

Pneumatic Division

Richland, Michigan USA

www.parker.com/pneumatics**45 VALVE SERIES**

Document Number		Description
☐	V275CP	3-Position 4-Way 5-Ports, Installation & Service Instructions
☐	V280CP	2-Position 4-Way 5-Ports, Installation & Service Instructions
☐	V284CP	4530 "C" Installation & Service Instructions
☐	V321CP	Valve with Stem Operator, Installation & Service Instructions
☐	V476BP Rev. 6	4510 Sandwich Regulator, Installation & Service Instructions
☐	Safety Guide	PDN Safety Guide



Visit www.pdnplu.com for additional instruction sheets.



Pneumatic Division North America
Richland, Michigan 49083

Installation & Service Instructions V-275CP

451*, 452*, & 453* Series Valves, 3-Position,
4-Way, 5-Ports; Air & Solenoid Operators

ISSUED: September, 2000

Supersedes: December, 1995

ECN# P27805

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.

WARNING

This valve/base DOES NOT CONFORM TO THE CURRENT ISO 5599/2: 1990 mounting interface standard. ISO valves which DO CONFORM are available and are labeled Parker Model R2, R3, & R4 series valves. These 451*, 452*, & 453* valves may have incompatible wiring with the ISO valves, which have blue wires in their base. Base wiring may be reversed, resulting in unpredictable machine function that may cause injury, property damage, or death. Completely test the machine for correct function before using, and rewire if necessary. Call 1-800-272-7537 for special ISO Valve Service Bulletin No. VAL-SIF73.

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 (Inlet) Pressure Range:	kPa	psig	bar
Minimum*	280	40	2.8
Maximum	1030	150	10.3

* Minimum valve pressure may be 0 to 28 in. of Hg (vacuum) when using external pilot supply.

Ambient Temperature Range:

-18°C to 71°C (0°F to 160°F)

Voltage Range: Rated Voltage +10%, -15%

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 into 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.

Filtered and lubricated air is necessary for maximum valve life and minimum maintenance.

Factory Pre-Lubrication - All valves are pre-lubricated at assembly with a petroleum based grease.

Valves will operate when mounted in any position.

On single pressure dual exhaust models, pipe the supply air into port "1". On dual pressure common exhaust models, pipe the highest supply pressure into the port that has the highest pressure designation; this pressure must be at least 276 kPa (40 psig). (If this designation is unknown, note valve model number and consult factory.)

Cylinder speed can be controlled by restricting the exhaust port of these valves with a flow control.

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.

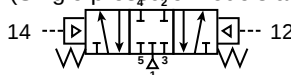
This document and other information from Parker Hannifin Corporation, its subsidiaries and authorized distributors provide product and/or system options for further investigation by users having technical expertise. It is important that you analyze all aspects of your application, including consequences 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.

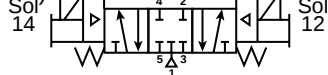
EXTRA COPIES OF THESE INSTRUCTIONS ARE AVAILABLE FOR INCLUSION IN EQUIPMENT / MAINTENANCE MANUALS THAT UTILIZE THESE PRODUCTS. CONTACT YOUR LOCAL REPRESENTATIVE.

Symbols

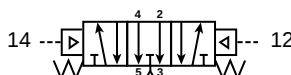
(Single pressure models are shown.)



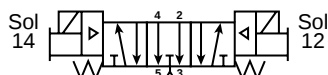
Double Air Operator
3-Position, 4-Way
All Ports Blocked *
Models: 4511, 4521, 4531



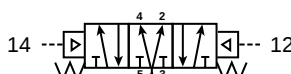
Double Solenoid
3-Position, 4-Way
All Ports Blocked *
Models: 4511, 4521, 4531



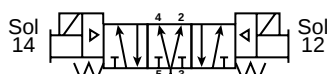
Double Air Operator
3-Position, 4-Way
Cylinder Ports Open to Exhaust *
Models: 4512, 4522, 4532



Double Solenoid
3-Position, 4-Way
Cylinder Ports Open to Exhaust *
Models: 4512, 4522, 4532



Double Air Operator
3-Position, 4-Way
Cylinder Ports Open to Pressure *
Models: 4513, 4523, 4533



Double Solenoid
3-Position, 4-Way
Cylinder Ports Open to Pressure *
Models: 4513, 4523, 4533

* Condition with spool in center position.

Service Procedures

⚠ Caution: Turn air and electrical supplies off before servicing unit.

Servicing *Plunger Type* Solenoid Operators:

For ease of repair, remove the operator and solenoid as an assembly by removing the two mounting screws which attach the operator and adapter to the valve body. Remove the two mounting screws which secure the solenoid to the operator. Then remove the topseat/sleeve/plunger, o-rings, and return spring.

⚠ Caution: Do not discard the above items if you are replacing the coil only.

Replace the old parts with new parts from the service kit. Lightly lubricate the o-rings with grease (supplied with the service kit). Assembly is the reverse of disassembly. Refer to Figure 1 for guidance. Tighten the operator mounting screws from 4.5 to 5.6 Nm (40 to 50 in-lbs) of torque. Tighten the solenoid mounting screws from 1.1 to 1.4 Nm (10 to 12 in-lbs) of torque. Then open the air supply and energize the solenoid to check if the valve still functions properly, and to insure that there is not any air leakage.

Servicing Valve Body

Remove the pilot body assembly and the operator adapter from the body. Remove the pilot piston, seals, stem centering spring, center rod, sleeves, end spacers, and spool. Remove bore seals and spacers by inserting a 1/4 inch hex wrench through the slotted holes in the bottom of the valve body and prying against the edge of the spacer until the seal pops loose. (Remove each seal and spacer individually.) Repeat this operation until all seals and spacers are removed.

Note: This is best accomplished by disassembling from both ends of the valve body.

Clean off the old grease from the valve body, spacers, pilot piston, and other parts which are to be reinstalled into the valve. Using the grease packet supplied in the service kit,

lubricate the new seals and spool's seals. Assembly is the reverse of disassembly. Tighten the mounting screws for the pilot assembly from 4.5 to 5.6 Nm (40 to 50 in-lbs) of torque. Tighten the cover mounting screws from 1.0 to 1.2 Nm (9 to 11 in-lbs). Replace the body assembly on the base. Torque these mounting screws from 13.0 to 14.7 Nm (115 to 130 in-lbs) for 451* units and from 25.4 to 28.2 Nm (225 to 250 in-lbs) for 452* and 453* units.

If you have questions concerning how to service this unit, contact your local authorized dealer or your customer service representative.

Field Conversions

These valves can be converted in the field from internal pilot supply to external pilot supply or from single pressure to dual pressure - highest pressure at port #5 (276 kPa/40 psig minimum). These conversions are easily accomplished by changing the body to base gasket. In the 3-position valve, the effect of dual pressure is extremely important when the valve is in the center position. Therefore care should be used when selecting the proper 3-position valve configuration.

To obtain the desired configuration, replace the standard gasket with the appropriate gasket from the following chart:

⚠ Caution: When installing gaskets, always orient gasket as indicated on the gasket.

External pilot supply conversion (single or dual pressure valves):

Model Number	Gasket Part Number	
	Solenoid Operator(s)	Air Operator(s)
451*	P00271D	P00273D
452*	P00445	P00447
453*	P00149	P00151

Dual pressure conversion (highest pressure at port #5 - internal pilot supply):

Model Number	Gasket Part Number
	Solenoid Operator(s)
451*	P00275
452*	P00449
453*	P00153

Maintenance & Trouble Shooting Hints

Valve not shifting completely when energized:

1. Check to insure that the proper voltage is supplied to the solenoids.
2. Check to insure that supply pressure is 276 kPa (40 psig) or greater at the valve's inlet when shifting valve.
3. Check for possible restrictions in air supply, such as undersized hoses, fittings, or quick disconnects.
4. Check to insure that the spool moves smoothly.
5. Check spool seals for proper installation, dirt, or damage.

Air Leakage Through Exhaust Ports:

1. Check for internal leak in the cylinder being operated by the valve.
2. Check condition of the spool seals for proper alignment, damaged (nicked or broken) seals and dirt contamination.
3. Check condition of the rubber seals on both ends of the solenoid plunger and their mating orifices in the solenoid adapter and topseat assembly.

451*, 452*, & 453* Series Valves

4. Check for missing, damaged, or incorrectly assembled o-rings and gaskets.

Noisy Solenoids:

1. Check to insure that voltage and pressure supplies are adequate.
2. Inspect topseat and plunger for nicked and damaged mating surfaces, dirt, and damaged topseat and plunger sleeve o-rings.

Replace worn or damaged parts. Reassemble and retest unit.

Service Kits Available

Valve Body Service Kit - **451*** **452*** **453***
Single Air & Single Solenoid: PS1234P PS1303P PS1438P
(consists of items #1, 3, 9, 11, 14, 25, 28, 29, & 38)

Solenoid Service Kit - **451*** **452*** **453***
Plunger Solenoid Operators: PS1418P PS1418P PS1418P
(consists of items #16, 18, 19, 20, 21, & 22)

Note: Two kits are required to service a double solenoid valve.

