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• Direct Acting Solenoid • 3-Way & 4-Way • Inline • IEM Bar Manifold • Subbase Valve Manifolds • .15 Cv	B Direct Acting
• Compact & Simplified Design • Subbase or Manifold Option • 3-Way • NO & NC on Same Manifold • Wide Range of Voltage • .033 to .05 Cv	B Direct Acting
• Stand Alone Valves • Valve Island • Collective Wiring or Fieldbus Configuration • 3-Way & 4-Way • Modular & Flexible Design • Multiple Pressure Option • Compact & Low Weight • .18 to .80 Cv	C Stacking
• Compact Composite Design • Modular with a Wide Range of Voltages • 3-Way & 4-Way • Fieldbus Available • .6 to 1.2 Cv	C Stacking
• Wear Compensating Dynamic Sealing System • Economical Solution • Optimized Design for Industrial Markets • Simplified Design • .8 to 2.4 Cv	D Inline
• Wide Range of Sizes & Flows • Multiple Options • IEM Bar Manifold • 3-Way & 4-Way • Wear Compensating Dynamic Sealing System • .75 to 7.0 Cv	D Inline
• Extreme Temperature & Pressure Ranges • ATEX Options • 4-Way • Wide Range of Voltages for Mobile Industries • Unique Overmoulded Spool Technology • .7 to 2.7 Cv	D Inline
• 10mm 3-Way • 15mm & 20mm 4-Way • Low Power Consumption • Subbase & Inline Body • Individual & Collective Wiring Solutions • .01 to .47 Cv	D Inline
• Robust Poppet Design • Fast Response & High Flow • 2-Way & 3-Way • High Maximum Pressure Option • 3.6 to 29.9 Cv	D Inline
• Compact Valves with High Flow • Innovative Back to Back Mounting Style with 4 Valves in a 42mm Width • Plug-in Design with Collective Wiring on Fieldbus or 25 Pin Cable • .35 Cv	E Subbase & Manifold
• ISO Valve Platform, 18mm, 26mm, Size 1, Size 2, & Size 3 Plug-in • Collective Wiring on Fieldbus or 25-Pin or M23 Cable • Non Plug-in Valves with 3-Pin Din or Mini Connectors • .55 to 6.0 Cv	E Subbase & Manifold
• Fieldbus Interface for Isys Valves • Added Input & Output Functionality • Up to 256 Inputs & 256 Outputs • Digital or Analog	E Subbase & Manifold
• ISO Valve Platform, 18mm, 26mm, Size 1, Size 2, & Size 3 • Non Plug-in Valves with 3-Pin Din or Mini Connectors • .55 to 4.15 Cv	E Subbase & Manifold
• Robust Spool Design • Fast Response & High Flow • Plug-in & Direct Pipe Design • 4-Way • Hazardous Duty Option • 1.9 to 12.0 Cv	E Subbase & Manifold
• Robust Poppet & Spool Designs • 3-Way & 4-Way • Manual & Mechanical • Plunger, Roller, One-Way Tripper, Button, Hand Lever, Toggle • 1/8" NPT • .17 to .20 Cv	F Manual Mechanical
• Robust Poppet & Spool Designs • 3-Way & 4-Way • Lever, Pedal, Treadle, Button • 1/4" NPT • .83 Cv	F Manual Mechanical
• Heavy Duty Design • 4-Way • Lever, Pedal Operated • 1/4" & 3/8" NPT • 1.3 to 2.8 Cv	F Manual Mechanical
• Heavy Duty Design • Bronze Body • 3-Way & 4-Way, Air Pilot Manual & Mechanical Valves • 1/4" to 1" NPTF Ports • 2.4 to 12.4 Cv	F Manual Mechanical
• Compliant with OSHA Standard 29 CFR 1910 • Lockout / Soft Start • 3.7 to 14.0 Cv	F Manual Mechanical
• Manual Valves • Lever & Button Operators • 1/8" thru 1/2" Ports • Wide Range of Sizes & Flows • .5 to 1.25 Cv	F Manual Mechanical
• Variety of Control Panel Options - Push Buttons - Indicators - Foot Pedals • Large Selection of Options • Two-Hand Control Conformance with EN 574	G Accessories
• Large Variety of Limit & Pressure Switches • Limit Switches for Standard & Heavy Duty Service • Blocking Valves for Air, Gas & Liquid Service • Threshold Sensors for Monitoring Cylinder Exhaust	G Accessories
• Flow Controls • Check Valves • Needle Valves • Muffler & Silencers • Relief Valves • Quick Exhaust Valves • Ball Valves • Fittings • Tubing & Hose • Quick Couplings	G Accessories
• Model Number to Page Number Index • Safety Guide • Offer of Sale	H



Control Panel Products

Human / Machine Dialog

Section G

www.parker.com/pneu/cpp

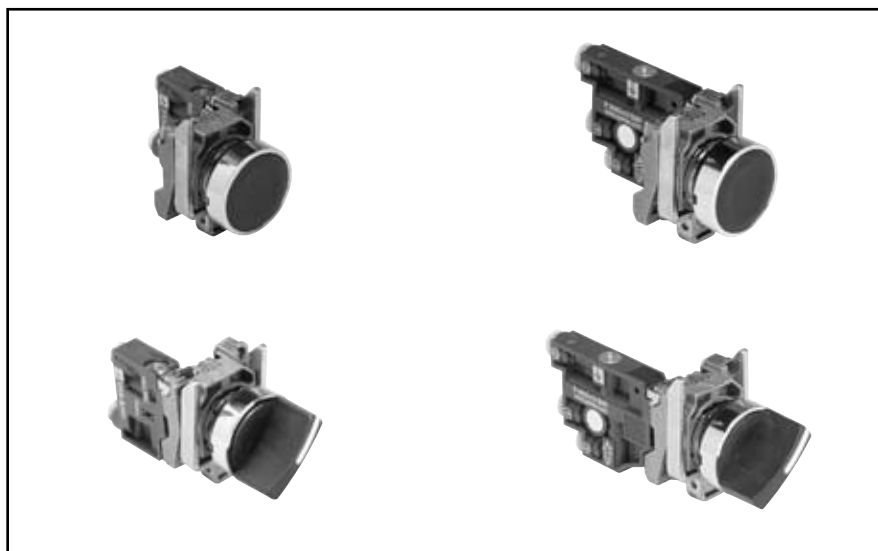


Basic Features	G2-G3	Rotary Selector Switches, 22mm (7/8")	G12
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BOLD ITEMS ARE MOST POPULAR.

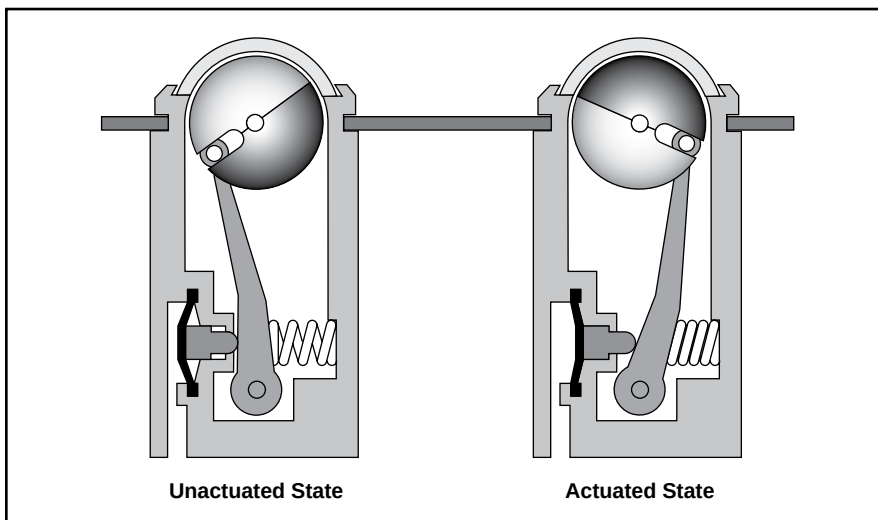


HUMAN-MACHINE DIALOG requires devices such as push buttons and selector switches to provide command inputs. A wide variety of these devices is available to meet most application needs. Both pneumatic and electrical switch bodies are available to match system technology. All of these devices use the 22 mm (7/8") mounting standard.



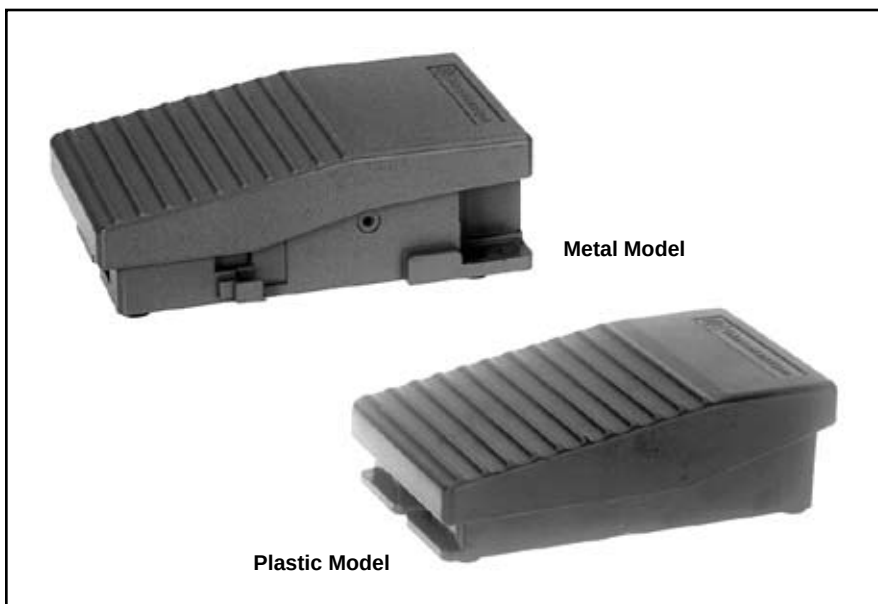
PNEUMATIC VISUAL INDICATORS

An indicator ball is rotated by a pneumatic input, changing the visible color. The ball sits behind a clear plastic window, providing a wide field of view. The visual indicators are available in five brightly colored Day-Glow paints for increased visibility. Like push buttons and selector switches, visual indicators use the 22mm (7/8") mounting standard.



FOOT PEDAL SWITCHES

When the application requires the use of foot pedals, these devices can be used to initiate a cycle or a step within a cycle. A metal foot pedal is available with protective guard.



**MODULAR
PNEUMATIC / ELECTRIC
PUSH BUTTONS**

As with electrical contact switches, pneumatic valve modules can be mounted on a number of different operating heads.

- Pneumatic normally non passing (NNP) is equivalent to electrical normally open (N.O.).
- Pneumatic normally passing (NP) is equivalent to electrical normally closed (N.C.).

Note: Electrical switches can be stacked, but the rear connection on pneumatic switches prevents stacking. Therefore, when mixing electrical and pneumatic switch bodies on the same operator, the pneumatic switch must be mounted last.



PXBB3911



PXBB4932



PXBB4931

Push Buttons

Spring Return or Latching
Mushroom Headed Push Buttons



Standard
Push Button



Visual indicators



Selector Switches

2 or 3 Positions,
Fixed or
Return To Center



Flow
Controls

Sensing

Control
Panel

G

With 3/2 Valve Bodies 5/32" Instant Straight Connections

Flush Push Buttons

Selector Switches



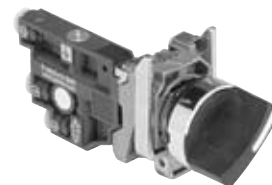
PXBB3111BA2



PXBB4131BA2



PXBB3111BD2



PXBB4131BD2

Part Number	Color	Function	Type of Switching*
PXBB3111BA2	Black	Spring Return	NNP
PXBB3111BA3	Green		
PXBB3111BA4	Red		
PXBB3251BA2	Black	Spring Return	NNP+NP
PXBB4131BA2	Black	Spring Return	Single Universal 3-Way
PXBB4131BA3	Green		
PXBB4131BA4	Red		
PXBB4231BA2	Black	Spring Return	Dual Universal 3-Way

* Type of switching: Universal 3-way: valve can be connected either as NP or NNP as required by connecting the primary air supply to port 1 or port 3.

Note: Mount up to three valves on mounting ring.

Part Number	Color	Function	Type of Switching*
PXBB3111BD2	Black	2 Maintained	NNP
PXBB3211BD2	Black	Positions with	NNP+NNP
PXBB3251BD2	Black	Std. Handle	NNP+NP
PXBB3211BD3	Black	3 Maintained Positions with Std. Handle	NNP+NNP
PXBB3251BD3	Black		NNP+NP
PXBB3211BJ5	Black	3 Positions, Spring Return to Center with Long Handle	NNP+NNP
PXBB4131BD2	Black	2 Maintained Positions with Std. Handle	Single Universal 3-Way
PXBB4231BD2	Black	2 Maintained Positions with Std. Handle	Dual Universal 3-Way
PXBB4231BD3	Black	3 Maintained Positions with Std. Handle	Dual Universal 3-Way
PXBB4231BJ5	Black	3 Maintained Positions with Long Handle	Dual Universal 3-Way

* Type of switching: Universal 3-way: valve can be connected either as NP or NNP as required by connecting the primary air supply to port 1 or port 3.

Mushroom Head Push Buttons (40mm Diameter)



PXBB3111BC2



PXBB4131BC2

Part Number	Color	Function	Type of Switching*
PXBB3111BC2	Black	Spring Return	NNP
PXBB3111BT4	Red	Push-Pul	
PXBB3121BT4	Red	Push-Pull	NP
PXBB4131BC2	Black	Spring Return	Single Universal 3-Way
PXBB4131BT4	Red	Push-Pull	

* Type of switching: Universal 3-way: valve can be connected either as NP or NNP as required by connecting the primary air supply to port 1 or port 3.

Note: Mount up to three valves on mounting ring.

BOLD ITEMS ARE MOST POPULAR.

Flow Controls

Sensing

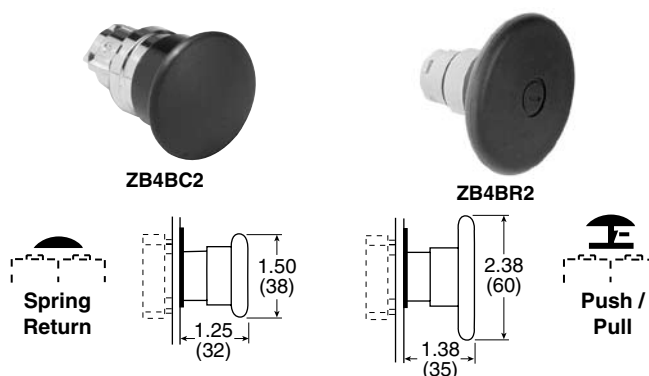
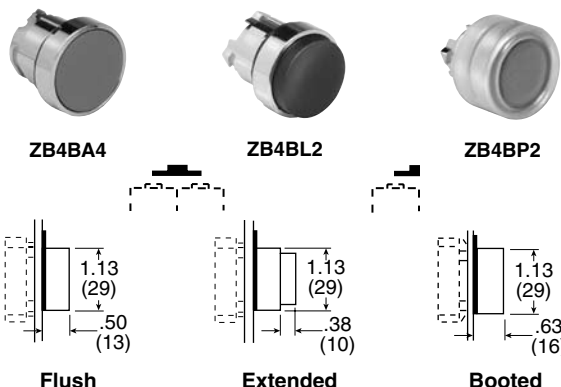
Control Panel

G

For Use With PXBB Valve Bodies and ZBE Electrical Switch Bodies

Push Buttons

Mushroom Head Push Buttons



Plastic Head ZB5**	Metal Head ZB4*			
Part Number	Part Number	Color	Function	Description
ZB5AA2	ZB4BA2	Black	Spring Return	Flush
ZB5AA3	ZB4BA3	Green		
ZB5AA4	ZB4BA4	Red		
—	ZB4BA5	Yellow		
—	ZB4BA6	Blue		
ZB5AL2	ZB4BL2	Black	Spring Return	Extended
ZB5AL3	ZB4BL3	Green		
ZB5AL4	ZB4BL4	Red		
—	ZB4BL5	Yellow	Spring Return	Booted
—	ZB4BP2	Black		
—	ZB4BP3	Green		
—	ZB4BP4	Red		

* ZB4*** Model Numbers are Metal Head Operators

** ZB5*** Model Numbers are Plastic Head Operators

Part Number*	Color	Function	Description
ZB4BC2	Black	Spring Return	Ø 40mm Head
ZB4BC3	Green		
ZB4BC4	Red		
ZB4BT2	Black	Latching Push-Pull	
ZB4BT3	Green		
ZB4BT4	Red		
ZB4BR2	Black	Spring Return	Ø 60mm Head
ZB4BR3	Green		
ZB4BR4	Red		

* ZB4*** Model Numbers are Metal Head Operators

Push / Push Buttons



ZB4BH02

Part Number*	Color	Function	Description
ZB4BH02	Black	Detent 2-Position	Flush
ZB4BH03	Green		
ZB4BH04	Red		

* ZB4**** Model Numbers are Metal Head Operators

Mounting Accessories



ZB5AZ905

Part Number	Color	Description
ZB5AZ905	—	Plastic Head (ZB5) Mounting Nut Tightening Tool
ZBZ1602	Black Plastic	Guard for 40mm

BOLD ITEMS ARE MOST POPULAR.

For Use With PXBB Variable Composition Switch Bodies

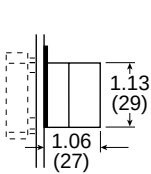
Selector Switches **Key Operated Selectors**



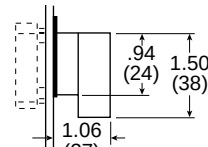
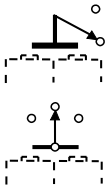
ZB4BD3



ZB4BJ3



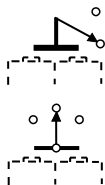
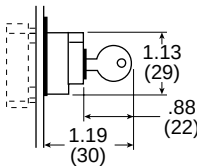
Standard Selector



Knob Lever



ZB4BG2



Standard Black Handle		
Part Number*	Description	Function
ZB4BD2	Maintained	2-Positions
ZB4BD4	Spring Return from Right to Left	
ZB4BD3	Maintained	3-Positions
ZB4BD5	Spring Return to Center from Left and Right	
ZB4BD7	Maintained Right Spring Return from Left to Center	3-Positions
ZB4BD8	Maintained Left Spring Return from Right to Center	3-Positions
Long Black Handle		
ZB4BJ2	Maintained	2-Positions
ZB4BJ4	Spring Return from Right to Left	
ZB4BJ3	Maintained	3-Positions
ZB4BJ5	Spring Return to Center from Left and Right	

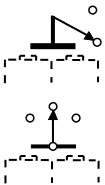
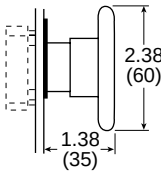
* ZB4*** Model Numbers are Metal Head Operators

Key Operated		
Part Number*	Key Withdrawal	Function
ZB4BG2	Left	2 Maintained Positions
ZB4BG4	Left and Right	
ZB4BG3	Center	3 Maintained Positions
ZB4BG5	Left and Right	
ZB4BG7	Center	3-Positions 2 Spring Return to Center

Mushroom Head Push Buttons with Key Select



ZB4BS24

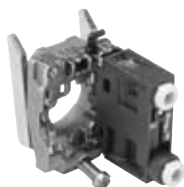


Part Number*	Color	Function	Description
ZB4BS54	Red	Latching Turn to Release	Ø 40mm Head
ZB4BS14	Red	Key Latching	
ZB4BS64	Red	Latching Turn to Release	Ø 60mm Head
ZB4BS24	Red	Key Latching	

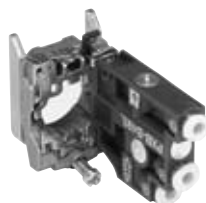
* ZB4**** Model Numbers are Metal Head Operators

BOLD ITEMS ARE MOST POPULAR.

For Use With 22mm (7/8") Metal Operating Heads 5/32" Instant Connections 3/2 Valve Bodies with Mounting Ring



PXBB3111B



PXBB4131B

Part Number	Connections	Function	Type of Switching*
PXBB3111B	5/32" Instant	3/2	NNP
PXBB3121B	5/32" Instant	3/2	NP
PXBB4131B	5/32" Instant	3/2	Universal 3-Way

Note: • Mount up to 3 valves on mounting ring for push buttons.
• Mount up to 2 valves on mounting ring for selector switches,
Valves **cannot** be mounted in center position.

Specifications

Air Quality –
Standard Shop Air, Lubricated or Dry 40 µm Filtration

Flow –
PXBB3• Cv=.08
PXBB4• Cv=.18

Materials –
Body Polyamide
Operating Head Zinc Alloy & Plastic

Operating Positions..... All Positions

Operating Pressure –
PXBB3• 15 to 115 PSIG (1 to 9 bar)
PXBB4• 15 to 145 PSIG (1 to 10 bar)

Ports5/32" Instant for Semi-Rigid Nylon or Polyurethane Tube

Temperature –
Operating5°F to 140°F (-15°C to + 60°C)

Additional Valve Bodies



PXBB3911



PXBB4932



PXBB4931

Part Number	Connections	Function	Type of Switching*
PXBB3911	5/32" Instant Straight	3/2	NNP
PXBB3912	5/32" Instant Swivel		
PXBB3921	5/32" Instant Straigh	3/2	NP
PXBB3922	5/32" Instant Swivel		
PXBB4931	5/32" Instant Straight	3/2	Universal 3-Way
PXBB4932	5/32" Instant Swivel		

Replacement Valve Bodies for PXBB1 and PXBB2 Push Button Valve Series



PXBB1911



PXBB1922

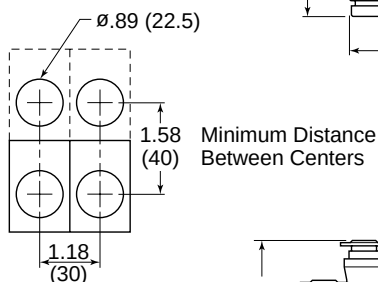
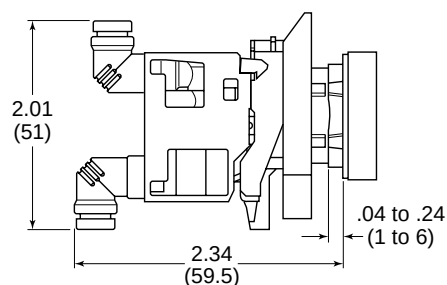
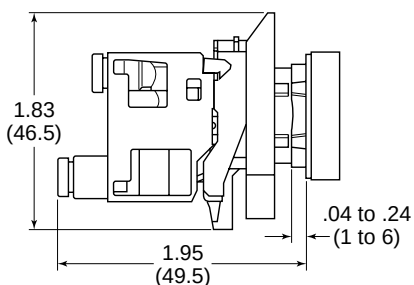


PXBB2911

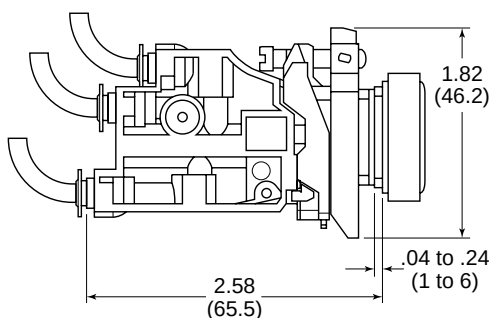
Part Number 1/16" ID Body	Part Number 1/8" ID Body	Connections	Function	Type of Switching*
PXBB1911	PXBB2911	5/32" Instant Straight	3/2	NNP
PXBB1912	—	5/32" Instant Swivel		
PXBB1915	PXBB2915	10-32 UNF Threaded		
PXBB1921	PXBB2921	5/32" Instant Straight	3/2	NP
PXBB1922	—	5/32" Instant Swivel		
PXBB1925	PXBB2925	10-32 UNF Threaded		
PXBB1911SE	—	5/32" Instant Straight	2/2	NNP NP
PXBB1921SE	—	5/32" Instant Swivel		

BOLD ITEMS ARE MOST POPULAR.

PXB-B3 Dimensions

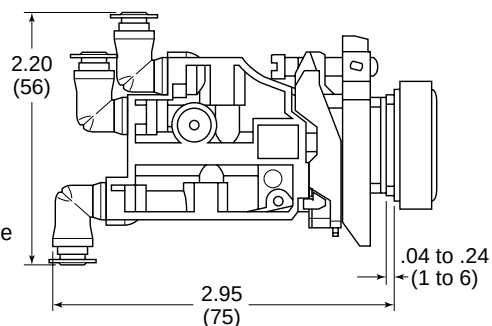


PXB-B4 Dimensions



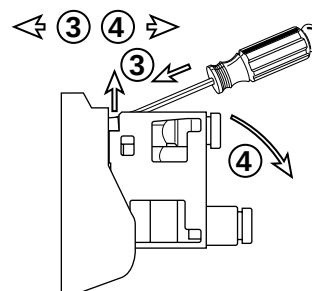
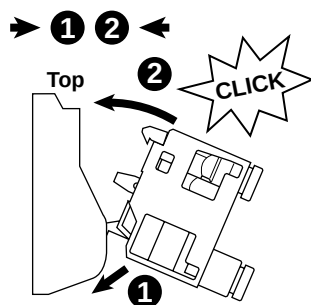
Tube Bending Radius For PXBB3 and PXBB4

- 4 mm O.D. x 2 mm I.D. Tube
= Minimum 0.39 (10) Radius
- 4 mm O.D. x 2.7 mm I.D. Tube
= Minimum 0.59 (15) Radius

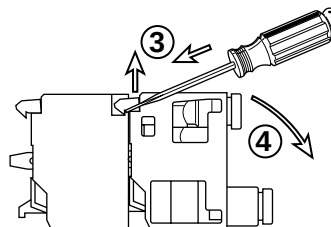
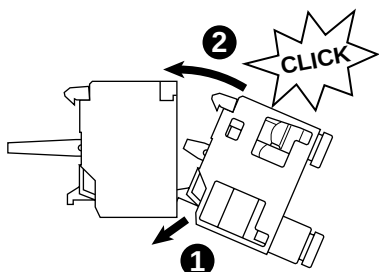


Assembly

Assembling PXB Valves On Mounting Block



Assembling PXB Valves On the Back of the Electrical Contact



For Push Buttons and Visual Indicators

Legend Plates for PXBB Devices
(22mm)



ZBY***

Part Number	Description
Without Text For Customer Engraving	
ZBY2101	Black / Red Background (White Letters)
ZBY4101	Yellow / White Background (Black Letters)
With Text For Push Buttons	
ZBY2303	Start
ZBY2304	Stop
ZBY2305	Forward
ZBY2306	Reverse
ZBY2307	Up
ZBY2308	Down
ZBY2309	Right
ZBY2310	Left
ZBY2311	On
ZBY2312	Off
ZBY2313	Open
ZBY2314	Close
ZBY2321	Inch
ZBY2323	Reset
ZBY2326	Power On
ZBY2327	Slow
ZBY2328	Fast
ZBY2330	Emergency Stop
ZBY2334	Run
With Text For 2-Position Selectors	
ZBY2367	Off On
With Text For 3-Position Selectors	
ZBY2387	Hand Off Auto

Blank Legend Plates for Inscription

For PXBB Devices (2 lines of 11 characters maximum)	
Please indicate the required text when ordering. (Allow 3 weeks for delivery)	
Part Number	Description
ZBY2002	Black Background / White Letters

For 22mm Visual Indicators Only

2 lines of 11 characters maximum

Please indicate the required text when ordering.
(Allow 3 weeks for delivery)

Part Number	Description
ZB2BY2002	Black Background / White Letters

Accessories



ZBE101

Electrical Switch Bodies

When combined with pneumatic valves, these contact blocks allow different forms of power to be provided from a single push button. Can be mounted with both types of valves PXBB3 / PXBB4.

