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Miniature Solenoid Valves

Precision Fluidics



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Innovative solutions for health care success



ENGINEERING **YOUR** SUCCESS.

When you partner with the global leader in motion and control technologies, expect to move your business and the world forward. From miniature solenoid valves to highly integrated automation systems, our innovations are critical to life-saving medical devices and scientific instruments used for drug discovery and pathogen detection. Not to mention, critical to decreasing time to market and lowering your overall cost of ownership. So partner with Parker, and get ready to move, well, anything.



www.parker.com/precisionfluidics 1 603 595-1500

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X-Valve[®] Miniature Pneumatic Solenoid Valve

8mm Solenoid Valve



Typical Applications

- Portable Equipment
- Blood Pressure Monitoring
- Wound Therapy
- Air and Oxygen Delivery
- Sensor Zeroing

Mechanical

Valve Type:

3 Port, Direct-acting poppet style
 - Universal (6 psig & 30 psig models)
 - Normally Closed (100 psig model)

Media:

Non-Reactive gases

Operating Environment:

32 to 122°F (0 to 50°C) 6, 30 psig
 59 to 122°F (15 to 50°C) 100 psig

Storage Temperature:

-40 to 158°F (-40 to 70°C)

Dimensions:

- Length: 0.92 in (23.4 mm)
 - Width: 0.31 in (7.9 mm)
 - Height: 0.48 in (12.2 mm)
 to Barb End / 0.35 in (8.9 mm)
 to Manifold Face

Spacing:

0.315 in (8 mm) center

Porting:

- Barbs for 1/16 in (1.5 mm)
 I. D. Tubing, (1/32 in Wall Max.)
 - Manifold Mount (Gasket accessory
 required, see ordering info)

Weight:


0.16 oz (4.5 g)

Internal Volume:

0.0056 in³ (0.092 cm³)

The X-Valve[®] is a miniature pneumatic solenoid valve measuring only 8 mm in width. The compact size, light weight and low power consumption of the X-Valve[®] is the ideal solution for portable applications and those applications with limited space and available power. The body construction of the X-Valve[®] is suited for manifold or barbed-tube pneumatic connections and is available in both 2-way and 3-way configurations.

Features

- Direct PC and side-to-side mounting enables compact and efficient system design
- Large range of pressure options (6, 30 and 100 psi) to meet various application requirements
- Light weight valve construction is ideal for portable applications
- Available low power model (0.5 Watt) for continuous duty applications
- RoHS compliant 

Electrical

Power Options:

0.5 Watt (6 psig model)
 1.0 Watt (30, 100 psig model)

Voltage Options:

3, 5, 12 or 24 VDC

Further power reduction may be achieved through the use of spike and hold or PWM electrical control.

Electrical Connections:

PC Pins, 4 mm centers (all models)
 Lead Wire/Connector Assembly
 (Accessory, see ordering info)

Wetted Materials

Bobbin/Body:

PBT (Polybutylene terephthalate)

Pole & Plunger:

430 FR Series Stainless Steel

Seal (Options):

FKM, EPDM, Silicone

Other:

302 Series Stainless Steel

Performance Characteristics

Leak Rate: Tested with Air

<0.016 sccm (6 psig Silicone)
 <0.016 sccm (30 psig FKM)
 <0.16 sccm (6 psig EPDM & FKM)
 <0.2 sccm (100 psig only)

Response:

< 20 ms maximum cycling
 (FKM, Silicone)
 < 50 ms maximum cycling (EPDM)

Pressure/Vacuum:

0 to 6 psid (0.4 bar differential)
 0 to 30 psid (2.0 bar differential)
 0 to 100 psid (6.9 bar differential)

Proof Pressure:

200 psig (13.7 bar)

Minimum Flow:

4 slpm @ 6 psid
 (0.4 bar differential)
 6 slpm @ 30 psid
 (2.0 bar differential)
 9 slpm @ 100 psid
 (6.9 bar differential)

Orifice Sizes/Equivalent Cv:

0.045" (1.14 mm) / 0.018
 0.030" (0.75 mm) / 0.010
 0.020" (0.5 mm) / 0.005

Reliability:

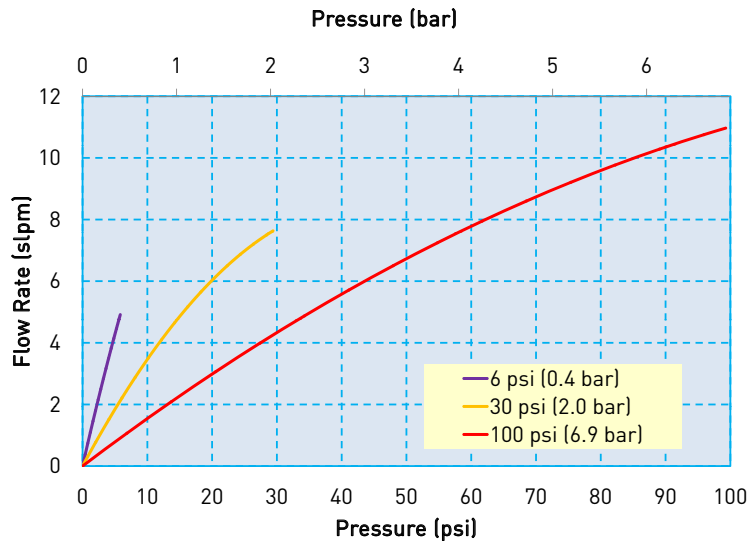
Life Cycle rating of 25 million
 (worst case tested, no performance
 degradation)



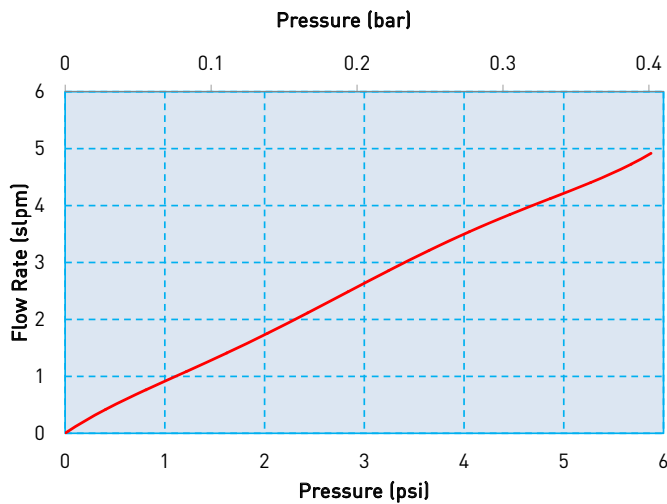
X-Valve® Miniature Pneumatic Solenoid Valve

Typical Flow Curve (Tested w/air 24° C)

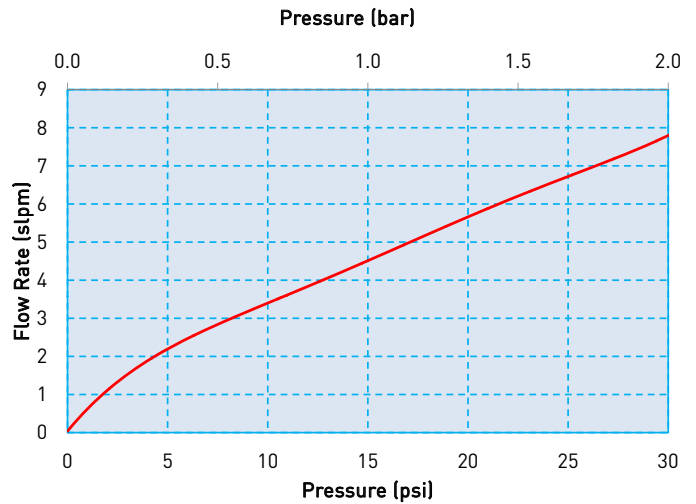
All Models



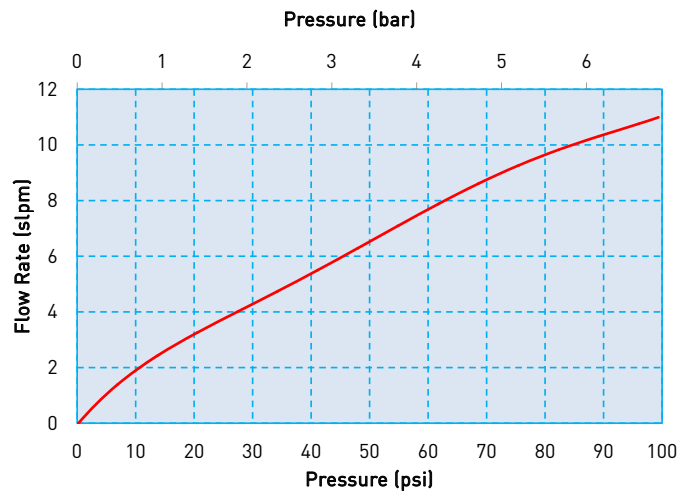
Model 1 – 0.045" (1.14 mm) Orifice



Model 2 – 0.030" (0.76 mm) Orifice



Model 5 – 0.020" (0.51 mm) Orifice



X-Valve® Miniature Pneumatic Solenoid Valve

Pressure and Flow Capabilities/Power

| Model No. | Orifice Size | Nominal Cv | Maximum Operating Pressure Differential * | Power Consumption |
|-----------|--------------------|------------|---|-------------------|
| 1 | 0.045 in (1.14 mm) | 0.018 | 6 psid (0.4 bar differential) | 0.5 Watt |
| 2 | 0.030 in (0.76 mm) | 0.010 | 30 psid (2.0 bar differential) | 1 Watt |
| 5 | 0.020 in (0.51 mm) | 0.005 | 100 psid (6.8 bar differential) | 1 Watt |

* Proof pressure is 200 psig (13.7 bar)

Electrical Interface / Pneumatic Interface

Short Pin

(For Pin/Wire Lead or PCB Terminal Housing Connection)
[Reference Accessories section]

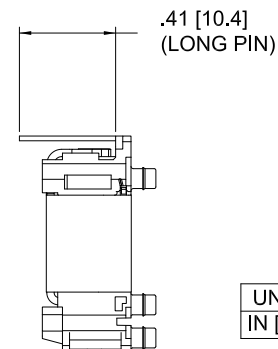
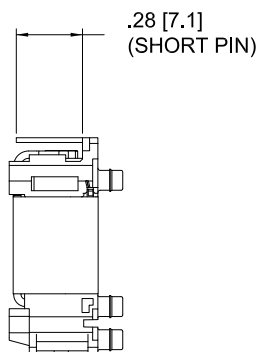


Long Pin

(For Pin/PCB solder mount connection)



Coil Connections



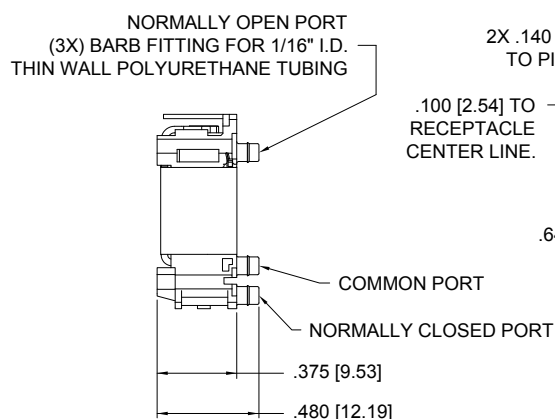
Electrical Connection Options:

Electrical terminals compatible with Molex 51065 series connector or equivalent.

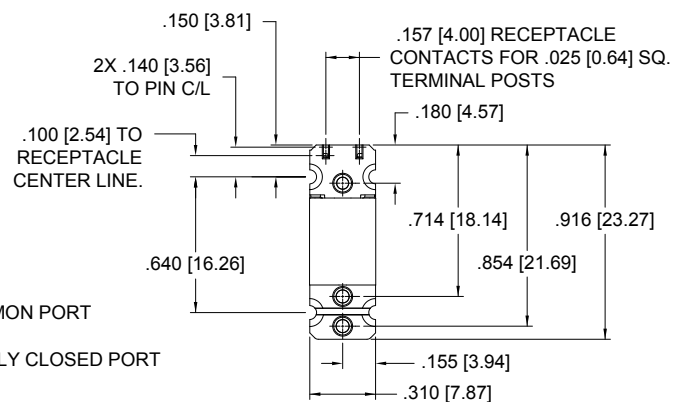
UNITS
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Dimensions

SIDE VIEW



BOTTOM VIEW

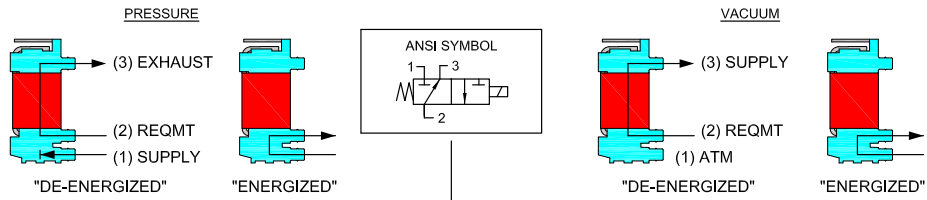


X-Valve® Miniature Pneumatic Solenoid Valve

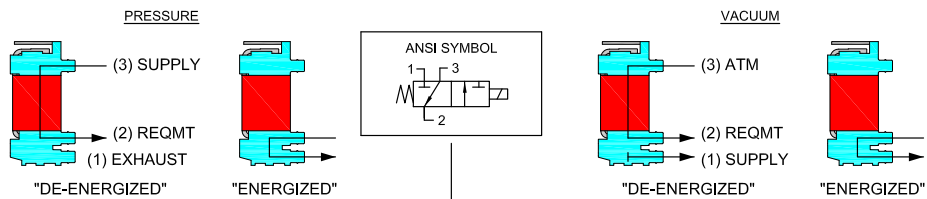
ANSI Pneumatic Schematics by Valve Types

| LEGEND: | |
|----------|-------------------------------------|
| SUPPLY: | Pneumatic Source or Supply Pressure |
| EXHAUST: | Exhaust to Atmospheric Pressure |
| REQMT: | Customer Requirement or Application |
| ATM: | Atmospheric Pressure |

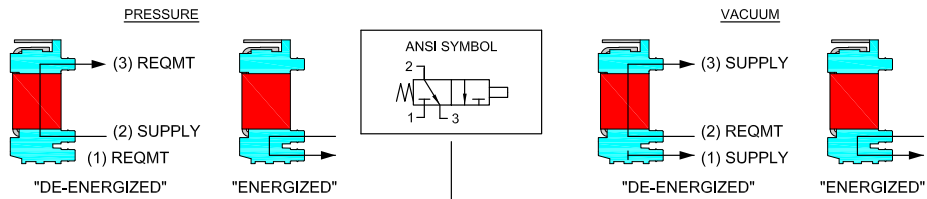
UNIVERSAL OPTION #1 (NORMALLY CLOSED)



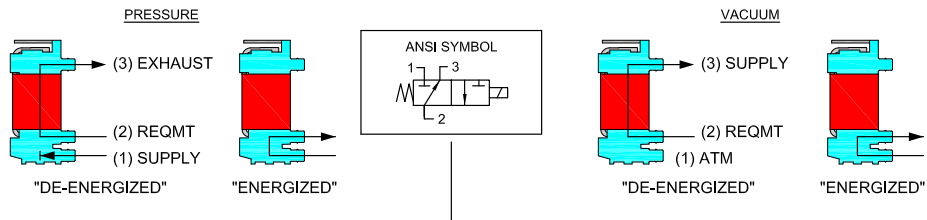
UNIVERSAL OPTION #2 (NORMALLY OPEN)



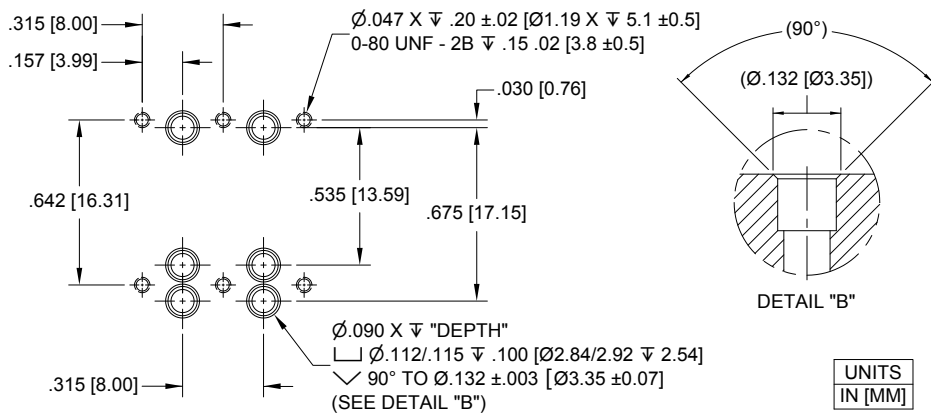
UNIVERSAL OPTION #3 (DISTRIBUTOR)



NORMALLY CLOSED MODEL-5, 100 PSI VERSION ONLY

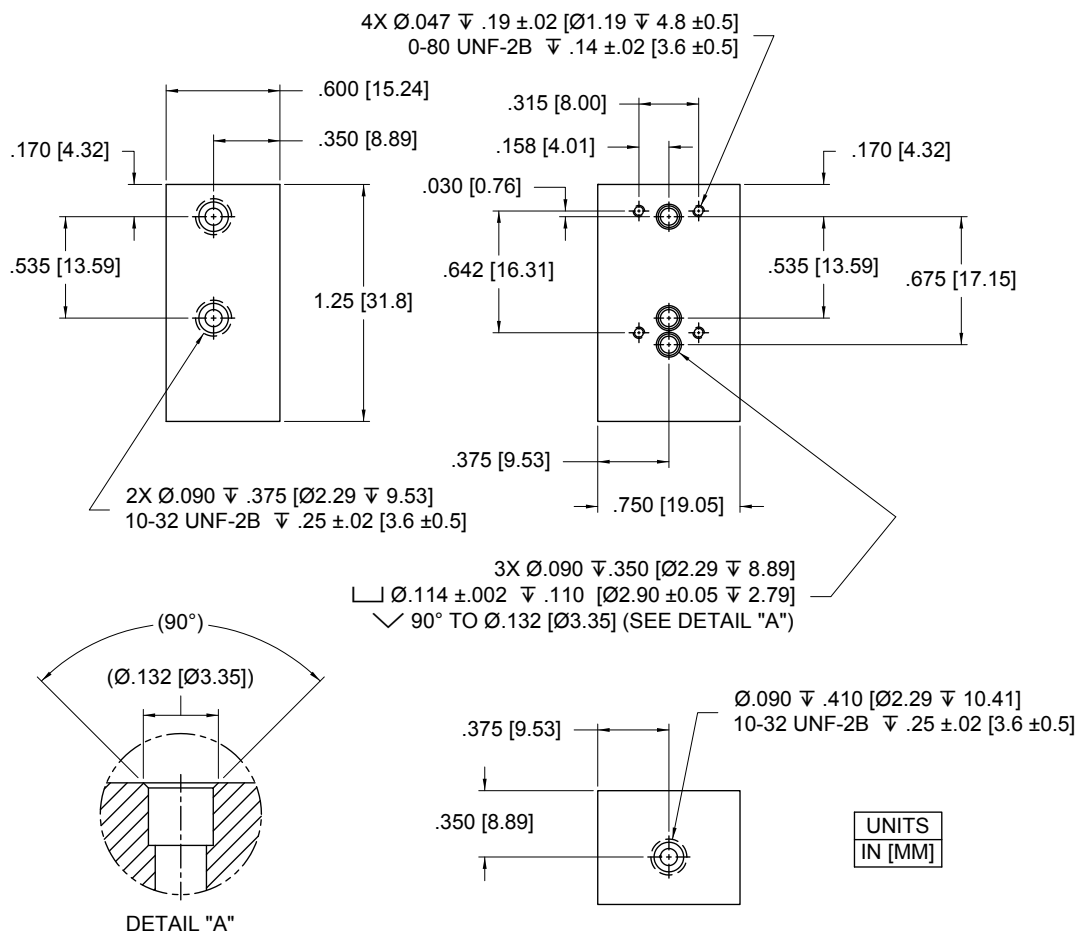


X-Valve Manifold Mount Diagram



X-Valve® Miniature Pneumatic Solenoid Valve

Recommended X-Valve Manifold Dimensions



Accessories

Manifold Rubber Gasket (FKM)

195-000159-001

(required for manifold mounting)

12" Wire Leads

290-006061-001

(for use with Short Pin valve configuration)

Screw 0-80 x 1/2"

Binding Head, Phillips

191-000100-208

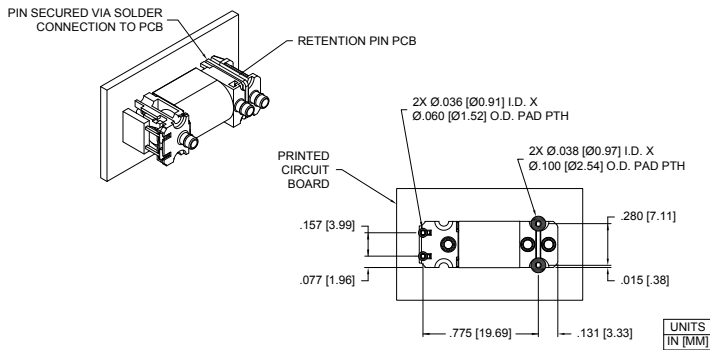
(2 required for each valve)



X-Valve® Miniature Pneumatic Solenoid Valve

Accessories (continued)

Retention Pin PCB
190-006020-001



Ordering Information

| Sample Product ID | X | 1 | 05 | L | F | | |
|-------------------|--------|--|----|--|--|--|-----------|
| Description | Series | Model Number: Pressure / Orifice / Power / Type | | Voltage | Electrical Connection | Coil | Elastomer |
| Options | X | 1: 6 psig / 0.045" / 0.5 Watt / Universal 2: 30 psig / 0.030" / 1 Watt / Universal 5: 100 psig / 0.020" / 1 Watt / Normally Closed | | 03: 3 VDC 05: 5 VDC 12: 12 VDC 24: 24 VDC | S: Short Pins (1) L: Long Pins (2) (1) For Pin/Wire Lead or PCB Terminal Housing Connection (2) For Pin/PCB solder mount connection | F: FKM E: EPDM (6 psig only) S: Silicone (6 psig only) | |

| Product ID Reference | Order Part Number | Product ID Reference | Order Part Number | Product ID Reference | Order Part Number |
|----------------------|-------------------|----------------------|-------------------|----------------------|-------------------|
| X-1-03-L-F | 912-000001-001 | X-1-05-S-F | 912-000001-009 | X-5-12-S-F | 912-000001-019 |
| X-1-12-L-F | 912-000001-002 | X-1-05-L-F | 912-000001-010 | X-5-24-S-F | 912-000001-020 |
| X-2-12-L-F | 912-000001-003 | X-2-03-S-F | 912-000001-011 | X-5-12-L-F | 912-000001-021 |
| X-2-24-L-F | 912-000001-004 | X-2-03-L-F | 912-000001-012 | X-5-24-L-F | 912-000001-022 |
| X-1-03-S-F | 912-000001-005 | X-5-03-S-F | 912-000001-013 | X-5-05-L-F | 912-000001-031 |
| X-1-12-S-F | 912-000001-006 | X-5-03-L-F | 912-000001-014 | X-5-05-S-F | 912-000001-032 |
| X-2-12-S-F | 912-000001-007 | X-1-24-S-F | 912-000001-017 | X-2-05-L-F | 912-000001-033 |
| X-2-24-S-F | 912-000001-008 | X-1-24-L-F | 912-000001-018 | X-2-05-S-F | 912-000001-034 |



| Accessories | |
|-----------------|--|
| 195-000159-001: | Rubber Gasket (FKM) |
| 290-006061-001: | 12" Wire Leads |
| 190-006020-001: | Retention Pin PCB |
| 191-000100-208: | Screw 0-80 x 1/2" Binding Head, Phillips (2 required for each valve) |

NOTE: In order to provide the best possible solution for your application, please provide the following requirements when contacting Applications Engineering:

- Media, Inlet & Outlet Pressures
- Minimum Required Flow Rate
- System Supply Voltage
- Media
- Ambient Temperature Range

Please click on the Order On-line button (or go to www.parker.com/precisionfluidics/xvalve) to configure your X-Valve Miniature Pneumatic Solenoid Valve. For more detailed information, visit us on the Web, or call and refer to Performance Spec. #790-002166-001 (6, 30 psig) and Drawing #790-002241-001 (100 psig) and drawing #890-003090-003 (Standard Pins) and #890-003090-004 (Long Pins).

