

# Electromagnetic Flowmeter Type M3000 & M4000

## Description

The amplifier with modular design allows flow measurements in Ex zones 1 and 2, in either the mounted or remote version. The amplifier housing, made of powder-coated aluminium, is available in protection class IP67 and with a separate connection space. Programming can be done either with closed housing thanks to a magnetic pen or with open housing via three buttons. The four-line display shows all necessary data like actual flow, totalizer and status messages. The programmable excitation frequency even enables the amplifier to be adjusted for difficult metering applications. The new developed process for amplifier compensation enables a high accuracy, especially in the lower flow range.



## Measuring principle

The operating principle of the electromagnetic flow meter is based on Faraday's law of magnetic induction: The voltage induced across any conductor, as it moves at right angles through a magnetic field, is proportional to the velocity of that conductor. The voltage induced within the fluid is measured by two diametrically opposed internally mounted electrodes. The induced signal voltage is proportional to the product of the magnetic flux density, the distance between the electrodes and the average flow velocity of the fluid.

## Applications

The ModMAG™ is especially suited for flow measurements in the chemical and pharmaceutical industry, as well as water and waste water plants with explosion-proof zones.

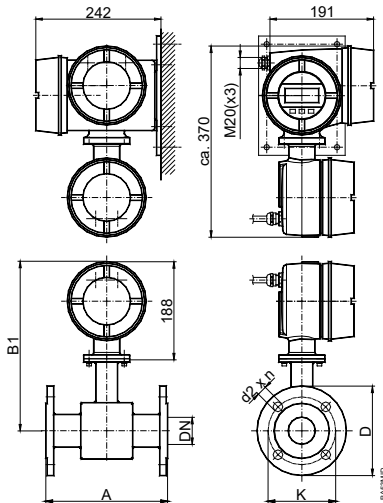
## Technical data

|                      |  |
|----------------------|--|
| Power supply         | 85 – 265 VAC, 45 – 65 Hz < 20 VA, optional 24 VDC  |
| Accuracy             | ±0,2% of actual flow, ≥0,5 m/s<br>±1,25 mm/s of actual flow, <0,5 m/s  |
| Repeatability        | <0,1% of full scale  |
| Flow range           | 0,03 – 12 m/s  |
| Conductivity         | min. 5 µS/cm   |
| Flow direction       | bi-directional   |
| Display              | LCD, 4 lines / 16 characters, backlit, actual flow, 3 totalizers, status display   |
| Programming          | 3 buttons or via magnetic pen  |
| Interface            | RS232 for measuring values and programming   |
| Analog output        | 0/4- 20 mA ≤750 ohms, flow direction is displayed upon a separate status output  |
| Pulse output         | active / passive selectable, 2 open collectors and 2 solid state relays<br>Open collector: active 18 VDC, 25 mA, passive 24 VDC, 20 mA (max. 0,5 W)  |
| Frequency output     | max. 10 kHz (open collector)   |
| Status output        | min./max. alarm, preselection, flow direction, error message, free configurable  |
| Empty pipe detection | separate electrode   |
| Low flow cut off     | 0-10%  |
| Housing              | Powder coated aluminium die cast   |
| Protection class     | IP67   |
| Cable insertion      | 3 x M 20   |
| Ambient temperature  | -20 up to +60°C  |
| Ex proof version     | M3000: FM/CSA class I, div. 2 / zone 2<br>ATEX II 3 G Ex nA ia IIC T3 Ta = -20°C to +50°C, IP66 (Flowmeter)<br>ATEX II 3 G Ex nA [ia] IIC T3 Ta = -20°C to +50°C, IP66 (converter only)<br>M4000: FM/CSA class I, div. 1 / zone 1<br>ATEX II 2 G Ex d e ia IIC T3 Ta = -20°C to +50°C, IP66 (Flowmeter)<br>ATEX II 2 G Ex d [ia] IIC T4 Ta = -20°C to +50°C, IP66 (converter only) |

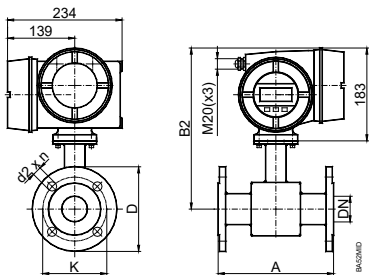
# Detector type V

## Flange process connection

The electromagnetic detector type V is not only available in a number of different flange process connections (DIN, ANSI, JIS, AWWA, etc.) but also in a number of liners like hard rubber, soft rubber, PTFE, PFA or Halar. Available in sizes from DN 6 to DN 600 and nominal pressures up to PN 100, the detector type V is best suited for a variety of applications in the industry and the water/waste water industry.