Electrical Specification: 240V, 10Amp

Part Number	Type of Contact
ZBE101	 Normally Open (NO)
ZBE102	 Normally Closed (NC)

Note: Plastic Mounting Ring ZB5AZ009 to be used with ZB5 Plastic Operating Heads.

Metal Mounting Ring ZB4BZ009 to be used with ZB4 Metal Operating Heads.



Metal: ZB4BZ009



Plastic: ZB5AZ009

Mounting Ring for Valve Bodies, Switch Bodies and Operating Heads

To make up a complete push button with one to three switching elements with 5/32" instant connections, use this mounting block and select the operating heads and bodies in this Section.

Part Number	Description
ZB4BZ009	Metal Mounting Ring
ZB5AZ009	Plastic Mounting Ring

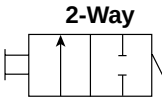
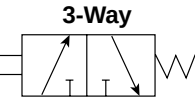
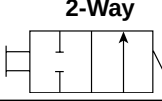
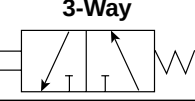
To make up a complete selector switch with one or two switching elements with 5/32" instant connections, use this mounting block and select the operating heads and bodies in this Section.

Part Number	Description
ZB4BZ009	Metal Mounting Ring
ZB5AZ009	Plastic Mounting Ring

Note: To release push button from mounting ring, pull lever on top of mounting ring up and remove push button operator. To assemble push button operator to mounting ring, align arrows and snap into place.

BOLD ITEMS ARE MOST POPULAR.

Functionality Explanation

Fluid Power			Universal Description	Electrical	
Function	Symbol			Function	Symbol
Normally Closed (N.C.)			Normally Non-Passing (NNP)	Normally Open (N.O.)	
Normally Open (N.O.)			Normally Passing (NP)	Normally Closed (N.C.)	

Type of Switching: Universal 3-Way: Valve can be connected either as NP or NNP as required by connecting the primary air supply to port 1 or port 3.



NNP: Normally Non-Passing. 

NP: Normally Passing. 

NNP + NNP: Double Switch Body, Both Normally Non-Passing. 

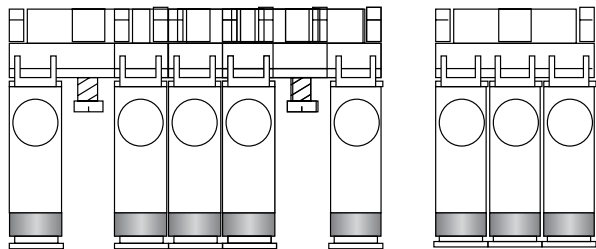
NNP + NP: Normally Non passing and Normally-Passing. 

NP + NP: Both Normally Passing. 

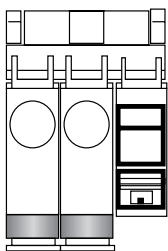
Combination of Output Devices
On a Single Mounting Block

Up to 3 output devices (valves or electrical contacts) can be mounted side by side on 1 mounting block.

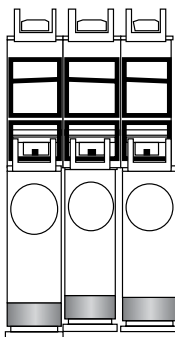
Note: The central position can only be activated by push button heads.



Electrical Contacts and Valves can be Combined Either Side by Side, or by Mounting the Valve on the Back of the Electrical Contact.

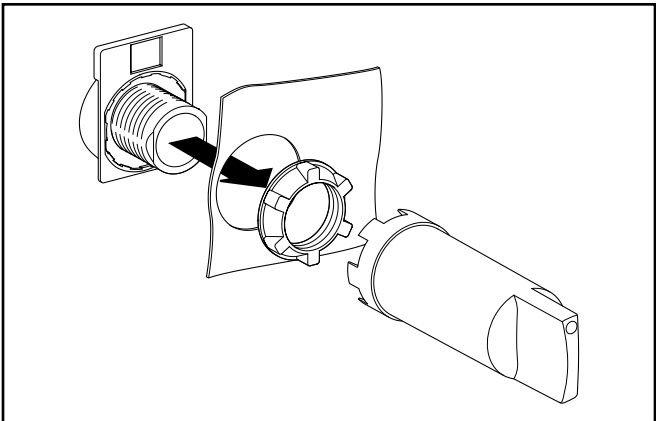


Side by Side
Combination

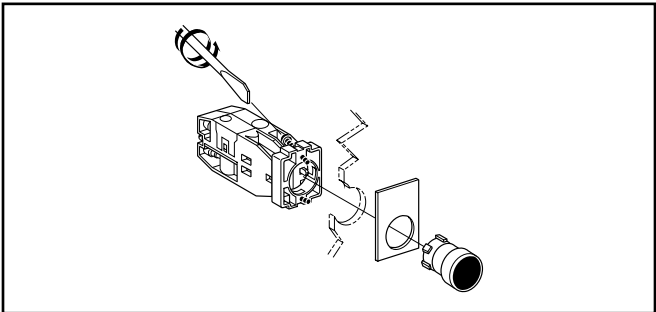


Combination by Mounting Valves
On the Back of the
Electrical Contact

Assembling Output Devices
and Heads On ZB5 Series
Mounting Block



Replacement Old Style Mounting

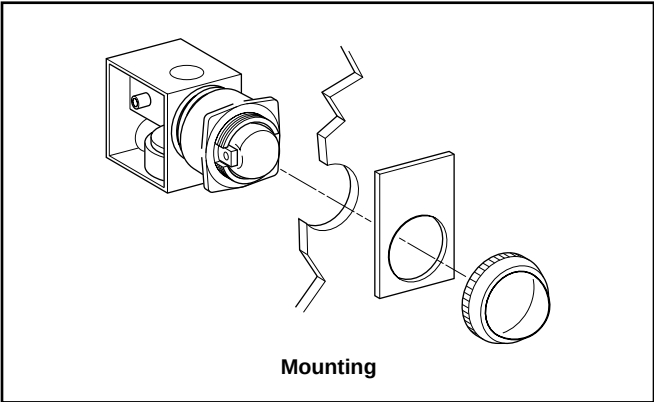


With 5/32" Instant Connections

22mm Visual Indicators



PXVF131



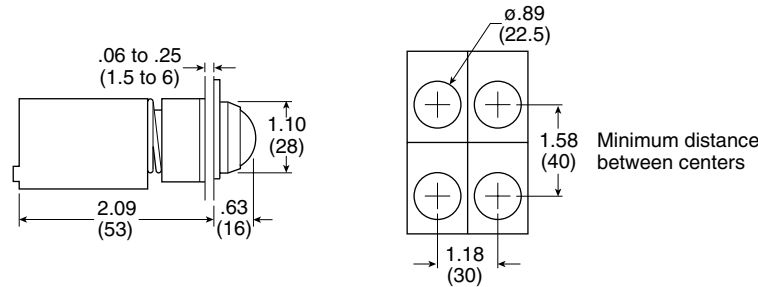
Black Plastic Bezel		
Part Number "ON" Indicator	Part Number "OFF" Indicator	Color
PXVF131	PXVF1213	Green
PXVF141	PXVF1214	Red
PXVF151	PXVF1215	Yellow
PXVF161	PXVF1216	Blue
PXVF111	PXVF1211	White

Notes:

- The Pneumatic Indicators are black in one position and colored in the other. The colored position corresponds either to the presence of a pressure ("ON" Indicator) or the absence of pressure ("OFF" Indicator).
- For Legend Plates, see page G9.

Dimensions

PXVF1••

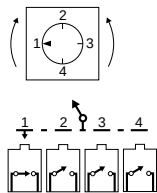


Specifications

- Air Quality –**
Standard Shop Air, Lubricated or Dry, 40µm Filtration
- Materials –**
Body..... Polyamide
Operating Head..... Zinc Alloy & Plastic
- Number of Operations with Dry Air at 90 PSI (6 bar) and 68°F (20°C) - Frequency 1 Hz.....**
Mushroom Head 300,000 Operations
- Operating Positions.....** All Positions
- Operating Pressure** 15 to 115 PSIG (1 to 8 bar)
- Ports –**
Standard 5/32" Instant for Semi- Rigid Nylon or Polyurethane Tube
10-32 UNF Available
- Temperature –**
Operating 32°F to 122°F (0°C to + 50°C)
Storage -22°F to 140°F (-30°C to +60°C)

With 5/32" Instant Connections, 1/16" I.D. Internal Orifice

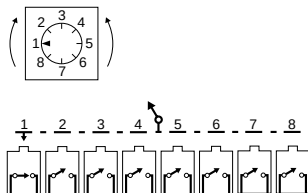
4-Positions, 4-Outputs 3/2



PXBDD104

Without Mechanical Stop		
Part Number	Operating Head	Type of Switching*
PXBDD104	Black Handle with 2.5" x 2.5" (64 x 64 mm) Legend Plate, Red or Black Background	NNP

8-Positions, 8-Outputs 3/2



PXBDD508

Without Mechanical Stop		
Part Number	Operating Head	Type of Switching*
PXBDD508	Black Handle with 2.5" x 2.5" (64 x 64 mm) Legend Plate, Red or Black Background	NNP

Specifications

- Air Quality –**
Standard Shop Air, Lubricated or Dry, 40µm Filtration
- Materials –**
Body..... Polyamide
Operating Head..... Zinc Alloy & Plastic
- Minimum Operating Force** 9.4 Lb (42 N)
- Number of Operations with Dry Air at 90 PSI (6 bar) and 68°F (20°C) - Frequency 1 Hz**..... 1 million Operations
Mushroom Head 300,000 Operations
- Operating Positions**..... All Positions
- Operating Pressure** 15 to 115 PSIG (1 to 8 bar)
- Ports –**
Standard: 5/32" Instant for Semi- Rigid Nylon or Polyurethane Tube
10-32 UNF Available.
- Temperature –**
Operating 32°F to 122°F (0°C to + 50°C)
Storage -22°F to 140°F (-30°C to +60°C)

- Notes:**
These Rotary Switches operate in either direction. They come assembled with switch PXBB1921 (Normally Passing). All switches are held in the actuated non-passing position except the one associated with a given dial position, which is in the unactuated Normally Passing position.
- Example of Operation: Rotation from Position 1 to Position 2:
- Switch 1 changes from unactuated Normally Passing to actuated non-passing.
 - Switch 2 changes from actuated non-passing to unactuated Normally Passing.
- Units will accept all switch bodies shown earlier in this Section, but care must be taken in selecting switch type.

With 5/32" Instant Connections, 1/16" I.D. Internal Orifice

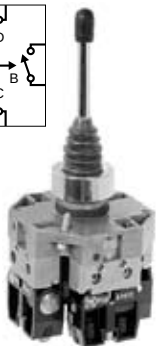
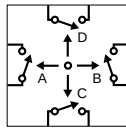
2-Position Unit

4-Position Unit

Specifications



PXBGA8211



PXBGA8411

Note: These Joystick Operators come assembled with switch type PXBB1911, but will accept all Switch Bodies shown later in this Section.

Part Number	Position	Function	Type of Switching*	Operating Head
PXBGA8211	2	Maintained Position in Each Direction	NNP	Chrome Plated Lever with Protective Bellows 1.6" x 2.5"
PXBGA8411	4			
PXBGA8221	2	Spring Return in Each Direction	NNP	(40 x 64 mm) Legend Plate Red or Black Background
PXBGA8421	4			

* NNP: Normally Non-Passing.

Air Quality –

Standard Shop Air, Lubricated or Dry, 40µm Filtration

Flow at 90 PSI (6 bar) in SCFM (l/mn ANR) 1.8 (50)

Materials –

Body..... Polyamide

Operating Head..... Zinc Alloy & Plastic

Nominal Bore Ø in Inches (mm) 1/16" (1.5)

Number of Operations with Dry Air at 90 PSI (6 bar) and 68°F (20°C) - Frequency 1 Hz..... 1 million Operations

Operating Angle..... 18°

Operating Positions..... All Positions

Operating Pressure 15 to 115 PSIG (1 to 8 bar)

Operating Torque 59.5 oz-in (420 mNm)

Ports –

Standard: 5/32" Instant for Semi- Rigid Nylon or Polyurethane Tube

10-32 UNF Available.

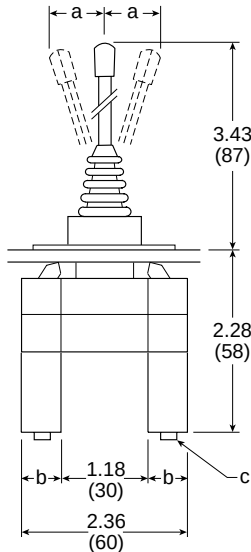
Temperature –

Operating 32°F to 122°F (0°C to + 50°C)

Storage -22°F to 140°F (-30°C to +60°C)

Dimensions

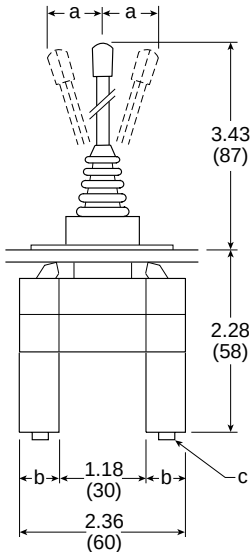
PXBGA82**



	inch	mm
a*	1.57	40
b	.59	15
c	5/32 Dia.	4 Dia.

* In both directions

PXBGA84**



	inch	mm
a*	1.57	40
b	.59	15
c	5/32 Dia.	4 Dia.

* In all 4 directions

Standard Duty 1/6" I.D. Valves with 5/32" Instant Connections

Protective Guard

Foot Switches Without Protective Guard



PXPEM510



PXPEA110

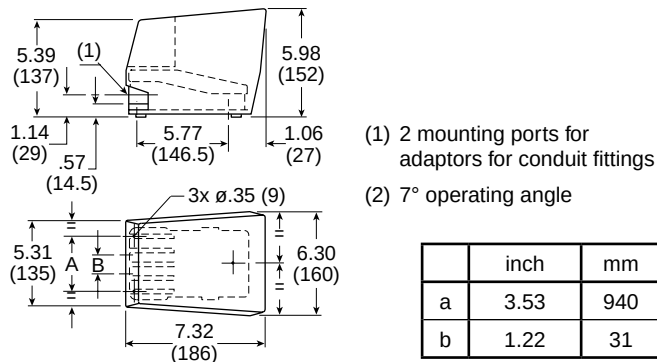
Part Number	Function	Material	Type of Switching*
PXPEM510	High resistance protective guard, with interlock mechanism to prevent accidental operation by a falling object.	Metal	NNP

Part Number	Function	Material	Type of Switching*
PXPEA110	Spring Return	Plastic	NNP
PXPEM110	Spring Return	Metal	NNP

CAUTION:
This valve shall not be used to actuate a punch press. Do not use this valve on punch presses or press brakes. See OSHA 1910.217.

Dimensions

PXPEM510

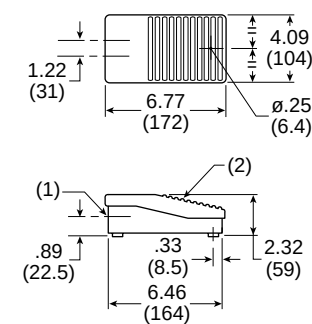


Notes: These Foot Pedal Operators come assembled with switch PXBB1921 (Normally Passing). With the pedal in the unoperated position, the switch is in the actuated non-passing position. With the pedal actuated, the switch is in the unactuated Normally Passing position.

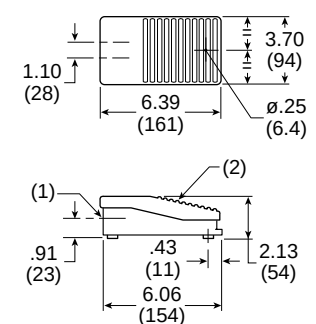
Units will accept all switch bodies shown earlier in this Section, but care must be taken in selecting switch type.

Dimensions

PXPEM110



PXPEA110



Specifications

Air Quality –

Standard Shop Air, Lubricated or Dry, 40µm Filtration

Flow at 90 PSI (6 bar) in SCFM (l/min ANR) 1.8 (50)

Materials –

Body..... Polyamide
Operating Head..... Zinc Alloy & Plastic

Nominal Bore Ø in Inches (mm) 1/16" (1.5)

Number of Operations with Dry Air at 90 PSI (6 bar) and 68°F (20°C) - Frequency 1 Hz 1 million Operations

Operating Positions..... All Positions

Operating Pressure 15 to 115 PSIG (1 to 8 bar)

Ports –

5/32" Instant for Semi-Rigid Nylon or Polyurethane Tube

Temperature –

Operating 32°F to 122°F (0°C to + 50°C)
Storage -22°F to 140°F (-30°C to + 60°C)

* NNP: Normally Non-Passing.

Features

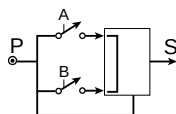
- The pre-assembled two-hand control enclosure occupies both hands of an operator by requiring nearly simultaneous operation of two pushbuttons
- Poppet – snap-acting (no spools)
- Same air as in cylinders – Filtration: 40 micron
- No lubrication required



PXPC111

Part Number	Connections
PXPC111	5/32" Instant

Operation



- Output "S" will appear only if "A" and "B" are simultaneously operated (within .5 seconds or less of each other).
- If the operator actuates only one pushbutton, either "A" or "B", or if both "A" and "B" are actuated but at an interval greater than .5 seconds, output "S" will not appear.
- Output "S" is regenerated by supply "P". Output "S" will therefore disappear if supply "P" is cut off.
- Output "S" will disappear if either "A" or "B" is released.
- If output "S" disappears for any reason, "A" and "B" must be nearly simultaneously actuated to again provide output "S".
- Since output "S" is regenerated it appears sharply, at full force (snap-acting), and is quickly exhausted upon deactivation. In addition the module is not affected by the length or diameter of tubing used for output "S".

General Characteristics

Operating Pressure 40 to 120 PSI (3 to 8 bar)

Permissible Fluids –

Air or neutral gas 40 micron filtration, lubricated or dry

Flow at 90 PSI (6 bar) 7 SCFM (200 l/mn ANR)

Operating Temperature -5°F to 140°F (-15°C to 60°C)

Below 40°F (5°C), an air dryer is required

Storage Temperature -40°F to 160°F (-40°C to 70°C)

Number of operations with dry air at 90 PSI (6 bar), 68°F (20°C), frequency 1 Hz 1 Million Operations

Vibration resistance –

Conforms to section 19-2 of bureau Véritas regulations (November 1987)

Materials –

Body..... Glass Filled Nylon

Operating Head Zinc Alloy and Plastic

Connections:..... 5/32" instant

Mounting

Approvals:

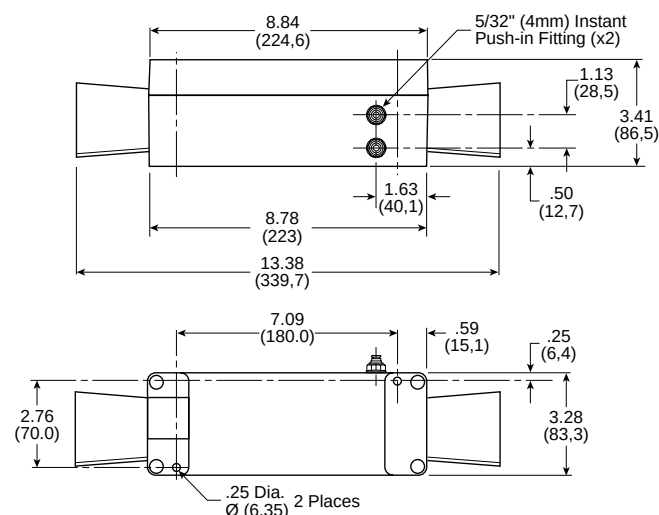
- In accordance with European Standard EN 574 - September 1996
- Conforms to the model that has obtained CE Type Test Certificate No. 02526 520 4631 0397

WARNING

These devices should **NOT** be used in any application involving rotary clutch presses. Two hand control modules do not of themselves insure the safety of any machine. Users and original equipment manufacturers are responsible for making sure that installations meet all relevant safety regulations.

Dimensions

Inches (mm)



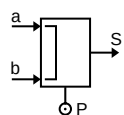
Flow Controls

Sensing

Control Panel

G

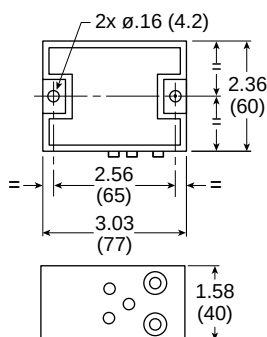
Two-Hand Control Module



PXPA11

Part Number	Connections
PXPA11	5/32" Instant

Dimensions



PXPA11

Specifications

Air Quality –

Standard Shop Air, Lubricated or Dry, 40 μ m Filtration

Flow at 90 PSI (6 bar) in SCFM (l/mn ANR) 7 (200)

Materials –

Body..... Polyamide

Operating Head..... Zinc Alloy & Plastic

Nominal Bore ϕ in Inches (mm)..... 7/64" (2.5)

Number of Operations with Dry Air at 90 PSI (6 bar) and 68°F (20°C) - Frequency 1 Hz 1 million Operations

Operating Positions..... All Positions

Operating Pressure 40 to 115 PSIG (3 to 8 bar)

Ports –

5/32" Instant for Semi-Rigid Nylon or Polyurethane Tube

Temperature –

Operating 32°F to 122°F (0°C to + 50°C)

Storage -22°F to 140°F (-30°C to + 60°C)

Vibration resistance:

Conforms to section 19-2 of bureau Véritas regulations (November 1987)

WARNING

These devices should **NOT** be used in any application involving rotary clutch presses. Two hand control modules do not of themselves insure the safety of any machine. Users and original equipment manufacturers are responsible for making sure that installations meet all relevant safety regulations.

Notes: These two-hand control modules provide an output signal upon nearly concurrent operation of two pushbuttons.

Two-Hand Control Module Guard



PPRL15

Part Number	Base Component
PPRL15	PXPC111

Two Hand Repair Parts

Part Number	Quantity Required	Description
PXPA11	1	Control Module
PXBB3111B	2	Valve Body & Mounting Ring
ZB4BR*	2	Push Button
PPRL15	2	Control Module Guard

* 2 = Black, 3 = Green, 4 = Red

Flow Controls

Sensing

Control Panel

G

Section G

www.parker.com/pneu/lmsen



Basic Features – Pneumatic Sensors G18

Limit Switches

- 3/2 Miniature Limit Switches G19-G20
- 3/2 Compact Limit Switches..... G21-G22
- “K” Series – Standard Duty Limit Switches... G23-G26
- “J” Series – Heavy Duty Limit Switches..... G27-G29

PWBA Blocking Valves G30-G31

Threshold Sensors G32-G34

Flow
Controls

Sensing

Control
Panel

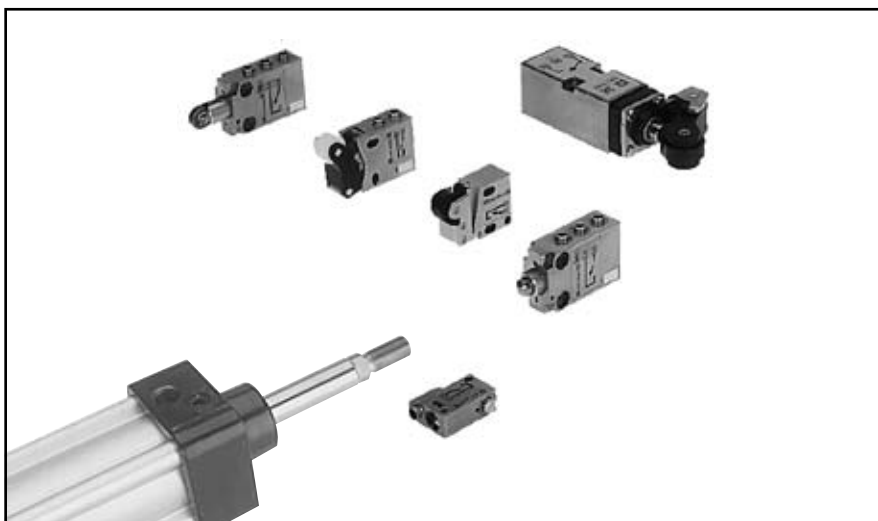
G

Basic Features

To achieve the sensing or feedback function, pneumatic sensors can be:

- Limit Switches in a Variety of Sizes and Configurations
- Pressure Switches with Many Adjustable Ranges
- Components Designed Specifically for Pneumatic Technology using Pressure Variation, Air Bleed or Blocking for Detection.

A wide variety of pneumatic sensors are available to suit any application requirement.

**Sensing
Pneumatic Sensors**

PNEUMATIC LIMIT SWITCHES

Pneumatic limit switches are non-passing (NNP) or passing (NP) when actuated by a moving part. The various operating levers, bore dimensions and functions are given below.

Interchangeable
with an Electrical
Microswitch



1/16" Bore



1/16" Bore

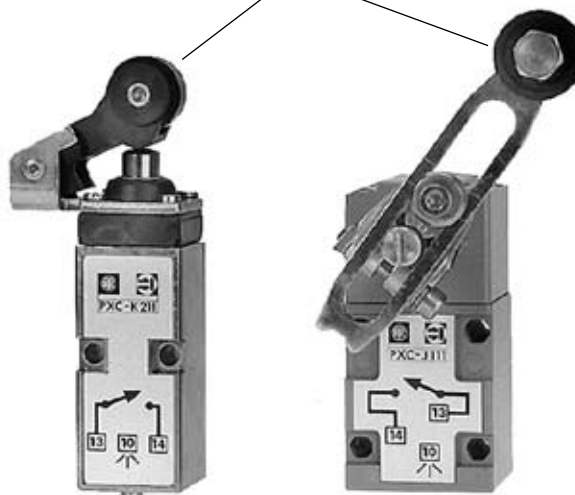
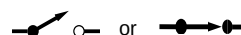


7/64" Bore



Normally Non-Passing (NNP) Models

Multiple Operating Heads

1/8" Bore
Connectable Exhaust1/8" Bore
Connectable Exhaust

NNP or NP, as Required

Flow
Controls

Sensing

Control
Panel

G

Direct Acting Limit Switches

1/16" I.D. Internal Orifice



PXCM111



PXCM121

Part Number	Connection	Actuator	Type of Switching*
PXCM111	5/32" Instant	Steel Plunger Operating Levers Available (See Below)	NNP
PXCM115	10-32 UNF		
PXCM121	5/32" Instant	Plastic Roller	NNP
PXCM125	10-32 UNF		

7/64" I.D. Internal Orifice



PXCM521

Part Number	Connection	Actuator	Type of Switching*
PXCM521	5/32" Instant	Plastic Roller	NNP

Actuators For Steel Plunger



PXCZ11

Use with PXCM11*

Part Number	Actuator
PXCZ11	Plastic Roller Lever
PXCZ12	Plastic Roller Lever, One Way Trip

* NNP: Normally Non-Passing.

