

Pneumatic Division

Richland, Michigan USA

www.parker.com/pneumatics**DIRECTAIR 2 VALVE SERIES**

Bulletin Number		Bulletin Description	
<input type="checkbox"/>	V620BP	Rev. 6	Poppet Valves, Installation & Service Instructions
<input type="checkbox"/>	V621BP	Rev. 6	Solenoid Operated Spool Valves, Installation & Service Instructions
<input type="checkbox"/>	V622CP	Rev. 5	Solenoid Operated Spool Valves, Service Instructions
<input type="checkbox"/>	V624BP	Rev. 7	Manual / Mechanical Spool Valves, Installation & Service Instructions
<input type="checkbox"/>	Safety Guide		PDN Safety Guide



Visit www.pdnplu.com for additional instruction sheets.



Pneumatic Division North America
Richland, Michigan 49083

Installation & Service Instructions
V-620BP

Directair 2 Poppet Valves

ISSUED: May, 2001

Supersedes: December, 1999

ECN# P28246 Rev. 6

⚠ WARNING

To avoid unpredictable system behavior that can cause personal injury and property damage:

- Disconnect electrical supply (when necessary) before installation, servicing, or conversion.
- Disconnect air supply and depressurize all air lines connected to this product before installation, servicing, or conversion.
- Operate within the manufacturer's specified pressure, temperature, and other conditions listed in these instructions.
- Medium must be moisture-free if ambient temperature is below freezing.
- Service according to procedures listed in these instructions.
- Installation, service, and conversion of these products must be performed by knowledgeable personnel who understand how pneumatic products are to be applied.
- After installation, servicing, or conversion, air and electrical supplies (when necessary) should be connected and the product tested for proper function and leakage. If audible leakage is present, or the product does not operate properly, do not put into use.
- Warnings and specifications on the product should not be covered by paint, etc. If masking is not possible, contact your local representative for replacement labels.

Application Limits:

These products are intended for use in general purpose compressed air systems only.

Operating Pressure Range:	kPa	psig	bar
Minimum	0	0	0
Maximum	1034	150	10.34

Pilot Pressure Range:

Minimum (Diaphragm)	104	1.5	0.10
Minimum (Pilot)	172	20	1.72
Maximum	1034	150	10.34

Operating Temperature Range: 0°C to 80°C (32°F to 175°F)

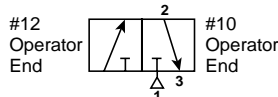
Port Identification / Connections:

Install valve in circuit per the following ANSI diagram (ports marked on valve):

Port Identification

3-Way Service	
Port No.	Function
1	Inlet
2	Cylinder
3	Exhaust
12	Remote Pilot

2-Position, 3-Way



Directair 2 poppet valves are designed for 3-Way, normally closed functions. These valves may be used as dual pressure selectors with the lower pressure plumbed to Port 3 and the higher pressure to Port 1. Port 2 is the working port.

Installation & Operating Instructions:

Valve should be installed with reasonable accessibility for service whenever possible – repair service kits are available. Keep pipe or tubing lengths to a minimum with inside clean and free of dirt and chips. Pipe joint compound should be used sparingly and applied only to the male pipe – never to the female port. Do not use PTFE

tape to seal pipe joints – pieces have a tendency to break off and lodge inside the unit, possibly causing malfunction.

Air to the valve must be filtered to realize maximum component life.

Life Expectancy – Normal multi-million cycle life expectancy of these valves is based on the use of properly filtered air at room temperature.

Lubrication – For maximum service life use clean, lubricated air. Valves are shipped prelubricated and can be operated without additional lubrication with reduced service life.

Recommended Lubricant – Use F422 oil. This oil is specially formulated to provide peak performance and maximum service life from all air operated equipment. Otherwise, use a straight paraffin base mineral oil of viscosity 100-200 SSU @ 100°F and an aniline point greater than 200°F.

⚠ **CAUTION: DO NOT use synthetic, reconstituted, or oils with an alcohol content or detergent additive.**

Operator Adjustments:

For plumbing convenience, all operators may be rotated 180° by removing the two phillips-head screws retaining the operator section, separating the body and operator, rotating and reassembling the operator to the body. Torque screws 1.5 to 2 Nm (13 to 18 in-lbs).

Roller & One-Way Tripper Operators (Figs. G & H) have two adjustment screws used during set up. By loosening jam nut (B), adjustments can be made to screw (C) with a flat-head screwdriver. Adjusting the side screw changes the angle (height) of the cam. The top adjustment determines the point of cam travel at which the spool shifts. Both adjustments can be made to add or subtract "slop" or deadband and control valve timing.

Service Procedures:

NOTE: All cleaning of parts to be done with mineral spirits or equivalent cleaning solution. Grease should be a mineral based lubricant (Texaco Marfak MP-2). Replacement seals are found in poppet valve seal kit unless otherwise noted. All parts showing nicks, scratches or other signs of wear or damage should be replaced.