Parts Identification List

Item #	Description
1	End Bumper Seal
2	Adapter
3	Gasket - adapter to body (has a tab with an "P" on it)
4	Body
5	Gasket - body to base
6	Spool
7	Subbase
8	Spacer

9	Seals for spool
10	End Spacer
11	Small O-ring - pilot piston to stem
12	Sleeve
13	Pilot Piston
14	Large O-ring - pilot piston to sleeve
15	Manual Override (solenoid operator)
16	Topseat/Plunger Sleeve Assembly
17	Solenoid Coil
18	Mounting Screw - solenoid coil to solenoid base
19	Solenoid Plunger Assembly
20	O-ring - plunger sleeve assembly to coil
21	Return Spring - solenoid plunger
22	Gasket - solenoid coil to solenoid base
23	Solenoid Operator (with override)
24	Solenoid Base
25	Gasket - solenoid base or air operator to adapter (has a tab without any letter on it)
26	Adapter
27	Centering Stem
28	Spring for centering stem
29	Retaining Ring for centering stem
30	Wiring Harness
31	Ground Screw (green color)
32	Terminal Insulator
33	Electrical Connectors
34	Cover
35	Mounting Screw - cover to body
36	Gasket - cover to body
37	Solenoid Operator (without override)
38	Mounting Screw - air or solenoid operators & adapter to body
39	Air operator

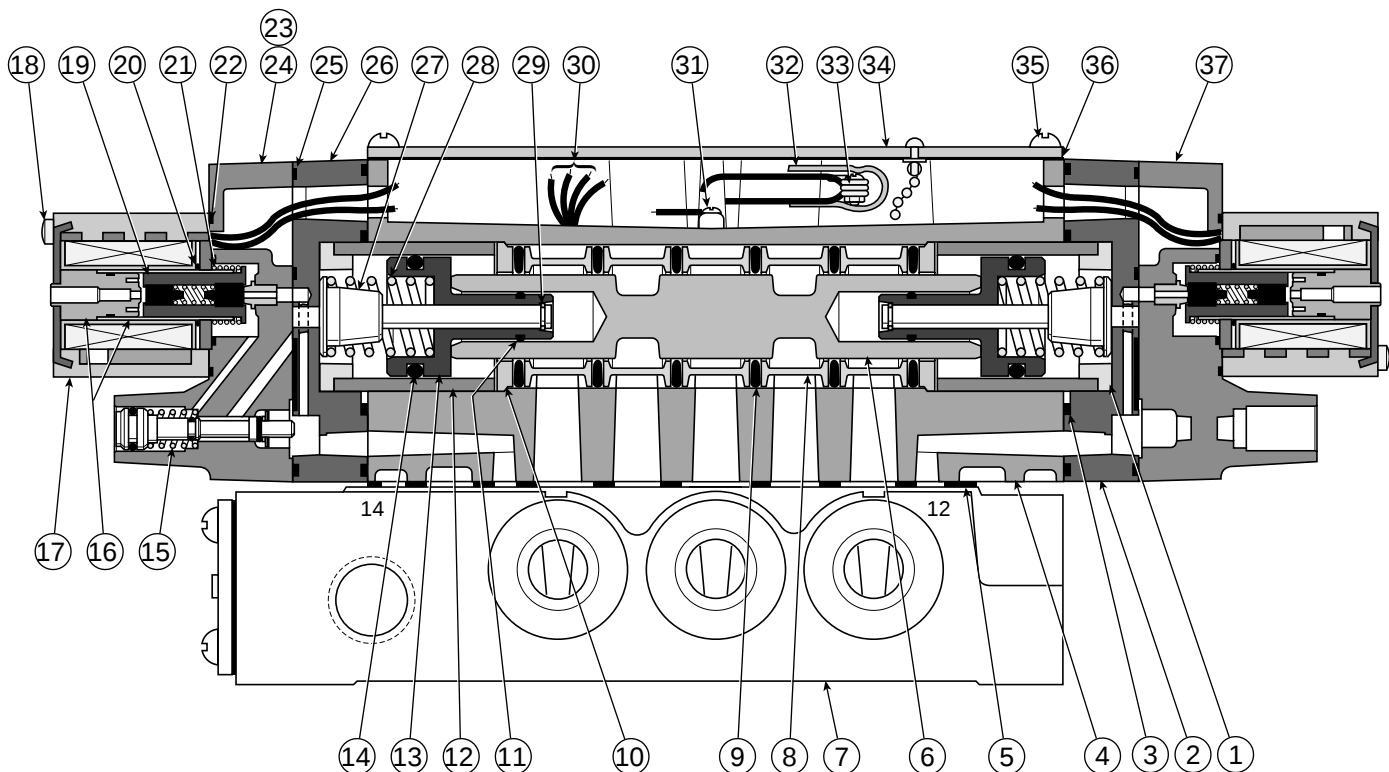


Figure 1: Double Solenoid Operators (plunger type)

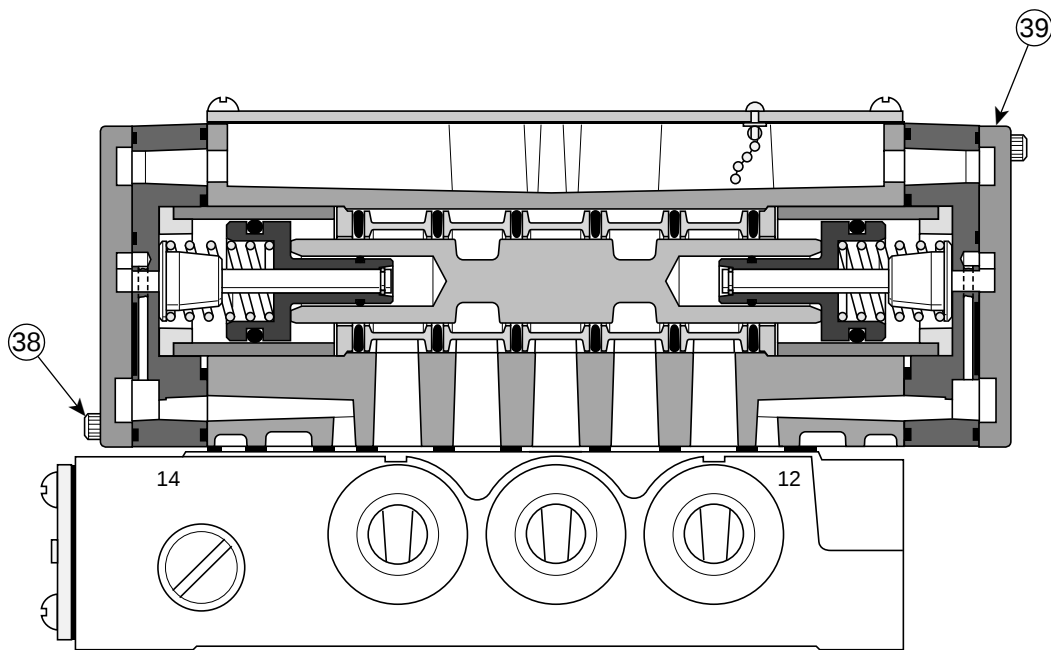


Figure 2: Double Air Operators



Pneumatic Division North America
Richland, Michigan 49083

Installation & Service Instructions V-280CP

4510, 4520, & 4530 Series Valves, 2-Position,
4-Way, 5-Ports; Air & Solenoid Operators

ISSUED: September, 2000

Supersedes: December, 1995

ECN# P27805

WARNING

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- 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.

WARNING

This valve/base DOES NOT CONFORM TO THE CURRENT ISO 5599/2: 1990 mounting interface standard. ISO valves which DO CONFORM are available and are labeled Parker Model R2, R3, & R4. These 4510, 20, & 30 valves may have incompatible wiring with the ISO valves, which have blue wires in their base. Base wiring may be reversed, resulting in unpredictable machine function that may cause injury, property damage, or death. Completely test the machine for correct function before using, and rewire if necessary. Call 1-800-272-7537 for special ISO Valve Service Bulletin No. VAL-SIF73.

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 (Inlet) Pressure Range:	kPa	psig	bar
Minimum*	280	40	2.8
Maximum	1030	150	10.3

* Minimum valve pressure may be 0-28 in. of Hg (vacuum) when using external pilot supply.

Ambient Temperature Range: -18°C to 71°C (0°F to 160°F)

Voltage Range: Rated voltage +10%, -15%

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 into 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.

Filtered and lubricated air is necessary for maximum valve life and minimum maintenance.

Factory Pre-Lubrication

All valves are pre-lubricated at assembly with a petroleum based grease.

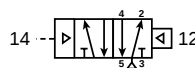
Valves will operate when mounted in any position.

On single pressure dual exhaust models, pipe the supply air into port "1". On dual pressure common exhaust models, pipe the highest supply pressure into the port that has the highest pressure designation; this pressure must be at least 276 kPa (40 psig). (If this designation is unknown, note valve model number and consult factory.)

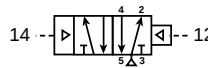
Cylinder speed can be controlled by restricting the exhaust port of these valves with a flow control.

Symbols

(Single pressure models are shown.)



Single Air Operator - Air Return
2-Position, 4-Way



Double Air Operator
2-Position, 4-Way



Sol 14 Single Solenoid - Air Return
2-Position, 4-Way



Sol 14 Double Solenoid
2-Position, 4-Way

WARNING

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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.

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Service Procedures

⚠ Caution: Turn air and electrical supplies off before servicing unit.

Servicing Valve Body

To service the valve body assembly, use the following procedure:

Remove valve body assembly from base. Then remove the operator assembly and adapter (or air return operator) from both ends of the body. For solenoid operators, disconnect the solenoid leads. These are located underneath the top cover. Remove bore seals and spacers by inserting a 1/4 inch hex wrench through the slotted holes in the bottom of the valve body and prying against the edge of the spacer until the seal pops loose. (Remove each seal and spacer individually.) Repeat this operation until all seals and spacers are removed.

Note: This is best accomplished by disassembling from both ends of the valve body.

Clean off the old grease from the valve body, spacers, pilot piston, and other parts which are to be reinstalled into the valve. Using the grease packet supplied in the service kit, lubricate the new seals and the spool. Assembly is the reverse of disassembly. Tighten the mounting screws for the pilot assembly (or air return operator) from 4.5 to 5.6 Nm (40 to 50 in-lbs.) of torque. Replace the body assembly on the base. Torque these mounting screws from 13.0 to 14.7 Nm (115 to 130 in-lbs.) for 4510 units and from 25.4 to 28.2 Nm (225 to 250 in-lbs.) for 4520 and 4530 units.

Servicing Solenoid

To service one or both of the solenoid assemblies, use the following procedure:

For ease of repair, remove the operator and solenoid as an assembly by removing the two mounting screws which attach the operator and adapter to the valve body. Remove the two mounting screws which secure the solenoid to the operator. Then remove the topseat/sleeve/plunger, o-rings, and return spring.

⚠ Caution: Do not discard the above items if you are replacing the coil only.

Replace the old parts with new parts from the service kit. Lightly lubricate the o-rings with grease (supplied with the service kit). Assembly is the reverse of disassembly. Refer to the appropriate valve figure for guidance. Tighten the operator/air return mounting screws from 4.5 to 5.6 Nm (40 to 50 in-lbs.) or torque. Tighten the solenoid mounting screws from 1.1 to 1.4 Nm (10 to 12 in-lbs.) of torque. Then open the air supply and energize the solenoid to check if the valve still functions properly, and to insure that there is not any air leakage.

