# Pro-V™ Multivariable Flowmeter

## Model M23 Insertion Vortex





VorTek Instruments' Pro-V™ multivariable flowmeters utilize three primary sensing elements—a vortex shedding velocity sensor, an RTD temperature sensor, and a solid-state pressure transducer—to measure the mass flow rate of gases, liquids and steam. Because the Pro-V™ is able to measure all process variables within a single device it provides exceptional accuracy, simplifies system design and reduces installation costs.

To enhance reliability, the Pro-V™ Model M23 insertion flowmeters feature a no-moving parts design and rugged, welded construction. They are easily installed with flanged or Male NPT process connections in any pipe size of two-inches and greater. Optional retractor or "hot-tap" hardware simplifies maintenance operations.

The Pro-V™ provides excellent rangeability and a low permanent pressure drop. To simplify installation and commissioning, all measured variables and programming menus are available on the instrument's easy to use display and control pad. The product line is available with a wide range of options and meter configurations to meet your specific application requirements.

## Pro-V™ Advantage:

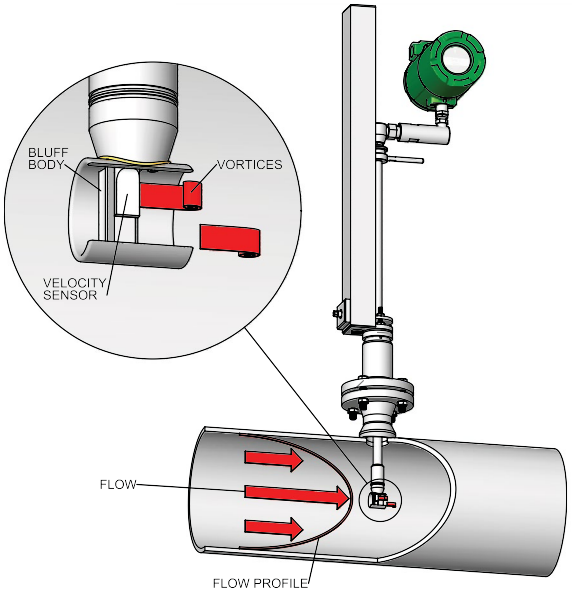
- Volumetric or mass flow monitoring of most liquids, gases, and steam
- Multivariable meter delivers mass flow, temperature, pressure, and density readings from a single installed device and reduces initial cost, installation cost and cost-of ownership over the lifetime of the instrument
- Mass flow equations - real gas, ideal gas, AGA 8, API 2540
- Compensated mass flow reading of liquids, gases, and steam
- Energy Monitoring–ability to compute and output energy use
- Easy to install and commission–hot tappable, process shut down not required for installation
- Reliable–no moving parts, no fluid to sensor contact
- High accuracy with rangeability up to 100:1
- Temperature up to 750°F
- Pressure up to 2250 psig
- Insertion style mounting permits installation in any pipe 2" SCH40 and greater
- Field configurable ranges, outputs and displays
- Remote electronics option available for use in harsh environments or locations with limited access
- 4-20mA loop–powered mass meter design saves on energy costs
- HART protocol communications - Standard
- Modbus, BACnet communications available
- FM, FMC, ATEX, IECEx Approved

VorTek INSTRUMENTS
VorTek Instruments, LLC
8475 West I-25 Frontage Rd., Suite 300
Longmont, CO 80504 USA
Tel: 303/682-9999 Fax: 303/682-4368
info@vortekinst.com

### Pro-V™ Principle of Operation

Vortex flowmeters measure flows of liquid, gas and steam by detecting the frequency at which vortices are alternately shed from a bluff body. According to proven laws of physics, the frequency at which the vortices are alternately shed is directly proportional to the flow velocity.

Insertion vortex flowmeters measure flow by detecting the local velocity at a strategically located position within the pipe. The Pro-V™ M23 detects the frequency at which vortices are alternately shed from the bluff body located within the sensor head. The Pro-V™M23 uses the local velocity, along with other parameters, such as fluid type, pipe size and Reynolds number to calculate the average pipe velocity, and consequently, the volumetric flow rate.




### Pro-V™ Model M23-VTP

The Model M23-VTP offers you flow computer functionality in a compact field device. This multivariable instrument incorporates temperature and pressure sensors to provide an instantaneous reading of the compensated mass flow rate of gases, liquids and steam. In addition to outputs for totalized mass and alarm settings, the field-configurable electronics deliver up to three analog 4-20 mA outputs of five process measurements, including volumetric flow rate, mass flow rate, pressure, temperature, and density.

### Pro-V™ Model M23-VT

The Model M23-VT integrates a precision 1000 Ohm platinum RTD temperature sensor that can be used to calculate and output a compensated mass reading. This device is typically used to measure flow rates of saturated steam.

### Pro-V™ Model M23-V

The Model M23-V delivers a direct reading of volumetric flow rate–generally the most cost-effective solution for liquid flow monitoring—in applications ranging from general water flows to hydrocarbon fuel flow measurement.

### Pro-V™ Model M23-EM

The Model M23 Energy Monitoring option permits real-time calculation of energy consumption for a facility or process. The meter can be programmed to measure steam, hot water, or chilled water. The Model M23-VTP flowmeter monitors one side of the process, either sent or returned, and uses the input from a second separate temperature sensor on the opposite leg of the process to calculate the change in energy. Selectable energy units include BTU, joules, calories, Watt-hours, Megawatt-hours and Horsepower-hours. The local or remote electronics indicate two temperatures, delta T, mass total and energy total.

### Pro-V™ Model M23-VTEP, VETEP

Similar to M23-VTP but with the option for an external input (T or P) via RTD or 4-20mA or one of each.

