

# SM6020

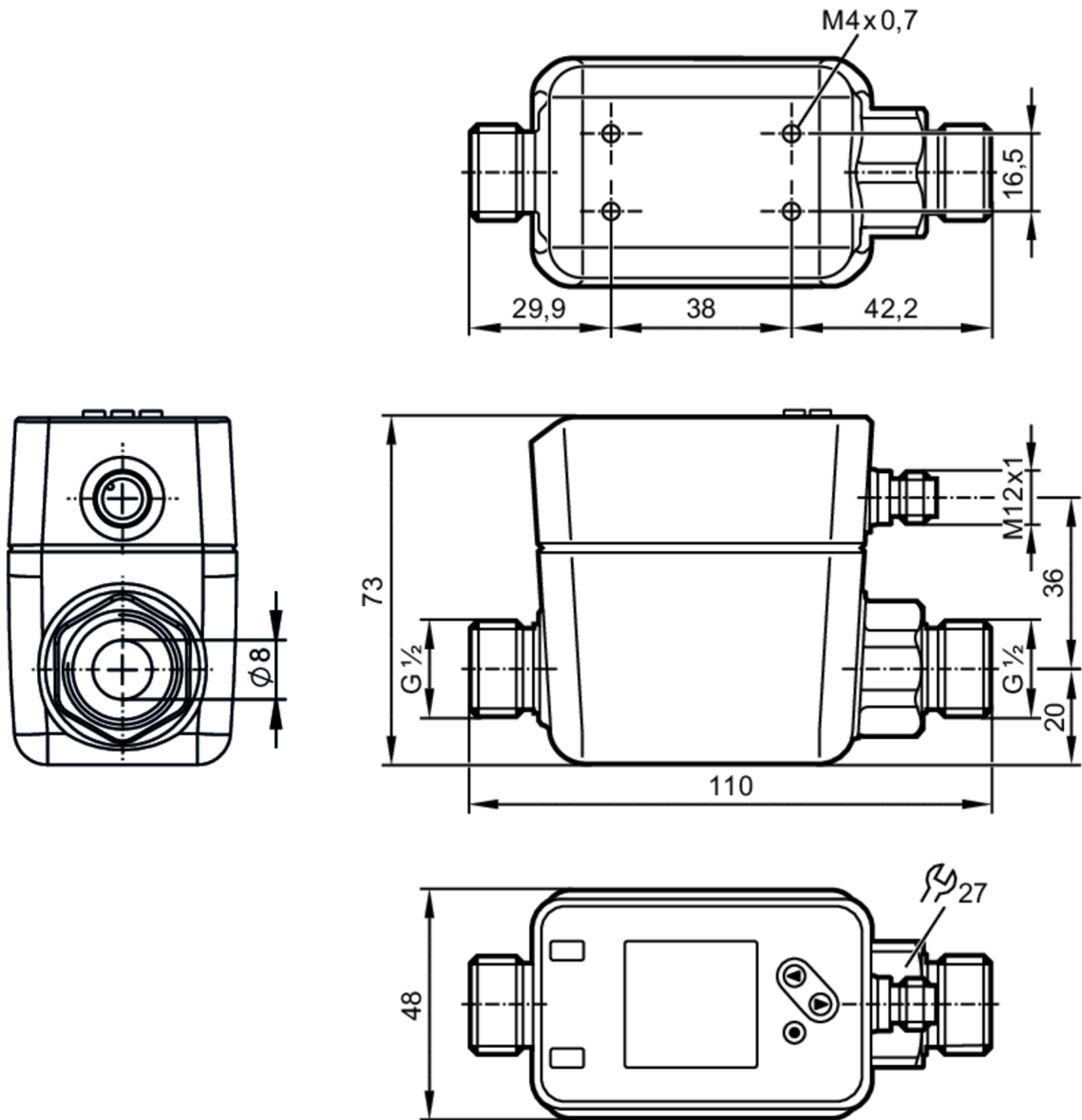


## Magnetic-inductive flow meter

SMR12XGXFRKG/US-100

Alternative articles: SM6000

When selecting an alternative article and accessories please note that technical data may differ!



