

# 5850E, 5850i

## Технические характеристики

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Model 5850E

# 5800 Series

Elastomer Sealed, Analog,  
General Purpose Thermal Mass Flow  
Meters & Controllers for Gases

The 5800 Series mass flow meters and mass flow controllers have gained broad acceptance as the standard for stability and reliability. These products have a wide flow measurement range and are suitable for a broad range of temperature and pressure conditions making them well suited for applications in chemical and petrochemical research, laboratory, analytical, fuel cell and life science among others.

Highlights of the 5800 Series mass flow products include: industry leading long-term stability, accuracy backed by superior metrology systems and methods using primary calibration systems directly traceable to international standards, and a range of analog I/O options.

The 5800 Series provides a highly configurable platform based on a simple modular architecture. The 5800 Series feature set was carefully selected to enable drop-in replacement of many brands of mass flow controllers. With the wide range of options and features available, the 5800 Series provides users with a single platform to support a broad range of applications.

| Features   | Benefits  |
|--|---|
| Industry leading long-term sensor stability                | Increased system uptime and reduced cost of ownership by reducing maintenance and eliminating periodic recipe adjustments and/or recalibrations |
| Superior valve technology                                  | Minimum leak-by, wide turndown, and superior corrosion resistant materials reduces overall gas panel cost                                       |
| Adaptable mechanical configurations                        | Easily retrofit to existing systems   |
| Primary standard calibration systems                       | Ensures measurement accuracy is traceable to international standards  |
| Simple modular design and reducing total cost of ownership | Easy-to-service elastomer sealed design provides for factory or field service maximizing uptime   |

## Advanced Thermal Flow Measurement Sensor

Brooks' sensor technology combines:

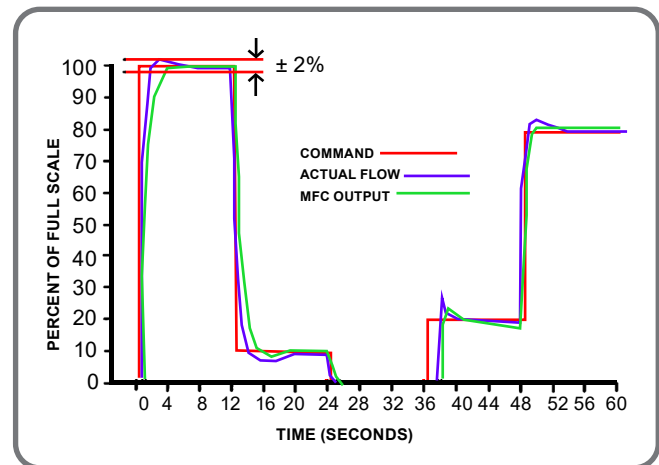
- Excellent signal to noise performance for improved accuracy at low setpoints
- Superior long-term stability through enhanced sensor manufacturing and burn in process
- Isothermal packaging to reduce sensitivity to external temperature changes

## Wide Flow Range

The 5800 Series covers an extremely broad range of flow rates. Model 5850 can have a full scale flow as low as 3 ccm. With a high turndown ratio of 50:1 repeatable gas flow can be measured or controlled down to 0.06 ccm! Model 5853 can monitor or control gas flows up to 1000 lpm.

## Fast Response Performance

The electronics and superior mechanical configuration in the 5800 Series provide for fast, stable response characteristics.