If you have questions concerning how to service this unit, contact your local authorized dealer or your customer service representative.

Field Conversions

These valves can be converted in the field from internal pilot supply to external pilot supply or from single pressure to dual pressure - highest pressure at port #5 (40 psig minimum). These conversions are easily accomplished by changing the body to base gasket.

To obtain the desired configuration, replace the standard gasket (item #6) with the appropriate gasket from the following chart:

⚠ Caution: When installing gaskets, always orient gasket as indicated on the gasket.

External pilot supply conversion (single or dual pressure valves):

Model Number	Gasket Part Number Solenoid Operator(s)	Air Operator(s)
4510	P00271D	P00273D
4520	P00445	P00447
4530	P00149	P00151

Dual pressure conversion (highest pressure at port #5 - internal pilot supply):

Model Number	Gasket Part Number Solenoid Operator(s)	Air Operator(s)
4510	P00275D	P00280D
4520	P00449	P00454
4530	P00153	P00158

Maintenance & Troubleshooting Hints

Valve not shifting completely when energized:

1. Check to insure that the proper voltage is supplied to the solenoids.
2. Check to insure that supply pressure is 276 kPa (40 psig) or greater at the valve's inlet when shifting valve.
3. Check for possible restrictions in air supply, such as undersized hoses, fittings, or quick disconnects.
4. Check to insure that the spool moves smoothly.
5. Check spool seals for proper installation, dirt, or damage.

Air Leakage Through Exhaust Ports:

1. Check for internal leak in the cylinder being operated by the valve.
2. Check condition of the spool seals for proper alignment, damaged (nicked or broken) seals and dirt contamination.
3. Check condition of the rubber seals on both ends of the solenoid plunger and their mating orifices in the solenoid adapter and top seat assembly.
4. Check for missing, damaged, or incorrectly assembled o-rings and gaskets.

Noisy Solenoids:

1. Check to insure that voltage and pressure supplies are adequate.
2. Inspect topseat and plunger for nicked and damaged mating surfaces, dirt, and damaged topseat and plunger sleeve o-rings.

Replace worn or damaged parts. Reassemble and retest unit.

Service Kits Available

Valve Body Service Kit - **4510** **4520** **4530**

Single Air & Single Solenoid: PS1201P PS1301P PS1401P
(consists of items #1, 2, 4, 10, 14, 15, 26, 28, & 38)

Valve Body Service Kit - **4510** **4520** **4530**

Double Air & Double Solenoid: PS1202PPS1302P PS1402P
(consists of items #10, 14, 15, 26, 28, & 38)

Solenoid Service Kit - **4510** **4520** **4530**
PS1418P PS1418P PS1418P

(consists of items #17, 19, 20, 21, 22, & 23)

Note: Two kits are required to service a double solenoid valve.

Parts Identification List

Item # Description

1	Mounting Screw - air return to body	10	Seals for spool
2	End Bumper Seal for air return	11	End Spacer
3	Air return	12	Sleeve
4	Gasket - body to air return (has a tab with an "A" on it)	13	Pilot Piston
5	Body	14	O-ring for piston
6	Gasket - body to base	15	End Bumper Seal for solenoid or air operator
7	Spool	16	Manual Override (solenoid operator)
8	Subbase	17	Topseat/Plunger Sleeve Assembly
9	Spacer	18	Solenoid Coil
		19	Mounting Screw - solenoid coil to solenoid base
		20	Solenoid Plunger Assembly
		21	O-ring - plunger sleeve assembly to coil

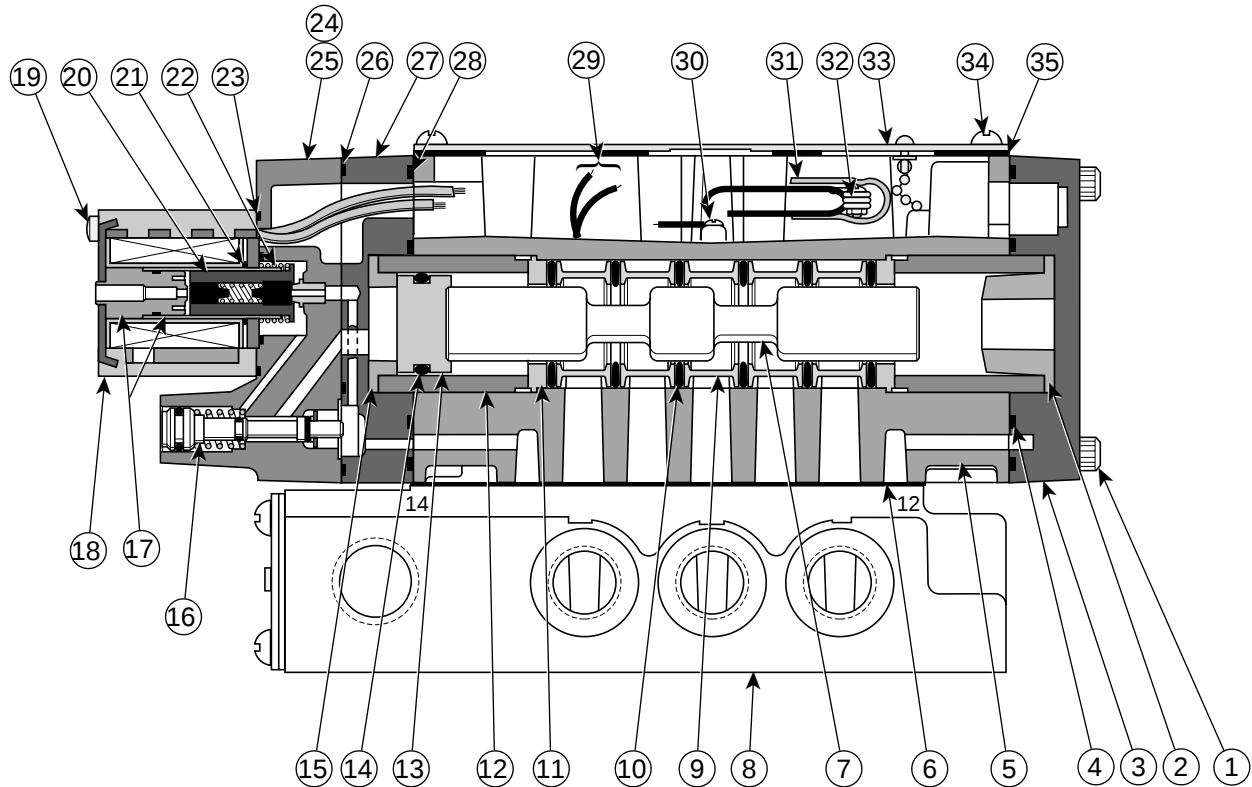


Figure 1: Single Solenoid Operator - air return (plunger type solenoid)

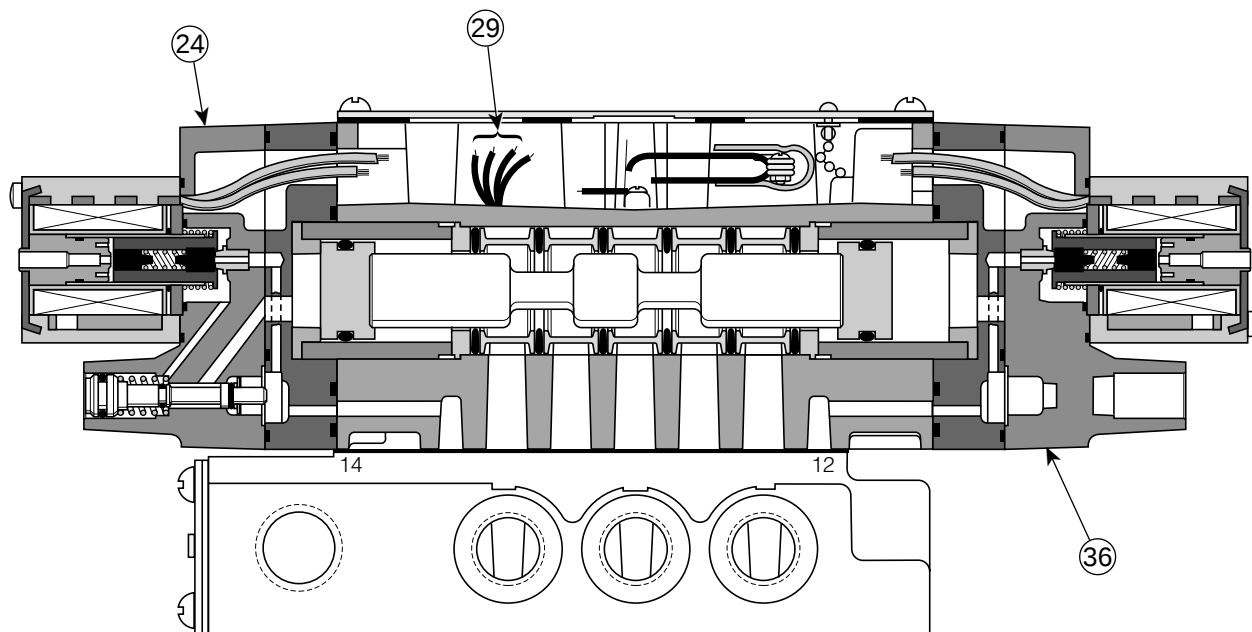


Figure 2: Double Solenoid Operators (plunger type)

22	Return Spring - Solenoid plunger	31	Terminal Insulator
23	Gasket - solenoid coil to solenoid base	32	Electrical Connectors
24	Solenoid Operator (with override)	33	Cover
25	Solenoid Base	34	Mounting Screw - cover to body
26	Gasket - solenoid base or air operator to adapter (has a tab without any letter on it)	35	Gasket - cover to body
27	Adapter	36	Solenoid Operator (without override)
28	Gasket - adapter to body (has a tab with a "P" on it)	37	Air operator
29	Wiring Harness	38	Mounting Screw - air operator or solenoid operator & adapter to body
30	Ground Screw (green color)	39	Mounting Screw - body to base (not shown)

