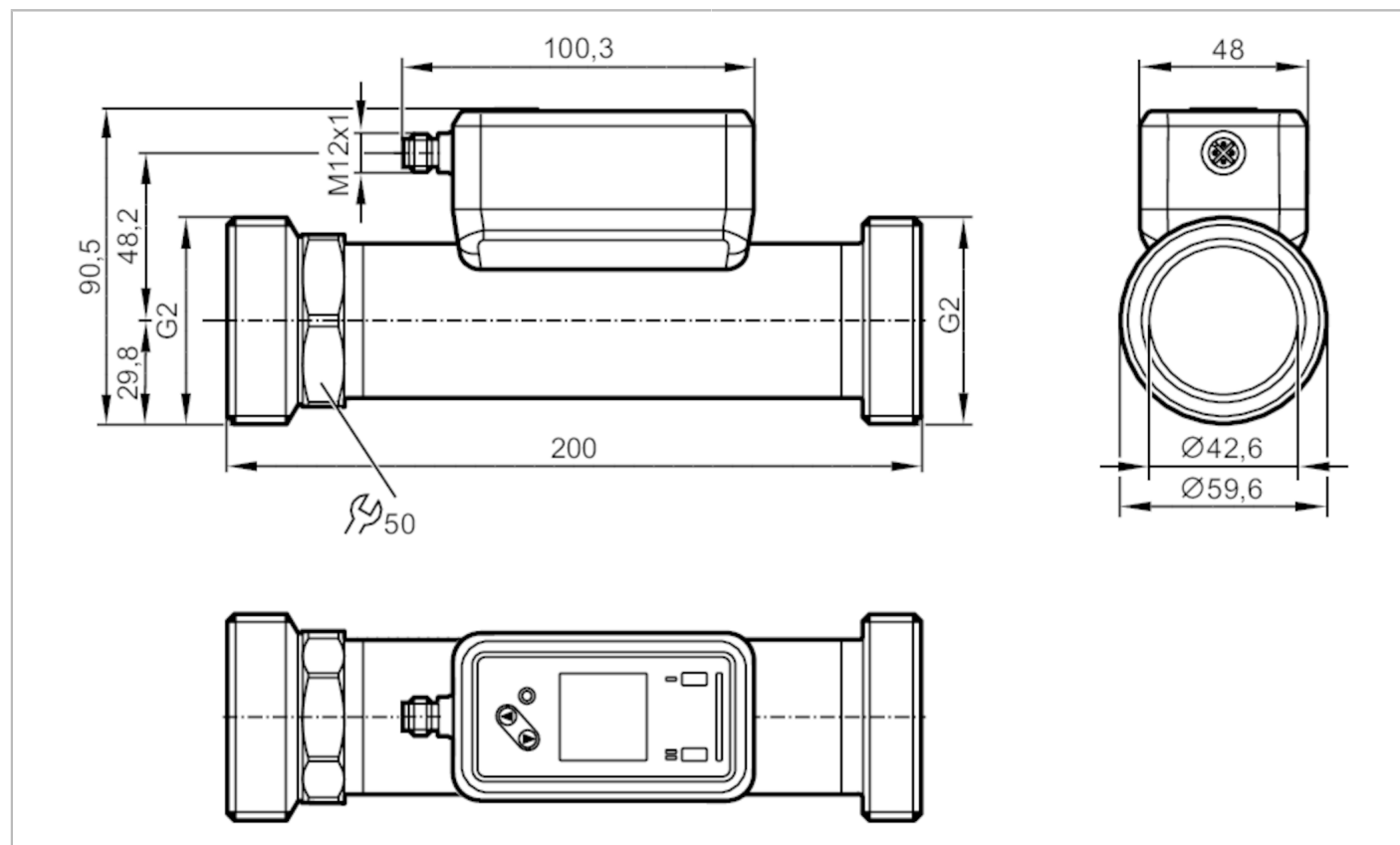


## Ultrasonic flow meter

SUR21XFBFRKG/US



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

### Product characteristics

|                    |                          |                 |                    |               |
|--------------------|--------------------------|-----------------|--------------------|---------------|
| Measuring range    | 5...1000 l/min           | 300...60000 l/h | 0.058...11.666 m/s | 0.3...60 m³/h |
| Process connection | G 2 DN50 external thread |                 |                    |               |

### 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 [°C]                        | -20...100                                                                                    |        |
| Min. bursting pressure                         | 150 bar                                                                                      | 15 MPa |
| Pressure rating                                | 100 bar                                                                                      | 10 MPa |
| Vacuum resistance [mbar]                       | -1000                                                                                        |        |
| MAWP (for applications according to CRN) [bar] | 100                                                                                          |        |

### Electrical data

|                             |                            |  |  |  |
|-----------------------------|----------------------------|--|--|--|
| Operating voltage [V]       | 18...32 DC; (to SELV/PELV) |  |  |  |
| Current consumption [mA]    | < 75                       |  |  |  |
| Protection class            | III                        |  |  |  |
| Reverse polarity protection | yes                        |  |  |  |
| Power-on delay time [s]     | 5                          |  |  |  |
| Measuring principle         | ultrasonic                 |  |  |  |



