“N” Series

High Speed
Inline Poppet Valves
2 & 3-Way

Section M
www.parker.com/pneu/n

M

BOLD ITEMS ARE MOST POPULAR.

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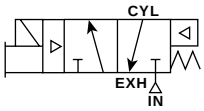
Single Solenoid 3-Way, 2-Position NC (NNP)



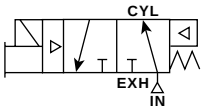
Normal position – Pressure at inlet port marked "IN" blocked. Cylinder port connected to exhaust port (3-Way).

Energized position – Solenoid operator energized, pressurized "IN" port connects to cylinder port. Exhaust port is blocked (3-Way).

⚠ **CAUTION:**
These are poppet valves, ***Do Not*** restrict the inlet.

Note: For 2-Way, Normally Closed, Exhaust Port is Plugged.

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



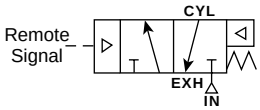
Normal position – Pressure at inlet port marked "IN" open to cylinder. Exhaust port is blocked (3-Way).

Energized position – Solenoid operator energized. Pressure at inlet port marked "IN" is blocked. Cylinder open to exhaust (3-Way).

⚠ **CAUTION:**
These are poppet valves, ***Do Not*** restrict the inlet.

Note: For 2-Way, Normally Open, Exhaust Port is Plugged.

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



Normal position –
Pressure at inlet port marked "IN" blocked. Cylinder port connected to exhaust port (3-Way).

Operated position – With maintained air signal at pilot port, pressurized "IN" port connects to cylinder port. Exhaust port is blocked (3-Way).

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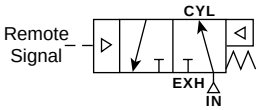
⚠ **CAUTION:**
These are poppet valves, ***Do Not*** restrict the inlet.

Note: For 2-Way, Normally Closed, Exhaust Port is Plugged.

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



Normal position –
Pressure at inlet port marked "IN" open to cylinder. Exhaust port is blocked (3-Way).

Operated position – With maintained air signal at pilot port, pressure at inlet port marked "IN" is blocked. Cylinder open to exhaust (3-Way).

⚠ **CAUTION:**
These are poppet valves, ***Do Not*** restrict the inlet.

Note: For 2-Way, Normally Open, Exhaust Port is Plugged.

For Information on Options that are no longer available and the Suggested Cross Reference or Kit Info, refer to www.parker.com/pneumatic/classicvalves & Catalog N Series-E/USA

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"N" Series

Specifications

- 2-Way NC
- 3-Way NO & NC
- Selector Function

Flow

- 3/8" Body – 3.0 to 4.4 Cv
- 3/4" Body – 9.0 to 11.0 Cv
- 1-1/4" Body – 20.0 to 30.0 Cv

Port Sizes

- 3/8" Body – 3/8", 1/2" NPT
- 3/4" Body – 1/2", 3/4", 1" NPT
- 1-1/4" Body – 1", 1-1/4", 1-1/2" NPT
- BSPP "G" Threads Available

Operating Pressure

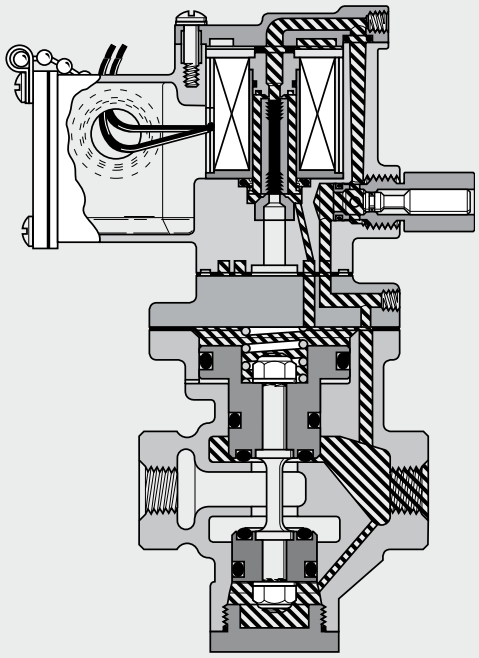
- 30 to 250 PSI (0 to 1000 kPa)
- Vacuum with External Pilot

Features

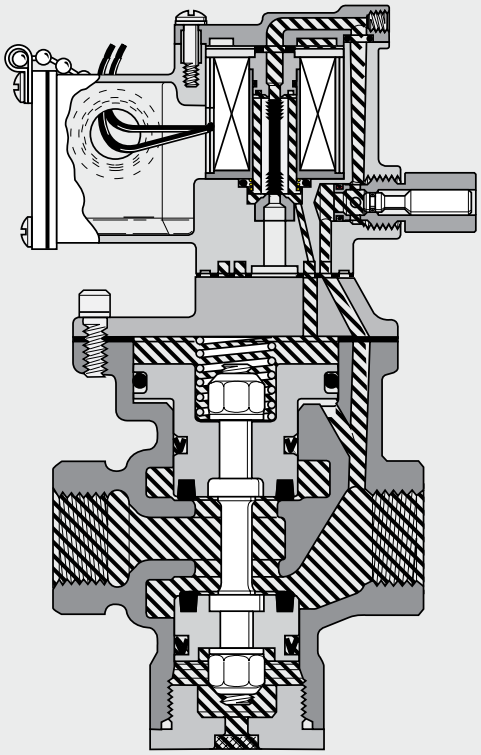
- Continuous Duty Rated Option
- Non-Lube Service
- Hi-Flow, Short Stroke Poppet
- Indicator Lights Available

Certification / Approval

- Approved to be CE Marked (Standard L-Pilot & P-Pilot)
- NEMA 4 Option
- Hazardous Duty Option



3/8" Solenoid Pilot De-Energized
Normally Closed



1-1/4" Solenoid Pilot De-Energized
Normally Open

Pressure **Exhaust**

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Single Solenoid Normally Closed

2-Way, 2-Position
3-Way, 2-Position

3/8" & 3/4" Body Size

	2-Way Normally Closed	3-Way Normally Closed	In/Cyl Ports	Exh. Port
3/8"	N315 39 045 53	N355 39 045 53	3/8"	1/2"
	N315 49 045 53	N355 49 045 53	1/2"	1/2"
3/4"	N315 59 045 53	N355 59 045 53	1/2"	3/4"
	N315 69 045 53	N355 69 045 53	3/4"	1"
	N315 79 045 53	N355 79 045 53	1"	1"

Locking Manual Override, Internal "P" Pilot 140 PSI, Standard Service, Junction Box w/ Light, 120VAC.

Single Solenoid Normally Open

3-Way, 2-Position

3/8" & 3/4" Body Size

	3-Way Normally Open	In/Cyl Ports	Exh Port
3/8"	N375 39 045 53	3/8"	1/2"
	N375 49 045 53	1/2"	1/2"
3/4"	N375 59 045 53	1/2"	3/4"
	N375 69 045 53	3/4"	1"
	N375 79 045 53	1"	1"

Locking Manual Override, Internal "P" Pilot 140 PSI, Standard Service, Junction Box w/ Light, 120VAC.

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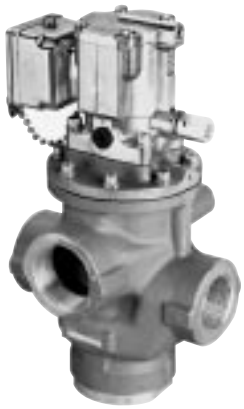
1-1/4" Body Size

	2-Way Normally Closed	3-Way Normally Closed	In/Cyl Ports	Exh. Port
1-1/4"	N325 79 047 53	N365 79 047 53	1"	1-1/4"
	N325 89 047 53	N365 89 047 53	1-1/4"	1-1/2"
	N325 99 047 53	N365 99 047 53	1-1/2"	1-1/2"

Locking Manual Override, Internal "P" Pilot 125 PSI, Standard Service, P-Pilot Junction Box w/ Light, 120VAC.



1-1/4" Body Size

	3-Way Normally Open	In/Cyl Ports	Exh. Port
1-1/4"	N385 79 047 53	1"	1-1/4"
	N385 89 047 53	1-1/4"	1-1/2"
	N385 99 047 53	1-1/2"	1-1/2"

Locking Manual Override, Internal "P" Pilot 125 PSI, Standard Service, P-Pilot Junction Box w/ Light, 120VAC.

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Single Remote Pilot Normally Closed

2-Way, 2-Position
3-Way, 2-Position

3/8" & 3/4" Body Size

	2-Way Normally Closed	3-Way Normally Closed	In/Cyl Ports	Exh. Port
3/8"	N314 31 091	N354 31 091	3/8"	1/2"
	N314 41 091	N354 41 091	1/2"	1/2"
3/4"	N314 51 091	N354 51 091	1/2"	3/4"
	N314 61 091	N354 61 091	3/4"	1"
	N314 71 091	N354 71 091	1"	1"

1/4" NPT Remote Pilot Port with Internal Pilot Return.