Specifications

Air Quality –

Standard Shop Air, Lubricated or Dry, 40µm Filtration

Flow SCFM (NI/min) –

PXCM111	2.2 (60)
PXCM121	3.0 (85)
PXCM521	8.8 (250)

Materials –

Body	Zinc Alloy
Poppets	Polyurethane
Seals	Nitrile (Buna N)

Maximum Operating Frequency..... 5 Hz

Nominal Bore Ø –

PXCM111, PXCM121	1/16" (1.5 mm)
PXCM521	7/64" (2.5 mm)

Number of Operations with Dry Air at 90 PSI (6 bar) and 68°F (20°C) – Frequency 1 Hz 10 Million

Operating Positions..... All Positions

Operating Pressure 40 to 115 PSIG (3 to 8 bar)

Ports –

5/32" Instant for Semi-Rigid Nylon or Polyurethane Tube

10-32 UNF Available

Temperature –

Operating 32°F to 122°F (0°C to + 50°C)

Storage -22°F to 140°F (-30°C to + 60°C)

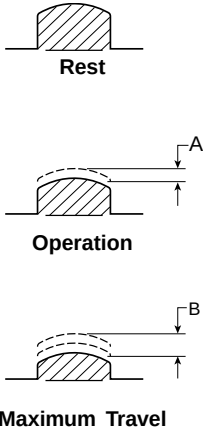
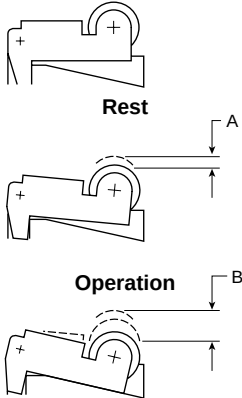
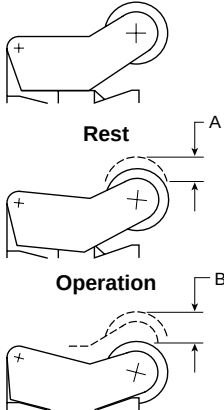
Flow
Controls

Sensing

Control
Panel

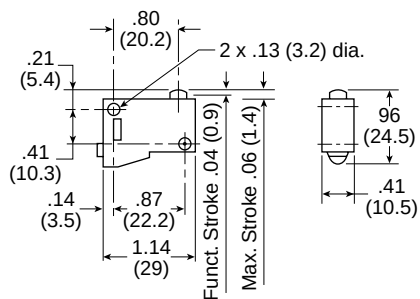
G

Operator Specifications

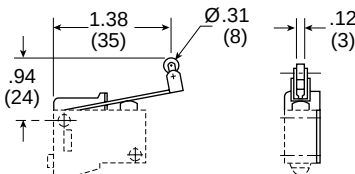
	PXCM111	PXCM121	PXCM521
Differential Travel at 90 PSI (6 bar)	.006" (0.15 mm)	.012" (0.3 mm)	.020" (0.5 mm)
Maximum Travel (B) at 90 PSIG (6 bar)	.055" (1.4 mm)	.126" (3.2 mm)	.228" (5.8 mm)
Minimum Pre-Travel (A) at 90 PSIG (6 bar)	.035" (0.9 mm)	.079" (2 mm)	.087" (2.2 mm)
Minimum Operating Force at 90 PSI (6 bar)	2.5 lb (11 N)	1.0 lb (4.5 N)	1.6 lb (7 N)
Operating Diagram	 The diagram for PXCM111 shows three states: Rest (a shaded rectangular block), Operation (the block with a dashed outline and a horizontal arrow labeled 'A' indicating travel), and Maximum Travel (the block with a dashed outline and a horizontal arrow labeled 'B' indicating the full range of travel).	 The diagram for PXCM121 shows three states: Rest (a complex mechanical part with a curved top), Operation (the part with a dashed outline and a horizontal arrow labeled 'A' indicating travel), and Maximum Travel (the part with a dashed outline and a horizontal arrow labeled 'B' indicating the full range of travel).	 The diagram for PXCM521 shows three states: Rest (a complex mechanical part with a curved top), Operation (the part with a dashed outline and a horizontal arrow labeled 'A' indicating travel), and Maximum Travel (the part with a dashed outline and a horizontal arrow labeled 'B' indicating the full range of travel).

Dimensions

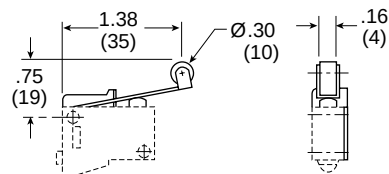
PXCM111



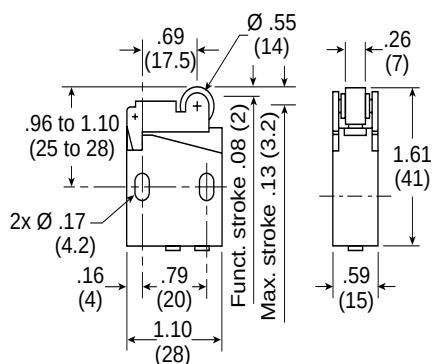
PXCZ12



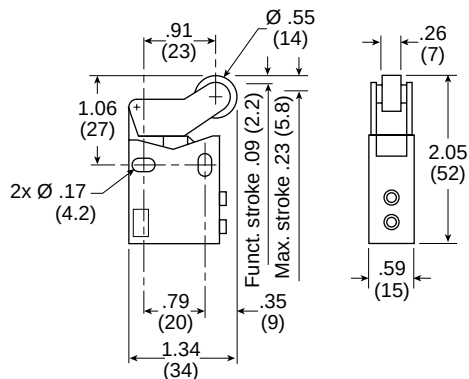
PXCZ11



PXCM121, PXCM131



PXCM521



**Pilot Operated
Compact Limit Switches**
5/32" Instant Connections
Pipeable Exhaust Port
7/64" I.D. Internal Orifice



PXCM601A110

PXCM601A102

PXCM601A103

Specifications

- Air Quality –**
Standard Shop Air, Lubricated or Dry, 40µm Filtration
- Flow SCFM (NI/min).....** 8.8 (250)
- Materials –**
Body..... Zinc Alloy
Poppets..... Polyurethane
Seals..... Nitrile (Buna N)
- Maximal Operating Frequency** 5 Hz
- Nominal Bore Ø** 7/64" (2.5 mm)
- Number of Operations with Dry Air at 90 PSI (6 bar) and 68°F (20°C) – Frequency 1 Hz.....** 10 Million
- Operating Positions.....** All Positions
- Operating Pressure** 40 to 115 PSIG (3 to 8 bar)
- Ports –**
5/32" Instant for Semi-Rigid Nylon or Polyurethane Tube
- Temperature –**
Operating 32°F to 122°F (0°C to + 50°C)
Storage -22°F to 140°F (-30°C to + 60°C)

Part Number	Actuator	Type of Switching*
PXCM601A110	Steel Plunger Operating Levers Available (See Below)	NNP
PXCM601A102	Steel Roller Plunger	
PXCM601A103	90° Steel Roller Plunger	

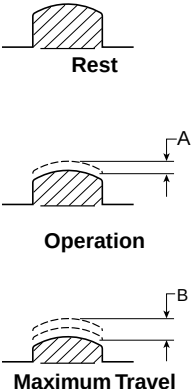
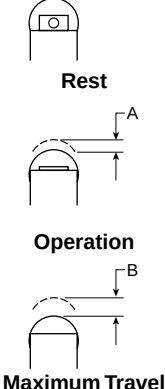
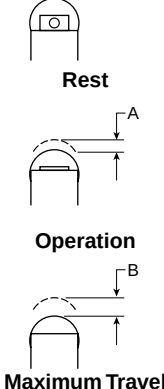
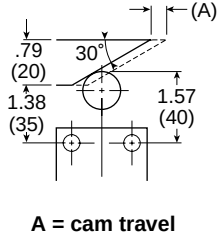
Flow
Controls

Sensing

Control
Panel

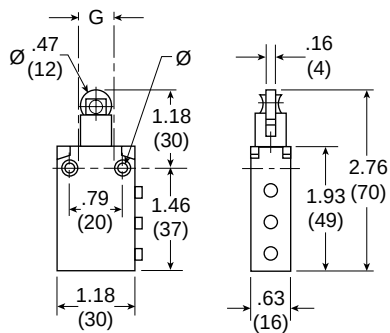
G

Operator Specifications

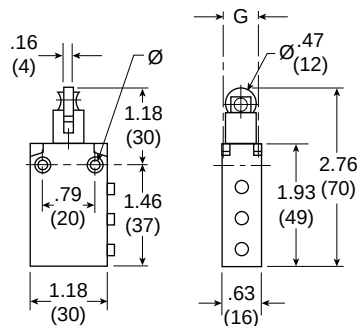
	PXCM601A110	PXCM601A102	PXCM601A103	PXCM601A110 + XCMZ24
Differential Travel at 90 PSI (6 bar)	.012" (0.3 mm)	.008" (0.2 mm)	.020" (0.5 mm)	.047" (1.2 mm) (A)
Maximum Travel (B) at 90 PSIG (6 bar)	.197" (5 mm)	.197" (5 mm)	.197" (5 mm)	—
Minimum Pre-Travel (A) at 90 PSIG (6 bar)	.066" (1.7 mm)	.066" (1.7 mm)	.066" (1.7 mm)	.370" (9.4 mm) (A)
Minimum Operating Force at 90 PSI (6 bar)	5.4 lbf (24 N)	5.2 lbf (23 N)	5.2 lbf (23)	4.3 lbf (19)
Operating Diagram				 A = cam travel

Dimensions

PXCM601A102

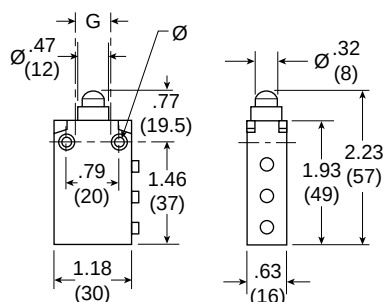


PXCM601A103



$\varnothing$:
2 mounting holes $\varnothing .17$ " (4.3)
2 countersunk $\varnothing .32$ " (8.2)
depth 4 mm

PXCM601A110



G:
top mounting holes, 2 x M5
.71" (18 mm) centers

Flow
Controls

Sensing

Control
Panel

G

Limit Switches

Plunger Operated
5/32" Instant Connections
Pipeable Exhaust Port
1/8" I.D. Internal Orifice



Roller Operated
5/32" Instant Connections
Pipeable Exhaust Port
1/8" I.D. Internal Orifice



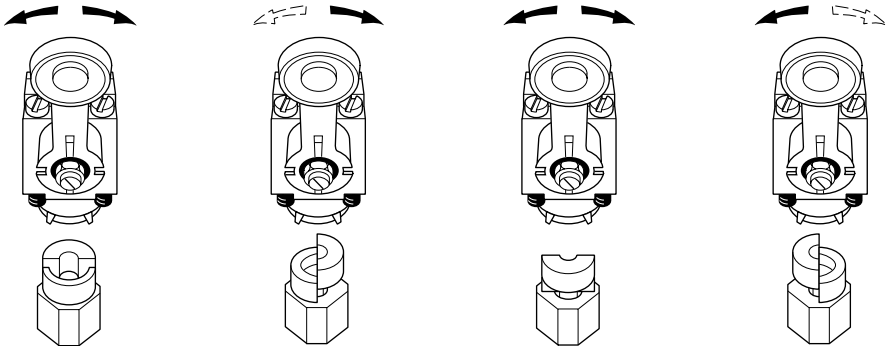
Complete Assemblies		
Part Number	Actuator	Type of Switching*
PXCK21101	Steel Plunger	NNP
PXCK22101		NP
PXCK21102	Steel Roller Plunger	NNP
PXCK22102		NP
PXCK21121	Plastic Roller Plunger	NNP
PXCK22121		NP
PXCK21106	Cats Whisker	NNP
PXCK22106		NP

With Die Cast Rotary Operating Head and Operating Lever - Complete Assemblies		
Part Number	Actuator	Type of Switching*
PXCK2110031	Fixed Delrin Roller Lever Multi-Function Head Actuates: - From Right and Left - From Right - From Left	NNP
PXCK2210031		NP
PXCK2110041	Adjustable Delrin Roller Lever Multi-Function Head Actuates: - From Right and Left - From Right - From Left	NNP
PXCK2210041		NP

NNP: Normally Non-Passing

NP: Normally Passing

Field Conversion of Rotary Operating Head



Flow Controls

Sensing

Control Panel

G

Separate Pneumatic Switch Bodies



PXCK211

Part Number	Actuator	Type of Switching*
PXCK211	For Use with ZCK Series Operating Heads	NNP
PXCK221		NP

Pneumatic Switch Bodies with Rotary Heads



PXCK21100

Part Number	Actuator	Type of Switching*
PXCK21100	Multi-Function Head Actuates: - From Right and Left - From Right - From Left	NNP
PXCK22100		NP

Operating Heads For Use With PXCK Switch Bodies



ZCKG00

Part Number	Actuator	Description
Rotary Operated		
ZCKG00	—	Die Cast Zinc
Plunger Operated		
ZCKD02	Roller Plunger	Plunger Operated
ZCKD06	Whisker	
ZCKD10	Rod Plunger	
ZCKD21	Delrin Roller Lever On Plunger	
ZCKD23	Steel Roller Lever On Plunger	

Operating Levers for Rotary Heads



ZCKY81



ZCKY91

For Use With Rotary Head ZCKG00		
Part Number	Actuator	Description
ZCKY51	Steel 1/8" Square	Rod Levers
ZCKY52	Fiberglass 1/8" Dia. Round	
ZCKY81	Plastic Spring Rod Lever	
ZCKY91	Metal Spring Rod Lever	
ZCKY11	Delrin Roller Lever	Roller Levers
ZCKY13	Steel Roller Lever	
ZCKY41	Adjust. Delrin Roller Lever	
ZCKY43	Adjust. Steel Roller Lever	

Specifications

Air Quality –

Standard Shop Air, Lubricated or Dry, 40µm Filtration

Flow SCFM (NI/min) 7.4 (210)

Materials –

Body Zinc Alloy

Poppets Polyurethane

Seals Nitrile (Buna N)

Maximal Operating Frequency 5 Hz

Nominal Bore Ø 1/8" (3 mm)

**Number of Operations with Dry Air at 90 PSI (6 bar) and
 68°F (20°C) – Frequency 1 Hz** 10 Million

Operating Positions All Positions

Operating Pressure 40 to 115 PSIG (3 to 8 bar)

Ports –

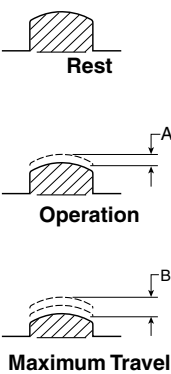
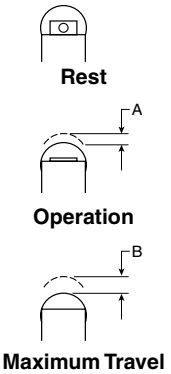
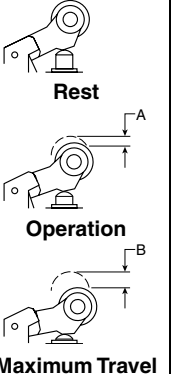
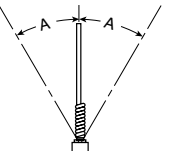
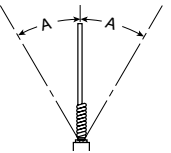
5/32" Instant for Semi-Rigid Nylon or Polyurethane Tube

Temperature

Operating 32°F to 122°F (0°C to + 50°C)

Storage -22°F to 140°F (-30°C to +60°C)

Operator Specifications

	PXCK2••01	PXCK2••02	PXCK2••03	PXCK2••06	PXCK2••00 + Actuator
Differential Angle	—	—	—	12°	3°
Differential Travel	.008" (0.2 mm)	.008" (0.2 mm)	.008" (0.2 mm)		
Maximum Angle of Travel	—	—	—	—	80°
Maximum Travel (B) at 90 PSIG (6 bar)	.228" (5.8 mm)	.228" (5.8 mm)	.228" (5.8 mm)	—	—
Minimum Pre-Travel (A) at 90 PSIG (6 bar)	.087" (2.2 mm)	.087" (2.2 mm)	.102" (2.6 mm)	—	—
Minimum Operating Force at 90 PSI (6 bar)	3.6 lbf (16N)	4.5 lbf (20N)	3.4 lbf (15N)	—	—
Minimum Operating Torque at 90 PSI (6 bar)	—	—	—	17.0 oz in (120mNm)	29.8 oz in (210mNm)
Operating Angle	—	—	—	35°	31° (Minimum Lever Travel Including Pre-Travel Required For Operation)
Operating Diagram					

Flow
Controls

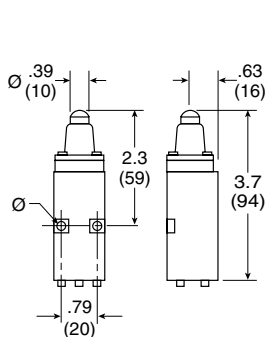
Sensing

Control
Panel

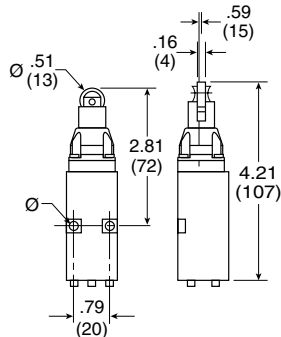
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Dimensions

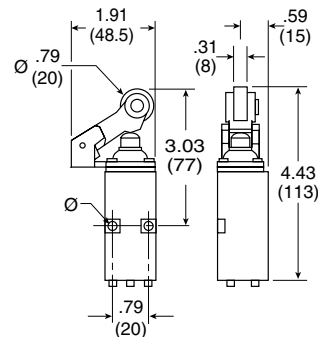
PXCK21101, PXCK22101



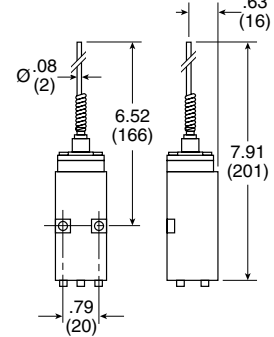
PXCK21102, PXCK22102



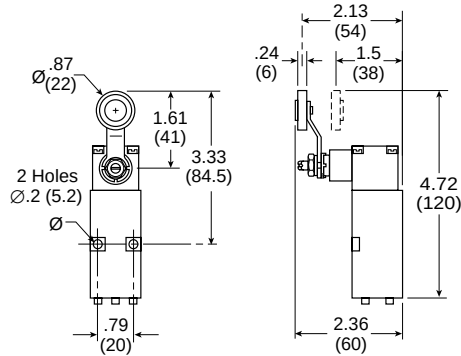
PXCK21121, PXCK22121



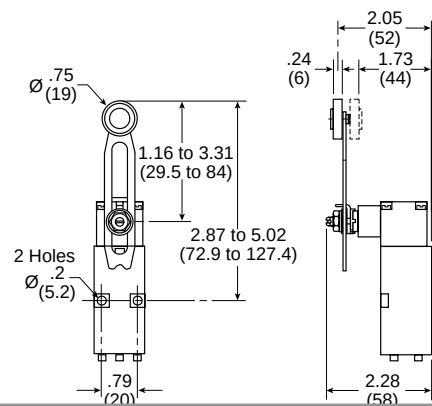
PXCK21106, PXCK22106



PXCK2110531, PXCK2210531

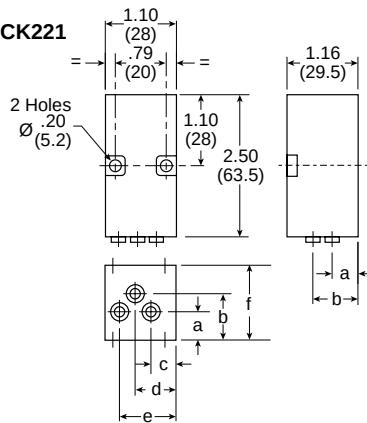


PXCK2110541, PXCK2210541



Pneumatic Switch Bodies

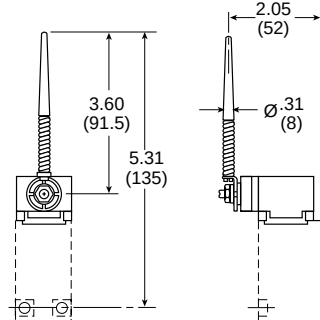
PXCK211, PXCK221



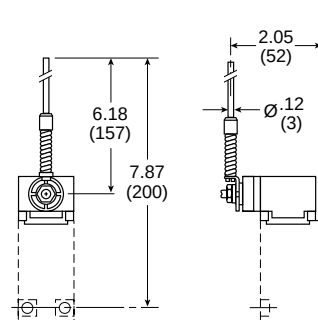
	inch	mm
a	.39	10
b	.77	19.5
c	.35	9
d	.61	15.5
e	.87	22
r	1.66	29.5

Rotary Heads with Operating Levers

ZCKY81



ZCKY91



Switch Bodies Only



PXCJ117

Part Number	Type of Switching*
PXCJ117	NNP
PXCJ127	NP

Switch Bodies with Rotary Head



PXCJ11701

Part Number	Direction of Actuation	Type of Switching*
PXCJ11701	Right & Left, Spring Return	NNP
PXCJ11705	Right or Left, Spring Return	
PXCJ12701	Right & Left, Spring Return	NP
PXCJ12705	Right or Left, Spring Return	

Operating Levers for Rotary Heads



ZC2JY11



ZC2JY31



ZC2JY81



ZC2JY91

Die Cast Zinc. For Use With PXCJ Switch Bodies		
Part Number	Operator	Description
ZC2JY11	Delrin Roller	Spring Return
ZC2JY13	Steel Roller	
ZC2JY21	Offset Delrin Roller	
ZC2JY81	Plastic Spring Rod	
ZC2JY91	Metal Spring Rod	
ZC2JY31	Delrin Roller	Adjustable Roller
ZC2JY41	Offset Delrin Roller	
ZC2JY51		Rod Lever
ZC2JY71	Single Track, Delrin Roller	Fork Lever
ZC2JY61	Double Track, Delrin Rollers	

NNP: Normally Non-Passing

NP: Normally Passing

Top Plunger & Rotary Operating Heads



ZC2JE70



ZC2JE01

Die Cast Zinc. For Use With PXCJ Switch Bodies		
Top Plunger Type		
Part Number	Operation	Description
ZC2JE61	Top Push	Spring Return
ZC2JE62	Top Roller Push	
ZC2JE63	Side Push	
ZC2JE70	Cat's Whisker	
Rotary Type		
ZC2JE01	From Left & Right	Spring Return
ZC2JE02	Counterclockwise From Right	
ZC2JE03	Clockwise From Left	
ZC2JE05	From Left or Right	
ZC2JE09	Maintained Positions	

Flow Controls

Sensing

Control Panel

G

Specifications

Air Quality –

Standard Shop Air, Lubricated or Dry, 40µm Filtration

Flow SCFM (NI/min) 7.4 (210)

Materials –

Body Zinc Alloy

Poppets Polyurethane

Seals Nitrile (Buna N)

Maximal Operating Frequency 5 Hz

Nominal Bore Ø 1/8" (3 mm)

Number of Operations with Dry Air at 90 PSI (6 bar) and 68°F (20°C) – Frequency 1 Hz 10 Million

Operating Positions All Positions

Operating Pressure 40 to 115 PSIG (3 to 8 bar)

Ports 1/8" NPT

Temperature –

Operating 32°F to 122°F (0°C to + 50°C)

Storage -22°F to 140°F (-30°C to +60°C)

Operator Specifications

	ZC2JE61	ZC2JE62	ZC2JE70	ZC2JE01	ZC2JE05
Differential Angle	—	5°	5°	2°	2°
Differential Travel at 90 PSI (6 bar)	.008" (0.2 mm)	—	—	—	—
Maximum Angle of Travel	—	—	—	75°	75°
Maximum Travel (B) at 90 PSIG (6 bar)	228" (5.8 mm)	—	—	—	—
Minimum Pre-Travel (A) at 90 PSIG (6 bar)	.059" (1.5 mm)	—	—	—	—
Minimum Operating Force at 90 PSI (6 bar)	3.6 lbf (16N)	—	—	—	—
Minimum Operating Torque at 90 PSI (6 bar)	7.1 oz in (50Nm)	35.4 oz in (250Nm)	35.4 oz in (250Nm)	35.4 oz in (250Nm)	—
Operating Angle (Minimum Lever Travel Including Pre-Travel Required For Operation)	—	23°	23°	12°	12°
Operating Diagram					

