EZ Inline Series
Air Control Valves

Catalog 0683

aerospace
climate control
electromechanical
filtration
fluid & gas handling
hydraulics
pneumatics
process control
sealing & shielding

Parker

ENGINEERING YOUR SUCCESS.

Global Pneumatics, Warning, Offer of Sale

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Parker Hannifin Corporation
Pneumatic Division
Richland, Michigan
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Table of Contents

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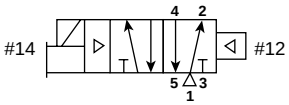
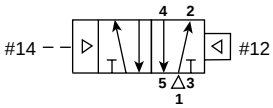
Single Solenoid
4-Way, 2-Position



De-energized position – Solenoid operator #14 de-energized. Pressure at inlet port 1 connected to outlet port 2. Outlet port 4 connected to exhaust port 5.

Energized position – Solenoid operator #14 energized. Pressure at inlet port 1 connected to outlet port 4. Outlet port 2 connected to exhaust port 3.

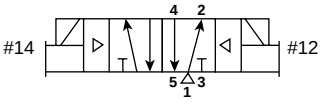
Single Remote Pilot
4-Way, 2-Position



Normal position – Pressure at inlet port 1 connected to outlet port 2. Outlet port 4 connected to exhaust port 5.

Operated position – Maintained air signal at port 14. Pressure at inlet port 1 connected to outlet port 4. Outlet port 2 connected to exhaust port 3.

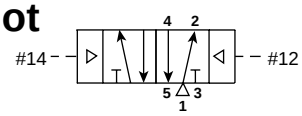
Double Solenoid
4-Way, 2-Position



Solenoid operator #14 energized last. Pressure at inlet port 1 connected to outlet port 4. Outlet port 2 connected to exhaust port 3.

Solenoid operator #12 energized last. Pressure at inlet port 1 connected to outlet port 2. Outlet port 4 connected to exhaust port 5.

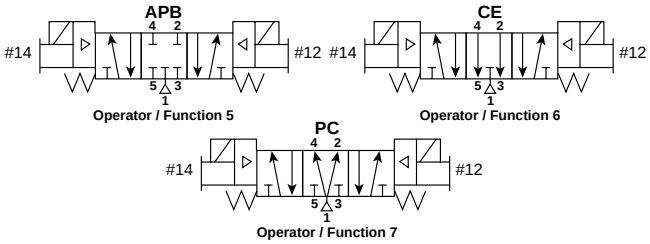
Double Remote Pilot
4-Way, 2-Position



Momentary air signal at port 14 last. Pressure at inlet port 1 connected to outlet port 4. Outlet port 2 connected to exhaust port 3.

Momentary air signal at port 12 last. Pressure at inlet port 1 connected to outlet port 2. Outlet port 4 connected to exhaust port 5.

Double Solenoid
4-Way, 3-Position



With #12 operator energized – inlet port 1 connected to cylinder port 2, cylinder port 4 connected to exhaust port 5.

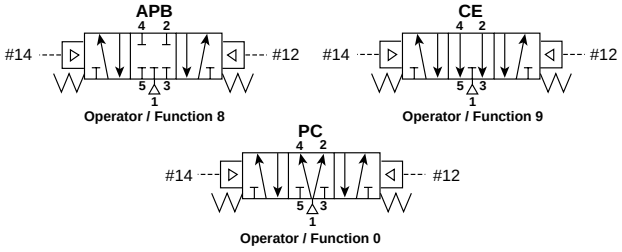
With #14 operator energized – inlet port 1 connected to cylinder port 4, cylinder port 2 connected to exhaust port 3.

Function 5: All Ports Blocked
All ports blocked in the center position.

Function 6: Center Exhaust
Cylinder ports 2 and 4 connected to exhaust ports 3 and 5 in center position. Port 1 is blocked.

Function 7: Pressure Center
Pressure port 1 connected to cylinder ports 2 and 4, and exhaust ports 3 and 5 blocked in center position.

Double Remote Pilot
4-Way, 3-Position



With #12 operator signaled – inlet port 1 connected to cylinder port 2, cylinder port 4 connected to exhaust port 5.

With #14 operator signaled – inlet port 1 connected to cylinder port 4, cylinder port 2 connected to exhaust port 3.

Function 8: All Ports Blocked
All ports blocked in the center position.

Function 9: Center Exhaust
Cylinder ports 2 and 4 connected to exhaust ports 3 and 5 in center position. Port 1 is blocked.

Function 0: Pressure Center
Pressure port 1 connected to cylinder ports 2 and 4, and exhaust ports 3 and 5 blocked in center position.

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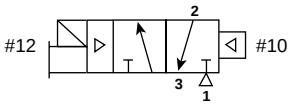
Single Solenoid
3-Way, 2-Position NC (NNP)

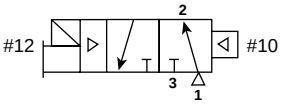


Normally Closed:

De-energized position – Solenoid #12 de-energized. Pressure at inlet port 1 blocked, outlet port 2 connected to exhaust port 3.

Energized position – Solenoid #12 energized. Pressure at inlet port 1 connected to outlet port 2, exhaust port 3 is blocked.

Single Solenoid
3-Way, 2-Position NO (NP)



Normally Open:

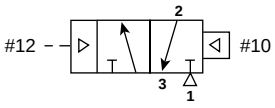
De-energized position – Solenoid #10 de-energized. Pressure at inlet port 1 connected to outlet port 2, exhaust port 3 is blocked.

Energized position – Solenoid #10 energized. Pressure at inlet port 1 blocked, outlet port 2 connected to exhaust port 3.

3-Way Configuration

Looking at the #1 and #3 ports, the solenoid (or remote operator) is always on the #3 port end.
Different spools are used for NO and NC functions.

Single Remote Pilot
3-Way, 2-Position NC (NNP)

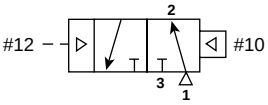


Normally Closed:

Normal position – Pressure at inlet port 1 blocked, outlet port 2 connected to exhaust port 3.

Operated position – Maintained air signal at port 12. Pressure at inlet port 1 connected to outlet port 2, exhaust port 3 is blocked.

Single Remote Pilot
3-Way, 2-Position NO (NP)



Normally Open:

Normal position – Pressure at inlet port 1 connected to outlet port 2, exhaust port 3 is blocked.

Operated position – Maintained air signal at port 10. Pressure at inlet port 1 blocked, outlet port 2 connected to exhaust port 3.

Definitions

CSA C US ..... Canadian Standards Association and UL Applicable Testing Methods.

CE..... European Directives Marking

IP65 ..... International classification system for sealing effectiveness for enclosures of electrical equipment. IP stands for “Ingress Protection” and the two digits XY stand for: X - protection from solid objects and Y - protection from moisture. IP 65 is protection from dust and water washdown.

NEMA 4..... National standard for electrical enclosure protection. NEMA 4 provides protection against dirt, dust, water hosedown and rain. (Similar to IP 65)

EN175301-803 ... International standard for the 15mm 3-Pin connector. The pin spacing is 8mm.

3-WAY ..... Valve has three ways for air to flow. Also designated as 3/2.

4-WAY ..... Valve has four ways for air to flow. Also designated as 5/2 for 2-Position and 5/3 for 3-Position.

NC ..... Normally Closed. Pressure is blocked when in neutral position. (Normally Non-Passing)

NO ..... Normally Open. Pressure passes thru when in neutral position. (Normally Passing)

IEM ..... Inlet / Exhaust manifold. The inlet and exhaust ports are located in the manifold. The cylinder ports are accessed in the valve.

NLMOR ..... Non-Locking Manual Override. A constant actuation must be maintained for the valve to remain shifted.

LMOR..... Locking Manual Override. Valve remains shifted without constant end user override actuation.

Surge Suppression
Nullifies reverse EMF generated when a solenoid is de-energized.

SCFM ..... Measure of air flow. Standard Cubic Feet per Minute at 68°F and 36% humidity at sea level.

PSIG ..... Pounds per Square Inch measured with a gage. (Catalog pressure reflects PSIG)

PSIA ..... Pounds per Square Inch atmospheric.

kPa ..... Kilopascals. International measure of pressure. 145 PSIG = 1000 kPa

PSIG = 0 → PSIA = 14.7 → In. of Hg = 0 → kPa = 0

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EZ Inline Features

Robust Design – Wear Compensation System and Balanced Spool Design

Simplified Ordering – Functions Based on Market Demand

Optimized Design – Ultimate Design for Industrial Market

International Offering –Voltage and Port Sizes for all Markets

Global Sourcing – Cost Effective Solution

Applications

Food and Beverage Processing

Household and Personal Care Packaging

Printing Processes

Textile Manufacturing and Packaging

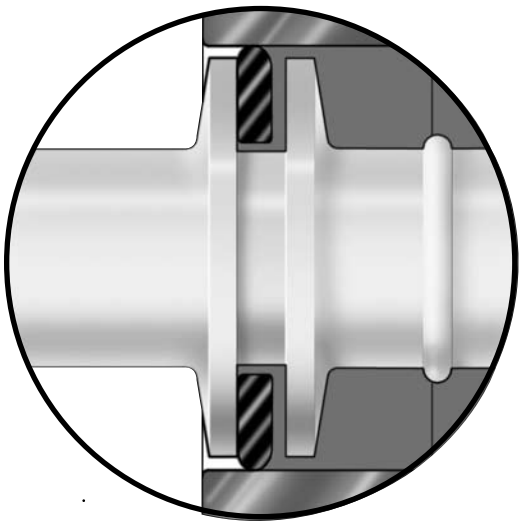
Airport Conveyor Systems

Warehousing, Packaging and Conveying

WCS

*W*ear *C*ompensation *S*ystem

- **Maximum Performance**
  - Low Friction - Lower Operating Pressures
  - Fast Response - Less Wear
- **Long Cycle Life** - Under pressure, radial expansion of the seal occurs to maintain sealing contact with the valve bore.
- **Non-Lube Service** - No lubrication required for continuous valve shifting.
- **Bi-Directional Spool Seals** - Common spool used for any pressure, including vacuum.



