(Revised 12-21-2010)

Telepneumatic

Pneumatic Logic & Controls

Catalog PCC-4/USA

Parker

Parker Hannifin Corporation

A global, Fortune 300 company with sales of $8 billion and over 400,000 customers in 46 countries, Parker Hannifin is the world's leading supplier of motion control components and system solutions serving the industrial, mobile, and aerospace markets.

Excellence is imprinted on our corporate DNA. We are the only manufacturer offering customers a choice of hydraulic, pneumatic, electromechanical, or computer motion control.

Total Systems Solutions

Parker's team of highly qualified applications engineers, product development engineers, and system specialists can turn pneumatic, structural extrusion, and electromechanical products into an integrated system solution. And our Selectable Levels of Integration™ program provides the components, subsystems, and controlled motion systems for the level of integration you choose.

Parker consistently raises the bar for its manufacturing plants and distributors, measuring its delivery to customer request date.

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Parker boasts the industry's largest global distribution network, with more than 8,600 distributors worldwide. With factories located strategically on five continents, we can maintain matchless on-time delivery rates.

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Parker's best-in-class technology training includes hands-on classes, Web-based training, and comprehensive texts for employees, distributors, and customers. Parker also provides computer based training, PowerPoint presentations, exams, drafting and simulation software, and trainer stands.

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Our standard 18-month warranty on pneumatic products is extended to 60 months when used with a properly installed and maintained Parker air preparation system.

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Industry's most comprehensive Web site is your single source for:

- Product information
- Downloadable catalogs
- 3D design files
- Training materials
- Product configuration software
- RFQ capabilities

24/7 Emergency Breakdown Referrals

The Parker product information center is available any time of the day or night at 1-800-C-Parker. Our operators will connect you with on-call representatives who will identify replacement parts or services for all motion technologies. Talk to a real person!

Warning, Offer of Sale

⚠ WARNING

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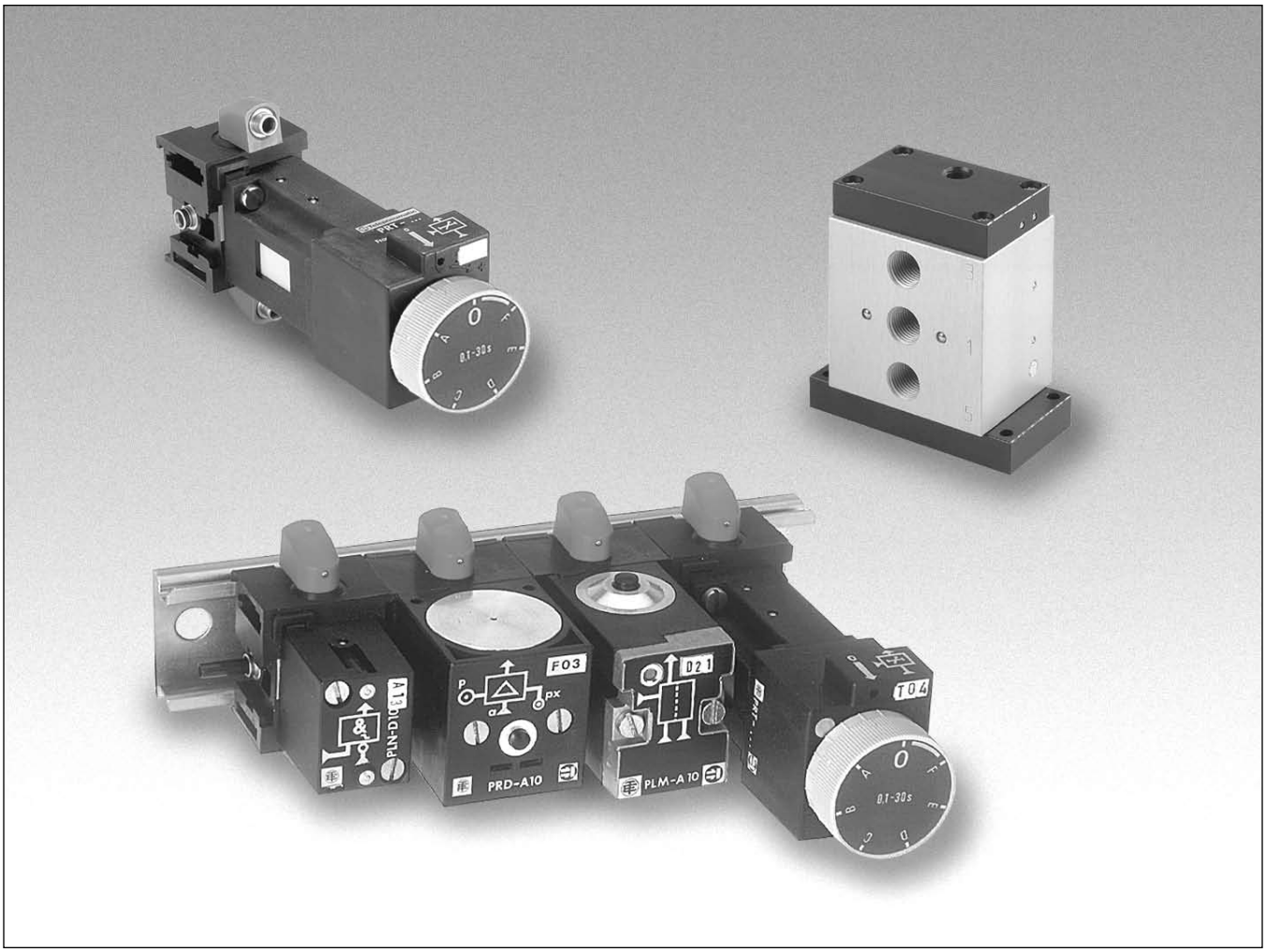
Logic

Pneumatic Logic & Controls

A

Section A



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A

When to Choose Pneumatic Controls

Automated machines often mix pneumatic actuation (cylinders, air motors, blowers, suction cups, etc.) and electrical actuation (motors, heat resistors, electro-magnets, etc.).

In choosing control hardware, the designer should seek to maximize overall system uniformity.

Therefore:

- **Pneumatic controls should be used when the majority of actuators are pneumatic.**
- **Electrical controls should be used when the majority of actuators are electrical.**

The flow chart on the facing page enables the choice of control technology for a machine or machine work station where pneumatic actuators are in the majority (60% minimum); the machine must be of unit or semi-unit construction; and finally it should only comprise of separate signals and require only logic processing.

These latter conditions apply to the latest automated systems. If however the machine under consideration comprises sections with analog or digital signals, it can be structured as a series of work stations and those which do not meet all the conditions can be treated separately.

Using the Flow Chart

The three essential selection criteria are applied in turn to the machine under consideration.

1 - Distance and Reaction Time

This criterion eliminates the total pneumatic configuration for machines which are too large.

The signal transfer distance, $D = D^1 + D^2$ is easily evaluated.

- If $D \leq 4m$: all configurations are possible.
- If $D \geq 16m$: only electro-pneumatic is suitable.
- If $4m < D < 16m$: the choice is made using **Diagram A** on the right; an average time is calculated for the stage T_E and, as a function of D, the diagram enables the choice of direction I - all configurations possible , or direction II - electro-pneumatic configuration.

2 - Matching of Sensors

We have seen the parallel which exists between pneumatic sensors and electric and electrical sensors. At this stage, verify that the majority of the sensors can be pneumatic.

3 - Volume of Processing Required

This is the optimization criterion enabling the best choice for the life of the machine and therefore its best overall cost.

The processing volume is a function of:

- the number of inputs / outputs, I + O
- the degree of complexity given by the formula:

$$T_C = \frac{\text{N° of steps + N° of sequences}}{I + O}$$

Values are established for both of these elements for the application concerned, and entered onto one of the diagrams alongside:

- **Diagram B** enables the choice between pneumatic control (I) and the programmable controller (II).
- **Diagram C** enables the choice between the electrical control with contacts (I) and the programmable controller (III).

In the case where the diagram indicates “free choice”, both technologies present are valid for the application concerned.

Diagram A

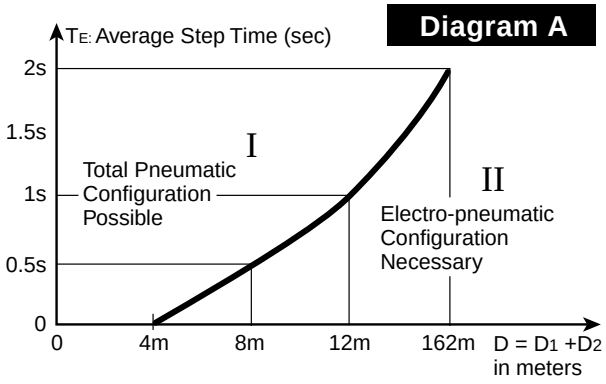


Diagram B

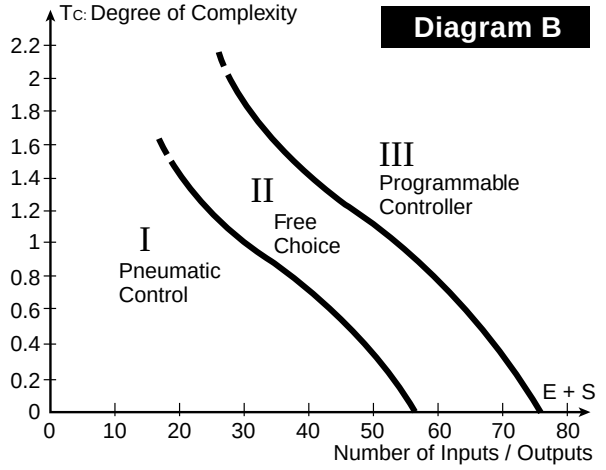
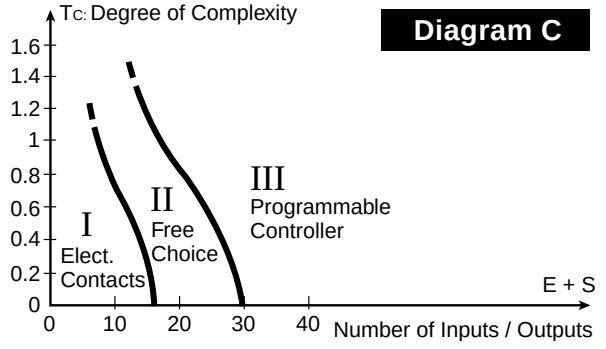


Diagram C



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Selection Criteria

Machine or Sub-Machine with Majority of Pneumatic Actuators
Produced on a unit or semi-unit basis and working in a non-explosive environment, with separate control signals and logic processing only.

1

Distances and Reaction Times

$D = D^1 + D^2$
D^1 = Distance "Sensors ◄► Processing"
D^2 = Distance "Processing" ◄► Directional Control Valves
T_E = Average Step Time

D 4m | D 16m

According to D and T_E with Diagram **A** Opposite

2

Adaptation of Sensors

Pneumatic Sensors Suitable | Only Electrical or Electronic Sensors Suitable

3

Volume of Processing Required

E + S = N° Inputs / Outputs
T_C = Degree of Complexity
= N° of Steps + N° of Sequences / I + O

According to I + O and T_C with Diagram **B** Opposite

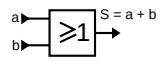
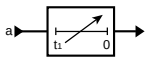
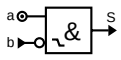
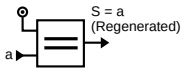
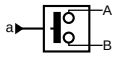
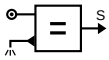
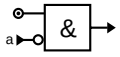
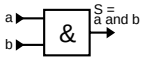
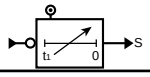
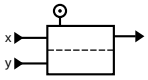
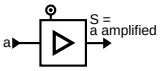
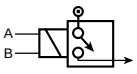
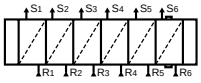
II Free Choice

According to I + O and T_C with Diagram **C** Opposite

II Free Choice

Pneumatic Control	"Sequential" Programmable Controller	Electrical Control with Contacts
• **Total Pneumatic** Structure • Pneumatic Sensors	• **Electro-Pneumatic** Structure • Electrical and Electronic Sensors	

Component Symbols

OR Function 	**TIME Function** 	**THRESHOLD NOT Function** 
YES Function 	**Air/Electric Interface (Pressure Switch: Non Adjustable)** 	**Back-Pressure Sensor (Booster Relay)** 
Not Function (Inhibitor) 	**AND Function** 	**INVERTED TIME Function** 
MEMORY Function 	**Amplifier Function** 	**Electric/Air Interface (Pressure Switch: Non Adjustable)** 
Modular Sequencer 		

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Advantages

Total Pneumatic control systems have a number of advantages over electro-pneumatic actuation. Among these are:

• System Uniformity
The use of one power and control medium simplifies design, operation, and maintenance of equipment by reducing the number of necessary skills and techniques.

• Hardware Uniformity
In practice, pneumatic cylinders integrate better with pneumatic sensors than electrical sensors. For example:

In Wet Environments:
Contrary to electrical sensors, pneumatic sensors operate trouble free in wet surroundings, an application where pneumatic cylinders are generally favored.

In Explosive Environments:
Explosion-proof electrical components are cumbersome and expensive; pneumatic components, inherently explosion-proof, are ideally suited to increasingly frequent explosive industrial environments.

For Short Stroke Cylinders:
Short strokes, typical of clamping cylinders for example, are easily sensed with pneumatic limit sensors.

Where Limit Switches Cannot be Used:
This frequently encountered problem can be solved by using threshold relays.

• Elimination of Solenoid Valves
Pneumatic systems are more compact, more reliable. Costs are reduced.

• Elimination of Electric Power Supplies and Protection Devices
Reduced costs and added safety.

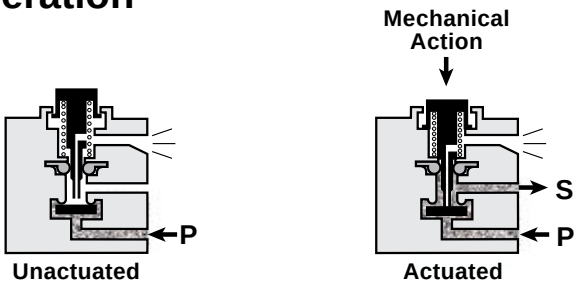
• Increased Safety
No Shocks from cut or exposed wires and devices.

• Longer Life and Increased Reliability
Recent generations of pneumatic controls have maximized simplicity of operation. Pneumatic controls are not inherently self-destructive as are their equivalents (through arcing).

• Faster Response Times
In compact control systems, total pneumatic systems have faster response times than electro-pneumatic systems.

• Reduced Overall Costs
For all these reasons, total pneumatic automation is an effective technique to reduce machine design, operation and maintenance costs.

Direct Operation

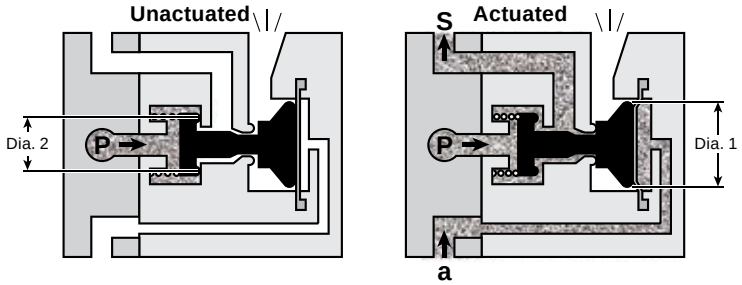


Components Using Illustrated Principles

Miniature Limit Switch

Relay Operation

• Non-Passing (YES Function)



- Output signal S is ON when pilot signal “a” is present.
- Relay is snap-acting because area of diameter 1 is greater than area of diameter 2.

YES Relay

Time Delay Relay (ON Delay)

Booster Relay

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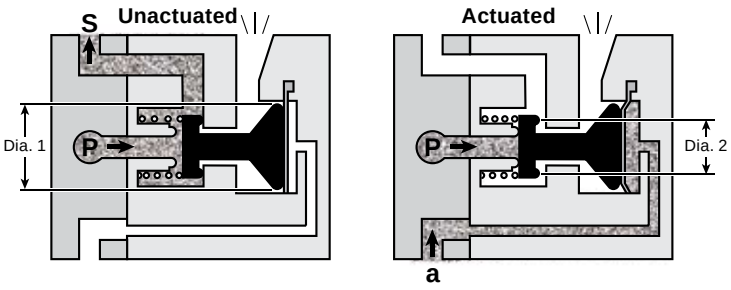
• Passing (NOT Function)



- Output signal S is ON when pilot signal “a” is present. When “a” appears, S is exhausted to atmosphere.
- Relay is snap-acting because area of diameter 1 is greater than area of diameter 2.

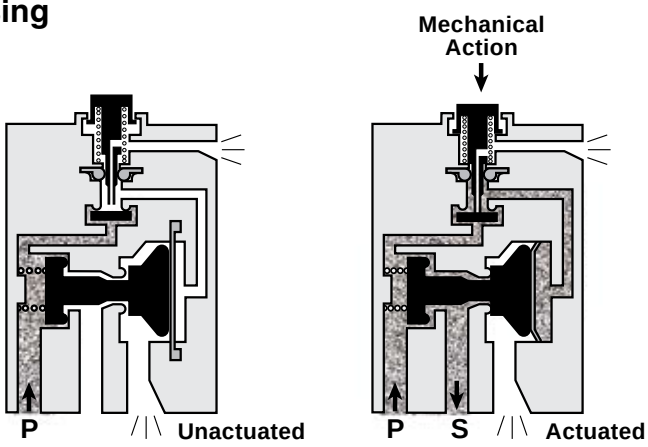
Components Using Illustrated Principles

Time Delay Relay (Inverted)

NOT Relay

Pilot Operation

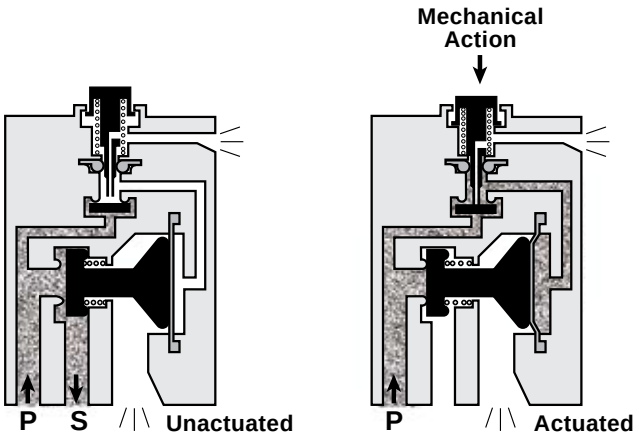
• Non-Passing



- Depressing actuator creates signal from pilot section; signal actuates NON-PASSING relay. Output S is ON.
- Associating pilot and relay in one component allows high flow (full 1/8" internal orifice) with minimal actuating effort (11 oz.). Snap-action at a precise point along actuator travel is an added characteristic.

Limit Switches

• Passing



- Depressing actuator creates signal from pilot section; signal actuates PASSING relay. Output S is OFF.
- Associating pilot and relay in one component allows high flow (full 1/8" internal orifice) with minimal actuating effort (11 oz.). Snap-action at a precise point along actuator travel is an added characteristic.

Push Buttons

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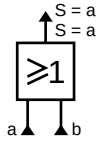
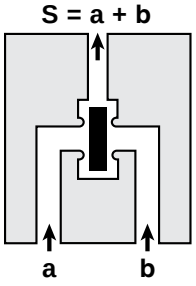
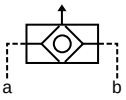
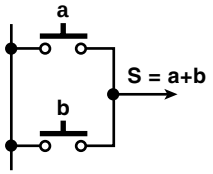
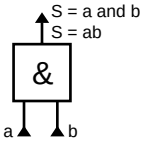
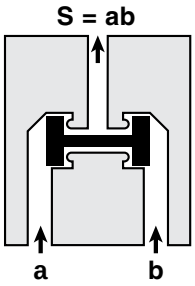
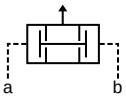
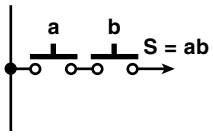
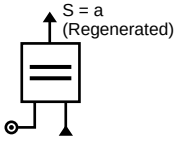
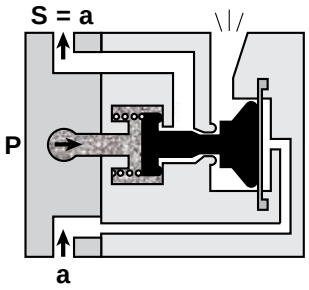
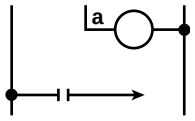
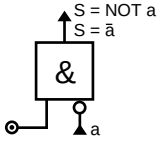
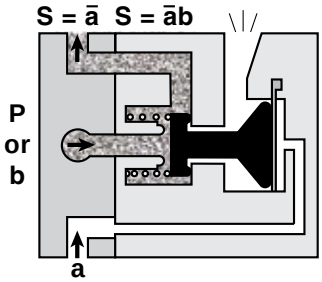
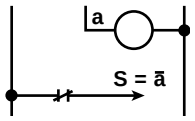
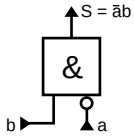
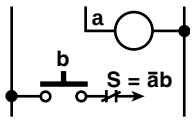
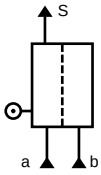
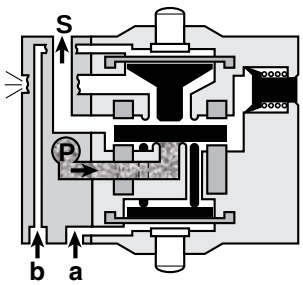
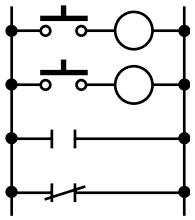
The following chart shows how pneumatic components perform all the basic logic functions.

	Logic Function	Logic Symbol		Pneumatic Component	Function Symbol	Electrical Equivalent
PASSIVE FUNCTIONS	**OR**		Output S is ON if at least one of the inputs “a” OR “b” is ON			
	AND		Output S is ON only if inputs “a” AND “b” are ON			
ACTIVE FUNCTIONS	**YES** (Regenerate)		Output S is ON and regenerated if input “a” is ON			
	NOT (Inhibit)		Output S is ON if input “a” is OFF (and if supply P is present)			
			“b” is an intermittent signal. “a” inhibits “b”. Output S is ON if “b” is ON and “a” is OFF			
	MEMORY		Input “a” generates Output S (SET). Output S remains ON until removed by input “b” (RESET)			

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Virtually all production machines using pneumatic actuators operate in a dedicated and repeatable sequence or cycle. The purpose of any control method is to insure that all steps of the machine's cycle occur as intended.

The sequencer constitutes the backbone of a Telepneumatic control circuit. The sequencer's poppet design provides long life using only shop air.

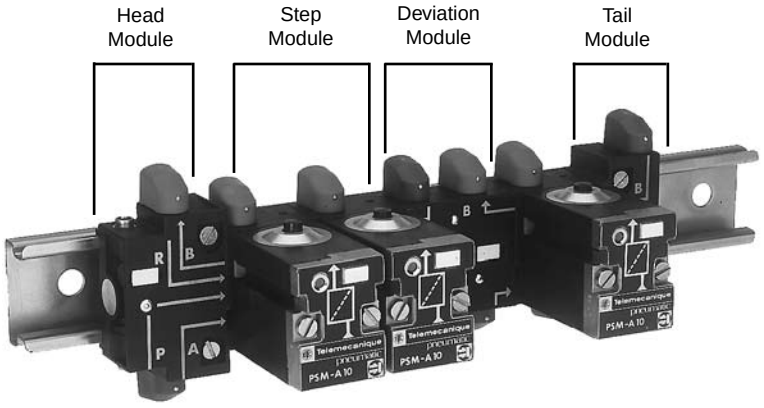
Since it is modular, the sequencer can easily be configured to any application cycle requirement. Logic elements and supporting relays provide for other application needs such as safety conditions, operating modes and time delays.

The Telepneumatic sequencer eliminates the need for solenoid operated valves.

COMPOSITION

A sequencer is comprised of a Number of step modules, each corresponding to a defined step in the machine's cycle according to the application requirements.

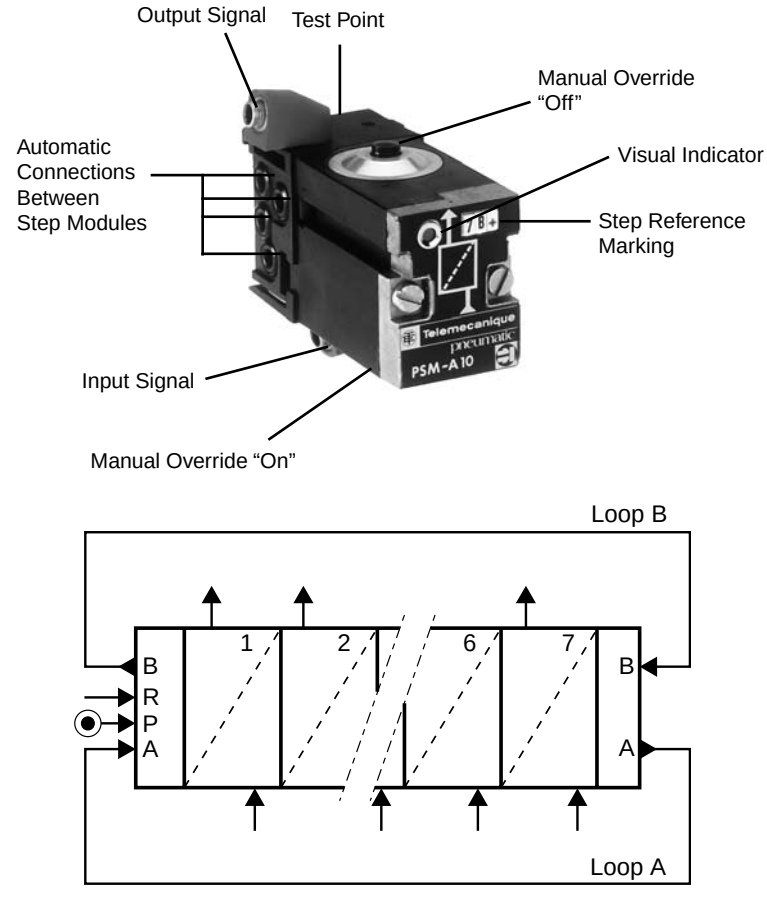
The head / tail module peforms the function of locking the easily stacked step modules to the 35 mm DIN rail while also supplying connection to the stack as follows: (1) supply pressure, (2) starting condition and (3) general and emergency resets. A deviation module is placed between step modules to provide for variation to the normal sequence of events such as skips, repeats, multi line cycles and resets.



STEP MODULE

At the heart of the sequencer, the step module is the decision making element that will read the necessary inputs and provide output commands as needed. The step module consists of the following parts:

- Input / Output via 5/32" Instant Swivels with Test Points
- Visual Indicator, Defining Status
- Both On and Off Manual Overrides
- Step Reference Marking to Assist in Sequence Diagnostics
- Stackable Subbase with Special Internal Piping.



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GRAFCET

The use of a function flow diagram allows the designers of machine tool automation to organize application requirements in a simple sequential flow. The GRAFCET flow diagram becomes a snapshot of the machine's positions and conditions. This simplifies understanding and modification of the specific application.

