Control Panel Products
Human / Machine Dialog

Section C

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

**PNEUMATIC VISUAL INDICATORS**

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

**FOOT PEDAL SWITCHES**

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

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

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

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

Push Buttons

Spring Return or Latching Mushroom Headed Push Buttons

Selector Switches

2 or 3 Positions, Fixed or Return To Center
### Human / Machine Dialog

#### Push Button Bodies

**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>Spring Return</td>
<td>NNP+NP</td>
</tr>
<tr>
<td>PXBB3111BA4</td>
<td>Red</td>
<td>Spring Return</td>
<td>Single Universal 3-Way</td>
</tr>
<tr>
<td>PXBB3251BA2</td>
<td>Black</td>
<td>Spring Return</td>
<td>Dual Universal 3-Way</td>
</tr>
<tr>
<td>PXBB4131BA2</td>
<td>Black</td>
<td>Spring Return</td>
<td>Single Universal 3-Way</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>
</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.

**Selector Switches**

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Color</th>
<th>Function</th>
<th>Type of Switching*</th>
</tr>
</thead>
<tbody>
<tr>
<td>PXBB3111BD2</td>
<td>Black</td>
<td>2 Maintained</td>
<td>NNP</td>
</tr>
<tr>
<td>PXBB3211BD2</td>
<td>Black</td>
<td>Positions with Std. Handle</td>
<td>NNP+NNP</td>
</tr>
<tr>
<td>PXBB3211BD3</td>
<td>Black</td>
<td>3 Maintained Positions with Std. Handle</td>
<td>NNP+NNP</td>
</tr>
<tr>
<td>PXBB3211BJ5</td>
<td>Black</td>
<td>3 Positions, Spring Return to Center with Long Handle</td>
<td>NNP+NNP</td>
</tr>
<tr>
<td>PXBB4131BD2</td>
<td>Black</td>
<td>2 Maintained Positions with Std. Handle</td>
<td>Single Universal 3-Way</td>
</tr>
<tr>
<td>PXBB4231BD2</td>
<td>Black</td>
<td>2 Maintained Positions with Std. Handle</td>
<td>Dual Universal 3-Way</td>
</tr>
<tr>
<td>PXBB4231BD3</td>
<td>Black</td>
<td>3 Maintained Positions with Std. Handle</td>
<td>Dual Universal 3-Way</td>
</tr>
<tr>
<td>PXBB4231BJ5</td>
<td>Black</td>
<td>3 Maintained Positions with Long Handle</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.

**Mushroom Head Push Buttons**

(40mm Diameter)

<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.

---

**NOTE:** BOLD ITEMS ARE READY (STOCK)
For Use With PXBB Valve Bodies and ZBE Electrical Switch Bodies

**Push Buttons**

- ZB4BA4
- ZB4BL2
- ZB4BP2

**Mushroom Head Push Buttons**

- ZB4BC2
- ZB4BR2

**Plastic Head**

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Part Number</th>
<th>Color</th>
<th>Function</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ZBSAA2</td>
<td>ZB4BA2</td>
<td>Black</td>
<td>Spring Return</td>
<td>Flush</td>
</tr>
<tr>
<td>ZBSAA3</td>
<td>ZB4BA3</td>
<td>Green</td>
<td>Spring Return</td>
<td>Extended</td>
</tr>
<tr>
<td>ZBSAA4</td>
<td>ZB4BA4</td>
<td>Red</td>
<td>Spring Return</td>
<td>Booted</td>
</tr>
<tr>
<td>ZBSAL2</td>
<td>ZB4BL2</td>
<td>Black</td>
<td>Spring Return</td>
<td>Flush</td>
</tr>
<tr>
<td>ZBSAL3</td>
<td>ZB4BL3</td>
<td>Green</td>
<td>Spring Return</td>
<td>Extended</td>
</tr>
<tr>
<td>ZBSAL4</td>
<td>ZB4BL4</td>
<td>Red</td>
<td>Spring Return</td>
<td>Booted</td>
</tr>
</tbody>
</table>

