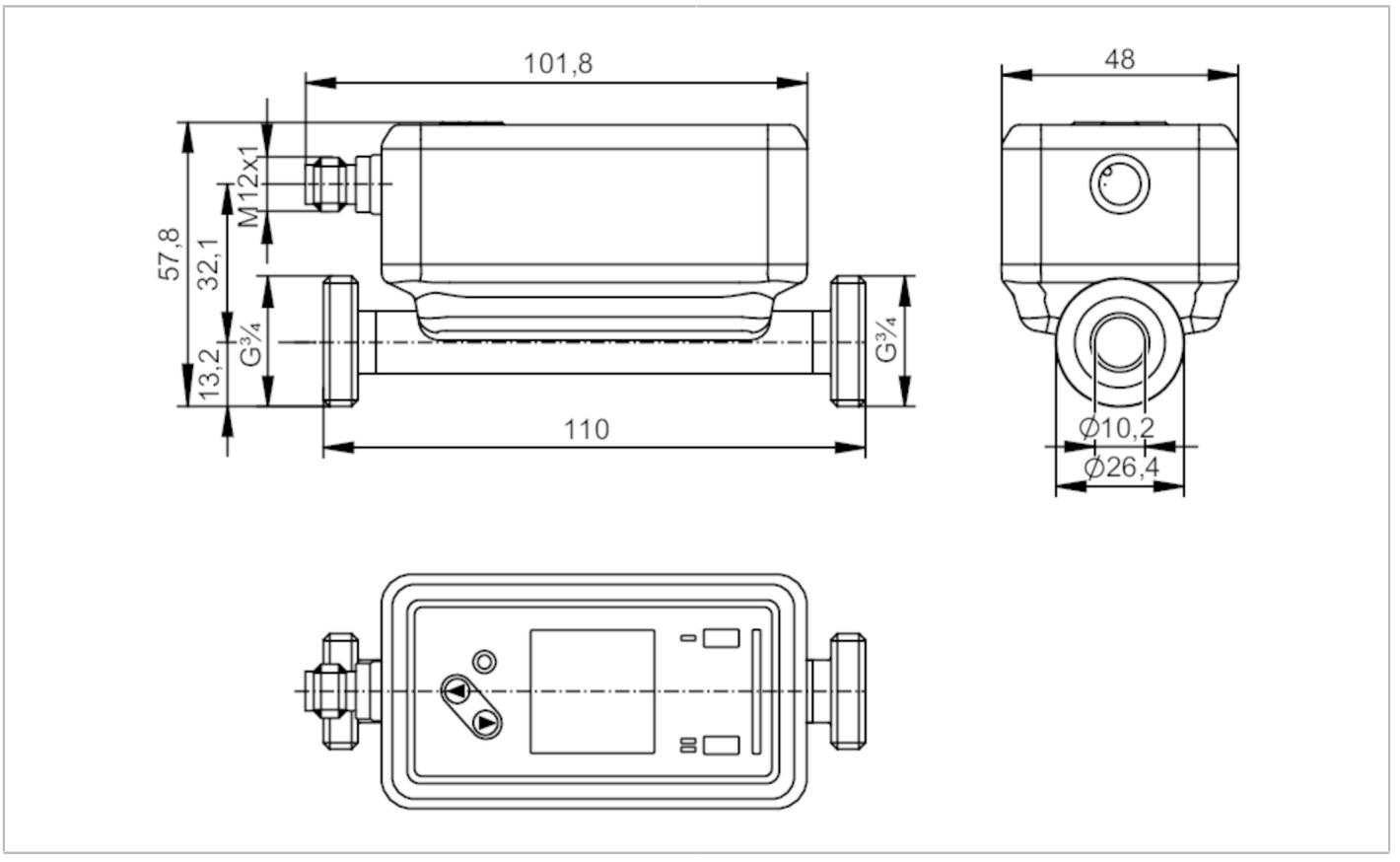
1 Ambient temperature

2 Medium temperature

SU7031

Ultrasonic flow meter

SUR34XFBFRKG/US



IO-Link

Product characteristics				
Measuring range	0.5...75 l/min	0.03...4.5 m³/h	8...1189 gph	0.13...19.81 gpm
Process connection	threaded connection G 3/4 external thread DN20			
Application				
Special feature	Gold-plated contacts			
Media	ultra-pure water; water; hydrous media; glycol solutions; oils; coolants			
Note on media	hydrous media: for media with >10 % additives, the repeatability is the only available value			
	low-viscosity oils with viscosity: 7...40 mm²/s (40 °C)			
	high-viscosity oils with viscosity: 30...68 mm²/s (40 °C)			
Medium temperature	-20...100 °C		-4...212 °F	
Min. bursting pressure	150 bar		15 MPa	
Pressure rating	100 bar		10 MPa	
Vacuum resistance [mbar]	-1000			
Electrical data				
Operating voltage [V]	18...32 DC; (to SELV/PELV)			
Current consumption [mA]	< 75			
Protection class	III			
Reverse polarity protection	yes			
Power-on delay time [s]	5			
Measuring principle	ultrasonic			

SU7031

Ultrasonic flow meter

SUR34XFBFRKG/US

Inputs					
Inputs		counter reset			
Outputs					
Total number of outputs		2			
Output signal		switching signal; pulse signal; analogue signal; IO-Link; frequency signal; diagnostic signal; totaliser switching signal			
Electrical design		PNP/NPN			
Output function		normally open / normally closed; (parameterisable)			
Max. voltage drop switching output DC	[V]	2			
Permanent current rating of switching output DC	[mA]	100			
Switching frequency DC	[Hz]	0...10000			
Analogue current output	[mA]	4...20			
Max. load	[Ω]	500			
Pulse output		flow rate meter			
Short-circuit protection		yes			
Type of short-circuit protection		pulsed			
Overload protection		yes			
Measuring/setting range					
Measuring range		0.5...75 l/min	0.03...4.5 m³/h	8...1189 gph	0.13...19.81 gpm
Display range		-90...90 l/min	-5.4...5.4 m³/h	-1427...1427 gph	-23.78...23.78 gpm
Resolution		0.1 l/min	0.002 m³/h	1 gph	0.01 gpm
Set point SP		0.9...75 l/min	0.055...4.5 m³/h	15...1189 gph	0.24...19.81 gpm
Reset point rP		0.5...74.6 l/min	0.032...4.477 m³/h	9...1183 gph	0.14...19.71 gpm
Analogue start point ASP		-75...60 l/min	-4.5...3.6 m³/h	-1189...951 gph	-19.81...15.85 gpm
Analogue end point AEP		-60...75 l/min	-3.6...4.5 m³/h	-951...1189 gph	-15.78...19.81 gpm
Low flow cut-off LFC		0.5...3.2 l/min	0.03...0.195 m³/h	8...59 gph	0.13...0.99 gpm
Frequency end point, FEP		15...75 l/min	0.903...4.5 m³/h	238...1189 gph	3.97...19.81 gpm
Frequency at the end point FRP	[Hz]	1...10000			
Volumetric flow quantity monitoring					
Pulse length	[s]	0.002...2			
Pulse value		0.02...99990000 l; 0.005...26414563.515 gal			
Temperature monitoring					
Measuring range		-20...100 °C	-4...212 °F		
Display range		-44...124 °C	-47.2...255.2 °F		
Resolution		0.1 °C	0.1 °F		
Set point SP		-19.6...100 °C	-3.2...212 °F		
Reset point rP		-20...99.6 °C	-4...211.2 °F		
Analogue start point		-20...76 °C	-4...168.8 °F		
Analogue end point		4...100 °C	39.2...212 °F		
Frequency start point, FSP		-20...76 °C	4...168.8 °F		
Frequency end point, FEP		4...100 °C	4...212 °F		
Frequency at the end point FRP	[Hz]	1...10000			

SU7031

Ultrasonic flow meter

SUR34XFBFRKG/US

Accuracy / deviations			
Flow monitoring			
Accuracy (in the measuring range)		glycol solutions (35%)	±(5,0 % MW + 0,5 % MEW)
		high-viscosity oils with viscosity 46mm2/s (40°C)	±(5,0 % MW + 1,0 % MEW)
		low-viscosity oils with viscosity 10mm2/s (40°C)	±(5,0 % MW + 1,0 % MEW)
		water	± (2,0 % MW + 0,5 % MEW)
Repeatability		± 0,2 % MEW	
Temperature monitoring			
Accuracy	[K]	± 2,5 (Q > 5 % MEW)	
Temperature coefficient [% of the span / 10 K]		0,2	
Response times			
Flow monitoring			
Response time	[s]	< 0.25; (dAP = 0, T09)	
Damping process value dAP	[s]	0...5	
Temperature monitoring			
Dynamic response T05 / T09	[s]	5,7 / 86	
Software / programming			
Diagnostic functions		direction of flow detection; signal quality	
Interfaces			
Communication interface		IO-Link	
Transmission type		COM2 (38,4 kBaud)	
IO-Link revision		1.1.3	
SDCI standard		IEC 61131-9: 2013-07	
Profiles		BLOB	Binary Large Object transfer
		Common - I&D	Identification and Diagnosis
Required master port type		A	
Process data analogue		3	
Process data binary		2	
Min. process cycle time	[ms]	9.6	
IO-Link process data (cyclical)		**function**	**bit length**
		totaliser	32
		Flow monitoring	32
		Temperature monitoring	32
		status	4
		Output 1	1
		Output 2	1
Supported DeviceIDs		**Type of operation**	**DeviceID**
		default	1757
Operating conditions			
Ambient temperature	[°C]	-20...60	
Storage temperature	[°C]	-25...80	
Protection		IP 67	

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Ultrasonic flow meter

SUR34XFBFRKG/US

Tests / approvals			
EMC		DIN 61326-1:2021	
Shock resistance		DIN IEC 68-2-27	20 g (11ms)
Vibration resistance		DIN IEC 68-2-6	20 g (10...2000Hz)
MTTF	[years]	160	
UL approval		UL approval no.	I034
Pressure Equipment Directive		can be used for group 2 fluids; group 1 fluids on request	

Mechanical data		
Weight	[g]	494.1
Housing		rectangular
Type of mounting		inlet pipe length 5xDN; outlet pipe length 1xDN
Dimensions	[mm]	110 x 48 x 57.8
Materials		housing: stainless steel (316L/1.4404); Display: PFA; Sealing Display: FKM; connector: PBT
Materials (wetted parts)		Pipe section: stainless steel (316L/1.4404); Process connection sealing: NBR reinforced fibre Flat seal
Process connection		threaded connection G 3/4 external thread DN20
Surface characteristics Ra/Rz of the wetted parts		Ra < 1.25 µm

Displays / operating elements		
Display		colour display 1,44", 128 x 128 pixels
	Switching function	2 x LED, yellow
	diagnosis	1 x LED, three-colour
Display unit		l/min; l/h; m³/h; m/s; gpm; gph; ft/s; oz/min

Accessories	
Items supplied	Flat seal 2, Centellen
	package insert

Remarks	
Remarks	MW = measured value
	MEW = Final value of the measuring range
	pulse and totaliser signal are only available for one of the two outputs
	the accuracy indications are adhered to over the entire application area
Pack quantity	1 pcs.

Electrical connection

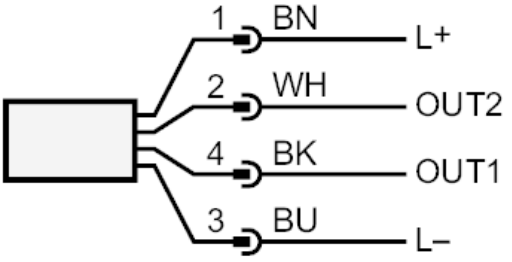
Connector: 1 x M12; coding: A; Contacts: gold-plated

SU7031

Ultrasonic flow meter

SUR34XFBFRKG/US

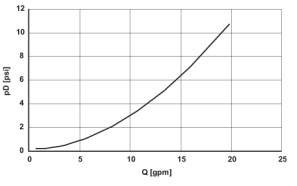
Connection



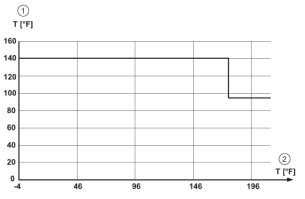
OUT1/IO-Link:	switching output volumetric flow quantity monitoring switching output Temperature monitoring Pulse output quantity meter frequency output volumetric flow quantity monitoring frequency output Temperature monitoring Diagnostic output direction of flow detection / signal quality signal output Preset counter
OUT2/InD:	switching output volumetric flow quantity monitoring switching output Temperature monitoring Pulse output quantity meter analogue output flow analogue output temperature Diagnostic output direction of flow detection / signal quality signal output Preset counter input counter reset
colours to DIN EN 60947-5-2	
Core colours	BK= black BN= brown BU= blue WH= white

Diagrams and graphs

Note on pressure loss



derating ambient temperature



1 Ambient temperature

2 Medium temperature

SU7050

Ultrasonic flow meter

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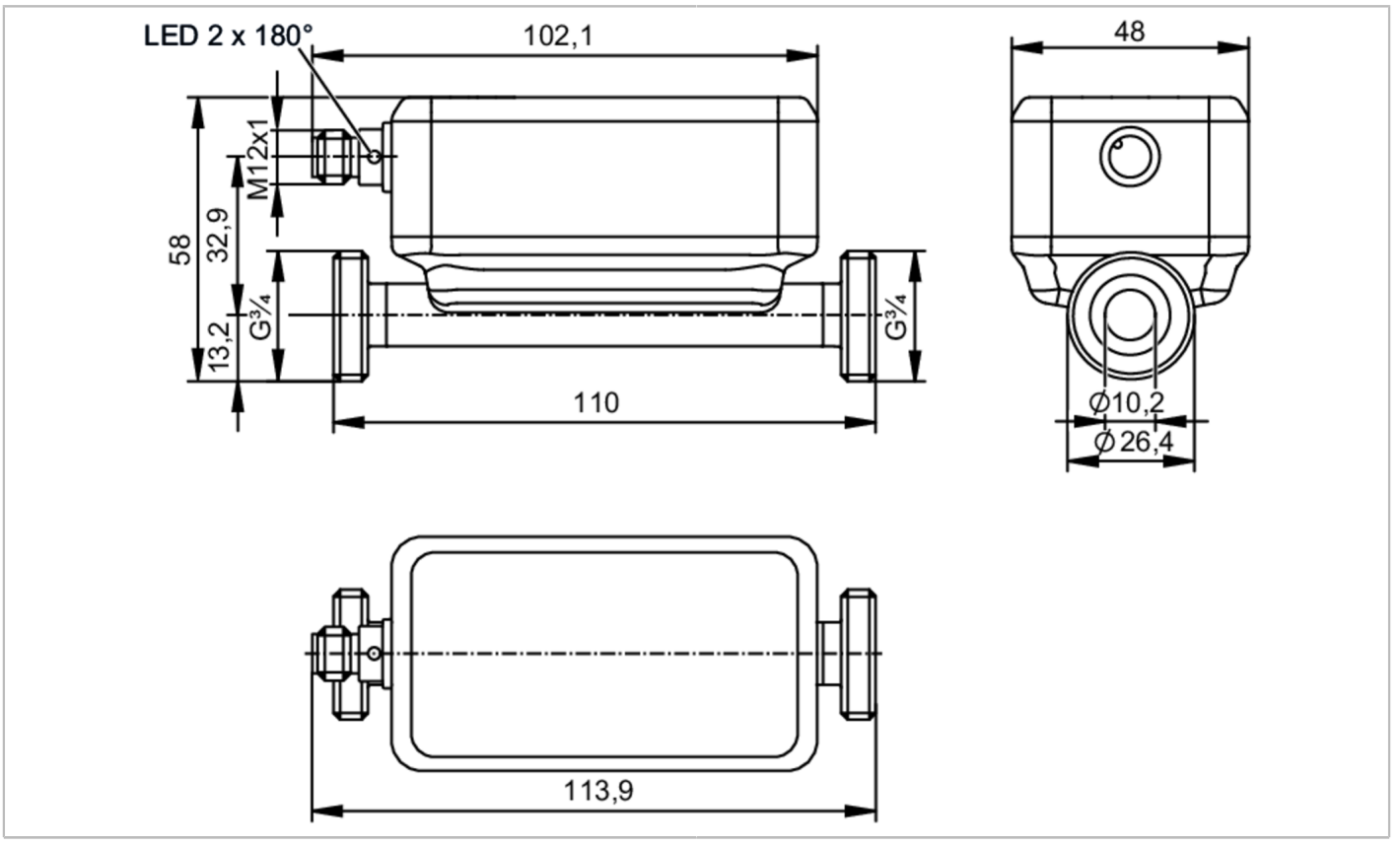

Product characteristics				
Number of inputs and outputs	Number of digital outputs: 2; Number of analogue outputs: 1			
Measuring range	0.5...75 l/min	0.03...4.5 m³/h	8...1189 gph	0.13...19.81 gpm
Nominal diameter	DN20 (3/4“)			
Process connection	threaded connection G 3/4 external thread DN20			
Application				
Special feature	Gold-plated contacts			
Application	use in mobile and industrial applications			
Media	ultra-pure water; water; hydrous media; glycol solutions; oils (of high and low viscosity); coolants			
Note on media	hydrous media: for media with >10 % additives, the repeatability is the only available value			
	low-viscosity oils with viscosity: 7...40 mm²/s (40 °C)			
	high-viscosity oils with viscosity: 30...68 mm²/s (40 °C)			
Medium temperature	-40...120 °C		-40...248 °F	
Min. bursting pressure	150 bar		15 MPa	
Pressure rating	100 bar		10 MPa	
Vacuum resistance [mbar]	-1000			
Electrical data				
Operating voltage [V]	8...32 DC; (to SELV/PELV)			
Current consumption [mA]	< 175			
Protection class	III			
Reverse polarity protection	yes			

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Ultrasonic flow meter

SUR34XJBFRKG/US

Power-on delay time	[s]	5			
Measuring principle		ultrasonic			
Inputs / outputs					
Total number of inputs and outputs		2			
Number of inputs and outputs		Number of digital outputs: 2; Number of analogue outputs: 1			
Inputs					
Inputs		OUT2	counter reset		
Outputs					
Total number of outputs		2			
Output signal		OUT1	switching signal; pulse signal; diagnostic signal; totaliser switching signal; frequency signal; IO-Link		
		OUT2	switching signal; pulse signal; diagnostic signal; totaliser switching signal; analogue signal		
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]	100			
Switching frequency DC	[Hz]	0...10000			
Number of analogue outputs		1			
Analogue current output	[mA]	4...20; (scalable)			
Max. load	[Ω]	500			
Analogue voltage output	[V]	0...10 / 0.5...4.5; (scalable)			
Min. load resistance	[Ω]	2000			
Pulse output		flow rate meter			
Short-circuit protection		yes			
Type of short-circuit protection		pulsed			
Overload protection		yes			
Measuring/setting range					
Measuring range		0.5...75 l/min	0.03...4.5 m³/h	8...1189 gph	0.13...19.81 gpm
Resolution		0.1 l/min	0.002 m³/h	1 gph	0.01 gpm
Note on factory setting		l/min			
		°C			
Set point SP		0.9...75 l/min	0.055...4.5 m³/h	15...1189 gph	0.24...19.81 gpm
Reset point rP		0.5...74.6 l/min	0.032...4.477 m³/h	9...1183 gph	0.14...19.71 gpm
Analogue start point ASP		-75...60 l/min	-4.5...3.6 m³/h	-1189...951 gph	-19.81...15.85 gpm
Analogue end point AEP		-60...75 l/min	-3.6...4.5 m³/h	-951...1189 gph	-15.78...19.81 gpm
Low flow cut-off LFC		0.5...3.2 l/min	0.03...0.195 m³/h	8...52 gph	0.13...0.86 gpm
Frequency end point, FEP		15...75 l/min	0.903...4.5 m³/h	238...1189 gph	3.97...19.81 gpm
Frequency at the end point FRP	[Hz]	1...10000			

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Ultrasonic flow meter

SUR34XJBFRKG/US

Volumetric flow quantity monitoring			
Pulse length	[s]	0.002...2	
Pulse value		0.1...99990000 l; 0.03...26414563.515 gal	
Temperature monitoring			
Measuring range		-40...120 °C	-40...248 °F
Resolution		0.1 °C	0.1 °F
Set point SP		-40...119.4 °C	-40...247 °F
Reset point rP		-40...88 °C	-40...190.4 °F
Analogue start point		-8...120 °C	17.6...248 °F
Analogue end point		-40...88 °C	-40...190.4 °F
Frequency start point, FSP		-8...120 °C	17.6...248 °F
Frequency end point, FEP		-40...119.4 °C	-40...247 °F
Frequency at the end point FRP	[Hz]	1...10000	
Accuracy / deviations			
Flow monitoring			
Accuracy (in the measuring range)		only up to 100 °C; at higher temperatures, only the repeatability is within the specification.	
Accuracy (in the measuring range)		glycol solutions (35%)	±(5,0 % MW + 0,5 % MEW)
		high-viscosity oils with viscosity 46mm2/s (40°C)	±(5,0 % MW + 1,0 % MEW)
		low-viscosity oils with viscosity 10mm2/s (40°C)	±(5,0 % MW + 1,0 % MEW)
		water	± (2,0 % MW + 0,5 % MEW)
Repeatability		± 0,2 % MEW	
Temperature monitoring			
Accuracy	[K]	± 2,5 (Q > 5 % MEW)	
Temperature coefficient	[% of the span / 10 K]	0,2	
Response times			
Flow monitoring			
Response time	[s]	< 0.25; (dAP = 0, T09)	
Damping process value dAP	[s]	0...5	
Temperature monitoring			
Dynamic response T05 / T09	[s]	5,7 / 86	
Software / programming			
Diagnostic functions		direction of flow detection; signal quality	
Interfaces			
Communication interface		IO-Link	
Transmission type		COM2 (38,4 kBaud)	
IO-Link revision		1.1.3	
SDCI standard		IEC 61131-9: 2013-07	
Profiles		BLOB	Binary Large Object transfer
		Common - I&D	Identification and Diagnosis
Required master port type		A	
Process data analogue		3	

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Ultrasonic flow meter

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Process data binary		2	
Min. process cycle time	[ms]	9.6	
IO-Link process data (cyclical)		**function**	**bit length**
		totaliser	32
		Flow monitoring	32
		Temperature monitoring	32
		status	4
		Output 1	1
		Output 2	1
Supported DeviceIDs		**Type of operation**	**DeviceID**
		default	1837
Operating conditions			
Ambient temperature	[°C]	-25...60	
Storage temperature	[°C]	-40...80	
Protection		IP 67; IP 69K	
Tests / approvals			
EMC		DIN 61326-1:2021	
Shock resistance		DIN IEC 68-2-27	20 g (11ms)
Vibration resistance		DIN IEC 68-2-6	20 g (10...2000Hz)
MTTF	[years]	136	
UL approval		UL approval no.	I037
		File number UL	E174189
Pressure Equipment Directive		can be used for group 2 fluids; group 1 fluids on request	
Mechanical data			
Weight	[g]	494.6	
Housing		rectangular	
Inlet pipe length		5 x DN	
Outlet pipe length		1 x DN	
Dimensions	[mm]	113.9 x 48 x 58	
Materials		housing: stainless steel (316L/1.4404); connector: PEI, FKM	
Materials (wetted parts)		Pipe section: stainless steel (316L/1.4404); Process connection sealing: NBR reinforced fibre	
Nominal diameter		DN20 (3/4“)	
Process connection		threaded connection G 3/4 external thread DN20	
Surface characteristics Ra/Rz of the wetted parts		Ra < 1.25 µm	
Displays / operating elements			
Display		operating status	1 x LED, green
Accessories			
Items supplied		Flat seal 2, NBR reinforced fibre	
		package insert	
Remarks			
Remarks		MW = measured value	
		MEW = Final value of the measuring range	
		pulse and totaliser signal are only available for one of the two outputs	
		the accuracy indications are adhered to over the entire application area	

SU7050

Ultrasonic flow meter

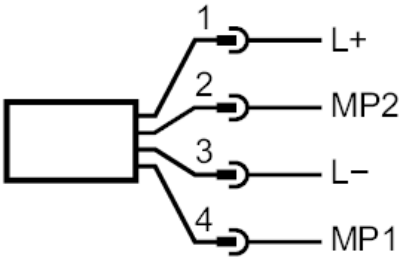
SUR34XJBFRKG/US

Pack quantity	1 pcs.

