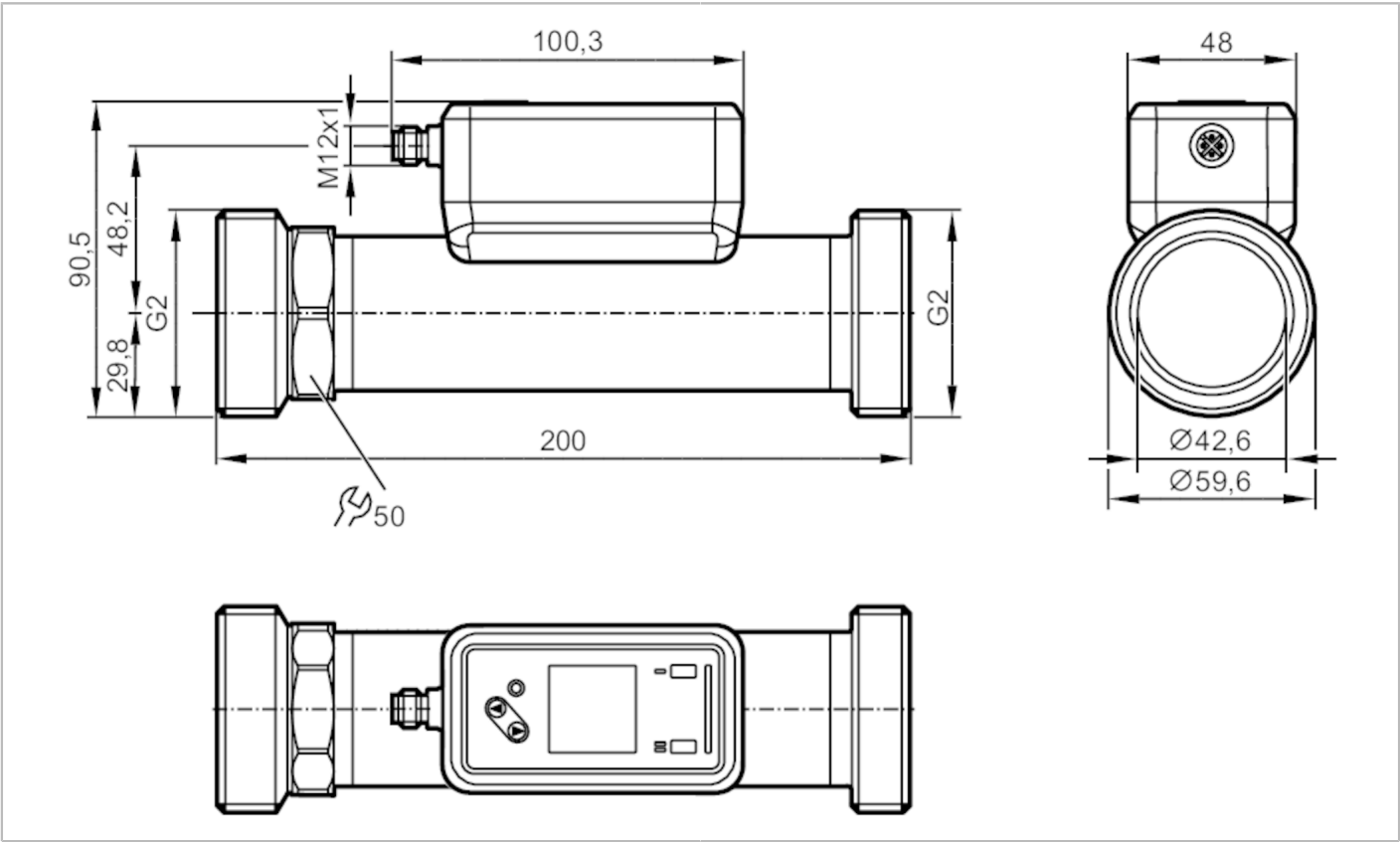




Ultrasonic flow meter

SUR21XXBFRKG/US



ACS CE PA CRN cUL US 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                                                                                |               |                |                   |



## Ultrasonic flow meter

SUR21XXBFRKG/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 | -264.17...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                                                                                                                 |                     |                    |                      |



## Ultrasonic flow meter

SUR21XXBFRKG/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                          |



## Ultrasonic flow meter

SUR21XXBFRKG/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]                                        | 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<br>package insert |
|----------------|------------------------------------------|

## Remarks

|               |                                                                                                                                                                                                                         |
|---------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Remarks       | MW = measured value<br>MEW = Final value of the measuring range<br>pulse and totaliser signal are only available for one of the two outputs<br>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

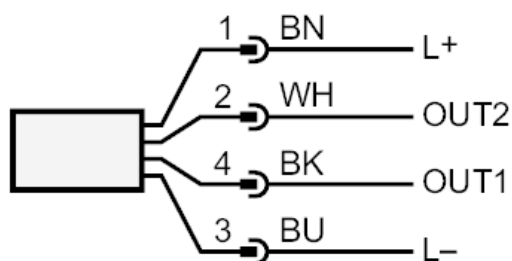




## Ultrasonic flow meter

SUR21XXBFRKG/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

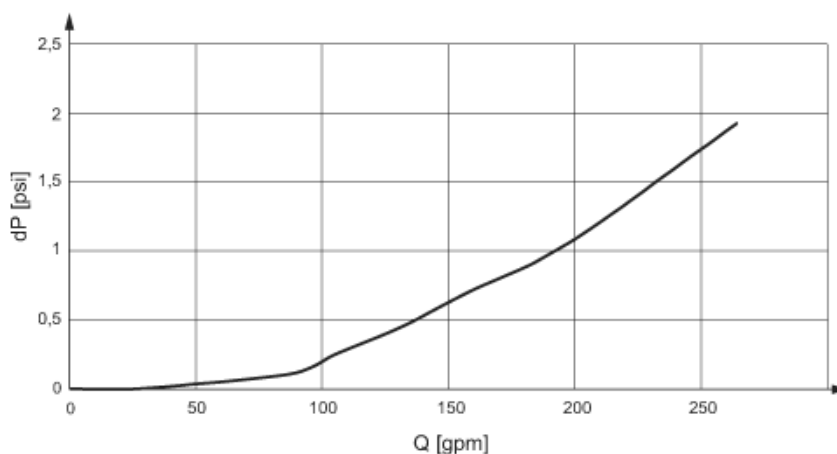
OUT2/InD: switching output volumetric flow quantity monitoring  
switching output Temperature monitoring  
Pulse output quantity meter  
analogue output flow  
analogue output temperature  
signal output Preset counter  
input counter reset

colours to DIN EN  
60947-5-2

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

### Diagrams and graphs

Note on pressure loss



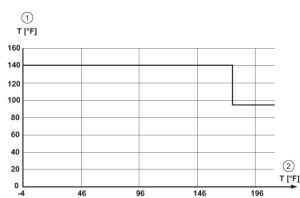
# SU2021

## Ultrasonic flow meter

SUR21XXBFRKG/US



derating ambient temperature



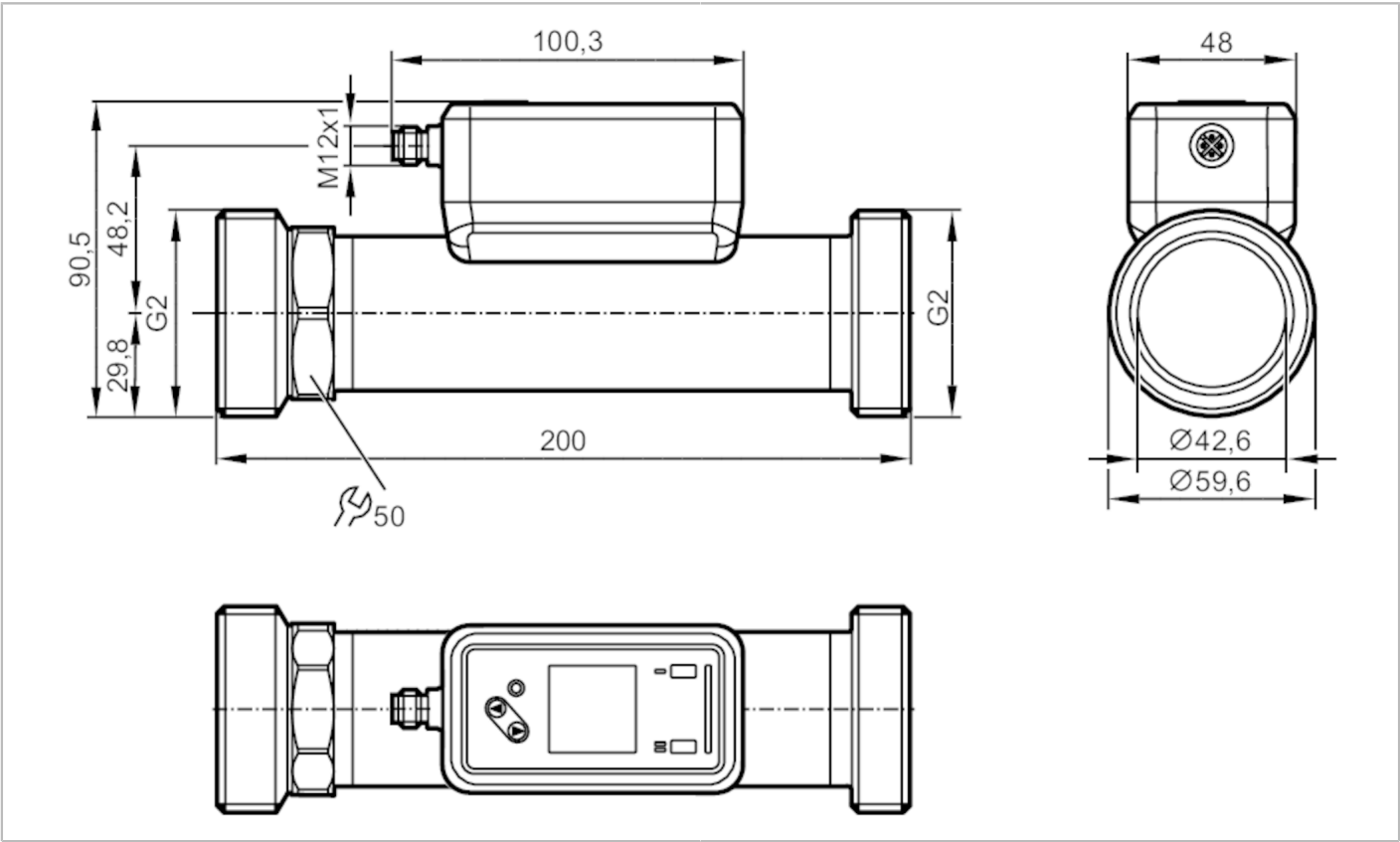
- 1 Ambient temperature
- 2 Medium temperature

SU2031



Ultrasonic flow meter

SUR21XFBFRKG/US



| 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                 |                |                   |



## Ultrasonic flow meter

SUR21XFBFRKG/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<br>1.32...264.18 gpm        |
| Display range                                        |  | -1200...1200 l/min                                                                                                        | -72...72 m³/h       | -19020...19020 gph<br>-317...317 gpm       |
| Resolution                                           |  | 0.1 l/min                                                                                                                 | 0.001 m³/h          | 1 gph<br>0.01 gpm                          |
| Set point SP                                         |  | 10.5...1000 l/min                                                                                                         | 0.63...60 m³/h      | 166...15850 gph<br>2.77...264.17 gpm       |
| Reset point rP                                       |  | 5.3...994.8 l/min                                                                                                         | 0.318...59.688 m³/h | 84...15768 gph<br>1.4...262.8 gpm          |
| Analogue start point ASP                             |  | -1000...800 l/min                                                                                                         | -60...48000 m³/h    | -15850...12680 gph<br>-264.17...211.34 gpm |
| Analogue end point AEP                               |  | -800...1000 l/min                                                                                                         | -48...60 m³/h       | -12680...15850 gph<br>-211.34...264.17 gpm |
| Low flow cut-off LFC                                 |  | 5...50 l/min                                                                                                              | 0.3...3 m³/h        | 79...793 gph<br>1.32...13.21 gpm           |
| Frequency end point, FEP                             |  | 200.6...1000 l/min                                                                                                        | 12.037...60 m³/h    | 3180...15850 gph<br>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                                                                                                                 |                     |                                            |





## Ultrasonic flow meter

SUR21XFBFRKG/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                                             |                              |



## Ultrasonic flow meter

SUR21XFBFRKG/US

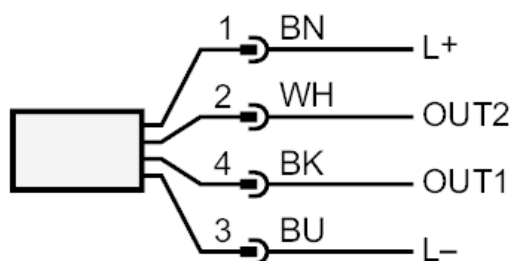
| Tests / approvals                                                                              |                                                                                                         |                                        |
|------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|----------------------------------------|
| 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]                                                                                     | 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                                           |                                                                                                         |                                        |
| <div></div> |                                                                                                         |                                        |



## Ultrasonic flow meter

SUR21XFBFRKG/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

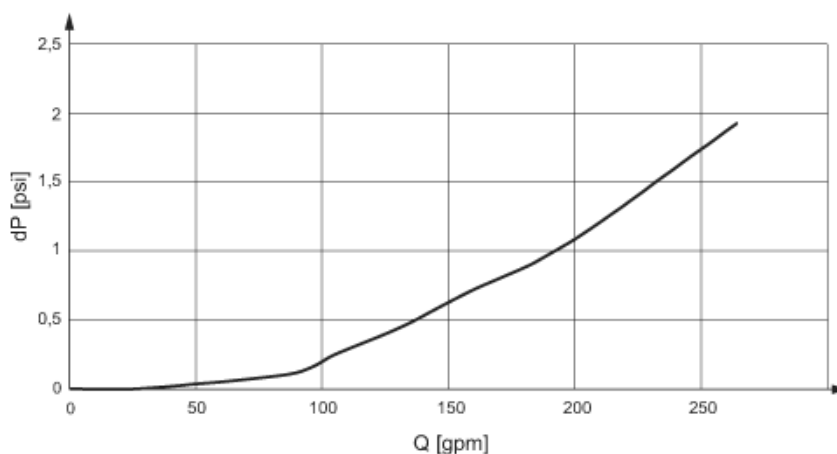
OUT2/InD: switching output volumetric flow quantity monitoring  
switching output Temperature monitoring  
Pulse output quantity meter  
analogue output flow  
analogue output temperature  
signal output Preset counter  
input counter reset

colours to DIN EN 60947-5-2

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

### Diagrams and graphs

Note on pressure loss



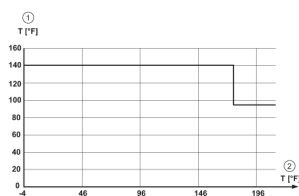
# SU2031

## Ultrasonic flow meter

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derating ambient temperature

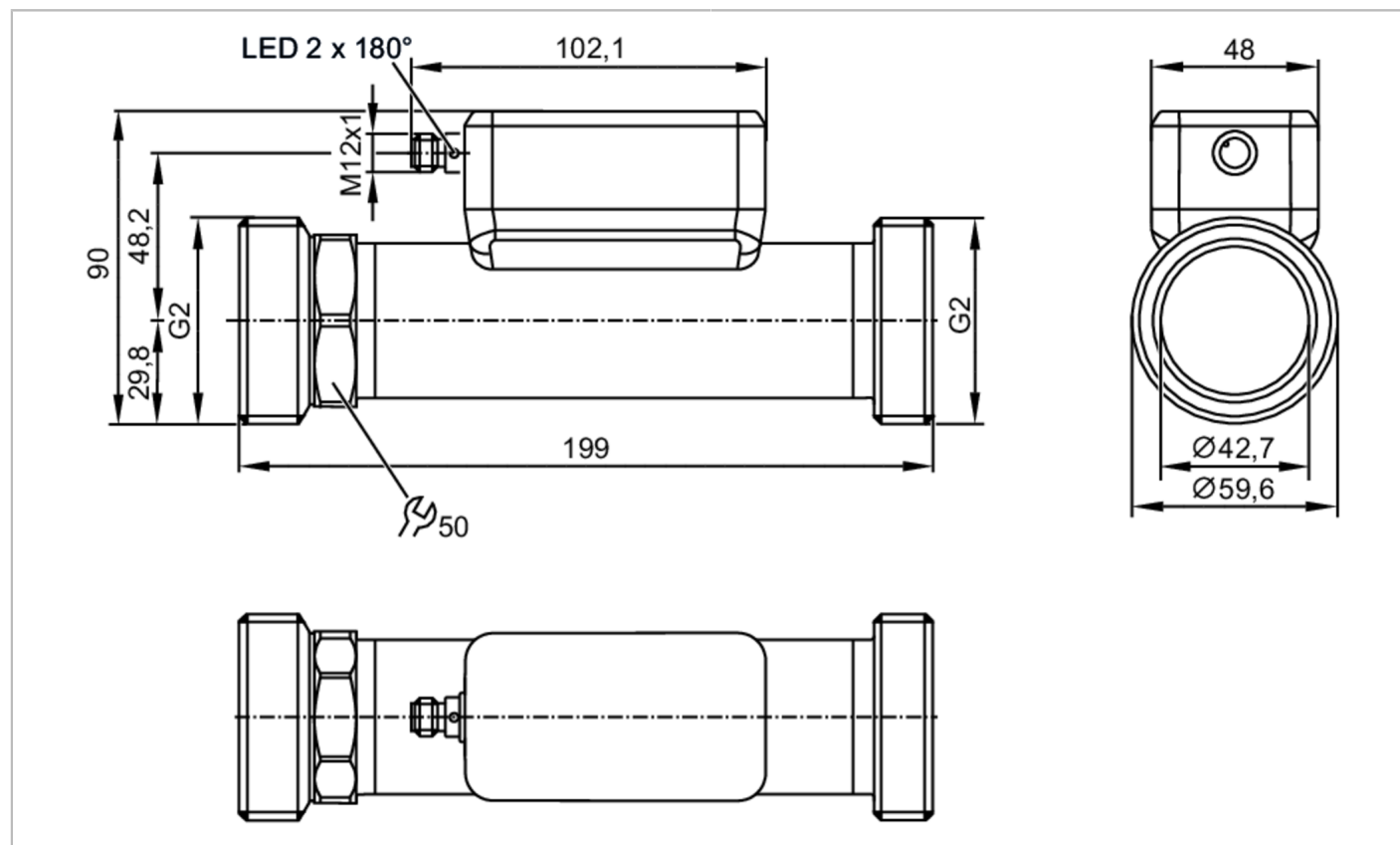


- 1 Ambient temperature
- 2 Medium temperature

# 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                       |



## 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                                                   |                                                                                                          |                    |                      |



## 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             | 0,2                                                                                            |                                           |
| [% of the span / 10 K]              |                                                                                                |                                           |
| 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                                                                                              |                                           |



## Ultrasonic flow meter

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|                                 |                          |                   |
|---------------------------------|--------------------------|-------------------|
| Process data binary             |                          | 2                 |
| Min. process cycle time         | [ms]                     | 9.6               |
| IO-Link process data (cyclical) | <b>function</b>          | <b>bit length</b> |
|                                 | totaliser                | 32                |
|                                 | Flow monitoring          | 32                |
|                                 | Temperature monitoring   | 32                |
|                                 | status                   | 4                 |
|                                 | Output 1                 | 1                 |
|                                 | Output 2                 | 1                 |
| Supported DeviceIDs             | <b>Type of operation</b> | <b>DeviceID</b>   |
|                                 | 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);<br>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<br>package insert |
|----------------|-----------------------------------------------------|

## Remarks

|         |                                                                                                                                                                                                                         |
|---------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Remarks | MW = measured value<br>MEW = Final value of the measuring range<br>pulse and totaliser signal are only available for one of the two outputs<br>the accuracy indications are adhered to over the entire application area |
|---------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|



# SU2050



## Ultrasonic flow meter

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Pack quantity

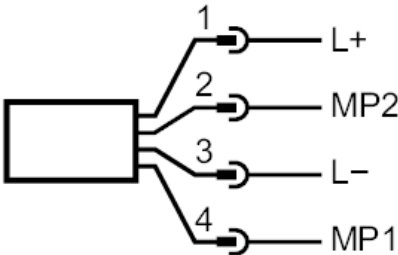
1 pcs.