⚠ WARNING

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EXTRA COPIES OF THESE INSTRUCTIONS ARE AVAILABLE FOR INCLUSION IN EQUIPMENT / MAINTENANCE MANUALS THAT UTILIZE THESE PRODUCTS. CONTACT YOUR LOCAL REPRESENTATIVE.

1. **Button, Toggle and Plunger Operated Valves** (Figs. B, C & D) – Unscrew and remove button (F) or toggle cap nut (E) on button or toggle operated valves. Unscrew and remove panel mount nut (C).
 2. **Diaphragm Operated Valves** (Fig. E) – Remove six phillips-head screws and separate diaphragm halves. The diaphragm (C) and o-ring (G) on diaphragm plunger may be replaced with new parts found in diaphragm seal kit.
3. Remove two phillips-head screws (A) from end section and detach.
4. Remove plunger from operator section and clean housing and plunger. For toggle operated valves (Fig. C) be careful not to lose ball (H).
5. **Remote Pilot End Section** (Fig. F) – Remove the piston (B) with needlenose pliers. Remove lipseal (A) on piston and discard. Clean and inspect the bore. Replace end section if required. Replace lipseal with new seal (lightly coated with grease). Reassemble piston. Grooved end of lipseal and hollow end of piston must face bottom of bore.

REFER TO FIGURE A FOR STEPS 6 THROUGH 10.

6. Remove brass bushing (C), poppet plunger (B), spring (J) and shell (D). Remove two washers (M) and "U" cup with a seal removal tool or small screwdriver. Discard spring and "U" cup.
7. Remove port adaptor (G), spring (H), ball (K) and o-ring seat (F). Discard spring, ball and o-ring seat. Remove and replace o-ring (E) with new one (lightly greased). Thoroughly clean valve body and inspect for scratches or nicks in the plunger bore.

8. Lightly grease and install new o-ring seat (F) and nylon ball (K) into the threaded end of the valve body. Insert new spring (H) into port adaptor (G) and assemble to body. Tighten 5.1 to 5.6 Nm (45 to 50 in-lbs).
9. Lightly grease "U" cup (L) and sandwich between two washers (M). Install with top or "U" facing into body. Tap on the top washer with a flat-head screwdriver to ensure proper alignment.
10. Re-install shell (D), brass bushing (C), spring (J) and poppet plunger (B). If shell or bushing are worn or damaged replace them from the body service kit.
11. Re-install end section and torque two phillips-head screws 1.5 to 2 Nm (13 to 18 in-lbs).
12. **Diaphragm Operated Valves** (Fig. F) – Lightly grease the diaphragm plunger o-ring (G) and install spring (K) and plunger/piston assembly into the diaphragm housing. Line up the diaphragm with the six screw holes and attach the cover, torquing screws 1.5 to 2 Nm (13 to 18 in-lbs).
13. **Button, Toggle and Plunger Operated Valves** (Figs. B, C & D) – Re-install panel mount nut (C). Re-install button (F) or toggle cap nut (E) as required.

Service Kits:

Poppet Valve Seal Kit (Contains all soft seals)	40411 8000
Body Service Kit (Contains bushings and shells for all valve styles)	40411 8005
Diaphragm Seal Kit (Contains diaphragm and o-rings)	41066 8000

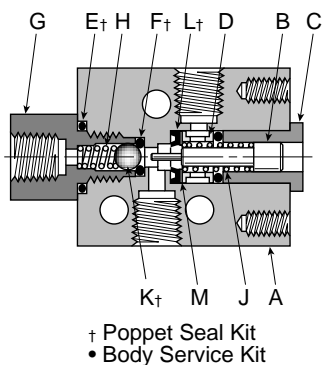


Figure A

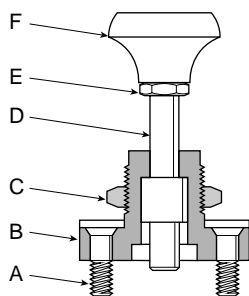


Figure B

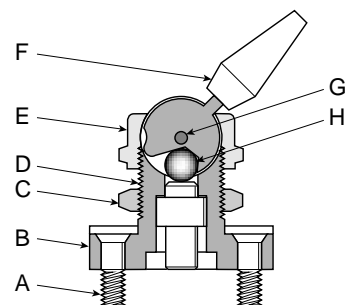


Figure C

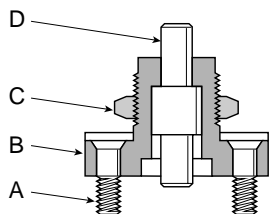


Figure D

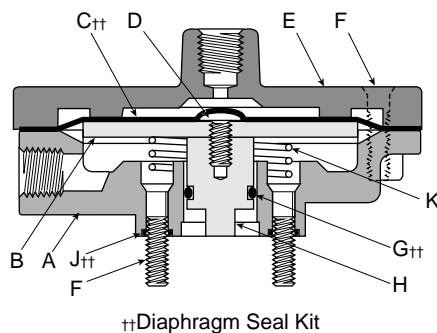
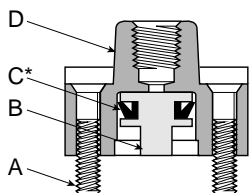


