Acro PE900 Series
Proportional Pinch Valve System Electric

Engineering GREAT Solutions
Contents

3 Introduction
   Engineering GREAT solutions

4 What Is A Pinch Valve?
   4 – Why use Pinch Valves?
   4 – Why use Proportional Pinch Valves?

5 PE900 Series Proportional Pinch
   5 – Advantages of Pinch Valves

6 Product Features
   6 – Features and Benefits

7 How It Works
   7 – Materials of Construction

8 How It’s Used
   8 – CLOSED LOOP vs OPEN LOOP
   8 – Advantages
   9 – Markets
   9 – Target Applications
   9 – How To Customize

10 How To Specify
   10 – Brief Product Overview
   10 – Product Selection Guide
   12 – Specifications and Sizes
   14 – Flow vs. Pressure Curves
   15 – Flow Curves Continued
   16 – PE902 and PE903 Model Dimensions
   17 – PE904, PE906, and PE908 Model Dimensions
   18 – PE912 and PE916 Model Dimensions
   19 – PE916 Model Dimensions
   20 – PEC 9 Dimensions
   21 – Pinch Valve Controller - PEC-9
   22 – Cables

23 How to Order
   23 – Model Description for PE900 Pinch Valve
   24 – Model Description for PEC9 Controller

25 How to Customize
   25 – Pinch Gap
   25 – Actuator Resolution
   25 – Custom Materials
   25 – Custom Software Programs
   25 – Custom Cabling
   25 – Custom Machined
     Body/Tube Stiff

26 Custom Pinch Valves
   26 – Complementary products

Engineering GREAT solutions

IMI Precision Engineering is a world leader in motion and fluid control technologies. Wherever precision, speed and engineering reliability are essential, we deliver exceptional solutions which improve the productivity and efficiency of our customers’ equipment.

Part of IMI plc, we have a sales and service network in 50 countries, as well as manufacturing capability in the USA, Germany, China, UK, Switzerland, Czech Republic, Mexico and Brazil. We support this with our global centres of technical excellence, and facilities for CFD design and R&D testing. We employ a dedicated team of field engineers, sector specialists and key account managers – all committed to providing excellent service to our customers.

As a business, we aim to UNDERSTAND our customers’ challenges. We then CONNECT our products, people and expertise in order to DELIVER exceptional service and solutions. These IMPROVE the performance of our customers’ machinery.

We call this Engineering GREAT, and we deliver it to customers through a world-class portfolio of high performance products, through close partnerships and problem-solving, and through a global network of support which ensures reliable local delivery, all over the world.

Our Concord facility is certified under ISO 9001:2015, ISO 13485:2016 and is a licensed CA medical device manufacturer with Class 100,000 clean room production capabilities.
What Is A Pinch Valve?

A pinch valve is a type of fluid control valve. It applies a pinching force to the outer surface of flexible tubing. While pinching it collapses and seals the tubing to control fluid flow or pressure. Pinch valves are considered non-wetted valves because there is no valve contact with the fluid. The mechanism consists of a tube holding pinch head attached to a linear actuator (electric or pneumatically powered).

Why use Pinch Valves?

Industry leaders looking for a low-maintenance and more cost-effective solutions for controlling liquids, gases, slurries and powders (incl. corrosive media) in a pipeline are turning to pinch valves over traditional valves (diaphragm valves, ball valves, butterfly valves, needle valves, etc.). Unlike traditional valves, pinch valves feature a straight-through flow, very little pressure drop over the valve, and full shut-off of media in the tube, making it the most practical and efficient solution for various ON/OFF flow control applications.

Why use Proportional Pinch Valves?

See below for pressure curves representing 2-way (ON/OFF) control versus proportional control. If you need the option to vary or hold flow or pressure in your system a proportional valve allows you flexibility to adjust the valve opening from full open to closed or anywhere in between.

Advantages of Pinch Valves

- Compact, lightweight design
- Easy cleaning (just throw away the tubing)
- Simple operation
- Eliminates media contamination
- Linear flow
- Quick tubing change-out
- High performance and reliability
- Easy valve exchange
- Maximizes productivity
- Reduced valve costs
- Valve body not affected by corrosive fluids
- Requires very low maintenance

PE900 Series Proportional Pinch Valve - Electric

With a growing number of applications requiring more accurate control of fluid within flexible tubing, IMI Precision Engineering has developed the Acro PE900 Series Proportional Pinch Valve Electric product line. The PE900 Series is controlled by a high accuracy linear drive capable of high pinch forces, integrated optical encoder and optimized software for fluid flow applications.

The PE900 Series is a robust and flexible fluid management system to meet your critical requirements and is ideal for Bio-Pharma, Bio-Processing and Food and Beverage applications, or anywhere sterility and high performance are needed.
**Product Features**

**Pinch Valve Benefits:**
- Designed for Bio-Pharma, Bio-Processing, Food and Beverage, Industrial applications where sterile and wash down procedures are needed
- Offers reliability and performance when working with hard or larger diameter tubing that require stronger pinch forces
- Provides a robust solution for accurate closed loop proportional control and precision fluid management.
- Dependable, compact and cost-effective solution
- Specifically designed for disposable tubing
- Each model contains an easy snap-in tube slot for quick loading and unloading procedures

**Motor/Controller Benefits:**
- Can run independent or as part of a closed loop system
- Optimized software for easy set-up and testing
- RoHS/CE Compliant
- High resolution encoder feedback
- DIN rail mountable (Controller Only)
- Noise Level 50 dbA Maximum

**Materials of Construction**

<table>
<thead>
<tr>
<th>Description</th>
<th>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aluminum Model - NEMA 8, 11, 17 and 23</td>
<td>Stainless Steel Model - NEMA 8, 11, 17 and 23</td>
</tr>
<tr>
<td>Body</td>
<td>6061 - Ti Aluminum, Black Anodized</td>
</tr>
<tr>
<td>Piston Rod</td>
<td>6061 - Ti Aluminum, Black Anodized</td>
</tr>
<tr>
<td>Piston Ridge</td>
<td>6061 - Ti Aluminum, Black Anodized</td>
</tr>
<tr>
<td>Body Plate</td>
<td>6061 - Ti Aluminum, Black Anodized</td>
</tr>
<tr>
<td>Mounting Plate</td>
<td>6061 - Ti Aluminum, Black Anodized</td>
</tr>
<tr>
<td>Safety Cover</td>
<td>Anodized6061 - Ti Aluminum, Black Anodized</td>
</tr>
<tr>
<td>Mounting Gasket</td>
<td>Silicone</td>
</tr>
<tr>
<td>O-Ring</td>
<td>Buna-N</td>
</tr>
<tr>
<td>Motor (Enclosure)</td>
<td>Aluminum</td>
</tr>
</tbody>
</table>

Note: * Stainless steel is a non-standard product.