**Metal Head**

- ZB5AA2
- ZB5AA3
- ZB5AA4
- ZB5AL2
- ZB5AL3
- ZB5AL4

**Part Numbers**

- **ZB4*** Model Numbers are Metal Head Operators
- **ZB5*** Model Numbers are Plastic Head Operators

**Mounting Accessories**

- ZB2BZ19
- ZB5AZ905

**Push / Push Buttons**

- ZB4BH02

**Part Numbers**

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Color</th>
<th>Function</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ZB4BH02</td>
<td>Black</td>
<td>Detent</td>
<td>2-Position</td>
</tr>
<tr>
<td>ZB4BH03</td>
<td>Green</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ZB4BH04</td>
<td>Red</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Part Number**

- **ZB4**** Model Numbers are Metal Head Operators
- **ZB5**** Model Numbers are Plastic Head Operators

**NOTE:** BOLD ITEMS ARE READY (STOCK)
Selector Switches

For Use With PXBB Variable Composition Switch Bodies

Selector Switches

Key Operated Selectors

Standard Selector Knob Lever

ZB4BG2

Standard Black Handle

<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>ZB4BD3</td>
<td>Maintained</td>
<td></td>
</tr>
<tr>
<td>ZB4BD5</td>
<td>Spring Return to Center from Left</td>
<td>3-Positions</td>
</tr>
<tr>
<td>ZB4BD7</td>
<td>Maintained Right Spring Return from 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</td>
<td>3-Positions</td>
</tr>
</tbody>
</table>

Key Operated

<table>
<thead>
<tr>
<th>Part Number*</th>
<th>Key Withdrawal</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>ZB4BG2</td>
<td>Left</td>
<td>2 Maintained</td>
</tr>
<tr>
<td>ZB4BG4</td>
<td>Left and Right</td>
<td>Positions</td>
</tr>
<tr>
<td>ZB4BG3</td>
<td>Center</td>
<td>3 Maintained</td>
</tr>
<tr>
<td>ZB4BG5</td>
<td>Left and Right</td>
<td>Positions</td>
</tr>
<tr>
<td>ZB4BG7</td>
<td>Center</td>
<td>3 Positions</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2 Spring Return to Center</td>
</tr>
</tbody>
</table>

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

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

Note: Bold Items are Ready (Stock)
For Use With 22mm (7/8") Metal Operating Heads 5/32" Instant Connections

### 3/2 Valve Bodies with Mounting Ring

**Part Numbers**

<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&quot; Instant</td>
<td>3/2</td>
<td>NNP</td>
</tr>
<tr>
<td>PXBB3121B</td>
<td>5/32&quot; Instant</td>
<td>3/2</td>
<td>NP</td>
</tr>
<tr>
<td>PXBB4131B</td>
<td>5/32&quot; Instant</td>
<td>3/2</td>
<td>Universal 3-Way</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)

**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

**Part Numbers**

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Connections</th>
<th>Function</th>
<th>Type of Switching*</th>
</tr>
</thead>
<tbody>
<tr>
<td>PXBB3911</td>
<td>5/32&quot; Instant</td>
<td>3/2</td>
<td>NNP</td>
</tr>
<tr>
<td>PXBB3912</td>
<td>5/32&quot; Instant</td>
<td>3/2</td>
<td>NP</td>
</tr>
<tr>
<td>PXBB3921</td>
<td>5/32&quot; Instant</td>
<td>3/2</td>
<td>Universal 3-Way</td>
</tr>
<tr>
<td>PXBB3922</td>
<td>5/32&quot; Instant</td>
<td>3/2</td>
<td></td>
</tr>
<tr>
<td>PXBB4931</td>
<td>5/32&quot; Instant</td>
<td>3/2</td>
<td>Universal 3-Way</td>
</tr>
<tr>
<td>PXBB4932</td>
<td>5/32&quot; Instant</td>
<td>3/2</td>
<td></td>
</tr>
</tbody>
</table>