Figure E



* Poppet Valve Seal Kit

Figure F

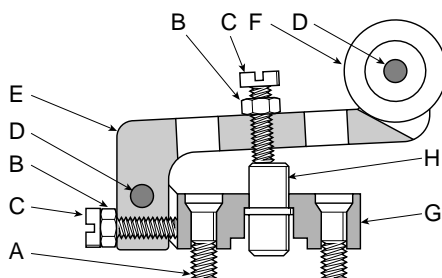


Figure G

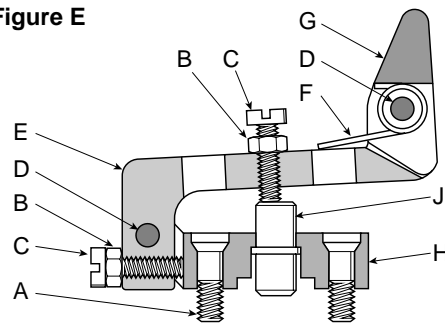


Figure H



Pneumatic Division
Richland, Michigan 49083

Installation & Service Instructions V-621BP

**41 Series Solenoid Operated
Spool Valves**

ISSUED: September, 2002

Supersedes: May, 2001

Doc. #V-621P, ECN# P28780 Rev. 6

WARNING

To avoid unpredictable system behavior that can cause personal injury and property damage:

- Disconnect electrical supply (when necessary) before installation, servicing, or conversion.
- Disconnect air supply and depressurize all air lines connected to this product before installation, servicing, or conversion.
- Operate within the manufacturer's specified pressure, temperature, and other conditions listed in these instructions.
- Medium must be moisture-free if ambient temperature is below freezing.
- Service according to procedures listed in these instructions.
- Installation, service, and conversion of these products must be performed by knowledgeable personnel who understand how pneumatic products are to be applied.
- After installation, servicing, or conversion, air and electrical supplies (when necessary) should be connected and the product tested for proper function and leakage. If audible leakage is present, or the product does not operate properly, do not put into use.
- Warnings and specifications on the product should not be covered by paint, etc. If masking is not possible, contact your local representative for replacement labels.

Application Limits:

These products are intended for use in general purpose compressed air systems only.

Operating Pressure Range:	kPa	PSIG	bar
Minimum* (Single Solenoid)	310	45	3.10
Minimum* (Double Solenoid or Solenoid / Pilot)	172	25	1.72
Maximum	1034	150	10.34

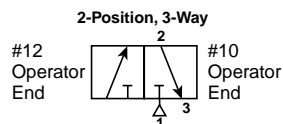
* For lower pressure or vacuum operation, solenoid(s) may be externally piloted (35 PSIG min.) following the conversion procedure in these instructions.

Operating Temperature Range: 0°C to 80°C (32°F to 175°F)

Voltage Range: +10 to -15% of rating

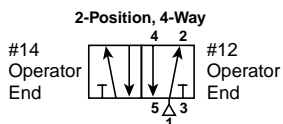
Port Identification / Connections:

Install valve in circuit per the following ANSI diagrams (ports marked on valve or subbase):



Port Identification

3-Way Service	
Port No.	Function
1	Inlet
2	Cylinder
3	Exhaust
10	Remote Pilot
12	Remote Pilot



Port Identification

4-Way Service	
Port No.	Function
1	Inlet
2	Cylinder
3	Exhaust
4	Cylinder
5	Exhaust
12	Remote Pilot
14	Remote Pilot

Function	Port No.				
	1	2	4	3	5
4-Way, Single Pressure	Inlet	Cyl.	Cyl.	Exh.	Exh.
4-Way, Dual Pressure	Exh.	Cyl.	Cyl.	Inlet 1	Inlet 2
3-Way, Normally Closed	Inlet	Cyl.	—	Exh.	—
3-Way, Normally Open	Exh.	Cyl.	—	Inlet	—
3-Way, Diverter	Out 1	Inlet	—	Out 2	—
3-Way, Selector	Inlet 1	Out	—	Inlet 2	—
2-Way, Normally Closed	Inlet	Out	—	Plug	—
2-Way, Normally Open	Plug	Out	—	Inlet	—

NOTE: All 2 & 3-Way functions may use 3-Way bodies (*14** ****). 4-Way bodies may be field converted to 2 & 3-Way functions by plugging ports.

Installation & Operating Instructions:

Valve should be installed with reasonable accessibility for service whenever possible – repair service kits are available. Keep pipe or tubing lengths to a minimum with inside clean and free of dirt and chips. Pipe joint compound should be used sparingly and applied only to the male pipe – never to the female port. Do not use PTFE tape to seal pipe joints – pieces have a tendency to break off and lodge inside the unit, possibly causing malfunction.

Air to valve must be filtered to realize maximum component life.