## Performance Specifications

### Accuracy

Mass flow rate for gas and steam based on 50-100% of pressure range.

| Model M23 Multiparameter Insertion Vortex Meter | | |
|---|---|---|
| Process Variables | Liquids | Gas & Steam |
| Volumetric Flow Rate | ± 1.2% of Rate | ± 1.5% of Rate |
| Mass Flow Rate | ± 1.5% of Rate | ± 2.0% of Rate |
| Temperature | ± 2°F (± 1°C) | ± 2°F (± 1°C) |
| Pressure | ± .3% of Full Scale | ± .3% of Full Scale |
| Density | ± .3% of Reading | ± .5% of Reading |

### Repeatability

Mass Flow Rate.....± .2% of rate
Volumetric Flow Rate.....± .1% of rate
Temperature.....± .2°F (± .1°C)
Pressure.....± .05% of full scale
Density.....± .1% of reading

### Stability Over 12 Months

Mass Flow Rate.....± .2% of rate
Volumetric Flow Rate.....± negligible
Temperature.....± .9°F (± .5°C)
Pressure.....± .1% of full scale
Density.....± .1% of reading

### Response Time

Adjustable from 1 to 100 seconds.

## Operating Specifications

Any gas, liquid, or steam compatible with 316L stainless steel or A105 carbon steel. Not recommended for multi-phase fluids.

### Process and Ambient Temperature

Process Standard Temperature (code ST): -330 to 500°F (-200 to 260°C)
Process High Temperature (code HT): to 750°F (400°C)
Ambient Operating: -40 to 140°F (-40 to 60°C)
Ambient Storage: -40 to 185°F (-40 to 85°C)

| Pressure Transducer Ratings | | | |
|---|---|---|---|
| Full Scale Operating Pressure | | Max. Over-Range Pressure | |
| psia | bara | psia | bara |
| 30 | 2 | 60 | 4 |
| 100 | 7 | 200 | 14 |
| 300 | 20 | 600 | 40 |
| 500 | 35 | 1000 | 70 |
| 1000 | 69 | 2000 | 138 |
| 1500 | 100 | 2750 | 175 |
| 2500 | 172 | 5000 | 344 |



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| Pressure Ratings | | | |
|---|---|---|---|
| Style Connection | Process | Rating Code | Ordering |
| Compression Fitting | 2-inch Male NPT | ANSI 600 lb | CNPT |
| | 2-inch 150 lb flange | ANSI 150 lb | C150 |
| | 2-inch 300 lb flange | ANSI 300 lb | C300 |
| | 2-inch 600 lb flange | ANSI 600 lb | C600 |
| | 2-inch 900 lb flange | ANSI 900 lb | C900 |
| Packing Gland | 2-inch Male NPT | 50 Psig (3.5 BarG) | PNPT |
| | 2-inch 150 lb flange | 50 Psig (3.5 BarG) | P150 |
| | 2-inch 300 lb flange | 50 Psig (3.5 BarG) | P300 |
| Packing Gland & Removable Retractor* | 2-inch Male NPT | ANSI 300 lb | PNPT + RR |
| | 2-inch 150 lb flange | ANSI 150 lb | P150 + RR |
| | 2-inch 300 lb flange | ANSI 300 lb | P300 + RR |
| Packing Gland & Permanent Retractor* | 2-inch Male NPT | ANSI 600 lb | PNPTR |
| | 2-inch 150 lb flange | ANSI 150 lb | P150R |
| | 2-inch 300 lb flange | ANSI 300 lb | P300R |
| | 2-inch 600 lb flange | ANSI 600 lb | P600R |
| | 2-inch 900 lb flange | ANSI 900 lb | P900R |

*Retractor handle or handwheel included in retractor assembly



### Power Requirements

DCL option: 12-36 VDC, 25mA, 1W max, loop powered (single output)
DCH option: 12-36 VDC, 300mA, 9W max, (multiple outputs)
DCHPOE option: 12-28 VDC or Power over Ethernet, 5W maximum (multiple outputs)
AC option: 100-240 VAC, 50/60Hz line power, 5W (multiple outputs)

### Display

Alphanumeric 2 line x 16 character LCD digital display Six pushbuttons for full field configuration. Pushbuttons can be operated with magnetic wand without removal of enclosure covers. Display can be mounted in 90° intervals for better viewing.

### Output Signals

Analog: 4-20 mA
Alarm: Solid state relay, 40 VDC
Totalizer Pulse: 50 millisecond pulse, 40 VDC
Volumetric or Loop Powered Mass: One analog, one totalizer pulse, HART
Multivariable option: Up to three analog signals, three alarms, one totalizer pulse, HART
Multivariable option: Modbus or BACnet process monitoring

## Physical Specifications

### Wetted Materials

Standard 316L Stainless Steel, plus
- DuPont Teflon® based thread sealant on models with pressure transducer
- DuPont Teflon® packing on standard temperature models with packing gland
- Graphite based packing on high temperature models with packing gland

### Approvals

FM, FMC CLASS I, DIV. 1, GROUPS B,C,D
CLASS II/III, DIV. 1, GROUPS E,F,G
Type 4X and IP66, T6, Ta = -40 to 60°C
CSA C22.2

KOSHA Korea KC Ex Certification

ATEX II 2 G Ex d IIB + H2 T6
II 2 D EX tD A21 IP66 T85°C, Ta = -40 to 60°C

IECEx Ex d IIB + H2 T6
Ex tD A21 IP66 T85°C, Ta = -40 to 60°C

CRN BSA B51 – Boiler and Pressure Vessel

## Sizing Considerations

| Piping Conditions | | |
|---|---|---|
| Condition | Pipe Diameters, D | |
| | Upstream | Downstream |
| One 90° elbow before meter | 10D | 5D |
| Two 90° elbows before meter | 15D | 5D |
| Two 90° elbows before meter, out of plane | 30D | 10D |
| Reduction before meter | 10D | 5D |
| Expansion before meter | 20D | 5D |
| Partially open valve | 30D | 10D |

