Porter Instrument Company, Inc. is a leading manufacturer of specialized components for analytical, industrial and medical instrumentation. Since its inception in 1968, the company’s focus has been the development, manufacture and sales of precision instruments for the measurement and control of gases and liquids.

The Flowmeters, Flow Tubes, Metering Valves and Flow Controllers in this catalog are part of a unique line of control components recognized as the industry standard for critical applications in the analytical, medical, semiconductor, chemical/petrochemical, water treatment, air quality monitoring and fuel cell industries.

The people at Porter are proud of the quality reputation that our products have earned. We are ready to help you achieve new levels of performance, efficiency and reliability in your application, either with standard product or a special configuration designed to your specific requirements.
Porter Flowmeters

Porter Variable Area Flowmeters include 65mm and 150mm scale length tube assemblies and are available in either forged body or side-plate construction. Forged body models feature a wrap-around window for full 180° tube visibility, and an attractive forged one-piece black anodized aluminum body. Side-plate constructed models are conveniently interchangeable with competitive designs.

Porter Control Valves, including the exclusive Torque Guard Cartridge, can be added to either style flowmeter for precise flow indication and control in one economical unit. Multi-tube side-plate models, ranging from two to six tubes, are available with or without controls valves and can include individual inlet and outlet connections or manifold ports according to your specifications.

Porter Metering Valves

Porter Metering Valves are designed for extremely precise control in low flow gas and liquid applications. Our Model HR High Resolution Control Valve features a non-rotating valve stem with a precision ground flat for exact control and an o-ring seal for positive shut-off. The Model HR’s spring-loaded, non-rising adjustment stem eliminates sawtooothing and backlash. The Model SCV Standard Cartridge Valve offers a unique blend of economy and utility for a wide range of applications. Standard Cartridge Valves are available with the exclusive Torque Guard Positive Stop Mechanism.

Porter Variable Constant Differential Flow Controller

Porter Model VCD 1000 Flow Controller is precision-engineered to control low gas flows at constant mass flow rates regardless of changes in downstream pressure. The unique design yields extremely linear flow output in relation to stem rotation and virtually eliminates the sawtooothing associated with valve-based controllers. Available in full scale flow rates from 5 sccm up to 1500 sccm (He @ 70°F and 50 PSIG).

Custom Capability

Porter Flowmeters, Metering Valves and Flow Controllers can be modified to meet the particular needs of Original Equipment Manufacturers. We can also supply OEM glass flow tubes to meet specific size, scale and flow requirements. We welcome your inquiries.
PORTER HIGH PRECISION
FLOWMETERS
the true measure of performance

Forged Body Flowmeters

The Porter Models F65 and F150 Forged Body Flowmeters feature a compact, one-piece, black anodized forged aluminum body with wraparound window for full 180° visibility of the flow tube. These units are available with aluminum, brass or 316 stainless steel wetted parts.

Side Plate Flowmeters

The Porter Models 65 and 150 Side Plate Constructed Flowmeters combine a traditional body style with innovative design features. They are available with aluminum, brass or 316 stainless steel wetted parts. Multi-tube (2 to 6 tube) versions are available with optional valves and manifold inlet/outlet ports.
**Design Features & Advantages**

- Interchangeable flow tube assemblies and valves allow configuration changes without removal from process system.
- Rib-guided, compression sealed flow tubes for maximum float stability.
- Ceramic scales fired on flow tubes against a contrasting background provide high visibility and durability.
- Standard or high-resolution metering valves available on inlet or outlet (see page 8 for valve details).
- Ten-to-one rangeability.

**Specifications**

**Scale**
- **Length:** Models F65 and 65 - 65mm; Models F150 and 150 - 150mm.
- **Type:** Fused on metering tube with contrasting yellow background.
- **Graduations:** Standard - Models F65 and 65: 0-65mm w/ calibration data; Models F150 and 150: 0-150mm w/ calibration data.
  Optional: Direct reading scales.