Caution: It is recommended that double solenoid and double remote air pilot operated valves be mounted so that the axis of the valve spool is in the horizontal plane. The valve may be rotated 360° around the axis for mounting convenience.

WARNING

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
41 Series Solenoid Operated Spool Valves

V-621BP

Life Expectancy – Normal multi-million cycle life expectancy of these valves is based on the use of properly filtered air at room temperature.

Lubrication – For maximum service life use clean, lubricated air. Valves are shipped pre-lubricated and can be operated without additional lubrication with reduced service life.

Recommended Lubricant – Use F422 oil. This oil is specially formulated to provide peak performance and maximum service life from all air operated equipment. Otherwise, use a straight paraffin base mineral oil of viscosity 100-200 SSU @ 100°F and an aniline point greater than 200°F.

 **Caution: DO NOT use synthetic, reconstituted, or oils with an alcohol content or detergent additive.**

Wiring Instructions – Solenoid operators are on the same end as depicted in the ANSI diagrams. Either wire may be “Hot”.

NOTE: In addition to above instructions, follow all requirements for local and national electrical codes.

Conversion Procedures:

Normally Closed 3-Way To Normally Open

1. Remove two phillips-head screws from each end section and detach.
2. While holding body assembly by the bushings, slide the spool out of the body assembly. Reverse the spool end-for-end and replace it in the body assembly.
3. Reassemble end sections to opposite ends of body from which they were removed. Tighten screws 1.5 to 2.0 Nm (13 to 18 in-lbs).

Internal To External Pilot

To operate solenoid valves below their minimum operating pressure, on vacuum, or dual pressure applications, the valve must be converted to external pilot as follows:

1. Remove 1/8" pipe plug and rubber disc from solenoid end(s).
2. Remove two phillips-head screws holding solenoid actuating end(s) to body.
3. Remove o-ring, now exposed, from counterbore in end of body and replace with rubber disc.
4. Reassemble solenoid end section(s) to body. Tighten screws 1.5 to 2.0 Nm (13 to 18 in-lbs).
5. Attach external pilot supply line(s) (35 PSIG min.) where the 1/8" pipe plug(s) were removed.

Solenoid Replacement Parts

Voltage & Frequency	Class B Coil 18" Leads	Operator Kit*
120V 60 Hz	K593158	41000 8115
24VDC	K593155	41000 8123

* Operator kit consists of plunger, o-ring, spring, plunger guide, housing & coil.

Service Kits:

Valve Seal Kit (Contains all seals found in 3 & 4-Way bodies, and all actuator styles) 41000 8000
Body Service Kit (Contains bushings, springs, retainers, and shells for all body styles) 41000 8005



Pneumatic Division
Richland, Michigan 49083

Service Instructions: V-622CP

41 Series Solenoid Operated
Spool Valves

ISSUED: September, 2002
Supersedes: December, 1999

Doc. #V-622P, ECN# P28780, Rev.5

! WARNING

To avoid unpredictable system behavior that can cause personal injury and property damage:

- Disconnect electrical supply (when necessary) before installation, servicing, or conversion.
- Disconnect air supply and depressurize all air lines connected to this product before installation, servicing, or conversion.
- Operate within the manufacturer's specified pressure, temperature, and other conditions listed in these instructions.
- Medium must be moisture-free if ambient temperature is below freezing.
- Service according to procedures listed in these instructions.
- Installation, service, and conversion of these products must be performed by knowledgeable personnel who understand how pneumatic products are to be applied.
- After installation, servicing, or conversion, air and electrical supplies (when necessary) should be connected and the product tested for proper function and leakage. If audible leakage is present, or the product does not operate properly, do not put into use.
- Warnings and specifications on the product should not be covered by paint, etc. If masking is not possible, contact your local representative for replacement labels.

Application Limits:

These products are intended for use in general purpose compressed air systems only.

Operating Pressure Range:	kPa	PSIG	bar
Minimum*			
(Single Solenoid)	310	45	3.10
Minimum*			
(Double Solenoid or Solenoid / Pilot)	172	25	1.72
Maximum	1034	150	10.34

* For lower pressure or vacuum operation, solenoid(s) may be externally piloted (35 PSIG min.) following the conversion procedure in these instructions.

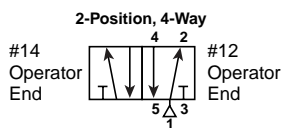
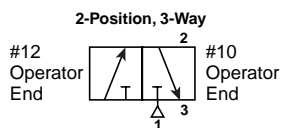
Operating Temperature Range: 0°C to 80°C (32°F to 175°F)

Voltage Range: +10% to -15% of Rating

Wiring Instructions:

Solenoid operators are on the same end as depicted on the ANSI diagrams. Either wire may be "Hot".

NOTE: In addition to above instructions, follow all requirements for local and national electrical codes.



Conversion Procedures:

Normally Closed 3-Way to Normally Open

1. Remove two Phillips-head screws from each end section and detach.
2. While holding body assembly by the bushings, slide the spool out of the body assembly. Reverse the spool end-for-end and replace it in body assembly.