### Velocity Range

Maximum velocity, liquid: 30 feet/sec (9 meters/second) Minimum velocity, liquid: 1 foot/sec (.3 meters/second) Maximum velocity, gas or steam: See Table Below Minimum velocity, gas or steam feet/sec (meters/second):

$$\frac{5}{\sqrt{\text{density (lb/ft3)}}} \qquad \frac{6.1}{\sqrt{\text{density (kg/m3)}}}$$

Consult the VorTek Instruments Sizing Program at https://vortek.sizingapp.com for easy calculation of flow range.

| Water Minimum and Maximum Flow Rates | | | | | | |
|---|---|---|---|---|---|---|
| Rate | Nominal Pipe Size (in) | | | | | |
| | 3 | 6 | 8 | 12 | 16 | 24 |
| GPM min | 20.6 | 81.3 | 142 | 317 | 501 | 1138 |
| GPM max | 618 | 2437 | 4270 | 9501 | 15043 | 34144 |
| Nominal Pipe Size (mm) | | | | | | |
| | 80 | 150 | 200 | 300 | 400 | 600 |
| $M^3$/hr min | 5.2 | 20.4 | 35.4 | 79.2 | 125 | 284 |
| $M^3$/hr Max | 157 | 614 | 1062 | 2337 | 3753 | 8537 |



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| Typical Saturated Steam Minimum and Maximum Flow Rates (lb/hr) | | | | | | |
|---|---|---|---|---|---|---|
| | Nominal Pipe Size (in) | | | | | |
| Pressure | 3 | 6 | 8 | 12 | 16 | 24 |
| 5 psig | 205<br>2721 | 800<br>10633 | 1385<br>18412 | 3099<br>41196 | 4893<br>65039 | 11132<br>147954 |
| 100 psig | 468<br>14246 | 1831<br>55674 | 3170<br>96407 | 7092<br>215703 | 11197<br>340546 | 25472<br>774698 |
| 200 psig | 632<br>25948 | 2471<br>101405 | 4278<br>175595 | 9572<br>392880 | 15111<br>620268 | 34377<br>1411029 |
| 300 psig | 762<br>37652 | 2976<br>147145 | 5153<br>254799 | 11530<br>570093 | 18203<br>900047 | 41410<br>2047489 |
| 400 psig | 873<br>49494 | 3412<br>193420 | 5908<br>334930 | 13219<br>749382 | 20870<br>1183103 | 47477<br>2691404 |
| 500 psig | 974<br>61543 | 3805<br>240507 | 6588<br>416468 | 14741<br>931816 | 23272<br>1471125 | 52942<br>3346615 |

| Typical Air Minimum and Maximum Flow Rates (SCFM) Air at 70°F | | | | | | |
|---|---|---|---|---|---|---|
| | Nominal Pipe Size (in) | | | | | |
| Pressure | 3 | 6 | 8 | 12 | 16 | 24 |
| 0 psig | 56<br>924 | 220<br>3611 | 381<br>6253 | 852<br>13991 | 1345<br>22089 | 3059<br>50250 |
| 100 psig | 157<br>7236 | 615<br>28279 | 1065<br>48969 | 2383<br>109564 | 3763<br>172977 | 8560<br>393500 |
| 200 psig | 216<br>13588 | 843<br>53101 | 1460<br>91950 | 3266<br>205732 | 5156<br>324804 | 11729<br>738886 |
| 300 psig | 262<br>19974 | 1022<br>78059 | 1770<br>135169 | 3960<br>302430 | 6251<br>477467 | 14221<br>1086176 |
| 400 psig | 301<br>26391 | 1175<br>103136 | 2034<br>178593 | 4551<br>399588 | 7186<br>630859 | 16346<br>1435121 |
| 500 psig | 335<br>32834 | 1310<br>128314 | 2269<br>222191 | 5077<br>497136 | 8015<br>784865 | 18233<br>1785464 |

| Typical Saturated Steam Minimum and Maximum Flow Rates (kg/hr) | | | | | | |
|---|---|---|---|---|---|---|
| | Nominal Pipe Size (mm) | | | | | |
| Pressure | 80 | 150 | 200 | 300 | 400 | 600 |
| 0 barg | 81<br>938 | 316<br>3667 | 548<br>6350 | 1226<br>14209 | 1936<br>22432 | 4404<br>51039 |
| 5 barg | 187<br>4986 | 729<br>19486 | 1263<br>33742 | 2826<br>75495 | 4461<br>119189 | 10151<br>271187 |
| 10 barg | 249<br>8859 | 972<br>34620 | 1683<br>59949 | 3767<br>134132 | 5947<br>211764 | 13530<br>481821 |
| 15 barg | 298<br>12700 | 1164<br>49629 | 2016<br>85939 | 4510<br>192283 | 7120<br>303570 | 16200<br>690705 |
| 20 barg | 340<br>16550 | 1329<br>64676 | 2301<br>111995 | 5148<br>250581 | 8128<br>395609 | 18493<br>900119 |
| 30 barg | 413<br>24357 | 1612<br>95187 | 2791<br>164827 | 6246<br>368789 | 9860<br>582234 | 22435<br>1324739 |

| Typical Air Minimum and Maximum Flow Rates (nm3/hr) Air at 20°C | | | | | | |
|---|---|---|---|---|---|---|
| | Nominal Pipe Size (mm) | | | | | |
| Pressure | 80 | 150 | 200 | 300 | 400 | 600 |
| 0 barg | 89<br>1463 | 347<br>5716 | 601<br>9897 | 1345<br>22145 | 2124<br>34962 | 4833<br>79547 |
| 5 barg | 217<br>8702 | 847<br>34006 | 1467<br>58885 | 3282<br>131751 | 5181<br>208004 | 11788<br>473266 |
| 10 barg | 294<br>15975 | 1148<br>62430 | 1987<br>108105 | 4446<br>241878 | 7020<br>381870 | 15972<br>868857 |
| 15 barg | 355<br>23280 | 1385<br>90979 | 2399<br>157542 | 5368<br>352487 | 8474<br>556497 | 19282<br>1266182 |
| 20 barg | 407<br>30615 | 1589<br>119642 | 2751<br>207175 | 6156<br>463539 | 9718<br>731823 | 22112<br>1665095 |
| 30 barg | 495<br>45361 | 1934<br>177268 | 3349<br>306961 | 7493<br>686801 | 11829<br>1084302 | 26915<br>2467081 |

### Turndown

Turndown is application dependent. Consult the VorTek Instruments Sizing Program at https://vortek.sizingapp.com. Turndown can exceed 100:1.

