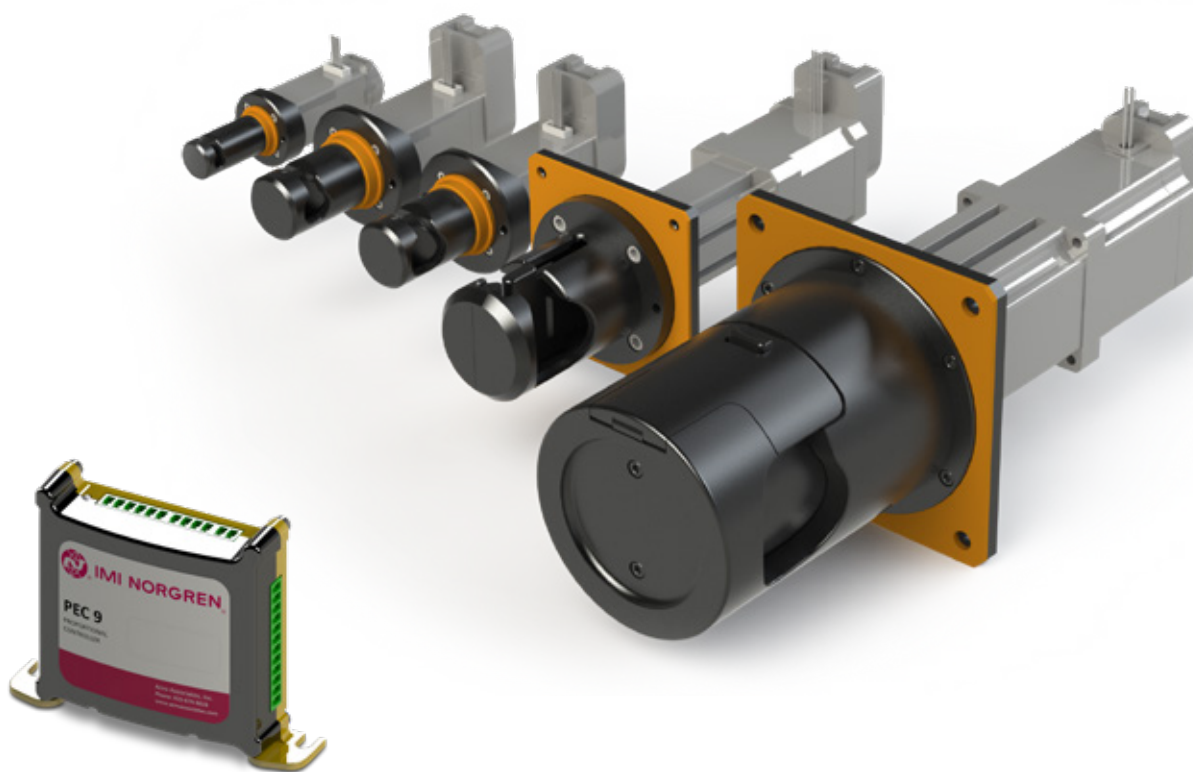


Acro PE900 Series

Proportional Pinch Valve

System Electric



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Breakthrough Engineering for a Better World

Norgren is part of global engineering organisation IMI plc. IMI is at the forefront of delivering the solutions we need in a changing world and is focused on **creating tremendous value by solving key industry problems** in attractive markets and employing the best.

Norgren has a proud history of creating innovative engineering solutions in precise motion control and fluid technology, and we collaborate with our customers across more than 50 countries in critical areas such as Factory Automation, Material Handling, Rail, Energy, Process Control, Life Science and Commercial Vehicles.

From improving speed, productivity, reliability and efficiency of equipment, to generating significant energy and cost savings, or lowering total cost of ownership across many industries, Norgren's high-quality solutions are designed to help customers pursue progress, achieve new goals and overcome problems.

With market-leading industry expertise, we offer the capability, resources, engineering intelligence and global support infrastructure to tackle the largest project demands.

Our world-class portfolio of fluid and motion control products include Norgren, Bimba, Buschjost, FAS, Herion, Kloehn and Maxseal. Supplied either individually or combined into powerful customised solutions to meet customer needs.

Breakthrough engineering you can count on.



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).

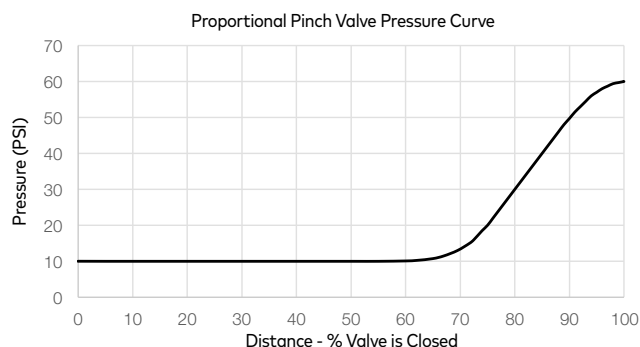
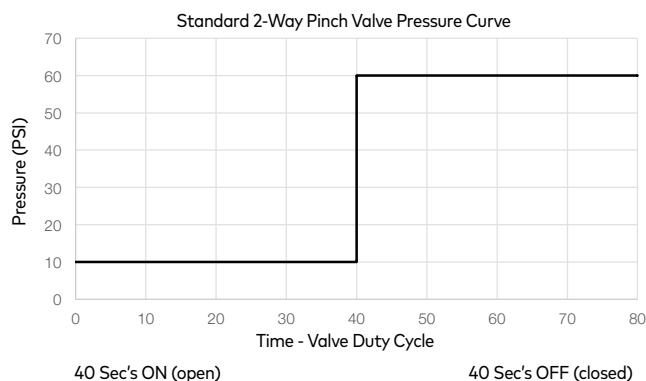
Why Use Pinch Valves?

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.)

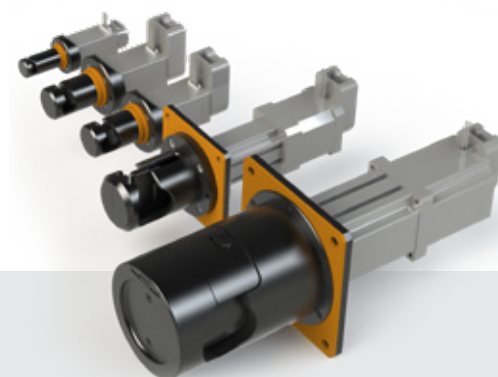
Unlike traditional valves, pinch valves feature a straight-through flow, very little pressure drop over the valve, and full shut-off of media in the tube, making it the most practical and efficient solution for various ON/OFF flow control applications

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.



**Pneumatic or Solenoid
Pinch Valves (NC/NO)**



**Electric Operated Proportional
Controlled Pinch Valves**

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.

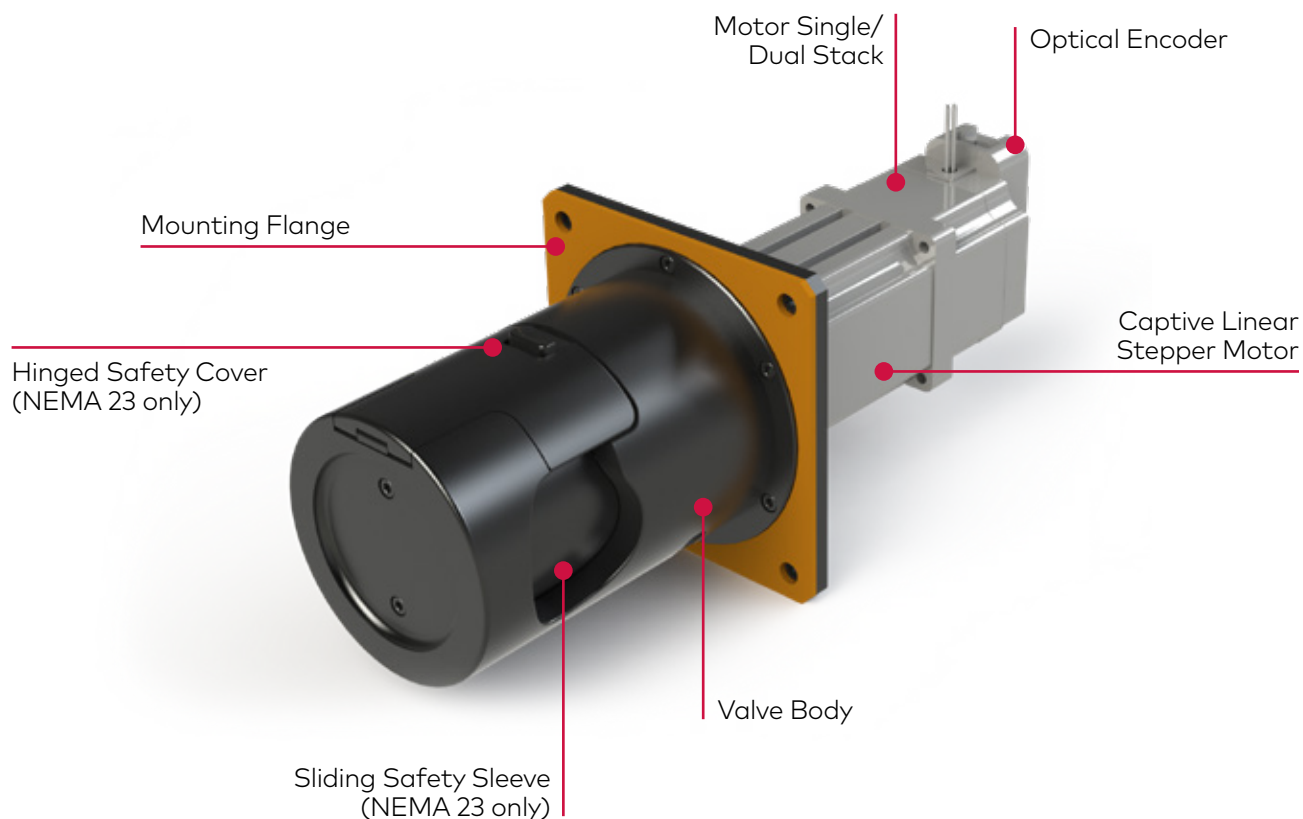
The PE900 Series is a robust and flexible fluid management system to meet your critical requirements and is ideal for Bio-Pharma, Bio-Processing and Food and Beverage applications, or anywhere sterility and high performance are needed.