### Electrical connection

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



### Connection

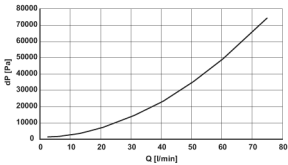


|          |     |               |
|----------|-----|---------------|
| 1 (L+)   | L+  |               |
| 2 (OUT2) | MP2 | DO, AO, reset |
| 3 (L-)   | L-  |               |
| 4 (OUT1) | MP1 | DO, IO-Link   |

### Electrical connection - plug

### Diagrams and graphs

Note on pressure loss

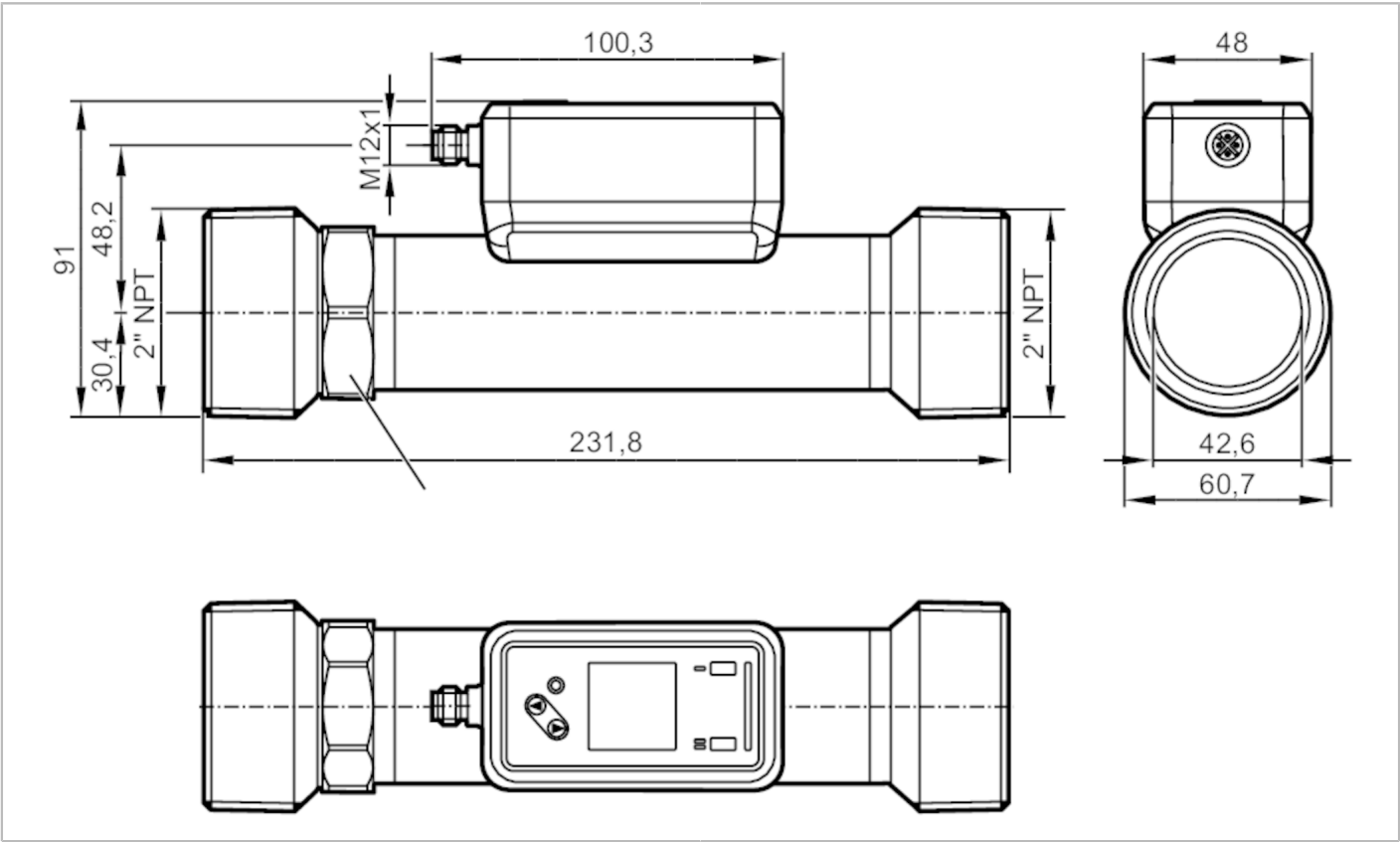


SU2621



Ultrasonic flow meter

SUN21XFBFRKG/US



ACS CE PA CRN cUL US 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              |                |                   |



## 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                                                                                                                 |                     |                    |                      |



## Ultrasonic flow meter

SUN21XFBFRKG/US

| Accuracy / deviations                          |                          |                                                              |
|------------------------------------------------|--------------------------|--------------------------------------------------------------|
| Flow monitoring                                |                          |                                                              |
| Accuracy (in the measuring range)              |                          | $\pm (1,0 \% \text{ MW} + 0,5 \% \text{ MEW})$               |
| Repeatability                                  |                          | $\pm 0,2 \% \text{ MEW}$                                     |
| Temperature monitoring                         |                          |                                                              |
| Accuracy [K]                                   |                          | $\pm 2,5 (Q > 5 \% \text{ MEW})$                             |
| 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<br>Common - I&D     | Binary Large Object transfer<br>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)                | <b>function</b>          | <b>bit length</b>                                            |
|                                                | totaliser                | 32                                                           |
|                                                | Flow monitoring          | 32                                                           |
|                                                | Temperature monitoring   | 32                                                           |
|                                                | status                   | 4                                                            |
|                                                | Output 1                 | 1                                                            |
|                                                | Output 2                 | 1                                                            |
| Supported DeviceIDs                            | <b>Type of operation</b> | <b>DeviceID</b>                                              |
|                                                | 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                                                          |



## 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

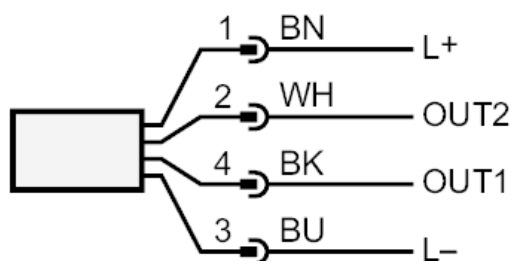




## Ultrasonic flow meter

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

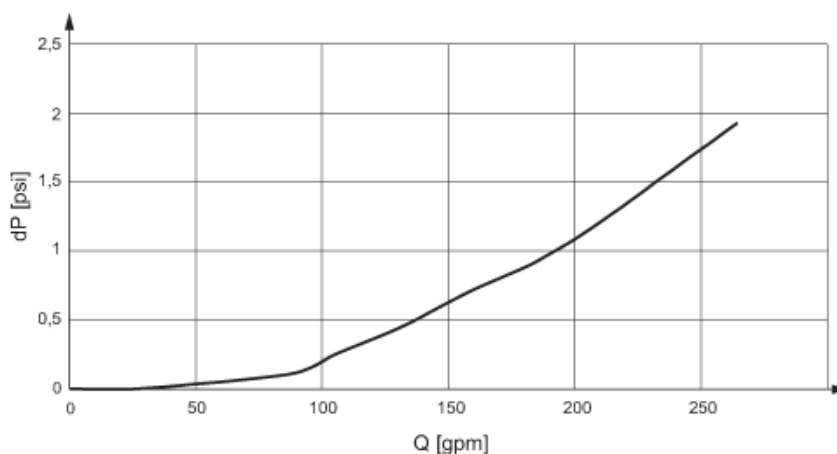
OUT2/InD: switching output volumetric flow quantity monitoring  
switching output Temperature monitoring  
Pulse output quantity meter  
analogue output flow  
analogue output temperature  
signal output Preset counter  
input counter reset

colours to DIN EN 60947-5-2

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

### Diagrams and graphs

Note on pressure loss



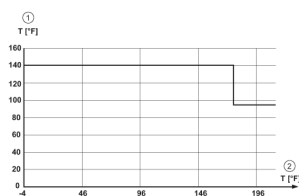
# SU2621

## Ultrasonic flow meter

SUN21XFBFRKG/US



derating ambient temperature



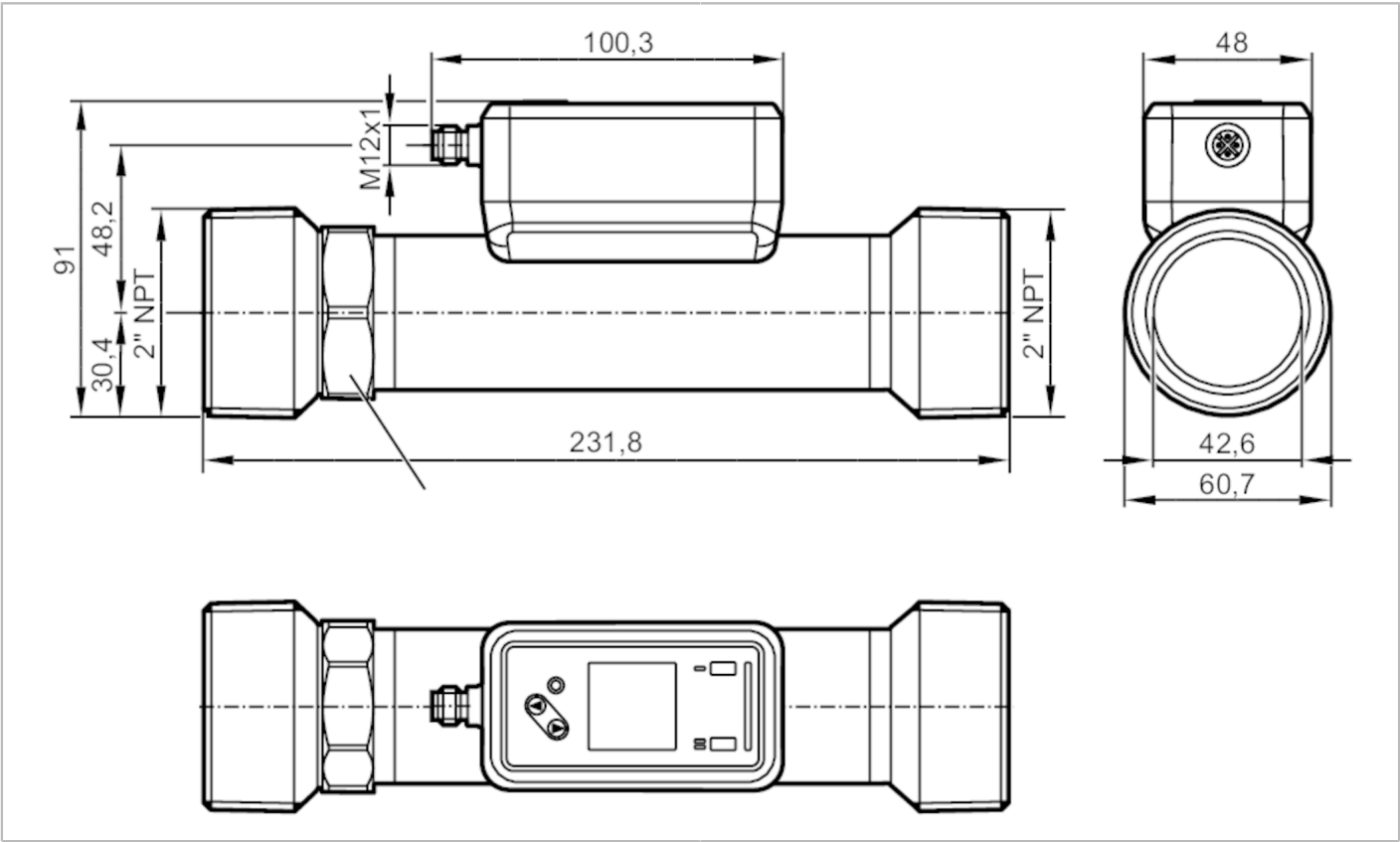
- 1 Ambient temperature
- 2 Medium temperature

SU2631



Ultrasonic flow meter

SUN21XFBFRKG/US



| 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                 |                |                   |





## 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 | -264.18...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                                                                                                                 |                     |                    |                      |



## 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                                             |                              |



## Ultrasonic flow meter

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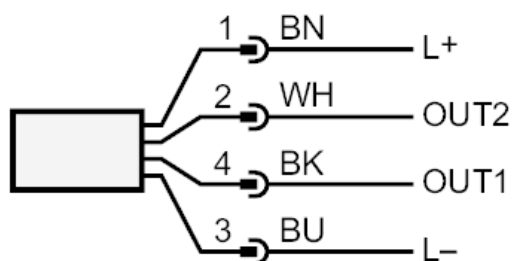
| Tests / approvals                                                                              |                                                                                            |                                        |
|------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|----------------------------------------|
| 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.                                                                            | 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                                           |                                                                                            |                                        |
| <div></div> |                                                                                            |                                        |



## 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

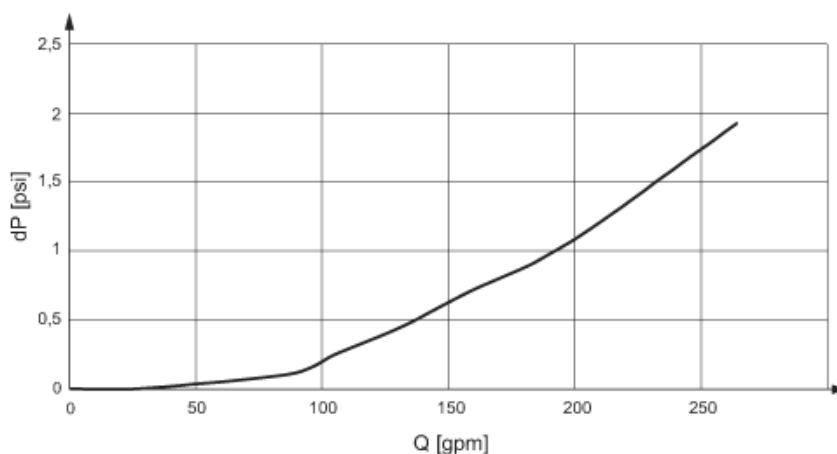
OUT2/InD: switching output volumetric flow quantity monitoring  
switching output Temperature monitoring  
Pulse output quantity meter  
analogue output flow  
analogue output temperature  
signal output Preset counter  
input counter reset

colours to DIN EN 60947-5-2

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

### Diagrams and graphs

Note on pressure loss



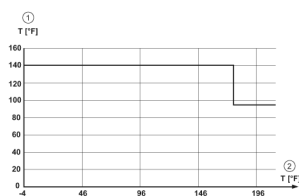
# SU2631

## Ultrasonic flow meter

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derating ambient temperature



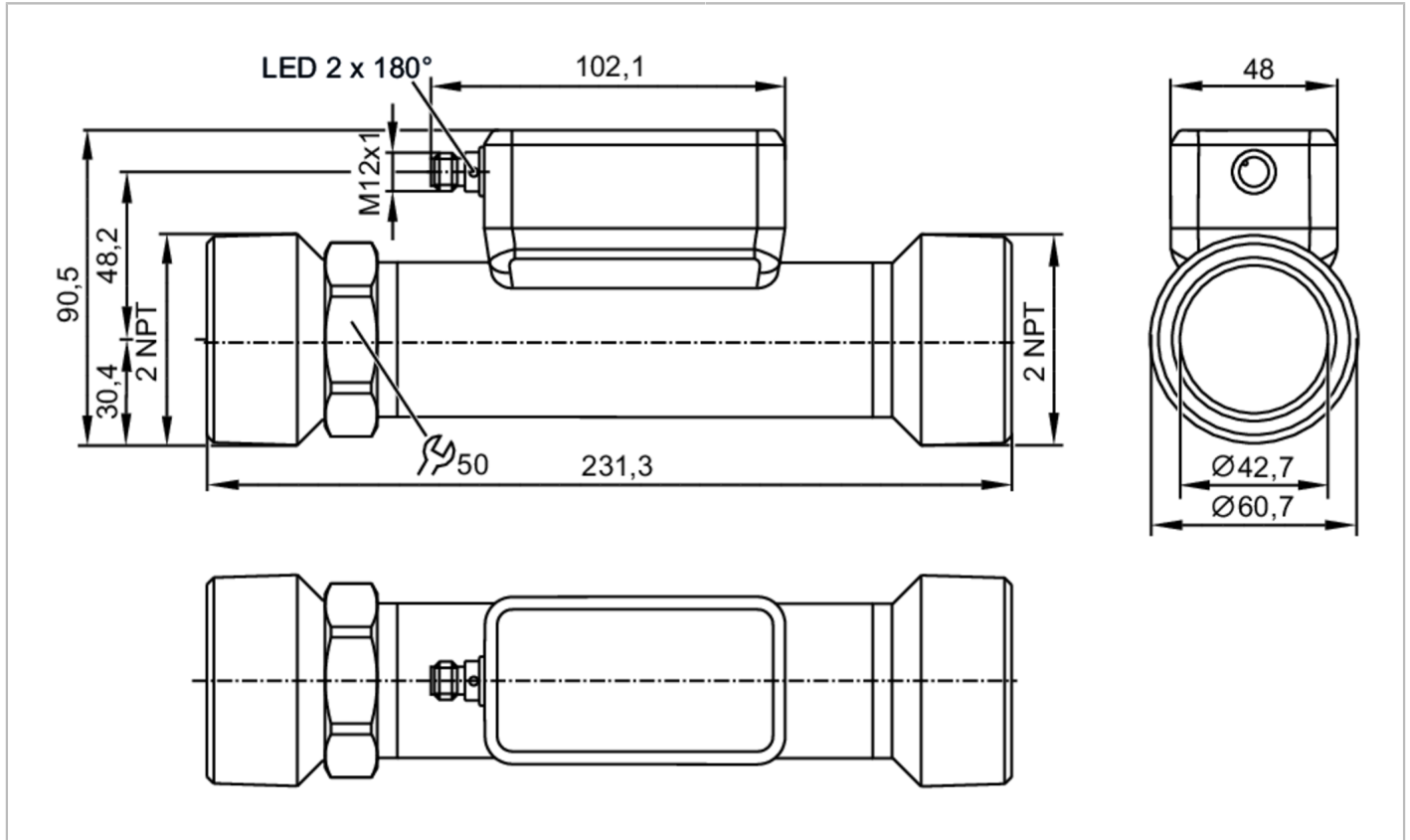
- 1 Ambient temperature
- 2 Medium temperature

# 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                       |



## 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                                                   |                                                                                                          |                    |                      |



## Ultrasonic flow meter

SUN21XJBFRKG/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 + 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                                                                                              |                                           |



# SU2651



## Ultrasonic flow meter

SUN21XJBFRKG/US

|                                 |                          |                   |
|---------------------------------|--------------------------|-------------------|
| Process data binary             |                          | 2                 |
| Min. process cycle time         | [ms]                     | 9.6               |
| IO-Link process data (cyclical) | <b>function</b>          | <b>bit length</b> |
|                                 | totaliser                | 32                |
|                                 | Flow monitoring          | 32                |
|                                 | Temperature monitoring   | 32                |
|                                 | status                   | 4                 |
|                                 | Output 1                 | 1                 |
|                                 | Output 2                 | 1                 |
| Supported DeviceIDs             | <b>Type of operation</b> | <b>DeviceID</b>   |
|                                 | 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

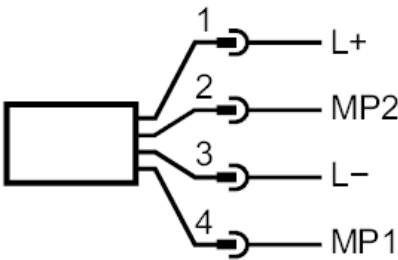
SUN21XJBFRKG/US

### Electrical connection

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



### Connection

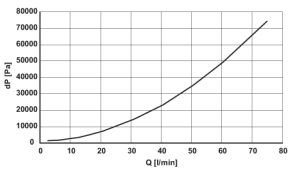


|          |     |               |
|----------|-----|---------------|
| 1 (L+)   | L+  |               |
| 2 (OUT2) | MP2 | DO, AO, reset |
| 3 (L-)   | L-  |               |
| 4 (OUT1) | MP1 | DO, IO-Link   |