## Product Disposal Information

To ensure environmental safety and compliance, please follow these disposal instructions for the product and its components:

**Electronic Components:**

This product contains electronics that must be recycled through approved e-waste recycling programs. Electronics can contain harmful materials and should be prevented from entering landfills. Do not place electronics in regular trash.

**Metal Parts:**

Any metal components can be separated and recycled through your local metal recycling facility.

**Packaging Materials:**

Recycle or reuse packaging materials such as cardboard or plastics, following local recycling guidelines.

For local disposal sites, refer to:

- Call2Recycle (USA, Canada)
- Earth911 (USA, Canada)
- SERI (International)

In the USA, for more information, visit:

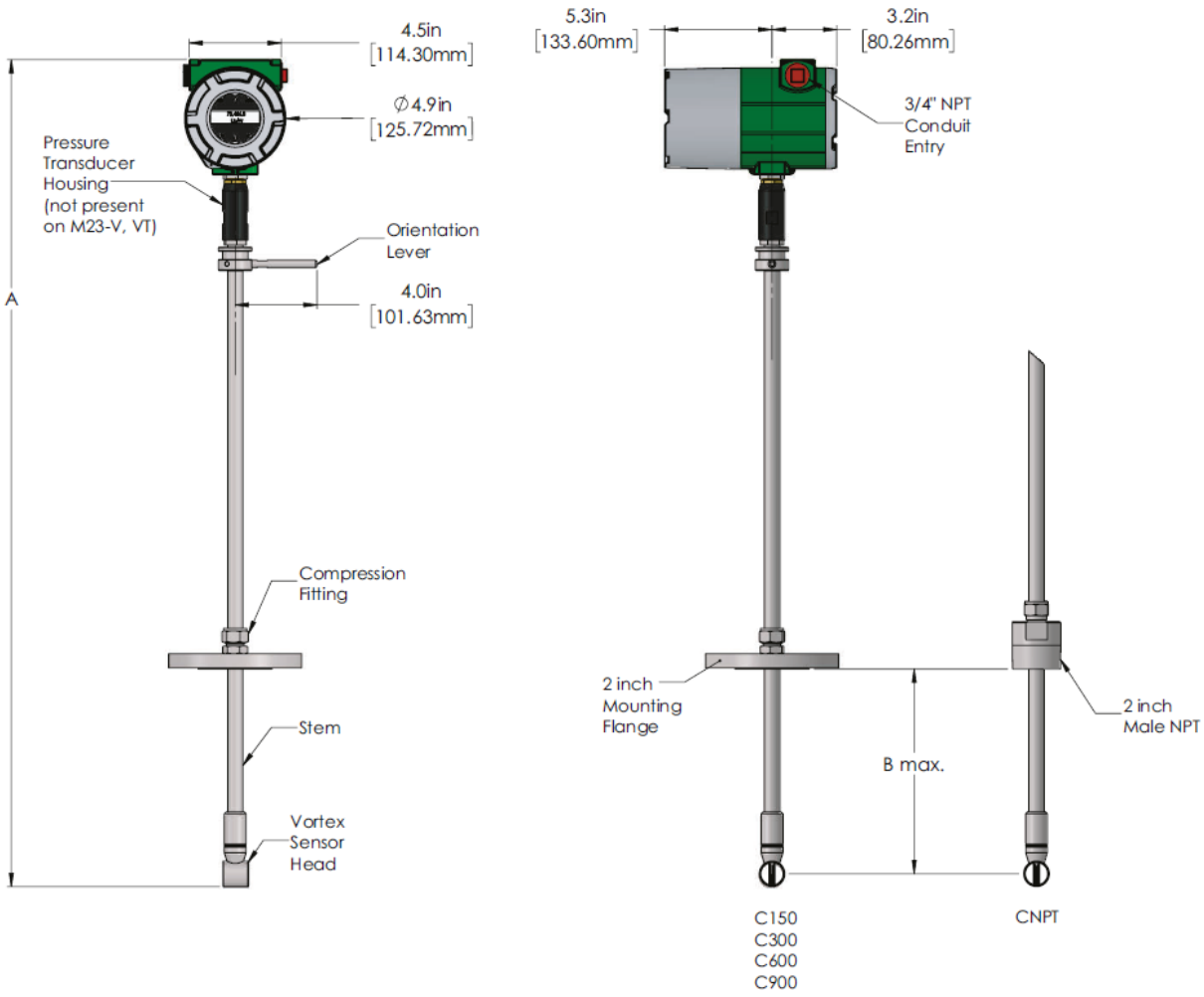
- EPA's battery disposal guide
- EPA's electronics recycling page

By following these guidelines, you help reduce waste and support environmental sustainability.