Refer to www.parker.com/pneu/EZinline
Click on Catalog EZ inline

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Flow Characteristics

- EZ1: 0.8 Cv
- EZ2: 1.3 Cv
- EZ3: 2.4 Cv

Operating Pressure

- Vacuum to 145 PSIG

Ports

- EZ1: 1/8 Inch
- EZ2: 1/4 Inch
- EZ3: 3/8 Inch

Mounting

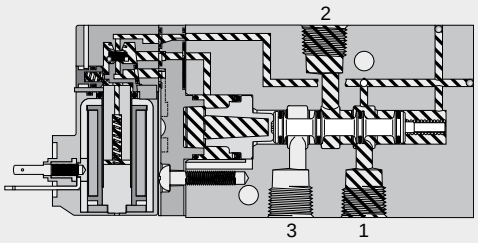
- Inline
- IEM Manifold

Solenoids

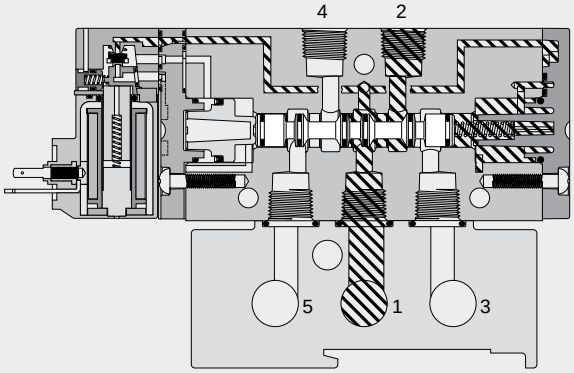
- 2.5 W – 15mm
  - Flying Leads
  - 3-Pin EN175301-803 (Formerly DIN 43650C)
- 1.2 W Option Available

Certification / Approval

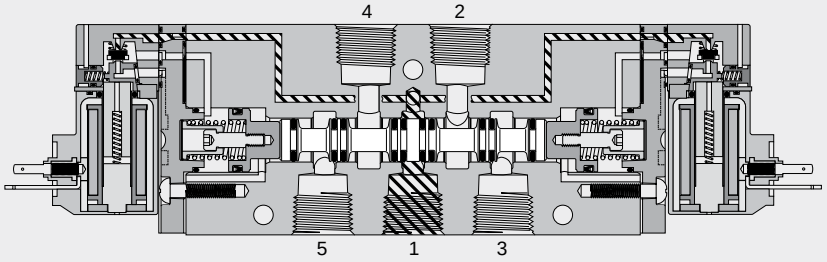
- CSA, C, US
- Solenoid Approved to be CE marked
- IP 65 Rating



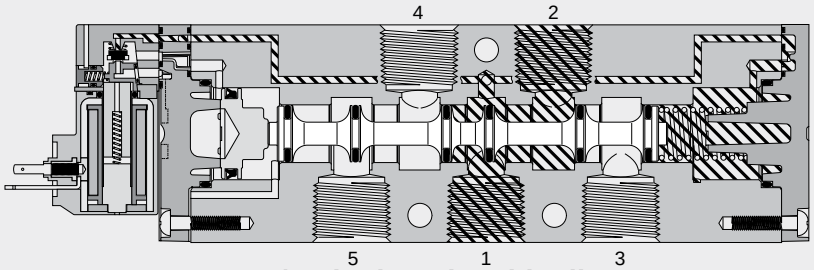
EZ1, 3/2, Single Solenoid Inline
Shown Energized



EZ1, 5/2, Single Solenoid Inline
Shown De-Energized



EZ2, 5/3 Double Solenoid Inline
Shown De-Energized



EZ3, 5/2 Single Solenoid Inline
Shown De-Energized

Pressure **Exhaust**

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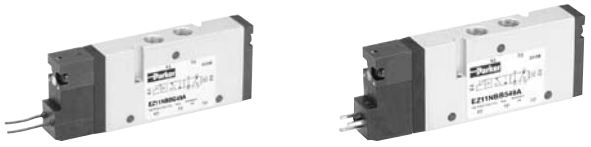
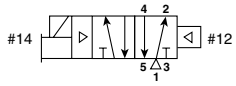
Single Solenoid
4-Way, 2-Position

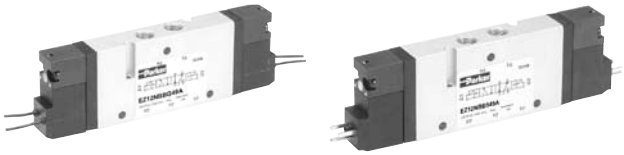


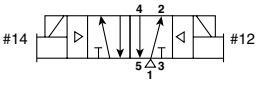


Inline

	Flying Leads	3-Pin			
EZ1	EZ11NBBG53A	EZ11NBB553A	1/8"	120VAC	0.8 Cv
EZ1	EZ11NBBG49A	EZ11NBB549A	1/8"	24VDC	0.8 Cv
EZ2	EZ21NBBG53A	EZ21NBB553A	1/4"	120VAC	1.3 Cv
EZ2	EZ21NBBG49A	EZ21NBB549A	1/4"	24VDC	1.3 Cv
EZ3	EZ31NBBG53A	EZ31NBB553A	3/8"	120VAC	2.4 Cv
EZ3	EZ31NBBG49A	EZ31NBB549A	3/8"	24VDC	2.4 Cv

Double Solenoid
4-Way, 2-Position

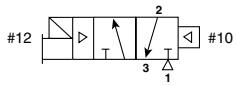




Inline

	Flying Leads	3-Pin			
EZ1	EZ12NBBG53A	EZ12NBB553A	1/8"	120VAC	0.8 Cv
EZ1	EZ12NBBG49A	EZ12NBB549A	1/8"	24VDC	0.8 Cv
EZ2	EZ22NBBG53A	EZ22NBB553A	1/4"	120VAC	1.3 Cv
EZ2	EZ22NBBG49A	EZ22NBB549A	1/4"	24VDC	1.3 Cv
EZ3	EZ32NBBG53A	EZ32NBB553A	3/8"	120VAC	2.4 Cv
EZ3	EZ32NBBG49A	EZ32NBB549A	3/8"	24VDC	2.4 Cv

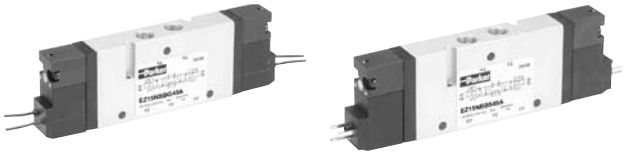
Single Solenoid
3-Way, 2-Position, NC

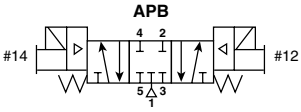


Inline

	Flying Leads	3-Pin			
EZ1	EZ1GNBBG53A	EZ1GNBB553A	1/8"	120VAC	0.8 Cv
EZ1	EZ1GNBBG49A	EZ1GNBB549A	1/8"	24VDC	0.8 Cv
EZ2	EZ2GNBBG53A	EZ2GNBB553A	1/4"	120VAC	1.3 Cv
EZ2	EZ2GNBBG49A	EZ2GNBB549A	1/4"	24VDC	1.3 Cv
EZ3	EZ3GNBBG53A	EZ3GNBB553A	3/8"	120VAC	2.4 Cv
EZ3	EZ3GNBBG49A	EZ3GNBB549A	3/8"	24VDC	2.4 Cv

Double Solenoid
4-Way, 3-Position, APB





Inline

	Flying Leads	3-Pin			
EZ1	EZ15NBBG53A	EZ15NBB553A	1/8"	120VAC	0.6 Cv
EZ1	EZ15NBBG49A	EZ15NBB549A	1/8"	24VDC	0.6 Cv
EZ2	EZ25NBBG53A	EZ25NBB553A	1/4"	120VAC	1.0 Cv
EZ2	EZ25NBBG49A	EZ25NBB549A	1/4"	24VDC	1.0 Cv
EZ3	EZ35NBBG53A	EZ35NBB553A	3/8"	120VAC	1.9 Cv
EZ3	EZ35NBBG49A	EZ35NBB549A	3/8"	24VDC	1.9 Cv

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Solenoid Operated Valves

EZ1 | 1 | N | BB | G | 49 | A

Basic Series		
EZ1 Series	**16mm, 1/8"**	**EZ1**
EZ2 Series	**19mm, 1/4"**	**EZ2**
EZ3 Series	**26mm, 3/8"**	**EZ3**

Operator Function	
3-Way	
Single Solenoid, 2-Position NC - Air Return	**G**
Single Solenoid, 2-Position NO - Air Return	H
Single Solenoid, 2-Position NC - Air Return / Spring Assist	V
Single Solenoid, 2-Position NO - Air Return / Spring Assist	W
4-Way	
Single Solenoid, 2-Position - Air Return	**1**
Double Solenoid, 2-Position	**2**
Double Solenoid, 3-Position - APB	**5**
Double Solenoid, 3-Position - CE	6
Double Solenoid, 3-Position - PC	7
Single Solenoid, 2-Position - Air Return / Spring Assist	E

Thread Type	
3-Way / 4-Way	
N	**NPT**
G	BSPP
R	BSPT

Pilot Source / Overrides	
BB	**Internal Pilot Source & Flush - Non-Locking Override**
BC	Internal Pilot Source & Flush Locking Override

Enclosure / Lead Length	
5	**15mm 3-Pin DIN EN175301-803**
G	**Flying Leads 18"**

Voltage	AC		DC
	60Hz	50Hz	
49			**24**
53	**120**	**110**	

BOLD OPTIONS ARE MOST POPULAR.

