

# SM7020

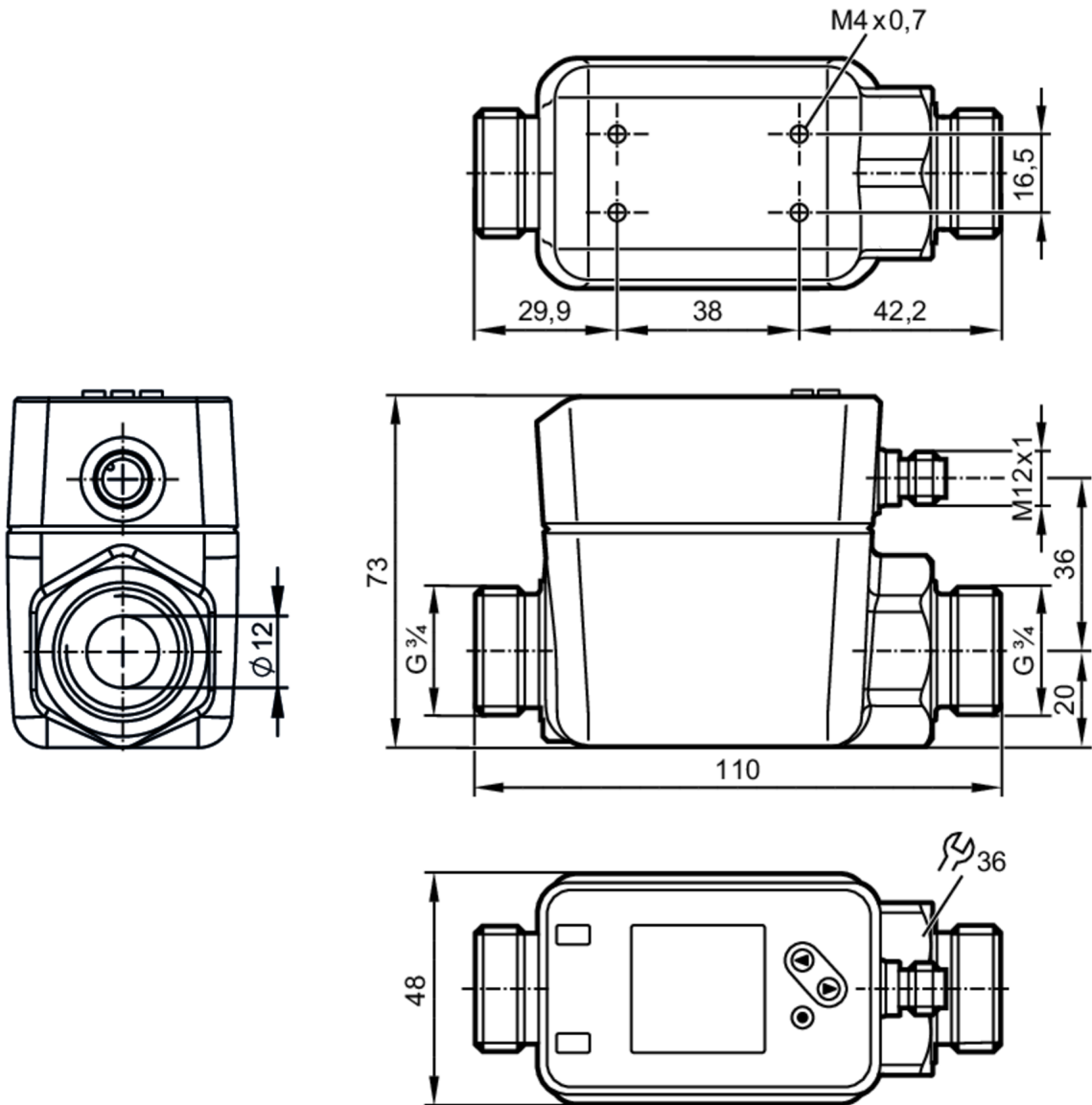


## Magnetic-inductive flow meter

SMR34XGXFRKG/US-100

Alternative articles: SM7000

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              | 0.1...75 l/min                                            | 0.006...4.5 m³/h | 1.2...1190 gph | 0.02...19.82 gpm |
| Process connection           | threaded connection G 3/4 external thread DN20 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                                      | 0.1...75 l/min                                                                           | 0.006...4.5 m³/h  | 1.2...1190 gph       | 0.02...19.82 gpm   |
| Display range                                        | -90...90 l/min                                                                           | -5.4...5.4 m³/h   | -1426.8...1426.8 gph | -23.78...23.78 gpm |
| Resolution                                           | 0.1 l/min                                                                                | 0.006 m³/h        | 0.6 gph              | 0.01 gpm           |
| Set point SP                                         | 0.5...75 l/min                                                                           | 0.03...4.5 m³/h   | 8.4...1189 gph       | 0.14...19.81 gpm   |
| Reset point rP                                       | 0.1...74.6 l/min                                                                         | 0.006...4.48 m³/h | 1.2...1183 gph       | 0.03...19.71 gpm   |
| Analog start point ASP                               | 0...59.9 l/min                                                                           | 0...3.6 m³/h      | 0...950 gph          | 0...15.82 gpm      |
| Analog end point AEP                                 | 15.1...75 l/min                                                                          | 0.9...4.5 m³/h    | 240...1189 gph       | 3.99...19.81 gpm   |
| Low flow cut-off LFC                                 | 0.1...3.8 l/min                                                                          | 0.006...0.23 m³/h | 1.8...59.4 gph       | 0.03...0.99 gpm    |
| Frequency end point, FEP                             | 15.1...75 l/min                                                                          | 0.9...4.5 m³/h    | 240...1189 gph       | 3.99...19.81 gpm   |
| Frequency at the end point FRP [Hz]                  | 1...10000                                                                                |                   |                      |                    |
| Volumetric flow quantity monitoring                  |                                                                                          |                   |                      |                    |
