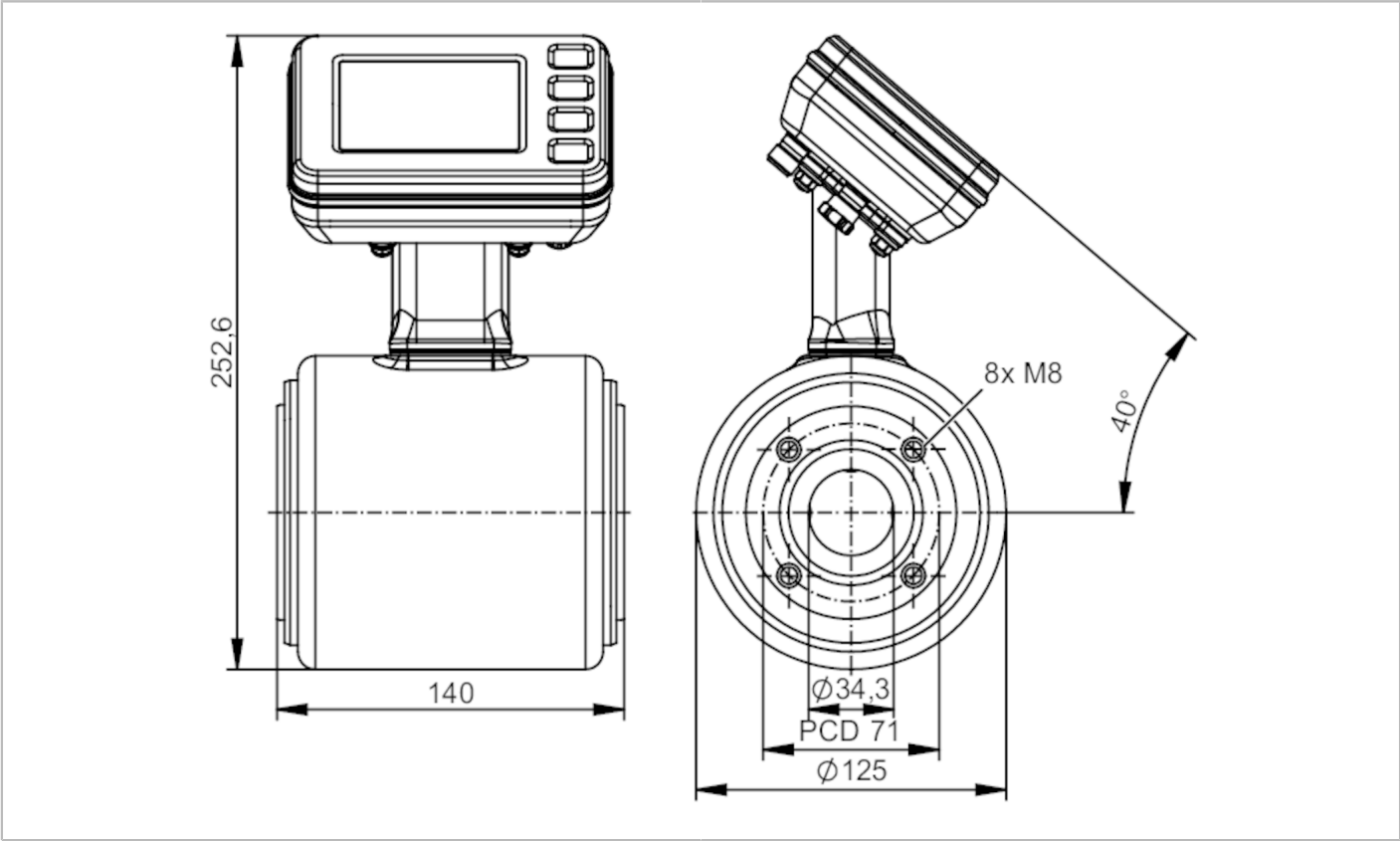


# SMF321



## Magnetic-inductive flow meter

SMG40KGFFRKG/USD



| Product characteristics     |                                                                                                          |                    |                 |                   |
|-----------------------------|----------------------------------------------------------------------------------------------------------|--------------------|-----------------|-------------------|
| Measuring range             | 5...750 l/min                                                                                            | 300...45000 l/h    | 1.4...198.2 gpm | 0.22...32.42 ft/s |
| Nominal diameter            | DN40 (1 1/2")                                                                                            |                    |                 |                   |
| Process connection          | ifm-specific device flange                                                                               |                    |                 |                   |
| Application                 |                                                                                                          |                    |                 |                   |
| System                      | gold-plated contacts                                                                                     |                    |                 |                   |
| Application                 | food and beverage industry                                                                               |                    |                 |                   |
| Media                       | Conductive liquids; water; water-based media                                                             |                    |                 |                   |
| Note on media               | food products such as beer, milk, fruit juices, soft drinks, ketchup, yogurt, yogurt toppings, ice cream |                    |                 |                   |
|                             | conductivity: ≥ 5 µS/cm                                                                                  |                    |                 |                   |
| Medium temperature          | -20...150 °C                                                                                             |                    | -4...302 °F     |                   |
| Min. bursting pressure      | 870 psi                                                                                                  |                    | 6 MPa           |                   |
| Pressure rating             | 580.1 psi                                                                                                |                    | 4 MPa           |                   |
| Electrical data             |                                                                                                          |                    |                 |                   |
| Operating voltage           | [V]                                                                                                      | 18...32 DC         |                 |                   |
| Current consumption         | [mA]                                                                                                     | 250; (24V)         |                 |                   |
| Protection class            |                                                                                                          | III                |                 |                   |
| Reverse polarity protection |                                                                                                          | yes                |                 |                   |
| Power-on delay time         | [s]                                                                                                      | < 5                |                 |                   |
| Measuring principle         |                                                                                                          | magnetic-inductive |                 |                   |

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| Inputs / outputs                                     |  |                      |                                                                            |                      |                    |
|------------------------------------------------------|--|----------------------|----------------------------------------------------------------------------|----------------------|--------------------|
| Total number of inputs and outputs                   |  | 2                    |                                                                            |                      |                    |
| Inputs                                               |  |                      |                                                                            |                      |                    |
| Inputs                                               |  | OUT2                 | external totalizer reset                                                   |                      |                    |
| Outputs                                              |  |                      |                                                                            |                      |                    |
| Total number of outputs                              |  | 2                    |                                                                            |                      |                    |
| Output signal                                        |  | OUT1                 | pulse signal; totalizer switching signal; diagnostic signal; IO-Link       |                      |                    |
|                                                      |  | OUT2                 | analog signal; pulse signal; totalizer switching signal; diagnostic signal |                      |                    |
| Electrical design                                    |  | PNP/NPN              |                                                                            |                      |                    |
