

### Overview



The SITRANS FMS500 is a magnetic flow meter sensor suitable for volume flow measurement of liquids (conductive) and is the ideal product for applications in water abstraction, wastewater treatment, water distribution networks, and irrigation.

The rugged, fully welded design supports direct burial, constant flooding and to stand up a wide range of harsh chemicals found in water-based applications in many different industries.

Designed for highly accurate measurement in low-flow conditions, these meters can measure from very low velocities up to 10 m/s, giving it a very wide measurement range.

Combined with a flow meter transmitter it is a traditional externally powered electromagnetic flow meter system

### Benefits

- Zero Up and Zero Down installation capabilities
- NBR rubber liner for all water and wastewater applications
- EPDM liner specifically for drinking water applications requiring special approvals
- Soft elastomer facing provides high abrasion resistance
- Increased low flow accuracy for water leak detection
- Rugged construction with no moving parts for maintenance-free operation over many years
- Simple on-site upgrade to IP68 of a standard sensor allowing underground installation, permanent immersion or underwater installation
- Integrated grounding electrodes – no grounding rings required for many applications
- Short delivery time
- Built-in length according to ISO 20456 (up to DN 400 mm)
- SENSORPROM™ Technology provides an automatic upload of start-up settings and calibration data for easy commissioning
- Designed to allow in-situ verification for easy performance check
- In conformity with ISO 4064, OIML R49 and EN 14154

### Application

The SITRANS FMS500 with its NBR or EPDM rubber lining is a flow meter sensor for all kinds of water applications such as ground water, potable water, cooling water, wastewater, sewage, or sludge applications.

Connected to the compatible transmitter SITRANS FMT020, either mounted remotely or as a compact unit, it forms the magnetic flow meter system SITRANS FM520 which can be used in almost all general-purpose water applications.

#### SITRANS FM520

Perfect match for a cost-effective solution for all water and wastewater applications. Measuring accuracy  $\pm 0.4\%$  of flow rate, optional  $\pm 0.2\%$  of flow rate available.