Electrical connection

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

Connection

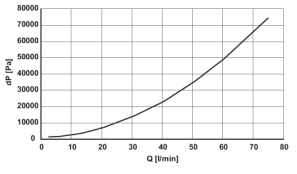


1 (L+)	L+	
2 (OUT2)	MP2	DO, AO, reset
3 (L-)	L-	
4 (OUT1)	MP1	DO, IO-Link

Electrical connection - plug

Diagrams and graphs

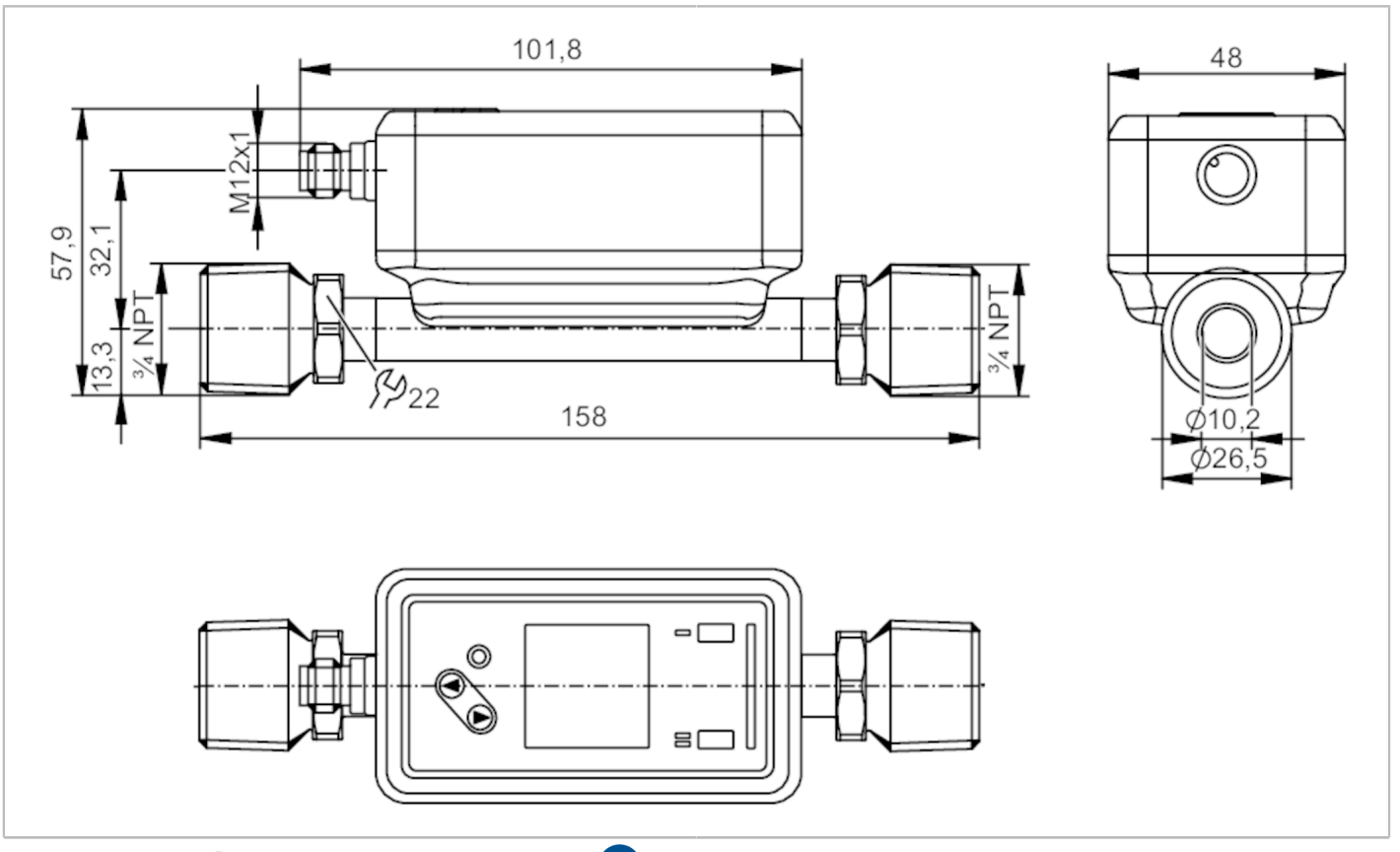
Note on pressure loss



SU7621

Ultrasonic flow meter

SUN34XXBFRKG/US



ACS CE cULus LISTED IO-Link KTW/W270 NSF Reg31

Product characteristics				
Measuring range	0.5...75 l/min	0.03...4.5 m³/h	8...1189 gph	0.13...19.81 gpm
Process connection	threaded connection 3/4" NPT external thread DN20			
Application				
Special feature	Gold-plated contacts			
Media	ultra-pure water; water; hydrous media			
Note on media	hydrous media: for media with >10 % additives, the repeatability is the only available value			
Medium temperature	-20...100 °C	-4...212 °F		
Min. bursting pressure	150 bar	15 MPa		
Pressure rating	100 bar	10 MPa		
Vacuum resistance [mbar]	-1000			
Electrical data				
Operating voltage [V]	18...32 DC; (to SELV/PELV)			
Current consumption [mA]	< 75			
Protection class	III			
Reverse polarity protection	yes			
Power-on delay time [s]	5			
Measuring principle	ultrasonic			
Inputs				
Inputs	counter reset			

SU7621

Ultrasonic flow meter

SUN34XXBFRKG/US

Outputs					
Total number of outputs		2			
Output signal		switching signal; pulse signal; analogue signal; IO-Link; frequency signal; diagnostic signal; totaliser switching signal			
Electrical design		PNP/NPN			
Output function		normally open / normally closed; (parameterisable)			
Max. voltage drop switching output DC	[V]	2			
Permanent current rating of switching output DC	[mA]	100			
Switching frequency DC	[Hz]	0...10000			
Analogue current output	[mA]	4...20			
Max. load	[Ω]	500			
Pulse output		flow rate meter			
Short-circuit protection		yes			
Type of short-circuit protection		pulsed			
Overload protection		yes			
Measuring/setting range					
Measuring range		0.5...75 l/min	0.03...4.5 m³/h	8...1189 gph	0.13...19.81 gpm
Display range		-90...90 l/min	-5.4...5.4 m³/h	-1427...1427 gph	-23.78...23.78 gpm
Resolution		0.1 l/min	0.002 m³/h	1 gph	0.01 gpm
Set point SP		0.9...75 l/min	0.055...4.5 m³/h	15...1189 gph	0.24...19.81 gpm
Reset point rP		0.5...74.6 l/min	0.032...4.477 m³/h	9...1183 gph	0.14...19.71 gpm
Analogue start point ASP		-75...60 l/min	-4.5...3.6 m³/h	-1189...951 gph	-19.81...15.85 gpm
Analogue end point AEP		-60...75 l/min	-3.6...4.5 m³/h	-951...1189 gph	-15.78...19.81 gpm
Low flow cut-off LFC		0.5...3.2 l/min	0.03...0.195 m³/h	8...59 gph	0.13...0.99 gpm
Frequency end point, FEP		15...75 l/min	0.903...4.5 m³/h	238...1189 gph	3.97...19.81 gpm
Frequency at the end point FRP	[Hz]	1...10000			
Volumetric flow quantity monitoring					
Pulse length	[s]	0.002...2			
Pulse value		0.02...99990000 l; 0.005...26414563.515 gal			
Temperature monitoring					
Measuring range		-20...100 °C		-4...212 °F	
Display range		-44...124 °C		-47.2...255.2 °F	
Resolution		0.1 °C		0.1 °F	
Set point SP		-19.6...100 °C		-3.2...212 °F	
Reset point rP		-20...99.6 °C		-4...211.2 °F	
Analogue start point		-20...76 °C		-4...168.8 °F	
Analogue end point		4...100 °C		39.2...212 °F	
Frequency start point, FSP		-20...76 °C		4...168.8 °F	
Frequency end point, FEP		4...100 °C		4...212 °F	
Frequency at the end point FRP	[Hz]	1...10000			

SU7621

Ultrasonic flow meter

SUN34XXBFRKG/US

Accuracy / deviations			
Flow monitoring			
Accuracy (in the measuring range)		± (2,0 % MW + 0,5 % MEW)	
Repeatability		± 0,2 % MEW	
Temperature monitoring			
Accuracy	[K]	± 2,5 (Q > 5 % MEW)	
Temperature coefficient	[% of the span / 10 K]	0,2	
Response times			
Flow monitoring			
Response time	[s]	< 0.25; (dAP = 0, T09)	
Damping process value dAP	[s]	0...5	
Temperature monitoring			
Dynamic response T05 / T09	[s]	5,7 / 86	
Software / programming			
Diagnostic functions		direction of flow detection; signal quality	
Interfaces			
Communication interface		IO-Link	
Transmission type		COM2 (38,4 kBaud)	
IO-Link revision		1.1.3	
SDCI standard		IEC 61131-9: 2013-07	
Profiles		BLOB	Binary Large Object transfer
		Common - I&D	Identification and Diagnosis
Required master port type		A	
Process data analogue		3	
Process data binary		2	
Min. process cycle time	[ms]	9.6	
IO-Link process data (cyclical)		**function**	**bit length**
		totaliser	32
		Flow monitoring	32
		Temperature monitoring	32
		status	4
		Output 1	1
		Output 2	1
Supported DeviceIDs		**Type of operation**	**DeviceID**
		default	1636
Operating conditions			
Ambient temperature	[°C]	-20...60	
Storage temperature	[°C]	-25...80	
Protection		IP 67	
Tests / approvals			
EMC		DIN 61326-1:2021	
Shock resistance		DIN IEC 68-2-27	20 g (11ms)
Vibration resistance		DIN IEC 68-2-6	20 g (10...2000Hz)

SU7621

Ultrasonic flow meter

SUN34XXBFRKG/US

MTTF	[years]	160	
UL approval		UL approval no.	I034
Pressure Equipment Directive		can be used for group 2 fluids; group 1 fluids on request	

Mechanical data

Weight	[g]	590.5	
Housing		rectangular	
Type of mounting		inlet pipe length 5xDN; outlet pipe length 1xDN	
Dimensions	[mm]	158 x 48 x 57.9	
Materials		housing: stainless steel (316L/1.4404); Display: PFA; Sealing Display: FKM; connector: PBT	
Materials (wetted parts)		Pipe section: stainless steel (316L/1.4404)	
Process connection		threaded connection 3/4" NPT external thread DN20	
Surface characteristics Ra/Rz of the wetted parts		49.21 µin	

Displays / operating elements

Display			colour display 1,44", 128 x 128 pixels
		Switching function	2 x LED, yellow
		diagnosis	1 x LED, three-colour

Accessories

Items supplied		package insert

Remarks

Remarks		MW = measured value
		MEW = Final value of the measuring range
		pulse and totaliser signal are only available for one of the two outputs
		the accuracy indications are adhered to over the entire application area
Pack quantity		1 pcs.

Electrical connection

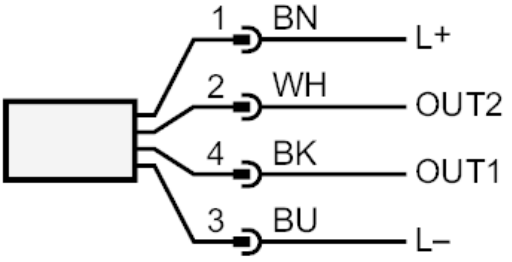
Connector: 1 x M12; coding: A; Contacts: gold-plated

SU7621

Ultrasonic flow meter

SUN34XXBFRKG/US

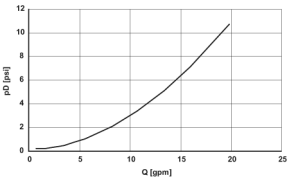
Connection



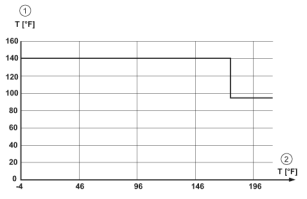
OUT1/IO-Link:	switching output volumetric flow quantity monitoring switching output Temperature monitoring Pulse output quantity meter frequency output volumetric flow quantity monitoring frequency output Temperature monitoring Diagnostic output direction of flow detection / signal quality signal output Preset counter
OUT2/InD:	switching output volumetric flow quantity monitoring switching output Temperature monitoring Pulse output quantity meter analogue output flow analogue output temperature Diagnostic output direction of flow detection / signal quality signal output Preset counter input counter reset
colours to DIN EN 60947-5-2	
Core colours	BK= black BN= brown BU= blue WH= white

Diagrams and graphs

Note on pressure loss



derating ambient temperature



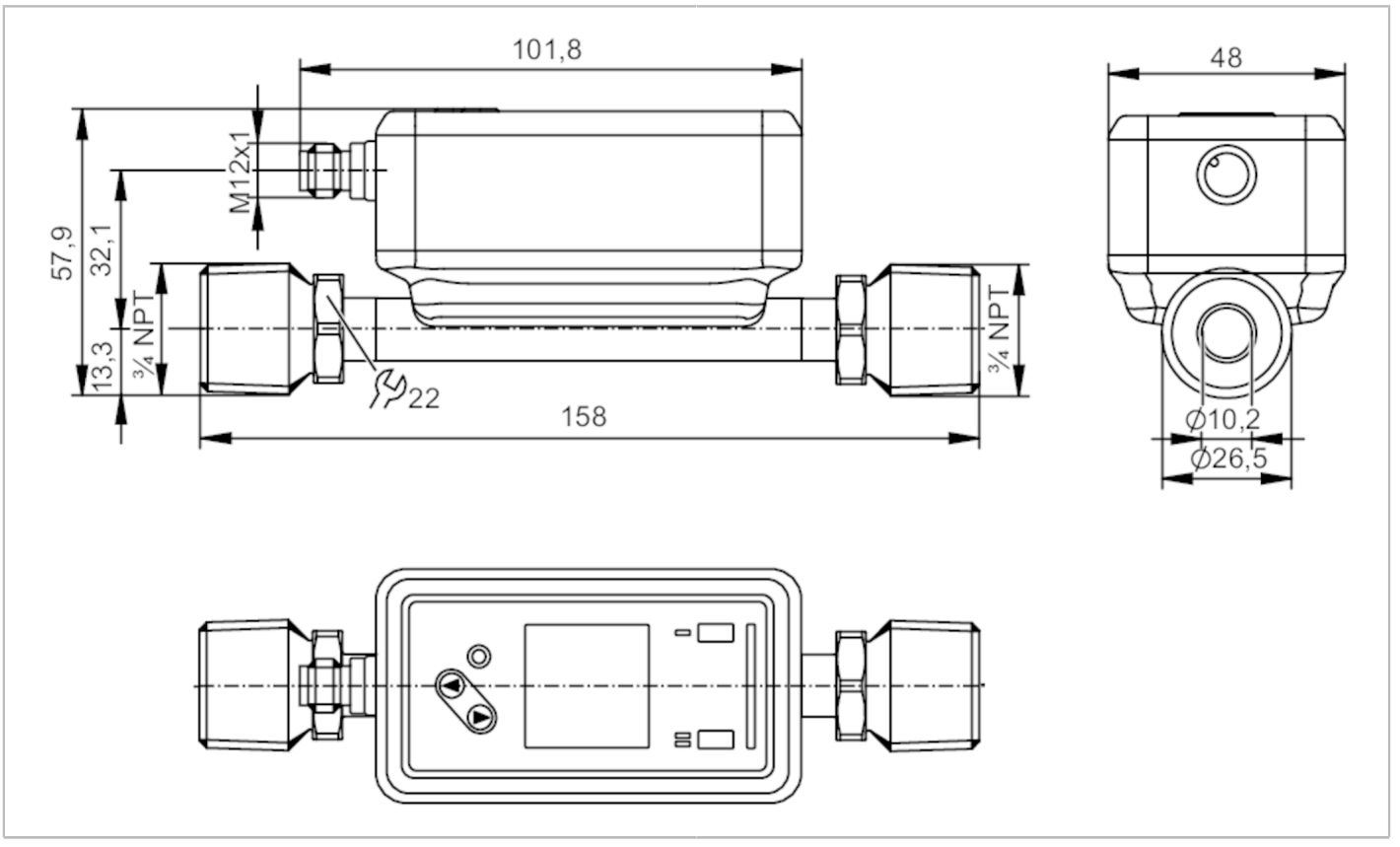
1 Ambient temperature

2 Medium temperature

SU7631

Ultrasonic flow meter

SUN34XFBFRKG/US



Product characteristics				
Measuring range	0.5...75 l/min	0.03...4.5 m³/h	8...1189 gph	0.13...19.81 gpm
Process connection	threaded connection 3/4" NPT external thread DN20			
Application				
Special feature	Gold-plated contacts			
Media	ultra-pure water; water; hydrous media; glycol solutions; oils; coolants			
Note on media	hydrous media: for media with >10 % additives, the repeatability is the only available value			
	low-viscosity oils with viscosity: 7...40 mm²/s (40 °C)			
	high-viscosity oils with viscosity: 30...68 mm²/s (40 °C)			
Medium temperature	-20...100 °C		-4...212 °F	
Min. bursting pressure	150 bar		15 MPa	
Pressure rating	100 bar		10 MPa	
Vacuum resistance [mbar]	-1000			
Electrical data				
Operating voltage [V]	18...32 DC; (to SELV/PELV)			
Current consumption [mA]	< 75			
Protection class	III			
Reverse polarity protection	yes			
Power-on delay time [s]	5			
Measuring principle	ultrasonic			

SU7631

Ultrasonic flow meter

SUN34XFBFRKG/US

Inputs					
Inputs		counter reset			
Outputs					
Total number of outputs		2			
Output signal		switching signal; pulse signal; analogue signal; IO-Link; frequency signal; diagnostic signal; totaliser switching signal			
Electrical design		PNP/NPN			
Output function		normally open / normally closed; (parameterisable)			
Max. voltage drop switching output DC	[V]	2			
Permanent current rating of switching output DC	[mA]	100			
Switching frequency DC	[Hz]	0...10000			
Analogue current output	[mA]	4...20			
Max. load	[Ω]	500			
Pulse output		flow rate meter			
Short-circuit protection		yes			
Type of short-circuit protection		pulsed			
Overload protection		yes			
Measuring/setting range					
Measuring range		0.5...75 l/min	0.03...4.5 m³/h	8...1189 gph	0.13...19.81 gpm
Display range		-90...90 l/min	-5.4...5.4 m³/h	-1427...1427 gph	-23.78...23.78 gpm
Resolution		0.1 l/min	0.002 m³/h	1 gph	0.01 gpm
Set point SP		0.9...75 l/min	0.055...4.5 m³/h	15...1189 gph	0.24...19.81 gpm
Reset point rP		0.5...74.6 l/min	0.032...4.477 m³/h	9...1183 gph	0.14...19.71 gpm
Analogue start point ASP		-75...60 l/min	-4.5...3.6 m³/h	-1189...951 gph	-19.81...15.85 gpm
Analogue end point AEP		-60...75 l/min	-3.6...4.5 m³/h	-951...1189 gph	-15.78...19.81 gpm
Low flow cut-off LFC		0.5...3.2 l/min	0.03...0.195 m³/h	8...59 gph	0.13...0.99 gpm
Frequency end point, FEP		15...75 l/min	0.903...4.5 m³/h	238...1189 gph	3.97...19.81 gpm
Frequency at the end point FRP	[Hz]	1...10000			
Volumetric flow quantity monitoring					
Pulse length	[s]	0.002...2			
Pulse value		0.02...99990000 l; 0.005...26414563.515 gal			
Temperature monitoring					
Measuring range		-20...100 °C	-4...212 °F		
Display range		-44...124 °C	-47.2...255.2 °F		
Resolution		0.1 °C	0.1 °F		
Set point SP		-19.6...100 °C	-3.2...212 °F		
Reset point rP		-20...99.6 °C	-4...211.2 °F		
Analogue start point		-20...76 °C	-4...168.8 °F		
Analogue end point		4...100 °C	39.2...212 °F		
Frequency start point, FSP		-20...76 °C	4...168.8 °F		
Frequency end point, FEP		4...100 °C	4...212 °F		
Frequency at the end point FRP	[Hz]	1...10000			