PPF-MSV-002/US May 2012

For more information call +1 603 595 1500 or email ppfinfo@parker.com
Visit www.parker.com/precisionfluidics



Ten-X[®] Miniature Pneumatic Solenoid Valve

10mm Normally Open/Closed Solenoid Valve



Typical Applications


- Portable medical equipment
- Patient monitors
- Wound therapy
- Blood Pressure Monitoring
- Dialysis

Mechanical

| |
|--|
| Valve Type: |
| 3 Port, Direct acting poppet style |
| - Normally Open (NO) |
| - Normally Closed (NC) |
| - Distributor |
| *Reference ordering information for available configurations. |
| Media: |
| Non-Reactive Gases |
| Operating Environment: |
| 32 to 122°F (0 to 50°C) |
| Storage Temperature: |
| -40 to 158°F (-40 to 70°C) |
| Dimensions: |
| - Length: 1.25 in (31.8 mm) |
| - Width: 0.39 in (9.9 mm) |
| - Height: 0.48 in (12.1 mm) to Manifold Face / 0.65 in (16.4 mm) to Barb End |
| Porting: |
| - Barbs for 5/64 in (2 mm) I. D. Tubing |
| - Manifold Mount (Gasket accessory required, see ordering info) |
| Weight: |
| 0.39 oz (10.7 g) |
| Internal Volume: |
| 0.0080 in ³ (0.131 cm ³) |

The Ten-X[®] miniature pneumatic solenoid valve measures only 10 mm in width and consumes as little as 0.5 watts of power making it an ideal solution for applications with limited space and available power. The Ten-X[®] miniature pneumatic solenoid valve features repeatable "on and off" response times, stable performance and a universal body design that is suited for manifold or barbed-tube mounting. The Ten-X[®] miniature pneumatic solenoid valve is available in 2-way or 3-way normally open/normally closed configurations.

Features

- Quiet, lightweight design with small footprint providing up to 8 lpm of flow
- Compact, efficient side-to-side mounting to minimize system size
- Universal barb or manifold connections and PCB mount for added system design flexibility
- 20 million cycles (*worst case tested, no performance degradation*)
- RoHS compliant 

Electrical

| |
|--|
| Power: |
| 0.5 Watt & 1.0 Watt |
| Not all power options are available in all models, see ordering info. |
| Voltage: |
| 5, 12 or 24 VDC |
| Further power reduction may be achieved through the use of spike and hold or PWM electrical control. |
| Electrical Connections: |
| - PC Pins, 6 mm centers (all models) |
| - Lead Wire/Connector Assembly, (Accessory, see ordering info) |

Wetted Materials

| |
|------------------------------------|
| Bobbin/Body: |
| PBT (Polybutylene terephthalate) |
| Glass Filled |
| Pole & Plunger: |
| 430 FR Series Stainless Steel |
| Seal (Options): |
| Silicone, EPDM, or FKM |
| Other: |
| 302 Stainless Steel, Nickel Plated |

Performance Characteristics

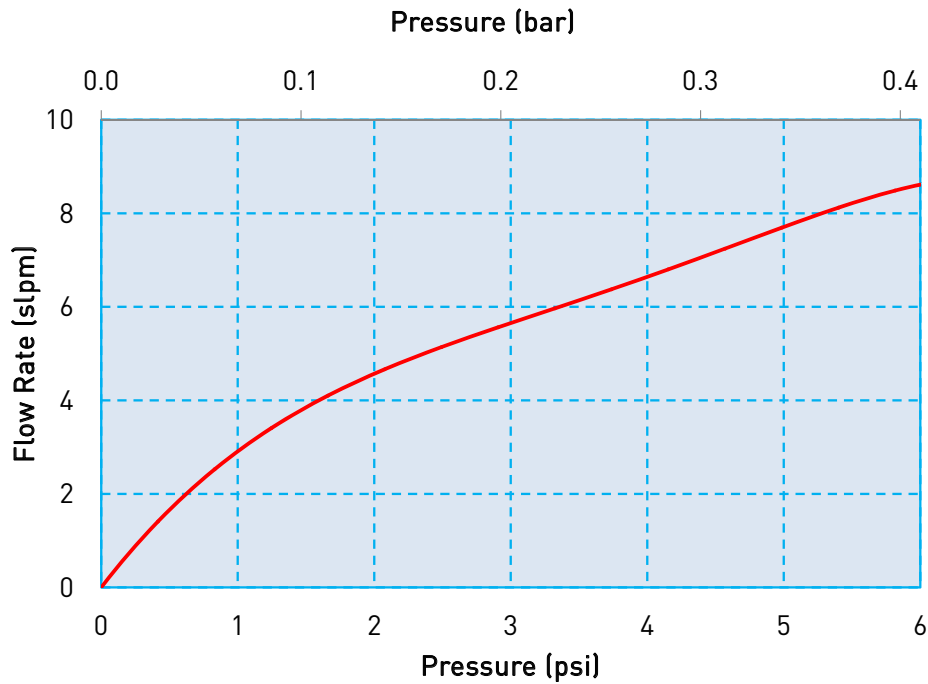
| |
|---|
| Leak Rate: |
| 0.016 sccm - (Air) |
| - Valve Type #1 (Normally Open - Silicone/EPDM) |
| - Valve Type #7 (Normally Open - Silicone) |
| 0.2 sccm - (Air) |
| - Valve Type #2 (Normally Closed - FKM) |
| - Valve Type #6 (Distributor - FKM/EPDM) |
| Response Time: |
| < 5 ms maximum cycling (Silicone) |
| < 20 ms maximum cycling (FKM, EPDM) |
| < 20 ms cycling (Viton & EPDM) |
| Pressure/Vacuum: |
| 6 psid (0.4 bar differential) |
| Proof Pressure: |
| 200 psig (13.7 bar) |
| Minimum Flow: |
| 8 slpm @ 6 psid (0.4 bar differential) |
| Orifice Sizes/Equivalent Cv: |
| 0.060" (1.52 mm) / 0.042 |
| Life Requirement: |
| 20 million cycles |

Ten-X is a registered trademark of Parker Hannifin Corporation.



Ten-X[®] Miniature Pneumatic Solenoid Valve

**Typical Flow Curve (Tested w/air 24° C)
Model 1 – 0.060" (1.52 mm) Orifice**



Electrical Interface / Pneumatic Interface

Short Pin

(For Pin/Wire Lead or PCB Terminal Housing Connection)
[Reference Accessories section]



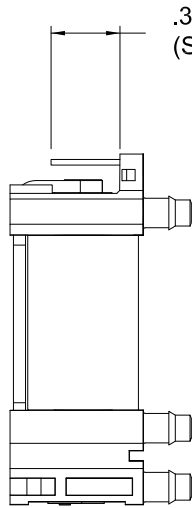
Long Pin

(For Pin/PCB solder mount connection)



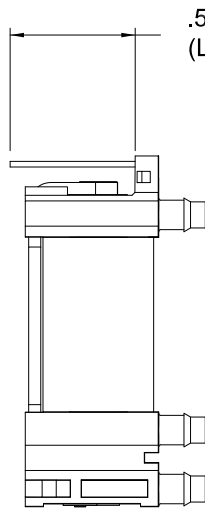
Ten-X[®] Miniature Pneumatic Solenoid Valve

Coil Connections



.375 [9.53]
(SHORT PIN)

Electrical Connection Options:
Electrical terminals compatible with Molex 51065 series connector or equivalent.

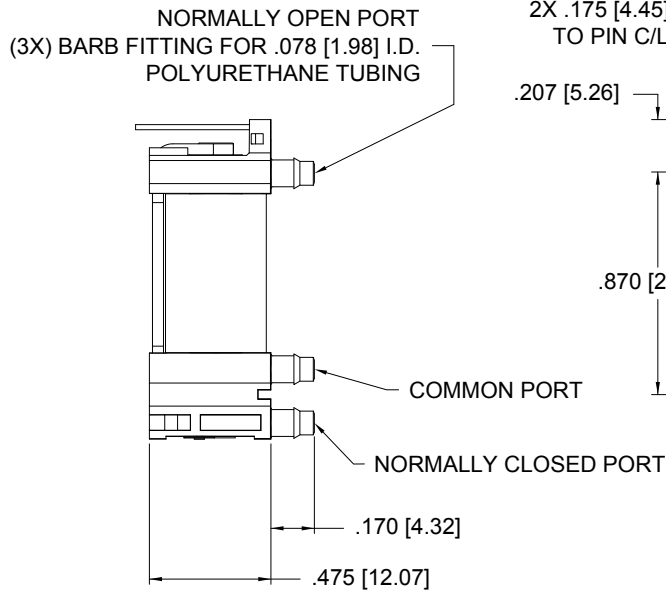


.575 [14.61]
(LONG PIN)

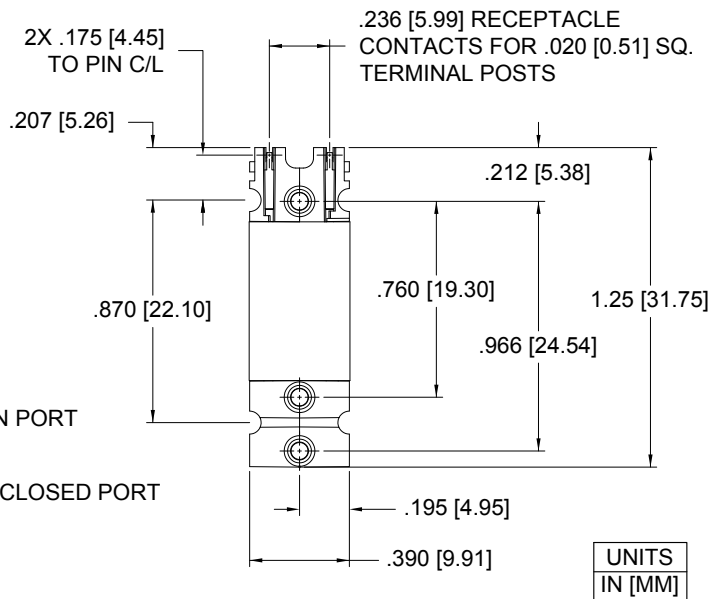
UNITS
IN [MM]

Dimensions

SIDE VIEW



BOTTOM VIEW

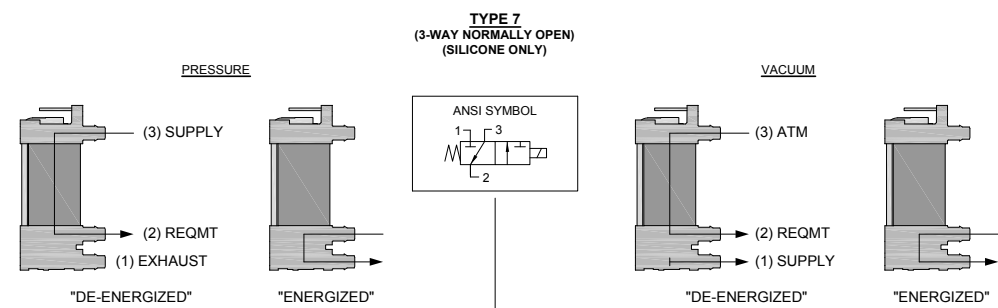
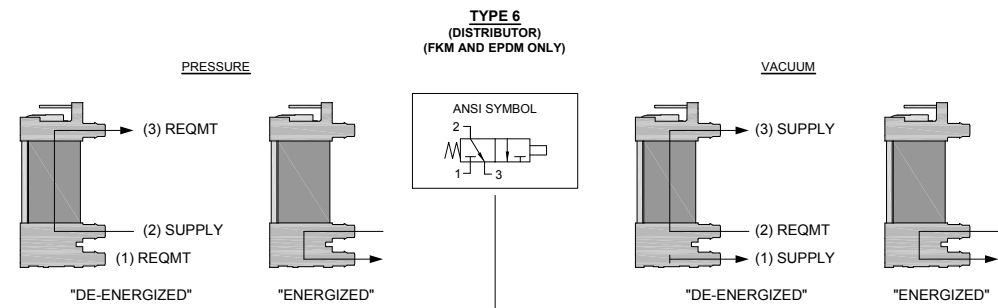
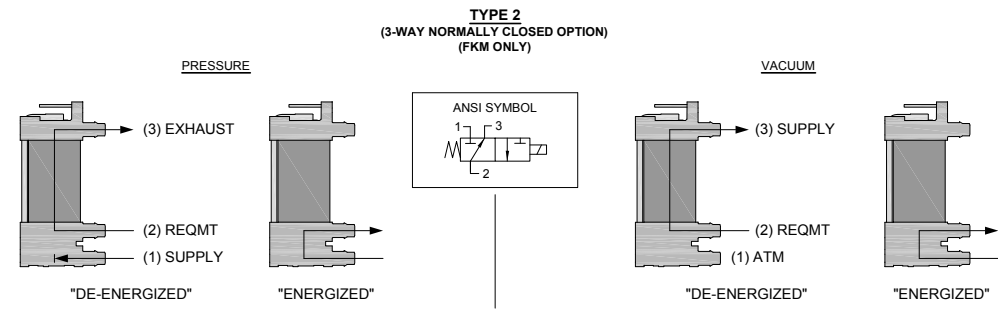
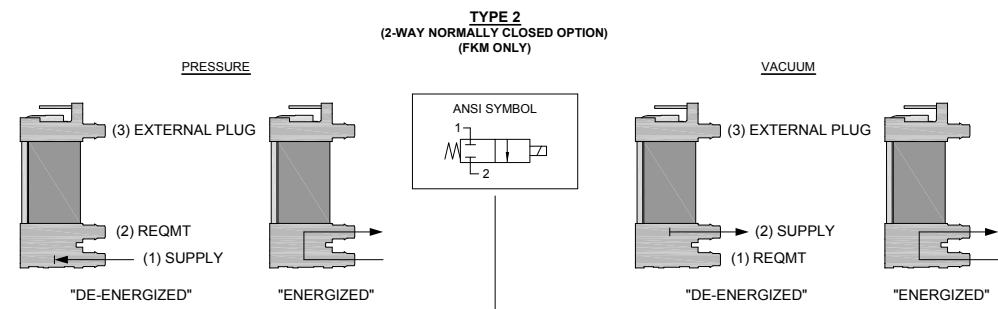
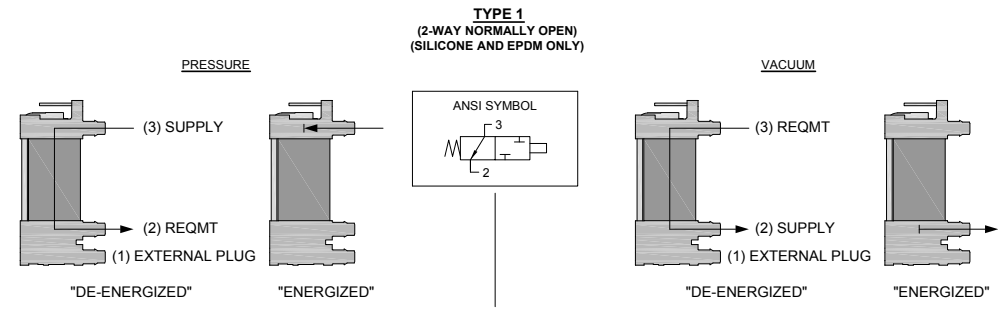


UNITS
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Ten-X® Miniature Pneumatic Solenoid Valve

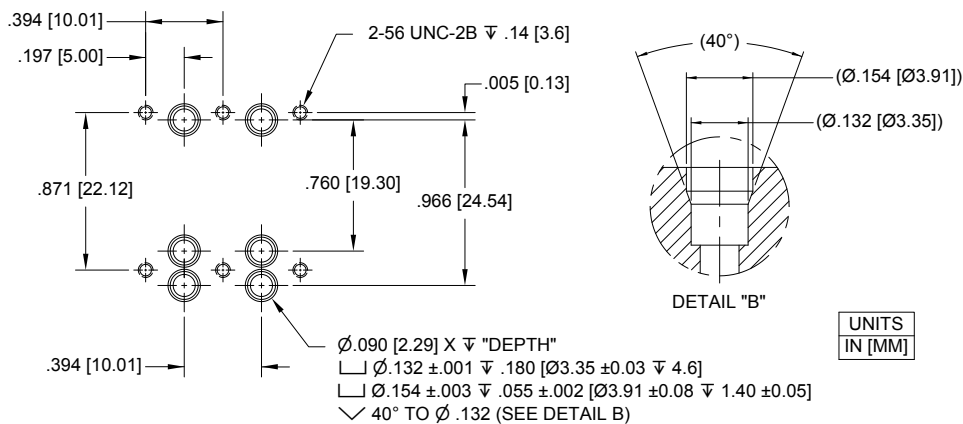
ANSI Pneumatic Schematics by Valve Types

| LEGEND: | |
|----------------|--|
| SUPPLY: | Pneumatic Source or Supply Pressure |
| EXHAUST: | Exhaust to Atmospheric Pressure |
| REQMT: | Customer Requirement or Application |
| ATM: | Atmospheric Pressure |
| EXTERNAL PLUG: | External Port Plug (Customer Supplied) |

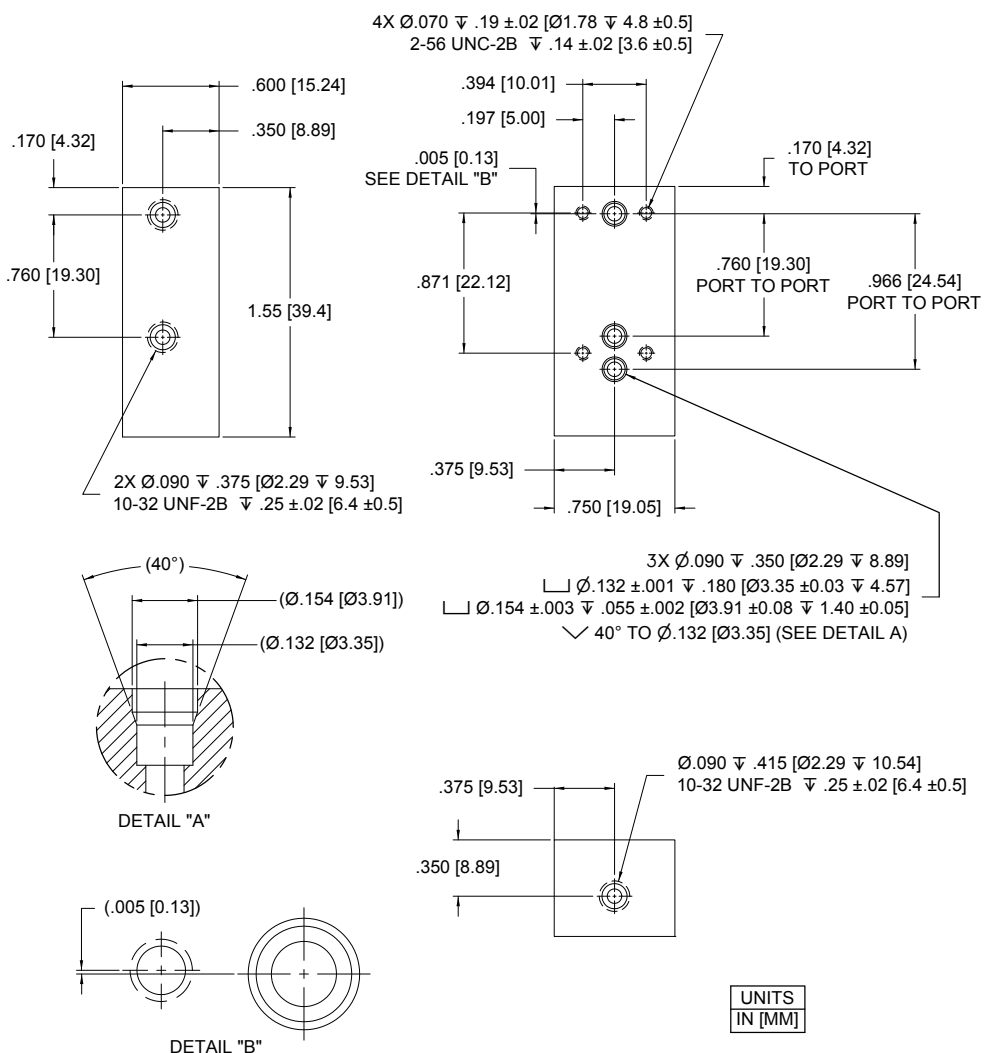


Ten-X® Miniature Pneumatic Solenoid Valve

Ten-X® Manifold Mount Diagram



Recommended Ten-X® Manifold Dimensions



Ten-X® Miniature Pneumatic Solenoid Valve

Mounting Option Accessories

Manifold Rubber Gasket (FKM)

195-000211-001



Manifold Rubber Gasket (EPDM)

195-000242-001



18" Wire Lead with connector

590-000106-001

(For use with Short Pin valve configuration)



Screw #2-56 x 5/8" Pan Head

191-000112-010

(2 required for each valve)



Ordering Information

| Sample Part ID | 914 | 1 | 1 | 1 | 05 | 1 |
|------------------------------------|--------|--|---|-------------|---------------------------------------|-------------------------------|
| Description | Series | Elastomer | Valve Type / Elastomer / Power | Model | Voltage | Electrical Coil Connection |
| Options | 914 | 1: Silicone 2: FKM (viton) 3: EPDM | 1: 2-Way Normally Open* 6 PSIG Silicone / EPDM Elastomer / 0.5 Watt 2: 2/3 Way Normally Closed 6 PSIG FKM Elastomer Only / 1 Watt 6: Distributor 6 PSIG 7: 3-Way Normally Open 6 PSIG Silicone Elastomer / 1 Watt | 1: Standard | 05: 5 VDC 12: 12 VDC 24: 24 VDC | 1: Pins (6 mm) 2: PC Mount |
| * Port 1 requires an external plug | | | | | | |

Accessories

195-000211-001: Manifold Rubber Gasket (FKM)
 195-000242-001: Manifold Rubber Gasket (EPDM)
 590-000106-001: 18" Wire Leads with connector
 191-000112-010: Screw 2-56 x 5/8" Pan Head (2 required for each valve)



NOTE: In order to provide the best possible solution for your application, please provide the following requirements when contacting Applications Engineering:

- Media, Inlet & Outlet Pressures
- Minimum Required Flow Rate
- System Supply Voltage
- Media
- Ambient Temperature Range

Please click on the Order On-line button (or go to www.parker.com/precisionfluidics/tenx) to configure your Ten-X Miniature Pneumatic Solenoid Valve. For more detailed information, visit us on the Web, or call and refer to Performance Spec. #790-002213-001 and Drawing #890-003150-003.

PPF-MSV-002/US May 2012

For more information call +1 603 595 1500 or email ppfinfo@parker.com

Visit www.parker.com/precisionfluidics



Ten-X[®] L_e Low Energy Miniature Pneumatic Solenoid Valve

10mm Normally Open/Closed Solenoid Valve




The Ten-X[®] L_e miniature pneumatic solenoid valve measures only 10 mm in width and features pulse width modulation (PWM) circuit technology to minimize power consumption making it an ideal solution for applications with limited space and available power. The Ten-X[®] L_e miniature solenoid valve features repeatable “on and off” response times, stable performance and a universal body design that is suited for manifold or barbed-tube mounting. The Ten-X[®] L_e miniature solenoid valve is available in 2-way or 3-way normally open/normally closed configurations.

Typical Applications

- Portable medical equipment
- Patient monitors
- Wound therapy
- Blood Pressure Monitoring
- Dialysis

Features

- PWM circuit technology to minimize power consumption
- Quiet, lightweight design with small footprint providing up to 22 lpm of flow
- Compact, efficient side-to-side mounting to minimize system size and ease integration
- RoHS compliant 

Mechanical

Valve Type:

3 Port, Direct acting poppet style
 - 2/3-Way Normally Closed (NC)
 - 2/3-Way Normally Open (NO)
 - 3-Way Distributor
 *Reference ordering information for available configurations.

Media:

Non-Reactive Gases

Operating Environment:

32 to 122°F (0 to 50°C)

Storage Temperature:

-40 to 158°F (-40 to 70°C)

Dimensions:

- Length: 1.30 in (33.1 mm)
 - Width: 0.39 in (9.9 mm)
 - Height: 0.62 in (15.7 mm) to Manifold Face / 0.79 in (20.0 mm) to Barb End

Porting:

- Barbs for 5/64 in (2 mm) I. D. Tubing, (0.055 in Wall Max.)
 - Manifold Mount (Gasket accessory required, see ordering info)

Weight:

0.42 oz. (12 g)

Internal Volume:

0.0080 in³ (0.131 cm³)

Electrical

Power:

0.5 Watt

Voltage:

5, 12, or 24 VDC

Electrical Connections:

- PC Pins, 2.5 mm centers (all models)
 - 18" Lead Wire/Connector Assembly, (Accessory, see ordering info)
 Constant Voltage supply required (Includes internal PWM circuit)

Wetted Materials

Bobbin/Body:

PBT (Polybutylene terephthalate)
 Glass Filled

Pole & Plunger:

430 FR Series Stainless Steel

Seal (Options):

FKM, EPDM

Other:

302 Stainless Steel, Nickel Plated

Performance Characteristics

Leak Rate:

0.2 sccm of air max.

