

Pneumatic Division

Richland, Michigan USA

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

Bulletin Number		Bulletin Description
☐	V539P	L-Pilot Valve, Installation & Service Instructions
☐	V610P Rev. 8	Internal Pressure Return, Remote Operated Poppet Valve, Installation & Service Instructions
☐	V611P Rev. 10	External Pressure Return, Remote Operated Poppet Valve, Installation & Service Instructions
☐	V612P Rev. 9	Internal Pilot Supply Solenoid Operated Poppet Valve, Installation & Service Instructions
☐	V613P Rev. 8	Solenoid Operated Poppet Valve, Installation & Service Instructions
☐	V614P Rev. 5	3/8" & 3/4" Basic, Internal or External Pilot Supply Solenoid Operated Poppet Valve, Installation & Service Instructions
☐	V615P Rev. 5	1-1/4" Basic, Internal or External Pilot Supply Solenoid Operated Poppet Valve, Installation & Service Instructions
☐	V616P Rev. 5	3/8" & 1-1/4" Basic, Internal Pressure Return Remote Operated Poppet Valve, Installation & Service Instructions
☐	V617P Rev. 5	3/8" & 1-1/4" Basic, External Pressure Return Remote Operated Poppet Valve, Installation & Service Instructions
☐	V643P	Hazardous Duty Valves and Solenoids, Application Bulletin
☐	V644P Rev. 7	L-Pilot and Operators, Installation & Service Instructions
☐	V645P Rev. 3	P-Pilot Valve and Operators, Installation & Service Instructions
☐	V648P	Time Delay Modules - K705 Series, Installation Instructions
☐	Safety Guide	PDN Safety Guide



Visit www.pdnplu.com for additional instruction sheets.



Pneumatic Division
Richland, Michigan 49083

Installation & Service Instructions
V539P

L-Pilot Series Valves

ISSUED: June, 2003

Supersedes: None

Doc.# V-539P, ECN030466

⚠ 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.

Service Kit O-Rings

Service Kits **K352166** and **K352366** will now have both the Small and Large O-ring. Use the one that is appropriate for your product and discard the other.

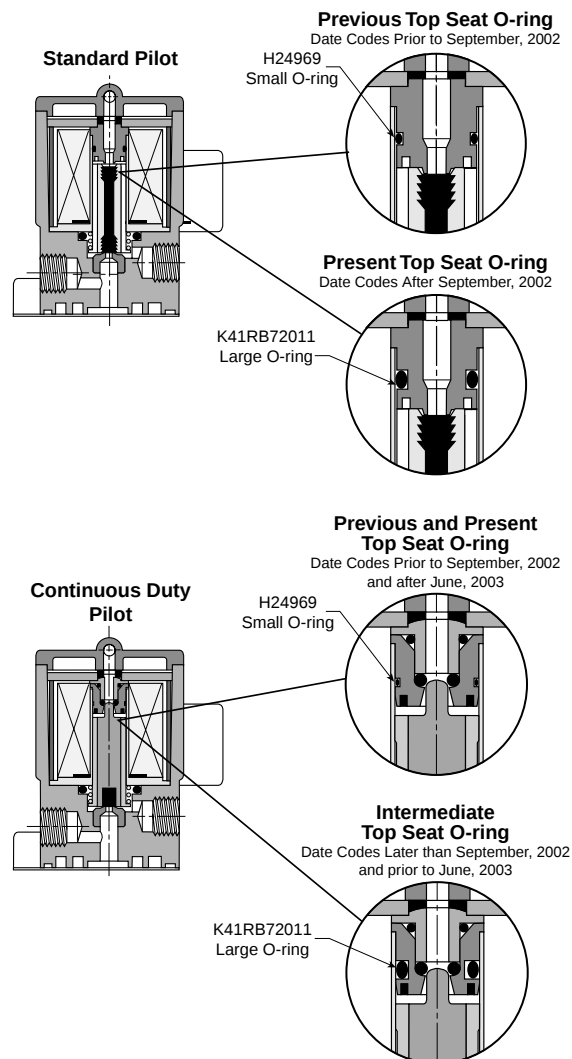
Top Seat O-rings supplied in this Service Kit:

As of September 2002 (Date Code 3702), the following series of Pilot Valves (Standard Service) have the Large O-ring.

K015	K175
K025	K185
K055	K225
K065	K235

As of June 2003 (Date Code 2503), the following series of Pilot Valves (Special Service) will have the Smaller O-ring.

K035	K085
K045	K245
K075	K255



⚠ 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.



Pneumatic Division
Richland, Michigan 49083

Installation & Service Instructions V610P

Internal Pressure Return
3/8 - 1-1/4 Remote Operated
Poppet Valves

ISSUED: June, 2002

Supersedes: May, 2001

Doc.# V-610P, ECN# 020070, Rev. 8

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.

Installation / Operating Instructions

Valve should be installed with reasonable accessibility for service whenever possible — repair service kits are available. Keep pipe or tubing lengths to a minimum with inside clean and free of dirt and chips. Pipe joint compound should be used sparingly and applied only to the male pipe — never into the female port. Do not use PTFE tape to seal pipe joints — pieces have a tendency to break off and lodge inside the unit, possibly causing malfunction. Care should be taken to avoid undue strain on the valve. Use mounting lugs (cast on valve body) as support when required.

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

Life Expectancy - Normal multi-million cycle life expectancy of these valves is based on the use of properly filtered and lubricated air at room temperature. These valves are also designed to operate under nonlubricated conditions and will yield millions of maintenance free cycles.

Factory Pre-Lubrication - Valves are pre-lubricated at assembly with Sunaplex 781 or equivalent (Petroleum Base - Lithium Content) grease. Valves specified for vacuum service are lubricated with Dow Corning Valve Seal A.

In-Service Lubrication - In-service lubrication is not required; however, if lubrication is to be used, F442 oil is recommended. This oil is specially formulated to provide peak performance and maximum service life from all air operated equipment. Otherwise, use an air line lubricant (compatible with Nitrile & Polyurethane seals) which will readily atomize and be of the medium aniline type. Aniline point range must be between 180° and 220° F. Viscosity at 100° F: 140 - 170 SUS.

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

Application Limits

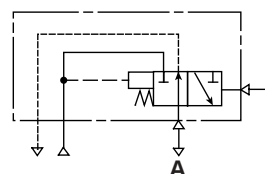
These products are intended for use in general purpose compressed air systems only.

Operating Temperature Range: Minimum 0° F (-18° C)
Maximum 200° F (93° C)

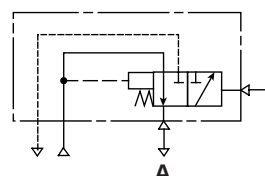
Inlet Operating Pressure Range:	PSIG	bar	kPa
Minimum (Standard)	20	1.38	138
Maximum	250	17.24	1724

ANSI Symbols

Normally Closed



Normally Open



WARNING

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Minimum Remote Pilot Signal Pressure 3/8" Basic Valves

Inlet Pressure			Function*	Minimum Remote Pilot Signal Pressure		
PSIG	bar	kPa		PSIG	bar	kPa
25	1.72	172	091	25	1.72	172
50	3.45	345	091	45	3.10	310
75	5.17	517	091	65	4.48	448
100	6.90	690	091	90	6.20	620
150	10.34	1034	091	135	9.31	931
200	13.79	1379	091	170	11.72	1172
250	17.24	1724	091	210	14.48	1448

Minimum Remote Pilot Signal Pressure 3/4" Basic Valves

Inlet Pressure			Function*	Minimum Remote Pilot Signal Pressure		
PSIG	bar	kPa		PSIG	bar	kPa
25	1.72	172	091	25	1.72	172
50	3.45	345	091	45	3.10	310
75	5.17	517	091	70	4.83	483
100	6.90	690	091	90	6.20	620
150	10.34	1034	091	140	9.65	965
200	13.79	1379	091	180	12.41	1241
250	17.24	1724	091	225	15.51	1551

Minimum Remote Pilot Signal Pressure 1-1/4" Basic Valves

Inlet Pressure			Function*	Minimum Remote Pilot Signal Pressure		
PSIG	bar	kPa		PSIG	bar	kPa
25	1.72	172	091	25	1.72	172
50	3.45	345	091	45	3.10	310
75	5.17	517	091	65	4.48	448
100	6.90	690	091	85	5.86	586
150	10.34	1034	091	125	8.62	862
200	13.79	1379	091	170	11.72	1172
250	17.24	1724	091	200	13.79	1379

* Function code is the 8th and 9th digit of the model number (i.e. "91" in N3542109153).

Remote Pilot Signal Pressure: **PSIG** **bar** **kPa**
Maximum 250 17.24 1724

Installation Port Connections

- 1) Connect inlet air supply to port "IN".
- 2) Connect mufflers (or plumb exhaust) from port "EXH" for 3-Way valves.
- 3) Connect cylinder ports "CYL" to cylinder or other device to be supplied air.
- 4) Connect airline from normally closed pilot signal valve to port in cover.