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

**Part Numbers**

<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&quot; Instant</td>
<td>3/2</td>
<td>NNP</td>
</tr>
<tr>
<td>PXBB1912</td>
<td>—</td>
<td>5/32&quot; Instant</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>PXBB1921</td>
<td>5/32&quot; Instant</td>
<td>3/2</td>
<td>NNP</td>
</tr>
<tr>
<td>PXBB1922</td>
<td>—</td>
<td>5/32&quot; Instant</td>
<td>NP</td>
</tr>
<tr>
<td>PXBB1925</td>
<td>10-32 UNF Threaded</td>
<td>3/2</td>
<td>NNP</td>
</tr>
<tr>
<td>PXBB1911SE</td>
<td>—</td>
<td>5/32&quot; Instant</td>
<td>NP</td>
</tr>
<tr>
<td>PXBB1921SE</td>
<td>—</td>
<td>5/32&quot; Instant</td>
<td>NP</td>
</tr>
</tbody>
</table>

**Note:** Bold Items are Ready (Stock)
PXB-B3 Dimensions

PXB-B4 Dimensions

Tube Bending Radius
For PXB3 and PXBB4
- 4 mm O.D. x 2 mm I.D. Tube
  = Minimum 0.39 (10) Radius
- 4 mm O.D. x 2.7 mm I.D. Tube
  = Minimum 0.59 (15) Radius

Assembly
Assembling PXB Valves On Mounting Block

Assembling PXB Valves On the Back of the Electrical Contact
For Push Buttons and Visual Indicators

Legend Plates for PXBB Devices (22mm)

For 22mm Visual Indicators Only

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>ZB2BY2002</td>
<td>Black Background / White Letters</td>
</tr>
</tbody>
</table>

Accessories

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

Electrical Specification: 240V, 10Amp

<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.

Mounting Ring for Valve Bodies, Switch Bodies and Operating Heads
To make up a complete push button with one to three switching
elements with 5/32” instant connections, use this mounting block
and select the operating heads and bodies in this Section.

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ZB4BZ009</td>
<td>Metal Mounting Ring</td>
</tr>
<tr>
<td>ZB5AZ009</td>
<td>Plastic Mounting Ring</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ZB4BZ009</td>
<td>Metal Mounting Ring</td>
</tr>
<tr>
<td>ZB5AZ009</td>
<td>Plastic Mounting Ring</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.

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>
Human / Machine Dialog
Mounting

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.

<table>
<thead>
<tr>
<th>NP</th>
<th>NNP</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>2</td>
</tr>
</tbody>
</table>

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.

<table>
<thead>
<tr>
<th>Universal Description</th>
<th>Electrical</th>
<th>Fluid Power</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Function</td>
<td>Symbol</td>
</tr>
<tr>
<td>Normally Non-Passing</td>
<td>Normally Open</td>
<td></td>
</tr>
<tr>
<td>(NNP)</td>
<td>(N.O.)</td>
<td></td>
</tr>
<tr>
<td>Normally Passing</td>
<td>Normally Closed</td>
<td></td>
</tr>
<tr>
<td>(NP)</td>
<td>(N.C.)</td>
<td></td>
</tr>
</tbody>
</table>

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.

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.

Side by Side Combination

Combination by Mounting Valves On the Back of the Electrical Contact
With 5/32” Instant Connections

22mm Visual Indicators

![Image of 22mm Visual Indicators]

**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)

<table>
<thead>
<tr>
<th>Black Plastic Bezel</th>
<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>
<td></td>
</tr>
<tr>
<td>PXVF141</td>
<td>PXVF1214</td>
<td>Red</td>
<td></td>
</tr>
<tr>
<td>PXVF151</td>
<td>PXVF1215</td>
<td>Yellow</td>
<td></td>
</tr>
<tr>
<td>PXVF161</td>
<td>PXVF1216</td>
<td>Blue</td>
<td></td>
</tr>
<tr>
<td>PXVF111</td>
<td>PXVF1211</td>
<td>White</td>
<td></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 Plates, see page C9.