**How It Works**

A proportional pinch valve (PPV) uses the properties of flexible tubing to create a variable fluid orifice by changing the tubing shape within the pinching mechanism. The PPV is capable of operating from full open to closed and virtually anywhere in between.

A precision linear actuator driven by a control system (controller and software) moves the pinching mechanism against the tubing to a specific position to achieve a desired flow or pressure through within the tubing. Typically a closed loop feedback system works in concert with the PPV to adapt to system changes.

---

**Definitions**

- **Proportional**
  - Having a constant ratio. In the case of a pinch valve, the movement of the actuator is proportional (or changing at a constant rate) to the input signal

- **Pinch Gap**
  - Mechanical linear distance between opposing pinching surfaces

- **Flexible Tubing**
  - Tubing designed to be compressibility by inlet pumps and pinch valves. Also call “pump tubing”. Maximum recommended hardness up to 75 durometer. The hardness scale is Shore A.

- **Media Pressure**
  - Force measured along the axis of the actuator. Peak thrust is when tubing is being fully pinched and sealed.

- **Actuator Stroke**
  - Maximum distance actuator can travel. For pinch valves it can also relate to the maximum tubing OD that can be accommodated.

- **Input Signal**
  - Low power analog signal used to control the opening/closure of the valve.

- **Closed Loop**
  - System configuration that senses and monitors changes to specific parameters, then uses this feedback in its logic scheme to make real-time adjustments in response to the changes. The results are accurate and predictable performance.

- **Open Loop**
  - System configuration that uses Set Point or pre-determined inputs to control the process. There is no feedback and logic therefore performance is reliant on system conditions and variables. Methods of mapping or calibrating each device can improve open loop performance.

- **Resolution**
  - The fineness or precision which the actuator can make individual moves. Resolution is dependent on input signal quality and other system conditions.

- **Repeatability**
  - The ability of the actuator to return to a given position. Repeatability is dependent on manufacturing tolerances for the pinch valve, tubing variations, wear and other system conditions.
### CLOSED LOOP vs OPEN LOOP

#### Closed Loop
- The PE900 is designed for and performs best in a closed loop control system. This setup provides the most accurate and predictable performance by compensating for most of the system variables. Feedback from an up or down stream sensor (flow or pressure) sends real-time updates to the PE900 in response to changes in the system performance.
- Advantages of a closed loop system include:
  - Robustness: The system is less sensitive to external disturbances.
  - Better accuracy: The system can maintain a precise set point despite fluctuations in the input signal.
  - Improved repeatability: The system can return to the same operating point consistently.
- Another advantage is the ability to manage low end torque for holding position and high thrust loads (think high media pressures and hard tubing). Intelligent control system with auto homing, dynamic input response, heat and power control and overthrust protection. Firmware and software developed specifically for fluid control using pinch valves and flexible tubing. Optimum performance is achieved with closed loop control. With the PEC-9’s dynamic input response, you will see real-time reaction and actor adjustment in response to your input signal/system changes. Analog Input is scalable. Standard options are 0-10 VDC or 4-20 mA. On board thrust and speed monitoring reduce stalling and damage to the actuator due to overthrust. Variable current control provides energy efficiency and heat control for high duty applications.

#### Open Loop
- PE900 can be used in open loop systems but limitations on system performance and repeatability must be acknowledged. You may be using set-points or pre-determined inputs to the valve. Manufacturing tolerances for mechanical pinch gaps and tubing, inaccuracies in input signals, power supplies, pumps and other system components can all cause performance and repeatability issues. To maximize the PE900 performance you should consider requesting a custom pinch gap tolerance. Also consider implementing a mapping or calibration cycle in your system setup to get the most from your PE900.

### How It’s Used

#### How To Customize
- The valve system comes with various features and additional options are available upon request. For further information, visit www.imi-precision.com and use the new improved search function. If you cannot see the option you require please contact us.

#### How it’s Used

<table>
<thead>
<tr>
<th>Feature</th>
<th>Advantage</th>
<th>Benefit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Designed for closed loop control</td>
<td>Allows system automation</td>
<td>Provides the most accurate and predictable performance</td>
</tr>
<tr>
<td>Rugged construction</td>
<td>Offers enhanced strength and durability</td>
<td>Can pinch larger OD tube sizes, higher durometer tube material and fluid media pressure</td>
</tr>
<tr>
<td>Washdown compatible</td>
<td>Fully removable pinch heads (PE912, PE916 and PE926)</td>
<td>Easy to clean and sterile valve for new batch run setups</td>
</tr>
<tr>
<td>Wide range of tubing sizes</td>
<td>Can support tubing from 0.063&quot; OD to 1.25&quot; OD</td>
<td>Provides greater flexibility and covers a wide range of applications</td>
</tr>
<tr>
<td>Low torque management</td>
<td>Utilizes smart stepper motors</td>
<td>Provides optimal performance for short strokes and precise moves which is ideal for proportional fluid control</td>
</tr>
<tr>
<td>Auto Homing</td>
<td>Sets actuator position upon startup</td>
<td>High position repeatability from homing and rotary encoder feedback</td>
</tr>
<tr>
<td>Dynamic input response</td>
<td>Real time response to system changes</td>
<td>Adapts to changes in system conditions based on an analog signal from logic or other input</td>
</tr>
<tr>
<td>Intelligent control</td>
<td>All components working together</td>
<td>Value, controller and software providing high linear resolution and repeatability to improve your batch yield efficiency and quality</td>
</tr>
<tr>
<td>Thread and speed monitoring</td>
<td>On board monitoring of actuator performance</td>
<td>Reduces stalling and damage to the actuator due to overthrust</td>
</tr>
<tr>
<td>Variable current control</td>
<td>Designed for high duty applications</td>
<td>Provides energy efficiency and heat control in extreme conditions</td>
</tr>
</tbody>
</table>