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| 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                                                                                                            | 300...60000 l/h    | 0.058...11.666 m/s   | 0.3...60 m³/h       |
| Display range                                   |      | -1200...1200 l/min                                                                                                        | -72000...72000 l/h | -13.999...13.999 m/s | -72...72 m³/h       |
| Resolution                                      |      | 0.1 l/min                                                                                                                 | 1 l/h              | 0.001 m/s            | 0.002 m³/h          |
| Set point SP                                    |      | 10.5...1000 l/min                                                                                                         | 630...60000 l/h    | 0.122...11.666 m/s   | 0.63...60 m³/h      |
| Reset point rP                                  |      | 5.3...994.8 l/min                                                                                                         | 318...59688 l/h    | 0.062...11.605 m/s   | 0.318...59.688 m³/h |
| Analogue start point ASP                        |      | -1000...800 l/min                                                                                                         | -60000...48000 l/h | -11.666...9.333 m/s  | -60...48 m³/h       |
| Analogue end point AEP                          |      | -800...1000 l/min                                                                                                         | -48000...60000 l/h | -9.333...11.666 m/s  | -48...60 m³/h       |
| Low flow cut-off LFC                            |      | 5...50 l/min                                                                                                              | 300...3000 l/h     | 0.058...0.583 m/s    | 0.3...3 m³/h        |
| Frequency end point, FEP                        |      | 200.6...1000 l/min                                                                                                        | 12037...60000 l/h  | 2.34...11.666 m/s    | 12.037...60 m³/h    |
| 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   |                      |                     |
| Temperature monitoring                          |      |                                                                                                                           |                    |                      |                     |
| Measuring range                                 |      | [°C]                                                                                                                      | -20...100          |                      |                     |
| Display range                                   |      | [°C]                                                                                                                      | -44...124          |                      |                     |
| Resolution                                      |      | [°C]                                                                                                                      | 0.1                |                      |                     |
| Set point SP                                    |      | [°C]                                                                                                                      | -19.6...100        |                      |                     |
| Reset point rP                                  |      | [°C]                                                                                                                      | -20...99.6         |                      |                     |
| Analogue start point                            |      | [°C]                                                                                                                      | -20...76           |                      |                     |
| Analogue end point                              |      | [°C]                                                                                                                      | 4...100            |                      |                     |
| Frequency start point, FSP                      |      | [°C]                                                                                                                      | -20...76           |                      |                     |
| Frequency end point, FEP                        |      | [°C]                                                                                                                      | 4...100            |                      |                     |



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|                                |      |           |
|--------------------------------|------|-----------|
| Frequency at the end point FRP | [Hz] | 1...10000 |
|--------------------------------|------|-----------|

## 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                        | Identification and Diagnosis (0x4000) |                   |
| 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                               | 1461              |

## Operating conditions

|                     |      |          |
|---------------------|------|----------|
| Ambient temperature | [°C] | -20...60 |
| Storage temperature | [°C] | -25...80 |
| Protection          |      | IP 67    |

## Tests / approvals

|     |                  |  |
|-----|------------------|--|
| EMC | DIN 61326-1:2021 |  |
|-----|------------------|--|



## Ultrasonic flow meter

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|                              |                                                           |                   |
|------------------------------|-----------------------------------------------------------|-------------------|
| CPA approval                 | model number                                              | 002US             |
|                              | accuracy class                                            | 1,5               |
| Shock resistance             | DIN IEC 68-2-27                                           | 20 g (11ms)       |
| Vibration resistance         | DIN IEC 68-2-6                                            | 5 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]                                        | 1180                                                                                         |
| Type of mounting                                  | inlet pipe length 5xDN; outlet pipe length 1xDN                                              |
| Materials                                         | housing: stainless steel (316L/1.4404); Display: PFA; Sealing Display: FKM; connector: POKAN |
| Materials (wetted parts)                          | Pipe section: stainless steel (316L/1.4404); Process connection sealing: Centellen Flat seal |
| Process connection                                | G 2 DN50 external thread                                                                     |
| Surface characteristics Ra/Rz of the wetted parts | 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                  |

## 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





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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

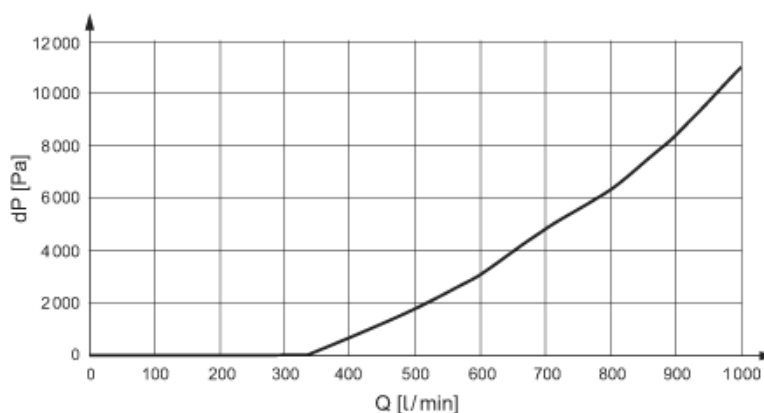
OUT2/InD: switching output volumetric flow quantity monitoring  
switching output Temperature monitoring  
Pulse output quantity meter  
analogue output flow  
analogue output temperature  
signal output Preset counter  
input counter reset

colours to DIN EN 60947-5-2

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

### Diagrams and graphs

Note on pressure loss



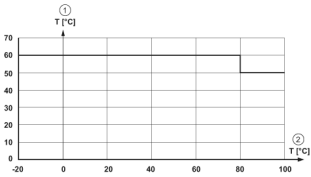
# SU2020



## Ultrasonic flow meter

SUR21XFBFRKG/US

derating ambient temperature



- 1 Ambient temperature
- 2 Medium temperature