**Dimensions**

![Image of Dimensions]

- Minimum distance between centers: 1.58 (40)
- Minimum diameter: 0.89 (22.5)

**Black Plastic Bezel**

- PXVF131: Green
- PXVF141: Red
- PXVF151: Yellow
- PXVF161: Blue
- PXVF111: White
With 5/32" Instant Connections, 1/16" I.D. Internal Orifice

### 4-Positions, 4-Outputs 3/2

![Diagram](image1.png)

#### 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

**Operating Pressure**
5 to 5 PSIG (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 PXBBD104 (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

![Diagram](image2.png)

#### Specifications

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

**Operating Pressure**
5 to 5 PSIG (to 8 bar)

**Ports** –
- Standard: 5/32" Instant for Semi-Rigid Nylon or Polyurethane Tube
- 10-32 UNF Available.

#### Notes:
These Rotary Switches operate in either direction. They come assembled with switch PXBBD508 (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>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>
Human / Machine Dialog

Joystick Operators, 22mm (7/8”)

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

### 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 in Each Direction</td>
<td>NNP</td>
<td>Chrome Plated Lever with Protective Bellows 1.6” x 2.5”</td>
</tr>
<tr>
<td>PXBGA8411</td>
<td>4</td>
<td></td>
<td>NNP</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>NNP</td>
<td></td>
</tr>
</tbody>
</table>

*NNP: Normally Non-Passing.

### Dimensions

**PXBGA82••**

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Function</th>
<th>Type of Switching</th>
<th>Operating Head</th>
</tr>
</thead>
<tbody>
<tr>
<td>PXBGA8211</td>
<td></td>
<td>NNP</td>
<td>Chrome Plated Lever with Protective Bellows 1.6” x 2.5”</td>
</tr>
<tr>
<td>PXBGA8411</td>
<td></td>
<td>NNP</td>
<td></td>
</tr>
<tr>
<td>PXBGA8221</td>
<td></td>
<td>NNP</td>
<td>(40 x 64 mm) Legend Plate Red or Black Background</td>
</tr>
<tr>
<td>PXBGA8421</td>
<td></td>
<td>NNP</td>
<td></td>
</tr>
</tbody>
</table>

*In all 4 directions

---

**PXBGA84••**

<table>
<thead>
<tr>
<th>Function</th>
<th>Type of Switching</th>
<th>Operating Head</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>NNP</td>
<td></td>
</tr>
<tr>
<td></td>
<td>NNP</td>
<td></td>
</tr>
<tr>
<td></td>
<td>NNP</td>
<td></td>
</tr>
</tbody>
</table>

*In both directions

---

C13
Human / Machine Dialog

Foot Pedal Operated Switches

C4

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

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>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</td>
<td>Plastic</td>
<td>NNP</td>
</tr>
<tr>
<td>PXPEM110</td>
<td>Spring Return Metal</td>
<td>Metal</td>
<td>NNP</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.

Dimensions

<table>
<thead>
<tr>
<th>PXPEM510</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.39 (137)</td>
</tr>
<tr>
<td>5.98 (152)</td>
</tr>
<tr>
<td>5.77 (146.5)</td>
</tr>
<tr>
<td>1.06 (27)</td>
</tr>
<tr>
<td>3x ø.35 (9)</td>
</tr>
<tr>
<td>6.30 (160)</td>
</tr>
<tr>
<td>7.32 (186)</td>
</tr>
</tbody>
</table>

(1) 2 mounting ports for adaptors for conduit fittings
(2) 7° operating angle

Notes: These Foot Pedal Operators come assembled with switch PXBB1921 (Normally Passing). With the pedal in the unoperated position, the switch is in the actuated non-passing position. With the pedal actuated, the switch is in the unactuated Normally Passing position.
Units will accept all switch bodies shown earlier in this Section, but care must be taken in selecting switch type.