# Flow Measurement

## SITRANS FM (electromagnetic)

### Flow sensors / SITRANS FMS500

#### Selection and ordering data

| Sensor SITRANS FMS500                                                                           |  |  |  | Article No.<br>7ME653-<br>• - • • • • • - 1 • A • |   |   |   |   |   |   |  |
|-------------------------------------------------------------------------------------------------|--|--|--|---------------------------------------------------|---|---|---|---|---|---|--|
| Click on the Article No. for the online configuration in the PIA Life Cycle Portal.             |  |  |  |                                                   |   |   |   |   |   |   |  |
| Transmitter variant                                                                             |  |  |  |                                                   |   |   |   |   |   |   |  |
| No transmitter (sensor only)                                                                    |  |  |  | 0                                                 |   |   |   |   |   |   |  |
| Transmitter SITRANS FMT020                                                                      |  |  |  | 2                                                 |   |   |   |   |   |   |  |
| Diameter                                                                                        |  |  |  |                                                   |   |   |   |   |   |   |  |
| DN 15, 1/2 inch                                                                                 |  |  |  |                                                   | 1 | V |   |   |   |   |  |
| DN 25, 1 inch                                                                                   |  |  |  |                                                   | 2 | D |   |   |   |   |  |
| DN 40, 1 1/2 inch                                                                               |  |  |  |                                                   | 2 | R |   |   |   |   |  |
| DN 50, 2 inch                                                                                   |  |  |  |                                                   | 2 | Y |   |   |   |   |  |
| DN 65, 2 1/2 inch                                                                               |  |  |  |                                                   | 3 | F |   |   |   |   |  |
| DN 80, 3 inch                                                                                   |  |  |  |                                                   | 3 | M |   |   |   |   |  |
| DN 100, 4 inch                                                                                  |  |  |  |                                                   | 3 | T |   |   |   |   |  |
| DN 125, 5 inch                                                                                  |  |  |  |                                                   | 4 | B |   |   |   |   |  |
| DN 150, 6 inch                                                                                  |  |  |  |                                                   | 4 | H |   |   |   |   |  |
| DN 200, 8 inch                                                                                  |  |  |  |                                                   | 4 | P |   |   |   |   |  |
| DN 250, 10 inch                                                                                 |  |  |  |                                                   | 4 | V |   |   |   |   |  |
| DN 300, 12 inch                                                                                 |  |  |  |                                                   | 5 | B |   |   |   |   |  |
| DN 350, 14 inch                                                                                 |  |  |  |                                                   | 5 | D |   |   |   |   |  |
| DN 400, 16 inch                                                                                 |  |  |  |                                                   | 5 | H |   |   |   |   |  |
| DN 450, 18 inch                                                                                 |  |  |  |                                                   | 5 | K |   |   |   |   |  |
| DN 500, 20 inch                                                                                 |  |  |  |                                                   | 5 | R |   |   |   |   |  |
| DN 600, 24 inch                                                                                 |  |  |  |                                                   | 5 | Y |   |   |   |   |  |
| DN 700, 28 inch                                                                                 |  |  |  |                                                   | 6 | B |   |   |   |   |  |
| DN 750, 30 inch                                                                                 |  |  |  |                                                   | 6 | D |   |   |   |   |  |
| DN 800, 32 inch                                                                                 |  |  |  |                                                   | 6 | H |   |   |   |   |  |
| DN 900, 36 inch                                                                                 |  |  |  |                                                   | 6 | K |   |   |   |   |  |
| DN 1000, 40 inch                                                                                |  |  |  |                                                   | 6 | R |   |   |   |   |  |
| DN 1050, 42 inch                                                                                |  |  |  |                                                   | 6 | Y |   |   |   |   |  |
| DN 1100, 44 inch                                                                                |  |  |  |                                                   | 7 | D |   |   |   |   |  |
| DN 1200, 48 inch                                                                                |  |  |  |                                                   | 7 | H |   |   |   |   |  |
| Process connection                                                                              |  |  |  |                                                   |   |   |   |   |   |   |  |
| EN 1092-1 PN 10 flanges                                                                         |  |  |  |                                                   |   | B |   |   |   |   |  |
| EN 1092-1 PN16 flanges                                                                          |  |  |  |                                                   |   | C |   |   |   |   |  |
| EN 1092-1 PN16 flanges, non-PED type of equipment (excluded from scope of PED 2014/68/EU)       |  |  |  |                                                   |   | D |   |   |   |   |  |
| EN 1092-1 PN 40 flanges                                                                         |  |  |  |                                                   |   | F |   |   |   |   |  |
| ANSI B16.5 Class 150 flanges                                                                    |  |  |  |                                                   |   | J |   |   |   |   |  |
| AWWA C-207 Class D flanges                                                                      |  |  |  |                                                   |   | M |   |   |   |   |  |
| AS 4087 PN 16 flanges                                                                           |  |  |  |                                                   |   | S |   |   |   |   |  |
| Process connection material                                                                     |  |  |  |                                                   |   |   |   |   |   |   |  |
| Carbon steel ASTM A 105 with corrosion-resistant coating acc. to EN ISO 12944 grade C4          |  |  |  |                                                   |   | 0 |   |   |   |   |  |
| Carbon steel ASTM A 105 with corrosion-resistant coating acc. to EN ISO 12944 grade C5 (300 µm) |  |  |  |                                                   |   | 1 |   |   |   |   |  |
| Liner material                                                                                  |  |  |  |                                                   |   |   |   |   |   |   |  |
| EPDM                                                                                            |  |  |  |                                                   |   |   | 2 |   |   |   |  |
| NBR                                                                                             |  |  |  |                                                   |   |   | 3 |   |   |   |  |
| Electrode material                                                                              |  |  |  |                                                   |   |   |   |   |   |   |  |
| Hastelloy C276 / 2.4819                                                                         |  |  |  |                                                   |   |   |   | 1 |   |   |  |
| Transmitter mounting & enclosure type                                                           |  |  |  |                                                   |   |   |   |   |   |   |  |
| No transmitter (sensor only)                                                                    |  |  |  |                                                   |   |   |   |   | A |   |  |
| Compact design (integral mount), polycarbonate enclosure                                        |  |  |  |                                                   |   |   |   |   | G |   |  |
| Remote design, polycarbonate enclosure (wall-mounting unit and sensor terminal board included)  |  |  |  |                                                   |   |   |   |   | J |   |  |
| Power supply                                                                                    |  |  |  |                                                   |   |   |   |   |   |   |  |
| None (sensor only)                                                                              |  |  |  |                                                   |   |   |   |   |   | 0 |  |
| 12 ... 42 V DC                                                                                  |  |  |  |                                                   |   |   |   |   |   | 2 |  |
| 100 ... 240 V AC, 50/60 Hz                                                                      |  |  |  |                                                   |   |   |   |   |   |   |  |