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
- » Maximize productivity
- » Reduced valve costs
- » Valve body not affected by corrosive fluids
- » Requires very low maintenance



Product Features



Features and Benefits

Complete System Features:

- » Provides a robust solution for accurate closed loop proportional control and precision fluid management
- » Dependable, compact and cost-effective solution
- » Pinch head designed for wash down and clean rooms
- » Controls high media/fluid pressures up to 75 psig (5.2 barg)
- » Flexible tubing sizes from 0.063" to 1.625" O.D.
- » Support tubing durometer up to 75 Shore A

Motor/Controller Benefits:

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

Pinch Valve Benefits:

- » Designed for Bio-Pharma, Bio-Processing, Food and Beverage, Industrial applications where sterility 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

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.

Materials of Construction

Description	Material	
	Aluminum Model - NEMA 8, 11, 17 and 23	Stainless Steel Model - NEMA 8, 11, 17 and 23*
Body	6061 - T6 Aluminum, Black Anodized	316 Stainless Steel
Piston Blade	6061 - T6 Aluminum, Black Anodized	316 Stainless Steel
Pinch Ridge	6061 - T6 Aluminum, Black Anodized	316 Stainless Steel
Body Plate	6061 - T6 Aluminum, Black Anodized	316 Stainless Steel
Mounting Plate	6061 - T6 Aluminum, Black Anodized	316 Stainless Steel
Safety Cover	Acetal/6061 - T6 Aluminum, Black Anodized	316 Stainless Steel
Mounting Gasket	Silicone	Silicone
O-Ring	Buna-N	Viton
Motor (Enclosure)	Aluminum	Aluminum

Note: * Stainless steel is a non-standard product

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 compressed by roller pumps and pinch valves. Also call "pump tubing". Maximum recommended hardness up to 75 durometer. The hardness scale is Shore A.
Media Pressure	Pressure of fluid passing through the tubing to be pinched.
Wash down	Equipment cleaning procedure for critical applications such as bioprocessing, pharmaceuticals and food and beverage.
Disposable /Single Use	Tubing, tube-sets, cassettes or manifolds intended for one time use to maintain sterility of flow path for each process or patient use.
Captive Linear Stepper Motor	A specialized motor configuration, combining a rotary stepper motor with a captive lead screw. Design is capable of precise linear positioning and high thrust output in a relatively small package size.
Optical Encoder	Electromechanical device that converts angular position of the motor shaft to an electrical output. Used with software to track rotary position of the stepper motor.
Thrust Loads	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/position 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.

How It's Used

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 critical system data to a logic device. The logic device provides real-time updates to the PE900 (with dynamic input response) to maintain or move valve position based on system changes.

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.

Advantages

The PE900-Series is designed for use for critical closed loop applications such as Bio-Processing, Clean Room and Medical. These have a rugged construction leveraged off our proven PE900 series pneumatic designs and years of experience in the fluid control/pinch valve industries. Can be used for wash down applications and has fully removeable heads for sterilizaion on model PE912, PE916 and PE926. This product accommodates the widest range of flow and pressure requirements available in an electric proportional pinch valve. Including tubing from 1/16" OD to 1-5/8" OD. Supporting the highest media pressures up to 5.2 barg (75 psig). The PE900's utilize 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). 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 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.

Feature	Advantage	Benefit
Designed for closed loop control	Allows system automation	Provides the most accurate and predictable performance
Rugged construction	Offers enhanced strength and durability	Can pinch larger OD tube sizes, higher durometer tube material and higher media pressure
Washdown compatible	Fully removable pinch heads (PE912, PE916 and PE926)	Easy to clean and sterilize valve for new batch run setups
Wide range of tubing sizes	Can support tubing from 0.063" OD to 1.625" OD	Provides greater flexibility and covers a wide range of applications
Low torque management	Utilizes smart stepper motors	Provides optimal performance for short strokes and precise moves which is ideal for proportional fluid control and has ability to manage low end torque for holding position and high thrust loads
Auto Homing	Sets actuator position upon startup	High position repeatability from homing and rotary encoder feedback
Dynamic input response	Real time response to system changes	Adapts to changes in system conditions based on an analog signal from a logic device or other input
Intelligent control	All components working together	Valve, controller, and software providing high linear resolution and repeatability to improve your batch yield efficiency and quality
Thrust and speed monitoring	On board monitoring of actuator performance	Reduces stalling and damage to the actuator due to overthrust
Variable current control	Designed for high duty applications	Provides energy efficiency and heat control in extreme conditions

Markets

- » Biotechnology
- » Pharmaceuticals
- » Medical devices
- » Diagnostics
- » Bioreactors
- » Bioprocessing single use technology
- » Process equipment
- » Food and beverage
- » Filtration, TFF (Tangential Flow Filtration)
- » Dispensing, filling and mixing: Resin, glue, epoxy, adhesive, paint, slurries, and other media
- » Chromatography - analyzers
- » Chemical processing equipment



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 just not 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 to 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 process 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.
- » Allows process monitoring and automation.
- » Closed loop control. Offers the most accurate and predictable performance.
- » Dynamic Input Response adapts to changes in system conditions based on an analog signal from logic or other input device

How To Customize

The valve system comes with various features and additional options are available upon request, such as:

- » Pinch gap optimization
- » Custom stroke length of the captive drive
- » Custom programs for the PEC-9 controller
- » Special cable lengths
- » Custom materials (316L stainless steel)

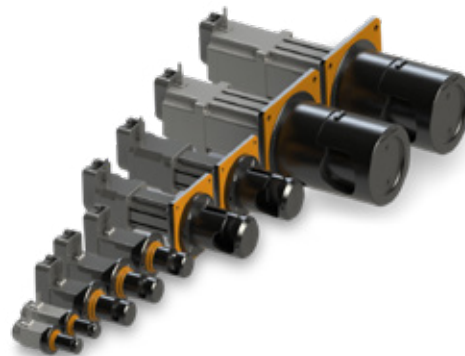
Additional information in regards to customization can be found in the "How to Customize" section on page 25.

How To Specify

Brief Product Overview

Key specification information for the PE900-Series Proportional Pinch Valve Electric is given below.

For additional specification information, please contact IMI Customer Service at Acro-Sales@IMI-Precision.com or (925)-676-8828 (or 800-672-2276).



Mechanical & Electrical	Model Number PE902/PE903	Model Number PE904/PE906/PE908	Model Number PE912/PE916	Model Number PE926
Tube Size O.D. - Inch (mm)	0.063 to 0.188 (1.6 to 4.8)	0.158 to 0.500 (4.0 to 12.7)	0.500 to 1.000 (12.7 to 25.4)	1.000 to 1.625 (25.4 to 41.3)
Tube Wall Thickness Supported - Inch (mm)	0.016 to 0.063 (0.2 to 1.6)	0.031 to 0.063 (0.8 to 1.6)	0.063 to 0.125 (1.6 to 3.2)	0.125 to 0.188 (3.2 to 4.8)
Media Pressure Maximum - psig (barg)	30 (2.1)	45 (3.1)	60 (4.1)	75 (5.2)
Recommended Tubing Durometer	Up to 75 Shore A	Up to 75 Shore A	Up to 75 Shore A	Up to 75 Shore A
Motor Frame Size	Nema 8	Nema 11	Nema 17	Nema 23
Pinch Force - Linear - Lbs (KgF)	Up to 10 (4.5)	Up to 30 (13.6)	Up to 50 (22.7)	Up to 100 (45.4)
Encoder	Differential 500 Line	Differential 1000 Line	Differential 1000 Line	Differential 1000 Line
Stepper Type	2-Phase 1.8 Step Angle	2-Phase 1.8 Step Angle	2-Phase 1.8 Step Angle	2-Phase 1.8 Step Angle

Product Selection Guide

Sizing and specifying your Proportional Pinch Valve

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 and temperature.
- » Durometer - Select a durometer per the recommendations listed.

