

# F-211CI

Industrial Style Thermal Mass Flow Controller for Gases



## Technical specifications

### Measurement & control

Type of media	Gases
Flow range	min. 0.16...8 ml <sub>n</sub> /min max. 0.5...25 l <sub>n</sub> /min
Accuracy	±0.5% Rd plus ±0.1% FS
Repeatability	<±0.2% Rd (or <±0.04% FS whichever is greater)
Turndown ratio	up to 1:187,5 (1:50 in analog mode)
Multi fluid capability	Storage of max. 8 calibration curves
Settling time (in control, typical)	standard: 1...2 seconds option: down to 500 msec
Control stability	< ± 0.1 % FS (typical)
Operating temperature	-10...+70°C; 0...+50°C for ATEX zone 2, KCs, Class1 Div 2
Temperature sensitivity	zero: < 0.05% FS/°C; span: < 0.05% Rd/°C
Leak integrity, outboard	tested < 2 x 10 <sup>-9</sup> mbar l/s He
Pressure sensitivity	0.1% Rd/bar typical N2; 0.01% Rd/bar typical H2
Max. Kv-value	6,6 x 10 <sup>-2</sup>
Mounting	max. error at 90° off horizontal 0.2% at 1 bar, typical N2
Warm-up time	30 minutes
Storage/transport conditions	0...+50°C, max. 95% RH (non-condensing)

### Approvals

Electrical safety	IEC 61010-1
Marking	CE, UKCA, RoHS, WEEE, REACH
Ex-Protection	Class I Div 2, ATEX Zone 2, KCs

### Mechanical specs

Pressure rating (PN) - in barg	100
Ingress protection	IP65
Material wetted parts	stainless steel 316L or comparable
Sealing material	standard: FKM/Viton®; options: EPDM, FFKM/Kalrez®, FDA and USP Class VI approved compounds
Plunger material	standard: FFKM with PI (polyimide) foil; options: EPDM with PI foil, FDA and USP Class VI approved EPDM, FDA and USP Class VI approved FFKM/Kalrez®
Process connections	compression type or face seal (VCR/VCO) couplings
Weight	1.4 kg

### Electrical properties

Power supply	+15...24 Vdc
Power consumption	3.5 W typical at 24 V for fieldbus: add 0.9 W
Analog output	0...5 (10) Vdc or 0 (4)...20 mA (sourcing)
Analog setpoint	0...5 (10) Vdc or 0 (4)...20 mA (sinking)
Digital communication	standard: RS232 options: CANopen®, DeviceNet™, EtherCAT®, PROFIBUS DP, PROFINET, Modbus RTU, ASCII or TCP/IP, EtherNet/IP, POWERLINK or FLOW-BUS

### Electrical interfaces

Power (main connector)	8-pin DIN (male)
Function (instrument connector)	Analog, RS232, RS485
PROFIBUS DP	8-pin M12B (female)
CANopen / DeviceNet	5-pin M12A (male)
Modbus RTU/ASCII/FLOW-BUS	5-pin M12A (male)
Modbus TCP / EtherNet/IP / EtherCAT® / PROFINET / POWERLINK	2x 4 pin M12D (female)