<sup>1)</sup> Not concerned by PED

## Selection and ordering data (continued)

| Additional information                                                                               | Order code |
|------------------------------------------------------------------------------------------------------|------------|
| Please add "-Z" to Article No. and specify Order code(s) and plain text.                             |            |
| <b>Cable glands</b>                                                                                  |            |
| Without cable glands (blind plugs)                                                                   | A00        |
| M20x1.5 cable glands, material polyamide                                                             | A02        |
| 1/2 inch NPT cable glands, material polyamide                                                        | A05        |
| <b>Certificates</b>                                                                                  |            |
| Declaration of compliance with the order 2.1 (EN 10204)                                              | C00        |
| Inspection certificate 3.1 (EN 10204) - Material of pressure-containing and wetted parts             | C12        |
| Test report 2.2 (EN 10204)                                                                           | C14        |
| Inspection certificate 3.1 (EN 10204) - Pressure test                                                | C18        |
| <b>High accuracy calibration</b>                                                                     |            |
| High accuracy factory calibration 0.2%, DN ≤ 200, ≤ 8 inch                                           | D01        |
| High accuracy factory calibration 0.2%, DN 250 ... 600, 10 ... 24 inch                               | D02        |
| High accuracy factory calibration 0.2%, DN 700 ... 1200, 28 ... 48 inch                              | D03        |
| <b>5-point calibration</b>                                                                           |            |
| 5-point factory calibration, DN ≤ 200, ≤ 8 inch                                                      | D10        |
| 5-point factory calibration, DN 250 ... 600, 10 ... 24 inch                                          | D11        |
| 5-point factory calibration, DN 700 ... 1200, 28 ... 48 inch                                         | D12        |
| <b>10-point calibration</b>                                                                          |            |
| 10-point factory calibration, DN ≤ 200, ≤ 8 inch                                                     | D15        |
| 10-point factory calibration, DN 250 ... 600, 10 ... 24 inch                                         | D16        |
| 10-point factory calibration, DN 700 ... 1200, 28 ... 48 inch                                        | D17        |
| <b>Default matched-pair calibration</b>                                                              |            |
| Default matched-pair factory calibration, DN ≤ 200, ≤ 8 inch                                         | D20        |
| Default matched-pair factory calibration, DN 250 ... 600, 10 ... 24 inch                             | D21        |
| Default matched-pair factory calibration, DN 700 ... 1200, 28 ... 48 inch                            | D22        |
| <b>5-point matched-pair calibration</b>                                                              |            |
| 5-point, matched-pair factory calibration, DN ≤ 200, ≤ 8 inch                                        | D25        |
| 5-point, matched-pair factory calibration, DN 250 ... 600, 10 ... 24 inch                            | D26        |
| 5-point, matched-pair factory calibration, DN 700 ... 1200, 28 ... 48 inch                           | D27        |
| <b>10-point matched-pair calibration</b>                                                             |            |
| 10-point, matched-pair factory calibration, DN ≤ 200, ≤ 8 inch                                       | D30        |
| 10-point, matched-pair factory calibration, DN 250 ... 600, 10 ... 24 inch                           | D31        |
| 10-point, matched-pair factory calibration, DN 700 ... 1200, 28 ... 48 inch                          | D32        |
| <b>Accredited ISO/IEC 17025 calibration</b>                                                          |            |
| ISO/IEC 17025 accredited, 5-point, matched-pair factory calibration, DN ≤ 200, ≤ 8 inch              | D35        |
| ISO/IEC 17025 accredited, 5-point, matched-pair factory calibration, DN 250 ... 600, 10 ... 24 inch  | D36        |
| ISO/IEC 17025 accredited, 5-point, matched-pair factory calibration, DN 700 ... 1200, 28 ... 48 inch | D37        |

| Additional information                                                                                                                      | Order code |
|---------------------------------------------------------------------------------------------------------------------------------------------|------------|
| <b>General safety</b>                                                                                                                       |            |
| CSA General Purpose                                                                                                                         | E06        |
| <b>Drinking water approvals</b>                                                                                                             |            |
| WRAS (WRc, BS 6920, GB)                                                                                                                     | E80        |
| NSF/ANSI 61 (Cold water, US)                                                                                                                | E81        |
| ACS (France)                                                                                                                                | E82        |
| DVGW-W270 (Germany)                                                                                                                         | E83        |
| Belgaqua (Belgium)                                                                                                                          | E84        |
| AS/NZS 4020 (Australia/New Zealand)                                                                                                         | E85        |
| GB/T 5750 (China)                                                                                                                           | E86        |
| <b>Country of origin</b>                                                                                                                    |            |
| France                                                                                                                                      | E90        |
| <b>Communication</b>                                                                                                                        |            |
| HART with 4 ... 20 mA output, active or passive                                                                                             | F01        |
| Modbus RTU / RS485                                                                                                                          | F04        |
| PROFIBUS PA                                                                                                                                 | F05        |
| PROFIBUS DP                                                                                                                                 | F06        |
| PROFINET                                                                                                                                    | F07        |
| EtherNet/IP                                                                                                                                 | F09        |
| <b>I/O extension</b>                                                                                                                        |            |
| Digital input / output, passive                                                                                                             | F30        |
| <b>Device options</b>                                                                                                                       |            |
| Sensor terminal board factory mounted                                                                                                       | J00        |
| Sensor cables factory mounted                                                                                                               | J01        |
| Factory preconfigured for transmitter mounting in compact design (integral mount)                                                           | J02        |
| Display with protection cover                                                                                                               | J03        |
| Industrial Micro-SD memory card, 8 GB storage capacity                                                                                      | J06        |
| <b>Type of protection (IP)</b>                                                                                                              |            |
| IP68 (NEMA 6P) protection class for sensor and transmitter, without potting (to 2 m depth, 10 days)                                         | L50        |
| IP68 (NEMA 6P) protection class for sensor in remote design, factory potted (to 10 m depth, continuously)                                   | L51        |
| <b>Sensor cables</b>                                                                                                                        |            |
| Cable kit with coil and electrode cable, standard type (3 × 1.5 mm <sup>2</sup> ), PVC jacket                                               |            |
| • 5 m (16 ft)                                                                                                                               | T00        |
| • 10 m (33 ft)                                                                                                                              | T01        |
| • 20 m (65 ft)                                                                                                                              | T03        |
| • 30 m (98 ft)                                                                                                                              | T05        |
| • 40 m (131 ft)                                                                                                                             | T06        |
| • 50 m (164 ft)                                                                                                                             | T07        |
| • 60 m (197 ft)                                                                                                                             | T08        |
| • 100 m (328 ft)                                                                                                                            | T11        |
| • 150 m (492 ft)                                                                                                                            | T14        |
| • 200 m (656 ft)                                                                                                                            | T16        |
| • 500 m (1640 ft)                                                                                                                           | T18        |
| Cable kit with coil cable standard type (3 × 1.5 mm <sup>2</sup> ) and electrode cable special type (3 × 0.25 mm <sup>2</sup> ), PVC jacket |            |
| • 5 m (16 ft)                                                                                                                               | T50        |
| • 10 m (33 ft)                                                                                                                              | T51        |
| • 15 m (49 ft)                                                                                                                              | T52        |
| • 20 m (65 ft)                                                                                                                              | T53        |

