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<td><strong>Safety Guide, Offer of Sale</strong></td>
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- Other Products
- Valve Selector Chart (By Flow)
- Fieldbus Solutions Guide
- Fluid Power Graphic Symbols
- Technical Information
- 5-Year Warranty

- Direct Acting Solenoid • 3-Way & 4-Way • IEM Bar Manifold
  - Subbase Valve Manifolds • .15 Cv
  - Compact & Simplified Design • Subbase or Manifold Option • 3-Way
  - NO & NC on Same Manifold • Wide Range of Voltage • .033 to .05 Cv

- 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

- Compact Composite Design • Modular with a Wide Range of Voltages • 3-Way & 4-Way
  - Fieldbus Available • .6 to 1.2 Cv

- Wear Compensating Dynamic Sealing System • Economical Solution
  - Optimized Design for Industrial Markets • Simplified Design • .8 to 2.4 Cv

- Extreme Temperature & Pressure Ranges • ATEX Options • 4-Way
  - Wide Range of Voltages for Mobile Industries • Unique Overmoulded Spool Technology • .7 to 2.7 Cv

- 10mm 3-Way • 15mm & 20mm 4-Way • Low Power Consumption
  - Subbase & Inline Body • Individual & Collective Wiring Solutions • .01 to .47 Cv

- Robust Poppet Design • Fast Response & High Flow • 2-Way & 3-Way
  - High Maximum Pressure Option • 3.6 to 29.9 Cv

- 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

- 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

- Fieldbus Interface for Isys Valves • Added Input & Output Functionality
  - Up to 256 Inputs & 256 Outputs • Digital or Analog

- 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

- Robust Spool Design • Fast Response & High Flow • Plug-in & Direct Pipe Design • 4-Way
  - Hazardous Duty Option • 1.9 to 12.0 Cv

- 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

- Robust Poppet & Spool Designs • 3-Way & 4-Way
  - Lever, Pedal, Treadle, Button • 1/4’ NPT • .83 Cv

- Heavy Duty Design • 4-Way • Lever, Pedal Operated • 1/4’ & 3/8’ NPT • 1.3 to 2.8 Cv

- 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

- Compliant with OSHA Standard 29 CFR 1910
  - Lockout / Soft Start • 3.7 to 14.0 Cv

- Manual Valves • Lever & Button Operators • 1/8’ thru 1/2’ Ports
  - Wide Range of Sizes & Flows • .5 to 1.25 Cv

- Variety of Control Panel Options • Push Buttons • Indicators • Foot Pedals
  - Large Selection of Options • Two-Hand Control Conformance with EN 574

- 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

- Flow Controls • Check Valves • Needle Valves • Muffler & Silencers • Relief Valves
  - Quick Exhaust Valves • Ball Valves • Fittings • Tubing & Hose • Quick Couplings

- Model Number to Page Number Index • Safety Guide • Offer of Sale

www.parker.com/pneu/xm
www.parker.com/pneu/15mm
www.parker.com/pneu/moduflex
www.parker.com/pneu/pvl
www.parker.com/pneu/EZInline
www.parker.com/pneu/b
www.parker.com/pneu/vikingx
www.parker.com/pneu/adex
www.parker.com/pneu/isysmicro
www.parker.com/pneu/isys
www.parker.com/pneu/isomax
www.parker.com/pneu/42ser
www.parker.com/pneu/directair
www.parker.com/pneu/directair
www.parker.com/pneu/limsen
www.parker.com/pneu/isysnet
www.parker.com/pneu/lockout
www.parker.com/pneu/ssv
www.parker.com/pneu/cpp
www.parker.com/pneu/cpp
www.parker.com/pneu/limsen
www.parker.com/pneu/accessories
Control Panel Products
Human / Machine Dialog

Section G
www.parker.com/pneu/cpp

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Foot Pedal Operated Switches .........................G14
Two-Hand Controls .....................................G15-G16

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.
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.
Part Numbers

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

Flush Push Buttons

- PXBB3111BA2
- PXBB4131BA2

Selector Switches

- PXBB3111BD2
- PXBB4131BD2

### Flush Push Buttons

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Color</th>
<th>Function</th>
<th>Type of Switching*</th>
</tr>
</thead>
<tbody>
<tr>
<td>PXBB3111BA2</td>
<td>Black</td>
<td>Spring Return</td>
<td>NNP</td>
</tr>
<tr>
<td>PXBB3111BA3</td>
<td>Green</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PXBB3111BA4</td>
<td>Red</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PXBB3251BA2</td>
<td>Black</td>
<td>Spring Return</td>
<td>NNP+NP</td>
</tr>
<tr>
<td>PXBB4131BA2</td>
<td>Black</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PXBB4131BA3</td>
<td>Green</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PXBB4131BA4</td>
<td>Red</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PXBB4231BA2</td>
<td>Black</td>
<td>Spring Return</td>
<td>Dual Universal 3-Way</td>
</tr>
</tbody>
</table>

* 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.

### Mushroom Head Push Buttons

(40mm Diameter)

- PXBB3111BC2
- PXBB4131BC2

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Color</th>
<th>Function</th>
<th>Type of Switching*</th>
</tr>
</thead>
<tbody>
<tr>
<td>PXBB3111BC2</td>
<td>Black</td>
<td>Spring Return</td>
<td>NNP</td>
</tr>
<tr>
<td>PXBB3111BT4</td>
<td>Red</td>
<td>Push-Pull</td>
<td></td>
</tr>
<tr>
<td>PXBB3121BT4</td>
<td>Red</td>
<td>Push-Pull</td>
<td>NP</td>
</tr>
<tr>
<td>PXBB4131BC2</td>
<td>Black</td>
<td>Spring Return</td>
<td>Single Universal 3-Way</td>
</tr>
<tr>
<td>PXBB4131BT4</td>
<td>Red</td>
<td>Push-Pull</td>
<td></td>
</tr>
</tbody>
</table>

* 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.
**Human / Machine Dialog**

**Push Buttons**

For Use With PXBB Valve Bodies and ZBE Electrical Switch Bodies

### Mushroom Head Push Buttons

- **ZB4BC2**
  - Part Number: ZB4BC2
  - Color: Black
  - Function: Spring Return
  - Description: Ø 40mm Head

- **ZB4BC3**
  - Part Number: ZB4BC3
  - Color: Green
  - Function: Spring Return

- **ZB4BC4**
  - Part Number: ZB4BC4
  - Color: Red
  - Function: Spring Return

- **ZB4BT2**
  - Part Number: ZB4BT2
  - Color: Black
  - Function: Latching Push-Pull

- **ZB4BT3**
  - Part Number: ZB4BT3
  - Color: Green
  - Function: Latching Push-Pull

- **ZB4BT4**
  - Part Number: ZB4BT4
  - Color: Red
  - Function: Latching Push-Pull

- **ZB4BR2**
  - Part Number: ZB4BR2
  - Color: Black
  - Function: Spring Return
  - Description: Ø 60mm Head

- **ZB4BR3**
  - Part Number: ZB4BR3
  - Color: Green
  - Function: Spring Return

- **ZB4BR4**
  - Part Number: ZB4BR4
  - Color: Red
  - Function: Spring Return

* ZB4*** Model Numbers are Metal Head Operators

### Mounting Accessories

- **ZB2BZ19**
  - Part Number: ZB2BZ19
  - Color: Black
  - Description: Guard for 60mm Mushroom Heads

- **ZB5AZ905**
  - Part Number: ZB5AZ905
  - Color: —
  - Description: Plastic Head (ZB5) Mounting Nut Tightening Tool

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

**Push / Push Buttons**

### Push Buttons

- **ZB4BA2**
  - Part Number: ZB4BA2
  - Color: Black
  - Function: Spring Return
  - Description: Flush

- **ZB4BA3**
  - Part Number: ZB4BA3
  - Color: Green
  - Function: Spring Return

- **ZB4BA4**
  - Part Number: ZB4BA4
  - Color: Red
  - Function: Spring Return

- **ZB4BA5**
  - Part Number: ZB4BA5
  - Color: Yellow
  - Function: Spring Return

- **ZB4BA6**
  - Part Number: ZB4BA6
  - Color: Blue
  - Function: Spring Return

- **ZB4AL2**
  - Part Number: ZB4AL2
  - Color: Black
  - Function: Spring Return
  - Description: Extended

- **ZB4AL3**
  - Part Number: ZB4AL3
  - Color: Green
  - Function: Spring Return

- **ZB4AL4**
  - Part Number: ZB4AL4
  - Color: Red
  - Function: Spring Return

- **ZB4BL2**
  - Part Number: ZB4BL2
  - Color: Black
  - Function: Spring Return
  - Description: Booted

- **ZB4BL3**
  - Part Number: ZB4BL3
  - Color: Green
  - Function: Spring Return

- **ZB4BL4**
  - Part Number: ZB4BL4
  - Color: Red
  - Function: Spring Return

- **ZB4BP2**
  - Part Number: ZB4BP2
  - Color: Black
  - Function: Spring Return

- **ZB4BP3**
  - Part Number: ZB4BP3
  - Color: Green
  - Function: Spring Return

- **ZB4BP4**
  - Part Number: ZB4BP4
  - Color: Red
  - Function: Spring Return

* ZB4*** Model Numbers are Metal Head Operators

**Plastic Head**

- **ZB5AA2**
  - Part Number: ZB5AA2
  - Color: Black
  - Function: Spring Return

- **ZB5AA3**
  - Part Number: ZB5AA3
  - Color: Green
  - Function: Spring Return

- **ZB5AA4**
  - Part Number: ZB5AA4
  - Color: Red
  - Function: Spring Return

- **ZB5AA5**
  - Part Number: ZB5AA5
  - Color: Yellow
  - Function: Spring Return

- **ZB5AA6**
  - Part Number: ZB5AA6
  - Color: Blue
  - Function: Spring Return

- **ZB5AL2**
  - Part Number: ZB5AL2
  - Color: Black
  - Function: Spring Return
  - Description: Extended

- **ZB5AL3**
  - Part Number: ZB5AL3
  - Color: Green
  - Function: Spring Return

- **ZB5AL4**
  - Part Number: ZB5AL4
  - Color: Red
  - Function: Spring Return

- **ZB5AL5**
  - Part Number: ZB5AL5
  - Color: Yellow
  - Function: Spring Return

- **ZB5AL6**
  - Part Number: ZB5AL6
  - Color: Blue
  - Function: Spring Return

* ZB5*** Model Numbers are Plastic Head Operators

**Push / Push Buttons**

- **ZB4BH02**
  - Part Number: ZB4BH02
  - Color: Black
  - Function: Detent
  - Description: 2-Position Flush

- **ZB4BH03**
  - Part Number: ZB4BH03
  - Color: Green
  - Function: Detent

- **ZB4BH04**
  - Part Number: ZB4BH04
  - Color: Red
  - Function: Detent

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

**BOLD ITEMS ARE MOST POPULAR.**
Selector Switches

For Use With PXBB Variable Composition Switch Bodies

Key Operated Selectors

Human / Machine Dialog

Selector Switches

**ZB4BD3**

**ZB4BJ3**

Standard Selector

Knob Lever

**ZB4BG2**

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Description</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>ZB4BD2</td>
<td>Maintained</td>
<td>2-Positions</td>
</tr>
<tr>
<td>ZB4BD4</td>
<td>Spring Return from Right to Left</td>
<td></td>
</tr>
<tr>
<td>ZB4BD5</td>
<td>Spring Return to Center from Left and Right</td>
<td>3-Positions</td>
</tr>
<tr>
<td>ZB4BD7</td>
<td>Maintained Right Spring Return from Left to Center</td>
<td>3-Positions</td>
</tr>
<tr>
<td>ZB4BD8</td>
<td>Maintained Left Spring Return from Right to Center</td>
<td>3-Positions</td>
</tr>
</tbody>
</table>