### Electrical connection - plug

### Diagrams and graphs

Note on pressure loss

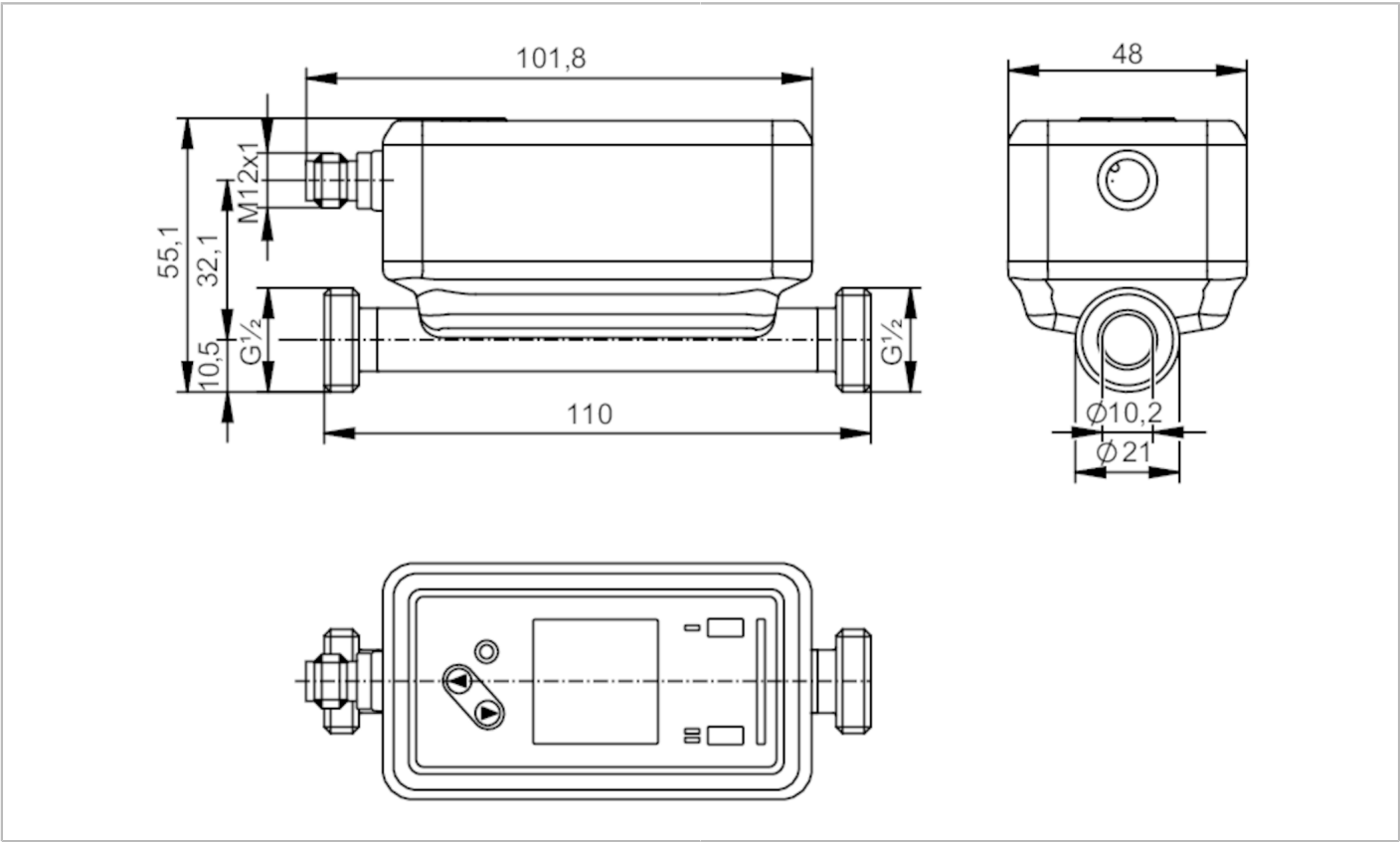


# SU6021



## Ultrasonic flow meter

SUR12XXBFRKG/US



ACS

| 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              |              |                  |



## 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                                                                                                                 |                   |                  |                    |



## Ultrasonic flow meter

SUR12XXBFRKG/US

| Accuracy / deviations                          |                          |                                                              |
|------------------------------------------------|--------------------------|--------------------------------------------------------------|
| Flow monitoring                                |                          |                                                              |
| Accuracy (in the measuring range)              |                          | $\pm (2,0 \% \text{ MW} + 0,5 \% \text{ MEW})$               |
| Repeatability                                  |                          | $\pm 0,2 \% \text{ MEW}$                                     |
| Temperature monitoring                         |                          |                                                              |
| Accuracy [K]                                   |                          | $\pm 2,5 (Q > 5 \% \text{ MEW})$                             |
| 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<br>Common - I&D     | Binary Large Object transfer<br>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)                | <b>function</b>          | <b>bit length</b>                                            |
|                                                | totaliser                | 32                                                           |
|                                                | Flow monitoring          | 32                                                           |
|                                                | Temperature monitoring   | 32                                                           |
|                                                | status                   | 4                                                            |
|                                                | Output 1                 | 1                                                            |
|                                                | Output 2                 | 1                                                            |
| Supported DeviceIDs                            | <b>Type of operation</b> | <b>DeviceID</b>                                              |
|                                                | 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)                                           |



## 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<br>package insert |
|----------------|------------------------------------------|

## Remarks

|               |                                                                                                                                                                                                                         |
|---------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Remarks       | MW = measured value<br>MEW = Final value of the measuring range<br>pulse and totaliser signal are only available for one of the two outputs<br>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

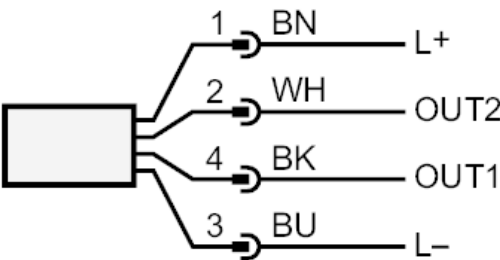




Ultrasonic flow meter

SUR12XXBFRKG/US

Connection



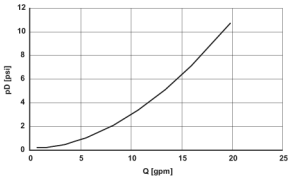
- OUT1/IO-Link:  
switching output volumetric flow quantity monitoring  
switching output Temperature monitoring  
Pulse output quantity meter  
frequency output volumetric flow quantity monitoring  
frequency output Temperature monitoring  
Diagnostic output direction of flow detection / signal quality  
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

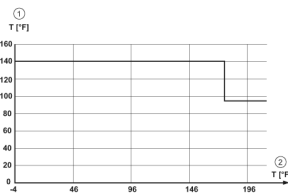
|              |           |
|--------------|-----------|
| Core colours | BK= black |
|              | BN= brown |
|              | BU= blue  |
|              | WH= white |

Diagrams and graphs

Note on pressure loss



derating ambient temperature



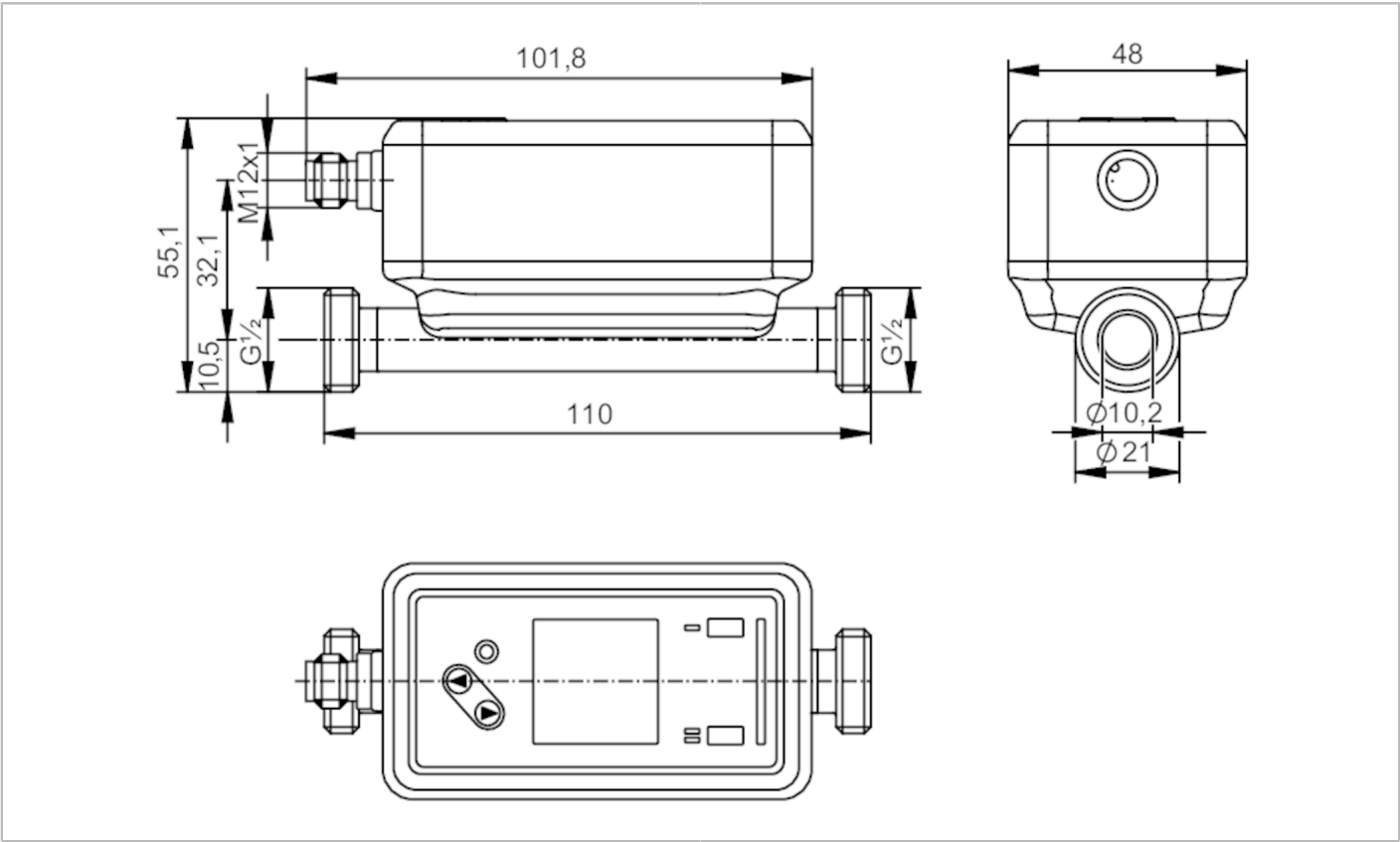
- 1 Ambient temperature
- 2 Medium temperature

# 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                 |              |                  |





## 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                                                                                                                 |                   |                  |                    |



## 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                                             |                              |



## Ultrasonic flow meter

SUR12XFBFRKG/US

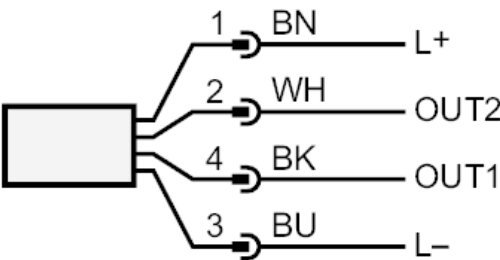
| Tests / approvals                                                                              |                                                                                                         |                                        |
|------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|----------------------------------------|
| 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                                           |                                                                                                         |                                        |
| <div></div> |                                                                                                         |                                        |



Ultrasonic flow meter

SUR12XFBFRKG/US

Connection



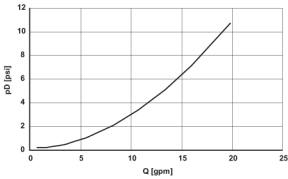
- OUT1/IO-Link:  
switching output volumetric flow quantity monitoring  
switching output Temperature monitoring  
Pulse output quantity meter  
frequency output volumetric flow quantity monitoring  
frequency output Temperature monitoring  
Diagnostic output direction of flow detection / signal quality  
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

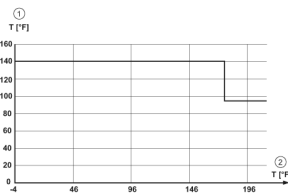
- Core colours
- BK= black  
BN= brown  
BU= blue  
WH= white

Diagrams and graphs

Note on pressure loss



derating ambient temperature



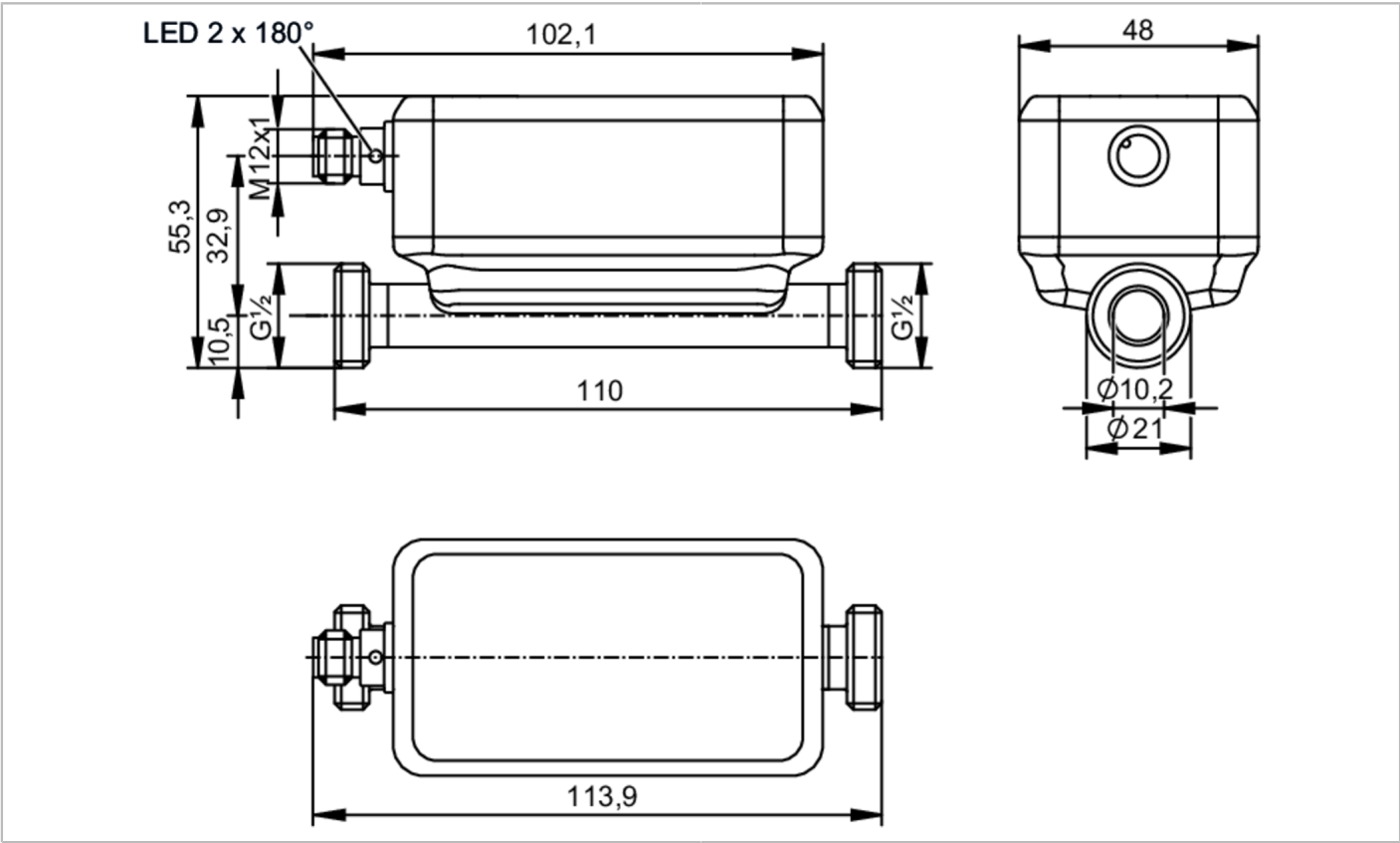
- 1 Ambient temperature
- 2 Medium temperature

# SU6050



## Ultrasonic flow meter

SUR12XJBFRKG/US



IO-Link

### 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                       |



## 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                                                   |                                                                                                          |                 |                    |



## Ultrasonic flow meter

SUR12XJBFRKG/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                                                                                              |                                           |

# SU6050



## Ultrasonic flow meter

SUR12XJBFRKG/US

|                                 |                          |                   |
|---------------------------------|--------------------------|-------------------|
| Process data binary             | 2                        |                   |
| Min. process cycle time [ms]    | 9.6                      |                   |
| IO-Link process data (cyclical) | <b>function</b>          | <b>bit length</b> |
|                                 | totaliser                | 32                |
|                                 | Flow monitoring          | 32                |
|                                 | Temperature monitoring   | 32                |
|                                 | status                   | 4                 |
|                                 | Output 1                 | 1                 |
|                                 | Output 2                 | 1                 |
| Supported DeviceIDs             | <b>Type of operation</b> | <b>DeviceID</b>   |
|                                 | 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);<br>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<br>package insert |  |

| Remarks |                                                                                                                                                                                                                         |  |
|---------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| Remarks | MW = measured value<br>MEW = Final value of the measuring range<br>pulse and totaliser signal are only available for one of the two outputs<br>the accuracy indications are adhered to over the entire application area |  |



SU6050



Ultrasonic flow meter

SUR12XJBFRKG/US

Pack quantity

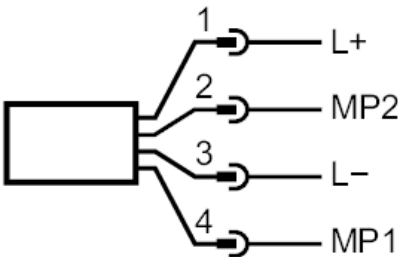
1 pcs.

Electrical connection

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



Connection

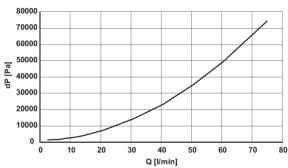


|          |     |               |
|----------|-----|---------------|
| 1 (L+)   | L+  |               |
| 2 (OUT2) | MP2 | DO, AO, reset |
| 3 (L-)   | L-  |               |
| 4 (OUT1) | MP1 | DO, IO-Link   |

Electrical connection - plug

Diagrams and graphs

Note on pressure loss

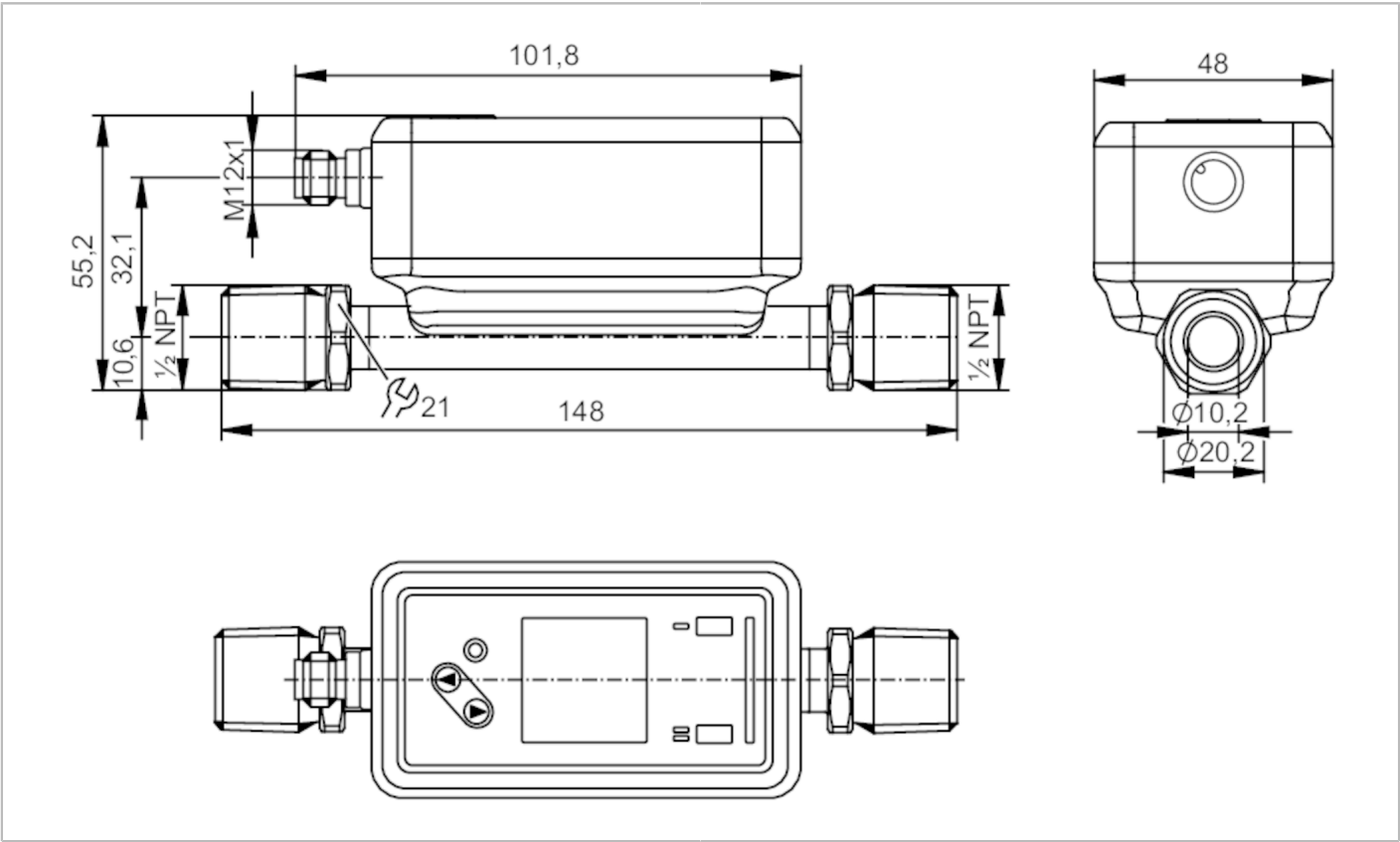


SU6621



Ultrasonic flow meter

SUN12XXBFRKG/US



ACS KTW/W270 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              |              |                  |



