

# 7300 Series

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

- » Outstanding reliability and repeatability
- » Flexible analog and digital control
- » Less than 1 second response time
- » Incorporates MultiFlo™ technology
- » Multiple power and connector choices
- » Data communications options



### Features at a glance

- 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)
- Reliable MTBF over 730,000 hours
- Repeatability ±0.15% of full scale
- ±1% full scale accuracy (analog)
- ±1% of setpoint accuracy (digital)
- Zero drift: < 0.6% per year
- 1 x 10<sup>-9</sup> atm-cc/sec (He) leak rate
- 2 year warranty
- 316L stainless steel
- ±15V or 11–33 VDC single ended power options

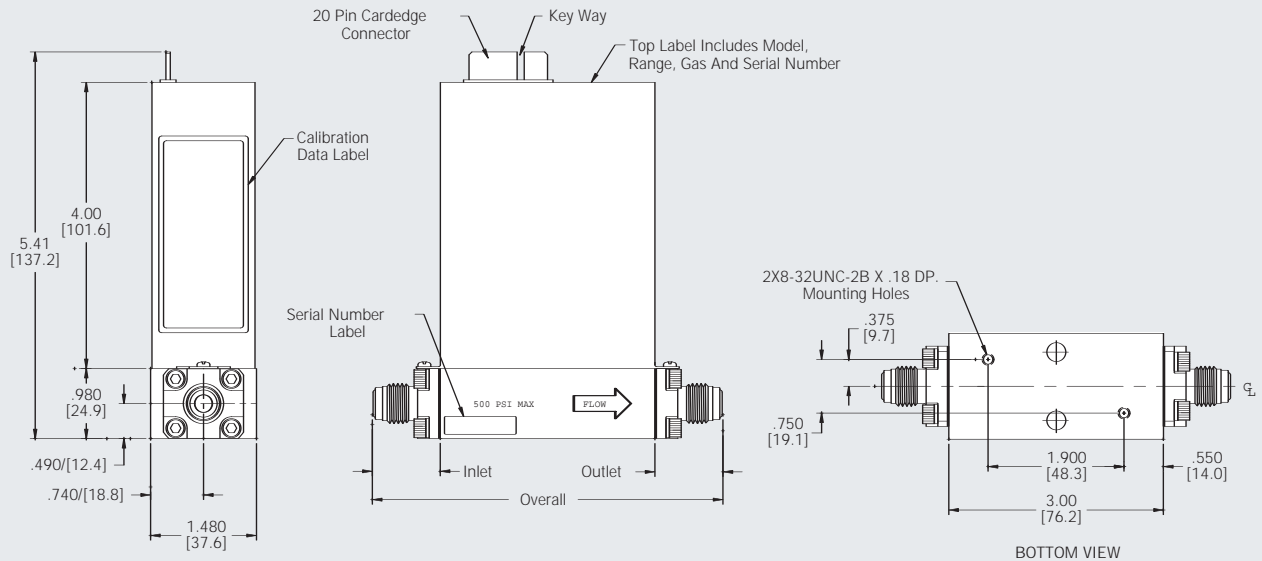
### Performance

The 7300 Series mass flow controller/meter is the industry's most advanced elastomer seal instrument. The 7300 Series is based on proven designs developed by Celerity. Unit mass flow controllers and meters are designed to measure and control flow, with consideration for changing process environments and applications.

### Typical applications

- Non-corrosive
- General process control
- Laser welding or cutting
- 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
- Tank blanketing
- Bioreactor gas management
- Flame control
- Mixing / Blending
- Thin films
- Argon flow for electro-surgery
- Chemical and petrochemical
- Gas analysis
- Pharmaceutical manufacturing

## Product dimensions



Unit mass flow controllers integrate the sensor, valve, and electronics into a compact device. The 7300 Series is a flexible instrument available with analog, digital, DeviceNet, or PROFIBUS communications. It provides the latest advances in control with high accuracy, repeatability, linearity, and fast response. The elastomer seals used in our 7300 Series MFCs are suitable for most process gases.

### Advanced sensor design

The 7300 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's IsoSensor™ offers a solution that eliminates the effects of thermal syphoning.

### Precision electromagnetic valve

The Unit 132 valve incorporated within the 7300 Series is the premier proportional control valve in the market today. Its unique design has been optimized to eliminate threads and shims that can trap dirt and moisture. In testing, it is 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 100,000 precision mass flow controllers demonstrating unmatched reliability.

### 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 7300 Series provides the same process result within 0.15% of full scale, time after time, exceeding industry standards for repeatability.

### Tested and field-proven reliability

Reliability is designed into the 7300 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. Our stable sensor allows our customers to extend calibrations cycles, reducing cost of ownership. Further, based on actual field data, the 7300 Series has a proven MTBF of over 730,000 hours in the analog version and 1.5 million hours in the digital version.

