

# Max-Trak™ Model 180

## Technical Data Sheet

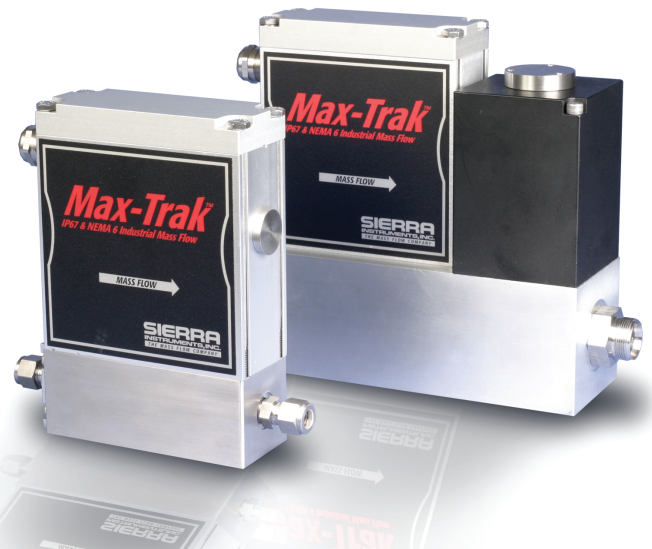
NEMA 6 / IP67 Compliant

Industrial Mass Flow

Meters and Controllers For Gases

### Features

- Industry's only NEMA 6/IP67 industrial MFC affords wash down protection eliminating the need for secondary enclosures
- Measure & Control gas mass flow rates up to 1000 slpm (other Sierra mass flow meters available up to 100,000 slpm & higher)
- Accuracy:  $\pm 1\%$  of Full Scale
- Repeatability:  $\pm 0.2\%$  Full Scale ensures a stable process even under changing conditions
- Dial-A-Gas® lets you select from up to 10 gases in one instrument, creating great flexibility and reducing spares inventories
- Operation at low differential pressures possible due to powerful direct valve design
- Both digital and analog communication included
- View and change the following functions in the field via RS-232 or our unique Pilot Module:
  - Gas
  - Setpoint Value
  - Setpoint source
  - Engineering units
  - Output signal
  - Valve state
  - Full scale value
  - Password
- 316 stainless steel construction is suitable for any clean gas, even corrosives & toxics
- Single sided power (24 VDC) reduces installation cost
- Free Software Included For Windows OS



### Description

**M**ax-Trak™ is an industrial mass flow controller from the company that has been a trusted name in industrial thermal mass flow meters for decades—Sierra Instruments.

In applications where frequent wash-down / hose-down is required, such as food and beverage, chemical processing, pharmaceutical and biotech, Max-Trak™ outperforms the competition as it conforms to the rigorous requirements of NEMA 6 and IP67.

Excellent accuracy and reliability coupled with unsurpassed instrument stability result from a patented, inherently linear design, advanced platinum sensor technology and a valve that is strong and forgiving of variations in process conditions.

Max-Trak™ controls gas mass flow from 10 to 1000 slpm, with lower flows (to 2 slpm) and higher flows available upon request. Based upon Sierra's successful Smart-Trak line of digital instruments, Max-Trak™ also offers Dial-A-Gas® multi-gas capability, both analog and digital communication and a wide variety of field adjustable parameters.

Max-Trak™ delivers the performance, flexibility and value you expect from Sierra Instruments.



The information contained herein is subject to change without notice.

## Performance Specifications

### Accuracy

Standard:  $\pm 1.0\%$  of full scale including linearity at operating conditions ( $\pm 2.0\%$  of full scale for 180M from 201-300 slpm)  
High Accuracy Calibration:  $\pm 0.7\%$  of reading +  $0.3\%$  of full scale at calibration conditions

### Dial-A-Gas

$\pm 1.0\%$  of full scale in all 10 standard gases

### Repeatability

$\pm 0.2\%$  of full scale

### Temperature Coefficient

$\pm 0.025\%$  of full scale per  $^{\circ}\text{F}$  ( $0.05\%$  of full scale per  $^{\circ}\text{C}$ ), or better

### Pressure Coefficient

$\pm 0.01\%$  of full scale per psi ( $0.15\%$  of full scale per bar), or better

### Response Time

300 millisecond time constant; 2 seconds typical to within  $\pm 2\%$  of final value (includes settling time). Faster or slower available upon request.