Response Time:

<20 ms cycling

Pressure/Vacuum:

30 psid (2.0 bar differential)

Proof Pressure:

200 psig (13.7 bar)

Minimum Flow:

22 slpm @ 30 psid (2.0 bar differential)

Orifice Sizes/Equivalent Cv:

0.060" (1.52 mm) / 0.042

Life Requirement:

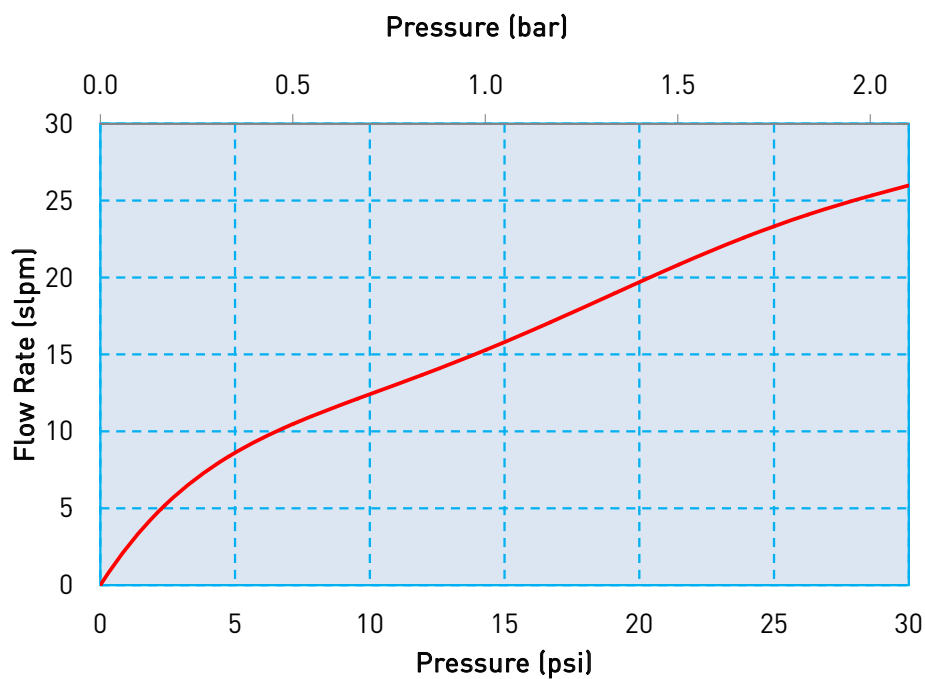
20 million cycles



Ten-X is a registered trademark of Parker Hannifin Corporation.

Ten-X[®]Le Low Energy Miniature Pneumatic Solenoid Valve

**Typical Flow Curve (Tested w/air 24° C)
Model 2 – 0.060" (1.52 mm) Orifice**



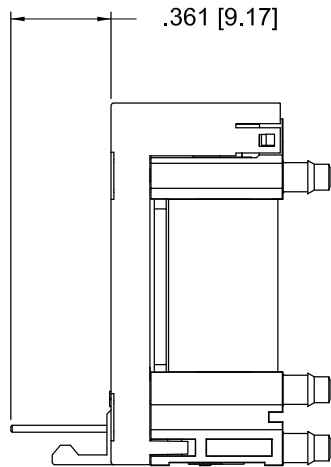
Electrical Interface / Pneumatic Interface

Standard Pin



Ten-X[®]Le Low Energy Miniature Pneumatic Solenoid Valve

Coil Connections



UNITS
IN [MM]

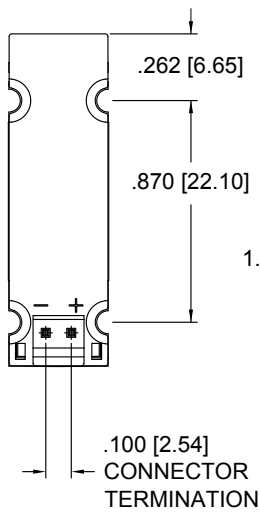
Wire Lead Connector
590-000073-001



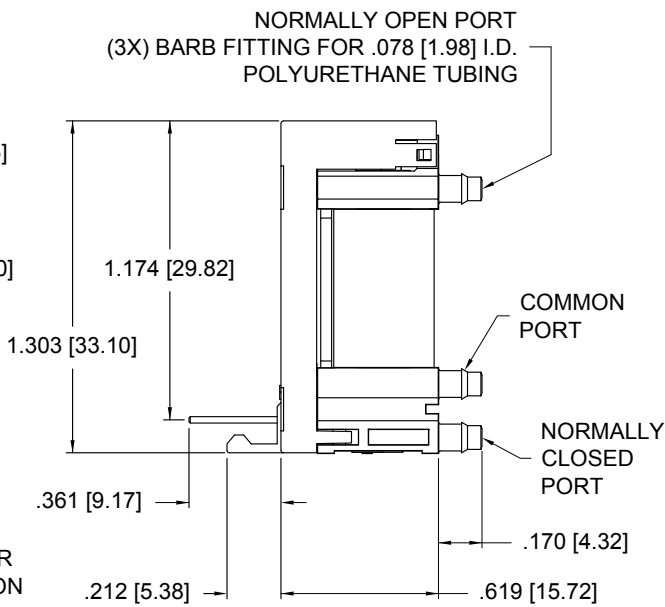
Wire Lead connector assembly required for electrical connectivity

Dimensions

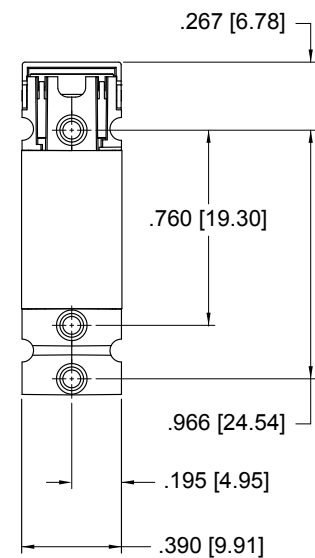
TOP VIEW



SIDE VIEW



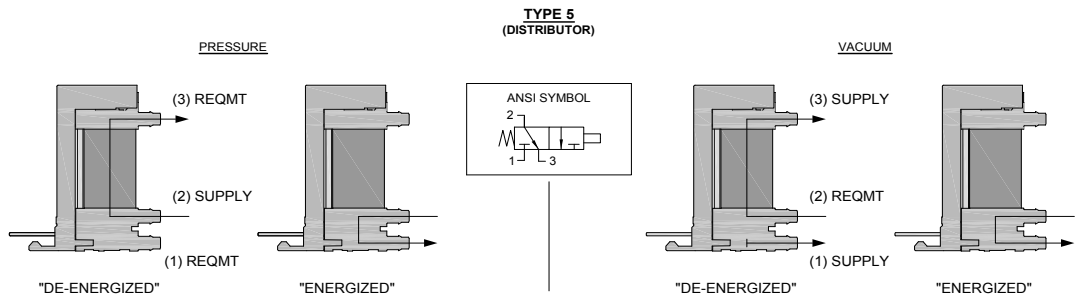
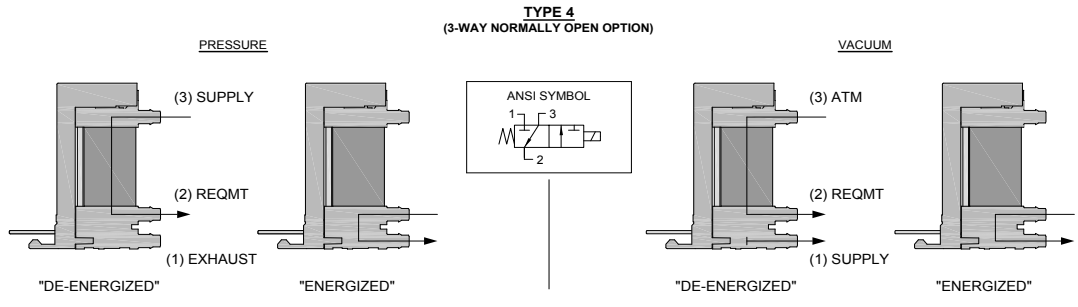
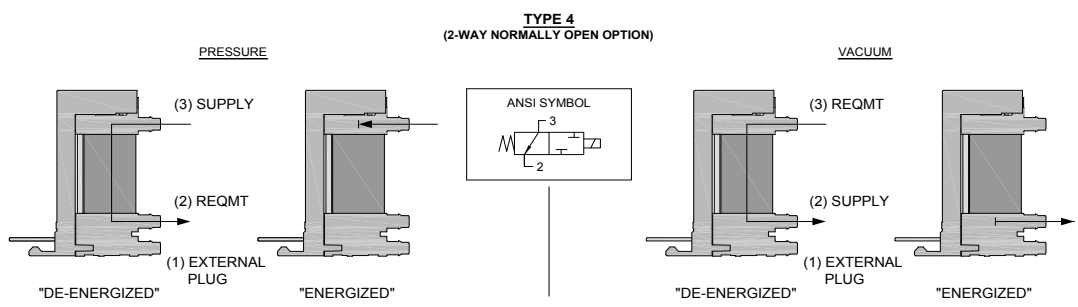
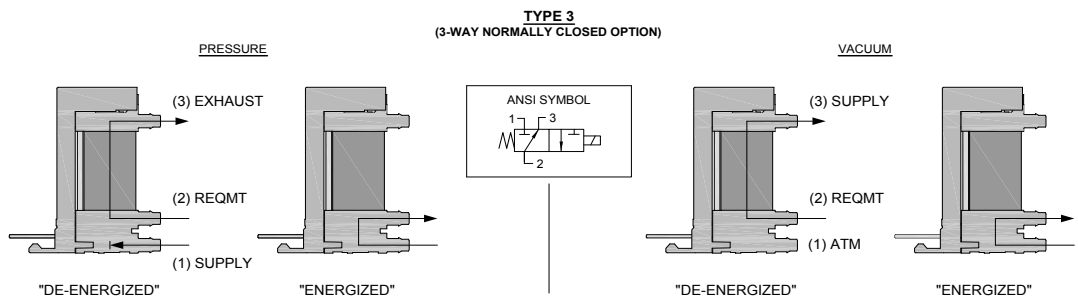
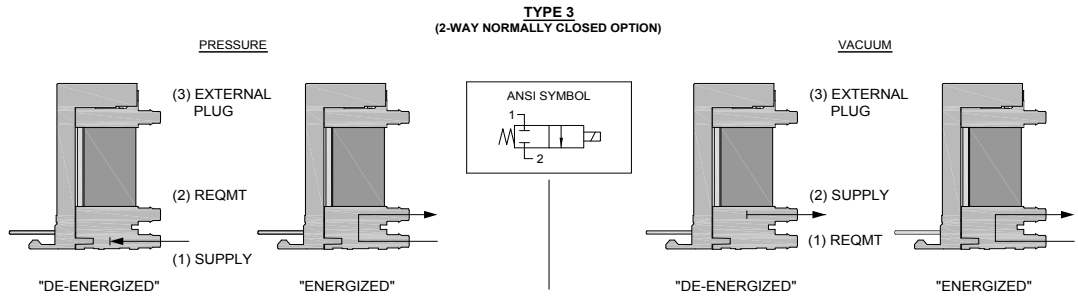
BOTTOM VIEW



Ten-X[®]Le Low Energy Miniature Pneumatic Solenoid Valve

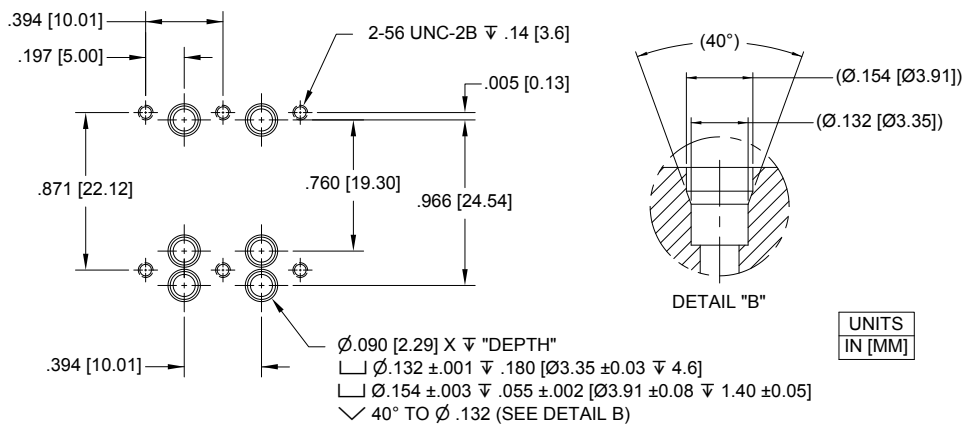
ANSI Pneumatic Schematics by Valve Types

| LEGEND: | |
|----------------|--|
| SUPPLY: | Pneumatic Source or Supply Pressure |
| EXHAUST: | Exhaust to Atmospheric Pressure |
| REQMT: | Customer Requirement or Application |
| ATM: | Atmospheric Pressure |
| EXTERNAL PLUG: | External Port Plug (Customer Supplied) |

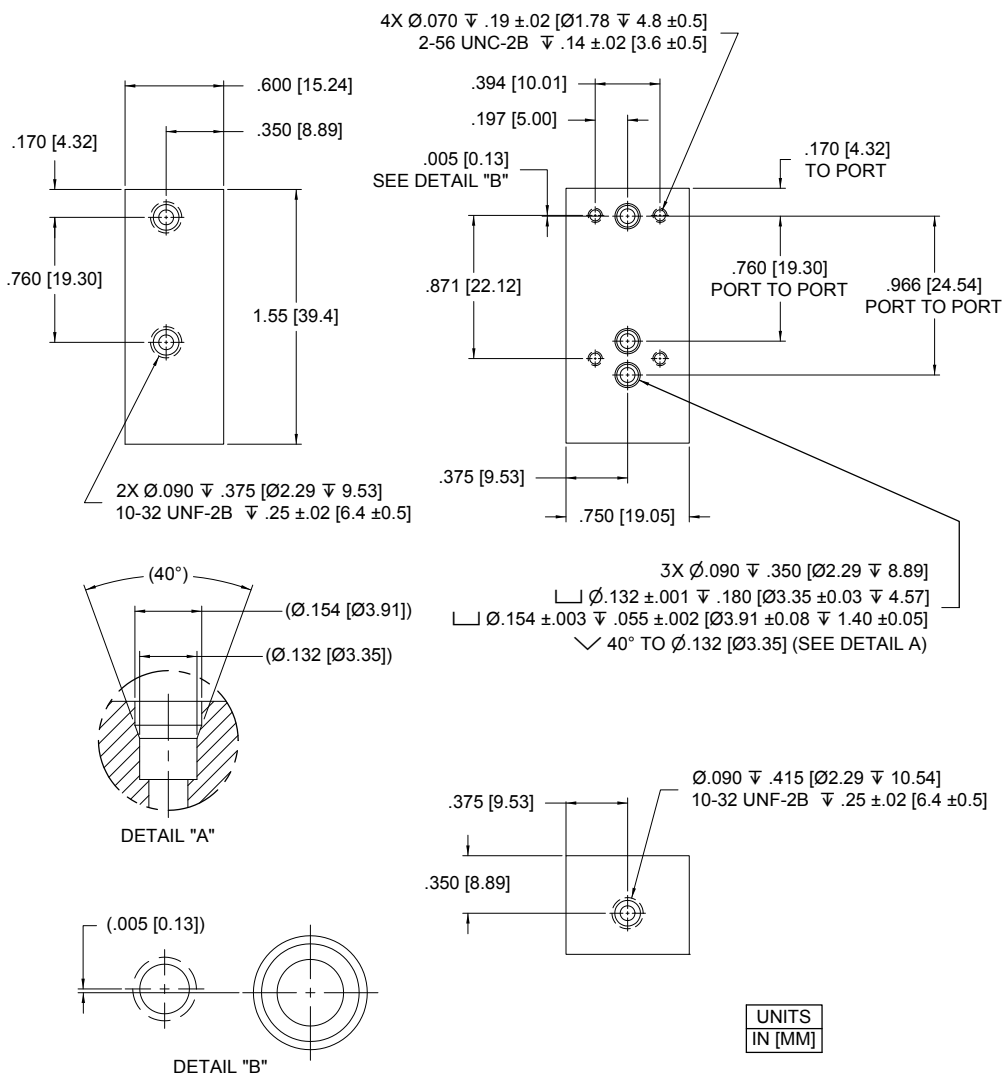


Ten-X® L_e Low Energy Miniature Pneumatic Solenoid Valve

Ten-X® L_e Manifold Mount Diagram



Recommended Ten-X® L_e Manifold Dimensions



Ten-X[®]Le Low Energy Miniature Pneumatic Solenoid Valve

Mounting Option Accessories

Manifold Rubber Gasket (FKM)

195-000211-001



Manifold Rubber Gasket (EPDM)

195-000242-001



18" Wire Lead with latching connector

590-000073-001



Screw #2-56 x 3/4" Pan Head

191-000112-012

(2 required for each valve)



Ordering Information

| Sample Part ID | 914 | 2 | 3 | 2 | 05 | 3 | 000 |
|----------------|--------|---------------------------|---|---------------------------|---------------------------------------|----------------------------|-----|
| Description | Series | Elastomer | Valve Type / Pressure | Model | Voltage | Electrical Coil Connection | |
| Options | 914 | 2: FKM (Viton) 3: EPDM | 3: 2/3 Way Normally Closed / 30 psi 2: 2/3 Way Normally Open / 30 psi 6: 3-Way Distributor / 20 psi | 2: Integrated Electronics | 05: 5 VDC 12: 12 VDC 24: 24 VDC | 3: Pins (2.54 mm) | |

| Accessories |
|--|
| 195-000211-001: Manifold Rubber Gasket (FKM) |
| 195-000242-001: Manifold Rubber Gasket (EPDM) |
| 590-000073-001: 18" Wire Leads with connector |
| 191-000112-012: Screw 2-56 x 3/4" Pan Head (2 required for each valve) |



NOTE: In order to provide the best possible solution for your application, please provide the following requirements when contacting Applications Engineering:

- Media, Inlet & Outlet Pressures
- Minimum Required Flow Rate
- System Supply Voltage
- Media
- Ambient Temperature Range

Please click on the Order On-line button (or go to www.parker.com/precisionfluidics/tenxle) to configure your Ten-X Miniature Low Energy Pneumatic Solenoid Valve. For more detailed information, visit us on the Web, or call and refer to Performance Spec. #790-002213-002 and Drawing #890-003150-002.

PPF-MSV-002/US May 2012

For more information call +1 603 595 1500 or email ppfinfo@parker.com
Visit www.parker.com/precisionfluidics



SRS Miniature Pneumatic Solenoid Valve

10 mm Manifold Mount Solenoid Valve




The SRS miniature solenoid valve is a compact and lightweight 10 mm manifold mount solenoid valve designed for portable instruments and medical devices requiring minimal power consumption and quiet operation. Utilizing an integrated manifold seal design in combination with a variety of electrical termination options, the SRS miniature solenoid valve simplifies pneumatic and electronic integration. With flow rates of up to 18 slpm and inlet pressures of up to 85 psig, the SRS miniature solenoid valve is an ideal solution for demanding portable instruments and medical devices.

Typical Applications

- Medical & Analytical Gas Control
- Blood Pressure Monitoring
- Sensor Zeroing
- Patient Monitors
- Portable Medical Devices

Features

- Lightweight and compact to reduce system size and weight
- Integrated manifold seal and PC mount capability to simplify integration
- Hermetically-sealed coil protects the valve from accidental exposure to liquids
- Constructed of PBT and non-corrosive metal for use with non-reactive gases
- RoHS compliant 

Mechanical

Valve Type:

3 Port, Direct-acting poppet style
 - Normally Closed
 - Normally Open
 - Distributor

Media:

Non-Reactive gases

Operating Environment:

32 to 131°F (0 to 55°C)

Storage Temperature:

-40 to 158°F (-40 to 70°C)

Dimensions:

- Length: 1.5 in (38.1 mm)
 - Width: 0.39 in (10.0 mm)
 - Height: 0.61 in (15.5 mm)

Porting:

Manifold mount; Gasket supplied

Weight:

0.23 oz (6.5 g)

Internal Volume:

0.0016 in³ (0.027 cm³)

Filtration:

40 micron (recommended)

Electrical

Power Options:

0.5 or 1.0 Watt

Voltage Options: (±10%)

5, 12 or 24 VDC

Further power reduction may be achieved through the use of spike and hold or PWM electrical control.

Wetted Materials

Bobbin/Body:

Glass Reinforced PBT
 (Polybutylene terephthalate)

Pole & Plunger:

430 FR Stainless Steel

Seal:

FKM

Other:

300 Series Stainless Steel

Performance Characteristics

Leak Rate:

<0.016 sccm of air

Response:

<30 ms cycling

Pressure:

0 to 85 psid (5.86 bar)

Vacuum:

0-27 in Hg (686 mm Hg)

Burst Pressure:

200 psig (13.7 bar)

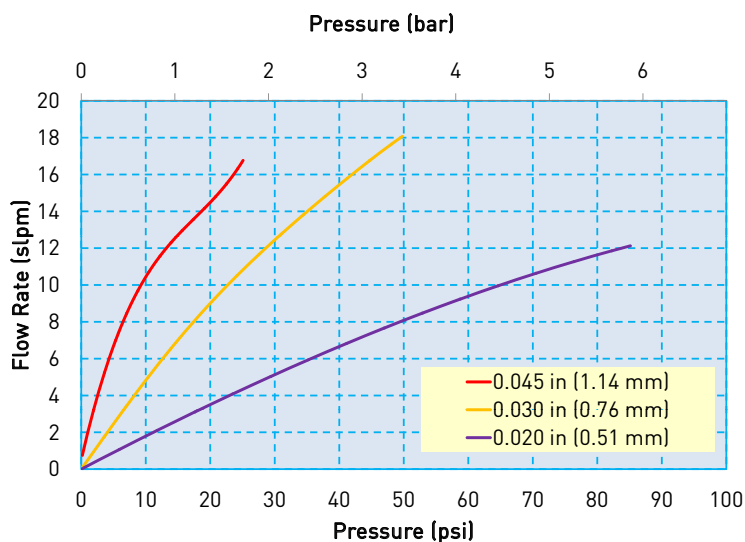
Orifice Sizes / Equivalent Cv:

0.045" (1.14 mm) / 0.027
 0.030" (0.76 mm) / 0.017
 0.020" (0.51 mm) / 0.0075

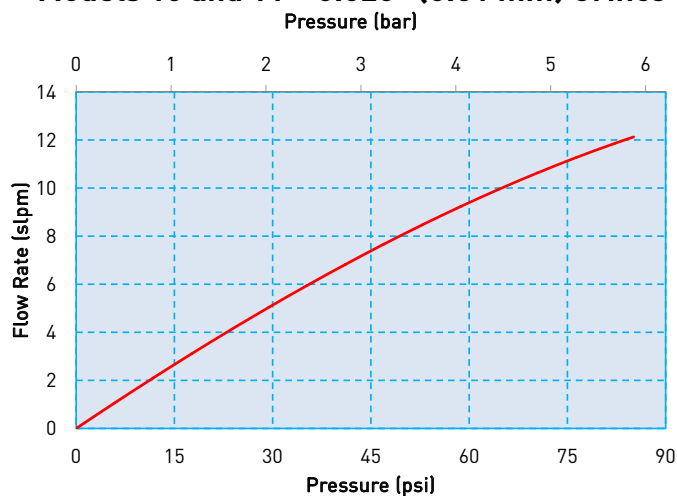
(See Life-cycle information in Performance Parameters section.)