Service Kits / Parts

Service Kits

Basic Valve Size	Kit Number
3/8"	K352073
3/4"	K352074
1-1/4"	K352075

Parts

Description	Basic Valve Size		
	3/8"	3/4"	1 1/4"
Lower Piston	K202001	K202002	K313028
Upper Piston	K212001	K212002	K313029
Gasket	K183049	K183057	K183058



Pneumatic Division
Richland, Michigan 49083

Installation & Service Instructions V611P

External Pressure Return
3/8 - 1-1/4 Remote Operated
Poppet Valves

ISSUED: June, 2009

Supersedes: June, 2002

Doc.# V611P, EN# 090433, Rev. 10

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.

Installation / Operating Instructions

Valve should be installed with reasonable accessibility for service whenever possible — repair service kits are available. Keep pipe or tubing lengths to a minimum with inside clean and free of dirt and chips. Pipe joint compound should be used sparingly and applied only to the male pipe — never into the female port. Do not use PTFE tape to seal pipe joints — pieces have a tendency to break off and lodge inside the unit, possibly causing malfunction. Care should be taken to avoid undue strain on the valve. Use mounting lugs (cast on valve body) as support when required.

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

Life Expectancy - Normal multi-million cycle life expectancy of these valves is based on the use of properly filtered and lubricated air at room temperature. These valves are also designed to operate under nonlubricated conditions and will yield millions of maintenance free cycles.

In-Service Lubrication - In-service lubrication is not required; however, if lubrication is to be used, F442 oil is recommended. This oil is specially formulated to provide peak performance and maximum service life from all air operated equipment. Otherwise, use an air line lubricant (compatible with Nitrile & Polyurethane seals) which will readily atomize and be of the medium aniline type. Aniline point range must be between 180° and 220° F. Viscosity at 100° F: 140 - 170 SUS.

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

Application Limits

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

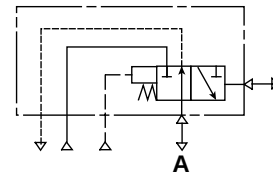
Operating Temperature Range: Minimum 0° F (-18° C)
Maximum 200° F (93° C)

Inlet Operating Pressure Range:	PSIG	bar	kPa
Minimum (Standard)	20	1.38	138
Maximum	250	17.24	1724

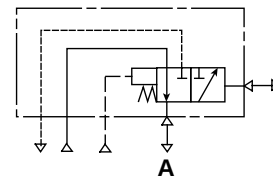
ANSI Symbols

Minimum Remote Pilot Signal and External Return Passages

Normally Closed



Normally Open



WARNING

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Minimum Remote Pilot Signal and External Return Passages

3/8" Basic Valves

Inlet Pressure			Function*	Minimum Pilot Signal & External Return Pressures		
PSIG	bar	kPa		PSIG	bar	kPa
25	1.72	172	089	35	2.41	241
50	3.45	345	089	45	3.10	310
75	5.17	517	089	55	3.79	379
100	6.90	690	089	65	4.48	448
150	10.34	1034	089	80	5.51	551
200	13.79	1379	089	95	6.55	655
250	17.24	1724	089	110	7.58	758

3/4" Basic Valves

Inlet Pressure			Function*	Minimum Pilot Signal & External Return Pressures		
PSIG	bar	kPa		PSIG	bar	kPa
25	1.72	172	089	35	2.41	241
50	3.45	345	089	40	2.76	276
75	5.17	517	089	50	3.45	345
100	6.90	690	089	65	4.48	448
150	10.34	1034	089	80	5.51	551
200	13.79	1379	089	95	6.55	655
250	17.24	1724	089	110	7.58	758

* Function code is the 8th and 9th digit of the model number (i.e. "89" in N3542108953).

Remote Pilot Signal and External Return Pressure:

	PSIG	bar	kPa
Maximum	250	17.24	1724

Minimum Remote Pilot Signal and External Return Passages

1-1/4" Basic Valves (Normally Closed)

Inlet Pressure			Function*	Minimum Pilot Signal & External Return Pressures		
PSIG	bar	kPa		PSIG	bar	kPa
25	1.72	172	089	40	2.76	276
50	3.45	345	089	50	3.45	345
75	5.17	517	089	70	4.83	483
100	6.90	690	089	85	5.86	586
150	10.34	1034	089	125	8.62	862
200	13.79	1379	089	170	11.72	1172
250	17.24	1724	089	210	14.48	1448

1-1/4" Basic Valves (Normally Closed)

Inlet Pressure			Function*	Minimum Pilot Signal & External Return Pressures		
PSIG	bar	kPa		PSIG	bar	kPa
25	1.72	172	089	30	2.07	207
50	3.45	345	089	35	2.41	241
75	5.17	517	089	45	3.10	310
100	6.90	690	089	55	3.79	379
150	10.34	1034	089	75	5.17	517
200	13.79	1379	089	105	7.24	724
250	17.24	1724	089	130	8.65	865

* Function code is the 8th and 9th digit of the model number (i.e. "89" in N3542108953).

Remote Pilot Signal and External Return Pressure:

	PSIG	bar	kPa
Maximum	250	17.24	1724

Installation Port Connections

- 1) Connect inlet air supply to port "IN".
 - 2) Connect mufflers (or plumb exhaust) from port "EXH" for 3-Way valves.
 - 3) Connect cylinder ports "CYL" to cylinder or other device to be supplied air.
 - 4) Connect airline from normally closed pilot signal valve to port in cover.
- 1) Connect air supply to external pressure return port.

Service Kits / Parts

Service Kits

Basic Valve Size	Kit Number
3/8"	K352031
3/4"	K352056
1-1/4"	K352083

Parts

Description	Basic Valve Size		
	3/8"	3/4"	1-1/4"
Lower Piston	K202001	K202002	K313028
Upper Piston	K212001	K212002	K313029
Gasket	K183049	K183057	K183058



Pneumatic Division
Richland, Michigan 49083

Installation & Service Instructions V612P

Internal Pilot Supply
Solenoid Operated Poppet Valves

ISSUED: February, 2003

Supersedes: September, 2002

Doc.# V-612P, ECN020755, Rev. 9

WARNING

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

- Disconnect electrical supply 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, voltage, 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 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

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 pip — 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. Care should be taken to avoid undue strain on the valve. Use mounting lugs (cast on valve body) as support when required.

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

Life Expectancy - Normal multi-million cycle life expectancy of these valves is based on the use of properly filtered and lubricated air at room temperature. These valves are also designed to operate under non-lubricated conditions and will yield millions of maintenance free cycles.

Factory Pre-Lubrication - Valves are pre-lubricated at assembly with Sunaplex 781 or equivalent (Petroleum Base - Lithium Content) grease. Valves specified for vacuum service are lubricated with Dow Corning Valve Seal A.

In-Service Lubrication - In-service lubrication is not required; however, if lubrication is to be used, F442 oil is recommended. This oil is specially formulated to provide peak performance and maximum service life from all air operated equipment. Otherwise, use an air line lubricant (compatible with Nitrile & Polyurethane seals) which will readily atomize and be of the medium aniline type. Aniline point range must be between 180° and 220° F. Viscosity at 100° F: 140 - 170 SUS.

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

 **CAUTION:** DO NOT RESTRICT THE INLET TO POPPET VALVES
Restriction of the inlet can starve the air supply to the pilot section of internally piloted poppet valves and result in slow shifting or failure of the valve to shift properly. Always connect the supply line directly to the inlet of the valve using the full pipe size of the valve inlet. Never use a quick coupling to connect a poppet valve to the air supply. On valves with a small inlet port, use of an up-stream surge tank may be required at lower operating pressures to insure an adequate air supply and proper operation.

 **CAUTION:** Switches used with switch reactors must not impart more than 5 lbs. force. Switch reaction forces above these maximums can prevent the valve from returning to the "fail safe" position in the event of air or electrical failure.

Application Limits

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

Pressure Range for 3/8" and 3/4" Basic Solenoid Operated Valves

Operator Type	Function *	Pressure Range			
			PSIG	bar	kPa
L-Pilot (Standard and Continuous Duty)	45 or 48	Minimum Maximum	20 140	1.38 9.65	138 965
L-Pilot (High Pressure)	46	Minimum Maximum	20 200	1.38 13.79	138 1379

* Function code is the 8th and 9th digit of the model number (i.e. "45" in N3552104553).

Pressure Range for 1-1/4" Basic Solenoid Operated Valves

Operator Type	Function *	Pressure Range			
			PSIG	bar	kPa
P-Pilot (Standard Duty)	47	Minimum Maximum	25 140	1.72 9.65	172 965
L-Pilot (Standard and Continuous Duty)	45 or 48	Minimum Maximum	25 140	1.72 9.65	172 965
L-Pilot (High Pressure)	46	Minimum Maximum	25 200	1.72 13.79	172 1379

* Function code is the 8th and 9th digit of the model number (i.e. "47" in N3657104753).

NOTE: Internal Pilot Supply Valves may not be used with vacuum service.