## Operating Specifications

### Gases

All clean and dry gases including corrosives; specify when ordering

The following 10 gases make up the Dial-A-Gas feature of every Max-Trak instrument; up to 9 alternate gases may be substituted.

**TABLE 1: DIAL-A-GAS**

Flow Rate (slpm)	Maximum Flow Rate Standard Size (slpm)	Maximum Flow Rate High Flow Size (slpm)
Air	300	1000
Argon	435	1450
CO <sub>2</sub>	220	740
CO	302	1000
Methane	227	720
Helium	420	1454
Hydrogen	300	1000
Oxygen	300	1000
Nitrogen	300	1000
Nitrous Oxide (N <sub>2</sub> O)	215	710



### Mass Flow Rates

180M Standard Size: 0-10 to 0-300 slpm full scale (as low as 0-2 slpm and as high as 0-400 slpm available upon request)

180H High Flow Size: 0-100 to 0-1000 slpm full scale

Flow range specified is for an equivalent flow of nitrogen at 760 mm Hg and 21 $^{\circ}\text{C}$  (70 $^{\circ}\text{F}$ ); other ranges in other units are available (e.g., NLPM, SCFH, NM<sup>3</sup>/H, kg/H)

### Gas Pressure

500 psig (34.5 barg) maximum, burst tested to 750 psig (52 barg)

## Operating Specifications (Continued)

### Gas & Ambient Temperature

**Gas:** 32 $^{\circ}\text{F}$  to 122 $^{\circ}\text{F}$  (0 $^{\circ}\text{C}$  to 50 $^{\circ}\text{C}$ )

**Ambient:** -5 to 122 $^{\circ}\text{F}$  (-20 to 50 $^{\circ}\text{C}$ )

### Leak Integrity

5 X 10<sup>-9</sup> atm. cc/sec of helium maximum

### Power Requirements (ripple should not exceed 100 mV peak-to-peak)

For All Mass Flow Meters: 15-24 VDC  $\pm 10\%$ , (130 mA, regulated).

For Mass Flow Controllers:

C180M: 24 VDC  $\pm 10\%$ , (700 mA, regulated)

C180H: 24 VDC  $\pm 10\%$ , (1260 mA, regulated)

### Control Range For Controllers

2–100% of full scale flow; automatic shut-off at 1.9%

### Output Signal

#### Analog:

Linear 4–20 mA, 500 ohms maximum loop resistance and one of the following (user selectable):

Linear 0–5 VDC, 1000 ohms minimum load resistance

Linear 0-10 VDC, 1000 ohms minimum load resistance

Linear 1-5 VDC, 1000 ohms minimum load resistance

#### Digital:

RS-232

Remote Pilot Module Display optional

### Command Signal

#### Analog (choice of one, user selectable):

Linear 4–20 mA

Linear 0–5 VDC

Linear 0-10 VDC

Linear 1-5 VDC

#### Digital:

RS-232

Pilot Module Display or RS-485 optional

### Physical Specifications

Wetted Material

316 stainless steel; 416 stainless steel; Viton® "O"-rings and valve seat standard

Other elastomers are available (consult factory).

## Operating Specifications

### Pressure Drop Across a Meter

Pressure must be above the values in the table below. Note that pressure increases with flow rate.

<b>MINIMUM PRESSURE DROP FOR AIR IN PSI (MBAR), METERS</b>			
Flow Rate (slpm)	Standard Size (M180M) 3/8 or 1/2 inch fittings	High Flow Size Small Bore (M180H) (std up to 500 slpm) 1/2 comp fittings	High flow Size Large Bore (M180H1, H2) (std 501-1000 slpm) 3/4 comp fittings
10	0.5 (34)	NA	N/A
20	0.5 (34)	NA	N/A
30	0.5 (34)	NA	N/A
40	0.5 (34)	NA	N/A
50	0.5 (34)	NA	N/A
100	1.0 (68)	1.0 (68)	0.5 (34)
150	2.0 (136)	1.2 (81.6)	0.5 (34)
200	5.5 (374)	1.5 (102)	0.5 (34)
250	N/A	1.8 (122.4)	0.5 (34)
300	N/A	2 (136)	0.6 (408)
350	N/A	2.5 (170)	0.7 (476)
400	N/A	3 (204)	0.9 (612)
450	N/A	3.5 (238)	1.1 (748)
500	N/A	4 (272)	1.3 (884)
750	N/A	N/A	3.0 (204)
1000	N/A	N/A	5.0 (340)