### Product characteristics

|                              |                                                           |                  |               |                 |
|------------------------------|-----------------------------------------------------------|------------------|---------------|-----------------|
| Number of inputs and outputs | Number of digital outputs: 2; Number of analog outputs: 1 |                  |               |                 |
| Measuring range              | 0.05...35 l/min                                           | 0.003...2.1 m³/h | 0.6...555 gph | 0.01...9.25 gpm |
| Process connection           | threaded connection G 1/2 external thread DN15 flat seal  |                  |               |                 |

### Application

|                         |                                                                                           |
|-------------------------|-------------------------------------------------------------------------------------------|
| System                  | gold-plated contacts                                                                      |
| Media                   | Conductive liquids; water; water-based media                                              |
| Note on media           | conductivity: $\geq 20 \mu\text{S/cm}$<br>viscosity: $< 70 \text{ mm}^2/\text{s}$ (40 °C) |
| Medium temperature [°C] | -20...90                                                                                  |



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|                                                 |                                                                                          |                            |                 |                  |
|-------------------------------------------------|------------------------------------------------------------------------------------------|----------------------------|-----------------|------------------|
| Pressure rating                                 | 16 bar                                                                                   | 1.6 MPa                    |                 |                  |
| Electrical data                                 |                                                                                          |                            |                 |                  |
| Operating voltage                               | [V]                                                                                      | 18...30 DC; (to SELV/PELV) |                 |                  |
| Current consumption                             | [mA]                                                                                     | < 80                       |                 |                  |
| Protection class                                |                                                                                          | III                        |                 |                  |
| Reverse polarity protection                     |                                                                                          | yes                        |                 |                  |
| Power-on delay time                             | [s]                                                                                      | 5                          |                 |                  |
| Measuring principle                             |                                                                                          | magnetic-inductive         |                 |                  |
| Inputs / outputs                                |                                                                                          |                            |                 |                  |
| Number of inputs and outputs                    | Number of digital outputs: 2; Number of analog outputs: 1                                |                            |                 |                  |
| Inputs                                          |                                                                                          |                            |                 |                  |
| Inputs                                          | counter reset                                                                            |                            |                 |                  |
| Outputs                                         |                                                                                          |                            |                 |                  |
| Total number of outputs                         | 2                                                                                        |                            |                 |                  |
| Output signal                                   | switching signal; analog signal; pulse signal; IO-Link; frequency signal; (configurable) |                            |                 |                  |
| 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                        |                 |                  |
| Number of analog outputs                        | 1                                                                                        |                            |                 |                  |
| Analog current output                           | [mA]                                                                                     | 4...20; (scalable)         |                 |                  |
| 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                                 | 0.05...35 l/min                                                                          | 0.003...2.1 m³/h           | 0.6...555 gph   | 0.01...9.25 gpm  |
| Display range                                   | -42...42 l/min                                                                           | -2.5...2.5 m³/h            | -666...666 gph  | -11.1...11.1 gpm |
| Resolution                                      | 0.02 l/min                                                                               | 0.002 m³/h                 | 0.6 gph         | 0.01 gpm         |
| Set point SP                                    | 0.25...35 l/min                                                                          | 0.015...2.1 m³/h           | 4.2...555 gph   | 0.07...9.25 gpm  |
| Reset point rP                                  | 0...34.8 l/min                                                                           | 0...2.08 m³/h              | 1.2...552 gph   | 0.02...9.2 gpm   |
| Analog start point ASP                          | 0...28 l/min                                                                             | 0...1.7 m³/h               | 0...666 gph     | 0...7.4 gpm      |
| Analog end point AEP                            | 7...35 l/min                                                                             | 0.42...2.1 m³/h            | 111...555 gph   | 1.85...9.25 gpm  |
| Low flow cut-off LFC                            | 0.05...1.75 l/min                                                                        | 0.003...0.1 m³/h           | 0.6...27.6 gph  | 0.01...0.46 gpm  |
| Frequency end point, FEP                        | 7...35 l/min                                                                             | 0.42...2.1 m³/h            | 111.6...555 gph | 1.86...9.25 gpm  |
| Frequency at the end point FRP                  | [Hz]                                                                                     | 1...10000                  |                 |                  |
| Volumetric flow quantity monitoring             |                                                                                          |                            |                 |                  |
| Pulse length                                    | [s]                                                                                      | 0.001...2                  |                 |                  |
| Pulse value                                     |                                                                                          | 0.001...99990000 l         |                 |                  |



