

# Model 251

## Mass Flow Instruments

Porter Mass Flow products reflect over four decades of experience in the design and manufacture of precision instruments for the measurement and control of gas flow. They incorporate design principles that are simple and straightforward, yet flexible enough to operate under a wide variety of process parameters. The result is flowmeters, flow controllers and control valves that are accurate, reliable and cost-effective solutions for many gas flow applications in the analytical, process, chemical/ petrochemical, environmental, biopharmaceutical and research markets.

The 200 series is the latest evolution of the original Porter Analog MFC. With thousands installed worldwide, they are the proven solution when cost effective high performance gas flow control is the goal. The 100 Series Mass Flow Meters are available for applications where flow measurement only is required.



## SPECIFICATIONS:

**Flow Capacity:** Any Flow range from 0-10 SLP M to 0-50 SLPM (nitrogen equivalent).

**Response Time (per SEMI E17-91 Settling Time):** 1 to 2 Seconds

**Accuracy and Linearity:**  $\pm 1\%$  full scale

**Repeatability:** Within  $\pm 0.2\%$  full scale at any constant temperature within operating temperature range

**Rangeability (Control Range):** 50; 1 (2%-100% full scale) (accuracy and control)

**Ambient and Operating Temperature Range:** -10 to 70 °C ( $\pm 14$  to 158 °F)

**Maximum Operating Pressure:** 1000 PSIG

**Temperature Coefficient (per SEMI E18-91 Zero Effect and Span Effect):**  
 $\pm 0.05\%$  full scale / °C of zero  
 $\pm 0.05\%$  of reading/ °C of span

**Mounting Orientation:** Attitude insensitive

**Warm-up Time:** 10 minutes

**External Electrical Connector:** Nine (9)- pin Dconnector

**Weight (approximate):** 1.4 lbs

**Power Supply Requirements:** (Current consumption <250 mAdc):

**Voltage output models:** +12 ( $\pm 5\%$ ) (0-5 Vdc & 1-5 Vdc flow signal outputs only) or +15 ( $\pm 10\%$ ) Vdc

**Current loop models:** +15 ( $\pm 5\%$ ) or +24 ( $\pm 15\%$ ) Vdc

**Setpoint Input/Flow Signal Output:**  
0-5 Vdc/0-5 Vdc (2K ohm minimum load resistance)  
0-10 Vdc/0-10 Vdc (3K ohm minimum load resistance)  
1-5 Vdc/1-5 Vdc (2K ohm minimum load resistance)  
4-20 mAdc/4-20mAdc (refer to load resistance values below)  
1-5 Vdc/4-20 mAdc (refer to load resistance values below)

**Load resistance values for 4-20 mAsc flow signal output:**  
0-450 ohm for 6.5-15 Vdc loop supply voltage  
200-750 ohm for 15-30 Vdc loop supply voltage



ENGINEERING YOUR SUCCESS.

# MATERIALS OF CONSTRUCTION

- Body:** 316 Stainless Steel
- Sensor Assembly:** 316L Stainless Steel
- Orifice:** 316 Stainless Steel
- Valve Components (Wetted):** 302 Stainless Steel, 316 Stainless Steel and Sandvik® 1802
- Elastomers (O-rings and Valve Seat):** Buna N, EPDM, Kalrez®, Neoprene or Viton®
- Process Connections:** 316 Stainless Steel