### Differential Pressure Requirement for Controllers (lower or higher available upon request)

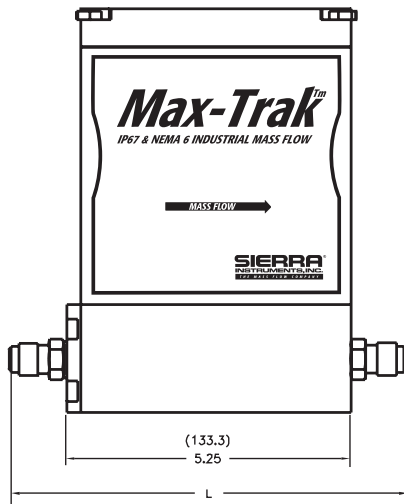
Optimum: 30-60 psi (2-4 bar)

Minimum: See chart below. Note that required pressure increases with flow rate.

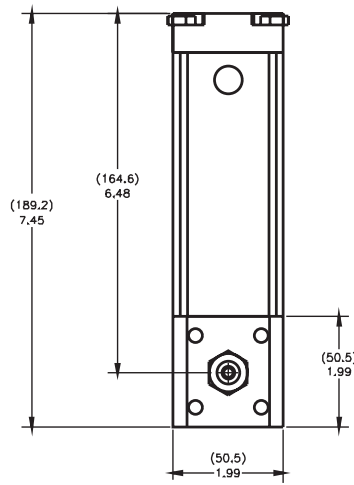
<b>MINIMUM DIFFERENTIAL PRESSURE FOR AIR IN PSI (MBAR), CONTROLLERS</b>			
Flow Rate (slpm)	Standard Size (C180M) 3/8 or 1/2 inch fittings	High Flow Size Small Bore (M180H) (std up to 500 slpm) 1/2 comp fittings	High flow Size Large Bore (M180H1, H2) (std 501-1000 slpm) 3/4 comp fittings
10	N/A	NA	N/A
20	1 (68)	NA	N/A
30	1.2 (82)	NA	N/A
40	1.6 (110)	NA	N/A
50	2 (136)	NA	N/A
100	5 (340)	1.5 (102)	1.0 (68)
150	10 (680)	2 (136)	1.0 (68)
200	15 (1020)	4.5 (306)	1.0 (68)
250	20 (1360)	5.5 (374)	1.5 (102)
300	25 (1700)	6.5 (442)	2.0 (136)
350	N/A	8.5 (578)	3.0 (204)
400	N/A	10.5 (714)	4.0 (272)
450	N/A	13 (884)	5.0 (340)
500	N/A	15 (1020)	6.0 (408)
750	N/A	N/A	15 (1020)
1000	N/A	N/A	20 (1360)