3. Reassemble end sections to opposite ends of body from which they were removed. Tighten screws 1.5 to 2 Nm (13 to 18 in-lbs).

Internal to External Pilot

To operate solenoid valves below their minimum operating pressure, on vacuum, or for dual pressure applications, the valve must be converted to external pilot as follows:

1. Remove 1/8" pipe plug and rubber disc from solenoid end(s).
2. Remove two Phillips-head screws holding solenoid actuating end(s) to body.
3. Remove o-ring, now exposed, from counterbore in end of body and replace with rubber disc.
4. Reassemble solenoid end section(s) to body. Tighten screws 1.5 to 2 Nm (13 to 18 in-lbs).
5. Attach external pilot supply line(s) (35 PSIG min.) where the 1/8" pipe plug(s) were removed.

Service Procedures:

NOTE: All cleaning of parts to be done with mineral spirits or equivalent cleaning solution. Grease should be a PTFE based lubricant (Accrolube®). All parts showing nicks, scratches or other signs of wear or damage should be replaced.

1. Mark end sections to ensure re-assembly on the proper end. Remove two phillips-head screws from each end section and detach. Remove spring (where applicable).

REFER TO FIGURES A & B FOR STEPS 2 THROUGH 6.

2. Remove spool (**B**) and clean. Note which end spring bore in spool was on (where applicable).
3. Remove bushings (**C**). Use spool to remove o-rings (**E**) and shells (**D**). Discard o-rings. Clean bushings, shells and body.
4. Apply grease to the body bore and o-rings (**E**). Sandwich an o-ring between each shell and slide assembly into body bore. Insert another o-ring and a bushing into each end of body.
5. While holding body assembly by the bushings, slide spool into body (with spring bore on same end as prior to disassembly on spring return valves).

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41 Series, Solenoid Operated Spool Valves

V-622CP

- 6. Replace o-rings (F) and / or washer (H) found in ends of body. (Requires removal of Phillips-head screw on a spring return end section.) Thru hole in body requires an o-ring for internally piloted valves, a washer for externally piloted valves. A light coating of grease will ensure sealing/retention.
- 7. **Solenoid and Remote Pilot Return (Figs. C-D):** Remove the piston (B) with needlenose pliers. Remove lipseal (C) from piston and discard. Clean and inspect the bore. Replace end section if required. Replace lipseal with new seal (lightly coated with grease). Reassemble piston. Grooved end of lipseal and hollow end of piston must face bottom of bore.
- 8. Re-install end sections and torque two Phillips-head screws to 1.5 to 2.0 Nm (13 to 18 in-lbs). For spring return valves, install spring end first, followed by the operating end section. Hold the operating end section while torquing screws.

Solenoid Operator Service - Remove hex nut on top of operator. Separate the housing and coil assembly. Remove the flux washer. Remove the plunger guide, spring, o-ring and plunger. Clean all parts taking special care to remove all foreign matter from seat areas. Replace coil or entire operator. Assemble parts in reverse order of disassembly.

CHART A: Solenoid Replacement Parts (Conduit Style)

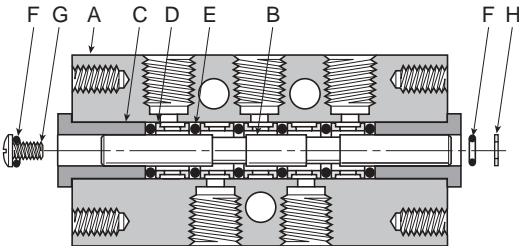
Voltage & Frequency	Class B Coil 18" Leads	Operator Kit*
120V 60 Hz	K593158	41000 8115
24VDC	K593155	41000 8123

* Operator kit consists of plunger, o-ring, spring, plunger guide, housing & coil.

Service Kits:

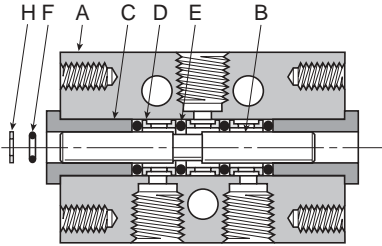
- Valve Seal Kit (Contains all seals found in 3 & 4-Way bodies and all actuator styles) 41000 8000
- Body Service Kit (Contains bushings, springs, retainers and shells for all body styles) 41000 8005

Figure A
4-Way Spool Valves



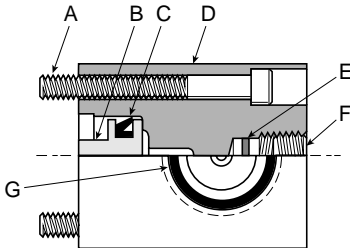
Item	Description
A	Body
B	Spool
C	Bushing
D	Shell
E	O-ring
F	O-ring
G	Screw
H	Washer

Figure B
3-Way Spool Valves



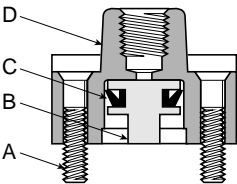
Key	Description
A	Body
B	Spool
C	Bushing
D	Shell
E	O-ring
F	O-ring
G	Screw
H	Washer