SU7631

Ultrasonic flow meter

SUN34XFBFRKG/US

Accuracy / deviations			
Flow monitoring			
Accuracy (in the measuring range)		glycol solutions (35%)	±(5,0 % MW + 0,5 % MEW)
		high-viscosity oils with viscosity 46mm2/s (40°C)	±(5,0 % MW + 1,0 % MEW)
		low-viscosity oils with viscosity 10mm2/s (40°C)	±(5,0 % MW + 1,0 % MEW)
		water	± (2,0 % MW + 0,5 % MEW)
Repeatability		± 0,2 % MEW	
Temperature monitoring			
Accuracy	[K]	± 2,5 (Q > 5 % MEW)	
Temperature coefficient [% of the span / 10 K]		0,2	
Response times			
Flow monitoring			
Response time	[s]	< 0.25; (dAP = 0, T09)	
Damping process value dAP	[s]	0...5	
Temperature monitoring			
Dynamic response T05 / T09	[s]	5,7 / 86	
Software / programming			
Diagnostic functions		direction of flow detection; signal quality	
Interfaces			
Communication interface		IO-Link	
Transmission type		COM2 (38,4 kBaud)	
IO-Link revision		1.1.3	
SDCI standard		IEC 61131-9: 2013-07	
Profiles		BLOB	Binary Large Object transfer
		Common - I&D	Identification and Diagnosis
Required master port type		A	
Process data analogue		3	
Process data binary		2	
Min. process cycle time	[ms]	9.6	
IO-Link process data (cyclical)		**function**	**bit length**
		totaliser	32
		Flow monitoring	32
		Temperature monitoring	32
		status	4
		Output 1	1
		Output 2	1
Supported DeviceIDs		**Type of operation**	**DeviceID**
		default	1757
Operating conditions			
Ambient temperature	[°C]	-20...60	
Storage temperature	[°C]	-25...80	
Protection		IP 67	

SU7631

Ultrasonic flow meter

SUN34XFBFRKG/US

Tests / approvals			
EMC		DIN 61326-1:2021	
Shock resistance		DIN IEC 68-2-27	20 g (11ms)
Vibration resistance		DIN IEC 68-2-6	20 g (10...2000Hz)
MTTF	[years]	160	
UL approval		UL approval no.	I034
Pressure Equipment Directive		can be used for group 2 fluids; group 1 fluids on request	
Mechanical data			
Weight	[g]	596.8	
Housing		rectangular	
Type of mounting		inlet pipe length 5xDN; outlet pipe length 1xDN	
Dimensions	[mm]	158 x 48 x 57.9	
Materials		housing: stainless steel (316L/1.4404); Display: PFA; Sealing Display: FKM; connector: PBT	
Materials (wetted parts)		Pipe section: stainless steel (316L/1.4404)	
Process connection		threaded connection 3/4" NPT external thread DN20	
Surface characteristics Ra/Rz of the wetted parts		49.21 µin	
Displays / operating elements			
Display			colour display 1,44", 128 x 128 pixels
		Switching function	2 x LED, yellow
		diagnosis	1 x LED, three-colour
Display unit		l/min; l/h; m³/h; m/s; gpm; gph; ft/s; oz/min	
Accessories			
Items supplied		package insert	
Remarks			
Remarks		MW = measured value	
		MEW = Final value of the measuring range	
		pulse and totaliser signal are only available for one of the two outputs	
		the accuracy indications are adhered to over the entire application area	
Pack quantity		1 pcs.	

Electrical connection

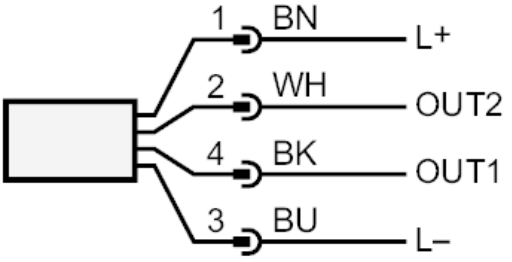
Connector: 1 x M12; coding: A; Contacts: gold-plated

SU7631

Ultrasonic flow meter

SUN34XFBFRKG/US

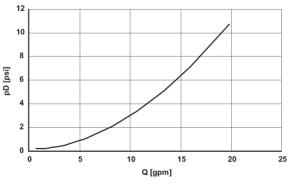
Connection



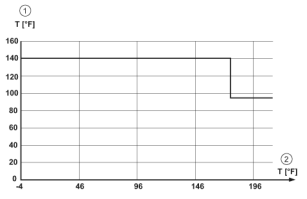
OUT1/IO-Link:	switching output volumetric flow quantity monitoring switching output Temperature monitoring Pulse output quantity meter frequency output volumetric flow quantity monitoring frequency output Temperature monitoring Diagnostic output direction of flow detection / signal quality signal output Preset counter
OUT2/InD:	switching output volumetric flow quantity monitoring switching output Temperature monitoring Pulse output quantity meter analogue output flow analogue output temperature Diagnostic output direction of flow detection / signal quality signal output Preset counter input counter reset
colours to DIN EN 60947-5-2	
Core colours	BK= black BN= brown BU= blue WH= white

Diagrams and graphs

Note on pressure loss



derating ambient temperature



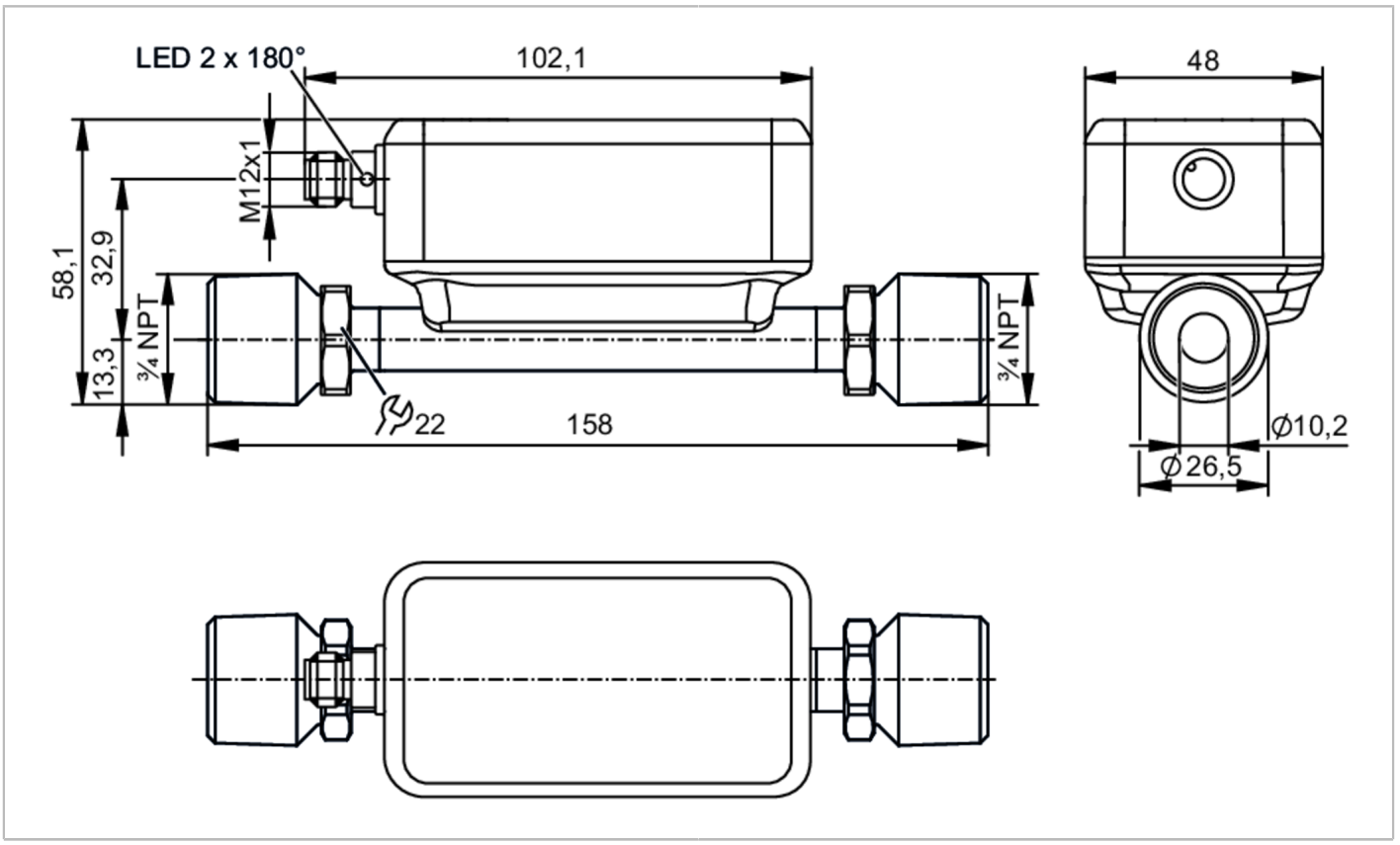
1 Ambient temperature

2 Medium temperature

SU7651

Ultrasonic flow meter

SUN34XJBFRKG/US



Product characteristics				
Number of inputs and outputs	Number of digital outputs: 2; Number of analogue outputs: 1			
Measuring range	0.5...75 l/min	0.03...4.5 m³/h	8...1189 gph	0.13...19.81 gpm
Nominal diameter	DN20 (3/4“)			
Process connection	threaded connection 3/4" NPT external thread DN20			
Application				
Special feature	Gold-plated contacts			
Application	use in mobile and industrial applications			
Media	ultra-pure water; water; hydrous media; glycol solutions; oils (of high and low viscosity); coolants			
Note on media	hydrous media: for media with >10 % additives, the repeatability is the only available value			
	low-viscosity oils with viscosity: 7...40 mm²/s (40 °C)			
	high-viscosity oils with viscosity: 30...68 mm²/s (40 °C)			
Medium temperature	-40...120 °C		-40...248 °F	
Min. bursting pressure	150 bar		15 MPa	
Pressure rating	100 bar		10 MPa	
Vacuum resistance [mbar]	-1000			
Electrical data				
Operating voltage [V]	8...32 DC; (to SELV/PELV)			
Current consumption [mA]	< 175			
Protection class	III			
Reverse polarity protection	yes			

SU7651

Ultrasonic flow meter

SUN34XJBFRKG/US

Power-on delay time	[s]	5			
Measuring principle		ultrasonic			
Inputs / outputs					
Total number of inputs and outputs		2			
Number of inputs and outputs		Number of digital outputs: 2; Number of analogue outputs: 1			
Inputs					
Inputs		OUT2	counter reset		
Outputs					
Total number of outputs		2			
Output signal		OUT1	switching signal; pulse signal; diagnostic signal; totaliser switching signal; frequency signal; IO-Link		
		OUT2	switching signal; pulse signal; diagnostic signal; totaliser switching signal; analogue signal		
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]	100			
Switching frequency DC	[Hz]	0...10000			
Number of analogue outputs		1			
Analogue current output	[mA]	4...20; (scalable)			
Max. load	[Ω]	500			
Analogue voltage output	[V]	0...10 / 0.5...4.5; (scalable)			
Min. load resistance	[Ω]	2000			
Pulse output		flow rate meter			
Short-circuit protection		yes			
Type of short-circuit protection		pulsed			
Overload protection		yes			
Measuring/setting range					
Measuring range		0.5...75 l/min	0.03...4.5 m³/h	8...1189 gph	0.13...19.81 gpm
Resolution		0.1 l/min	0.002 m³/h	1 gph	0.01 gpm
Note on factory setting		gpm			
		°F			
Set point SP		0.9...75 l/min	0.055...4.5 m³/h	15...1189 gph	0.24...19.81 gpm
Reset point rP		0.5...74.6 l/min	0.032...4.477 m³/h	9...1183 gph	0.14...19.71 gpm
Analogue start point ASP		-75...60 l/min	-4.5...3.6 m³/h	-1189...951 gph	-19.81...15.85 gpm
Analogue end point AEP		-60...75 l/min	-3.6...4.5 m³/h	-951...1189 gph	-15.78...19.81 gpm
Low flow cut-off LFC		0.5...3.2 l/min	0.03...0.195 m³/h	8...52 gph	0.13...0.86 gpm
Frequency end point, FEP		15...75 l/min	0.903...4.5 m³/h	238...1189 gph	3.97...19.81 gpm
Frequency at the end point FRP	[Hz]	1...10000			

SU7651

Ultrasonic flow meter

SUN34XJBFRKG/US

Volumetric flow quantity monitoring			
Pulse length	[s]	0.002...2	
Pulse value		0.1...99990000 l; 0.03...26414563.515 gal	
Temperature monitoring			
Measuring range		-40...120 °C	-40...248 °F
Resolution		0.1 °C	0.1 °F
Set point SP		-40...119.4 °C	-40...247 °F
Reset point rP		-40...88 °C	-40...190.4 °F
Analogue start point		-8...120 °C	17.6...248 °F
Analogue end point		-40...88 °C	-40...190.4 °F
Frequency start point, FSP		-8...120 °C	17.6...248 °F
Frequency end point, FEP		-40...119.4 °C	-40...247 °F
Frequency at the end point FRP	[Hz]	1...10000	
Accuracy / deviations			
Flow monitoring			
Accuracy (in the measuring range)		only up to 100 °C; at higher temperatures, only the repeatability is within the specification.	
Accuracy (in the measuring range)		glycol solutions (35%)	±(5,0 % MW + 0,5 % MEW)
		high-viscosity oils with viscosity 46mm2/s (40°C)	±(5,0 % MW + 1,0 % MEW)
		low-viscosity oils with viscosity 10mm2/s (40°C)	±(5,0 % MW + 1,0 % MEW)
		water	± (2,0 % MW + 0,5 % MEW)
Repeatability		± 0,2 % MEW	
Temperature monitoring			
Accuracy	[K]	± 2,5 (Q > 5 % MEW)	
Temperature coefficient	[% of the span / 10 K]	0,2	
Response times			
Flow monitoring			
Response time	[s]	< 0.25; (dAP = 0, T09)	
Damping process value dAP	[s]	0...5	
Temperature monitoring			
Dynamic response T05 / T09	[s]	5,7 / 86	
Software / programming			
Diagnostic functions		direction of flow detection; signal quality	
Interfaces			
Communication interface		IO-Link	
Transmission type		COM2 (38,4 kBaud)	
IO-Link revision		1.1.3	
SDCI standard		IEC 61131-9: 2013-07	
Profiles		BLOB	Binary Large Object transfer
		Common - I&D	Identification and Diagnosis
Required master port type		A	
Process data analogue		3	

SU7651

Ultrasonic flow meter

SUN34XJBFRKG/US

Process data binary		2	
Min. process cycle time	[ms]	9.6	
IO-Link process data (cyclical)		**function**	**bit length**
		totaliser	32
		Flow monitoring	32
		Temperature monitoring	32
		status	4
		Output 1	1
		Output 2	1
Supported DeviceIDs		**Type of operation**	**DeviceID**
		default	1836
Operating conditions			
Ambient temperature	[°C]	-25...60	
Storage temperature	[°C]	-40...80	
Protection		IP 67; IP 69K	
Tests / approvals			
EMC		DIN 61326-1:2021	
Shock resistance		DIN IEC 68-2-27	20 g (11ms)
Vibration resistance		DIN IEC 68-2-6	20 g (10...2000Hz)
MTTF	[years]	136	
UL approval		UL approval no.	I037
		File number UL	E174189
Pressure Equipment Directive		can be used for group 2 fluids; group 1 fluids on request	
Mechanical data			
Weight	[g]	599.9	
Housing		rectangular	
Inlet pipe length		5 x DN	
Outlet pipe length		1 x DN	
Dimensions	[mm]	158 x 48 x 58.1	
Materials		housing: stainless steel (316L/1.4404); connector: PEI, FKM	
Materials (wetted parts)		Pipe section: stainless steel (316L/1.4404)	
Nominal diameter		DN20 (3/4“)	
Process connection		threaded connection 3/4" NPT external thread DN20	
Surface characteristics Ra/Rz of the wetted parts		49.21 µin	
Displays / operating elements			
Display		operating status	1 x LED, green
Accessories			
Items supplied		package insert	
Remarks			
Remarks		MW = measured value	
		MEW = Final value of the measuring range	
		pulse and totaliser signal are only available for one of the two outputs	
		the accuracy indications are adhered to over the entire application area	
Pack quantity		1 pcs.	

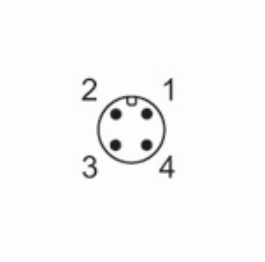
SU7651

Ultrasonic flow meter

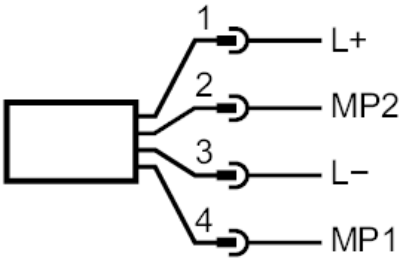
SUN34XJBFRKG/US

Electrical connection

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



Connection

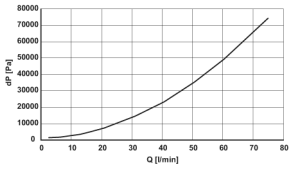


1 (L+)	L+	
2 (OUT2)	MP2	DO, AO, reset
3 (L-)	L-	
4 (OUT1)	MP1	DO, IO-Link

Electrical connection - plug

Diagrams and graphs

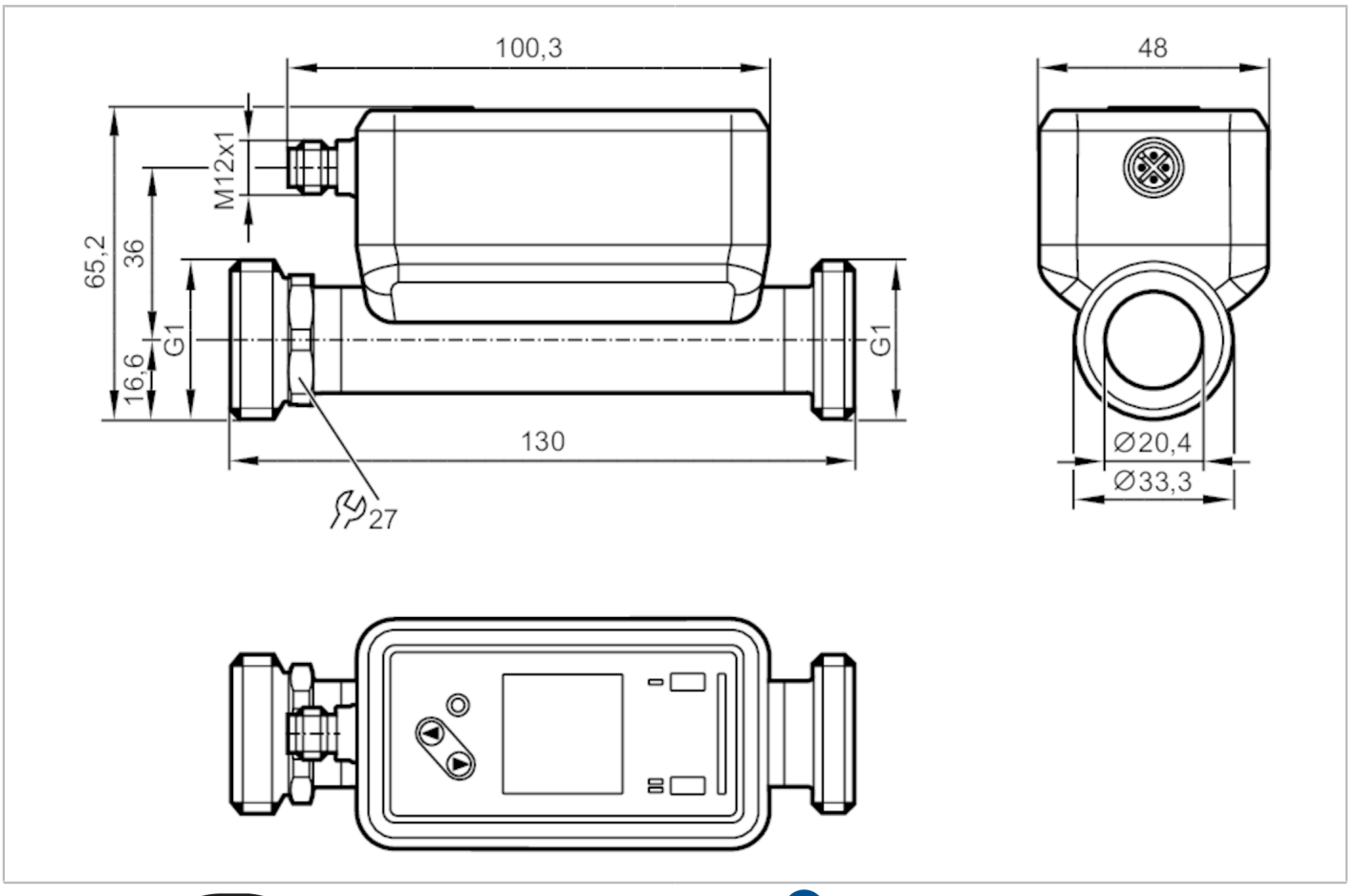
Note on pressure loss



SU8021

Ultrasonic flow meter

SUR11XXBFRKG/US



ACS CE PA CRN cULus LISTED IO-Link KTW/W270 NSF Reg31

Product characteristics				
Measuring range	1...240 l/min	0.06...14.4 m³/h	16...3804 gph	0.26...63.4 gpm
Process connection	threaded connection G 1 external thread DN25			
Application				
Special feature	Gold-plated contacts			
Media	ultra-pure water; water; hydrous media			
Note on media	hydrous media: for media with >10 % additives, the repeatability is the only available value			
Medium temperature	-20...100 °C		-4...212 °F	
Min. bursting pressure	150 bar		15 MPa	
Pressure rating	100 bar		10 MPa	
Vacuum resistance [mbar]	-1000			
MAWP for applications according to CRN	82.8 bar		8.28 MPa	
Electrical data				
Operating voltage [V]	18...32 DC; (to SELV/PELV)			
Current consumption [mA]	< 75			
Protection class	III			
Reverse polarity protection	yes			
Power-on delay time [s]	5			
Measuring principle	ultrasonic			