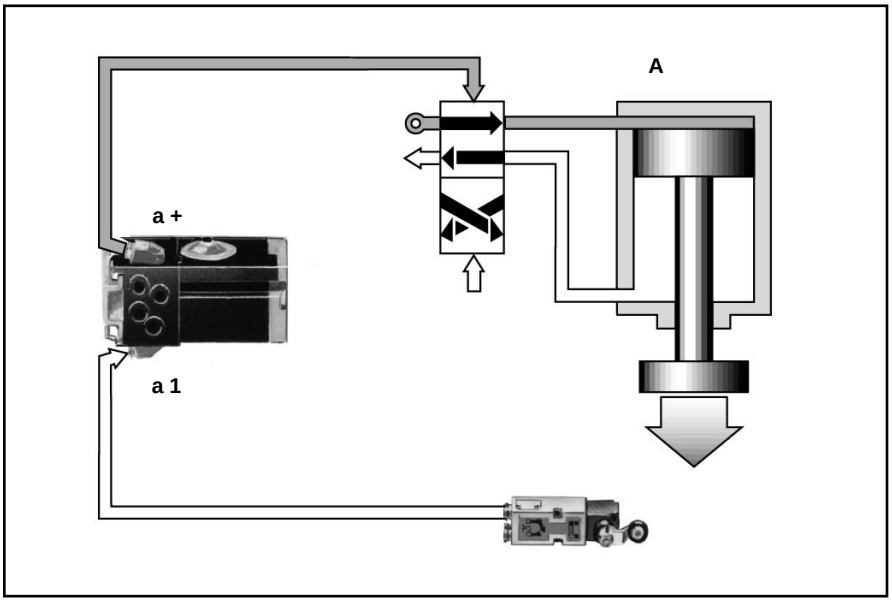
CONTROL LOOP

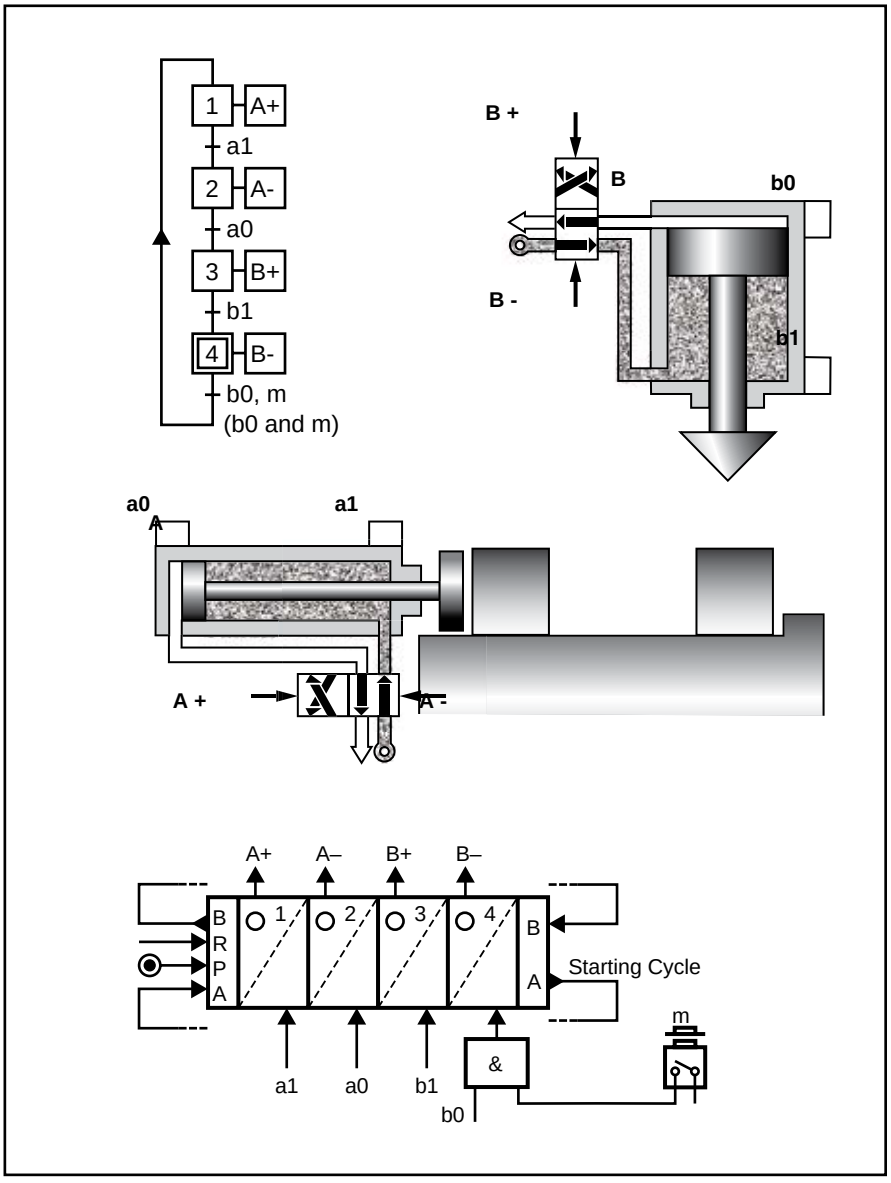
To understand the operating cycle, we first define each actuator motion in sequence. We will address each actuator with a letter starting with A. For a cylinder as shown to the right, the motion required is the extension of the cylinder. This action will now be known as A+. The "+" indicates the extension of a cylinder, or the turning of an actuator that is digital (on / off). When the cylinder reaches the end of its stroke, it will trigger a limit switch. This signal is an input (transition) that we call "a1". The "a" defines the actuator, and "1" defines its active state. This completes a step consisting of a command and a transition.

COMBINATION

We can now combine additional actuators and reciprocal motions to create a total control package. To the right are two actuators A and B. "A" is a transfer cylinder that will move parts into the workspace. "B" is a press that will form the parts.

The GRAFCET flow diagram in the upper left shows the required actions and the corresponding limit switch feedback signals to indicate the actions are complete. When the machine starts, the transfer (A) will extend (+), placing a part in the nest. Feedback (a1) states that the action is complete and initiates retraction (A-). Feedback (a0) confirms the action is complete and initiates the next motion. The press (B) will extend downward (+) until reaching the end of stroke sensor (b1) which confirms the action and initiates the final step that returns the press to its home condition (B-). The sensor (b0) confirms when (B) is home and signals end of cycle.





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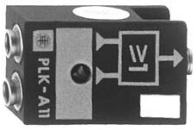
IN-LINE MOUNTED LOGIC ELEMENTS

These logic elements can be either flush mounted on any flat surface, 35mm DIN rail mounted with the addition of a spring clip or hung from the tubing.

In-line elements are available in two logic statements: AND and OR.

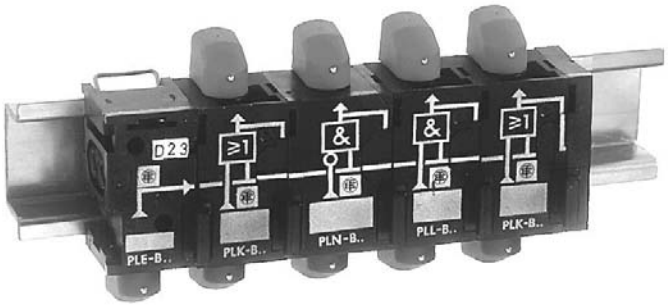


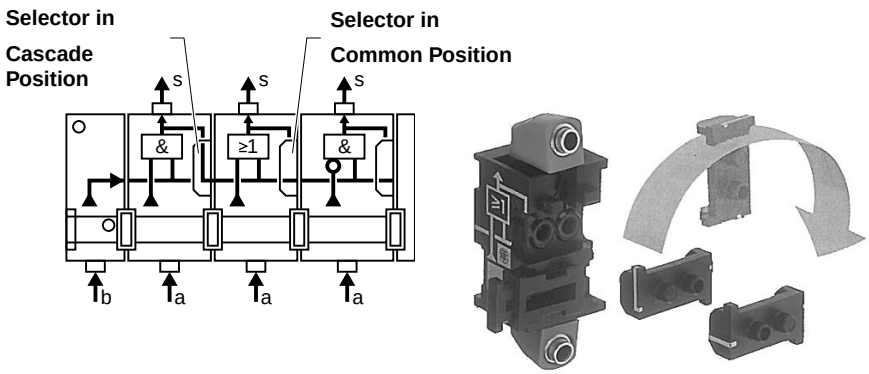
INTEGRATED LOGIC ELEMENTS

These elements can be combined with each other, allowing the creation of string statements in a compact footprint while reducing the piping required. There are three logic functions available in this configuration: AND, OR and NOT.

Each element is supplied with an integral locking key which allows each logic unit to lock to the next element to the right. In addition, each element includes a mode selector which enables the user to select either cascade (series) or common (parallel) cilrcuitry.

Cascade mode determines that the output of a logic element will feed the next downstream logic element, while the common mode feeds its supply to the next component. These units are designed for 35mm DIN rail mounting and are supplied with the internal piping diagram printed on the face of the device. This internal piping is field convertable.





SUBBASE MOUNTING LOGIC ELEMENTS

All logic devices are designed to mount on 3-port subbases. The 3-Port subbase is available in two styles (common input and cascade input) and are manifoldable with each other as well as the 4-Port subbases for relays. A stand alone 3-Port (1/8" pipe) metal subbase is also available. There are 5 logic elements for subbase mounting: AND, OR, YES, NOT and THRESHOLD NOT.

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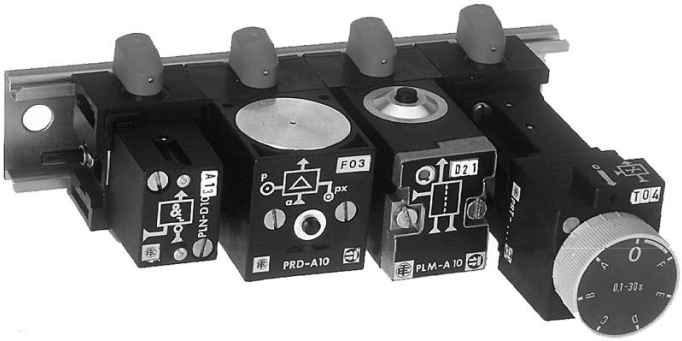
RELAYS

These components provide additional capability to the pneumatic logic system. Types available are: Time Delay, Memory, Amplifier, Sensor, Solenoid, and Pressure Switch (both pneumatic and electric). Depending on function, a 3 or 4-Port subbase is used.



3-PORT SUBBASES

These stackable subbases are designed for the mounting of:

- Logic Devices
- Timers
- Bleed Sensor Relays
- Threshold NOT Relays
- E/P and P/E Interfaces.

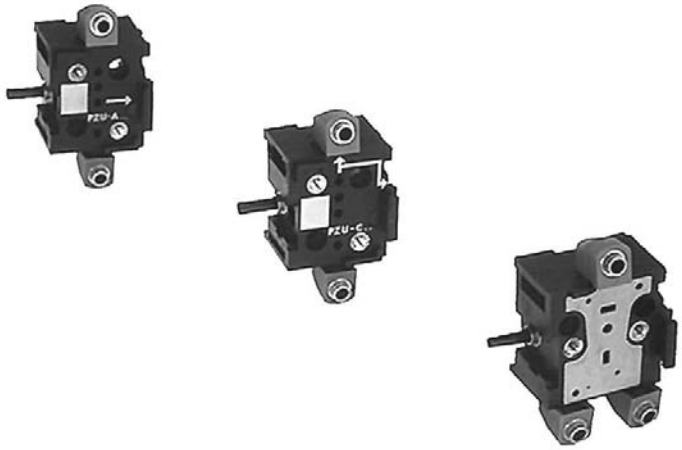
They are stackable with the 4-Port subbases below and are available in common input or cascade input styles.

4-PORT SUBBASES

These stackable subbases are designed for the mounting of:

- Memory Relays
- Amplifier Relays for use with Proximity Sensors.

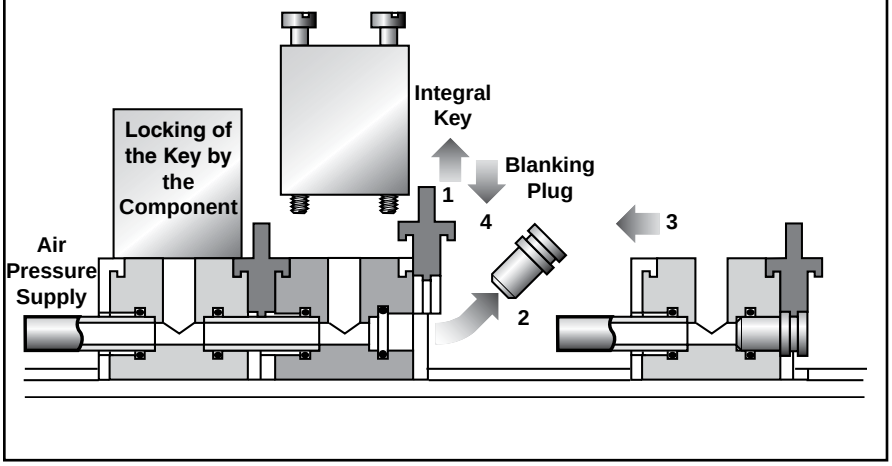
They are stackable with the 3-Port subbases above.



STACK ASSEMBLY

The drawing to the right explains the procedure for asembling subbase mounted logic components and relays.

Note: The subbases are supplied with an integral key that must be pulled upward (1) to release the blanking plug (2). Now the downstream subbase can be positioned (3) then locked by returning the integral key back to its original position (4). After this process is complete, the relay or logic element are mounted on top.



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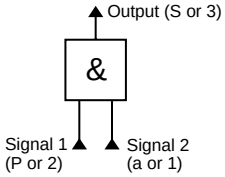
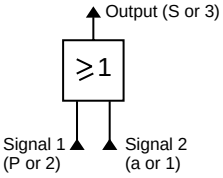
AND Element



PLLA11

Part Number	Description
PLLA11	**5/32" Instant**

OR Element



PLKA11

Part Number	Description
PLKA11	**5/32" Instant**

Mounting Clip Assembly

PZML199

Part Number	Description
PZML199	**1 Set of Clip Assemblies**

Specifications

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

Cv 0.14 (1.8)

Flow rate at 90 PSI (6 bar) in SCFM (l/mn ANR) ...6.4 (180)

Materials –
- Body.....Polyamide
- Poppet.....Polyurethane
- Seals..... Nitrile (Buna N)

Mounting .....Inline or 35mm DIN Rail

Number of Operations with Dry Air at 90 PSI and 70°F, Frequency 1 Hz.....10 Million

Operating Positions.....All Positions

Operating Pressure .....20 to 115 PSIG (1.4 to 8 bar)

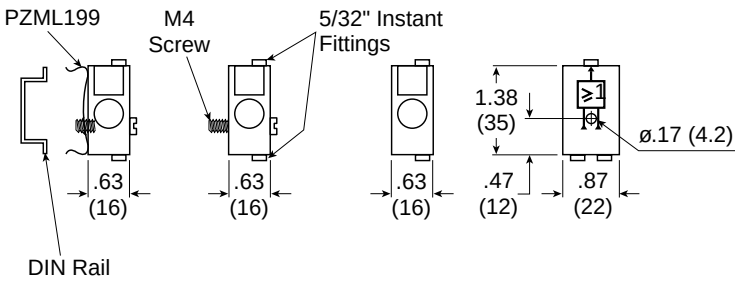
Ports –
Standard: 5/32" Instant for Semi- Rigid Nylon or Polyurethane Tube

10-32 UNF Available

Response Time ..... 2 to 3 msec

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

Dimensions



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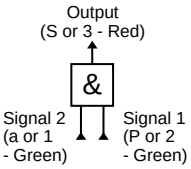
A

With 5/32" Instant Swivel Connections and Pressure Indicators

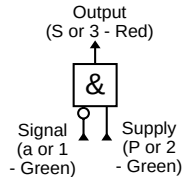
AND Element



PLLB12

Part Number	Description
PLLB12	With Integral Circuit Selector for Cascade or Common Mode Selection

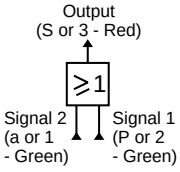
NOT Element



PLNB12

Part Number	Description
PLNB12	With Integral Circuit Selector for Cascade or Common Mode Selection

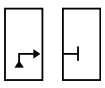
OR Element

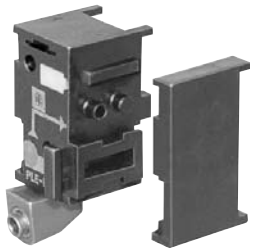


PLKB12

Part Number	Description
PLKB12	With Integral Circuit Selector for Cascade or Common Mode Selection

Head / Tail Plate Set





PLEB12

Part Number	Description
PLEB12	Mounts on DIN Rail, Required with Integrated Logic Elements to Complete Stack Assembly

Specifications

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

Cv 0.14 (1.8)

Flow rate at 90 PSI (6 bar) in SCFM (l/mn ANR) ...6.4 (180)

Materials –
- Body.....Polyamide
- Poppet.....Polyurethane
- Seals..... Nitrile (Buna N)

Mounting .....Inline or 35mm DIN Rail

Number of Operations with Dry Air at 90 PSI and 70°F, Frequency 1 Hz.....10 Million

Operating Positions.....All Positions

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

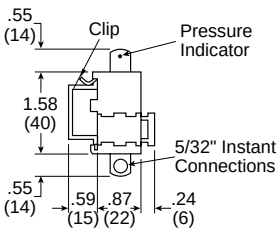
Ports –
Standard: 5/32" Instant for Semi- Rigid Nylon or Polyurethane Tube

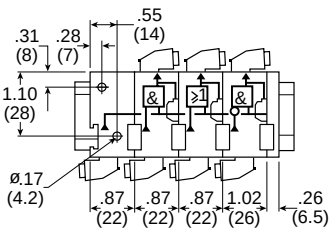
10-32 UNF Available

Response Time ..... 2 to 3 msec

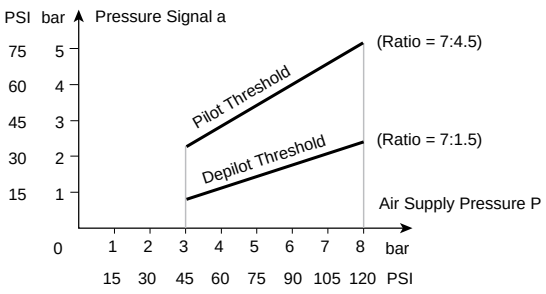
Temperature –
Operating ..... 32°F to 122°F (0°C to +50°C)
Storage .....-22°F to 140°F (-30°C to +60°C)

Dimensions





PLN - NOT



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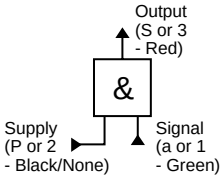
For Mounting On 3 Port Subbases

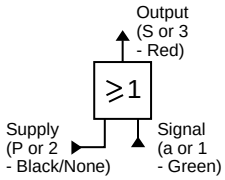
AND Element



PLLC10

Part Number	Description
PLLC10	Less Base

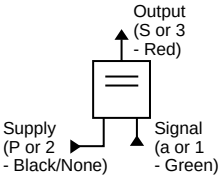
OR Element



PLKC10

Part Number	Description
PLKC10	Less Base

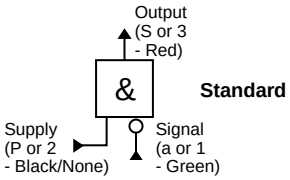
YES Element



PLJC10

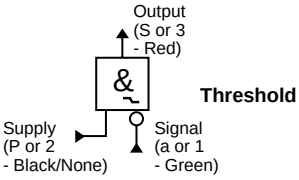
Part Number	Description
PLJC10	Less Base

NOT Elements



Standard

PLNC10



Threshold

PLND10

Part Number	Description
PLNC10	Less Base
PLNC12	PLNC10 on PZUA12 Subbase
PLND10	Less Base
PLND12	PLND10 on PZUA12 Subbase

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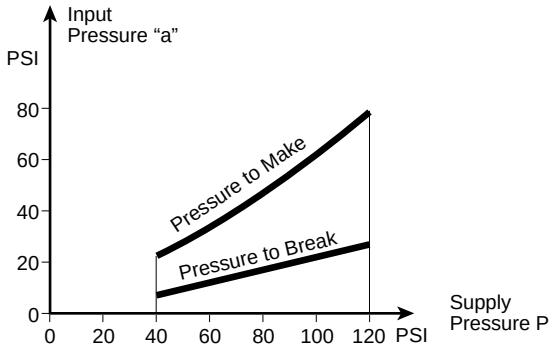
A

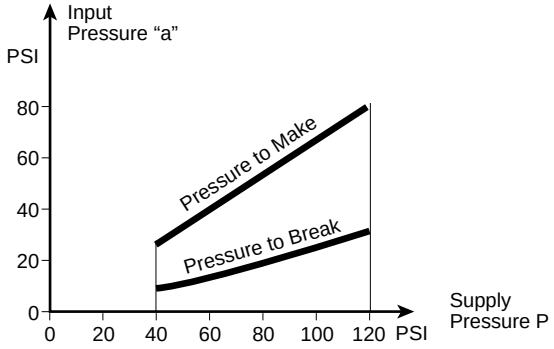
Make and Break Pressures

PLJ - YES Element



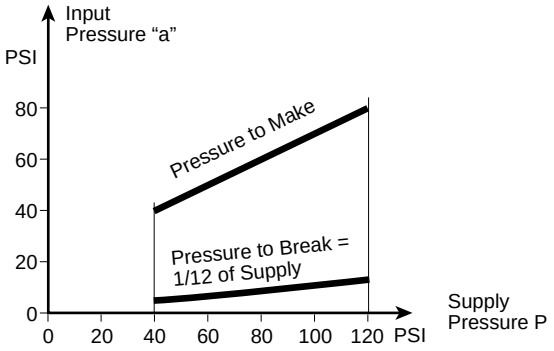
Because of sizeable differences in seating areas, pressure to make and pressure to break differ significantly. Snap-acting feature of relay is a result of this difference in pressure.

PLN - NOT Element



Because of sizeable differences in seating areas, pressure to make and pressure to break differ significantly. Snap-acting feature of relay is a result of this difference in pressure.

PLND - Threshold NOT Element



Diameter of supply P orifice is reduced to keep relay from breaking until control signal "a" is almost completely exhausted.

- Nominal supply orifice diameter = 5/64"
- Cv factor: .11

Specifications

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

Cv –
PLNC, PLJC, PLL & PLK 0.14 (1.8)
PLND ..... .08 (1.0); 0.14 (1.8)

Flow rate at 90 PSI (6 bar) in SCFM (l/mn ANR) –
PLNC, PLJC, PLL & PLK 6.4 (180)
PLND 3.2 (90); 6.4 (180)

Materials –
- Body..... Polyamide
- Poppet..... Polyurethane
- Seals..... Nitrile (Buna N)

Mounting ..... 3-Port Subbase

Number of Operations with Dry Air at 90 PSI and 70°F, Frequency 1 Hz –
PLND, PLNC / PLJC ..... 10 Million
PLL & PLK ..... 100 Million

Operating Positions..... All Positions

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

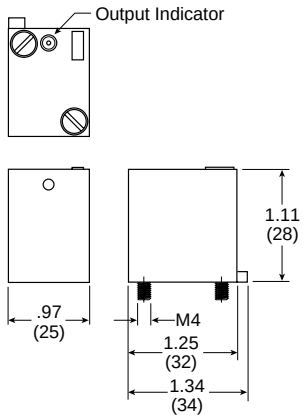
Ports –
Standard: 5/32" Instant for Semi-Rigid Nylon or Polyurethane Tube
10-32 UNF Available

Response Time ..... 2 to 3 msec

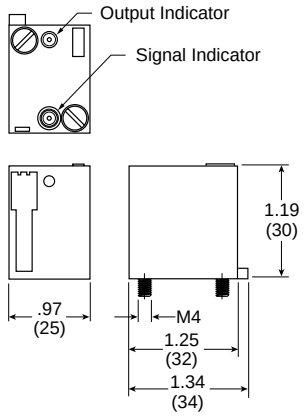
Temperature –
Operating ..... 32°F to 122°F (0°C to +50°C)
Storage ..... -22°F to 140°F (-30°C to +60°C)

Dimensions

PLKC10, PLLC10



PLNC10, PLND10, PLJC10



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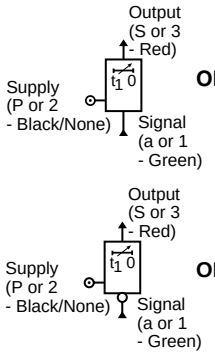
Time Delay Relays

For Mounting on any 2* or 3-Port Subbase Using Atmospheric Air for Control Single Turn Adjustment



PRTA10

*Function Must Be Checked.

Part Number	Description	Timing Range
PRTE10	ON Delay	0.1 to 3 sec.
PRTA10	ON Delay	0.1 to 30 sec.
PRTB10	ON Delay	10 to 180 sec.
PRTF10	OFF Delay	0.1 to 3 sec.
PRTC10	OFF Delay	0.1 to 30 sec.
PRTD10	OFF Delay	10 to 180 sec.
PRTA12	PRTE10 on PZUA12 Subbase	
LA9D901	Tamperproof Cap	

The Time Delay Relay delays a maintained input signal during an adjustable time period after which a regenerated output appears.

Setting

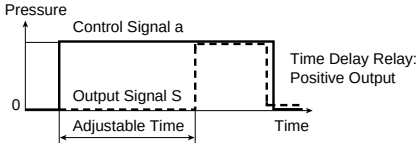
- Delay is set by turning knob.
- One 360° turn covers complete timing range.
- When white line on dial is set at top dead center, TDR goes to infinity. This feature facilitates machine set up.

Connections: 3-Port Subbase with

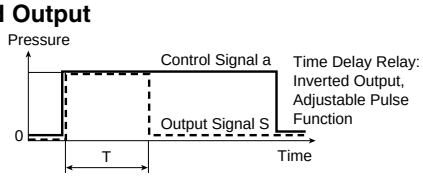
- Instant Straight Connections
- Instant Swivel Connections
- 1/8" NPT Female Connections

Timing Functions

- **Positive Output**



- **Inverted Output**



Repeatability +2%

Specifications

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

Cv 0.14 (1.8)

Filter ..... a-PPRL23, Vent - PPRL20

Flow rate at 90 PSI (6 bar) in SCFM (l/mn ANR) 6.4 (180)

Interchangable 50 µm Filter –
a (Input) PPRL23
Input Cylinder PPRL20

Materials –
- Body ..... Polyamide
- Poppet ..... Polyurethane
- Seals ..... Nitrile (Buna N)

Mounting ..... 2 or 3-Port Subbase

Number of Operations with Dry Air at 90 PSI and 70°F, Frequency 1 Hz ..... 10 Million

Operating Positions ..... All

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

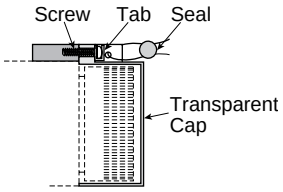
Repeatability ..... ±5% / 5 Operations

Response Time ..... 2 to 3 msec

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

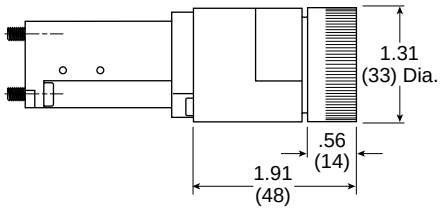
Tamperproof Cap

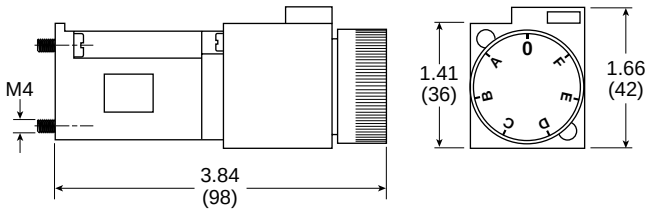
- **Locking**
  Set desired time delay, then place transparent cap over setting knob and tighten screw.
- **Sealing**
  Bend tab over screw head; run wire over head, then seal.



Dimensions

PRT•10





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A

Operating Principle

The time delay relay is entirely pneumatic. Air supply to the timing head is taken from the ambient atmosphere. The timing function is therefore independent of line pressure. As a result, repeatability is unaffected by variations in supply pressure, temperature or contamination of supply. In the positive output version, output is provided by a YES relay. In the inverted version, Output is provided by a NOT relay.

Note: Piping inverted TDR for adjustable pulse function: Tee off input "a" to supply port as shown on diagram.

Time Delay Relay Operating Principle: On Delay Positive Output

• SET

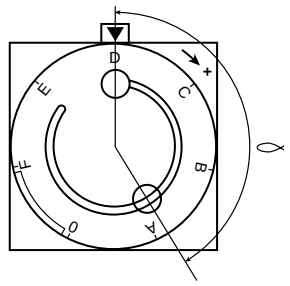
Signal "a" appears at input orifice in subbase and is divided into two separate signals after filter ①. The first signal cocks the piston ② and timing begins.

Simultaneously the second divided signal flows through fixed orifice ③ and supplies bleed at orifice ④.

• TIMING

Poppet ⑤, attached to bellows ⑦ and released by piston ②, starts to extend at a rate determined by the amount of delay required. Bellows ⑦ rate of extension is controlled as follows:

– Spring ⑥ pushed bellows out. To extend, bellows draws atmosphere air through filter ⑧ and circular channel ⑨ . Length of channel ⑨ varies as a function of angle, determined by knob ⑩.



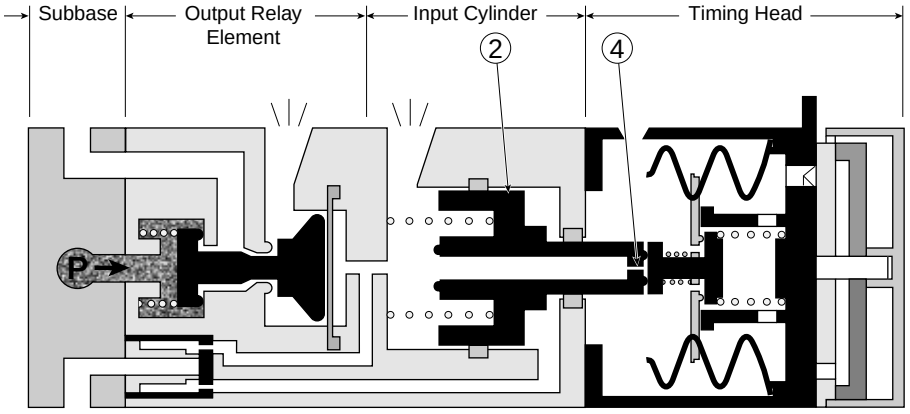
The greater the angle, the longer the time delay.

• OUTPUT

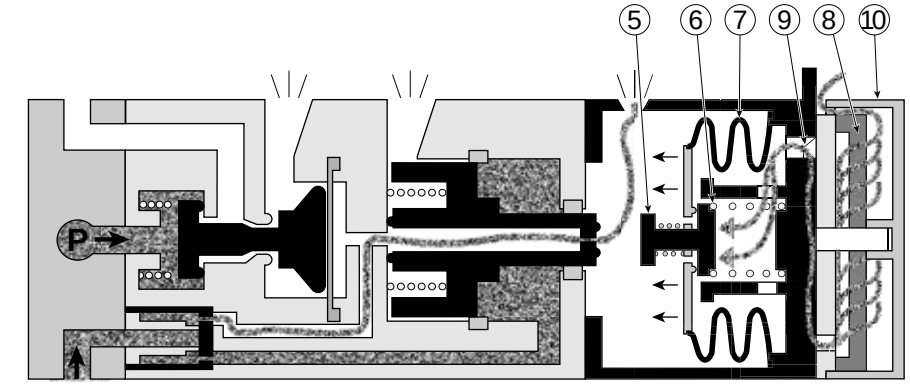
When bellows ⑦ reaches the end of its travel, poppet ⑤ seals off bleed from orifice ④, causing a rise in pressure and as a result output relay switches. Output S appears, supplied by pressure P.

