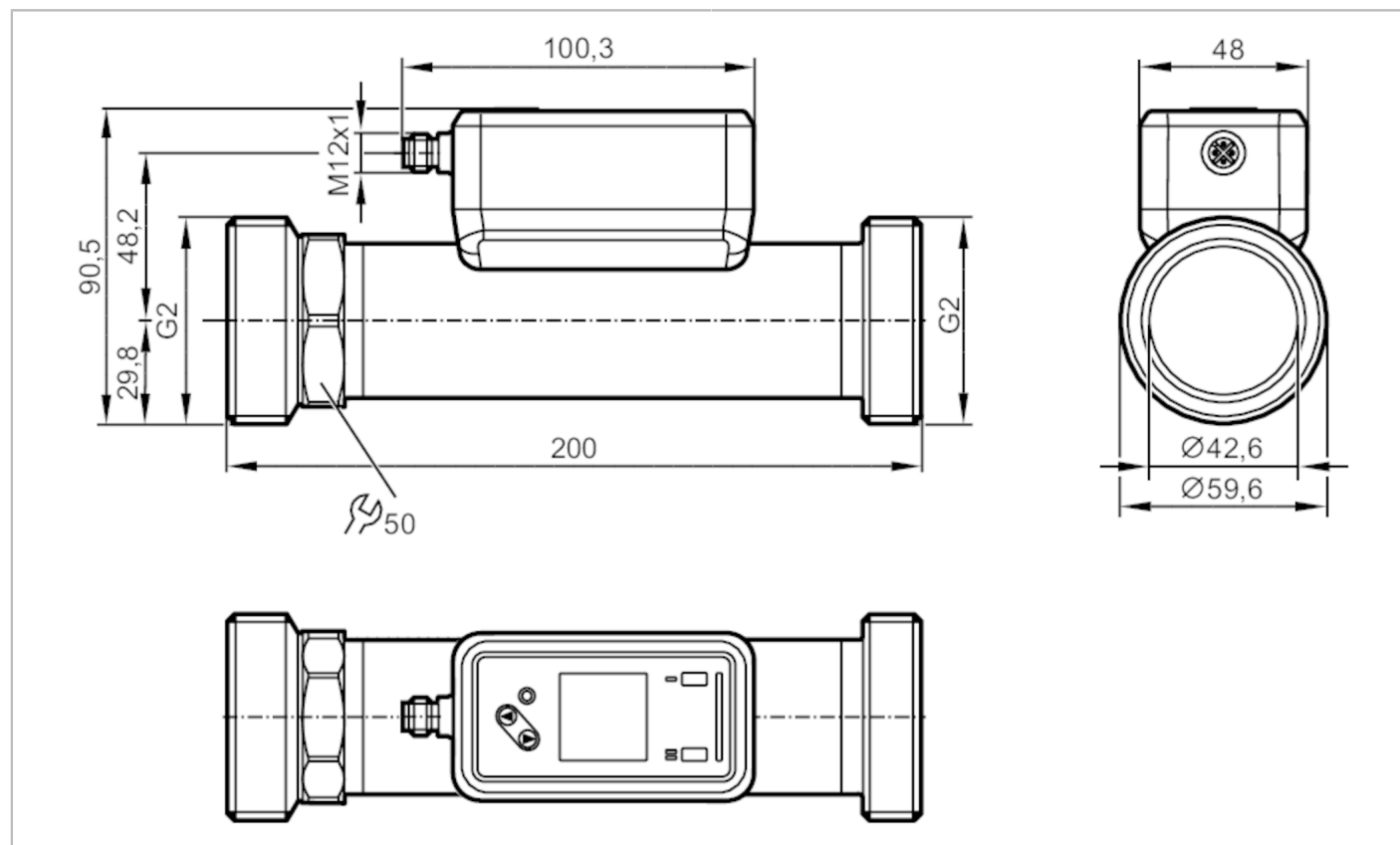


# SU2020



## Ultrasonic flow meter

SUR21XFBFRKG/US



ACS CE PA c UL US LISTED IO-Link KTW/W270 NSF 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 | threaded connection G 2 external thread DN50 |                 |                    |               |

### Application

|                          |                                                                                                  |        |
|--------------------------|--------------------------------------------------------------------------------------------------|--------|
| System                   | gold-plated contacts                                                                             |        |
| Media                    | ultra-pure water; water; water-based media                                                       |        |
| Note on media            | water-based 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                                                                                            |        |

### Electrical data

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

### Inputs

|        |               |
|--------|---------------|
| Inputs | counter reset |
|--------|---------------|



