Unit 8560 Series

1.125" modular surface mount component high performance modular mass flow

» 1% digital setpoint accuracy and <1 second response
» High reliability and repeatability
» MultiFlo™ technology
» Digitals are backward-compatible to analog MFCs

Advanced control systems

The Unit 8560 series mass flow controllers and meters offer state-of-the-art, advanced control systems unequalled in the market today. The underlying algorithms provide the best-in-class accuracy of ±1% set-point and response of <1 second. The Unit 8560 series can meet specifications for any gas over a large inlet/outlet pressure range, over a wide temperature range, and over a large range of flow rates.

MultiFlo™ technology

MultiFlo™

MultiFlo is a proprietary technology available on all Unit digital MFCs. Our MultiFlo technology offers a host of benefits that increase tool uptime, reduce cost of ownership, and improve inventory requirements.

Unit MFCs with MultiFlo are offered in nine standard configurations, each programmable for a set of gases and flow ranges. Combined, the nine standard MFCs cover 85% of the gases and flow ranges used in a typical production fab (from 3 sccm to 30 slm, N_2 equivalent).

MultiFlo is offered with a Configuration Kit which allows OEMs and fab owners to program the MFC for desired gas and flow range anywhere, anytime, and in most cases, without removing the MFC from the module. Calibration does not require surrogate gases and can be completed in just a few minutes. In a recent benchmark study, we were able to cover an entire fab's MFC inventory requirement with only 23 part numbers (nine configurable MFC part numbers and 14 other unique part numbers), significantly reducing the fab's inventory requirements.

MultiFlo™ benefits

- Replacement MFCs are available in only a few minutes
- Nine standard MFC part numbers cover 85% of all applications
- Enables on-site gas and range changes with no surrogate gas requirements
- Enables last minute changes in gas panel integration without impacting on-time delivery
- Dramatically reduces inventory requirements
- Increases tool uptime

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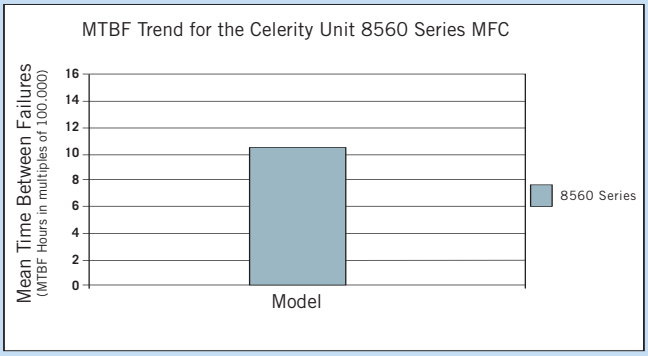
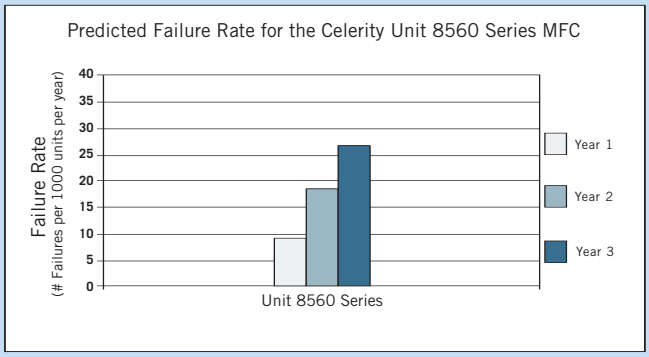




Better by design

Unit MFCs use a valve, sensor, and bypass design which has been perfected from years of research and testing. Unit MFCs are robust, reliable, and field proven.

The Unit solenoid valve has major advantages over other MFC valves (such as piezoelectric valves, which tend to shed particles). Our valve has only one moving part, and only three parts physically in the gas flow path. This results in no particle generation during normal operation. (Other valves, such as piezoelectrics, can release huge amounts of gas during a failure and can overtax abatement systems.)