SU8021

Ultrasonic flow meter

SUR11XXBFRKG/US

Inputs				
Inputs	counter reset			
Outputs				
Total number of outputs	2			
Output signal	analogue signal; pulse signal; analogue signal; IO-Link; frequency signal; diagnostic signal; totaliser switching signal			
Electrical design	PNP/NPN			
Output function	normally open / normally closed; (parameterisable)			
Max. voltage drop switching output DC [V]	2			
Permanent current rating of switching output DC [mA]	100			
Switching frequency DC [Hz]	0...10000			
Analogue current output [mA]	4...20			
Max. load [Ω]	500			
Pulse output	flow rate meter			
Short-circuit protection	yes			
Type of short-circuit protection	pulsed			
Overload protection	yes			
Measuring/setting range				
Measuring range	1...240 l/min	0.06...14.4 m³/h	16...3804 gph	0.26...63.4 gpm
Display range	-288...288 l/min	-17.28...17.28 m³/h	-4565...4565 gph	-76.08...76.08 gpm
Resolution	0.1 l/min	0.001 m³/h	1 gph	0.02 gpm
Set point SP	2.3...240 l/min	0.139...14.4 m³/h	37...3804 gph	0.61...63.4 gpm
Reset point rP	1.1...238.8 l/min	0.064...14.325 m³/h	17...3784 gph	0.28...63.07 gpm
Analogue start point ASP	-240...192 l/min	-14.4...11.522 m³/h	-3804...3044 gph	-63.4...50.73 gpm
Analogue end point AEP	-192...240 l/min	-11.522...14.4 m³/h	-3044...3804 gph	-50.73...63.4 gpm
Low flow cut-off LFC	1...12 l/min	0.06...0.72 m³/h	16...190 gph	0.26...3.17 gpm
Frequency end point, FEP	48.1...240 l/min	2.889...14.4 m³/h	763...3804 gph	12.72...63.4 gpm
Frequency at the end point FRP [Hz]	1...10000			
Volumetric flow quantity monitoring				
Pulse length [s]	0.002...2			
Pulse value	0.02...99990000 l; 0.005...26414563.515 gal			
Temperature monitoring				
Measuring range	-20...100 °C	-4...212 °F		
Display range	-44...124 °C	-47.2...255.2 °F		
Resolution	0.1 °C	0.1 °F		
Set point SP	-19.6...100 °C	-3.2...212 °F		
Reset point rP	-20...99.6 °C	-4...211.2 °F		
Analogue start point	-20...76 °C	-4...168.8 °F		
Analogue end point	4...100 °C	39.2...212 °F		
Frequency start point, FSP	-20...76 °C	-4...168.8 °F		
Frequency end point, FEP	4...100 °C	39.2...212 °F		
Frequency at the end point FRP [Hz]	1...10000			

SU8021

Ultrasonic flow meter

SUR11XXBFRKG/US

Accuracy / deviations			
Flow monitoring			
Accuracy (in the measuring range)		± (1,0 % MW + 0,5 % MEW)	
Repeatability		± 0,2 % MEW	
Temperature monitoring			
Accuracy	[K]	± 2,5 (Q > 5 % MEW)	
Temperature coefficient	[% of the span / 10 K]	0,2	
Response times			
Flow monitoring			
Response time	[s]	< 0.25; (dAP = 0, T09)	
Damping process value dAP	[s]	0...5	
Temperature monitoring			
Dynamic response T05 / T09	[s]	5,7 / 86	
Software / programming			
Diagnostic functions		direction of flow detection; signal quality	
Interfaces			
Communication interface		IO-Link	
Transmission type		COM2 (38,4 kBaud)	
IO-Link revision		1.1.3	
SDCI standard		IEC 61131-9: 2013-07	
Profiles		BLOB	Binary Large Object transfer
		Common - I&D	Identification and Diagnosis
Required master port type		A	
Process data analogue		3	
Process data binary		2	
Min. process cycle time	[ms]	9.6	
IO-Link process data (cyclical)		**function**	**bit length**
		totaliser	32
		Flow monitoring	32
		Temperature monitoring	32
		status	4
		Output 1	1
		Output 2	1
Supported DeviceIDs		**Type of operation**	**DeviceID**
		default	1463
Operating conditions			
Ambient temperature	[°C]	-20...60	
Storage temperature	[°C]	-25...80	
Protection		IP 67	
Tests / approvals			
EMC		DIN 61326-1:2021	
CPA approval		model number	002US
		accuracy class	1,5

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Ultrasonic flow meter

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Shock resistance		DIN IEC 68-2-27	20 g (11ms)
Vibration resistance		DIN IEC 68-2-6	20 g (10...2000Hz)
MTTF	[years]	160	
UL approval		UL approval no.	I034
		File number UL	E174189
Pressure Equipment Directive		can be used for group 2 fluids; group 1 fluids on request	

Mechanical data

Weight	[g]	496.8	
Housing		rectangular	
Type of mounting		inlet pipe length 5xDN; outlet pipe length 1xDN	
Dimensions	[mm]	130 x 48 x 65.2	
Materials		housing: stainless steel (316L/1.4404); Display: PFA; Sealing Display: FKM; connector: PBT	
Materials (wetted parts)		Pipe section: stainless steel (316L/1.4404); Process connection sealing: NBR reinforced fibre Flat seal	
Process connection		threaded connection G 1 external thread DN25	
Surface characteristics Ra/Rz of the wetted parts		Ra < 1.25 µm	

Displays / operating elements

Display			colour display 1,44", 128 x 128 pixels
		Switching function	2 x LED, yellow
		diagnosis	1 x LED, three-colour

Accessories

Items supplied	Flat seal 2, Centellen
	package insert

Remarks

Remarks	MW = measured value
	MEW = Final value of the measuring range
	pulse and totaliser signal are only available for one of the two outputs
	the accuracy indications are adhered to over the entire application area
Pack quantity	1 pcs.

Electrical connection

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

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Ultrasonic flow meter

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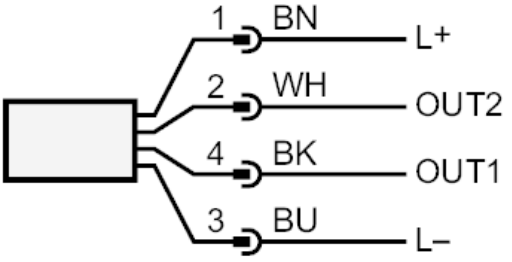
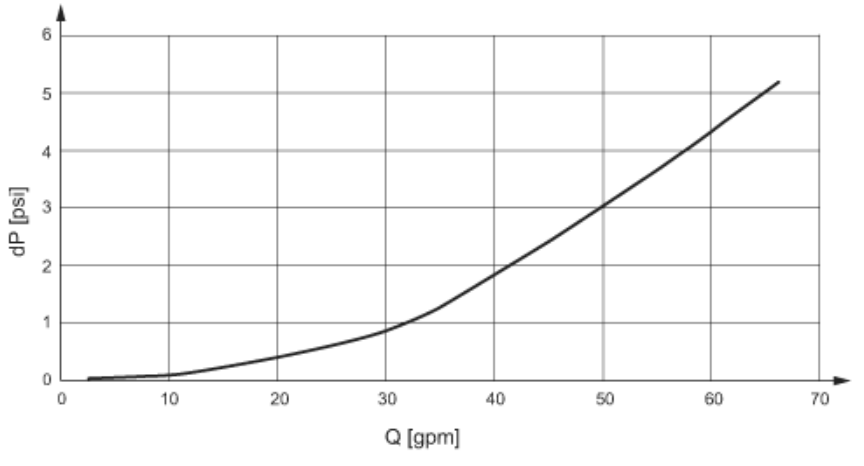
Connection

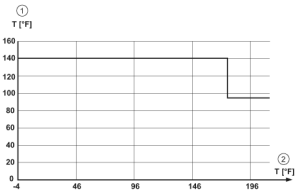


OUT1/IO-Link:	switching output volumetric flow quantity monitoring switching output Temperature monitoring Pulse output quantity meter frequency output volumetric flow quantity monitoring frequency output Temperature monitoring signal output Preset counter
OUT2/InD:	switching output volumetric flow quantity monitoring switching output Temperature monitoring Pulse output quantity meter analogue output flow analogue output temperature signal output Preset counter input counter reset
colours to DIN EN 60947-5-2	
Core colours	BK= black BN= brown BU= blue WH= white

Diagrams and graphs

Note on pressure loss



derating ambient temperature	 1 Ambient temperature 2 Medium temperature

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Ultrasonic flow meter

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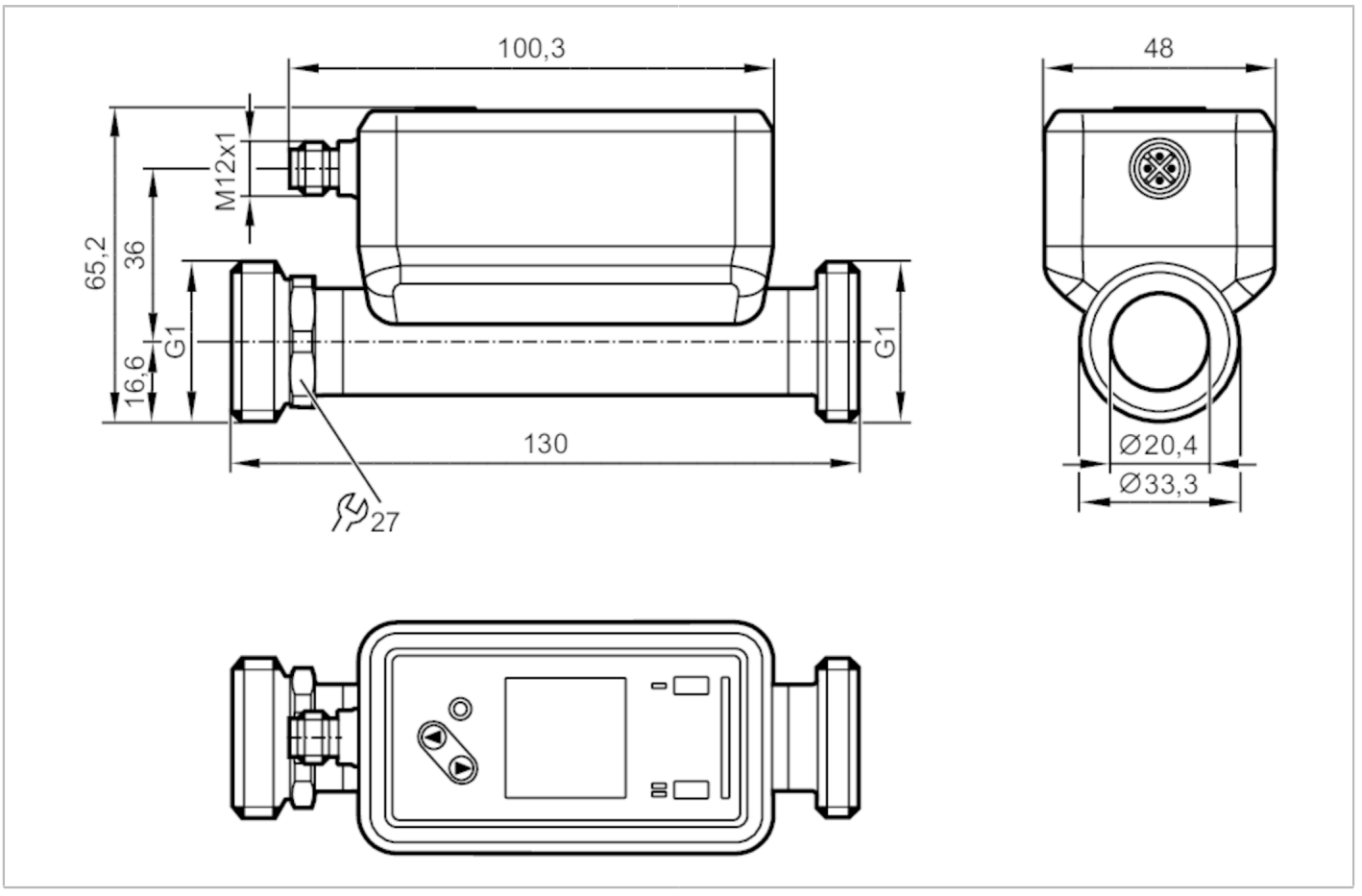

Product characteristics				
Measuring range	1...240 l/min	0.06...14.4 m³/h	16...3804 gph	0.26...63.4 gpm
Process connection	threaded connection G 1 external thread DN25			
Application				
Special feature	Gold-plated contacts			
Media	ultra-pure water; water; hydrous media; glycol solutions; oils; coolants			
Note on media	hydrous media: for media with >10 % additives, the repeatability is the only available value			
	low-viscosity oils with viscosity: 7...40 mm²/s (40 °C)			
	high-viscosity oils with viscosity: 30...68 mm²/s (40 °C)			
Medium temperature	-20...100 °C		-4...212 °F	
Min. bursting pressure	150 bar		15 MPa	
Pressure rating	100 bar		10 MPa	
Vacuum resistance [mbar]	-1000			
Electrical data				
Operating voltage [V]	18...32 DC; (to SELV/PELV)			
Current consumption [mA]	< 75			
Protection class	III			
Reverse polarity protection	yes			
Power-on delay time [s]	5			
Measuring principle	ultrasonic			

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Ultrasonic flow meter

SUR11XFBFRKG/US

Inputs				
Inputs	counter reset			
Outputs				
Total number of outputs	2			
Output signal	analogue signal; pulse signal; analogue signal; IO-Link; frequency signal; diagnostic signal; totaliser switching signal			
Electrical design	PNP/NPN			
Output function	normally open / normally closed; (parameterisable)			
Max. voltage drop switching output DC [V]	2			
Permanent current rating of switching output DC [mA]	100			
Switching frequency DC [Hz]	0...10000			
Analogue current output [mA]	4...20			
Max. load [Ω]	500			
Pulse output	flow rate meter			
Short-circuit protection	yes			
Type of short-circuit protection	pulsed			
Overload protection	yes			
Measuring/setting range				
Measuring range	1...240 l/min	0.06...14.4 m³/h	16...3804 gph	0.26...63.4 gpm
Display range	-288...288 l/min	-17.28...17.28 m³/h	-4565...4565 gph	-76.08...76.08 gpm
Resolution	0.1 l/min	0.001 m³/h	1 gph	0.02 gpm
Set point SP	2.3...240 l/min	0.139...14.4 m³/h	37...3804 gph	0.61...63.4 gpm
Reset point rP	1.1...238.8 l/min	0.064...14.325 m³/h	17...3784 gph	0.28...63.07 gpm
Analogue start point ASP	-240...192 l/min	-14.4...11.522 m³/h	-3804...3044 gph	-63.4...50.73 gpm
Analogue end point AEP	-192...240 l/min	-11.522...14.4 m³/h	-3044...3804 gph	-50.73...63.4 gpm
Low flow cut-off LFC	1...12 l/min	0.06...0.72 m³/h	16...190 gph	0.26...3.17 gpm
Frequency end point, FEP	48.1...240 l/min	2.889...14.4 m³/h	763...3804 gph	12.72...63.4 gpm
Frequency at the end point FRP [Hz]	1...10000			
Volumetric flow quantity monitoring				
Pulse length [s]	0.002...2			
Pulse value	0.02...99990000 l; 0.005...26414563.515 gal			
Temperature monitoring				
Measuring range	-20...100 °C	-4...212 °F		
Display range	-44...124 °C	-47.2...255.2 °F		
Resolution	0.1 °C	0.1 °F		
Set point SP	-19.6...100 °C	-3.2...212 °F		
Reset point rP	-20...99.6 °C	-4...211.2 °F		
Analogue start point	-20...76 °C	-4...168.8 °F		
Analogue end point	4...100 °C	39.2...212 °F		
Frequency start point, FSP	-20...76 °C	-4...168.8 °F		
Frequency end point, FEP	4...100 °C	39.2...212 °F		
Frequency at the end point FRP [Hz]	1...10000			

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Ultrasonic flow meter

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Accuracy / deviations			
Flow monitoring			
Accuracy (in the measuring range)		glycol solutions (35%)	±(5,0 % MW + 0,5 % MEW)
		high-viscosity oils with viscosity 46mm2/s (40°C)	±(5,0 % MW + 0,5% MEW)
		low-viscosity oils with viscosity 10mm2/s (40°C)	±(5,0 % MW + 0,5% MEW)
		water	± (1,0 % MW + 0,5 % MEW)
Repeatability		± 0,2 % MEW	
Temperature monitoring			
Accuracy	[K]	± 2,5 (Q > 5 % MEW)	
Temperature coefficient [% of the span / 10 K]		0,2	
Response times			
Flow monitoring			
Response time	[s]	< 0.25; (dAP = 0, T09)	
Damping process value dAP	[s]	0...5	
Temperature monitoring			
Dynamic response T05 / T09	[s]	5,7 / 86	
Software / programming			
Diagnostic functions		direction of flow detection; signal quality	
Interfaces			
Communication interface		IO-Link	
Transmission type		COM2 (38,4 kBaud)	
IO-Link revision		1.1.3	
SDCI standard		IEC 61131-9: 2013-07	
Profiles		BLOB	Binary Large Object transfer
		Common - I&D	Identification and Diagnosis
Required master port type		A	
Process data analogue		3	
Process data binary		2	
Min. process cycle time	[ms]	9.6	
IO-Link process data (cyclical)		**function**	**bit length**
		totaliser	32
		Flow monitoring	32
		Temperature monitoring	32
		status	4
		Output 1	1
		Output 2	1
Supported DeviceIDs		**Type of operation**	**DeviceID**
		default	1759
Operating conditions			
Ambient temperature	[°C]	-20...60	
Storage temperature	[°C]	-25...80	
Protection		IP 67	

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Ultrasonic flow meter

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Tests / approvals			
EMC		DIN 61326-1:2021	
Shock resistance		DIN IEC 68-2-27	20 g (11ms)
Vibration resistance		DIN IEC 68-2-6	20 g (10...2000Hz)
MTTF	[years]	160	
UL approval		UL approval no.	I034
Pressure Equipment Directive		can be used for group 2 fluids; group 1 fluids on request	
Mechanical data			
Weight	[g]	544	
Housing		rectangular	
Type of mounting		inlet pipe length 5xDN; outlet pipe length 1xDN	
Dimensions	[mm]	130 x 48 x 65.2	
Materials		housing: stainless steel (316L/1.4404); Display: PFA; Sealing Display: FKM; connector: PBT	
Materials (wetted parts)		Pipe section: stainless steel (316L/1.4404); Process connection sealing: NBR reinforced fibre Flat seal	
Process connection		threaded connection G 1 external thread DN25	
Surface characteristics Ra/Rz of the wetted parts		Ra < 1.25 µm	
Displays / operating elements			
Display			colour display 1,44", 128 x 128 pixels
		Switching function	2 x LED, yellow
		diagnosis	1 x LED, three-colour
Display unit		l/min; l/h; m³/h; m/s; gpm; gph; ft/s; oz/min	
Accessories			
Items supplied		Flat seal 2, Centellen	
		package insert	
Remarks			
Remarks		MW = measured value	
		MEW = Final value of the measuring range	
		pulse and totaliser signal are only available for one of the two outputs	
		the accuracy indications are adhered to over the entire application area	
Pack quantity		1 pcs.	