**Capacities**
- Refer to capacity chart on page 7.

**Ratings**
- Pressure/Temperature: Neoprene packing/Buna N O-rings - 200 psig at temperatures up to 160°F; Viton® packing/Viton O-rings - 200 psig at temperatures up to 200°F.

**Performance**
- **Accuracy:** Models F65 and 65: ± 10% full scale; Models F150 and 150: ± 5% full scale. Accuracy specified for 100% - 10% of scale reading (10 to 1 rangeability).
- **Repeatability:** Models F65 and 65: ± 0.5% of full scale reading; Models F150 and 150: ± 0.25% of full scale reading.

**Connections**
- Standard: 1/8” female NPT threaded adaptors with locknuts for front panel mounting. Optional: 1/8” compression fitting; 1/4” compression fitting; 1/4” NPT female; 1/4” I.D. Hose.

**Materials of Construction**

**Metering tube** - Borosilicate glass.


**Structural Members**
- **Metering body:** (F65 and F150) Black anodized aluminum.
- **Side plates:** (65 and 150) Standard: black anodized aluminum. Optional: stainless steel.
- **Wetted Parts:** aluminum, brass or 316 stainless steel.
- **End Fittings:** black anodized aluminum or chrome plated brass or 316 stainless steel.

**Shields** - Clear polycarbonate.


**Options**

- Integral standard cartridge or high resolution flow control valve
- Brass or 316 stainless steel wetted parts
- Special packing and o-rings
- Special process connections
- Direct reading scales
- Stainless steel side plates (Models 65 & 150 only)
- Base plate (Models 65 & 150 only)

**Multi-tube Flowmeters**

Porter Models 65 and 150 Side-Plate Flowmeters are available in multi-tube configurations up to 6 tubes. All valve options are available, and the inlet/outlet ports can be manifolded. Contact factory for details.

**Ordering Information**

**Model Number and Description**

**Example:**

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<tr>
<th>F65</th>
<th>A</th>
<th>V</th>
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**Basic Model**
- F65-65mm Forged Body
- F150-150mm Forged Body
- 65-65mm Side Plate Body
- 150-150mm Side Plate Body

**Body Material**
- A - Aluminum
- B - Brass
- S - Stainless Steel

**Valve**
- O - No Valve
- V - Standard Cartridge Control Valve
- HR - High Resolution Control Valve

**Valve Size**
- 0 thru 6 High Resolution Control Valve
- 1 thru 3 Standard Cartridge Valve
- 1-TG Torque Guard Taper 1
- 2-TG Torque Guard Taper 2

**To order, specify:**

- Model Number
- Tube Number
- Float Material
- Connections (Type & Size)
- Fluid Specifications (specific gravity & viscosity)
- Flow Rate
- Operating Pressure
- Operating Temperature
- Material of Construction for 
  (a) End fitting
  (b) Side plates or meter body
  (c) Elastomers

Teflon® - E.I. DuPont de Nemours & Co.
Kalrez®, Viton® - DuPont Dow Elastomers LLC
Custom Variable Area Flow Tubes

Porter Instrument Company's heritage is based on the Variable Area Flow Tube. Today, Porter is recognized as the leading supplier of custom configured tubes. Porter Flow Tubes are the industry standard for medical anesthesia equipment, while Porter Flowmeters with special tubes are being utilized in the majority of veterinary anesthesia equipment.

Porter Custom Flow Tubes are also utilized in applications as diverse as water treatment equipment and specialized devices for testing rail car air brakes. For applications that demand accuracy and flexibility, Porter Flow Tubes are the solution. We can configure tubes for special length and diameter requirements, provide multiple tapers to increase range and supply a variety of float and scale options. We invite your inquiry.
### Flowmeter Capacities

#### Models F65 & 65

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#### Conversion Equations:

- **Gas**: $\text{SLPM} \times 1000 = \text{cc/min}$
- **SCFM**: $\text{SCFM} \times 28320 = \text{cc/min}$
- **SFCF**: $\text{SFCF} \times 472 = \text{cc/min}$

- **Liquid**: $\text{GPH} \times 63.09 = \text{cc/min}$
- **GPM**: $\text{GPM} \times 3785 = \text{cc/min}$
- **LPM**: $\text{LPM} \times 1000 = \text{cc/min}$
Porter Metering Valves are designed for extremely precise control in low flow gas and liquid applications. They are available as valve cartridges, integrally mounted in flowmeters and in-line valve assemblies with straight or angle patterned bodies. All in-line valves assemblies have 1/8" female NPT inlet and outlet ports.