Single Remote Pilot Normally Open

3-Way, 2-Position

3/8" & 3/4" Body Size

	3-Way Normally Open	In/Cyl Ports	Exh. Port
3/8"	N374 31 091	3/8"	1/2"
	N374 41 091	1/2"	1/2"
3/4"	N374 51 091	1/2"	3/4"
	N374 61 091	3/4"	1"
	N374 71 091	1"	1"

1/4" NPT Remote Pilot Port with Internal Pilot Return.

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1-1/4" Body Size

	2-Way Normally Closed	3-Way Normally Closed	In/Cyl Ports	Exh. Port
1-1/4"	N324 71 091	N364 71 091	1"	1-1/4"
	N324 81 091	N364 81 091	1-1/4"	1-1/2"
	N324 91 091	N364 91 091	1-1/2"	1-1/2"

1/4" NPT Remote Pilot Port with Internal Pilot Return.

1-1/4" Body Size

	3-Way Normally Open	In/Cyl Ports	Exh. Port
1-1/4"	N384 71 091	1"	1-1/4"
	N384 81 091	1-1/4"	1-1/2"
	N384 91 091	1-1/2"	1-1/2"

1/4" NPT Remote Pilot Port with Internal Pilot Return.

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"N" Series 3/8", 3/4" & 1-1/4" Body Sizes - Solenoid 'L' Pilot

N	315	3	9	0	45	53	—

Valve Function - Solenoid	
3/8" & 3/4" Body	
2-Way, Normally Closed	**315**
3-Way, Normally Closed	**355**
3-Way, Normally Open	**375**
1-1/4" Body	
2-Way, Normally Closed	**325**
3-Way, Normally Closed	**365**
3-Way, Normally Open	**385**

Port Size / Thread Type	
3/8" Body Size	
3/8" Inlet & Cyl - 1/2" Exhaust - NPT	3
1/2" Inlet & Cyl - 1/2" Exhaust - NPT	4
1/2" Inlet & Cyl - 1/2" Exhaust - BSPP	N
3/4" Body Size	
1/2" Inlet & Cyl - 3/4" Exhaust - NPT	5
3/4" Inlet & Cyl - 1" Exhaust - NPT	**6**
3/4" Inlet & Cyl - 1" Exhaust - BSPP	Q
1" Inlet & Cyl - 1" Exhaust - NPT	7
1-1/4" Body Size	
1" Inlet & Cyl - 1 1/4"Exhaust - NPT	**7**
1-1/4" Inlet & Cyl – 1-1/2" Exhaust - NPT	**8**
1-1/4" Inlet & Cyl – 1-1/2" Exhaust - BSPP	S*
1-1/2" Inlet & Cyl – 1-1/2" Exhaust - NPT	**9**
1-1/2" Inlet & Cyl – 1-1/2" Exhaust - BSPP	T*

* Not available with Valve Function 325.

Note: BSPP is to the ISO 228 Standard, and requires an R-BSPT male fitting.

Solenoid Enclosure	
Basic Pilot	**1**
Basic Pilot NLMO	2
Basic Pilot LMO	3
Junction Box NLMO	**5**
Junction Box LMO	6
Junction Box NLMO w/ Light	**8**
Junction Box LMO w/ Light	**9**
Basic Pilot Ext. LMO	W
JIC NLMO w/Light - 3-Pin Automotive	E
JIC NLMO w/ Light - 4-Pin M12	J
JIC NLMO w/ Light - 5-Pin Automotive	N

Options	
Blank	**None**
L	72" Leads - '51' Voltage Code Only
C	Chrysler Wiring - Enclosure 'J' & 'N'
F	Ford Wiring - Enclosure 'E', 'J', & 'N'
G	GM wiring - Enclosure 'J' & 'N'

"L" Pilot Code						
Code	Voltage			Solenoid Enclosure Options		
	AC 60hz	AC 50hz	DC	Standard Duty (01, 45)	Cont. Duty (04, 48)	200 PSI (46)
42	24	24	6	5, 6	6	
45			12	1, 5, 6		
49			**24**	**1, 2, 3, 5, 6, 8, 9, W**	**6, 8, 9**	**9**
51			48	1		
53	**120**	**110**		**1, 2, 3, 5, 6, 8, 9, E, N, W**	**1, 6, 8, 9, N**	**8, 9, E**
57	240	220		1, 3, W		
61			120	5, 6		
79			24	E, J	E, J	E, J

"L" Pilot Configuration	
01*	External Pilot, Std Service, 140 PSI
04*	External Pilot, Cont Duty, 140 PSI
45	**Internal Pilot, Std Service, 140 PSI**
46	Internal Pilot, Std Service, 200 PSI
48	**Internal Pilot, Cont Duty, 140 PSI**

* Not available with Valve Function 325, 365, and 385 (1-1/4" Body).

Solenoid Type	
0	**Standard**
5*	Hazardous Duty
8*	NEMA 4 Solenoid

* Available with Solenoid Enclosure 2 & 3, 'L' Pilot Configuration 04 & 48, and Voltage 49 & 53 ONLY.

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"N" Series 1-1/4" Body Sizes - Solenoid Hi-Flow 'P' Pilot

N 365 8 9 0 47 53

Valve Function - Solenoid	
1-1/4" Body	
2-Way, Normally Closed	**325**
3-Way, Normally Closed	**365**
3-Way, Normally Open	**385**

Port Size / Thread Type	
1-1/4" Body Size	
1" Inlet & Cyl - 1 1/4"Exhaust - NPT	**7**
1-1/4" Inlet & Cyl – 1-1/2" Exhaust - NPT	**8**
1-1/4" Inlet & Cyl – 1-1/2" Exhaust - BSPP	S
1-1/2" Inlet & Cyl – 1-1/2" Exhaust - NPT	**9**
1-1/2" Inlet & Cyl – 1-1/2" Exhaust - BSPP	T

Note: BSPP is to the ISO 228 Standard, and requires an R-BSPT male fitting.

Solenoid Enclosure	
Junction Box NLMO	5
Junction Box LMO	6
Junction Box NLMO w/ Light	**8**
Junction Box LMO w/ Light	**9**

Solenoid Type	
0	**Standard**

"P" Pilot Configuration	
02	External Pilot, Std Service, 125 PSI
47	**Internal Pilot, Std Service, 125 PSI**

"P" Pilot Code				
	Voltage			Enclosure Options
Code	AC 60hz	AC 50hz	DC	Standard Duty
49			24	5, 6
53	**120**	**110**		**5, 6, 8, 9**

"N" Series 3/8", 3/4" & 1-1/4" Body Sizes - Remote Pilot

N 314 3 1 91

Valve Function - Solenoid	
3/8" & 3/4" Body	
2-Way, Normally Closed	**314**
3-Way, Normally Closed	**354**
3-Way, Normally Open	**374**
1-1/4" Body	
2-Way, Normally Closed	**324**
3-Way, Normally Closed	**364**
3-Way, Normally Open	**384**

Port Size / Thread Type	
3/8" Body Size	
3/8" Inlet & Cyl - 1/2" Exhaust - NPT	**3**
1/2" Inlet & Cyl - 1/2" Exhaust - NPT	**4**
1/2" Inlet & Cyl - 1/2" Exhaust - BSPP	N
3/4" Body Size	
1/2" Inlet & Cyl - 3/4" Exhaust - NPT	5
1/2" Inlet & Cyl - 3/4" Exhaust - BSPP	P
3/4" Inlet & Cyl - 1" Exhaust - NPT	**6**
3/4" Inlet & Cyl - 1" Exhaust - BSPP	Q
1" Inlet & Cyl - 1" Exhaust - NPT	7
1-1/4" Body Size	
1" Inlet & Cyl - 1 1/4"Exhaust - NPT	**7**
1-1/4" Inlet & Cyl – 1-1/2" Exhaust - NPT	**8**
1-1/4" Inlet & Cyl – 1-1/2" Exhaust - BSPP	S*
1-1/2" Inlet & Cyl – 1-1/2" Exhaust - NPT	**9**
1-1/2" Inlet & Cyl – 1-1/2" Exhaust - BSPP	T*

* Not available with Valve Function 325.

Note: BSPP is to the ISO 228 Standard, and requires an R-BSPT male fitting.

Pilot Configuration	
089	External Pilot Return
091	**Internal Pilot Return**

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Operating Pressure

Internal Pilot – Solenoid Valves

3/8" & 3/4" Body

- 20 to 140 PSIG (standard)

1-1/4" Body

- 25 to 140 PSIG (200 PSIG option available)

Internal Pilot – Remote Pilot Valve

Operating Pressure Limitations			
Air Pressure Thru Valve	Remote Pilot Pressure (PSI)		
	3/8" Basic	3/4" Basic	1-1/4" Basic
25 PSI	30-250	30-250	30-250
50 PSI	50-250	50-250	50-250
75 PSI	70-250	75-250	70-250
100 PSI	95-250	95-250	90-250
150 PSI	140-250	145-250	130-250
200 PSI	175-250	185-250	175-250
250 PSI	215-250	230-250	205-250

Solenoid Valves: External Supply

3/8" & 3/4" Basic

Air Pressure Thru Valve (PSI)	External Pilot Pressure Required (PSI)*	
	3/8" Basic	3/4" Basic
25 PSI	35-200	35-200
50 PSI	45-200	40-200
75 PSI	55-200	50-200
100 PSI	65-200	65-200
150 PSI	80-200	80-200
250 PSI	110-200	110-200

Vacuum up to 1" HG, less than a perfect vacuum.