Figure C
41000 8001
Solenoid Actuator Assembly
Does not include solenoid operator.
See Chart A for operator kit



Item	Description
A	Screw
B	Piston
C	Lipseal
D	Solenoid Housing
E	Washer
F	Pipe Plug (1/8" NPTF)
G	O-ring

Figure D
41051 8001
Pilot Actuator Assembly



Item	Description
A	Screw
B	Piston
C	Lipseal
D	Pilot Housing



Pneumatic Division
Richland, Michigan 49083

Installation & Service Instructions:
V624BP

Directair 2 Manual / Mechanical
Spool Valves

ISSUED: September, 2006

Supersedes: August, 2000

Doc. #V-624P, ECN #060870, Rev. 7

WARNING

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- Disconnect electrical supply (when necessary) before installation, servicing, or conversion.
- Disconnect air supply and depressurize all air lines connected to this product before installation, servicing, or conversion.
- Operate within the manufacturer's specified pressure, temperature, and other conditions listed in these instructions.
- Medium must be moisture-free if ambient temperature is below freezing.
- Service according to procedures listed in these instructions.
- Installation, service, and conversion of these products must be performed by knowledgeable personnel who understand how pneumatic products are to be applied.
- After installation, servicing, or conversion, air and electrical supplies (when necessary) should be connected and the product tested for proper function and leakage. If audible leakage is present, or the product does not operate properly, do not put into use.
- Warnings and specifications on the product should not be covered by paint, etc. If masking is not possible, contact your local representative for replacement labels.

Safety Guide

For more complete information on recommended application guidelines, see the Safety Guide section of Pneumatic Division catalogs or you can download the **Pneumatic Division Safety Guide** at: www.parker.com/safety

Introduction

Follow these instructions when installing, operating or servicing the product.

Application Limits:

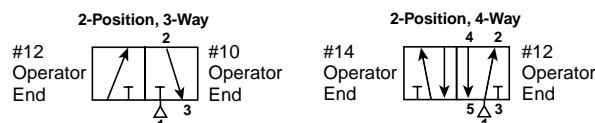
These products are intended for use in general purpose compressed air systems only.

Operating Pressure Range:	kPa	PSIG	bar
Minimum	Vac.	Vac.	Vac.
Maximum	1034	150	10.34
Pilot Pressure Range:	kPa	PSIG	bar
Minimum (Double Diaphragm)	14	2	0.14
Minimum (Diaphragm / Spring)	34	5	0.34
Minimum (Double Pilot)	172	25	1.72
Minimum (Pilot / Spring)	310	45	3.10
Maximum	1034	150	10.34

Operating Temperature Range: 0°C to 80°C (32°F to 175°F)

Port Identification / Connections:

Install valve in circuit per the following ANSI diagram (ports marked on valve):



Port Identification

3-Way Service

Port No.	Function
1	Inlet
2	Cylinder
3	Exhaust
10	Remote Pilot
12	Remote Pilot

Port Identification

4-Way Service

Port No.	Function
1	Inlet
2	Cylinder
3	Exhaust
4	Cylinder
5	Exhaust
12	Remote Pilot
14	Remote Pilot

Function	Port No.				
	1	2	4	3	5
4-Way, Single Pressure	Inlet	Cyl.	Cyl.	Exh.	Exh.
4-Way, Dual Pressure	Exh.	Cyl.	Cyl.	Inlet 1	Inlet 2
3-Way, Normally Closed	Inlet	Cyl.	—	Exh.	—
3-Way, Normally Open	Exh.	Cyl.	—	Inlet	—
3-Way, Diverter	Out 1	Inlet	—	Out 2	—
3-Way, Selector	Inlet 1	Out	—	Inlet 2	—
2-Way, Normally Closed	Inlet	Out	—	Plug	—
2-Way, Normally Open	Plug	Out	—	Inlet	—

NOTE: All 2 & 3-Way functions may use 3-Way bodies (414** ****). 4-Way bodies may be field converted to 2 & 3-Way functions by plugging ports.

Installation & Operating Instructions:

Valve should be installed with reasonable accessibility for service whenever possible – repair service kits are available. Keep pipe or tubing lengths to a minimum with inside clean and free of dirt and chips. Pipe joint compound should be used sparingly and applied only to the male pipe – never to the female port. Do not use PTFE tape to seal pipe joints – pieces have a tendency to break off and lodge inside the unit, possibly causing malfunction.

Air to the valve must be filtered to realize maximum component life.

Life Expectancy – Normal multi-million cycle life expectancy of these valves is based on the use of properly filtered air at room temperature.

Lubrication – For maximum service life use clean, lubricated air. Valves are shipped prelubricated and can be operated without additional lubrication with reduced service life.

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 systems 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.

The products described herein, including without limitation, product features, specifications, designs, availability and pricing, are subject to change by Parker Hannifin Corporation and its subsidiaries at any time without notice.