## 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                                                                                                                 |                   |                  |                    |



## Ultrasonic flow meter

SUN12XXBFRKG/US

| Accuracy / deviations                          |                          |                                                |
|------------------------------------------------|--------------------------|------------------------------------------------|
| Flow monitoring                                |                          |                                                |
| Accuracy (in the measuring range)              |                          | $\pm (2,0 \% \text{ MW} + 0,5 \% \text{ MEW})$ |
| Repeatability                                  |                          | $\pm 0,2 \% \text{ MEW}$                       |
| Temperature monitoring                         |                          |                                                |
| Accuracy [K]                                   |                          | $\pm 2,5 (Q > 5 \% \text{ MEW})$               |
| 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)                | <b>function</b>          | <b>bit length</b>                              |
|                                                | totaliser                | 32                                             |
|                                                | Flow monitoring          | 32                                             |
|                                                | Temperature monitoring   | 32                                             |
|                                                | status                   | 4                                              |
|                                                | Output 1                 | 1                                              |
|                                                | Output 2                 | 1                                              |
| Supported DeviceIDs                            | <b>Type of operation</b> | <b>DeviceID</b>                                |
|                                                | 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



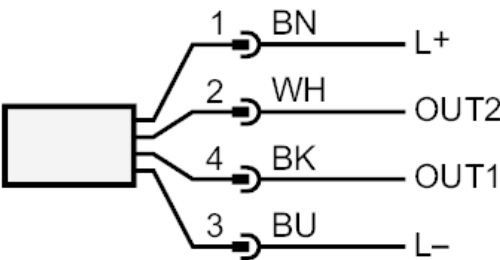
# SU6621



## Ultrasonic flow meter

SUN12XXBFRKG/US

### Connection



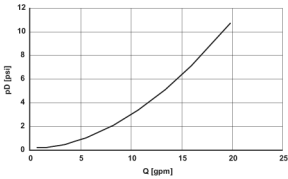
- OUT1/IO-Link:
- switching output volumetric flow quantity monitoring  
switching output Temperature monitoring  
Pulse output quantity meter  
frequency output volumetric flow quantity monitoring  
frequency output Temperature monitoring  
Diagnostic output direction of flow detection / signal quality  
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

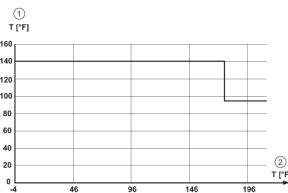
- Core colours
- BK= black  
BN= brown  
BU= blue  
WH= white

### Diagrams and graphs

Note on pressure loss



derating ambient temperature



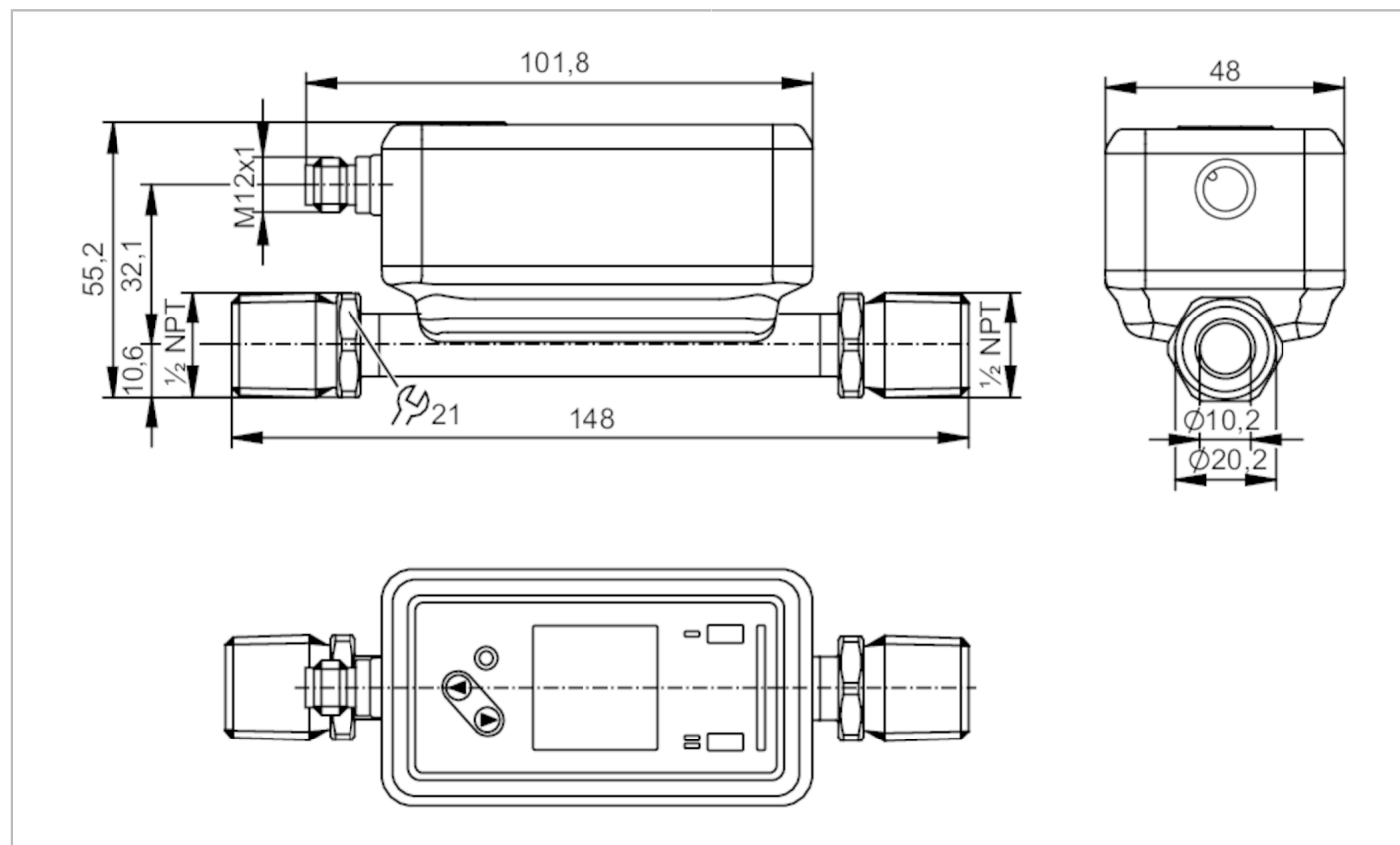
- 1 Ambient temperature
- 2 Medium temperature

# 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                 |  |  |



## 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                                                                                                                 |                   |                  |                    |





## 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                                             |                              |



## 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                                           |                                                                                            |                                        |
| <div></div> |                                                                                            |                                        |

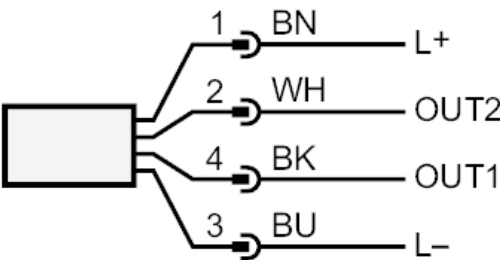
# SU6631



## Ultrasonic flow meter

SUN12XFBFRKG/US

### Connection



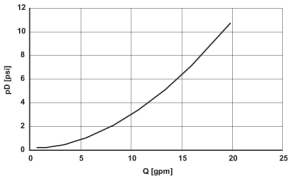
- OUT1/IO-Link:
- switching output volumetric flow quantity monitoring
  - switching output Temperature monitoring
  - Pulse output quantity meter
  - frequency output volumetric flow quantity monitoring
  - frequency output Temperature monitoring
  - Diagnostic output direction of flow detection / signal 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

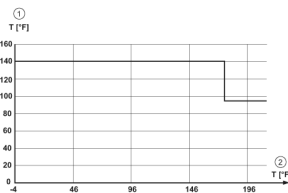
- Core colours
- BK= black
  - BN= brown
  - BU= blue
  - WH= white

### Diagrams and graphs

Note on pressure loss



derating ambient temperature



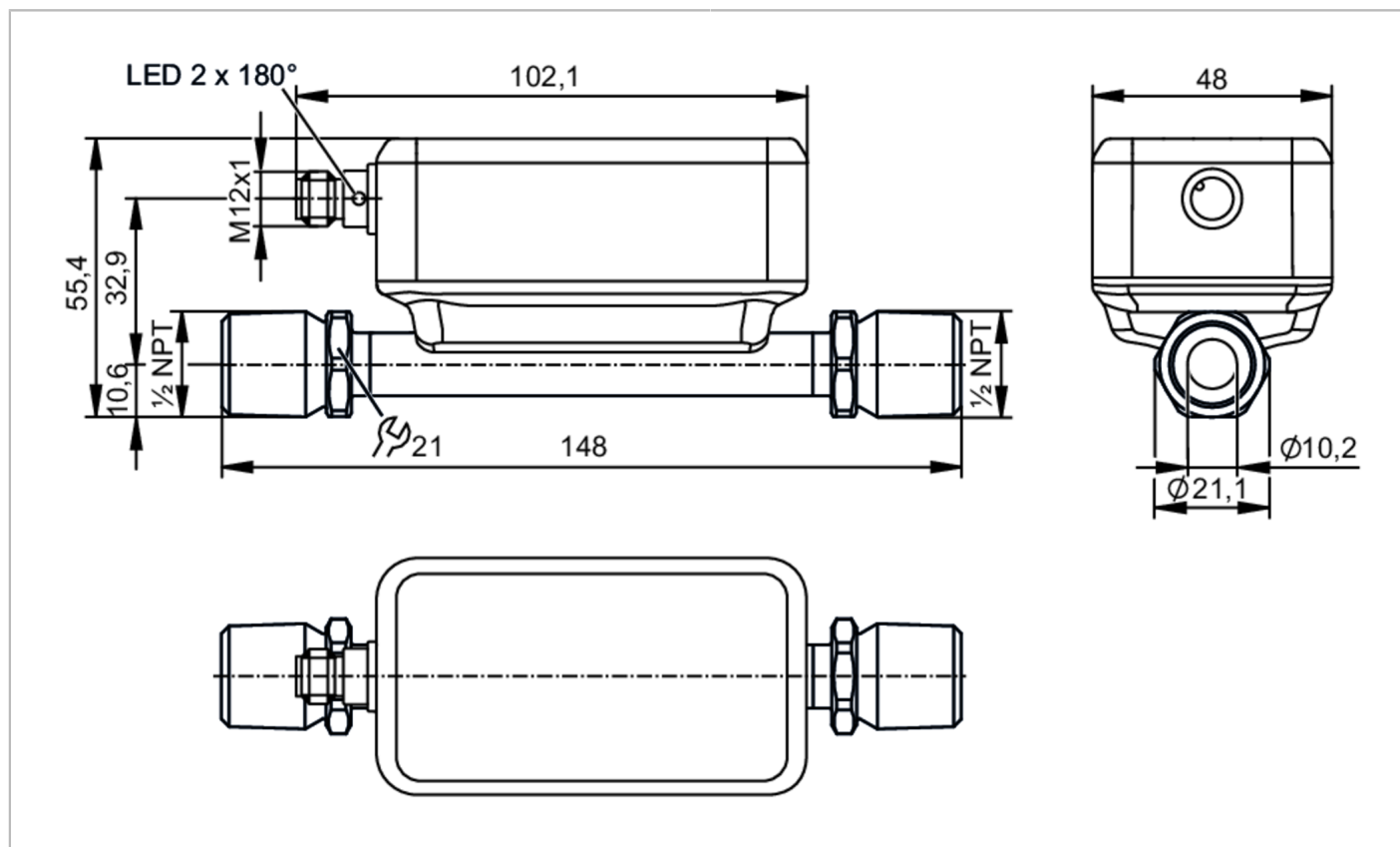
- 1 Ambient temperature
- 2 Medium temperature

# 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 |
| 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                                                                                                  |                 |              |



## 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                                                   |                                                                                                          |                 |                    |



## 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<br>(cyclical) | <b>function</b>          | <b>bit length</b> |
|                                    | totaliser                | 32                |
|                                    | Flow monitoring          | 32                |
|                                    | Temperature monitoring   | 32                |
|                                    | status                   | 4                 |
|                                    | Output 1                 | 1                 |
|                                    | Output 2                 | 1                 |
| Supported DeviceIDs                | <b>Type of operation</b> | <b>DeviceID</b>   |
|                                    | 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

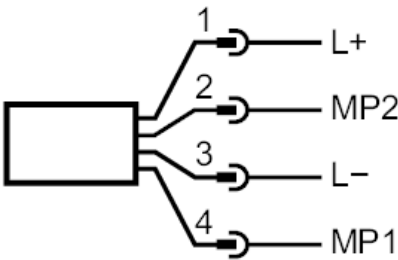
SUN12XJBFRKG/US

### Electrical connection

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



### Connection

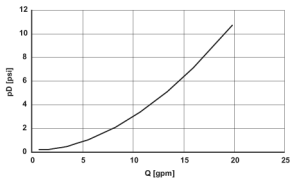


|          |     |               |
|----------|-----|---------------|
| 1 (L+)   | L+  |               |
| 2 (OUT2) | MP2 | DO, AO, reset |
| 3 (L-)   | L-  |               |
| 4 (OUT1) | MP1 | DO, IO-Link   |

### Electrical connection - plug

### Diagrams and graphs

Note on pressure loss

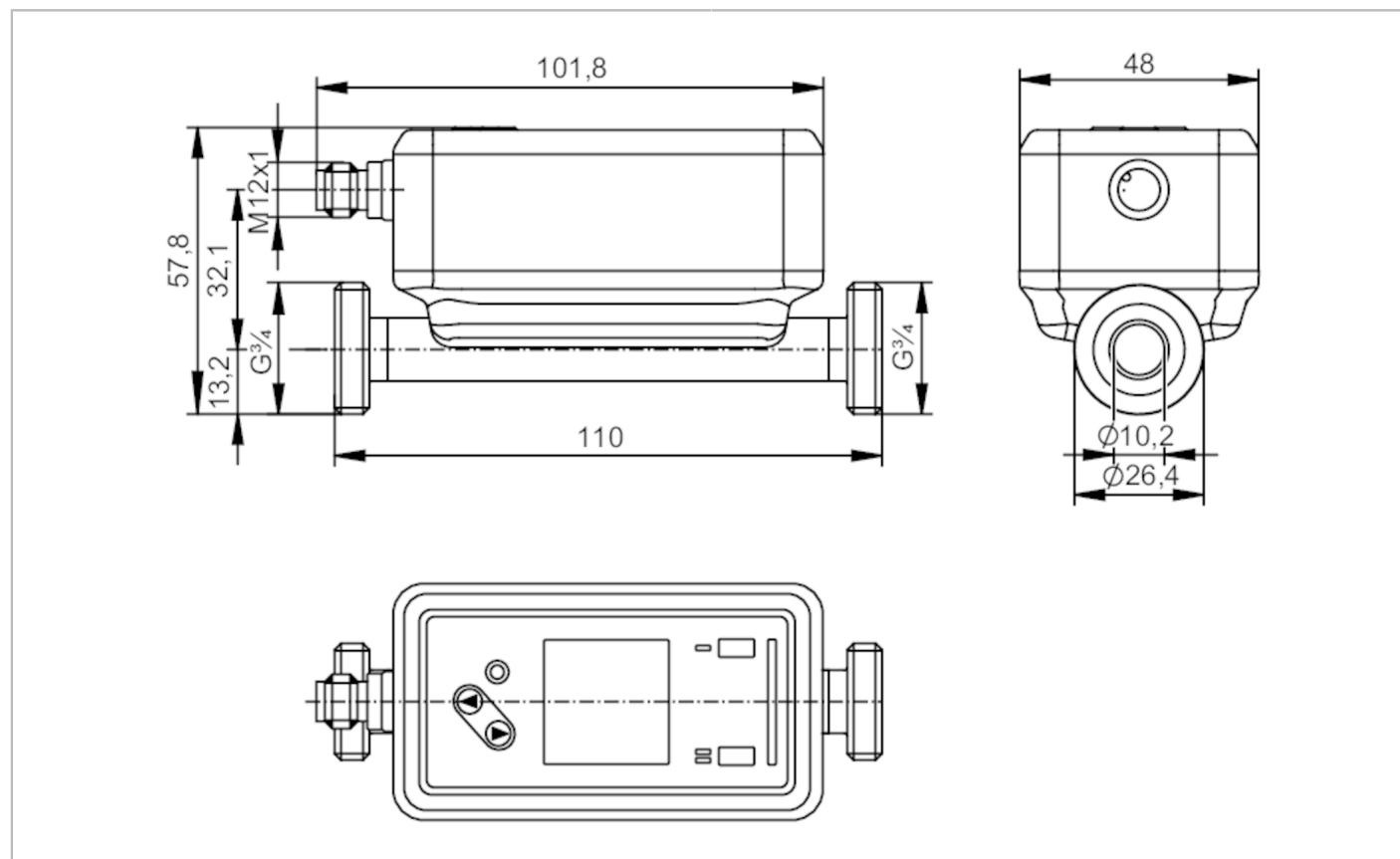




# SU7021

## Ultrasonic flow meter

SUR34XXBFRKG/US



ACS KTW/W270 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 |
|--------|---------------|



## 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                                                                                                                 |                    |                  |                    |



| Accuracy / deviations                          |                          |                                                |
|------------------------------------------------|--------------------------|------------------------------------------------|
| Flow monitoring                                |                          |                                                |
| Accuracy (in the measuring range)              |                          | $\pm (2,0 \% \text{ MW} + 0,5 \% \text{ MEW})$ |
| Repeatability                                  |                          | $\pm 0,2 \% \text{ MEW}$                       |
| Temperature monitoring                         |                          |                                                |
| Accuracy [K]                                   |                          | $\pm 2,5 (Q > 5 \% \text{ MEW})$               |
| 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)                | <b>function</b>          | <b>bit length</b>                              |
|                                                | totaliser                | 32                                             |
|                                                | Flow monitoring          | 32                                             |
|                                                | Temperature monitoring   | 32                                             |
|                                                | status                   | 4                                              |
|                                                | Output 1                 | 1                                              |
|                                                | Output 2                 | 1                                              |
| Supported DeviceIDs                            | <b>Type of operation</b> | <b>DeviceID</b>                                |
|                                                | 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)                             |



## 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<br>package insert |
|----------------|------------------------------------------|

## Remarks

|               |                                                                                                                                                                                                                         |
|---------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Remarks       | MW = measured value<br>MEW = Final value of the measuring range<br>pulse and totaliser signal are only available for one of the two outputs<br>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

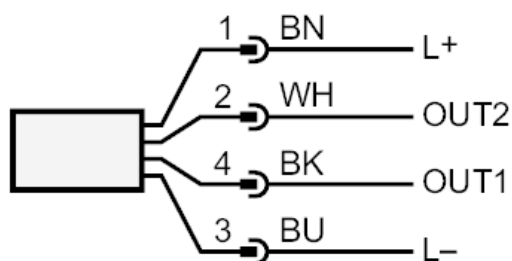




## Ultrasonic flow meter

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

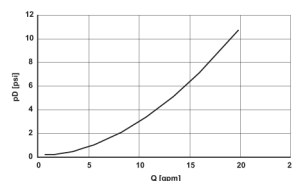
OUT2/InD: switching output volumetric flow quantity monitoring  
switching output Temperature monitoring  
Pulse output quantity meter  
analogue output flow  
analogue output temperature  
Diagnostic output direction of flow detection / signal quality  
signal output Preset counter  
input counter reset

colours to DIN EN  
60947-5-2

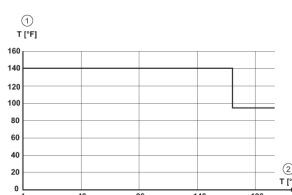
Core colours  
BK= black  
BN= brown  
BU= blue  
WH= white