## Flow Measurement

### SITRANS FM (electromagnetic)

#### Flow sensors / SITRANS FMS500

#### Selection and ordering data (continued)

| Additional information                                                                                       | Order code |
|--------------------------------------------------------------------------------------------------------------|------------|
| • 25 m (82 ft)                                                                                               | T54        |
| • 30 m (98 ft)                                                                                               | T55        |
| • 40 m (131 ft)                                                                                              | T56        |
| • 50 m (164 ft)                                                                                              | T57        |
| • 60 m (197 ft)                                                                                              | T58        |
| • 100 m (328 ft)                                                                                             | T61        |
| • 150 m (492 ft)                                                                                             | T64        |
| • 200 m (656 ft)                                                                                             | T66        |
| • 500 m (1640 ft)                                                                                            | T68        |
| <b>Device settings</b>                                                                                       |            |
| Measuring range: Upper range value ( $Q_{max}$ ), unit                                                       | Y01        |
| Current output damping                                                                                       | Y02        |
| Current output signal range (Default setting: 4 ... 20 mA NAMUR)                                             | Y03        |
| Low flow cut off                                                                                             | Y04        |
| Flow direction (Default setting: Positive)                                                                   | Y05        |
| Empty pipe detection (Default setting: On)                                                                   | Y06        |
| Mains frequency (Default setting: 50 Hz)                                                                     | Y07        |
| Operation language display (Default setting English)                                                         | Y24        |
| Device address (PROFIBUS 0 ... 125)                                                                          | Y25        |
| <b>Device identification</b>                                                                                 |            |
| Location designation (TAG), device parameter and stainless-steel plate for transmitter (max. 32 characters)  | Y11        |
| Measuring point description, device parameter and stainless-steel plate for transmitter (max. 32 characters) | Y12        |
| Location designation (TAG), device parameter and adhesive label for transmitter (max. 32 characters)         | Y13        |
| Measuring point description, device parameter and adhesive label for transmitter (max. 32 characters)        | Y14        |
| Location designation (TAG), device parameter and stainless-steel plate (max. 32 characters)                  | Y15        |

| Additional information                                                                       | Order code |
|----------------------------------------------------------------------------------------------|------------|
| Measuring point description, device parameter and stainless-steel plate (max. 32 characters) | Y16        |
| Location designation (TAG), device parameter and adhesive label (max. 32 characters)         | Y18        |
| Measuring point description, device parameter and adhesive label (max. 32 characters)        | Y19        |
| <b>Totalizer 1 settings</b>                                                                  |            |
| Preset value                                                                                 | Y30        |
| Unit (Default setting: m³)                                                                   | Y31        |
| Direction (Default setting: Forward counting)                                                | Y32        |
| Failure mode (Default setting: Continue counting)                                            | Y33        |
| Decimal places (Default setting: 2)                                                          | Y34        |
| <b>Totalizer 2 settings</b>                                                                  |            |
| Preset value                                                                                 | Y35        |
| Unit (Default setting: m³)                                                                   | Y36        |
| Direction (Default setting: Backward counting)                                               | Y37        |
| Failure mode (Default setting: Continue counting)                                            | Y38        |
| Decimal places (Default setting: 2)                                                          | Y39        |
| <b>Totalizer 3 settings</b>                                                                  |            |
| Preset value                                                                                 | Y40        |
| Unit (Default setting: m³)                                                                   | Y41        |
| Direction (Default setting: Forward / backward counting, net)                                | Y42        |
| Failure mode (Default setting: Continue counting)                                            | Y43        |
| Decimal places (Default setting: 2)                                                          | Y44        |
| <b>Pulse output settings</b>                                                                 |            |
| Volume per pulse                                                                             | Y50        |
| Pulse width                                                                                  | Y51        |