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| Outputs                                              |                                                                                                                            |                    |                      |                     |
|------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------|--------------------|----------------------|---------------------|
| Total number of outputs                              | 2                                                                                                                          |                    |                      |                     |
| Output signal                                        | switching signal; pulse signal; analog signal; IO-Link;<br>frequency signal; diagnostic signal; totalizer switching signal |                    |                      |                     |
| Electrical design                                    | PNP/NPN                                                                                                                    |                    |                      |                     |
| Output function                                      | normally open / closed; (configurable)                                                                                     |                    |                      |                     |
| Max. voltage drop switching output DC [V]            | 2                                                                                                                          |                    |                      |                     |
| Permanent current rating of switching output DC [mA] | 100                                                                                                                        |                    |                      |                     |
| Switching frequency DC [Hz]                          | 0...10000                                                                                                                  |                    |                      |                     |
| Analog current output [mA]                           | 4...20                                                                                                                     |                    |                      |                     |
| Max. load [Ω]                                        | 500                                                                                                                        |                    |                      |                     |
| Pulse output                                         | flow rate meter                                                                                                            |                    |                      |                     |
| Short-circuit protection                             | yes                                                                                                                        |                    |                      |                     |
| Type of short-circuit protection                     | yes (non-latching)                                                                                                         |                    |                      |                     |
| Overload protection                                  | yes                                                                                                                        |                    |                      |                     |
| Measuring/setting range                              |                                                                                                                            |                    |                      |                     |
| Measuring range                                      | 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 |
| Analog start point ASP                               | -1000...800 l/min                                                                                                          | -60000...48000 l/h | -11.666...9.333 m/s  | -60...48 m³/h       |
| Analog 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                                                                                                                 |                    |                      |                     |
| Analog start point [°C]                              | -20...76                                                                                                                   |                    |                      |                     |
| Analog end point [°C]                                | 4...100                                                                                                                    |                    |                      |                     |
| Frequency start point, FSP [°C]                      | -20...76                                                                                                                   |                    |                      |                     |
| Frequency end point, FEP [°C]                        | 4...100                                                                                                                    |                    |                      |                     |
| Frequency at the end point FRP [Hz]                  | 1...10000                                                                                                                  |                    |                      |                     |



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| 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                                            |
| Reaction 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                                       | <b>Function class</b>    | <b>Description</b>                             |
|                                                | 0x4000                   | Identification and Diagnosis                   |
| Required master port class                     |                          | A                                              |
| Process data analog                            |                          | 3                                              |
| Process data binary                            |                          | 2                                              |
| Min. process cycle time [ms]                   |                          | 9.6                                            |
| IO-Link process data (cyclical)                | <b>Function</b>          | <b>bit length</b>                              |
|                                                | totalizer                | 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         |                                                |
| CPA approval                                   | model number             | 002US                                          |
|                                                | accuracy class           | 1,5                                            |



## Ultrasonic flow meter

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|                              |                                                           |                   |
|------------------------------|-----------------------------------------------------------|-------------------|
| 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 number                                        | 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                                                                                         |
| Housing                                           | rectangular                                                                                  |
| Type of mounting                                  | inlet pipe length 5xDN; outlet pipe length 1xDN                                              |
| Dimensions [mm]                                   | 200 x 59.6 x 90.5                                                                            |
| Material                                          | housing: stainless steel (1.4404 / 316L); Display: PFA; sealing Display: FKM; connector: PBT |
| Materials (wetted parts)                          | Pipe section: stainless steel (1.4404 / 316L); Process connection sealing: Centellen Gasket  |
| Process connection                                | threaded connection G 2 external thread DN50                                                 |
| Surface characteristics Ra/Rz of the wetted parts | 1.25 µm                                                                                      |

## Displays / operating elements

|                    |                                       |
|--------------------|---------------------------------------|
| Display            | Color display 1,44", 128 x 128 pixels |
| Switching function | 2 x LED, yellow                       |
| diagnosis          | 1 x LED, three-color                  |
| Display unit       | l/min; l/h; m³/h; m/s                 |

## Accessories

|                |                     |
|----------------|---------------------|
| Items supplied | Gasket 2, Centellen |
|                | package insert      |

## Remarks

|               |                                                                          |
|---------------|--------------------------------------------------------------------------|
| Remarks       | MW = Measured value                                                      |
|               | MEW = Final value of the measuring range                                 |
|               | pulse and totalizer signal are only available for one of the two outputs |
|               | 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

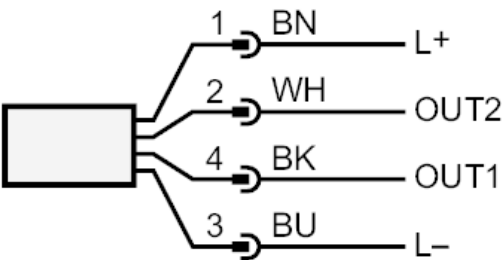




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Connection



- OUT1/IO-Link:
- OUT2/InD:
- 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
  - Switching output Volumetric flow quantity monitoring
  - Switching output Temperature monitoring
  - Pulse output quantity meter
  - analog output flow
  - analog output temperature
  - signal output Preset counter
  - Input counter reset

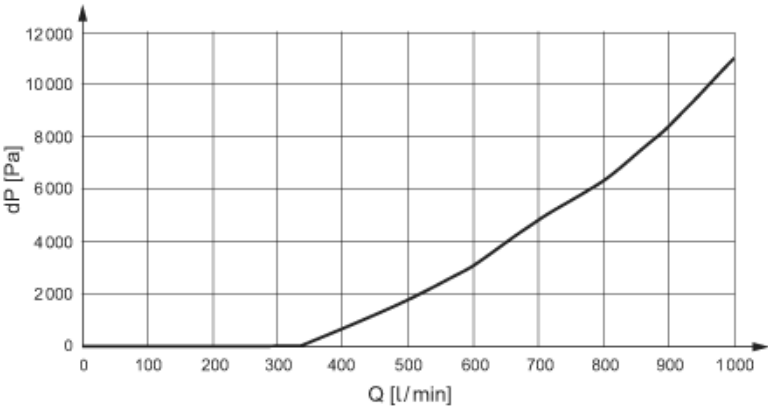
Colors to DIN EN 60947-5-2

Core colors

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

Diagrams and graphs

Note on pressure loss



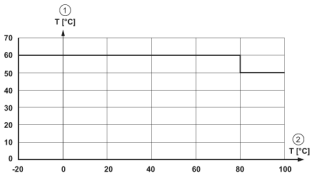
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## Ultrasonic flow meter

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derating ambient temperature



- 1 Ambient temperature
- 2 Medium temperature