

500 and 600 Series

Gas Mass Flow Instruments



Digital Electronics Give High Accuracy with Enhanced Performance

Porter Series 500 Mass Flow Meters (MFMs) and Series 600 Mass Flow Controllers (MFCs) accurately measure and control flow rates of a wide variety of gases from 5 standard cubic centimeters per minute (SCCM) to 1000 standard liters per minute (SLPM) full scale nitrogen flow for operating pressures up to 1500 PSIG.

Series 500 MFMs and Series 600 MFCs feature performance-enhancing digital electronics, improved accuracy and repeatability, multi-gas capability and self-diagnostics. Both Series 500 and Series 600 are available with traditional analog inputs and outputs, an RS232 connection and Modbus, Profibus or DeviceNet digital protocol.



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Product Features:

- Digital Electronics
- Percentage of Reading Accuracy & Repeatability
- Multi-Gas Capability
- Analog I/O, RS232, Modbus, Profibus DP or DeviceNet Protocol
- Self-Diagnostics
- LED Operation Indicators
- Operating Pressures to 3000 PSIG
- Alarm and Counter Functions
- Remotely Adjustable Control Settings
- Single Power Supply Operation



ENGINEERING YOUR SUCCESS.

Specifications

Performance

Flow Capacities*	Any flow range from 0-5 SCCM to 0-1000 SLPM (nitrogen equivalent)
*Note: The flow ranges listed are the minimum and maximum nitrogen (N ₂) flow ranges available. Intermediate flow ranges are available. For correct sizing when operating parameters are questionable, please consult the factory.	
Response Time (per SEMI E17-91 Settling Time)	1 to 2 seconds (consult factory for applications requiring faster response times)
Accuracy & Linearity	±1.0% of reading (20%-100% full scale) ±0.8% of reading plus ±0.2% full scale (below 20% full scale)
Repeatability	Within ±0.2% of reading 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°C to 70°C (+14°F to 158°F)
Maximum Operating Pressures	1500 PSIG – Models 511 & 512 1000 PSIG – Models 513 514, 601, 602 & 651 200 PSIG – Models 602A, 603A & 604A
Temperature Coefficient (per SEMI E18-91 Zero Effect and Span Effect)	±0.05% full scale/°C of zero ±0.05% of reading/°C of span
Pressure Coefficient (per SEMI E28-92 Total Calibration Effect)	± 0.1%/atmosphere typical using nitrogen (N ₂)
Mounting Orientation	Attitude insensitive
Warm-up Time	10 minutes
External Electrical Connector	Nine (9)-pin D-connector (all units) RJ-45 connector (Modbus only) Nine (9)-pin D-connector (Profibus only) TURK B 8151-0-PG 9 (DeviceNet only)
Power Supply Requirements (Current Consumption <250 mAdc)	All models operate from nominal power supply voltages of +15 or +24 Vdc

Specifications subject to change.

Setpoint Input/Flow Signal Output:

Setpoint	Flow Signal
0-5 Vdc	0-5 Vdc (2K ohm minimum load resistance)
0-10 Vdc	0-10 Vdc (3K ohm minimum load resistance)
4-20 mAdc	4-20 mAdc (sourcing) (refer to load resistance values below)
0-100% (Modbus, Profibus DP, DeviceNet)	0-100% (Modbus, Profibus DP, DeviceNet)
Load Resistance Values for 4-20 mAdc flow signal output	200-750 ohm for 15-30 Vdc loop supply voltage

Materials

Body	316 Stainless Steel
Sensor Assembly	316L Stainless Steel
Orifice (MFCs only)	316 Stainless Steel
Valve Components (Wetted) (MFCs only)	302 Stainless Steel, 316 Stainless Steel, 430F Stainless Steel and Sandvik® 1802
Elastomers	Buna N, EPDM, Kalrez®, Neoprene or Viton®
Process Connections	316 Stainless Steel