### Target Applications
- The Proportional Pinch Valve Electric (PPV) is designed for various types of applications, but some key industries would be biopharmaceutical, bioprocessing, food and beverage, and industrial applications due to sterility and wash-down procedures being a vital attribute.
- Across a variety of markets and industries, maintaining the integrity of the fluid or media passing through non-contact technology, is a driving factor in choosing pinch valves. As technologies evolve, we see more and more applications that require increasingly demanding performances that are not just achievable with conventional pneumatic or solenoid pinch valves; there is a demand for proportional controls in order to regulate and monitor processes with greater accuracy, speed, and delivery. Regulation of the fluid or media is necessary and can be limited to several factors, including flow, net volume, temperature, positive or negative pressure, and viscosity.
- Filtration and dispensing applications benefit immensely from proportional pinch valves. Filtration is a method used to separate particles from a fluid. Filters require precise regulation of flow, along with monitoring positive and negative pressure at the membrane as the process occurs. Material build-up as the filter does its job means that increased flow or pressure may be needed in order to maximize the filters’ usefulness at a maximum point.

#### How system can be used in applications:
- **Pressure Control**:
  - Maintain a specific pressure or setpoint for critical bio-processing applications.
  - Assist in your system control.
  - Improve your batch yield efficiency and quality.
  - Flow Control
  - Control your system variables.
  - When flow through system needs a higher level of accuracy than provided by your pump.

#### Markets
- Biotechnology
- Pharmaceuticals
- Medical devices
- Diagnostics
- Bioreactors
- Bioprocessing single use technology
- Process equipment
- Food and beverage
- Filtration, TFF (Tangential Flow Filtration)
- Dispersing, filling and mixing: Resin, glue, epoxy, adhesive, paint, slurries, and other media
- Chromatography - analyzers
- Chemical processing equipment
- Other applications
You must define an analog input signal to control the valve.

Standard supply power is 24 VDC. Amperage can be from 1.0 to 4.0 Amps and is dependent on the motor frame size and stack height (see table for specifics). Input signal You must define an analog input signal to control the valve. We offer 0-10 VDC and 4-20mA options.

**Product Selection Guide**

Using the included guides; “Specifications and Sizes” and “Product Selection” follow the steps below to size and specify your pinch valve.

**Tubing**
- **Size**: Select a valve model that will work with your tube size (based on your flowrate).
- **Material**: Select a material compatible with your media type.
- **Tube Wall Thickness**: Select a valve model that will work with your tube thickness.

**Media Pressure**
Make sure your pressure is within the maximum listed value. You can use our application software programs to select a tube, valve, and pressure for your application which results in selecting the correct valve size.

**Resolution**
How fine or accurate of adjustment do you need to meet your flow or pressure specification? Linear resolution can be as low as 0.01% of the actuator stroke but is dependent on the accuracy of your input signal and other system factors. For finer resolution we recommend the use of closed loop control which compensates for valve to valve variations.

**Repeatability**
How closely do you need the valve to repeat position? Repeatability has 2 measurements; first is for a single valve, second is for multiple valves across multiple deliveries.

**Single Valve**
Repeatability for a single valve to return to position at a given input signal can be as low as 0.1% of actuator stroke but is dependent on the accuracy of your input signal and other system factors.

**Multiple Valves**
Repeatability across multiple valves to achieve the same performance as a single valve is dependent on additional factors, primarily manufacturing tolerances for pinch gap. A variation of up to 4% is possible and therefore we recommend the use of closed loop control which compensates for valve to valve variations.

**How To Specify**

For further information, visit www.imi-precision.com and use the new improved search function. If you cannot see the option you require please contact us.

For additional information on other tube sizes or material, contact IMI Customer Service at Acro-Sales@IMI-Precision.com or (925)-676-8828 (or 800-672-2276).
### Specifications and Sizes