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|                                   |                                                                                                                                                                |                                       |
|-----------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|
| Temperature monitoring            |                                                                                                                                                                |                                       |
| Measuring range                   | [°C]                                                                                                                                                           | -20...90                              |
| Display range                     | [°C]                                                                                                                                                           | -42...112                             |
| Resolution                        | [°C]                                                                                                                                                           | 0.1                                   |
| Set point SP                      | [°C]                                                                                                                                                           | -19.6...90                            |
| Reset point rP                    | [°C]                                                                                                                                                           | -20...89.6                            |
| Analog start point                | [°C]                                                                                                                                                           | -20...68                              |
| Analog end point                  | [°C]                                                                                                                                                           | 2...90                                |
| In steps of                       | [°C]                                                                                                                                                           | 0.1                                   |
| Accuracy / deviations             |                                                                                                                                                                |                                       |
| Flow monitoring                   |                                                                                                                                                                |                                       |
| Accuracy (in the measuring range) |                                                                                                                                                                | ± (0,8 % MW + 0,2 % MEW)              |
| Repeatability                     |                                                                                                                                                                | ± 0,2 % MEW                           |
| Temperature monitoring            |                                                                                                                                                                |                                       |
| Accuracy                          | [K]                                                                                                                                                            | ± 2,5 (Q > 5 % MEW)                   |
| Reaction times                    |                                                                                                                                                                |                                       |
| Flow monitoring                   |                                                                                                                                                                |                                       |
| Start-up delay                    | [s]                                                                                                                                                            | 0...50                                |
| Response time                     | [s]                                                                                                                                                            | < 0.25; (dAP = 0, T09)                |
| Damping process value dAP         | [s]                                                                                                                                                            | 0...5                                 |
| Temperature monitoring            |                                                                                                                                                                |                                       |
| Response time                     | [s]                                                                                                                                                            | 15; (Q > 10 % MEW, T09)               |
| Software / programming            |                                                                                                                                                                |                                       |
| Parameter setting options         | hysteresis / window; normally open / closed; switching logic; Frequency output; current/pulse output; Start-up delay; display can be deactivated; Display unit |                                       |
| Interfaces                        |                                                                                                                                                                |                                       |
| Communication interface           | IO-Link                                                                                                                                                        |                                       |
| Transmission type                 | COM2 (38,4 kBaud)                                                                                                                                              |                                       |
| IO-Link revision                  | 1.1                                                                                                                                                            |                                       |
| SDCI standard                     | IEC 61131-9                                                                                                                                                    |                                       |
| Profiles                          | Common - I&D                                                                                                                                                   | Identification and Diagnosis          |
|                                   | Function                                                                                                                                                       | Measurement data, standard resolution |
| SIO mode                          | yes                                                                                                                                                            |                                       |
| Required master port class        | A                                                                                                                                                              |                                       |
| Process data analog               | 3                                                                                                                                                              |                                       |
| Process data binary               | 2                                                                                                                                                              |                                       |
| Min. process cycle time           | [ms]                                                                                                                                                           | 8                                     |
| Supported DeviceIDs               | Type of operation                                                                                                                                              | DeviceID                              |
|                                   | default                                                                                                                                                        | 949                                   |
| Operating conditions              |                                                                                                                                                                |                                       |
| Ambient temperature               | [°C]                                                                                                                                                           | -20...60                              |
| Storage temperature               | [°C]                                                                                                                                                           | -25...80                              |
| Protection                        | IP 65; IP 67                                                                                                                                                   |                                       |