• RESET

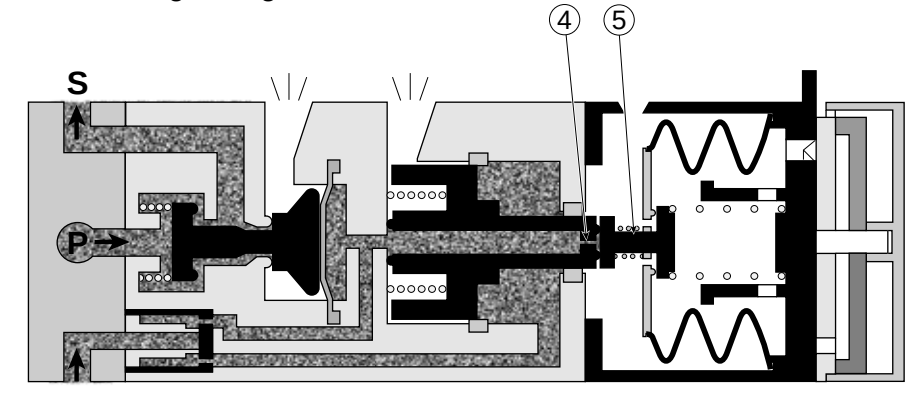
Removing the signal "a" automatically resets the time delay relay. Output S disappears.



Unactuated State (Before Timing)



State During Timing



Actuated State (After Timing)

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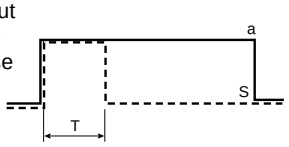
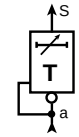
Adjustable Pulse Output Timer

Maintained input generates adjustable pulse output. When maintained input “a” goes ON, output S goes ON then drops OFF after an adjustable time period T even though “a” is still on.

Maintained input “a” provides an adjustable pulse output using inverted TDR.

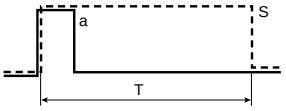


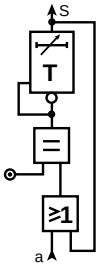


Single Adjustable Pulse Output Timer

Momentary input generates single adjustable pulse output (one shot). This circuit is useful when a brief signal needs to be prolonged, for example, rapidly actuated limit switches.

Momentary input “a” generates longer output S. After adjustable time period T, the inverted TDR cuts off output S.



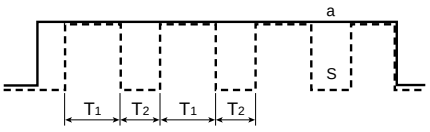


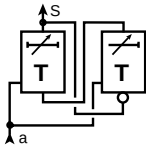
Adjustable Reciprocate Output Timer

Maintained input generates repeated pulse output (clock signal). Maintained input “a” generates continuously repeated pulse output S.

– The time duration of pulse S is adjustable separately.

– The time between pulses is adjustable separately.





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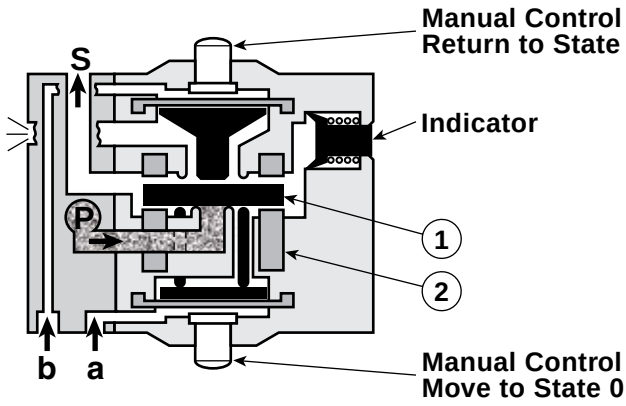
A

Memory Operation

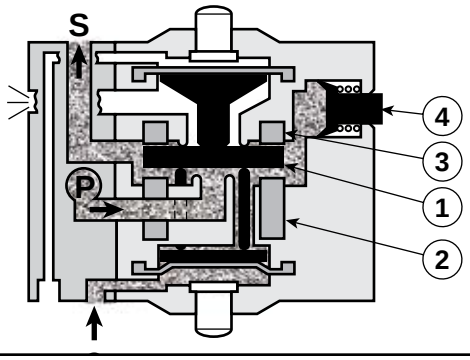
• OFF

Held in podition by magnet ②, Poppet ① closes off supply pressure P.



• SET

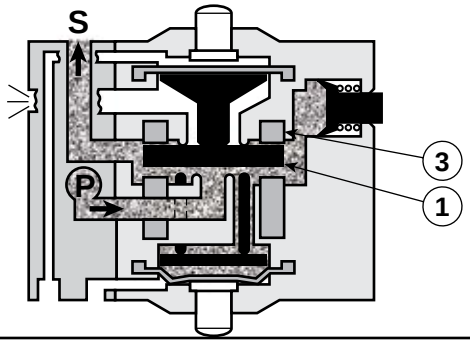
Input signal “a” acting on a diaphragm drives poppet ① from magnet ② to magnet ③ allowing pressure to flow. Output signal S appears as indicated by position indicator ④ .



• ON

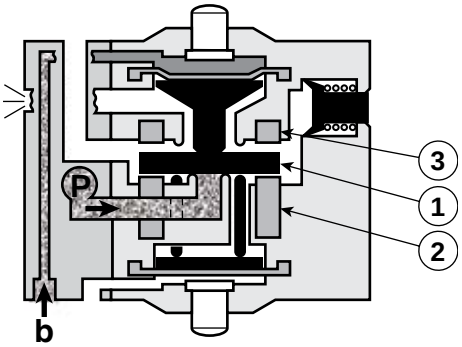
When input “a” is removed, output S is maintained since magnet ③ holds poppet ① seated.

Note: If pressure is lost, the last MEMORY will maintain its last position.



• RESET

Input “b” acting on the opposite diaphragm returns poppet ① to magnet ② . Outout S is removed and exhausted to atmosphere.



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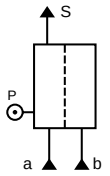
Memory Relay Without Subbase

For Mounting On 4-Port Modular Subbase

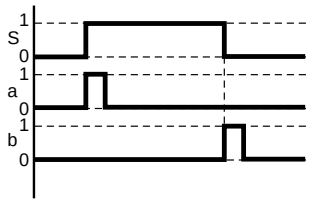


PLMA10

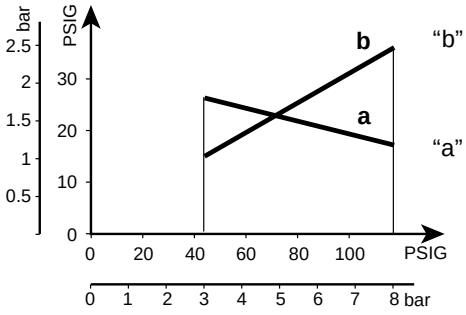
Part Number	Description
PLMA10	3-Way Double Air Pilot Operated Valve. Reset Signal "b" Always Has Priority Over Set Signal "a". With Manual Override
PLMA12	PLMA10 on PZUB12 Subbase

The Memory element is a relay designed to maintain output signal S after disappearance of the input signal which generated it.

Special Characteristics

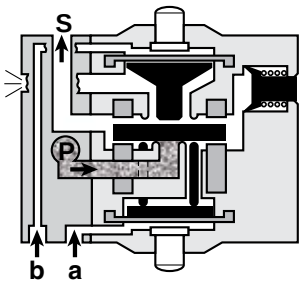


The signal "a" for setting to State 1 causes the output Signal S to be maintained. This will only be erased by the Signal "b" for resetting to State 0.



"b" = Resetting to State 0 of the Memory

"a" = Setting to State 1 of the Memory



Specifications

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

Cv 0.14 (1.8)

Flow rate at 90 PSI (6 bar) in SCFM (l/mn ANR) 6.4 (180)

Materials –
- Body ..... Polyamide
- Poppet ..... Polyurethane
- Seals ..... Nitrile (Buna N)

Mounting ..... 4-Ported Subbase

Number of Operations with Dry Air at 90 PSI and 70°F, Frequency 1 Hz ..... 10 Million

Operating Positions ..... All

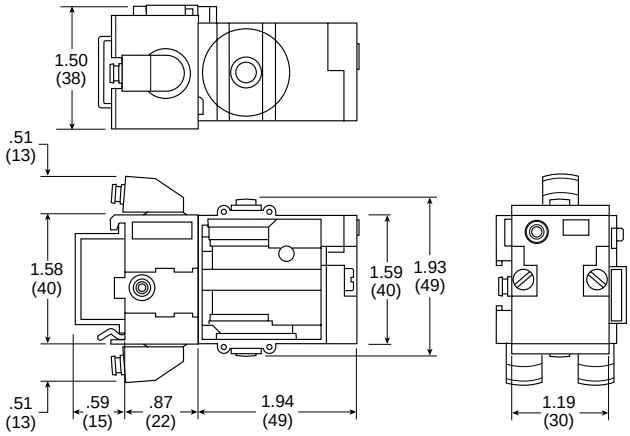
Operating Pressure ..... 40 to 115 PSIG (3 to 8 bar)

Response Time ..... 2 to 3 msec

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

Dimensions

PLMA12



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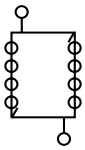
Step Module

PSMA10

Part Number	Description
PSMA10	With Manual Override, Less Base
PSMB10	Without Manual Override, Less Base
PSMA12	PSMA10 on PSBA12 Base
PSMB12	PSMB10 on PSBA12 Base

Step Module Subbase



PSBA12

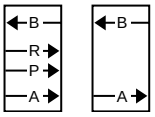
Part Number	Description
PSBA12	For Mounting with PSM•10 Step Modules

Step Module Interlock

PSVA12

Part Number	Description
PSVA12	Mounted between the Subbase and the Step Module to Interrupt the Sequence if a Sensor Signal is Faulty.

Head / Tail Set
(For 35mm DIN Rail Mounting)



PSEA127

Part Number	Description
PSEA127	Required to assemble Modular Sequencer Provides Inlet & Signal Ports

Deviation Models

Standard

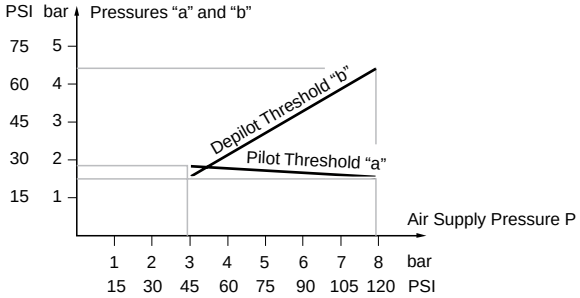
Blocked Port

PSDB12

Part Number	Description
PSDA12	**Standard**: - Parallel Sequences - Selection Sequences - Repeat Sequences - Skip Steps
PSDB12	**Blocked Port:** For the Remote Reinitialization of the Blocked Port

Pilot & Depilot Pressures

Reset Signal always takes priority over Set Signal in a Step Module.



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Specifications

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

Cv 0.14 (1.8)

Flow rate at 90 PSI (6 bar) in SCFM (l/mn ANR)....6.4 (180)

Function –
3-Way, Double Air operated Valve with priority reset (Reset signal takes precedence over set signal).

Materials –
- Body.....Polyamide
- Poppet.....Polyurethane
- Seals..... Nitrile (Buna N)

Number of Operations with Dry Air at 90 PSI and 70°F, Frequency 1 Hz .....10 Million

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

Ports –
PSEA127: Supply 1/4", All Others 5/32"

PSDA12, PSDB12, PSBA12, PSVA12: All 5/32 use Semi- Rigid Nylon or Polyurethane Tube

Response Time ..... 2 to 3 msec

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

Sequencer Special Applications

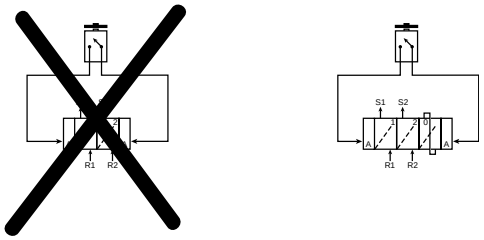
Application of Dummy Modules

In most applications the rule of thumb for sequencer circuit design is “one step module for each step in the cycle”.

Some applications, particularly those involving several sequencers controlling sub-programs, may require the use of dummy modules.

Following are the most frequent instances and the method for handeling each one.

Less than 3 Steps in the Cycle

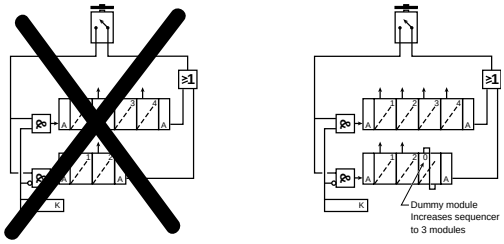


Module 1 cannot start because of module 2 resetting it while at the same time pressurizing the recycle loop.

Dummy module 0, with its output connected to its feedback port, pressurizes the recycle loop without resetting module 1. In most cases, sequencers must have at least 3 modules to operate.

Parallel Lines in the Cycle

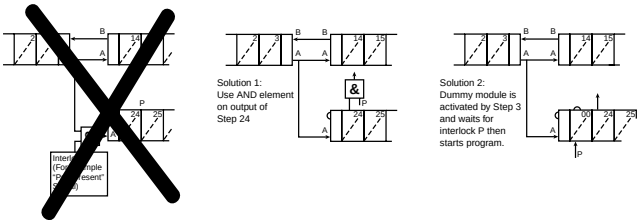
– Input k determines which program will be activated.
– One program has less than 3 steps.



The rule of “3 modules minimum” applies in this case also.

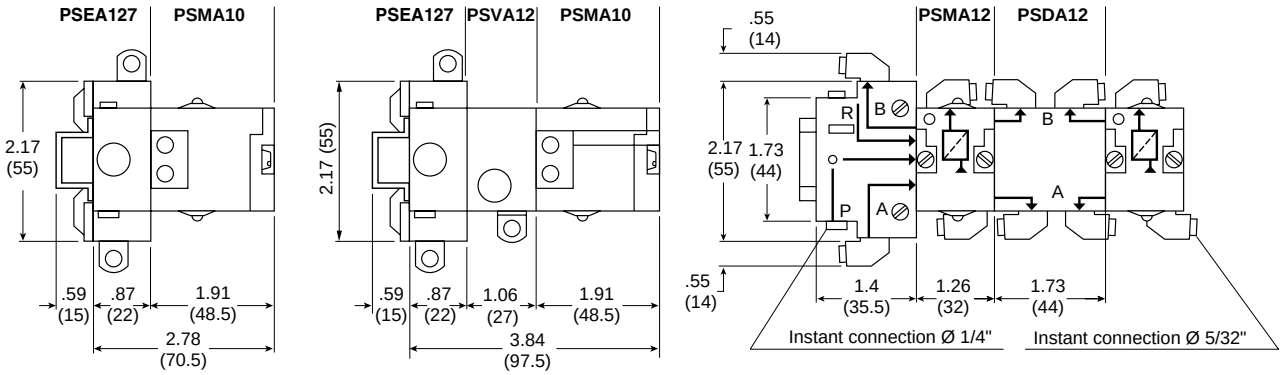
Parallel Lines in the Cycle

– Both programs operate simultaneously.
– Interlock P is required to start the second program.



Module 3 is reset by module 4.
If interlock P is delayed, module 3, reset by 14, will be unable to satisfy AND the function. Therefore module 24 will not start.

Dimensions



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A

Application Example

The sequencer is inherently adapted to the control of sequential automation cycles as shown in the following example.

Machine

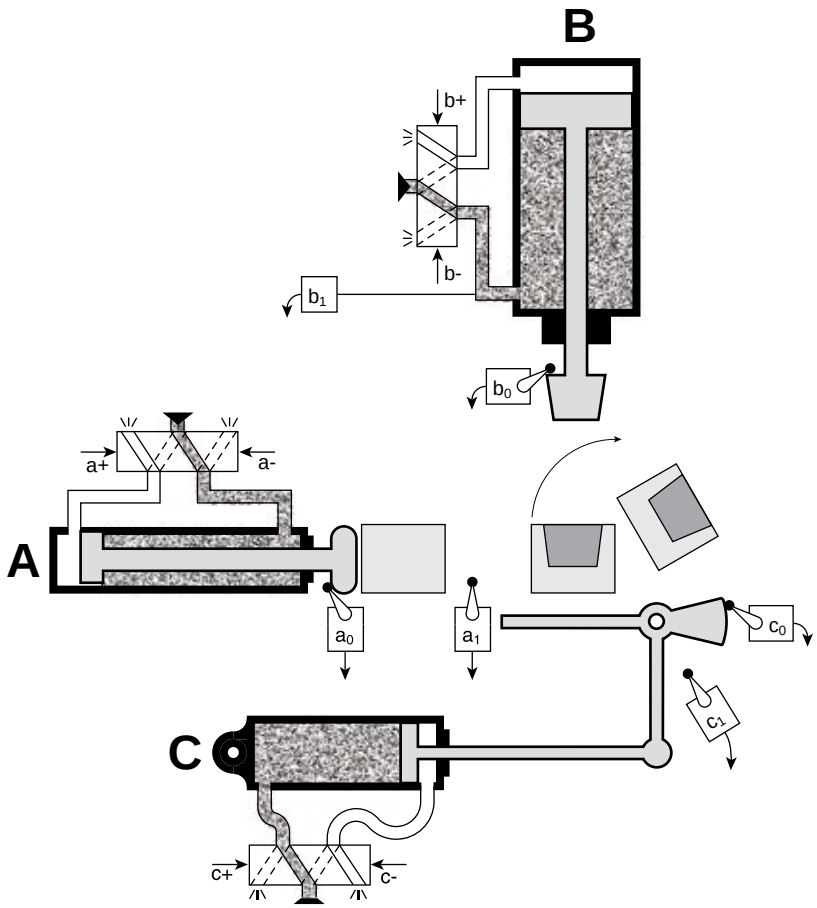
This typical pneumatic part forming machine consists of three pneumatic cylinders with the following functions:

- Cylinder **A**: Part Transfer
- Cylinder **B**: Part Forming
- Cylinder **C**: Part Ejecting

A 4-Way power valve controls each cylinder.

Limit switches are mounted at both ends of each cylinder stroke.

Push button starts the cycle..



Cycle

Step 1. Part is Transferred	**A+**
Step 2. Part is Formed. **A** retracts	**B+ A-**
Step 3. Cylinder **B** Retracts.	**B-**
Step 4. Part is Ejected.	**C-**
Step 5. Cylinder **C** Extends.	**C+**

Sequencer

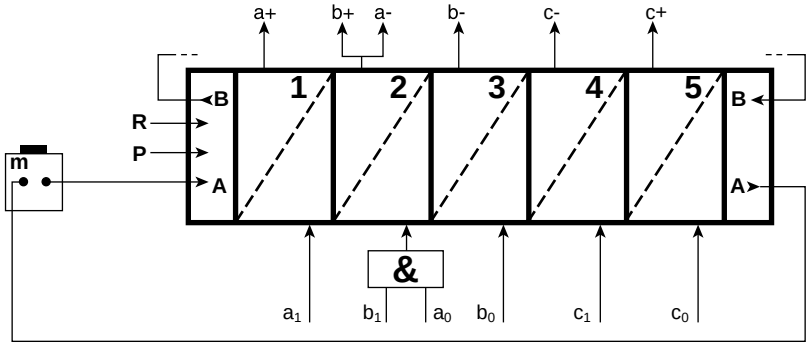
A step module is assigned to each step (or line) in the cycle.

Since there are 5 steps in the cycle, there are 5 step modules in the sequencer.

Control piping of the sequencer is immediately apparent:

- The **output** from each step module orders its assigned movement(s).
- The **feedbac**k from each completed movement(s) is directed back to the step module where the movement originated.

START push button is connected in series in the recycle loop.



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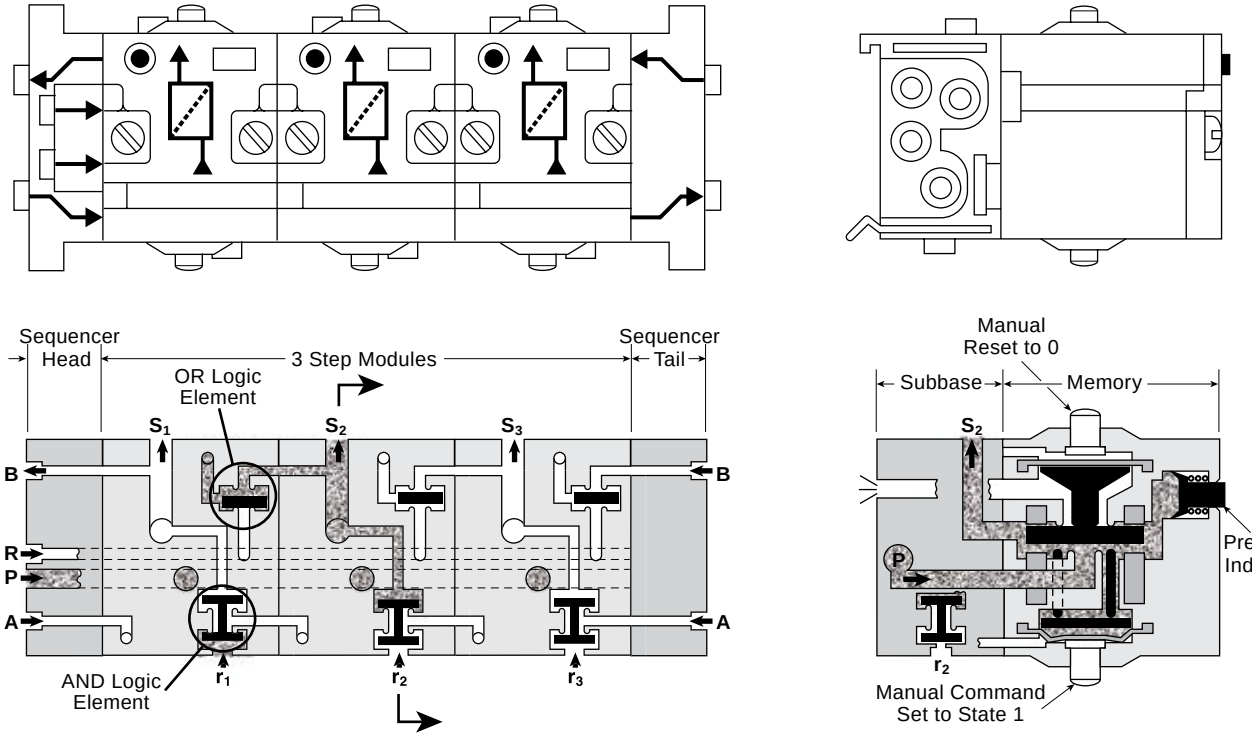
Operating Principle

Each step module consists of a MEMORY mounted on a subbase. Integrated in each subbase are an AND function and an OR function. Module interconnections automatically plug in during sequencer assembly.

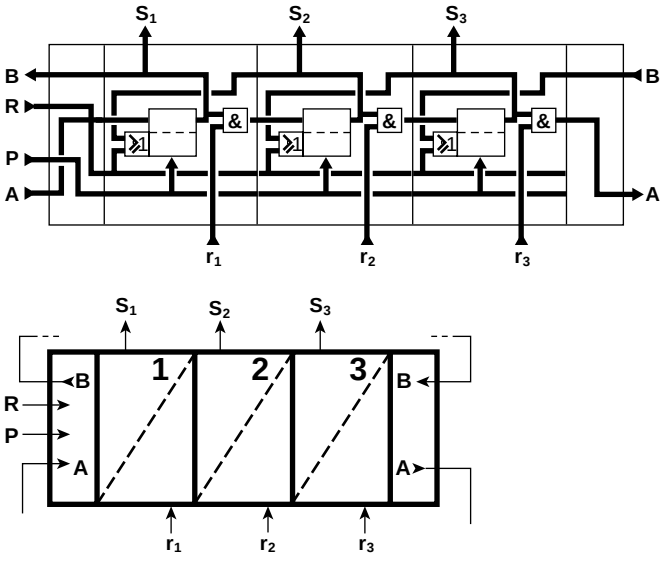
Two channels run from one end of the completed sequencer to the other:

- Common Supply Channel, inlet in entry module (P)
- General Reset Channel, input in entry module (R)



Internal Operation Cutaway Views

Schematic



Operating Principle

Step Module MEMORY is set (ON) by output from preceding AND element.

Output from MEMORY has three functions:

1. Provides working output for that step.
2. Resets preceding step module through OR element.
3. Pressurizes one input of its own AND element.

Upon completion of movement in the step, feedback signal “r” pressurizes second input of AND element. AND element goes PASSING (ON) and sets following step module MEMORY (ON).

Advantages of Modular Schematic

- Circuit design is immediately evident. Because circuit logic is integrated the designer has only to stack up modules. No need for elaborate diagrams.
- Cycle progression is clearly displayed. Position indicator identifies active step at all times.
- Cycle progression is fully interlocked. False feedback signals are rejected because the AND element in the active step module is the only one in PASSING state.
- Varing types of operating modes, emergency stops, “safeties” and interlock information can be plugged in as modular circuit elements.

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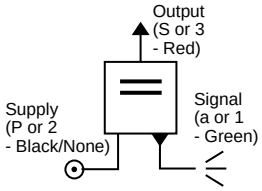
A

Bleed Sensor Relay
For Mounting On Any 3-Port Base

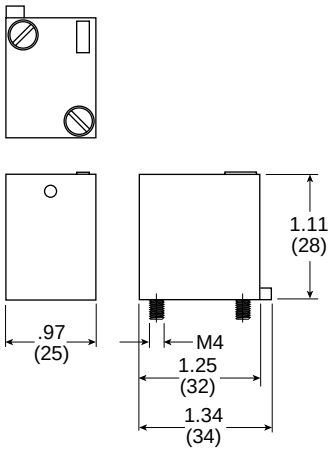


PRFA10

Part Number	Description
PRFA10	Provides a supply to a bleed sensor and generates an output signal when operated.
PRFA12	PRFA10 on PZUA12 Subbase

Dimensions

PRFA10



Specifications

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

Cv 0.14 (1.8)

Flow rate at 90 PSI (6 bar) in SCFM (l/mn ANR) ... 6.4 (180)

Function –
3-Way Normally Closed NNP ..... Yes

Materials –
- Body ..... Polyamide
- Poppet ..... Polyurethane
- Seals ..... Nitrile (Buna N)

Mounting –
Sensor ..... 3-Ported Subbase

Nozzle Consumption –
0.00487ft³ / PSI Min (2 l / bar - Min ANR) **Nozzle Ø (Of Sensor)** ..... 1/32" (3mm)

Number of Operations with Dry Air at 90 PSI and 70°F, Frequency 1 Hz ..... 10 Million

Operating Positions ..... All

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

Response Time ..... 2 to 3 msec

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

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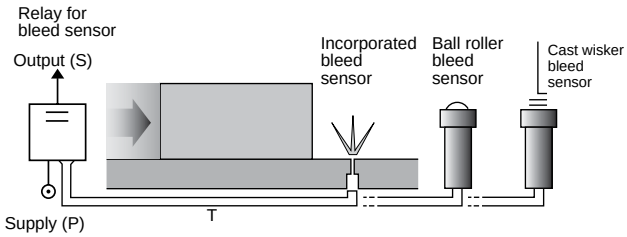
Bleed Sensors

Bleed sensors are used for the sensing of low forces and short travel. They are simple to install and connect. The detected object blocks the bleed air at low flow. An increase of pressure in tube (T) creates a pneumatic signal (S) on the relay equal to the supply pressure (P).

PXFA111

PXFA121

PXFA131

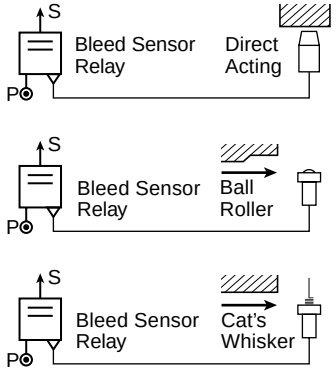


For Use With PRFA12 Relay		
Part Number	**Port**	**Actuator**
PXFA111	5/32" Instant	Touch
PXFA121	5/32" Instant	Ball Roller
PXFA131	5/32" Instant	Cat's Whisker

Application

Bleed sensors make it possible to sense very low actuating forces or small motions in a small space. They are easy to install and connect, as they only require a single tube.

Note: The length of the interconnecting tube must remain short if quick response times are required.



Specifications

Minimum Pre-Travel at 6 bar –
PXFA12• ..... .040 (1 mm)

Maximum Travel –
PXFA12• ..... .110 (2.8 mm)

Minimum Operating Force at 90 PSI (6 bar) –
PXFA12• ..... 11 oz. (3 N)

Minimum Operating Torque at 90 PSI (6 bar) –
PXFA13• .....1.3 in-oz (12.5 mmN) (Center of Operator)

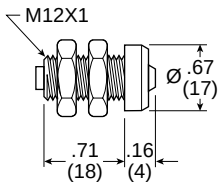
Sensing Distance –
PXFA11• ..... Direct
PXFA12• ..... Direct
PXFA13• ..... Direct

Sensing Angle –
PXFA13• ..... 10°

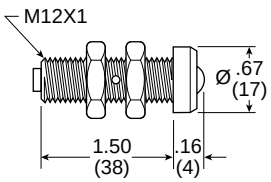
For PRFA12 Specifications, see Relays in Section A of this Catalog.