#### PE900 Series

<table>
<thead>
<tr>
<th>Specifications</th>
<th>PE902</th>
<th>PE903</th>
<th>PE904</th>
<th>PE906</th>
<th>PE908</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tube Size O.D. - Inch (mm)</td>
<td>0.063 to 0.125 (1.6 to 3.2)</td>
<td>0.125 to 0.188 (3.2 to 4.8)</td>
<td>0.188 to 0.250 (4.8 to 6.4)</td>
<td>0.250 to 0.375 (6.4 to 9.6)</td>
<td>0.375 to 0.500 (9.6 to 12.7)</td>
</tr>
<tr>
<td>Tube Wall Thickness Supported - Inch (mm)</td>
<td>0.016 to 0.031 (0.4 to 0.8)</td>
<td>0.031 to 0.063 (0.8 to 1.6)</td>
<td>0.063 to 0.125 (1.6 to 3.2)</td>
<td>0.063 to 0.125 (1.6 to 3.2)</td>
<td>0.063 to 0.125 (1.6 to 3.2)</td>
</tr>
<tr>
<td>Media Pressure Maximum - psig (barg)</td>
<td>45 (3.1)</td>
<td>45 (3.1)</td>
<td>45 (3.1)</td>
<td>45 (3.1)</td>
<td>45 (3.1)</td>
</tr>
<tr>
<td>Recommended Tubing Diameter</td>
<td>Up to 65 Shore A</td>
<td>Up to 75 Shore A</td>
<td>Up to 65 Shore A</td>
<td>Up to 75 Shore A</td>
<td>Up to 65 Shore A</td>
</tr>
<tr>
<td>Motor Frame Size</td>
<td>Nema 8</td>
<td>Nema 8</td>
<td>Nema 11</td>
<td>Nema 11</td>
<td>Nema 11</td>
</tr>
<tr>
<td>Motor Configuration - Single/Double Stack</td>
<td>Single</td>
<td>Double</td>
<td>Single</td>
<td>Double</td>
<td>Double</td>
</tr>
<tr>
<td>Pinch Force - Linear</td>
<td>Up to 5 (2.3)</td>
<td>Up to 10 (4.5)</td>
<td>Up to 15 (6.8)</td>
<td>Up to 30 (13.6)</td>
<td>Up to 30 (13.6)</td>
</tr>
<tr>
<td>Stroke - Inch (mm)</td>
<td>0.062 (1.27)</td>
<td>0.062 (1.27)</td>
<td>0.062 (1.27)</td>
<td>0.062 (1.27)</td>
<td>0.062 (1.27)</td>
</tr>
<tr>
<td>Safety Features</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Recommended Panel Thickness</td>
<td>0.093 to 0.250 (0.37 to 1.0)</td>
<td>0.093 to 0.250 (0.37 to 1.0)</td>
<td>0.093 to 0.250 (0.37 to 1.0)</td>
<td>0.093 to 0.250 (0.37 to 1.0)</td>
<td>0.093 to 0.250 (0.37 to 1.0)</td>
</tr>
<tr>
<td>Weight - oz (g)</td>
<td>3.0 (86)</td>
<td>4.1 (120)</td>
<td>8.2 (230)</td>
<td>10.2 (285)</td>
<td>10.2 (285)</td>
</tr>
<tr>
<td>Pinch Force - Linear</td>
<td>4.4 (125)</td>
<td>5.5 (155)</td>
<td>13.3 (350)</td>
<td>15.0 (405)</td>
<td>14.8 (405)</td>
</tr>
<tr>
<td>Length - Inch (mm)</td>
<td>3.3 (84)</td>
<td>3.7 (95)</td>
<td>4.3 (108)</td>
<td>4.7 (119)</td>
<td>4.7 (119)</td>
</tr>
<tr>
<td>Width and Depth - Inch (mm)</td>
<td>1.3 (33)</td>
<td>2.0 (51)</td>
<td>3.7 (95)</td>
<td>4.7 (119)</td>
<td>4.7 (119)</td>
</tr>
<tr>
<td>Standard Supply Power - Ampere</td>
<td>1 Amps</td>
<td>2 Amps</td>
<td>1 Amps</td>
<td>2 Amps</td>
<td>2 Amps</td>
</tr>
<tr>
<td>Input Control Analog Signal Options</td>
<td>0-10 VDC, 4-20 mA</td>
<td>0-10 VDC, 4-20 mA</td>
<td>0-10 VDC, 4-20 mA</td>
<td>0-10 VDC, 4-20 mA</td>
<td>0-10 VDC, 4-20 mA</td>
</tr>
<tr>
<td>Stepper Type</td>
<td>2-Phase 1.8 Step Angle</td>
<td>2-Phase 1.8 Step Angle</td>
<td>2-Phase 1.8 Step Angle</td>
<td>2-Phase 1.8 Step Angle</td>
<td>2-Phase 1.8 Step Angle</td>
</tr>
<tr>
<td>Standard Electrical Connections</td>
<td>2 wire DC power, 2 wire analog Input Signal</td>
<td>2 wire DC power, 2 wire analog Input Signal</td>
<td>2 wire DC power, 2 wire analog Input Signal</td>
<td>2 wire DC power, 2 wire analog Input Signal</td>
<td>2 wire DC power, 2 wire analog Input Signal</td>
</tr>
<tr>
<td>Ambient Temp Maximum - °C (°F)</td>
<td>50 (122)</td>
<td>50 (122)</td>
<td>50 (122)</td>
<td>50 (122)</td>
<td>50 (122)</td>
</tr>
<tr>
<td>Standard Supply Power - Voltage</td>
<td>24 VDC</td>
<td>24 VDC</td>
<td>24 VDC</td>
<td>24 VDC</td>
<td>24 VDC</td>
</tr>
<tr>
<td>Tube Loading</td>
<td>Side Load Snap In</td>
<td>Side Load Snap In</td>
<td>Side Load Snap In</td>
<td>Side Load Snap In</td>
<td>Side Load Snap In</td>
</tr>
<tr>
<td>Tube Materials</td>
<td>C-Flex, PharMed, Tygon, Pharma, Silicone, Braid Reinforced</td>
<td>C-Flex, PharMed, Tygon, Pharma, Silicone, Braid Reinforced</td>
<td>C-Flex, PharMed, Tygon, Pharma, Silicone, Braid Reinforced</td>
<td>C-Flex, PharMed, Tygon, Pharma, Silicone, Braid Reinforced</td>
<td>C-Flex, PharMed, Tygon, Pharma, Silicone, Braid Reinforced</td>
</tr>
<tr>
<td>Noise</td>
<td>50 dBA</td>
<td>50 dBA</td>
<td>50 dBA</td>
<td>50 dBA</td>
<td>50 dBA</td>
</tr>
<tr>
<td>Compliance</td>
<td>RoHS, CE</td>
<td>RoHS, CE</td>
<td>RoHS, CE</td>
<td>RoHS, CE</td>
<td>RoHS, CE</td>
</tr>
</tbody>
</table>