### Technical specifications

| SITRANS FMS500 flowmeter sensor                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |        |             |                                                                                                               |                                                                                                                 |        |             |                                                                                                                                             |                                                                                                                                              |
|---------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|-------------|---------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|--------|-------------|---------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|
| Product characteristic                                                                                                                      | For demanding applications in the water & wastewater industry                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |        |             |                                                                                                               |                                                                                                                 |        |             |                                                                                                                                             |                                                                                                                                              |
| Measurement of                                                                                                                              | Volume flow, flow velocity, electrical conductivity                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |        |             |                                                                                                               |                                                                                                                 |        |             |                                                                                                                                             |                                                                                                                                              |
| Nominal diameter                                                                                                                            | <ul style="list-style-type: none"> <li>Coned sensor (octagon liner): DN 15 ... 40 (½" ... 1½")</li> <li>Coned sensor: DN 50 ... 300 (2" ... 12")</li> <li>Full bore sensor: DN 350 ... 1200 (14" ... 48")</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |        |             |                                                                                                               |                                                                                                                 |        |             |                                                                                                                                             |                                                                                                                                              |
| Mode of operation                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |        |             |                                                                                                               |                                                                                                                 |        |             |                                                                                                                                             |                                                                                                                                              |
| Measuring principle                                                                                                                         | Electromagnetic induction                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |        |             |                                                                                                               |                                                                                                                 |        |             |                                                                                                                                             |                                                                                                                                              |
| Medium conductivity                                                                                                                         | Liquids with an electrical conductivity $\geq 5 \mu\text{S/cm}$ .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |        |             |                                                                                                               |                                                                                                                 |        |             |                                                                                                                                             |                                                                                                                                              |
| Excitation frequency<br>(mains supply: 50 Hz / 60 Hz)                                                                                       | <ul style="list-style-type: none"> <li>DN 15 ... 65 (1/2" ... 2 1/2"): 12.5 Hz / 15 Hz</li> <li>DN 80 ... 150 (3" ... 6"): 6.25 Hz / 7.5 Hz</li> <li>DN 200 ... 300 (8" ... 12"): 3.125 Hz / 3.75 Hz</li> <li>DN 350 ... 1200 (14" ... 48"): 1.5625 Hz / 1.875 Hz</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |        |             |                                                                                                               |                                                                                                                 |        |             |                                                                                                                                             |                                                                                                                                              |
| Performance characteristics                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |        |             |                                                                                                               |                                                                                                                 |        |             |                                                                                                                                             |                                                                                                                                              |
| Electrical conductivity                                                                                                                     | Repeatability: Max. $\pm 5\%$ of measured value <sup>2)</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |        |             |                                                                                                               |                                                                                                                 |        |             |                                                                                                                                             |                                                                                                                                              |
| Process connection                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |        |             |                                                                                                               |                                                                                                                 |        |             |                                                                                                                                             |                                                                                                                                              |
| Flanges <sup>1)</sup>                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |        |             |                                                                                                               |                                                                                                                 |        |             |                                                                                                                                             |                                                                                                                                              |
| <ul style="list-style-type: none"> <li>EN 1092-1</li> </ul>                                                                                 | PN 10 (145 psi) Flat face DN 200 ... 300 (8" ... 12")<br>PN 10 (145 psi) Raised face DN 350 ... 1200 (14" ... 48")<br>PN 16 (232 psi) Flat face DN 50 ... 300 (2" ... 12")<br>PN 16 (232 psi) Raised face DN 350 ... 1200 (14" ... 48")<br>PN 40 (580 psi) Flat face DN 15 ... 40 (½" ... 1½")                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |        |             |                                                                                                               |                                                                                                                 |        |             |                                                                                                                                             |                                                                                                                                              |
| <ul style="list-style-type: none"> <li>ANSI B16.5</li> </ul>                                                                                | Class 150 Flat face ½" ... 12"<br>Class 150 Raised face 14" ... 24"                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |        |             |                                                                                                               |                                                                                                                 |        |             |                                                                                                                                             |                                                                                                                                              |
| <ul style="list-style-type: none"> <li>AWWA C-207</li> </ul>                                                                                | Class D Flat face 28 ... 48"                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |        |             |                                                                                                               |                                                                                                                 |        |             |                                                                                                                                             |                                                                                                                                              |
| <ul style="list-style-type: none"> <li>AS/NZS 4087</li> </ul>                                                                               | PN 16 (232 psi) Flat Face DN 50 ... 300 (2" ... 12")<br>PN 16 (232 psi) Raised face DN 350 ... 1200 (14" ... 48")                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |        |             |                                                                                                               |                                                                                                                 |        |             |                                                                                                                                             |                                                                                                                                              |
| <ul style="list-style-type: none"> <li>JIS B 2220:2004</li> </ul>                                                                           | 10K DN 15 ... 600 (1" ... 24")                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |        |             |                                                                                                               |                                                                                                                 |        |             |                                                                                                                                             |                                                                                                                                              |
