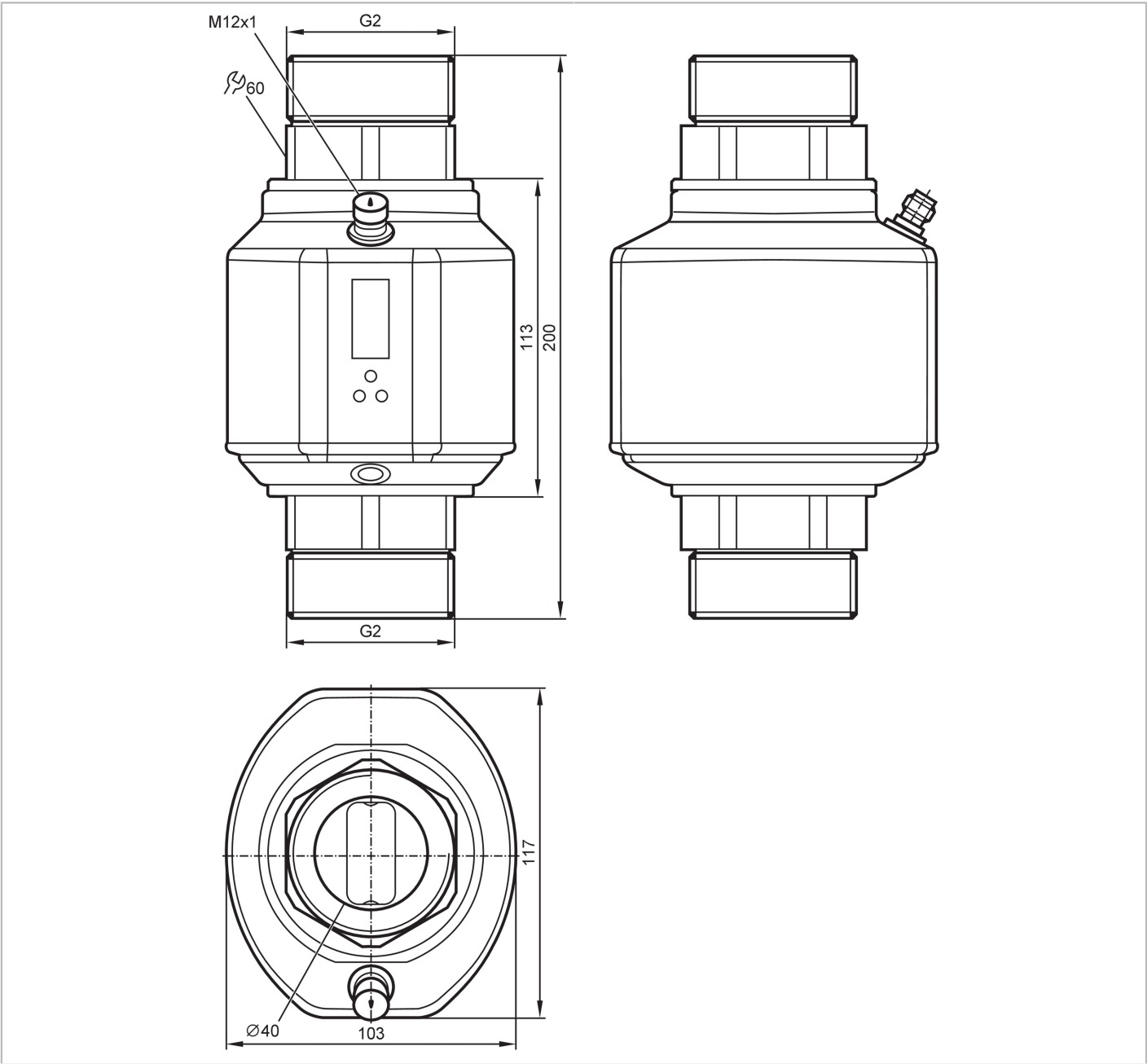


# SM2130



## Magnetic-inductive flow meter

SMR21XGXFRKG/US



ACS CRN IO-Link KTW/W270 Reg31

| Product characteristics      |                                                                       |               |
|------------------------------|-----------------------------------------------------------------------|---------------|
| Number of inputs and outputs | Number of digital outputs: 2; Number of analog outputs: 1             |               |
| Measuring range              | 5...900 l/min                                                         | 0.3...54 m³/h |
| Process connection           | threaded connection G 2 external thread DN50 flat seal                |               |
| Application                  |                                                                       |               |
| Special feature              | gold-plated contacts                                                  |               |
| Application                  | Totalizer function; empty pipe detection; for industrial applications |               |
| Installation                 | connection to pipe by means of an adapter                             |               |
| Media                        | Conductive liquids; water; water-based media                          |               |



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|                                          |                                                 |          |
|------------------------------------------|-------------------------------------------------|----------|
| Note on media                            | conductivity: $\geq 20 \mu\text{S/cm}$          |          |
|                                          | viscosity: $< 70 \text{ mm}^2/\text{s}$ (40 °C) |          |
| 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 analog outputs: 1 |
|------------------------------|-----------------------------------------------------------|

