

## Pneumatic Division

Richland, Michigan USA

[www.parker.com/pneumatics](http://www.parker.com/pneumatics)



### H VALVE SERIES

Bulletin Number		Bulletin Description
<input type="checkbox"/>	V398FP	H1 & H2 Valve, Installation & Service Instructions
<input type="checkbox"/>	V408CP	H4 Valve, Installation & Service Instructions
<input type="checkbox"/>	V418EP	H1, H2, H3 Collective Wiring Manifold, Installation Instructions
<input type="checkbox"/>	V433CP	Rev. 4 H1 Manifold, Installation & Service Instructions
<input type="checkbox"/>	V434BP	Rev. 3 H1 Subbase, Installation & Service Instructions
<input type="checkbox"/>	V440P	Rev. 3 H ISO 5599-2 Valve, Installation & Service Instructions
<input type="checkbox"/>	V441BP	H ISO Valve, Installation & Service Instructions
<input type="checkbox"/>	V442P	H ISO 5599-1 AUTO Valve, Installation & Service Instructions
<input type="checkbox"/>	V443P	Rev. 1 H ISO 5599-2 Manifold, Installation & Service Instructions
<input type="checkbox"/>	V444P	H ISO 5599-1 CNOMO Valve, Installation & Service Instructions
<input type="checkbox"/>	V445P	Rev. 2 H ISO Sandwich Flow Control, Installation & Service Instructions
<input type="checkbox"/>	V446P	H1 Sandwich Regulators, Installation & Service Instructions
<input type="checkbox"/>	V447P	Rev. 1 H2B, H3B Sandwich Regulator, Installation & Service Instructions
<input type="checkbox"/>	V448BP	H ISO 5599-2 Manifold Base with Interconnect Wiring, Installation & Service
<input type="checkbox"/>	V449P	H Selector Regulator, Installation & Service Instructions
<input type="checkbox"/>	V462BP	H Valves 2 & 3-Position, Installation & Service Instructions
<input type="checkbox"/>	V465BP	H1, H2, H3 Sandwich Flow Controls, Installation & Service Instructions
<input type="checkbox"/>	V466P	H1 Sandwich Regulators, Installation & Service Instructions
<input type="checkbox"/>	V474P	H2 & H3 Subbase, Installation & Service Instructions
<input type="checkbox"/>	V476BP	H2 Sandwich Regulator, Installation & Service Instructions
<input type="checkbox"/>	V480CP	H3 5599-1 2 & 3-Position 4-Way, 5-Ports, Installation & Service Instructions
<input type="checkbox"/>	V483P	Rev. 2 H3 Manifold without Interconnect Circuit Board, Installation & Service Instructions
<input type="checkbox"/>	V486BP	Rev. 4 H3 Sandwich Regulator, Installation & Service Instructions
<input type="checkbox"/>	Safety Guide	PDN Safety Guide



**Pneumatic Division North America**  
 Richland, Michigan 49083

**Installation & Service Instructions**  
**V-398FP**  
**H1 & H2 Series Valves**  
**2-Position, 4-Way, 5-Ports &**  
**3-Position, 4-Way, 5-Ports**  
**Meets ISO 5599-2 / 5599-1**  
**ISSUED: September, 2000**  
**Supersedes: October, 1999**  
**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.

**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.

**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:**

	<b>kPa</b>	<b>psig</b>	<b>bar</b>
<b>Minimum</b>	241	35	2.4
<b>Maximum</b>	1030	150	10.3

**Ambient Temperature Range:** -18°C to 60°C (0°F to 140°F)

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

**⚠ 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.

**⚠ WARNING**

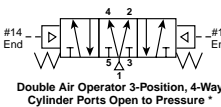
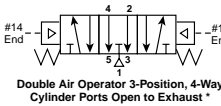
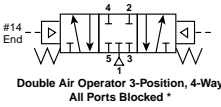
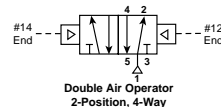
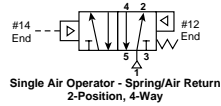
**FAILURE OR IMPROPER SELECTION OR IMPROPER USE OF THE PRODUCTS AND/OR SYSTEMS DESCRIBED HEREIN OR RELATED ITEMS CAN CAUSE DEATH, PERSONAL INJURY AND PROPERTY DAMAGE.**

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.

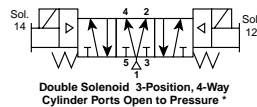
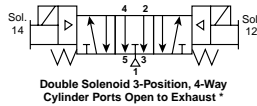
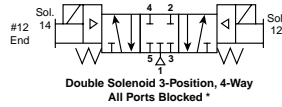
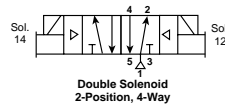
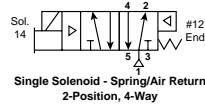
The products described herein, including without limitation, product features, specifications, designs, availability and pricing, are subject to change by Parker Hannifin Corporation and its subsidiaries at any time without notice.

**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.)



\* Condition with spool in center position.



**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 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 Procedures**

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

**NOTE:** When servicing valves equipped with solenoid(s) (Item #5 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 and interface block 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 assembly.
3. Using a clean, lint free cloth, clean off the old grease from the valve body, solenoid adapter block(s), end cap, pistons (piston assemblies), and other parts which are to be reinstalled into the valve. Using the grease packet supplied in the service kit, lightly lubricate the new seals and spool assembly.
4. Assembly is the reverse of disassembly. Take special care to assure that the gasket(s) have been positioned properly.
5. Tighten mounting screws for the adapter block (or air return operator) from 4.5 to 5.6 Nm (40 to 50 in-lbs) of torque. Install the valve body assembly onto its base. Torque the H2 mounting screws from 13.0 to 14.7 Nm (115 to 130 in-lbs) of torque. Torque the H1 mounting screws from 5.1 to 5.6 Nm (45 to 50 in-lbs) of torque. Then screw nut onto plunger guide and torque from 4.5 to 5.6 Nm (40 to 50 in-lbs).

**Servicing Solenoid Coil:**

1. Remove nut (item #7) 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 4.5 to 5.6 Nm (40 to 50 in-lbs).

**Voltage Code & Replacement Coil Kits**

Voltage Code	Voltage			Coil Kit Number	
	60 Hz	50Hz	DC	With Indicator Light	Unlighted
B9* (Blue)	—	—	24	K252 030*	K252 029*
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
83**	120	110	—	K252 040**	K252 041**

\* Low watt with surge suppression.  
 \*\* This coil contains an MOV as standard for surge suppression.

**Servicing Plunger Assembly:**

1. Remove the nut (item #7) which secures the solenoid coil to

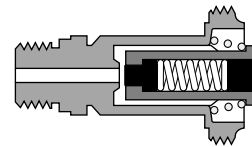
the plunger guide assembly. Then slide coil off of the plunger guide. Unscrew the plunger guide and remove plunger, spring, and o-ring (item #8).

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 5.6 to 6.8 Nm (50 to 60 in-lbs).
4. Slide coil onto plunger guide and then screw nut onto plunger guide and torque from 4.5 to 5.6 Nm (40 to 50 in-lbs).

**Plunger & Guide Assembly**

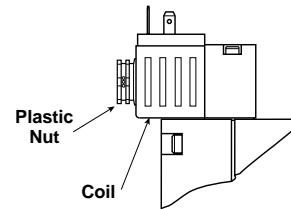
**(Includes Plunger, Plunger Guide and Spring)**

- K232 025 Standard Voltages
- K232 049 B9 Low Watt Voltage Code (Blue Coil)



**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

**Manual Override Service:**

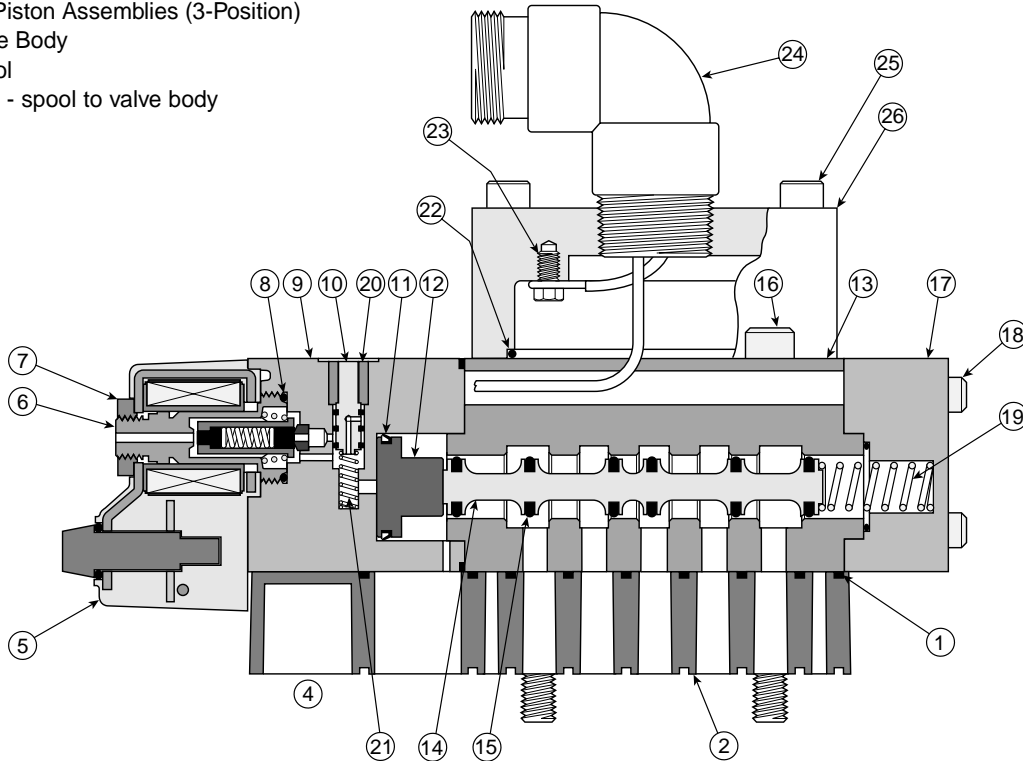
Use PS1554P Service Kit for non-locking override.

Use PS1555P Service Kit for locking override

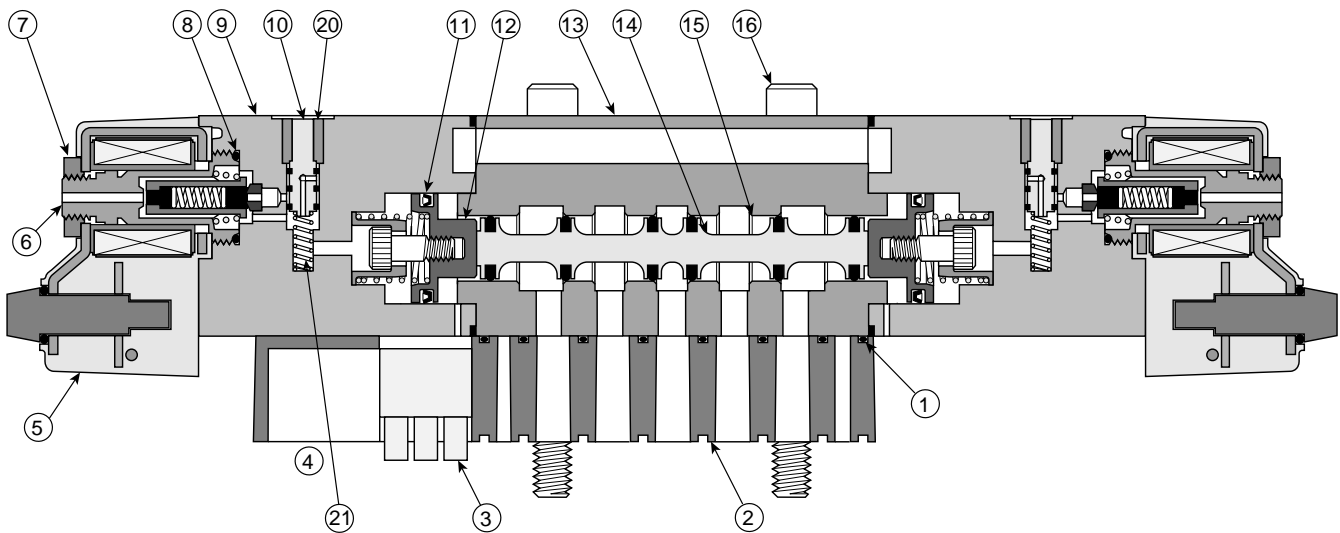
1. Remove retainer (item #20) with 1/4" hex key. Withdraw override stem (item #10) with seals and spring (Item #21). Discard parts.
2. Inspect and remove any debris from the override hole in the solenoid block (item #9).
3. From new kit, place spring in hole.
4. Seals on stem must be greased. Install stem (with greased seals) in hole.
5. Install threaded retainer in hole. Tighten to 40 to 50 in-lbs.

**Parts Identification List**

Item#	Description	Item#	Description
1	Gasket - valve body to interface block	16	Mounting Screw - valve body & interface block to base
2	Interface Block	17	Return End Cap
3	Electrical Connector - valve to base	18	Mounting Screw - return end cap to valve body
4	Mounting Screw - adapter block to valve body (not shown)	19	Spool Return Spring
5	Solenoid coil - encapsulated (includes gasket)	20	Override Retainer
6	Plunger Guide Assembly	21	Override Spring
7	Hex Nut - solenoid coil to plunger guide assembly	22	O-ring
8	O-ring - plunger guide assembly to adapter block	23	Ground Screw
9	Adapter Block	24	Automotive Receptacle
10	Override Stem	25	Screws, Adapter
11	Lip Seal - piston to adapter block	26	Adapter
12	Piston (2-Position)		
	Piston Assemblies (3-Position)		
13	Valve Body		
14	Spool		
15	Seal - spool to valve body		



**Single Solenoid Operator - Spring/Air Return  
(H2, 2-Position Valve Shown)**



**Double Solenoid Operators  
(H2, 3-Position Valve Shown)**

## Field Conversion of Pilot Supplies

(Internal vs. External)

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

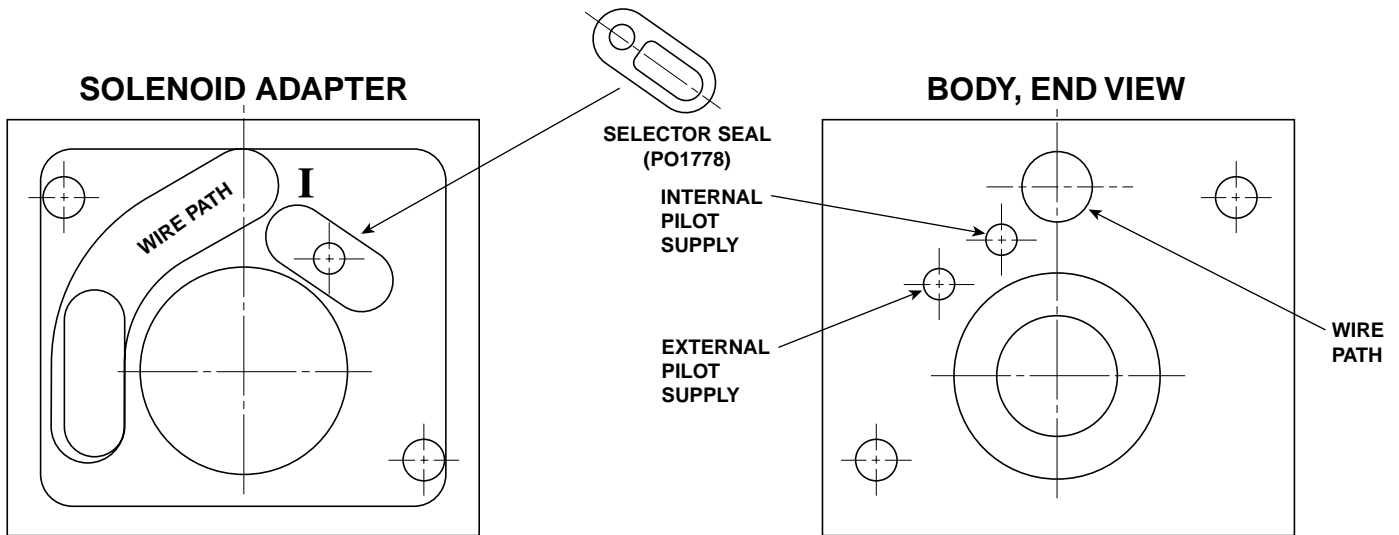
1. Remove valve from base, if required.
2. Remove solenoid coil (item #5) so that you can access and remove the adapter block (item #9) at the #14 end (and/or #12 end).
3. Remove air return end cap (item #17) at the #12 end.