| Pulse length [s]                                     | 0.003...2                                                                                |                   |                      |                    |
| Pulse value                                          | 0.01...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                                                                                                                                                        | 955                                   |
| 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                                                                          | 006MI              |
|                              | accuracy class                                                                        | -                  |
|                              | maximum allowable error                                                               | ± 1,0 % FS         |
|                              | Q (min)                                                                               | 0,006 m³/h         |
|                              | Q (t)                                                                                 | -                  |
|                              | Q (max)                                                                               | 4,5 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]  | 797.5                                                                                                                                |
| 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 3/4 external thread DN20 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



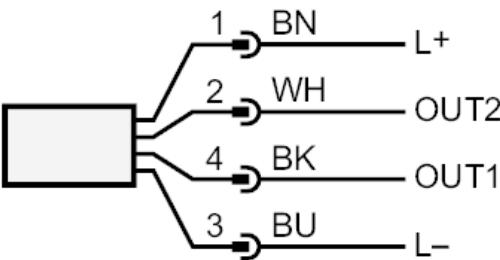
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### Connection



|       |                                                      |
|-------|------------------------------------------------------|
| OUT1: | Colors to DIN EN 60947-5-2                           |
|       | 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                         |
| OUT2: | IO-Link                                              |
|       | Switching output Volumetric flow quantity monitoring |
|       | Switching output Temperature monitoring              |
|       | analog output flow                                   |
|       | analog output temperature                            |
|       | Input counter reset                                  |
|       | Core colors :                                        |
| BK =  | black                                                |
| BN =  | brown                                                |
| BU =  | blue                                                 |
| WH =  | white                                                |

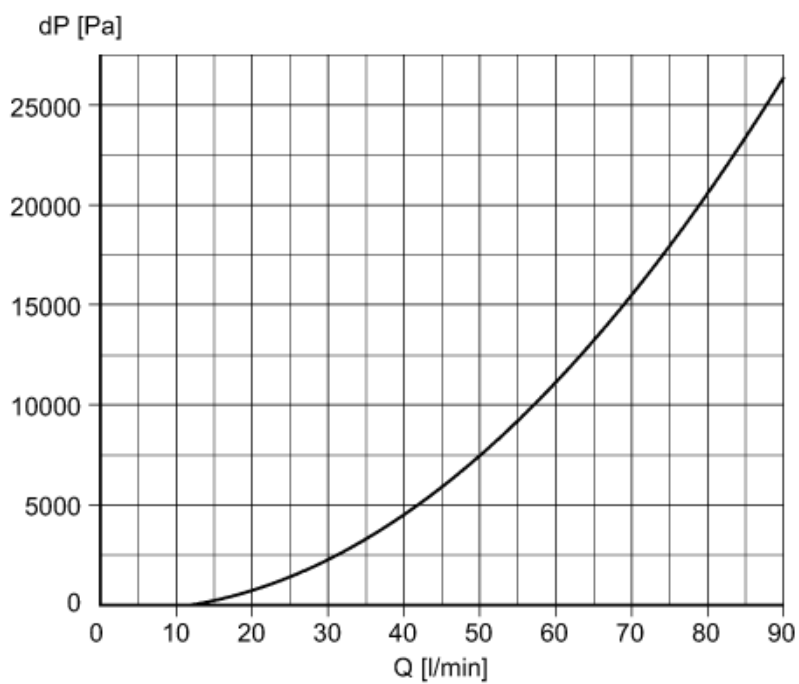
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### Diagrams and graphs



Pressure loss / volumetric flow quantity