**Long Black Handle**

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Description</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>ZB4BJ2</td>
<td>Maintained</td>
<td>2-Positions</td>
</tr>
<tr>
<td>ZB4BJ4</td>
<td>Spring Return from Right to Left</td>
<td></td>
</tr>
<tr>
<td>ZB4BJ3</td>
<td>Maintained</td>
<td></td>
</tr>
<tr>
<td>ZB4BJ5</td>
<td>Spring Return to Center from Left and Right</td>
<td>3-Positions</td>
</tr>
</tbody>
</table>

**Mushroom Head Push Buttons with Key Select**

**ZB4BS24**

<table>
<thead>
<tr>
<th>Part Number*</th>
<th>Color</th>
<th>Function</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ZB4BS54</td>
<td>Red</td>
<td>Latching Turn to Release</td>
<td>Ø 40mm Head</td>
</tr>
<tr>
<td>ZB4BS14</td>
<td>Red</td>
<td>Key Latching</td>
<td></td>
</tr>
<tr>
<td>ZB4BS64</td>
<td>Red</td>
<td>Latching Turn to Release</td>
<td>Ø 60mm Head</td>
</tr>
<tr>
<td>ZB4BS24</td>
<td>Red</td>
<td>Key Latching</td>
<td></td>
</tr>
</tbody>
</table>

* 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

![Images of PXBB3111B and PXBB4131B valve bodies]

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Connections</th>
<th>Function</th>
<th>Type of Switching*</th>
</tr>
</thead>
<tbody>
<tr>
<td>PXBB3111B</td>
<td>5/32” Instant</td>
<td>3/2</td>
<td>NNP</td>
</tr>
<tr>
<td>PXBB3121B</td>
<td>5/32” Instant</td>
<td>3/2</td>
<td>NP</td>
</tr>
<tr>
<td>PXBB4131B</td>
<td>5/32” Instant</td>
<td>3/2</td>
<td>Universal 3-Way</td>
</tr>
</tbody>
</table>

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.

### Additional Valve Bodies

- PXBB3911
- PXBB4932
- PXBB4931

### Replacement Valve Bodies for PXBB1 and PXBB2 Push Button Valve Series

- PXBB1911
- PXBB1922
- PXBB2911

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Connections</th>
<th>Function</th>
<th>Type of Switching*</th>
</tr>
</thead>
<tbody>
<tr>
<td>PXBB1911</td>
<td>5/32” Instant</td>
<td>3/2</td>
<td>NNP</td>
</tr>
<tr>
<td>PXBB1921</td>
<td>5/32” Instant</td>
<td>3/2</td>
<td>NP</td>
</tr>
<tr>
<td>PXBB1915</td>
<td>10-32 UNF Threaded</td>
<td>3/2</td>
<td>NNP</td>
</tr>
<tr>
<td>PXBB1925</td>
<td>10-32 UNF Threaded</td>
<td>3/2</td>
<td>NP</td>
</tr>
</tbody>
</table>

**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)  
- **Ports** — 5/32” Instant for Semi-Rigid Nylon or Polyurethane Tube
- **Temperature** — Operating .............................5°F to 140°F (-15°C to + 60°C)

**BOLD ITEMS ARE MOST POPULAR.**
PXB-B3 Dimensions

PXB-B4 Dimensions

Minimum Distance Between Centers

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

Human / Machine Dialog
Dimensions & Assembly
Legend Plates for PXBB Devices (22mm)

For Push Buttons and Visual Indicators

For 22mm Visual Indicators Only

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ZB2BY2002</td>
<td>Black Background / White Letters</td>
</tr>
</tbody>
</table>

Accessories

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Type of Contact</th>
</tr>
</thead>
<tbody>
<tr>
<td>ZB5AZ009</td>
<td>Metal Mounting Ring</td>
</tr>
<tr>
<td>ZB5AZ009</td>
<td>Plastic Mounting Ring</td>
</tr>
</tbody>
</table>

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.

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Type of Contact</th>
</tr>
</thead>
<tbody>
<tr>
<td>ZBE101</td>
<td>Normally Open (NO)</td>
</tr>
<tr>
<td>ZBE102</td>
<td>Normally Closed (NC)</td>
</tr>
</tbody>
</table>

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.

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)

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ZBY2002</td>
<td>Black Background / White Letters</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Fluid Power</th>
<th>Universal Description</th>
<th>Electrical</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Function</strong></td>
<td><strong>Symbol</strong></td>
<td><strong>Function</strong></td>
</tr>
<tr>
<td>Normally Closed (N.C.)</td>
<td><img src="#" alt="2-Way Symbol" /></td>
<td>Normally Non-Passing (NNP)</td>
</tr>
<tr>
<td>Normally Open (N.O.)</td>
<td><img src="#" alt="2-Way Symbol" /></td>
<td>Normally Passing (NP)</td>
</tr>
</tbody>
</table>

**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.

- NP 3 2 NNP 1 2
- 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.

- **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

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

### Replacement Old Style Mounting
22mm Visual Indicators

With 5/32” Instant Connections

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..................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)

Black Plastic Bezel

<table>
<thead>
<tr>
<th>Part Number “ON” Indicator</th>
<th>Part Number “OFF” Indicator</th>
<th>Color</th>
</tr>
</thead>
<tbody>
<tr>
<td>PXVF131</td>
<td>PXVF1213</td>
<td>Green</td>
</tr>
<tr>
<td>PXVF141</td>
<td>PXVF1214</td>
<td>Red</td>
</tr>
<tr>
<td>PXVF151</td>
<td>PXVF1215</td>
<td>Yellow</td>
</tr>
<tr>
<td>PXVF161</td>
<td>PXVF1216</td>
<td>Blue</td>
</tr>
<tr>
<td>PXVF111</td>
<td>PXVF1211</td>
<td>White</td>
</tr>
</tbody>
</table>

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 ON Indicator or OFF Indicator Plates, see page G9.

Dimensions

<table>
<thead>
<tr>
<th>PXVF111-131</th>
</tr>
</thead>
<tbody>
<tr>
<td>.06 to .25</td>
</tr>
<tr>
<td>(1.5 to 6)</td>
</tr>
<tr>
<td>2.09 (53)</td>
</tr>
<tr>
<td>1.10 (28)</td>
</tr>
<tr>
<td>1.18 (30)</td>
</tr>
<tr>
<td>1.58 (40)</td>
</tr>
<tr>
<td>1.9 (48)</td>
</tr>
<tr>
<td>ø.89 (22.5)</td>
</tr>
<tr>
<td>Minimum distance between centers</td>
</tr>
</tbody>
</table>

Human / Machine Dialog
Visual Indicators, 22mm (7/8”)
Human / Machine Dialog

Rotary Selector Switches, 22mm (7/8")

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

4-Positions, 4-Outputs 3/2

4-Positions, 4-Outputs 3/2

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

4-Positions, 4-Outputs 3/2

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.

Without Mechanical Stop

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Operating Head</th>
<th>Type of Switching*</th>
</tr>
</thead>
<tbody>
<tr>
<td>PXBDD104</td>
<td>Black Handle with 2.5&quot; x 2.5&quot; (64 x 64 mm) Legend Plate, Red or Black Background</td>
<td>NNP</td>
</tr>
</tbody>
</table>

8-Positions, 8-Outputs 3/2

8-Positions, 8-Outputs 3/2

Without Mechanical Stop

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Operating Head</th>
<th>Type of Switching*</th>
</tr>
</thead>
<tbody>
<tr>
<td>PXBDD508</td>
<td>Black Handle with 2.5&quot; x 2.5&quot; (64 x 64 mm) Legend Plate, Red or Black Background</td>
<td>NNP</td>
</tr>
</tbody>
</table>
With 5/32" Instant Connections, 1/16" I.D. Internal Orifice

2-Position Unit  
4-Position Unit

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

Specifications

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)

Part Numbers

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Position</th>
<th>Function</th>
<th>Type of Switching*</th>
<th>Operating Head</th>
</tr>
</thead>
<tbody>
<tr>
<td>PXBGA8211</td>
<td>2</td>
<td>Maintained Position in Each Direction</td>
<td>NNP</td>
<td>Chrome Plated Lever with Protective Bellows 1.6&quot; x 2.5&quot;</td>
</tr>
<tr>
<td>PXBGA8411</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PXBGA8221</td>
<td>2</td>
<td>Spring Return in Each Direction</td>
<td>NNP</td>
<td>(40 x 64 mm) Legend Plate Red or Black Background</td>
</tr>
<tr>
<td>PXBGA8421</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* NNP: Normally Non-Passing.

Dimensions

<table>
<thead>
<tr>
<th>PXBGA82**</th>
<th>inch</th>
<th>mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>1.57</td>
<td>40</td>
</tr>
<tr>
<td>b</td>
<td>0.59</td>
<td>15</td>
</tr>
<tr>
<td>c</td>
<td>5/32 Dia.</td>
<td>4 Dia.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>PXBGA84**</th>
<th>inch</th>
<th>mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>1.57</td>
<td>40</td>
</tr>
<tr>
<td>b</td>
<td>0.59</td>
<td>15</td>
</tr>
<tr>
<td>c</td>
<td>5/32 Dia.</td>
<td>4 Dia.</td>
</tr>
</tbody>
</table>

* In both directions
* In all 4 directions
Part Numbers

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

Protective Guard

Foot Switches Without Protective Guard

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Function</th>
<th>Material</th>
<th>Type of Switching*</th>
</tr>
</thead>
<tbody>
<tr>
<td>PXPEM510</td>
<td>High resistance protective guard, with interlock mechanism to prevent accidental operation by a falling object.</td>
<td>Metal</td>
<td>NNP</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>PXPEM510</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Function</th>
<th>Material</th>
<th>Type of Switching*</th>
</tr>
</thead>
<tbody>
<tr>
<td>PXPEA110</td>
<td>Spring Return Plastic NNP</td>
<td>Plastic NNP</td>
<td></td>
</tr>
<tr>
<td>PXPEM110</td>
<td>Spring Return Metal NNP</td>
<td>Metal NNP</td>
<td></td>
</tr>
</tbody>
</table>

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.

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.

Specifications

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 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.
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

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)**

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Connections</th>
</tr>
</thead>
<tbody>
<tr>
<td>PXPC111</td>
<td>5/32” Instant</td>
</tr>
</tbody>
</table>

**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”.

[Diagram of PXPC111 module and pre-assembled enclosure]

Human / Machine Dialog

**Two-Hand Controls**
Two-Hand Control Module

Specifications

Air Quality –
Standard Shop Air, Lubricated or Dry, 40µm Filtration
Flow at 90 PSI (6 bar) in SCFM (l/min ANR) ............... 7 (200)
Materials –
Body.......................................................... Polyamide
Operating Head......................................... Zinc Alloy & Plastic
Nominal Bore Ø 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.