#### PE900 Series

<table>
<thead>
<tr>
<th>Specifications</th>
<th>PE912</th>
<th>PE916</th>
<th>PE926</th>
<th>PE926</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tube Size O.D. - Inch (mm)</td>
<td>0.062 to 0.125 (1.6 to 3.2)</td>
<td>0.062 to 0.125 (1.6 to 3.2)</td>
<td>0.125 to 0.188 (3.2 to 4.8)</td>
<td>0.125 to 0.188 (3.2 to 4.8)</td>
</tr>
<tr>
<td>Tube Wall Thickness Supported - Inch (mm)</td>
<td>0.093 to 0.250 (0.37 to 1.0)</td>
<td>0.093 to 0.250 (0.37 to 1.0)</td>
<td>0.093 to 0.250 (0.37 to 1.0)</td>
<td>0.093 to 0.250 (0.37 to 1.0)</td>
</tr>
<tr>
<td>Media Pressure Maximum - psig (barg)</td>
<td>23 (1.6)</td>
<td>28 (2.0)</td>
<td>90 (6.2)</td>
<td>150 (10.5)</td>
</tr>
<tr>
<td>Recommended Tubing Diameter</td>
<td>Up to 65 Shore A</td>
<td>Up to 75 Shore A</td>
<td>Up to 65 Shore A</td>
<td>Up to 75 Shore A</td>
</tr>
<tr>
<td>Motor Frame Size</td>
<td>Nema 8</td>
<td>Nema 8</td>
<td>Nema 11</td>
<td>Nema 11</td>
</tr>
<tr>
<td>Motor Configuration - Single/Double Stack</td>
<td>Single</td>
<td>Double</td>
<td>Single</td>
<td>Double</td>
</tr>
<tr>
<td>Pinch Force - Linear</td>
<td>Up to 5 (2.3)</td>
<td>Up to 10 (4.5)</td>
<td>Up to 15 (6.8)</td>
<td>Up to 30 (13.6)</td>
</tr>
<tr>
<td>Stroke - Inch (mm)</td>
<td>0.500 (12.7)</td>
<td>0.500 (12.7)</td>
<td>0.500 (12.7)</td>
<td>0.500 (12.7)</td>
</tr>
<tr>
<td>Safety Features</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Recommended Panel Thickness</td>
<td>0.093 to 0.250 (0.37 to 1.0)</td>
<td>0.093 to 0.250 (0.37 to 1.0)</td>
<td>0.093 to 0.250 (0.37 to 1.0)</td>
<td>0.093 to 0.250 (0.37 to 1.0)</td>
</tr>
<tr>
<td>Weight - oz (g)</td>
<td>3.0 (85)</td>
<td>4.1 (120)</td>
<td>8.2 (230)</td>
<td>10.2 (285)</td>
</tr>
<tr>
<td>Pinch Force - Linear</td>
<td>4.4 (125)</td>
<td>5.5 (155)</td>
<td>13.3 (350)</td>
<td>15.0 (405)</td>
</tr>
<tr>
<td>Length - Inch (mm)</td>
<td>7.6 (194)</td>
<td>8.2 (208)</td>
<td>10.9 (277)</td>
<td>11.7 (297)</td>
</tr>
<tr>
<td>Width and Depth - Inch (mm)</td>
<td>3.0 (77)</td>
<td>4.3 (109)</td>
<td>6.0 (152)</td>
<td>7.0 (178)</td>
</tr>
<tr>
<td>Encoder</td>
<td>Differential 1000 Line</td>
<td>Differential 1000 Line</td>
<td>Differential 1000 Line</td>
<td>Differential 1000 Line</td>
</tr>
<tr>
<td>Standard Supply Power - Ampere</td>
<td>1 Amps</td>
<td>2 Amps</td>
<td>5 Amps</td>
<td>5 Amps</td>
</tr>
<tr>
<td>Input Control Analog Signal Options</td>
<td>0-10 VDC, 4-20 mA</td>
<td>0-10 VDC, 4-20 mA</td>
<td>0-10 VDC, 4-20 mA</td>
<td>0-10 VDC, 4-20 mA</td>
</tr>
<tr>
<td>Stepper Type</td>
<td>2-Phase 1.8 Step Angle</td>
<td>2-Phase 1.8 Step Angle</td>
<td>2-Phase 1.8 Step Angle</td>
<td>2-Phase 1.8 Step Angle</td>
</tr>
<tr>
<td>Standard Electrical Connections</td>
<td>2 wire DC power, 2 wire analog Input Signal</td>
<td>2 wire DC power, 2 wire analog Input Signal</td>
<td>2 wire DC power, 2 wire analog Input Signal</td>
<td>2 wire DC power, 2 wire analog Input Signal</td>
</tr>
<tr>
<td>Ambient Temp Maximum - °C (°F)</td>
<td>50 (122)</td>
<td>50 (122)</td>
<td>50 (122)</td>
<td>50 (122)</td>
</tr>
<tr>
<td>Standard Supply Power - Voltage</td>
<td>24 VDC</td>
<td>24 VDC</td>
<td>24 VDC</td>
<td>24 VDC</td>
</tr>
<tr>
<td>Tube Loading</td>
<td>Side Load Snap In</td>
<td>Side Load Snap In</td>
<td>Side Load Snap In</td>
<td>Side Load Snap In</td>
</tr>
<tr>
<td>Tube Materials</td>
<td>C-Flex, PharMed, Tygon, Pharma, Silicone, Braid Reinforced</td>
<td>C-Flex, PharMed, Tygon, Pharma, Silicone, Braid Reinforced</td>
<td>C-Flex, PharMed, Tygon, Pharma, Silicone, Braid Reinforced</td>
<td>C-Flex, PharMed, Tygon, Pharma, Silicone, Braid Reinforced</td>
</tr>
<tr>
<td>Noise</td>
<td>50 dBA</td>
<td>50 dBA</td>
<td>50 dBA</td>
<td>50 dBA</td>
</tr>
<tr>
<td>Compliance</td>
<td>RoHS, CE</td>
<td>RoHS, CE</td>
<td>RoHS, CE</td>
<td>RoHS, CE</td>
</tr>
</tbody>
</table>

For further information, visit www.imi-precision.com and use the new improved search function. If you cannot see the option you require please contact us.
Flow vs. Pressure Curves

The following charts show flow vs. pressure for four (4) different valve/tube sizes. For additional information on tube sizes, contact IMI Customer Service at Acro-Sales@IMI-Precision.com or (925)-676-8828 (or 800-672-2276).

