

# DATASHEET FF-M0X

## FLEXI-FLOW Compact FF-M0x

Built-to-Order Mass Flow and Pressure Meter



### Mass Flow/Pressure Meters for Low Gas Flows

FLEXI-FLOW Compact models FF-M00 and FF-M01 Mass Flow / Pressure Meters are suited for accurate measurement of flow ranges between 0...5 ml<sub>n</sub>/min and 0...200 ml<sub>n</sub>/min at operating pressures between 0,8 and 17 bar(a). The instrument combines a swift and stable thermal mass flow sensor based on capillary MEMS technology with a precise and proven by-pass construction. Due to the unique, internationally patented **TCS Technology (Through Chip Sensor)**, accurate mass flow measurement, virtual independent of variations in temperature and line pressure is established. In combination with integrated temperature and up- and downstream pressure sensors, the embedded database for 22 gases allows accurate, on-board conversion.

The **multi-parameter** instruments are Built-to-Order (BtO) and provide the user with useful process information:

- Model FF-M00: flow + temperature
- Model FF-M01: flow + temperature + up- and downstream pressure

### Technical specifications

#### Measurement / control system

Flow range (intermediate ranges available)	min. 0...5 ml <sub>n</sub> /min max. 0...200 ml <sub>n</sub> /min (based on N <sub>2</sub> )
Pressure ranges	FF-M00: not available / FF-M01: 0...17 bar(a)
Accuracy (incl. linearity) (based on actual calibration)	Up to ±0,5% Rd plus ±0,1% FS (N <sub>2</sub> /Air/O <sub>2</sub> ); for other gases add conversion uncertainty; see <a href="#">multi gas table</a> ;
Repeatability	Flow sensor: < ±0,2% Rd; Pressure sensors: < ±0,2% FS
Turndown ratio	up to 1:1000; ≤ 20 ml <sub>n</sub> /min: up to 1:500
Max. operating pressure	16 bar g
Multi Gas/Multi Range	embedded gas data for <u>22 unique gases</u> plus any mixture of these gases
Response time (sensor)	< 30 ms (T <sub>63</sub> )
Long term stability	< 0,5% FS over period of 3 years; then < 0,2% FS per year
Operating temperature	0 ... 50 °C
Storage / Transport conditions	-20 ... +80 °C, max. 95% RH (non-condensing)
Mounting	any position, attitude sensitivity negligible
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

## Measurement / control system

Temperature accuracy	± 0,2 °C (instrument body temperature)
Accuracy pressure sensors	±0,5% FS
Pressure sensitivity	standard: < 0,15% Rd/bar typical N <sub>2</sub> ; with pressure correction: typical factor 5 improved
Leak integrity, outboard	tested < 2 x 10 <sup>-9</sup> mbar l/s He

## Mechanical parts

Instrument body	Aluminium or Stainless steel (selectable)
Material (wetted parts)	aluminium, stainless steel, silicon nitride, epoxy, aluminium oxide, glass
Surface quality	< 1,6 µ Ra (<0,8 µ Ra for stainless steel body)
Pressure rating (PN)	16 bar(g) / 250 psig
Process connections	1/8" BSPP female thread; couplings to be ordered separately
Seals	default: FKM 51415; for other materials contact factory
Weight	250 g with Aluminium body, 350 g with SS 316 body; add 50 g for Ethernet interface
Ingress protection	IP40

## Electrical properties

Power supply	24 Vdc ± 10%
Max. power consumption	0,5 Watt; add 0,9 Watt for EtherNet communication
Digital communication	Modbus RTU or FLOW-BUS (selectable) Optional: PROFINET, EtherCAT, Modbus-TCP, Ethernet/IP or POWERLINK
Support interface	USB-C port for easy setup; Optional Bluetooth connection for monitoring
Electrical connection	9-pin D-sub (male)
Certification	CE / UKCA / KC

## Electrical connection

## Control valve options

## External actuator options to be connected to the controller

## Certification for hazardous areas

## Approvals / certificates

Technical specifications subject to change without notice.

For dimensional drawings and hook-up diagrams please visit the [product page](#) on our [website](#)

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## Related products



### FLEXI-FLOW COMPACT FF-M1X

Flow 0...500 mln/min  
up to 0...20 lln/min

Accuracy  $\pm 0,5\%$  Rd +  
 $\pm 0,1\%$  FS

Multi-parameter (P+T  
output options)

Fast response (TCS  
technology)



### FLEXI-FLOW COMPACT FF-COX

Flow 0...5 mln/min  
up to 0...200 mln/min

Accuracy  $\pm 0,5\%$  Rd +  
 $\pm 0,1\%$  FS

Multi-parameter (P+T  
output options)

Fast response (TCS  
technology)