CSA Approved Solenoid Operated Valves

EZ1 | 1 | N | BB | 5 | 49 | A | L*

Basic Series		
EZ1 Series	16mm, 1/8"	**EZ1**
EZ2 Series	19mm, 1/4"	**EZ2**
EZ3 Series	26mm, 3/8"	**EZ3**

Operator Function	
3-Way	
Single Solenoid, 2-Position NC - Air Return	G
Single Solenoid, 2-Position NO - Air Return	H
Single Solenoid, 2-Position NC - Air Return / Spring Assist	V
Single Solenoid, 2-Position NO - Air Return / Spring Assist	W
4-Way	
Single Solenoid, 2-Position - Air Return	**1**
Double Solenoid, 2-Position	**2**
Double Solenoid, 3-Position - APB	**5**
Double Solenoid, 3-Position - CE	6
Double Solenoid, 3-Position - PC	7
Single Solenoid, 2-Position - Air Return / Spring Assist	E

* Max pressure: EZ1 145 PSI
EZ2 145 PSI
EZ3 110 PSI

Thread Type	
3-Way / 4-Way	
N	NPT
G	BSPP
R	BSPT

Pilot Source / Overrides	
BB	Internal Pilot Source & Flush - Non-Locking Override
BC	Internal Pilot Source & Flush Locking Override

Enclosure / Lead Length	
5	15mm 3-Pin DIN EN175301-803

Voltage	AC	DC
	60Hz	
49		24
53	120	
57	240	

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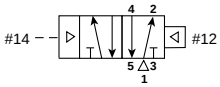
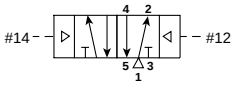
Single Remote Pilot
4-Way, 2-Position



Inline

EZ1	**EZ13N000YYA**	1/8"	16mm	0.8 Cv
EZ2	**EZ23N000YYA**	1/4"	19mm	1.3 Cv
EZ3	**EZ33N000YYA**	3/8"	26mm	2.4 Cv

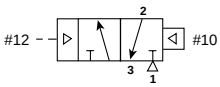
Double Remote Pilot
4-Way, 2-Position



Inline

EZ1	**EZ14N000YYA**	1/8"	16mm	0.8 Cv
EZ2	**EZ24N000YYA**	1/4"	19mm	1.3 Cv
EZ3	**EZ34N000YYA**	3/8"	26mm	2.4 Cv

Single Remote Pilot
3-Way, 2-Position, NC

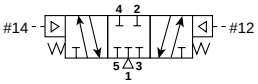


Inline

EZ1	**EZ1KN000YYA**	1/8"	16mm	0.8 Cv
EZ2	**EZ2KN000YYA**	1/4"	19mm	1.3 Cv
EZ3	**EZ3KN000YYA**	3/8"	26mm	2.4 Cv

Double Remote Pilot
4-Way, 3-Position, APB

APB



Inline

EZ1	**EZ18N000YYA**	1/8"	16mm	0.6 Cv
EZ2	**EZ28N000YYA**	1/4"	19mm	1.0 Cv
EZ3	**EZ38N000YYA**	3/8"	26mm	1.9 Cv

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Air Pilot Operated Valves

EZ1	K	N	000	YY	A

Basic Series		
EZ1 Series	**16mm, 1/8"**	**EZ1**
EZ2 Series	**19mm, 1/4"**	**EZ2**
EZ3 Series	**26mm, 3/8"**	**EZ3**

Thread Type	
3-Way / 4-Way	
N	**NPT**
G	BSPP
R	BSPT

Operator Function	
3-Way	
Single Remote Pilot, 2-Position NC - Air Return	**K**
Single Remote Pilot, 2-Position NO - Air Return	L
Single Remote Pilot, 2-Position NC - Air Return / Spring Assist	X
Single Remote Pilot, 2-Position NO - Air Return / Spring Assist	Y
4-Way	
Single Remote Pilot, 2-Position - Air Return	**3**
Double Remote Pilot, 2-Position	**4**
Double Remote Pilot, 3-Position - APB	**8**
Double Remote Pilot, 3-Position - CE	9
Double Remote Pilot, 3-Position - PC	0
Single Remote Pilot, 2-Position - Air Return / Spring Assist	F

BOLD OPTIONS ARE MOST POPULAR.

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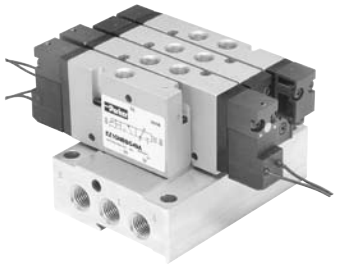
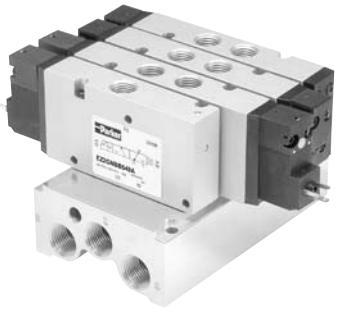
EZ1



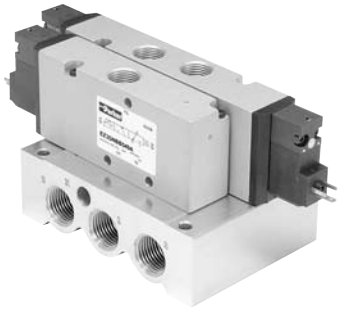
3-Way or 4-Way, NPT	**AAPSMABXN##NP**	## – stations 02 to 12

EZ2



3-Way or 4-Way, NPT	**AAPSMBBXN##NP**	## – stations 02 to 12

EZ3



3-Way or 4-Way, NPT	**AAPSMCBXN##NP**	## – stations 02 to 12

IEM Bar Manifold allows for mounting of 3-Way and 4-Way inline valves on the same manifold.

- Utilizes Inline mount.
- Same manifold for 3-Way & 4-Way valves.
- **Kits (PS....) include:** (1) Manifold, Valve Hold Down Bolts, Gaskets.

IEM Bar Manifold Model Number

AA PS M A BX N 02 NP

Manifold	
Manifold Only	Blank
Manifold with Factory Assembled Valves Mounted	AA

Type	
IEM, 3-Way or 4-Way	M

Series	
EZ1 Series	A
EZ2 Series	B
EZ3 Series	C

Port Type	
N	NPT
G	BSPP "G"
R	BSPT "R"

Stations
02
•
•
•
12

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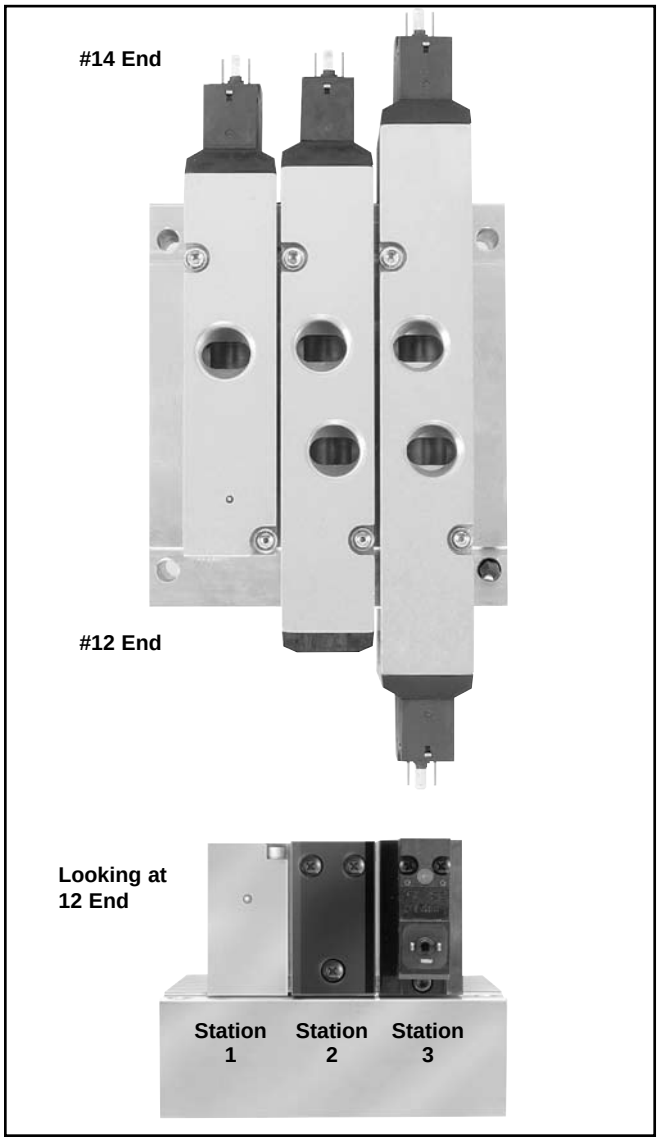


How To Order Aluminum Bar Manifold Assemblies

1. List Manifold Assembly call out. Use AA + the part number of the aluminum bar manifold. This automatically includes the aluminum bar manifold and assembly.

2. List complete valve model number, listing left to right, LOOKING AT THE #12 END of the manifold. The left most station is station 1.

(If a blank station is needed, list the blanking plate part number at the desired station.)

AA PSM***##NP**

Use Aluminum Bar Manifold Kit Numbers from previous pages.

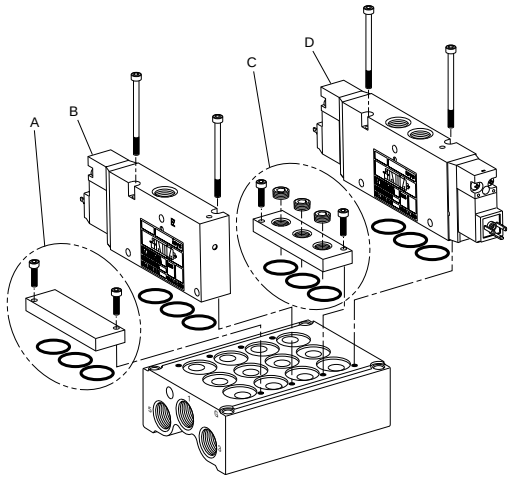
AA Manifold Assembly

Example: Application requires a 3-station "EZ3" manifold with one 3-Way, one 4-Way 2-Position and one 4-Way 3-Position valve assembled.