Flow
Controls

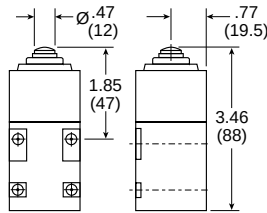
Sensing

Control
Panel

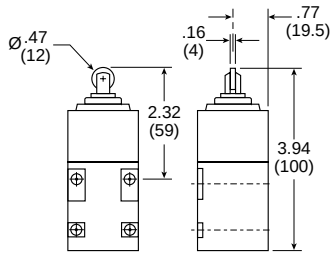
G

Switch Body With Plunger Heads

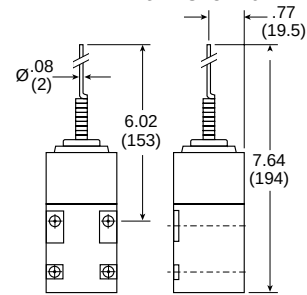
With ZC2JE61



With ZC2JE62

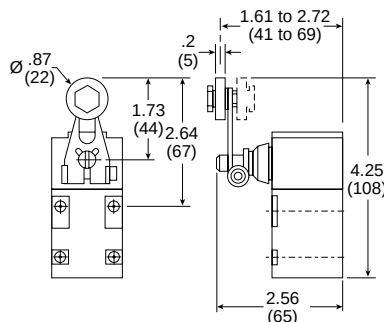


With ZC2JE70

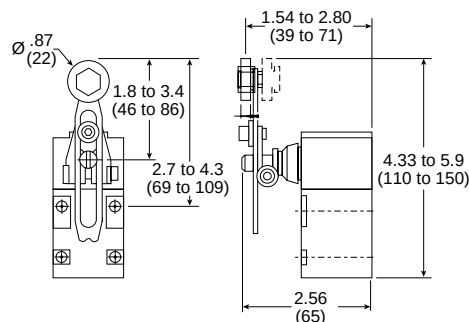


Switch Body With Rotary Heads and Operating Levers

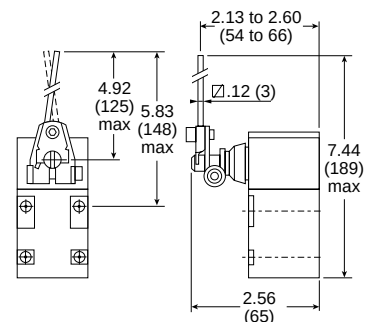
With ZC2JY11



With ZC2JY31

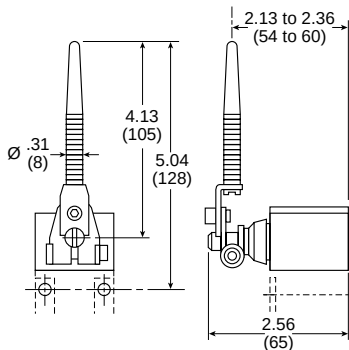


With ZC2JY51

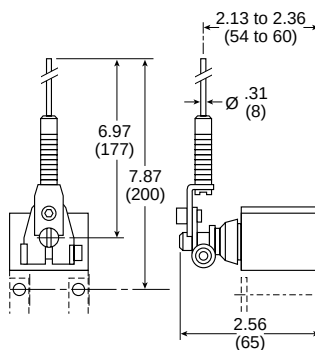


Rotary Heads With Operating Levers

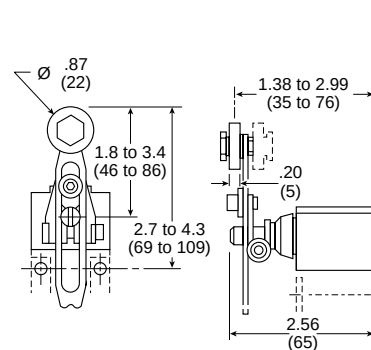
ZC2JY81



ZC2JY91

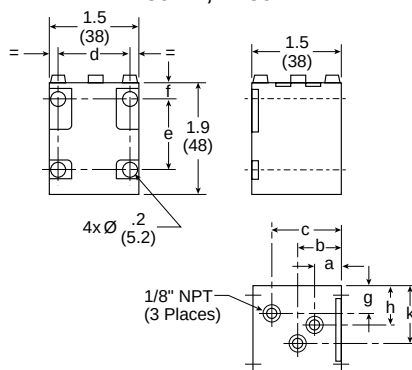


ZC2JY41



Pneumatic Switch Bodies

PXCJ117, PXCJ127



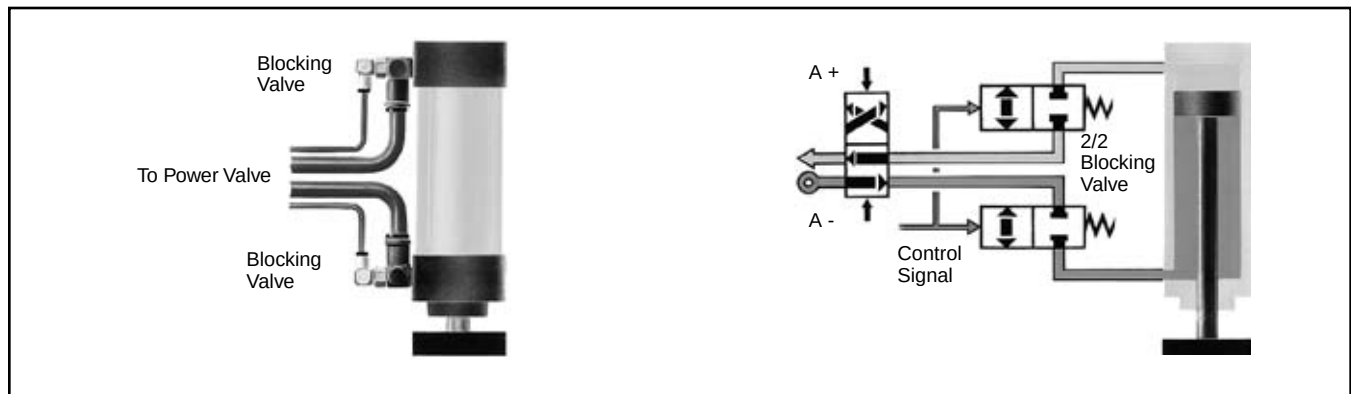
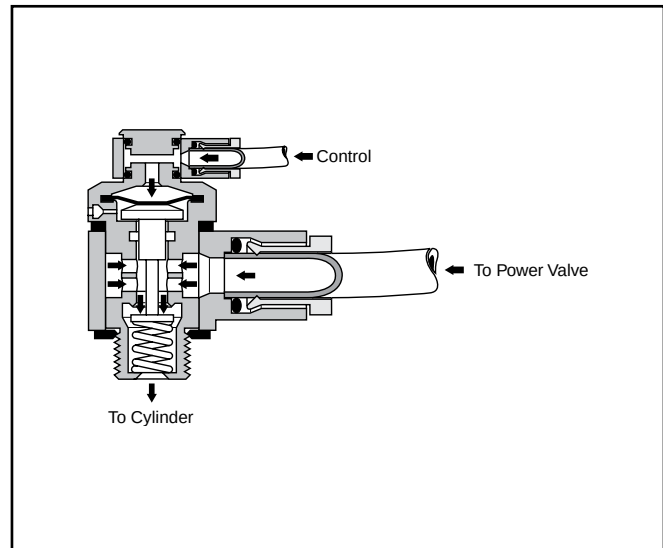
	inch	mm
a	.47	12
b	.75	19
c	1.16	29.5
d	1.14 to 1.18	29 to 30
e	1.18	30
f	.28	7
g	.43	11
h	.51	13
k	.94	24



Blocking Valves

The blocking valve is a single acting spring return 2/2 valve in a fitting format. The device requires a pneumatic pilot signal to open, which allows free flow of air, gas or liquid to pass. As long as a pilot signal is present, the device will remain open. When the pilot signal is removed, the internal spring will close the blocking valve, bubble tight. The blocking valve is oil serviceable and rated to 150 PSI.

These devices have two primary design uses: (1) to prevent unwanted gravity induced motion in cylinders during shut down procedures or during periods of lost supply pressure and (2) freezing the cylinder position by using a blocking valve at each end of the cylinder. Application needs such as tool or work piece protection, horizontal indexing or inspection stops are often satisfied by these devices.



PWBA General Characteristics

Operating Pressure	0 to 150 PSI
Permissible Fluids	Air or neutral gas, 50 µm filtration, lubricated or not
Operating Temperature	5° to 140°F (-15° to 60°C)
Storage Temperature	-40° to 160°F (-40° to 70°C)
Flow	See page w15
Mechanical Life	10 Million
Maximum Operating Frequency	10Hz
Material: Body	Zinc alloy
Mounting Screw	Brass
Maximum Mounting Torque:	88 inch pounds
10-32 UNF and M5	
1/8"	70 inch pounds
1/4"	105 inch pounds
3/8"	265 inch pounds
1/2"	310 inch pounds
Adjustment	N/A
Adjustment Locking	N/A

Piloting and De-Piloting Pressure

Blocking Valve Sizes	Pilot with Operating Pressure of:			
	30 PSI	60 PSI	90 PSI	120 PSI
1/8" BSP or NPT	33 PSI	40 PSI	45 PSI	50 PSI
1/4" BSP or NPT	33 PSI	40 PSI	45 PSI	50 PSI
3/8" BSP or NPT	35 PSI	40 PSI	45 PSI	50 PSI
1/2" BSP or NPT	45 PSI	50 PSI	55 PSI	60 PSI
Blocking Valve Sizes	Depilot with Operating Pressure of:			
	30 PSI	60 PSI	90 PSI	120 PSI
1/8" BSP or NPT	20 PSI	25 PSI	30 PSI	34 PSI
1/4" BSP or NPT	20 PSI	25 PSI	30 PSI	34 PSI
3/8" BSP or NPT	20 PSI	25 PSI	30 PSI	34 PSI
1/2" BSP or NPT	25 PSI	30 PSI	34 PSI	40 PSI



For Cylinder Mounting
(Can also be mounted in Threshold Sensor Banjo)

With Instant Tube Fittings



PWBA3469

BSP					NPT			
Symbol	Connection for Pilot	Cylinder Port Thread (Male)	Connection for Tube	Catalog Number	Connection for Pilot	Cylinder Port Thread (Male)	Connection for Tube	Catalog Number
	4mm Tube	1/8"	6mm	PWBA1468	5/32" Tube	1/8"	1/4"	PWBA3468
		1/4"	6mm	PWBA1469		1/4"	1/4"	PWBA3469
		1/4"	8mm	PWBA1489				
		3/8"	8mm	PWBA1483		3/8"	3/8"	PWBA3493
		3/8"	10mm	PWBA1493				
		1/2"	12mm	PWBA1412		1/2"	1/2"	PWBA3412

With Threaded Connections and Tube Pilot Port



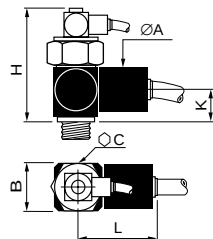
PWBA3833

BSP					NPT			
Symbol	Connection for Pilot	Cylinder Port Thread (Male)	Connection from Valve (Female)	Catalog Number	Connection for Pilot	Cylinder Port Thread (Male)	Connection from Valve (Female)	Catalog Number
	4mm Tube	1/8"	1/4"	PWBA1898	5/32" * Tube	1/8"	1/8"	PWBA3888
		1/4"	1/4"	PWBA1899		1/4"	1/4"	PWBA3899
	M5 Female	3/8"	3/8"	PWBA1833	5/32" * Tube	3/8"	3/8"	PWBA3833
		1/2"	1/2"	PWBA1822		1/2"	1/2"	PWBA3822

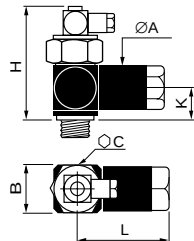
* Instant fitting

With Threaded Connections and Threaded Pilot Port

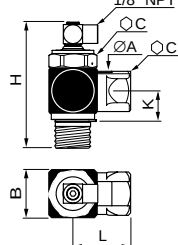
PWBA14/34



PWBA18/38



PWBA38



Dimensions: Inches (mm)

	Flow*	ØA	B	C	K	H	L
PWBA1468/3468	14.8	0.86" (22)	0.82" (21)	0.94" (24)	0.53" (13.5)	2.32" (59)	1.54" (39)
PWBA1469/3469	19.4	0.86" (22)	0.82" (21)	0.94" (24)	0.53" (13.5)	2.09" (53)	1.54" (39)
PWBA1489							
PWBA1483	45.9	1.06" (27)	1.10" (28)	0.94" (24)	0.55" (14)	2.09" (53)	1.98" (50)
PWBA1493/3493							
PWBA1412/3412	81.2	1.22" (31)	1.30" (33)	1.30" (33)	0.94" (24)	2.59" (66)	2.59" (66)
PWBA1898/3888	14.8	0.86" (22)	0.82" (21)	0.94" (24)	0.53" (13.5)	2.32" (59)	1.71" (43.5)
PWBA1899/3899	19.4	0.86" (22)	0.82" (21)	0.94" (24)	0.53" (13.5)	2.09" (53)	1.71" (43.5)
PWBA1833/3833	45.9	1.06" (27)	1.10" (28)	0.94" (24)	0.55" (14)	2.09" (53)	2.18" (55)
PWBA1822/3822	81.2	1.22" (31)	1.30" (33)	1.30" (33)	0.94" (24)	2.59" (66)	2.47" (63)
PWBA38887	14.8	0.75" (19)	0.87" (22)	0.83" (21)	0.67" (17)	2.20" (56)	1.73" (44)
PWBA38997	19.4	0.75" (19)	0.87" (22)	0.83" (21)	0.67" (17)	2.20" (56)	1.73" (44)
PWBA38337	45.9	1.06" (27)	1.18" (30)	1.06" (27)	0.91" (23)	2.64" (67)	1.42" (36)
PWBA38227	81.2	1.06" (27)	1.18" (30)	1.06" (27)	0.91" (23)	2.64" (67)	1.42" (36)

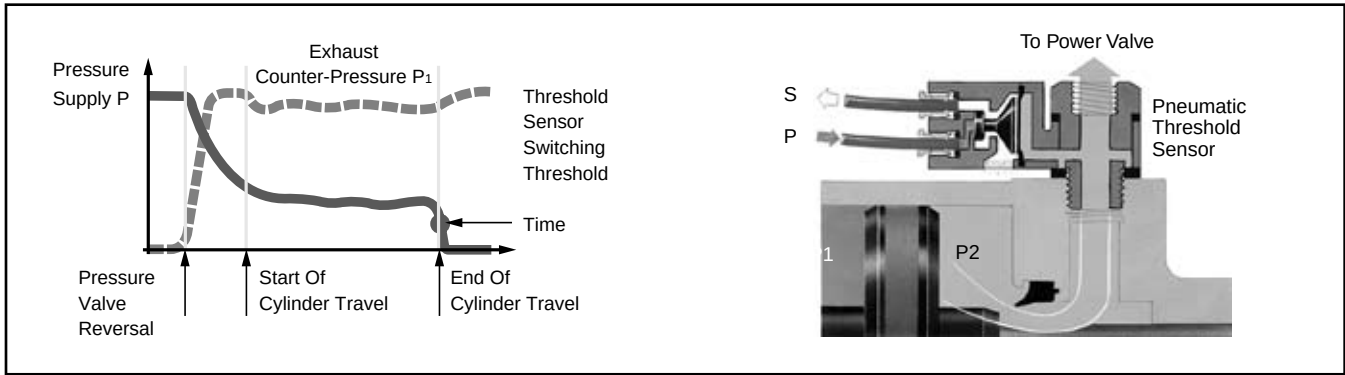
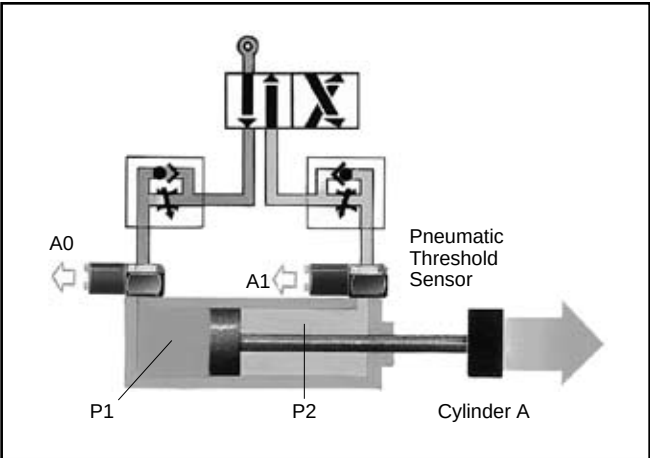
*SCFM at 90 PSI

General Description

Threshold Sensors – PWS

The plug-in threshold sensors provide feedback information on pneumatic cylinder status in one of three possible outputs . . . pneumatic, electric, or electronic. Mounted into the cylinder port, these devices monitor the back pressure of the cylinder's exhaust. When the cylinder's piston stops, the back pressure rapidly drops and the threshold sensor provides the desired output. Ideal for variable stroke applications such as robotics where other sensor type devices such as limit switches are impractical, these devices provide a signal whenever the cylinder stops motion.

The threshold sensor consists of two complementary sub assemblies (1) the banjo fitting and (2) the plug-in sensor element. In all cases, the sensor is easily plugged into the banjo fitting and locked in place with a spring clip. The banjo fitting is designed to accept (piggy backed) other functional fittings such as flow controls or blocking valves. Simply select the sensor based on the type feedback signal that best fits the application.

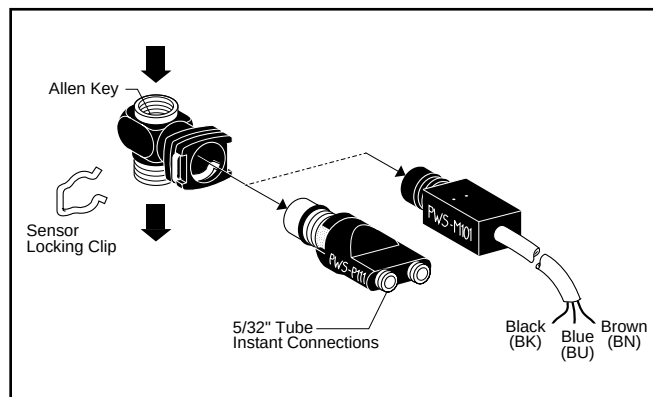


PWS General Characteristics

Operating Pressure	0 to 150 PSI
Permissible Fluids	Air or neutral gas, 50 µm filtration, lubricated or not
Operating Temperature	5° to 140°F (-15° to 60°C)
Storage Temperature	-40° to 160°F (-40° to 70°C)
Flow	N/A
Mechanical Life	10 Million
Maximum Operating Frequency	10Hz
Material: Body	Thermoplastic
Mounting Screw	Brass
Maximum Mounting Torque: 10-32 UNF and M5	88 inch pounds
1/8"	70 inch pounds
1/4"	105 inch pounds
3/8"	265 inch pounds
1/2"	310 inch pounds
Adjustment	N/A
Adjustment Locking	N/A

Piloting and De-Piloting Pressure

Threshold Sensors	Pilot with Operating Pressure of 90 PSI	Depilot with Operating Pressure of 90 PSI
PWSP111	64 PSI	6 PSI
PWSM1012	15 PSI	9 PSI
PWSE101 and PWSE111	10 PSI	7 PSI



Model Selection

Banjo Sockets (with Sensor Clip)		
Port Size	Model Number	Wrench
10-32	PWSB1557	5/16" Hex
1/8"	PWSB1887	3/16" Allen
1/4"	PWSB1997	5/16" Allen
3/8"	PWSB1337	3/8" Allen
1/2"	PWSB1227	1/2" Allen

Plug-in Sensors		
Output	Model Number	Connection
Pneumatic	PWSP111	5/32" push-in
Electrical	PWSM1012	3-wire cable (6 ft)

Application

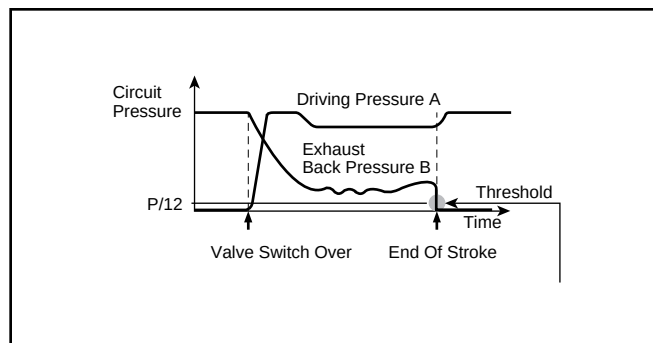
The threshold sensor provides electrical or pneumatic feedback information on pneumatic (air) cylinder status. These devices monitor the back pressure of the cylinder's exhausting chamber. When the cylinder stops, the back pressure drops and the threshold sensor provides the desired output. Ideal for variable stroke applications. The banjo fitting and the feedback element are two separate subassemblies, giving the user flexibility between electrical and pneumatic outputs as feedback.

Mounting

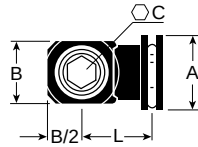
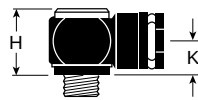
Banjo fittings in 10-32 to 1/2" pipe sizes are designed to be installed directly into actuator ports (up to 5" bore cylinders). The banjo fitting can accommodate other functional fittings and components such as right angle flow control valves or blocking valves. Banjo fittings screw into actuators using an Allen wrench or 5/16" hex head wrench for 10-32 size. Electrical or pneumatic feedback element snaps into place using a locking clip.

Operation

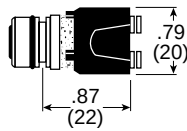
Pneumatic sensors have a continuous pressure signal applied to the sensor device. Electrical sensors have a continuous electrical signal applied to the sensor device. The threshold sensor assembly mounted directly into the cylinder Port provides an output signal S, which can be pneumatic or electrical, when the falling back pressure in the exhausting chamber of the cylinder reaches the operating threshold (approximately 6-9 PSIG). (The device is a normally passing device. The output is only on when there is nearly zero pressure at the cylinder.)



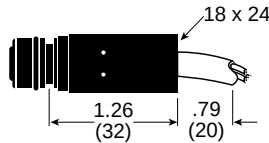
Dimensions



Banjo Socket



PWSP111



PWSM1012

Model	A	B	C	H	K	L
PWSB1557	.98 (25)	.43 (11)	5/16" Hex	.79 (20)	.40 (10)	.67 (17)
PWSB1887	.98" (25)	.63 (16)	3/16" Allen	.71 (18)	.40 (10)	.79 (20)
PWSB1997	.98 (25)	.83 (21)	5/16" Allen	.71 (18)	.40 (10)	.87 (22)
PWSB1337	.98 (25)	1.10 (28)	3/8" Allen	.79 (20)	.47 (12)	.98 (25)
PWSB1227	.98 (25)	1.30 (33)	1/2" Allen	.93 (24)	.55 (14)	1.02 (26)

inches
(mm)

Specifications

Operating Pressure 0 to 150 PSIG (0 to 10 bar)

Temperature Range 5°F to 140°F (-15°C to 60°C)

CAUTION: If it is possible that the ambient temperature may fall below freezing, the medium must be moisture free to prevent internal damage or unpredictable behavior.

Maximum Operating Frequency 10 Hz

Pilot Pressure (PWSP111) >64 PSIG (4.4 bar)

Threshold Pressure 6 to 9 PSIG (.4 to .6 bar)

Output Flow Rate (PWSP111) 3 SCFM at 90 PSIG

Current Rating (PWSM1012) –

5 VA, 250 VAC

5W, 48 VAC

Materials –

Body Thermoplastic

Mounting Screw & Threads Brass

Life Expectancy –

10 million cycles with dry air at 90 PSIG, 68°F, and 1 Hz operating frequency

Voltage Range (PWSM1012) –

12 - 240 VAC

12 - 48 VDC

Flow
Controls

Sensing

Control
Panel

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Fluid Power			Universal Description	Electrical	
Function	Symbol			Function	Symbol
Normally Closed (N.C.)	2-Way 	3-Way 	Normally Non-Passing (NNP)	Normally Open (N.O.)	
Normally Open (N.O.)	2-Way 	3-Way 	Normally Passing (NP)	Normally Closed (N.C.)	



Flow Controls & Accessories

Section G

www.parker.com/pneu/accessories



Flow Control Valves

"FCM701 & FCM703 Series"	G36
"FC800 & FC806 Series"	G37-G38
PWRA & PWRE	G39-G41
"3251" Series	G42
"337" Series	G43
"3250" Series	G44-G45
"338" Series	G46

Check Valves

"339" & "3047" Series Check Valve	G47
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Tank Valves & Air Chucks

"EM" Series Exhaust Mufflers

Muffler / Flow Controls	G49
Breather Vents	G50
"ES" Series Silencer	G50
ASN Air Line Silencer	G51
P6M Air Line Silencer	G52
Muffler-Reclassifier ECS	G53
Automatic Drip Leg Drain & Relief Valve	G54
Relief Valves - Diaphragm Type	G55
Shuttle Valves & Quick Exhaust	G56-G58
Pressure Switches	G59-G61
Drain Valves	G62-G63

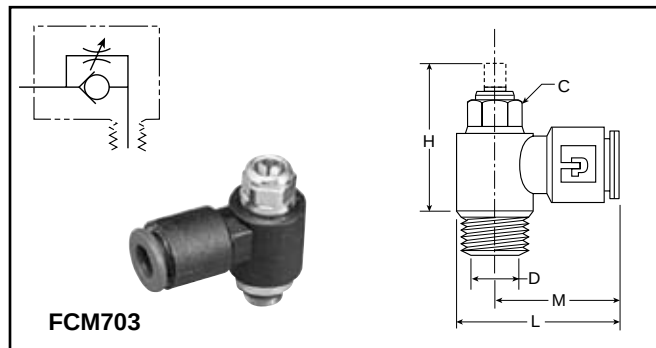
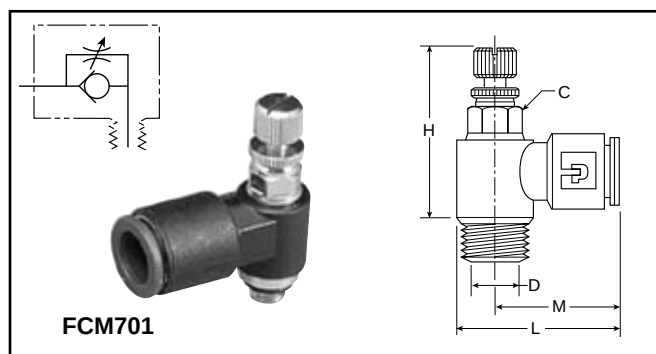
Flow
Controls

Sensing

Control
Panel

G





General Information

Miniature right angle flow controls provide meter out control of exhaust air from an air cylinder while providing full flow in the reverse direction. The 10-32 male thread can be used to mount directly to cylinder ports. The inlet ports are available in 5-32 or 1/4" instant tube fittings. The adjustment screw is captive and discourages tampering.

This compact flow control saves space and reduces the number of fittings involved in making the connection. Plumbing can be oriented 360° about the cylinder port.

Valve Specifications

Maximum Operating Pressure.....145 PSIG (10 bar, 1000 kPa) max.

Temperature Range* 0°F to 140°F (-18°C to 60°C)

* Ambient temperatures below freezing require moisture-free air. Ambient temperatures below freezing and above 180° require lubricants especially selected for suitability at these temperatures. Pneumatic valves should be used with filtered and lubricated air.

Component Materials

Body Polyamide

Mounting Thread Brass

Dimensions

Miniature Exhaust Flow Control FCM701

Composite Body

Part No.	Tube Size	Thread Size	C Hex (mm)	H Closed	H Open	L	M	Flow Dia. D	Adjusted Flow (SCFM)	Free Flow (SCFM)
FCM701-5/32-0	5/32	10-32	6	0.925	1.023	0.846	0.669	0.080	5.23	2.90
FCM701-5/32-2	5/32	1/8	7	1.000	1.083	0.935	0.708	0.100	8.41	6.32
FCM701-4-0	1/4	10-32	6	0.925	1.023	0.885	0.708	0.080	9.94	3.86
FCM701-4-2	1/4	1/8	7	1.000	1.083	0.957	0.730	0.100	10.56	5.08
FCM701-4-4	1/4	1/4	8	1.083	1.180	1.013	0.748	0.160	18.79	10.79

Knobless Miniature Exhaust Flow Control FCM703

Composite Body

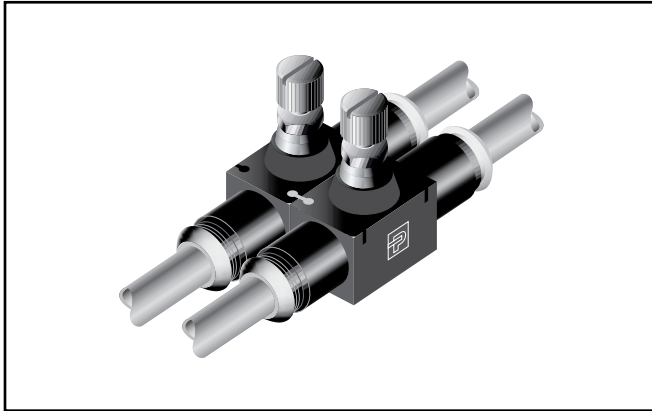
Part No.	Tube Size	Thread Size	C Hex (mm)	H Closed	H Open	L	M	Flow Dia. D	Adjusted Flow (SCFM)	Free Flow (SCFM)
FCM703-5/32-0	5/32	10-32	6	0.650	0.787	0.846	0.669	0.080	7.43	4.76
FCM703-4-2	1/4	1/8	7	0.708	0.860	0.956	0.730	0.100	12.08	5.86
FCM703-4-4	1/4	1/4	8	0.826	0.964	1.013	0.748	0.160	19.55	10.89

Flow Controls

Sensing

Control Panel

G



General Information

It is sometimes impossible to mount a flow control directly on the port of the cylinder, either due to lack of space or because of the need for remote adjustment of the flow control. To resolve this problem in-line flow controls are designed to mount on the piping between the directional valve and the cylinder or can be mounted on the control panel next to other control units.