Media Pressure

Make sure your pressure is within the maximum listed value. You may need to move up to the next larger model. Note motor stack heights. In general single stacks are for lower pressures and double stacks are for higher pressures.

Power

Standard supply power is 24 VDC. Amperage can be from 1.0 to 5.0 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 4-20 mA options.

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 have specialized software programs.

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.

Product Selection Guide

The following product selection guide is used in selecting a proper tube for your application. The product selection guide shows a selection of tubes in several diameters, tube wall thickness, and various materials. The flow curves show flow vs. pressure for four (4) different valve/tube sizes.

Using the application information, you will be able to select a tube with the correct outside/inside diameter and the proper material for your application which results in selecting the correct valve size. 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).

Product Selection Guide										
Valve Model	Valve Model Accommodates Tubing Outer Diameter Range In. (mm)	Tube Wall Thickness Supported In. (mm)	No.	Tubing O.D. In. (mm)	Tubing I.D. In. (mm)	Material	Durometer (Shore A)	Manufacturer Max. Working Pressure psig (Barg)	Maximum Tested Media Pressure psig (Barg)**	Valve Part Number
PE902	0.063 to 0.125 (1.6 to 3.2)	0.016 to 0.031 (0.4 to 0.8)	1	0.125 (3.2)	0.063 (1.6)	Silicone	50	10 (0.69)	10 (0.69)	PE902-10008
			2			Pharmed	64	24 (1.65)	24 (1.65)	
			3			C-Flex	62	25 (1.72)	25 (1.72)	
PE903	0.063 to 0.125 (1.6 to 3.2)	0.031 to 0.063 (0.8 to 1.6)	1	0.188 (4.8)	0.125 (3.2)	Silicone	50	6 (0.41)	6 (0.41)	PE903-10010
			2			Pharmed	64	13 (0.90)	13 (0.90)	
			3			C-Flex	62	17 (1.17)	17 (1.17)	
PE904	0.158 to 0.250 (4.0 to 6.3)	0.031 to 0.063 (0.8 to 1.6)	1	0.250 (6.4)	0.125 (3.2)	Silicone	50	10 (0.69)	10 (0.69)	PE904-10012
			2			Pharmed	64	24 (1.65)	24 (1.65)	
			3			C-Flex	62	35 (2.41)	35 (2.41)	
PE906	0.250 to 0.375 (6.3 to 9.5)	0.031 to 0.063 (0.8 to 1.6)	1	0.375 (9.5)	0.25 (6.4)	Silicone	50	6 (0.41)	6 (0.41)	PE906-10014
			2			Pharmed	64	13 (0.90)	13 (0.90)	
			3			C-Flex	62	20 (1.38)	20 (1.38)	
PE908	0.375 to 0.500 (9.5 to 12.7)	0.031 to 0.063 (0.8 to 1.6)	1	0.5 (12.7)	0.375 (9.5)	C-Flex	62	17 (1.17)	17 (1.17)	PE908-10016
			2	0.5 (12.7)	0.25 (6.4)	Pharmed	64	24 (1.65)	24 (1.65)	
			3	0.5 (12.7)	0.25 (6.4)	Silicone Braided	65	140 (9.65)	72 (5.0)	
PE912	0.500 to 0.750 (12.7 to 19.1)	0.063 to 0.125 (1.6 to 3.2)	1	0.75 (19.1)	0.50 (12.7)	C-Flex	62	17 (1.17)	17 (1.17)	PE912-10018
			2			Tygon	66	30 (2.07)	30 (2.07)	
			3			Silicone Braided	65	130 (8.96)	72 (5.0)	
PE916	0.750 to 1.000 (19.1 to 25.4)	0.063 to 0.125 (1.6 to 3.2)	1	1.00 (25.4)	0.75 (19.1)	C-Flex	62	20 (1.38)	20 (1.38)	PE916-10020
			2			Tygon	66	25 (1.72)	25 (1.72)	
			3		0.625 (15.9)	Silicone Braided	65	100 (6.89)	72 (5.0)	
PE926	1.000 to 1.250 (25.4 to 31.8)	0.125 to 0.188 (3.2 to 4.8)	1	1.25 (31.8)	1.00 (25.4)	Tygon	66	20 (1.38)	20 (1.38)	PE926-10022
			2		0.875 (22.2)	Silicone Braided	65	70 (4.83)	70 (4.83)	
			3	1.125 (28.6)	0.75 (19.1)	Silicone Braided	65	90 (6.21)	72 (5.0)	
PE926	1.000 to 1.625 (25.4 to 41.3)	0.125 to 0.188 (3.2 to 4.8)	1	1.625 (41.3)	1.25 (31.8)	Tygon	66	20 (1.38)	20 (1.38)	PE926-10024
			2		1.25 (31.8)	Silicone Braided	65	55 (3.79)	55 (3.79)	
			3	1.44 (36.6)	1.00 (25.4)	Silicone Braided	65	60 (4.14)	60 (4.14)	

Specifications and Sizes

PE900 Series					
Specifications	PE902	PE903	PE904	PE906	PE908
Tube Size O.D. - Inch (mm)	0.063 to 0.125 (1.6 to 3.2)	0.125 to 0.188 (3.2 to 4.8)	0.158 to 0.250 (4.0 to 6.4)	0.250 to 0.375 (6.4 to 9.5)	0.375 to 0.500 (9.5 to 12.7)
Tube Wall Thickness Supported - Inch (mm)	0.016 to 0.031 (0.4 to 0.8)	0.031 to 0.063 (0.8 to 1.6)	0.031 to 0.063 (0.8 to 1.6)	0.031 to 0.063 (0.8 to 1.6)	0.063 to 0.125 (1.6 to 3.2)
Media Pressure Maximum - psig (barg)	15 (1.0)	30 (2.1)	30 (2.1)	45 (3.1)	45 (3.1)
Recommended Tubing Durometer	Up to 65 Shore A	Up to 75 Shore A	Up to 65 Shore A	Up to 75 Shore A	Up to 65 Shore A
Motor Frame Size	Nema 8	Nema 8	Nema 11	Nema 11	Nema 11
Motor Configuration - Single/ Double Stack	Single	Double	Single	Double	Double
Pinch Force - Linear - Lbs (KgF)	Up to 5 (2.3)	Up to 10 (4.5)	Up to 15 (6.8)	Up to 30 (13.6)	Up to 30 (13.6)
Stroke - Inch (mm)	0.500 (12.7)		0.500 (12.7)		
Safety Features	None	None	None	None	None
Recommended Panel Thickness	.093 to .250	.093 to .250	.093 to .250	.093 to .250	.093 to .250
Weight - oz. (g) Aluminum Model	3.0 (85)	4.1 (120)	8.2 (235)	10.0 (285)	10.0 (285)
Weight - oz. (g) Stainless Steel Model (Special)	4.4 (125)	5.5 (155)	13.3 (380)	15.0 (425)	14.8 (420)
Length - Inch (mm)	3.3 (84)	3.7 (95)	4.3 (108)	4.7 (119)	4.7 (119)
Width and Depth - Inch (mm)	1.3 (32) DIA		2.0 (50) DIA		
Encoder	Differential 500 Line		Differential 1000 Line		
Standard Supply Power - Amperage	1 Amps		2 Amps		
Input Control (Analog) Signal Options	0-10 VDC; 4-20 mA				
Stepper type	2-Phase 1.8 Step Angle				
Standard Electrical Connections	2 wire DC power, 2 wire analog Input Signal				
Ambient Temp Maximum - °C (°F)	50 (122)				
Standard Supply Power - Voltage	24 VDC				
Tube Loading	Side Load Snap in				
Tube Materials	C-Flex; PharMed; Tygon; Pharma; Silicone, Braid Reinforced				
Noise	50 dbA				
Compliance	RoHS; CE				

