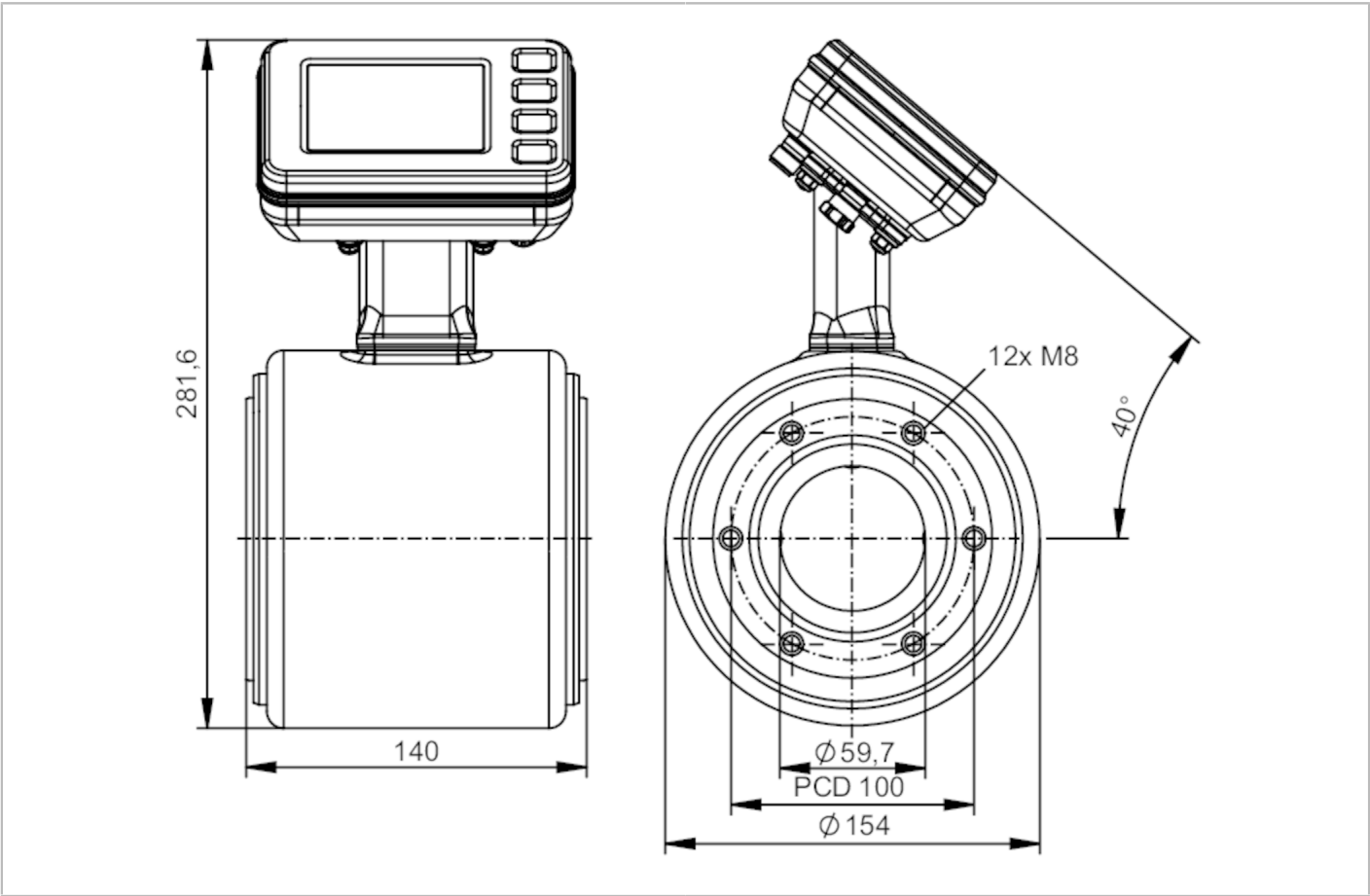


# SMF520



## Magnetic-inductive flow meter

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| Product characteristics     |                                                                                                            |                   |              |                |
|-----------------------------|------------------------------------------------------------------------------------------------------------|-------------------|--------------|----------------|
| Measuring range             | 20...2000 l/min                                                                                            | 1200...120000 l/h | 0.1...10 m/s | 1.2...120 m³/h |
| Nominal diameter            | DN65 (2 1/2")                                                                                              |                   |              |                |
| Process connection          | ifm-specific device flange                                                                                 |                   |              |                |
| Application                 |                                                                                                            |                   |              |                |
| Special feature             | Gold-plated contacts                                                                                       |                   |              |                |
| Application                 | food and beverage industry                                                                                 |                   |              |                |
| Media                       | conductive liquids; water; hydrous media                                                                   |                   |              |                |
| Note on media               | food products such as beer, milk, fruit juices, soft drinks, ketchup, yoghurt, yoghurt toppings, ice cream |                   |              |                |
|                             | conductivity: ≥ 5 µS/cm                                                                                    |                   |              |                |
| Medium temperature          | [°C]                                                                                                       | -20...150         |              |                |
| Min. bursting pressure      | 37.5 bar                                                                                                   |                   | 3.75 MPa     |                |
| Pressure rating             | 25 bar                                                                                                     |                   | 2.5 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               |              |                |