Dimensions

Two-Hand Control Module Guard

Two Hand Repair Parts

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Quantity Required</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>PXPA11</td>
<td>1</td>
<td>Control Module</td>
</tr>
<tr>
<td>PXBB3111B</td>
<td>2</td>
<td>Valve Body &amp; Mounting Ring</td>
</tr>
<tr>
<td>ZB48BR*</td>
<td>2</td>
<td>Push Button</td>
</tr>
<tr>
<td>PPRL15</td>
<td>2</td>
<td>Control Module Guard</td>
</tr>
</tbody>
</table>

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

Part Number Base Component
PPRL15 PXPC111
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
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.

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.
Direct Acting Limit Switches
1/16" I.D. Internal Orifice

**Part Numbers**

**PXCM111**
- **Connection**: 5/32" Instant
- **Actuator**: Steel Plunger
- **Type of Switching**: NNP

**PXCM115**
- **Connection**: 10-32 UNF
- **Actuator**: Operating Levers
- **Type of Switching**: NNP

**PXCM121**
- **Connection**: 5/32" Instant
- **Actuator**: Plastic Roller
- **Type of Switching**: NNP

**PXCM125**
- **Connection**: 10-32 UNF

**7/64" I.D. Internal Orifice**

**Part Numbers**

**PXCM521**
- **Connection**: 5/32" Instant
- **Actuator**: Plastic Roller
- **Type of Switching**: NNP

**Specifications**

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

**Flow SCFM (NL/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)

**Actuators For Steel Plunger**

**Use with PXCM11**

**Part Numbers**

**PXCZ11**
- **Actuator**: Plastic Roller Lever

**PXCZ12**
- **Actuator**: Plastic Roller Lever, One Way Trip

*NNP: Normally Non-Passing.
## Operator Specifications

<table>
<thead>
<tr>
<th></th>
<th>PXCM111</th>
<th>PXCM121</th>
<th>PXCM521</th>
</tr>
</thead>
<tbody>
<tr>
<td>Differential Travel</td>
<td>.006&quot; (0.15 mm)</td>
<td>.012&quot; (0.3 mm)</td>
<td>.020&quot; (0.5 mm)</td>
</tr>
<tr>
<td>at 90 PSI (6 bar)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maximum Travel (B)</td>
<td>.055&quot; (1.4 mm)</td>
<td>.126&quot; (3.2 mm)</td>
<td>.228&quot; (5.8 mm)</td>
</tr>
<tr>
<td>at 90 PSIG (6 bar)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Minimum Pre-Travel (A)</td>
<td>.035&quot; (0.9 mm)</td>
<td>.079&quot; (2 mm)</td>
<td>.087&quot; (2.2 mm)</td>
</tr>
<tr>
<td>at 90 PSIG (6 bar)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Minimum Operating Force</td>
<td>2.5 lb (11 N)</td>
<td>1.0 lb (4.5 N)</td>
<td>1.6 lb (7 N)</td>
</tr>
<tr>
<td>at 90 PSI (6 bar)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Operating Diagram

#### Rest

#### Operation

#### Maximum Travel

---

## Dimensions

### PXCM111

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Value 1</th>
<th>Value 2</th>
<th>Value 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>PXCM121, PXCM131</td>
<td>2x Ø .17 (4.2)</td>
<td>2x .13 (3.2) dia.</td>
<td>69 (17.5)</td>
</tr>
<tr>
<td>PXCM521</td>
<td>2x .17 (4.2)</td>
<td>.59 (15)</td>
<td>26 (7)</td>
</tr>
</tbody>
</table>

### PXCM121

### PXCM112
Pilot Operated Compact Limit Switches
5/32" Instant Connections
Pipeable Exhaust Port
7/64" I.D. Internal Orifice

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)

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Actuator</th>
<th>Type of Switching*</th>
</tr>
</thead>
<tbody>
<tr>
<td>PXCM601A110</td>
<td>Steel Plunger Operating Levers Available (See Below)</td>
<td>NNP</td>
</tr>
<tr>
<td>PXCM601A102</td>
<td>Steel Roller Plunger</td>
<td></td>
</tr>
<tr>
<td>PXCM601A103</td>
<td>90° Steel Roller Plunger</td>
<td></td>
</tr>
</tbody>
</table>
### Operator Specifications

<table>
<thead>
<tr>
<th></th>
<th>PXCM601A110</th>
<th>PXCM601A102</th>
<th>PXCM601A103</th>
<th>PXCM601A110 + XCMZ24</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Differential Travel</strong></td>
<td>.012&quot; (0.3 mm)</td>
<td>.008&quot; (0.2 mm)</td>
<td>.020&quot; (0.5 mm)</td>
<td>.047&quot; (1.2 mm) (A)</td>
</tr>
<tr>
<td>at 90 PSI (6 bar)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Maximum Travel (B)</strong></td>
<td>.197&quot; (5 mm)</td>
<td>.197&quot; (5 mm)</td>
<td>.197&quot; (5 mm)</td>
<td>—</td>
</tr>
<tr>
<td>at 90 PSIG (6 bar)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Minimum Pre-Travel (A)</strong> at 90 PSIG (6 bar)</td>
<td>.066&quot; (1.7 mm)</td>
<td>.066&quot; (1.7 mm)</td>
<td>.066&quot; (1.7 mm)</td>
<td>.370&quot; (9.4 mm) (A)</td>
</tr>
<tr>
<td><strong>Minimum Operating Force</strong> at 90 PSI (6 bar)</td>
<td>5.4 lbf (24 N)</td>
<td>5.2 lbf (23 N)</td>
<td>5.2 lbf (23)</td>
<td>4.3 lbf (19)</td>
</tr>
<tr>
<td><strong>Operating Diagram</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Dimensions

**PXCM601A102**
- 2 mounting holes Ø .17" (4.3)
- 2 countersunk Ø .32" (8.2)
- depth 4 mm

**PXCM601A103**
- top mounting holes, 2 x M5
  - .71" (18 mm) centers

**PXCM601A110**
- top mounting holes, 2 x M5
  - .71" (18 mm) centers
## 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

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Actuator</th>
<th>Type of Switching*</th>
</tr>
</thead>
<tbody>
<tr>
<td>PXCK21101</td>
<td>Steel Plunger</td>
<td>NNP</td>
</tr>
<tr>
<td>PXCK22101</td>
<td>Steel Plunger</td>
<td>NP</td>
</tr>
<tr>
<td>PXCK21102</td>
<td>Steel Roller Plunger</td>
<td>NNP</td>
</tr>
<tr>
<td>PXCK22102</td>
<td>Steel Roller Plunger</td>
<td>NP</td>
</tr>
<tr>
<td>PXCK21121</td>
<td>Plastic Roller Plunger</td>
<td>NNP</td>
</tr>
<tr>
<td>PXCK22121</td>
<td>Plastic Roller Plunger</td>
<td>NP</td>
</tr>
<tr>
<td>PXCK21106</td>
<td>Cats Whisker</td>
<td>NNP</td>
</tr>
<tr>
<td>PXCK22106</td>
<td>Cats Whisker</td>
<td>NP</td>
</tr>
</tbody>
</table>

**NNP:** Normally Non-Passing

**NP:** Normally Passing

### With Die Cast Rotary Operating Head and Operating Lever - Complete Assemblies

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Actuator</th>
<th>Type of Switching*</th>
</tr>
</thead>
<tbody>
<tr>
<td>PXCK2110031</td>
<td>Fixed Delrin Roller Lever Multi-Function Head Actuates: - From Right and Left</td>
<td>NNP</td>
</tr>
<tr>
<td>PXCK2210031</td>
<td>Fixed Delrin Roller Lever Multi-Function Head Actuates: - From Right, - From Left</td>
<td>NP</td>
</tr>
<tr>
<td>PXCK2110041</td>
<td>Adjustable Delrin Roller Lever Multi-Function Head Actuates: - From Right and Left</td>
<td>NNP</td>
</tr>
<tr>
<td>PXCK2210041</td>
<td>Adjustable Delrin Roller Lever Multi-Function Head Actuates: - From Right, - From Left</td>
<td>NP</td>
</tr>
</tbody>
</table>

### Field Conversion of Rotary Operating Head

- Steel Plunger: NNP
- Steel Roller Plunger: NP
- Plastic Roller Plunger: NNP
- Cats Whisker: NNP

**Flow Controls**

**Sensing**

**Control Panel**

---

**Parker Hannifin Corporation**

Pneumatic Division

Richland, Michigan

www.parker.com/pneumatics
# Separate Pneumatic Switch Bodies

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Actuator</th>
<th>Type of Switching*</th>
</tr>
</thead>
<tbody>
<tr>
<td>PXCK211</td>
<td>For Use with ZCK Series Operating Heads</td>
<td>NNP</td>
</tr>
<tr>
<td>PXCK221</td>
<td>—</td>
<td>NP</td>
</tr>
</tbody>
</table>

---

# Pneumatic Switch Bodies with Rotary Heads

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Actuator</th>
<th>Type of Switching*</th>
</tr>
</thead>
<tbody>
<tr>
<td>PXCK21100</td>
<td>Multi-Function Head Actuates: - From Right and Left - From Right - From Left</td>
<td>NNP</td>
</tr>
<tr>
<td>PXCK22100</td>
<td>—</td>
<td>NP</td>
</tr>
</tbody>
</table>

---

# Operating Heads

For Use With PXCK Switch Bodies

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Actuator</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ZCKG00</td>
<td>—</td>
<td>Die Cast Zinc</td>
</tr>
</tbody>
</table>

Plunger Operated

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Actuator</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ZCKD02</td>
<td>Roller Plunger</td>
<td></td>
</tr>
<tr>
<td>ZCKD06</td>
<td>Whisker</td>
<td></td>
</tr>
<tr>
<td>ZCKD10</td>
<td>Rod Plunger</td>
<td></td>
</tr>
<tr>
<td>ZCKD21</td>
<td>Delrin Roller Lever On Plunger</td>
<td></td>
</tr>
<tr>
<td>ZCKD23</td>
<td>Steel Roller Lever On Plunger</td>
<td></td>
</tr>
</tbody>
</table>

---

# Operating Levers for Rotary Heads

For Use With Rotary Head ZCKG00

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Actuator</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ZCKY51</td>
<td>Steel 1/8” Square</td>
<td>Rod Levers</td>
</tr>
<tr>
<td>ZCKY52</td>
<td>Fiberglas 1/8” Dia. Round</td>
<td></td>
</tr>
<tr>
<td>ZCKY81</td>
<td>Plastic Spring Rod Lever</td>
<td></td>
</tr>
<tr>
<td>ZCKY91</td>
<td>Metal Spring Rod Lever</td>
<td></td>
</tr>
<tr>
<td>ZCKY11</td>
<td>Delrin Roller Lever</td>
<td></td>
</tr>
<tr>
<td>ZCKY13</td>
<td>Steel Roller Lever</td>
<td></td>
</tr>
<tr>
<td>ZCKY41</td>
<td>Adjust. Delrin Roller Lever</td>
<td></td>
</tr>
<tr>
<td>ZCKY43</td>
<td>Adjust. Steel Roller Lever</td>
<td></td>
</tr>
</tbody>
</table>
## Specifications