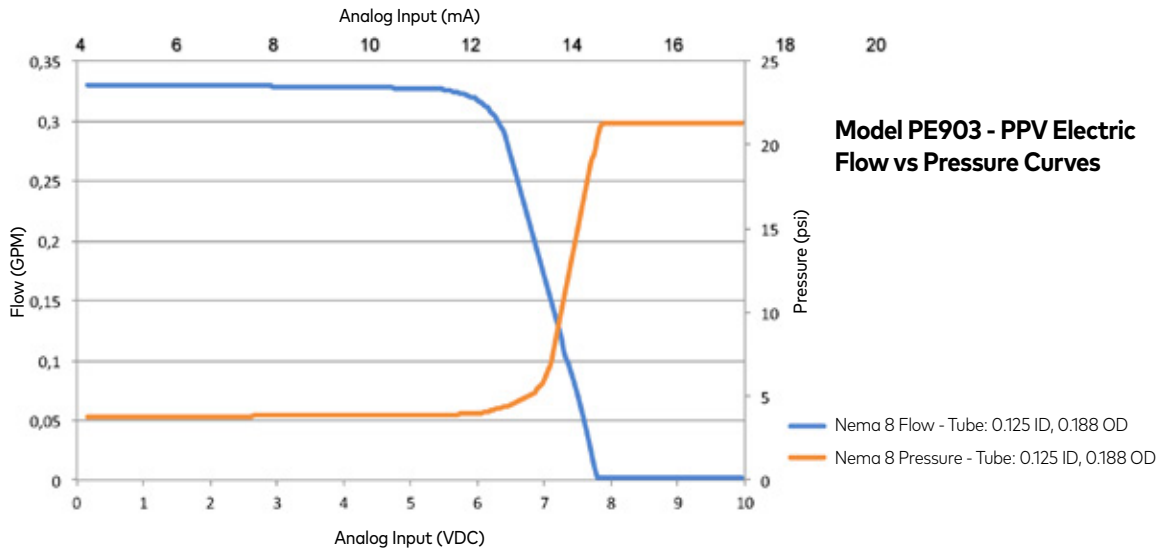
Specifications and Sizes

PE900 Series				
Specifications	PE912	PE916	PE926	PE926
Tube Size O.D. - Inch (mm)	0.500 to 0.750 (12.7 to 19.1)	0.750 to 1.000 (19.1 to 25.4)	1.000 to 1.250 (25.4 to 31.8)	1.000 to 1.625 (25.4 to 41.3)
Tube Wall Thickness Supported - Inch (mm)	0.063 to 0.125 (1.6 to 3.2)	0.063 to 0.125 (1.6 to 3.2)	0.125 to 0.188 (3.2 to 4.8)	0.125 to 0.188 (3.2 to 4.8)
Media Pressure Maximum - psig (barg)	45 (3.1)	60 (4.1)	60 (4.1)	75 (5.2)
Recommended Tubing Durometer	Up to 65 Shore A	Up to 75 Shore A	Up to 65 Shore A	Up to 75 Shore A
Motor Frame Size	Nema 17	Nema 17	Nema 23	Nema 23
Motor Configuration - Single/Double Stack	Single	Double	Single	Double
Pinch Force - Linear - Lbs (KgF)	Up to 25 (11.4)	Up to 50 (22.7)	Up to 50 (22.7)	Up to 100 (45.4)
Stroke - Inch (mm)	1.000 (25.4)		1.500 (38.1)	
Safety Features	Optional Cap	Optional Cap	Integrated	Integrated
Recommended Panel Thickness	.093 to .250	.093 to .250	.093 to .250	.093 to .250
Weight - oz. (g) Aluminum Model	23 (650)	28 (790)	79 (2240)	90 (2550)
Weight - oz. (g) Stainless Steel Model (Special)	32 (900)	36 (1025)	140 (3950)	150 (4250)
Length - Inch (mm)	7.6 (194)	8.2 (208)	10.9 (277)	11.7 (297)
Width and Depth - Inch (mm)	3.0 (77) SQ		4.3 (108) SQ	
Encoder	Differential 1000 Line		Differential 1000 Line	
Standard Supply Power - Amperage	2.5 Amps		5 Amps	
Input Control (Analog) Signal Options	0-10 VDC; 4-20 mA			
Stepper type	2-Phase 1.8 Step Angle			
Standard Electrical Connections	2 wire DC power, 2 wire analog Input Signal			
Ambient Temp Maximum - °C (°F)	50 (122)			
Standard Supply Power - Voltage	24 VDC			
Tube Loading	Side Load Snap in			
Tube Materials	C-Flex; PharMed; Tygon; Pharma; Silicone, Braid Reinforced			
Noise	50 dbA			
Compliance	RoHS; CE			