Electrical connection

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

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Ultrasonic flow meter

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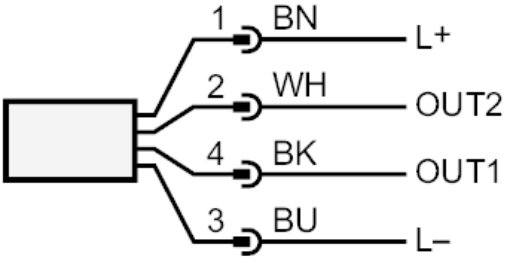
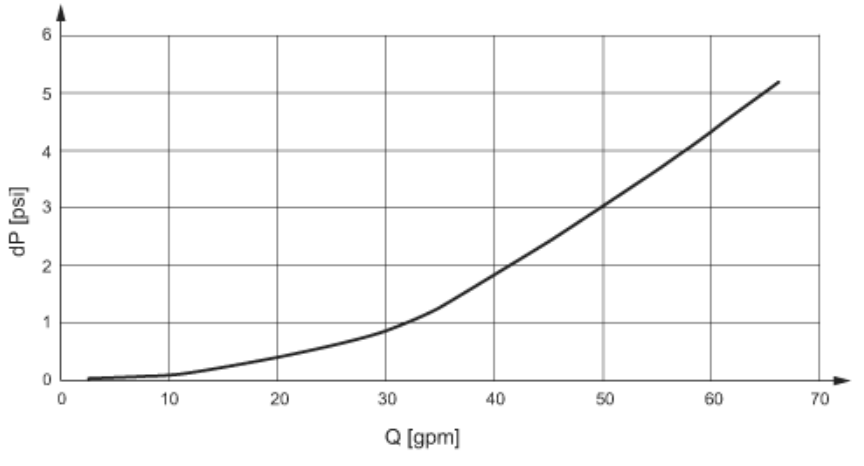
Connection

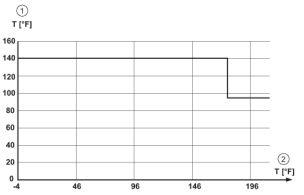


OUT1/IO-Link:	switching output volumetric flow quantity monitoring switching output Temperature monitoring Pulse output quantity meter frequency output volumetric flow quantity monitoring frequency output Temperature monitoring signal output Preset counter
OUT2/InD:	switching output volumetric flow quantity monitoring switching output Temperature monitoring Pulse output quantity meter analogue output flow analogue output temperature signal output Preset counter input counter reset
colours to DIN EN 60947-5-2	
Core colours	BK= black BN= brown BU= blue WH= white

Diagrams and graphs

Note on pressure loss



derating ambient temperature	 1 Ambient temperature 2 Medium temperature

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Ultrasonic flow meter

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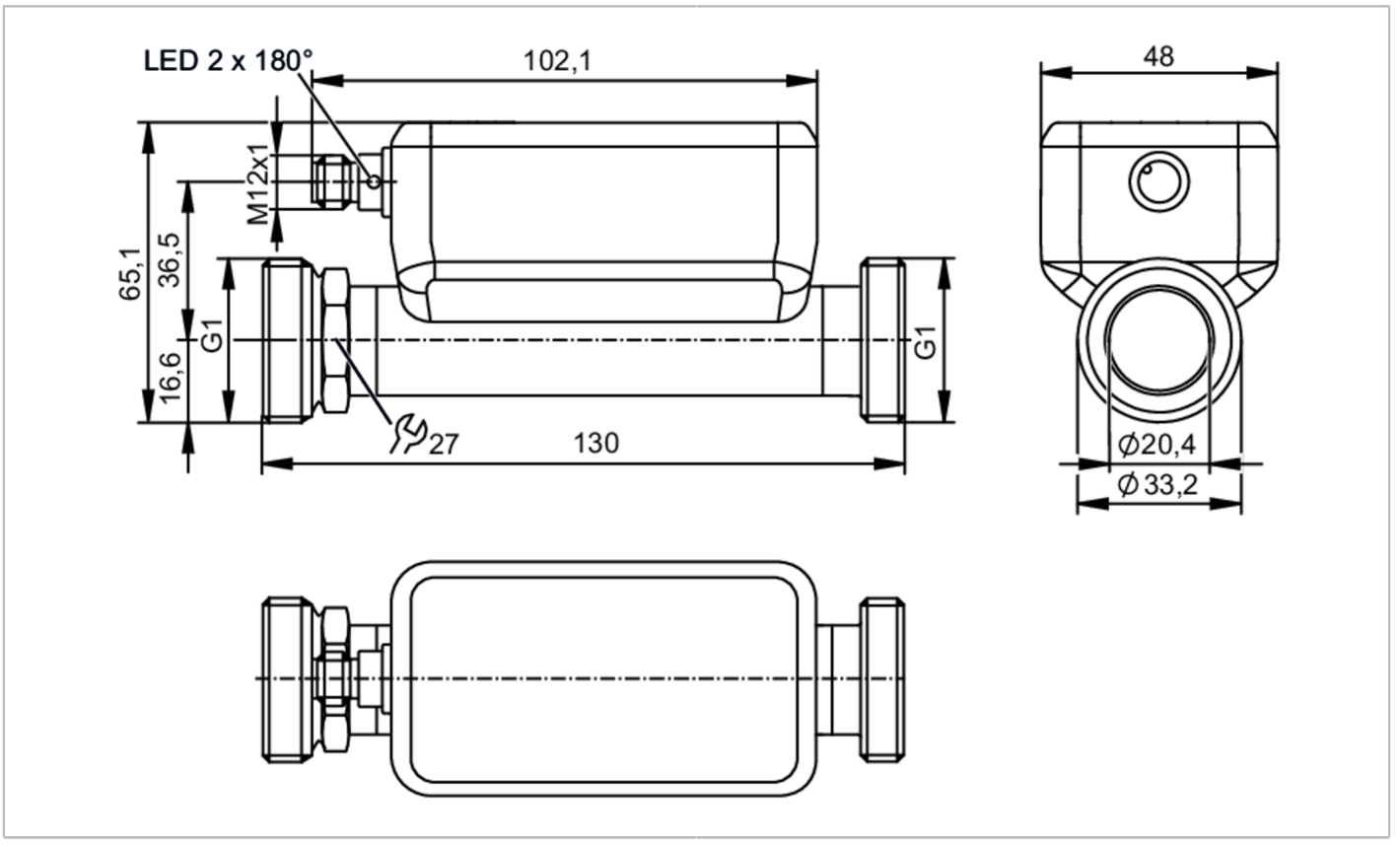

Product characteristics				
Number of inputs and outputs	Number of digital outputs: 2; Number of analogue outputs: 1			
Measuring range	1...240 l/min	0.06...14.4 m³/h	16...3804 gph	0.26...63.4 gpm
Nominal diameter	DN25 (1“)			
Process connection	threaded connection G 1 external thread DN25			
Application				
Special feature	Gold-plated contacts			
Application	use in mobile and industrial applications			
Media	ultra-pure water; water; hydrous media; glycol solutions; oils (of high and low viscosity); coolants			
Note on media	hydrous media: for media with >10 % additives, the repeatability is the only available value			
	low-viscosity oils with viscosity: 7...40 mm²/s (40 °C)			
	high-viscosity oils with viscosity: 30...68 mm²/s (40 °C)			
Medium temperature	-40...120 °C		-40...248 °F	
Min. bursting pressure	150 bar		15 MPa	
Pressure rating	100 bar		10 MPa	
Vacuum resistance [mbar]	-1000			
Electrical data				
Operating voltage [V]	8...32 DC; (to SELV/PELV)			
Current consumption [mA]	< 175			
Protection class	III			
Reverse polarity protection	yes			

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Ultrasonic flow meter

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Power-on delay time	[s]	5			
Measuring principle		ultrasonic			
Inputs / outputs					
Total number of inputs and outputs		2			
Number of inputs and outputs		Number of digital outputs: 2; Number of analogue outputs: 1			
Inputs					
Inputs		OUT2	counter reset		
Outputs					
Total number of outputs		2			
Output signal		OUT1	switching signal; pulse signal; diagnostic signal; totaliser switching signal; frequency signal; IO-Link		
		OUT2	switching signal; pulse signal; diagnostic signal; totaliser switching signal; analogue signal		
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]	100			
Switching frequency DC	[Hz]	0...10000			
Number of analogue outputs		1			
Analogue current output	[mA]	4...20; (scalable)			
Max. load	[Ω]	500			
Analogue voltage output	[V]	0...10 / 0.5...4.5; (scalable)			
Min. load resistance	[Ω]	2000			
Pulse output		flow rate meter			
Short-circuit protection		yes			
Type of short-circuit protection		pulsed			
Overload protection		yes			
Measuring/setting range					
Measuring range		1...240 l/min	0.06...14.4 m³/h	16...3804 gph	0.26...63.4 gpm
Resolution		0.1 l/min	0.001 m³/h	1 gph	0.02 gpm
Note on factory setting		l/min			
		°C			
Set point SP		2.3...240 l/min	0.139...14.4 m³/h	37...3804 gph	0.61...63.4 gpm
Reset point rP		1.1...238.8 l/min	0.064...14.325 m³/h	17...3784 gph	0.28...63.07 gpm
Analogue start point ASP		-240...192 l/min	-14.4...11.522 m³/h	-3804...3044 gph	-63.4...50.73 gpm
Analogue end point AEP		-191.9...240 l/min	-11.511...14.4 m³/h	-3041...3804 gph	-50.68...63.4 gpm
Low flow cut-off LFC		1...12 l/min	0.06...0.72 m³/h	16...190 gph	0.26...3.17 gpm
Frequency end point, FEP		48.1...240 l/min	2.889...14.4 m³/h	763...3804 gph	12.72...63.4 gpm
Frequency at the end point FRP	[Hz]	1...10000			

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Volumetric flow quantity monitoring			
Pulse length	[s]	0.002...2	
Pulse value		0.1...99990000 l; 0.03...26414563.515 gal	
Temperature monitoring			
Measuring range		-40...120 °C	-40...248 °F
Resolution		0.1 °C	0.1 °F
Set point SP		-40...119.4 °C	-40...247 °F
Reset point rP		-40...88 °C	-40...190.4 °F
Analogue start point		-8...120 °C	17.6...248 °F
Analogue end point		-40...88 °C	-40...190.4 °F
Frequency start point, FSP		-8...120 °C	17.6...248 °F
Frequency end point, FEP		-40...119.4 °C	-40...247 °F
Frequency at the end point FRP	[Hz]	1...10000	
Accuracy / deviations			
Flow monitoring			
Accuracy (in the measuring range)		only up to 100 °C; at higher temperatures, only the repeatability is within the specification.	
Accuracy (in the measuring range)		glycol solutions (35%)	±(5,0 % MW + 0,5 % MEW)
		high-viscosity oils with viscosity 46mm2/s (40°C)	±(5,0 % MW + 0,5 % MEW)
		low-viscosity oils with viscosity 10mm2/s (40°C)	±(5,0 % MW + 0,5 % MEW)
		water	± (1,0 % MW + 0,5 % MEW)
Repeatability		± 0,2 % MEW	
Temperature monitoring			
Accuracy	[K]	± 2,5 (Q > 5 % MEW)	
Temperature coefficient	[% of the span / 10 K]	0,2	
Response times			
Flow monitoring			
Response time	[s]	< 0.25; (dAP = 0, T09)	
Damping process value dAP	[s]	0...5	
Temperature monitoring			
Dynamic response T05 / T09	[s]	5,7 / 86	
Software / programming			
Diagnostic functions		direction of flow detection; signal quality	
Interfaces			
Communication interface		IO-Link	
Transmission type		COM2 (38,4 kBaud)	
IO-Link revision		1.1.3	
SDCI standard		IEC 61131-9: 2013-07	
Profiles		BLOB	Binary Large Object transfer
		Common - I&D	Identification and Diagnosis
Required master port type		A	
Process data analogue		3	

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Ultrasonic flow meter

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Process data binary		2	
Min. process cycle time	[ms]	9.6	
IO-Link process data (cyclical)		**function**	**bit length**
		totaliser	32
		Flow monitoring	32
		Temperature monitoring	32
		status	4
		Output 1	1
		Output 2	1
Supported DeviceIDs		**Type of operation**	**DeviceID**
		default	1838
Operating conditions			
Ambient temperature	[°C]	-25...60	
Storage temperature	[°C]	-40...80	
Protection		IP 67; IP 69K	
Tests / approvals			
EMC		DIN 61326-1:2021	
Shock resistance		DIN IEC 68-2-27	20 g (11ms)
Vibration resistance		DIN IEC 68-2-6	20 g (10...2000Hz)
MTTF	[years]	136	
UL approval		UL approval no.	I037
		File number UL	E174189
Pressure Equipment Directive		can be used for group 2 fluids; group 1 fluids on request	
Mechanical data			
Weight	[g]	542.95	
Housing		rectangular	
Inlet pipe length		5 x DN	
Outlet pipe length		1 x DN	
Dimensions	[mm]	130 x 48 x 65.1	
Materials		housing: stainless steel (316L/1.4404); connector: PEI, FKM	
Materials (wetted parts)		Pipe section: stainless steel (316L/1.4404); Process connection sealing: NBR reinforced fibre	
Nominal diameter		DN25 (1“)	
Process connection		threaded connection G 1 external thread DN25	
Surface characteristics Ra/Rz of the wetted parts		Ra < 1.25 µm	
Displays / operating elements			
Display		operating status	1 x LED, green
Accessories			
Items supplied		Flat seal 2, NBR reinforced fibre	
		package insert	
Remarks			
Remarks		MW = measured value	
		MEW = Final value of the measuring range	
		pulse and totaliser signal are only available for one of the two outputs	
		the accuracy indications are adhered to over the entire application area	

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Ultrasonic flow meter

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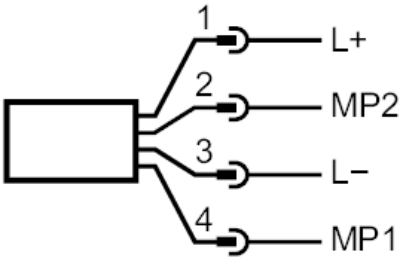
Pack quantity	1 pcs.

Electrical connection

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

Connection

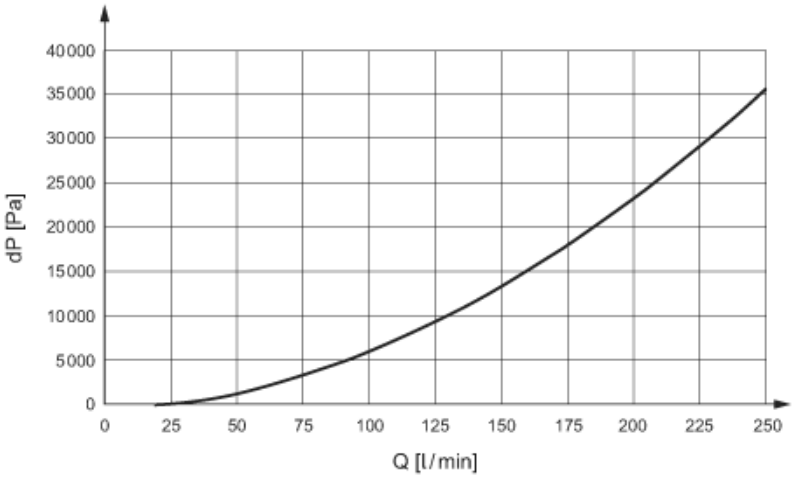


1 (L+)	L+	
2 (OUT2)	MP2	DO, AO, reset
3 (L-)	L-	
4 (OUT1)	MP1	DO, IO-Link

Electrical connection - plug

Diagrams and graphs

Note on pressure loss



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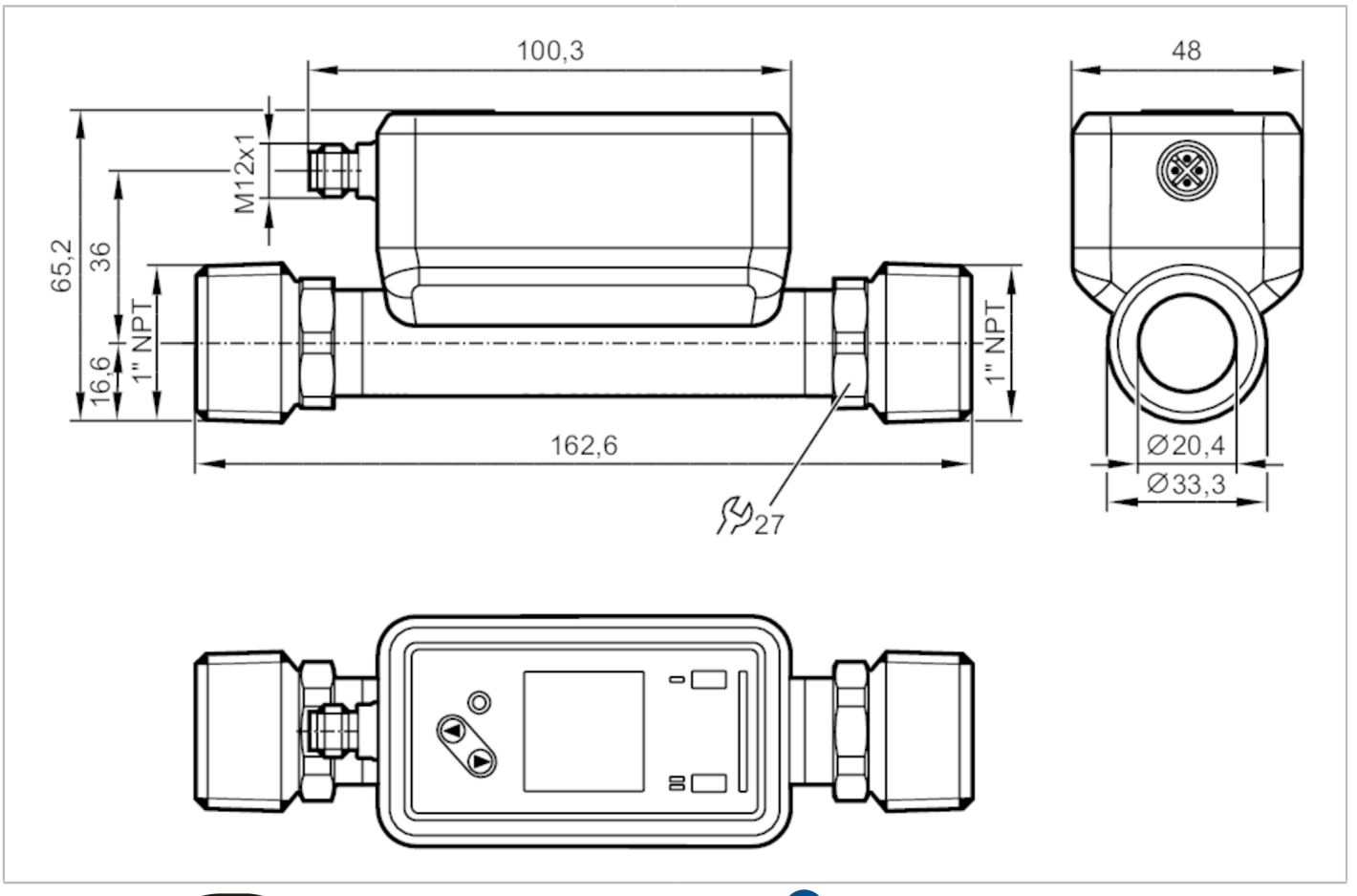
Ultrasonic flow meter

SUN11XFBFRKG/US



ACS CE PA CRN cULus LISTED IO-Link KTW/W270 NSF Reg31

Product characteristics				
Measuring range	1...240 l/min	0.06...14.4 m³/h	16...3804 gph	0.26...63.4 gpm
Process connection	threaded connection 1" NPT external thread DN25			
Application				
Special feature	Gold-plated contacts			
Media	ultra-pure water; water; hydrous media			
Note on media	hydrous media: for media with >10 % additives, the repeatability is the only available value			
Medium temperature	-20...100 °C		-4...212 °F	
Min. bursting pressure	150 bar		15 MPa	
Pressure rating	100 bar		10 MPa	
Vacuum resistance [mbar]	-1000			
MAWP for applications according to CRN	82.8 bar		8.28 MPa	
Electrical data				
Operating voltage [V]	18...32 DC; (to SELV/PELV)			
Current consumption [mA]	< 75			
Protection class	III			
Reverse polarity protection	yes			
Power-on delay time [s]	5			
Measuring principle	ultrasonic			

SU8621

Ultrasonic flow meter

SUN11XFBFRKG/US

Inputs				
Inputs	counter reset			
Outputs				
Total number of outputs	2			
Output signal	switching signal; pulse signal; analogue signal; IO-Link; frequency signal; diagnostic signal; totaliser switching signal			
Electrical design	PNP/NPN			
Output function	normally open / normally closed; (parameterisable)			
Max. voltage drop switching output DC [V]	2			
Permanent current rating of switching output DC [mA]	100			
Switching frequency DC [Hz]	0...10000			
Analogue current output [mA]	4...20			
Max. load [Ω]	500			
Pulse output	flow rate meter			
Short-circuit protection	yes			
Type of short-circuit protection	pulsed			
Overload protection	yes			
Measuring/setting range				
Measuring range	1...240 l/min	0.06...14.4 m³/h	16...3804 gph	0.26...63.4 gpm
Display range	-288...288 l/min	-17.28...17.28 m³/h	-4565...4565 gph	-76.08...76.08 gpm
Resolution	0.1 l/min	0.001 m³/h	1 gph	0.02 gpm
Set point SP	2.3...240 l/min	0.139...14.4 m³/h	37...3804 gph	0.61...63.4 gpm
Reset point rP	1.1...238.8 l/min	0.064...14.325 m³/h	17...3784 gph	0.28...63.07 gpm
Analogue start point ASP	-240...192 l/min	-14.4...11.522 m³/h	-3804...3044 gph	-63.4...50.73 gpm
Analogue end point AEP	-191.9...240 l/min	-11.511...14.4 m³/h	-3041...3804 gph	-50.68...63.4 gpm
Low flow cut-off LFC	1...12 l/min	0.06...0.72 m³/h	16...190 gph	0.26...3.17 gpm
Frequency end point, FEP	48.1...240 l/min	2.889...14.4 m³/h	763...3804 gph	12.72...63.4 gpm
Frequency at the end point FRP [Hz]	1...10000			
Volumetric flow quantity monitoring				
Pulse length [s]	0.002...2			
Pulse value	0.02...99990000 l; 0.005...26414563.515 gal			
Temperature monitoring				
Measuring range	-20...100 °C	-4...212 °F		
Display range	-44...124 °C	-47.2...255.2 °F		
Resolution	0.1 °C	0.1 °F		
Set point SP	-19.6...100 °C	-3.2...212 °F		
Reset point rP	-20...99.6 °C	-4...211.2 °F		
Analogue start point	-20...76 °C	-4...168.8 °F		
Analogue end point	4...100 °C	39.2...212 °F		
Frequency start point, FSP	-20...76 °C	-4...168.8 °F		
Frequency end point, FEP	4...100 °C	39.2...212 °F		
Frequency at the end point FRP [Hz]	1...10000			

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Ultrasonic flow meter

SUN11XFBFRKG/US

Accuracy / deviations			
Flow monitoring			
Accuracy (in the measuring range)		± (1,0 % MW + 0,5 % MEW)	
Repeatability		± 0,2 % MEW	
Temperature monitoring			
Accuracy	[K]	± 2,5 (Q > 5 % MEW)	
Temperature coefficient	[% of the span / 10 K]	0,2	
Response times			
Flow monitoring			
Response time	[s]	< 0.25; (dAP = 0, T09)	
Damping process value dAP	[s]	0...5	
Temperature monitoring			
Dynamic response T05 / T09	[s]	5,7 / 86	
Software / programming			
Diagnostic functions		direction of flow detection; signal quality	
Interfaces			
Communication interface		IO-Link	
Transmission type		COM2 (38,4 kBaud)	
IO-Link revision		1.1.3	
SDCI standard		IEC 61131-9: 2013-07	
Profiles		BLOB	Binary Large Object transfer
		Common - I&D	Identification and Diagnosis
Required master port type		A	
Process data analogue		3	
Process data binary		2	
Min. process cycle time	[ms]	9.6	
IO-Link process data (cyclical)		**function**	**bit length**
		totaliser	32
		Flow monitoring	32
		Temperature monitoring	32
		status	4
		Output 1	1
		Output 2	1
Supported DeviceIDs		**Type of operation**	**DeviceID**
		default	1463
Operating conditions			
Ambient temperature	[°C]	-20...60	
Storage temperature	[°C]	-25...80	
Protection		IP 67	
Tests / approvals			
EMC		DIN 61326-1:2021	
CPA approval		model number	002US
		accuracy class	1,5

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Ultrasonic flow meter

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Shock resistance		DIN IEC 68-2-27	20 g (11ms)
Vibration resistance		DIN IEC 68-2-6	20 g (10...2000Hz)
MTTF	[years]	160	
UL approval		UL approval no.	I034
		File number UL	E174189
Pressure Equipment Directive		can be used for group 2 fluids; group 1 fluids on request	

Mechanical data

Weight	[g]	631.5	
Housing		rectangular	
Type of mounting		inlet pipe length 5xDN; outlet pipe length 1xDN	
Dimensions	[mm]	162.6 x 48 x 65.2	
Materials		housing: stainless steel (316L/1.4404); Display: PFA; Sealing Display: FKM; connector: PBT	
Materials (wetted parts)		Pipe section: stainless steel (316L/1.4404)	
Process connection		threaded connection 1" NPT external thread DN25	
Surface characteristics Ra/Rz of the wetted parts		49.21 µin	

Displays / operating elements

Display			colour display 1,44", 128 x 128 pixels
		Switching function	2 x LED, yellow
		diagnosis	1 x LED, three-colour

Accessories

Items supplied		package insert

Remarks

Remarks		MW = measured value
		MEW = Final value of the measuring range
		pulse and totaliser signal are only available for one of the two outputs
		the accuracy indications are adhered to over the entire application area
Pack quantity		1 pcs.

