

# 7360 Series

Mass Flow Controller/Meter for Low to Medium Flow  
(5 sccm—30 slm) with Metal Seals

- » Outstanding reliability
- » Unmatched repeatability
- » Flexible analog and digital outputs
- » Less than 1 second response time
- » Incorporates MultiFlo™ technology



## Features at a glance

- High-integrity metal seals
- Control signal: 0-5 VDC or 4-20 mA
- Dual connector RS485
- DeviceNet™ or PROFIBUS™
- Range 5 sccm—30 slm (N<sub>2</sub> equivalent)
- Outstanding reliability MTBF over 380,000 hours
- Repeatable ±0.15% full scale
- ±1% full scale accuracy (analog)
- ±1% of setpoint accuracy (digital)
- Zero drift: <0.6% per year
- 1 x 10<sup>-10</sup> atm-cc/sec (He) leak rate
- 3 year warranty
- 316L stainless steel
- Attitude insensitive
- 16μ inch Ra finish
- Class 100 cleanroom manufacturing and packaging

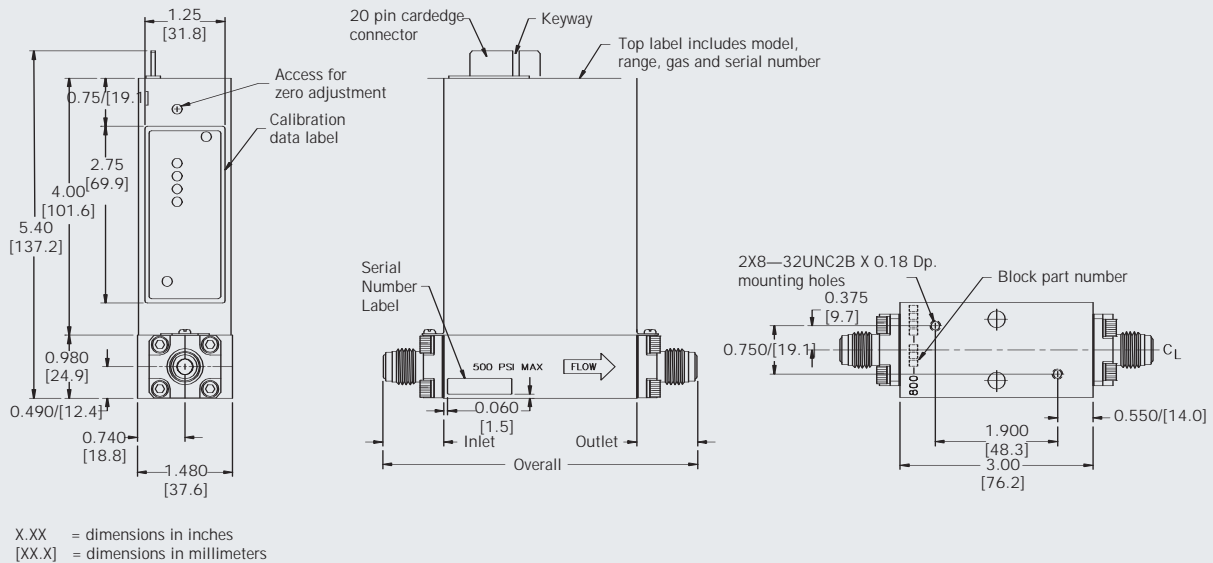
## Performance

The high performance 7360 Series mass flow controller/meter is designed for corrosive, reactive, and high-purity gases. The 7360 Series utilizes Celerity's high-integrity metal seal, providing a long

## Typical applications

- All gases
- Highly corrosive environment
- Reactive gases
- Fiber optics and glass coating
- Vacuum processes
- Environmental gas monitoring and control
- Medical equipment gas monitoring and control
- Combustion control
- Leak testing
- Purging
- Plasma spray coating
- Gas sampling
- Carrier gas monitoring
- Central gas distribution
- Orifice sizing
- Particulate sampling
- Gas chromatography
- Argon flow for electro-surgery
- Chemical and petrochemical gas analysis
- Pharmaceutical manufacturing

## Product dimensions



lasting seal for all gases. The 7360 Series is based on proven designs developed by Celerity for the semiconductor industry's most demanding processes. Its accuracy and repeatability increase yields and provide superior output quality.

Unit mass flow controllers integrate the sensor, valve, and electronics into a compact device. They are designed to measure flow independent of pressure and temperature, providing a stable measurement with changing process conditions. The 7360 Series is a flexible instrument available with analog, digital, DeviceNet, or PROFIBUS communications.