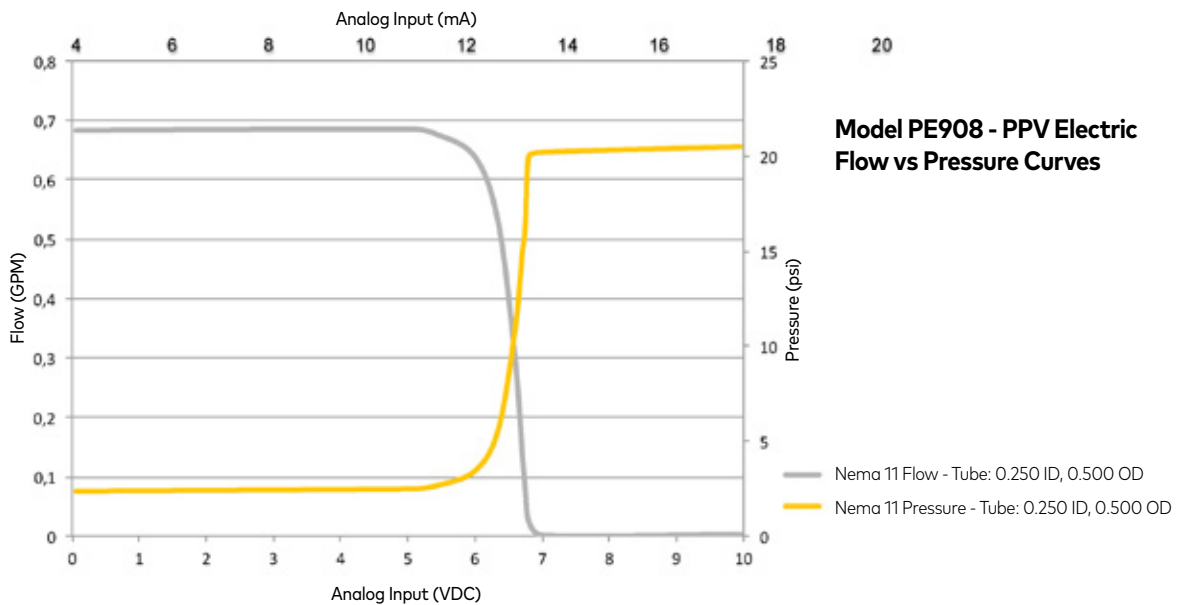
Flow vs. Pressure Curves

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

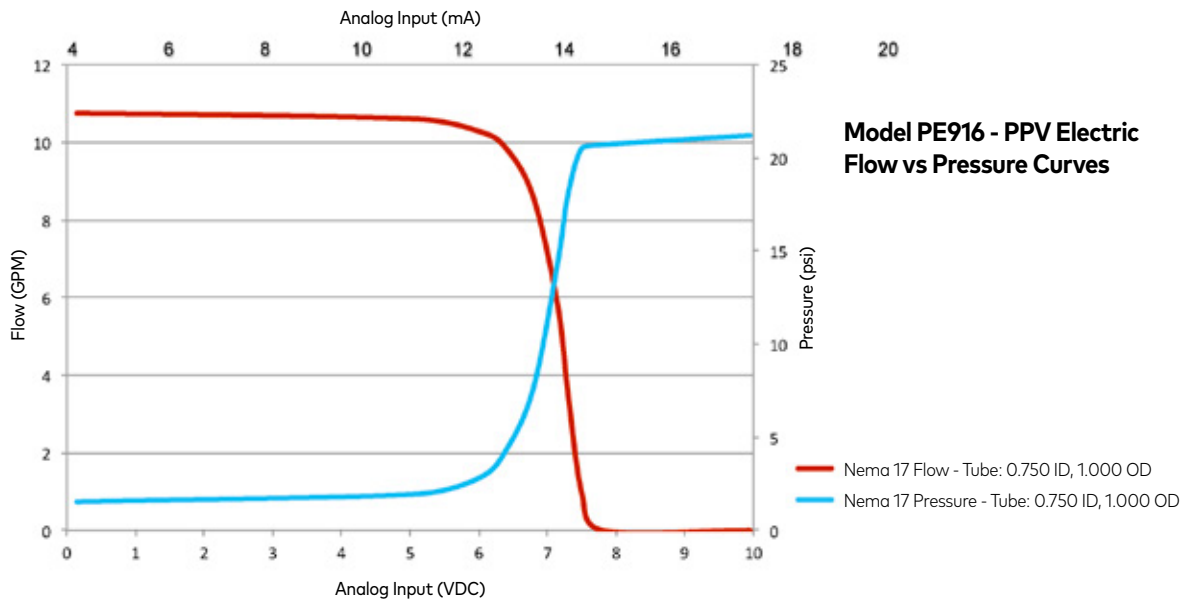


Flow Curve using 0-10 VDC and 4-20 mA - NEMA 11 Double Stack

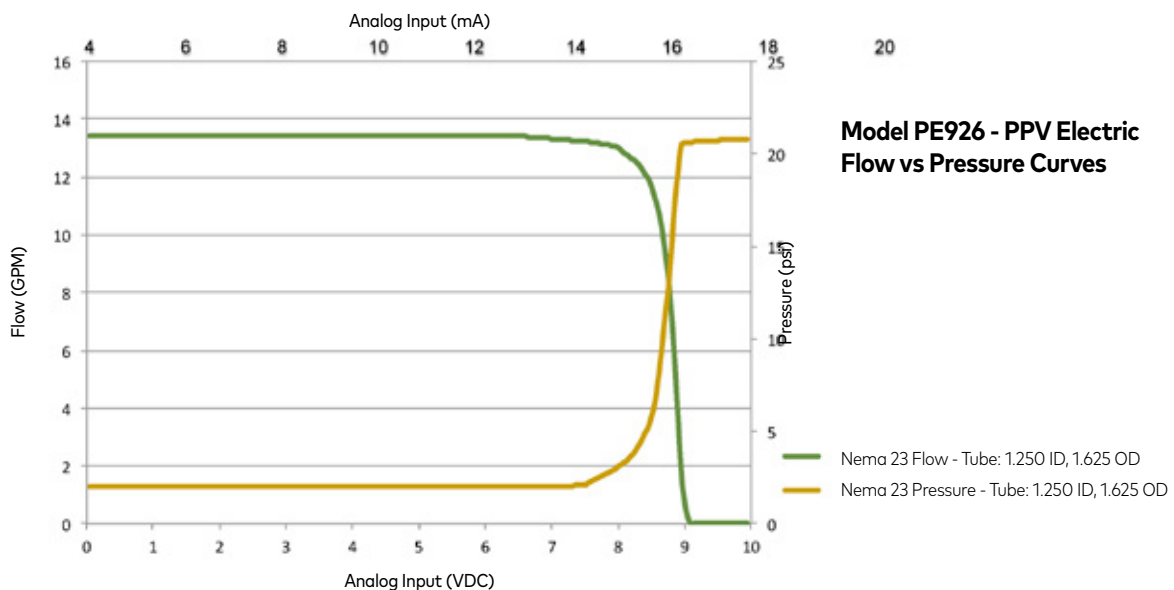


Flow Curves Continued

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

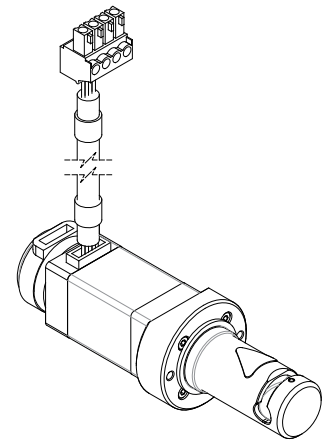
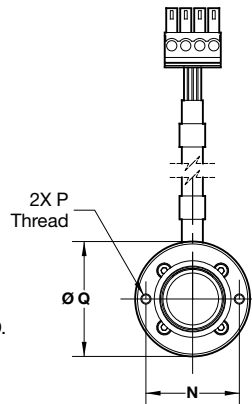
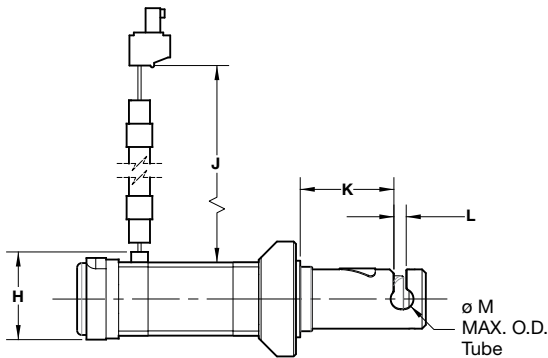
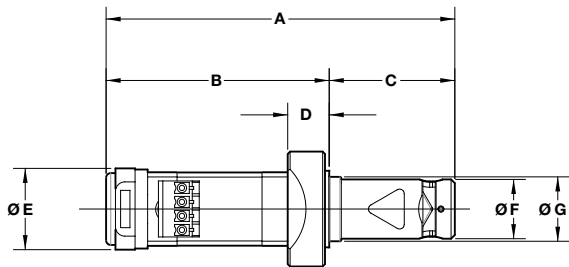
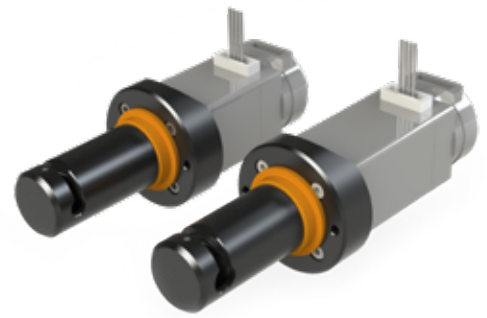


Flow Curve using 0-10 VDC and 4-20 mA - NEMA 23 Double Stack



How To Specify

PE902 and PE903 Model Dimensions



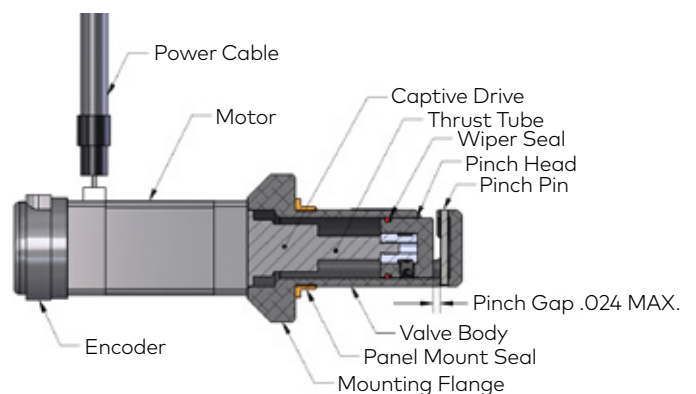
Valve Dimensions

Valve Part Number	Valve Description	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q
		Inch	Inch	Inch	Inch	Inch	Inch	Inch	Inch	Inch	Inch	Inch	Inch	Inch	Thread	Inch
PE902-10008	PE902E1-24005AB0500-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	4-40 UNC	1.230
PE903-10010	PE903E1-24010AB0500-NS040	3.734	2.389	1.345	0.444	0.870	0.635	0.690	0.939	48	1.003	0.132	0.187	1.000	4-40 UNC	1.230

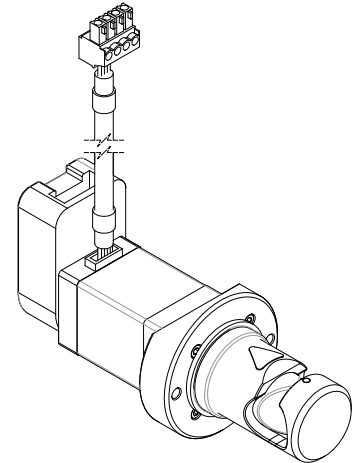
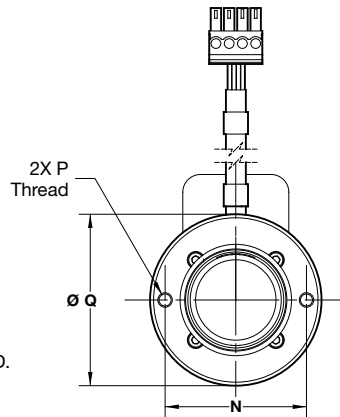
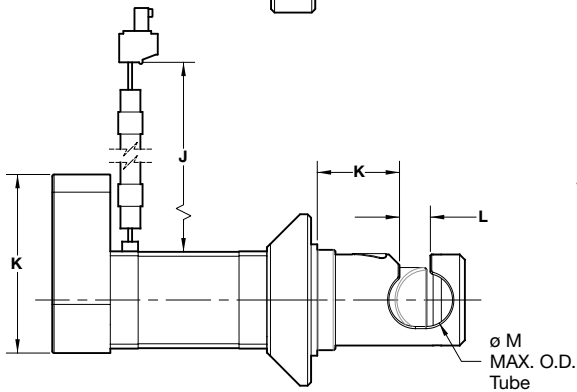
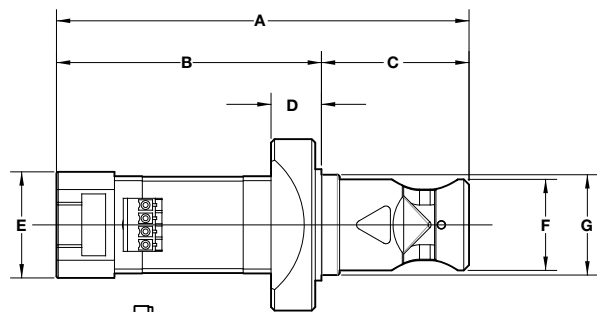
Valve Dimensions