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|                                                      |                      |                                                                              |                          |                 |
|------------------------------------------------------|----------------------|------------------------------------------------------------------------------|--------------------------|-----------------|
| Measuring principle                                  | magnetic-inductive   |                                                                              |                          |                 |
| Inputs / outputs                                     |                      |                                                                              |                          |                 |
| Total number of inputs and outputs                   | 2                    |                                                                              |                          |                 |
| Inputs                                               |                      |                                                                              |                          |                 |
| Inputs                                               | OUT2                 |                                                                              | external totaliser reset |                 |
| Outputs                                              |                      |                                                                              |                          |                 |
| Total number of outputs                              | 2                    |                                                                              |                          |                 |
| Output signal                                        | OUT1                 | pulse signal; totaliser switching signal; diagnostic signal; IO-Link         |                          |                 |
|                                                      | OUT2                 | analogue signal; pulse signal; totaliser switching signal; diagnostic signal |                          |                 |
| Electrical design                                    | PNP/NPN              |                                                                              |                          |                 |
| Pulse output                                         | flow rate meter      |                                                                              |                          |                 |
| Short-circuit protection                             | yes                  |                                                                              |                          |                 |
| Type of short-circuit protection                     | pulsed               |                                                                              |                          |                 |
| Overload protection                                  | yes                  |                                                                              |                          |                 |
| analogue                                             |                      |                                                                              |                          |                 |
| Number of analogue outputs                           | 1                    |                                                                              |                          |                 |
| Analogue current output [mA]                         | 4...20; (skalierbar) |                                                                              |                          |                 |
| Max. load [Ω]                                        | 500                  |                                                                              |                          |                 |
| Resolution of analogue 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                                      | 20...2000 l/min      | 1200...120000 l/h                                                            | 0.1...10 m/s             | 1.2...120 m³/h  |
| Display range                                        | -2400...2400 l/min   | -144000...144000 l/h                                                         | -12...12 m/s             | -144...144 m³/h |
| Resolution                                           | 0.1 l/min            | 100 l/h                                                                      | 0.01 m/s                 | 0.01 m³/h       |
| Note on factory setting                              | 0...30,0 m³/h        |                                                                              |                          |                 |
| Analogue start point ASP                             | 0...1600 l/min       | 0...96000 l/h                                                                | 0...8.05 m/s             | 0...96 m³/h     |
| Analogue end point AEP                               | 400...2000 l/min     | 24000...120000 l/h                                                           | 2...10.05 m/s            | 24...120 m³/h   |
| Low flow cut-off LFC                                 | 0...1600 l/min       | 0...96000 l/h                                                                | 0...8.05 m/s             | 0...96 m³/h     |
| Pulse length [s]                                     | 0.002...2            |                                                                              |                          |                 |
| Pulse value                                          | 0.001...99990000 l   |                                                                              |                          |                 |
| Temperature monitoring                               |                      |                                                                              |                          |                 |
| Measuring range [°C]                                 | -20...150            |                                                                              |                          |                 |
| Display range [°C]                                   | -20...150            |                                                                              |                          |                 |
| Resolution [°C]                                      | 0.01                 |                                                                              |                          |                 |
| Analogue start point [°C]                            | -20...116            |                                                                              |                          |                 |
| Analogue end point [°C]                              | 14...150             |                                                                              |                          |                 |