# Product Specifications

## Flow Ranges and Pressure Ratings:

| Mass Flow Controller Model | Mass Flow Meter Model | Flow Ranges<br>N2 Eq. Ratings |                      | Pressure Unit<br>psi/bar | PED Module H<br>Category                                |
|----------------------------|-----------------------|-------------------------------|----------------------|--------------------------|---|
|                            |                       | Min. F.S.                     | Max. F.S.            |                          |   |
| 5850                       | 5860                  | 0.003                         | 30 lpm               | 1500 psi/100 bar         | SEP   |
| 5851                       | 5861                  | 10                            | 100 lpm <sup>1</sup> | 1500 psi/103 bar         | SEP   |
| 5853                       | 5863                  | 100                           | 1000 lpm             | 1000 psi/70 bar          | 1 for all 150 lb flanges<br>2 for all other connections |

<sup>1</sup> 200 lpm of H2 possible, 600 lpm of H2 possible with decreased accuracy

|   | 5850/60   | 5851/61 | 5853/63 |
|---|---|---------|---------|
| <b>PERFORMANCE</b>  |   |         |         |
| Flow Accuracy <sup>2</sup>  | 1% F.S.   | 1% F.S. | 1% F.S. |
| Control Range   | 50:1  |         |         |
| Repeatability & Reproducibility                                       | 0.25% of rate   |         |         |
| Linearity   | Included in accuracy  |         |         |
| Response Time (Settling Time within ±2% F.S. for 0-100% command step) | E-Series: <3 seconds<br>i-Series: <6 seconds  |         |         |
| Zero Stability  | < ± 0.2% F.S. per year  |         |         |
| Temperature Coefficient   | Zero: <0.075% of F.S. per °C. Span: <1.0% of F.S. shift from original calibration over 10-50°C (50-122°F) range |         |         |
| Pressure Coefficient  | ±0.03% per psi (0-200 psi N2)   |         |         |
| Attitude Sensitivity  | <0.5% F.S. maximum deviation from specified accuracy after re-zeroing   |         |         |

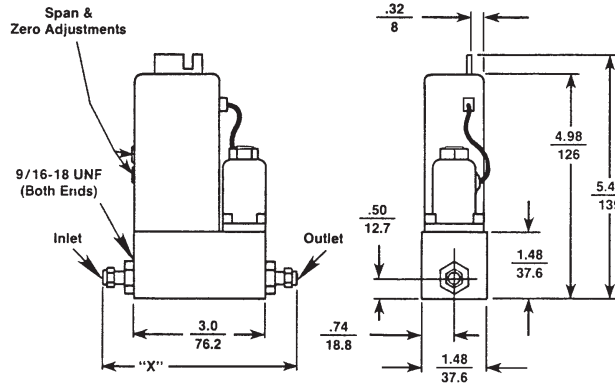
<sup>2</sup> Accuracy including linearity at calibration conditions.

|  |                                   |                 |   |
|--|-----------------------------------|-----------------|---|
| <b>RATINGS</b>   |                                   |                 |   |
| Operating Temperature Range                              | 5-65°C (41-149°F)                 |                 |   |
| Minimum Pressure Differential (Controllers) <sup>3</sup> | 5 psi/0.35 bar                    | 10 psi/0.69 bar | Min.: 7.5 psi/0.52 <500 lpm<br>Min.: 11.8 psi/0.81 >500 lpm |
| Maximum Pressure Differential (Controllers) <sup>3</sup> | 50 psi/3.45 bar                   |                 | 290 psi/20 bar  |
| Leak Integrity (external)                                | 1x10 <sup>-9</sup> atm. cc/sec He |                 |   |

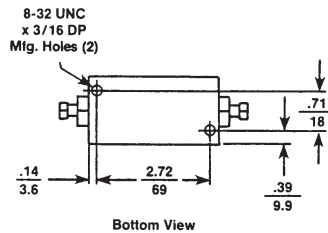
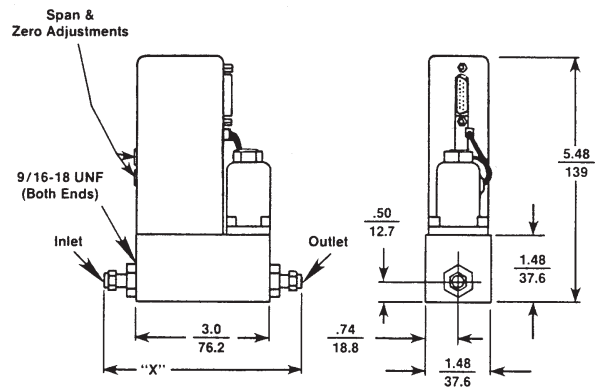
<sup>3</sup> Differential pressures beyond the specified limits may be possible depending on process conditions.