## 7300 Series High Performance Mass Flow Controller/Meter

### Product specifications

Flow range	5 sccm to 30 slm (N <sub>2</sub> equivalent)
Accuracy ( $\pm 3\sigma$ ):	
7300	±1% full scale
7301/7304 series	±0.35% full scale < 35% full scale ±1% setpoint > 35% full scale
Repeatability	±0.15% full scale
Turndown ratio	50:1
Linearity	±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	±0.05% full scale per °C
Span	±0.1% full scale per °C
Pressure coefficient	0.007% per psi
Zero drift	< 0.60 % per year without auto-zero
Leak integrity	1 x 10 <sup>-9</sup> atm-cc/sec (He)
Warm-up period	30 minutes

	7300 Analog	7301 Digital 0-5V	7301 Digital 4-20 mA	7304 DeviceNet
<b>Power input</b>	±15 VDC	11-33 VDC	11-33 VDC	11-25V per ODVA requirement
<b>Control signal</b>	0-5 VDC	0-5 VDC	4-20 mA	Per ODVA requirements
<b>Max. power controller</b>	4.5 W	4.8 W	5 W	5 W
<b>Max. power meter</b>	1.5 W	2 W	2 W	2 W

Input impedance	100,000 ohm minimum
Output impedance	10 ohm maximum
Wetted materials	316L stainless steel, 304 stainless steel spring
Surface finish	32μ inch Ra
EMI/EFI resistance	Completed shielded electronics
Certification	Fully CE certified
Calibration	National Institute of Standards and Technology (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.

Fitting type	Overall	Inlet	Outlet
1/8" NPT female	4.44 in./112.8 mm	0.72 in./18.3 mm	0.72 in./18.3 mm
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" VCO male	4.56 in./115.8 mm	0.78 in./19.8 mm	0.78 in./19.8 mm
1/4" VCR male	4.88 in./124.0 mm	0.94 in./23.9 mm	0.94 in./23.9 mm
3/8" SW male	4.56 in./115.8 mm	0.78 in./19.8 mm	0.78 in./19.8 mm
Downported	4.14 in. / 105.2 mm	0.57 in. / 14.5 mm	0.57 in. / 14.5 mm

7300 Series product dimensions

### The Celerity MultiFlo™ advantage



Unit digital mass flow controllers and meters with MultiFlo technology are the industry's most accurate mass flow devices offering ±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 7301 with MultiFlo has a dual connector and can be operated in either RS485 or analog mode. When operating in the analog mode, the RS485 port can still be used to read flow and change gases and ranges. The DeviceNet and PROFIBUS model 7304 utilize either the PROFIBUS or Open DeviceNet Vendors Association (ODVA) compliant interfaces.

# UFC/UFM 7300, 7301, 7304—Elastomer Seal

C	Mass Flow Controller
M	Mass Flow Meter
7300	High Performance, Elastomer Seals, Analog Interface
7301	High Performance, Elastomer Seals, RS485 Digital and Analog Interface (Select Analog Connector Below)
7301C	High Performance, Elastomer Seals, Configurable MultiFlo, RS485 Digital and Analog Interface (Select Analog Connector Below)
7304C	High Performance, Elastomer Seals, Configurable MultiFlo, Network Interface (Select DeviceNet or PROFIBUS Below)
7304	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: Nitrogen = "0013" and 100 sccm = "100C")
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
8N	1/8" NPT Female Adapter
8S	1/8" Swagelok
4S	1/4" Swagelok
40	1/4" VCO
4R	1/4" VCR
3S	3/8" Swagelok
DB	Downported—C Seal
HOV	Horizontal or Vertical Mounting Attitude (Standard)
HOS	Horizontal or Side
A	Atmospheric Downstream Pressure
V	Vacuum Downstream Pressure
V F	Viton O-Ring/Kel-F Seat—Standard
N F	Neoprene O-Ring/Kel-F Seat
V M	Viton O-Ring/Metal Seat (Required for 7301C)
V X	Viton O-Ring—No Valve (Mass Flow Meter)
AA	15 Pin "D" Connector Brooks SMART Compatible 4-20mA (7300 & 7301 only)
B	15 Pin "D" Connector (UDB15) Brooks Pin-out 0-5 VDC
D	DeviceNet (7304 only)
E	Cardedge Connector 0-5 VDC
I	15 Pin "D" Connector (UDI15) 4-20mA (7300 & 7301 only)
K	15 Pin "D" Connector (UDK15) MKS Pin-out 0-5 VDC (7300 only)
L	Cardedge Lockdown Connector 0-5 VDC (7300 only)
P	PROFIBUS Connector (7304 only)
S	9 pin "D" Connector (UDS9) STEC 0-5 VDC
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 (7300 only)
XXXX	Customer Special Request (CSR) Consult Factory
O	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 7300 A F 0013 100C 8S HOV A V F U XXXX C S X 32X 00

## 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).



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