### Unmatched repeatability

The features that provide Unit MFCs superior repeatability are the IsoSensor™, the unique frictionless free-floating solenoid control valve, and the advanced control electronics with temperature compensation. The Unit 7360 Series provides the same process result within 0.15% of full scale, time after time, exceeding industry standards for repeatability.

### Tested an field-proven reliability

Reliability is designed into the 7360 Series in a variety of ways. The electronics provide easier calibration, low drift, and linear accuracy. The single valve spring retains its tension, even after millions of flex operations, giving longer life to the MFC. Typically, our stable sensor allows

for up to 2 years between calibrations. Further, based on actual field data, the 7360 Series has a proven MTBF of over 345,000 hours in the analog version and 380,000 hours in the digital version.

### Advanced sensor design

A mass flow device is only as good as its mass flow sensor. The 7360 Series' patented thermal IsoSensor is designed using sophisticated modeling techniques to maximize output and minimize noise. In addition, stringent environmental testing has been performed to improve durability. The result is high output, high stability, and superior accuracy and reliability. Celerity is the only mass flow device manufacturer to offer an attitude insensitive sensor with no thermal siphoning effects.

### Precision electromagnetic valve

The Unit 132 valve incorporated within the 7360 Series is the premier proportional control valve on today's market. Its unique design has been optimized to eliminate threads and shims that can trap dirt and moisture. In testing, it has been subjected to over 8 million cycles with no degradation in performance. The electromagnetic actuator is proven to have superior reliability to Piezo actuators and can also operate over a larger pressure range. This design has been used in over 200,000 precision mass flow controllers demonstrating unmatched reliability.

## 7360 Series High Performance Mass Flow Controller/Meter

### Product specifications

All specifications are 3 sigma (exceeding with 99.7% confidence)

Ftng. type	Overall	Inlet	Outlet
1/4" VCR male	4.88 in./124.0 mm	0.94 in./23.9 mm	0.94 in./23.9 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" VCO male	4.56 in./115.8 mm	0.78 in./19.8 mm	0.78 in./19.8 mm
1/8" SW male	4.32 in./109.7 mm	0.66 in./16.8 mm	0.66 in./16.8 mm
3/8" SW male	4.56 in./115.8 mm	0.78 in./19.8 mm	0.78 in./19.8 mm

7360 Series product dimensions

### The MultiFlo™ advantage



Unit digital mass flow controllers and meters with MultiFlo technology are the most accurate mass flow devices offering  $\pm 1\%$  of setpoint

accuracy. Other mass flow controllers and meters measure accuracy in percentage of full scale. The high resolution calibration control utilizes a 32 point calibration table for each gas, resulting in a ten-fold improvement in accuracy. We guarantee a zero drift to less than 0.6% per year, reducing the number of periodic calibrations needed.

Each MultiFlo digital device can be field programmed for unlimited process gases with a programmable full scale from 33% to 100% of the maximum specified range. This eliminates the need to purchase spares for each application and lowers the cost of ownership. In addition, it reduces costs associated with change of gas and range. The response time can be programmed from less than 1 second up to 20 seconds to meet process requirements. Further, real time in situ calibration, monitoring, diagnostics, and troubleshooting reduce equipment down-time and cost of ownership.

Digital model 7361 with MultiFlo has a dual connector and can be operated in either RS485 or analog mode. When operating in analog mode, the RS485 port can still be used to read flow and change gases and ranges. The DeviceNet and PROFIBUS model 7364 utilize either the PROFIBUS or Open DeviceNet Vendors Association (ODVA) compliant interfaces.

Flow range	5 sccm to 30 slm (N <sub>2</sub> equivalent)
Accuracy:	
7360	$\pm 1\%$ full scale
7361/7364 series	$\pm 1\%$ setpoint, 35% to 100% full scale $\pm 0.35\%$ full scale at < 35% full scale
Repeatability	$\pm 0.15\%$ full scale
Turn down ratio	50:1
Linearity	$\pm 0.15\%$ full scale
Operating pressure:	
Maximum inlet pressure	500 psig
Proof pressure	1,500 psig
Pressure drop (controller)	7 to 40 psid
Pressure drop (meter)	< 4 torr (0.08 psid)
Response:	
Fast	< 1 second
Ramp	Various linear ramps available
Operating temperature	0 to 50°C
Temperature coefficient:	
Zero	$\pm 0.03\%$ full scale per °C
Span	$\pm 0.05\%$ full scale per °C
Pressure coefficient	0.0025% per psi
Zero drift	< 0.60 % per year without auto-zero
Leak integrity	$1 \times 10^{-10}$ atm-cc/sec (He)
Warm-up period	20 minutes
Control signal input/output	0-5 VDC or 4-20 mA
Power:	
Controller (analog)	+15 VDC (100 mA max.), -15 VDC (200 mA max.)
Controller (RS485)	+15 VDC (160 mA max.), -15 VDC (160 mA max.)
Controller (DeviceNet)	+11-25 VDC per ODVA requirements: 600 mA @ 12VDC, 300 mA @ 24VDC
Meter (analog)	+15 VDC (50 mA max.), -15 VDC (50 mA max.)
Input impedance	100,000 ohm minimum
Output impedance	10 ohm maximum
Wetted materials	316L stainless steel, elastomer seal
Surface finish	16 $\mu$ inch Ra
EMI/EFI resistance	Completed shielded electronics
Certification	Fully CE certified
Calibration Technology	National Institute of Standards and (N.I.S.T.) traceable