| Pulse output                                         |  | flow rate meter      |                                                                            |                      |                    |
| Short-circuit protection                             |  | yes                  |                                                                            |                      |                    |
| Type of short-circuit protection                     |  | yes (non-latching)   |                                                                            |                      |                    |
| Overload protection                                  |  | yes                  |                                                                            |                      |                    |
| Analog                                               |  |                      |                                                                            |                      |                    |
| Number of analog outputs                             |  | 1                    |                                                                            |                      |                    |
| Analog current output [mA]                           |  | 4...20; (skalierbar) |                                                                            |                      |                    |
| Max. load [Ω]                                        |  | 500                  |                                                                            |                      |                    |
| Resolution of analog output                          |  | 0.38 μA              |                                                                            |                      |                    |
| Digital                                              |  |                      |                                                                            |                      |                    |
| Number of digital outputs                            |  | 2                    |                                                                            |                      |                    |
| Max. voltage drop switching output DC [V]            |  | 2                    |                                                                            |                      |                    |
| Permanent current rating of switching output DC [mA] |  | 100                  |                                                                            |                      |                    |
| Switching frequency DC [Hz]                          |  | 0...10000            |                                                                            |                      |                    |
| Measuring/setting range                              |  |                      |                                                                            |                      |                    |
| Measuring range                                      |  | 5...750 l/min        | 300...45000 l/h                                                            | 1.4...198.2 gpm      | 0.22...32.42 ft/s  |
| Display range                                        |  | -900...900 l/min     | -54000...54000 l/h                                                         | -237.75...237.75 gpm | -39.4...39.4 ft/s  |
| Resolution                                           |  | 0.01 l/min           | 50 l/h                                                                     | 0.01 gpm             | 0.01 ft/s          |
| Note on factory setting                              |  | 0...50 gpm           |                                                                            |                      |                    |
| Analog start point ASP                               |  | -750...600 l/min     | -45000...36000 l/h                                                         | -198.15...158.52 gpm | -32.8...26.24 ft/s |
| Analog end point AEP                                 |  | -600...750 l/min     | -36000...45000 l/h                                                         | < 198.15 gpm         | < 32.8 ft/s        |
| Low flow cut-off LFC                                 |  | 0...600 l/min        | 0...36000 l/h                                                              | 0...158.52 gpm       | 0...26.24 ft/s     |
| Pulse length [s]                                     |  | 0.00005...2          |                                                                            |                      |                    |
| Pulse value                                          |  | 0.002...99990000 l   |                                                                            |                      |                    |
| Temperature monitoring                               |  |                      |                                                                            |                      |                    |
| Measuring range                                      |  | -20...150 °C         |                                                                            | -4...302 °F          |                    |
| Display range                                        |  | -20...150 °C         |                                                                            | -4...302 °F          |                    |
| Resolution                                           |  | 0.01 °C              |                                                                            | 0.1 °F               |                    |
| Analog start point                                   |  | -20...116 °C         |                                                                            | -4...240.8 °F        |                    |
| Analog end point                                     |  | 14...150 °C          |                                                                            | 57.2...302 °F        |                    |
| Conductivity monitoring                              |  |                      |                                                                            |                      |                    |
| Measuring range [μS/cm]                              |  | 100...100000         |                                                                            |                      |                    |