Flow Curve using 0-10 VDC and 4-20 mA - NEMA 8 Double Stack

Model PE903 - PPV Electric
Flow vs Pressure Curves

Flow Curve using 0-10 VDC and 4-20 mA - NEMA 17 Double Stack

Model PE916 - PPV Electric
Flow vs Pressure Curves

Flow Curve using 0-10 VDC and 4-20 mA - NEMA 11 Double Stack

Model PE908 - PPV Electric
Flow vs Pressure Curves

Flow Curve using 0-10 VDC and 4-20 mA - NEMA 23 Double Stack

Model PE926 - PPV Electric
Flow vs Pressure Curves

Flow Curves Continued
### How To Specify

#### PE902 and PE903 Model Dimensions

| Valve Part Number | Valve Description | A | B | C | D | E | F | G | H | J | K | L | M | N | P | Q |
|-------------------|-------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PE902-10008       | PE902E1-24005AB050-NS040 | 3.305 | 1.960 | 1.345 | 0.444 | 0.870 | 0.635 | 0.690 | 0.939 | 48 | 1.048 | 0.088 | 0.125 | 1.000 | 4-40UNC | 1.230 |
| PE903-10010       | PE903E1-24010AB050-NS040 | 3.734 | 2.369 | 1.345 | 0.444 | 0.870 | 0.635 | 0.690 | 0.939 | 48 | 1.103 | 0.132 | 0.187 | 1.000 | 4-40UNC | 1.230 |

### How To Specify

#### PE904, PE906, and PE908 Model Dimensions

| Valve Part Number | Valve Description | A | B | C | D | E | F | G | H | J | K | L | M | N | P | Q |
|-------------------|-------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PE904-10012       | PE904E1-24015AB050-NS040 | 4.235 | 2.565 | 1.670 | 0.570 | 1.200 | 1.030 | 1.135 | 2.020 | 48 | 1.105 | 0.175 | 0.250 | 1.000 | 8-32UNC | 1.940 |
| PE906-10014       | PE906E1-24030AB050-NS060 | 4.668 | 2.966 | 1.670 | 0.570 | 1.200 | 1.030 | 1.135 | 2.020 | 48 | 1.105 | 0.265 | 0.375 | 1.000 | 8-32UNC | 1.940 |
| PE908-10016       | PE908E1-24025AB050-NS080 | 4.668 | 2.966 | 1.670 | 0.570 | 1.200 | 1.030 | 1.135 | 2.020 | 48 | 0.890 | 0.350 | 0.500 | 1.000 | 8-32UNC | 1.940 |

### Valve Dimensions

| Valve Part Number | Valve Description | A | B | C | D | E | F | G | H | J | K | L | M | N | P | Q |
|-------------------|-------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PE904-10008       | PE904E1-24015AB050-NS040 | 107.6 | 65.2 | 42.4 | 14.5 | 30.5 | 26.2 | 28.8 | 51.3 | 1219.2 | 28.1 | 4.4 | 6.4 | 40.6 | 8-32UNC | 49.3 |
| PE906-10014       | PE906E1-24030AB050-NS060 | 118.6 | 76.1 | 42.4 | 14.5 | 30.5 | 26.2 | 28.8 | 51.3 | 1219.2 | 28.1 | 6.7 | 9.5 | 40.6 | 8-32UNC | 49.3 |
| PE908-10016       | PE908E1-24025AB050-NS080 | 118.6 | 76.1 | 42.4 | 14.5 | 30.5 | 26.2 | 28.8 | 51.3 | 1219.2 | 28.1 | 8.9 | 12.7 | 40.6 | 8-32UNC | 49.3 |

### Description

- **Valve Body**: 6061 - T6 Aluminum, Black Anodized
- **Pinch Blade/Head**: 6061 - T6 Aluminum, Black Anodized
- **Pinch Ridge/Pin**: 316 Stainless Steel
- **Mounting Flange (Part of Valve Body)**: 6061 - T6 Aluminum, Black Anodized
- **Panel Mount Gasket/Seal**: Silicone
- **Wiper Seal (O-Ring)**: Buna-N
- **Motor (Enclosure)**: Aluminum
- **Captive Drive (Enclosure)**: N/A

For further information, visit [www.imi-precision.com](http://www.imi-precision.com) and use the new improved search function. If you cannot see the option you require please contact us.
How To Specify

**PE912 and PE916 Model Dimensions**

**PE926 Model Dimensions**

**Valve Dimensions**

<table>
<thead>
<tr>
<th>Valve Part Number</th>
<th>Valve Description</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
<th>J</th>
<th>K</th>
<th>L</th>
<th>M</th>
<th>N</th>
<th>P</th>
<th>Q</th>
</tr>
</thead>
<tbody>
<tr>
<td>PE912-10018</td>
<td>PE912E1-24025AB1000-NS080</td>
<td>194.1</td>
<td>126.4</td>
<td>67.7</td>
<td>8.0</td>
<td>42.1</td>
<td>43.2</td>
<td>63.1</td>
<td>56.5</td>
<td>1219</td>
<td>44.7</td>
<td>9.5</td>
<td>15.1</td>
<td>76.2</td>
<td>8-32 UNC</td>
<td>63.5</td>
</tr>
<tr>
<td>PE916-10020</td>
<td>PE916E1-24030AB1000-NS080</td>
<td>208.0</td>
<td>140.4</td>
<td>67.7</td>
<td>8.0</td>
<td>42.1</td>
<td>43.2</td>
<td>63.1</td>
<td>56.5</td>
<td>1219</td>
<td>39.0</td>
<td>15.2</td>
<td>25.4</td>
<td>76.2</td>
<td>8-32 UNC</td>
<td>63.5</td>
</tr>
</tbody>
</table>

**Description**

<table>
<thead>
<tr>
<th>Material</th>
<th>Valve Body</th>
<th>6061 - T6 Aluminum, Black Anodized</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pinch Blade/Head</td>
<td>6061 - T6 Aluminum, Black Anodized</td>
</tr>
<tr>
<td></td>
<td>Pinch Ridge/Pin</td>
<td>6061 - T6 Aluminum, Black Anodized</td>
</tr>
<tr>
<td></td>
<td>Mounting Flange</td>
<td>6061 - T6 Aluminum, Black Anodized</td>
</tr>
<tr>
<td></td>
<td>Safety Cover</td>
<td>6061 - T6 Aluminum, Black Anodized</td>
</tr>
<tr>
<td>Panel Mount Gasket/Seal</td>
<td>Silicone</td>
<td></td>
</tr>
<tr>
<td>Wiper Seal (O-Ring)</td>
<td>Buna-N</td>
<td></td>
</tr>
<tr>
<td>Motor (Enclosure)</td>
<td>Aluminum</td>
<td></td>
</tr>
<tr>
<td>Captive Drive (Enclosure)</td>
<td>Aluminum</td>
<td></td>
</tr>
</tbody>
</table>

**Material**

- Aluminum Model - PE912 (Single Stack) & PE916 (Double Stack)