* With 200 PSI option.

Do not exceed 140 PSI with standard pilots.

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3/8" & 3/4" Body
Single Solenoid External Pilot
Normally Closed

3/8" & 3/4" Body
Single Solenoid External Pilot
Normally Open

3/8" & 3/4" Body

1-1/4" Body

Remote Operated External Return
Normally Closed

3/8" & 3/4" Body

1-1/4" Body

Remote Operated External Return
Normally Open

External Pilot supply should be used when the main valve needs to operate below the Minimum Operating Pressure or at Vacuum. A Selector function can also be achieved (pressurizing the IN and EXHAUST ports) with an External Pilot Supply. Refer to charts for required external pilot pressure.

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Flow

Basic Valve Size	Inlet Port Size	Exhaust Port Size	Cv Inlet to Cylinder	Cv Cylinder to Exhaust
3/8" 3-Way Normally Closed	3/8" Pipe	1/2" Pipe	3.6	4.2
	1/2" Pipe	1/2" Pipe	3.8	4.3
3/8" 3-Way Normally Open	3/8" Pipe	1/2" Pipe	3.6	4.1
	1/2" Pipe	1/2" Pipe	3.9	4.5
3/4" 3-Way Normally Closed	1/2" Pipe	3/4" Pipe	8.2	9.2
	3/4" Pipe	1" Pipe	9.3	10.8
3/4" 3-Way Normally Open	1/2" Pipe	3/4" Pipe	7.7	6.6
	3/4" Pipe	1" Pipe	9.6	11.4
1-1/4" 3-Way Normally Closed	1" Pipe	1-1/4" Pipe	19.5	23.5
	1-1/4" Pipe	1-1/2" Pipe	23.3	26.9
	1-1/2" Pipe	1-1/2" Pipe	23.3	26.9
1-1/4" 3-Way Normally Open	1" Pipe	1-1/4" Pipe	20.4	24.8
	1-1/4" Pipe	1-1/2" Pipe	25.0	29.1
	1-1/2" Pipe	1-1/2" Pipe	26.7	29.9

Temperature Rating

Operating Temperature Range:

Operator Type	Duty Cycle*	Maximum Ambient Temperature	Minimum Ambient Temperature
Standard Service	Intermittent	0°F (-18°C)	125°F (52°C)
Solenoid	Continuous	0°F (-18°C)	100°F (38°C)
Special Service	Intermittent	0°F (-18°C)	125°F (52°C)
Solenoid	Continuous	0°F (-18°C)	125°F (52°C)
Remote Pilot	Not Applicable	0°F (-18°C)	200°F (93°C

* Applications with pilot valves energized for ten (10) minutes or longer with a duty cycle greater than 70% are considered to be continuously energized.

$$\text{Duty cycle} = \frac{\text{Time energized}}{\text{Time energized + time off}} \times 100\% = \%\ \text{Duty Cycle}$$

Materials of Construction

Valve Body .....Cast Aluminum

Poppet Assembly..... Aluminum and Stainless Steel

Pilot Valve.....Zinc, Stainless Steel, Brass, Copper, Zinc Plated Steel

Seals.....Nitrile

Selection

Although reasonable safety factors are designed into each speed poppet valve, it is important that application requirements do not exceed the rated limitation of the valve. This precaution insures a sufficient safety factor.

Life Expectancy

Normal multimillion cycle life expectancy of high speed poppet series valves is based on the use of properly filtered and lubricated air at room temperature. In actual laboratory tests, the high speed poppet valves provide maintenance-free service life in excess of 20,000,000 cycles.

Lubrication

The high speed poppet valves are pre-lubricated to permit use with non-lubricated air. However, air should be lubricated to assure maximum seal life.

F442 lubricating oil is recommended. This oil is specially formulated to provide peak performance and maximum service life from air-operated equipment.

Other good air line lubricating oils may be used provided they atomize readily and are of the medium aniline type. Aniline point range must be between 180°F - 220°F. Viscosity SUS @ 100°F of 140-170. High aniline oils will shrink seals; low aniline oils will swell seals, reducing operating life and expectancy.

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Installation

Valves should be installed with reasonable accessibility for service whenever possible. Care should be taken to hold piping length to a minimum and to protect valves from exposure to extreme heat, dirt and moisture. Piping should be clean and clear of dirt and chips. Threads should be the correct size and undamaged. Pipe joint compound should be used sparingly and only on pipe threads, never in the valve body. Care should be taken in installation to avoid undue strain on valve.

For the small port size options, it is recommended that an air reservoir is located close to the valve inlet as to not starve the valve of air pressure.

⚠ ***CAUTION:*** **DO NOT RESTRICT THE INLET TO POPPET VALVES**

Restriction of the inlet can starve the air supply to the pilot section of internally piloted poppet valves and result in slow shifting or failure of the valve to shift properly. Always connect the supply line directly to the inlet of the valve using the full pipe size of the valve inlet. Never use a quick coupling to connect a poppet valve to the air supply. On valves with a small inlet port, use of an upstream surge tank may be required at lower operating pressures to insure an adequate air supply and proper operation.

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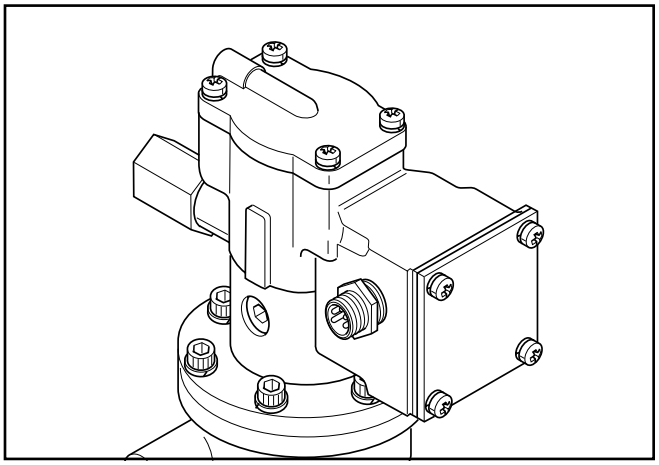


Automotive Connections

- 3-Pin & 5-Pin "Mini" (7/8 UNF Thread)
- 4-Pin "Micro" (M12 Thread)

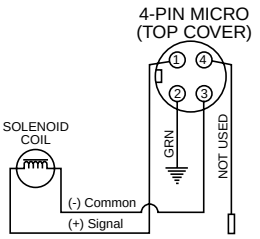
Solenoid Configurations

"E", "J", "N"

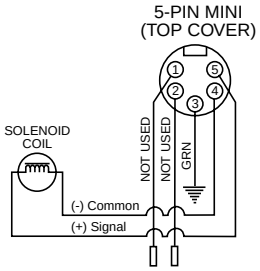
Wiring Connections

Chrysler Connection

4-Pin Male/Single Solenoid
(Encl. Option J, Wiring Option C)

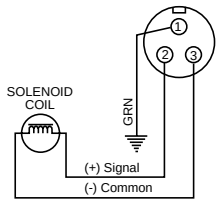


5-Pin Male/Single Solenoid
(Encl. Option N, Wiring Option C)

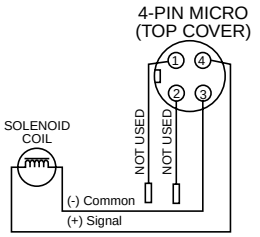


Ford Connection

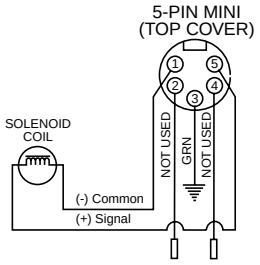
3-Pin Male/Single Solenoid
(Encl. Option E, Wiring Option F)



4-Pin Male/Single Solenoid
(Encl. Option J, Wiring Option F)

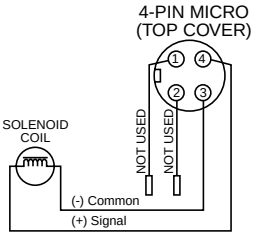


5-Pin Male/Single Solenoid
(Encl. Option N, Wiring Option F)

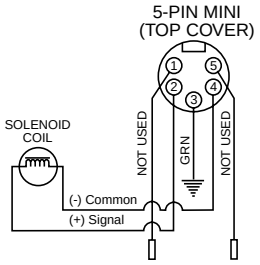


GM Connection

4-Pin Male/Single Solenoid
(Encl. Option J, Wiring Option G)