Qty.	Part No.	Comment
1	AAPSMCBXN03NP	
1	EZ3GNBB549A	Station 1
1	EZ31NBB549A	Station 2
1	EZ35NBB549A	Station 3

EZ2 4-Station Manifold Shown

A. Blanking Plate Kit
B. 3-Way Valve
C. Universal Blanking Plate Kit
D. 4-Way Valve



Manifold Mounting Screw Torque Chart		
Valve Size	**Screw Type**	**Torque Nm (in.lbs.)**
EZ1	M2.5	0.7 to 1.1 (6 to 10)
EZ2	M3	1.1 to 1.3 (10 to 12)
EZ3	M4	1.7 to 2.3 (15 to 20)

Valve to Base Mounting Screws and O-Rings are supplied with the Base. Additional Screws and O-rings are available as kits.

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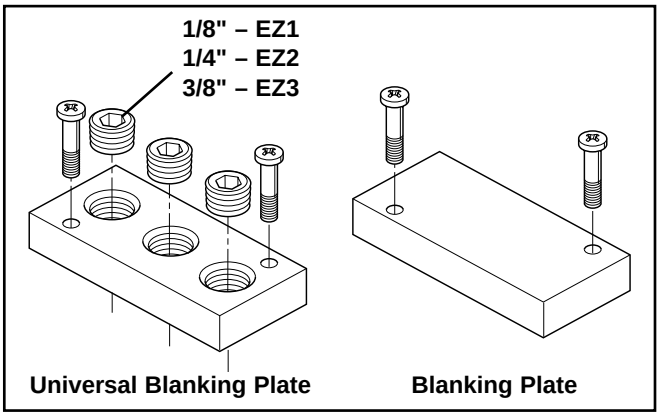
Blanking Plate

	Kit Number			
	IEM Universal			
	NPT	BSPP "G"	BSPT "R"	Blank
EZ1	**PS5720P**	PS5721P	PS5722P	**PS5769P**
EZ2	**PS5820P**	PS5821P	PS5822P	**PS5869P**
EZ3	**PS5920P**	PS5921P	PS5922P	**PS5969P**

Kit includes:
(1) Plate, (2) Screws, Seal / Gaskets



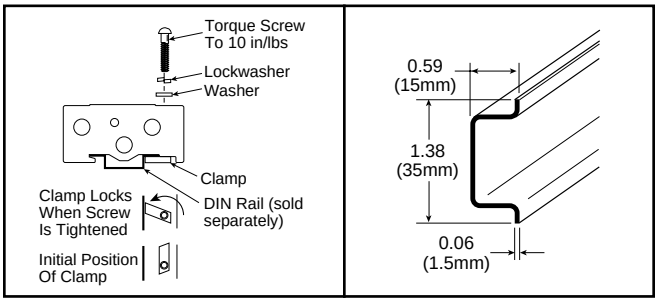
DIN Rail Hardware Kit

Series	Length	Part Number
EZ1	6 Feet	AM1DE200

DIN Rail Hardware Kit

Series	IEM Bar
EZ1	PS2990P

Kit includes: (2) Screws, (2) Nuts, (2) Clamps

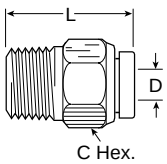


Exhaust Mufflers

Pipe Thread		Part Number
EZ1	1/8" NPT	**P6M-PAB1**
EZ2	1/4" NPT	**P6M-PAB2**
EZ3	3/8" NPT	**P6M-PAB3**
EZ3	1/2" NPT	**P6M-PAB4**

Fittings

W68PLP Male Connector NPT (Nickel Plated)



	Part No.	Tube Size	Pipe Thread	C Hex.	L	Flow Dia. D
EZ1	W68PLP-4-2	1/4	1/8	1/2	0.89	0.188
EZ2	W68PLP-6-4	3/8	1/4	5/8	1.08	0.312
EZ3	W68PLP-8-6	1/2	3/8	13/16	1.24	0.344

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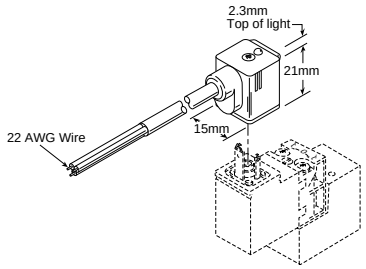
15mm 3-Pin EN175301-803

Connector	Connector with Cord	Description
PS2932BP	PS2932HBP 18 Inches	Unlighted
PS2932BP	PS2932JBP 6 Feet	Unlighted
PS294675BP	PS2946J75BP* 6 Feet	Light – 12VAC or DC
PS294679BP	PS2946J79BP* 6 Feet	Light – 24VAC or DC
PS294683BP	PS2946J83BP* 6 Feet	Light – 110/120VAC
PS294687BP	N/A	Light – 240/230VAC



**Molded 6'
Cord Shown**

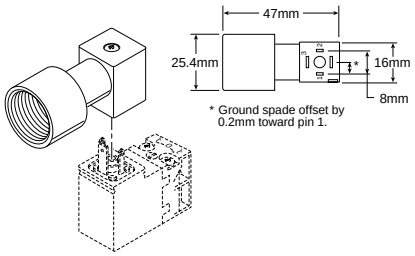
* LED with surge suppression.

Note: Max ø6.5mm cable size required for connector w/o 6' (2m) cord.
IP65 rated when properly installed.

Engineering Data:
Conductors: 2 Poles Plus Ground
Cable Range (Connector Only): 4 to 6mm (0.16 to 0.24 Inch)
Contact Spacing: 8mm

15mm 3-Pin EN175301-803 to 1/2" Conduit

Connector	Description
PS2998P	1/2" NPTF Conduit – Unlighted with 3' (1m) Leads 20 AWG Wire



Note: Rated up to 250VAC or VDC; 6 Amps
IP65 rated when properly installed.

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Cv Calculations

Cv ..... Measure of calculating flow of a valve (or other pneumatic device) that takes into effect the temperature, pressure, pressure drop, and flow. As a rule of thumb. a Cv of 1.0 is 25 SCFM with a 5 PSIG pressure drop.

$$Cv = \frac{\text{Cylinder Area (Sq. In.) (See Table 2)} \times \text{Cylinder Stroke (In.)} \times \text{Compression Factor (Table 1)} \times \text{“A” (Table 1)}}{\text{Stroke Time (sec.)} \times 28.8}$$

Table 1
Compression Factors and “A” Constants

Inlet Pressure (PSIG)	Compression Factor	“A” Constants for Various Pressure Drop*		
		2 PSI △ P	5 PSI △ P	10 PSI △ P
10	1.6	.152	.103	
20	2.3	.126	.084	.065
30	3.0	.111	.073	.055
40	3.7	.100	.065	.048
50	4.4	.091	.059	.044
60	5.1	.085	.055	.040
70	5.7	.079	.051	.037
80	6.4	.075	.048	.035
90	7.1	.071	.046	.033
100	7.8	.068	.044	.032
110	8.5	.065	.042	.030
120	9.2	.063	.040	.029
130	9.9	.061	.039	.028
140	10.6	.058	.037	.027
150	11.2	.057	.036	.026
160	11.9	.055	.035	.025
170	12.6	.053	.034	.024
180	13.3	.052	.033	.024
190	14.0	.051	.032	.023
200	14.7	.050	.032	.023

Note: Use “A” constant at 5 PSI △ P for most applications. On very critical applications. use “A” at 2 PSI △ P. You will find in many cases, a 10 PSI △ P is not detrimental, and can save money and mounting space.

* Tabulated values are the solution of $\frac{1}{22.48}\sqrt{\frac{GT}{(P_1 - P_2)\,P_2}}$ where T is for 68°F and G =1 for Air.

Flow Rating (Cv)

Size	Port Size	Mounting Style	2-Position	3-Position
EZ1	1/8" Ports	Inline	0.8	0.6
EZ2	1/4" Ports	Inline	1.3	1.0
EZ3	3/8" Ports	Inline	2.4	1.9

ANSI / (NFPA) T3.21.3-1990 standard for Cv measurement.

Table 2
Effective Square-Inch Areas for Standard-Bore-Size Cylinders

Bore Size	Cylinder Area (Sq. In.)	Bore Size	Cylinder Area (Sq. In.)
3/4"	.44	4"	12.57
1"	.79	4-1/2"	15.90
1-1/8"	.99	5"	19.64
1-1/4"	1.23	6"	28.27
1-1/2"	1.77	7"	38.48
1-3/4"	2.41	8"	50.27
2"	3.14	10"	78.54
2-1/2"	4.91	12"	113.10
3-1/4"	8.30	14"	153.94
3-5/8"	10.32		

Temperature Rating

5°F to 120°F (-15°C to 49°C) ambient.

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Drying
Baking
Fermentation
Inspection Systems
Packaging
Printing
Palleting

Household & Personal Care

Blending
Extracting
Filling
Labeling
Palleting

Textile

Dying
Ginning
Weaving/Knitting
Drawing
Spinning
Hydroentangeling
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Robust Design

– Wear Compensating Dynamic Sealing System and Balanced Spool Design

Global Sourcing & Assembly

– Economical Solution

Optimized Design

– Targeted Design for Industrial Market

Parker

International Offering

– Voltage and Port Threads for All Markets

Simplified Ordering

– Valve Options Based on Industrial Market Demand

Economical Design

– Good Value

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Global Simplistic Economical

Features	Advantages	Benefits
Global Valve Offering	Global Sourcing & Assembly	Global Offering with Economical Cost
Wear Compensating Dynamic Sealing System	Low Friction, Fast Response & Less Wear	High Life
Flow Capacity	Large Flow for Small Overall Size	Compact System
Closed Spool Cross-over	No Stalling Valves, No Wasted Air	Less Failure and Energy Savings
Balanced Spool Design	Accommodate Many Applications	System Flexibility
Metal Valve Body	Rugged Construction	Robust Design
Simplified Ordering	Minimum Part Count	Options More Economical
IEM Manifold Mount	Small Footprint	Flexible Mount

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Response Time

Valve Size	Port Size	0 Cu. In. Test Chamber	
		Fill	Exhaust
2-Position Single Solenoid / Internal Air Return			
EZ1	1/8"	21	24
EZ2	1/4"	24	26
EZ3	3/8"	35	36
2-Position Single Solenoid Spring / Air Return			
EZ1	1/8"	20	23
EZ2	1/4"	21	24
EZ3	3/8"	34	34
2-Position Double Solenoid			
EZ1	1/8"	20	23
EZ2	1/4"	21	23
EZ3	3/8"	31	33
3-Position Double Solenoid			
EZ1	1/8"	25	22
EZ2	1/4"	23	23
EZ3	3/8"	20	22

Average Fill Time (ms milliseconds): With 100 PSIG supply, time required to fill from 0-90 PSIG and exhaust from 100 PSIG to 10 PSIG is measured from instant of energizing, or de-energizing 120V/60Hz solenoid. Times shown are average.