Valve Part Number	Valve Description	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q
		mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	Thread	mm
PE902-10008	PE902E1-24005AB0500-NS040	83.9	49.8	34.2	11.3	22.1	16.1	17.5	23.9	1219	26.6	2.2	3.2	25.4	4-40 UNC	31.2
PE903-10010	PE903E1-24010AB0500-NS040	94.8	60.7	34.2	11.3	22.1	16.1	17.5	23.9	1219	25.5	3.4	4.7	25.4	4-40 UNC	31.2

Description	Material
	Aluminum Model - PE902 (Single Stack) & PE903 (Double Stack)
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



PE904, PE906, and PE908 Model Dimensions



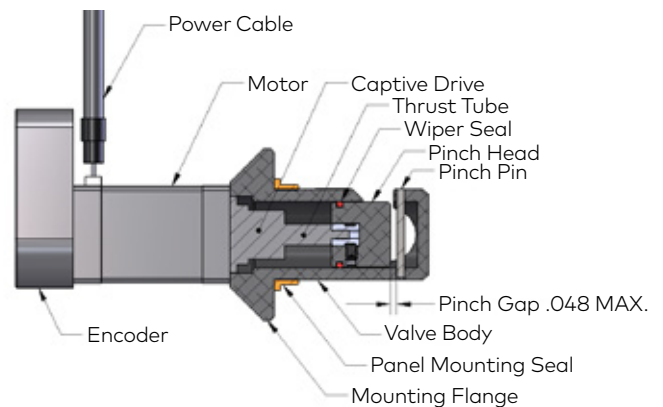
Valve Dimensions

Valve Part Number	Valve Description	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q
		Inch	Inch	Inch	Inch	Inch	Inch	Inch	Inch	Inch	Inch	Inch	Inch	Inch	Thread	Inch
PE904-10012	PE904E1-24015AB0500-NS040	4.235	2.565	1.670	0.570	1.200	1.030	1.135	2.020	48	1.105	0.175	0.250	1.600	8-32 UNC	1.940
PE906-10014	PE906E1-24030AB0500-NS060	4.668	2.998	1.670	0.570	1.200	1.030	1.135	2.020	48	1.105	0.265	0.375	1.600	8-32 UNC	1.940
PE908-10016	PE908E1-24025AB0500-NS080	4.668	2.998	1.670	0.570	1.200	1.030	1.135	2.020	48	0.930	0.350	0.500	1.600	8-32 UNC	1.940

Valve Dimensions

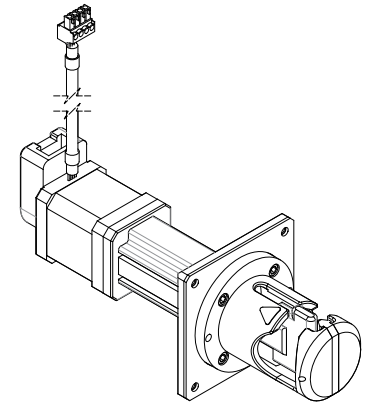
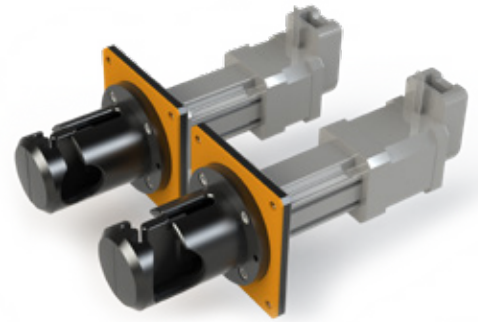
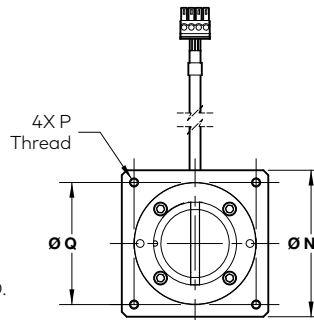
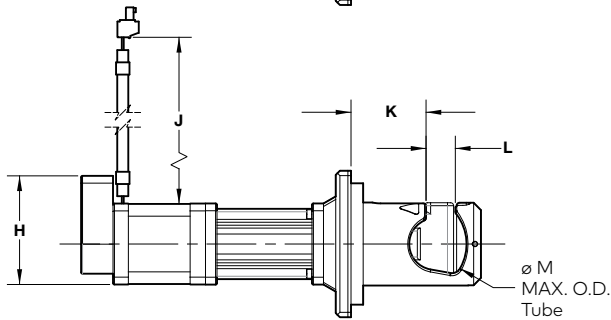
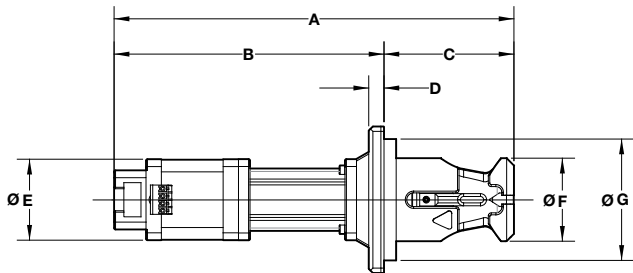
Valve Part Number	Valve Description	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q
		mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	Thread	mm
PE904-10012	PE904E1-24015AB0500-NS040	107.6	65.2	42.4	14.5	30.5	26.2	28.8	51.3	1219.2	28.1	4.4	6.4	40.6	8-32 UNC	49.3
PE906-10014	PE906E1-24030AB0500-NS060	118.6	76.1	42.4	14.5	30.5	26.2	28.8	51.3	1219.2	28.1	6.7	9.5	40.6	8-32 UNC	49.3
PE908-10016	PE908E1-24025AB0500-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	8-32 UNC	49.3

Description	Material
	Aluminum Model - PE904 (Single Stack), PE906 (Double Stack) & PE908 (Double Stack)
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



How To Specify

PE912 and PE916 Model Dimensions



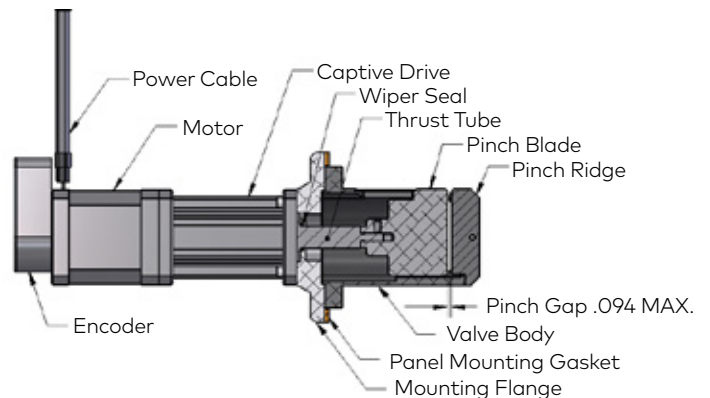
Valve Dimensions

Valve Part Number	Valve Description	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q
		Inch	Inch	Inch	Inch	Inch	Inch	Inch	Inch	Inch	Inch	Inch	Inch	Inch	Thread	Inch
PE912-10018	PE912E1-24025AB1000-NS080	7.640	4.976	2.664	0.313	1.657	1.700	2.485	2.225	48	1.759	0.375	0.750	3.000	8-32 UNC	2.500
PE916-10020	PE916E1-24050AB1000-NS080	8.189	5.528	2.664	0.313	1.657	1.700	2.485	2.225	48	1.537	0.600	1.000	3.000	8-32 UNC	2.500

