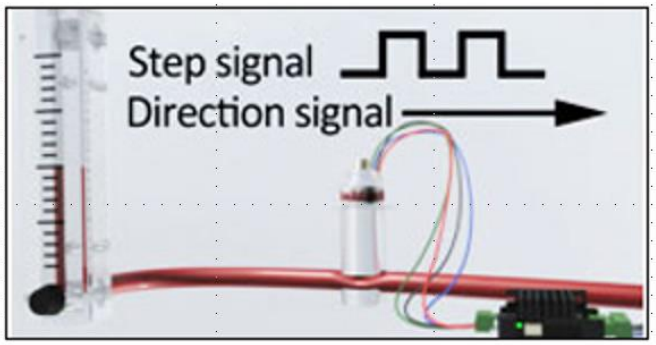
Getting Started with the Miniature Proportional Pinch Valve MPPV-EN-PS Series

Proportional Pinch Valves with Position Sensing

Resolution Air, Ltd. expands its innovative portfolio of patented Proportional Pinch Valves with their MPPV-EN-PS Position Sensor Series. This advanced feature integrates a compact position sensor, offering precise linear position feedback for critical fluid handling applications. The new technology replaces traditional home sensors and encoder combinations, providing a streamlined solution with numerous benefits for industries requiring precision, reliability, and continuous position feedback

Control Requirements

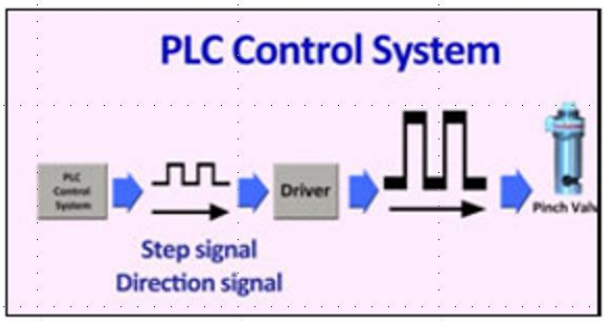
The bi-polar stepper motors used in the Resolution Air, Ltd. Proportional Pinch Valves require two input control signals, a step signal and a direction signal.



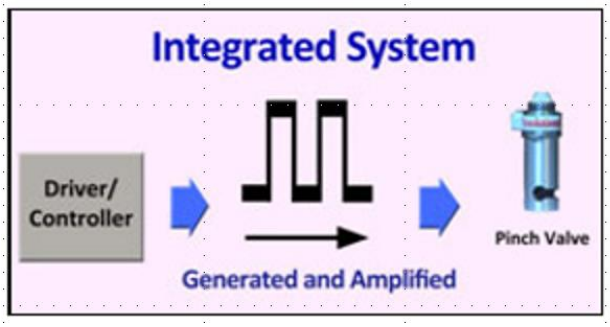
Step Signal- A pulse width modulated (PWM) signal. Each pulse generates a single step. For the MPPV-Series, a single step equates to 7.5 degrees of motor rotation (15 degrees for the HPPV-Series). Since the motor shaft is coupled to an integral leadscrew, this rotation translates into 0.0005”/step of linear motion.

Direction Signal- A digital binary signal which determines the clockwise/anti clockwise motor rotation.

There are two primary methods for generating, sequencing, and amplifying the step and direction signals required for stepper motor control.



PLC Based Control System
Signals generated by a Programmable Logic Controller (PLC) are amplified and sequenced by a Bi-Polar Chopper Driver (DRV-1) to the level required to drive the Proportional Pinch Valve.



Bi-Polar Driver/Controller System
The Step and Direction signals are generated, sequenced, and amplified by a single control device known as a Bi-Polar Driver/Controller.