Electrical connection

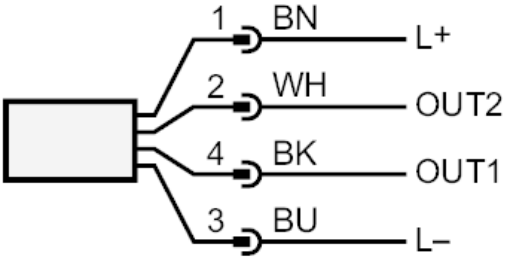
Connector: 1 x M12; coding: A; Contacts: gold-plated

SU8621

Ultrasonic flow meter

SUN11XFBFRKG/US

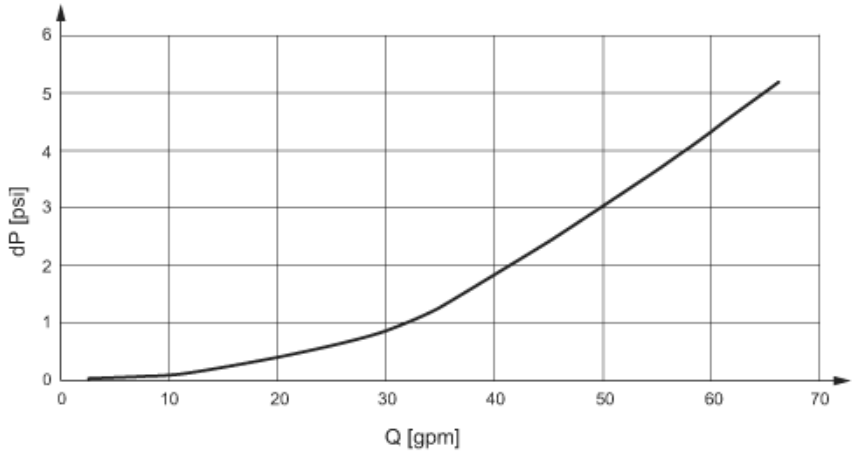
Connection



OUT1/IO-Link:	switching output volumetric flow quantity monitoring switching output Temperature monitoring Pulse output quantity meter frequency output volumetric flow quantity monitoring frequency output Temperature monitoring signal output Preset counter
OUT2/InD:	switching output volumetric flow quantity monitoring switching output Temperature monitoring Pulse output quantity meter analogue output flow analogue output temperature signal output Preset counter input counter reset
colours to DIN EN 60947-5-2	
Core colours	BK= black BN= brown BU= blue WH= white

Diagrams and graphs

Note on pressure loss



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Ultrasonic flow meter

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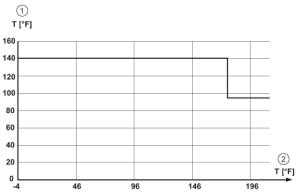
derating ambient temperature	 1 Ambient temperature 2 Medium temperature

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Ultrasonic flow meter

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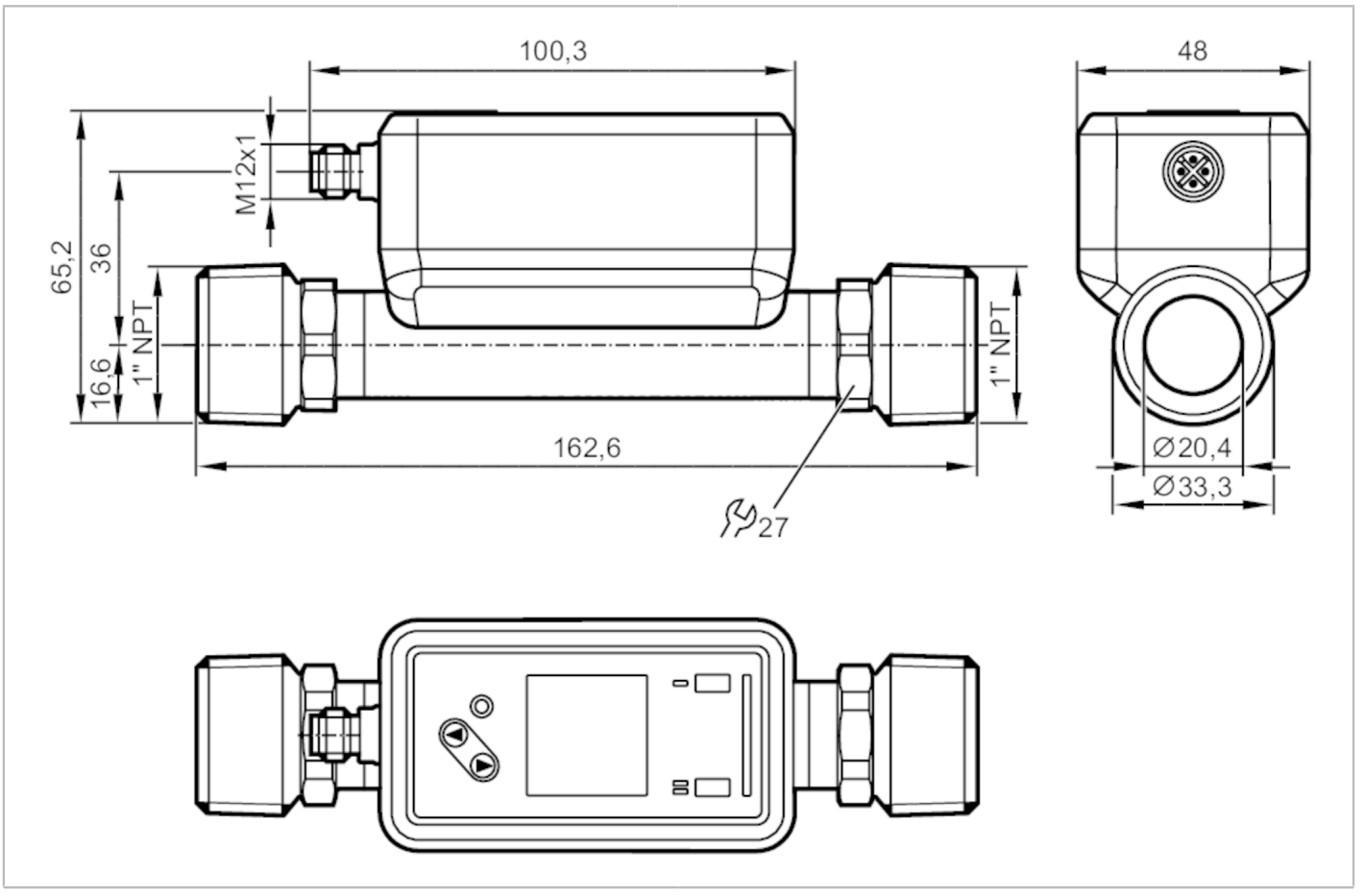

IO-Link

Product characteristics				
Measuring range	1...240 l/min	0.06...14.4 m³/h	16...3804 gph	0.26...63.4 gpm
Process connection	threaded connection 1" NPT external thread DN25			
Application				
Special feature	Gold-plated contacts			
Media	ultra-pure water; water; hydrous media; glycol solutions; oils; coolants			
Note on media	hydrous media: for media with >10 % additives, the repeatability is the only available value			
	low-viscosity oils with viscosity: 7...40 mm²/s (40 °C)			
	high-viscosity oils with viscosity: 30...68 mm²/s (40 °C)			
Medium temperature	-20...100 °C		-4...212 °F	
Min. bursting pressure	150 bar		15 MPa	
Pressure rating	100 bar		10 MPa	
Vacuum resistance [mbar]	-1000			
Electrical data				
Operating voltage [V]	18...32 DC; (to SELV/PELV)			
Current consumption [mA]	< 75			
Protection class	III			
Reverse polarity protection	yes			
Power-on delay time [s]	5			
Measuring principle	ultrasonic			

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Ultrasonic flow meter

SUN11XXBFRKG/US

Inputs				
Inputs	counter reset			
Outputs				
Total number of outputs	2			
Output signal	switching signal; pulse signal; analogue signal; IO-Link; frequency signal; diagnostic signal; totaliser switching signal			
Electrical design	PNP/NPN			
Output function	normally open / normally closed; (parameterisable)			
Max. voltage drop switching output DC [V]	2			
Permanent current rating of switching output DC [mA]	100			
Switching frequency DC [Hz]	0...10000			
Analogue current output [mA]	4...20			
Max. load [Ω]	500			
Pulse output	flow rate meter			
Short-circuit protection	yes			
Type of short-circuit protection	pulsed			
Overload protection	yes			
Measuring/setting range				
Measuring range	1...240 l/min	0.06...14.4 m³/h	16...3804 gph	0.26...63.4 gpm
Display range	-288...288 l/min	-17.28...17.28 m³/h	-4565...4565 gph	-76.08...76.08 gpm
Resolution	0.1 l/min	0.001 m³/h	1 gph	0.02 gpm
Set point SP	2.3...240 l/min	0.139...14.4 m³/h	37...3804 gph	0.61...63.4 gpm
Reset point rP	1.1...238.8 l/min	0.064...14.325 m³/h	17...3784 gph	0.28...63.07 gpm
Analogue start point ASP	-240...192 l/min	-14.4...11.522 m³/h	-3804...3044 gph	-63.4...50.73 gpm
Analogue end point AEP	-191.9...240 l/min	-11.511...14.4 m³/h	-3041...3804 gph	-50.68...63.4 gpm
Low flow cut-off LFC	1...12 l/min	0.06...0.72 m³/h	16...190 gph	0.26...3.17 gpm
Frequency end point, FEP	48.1...240 l/min	2.889...14.4 m³/h	763...3804 gph	12.72...63.4 gpm
Frequency at the end point FRP [Hz]	1...10000			
Volumetric flow quantity monitoring				
Pulse length [s]	0.002...2			
Pulse value	0.02...99990000 l; 0.005...26414563.515 gal			
Temperature monitoring				
Measuring range	-20...100 °C	-4...212 °F		
Display range	-44...124 °C	-47.2...255.2 °F		
Resolution	0.1 °C	0.1 °F		
Set point SP	-19.6...100 °C	-3.2...212 °F		
Reset point rP	-20...99.6 °C	-4...211.2 °F		
Analogue start point	-20...76 °C	-4...168.8 °F		
Analogue end point	4...100 °C	39.2...212 °F		
Frequency start point, FSP	-20...76 °C	4...168.8 °F		
Frequency end point, FEP	4...100 °C	4...212 °F		
Frequency at the end point FRP [Hz]	1...10000			

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Ultrasonic flow meter

SUN11XXBFRKG/US

Accuracy / deviations			
Flow monitoring			
Accuracy (in the measuring range)		glycol solutions (35%)	±(5,0 % MW + 0,5 % MEW)
		high-viscosity oils with viscosity 46mm2/s (40°C)	±(5,0 % MW + 0,5 % MEW)
		low-viscosity oils with viscosity 10mm2/s (40°C)	±(5,0 % MW + 0,5 % MEW)
		water	± (1,0 % MW + 0,5 % MEW)
Repeatability		± 0,2 % MEW	
Temperature monitoring			
Accuracy	[K]	± 2,5 (Q > 5 % MEW)	
Temperature coefficient [% of the span / 10 K]		0,2	
Response times			
Flow monitoring			
Response time	[s]	< 0.25; (dAP = 0, T09)	
Damping process value dAP	[s]	0...5	
Temperature monitoring			
Dynamic response T05 / T09	[s]	5,7 / 86	
Software / programming			
Diagnostic functions		direction of flow detection; signal quality	
Interfaces			
Communication interface		IO-Link	
Transmission type		COM2 (38,4 kBaud)	
IO-Link revision		1.1.3	
SDCI standard		IEC 61131-9: 2013-07	
Profiles		BLOB	Binary Large Object transfer
		Common - I&D	Identification and Diagnosis
Required master port type		A	
Process data analogue		3	
Process data binary		2	
Min. process cycle time	[ms]	9.6	
IO-Link process data (cyclical)		**function**	**bit length**
		totaliser	32
		Flow monitoring	32
		Temperature monitoring	32
		status	4
		Output 1	1
		Output 2	1
Supported DeviceIDs		**Type of operation**	**DeviceID**
		default	1759
Operating conditions			
Ambient temperature	[°C]	-20...60	
Storage temperature	[°C]	-25...80	
Protection		IP 67	

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Ultrasonic flow meter

SUN11XXBFRKG/US

Tests / approvals			
EMC		DIN 61326-1:2021	
Shock resistance		DIN IEC 68-2-27	20 g (11ms)
Vibration resistance		DIN IEC 68-2-6	20 g (10...2000Hz)
MTTF	[years]	160	
UL approval		UL approval no.	I034
Pressure Equipment Directive		can be used for group 2 fluids; group 1 fluids on request	
Mechanical data			
Weight	[g]	623.4	
Housing		rectangular	
Type of mounting		inlet pipe length 5xDN; outlet pipe length 1xDN	
Dimensions	[mm]	162.6 x 48 x 65.2	
Materials		housing: stainless steel (316L/1.4404); Display: PFA; Sealing Display: FKM; connector: PBT	
Materials (wetted parts)		Pipe section: stainless steel (316L/1.4404)	
Process connection		threaded connection 1" NPT external thread DN25	
Surface characteristics Ra/Rz of the wetted parts		49.21 µin	
Displays / operating elements			
Display			colour display 1,44", 128 x 128 pixels
		Switching function	2 x LED, yellow
		diagnosis	1 x LED, three-colour
Display unit		l/min; l/h; m³/h; m/s; gpm; gph; ft/s; oz/min	
Accessories			
Items supplied		package insert	
Remarks			
Remarks		MW = measured value	
		MEW = Final value of the measuring range	
		pulse and totaliser signal are only available for one of the two outputs	
		the accuracy indications are adhered to over the entire application area	
Pack quantity		1 pcs.	

Electrical connection

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

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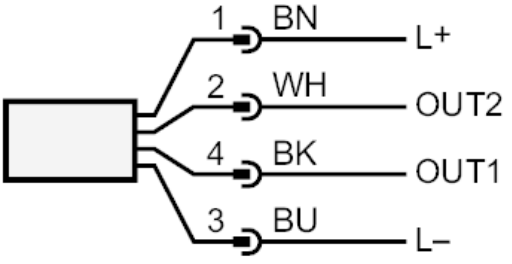
Ultrasonic flow meter

SUN11XXBFRKG/US

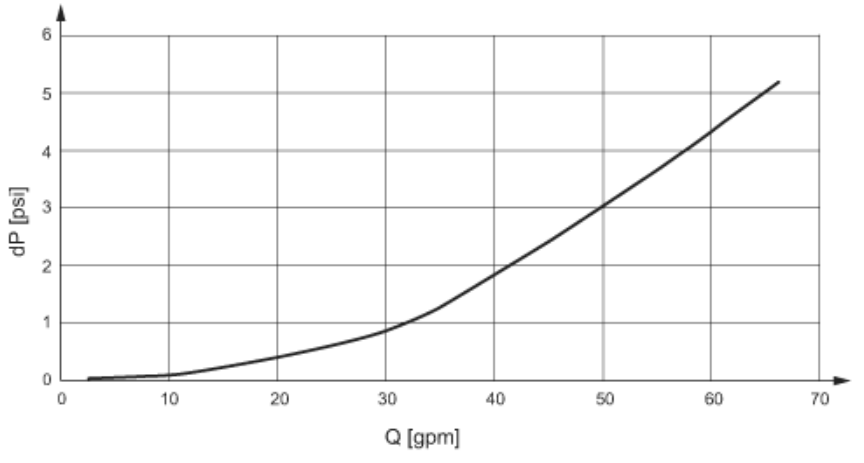
Connection

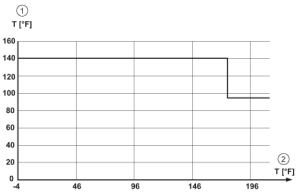


OUT1/IO-Link:	switching output volumetric flow quantity monitoring switching output Temperature monitoring Pulse output quantity meter frequency output volumetric flow quantity monitoring frequency output Temperature monitoring signal output Preset counter
OUT2/InD:	switching output volumetric flow quantity monitoring switching output Temperature monitoring Pulse output quantity meter analogue output flow analogue output temperature signal output Preset counter input counter reset
colours to DIN EN 60947-5-2	
Core colours	BK= black BN= brown BU= blue WH= white

Diagrams and graphs

Note on pressure loss



derating ambient temperature	 1 Ambient temperature 2 Medium temperature

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Ultrasonic flow meter

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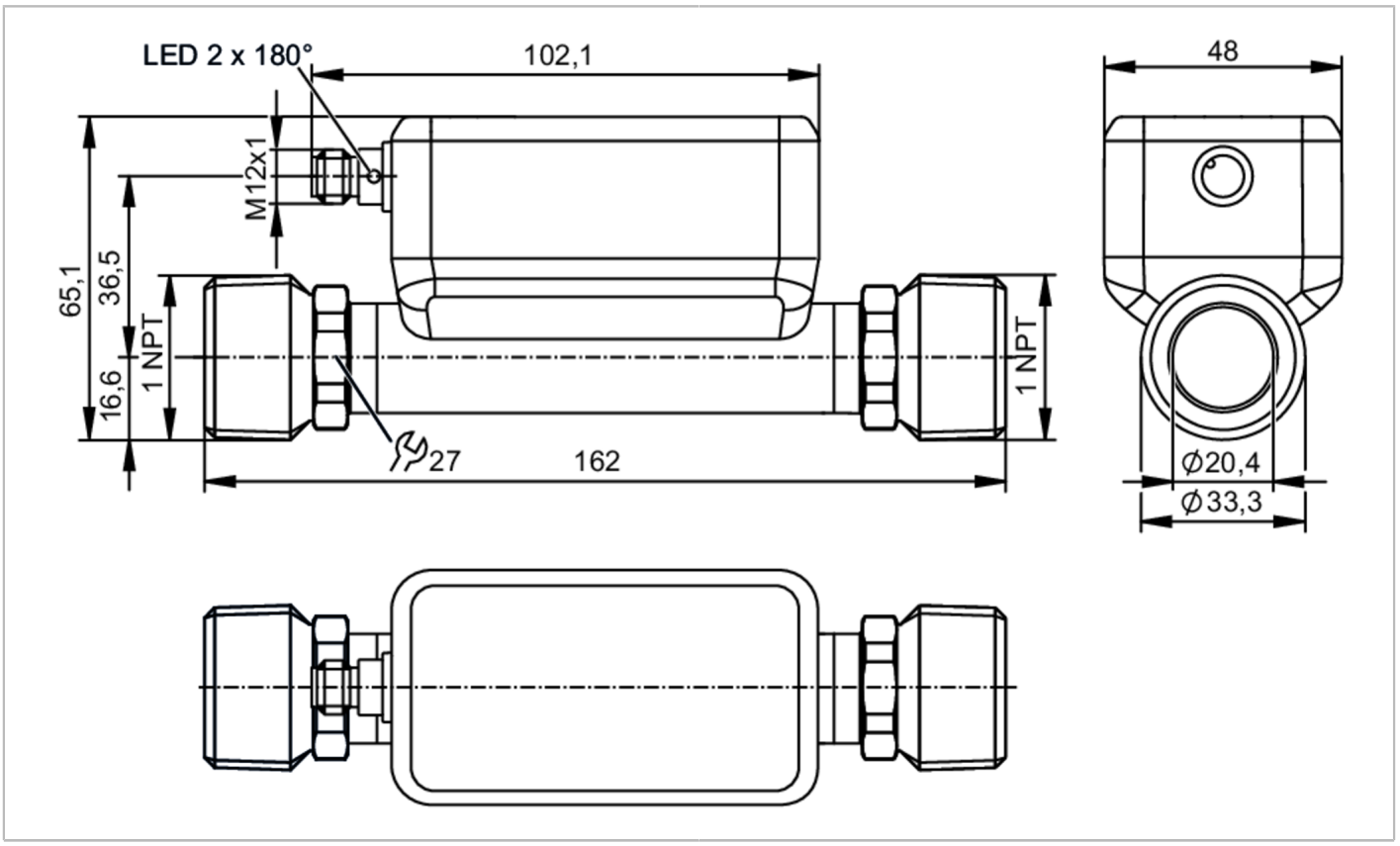

Product characteristics				
Number of inputs and outputs	Number of digital outputs: 2; Number of analogue outputs: 1			
Measuring range	1...240 l/min	0.06...14.4 m³/h	16...3804 gph	0.26...63.4 gpm
Nominal diameter	DN25 (1“)			
Process connection	threaded connection 1" NPT external thread DN25			
Application				
Special feature	Gold-plated contacts			
Application	use in mobile and industrial applications			
Media	ultra-pure water; water; hydrous media; glycol solutions; oils (of high and low viscosity); coolants			
Note on media	hydrous media: for media with >10 % additives, the repeatability is the only available value			
	low-viscosity oils with viscosity: 7...40 mm²/s (40 °C)			
	high-viscosity oils with viscosity: 30...68 mm²/s (40 °C)			
Medium temperature	-40...120 °C		-40...248 °F	
Min. bursting pressure	150 bar		15 MPa	
Pressure rating	100 bar		10 MPa	
Vacuum resistance [mbar]	-1000			
Electrical data				
Operating voltage [V]	8...32 DC; (to SELV/PELV)			
Current consumption [mA]	< 175			
Protection class	III			
Reverse polarity protection	yes			