## Physical Dimensions

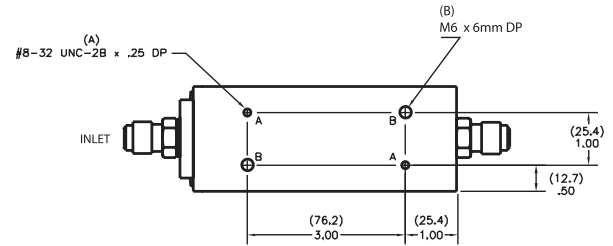
M180M, M1 and C180M, M1 Front View



M180M, M1 and C180M, M1 Side View



M180M, M1 and C180M, M1 Bottom View



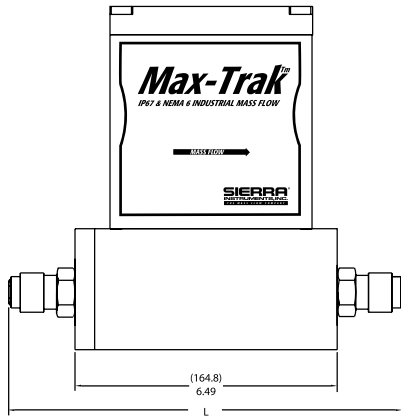
## Dimension L

Fittings	Length with fittings in inches (mm)				
	C180/M180L	M180H	M180H1,H2	C180H	C180H1,C180H2
1/8 compression	NA	NA	NA	NA	NA
1/4 compression	7.27 (186)	NA	NA	NA	NA
3/8 compression	7.39 (189)	NA	NA	NA	NA
1/2 compression	7.55 (194)	8.92 (229)	NA	10.37 (266)	NA
1/4 VCO	6.81 (175)	NA	NA	NA	NA
1/2 VCO	7.25 (186)	8.56 (220)	NA	10.01 (267)	NA
3/4 VCO	NA	NA	8.78 (225)	NA	11.28 (289)
1/4 VCR	7.13 (183)	NA	NA	NA	NA
1/2 VCR	7.43 (191)	9.00 (231)	NA	10.45 (268)	NA
6 mm compression	7.29 (187)	NA	NA	NA	NA
10 mm compression	7.45 (191)	NA	NA	NA	NA
12 mm compression	7.63 (196)	8.90 (228)	NA	10.35 (265)	NA
1/4 FNPT	7.10 (182)	NA	NA	NA	NA
3/8 FNPT	7.25 (186)	NA	NA	NA	NA
1/2 FNPT	NA	9.14 (234)	NA	10.59 (272)	NA
3/4 FNPT	NA	NA	9.30 (238)	NA	11.30 (290)
3/4 compression	NA	9.24 (237)	9.18 (235)	10.69 (274)	11.68 (300)
1 inch compression	NA	NA	8.52 (244)	NA	12.02 (308)

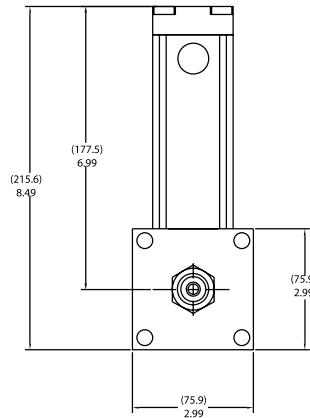
## Physical Dimensions

All dimensions are in inches with mm in brackets. Certified drawings are available on request.