Designed to be Versatile

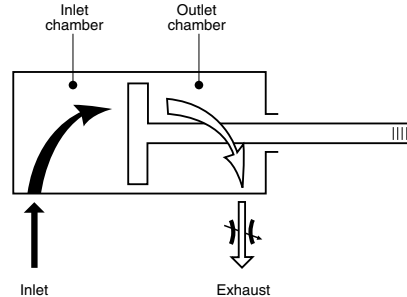
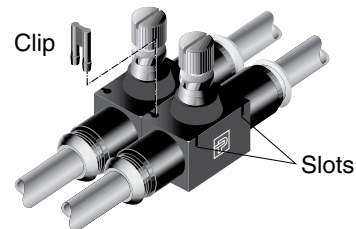
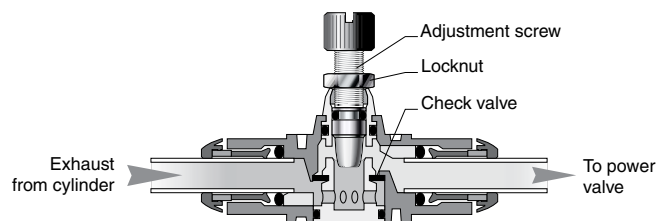
Parker In-Line Flow Controls are unidirectional flow control valves. Intake air flows freely through the flow control; exhaust air is metered out through a specially designed adjustment screw. An arrow on the body of the valve indicates the direction of controlled flow. Since it is a tube to tube connection, our in-line flow controls may be installed as a meter in or a meter out device. Parker in-line flow controls can be easily added to existing circuitry. Simply splice it into the cylinder port line. In-line flow controls may be used individually or, they may be stacked together using two joining clips, supplied standard with each valve. Panel mounting is accomplished by using the through holes in the molded body.

Adjustment Characteristics

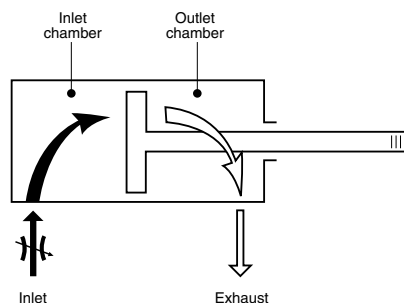
Control is achieved through a finely threaded special adjustment screw. The special shaped adjustment screw produces a more linear flow control than ordinary tapered screws. With the use of a locking nut, the in-line flow control may be secured in its final setting. Settings are maintained even under adverse conditions such as vibration. A captive adjustment screw prevents loss or dangerous blow out.

Full Flow in Both Directions

Intake capacity is always slightly greater than the full open exhaust capacity, enabling maximum variation of speeds between outward and return strokes.



Flow regulation on the exhaust port



Flow regulation on the inlet port



Flow
Controls

Sensing

Control
Panel

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Advantages

- Assembly in Banks
- Panel Mounting
- Allows other Function Fittings to be Mounted on a Cylinder
- Space Saving
- Weight Saving
- Flexibility

Valve Specifications

Maximum Working Pressure..... 145 PSI

Operating Temperature 5° to 150°F

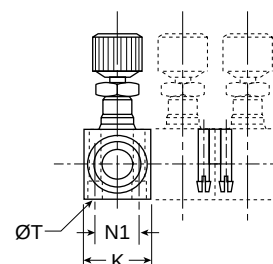
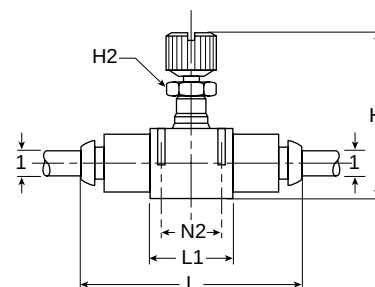
Body Material.....High Resistance Polyamide

Adjustment Screw Material.....Brass

Dimensions

FC800 In-Line Flow Control with Push-in Connection

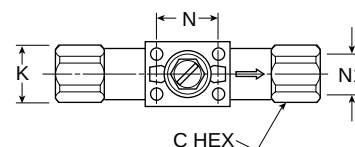
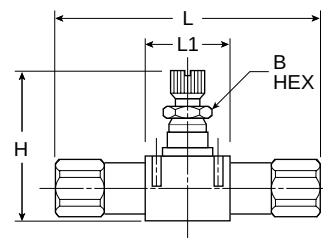
Part No.	1 ØD	H Min.	H Max.	L	L1	K	N1	N2	T	Orifice	H2 (mm)
FC800-5/32	5/32	1.15	1.31	1.52	.59	.47	.31	.43	.09	.12	5
FC800-4	1/4	1.54	1.74	2.11	.90	.66	.43	.66	.12	.16	8
FC800-6	3/8	2.03	2.38	2.96	1.29	.94	.62	1.01	.16	.31	14
FC800-8	1/2	2.24	2.63	3.35	1.37	1.09	.78	1.07	.16	.39	14



Supplied with 2 clips

FC806 Threaded In-Line Flow Control

Part No.	Thread Size	B Hex (mm)	C Hex (mm)	H Closed	H Open	L	L1	K	N	N1
FC806-2	1/8	13	8	1.56	1.75	2.70	.91	.67	.67	.43
FC806-4	1/4	16	11	1.73	1.97	3.27	1.02	.73	.79	.49
FC806-6	3/8	22	14	2.05	2.40	3.82	1.30	.94	1.02	.63
FC806-8	1/2	24	14	2.26	2.66	4.76	1.38	1.10	1.08	.79

Flow
Controls

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Panel

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General Description

Flow Control – PWRE (Thermoplastic)

These rugged flow controllers enhance the performance of pneumatic cylinders by precise control of piston motion in both directions. They allow full inlet flow to the cylinder while providing fine adjustment of the exhaust flow.

Right angle construction provides for convenient mounting where the cylinder is best controlled . . . at the cylinder port.



PWRA

The PWRA series is made of zinc alloy, built for rugged applications and is available in sizes ranging from 1/8" through 1/2" with cylinder port fittings in either NPT or BSP. Tubing connections are offered either as instant fittings (fractional or metric) or threaded fittings (NPT or BSP). To prevent unwanted drift due to shock or vibration, these devices are fitted with adjustment locking nuts.

PWRE

The PWRE series has a thermoplastic body with brass fittings giving lighter weight and lower profile than its metal counterpart to the left. These flow controls are supplied with instant tube fittings (fractional or metric) and NPT or BSP cylinder port fittings.

Valve Specifications

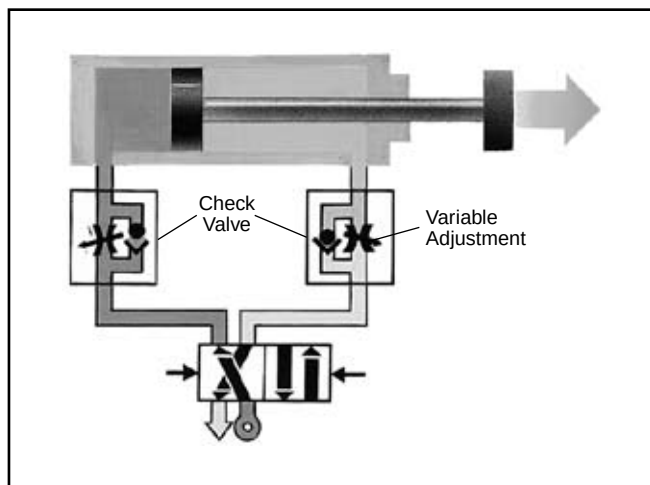
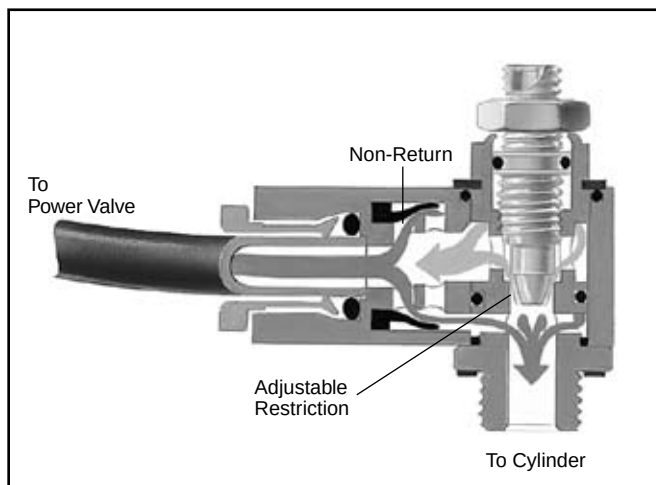
Maximum Operating Pressure..... 145 PSIG (10 bar)

Operating Temperature 0° to 140°F* (-18°C to 60°F)

* Ambient temperatures below freezing require moisture-free air. Ambient temperatures below freezing and above 180° require lubricants especially selected for suitability at these temperatures. Pneumatic valves should be used with filtered and lubricated air.

Flow

No of Turns	Exhaust (Screw Open)	Inlet (Screw Closed)
12	1.8 SCFM	1.8 SCFM





For Cylinder Mounting
(Can also be mounted in Threshold Sensor Banjo)

With Instant Tube Fittings

with Allen key adjustment and locknut



PWRA3469

BSP				NPT		
Symbol	Cylinder Port Thread	Connection for Tube	Catalog Number	Cylinder Port Thread	Connection for Tube	Catalog Number
	1/8"	6mm	PWRA1468	1/8"	1/4"	PWRA3468
		8mm	PWRA1488			
	1/4"	6mm	PWRA1469	1/4"	1/4"	PWRA3469
	3/8"	8mm	PWRA1483	—	—	—
	1/2"	12mm	PWRA1412	1/2"	1/2"	PWRA3412

With Threaded Connection

with Allen key adjustment and locknut

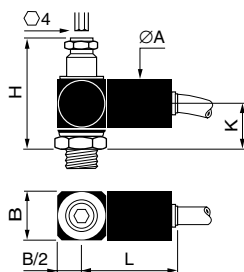


PWRA3833

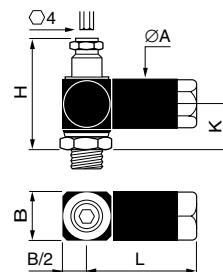
BSP				NPT		
Symbol	Cylinder Port Thread	Connection Tapped Thread	Catalog Number	Cylinder Port Thread	Connection Tapped Thread	Catalog Number
	1/8"	1/8"	PWRA1888	—	—	—
	1/4"	1/4"	PWRA1899	1/4"	1/4"	PWRA3899
	3/8"	3/8"	PWRA1833	3/8"	3/8"	PWRA3833
	1/2"	1/2"	PWRA1822	1/2"	1/2"	PWRA3822

Dimensions: Inches (mm)

PWRA14**/34**



PWRA18**/38**



	Adjustment*	Flow**	ØA	B	K	H	L
PWRA1468/3468	10	15.9	0.67" (17)	0.71" (18)	0.67" (17)	1.77" (45)	1.26" (32)
PWRA1488	14	23.0	0.87" (22)	0.83" (21)	0.83" (21)	2.17" (55)	1.54" (39)
PWRA1469/3469	14	26.5	0.87" (22)	0.83" (21)	0.83" (21)	2.17" (55)	1.54" (39)
PWRA1483	14	61.8	1.06" (27)	1.10" (28)	1.02" (26)	2.36" (60)	1.97" (50)
PWRA1412/3412	20	97.1	1.22" (31)	1.30" (33)	1.38" (35)	3.03" (77)	2.60" (66)
PWRA1888	10	15.9	0.67" (17)	0.71" (18)	0.67" (17)	1.77" (45)	1.44" (36.5)
PWRA1899/3899	14	31.8	0.87" (22)	0.83" (21)	0.83" (21)	2.17" (55)	.71" (43.5)
PWRA1833/3833	14	68.9	1.06" (27)	1.10" (28)	1.02" (26)	2.36" (60)	2.19" (55.5)
PWRA1822/3822	20	97.1	1.22" (31)	1.30" (33)	1.38" (35)	3.03" (77)	2.48" (63)

* Number of turns (4mm Allen key)

** SCFM at 90 PSI with screw closed



For Cylinder Mounting
 (Can also be mounted in Threshold Sensor Banjo)



PWRE14457



PWRE14697

With Instant Tube Fittings

with Allen key adjustment and fine thread friction locking

Symbol	BSP			NPT		
	Cylinder Port Thread	Connection for Tube	Catalog Number	Cylinder Port Thread	Connection for Tube	Catalog Number
	M5	4mm	PWRE1445	10-32 UNF	5/32"	PWRE14457
					10-32 UNF	PWRE14557
	1/8"	4mm	PWRE1448	1/8"	5/32"	PWRE14487
		6mm	PWRE1468		1/4"	PWRE14687
	1/4"	6mm	PWRE1469	1/4"	1/4"	PWRE14697
	3/8"	8mm	PWRE1483	3/8"	3/8"	PWRE14937
	Reverse Flow	M5	4mm	10-32UNF	5/32"	PWRE11457

Component Materials

Body Polyamide

Mounting Thread.....Brass

General Information

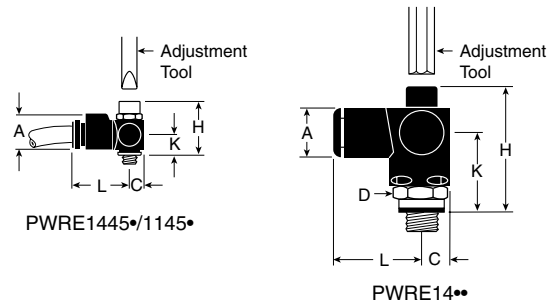
Miniature right angle flow controls provide meter out control of exhaust air from an air cylinder while providing full flow in the reverse direction. The M5 (10-32) male thread can be used to mount directly to cylinder ports. The inlet ports are available in M5 (10-32) male or 5/32" instant tube fitting. The adjustment screw is captive and discourages tampering.

This compact flow control saves space and reduces the number of fittings involved in making the connection. Plumbing can be oriented 360° about the cylinder port.

Flow

No of Turns	Exhaust (Screw Open)	Inlet (Screw Closed)
12	1.8 SCFM	1.8 SCFM

Dimensions: Inches (mm)



Valve Specifications

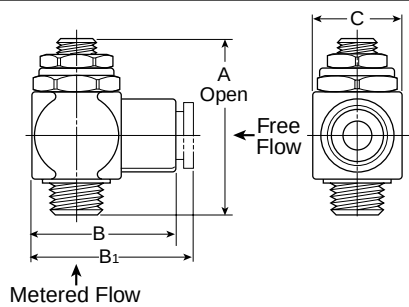
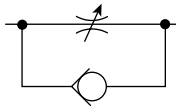
Maximum Operating Pressure..... 145 PSIG (10 bar)

Operating Temperature 0° to 140°F* (-18°C to 60°F)

* Ambient temperatures below freezing require moisture-free air. Ambient temperatures below freezing and above 180° require lubricants especially selected for suitability at these temperatures. Pneumatic valves should be used with filtered and lubricated air.

	Adjustment	# Turns	Flow*	ØA	C	D Hex.	K	H	L
PWRE1445/14457 PWRE1145/11457 PWRE14557	3mm screwdriver	12	1.8	0.43" (11)	0.16" (4)	5/16" (8)	0.28" (7.2)	0.67" (17)	0.83" (21)
PWRE1448/14487	3mm Allen key	14	10.2	0.55" (14)	0.31" (8)	9/16" (14)	0.94" (23.8)	1.77" (45)	0.94" (24)
PWRE1468/14687	3mm Allen key	14	23.0	0.55" (14)	0.31" (8)	9/16" (14)	0.94" (23.8)	1.77" (45)	0.94" (24)
PWRE1469/14697	4mm Allen key	18	23.0	0.63" (16)	0.41" (10.5)	11/16" (17)	1.04" (26.5)	1.94" (49.3)	1.06" (27)
PWRE1483/14937	4mm Allen key	18	47.7	0.79" (20)	0.45" (11.5)	7/8" (22)	1.17" (29.8)	2.24" (56.8)	1.30" (33)

* SCFM at 90 PSI with screw closed

Shown with
Threaded InletShown with Prestolok
Inlet Fitting

Application

The Right Angle Flow Control is an ideal solution to cylinder speed control where space is at a premium. Costly fittings, connections and piping expenses can be eliminated because the valve can rotate 360°, the piping alignment can be in any direction. The 1/8" model can be rotated after final assembly.

Operation

Install by threading male end directly into cylinder port. The free-flow and metered-flow direction is automatically predetermined. Free-flow direction is into cylinder and metered-flow is out of the cylinder. Flow is adjusted with an Allen wrench and locked with nut.

Right Angle Flow Control also available with Prestolok fittings on inlet port to accommodate 5/32 - 3/8 tube sizes. This allows for quick connection and eliminates need for separate tube fitting.

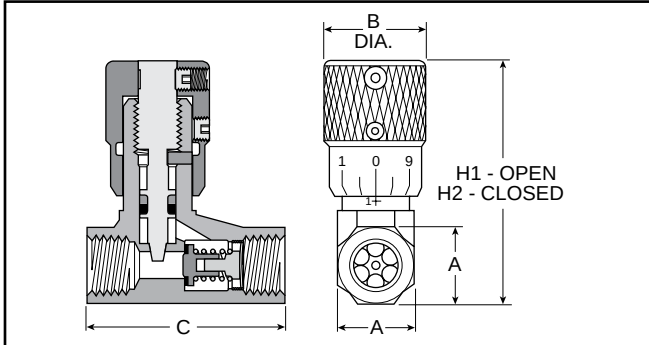
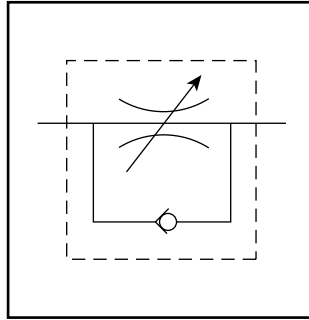
Valve Specifications

Body Brass
Plunger Brass and Acetal
Seals Buna N
Temperature Range 0°F to 140°F (-18°C to 60°C)
Pressure Rating 125 PSIG (863 kPa) max.

Model Selection Information and Dimensions

Model Number	Thread (NPT) Male	Thread (NPT) Female	A		B		C		Weight		Cv	
			Inches	mm	Inches	mm	Inches	mm	oz.	kg.	Adjusted Flow	Free Flow
03251 0125	1/8	1/8	1.74	44	1.18	30	0.67	17	2.0	0.9	0.26	0.20
03251 0250	1/4	1/4	1.99	51	1.40	36	0.91	23	4.5	2.0	0.75	0.68
03251 0375	3/8	3/8	2.28	58	1.71	43	1.06	27	7.0	3.2	0.84	0.72
03251 0500	1/2	1/2	2.69	68	1.98	53	1.26	32	11.0	5.0	1.64	1.41
With Prestolok Fittings	Thread (NPT)	Tube Size	A		B ₁		C		Weight		Cv	
03251 1215	1/8	5/32	1.74	44	1.18	30	0.67	17	2.0	0.9	0.19	0.16
03251 1225	1/8	1/4	1.74	44	1.18	30	0.67	17	2.0	0.9	0.28	0.22
03251 2525	1/4	1/4	1.99	51	1.40	36	0.91	23	4.5	2.0	0.51	0.44
03251 2538	1/4	3/8	1.99	51	1.40	36	0.91	23	4.5	2.0	0.62	0.53
03251 3838	3/8	3/8	2.28	58	1.71	43	1.06	27	7.0	3.2	0.78	0.65

CAUTION: If it is possible that the ambient temperature may fall below freezing, the medium must be moisture-free to prevent internal damage or unpredictable behavior.



General Information

The "337" Series Flow Control Valves meter flow of air in one direction and allow free flow in the reverse direction.

The "337" Series valves are manufactured with a fine tapered needle providing precise flow control, even at low flow rates. The perimeter of the adjustment knob features numerical micrometer position markings providing a visual indication of the setting. Once the desired flow is selected, a set screw can be tightened to maintain the setting.

These valves are available with NPTF ports in 1/8", 1/4", 3/8", 1/2", and 3/4" sizes. This series is recommended for pneumatic service.

Valve Specifications

Maximum Operating Pressure 250 PSI

Cracking pressure for

return check poppet – 1 to 2 PSIG

Operating Temperature Standard: 0° to 180°F*

Extended Temperature 0° to 300°F* (consult factory)

* Ambient temperatures below freezing require moisture-free air. Ambient temperatures below freezing and above 180° require lubricants especially selected for suitability at these temperatures. Pneumatic valves should be used with filtered and lubricated air.

Component Materials

Body Material Brass

Needle Stainless Steel

Check Seal Urethane

Needle Seals Buna N
(Fluorocarbon optional – consult factory)

Knob Aluminum

Spring Stainless Steel

Retainer Zinc- Plated Steel

Set Screw Steel

Model Selection and Dimensions

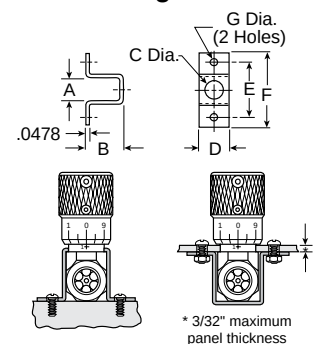
Port Size	Model	Flow (SCFM†)		Dimensions					Service Kit
		Adj.	Free Flow	A	B	C	H1	H2	
1/8"	00337 1000	15	32	9/16"	0.75	1.47	2.03	1.81	00337 8000
1/4"	00337 1001	28	75	11/16"	0.75	1.47	2.28	2.03	00337 8001
3/8"	00337 1002	59	139	7/8"	0.88	2.31	2.84	2.53	00337 8002
1/2"	00337 1003	126	183	1-3/16"	1.06	3.25	3.62	3.22	00337 8003
3/4"	00337 1004	140	327	1-3/8"	1.06	3.25	3.72	3.31	00337 8004

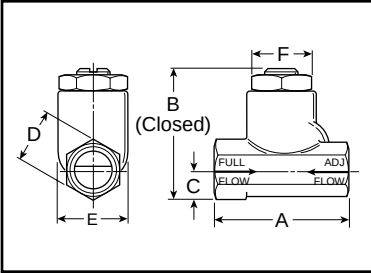
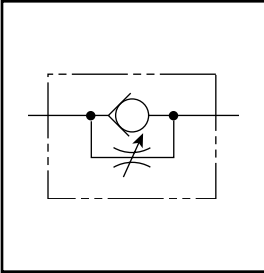
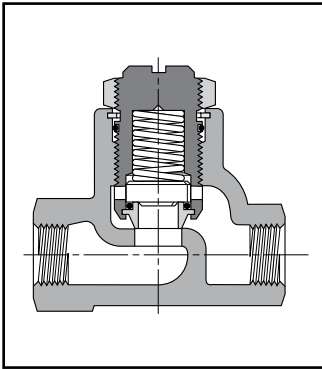
† At 100 PSIG inlet pressure with full pressure drop.

Mounting Bracket Model Selection and Dimensions

Port Size	Mounting Bracket Model No.	Dimensions						
		A	B	C	D	E	F	G
1/8"	00337 8100	0.66	0.66	0.505	0.75	1.38	1.88	0.22
1/4"	00337 8101	0.75	0.89	0.505	0.75	1.50	2.00	0.22
3/8"	00337 8102	0.94	1.12	0.630	1.25	1.75	2.31	0.27
1/2"	00337 8103	1.25	1.62	0.755	1.75	2.06	2.62	0.27
3/4"	00337 8104	1.44	1.72	0.755	1.75	2.25	2.81	0.27

Mounting Bracket





Application

The "3250" Series Flow Control Valves are specifically designed to accurately meter the flow of air in one direction and allow free flow in the opposite direction. The "3250" Series Flow Control Valves are also suitable for low pressure hydraulic service.

Operation

When air is moving in the free flow direction through the valve, it forces the poppet off its seat and unrestricted air flow is permitted.

When air is moving in the metered direction through the valve, air pressure and the force of the poppet spring causes the poppet to close. Flow must then be through the orifice that is controlled by the metering screw. Opening this screw allows more flow; closing it, less flow.

Technical Specifications

BodyBrass
Port Size 1/8", 1/4", 3/8", 1/2", 3/4"
Internal ComponentsBrass, Stainless Steel
Seals Buna N
Operating Temperature Standard: 0°F to 180°F
Extended Options: 0°F to 300°F

Operating Pressures:

Air 250 PSIG
Hydraulic 250 PSIG

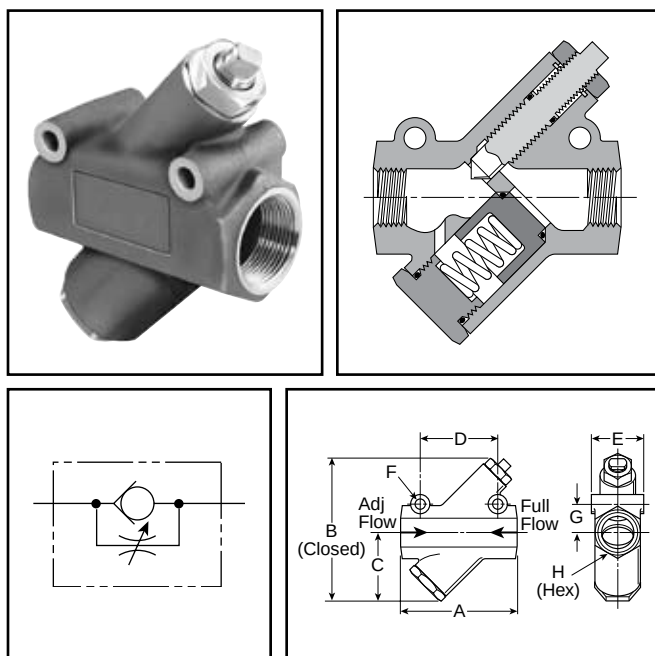
Valve will operate mounted in any position.
Lock nut on metering screw prevents change in setting during operation.