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|                                       |                                                         |                                                           |
|---------------------------------------|---------------------------------------------------------|-----------------------------------------------------------|
| Display range                         | [μS/cm]                                                 | 0...10000000                                              |
| Resolution                            | [μS/cm]                                                 | 1                                                         |
| Analog start point                    | [μS/cm]                                                 | 0...80000                                                 |
| Analog end point                      | [μS/cm]                                                 | 20000...100000                                            |
| <b>Accuracy / deviations</b>          |                                                         |                                                           |
| Volumetric flow monitoring            |                                                         |                                                           |
| Accuracy (under reference conditions) | with optional factory calibration (available from 2025) | ± (0,2 % MW + 2 mm/s)                                     |
|                                       | standard                                                | ± (0,5 % MW + 1,5 mm/s)                                   |
| Repeatability                         |                                                         | 0,1% MW                                                   |
| Temperature monitoring                |                                                         |                                                           |
| Accuracy                              | [K]                                                     | ± 1                                                       |
| Repeatability                         | [K]                                                     | ± 0,5                                                     |
| Conductivity monitoring               |                                                         |                                                           |
| Accuracy (in the measuring range)     | in the range of 100...20000 μS/cm                       | ±10% MW                                                   |
|                                       | in the range of 20000...100000 μS/cm                    | ±20% MW                                                   |
| Repeatability                         |                                                         | ± 5% MW                                                   |
| <b>Reaction times</b>                 |                                                         |                                                           |
| Volumetric flow monitoring            |                                                         |                                                           |
| Response time                         | [s]                                                     | < 0.3                                                     |
| Damping process value dAP             | [s]                                                     | 0...5                                                     |
| Temperature monitoring                |                                                         |                                                           |
| Response time                         | [s]                                                     | < 3; (Flow velocity: ≥ 0,5m/s)                            |
| Conductivity monitoring               |                                                         |                                                           |
| Response time                         | [s]                                                     | < 2                                                       |
| <b>Software / programming</b>         |                                                         |                                                           |
| Diagnostic functions                  |                                                         | direction of flow detection; liquid detection             |
| <b>Interfaces</b>                     |                                                         |                                                           |
| Communication interface               |                                                         | IO-Link                                                   |
| Transmission type                     |                                                         | COM3 (230,4 kBaud)                                        |
| IO-Link revision                      |                                                         | 1.1.3                                                     |
| SDCI standard                         |                                                         | IEC 61131-9                                               |
| Profiles                              | <b>Function class</b>                                   | <b>Description</b>                                        |
|                                       | 0x4000                                                  | Identification and Diagnosis                              |
|                                       | 0x001B                                                  | Measuring and Switching Sensor, floating point, 4 channel |
| SIO mode                              |                                                         | yes                                                       |
| Required master port class            |                                                         | A                                                         |
| Process data analog                   |                                                         | 6                                                         |
| Process data binary                   |                                                         | 8                                                         |
| Min. process cycle time               | [ms]                                                    | 1.9                                                       |