EXTRA COPIES OF THESE INSTRUCTIONS ARE AVAILABLE FOR INCLUSION IN EQUIPMENT / MAINTENANCE MANUALS THAT UTILIZE THESE PRODUCTS. CONTACT YOUR LOCAL REPRESENTATIVE.

Recommended Lubricant – Use F422 oil. This oil is specially formulated to provide peak performance and maximum service life from all air operated equipment. Otherwise, use a straight paraffin base mineral oil of viscosity 100-200 SSU @ 100°F and an aniline point greater than 200°F.

CAUTION: DO NOT use synthetic, reconstituted, or oils with an alcohol content or detergent additive.

Operator Adjustments:

For plumbing convenience, all operators may be rotated 180° by removing the two phillips-head screws retaining the operator section, separating the body and operator, rotating and reassembling the operator to the body. Torque screws 1.5 to 2.0 Nm (13 to 18 in-lbs).

Roller & One-Way Tripper Operators (Figs. K & L) have two adjustment screws used during set up. By loosening jam nut (B), adjustments can be made to screw (C) with a flat-head screwdriver. Adjusting the side screw changes the angle (height) of the cam. The top adjustment determines the point of cam travel at which the spool shifts. Both adjustments can be made to add or subtract “slop” or deadband and control valve timing.

Service Procedures:

USE SPOOL VALVE SEAL KIT 41000 8000.

NOTE: All cleaning of parts to be done with mineral spirits or equivalent cleaning solution. Grease should be a mineral based lubricant (Texaco Marfak MP-2). Replacement seals are found in spool valve seal kit unless otherwise noted. All parts showing nicks, scratches or other signs of wear or damage should be replaced.

1. Mark end sections to ensure re-assembly on the proper end.
2. **Button, Toggle and Plunger Operated Valves** (Figs. E, F & G) – Unscrew and remove button (F) or toggle cap nut (E) on button or toggle operated valves. Unscrew and remove panel mount nut (C).
3. **Diaphragm Operated Valves** (Fig. J) – Remove six phillips-head screws and separate diaphragm halves. The diaphragm (C) and o-ring (G) on diaphragm plunger may be replaced with new parts found in diaphragm seal kit.
4. Remove two phillips-head screws (A) from end section and detach. Remove spring (where applicable).