Solenoid Information

(Solenoids are rated for continuous duty.)

Code	Voltage			Power Consumption	Holding (Amps)
	AC		DC		
	60Hz	50Hz			
49	—	—	24	2.5W	.022
53	120	110	—	3.0VA	.013
57	240	230	—	3.0VA	.010

Note: Voltage rated +10 / -10%.

Solenoid Information

(CSA Approved Valves)

Code	Voltage			Power Consumption	Holding (Amps)
	AC		DC		
	60Hz	50Hz			
49	—	—	24	1.2W	.049
53	120	110	—	1.6VA	.013
57	240	230	—	1.6VA	.007

Note: Voltage rated +10 / -15%.

Operating Pressures:

Maximum: 145 PSIG (10.0 bar)*
Minimum: see chart

Operator / Function		EZ1	EZ2	EZ3
1, 3, G, H, K, L	Single Operator, Air Return	30 (2.1)	25 (1.7)	20 (1.4)
2	Double Solenoid Operator, 2-Position	30 (2.1)	25 (1.7)	20 (1.4)
4, 8, 9, 0	Double Remote Pilot Operator	Vacuum	Vacuum	Vacuum
5, 6, 7	Double Solenoid Operator, 3-Position	35 (2.4)	35 (2.4)	30 (2.0)
E, F, V, W, X, Y	Single Operator, Spring / Air Return	35 (2.4)	35 (2.4)	35 (2.4)

Remote Pilot Signal – 35 to 145 PSIG (3.1 to 10 bar)
* Maximum Pressure for EZ3, CSA approved valve is 110 PSIG (7.6 bar)

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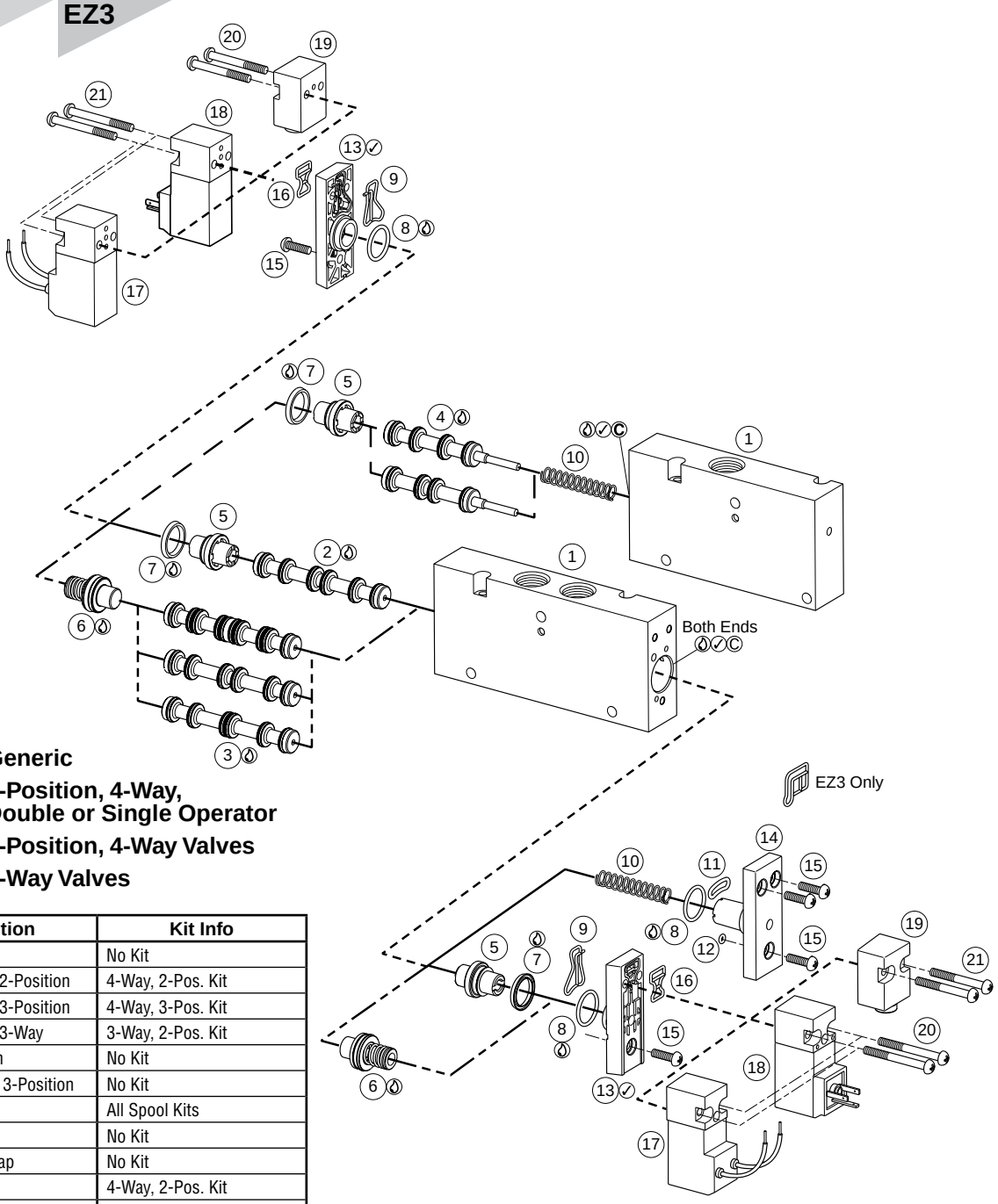
EZ1 **EZ2** **EZ3**



EZ2 Valve Shown

Legend

- **Generic**
- **2-Position, 4-Way, Double or Single Operator**
- **3-Position, 4-Way Valves**
- **3-Way Valves**

Parts List

Item	Description	Kit Info
1	Valve Body	No Kit
2	Spool Assembly, 2-Position	4-Way, 2-Pos. Kit
3	Spool Assembly, 3-Position	4-Way, 3-Pos. Kit
4	Spool Assembly, 3-Way	3-Way, 2-Pos. Kit
5	Piston, 2-Position	No Kit
6	Piston Assembly, 3-Position	No Kit
7	Lip Seal	All Spool Kits
8	O-Ring	No Kit
9	Gasket, 13 End Cap	No Kit
10	Spring	4-Way, 2-Pos. Kit
11	O-Ring, 14 End Cap	No Kit
12	O-Ring	No Kit
13	End Cap, Solenoid Operator	No Kit
14	End Cap, 12 End Return	No Kit
15	Screw, End Cap	No Kit
16	Gasket, Solenoid	Solenoid Kits w/ Air Pilot Kit
17	Solenoid Operator, Flying Lead	Solenoid Kit, Flying Lead
18	Solenoid Operator, DIN	Solenoid Kit, 3-Pin
19	Remote Pilot Adapter	Air Pilot Kit
20	Screw, Solenoid	Solenoid Kits
21	Screw, Remote Pilot Adapter	Remote Pilot Kit
22	Grease Tube, (not shown)	All Spool Kits
23	Instruction Sheet, (not shown)	All Kits (No. V457P)

Note: See Kits on following page.

Lightly grease with provided lubricant.

Inspect for nicks, scratches, and surface imperfections. If present, reduced service life is probable and future replacement should be planned.

Clean with lint-free cloth.

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EZ1 **EZ2** **EZ3**

Spool Kits	EZ1	EZ2	EZ3	Items Included
4-Way, 2-Pos	PS5701	PS5801	PS5901	2, 7, 10, 22, 23
4-Way, 3-Pos APB	PS5702	PS5802	PS5902	3, 7, 22, 23
4-Way, 3-Pos CE	PS5703	PS5803	PS5903	3, 7, 22, 23
4-Way, 3-Pos PC	PS5704	PS5804	PS5904	3, 7, 22, 23
3-Way, 2-Pos NC	PS5771	PS5871	PS5971	4, 7, 10, 22, 23
3-Way, 2-Pos NO	PS5772	PS5872	PS5972	4, 7, 10, 22, 23

Manifold Kits	EZ1	EZ2	EZ3	Items Included
Valve to Base	PS5784	PS5884	PS5984	0-Ring (15), Screws (10)

Solenoid Kits 2.5W Coils	Non-Locking Overide			
	3 Pin EN175301803	Items Included	Flying Leads	Items Included
24VDC (49)	PS575B49P	16, 18, 20, 23	PS57GB49P	16, 17, 20, 23
120VAC (53)	PS575B53P	16, 18, 20, 23	PS57GB53P	16, 17, 20, 23
	Locking Override			
24VDC (49)	PS575C49P	16, 18, 20, 23	PS57GC49P	16, 17, 20, 23
120VAC (53)	PS575C53P	16, 18, 20, 23	PS57GC53P	16, 17, 20, 23
Solenoid Kits CSA Approved*	**Non-Locking Overide**			
	3 Pin EN175301803	**Items Included**	**Flying Leads**	**Items Included**
24VDC (49)	PS585B49P	16, 18, 20, 23	PS58GB49P	16, 17, 20, 23
120VAC (53)	PS585B53P	16, 18, 20, 23	PS58GB53P	16, 17, 20, 23
240VAC (57)	PS585B57P	16, 18, 20, 23	PS58GB57P	16, 17, 20, 23
	Locking Override			
24VDC (49)	PS585C49P	16, 18, 20, 23	PS58GC49P	16, 17, 20, 23
120VAC (53)	PS585C53P	16, 18, 20, 23	PS58GC53P	16, 17, 20, 23
240VAC (57)	PS585C57P	16, 18, 20, 23	PS58GC57P	16, 17, 20, 23

Remote Pilot Kit				Items Included
Air Pilot Conversion	EZ1 PS5711	EZ2 PS5711	EZ3 PS5711	16, 19, 21

* Only applicable with CSA approved valves.