Remote version



Compact version

### Technical data

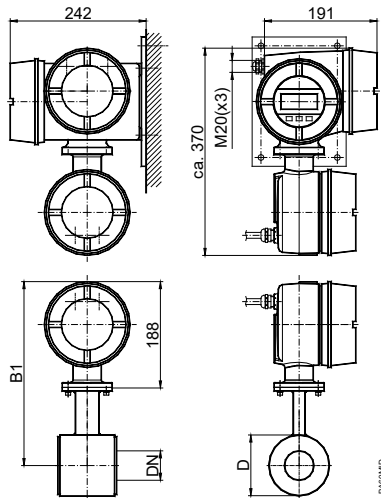
|                      |  |             |                  |
|----------------------|--|-------------|------------------|
| Size                 | M3000: DN 6 – 600 (1/4" ... 56")<br>M4000: DN 6 – 300 (1/4" ... 12")         |             |                  |
| Process connections  | Flange: DIN, ANSI, JIS, AWWA, etc.   |             |                  |
| Nominal pressure     | up to PN 100   |             |                  |
| Protection class     | IP65, optional IP68  |             |                  |
| Min. conductivity    | 5 µS/cm (20 µS/cm for demineralized water)                                   |             |                  |
| Liner materials      | Hard/soft rubber   | from DN 25  | 0 up to +80°C    |
|                      | PFA  | DN 6 – 10   | -40 up to +150°C |
|                      | PTFE   | DN 15 – 600 | -40 up to +150°C |
|                      | Halar (ECTFE)  | from DN 300 | -40 up to +150°C |
| Electrodes materials | Hastelloy C (Standard), Tantal<br>Platinum / Gold plated, Platinum / Rhodium |             |                  |
| Housing              | Carbon steel / optional stainless steel                                      |             |                  |