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|                                   |                                                         |                                                           |
|-----------------------------------|---------------------------------------------------------|-----------------------------------------------------------|
| conductivity monitoring           |                                                         |                                                           |
| Measuring range                   | [μS/cm]                                                 | 100...100000                                              |
| Display range                     | [μS/cm]                                                 | 0...100000                                                |
| Resolution                        | [μS/cm]                                                 | 1                                                         |
| Analogue start point              | [μS/cm]                                                 | 0...80000                                                 |
| Analogue end point                | [μS/cm]                                                 | 20000...100000                                            |
| Accuracy / deviations             |                                                         |                                                           |
| volumetric flow monitoring        |                                                         |                                                           |
| Accuracy (in the measuring range) | 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                                                   |
| Response times                    |                                                         |                                                           |
| 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                                                       |
| Software / programming            |                                                         |                                                           |
| Diagnostic functions              |                                                         | direction of flow detection; liquid detection             |
| Interfaces                        |                                                         |                                                           |
| 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>Designation</b>                                        |
|                                   | 0x4000                                                  | Identification and Diagnosis                              |
|                                   | 0x001B                                                  | Measuring and Switching Sensor, floating point, 4 channel |
| SIO mode                          |                                                         | yes                                                       |
| Required master port type         |                                                         | A                                                         |
| Process data analogue             |                                                         | 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 |
|------------------------------------|----------------------------------------------------------------------------------------------------------------------|------------|
|                                    | totaliser                                                                                                            | 32         |
|                                    | flow                                                                                                                 | 32         |
|                                    | temperature                                                                                                          | 32         |
|                                    | conductivity                                                                                                         | 32         |
|                                    | status                                                                                                               | 4          |
|                                    | binary switching information                                                                                         | 8          |
| IO-Link functions (acyclical)      | direction of flow detection; totaliser; Speicher; operating hours counter; internal temperature; simulation function |            |

| Operating conditions |      |              |
|----------------------|------|--------------|
| Ambient temperature  | [°C] | -20...65     |
| Storage temperature  | [°C] | -20...80     |
| 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                |
| Pressure Equipment Directive | Sound engineering practice; can be used for group 2 fluids; group 1 fluids on request |                   |

| Mechanical data                                   |                                                                                                                                                                                                                                |                            |
|---------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|
| Weight                                            | [g]                                                                                                                                                                                                                            | 6925.7                     |
| Inlet pipe length                                 |                                                                                                                                                                                                                                | 5 x DN                     |
| Outlet pipe length                                |                                                                                                                                                                                                                                | 2 x DN                     |
| Materials                                         | housing: stainless steel (316L/1.4404); flange: stainless steel (304/1.4301); electronics fixture: stainless steel (304/1.4301); electronics: stainless steel (316L/1.4404); Display: PPSU; Display-Sealing: FKM; LED ring: PP |                            |
| Materials (wetted parts)                          | Pipe section: PFA; electrodes: stainless steel (316L/1.4435)                                                                                                                                                                   |                            |
| Nominal diameter                                  |                                                                                                                                                                                                                                | DN65 (2 1/2")              |
| Process connection                                |                                                                                                                                                                                                                                | ifm-specific device flange |
| Surface characteristics Ra/Rz of the wetted parts |                                                                                                                                                                                                                                | ≤ 0.4 µm                   |

| Displays / operating elements |                                                                                  |                                                              |
|-------------------------------|----------------------------------------------------------------------------------|--------------------------------------------------------------|
| Factory setting               | m³/h; °C; µS/cm                                                                  |                                                              |
| Display                       | process value                                                                    | full graphics TFT display, multi-colour 3,5" 128 x 128 Pixel |
|                               |                                                                                  | display layouts: 4                                           |
|                               |                                                                                  | display rotation: 4 x 90°                                    |
|                               | operating status                                                                 | LED ring, three-colour                                       |
| Display unit                  | l/min; l/h; hl/min; hl/h; m³/min; m³/h; m/s; °C; µS/cm; S/m; ms/cm               |                                                              |
| Language                      | German; English; Spanish; French; Italian; Japanese; Korean; Portuguese; Chinese |                                                              |
| Operating elements            | 4                                                                                | capacitive pushbuttons                                       |

| Remarks |                                                                                                   |  |
|---------|---------------------------------------------------------------------------------------------------|--|
| Remarks | MW = measured value                                                                               |  |
|         | MEW = Final value of the measuring range                                                          |  |
|         | pulse and totaliser signal are only available for one of the two outputs                          |  |
|         | reference conditions : water , 15...35 °C, inlet pipe length: 10 x DN, outlet pipe length: 5 x DN |  |
|         |                                                                                                   |  |

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## Magnetic-inductive flow meter

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Pack quantity

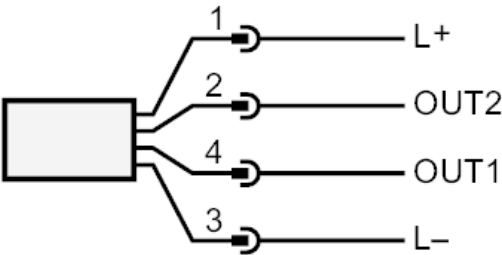
1 pcs.

### Electrical connection

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



### Connection



|    |                    |
|----|--------------------|
| 1: | L+                 |
| 2: | OUT2 DO, AO, reset |
| 3: | L-                 |
| 4: | OUT1 DO, IO-Link   |