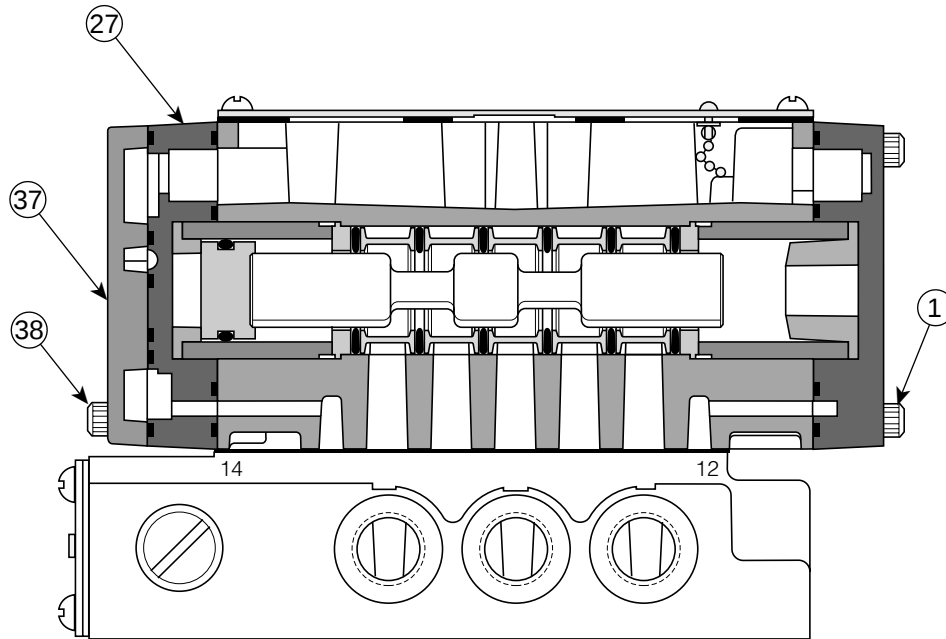


Figure 3: Single Air Operator - air return

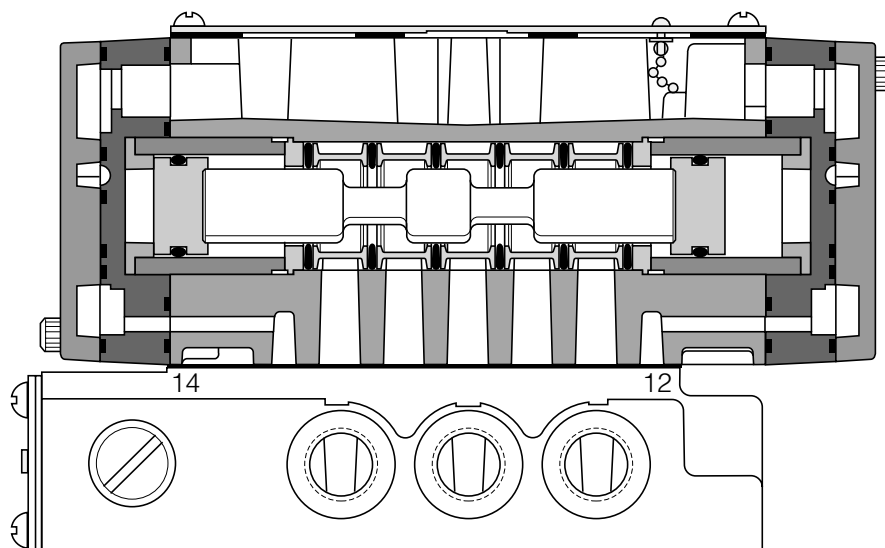


Figure 4: Double Air Operators



Pneumatic Division North America
Richland, Michigan 49083

Installation & Service Instructions
V-284BP

4530C Series Valves
2-Position, 4-Way, 5-Ports &
3-Position, 4-Way, 5-Ports

ISSUED: September, 2000

Supersedes: May, 1998

ECN# P27805

WARNING

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Application Limits

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

Operating Pressure Range:

	kPa	psig	bar
Minimum	280	40	2.8
Maximum	1030	150	10.3

Ambient Temperature Range: -15°C to 50°C (5°F to 120°F)

Voltage Range: Rated Voltage +10%, -15%

Installation & Operating Instructions

CAUTION: Solenoid versions of this valve contain solid state components that can be damaged by transient voltage spikes, over-voltage or high temperature. To protect against premature solenoid failure, please read and adhere to the following:

1. If this solenoid operated valve is used in a circuit with other inductive loads, the solenoid should be electrically protected with a voltage suppression device (e.g. transient voltage suppressor or varistor) that has a minimum rating of 1.6 times the rated voltage of the solenoid valve and sufficient capacity to dissipate the energy of other inductive loads.
2. Operating voltage is 85-110% of rated voltage. These limits should not be exceeded.

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.

Valves will operate when mounted in any position.

Lubrication

All valves are pre-lubricated at assembly with a petroleum based grease. Filtered and lubricated air is necessary for maximum valve life and minimum maintenance. If in-service lubrication is used, lubricants should be a straight paraffin based mineral oil having an ISO viscosity grade of 32 (e.g. Sunvis 932).

NOTE: Once in-service lubrication is initiated, the practice should be continued in order to maximize valve life.

 **CAUTION:** Do not use synthetic, reconstituted, or oils with an alcohol content or detergent additives.

WARNING

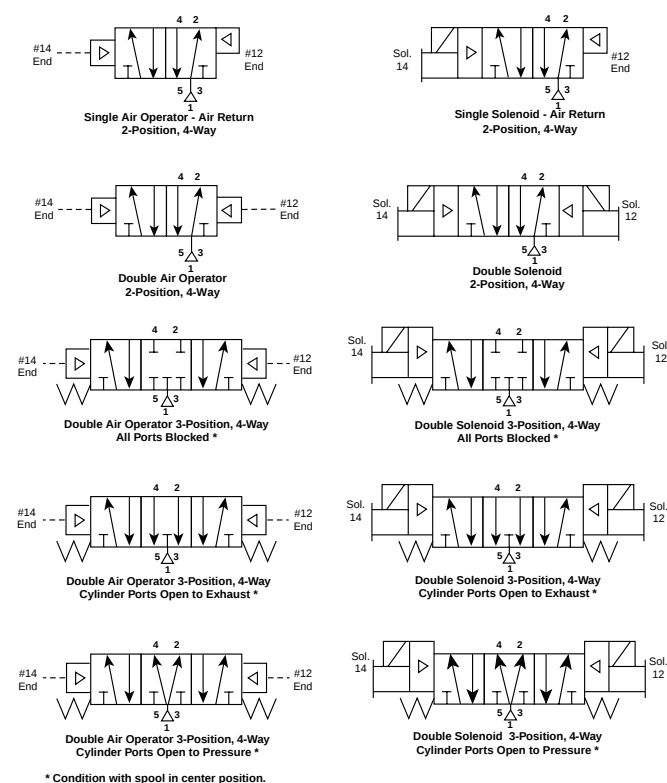
FAILURE OR IMPROPER SELECTION OR IMPROPER USE OF THE PRODUCTS AND/OR SYSTEMS DESCRIBED HEREIN OR RELATED ITEMS CAN CAUSE DEATH, PERSONAL INJURY AND PROPERTY DAMAGE.

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.

Symbols (Single pressure models are shown.)



Field Conversions

These valves can be converted in the field from internal pilot supply to external pilot supply or from single pressure to dual pressure - highest pressure at port #5 (40 psig minimum). These conversions are easily accomplished by changing the body to base gasket. In the 3-position valve, the effect of dual pressure is extremely important when the valve is in the center position. Therefore care should be used when selecting the proper 3-position valve configuration.

To obtain the desired configuration, replace the standard gasket with the appropriate gasket from the following chart:

CAUTION: When installing gaskets, always orient gasket as indicated on the gasket.

External pilot supply conversion
(single or dual pressure valves):

Model Number	Gasket Part Number	
	Solenoid Operators	Air Operators
4530C	P00149	P00151

Dual pressure conversion
(highest pressure at port #5 - internal pilot supply):

Model Number	Gasket Part Number	
	Solenoid Operators	Single Air Operator (2-Position Valve only)
4530C	P00153	P00158

Maintenance & Troubleshooting Hints

Valve Not Shifting Completely When Energized:

1. Check to insure that the proper voltage is supplied to the solenoids.
2. Check to insure that supply pressure is 280 kPa (40 psig) or greater at the valve's inlet when shifting valve.
3. Check for possible restrictions in air supply, such as undersized hoses, fittings, or quick disconnects.
4. Check to insure that the spool moves smoothly.
5. Check spool seals for proper installation, dirt, or damage.

Air Leakage Through Exhaust Ports:

1. Check for internal leakage in the cylinder being operated by the valve.
2. Check condition of the spool seals for proper alignment, damaged (nicked or broken) seals and dirt contamination.
3. Inspect the solenoid plunger guide, plunger, spring, and seat (as well as their mating parts) for dirt, nicks, or damage.
4. Check for missing, damaged, or incorrectly assembled o-rings and gaskets.

Noisy Solenoids:

1. Check to insure that voltage and pressure supplies are adequate.
2. Inspect the plunger guide, plunger, spring, and seat (as well as their mating parts) for dirt, nicks, or damage.
3. Replace worn or damaged parts. Reassemble and retest unit.

If you have questions concerning how to service this unit, contact your local authorized dealer or your customer service representative.

Service Kits Available

Valve Body Service Kit - 2-Position

Single Solenoid and Single Air Operator: PS1401P
(consists of item #s 1, 2, 4, 10, 14, 15, 24, 26, 29)

Double Solenoid and Double Air Operator: PS1402P
(consists of item #s 10, 14, 15, 24, 26, 29)

Valve Body Service Kit - 3-Position

Double Solenoid and Double Air Operators: PS1438P
(consists of item #s 10, 14, 15, 24, 26, 29, 31)

Service Procedures

CAUTION: Turn air and electrical supplies off before servicing unit.

NOTE: When servicing valves equipped with solenoid(s) (Item #18 only), note that the adapter blocks are permanently wired to the body. Handle the disassembled valve with care to avoid damage to the wire harness and solenoid adapter blocks.