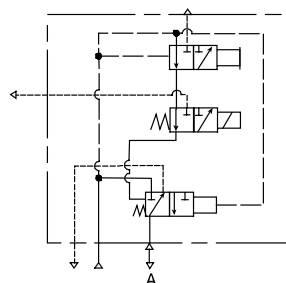
Operating Temperature Range:

Operator Type	Duty Cycle	Minimum Ambient Temperature	Maximum Ambient Temperature
Standard Service Solenoid	Intermittent	0°F (-18°C)	125°F (52°C)
	Continuous	0°F (-18°C)	100°F (38°C)
Special Service Solenoid	Intermittent	0°F (-18°C)	125°F (52°C)
	Continuous	0°F (-18°C)	125°F (52°C)

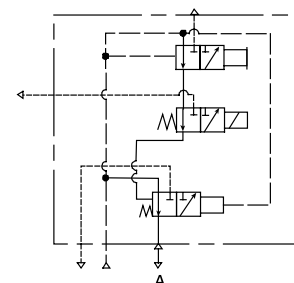
Voltage Range: +10% to -15% of rating

ANSI Symbols

Normally Closed

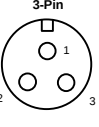
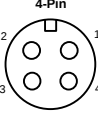
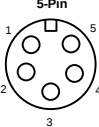


Normally Open



Wiring Instructions

Units with 3-Pin, 4-Pin or 5-Pin Connectors
(JIC Pilots Only)



NOTE: Refer to Decal placed on cover or inside junction Box of pilot operator for wiring configuration.

Pin numbers as viewing face of male receptacle.

Units with flying leads
Either may be "Hot".

- ⚠ CAUTION:** DC solenoids with indicator lights and/or arc suppression coils are polarity sensitive. Use red wire as positive.

⚠ 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.

Earth ground: All electrically operated valves must be provided a proper earth ground.

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

Installation

Port Connections

- Connect inlet air supply to port "IN".
- Connect mufflers (or plumb exhaust) from port "EXH" for 3-way valves.
- Connect cylinder ports "CYL" to cylinder or other device to be supplied air.

Override Operation

To operate override push and turn to a full stop (at least 90°).

Service Kits / Parts

Service Kits

Basic Valve Size	Operator	Function* Type	Kit Number
3/8"	L-Pilot (Standard Duty)	45 or 46	K352076
	L-Pilot (Continuous Duty)	48	K352276
3/4"	L-Pilot (Standard Duty)	45 or 46	K352077
	L-Pilot (Continuous Duty)	48	K352277
1-1/4"	P-Pilot (Standard Duty)	47	K352078
	L-Pilot (Standard Duty)	45 or 46	K352408
	L-Pilot (Continuous Duty)	48	K352080

* Function code is the 8th and 9th digit of the model number (i.e. "45" in N3552104553).

Parts

Description	Basic Valve Size		
	3/8"	3/4"	1-1/4"
Lower Piston	K202001	K202002	K313028
Upper Piston	K212001	K212002	K313029
L-Pilot Valve Gasket	K183001	K183001	K183001
P-Pilot Valve Gasket	—	—	K183001
Gasket	K183049	K183057	K183058
Indicator Light 120/60 110/50 (JIC Pilots ONLY)	K252050	K252050	K252050
Indicator Light 24VDC (JIC Pilots ONLY)	K252051	K252051	K252051

Coils for L-Pilot Operated Valves

Voltage			Coil Number	
60 Hz	50 Hz	D.C.	19" Leads	72" Leads
12	—	—	K593007	K593178
24	—	6	K593003	K593179
—	24	—	K593015	K593181
—	36	—	K593016	K593183
—	—	12	K593010	K593182
—	—	24 (Standard)	K593014	K593184
—	—	24 (Arc Suppressed)	K593271	K593272
—	—	48	K593028	K593185
120	110	—	K593025	K593186
240	220	—	K593035	K593187
—	240	—	K593033	K593188
—	—	90	K593020	K593189
—	—	120	K593041	K593190
—	380	—	K593038	K593191

Coils for P-Pilot Operated Valves

Voltage			Coil Number	
60 Hz	50 Hz	D.C.	19" Leads	72" Leads
—	12	—	K593095	K593255
12	—	—	K593096	K593256
—	—	6	K593092	K593257
24	—	—	K593099	K593258
—	24	—	K593098	K593259
—	—	12	K593094	K593260
—	—	24	K593097	K593261
—	—	48	K593102	K593254
115	—	—	K593108	K593262
—	110	—	K593106	K593263
230	—	—	K593112	K593264
—	230	—	K593111	K593265
—	—	115	K593107	K593266

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.



Pneumatic Division
Richland, Michigan 49083

Installation & Service Instructions V613P

Solenoid Operated Poppet Valve

ISSUED: April, 2002

Supersedes: November, 2001

Doc.# V-613P, ECN# P28906, Rev. 8

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

Valve should be installed with reasonable accessibility for service whenever possible — repair service kits are available. Keep pipe or tubing lengths to a minimum with inside clean and free of dirt and chips. Pipe joint compound should be used sparingly and applied only to the male pipe — never into the female port. Do not use PTFE tape to seal pipe joints — pieces have a tendency to break off and lodge inside the unit, possibly causing malfunction. Care should be taken to avoid undue strain on the valve. Use mounting lugs (cast on valve body) as support when required.

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

Life Expectancy - Normal multi-million cycle life expectancy of these valves is based on the use of properly filtered and lubricated air at room temperature. These valves are also designed to operate under nonlubricated conditions and will yield millions of maintenance free cycles.

Factory Pre-Lubrication - Valves are pre-lubricated at assembly with Sunaplex 781 or equivalent (Petroleum Base - Lithium Content) grease. Valves specified for vacuum service are lubricated with Dow Corning Valve Seal A.

In-Service Lubrication - In-service lubrication is not required; however, if lubrication is to be used, F442 oil is recommended. This oil is specially formulated to provide peak performance and maximum service life from all air operated equipment. Otherwise, use an air line lubricant (compatible with Nitrile & Polyurethane seals) which will readily atomize and be of the medium aniline type. Aniline point range must be between 180° and 220° F. Viscosity at 100° F: 140 - 170 SUS.



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

Application Limits

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

Inlet Operating Pressure Range:	PSIG	bar	kPa
Minimum*	0	0	0
Maximum	250	17.24	1724

* May also be used for vacuum service up to 1" HG.

Minimum External Pilot Pressure

Inlet Pressure			3/4" Basic			3/4" Basic		
PSIG	bar	kPa	PSIG	bar	kPa	PSIG	bar	kPa
25	1.72	172	35	2.41	241	35	2.41	241
50	3.45	345	45	3.10	310	40	2.76	276
75	5.17	517	55	3.79	379	50	3.45	345
100	6.90	690	65	4.48	448	65	4.48	448
150	10.34	1034	80	5.51	551	80	5.51	551
250	17.24	1724	110	7.58	758	110	7.58	758

Inlet Pressure			1 1/4" Basic Normally Closed			1 1/4" Basic Normally Open		
PSIG	bar	kPa	PSIG	bar	kPa	PSIG	bar	kPa
25	1.72	172	30	2.07	207	40	2.75	275
50	3.45	345	35	2.41	241	50	3.45	345
75	5.17	517	45	3.10	310	70	4.82	482
100	6.90	690	55	3.79	379	85	5.86	586
150	10.34	1034	75	5.17	517	125	8.62	862
200	13.79	1379	105	7.24	724			

Maximum External Pilot Pressure

Operator Type	Function*	Maximum Pressure		
		PSI	bar	kPa
L-Pilot (Standard and Continuous Duty)	01, 04, 35 or 38	140	9.65	965
L-Pilot (High Pressure)	03 or 36	200	13.79	1379
P-Pilot	02 or 37	125	8.61	861

* Function code is the 8th and 9th digit of the model number (i.e. "01" in N3552100153).

WARNING

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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.

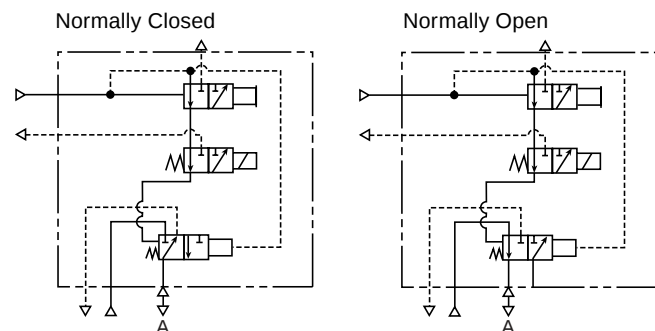
EXTRA COPIES OF THESE INSTRUCTIONS ARE AVAILABLE FOR INCLUSION IN EQUIPMENT / MAINTENANCE MANUALS THAT UTILIZE THESE PRODUCTS. CONTACT YOUR LOCAL REPRESENTATIVE.

Operating Temperature Range

Operator Type	Duty Cycle	Minimum Ambient Temperature	Maximum Ambient Temperature
Standard Service Solenoid	Intermittent	0°F (-18°C)	125°F (52°C)
	Continuous	0°F (-18°C)	100°F (38°C)
Special Service Solenoid	Intermittent	0°F (-18°C)	125°F (52°C)
	Continuous	0°F (-18°C)	125°F (52°C)

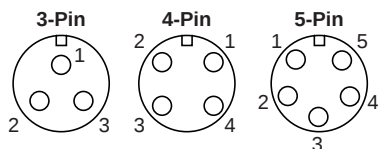
Voltage Range: +10% to -15% of rating

ANSI Symbols



Wiring Instructions

Units with 3-Pin, 4-Pin, or 5-Pin Connectors:
(JIC Pilots Only)



NOTE: Refer to decal placed on cover or inside junction box of pilot operator for wiring configuration.