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## Dimensional Outline: Pro-V™ Compression Fitting Models




| MODEL M23–V, VT, VTEP, VETEP in (mm) | CL/Compact Length | | SL/Standard Length | | EL/Extended Length | | Weight lb (KG) | | |
|---|---|---|---|---|---|---|---|---|---|
| | A | B | A | B | A | B | CL | SL | EL |
| CNPT, Compression Fitting, Male NPT | 21.6 (549) | 9.8 (249) | 38 (965) | 26.2 (665) | 50 (1270) | 38.2 (970) | 13 (5.7) | 14 (6.2) | 15 (6.7) |
| C150, Compression Fitting, 150 lb. Flange | 21.6 (549) | 10.9 (277) | 38 (965) | 27.3 (693) | 50 (1270) | 39.3 (998) | 15 (6.8) | 16 (7.3) | 17 (7.8) |
| C300, Compression Fitting, 300 lb. Flange | 21.6 (549) | 10.8 (274) | 38 (965) | 27.2 (691) | 50 (1270) | 39.2 (996) | 17 (7.8) | 18 (8.3) | 19 (8.8) |
| C600, Compression Fitting, 600 lb. Flange | 21.6 (549) | 10.4 (264) | 38 (965) | 26.8 (681) | 50 (1270) | 38.8 (986) | 18 (7.8) | 19 (8.7) | 20 (9.2) |
| C900, Compression Fitting, 900 lb. Flange | 21.6 (549) | 9.9 (251) | 38 (965) | 26.3 (668) | 50 (1270) | 38.3 (973) | 31 (14.1) | 32 (14.5) | 33 (15) |

Add 11 lb (5 KG) for remote electronics

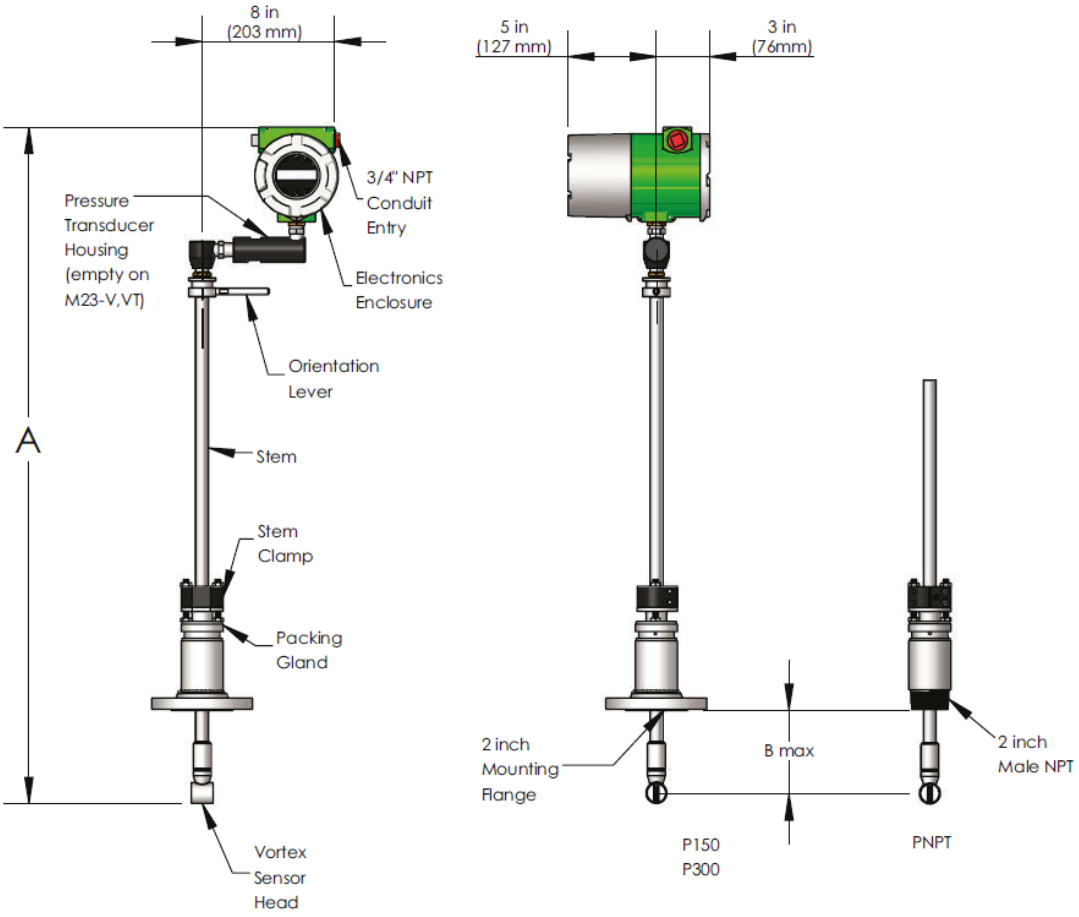
| MODEL M23–VTP in (mm) | CL/Compact Length | | SL/Standard Length | | EL/Extended Length | | Weight lb (KG) | | |
|---|---|---|---|---|---|---|---|---|---|
| | A | B | A | B | A | B | CL | SL | EL |
| CNPT, Compression Fitting, Male NPT | 24.6 (625) | 9.8 (249) | 41 (1041) | 26.2 (665) | 53 (1348) | 38.2 (970) | 13 (5.7) | 14 (6.2) | 15 (6.7) |
| C150, Compression Fitting, 150 lb. Flange | 24.6 (625) | 10.9 (277) | 41 (1041) | 27.3 (693) | 53 (1348) | 39.3 (998) | 15 (6.8) | 16 (7.3) | 17 (7.8) |
| C300, Compression Fitting, 300 lb. Flange | 24.6 (625) | 10.8 (274) | 41 (1041) | 27.2 (691) | 53 (1348) | 39.2 (996) | 17 (7.8) | 18 (8.3) | 19 (8.8) |
| C600, Compression Fitting, 600 lb. Flange | 24.6 (625) | 10.4 (264) | 41 (1041) | 26.8 (681) | 53 (1348) | 38.8 (986) | 18 (7.8) | 19 (8.7) | 20 (9.2) |
| C900, Compression Fitting, 900 lb. Flange | 24.6 (625) | 9.9 (251) | 41 (1041) | 26.3 (668) | 53 (1348) | 38.3 (973) | 31 (14.1) | 32 (14.5) | 33 (15) |