**High Resolution Control Valves**

The HR Series High Resolution Control Valves contain unique design features that make them the ultimate choice for precise low flow control.

- Spring loaded, non rising adjustment stem with 56-pitch thread provides smooth, non-reversing flow characteristics and 15-turn resolution.
- Non-rotating stainless steel valve pin with precision ground flat gives exact control.
- Valve pin o-ring guarantees positive shut-off without stem damage.
- Self-lubricating orifice liner assures long life.
- Seven available needle tapers expand valve capacity.

**Standard Cartridge Valves**

Porter’s Standard Cartridge Valves (SCV) are economical, multi-purpose valve assemblies. Available in 3 needle tapers, they are ideal for a wide spectrum of low flow applications.
Ordering Information

Model Number and Description
Control Valve
Example:

Basic Model
HRCV (High Resolution)
SCV (Standard Cartridge)

Body Material
B - Brass
S - Stainless Steel

Needle Size
0 thru 6 (HRCV only)
1 thru 3 (SCV only)
1 - TG (Torque Guard Taper 1)
2 - TG (Torque Guard Taper 2)

Connection Configuration
A – Angle
S – Straight

Valve Cartridge Only
Example:

Needle Size
0 thru 6 (HR only)
1 thru 3 (SC only)
1 - TG (Torque Guard Taper 1)
2 - TG (Torque Guard Taper 2)

Material
A – Aluminum
B – Brass
S – Stainless Steel

To order, specify:
• Model Number
• Fluid
• Flow Rate
• Operating Pressure (inlet and outlet)
• Operating Temperature
• Materials of Construction

Specifications

Capacities for High Resolution Control Valves

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<tr>
<th>Needle Size (HRCV)</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max. Flow</td>
<td>cc/min. – Helium</td>
<td>95</td>
<td>220</td>
<td>450</td>
<td>1250</td>
<td>3600</td>
<td>12500</td>
</tr>
<tr>
<td></td>
<td>cc/min. – Water</td>
<td>2</td>
<td>6</td>
<td>15</td>
<td>30</td>
<td>100</td>
<td>200</td>
</tr>
</tbody>
</table>

Capacities for Standard Cartridge Valves

<table>
<thead>
<tr>
<th>Needle Size (SCV)</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max. Flow</td>
<td>cc/min. – Helium</td>
<td>25000</td>
<td>35000</td>
</tr>
<tr>
<td></td>
<td>cc/min. – Water</td>
<td>700</td>
<td>1000</td>
</tr>
</tbody>
</table>

Note: Capacities are typically measured with water or helium at 10 psig supply pressure and atmospheric pressure downstream. Capacities vary for different fluids and operating conditions.

Ratings: Maximum Operating

<table>
<thead>
<tr>
<th></th>
<th>Temperature °F</th>
<th>Pressure PSIG</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brass Model</td>
<td>160</td>
<td>250</td>
</tr>
<tr>
<td>Stainless Steel Model</td>
<td>250</td>
<td>250</td>
</tr>
</tbody>
</table>

Connections: 1/8” Female NPT (integral)