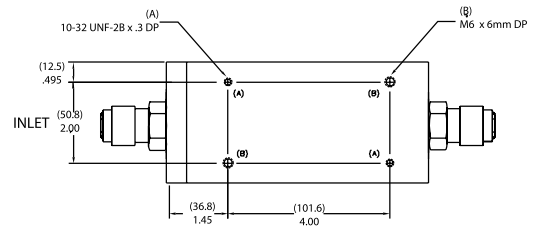
**M180H, H1, H2 Front View**



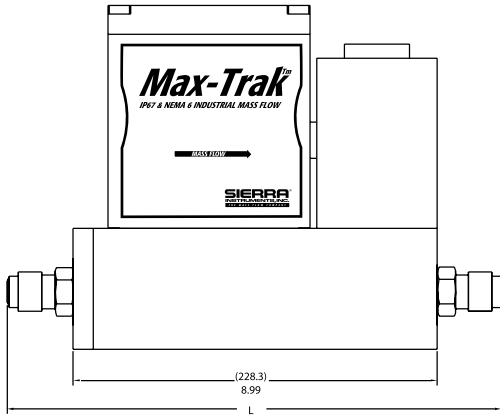
**M180H, H1, H2 Side View**



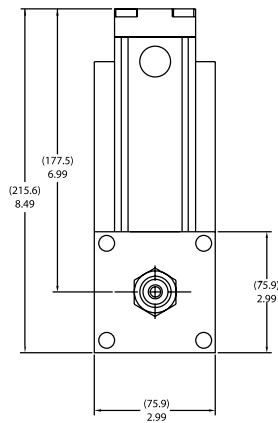
**M180H, H1, H2 Bottom View**



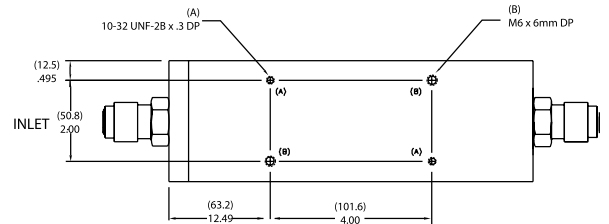
**C180H, H1, H2 Front View**



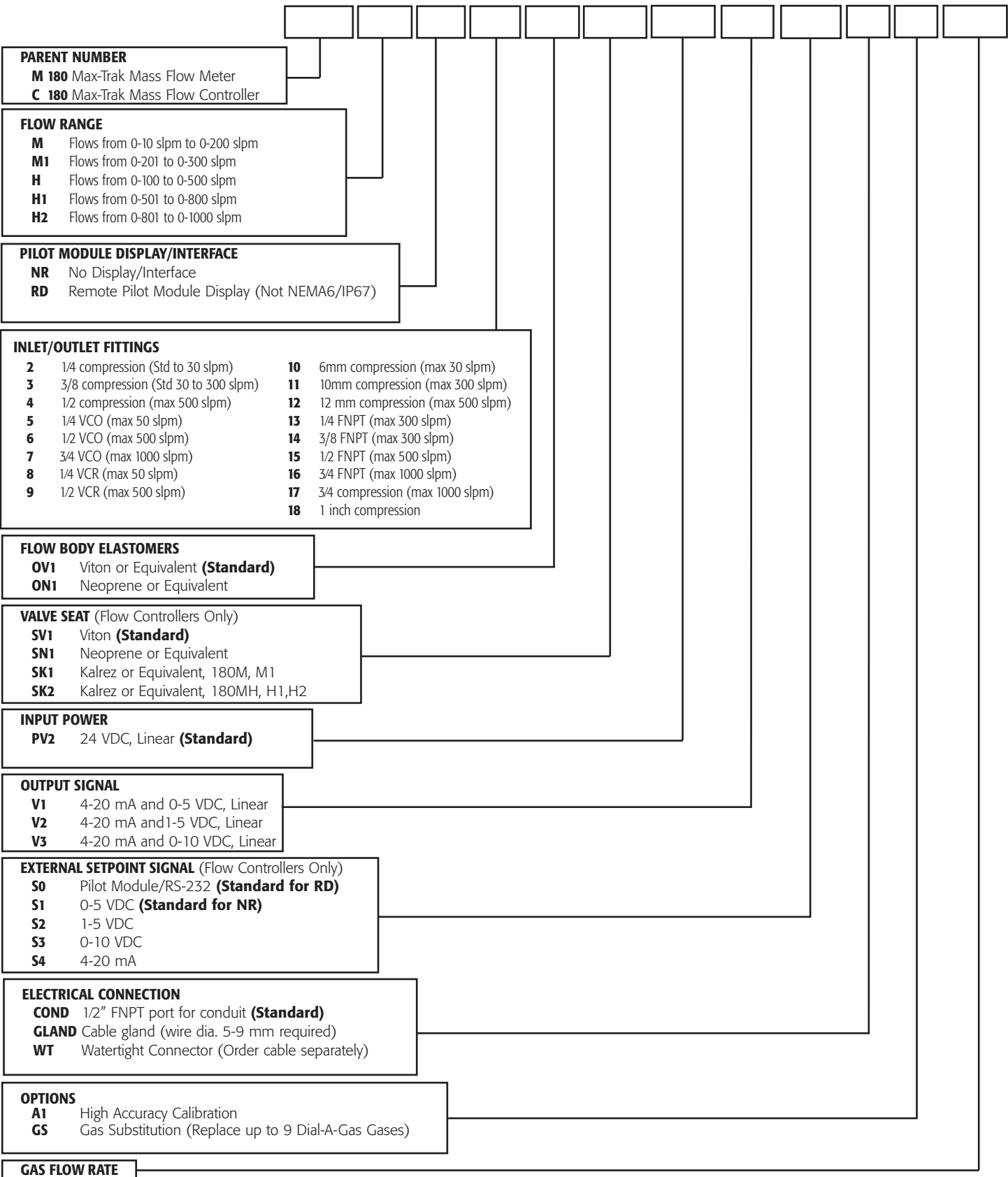
**C180H, H1, H2 Side View**



**C180H, H1, H2 Bottom View**



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