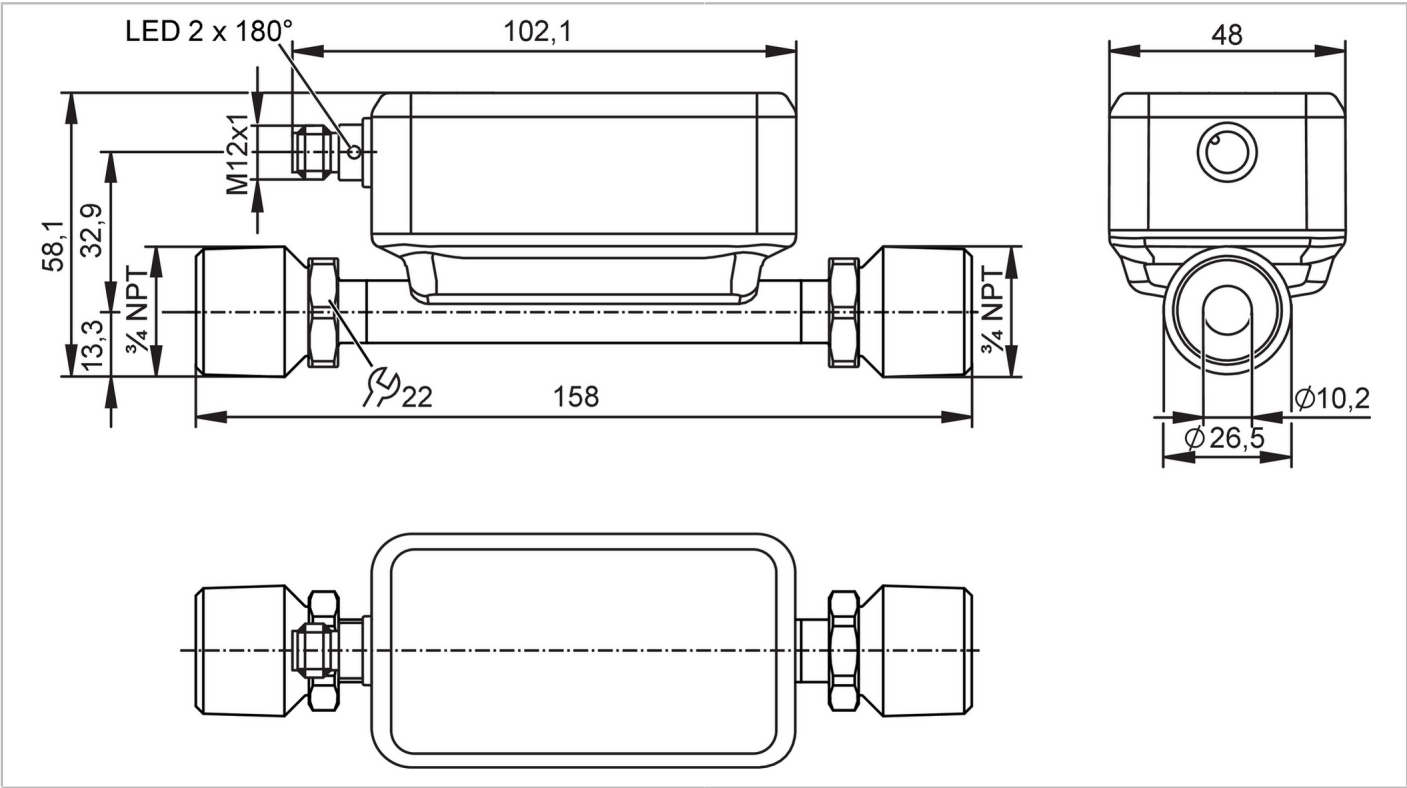


# SU7651



## Ultrasonic flow meter

SUN34XJBFRKG/US



ACS KTW/W270 Reg31

| Product characteristics      |                                                                                                          |                 |              |                  |
|------------------------------|----------------------------------------------------------------------------------------------------------|-----------------|--------------|------------------|
| Number of inputs and outputs | Number of digital outputs: 2; Number of analog 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; water-based media; glycol solutions; oils (of high and low viscosity); Coolants |                 |              |                  |
| Note on media                | water-based 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. burst 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                                                                                                      |                 |              |                  |
| Power-on delay time [s]      | 5                                                                                                        |                 |              |                  |

