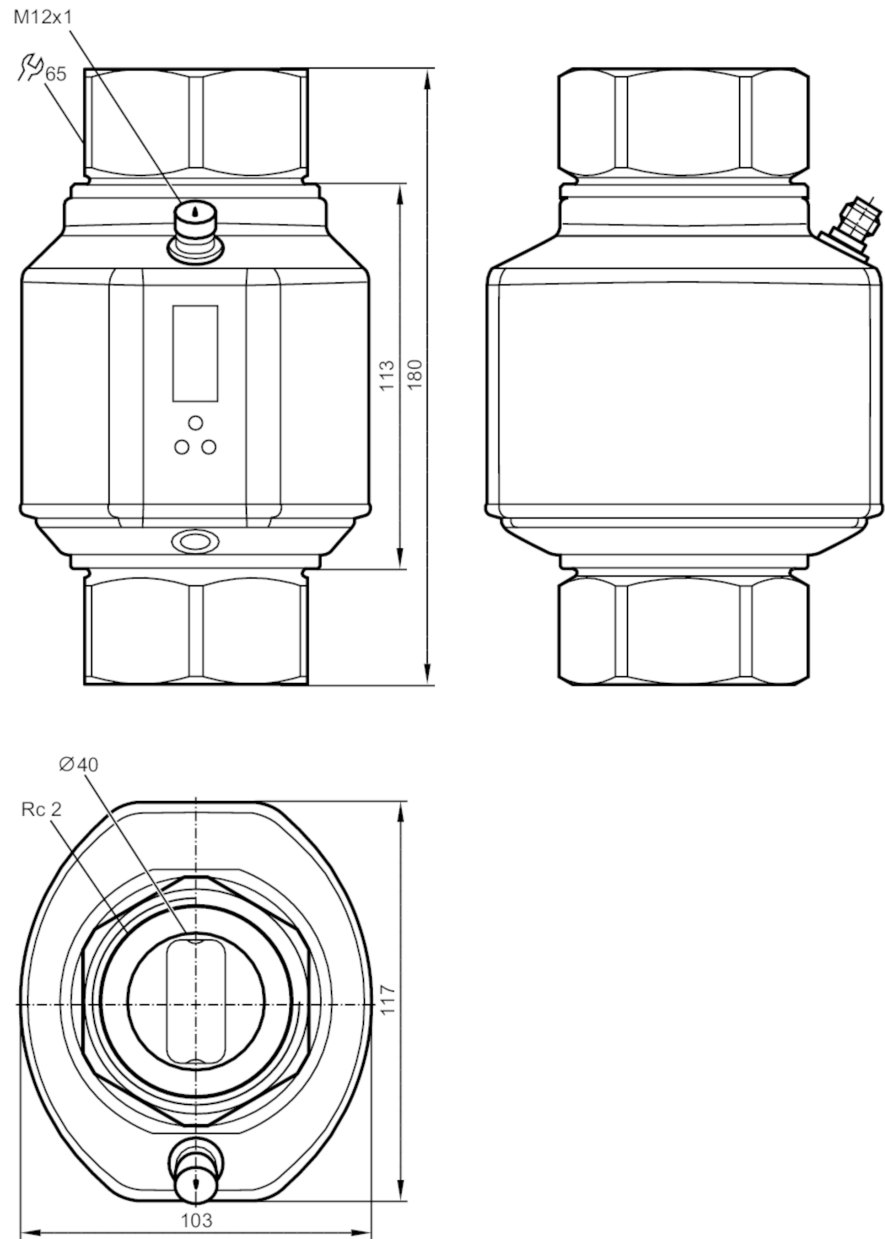


# SM2400



## Magnetic-inductive flow meter

SMK21XGXFRKG/US-100



### 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 Rc 2 internal thread DN50               |               |

### Application

|                 |                                                                       |
|-----------------|-----------------------------------------------------------------------|
| Special feature | Gold-plated contacts                                                  |
| Application     | totaliser function; empty pipe detection; for industrial applications |
| Media           | conductive liquids; water; hydrous media                              |
| Note on media   | conductivity: $\geq 20 \mu\text{S/cm}$                                |
|                 | viscosity: $< 70 \text{ mm}^2/\text{s}$ (40 °C)                       |