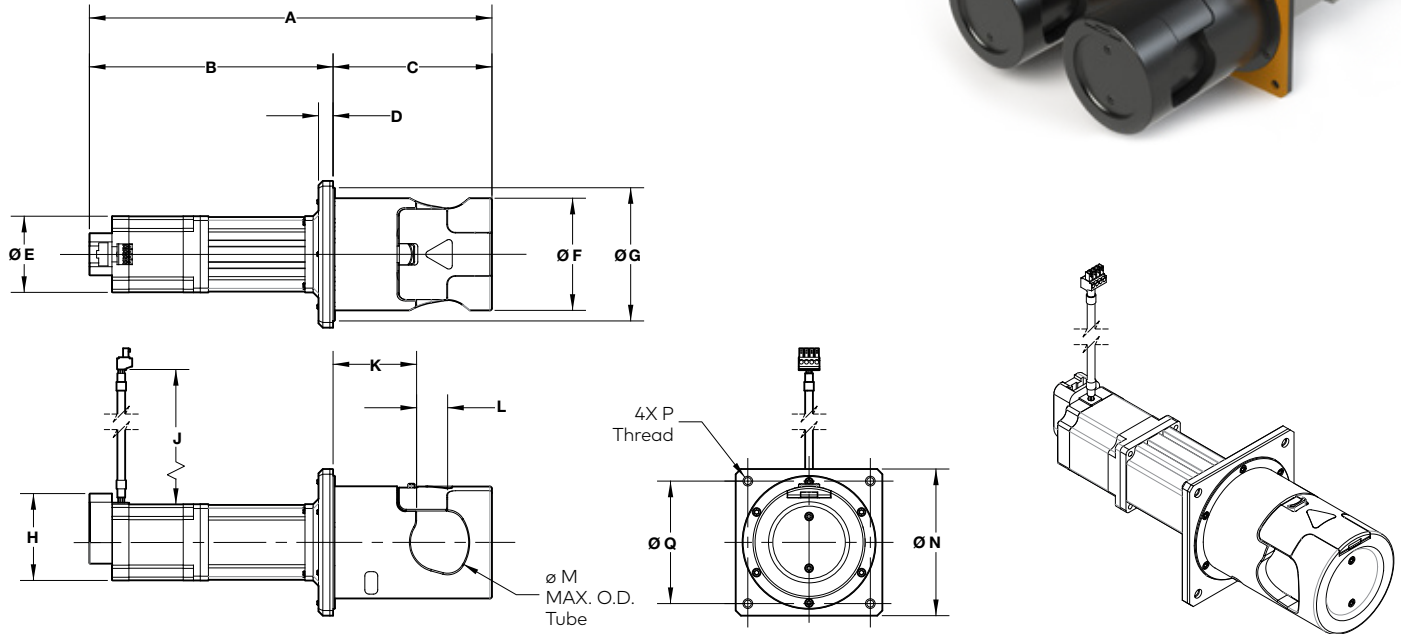
Valve Dimensions

Valve Part Number	Valve Description	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q
		mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	Thread	mm
PE912-10018	PE912E1-24025AB1000-NS080	194.1	126.4	67.7	8.0	42.1	43.2	63.1	56.5	1219	44.7	9.5	19.1	76.2	8-32 UNC	63.5
PE916-10020	PE916E1-24050AB1000-NS080	208.0	140.4	67.7	8.0	42.1	43.2	63.1	56.5	1219	39.0	15.2	25.4	76.2	8-32 UNC	63.5

Description	Material
	Aluminum Model - PE912 (Single Stack) & PE916 (Double Stack)
Valve Body	6061 - T6 Aluminum, Black Anodized
Pinch Blade/Head	6061 - T6 Aluminum, Black Anodized
Pinch Ridge/Pin	6061 - T6 Aluminum, Black Anodized
Mounting Flange (Part of Valve Body)	6061 - T6 Aluminum, Black Anodized
Safety Cover	6061 - T6 Aluminum, Black Anodized
Panel Mount Gasket/Seal	Silicone
Wiper Seal (O-Ring)	Buna-N
Motor (Enclosure)	Aluminum
Captive Drive (Enclosure)	Aluminum



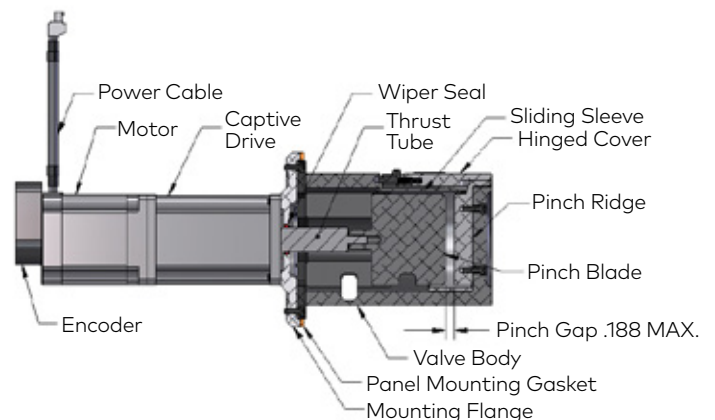
PE926 Model Dimensions



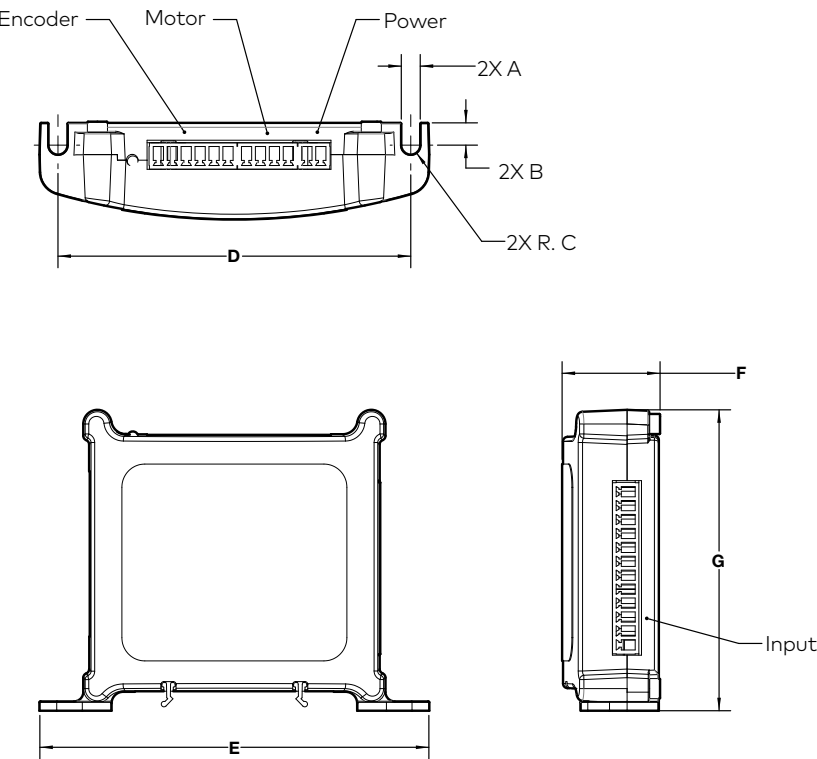
Valve Dimensions																
Valve Part Number	Valve Description	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q
		Inch	Inch	Inch	Inch	Inch	Inch	Inch	Inch	Inch	Inch	Inch	Inch	Inch	Thread	Inch
PE926-10022	PE926E1-24050AB1000-NS150	10.879	6.275	4.604	0.423	2.209	3.250	3.860	2.517	48	2.419	0.900	1.250	4.250	1/4-20 UNC	3.550
PE926-10024	PE926E1-24100AB1500-NS150	11.666	7.062	4.604	0.423	2.209	3.250	3.860	2.517	48	2.419	0.900	1.625	4.250	1/4-20 UNC	3.550

Valve Dimensions																
Valve Part Number	Valve Description	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q
		mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	Thread	mm
PE926-10022	PE926E1-24050AB1500-NS150	276.3	159.4	116.9	10.7	56.1	82.6	98.0	63.9	1219	61.4	22.9	31.8	108.0	1/4-20 UNC	90.2
PE926-10024	PE926E1-24100AB1500-NS150	296.3	179.4	116.9	10.7	56.1	82.6	98.0	63.9	1219	61.4	22.9	41.3	108.0	1/4-20 UNC	90.2

Description	Material
	Aluminum Model - PE926 (Single Stack) & PE926 (Double Stack)
Valve Body	6061 - T6 Aluminum, Black Anodized
Pinch Blade/Head	6061 - T6 Aluminum, Black Anodized
Pinch Ridge/Pin	6061 - T6 Aluminum, Black Anodized
Body Plate	6061 - T6 Aluminum, Black Anodized
Mounting Flange	6061 - T6 Aluminum, Black Anodized
Safety Cover	6061 - T6 Aluminum, Black Anodized
Panel Mount Gasket/Seal	Silicone
Wiper Seal (O-Ring)	Buna-N
Motor (Enclosure)	Aluminum
Captive Drive (Enclosure)	Aluminum



PEC 9 Dimensions



Controller Part Number	Controller Description	A	B	C	D	E	F	G
		Inch	Inch	Inch	Inch	Inch	Inch	Inch
PEC9XXX-XXXXX	PEC9 NEMA-XXXXXX-XXX-XXXX	0,204	0,240	0,102	3,800	4,200	1,100	3,200

Controller Part Number	Controller Description	A	B	C	D	E	F	G
		mm	mm	mm	mm	mm	mm	mm
PEC9XXX-XXXXX	PEC9 NEMA-XXXXXX-XXX-XXXX	5,2	6,1	2,6	96,5	106,7	27,9	81,3

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.

