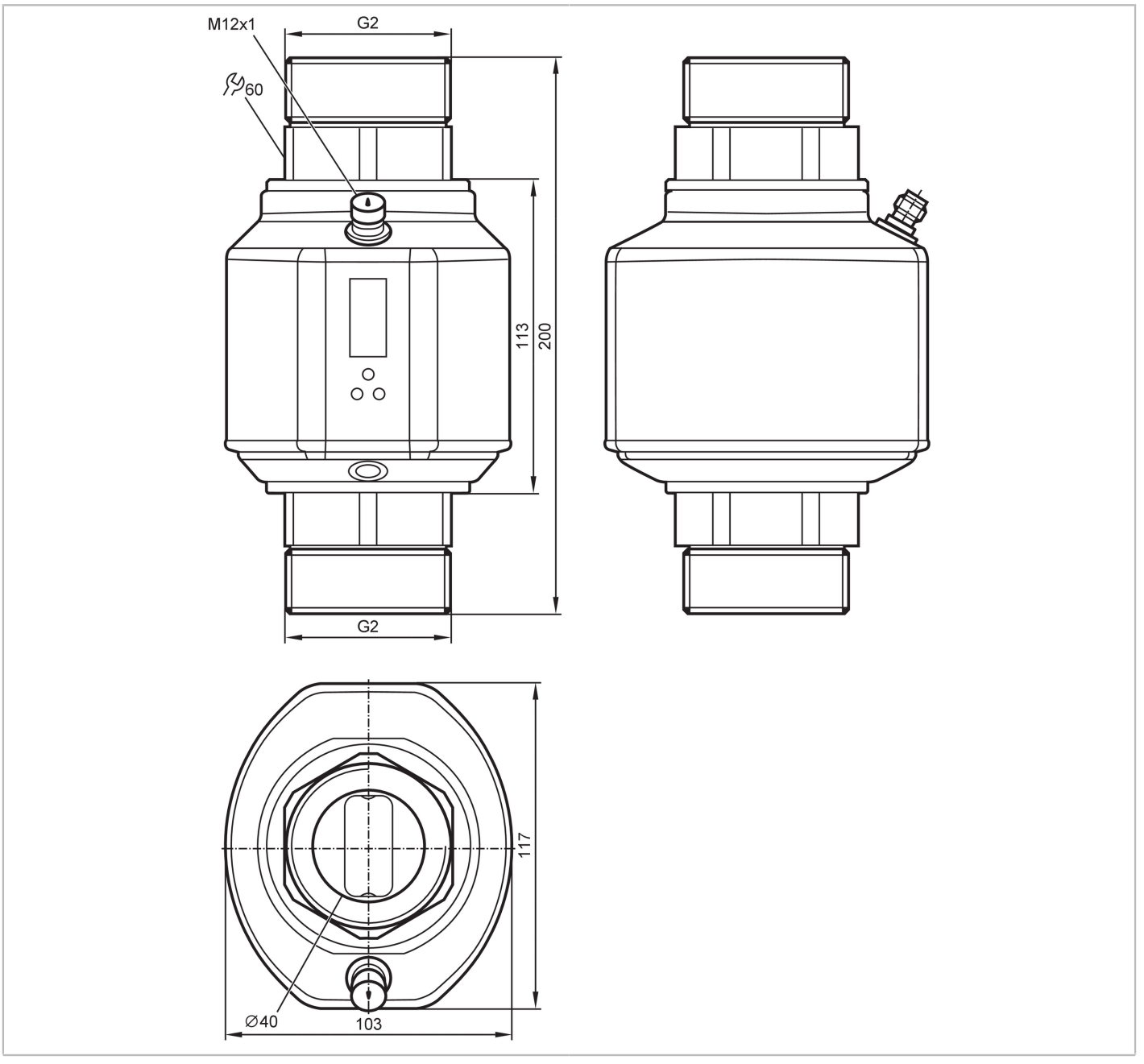
# SM2000

## Magnetic-inductive flow meter

SMR21XGXFRKG/US




| | | |
|---|---|---|
| **Product characteristics** | | |
| Number of inputs and outputs | Number of digital outputs: 2; Number of analogue outputs: 1 | |
| Measuring range | 5...600 l/min | 0.3...36 m³/h |
| Process connection | threaded connection G 2 external thread DN50 flat seal | |
| **Application** | | |
| Special feature | Gold-plated contacts | |
| Application | totaliser function; empty pipe detection; for industrial applications | |
| Installation | connection to pipe by means of an adapter | |
| Media | conductive liquids; water; hydrous media | |