For further information, visit www.imi-precision.com and use the new improved search function. If you cannot see the option you require please contact us.
How To Specify

PEC 9 Dimensions

Controller Part Number | Controller Description | A | B | C | D | E | F | G
--- | --- | --- | --- | --- | --- | --- | ---
PEC9XXX-XXXXX | PEC9 NEMA-XXXXXX-XXX-XXXX | 0.054 | 0.240 | 0.102 | 3.800 | 4.200 | 1.100 | 3.200

Controller Part Number | Controller Description | A | B | C | D | E | F | G
--- | --- | --- | --- | --- | --- | --- | ---
PEC9XXX-XXXXX | PEC9 NEMA-XXXXXX-XXX-XXXX | 5.2 | 6.1 | 2.6 | 96.5 | 106.7 | 27.9 | 81.3

How To Specify

Pinch Valve Controller - PEC-9

We are pleased that you chose the IMI-Concord Proportional Pinch Valve (PPV) electric and controller. Where the pinch valve is the heart and soul (or brawn) of our proportional pinch valve system, the controller is the brains behind its robust, accurate and reliable performance.

The PEC-9 was created to work with precision stepper motors to optimize performance for short strokes and precise moves which is ideal for proportional fluid control. Another advantage is the ability to manage low end torque for holding position and high thrust loads (think high media pressures and hard tubing). The controller is designed for bipolar motors.

Optimum performance is achieved with closed loop control. With the PEC-9’s dynamic input response, you will see real-time reaction and actuator adjustment in response to your input signal/system changes. Analog input is scalable. Standard options are 0-10 VDC or 4-20 mA.

On board thrust and speed monitoring reduce stalling and damage to the actuator due to overthrust. Variable current control provides energy efficiency and heat control for high duty applications.

Mounting options include foot mount slots and DIN rail mountable (35mm). Connectivly is made simple by use of Phoenix style connectors. A number of connector port options are available as customs (USB for factory programing and User Interface, General purpose I/O, I/O ports – Sinking inputs and sourcing outputs, Opto Isolated outputs).
How To Specify

● Cables

All electric PPV's are supplied with a cable kit, which is all you need for quick set-up and operation. You'll receive 3 primary cables (Power, Encoder and Input). There is a fourth cable (Motor) which comes attached to the motor.

Connectivity to the controller is made easy by use of Phoenix style connectors. Standard cable length is 4 feet. Consult factory for custom lengths.

Of the 4 cables 2 are connected to device and 2 are customer interface. Cable #1 is permanently connected to motor. Cable #2 through #4 is provided in a cable kit.

They are listed below;

**Device to Device**

- **Cable #1:** Motor Cable (motor to PEC-9) Motor leads are wire gauge is 18-20.
- **Cable #2:** Encoder Cable (encoder to PEC-9) Encoder cable is shielded and is 18-20 gauge.
- **Cable #3:** Power Cable (PEC-9 to customer 24 VDC power) Power cable is shielded and is 18-20 gauge.
- **Cable #4:** Input Cable (PEC-9 to customer 0-10 VDC or 4-20 mA input) Input cable cable is shielded and is 18-20 gauge.

**Customer Interface**

- **Cable #5:** Encoder Cable for EF (NEMA 8 Motors)
- **Cable #6:** Encoder Cable for EF (NEMA 11, 17 and 23 Motors)

**Cable Kit - 3 Cables**

- Encoder cable for EF (NEMA 11, 17 and 23 Motors)
- Cable for EF (NEMA 8 Motors)
- Encoder cable for EF (NEMA 8 Motors)

How to Order

An example of a basic PE900 Series Proportional Pinch Valve shows a valve with a 1,000” O.D. tube slot, 24 VDC operating power, 50 lbs of pinch force, aluminum pinch head, 1,000” motor stroke, single tube slot, and a NEMA 17 double stack shown below.

<table>
<thead>
<tr>
<th>valve Type</th>
<th>Model Description for PE900 Pinch Valve</th>
</tr>
</thead>
<tbody>
<tr>
<td>PE</td>
<td>Electric PPV consists of an alphanumeric cluster designating valve type, valve family, feedback option, operating power, color, normal state, tube slot size, force specification, body material, motor full stroke, tube slot and motor model, which together make up the complete part number to use in ordering. Use the ordering information below to build a valid part number. Standard part numbers are listed below.</td>
</tr>
</tbody>
</table>

**How To Specify**

- **Valve Type:** PE
- **Valve Family:** Proportional Electric
- **Tube Slot Size:** 24 24 VDC
- **Encoder Option:** 050 0.500”
- **Normal State:** 1500 1.500”
- **Color:** A Aluminum
- **Body Material:** S Stainless Steel
- **Motor Full Stroke:** 24 24 VDC
- **Body Design:** A Aluminum
- **Motor Model:** PE900-10008 PE900E4-24005AB0500-NS08S
- **Operating Power:** 005 >5 up to 6 lbs
- **Operational Power Supply:** 010 >10 up to 11 lbs
- **Feedback Option:** 015 >15 up to 16 lbs
- **Normal State:** 025 >25 up to 26 lbs
- **24 VDC Power Supply:** 030 >30 up to 31 lbs
- **Feedback Option:** 050 >50 up to 51 lbs
- **Calibration:** 100 >100 up to 101 lbs
- **Calibration:** N Not Applicable

**How to Order**

- **Standard Part Number:** PE900-10008 PE900E4-24005AB0500-NS08S
- **Part Description:** PE900E4-24005AB0500-NS08S
How to Order

Example of a basic PEC9 Controller. Product Key Number shows a double stack NEMA 17 motor frame, voltage for input type, input range of 10 VDC, 100% of full stroke and 1.007” motor full stroke, just to name some of the features on the model.

PEC9D17 - D24V10 - 100 - 1000

- Motor Full Stroke
  - 0500
  - 1000
  - 1500

- % of Stroke
  - 100
  - 50%
  - Full Stroke

- Input Voltage
  - 05
  - 10
  - 20

- A Current
  - 20 mA

- Motor Voltage
  - 24 VDC

How to Customize

- Pinch Gap
  - All PEC900 Models have a mechanical gap between opposing pinch surfaces. The gaps are set for standard tube wall thicknesses listed on the Specifications chart. There are production tolerances for the pinch gap. Closed loop control compensates for most of the fluid system variables including pinch gap tolerances. Open loop control, depending on system setup can be more sensitive to pinch gap variations. If you feel you need tighter pinch gap control, we can help you optimize the gap.