Dimensions

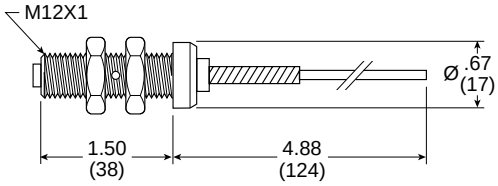
PXFA111



PXFA121



PXFA131



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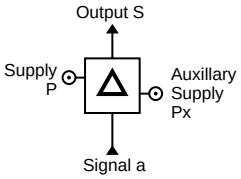
A

Amplifier Relay
For Mounting On 4-Port Base

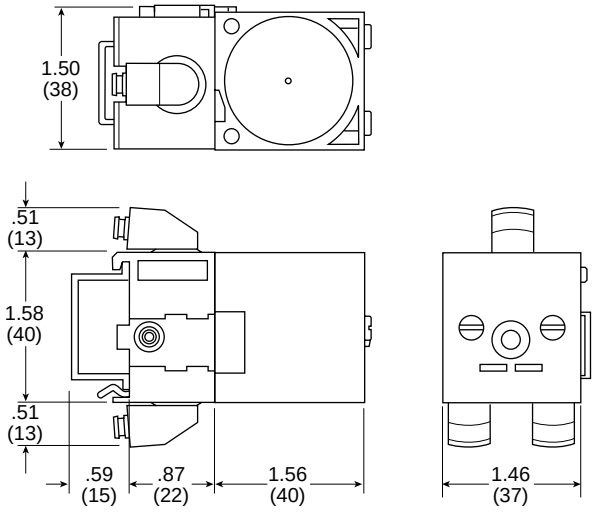


PRDA10

Part Number	Description
PRDA10	Amplifies the low pressure With signal coming from a fluidic Manual proximity sensor to a Override usable level.
PRDA12	PRDA10 on PZUB12 Subbase

Dimensions

PRDA12



Specifications

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

Cv 0.14 (1.8)

Flow rate at 90 PSI (6 bar) in SCFM (l/mn ANR) ... 6.4 (180)

Function –
3-Way Normally Closed NNP ..... Yes

Materials –
- Body ..... Polyamide
- Poppet ..... Polyurethane
- Seals ..... Nitrile (Buna N)

Mounting –
Amplifier ..... 4-Ported Subbase

Number of Operations with Dry Air at 90 PSI and 70°F, Frequency 1 Hz ..... 10 Million

Operating Positions ..... All

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

Response Time ..... 2 to 3 msec

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

PRD - Amplifier Relay Only:

Air Signal Pressure (a) ..... .007 to .03 PSI (0.5 to 2 mbar)

Auxiliary Supply Pressure (Px) –
1.5 to 3 PSI (100 to 200 mbar)

Consumption –
At 1.5 PSI (100mbar) with a = 0: 0.1 SCFM (3Nl/mn)

Maximum Operating Frequency ..... 10 Hz

Manual Control ..... PRDA

Replacement Diaphragm for PRDA .... PPRL08 (Pack of 10)

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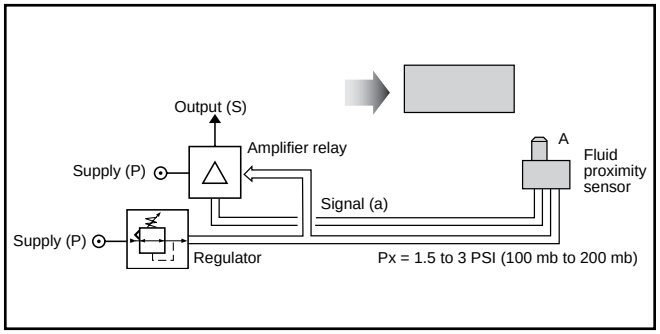
Fluidic Proximity Sensor
Amplified, 1/8" I.D. Internal Orifice

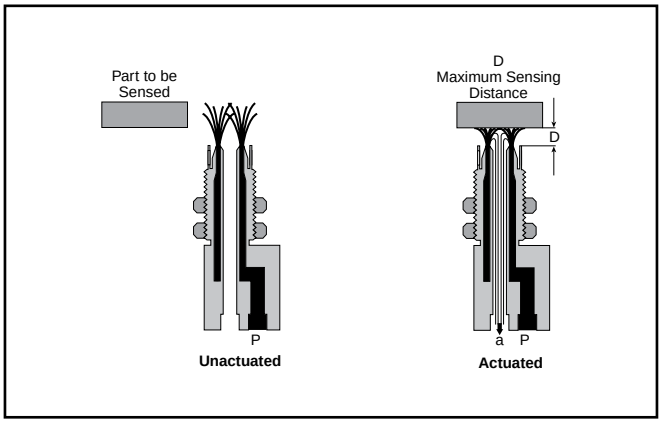
PXDA111

For Use With PRDA12 Amplifier Relay			
Part Number	**Sensing Distance**	**Ø Mounting**	**Connections**
PXDA111	5/64" to 3/16" (2 to 5mm)	M12 x 2	5/32" (4mm) Instant

Operating Principle, Characteristics

Fluidic proximity sensors are used when the application requires non-contact sensing of the moving part. A fluidic sensor emits a continuous air jet (A) at low pressure. When the object to be detected interferes with this air jet, a back pressure (a) is created. When this back pressure reaches the amplifier relay, an output signal (S) is generated equal to supply pressure (P).



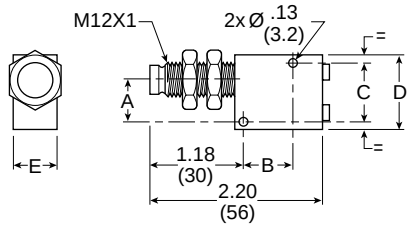


Mounting Styles

Two mounting styles are provided on each Sensor.
Nose Mount: Nuts are supplied
Flush Mount: Two clearance holes are provided in Sensor body.

Dimensions

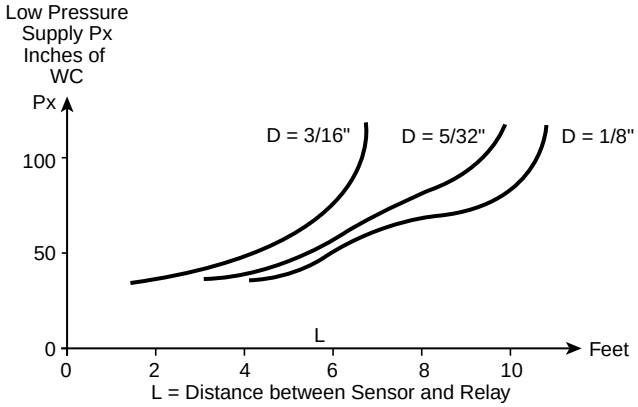
PXDA111



	inch	mm
A	.49	12.5
B	.67	17
C	.71	18
D	.98	25
E	.59	15

Specifications

Sensing Distance –
PXDA11• ..... .04 to .20 (1 to 5 mm)



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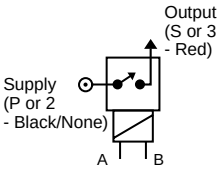
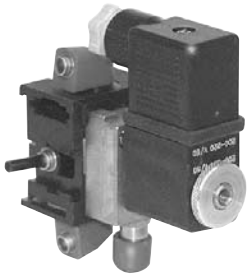
A

Solenoid Relay
With PZUA12 Subbase





With manual override and plug-in DIN connector 22 x 30 mm (43650 Form B Industrial)

PRSA121B

Part Number	Description	
PRSA121B	24VAC 50/60 Hz	6VA
PRSA121F	120VAC 60 Hz	6VA
PRSA122B	24VDC	5W

Solenoid Coil
With Plunger and Plug-in DIN Connector (22 x 30mm)

PVAF10

Part Number	Description	
PVAF102B	24VDC	5W
PVAF102E	48VDC	5W
PVAF101B	24VAC 50/60 Hz	6VA
PVAF101E	48VAC 50/60 Hz	6VA
PVAF101F	120VAC 60 Hz	6VA
PVAF101M	240VAC 60 Hz	6VA

Coil Mount
For Mounting on any 2 or 3-Port Subbase

PRSD10

Part Number	Description
PRSD10	For mounting the Solenoid Coil and Plunger on a 3-Port Subbase With Manual Override

Specifications

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

Consumption –
Direct Current: Holding = 5 W
Alternating Current: Holding = 6 VA; Inrush = 20 VA

Cv 0.05 (0.65)

Degree of Protection ..... IP 65

Duty Rating ..... 100 %

Electrical Connection –
Plug-in Connector, 22-30 mm,
Ø 9 mm Cable Entry, Terminal Capacity 1.5 mm²

Flow rate at 90 PSI (6 bar) in SCFM (l/mn ANR) 2.1 (60)

Manual Control ..... Yes

Materials –
- Body ..... Polyamide
- Poppet ..... Polyurethane
- Seals ..... Nitrile (Buna N)

Mounting ..... 3-Ported Subbase

Number of Operations with Dry Air at 90 PSI and 70°F, Frequency 1 Hz ..... 10 Million

Operating Positions ..... All Positions

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

Rated Insulation Voltage ..... 660V AC or DC

Response Time ..... 8 to 12 msec

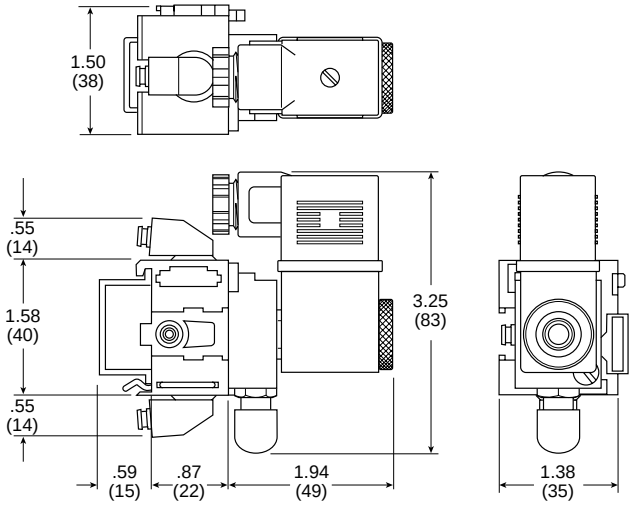
Standard Voltages –

24 VDC	48 VDC	24 VAC	48 VAC	120 VAC	240 VAC

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

Dimensions

PRSA121B



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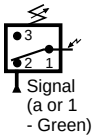
Electrical Pressure Switch Without Subbase

For Mounting On Any 2 or 3-Port Base



LPS10/*

Part Number	Description
LPS10/2	1.5 to 30 PSIG Adjustable Senses Presence of Air Pressure to provide Electrical Switching
LPS10/3	10 to 100 PSIG Adjustable Senses Presence of Air Pressure to provide Electrical Switching

Units supplied with 3 crimp-on electrical terminals with insulators.

Electrical Characteristics

5A / 250V, 1 N.O. or 1 N.C. (SPDT) Contact

Terminal Number	Description
1	Common
2	Normally Passing
3	Normally Non-Passing

Specifications

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

Degree of Protection
IP40 with Molded Connector

Depilot Pressure
Differential less than 25% of maximum range

Electrical Connection
Spade Connectors or Molded Cable

Function
SPDT Contacts (NO or NC)

Insulation Voltage Rating
250V AC or DC

Materials
- Body.....Polyamide
- Poppet..... Acetal
- Seals..... Nitrile (Buna N)

Maximum Operating Frequency
2 Hz

Mechanical Life
10 Million Operations

Mounting
2 or 3-Port Subbase

Number of Operations with Dry Air at 90 PSI and 70°F – Frequency 1 Hz
10 Million

Operating Positions
All Positions

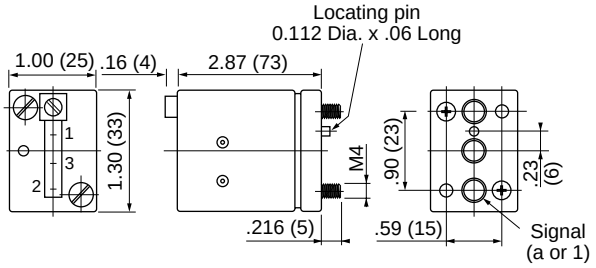
Operating Pressure
115 PSIG (8 bar Max.)

Rated Current
5A (3A with 7097J03711 Cable)

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

Trip Pressure
LPS10/2 - 1.5 to 30 PSI (0.1 to 2 bar) Adjustable
LPS10/3 - 10 to 100 PSI (0.7 to 7 bar) Adjustable

Dimensions



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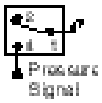
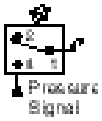
A

Line Mounted Pressure Switch
(Includes Manual Override and Visual Indicator)



Fixed



Adjustable

PS1P1091

Part Number	Description	
	Electrical	**Pneumatic**
PS1P1081	1SPDT Contact 5A / 250V	20PSI Fixed Switching Pressure
PS1P1091	1SPDT Contact 5A / 250V	30-75 PSI Adjustable Switching Pressure

Specifications

Adjustable Trip Pressure
30 to 75 PSI (2 to 5 bar)

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

Degree of Protection
IP 40

Electrical Connections
Screw Terminals

Fixed Trip Pressure
≥20 PSI (1.3 bar)

Function
SPDT Contacts

Insulation Voltage Rating
250V AC or DC

Materials
- Body.....Polyamide
- Poppet.....Polyurethane
- Seals.....Nitrile (Buna N)

Maximum Operating Frequency
10 Hz

Mounting
Inline or 35 mm DIN Rail

Nominal Current Rating
5 A

Number of Operations with Dry Air at 90 PSI and 70°F – Frequency 1 Hz
10 Million

Operating Positions
All Positions

Operating Pressure
115 PSIG Max. (8 bar)

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

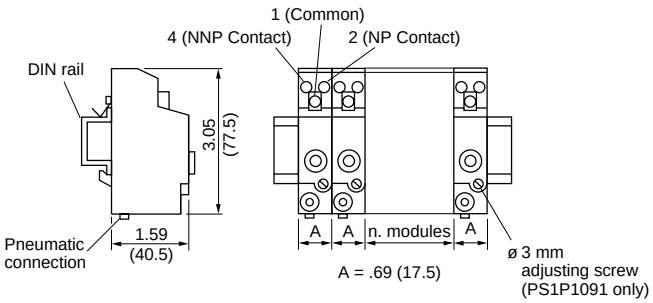
Response Time
2 to 3 msec

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

Electrical Life

		Type of Circuit									
		AC (Switching Capacity in VA)					DC (Switching Capacity in W)				
		12V	24V	48V	120V	220V	12V	24V	48V	110V	220V
For 1 Million Operations	AC	15	25	56	115	140	17	24	37	50	54
	DC	54	86	190	370	440	42	58	88	115	105
For 2 Million Operations	AC	-	-	-	-	-	10	14	25	40	23
	DC	-	-	-	-	-	30	43	70	100	90
For 5 Million Operations	AC	8	10	14	19	21	-	-	-	-	-
	DC	21	35	82	160	200	-	-	-	-	-

Dimensions



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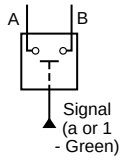
Pressure Switch Without Subbase

For Mounting On Any 2 or 3-Port Base



PREA10

Part Number	Description
PREA10	With Manual Override and Plug-in DIN Connector 22 x 30 mm
PREA12	PREA10 on PZUA12 Subbase

Specifications

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

Degree of Protection ..... IP 65

Depilot Pressure ..... 30 to 37 PSI (2 to 2.6 bar)

Electrical Characteristics.... N.O. (NNP) Contact, 5A / 660V

Electrical Connection –
Plug-in Connector, 22-30 mm,
Ø 9 mm Cable Entry,
Terminal Capacity 1,5 mm2

Function .....NO Contact

Insulation Voltage Rating .....660V AC or DC

Materials
- Body.....Polyamide
- Poppet.....Polyurethane
- Seals.....Nitrile (Buna N)

Maximum Operating Frequency ..... 10 Hz

Mounting .....2 or 3-Ported Subbase

Nominal Current Rating ..... 10 A

Number of Operations with Dry Air at 90 PSI and 70°F, Frequency 1 Hz ..... 10 Million

Operating Positions..... All Positions

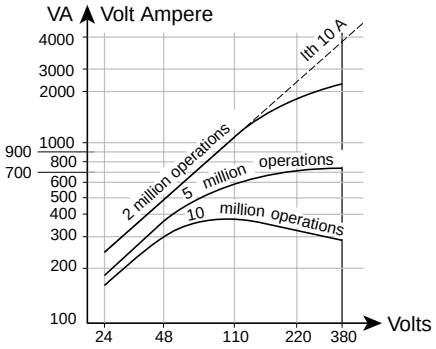
Operating Pressure .....115 PSIG Max. (8 bar)

Response Time .....2 to 3 msec

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

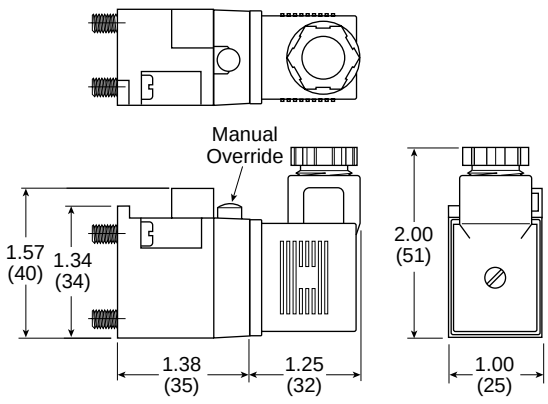
Trip Pressure..... 32 to 40 PSI (2.2 to 3 bar)

Mechanical Life –



Dimensions

PREA10



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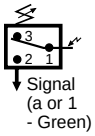
A

Vacuum Switch

For Mounting On Any 2 or 3-Port Base



LPSV10

Part Number	Description
LPSV10	Senses Presence of Vacuum

Units supplied with 3 crimp-on electrical terminals with insulators.

Electrical Characteristics

5A / 250V, 1 N.O. or 1 N.C. (SPDT) Contact

Terminal Number	Description
1	Common
2	Normally Passing
3	Normally Non-Passing

Cable

7097J03711

Part Number	Description
7097J03711	Optional for LPS10 / LPSV

Units supplied with 3 crimp-on electrical terminals with insulators.

Terminal Number	Wire Color
1	Brown
2	Blue
3	Black

Specifications

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

Degree of Protection
IP40 with Molded Connector

Depilot Pressure
Differential less than 25% of maximum range

Electrical Connection
Spade Connectors or Molded Cable

Function
SPDT Contacts (NO or NC)

Insulation Voltage Rating
250V AC or DC

Materials
- Body.....Polyamide
- Poppet..... Acetal
- Seals..... Nitrile (Buna N)

Maximum Operating Frequency
2 Hz

Mechanical Life
10 Million Operations

Mounting
2 or 3-Port Subbase

Number of Operations with Dry Air at 90 PSI and 70°F – Frequency 1 Hz
10 Million

Operating Positions
All Positions

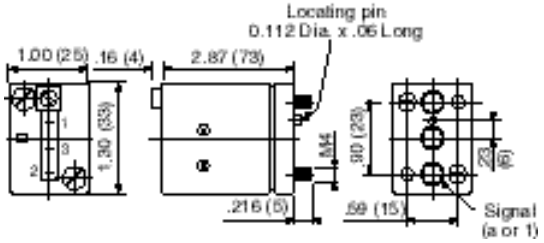
Operating Pressure
115 PSIG (8 bar Max.)

Rated Current
5A (3A with 7097J03711 Cable)

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

Trip Pressure
LPS10/2 - 1.5 to 30 PSI (0.1 to 2 bar) Adjustable
LPS10/3 - 10 to 100 PSI (0.7 to 7 bar) Adjustable

Dimensions



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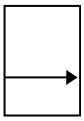
A

For Mounting Logic Elements And Relays

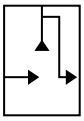
3-Port Subbases

With 5/32" Instant Swivel Connections, Pressure Indicators and Integral Lock for Stacking



Common Input

PZUA12



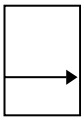
Cascade

PZUC12

Part Number	Description
PZUA12	Common Input
PZUC12	Cascade

4-Port Subbases

With 5/32" Instant Swivel Connections, Pressure Indicators and Integral Lock for Stacking



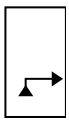
Common Input

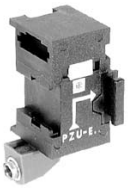
PZUB12

Part Number	Description
PZUB12	Common Input

Entry Module

With Integral Lock for Stacking





PZUE12

Part Number	Description
PZUE12	Relay Entry Module (Used with PZUA12, PZUB12 and PZUC12 Bases)

Specifications

Materials ..... Polyamide and Brass

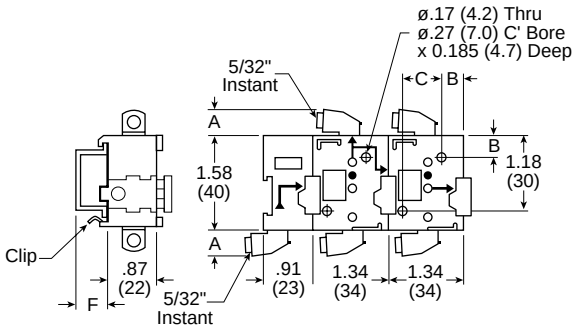
Ports –
5/32" Instant for Semi- Rigid Nylon or Polyurethane Tube

Notes:

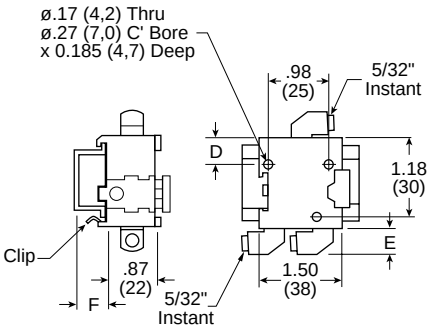
1. Can be used as individual units or in stacking assemblies.
2. May be DIN rail mounted using spring clip or surface mounted using 2 socket head cap screws.
3. PZUA12, PZUB12 and PZUC12 can be mounted together in the same assembly.
4. Units interconnect with 5/32" Tube. For replacement use 1" (25mm), 5/32" semi-rigid nylon or polyurethane.

Dimensions

PZUE12, PZUC12, PZUA12



PZUB12



	inch	mm
A	.55	14
B	.39	10
C	.59	15
D	.47	12
E	.20	5
F	.59	15

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A

Independent Base

BNC3P10

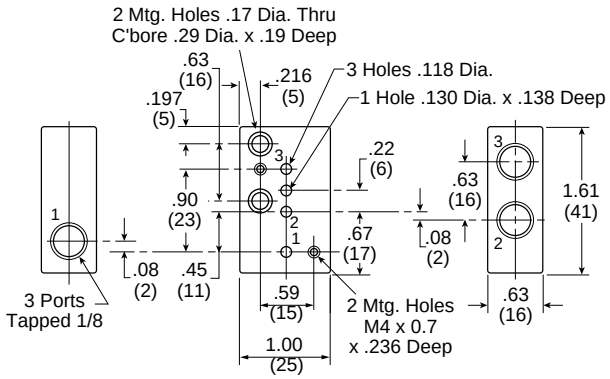
Part Number	Description	# of Ports
BNC3P10	1/8" NPT, Individual Mount	3
BPB3P10	5/32 Instant Fitting, Machine Mount	3

Specifications

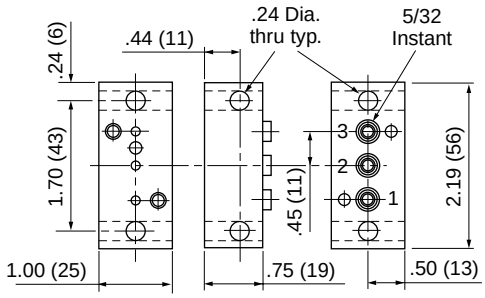
Materials (BNC).....Plated Zinc
Materials (BPB).....Aluminum

Dimensions

BNC3P10



BPB3P10



Independent 2-Port Pulse Base

BNC3P20

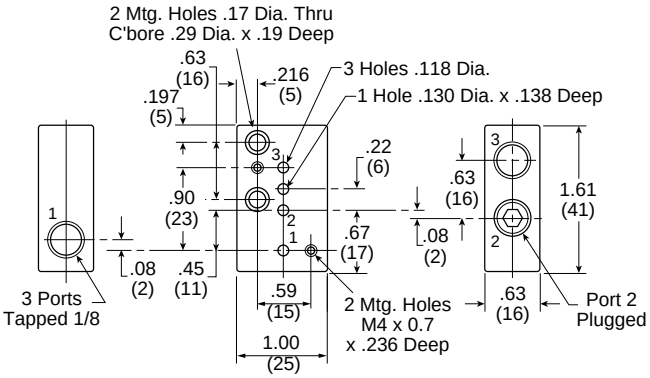
Part Number	Description
BNC3P20	1/8" NPT, Port 1 and 2 Common
BPB3P20	5/32 Instant Fitting, Machine Mount, Port 1 and 2 Common

Specifications

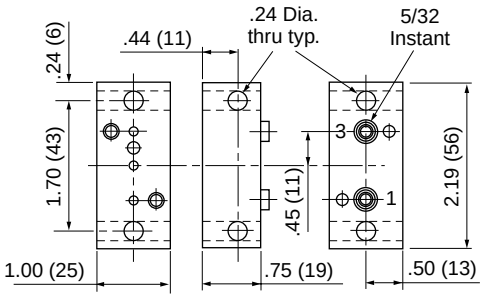
Materials (BNC).....Plated Zinc
Materials (BPB).....Aluminum

Dimensions

BNC3P20



BPB3P20



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Base Usage - Shows which components can be mounted with which base types.

Element	Part No.	Base Description / Part Number				
		Type	2-Port	3-Port	4-Port	6-Port
		Stacking		PZUA12	PZUB12	PSBA12
		Stacking		PZUC12		
		Inline	BNC3P20	BNC3P10		
		Inline	BPB3P20	BPB3P10		
Step Module						
Step Module w/Overrides	PSMA10					X
Step Module w/o Overrides	PSMB10					X
Logic						
AND	PLLC10			X		
OR	PLKC10			X		
YES	PLJC10			X		
NO	PLNC10			X		
Threshold NOT	PLND10			X		
Relays						
Sensor	PRFA10			X		
Solenoid	PRSA10		X	X		
Electric Pressure Switch	PREA10			X	X	
E/P Pressure Switch	LNOTPS10			X		
Electric Pressure Switch	LPS10		X	X		
Vacuum/Electric	LPSV10		X	X		
Timers						
Timer (NNP) Relay	PRTA10		X*	X		
Timer (NNP) Relay	PRTB10		X*	X		
Timer (NNP) Relay	PRTE10		X*	X		
Timer (NP) Relay	PRTC10		X*	X		
Timer (NP) Relay	PRTD10		X*	X		
Timer (NP) Relay	PRTF10		X*	X		
Other Relays						
Memory Relay	PLMA10			X	X	
Amplifer Relay	PRDA10			X	X	

*Fuctionality Must be Checked.

Port	Label		Color
Supply	P	2	Black / None
Signal	a	1	Green
Output	S	3	Red

	Entry Module	Head / Tail
	PZUE12	PSEA127
Used With Base	PZUA12	PSBA12
	PZUC12	
	PZUB12	

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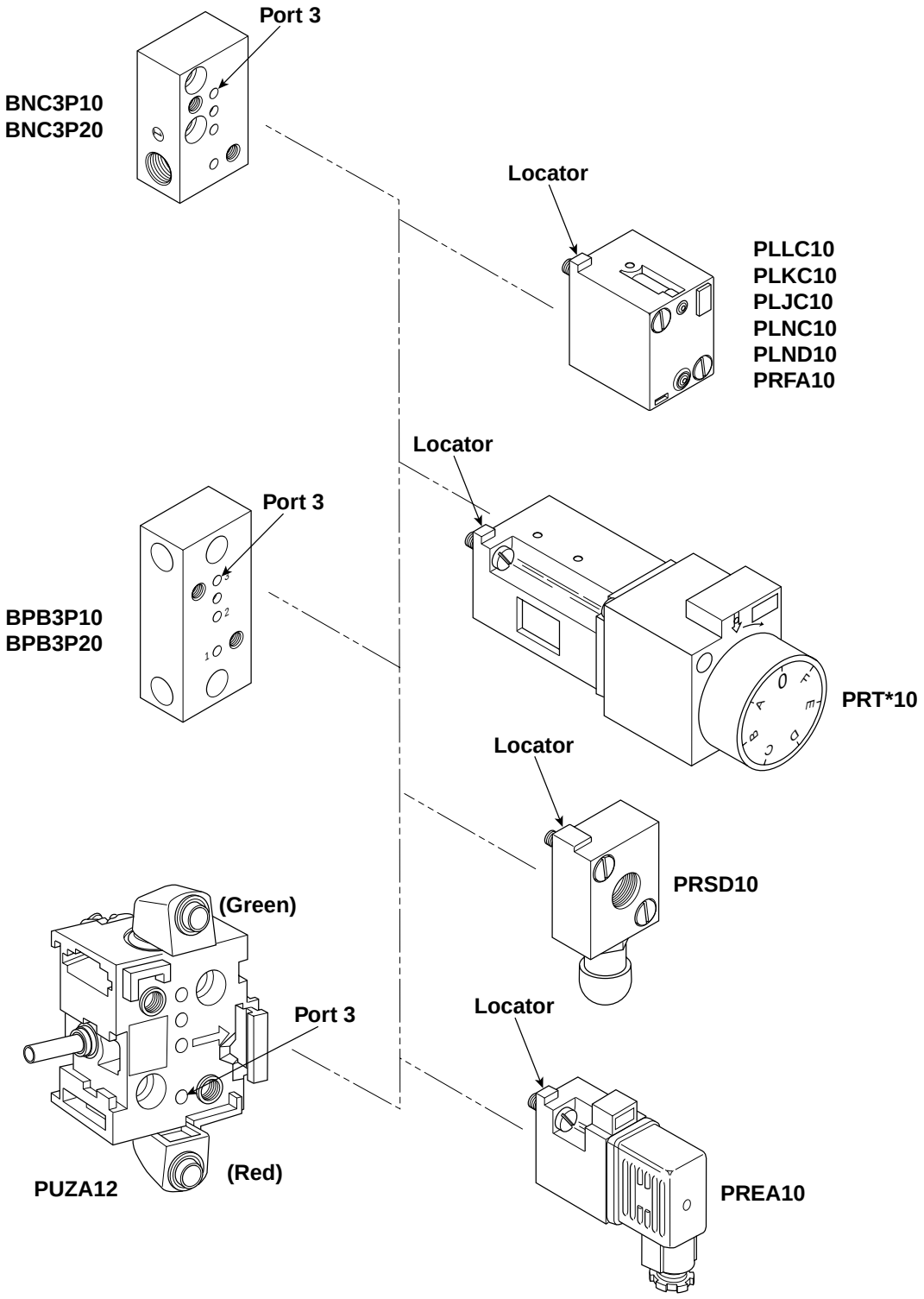
⚠ **CAUTION:** The logic and relay units shown on the right can be improperly assembled to the bases shown on the left. For proper assembly, the locators shown should be oriented towards port 3 on the subbases.