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Ultrasonic flow meter

SUN11XJBFRKG/US

Power-on delay time	[s]	5			
Measuring principle		ultrasonic			
Inputs / outputs					
Total number of inputs and outputs		2			
Number of inputs and outputs		Number of digital outputs: 2; Number of analogue outputs: 1			
Inputs					
Inputs		OUT2	counter reset		
Outputs					
Total number of outputs		2			
Output signal		OUT1	switching signal; pulse signal; diagnostic signal; totaliser switching signal; frequency signal; IO-Link		
		OUT2	switching signal; pulse signal; diagnostic signal; totaliser switching signal; analogue signal		
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]	100			
Switching frequency DC	[Hz]	0...10000			
Number of analogue outputs		1			
Analogue current output	[mA]	4...20; (scalable)			
Max. load	[Ω]	500			
Analogue voltage output	[V]	0...10 / 0.5...4.5; (scalable)			
Min. load resistance	[Ω]	2000			
Pulse output		flow rate meter			
Short-circuit protection		yes			
Type of short-circuit protection		pulsed			
Overload protection		yes			
Measuring/setting range					
Measuring range		1...240 l/min	0.06...14.4 m³/h	16...3804 gph	0.26...63.4 gpm
Resolution		0.1 l/min	0.001 m³/h	1 gph	0.02 gpm
Note on factory setting		gpm			
		°F			
Set point SP		2.3...240 l/min	0.139...14.4 m³/h	37...3804 gph	0.61...63.4 gpm
Reset point rP		1.1...238.8 l/min	0.064...14.325 m³/h	17...3784 gph	0.28...63.07 gpm
Analogue start point ASP		-240...192 l/min	-14.4...11.522 m³/h	-3804...3044 gph	-63.4...50.73 gpm
Analogue end point AEP		-191.9...240 l/min	-11.511...14.4 m³/h	-3041...3804 gph	-50.68...63.4 gpm
Low flow cut-off LFC		1...12 l/min	0.06...0.72 m³/h	16...190 gph	0.26...3.17 gpm
Frequency end point, FEP		48.1...240 l/min	2.889...14.4 m³/h	763...3804 gph	12.72...63.4 gpm
Frequency at the end point FRP	[Hz]	1...10000			

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Ultrasonic flow meter

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Volumetric flow quantity monitoring			
Pulse length	[s]	0.002...2	
Pulse value		0.1...99990000 l; 0.03...26414563.515 gal	
Temperature monitoring			
Measuring range		-40...120 °C	-40...248 °F
Resolution		0.1 °C	0.1 °F
Set point SP		-40...119.4 °C	-40...247 °F
Reset point rP		-40...88 °C	-40...190.4 °F
Analogue start point		-8...120 °C	17.6...248 °F
Analogue end point		-40...88 °C	-40...190.4 °F
Frequency start point, FSP		-8...120 °C	17.6...248 °F
Frequency end point, FEP		-40...119.4 °C	-40...247 °F
Frequency at the end point FRP	[Hz]	1...10000	
Accuracy / deviations			
Flow monitoring			
Accuracy (in the measuring range)		only up to 100 °C; at higher temperatures, only the repeatability is within the specification.	
Accuracy (in the measuring range)		glycol solutions (35%)	±(5,0 % MW + 0,5 % MEW)
		high-viscosity oils with viscosity 46mm2/s (40°C)	±(5,0 % MW + 0,5 % MEW)
		low-viscosity oils with viscosity 10mm2/s (40°C)	±(5,0 % MW + 0,5 % MEW)
		water	± (1,0 % MW + 0,5 % MEW)
Repeatability		± 0,2 % MEW	
Temperature monitoring			
Accuracy	[K]	± 2,5 (Q > 5 % MEW)	
Temperature coefficient	[% of the span / 10 K]	0,2	
Response times			
Flow monitoring			
Response time	[s]	< 0.25; (dAP = 0, T09)	
Damping process value dAP	[s]	0...5	
Temperature monitoring			
Dynamic response T05 / T09	[s]	5,7 / 86	
Software / programming			
Diagnostic functions		direction of flow detection; signal quality	
Interfaces			
Communication interface		IO-Link	
Transmission type		COM2 (38,4 kBaud)	
IO-Link revision		1.1.3	
SDCI standard		IEC 61131-9: 2013-07	
Profiles		BLOB	Binary Large Object transfer
		Common - I&D	Identification and Diagnosis
Required master port type		A	
Process data analogue		3	

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Ultrasonic flow meter

SUN11XJBFRKG/US

Process data binary		2	
Min. process cycle time	[ms]	9.6	
IO-Link process data (cyclical)		**function**	**bit length**
		totaliser	32
		Flow monitoring	32
		Temperature monitoring	32
		status	4
		Output 1	1
		Output 2	1
Supported DeviceIDs		**Type of operation**	**DeviceID**
		default	1828
Operating conditions			
Ambient temperature	[°C]	-25...60	
Storage temperature	[°C]	-40...80	
Protection		IP 67; IP 69K	
Tests / approvals			
EMC		DIN 61326-1:2021	
Shock resistance		DIN IEC 68-2-27	20 g (11ms)
Vibration resistance		DIN IEC 68-2-6	20 g (10...2000Hz)
MTTF	[years]	136	
UL approval		UL approval no.	I037
		File number UL	E174189
Pressure Equipment Directive		can be used for group 2 fluids; group 1 fluids on request	
Mechanical data			
Weight	[g]	631.5	
Housing		rectangular	
Inlet pipe length		5 x DN	
Outlet pipe length		1 x DN	
Dimensions	[mm]	162 x 48 x 65.1	
Materials		housing: stainless steel (316L/1.4404); connector: PEI FKM	
Materials (wetted parts)		Pipe section: stainless steel (316L/1.4404)	
Nominal diameter		DN25 (1“)	
Process connection		threaded connection 1" NPT external thread DN25	
Surface characteristics Ra/Rz of the wetted parts		49.21 µin	
Displays / operating elements			
Display		operating status	1 x LED, green
Accessories			
Items supplied		package insert	
Remarks			
Remarks		MW = measured value	
		MEW = Final value of the measuring range	
		pulse and totaliser signal are only available for one of the two outputs	
		the accuracy indications are adhered to over the entire application area	
Pack quantity		1 pcs.	

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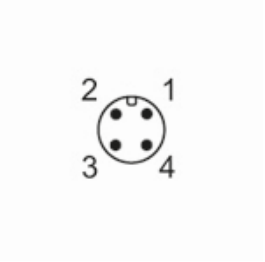
Ultrasonic flow meter

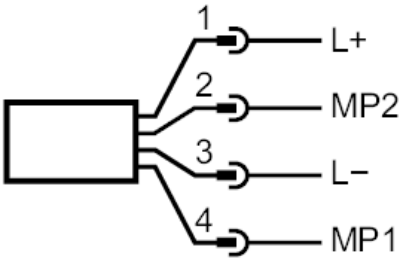
SUN11XJBFRKG/US

Electrical connection

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



Connection

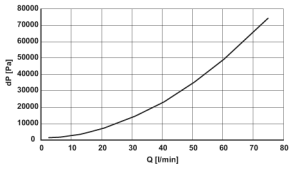


1 (L+)	L+	
2 (OUT2)	MP2	DO, AO, reset
3 (L-)	L-	
4 (OUT1)	MP1	DO, IO-Link

Electrical connection - plug

Diagrams and graphs

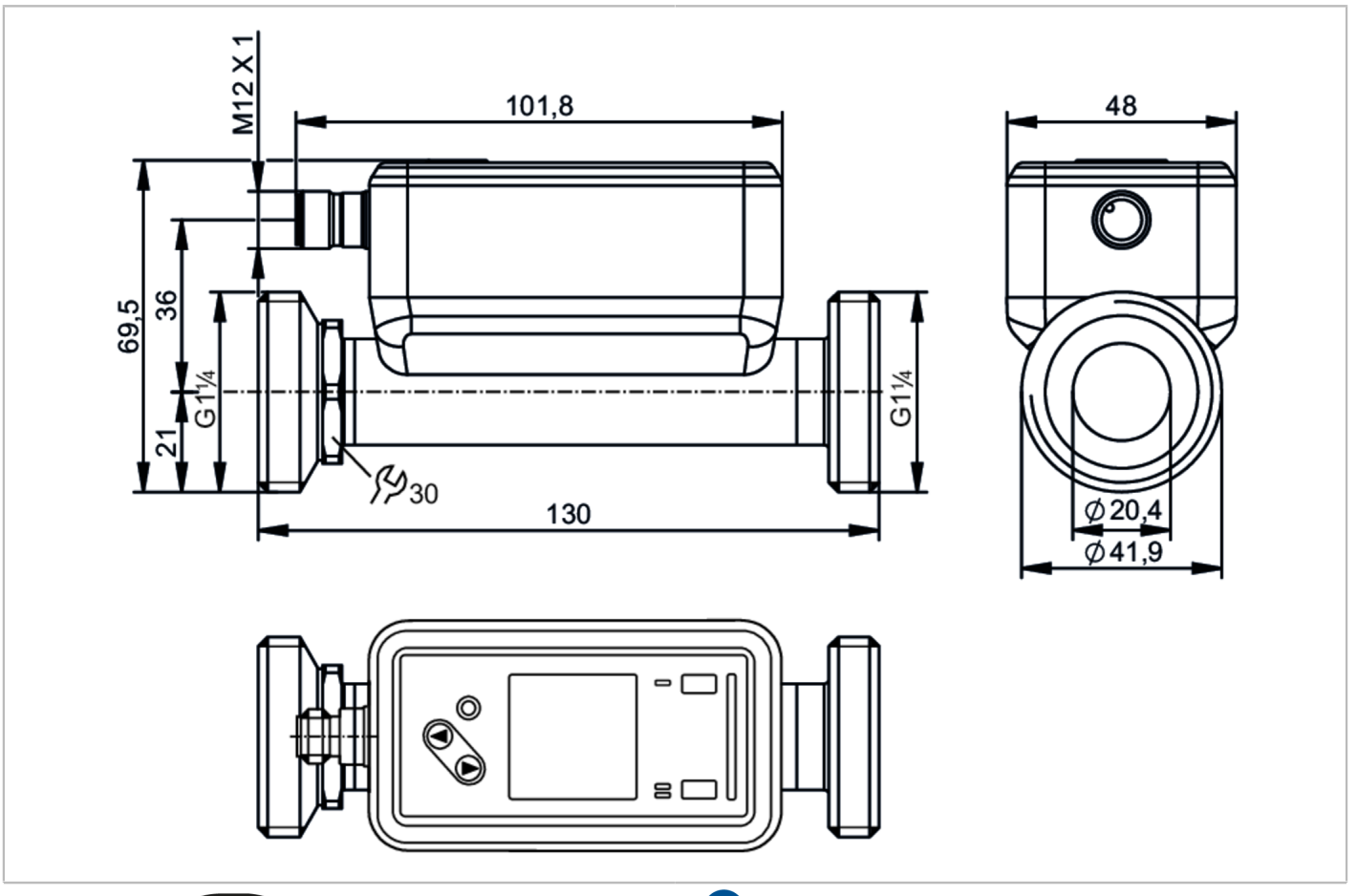
Note on pressure loss



SU9021

Ultrasonic flow meter

SUR54XXBFRKG/US



ACS CE PA c UL us LISTED IO-Link KTW/W270 NSF Reg31

Product characteristics				
Measuring range	1...275 l/min	0.06...16.5 m³/h	16...4359 gph	0.26...72.64 gpm
Process connection	threaded connection G 1 1/4 external thread DN32			
Application				
Special feature	Gold-plated contacts			
Media	ultra-pure water; water; hydrous media			
Note on media	hydrous media: for media with >10 % additives, the repeatability is the only available value			
Medium temperature	-20...100 °C		-4...212 °F	
Min. bursting pressure	150 bar		15 MPa	
Pressure rating	100 bar		10 MPa	
Vacuum resistance [mbar]	-1000			
Electrical data				
Operating voltage [V]	18...32 DC; (to SELV/PELV)			
Current consumption [mA]	< 75			
Protection class	III			
Reverse polarity protection	yes			
Power-on delay time [s]	5			
Measuring principle	ultrasonic			

SU9021

Ultrasonic flow meter

SUR54XXBFRKG/US

Inputs				
Inputs	counter reset			
Outputs				
Total number of outputs	2			
Output signal	switching signal; pulse signal; analogue signal; IO-Link; frequency signal; diagnostic signal; totaliser switching signal			
Electrical design	PNP/NPN			
Output function	normally open / normally closed; (parameterisable)			
Max. voltage drop switching output DC [V]	2			
Permanent current rating of switching output DC [mA]	100			
Switching frequency DC [Hz]	0...10000			
Analogue current output [mA]	4...20			
Max. load [Ω]	500			
Pulse output	flow rate meter			
Short-circuit protection	yes			
Type of short-circuit protection	pulsed			
Overload protection	yes			
Measuring/setting range				
Measuring range	1...275 l/min	0.06...16.5 m³/h	16...4359 gph	0.26...72.64 gpm
Display range	-330...330 l/min	-19.8...19.8 m³/h	-5231...5231 gph	-87.18...87.18 gpm
Resolution	0.1 l/min	0.001 m³/h	1 gph	0.01 gpm
Set point SP	2.5...275 l/min	0.151...16.5 m³/h	40...4359 gph	0.66...72.65 gpm
Reset point rP	1.1...273.6 l/min	0.065...16.414 m³/h	17...4336 gph	0.29...72.27 gpm
Analogue start point ASP	-275...220 l/min	-16.5...13.2 m³/h	-4359...3487 gph	-72.65...58.12 gpm
Analogue end point AEP	-220...275 l/min	-13.2...16.5 m³/h	-3487...4359 gph	-58.12...72.65 gpm
Low flow cut-off LFC	1...13.8 l/min	0.06...0.825 m³/h	16...218 gph	0.26...3.63 gpm
Frequency end point, FEP	55.2...275 l/min	3.31...16.5 m³/h	874...4359 gph	14.75...72.65 gpm
Frequency at the end point FRP [Hz]	1...10000			
Volumetric flow quantity monitoring				
Pulse length [s]	0.002...2			
Pulse value	0.02...99990000 l; 0.026...26414563.515 gal			
Temperature monitoring				
Measuring range	-20...100 °C	-4...212 °F		
Display range	-44...124 °C	-47.2...255.2 °F		
Resolution	0.1 °C	0.1 °F		
Set point SP	-19.6...100 °C	-3.2...212 °F		
Reset point rP	-20...99.6 °C	-4...211.2 °F		
Analogue start point	-20...76 °C	-4...168.8 °F		
Analogue end point	4...100 °C	39.2...212 °F		
Frequency start point, FSP	-20...76 °C	4...168.8 °F		
Frequency end point, FEP	4...100 °C	39.2...212 °F		
Frequency at the end point FRP [Hz]	1...10000			

SU9021

Ultrasonic flow meter

SUR54XXBFRKG/US

Accuracy / deviations			
Flow monitoring			
Accuracy (in the measuring range)		± (1,0 % MW + 0,5 % MEW)	
Repeatability		± 0,2 % MEW	
Temperature monitoring			
Accuracy	[K]	± 2,5 (Q > 5 % MEW)	
Temperature coefficient	[% of the span / 10 K]	0,2	
Response times			
Flow monitoring			
Response time	[s]	< 0.25; (dAP = 0, T09)	
Damping process value dAP	[s]	0...5	
Temperature monitoring			
Dynamic response T05 / T09	[s]	5,7 / 86	
Software / programming			
Diagnostic functions		direction of flow detection; signal quality	
Interfaces			
Communication interface		IO-Link	
Transmission type		COM2 (38,4 kBaud)	
IO-Link revision		1.1.3	
SDCI standard		IEC 61131-9: 2013-07	
Profiles		BLOB	Binary Large Object transfer
		Common - I&D	Identification and Diagnosis
Required master port type		A	
Process data analogue		3	
Process data binary		2	
Min. process cycle time	[ms]	9.6	
IO-Link process data (cyclical)		**function**	**bit length**
		totaliser	32
		Flow monitoring	32
		Temperature monitoring	32
		status	4
		Output 1	1
		Output 2	1
Supported DeviceIDs		**Type of operation**	**DeviceID**
		default	1638
Operating conditions			
Ambient temperature	[°C]	-20...60	
Storage temperature	[°C]	-25...80	
Protection		IP 67	
Tests / approvals			
EMC		DIN 61326-1:2021	
CPA approval		model number	003US
		accuracy class	1,5

SU9021

Ultrasonic flow meter

SUR54XXBFRKG/US

Shock resistance		DIN IEC 68-2-27	20 g (11ms)
Vibration resistance		DIN IEC 68-2-6	20 g (10...2000Hz)
MTTF	[years]	160	
UL approval		UL approval no.	I034
Pressure Equipment Directive		can be used for group 2 fluids; group 1 fluids on request	

Mechanical data

Weight	[g]	620.4	
Housing		rectangular	
Type of mounting		inlet pipe length 5xDN; outlet pipe length 1xDN	
Dimensions	[mm]	130 x 48 x 69.5	
Materials		housing: stainless steel (316L/1.4404); Display: PFA; Sealing Display: FKM; connector: PBT	
Materials (wetted parts)		Pipe section: stainless steel (316L/1.4404); Process connection sealing: NBR reinforced fibre Flat seal	
Process connection		threaded connection G 1 1/4 external thread DN32	
Surface characteristics Ra/Rz of the wetted parts		Ra < 1.25 µm	

Displays / operating elements

Display			colour display 1,44", 128 x 128 pixels
		Switching function	2 x LED, yellow
		diagnosis	1 x LED, three-colour

Accessories

Items supplied	Flat seal 2, Centellen
	package insert

Remarks

Remarks	MW = measured value
	MEW = Final value of the measuring range
	pulse and totaliser signal are only available for one of the two outputs
	the accuracy indications are adhered to over the entire application area
Pack quantity	1 pcs.

Electrical connection

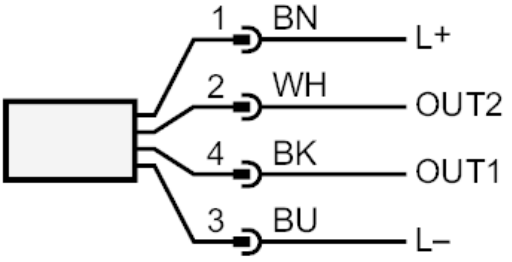
Connector: 1 x M12; coding: A; Contacts: gold-plated

SU9021

Ultrasonic flow meter

SUR54XXBFRKG/US

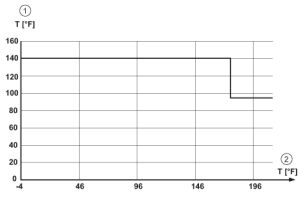
Connection



OUT1/IO-Link:	switching output volumetric flow quantity monitoring switching output Temperature monitoring Pulse output quantity meter frequency output volumetric flow quantity monitoring frequency output Temperature monitoring Diagnostic output direction of flow detection Diagnostic output signal quality signal output Preset counter
OUT2/InD:	switching output volumetric flow quantity monitoring switching output Temperature monitoring Pulse output quantity meter analogue output flow analogue output temperature Diagnostic output direction of flow detection Diagnostic output signal quality signal output Preset counter input counter reset
colours to DIN EN 60947-5-2	
Core colours	BK= black BN= brown BU= blue WH= white

Diagrams and graphs

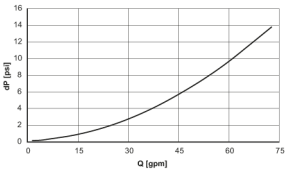
derating ambient temperature



1 Ambient temperature

2 Medium temperature

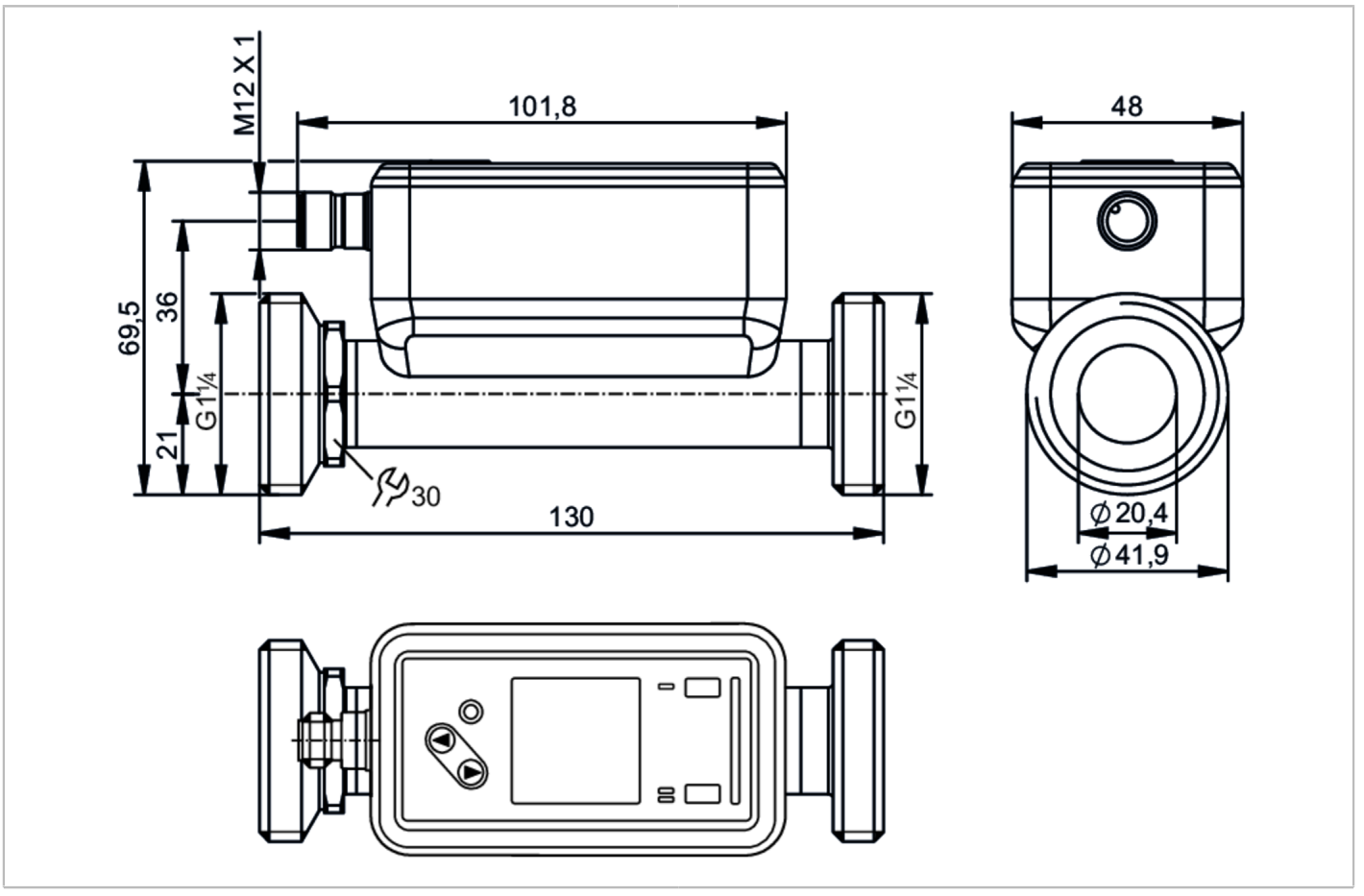
Pressure loss



SU9031

Ultrasonic flow meter

SUR54XFBFRKG/US



Product characteristics				
Measuring range	1...275 l/min	0.06...16.5 m³/h	16...4359 gph	0.26...72.64 gpm
Process connection	threaded connection G 1 1/4 external thread DN32			
Application				
Special feature	Gold-plated contacts			
Media	ultra-pure water; water; hydrous media; glycol solutions; oils; coolants			
Note on media	hydrous media: for media with >10 % additives, the repeatability is the only available value			
	low-viscosity oils with viscosity: 7...40 mm²/s (40 °C)			
	high-viscosity oils with viscosity: 30...68 mm²/s (40 °C)			
Medium temperature	-20...100 °C		-4...212 °F	
Min. bursting pressure	150 bar		15 MPa	
Pressure rating	100 bar		10 MPa	
Vacuum resistance [mbar]	-1000			
Electrical data				
Operating voltage [V]	18...32 DC; (to SELV/PELV)			
Current consumption [mA]	< 75			
Protection class	III			
Reverse polarity protection	yes			
Power-on delay time [s]	5			
Measuring principle	ultrasonic			