Add 11 lb (5 KG) for remote electronics



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## REMOVABLE RETRACTOR CAN BE USED WITH THESE MODELS



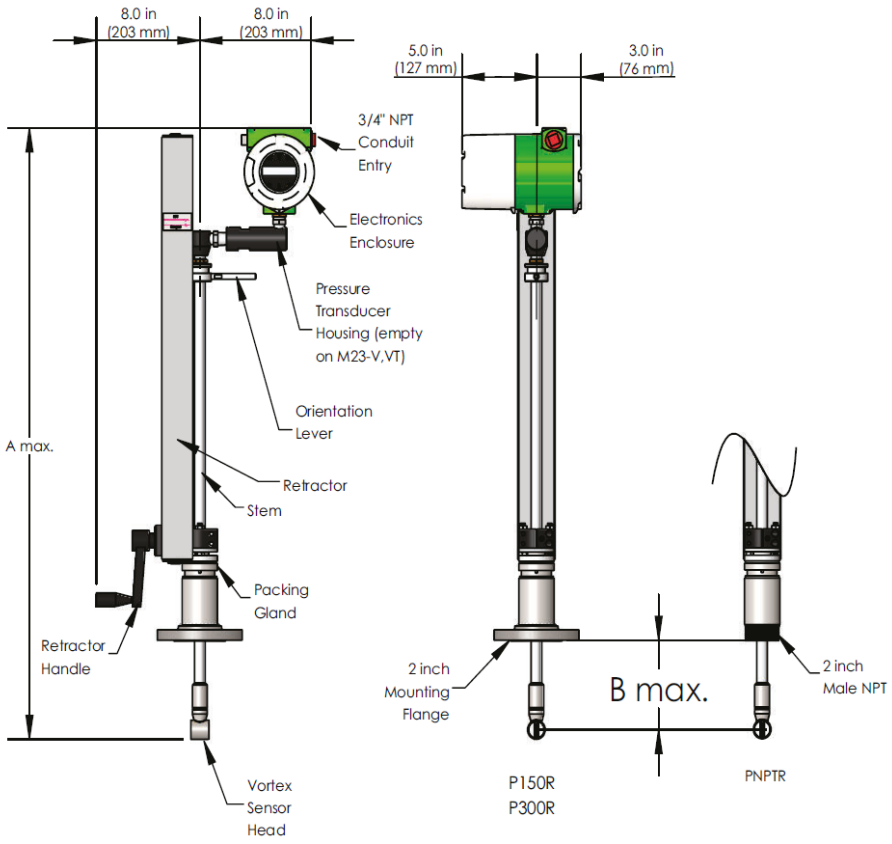

| MODEL M23 in (mm) | SL/Standard Length | | EL/Extended Length | | Weight lb (KG) | |
|---|---|---|---|---|---|---|
| | A | B | A | B | SL | EL |
| PNPT, Packing Gland, Male NPT | 40.5 (1029) | 21.5 (546) | 52.5 (1334) | 33.5 (851) | 16 (7.1) | 17 (7.6) |
| P150, Packing Gland, 150 lb. Flange | 40.5 (1029) | 21.1 (536) | 52.5 (1334) | 33.1 (841) | 21 (9.4) | 22 (9.9) |
| P300, Packing Gland, 300 lb. Flange | 40.5 (1029) | 21.1 (536) | 52.5 (1334) | 33.1 (841) | 25 (11.3) | 26 (11.8) |

Add 11 lb (5 KG) for remote electronics



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## Dimensional Outline: Pro-V™ Packing Gland Models with Permanent Retractor




| MODEL M23 in (mm) WITH PERMANENT RETRACTOR | SL/Standard Length | | EL/Extended Length | | Weight lb (KG) | |
|---|---|---|---|---|---|---|
| | A | B | A | B | SL | EL |
| PNPTR, Packing Gland, Male NPT | 40.5 (1029) | 21.5 (548) | 52.5 (1334) | 33.5 (851) | 25 (11.5) | 32 (14.5) |
| P150R, Packing Gland, 150 lb. Flange | 40.5 (1029) | 21.1 (536) | 52.5 (1334) | 33.1 (841) | 30 (13.7) | 37 (16.7) |
| P300R, Packing Gland, 300 lb. Flange | 40.5 (1029) | 21.1 (536) | 52.5 (1334) | 33.1 (841) | 34 (15.5) | 41 (18.5) |