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|---|---|---|---|
| Note on media | | conductivity: ≥ 20 µS/cm | |
| | | viscosity: < 70 mm²/s (40 °C) | |
| Medium temperature | [°C] | -10...80 | |
| Pressure rating | | 16 bar | 1.6 MPa |
| MAWP for applications according to CRN | [bar] | 16 | |
| **Electrical data** | | | |
| Operating voltage | [V] | 18...32 DC; (to SELV/PELV) | |
| Current consumption | [mA] | < 150 | |
| Protection class | | III | |
| Reverse polarity protection | | yes | |
| Power-on delay time | [s] | 5 | |
| **Inputs / outputs** | | | |
| Number of inputs and outputs | | Number of digital outputs: 2; Number of analogue outputs: 1 | |
| **Inputs** | | | |
| Inputs | | counter reset | |
| **Outputs** | | | |
| Total number of outputs | | 2 | |
| Output signal | | switching signal; analogue signal; pulse signal; frequency signal; IO-Link; (configurable) | |
| Electrical design | | PNP/NPN | |
| Number of digital outputs | | 2 | |
| Output function | | normally open / normally closed; (parameterisable) | |
| Max. voltage drop switching output DC | [V] | 2 | |
| Permanent current rating of switching output DC | [mA] | 250; (per output) | |
| Number of analogue outputs | | 1 | |
| Analogue current output | [mA] | 4...20; (scalable) | |
| Max. load | [Ω] | 500 | |
| Analogue voltage output | [V] | 0...10; (scalable) | |
| Min. load resistance | [Ω] | 2000 | |
| Pulse output | | flow rate meter | |
| Short-circuit protection | | yes | |
| Type of short-circuit protection | | pulsed | |
| Overload protection | | yes | |
| Frequency of the output | [Hz] | 0.1...10000 | |
| **Measuring/setting range** | | | |
| Measuring range | | 5...600 l/min | 0.3...36 m³/h |
| Display range | | -720...720 l/min | -43.2...43.2 m³/h |
| Resolution | | 0.5 l/min | 0.02 m³/h |
| Set point SP | | 8...600 l/min | 0.5...36 m³/h |
| Reset point rP | | 5...597 l/min | 0.3...35.8 m³/h |
| Analogue start point ASP | | 0...480 l/min | 0...28.8 m³/h |
| Analogue end point AEP | | 120...600 l/min | 7.2...36 m³/h |
| Low flow cut-off LFC | | < 15 l/min | < 0.9 m³/h |

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| In steps of | | 0.5 l/min | 0.02 m³/h |
| Measuring dynamics | | 1:120 | |
| **Volumetric flow quantity monitoring** | | | |
| Pulse value | | 0.0001...600 x 10³ m³ | |
| In steps of | | 0.0001 m³ | |
| Pulse length | [s] | 0,008...2 | |
| **Temperature monitoring** | | | |
| Measuring range | [°C] | -20...80 | |
| Display range | [°C] | -40...100 | |
| Resolution | [°C] | 0.2 | |
| Set point SP | [°C] | -19.2...80 | |
| Reset point rP | [°C] | -19.6...79.6 | |
| Analogue start point | [°C] | -20...60 | |
| Analogue end point | [°C] | 0...80 | |
| In steps of | [°C] | 0.2 | |
| **Accuracy / deviations** | | | |
| **Flow monitoring** | | | |
| Accuracy (in the measuring range) | | ± (0,8 % MW + 0,5 % MEW) | |
| Repeatability | | ± 0,2% MEW | |
| **Temperature monitoring** | | | |
| Temperature drift | | ± 0,0333 °C / K | |
| Accuracy | [K] | ± 1 (bei 25 °C, Q > 15 l/min) | |
| **Response times** | | | |
| **Flow monitoring** | | | |
| Response time | [s] | 0.35;  (dAP = 0) | |
| Delay time programmable dS, dr | [s] | 0...50 | |
| Damping process value dAP | [s] | 0...5 | |
| **Temperature monitoring** | | | |
| Dynamic response T05 / T09 | [s] | T09 = 3 (Q > 15 l/min) | |
| **Software / programming** | | | |
| Parameter setting options | | Flow monitoring; quantity meter; Preset counter; Temperature monitoring; hysteresis / window; normally open / normally closed; switching logic; current/voltage/frequency/ pulse output; start-up delay; display can be deactivated; Display unit; empty pipe detection | |
| **Interfaces** | | | |
| Communication interface | | IO-Link | |
| Transmission type | | COM2 (38,4 kBaud) | |
| IO-Link revision | | 1.1 | |
| SDCI standard | | IEC 61131-9 CDV | |
| Profiles | | Smart Sensor - SSP 0 | Generic Profiled Sensor |
| | | Function | Device identification |
| | | Function | Process data variable |
| SIO mode | | yes | |

