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TECHNOLOGY GROUP

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Find the *Brooks Instrument / Celerity / Unit Instruments UFC-8100* at our website: ***Click HERE***

8100 Series

High Flow Mass Flow Controllers/Meters

» MultiFlo™ technology for superior performance, reduced inventory and in situ support
» Advanced design using proven technologies used in metal seal 1660 model next generation semiconductor applications
» Best performance and reliability in the industry
» Low cost semiconductor-grade flow controller
» Available with analog, RS485, DeviceNet™ or PROFIBUS™ interfaces

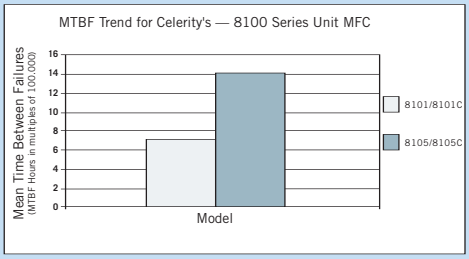


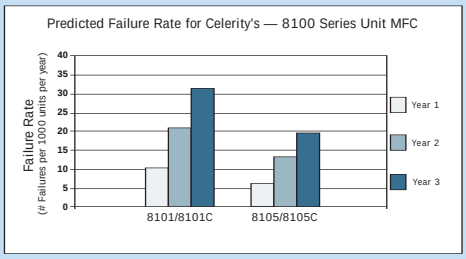
Features at a glance

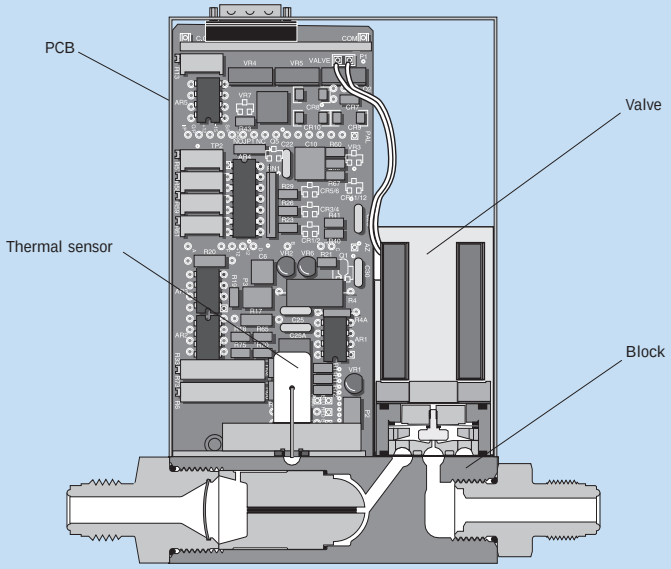
- For non-corrosive and non-ultraclean process gas applications (32µ inch Ra finish)
- Drop-in replacement for any elastomeric MFC
- Sealed with an elastomeric O-ring, which is inexpensive, well characterized, and offers reliable resealing
- Easy configuration change and maintenance
- Field proven—MTBF of 536,000 hours and ultra-low drift of less than 0.6% per year to reduce year-to-year maintenance and increase uptime
- Better than 0.15% full scale repeatability to provide the same quality run-after-run
- Statistically verified accuracy. Allows you to easily replicate processes from tool-to-tool and fab-to-fab and to use a single MFC over a wide range of flows.
- Minimized dead space for increased accuracy and faster response time under all turn-on conditions
- Valve designed with fewer parts to enhance speed, responsiveness and long-term reliability
- Upstream pressure buffering available for applications with fluctuating inlet pressures
- Compliant with the SEMI standard for Sensor Actuator Network Communications for DeviceNet (SEMI Std. Doc. #2602). Model 8105 specifically designed for full ODVA/SEMI compliance.
- All performance tests per SEMI test methods
- 2 year warranty

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Typical mass flow controller cutaway view

The Celerity advantage

- Available on models 8101 and 8105
- Digital control
- Accuracy of ±1% of setpoint compared to ±1% of full scale for model 8100. This allows the use of MultiFlo MFCs over a wide range of conditions while maintaining accuracy. Specifically designed to handle low and high flow of the same gas with the identical accuracy and stability
- High resolution calibration control that utilizes a 32 point calibration table for each gas resulting in a ten-fold improvement in accuracy
- MultiFlo MFCs can be programmed for an unlimited number of configurations. They eliminate the need to purchase spares for eachapplication, reducing inventory up to 90%.
- Programmable turn-on response time from less than 1 second up to 20 seconds to meet your process requirements
- Real time in situ reranging, monitoring, diagnostics and trouble-shooting to reduce equipment downtime and cost of ownership
- Model 8101 drop-in replacement for analog MFCs has two analog connectors (a 20 pin cardedge and 9 or a 15 pin “D”connector option)