Materials of Construction

Body ..... Anodized Aluminum
End Caps..... Nylon Polymer - 33% Glass Filled
Seals..... Nitrile
Solenoid..... Polyamide
Spool ..... Aluminum

Product Shipping Weights

Series	Single 4-Way Solenoid Valve	4-Way, 3-Position Valve
EZ1	0.35	0.53
EZ2	0.50	0.60
EZ3	0.85	1.17

Weights are in pounds and are approximate.

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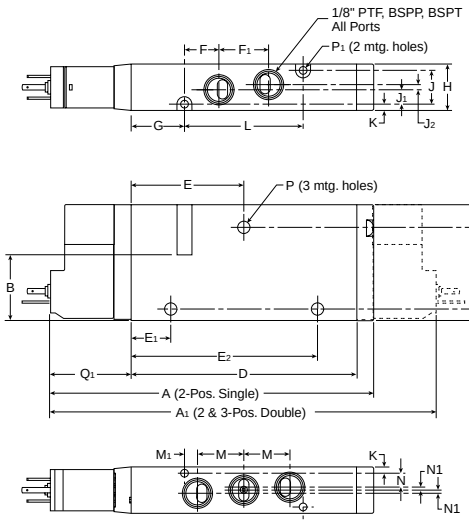
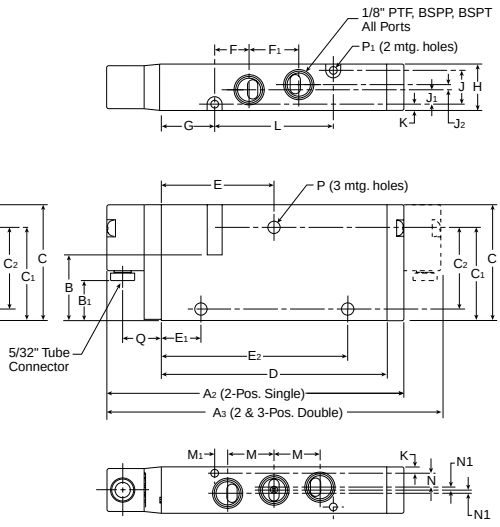
EZ1

Single & Double Operators – 4-Way Inline

Solenoid



Remote Pilot



Note: For CSA Approved valves, add .09 (2.5mm) to dimension A and .19 (5mm) to dimension A_1.

EZ1 4-Way Inline

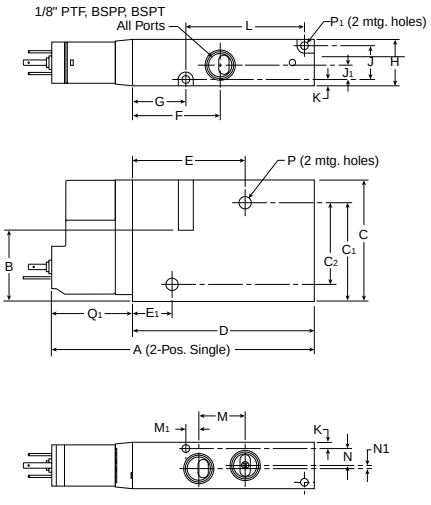
A	A1	A2	A3
4.49 (114)	5.41 (137.4)	4.08 (103.6)	4.59 (116.6)
B	**B1**	**C**	**C1**
.94 (23.9)	.65 (16.0)	1.67 (42.4)	1.36 (34.5)
C2	**D**	**E**	**E1**
1.16 (29.5)	3.09 (78.6)	1.55 (39.3)	.54 (13.8)
E2	**F**	**F1**	**G**
2.55 (64.8)	.47 (12)	69 (17.4)	.73 (18.6)
H	**J**	**J1**	**J2**
.64 (16.2)	.46 (11.8)	.20 (5)	.07 (1.8)
K	**L**	**M**	**M1**
.09 (2.2)	1.63 (41.4)	.64 (16.2)	.18 (4.5)
N	**N1**	**P**	**P1**
.19 (4.8)	.04 (1.1)	.17 (4.3)	.11 (2.7)
Q	**Q1**		
.53 (13.5)	1.16 29.4)		

Inches (mm)

EZ1

Single Operator – 3-Way Inline

Solenoid



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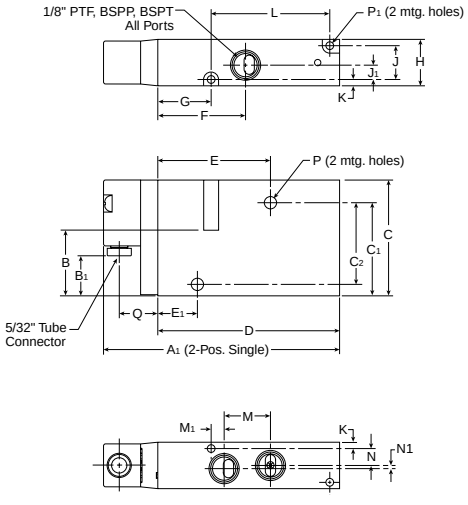

Note: For CSA Approved valves, add .09 (2.5mm) to dimension A.

EZ1 3-Way Inline

A	A1	B	B1
3.65 (92.8)	3.24 (82.4)	.90 (23.9)	.63 (16)
C	**C1**	**C2**	**D**
1.67 (42.4)	1.36 (34.5)	1.16 (29.5)	2.50 (63.4)
E	**E1**	**F**	**G**
1.55 (39.3)	.54 (13.8)	1.20 (30.6)	.73 (18.6)
H	**J**	**J1**	**K**
.64 (16.2)	.46 (11.8)	.20 (5)	.09 (2.2)
L	**M**	**M1**	**N**
1.63 (41.4)	.64 (16.2)	.18 (4.5)	.23 (5.9)
N1	**P**	**P1**	**Q**
.04 (1.1)	.17 (4.3)	.11 (2.7)	.53 (13.5)
Q1			
1.16 (29.4)			

Inches (mm)

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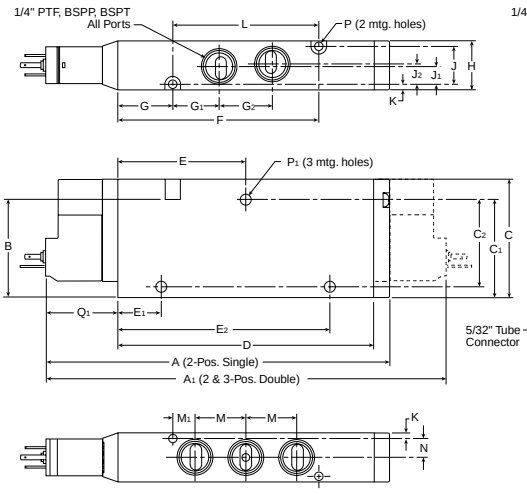
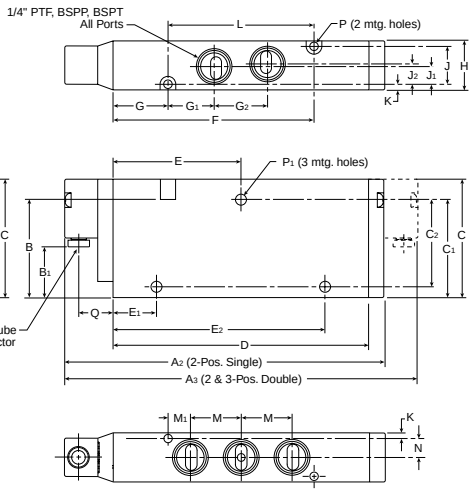
EZ2

Single & Double Operators – 4-Way Inline

Solenoid



Remote Pilot



Note: For CSA Approved valves, add .09 (2.5mm) to dimension A and .19 (5mm) to dimension A_1.

EZ2 4-Way Inline

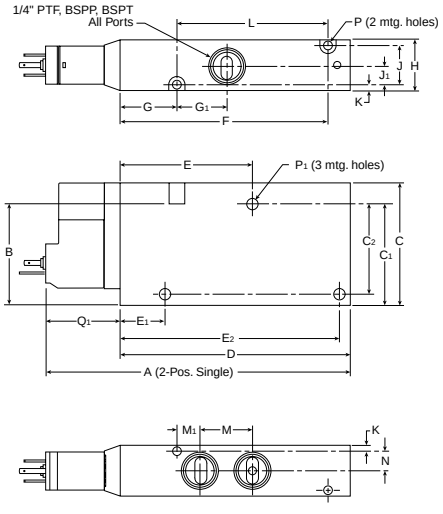
A	**A1**	**A2**	**A3**
5.34 (135.6)	6.26 (159)	4.93 (125.2)	5.44 (138.2)
B	**B1**	**C**	**C1**
1.51 (38.4)	.79 (20)	1.83 (46.4)	1.43 (36.4)
C2	**D**	**E**	**E1**
1.26 (32)	3.94 (100.2)	1.97 (50.1)	.67 (17.1)
E2	**F**	**G**	**G1**
3.27 (83.1)	3.10 (78.7)	.85 (21.5)	.71 (18.1)
G2	**H**	**J**	**J1**
.82 (20.9)	.76 (19.2)	.58 (14.8)	.27 (6.9)
J2	**K**	**L**	**M**
.31 (7.9)	.09 (2.2)	2.25 (57.2)	.78 (19.9)
M1	**N**	**P**	**P1**
.34 (8.7)	.27 (7.4)	.13 (3.3)	.17 (4.3)
Q	**Q1**		
.53 (13.5)	1.16 (29.4)		

Inches (mm)

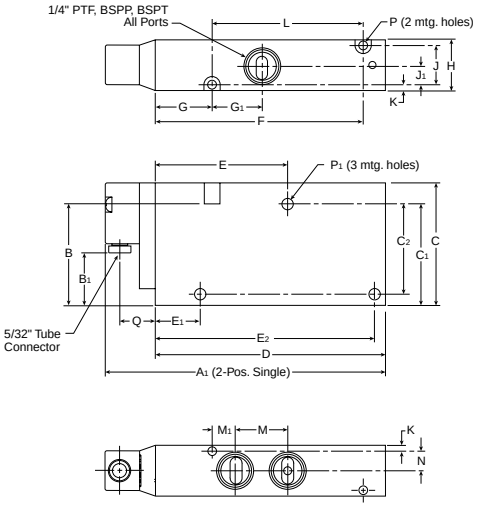
EZ2

Single Operator – 3-Way Inline

Solenoid



Remote Pilot



Note: For CSA Approved valves, add .09 (2.5mm) to dimension A.