Sandvik®, Kalrez® and Viton® are property of their respective owners

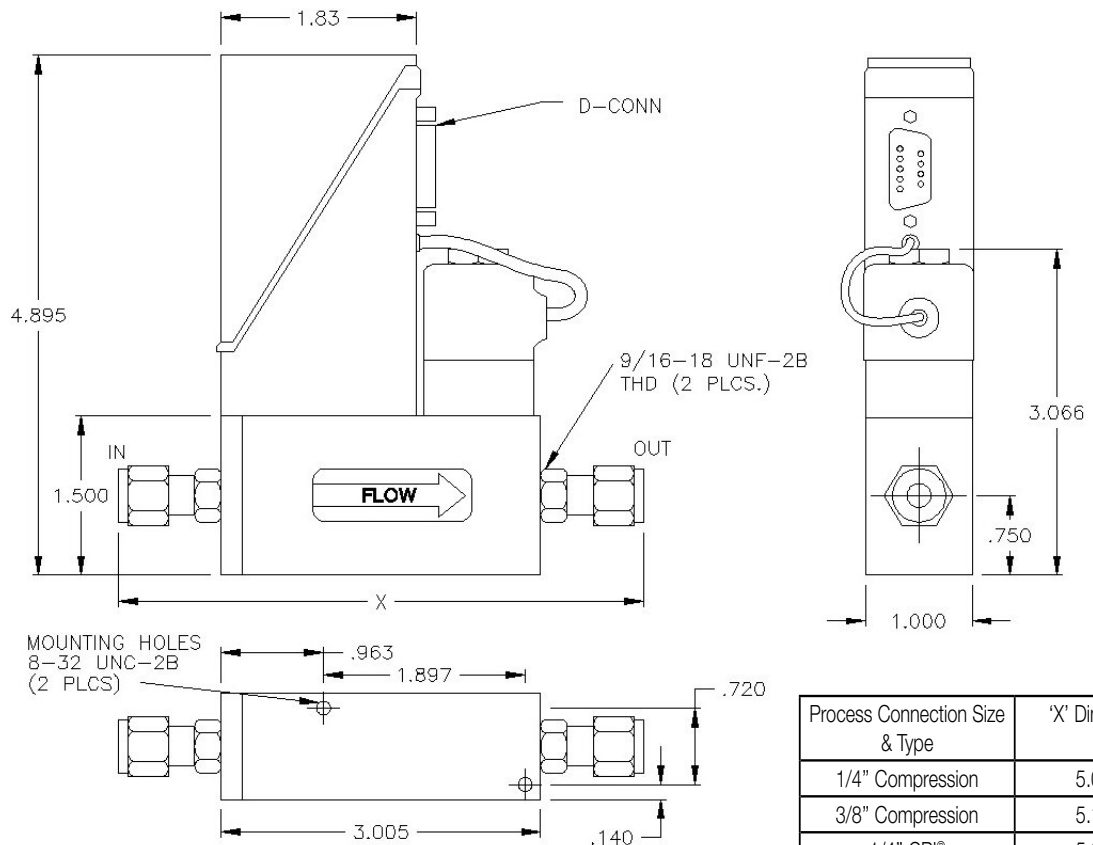
Specifications subject to change

# ORDERING INFORMATION

To order, please specify:

- Model number
- Type of output signal
- Elastomer material
- Process connection size and type
- Flow capacity
- Gas type
- Operating temperature
- Inlet (supply) pressure
- Outlet pressure
- Calibration standard (i.e. 0°C, 20°C, 21.1°C or 25°C)
- Additional accessories required

# DIMENSIONAL DATA



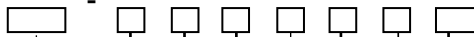
Dimensions shown in inches

Process Connection Size & Type	'X' Dimension
1/4" Compression	5.025"
3/8" Compression	5.145"
1/4" CPI®	5.025"
3/8" CPI	5.145"
1/4" A-Lok®	5.025"
3/8" A-Lok	5.145"
1/4" MMGFS	4.885"

# MODEL NUMBER AND DESCRIPTION

251 - F K A S V C AA

Example:



Model  
251

Model Revision  
F: Current Revision

PC Board Electrical Connector  
K: Nine (9)-Pin "D"

Setpoint Signal/Output Signal  
A: 0-5 Vdc/0-5 Vdc  
B: 1-5 Vdc/4-20 mAdc (sinking)  
D: 1-5 Vdc/1-5 Vdc  
E: 0-10 Vdc/0-10 Vdc  
H: 4-20 mAdc/4-20 mAdc (sourcing)  
J: 4-20 mAdc/4-20 mAdc (sinking)

Body Material  
S: 316 Stainless Steel

Assembly/Calibration Features  
AA: Factory Standard

Process Connection Size and Type			
A	3/8" CPI™	P	1/4" MMGFS <sup>(2)</sup>
C	1/4" Compression	Q	3/8" MMGFS <sup>(2)</sup>
D	3/8" Compression	R	3/8" UltraSeal®
E	1/2" Compression	S	1/2" MMGFS <sup>(2)</sup>
H	10 mm Compression	U	3/8" A-LOK®
I	1/4" CPI™	W	6 mm Compression
J	1/4" MORFS <sup>(1)</sup>	X	No Connections
K	3/8" MORFS <sup>(1)</sup>	Y	1/4" A-LOK
L	1/2" MORFS <sup>(1)</sup>	Z	Special Connections
M	1/4" UltraSeal®		

Elastomers (Valve Seat/O-Rings)

- B. Buna N/Buna N
- E. EPDM/EPDM
- K. Kalrez/Kalrez
- N. Neoprene/Neoprene
- V. Viton/Viton

A-LOK®, CPI™, UltraSeal™, VacuSeal™ - Parker Hannifin Corp.

<sup>(1)</sup>MORFS = Male O-Ring Face Seal

<sup>(2)</sup>MMGFS = Male Metal Gasket Face Seal

*For model number options not shown above, please consult factory*

## OTHER AVAILABLE ANALOG MASS FLOWMETER AND MASS FLOW CONTROLLER MODELS

Type	Model	Max. Flow <sup>1</sup> (SLPM)	Max. Pressure <sup>2</sup> (PSIG)	Min. Delta <sup>3</sup> (PSIG)
Analog Flow Meters	111	10	1500	2
	121	10	3000	2
	112	100	1500	2
	122	100	3000	2
	113	500	1000	2
	114	1000	1000	2
	2111	10	200	2
	3211	10	1000	2

Type	Model	Max. Flow <sup>1</sup> (SLPM)	Max. Pressure <sup>2</sup> (PSIG)	Min. Delta <sup>3</sup> (PSIG)
Analog Flow Controllers	201	10	1000	7
	261	10	1000	7
	221	10	3000	7
	251	50	1000	35
	202	100	1000	60
	222	100	3000	60
	202A	100	200	10
	203A	500	200	40
	204A	1000	200	80
	2201	10	200	7
	3201/3261	10	1000	7

Note: The flow ranges listed are the minimum and maximum nitrogen (N<sub>2</sub>) flow ranges available for each given model. Intermediate flow ranges are available. For correct sizing when operating parameters are questionable, please consult the factory.



Parker Hannifin Corporation  
Porter Instrument Division  
245 Township Line Road  
Hatfield, PA 19440 USA  
(215) 723-4000/ fax (215) 723-2199

WS-0016 Rev. B 02/12

ENGINEERING YOUR SUCCESS.