5-Pin Male/Single Solenoid
(Encl. Option N, Wiring Option G)



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Solenoid Characteristics Chart

Voltage Range +10/-15% of Nominal

3/8" & 3/4" Basic – L-Pilot					
Voltage/ Cycles	**Amps Inrush**	**Amps Holding**	**Resistance Ohms**	**Watts**	**Insulation Class**
120/60VAC	.29	.18	122	12	B
110/50VAC	.21	.14	122	12	B
240/60VAC	.18	.12	610	12	B
24/60VAC	1.6	1.0	4.5	9.5	B
24/50VAC	1.2	.75	6.4	9.5	B
6VDC	–	1.4	4.5	7.6	B
12VDC	–	.66	17.7	9	B
24VDC	–	.32	71	9	B
48VDC	–	.22	216	11	B

1-1/4" Basic – P-Pilot					
Voltage/ Cycles	**Amps Inrush**	**Amps Holding**	**Resistance Ohms**	**Watts**	**Insulation Class**
120/60VAC	.46	.25	35	18.5	B
110/50VAC	.36	.19	48	12	B
230/60VAC	.26	.15	125	19.5	B
220/50VAC	.20	.11	191	15	B
24/60VAC	2.3	1.4	1.3	20	B
24/50VAC	1.6	.9	2.1	12	B
12VDC	–	.7	17	8	B
24VDC	–	.33	68	8	B
48VDC	–	.16	275	7.5	B

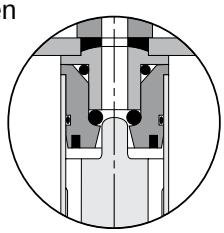
NOTE: Continuous duty type service is for applications where pilot valve is energized more than ten (10) minutes.

Continuous Duty Pilots

Continuous duty pilots are designed for applications where cycling is infrequent and the pilot is to be energized for indefinite periods of time . . . hours, days or weeks. Typical uses include fail-safe or emergency shutdown circuits where the pilot is to be energized and the valve open as long as the main control is "live" in order to shut off air to equipment in the event of power failure.

The Continuous duty pilot operates satisfactorily in ambient temperatures up to 125°F, even when continuously energized and without the benefit of the cooling air which normally flows through the pilot during frequent cycling. Under certain conditions, satisfactory operation may be obtained at ambient temperatures above 125°F. CONSULT FACTORY.

Incorporating the performance-proven design features of the standard L-Pilot, the continuous duty pilot utilizes a bullet-shaped stem on the upper end of the plunger. This bullet-shaped stem, seating in a high-temperature rubber o-ring, provides both a bubble-tight seal and positive release.



Continuous Duty Pilot

M

Hazardous Duty Solenoid Listing

Valves with solenoid operators designed for hazardous locations are UL & CSA Approved as follows:

National Electric Code	Ambient Conditions	NEMA Classification
Class I Div. 1 Group C	Ethyl, Ether, Etc. Gases & Vapors	VII (7)
Class I Div. 1 Group D	Gasoline, Etc. Gases & Vapors	VII (7)
Class I Div. 2 Group B	Butadiene, Etc., Liquid, Fluid or Vapor Normally Contained, or Atmosphere Ventilated	VII (7)
Class II Div. 1 Group E	Metal Dust	IX (9)
Class II Div. 1 Group F	Coal, Coke, Carbon Black Dust	IX (9)
Class II Div. 1 Group G	Flour, Starch, Grain Dust	IX (9)

See Article 500 – Hazardous (Classified) Locations, National Electric Code.

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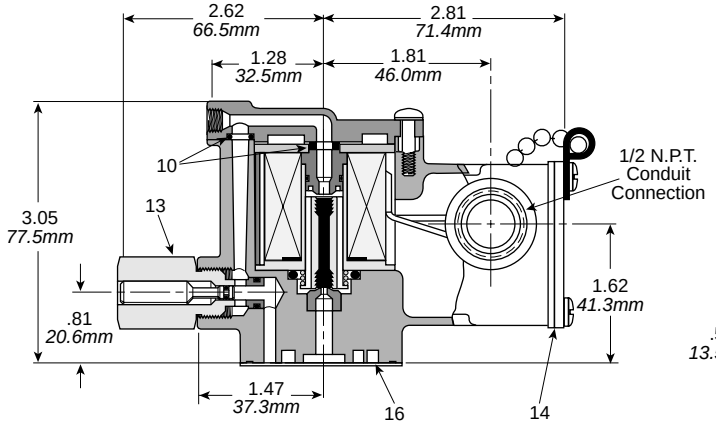
Basic L-Pilot

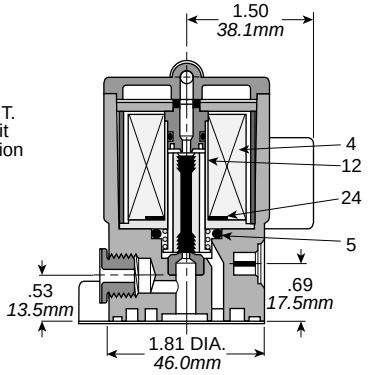
Junction Box L-Pilot

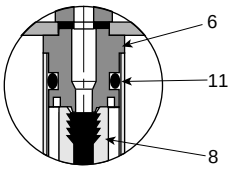
Replacement Pilots

Description	Standard L-Pilot		Continuous Duty L-Pilot	
Override Type	**Locking**	**Non-Locking**	**Locking**	**Non-Locking**
Basic with Override	K065 3035**	K065 2035**	K085 3025**	K085 2025**
JIC with Junction Box & Override	K065 6035**	K065 5035**	K085 6025**	K085 5025**
JIC Pilot with Junction Box & Override & Indicator Lights (120VAC Only)	K065 9035**	K065 8035**	K085 9025**	K085 8025**

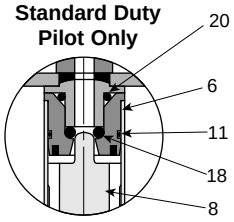
** Voltage Code - (Reference Model Index for Availability)







Standard Duty Pilot Only



Continuous Duty Pilot Only

Parts List

Item No.	Part Number	Description
4	**K593 025**	**Coil 120V 60Hz / 110V 50Hz**
	K593 035	**Coil 240V 60Hz / 220V 50Hz**
	K593 003	Coil 6VDC / 24V 60Hz
	K593 010	Coil 12VDC
	K593 014	**Coil 24VDC**
	K593 041	**Coil 120VDC**
5	H142 13	Seal
6	K423 006	Top Seat
	K423 010	Top Seat (Continuous Duty)
8	**K343 002**	**Plunger (STD. Service)**
	K343 001	**Plunger (Continuous Duty)**
10*	H142 01	Seal
11*	K41RB72011	O-Ring (STD. Service)
	H249 69	O-Ring (Continuous Duty)

Item No.	Part Number	Description
12	K272 004	Plunger Guide
13	K152 003	Override Assembly
14*	K183 047	Cover Gasket
16*	K183 001	Gasket
18*	H134 73	O-Ring
20*	H134 13	O-Ring
22	H191 02	120 AC Only – Indicator Light
24	K183 108	Gasket

Coil leads are 19" long.

* Parts included in Service Kit.

Continuous Duty Kit K352 366

Standard Service Kit K352 166

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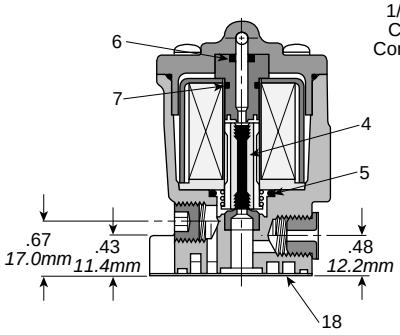
Hazardous Duty L-Pilot

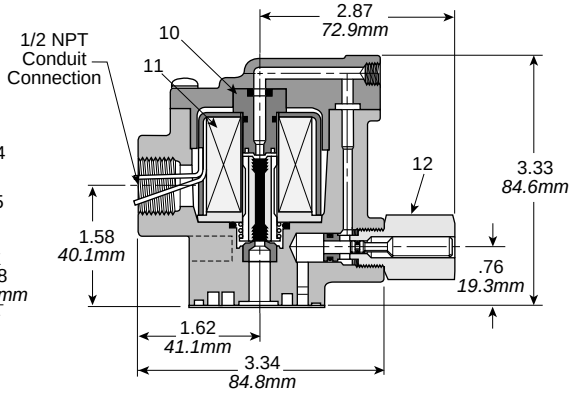
NEMA 4 L-Pilot

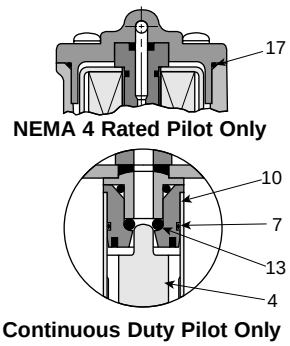
Replacement Pilots

Description	Continuous Duty L-Pilot	
Hazardous Duty L-Pilot - UL & CSA NEMA 4 L-Pilot	K045 1025**	K255 1025**
Override Type	**Locking**	**Non-Locking**
Hazardous Duty with Override	K045 3025**	K045 2025**
NEMA 4 with Override	K255 3025**	K255 2025**