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

### Flow SCFM (NI/min)
<table>
<thead>
<tr>
<th></th>
<th>PXCK2••01</th>
<th>PXCK2••02</th>
<th>PXCK2••03</th>
<th>PXCK2••06</th>
<th>PXCK2••00 + Actuator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Differential Angle</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>12°</td>
<td>3°</td>
</tr>
<tr>
<td>Differential Travel</td>
<td>.008&quot; (0.2 mm)</td>
<td>.008&quot; (0.2 mm)</td>
<td>.008&quot; (0.2 mm)</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Maximum Angle of Travel</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>80°</td>
</tr>
<tr>
<td>Maximum Travel (B) at 90 PSIG (6 bar)</td>
<td>.020&quot; (0.5 mm)</td>
<td>.020&quot; (0.5 mm)</td>
<td>.020&quot; (0.5 mm)</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Minimum Pre-Travel (A) at 90 PSIG (6 bar)</td>
<td>.087&quot; (2.2 mm)</td>
<td>.087&quot; (2.2 mm)</td>
<td>.102&quot; (2.6 mm)</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Minimum Operating Force at 90 PSI (6 bar)</td>
<td>3.6 lbf (16N)</td>
<td>4.5 lbf (20N)</td>
<td>3.4 lbf (15N)</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Minimum Operating Torque at 90 PSI (6 bar)</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>17.0 oz in (120mNm)</td>
<td>29.8 oz in (210mNm)</td>
</tr>
<tr>
<td>Operating Angle</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>35° (Minimum Lever Travel Including Pre-Travel Required For Operation)</td>
</tr>
</tbody>
</table>

### Operating Diagram
- Rest
- Operation
- Maximum Travel

---

## Operator Specifications

- 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)
Dimensions

Flow Controls

Panel

Sensing

“K” Series

Catalog 0600P-11

Dimensions

PXCK21101, PXCK22101

PXCK21102, PXCK22102

PXCK2111121, PXCK221121

PXCK21106, PXCK22106

PXCK2110531, PXCK2210531

PXCK2110541, PXCK2210541

Pneumatic Switch Bodies

PXCK21, PXCK22

Rotary Heads with Operating Levers

ZCKY81

ZCKY91

Pneumatic Switch Bodies

PXCK211, PXCK221

Rotary Heads with Operating Levers

ZCKY81

ZCKY91

Pneumatic Switch Bodies

PXCK21, PXCK22

Rotary Heads with Operating Levers

ZCKY81

ZCKY91

Pneumatic Switch Bodies

PXCK21, PXCK22

Rotary Heads with Operating Levers

ZCKY81

ZCKY91
Catalog 0600P-11

Body & Head Part Numbers

Switch Bodies Only

![PXCJ117](image1)

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Type of Switching*</th>
</tr>
</thead>
<tbody>
<tr>
<td>PXCJ117</td>
<td>NNP</td>
</tr>
<tr>
<td>PXCJ127</td>
<td>NP</td>
</tr>
</tbody>
</table>

Switch Bodies with Rotary Head

![PXCJ11701](image2)

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Direction of Actuation</th>
<th>Type of Switching*</th>
</tr>
</thead>
<tbody>
<tr>
<td>PXCJ11701</td>
<td>Right &amp; Left, Spring Return</td>
<td>NNP</td>
</tr>
<tr>
<td>PXCJ11705</td>
<td>Right or Left, Spring Return</td>
<td>NNP</td>
</tr>
<tr>
<td>PXCJ12701</td>
<td>Right &amp; Left, Spring Return</td>
<td>NP</td>
</tr>
<tr>
<td>PXCJ12705</td>
<td>Right or Left, Spring Return</td>
<td>NP</td>
</tr>
</tbody>
</table>

Operating Levers for Rotary Heads

![Die Cast Zinc. For Use With PXCJ Switch Bodies](image3)

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Operator</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ZC2JY11</td>
<td>Delrin Roller</td>
<td>Spring Return</td>
</tr>
<tr>
<td>ZC2JY13</td>
<td>Steel Roller</td>
<td></td>
</tr>
<tr>
<td>ZC2JY21</td>
<td>Offset Delrin Roller</td>
<td></td>
</tr>
<tr>
<td>ZC2JY81</td>
<td>Plastic Spring Rod</td>
<td></td>
</tr>
<tr>
<td>ZC2JY91</td>
<td>Metal Spring Rod</td>
<td></td>
</tr>
<tr>
<td>ZC2JY31</td>
<td>Delrin Roller</td>
<td>Adjustable Roller</td>
</tr>
<tr>
<td>ZC2JY41</td>
<td>Offset Delrin Roller</td>
<td>Rod Lever</td>
</tr>
<tr>
<td>ZC2JY51</td>
<td>Single Track, Delrin Roller</td>
<td>Fork Lever</td>
</tr>
<tr>
<td>ZC2JY61</td>
<td>Double Track, Delrin Rollers</td>
<td></td>
</tr>
</tbody>
</table>

Sensing

Heavy Duty Limit Switches – “J” Series

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Operation Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>PXCJ11701</td>
<td>Top Push</td>
<td>Spring Return</td>
</tr>
<tr>
<td>PXCJ11705</td>
<td>Top Roller Push</td>
<td></td>
</tr>
<tr>
<td>ZC2JE63</td>
<td>Side Push</td>
<td></td>
</tr>
<tr>
<td>ZC2JE70</td>
<td>Cat’s Whisker</td>
<td></td>
</tr>
<tr>
<td>ZC2JE01</td>
<td>From Left &amp; Right</td>
<td></td>
</tr>
<tr>
<td>ZC2JE02</td>
<td>Counterclockwise From Right</td>
<td>Spring Return</td>
</tr>
<tr>
<td>ZC2JE03</td>
<td>Clockwise From Left</td>
<td></td>
</tr>
<tr>
<td>ZC2JE05</td>
<td>From Left or Right</td>
<td></td>
</tr>
<tr>
<td>ZC2JE09</td>
<td>Maintained Positions</td>
<td></td>
</tr>
</tbody>
</table>

Die Cast Zinc. For Use With PXCJ Switch Bodies

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Operator</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ZC2JE70</td>
<td>Top Plunger &amp; Rotary Operating Heads</td>
<td></td>
</tr>
<tr>
<td>ZC2JE01</td>
<td>Top Plunger &amp; Rotary Operating Heads</td>
<td>Spring Return</td>
</tr>
</tbody>
</table>

G27
Specifications

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

Flow SCFM (Nl/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

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

Operating Diagram

- Rest
- Operation
- Maximum Travel
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

<table>
<thead>
<tr>
<th></th>
<th>inch</th>
<th>mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>.47</td>
<td>12</td>
</tr>
<tr>
<td>b</td>
<td>.75</td>
<td>19</td>
</tr>
<tr>
<td>c</td>
<td>1.16</td>
<td>29.5</td>
</tr>
<tr>
<td>d</td>
<td>1.14 to 1.18</td>
<td>29 to 30</td>
</tr>
<tr>
<td>e</td>
<td>1.18</td>
<td>30</td>
</tr>
<tr>
<td>f</td>
<td>.28</td>
<td>7</td>
</tr>
<tr>
<td>g</td>
<td>.43</td>
<td>11</td>
</tr>
<tr>
<td>h</td>
<td>.51</td>
<td>13</td>
</tr>
<tr>
<td>k</td>
<td>.94</td>
<td>24</td>
</tr>
</tbody>
</table>

G29
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**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating Pressure</td>
<td>0 to 150 PSI</td>
</tr>
<tr>
<td>Permissible Fluids</td>
<td>Air or neutral gas, 50 µm filtration, lubricated or not</td>
</tr>
<tr>
<td>Operating Temperature</td>
<td>5°F to 140°F (-15°C to 60°C)</td>
</tr>
<tr>
<td>Storage Temperature</td>
<td>-40°F to 160°F (-40°C to 70°C)</td>
</tr>
<tr>
<td>Flow</td>
<td>10 Million</td>
</tr>
<tr>
<td>Maximum Operating Frequency</td>
<td>10 Hz</td>
</tr>
<tr>
<td>Material: Body</td>
<td>Zinc alloy</td>
</tr>
<tr>
<td>Mounting Screw</td>
<td>Brass</td>
</tr>
<tr>
<td>Maximum Mounting Torque</td>
<td>88 inch pounds</td>
</tr>
<tr>
<td>1/8”</td>
<td>70 inch pounds</td>
</tr>
<tr>
<td>1/4”</td>
<td>105 inch pounds</td>
</tr>
<tr>
<td>3/8”</td>
<td>265 inch pounds</td>
</tr>
<tr>
<td>1/2”</td>
<td>310 inch pounds</td>
</tr>
<tr>
<td>Adjustment</td>
<td>N/A</td>
</tr>
<tr>
<td>Adjustment Locking</td>
<td>N/A</td>
</tr>
</tbody>
</table>

---

**Piloting and De-Piloting Pressure**

<table>
<thead>
<tr>
<th>Blocking Valve Sizes</th>
<th>Depilot with Operating Pressure of:</th>
</tr>
</thead>
<tbody>
<tr>
<td>30 PSI</td>
<td>60 PSI</td>
</tr>
<tr>
<td>1/8” BSP or NPT</td>
<td>30 PSI</td>
</tr>
<tr>
<td>1/4” BSP or NPT</td>
<td>45 PSI</td>
</tr>
<tr>
<td>3/8” BSP or NPT</td>
<td>50 PSI</td>
</tr>
<tr>
<td>1/2” BSP or NPT</td>
<td>60 PSI</td>
</tr>
</tbody>
</table>

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

### With Instant Tube Fittings

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Connection for Pilot</th>
<th>Cylinder Port Thread (Male)</th>
<th>Connection for Tube</th>
<th>Catalog Number</th>
<th>Connection for Pilot</th>
<th>Cylinder Port Thread (Male)</th>
<th>Connection for Tube</th>
<th>Catalog Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>4mm</td>
<td></td>
<td>1/8&quot; 6mm</td>
<td>PWBA1468</td>
<td></td>
<td>1/8&quot; 1/4&quot;</td>
<td>PWBA3468</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>1/4&quot; 6mm</td>
<td>PWBA1469</td>
<td></td>
<td>1/4&quot; 1/4&quot;</td>
<td>PWBA3469</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>3/8&quot; 8mm</td>
<td>PWBA1483</td>
<td></td>
<td>3/8&quot; 3/8&quot;</td>
<td>PWBA3493</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>3/8&quot; 10mm</td>
<td>PWBA1493</td>
<td></td>
<td>1/2&quot; 1/2&quot;</td>
<td>PWBA3412</td>
<td></td>
<td></td>
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</tbody>
</table>

### With Threaded Connections and Tube Pilot Port

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Connection for Pilot</th>
<th>Cylinder Port Thread (Male)</th>
<th>Connection from Valve (Female)</th>
<th>Catalog Number</th>
<th>Connection for Pilot</th>
<th>Cylinder Port Thread (Male)</th>
<th>Connection from Valve (Female)</th>
<th>Catalog Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>4mm</td>
<td></td>
<td>1/8&quot; 1/4&quot;</td>
<td>PWBA1898</td>
<td></td>
<td>1/8&quot; 1/8&quot;</td>
<td>PWBA3888</td>
<td></td>
<td></td>
</tr>
<tr>
<td>M5</td>
<td></td>
<td>3/8&quot; 3/8&quot;</td>
<td>PWBA1833</td>
<td></td>
<td>3/8&quot; 3/8&quot;</td>
<td>PWBA3833</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>1/2&quot; 1/2&quot;</td>
<td>PWBA1822</td>
<td></td>
<td>1/2&quot; 1/2&quot;</td>
<td>PWBA3822</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Instant fitting