Units with flying leads:

Either wire may be "Hot".



CAUTION: DC solenoids with indicator lights and/or arc suppression coils are polarity sensitive. Use red wire as positive.



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.

Earth ground: All electrically operated valves must be provided a proper earth ground.

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

Installation

Port Connections

- 1) Connect inlet air supply to port "IN".
- 2) Connect mufflers (or plumb exhaust) from port "EXH" for 3-way valves.
- 3) Connect cylinder ports "CYL" to cylinder or other device to be supplied air.
- 4) Connect external pilot supply to port in adapter plate under pilot valve.

Override Operation

To operate override push and turn to a full stop (at least 90°).

Service Kits / Parts

Service Kits

Basic Valve Size	Operator Type	Function*	Kit Number
3/8"	L-Pilot (Standard Duty)	01 or 03	K352076
	L-Pilot (Continuous Duty)	04	K352276
3/4"	L-Pilot (Standard Duty)	01 or 03	K352077
	L-Pilot (Continuous Duty)	04	K352277
1 1/4"	P-Pilot (Standard Duty)	02	K352078
	L-Pilot (Standard Duty)	01 or 03	K352408
	L-Pilot (Continuous Duty)	04	K352080

* Function code is the 8th and 9th digit of the model number (i.e. "01" in N3552100153).

Parts

Description	Basic Valve Size		
	3/8"	3/4"	1-1/4"
Lower Piston	K202001	K202002	K313028
Upper Piston	K212001	K212002	K313029
L-Pilot Valve Gasket	K183001	K183001	K183001
P-Pilot Valve Gasket	—	—	K183012
Gasket	K183049	K183057	K183058
Indicator Light 120/60 110/50 (JIC Pilots ONLY)	K252050	K252050	K252050
Indicator Light 24VDC (JIC Pilots ONLY)	K252051	K252051	K252051

Coils for L-Pilot Operated Valves

Voltage			Coil	
60 Hz	50 Hz	D. C.	19" Leads	72" Leads
12	—	—	K593007	K593178
24	—	6	K593003	K593179
—	24	—	K593015	K593181
—	36	—	K593016	K593183
—	—	12	K593010	K593182
—	—	24 (Standard)	K593014	K593184
—	—	24 (Arc Suppressed)	K593271	K593272
—	—	48	K593028	K593185
120	110	—	K593025	K593186
240	220	—	K593035	K593187
—	240	—	K593033	K593188
—	—	90	K593020	K593189
—	—	120	K593041	K593190
—	380	—	K593038	K593191

Coils for P-Pilot Operated Valves

Voltage			Coil	
60 Hz	50 Hz	D. C.	19" Leads	72" Leads
—	12	—	K593095	K593255
12	—	—	K593096	K593256
—	—	6	K593092	K593257
24	—	—	K593099	K593258
—	24	—	K593098	K593259
—	—	12	K593094	K593260
—	—	24	K593097	K593261
—	—	48	K593102	K593254
115	—	—	K593108	K593262
—	110	—	K593106	K593263
230	—	—	K593112	K593264
—	230	—	K593111	K593265
—	—	115	K593107	K593266



Pneumatic Division
Richland, Michigan 49083

Installation & Service Instructions V614P

3/8" & 3/4" Basic
Internal or External Pilot Supply
Solenoid Operated Poppet Valves

ISSUED: September, 2002
Supersedes: February, 2002

Doc.# V-614P, ECN020367, Rev. 5

⚠ WARNING

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

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

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.

Inlet Operating Pressure Range:	PSIG	bar	kPa
Minimum*	0	0	0
Maximum	250	17.24	1724

* May also be used for vacuum service.

Minimum External Pilot Pressure

Inlet Pressure			3/4" Basic			3/4" Basic		
PSIG	bar	kPa	PSIG	bar	kPa	PSIG	bar	kPa
25	1.72	172	35	2.41	241	35	2.41	241
50	3.45	345	45	3.10	310	40	2.76	276
75	5.17	517	55	3.79	379	50	3.45	345
100	6.89	689	65	4.48	448	65	4.48	448
150	10.34	1034	80	5.52	552	80	5.52	552
250	17.24	1724	110	7.58	758	110	7.58	758

Maximum External Pilot Pressure

Operator Type	Function*	Maximum Pressure		
		PSIG	bar	kPa
L-Pilot (Standard and Continuous Duty)	01 or 04	140	9.65	965
L-Pilot (High Pressure)	03	200	13.79	1379

* Function code is the 8th and 9th digit of the model number (i.e. "01" in N3552100153).

Pressure Range for 3/8" and 3/4" Basic Internal Pilot Supply Solenoid Operated Valves

Operator Type	Function *	Pressure Range		
		PSIG	bar	kPa
L-Pilot (Standard and Continuous Duty)	45 or 48	Minimum	20	1.38
		Maximum	140	9.65
L-Pilot (High Pressure)	46	Minimum	20	1.38
		Maximum	200	13.79

* Function code is the 8th and 9th digit of the model number (i.e. "45" in N3552104553).

NOTE: Internal Pilot Supply Valves may not be used with vacuum service.

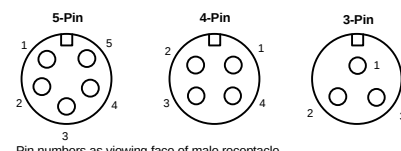
Operating Temperature Range:

Operator Type	Duty Cycle	Minimum Ambient Temperature	Maximum Ambient Temperature
Standard Service Solenoid	Intermittent	0°F (-18°C)	125°F (52°C)
	Continuous	0°F (-18°C)	100°F (38°C)
Special Service Solenoid	Intermittent	0°F (-18°C)	125°F (52°C)
	Continuous	0°F (-18°C)	125°F (52°C)

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

Wiring Instructions

Units with 3-Pin, 4-Pin or 5-Pin Connectors
(JIC Pilots Only)



NOTE: Refer to Decal placed on cover or inside junction Box of pilot operator for wiring configuration.

Units with flying leads

Either may be "Hot".

⚠ CAUTION: DC solenoids with indicator lights and/or arc suppression coils are polarity sensitive. Use red wire as positive.

⚠ 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.

Earth ground: All electrically operated valves must be provided a proper earth ground.

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

WARNING

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Service Procedures

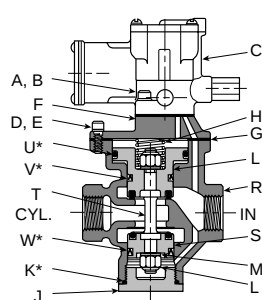
NOTE: All cleaning of parts to be done with mineral spirits or equivalent cleaning solution. Grease should be a mineral based lubricant (MagnaLube G). All parts showing nicks, scratches or other signs of wear or damage should be replaced.

Valve Service

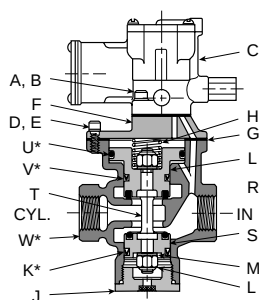
NOTE: Kits are universal and may contain parts that are not required for repair of certain valves.

1. Remove (2) socket head cap screws **(A)** and lock washers **(B)**. Remove pilot valve **(C)** and scrape off any traces of gasket that have adhered to pilot valve or adapter plate **(F)**.
2. Remove socket head cap screws **(D)** and lock washers **(E)**. Remove adapter plate **(F)** and gasket **(G)**. Scrape off any traces of gasket that have adhered to valve body or adapter plate.
3. Remove spring **(H)**.
4. Remove bottom cap **(J)**. Remove and discard o-ring **(K)** - used only on normally closed versions.
5. Remove both lock nuts **(L)** and washers **(M)**.
6. Remove upper and lower pistons **(R & S)** and stem **(T)**. Remove and discard o-ring **(U)** and o-ring (or v-seal) **(V)** from upper piston **(R)**. Remove and discard o-ring (or v-seal) **(W)** from lower piston **(S)**. Clean all retained parts.
7. Apply lubricant (tube in kit) too all seals and both piston bores in body.
8. Assemble o-ring **(U)** and o-ring **(V)** to upper piston **(R)**. Assemble o-ring **(W)** to lower piston **(S)**. Note: Any v-seals are to be replaced with o-rings.
9. Loosely assemble stem **(T)** to upper piston **(R)** using washer **(M)** and lock nut **(L)**. Push this sub-assembly into body from above. Push lower piston **(S)** and washer **(M)** into body from below.

Normally Closed



Normally Open



* Parts contained in service kits.

(NOTE: INTERNAL PILOT SUPPLY VERSION SHOWN)

10. Assemble lower lock nut **(L)** to stem **(T)** while holding upper lock nut and tighten as follows:
3/8" Basic Valves - 10 to 13 ft-lb.
3/4" Basic Valves - 14 to 17 ft-lb.
Assemble o-ring **(X)** to plunger **(P)**. Slide plunger into collar **(N)** and assemble collar to lock nut **(Q)**.
11. Assemble o-ring **(K)** to bottom cap **(J)** and bottom cap to body. O-ring is not required on normally open valves.
12. Place spring **(H)** into top of upper piston **(R)**.
13. Place gasket **(G)** and adapter **(F)** on top of valve body lining up all holes. Assemble socket head cap screws **(D)** and lock washers **(E)** and tighten progressively in a criss-cross pattern to 40 to 50 in-lb.