** Voltage Code - 49 & 53







Parts List

Item No.	Part Number	Description
4*	**K343 002**	**Plunger (STD. Service)**
	K343 001	**Plunger (Continuous Duty)**
5*	K142 13	Seal
6*	K41RB72009	O-Ring
	K41RB72008	O-Ring (STD. Service)
7*	K41RB72011	O-Ring (STD. Service)
	H249 69	O-Ring (Continuous Duty)
10	K423 001	Top Seat
	K423 002	Top Seat (Continuous Duty)
11	**K593 025**	**Coil 120V 60Hz / 110V 50Hz**
	K593 035	**Coil 240V 60Hz / 220V 50Hz**
	K593 003	Coil 6VDC / 24V 60Hz
	K593 010	Coil 12VDC
	K593 014	**Coil 24VDC**
	K593 041	**Coil 120VDC**

Item No.	Part Number	Description
12	K152 003	Override Assembly
13*	H134 73	O-Ring
17*	H137 16	Gasket (NEMA 4 Rated Pilot Only)
18*	K183 001	Gasket

Coil leads are 19" long.

***** Parts included in Service Kit.

Continuous Duty Kit K352 366

Standard Service Kit K352 166

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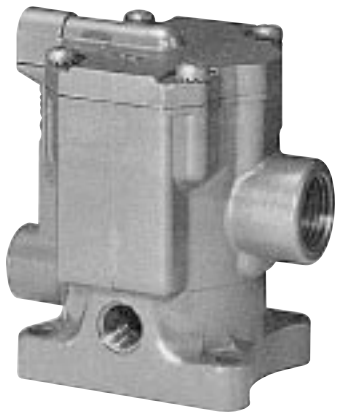
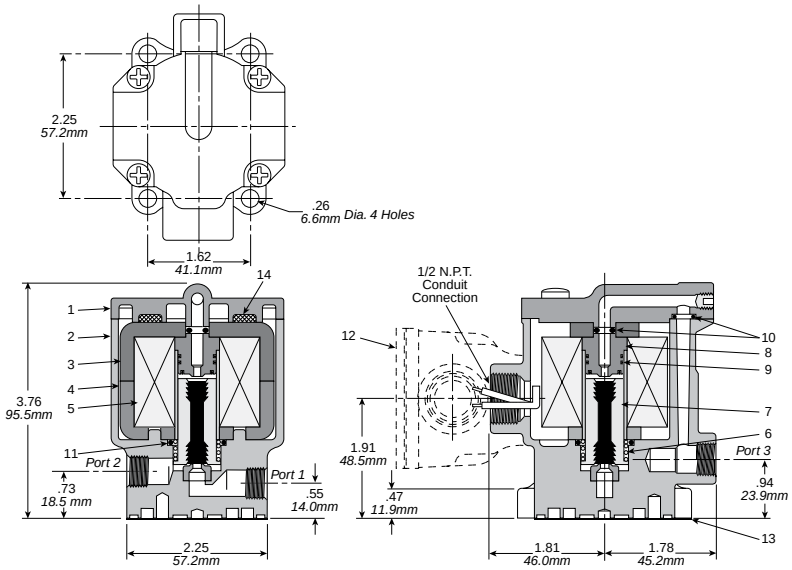


Heavy Duty P-Pilot

Replacement Pilots

Description	Standard P-Pilot		
Override Type	**No Override**	**Non-Locking**	**Locking**
Basic with Override	K135 1045**	N/A	N/A
JIC with Junction Box & Override	N/A	K135 5045**	K135 6045**
JIC Pilot with Junction Box & Override & Indicator Lights (120VAC Only)	N/A	K135 804553	K135 904553

** Voltage Code - 49 & 53



Parts List

Item No.	Part Number	Description
1	K062 005	Cover Assy
2	K112 045	Body, Man. Mtd. (1/8" Bottom Seal)
	K112 046	Body, Man. Mtd. (3/16" Bottom Seal)
3	K013 001	Magnet Bar
4	K272 002	Sleeve Sub Assy
5*	K593 108	Coil (115V 60Hz)
	K593 112	Coil (230V 60Hz)
	K593 097	Coil 24VDC
	K593 107	Coil 115VDC

Item No.	Part Number	Description
6	K473 010	Spring N.O. Valve
	K473 011	Spring N.C. Valve
• 7	K343 042	Plunger
8	K423 020	Top Seat (1/8" Orifice)
	K423 022	Top Seat (3/16" Orifice)
• 9	H134 36	Seal
• 10	H142 02	Seal
• 11	H142 15	Seal
12	K322 004	Junction Box Kit
• 13	K183 012	Gasket

* Coil leads are 19" long.

• Parts included in Seal Kit K352 064.

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Coils for L-Pilot Operated Valves

Voltage Code **	Voltage			Coil	
	60Hz	50Hz	DC	19" Leads	72" Leads
40	12	—	—	K593007	—
41,42	24	—	6	K593003	—
45*	**—**	**—**	**12**	**K593010**	**—**
49*	**—**	**—**	**24 (Standard)**	**K593014**	**—**
79	—	—	24 (Arc Suppressed)	K593271	—
51*	—	—	48	—	K593185
53*	**120**	**110**	**—**	**K593025**	**—**
57*	**240**	**240**	**—**	**K593035**	**—**
60	**240**	**220**	**—**	**K593035**	**—**
61	**—**	**—**	**120**	**K593041**	**—**

* Indicates voltages approved for solenoid operators designed for use in hazardous locations.

Coils for P-Pilot Operated Valves

Voltage Code **	Voltage			Coil	
	60Hz	50Hz	DC	19" Leads	72" Leads
42	24	—	—	K593099	—
43	—	24	—	K593098	—
45	**—**	**—**	**12**	**K593094**	**—**
49	**—**	**—**	**24**	**K593097**	**—**
51	—	—	48	—	K593254
53	**115**	**—**	**—**	**K593108**	**—**
58	**—**	**230**	**—**	**K593111**	**—**

N □□□ □□ □□□ ******
Voltage Code

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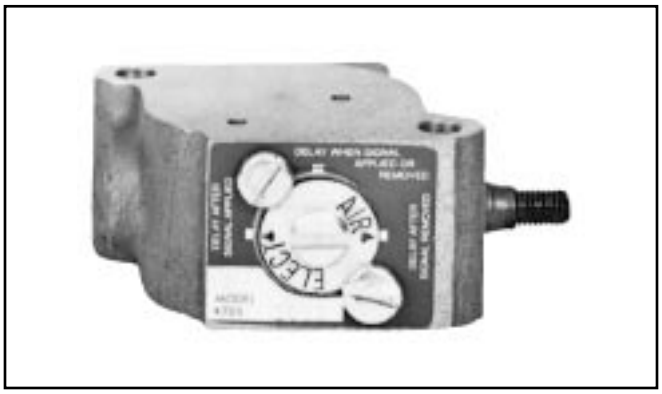
Time Delay Modules Provide:

- Delay of valve action upon application of control signal, removal of control signal or both application and removal of control signal.
- Delay intervals from 0-6, 5-12 or 10-30 seconds . . . up to several minutes with the addition of a small external reservoir.
- Repeatability within 10%, using clean filtered air.
- Change of function without disassembly . . . with line pressure on the valve.



Function

Time delay to be used with **external pressure return** valve only.

Time delay modules provide precise, consistent delay of valve shift. They eliminate the need for electrical timers and relays and simplify circuitry.

Delay interval is controlled by an externally adjustable metering screw. Change of function is accomplished by loosening two lock screws, turning the slotted selector plate to the desired function and re-tightening the lock screws. By adding a small external reservoir, delay interval can be extended up to several minutes.

M

Setting Selector for Desired Function

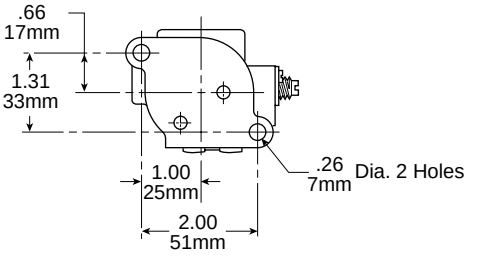
For valves which are solenoid pilot operated, or valves being controlled by normally open remote pilot, match the pointer marker **"Elect"** with the desired function indicator line.

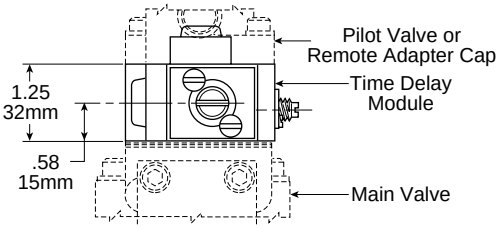
For valves which are being controlled by normally closed pilot, match the pointer marked **"Air"** with the desired function indicator line.