### With Threaded Connections and Threaded Pilot Port

<table>
<thead>
<tr>
<th>Connection for Pilot</th>
<th>Cylinder Port Thread (Male)</th>
<th>Connection from Valve (Female)</th>
<th>Catalog Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/8&quot; pipe</td>
<td></td>
<td></td>
<td>PWBA388887</td>
</tr>
<tr>
<td>1/4&quot;</td>
<td></td>
<td></td>
<td>PWBA38997</td>
</tr>
<tr>
<td>3/8&quot;</td>
<td></td>
<td></td>
<td>PWBA38337</td>
</tr>
<tr>
<td>1/2&quot;</td>
<td></td>
<td></td>
<td>PWBA38227</td>
</tr>
</tbody>
</table>

### Dimensions: Inches (mm)

<table>
<thead>
<tr>
<th>Flow</th>
<th>ØA</th>
<th>B</th>
<th>C</th>
<th>K</th>
<th>H</th>
<th>L</th>
</tr>
</thead>
<tbody>
<tr>
<td>PWBA1468/3468</td>
<td>14.8</td>
<td>0.86&quot; (22)</td>
<td>0.82&quot; (21)</td>
<td>0.94&quot; (24)</td>
<td>0.53&quot; (13.5)</td>
<td>2.32&quot; (59)</td>
</tr>
<tr>
<td>PWBA1469/3469</td>
<td>19.4</td>
<td>0.86&quot; (22)</td>
<td>0.82&quot; (21)</td>
<td>0.94&quot; (24)</td>
<td>0.53&quot; (13.5)</td>
<td>2.32&quot; (59)</td>
</tr>
<tr>
<td>PWBA1483</td>
<td>45.9</td>
<td>1.06&quot; (27)</td>
<td>1.10&quot; (28)</td>
<td>0.94&quot; (24)</td>
<td>0.55&quot; (14)</td>
<td>2.09&quot; (53)</td>
</tr>
<tr>
<td>PWBA1412/3412</td>
<td>81.2</td>
<td>1.22&quot; (31)</td>
<td>1.30&quot; (33)</td>
<td>1.30&quot; (33)</td>
<td>0.94&quot; (24)</td>
<td>2.59&quot; (66)</td>
</tr>
<tr>
<td>PWBA1898/3888</td>
<td>14.8</td>
<td>0.86&quot; (22)</td>
<td>0.82&quot; (21)</td>
<td>0.94&quot; (24)</td>
<td>0.53&quot; (13.5)</td>
<td>2.32&quot; (59)</td>
</tr>
<tr>
<td>PWBA1899/3899</td>
<td>19.4</td>
<td>0.86&quot; (22)</td>
<td>0.82&quot; (21)</td>
<td>0.94&quot; (24)</td>
<td>0.53&quot; (13.5)</td>
<td>2.32&quot; (59)</td>
</tr>
<tr>
<td>PWBA1833/3833</td>
<td>45.9</td>
<td>1.06&quot; (27)</td>
<td>1.10&quot; (28)</td>
<td>0.94&quot; (24)</td>
<td>0.55&quot; (14)</td>
<td>2.09&quot; (53)</td>
</tr>
<tr>
<td>PWBA1822/3822</td>
<td>81.2</td>
<td>1.22&quot; (31)</td>
<td>1.30&quot; (33)</td>
<td>1.30&quot; (33)</td>
<td>0.94&quot; (24)</td>
<td>2.59&quot; (66)</td>
</tr>
<tr>
<td>PWBA38887</td>
<td>14.8</td>
<td>0.75&quot; (19)</td>
<td>0.87&quot; (22)</td>
<td>0.83&quot; (21)</td>
<td>0.67&quot; (17)</td>
<td>2.20&quot; (56)</td>
</tr>
<tr>
<td>PWBA38997</td>
<td>19.4</td>
<td>0.75&quot; (19)</td>
<td>0.87&quot; (22)</td>
<td>0.83&quot; (21)</td>
<td>0.67&quot; (17)</td>
<td>2.20&quot; (56)</td>
</tr>
<tr>
<td>PWBA38337</td>
<td>45.9</td>
<td>1.06&quot; (27)</td>
<td>1.18&quot; (30)</td>
<td>1.06&quot; (27)</td>
<td>0.91&quot; (23)</td>
<td>2.64&quot; (67)</td>
</tr>
<tr>
<td>PWBA38227</td>
<td>81.2</td>
<td>1.06&quot; (27)</td>
<td>1.18&quot; (30)</td>
<td>1.06&quot; (27)</td>
<td>0.91&quot; (23)</td>
<td>2.64&quot; (67)</td>
</tr>
</tbody>
</table>

*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.

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

PWS General Characteristics

Piloting and De-Piloting Pressure

<table>
<thead>
<tr>
<th>Threshold Sensors</th>
<th>Pilot with Operating Pressure of 90 PSI</th>
<th>Depilot with Operating Pressure of 90 PSI</th>
</tr>
</thead>
<tbody>
<tr>
<td>PWSP111</td>
<td>64 PSI</td>
<td>6 PSI</td>
</tr>
<tr>
<td>PWSM1012</td>
<td>15 PSI</td>
<td>9 PSI</td>
</tr>
<tr>
<td>PWSE101 and PWSE111</td>
<td>10 PSI</td>
<td>7 PSI</td>
</tr>
</tbody>
</table>
Sensing Threshold Sensors

Model Selection

<table>
<thead>
<tr>
<th>Banjo Sockets (with Sensor Clip)</th>
<th>Port Size</th>
<th>Model Number</th>
<th>Wrench</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>10-32</td>
<td>PWSB1557</td>
<td>5/16&quot; Hex</td>
</tr>
<tr>
<td></td>
<td>1/8&quot;</td>
<td>PWSB1887</td>
<td>3/16&quot; Allen</td>
</tr>
<tr>
<td></td>
<td>1/4&quot;</td>
<td>PWSB1997</td>
<td>5/16&quot; Allen</td>
</tr>
<tr>
<td></td>
<td>3/8&quot;</td>
<td>PWSB1337</td>
<td>3/8&quot; Allen</td>
</tr>
<tr>
<td></td>
<td>1/2&quot;</td>
<td>PWSB1227</td>
<td>1/2&quot; Allen</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Plug-in Sensors</th>
<th>Output</th>
<th>Model Number</th>
<th>Connection</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pneumatic</td>
<td>PWSP111</td>
<td>5/32&quot; push-in</td>
</tr>
<tr>
<td></td>
<td>Electrical</td>
<td>PWSM1012</td>
<td>3-wire cable (6 ft)</td>
</tr>
</tbody>
</table>

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 & Technical Information

Dimensions

**Sensing Threshold Sensors**

**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

---

**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) | .63 (16) | 3/16” Allen | .71 (18) | .40 (10) | .79 (20)
PWSB1337 | .98 (25) | 1.10 (28) | 3/8” Allen | .79 (20) | .47 (12) | .98 (25)
PWSB1227 | .98 (25) | 1.10 (28) | 1/2” Allen | .93 (24) | .55 (14) | 1.02 (26)

(Units: inches (mm))

---

**Fluid Power**

<table>
<thead>
<tr>
<th>Function</th>
<th>Symbol</th>
<th>Universal Description</th>
<th>Electrical</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normally Closed (N.C.)</td>
<td><img src="image1" alt="2-Way Symbol" /></td>
<td><img src="image2" alt="3-Way Symbol" /></td>
<td>Normally Non-Passing (NNP)</td>
</tr>
<tr>
<td>Normally Open (N.O.)</td>
<td><img src="image4" alt="2-Way Symbol" /></td>
<td><img src="image5" alt="3-Way Symbol" /></td>
<td>Normally Passing (NP)</td>
</tr>
</tbody>
</table>

---

G34 Parker Hannifin Corporation
Pneumatic Division
Richland, Michigan
www.parker.com/pneumatics
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
Tank Valves & Air Chucks..............................G48
“EM” Series Exhaust Mufflers..........................G49

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
Miniature Right Angle Flow Control

**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**

<table>
<thead>
<tr>
<th>Flow Controls &amp; Accessories</th>
</tr>
</thead>
<tbody>
<tr>
<td>“FCM701 &amp; FCM703” Series</td>
</tr>
</tbody>
</table>

**Temperature Range**

- 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**

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

**Knobless Miniature Exhaust Flow Control FCM703**

**Composite Body**

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

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**

<table>
<thead>
<tr>
<th>Part No.</th>
<th>1 ØD</th>
<th>H Min.</th>
<th>H Max.</th>
<th>L</th>
<th>L1</th>
<th>K</th>
<th>N1</th>
<th>N2</th>
<th>T</th>
<th>Orifice</th>
<th>H2 (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>FC800-5/32</td>
<td>5/32</td>
<td>1.15</td>
<td>1.31</td>
<td>1.52</td>
<td>.59</td>
<td>.47</td>
<td>.31</td>
<td>.43</td>
<td>.09</td>
<td>.12</td>
<td>5</td>
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<tr>
<td>FC800-4</td>
<td>1/4</td>
<td>1.54</td>
<td>1.74</td>
<td>2.11</td>
<td>.90</td>
<td>.66</td>
<td>.43</td>
<td>.66</td>
<td>.12</td>
<td>.16</td>
<td>8</td>
</tr>
<tr>
<td>FC800-6</td>
<td>3/8</td>
<td>2.03</td>
<td>2.38</td>
<td>2.96</td>
<td>1.29</td>
<td>.94</td>
<td>.62</td>
<td>1.01</td>
<td>.16</td>
<td>.31</td>
<td>14</td>
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<tr>
<td>FC800-8</td>
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<td>2.24</td>
<td>2.63</td>
<td>3.35</td>
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<td>1.09</td>
<td>.78</td>
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**FC806 Threaded In-Line Flow Control**

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Thread Size</th>
<th>B Hex (mm)</th>
<th>C Hex (mm)</th>
<th>H Closed</th>
<th>H Open</th>
<th>L</th>
<th>L1</th>
<th>K</th>
<th>N</th>
<th>N1</th>
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<td>.67</td>
<td>.43</td>
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<tr>
<td>FC806-4</td>
<td>1/4</td>
<td>16</td>
<td>11</td>
<td>1.73</td>
<td>1.97</td>
<td>.32</td>
<td>1.02</td>
<td>.73</td>
<td>.79</td>
<td>.49</td>
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<tr>
<td>FC806-6</td>
<td>3/8</td>
<td>22</td>
<td>14</td>
<td>2.05</td>
<td>2.40</td>
<td>3.82</td>
<td>1.30</td>
<td>.94</td>
<td>1.02</td>
<td>.63</td>
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<tr>
<td>FC806-8</td>
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<td>24</td>
<td>14</td>
<td>2.26</td>
<td>2.66</td>
<td>4.76</td>
<td>1.38</td>
<td>1.10</td>
<td>1.08</td>
<td>.79</td>
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</tbody>
</table>
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

<table>
<thead>
<tr>
<th>No of Turns</th>
<th>Exhaust (Screw Open)</th>
<th>Inlet (Screw Closed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>1.8 SCFM</td>
<td>1.8 SCFM</td>
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</tbody>
</table>
## Flow Controls & Accessories
### PWRA Series – Metal

#### With Instant Tube Fittings
with Allen key adjustment and locknut

<table>
<thead>
<tr>
<th>Symbol</th>
<th>BSP</th>
<th>NPT</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cylinder Port Thread</strong></td>
<td><strong>Connection for Tube</strong></td>
<td><strong>Catalog Number</strong></td>
</tr>
<tr>
<td>1/8&quot;</td>
<td>6mm</td>
<td>PWRA1468</td>
</tr>
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<td>1/4&quot;</td>
<td>6mm</td>
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<tr>
<td>1/2&quot;</td>
<td>12mm</td>
<td>PWRA1412</td>
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#### With Threaded Connection
with Allen key adjustment and locknut