SRS Miniature Pneumatic Solenoid Valve

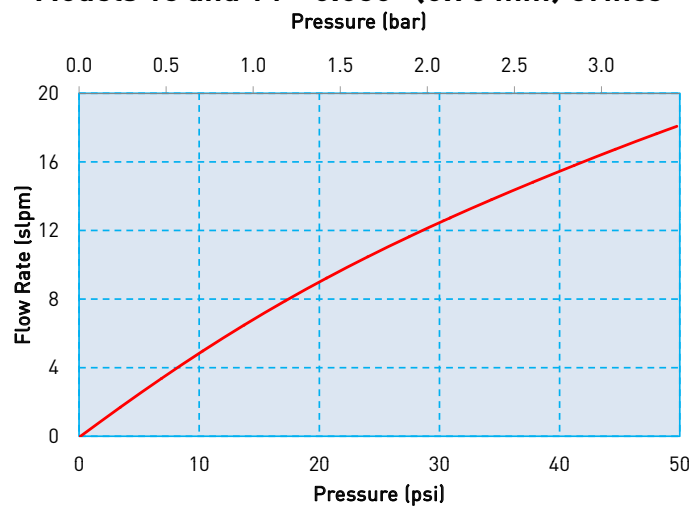
Typical Flow Curve (Tested w/ air 24°C) All Models



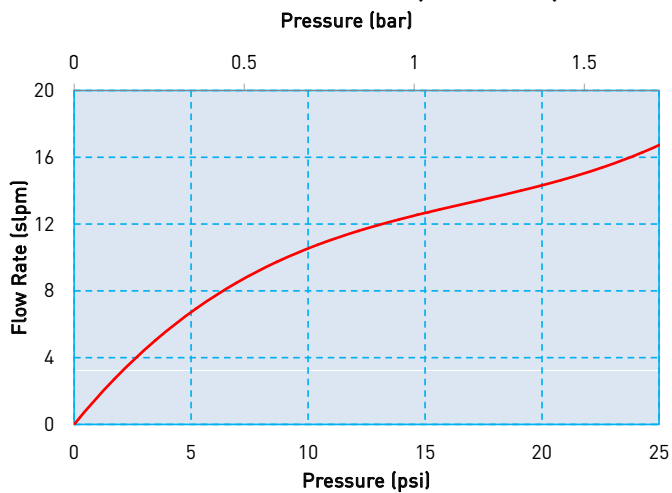
Models 10 and 11 – 0.020" (0.51 mm) Orifice



Models 13 and 14 – 0.030" (0.76 mm) Orifice



Models 16 and 17 – 0.045" (1.14 mm) Orifice



SRS Miniature Pneumatic Solenoid Valve

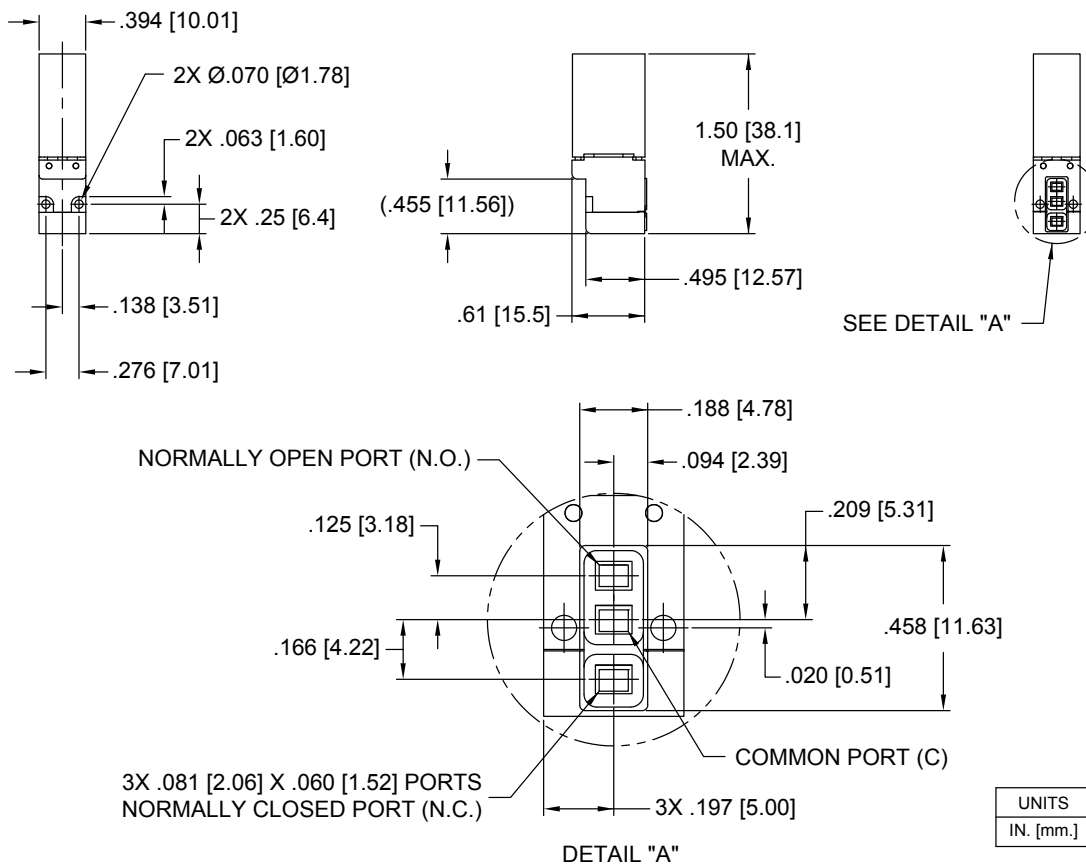
Performance Parameters

| Model No. | Orifice Size | Maximum Supply Pressure | Maximum Supply Vacuum | Power Consumption | Life Requirements (millions of cycles) |
|-----------|--------------------|-------------------------|-----------------------|-------------------|--|
| 10 | 0.020 in (0.51 mm) | 35 psi (2.41 bar) | 27 in Hg (686 mm Hg) | 0.5 Watt | 175 |
| 11 | 0.020 in (0.51 mm) | 85 psi (5.86 bar) | 27 in Hg (686 mm Hg) | 1 Watt | 50 |
| 13 | 0.030 in (0.76 mm) | 20 psi (1.37 bar) | 27 in Hg (686 mm Hg) | 0.5 Watt | 200 |
| 14 | 0.030 in (0.76 mm) | 50 psi (3.44 bar) | 27 in Hg (686 mm Hg) | 1 Watt | 25 |
| 16 | 0.045 in (1.14 mm) | 10 psi (0.68 bar) | 20 in Hg (508 mm Hg) | 0.5 Watt | 100 |
| 17 | 0.045 in (1.14 mm) | 20 psi (1.37 bar) | 27 in Hg (686 mm Hg) | 1 Watt | 25 |

Pneumatic Interface

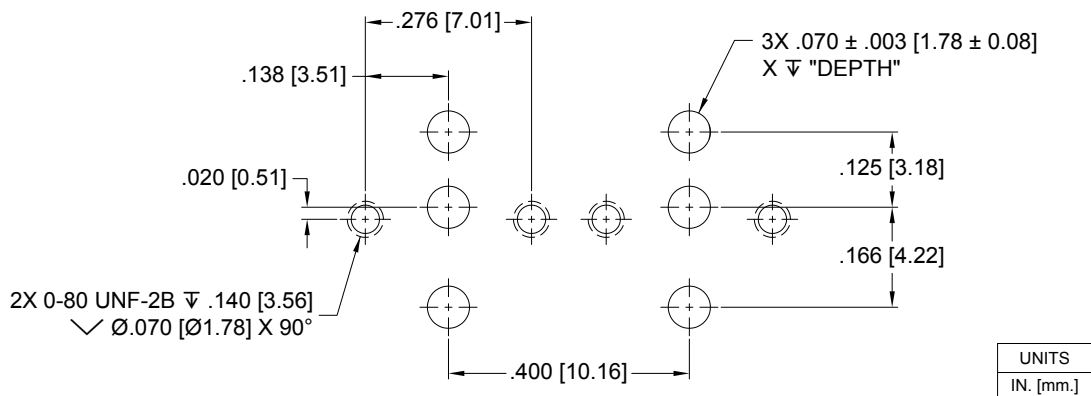


SRS Basic Valve Dimensions

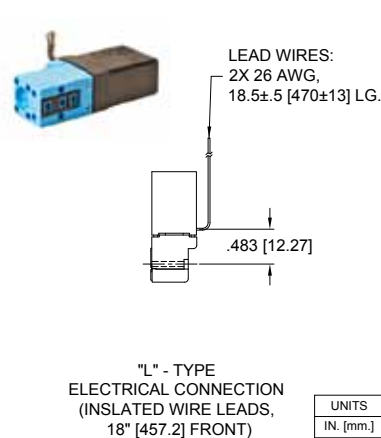
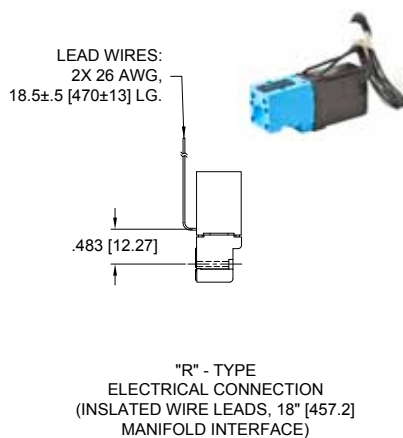
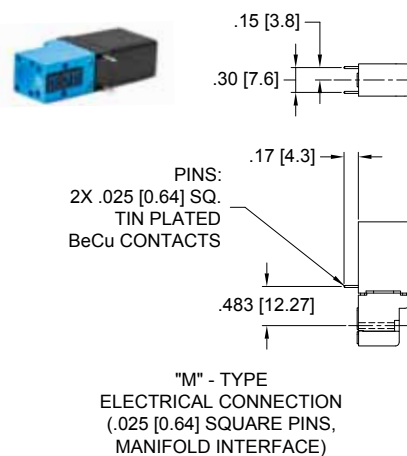
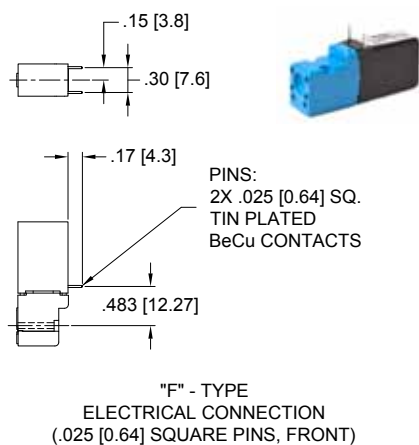


SRS Miniature Pneumatic Solenoid Valve

SRS Manifold Mount Diagram



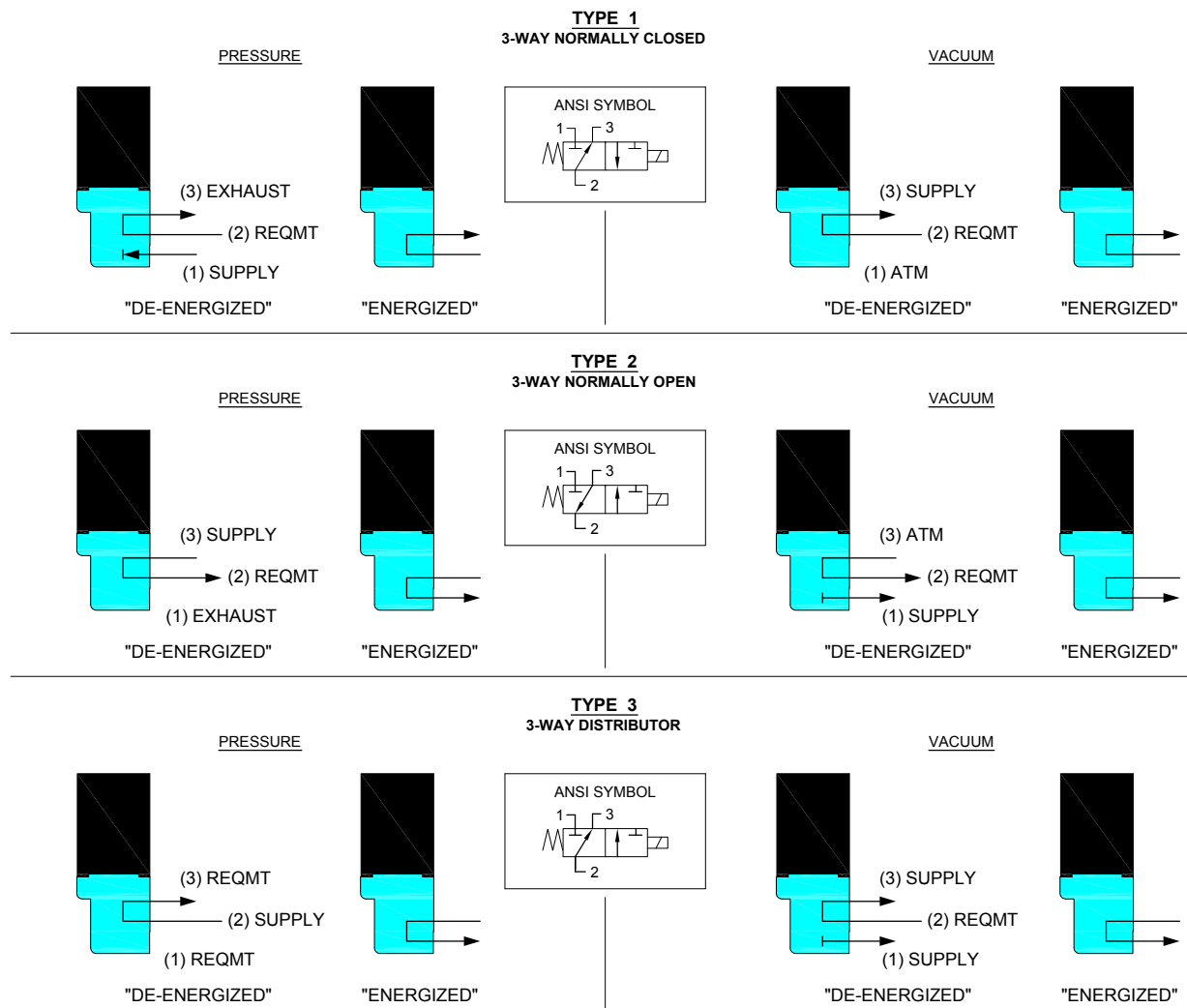
Electrical Interface



SRS Miniature Pneumatic Solenoid Valve

| LEGEND: | |
|----------|-------------------------------------|
| SUPPLY: | Pneumatic Source or Supply Pressure |
| EXHAUST: | Exhaust to Atmospheric Pressure |
| REQMT: | Customer Requirement or Application |
| ATM: | Atmospheric Pressure |

ANSI Pneumatic Schematics by Valve Types



SRS Miniature Pneumatic Solenoid Valve

Accessories

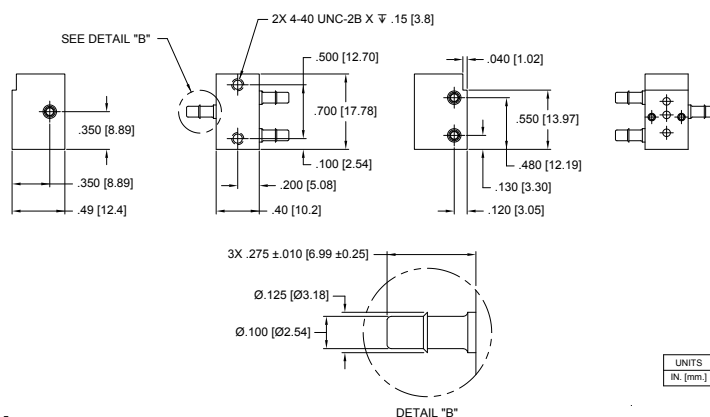
Seal, Valve Manifold, SRS
195-000139-001



Screw 0-80 x 9/16" Pan Head, Phillips
191-000100-009
(2 required for each valve)



Test Manifold, Single Station, SRS
990-001362-001



Ordering Information

| Sample Part ID | SRS | 10 | 2 | P | V | 12 | M |
|----------------|--------|-------------------------------------|-------------------------------|------------------------|------------------|------------|--|
| Description | Series | Model Number: Pressure / Orifice | Type | Material | Seal Material | Voltage | Electrical Connection |
| Options | SRS | 10: 0-35 psi / 0.020" | 1: 3-Way NC | P: Engineering Plastic | V: FKM | 5: 5 VDC | F: 0.025" Square Pins, Front |
| | | 11: 0-85 psi / 0.020" | 2: 3-Way NO | | | 12: 12 VDC | M: 0.025" Square Pins, Manifold Interface |
| | | 13: 0-20 psi / 0.030" | 3: 3-Way NC or Distributor | | | 24: 24 VDC | L: Insulated Wire Leads, 18", Front |
| | | 14: 0-50 psi / 0.030" | | | | | R: Insulated Wire Leads, 18", Manifold Interface |
| | | 16: 0-10 psi / 0.045" | | | | | |
| | | 17: 0-20 psi / 0.045" | | | | | |

Accessories

| | |
|--|--|
| 195-000139-001: Seal, Valve Manifold, SRS * | * Used as seal between manifold and valve body |
| 191-000100-009: Screw 0-80 x 9/16", Pan Head, Phillips (2 required for each valve) | |
| 990-001362-001: Test Manifold, Single Station, SRS | |

NOTE: In order to provide the best possible solution for your application, please provide the following requirements when contacting Applications Engineering:

- Media, Inlet & Outlet Pressures
- Minimum Required Flow Rate
- System Supply Voltage
- Media
- Ambient Temperature Range



Please click on the Order On-line button (or go to www.parker.com/precisionfluidics/srs) to configure your SRS Miniature Pneumatic Solenoid Valve. For more detailed information, visit us on the Web, or call and refer to Performance Spec. #790-002090-001 and Drawing #890-003061-001.

PPF-MSV-002/US May 2012

For more information call +1 603 595 1500 or email ppfinfo@parker.com
Visit www.parker.com/precisionfluidics




PND Series Miniature Pneumatic Solenoid Valve

10 mm Normally Open Exhaust Valve



The PND Series miniature pneumatic solenoid valve is an economical 2-way normally open exhaust valve designed for rapid pressure relief. The PND Series miniature pneumatic solenoid valve is the perfect solution for safety oriented applications that require pressure relief to atmosphere upon power loss.

Features

- Compact, economical design to reduce size and cost of integration
- Normally Open configuration to ensure rapid deflation upon power loss
- Low power design reduces heat generation and power consumption
- Proven performance tested to 250,000 life cycles
- RoHS compliant 

Typical Applications

- Non-Invasive Blood Pressure Devices
- Normally Open Fail-Safe Exhaust

Mechanical

| |
|--|
| Valve Type: |
| 2 Port, Direct-acting poppet style - Normally Open (NO) |
| Media: |
| Air, Nitrogen, Argon, Carbon Dioxide, & other non-reacting gasses |
| Operating Environment: |
| 32 to 131°F (0 to 55°C) |
| Storage Temperature: |
| -13 to 158°F (-25 to 70°C) |
| Dimensions: |
| - Length: 1.01 in (25.7 mm) |
| - Width: 0.39 (10.0 mm) |
| - Height: 0.47 in (12.0 mm) |
| Porting: |
| Single Barb for 0.078" (2.0 mm) I.D. Tubing |
| Weight: |
| PND-05A: 0.60 oz (17.0 g) |
| PND-05D: 0.40 oz (11.8 g) |
| Internal Volume: |
| PND-05A: 0.0036 in ³ (0.059 cm ³) |
| PND-05D: 0.0025 in ³ (0.041 cm ³) |
| Filtration: |
| 40 micron (recommended) |

Electrical

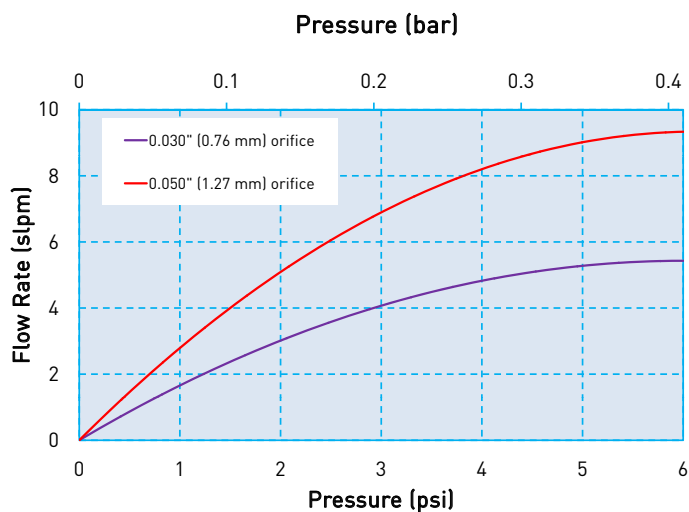
| |
|---|
| Power: |
| PND-05A: 0.36 Watt |
| PND-05D: 0.50 Watt |
| Voltage: |
| 3, 6 or 12 VDC |
| Further power reduction can be achieved with the use of PWM control. |
| Wetted Materials |
| Bobbin: |
| PBT (Polybutylene terephthalate) |
| Plunger/Barb: |
| SUM24L Steel |
| Seal: |
| Silicone |
| Frame: |
| SPCC Steel (Treatment: MFZn-c) |
| Other: |
| 304 Stainless Steel |

Performance Characteristics

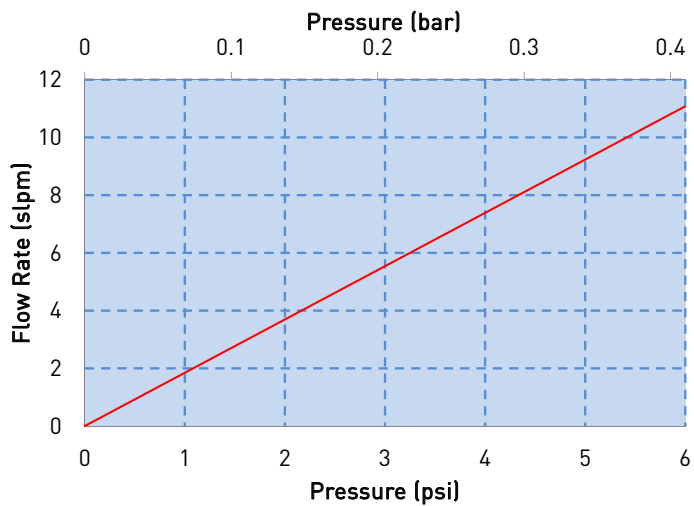
| |
|---|
| Leak Rate: |
| < 0.016 sccm of air |
| Response: |
| < 100 ms cycling |
| Pressure: |
| 0 to 6 psig (0.4 bar) |
| Orifice Sizes/Equivalent Cv: |
| PND-05A: 0.050" (1.27 mm) / 0.035 |
| PND-05D: 0.030" (0.75 mm) / 0.017 |
| Reliability: |
| Life cycle rating of 250,000 cycles (worst case tested, no performance degradation) |

PND Series Miniature Pneumatic Solenoid Valves

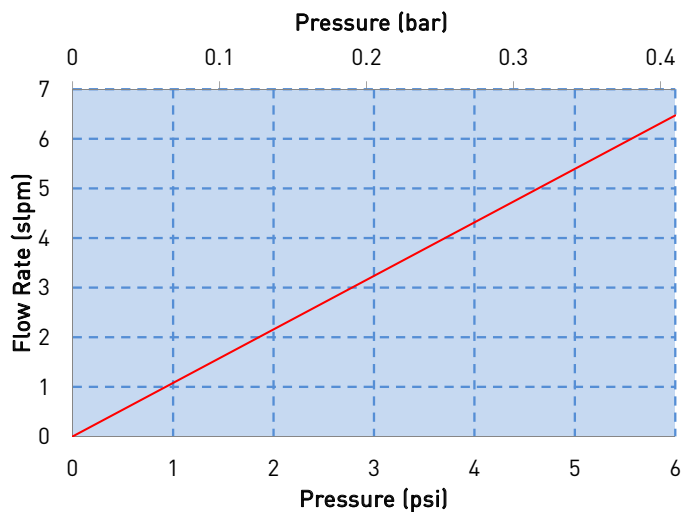
Typical Flow Curve (Tested w/air 24°C) All Models



Model PND-05A – 0.050" (1.27 mm) Orifice



Model PND-05D – 0.030" (0.76 mm) Orifice



PND Series Miniature Pneumatic Solenoid Valves

Pressure and Flow Capabilities/Power

| Model No. | Orifice Size | Nominal Cv | Maximum Supply Pressure | Power Consumption |
|-----------|--------------------|------------|-------------------------|-------------------|
| PND-05A | 0.050 in (1.27 mm) | 0.035 | 6 psig (0.4 bar) | 0.36 Watt |
| PND-05D | 0.030 in (0.76 mm) | 0.017 | 6 psig (0.4 bar) | 0.50 Watt |

Pneumatic Interface

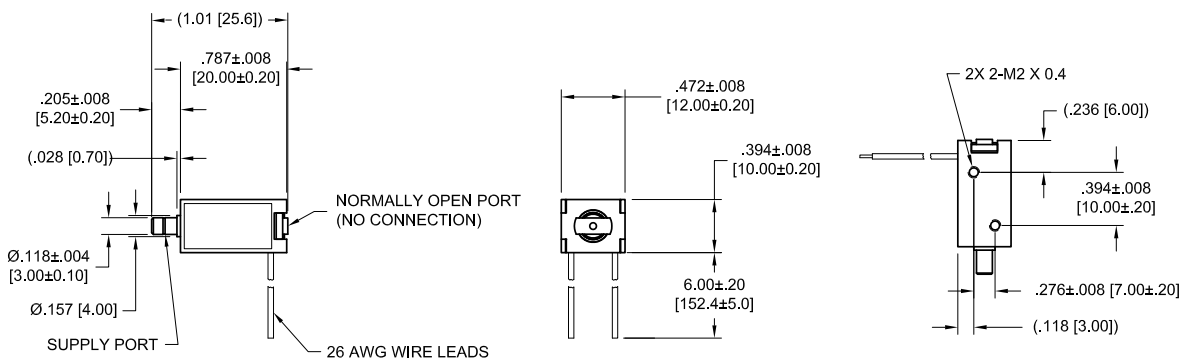
PND Series 05A



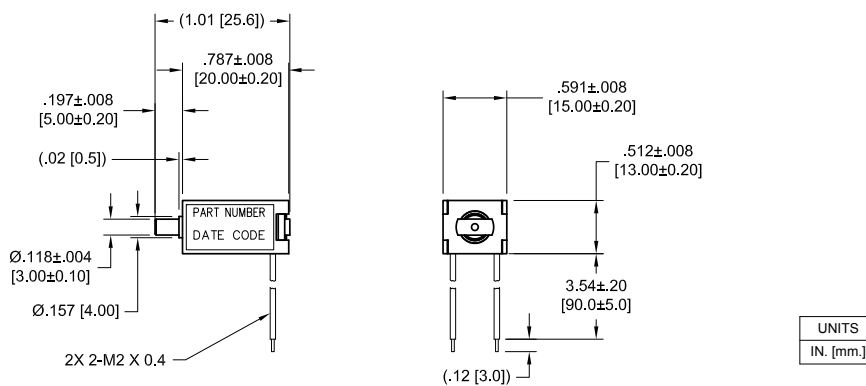
PND Series 05D



Basic Dimensions, PND-05A

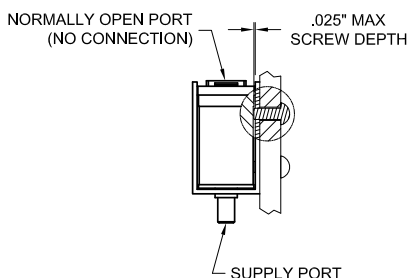


Basic Dimensions, PND-05D



UNITS
IN. [mm.]