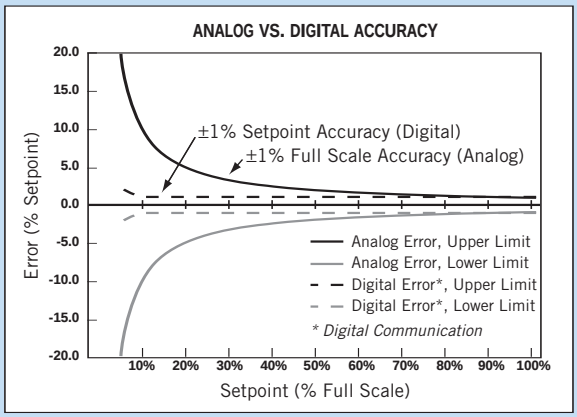
Description

The 8100 Series mass flow controllers are integrated devices that control gas flows using a high precision electromagnetic valve responding to flow measurements through a sensor using the thermal properties of gases. Since the thermal properties of gases are independent of pressure and temperature, this method provides a stable measurement with changing process conditions.

The patented IsoSensor™ is a high stability sensor that produces ultra-low drift, eliminating the need for frequent recalibration. It is attitude insensitive and eliminates thermal siphoning effects.

The precision electromagnetic control valve has a wide dynamic range that provides superior precision and control. It has been subjected to over 8 million cycles with no degradation in performance. It has proven to have superior reliability to piezo actuators and can also operate over a larger pressure range.

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Digital models 8101 and 8105 have an accuracy of ±1% of setpoint, while the analog model 8100 has an accuracy of ±1% of full scale. (Accuracy chart reflects primary standard calibration option.)

Model description

8101 MultiFlo	Digital control	Analog and RS485 interfaces
8105 MultiFlo	Digital control	DeviceNet or PROFIBUS interface

CrossChek™ metrology system

CrossChek™

Celerity's world-class CrossChek calibration methodology maintains SPC-verified calibration accuracy with ±3 sigma limit (99.7% confidence level) compared to ±1 or 2 sigma limits (67% to 95% confidence level) for other manufacturers.

CrossChek calibration methodology provides ongoing verification of production calibration standards. This ensures consistent and repeatable accuracy performance within ±3 sigma of published specifications. No other flow control company offers the same guarantee.

Warranty

- 2 year standard warranty
- Extended warranty option available

8100 Series Standard

High Flow Mass Flow Controllers/Meters

Performance

Settling time (to within 2% of setpoint):	
Fast start	≤ 1.0 sec (per SEMI E17-91)
Soft start	Linear 20% per sec (0 to 100% in 5 sec)
Accuracy:	
35% to 100% F.S.	±1% setpoint (±3σ per SEMI E56-96)
< 35% F.S.	±0.35% full scale (±3σ per SEMI E56-96)
Repeatability (full scale)	±0.15% (per SEMI E56-96)
Linearity (full scale)	±0.5% (per SEMI E27-92)
Inlet pressure coefficient	0.007% per psi (N_2)
Ambient temp. coefficient	Zero: 0.05% F.S. per °C; Span: 0.1% F.S. per °C
Leak integrity	1 X 10^{-9} atm-cc/sec (He) (per SEMI E16-90)
Automatic zero	Standard on 8101/8105 (customer programmable); optional on 8100
Zero drift	≤ 0.6% per year without auto zero
Thermal siphoning and attitude sensitivity	< 0.1% full scale (30 psi SF_6)

Operating limits

Standard flow range	3 sccm to 30 slm (N_2 equivalent)
Control range (full scale)	2-100%
Valve leak rate	≤ 1% full scale
Gases	Non-corrosive
Ambient temp. range	0-50°C (32-122°F)
Maximum operating pressure	3,500 kPa (500 psi)
Proof pressure	10,500 kPa (1,500 psi)
Pressure differential range	6.65 to 350 kPa (50 torr to 50 psid[1]) [1]Lower limit depends on gas density and flow range
Warm-up period	30 minutes
Mounting position	Any position
Valve	Normally closed or normally open