EZ2 3-Way Inline

A	**A1**	**B**	**B1**
4.57 (116.5)	4.18 (106.1)	1.51 (38.4)	.79 (20)
C	**C1**	**C2**	**D**
1.83 (46.4)	1.43 (36.4)	1.26 (32)	3.43 (87.1)
E	**E1**	**E2**	**F**
1.97 (50.1)	.67 (17.1)	2.60 (66)	3.10 (78.7)
G	**G1**	**H**	**J**
.85 (21.5)	.74 (18.8)	.76 (19.2)	.58 (14.8)
J1	**K**	**L**	**M**
.27 (6.9)	.09 (2.2)	2.25 (57.2)	.78 (19.9)
M1	**N**	**P**	**P1**
.34 (8.7)	.29 (7.4)	.13 (3.3)	.17 (4.3)
Q	**Q1**		
.53 (13.5)	1.16 (29.4)		

Inches (mm)

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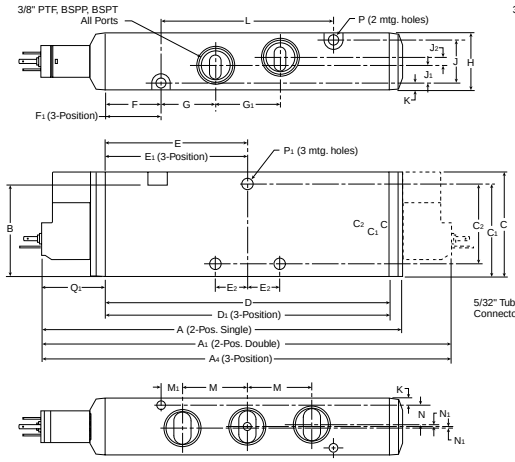
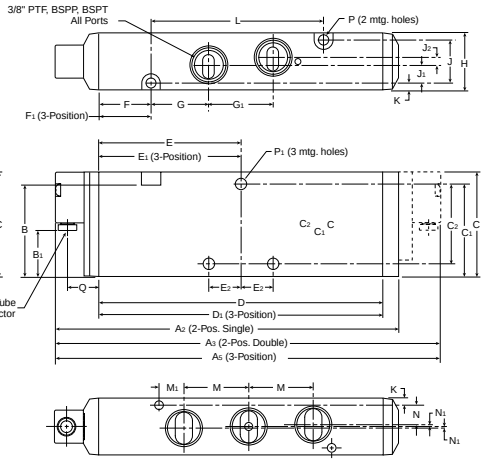
EZ3

Single & Double Operators – 4-Way Inline

Solenoid



Remote Pilot



Note: For CSA Approved valves, add .09 (2.5mm) to dimension A and .19 (5mm) to dimension A_1.

EZ3 4-Way Inline

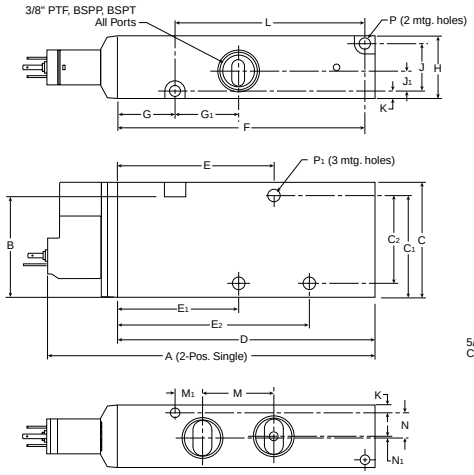
A 6.56 (166.7)	**A_1** 7.52 (191.1)	**A_2** 6.15 (156.3)	**A_3** 6.70 (170.3)
A_4 8.46 (214.9)	**A_5** 7.64 (194.1)	**B** 1.65 (42)	**B_1** .85 (21.6)
C 1.89 (48)	**C_1** 1.67 (42.5)	**C_2** 1.43 (36.5)	**D** 5.13 (130.3)
D_1 6.06 (154.1)	**E** 2.57 (65.2)	**E_1** 3.04 (77.1)	**E_2** .58 (14.7)
F 1.01 (25.7)	**F_1** 1.48 (37.6)	**G** .98 (24.8)	**G_1** 1.16 (29.4)
H 1.02 (26)	**J** .77 (19.6)	**J_1** .31 (8)	**J_2** .15 (3.7)
K .13 (3.2)	**L** 3.11 (79)	**M** 1.17 (29.7)	**M_1** .39 (9.8)
N .36 (9.1)	**N_1** .03 (.8)	**P** .17 (4.4)	**P_1** .21 (5.3)
Q .57 (14.5)	**Q_1** 1.19 (30.4)		

Inches (mm)

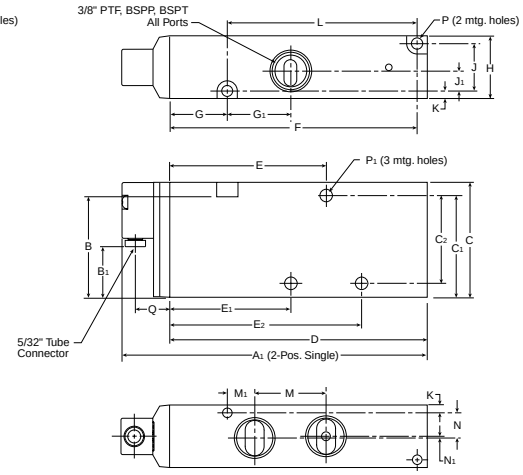
EZ3

Single Operators – 3-Way Inline

Solenoid



Remote Pilot



Note: For CSA Approved valves, add .09 (2.5mm) to dimension A.

EZ3 3-Way Inline

A 5.42 (137.7)	**A_1** 5.01 (127.3)	**B** 1.65 (42)	**B_1** .85 (21.6)
C 1.89 (48)	**C_1** 1.67 (42.5)	**C_2** 1.44 (36.5)	**D** 4.22 (107.3)
E 2.57 (65.2)	**E_1** 1.99 (50.5)	**E_2** 3.15 (79.9)	**F** 4.06 (103)
G .94 (24)	**G_1** 1.03 (26.5)	**H** 1.02 (26)	**J** .77 (19.6)
J_1 .33 (8.3)	**K** .13 (3.2)	**L** 3.11 (79)	**M** 1.17 (29.7)
M_1 .45 (11.5)	**N** .42 (10.6)	**N_1** .03 (.8)	**P** .17 (4.4)
P_1 .21 (5.3)	**Q** .57 (14.5)	**Q** 1.20 (30.4)	

Inches (mm)

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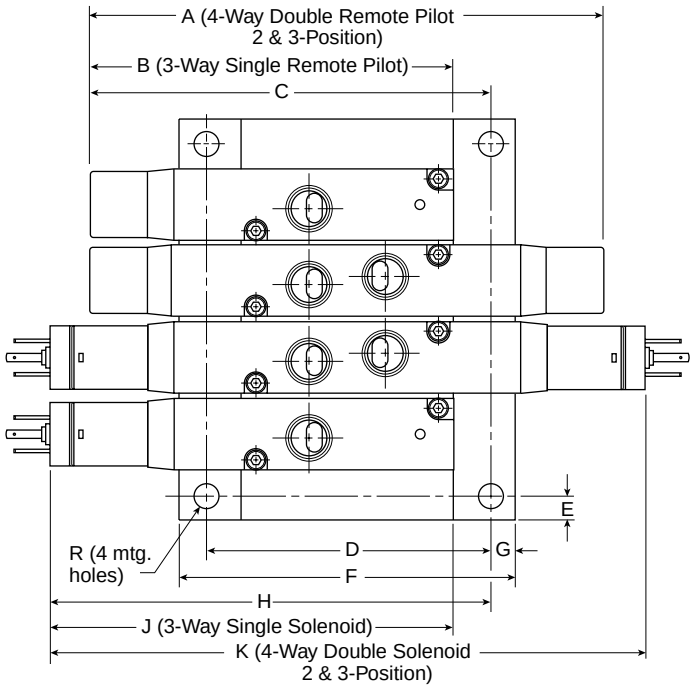
EZ1

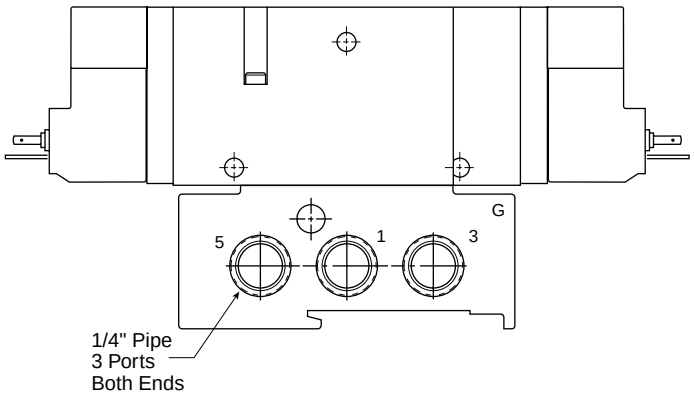
EZ1 Manifold

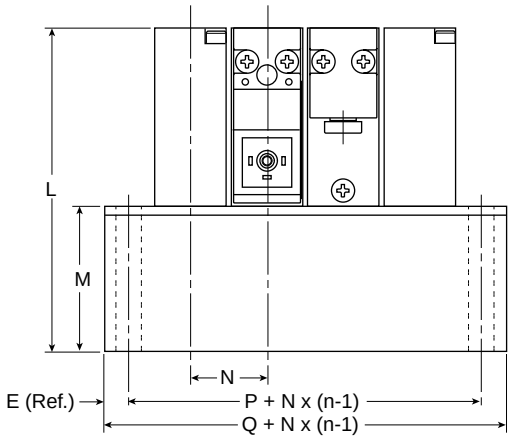
EZ1 Manifold

A	B	C	D
4.59 (116.6)	3.24 (82.4)	3.58 (90.9)	2.54 (64.5)
E	**F**	**G**	**H**
.20 (5)	3.00 (76.2)	.20 (5)	4.11 (104.3)
J	**K**	**L**	**M**
3.75 (95.8)	5.41 (137.4)	2.95 (74.9)	1.28 (32.5)
N	**P**	**Q**	**R**
.68 (17.3)	1.11 (28.2)	1.54 (39)	.25 (6.3)