Mounting Guidelines (PND-05A Only)



PND Series Miniature Pneumatic Solenoid Valves

Ordering Information

| Sample Part ID | PND | - | 05D | - | 12 |
|----------------|--------|---|--|---|-------------------------------------|
| Description | Series | - | Model: Orifice / Power | - | Voltage |
| Options | PND | | 05A: 0.050" / 0.36 Watt 05D: 0.030" / 0.50 Watt | | 03: 3 VDC 06: 6 VDC 12:12 VDC |



NOTE: In order to provide the best possible solution for your application, please provide the following requirements when contacting Applications Engineering:

- Media, Inlet & Outlet Pressures
- Minimum Required Flow Rate
- System Supply Voltage
- Media
- Ambient Temperature Range

Please click on the Order On-line button (or go to www.parker.com/precisionfluidics/pndvalve) to configure your PND Miniature Pneumatic Solenoid Valve. For more detailed information, visit us on the Web, or call and refer to Performance Spec. #790-002198-001 and Drawing #s: PND-05A-DWG and PND-05D-DWG.

Series 11 Miniature Pneumatic Solenoid Valve

15mm Solenoid Valve




The Series 11 miniature pneumatic solenoid valve is a robust and proven product with a reputation for reliable and consistent performance. The Series 11 miniature solenoid valve is the preferred choice of major OEM's in the medical and analytical market. With valve bodies made from brass or stainless steel, the Series 11 miniature solenoid valve is an ideal solution for general purpose applications and those applications requiring low out-gassing and a bubble-tight seal.

Typical Applications

- Oxygen Conservers
- Oxygen Concentrators
- Compression Therapy
- Gas Chromatography
- Insufflators
- Medical & Analytical Gas Control

Features

- Proven performance tested to 260 million life cycles
- Wide range of available electrical connections to simplify valve integration and control
- Manifold mount or barbed tube pneumatic configurations available for added system design flexibility
- Available Analytical and Oxygen Service Clean to minimize contamination
- RoHS compliant 

Mechanical

Valve Type:

2/3 Port, Direct-acting poppet style

- Normally Closed (NC)
- Normally Open (NO)
- Distributor

Media:

Air, argon, helium, hydrogen, methane, nitrogen, oxygen, & other non-reacting gasses

Operating Environment:

32 to 158°F (0 to 70°C)

Storage Temperature:

-40 to 158°F (-40 to 70°C)

Dimensions:

- Length: 1.73 in (43.9 mm)
- Width: 0.63 in (15.8 mm)
- Height: 0.67 in (17.0 mm)

Weight:

2.1 oz (60 g)

Internal Volume:

0.026 in³ (0.426 cm³)

Filtration:

40 micron (recommended)

Oxygen Clean:

Call For Details

Electrical

Power Options:

0.5, 1.0, or 2.0 Watts

Voltage Options:

5, 12 or 24 VDC
Further power reduction may be achieved through the use of spike and hold or PWM electrical control.

Electrical Connections:

Wire Leads, PC Pins, Solder Tabs, Quick Disconnect Spade

Wetted Materials

Body:

36000 HO2 Brass;
303 Series Stainless Steel

Stem Base:

36000 HO2 Brass;
303 Series Stainless Steel

Poppet Options:

FKM or EPDM

All Others:

430 FR Series Stainless Steel
302 Series Stainless Steel

Performance Characteristics

Leak Rate:

<0.016 sccm of air (bubble tight)

Response:

<30 ms cycling

Pressure:

0 to 100 psig (6.9 bar)

Vacuum:

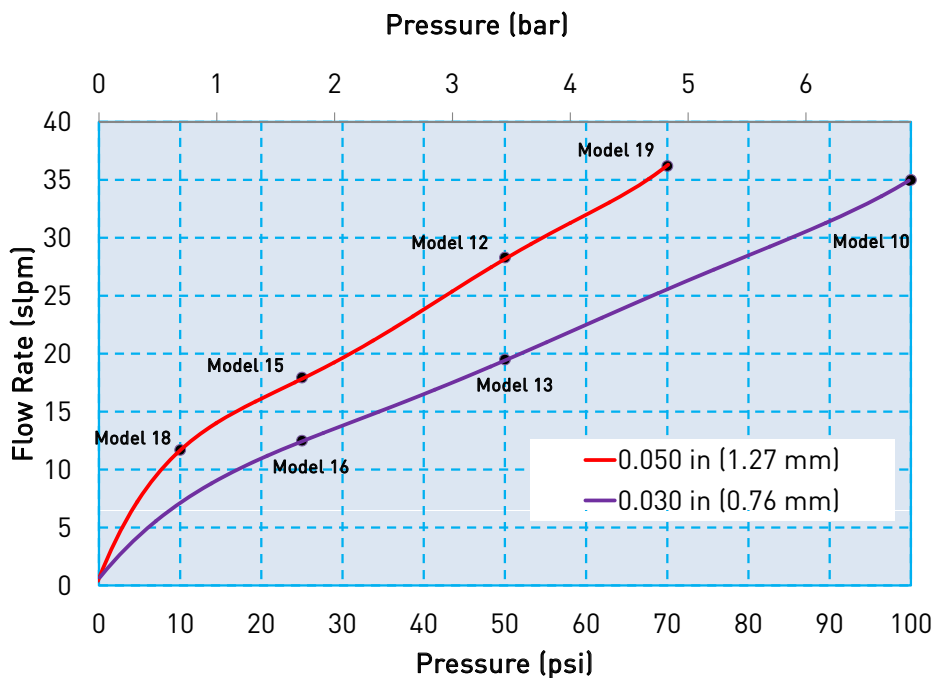
0-27 in Hg (686 mm Hg)

Orifice Sizes:

0.030" (0.76 mm)
0.050" (1.27 mm)

Series 11 Miniature Pneumatic Solenoid Valve

Typical Flow Curve (Tested w/air 24° C) All Models



All models reflect typical flow output capability based on rated pressure

Pressure and Flow Capabilities/Life Requirements

| Model No. | Orifice Size | Nominal Cv | Maximum Supply Pressure | Power Consumption | Elastomer | Life Requirements (millions of cycles*) |
|-----------|--------------------|------------|-------------------------|-------------------|-----------|---|
| 10 | 0.030 in (0.76 mm) | 0.017 | 100 psig (6.9 bar) | 2 Watts | FKM | 100 |
| | | | | | EPDM | 20 |
| 12 | 0.050 in (1.27 mm) | 0.031 | 50 psig (3.5 bar) | 2 Watts | FKM | 100 |
| | | | | | EPDM | 20 |
| 13 | 0.030 in (0.76 mm) | 0.017 | 50 psig (3.5 bar) | 1 Watt | FKM | 200 |
| | | | | | EPDM | 40 |
| 15 | 0.050 in (1.27 mm) | 0.025 | 25 psig (1.7 bar) | 1 Watt | FKM | 200 |
| | | | | | EPDM | 40 |
| 16 | 0.030 in (0.76 mm) | 0.017 | 25 psig (1.7 bar) | 0.5 Watt | FKM | 260 |
| | | | | | EPDM | 60 |
| 18 | 0.050 in (1.27 mm) | 0.021 | 10 psig (0.7 bar) | 0.5 Watt | FKM | 260 |
| | | | | | EPDM | 60 |
| 19 | 0.050 in (1.27 mm) | 0.025 | 70 psig (4.8 bar) | 2 Watts | FKM | 20 |
| | | | | | EPDM | 16 |

*Life is dependent upon elastomeric material, duty cycle and pressures

For custom requirements please contact Applications Engineering at 603-595-1500 or ppinfo@parker.com



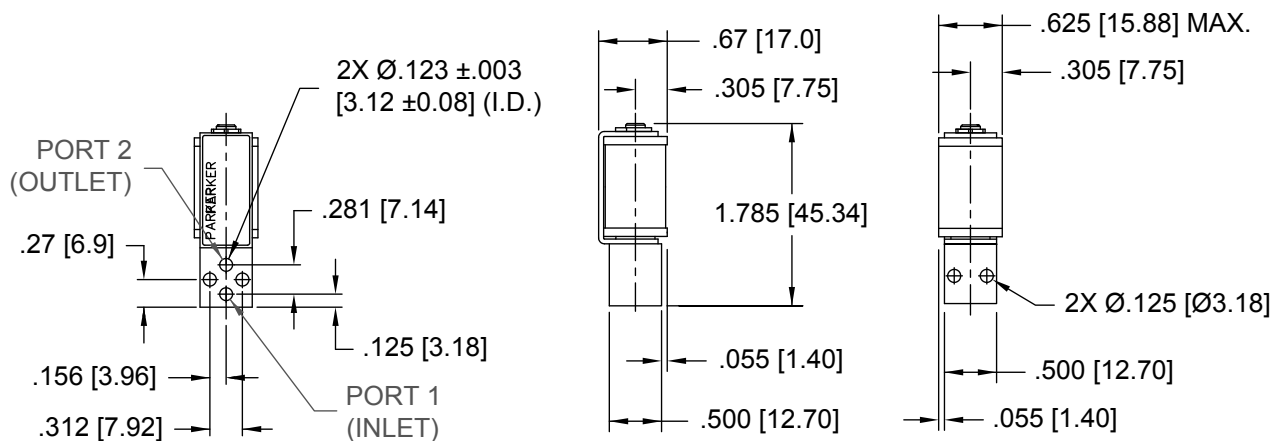
Series 11 Miniature Pneumatic Solenoid Valve

Pneumatic Interface

Manifold Mount

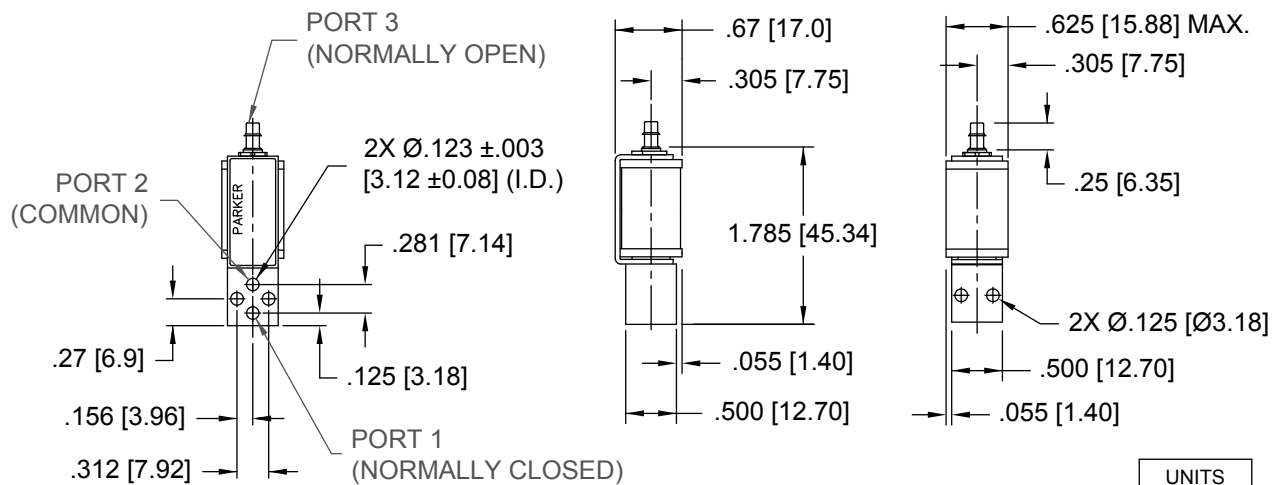


Basic Dimensions, 2-Way Valve Configuration



| |
|-----------|
| UNITS |
| IN. [mm.] |

Basic Dimensions, 3-Way Valve Configuration



| |
|-----------|
| UNITS |
| IN. [mm.] |



Series 11 Miniature Pneumatic Solenoid Valve

Pneumatic Interface

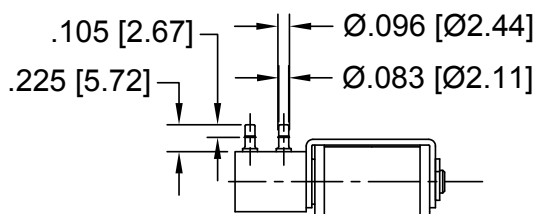
Barbed



Barb Options

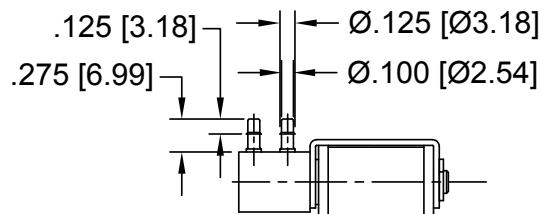
1/16" (1.5 mm) Barbs

(For 1/16" (1.5 mm) I.D. Tubing)



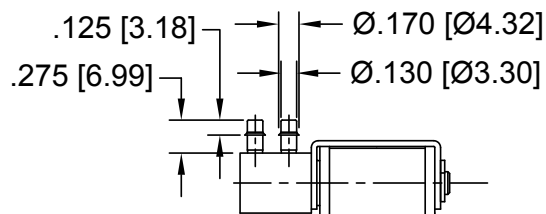
5/64" (2 mm) Barbs

(For 5/64" (2 mm) I.D. Tubing)

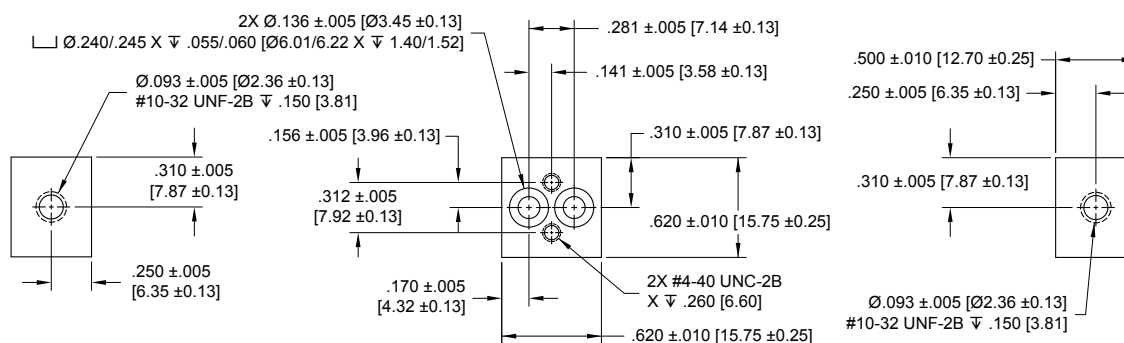


1/8" (3 mm) Barbs

(For 1/8" (3 mm) I.D. Tubing)



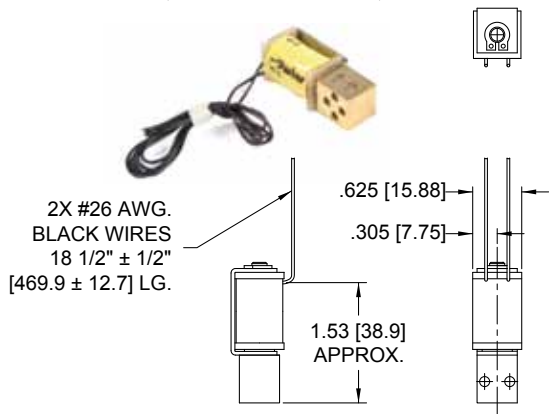
Manifold & O-Ring Dimensions & Design



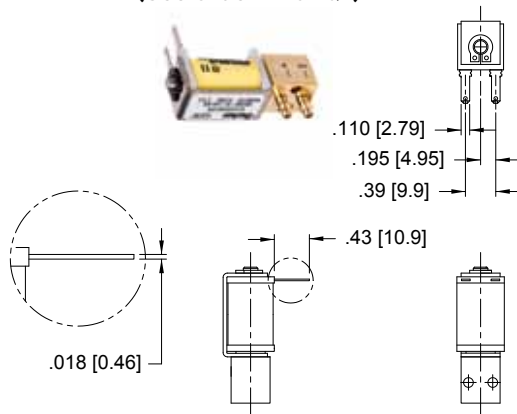
Series 11 Miniature Pneumatic Solenoid Valve

Electrical Interface

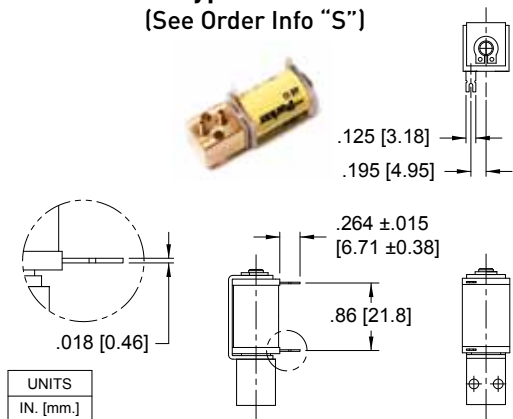
Coil Type: Wire Leads (See Order Info "F")



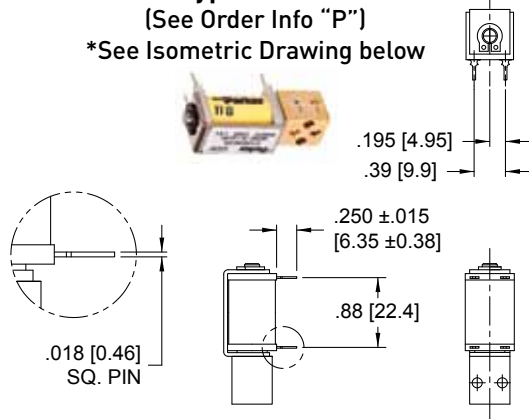
Coil Type: Quick Connect Spade (See Order Info "Q")



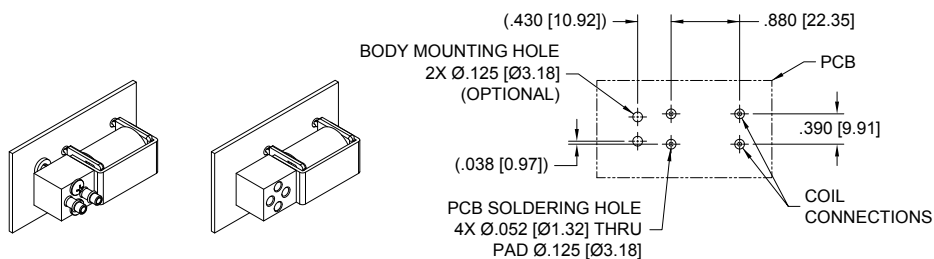
Coil Type: Solder Tab (See Order Info "S")



Coil Type: 4 PC Pins* (See Order Info "P") *See Isometric Drawing below



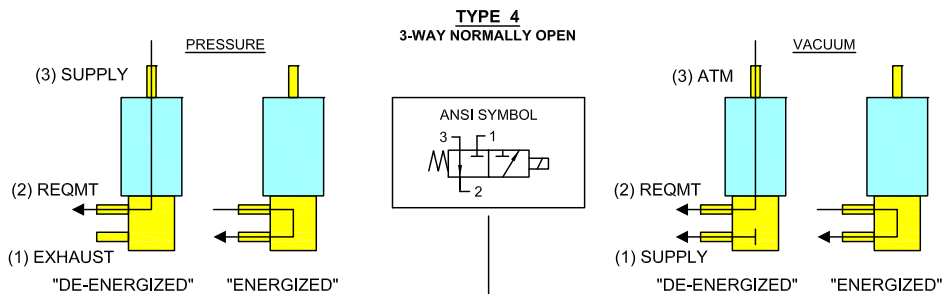
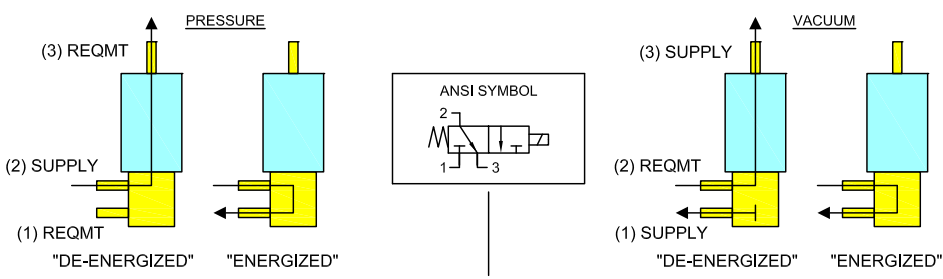
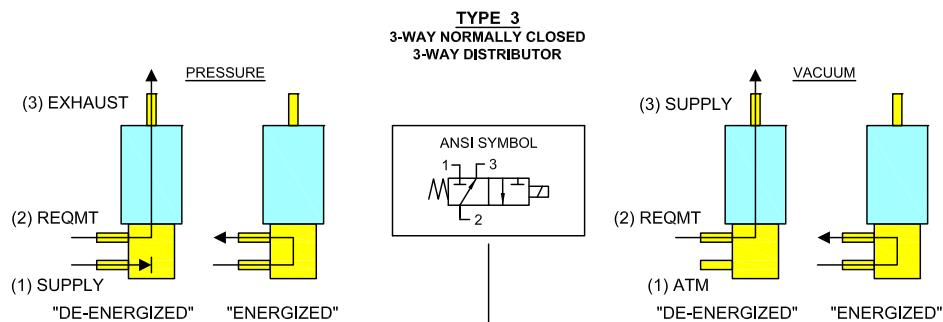
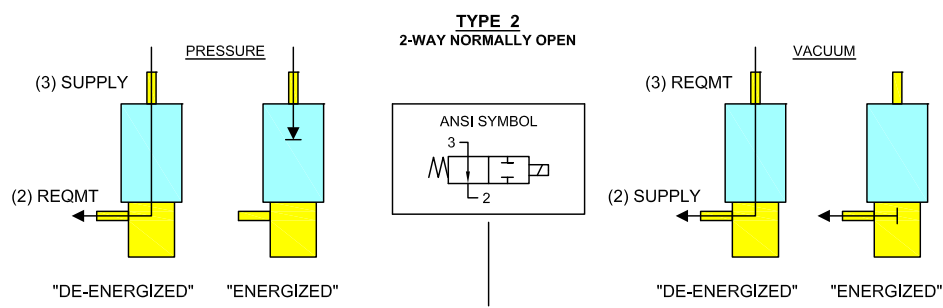
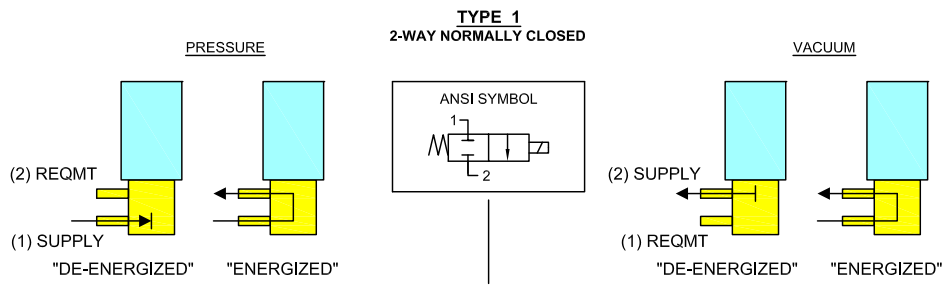
*4 PC PIN PCB Interface



Series 11 Miniature Pneumatic Solenoid Valve

ANSI Pneumatic Schematics by Valve Types

| LEGEND: | |
|----------|-------------------------------------|
| SUPPLY: | Pneumatic Source or Supply Pressure |
| EXHAUST: | Exhaust to Atmospheric Pressure |
| REQMT: | Customer Requirement or Application |
| ATM: | Atmospheric Pressure |



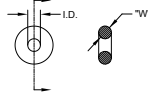
Series 11 Miniature Pneumatic Solenoid Valve

Accessories

O-Ring (Manifold Seal) Dimensions

(see Accessories table below for part numbers)

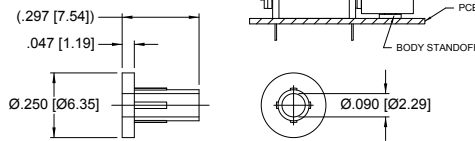
I.D. = $\varnothing 1.14 \pm 0.05$ [$\varnothing 2.90 \pm 0.13$]
 W = 0.070 ± 0.003 [1.78 ± 0.08]
 O.D. = $\varnothing 2.54$ [$\varnothing 6.45$] REFERENCE



Body Standoff

190-007024-002

(2 required for each valve)



Screw 4-40 x 1/2" Pan Head

191-000100-208

(2 required for each valve)



Ordering Information

| Sample Part ID | 11 | 10 | 3 | BV | 12 | P | 7 | 7 |
|----------------|--------|--|---|--|--------------------------------------|--|---|---|
| Description | Series | Model Number: Pressure / Orifice / Power | Type | Material XX: Body / Poppet Seal | Voltage | Electrical Coil Selection | Pneumatic Connection Body | Pneumatic Connection Stem |
| Options | 11 | 10: 0-100 psi / 0.030" orifice / 2 Watts 12: 0-50 psi / 0.050" orifice / 2 Watts 13: 0-50 psi / 0.030" orifice / 1 Watt 15: 0-25 psi / 0.050" orifice / 1 Watt 16: 0-25 psi / 0.030" orifice / 0.5 Watt 18: 0-10 psi / 0.050" orifice / 0.5 Watt 19: 0-70 psi / 0.050" orifice / 2 Watts | 1: 2-Way NC 2: 2-Way NO 3: 3-Way NC or Distributor 4: 3-Way NO | BV: Brass / FKM SV: Stainless Steel / FKM BE: Brass / EPDM | 5: 5 VDC 12: 12 VDC 24: 24 VDC | F: Wire Leads, 18", No Termination P: PC Mount, 4 PC Pins S: PC Mount, 2 Solder Tabs Q: Quick Connect Spade | 0: Manifold Mount 6: 1/16" (1.5 mm) Barbs 7: 5/64" (2 mm) Barbs 8: 1/8" (3 mm) Barbs | 0: Manifold Mount (2-Way NC Only) 6: 1/16" (1.5mm) Barbs* 7: 5/64" (2 mm) Barbs 8: 1/8" (3 mm) Barbs |

| Accessories | |
|--|--|
| 190-007024-001: O-ring, Buna -N** | ** Used as seal between manifold and valve body |
| 190-007024-002: O-ring, FKM** | *** Used to create a flush mount between coil and valve body |
| 890-00027-001: Body Standoff*** | |
| 191-000115-010: Screw 4-40 x 5/8" Pan Head, Phillips | |



NOTE: In order to provide the best possible solution for your application, please provide the following requirements when contacting Applications Engineering:

- Media, Inlet & Outlet Pressures
- Minimum Required Flow Rate
- System Supply Voltage
- Media
- Ambient Temperature Range

Please click on the Order On-line button (or go to www.parker.com/precisionfluidics/s11) to configure your Series 11 Miniature Pneumatic Solenoid Valve. For more detailed information, visit us on the Web, or call and refer to Performance Spec. #790-002075-001 and Drawing #890-003016-001.