**NOTE:** Valve body has two pilot holes (internal & external). The internal pilot hole is the one located closest to the wire path hole. It is marked with an "I" on the adapter block.

4. Position the selector seal into its groove in the adapter block (item #9) to connect the supply air (from the valve body) to either internal or external pilot supply. The figure shows the external pilot supply being selected.

**NOTE:** The same selection of seal positioning needs to be made at both the #12 & #14 ends.

5. Reassemble unit using the reverse order that it was taken apart. See the following sections for proper assembly techniques and screw torque.
6. External pilot supply has now been connected to the #12 end of the base.

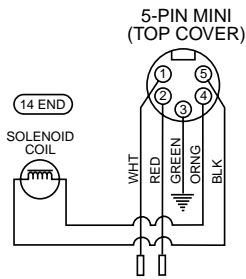


Field Conversion of Pilot Supplies

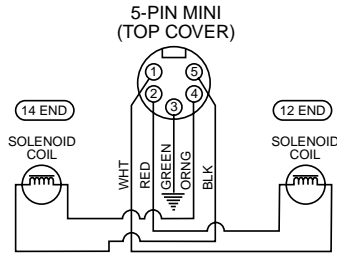
## Automotive Connection – Wiring Options

### Chrysler Connection (Straight or 90° Receptacle)

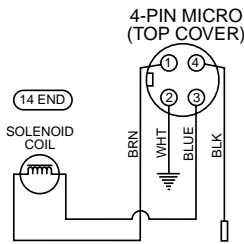
**5-Pin Male/Single Solenoid**  
(Encl. Options 3 & 5, Auto Option C)



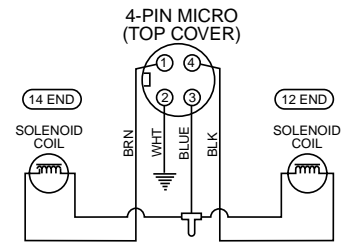
**5-Pin Male/Double Solenoid**  
(Encl. Options 3 & 5, Auto Option C)



**4-Pin Male/Single Solenoid**  
(Encl. Options 2 & 4, Auto Option C)

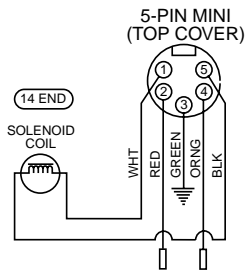


**4-Pin Male/Double Solenoid**  
(Encl. Options 2 & 4, Auto Option C)

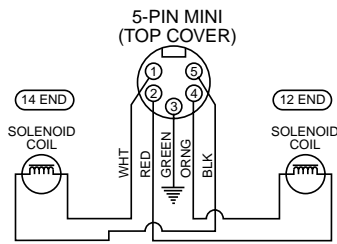


### Ford Connection (Straight or 90° Receptacle)

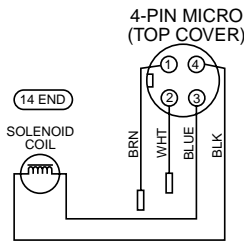
**5-Pin Male/Single Solenoid**  
(Encl. Options 3 & 5, Auto Option F)



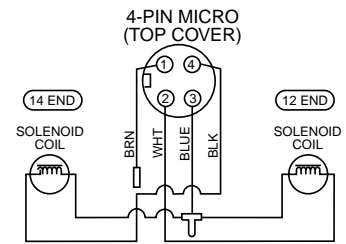
**5-Pin Male/Double Solenoid**  
(Encl. Options 3 & 5, Auto Option F)



**4-Pin Male/Single Solenoid**  
(Encl. Options 2 & 4, Auto Option F,G)

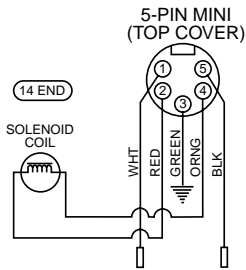


**4-Pin Male/Double Solenoid**  
(Encl. Options 2 & 4, Auto Option F)

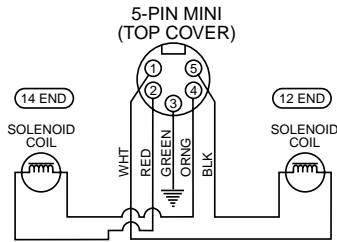


### GM Connection (Straight or 90° Receptacle)

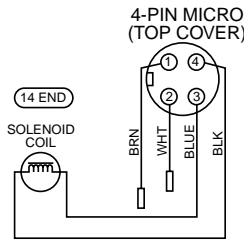
**5-Pin Male/Single Solenoid**  
(Encl. Options 3 & 5, Auto Option G)



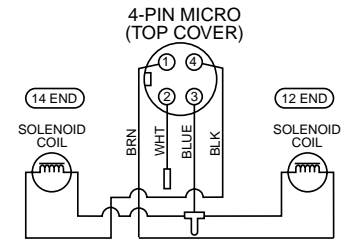
**5-Pin Male/Double Solenoid**  
(Encl. Options 2 & 4, Auto Option G)



**4-Pin Male/Single Solenoid**  
(Encl. Options 2 & 4, Auto Option F,G)



**4-Pin Male/Double Solenoid**  
(Encl. Options 2 & 4, Auto Option G)



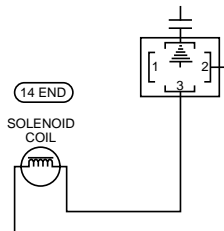
## Automotive Connection – Thread Type

5-Pin Mini Connector - 7/8 UNF thread

4-Pin Micro Connector - M12 thread

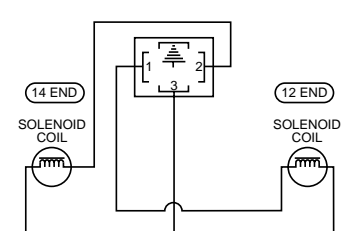
**30mm, 4-Pin ISO 4400  
Single Solenoid**

(Encl. Options V)



**30mm, 4-Pin ISO 4400  
Double Solenoid**

(Encl. Options V)





**Pneumatic Division North America**  
 Richland, Michigan 49083

**Installation & Service Instructions**  
**V-408CP**  
**H4 Series Valves**  
**2-Position, 4-Way, 5-Ports &**  
**3-Position, 4-Way, 5-Ports**  
**Meets ISO 5599-2 / 5599-1**  
**ISSUED: September, 2000**  
**Supersedes: October, 1999**  
 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 (with wiring in the base) has a standard ISO 5599-2: 1990 mounting interface. Valve bodies labeled Parker Model 45\_, and bases marked ISO 2E, 3E, or 4E or simply O 2E, O 3E, or O 4E (opposite the junction box under the valve body) - and without blue wires in the base - can be connected to this valve/base, but may have incompatible wiring. 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 Pressure Range:**

	<b>kPa</b>	<b>psig</b>	<b>bar</b>
<b>Minimum</b>	280	40	2.8
<b>Maximum</b>	1030	150	10.3

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

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

**⚠ 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.

**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**

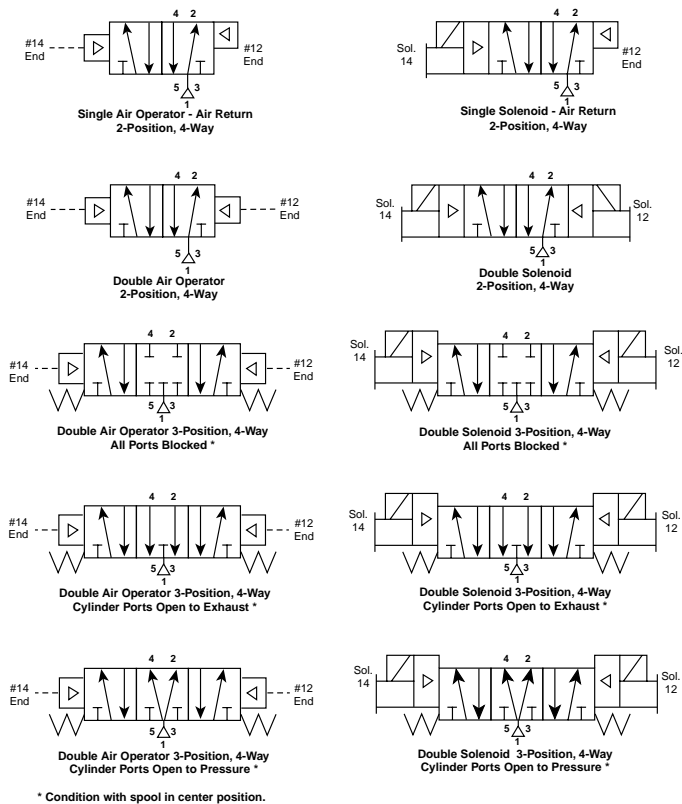
**FAILURE OR IMPROPER SELECTION OR IMPROPER USE OF THE PRODUCTS AND/OR SYSTEMS DESCRIBED HEREIN OR RELATED ITEMS CAN CAUSE DEATH, PERSONAL INJURY AND PROPERTY DAMAGE.**

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.)



\* Condition with spool in center position.

**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
H4	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)
H4	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)

**H4 Series Valves**

**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 N•m) of torque. Replace the body assembly on the base. Torque these mounting screws from 225 to 250 in-lbs. (25.4 to 28.2 N•m). Then screw nut onto plunger guide and torque from 30 to 40 in-lbs. (3.4 to 4.5 N•m).

**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 N•m).

**Voltage Code & Replacement Coil Kits**

Voltage Code	Voltage			Coil Kit Number	
	60 Hz	50Hz	DC	With Indicator Light	Unlighted
B9* (Blue)	—	—	24	K252 030*	K252 029*
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
83**	120	110	—	K252 040**	K252 041**

\* Low watt with surge suppression.  
 \*\* This coil contains an MOV as standard for surge suppression.

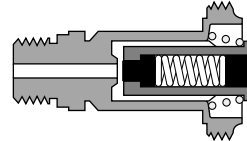
**Servicing Plunger Assembly:**

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 N•m).
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 N•m).

**Plunger & Guide Assembly (Includes Plunger, Plunger Guide and Spring)**

- K232 025 Standard Voltages
- K232 049 B9 Low Watt Voltage Code (Blue Coil)

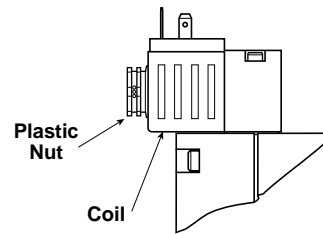


**Manual Override Service:**

- 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 N•m).

**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.

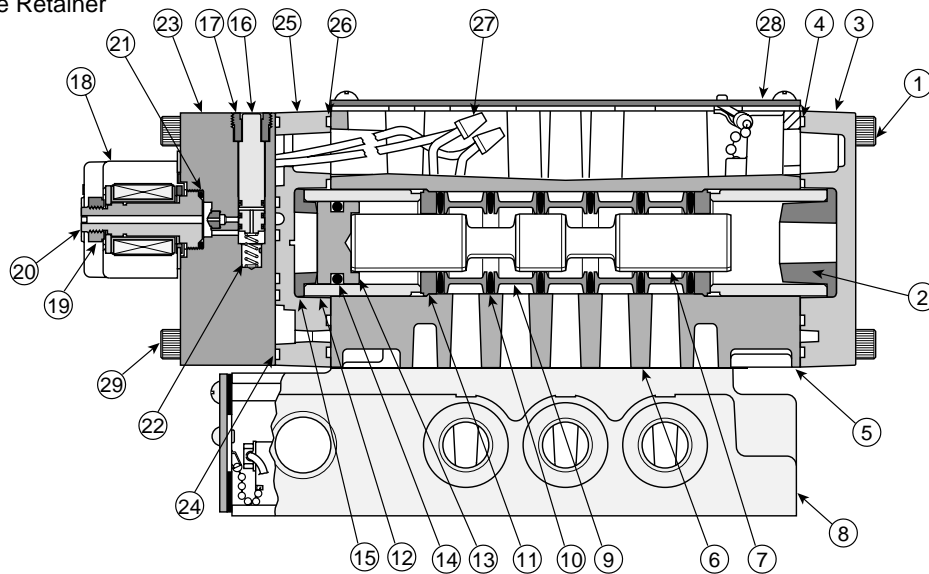


**Voltage Code & Replacement Coil Kits (22mm-30mm CNOMO)**

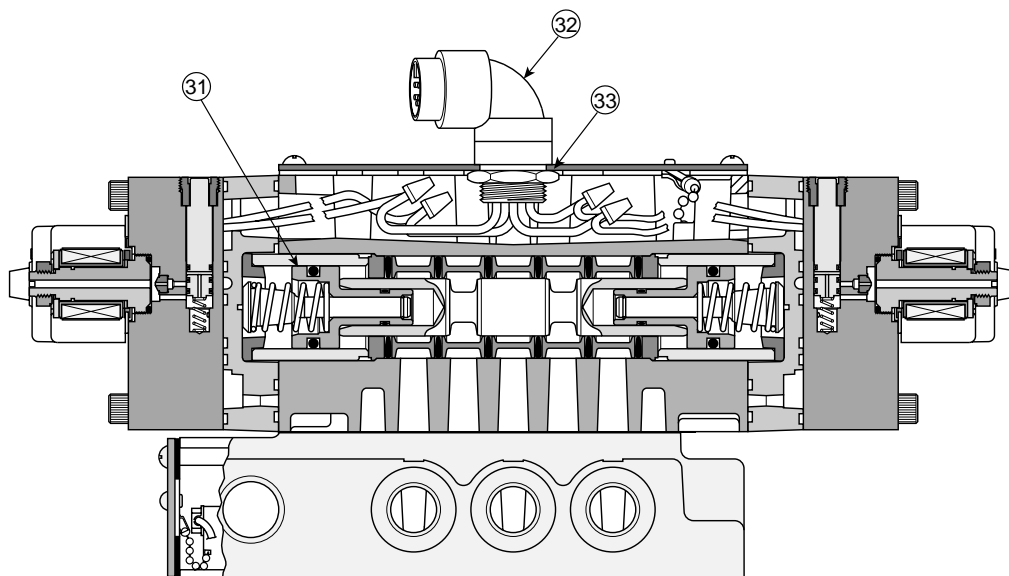
Voltage Code	Voltage			Coil Kit Number	
	60 Hz	50Hz	DC	22mm	30mm
42	24	—	—	PS155142P	PS155042P
49	—	—	24	PS155149P	PS155049P
53	120	110	—	PS155153P	PS155053P
57	240	—	—	PS155157P	PS155057P

**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	32	Automotive Receptacle
16	Manual Override Stem	33	Conduit Locknut
17	Override Retainer		



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

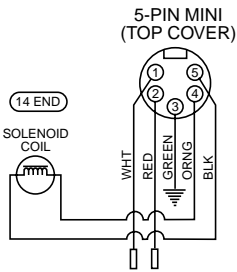


**Double Solenoid Operators (with Lights)  
(3-Position Valve Shown)**

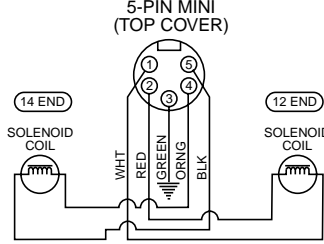
# Automotive Connection – Wiring Options