Inches (mm)







n = Number of Stations

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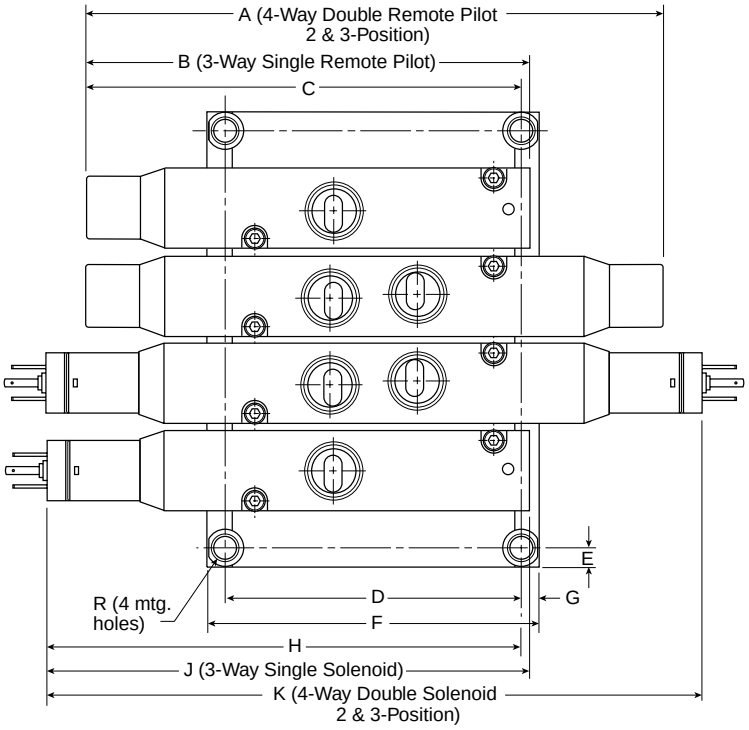
EZ2

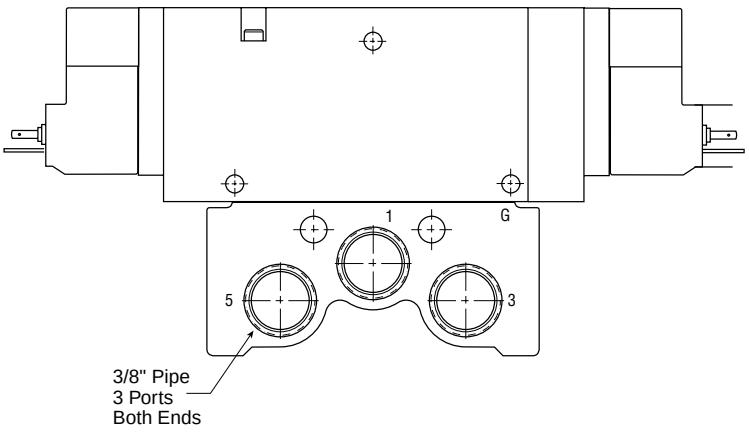
EZ2 Manifold

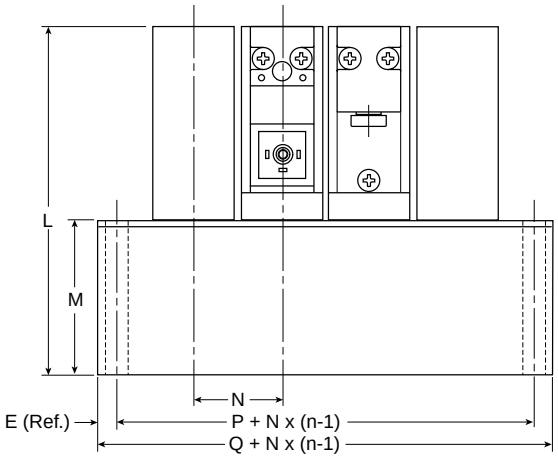
EZ2 Manifold

A	B	C	D
5.44 (138.2)	4.18 (106.1)	4.11 (104.4)	2.78 (70.6)
E	**F**	**G**	**H**
.18 (4.6)	3.12 (79.3)	.17 (4.3)	4.52 (114.8)
J	**K**	**L**	**M**
4.57 (116.5)	6.26 (159)	3.27 (83)	1.44 (36.6)
N	**P**	**Q**	**R**
.81 (20.5)	1.48 (37.6)	1.84 (46.8)	.22 (5.5)

Inches (mm)







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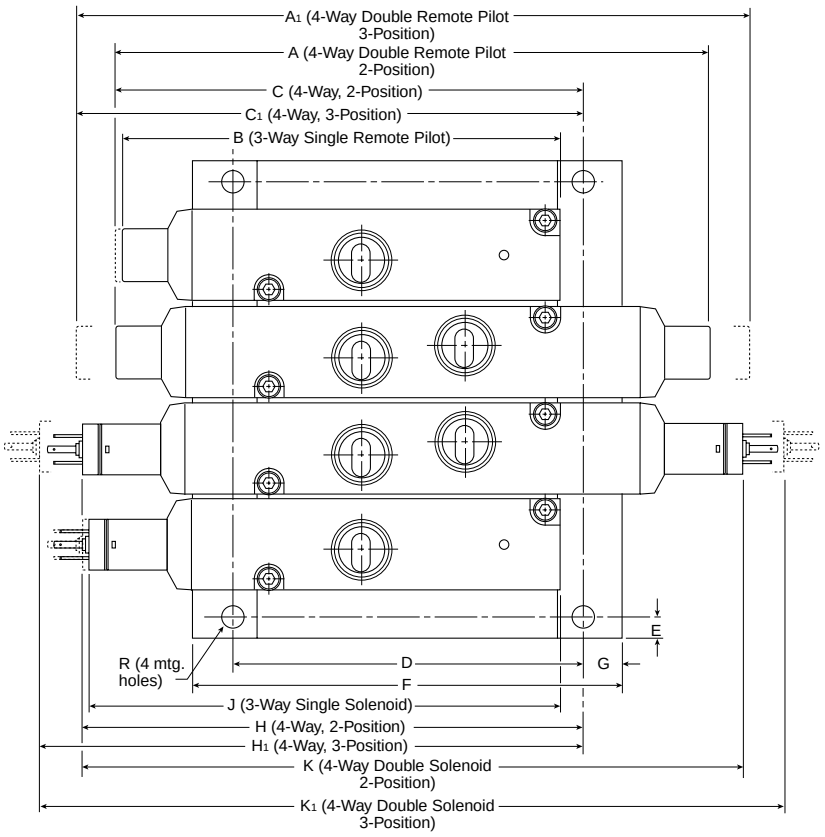
EZ3

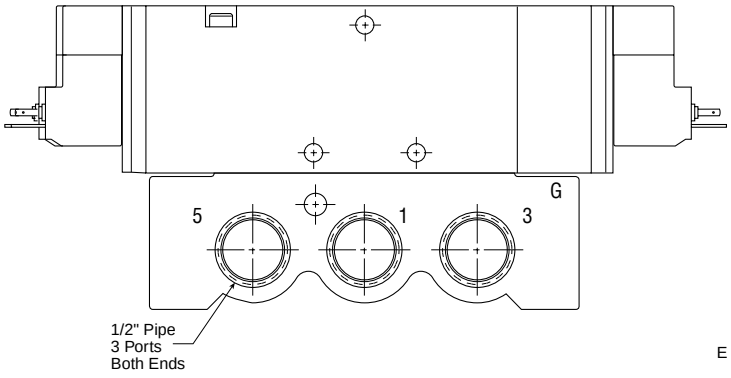
EZ3 Manifold

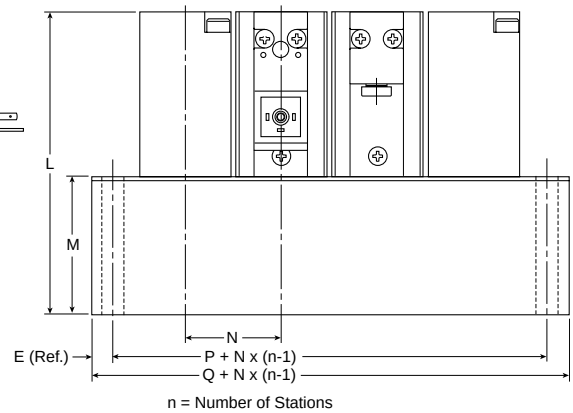


EZ3 Manifold

A	A1	B	C
6.70 (170.3)	7.64 (194.1)	5.01 (127.3)	5.33 (135.5)
C1	**D**	**E**	**F**
5.72 (145.4)	3.94 (100)	.24 (6)	4.84 (123)
G	**H**	**H1**	**J**
.45 (11.5)	5.67 (143.9)	6.13 (155.8)	5.42 (137.7)
K	**K1**	**L**	**M**
7.52 (191.1)	8.46 (214.9)	3.43 (87)	1.54 (39)
N	**P**	**Q**	**R**
1.08 (27.5)	1.64 (41.6)	2.11 (53.6)	.26 (6.5)

Inches (mm)





n = Number of Stations

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Notes

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

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

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

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

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Catalog 0683 10/2008

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