| Rated operating conditions                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |        |             |                                                                                                               |                                                                                                                 |        |             |                                                                                                                                             |                                                                                                                                              |
| Ambient temperature                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |        |             |                                                                                                               |                                                                                                                 |        |             |                                                                                                                                             |                                                                                                                                              |
| <ul style="list-style-type: none"> <li>Sensor</li> </ul>                                                                                    | -20 ... +70 °C (-4 ... +158 °F)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |        |             |                                                                                                               |                                                                                                                 |        |             |                                                                                                                                             |                                                                                                                                              |
| <ul style="list-style-type: none"> <li>Compact with transmitter</li> </ul>                                                                  | -20 ... +65 °C (-4 ... +149 °F)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |        |             |                                                                                                               |                                                                                                                 |        |             |                                                                                                                                             |                                                                                                                                              |
| Operating pressure (abs)<br>(maximum operating pressure depending on flange type)                                                           | DN 15 ... 40 (1/2" ... 1 1/2"): 0.01 ... 40 bar (0.15 ... 580 psi)<br>DN 50 ... 300 (2" ... 12"): 0.03 ... 20 bar (0.44 ... 290 psi)<br>DN 350 ... 1200 (14" ... 48"): 0.01 ... 16 bar (0.15 ... 232 psi)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |        |             |                                                                                                               |                                                                                                                 |        |             |                                                                                                                                             |                                                                                                                                              |
| Protection class                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |        |             |                                                                                                               |                                                                                                                 |        |             |                                                                                                                                             |                                                                                                                                              |
| <ul style="list-style-type: none"> <li>Standard</li> </ul>                                                                                  | IP66/67, NEMA 4X/6                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |        |             |                                                                                                               |                                                                                                                 |        |             |                                                                                                                                             |                                                                                                                                              |
| <ul style="list-style-type: none"> <li>Optional</li> </ul>                                                                                  | IP68 and NEMA 6P (2m, 10 days) for sensor in compact (integral mount) and remote design<br>IP68 and NEMA 6P (10m, continuously) for sensor in remote design                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |        |             |                                                                                                               |                                                                                                                 |        |             |                                                                                                                                             |                                                                                                                                              |
| Mechanical load (vibration)                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |        |             |                                                                                                               |                                                                                                                 |        |             |                                                                                                                                             |                                                                                                                                              |
| <ul style="list-style-type: none"> <li>Integral mount / compact version</li> </ul>                                                          | Vibration, sinusoidal according to IEC 60068-2-6 <ul style="list-style-type: none"> <li>2 ... 4 Hz, 3.5 mm peak</li> <li>8.4 ... 500 Hz, 1 g peak</li> </ul> Vibration broad-band random, according to IEC 60068-2-64 <ul style="list-style-type: none"> <li>10 ... 200 Hz, 0.003 g2/Hz</li> <li>200 ... 500 Hz, 0.001 g2/Hz</li> <li>Total: 1.54 g rms</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |        |             |                                                                                                               |                                                                                                                 |        |             |                                                                                                                                             |                                                                                                                                              |
| <ul style="list-style-type: none"> <li>Remote version</li> </ul>                                                                            | Vibration, sinusoidal according to IEC 60068-2-6 <table border="1"> <tr> <td>Sensor</td><td>Transmitter</td></tr> <tr> <td> <ul style="list-style-type: none"> <li>2 ... 8.4 Hz, 7.5 mm peak</li> <li>8.4 ... 500 Hz, 2 g peak</li> </ul> </td><td> <ul style="list-style-type: none"> <li>2 ... 8.4 Hz, 1.5 mm peak</li> <li>8.4 ... 500 Hz, 0.7 g peak</li> </ul> </td></tr> </table> Vibration broad-band random, according to IEC 60068-2-64 <table border="1"> <tr> <td>Sensor</td><td>Transmitter</td></tr> <tr> <td> <ul style="list-style-type: none"> <li>10 ... 200 Hz, 0.01 g2/Hz</li> <li>200 ... 500 Hz, 0.003 g2/Hz</li> <li>Total: 1.54 g rms</li> </ul> </td><td> <ul style="list-style-type: none"> <li>10 ... 200 Hz, 0.003 g2/Hz</li> <li>200 ... 500 Hz, 0.001 g2/Hz</li> <li>Total: 1.54 g rms</li> </ul> </td></tr> </table> | Sensor | Transmitter | <ul style="list-style-type: none"> <li>2 ... 8.4 Hz, 7.5 mm peak</li> <li>8.4 ... 500 Hz, 2 g peak</li> </ul> | <ul style="list-style-type: none"> <li>2 ... 8.4 Hz, 1.5 mm peak</li> <li>8.4 ... 500 Hz, 0.7 g peak</li> </ul> | Sensor | Transmitter | <ul style="list-style-type: none"> <li>10 ... 200 Hz, 0.01 g2/Hz</li> <li>200 ... 500 Hz, 0.003 g2/Hz</li> <li>Total: 1.54 g rms</li> </ul> | <ul style="list-style-type: none"> <li>10 ... 200 Hz, 0.003 g2/Hz</li> <li>200 ... 500 Hz, 0.001 g2/Hz</li> <li>Total: 1.54 g rms</li> </ul> |
| Sensor                                                                                                                                      | Transmitter                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |        |             |                                                                                                               |                                                                                                                 |        |             |                                                                                                                                             |                                                                                                                                              |
| <ul style="list-style-type: none"> <li>2 ... 8.4 Hz, 7.5 mm peak</li> <li>8.4 ... 500 Hz, 2 g peak</li> </ul>                               | <ul style="list-style-type: none"> <li>2 ... 8.4 Hz, 1.5 mm peak</li> <li>8.4 ... 500 Hz, 0.7 g peak</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |        |             |                                                                                                               |                                                                                                                 |        |             |                                                                                                                                             |                                                                                                                                              |
| Sensor                                                                                                                                      | Transmitter                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |        |             |                                                                                                               |                                                                                                                 |        |             |                                                                                                                                             |                                                                                                                                              |
| <ul style="list-style-type: none"> <li>10 ... 200 Hz, 0.01 g2/Hz</li> <li>200 ... 500 Hz, 0.003 g2/Hz</li> <li>Total: 1.54 g rms</li> </ul> | <ul style="list-style-type: none"> <li>10 ... 200 Hz, 0.003 g2/Hz</li> <li>200 ... 500 Hz, 0.001 g2/Hz</li> <li>Total: 1.54 g rms</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |        |             |                                                                                                               |                                                                                                                 |        |             |                                                                                                                                             |                                                                                                                                              |
| Process temperature                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |        |             |                                                                                                               |                                                                                                                 |        |             |                                                                                                                                             |                                                                                                                                              |