Dimensions

<table>
<thead>
<tr>
<th>PXPEM110</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.22 (31)</td>
</tr>
<tr>
<td>6.77 (172)</td>
</tr>
<tr>
<td>ø.25 (6.4)</td>
</tr>
</tbody>
</table>

(1) .825" diameter thru hole
(2) 6° operating angle

Specifications

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

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

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

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

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

Operating Positions..............................................All Positions
Operating Pressure .................................... 15 to 115 PSIG (1 to 8 bar)
Ports –
5/32" Instant for Semi-Rigid Nylon or.... Polyurethane Tube

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

* NNP: Normally Non-Passing.
Features

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

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/min 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

Part Number | Connections
------------|-------------
PXPC111     | 5/32” Instant

Operation

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

Dimensions

Inches (mm)

<table>
<thead>
<tr>
<th>Part</th>
<th>Dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>PXPC111</td>
<td>8.84 (224.6)</td>
</tr>
<tr>
<td></td>
<td>5/32” (4mm) Instant Push-in Fitting (x2)</td>
</tr>
<tr>
<td></td>
<td>1.33 (33.9)</td>
</tr>
<tr>
<td></td>
<td>1.93 (49.1)</td>
</tr>
<tr>
<td></td>
<td>3.41 (86.5)</td>
</tr>
<tr>
<td></td>
<td>7.09 (180.0)</td>
</tr>
<tr>
<td></td>
<td>59 (15.1)</td>
</tr>
<tr>
<td></td>
<td>25 (6.4)</td>
</tr>
<tr>
<td></td>
<td>2.76 (70.0)</td>
</tr>
<tr>
<td></td>
<td>3.38 (83.3)</td>
</tr>
<tr>
<td></td>
<td>25 Dia, Ø (6.35), 2 Places</td>
</tr>
</tbody>
</table>
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/mn 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.

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>PXPB311B</td>
<td>2</td>
<td>Valve Body &amp; Mounting Ring</td>
</tr>
<tr>
<td>ZB4BR*</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
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 (Filters, Pressure Regulators, and Lubricators), Vacuum products and related accessory components. 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.

Before selecting or using any of these Products, it is important that you read and follow the instructions below.
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 exceed the maximum primary pressure rating of any pressure regulator or any system component.
   - Do not connect pressure regulators or other Pneumatic Division products to bottled gas cylinders.
   - 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 requires immediate system shut down and replacement of worn or damaged components:
   - Air leakage: Look and listen to see if there are any signs of visual damage to any of the components in the system. Leakage is an indication of worn or damaged components.
   - Damaged or degraded components: Look to see if there are any visible signs of wear or component degradation.
   - Kinked, crushed, or damaged hoses. Kinked hoses can result in restricted air flow and lead to unpredictable system behavior.
   - Any observed improper system or component function: Immediately shut down the system and correct malfunction.
   - Excessive dirt build-up: Dirt and clutter can mask potentially hazardous situations.

Caution: Leak detection solutions should be rinsed off after use.

4.5. Routine Maintenance Issues:
   - Remove excessive dirt, grime and clutter from work areas.
   - Make sure all required guards and shields are in place.

4.6. Functional Test: Before initiating automatic operation, operate the system manually to make sure all required functions operate properly and safely.

4.7. Service or Replacement Intervals: It is the user’s responsibility to establish appropriate service intervals. Valves, FRLs and vacuum products contain components that age, harden, wear, and otherwise deteriorate over time. Environmental conditions can significantly accelerate this process. Valves, FRLs and vacuum components need to be serviced or replaced on routine intervals. Service intervals need to be established based on:
   - Previous performance experiences.
   - Government and / or industrial standards.
   - When failures could result in unacceptable down time, equipment damage or personal injury risk.

4.8. Servicing or Replacing of any Worn or Damaged Parts: To avoid unpredictable system behavior that can cause death, personal injury and property damage:
   - Disconnect electrical supply (when necessary) before installation, servicing, or conversion.
   - Disconnect air supply and depressurize all air lines connected to system and Pneumatic Division products before installation, service, or conversion.
   - Installation, servicing, and / or conversion of these products must be performed by knowledgeable personnel who understand how pneumatic products are to be applied.
   - After installation, servicing, or conversions air and electrical supplies (when necessary) should be connected and the product tested for proper function and leakage. If audible leakage is present, or if the product does not operate properly, do not put product or system into use.
   - Warnings and specifications on the product should not be covered or painted over. If masking is not possible, contact your local representative for replacement labels.