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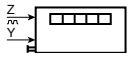
With 5/32" Instant Straight Connections

Totalizing Counters



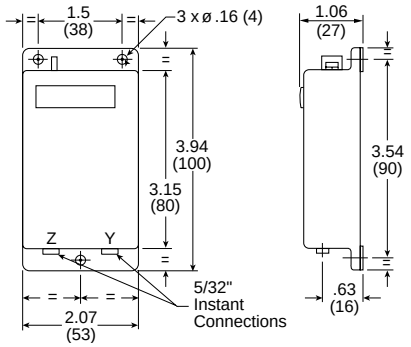
PCTA11

PCTB11

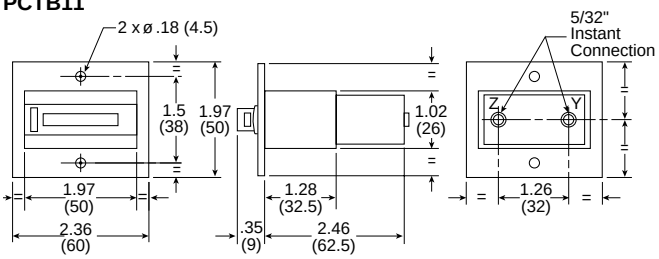
Part Number	Description	
PCTA11	0 to 999,999	Surface Mount
PCTB11	0 to 99,999	Panel Mount with 60 x 50 mm Bezel
	(Lockable cover available, see below)	

Dimensions

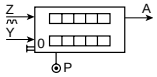
PCTA11



PCTB11



Predetermined Counters

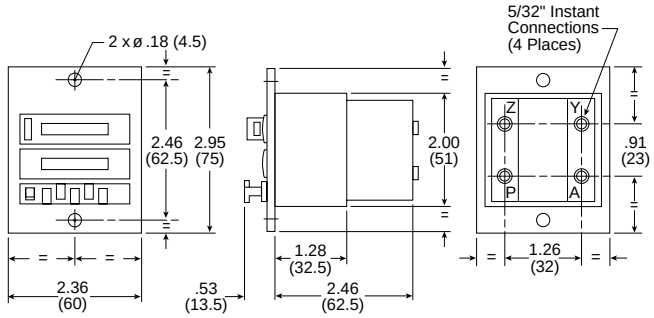


PCPA11

Part Number	Description	
PCPA11	0 to 99,999	Panel Mount with 60 x 75 mm Bezel
	(Lockable cover available, see below)	

Dimensions

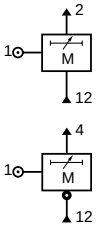
PCPA11



Lockable Cover

Part Number	Description
PXCA1	For 60 x 50 mm Bezel
PXCB1	For 60 x 75 mm Bezel

Timers with Calibrated Dial

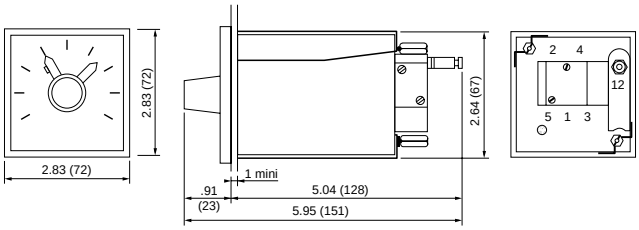


PCMC11

Part Number	Description
PCMC11	3 to 100 Seconds, With Reset
PCMD11	0.3 to 10 Minutes, With Reset
PCME11	3 to 100 Minutes, With Reset

Dimensions

PCMC11, PCMD11, PCME11



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A

Specifications

	PCTA	PCTB	PCPA	PCMC, PCMD & PCME
Connections	Standard: 5/32" Instant for Semi-rigid Tube (Nylon and Polyurethane).			
Degree of Protection	—	IP55 with Lockable Cover	IP55 with Lockable Cover	—
Function	—	—	NNP or NP	NNP
Maximum Operating Frequency	20 Hz with Mark / Space Ratio of 1/1		—	—
Mechanical Life (Number of Operations) with Dry Air at 90 PSI and 70°F – Frequency 1 Hz	10 Million			10 Million
Mounting	Surface Mount	Panel Mount	Panel Mount	Panel Mount
Operating Positions	All Positions	All Positions	All Positions	All Positions
Operating Pressure	40 to 130 PSI (3 to 9 bar)			40 to 130 PSI (3 to 9 bar)
Operating Temperature	32°F to 140°F (0°C to 60°C)			32°F to 122°F (0°C to 50°C)
Pneumatic Reset Time	150 ms	150 ms	150 ms	200 ms
Setting Accuracy	—	—	—	—
Storage Temperature	-40°F to 160°F (-40°C to 70°C)			-22°F to 140°F (-30°C to 60°C)
Timing Accuracy	—	—	—	± 2%
Type of Air	Dry with 40 µm Filtration			Dry with 5 µm Filtration

Operating Characteristics

PCTA11 and PCTB11	Count and display the Number of impluses received.
	Pulse input at Port Z.
	Pneumatic reset at Port Y.
PCPA11	Supplies a signal at A when the preselected Number of pulses has been reached.
	The required Number of impulses is preselected using the keys associated with the lower display, which remains unchanged during counting.
	The pulses to be counted are applied to Port Z. Signal A is given as soon as the two displays show the same value.
	Port Y is used to reset the counter with a single pulse. (1)
PCMC11, PCMD11 and PCME11	The required time is preselected directly on the dial, by moving the preselection pointer to the required position.
	Timing starts when a signal appears at 12.
	This signal must be maintained continuously until the output signal appears at 2.
	Signal 2 is given at the end of the timing period.
	The output signal is “on delay” if connected to 2 and “off delay” if connected to 4.
	The timer is reset by breaking the command signal at 12.
	Units have constant bleed rate of 0.14 SCFM @ 72 PSIG (4Nl/min @ 5 bar)

(1) Note: “Output” may not be used as the reset signal.

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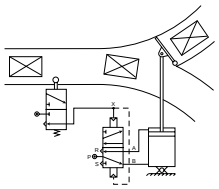
Binary Counter Valve



2147900

Part Number	Description
2147900	Pneumatic Actuated
2147950	Electric Actuated

Specifications

Air Quality –
Standard Shop Air, Lubricated or Dry, 50 µm Filtration

Flow ..... 460 Nl/min

Materials –
- Body.....Anodized Aluminum
- Other..... Steel
- Seals.....NBR and PTFE
- Spool..... Brass

Mounting ..... M4 Bolts Thru Holes in Mounting Plate

Operating Pressure ..... 58 to 145 PSIG (4 to 10 bar)

Ports –
Pneumatic..... 1/4" (Ports 1,2,3,4,5)
Actuation Port..... 1/8"
Electrical ..... 1/4" (Ports 1,2,3,4,5)
Electrical Connection...P2E Solenoid, DIN 43650 Form C

Temperature Range.....32°F to 158°F (0°C to +70°C)

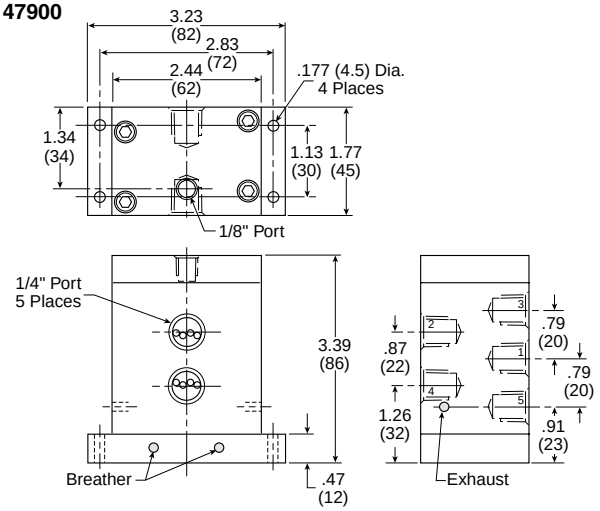
2147950 – (Solenoid & Cable Plug Must be Ordered Separately)
Solenoid (Manual Override, Non-locking) P2E-KV32C1
Cable Plug P8C-H

Features

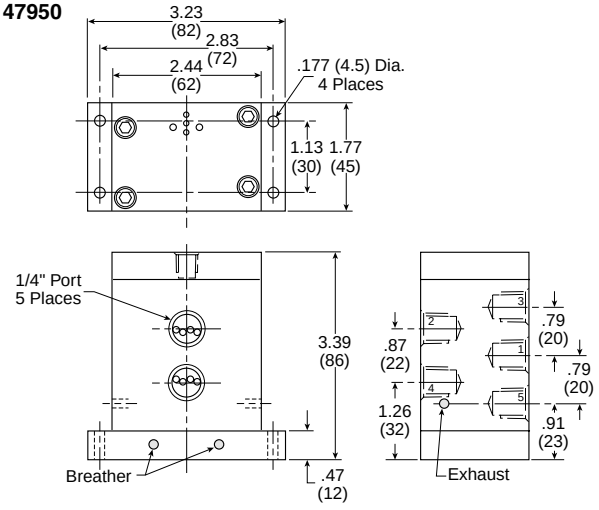
This valve is controlled by an internal integrated sequence system and utilizes the ball-point principle. (Two pilot spools and a main spool are fully integrated in an aluminum block.)

Dimensions

2147900



2147950



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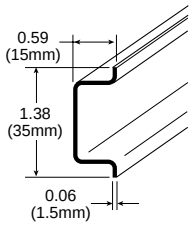
A

DIN Rail



Part Number	Description
AM1DE200	6 Foot Rail Length

Subbase Plugs for 3 or 4-Port Subbases

PPRL05

Part Number	Base Component	Description
PPRL05	PZUA12	1 Set of 50 Subbase Plugs
	PZUB12	
	PZUC12	

Head and Tail Module Rail Clamping Components

PPRL09

Part Number	Base Component	Description
PPRL09	PSEA12	1 Set Comprising Of: - 20 Hooks - 20 Screws - 20 Springs

Mylar Diaphragms for Amplifier Relays

Part Number	Base Component	Description
PPRL08	PRDA10	1 Set of 10 Mylar Diaphragms
	PRDA12	

Note: To obtain 1 set of 10 Mylar Diaphragms for PRDA10, order 1 of PPRL08.

Base Mounted Component Screws M4 x 0.7 With 7mm Head Diameter

Part Number	Element	Screw Length	Replacement Screw Part Number
PLMA10	Memory Relay	50 mm	K05M11040050
PREA10	Electric Pressure Switch	12 mm	K05M11040012
PRTA10	Timer (NNP) Relay	12 mm	K05M11040012
PRTB10	Timer (NNP) Relay	12 mm	K05M11040012
PRTC10	Timer (NP) Relay	12 mm	K05M11040012
PRTD10	Timer (NP) Relay	12 mm	K05M11040012
PRTE10	Timer (NNP) Relay	12 mm	K05M11040012
PRTF10	Timer (NP) Relay	12 mm	K05M11040012
PSMA10	Step Module w/Overrides	50 mm	K05M11040050
PSMB10	Step Module w/o Overrides	50 mm	K05M11040050

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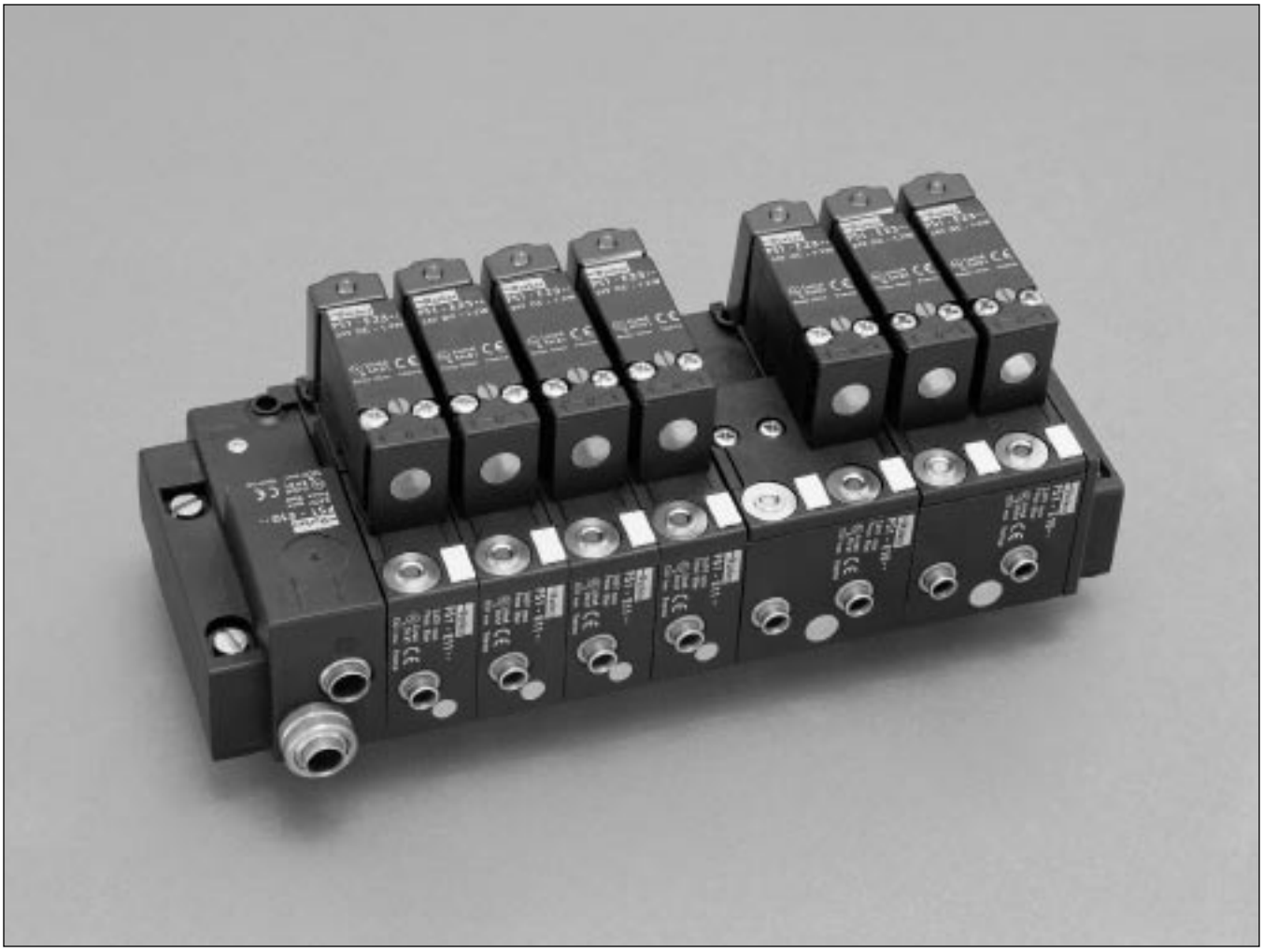
PS1E Series Electro-pneumatic Interface Valves

Section B

B



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Compact, easy to install, reliable...

Easy To Meet System Design Needs

- Full flow capacity allows direct operation of small cylinders (single or double acting) or pneumatic piloting of larger control valves (pneumatic or hydraulic).
- Valve configurations in 3/2 or 4/2 (single or double acting).
- Outlet fittings (push-in) for 5/32" or 1/4" tubing.
- System modification or expansion simplified by easily adding modules to stack.
- Wide range of voltages available.
- Multiple pressures possible in one assembly.

Easy To Install In Your System

- Modules snap together and mount on 35mm (DIN) rail.
- Micro-valve stack and PLC may be mounted in the same enclosure.
- Common air supply, exhaust, and electrical supply reduce connections to 1 wire and 1 tube per module.
- Supply and exhaust air can be piped with only one tube for each.
- Fast hook-up with captive wire clamp connections and push-in fittings.
- Compatible pneumo-electric module provides integrated feedback capability for the PLC.
- Eliminates cumbersome electrical connections on machine mounted solenoid valves.

Easy To Maintain System Operation

- Manual override for setup and troubleshooting.
- Poppet design for long, trouble free life (lubricated or non-lubricated air).
- Integrated diagnostics (main air test point, output pneumatic indicator, optional suppressor / LED) provide system status at a glance.
- All electrical connections are in a protected enclosure.
- Modular design and easy connection aid in module replacement or system expansion.

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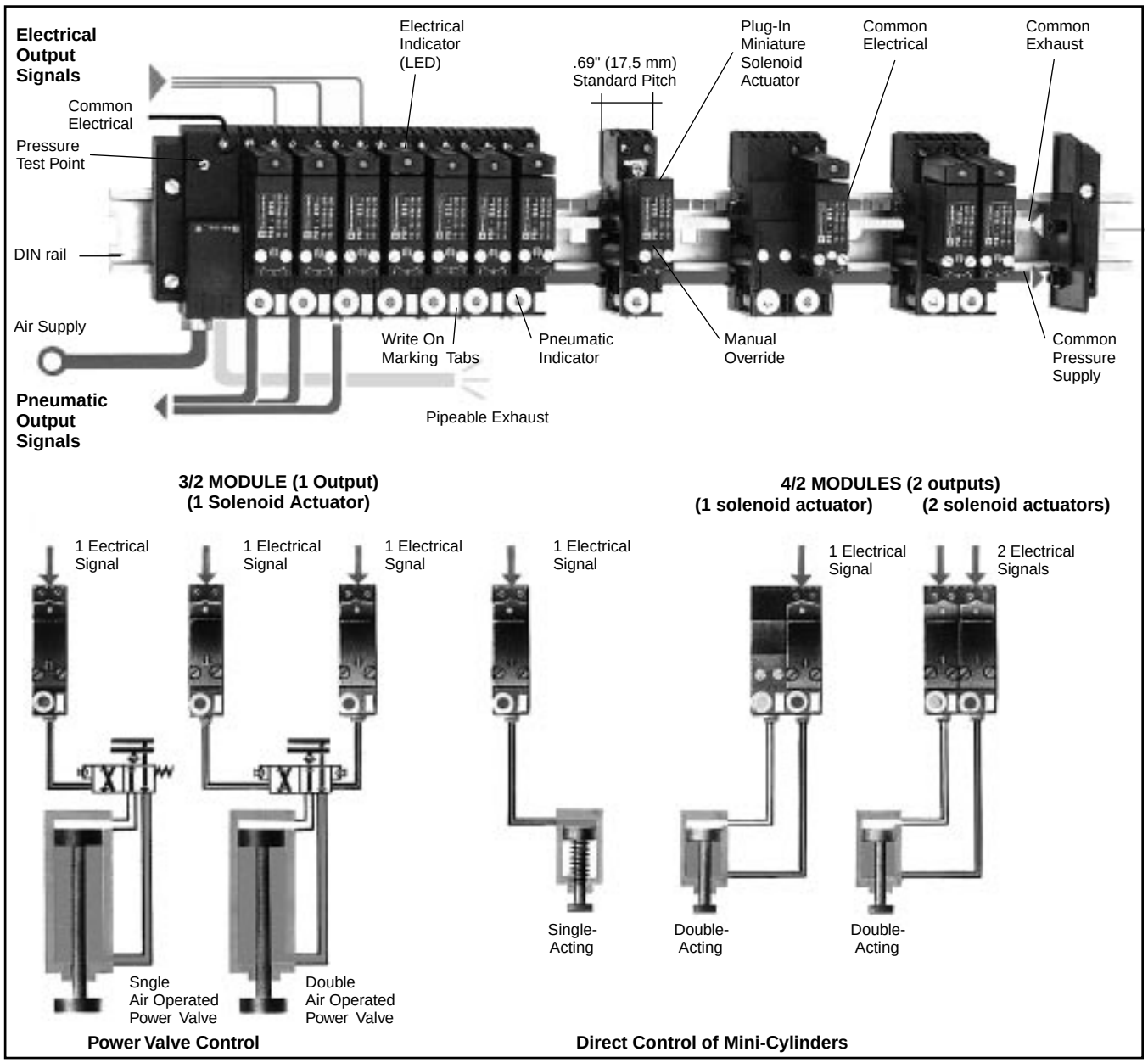

B

⚠ **Caution**: Because these are poppet valves, the common air supply pressure must be built up rapidly (never use a slow start valve 2/2 on the air supply for the interfaces).

When pressure is applied, the 4/2 valve takes up a predetermined position (unactuated) when no electrical signal is present.

- Output 2 (yellow indicator) passing.
- Output 4 (red indicator) non-passing.

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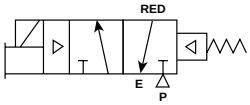
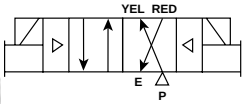
All units include pop-up indicator for pneumatic output. Red indicates NNP / NC function. Yellow indicates NP / NO function.
All model numbers shown include non-locking manual override. (For other voltages, use component parts shown on next page).



PS1E21102•• **PS1E111**



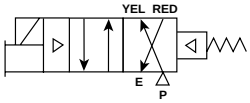
PS1E29102•• **PS1E29102••**

B

Assembled Units		
Single Solenoid - Spring Return 3/2 - Normally Non-Passing (NNP) / Normally Closed (NC)		
Voltage	**Output Port Push-In Connection Size**	
	5/32" (4 mm) Tube	1/4" Tube
12V DC	PS1E21102J	PS1E216702J
24V DC	**PS1E21102B**	**PS1E216702B**
24V AC	PS1E21101B	PS1E216701B
120V AC	**PS1E21101F**	**PS1E216701F**

Weight: 0.21 lb (0.095 kg)

Valves Without Solenoid Operators		
Output Port Push-In Connection Size		
5/32" (4mm) Tube	6mm Tube	1/4" Tube
PS1E111	PS1E116	PS1E1167



PS1E28102•• **PS1E181**

Assembled Units		
Single Solenoid - Spring Return 4/2		
Voltage	**Output Port Push-In Connection Size**	
	5/32" (4 mm) Tube	1/4" Tube
12V DC	PS1E28102J	—
24V DC	**PS1E28102B**	**PS1E286702B**
24V AC	PS1E28101B	PS1E286701B
120V AC	**PS1E28101F**	**PS1E286701F**

Weight: 0.36 lb (0.165 kg)

Valves Without Solenoid Operators		
Output Port Push-In Connection Size		
5/32" (4mm) Tube	6mm Tube	1/4" Tube
PS1E181	PS1E186	PS1E1867

Assembled Units		
Double Solenoid 4/2		
Voltage	**Output Port Push-In Connection Size**	
	5/32" (4 mm) Tube	1/4" Tube
12V DC	PS1E29102J	—
24V DC	**PS1E29102B**	—
24V AC	PS1E29101B	—
120V AC	**PS1E29101F**	**PS1E296701F**

Weight: 0.45 lb (0.205 kg)

Valves Without Solenoid Operators		
Output Port Push-In Connection Size		
5/32" (4mm) Tube	6mm Tube	1/4" Tube
PS1E191	PS1E196	PS1E1967

Head and Tail Sets

Used to mount valves to DIN rail and provide supply and exhaust ports. All hardware is included.

Single supply type supplys from one end of the manifold assembly with the other end blocked.

Double supply type provides pressure and exhaust ports on both ends of the assembly.

PS1E1027

Push-In Connection Ports	Single Supply	Double Supply
1/4" Tube	**PS1E1017**	**PS1E1027**
6mm Tube	PS1E101	PS1E102
	Wt: 0.22 lb (0.100 kg)	Wt: 0.28 lb (0.125 kg)

Intermediate Supply Module - PS1E10387

1/8" Pipe port for supply and exhaust ports.

Allows replenishment or isolation of the supply and / or exhaust ports using included plugs.

Weight: 0.28 lb (0.125 kg)

PS1E10387

1/8" Pipe Supply & Exhaust	
NPT	**PS1E10387**
BSP	PS1E1038

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PS1P10●●

Line Mounted Pressure Switch

Includes pop-up indicator to show presence of pressure.

Includes Clip for mounting on 35mm DIN Rail.

1 SPDT Contact

5A 250V

5/32 (4 mm) Push-In Tubing Port

8mm Pin Spacing

Switching Pressure	
20 PSIG Fixed	30 - 75 Adjustable
PS1P1081	PS1P1091

Wt: 0.11 lb (0.050 kg)

P2E-KS32C1

Plug-In Solenoid Operators

15mm Solenoids / Kits (8mm Pin Spacing) DIN 43650C

Voltage	Override			
	Non-Locking Kit	Replacement Solenoid	Locking Kit	Replacement Solenoid
12VDC	**PS3441B45P**	**P2E-KS32B1**	**PS3441C45P**	**P2E-KS32B2**
24VDC	**PS3441B49P**	**P2E-KS32C1**	**PS3441C49P**	**P2E-KS32C2**
24V 50/60Hz	**PS3441B42P**	**P2E-KS31C1**	**PS3441C42P**	**P2E-KS31C2**
120V 60Hz	**PS3441B53P**	**P2E-KS31F1**	**PS3441C53P**	**P2E-KS31F2**

Kit includes: solenoid, (2) machine screws, (2) self threading screws, (1) gasket, (1) 3-cell gasket, (1) L-shaped 3-cell gasket.

PS1E230●●

Plug-In Solenoid Operators

(9.4mm Pin Spacing) For Older Version (Replacement Parts Only)

Voltage	Power Consumption	Drop-out* Current (mamp)	With Non-Locking Manual Override	With Locking Manual Override
12 VDC	1.2W	—	PS1E2302J	PS1E2352J
24 VDC	1.2W	5	PS1E2302B	PS1E2352B
48 VDC	1.2W	2.5	PS1E2302E	PS1E2352E
24 V 50-60 Hz	1.6VA**	22	PS1E2301B	PS1E2351B
48 V 50-60 Hz	1.6VA**	12	PS1E2301E	PS1E2351E
120V 60Hz / 115V 50Hz	1.6VA**	5	PS1E2301F	PS1E2351F

** 3.5VA Inrush

Weight: 0.10 lb (0.043 kg)

* The solenoid valves are programmable controller compatible provided that leakage currents of the PLC outputs are lower than the drop-out current value.

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B

Valve Specifications

Body Material ..... Glass Filled Polyamide

Electrical Connection ..... Captive Wire Clamp

LED / Noise Suppressor –
120/240VAC LED Only (No noise suppressor)
Combination LED (green) and zener diode

Life Expectancy ..... 10 Million Operations

Maximum Operating Frequency ..... 10 Hz

Medium Quality –
Standard shop air, lubricated or non-lubricated, 50µ filtered

Mounting ..... 35mm (DIN) Rail

Operating Medium ..... Compressed air

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

Operating Principal –
Solenoid Pilot Operated Poppet Valve

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

Response Time –
10-15 ms (Electronic Signal to Pneumatic Output)

Seal Material –
Poppet ..... Polyurethane
Seals ..... Nitrile (Buna N)

Supply and Exhaust Ports ..... 1/4"

Outlet Port	5/32"	1/4"
Flow rate (SCFM @ 90 PSI)	7.1	9.2
Cv	14	.16

Tube Connections ..... Push-in (Instant) Fittings

Voltage Tolerance ..... +10 to -15% of rated voltage @ 70°F

Wire Size ..... 14 - 22 AWG

⚠ **Caution:** Memory in double acting (Bistable) 4/2 modules is input dependent. Either air supply or electrical command signal must be maintained or memory may be lost.