<table>
<thead>
<tr>
<th>Symbol</th>
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<th>NPT</th>
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</thead>
<tbody>
<tr>
<td><strong>Cylinder Port Thread</strong></td>
<td><strong>Connection for Tube</strong></td>
<td><strong>Catalog Number</strong></td>
</tr>
<tr>
<td>1/8&quot;</td>
<td>1/8&quot;</td>
<td>PWRA1888</td>
</tr>
<tr>
<td>1/4&quot;</td>
<td>1/4&quot;</td>
<td>PWRA1899</td>
</tr>
<tr>
<td>3/8&quot;</td>
<td>3/8&quot;</td>
<td>PWRA1833</td>
</tr>
<tr>
<td>1/2&quot;</td>
<td>1/2&quot;</td>
<td>PWRA1822</td>
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</table>

#### Dimensions: Inches (mm)

<table>
<thead>
<tr>
<th>Adjustment*</th>
<th>Flow**</th>
<th>ØA</th>
<th>B</th>
<th>K</th>
<th>H</th>
<th>L</th>
</tr>
</thead>
<tbody>
<tr>
<td>PWRA1468/3468</td>
<td>10</td>
<td>15.9</td>
<td>0.67&quot; (17)</td>
<td>0.71&quot; (18)</td>
<td>0.67&quot; (17)</td>
<td>1.77&quot; (45)</td>
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<tr>
<td>PWRA1488</td>
<td>14</td>
<td>23.0</td>
<td>0.87&quot; (22)</td>
<td>0.83&quot; (21)</td>
<td>0.83&quot; (21)</td>
<td>2.17&quot; (55)</td>
</tr>
<tr>
<td>PWRA1469/3469</td>
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<td>0.83&quot; (21)</td>
<td>0.83&quot; (21)</td>
<td>2.17&quot; (55)</td>
</tr>
<tr>
<td>PWRA1483</td>
<td>14</td>
<td>61.8</td>
<td>1.06&quot; (27)</td>
<td>1.10&quot; (28)</td>
<td>1.02&quot; (26)</td>
<td>2.36&quot; (60)</td>
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<tr>
<td>PWRA1412/3412</td>
<td>20</td>
<td>97.1</td>
<td>1.22&quot; (31)</td>
<td>1.30&quot; (33)</td>
<td>1.38&quot; (35)</td>
<td>3.03&quot; (77)</td>
</tr>
<tr>
<td>PWRA1888</td>
<td>10</td>
<td>15.9</td>
<td>0.67&quot; (17)</td>
<td>0.71&quot; (18)</td>
<td>0.67&quot; (17)</td>
<td>1.77&quot; (45)</td>
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<tr>
<td>PWRA1899/3899</td>
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<td>0.87&quot; (22)</td>
<td>0.83&quot; (21)</td>
<td>0.83&quot; (21)</td>
<td>2.17&quot; (55)</td>
</tr>
<tr>
<td>PWRA1833/3833</td>
<td>14</td>
<td>68.9</td>
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<td>1.10&quot; (28)</td>
<td>1.02&quot; (26)</td>
<td>2.36&quot; (60)</td>
</tr>
<tr>
<td>PWRA1822/3822</td>
<td>20</td>
<td>97.1</td>
<td>1.22&quot; (31)</td>
<td>1.30&quot; (33)</td>
<td>1.38&quot; (35)</td>
<td>3.03&quot; (77)</td>
</tr>
</tbody>
</table>

* Number of turns (4mm Allen key)  
** SCFM at 90 PSI with screw closed
## 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.

## Valve Specifications

<table>
<thead>
<tr>
<th>Component Materials</th>
<th>Body</th>
<th>Polyamide</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mounting Thread</td>
<td>Brass</td>
<td></td>
</tr>
</tbody>
</table>

### 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 Controls & Accessories

**PWRE Series – Thermoplastic**

**Catalog 0600P-11**

### Flow Control Valves

**For Cylinder Mounting**

(Can also be mounted in Threshold Sensor Banjo)

### With Instant Tube Fittings

with Allen key adjustment and fine thread friction locking

<table>
<thead>
<tr>
<th>BSP Symbol</th>
<th>Cylinder Port Thread</th>
<th>Connection for Tube</th>
<th>Catalog Number</th>
<th>NPT Cylinder Port Thread</th>
<th>Connection for Tube</th>
<th>Catalog Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>M5</td>
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<td>PWRE1445</td>
<td>10-32 UNF</td>
<td>PWRE14457</td>
<td>5/32&quot;</td>
<td>PWRE14557</td>
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<td>4mm</td>
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<td>PWRE14487</td>
<td>5/32&quot;</td>
<td>PWRE14557</td>
</tr>
<tr>
<td>1/4&quot;</td>
<td>6mm</td>
<td>PWRE1468</td>
<td>1/4&quot;</td>
<td>PWRE14687</td>
<td>3/8&quot;</td>
<td>PWRE14937</td>
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<tr>
<td>3/8&quot;</td>
<td>8mm</td>
<td>PWRE1483</td>
<td>3/8&quot;</td>
<td>PWRE14937</td>
<td></td>
<td></td>
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</tbody>
</table>

### Reverse Flow

<table>
<thead>
<tr>
<th>BSP Symbol</th>
<th>Cylinder Port Thread</th>
<th>Connection for Tube</th>
<th>Catalog Number</th>
<th>NPT Cylinder Port Thread</th>
<th>Connection for Tube</th>
<th>Catalog Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>M5</td>
<td>4mm</td>
<td>PWRE1145</td>
<td>10-32 UNF</td>
<td>PWRE11457</td>
<td>5/32&quot;</td>
<td>PWRE1157</td>
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### Component Materials

- **Flow**

<table>
<thead>
<tr>
<th>No of Turns</th>
<th>Exhaust (Screw Open)</th>
<th>Inlet (Screw Closed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>1.8 SCFM</td>
<td>1.8 SCFM</td>
</tr>
</tbody>
</table>

### Dimensions: Inches (mm)

<table>
<thead>
<tr>
<th>Adjustment Tool</th>
</tr>
</thead>
<tbody>
<tr>
<td>PWRE1445<em>1145</em></td>
</tr>
</tbody>
</table>

| PWRE1445/14457  | 3mm screwdriver   | 12 | 1.8 | 0.43" (11) | 0.16" (4) | 5/16" (8) | 0.28" (7.2) | 0.67" (17) | 0.83" (21) |
| PWRE1145/11457  | 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
Flow Controls & Accessories
“3251” Series

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

<table>
<thead>
<tr>
<th>Model Number</th>
<th>Thread (NPT) Male</th>
<th>Thread (NPT) Female</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>Weight</th>
<th>Cv</th>
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<tbody>
<tr>
<td>03251 0125</td>
<td>1/8</td>
<td>1/8</td>
<td>1.74</td>
<td>44</td>
<td>1.18</td>
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<tr>
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<td>1/4</td>
<td>1.99</td>
<td>51</td>
<td>1.40</td>
<td>36</td>
<td>0.91</td>
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<tr>
<td>03251 0375</td>
<td>3/8</td>
<td>3/8</td>
<td>2.28</td>
<td>58</td>
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<tr>
<td>03251 0500</td>
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<td>2.69</td>
<td>68</td>
<td>1.98</td>
<td>53</td>
<td>1.26</td>
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</tbody>
</table>

With Prestolok Fittings

<table>
<thead>
<tr>
<th>Model Number</th>
<th>Thread (NPT) Male</th>
<th>Tube Size</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>Weight</th>
<th>Cv</th>
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</thead>
<tbody>
<tr>
<td>03251 1215</td>
<td>1/8</td>
<td>5/32</td>
<td>1.74</td>
<td>44</td>
<td>1.18</td>
<td>30</td>
<td>0.67</td>
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<tr>
<td>03251 1225</td>
<td>1/8</td>
<td>1/4</td>
<td>1.74</td>
<td>44</td>
<td>1.18</td>
<td>30</td>
<td>0.67</td>
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<tr>
<td>03251 2525</td>
<td>1/4</td>
<td>1/4</td>
<td>1.99</td>
<td>51</td>
<td>1.40</td>
<td>36</td>
<td>0.91</td>
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<td>03251 2538</td>
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<td>3/8</td>
<td>1.99</td>
<td>51</td>
<td>1.40</td>
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<td>03251 3838</td>
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<td>3/8</td>
<td>2.28</td>
<td>58</td>
<td>1.71</td>
<td>43</td>
<td>1.06</td>
</tr>
</tbody>
</table>

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.
Flow Controls & Accessories
“337” Series – 1/8” to 3/4” Ports

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

<table>
<thead>
<tr>
<th>Port Size</th>
<th>Model</th>
<th>Flow (SCFM)</th>
<th>Dimensions</th>
<th>Service Kit</th>
</tr>
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<tbody>
<tr>
<td></td>
<td></td>
<td>Adj.</td>
<td>Free Flow</td>
<td>A</td>
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<tr>
<td>1/8&quot;</td>
<td>00337 1000</td>
<td>15</td>
<td>32</td>
<td>9/16&quot;</td>
</tr>
<tr>
<td>1/4&quot;</td>
<td>00337 1001</td>
<td>28</td>
<td>75</td>
<td>11/16&quot;</td>
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<tr>
<td>3/8&quot;</td>
<td>00337 1002</td>
<td>59</td>
<td>139</td>
<td>7/8&quot;</td>
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<tr>
<td>1/2&quot;</td>
<td>00337 1003</td>
<td>126</td>
<td>183</td>
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<tr>
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<td>00337 1004</td>
<td>140</td>
<td>327</td>
<td>1-3/8&quot;</td>
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</table>

† At 100 PSIG inlet pressure with full pressure drop.