Electrical characteristics

Input/Output signal:	
Setpoint input	0-5 VDC linearly proportional to required flow
Output monitor	0-5 VDC linearly proportional to flow rate
Valve off	External: TTL signal
Auto shut-off	Setpoint < 2% full scale commands valve off
Power controller:	
8101 (RS485)	+15 VDC (160 mA max.), -15 VDC (160 mA max.)
8105 (DeviceNet)	+11-25 VDC per ODVA requirements: 600 mA @ 12 VDC, 300mA @ 24 VDC
8105 (PROFIBUS)	+15 VDC (500 mA max.), -15 VDC (500 mA max.)
Power meter (analog)	+15 VDC (50 mA max.), -15 VDC (50 mA max.)
Power consumption	8100 = 4.5 watts max., 8101 = 5 watts max., 8105 = 7.2 watts max.
CE certified	Immune to radiated energy 10 V/m, 30-850 mHz

Mechanical characteristics

Surface finish	32µ inch Ra
Fittings	1/8" and 3/8" Swagelok®, 1/4" VCR®, VCO®, Swagelok
Valve position	Downstream or upstream (optional)
Materials:	
Wetted components	316L SS/K-M45/304/7MO+
Seals	Viton®, Neoprene
Seat	Kel-F®, metal
Weight	1.2 kg (2.65 lbs)

Calibration references

Traceability	National Institute of Standards and Technology (N.I.S.T.)
Standard temperature and pressure	0°C and 760 mm Hg (per SEMI E12-96)

Specifications and features are subject to change without notice.

All specifications reflect nitrogen calibration using Molbloc/Molbox™ transfer standards.

Calibration by primary standards and surrogate gases is available as an additional charge option.

CrossChek™ calibration methodology maintains SPC-verified calibration accuracy with ±3σ limit (99.7% confidence level).

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8100 Series Product Configuration

C	8101	High Performance, Elastomer Seals, RS485 Digital and Analog Interface (Select Analog Connector Below)
C	8101C	High Performance, Elastomer Seals, Configurable MultiFlo, RS485 Digital and Analog Interface (Select Analog Connector Below)
M		High Performance, Elastomer Seals, RS485 Digital and Analog Interface (Select Analog Connector Below)
C	8105	High Performance, Elastomer Seals, Network Interface (Select DeviceNet or PROFIBUS Below)
C	8105C	High Performance, Elastomer Seals, Configurable MultiFlo, RS485 Digital and Analog Interface (Select Analog Connector Below)
M		High Performance, Elastomer Seals, Network Interface (Select DeviceNet or PROFIBUS Below)

A	Auto Shut-off
X	No Auto Shut-off

F	Fast Start < 1 Second Response
S	5 Second Linear Soft Start
T	6-10 Second Soft Start
V	10-15 Second Soft Start
X	No Valve (Mass Flow Meter)

===>	===>	Specify Pre-programmed Gas and Full Scale Range (example: Argon="0004" and 30 sccm="030C")
SC10	010C	Configurable MultiFlo. 3-10 sccm N_2 Equivalent
SC11	030C	Configurable MultiFlo. 11-30 sccm N_2 Equivalent
SC12	090C	Configurable MultiFlo. 31-90 sccm N_2 Equivalent
SC13	250C	Configurable MultiFlo. 91-250 sccm N_2 Equivalent
SC14	750C	Configurable MultiFlo. 251-750 sccm N_2 Equivalent
SC15	002L	Configurable MultiFlo. 751-2,000 sccm N_2 Equivalent
SC16	006L	Configurable MultiFlo. 2,001-6,000 sccm N_2 Equivalent
SC17	015L	Configurable MultiFlo. 6,001-15,000 sccm N_2 Equivalent
SC18	030L	Configurable MultiFlo. 15,001-30,000 scmm N_2 Equivalent

8S	1/8" Swagelok
4S	1/4" Swagelok
4R	1/4" VCR
40	1/4" VCO

H0V	Horizontal Or Vertical Mounting Attitude (Standard)
H0S	Horizontal Or Side

A	Atmospheric Downstream Pressure
V	Vacuum Downstream Pressure

V	F	Viton O-Ring/Kel-F Seat
N	F	Neoprene O-Ring/Kel-F Seat
V	M	Viton O-Ring/Metal Seat
V	X	Viton O-Ring - No Valve (Mass Flow Meter)