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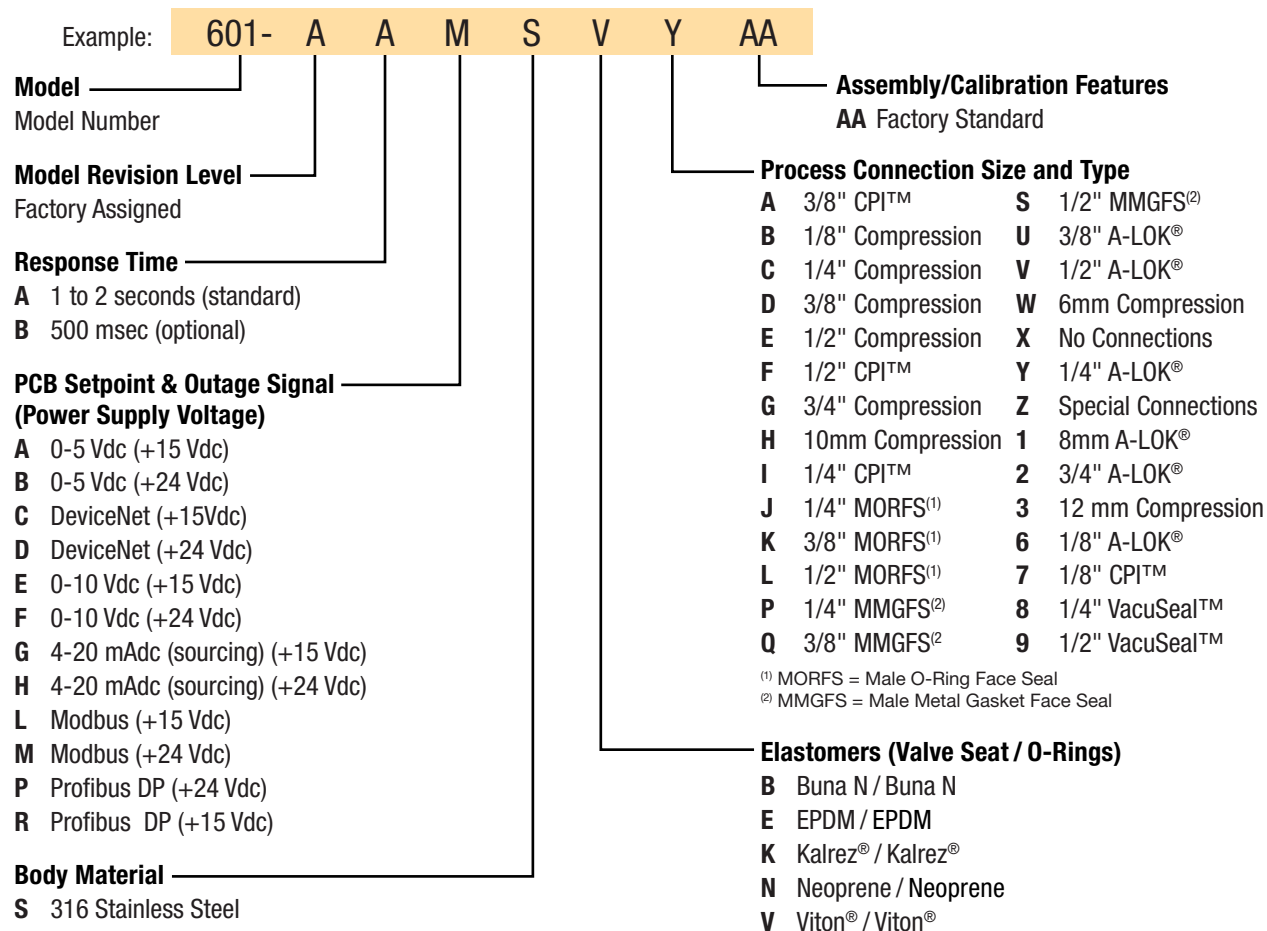
Ordering Information

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 (not required for MFMs)
- Calibration standard (i.e. 0°C, 20°C, 21.1°C or 25°C)
- Additional accessories required

Ordering Information

Model Number and Description



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

Available Models

Note: The flow ranges listed are the minimum and maximum nitrogen (N₂) flow ranges available for each given model. Intermediate flow ranges are available. For correct sizing when operating parameters are questionable, please consult the factory.

Mass Flow Meters:

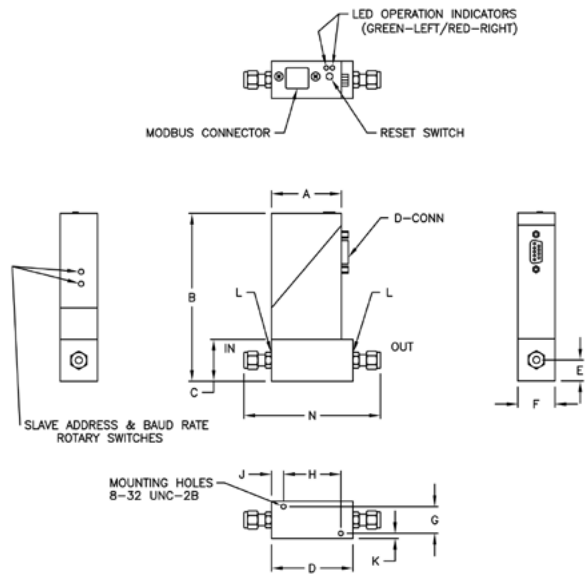
Model 511	0-5 SCCM to 0-10 SLPM N ₂
Model 512	0-10 SLPM to 0-100 SLPM N ₂
Model 513	0-100 SLPM to 0-500 SLPM N ₂
Model 514	0-500 SLPM to 0-1000 SLPM N ₂