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| Tests / approvals            |                                                                                       |                    |
|------------------------------|---------------------------------------------------------------------------------------|--------------------|
| EMC                          | DIN EN 60947-5-9                                                                      |                    |
| CPA approval                 | model number                                                                          | 005MI              |
|                              | accuracy class                                                                        | -                  |
|                              | maximum allowable error                                                               | ± 1,0 % FS         |
|                              | Q (min)                                                                               | 0,003 m³/h         |
|                              | Q (t)                                                                                 | -                  |
|                              | Q (max)                                                                               | 2,1 m³/h           |
| Shock resistance             | DIN IEC 68-2-27                                                                       | 20 g (11 ms)       |
| Vibration resistance         | DIN IEC 68-2-6:                                                                       | 5 g (10...2000 Hz) |
| MTTF [years]                 |                                                                                       | 114                |
| UL approval                  | UL approval number                                                                    | I014               |
|                              | File number UL                                                                        | E174189            |
| Pressure equipment directive | sound engineering practice; can be used for group 2 fluids; group 1 fluids on request |                    |

| Mechanical data          |                                                                                                                                      |               |
|--------------------------|--------------------------------------------------------------------------------------------------------------------------------------|---------------|
| Weight [g]               |                                                                                                                                      | 717.2         |
| Housing                  |                                                                                                                                      | rectangular   |
| Dimensions [mm]          |                                                                                                                                      | 110 x 48 x 73 |
| Material                 | stainless steel (1.4408/316); stainless steel (1.4404 / 316L); PC; PBT+PC-GF30                                                       |               |
| Materials (wetted parts) | Pipe section: stainless steel (1.4404 / 316L); Process connection sealing: NBR fiber-reinforced Gasket; FKM; PEEK; carbon fiber PEEK |               |
| Process connection       | threaded connection G 1/2 external thread DN15 flat seal                                                                             |               |

| Displays / operating elements |  |                                       |
|-------------------------------|--|---------------------------------------|
| Display                       |  | Color display 1,44", 128 x 128 pixels |
|                               |  | 2 x LED, yellow                       |

| Remarks       |  |                                          |
|---------------|--|------------------------------------------|
| Remarks       |  | MW = Measured value                      |
|               |  | MEW = Final value of the measuring range |
| Pack quantity |  | 1 pcs.                                   |

### Electrical connection

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



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### Connection



- OUT1:

Switching output Volumetric flow quantity monitoring  
Switching output Temperature monitoring  
Pulse output quantity meter  
Frequency output volumetric flow monitoring  
Frequency output Temperature monitoring  
signal output Preset counter  
IO-Link
- OUT2:

Switching output Volumetric flow quantity monitoring  
Switching output Temperature monitoring  
analog output flow  
analog output temperature  
Input counter reset  
Colors to DIN EN 60947-5-2  
Core colors :
- BK =

black
- BN =

brown
- BU =

blue
- WH =

white

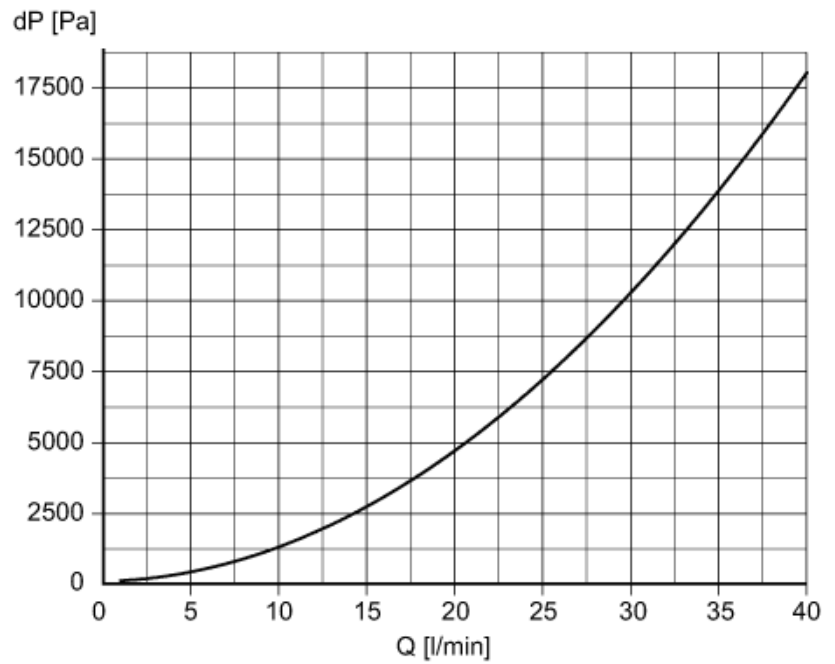
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### Diagrams and graphs



Pressure loss / volumetric flow quantity