|                                   |   |  |  |  |
|-----------------------------------|---|--|--|--|
| <b>MECHANICAL</b>                 |   |  |  |  |
| Valve Type                        | Normally Closed, Normally Open, Meter   |  |  |  |
| Primary Wetted Materials          | 316L Stainless Steel, High Alloy Stainless Steel, Viton <sup>®</sup> fluor elastomers, Buna-N, Kalrez <sup>®</sup> and Teflon <sup>®</sup>  |  |  |  |
| <b>Electrical - 5800 E-Series</b> |   |  |  |  |
|                                   | 5850E   | 5851E  | 5853E  | 5860E/5861E/5863E                                      |
| Electrical Connection             | 15-Pin Male Sub D-Type (DA-15P) or Card Edge connector (Controller models only)   |  |  |  |
| Input (Setpoint) Signal           | 0 to 5 Vdc (200 K ohms input resistance)  |  |  | N/A  |
| Output Signal                     | 0 to 5 Vdc into 2000 ohms (or greater) load   |  |  |  |
| Reference Output Signal           | 5 Vdc ±0.01 Vdc, max. load 2 K ohm  |  |  |  |
| Power Requirements                | N. C. Valve or N.O. Valve with flow <2.5 slpm:<br>3.5 watts, +15 Vdc @ 35 mA,<br>-15 Vdc @ 180 mA<br>N.O. Valve with flow rate > 2.5 slpm: 10.5 watts,<br>+15 Vdc @ 350 mA,<br>-15 Vdc @ 350 mA | 10.5 watts,<br>+15 Vdc @ 350 mA,<br>-15 Vdc @ 350 mA   | 3.5 watts,<br>+15 Vdc @ 35 mA,<br>-15 Vdc @ 180 mA     | 1.05 watts<br>+15 Vdc @ 35 mA,<br>-15 Vdc @ 35 mA      |
| <b>Electrical - 5800 i-Series</b> |   |  |  |  |
|                                   | 5850i   | 5851i  | 5853i  | 5860i/5861i/5863i                                      |
| Electrical Connection             | 15-Pin Male Sub D-Type (DA-15P)   |  |  |  |
| Input (Setpoint) Signal           | 0 to 5 Vdc (200 K ohms input resistance) or 4-20 mAdc (75 ohms input resistance)  |  |  | N/A  |
| Output Signal                     | 0 to 5 Vdc into 2000 ohms (or greater) load and 4 - 20 mAdc or 0 - 20 mA, maximum loop resistance is power supply dependent (500 ohms maximum @ +15 Vdc)  |  |  |  |
| Reference Output Signal           | 5 Vdc ±0.01 Vdc, max. load 2 K ohm  |  |  |  |
| Power Requirements                | +15 to +28 Vdc,<br>240 mA @ +15 Vdc<br>370 mA @ 28 Vdc  | +22 to +28 Vdc,<br>290 mA @ 20 Vdc,<br>370 mA @ 28 Vdc | +15 to +28 Vdc,<br>240 mA @ +15 Vdc<br>370 mA @ 28 Vdc | +15 to + 28 Vdc,<br>max current draw<br>90 mA @ 28 Vdc |