Flow Rating (SCFM)

Flow Path	Valve Port Size				
	1/8"	1/4"	3/8"	1/2"	3/4"
Maximum Flow in Metered Direction	70	130	220	295	420
Maximum Flow in Free Flow Direction	60	120	205	346	615

Model Selection Information and Dimensions

Model Number	03250 0119		03250 0219		03250 0319		03250 0419		03250 0519	
Port Size NPTF	1/8"		1/4"		3/8"		1/2"		3/4"	
	Inches	mm	Inches	mm	Inches	mm	Inches	mm	Inches	mm
A	1.75	45	2.33	59	2.66	68	3.11	79	3.56	90
B	1.56	40	1.97	50	2.44	62	3.06	78	3.69	94
C	0.37	9	0.44	11	0.56	14	0.75	19	0.88	22
D	0.62	16	0.75	19	1.00	25	1.25	32	1.50	38
E	0.81	21	1.09	28	1.38	35	1.63	41	2.00	51
F	0.68	17	0.94	24	1.19	30	1.38	35	1.75	44



Application

These extra large flow control valves have been developed to provide effective flow settings for large diameter cylinders and for other similar air applications. Each valve has a fine screw adjustment allowing precise settings which are secured by a sturdy lock nut.

Operation

Large internal port passages coupled with unique soft seal poppet and inline design provide maximum full flow capacity and minimum pressure drop in the free flow direction. Their cone shaped brass metering valve will provide consistent cylinder speed by regulating cylinder exhaust.

Technical Specifications

Body Cast Aluminum
Port Size 1", 1-1/4", 1-1/2"
Internal Components Brass, Aluminum
Seals Buna N, Urethane
Spring Stainless Steel
Operating Temperature:
 Standard -40°F to 180°F
 Extended Options -40°F to 350°F
Operating Pressures:
 Maximum Air 250 PSIG

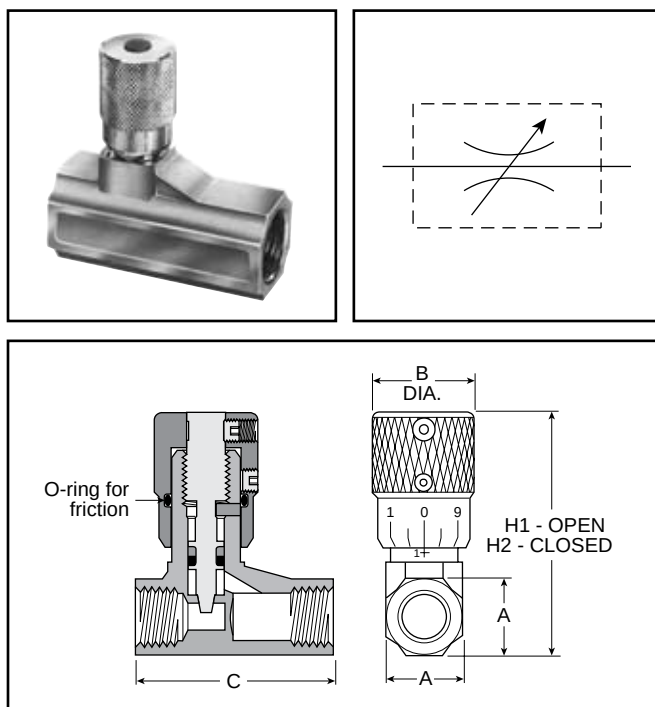
Flow Capacity In Full Flow Direction

Port Size (NPTF)	Max. Flow (Needle Open)		Model Number
	SCFM**	C _v	
1	1000	12.3	03250 1000
1-1/4	1200	13.8	03250 1250
1-1/2	1800	17.5	03250 1500

** At 100 PSIG inlet pressure with full pressure drop.

Model Selection Information and Dimensions

Model Number	03250 1000		03250 1250		03250 1500	
Port Size NPTF	1"		1-1/4"		1-1/2"	
	Inches	mm	Inches	mm	Inches	mm
A	5.00	127	5.00	127	5.88	149
B	6.50	165	6.50	165	8.00	203
C	3.00	76	3.00	76	3.75	95
D	3.25	83	3.25	83	3.50	89
E	2.25	57	2.25	57	2.50	64
F	.39	10	.39	10	.39	10
G	1.31	33	1.31	33	1.50	38
H	2.13	54	2.13	54	2.38	60



General Information

"338" Series needle valves bi-directionally meter the flow of air through the valve.

This series features a fine tapered needle providing precise flow of air in both directions. Numerical micrometer position markings are stamped on the perimeter of the adjustment knob which provide a visual indication of the setting. Once the desired flow is selected, a set screw can be tightened to maintain the setting.

These valves are available with NPTF ports in 1/8", 1/4", 3/8" 1/2" and 3/4" sizes. This series is recommended for pneumatic service

Valve Specifications

Maximum Operating Pressure250 PSIG (Air)

Operating TemperatureStandard: 0° to 180°F*

Extended Temperature 0°F to 300°F* (Consult factory)

* Ambient temperatures below freezing require moisture-free air. Ambient temperatures below freezing and above 180° require lubricants especially selected for suitability at these temperatures. Pneumatic valves should be used with filtered and lubricated air.

Component Materials

Body MaterialBrass

Internal ComponentsStainless Steel / Brass

Seals Nitrile (Fluorocarbon optional – consult factory)

Model Selection and Dimensions

Model Number	Port Size	Dimensions					Kit
		A	B	C	H1	H2	
00338 1100	1/8"	9/16"	0.75	1.47	2.03	1.81	00337 8000
00338 1101	1/4"	11/16"	0.75	1.47	2.28	2.03	00337 8001
00338 1102	3/8"	7/8"	0.88	2.31	2.84	2.53	00337 8002
00338 1103	1/2"	1-3/16"	1.06	3.25	3.62	3.22	00337 8003
00338 1104	3/4"	1-3/8"	1.06	3.25	3.72	3.31	00337 8004

Performance Data – Flow

Model Number	Port Size	Flow (SCFM†)
00338 1100	1/8"	15
00338 1101	1/4"	28
00338 1102	3/8"	59
00338 1103	1/2"	126
00338 1104	3/4"	140

† At 100 PSIG inlet pressure with full pressure drop.

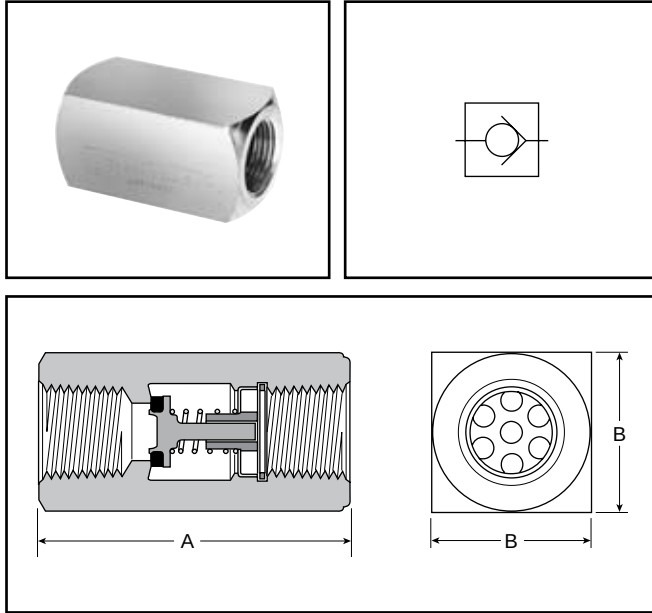
Flow
Controls

Sensing

Control
Panel

G

"339" Series – 1/8" to 3/4" Ports



General Information

"339" Series check valves allow free flow in one direction and provide positive checked (zero flow) in the reverse direction. These valves are available with NPTF ports in 1/8", 1/4", 3/8", 1/2" & 3/4" sizes. This series is recommended for pneumatic service.

Valve Specifications

Maximum Operating Pressure:

250 PSIG

Cracking Pressure: 1 to 2 PSIG

Operating Temperature:

Standard: 0° to 180° F*

Extended Temperature Option: 0°F to 300°F*

* Ambient temperatures below freezing require moisture-free air. Ambient temperatures below freezing and above 180° require lubricants especially selected for suitability at these temperatures. Pneumatic valves should be used with filtered and lubricated air.

Component Materials

Body Material..... Brass

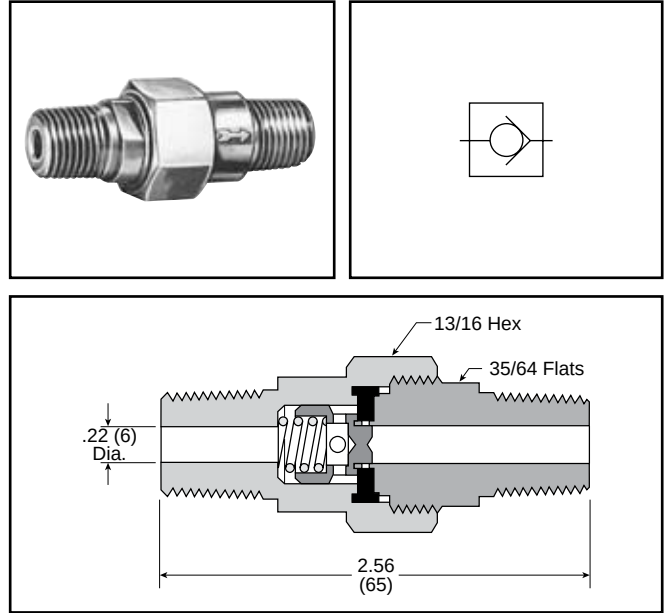
Internal ComponentsBrass / Stainless Steel / Zinc-Plated Steel

Seals..... Urethane (standard),
 Fluorocarbon (optional – consult factory)

Model Selection and Dimensions

Model Number	Port Size	Flow† (SCFM)	Dimensions		Service Kit
			A	B	
00339 3000	1/8"	35	1.22	0.56	00337 8000
00339 3001	1/4"	75	1.34	0.69	00337 8001
00339 3002	3/8"	143	2.00	0.88	00337 8002
00339 3003	1/2"	162	2.56	1.19	00337 8003
00339 3004	3/4"	323	2.66	1.38	00337 8004

"3047" – 1/4" Male Pipe



General Information

"3047" Series check valves allow free flow in one direction and provide positive checked (zero flow) in the reverse direction. This valve is available with a male 1/4" NPTF connection and is recommended for pneumatic service.

Valve Specifications

Maximum Operating Pressure:

250 PSIG

Cracking Pressure: 1 to 2 PSIG

Operating Temperature:

Standard: 0° to 180° F*

* Ambient temperatures below freezing require moisture-free air. Ambient temperatures below freezing and above 180° require lubricants especially selected for suitability at these temperatures. Pneumatic valves should be used with filtered and lubricated air.

Component Materials

Body Material.....Brass

Internal ComponentsBrass / Stainless Steel

Seals.....Nitrile

Model Selection

Model Number	Pipe Thread	Flow† (SCFM)
03047 0099	1/4"	30

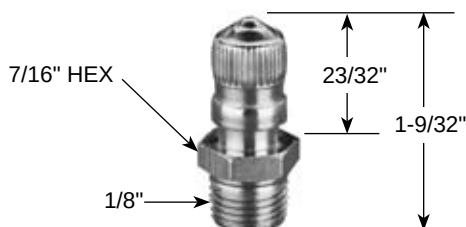
† At 100 PSIG inlet pressure with full pressure drop.

Tank Valves

For tanks, steel barrels, compressors and other pneumatic containers where a dependable automatic air valve is needed. Equipped with standard valve core and sealing cap. Maximum operating pressure is 185 PSIG. Temperature range is -40°F to 220°F.

Model No. 09166 0060

Has a 1/8" pipe thread at bottom for minimum protrusion. N/P finish, dome shaped cap. Packed 25 to a box.



Air Chucks

For regular airlines.

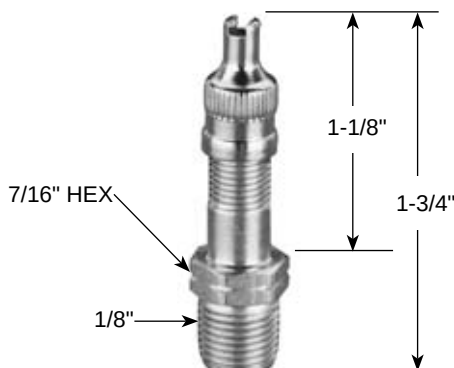
Model No. 05499 0000

Ball-foot air chuck, 1/4" female port. Packed 10 to a box.



Model No. 00645 0060

A 1/8" pipe thread at bottom permits maximum protrusion. N/P finish, screwdriver type cap. Packed 25 to a box.



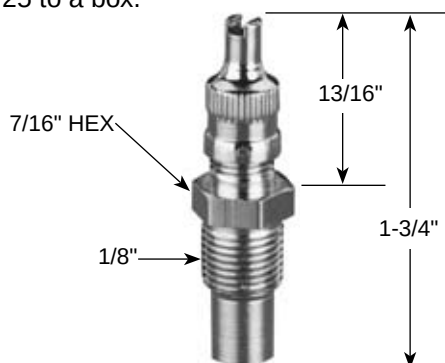
Model No. 06739 0000

Ball-foot air chuck with clip. Fits standard valve mouth. Saves holding on by hand. Has 1/4" port for connecting to hose. Packed 10 to a box.

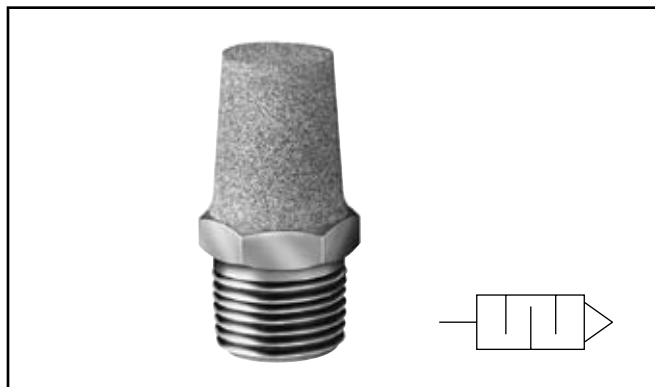


Model No. 01468 0006

Has a 1/8" pipe thread part way up the stem which allows for minimum protrusion. N/P finish, has screwdriver type cap. Packed 25 to a box.



"EM" Series – Sintered Bronze Muffler / Filters



General Description

Muffler / filters effectively reduce air exhaust noises to an industry accepted level with minimum flow restriction. They protect valves, impact wrenches, screw drivers and other air tools by preventing dirt and other foreign matter from entering the system. Non-corrosive. Can be cleaned with many common solvents.

Specifications

Maximum Operating Pressure.....250 PSIG (Air)

Operating Temperature 0° to 300°F*

* Ambient temperatures below freezing require moisture-free air. Ambient temperatures below freezing and above 180° require lubricants especially selected for suitability at these temperatures. Pneumatic valves should be used with filtered and lubricated air.

Model Number	Pipe Thread	Overall Length	Hex Size
EM12	1/8"	1.00	7/16"
EM25	1/4"	1.32	9/16"
EM37	3/8"	1.54	11/16"
EM50	1/2"	1.85	7/8"
EM75	3/4"	2.29	1-1/16"
EM100	1"	2.91	1-5/16"
EM125	1-1/4"	3.25	1-11/16"
EM150	1-1/2"	3.69	2"

Muffler / Flow Controls



General Description

Muffler / flow controls provide an acceptable exhaust noise level and effectively meter exhaust. Installed in valve exhaust ports, they control cylinder piston speeds throughout a wide range. The adjusting screw cannot be accidentally blown out, can be locked to maintain setting. Brass and bronze construction. Clean with commonly used solvents.

Specifications

Maximum Operating Pressure.....250 PSIG (Air)

Operating Temperature 0° to 300°F*

* Ambient temperatures below freezing require moisture-free air. Ambient temperatures below freezing and above 180° require lubricants especially selected for suitability at these temperatures. Pneumatic valves should be used with filtered and lubricated air.

Model Number	Pipe Thread	Overall Length	Hex Size
04502 0002	1/8"	1.15	9/16"
04504 0004	1/4"	1.42	1/2"
04506 0060	3/8"	1.49	11/16"
04508 0080	1/2"	1.77	7/8"
04512 0012	3/4"	1.98	1-1/16"
04516 0016	1"	2.15	1-5/16"

Breather Vents



NOTE: Breather vents should not be used as exhaust mufflers.

General Description

These low silhouette versions of the muffler / filter are useful where space is a problem and / or to prevent contamination. Use for vacuum relief or pressure equalization in gear boxes, oil tanks, reservoirs, etc. Non-corrosive.

Specifications

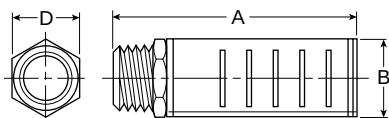
Maximum Operating Pressure 150 PSIG (Air)

Operating Temperature 0° to 300°F*

* Ambient temperatures below freezing require moisture-free air. Ambient temperatures below freezing and above 180° require lubricants especially selected for suitability at these temperatures. Pneumatic valves should be used with filtered and lubricated air.

Model Number	Pipe Thread	Overall Length	Hex Size
04702 0002	1/8"	0.44	7/16"
04704 0004	1/4"	0.63	9/16"
04706 0006	3/8"	0.75	11/16"
04708 0008	1/2"	0.88	7/8"
04712 0012	3/4"	1.00	1-1/6"
04716 0016	1"	1.31	1-5/16"
04720 0020	1-1/4"	1.41	1-11/16"
04724 0024	1-1/2"	1.50	2"

"ES" Series – Silencer



General Description

These low silhouette versions of the muffler / filter are useful where space is a problem and / or to prevent contamination. Use for vacuum relief or pressure equalization in gear boxes, oil tanks, reservoirs, etc. Non-corrosive.

The silencer is designed to give superior performance in noise control with a minimum effect on air efficiency. "Trimline" design allows location in the tightest places without extra plumbing and fittings. Fits directly into the exhaust port of more than 90% of present commercial valves. Slotted body permits rapid discharge of air without undesirable back pressure. Unique nylon screen element resists dirt buildup or clogging.

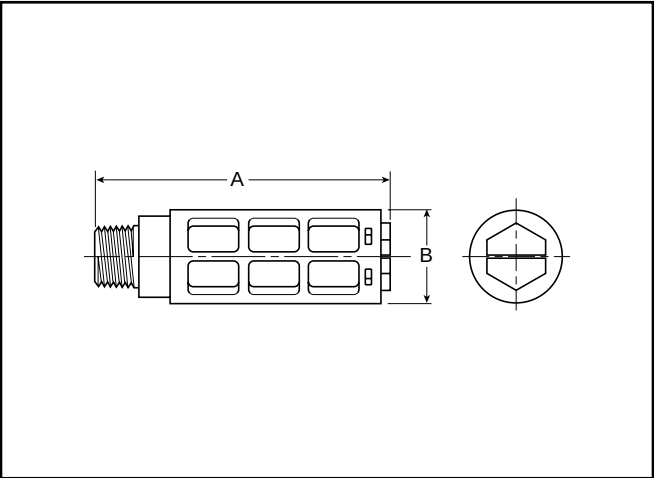
Specifications

Maximum Operating Pressure 250 PSIG (Air)

Operating Temperature 0° to 300°F*

* Ambient temperatures below freezing require moisture-free air. Ambient temperatures below freezing and above 180° require lubricants especially selected for suitability at these temperatures. Pneumatic valves should be used with filtered and lubricated air.

Model Numbers		Pipe Thread	Flow SCFM @ 100 PSIG Inlet	Dimensions		
NPTF	BSPT (R)			A	B	D
ES12MC	ESB12MC	1/8"	115	1.85	0.81	0.63
ES25MC	ESB25MC	1/4"	129	1.85	0.81	0.63
ES37MC	ESB37MC	3/8"	219	3.31	1.26	1.00
ES50MC	ESB50MC	1/2"	549	3.31	1.26	1.00
ES75MC	ESB75MC	3/4"	893	4.56	2.01	1.62
ES100MC	ESB100MC	1"	1,013	4.56	2.01	1.62
ES125MC	ESB125MC	1-1/4"	1,486	5.69	2.88	—
ES150MC	ESB150MC	1-1/2"	1,580	5.69	2.88	—



Features

- Compact
- Lightweight
- Easy to Install
- Excellent Noise Reduction
- Protects Components from Contamination
- NPT and BSPT Threads Available

Part Number		Thread Size	A (mm)	B (mm)	Maximum Flow (SCFM) 100 PSIG Inlet	Sound Pressure Level (dBA)	
NPT	BSPT					20 PSIG Inlet	100 PSIG Inlet
AS-5		M5	0.43 (11)	0.32 (8)	15	69	79
ASN-6	AS-6	1/8"	1.57 (40)	0.63 (16)	51	69	81
ASN-8	AS-8	1/4"	2.56 (65)	0.83 (21)	124	67	84
ASN-10	AS-10	3/8"	3.35 (85)	0.98 (25)	247	83	98
ASN-15	AS-15	1/2"	3.74 (95)	1.18 (30)	370	69	96

Application

The plastic silencer is designed to give excellent noise reduction with a minimum effect on air efficiency. The "Trimline" design allows for locating the silencer in the tightest places without extra plumbing or fittings. Fits directly into the exhaust port of most commercial valves. Open surface area of element allows for rapid discharge of air without undesirable back pressure.

Specifications

Pressure Rating.....0 to 150 PSIG
(0 to 10 bar, 0 to 1034 kPa)

Temperature Rating14°F to 140°F (-10°C to 60°C)

BodyAcetal (Plastic)

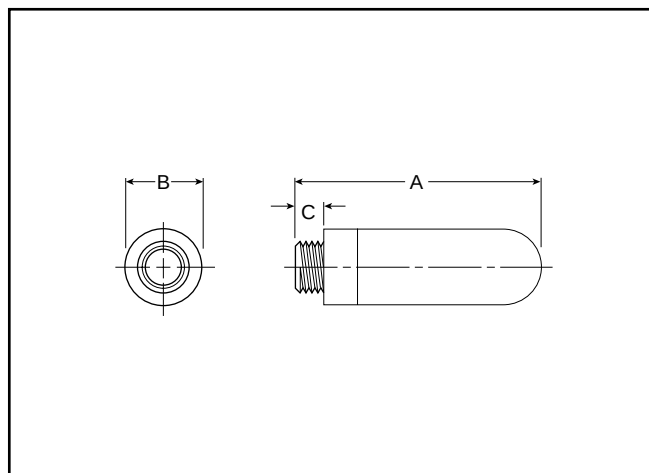
Element Polyethylene

Flow Controls

Sensing

Control Panel

G



Features

- All Plastic Ultra Light Weight Versions
- High Noise Level Reduction
- Low Back Pressure Generation

Application

The plastic silencer is designed to give excellent noise reduction with a minimum effect on air efficiency. The “Trimline” design allows for locating the silencer in the tightest places without extra plumbing or fittings. Fits directly into the exhaust port of most commercial valves. Open surface area of element allows for rapid discharge of air without undesirable back pressure.

Port Thread	A	Diameter B	C	Weight (grams)	Part Number
M5	0.91 (23)	0.26 (6,5)	0.16 (4)	0.01	P6M-PAC5
G1/8	1.14 (29)	0.55 (14)	0.24 (6)	0.02	P6M-PAB1
G1/4	1.34 (34)	0.67 (17)	0.24 (6)	0.04	P6M-PAB2
G3/8	2.36 (60)	0.98 (25)	0.35 (9)	0.06	P6M-PAB3
G1/2	2.52 (64)	0.98 (25)	0.43 (11)	0.10	P6M-PAB4
G3/4	5.51 (140)	1.50 (38)	0.55 (14)	0.50	P6M-PAB6
G1	6.30 (160)	1.89 (48)	0.79 (20)	0.62	P6M-PAB8

Specifications

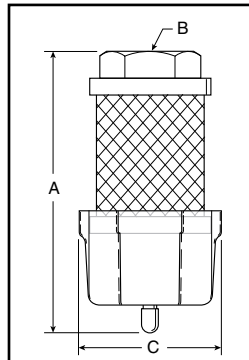
Pressure Rating..... 0 to 246 PSIG
(0 to 17 bar, 0 to 1700 kPa)

Temperature Rating

Plastic14°F to 176 °F (-10°C to 80°C)

Metal..... 14°F to 165 °F (-10°C to 74°C)

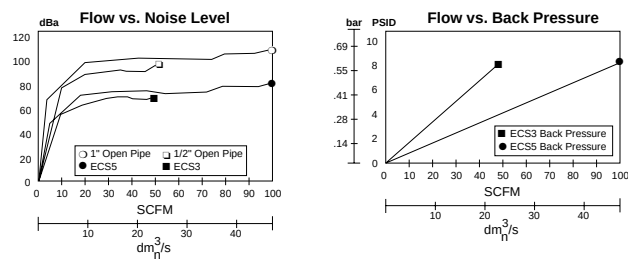
Efficiency92%



Dimensions:

Model	A	B	C
ECS3	5.30 (135 mm)	1/2" NPT	2.57 (65 mm)
ECS5	7.30 (185 mm)	1" NPT	2.57 (65 mm)

Performance Characteristics



Features

The ECS (Muffler-Reclassifier) eliminates unwanted oil mist and reduces exhaust noise from pneumatic valves, cylinders and air motors.

- 99.97% Oil Removal Efficiencies
- 25 dBA Noise Attenuation
- 1/2" NPT and 1" NPT
- Disposable Units
- Continuous or Plugged Drain Option
- Metal Retained Construction
- Fast Exhaust Time

Improve Overall Plant Environment

Exhaust oil mist and noise pollution have a direct impact on worker productivity.

Oil aerosol mist from lubricators and compressors is pervasive and enters the industrial plant environment through the exhaust ports of valves, cylinders and air motors. This rapidly expanding exhaust also produces sudden and excessive noise.

The ECS (Muffler-Reclassifier) is 99.97% efficient at removing the oil aerosols. The ECS also acts as a silencer to lower the dBA levels below O.S.H.A. requirements.

The result is a cleaner, quieter environment which equates to greater work productivity and safety.

Operation

Compressor oils and lubricating oils are exhausted from valves, cylinders and air motors into the ECS. Oil aerosols are "coalesced" into larger droplets and gravity pulls them into the attached drain sump. The sump can then be drained manually or by using a 1/4" ID plastic tube drain. The air flowing into the ECS is also muffled or silenced as it enters the inside of the ECS and passes through the filter media into the atmosphere.

Proven Technology

The ECS units are constructed from the same materials that go into our oil removal coalescing filter elements.

The seamless design insures media uniformity and strength. This proven technology provides high coalescing efficiency with low pressure drop.

The filter media is supported by cylindrical perforated steel retainers both inside and out. These retainers, fully plated for excellent corrosion resistance, give the ECS units high rupture strength in either flow direction. These filters can also be used as high efficiency inlet or bypass filters for vacuum pumps, or breather elements to protect the air above critical process liquids.

ECS3 / ECS5

The ECS solves two problems inherent in compressed air exhaust from valves, cylinders and air motors - oil mist removal and noise abatement.

