

FLEXI-FLOW Compact

# FF-M21

Built-to-order mass flow and pressure meter



## Technical specifications

### Measurement & control

|                              |   |
|------------------------------|---|
| Type of media                | Gases   |
| Flow range                   | 50 / 200 / 500 l/min  |
| Accuracy                     | up to $\pm 0.5\%$ Rd plus $\pm 0.1\%$ FS  |
| Repeatability                | $< \pm 0.2\%$ Rd  |
| Turndown ratio               | up to 1:1000  |
| Multi fluid capability       | embedded gas data for 22 unique gases plus any mixture of these gases                                   |
| Pre-installed gases          | C2H2 Air C3H4 #1 Ar CO2 CO C3H6 #1 D2 #1 C2H6 C2H4 He H2 Kr CH4 Ne N2 N2O O2 C3F8 C3H6 #2 C3H8 C3H4 #2  |
| Response time (sensor)       | $< 30$ ms (T63)   |
| Operating temperature        | 0...+50 °C (32°F - 122°F)   |
| Temperature sensitivity      | Flow sensor: zero 0.015% FS/°C; span 0.05% Rd/°C; Pressure sensors: zero 0.16 mbar/°C; span 0.05% Rd/°C |
| Leak integrity, outboard     | tested $< 2 \times 10^{-9}$ mbar l/s He   |
| Long term stability          | $< 0.5\%$ FS over period of 3 years, then $< 0.2\%$ FS per year   |
| Pressure sensitivity         | standard: $< 0.15\%$ Rd/bar typical N2; with pressure correction: typical factor 5 improved             |
| Pressure range sensor        | 0...17 bar(a)   |
| Mounting                     | any position, attitude sensitivity negligible   |
| Warm-up time                 | 30 minutes  |
| Storage/transport conditions | 0...+50°C, max. 95% RH (non-condensing)   |

### Approvals

|         |    |
|---------|----|
| Marking | CE |
|---------|----|

### Mechanical specs

|                                |   |
|--------------------------------|---|
| Pressure rating (PN)           | 16  |
| Ingress protection             | IP40  |
| Surface roughness wetted parts | $< 1.6 \mu\text{m Ra}$ ( $< 0.8 \mu\text{m Ra}$ for stainless steel body)           |
| Material wetted parts          | aluminium, stainless steel, silicon nitride, epoxy, aluminiumoxide, glas, FKM       |
| Sealing material               | FKM 51415; for other materials contact factory                                      |
| Process connections            | 1/2" BSP female thread (ISO1179-1); couplings to be ordered separately              |
| Weight                         | 651 g with aluminium body, 1175 g with SS 316 body; add 50 g for Ethernet interface |

### Electrical properties

|                       |   |
|-----------------------|---|
| Power supply          | +24 Vdc $\pm 10\%$  |
| Power consumption     | 0.5 Watt typical, add 0.9 Watt for EtherNet communication                                   |
| Digital communication | Modbus-RTU, Modbus-ASCII, FLOW-BUS, EtherCAT®, EtherNet/IP, Modbus-TCP, POWERLINK, PROFINET |

### Electrical interfaces

|   |                                     |
|---|-------------------------------------|
| Service interface   | USB-C, Bluetooth                    |
| Power (main connector)                                      | 9-pin D-sub (male)                  |
| Function (main connector)                                   | RS485                               |
| Modbus RTU/ASCII/FLOW-BUS                                   | 9-pin D-sub (male, main connection) |
| Modbus TCP / EtherNet/IP / EtherCAT® / PROFINET / POWERLINK | 2x RJ45                             |