14. Perform pilot valve service. See **Service Instructions V-644P L-Pilot Valves and Operators** packed with **Pilot Valve Service Kit K352166** or **K352366** included in this kit.

15. Assemble pilot valve and gasket to adapter using socket head cap screws **(A)** and lock washers **(B)**. Tighten to 40 to 50 in-lb.

Coil / Indicator Light Replacement

See **Service Instructions V-644P L-Pilot Valves and Operators** or **V-645P P-Pilot Valves and Operators** packed with replacement coils and lights.

Manual Override Replacement Or Conversion

The following override assemblies are interchangeable and can be replaced or field converted:

Non-locking override	K162001
Locking override	K152003
Extended locking override	K152006
Locking spring return override	K1502002

Remove override and clean internal threads in housing. Apply pipe sealant sparingly to threads of override housing and assemble override to pilot valve housing.

NOTE: Overrides are held out by air pressure and may not extend until pressure is reapplied to the valve.

Service Kits / Parts

Service Kits

Basic Valve Size	Operator	Function* Type	Kit Number
3/8"	L-Pilot (Standard Duty)	01, 03, 45, 46	K352076
	L-Pilot (Continuous Duty)	04, 48	K352276
3/4"	L-Pilot (Standard Duty)	01, 03, 45, 46	K352077
	L-Pilot (Continuous Duty)	04, 48	K352277

* Function code is the 8th and 9th digit of the model number (i.e. "45" in N3552104553).

Parts

Description	Basic Valve Size	
	3/8"	3/4"
Lower Piston	K202001	K202002
Upper Piston	K212001	K212002
L-Pilot Valve Gasket	K183001	K183001
Gasket	K183049	K183057
Indicator Light 120/60 110/50 (JIC Pilots ONLY)	K252050	K252050
Indicator Light 24VDC (JIC Pilots ONLY)	K252051	K252051

Coils

Voltage			Coil Number	
60 Hz	50 Hz	D.C.	19" Leads	72" Leads
12	—	—	K593007	K593178
24	—	6	K593003	K593179
—	24	—	K593015	K593181
—	36	—	K593016	K593183
—	—	12	K593010	K593182
—	—	24 (Standard)	K593014	K593184
—	—	24 (Arc Suppressed)	K593271	K593272
—	—	48	K593028	K593185
120	110	—	K593025	K593186
240	220	—	K593035	K593187
—	240	—	K593033	K593188
—	—	90	K593020	K593189
—	—	120	K593041	K593190
—	380	—	K593038	K593191



Pneumatic Division
Richland, Michigan 49083

Installation & Service Instructions V615P

1-1/4" Basic
Internal or External Pilot Supply
Solenoid Operated Poppet Valves

ISSUED: September, 2002
Supersedes: February, 2002

Doc.# V-615P, ECN020367, Rev. 5

WARNING

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

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

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.

Inlet Operating Pressure Range:

	PSIG	bar	kPa
Minimum*	0	0	0
Maximum	250	17.24	1724

* May also be used for vacuum service.

Minimum External Pilot Pressure

Inlet Pressure			1-1/4" Basic			1-1/4" Basic		
PSIG	bar	kPa	PSIG	bar	kPa	PSIG	bar	kPa
25	1.72	172	30	2.07	207	40	2.76	276
50	3.45	345	35	2.41	241	50	3.45	345
75	5.17	517	45	3.10	310	70	4.83	483
100	6.89	689	55	3.79	379	85	5.86	586
150	10.34	1034	75	5.17	517	125	8.62	862
250	17.23	1723	105	7.24	724			

Maximum External Pilot Pressure

Operator Type	Function*	Maximum Pressure		
		PSIG	bar	kPa
L-Pilot (Standard and Continuous Duty)	01 or 04	140	9.65	965
L-Pilot (High Pressure)	03	200	13.79	1379
P-Pilot	02	125	8.61	861

* Function code is the 8th and 9th digit of the model number (i.e. "01" in N3657100153).

Pressure Range for 3/8" and 3/4" Basic Internal Pilot Supply Solenoid Operated Valves

Operator Type	Function *		Pressure Range		
			PSIG	bar	kPa
P-Pilot (Standard Duty)	47	Minimum	25	1.72	172
		Maximum	125	8.62	862
L-Pilot (Standard and Continuous Duty)	45 or 48	Minimum	25	1.72	172
		Maximum	140	9.65	965
L-Pilot (High Pressure)	46	Minimum	25	1.72	172
		Maximum	200	13.79	1379

* Function code is the 8th and 9th digit of the model number (i.e. "47" in N3657104753).

NOTE: Internal Pilot Supply Valves may not be used with vacuum service.

Operating Temperature Range:

Operator Type	Duty Cycle	Minimum Ambient Temperature	Maximum Ambient Temperature
Standard Service Solenoid	Intermittent	0°F (-18°C)	125°F (52°C)
	Continuous	0°F (-18°C)	100°F (38°C)
Special Service Solenoid	Intermittent	0°F (-18°C)	125°F (52°C)
	Continuous	0°F (-18°C)	125°F (52°C)

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

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.

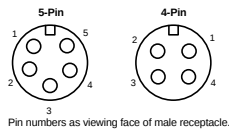
The products described herein, including without limitation, product features, specifications, designs, availability and pricing, are subject to change by Parker Hannifin Corporation and its subsidiaries at any time without notice.

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Wiring Instructions

Units with flying leads:

Either may be "Hot".



CAUTION: DC solenoids with indicator lights and/or arc suppression coils are polarity sensitive. Use red wire as positive.

Units with 3-Pin, 4-Pin or 5-Pin Connectors

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

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.

Earth ground: All electrically operated valves must be provided a proper earth ground.

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

Service Procedures

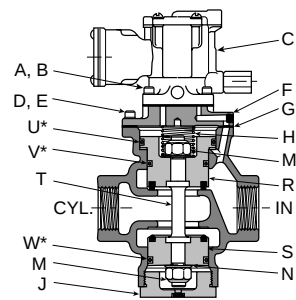
NOTE: All cleaning of parts to be done with mineral spirits or equivalent cleaning solution. Grease should be a mineral based lubricant (MagnaLube G). All parts showing nicks, scratches or other signs of wear or damage should be replaced.

Valve Service

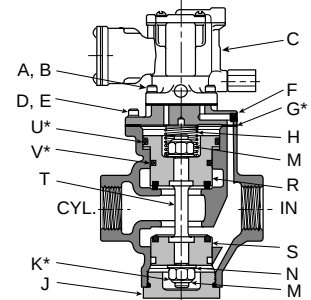
NOTE: Kits are universal and may contain parts that are not required for repair of certain valves.

1. Remove socket head cap screws (A) and lock washers (B). Remove pilot valve (C) and scrape off any traces of gasket that have adhered to pilot valve or adapter plate (F).
2. Remove (8) socket head cap screws (D) and lock washers (E). Remove adapter plate (F) and gasket (G). Scrape off any traces of gasket that have adhered to valve body or adapter plate.
3. Remove spring (H).
4. Remove bottom cap (J). Remove and discard o-ring (K) on normally closed versions.
5. Remove both lock nuts (M) and washers (N).
6. Remove upper and lower pistons (R & S) and stem (T). Remove and discard o-rings (U & V) from upper piston (R). Remove and discard o-ring (W) from lower piston (S). Clean all retained parts.
7. Apply lubricant (tube in kit) to all seals and both piston bores in body.
8. Assemble o-rings (U & V) to upper piston (R). Assemble o-ring (W) to lower piston (S) on **normally closed** valves only.
9. Loosely assemble stem (T) to upper piston (R) using washer (N) and lock nut (M). Push this sub-assembly into body from above. Push lower piston (S) and washer (N) into body from below.

Normally Closed



Normally Open



* Parts contained in service kits.

(NOTE: INTERNAL PILOT SUPPLY VERSION SHOWN)

10. Assemble lower lock nut (M) to stem (T) while holding upper lock nut and tighten to 40 to 45 ft-lb.
11. Assemble o-ring (K) to bottom cap (J) on normally open valves. Assemble bottom cap to body.
12. Place spring (H) into top of upper piston (R).
13. Place gasket (G) and adapter (F) on top of valve body lining up all holes. Assemble socket head cap screws (D) and lock washers (E) and tighten progressively in a criss-cross pattern to 40 to 50 in-lb.
14. Perform pilot valve service. See **Service Instructions V-644P L-Pilot Valves and Operators** or **V-645P P-Pilot Valves and Operators** packed with **Pilot Valve Service Kit K352166, K352366 or K352064** included in this kit.
15. Assemble pilot valve and gasket to adapter using socket head cap screws (A) and lock washers (B). Tighten to 40 to 50 in-lb.

Coil / Indicator Light Replacement

See **Service Instructions V-644P L-Pilot Valves and Operators** or **V-645P P-Pilot Valves and Operators** packed with replacement coils and lights.