### Diagrams and graphs

Note on pressure loss



derating ambient temperature

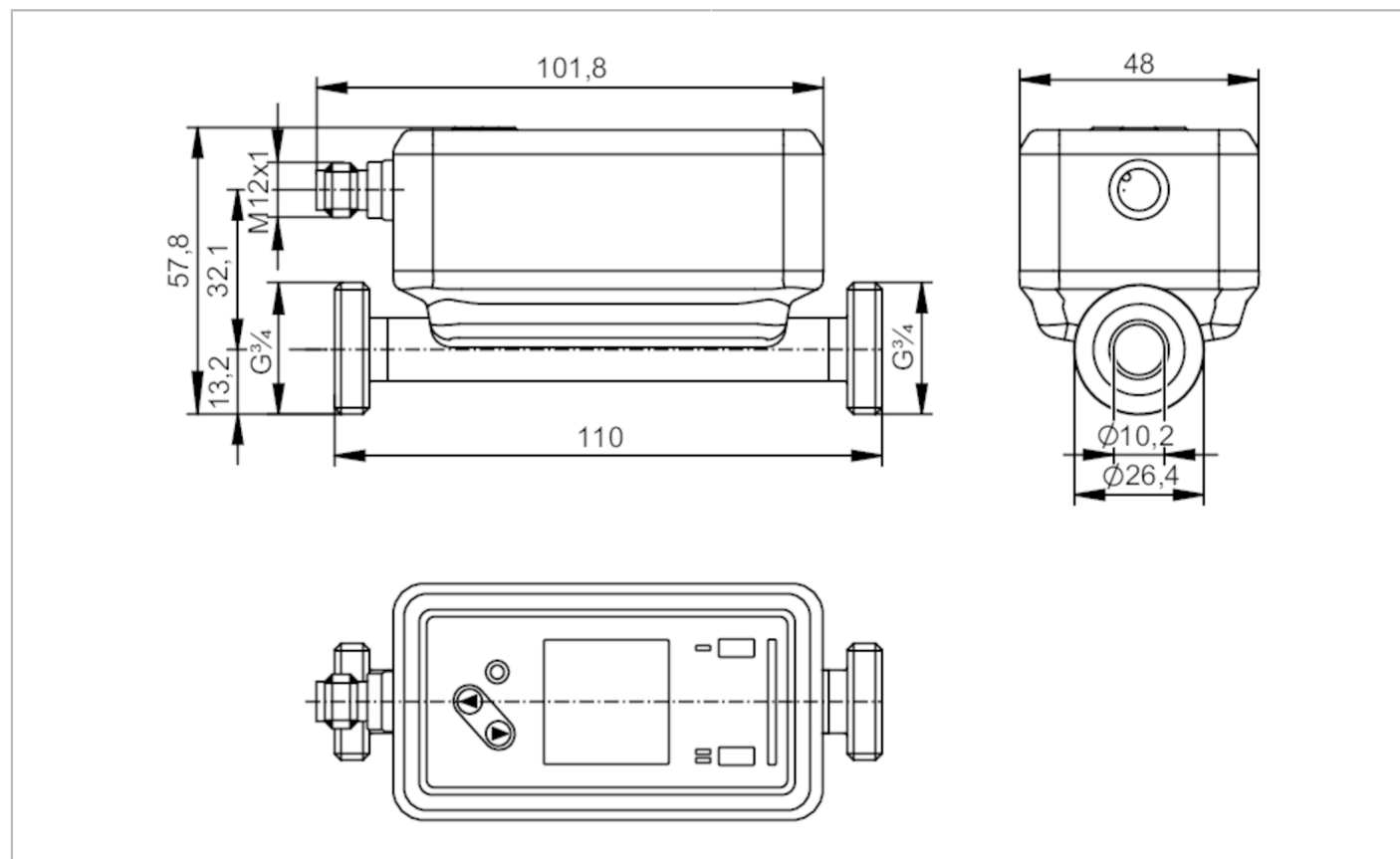


- 1 Ambient temperature
- 2 Medium temperature



## Ultrasonic flow meter

SUR34XFBFRKG/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 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                 |  |  |  |



## 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                                                                                                                 |                    |                  |                    |



## 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                                             |                              |





## Ultrasonic flow meter

SUR34XFBFRKG/US

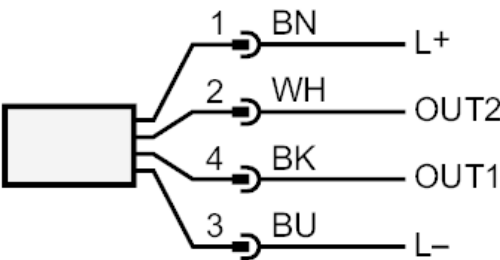
| Tests / approvals                                                                              |                                                                                                         |                                        |
|------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|----------------------------------------|
| 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                                           |                                                                                                         |                                        |
| <div></div> |                                                                                                         |                                        |



Ultrasonic flow meter

SUR34XFBFRKG/US

Connection



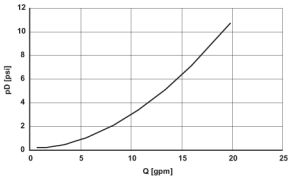
- OUT1/IO-Link:  
switching output volumetric flow quantity monitoring  
switching output Temperature monitoring  
Pulse output quantity meter  
frequency output volumetric flow quantity monitoring  
frequency output Temperature monitoring  
Diagnostic output direction of flow detection / signal quality  
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

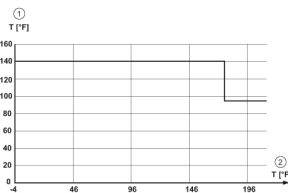
|              |           |
|--------------|-----------|
| Core colours | BK= black |
|              | BN= brown |
|              | BU= blue  |
|              | WH= white |

Diagrams and graphs

Note on pressure loss



derating ambient temperature



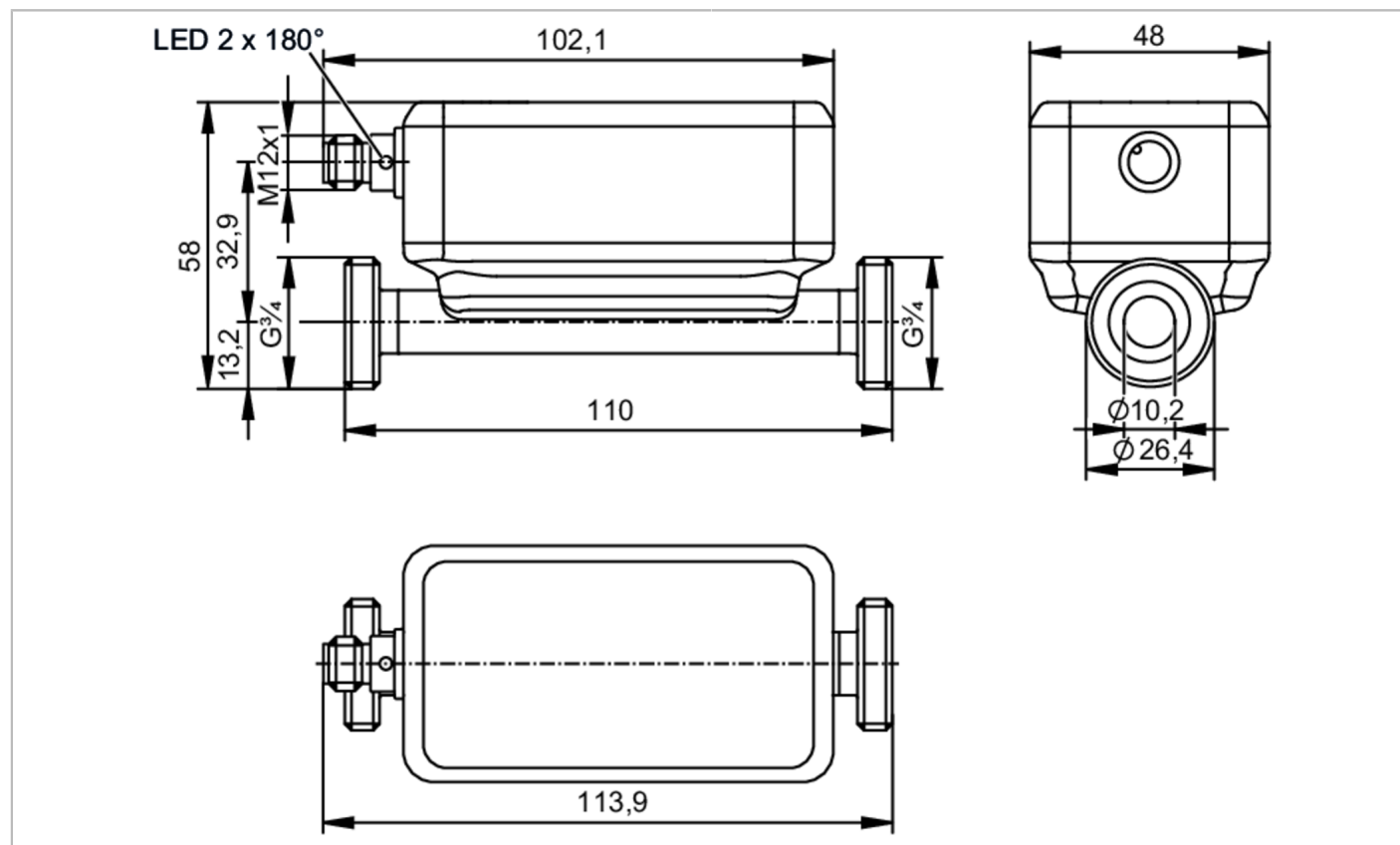
- 1 Ambient temperature
- 2 Medium temperature

# SU7050



## Ultrasonic flow meter

SUR34XJBFRKG/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 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                       |



## 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                                                   |                                                                                                          |                 |                    |



## 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                                                                                              |

# SU7050



## Ultrasonic flow meter

SUR34XJBFRKG/US

|                                 |                          |                   |
|---------------------------------|--------------------------|-------------------|
| Process data binary             | 2                        |                   |
| Min. process cycle time [ms]    | 9.6                      |                   |
| IO-Link process data (cyclical) | <b>function</b>          | <b>bit length</b> |
|                                 | totaliser                | 32                |
|                                 | Flow monitoring          | 32                |
|                                 | Temperature monitoring   | 32                |
|                                 | status                   | 4                 |
|                                 | Output 1                 | 1                 |
|                                 | Output 2                 | 1                 |
| Supported DeviceIDs             | <b>Type of operation</b> | <b>DeviceID</b>   |
|                                 | 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);<br>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<br>package insert |
|----------------|-----------------------------------------------------|

### Remarks

|         |                                                                                                                                                                                                                         |
|---------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Remarks | MW = measured value<br>MEW = Final value of the measuring range<br>pulse and totaliser signal are only available for one of the two outputs<br>the accuracy indications are adhered to over the entire application area |
|---------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

# SU7050



## Ultrasonic flow meter

SUR34XJBFRKG/US

Pack quantity

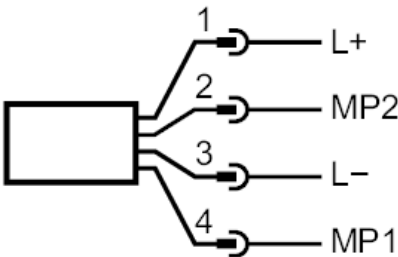
1 pcs.

### Electrical connection

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



### Connection

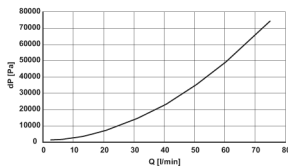


|          |     |               |
|----------|-----|---------------|
| 1 (L+)   | L+  |               |
| 2 (OUT2) | MP2 | DO, AO, reset |
| 3 (L-)   | L-  |               |
| 4 (OUT1) | MP1 | DO, IO-Link   |

### Electrical connection - plug

### Diagrams and graphs

Note on pressure loss

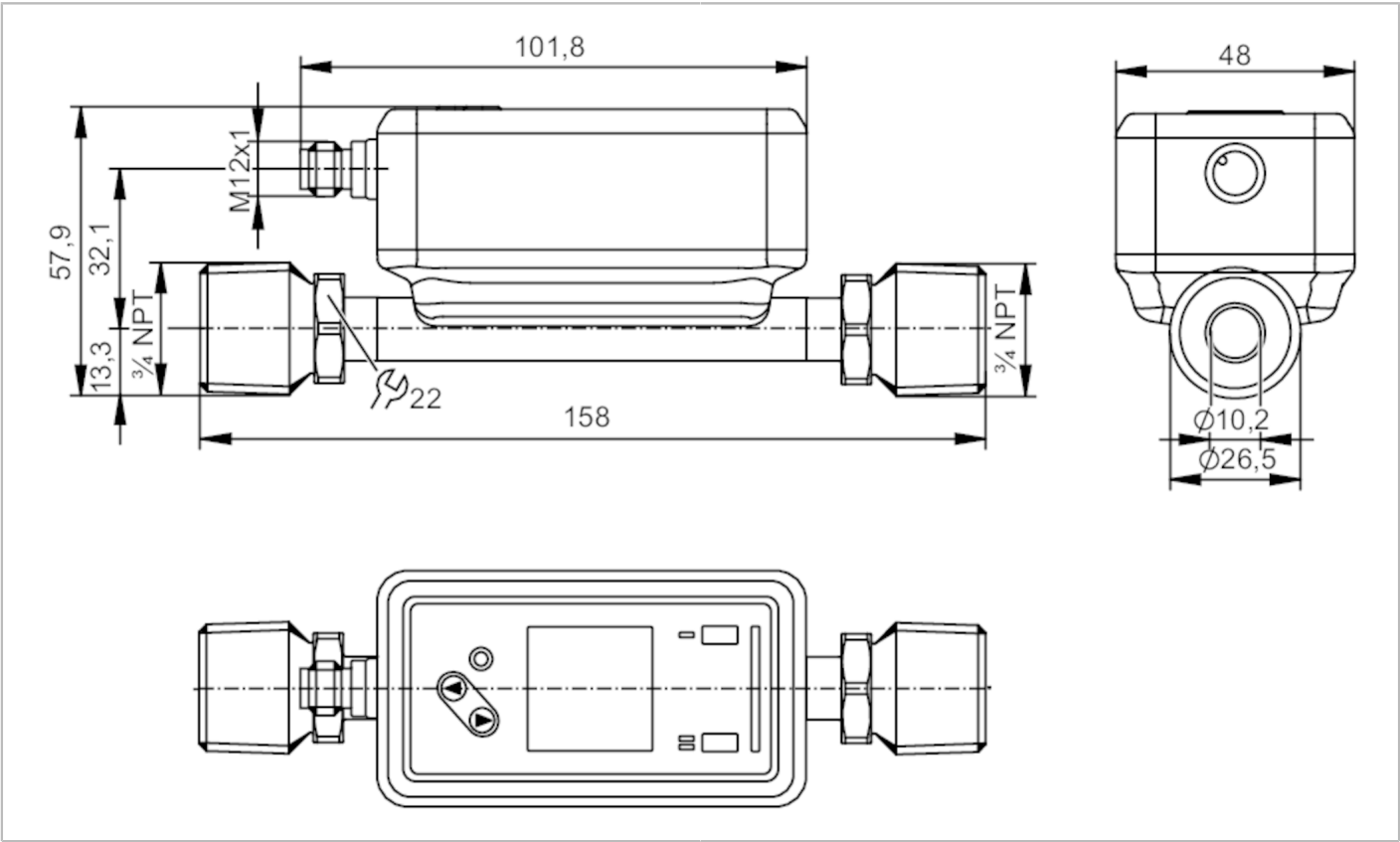


SU7621



Ultrasonic flow meter

SUN34XXBFRKG/US



ACS KTW/W270 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              |              |                  |





## 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                                                                                                                 |                    |                  |                    |



## Ultrasonic flow meter

SUN34XXBFRKG/US

| Accuracy / deviations                          |                          |                                                              |
|------------------------------------------------|--------------------------|--------------------------------------------------------------|
| Flow monitoring                                |                          |                                                              |
| Accuracy (in the measuring range)              |                          | $\pm (2,0 \% \text{ MW} + 0,5 \% \text{ MEW})$               |
| Repeatability                                  |                          | $\pm 0,2 \% \text{ MEW}$                                     |
| Temperature monitoring                         |                          |                                                              |
| Accuracy [K]                                   |                          | $\pm 2,5 (Q > 5 \% \text{ MEW})$                             |
| 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<br>Common - I&D     | Binary Large Object transfer<br>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)                | <b>function</b>          | <b>bit length</b>                                            |
|                                                | totaliser                | 32                                                           |
|                                                | Flow monitoring          | 32                                                           |
|                                                | Temperature monitoring   | 32                                                           |
|                                                | status                   | 4                                                            |
|                                                | Output 1                 | 1                                                            |
|                                                | Output 2                 | 1                                                            |
| Supported DeviceIDs                            | <b>Type of operation</b> | <b>DeviceID</b>                                              |
|                                                | 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                                |  |
|  |  |

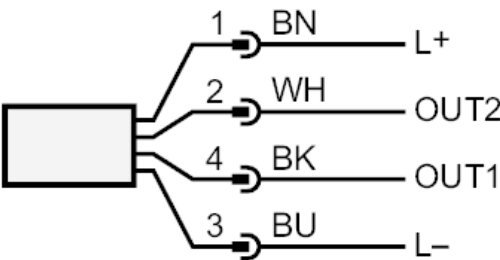
# SU7621



## Ultrasonic flow meter

SUN34XXBFRKG/US

### Connection



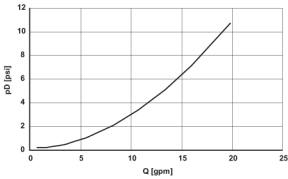
- OUT1/IO-Link:
- switching output volumetric flow quantity monitoring
  - switching output Temperature monitoring
  - Pulse output quantity meter
  - frequency output volumetric flow quantity monitoring
  - frequency output Temperature monitoring
  - Diagnostic output direction of flow detection / signal 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

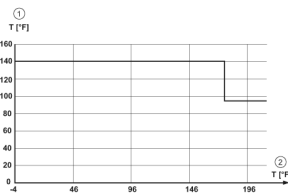
- Core colours
- BK= black
  - BN= brown
  - BU= blue
  - WH= white

### Diagrams and graphs

Note on pressure loss



derating ambient temperature

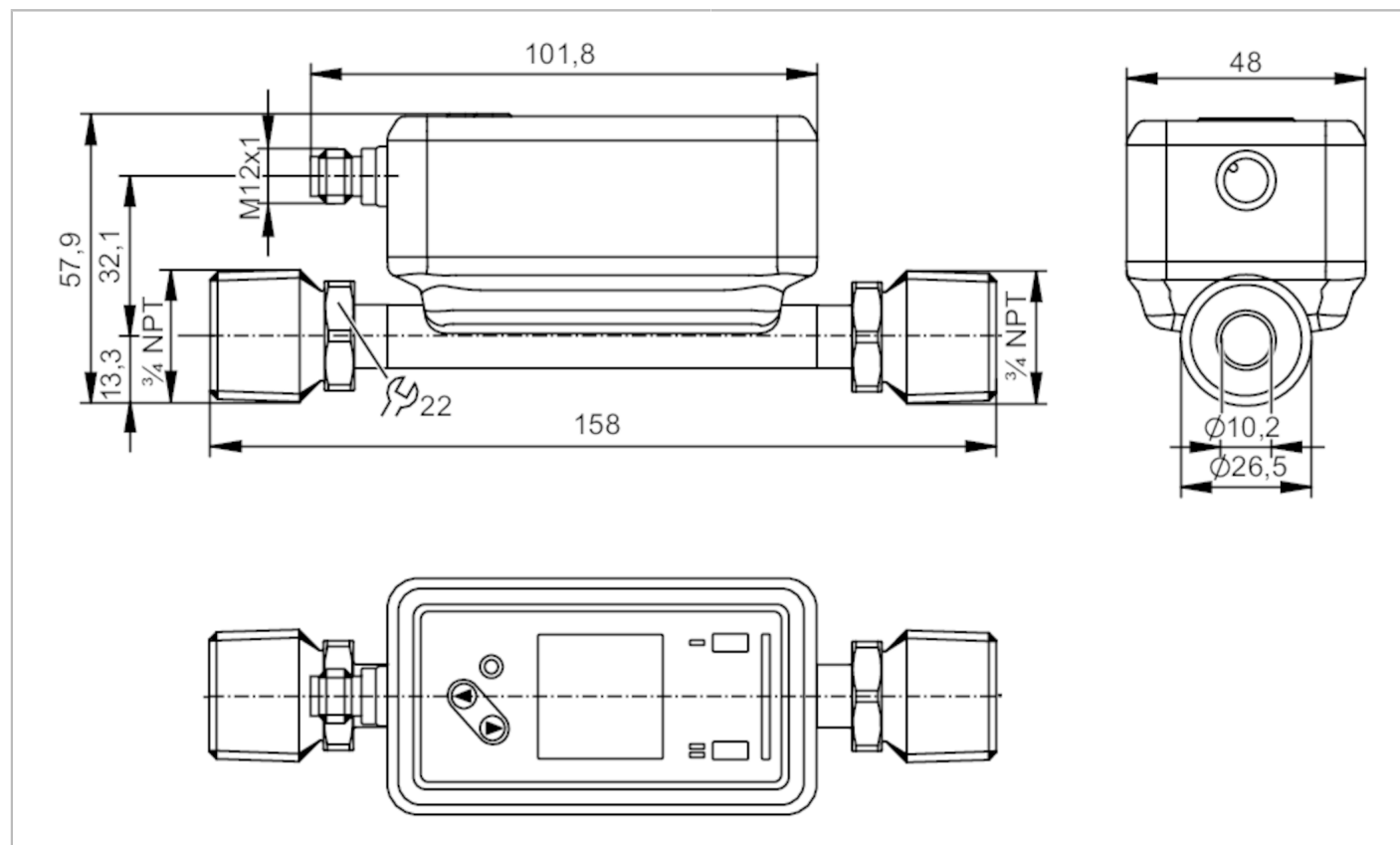


- 1 Ambient temperature
- 2 Medium temperature

# 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                 |  |  |  |



## 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                                                                                                                 |                    |                  |                    |