Pressure Switch Specifications

Body Material ..... Glass Filled Polyamide

Contact Material ..... Silver

Contact Rating ..... 10A / 250VAC

Maximum Operating Frequency ..... 10 Hz

Mechanical Life ..... 30 million operations

Operating Pressure Range –
Fixed Pressure ..... 19 to 120 PSI (1.3 to 8 bar)
Adjustable Pressure ..... 30 to 120 PSI (2 to 8 bar)

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

Operating Principal ..... Pressure Operated Micro Switch

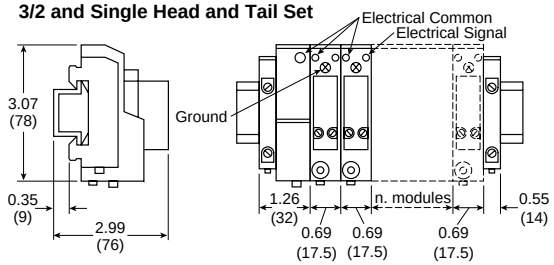
Seal Material –
Poppet ..... Polyurethane
Seals ..... Nitrile (Buna N)

Switch Pressure –
Fixed Pressure ..... >19 PSI (>1.3 bar)
Adjustable Pressure ..... 30 to 75 PSI (2 to 5 bar)

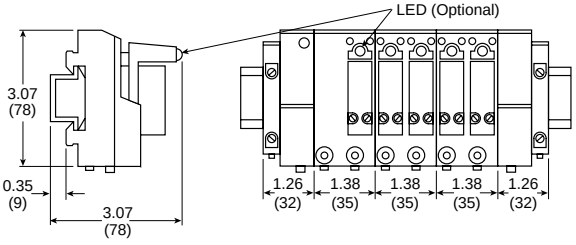
Contact life		**AC**				**DC**		
		24V	**48V**	**120V**	**240V**	**12V**	**24V**	**48V**
1 Million Operations	Inductive	25	56	115	140	17	24	37
	Resistive	86	190	370	440	42	58	88
2 Million Operations	Inductive	–	–	–	–	10	14	25
	Resistive	–	–	–	–	30	43	70
5 Million Operations	Inductive	10	14	19	21	–	–	–
	Resistive	35	82	160	200	–	–	–

Dimensions Shown in Inches (mm)

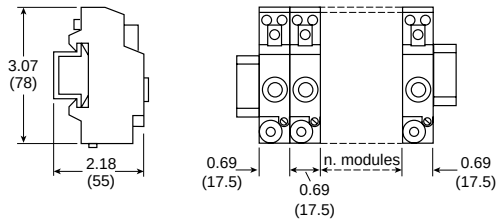
3/2 and Single Head and Tail Set



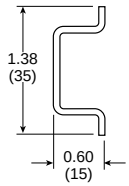
4/2 and Double Head and Tail Set



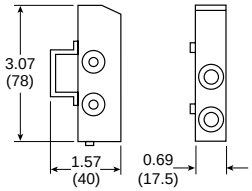
PS1 P1091



35mm (DIN) Rail*



Intermediate Module



***Rail at less than 0.6" does not allow enough room for mounting clips and may cause air leaks.**

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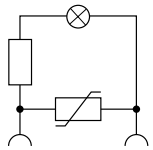
Suppressor and LED Indicators for PS1E

Mount between Solenoid Valve and the Interface Module



Circuit Diagram

PS1E1620●

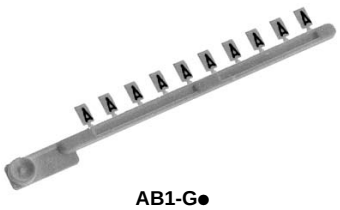
Characteristics	Voltage	Part Number	Weight	
			lb	kg
Indication by LED Sold in Lots of 5	24 VDC and 50/60 Hz	PS1E1620B	.022	0.010
	48 VDC and 50/60 Hz	PS1E1620E	.022	0.010
	120 V / 60 Hz 115 V / 50 Hz	PS1E1511F	.028	0.012

Spare Parts

Description	Part Number
1 lot of 100 O-ring Seals Between Modules (Pressure - Exhaust)	PPR-L12
1 lot of 50 Seals Between Modules 3/2 or 4/2 and Coil PS1-E23 - 25 Seals (Type A) for Modules 3/2 and 4/2 Bistable - 25 Seals (Type B) for Modules 4/2 Monostable and Bistable	PPR-L13

Marking Accessories

To be used in place of Write-On Marking Tabs



AB1-G●

Clip-On Marker Strips	Part Number
Strip of 10 Identical Numerals (State the Number required)	AB1-R•
Strip of 10 Identical Letters (State the Letter required)	AB1-G•
Strip of 10 - Signs*	AB1-R13

*Sold in Lots of 25 Strips of 10 Markers

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Control Panel Products

Human / Machine Dialog

Section C

C

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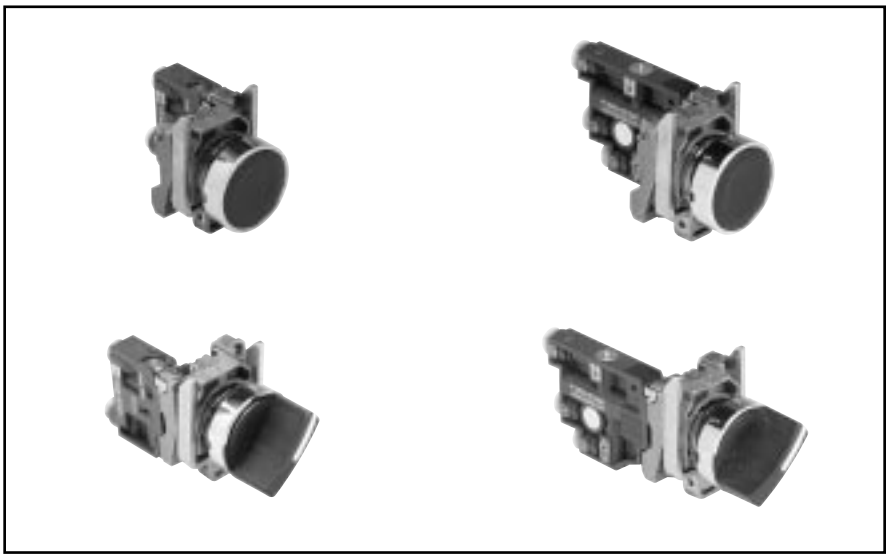
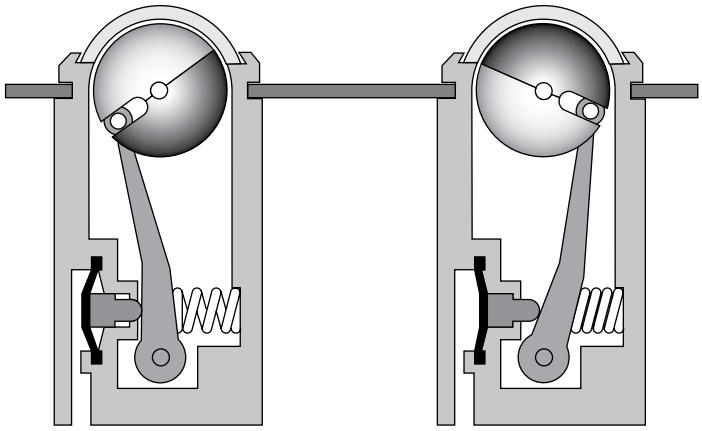
HUMAN-MACHINE DIALOG requires devices such as push buttons and selector switches to provide command inputs. A wide variety of these devices is available to meet most application needs. Both pneumatic and electrical switch bodies are available to match system technology. All of these devices use the 22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



C

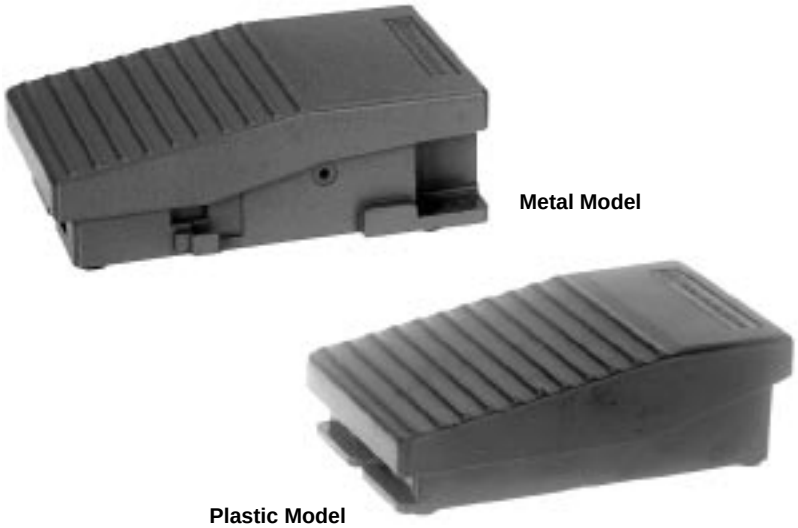
PNEUMATIC VISUAL INDICATORS

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.



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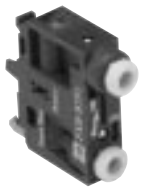
MODULAR PNEUMATIC / ELECTRIC PUSH BUTTONS

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

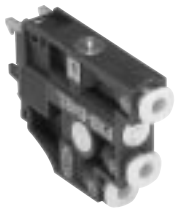
- Pneumatic normally non passing (NNP) is equivalent to electrical normally open (N.O.).
- Pneumatic normally passing (NP) is equivalent to electrical normally closed (N.C.).

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



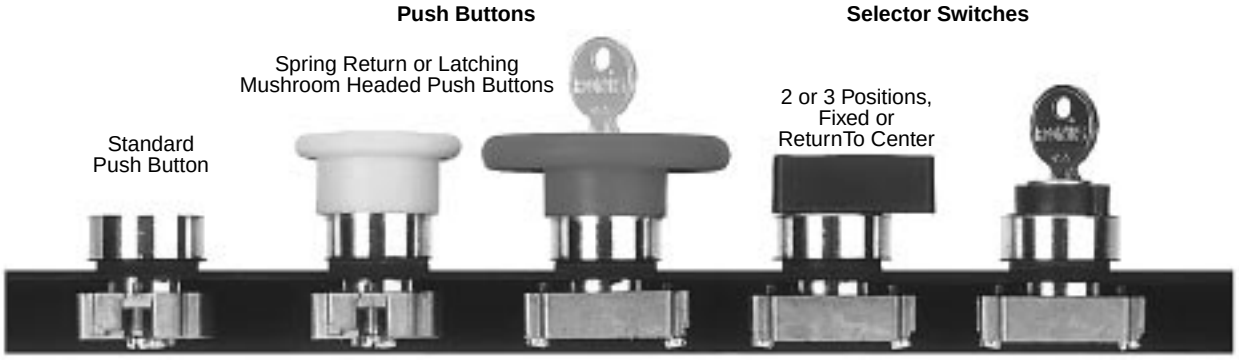
PXBB3911

PXBB4932



PXBB4931

C



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

C

Flush Push Buttons

PXBB3111BA2

PXBB4131BA2

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

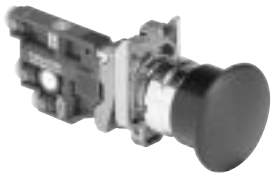
* Type of switching: Universal 3-way: valve can be connected either as NP or NNP as required by connecting the primary air supply to port 1 or port 3.

Note: Mount up to three valves on mounting ring.

Mushroom Head Push Buttons

(40mm Diameter)

PXBB3111BC2



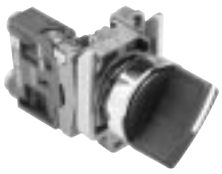
PXBB4131BC2

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

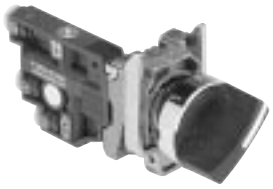
* Type of switching: Universal 3-way: valve can be connected either as NP or NNP as required by connecting the primary air supply to port 1 or port 3.

Note: Mount up to three valves on mounting ring.

Selector Switches



PXBB3111BD2



PXBB4131BD2

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

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

Note: 0.9" Dia. Hole required for mounting.

BOLD ITEMS ARE MOST POPULAR.

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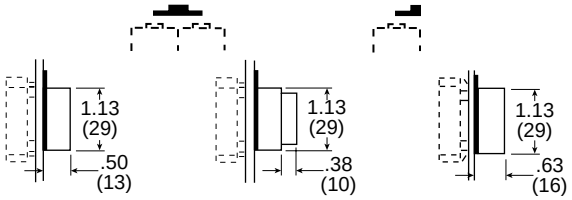
For Use With PXBB Valve Bodies and ZBE Electrical Switch Bodies

Push Buttons

ZB4BA4

ZB4BL2

ZB4BP2



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

* ZB4*** Model Numbers are Metal Head Operators

** ZB5*** Model Numbers are Plasticl Head Operators

Push / Push Buttons

ZB4BH02

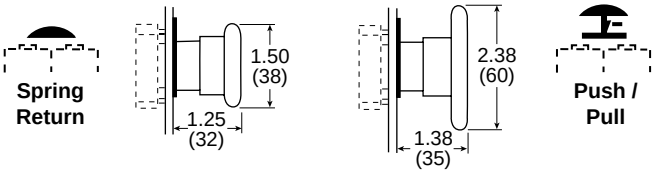
Part Number*	Color	Function	Description
ZB4BH02	Black	Detent 2-Position	Flush
ZB4BH03	Green		
ZB4BH04	Red		

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

Mushroom Head Push Buttons

ZB4BC2

ZB4BR2



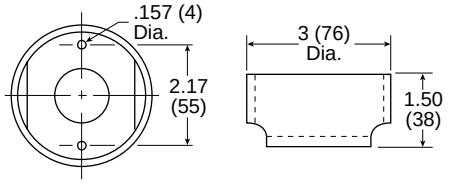
Part Number*	Color	Function	Description
ZB4BC2	Black	Spring Return	Ø 40mm Head
ZB4BC3	Green		
ZB4BC4	Red		
ZB4BT2	Black	Latching Push-Pull	
ZB4BT4	Red		
ZB4BR2	Black	Spring Return	Ø 60mm Head
ZB4BR3	Green		
ZB4BR4	Red		

* ZB4*** Model Numbers are Metal Head Operators

Mounting Accessories

ZB2BZ19

ZB5AZ905



Part Number	Color	Description
ZB2BZ19	Black Plastic	Guard for 60mm Mushroom Heads
ZB5AZ905	—	Plastic Head (ZB5) Mounting Nut Tightening Tool

NOTE: BOLD ITEMS ARE READY (STOCK)

C

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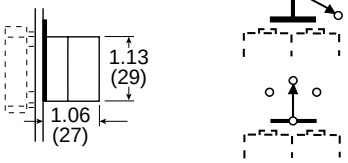
For Use With PXBB Variable Composition Switch Bodies

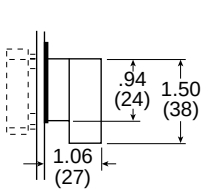
Selector Switches

ZB4BD3

ZB4BJ3



Standard Selector

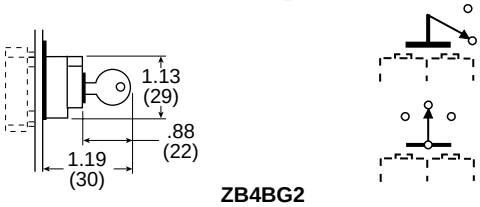


Knob Lever

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

* ZB4*** Model Numbers are Metal Head Operators

Key Operated Selectors

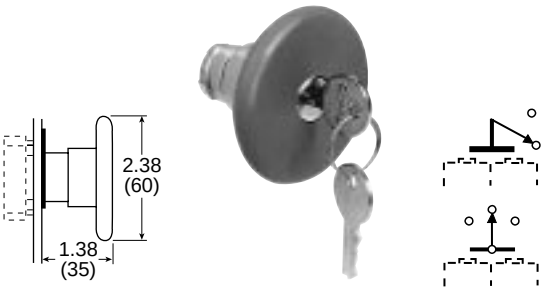


ZB4BG2

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

* ZB4*** Model Numbers are Metal Head Operators

Mushroom Head Push Buttons with Key Select



ZB4BS24

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

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

Note: Bold Items are Ready (Stock)

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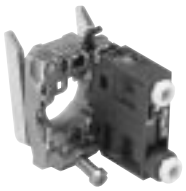
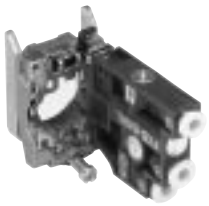
For Use With 22mm (7/8") Metal Operating Heads 5/32" Instant Connections

3/2 Valve Bodies with Mounting Ring



PXBB3111B



PXBB4131B

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

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

Specifications

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

Flow –
PXBB3• ..... Cv=.08
PXBB4• ..... Cv=.18

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

Operating Positions ..... All Positions

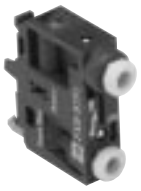
Operating Pressure –
PXBB3• ..... 15 to 115 PSIG (1 to 9 bar)
PXBB4• ..... 15 to 145 PSIG (1 to 10 bar)

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

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

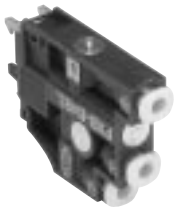
C

Additional Valve Bodies



PXBB3911

PXBB4932



PXBB4931

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

Note: Bold Items are Ready (Stock)

Replacement Valve Bodies for PXBB1 and PXBB2 Push Button Valve Series

PXBB1911

PXBB1922

PXBB2911

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

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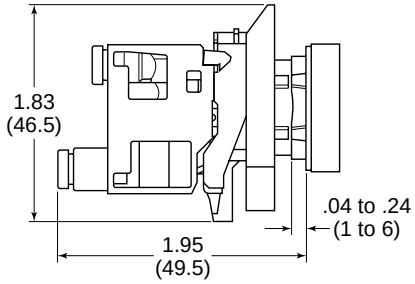
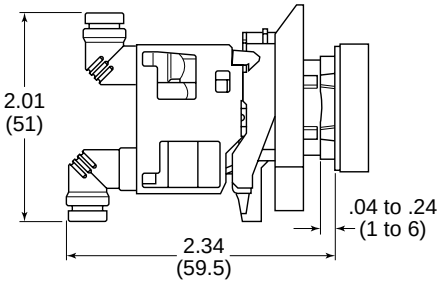
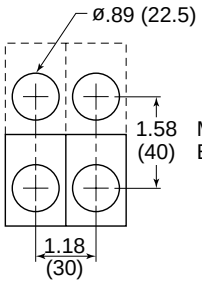
C

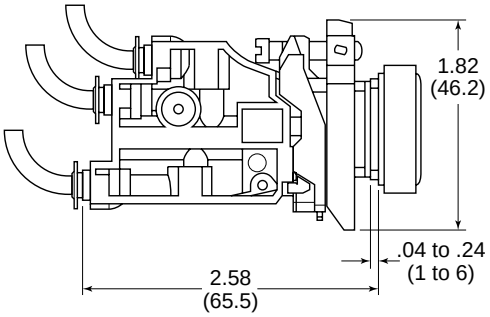
PXB-B3 Dimensions





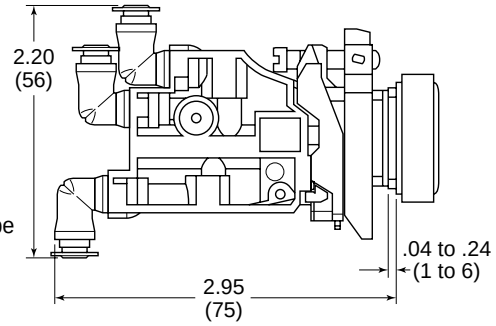


PXB-B4 Dimensions



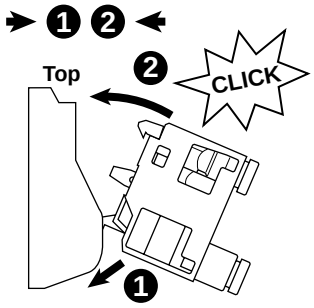
Tube Bending Radius
For PXBB3 and PXBB4

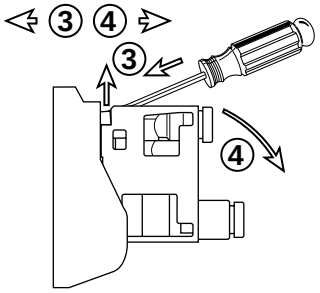
- 4 mm O.D. x 2 mm I.D. Tube = Minimum 0.39 (10) Radius
- 4 mm O.D. x 2.7 mm I.D. Tube = Minimum 0.59 (15) Radius



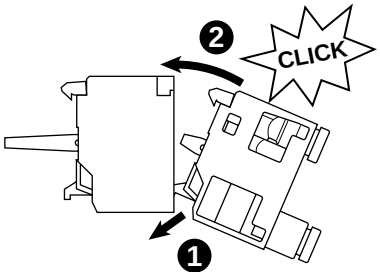
Assembly

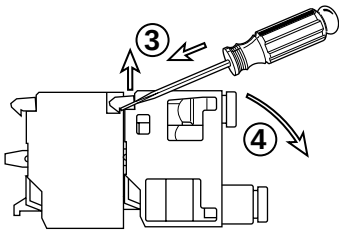
Assembling PXB Valves On Mounting Block





Assembling PXB Valves On the Back of the Electrical Contact





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For Push Buttons and Visual Indicators

Legend Plates for PXBB Devices (22mm)

ZBY••••

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

Blank Legend Plates for Inscription

For PXBB Devices *(2 lines of 11 characters maximum)*

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

Part Number	Description
ZBY2002	Black Background / White Letters

For 22mm Visual Indicators Only

2 lines of 11 characters maximum

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

Part Number	Description
ZB2BY2002	Black Background / White Letters

Accessories

ZBE101

Electrical Switch Bodies

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

Electrical Specification: 240V, 10Amp

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

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

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

Metal: ZB4BZ009

Plastic: ZB5AZ009

Mounting Ring for Valve Bodies, Switch Bodies and Operating Heads

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

Part Number	Description
ZB4BZ009	Metal Mounting Ring
ZB5AZ009	Plastic Mounting Ring

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

Part Number	Description
ZB4BZ009	Metal Mounting Ring
ZB5AZ009	Plastic Mounting Ring

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

Note: Bold Items are Ready (Stock)

C

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Functionality Explanation

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

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.

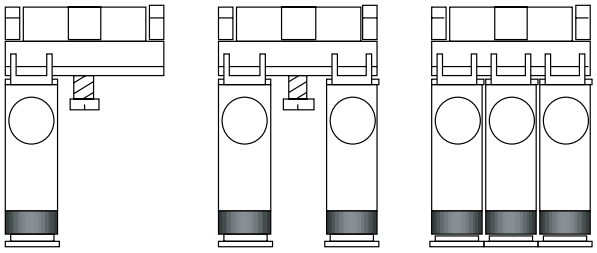
NP + NP: Both Normally Passing.

C

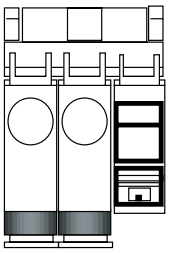
Combination of Output Devices On a Single Mounting Block

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

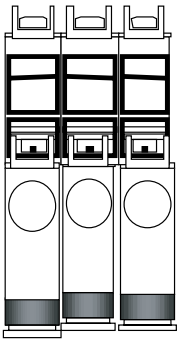
Note: The central position can only be activated by push button heads.



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

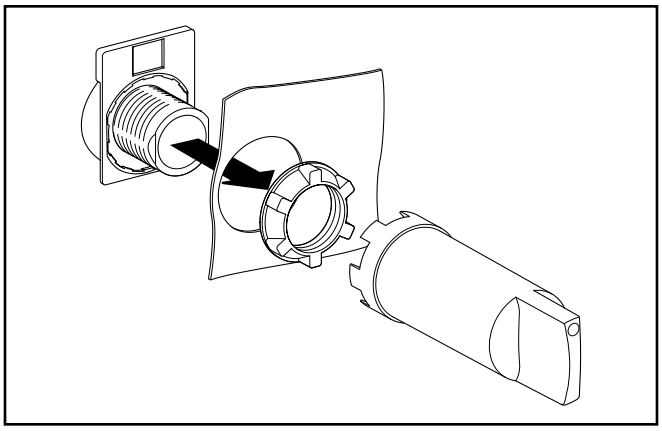


Side by Side Combination

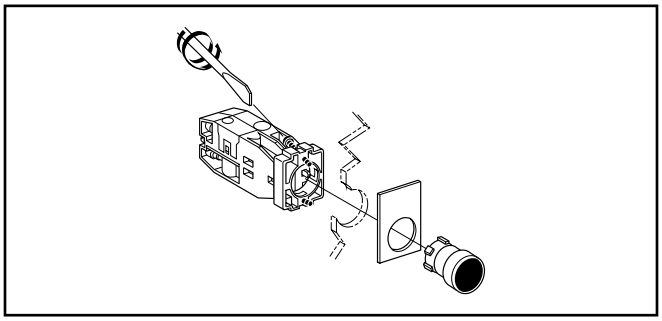


Combination by Mounting Valves On the Back of the Electrical Contact

Assembling Output Devices and Heads On ZB5 Series Mounting Block



Mounting



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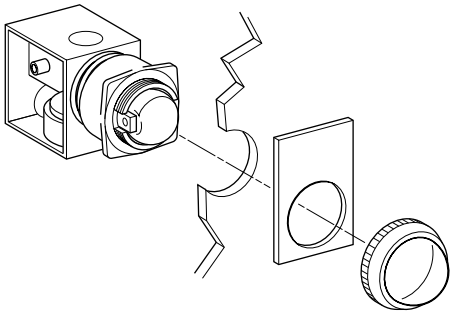
With 5/32" Instant Connections

22mm Visual Indicators

PXVF131



Mounting

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

Notes:

- The Pneumatic Indicators are black in one position and colored in the other. The colored position corresponds either to the presence of a pressure ("ON" Indicator) or the absence of pressure ("OFF" Indicator).
- For Legend Plates, see page C9.

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)

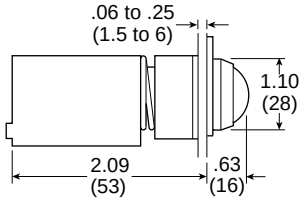
Ports –
Standard .....5/32" Instant for Semi- Rigid Nylon or Polyurethane Tube
10-32 UNF Available

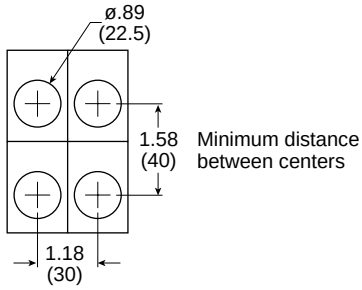
Temperature –
Operating .....32°F to 122°F (0°C to + 50°C)
Storage ..... -22°F to 140°F (-30°C to +60°C)

C

Dimensions

PXVF1• •





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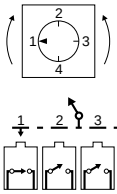
With 5/32" Instant Connections, 1/16" I.D. Internal Orifice

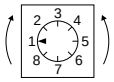
4-Positions, 4-Outputs 3/2



PXBDD104

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

8-Positions, 8-Outputs 3/2



PXBDD508

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

Specifications

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

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

Minimum Operating Force ..... 9.4 Lb (42 N)

Number of Operations with Dry Air at 90 PSI (6 bar) and 68°F (20°C) - Frequency 1 Hz..... 1 million Operations
Mushroom Head ..... 300,000 Operations

Operating Positions..... All Positions

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

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

10-32 UNF Available.

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

Notes:

These Rotary Switches operate in either direction. They come assembled with switch PXBB1921 (Normally Passing). All switches are held in the actuated non-passing position except the one associated with a given dial position, which is in the unactuated Normally Passing position.

Example of Operation: Rotation from Position 1 to Position 2:

- Switch 1 changes from unactuated Normally Passing to actuated non-passing.
- Switch 2 changes from actuated non-passing to unactuated Normally Passing.

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

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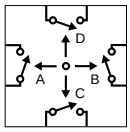
With 5/32" Instant Connections, 1/16" I.D. Internal Orifice

2-Position Unit

PXBGA8211

4-Position Unit



PXBGA8411

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

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

* NNP: Normally Non-Passing. 

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

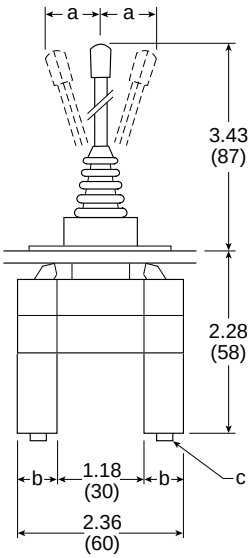
10-32 UNF Available.

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

C

Dimensions

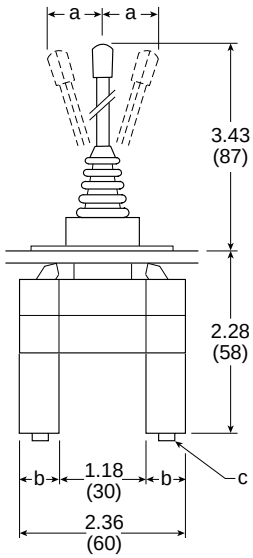
PXBGA82••



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

* In both directions

PXBGA84••



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

* In all 4 directions

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

C

Protective Guard

PXPEM510

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

Foot Switches Without Protective Guard

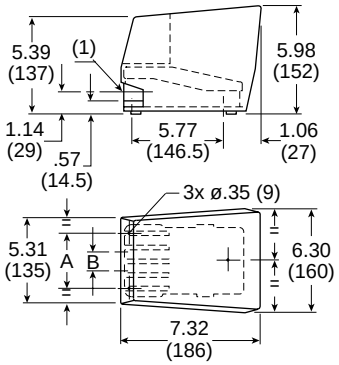
PXPEA110

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

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

Dimensions

PXPEM510



(1) 2 mounting ports for adaptors for conduit fittings

(2) 7° operating angle

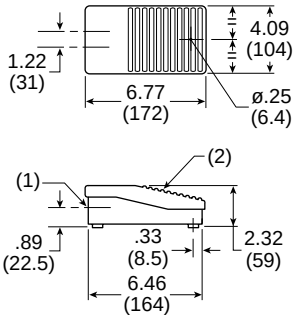
	inch	mm
a	3.53	940
b	1.22	31

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

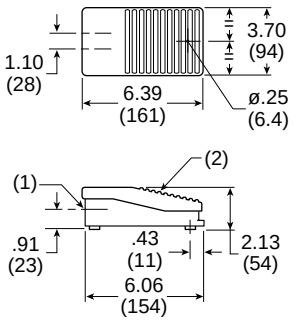
Units will accept all switch bodies shown earlier in this Section, but care must be taken in selecting switch type.

Dimensions

PXPEM110



PXPEA110



(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/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.