## Inputs

|        |               |
|--------|---------------|
| Inputs | counter reset |
|--------|---------------|

## Outputs

|                                                      |                                                                                          |  |
|------------------------------------------------------|------------------------------------------------------------------------------------------|--|
| Total number of outputs                              | 2                                                                                        |  |
| Output signal                                        | switching signal; analog signal; pulse signal; frequency signal; IO-Link; (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] | 250; (per output)                                                                        |  |
| Number of analog outputs                             | 1                                                                                        |  |
| Analog current output [mA]                           | 4...20; (scalable)                                                                       |  |
| Max. load [ $\Omega$ ]                               | 500                                                                                      |  |
| Analog voltage output [V]                            | 0...10; (scalable)                                                                       |  |
| Min. load resistance [ $\Omega$ ]                    | 2000                                                                                     |  |
| Pulse output                                         | flow rate meter                                                                          |  |
| Short-circuit protection                             | yes                                                                                      |  |
| Type of short-circuit protection                     | yes (non-latching)                                                                       |  |
| Overload protection                                  | yes                                                                                      |  |
| Frequency of the output [Hz]                         | 0.1...10000                                                                              |  |

## Measuring/setting range

|                        |                  |                   |
|------------------------|------------------|-------------------|
| Measuring range        | 5...900 l/min    | 0.3...54 m³/h     |
| Display range          | -920...920 l/min | -55.2...55.2 m³/h |
| Resolution             | 1 l/min          | 0.05 m³/h         |
| Set point SP           | 10...900 l/min   | 0.55...54 m³/h    |
| Reset point rP         | 5...896 l/min    | 0.3...53.75 m³/h  |
| Analog start point ASP | 0...720 l/min    | 0...43.2 m³/h     |
| Analog end point AEP   | 180...900 l/min  | 10.8...54 m³/h    |



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|                                     |                                                                                                                                                                                                                                                               |                         |            |
|-------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|------------|
| Low flow cut-off LFC                | < 15 l/min                                                                                                                                                                                                                                                    |                         | < 0.9 m³/h |
| In steps of                         | 1 l/min                                                                                                                                                                                                                                                       |                         | 0.05 m³/h  |
| Measuring dynamics                  | 1:180                                                                                                                                                                                                                                                         |                         |            |
| Volumetric flow quantity monitoring |                                                                                                                                                                                                                                                               |                         |            |
| Pulse value                         | 0.1 l...600 x 10³ m³                                                                                                                                                                                                                                          |                         |            |
| In steps of                         | 0.1 l                                                                                                                                                                                                                                                         |                         |            |
| Pulse length [s]                    | 0,003...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                                                                                                                                                                                                                                                  |                         |            |
| Analog start point [°C]             | -20...60                                                                                                                                                                                                                                                      |                         |            |
| Analog 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); (Q > 15 l/min; medium and operating temperature: 22 °C ± 4 K)                                                                                                                                                                       |                         |            |
| Repeatability                       | ± 0,2% MEW                                                                                                                                                                                                                                                    |                         |            |
| Temperature monitoring              |                                                                                                                                                                                                                                                               |                         |            |
| Temperature drift                   | ± 0,0333 °C / K                                                                                                                                                                                                                                               |                         |            |
| Accuracy [K]                        | ± 1 (bei 25 °C, Q > 15 l/min)                                                                                                                                                                                                                                 |                         |            |
| Reaction 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 / 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   |            |

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|                              |                          |                 |
|------------------------------|--------------------------|-----------------|
| SIO mode                     | yes                      |                 |
| Required master port class   | A                        |                 |
| Process data analog          | 3                        |                 |
| Process data binary          | 2                        |                 |
| Min. process cycle time [ms] | 5                        |                 |
| Supported DeviceIDs          | <b>Type of operation</b> | <b>DeviceID</b> |
|                              | default                  | 1322            |

### Operating conditions

|                          |              |
|--------------------------|--------------|
| Ambient temperature [°C] | -10...60     |
| Storage temperature [°C] | -25...80     |
| Protection               | IP 65; IP 67 |

### Tests / approvals

|                              |                                                                                       |                    |
|------------------------------|---------------------------------------------------------------------------------------|--------------------|
| EMC                          | DIN EN 61000-4-2 ESD                                                                  | 4 kV CD / 8 kV AD  |
|                              | DIN EN 61000-4-3 HF radiated                                                          | 10 V/m             |
|                              | DIN EN 61000-4-4 Burst                                                                | 2 kV               |
|                              | DIN EN 61000-4-5 Surge                                                                | 1 kV               |
|                              | DIN EN 61000-4-6 HF conducted                                                         | 10 V               |
| 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 number                                                                    | 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]               | 3109.9                                                                                                                                              |
| Housing                  | rectangular                                                                                                                                         |
| Inlet pipe length        | 3 x DN                                                                                                                                              |
| Outlet pipe length       | 1 x DN                                                                                                                                              |
| Dimensions [mm]          | 200 x 103 x 117                                                                                                                                     |
| Material                 | stainless steel (1.4404 / 316L); stainless steel (1.4571/316Ti ); PC; FKM; PBT-GF20; TPE-U                                                          |
| Materials (wetted parts) | Pipe section: stainless steel (1.4404 / 316L); Process connection sealing: NBR fiber-reinforced Gasket; stainless steel (1.4571/316Ti ); PEEK; EPDM |
| 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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## Magnetic-inductive flow meter