## Flow Measurement

### SITRANS FM (electromagnetic)

#### Flow sensors / SITRANS FMS500

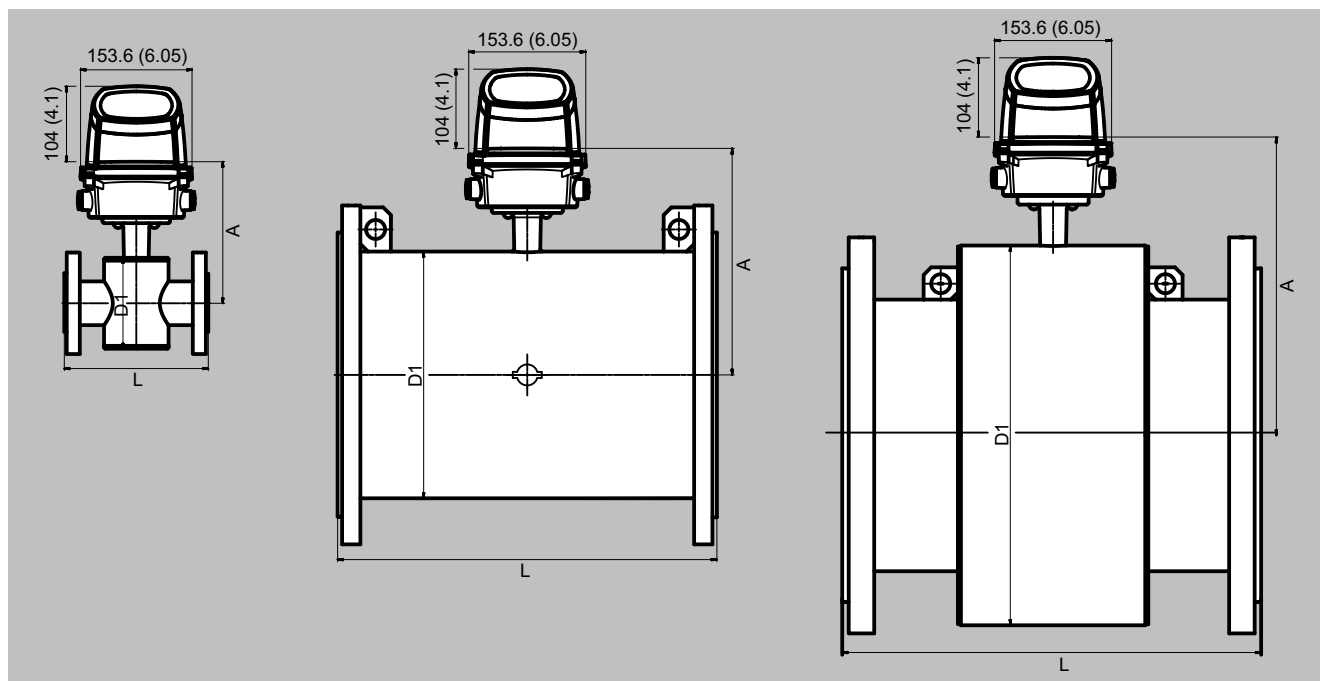
#### Technical specifications (continued)

| SITRANS FMS500 flowmeter sensor   |                                                                                                                                                                                                                                                                                                                                                                    |
|-----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| • NBR liner                       | -10 ... +70 °C (14 ... 158 °F)                                                                                                                                                                                                                                                                                                                                     |
| • EPDM liner                      | -10 ... +70 °C (14 ... 158 °F)                                                                                                                                                                                                                                                                                                                                     |
| <b>Pressure drop</b>              | DN 15 and 25 (½" and 1"): Max. 20 mbar (0.29 psi) at 1 m/s (3 ft/s)<br>DN 40 ... 300 (1½" ... 12"): Max. 25 mbar (0.36 psi) at 3 m/s (10 ft/s)<br>DN 350 ... 1200 (14" ... 48"): Insignificant                                                                                                                                                                     |
| <b>Test pressure</b>              | 1.5 × PN (where applicable)                                                                                                                                                                                                                                                                                                                                        |
| <b>Design</b>                     |                                                                                                                                                                                                                                                                                                                                                                    |
| Dimensions                        | See dimensional drawings                                                                                                                                                                                                                                                                                                                                           |
| Weight                            | See dimensional drawings                                                                                                                                                                                                                                                                                                                                           |
| Material                          |                                                                                                                                                                                                                                                                                                                                                                    |
| • Housing and flanges             | Carbon steel ASTM A 105 with corrosion resistant coating of class C4 or C5 (durability up to 15 years)<br>EN ISO 12944                                                                                                                                                                                                                                             |
| • Measuring electrode             | Hastelloy C276 / 2.4819                                                                                                                                                                                                                                                                                                                                            |
| • Grounding electrode             | Hastelloy C276 / 2.4819                                                                                                                                                                                                                                                                                                                                            |
| • Measuring tube <sup>2)</sup>    | Stainless steel AISI 304 / 1.4301                                                                                                                                                                                                                                                                                                                                  |
| • Terminal box                    | Polycarbonate                                                                                                                                                                                                                                                                                                                                                      |
| Cable entries                     | 4 x metric thread (size M20 x 1.5)                                                                                                                                                                                                                                                                                                                                 |
| <b>Calibration</b>                |                                                                                                                                                                                                                                                                                                                                                                    |
| Standard                          | Zero-point, 2 × 25 % and 2 × 90 %                                                                                                                                                                                                                                                                                                                                  |
| Optional                          | <ul style="list-style-type: none"> <li>5-point calibration: 20 %, 40 %, 60 %, 80 %, 100 % of factory Qmax</li> <li>10-point calibration: ascending and descending at 20 %, 40 %, 60 %, 80 %, 100 % of factory Qmax</li> <li>Matched pair calibration: default, 5-point or 10-point</li> <li>ISO/IEC 17025 accredited, 5-point, matched-pair calibration</li> </ul> |
| <b>Certificates and approvals</b> |                                                                                                                                                                                                                                                                                                                                                                    |
| General purpose                   | CE (LVD, PED, EMC, RoHS), UKCA                                                                                                                                                                                                                                                                                                                                     |
| Drinking water                    | <ul style="list-style-type: none"> <li>WRAS (WRc, BS 6920 material approval for cold water, GB)</li> <li>NSF/ANSI Standard 61 (Cold water, US)</li> <li>ACS listed (France)</li> <li>DVGW W270 (Germany)</li> <li>Belgaqua (Belgium)</li> <li>AS/NZS 4020 (Australia/New Zealand)</li> <li>GB/T 5750 (China)</li> </ul>                                            |
| Others                            | <ul style="list-style-type: none"> <li>Environmental Product Declaration (EPD)</li> <li>MCERTS (GB environmental)</li> <li>EAC (Kazakhstan)</li> </ul>                                                                                                                                                                                                             |