SU9031

Ultrasonic flow meter

SUR54XFBFRKG/US

Inputs				
Inputs	counter reset			
Outputs				
Total number of outputs	2			
Output signal	switching signal; pulse signal; analogue signal; IO-Link; frequency signal; diagnostic signal; totaliser switching signal			
Electrical design	PNP/NPN			
Output function	normally open / normally closed; (parameterisable)			
Max. voltage drop switching output DC [V]	2			
Permanent current rating of switching output DC [mA]	100			
Switching frequency DC [Hz]	0...10000			
Analogue current output [mA]	4...20			
Max. load [Ω]	500			
Pulse output	flow rate meter			
Short-circuit protection	yes			
Type of short-circuit protection	pulsed			
Overload protection	yes			
Measuring/setting range				
Measuring range	1...275 l/min	0.06...16.5 m³/h	16...4359 gph	0.26...72.64 gpm
Display range	-330...330 l/min	-19.8...19.8 m³/h	-5231...5231 gph	-87.18...87.18 gpm
Resolution	0.1 l/min	0.001 m³/h	1 gph	0.01 gpm
Set point SP	2.5...275 l/min	0.151...16.5 m³/h	40...4359 gph	0.66...72.65 gpm
Reset point rP	1.1...273.6 l/min	0.065...16.414 m³/h	17...4336 gph	0.29...72.27 gpm
Analogue start point ASP	-275...220 l/min	-16.5...13.2 m³/h	-4359...3487 gph	-72.65...58.12 gpm
Analogue end point AEP	-220...275 l/min	-13.2...16.5 m³/h	-3487...4359 gph	-58.12...72.65 gpm
Low flow cut-off LFC	1...13.8 l/min	0.06...0.825 m³/h	16...218 gph	0.26...3.63 gpm
Frequency end point, FEP	55.2...275 l/min	3.31...16.5 m³/h	874...4359 gph	14.75...72.65 gpm
Frequency at the end point FRP [Hz]	1...10000			
Volumetric flow quantity monitoring				
Pulse length [s]	0.002...2			
Pulse value	0.02...99990000 l; 0.026...26414563.515 gal			
Temperature monitoring				
Measuring range	-20...100 °C	-4...212 °F		
Display range	-44...124 °C	-47.2...255.2 °F		
Resolution	0.1 °C	0.1 °F		
Set point SP	-19.6...100 °C	-3.2...212 °F		
Reset point rP	-20...99.6 °C	-4...211.2 °F		
Analogue start point	-20...76 °C	-4...168.8 °F		
Analogue end point	4...100 °C	39.2...212 °F		
Frequency start point, FSP	-20...76 °C	4...168.8 °F		
Frequency end point, FEP	4...100 °C	39.2...212 °F		
Frequency at the end point FRP [Hz]	1...10000			

SU9031

Ultrasonic flow meter

SUR54XFBFRKG/US

Accuracy / deviations			
Flow monitoring			
Accuracy (in the measuring range)		glycol solutions (35%)	±(5,0 % MW + 0,5 % MEW)
		high-viscosity oils with viscosity 46mm2/s (40°C)	±(5,0 % MW + 0,5 % MEW)
		low-viscosity oils with viscosity 10mm2/s (40°C)	±(5,0 % MW + 0,5 % MEW)
		water	± (1,0 % MW + 0,5 % MEW)
Repeatability		± 0,2 % MEW	
Temperature monitoring			
Accuracy	[K]	± 2,5 (Q > 5 % MEW)	
Temperature coefficient	[% of the span / 10 K]	0,2	
Response times			
Flow monitoring			
Response time	[s]	< 0.25; (dAP = 0, T09)	
Damping process value dAP	[s]	0...5	
Temperature monitoring			
Dynamic response T05 / T09	[s]	5,7 / 86	
Software / programming			
Diagnostic functions		direction of flow detection; signal quality	
Interfaces			
Communication interface		IO-Link	
Transmission type		COM2 (38,4 kBaud)	
IO-Link revision		1.1.3	
SDCI standard		IEC 61131-9: 2013-07	
Profiles		BLOB	Binary Large Object transfer
		Common - I&D	Identification and Diagnosis
Required master port type		A	
Process data analogue		3	
Process data binary		2	
Min. process cycle time	[ms]	9.6	
IO-Link process data (cyclical)		**function**	**bit length**
		totaliser	32
		Flow monitoring	32
		Temperature monitoring	32
		status	4
		Output 1	1
		Output 2	1
Supported DeviceIDs		**Type of operation**	**DeviceID**
		default	1761
Operating conditions			
Ambient temperature	[°C]	-20...60	
Storage temperature	[°C]	-25...80	
Protection		IP 67	

SU9031

Ultrasonic flow meter

SUR54XFBFRKG/US

Tests / approvals			
EMC		DIN 61326-1:2021	
Shock resistance		DIN IEC 68-2-27	20 g (11ms)
Vibration resistance		DIN IEC 68-2-6	20 g (10...2000Hz)
MTTF	[years]	160	
UL approval		UL approval no.	I034
Pressure Equipment Directive		can be used for group 2 fluids; group 1 fluids on request	

Mechanical data			
Weight	[g]	608.1	
Housing		rectangular	
Type of mounting		inlet pipe length 5xDN; outlet pipe length 1xDN	
Dimensions	[mm]	130 x 48 x 69.5	
Materials		housing: stainless steel (316L/1.4404); Display: PFA; Sealing Display: FKM; connector: PBT	
Materials (wetted parts)		Pipe section: stainless steel (316L/1.4404); Process connection sealing: NBR reinforced fibre Flat seal	
Process connection		threaded connection G 1 1/4 external thread DN32	
Surface characteristics Ra/Rz of the wetted parts		Ra < 1.25 µm	

Displays / operating elements			
Display			colour display 1,44", 128 x 128 pixels
		Switching function	2 x LED, yellow
		diagnosis	1 x LED, three-colour
Display unit		l/min; l/h; m³/h; m/s; gpm; gph; ft/s; oz/min	

Accessories	
Items supplied	Flat seal 2, Centellen
	package insert

Remarks	
Remarks	MW = measured value
	MEW = Final value of the measuring range
	pulse and totaliser signal are only available for one of the two outputs
	the accuracy indications are adhered to over the entire application area
Pack quantity	1 pcs.

Electrical connection

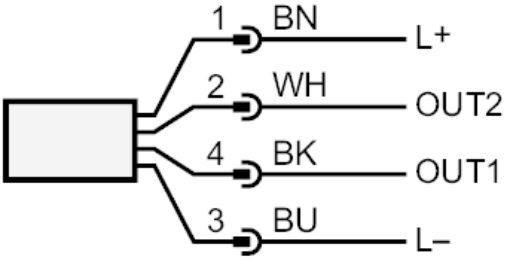
Connector: 1 x M12; coding: A; Contacts: gold-plated

SU9031

Ultrasonic flow meter

SUR54XFBFRKG/US

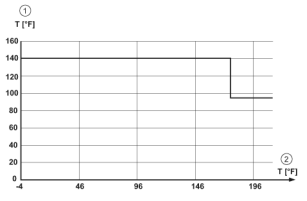
Connection



OUT1/IO-Link:	switching output volumetric flow quantity monitoring switching output Temperature monitoring Pulse output quantity meter frequency output volumetric flow quantity monitoring frequency output Temperature monitoring Diagnostic output direction of flow detection Diagnostic output signal quality signal output Preset counter
OUT2/InD:	switching output volumetric flow quantity monitoring switching output Temperature monitoring Pulse output quantity meter analogue output flow analogue output temperature Diagnostic output direction of flow detection Diagnostic output signal quality signal output Preset counter input counter reset
colours to DIN EN 60947-5-2	
Core colours	BK= black BN= brown BU= blue WH= white

Diagrams and graphs

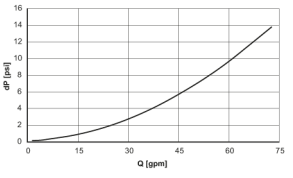
derating ambient temperature



1 Ambient temperature

2 Medium temperature

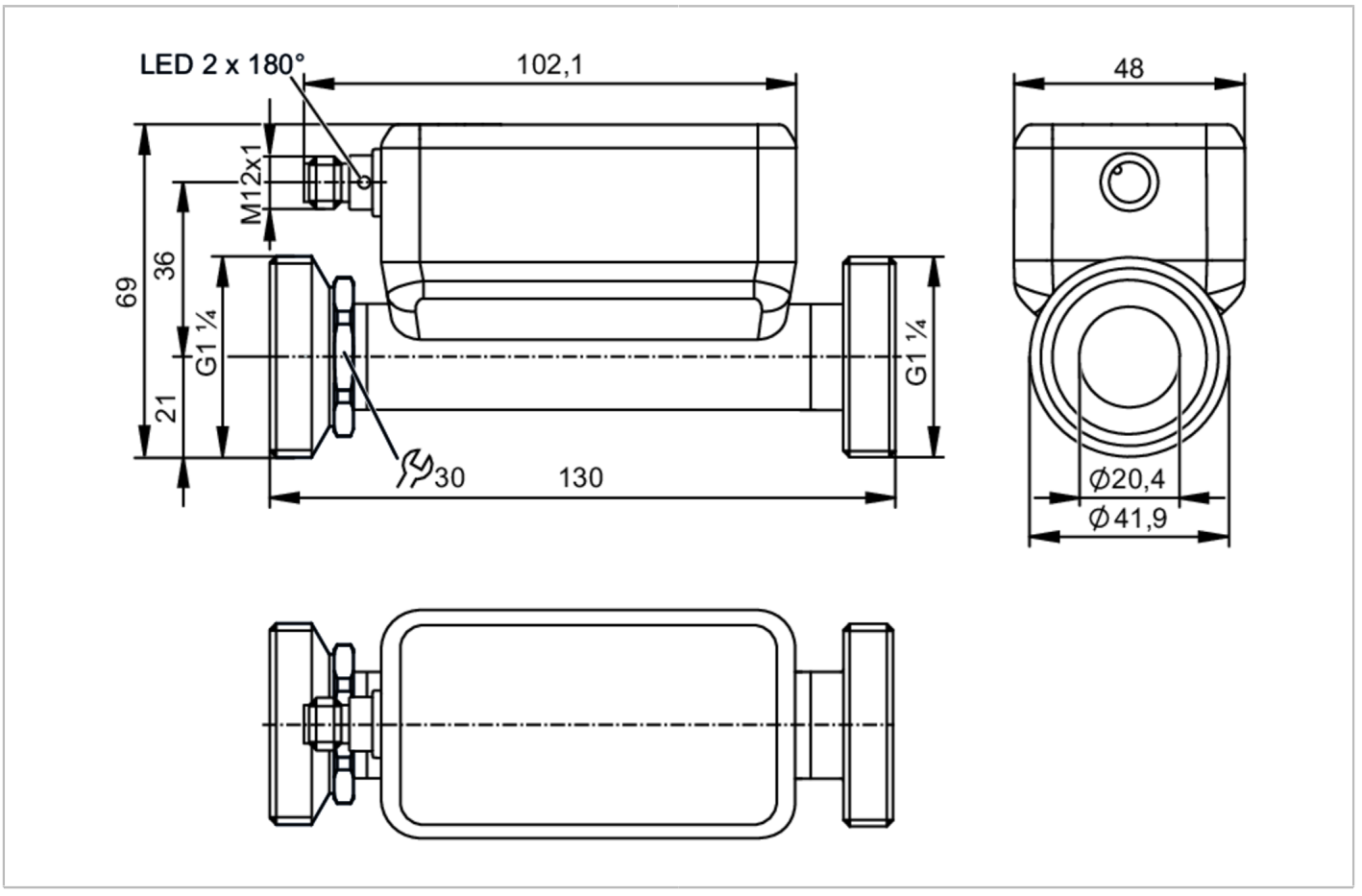
Pressure loss



SU9050

Ultrasonic flow meter

SUR54XJBFRKG/US



Product characteristics				
Number of inputs and outputs	Number of digital outputs: 2; Number of analogue outputs: 1			
Measuring range	1...275 l/min	0.06...16.5 m³/h	16...4359 gph	0.26...72.64 gpm
Nominal diameter	DN 32 (1 1/4“)			
Process connection	threaded connection G 1 1/4 external thread DN32			
Application				
Special feature	Gold-plated contacts			
Application	use in mobile and industrial applications			
Media	ultra-pure water; water; hydrous media; glycol solutions; oils (of high and low viscosity); coolants			
Note on media	hydrous media: for media with >10 % additives, the repeatability is the only available value			
	low-viscosity oils with viscosity: 7...40 mm²/s (40 °C)			
	high-viscosity oils with viscosity: 30...68 mm²/s (40 °C)			
Medium temperature	-40...120 °C		-40...248 °F	
Min. bursting pressure	150 bar		15 MPa	
Pressure rating	100 bar		10 MPa	
Vacuum resistance [mbar]	-1000			
Electrical data				
Operating voltage [V]	8...32 DC; (to SELV/PELV)			
Current consumption [mA]	< 175			

SU9050

Ultrasonic flow meter

SUR54XJBFRKG/US

Protection class		III			
Reverse polarity protection		yes			
Power-on delay time	[s]	5			
Measuring principle		ultrasonic			
Inputs / outputs					
Total number of inputs and outputs		2			
Number of inputs and outputs		Number of digital outputs: 2; Number of analogue outputs: 1			
Inputs					
Inputs		OUT2	counter reset		
Outputs					
Total number of outputs		2			
Output signal		OUT1	switching signal; pulse signal; diagnostic signal; totaliser switching signal; frequency signal; IO-Link		
		OUT2	switching signal; pulse signal; diagnostic signal; totaliser switching signal; analogue signal		
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]	100			
Switching frequency DC	[Hz]	0...10000			
Number of analogue outputs		1			
Analogue current output	[mA]	4...20; (scalable)			
Max. load	[Ω]	500			
Analogue voltage output	[V]	0...10 / 0.5...4.5; (scalable)			
Min. load resistance	[Ω]	2000			
Pulse output		flow rate meter			
Short-circuit protection		yes			
Type of short-circuit protection		pulsed			
Overload protection		yes			
Measuring/setting range					
Measuring range		1...275 l/min	0.06...16.5 m³/h	16...4359 gph	0.26...72.64 gpm
Resolution		0.1 l/min	0.001 m³/h	1 gph	0.01 gpm
Note on factory setting		l/min			
		°C			
Set point SP		2.5...275 l/min	0.151...16.5 m³/h	40...4359 gph	0.66...72.65 gpm
Reset point rP		1.1...273.6 l/min	0.065...16.414 m³/h	17...4336 gph	0.29...72.27 gpm
Analogue start point ASP		-275...220 l/min	-16.5...13.2 m³/h	-4359...3487 gph	-72.65...58.12 gpm
Analogue end point AEP		-220...275 l/min	-13.2...16.5 m³/h	-3487...4359 gph	-58.12...72.65 gpm
Low flow cut-off LFC		1...13.8 l/min	0.06...0.825 m³/h	16...218 gph	0.26...3.63 gpm
Frequency end point, FEP		55.2...275 l/min	3.31...16.5 m³/h	874...4359 gph	14.75...72.65 gpm

SU9050

Ultrasonic flow meter

SUR54XJBFRKG/US

Frequency at the end point FRP [Hz]	1...10000		
Volumetric flow quantity monitoring			
Pulse length [s]	0.002...2		
Pulse value	0.1...99990000 l; 0.03...26414563.515 gal		
Temperature monitoring			
Measuring range	-40...120 °C	-40...248 °F	
Resolution	0.1 °C	0.1 °F	
Set point SP	-40...119.4 °C	-40...247 °F	
Reset point rP	-40...88 °C	-40...190.4 °F	
Analogue start point	-8...120 °C	17.6...248 °F	
Analogue end point	-40...88 °C	-40...190.4 °F	
Frequency start point, FSP	-8...120 °C	17.6...248 °F	
Frequency end point, FEP	-40...119.4 °C	-40...247 °F	
Frequency at the end point FRP [Hz]	1...10000		

Accuracy / deviations

Flow monitoring		
Accuracy (in the measuring range)	only up to 100 °C; at higher temperatures, only the repeatability is within the specification.	
Accuracy (in the measuring range)	glycol solutions (35%)	±(5,0 % MW + 0,5 % MEW)
	high-viscosity oils with viscosity 46mm2/s (40°C)	±(5,0 % MW + 0,5 % MEW)
	low-viscosity oils with viscosity 10mm2/s (40°C)	±(5,0 % MW + 0,5 % MEW)
	water	± (1,0 % MW + 0,5 % MEW)
Repeatability	± 0,2 % MEW	
Temperature monitoring		
Accuracy [K]	± 2,5 (Q > 5 % MEW)	
Temperature coefficient [% of the span / 10 K]	0,2	

Response times

Flow monitoring		
Response time [s]	< 0.25; (dAP = 0, T09)	
Damping process value dAP [s]	0...5	
Temperature monitoring		
Dynamic response T05 / T09 [s]	5,7 / 86	

Software / programming

Diagnostic functions	direction of flow detection; signal quality

Interfaces

Communication interface	IO-Link	
Transmission type	COM2 (38,4 kBaud)	
IO-Link revision	1.1.3	
SDCI standard	IEC 61131-9: 2013-07	
Profiles	BLOB	Binary Large Object transfer
	Common - I&D	Identification and Diagnosis

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Required master port type		A	
Process data analogue		3	
Process data binary		2	
Min. process cycle time	[ms]	9.6	
IO-Link process data (cyclical)		**function**	**bit length**
		totaliser	32
		Flow monitoring	32
		Temperature monitoring	32
		status	4
		Output 1	1
		Output 2	1
Supported DeviceIDs		**Type of operation**	**DeviceID**
		default	1839
Operating conditions			
Ambient temperature	[°C]	-25...60	
Storage temperature	[°C]	-40...80	
Protection		IP 67; IP 69K	
Tests / approvals			
EMC		DIN 61326-1:2021	
Shock resistance		DIN IEC 68-2-27	20 g (11ms)
Vibration resistance		DIN IEC 68-2-6	20 g (10...2000Hz)
MTTF	[years]	136	
UL approval		UL approval no.	I037
		File number UL	E174189
Pressure Equipment Directive		can be used for group 2 fluids; group 1 fluids on request	
Mechanical data			
Weight	[g]	606.3	
Housing		rectangular	
Inlet pipe length		5 x DN	
Outlet pipe length		1 x DN	
Dimensions	[mm]	130 x 48 x 69	
Materials		housing: stainless steel (316L/1.4404); connector: PEI, FKM	
Materials (wetted parts)		Pipe section: stainless steel (316L/1.4404); Process connection sealing: NBR reinforced fibre	
Nominal diameter		DN 32 (1 1/4“)	
Process connection		threaded connection G 1 1/4 external thread DN32	
Surface characteristics Ra/Rz of the wetted parts		Ra < 1.25 µm	
Displays / operating elements			
Display		operating status	1 x LED, green
Accessories			
Items supplied		Flat seal 2, NBR reinforced fibre	
		package insert	

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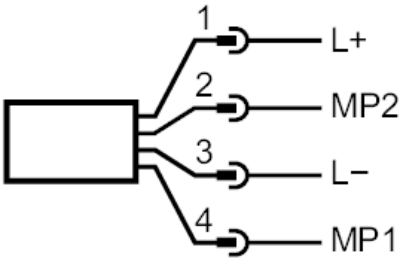
Remarks	
Remarks	MW = measured value
	MEW = Final value of the measuring range
	pulse and totaliser signal are only available for one of the two outputs
	the accuracy indications are adhered to over the entire application area
Pack quantity	1 pcs.

Electrical connection

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

Connection



1 (L+)	L+	
2 (OUT2)	MP2	DO, AO, reset
3 (L-)	L-	
4 (OUT1)	MP1	DO, IO-Link

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Electrical connection - plug

Diagrams and graphs

Note on pressure loss