5850E, Card Edge Connector



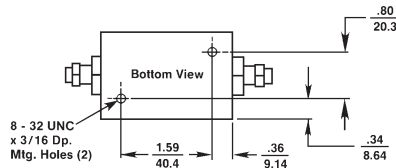
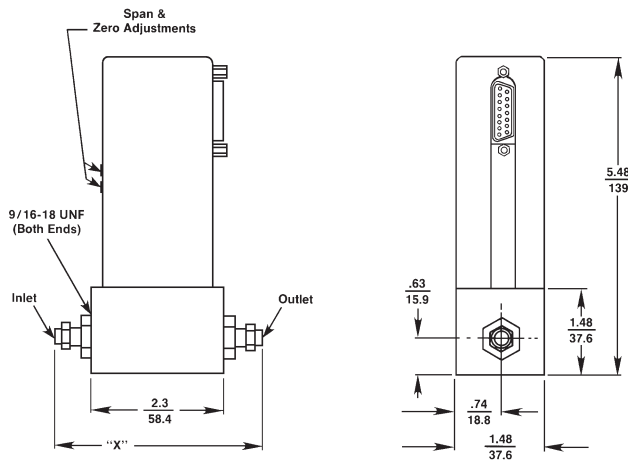
5850E/5850i, 15-Pin D Connector



| Connection Type          | "X" Dim.   |
|--------------------------|------------|
| 1/8" Compression Fitting | 4.84/122.9 |
| 1/4" Compression Fitting | 5.02/127.5 |
| 3/8" Compression Fitting | 5.14/130.5 |
| 1/4" Tube VCO®           | 4.56/115.8 |
| 1/4" Tube VCR®           | 4.88/124.0 |

Inches/Millimeters

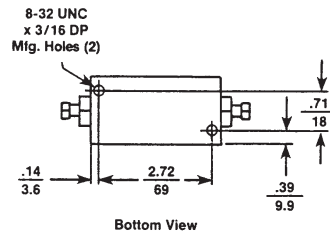
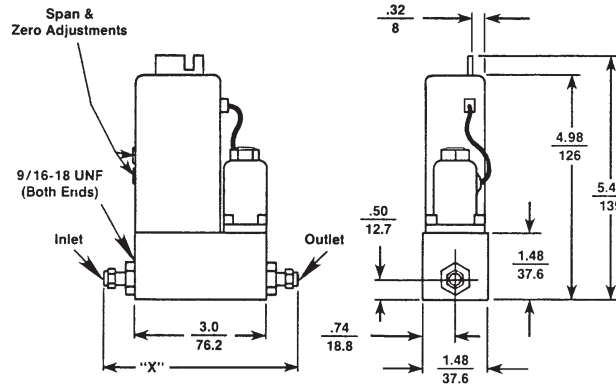
5860E/5860i, 15-Pin D Connector



| Connection Type          | "X" Dim    |
|--------------------------|------------|
| 1/8" Compression Fitting | 4.14/105.2 |
| 1/4" Compression Fitting | 4.32/109.7 |
| 3/8" Compression Fitting | 4.44/112.8 |
| 1/4" Tube VCO®           | 3.86/98.0  |
| 1/4" VCR®                | 4.18/106.2 |