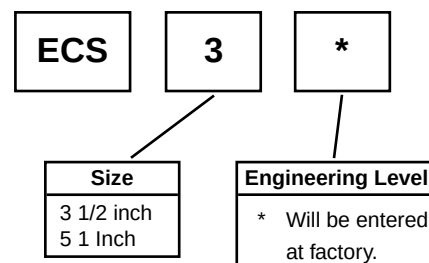
The ECS will improve your industrial plant environment, thereby improving worker productivity.

Specifications

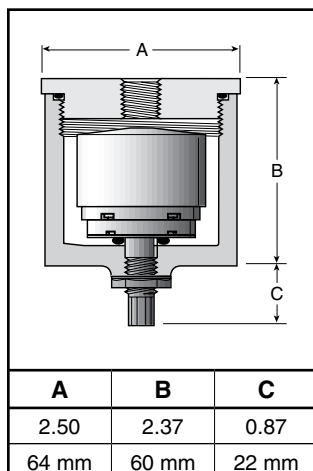
Maximum Operating Temperature 125°F (52°C)

Maximum Line Pressure..... 100 PSIG (6.8 bar)

Ordering Information



Automatic Drip Leg Drain



Features

- Auto drain ported 1/8" to pipe away liquid.
- Drain has manual override.
- Easily serviced without tool.
- 20-250 PSIG range.
- Compact size.



Specifications

Housing & Cap.....Aluminum

Port Threads.....1/4" - 1/2" Top
1/8" Drain

Pressure and Temperature Ratings:

Metal Bowl.....20 to 250 PSIG (0 to 17.2 bar)
32°C to 175°F (0°C to 80°C)

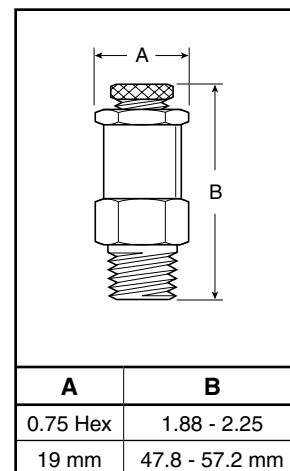
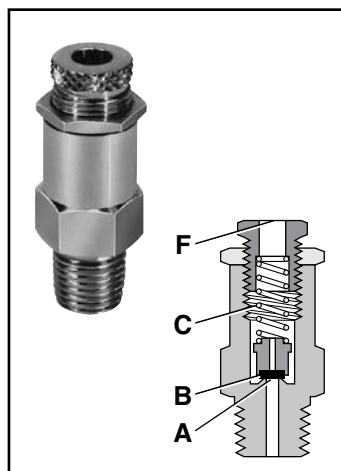
Seals.....Buna N

Ordering Information

Consists of Drip Leg Drain Housing WITH Auto Drain.

Model No.	Size
06D1NA	1/4"
06D3NA	1/2"

Relief Valve



Features

- Large Relief Capacity (70.39 Cv @ 150 PSI when fully opened) in a Compact Size
- Lightweight aluminum construction with resilient seat.

Application

The RV01A1N Pop Off Relief Valve is designed to protect against excessive pressure buildup in a pneumatic circuit or system.

Operation*

With the relief valve mounted in a reservoir or system, the force of system pressure at (A) is offset by the force of spring (C) acting on poppet seat (B). At pressures lower than the setting, the poppet seat (B) is held against the body at (A) effecting a seal. As pressure approaches set point, the poppet begins to vent until set point is reached, at which time the poppet seat (B) lifts off the body at (A) allowing the excess pressure to vent to atmosphere at (F). When the excess pressure has been vented, the spring (C) acts on the poppet seat (B) forcing it to seat on the body at (A), sealing off the flow of air.

Specification

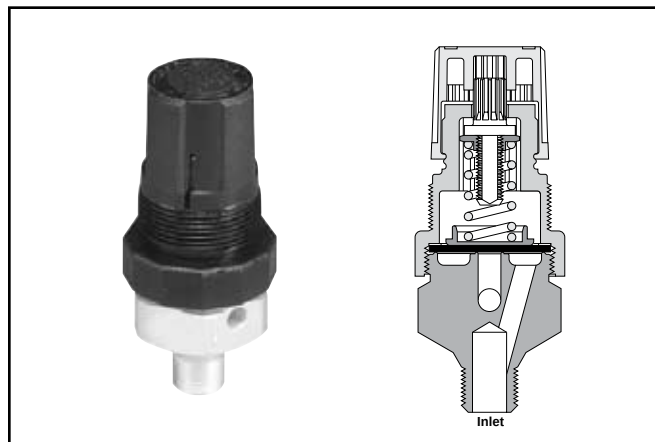
Body & Adjusting Screw.....Aluminum
Locking Nut.....Steel
Seat.....Nitrile
Spring.....Steel
Poppet.....Plastic
Operating Temperature.....32°F to 200°F (0°C to 93°C)
Port Threads.....1/4 Inch Male
Relief Range.....10 to 200 PSIG (.7 to 14 bar)
with standard spring.

* Ref: 1RV100B Installation & Service Instructions

Ordering Information

RV01A1N	XXX	Seals
10 -200 PSI	Blank	BUNA
	V	Fluorocarbon

130 Relief Valve



Features

- Compact, sensitive diaphragm-type relief valve.
- Push-pull, locking knob.
- Knob and top work the same as a miniature regulator.
- 130 has lightweight aluminum construction.
- 134 has a brass body, captured exhaust and is an inline type with 3 inlet ports and 1 outlet port.

Applications

- Designed to protect against excessive pressure buildup in a pneumatic circuit or system.
- For use where gradual proportional relief is required.

Operation

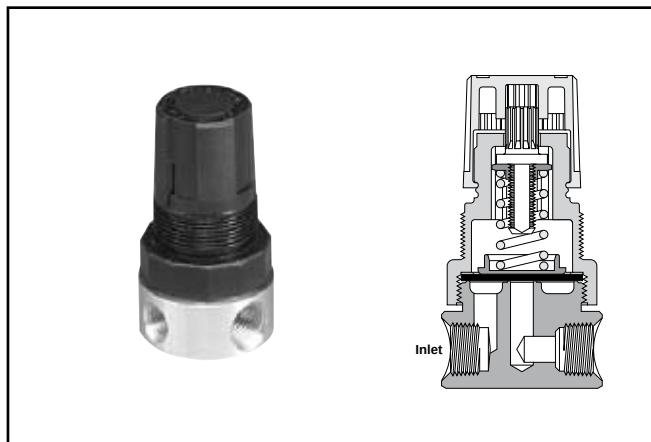
- Turn relief valve knob clockwise for maximum pressure.
- Set pressure going into relief valve at desired pressure.
- Turn relief valve knob counter-clockwise until exhaust starts to bleed.
- Turn relief valve knob clockwise until exhaust stops bleeding. Push to lock knob.

Ordering Information

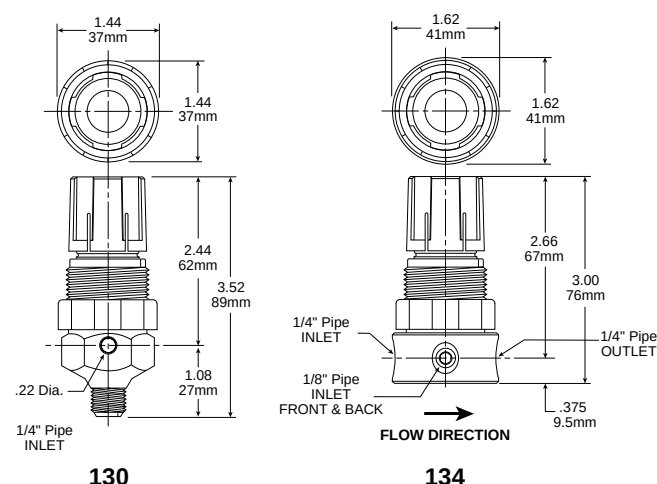
Relief Valve	Spring Range			
	0-15 PSIG	0-25 PSIG	0-50 PSIG	0-100 PSIG
130	130-02AA	130-02A	130-02B	130-02C
	130-02AAP*	130-02AP*	130-02BP*	130-02CP*
134	134-02AA	134-02A	134-02B	134-02C
	134-02AAP*	134-02AP*	134-02BP*	134-02CP*

* Panel mount nut included.

134 Relief Valve



Dimensions



Relief Valve Kits

Bonnet Assembly Kit	PCKR364Y
Panel Mount Nut	PR05X51

Specifications

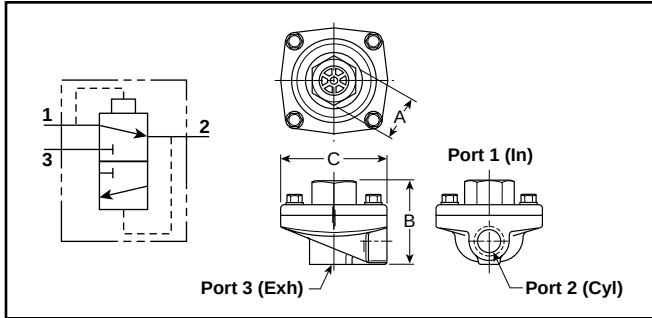
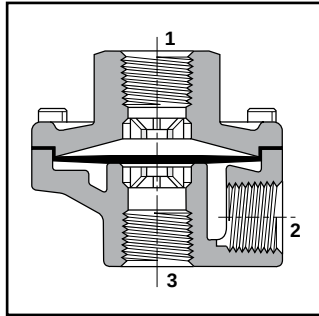
Relief Range	0 to 100 PSIG (0 to 6.9 bar)
Maximum Inlet Pressure	300 PSIG (20.7 bar)
Operating Temperature	40°F to 120°F (4°C to 49°C)

Port Threads:

130	1/4" Pipe Male Only
134	Inlet Port – Two 1/8" & One 1/4" Pipe Outlet Port – 1/4" Pipe

Materials of Construction

Adjusting Knob	Polypropylene
Adjusting Screw	Zinc-plated Steel
Body	Aluminum (130); Brass (134)
Diaphragm / Disc	Buna-N
Nut	Chromated Steel
Spring Cage	Acetal
Spring	Zinc-plated Steel

Quick Exhaust & Shuttle Valves**"0R" Series – 1/8" thru 3/4" Ports****Valve Specifications****Operating Pressure (Air)****Maximum:**

150 PSIG

200 PSIG for Model No. 0R37TB (PTFE diaphragm)

Minimum:

3 PSIG

50 PSIG for Model No. 0R37TB (PTFE diaphragm)

Operating Temperature:

Urethane: 0°F to 180°F* (-18°C to 80°C)

Nitrile: 0°F to 180°F* (-18°C to 80°C)

Fluorocarbon: 0°F to 400°F* (-18°C to 205°C)

PTFE: 0°F to 500°F* (-18°C to 260°C)

* Ambient temperatures below freezing require moisture-free air.

Ambient temperatures below freezing and above 180° require

lubricants especially selected for suitability at these temperatures.

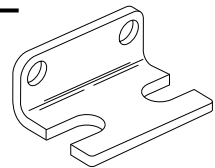
Pneumatic valves should be used with filtered and lubricated air.

Component Materials**Body Material**..... Die cast aluminum**Static Seals**.....Nitrile standard with urethane
(Others see below)**Diaphragm** Standard – Urethane
Optional – Fluorocarbon, PTFE, or Nitrile
(Depending on size)**General Information**

Quick exhaust valves provide rapid exhaust of control air when placed between control valve and actuator. They can also be used as shuttle valves. Diaphragm materials are available in urethane, Nitrile, Fluorocarbon, and PTFE to meet a wide variety of operating conditions.

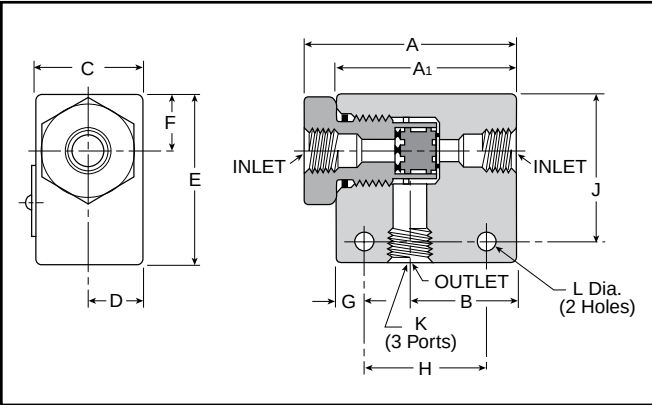
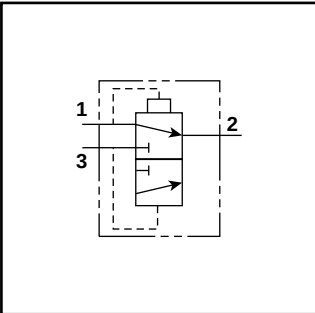
Mounting Bracket Kit –**No. 03640 8100**

(Including body screws)

For "0R12" and "0R25" sizes
with 7/8" "A" Dimension.**Model Selection, Performance Data and Dimensions**

Port			Flow (SCFM [†])	Model Number		A	B	C	Service Kit No.
1	2	3		NPTF	BSPP “G”				
STANDARD URETHANE DIAPHRAGMS (Nitrile static seals)									
1/4"	1/4"	3/8"	150	0R25NB	ORB25NB	1" Hex	2.06	2.44	03340 0105
	3/8"	3/8"	240	0R25PB	—	1" Hex	2.06	2.44	03340 0105
3/8"	3/8"	3/8"	240	0R37B	ORB37B	1" Hex	2.06	2.44	03340 0105
1/2"	1/2"	1/2"	450	0R50B	ORB50B	1-1/2" Hex	2.88	3.38	03475 0109
3/4"	3/4"	3/4"	550	0R75B	ORB75B	1-1/2" Hex	2.88	3.38	03475 0109
NITRILE DIAPHRAGMS (Nitrile static seals)									
1/8"	1/8"	1/8"	70	0R12B	ORB12B	7/8" Sq.	1.75	1.88	03640 8000
	1/8"	1/4"	70	0R12NB	ORB12NB	7/8" Sq.	1.75	1.88	03640 8000
1/4"	1/4"	1/4"	90	0R25B	ORB25B	7/8" Sq.	1.75	1.88	03640 8000
	1/4"	3/8"	90	0R25NFB	ORB25NFB	7/8" Sq.	1.75	1.88	03340 8000
3/8"	3/8"	3/8"	240	0R37FB	ORB37FB	1" Hex	2.06	2.44	03340 8000
3/4"	3/4"	3/4"	550	0R75FB	ORB75FB	1-1/2" Hex	2.88	3.38	03475 9000
FLUOROCARBON DIAPHRAGMS for extended temperature operation (Fluorocarbon static seals)									
1/8"	1/8"	1/8"	70	0R12VB	ORB12VB	7/8" Sq.	1.75	1.88	03650 8000
	1/8"	1/4"	70	0R12NVB	ORB12NVB	7/8" Sq.	1.75	1.88	03650 8000
1/4"	1/4"	1/4"	90	0R25VB	ORB25VB	7/8" Sq.	1.75	1.88	03650 8000
3/8"	3/8"	3/8"	240	0R37VB	ORB37VB	1" Hex	2.06	2.44	03340 0319
1/2"	1/2"	1/2"	450	0R50VB	ORB50VB	1-1/2" Hex	2.88	3.38	03475 0120
3/4"	3/4"	3/4"	550	0R75VB	ORB75VB	1-1/2" Hex	2.88	3.38	03475 0120
PTFE DIAPHRAGMS for higher pressure and temperature (Fibre static seals)									
3/8"	3/8"	3/8"	240	0R37TB	ORB37TB	1" Hex	2.06	2.44	03340 0504

[†] At 100 PSIG inlet pressure with full pressure drop.**BOLD ITEMS ARE MOST POPULAR.**



General Information

Shuttle valves determine a single pneumatic output from two separate inputs. If pressure is applied to both ports simultaneously, the valve will select the port with the higher pressure.

Valve Specifications

Maximum Operating Pressure200 PSIG Maximum
3 PSIG Minimum: Differential Pressure

Operating Temperature0° to 160°F*

* Ambient temperatures below freezing require moisture-free air. Ambient temperatures below freezing and above 180° require lubricants especially selected for suitability at these temperatures. Pneumatic valves should be used with filtered and lubricated air.

Component Materials

Body Material.....Aluminum
Internal Components..... Aluminum
SealsNitrile

Model Selection and Dimensions

Model Number	Port Size	Dimensions											
		A	A1	B	C	D	E	F	G	H	J	K	L
N164 1001	1/8"	N/A	1.62	0.81	0.62	0.31	1.00	0.281	0.312	1.00	0.75	1/8 - 27	0.219
N164 2003	1/4"	2.50	2.12	1.25	1.25	0.62	2.00	0.67	0.265	1.25	1.35	1/4 - 18	0.219
N164 3003	3/8"	2.50	2.12	1.25	1.25	0.62	2.00	0.67	0.265	1.25	1.35	3/8 - 16	0.219

Performance Data – Flow

Model Number	Port Size	Flow (Cv)
N164 1001	1/8"	0.32
N164 2003	1/4"	1.65
N164 3003	3/8"	2.02

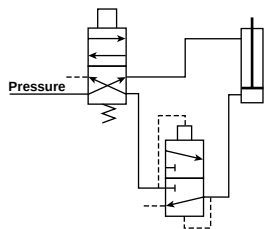
Flow Controls

Sensing

Control Panel

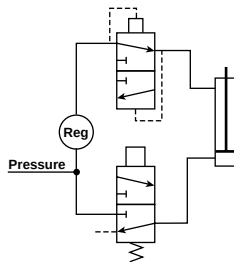
G

Typical “Quick Exhaust Valve” Applications



Rapid Retraction – Double Acting Cylinder

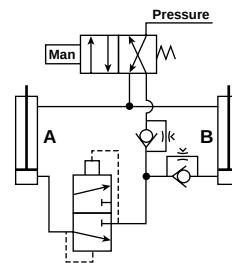
In this circuit, air is exhausted through a Quick Exhaust Valve that is **close coupled** to the cap end of the cylinder. Because the Quick Exhaust Valve has a greater exhaust capacity than the four-way Control Valve, increased cylinder speed can be accomplished with a smaller and less expensive control valve.



Dual Pressure Actuation of Double Acting Cylinder

This circuit utilizes a Quick Exhaust Valve and a three-way Control Valve to permit rapid extension of the cylinder at a high pressure. Under life.

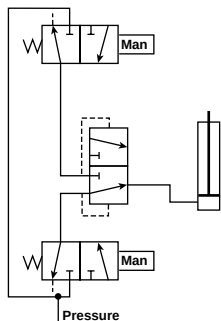
NOTE: Line pressure must be 3 or 4 times greater than rod end pressure. Effective working pressure is the differential between the cap and rod end.



Bi-Directional Control of Two Double Acting Cylinders

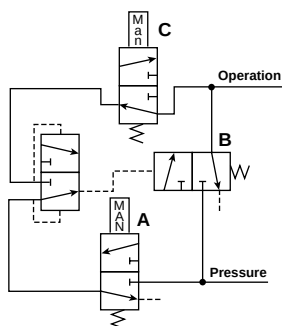
This circuit provides maximum control with a minimum of valving. A large four-way Control Valve is not needed to permit the rapid retraction of Cylinder A, as the Quick Exhaust Valve performs this function. The extension of Cylinders A and B and retraction of Cylinder B are controlled by Speed Control Valves.

Typical “Shuttle Valve” Applications



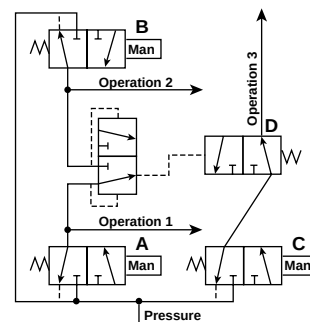
“OR” Circuit

The most common application of the Shuttle Valve is the “OR” Circuit. Here a cylinder or other work device can be actuated by either control valve. The valves can be manually or electrically actuated and located in any position.



Memory Circuit

This circuit enables continuous operation once initiated. Pressure is delivered to the circuit when Valve A is actuated. This allows pressure to pass through the shuttle valve actuating Valve B. Pressure then flows through Valve B and also the other side of the shuttle valve which holds Valve B open for continuous operation. To unlock the circuit, Valve C must be opened to exhaust the circuit and allow Valve B to return to its normally closed position.

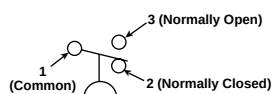


Interlock

This circuit prevents the occurrence of a specific operation while one or another operation takes place. When either Valve A or B is actuated to perform operation 1 or 2, Valve D is shifted to the closed position and prevents operation 3 from occurring.

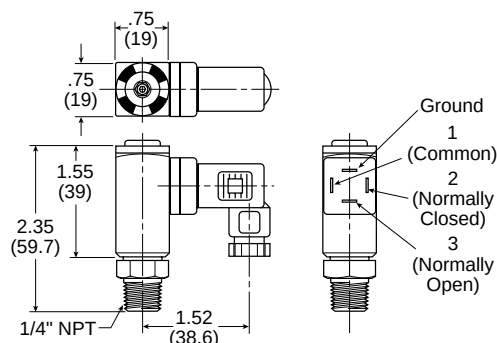


Pressure Switch – P01909



Features:

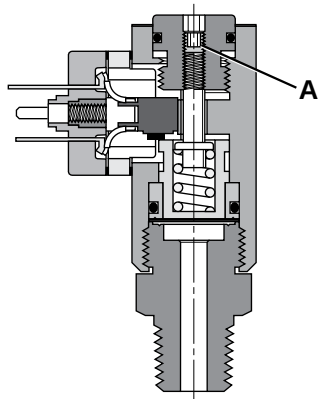
- Inline mounting
- Dial indicator for easy pressure setting
- 5 amp rated snap action micro switch
- Heavy duty Aluminum components
- Compact size
- DIN 43650HCM connector
- IP65 Rated
- Field adjustable 30-150 PSIG
- +/- 2% repeatability
- Single pole/Double throw switch



Operation

The pressure switch monitors the air pressure in your pneumatic system. When the pressure in your system either drops below or exceeds the set point pressure, an electrical output is given.

Using a 0.125" (3mm) hex wrench, turn the adjusting screw **(A)** clockwise to increase the pressure set point and counterclockwise to decrease the pressure setting. One complete revolution of the adjusting screw covers the complete adjustment range of 30 to 150 PSIG (2 to 10 bar).



Definitions and Terminology

Repeatability — Accuracy is the maximum allowable set point deviation of a single pressure or temperature switch under one given set of environmental and operational conditions.

Single Pole Double Throw (SPDT) Switching element — A SPDT switching element has one normally open, one normally closed and one common terminal. Three terminals mean that the switch can be wired with the circuit either normally open (NO), or normally closed (NC), or both.

Dead Band — The dead band, sometimes referred to as "differential" or "hysteresis", is the change in pressure between actuation and deactuation set points.

Kits and Accessories

Bushing 1/4" to 3/8"	209P-6-4
Bushing 1/4" to 1/2"	209P-8-4

Specifications

Electrical	5 AMP, 12/24VDC, 125/250VAC
Maximum Inlet Pressure	300 PSIG (20 bar)
Mechanical Life	10 ⁶ at standard operating conditions
Electrical Connection	DIN 43650HCM
Electrical Protection	IP65
Repeatability	±2% at 70°F (20°C) Ambient
Temperature Range	-40°F to 180°F (-40°C to 80°C)
Weight	0.13 lb. (0.06 Kg)

Materials of Construction

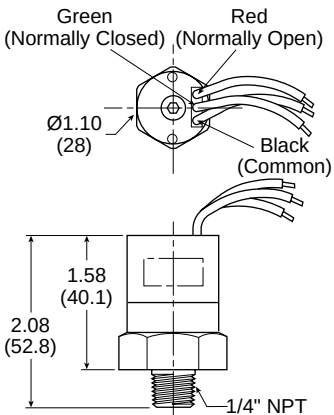
Diaphragm	Nitrile
Housing	Anodized Aluminum

Pressure Switch – P01908



Features:

- Inline mounting
- 5 amp rated snap action micro switch
- Brass body
- Compact size
- Flying leads electrical connection
- IP65 Rated
- Field adjustable 25-100 PSIG
- +/- 2% repeatability
- Single pole/Double throw switch



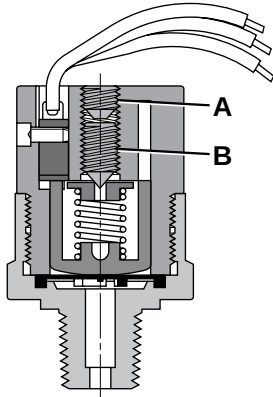
Operation

The pressure switch monitors the air pressure in your pneumatic system. When the pressure in your system either drops below or exceeds the set point pressure, an electrical output is given.

Remove screw **(A)** from the top of the switch. Using a 0.125" (3mm) hex wrench, turn the adjusting screw **(B)** clockwise to increase the pressure set point and counterclockwise to decrease the pressure setting, replace screw **(A)**. Adjustment range of 25 to 100 PSIG (1.7 to 7.5 bar).

Standard electrical circuit

Black..... Common
Green..... Normally Closed
Red..... Normally Open



Definitions and Terminology

Repeatability — Accuracy is the maximum allowable set point deviation of a single pressure or temperature switch under one given set of environmental and operational conditions.

Single Pole Double Throw (SPDT) Switching element

— A SPDT switching element has one normally open, one normally closed and one common terminal. Three terminals mean that the switch can be wired with the circuit either normally open (NO), or normally closed (NC), or both.

Dead Band — The dead band, sometimes referred to as "differential" or "hysteresis", is the change in pressure between actuation and deactuation set points.

Kits and Accessories

Bushing 1/4" to 3/8"	209P-6-4
Bushing 1/4" to 1/2"	209P-8-4

Specifications

Electrical	5 AMP, 12/24VDC, 125/250VAC
Maximum Inlet Pressure	300 PSIG (20 bar)
Mechanical Life	2x10 ⁶ at 75 PSIG (5 bar)
Electrical Connection	18" Flying Leads
Electrical Protection	IP65
Repeatability	±2% at 70°F (20°C) Ambient
Temperature Range	-40°F to 180°F (-40°C to 80°C)
Weight	0.23 lb. (0.11 Kg)

Materials of Construction

Diaphragm	Nitrile
Housing	Brass

Mobile Pressure Switch

P04159 – Normally Closed

P04160 – Normally Open



Features:

- Inline Mounting
- 4 Amp Rated Snap Action Micro Switch
- Brass Body
- Compact Size
- Spade Electrical Connection
- Field Adjustable 15 to 150 PSIG
- Rubber Boot Protection
- $\pm 5\%$ Repeatability @ 70°F (20°C) Ambient Temperature
- Temperature Range -40°F to 220°F (-40°C to 105°C)

Applications

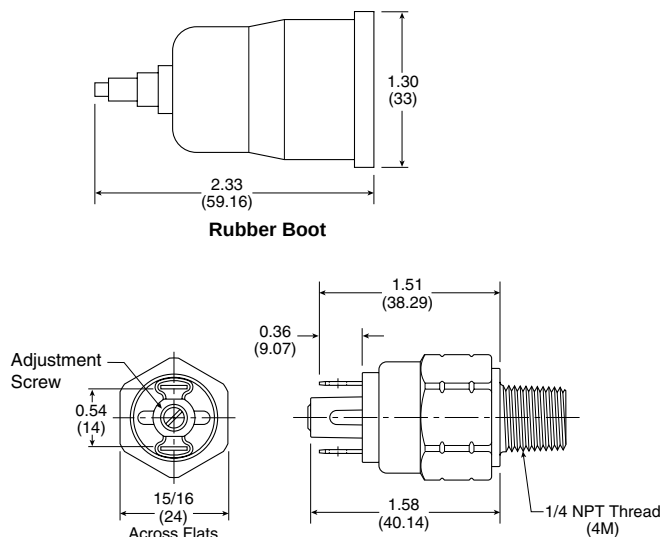
These Pressure Switches are intended for use in mobile, general-purpose, compressed air systems. Product is suitable for all trailer air-ride systems, truck suspension systems, associated bus door systems, and electro-pneumatic operations. The performance requirements and reliability are suitable for the extreme cold weather environment of North American winters.