## 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                                             |                              |



## 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                                           |                                                                                            |                                        |
| <div></div> |                                                                                            |                                        |



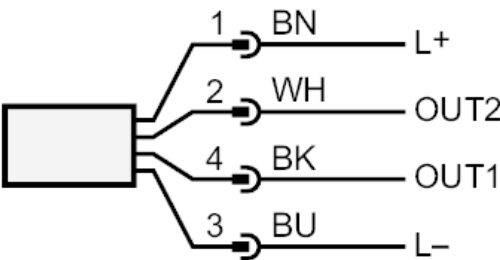
# SU7631



## Ultrasonic flow meter

SUN34XFBFRKG/US

### Connection



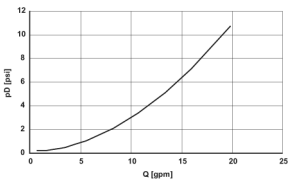
- OUT1/IO-Link:
- switching output volumetric flow quantity monitoring
  - switching output Temperature monitoring
  - Pulse output quantity meter
  - frequency output volumetric flow quantity monitoring
  - frequency output Temperature monitoring
  - Diagnostic output direction of flow detection / signal 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

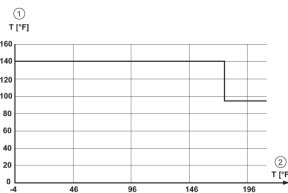
- Core colours
- BK= black
  - BN= brown
  - BU= blue
  - WH= white

### Diagrams and graphs

Note on pressure loss



derating ambient temperature

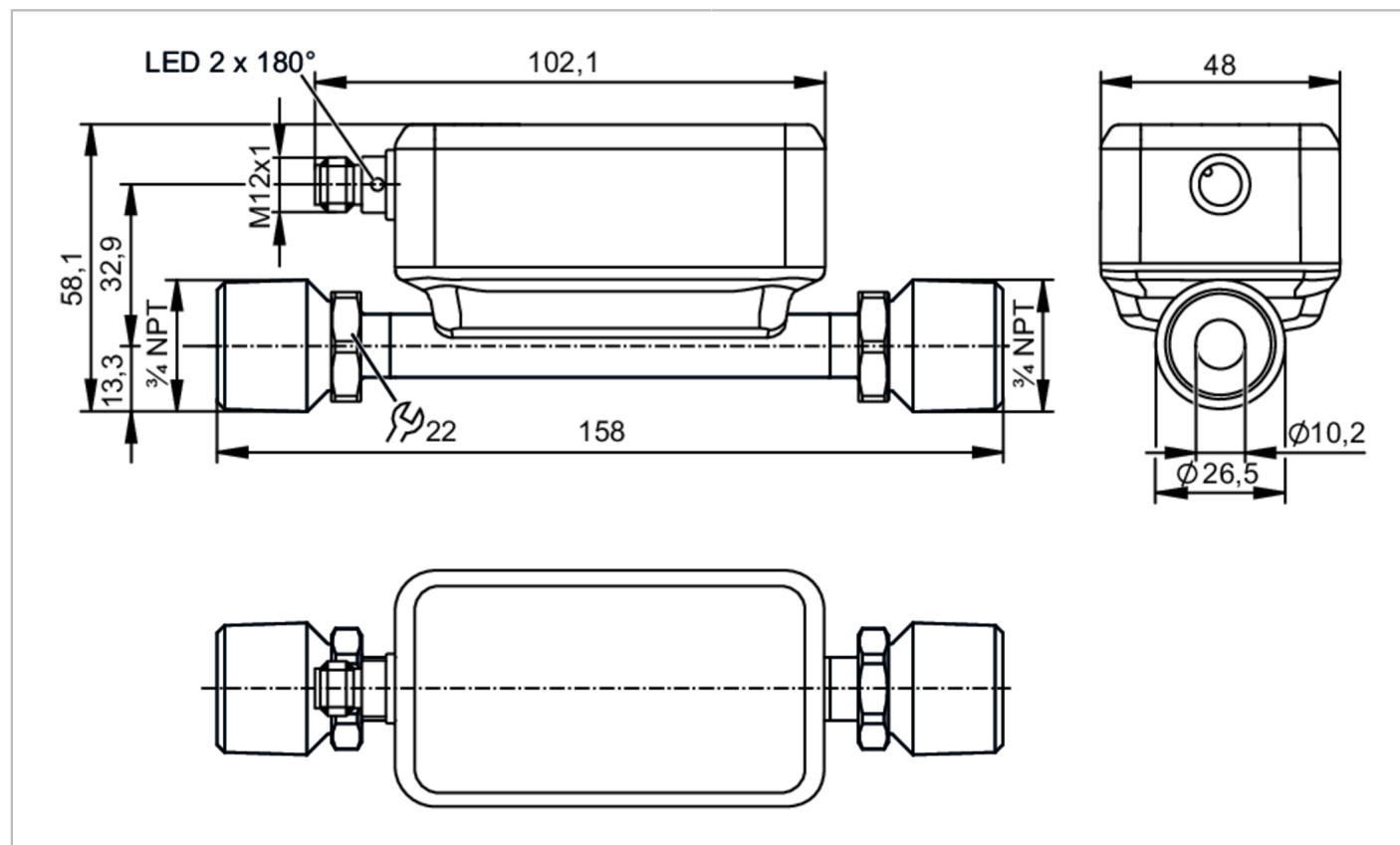


- 1 Ambient temperature
- 2 Medium temperature

# 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                                                   |                                                                                                          |                 |                    |



## 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) | <b>function</b>          | <b>bit length</b> |
|                                 | totaliser                | 32                |
|                                 | Flow monitoring          | 32                |
|                                 | Temperature monitoring   | 32                |
|                                 | status                   | 4                 |
|                                 | Output 1                 | 1                 |
|                                 | Output 2                 | 1                 |
| Supported DeviceIDs             | <b>Type of operation</b> | <b>DeviceID</b>   |
|                                 | 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

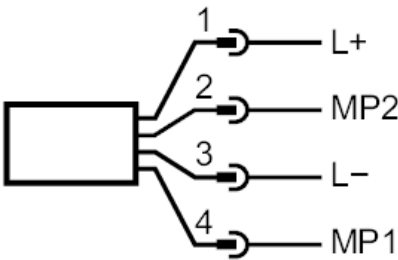
SUN34XJBFRKG/US

### Electrical connection

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



### Connection

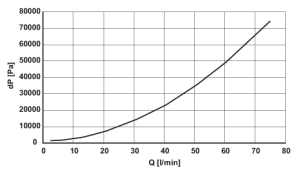


|          |     |               |
|----------|-----|---------------|
| 1 (L+)   | L+  |               |
| 2 (OUT2) | MP2 | DO, AO, reset |
| 3 (L-)   | L-  |               |
| 4 (OUT1) | MP1 | DO, IO-Link   |

### Electrical connection - plug

### Diagrams and graphs

Note on pressure loss

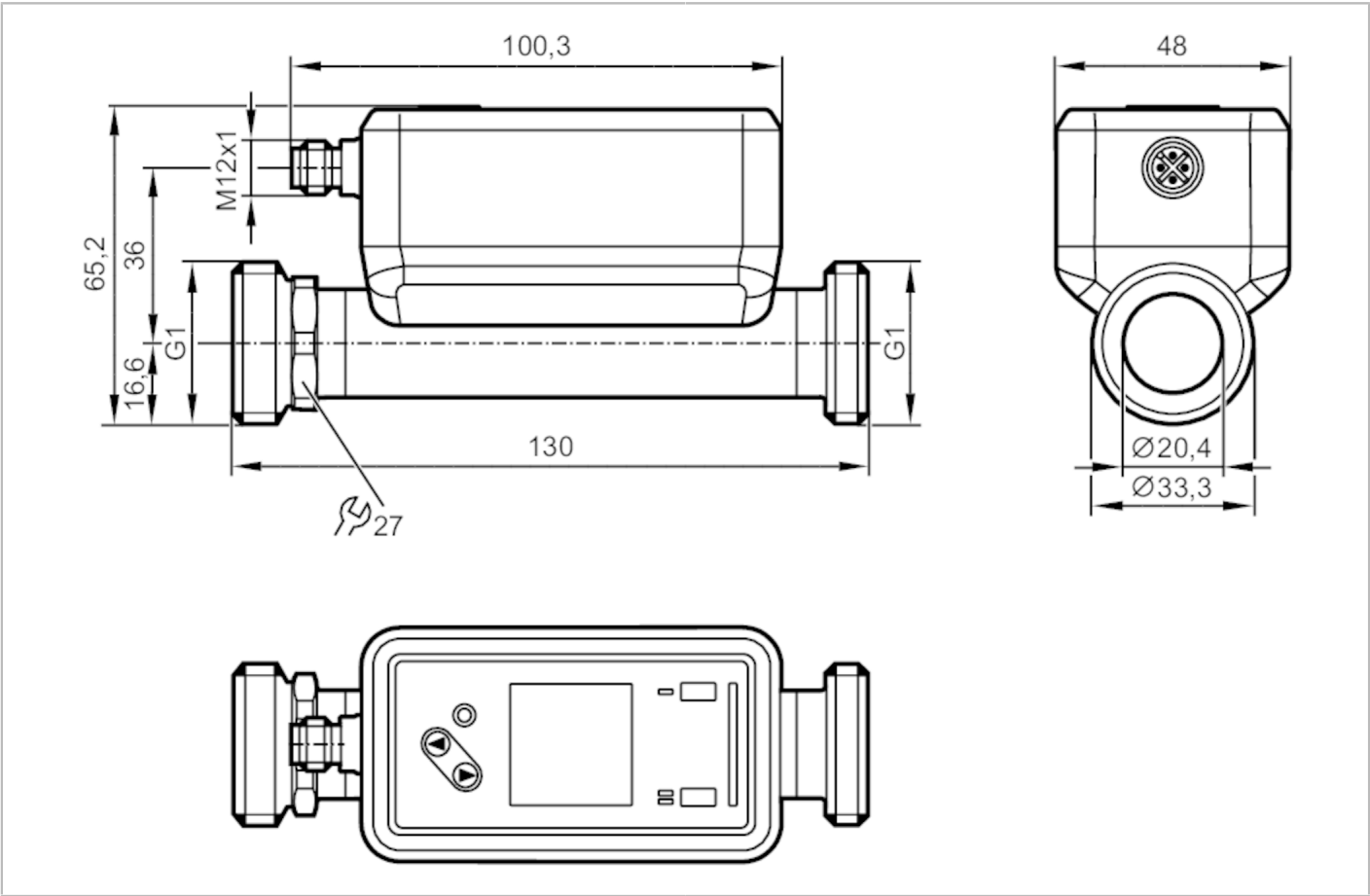


# SU8021



## Ultrasonic flow meter

SUR11XXBFRKG/US



ACS CE PA CRN c UL US 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                                                                                   |                  |               |                 |



## 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;<br>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                                                                                                                   |                     |                  |                    |





## 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                          |



## Ultrasonic flow meter

SUR11XXBFRKG/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               |
|                              | 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<br>package insert |
|----------------|------------------------------------------|

## Remarks

|               |                                                                                                                                                                                                                         |
|---------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Remarks       | MW = measured value<br>MEW = Final value of the measuring range<br>pulse and totaliser signal are only available for one of the two outputs<br>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

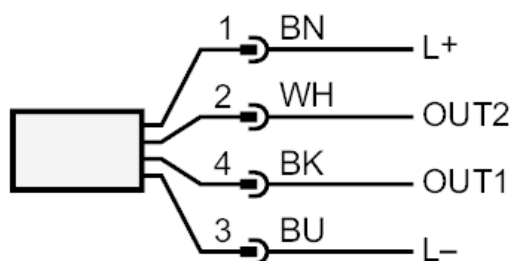




## Ultrasonic flow meter

SUR11XXBFRKG/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

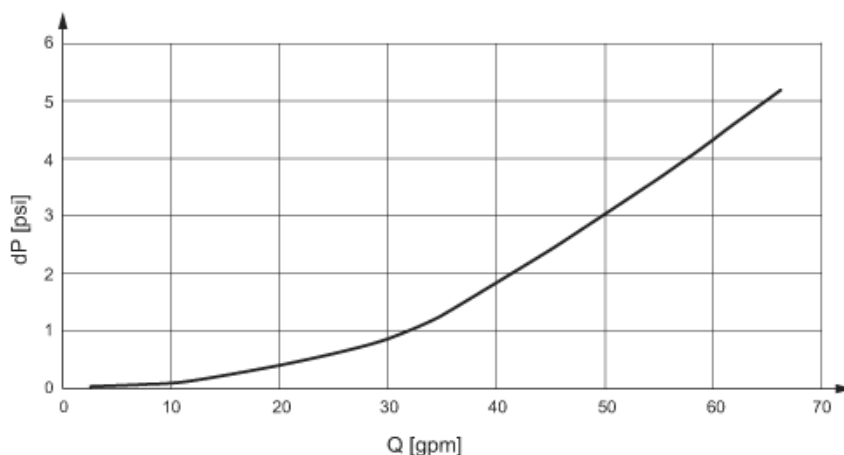
OUT2/InD: switching output volumetric flow quantity monitoring  
switching output Temperature monitoring  
Pulse output quantity meter  
analogue output flow  
analogue output temperature  
signal output Preset counter  
input counter reset

colours to DIN EN 60947-5-2

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

### Diagrams and graphs

Note on pressure loss



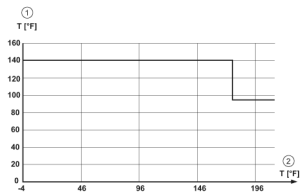
# SU8021

## Ultrasonic flow meter

SUR11XXBFRKG/US



derating ambient temperature

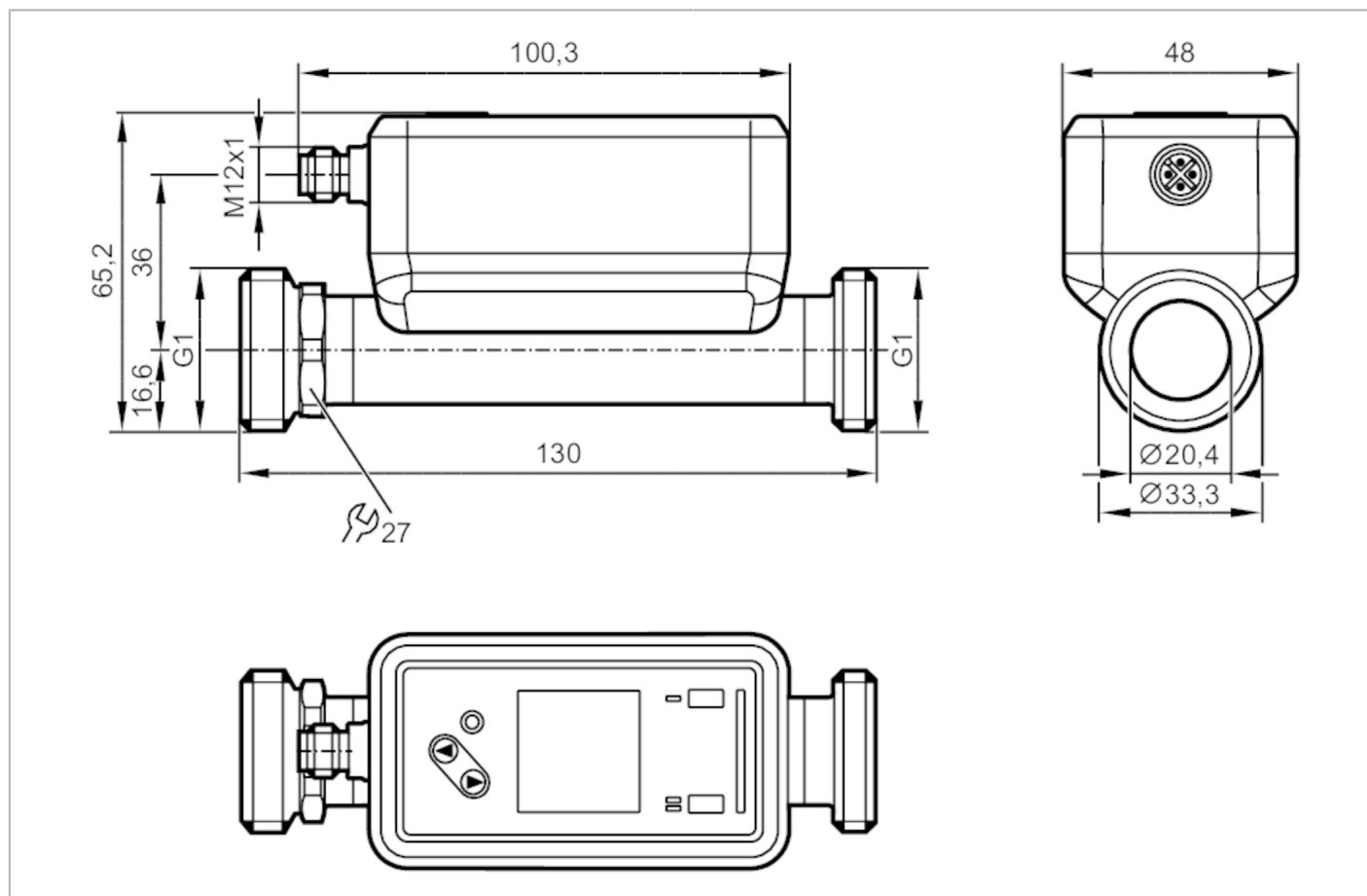


- 1 Ambient temperature
- 2 Medium temperature

# SU8031

## 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                 |  |  |



## Ultrasonic flow meter

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| 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                                                                                                                |                     |                  |                    |



## 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                                             |                              |



## 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                                           |                                                                                                         |                                        |
| <div></div> |                                                                                                         |                                        |

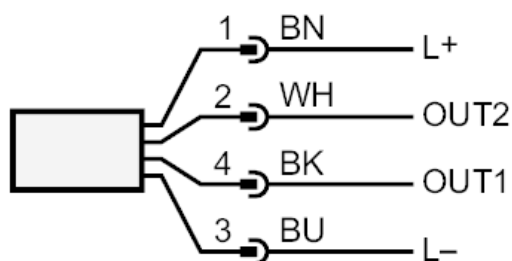




## Ultrasonic flow meter

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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