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|                                        |         |          |
|----------------------------------------|---------|----------|
| Medium temperature                     | [°C]    | -10...90 |
| Pressure rating                        | 16 bar  | 1.6 MPa  |
| MAWP for applications according to CRN | 8.9 bar | 0.89 MPa |

| 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                          |
| Measuring principle         |      | magnetic-inductive         |

| 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        |
| In steps of              | 0.5 l/min        | 0.02 m³/h         |



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|                                     |                                                                                                                                                                                                                                                                         |                         |
|-------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|
| 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                                                                                                                                                                                                                                                                     |                         |
| Required master port type           | A                                                                                                                                                                                                                                                                       |                         |

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|                              |                   |          |
|------------------------------|-------------------|----------|
| 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               |
| Pressure Equipment Directive | Sound engineering practice; can be used for group 2 fluids; group 1 fluids on request |                    |

| Mechanical data          |                                                                                          |                 |
|--------------------------|------------------------------------------------------------------------------------------|-----------------|
| Weight [g]               |                                                                                          | 2740            |
| Housing                  |                                                                                          | rectangular     |
| Dimensions [mm]          |                                                                                          | 180 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; FKM                 |                 |
| Process connection       | threaded connection Rc 2 internal thread DN50                                            |                 |

| 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 |  | Label |

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

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## Magnetic-inductive flow meter

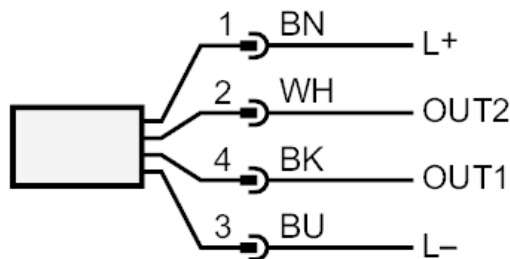
SMK21XGXFRKG/US-100

### Electrical connection

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



### Connection



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

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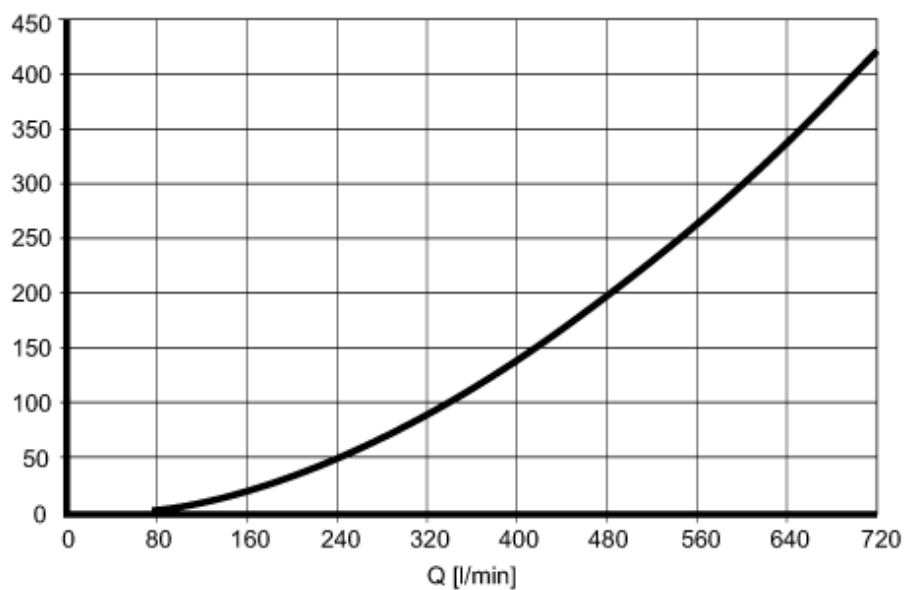
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### Diagrams and graphs

Pressure loss

dP [mbar] DN50



dP Pressure loss

Q volumetric flow quantity