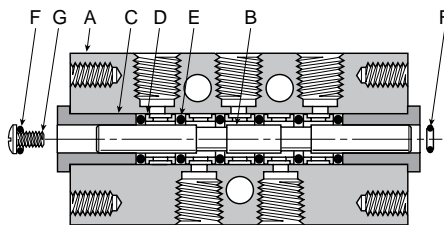


Figure A

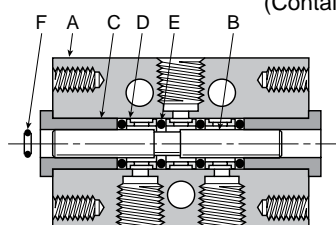


Figure B

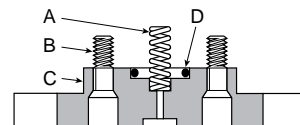


Figure C

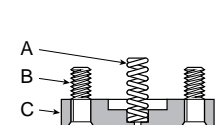


Figure D

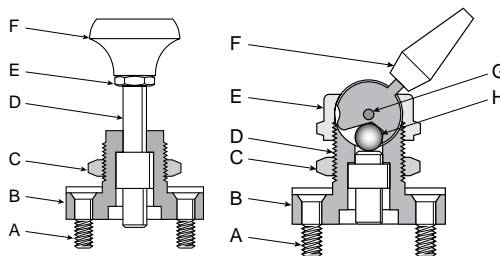


Figure E

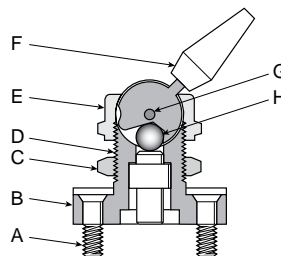


Figure F

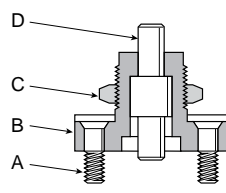


Figure G

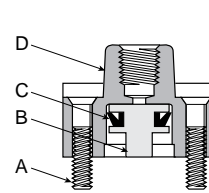


Figure H

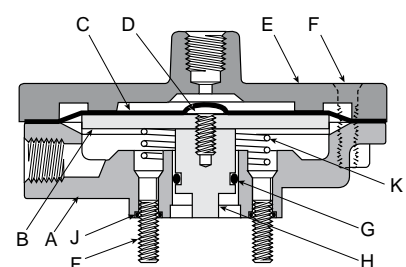


Figure J

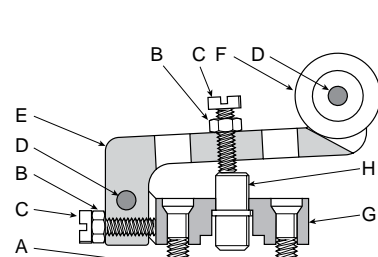


Figure K

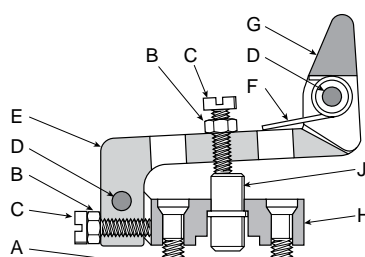


Figure L

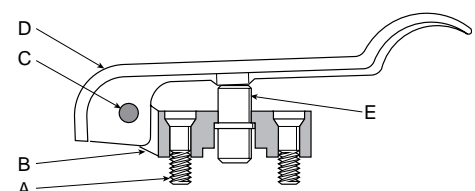


Figure M

5. Remove plunger from operator section and clean housing and plunger. For toggle operated valves (Fig. F) be careful not to lose ball (H).

REFER TO FIGURES A & B FOR STEPS 6 THROUGH 9.

6. Remove spool (B) and clean. Note which end spring bore in spool was on (where applicable).
7. Remove bushings (C). Use spool to remove o-rings (E) and shells (D). Discard o-rings. Clean bushings, shells and body.
8. Apply grease to the body bore and o-rings (E). Sandwich an o-ring between each shell and slide assembly into body bore. Insert another o-ring and a bushing into each end of body.
9. While holding body assembly by the bushings, slide spool into body (with spring bore on same end as prior to disassembly on spring return valves).
10. Remote Pilot Return End Sections (Fig. H) – Remove the piston (B) with needlenose pliers. Remove lipseal (A) on piston and discard. Clean and inspect the bore. Replace end section if required. Replace lipseal with new seal (lightly coated with grease). Reassemble piston. Grooved end of lipseal and hollow end of piston must face bottom of bore.
11. Foot Mount Spring Return Valves (Fig. C) – Remove o-ring (D) and replace with new one.
12. Re-install end sections and torque two phillips-head screws 1.5 to 2 Nm (13 to 18 in-lbs). For spring return valves, install spring end first, followed by the operating end section. Hold the operating end section down while torquing screws.
13. Diaphragm Operated Valves (Fig. J) – Lightly grease the diaphragm plunger o-ring (G) and install spring (K) and plunger / piston assembly into the diaphragm housing. Line up the diaphragm with the six screw holes and attach the cover, torquing screws 1.5 to 2.0 Nm (13 to 18 in-lbs).
14. Button, Toggle and Plunger Operated Valves (Figs. E, F & G) – Re-install panel mount nut (C). Re-install button (F) or toggle cap nut (E) as required.

Service Kits:

Spool Valve Seal Kit (Contains all soft seals for 3 & 4-Way valves, all actuator styles).....	41000 8000
Body Service Kit (Contains bushings and shells for all valve styles)	41000 8005
Diaphragm Seal Kit (Contains diaphragm and o-rings)	41066 8000



Pneumatic Division
Richland, Michigan 49083
269-629-5000

PDNSG-1

Pneumatic Division Safety Guide

ISSUED: August 1, 2006

Supersedes: June 1, 2006

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, ketones, esters or certain alcohols.
 - Do not use polycarbonate bowls or sight glasses in air systems where compressors are lubricated with fire resistant fluids such as phosphate ester and di-ester lubricants.

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

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

3. PRODUCT ASSEMBLY AND INSTALLATION INSTRUCTIONS

- 3.1. Component Inspection:** Prior to assembly or installation a careful examination of the valves, FRLs or vacuum products must be performed. All components must be checked for correct style, size, and catalog number. DO NOT use any component that displays any signs of nonconformance.
- 3.2. Installation Instructions:** Parker published Installation Instructions must be followed for installation of Parker valves, FRLs and vacuum components. These instructions are provided with every Parker valve or FRL sold, or by calling 1-800-CPARKER, or at www.parker.com.
- 3.3. Air Supply:** The air supply or control medium supplied to Valves, FRLs and Vacuum components must be moisture-free if ambient temperature can drop below freezing

4. VALVE AND FRL MAINTENANCE AND REPLACEMENT INSTRUCTIONS

- 4.1. Maintenance:** Even with proper selection and installation, valve, FRL and vacuum products service life may be significantly reduced without a continuing maintenance program. The severity of the application, risk potential from a component failure, and experience with any known failures in the application or in similar applications should determine the frequency of inspections and the servicing or replacement of Pneumatic Division products so that products are replaced before any failure occurs. A maintenance program must be established and followed by the user and, at minimum, must include instructions 4.2 through 4.10.
- 4.2. Installation and Service Instructions:** Before attempting to service or replace any worn or damaged parts consult the appropriate Service Bulletin for the valve or FRL in question for the appropriate practices to service the unit in question. These Service and Installation Instructions are provided with every Parker valve and FRL sold, or are available by calling 1-800-CPARKER, or by accessing the Parker web site at www.parker.com.
- 4.3. 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.