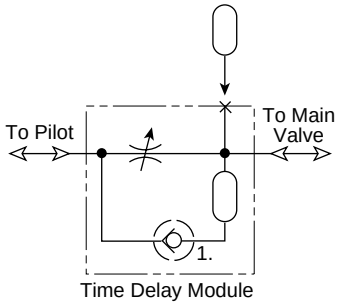
How to Order Kits

Kits are suitable for both solenoid and remote operated valves. Kits include module, gaskets, screws, and installation instructions.

Delay Interval	Module Kit Number
0-6 Seconds	K705 1001
5-12 Seconds	K705 1002
10-30 Seconds	K705 1003







1. Time Delay After Application of Signal to Solenoid. (Elect. Pointer)
2. Time Delay After Removal of Signal From Solenoid. 

3. Time Delay After Application and Removal of Signal to Solenoid. 

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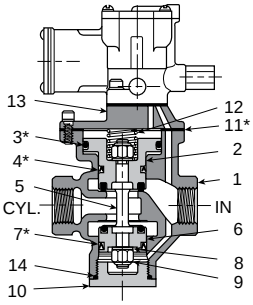
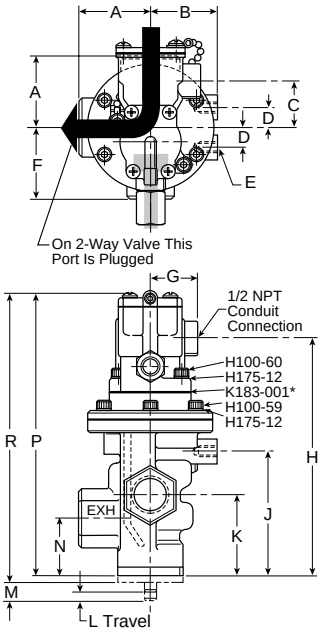
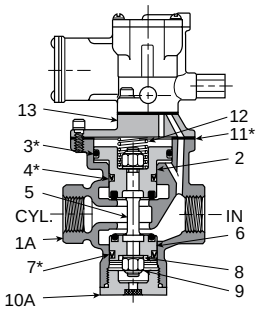
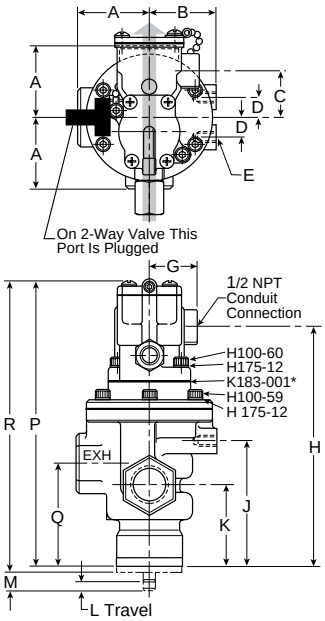
Normally Closed





Normally Open





Exhaust
Pressure

Top view indicates flow through 3-Way valve with coil de-energized.

NOTE: For normal valve operation, override must be in "out" position.

Dimensions

Key	3/8" Body		3/4" Body	
	Inch	mm	Inch	mm
A	1.56	40	2.13	54
B	1.50	38	1.94	49
C	1.81	46	1.34	34
D	.56	14	.56	14
E	3/8-16UNC 7/16" deep		3/8-16UNC 9/16" deep	
F	1.75	44	2.25	57
G	1.50	38	1.50	38
H	5.92	150	7.14	181
J	3.19	81	3.75	95
K	1.88	47	2.44	62
L	.11	3	.16	4
M	.50	13	.50	13
N	1.44	37	1.78	45
P	7.36	196	8.58	218
Q	2.31	59	3.09	84
R	7.92	201	8.83	224

Service Kits

Include all parts normally required for in-service maintenance:

3/8" Basic Valve with standard service L-Pilots.....**K352 076**

3/8" Basic Valve with continuous duty L-Pilots **K352 276**

3/4" Basic Valve with standard service L-Pilots.....**K352 077**

3/4" Basic Valve with continuous duty L-Pilots **K352 277**

M

Key	3/8" Valve	3/4" Valve	Description
1	—	1/2" Tap K053 075	Body (N.C.)
	3/8" Tap K053 022	3/4" Tap K053 076	
	1/2" Tap K053 023	1" Tap K053 220	
1A	—	3/4" Tap K053 077	Body (N.O.)
	3/8" Tap K053 025	3/4" Tap K053 078	
	1/2" Tap K053 026	1" Tap K053 218	
2	K212 001	K212 002	Upper Piston Assy
3*	H136 48	H137 28	Seal
4*	H145 10	H136 76	U-Cup (3/8), O-Ring (3/4)

Key	3/8" Valve	3/4" Valve	Description
5	K493 002	K493 009	Stem
6	K202 001	K202 002	Lower Piston Assy.
7*	H145 09	H136 76	U-Cup (3/8), O-Ring (3/4)
8	H178 11	H178 13	Washer (2)
9	H063 26	H063 32	Stop Nut (2)
10	K103 035	K103 053	Bottom Cap (N.C.)
10A	K092 020	K092 034	Bottom Cap Assy. (N.O.)
11*	K183 049	K183 057	Gasket
12	K473 014	K473 015	Spring
13	K563 015	K563 017	Adapter
14*	K41RB72121	K41RB72221	O-Ring

*** Parts included in seal kit**

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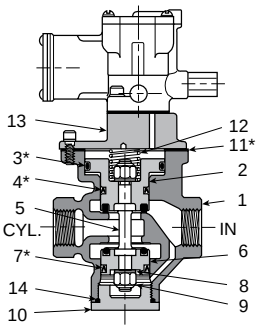
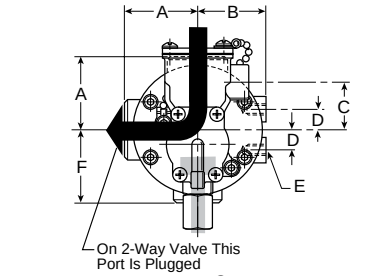
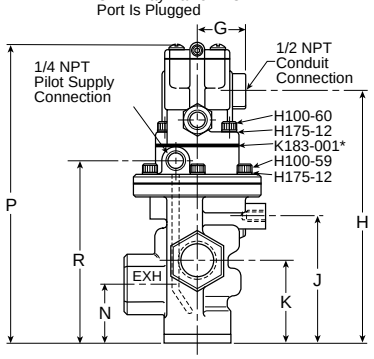
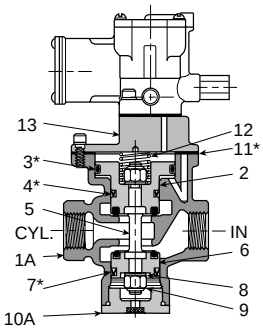
Normally Closed

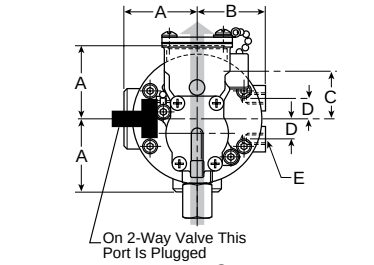


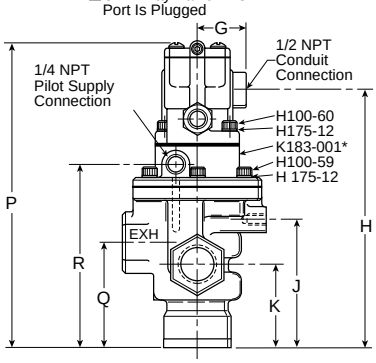




Normally Open







Exhaust
Pressure

Top view indicates flow through 3-Way valve with coil de-energized.

NOTE: For normal valve operation, override must be in "out" position.