## Chrysler Connection (Straight or 90° Receptacle)

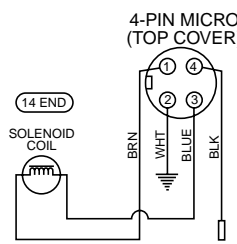
**5-Pin Male/Single Solenoid**  
(Encl. Options 3 & 5, Auto Option C)



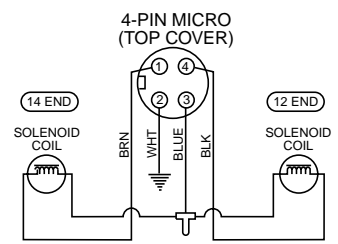
**5-Pin Male/Double Solenoid**  
(Encl. Options 3 & 5, Auto Option C)



**4-Pin Male/Single Solenoid**  
(Encl. Options 2 & 4, Auto Option C)

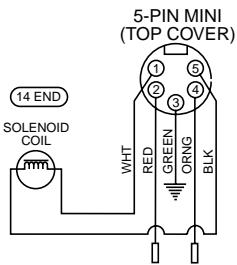


**4-Pin Male/Double Solenoid**  
(Encl. Options 2 & 4, Auto Option C)

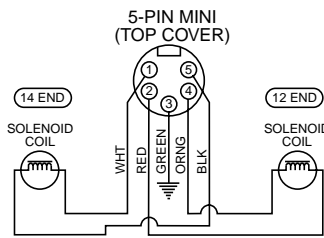


## Ford Connection (Straight or 90° Receptacle)

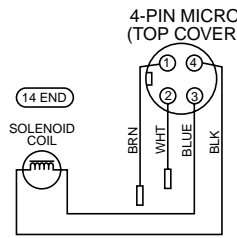
**5-Pin Male/Single Solenoid**  
(Encl. Options 3 & 5, Auto Option F)



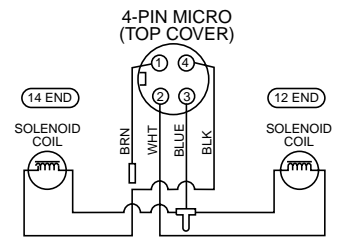
**5-Pin Male/Double Solenoid**  
(Encl. Options 3 & 5, Auto Option F)



**4-Pin Male/Single Solenoid**  
(Encl. Options 2 & 4, Auto Option F,G)

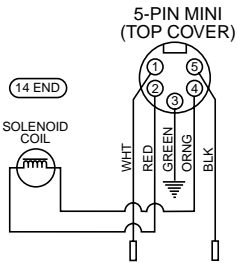


**4-Pin Male/Double Solenoid**  
(Encl. Options 2 & 4, Auto Option F)

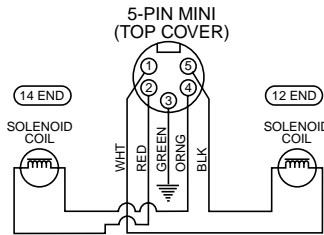


## GM Connection (Straight or 90° Receptacle)

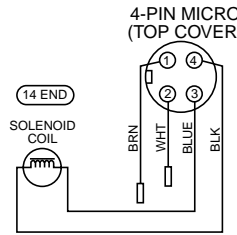
**5-Pin Male/Single Solenoid**  
(Encl. Options 3 & 5, Auto Option G)



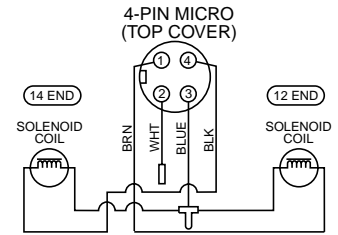
**5-Pin Male/Double Solenoid**  
(Encl. Options 2 & 4, Auto Option G)



**4-Pin Male/Single Solenoid**  
(Encl. Options 2 & 4, Auto Option F,G)



**4-Pin Male/Double Solenoid**  
(Encl. Options 2 & 4, Auto Option G)

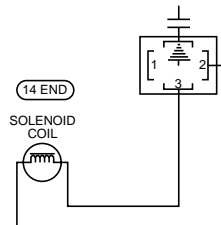


## Automotive Connection – Thread Type

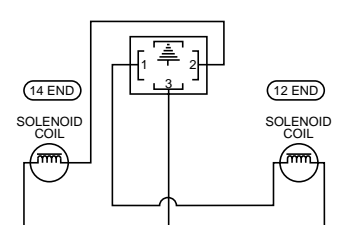
5-Pin Mini Connector - 7/8 UNF thread

4-Pin Micro Connector - M12 thread

**30mm, 4-Pin ISO 4400  
Single Solenoid**  
(Encl. Options V)



**30mm, 4-Pin ISO 4400  
Double Solenoid**  
(Encl. Options V)





**Pneumatic Division**  
Richland, Michigan 49083

**Installation Instructions: Form V-434BP**

**H1 & F5 Series Valves - Subbase  
Installation 2 & 3-Position, 4-Way,  
5-Ports**

**ISSUED: November, 2000**  
**Supersedes: October, 1999**  
ECN# P27873, Rev. 3

**! 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. Compliance with the rated pressure, temperature, and voltage is necessary - see Installation & Operating Instructions (V-430CP) packed with valve.

**Operating Pressure Range:**

	kPa	psig	bar
<b>Min.</b> (2-Position - Air Return)	140	20	1.4
<b>Min.</b> (2-Position w/Spring and Air Return)	240	35	2.4
<b>Min.</b> (3-Position)	210	30	2.1
<b>Max.</b> (2 & 3-Position)	996	145	10.0

**NOTE:** Solenoid operated valves, when specified with external pilot, may have operating pressures down to vacuum in the main valve. External pilot pressure and air pilot signals must be greater than or equal to that in the main valve, but not outside the ratings above.

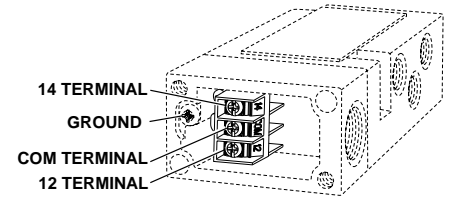
**Ambient Temperature Range:** -15°C to 49°C (5°F to 120°F)

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

**! 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.

**Wiring Instructions**

1. Follow all requirements for local and national electrical codes.
2. Remove end cover from base by backing off the two captive screws. Reassemble cover to base by tightening screws from 0.8 to 1.0 Nm (7 to 9 in-lbs).
3. An external ground connection must be attached to the green ground screw.
4. Disregard unused wires or terminals.



**Connections**

	14 Solenoid	12 Solenoid
Valves with Wires	Black Wires	Red Wires
Valves with Terminal Block (Will accept 18 to 24 Gauge Wires)	14 and Com Terminals	12 and Com Terminals

**Valve Mounting Procedures**

If valve and subbase are purchased separately, use the following procedure to mount valve to base:

1. Using a clean, lint free cloth, clean top surface of subbase and bottom surface of valve body of dirt and dust.
2. Check to insure that gasket is properly seated in gasket track on sandwich block.
3. Place valve assembly on top of subbase. On electrically operated valves, line up plug with socket in base and gently press down on valve to seat plug properly.
4. Line up the captive mounting screws. Tighten using a 4 mm wrench; torque from 2.9 to 3.8 Nm (25 to 35 in-lbs) using progressive steps with a criss-cross pattern.
5. Apply main pressure and check for leaks. If any are present, do not operate the valve - repeat the reassembly process until satisfactory.

**Port Connections**

(Below is a brief summary of typical port connections. See Technical Data section of the F Series catalog for more details.)

1. Connect a single inlet air supply to port "1". (For dual pressure applications connect inlet air supplies to ports "3" and "5".)
2. Connect mufflers (or pipe exhaust) to ports "3" and "5" for single air supply. For dual pressure applications, connect to port "1".
3. Connect cylinder ports marked "2" and "4" to cylinder or other device to be supplied air.
4. External pilot supply may be applied to ports 12 or 14. Double air piloted valves need to use both 12 and 14 ports for remote pilot signal; and single air piloted valves have to use port 14 for remote pilot signal.
5. For 2-Way and 3-Way functions, you will need to plug some of the ports - consult the Technical Data section of the F Series catalog.

**NOTE:** Some subbase kits come with pipe plugs. These plugs should be located as desired.

**! WARNING**

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

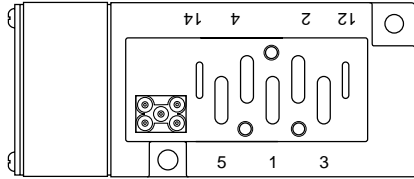
This document and other information from Parker Hannifin Corporation, its subsidiaries and authorized distributors provide product and/or system options for further investigation by users having technical expertise. It is important that you analyze all aspects of your application, including consequences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

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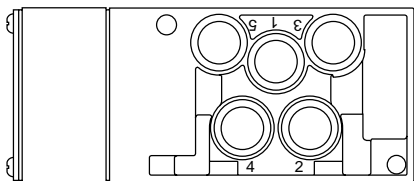
**EXTRA COPIES OF THESE INSTRUCTIONS ARE AVAILABLE FOR INCLUSION IN EQUIPMENT / MAINTENANCE MANUALS THAT UTILIZE THESE PRODUCTS. CONTACT YOUR LOCAL REPRESENTATIVE.**

**Instruction Sheets Available:**

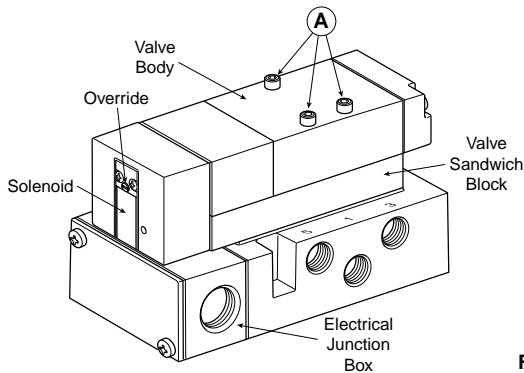
- V-430CP - Valve Installation & Operating Instructions
- V-431BP - Valve Body Service Instructions
- V-432BP - Solenoid Service Instructions
- V-433BP - Manifold Installation Instructions
- V-435BP - Sandwich Flow Control Installation Instructions
- V-436BP - Sandwich Regulator Installation & Operating Instructions
- V-437BP - Sandwich Regulator Conversions & Service Instructions
- V-438BP - Manifold With Electrical Interconnect Installation



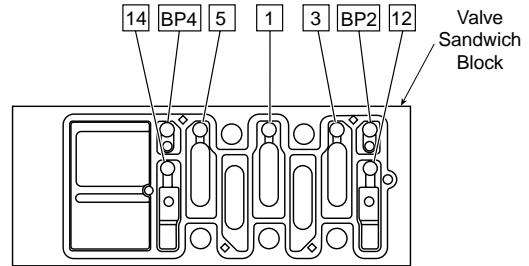
**FIGURE 1: Top View (Ports located on side)**



**FIGURE 2: Bottom View of Subbase - showing optional bottom ports**



**FIGURE 3**



**FIGURE 4**

**Pilot Pressure Supply**

This valve requires a source of air pressure for shifting - a pilot supply. The sixth character in the model number identifies this supply when the valve was assembled at the factory. If changes have occurred in the field, the character will no longer represent that pilot arrangement. If a new valve is ordered with the same model number as the old one, perform an examination at the time of replacement and move the plugs (if necessary) so that the new valve has them in the same locations as the old one (described in steps 1-3 following).

Conversion in the field from an internal pilot supply to an external type, or vice versa, is possible. However, conversion from a single pressure valve to a dual pressure type is not possible in the field - special parts are required. (However, dual pressure valves can be converted back to single pressure in the field.) All of these conversions are performed by relocating small plugs as follows:

1. The bottom surface of the sandwich block has several holes which receive the small plugs. This is accessed by loosening the three main body mounting screws (item A) with a 4 mm hex wrench and removing the valve from its base. These holes have identification alongside as shown in Figure 4 and plugs must be located in the holes as described in Table 1. (See the two identification methods located in Table 1.)
2. 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.
3. Replace the valve on its base, making certain first that the interface gasket (item B) is in place in its grooves in the sandwich block. Engage the electrical plug carefully during this process. Tighten the 3 main body mounting screws from 2.9 to 3.8 N•m (25 to 35 in-lbs).
4. Apply main pressure and check for leaks. If any are present, do not operate the valve - repeat the reassembly process until satisfactory.

**Table 1 - Sandwich Block Pilot Plug Locations (Reference Illustrations Above)**

Method 1: Using Model No. to Determine Plug Locations		Method 2: Using Attributes of Valve & Operator(s) to Determine Plug Locations							Pilot Supply	Main Press Supply Type	Control Mechanism Operator Types
3rd Digit in Model No.	6th Digit in Model No.	Pilot Supply Holes									
		1	3	5	BP4	BP2	12	14			
1 or E	B or C		M	M			X	X	Internal @ Port 1 External @ Port 12 External @ Port 14	Single	All Solenoids
	P or Q	X	M	M				X			
	L or M	X	M	M							
2, 5, 6, 7	B or C		M	M			X	X	Internal @ Port 1 Internal @ Port 3 Internal @ Port 5 External @ Port 12 External @ Port 14	Dual	
	E or F	X		X			X	X			
	H or J	X	X				X	X			
	P or Q	X	M	M				X			
3 or F	L or M	X	M	M	X				Internal @ Port 1 External @ Port 12 External @ Port 14	Single	
	0 or C		M	M	X		X				
	P or Q	X	M	M		X					
	L or M	X	M	M	X						
4, 8, 9, 0	E or F	X		X			X	X	Internal @ Port 3 Internal @ Port 5	Dual	
	H or J	X	X				X	X			
4, 8, 9, 0	0	X	M	M	X				None	Single or Dual	Double Air Pilot

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 holes are open - the probe must be able to pass through the thickness of the sandwich block for the holes to be open.



**Pneumatic Division**  
Richland, Michigan 49083

**Installation & Service Instructions:**  
**V440P**  
**F & H ISO 5599-2 Valve Installation**  
**ISSUED: September, 2002**  
**Supersedes: February, 2001**  
Doc.# V-440P, ECN# 060870, Rev. 3

**⚠ 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.

**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](http://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:**

**Maximum: 145 PSIG (1000 kPa)**

**Minimum: See Chart**

Operator / Function	Internal Pilot	Min. PSIG (kPa) F5/H1	Min. PSIG (kPa) F6/H2, F7/H3
1	Single Solenoid - 2-Pos	20 (138)	30 (207)
2	Double Solenoid- 2-Pos		
3	Single Remote - 2-Pos		
4	Double Remote Pilot - 2-Pos	Vacuum	Vacuum
5, 6, 7	Double Solenoid - 3-Pos	30 (207)	45 (310)
8, 9, 0	Double Remote Pilot - 3-Pos	Vacuum	Vacuum
E	Single Solenoid - 2-Pos Air Return / Spring Assist	35 (241)	45 (310)
F	Single Remote Pilot - 2-Pos Air Return / Spring Assist		
	<b>External Pilot*</b>		
All	F & H Series	Vacuum	Vacuum

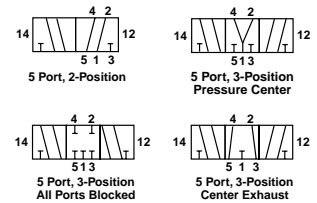
\*External Pilot Pressure / Remote Pilot Signal - 45-145 PSIG (310-1000 kPa).

**Ambient Temperature Range:** -15°C to 49°C (5°F to 120°F)

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

**Port Identification / Connections / Symbols**

Port No.	Single Pressure	Dual Pressure
1	Inlet	Exhaust
2	Outlet	Outlet
3	Exhaust	Inlet
4	Outlet	Outlet
5	Exhaust	Inlet
12, 14	Pilot ports for External Pilot or Remote Pilot	



Valves may be used for single outlet (3-Way) by plugging an outlet port.

**NOTE:** The operator identification describes the ports that are connected when the operator is energized: operator 12 connects port 1 to port 2; operator 14 connects port 1 to port 4. Other ports may also be connected, or blocked – see symbols on the valve.