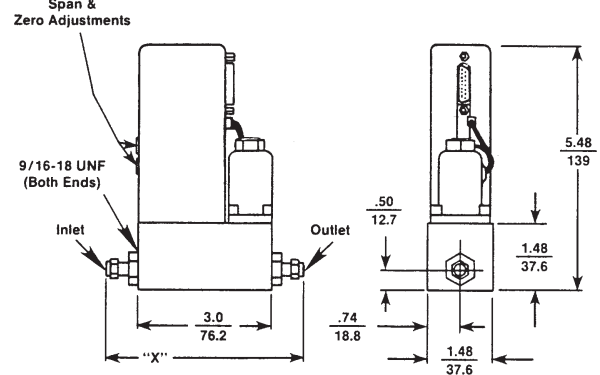
Inches/Millimeters

## 5850E, Card Edge Connector



Bottom View

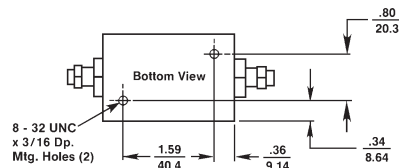
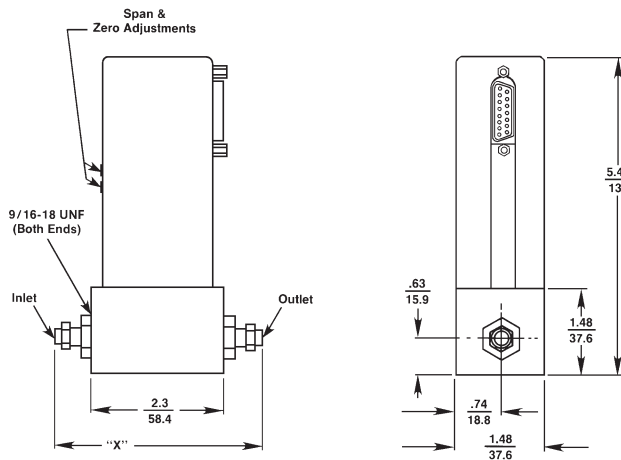
## 5850E/5850i, 15-Pin D Connector



| Connection Type          | "X" Dim.   |
|--------------------------|------------|
| 1/8" Compression Fitting | 4.84/122.9 |
| 1/4" Compression Fitting | 5.02/127.5 |
| 3/8" Compression Fitting | 5.14/130.5 |
| 1/4" Tube VCO®           | 4.56/115.8 |
| 1/4" Tube VCR®           | 4.88/124.0 |

Inches/Millimeters

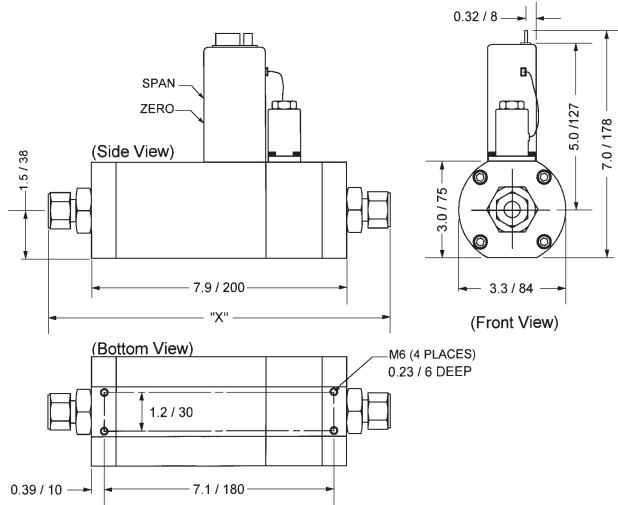
## 5860E/5860i, 15-Pin D Connector



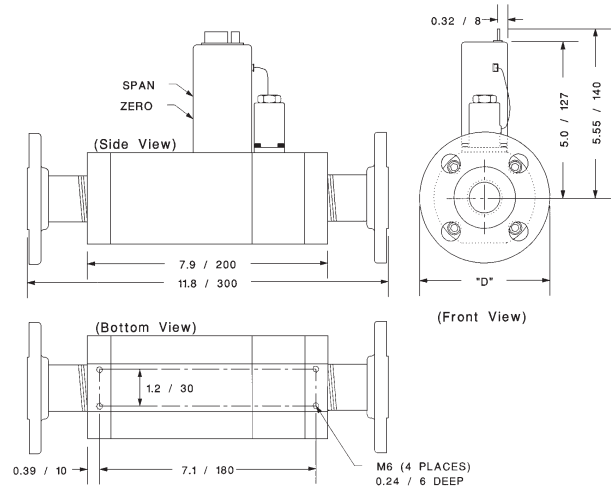
| Connection Type          | "X" Dim    |
|--------------------------|------------|
| 1/8" Compression Fitting | 4.14/105.2 |
| 1/4" Compression Fitting | 4.32/109.7 |
| 3/8" Compression Fitting | 4.44/112.8 |
| 1/4" Tube VCO®           | 3.86/98.0  |
| 1/4" VCR®                | 4.18/106.2 |