Servicing Valve Body:

1. If necessary, remove valve body assembly from base. Then detach solenoid coil(s).
2. Remove the solenoid adapter block(s) and the return end cap (if present). Then remove pistons (piston assemblies), piston seals, and spool.
3. Remove bore seals and spacers by inserting a 1/4 inch hex wrench through the slotted holes in the bottom of the valve body and prying against the edge of the spacer until the seal pops loose. (Remove each seal and spacer individually.) Repeat this operation until all seals and spacers are removed.

NOTE: This is best accomplished by disassembling from both ends of the valve body.

4. Clean off the old grease from the valve body, spacers, pilot piston(s) (or piston assemblies), and other parts which are to be reinstalled into the valve. Using the grease packet supplied in the service kit, lubricate the new seals and the spool. Assembly is the reverse of disassembly. Take special care to assure that the gasket(s) have been positioned properly. Tighten the mounting screws for the pilot assembly (or air return operator) from 40 to 50 in-lbs. (4.5 to 5.6 Nm) of torque. Replace the body assembly on the base. Torque these mounting screws from 225 to 250 in-lbs. (25.4 to 28.2 Nm). Then screw nut onto plunger guide and torque from 30 to 40 in-lbs. (3.4 to 4.5 Nm).

Servicing Solenoid Coil:

1. Remove nut (Item #19) which secures solenoid coil in place. Slide coil off of the plunger guide.
2. Slide new encapsulated coil onto plunger guide.
3. Then screw nut onto plunger guide and torque from 30 to 40 in-lbs. (3.4 to 4.5 Nm).

Voltage Code & Replacement Coil Kits

Voltage Code	Voltage			Coil Kit Number	
	60 Hz	50Hz	DC	With Indicator Light	Unlighted
42	24	—	—	—	K252 031
43	—	24	—	—	K252 032
45	—	—	12	—	K252 032
49	—	—	24	K252 033	K252 034
51	—	—	48	—	K252 035
53	120	110	—	K252 036	K252 037
57	240	—	—	—	K252 038
59	—	240	—	—	K252 039

Servicing Plunger Assembly:

1. Remove the nut (Item #19) which secures the solenoid coil to the plunger guide assembly. Then slide coil off of the plunger guide. Unscrew the plunger guide and remove plunger, spring, and o-ring (Item #21).
2. Using a clean, lint free cloth, clean plunger guide, plunger, spring, and seat (which is permanently mounted in the adapter block). Replace plunger guide assembly if necessary.

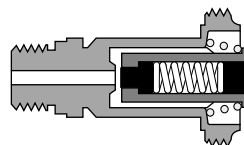
3. Grease o-ring and place at bottom of threaded bore. Very lightly grease plunger. Reassemble plunger and spring into plunger guide. Screw plunger guide into adapter block and torque from 50 to 60 in-lbs (5.6 to 6.8 Nm).
4. Slide coil onto plunger guide and then screw nut onto plunger guide and torque from 30 to 40 in-lbs (3.4 to 4.5 Nm).

Plunger & Guide Assembly

(Includes Plunger, Plunger Guide and Spring)

K232 025

Standard Voltages



Manual Override Service:

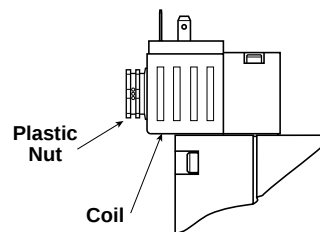
Use PS1825P Service Kit for non-locking override.

Use PS1826P Service Kit for locking override

1. Remove retainer (Item #17) with 1/4" hex key. Withdraw override stem (Item #16) with seals and spring (Item #22). Discard parts.
2. Inspect and remove any debris from the override hole in the solenoid block (Item #25).
3. From new kit, place spring in hole.
4. Seals on stem must be greased. Install stem (with greased seals) in hole.
5. Install threaded retainer in hole. Tighten to 40 to 50 in-lbs. (4.5 to 5.6 Nm).

Servicing Solenoid Coil: (22mm - 30mm CNOMO)

1. Remove plastic retaining nut which secures coil in place. Slide coil off stem.
2. Slide new coil onto existing stem and reinstall plastic retaining nut and tighten to hand tight.

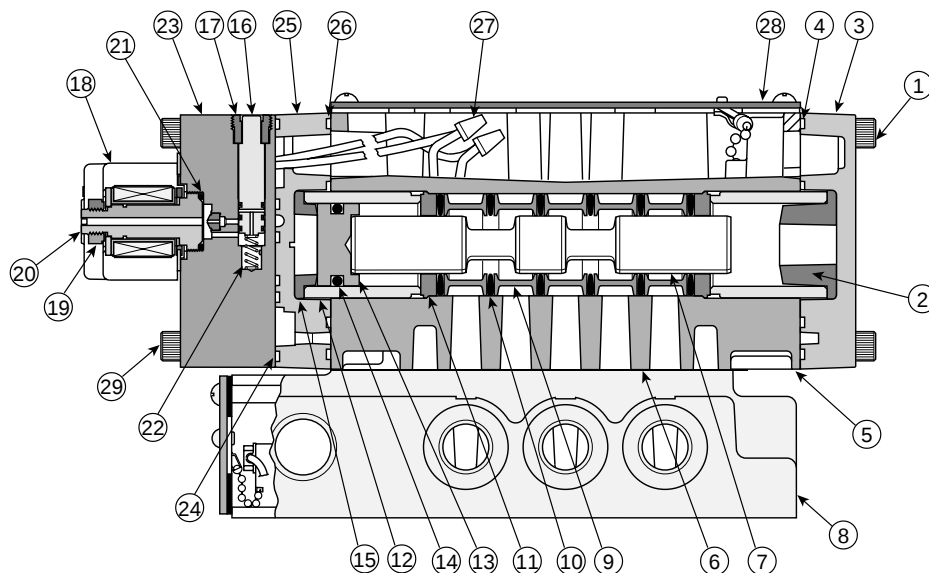


Voltage Code & Replacement Coil Kits (22mm-30mm CNOMO)

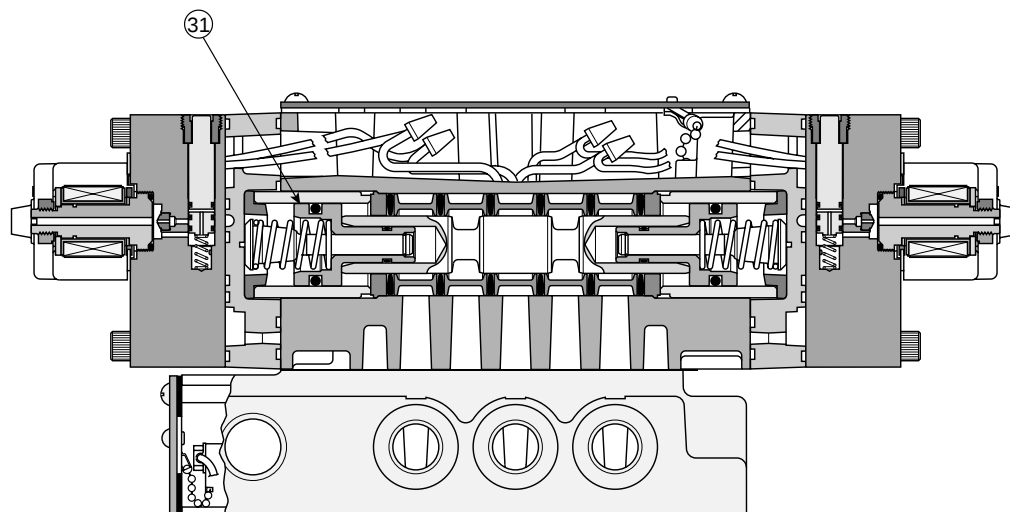
Voltage Code	Voltage			Coil Kit Number	
	60 Hz	50Hz	DC	22mm	30mm
42	24	—	—	PS155142P	PS155042P
49	—	—	24	PS155149P	PS155049P
53	120	110	—	PS155153P	PS155053P
57	240	—	—	PS155157P	PS155057P

Parts Identification List

Item#	Description	Item#	Description
1	Mounting Screw - air return to body	18	Solenoid Coil - includes gasket
2	End Bumper Seal for air return	19	Hex Nut, Solenoid
3	Air Return	20	Solenoid Plunger Guide Assembly
4	Gasket - body to air return (has a tab with an "A" on it)	21	O-ring - plunger guide assembly to adapter block
5	Body	22	Override Spring
6	Gasket - body to base	23	Adapter Block
7	Spool	24	Gasket - solenoid base or air operator to adapter (has a tab without any letter on it)
8	Subbase	25	Operator Adapter
9	Spacer	26	Gasket - adapter to body (has a tab with a "P" on it)
10	Seals for spool	27	Insulated Splicer
11	End Spacer	28	Cover
12	Sleeve	29	Mounting Screw - air operator or solenoid operator & adapter to body
13	Pilot Piston - 2-Position valve	30	Mounting Screw - body to base (not shown)
14	O-ring for piston	31	Pilot Piston Assembly - 3-position valve
15	End Bumper Seal for solenoid or air operator		
16	Manual Override Stem		
17	Override Retainer		



**Single Solenoid Operator - Air Return
(2-Position Valve)**



**Double Solenoid Operators (with Lights)
(3-Position Valve Shown)**



Pneumatic Division North America
Richland, Michigan 49083

Installation & Service Instructions V-321CP

451*, 452*, & 453* Series Valves
3-Position; Double Solenoid with
Stem Operator

ISSUED: September, 2000

Supersedes: February, 1995

ECN# P27805

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:

	psig	bar	kPa
Minimum	40	2.8	280
Maximum	150	10.0	1000

Operating Temperature Range:

0°F to 160°F (-18°C to 71°C)

Voltage Range:

+10% to -15% of Rating

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 into 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.

Filtered and lubricated air is necessary for maximum valve life and minimum maintenance.

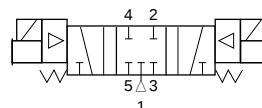
Factory Pre-Lubrication - All valves are pre-lubricated at assembly with a petroleum based grease.

Valves will operate mounted in any position.