4.9. Putting Serviced System Back into Operation: Follow the guidelines above and all relevant Installation and Maintenance Instructions supplied with the valve FRL or vacuum component to insure proper function of the system.
The items described in this document and other documents or descriptions provided by Parker Hannifin Corporation, its subsidiaries and its authorized distributors, are hereby offered for sale at prices to be established by Parker Hannifin Corporation, its subsidiaries and its authorized distributors. This offer and its acceptance by any customer ("Buyer") shall be governed by all of the following Terms and Conditions. Buyer’s order for any such item, when communicated to Parker Hannifin Corporation, its subsidiaries or an authorized distributor ("Seller") verbally or in writing, shall constitute acceptance of this offer.

1. Terms and Conditions of Sale: All descriptions, quotations, proposals, offers, acknowledgments, acceptances and sales of Seller's products sold hereunder shall be governed exclusively by the terms and conditions stated herein. Buyer's acceptance of any offer to sell is limited to these terms and conditions. Any terms or conditions in addition to, or inconsistent with those stated herein, proposed by Buyer in any acceptance of an offer by Seller, are hereby objected to. Any terms, different or inconsistent terms and conditions shall become part of the contract between Buyer and Seller unless expressly accepted in writing by Seller. Seller's acceptance of any offer to purchase by Buyer is expressly conditional upon Buyer's assent to all the terms and conditions stated herein, including any terms in addition to, or inconsistent with those contained in Buyer's offer. Acceptance of Seller's products shall in all events constitute such assent.

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

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

4. Warranty: Seller warrants that the items sold hereunder shall be free from defects in material or workmanship for a period of 8 months from date of shipment from Parker Hannifin Corporation. THIS WARRANTY COMPRESSES THE SOLE AND ENTIRE WARRANTY PERTAINING TO ITEMS PROVIDED HEREUNDER. SELLER MAKES NO OTHER WARRANTY, GUARANTEE, OR REPRESENTATION OF ANY KIND WHATSOEVER. ALL OTHER WARRANTIES, INCLUDING BUT NOT LIMITED TO, MERCHANTABILITY AND FITNESS FOR PURPOSE, WHETHER EXPRESS, IMPLIED, OR ARISING BY OPERATION OF LAW, TRADE USAGE, OR COURSE OF DEALING ARE HEREBY DISCLAIMED.

NOTWITHSTANDING THE FOREGOING, THERE ARE 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 EXCLUSIVELY TO REPAIR OR REPLACE AT SELLER’S OPTION, 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 BUT NOT LIMITED TO, NEGLIGENCE, STRICT LIABILITY, AND OTHER CAUSES.

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

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

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

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

10. Indemnity For Infringement of Intellectual Property Rights: Seller shall have no liability for infringement of any patents, trademarks, copyrights, trade dress, trade secrets or similar rights except as provided in this Part 10. Seller will defend and indemnify Buyer against allegations of infringement of U.S. patents, U.S. trademarks, copyrights, trade dress and trade secrets (hereinafter “Intellectual Property Rights”). Seller will defend at its expense and will pay the cost of any settlement or damages awarded in an action brought against Buyer based on an allegation that an item sold pursuant to this contract infringes the Intellectual Property Rights of a third party. Seller's obligation to defend and indemnify Buyer shall continue 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 infringement based on Buyer’s failure or refusal to incorporate into items delivered hereunder for which the designs are specified in whole or part by Buyer, or infringements resulting from the modification, combination or use in a system of any item sold hereunder. The foregoing provisions of this Part 10 shall constitute Seller’s sole and exclusive liability and Buyer’s sole and exclusive remedy for infringement of Intellectual Property Rights. If a claim is based on information provided by Buyer or if the design for an item delivered hereunder is specified in whole or in part by Buyer, Buyer shall defend and indemnify Seller for all costs, expenses or judgments resulting from any claim that such item infringes any patent, trademark, copyright, trade dress, trade secret or any similar right.

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

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