### Dimensions (mm)

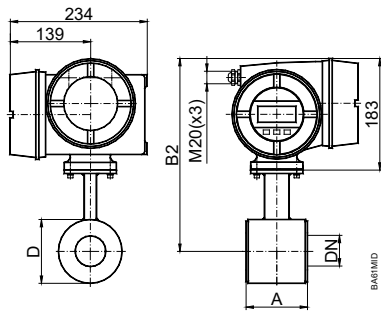
| DN                           |        | A*  | M3000        |     | M4000 |     | ANSI flanges     |       |           | DIN flanges |     |         |
|------------------------------|--------|-----|--------------|-----|-------|-----|------------------|-------|-----------|-------------|-----|---------|
|                              |        |     | B1           | B2  | B1    | B2  | Ø D              | Ø K   | Ø d2xn    | Ø D         | Ø K | Ø d2xn  |
| 6                            | 1/4"   | 170 | 296          | 291 | 320   | 315 | 88,9             | 60,3  | 15,9 x 4  | 90          | 60  | 14 x 4  |
| 8                            | 3/10"  | 170 | 296          | 291 | 320   | 315 | 88,9             | 60,3  | 15,9 x 4  | 90          | 60  | 14 x 4  |
| 10                           | 3/8"   | 170 | 296          | 291 | 320   | 315 | 88,9             | 60,3  | 15,9 x 4  | 90          | 60  | 14 x 4  |
| 15                           | 1/2"   | 200 | 306          | 301 | 330   | 325 | 88,9             | 60,3  | 15,9 x 4  | 95          | 65  | 14 x 4  |
| 20                           | 3/4"   | 200 | 306          | 301 | 330   | 325 | 98,4             | 69,8  | 15,9 x 4  | 105         | 75  | 14 x 4  |
| 25                           | 1"     | 200 | 306          | 301 | 330   | 325 | 107,9            | 79,4  | 15,9 x 4  | 115         | 85  | 14 x 4  |
| 32                           | 1 1/4" | 200 | 321          | 316 | 345   | 340 | 117,5            | 88,9  | 15,9 x 4  | 140         | 100 | 18 x 4  |
| 40                           | 1 1/2" | 200 | 321          | 316 | 345   | 340 | 127              | 98,4  | 15,9 x 4  | 150         | 110 | 18 x 4  |
| 50                           | 2"     | 200 | 321          | 316 | 345   | 340 | 152,4            | 120,6 | 19 x 4    | 165         | 125 | 18 x 4  |
| 65                           | 2 1/2" | 200 | 339          | 334 | 363   | 358 | 177,8            | 139,7 | 19 x 4    | 185         | 145 | 18 x 4  |
| 80                           | 3"     | 200 | 339          | 334 | 363   | 358 | 190,5            | 152,4 | 19 x 4    | 200         | 160 | 18 x 8  |
| 100                          | 4"     | 250 | 346          | 341 | 370   | 365 | 228,6            | 190,5 | 19 x 8    | 220         | 180 | 18 x 8  |
| 125                          | 5"     | 250 | 366          | 361 | 390   | 385 | 254              | 215,9 | 22,2 x 8  | 250         | 210 | 18 x 8  |
| 150                          | 6"     | 300 | 378          | 373 | 402   | 397 | 279,4            | 241,3 | 22,2 x 8  | 285         | 240 | 22 x 8  |
| 200                          | 8"     | 350 | 406          | 401 | 430   | 425 | 342,9            | 298,4 | 22,2 x 8  | 340         | 295 | 22 x 12 |
| 250                          | 10"    | 450 | 430          | 425 | 454   | 449 | 406,4            | 361,9 | 25,4 x 12 | 395         | 350 | 22 x 12 |
| 300                          | 12"    | 500 | 493          | 488 | 517   | 512 | 482,6            | 431,8 | 25,4 x 12 | 445         | 400 | 22 x 12 |
| 350                          | 14"    | 550 | 518          | 513 | ---   | --- | 533,4            | 476,2 | 28,6 x 12 | 505         | 460 | 22 x 16 |
| 400                          | 16"    | 600 | 543          | 538 | ---   | --- | 596,9            | 539,7 | 28,6 x 16 | 565         | 515 | 26 x 16 |
| 450                          | 18"    | 600 | 568          | 563 | ---   | --- | 635,0            | 577,8 | 31,7 x 16 | ---         | --- | ---     |
| 500                          | 20"    | 600 | 593          | 588 | ---   | --- | 698,5            | 635,0 | 31,7 x 20 | 670         | 620 | 26 x 20 |
| 550                          | 22"    | 600 | 618          | 613 | ---   | --- | 749,3            | 692,1 | 34,9 x 20 | ---         | --- | ---     |
| 600                          | 24"    | 600 | 656          | 651 | ---   | --- | 812,8            | 749,3 | 34,9 x 20 | 780         | 725 | 30 x 20 |
| Standard                     |        |     |              |     |       |     |                  |       |           |             |     |         |
| With ANSI flanges            |        |     | DN 6 - 600   |     |       |     | Pressure 150 lbs |       |           |             |     |         |
| With DIN flanges             |        |     | DN 6 - 200   |     |       |     | Pressure PN16    |       |           |             |     |         |
|                              |        |     | DN 250 - 600 |     |       |     | Pressure PN10    |       |           |             |     |         |
| *ISO 13359 from DN 15 to 400 |        |     |              |     |       |     |                  |       |           |             |     |         |

# Detector type III

## Wafer connection



Remote version



Compact version

Thanks to its very short lay length, the detector type III is often the right alternative to a lot of applications. Delivered with a PTFE liner, the detector type III has a standard nominal pressure of PN 40.