Inches/Millimeters

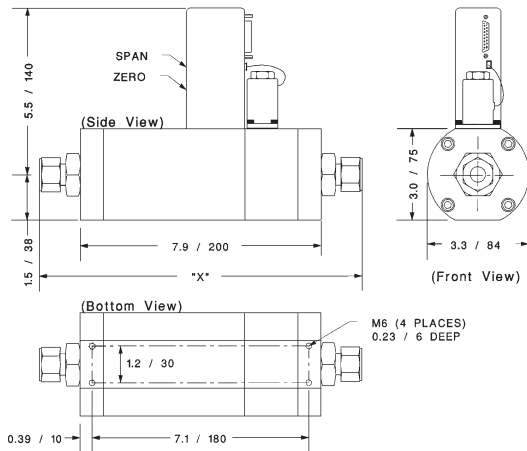
5853E, Card Edge Connector  
With Fittings



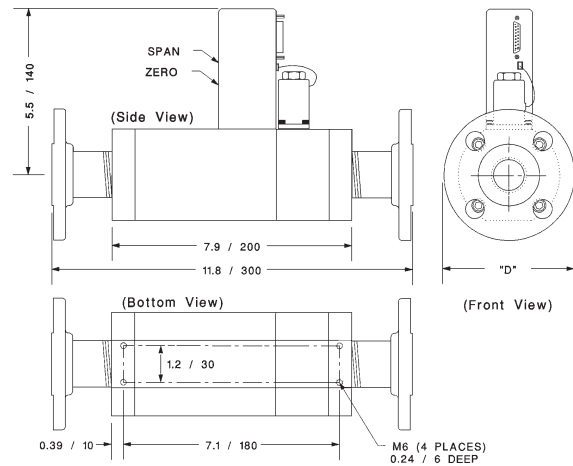
5853E, Card Edge  
With Flanges



5853E/5853i, 15-Pin D Connector  
With Fittings



5853E/5853i, 15-Pin D Connector  
With Flanges



| Connection Type            | "X" Dimension |     |
|----------------------------|---------------|-----|
|                            | inch          | mm  |
| Female Pipe Thread         | 7.9           | 200 |
| 1/2" Tube Compression*     | 10.6          | 268 |
| 3/4" Tube Compression*     | 10.6          | 268 |
| 1" Tube Compression*       | 10.9          | 277 |
| 1/2" VCO** (100 slpm max.) | 9.9           | 251 |
| 3/4" VCO*                  | 10.2          | 258 |
| 1/2" VCR** (100 slpm max.) | 10.1          | 257 |
| 1/2" VCR*                  | 10.2          | 259 |