Manual Override Replacement Or Conversion

The following override assemblies are interchangeable and can be replaced or field converted:

Non-locking override	K162001
Locking override	K152003
Extended locking override	K152006
Locking spring return override	K1502002

Remove override and clean internal threads in housing. Apply pipe sealant sparingly to threads of override housing and assemble override to pilot valve housing.

NOTE: Overrides are held out by air pressure and may not extend until pressure is reapplied to the valve.

Service Kits / Parts

Service Kits

Operator	Function* Type	Kit Number
P-Pilot (Standard Duty)	02 or 47	K352078
L-Pilot (Standard Duty)	01, 03, 45, or 46	K352408
L-Pilot (Continuous Duty)	04 or 48	K352080

* Function code is the 8th and 9th digit of the model number (i.e. "47" in N3657104753).

Parts

Description	Part Number
Lower Piston	K313028
Upper Piston	K313029
L-Pilot Valve Gasket	K183001
P-Pilot Valve Gasket	K183012
Gasket	K183058
Indicator Light 120/60 110/50 (JIC Pilots ONLY)	K252050
Indicator Light 24VDC (JIC Pilots ONLY)	K252051

Coils for L-Pilot Operated Valves

Voltage			Coil Number	
60 Hz	50 Hz	D.C.	19" Leads	72" Leads
12	—	—	K593007	K593178
24	—	6	K593003	K593179
—	24	—	K593015	K593181
—	36	—	K593016	K593183
—	—	12	K593010	K593182
—	—	24 (Standard)	K593014	K593184
—	—	24 (Arc Suppressed)	K593271	K593272
—	—	48	K593028	K593185
120	110	—	K593025	K593186
240	220	—	K593035	K593187
—	240	—	K593033	K593188
—	—	90	K593020	K593189
—	—	120	K593041	K593190
—	380	—	K593038	K593191

Coils for P-Pilot Operated Valves

Voltage			Coil Number	
60 Hz	50 Hz	D.C.	19" Leads	72" Leads
—	12	—	K593095	K593255
12	—	—	K593096	K593256
—	—	6	K593092	K593257
24	—	—	K593099	K593258
—	24	—	K593098	K593259
—	—	12	K593094	K593260
—	—	24	K593097	K593261
—	—	48	K593102	K593254
115	—	—	K593108	K593262
—	110	—	K593106	K593263
230	—	—	K593112	K593264
—	230	—	K593111	K593265
—	—	118	K593107	K593266



Pneumatic Division
Richland, Michigan 49083

Installation & Service Instructions V616P

3/8" & 1-1/4" Basic
Internal Pressure Return
Remote Operated Poppet Valves

ISSUED: September, 2002
Supersedes: February, 2002

Doc.# V-616P, ECN020367, Rev. 5

WARNING

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

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

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 Temperature Range:

Minimum	0°F (-18°C)
Maximum	200°F (93°C)

Inlet Operating Pressure Range:	PSIG	bar	kPa
Minimum (Standard)	20	1.38	138
Maximum	250	17.24	1724

Minimum Remote Pilot Signal Pressure 3/8" Basic Valves

Inlet Pressure			Function*	Minimum Remote Pilot Signal Pressure		
PSIG	bar	kPa		PSIG	bar	kPa
25	1.72	175	091	25	1.72	175
50	3.45	345	091	45	3.10	310
75	5.17	517	091	65	4.48	448
100	6.89	689	091	90	6.21	621
150	10.34	1034	091	135	9.31	931
200	13.79	1379	091	170	11.72	1172
250	17.24	1724	091	210	14.48	1448

Minimum Remote Pilot Signal Pressure 3/4" Basic Valves

Inlet Pressure			Function*	Minimum Remote Pilot Signal Pressure		
PSIG	bar	kPa		PSIG	bar	kPa
25	1.72	175	091	25	1.72	175
50	3.45	345	091	45	3.10	310
75	5.17	517	091	70	4.83	483
100	6.89	689	091	90	6.21	621
150	10.34	1034	091	140	9.65	965
200	13.79	1379	091	180	12.41	1241
250	17.24	1724	091	225	15.51	1551

Minimum Remote Pilot Signal Pressure 3/4" Basic Valves

Inlet Pressure			Function*	Minimum Remote Pilot Signal Pressure		
PSIG	bar	kPa		PSIG	bar	kPa
25	1.72	175	091	25	1.72	175
50	3.45	345	091	45	3.10	310
75	5.17	517	091	65	4.48	448
100	6.89	689	091	85	5.86	586
150	10.34	1034	091	125	8.62	862
200	13.79	1379	091	170	11.72	1172
250	17.24	1724	091	200	13.79	1379

* Function code is the 8th and 9th digit of the model number (i.e. "91" in N3542109153).

Maximum Remote Pilot Signal Pressure: PSIG bar kPa
250 17.24 1724

WARNING

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Service Procedures

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

NOTE: Kits are universal and may contain parts that are not required for repair of certain valves.

1. Remove socket head cap screws **(A)** and lock washers **(B)**. Remove cover **(C)** and gasket **(D)**. Scrape off any traces of gasket that have adhered to valve body or cover.
2. Remove bottom cap **(E)**. Remove and discard o-ring **(F)** - used only on units without breather vent in bottom cap.
3. Remove spring **(G)**.
4. **3/8", 3/4" & 1-1/4" Basic units** - Remove both lock nuts **(H)** and washers **(J)**.
5. Remove upper and lower pistons **(P & Q)** and stem **(R)**. Remove and discard o-ring **(S)** and o-ring (or v-seal) **(T)** from upper piston **(P)**. Remove and discard o-ring (or v-seal) **(U)** from lower piston **(Q)**. Clean all retained parts.
6. Apply lubricant (tube in kit) too all seals and both piston bores in body.
7. Assemble o-ring **(S)** and o-ring **(T)** to upper piston **(P)**. Assemble o-ring **(U)** to lower piston **(Q)**.

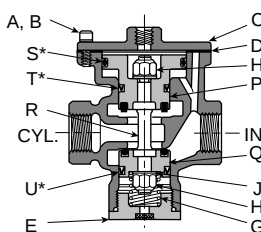
NOTE: Any v-seals are to be replaced with o-rings.

8. Loosely assemble stem **(R)** to upper piston **(P)** using washer **(J)** and lock nut **(H)**. Push this sub-assembly into body from above. Push lower piston **(Q)** and washer **(J)** into body from below.
9. **3/8", 3/4" & 1-1/4" Basic units** - Assemble lower lock nut **(H)** to stem **(R)** while holding upper lock nut and tighten per chart below.

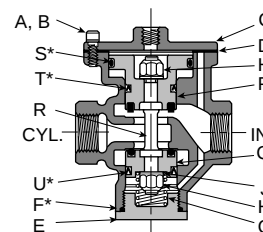
Basic Valve Size	Lock nut to stem torque
3/8"	10 to 13 ft-lb.
3/4"	14 to 17 ft-lb.
1-1/4"	40 to 45 ft-lb.

10. Assemble o-ring **(F)** and spring **(G)** to bottom cap **(E)**. Assemble bottom cap to body. O-ring is not required on units with vented bottom caps.
11. Place gasket **(D)** and cover **(C)** on top of valve body lining up all holes. Assemble socket head cap screws **(A)** and lock washers **(B)** and tighten progressively in a criss-cross pattern to 40 to 50 in-lb.

Normally Closed



Normally Open



* Parts contained in service kits.

Service Kits / Parts

Service Kits

Basic Valve	Size Kit Number
3/8"	K352073
3/4"	K352074
1 1/4"	K352075

Parts

Description	Basic Valve Size		
	3/8"	3/4"	1 1/4"
Lower Piston	K202001	K202002	K313028
Upper Piston	K212001	K212002	K313029
Gasket	K183049	K183057	K183058

* Parts contained in service kits.



Pneumatic Division
Richland, Michigan 49083

Installation & Service Instructions V617P

3/8" & 1-1/4" Basic
External Pressure Return
Remote Operated Poppet Valves

ISSUED: September, 2002
Supersedes: February, 2002

Doc.# V-617P, ECN020367, Rev. 5

WARNING

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

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

Minimum Remote Pilot Signal and External Return Pressures 3/4" Basic Valves

Inlet Pressure			Function*	Minimum Pilot Signal & External Return Pressures		
PSIG	bar	kPa		PSIG	bar	kPa
25	1.72	175	091	35	2.41	241
50	3.45	345	091	40	2.76	276
75	5.17	517	091	50	3.45	345
100	6.89	689	091	65	4.48	448
150	10.34	1034	091	80	5.51	551
200	13.79	1379	091	95	6.55	655
250	17.24	1724	091	110	7.58	758

* Function code is the 8th and 9th digit of the model number (i.e. "89" in N3542108953).