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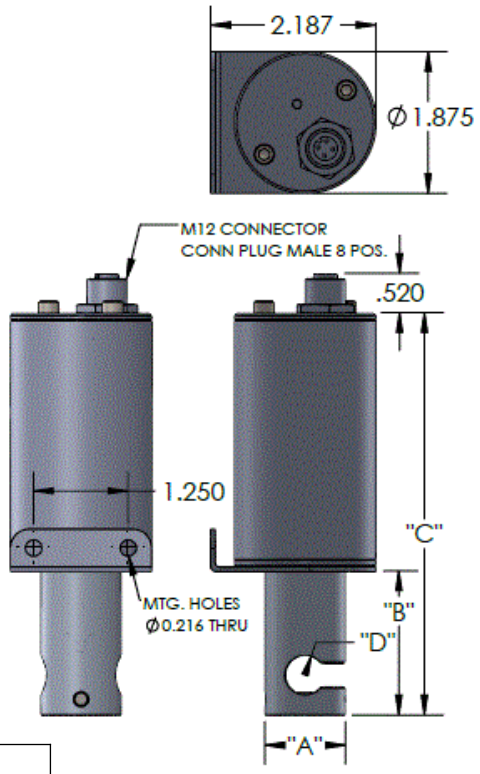
VALVE DIMENSIONS				
	Dim. A (in.)	Dim. B (in.)	Dim. C (in.)	Dim. D (in.)
MPPV-2-PS-EN	0.875	1.424	4.836	0.125
MPPV-3-PS-EN	0.875	1.437	4.849	0.187
MPPV-4-PS-EN	0.875	1.521	4.933	0.250
MPPV-6-PS-EN	0.875	1.667	5.078	0.375
MPPV-8-PS-EN	1.063	1.902	5.314	0.500



POSITION SENSOR PERFORMANCE CHARACTERISTICS	
Supply Voltage	8-24 VDC
Output Smoothness	0.1% max. at 10" to 18" per minute
Backlash	0.003" maximum
Sensor Output	4-20 mA (2 wire)
Sensor Resolution	Essentially infinite
Valve Position Resolution	0.0005"/Full Step
Electrical Connection	12" Wire Harness included
POSITION SENSOR SETTINGS	
Piston Position	mA Value
Full Open-Hard Stop	4.00 mA.
Full Open-Top of Tube	5.59mA
Full Travel-0.500"	20 mA

Establishing Home Position

In order to maximize valve life, establish home position prior to valve reaching Full Open-Hard Stop piston position. For example, utilizing Full Open-Top of Tube position for the homing reference prevents excess load to leadscrew and nut assembly.

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ELECTRICAL SPECS.: STEPPER MOTOR	
Wiring	BiPolar
Step Angle	7.5 Degrees
Motor Voltage *	5 VDC
Supply Voltage	24 VDC - 40 VDC
Current/Phase	.385 A Max
Resistance/Phase	13 Ω
Inductance/Phase	10.6 mH
Power Consumption	3.85 Watts
Rotor Inertia	1.07 gcm^2
Temperature Rise	135° F
Insulation Resistance	20 MΩ

CABLE TECHNICAL DATA		
Part Number	Cable-EN-R-(L)M	Cable-EN-S-(L)M
No. Conductors	8	8
Shield	85% Tinned Copper Braid	85% Tinned Copper Braid
Cord Configuration		
End 1	M12-A Female, **90 Degree**	M12-A Female, **Straight**
End 2	Cut End	Cut End
Contact Material	Copper Alloy, Gold Plated	Copper Alloy, Gold Plated
O-Ring	FKM	FKM
Standard Lengths (L)	0.6, 1, 3, 5 Meters	0.6, 1, 3, 5 Meters
Environmental Compliance	CE, IP 67, REACH Regulation (EC 1907/2006)	CE, IP 67, REACH Regulation (EC 1907/2006)
Temperature Range	-25° to 60°C	-25° to 60°C
Bend Radius	5x Cable Diameter (static) 10X Cable Diameter (dynamic)	5x Cable Diameter (static) 10X Cable Diameter (dynamic)
Current Rating	1.1 Amps @ 50°C	1.1 Amps @ 50°C

CABLE-EN-R(S)-(X)M COLOR CODE	
Pin 1: White	Motor A+
Pin 2: Brown	Motor A-
Pin 3: Green	Motor B+
Pin 4: Yellow	Motor B-
Pin 5: Grey	Sensor +24 VDC Supply
Pin 6: Pink	Sensor GND (RTN)

R=Right Angle Connector S=Straight Connector X=Length in Meters

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Wiring Schematic Example

MPPV-EN-PS + PLC + P.SUPPLY + BI-POLAR CHOPPER DRIVE