**NOTE:** For dual pressure, the higher pressure is to be at port 3 for single air operated valves. Solenoid types may have the highest pressure at either port 3 or 5, as specified.

**⚠ CAUTION:** It is recommended that double solenoid and double remote air pilot operated 2-Position valves be mounted so that the axis of the valve spool is in the horizontal plane.

**Lubrication**

Factory Pre-lubed. If lubricating in service, use Parker F440 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.

**⚠ 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:

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.

**⚠ 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.

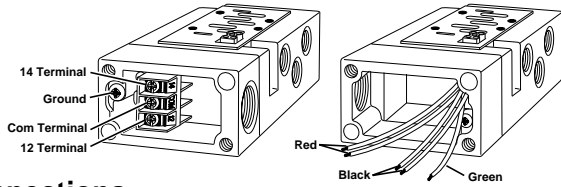
**EXTRA COPIES OF THESE INSTRUCTIONS ARE AVAILABLE FOR INCLUSION IN EQUIPMENT / MAINTENANCE MANUALS THAT UTILIZE THESE PRODUCTS. CONTACT YOUR LOCAL REPRESENTATIVE.**

**Wiring Instructions**

1. Follow all requirements for local and national electrical codes.
2. Remove end cover from base by backing off the two captive screws.
3. An external ground connection must be attached to the green ground screw.
4. Disregard unused wires or terminals.
5. Reassemble cover to base by tightening screws from 0.8 to 1.0 Nm (7 to 9 in-lbs).

**⚠ WARNING**

This valve / base has a standard ISO 5599/2: 1990 mounting interface. Valve bodies labeled Parker Model 45\_, and bases marked ISO 2E, 3E, or 4E or simply O 2E, O 3E, or O 4E (opposite the junction box under the valve body) - and without blue wires in the base - can be connected to this valve/base, but may have incompatible wiring. 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.

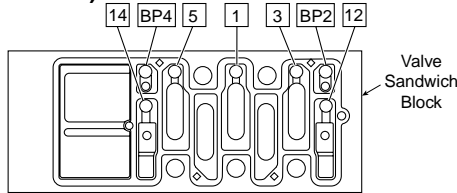


**Connections**

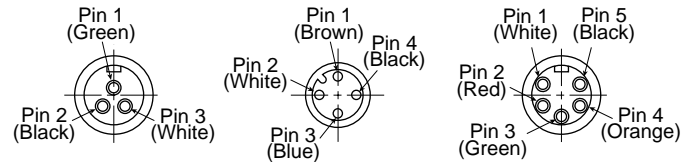
	14 Solenoid	12 Solenoid
Valves with Wires	Black Wires	Red Wires
Valves with Terminal Block (Will accept 18 to 26 Gauge Wires)	14 and Com Terminals	12 and Com Terminals

**Sandwich Block Pilot Plug Locations**

(See Table Below)



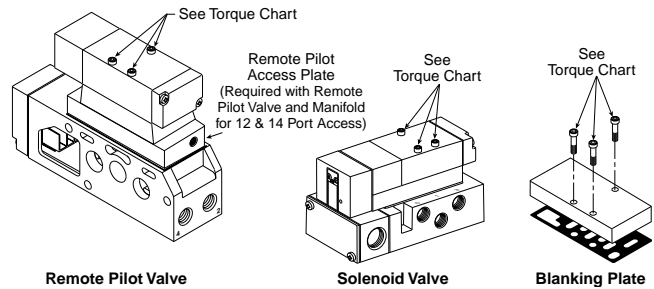
**Wiring - Auto C, F, G**



	3-Pin Mini Encl '1', '7'	4-Pin M12 - Encl '2', '4', '8'			5-Pin Mini Encl '3', '5', '9'		
Wiring Type	C, F, G	C	F	G	C	F	G
Pin #1	Grd	14	N/A	12	12	14	12
Pin #2	14	Grd	12	N/A	12	12	14
Pin #3	Com	Com	Com	Com	Grd	Grd	Grd
Pin #4	N/A	12	14	14	14	12	14
Pin #5	N/A	N/A	N/A	N/A	14	14	12

**⚠ 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.

**Valve Mounting Torque Specifications**



Valve to Base	F5 / H1	F6 / H2	F7 / H3
Torque - in.lb. (Nm)	25 to 35 (3 to 4)	115 to 130 (13 to 15)	120 to 140 (14 to 16)

Using Model No. to Determine Plug Locations		Plug Locations							Using Attributes of Valve & Operator(s) to Determine Plug Locations				
3rd Digit in Model No.	6th Digit in Model No.	Pilot Supply Holes							Pilot Supply	Main Press Supply Type	Control Mechanism Operator Types		
		1	3	5	BP4	BP2	12	14					
1, 2, 5, 6 7 or E	B or C		M	M				X	X	Internal @ Port 1	Single	All Solenoids	
	P or Q	X	M	M					X	External @ Port 12			
	L or M	X	M	M				X		External @ Port 14			
	E or F	X		X				X	X	Internal @ Port 3			
	H or J	X	X					X	X	Internal @ Port 5			
	P or Q	X	M	M					X	External @ Port 12			
3 or F	L or M	X	M	M				X		External @ Port 14	Dual	Single Air Pilot	
	0 or C		M	M	X			X		Internal @ Port 1			
	P or Q	X	M	M	X					External @ Port 12			
	L or M	X	M	M		X				External @ Port 14			
	E or F	X		X	X			X		Internal @ Port 3			
4, 8, 9, 0	H or J	X	X		X			X		Internal @ Port 5	None	Single or Dual	Double Air Pilot
	0		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 holes are open - the probe must be able to pass through the thickness of the sandwich block for the holes to be open.

**For all Instruction Sheets, go to [www.parker.com/pneumatic](http://www.parker.com/pneumatic)**

**Instruction Sheets Available:**

- V-402CP - F & H ISO 5599-2 Solenoid Service
- V-440P - F & H ISO 5599-2 Valve Installation
- V-441P - F & H ISO Valve Service

- V-442P - H ISO 5599-1 Auto Valve Installation
- V-443P - F & H ISO 5599-2 Manifold Installation
- V-444P - H ISO 5599-1 CNOMO Valve Installation
- V-445P - F & H ISO Flow Control Installation

- V-446P - F5/H1 Sandwich Regulator
- V-447P - F6/H2 & F7/H3 Sandwich Regulator
- V-449P - F & H Selector Regulator Installation



**Pneumatic Division North America**  
 Richland, Michigan 49083

**Installation & Service Instructions**  
 V-441BP

**F & H ISO Valve Service**

**ISSUED: May, 2001**

**Supersedes: February, 2001**

**ECN# 28254**

**⚠ 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.

**⚠ CAUTION:** It is recommended that double solenoid and double remote air pilot operated 2-Position valves be mounted so that the axis of the valve spool is in the horizontal plane.

**Body Service Kits (Items referenced next page)**

Valve	Kit Number	Description	Kit Includes Item# (Qty.)
F5 / H1	PS3501P	2-Position Body Service Kit	5 (2), 8/9/10, 14, 15, 22 (2), 32 (2), 33 (2)
F6 / H2	PS3601P		
F7 / H3	PS3701P		
F5 / H1	PS3502P	3-Position APB Body Service Kit	5 (2), 8/9/11, 22 (2), 32 (2), 33 (2)
F6 / H2	PS3602P		
F7 / H3	PS3702P		
F5 / H1	PS3503P	3-Position CE Body Service Kit	5 (2), 8/9/11 22 (2), 32 (2), 33 (2)
F6 / H2	PS3603P		
F7 / H3	PS3703P		
F5 / H1	PS3504P	3-Position PC Body Service Kit	5 (2), 8/9/11, 22 (2), 32 (2), 33 (2)
F6 / H2	PS3604P		
F7 / H3	PS3704P		

**Lubrication**

Factory Pre-lubed. If lubricating in service, use Parker F440 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.

**Application Limits**

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

**Operating Pressure Range:** Maximum 145 PSIG (1000 kPa)

**Ambient Temperature Range:** -15°C to 49°C (5°F to 120°F)

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

**5599-1 CNOMO Solenoid Information and Kits (Item #32 referenced next page)**

Code	Voltage		DC	3-Pin 30mm 'L'	3-Pin 22mm 'P'
	AC			Coil Kit	Coil Kit
	60Hz	50Hz			
19	—	—	24	PS2828619P*	—
42	24	24	—	PS2828A42P	PS2828B42P
45	—	—	12	PS2828A45P	PS2828B45P
49	—	—	24	PS2828A49P	PS2828B49P
53	120	120	—	PS2828A53P	PS2828B53P
57	230	230	—	PS2828A57P	PS2828B57P

\* Enclosure '6' - 2-pin M12 Euro with LED & Surge Suppression

**CNOMO Pilot Kits (Items referenced next page)**

Kit Number	Description	Kit Includes Item# (Qty.)
PS1552	CNOMO Pilot / LMOR	1, 3, 4 (2), 23 (2)
PS1553	CNOMO Pilot / NLMOR	1, 3, 4 (2), 23 (2)
PS1556	Diffuser Nut	1 (5)

**⚠ 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:

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.

**⚠ WARNING**

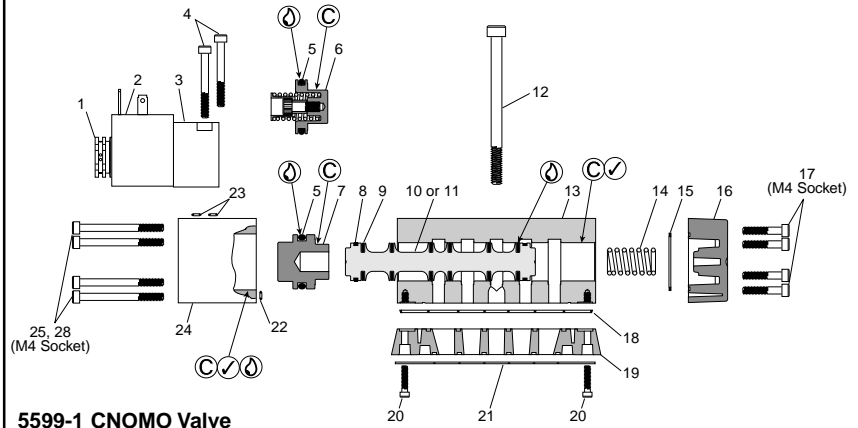
**FAILURE OR IMPROPER SELECTION OR IMPROPER USE OF THE PRODUCTS AND/OR SYSTEMS DESCRIBED HEREIN OR RELATED ITEMS CAN CAUSE DEATH, PERSONAL INJURY AND PROPERTY DAMAGE.**

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.

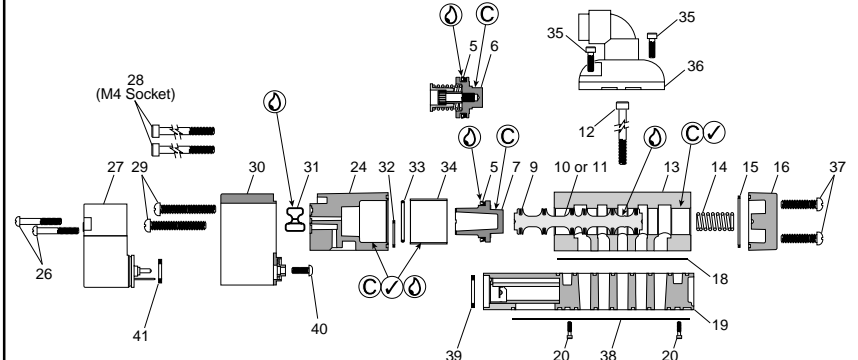
The products described herein, including without limitation, product features, specifications, designs, availability and pricing, are subject to change by Parker Hannifin Corporation and its subsidiaries at any time without notice.

Item	Description	Torque (In. / Lb.)
1	Nut, Diffuser	
2	Coil, CNOMO	
3	Pilot, CNOMO	
4	Screws, CNOMO Mount	15 - 20
5	Seal - Operator Piston	
6	Operator Piston - 3-Position	
7	Operator Piston - 2-Position	
8	Wear Ring	
9	Seal - Spool	
10	Spool - 2-Position (Seals Assembled)	
11	Spool - 3-Position (Seals Assembled)	
12	Screw, Body to Base (F5 / H1)	25 - 35
	Screw, Body to Base (F6 / H2)	115 - 130
	Screw, Body to Base (F7 / H3)	120 - 140
13	Body	
14	Spring, Return Assist	
15	Gasket, Return Operator	
16	Operator, Return	
17	Screws, Return Operator (F6 / F7 / H2 / H3)	15 - 20
18	Gasket, Body to Sandwich Block	
19	Sandwich Block	
20	Screws, Sandwich Block to Body	4 - 6
21	Gasket, Valve to Base - 5599-1 CNOMO	
22	O-ring, Adapter to Body	
23	O-ring, Solenoid to Adapter	
24	Adapter, Operator	
25	Screw, Operator Adapter (F5 / H1)	15 - 20
26	Screw - Solenoid to Adapter	6 - 8
27	Solenoid Operator (See V-402CP)	
28	Screw, Operator Adapter (F6 / H2 / F7 / H3)	15 - 20
29	Screw, Operator Adapter (F5 / H1)	15 - 20
30	Adapter, Lighted, Solenoid to Sandwich Block	
31	Gasket, Solenoid to Operator Adapter	
32	Gasket, Operator Adapter to Body	
33	O-ring, Sleeve (H1 / F6 / F7 / H2 / H3)	
34	Piston Sleeve (H1 / F6 / F7 / H2 / H3)	
35	Screw, Auto Plate	
36	Auto Plate & Connector	
37	Screws, Return Operator (F5 / H1)	15 - 20
38	Gasket, Valve to Base - 5599-2 / 5599-1 Auto	
39	Gasket, Adapter to Sandwich Block	
40	Screw, Solenoid Adapter to Solenoid	4 - 6
41	Gasket, Solenoid to Adapter	

NOTE ON CNOMO PILOT KITS:  
For H 'A' CNOMO valves, use Parker o-ring size 2006 for item 23.



5599-1 CNOMO Valve  
H1, H2, H3



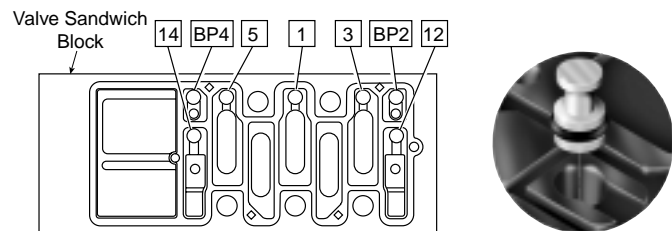
5599-2 & 5599-1 Auto Valve  
H1, H2, H3 & F5, F6, F7

- Lightly grease with provided lubricant.
- Inspect for nicks, scratches, and surface imperfections. If present, reduced service life is probable and future replacement should be planned.
- Clean with lint-free cloth.

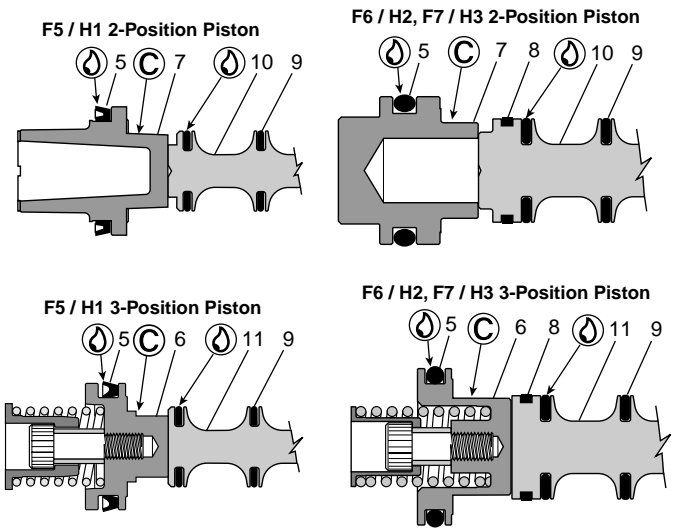
**Valve to Base Gaskets - Item# 21 & 38 (Qty 5 per Kit)**

	5599-2 / 5599-1 Auto	5599-1 CNOMO
F5 / H1	PS3505P	PS3506P
F6 / H2	PS3605P	PS3606P
F7 / H3	PS3705P	PS3706P

**Sandwich Block Pilot Plug Kits - PS3509P (Qty. 20)**



**CAUTION:** Do not remove the valve body from the sandwich block. Doing so could risk possible seal contamination. There are no parts between the valve body and sandwich block that require servicing.