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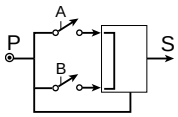
Features

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

PXPC111

Part Number	Connections
PXPC111	5/32" Instant

Operation



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

General Characteristics

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

Permissible Fluids –
Air or neutral gas 40 micron filtration, lubricated or dry

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

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

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

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

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

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

Materials –
Body.....Glass Filled Nylon
Operating Head ..... Zinc Alloy and Plastic

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

Mounting

Approvals:

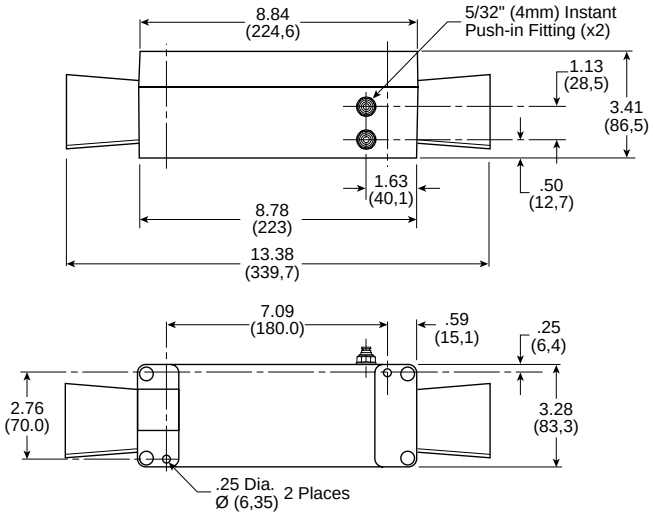
- In accordance with European Standard EN 574 - September 1996
- Conforms to the model that has obtained CE Type Test Certificate No. 02526 520 4631 0397

⚠WARNING

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

Dimensions

Inches (mm)



C

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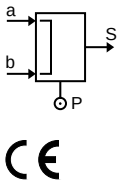
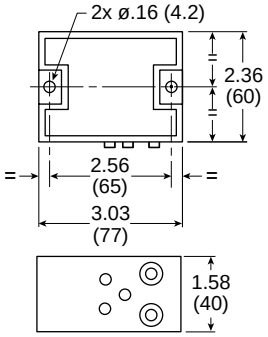
Two-Hand Control Module



PXPA11

Part Number	Connections
PXPA11	5/32" Instant

Dimensions



PXPA11

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

PPRL15

Part Number	Base Component
PPRL15	PXPC111

Two Hand Repair Parts

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

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

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Sensing

Pneumatic Control Components

Section D

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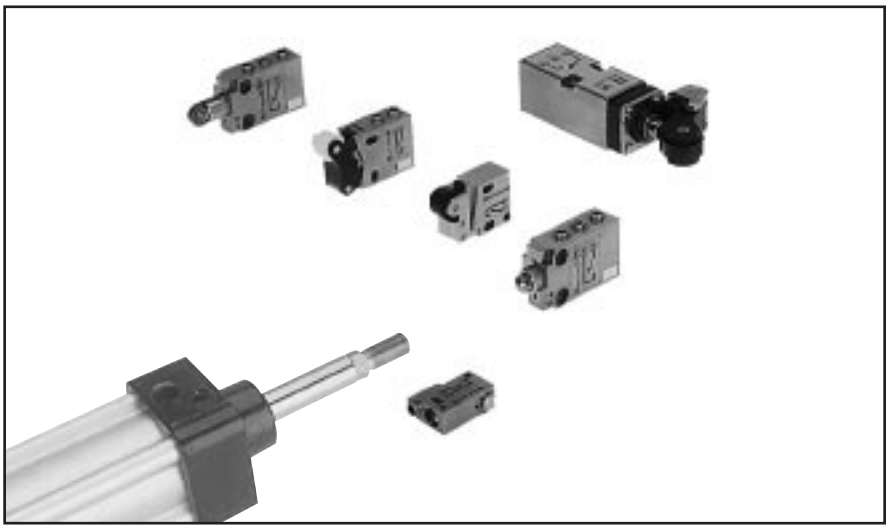
To achieve the sensing or feedback function, pneumatic sensors can be:

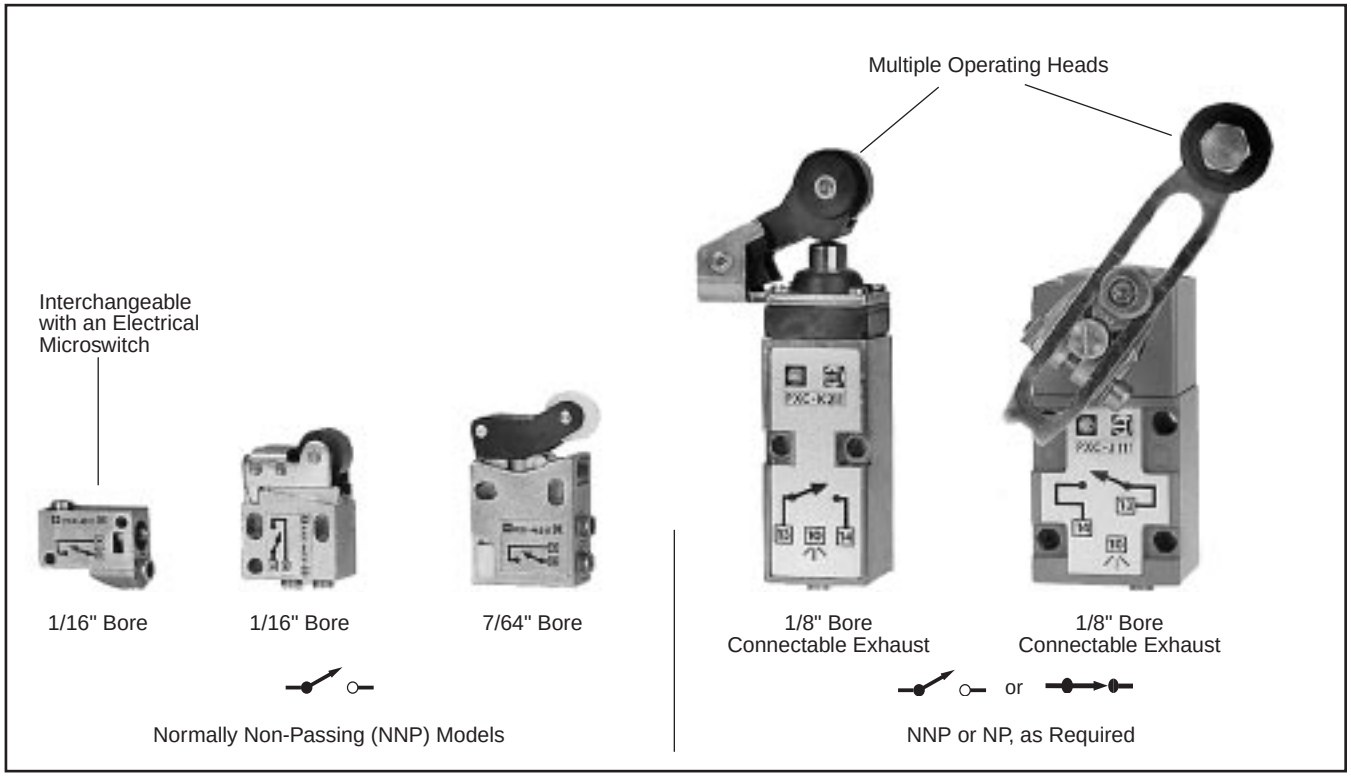
- Limit Switches in a Variety of Sizes and Configurations
- Pressure Switches with Many Adjustable Ranges
- Components Designed Specifically for Pneumatic Technology using Pressure Variation, Air Bleed or Blocking for Detection.

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.



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Direct Acting Limit Switches

1/16" I.D. Internal Orifice

PXCM111

PXCM121

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

7/64" I.D. Internal Orifice

PXCM521

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

Actuators For Steel Plunger

PXCZ11

Use with PXCM11*

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

* NNP: Normally Non-Passing.

Specifications

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

Flow SCFM (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)

D

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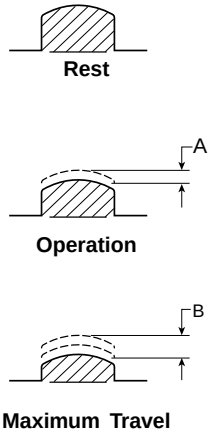
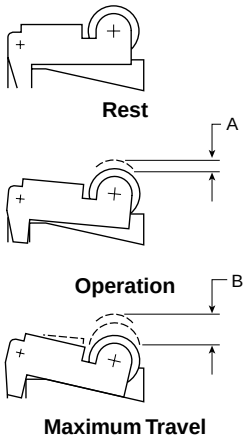
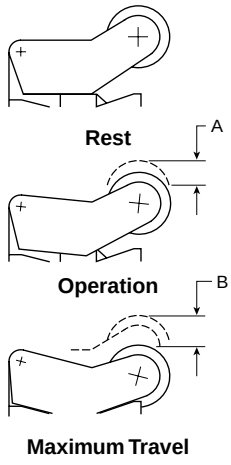
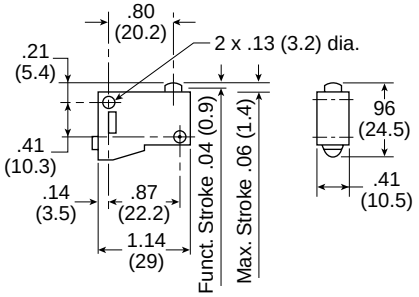
Operator Specifications

	PXCM111	PXCM121	PXCM521
Differential Travel at 90 PSI (6 bar)	.006" (0.15 mm)	.012" (0.3 mm)	.020" (0.5 mm)
Maximum Travel (B) at 90 PSIG (6 bar)	.055" (1.4 mm)	.126" (3.2 mm)	.228" (5.8 mm)
Minimum Pre-Travel (A) at 90 PSIG (6 bar)	.035" (0.9 mm)	.079" (2 mm)	.087" (2.2 mm)
Minimum Operating Force at 90 PSI (6 bar)	2.5 lb (11 N)	1.0 lb (4.5 N)	1.6 lb (7 N)
Operating Diagram			

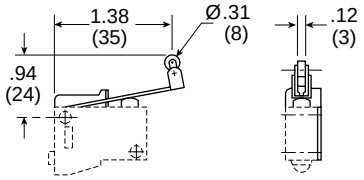
D

Dimensions

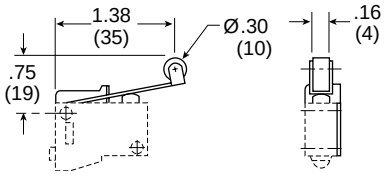
PXCM111



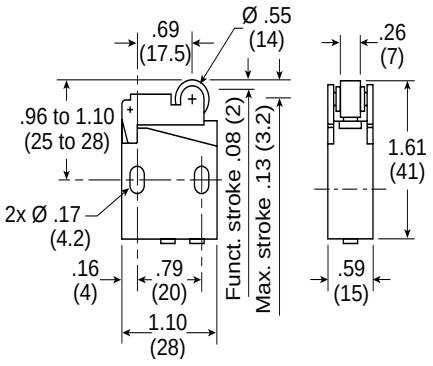
PXCZ12



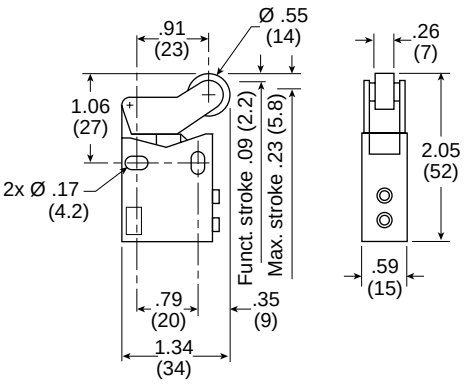
PXCZ11



PXCM121, PXCM131



PXCM521



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Pilot Operated Compact Limit Switches

5/32" Instant Connections
Pipeable Exhaust Port
7/64" I.D. Internal Orifice

PXCM601A110

PXCM601A102

PXCM601A103

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

Specifications

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

Flow SCFM (Nl/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)

D

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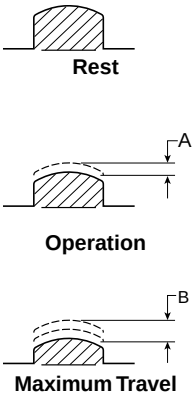
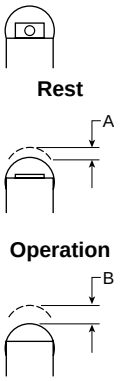
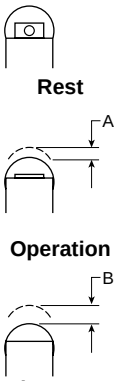
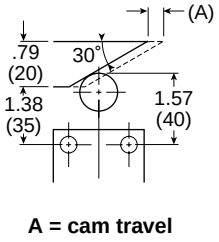
Operator Specifications

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

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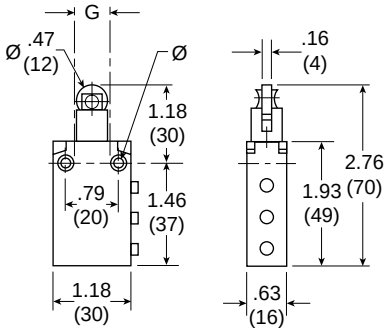
Dimensions

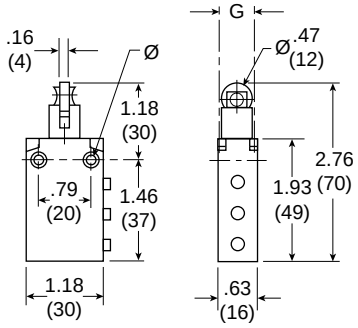
PXCM601A102



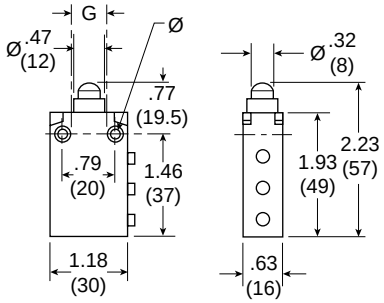
Ø:
2 mounting holes Ø .17" (4.3)
2 countersunk Ø .32" (8.2)
depth 4 mm

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

PXCM601A103



PXCM601A110



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Limit Switches

Plunger Operated

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

PXCK21101 **PXCK21102** **PXCK21121** **PXCK21106**

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

Roller Operated

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

PXCK2110031 **PXCK2110041**

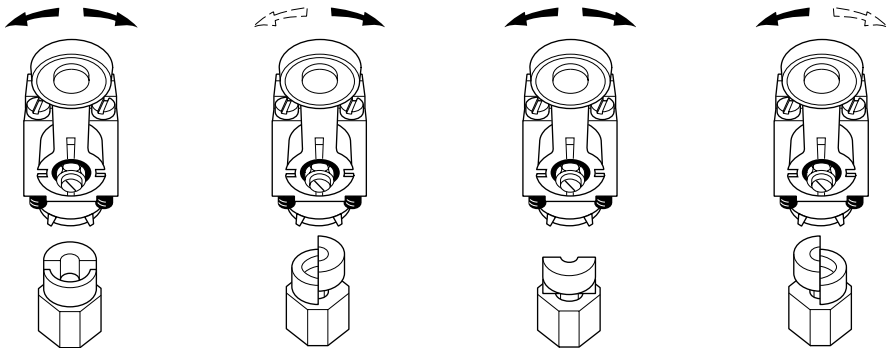
With Die Cast Rotary Operating Head and Operating Lever - Complete Assemblies		
Part Number	**Actuator**	**Type of Switching***
PXCK2110031	Fixed Delrin Roller Lever Multi-Function Head Actuates: - From Right and Left - From Right - From Left	NNP
PXCK2210031		NP
PXCK2110041	Adjustable Delrin Roller Lever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

NNP: Normally Non-Passing 

NP: Normally Passing

D

Field Conversion of Rotary Operating Head



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Separate Pneumatic Switch Bodies

PXCK211

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

Pneumatic Switch Bodies with Rotary Heads

PXCK21100

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

Operating Heads
For Use With PXCK Switch Bodies

ZCKG00

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

Operating Levers for Rotary Heads

ZCKY81

ZCKY91

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

D

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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

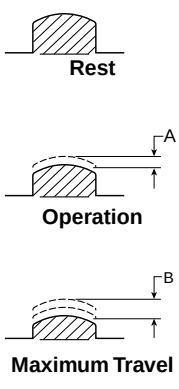
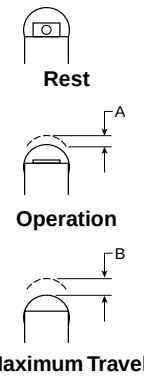
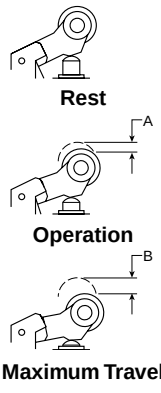
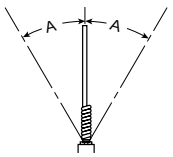
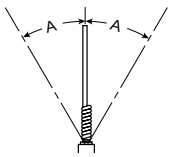
Operating Positions ..... All Positions

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

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

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

Operator Specifications

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

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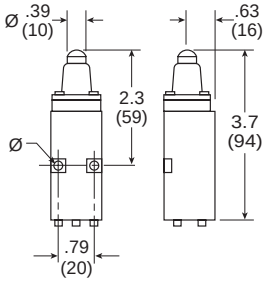
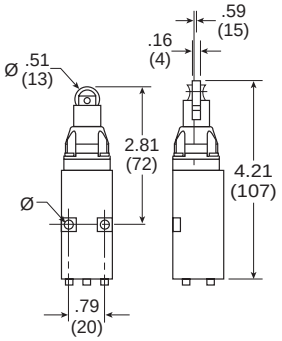
Dimensions

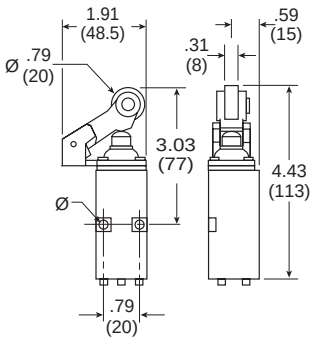
PXCK21101, PXCK22101



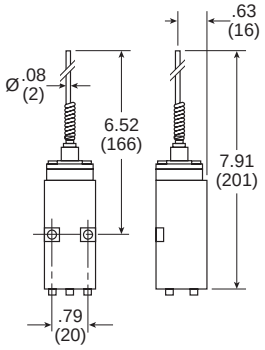
PXCK21102, PXCK22102



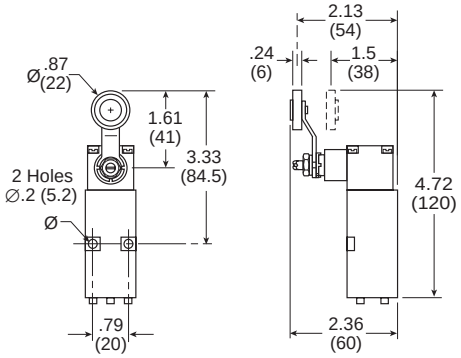
PXCK21121, PXCK22121



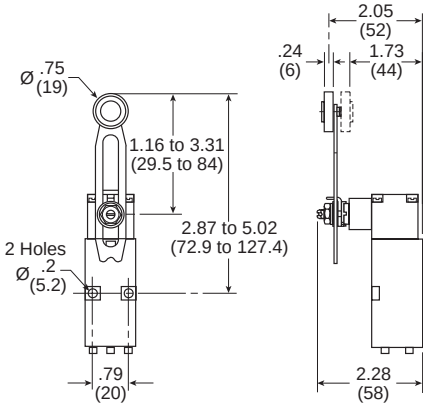
PXCK21106, PXCK22106



PXCK2110031, PXCK2210031



PXCK2110041, PXCK2210041



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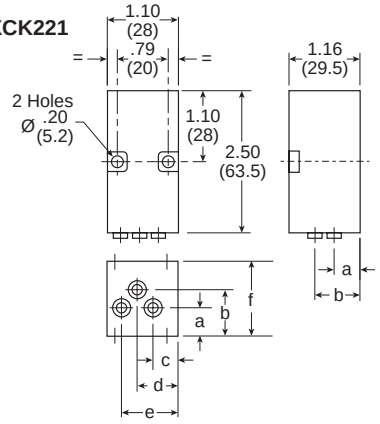
Pneumatic Switch Bodies

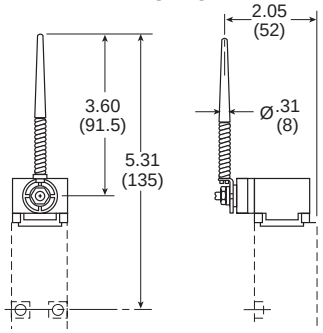
PXCK211, PXCK221



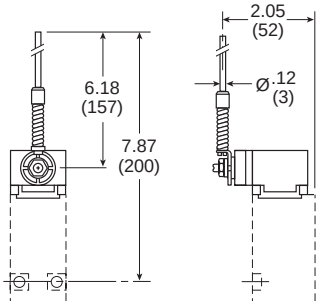
	inch	mm
a	.39	10
b	.77	19.5
c	.35	9
d	.61	15.5
e	.87	22
r	1.66	29.5

Rotary Heads with Operating Levers

ZCKY81



ZCKY91



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Switch Bodies Only

PXCJ117

Part Number	Type of Switching*
PXCJ117	NNP
PXCJ127	NP

Switch Bodies with Rotary Head

PXCJ11701

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

Operating Levers for Rotary Heads

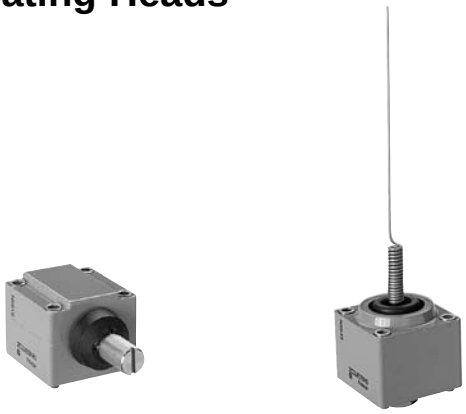
ZC2JY11 **ZC2JY31** **ZC2JY81** **ZC2JY91**

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

NNP: Normally Non-Passing

NP: Normally Passing

Top Plunger & Rotary Operating Heads



ZC2JE70 **ZC2JE01**

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

D

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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

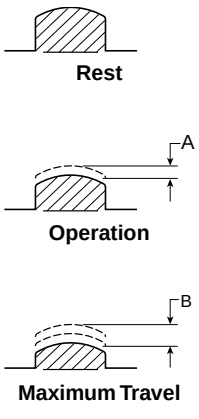
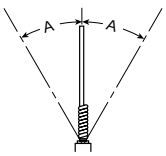
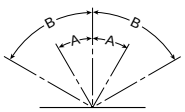
Operating Positions ..... All Positions

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

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

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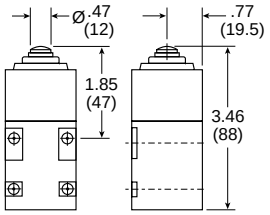
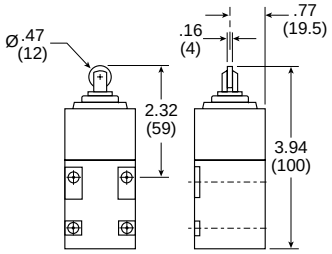
Switch Body With Plunger Heads

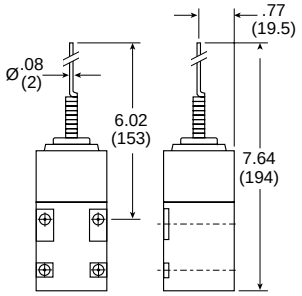
With ZC2JE61



With ZC2JE62

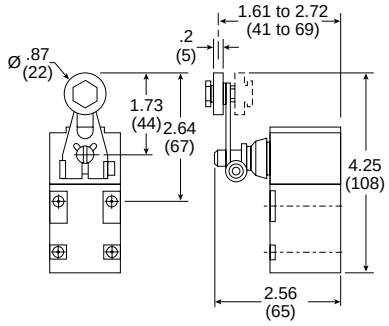


With ZC2JE70

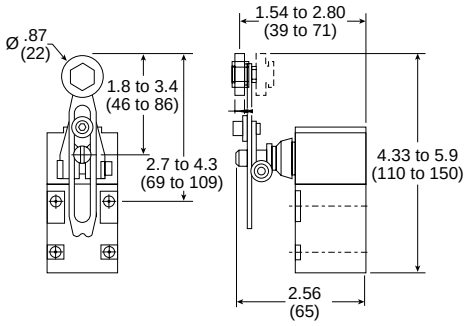


Switch Body With Rotary Heads and Operating Levers

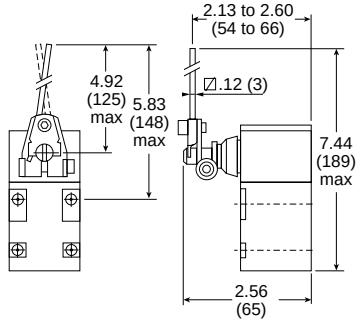
With ZC2JY11



With ZC2JY31

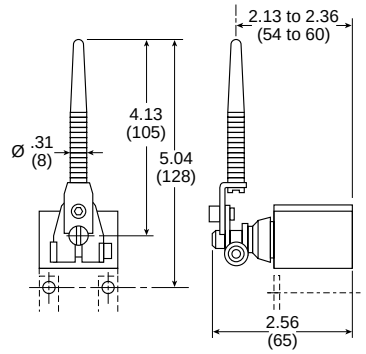


With ZC2JY51

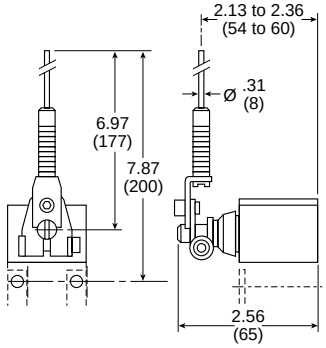


Rotary Heads With Operating Levers

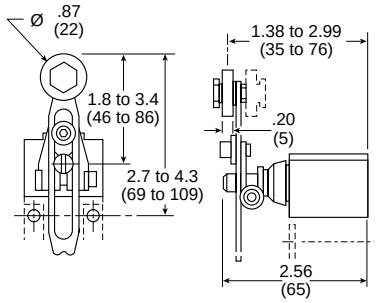
ZC2JY81



ZC2JY91

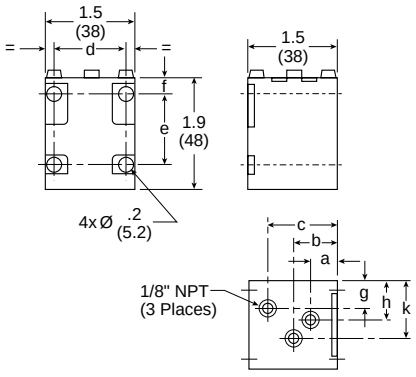


ZC2JY41



Pneumatic Switch Bodies

PXCJ117, PXCJ127



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

D

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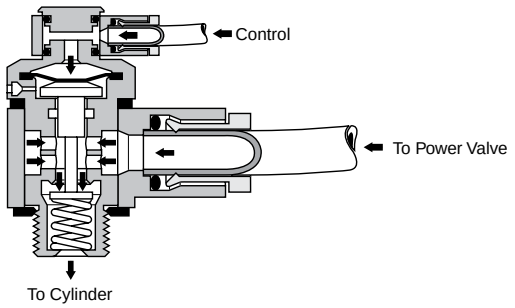
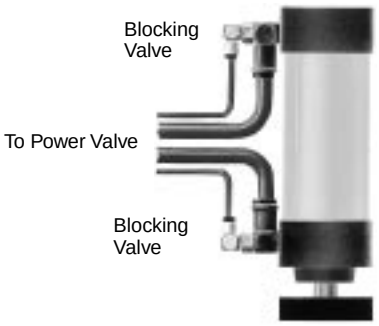
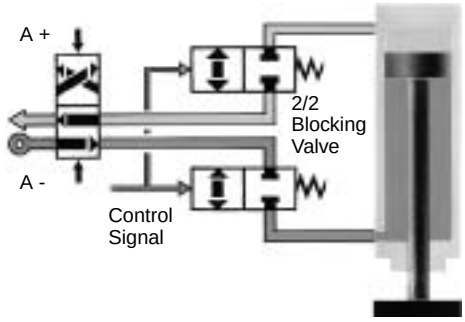
Blocking Valves

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.