The 3 sigma guarantee

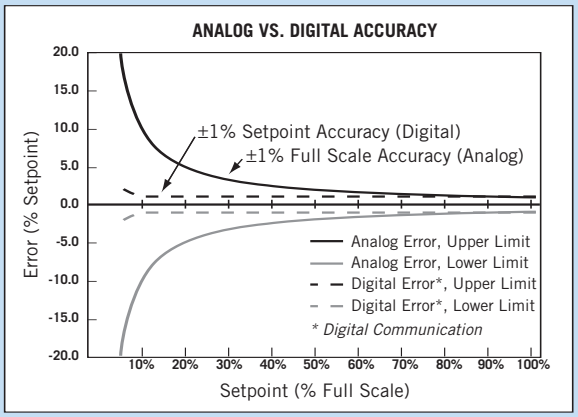
At Celerity, we stand behind our specifications. While others give only a one or two sigma limits (66.7% or 95%), Celerity guarantees 3 sigma limits, or 99.7% confidence, on critical parameters.

Communications options

All Unit digital products have the ability to communicate via analog, RS485 and DeviceNet. A variety of connector options are available to meet the interface requirements.

Flexible design

Mechanical connector options are available to support both welded and modular gas system requirements.



At 10% setpoint, digital MFCs are ten times more accurate than analog models. (Accuracy chart reflects primary standard calibration option.)

Model description

8561 MultiFlo	Analog control	Analog and RS485 interfaces
8565 MultiFlo	Digital control	DeviceNet

See the SDS Series datasheet for low vapor pressure products.

24/7 service and support

Celerity is unmatched in the industry for service and support. We have worldwide service locations with calibration, application support, and repair capabilities, operating 24 hours a day, 7 days a week. Celerity's website also provides updated application and technical support.

Visit us at www.celerity.net.

Warranty

- 3 year standard warranty
- Extended warranty option available

Unit 8560 Series Specifications

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% Full Scale	±1% set point (±3σ per SEMI E56-96)
< 35% Full Scale	±0.35% full scale (±3σ per SEMI E56-96) ±1% set point >35% full scale
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% full scale per ºC; Span: 0.1% full scale per ºC
Leak Integrity	1 X 10^{-11} atm-cc/sec (He) (per SEMI E16-90)
Automatic Zero	Standard on 8161/8165 (customer programmable)
Zero Xrift	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 to 100%
Valve Leak Rate	1% full scale
Gases	All
Ambient Temp. Range	0 to 50ºC (32 to 122ºF)
Max. Operating Pressure	3,500 kPa (500 psi)
Proof Pressure	10,500 kPa (1500 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	HOV or HOS
Valve	Normally closed or normally open solenoid

Electrical characteristics

Input/Output Signal	
Setpoint input	0 to 5 VDC linearly proportional to required flow
Output monitor	0 to 5 VDC linearly proportional to flow rate
Valve Off	External: TTL signal
Auto Shut-off	Setpoint <2% full scale commands valve off
Power Controller	
8561 (RS485)	+15 VDC (160 mA max.), –15 VDC (160 mA max.)
8565 (DeviceNet)	+11 to 25 VDC per ODVA requirements: 600 mA @12 VDC, 300mA @ 24 VDC
Power Consumption	8561 = 5 watts max. 8565 = 7.2 watts max.
CE Certified	Immune to radiated energy 10v/m, 30 to 850 mHz

Mechanical characteristics

Surface Finish	4µ inch Ra
Fittings	Downported C or W seals
Valve Position	Downstream or upstream (optional)
Materials	
Wetted Components	316L SS/K-M45/304/7MO+
Weight	1.2 Kg (2.65 lbs)

Calibration references

Traceability	National Institute of Standards and Technology (NIST)
Standard Temperature and Pressure	0ºC 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).