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 Temperature Range:

Minimum	0°F (-18°C)
Maximum	200°F (93°C)

Inlet Operating Pressure Range:	PSIG	bar	kPa
Minimum (Standard)	20	1.38	138
Maximum	250	17.24	1724

Minimum Remote Pilot Signal Pressure 3/8" Basic Valves

Inlet Pressure			Function*	Minimum Pilot Signal & External Return Pressures		
PSIG	bar	kPa		PSIG	bar	kPa
25	1.72	175	091	35	2.41	241
50	3.45	345	091	45	3.10	310
75	5.17	517	091	55	3.79	379
100	6.89	689	091	65	4.48	448
150	10.34	1034	091	80	5.51	551
200	13.79	1379	091	95	6.55	655
250	17.24	1724	091	110	7.58	758

1-1/4" Basic Valves (Normally Closed)

Inlet Pressure			Function*	Minimum Pilot Signal & External Return Pressures		
PSIG	bar	kPa		PSIG	bar	kPa
25	1.72	175	091	40	2.76	276
50	3.45	345	091	50	3.45	345
75	5.17	517	091	70	4.83	483
100	6.89	689	091	85	5.86	586
150	10.34	1034	091	125	8.62	862
200	13.79	1379	091	170	11.72	1172
250	17.24	1724	091	210	14.48	1448

WARNING

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3/8" & 1-14" Basic External Pressure Return Remote Operated Poppet Valves

V617P

1-1/4" Basic Valves (Normally Open)

Inlet Pressure			Function*	Minimum Pilot Signal & External Return Pressures		
PSIG	bar	kPa		PSIG	bar	kPa
25	1.72	175	091	30	2.07	207
50	3.45	345	091	35	2.41	241
75	5.17	517	091	45	3.10	310
100	6.89	689	091	55	3.79	379
150	10.34	1034	091	75	5.17	517
200	13.79	1379	091	105	7.24	724
250	17.24	1724	091	130	8.65	865

* Function code is the 8th and 9th digit of the model number (i.e. "89" in N3542108953).

Maximum Remote Pilot Signal and External Return Pressure:

PSIG	bar	kPa
250	17.24	1724

Service Procedures

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

NOTE: Kits are universal and may contain parts that are not required for repair of certain valves.

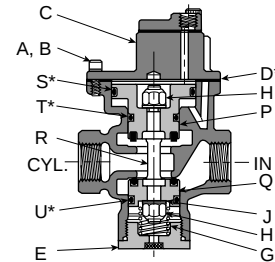
1. Remove socket head cap screws **(A)** and lock washers **(B)**. Remove adapter **(C)** and gasket **(D)**. Scrape off any traces of gasket that have adhered to valve body or cover.
2. Remove bottom cap **(E)**. Remove and discard o-ring **(F)** - used only on units without breather vent in bottom cap.
3. Remove spring **(G)**.
4. **3/8", 3/4" & 1-1/4" Basic units** - Remove both lock nuts **(H)** and washers **(J)**.
5. Remove upper and lower pistons **(P & Q)** and stem **(R)**. Remove and discard o-rings **(S & T)** from upper piston **(P)**. Remove and discard o-ring **(U)** from lower piston **(Q)**. Clean all retained parts.
6. Apply lubricant (tube in kit) too all seals and both piston bores in body.
7. Assemble o-rings **(S & T)** to upper piston **(P)**. Assemble o-ring **(U)** to lower piston **(Q)**.
8. Loosely assemble stem **(R)** to upper piston **(P)** using washer **(J)** and lock nut **(H)**. Push this sub-assembly into body from above. Push lower piston **(Q)** and washer **(J)** into body from below.
9. **3/8", 3/4" & 1-1/4" Basic units** - Assemble lower lock nut **(H)** to stem **(R)** while holding upper lock nut and tighten per chart below.

Basic Valve Size	Lock nut to stem torque
3/8"	10 to 13 ft-lb.
3/4"	14 to 17 ft-lb.
1-1/4"	40 to 45 ft-lb.

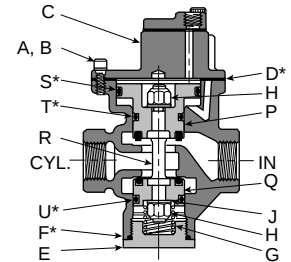
10. Assemble o-ring **(F)** and spring **(G)** to bottom cap **(E)**. Assemble bottom cap to body. O-ring is not required on units with vented bottom caps.

11. Place gasket **(D)** and cover **(C)** on top of valve body lining up all holes. Assemble socket head cap screws **(A)** and lock washers **(B)** and tighten progressively in a criss-cross pattern to 40 to 50 in-lb.

Normally Closed



Normally Open



* Parts contained in service kits.

Service Kits / Parts

Service Kits

Basic Valve	Size Kit Number
3/8"	K352031
3/4"	K352056
1 1/4"	K352083

Parts

Description	Basic Valve Size		
	3/8"	3/4"	1 1/4"
Lower Piston	K202001	K202002	K313028
Upper Piston	K212001	K212002	K313029
Gasket	K183049	K183057	K183058

* Parts contained in service kits.



Pneumatic Division North America
8676 East M-89
Richland, MI 49083

Application Bulletin: V-643P
Hazardous Duty Valves and Solenoids
ISSUED: November, 1998
Supersedes: K583-128, July, 1995
ECN #8983

UL AND/OR CSA LISTED VALVES
ARE LISTED UNDER THE FOLLOWING
APPROVAL AGENCIES FILE NUMBERS:

	VALVES	SOLENOIDS
U.L. FILE	E40014	E42547 (N)
GUIDE CARD	YTSX	VAPT
C.S.A. FILE	24349	
GUIDE CARD	440-A-0.8	

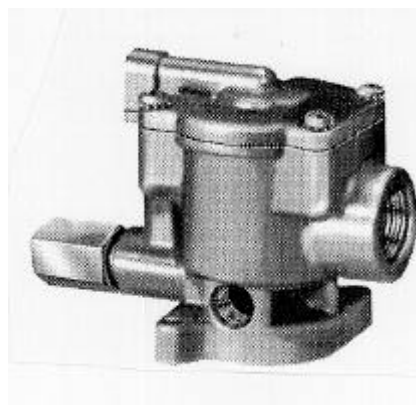
Valves and solenoids for use in hazardous locations, National Electric Code Class I, Group D; Class II, Div. 1, Group E,F and G; and Class I, Div. 2, Group B.

The model numbers shown are U.L. and C.S.A. listed:

These valves are listed by the above indicated agencies for service at 77°F ambient and fluid temperature.

VALVES: K015-1005, -1007, -1019, -1023, -1041, -1043, K035-1019 and -1023

SOLENOIDS: (Operators): K025 and K045 with or without suffix numbers. The suffix numbers indicate variations in the orifice sizes of the solenoids. The variations do not affect the construction of the solenoids described.



Model selection

Valve Description	Orifice Size	Cv	Standard Service		Special Service		Vacuum Service
			2-Way	3-Way	2-Way	3-Way	
N.C. Direct Ported	1/16"	0.12	K015-1005	K015-1005			
	3/32"	0.20		K015-1019	K035-1019	K035-1019	
	1/8"	0.23		K015-1041			K015-1043
N.O. Direct Ported	1/16"	0.12		K015-1007			
	3/32"	0.18		K015-1023		K035-1023	
	1/8"	0.23		K015-1043			K015-1041
N.C. Solenoid Subbase Mounted	1/16"	0.10	K025-1005	K025-1005			
	3/32"	0.14	K025-1015	K025-1019	K045-1019	K045-1019	
	1/8"	0.15		K025-1041			K025-1043
N.O. Solenoid Subbase Mounted	1/16"	0.08		K025-1007			
	3/32"	0.14		K025-1023		K045-1023	
	1/8"	0.15		K025-1043			K025-1041
N.O. Solenoid Subbase Mounted W/Override	1/16"	0.08		K025-3007			
	3/32"	0.14		K025-3023		K045-3023	
	1/8"	0.15		K025-3043			

ENGINEERING DATA

Service: Air, inert gas, vacuum.

Cycle Speed: 600 cycles per minute.

Current consumption:

at 120/60Hz: .29 amp. inrush; .18 amp. holding

at 110/50Hz: .32 amp. inrush; .22 amp. holding



CAUTION: If it is possible that the ambient temperature may fall below freezing, the medium must be moisture free to prevent internal damage or unpredictable behavior.

Maximum Operating Air Pressure (PSIG)

Valve Orifice Size	Normally Closed		Normally Open	
	3-Way	2-Way	3-Way	2-Way
1/16"	150	250	200	200
3/32"	90	175	130	130
1/8"	60	125	90	90

Port Identification

Normally Closed		Port 1	Port 2	Port 3
Pressure Service	3-Way	Inlet	Cylinder	Exhaust
	2-Way	Outlet	Inlet	Plugged
Vacuum Service	3-Way	Pump	Device	Open
	2-Way	Pump	Device	Plugged

Normally Open		Port 1	Port 2	Port 3
Pressure Service	3-Way	Exhaust	Cylinder	Inlet
	2-Way	Plugged	Outlet	Inlet
Vacuum Service	3-Way	Open	Device	Pump
	2-Way	Plugged	Device	Pump

**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 INSTRUCTION MANUALS THAT UTILIZE THESE PRODUCTS. CONTACT YOUR LOCAL REPRESENTATIVE.



Pneumatic Division
Richland, Michigan 49083

Installation & Service Instructions:
V-644P

L-Pilot and Operators

ISSUED: November, 2012
Supersedes: April, 2005

Doc. #V644, EN #120642, Rev. 7

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

NOTE: Locking manual overrides should be in the out position for proper valve operation.