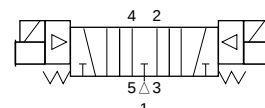
On single pressure dual exhaust models, pipe the supply air into port "1". On dual pressure common exhaust models, pipe the highest supply pressure into the port that has the highest pressure designation. (If this designation is unknown, note valve model number and consult factory.)

Cylinder speed can be controlled by restricting the exhaust port of these valves with a flow control.

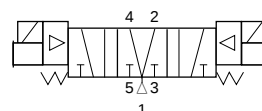
Port Identifications / Connections



MODEL
4511, 4521, 4531



MODEL
4512, 4522, 4532



MODEL
4513, 4523, 4533

Service Procedures

Servicing Solenoid - To service one or both of the solenoid assemblies, use the following procedure:

For ease of repair, remove the pilot body and solenoid as an assembly by removing the two mounting screws which attach the pilot body to the valve body. Remove the two mounting screws which secure the solenoid top plate to the solenoid. Then lift the solenoid coil from the pilot body. Remove the plunger assembly, override seal, and the seal between the solenoid and pilot body.



CAUTION:

Do not discard the above items if you are replacing the coil only.

Remove the fixed pole assembly (item 10) by turning it counter-clockwise until its threads are disengaged. Then remove and replace the plunger pin and reassemble the fixed pole assembly into the pilot body. Tighten the fixed pole from 20 to 30 in-lbs of torque.

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.

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**CAUTION:**

Do not exceed this torque specification. Doing so could cause severe damage to the pilot body's poppet seating surface, which may then cause the valve to malfunction.

Replace the seal between the solenoid and pilot body. Install the plunger assembly. Mount the solenoid coil onto the fixed pole's guide sleeve. Replace the override seal. Then attach the solenoid's top plate and tighten its mounting screws from 30 to 40 in-lbs of torque. Attach the pilot body assembly to the valve body and tighten the mounting screws from 40 to 50 in-lbs of torque. Then open the air supply and energize the solenoid to check if the valve still functions properly, and to insure that there is not any air leakage.

Servicing Pilot Body -

To service one or both of the pilot body assemblies, use the following procedure:

For ease of repair, remove the pilot body and solenoid as an assembly by removing the two mounting screws which attach the pilot body to the valve body. Remove the two mounting screws which hold the solenoid's top plate to the solenoid. Then lift the solenoid coil from the pilot body.

**CAUTION:**

When removing solenoid coil, do not drop or damage plunger assembly.

Remove the fixed pole assembly (item 10) by turning it counter-clockwise until its threads are disengaged. Then remove the plunger pin, bore insert, poppet assembly, and poppet return spring. Thoroughly clean the pilot body's bore surfaces and inspect for nicks, voids, pits, and deep scratches. Install poppet return spring and poppet assembly. Position poppet assembly with the seal as shown in the sketch.

Assemble the bore insert seals into the bore insert. Then install the bore insert into the pilot body. Replace the plunger pin and reassemble the fixed pole assembly into the pilot body. Tighten the fixed pole from 20 to 30 in-lbs of torque.

**CAUTION:**

Do not exceed this torque specification. Doing so could cause severe damage to the pilot body's poppet seating surface, which may then cause the valve to malfunction.

Inspect the fixed pole's guide sleeve for excessive wear, and inspect the plunger assembly for battered and/or flared metal conditions. Replace parts if they are found to be damaged. Mount the solenoid coil onto the fixed pole's guide sleeve. Replace the override seal. Then attach the solenoid's top plate and tighten its mounting screws from 30 to 40 in-lbs of torque. Attach the pilot body assembly to the valve body and tighten the mounting screws from 40 to 50 in-lbs of torque. Open the air supply and energize the solenoid to check if the valve still functions properly, and to insure that there is not any air leakage.

Servicing Valve Body -

To service the valve body assembly, use the following procedure:

Remove the pilot body assembly and the operator adapter from the body. Remove the pilot piston, seals, stem centering spring, center rod, sleeves, end spacers, and stem. Remove bore seals and spacers by inserting a 1/4 inch hex wrench through the slotted holes in the bottom of the valve body and prying against the edge of the spacer until the seal pops loose. (Remove each seal and spacer individually.) Repeat this operation until all seals and spacers are removed.

Note: This is best accomplished by disassembling from both ends of the valve body.

Clean off the old grease from the valve body, spacers, pilot piston, and other parts which are to be reinstalled into the valve. Using the grease packet supplied in the service kit, lubricate the new seals and stem's seals. Assembly is the reverse of disassembly. Tighten the mounting screws for the pilot assembly from 40 to 50 in-lbs of torque. Tighten the cover mounting screws from 9 to 11 in-lbs.

If you have questions concerning how to service this unit, contact your local authorized dealer or your customer service representative.

Maintenance & Trouble Shooting Hints**Valve not shifting when air is energized:**

1. Check to insure that the proper voltage is supplied to the solenoids.
2. Check to insure that supply pressure is 40 psig or greater at the valve's inlet when shifting valve.
3. Check for possible restrictions in air supply, such as undersized hoses, fittings, or quick disconnects.
4. Check to insure that the stem moves smoothly.
5. Check stem seals and o-rings for proper installation, dirt, or damage.

Air Leakage Through Exhaust Ports:

1. Check for internal leakage in cylinder being operated by valve.
2. Check seals & o-rings for nicks, cracks, and/or cuts.
3. Check for missing, damaged, swollen, or incorrectly assembled o-rings and gaskets.
4. Check cover to body gasket for damage or improper assembly.

Noisy Solenoids:

1. Check to insure that voltage and pressure supplies are adequate.
2. Inspect the fixed pole and plunger assemblies as well as their mating parts for dirt, nicks, or damage.
3. Check override access for dirt.

Replace worn or damaged parts. Reassemble and retest unit.

Field Conversions

These valves can be converted in the field from single pressure to dual pressure, or from internal pilot supply to external pilot supply. These conversions are easily accomplished by changing the body to base gasket.

**CAUTION:**

When installing gaskets, always orient gasket as indicated on the gasket.

Dual Pressure Conversion -

To obtain dual pressure with port # 5 having pressure, use gasket part # P00275, P00449, and P00153 for valve models 451*, 452*, and 453*, respectively. To obtain dual pressure with port # 3 having the highest pressure, use gasket part # P00274, P00448, and P00152 for valve models 451*, 452*, and 453*, respectively.

External Pilot Supply Conversion -

To obtain external pilot supply (single pressure) use gasket part # P00271, P00445, and P00149 for valve models 451*, 452*, and 453*, respectively. Connect the external pilot supply line to pilot supply port 14 or the "X" port of the side plate on the manifold stacks. The external pilot supply should be approximately equal to the inlet pressure, but not less than 50 psig or more than 150 psig.

Service Kits and Parts Available**Valve Body Service Kit:**

(consists of items # 3, 17, 19, 23, 26, 27, 30, 34, & 35)

451*	PS1234
452*	PS1303
453*	PS1438

Solenoid Service Kit:

(consists of items # 8, 9, 10, 13, 14, & 16) PS2013BP

Note: Two kits are required to service a double solenoid valve.

Pilot Body Service Kit:

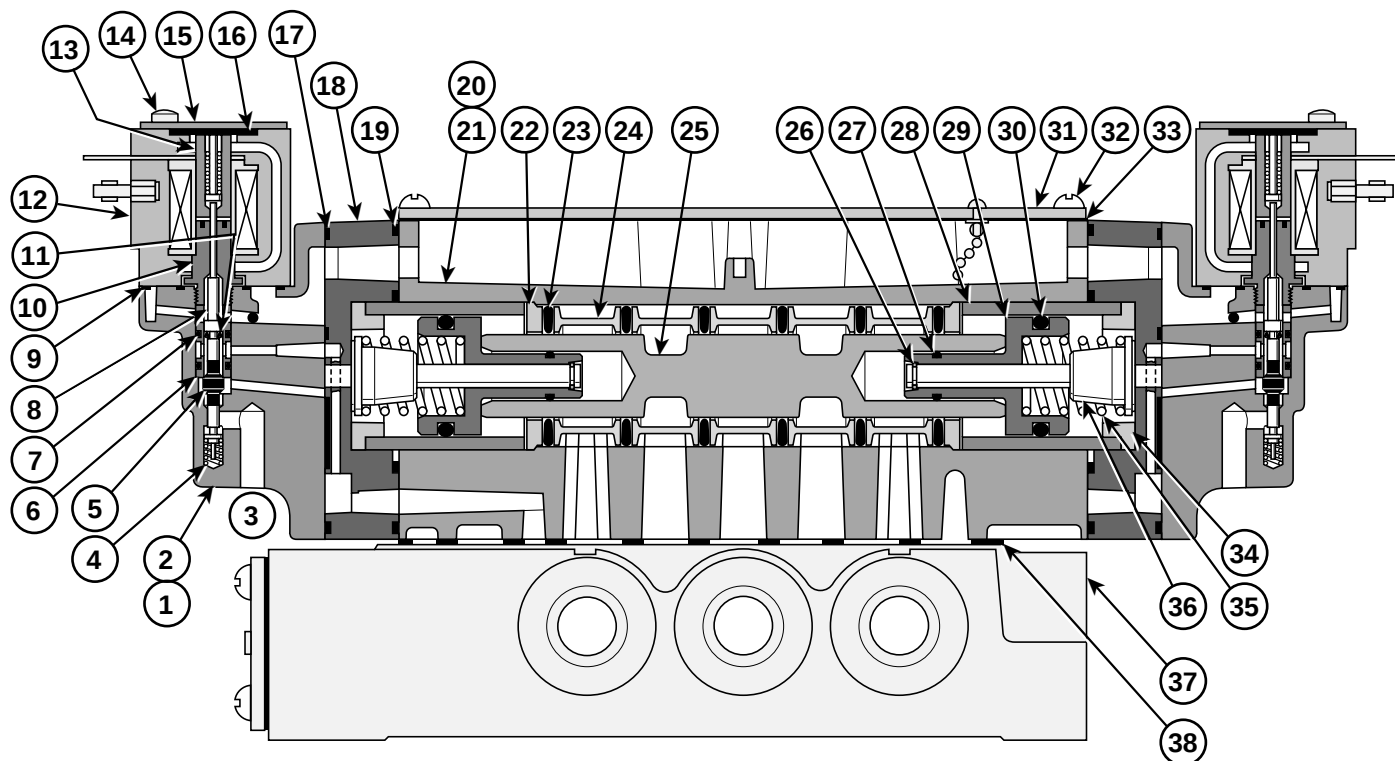
(consists of items # 4, 5, 6, 7, & 14) PS2015BP

Note: Two kits are required to service a double solenoid valve.