**For all Instruction Sheets, go to [www.parker.com/pneumatic](http://www.parker.com/pneumatic)**

**Instruction Sheets Available:**

- V-402CP - F & H ISO 5599-2 Solenoid Service
- V-440P - F & H ISO 5599-2 Valve Installation
- V-441P - F & H ISO Valve Service

- V-442P - H ISO 5599-1 Auto Valve Installation
- V-443P - F & H ISO 5599-2 Manifold Installation
- V-444P - H ISO 5599-1 CNOMO Valve Installation
- V-445P - F & H ISO Flow Control Installation

- V-446P - F5/H1 Sandwich Regulator
- V-447P - F6/H2 & F7/H3 Sandwich Regulator
- V-449P - F & H Selector Regulator Installation



**Pneumatic Division**  
Richland, Michigan 49083

**Installation & Service Instructions**  
**V-443P**  
**F & H ISO 5599-2 Manifold Installation**  
**ISSUED: November, 2001**  
**Supersedes: February, 2001**  
Rev. 1 NPR# R06988

**! 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.

3. An external ground connection must be attached to the green ground screw of every base in an assembly.
4. Disregard unused wires or terminals.

**Connections**

	14 Solenoid	12 Solenoid
Valves with Wires	Black Wires	Red Wires
Valves with Terminal Block (Will accept 18 to 24 Gauge Wires)	14 and Com Terminals	12 and Com Terminals

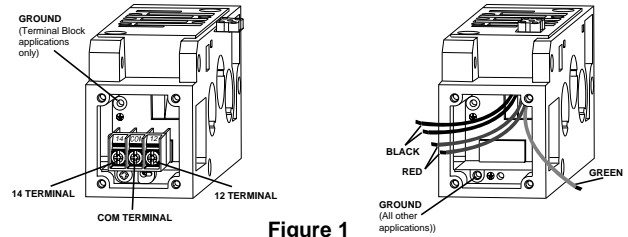
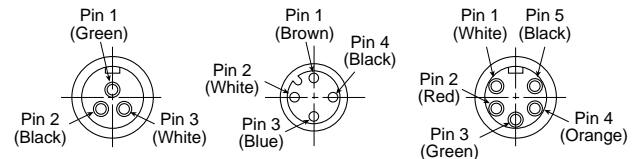


Figure 1

**Wiring - Auto C, F, G**

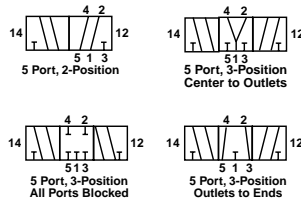


**Introduction**

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

**Port Identification / Connections / Symbols**

Port No.	Single Pressure	Dual Pressure
1	Inlet	Exhaust
2	Outlet	Outlet
3	Exhaust	Inlet
4	Outlet	Outlet
5	Exhaust	Inlet
12, 14	Pilot ports for External Pilot or Remote Pilot	



**Application Limits**

These products are intended for use in general purpose compressed air systems only. Compliance with the rated pressure, temperature, and voltage is necessary - see Installation & Service Instructions (V-440P) packed with valve.

**Operating Pressure Range:** Maximum 145 PSIG (1000 kPa)

**Ambient Temperature Range:** -15°C to 49°C (5°F to 120°F)

**! WARNING**

Air exhausting from one valve into the exhaust gallery of the manifold assembly may momentarily pressurize other valve circuits open to the same gallery. Design the circuit such that there is no hazard or consequence of damage from this action.

**Wiring Instructions**

1. Follow all requirements for local and national electrical codes.
2. Remove end cover from base by backing off the two captive screws. Reassemble cover to base by tightening screws from 0.8 to 1.0 Nm (7 to 9 in-lbs).

**! 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.

**! 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.**

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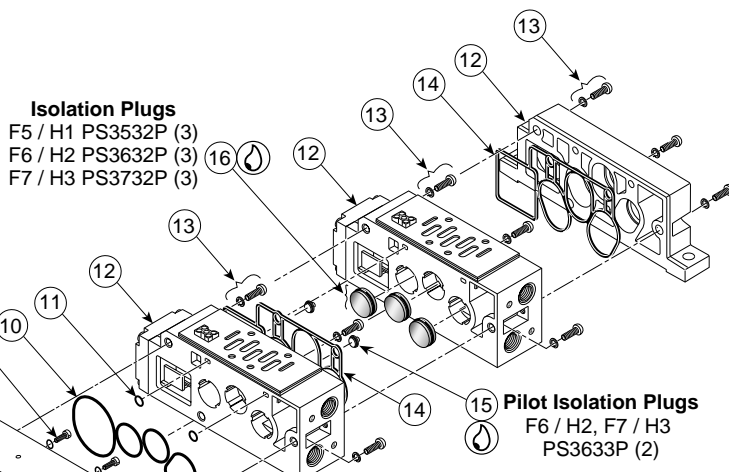
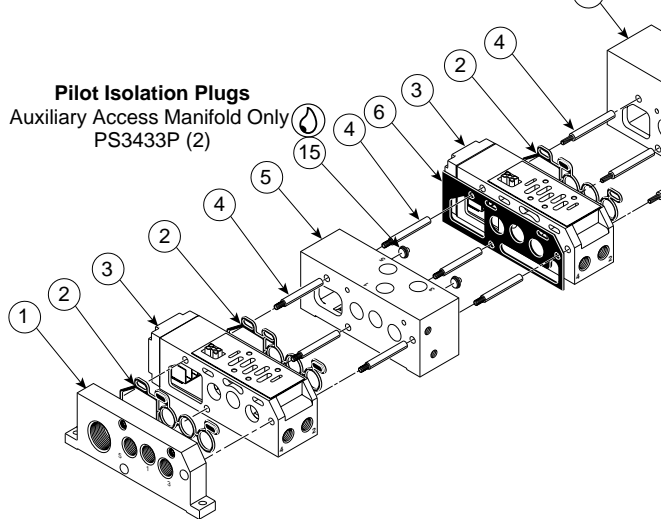
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**F5 / H1 Manifold Gaskets**

Select appropriate gasket to block external pilot galley for special piloting applications.

PS353300BP      PS353301BP      PS353302BP

Lightly grease with provided lubricant.



**O-ring Seal**  
 Only for  
 PS362\*\*\*P and P372\*\*\*P

**Isolator Plug Location with Transition Plates**

	Left	Right		
			F3 to F5	R
			F3 to F6	R
			F5 / H1 to F6 / H2	L
			F5 / H1 to F7 / H3	L
			F5 / H1 to F7 / H3	L
			F6 / H2 to H4	L
			F7 / H3 to H4	L

Item #	Description
1	Left End Plate
2	Molded Gasket
3	Manifold Base (F5 / H1)
4	Tie Rod
5	Auxiliary Access Manifold
6	Flat Gasket - manifold base to auxiliary access manifold
7	Transition Plate
8	Mounting Screws
9	O-ring Seal Washer
10	O-rings - transition plate to manifold
11	Pilot Gallery O-rings
12	Manifold Base (F6 / H2, F7 / H3)
13	Mounting Screw & Lock Washers
14	Manifold Gasket
15	Isolation Plugs - Pilot Gallery (2)
16	Isolation Plugs - Main Gallery (2)
17	Collective Wiring End Plate (Blank or Top Port)
18	Collective Wiring End Plate Gasket

**Assembly Techniques**

**F5 / H1**

1. Lay Left Hand End Plate (when looking at cylinder ports) port side down.
2. Place Gasket in gasket track (and Isolator Plugs if required).
3. Screw in Tie Rods and build manifold vertically.
4. Place Right Hand End Plate and lightly tighten the screws.
5. Lay manifold on flat surface and check for straightness.
6. Tighten End Plate Bolts per torque specs, alternating each bolt incrementally.

Note: When assembling a manifold greater than 5 stations, back each tie rod out 1 to 2 turns. This will allow engagement of the end plate screws to the last station.

**F6 / H2, F7 / H3**

1. Lay Left Hand End Plate (when looking at cylinder ports) port side down.
2. Place Gasket in gasket track (and Isolator Plugs if required).
3. Tighten all 3 bolts per torque spec for each station and build manifold vertically.
4. Place Right Hand End Plate and lightly tighten screws to torque.
5. Check the manifold for straightness. Loosen and tighten bolts if needed.

Add Valves and Accessories. All Manifold Assemblies should be leak tested before operation.

**Manifold / End Plate Assembly Torque Values**

Valve Series	F5 / H1	F6 / H2	F7 / H3
Torque - in.lb. (Nm)	40 to 50 (4.5 to 5.1)	195 to 205 (22.0 to 23.2)	195 to 205 (22.0 to 23.2)

**Hi-Flow Manifold Repair Kits**

Kit Number	Description	Item Number
PS3512BP	H1 / F5 Manifold Tie Rod (12)	4
PS3513BP	H1 / F5 Manifold to Manifold Gasket (1)	2
PS3612P	H2 / H3, F6 / F7 Manifold Hardware (12)	13
PS3613P	H2 / F6 Manifold to Manifold Gasket (1)	14
PS3713P	H3 / F7 Manifold to Manifold Gasket (1)	14

**For all Instruction Sheets, go to [www.parker.com/pneumatic](http://www.parker.com/pneumatic)**

**Instruction Sheets Available:**

V-402CP - F & H ISO 5599-2 Solenoid Service	V-442P - H ISO 5599-1 Auto Valve Installation	V-446P - F5/H1 Sandwich Regulator
V-440P - F & H ISO 5599-2 Valve Installation	V-443P - F & H ISO 5599-2 Manifold Installation	V-447P - F6/H2 & F7/H3 Sandwich Regulator
V-441P - F & H ISO Valve Service	V-444P - H ISO 5599-1 CNOMO Valve Installation	V-448P - F5/H1, F6/H2 & F7/H3 Interconnect Wiring
	V-445P - F & H ISO Flow Control Installation	V-449P - F & H Selector Regulator Installation



**Pneumatic Division North America**  
 Richland, Michigan 49083

**Installation & Service Instructions:**  
 V-445P

**F & H ISO Sandwich Flow Control Installation**

**ISSUED: February, 2001**

**Supersedes: February, 2001**

**Rev. 2 ECN# 9347**

**⚠ 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.

**Installation & Operating Instructions:**

A Flow Control "Sandwich" controls the flow of air from the valve exhaust ports to atmosphere. The F5 / H1, F6 / H2, & F7 / H3 4-Way valve is typically used with a double acting cylinder alternately pressurizing one end while exhausting the other. Cylinder speed can be influenced by restricting the exhaust path.

The Flow Control "Sandwich" is intended for use with the respective subbase or manifold mounted valves. F5 / H1, F6 / H2, & F7 / H3 valves and flow controls are designed in conformance to ISO 5599/1, 5599/2, Sizes 1, 2, & 3.

H1, H2, & H3 Flow Control "Sandwiches" are only recommended for use with Common Port versions of Sandwich Regulators. The Flow Control is to be assembled between the regulator and the subbase or manifold.

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.

**Lubrication**

Factory Pre-lubed. If lubricating in service, use Parker F440 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.**

**Application Limits:**

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

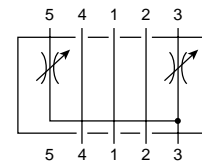
**Operating Pressure Range:** Maximum 145 PSIG, 1000kPa

**Ambient Temperature Range:** -18°C to 60°C (0°F to 140°F)

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

**NOTE:** The above ratings are those of the associated valve.

**ANSI Symbol:**



**Installation:**

1. Remove the valve from the subbase or manifold (if assembled) by removing and retaining the four mounting screws (A).
2. Clean all mating surfaces of valve, subbase or manifold and Flow Control "Sandwich" of dust and dirt.
3. Install male-female tie rods (C) to base. Tighten the tie rods using hex broached on the inside of the female end.

Internal Hex		
F5 / H1	F6 / H2	F7 / H3
M3	M4	M5

4. Slide gasket (D) over the male-female tie rods protruding from top of subbase or manifold, lining up electrical plug cavity.
5. Slide Flow Control "Sandwich" over the male-female tie rods (C) protruding from top of subbase or manifold and press down on flow control to seat electrical plug (if applicable).
6. Check to insure that the gasket (B) on the bottom of the valve sandwich block is still properly seated in its gasket track.

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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.**

- Place valve on top of Flow Control "Sandwich" lining up all mounting holes and press down on flow control to seat electrical plug (if applicable).
- Assemble valve, flow control and subbase or manifold together with the valve mounting screws (A). Tighten as follows:

ISO Spec	Size	Sandwich Flow Control Model No.	Torque
5599/1	H1	PS4042P	3.4 to 4.0 Nm (30 to 35 in-lb)
5599/2	H1	PS4035P	
No Plug	F5	PS3542P	5.1 to 5.6 Nm (45 to 50 in-lb)
With Plug	F5	PS3535P	
5599/1	H2	PS4142P	9.0 to 11.3 Nm (80 to 100 in-lb)
5599/2	H2	PS4135P	
No Plug	F6	PS3642P	9.0 to 11.3 Nm (80 to 100 in-lb)
With Plug	F6	PS3635P	
5599/1	H3	PS4242P	9.0 to 11.3 Nm (80 to 100 in-lb)
5599/2	H3	PS4235P	
No Plug	F7	PS3742P	9.0 to 11.3 Nm (80 to 100 in-lb)
With Plug	F7	PS3735P	

- Apply inlet pressure and check for leaks. If any are present, do not operate the valve, repeat this assembly process until satisfactory.

**Adjustment Procedures:**

**For F6 / H2 & F7 / H3**

Adjustment screw labeled "5" controls the flow of air from cylinder Port 4 to exhaust Port 3. With a double solenoid valve this occurs when operator #12 is actuated. With a single solenoid valve this occurs when operator #14 is not actuated. Adjustment screw labeled "3" controls air from cylinder Port 2 to exhaust Port 3.

- Turn both adjustment screws clockwise until fully closed and then counterclockwise slightly.
- While cycling valve with cylinder adjust clockwise to decrease speed or counterclockwise to increase speed.

