DATASHEET FF-C1X

FLEXI-FLOW Compact FF-C1x

Built-to-Order Mass Flow and Pressure Controller for Gases



Mass Flow / Pressure Controllers for Low Gas Flows

FLEXI-FLOW Compact Built-to-Order (BtO) Mass Flow / Pressure Controllers are suited for accurate measurement and control of flow ranges between 0…500 ml_n/min and 0…20 l_n/min at operating pressures between vacuum 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 provide the user with useful process information.

FLEXI-FLOW Compact Built-to-Order models feature a Mass Flow / Pressure Controllers **a turndown to 1:1000; free selection of ranges between 0,5 and 20 l_n/min** (FS, based on N_2). They are currently available in 2 variants:

- Type FF-C10: flow + temperature
- Type FF-C11: flow + temperature + up- and downstream pressure

BtO models may also be used to configure **multi-channel versions up to 8 channels**.

Technical specifications

Measurement / control system

Flow range (intermediate ranges available)	min. 0…500 ml_n/min max. 0…20 l_n/min (based on N_2)
Pressure ranges	FF-C10: not available / FF-C11: 0...17 bar(a)
Accuracy (incl. linearity) (based on actual calibration)	Up to ±0,5% Rd plus ±0,1% FS (N_2/Air/O_2); for other gases add conversion uncertainty; see multi gas table;
Repeatability	Flow sensor: < ±0,2% Rd; Pressure sensors: < ±0,2% FS
Turndown ratio	up to 1:1000
Max. operating pressure	16 bar(g)
Multi Gas / Multi Range	embedded gas data for 22 unique gases plus any mixture of these gases
Settling time (in control, typical)	< 150 ms
Long term stability	< 0,5% FS over period of 3 years; then < 0,2% FS per year
Control stability	< ± 0,1% FS (typical for 1 l_n/min N_2)
Operating temperature	0 … 50 °C

Measurement / control system

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
Temperature accuracy	± 0,2 °C (instrument body temperature)
Accuracy pressure sensors	±0,5% FS
Pressure sensitivity	standard: < 0,15% Rd/bar typical N_2; with pressure correction: typical factor 5 improved
Leak integrity, outboard	tested < 2 x 10^{-9} mbar l/s He
Leak-by through closed valve	typical < 1 x 10^{-4} 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 mu Ra (<0,8 mu Ra for stainless steel body)
Pressure rating (PN)	16 bar(g) / 250 psig
Max. ΔP	16 bar(d); 20 ln/min models: 5 bar (d)
Process connections	compression type, push-in or face seal couplings
Seals	FKM 51415; valve seat: FFKM with PI film; for other materials contact factory
Weight	200 g with Aluminium body, 300 g with SS 316 body
Ingress protection	IP40

Electrical properties

Power supply	24 Vdc ± 10%
Max. power consumption	2,5 Watt
Digital communication	Modbus RTU or FLOW-BUS (selectable)
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

Ex-proof specifications

Approvals / certificates

Technical specifications subject to change without notice.

For dimensional drawings and hook-up diagrams please visit the product page on our website

Related products



FLEXI-FLOW COMPACT FF-M1X

Flow 0…500 mln/min up to 0…20 ln/min

Accuracy ±0,5% Rd + ±0,1% FS

Multi-parameter (P+T output options)

Fast response (TCS technology)



FLEXI-FLOW MULTI-CHANNEL SOLUTIONS

Multi-channel Mass Flow/Pressure Control

Very compact assembly

Economical solution

Optional shut-off valves or mixing chamber



FLEXI-FLOW COMPACT FF-AXXX

Flow ranges 0…0,5 / 2 / 5 / 20 ln/min; ratio 1:500

Accuracy ±0,8% Rd + ±0,2% FS

Multi-parameter (P+T output options)

Fast response (TCS technology)



FLEXI-FLOW COMPACT FF-SXXX

Flow ranges 0…0,5 / 2 / 5 / 20 ln/min; ratio 1:50

Accuracy ±1,5% Rd + ±0,5% FS

Multi-parameter (T output option)

Fast response (TCS technology)

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