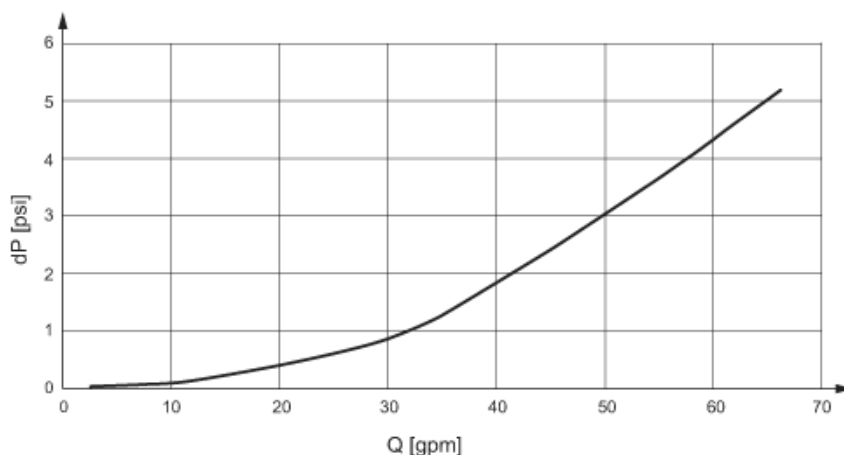
OUT2/InD: switching output volumetric flow quantity monitoring  
switching output Temperature monitoring  
Pulse output quantity meter  
analogue output flow  
analogue output temperature  
signal output Preset counter  
input counter reset

colours to DIN EN  
60947-5-2

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

### Diagrams and graphs

Note on pressure loss



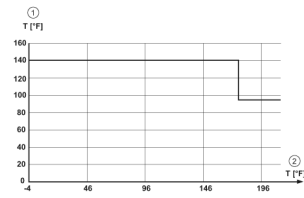
# SU8031

## Ultrasonic flow meter

SUR11XFBFRKG/US



derating ambient temperature



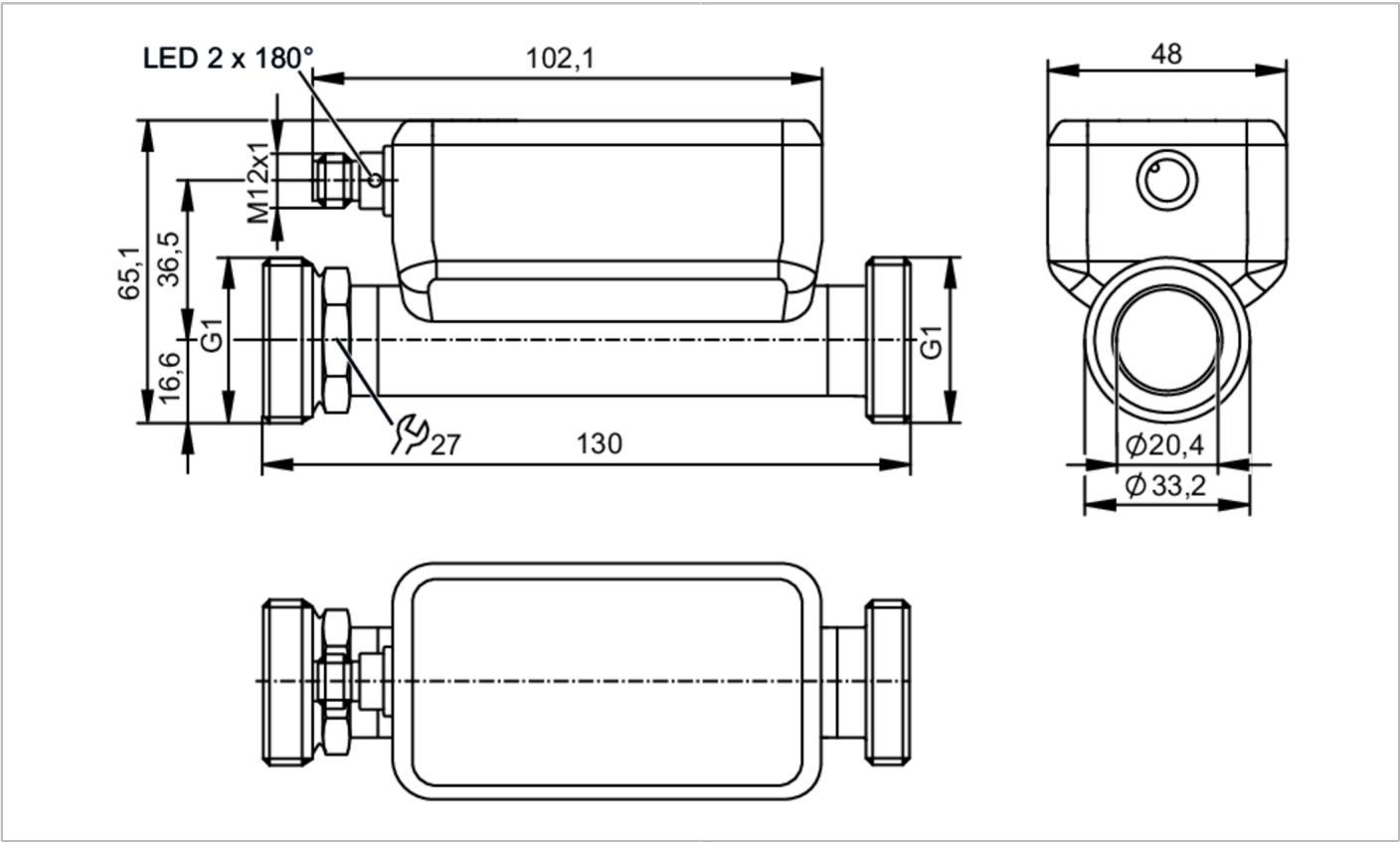
- 1 Ambient temperature
- 2 Medium temperature

# SU8050



## 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                                                                                                  |                  |               |                 |



## 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                                                   |                                                                                                          |                  |                   |



## 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                                                                                              |

# SU8050



## Ultrasonic flow meter

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|                                 |                          |                   |
|---------------------------------|--------------------------|-------------------|
| Process data binary             |                          | 2                 |
| Min. process cycle time         | [ms]                     | 9.6               |
| IO-Link process data (cyclical) | <b>function</b>          | <b>bit length</b> |
|                                 | totaliser                | 32                |
|                                 | Flow monitoring          | 32                |
|                                 | Temperature monitoring   | 32                |
|                                 | status                   | 4                 |
|                                 | Output 1                 | 1                 |
|                                 | Output 2                 | 1                 |
| Supported DeviceIDs             | <b>Type of operation</b> | <b>DeviceID</b>   |
|                                 | 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);<br>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<br>package insert |  |

| Remarks |                                                                                                                                                                                                                         |  |
|---------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| Remarks | MW = measured value<br>MEW = Final value of the measuring range<br>pulse and totaliser signal are only available for one of the two outputs<br>the accuracy indications are adhered to over the entire application area |  |

# SU8050



## Ultrasonic flow meter

SUR11XJBFRKG/US

Pack quantity

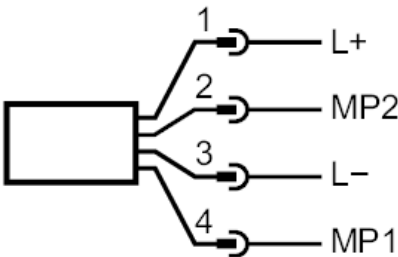
1 pcs.

### Electrical connection

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



### Connection

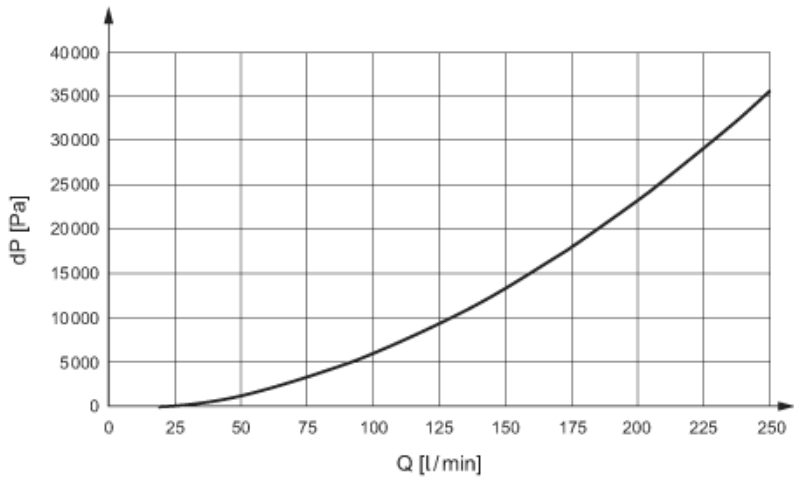


|          |     |               |
|----------|-----|---------------|
| 1 (L+)   | L+  |               |
| 2 (OUT2) | MP2 | DO, AO, reset |
| 3 (L-)   | L-  |               |
| 4 (OUT1) | MP1 | DO, IO-Link   |

### Electrical connection - plug

### Diagrams and graphs

Note on pressure loss

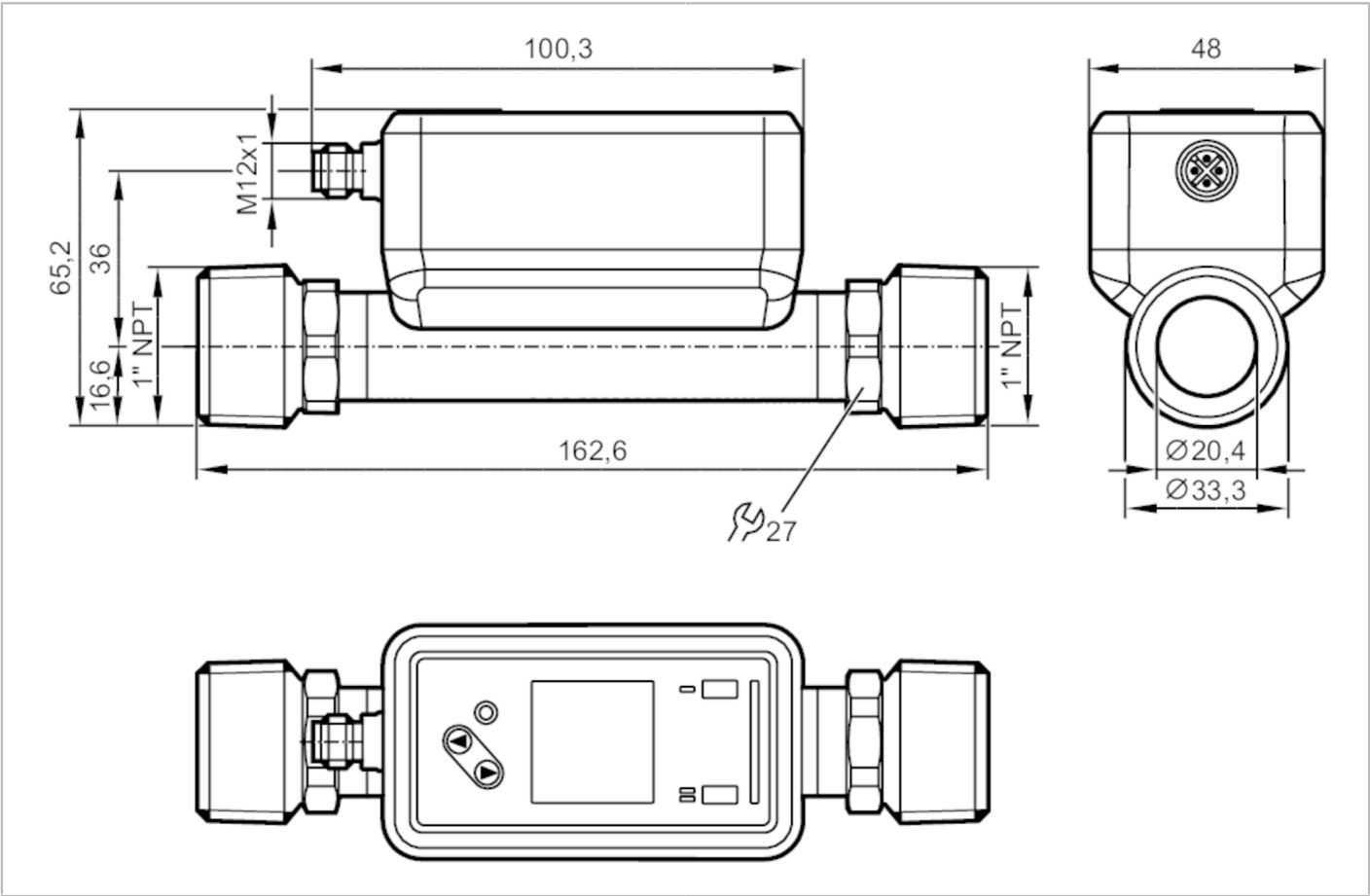


SU8621



Ultrasonic flow meter

SUN11XFBFRKG/US



ACS CRN KTW/W270 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                                                                                   |                  |               |                 |





## 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                                                                                                                 |                     |                  |                    |



## 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                          |



## Ultrasonic flow meter

SUN11XFBFRKG/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               |
|                              | 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

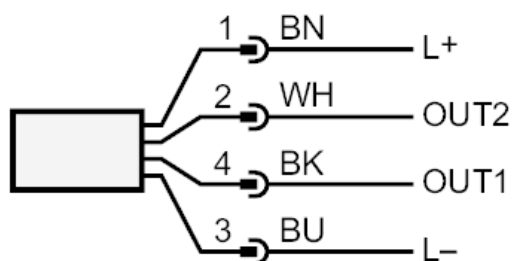




## Ultrasonic flow meter

SUN11XFBFRKG/US

### Connection



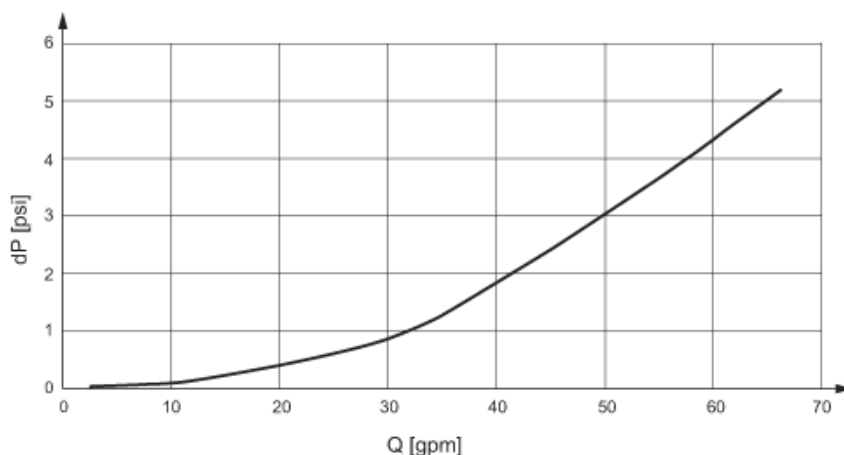
- OUT1/IO-Link: switching output volumetric flow quantity monitoring  
switching output Temperature monitoring  
Pulse output quantity meter  
frequency output volumetric flow quantity monitoring  
frequency output Temperature monitoring  
signal output Preset counter
- OUT2/InD: switching output volumetric 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



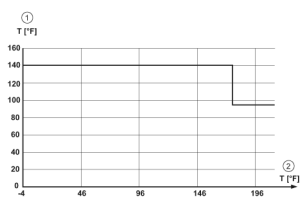
# SU8621

## Ultrasonic flow meter

SUN11XFBFRKG/US



derating ambient temperature

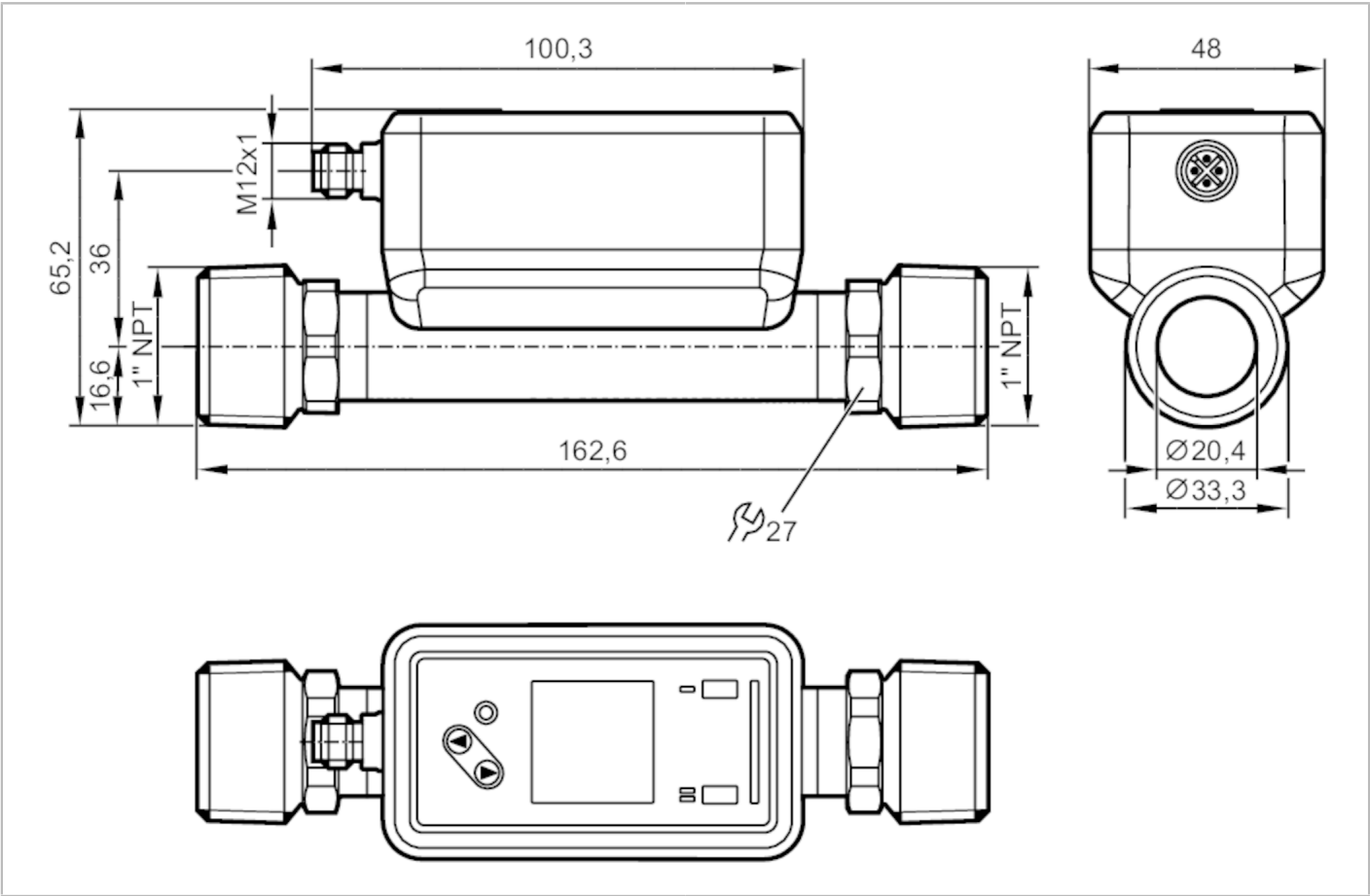


- 1 Ambient temperature
- 2 Medium temperature

# SU8631

## Ultrasonic flow meter

SUN11XXBFRKG/US



### 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                 |  |  |



## 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                                                                                                                 |                     |                  |                    |



## 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                                             |                              |





## Ultrasonic flow meter

SUN11XXBFRKG/US

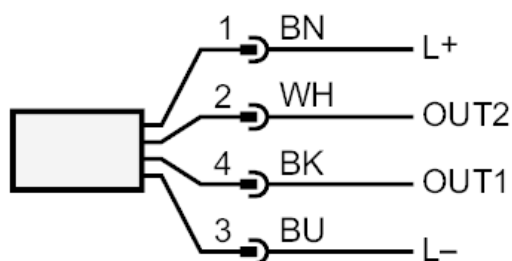
| Tests / approvals                                                                              |                                                                                            |                                        |
|------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|----------------------------------------|
| 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                                           |                                                                                            |                                        |
| <div></div> |                                                                                            |                                        |



## 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

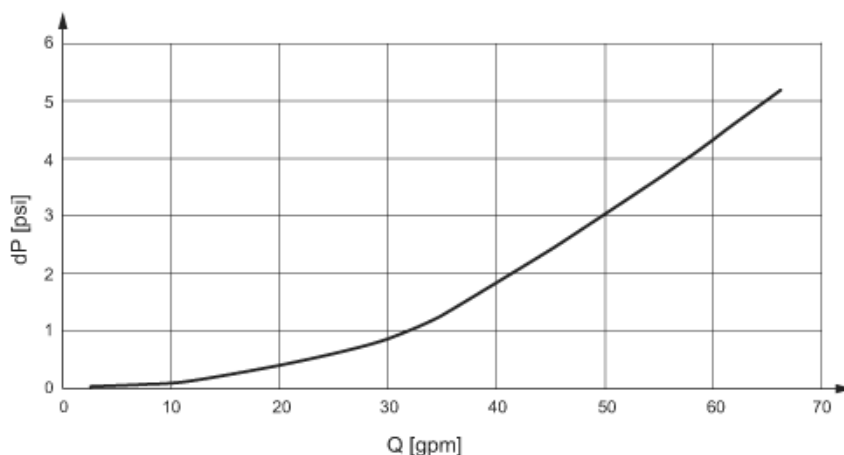
OUT2/InD: switching output volumetric flow quantity monitoring  
switching output Temperature monitoring  
Pulse output quantity meter  
analogue output flow  
analogue output temperature  
signal output Preset counter  
input counter reset

colours to DIN EN  
60947-5-2

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

### Diagrams and graphs

Note on pressure loss



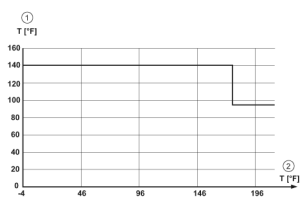
# SU8631

## Ultrasonic flow meter

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derating ambient temperature