Dimensions

Key	3/8" Body		3/4" Body	
	Inch	mm	Inch	mm
A	1.56	40	2.13	54
B	1.50	38	1.94	49
C	1.81	46	1.34	34
D	.56	14	.56	14
E	3/8-16UNC 7/16" deep		3/8-16UNC 9/16" deep	
F	1.75	44	2.25	57
G	1.50	38	1.50	38
H	6.42	163	7.45	189
J	3.19	81	3.75	95
K	1.88	47	2.44	62
N	1.44	37	1.78	45
P	7.86	200	8.89	226
Q	2.31	59	3.09	84
R	4.34	110	5.38	137

Service Kits

Include all parts normally required for in-service maintenance:

3/8" Basic Valve with standard service L-Pilots.....**K352 076**

3/8" Basic Valve with continuous duty L-Pilots **K352 276**

3/4" Basic Valve with standard service L-Pilots.....**K352 077**

3/4" Basic Valve with continuous duty L-Pilots **K352 277**

Key	3/8" Valve	3/4" Valve	Description
1	—	1/2" Tap K053 067	Body (N.C.)
	3/8" Tap K053 019	3/4" Tap K053 069	
	1/2" Tap K053 157	1" Tap K053 221	
1A	—	3/4" Tap K053 065	Body (N.O.)
	3/8" Tap K053 018	3/4" Tap K053 070	
	1/2" Tap K053 064	1" Tap K053 219	
2	K212 001	K212 002	Upper Piston Assy
3*	H136 48	H137 28	Seal
4*	K41RB72211	H136 76	O-Ring

Key	3/8" Valve	3/4" Valve	Description
5	K493 002	K493 009	Stem
6	K202 001	K202 002	Lower Piston Assy.
7*	K41RB72210	H136 76	O-Ring
8	H178 11	H178 13	Washer (2)
9	H063 26	H063 32	Stop Nut (2)
10	K103 035	K103 053	Bottom Cap (N.C.)
10A	K092 020	K092 034	Bottom Cap Assy. (N.O.)
11	K473 014	K473 015	Spring
12*	K183 049	K183 057	Gasket
13	K563 016	K563 021	Adapter
14*	K41RB72121	K41RB72221	O-Ring

*** Parts included in seal kit**

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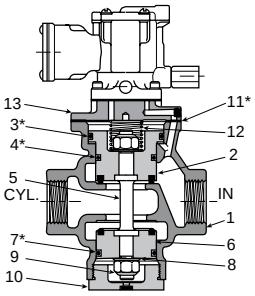
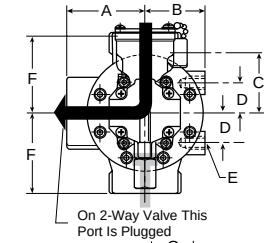
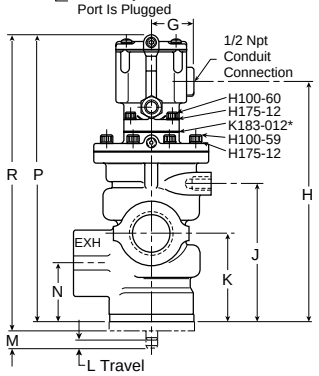
Normally Closed







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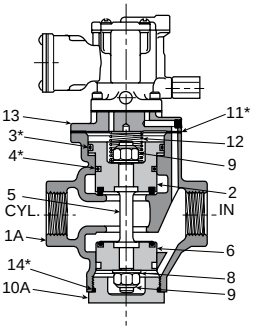

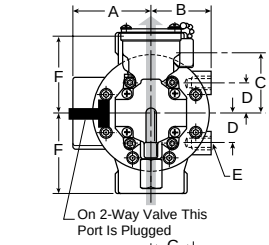

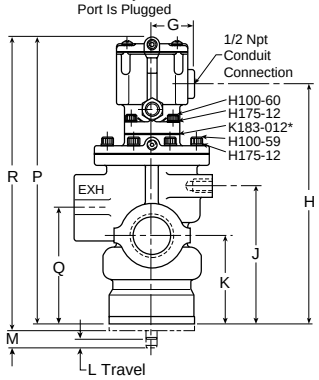

Exhaust
Pressure

Top view indicates flow through 3-Way valve with coil de-energized.

NOTE: For normal valve operation, override must be in "out" position.

Dimensions

Key	1-14" Body	
	Inch	mm
H	9.30	236
J	5.34	136
K	3.44	87
L	.25	6
M	.50	13
N	2.31	59
P	11.14	283
Q	4.56	116
R	11.48	292

Service Kits

Includ e all parts normally required for in-service maintenance:

1-1/4" Basic Valve with standard service P-Pilot **K352 078**

M

Key	1-1/4" Valve	Description
1	1" Tap K053 111	Body (N.C.)
	1-1/4" Tap K053 112	
	1-1/2" Tap K053 113	
1A	1" Tap K053 114	Body (N.O.)
	1-1/4" Tap K053 115	
	1-1/2" Tap K053 116	
2	K313 029	Upper Piston Assy
3*	H137 52	O-Ring
4*	H137 28	Seal

Key	1-1/4" Valve	Description
5	K493 016	Stem
6	K313 028	Lower Piston
7*	H137 28	Seal
8	H178 17	Washer
9	H063 38	Stop Nut
10	K092 046	Bottom Cap (N.C.)
10A	K103 061	Bottom Cap (N.O.)
11*	K183 058	Gasket
12	K473 016	Spring
13	K012 003	Adapter
14*	K41RB72143	O-Ring

*** Parts included in seal kit**

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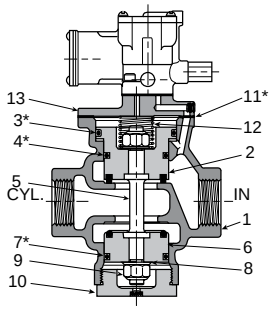

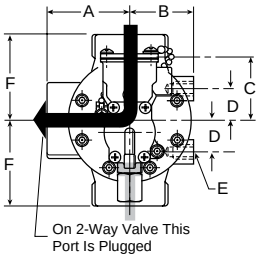

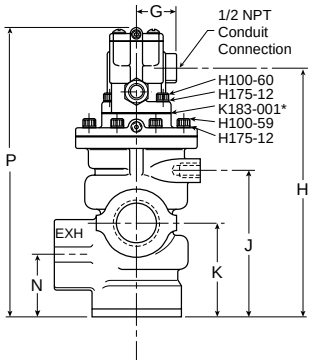

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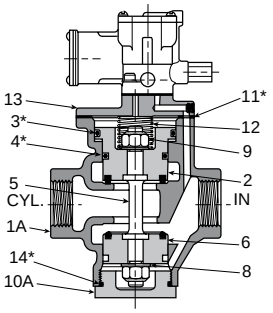

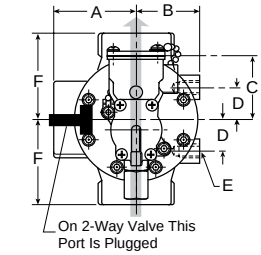

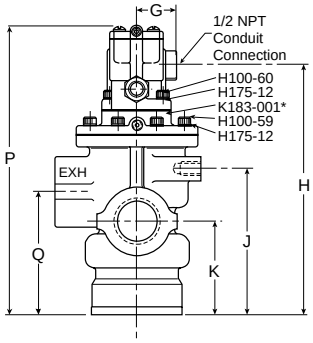

Exhaust
Pressure

Top view indicates flow through 3-Way valve with coil de-energized.

NOTE: For normal valve operation, override must be in "out" position.

Dimensions

Key	1-1/4" Body	
	Inch	mm
A	3.00	76
B	2.25	57
C	1.34	34
D	1.19	30
E	1/2-13 UNC 3/4 Deep	
F	3.13	80
G	1.50	38
H	9.02	229
J	5.34	136
K	3.44	87
N	2.31	59
P	10.45	265
Q	4.56	116

Service Kits

Include all parts normally required for in-service maintenance:

1-1/4" Basic Valve with continuous duty L-Pilot.....**K352 080**

Key	1-1/4" Valve	Description
1	1" Tap K053 111	Body (N.C.)
	1-1/4" Tap K053 112	
	1-1/2" Tap K053 113	
1A	1" Tap K053 114	Body (N.O.)
	1-1/4" Tap K053 115	
	1-1/2" Tap K053 116	
2	K313 029	Upper Piston Assy
3*	H137 52	O-Ring
4*	H137 28	Seal

Key	1-1/4" Valve	Description
5	K493 016	Stem
6	K313 028	Lower Piston
7*	H137 28	Seal
8	H178 17	Washer
9	H063 38	Stop Nut
10	K092 046	Bottom Cap (N.C.)
10A	K103 061	Bottom Cap (N.O.)
11*	K183 058	Gasket
12	K473 016	Spring
13	K012 003	Adapter
14*	K41RB72143	O-Ring

*** Parts included in seal kit**

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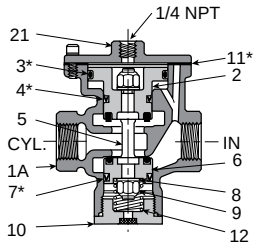
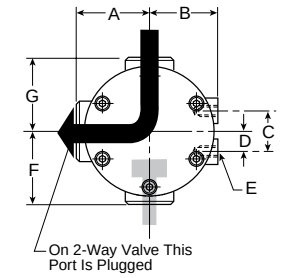
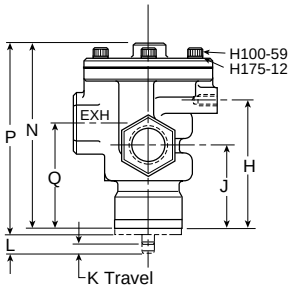
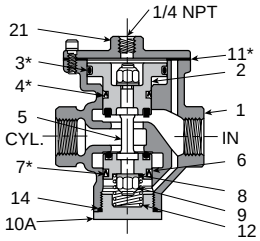
Normally Closed

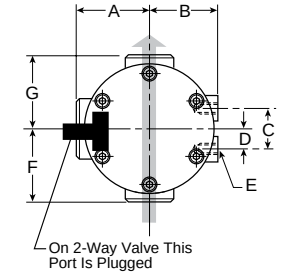


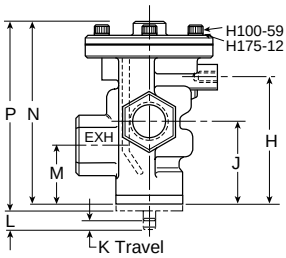




Normally Open







Exhaust
Pressure

Top view indicates flow through 3-Way valve.