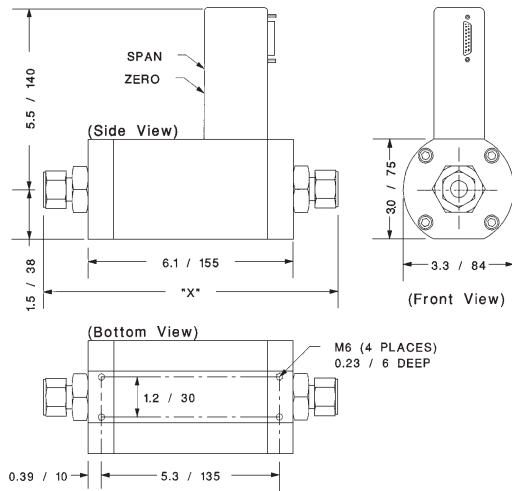
\* 1-1/16 - 12 UNF Connection To Body

\*\* 9/16 - 18 UNF Connection To Body

| Flange Type      | Flange OD, "D" |     |
|------------------|----------------|-----|
|                  | inch           | mm  |
| ANSI 1/2" 150 lb | 3-1/2          | 89  |
| ANSI 1/2" 300 lb | 3-3/4          | 95  |
| ANSI 1.0" 150 lb | 4-1/4          | 108 |
| ANSI 1.0" 300lb  | 4-7/8          | 124 |
| ANSI 1.5" 150 lb | 5              | 127 |
| ANSI 1.5" 300 lb | 6-1/8          | 156 |
| ANSI 2.0" 150 lb | 6              | 152 |
| ANSI 2.0" 300 lb | 6-1/2          | 165 |
| DIN DN15 PN40    | 3.74           | 95  |
| DIN DN25 PN40    | 4.53           | 115 |
| DIN DN40 PN40    | 5.90           | 150 |
| DIN DN50 PN40    | 6.50           | 165 |

Inches/Millimeters

5863E/5863i, 15-Pin D Connector  
With Fittings

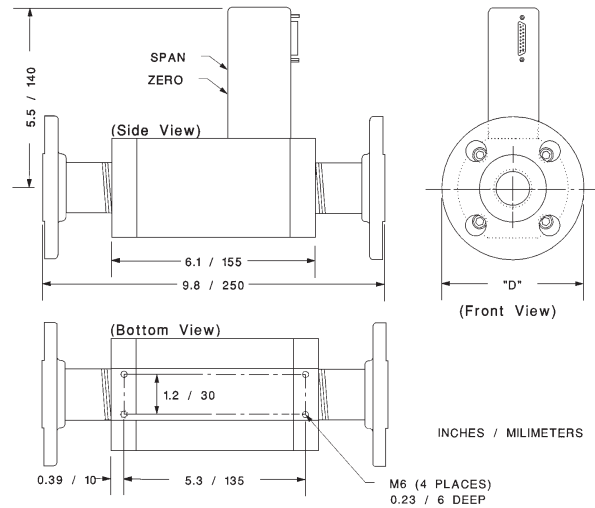


| Connection Type             | "X" Dimension |     |
|-----------------------------|---------------|-----|
|                             | inch          | mm  |
| Female Pipe Thread          | 6.1           | 155 |
| 1/2" Tube Compression*      | 8.8           | 223 |
| 3/4" Tube Compression*      | 8.8           | 223 |
| 1" Tube Compression*        | 9.1           | 232 |
| 1/2" VCO ** (100 slpm max.) | 8.1           | 206 |
| 3/4" VCO *                  | 8.4           | 213 |
| 1/2" VCR ** (100 slpm max.) | 8.3           | 211 |
| 1/2" VCR*                   | 8.4           | 214 |

\* 1-1/16 - 12 UNF Connection To Body

\*\* 9/16 - 18 UNF Connection To Body

5863E/5863i, 15-Pin D Connector  
With Flanges



| Flange Type      | Flange OD, "D" |     |
|------------------|----------------|-----|
|                  | inch           | mm  |
| ANSI 1/2" 150 lb | 3-1/2          | 89  |
| ANSI 1/2" 300 lb | 3-3/4          | 95  |
| ANSI 1.0" 150 lb | 4-1/4          | 108 |
| ANSI 1.0" 300lb  | 4-7/8          | 124 |
| ANSI 1.5" 150 lb | 5              | 127 |
| ANSI 1.5" 300 lb | 6-1/8          | 156 |
| ANSI 2.0" 150 lb | 6              | 152 |
| ANSI 2.0" 300 lb | 6-1/2          | 165 |
| DIN DN15 PN40    | 3.74           | 95  |
| DIN DN25 PN40    | 4.53           | 115 |
| DIN DN40 PN40    | 5.90           | 150 |
| DIN DN50 PN40    | 6.50           | 165 |

Inches/Millimeters



**По вопросам продаж и поддержки обращайтесь:**

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