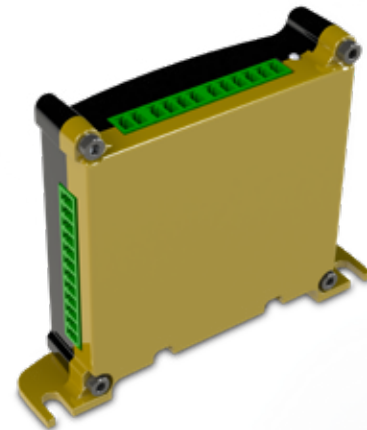
On board thrust and speed monitoring reduce stalling and damage to the actuator due to overthrust. Variable current control provides energy efficiency and heat control for high duty applications.

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

STEPPER MOTOR CONTROLLER



FRONT



BACK

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 4th 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 device 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.

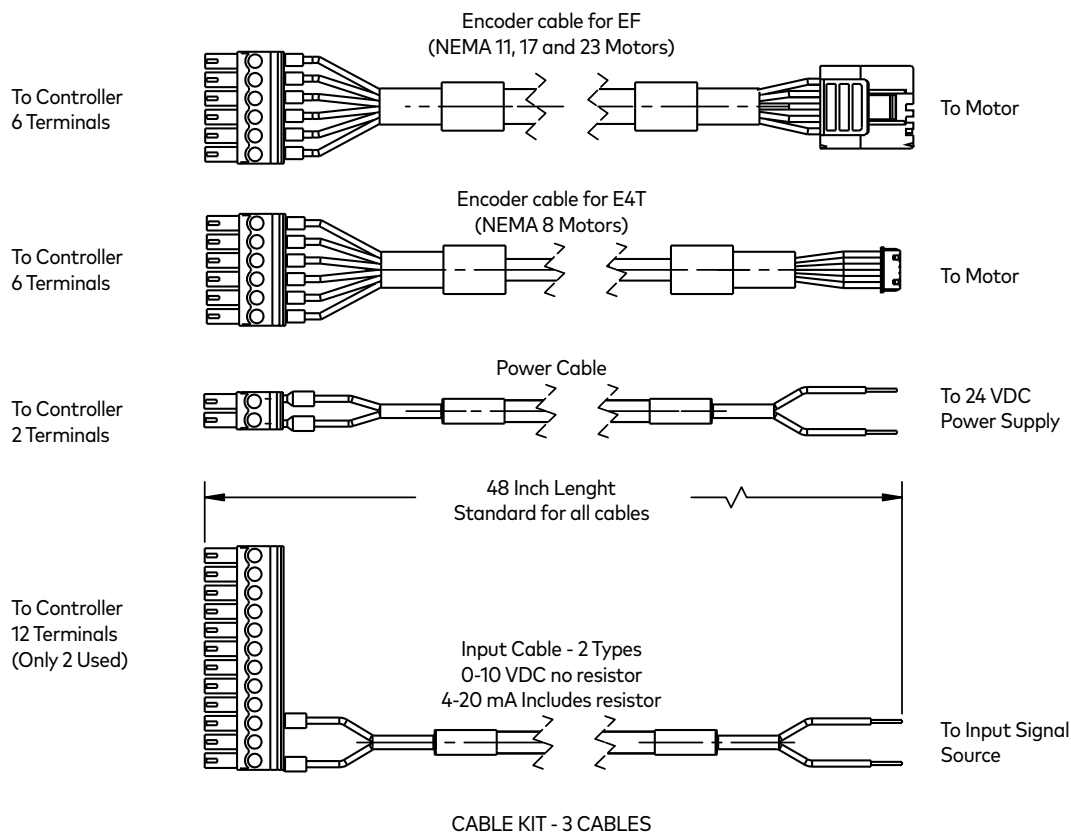
Customer Interface

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.



Model Description for PE900 Pinch Valve

The model number of the PE900 Series Proportional Pinch Valve Electric 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.

An example of a basic PE900 Series Proportional Pinch Valve shows a valve with 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.

PE916E5-24050AB1000-NS17D

Valve Type	
PE	Proportional Electric
Valve Family	
9	900 Series
Tube Slot Size	
01	0.063" O.D.
02	0.125" O.D.
03	0.188" O.D.
04	0.250" O.D.
06	0.375" O.D.
08	0.500" O.D.
12	0.750" O.D.
16	1.000" O.D.
26	1.625" O.D.
Feedback Option	
E4	Encoder E4T
E5	Encoder E5
Operating Power	
24	24 VDC
Force Spec	
005	>5 up to 6 lbs
010	>10 up to 11 lbs
015	>15 up to 16 lbs
025	>25 up to 26 lbs
030	>30 up to 31 lbs
050	>50 up to 51 lbs
100	>100 up to 101 lbs

Motor Model	
08S	NEMA 8 Single Stack
08D	NEMA 8 Double Stack
11S	NEMA 11 Single Stack
11D	NEMA 11 Single Stack
17S	NEMA 17 Single Stack
17D	NEMA 17 Double Stack
23S	NEMA 23 Single Stack
23D	NEMA 23 Double Stack
Tube Slot	
S	Single Tube Slot
Normal State	
N	Not Applicable
Motor Full Stroke	
0500	0.500"
1000	1.000"
1500	1.500"
Color	
B	Black
C	Clear
N	Natural
Body Material	
A	Aluminum
S	Stainless Steel

Notes: Feedback option E4T is for NEMA 8 and E5 is for NEMA 11, 17, and 23

Standard Part Number	Part Description
PE902-10008	PE902E4-24005AB0500-NS08S
PE903-10010	PE903E4-24010AB0500-NS08D
PE904-10012	PE904E5-24015AB0500-NS11S
PE906-10014	PE906E5-24030AB0500-NS11D
PE908-10016	PE908E5-24030AB0500-NS11D
PE912-10018	PE912E5-24025AB1000-NS17S
PE916-10020	PE916E5-24050AB1000-NS17D
PE926-10022	PE926E5-24050AB1500-NS23S
PE926-10024	PE926E5-24100AB1500-NS23D

How to Order

Model Description for PEC9 Controller

The model number of the PEC9 Controller consist of an alphanumeric cluster designating: Valve type, product type, valve family, motor stack, motor frame, supply type, motor voltage, input type, input range, % of stroke and motor full stroke, that together make up the complete Product Key Number to describe the controller when product is ordered. Use the ordering information below to build a valid Product Key Number.

Standard part numbers and product key numbers are listed below.

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 1.000" motor full stroke, just to name some of the features on the model.

PEC9D17 - D24V10 - 100 - 1000

Valve Type	
PE	Proportional Electric
Product Type	
C	Controller
Valve Family	
9	900 Series
Motor Stack	
S	Single Stack
D	Double Stack
Motor Frame	
08	NEMA 8
11	NEMA 11
17	NEMA 17
23	NEMA 23
Supply Type	
D	VDC
A	VAC

Motor Full Stroke	
0500	0.500"
1000	1.000"
1500	1.500"
% of Stroke	
100	Full Stroke
050	50% of Full Stroke
Input Range	
05	5 VDC
10	10 VDC
20	20 mA
Input Type	
V	Voltage
A	Current
Motor Voltage	
24	24 VDC

Standard Part Number	Part Description
PEC9D08-10028	PEC9D08-D24V10-050-0500
PEC9D08-10032	PEC9D08-D24A20-050-0500
PEC9D11-10034	PEC9D11-D24V10-100-0500
PEC9D11-10036	PEC9D11-D24V10-050-0500
PEC9D11-10038	PEC9D11-D24A20-100-0500
PEC9D11-10040	PEC9D11-D24A20-050-0500
PEC9S17-10042	PEC9S17-D24V10-100-1000
PEC9S17-10044	PEC9S17-D24V10-050-1000
PEC9S17-10046	PEC9S17-D24A20-100-1000
PEC9S17-10048	PEC9S17-D24A20-050-1000
PEC9D17-10050	PEC9D17-D24V10-100-1000
PEC9D17-10054	PEC9D17-D24A20-100-1000
PEC9S23-10058	PEC9S23-D24V10-100-1500
PEC9S23-10062	PEC9S23-D24A20-100-1500
PEC9D23-10066	PEC9D23-D24V10-100-1500
PEC9D23-10070	PEC9D23-D24A20-100-1500

The PE900-Series is configured to meet your precision flow and pressure control requirements by offering 9 different standard models. These accommodate a generously wide range of tube sizes and hardnesses to meet your specific flow, pressure and media compatibility needs. You also have your choice of standard input signals and stroke length programs.

We understand that one size (or even 9 sizes) don't fit all. And that's why we plan to offer customized options for you. This list covers items we anticipate getting requests for.

Pinch Gap

All PE900 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 variations 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, tube 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 0-10 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.

But we've learned over the years that our customers are very creative, and we want to support your special requirements. We will work with you to develop your ideas. See below for examples of how you can customize your PPV.

Custom Software Programs

Beyond higher actuator resolutions the PE900 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 PE900-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 and we will do our best to meet your needs.

Note that certain components are sensitive to signal quality. We recommend not to exceed 25 feet in length for motor to controller, encoder and input cables. Power cable should not exceed 50 feet.

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 you 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, shape) 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 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



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