Mass Flow Controllers:

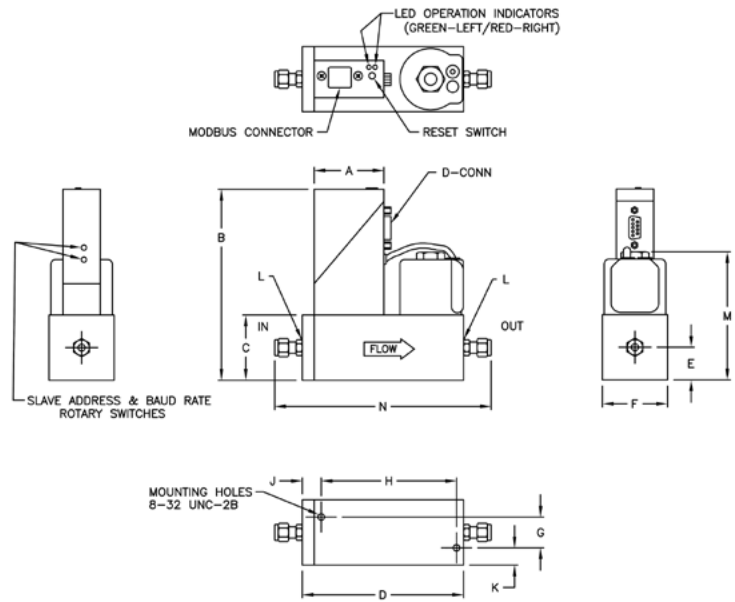
Model 601	0-5 SCCM to 0-10 SLPM N ₂
Model 651	0-10 SLPM to 0-50 SLPM N ₂
Model 602	0-10 SLPM to 0-100 SLPM N ₂
Model 602A	0-10 SLPM to 0-100 SLPM N ₂ (low ΔP)
Model 603A	0-100 SLPM to 0-500 SLPM N ₂
Model 604A	0-500 SLPM to 0-1000 SLPM N ₂

Dimensions (Dimensions shown in inches)

Series 500 Mass Flow Meter



Series 600 Mass Flow Controller



Series 500 Dimensions

Model	511	512	513	514
A	1.830	1.830	1.830	1.830
B	4.520	5.145	5.895	5.895
C	1.125	1.750	2.500	2.500
D	2.187	2.564	3.739	5.174
E	0.500	0.875	1.250	1.250
F	1.000	1.750	2.500	2.500
G	0.720	0.828	1.318	1.318
H	1.540	1.862	2.953	2.953
J	0.324	0.511	0.590	1.307
K	0.140	0.461	0.591	0.591
L	9/16-18	9/16-18	3/4-16	3/4-16
N	Refer to Dimension "N" table at right			

Series 600 Dimensions

Model	601	602	602A	603A	604A	651
A	1.830	1.830	1.830	1.830	1.830	1.830
B	4.520	5.145	5.270	5.895	5.895	4.895
C	1.125	1.750	1.875	2.500	2.500	1.500
D	3.005	4.335	5.241	6.299	6.299	3.005
E	0.500	0.875	0.875	1.250	1.250	0.750
F	1.000	1.750	1.875	2.500	2.500	1.000
G	0.720	0.828	0.828	1.318	1.318	0.720

Model	601	602	602A	603A	604A	651
H	2.720	3.634	4.539	5.512	5.512	1.897
J	0.145	0.511	0.511	0.590	0.590	0.963
K	0.140	0.461	0.523	0.591	0.591	0.140
L	9-16/18	9-16/18	9-16/18	3/4-16	3/4-16	9-16/18
M	2.218	3.569	3.770	4.395	4.395	3.066
N	Refer to Dimension "N" table below					

Dimension "N"

Model	511	512	513	514	601	602	602A	603A	604A	651
A-LOK® CPI™	1/8"	4.027		N/A	4.845			N/A		
	1/4"	4.207	4.584		5.025	6.355	7.261		N/A	5.025
	3/8"	4.327	4.704	5.939	N/A	5.145	6.475	7.381	8.499	N/A
	1/2"	4.487	4.864	6.159	7.594	5.305	6.635	7.541	8.719	8.719
			6.479	7.914		N/A	7.981	9.039	9.039	5.745
VacuSeal™	1/4"	4.067	4.444		N/A	4.885	6.215	7.121		N/A
	3/8"	4.367	4.744	6.179	7.614	5.185	6.515	7.421	8.739	8.739
	1/2"	4.367	4.744	6.179	7.614	5.185	6.515	7.421	8.739	8.739

N/A = Not Available

For process connection options not shown, please consult factory.

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