Mounting Bracket Model Selection and Dimensions

<table>
<thead>
<tr>
<th>Port Size</th>
<th>Mounting Bracket Model No.</th>
<th>Dimensions</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1/8&quot;</td>
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<td>0.66</td>
<td>0.60</td>
</tr>
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<td>0.75</td>
<td>0.89</td>
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<tr>
<td>3/8&quot;</td>
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<td>0.94</td>
<td>1.12</td>
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<td>1/2&quot;</td>
<td>00337 8103</td>
<td>1.25</td>
<td>1.62</td>
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<tr>
<td>3/4&quot;</td>
<td>00337 8104</td>
<td>1.44</td>
<td>1.72</td>
</tr>
</tbody>
</table>

* 3/32” maximum panel thickness
Flow Controls & Accessories
“3250” Series – 1/8” to 3/4” Ports

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
Body .................................................. Brass
Port Size ............................................. 1/8”, 1/4”, 3/8”, 1/2”, 3/4”
Internal Components ......................... Brass, 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

Flow Rating (SCFM)

<table>
<thead>
<tr>
<th>Flow Path</th>
<th>Valve Port Size</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1/8”</td>
</tr>
<tr>
<td>Maximum Flow in Metered Direction</td>
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</tr>
<tr>
<td>Maximum Flow in Free Flow Direction</td>
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</table>

Model Selection Information and Dimensions

<table>
<thead>
<tr>
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<th>03250 0119</th>
<th>03250 0219</th>
<th>03250 0319</th>
<th>03250 0419</th>
<th>03250 0519</th>
</tr>
</thead>
<tbody>
<tr>
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<td>1/8”</td>
<td>1/4”</td>
<td>3/8”</td>
<td>1/2”</td>
<td>3/4”</td>
</tr>
<tr>
<td>Inches</td>
<td>mm</td>
<td>Inches</td>
<td>mm</td>
<td>Inches</td>
<td>mm</td>
</tr>
<tr>
<td>A</td>
<td>1.75</td>
<td>45</td>
<td>2.33</td>
<td>59</td>
<td>2.66</td>
</tr>
<tr>
<td>B</td>
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<td>40</td>
<td>1.97</td>
<td>50</td>
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<td>C</td>
<td>0.37</td>
<td>9</td>
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<td>D</td>
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<td>17</td>
<td>0.94</td>
<td>24</td>
<td>1.19</td>
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</table>
Flow Controls & Accessories
“3250” Series – 1”, 1-1/4” & 1-1/2” Ports

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

<table>
<thead>
<tr>
<th>Port Size (NPTF)</th>
<th>Max. Flow (Needle Open)</th>
<th>Model Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>SCFM**</td>
<td>CV</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>1000</td>
<td>03250 1000</td>
</tr>
<tr>
<td>1-1/4</td>
<td>1200</td>
<td>03250 1250</td>
</tr>
<tr>
<td>1-1/2</td>
<td>1800</td>
<td>03250 1500</td>
</tr>
</tbody>
</table>

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

Model Selection Information and Dimensions

<table>
<thead>
<tr>
<th>Model Number</th>
<th>03250 1000</th>
<th>03250 1250</th>
<th>03250 1500</th>
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</thead>
<tbody>
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<td>mm</td>
<td>Inches</td>
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</tr>
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<td>B</td>
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<td>8.00</td>
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<tr>
<td>C</td>
<td>3.00</td>
<td>3.00</td>
<td>3.75</td>
</tr>
<tr>
<td>D</td>
<td>3.25</td>
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<td>E</td>
<td>2.25</td>
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<td>2.50</td>
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<td>.39</td>
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<td>G</td>
<td>1.31</td>
<td>1.31</td>
<td>1.50</td>
</tr>
<tr>
<td>H</td>
<td>2.13</td>
<td>2.13</td>
<td>2.38</td>
</tr>
</tbody>
</table>
Needle Valves

“338” Series – 1/8” to 3/4” Ports

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 Pressure.................250 PSIG (Air)
Operating Temperature ..................Standard: 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 Material................................................Brass
Internal Components.........................Stainless Steel / Brass
Seals.............Nitrile (Fluorocarbon optional – consult factory)

Model Selection and Dimensions

<table>
<thead>
<tr>
<th>Model Number</th>
<th>Port Size</th>
<th>Dimensions</th>
<th>Kit</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td>00338 1100</td>
<td>1/8”</td>
<td>9/16”</td>
<td>0.75</td>
</tr>
<tr>
<td>00338 1101</td>
<td>1/4”</td>
<td>11/16”</td>
<td>0.75</td>
</tr>
<tr>
<td>00338 1102</td>
<td>3/8”</td>
<td>7/8”</td>
<td>0.88</td>
</tr>
<tr>
<td>00338 1103</td>
<td>1/2”</td>
<td>1-3/16”</td>
<td>1.06</td>
</tr>
<tr>
<td>00338 1104</td>
<td>3/4”</td>
<td>1-3/8”</td>
<td>1.06</td>
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Performance Data – Flow

<table>
<thead>
<tr>
<th>Model Number</th>
<th>Port Size</th>
<th>Flow (SCFM†)</th>
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<tr>
<td>00338 1100</td>
<td>1/8”</td>
<td>15</td>
</tr>
<tr>
<td>00338 1101</td>
<td>1/4”</td>
<td>28</td>
</tr>
<tr>
<td>00338 1102</td>
<td>3/8”</td>
<td>59</td>
</tr>
<tr>
<td>00338 1103</td>
<td>1/2”</td>
<td>126</td>
</tr>
<tr>
<td>00338 1104</td>
<td>3/4”</td>
<td>140</td>
</tr>
</tbody>
</table>

† At 100 PSIG inlet pressure with full pressure drop.
Catalog 0600P-11
Check Valves

Flow Controls & Accessories
“339” Series & “3047” Series

“339” Series – 1/8” to 3/4” Ports

“3047” – 1/4” Male Pipe

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 Components.................................Brass / Stainless Steel / Zinc-Plated Steel
Seals....................................................... Urethane (standard), Fluorocarbon (optional – consult factory)

Model Selection and Dimensions

<table>
<thead>
<tr>
<th>Model Number</th>
<th>Port Size</th>
<th>Flow† (SCFM)</th>
<th>Dimensions A</th>
<th>Dimensions B</th>
<th>Service Kit</th>
</tr>
</thead>
<tbody>
<tr>
<td>00339 3000</td>
<td>1/8&quot;</td>
<td>35</td>
<td>1.22</td>
<td>0.56</td>
<td>00337 8000</td>
</tr>
<tr>
<td>00339 3001</td>
<td>1/4&quot;</td>
<td>75</td>
<td>1.34</td>
<td>0.69</td>
<td>00337 8001</td>
</tr>
<tr>
<td>00339 3002</td>
<td>3/8&quot;</td>
<td>143</td>
<td>2.00</td>
<td>0.88</td>
<td>00337 8002</td>
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<tr>
<td>00339 3003</td>
<td>1/2&quot;</td>
<td>162</td>
<td>2.56</td>
<td>1.19</td>
<td>00337 8003</td>
</tr>
<tr>
<td>00339 3004</td>
<td>3/4&quot;</td>
<td>323</td>
<td>2.66</td>
<td>1.38</td>
<td>00337 8004</td>
</tr>
</tbody>
</table>

† At 100 PSIG inlet pressure with full pressure drop.

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 Components.......................... Brass / Stainless Steel
Seals.............................................. Nitrile

Model Selection

<table>
<thead>
<tr>
<th>Model Number</th>
<th>Pipe Thread</th>
<th>Flow† (SCFM)</th>
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</thead>
<tbody>
<tr>
<td>03047 0099</td>
<td>1/4&quot;</td>
<td>30</td>
</tr>
</tbody>
</table>

Parker Hannifin Corporation
Pneumatic Division
Richland, Michigan
www.parker.com/pneumatics
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.

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. 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.

Air Chucks
For regular airlines.

Model No. 05499 0000
Ball-foot air chuck, 1/4” female port. Packed 10 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.
**Muffler / Filters**

**“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

<table>
<thead>
<tr>
<th>Model Number</th>
<th>Pipe Thread</th>
<th>Overall Length</th>
<th>Hex Size</th>
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<tr>
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<tr>
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<td>9/16&quot;</td>
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<tr>
<td>EM37</td>
<td>3/8&quot;</td>
<td>1.54</td>
<td>11/16&quot;</td>
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<tr>
<td>EM50</td>
<td>1/2&quot;</td>
<td>1.85</td>
<td>7/8&quot;</td>
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<td>EM75</td>
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<td>1-1/6&quot;</td>
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<td>EM125</td>
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<td>3.25</td>
<td>1-11/16&quot;</td>
</tr>
<tr>
<td>EM150</td>
<td>1-1/2&quot;</td>
<td>3.69</td>
<td>2&quot;</td>
</tr>
</tbody>
</table>

**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 accidently blown out, can be locked to maintain setting. Brass and bronze construction. Clean with commonly used solvents.

Specifications

<table>
<thead>
<tr>
<th>Model Number</th>
<th>Pipe Thread</th>
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<th>Hex Size</th>
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<td>1.42</td>
<td>1/2&quot;</td>
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<tr>
<td>04506 0060</td>
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<td>11/16&quot;</td>
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<td>04516 0016</td>
<td>1&quot;</td>
<td>2.15</td>
<td>1-5/16&quot;</td>
</tr>
</tbody>
</table>
**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**

<table>
<thead>
<tr>
<th>Model Numbers</th>
<th>Pipe Thread</th>
<th>Flow SCFM @ 100 PSIG Inlet</th>
<th>Dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td>NPTF</td>
<td>BSPT (R)</td>
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<tr>
<td>ES12MC</td>
<td>ESB12MC</td>
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<td>1.85</td>
</tr>
<tr>
<td>ES25MC</td>
<td>ESB25MC</td>
<td>129</td>
<td>1.85</td>
</tr>
<tr>
<td>ES37MC</td>
<td>ESB37MC</td>
<td>219</td>
<td>3.31</td>
</tr>
<tr>
<td>ES50MC</td>
<td>ESB50MC</td>
<td>549</td>
<td>3.31</td>
</tr>
<tr>
<td>ES75MC</td>
<td>ESB75MC</td>
<td>893</td>
<td>4.56</td>
</tr>
<tr>
<td>ES100MC</td>
<td>ESB100MC</td>
<td>1,013</td>
<td>4.56</td>
</tr>
<tr>
<td>ES125MC</td>
<td>ESB125MC</td>
<td>1,486</td>
<td>5.69</td>
</tr>
<tr>
<td>ES150MC</td>
<td>ESB150MC</td>
<td>1,580</td>
<td>5.69</td>
</tr>
</tbody>
</table>

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

**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**

<table>
<thead>
<tr>
<th>Model Numbers</th>
<th>Pipe Thread</th>
<th>Flow SCFM @ 100 PSIG Inlet</th>
<th>Dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td>NPTF</td>
<td>BSPT (R)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ES12MC</td>
<td>ESB12MC</td>
<td>115</td>
<td>1.85</td>
</tr>
<tr>
<td>ES25MC</td>
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<td>ESB37MC</td>
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<td>3.31</td>
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<tr>
<td>ES50MC</td>
<td>ESB50MC</td>
<td>549</td>
<td>3.31</td>
</tr>
<tr>
<td>ES75MC</td>
<td>ESB75MC</td>
<td>893</td>
<td>4.56</td>
</tr>
<tr>
<td>ES100MC</td>
<td>ESB100MC</td>
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</tr>
<tr>
<td>ES150MC</td>
<td>ESB150MC</td>
<td>1,580</td>
<td>5.69</td>
</tr>
</tbody>
</table>
**Features**

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

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Thread Size</th>
<th>A (mm)</th>
<th>B (mm)</th>
<th>Maximum Flow (SCFM)</th>
<th>Sound Pressure Level (dBA)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>NPT</td>
<td>BSPT</td>
<td>100 PSIG Inlet</td>
<td>20 PSIG Inlet</td>
<td>100 PSIG Inlet</td>
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<td>M5</td>
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<td>0.32 (8)</td>
<td>15</td>
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<td>1/4&quot;</td>
<td>AS-8</td>
<td>2.56 (65)</td>
<td>0.83 (21)</td>
<td>124</td>
</tr>
<tr>
<td>ASN-10</td>
<td>3/8&quot;</td>
<td>AS-10</td>
<td>3.35 (85)</td>
<td>0.98 (25)</td>
<td>247</td>
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<tr>
<td>ASN-15</td>
<td>1/2&quot;</td>
<td>AS-15</td>
<td>3.74 (95)</td>
<td>1.18 (30)</td>
<td>370</td>
</tr>
</tbody>
</table>

**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 Rating**
  - 14°F to 140°F (-10°C to 60°C)
- **Body**
  - Acetal (Plastic)
- **Element**
  - Polyethylene
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.

