EN

FLEXI-FLOW Compact

# FF-C1xS

Mass flow and pressure controller with shut-off valve


Bronkhorst®

## Technical specifications

### Measurement & control

| | |
|---|---|
| Type of media | Gases |
| Flow range | 0.5 / 2 / 5 / 20 ln/min |
| Accuracy | Up to ±0,5% Rd plus ±0,1% FS ($N_2$/Air/$O_2$) |
| Repeatability | < ±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 |
| Settling time (in control, typical) | < 150 ms |
| Control stability | < ± 0.1% FS (typical for 1 ln/min N2) |
| Response time (sensor) | <30 ms |
| Operating temperature | 0…+50 °C (32 - 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 x $10^{-9}$ 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 | FF-C10D: not available / FF-C11D: 0...17 bar(a) |
| Leak-by through closed valve | typical < 1 x $10^{-4}$ mbar·l/s He;<br>< 2 x $10^{-8}$ mbar·l/s He for shut-off valve |
| 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

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|---|---|
| Pressure rating (PN) | 16 |
| Ingress protection | IP40 |
| Surface roughness wetted parts | <1.6 µm Ra (<0.8 µm 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 |
| Plunger material | FFKM with PI foil |
| Process connections | 1/8" BSPP female thread (ISO1179-1); compression type, push-in or face seal (VCR/VCO) couplings |
| Max. ΔP | 16 bar(d) |
| Weight | 350 g with Aluminium body, 450 g with SS 316 body; add 50 g for Ethernet interface |

### Electrical properties

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|---|---|
| Power supply | +24 Vdc ± 10% |
| Power consumption | 2.5 Watt (typical, in control);<br>add 0.9 Watt for EtherNet communication;<br>add 2.4 Watt for integrated shut-off (N/C) |
| 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 |

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