<sup>1)</sup> DN 750, DN 1050 and DN 1100 (30", 42" and 44") not available with EN 1092-1 (PN 10 and PN 16) and AS 4087 flanges

<sup>2)</sup> The value applies for measurement between 15 µS/cm and 5000 µS/cm at a reference temperature of 25 °C (77 °F)

<sup>3)</sup> DN > 300 (12")

**Dimensional drawings**


SITRANS FMS500 Sensor: DN 15 ... 40, ½" ... 1½" (left), DN 50 ... 300, 2" ... 12" (middle) and DN 350 ... 1200, 14" ... 48" (right)

| Sensor SITRANS FMS500 (7ME653) |        |      |        |      |        |      |        |                      |       |
|--------------------------------|--------|------|--------|------|--------|------|--------|----------------------|-------|
| Nominal diameter               |        | A    |        | D1   |        | L1)  |        | Weight <sup>1)</sup> |       |
| [mm]                           | [inch] | [mm] | [inch] | [mm] | [inch] | [mm] | [inch] | [kg]                 | [lbs] |
| 15                             | ½      | 170  | 6.7    | 77   | 3.0    | 200  | 7.9    | 5                    | 11    |
| 25                             | 1      | 180  | 7.1    | 96   | 3.8    | 200  | 7.9    | 6                    | 13    |
| 40                             | 1½     | 195  | 7.7    | 127  | 5.0    | 200  | 7.9    | 9                    | 20    |
| 50                             | 2      | 181  | 7.1    | 76   | 3.0    | 200  | 7.9    | 10                   | 22    |
| 65                             | 2½     | 187  | 7.4    | 89   | 3.5    | 200  | 7.9    | 12                   | 26    |
| 80                             | 3      | 193  | 7.6    | 102  | 4.0    | 200  | 7.9    | 13                   | 29    |
| 100                            | 4      | 200  | 7.9    | 114  | 4.5    | 250  | 9.8    | 17                   | 37    |
| 125                            | 5      | 210  | 8.3    | 140  | 5.5    | 250  | 9.8    | 20                   | 44    |
| 150                            | 6      | 225  | 8.9    | 168  | 6.6    | 300  | 11.8   | 27                   | 60    |
| 200                            | 8      | 250  | 9.8    | 219  | 8.6    | 350  | 13.8   | 39                   | 86    |
| 250                            | 10     | 277  | 10.9   | 273  | 10.8   | 450  | 17.7   | 56                   | 123   |
| 300                            | 12     | 303  | 11.9   | 324  | 12.8   | 500  | 19.7   | 72                   | 159   |
| 350                            | 14     | 375  | 14.8   | 451  | 17.8   | 550  | 21.7   | 115                  | 254   |
| 400                            | 16     | 400  | 15.7   | 502  | 19.8   | 600  | 23.6   | 143                  | 315   |
| 450                            | 18     | 431  | 17.0   | 563  | 22.2   | 600  | 23.6   | 177                  | 390   |
| 500                            | 20     | 456  | 18.0   | 614  | 24.2   | 600  | 23.6   | 222                  | 489   |
| 600                            | 24     | 507  | 20.0   | 715  | 28.2   | 600  | 23.6   | 321                  | 708   |
| 700                            | 28     | 557  | 21.9   | 816  | 32.1   | 700  | 27.6   | 331                  | 730   |
| 750                            | 30     | 584  | 23.0   | 869  | 34.2   | 750  | 29.5   | -                    | -     |
| 800                            | 32     | 609  | 24.0   | 927  | 36.5   | 800  | 31.5   | 386                  | 851   |
| 900                            | 36     | 656  | 25.8   | 1032 | 40.6   | 900  | 35.4   | 482                  | 1063  |
| 1000                           | 40     | 707  | 27.8   | 1136 | 44.7   | 1000 | 39.4   | 672                  | 1482  |
| 1050                           | 42     | 707  | 27.8   | 1136 | 44.7   | 1000 | 39.4   | -                    | -     |
| 1100                           | 44     | 758  | 29.8   | 1238 | 48.7   | 1100 | 43.3   | -                    | -     |
| 1200                           | 48     | 813  | 32.0   | 1348 | 53.1   | 1200 | 47.2   | 1116                 | 2460  |

<sup>1)</sup> Weights are appr. for sensor with EN 1092-1 PN 16 flanges without transmitter. With transmitter FMT020 mounted, weight is increased by appr. 1.0 kg (2.2 lb).