**For F5 / H1**

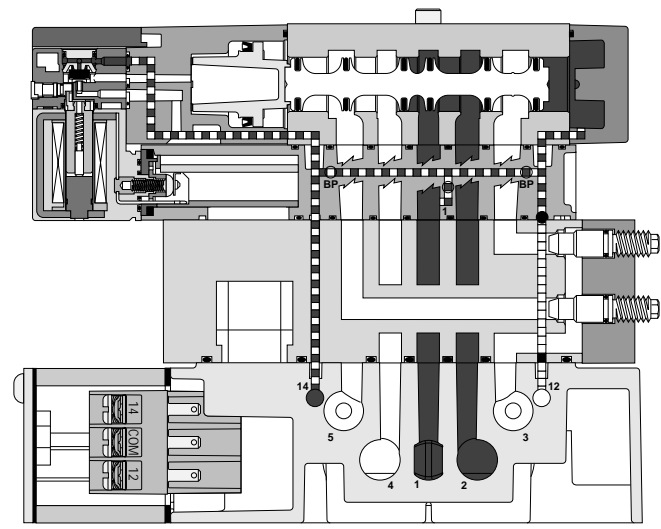
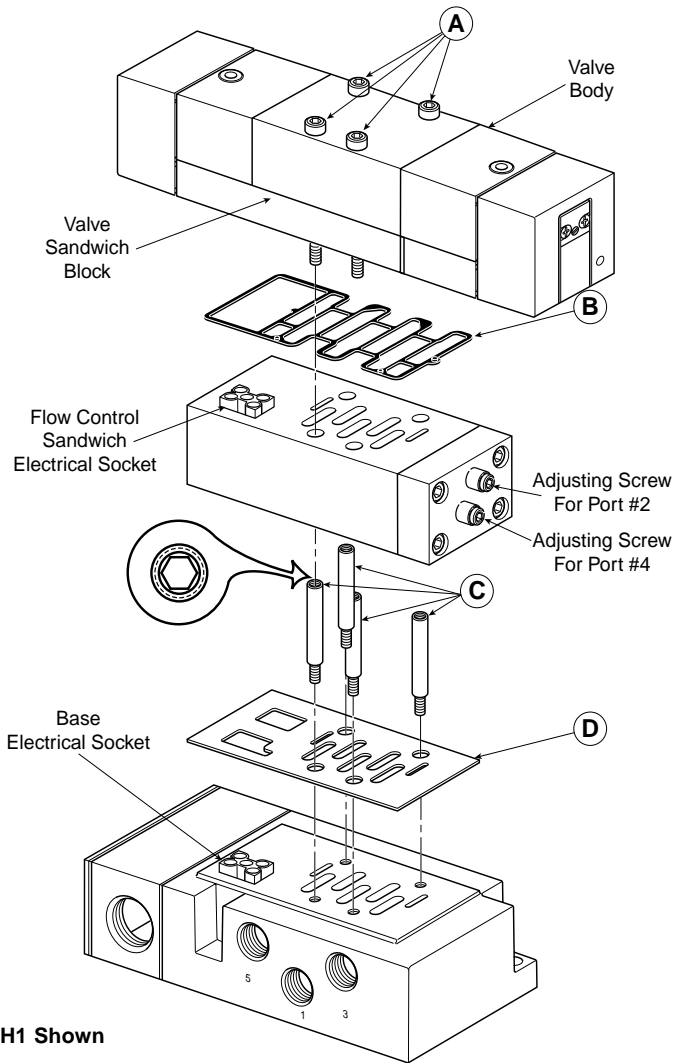
Both adjusting screws are located at the 12 end of the assembly. When viewed from this end, the screw to the left (marked port 4) controls flow from valve cylinder port 4 to exhaust. The screw to the right (marked port 2) controls flow from valve cylinder port 2 to exhaust. Both valves exhaust the base at port 3.

**Cv Values**

			Flow Control	Cv			
				1-2	1-4	2-3	4-3
H1	PS401165AP	3/8"	H11VXBG019B PS4042P	1.4	1.2	.09	.08
H2	PS411167AP	1/2"	H21VXBG019B PS4142P	2.2	2.2	1.5	1.6
H3	PS421169AP	3/4"	H31VXBG019B PS4242P	4.3	4.4	2.8	3.7

**Tie Rods**

Valve	Qty.	Kit Number
F5 / H1	Tie Rods (12)	PS3536P
F6 / H2	Tie Rods (12)	PS3636P
F7 / H3	Tie Rods (12)	PS3736P



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- V-441P - F & H ISO Valve Service
- V-442P - H ISO 5599-1 Auto Valve Installation
- V-443P - F & H ISO 5599-2 Manifold Installation
- V-444P - H ISO 5599-1 CNOMO Valve Installation

- V-445P - F & H ISO Flow Control Installation
- V-446P - F5/H1 Sandwich Regulator
- V-447P - F6/H2 & F7/H3 Sandwich Regulator
- V-449P - F & H Selector Regulator Installation



Pneumatic Division North America  
Richland, Michigan 49083

Installation & Service Instructions  
V-446P

F5 / H1 Sandwich Regulators

ISSUED: March, 2001

Supersedes: None

NPR# 1998

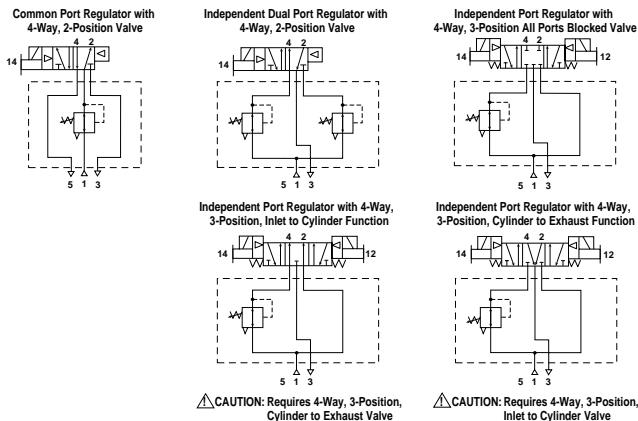
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## Introduction

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



**NOTE:** The Independent Regulators shown are with regulators on the 14 end. Regulators may also be on the 12 end, or both the 12 and 14 end.

**CAUTION:** The reverse valve porting utilized with Independent Port will reverse the function of 4-Way, 3-Position cylinder to exhaust and 4-Way, 3-Position inlet to cylinder to valves. Utilize opposite function valve for normal operation.

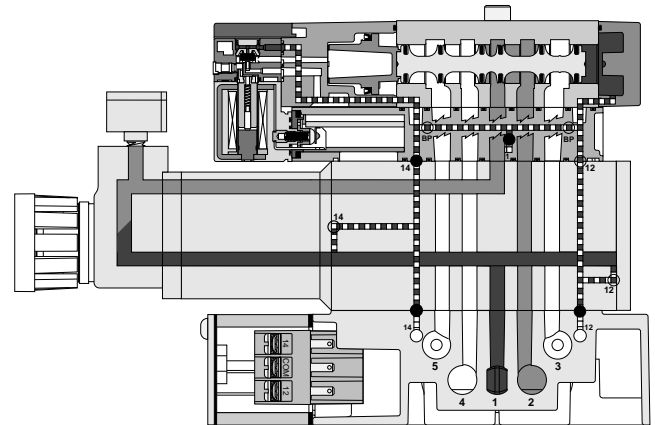
## Application Limits

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

**Operating Pressure Range:** Maximum 145 PSIG (1000 kPa)

**Ambient Temperature Range:** -15°C to 49°C (5°F to 120°F)

## F5 / H1 Sandwich Regulator - Common Port / Internal Pilot Shown



## Installation (See assembly on next page)

- Remove pressure and electrical connections before installation.
1. After removing Valve from Base, install three (F5) or four (H1) Mounting Studs (24) from Regulator Kit to the Base, torque finger tight.
  2. Place the Gasket (23) over the Studs and on the Base.
  3. Install Regulator over Studs. Carefully engage the Electrical Plug (F5 / H1 5599-2).
  4. Install Valve onto Regulator. Carefully engage the electrical plug (F5 / H1 5599-2).
  5. Tighten Valve Bolts (19) - three (F5) or four (H1) - from 2.8 to 3.9 Nm (25 to 35 in-lbs).
  6. Apply main pressure and check for leaks - repeat assembly if leaks are present.

**NOTE:** If both a sandwich flow control and sandwich regulator are to be installed, the flow control should be installed between the regulator and the base. Both sets of studs should be installed to base before installing the flow control.

## Lubrication

Factory pre-lubed. If lubricating in service, use Parker F440 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.

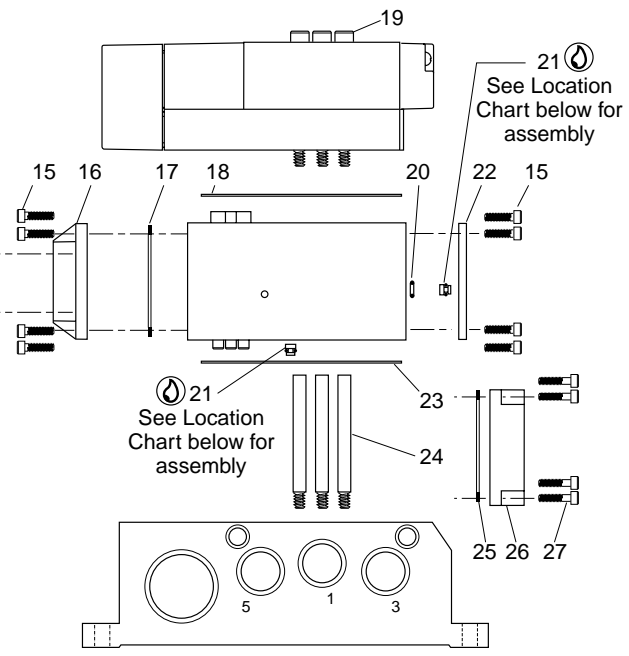
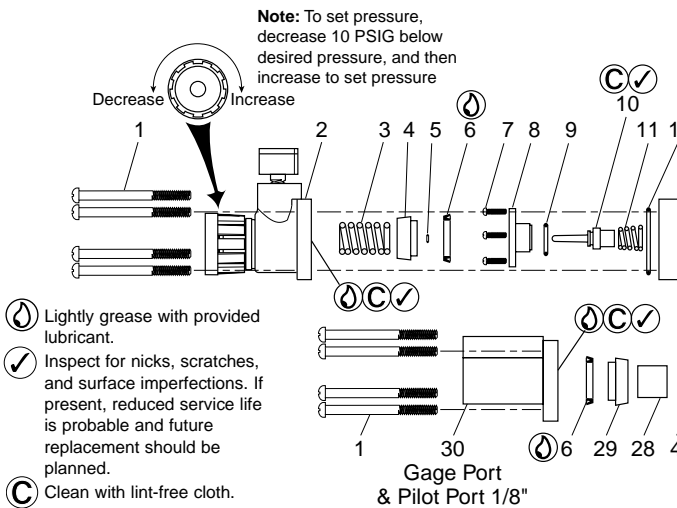
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**Service Instructions**



**Sandwich Regulator Kits**

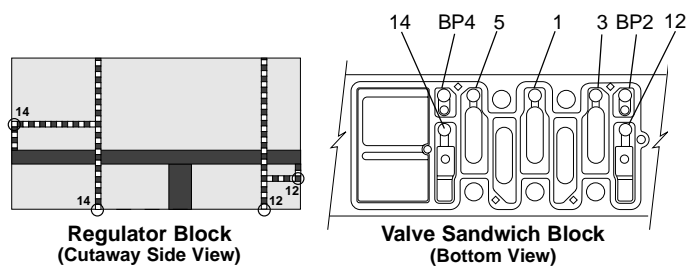
Kit Number	Description	Kit Includes Item# (Qty.)
PS3439P	Repair Kit	4, 5, 6, 9, 10,11, 12, 29
PS3445P	Regulator Conversion Kit	1 (4), 2, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14
PS3447P	Pilot Conversion Kit	1 (4), 6, 28, 29, 30
PS3450030P	Spring - 30 PSIG	3
PS3450060P	Spring - 60 PSIG	3
PS3450125P	Spring - 125 PSIG	3
PS3509P	Pilot Plug Kit	21 (20)
PS3540P	Mounting Studs	24 (12)
PS3548P	By-Pass Plate	25, 26, 27 (4)

**Component List**

The components listed below are for identification purposes only. Some of these components are available in various Sandwich Regulator Kits, some are not available due to special factory assembly. Individual components are not sold separately since all kit components should be installed when serviced.

**Sandwich Block Pilot Plug Locations**

Pilot Plugs in the Valve Sandwich must also be changed per the chart below when assembled together with a Sandwich Regulator.



Valve & Reg. Model Number			Regulator Block				Valve Sandwich Block						
Operator Function Digit #3	Pilot Source Digit #6	Regulator Blk. Func. Digit #11	Bottom		Ends		14	BP4	5	1	3	BP2	12
			14	12	14	12							
1, 2, 5, 6, 7, E	B, C	1, 2, 3, 4, 5	X	X			X			X			
	L, M				X	X				X			X
	P, Q				X	X	X			X			
3 or F	0, C		X	X			X		X				
	P, Q				X	X		X		X			
4, 8, 9, 0	0			X	X		X					X	
All	E, F, H, J	Regulator Not Available with Pilot Source Codes Listed											

Item	Description	Torque Nm (In. / Lb.)
1	Screw, Regulator Block	0,9 to 1,4 (8 to 12)
2	Bonnet Assembly	
3	Spring, Control (30, 60 or 125 PSIG)	
4	Piston, Relieving (Includes vent hole)	
5	O-ring, Piston Vent	
6	Lip Seal, Piston	
7	Screw, Seat Plate	0,3 to 0,6 (3 to 5)
8	Seat Plate	
9	O-ring, Seat Plate	
10	Poppet Assembly	
11	Spring, Poppet Return	
12	O-ring, Bonnet / Body Seal	
13	Body, Regulator	
14	Gasket, Regulator Block	
15	Screw, End Plate	1,1 to 1,7 (10 to 15)
16	Adapter, Regulator	
17	Gasket, Regulator Block	
18	Gasket, Valve to Regulator Block	
19	Screw, Valve to Mtg. Stud	2,8 to 3,9 (25 to 35)
20	O-ring	
21	Plug, Pilot	
22	End Plate	
23	Gasket, Regulator Base	
24	Stud, Mounting	Finger Tight
25	Gasket, Bypass Plate	
26	Bypass Plate, Dual Pressure	
27	Screw, Bypass Plate	1,1 to 1,7 (10 to 15)
28	Spacer, Air Pilot	
29	Piston, Non-Relieving (No vent hole)	
30	Bonnet, Air Pilot	

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- V-445P - F & H ISO Flow Control Installation

- V-446P - F5/H1 Sandwich Regulator
- V-447P - F6/H2 & F7/H3 Sandwich Regulator
- V-449P - F & H Selector Regulator Installation



**Pneumatic Division**  
Richland, Michigan 49083

**Installation & Service Instructions**  
**V-447P**

**F6 / H2B, F7 / H3B**  
**Sandwich Regulators**

**ISSUED: December, 2001**

**Supersedes: None**

**ECN# P28681 Rev. 1**

## ! WARNING

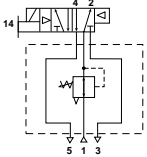
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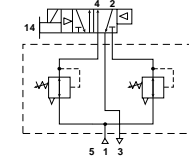
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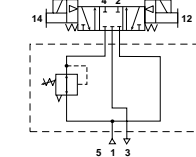
Common Port Regulator with 4-Way, 2-Position Valve



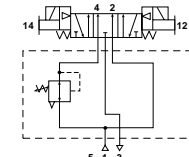
Independent Dual Port Regulator with 4-Way, 2-Position Valve



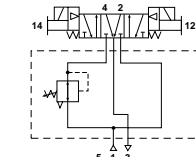
Independent Port Regulator with 4-Way, 3-Position All Ports Blocked Valve



Independent Port Regulator with 4-Way, 3-Position, Inlet to Cylinder Function



Independent Port Regulator with 4-Way, 3-Position, Cylinder to Exhaust Function



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

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

**NOTE:** The Independent Regulators shown are with regulators on the 14 end. Regulators may also be on the 12 end, or both the 12 and 14 end.



**CAUTION:** The reverse valve porting utilized with Independent Port will reverse the function of 4-Way, 3-Position cylinder to exhaust and 4-Way, 3-Position inlet to cylinder to valves. Utilize opposite function valve for normal operation.

## Application Limits

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**Operating Pressure Range:** Maximum 145 PSIG (1000 kPa)

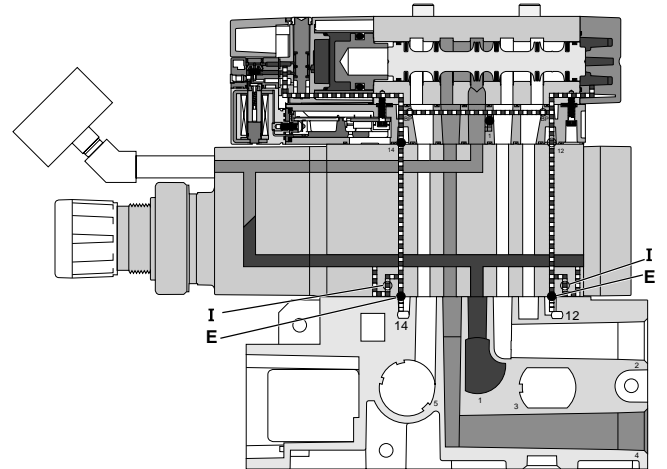
**Ambient Temperature Range:** -15°C to 49°C (5°F to 120°F)

## 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.

## F6 / H2B, F7 / H3B Sandwich Regulator



## Installation

Remove pressure and electrical connections before installation.