Series 25 Miniature Pneumatic Solenoid Valve

15mm Solenoid Valve



Typical Applications


- Oxygen Conservers and Concentrators
- Sieve Bed Switching
- Anesthesia Delivery
- Compression Therapy
- Gas Chromatography
- Insufflators
- Flow Control/Shut-off

Mechanical

| |
|--|
| Valve Type: |
| 2/3 Port, Direct-acting poppet style |
| - Normally Closed (NC) |
| - Normally Open (NO) |
| - Distributor |
| Media: |
| Air, argon, helium, hydrogen, methane, nitrogen, oxygen, & other non-reacting gasses |
| Operating Environment: |
| 32 to 158°F (0 to 70°C) |
| Storage Temperature: |
| -40 to 158°F (-40 to 70°C) |
| Dimensions: |
| - Length: 1.73 in (43.9 mm) |
| - Width: 0.63 in (15.8 mm) |
| - Height: 0.67 in (17.0 mm) |
| Weight: |
| 2.1 oz (60 g) |
| Internal Volume: |
| 0.026 in ³ (0.426 cm ³) |
| Filtration: |
| 40 micron (recommended) |
| Oxygen Clean: |
| Call For Details |

The Series 25 miniature pneumatic solenoid valve is a robust and proven product with a reputation for reliable and consistent performance. The Series 25 miniature solenoid valve is the preferred choice of major OEM's in the medical and analytical market. With valve bodies made from nickel-plated brass and multiple pneumatic and electrical interface options, the Series 25 miniature solenoid valve is the ideal solution for general purpose applications and those applications requiring low out-gassing and a bubble-tight seal.

Features

- Proven performance tested to 260 million life cycles
- Wide range of available electrical connections to simplify valve integration and control
- Manifold mount or barbed tube pneumatic configurations available for added system design flexibility
- Available Analytical and Oxygen Service Clean to minimize contamination
- RoHS compliant 

Electrical

| |
|--|
| Power Options: |
| 0.5, 1.0 or 2.0 Watts |
| Voltage Options: |
| 5, 12 or 24 VDC |
| Further power reduction may be achieved through the use of spike and hold or PWM electrical control. |
| Electrical Connections: |
| Wire Leads, PC Pins, Solder Tabs, Quick Disconnect Spade |

Wetted Materials

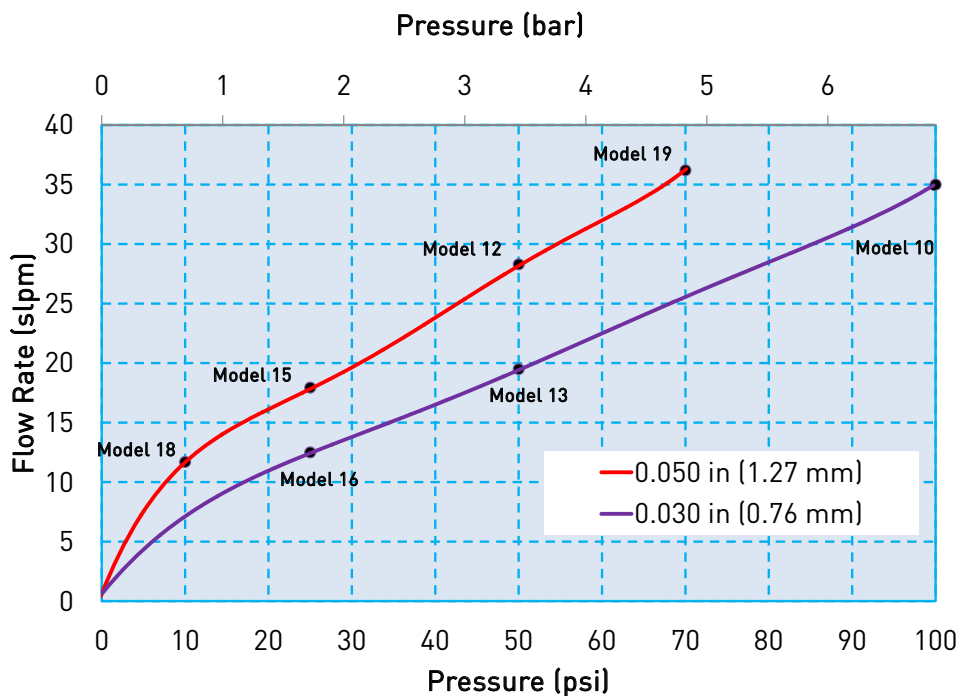
| |
|--------------------------------|
| Body: |
| 36000 HO2 Brass, Nickel Plated |
| Stem Base: |
| 36000 HO2 Brass; |
| Poppet Options: |
| FKM or EPDM |
| All Others: |
| 430 FR Series Stainless Steel |
| 302 Series Stainless Steel |
| 36000 HO2 Brass, Nickel Plated |

Performance Characteristics

| |
|-----------------------------------|
| Leak Rate: |
| <0.016 sccm of air (bubble tight) |
| Response: |
| <30 ms cycling |
| Pressure: |
| 0 to 100 psig (6.9 bar) |
| Vacuum: |
| 0-27 in Hg (686 mm Hg) |
| Orifice Sizes: |
| 0.030" (0.76 mm) |
| 0.050" (1.27 mm) |

Series 25 Miniature Pneumatic Solenoid Valve

Typical Flow Curve (Tested w/air 24° C) All Models



All models reflect typical flow output capability based on rated pressure

Pressure and Flow Capabilities/Life Requirements

| Model No. | Orifice Size | Nominal Cv | Maximum Supply Pressure | Power Consumption | Elastomer | Life Requirements (millions of cycles*) |
|-----------|--------------------|------------|-------------------------|-------------------|-----------|---|
| 10 | 0.030 in (0.76 mm) | 0.017 | 100 psig (6.9 bar) | 2 Watts | FKM | 100 |
| 12 | 0.050 in (1.27 mm) | 0.031 | 50 psig (3.5 bar) | 2 Watts | FKM | 100 |
| 13 | 0.030 in (0.76 mm) | 0.017 | 50 psig (3.5 bar) | 1 Watt | FKM | 200 |
| 15 | 0.050 in (1.27 mm) | 0.025 | 25 psig (1.7 bar) | 1 Watt | FKM | 200 |
| 16 | 0.030 in (0.76 mm) | 0.017 | 25 psig (1.7 bar) | 0.5 Watt | FKM | 260 |
| 18 | 0.050 in (1.27 mm) | 0.021 | 10 psig (0.7 bar) | 0.5 Watt | FKM | 260 |
| 19 | 0.050 in (1.27 mm) | 0.025 | 70 psig (4.8 bar) | 2 Watts | FKM | 20 |

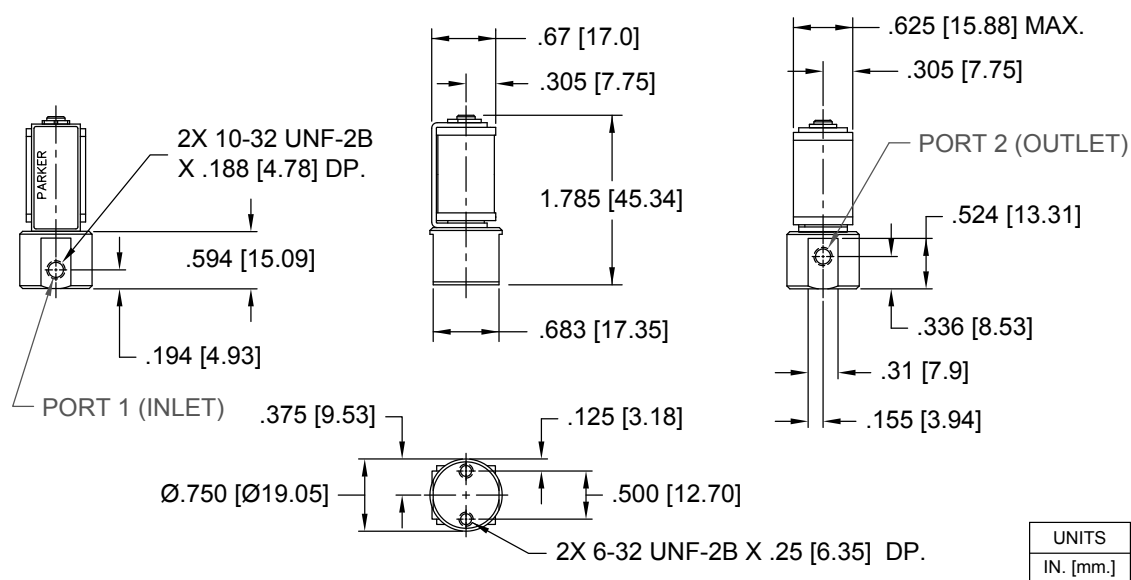
*Life is dependent upon elastomeric material, duty cycle and pressures

For custom requirements please contact Applications Engineering at 1-603-595-1500 or ppinfo@parker.com

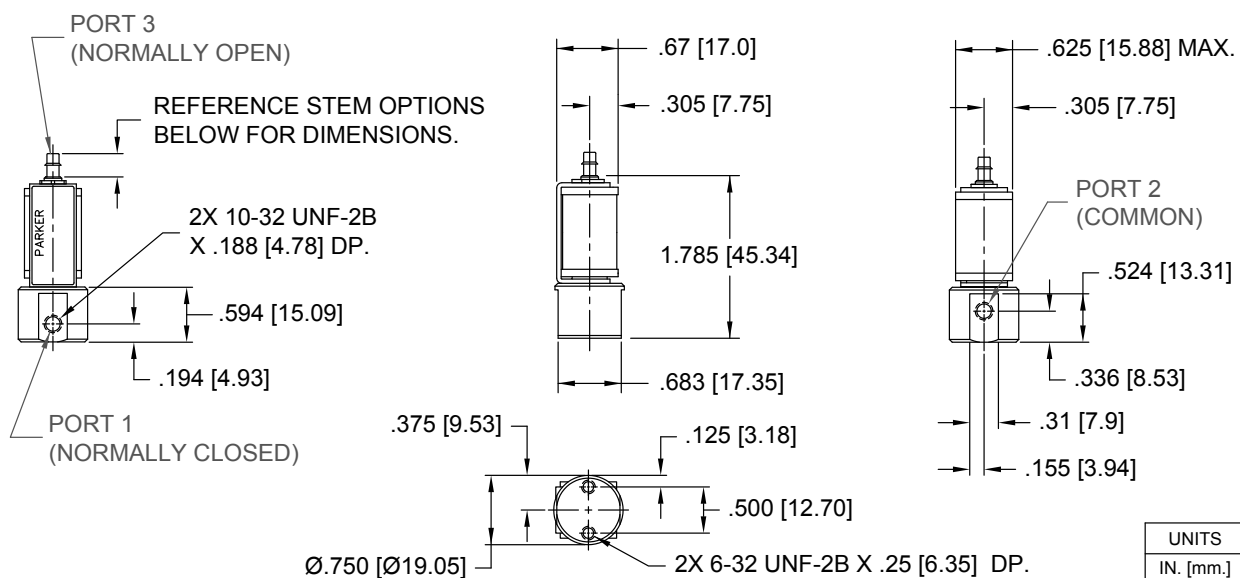


Series 25 Miniature Pneumatic Solenoid Valve

Basic Dimensions, 2-Way Valve Configuration

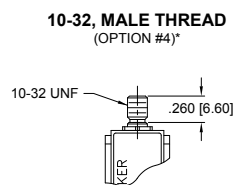


Basic Dimensions, 3-Way Valve Configuration

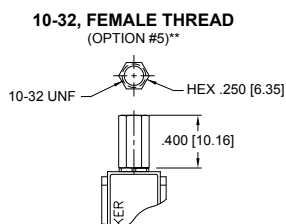


Series 25 Miniature Pneumatic Solenoid Valve

Stem Options



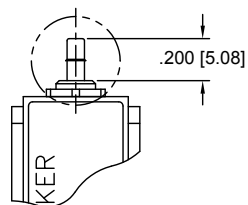
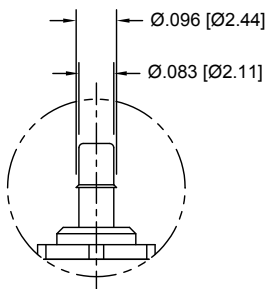
*Torque applied to #10-32 male fitting not to exceed 0.5 in-oz (3.5 mN-m). Use Loctite 290 or compatible liquid-curing fastener to secure mating fitting in place.



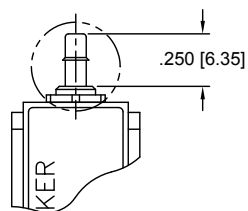
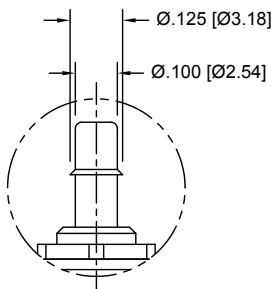
**Torque applied to #10-32 Female fitting not to exceed 0.5 in-oz (3.5 mN-m). Use 1/4 inch hex wrench to support the fitting when installing a mating, #10-32 male fitting.

Barb Options

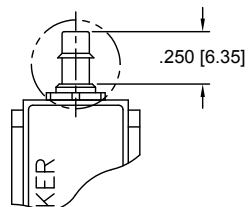
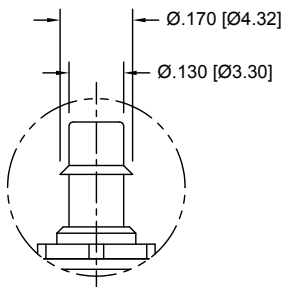
1/16" (1.5 mm) Barb
(For 1/16" (1.5 mm) I.D. Tubing)
(OPTION #6)



5/64" (2 mm) Barb
(For 5/64" (2 mm) I.D. Tubing)
(OPTION #7)



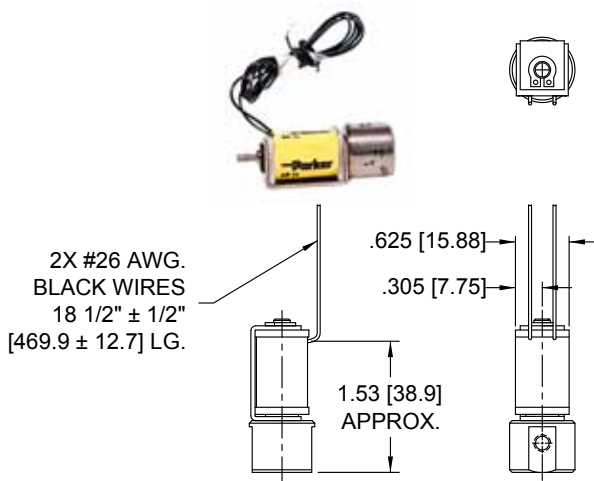
1/8" (3 mm) Barb
(For 1/8" (3 mm) I.D. Tubing)
(OPTION #8)



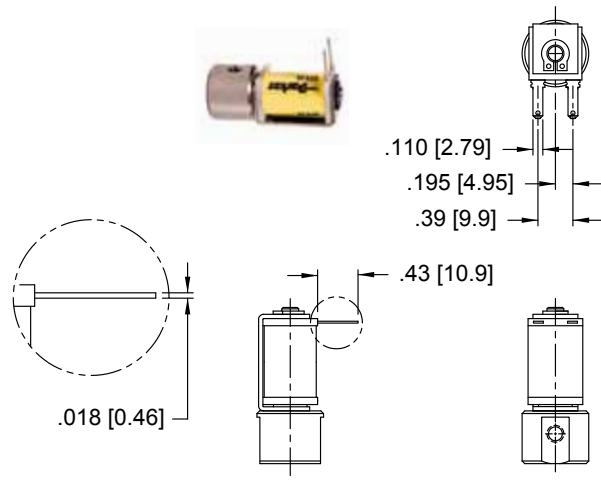
Series 25 Miniature Pneumatic Solenoid Valve

Electrical Interface

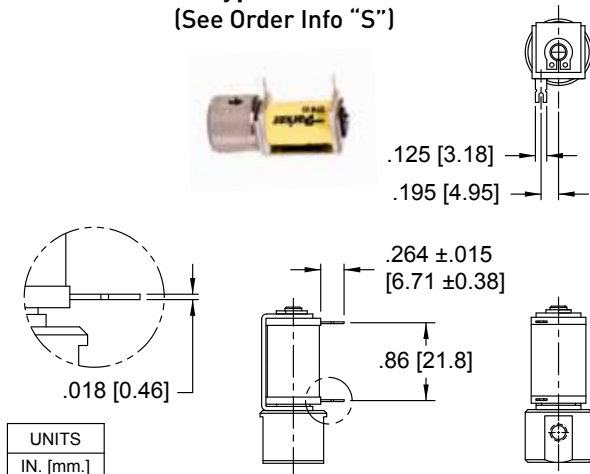
Coil Type: Wire Leads (See Order Info "F")



Coil Type: Quick Connect Spade (See Order Info "Q")



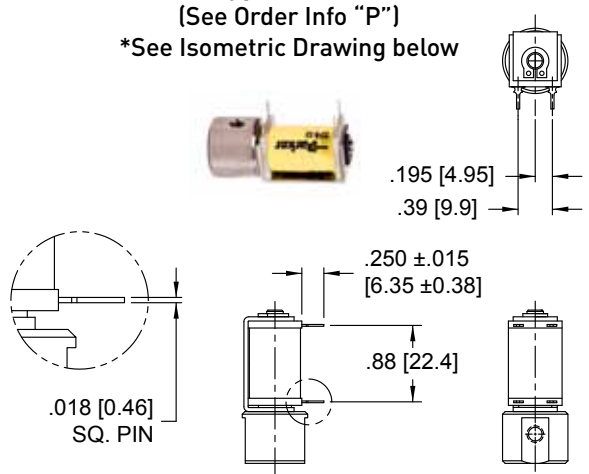
Coil Type: Solder Tab (See Order Info "S")



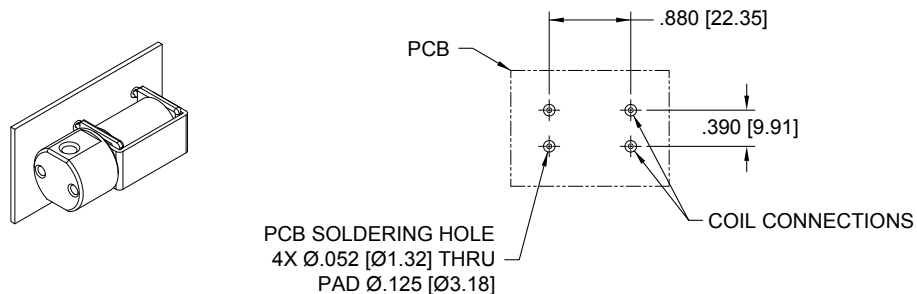
UNITS
IN. [mm.]

Coil Type: 4 PC Pins* (See Order Info "P")

*See Isometric Drawing below



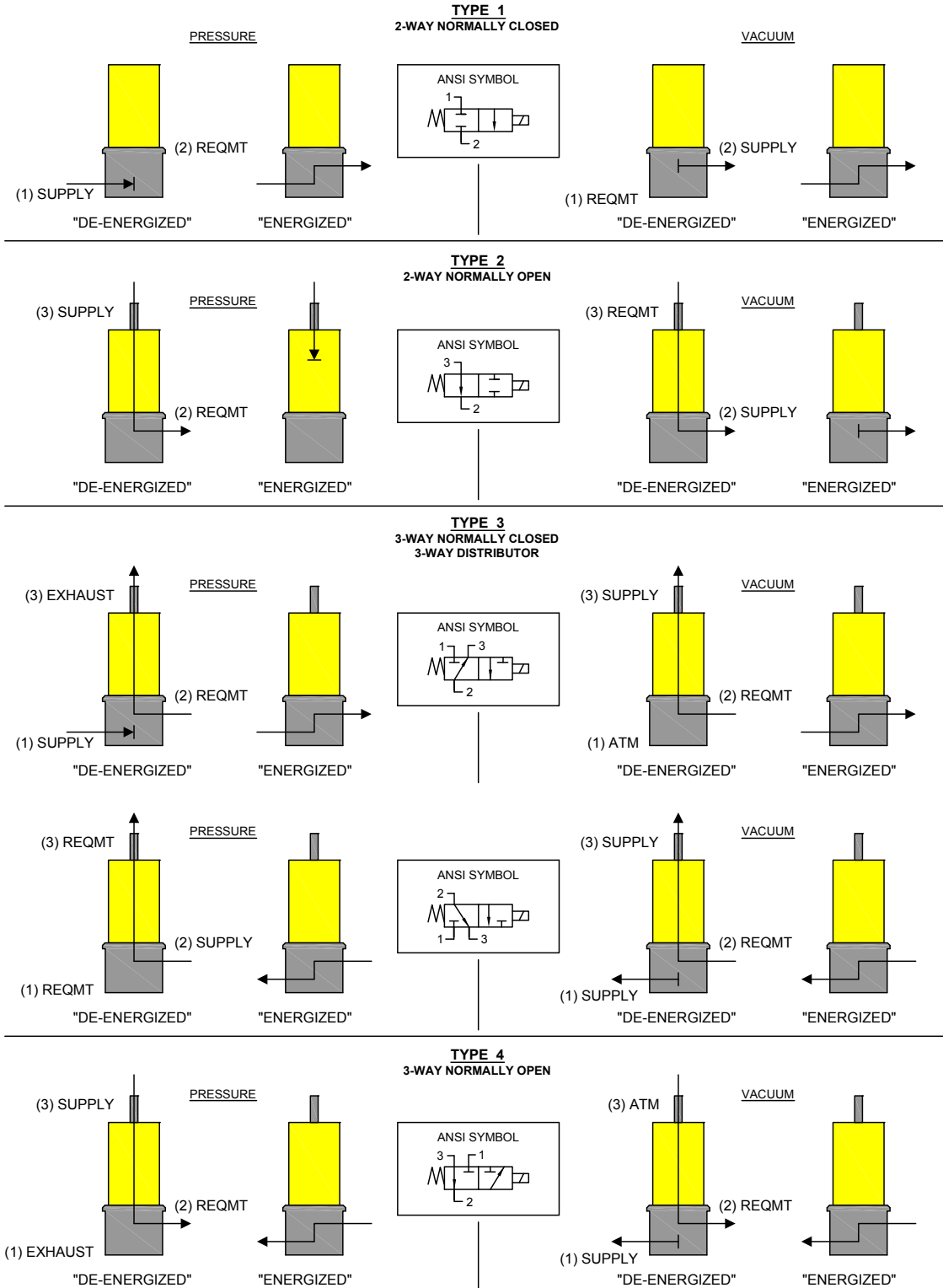
*4 PC PIN PCB Interface



Series 25 Miniature Pneumatic Solenoid Valve

ANSI Pneumatic Schematics by Valve Types

| LEGEND: | |
|----------|-------------------------------------|
| SUPPLY: | Pneumatic Source or Supply Pressure |
| EXHAUST: | Exhaust to Atmospheric Pressure |
| REQMT: | Customer Requirement or Application |
| ATM: | Atmospheric Pressure |



Series 25 Miniature Pneumatic Solenoid Valve

Ordering Information

| Sample Part ID | 25 | 10 | 3 | NV | 12 | P | 5 | 7 |
|----------------|--------|--|---|--------------------------------------|--------------------------------------|--|---------------------------------|---|
| Description | Series | Model Number: Pressure / Orifice / Power | Type | Material XX: Body / Poppet & Seal | Voltage | Electrical Coil Selection | Pneumatic Connection Body | Pneumatic Connection Stem |
| Options | 25 | 10: 0-100 psi / 0.030" orifice / 2 Watts 12: 0-50 psi / 0.050" orifice / 2 Watts 13: 0-50 psi / 0.030" orifice / 1 Watt 15: 0-25 psi / 0.050" orifice / 1 Watt 16: 0-25 psi / 0.030" orifice / 0.5 Watt 18: 0-10 psi / 0.050" orifice / 0.5 Watt 19: 0-70 psi / 0.050" orifice / 2 Watts | 1: 2-Way NC 2: 2-Way NO 3: 3-Way NC or Distributor 4: 3-Way NO | NV: Nickel-plated Brass / FKM | 5: 5 VDC 12: 12 VDC 24: 24 VDC | F: Wire Leads, 18", No Termination P: PC Mount, 4 PC Pins S: PC Mount, 2 Solder Tabs Q: Quick Connect Spade | 5: 10-32 Female | 0: Manifold Mount (2-Way NC Only) 4: 10-32 Male 5: 10-32 Female 6: 1/16" (1.5mm) Barbs* 7: 5/64" (2 mm) Barbs 8: 1/8" (3 mm) Barbs *1/16" Barbs not available for 0.050" orifice valves |

NOTE: In order to provide the best possible solution for your application, please provide the following requirements when contacting Applications Engineering:

- Media, Inlet & Outlet Pressures
- Minimum Required Flow Rate
- System Supply Voltage
- Media
- Ambient Temperature Range



Please click on the Order On-line button (or go to www.parker.com/precisionfluidics/s11) to configure your Series 25 Miniature Pneumatic Solenoid Valve. For more detailed information, visit us on the Web, or call and refer to Performance Spec. #790-002075-001 and Drawing #890-003016-001.