B	15 Pin "D" Connector (UDB15) Brooks Pin-out 0-5 VDC
D	DeviceNet (8105 only)
E	Cardedge Connector 0-5 VDC
I	15 Pin "D" Connector (UDI15) 4-20mA
K	15 Pin "D" Connector (UDK15) MKS Pin-out 0-5 VDC
L	Cardedge Lockdown Connector 0-5 VDC
P	PROFIBUS (8105 only)
S	9 Pin "D" Connector (UDS 9) 0-5 VDC STEC Pin-out
T	9 Pin "D" Connector (UDU9) Unit 0-5 VDC
U	15 Pin "D" Connector (UDU15) 0-5 VDC

XXXX	Customer Special Request (CSR) Consult Factory

0	Normally Open
C	Normally Closed (Standard)
X	No Valve (Mass Flow Meter)

S	Standard (Valve Downstream)
B	Buffered (Valve Upstream)
X	No Valve (Mass Flow Meter)

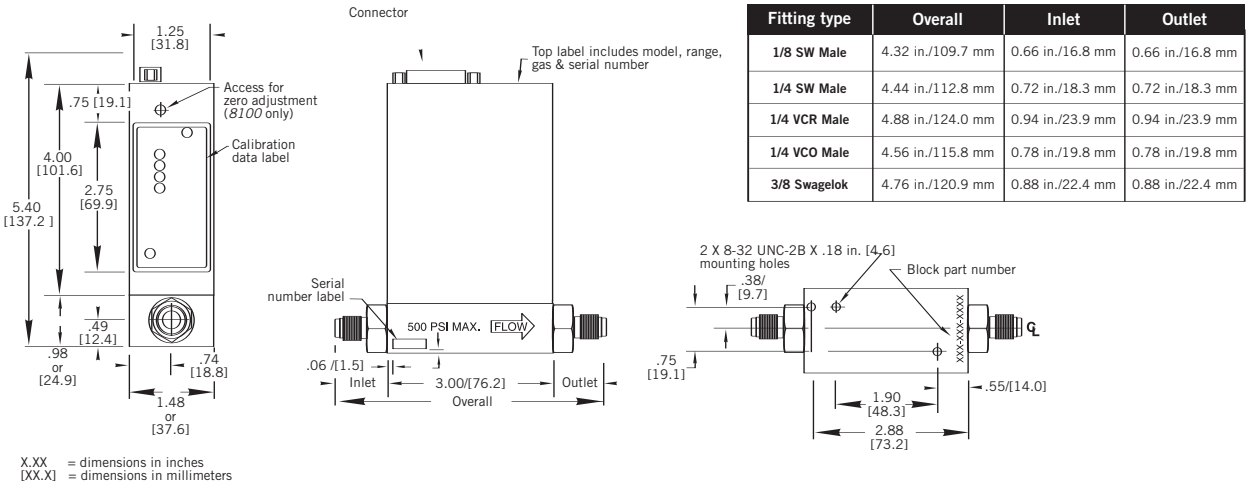
A	Auto-Zero Enabled
X	Auto-Zero Disabled

32X	32µ inch Ra Finish

00	0°C Reference Calibration (Standard)
XX	Custom Reference Calibration (20°C=20)

Example:

C	8100	A	F	0013	100C	8S	H0V	A	V	F	U	XXXX	C	S	X	32X	00



X.XX = dimensions in inches
[XX.X] = dimensions in millimeters

Fitting type	Overall	Inlet	Outlet
1/8 SW Male	4.32 in./109.7 mm	0.66 in./16.8 mm	0.66 in./16.8 mm
1/4 SW Male	4.44 in./112.8 mm	0.72 in./18.3 mm	0.72 in./18.3 mm
1/4 VCR Male	4.88 in./124.0 mm	0.94 in./23.9 mm	0.94 in./23.9 mm
1/4 VCO Male	4.56 in./115.8 mm	0.78 in./19.8 mm	0.78 in./19.8 mm
3/8 Swagelok	4.76 in./120.9 mm	0.88 in./22.4 mm	0.88 in./22.4 mm

CELERITY

UNIT

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