Unit 8560 Series Product Configuration

C	8561	High Purity, Metal Seals, RS485 Digital and Analog Interface (Select Analog Connector Below)
C	8561C	High Purity, Metal Seals, Configurable MultiFlo, RS485 Digital and Analog Interface (Select Analog Connector Below)
M		High Purity, Metal Seals, RS485 Digital and Analog Interface (Select Analog Connector Below)
C	8565	High Purity, Metal Seals, Network Interface (Select DeviceNet Below)
C	8565C	High Purity, Metal Seals, Configurable MultiFlo, Network Interface (Select DeviceNet Below)
M		High Purity, Metal Seals, Network Interface (Select DeviceNet 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/SH10*	010C	Configurable MultiFlo. 3–10 sccm N_2 Equivalent
SC11/SH11*	030C	Configurable MultiFlo. 11–30 sccm N_2 Equivalent
SC12/SH12*	090C	Configurable MultiFlo. 31–90 sccm N_2 Equivalent
SC13/SH13*	250C	Configurable MultiFlo. 91–250 sccm N_2 Equivalent
SC14/SH14*	750C	Configurable MultiFlo. 251–750 sccm N_2 Equivalent
SC15/SH15*	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 sccm N_2 Equivalent

DB	Downported – C Seal
DW	Downported – W Seal
LR	Poka Yoke Fitting

HOV	Horizontal or Vertical Mounting Attitude (Standard)
HOS	Horizontal or Side

A	Atmospheric Downstream Pressure
V	Vacuum Downstream Pressure

D	DeviceNet (8565 only)
F	9 Pin "D" Pigtail Cable STEC (UDF9) Unit 0–5 VDC
G	9 Pin "D" Connector (UDG9) Unit 0–5 VDC
J	9 Pin "D" Cable Adapter Pin 1 to 1 (Unit UDJ9) 0–5 VDC
N	9 Pin "D" Cable Adapter to UDS15 (UDN9) Unit 0–5 VDC
S	9 Pin "D" Connector (Unit UDS9) 0–5 VDC
T	9 Pin "D" Connector (UDU9) Unit 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

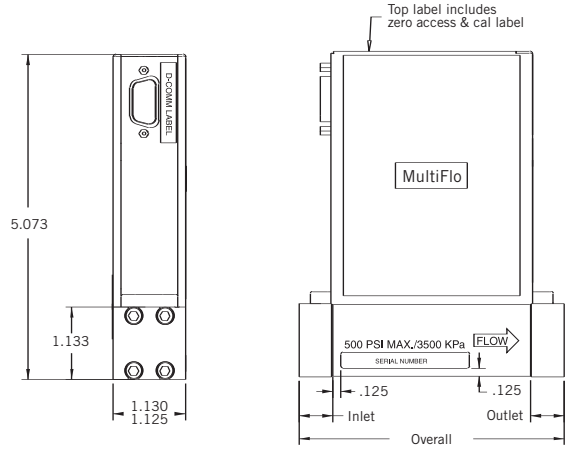
04E	4 inch Ra Finish (Standard)

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

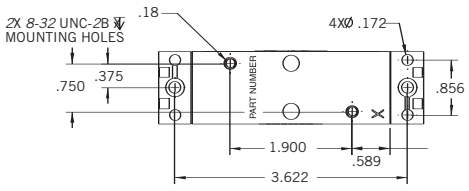
Example:

C	8565	A	F	0013	100C	DB	HOV	A	D	XXXX	C	S	X	04E	00

*Select "SH" series configuration for the following corrosive gas species: BCl_3, Cl_2, HBr or HCl.



Fitting type	Overall	Inlet	Outlet
Downported 'C' Bore	4.13 in./104.9 mm	0.526 in./13.4 mm	0.526 in./13.4 mm
Downported 'W'	4.13 in./104.9 mm	0.526 in./13.4 mm	0.526 in./13.4 mm



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

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UNIT

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