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| IO-Link process data<br>(cyclical) | Function                                                                                                             | bit length |
|------------------------------------|----------------------------------------------------------------------------------------------------------------------|------------|
|                                    | totalizer                                                                                                            | 32         |
|                                    | flow                                                                                                                 | 32         |
|                                    | temperature                                                                                                          | 32         |
|                                    | conductivity                                                                                                         | 32         |
|                                    | status                                                                                                               | 4          |
|                                    | binary switching information                                                                                         | 8          |
| IO-Link functions (acyclical)      | direction of flow detection; totalizer; Speicher; operating hours counter; internal temperature; simulation function |            |

| Operating conditions |              |             |
|----------------------|--------------|-------------|
| Ambient temperature  | -20...65 °C  | -4...149 °F |
| Storage temperature  | -20...80 °C  | -4...176 °F |
| Protection           | IP 67; IP 69 |             |

| Tests / approvals            |                                                                                       |                   |
|------------------------------|---------------------------------------------------------------------------------------|-------------------|
| EMC                          | DIN 61326-1                                                                           |                   |
| Shock resistance             | DIN IEC 68-2-27                                                                       | 20 g (18ms)       |
| Vibration resistance         | DIN IEC 68-2-6                                                                        | 5 g (10...2000Hz) |
| MTTF [years]                 |                                                                                       | 81                |
| UL approval                  | UL approval number                                                                    | I031              |
| Pressure equipment directive | sound engineering practice; can be used for group 2 fluids; group 1 fluids on request |                   |

| Mechanical data                                   |                                                                                                                                                                                                                                               |  |
|---------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| Weight [g]                                        | 5324.8                                                                                                                                                                                                                                        |  |
| Inlet pipe length                                 | 5 x DN                                                                                                                                                                                                                                        |  |
| Outlet pipe length                                | 2 x DN                                                                                                                                                                                                                                        |  |
| Material                                          | housing: stainless steel (1.4404 / 316L); flange: stainless steel (1.4301 / 304); electronics fixture: stainless steel (1.4301 / 304); electronics: stainless steel (1.4404 / 316L); Display: polysulfane; Display-sealing: FKM; LED ring: PP |  |
| Materials (wetted parts)                          | Pipe section: PFA; electrodes: stainless steel (1.4435 / 316L)                                                                                                                                                                                |  |
| Nominal diameter                                  | DN40 (1 1/2")                                                                                                                                                                                                                                 |  |
| Process connection                                | ifm-specific device flange                                                                                                                                                                                                                    |  |
| Surface characteristics Ra/Rz of the wetted parts | ≤ 0.4 µm                                                                                                                                                                                                                                      |  |

| Displays / operating elements |                                                                                        |                                                             |
|-------------------------------|----------------------------------------------------------------------------------------|-------------------------------------------------------------|
| Display                       | process value                                                                          | full graphics TFT display, multi-color 3,5" 320 x 240 Pixel |
|                               |                                                                                        | display layouts: 4                                          |
|                               |                                                                                        | display rotation: 4 x 90°                                   |
|                               | operating status                                                                       | LED ring, three-color                                       |
| Display unit                  | l/min; l/h; hl/min; hl/h; m³/min; m³/h; m/s; gpm; gph; ft/s; °C; °F; µS/cm; S/m; ms/cm |                                                             |
| Factory setting               | gpm; °F; µS/cm                                                                         |                                                             |
| Language                      | German; English; Spanish; French; Italian; Japanese; Korean; Portuguese; Chinese       |                                                             |
| Operating elements            | 4                                                                                      | capacitive pushbuttons                                      |

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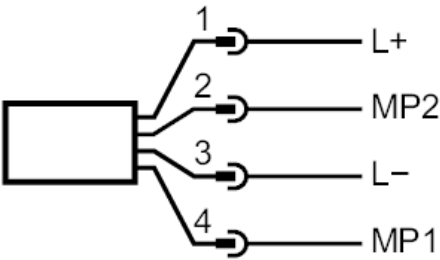
| Remarks       |                                                                                                                                                                         |
|---------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Remarks       | MW = Measured value                                                                                                                                                     |
|               | MEW = Final value of the measuring range                                                                                                                                |
|               | pulse and totalizer signal are only available for one of the two outputs                                                                                                |
|               | reference conditions (1/2): water (free of gas bubbles), 15...35 °C, process connection: DIN32676 series A, pipe standard suitable for process connection               |
|               | reference conditions (2/2): inlet pipe length 10xDN, outlet pipe length 5xDN, device settling time: 30 minutes, device orientation: horizontal, display orientation: up |
| Pack quantity | 1 pcs.                                                                                                                                                                  |

Electrical connection

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



Connection



|    |                        |
|----|------------------------|
| 1: | L+                     |
| 2: | OUT MP2, DO, AO, Reset |
| 3: | L-                     |
| 4: | OUT1 MP1, DO, IO-Link  |