- Actuator Resolution
  - PE900 Series has a number of standard control programs (software) covering all actuator sizes, stack heights and input signals. For critical applications it may be necessary to increase resolution to achieve specific performance points. We use a relationship between the tubing OD and actuator stroke to improve resolution. We define the relationship as a percentage, and it is used to define resolution for a given input signal range. For example; an actuator with a 1.0” stroke pinching a 1.0” tube would use a 100% program over a range of 0-10 VDC input signal to achieve standard resolution (still very high). If the same actuator, and input signal used a 50% program you would double the resolution. With a 50% program you divide the stroke in half and achieve higher resolution by applying 0-5 VDC over 50% of the stroke. In most cases the reduced stroke does not affect overall flow or pressure capability.

- Custom Materials
  - Standard construction of the PE900 Models are similar to our popular pneumatic pinch valve line which perform great for most applications. Typical mounting is through panel with the main body and pinching area front of panel for easy cleaning and tube loading. These critical surfaces are made from hard coated black anodized aluminum, silicone (mounting seal/gasket) and nitrile (wiper seal). For higher end applications like sterilization or harsh environments we can offer 316L Stainless Steel instead of Aluminum and Viton or other elastomer instead of silicone and nitrile.

- Custom Machined Body/Tube Slot
  - Our standard Body mounting arrangement and Tube Slots work well for the majority of applications. They are designed for easy loading of flexible tubing into our “snap in” tube slot and provides positive tubing retention during operation. But we may want to load tubing differently or provide your own retention. So if your application requires a different geometry or configuration for the body (mounting, projection from panel, shaped or different tube slot (size, shape, retention, or no slot at all) please let us know. We have not done them all, but we have done enough to be confident we can help you. For further customization, contact the factory.

- Custom Software Programs
  - Beyond higher actuator resolutions the PE980 has other parameters that can be adjusted to meet your requirements. Custom programs can include; changes to speed, acceleration, tube settings and move sequence. We can also enable optional controller I/O’s. Each input/output port can be configured for your needs and requires the setting of power and control limits.

- Custom Cabling
  - The standard cable set provided with the PE980-Series will allow you to get set up and running for test. At 4 foot in length it will allow you options in component spacing and proper routing of cables in your system/cabinet. Our typical request for custom cabling is different lengths. We can do this and more. Let us know if you have special jacket, insulation or connector requirements. We will do our best to meet your needs.

- Actuator Resolution
  - PE900 Series has a number of standard control programs (software) covering all actuator sizes, stack heights and input signals. For critical applications it may be necessary to increase resolution to achieve specific performance points. We use a relationship between the tubing OD and actuator stroke to improve resolution. We define the relationship as a percentage, and it is used to define resolution for a given input signal range. For example; an actuator with a 1.0” stroke pinching a 1.0” tube would use a 100% program over a range of 0-10 VDC input signal to achieve standard resolution (still very high). If the same actuator, and input signal used a 50% program you would double the resolution. With a 50% program you divide the stroke in half and achieve higher resolution by applying 0-5 VDC over 50% of the stroke. In most cases the reduced stroke does not affect overall flow or pressure capability.

- Custom Materials
  - Standard construction of the PE900 Models are similar to our popular pneumatic pinch valve line which perform great for most applications. Typical mounting is through panel with the main body and pinching area front of panel for easy cleaning and tube loading. These critical surfaces are made from hard coated black anodized aluminum, silicone (mounting seal/gasket) and nitrile (wiper seal). For higher end applications like sterilization or harsh environments we can offer 316L Stainless Steel instead of Aluminum and Viton or other elastomer instead of silicone and nitrile.

- Custom Cabling
  - The standard cable set provided with the PE980-Series will allow you to get set up and running for test. At 4 foot in length it will allow you options in component spacing and proper routing of cables in your system/cabinet. Our typical request for custom cabling is different lengths. We can do this and more. Let us know if you have special jacket, insulation or connector requirements. We will do our best to meet your needs.

- Actuator Resolution
  - PE900 Series has a number of standard control programs (software) covering all actuator sizes, stack heights and input signals. For critical applications it may be necessary to increase resolution to achieve specific performance points. We use a relationship between the tubing OD and actuator stroke to improve resolution. We define the relationship as a percentage, and it is used to define resolution for a given input signal range. For example; an actuator with a 1.0” stroke pinching a 1.0” tube would use a 100% program over a range of 0-10 VDC input signal to achieve standard resolution (still very high). If the same actuator, and input signal used a 50% program you would double the resolution. With a 50% program you divide the stroke in half and achieve higher resolution by applying 0-5 VDC over 50% of the stroke. In most cases the reduced stroke does not affect overall flow or pressure capability.

- Custom Materials
  - Standard construction of the PE900 Models are similar to our popular pneumatic pinch valve line which perform great for most applications. Typical mounting is through panel with the main body and pinching area front of panel for easy cleaning and tube loading. These critical surfaces are made from hard coated black anodized aluminum, silicone (mounting seal/gasket) and nitrile (wiper seal). For higher end applications like sterilization or harsh environments we can offer 316L Stainless Steel instead of Aluminum and Viton or other elastomer instead of silicone and nitrile.
Custom Pinch Valves

Need a custom designed pinch valve or fluidic assembly? Let IMI’s team of experienced engineers work closely with you to produce a solution that fits your exact specifications and needs. We use current engineering software and have successfully designed hundreds of custom solutions for customers for over 30 years.

Complementary products:
- Accessories
- Manifolds
- Fittings

For further information, visit www.imi-precision.com and use the new improved search function. If you cannot see the option you require please contact us.
IMI Precision Engineering operates four global centres of technical excellence and a sales and service network in 50 countries, as well as manufacturing capability in the USA, Germany, China, UK, Switzerland, Czech Republic, Mexico and Brazil.

For information on all IMI Precision Engineering companies visit www.imi-precision.com

Supported by distributors worldwide.