Operation

The pressure switch monitors air pressure and provides an electrical output when the pressure drops below or exceeds an adjustable preset pressure.

Adjust the pressure switch using a flat head screwdriver; turn adjustment screw clockwise to increase set point or counterclockwise to decrease set point.

Dimensions



Kits and Accessories

Rubber Boot P04161

Specifications

Switch Position	
P04159	Normally Closed
P04160	Normally Open
Electrical Rating	100VA
Electrical Life	4 Amp in Rush @ 12VDC >2,000,000 Cycles
Maximum Inlet Pressure	300 PSIG (20 bar)
Mechanical Life	>2 x 10 ⁶ @ 75 PSIG (5 bar)
Electrical Connection	1/4 x 1/32 Spade
Electrical Protection	Rubber Boot
Repeatability	$\pm 5\%$ @ 70°F (20°C)
Ambient & Medium Temperature Range	-40°F to 220°F (-40°C to 105°C)
Weight	0.14 lb. (0.06 Kg)

Materials of Construction

Diaphragm	Kapton
Housing	Brass

Flow Controls

Sensing

Control Panel

G

Automatic Electrical Drain Valve WDV3-G



WDV3-G

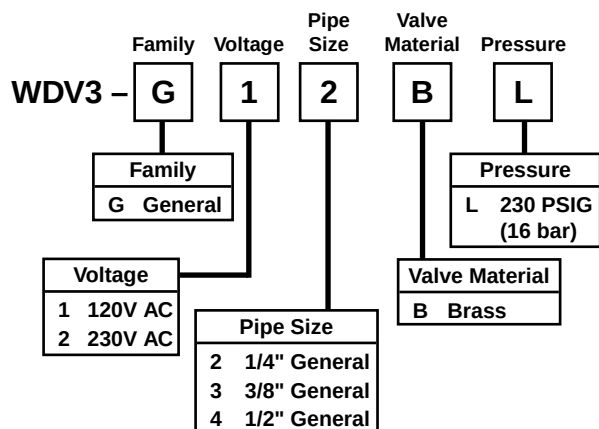
The WDV3 Electrical Drain is designed to remove condensate from compressors, compressed air dryers and receivers up to any size, type or manufacturer.

The WDV3 offers true installation simplicity and it is recognized as the most reliable and best performing condensate drain worldwide. The large orifice in the direct acting valve, combined with its sophisticated timer module ensure many years of trouble-free draining of condensate.

Benefits

- Does Not Air-Lock During Operation.
- Compressed Air Systems Up to Any Size.
- Also Available In Stainless Steel.
- The Direct Acting Valve Is Serviceable.
- Suitable for All Types of Compressors.
- TEST (Micro-Switch) Feature.
- High Time Cycle Accuracy.
- Large (4.5mm) Valve Orifice.

Ordering Information



Specifications

Operating Pressure..... 230 PSIG (15,9 bar)

Ambient Operating Range Temperature:
34° to 130°F (1,1° to 54°C)

Coil Insulation

Class H 340°F (171,1°C)

Voltages

AC 115, 230/50-60

Timer:

Open Time5 to 10 sec., Adjustable

Cycle Time5 sec. to 45 min., Adjustable

Maximum Current Rating 4mA Max.

Port Size 1/4, 3/8, 1/2 NPT

Weight 1.8 lb. (0,8 kg)

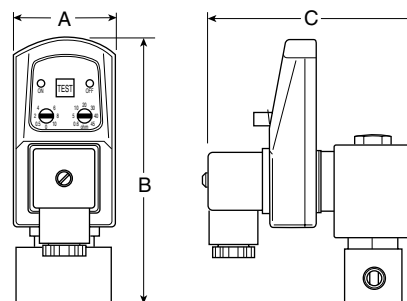
Materials of Construction

Valve Body Brass / Stainless Steel

Enclosure (NEMA 4) ABS Plastic

Internal Parts Brass / Stainless Steel

Sealing Material FPM (Fluorocarbon)



Front View

Side View

Model Selection and Dimensions

Model Number	A	B	C
WDV3-G**BL	1.73 (44)	4.53 (115)	3.46 (88)

Zero Loss Drain – WDV2



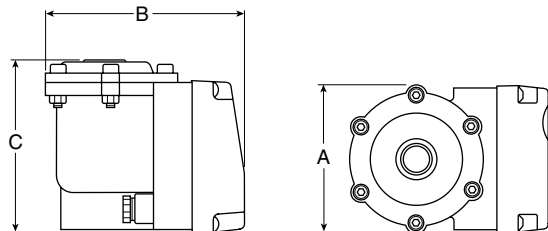
WDV2-425

Features

- Zero Air Loss.
- Automatically Self-Adjusting for Voltages from 110 to 230V.
- Sensor Device with No Moving Parts.
- Sophisticated Electronic Controls.
- Alarm with Remote Contacts.
- Large Inlet Port to Eliminate Clogging.
- Manual Push-to-Test Button.
- Automatically Clears Slugs.

Benefits

- Energy Efficient.
- World-Wide Applications.
- Long Life.
- High Reliability.
- Versatility, Early Warning.
- Low Maintenance.
- On Demand Operation.
- Maintenance Free.



Model Selection and Dimensions

Model Number	A	B	C
WDV2-425	3.23 (82)	4.61 (117)	4.65 (118)

Specifications

Drain Volume0.01 Gallons / Cycle
Maximum Fluid Temperature150°F (60°C)
Voltage110 to 240V, 50/60 Hz
Inlet Ports (2) 1/2" NPT
Outlet Ports (1) 5/16" (8mm) I.D. Hose

Operating Conditions

Ambient Temperature33° to 140°F (0° to 60°C)
Maximum Operating Pressure 232 PSIG (16 bar)

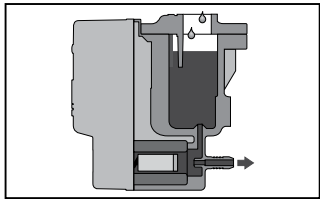
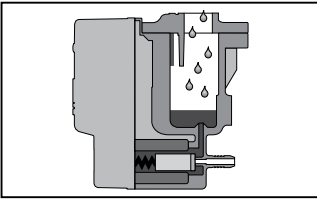
The WDV2 Electronic Demand Drain Valves, with zero air loss, are suitable for all compressed air system applications from aftercoolers to filters to receivers to refrigerated dryers. These drain valves activate automatically and are both reliable and economical.

Alarm Mode

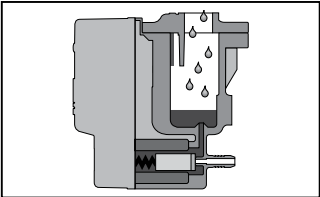
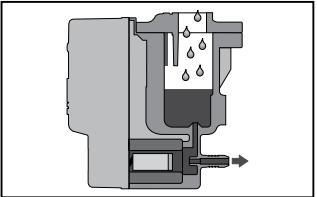
Should the drain fail to discharge due to an excessive volume of condensate or blocked outlet piping, an alarm condition is activated. During the alarm condition, the drain cycles continuously in an attempt to remove the excess condensate. At the same time, the volt free alarm contacts change state and the normally green power LED flashes to indicate a problem. When the excess condensate or blockage has been cleared, the drain will resume normal operation.

Operation

1. Upon power up, the outlet valve is closed and sensor is constantly monitoring for presence of liquid.
2. When condensate is detected by the sensor, the outlet valve is opened for a pre-set time.



3. The condensate is discharged from the outlet port, due to the system pressure acting on the top of the liquid.
4. The outlet valve is closed after a pre-set time has expired. The opening time has been calculated to always ensure a small amount of liquid remains in bowl. This liquid acts as a seal, preventing air loss.



Level monitoring and discharge operation are continuous.

Flow
Controls

Sensing

Control
Panel

G

Notes

Flow Controls
Sensing
Control Panel
G

Safety Guide For Selecting And Using Pneumatic Division Products And Related Accessories

WARNING:

FAILURE OR IMPROPER SELECTION OR IMPROPER USE OF PNEUMATIC DIVISION PRODUCTS, ASSEMBLIES OR RELATED ITEMS ("PRODUCTS") CAN CAUSE DEATH, PERSONAL INJURY, AND PROPERTY DAMAGE. POSSIBLE CONSEQUENCES OF FAILURE OR IMPROPER SELECTION OR IMPROPER USE OF THESE PRODUCTS INCLUDE BUT ARE NOT LIMITED TO:

- Unintended or mistimed cycling or motion of machine members or failure to cycle
- Work pieces or component parts being thrown off at high speeds.
- Failure of a device to function properly for example, failure to clamp or unclamp an associated item or device.
- Explosion
- Suddenly moving or falling objects.
- Release of toxic or otherwise injurious liquids or gasses.

Before selecting or using any of these Products, it is important that you read and follow the instructions below.

1. GENERAL INSTRUCTIONS

- 1.1. Scope:** This safety guide is designed to cover general guidelines on the installation, use, and maintenance of Pneumatic Division Valves, FRLs (Filters, Pressure Regulators, and Lubricators), Vacuum products and related accessory components.
- 1.2. Fail-Safe:** Valves, FRLs, Vacuum products and their related components can and do fail without warning for many reasons. Design all systems and equipment in a fail-safe mode, so that failure of associated valves, FRLs or Vacuum products will not endanger persons or property.
- 1.3. Relevant International Standards:** For a good guide to the application of a broad spectrum of pneumatic fluid power devices see: ISO 4414:1998, Pneumatic Fluid Power – General Rules Relating to Systems. See www.iso.org for ordering information.
- 1.4. Distribution:** Provide a copy of this safety guide to each person that is responsible for selection, installation, or use of Valves, FRLs or Vacuum products. Do not select, or use Parker valves, FRLs or vacuum products without thoroughly reading and understanding this safety guide as well as the specific Parker publications for the products considered or selected.
- 1.5. User Responsibility:** Due to the wide variety of operating conditions and applications for valves, FRLs, and vacuum products Parker and its distributors do not represent or warrant that any particular valve, FRL or vacuum product is suitable for any specific end use system. This safety guide does not analyze all technical parameters that must be considered in selecting a product. The user, through its own analysis and testing, is solely responsible for:
 - Making the final selection of the appropriate valve, FRL, Vacuum component, or accessory.
 - Assuring that all user's performance, endurance, maintenance, safety, and warning requirements are met and that the application presents no health or safety hazards.
 - Complying with all existing warning labels and / or providing all appropriate health and safety warnings on the equipment on which the valves, FRLs or Vacuum products are used; and,
 - Assuring compliance with all applicable government and industry standards.
- 1.6. Safety Devices:** Safety devices should not be removed, or defeated.
- 1.7. Warning Labels:** Warning labels should not be removed, painted over or otherwise obscured.
- 1.8. Additional Questions:** Call the appropriate Parker technical service department if you have any questions or require any additional information. See the Parker publication for the product being considered or used, or call 1-800-CPARKER, or go to www.parker.com, for telephone numbers of the appropriate technical service department.

2. PRODUCT SELECTION INSTRUCTIONS

- 2.1. Flow Rate:** The flow rate requirements of a system are frequently the primary consideration when designing any pneumatic system. System components need to be able to provide adequate flow and pressure for the desired application.
- 2.2. Pressure Rating:** Never exceed the rated pressure of a product. Consult product labeling, Pneumatic Division catalogs or the instruction sheets supplied for maximum pressure ratings.
- 2.3. Temperature Rating:** Never exceed the temperature rating of a product. Excessive heat can shorten the life expectancy of a product and result in complete product failure.
- 2.4. Environment:** Many environmental conditions can affect the integrity and suitability of a product for a given application. Pneumatic Division products are designed for use in general purpose industrial applications. If these products are to be used in unusual circumstances such as direct sunlight and/or corrosive or caustic environments, such use can shorten the useful life and lead to premature failure of a product.
- 2.5. Lubrication and Compressor Carryover:** Some modern synthetic oils can and will attack nitrile seals. If there is any possibility of synthetic oils or greases migrating into the pneumatic components check for compatibility with the seal materials used. Consult the factory or product literature for materials of construction.
- 2.6. Polycarbonate Bowls and Sight Glasses:** To avoid potential polycarbonate bowl failures:
 - Do not locate polycarbonate bowls or sight glasses in areas where they could be subject to direct sunlight, impact blow, or temperatures outside of the rated range.
 - Do not expose or clean polycarbonate bowls with detergents, chlorinated hydro-carbons, ketones, esters or certain alcohols.
 - Do not use polycarbonate bowls or sight glasses in air systems where compressors are lubricated with fire resistant fluids such as phosphate ester and di-ester lubricants.

- 2.7. Chemical Compatibility:** For more information on plastic component chemical compatibility see Pneumatic Division technical bulletins Tec-3, Tec-4, and Tec-5
- 2.8. Product Rupture:** Product rupture can cause death, serious personal injury, and property damage.
- Do not connect pressure regulators or other Pneumatic Division products to bottled gas cylinders.
 - Do not exceed the maximum primary pressure rating of any pressure regulator or any system component.
 - Consult product labeling or product literature for pressure rating limitations.

3. PRODUCT ASSEMBLY AND INSTALLATION INSTRUCTIONS

- 3.1. Component Inspection:** Prior to assembly or installation a careful examination of the valves, FRLs or vacuum products must be performed. All components must be checked for correct style, size, and catalog number. DO NOT use any component that displays any signs of nonconformance.
- 3.2. Installation Instructions:** Parker published Installation Instructions must be followed for installation of Parker valves, FRLs and vacuum components. These instructions are provided with every Parker valve or FRL sold, or by calling 1-800-CPARKER, or at www.parker.com.
- 3.3. Air Supply:** The air supply or control medium supplied to Valves, FRLs and Vacuum components must be moisture-free if ambient temperature can drop below freezing

4. VALVE AND FRL MAINTENANCE AND REPLACEMENT INSTRUCTIONS

- 4.1. Maintenance:** Even with proper selection and installation, valve, FRL and vacuum products service life may be significantly reduced without a continuing maintenance program. The severity of the application, risk potential from a component failure, and experience with any known failures in the application or in similar applications should determine the frequency of inspections and the servicing or replacement of Pneumatic Division products so that products are replaced before any failure occurs. A maintenance program must be established and followed by the user and, at minimum, must include instructions 4.2 through 4.10.
- 4.2. Installation and Service Instructions:** Before attempting to service or replace any worn or damaged parts consult the appropriate Service Bulletin for the valve or FRL in question for the appropriate practices to service the unit in question. These Service and Installation Instructions are provided with every Parker valve and FRL sold, or are available by calling 1-800-CPARKER, or by accessing the Parker web site at www.parker.com.
- 4.3. Lockout / Tagout Procedures:** Be sure to follow all required lockout and tagout procedures when servicing equipment. For more information see: OSHA Standard – 29 CFR, Part 1910.147, Appendix A, The Control of Hazardous Energy – (Lockout / Tagout)
- 4.4. Visual Inspection:** Any of the following conditions requires immediate system shut down and replacement of worn or damaged components:
- Air leakage: Look and listen to see if there are any signs of visual damage to any of the components in the system. Leakage is an indication of worn or damaged components.
 - Damaged or degraded components: Look to see if there are any visible signs of wear or component degradation.
 - Kinked, crushed, or damaged hoses. Kinked hoses can result in restricted air flow and lead to unpredictable system behavior.
 - Any observed improper system or component function: Immediately shut down the system and correct malfunction.
 - Excessive dirt build-up: Dirt and clutter can mask potentially hazardous situations.
- Caution: Leak detection solutions should be rinsed off after use.**
- 4.5. Routine Maintenance Issues:**
- Remove excessive dirt, grime and clutter from work areas.
 - Make sure all required guards and shields are in place.
- 4.6. Functional Test:** Before initiating automatic operation, operate the system manually to make sure all required functions operate properly and safely.
- 4.7. Service or Replacement Intervals:** It is the user's responsibility to establish appropriate service intervals. Valves, FRLs and vacuum products contain components that age, harden, wear, and otherwise deteriorate over time. Environmental conditions can significantly accelerate this process. Valves, FRLs and vacuum components need to be serviced or replaced on routine intervals. Service intervals need to be established based on:
- Previous performance experiences.
 - Government and / or industrial standards.
 - When failures could result in unacceptable down time, equipment damage or personal injury risk.

- 4.8. Servicing or Replacing of any Worn or Damaged Parts:** To avoid unpredictable system behavior that can cause death, personal injury and property damage:
- Follow all government, state and local safety and servicing practices prior to service including but not limited to all OSHA Lockout Tagout procedures (OSHA Standard – 29 CFR, Part 1910.147, Appendix A, The Control of Hazardous Energy – Lockout / Tagout).
 - Disconnect electrical supply (when necessary) before installation, servicing, or conversion.
 - Disconnect air supply and depressurize all air lines connected to system and Pneumatic Division products before installation, service, or conversion.
 - Installation, servicing, and / or conversion of these products must be performed by knowledgeable personnel who understand how pneumatic products are to be applied.
 - After installation, servicing, or conversions air and electrical supplies (when necessary) should be connected and the product tested for proper function and leakage. If audible leakage is present, or if the product does not operate properly, do not put product or system into use.
 - Warnings and specifications on the product should not be covered or painted over. If masking is not possible, contact your local representative for replacement labels.
- 4.9. Putting Serviced System Back into Operation:** Follow the guidelines above and all relevant Installation and Maintenance Instructions supplied with the valve FRL or vacuum component to insure proper function of the system.

Offer of Sale

The items described in this document and other documents or descriptions provided by Parker Hannifin Corporation, its subsidiaries and its authorized distributors, are hereby offered for sale at prices to be established by Parker Hannifin Corporation, its subsidiaries and its authorized distributors. This offer and its acceptance by any customer ("Buyer") shall be governed by all of the following Terms and Conditions. Buyer's order for any such item, when communicated to Parker Hannifin Corporation, its subsidiaries or an authorized distributor ("Seller") verbally or in writing, shall constitute acceptance of this offer.

1. Terms and Conditions of Sale: All descriptions, quotations, proposals, offers, acknowledgments, acceptances and sales of Seller's products are subject to and shall be governed exclusively by the terms and conditions stated herein. Buyer's acceptance of any offer to sell is limited to these terms and conditions. Any terms or conditions in addition to, or inconsistent with those stated herein, proposed by Buyer in any acceptance of an offer by Seller, are hereby objected to. No such additional, different or inconsistent terms and conditions shall become part of the contract between Buyer and Seller unless expressly accepted in writing by Seller. Seller's acceptance of any offer to purchase by Buyer is expressly conditional upon Buyer's assent to all the terms and conditions stated herein, including any terms in addition to, or inconsistent with those contained in Buyer's offer. Acceptance of Seller's products shall in all events constitute such assent.

2. Payment: Payment shall be made by Buyer net 30 days from the date of delivery of the items purchased hereunder. Amounts not timely paid shall bear interest at the maximum rate permitted by law for each month or portion thereof that the Buyer is late in making payment. Any claims by Buyer for omissions or shortages in a shipment shall be waived unless Seller receives notice thereof within 30 days after Buyer's receipt of the shipment.

3. Delivery: Unless otherwise provided on the face hereof, delivery shall be made F.O.B. Seller's plant. Regardless of the method of delivery, however, risk of loss shall pass to Buyer upon Seller's delivery to a carrier. Any delivery dates shown are approximate only and Seller shall have no liability for any delays in delivery.

4. Warranty: Seller warrants that the items sold hereunder shall be free from defects in material or workmanship for a period of 18 months from date of shipment from Parker Hannifin Corporation. THIS WARRANTY COMPRISES THE SOLE AND ENTIRE WARRANTY PERTAINING TO ITEMS PROVIDED HEREUNDER. SELLER MAKES NO OTHER WARRANTY, GUARANTEE, OR REPRESENTATION OF ANY KIND WHATSOEVER. ALL OTHER WARRANTIES, INCLUDING BUT NOT LIMITED TO, MERCHANTABILITY AND FITNESS FOR PURPOSE, WHETHER EXPRESS, IMPLIED, OR ARISING BY OPERATION OF LAW, TRADE USAGE, OR COURSE OF DEALING ARE HEREBY DISCLAIMED.

NOTWITHSTANDING THE FOREGOING, THERE ARE NOWARRANTIES WHATSOEVER ON ITEMS BUILT OR ACQUIRED WHOLLY OR PARTIALLY, TO BUYER'S DESIGN OR SPECIFICATIONS.

5. Limitation of Remedy: SELLER'S LIABILITY ARISING FROM OR IN ANY WAY CONNECTED WITH THE ITEMS SOLD OR THIS CONTRACT SHALL BE LIMITED EXCLUSIVELY TO REPAIR OR REPLACEMENT OF THE ITEMS SOLD OR REFUND OF THE PURCHASE PRICE PAID BY BUYER, AT SELLER'S SOLE OPTION. IN NO EVENT SHALL SELLER BE LIABLE FOR ANY INCIDENTAL, CONSEQUENTIAL OR SPECIAL DAMAGES OF ANY KIND OR NATURE WHATSOEVER, INCLUDING BUT NOT LIMITED TO LOST PROFITS ARISING FROM OR IN ANY WAY CONNECTED WITH THIS AGREEMENT OR ITEMS SOLD HEREUNDER, WHETHER ALLEGED TO ARISE FROM BREACH OF CONTRACT, EXPRESS OR IMPLIED WARRANTY, OR IN TORT, INCLUDING WITHOUT LIMITATION, NEGLIGENCE, FAILURE TO WARN OR STRICT LIABILITY.

6. Changes, Reschedules and Cancellations: Buyer may request to modify the designs or specifications for the items sold hereunder as well as the quantities and delivery dates thereof, or may request to cancel all or part of this order, however, no such requested modification or cancellation shall become part of the contract between Buyer and Seller unless accepted by Seller in a written amendment to this Agreement. Acceptance of any such requested modification or cancellation shall be at Seller's discretion, and shall be upon such terms and conditions as Seller may require.

7. Special Tooling: A tooling charge may be imposed for any special tooling, including without limitations, dies, fixtures, molds and patterns, acquired to manufacture items sold pursuant to this contract. Such special tooling shall be and remain Seller's property notwithstanding payment of any charges by Buyer. In no event will Buyer acquire any interest in apparatus belonging to Seller which is utilized in the manufacture of the items sold hereunder, even if such apparatus has been specially converted or adapted for such manufacture and notwithstanding any

charges paid by Buyer. Unless otherwise agreed, Seller shall have the right to alter, discard or otherwise dispose of any special tooling or other property in its sole discretion at any time.

8. Buyer's Property: Any designs, tools, patterns, materials, drawings, confidential information or equipment furnished by Buyer, or any other items which become Buyer's property, may be considered obsolete and may be destroyed by Seller after two (2) consecutive years have elapsed without Buyer placing an order for the items which are manufactured using such property. Seller shall not be responsible for any loss or damage to such property while it is in Seller's possession or control.

9. Taxes: Unless otherwise indicated on the face hereof, all prices and charges are exclusive of excise, sales, use, property, occupational or like taxes which may be imposed by any taxing authority upon the manufacture, sale or delivery of the items sold hereunder. If any such taxes must be paid by Seller or if Seller is liable for the collection of such tax, the amount thereof shall be in addition to the amounts for the items sold. Buyer agrees to pay all such taxes or to reimburse Seller therefore upon receipt of its invoice. If Buyer claims exemption from any sales, use or other tax imposed by any taxing authority, Buyer shall save Seller harmless from and against any such tax, together with any interest or penalties thereon which may be assessed if the items are held to be taxable.

10. Indemnity For Infringement of Intellectual Property Rights: Seller shall have no liability for infringement of any patents, trademarks, copyrights, trade dress, trade secrets or similar rights except as provided in this Part 10. Seller will defend and indemnify Buyer against allegations of infringement of U.S. patents, U.S. trademarks, copyrights, trade dress and trade secrets (hereinafter "Intellectual Property Rights"). Seller will defend at its expense and will pay the cost of any settlement or damages awarded in an action brought against Buyer based on an allegation that an item sold pursuant to this contract infringes the Intellectual Property Rights of a third party. Seller's obligation to defend and indemnify Buyer is contingent on Buyer notifying Seller within ten (10) days after Buyer becomes aware of such allegations of infringement, and Seller having sole control over the defense of any allegations or actions including all negotiations for settlement or compromise. If an item sold hereunder is subject to a claim that it infringes the Intellectual Property Rights of a third party, Seller may, at its sole expense and option, procure for Buyer the right to continue using said item, replace or modify said item so as to make it noninfringing, or offer to accept return of said item and return the purchase price less a reasonable allowance for depreciation. Notwithstanding the foregoing, Seller shall have no liability for claims of infringement based on information provided by Buyer, or directed to items delivered hereunder for which the designs are specified in whole or part by Buyer, or infringements resulting from the modification, combination or use in a system of any item sold hereunder. The foregoing provisions of this Part 10 shall constitute Seller's sole and exclusive liability and Buyer's sole and exclusive remedy for infringement of Intellectual Property Rights.

If a claim is based on information provided by Buyer or if the design for an item delivered hereunder is specified in whole or in part by Buyer, Buyer shall defend and indemnify Seller for all costs, expenses or judgments resulting from any claim that such item infringes any patent, trademark, copyright, trade dress, trade secret or any similar right.

11. Force Majeure: Seller does not assume the risk of and shall not be liable for delay or failure to perform any of Seller's obligations by reason of circumstances beyond the reasonable control of Seller (hereinafter "Events of Force Majeure"). Events of Force Majeure shall include without limitation, accidents, acts of God, strikes or labor disputes, acts, laws, rules or regulations of any government or government agency, fires, floods, delays or failures in delivery of carriers or suppliers, shortages of materials and any other cause beyond Seller's control.

12. Entire Agreement/Governing Law: The terms and conditions set forth herein, together with any amendments, modifications and any different terms or conditions expressly accepted by Seller in writing, shall constitute the entire Agreement concerning the items sold, and there are no oral or other representations or agreements which pertain thereto. This Agreement shall be governed in all respects by the law of the State of Ohio. No actions arising out of sale of the items sold hereunder or this Agreement may be brought by either party more than two (2) years after the cause of action accrues.