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|---|---|---|---|
| Required master port type | | A | |
| Process data analogue | | 3 | |
| Process data binary | | 2 | |
| Min. process cycle time | [ms] | 5 | |
| Supported DeviceIDs | | **Type of operation** | **DeviceID** |
| | | default | 389 |
| **Operating conditions** | | | |
| Ambient temperature | [°C] | -10...60 | |
| Storage temperature | [°C] | -25...80 | |
| Protection | | IP 65; IP 67 | |
| **Tests / approvals** | | | |
| EMC | | DIN EN 60947-5-9 | |
| CPA approval | | model number | 004MI |
| | | accuracy class | - |
| | | maximum allowable error | ± 1,5 % FS |
| | | Q (min) | 0,3 m³/h |
| | | Q (t) | - |
| | | Q (max) | 36 m³/h |
| | | Medium temperature | -10...70°C |
| Shock resistance | | DIN EN 60068-2-27 | 20 g (11 ms) |
| Vibration resistance | | DIN EN 60068-2-6 | 5 g (10...2000 Hz) |
| MTTF | [years] | 85 | |
| UL approval | | UL approval no. | I008 |
| | | 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] | 3208 | |
| Housing | | rectangular | |
| Dimensions | [mm] | 200 x 103 x 117 | |
| Materials | | stainless steel (316L/1.4404); stainless steel (316Ti/1.4571); PEI; FKM; PBT-GF20; TPE-U | |
| Materials (wetted parts) | | stainless steel (316L/1.4404); stainless steel (316Ti/1.4571); PEEK; NBR reinforced fibre; FKM | |
| Process connection | | threaded connection G 2 external thread DN50 flat seal | |
| **Displays / operating elements** | | | |
| Display | | Display unit | 6 x LED, green (l/min, m³/h, l, m³, 10³, °C) |
| | | switching status | 2 x LED, yellow |
| | | measured values | alphanumeric display, 4-digit |
| | | programming | alphanumeric display, 4-digit |
| **Accessories** | | | |
| Items supplied | | sealings: 2, Centellen | |
| | | Label | |
| **Remarks** | | | |
| Remarks | | MW = measured value | |
| | | MEW = Final value of the measuring range | |
| Pack quantity | | 1 pcs. | |

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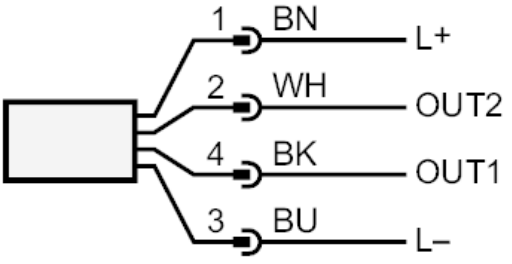
## Electrical connection

Connector: 1 x M12; coding: A; Contacts: 4, gold-plated


### Connection




| | |
|---|---|
| | colours to DIN EN 60947-5-2 |
| OUT1: | switching output empty pipe detection |
| | switching output volumetric flow quantity monitoring |
| | frequency output volumetric flow quantity monitoring |
| | Pulse output quantity meter |
| | signal output Preset counter |
| | IO-Link |
| OUT2: | switching output empty pipe detection |
| | switching output volumetric flow quantity monitoring |
| | switching output Temperature monitoring |
| | analogue output volumetric flow quantity monitoring |
| | analogue output Temperature monitoring |
| | input counter reset |
| | Core colours : |
| BK = | black |
| BN = | brown |
| BU = | blue |
| WH = | white |

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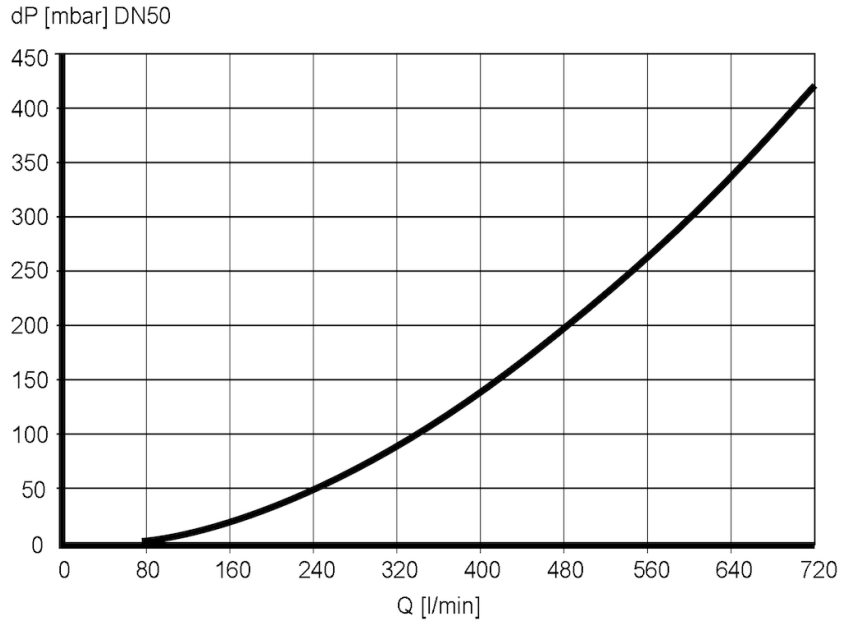
## Diagrams and graphs

Pressure loss




dP Pressure loss

Q volumetric flow quantity