Part Identification List**Item # Description**

- | | |
|---|--|
| 1 | Pilot Body Assembly |
| 2 | Pilot Body |
| 3 | Mounting Screw - pilot body to valve body
(not shown) |
| 4 | Poppet Return Spring |

- | | |
|---------------|--|
| Item # | Description |
| 5 | Poppet |
| 6 | Bore Insert |
| 7 | O-rings for bore insert |
| 8 | Plunger Pin |
| 9 | Seal - solenoid to pilot body |
| 10 | Fixed Pole & Sleeve |
| 11 | Lip Seal |
| 12 | Solenoid Coil |
| 13 | Plunger |
| 14 | Mounting Screws - solenoid to pilot body |
| 15 | Top Plate for solenoid |
| 16 | Override Seal |
| 17 | Gasket - pilot body to operator adapter |
| 18 | Operator Adapter |
| 19 | Gasket - operator adapter to valve body |
| 20 | Valve Body Assembly |
| 21 | Valve Body |
| 22 | End Spacer |
| 23 | Seals - stem to valve body |
| 24 | Spacers |
| 25 | Stem |
| 26 | Retaining Ring |
| 27 | Small O-ring - pilot piston to stem |
| 28 | Sleeve |
| 29 | Pilot Piston |
| 30 | Large O-ring - pilot piston to sleeve |
| 31 | Cover |
| 32 | Mounting Screws - cover to valve body |
| 33 | Gasket - cover to valve body |
| 34 | Seal (End Bumper) |
| 35 | Stem Centering Spring |
| 36 | Centering Rod |
| 37 | Subbase |
| 38 | Gasket - valve body to subbase |





Pneumatic Division North America
Richland, Michigan 49083

Installation & Service Instructions:
V-476BP

H2, F6 and 4510 Sandwich Regulator

ISSUED: December, 2000
Supersedes: March, 1999

Rev. 6, ECN# 9319

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.

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 Inlet Pressure:	kPa	psig	bar
Maximum	1034	150	10.4

Ambient Temperature Range: 0°C to 52°C (32°F to 125°F)

Voltage Range: +10% to -15% of rating
(Applicable only for solenoid operated valves)

NOTE: Some of the above ratings are those of the associated valve.

Lubrication

Factory Pre-lubed. If lubricating in service, use Parker F442 oil or equivalent paraffin based mineral oil with 150 to 200 SSU viscosity @100°F.

CAUTION: Do not use oils that are synthetic, reconstituted, have an alcohol content or a detergent additive.

Wiring Instructions

Sandwich Regulators for electrically operated valves include a bridge plug which directly connects the valve electrical plug with the subbase or manifold plug.

CAUTION: An interruption of 10 milliseconds or greater to the power supplied to the solenoid of a solenoid operated valve may cause the valve to shift. Provision must be made to prevent power interruption of this duration to avoid unintended, potentially hazardous, consequences.

NOTE: Follow all requirements for local and national electrical codes.

Installation & Operating Instructions:

A sandwich regulator is used to provide regulated pressure to individual valves in a manifolded valve arrangement. Three basic modes of regulation are available as follows:

Common Port Regulation - Provides adjustable regulated air pressure to the valve inlet.

Independent Port Regulation - Provides (2) separately adjustable regulated air pressures to the outlet ports, one through each of the valves exhaust passages. The valves exhaust (coming out of its inlet passage) is directed to manifold or subbase exhaust port "3".

Single Port Regulation - Provides adjustable regulated air pressure to one outlet port through the corresponding valve exhaust passage and full inlet pressure to the other. The valves exhaust (coming out of its inlet passage) is directed to manifold or subbase exhaust port "3".

CAUTION: With Independent Port and Single Port Regulation the valves' flow functions are reversed as indicated by the diagrams on page 2 of these instructions. Wiring and plumbing must be adjusted accordingly. Common Port Regulation does not affect the valves function.

Sandwich regulator 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 into 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 applied to the sandwich regulator must be filtered to realize maximum component life.

If used in conjunction with an H2 or F6 Sandwich Flow Control, assemble between the valve and the Sandwich Flow Control.

H2 or F6 Valves: H2 or F6 Flow Control "Sandwiches" are only recommended for use with Common Port versions of Sandwich Regulators. If used with Single Port or Independent Port versions of Sandwich Regulators, functionality is limited as follows:

Flow Control "Sandwich" used in conjunction with Single or Independent Port versions of Sandwich Regulator - Adjust speed with the adjusting screw labeled "3". It adjusts the speed of exhaust flow from cylinder ports "2" and "4". Independent speed adjustment is not possible. This could result in different exhaust speeds for cylinder ports "2" and "4" since line pressure is supplied to one cylinder port and a regulated pressure is supplied to the other. The other adjusting screw is non-functional.

WARNING

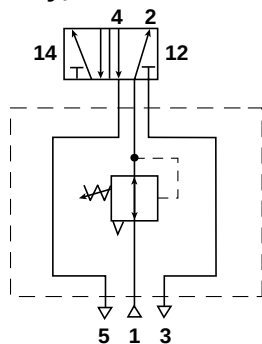
FAILURE OR IMPROPER SELECTION OR IMPROPER USE OF THE PRODUCTS AND/OR SYSTEMS DESCRIBED HEREIN OR RELATED ITEMS CAN CAUSE DEATH, PERSONAL INJURY AND PROPERTY DAMAGE.

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.

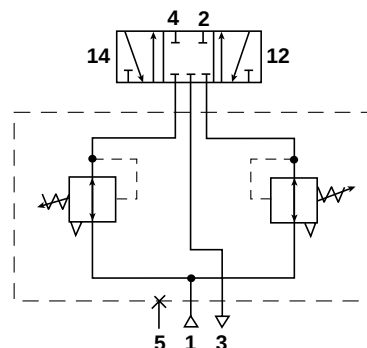
The products described herein, including without limitation, product features, specifications, designs, availability and pricing, are subject to change by Parker Hannifin Corporation and its subsidiaries at any time without notice.

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

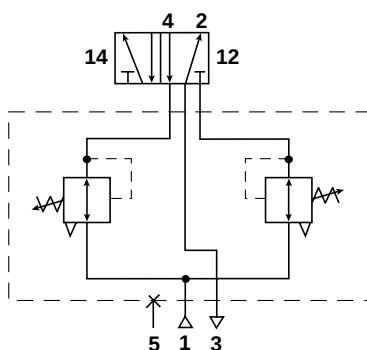
**Common Port Regulator with
4-Way, 2-Position Valve**



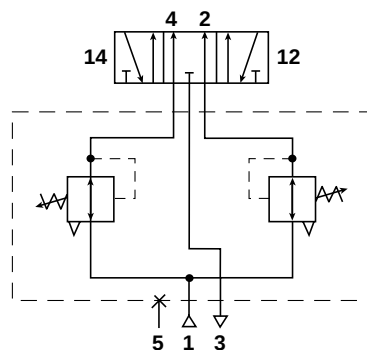
**Independent and Single Port Regulation with
4-Way, 3-Position, All Ports Blocked Valve
(Independent Port Regulation Shown)**



**Independent and Single Port Regulation with
4-Way, 2-Position Valve
(Independent Port Regulation Shown)**

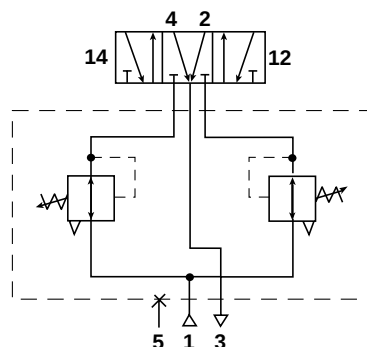


**Independent and Single Port Regulation with
4-Way, 3-Position, Inlet to Cylinder Function
(Independent Port Regulation Shown)**



**⚠ CAUTION: Requires 4-Way, 3-Position,
Cylinder to Exhaust Valve**

**Independent and Single Port Regulation with
4-Way, 3-Position, Cylinder to Exhaust Function
(Independent Port Regulation Shown)**



**⚠ CAUTION: Requires 4-Way, 3-Position,
Inlet to Cylinder Valve**

Installation

H2, F6 & 4510C Series Valves:

1. Remove the valve from the subbase or manifold (if assembled) by removing and retaining the mounting screws.
2. Convert the valve to external pilot supply per the *Conversion of Valve to External Pilot Configuration* procedure found below.
3. Clean all mating surfaces of valve, subbase or manifold and sandwich regulator of dust and dirt.
4. Add a drop of low strength thread locking compound to male threads of male-female tie rods and screw into subbase or manifold finger tight.
5. Slide gasket and Sandwich Regulator over male-female tie rods protruding from top of subbase or manifold and press down on Sandwich Regulator to seat electrical plug.
6. Place valve on top of Sandwich Regulator lining up all mounting holes and press down on valve to seat electrical plug.
7. Assemble valve to sandwich regulator with valve mounting screws. Tighten 5.1 to 5.6 Nm (45 to 50 in-lb).
8. Apply pressure to subbase or manifold and check for audible leakage at joints.
9. Adjust outlet pressure per *Outlet Pressure Adjustment* procedure at right to verify proper function.

4510A and 4510B Series Valves:

1. Remove the valve from the subbase or manifold (if assembled) by removing and discard the (4) mounting screws.
2. Clean all mating surfaces of valve, subbase or manifold and sandwich regulator of dust and dirt.
3. Place gasket on top of subbase or manifold. Select the proper gasket per the following chart:

Operator Type	Pilot Supply Option	Gasket Part No.
Single & Double Solenoid	Common Internal Supply	P00636
Single & Double Solenoid	Common External Supply	P00637
Single Remote Air / Air Return	Internal Supply to 12 end only	P00636
Double Remote Air	Separate External Supply	P00637

4. Assemble regulator to subbase or manifold and press down on Sandwich Regulator to seat electrical plug.
5. Place gasket on top of regulator interface block. Select the proper gasket per the following chart:

Operator Type	Pilot Supply Option	Gasket Part No.
Single & Double Solenoid	Common Internal Supply	P00271D*
Single & Double Solenoid	Common External Supply	P00271D*
Single Remote Air / Air Return	Internal Supply to 12 end only	P00630*
Double Remote Air	Separate External Supply	P00273D*

* Must be ordered separately.