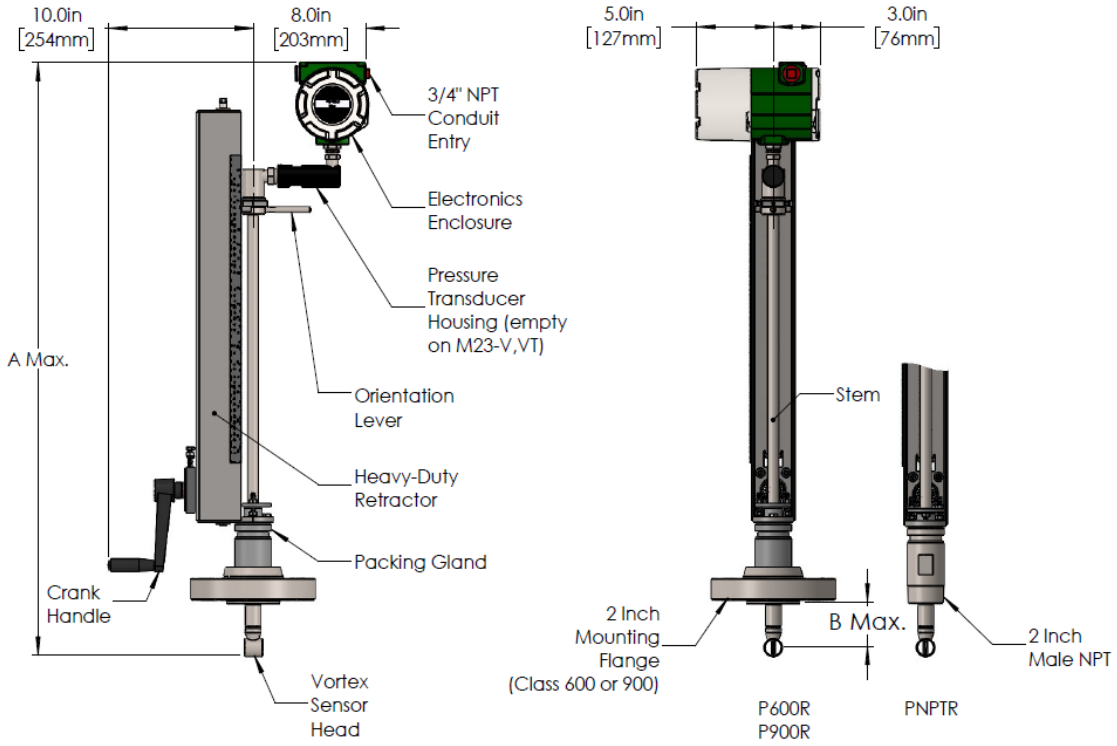
Add 11 lb (5 KG) for remote electronics

Heavy-Duty Retractor option available upon request – consult factory



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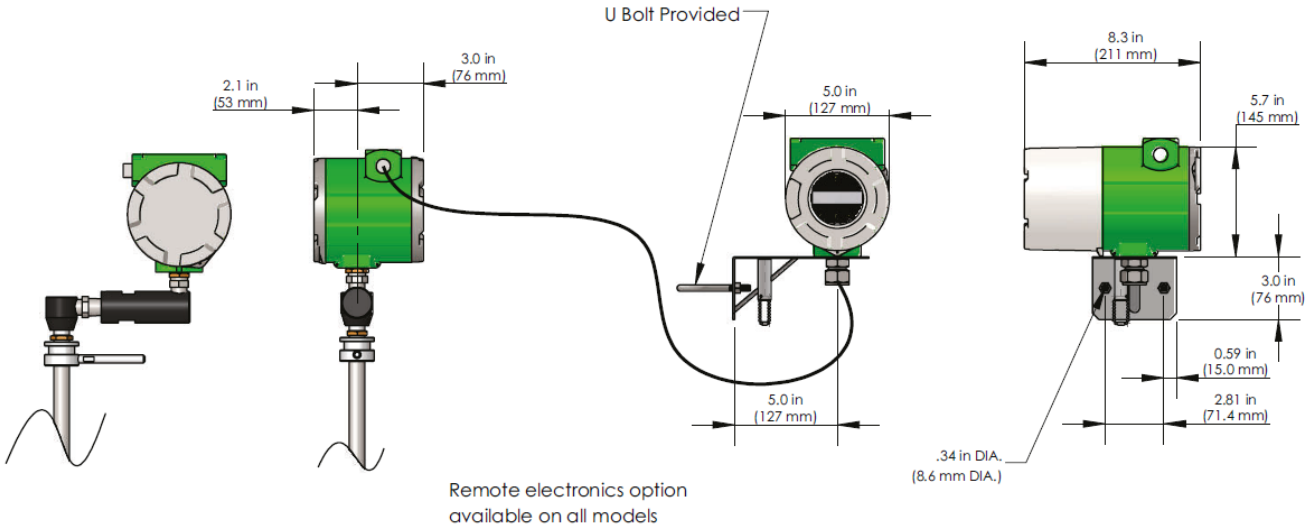
## Dimensional Outline: Pro-V™ Packing Gland Models with Permanent Heavy-Duty Retractor




| MODEL M23 in (mm) WITH PERMANENT HEAVY-DUTY RETRACTOR | SL/Standard Length | | EL/Extended Length | | Weight lb (KG) | |
|---|---|---|---|---|---|---|
| | A | B | A | B | SL | EL |
| PNPTR, Packing Gland, Male NPT | 40.5 (1029) | 21.2 (538) | 52.5 (1334) | 33.2 (843) | 32 (14.5) | 38 (17.2) |
| P600R, Packing Gland, 600 lb. Flange | 40.5 (1029) | 20.9 (531) | 52.5 (1334) | 32.9 (836) | 42 (19.1) | 48 (21.8) |
| P900R, Packing Gland, 900 lb. Flange | 40.5 (1029) | 20.9 (531) | 52.5 (1334) | 32.9 (836) | 55 (24.9) | 61 (27.7) |

Add 11 lb (5 KG) for remote electronics

## Dimensional Outline: Remote Electronics Option






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## Model Number Information - Pro-V™ Model M23 Insertion Mass Vortex Flowmeter

**Parent Number Code**

| | |
|---|---|
| **M23** | Insertion Vortex Flowmeter |

**Feature 1: Multivariable Options**

| | |
|---|---|
| **V** | Volumetric Flowmeter for liquid, gas, and steam |
| **VT** | Velocity and Temperature Sensors |
| **VTP** | Velocity, Temperature, and Pressure Sensors |
| **VTEP** | Velocity, Temperature, and External 4-20mA Input (T or P) |
| **VETEP** | Velocity, External RTD Temperature Input, External 4-20mA Input (T or P) |
| **VT-EM** | Energy Output Options |
| **VTP-EM** | Energy Options with Pressure Sensor |
| **VTEP-EM** | Velocity, Temperature, External 4-20mA Input (T or P) |
| **VETEP-EM** | Velocity, External RTD Temperature Input, External 4-20mA Input (T or P) |

**Feature 2: Probe Length**

| | | | | | |
|---|---|---|---|---|---|
| **CL** | Compact Length | **SL** | Standard Length | **EL** | Extended Length |

**Feature 3: Electronics Enclosure**

| | | | |
|---|---|---|---|
| **L** | NEMA 4x IP66 Enclosure | **R()** | Remote Electronics NEMA 4X IP66 Enclosure, Specify cable length in parentheses, Standard 50ft |