Series 26 Miniature Pneumatic Solenoid Valve

15mm Solenoid Valve




The Series 26 miniature pneumatic solenoid valve is a robust and proven product with a reputation for reliable and consistent performance. The Series 26 miniature solenoid valve is the preferred choice of major OEM's in the medical and analytical market. With valve bodies made from nickel-plated brass and multiple pneumatic and electrical interface options, the Series 26 miniature solenoid valve is the ideal solution for general purpose applications and those applications requiring low out-gassing and a bubble-tight seal.

Typical Applications

- Oxygen Conservers and Concentrators
- Sieve Bed Switching
- Anesthesia Delivery
- Compression Therapy
- Gas Chromatography
- Insufflators
- Flow Control/Shut-off

Features

- Proven performance tested to 260 million life cycles
- Wide range of available electrical connections to simplify valve integration and control
- Manifold mount body interface simplifies the manifold design and eases valve installation
- Available Analytical and Oxygen Service Clean to minimize contamination
- RoHS compliant 

Mechanical

| |
|--|
| Valve Type: |
| 2/3 Port, Direct-acting poppet style |
| - Normally Closed (NC) |
| - Normally Open (NO) |
| - Distributor |
| Media: |
| Air, argon, helium, hydrogen, methane, nitrogen, oxygen, & other non-reacting gasses |
| Operating Environment: |
| 32 to 158°F (0 to 70°C) |
| Storage Temperature: |
| -40 to 158°F (-40 to 70°C) |
| Dimensions: |
| Length: 1.53 in (38.8 mm) |
| Diameter: 0.75 in (19.0 mm) |
| Weight: |
| 2.1 oz (60 g) |
| Internal Volume: |
| 0.026 in ³ (0.426 cm ³) |
| Filtration: |
| 40 micron (recommended) |
| Oxygen Clean: |
| Call For Details |

Electrical

| |
|--|
| Power Options: |
| 0.5, 1.0 or 2.0 Watts |
| Voltage Options: |
| 5, 12 or 24 VDC |
| Further power reduction may be achieved through the use of spike and hold or PWM electrical control. |
| Electrical Connections: |
| Wire Leads, PC Pins, Solder Tabs, Quick Disconnect Spade |

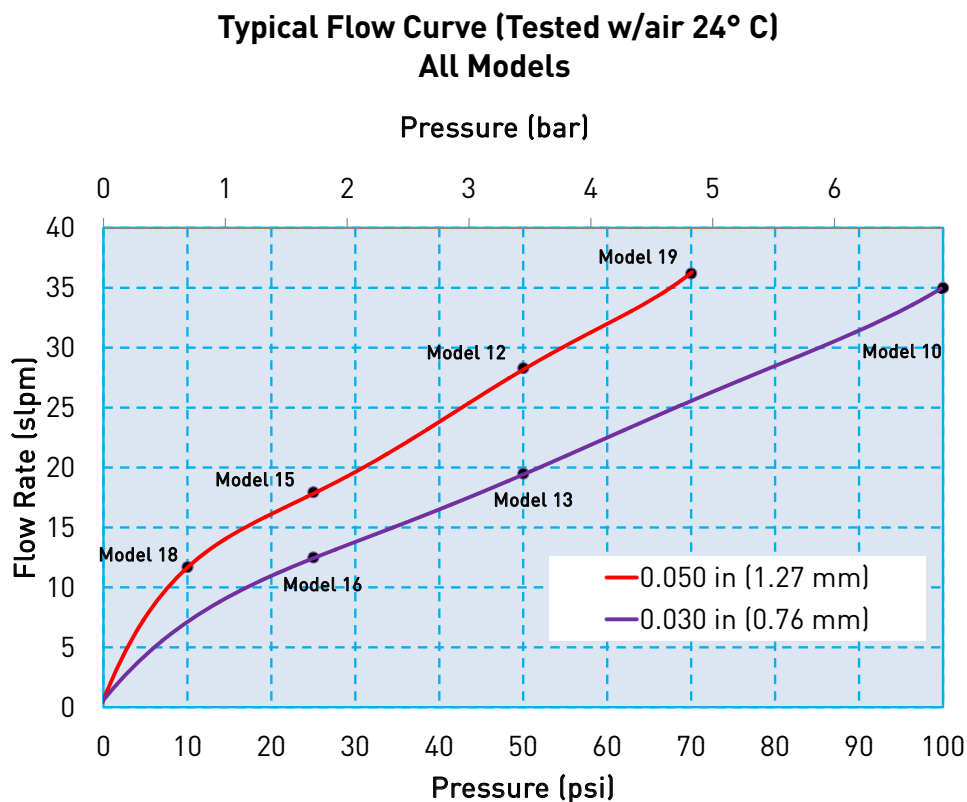
Wetted Materials

| |
|--------------------------------|
| Body: |
| 36000 HO2 Brass, Nickel Plated |
| Stem Base: |
| 36000 HO2 Brass; |
| Poppet Options: |
| FKM or EPDM |
| All Others: |
| 430 FR Series Stainless Steel |
| 302 Series Stainless Steel |
| 36000 HO2 Brass, Nickel Plated |

Performance Characteristics

| |
|-----------------------------------|
| Leak Rate: |
| <0.016 sccm of air (bubble tight) |
| Response: |
| <30 ms cycling |
| Pressure: |
| 0 to 100 psig (6.9 bar) |
| Vacuum: |
| 0-27 in Hg (686 mm Hg) |
| Orifice Sizes: |
| 0.030" (0.76 mm) |
| 0.050" (1.27 mm) |

Series 26 Miniature Pneumatic Solenoid Valve



All models reflect typical flow output capability based on rated pressure

Pressure and Flow Capabilities/Life Requirements

| Model No. | Orifice Size | Nominal Cv | Maximum Supply Pressure | Power Consumption | Elastomer | Life Requirements (millions of cycles*) |
|-----------|--------------------|------------|-------------------------|-------------------|-----------|---|
| 10 | 0.030 in (0.76 mm) | 0.017 | 100 psig (6.9 bar) | 2 Watts | FKM | 100 |
| 12 | 0.050 in (1.27 mm) | 0.031 | 50 psig (3.5 bar) | 2 Watts | FKM | 100 |
| 13 | 0.030 in (0.76 mm) | 0.017 | 50 psig (3.5 bar) | 1 Watt | FKM | 200 |
| 15 | 0.050 in (1.27 mm) | 0.025 | 25 psig (1.7 bar) | 1 Watt | FKM | 200 |
| 16 | 0.030 in (0.76 mm) | 0.017 | 25 psig (1.7 bar) | 0.5 Watt | FKM | 260 |
| 18 | 0.050 in (1.27 mm) | 0.021 | 10 psig (0.7 bar) | 0.5 Watt | FKM | 260 |
| 19 | 0.050 in (1.27 mm) | 0.025 | 70 psig (4.8 bar) | 2 Watts | FKM | 20 |

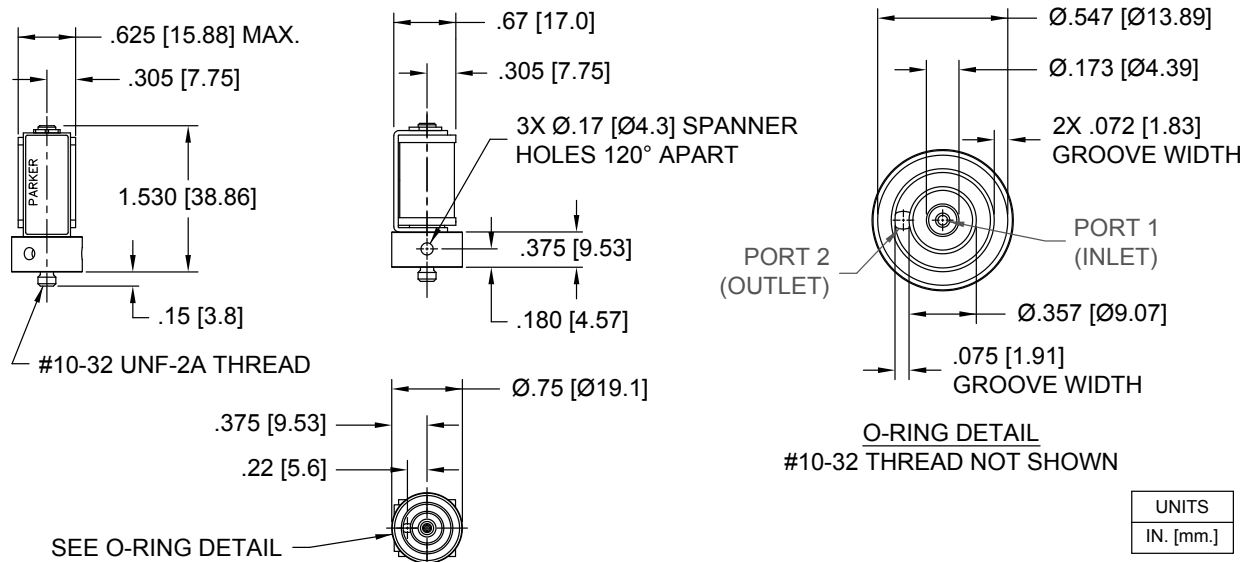
*Life is dependent upon elastomeric material, duty cycle and pressures

For custom requirements please contact Applications Engineering at 1-603-595-1500 or ppinfo@parker.com

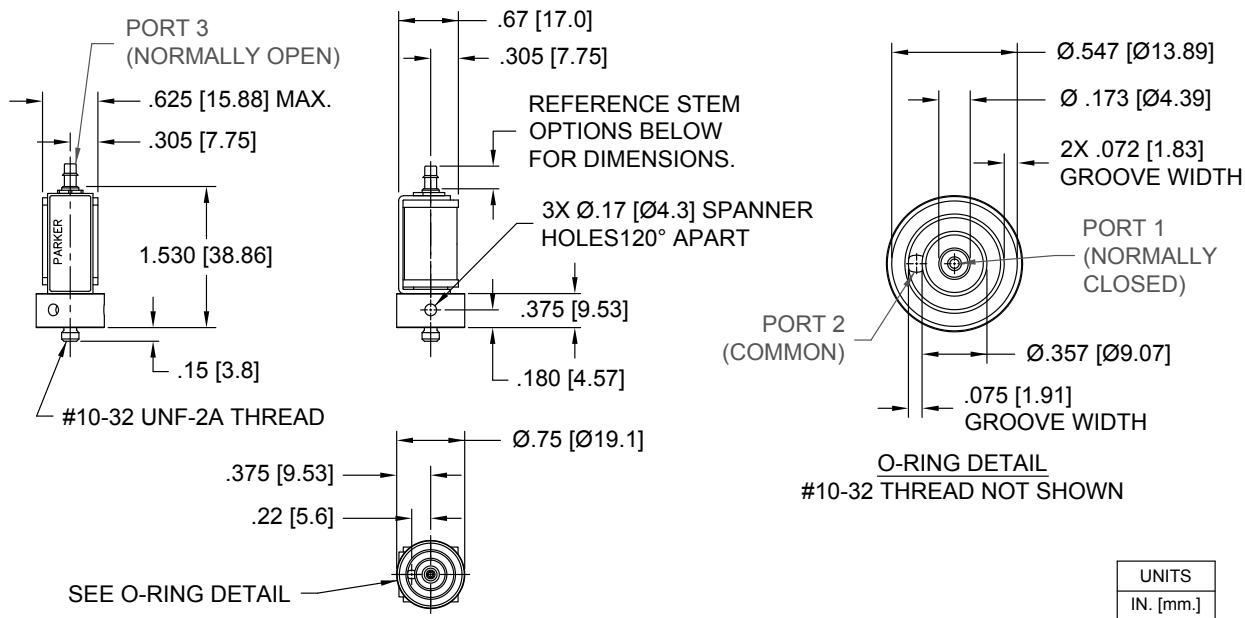


Series 26 Miniature Pneumatic Solenoid Valve

Basic Dimensions, 2-Way Valve Configuration

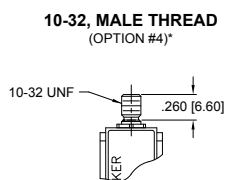


Basic Dimensions, 3-Way Valve Configuration

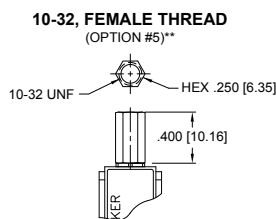


Series 26 Miniature Pneumatic Solenoid Valve

Stem Options



*Torque applied to #10-32 male fitting not to exceed 0.5 in-oz (3.5 mN-m). Use Loctite 290 or compatible liquid-curing fastener to secure mating fitting in place.

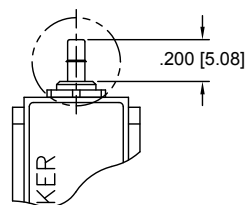
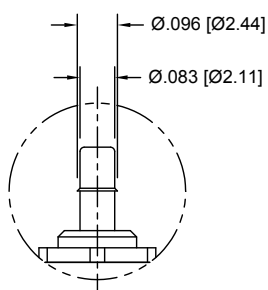


**Torque applied to #10-32 Female fitting not to exceed 0.5 in-oz (3.5 mN-m). Use 1/4 inch hex wrench to support the fitting when installing a mating, #10-32 male fitting.

Barb Options

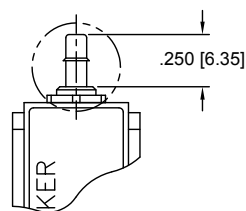
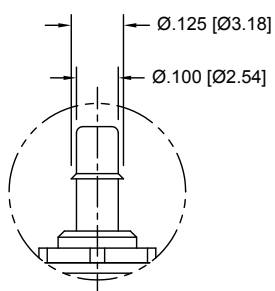
1/16" (1.5 mm) Barb

(For 1/16" (1.5 mm) I.D. Tubing)
(OPTION #6)



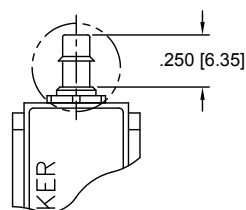
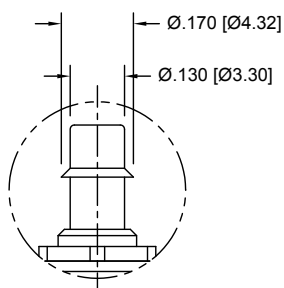
5/64" (2 mm) Barb

(For 5/64" (2 mm) I.D. Tubing)
(OPTION #7)



1/8" (3 mm) Barb

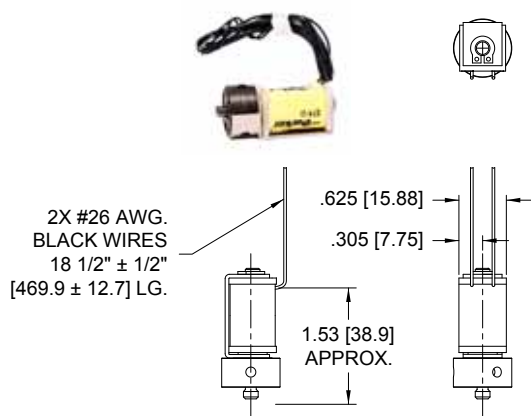
(For 1/8" (3 mm) I.D. Tubing)
(OPTION #8)



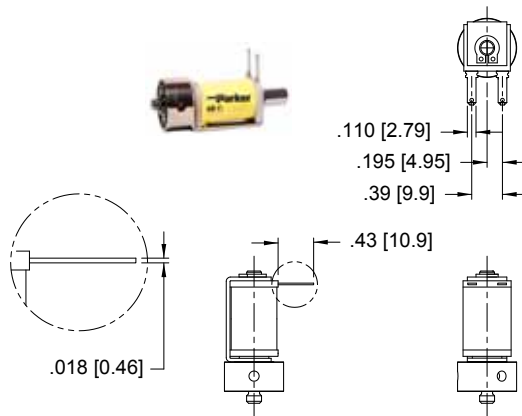
Series 26 Miniature Pneumatic Solenoid Valve

Electrical Interface

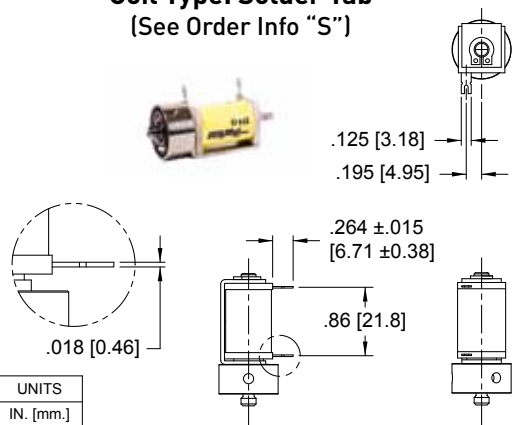
Coil Type: Wire Leads
(See Order Info "F")



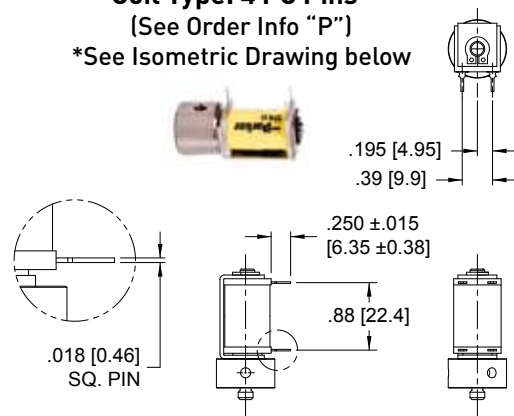
Coil Type: Quick Connect Spade
(See Order Info "Q")



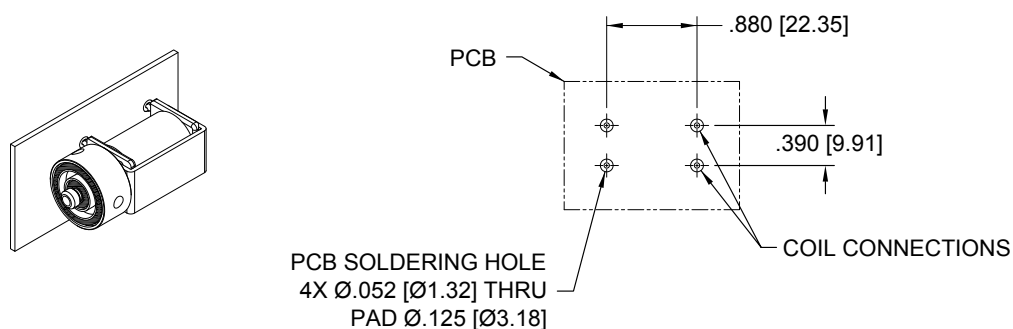
Coil Type: Solder Tab
(See Order Info "S")



Coil Type: 4 PC Pins*
(See Order Info "P")
*See Isometric Drawing below



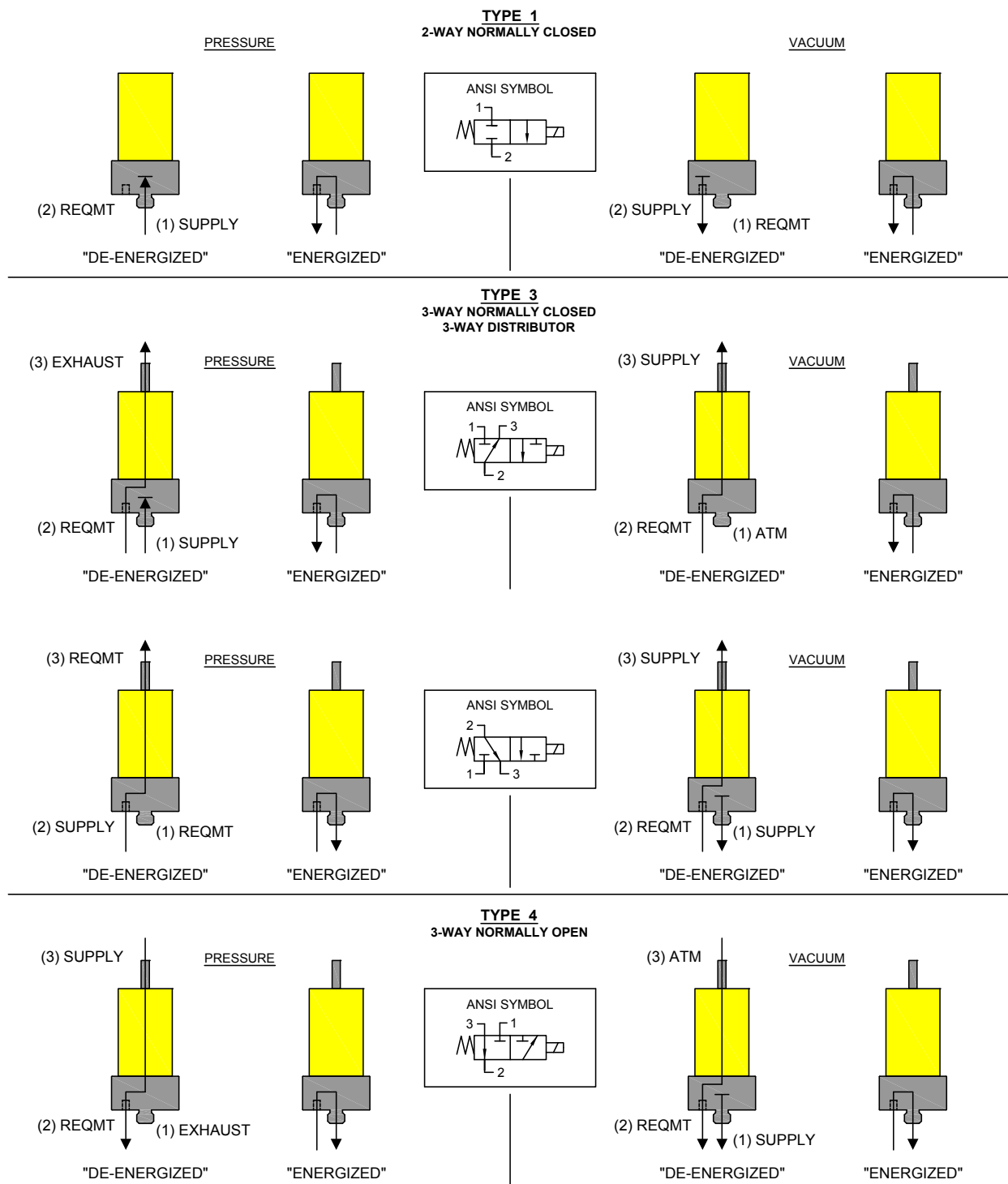
*4 PC PIN PCB Interface



Series 26 Miniature Pneumatic Solenoid Valve

| LEGEND: | |
|----------|-------------------------------------|
| SUPPLY: | Pneumatic Source or Supply Pressure |
| EXHAUST: | Exhaust to Atmospheric Pressure |
| REQMT: | Customer Requirement or Application |
| ATM: | Atmospheric Pressure |

ANSI Pneumatic Schematics by Valve Types



Series 26 Miniature Pneumatic Solenoid Valve

Ordering Information

| Sample Part ID | 26 | 10 | 3 | NV | 12 | P | 4 | 7 |
|----------------|--------|---|--|-----------------------------|--------------------------------------|--|---------------------------------|--|
| Description | Series | Model Number: Pressure / Orifice / Power | Type | Material | Voltage | Electrical Coil Selection | Pneumatic Connection Body | Pneumatic Connection Stem |
| Options | 26 | 10: 0-100 psig / 0.030" orifice / 2 Watts 12: 0-50 psig / 0.050" orifice / 2 Watts 13: 0-50 psig / 0.030" orifice / 1 Watt 15: 0-25 psig / 0.050" orifice / 1 Watt 16: 0-25 psig / 0.030" orifice / 0.5 Watt 18: 0-10 psig / 0.050" orifice / 0.5 Watt 19: 0-70 psig / 0.050" orifice / 2 Watts | 1: 2-Way NC 3: 3-Way NC or Distributor 4: 3-Way NO | NV: Nickel-plated Brass/FKM | 5: 5 VDC 12: 12 VDC 24: 24 VDC | F: Wire Leads, 18", No Termination P: PC Mount, 4 PC Pins S: PC Mount, 2 Solder Tabs Q: Quick Connect Spade | 4: 10-32 Male | 0: Manifold Mount (2-Way NC Only) 4: 10-32 Male 5: 10-32 Female 6: 1/16" (1.5 mm) Barbs* 7: 5/64" (2 mm) Barbs 8: 1/8" (3 mm) Barbs *1/16" Barbs not available for 0.050" orifice valves |

NOTE: In order to provide the best possible solution for your application, please provide the following requirements when contacting Applications Engineering:

- Media, Inlet & Outlet Pressures
- Minimum Required Flow Rate
- System Supply Voltage
- Media
- Ambient Temperature Range



Please click on the Order On-line button (or go to www.parker.com/precisionfluidics/s11) to configure your Series 26 Miniature Pneumatic Solenoid Valve. For more detailed information, visit us on the Web, or call and refer to Performance Spec. #790-002075-001 and Drawing #890-003016-001.