### Technical data

|                      |  |                  |
|----------------------|--|------------------|
| Size                 | DN 25 – 100 (1" ... 4")  |                  |
| Process connections  | Wafer connection (in-between flange mounting)                                    |                  |
| Nominal pressure     | PN 40  |                  |
| Protection class     | IP65, optional IP68  |                  |
| Min. conductivity    | 5 $\mu$ S/cm (20 $\mu$ S/cm for demineralized water)                             |                  |
| Liner materials      | PTFE   | -40 up to +150°C |
| Electrodes materials | Hastelloy C (Standard)<br>Tantal<br>Platinum / Gold plated<br>Platinum / Rhodium |                  |
| Housing              | Carbon steel / optional stainless steel  |                  |
| Lay length           | DN 25 – 50   | 100 mm           |
|                      | DN 65 – 100  | 150 mm           |

### Dimensions (mm)

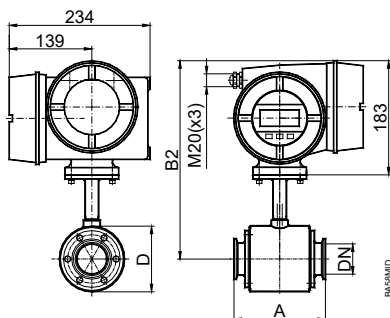
| DN  |        | A   | M3000 |     | M4000 |     | D   |
|-----|--------|-----|-------|-----|-------|-----|-----|
|     |        |     | B1    | B2  | B1    | B2  |     |
| 25  | 1"     | 100 | 306   | 301 | 330   | 325 | 74  |
| 32  | 1 1/4" | 100 | 311   | 306 | 335   | 330 | 84  |
| 40  | 1 1/2" | 100 | 316   | 311 | 340   | 335 | 94  |
| 50  | 2"     | 100 | 321   | 316 | 345   | 340 | 104 |
| 65  | 2 1/2" | 150 | 334   | 329 | 358   | 353 | 129 |
| 80  | 3"     | 150 | 339   | 334 | 363   | 358 | 140 |
| 100 | 4"     | 150 | 347   | 342 | 371   | 366 | 156 |

PN 40

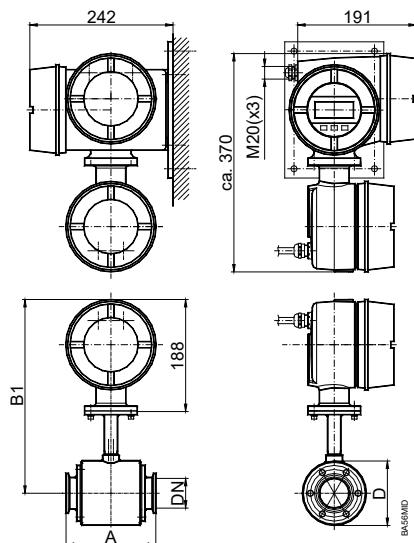
# Sanitary detector for Food

Process connections Tri-Clamp®, DIN 11851, ISO 2852, etc.

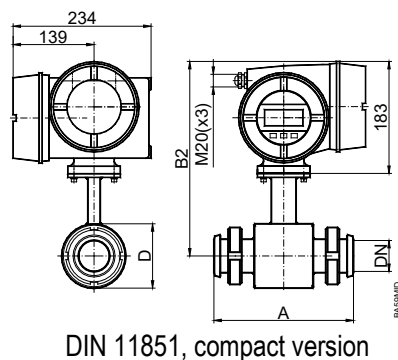
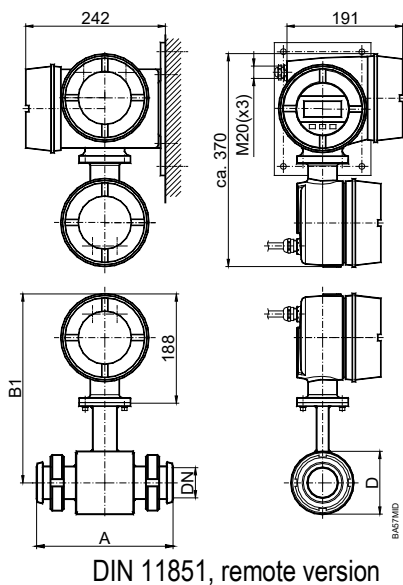
The sanitary detector was developed for the flow measurement of liquid food. This model is available with Tri-Clamp®, DIN 11851, ISO 2852 process connections and also with any special connections (customer specifications). The sanitary detector is delivered in a stainless steel housing and with PTFE lining.