Materials of Construction

<table>
<thead>
<tr>
<th>Model</th>
<th>Body</th>
<th>Valve Pin</th>
<th>Valve Pin Holder</th>
<th>O-Rings</th>
<th>Orifice</th>
</tr>
</thead>
<tbody>
<tr>
<td>HRCV Brass</td>
<td>Nickel Plated Brass</td>
<td>316 SS</td>
<td>Brass</td>
<td>Buna N</td>
<td>Brass w/ Fluorosint® liner</td>
</tr>
<tr>
<td>HRCV Stainless Steel</td>
<td>316 SS</td>
<td>316 SS</td>
<td>316 SS</td>
<td>Viton</td>
<td>316 SS w/ Fluorosint® liner</td>
</tr>
<tr>
<td>SCV Brass</td>
<td>Nickel Plated Brass</td>
<td>316 SS</td>
<td>316 SS</td>
<td>Buna N</td>
<td>Brass</td>
</tr>
<tr>
<td>SCV Stainless Steel</td>
<td>316 SS</td>
<td>316 SS</td>
<td>316 SS</td>
<td>Viton</td>
<td>316 SS</td>
</tr>
</tbody>
</table>

Fluorosint® - DSM Engineering Plastic Products

Torque Guard

Porter Standard Cartridge Valves are available with the exclusive Torque Guard Stop Mechanism. Torque Guard eliminates stem damage caused by over tightening of the valve at shut-off.

The Torque Guard System consists of a specially designed knob with a stop pin pressed into an aluminum knob insert and a machined detail on the packing nut that engages the stop pin and prevents clockwise rotation beyond a predetermined point. During final test, the knob is adjusted so that the stop pin and packing nut engage precisely at shut-off. This combination eliminates the possibility of over tightening and the resultant stem damage.
Variable Constant Differential Flow Controllers

The Porter Model VCD 1000 Flow Controller is precision-engineered to control low gas flows at constant mass flow rates regardless of changes in downstream pressure. The VCD 1000 maintains a preset pressure differential across a laminar flow element. Turning the fine-pitched adjusting stem varies the force on an internal diaphragm, which alters the differential pressure across the laminar flow element, thereby changing the flow rate. This design yields extremely linear flow output in relation to stem rotation and virtually eliminates the sawtooothing associated with valve-based controllers. The laminar flow elements are available in full scale flow rates from 5 sccm up to 1500 sccm (He @ 70°F and 50 PSIG).

Design Features & Advantages

- Delrin® adjusting stem with 56 pitch threads.
- Turns vs. flow relationship is linear.
- Bubble-tight shut-off
- Full scale flow rates from 5 SCCM up to 1500 SCCM (He @ 70°F and 50 PSIG)
- Replaceable inlet filter included.
- Standard panel mount configuration.

VCD 1000 Capacities

<table>
<thead>
<tr>
<th>Maximum Flow Range*</th>
<th>Flow Element Size Number</th>
<th>Color Code on Flow Element**</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 cc/min</td>
<td>5</td>
<td>Gold Anodize w/ Red Dot</td>
</tr>
<tr>
<td>8 cc/min</td>
<td>8</td>
<td>Blue Anodize w/ Red Dot</td>
</tr>
<tr>
<td>10 cc/min</td>
<td>10</td>
<td>Blue Anodize</td>
</tr>
<tr>
<td>15 cc/min</td>
<td>15</td>
<td>Silver Anodize w/ Blue Dot</td>
</tr>
<tr>
<td>25 cc/min</td>
<td>25</td>
<td>Red Anodize w/ Silver Dot</td>
</tr>
<tr>
<td>35 cc/min</td>
<td>35</td>
<td>Black Anodize w/ White Dot</td>
</tr>
<tr>
<td>45 cc/min</td>
<td>45</td>
<td>Blue Anodize w/ Green Dot</td>
</tr>
<tr>
<td>60 cc/min</td>
<td>60</td>
<td>Red Anodize</td>
</tr>
<tr>
<td>95 cc/min</td>
<td>95</td>
<td>Gold Anodize</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Maximum Flow Range*</th>
<th>Flow Element Size Number</th>
<th>Color Code on Flow Element**</th>
</tr>
</thead>
<tbody>
<tr>
<td>110 cc/min</td>
<td>110</td>
<td>Green Anodize</td>
</tr>
<tr>
<td>144 cc/min</td>
<td>144</td>
<td>Silver Anodize w/ Red Dot</td>
</tr>
<tr>
<td>180 cc/min</td>
<td>180</td>
<td>Silver Anodize</td>
</tr>
<tr>
<td>535 cc/min</td>
<td>535</td>
<td>Black Anodize</td>
</tr>
<tr>
<td>465 cc/min</td>
<td>465</td>
<td>Black Anodize w/ Silver Dot</td>
</tr>
<tr>
<td>750 cc/min</td>
<td>750</td>
<td>Silver Anodize w/ Green Dot</td>
</tr>
<tr>
<td>1060 cc/min</td>
<td>1000</td>
<td>Black Anodize w/ Red Dot</td>
</tr>
<tr>
<td>1600 cc/min</td>
<td>1500</td>
<td>Black Anodize w/ Green Dot</td>
</tr>
</tbody>
</table>