V² Valve Miniature Pneumatic Solenoid Valve

15 mm Pneumatic Solenoid Valve




The V² miniature pneumatic solenoid valve is a proven product with a reputation for reliable and consistent performance. Designed for medical device and system manufacturers, the V² miniature pneumatic solenoid valve is made from lightweight PBT plastic and provides flexible mounting and termination options. The V² miniature pneumatic solenoid valve also offers pneumatic and electrical design flexibility. It is available in manifold mount or 1/8" (3 mm) barbed tube configurations and is also available with either wire lead, quick connect spade or 4 pin printed circuit board electrical termination.

Typical Applications

- Oxygen Conservers
- Flow control/shut-off valve
- Portable Medical Devices

Features

- Lightweight PBT plastic body to reduce system weight
- Manifold mount or molded barbed fittings for added system design flexibility
- Printed circuit board mount, quick connect spade or wire lead coil termination to ease integration
- Proven performance tested to 25 million life cycles
- RoHS compliant 

Mechanical

Valve Type:

2/3 Port, Direct-acting poppet style
 - Normally Closed (NC)
 - Normally Open (NO)
 - Distributor (Dist)

Media:

Air, Oxygen, Helium, Nitrogen, Carbon Dioxide/Monoxide, & other non-reactive gases.

Operating Environment:

32 to 158°F (0 to 70°C)

Storage Temperature:

-40 to 158°F (-40 to 70°C)

Dimensions:

- Length: 1.73 in (43.9 mm)
 - Width: 0.63 in (15.9 mm)
 - Height: 0.67 in (17.0 mm)

Weight:

1.2 oz (34.3 g)

Internal Volume:

0.0009 in³ (0.016 cm³)

Filtration:

40 micron (recommended)

Electrical

Power Options:

0.5, 1.0, or 2.0 Watts

Voltage Options:

5, 12 or 24 VDC

Further power reduction may be achieved through the use of spike and hold or PWM electrical control.

Wetted Materials

Body:

PBT

Stem Base:

36000 HO2 Brass

All Others:

FKM

430 FR Series Stainless Steel

302 Series Stainless Steel

Performance Characteristics

Leak Rate (Air):

≤0.2 sccm

Response:

<30 ms cycling

Pressure:

0 to 100 psig (6.89 bar)

Vacuum:

0-27 in Hg (686 mm Hg)

Orifice Sizes:

0.030" (0.76 mm)

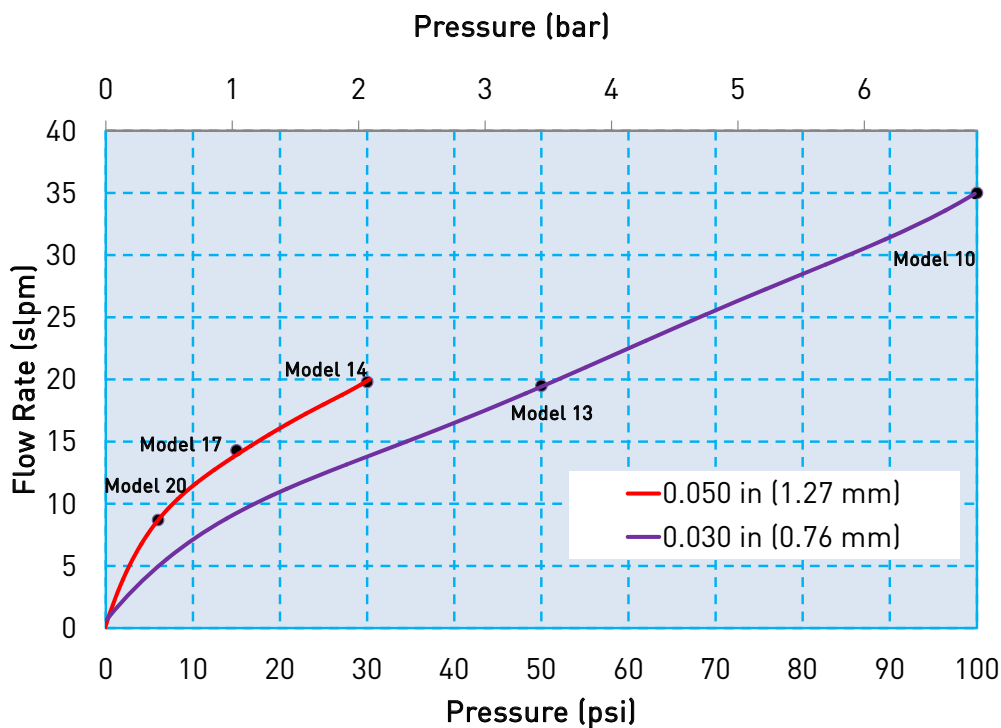
0.050" (1.27 mm)

Reliability:

Life cycle rating of 25 million (worst case tested, no performance degradation)

V² Valve Miniature Pneumatic Solenoid Valve

**Typical Flow Curve (Tested w/air 24° C)
All Models**



All models reflect typical flow output capability based on rated pressure

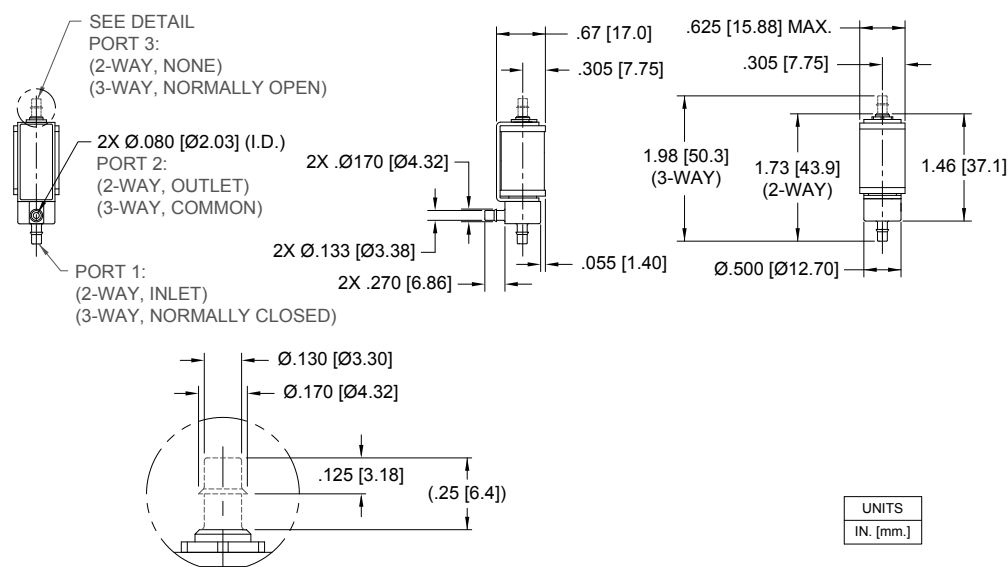
Pressure and Flow Capabilities

| Model No. | Orifice Size | Nominal Cv | Maximum Supply Pressure | Power Consumption |
|-----------|--------------------|------------|-------------------------|-------------------|
| 10 | 0.030 in (0.76 mm) | 0.017 | 100 psig (6.89 bar) | 2 Watts |
| 13 | 0.030 in (0.76 mm) | 0.017 | 50 psig (3.45 bar) | 1 Watt |
| 14 | 0.050 in (1.27 mm) | 0.034 | 30 psig (2.07 bar) | 2 Watts |
| 16 | 0.030 in (0.76 mm) | 0.017 | 25 psig (1.72 bar) | 0.5 Watt |
| 17 | 0.050 in (1.27 mm) | 0.032 | 15 psig (1.03 bar) | 1 Watt |
| 20 | 0.050 in (1.27 mm) | 0.030 | 6 psig (0.41 bar) | 0.5 Watt |

V² Valve Miniature Pneumatic Solenoid Valve

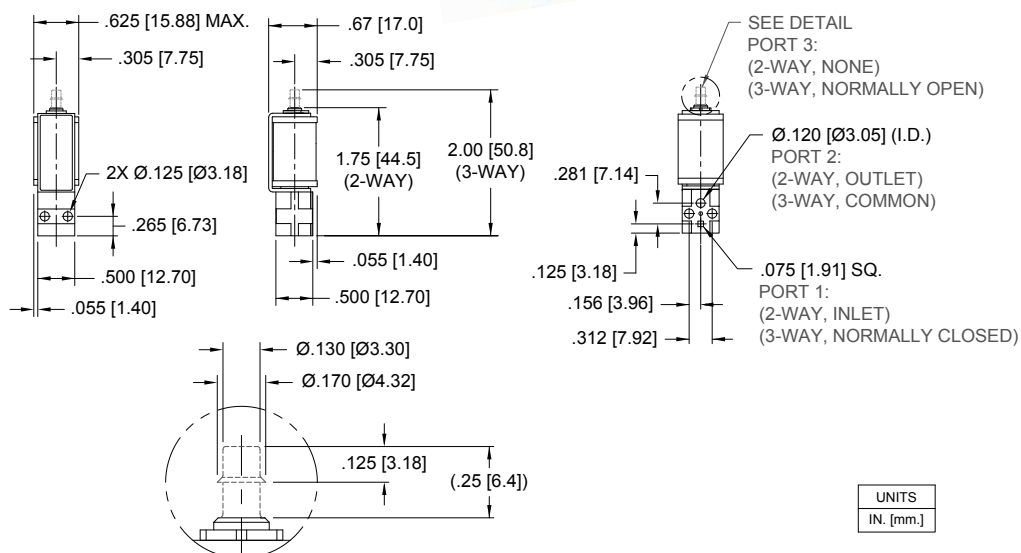
V² Basic Dimensions, Barbed Configuration

Barbed



V² Basic Dimensions, Manifold Mount Configuration

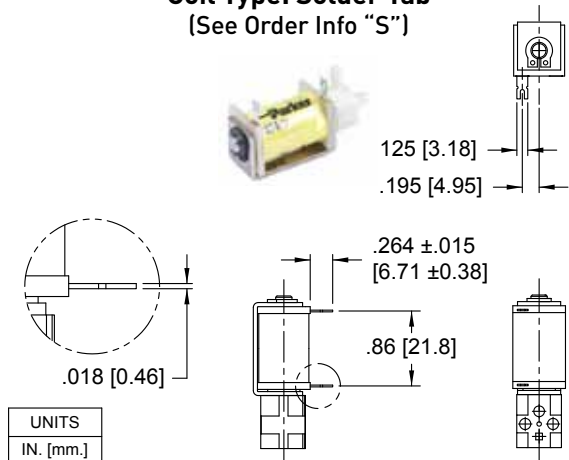
Manifold Mount



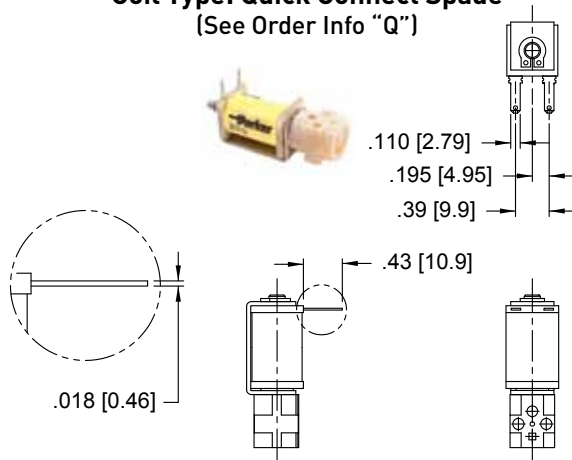
V² Valve Miniature Pneumatic Solenoid Valve

Electrical Interface

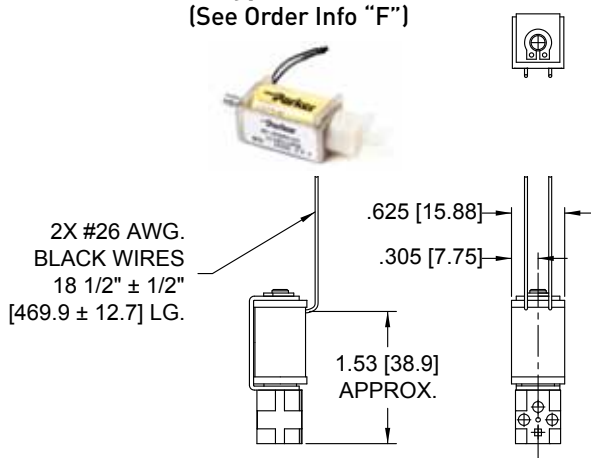
Coil Type: Solder Tab (See Order Info "S")



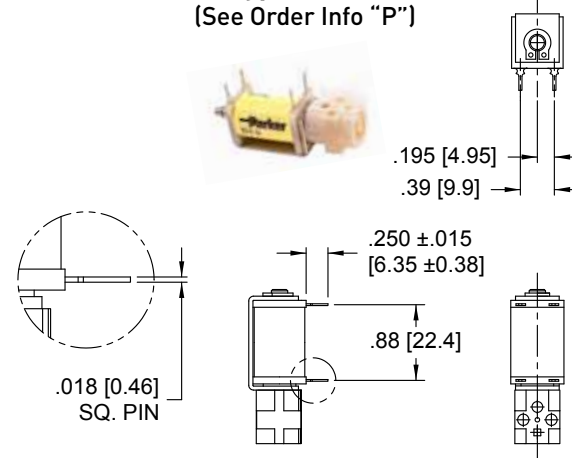
Coil Type: Quick Connect Spade (See Order Info "Q")



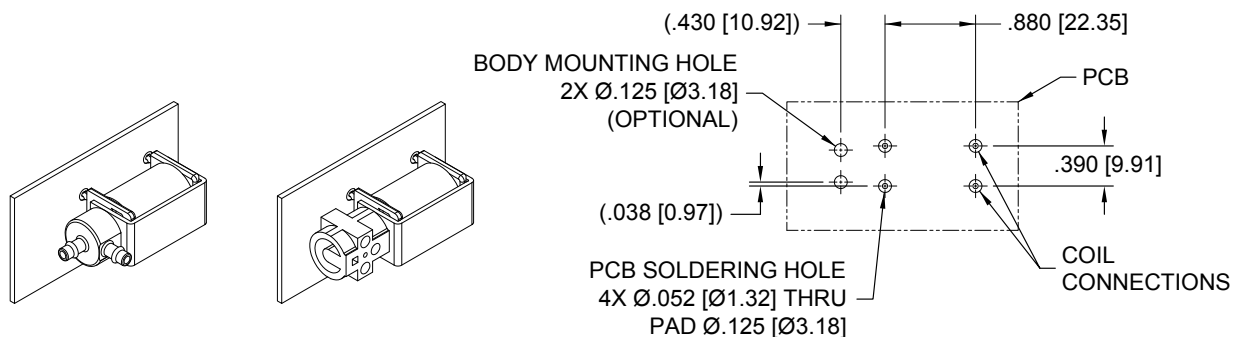
Coil Type: Wire Leads (See Order Info "F")



Coil Type: 4 PC Pins* (See Order Info "P")



*PCB Pin Layout (Coil Type 4 PC Pin)



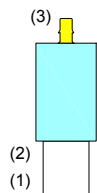
V² Valve Miniature Pneumatic Solenoid Valve

ANSI Pneumatic Schematics by Valve Types

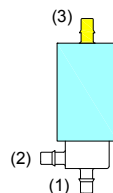
| LEGEND: | |
|----------|-------------------------------------|
| SUPPLY: | Pneumatic Source or Supply Pressure |
| EXHAUST: | Exhaust to Atmospheric Pressure |
| REQMT: | Customer Requirement or Application |
| ATM: | Atmospheric Pressure |

PORT LOCATIONS

MANIFOLD BODY OPTION

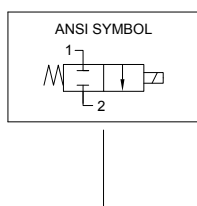
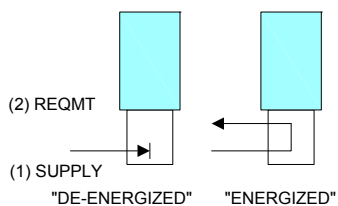


BARB BODY OPTION

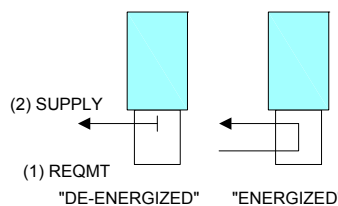


TYPE 1 2-WAY NORMALLY CLOSED

PRESSURE

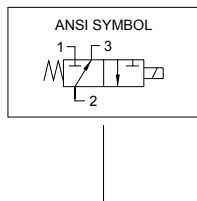
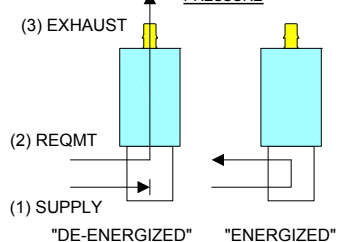


VACUUM

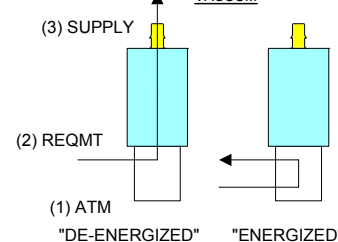


TYPE 3 3-WAY NORMALLY CLOSED

PRESSURE

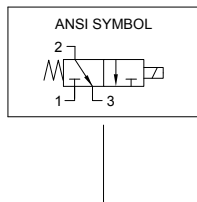
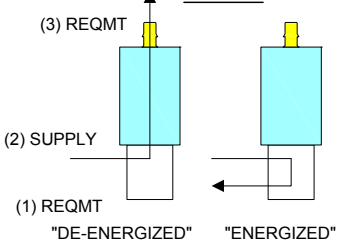


VACUUM

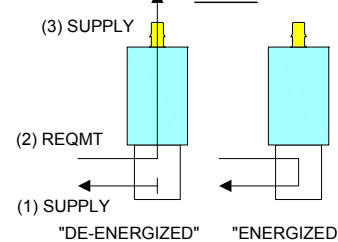


TYPE 3 3-WAY DISTRIBUTOR

PRESSURE

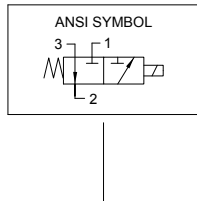
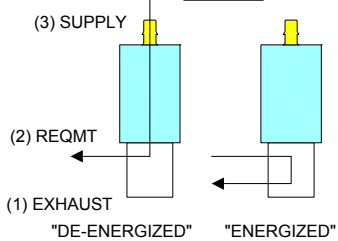


VACUUM

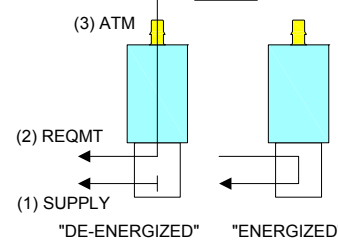


TYPE 4 3-WAY NORMALLY OPEN

PRESSURE



VACUUM



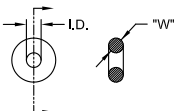
V² Valve Miniature Pneumatic Solenoid Valve

Accessories

O-Ring (Manifold Seal) Dimensions

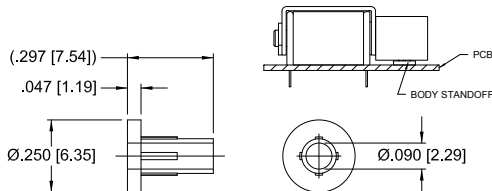
190-007024-002
[2 required for each valve]

I.D. = .144±.005 [2.90±.13]
W = .070±.003 [1.78±.08]
O.D. = .254 [6.45] REFERENCE



Body Standoff

890-000027-001
[2 required for each valve]



Screw 4-40 x 1/2" Pan Head

191-000100-208
[2 required for each valve]



Ordering Information

| Sample Part ID | V2 | 14 | 3 | PV | 12 | P | 8 | 8 |
|----------------|--------|--|--|------------------------------------|--------------------------------------|--|---|---|
| Description | Series | Model Number: Pressure / Orifice / Power | Type | Material XX: Body / Poppet Seal | Voltage | Coil Type | Body Styles | Topseat Barbs |
| Options | V2 | 10: 0-100 psi / 0.030" orifice / 2 Watts 13: 0-50 psi / 0.030" orifice / 1 Watt 14: 0-30 psi / 0.050" orifice / 2 Watts 16: 0-25 psi / 0.030" orifice / 0.5 Watt 17: 0-15 psi / 0.050" orifice / 1 Watt 20: 0-6 psi / 0.050" orifice / 0.5 Watt 16: 0-25 psi / 0.030" orifice / 0.5 Watt | 1: 2-Way NC 3: 3-Way NC or Distributor 4: 3-Way NO | PV: Plastic / FKM | 5: 5 VDC 12: 12 VDC 24: 24 VDC | F: Wire Leads, 18", No Termination P: PC Mount, 4 PC Pins S: PC Mount, 2 Solder Tabs Q: Quick Connect Spade | 0: Manifold Mount 8: 1/8" (3 mm) Barbs | 0: None (2-Way NC Only) 8: 1/8" (3 mm) Barbs |

| Accessories | |
|--|--|
| 191-000115-010: Screw 4-40 x 5/8" Pan Head, Phillips | |
| 890-000027-001: Body Standoff | Used to create a flush mount between coil and valve body |
| 190-007024-002: O-ring, FKM | Used as seal between manifold and valve body |



NOTE: In order to provide the best possible solution for your application, please provide the following requirements when contacting Applications Engineering:

- Media, Inlet & Outlet Pressures
- Minimum Required Flow Rate
- System Supply Voltage
- Media
- Ambient Temperature Range

Please click on the Order On-line button (or go to www.parker.com/precisionfluidics/v2) to configure your V² Miniature Pneumatic Solenoid Valve. For more detailed information, visit us on the Web, or call and refer to Performance Spec. #790-002156-001 and Drawing #890-003080-001.



NOTES

NOTES

NOTES

Value Added Application-Specific Solutions

Gassing Control System



- Mixed gassing logic design includes VSO® proportional valves, X-Valve®, pressure switch, pressure sensors, and PCB interface

7 Position X-Valve® Pneumatic Manifold



- Integrated pressure/vacuum sensors
- Mixed pneumatic logic design
- Ultem® manifold pressure/vacuum sensors

Vacuum Gas Control Module



- Tested to 1×10^{-7} cc/sec/atm Helium
- Assembly tested on mass spectrometer

6 Position VSO® Proportional Valve Pneumatic Manifold Assembly



- Quick connect fittings
- Circuit board with mass electrical termination

5 Position SRS Model Pneumatic Manifold



- Mixed pneumatic logic assembly
- Integrated pressure sensors
- Mass termination of sensors & valves
- Pressed in barbed fittings

8 Position SRS Model Pneumatic Manifold



- Integrated circuit board mounting
- Mass electrical termination

10 Position X-Valve® Pneumatic Manifold



- Mixed pneumatic logic design
- Ultra-miniature design with PCB for mass termination

10 Position SRS Model Pneumatic Manifold



- Circuit board with transducers
- Pressed in barbed fittings

For more information call +1 603 595 1500 or email ppfinfo@parker.com
Visit www.parker.com/precisionfluidics



WARNING

FAILURE OR IMPROPER SELECTION OR IMPROPER USE OF THE PRODUCTS AND/OR SYSTEMS DESCRIBED HEREIN OR RELATED ITEMS CAN CAUSE DEATH, PERSONAL INJURY, AND PROPERTY DAMAGE.

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The products described herein, including without limitation, product features, specifications, designs, availability and pricing, are subject to change by Parker Hannifin Corporation and its subsidiaries at any time without notice.



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