NOTE: For normal valve operation, override must be in "out" position.

Dimensions

Key	3/8" Body		3/4" Body		1-1/4" Body	
	Inch	mm	Inch	mm	Inch	mm
H	3.19	81	3.75	95	5.34	136
J	1.88	48	2.44	62	3.44	87
K	.50	13	.50	13	.50	13
L	.11	3	.16	4	.25	6
M	1.44	37	1.78	45	2.66	67
N	4.22	107	5.31	135	7.19	183
P	4.78	121	5.56	141	7.53	191
Q	2.31	59	3.09	78	4.56	116

Service Kits

Include all parts normally required for in-service maintenance:

3/8" Basic Valve.....**K352 073**

3/4" Basic Valve.....**K352 074**

1-1/4" Basic Valve.....**K352 075**

M

Key	3/8" Valve	3/4" Valve	1-1/4" Valve	Description
1	—	1/2" Tap K053 075	1" Tap K053 111	Body (N.O.)
	3/8" Tap K053 022	3/4" Tap K053 076	1-1/4" Tap K053 112	
	1/2" Tap K053 023	1" Tap K053 220	1-1/2" Tap K053 113	
1A	—	1/2" Tap K053 077	1" Tap K053 114	Body (N.C.)
	3/8" Tap K053 025	3/4" Tap K053 078	1-1/4" Tap K053 115	
	1/2" Tap K053 026	1" Tap K053 218	1-1/2" Tap K053 116	
2	K212 001	K212 002	K313 029	Upper Piston Assy
3*	H136 48	H137 28	H137 52	Seal
4*	H145 10	H136 76	H137 28	Seal

Key	3/8" Valve	3/4" Valve	1-1/4" Valve	Description
5	K493 002	K493 009	K493 016	Stem
6	K202 001	K202 002	K313 028	Lower Piston Assy.
7*	H145 09	H136 76	H137 28	Seal
8	H178 11	H178 13	H178 17	Washer (2)
9	H063 26	H063 32	H063 38	Stop Nut (2)
10	K092 020	K092 034	K103 061	Bottom Cap (N.C.)
10A	K103 035	K103 053	K092 046	Bottom Cap (N.O.)
11*	K183 049	K183 057	K183 058	Gasket
12	K473 014	K473 015	K473 016	Spring
14*	K41RB72121	K41RB72221	K41RB72143	O-Ring
21	K123 018	K123 021	K123 024	Cover

*** Parts included in seal kit**

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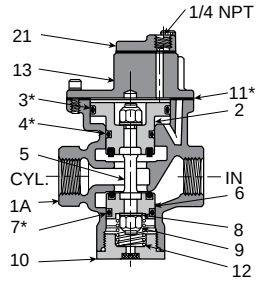
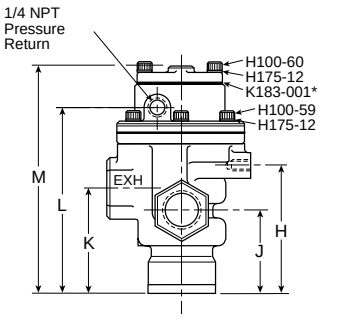
Normally Closed





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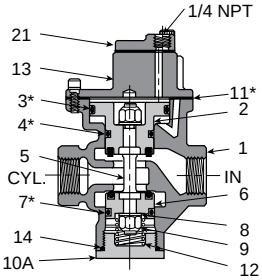

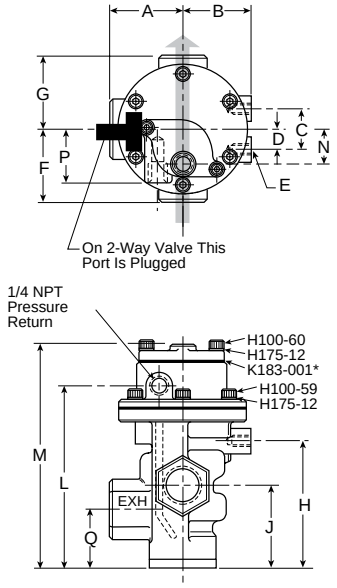

Exhaust
Pressure

Top view indicates flow through 3-Way valve.

NOTE: For normal valve operation, override must be in "out" position.

Dimensions

	3/8" Body		3/4" Body		1-1/4" Body	
Key	Inch	mm	Inch	mm	Inch	mm
A	1.56	40	2.13	54	3.00	76
B	1.50	38	1.94	49	2.25	57
C	1.13	29	1.13	29	2.38	60
D	.56	14	.56	14	1.19	30
E	3/8–16UNC 7/16" deep		3/8–16UNC 9/16" deep		1/2–13UNC 3/4" deep	
F	1.75	44	2.25	57	3.13	79
G	1.56	40	2.13	54	3.13	79
H	3.19	81	3.75	95	5.34	136
J	1.88	48	2.44	62	3.44	87
K	2.31	59	3.09	78	4.56	116
L	4.34	110	5.38	137	7.31	186
M	5.31	135	6.34	161	7.88	200
N	Left of center				On center	
	.53	13	1.00	25		
Q	1.44	37	1.78	45	2.31	59

Service Kits

Include all parts normally required for in-service maintenance:

3/8" Basic Valve.....**K352 031**

3/4" Basic Valve.....**K352 056**

1-1/4" Basic Valve.....**K352 083**

Key	3/8" Valve	3/4" Valve	1-1/4" Valve	Description
1	1/4" Tap K053 011	1/2" Tap K053 067	1" Tap K053 143	Body (N.O.)
	—	3/4" Tap K053 069	1-1/4" Tap K053 110	
	1/2" Tap K053 157	1" Tap K053 221	1-1/2" Tap K053 146	
1A	1/4" Tap K053 010	1/2" Tap K053 065	1" Tap K053 159	Body (N.C.)
	—	3/4" Tap K053 070	1-1/4" Tap K053 144	
	1/2" Tap K053 064	1" Tap K053 219	1-1/2" Tap K053 145	
2	K212 001	K212 002	K313 029	Upper Piston Assy
3*	H136 48	H137 28	H137 52	Seal
4*	H135 29	H136 76	H137 28	Seal

Key	3/8" Valve	3/4" Valve	1-1/4" Valve	Part
5	K493 002	K493 009	K493 016	Stem
6	K202 001	K202 002	K313 028	Lower Piston Assy.
7*	H135 19	H136 76	H137 28	Seal
8	H178 11	H178 13	H178 17	Washer (2)
9	H063 26	H063 32	H063 38	Stop Nut (2)
10	K092 020	K092 034	K092 046	Bottom Cap Assy. (N.C.)
10A	K103 035	K103 053	K103 061	Bottom Cap (N.O.)
11*	K183 049	K183 057	K183 058	Gasket
12	K473 014	K473 015	K473 016	Spring
13	K563 016	K563 021	K563 027	Adapter
14*	K41RB72121	K41RB72221	K41RB72143	O-Ring
21	K323 027	K323 027	Not used	Cover

*** Parts included in seal kit**

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* Stocking levels vary by country

⚠ WARNING

FAILURE OR IMPROPER SELECTION OR IMPROPER USE OF THE PRODUCTS AND/OR SYSTEMS DESCRIBED HEREIN OR RELATED ITEMS CAN CAUSE DEATH, PERSONAL INJURY AND PROPERTY DAMAGE.

This document and other information from Parker Hannifin Corporation, its subsidiaries and authorized distributors provide product and/or system options for further investigation by users having technical expertise. It is important that you analyze all aspects of your application including consequences of any failure, and review the information concerning the product or system in the current product catalog. Due to the variety of operating conditions and applications for these products or systems, the user, through its own analysis and testing, is solely responsible for making the final selection of the products and systems and assuring that all performance, safety and warning requirements of the application are met.

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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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Offer of Sale

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

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

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

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

NOTWITHSTANDING THE FOREGOING, THERE ARE NO WARRANTIES WHATSOEVER ON ITEMS BUILT OR ACQUIRED WHOLLY OR PARTIALLY, TO BUYER'S DESIGN OR SPECIFICATIONS.

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

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

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

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

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

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

If a claim is based on information provided by Buyer or if the design for an item delivered hereunder is specified in whole or in part by Buyer, Buyer shall defend and indemnify Seller for all costs, expenses or 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.