6. Place valve on top of Sandwich Regulator lining up all mounting holes and press down on valve to seat electrical plug.
7. Attach valve and sandwich regulator to base with long mounting screws (contained in kit). Tighten 13.0 to 14.7 Nm (115 to 130 in-lb).
8. Apply pressure to subbase or manifold and check for audible leakage at joints.
9. Adjust outlet pressure per *Outlet Pressure Adjustment* procedure at right to verify proper function.

Outlet Pressure Adjustment

1. Before turning on the air supply, turn the adjusting knob counterclockwise until compression is released from the pressure control spring then turn on air supply. Proceed to adjust the desired downstream pressure by turning adjusting knob clockwise. This permits pressure to build up slowly in the downstream line.
2. To decrease regulated pressure setting, always reset from a pressure lower than the final setting required. Example, lowering the secondary pressure from 550 kPa (80 PSIG) to 410 kPa (60 PSIG) is best accomplished by dropping the secondary pressure to 345 kPa (50 PSIG), then adjusting upward to 410 kPa (60 PSIG).

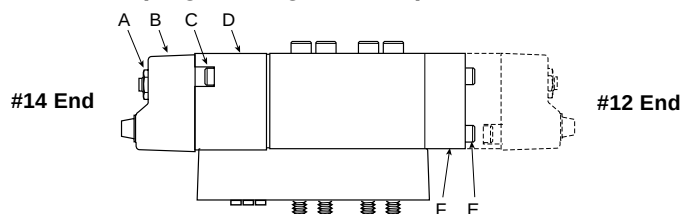
3. When desired secondary pressure setting has been reached, push the adjusting knob down to lock the adjusting knob.

Conversion Of Valve To External Pilot Supply Configuration (H2 & F6 Valves Only)

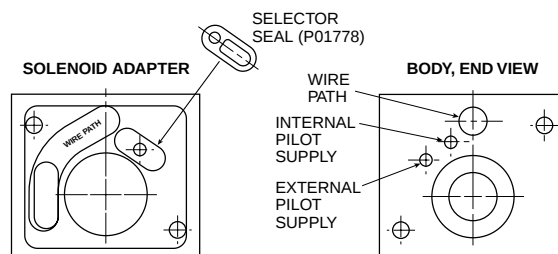
CAUTION: H2 & F6 valves equipped with solenoid operators or remote operated valves with air return must be converted to external pilot supply in order to insure proper valve operation.

Sandwich Regulator Model Numbers L95423*** and L95424*** will provide inlet air from the subbase or manifold to external pilot supply connection "12" in the valve. Model Numbers L95421*** and L95422*** require that pilot supply air 241 to 1034 kPa (35 to 150 PSIG) be connected to pilot supply connection "12" in the subbase or manifold.

H2 Valves (Engineering Level 'A')



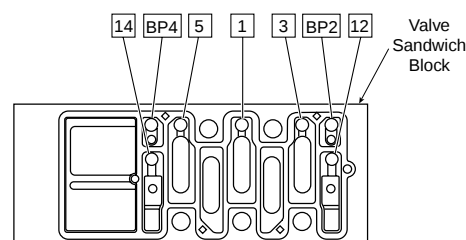
1. **#14 End** - Remove nut (A) solenoid coil (B), adapter block screws (C) and adapter block (D).
2. **#12 End - Double Solenoid Operated Valves** - Remove nut (A) solenoid coil (B), adapter block screws (C) and adapter block (D).
#12 End - Single Solenoid Operated Valves - Remove screws (E) and air return end cap (F).
3. Position selector seal on solenoid adapter(s) and air return end cap (where required) as shown below: The cylindrical projection on the selector seal will block the internal pilot supply located on the end of the valve body.



4. Reassemble solenoid end cap(s) (D) and air return end cap (F) (where required). Tighten screws (C & E) 4.5 to 5.6 Nm (40 to 50 in-lb.) torque.
5. Reassemble solenoid coil (B) and nut (A) and tighten 3.4 to 4.5 Nm (30 to 40 in-lb.) torque.

H2 Valves (Engineering Level 'B') & F6 Valves

Conversion to external pilot supply is accomplished by inserting small plugs in the sandwich plate located on the bottom of the valve. These plugs are located in small holes which are identified as follows:



Place the plugs in the proper holes per Table 1 on page 4.

To remove a plug, insert a narrow tool under the side of the nib and pry it upward slightly. Then, grasp the projecting nib (long nose pliers may help) and pull it out. Examine the o-ring to be sure it is not torn or

nicked, and that it has a coating of grease. Install the plug into the appropriate hole (o-ring end enters first) by pushing it in place until it comes to a stop and the nib is flush with the surface of the sandwich block.

Table 1 - Sandwich Block Pilot Plug Locations

Control Mechanism Operator Types	Plug Locations						
	Pilot Supply Holes						
	1	3	5	BP4	BP2	12	14
All Solenoids	X	M	M				X
Single Air Pilot	X	M	M	X			
Double Air Pilot		M	M	X	X		

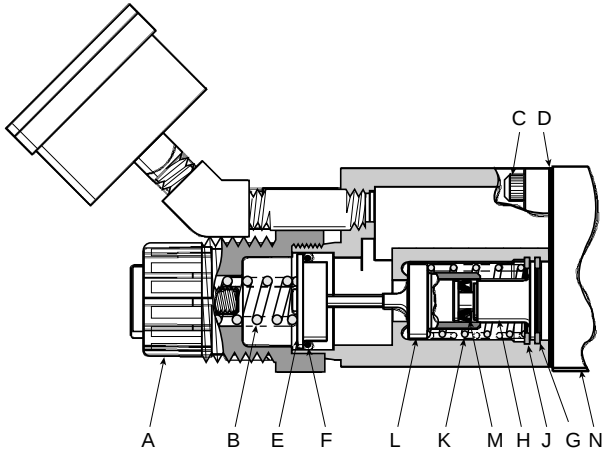
Key Code:

X = Pilot hole must be plugged

Blank = Pilot hole must be left open

M = Pilot holes may be molded shut and will not need a plug; however, some holes may be open and therefore will require a plug. Use a probe to test if the holes are open - the probe must be able to pass through the thickness of the sandwich block for the holes to be open.

Service Instructions



1. Disconnect air supply and depressurize the unit.
2. Pull the locking knob on bonnet assembly (A) outward and then turn it counterclockwise until all downstream air is exhausted.
3. Remove (4) socket head cap screws (C). Remove regulator and gasket (D) from function block. Discard screws (C) and gasket (D).
4. Turn bonnet assembly (A) counterclockwise and remove. Retain bonnet assembly and pressure control spring (B).
5. Remove and discard piston (E) and o-ring (F).
6. Remove first retaining ring (G), plug (H), second retaining ring (J), poppet return spring (K) and poppet (L). Discard retaining rings (G & J), poppet return spring (K) and poppet (L). Retain plug (H).
7. Remove and discard vee packing (M) from plug (H).
8. Clean all parts with warm water and soap. Dry thoroughly.
9. Inspect all parts.
10. Replace damaged parts.
11. Lightly lubricate o-ring (F), piston (E), vee packing (M) and poppet (L) with Marfak MP-2* grease (tube in kit).
12. Replace vee packing (M) on plug (H) with open end of vee facing large end of plug.
13. Insert poppet (L) and poppet return spring (K) into housing. Secure using retaining ring (J) in the inner of the two grooves.
14. Slide plug (H) into poppet (L) and secure in housing with retaining ring (G).

15. Place o-ring (F) onto piston (E) and slide into housing.
16. Place spring (B) into bonnet assembly (A) and screw onto housing. Tighten to 6.2 to 7.3 Nm (55-65 in-lb.) torque.
17. Assemble gasket (D) and housing to interface block using (4) socket head cap screws. Tighten screws to 6.2 to 6.8 Nm (55-60 in-lb.) torque.
18. Reapply pressure to unit and check for audible leakage at joints or out bleed holes.
19. Adjust outlet pressure per *Outlet Pressure Adjustment* procedure above to verify proper function.

Regulator Spring Conversion

1. Disconnect air supply and depressurize the unit.
2. Pull the locking knob on bonnet assembly (A) outward and then turn it counterclockwise until all downstream air is exhausted.
3. Turn bonnet assembly (A) counterclockwise and remove. Remove and discard spring (B).
4. Replace spring (B) with one for new pressure range and assemble into bonnet assembly (A). Screw bonnet assembly (A) onto housing and tighten to 6.2 to 7.3 Nm (55-65 in-lb.) torque.
5. Reapply pressure to unit and check for audible leakage at joints or out bleed holes.
6. Adjust outlet pressure per *Outlet Pressure Adjustment* procedure on page 2 of these instructions to verify proper function.

Replacement Parts

Item No.	Part Number	Description
A	L00715B	Bonnet Assembly
B	P00411 P78660B P78648	1-30 PSI Spring (Green) 2-60 PSI Spring (Blue) 5-125 PSI Spring
C	•	Socket Head Cap Screw
D	•	Regulator Base Gasket
E	•	Piston
F	•	O-Ring
G	•	Retaining Ring
H	NSS	Plug
J	•	Retaining Ring
K	•	Poppet Return Spring
L	•	Poppet Assembly
M	•	Vee Packing
N	K183118	Subbase Gasket - H2
N	K183134	Subbase Gasket - F6

• Parts included in K352415 Service Kit.

NSS Not Sold Separately.

Replacement Gauges

PSI	Standard	Liquid Filled
0 - 60	P530154	—
0 - 160	P77413	H03276

H2 Sandwich Flow Control w/ Electrical Plug PS4135

H2 Sandwich Flow Control w/o Electrical Plug PS4142

F6 Sandwich Flow Control w/ Electrical Plug PS3635

F6 Sandwich Flow Control w/o Electrical Plug PS3642

For all Installation & Service Instructions, go to www.parker.com/pneumatic



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.