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PWBA General Characteristics

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

Piloting and De-Piloting Pressure

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

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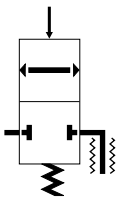
For Cylinder Mounting
(Can also be mounted in Threshold Sensor Banjo)

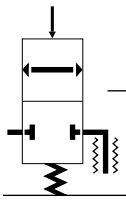
With Instant Tube Fittings

PWBA3469

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

With Threaded Connections and Tube Pilot Port

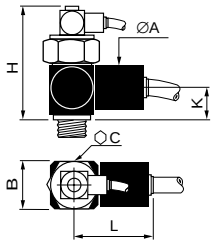
PWBA3833

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

* Instant fitting

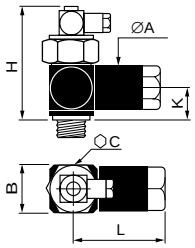
With Threaded Connections and Threaded Pilot Port

PWBA14/34

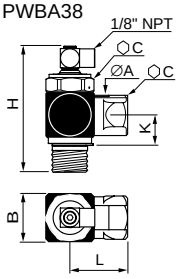


NPT			
Connection for Pilot	Cylinder Port Thread (Male)	Connection from Valve	Catalog Number
1/8" pipe	1/8"	1/8"	PWBA3788
	1/4"	1/4"	PWBA3799
	3/8"	3/8"	PWBA3733
	1/2"	1/2"	PWBA3722

PWBA18/38



PWBA38



Dimensions: Inches (mm)

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

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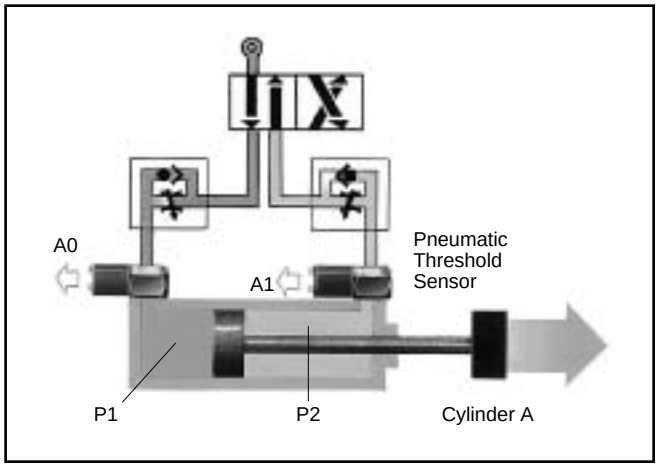
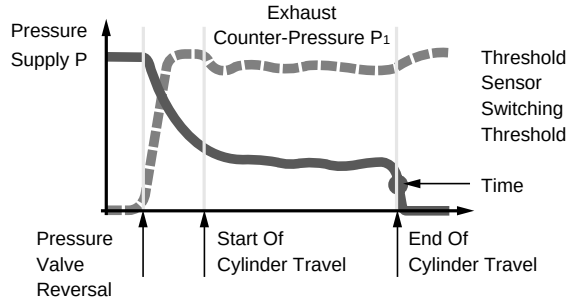
General Description

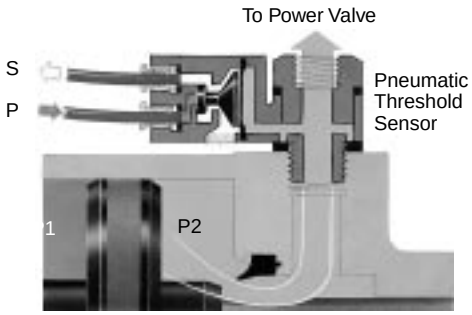
Threshold Sensors – PWS

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.







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PWS General Characteristics

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

Piloting and De-Piloting Pressure

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

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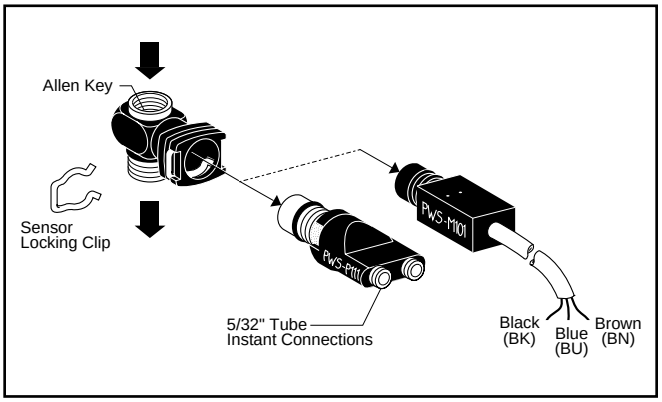


Model Selection

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

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

Application

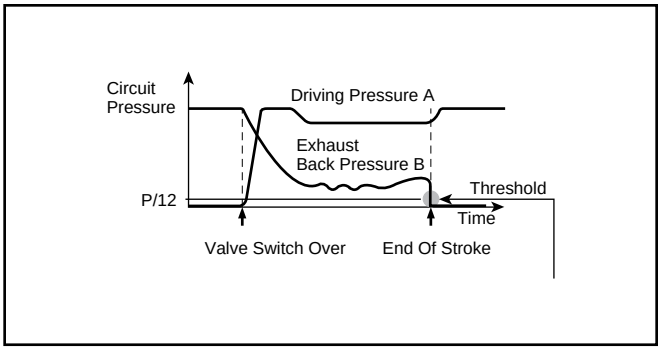
The threshold sensor provides electrical or pneumatic feedback information on pneumatic (air) cylinder status. These devices monitor the back pressure of the cylinder's exhausting chamber. When the cylinder stops, the back pressure drops and the threshold sensor provides the desired output. Ideal for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

Mounting

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

Operation

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



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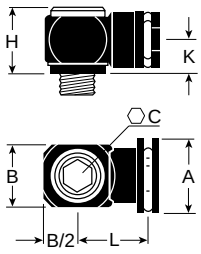
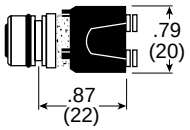
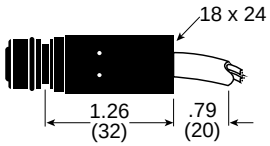
Dimensions



Banjo Socket



PWSP111



PWSM1012

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

inches
(mm)

Specifications

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

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

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

Maximum Operating Frequency ..... 10 Hz

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

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

Output Flow Rate (PWSP111) .....3 SCFM at 90 PSIG

Current Rating (PWSM1012) –
5 VA, 250 VAC
5W, 48 VAC

Materials –
Body.....Thermoplastic
Mounting Screw & Threads.....Brass

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

Voltage Range (PWSM1012) –
12 - 240 VAC
12 - 48 VDC

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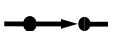
Universal Description	Electrical		Fluid Power		
	Function	Symbol	Function	Symbol	
				2-Way	3-Way
Normally Non-Passing (NNP)	Normally Open (N.O.)		Normally Closed (N.C.)		
Normally Passing (NP)	Normally Closed (N.C.)		Normally Open (N.O.)		

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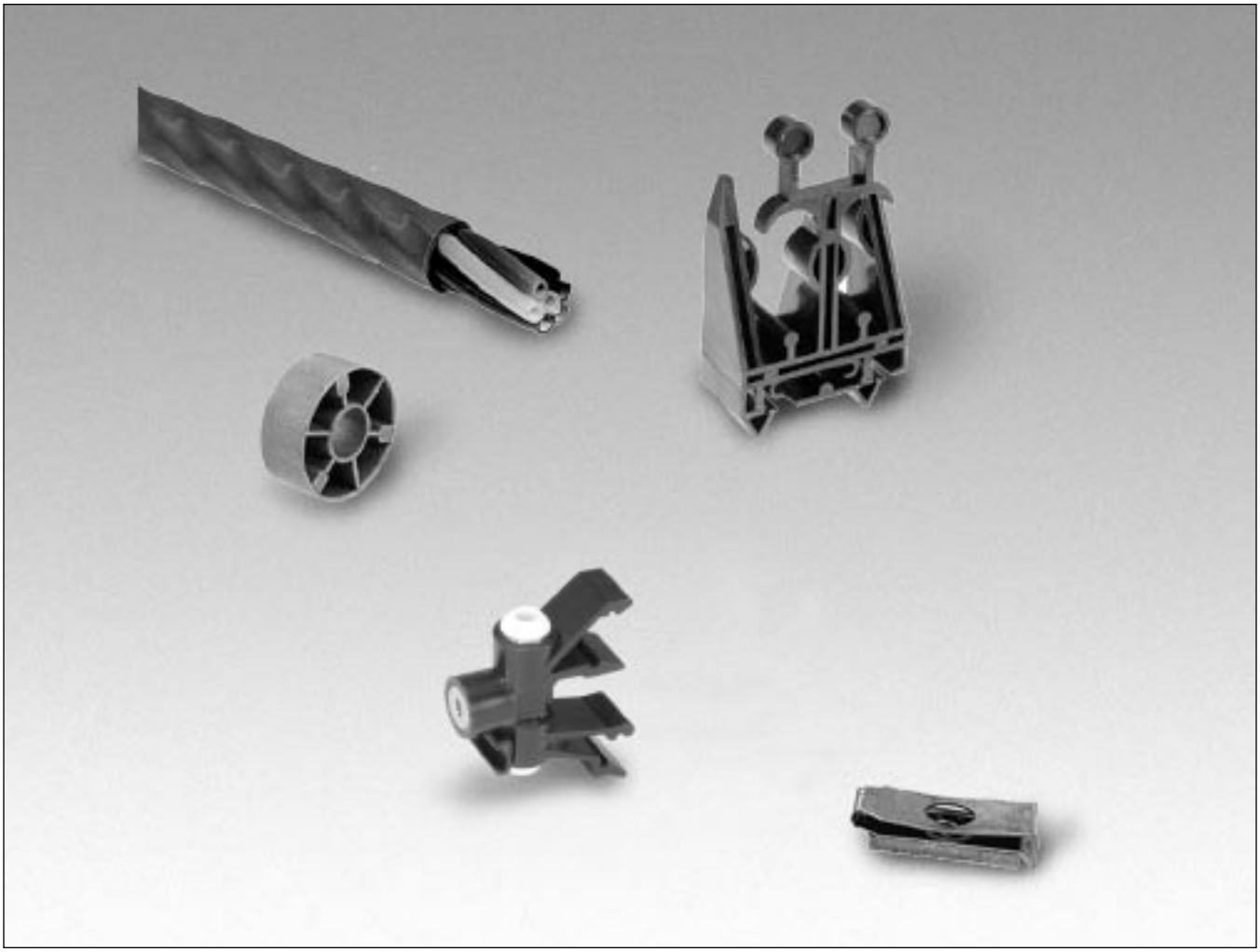
Accessories

Pneumatic Control Components

Section E



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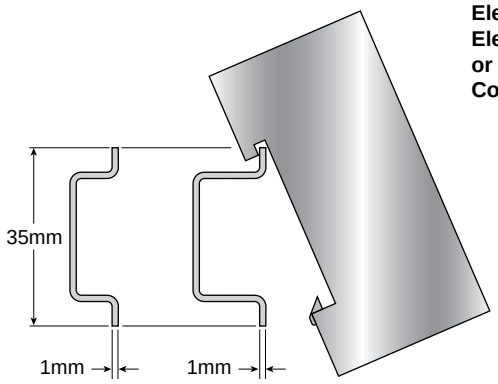
MOUNTING ON DIN RAIL

Suitable for various uses, the rails shown on the right all are conform to standards NF, DIN, EN: width 35 mm, latching groove thickness 1mm.

They are therefore suitable for the simple clip-on mounting of all standard components.



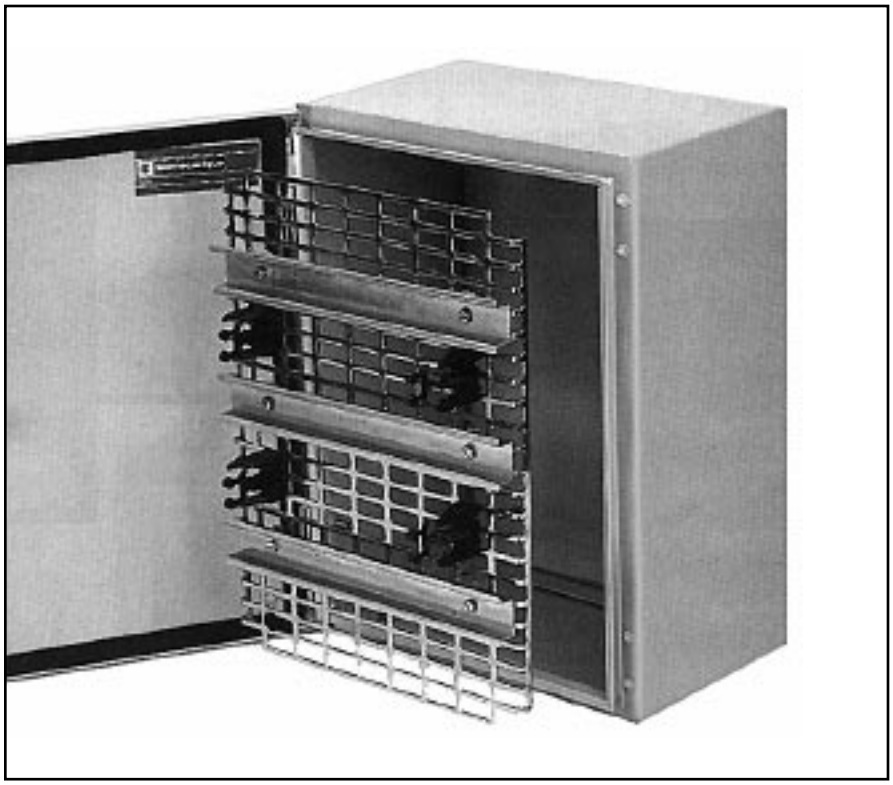
MOUNTING IN ENCLOSURE

When pneumatic components generated humid exhausts, they had to be separated from electrical components, and a special pneumatics enclosure was necessary.

Now that the exhaust is captured and/or the air is dry, it has become more economical to locate the electro- mechanical, electronic, and pneumatic components in the same enclosure: the assembly is more compact, the connections are shorter, the component positions and their referencing are more logical, thus facilitating any interventions.

The Grid System

Very familiar to electricians, the system includes the enclosures, the mounting plates, the rails and all the installation and wiring accessories for the three technologies: electromechanical, electronic and pneumatic.

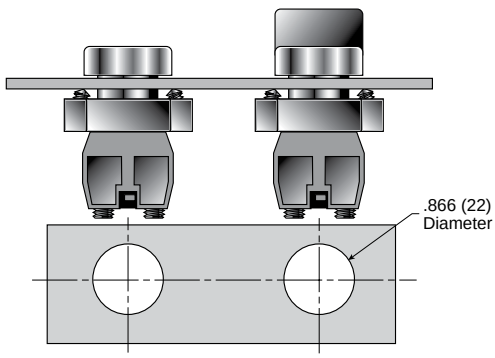


MOUNTING IN A CONTROL STATION

The pneumatic push-buttons presented have the same operating heads as electrical push-buttons.

Because of this, their installation in control panels or control stations is exactly the same :

- same mounting centers;
- same cutout Ø.



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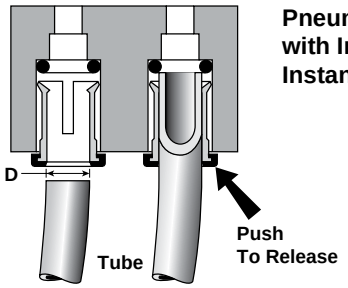
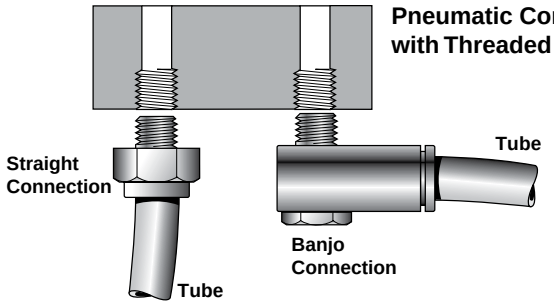
PNEUMATIC CONNECTIONS

The flexible pneumatic tubes are connected without preparation, by simply pushing into the component connection. Disconnection is also instant. One push on the external collet unlocks the tube.



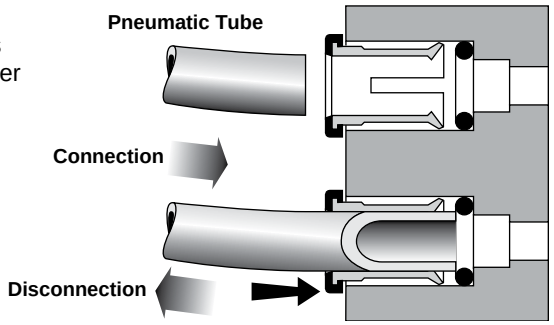
Pneumatic Component with Incorporated Instant Connections



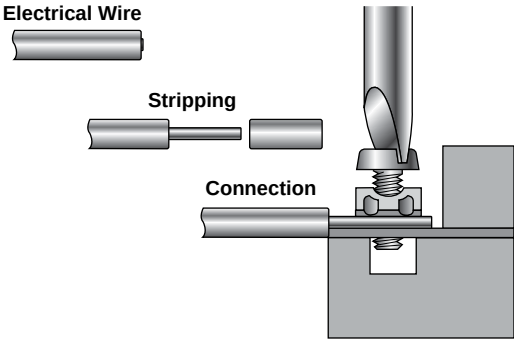
Pneumatic Component with Threaded Port

COMPARISON :
In comparison with current electrical wiring, connection and disconnection is simpler and faster with pneumatic tubing.

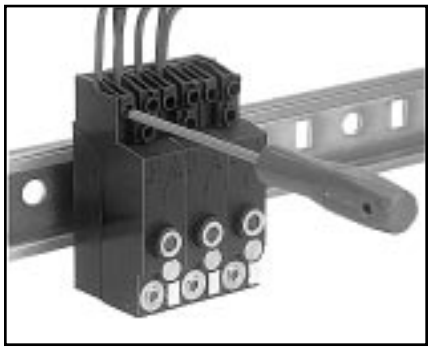
Pneumatic connections



Electrical connections

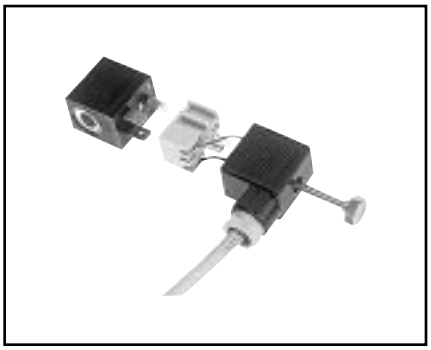


ELECTRICAL CONNECTIONS



On Modular Interfaces

Designed to be mounted in an enclosure,electro-pneumatic or pneumo-electric interfaces are all connected by screw terminals, as are industrial electrical or electronic components.



Plug-In Connectors

When it is necessary to mount the components outside the enclosure, the solenoid valves are fitted with a protected plug-in connector (IP65).

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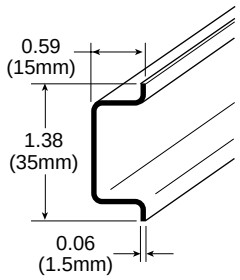
Mounting Rail



AM1DE200

Part Number	Length	Description
AM1DE200	6 Feet	Zinc Chromated Steel 1.5mm Thick To DIN EN 50022

Mounting Accessories

AZ1CA04

Part Number	Height Inches (mm)	Description
AZ1CA029123	3/4" (20)	Sold In Sets Of Four (4)

AF1EA51

Part Number	Thread Size	Description
AF1EA51	10-24 (ØM5)	Clip On Nut Sold In Sets Of 100

Push-In Fitting

Part Number	Thread Size	Description
HS3PK4	5/32" (4)	2 Ports with Pressure Indicator

Tools

PZCM994

PZCM888

Part Number	Tube Size	Description
PZCM994	5/32" (4)	Tube Disconnecting Tool
PZCM996	1/4" (6)	
PZCM888	—	Tube Cutter

Clip-On Terminal Blocks Subbase

Part Number	Thread Size	Description
PZCB2268	1/4" (6)	2 Ports

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Section F

What is ATEX?

ATEX is a European Directive (94/9/EC) valid for products to be used within an explosive atmosphere.

Why is ATEX?

Harmonized European ATEX Standard

The European Union has adopted two harmonized directives in the field of health and safety. The directives are known as ATEX100a and ATEX137. Directive ATEX100a (94/9/EC) lays down minimum safety requirements for products intended for use in potentially explosive atmospheres in European Union member states. Directive ATEX137(99/92/EC) defines minimum requirements for health and safety at the workplace, for working conditions and for the handling of products and materials in potentially explosive atmospheres. This directive also divides the workplace into **zones** and defines criteria by which products are **categorized** within these zones.

The **owner** of the installation must analyze and assess the area in which the explosive gas / dust mixture may occur, and if necessary must divide it into. This process of zoning then allows the correct plant and equipment to be selected for use in the area.

Zones		Presence of Potentially Explosive Atmosphere	Type of Risk
Gas G	Dust D		
0	20	Present Continuously or for Long Periods	Permanent
1	21	Likely to Occur in Normal Operation Occasionally	Potential
2	22	Not Likely to Occur in Normal Operation but, if it Does Occur, will Persist for a Short Period Only	Minimal

Levels of Protection for the Various Equipment Categories

The various equipment categories must be capable of operating in accordance with the manufacturer's operating specifications at defined levels of protection. With regard to the Machinery Directive, directive 94/9/EC (ATEX100a) takes precedence over the Machinery directive with regard to explosion protection in potentially explosive atmospheres.

Level of Protection	Category		Type of Protection	Operating Specification
	Group I	Group II		
Very High	**M1**	**—**	Two independent means of protection or safety, ensuring that the equipment remains functional even in the event of two faults occurring independently of each other	The equipment remains energized and functional even with an explosive atmosphere present
Very High	**—**	**1**		The equipment remains energized and functional in zones 0, 1, 2 (G) and / or zones 20, 21, 22 (D)
High	**M2**	**—**	Protection suitable for normal operation and severe operating conditions	The equipment is de-energized in the event of an explosive atmosphere
High	**—**	**2**	Protection suitable for normal operation and frequent faults, or equipment in which faults normally have to be taken into account	The equipment remains energized and functional in zones 1, 2 (G) and / or zones 21, 22 (D)
Normal	**—**	**3**	Protection suitable for normal operation	The equipment remains energized and functional in zone 2 (G) and / or zone 22 (D)

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Classifying of Ex-equipment According to the ATEX-directive

Group	I Mines, Combustible Vapors		II Other Potentially Explosive Atmospheres (Gases, Dusts, Mists and Vapors)					
Category	M1	M2	1		2		3	
Atmosphere			G	D	G	D	G	D
Zone			0	20	1	21	2	22

What are the Stated Temperature Classes?

Classification of flammable gases and vapors on the basis of ignition temperature.

Temperature Classes	Maximum Allowed Surface Temperature on the Material in C°
T1	450
T2	300
T3	200
T4	135
T5	100
T6	85

ATEX Product Compliance

Products	Part Number	Labels	Zones
Limit Switches	PXC-M	T6 (85°C)	1, 2, 21, 22
Logic	PLL-, PLK-, PLN-	T6 (85°C)	1, 2, 21, 22
	PSV-A1		
Control Duty	PXV-F1, PXB-B4	T6 (85°C)	1, 2, 21, 22
Cylinder Control	PWS-P111	T6 (85°C)	1, 2, 21, 22

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Please Note
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Click on: Divisions
Click on: Pneumatic Division Europe
Click on: ATEX Products

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Notes

Part Number	Page
ZCKY13	D8
ZCKY41	D8
ZCKY43	D8
ZCKY51	D8
ZCKY52	D8
ZCKY81	D8
ZCKY91	D8

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Click on: ATEX Products

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

⚠ WARNING:

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

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

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

1. GENERAL INSTRUCTIONS

1.1. Scope: This safety guide is designed to cover general guidelines on the installation, use, and maintenance of Pneumatic Division Valves, FRLs (Filters, Pressure Regulators, and Lubricators), Vacuum products and related accessory components.

1.2. Fail-Safe: Valves, FRLs, Vacuum products and their related components can and do fail without warning for many reasons. Design all systems and equipment in a fail-safe mode, so that failure of associated valves, FRLs or Vacuum products will not endanger persons or property.

1.3 Relevant International Standards: For a good guide to the application of a broad spectrum of pneumatic fluid power devices see: ISO 4414:1998, Pneumatic Fluid Power – General Rules Relating to Systems. See www.iso.org for ordering information.

1.4. Distribution: Provide a copy of this safety guide to each person that is responsible for selection, installation, or use of Valves, FRLs or Vacuum products. Do not select, or use Parker valves, FRLs or vacuum products without thoroughly reading and understanding this safety guide as well as the specific Parker publications for the products considered or selected.

1.5. User Responsibility: Due to the wide variety of operating conditions and applications for valves, FRLs, and vacuum products Parker and its distributors do not represent or warrant that any particular valve, FRL or vacuum product is suitable for any specific end use system. This safety guide does not analyze all technical parameters that must be considered in selecting a product. The user, through its own analysis and testing, is solely responsible for:

- Making the final selection of the appropriate valve, FRL, Vacuum component, or accessory.
- Assuring that all user's performance, endurance, maintenance, safety, and warning requirements are met and that the application presents no health or safety hazards.
- Complying with all existing warning labels and / or providing all appropriate health and safety warnings on the equipment on which the valves, FRLs or Vacuum products are used; and,
- Assuring compliance with all applicable government and industry standards.

1.6. Safety Devices: Safety devices should not be removed, or defeated.

1.7. Warning Labels: Warning labels should not be removed, painted over or otherwise obscured.

1.8. Additional Questions: Call the appropriate Parker technical service department if you have any questions or require any additional information. See the Parker publication for the product being considered or used, or call 1-800-CPARKER, or go to www.parker.com, for telephone numbers of the appropriate technical service department.

2. PRODUCT SELECTION INSTRUCTIONS

2.1. Flow Rate: The flow rate requirements of a system are frequently the primary consideration when designing any pneumatic system. System components need to be able to provide adequate flow and pressure for the desired application.

2.2. Pressure Rating: Never exceed the rated pressure of a product. Consult product labeling, Pneumatic Division catalogs or the instruction sheets supplied for maximum pressure ratings.

2.3. Temperature Rating: Never exceed the temperature rating of a product. Excessive heat can shorten the life expectancy of a product and result in complete product failure.

2.4. Environment: Many environmental conditions can affect the integrity and suitability of a product for a given application. Pneumatic Division products are designed for use in general purpose industrial applications. If these products are to be used in unusual circumstances such as direct sunlight and/or corrosive or caustic environments, such use can shorten the useful life and lead to premature failure of a product.

2.5. Lubrication and Compressor Carryover: Some modern synthetic oils can and will attack nitrile seals. If there is any possibility of synthetic oils or greases migrating into the pneumatic components check for compatibility with the seal materials used. Consult the factory or product literature for materials of construction.

2.6. Polycarbonate Bowls and Sight Glasses: To avoid potential polycarbonate bowl failures:

- Do not locate polycarbonate bowls or sight glasses in areas where they could be subject to direct sunlight, impact blow, or temperatures outside of the rated range.
- Do not expose or clean polycarbonate bowls with detergents, chlorinated hydro-carbons, 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.

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2.7. Chemical Compatibility: For more information on plastic component chemical compatibility see Pneumatic Division technical bulletins Tec-3, Tec-4, and Tec-5

2.8. Product Rupture: Product rupture can cause death, serious personal injury, and property damage.
- Do not connect pressure regulators or other Pneumatic Division products to bottled gas cylinders.
- Do not exceed the maximum primary pressure rating of any pressure regulator or any system component.
- Consult product labeling or product literature for pressure rating limitations.

3. PRODUCT ASSEMBLY AND INSTALLATION INSTRUCTIONS

3.1. Component Inspection: Prior to assembly or installation a careful examination of the valves, FRLs or vacuum products must be performed. All components must be checked for correct style, size, and catalog number. DO NOT use any component that displays any signs of nonconformance.

3.2. Installation Instructions: Parker published Installation Instructions must be followed for installation of Parker valves, FRLs and vacuum components. These instructions are provided with every Parker valve or FRL sold, or by calling 1-800-CPARKER, or at www.parker.com.

3.3. Air Supply: The air supply or control medium supplied to Valves, FRLs and Vacuum components must be moisture-free if ambient temperature can drop below freezing

4. VALVE AND FRL MAINTENANCE AND REPLACEMENT INSTRUCTIONS

4.1. Maintenance: Even with proper selection and installation, valve, FRL and vacuum products service life may be significantly reduced without a continuing maintenance program. The severity of the application, risk potential from a component failure, and experience with any known failures in the application or in similar applications should determine the frequency of inspections and the servicing or replacement of Pneumatic Division products so that products are replaced before any failure occurs. A maintenance program must be established and followed by the user and, at minimum, must include instructions 4.2 through 4.10.

4.2. Installation and Service Instructions: Before attempting to service or replace any worn or damaged parts consult the appropriate Service Bulletin for the valve or FRL in question for the appropriate practices to service the unit in question. These Service and Installation Instructions are provided with every Parker valve and FRL sold, or are available by calling 1-800-CPARKER, or by accessing the Parker web site at www.parker.com.

4.3. Lockout / Tagout Procedures: Be sure to follow all required lockout and tagout procedures when servicing equipment. For more information see: OSHA Standard – 29 CFR, Part 1910.147, Appendix A, The Control of Hazardous Energy – (Lockout / Tagout)

4.4. Visual Inspection: Any of the following conditions requires immediate system shut down and replacement of worn or damaged components:
- Air leakage: Look and listen to see if there are any signs of visual damage to any of the components in the system. Leakage is an indication of worn or damaged components.
- Damaged or degraded components: Look to see if there are any visible signs of wear or component degradation.
- Kinked, crushed, or damaged hoses. Kinked hoses can result in restricted air flow and lead to unpredictable system behavior.
- Any observed improper system or component function: Immediately shut down the system and correct malfunction.
- Excessive dirt build-up: Dirt and clutter can mask potentially hazardous situations.

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

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

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

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

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

4.9. Putting Serviced System Back into Operation: Follow the guidelines above and all relevant Installation and Maintenance Instructions supplied with the valve FRL or vacuum component to insure proper function of the system.

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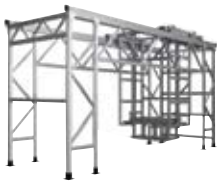

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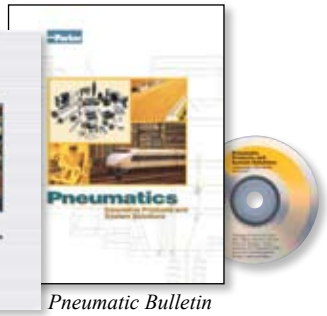

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