TriClamp®, compact version



TriClamp®, remote version



### Technical data

|                      |  |                  |        |
|----------------------|--|------------------|--------|
| Size                 | DN 10 - 100 (3/8" ... 4")  |                  |        |
| Process connections  | Tri-Clamp®, DIN 11851, ISO 2852, etc.  |                  |        |
| Nominal pressure     | PN 10  |                  |        |
| Protection class     | IP65, optional IP68  |                  |        |
| Min. conductivity    | 5 µS/cm (20 µS/cm for demineralized water)                                       |                  |        |
| Liner materials      | PTFE   | -40 up to +150°C |        |
| Electrodes materials | Hastelloy C (Standard)<br>Tantal<br>Platinum / Gold plated<br>Platinum / Rhodium |                  |        |
| Housing              | Stainless steel  |                  |        |
| Lay length           | Tri-Clamp® connection  | DN 10 – 50       | 145 mm |
|                      |  | DN 65 – 100      | 200 mm |
|                      | DIN 11851 connection   | DN 10 – 20       | 170 mm |
|                      |  | DN 25 – 50       | 225 mm |
|                      |  | DN 65 – 100      | 280 mm |

### Dimensions (mm) type Food Tri-Clamp®

| DN    |        | A   | M3000 |     | M4000 |     | D   |
|-------|--------|-----|-------|-----|-------|-----|-----|
|       |        |     | B1    | B2  | B1    | B2  |     |
| 10    | 3/8"   | 145 | 296   | 291 | 320   | 315 | 74  |
| 15    | 1/2"   | 145 | 296   | 291 | 320   | 315 | 74  |
| 20    | 3/4"   | 145 | 296   | 291 | 320   | 315 | 74  |
| 25    | 1"     | 145 | 296   | 291 | 320   | 315 | 74  |
| 40    | 1 1/2" | 145 | 306   | 301 | 330   | 325 | 94  |
| 50    | 2"     | 145 | 311   | 306 | 335   | 330 | 104 |
| 65    | 2 1/2" | 200 | 324   | 319 | 348   | 343 | 129 |
| 80    | 3"     | 200 | 329   | 324 | 353   | 348 | 140 |
| 100   | 4"     | 200 | 337   | 332 | 361   | 356 | 156 |
| PN 10 |        |     |       |     |       |     |     |

### Dimensions (mm) type Food DIN 11851

| DN    |        | A   | M3000 |     | M4000 |     | D   |
|-------|--------|-----|-------|-----|-------|-----|-----|
|       |        |     | B1    | B2  | B1    | B2  |     |
| 10    | 3/8"   | 170 | 306   | 301 | 330   | 325 | 74  |
| 15    | 1/2"   | 170 | 306   | 301 | 330   | 325 | 74  |
| 20    | 3/4"   | 170 | 306   | 301 | 330   | 325 | 74  |
| 25    | 1"     | 225 | 306   | 301 | 330   | 325 | 74  |
| 32    | 1 1/4" | 225 | 311   | 306 | 335   | 330 | 84  |
| 40    | 1 1/2" | 225 | 316   | 311 | 340   | 335 | 94  |
| 50    | 2"     | 225 | 321   | 316 | 345   | 340 | 104 |
| 65    | 2 1/2" | 280 | 334   | 329 | 358   | 353 | 129 |
| 80    | 3"     | 280 | 339   | 334 | 363   | 358 | 140 |
| 100   | 4"     | 280 | 347   | 342 | 371   | 366 | 156 |
| PN 10 |        |     |       |     |       |     |     |

## Fuji Electric France S.A.S.

46, Rue Georges Besse – ZI du Brézet  
63039 Clermont-Ferrand cedex 2 – France  
France : Tél. 04 73 98 26 98 – Fax : 04 73 98 26 99  
International : Tél. (33) 4 73 98 26 98 – Fax : (33) 4 73 98 26 99  
Email : sales.dpt@fujielectric.fr – Web : www.fujielectric.fr

Fuji Electric can accept no responsibility for possible errors in catalogues, brochures and other printed material. Fuji Electric reserves the right to alter its products without notice. This also applies to products already on order provided that such alterations can be made without sub sequential changes being necessary in specifications already agreed. All trademarks in this material are property of the respective companies. All rights reserved.