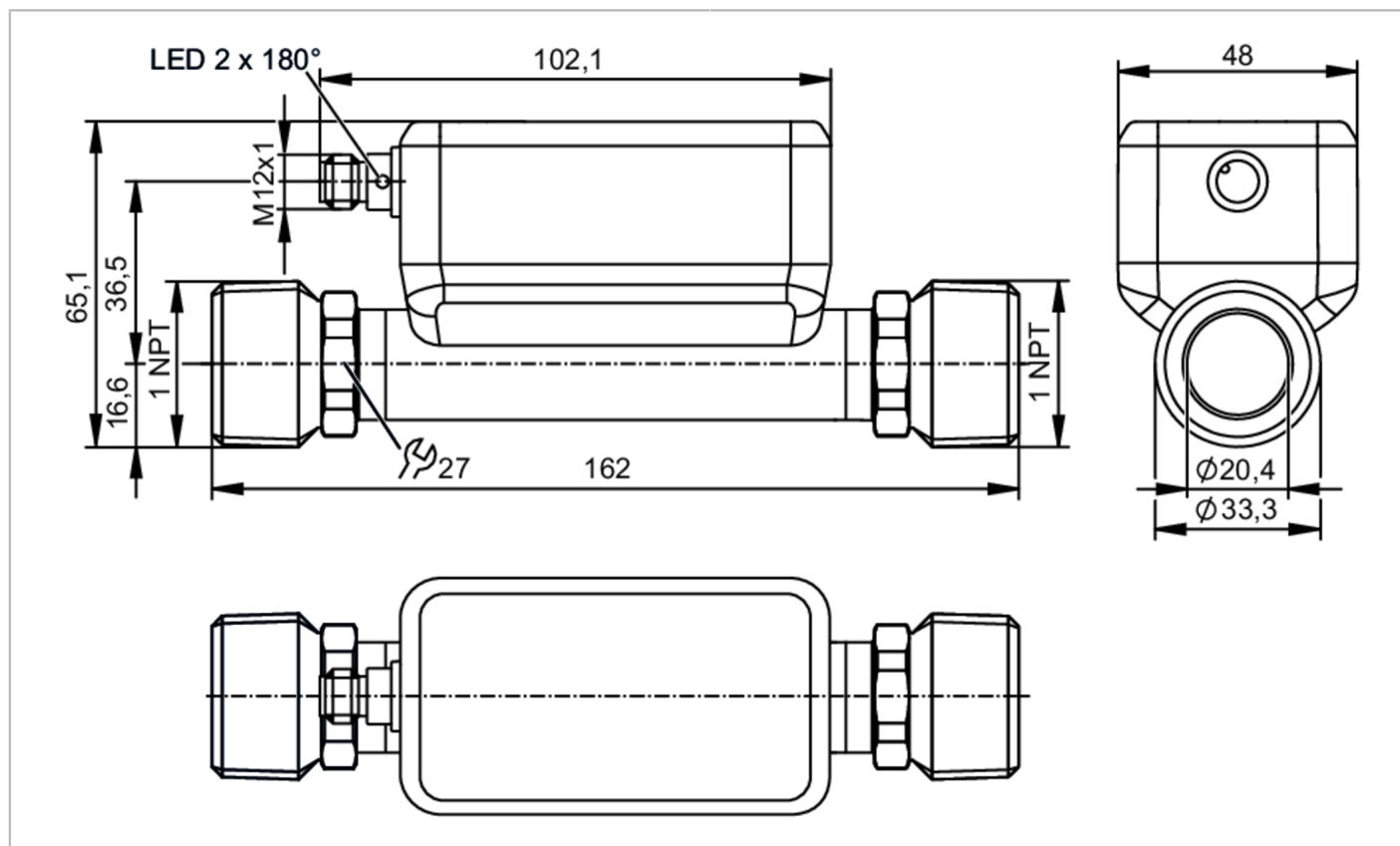
- 1 Ambient temperature
- 2 Medium temperature

# SU8651



## Ultrasonic flow meter

SUN11XJBFRKG/US



| 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<br>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                       |                                  |



## 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                                                   |                                                                                                          |                  |                   |



## 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                                                                                              |                                           |

# SU8651



## Ultrasonic flow meter

SUN11XJBFRKG/US

|                                 |                          |                   |
|---------------------------------|--------------------------|-------------------|
| Process data binary             |                          | 2                 |
| Min. process cycle time         | [ms]                     | 9.6               |
| IO-Link process data (cyclical) | <b>function</b>          | <b>bit length</b> |
|                                 | totaliser                | 32                |
|                                 | Flow monitoring          | 32                |
|                                 | Temperature monitoring   | 32                |
|                                 | status                   | 4                 |
|                                 | Output 1                 | 1                 |
|                                 | Output 2                 | 1                 |
| Supported DeviceIDs             | <b>Type of operation</b> | <b>DeviceID</b>   |
|                                 | 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.                                                                   |

# SU8651



## Ultrasonic flow meter

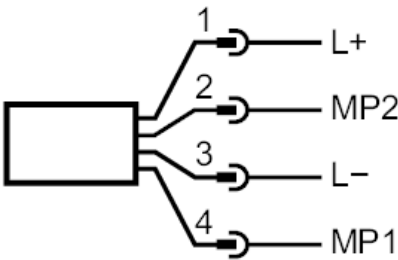
SUN11XJBFRKG/US

### Electrical connection

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



### Connection

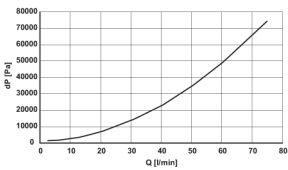


|          |     |               |
|----------|-----|---------------|
| 1 (L+)   | L+  |               |
| 2 (OUT2) | MP2 | DO, AO, reset |
| 3 (L-)   | L-  |               |
| 4 (OUT1) | MP1 | DO, IO-Link   |

### Electrical connection - plug

### Diagrams and graphs

Note on pressure loss



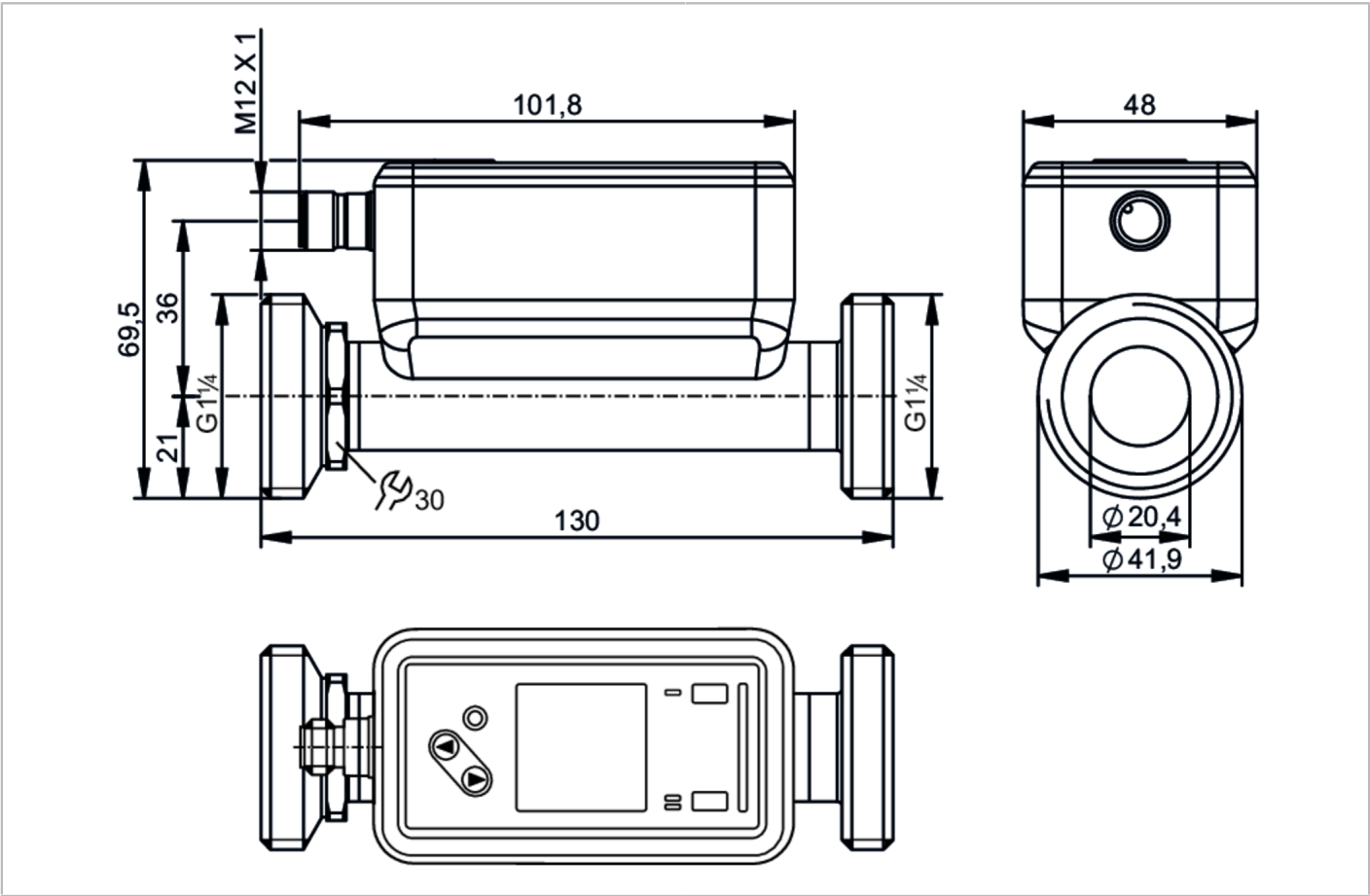


SU9021



Ultrasonic flow meter

SUR54XXBFRKG/US



ACS CE PA cUL 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                 |               |                  |



## 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                                                                                                                 |                     |                  |                    |



## 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<br>[% 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<br>(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                                         |



## 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

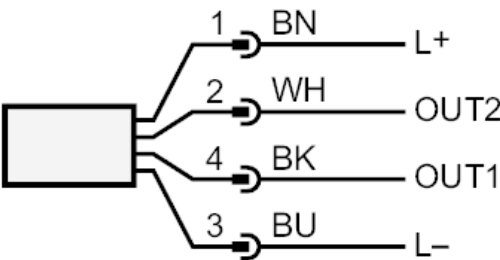




Ultrasonic flow meter

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

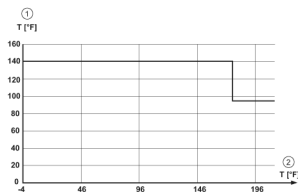
BN= brown

BU= blue

WH= white

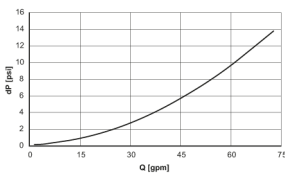
Diagrams and graphs

derating ambient temperature



- 1 Ambient temperature
- 2 Medium temperature

Pressure loss

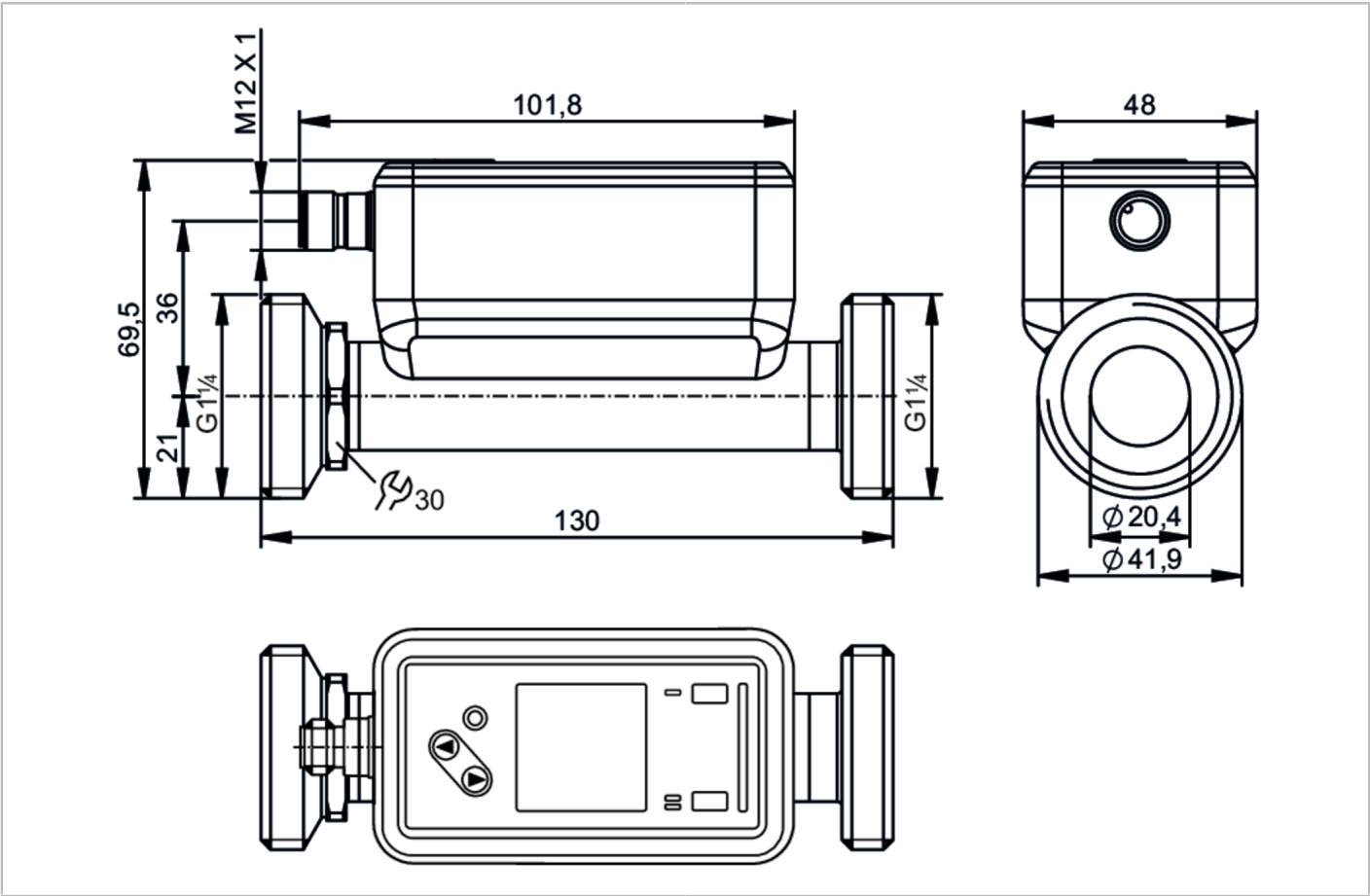


# SU9031



## 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                 |  |  |



## 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                                                                                                                 |                     |                  |                    |



## 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                                             |                              |





## Ultrasonic flow meter

SUR54XFBFRKG/US

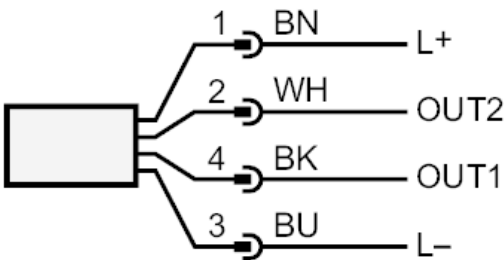
| Tests / approvals                                                                              |                                                                                                         |                                        |
|------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|----------------------------------------|
| 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                                           |                                                                                                         |                                        |
| <div></div> |                                                                                                         |                                        |



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

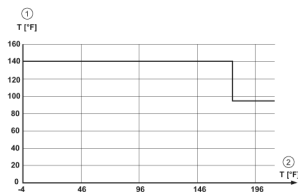
colours to DIN EN 60947-5-2

Core colours

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

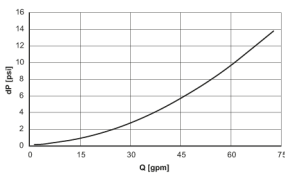
Diagrams and graphs

derating ambient temperature



- 1 Ambient temperature
- 2 Medium temperature

Pressure loss

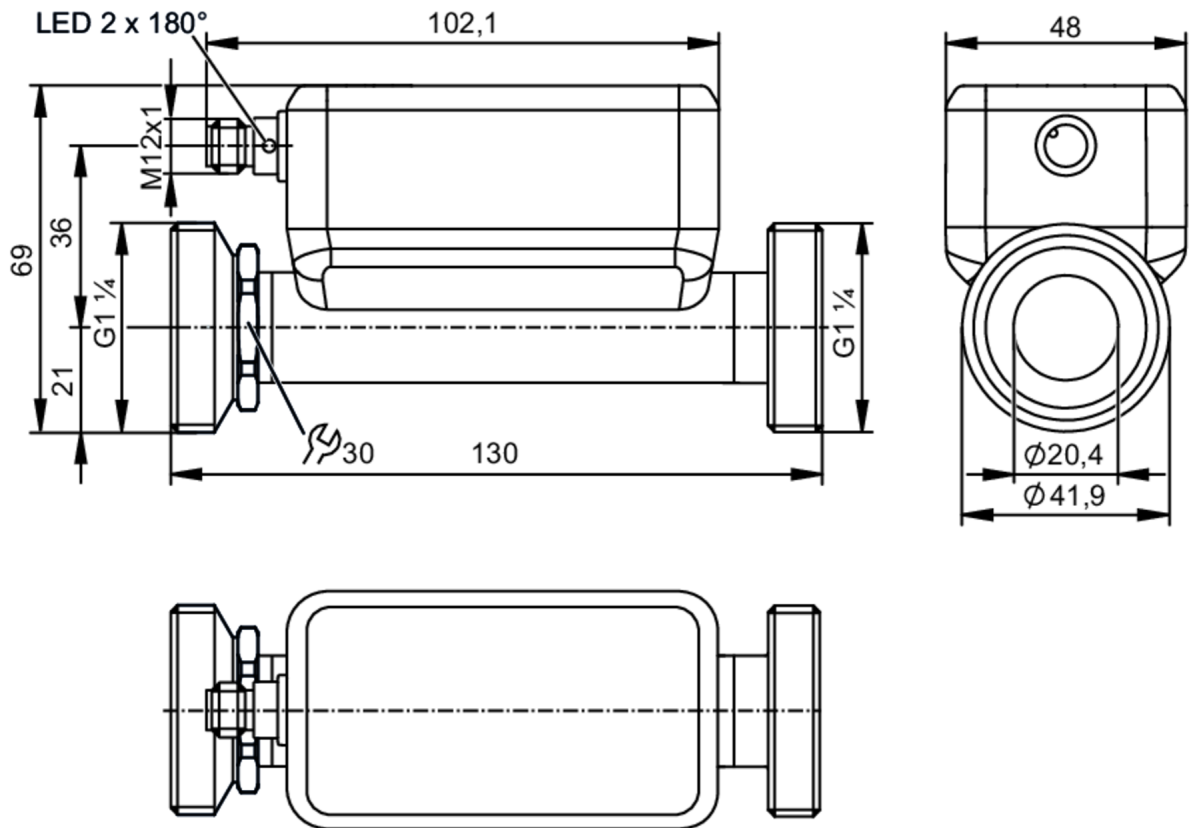


# SU9050



## 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  |



## 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 46mm <sup>2</sup> /s (40°C) ±(5,0 % MW + 0,5 % MEW)         |
|                                                |              | low-viscosity oils with viscosity 10mm <sup>2</sup> /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                                                                   |



## Ultrasonic flow meter

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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) | <b>function</b>          | <b>bit length</b> |
|                                 | totaliser                | 32                |
|                                 | Flow monitoring          | 32                |
|                                 | Temperature monitoring   | 32                |
|                                 | status                   | 4                 |
|                                 | Output 1                 | 1                 |
| Supported DeviceIDs             | Output 2                 | 1                 |
|                                 | <b>Type of operation</b> | <b>DeviceID</b>   |
|                                 | 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);<br>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                    |  |

SU9050



Ultrasonic flow meter

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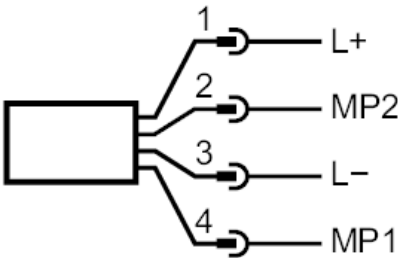
| Remarks       |                                                                          |
|---------------|--------------------------------------------------------------------------|
| Remarks       | MW = measured value                                                      |
|               | MEW = 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   |

# SU9050

## Ultrasonic flow meter

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### Electrical connection - plug

### Diagrams and graphs

Note on pressure loss