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

Temperature Rating
Plastic............................................14°F to 176 °F (-10°C to 80°C)
Metal..............................................14°F to 165 °F (-10°C to 74°C)

Efficiency.................................................. 92%

<table>
<thead>
<tr>
<th>Port Thread</th>
<th>A</th>
<th>Diameter B</th>
<th>C</th>
<th>Weight (grams)</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>M5</td>
<td>0.91</td>
<td>0.26</td>
<td>0.16</td>
<td>0.01</td>
<td>P6M-PAC5</td>
</tr>
<tr>
<td>G1/8</td>
<td>1.14</td>
<td>0.55</td>
<td>0.24</td>
<td>0.02</td>
<td>P6M-PAB1</td>
</tr>
<tr>
<td>G1/4</td>
<td>1.34</td>
<td>0.67</td>
<td>0.24</td>
<td>0.04</td>
<td>P6M-PAB2</td>
</tr>
<tr>
<td>G3/8</td>
<td>2.36</td>
<td>0.98</td>
<td>0.35</td>
<td>0.06</td>
<td>P6M-PAB3</td>
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<tr>
<td>G1/2</td>
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<td>0.43</td>
<td>0.10</td>
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<tr>
<td>G3/4</td>
<td>5.51</td>
<td>1.50</td>
<td>0.55</td>
<td>0.50</td>
<td>P6M-PAB6</td>
</tr>
<tr>
<td>G1</td>
<td>6.30</td>
<td>1.89</td>
<td>0.79</td>
<td>0.62</td>
<td>P6M-PAB8</td>
</tr>
</tbody>
</table>

![Image of silencer]
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

Size

| ECS | 3 | * |

| 3 1/2 inch | 5 1 inch |

■ ■ ■

G53

Parker Hannifin Corporation
Pneumatic Division
Richland, Michigan
www.parker.com/pneumatics
Flow Controls & Accessories
Features & Operation

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.

<table>
<thead>
<tr>
<th>Model No.</th>
<th>Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>06D1NA</td>
<td>1/4&quot;</td>
</tr>
<tr>
<td>06D3NA</td>
<td>1/2&quot;</td>
</tr>
</tbody>
</table>

Relief Valve

Features
• Large relief capacity 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.

Ordering Information

<table>
<thead>
<tr>
<th>Model No.</th>
<th>Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>RV01A1N</td>
<td>XXX</td>
</tr>
</tbody>
</table>

* Ref: 1RV100B Installation & Service Instructions

Seals

<table>
<thead>
<tr>
<th>Type</th>
<th>Temperature Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>BUNA</td>
<td>10 - 200 PSI</td>
</tr>
<tr>
<td>Blank V</td>
<td>10 - 200 PSI</td>
</tr>
<tr>
<td>BUNA V</td>
<td>10 - 200 PSI</td>
</tr>
<tr>
<td>Flurocarbon</td>
<td>10 - 200 PSI</td>
</tr>
</tbody>
</table>
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

<table>
<thead>
<tr>
<th>Relief Valve</th>
<th>Spring Range</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0-15 PSIG</td>
</tr>
<tr>
<td>130</td>
<td>130-02AA</td>
</tr>
<tr>
<td></td>
<td>130-02AAP*</td>
</tr>
<tr>
<td>134</td>
<td>134-02AA</td>
</tr>
<tr>
<td></td>
<td>134-02AAP*</td>
</tr>
</tbody>
</table>

* 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
  - 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

**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.

### 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°F 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)

### 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

<table>
<thead>
<tr>
<th>Port Flow (SCFM)</th>
<th>Model Number</th>
<th>Service Kit No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Port 1 (In)</td>
<td>Port 2 (Cyl)</td>
<td>Port 3 (Exh)</td>
</tr>
<tr>
<td>1/4&quot; 1/4&quot; 3/8&quot;</td>
<td>150</td>
<td>0R25NB</td>
</tr>
<tr>
<td>3/8&quot; 3/8&quot; 3/8&quot;</td>
<td>240</td>
<td>0R25PB</td>
</tr>
<tr>
<td>3/4&quot; 3/4&quot; 3/4&quot;</td>
<td>550</td>
<td>0R50B</td>
</tr>
</tbody>
</table>

**NITRILE DIAPHRAGMS (Nitrile static seals)**

<table>
<thead>
<tr>
<th>Port Flow (SCFM)</th>
<th>Model Number</th>
<th>Service Kit No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Port 1 (In)</td>
<td>Port 2 (Cyl)</td>
<td>Port 3 (Exh)</td>
</tr>
<tr>
<td>1/8&quot; 1/8&quot; 1/8&quot;</td>
<td>70</td>
<td>0R12B</td>
</tr>
<tr>
<td>1&quot; 1/4&quot; 1/4&quot;</td>
<td>70</td>
<td>0R12NB</td>
</tr>
<tr>
<td>1/4&quot; 1/4&quot; 1/4&quot;</td>
<td>90</td>
<td>0R25B</td>
</tr>
<tr>
<td>3/8&quot; 3/8&quot; 3/8&quot;</td>
<td>240</td>
<td>0R37FB</td>
</tr>
<tr>
<td>3/4&quot; 3/4&quot; 3/4&quot;</td>
<td>550</td>
<td>0R75FB</td>
</tr>
</tbody>
</table>

**FLUOROCARBON DIAPHRAGMS for extended temperature operation (Fluorocarbon static seals)**

<table>
<thead>
<tr>
<th>Port Flow (SCFM)</th>
<th>Model Number</th>
<th>Service Kit No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Port 1 (In)</td>
<td>Port 2 (Cyl)</td>
<td>Port 3 (Exh)</td>
</tr>
<tr>
<td>1/8&quot; 1/8&quot; 1/8&quot;</td>
<td>70</td>
<td>0R12VB</td>
</tr>
<tr>
<td>1&quot; 1/4&quot; 1/4&quot;</td>
<td>70</td>
<td>0R12NVB</td>
</tr>
<tr>
<td>1/4&quot; 1/4&quot; 1/4&quot;</td>
<td>90</td>
<td>0R25VB</td>
</tr>
<tr>
<td>3/8&quot; 3/8&quot; 3/8&quot;</td>
<td>240</td>
<td>0R37VB</td>
</tr>
<tr>
<td>3/4&quot; 3/4&quot; 3/4&quot;</td>
<td>550</td>
<td>0R50VB</td>
</tr>
</tbody>
</table>

**PTFE DIAPHRAGMS for higher pressure and temperature (Fibre static seals)**

<table>
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<th>Port Flow (SCFM)</th>
<th>Model Number</th>
<th>Service Kit No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Port 1 (In)</td>
<td>Port 2 (Cyl)</td>
<td>Port 3 (Exh)</td>
</tr>
<tr>
<td>3/8&quot; 3/8&quot; 3/8&quot;</td>
<td>240</td>
<td>0R37TB</td>
</tr>
</tbody>
</table>

† At 100 PSIG inlet pressure with full pressure drop.

**BOLD ITEMS ARE MOST POPULAR.**
Flow Controls & Accessories
1/8" to 3/8" Ports

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 Pressure............200 PSIG Maximum
3 PSIG Minimum: Differential Pressure
Operating Temperature..............................0° 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
Seals..............................................................Nitrile

Model Selection and Dimensions

<table>
<thead>
<tr>
<th>Model Number</th>
<th>Port Size</th>
<th>Dimensions (D x E x F x G x H x J x K x L)</th>
</tr>
</thead>
<tbody>
<tr>
<td>N164 1001</td>
<td>1/8&quot;</td>
<td>1.62 x 0.81 x 0.62 x 0.31 x 1.00 x 0.281 x 0.312 x 1.00</td>
</tr>
<tr>
<td>N164 2003</td>
<td>1/4&quot;</td>
<td>2.50 x 2.12 x 1.25 x 1.25 x 0.62 x 2.00 x 0.67 x 0.265</td>
</tr>
<tr>
<td>N164 3003</td>
<td>3/8&quot;</td>
<td>2.50 x 2.12 x 1.25 x 1.25 x 0.62 x 2.00 x 0.67 x 0.265</td>
</tr>
</tbody>
</table>

Performance Data – Flow

<table>
<thead>
<tr>
<th>Model Number</th>
<th>Port Size</th>
<th>Flow (Cv)</th>
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</thead>
<tbody>
<tr>
<td>N164 1001</td>
<td>1/8&quot;</td>
<td>0.32</td>
</tr>
<tr>
<td>N164 2003</td>
<td>1/4&quot;</td>
<td>1.65</td>
</tr>
<tr>
<td>N164 3003</td>
<td>3/8&quot;</td>
<td>2.02</td>
</tr>
</tbody>
</table>
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. 

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 “hysterisis”, 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 .........................10⁸ 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).

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 “hysterisis”, is the change in pressure between actuation and deactuation set points.

Specifications
- Electrical: 5 AMP, 12/24VDC, 125/250VAC
- Maximum Inlet Pressure: 300 PSIG (20 bar)
- Mechanical Life: 2x10⁶ 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

Kits and Accessories
- Bushing 1/4” to 3/8”: 209P-6-4
- Bushing 1/4” to 1/2”: 209P-8-4

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 “hysterisis”, is the change in pressure between actuation and deactuation set points.
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
• ±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.

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)

Electrical Protection ........................................ Rubber Boot

Repeatability ............................................. ±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
Automatic Electrical Drain Valve 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

<table>
<thead>
<tr>
<th>Model Selection and Dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Model Number</strong></td>
</tr>
<tr>
<td>WDV3-G**BL</td>
</tr>
</tbody>
</table>

Materials of Construction

- **Valve Body:** Brass / Stainless Steel
- **Enclosure (NEMA 4):** ABS Plastic
- **Internal Parts:** Brass / Stainless Steel
- **Sealing Material:** FPM (Fluorocarbon)
Zero Loss Drain – WDV2

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.
- Automatically Clears Slugs.

Benefits

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

Specifications

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drain Volume</td>
<td>0.01 Gallons / Cycle</td>
</tr>
<tr>
<td>Maximum Fluid Temperature</td>
<td>150°F (60°C)</td>
</tr>
<tr>
<td>Voltage</td>
<td>110 to 240V, 50/60 Hz</td>
</tr>
<tr>
<td>Inlet Ports (2)</td>
<td>1/2&quot; NPT</td>
</tr>
<tr>
<td>Outlet Ports (1)</td>
<td>5/16&quot; (8mm) I.D. Hose</td>
</tr>
</tbody>
</table>

Operating Conditions

- Ambient Temperature: 33° 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.

Model Selection and Dimensions

<table>
<thead>
<tr>
<th>Model Number</th>
<th>A</th>
<th>B</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>WDV2-425</td>
<td>3.23 (82)</td>
<td>4.61 (117)</td>
<td>4.65 (118)</td>
</tr>
</tbody>
</table>
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.


1.4. 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, keytones, 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.


4.4. Visual Inspection: Any of the following conditions require 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:
   - 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.
   - Warning: 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.
The terms 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, and acknowledgments or any other terms and conditions stated herein, including any terms in addition to, or inconsistent with those stated herein, proposed by Buyer or a representative of Buyer, and acceptance of an offer by Seller, are hereby rejected. 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 of a month that Buyer is late in making payment. Any 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. The dates shown are approximate and neither 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 COMPRIS ES THE SOLE AND ENTIRE WARRANTY PERTAINING TO ITEMS PROVIDED HEREBY, 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 NO WARRANTIES 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 specifications or quantities of the items sold hereunder at any time, 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 or patterns, acquired to manufacture items sold pursuant to this contract. Such special tooling shall be the sole domain 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 use, sell 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 from 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, and any liability 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 any 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 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 any oral or other representations or negotiations of Seller 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.