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|                                                      |                                                           |                                                                                                          |                 |                    |
|------------------------------------------------------|-----------------------------------------------------------|----------------------------------------------------------------------------------------------------------|-----------------|--------------------|
| Measuring principle                                  | ultrasonic                                                |                                                                                                          |                 |                    |
| Inputs / outputs                                     |                                                           |                                                                                                          |                 |                    |
| Total number of inputs and outputs                   | 2                                                         |                                                                                                          |                 |                    |
| Number of inputs and outputs                         | Number of digital outputs: 2; Number of analog outputs: 1 |                                                                                                          |                 |                    |
| Inputs                                               |                                                           |                                                                                                          |                 |                    |
| Inputs                                               | OUT2                                                      | counter reset                                                                                            |                 |                    |
| Outputs                                              |                                                           |                                                                                                          |                 |                    |
| Total number of outputs                              | 2                                                         |                                                                                                          |                 |                    |
| Output signal                                        | OUT1                                                      | switching signal; pulse signal; diagnostic signal; totalizer switching signal; frequency signal; IO-Link |                 |                    |
|                                                      | OUT2                                                      | switching signal; pulse signal; diagnostic signal; totalizer switching signal; analog signal             |                 |                    |
| Electrical design                                    | PNP/NPN                                                   |                                                                                                          |                 |                    |
| Number of digital outputs                            | 2                                                         |                                                                                                          |                 |                    |
| 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                                                 |                                                                                                          |                 |                    |
| Number of analog outputs                             | 1                                                         |                                                                                                          |                 |                    |
| Analog current output [mA]                           | 4...20; (scalable)                                        |                                                                                                          |                 |                    |
| Max. load [Ω]                                        | 500                                                       |                                                                                                          |                 |                    |
| Analog 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                     | yes (non-latching)                                        |                                                                                                          |                 |                    |
| 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   |
| Analog start point ASP                               | -75...60 l/min                                            | -4.5...3.6 m³/h                                                                                          | -1189...951 gph | -19.81...15.85 gpm |
| Analog 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                                                 |                                                                                                          |                 |                    |
| Volumetric flow quantity monitoring                  |                                                           |                                                                                                          |                 |                    |
| Pulse length [s]                                     | 0.002...2                                                 |                                                                                                          |                 |                    |



## Ultrasonic flow meter

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|                                                |                                                                                                |                                           |  |
|------------------------------------------------|------------------------------------------------------------------------------------------------|-------------------------------------------|--|
| 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                            |  |
| Analog start point                             | -8...120 °C                                                                                    | 17.6...248 °F                             |  |
| Analog 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                                       |  |
| 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                                       | BLOB                                                                                           | Binary Large Object transfer              |  |
|                                                | Common - I&D                                                                                   | Identification and Diagnosis              |  |
| Required master port class                     | A                                                                                              |                                           |  |
| Process data analog                            | 3                                                                                              |                                           |  |
| Process data binary                            | 2                                                                                              |                                           |  |
| Min. process cycle time                        | [ms]                                                                                           | 9.6                                       |  |

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|                                    |                          |                   |
|------------------------------------|--------------------------|-------------------|
| IO-Link process data<br>(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                  | 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 number                                        | 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                                               |
| Material                                          |      | housing: stainless steel (1.4404 / 316L); connector: PEI, FKM |
| Materials (wetted parts)                          |      | Pipe section: stainless steel (1.4404 / 316L)                 |
| 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 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.                                                                   |

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## Ultrasonic flow meter

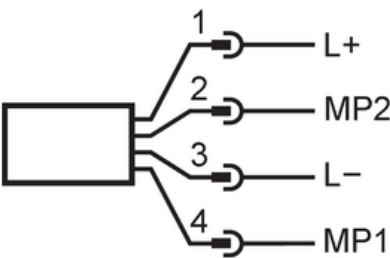
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### Electrical connection

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



### Connection



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

### Electrical connection - plug

### Diagrams and graphs

Note on pressure loss