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.


# 7360 Series Product Configuration

C	Mass Flow Controller
M	Mass Flow Meter
7360	High Performance, Metal Seals, Analog Interface (Select Analog Connector Below)
7361	High Performance, Metal Seals, RS485 Digital and Analog Interface (Select Analog Connector Below)
7361C	High Performance, Metal Seals, Configurable MultiFlo, RS485 Digital and Analog Interface (Select Analog Connector Below)
7364	High Performance, Metal Seals, Network Interface (Select DeviceNet or PROFIBUS Below)
7364C	High Performance, Metal Seals, Configurable MultiFlo, 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
Y	20-30 Second Soft Start
Z	40-60 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 <sub>2</sub> Equivalent
SC11	030C Configurable MultiFlo. 11-30 sccm N <sub>2</sub> Equivalent
SC12	090C Configurable MultiFlo. 31-90 sccm N <sub>2</sub> Equivalent
SC13	250C Configurable MultiFlo. 91-250 sccm N <sub>2</sub> Equivalent
SC14	750C Configurable MultiFlo. 251-750 sccm N <sub>2</sub> Equivalent
SC15	002L Configurable MultiFlo. 751-2,000 sccm N <sub>2</sub> Equivalent
SC16	006L Configurable MultiFlo. 2,001-6,000 sccm N <sub>2</sub> Equivalent
SC17	015L Configurable MultiFlo. 6,001-15,000 sccm N <sub>2</sub> Equivalent
SC18	030L Configurable MultiFlo. 15,001-30,000 sccm N <sub>2</sub> Equivalent
3S	3/8" Swagelok
4S	1/4" Swagelok
4R	1/4" VCR
3R	3/8" VCR
DB	Large Counter Bore C Seal (Standard C Seal)
DC	Downported—C Seal
HOV	Horizontal or Vertical Mounting Attitude (Standard)
HOS	Horizontal on Side
A	Atmosphere Calibration—(Downstream Calibration Pressure)
V	Vacuum Calibration—(Downstream Calibration Pressure)
M	Metal O-Ring/Kel-F Seat
F	Metal O-Ring/Metal Seat
M	Metal O-Ring—No Valve (Mass Flow Meter)
X	Metal O-Ring—No Valve (Mass Flow Meter)
AA	15 Pin "D" Connector Brooks SMART Compatible 4-20mA (7360 only)
B	15 Pin "D" Connector (UDB15) Brooks Pin-out 0-5 VDC (7360 only)
D	DeviceNet (7364 only)
E	Cardedge Connector 0-5 VDC
I	15 Pin "D" Connector (UDI15) 4-20mA (7360 only)
K	15 Pin "D" Connector (UDK15) MKS Pin-out 0-5 VDC (7360 only)
L	Cardedge Lockdown Connector 0-5 VDC (7360 only)
P	PROFIBUS (7364 only)
S	9 Pin "D" Connector (UDS9) 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
V	9 Pin "D" Connector (UDV9) 0-10 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 Included (Need Auto Shut-off) (Digital no charge)
X	Auto-Zero Not Included
16X	16μ inch Ra Finish (Standard)
10E	10μ inch Ra Finish
00	0°C Reference Calibration (Standard)
XX	Custom Reference Calibration (20°C=20)

Example:

C	7360	A	F	0013	100C	4S	HOV	A	M	M	U	XXXX	C	S	X	16X	00
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## CrossChek™ metrology system

 Celerity's world-class CrossChek calibration methodology maintains SPC-verified calibration accuracy within ±3 sigma limits (99.7% confidence level).

## Warranty

- 2 year standard warranty
- Extended warranty option available

## 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](http://www.celerity.net).



CELERITY, INC.  
 22600 Savi Ranch Parkway  
 Yorba Linda, California 92887  
 Telephone 714.279.3500  
 Facsimile 714.921.0804  
[www.celerity.net](http://www.celerity.net)



For technical assistance, contact Celerity Applications Engineering at 714.921.2640.

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