1. After removing Valve from Base, install three (F6, F7) or four (H2B, H3B) Mounting Studs (26) from Regulator Kit to the Base, torque finger tight.
2. **F6 / H2B Common & Independent Port Versions** – Place Interface Block Track Seal (29) into Interface Block Assembly (22).  
**F7 / H3B All Versions & F6 / H2B Selector Regulator Version-** Place the Gasket (29) over the Studs and on the Base.
3. Install Regulator over Studs. Carefully engage the Electrical Plug (F6 / H2B 5599-2, F7 / H3B 5599-2).
4. Install Valve onto Regulator. Carefully engage the Electrical Plug (F6 / H2B 5599-2, F7 / H3B 5599-2).

5. Tighten Valve Bolts (20) as follows:

Valve Type	No. of Bolts	Wrench Size	Torque Nm (In.-Lb.)
F6 / H2B	3 / 4	M5	13 to 15 (115 to 130)
F7 / H3B	3 / 4	M6	14 to 16 (120 to 140)

6. Apply main pressure and check for leaks – repeat assembly if leaks are present.

**NOTE:** If both a sandwich flow control and sandwich regulator are to be installed, the flow control should be installed between the regulator and the base. Both sets of studs should be installed to base before installing the 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.**

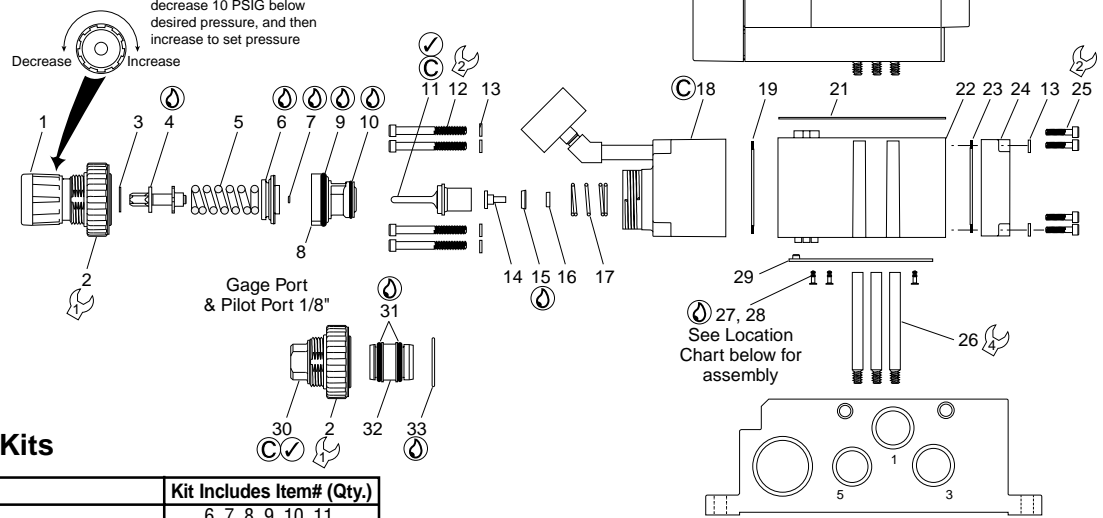
This document and other information from Parker Hannifin Corporation, its subsidiaries and authorized distributors provide product and/or system options for further investigation by users having technical expertise. It is important that you analyze all aspects of your application, including consequences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

Service Instructions

- Lightly grease with provided lubricant.
- Inspect for nicks, scratches, and surface imperfections. If present, reduced service life is probable and future replacement should be planned.
- Clean with lint-free cloth.
- Torque: Nm (In.-Lb.)**
- Hand Tight + 1/4 Turn
- 3,4 to 4,5 (30 to 40)
- F6/H2B: 13 to 15 (115 to 130)  
F7/ H3B: 14 to 16 (120 to 140)
- Finger Tight

**Note:** To set pressure, decrease 10 PSIG below desired pressure, and then increase to set pressure



Sandwich Regulator Kits

Kit Number	Description	Kit Includes Item# (Qty.)
PS3639P	Repair Kit (F6/H2B, F7/H3B)	6, 7, 8, 9, 10, 11, 17, 19 (2), 31, 33
PS3645P	Regulator Conversion Kit (F6/H2B, F7/H3B)	1, 3, 4, 6, 7
PS3647P	Pilot Conversion Kit (F6/H2B, F7/H3B)	7, 30, 31 (2), 32, 33
P04427	Spring - 30 PSIG (F6/H2B, F7/H3B)	5
P04426	Spring - 60 PSIG (F6/H2B, F7/H3B)	5
P04425	Spring - 125 PSIG (F6/H2B, F7/H3B)	5
PS3609P	Pilot Plug Kit (F6/H2B)	27 (20)
PS3709P	Pilot Plug Kit (F7/H3B)	28 (20)
PS3640P	Mounting Studs (F6/H2B)	26 (12)
PS3740P	Mounting Studs (F7/H3B)	26 (12)
PS3648P	By-Pass Cap (F6/H2B, F7/H3B)	13 (4), 23, 24, 25 (4)
PS3654P	Regulator to Base Gasket Kit (F6/H2B Common & Independent Port)	29 (5)
PS365401P	Regulator to Base Gasket (F6/H2B Selector)	29 (5)
PS3754P	Regulator to Base Gasket Kit (F7/H3B)	29 (5)

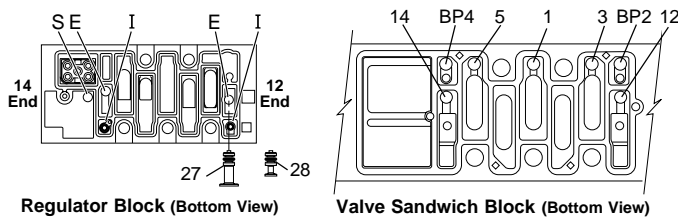
Component List

The components listed below are for identification purposes only, Some of these components are available in various Sandwich Regulator Kits, some are not available due to special factory assembly. Individual components are not sold separately since all kit components should be installed when serviced.

Item	Description	Item	Description
1	Bonnet Assembly	18	Housing, Regulator
2	Collar	19	Seal, Regulator Track
3	Thrust Washer	20	Screw, Valve Mounting - F6 / H2B
4	Control Screw Assembly	20	Screw, Valve Mounting - F7 / H3B
5	Spring, Control (30, 60 or 125 PSIG)	21	Gasket, Valve to Regulator Base
6	Diaphragm Assembly, Relieving (Includes vent hole)	22	Block Assembly, Interface
7	O-ring, Piston Vent	23	Seal, Bypass Cap Track
8	Seat Insert Assembly	24	Bypass Cap, Dual Pressure
9	O-ring, Upper Seat Insert	25	Screw, Bypass Cap
10	O-ring, Lower Seat Insert	26	Stud, Mounting
11	Poppet Assembly	27	Plug, Pilot (F6/H2B Regulator)
12	Screw, Regulator Housing	28	Plug, Pilot (F7/H3B Regulator, F6/H2B Valves, F7/H3B Valves)
13	M5 Lockwasher	29	Seal, Interface Block Track
14	Retainer, Seal	30	Bonnet, Air Pilot
15	Vee Packing	31	O-ring, Piston
16	Retainer, Backflow	32	Piston
17	Spring, Poppet Return	33	O-ring, Air Pilot Cap

Sandwich Block Pilot Plug Locations

Pilot Plugs in the Valve Sandwich Block and Sandwich Regulator must be changed per the chart below when assembled together.



Valve Model Number		Sandwich Regulator Block				Valve Sandwich Block				Valve Actuator Type / Pilot Source						
Operator Function Digit #3	Pilot Source Digit #6	14 End		12 End		Pilot Supply Holes				#14 End		#12 End				
		S	E	I	E	I	14	BP4	5	1	3	BP2	12	Actuator Type	Pilot Source	Actuator Type
1, 2, 5, 6, 7 or E	B or C*	X	X		X	X		M	X	M			Solenoid Operator	Internal @ Port 1	Solenoid Operator or Air Return	Internal @ Port 1
	L or M*			X	X	X		M	X	M	X		Solenoid Operator	External @ Port 14	Solenoid Operator or Air Return	External @ Port 14
	P or Q*	X	X		X	X		M	X	M			Solenoid Operator	External @ Port 12	Solenoid Operator or Air Return	External @ Port 12
3 or F	0 or C*	X	X	X	X		X	M	X	M			Remote Pilot @ Port 14	None	Air Return	Internal @ Port 1
3 or F	P or Q*	X	X		X		X	M	X	M			Remote Pilot @ Port 14	None	Air Return	External @ Port 12
4, 8, 9, 0	0	X	X		X		X	M		M	X		Remote Pilot @ Port 14	None	Remote Pilot @ Port 12	None
All	E, F, H, J	Regulator Not Available with Pilot Source Codes Listed														

\* Valve Model Numbers with C, M or Q (Internal Pilot Exhaust) when used in combination with Independent or Selector Regulators (Kit No's: PS\*\*\*\*2\*\*P or PS\*\*\*\*3\*\*P) require that the valve be purchased in combination with the Sandwich Regulator to insure proper function.

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 holes are open - the probe must be able to pass through the thickness of the sandwich block for the holes to be open.

For all Instruction Sheets, go to [www.parker.com/pneumatic](http://www.parker.com/pneumatic)

Instruction Sheets Available:

V-402CP - F & H ISO 5599-2 Solenoid Service	V-442P - H ISO 5599-1 Auto Valve Installation	V-446P - F5/H1 Sandwich Regulator
V-440P - F & H ISO 5599-2 Valve Installation	V-443P - F & H ISO 5599-2 Manifold Installation	V-447P - F6/H2 & F7/H3 Sandwich Regulator
V-441P - F & H ISO Valve Service	V-444P - H ISO 5599-1 CNOMO Valve Installation	V-449P - F & H Selector Regulator Installation
	V-445P - F & H ISO Flow Control Installation	



**Pneumatic Division North America**  
 Richland, Michigan 49083

**Installation & Service Instructions**  
**V-474P**

**H2 & H3 Series Valves -**  
**Subbase Installation**

**ISSUED: October, 2000**

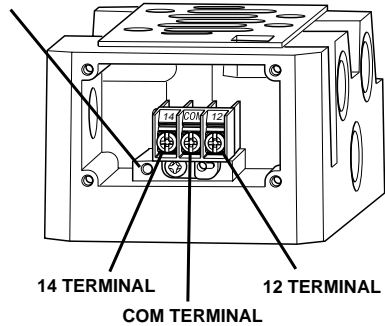
**NPR# 6963**

**⚠ 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.

**GROUND**  
 (Terminal Block applications only)



**Connections**

	14 Solenoid	12 Solenoid
Valves with Wires	Black Wires	Red Wires
Valves with Terminal Block (Will accept 18 to 24 Gauge Wires)	14 and Com Terminals	12 and Com Terminals

**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:**

	<b>kPa</b>	<b>psig</b>	<b>bar</b>
<b>Min.</b>	240	35	2.4
<b>Max. (2 &amp; 3-Position)</b>	1030	150	10.3

**NOTE:** Solenoid operated valves, when specified with external pilot, may have operating pressures down to vacuum in the main valve. External pilot pressure and air pilot signals must be greater than or equal to that in the main valve, but not outside the ratings above.

**Ambient Temperature Range:** -18°C to 60°C (0°F to 140°F)

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

**⚠ 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.

**Wiring Instructions**

1. Follow all requirements for local and national electrical codes.
2. Remove end cover from base by backing off the four captive screws. Reassemble cover to base by tightening screws from 0.8 to 1.0 Nm (7 to 9 in-lbs).
3. An external ground connection must be attached to the green ground screw.
4. Disregard unused wires or terminals.

**Valve Mounting Procedures**

If valve and subbase are purchased separately, use the following procedure to mount valve to base:

1. Using a clean, lint free cloth, clean top surface of subbase and bottom surface of valve body of dirt and dust.
2. Check to insure that gasket is properly seated in gasket track on sandwich block.
3. Place valve assembly on top of subbase. On electrically operated valves, line up plug with socket in base and gently press down on valve to seat plug properly.
4. Using a criss-cross pattern, torque the H3 mounting screws 13.5 to 15.8 Nm (120 to 140 in-lbs). Torque the H2 mounting screws 13.0 to 14.7 Nm (115 to 130 in-lbs).
5. Apply main pressure and check for leaks. If any are present, do not operate the valve - repeat the reassembly process until satisfactory.

**⚠ WARNING**

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

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

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.**

## Port Connections

(Below is a brief summary of typical port connections. See Technical Data section of the H Series catalog for more details.)

1. Connect a single inlet air supply to port "1". (For dual pressure applications connect inlet air supplies to ports "3" and "5".)
2. Connect mufflers (or pipe exhaust) to ports "3" and "5" for single air supply. For dual pressure applications, connect to port "1".
3. Connect cylinder ports marked "2" and "4" to cylinder or other device to be supplied air.
4. External pilot supply may be applied to ports 12 or 14. Double air piloted valves need to use both 12 and 14 ports for remote pilot signal; and single air piloted valves have to use port 14 for remote pilot signal.
5. For 2-Way and 3-Way functions, you will need to plug some of the ports - consult the Technical Data section of the H Series catalog.

**NOTE:** Some subbase kits come with pipe plugs. These plugs should be located as desired.

## Instruction Sheets Available:

V-480\*P - H3 Valve Installation & Service Instructions

V-481\*P - H3 Valve Installation & Service Instructions

V-498\*P - H2 Valve Installation & Service Instructions

## Field Conversion of Pilot Supplies (Internal vs. External)

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

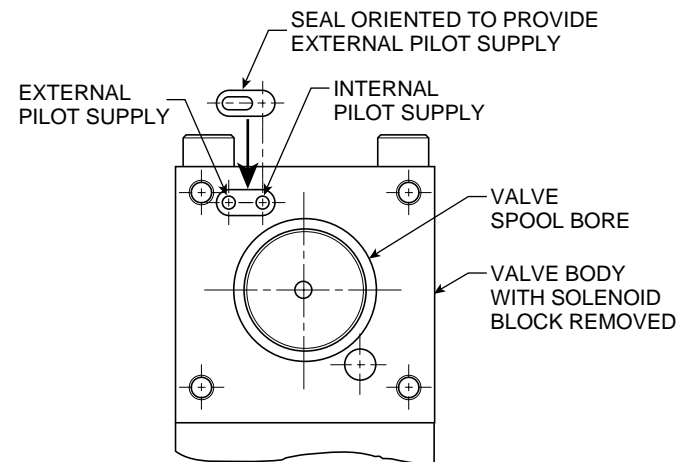
1. Remove valve from base, if required.
2. Remove (4) screws which fasten solenoid block or end cap to body at both #12 and #14 ends.

**NOTE:** Valve body has two pilot holes (internal and external). The internal pilot hole is located nearest to valve spool bore (Figure 1).

3. To select external supply, install seal in its recess in the body with the projection on backside of seal plugging the internal supply hole. To select internal supply, install seal as above but with the projection plugging the external supply hole.

**NOTE:** The selection of seal positioning must be the same at both 12 and 14 ends.

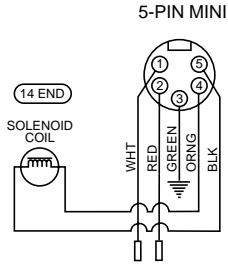
4. Reassemble unit by reversing the order by which it was disassembled. See valve servicing for proper assembly techniques and screw torque.