* Flow ranges stated are based on helium gas at 50 psig supply pressure.
** Color-coded flow element packages appear on aluminum units only. Stainless steel flow controllers have flow element size etched on the flow element holder.
Specifications

**Capacities** - see chart on previous page.

**Ratings** – Maximum operating pressure: 250 psig; Maximum operating temperature: 160°F; Pressure Drop required: 15 psi minimum.

**Performance** – Control Accuracy: 0.3% of instantaneous flow rate. Adjustability: 0-100% of flow over 14 turns.

**Connections** – 1/8" compression fitting (brass) with aluminum body; 1/8" compression fitting (stainless steel) with SS body.

**Dimensions** – Refer to diagram

Materials of Construction

**Controller Body** - Aluminum or stainless steel.

**Controller Diaphragm** - Fairprene® BN-5029 or stainless steel.

**Orifice** - Brass with aluminum body; 316 stainless steel with stainless steel body.

**O-Rings** - Buna N or Viton.

**Filter** - Aluminum with aluminum body; stainless steel with stainless steel body.

CERTIFICATE OF WARRANTY

THIS WARRANTY IS GIVEN IN PLACE OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, OR OTHERWISE. NO PROMISE OR STATEMENT MADE BY ANY REPRESENTATIVE OR AUTHORIZED DEALER OF PORTER INSTRUMENT CO., INC. SHALL CONSTITUTE A WARRANTY BY PORTER INSTRUMENT CO., INC. PORTER INSTRUMENT CO., INC. ASSUMES NO LIABILITY FOR USE OF THIS EQUIPMENT.

Porter Instrument Co., Inc. warrants this equipment to be free from defects in workmanship and materials, when used in accordance with applicable specifications and with appropriate maintenance, for one (1) year from date of delivery to the customer, unless otherwise specified in writing.

Equipment which malfunctions may be returned, shipment prepaid, to Porter Instrument Co., Inc. for test and evaluation. Equipment determined to be defective and in warranty will be repaired or replaced at no charge to the customer.

Equipment out of warranty will be evaluated, and if the equipment does not meet original specifications and calibration, the customer will be notified of the costs before proceeding with repair or replacement. Repaired equipment will be warranted ninety (90) days from date of delivery to the customer or for the balance of the original warranty, whichever is longer.

Failures due to shipping damage, accident, misuse, improper mechanical or electrical installation or operation, or internal clogging or corrosion due to contaminated fluids or inadequate system purging are excluded from warranty coverage.

Porter Instrument Co., Inc.’s obligation for breach of this warranty, or for negligence or otherwise, shall be strictly and exclusively limited to the repair or replacement of the equipment. This warranty shall be void as to any equipment on which the serial number, if applicable, has been altered, defaced, or removed. Porter Instrument Co., Inc. shall under no circumstances be liable for incidental or consequential damages.

No other promise or statement about the equipment by any representative or authorized dealer of Porter Instrument Co., Inc. shall constitute a warranty by Porter Instrument Company, Inc. or give rise to any liability or obligation of Porter Instrument Co., Inc.

**Specifications and dimensions subject to change.**