**Feature 4: Display Options**

| | |
|---|---|
| **DD** | Digital Display and Programming Buttons |

**Feature 5: Input Power**

| | |
|---|---|
| **DCL** | 12-36 VDC, 25mA, 1W max. – required on loop powered meters, 1AHL only |
| **DCH** | 12-36 VDC, 300mA, 9W max. – use with 1AH, 1AM, 1AB, 3AH, 3AM, 3AB |
| **DCHPOE** | 12-28 VDC or Power Over Ethernet, 5W max. – required on 1AMIP, 1ABIP, 3AMIP, 3ABIP |
| **AC** | 100-240 VAC, 50/60 Hz line power, 5W max. – use with 1AH, 1AM, 1AB, 3AH, 3AM, 3AB |

**Feature 6: Output**

| | |
|---|---|
| **1AHL** | Loop powered option – one analog output (4-20mA), one scaled frequency, one pulse, HART, DCL input power only |
| **1AH** | One analog output (4-20mA), one alarm, one pulse, HART Communication Protocol, DCH or AC option only * |
| **1AM** | One analog output (4-20mA), one alarm, one pulse, MODBUS RTU Communication Protocol, DCH or AC option only * |
| **1AMIP** | One analog output (4-20mA), one alarm, one pulse, MODBUS TCP/IP Communication Protocol, DCHPOE option only * |
| **1AB** | One analog output (4-20mA), one alarm, one pulse, BACnet MS/TP Communication Protocol, DCH or AC option only * |
| **1ABIP** | One analog output (4-20mA), one alarm, one pulse, BACnet/IP Communication Protocol, DCHPOE option only * |
| **3AH** | Three analog outputs (4-20mA), three alarms, one pulse, HART, VT or VTP option only, DCH or AC option only * |
| **3AM** | Three analog outputs (4-20mA), three alarms, one pulse, MODBUS RTU, VT or VTP option only, DCH or AC option only * |
| **3AMIP** | Three analog outputs (4-20mA), three alarms, one pulse, MODBUS TCP/IP, VT or VTP option only, DCHPOE option only * |
| **3AB** | Three analog outputs (4-20mA), three alarms, one pulse, BACnet MS/TP, VT or VTP option only, DCH or AC option only * |
| **3ABIP** | Three analog outputs (4-20mA), three alarms, one pulse, BACnet/IP, VT or VTP option only, DCHPOE option only * |

*Includes scaled frequency output

**Feature 7: Temperature Options**

| | | | |
|---|---|---|---|
| **ST** | Standard Temperature – Process temperature -330° to 500° F (-200° to 260° C) | **HT** | High Temperature – Process temperature up to 750° F (400° C) |

**Feature 8: Pressure Options**

| | | | |
|---|---|---|---|
| **P0** | No Pressure Sensor | **P4** | Maximum 500 psia (34 bara), Proof 1000 psia (64 bara) |
| **P1** | Maximum 30 psia (2 bara), Proof 60 psia (4 bara) | **P5** | Maximum 1500 psia (100 bara), Proof 2500 psia (175 bara) |
| **P2** | Maximum 100 psia (7 bara), Proof 200 psia (14 bara) | **P6** | Maximum 2500 psia (172 bara), Proof 5000 psia (344 bara) |
| **P3** | Maximum 300 psia (20 bara), Proof 600 psia (41 bara) | **P7** | Maximum 1000 psia (69 bara), Proof 2000 psia (138 bara) |

**Feature 9: Process Connections**

| | | | |
|---|---|---|---|
| **CNPT** | Compression, 2 inch NPT | **PJ10** | Packing Gland, 2 inch JIS 10K Flange |
| **CJNPT** | Compression, 2 inch NPT JIS | **P300** | Packing Gland, 2 inch 300# Flange |
| **C150** | Compression, 2 inch 150# Flange | **P40** | Packing Gland, DN50 PN40 Flange |
| **C16** | Compression, DN50 PN16 Flange | **PJ20** | Packing Gland, 2 inch JIS 20K Flange |
| **CJ10** | Compression, 2 inch JIS 10K Flange | **PNPTR** | Packing Gland, 2 inch NPT, Retractor* **(PNPTHR)** |
| **C300** | Compression, 2 inch 300# Flange | **PJNPTR** | Packing Gland, 2 inch NPT JIS, Retractor* (**PJNPTHR)** |
| **C40** | Compression, DN50 PN40 Flange | **P150R** | Packing Gland, 2 inch 150# Flange, Retractor* |
| **CJ20** | Compression, 2 inch JIS 20K Flange | **P16R** | Packing Gland, DN50 PN16 Flange, Retractor* |
| **C600** | Compression, 2 inch 600# Flange | **PJ10R** | Packing Gland, 2 inch JIS 10K Flange, Retractor* |
| **C63** | Compression, DN50 PN63 Flange | **P300R** | Packing Gland, 2 inch 300# Flange, Retractor* |
| **C900** | Compression, 2 inch 900# Flange | **P40R** | Packing Gland, DN50 PN40, Retractor* |
| **CJ30** | Compression, 2 inch JIS 30K Flange | **PJ20R** | Packing Gland, 2 inch JIS 20K Flange, Retractor* |
| **PNPT** | Packing Gland, 2 inch NPT | **P600R** | Packing Gland, 2 inch 600# Flange, Heavy-Duty Retractor** |
| **PGJPT** | Packing Gland, 2 inch NPT JIS | **P63R** | Packing Gland, DN50 PN63 Flange, Heavy-Duty Retractor** |
| **P150** | Packing Gland, 2 inch 150# Flange | **PJ30R** | Packing Gland, 2 inch JIS 30K Flange, Heavy-Duty Retractor** |
| **P16** | Packing Gland, DN50 PN16 Flange | **P900R** | Packing Gland, 2 inch 900# Flange, Heavy-Duty Retractor** (includes safety clamp) |

*Heavy-Duty Retractor Option Available
**Stem Safety Clamp Option Recommended



VorTek Instruments, LLC | 8475 West I-25 Frontage Rd., Suite 300 | Longmont, CO 80504 USA Tel: 303/682-9999 | Fax: 303/682-4368 | info@vortekinst.com | www.vortekinst.com