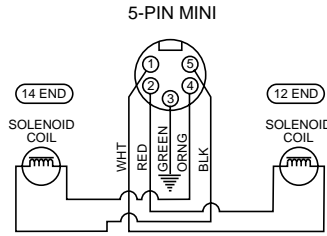
# Automotive Connection – Wiring Options

## Chrysler Connection (Straight or 90° Receptacle)

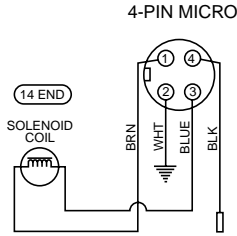
**5-Pin Male/Single Solenoid**  
(Encl. Options 3, 5 & 9,  
Auto Option C & V)



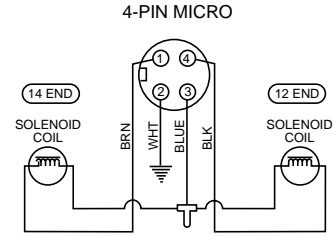
**5-Pin Male/Double Solenoid**  
(Encl. Options 3, 5 & 9,  
Auto Option C & V)



**4-Pin Male/Single Solenoid**  
(Encl. Options 2, 4 & 8,  
Auto Option C & V)

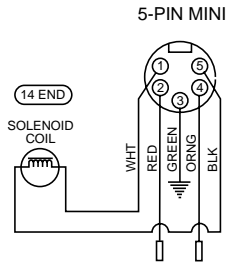


**4-Pin Male/Double Solenoid**  
(Encl. Options 2, 4 & 8,  
Auto Option C & V)

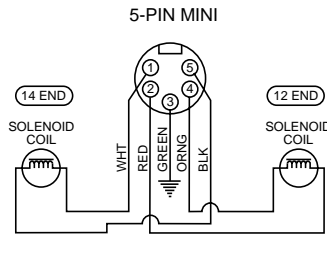


## Ford Connection (Straight or 90° Receptacle)

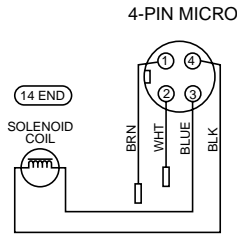
**5-Pin Male/Single Solenoid**  
(Encl. Options 3, 5 & 9,  
Auto Option F & W)



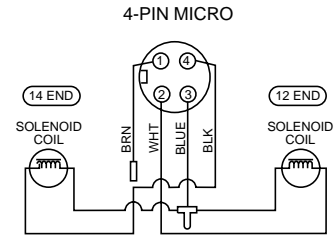
**5-Pin Male/Double Solenoid**  
(Encl. Options 3, 5 & 9,  
Auto Option F & W)



**4-Pin Male/Single Solenoid**  
(Encl. Options 2, 4 & 8,  
Auto Option F, G, W & X)

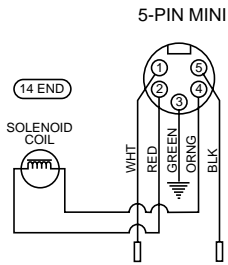


**4-Pin Male/Double Solenoid**  
(Encl. Options 2, 4 & 8,  
Auto Option F, G, W & X)

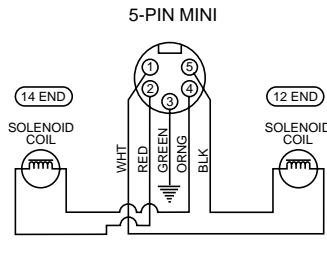


## GM Connection (Straight or 90° Receptacle)

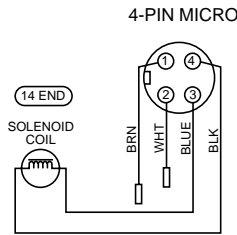
**5-Pin Male/Single Solenoid**  
(Encl. Options 3, 5 & 9,  
Auto Option G & X)



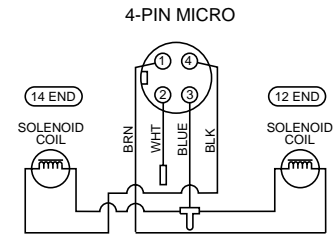
**5-Pin Male/Double Solenoid**  
(Encl. Options 3, 5 & 9,  
Auto Option G & X)



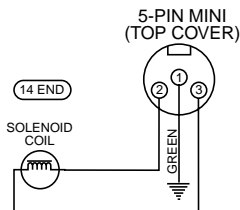
**4-Pin Male/Single Solenoid**  
(Encl. Options 2, 4 & 8,  
Auto Option F, G, W & X)



**4-Pin Male/Double Solenoid**  
(Encl. Options 2, 4 & 8,  
Auto Option G & X)

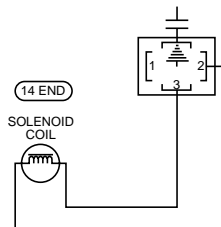


**3-Pin Male**  
(Encl. Options 1 & 7,  
Auto Option C, F, G, V, W & X)

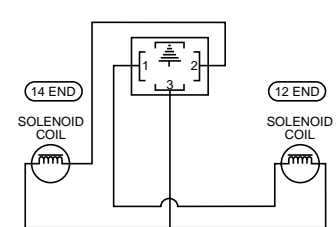


## 4-Pin ISO 4400

**30mm, 4-Pin ISO 4400  
Single Solenoid**  
(Encl. Options V)



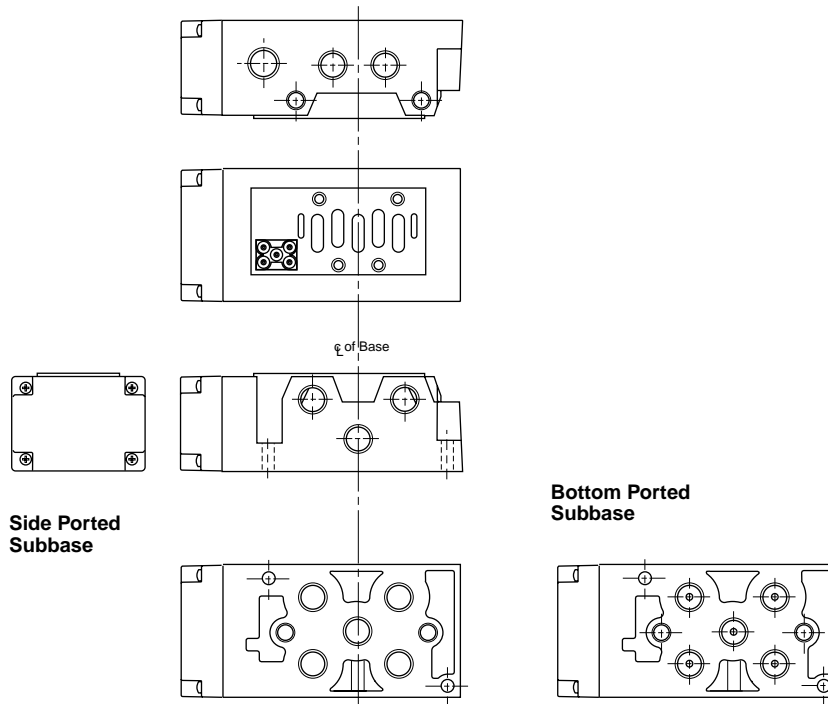
**30mm, 4-Pin ISO 4400  
Double Solenoid**  
(Encl. Options V)



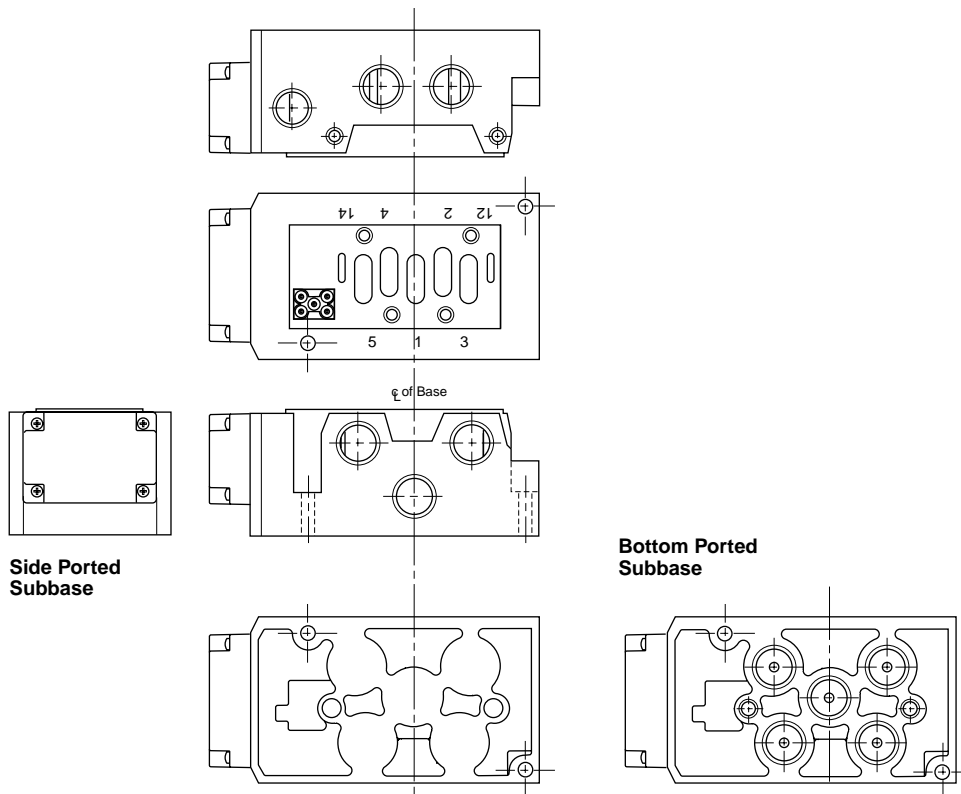
## Automotive Connection Thread Type

5-Pin Mini Connector - 7/8 UNF thread  
4-Pin Micro Connector - M12 thread

H2 5599-2 / 5599-1 Subbase



H3 5599-2 / 5599-1 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.

<b>Operating Inlet Pressure:</b>	<b>kPa</b>	<b>psig</b>	<b>bar</b>
<b>Maximum</b>	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

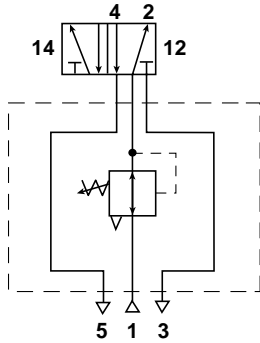
**FAILURE OR IMPROPER SELECTION OR IMPROPER USE OF THE PRODUCTS AND/OR SYSTEMS DESCRIBED HEREIN OR RELATED ITEMS CAN CAUSE DEATH, PERSONAL INJURY AND PROPERTY DAMAGE.**

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.

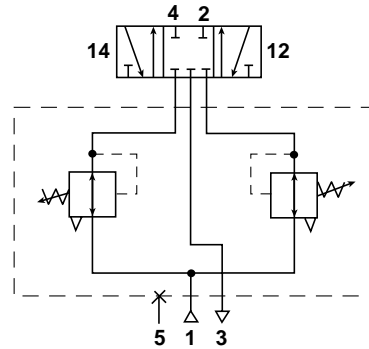
The products described herein, including without limitation, product features, specifications, designs, availability and pricing, are subject to change by Parker Hannifin Corporation and its subsidiaries at any time without notice.

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

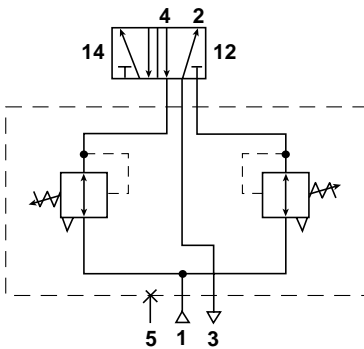
**Common Port Regulator with 4-Way, 2-Position Valve**



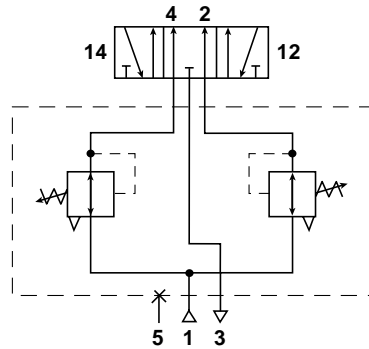
**Independent and Single Port Regulation with 4-Way, 3-Position, All Ports Blocked Valve (Independent Port Regulation Shown)**



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

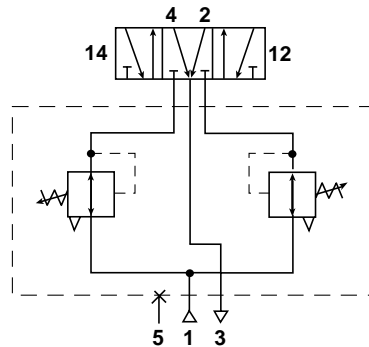


**Independent and Single Port Regulation with 4-Way, 3-Position, Inlet to Cylinder Function (Independent Port Regulation Shown)**



**⚠ 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).

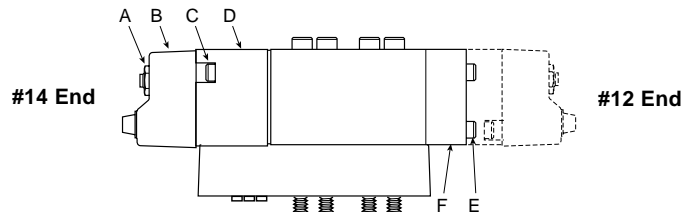
3. When desired secondary pressure setting has been reached, push the adjusting knob down to lock the adjusting knob.

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

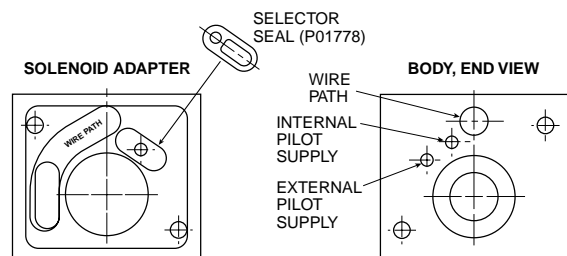
**CAUTION: H2 & F6 valves equipped with solenoid operators or remote operated valves with air return must be converted to external pilot supply in order to insure proper valve operation.**

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')



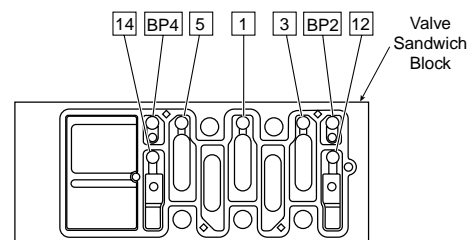
1. **#14 End** - Remove nut (A) solenoid coil (B), adapter block screws (C) and adapter block (D).
2. **#12 End - Double Solenoid Operated Valves** - Remove nut (A) solenoid coil (B), adapter block screws (C) and adapter block (D).
3. **#12 End - Single Solenoid Operated Valves** - Remove screws (E) 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		

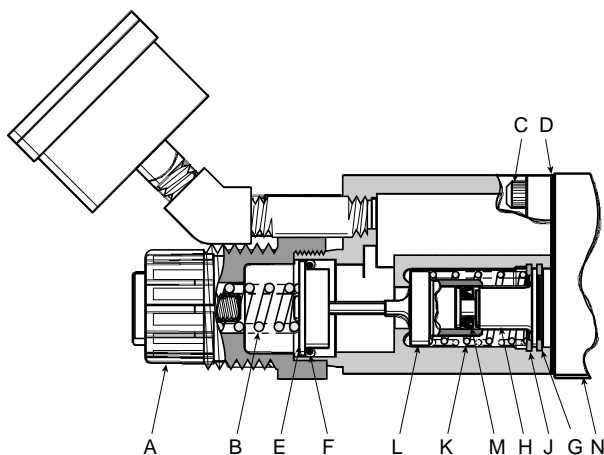
**Key Code:**

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](http://www.parker.com/pneumatic)**

\* Marfak MP-2 is a registered trademark of Texaco.



**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](http://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](http://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.

## Pneumatic Division Safety Guide

**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](http://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](http://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.