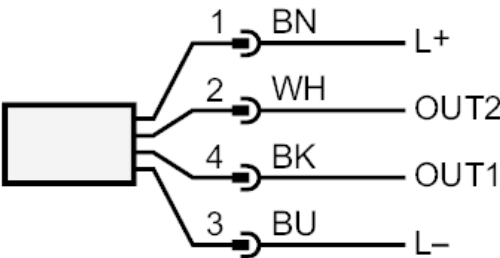
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### Electrical connection

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



### Connection



|       |                                                                                                                                                                                                                                                                               |
|-------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| OUT1: | Colors 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>analog output Volumetric flow quantity monitoring<br>analog output Temperature monitoring<br>Input counter reset<br>Core colors : |
| BK =  | black                                                                                                                                                                                                                                                                         |
| BN =  | brown                                                                                                                                                                                                                                                                         |
| BU =  | blue                                                                                                                                                                                                                                                                          |
| WH =  | white                                                                                                                                                                                                                                                                         |

# SM2130

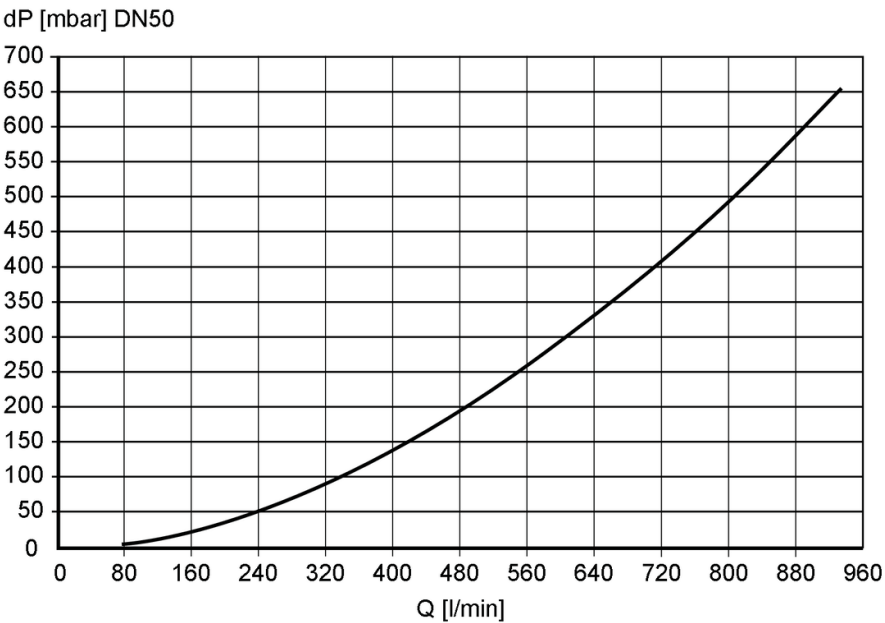


## Magnetic-inductive flow meter

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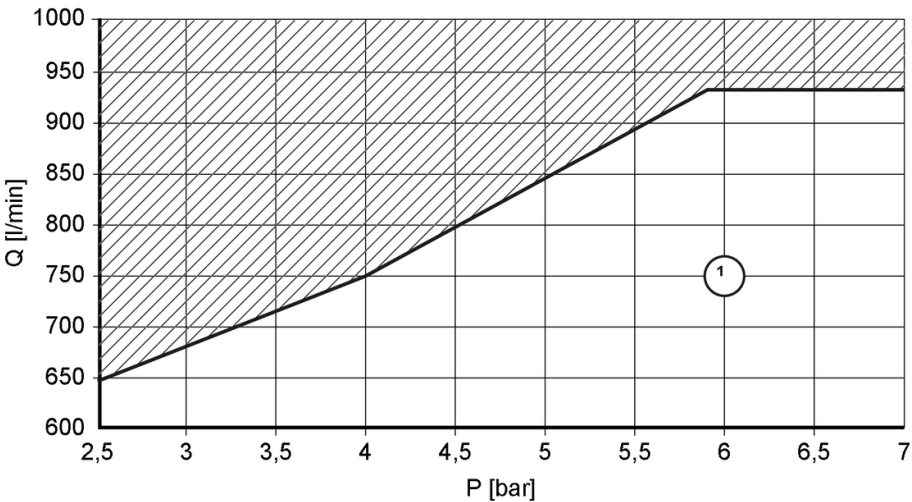
### Diagrams and graphs

#### Pressure loss



dP Pressure loss  
Q volumetric flow quantity

#### Cavitation



1 cavitation-free working area see operating instructions