Application Limits

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

0 PSIG Minimum / Maximum pressures vary with model.
Take the 5th through 7th digits in the model number and then look up maximum rating in the following table.

Kxxx-xxxx < Model Number
└─── "C" - (Orifice / Function Code)

C	psig	bar	kPa	C	psig	bar	kPa
001	250	17.24	1724	029	150	10.34	1034
003	200	13.79	1379	033	140	9.65	965
005	150	10.34	1034	035	140	9.65	965
007	200	13.79	1379	036	150	10.34	1034
009	200	13.79	1379	037	125	8.62	862
013	200	13.79	1379	039	90	6.21	621
014	200	13.79	1379	041	60	4.14	414
015	175	12.07	1207	043	90	6.21	621
017	140	9.65	965	045	90	6.21	621
019	90	6.21	621	054	90	6.21	621
021	90	6.21	621	056	90	6.21	621
023	130	8.96	896	080	150	10.34	1034
025	140	9.65	965				

Operating Temperature Range

Minimum*: -17°C (0°F)

Maximum (Standard Service): 37°C (100°F)

Maximum (Special Service): 52°C (125°F)

* In below-freezing ambient temperatures, it is important that a suitable lubricant be reasonably moisture-free.

Voltage Range: +10% to -15% of rating.

Wiring Instructions

(Units with flying leads)

Connect the two wires to suitable supply voltage. Either may be "Hot". (Plug-in valves are merely plugged into the mating power valve or manifold base.)

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

Pilot Valve Replacement

1. Loosen and remove (2) socket head capscrews and lockwashers from mounting feet.
2. Remove pilot valve and gasket.
3. Place new gasket and pilot valve on top of power valve or base, aligning edges of gasket with footprint of pilot valve.
4. Screw capscrews (with lockwashers) into power valve or base. Tighten capscrews to 4.5 to 5.6 Nm (40 to 50 in. lbs.) torque by alternatively tightening screws in progressive steps.

Service Procedures

General Service (Conduit, JIC and Plug-In Style)

1. Loosen cover screws and remove cover and top plate. Remove and discard seals from top plate and underside of cover. Replace with new seals from kit.

WARNING

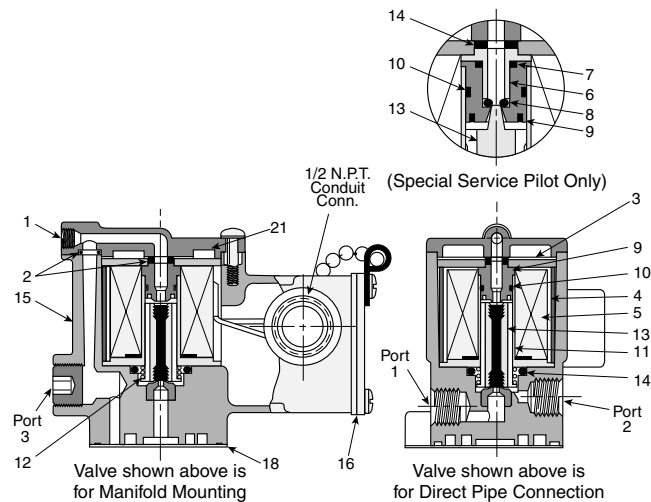
FAILURE OR IMPROPER SELECTION OR IMPROPER USE OF THE PRODUCTS AND/OR SYSTEMS DESCRIBED HEREIN OR RELATED ITEMS CAN CAUSE DEATH, PERSONAL INJURY AND PROPERTY DAMAGE.

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.

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2. Remove split sleeve and then pull up on coil while pushing lead wires toward center of housing.
3. Remove sleeve assembly, plunger and spring. Discard plunger (retain spring). Remove and replace tetraseal in bottom of housing with new one from kit.
4. Pull top seat out of sleeve. Remove and discard o-rings from top seat. Clean top seat, sleeve, spring and seat in housing.
5. Lightly grease new o-rings from kit and assemble to top seat. (Include insert where applicable). Push top seat into sleeve. Slide spring onto new plunger and then plunger into sleeve.
6. Reassemble sleeve assembly and plunger into housing. Slide coil over sleeve assembly while lightly pulling on coil wires. Slide split sleeve over coil.
7. Reassemble top plate and cover. Tighten cover screws to 2.3 to 2.8 Nm (20 to 25 in. lbs) torque.



Conduit, JIC and Plug-In Style

Item	Kit	Description
1		Cover Assembly
2	(1) & (2)	Tetraseal (Qty 2)
3		Top Plate
4		Split Sleeve
5	(3)	Coil
6		Insert
7	(2)	O-Ring (.176 ID X .070W) Silicone, Red
8	(2)	O-Ring (.114 ID X .070W)
9		Top Seat
10	(1) & (2)	O-Ring (.375 ID X .030W)
11		Sleeve Assembly
12		Spring
13	(1) & (2)	Plunger
14	(1) & (2)	Tetraseal
15		Body Assembly
16		Junction Box Cover Assy.
17		Exhaust Deflector**
18	(1) & (2)	Gasket
19	(1) & (2)	O-Ring (.300 ID X .050W)**
20	(4)	Override**

(1) Included in standard service repair kit K352166.

(2) Included in special service repair kit K352366.

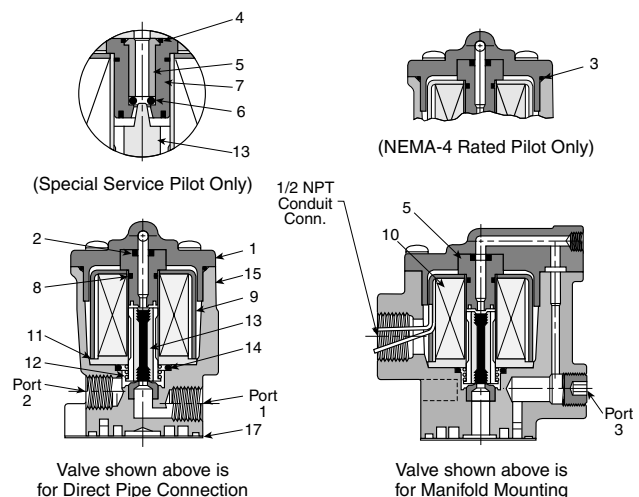
(3) See coil chart page 3.

(4) See list on page 3.

** Not Shown.

General Service (Hazardous Duty & NEMA-4)

1. Loosen cover screws and remove cover. Remove and discard seals from underside of cover. Replace with new seals from kit.
2. Remove top seat and insert (where applicable), remove and discard o-rings and clean parts.
3. Lightly grease new o-ring(s) from kit and assemble o-ring(s) and insert (where applicable) to top seat.
4. Remove inner housing and then pull up on coil while pushing lead wires toward center of housing.
5. Remove sleeve assembly, plunger and spring. Discard plunger (retain spring). Remove and replace tetraseal in bottom of housing with new one from kit.
6. Clean sleeve, spring and seat in housing.
7. Slide spring onto new plunger and then plunger into sleeve.
8. Reassemble sleeve assembly and plunger into housing. Slide coil over sleeve assembly while lightly pulling on coil wires. Slide inner housing over coil.
9. Reassemble top seat and cover. Tighten cover screws to 2.3 to 2.8 Nm (20 to 25 in. lbs) torque.



Hazardous Duty and Nema 4

Item	Kit	Description
1		Cover Assembly
2	(1) & (2)	O-Ring (.176 ID X .070 W Nitrile – Black)
3	(1) & (2)	O-Ring (Nema 4 Only)
4	(2)	O-Ring (.208 ID x .070W)
5		Top Seat Insert
6	(2)	O-Ring (.114 ID X .070W)
7		Top Seat
8	(1) & (2)	O-Ring (.375 ID X .030W)
9		Housing
10	(3)	Coil
11		Plate – Sleeve Assy.
12		Spring
13	(1) & (2)	Plunger
14	(1) & (2)	Tetraseal
15		Body Assy.
16		Exhaust Deflector **
17	(1) & (2)	Gasket
18	(1) & (2)	O-Ring (.300 ID X .050W)**
19	(4)	Override**

(1) Included in standard service kit K352166.

(2) Included in special service repair kit K352366.

(3) See coil chart on page 3.

(4) See list on page 3.

** Not Shown.

Indicator Light Replacement

Indicator Lights

Volts/Hertz	Plug-In Style	JIC Style (KIT)
120V 60 HZ/110V 50 HZ	H19105	K252050
24 VDC	H19112	K252051

Plug-In Style Valves

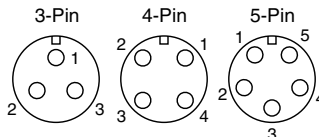
1. Loosen cover screws and remove cover.
2. Remove light from cover by pushing on lens. Discard light.
3. Push new light into socket in housing. Be careful to align pins on bottom of light with connectors in socket.
4. Reassemble cover and tighten screws to 2.3 to 2.8 Nm (20 to 25 in. lbs) torque.

JIC Valves (Without Multi-Pin Connector)

1. Loosen screws and remove junction box cover.
2. Snap open splice connectors and pry clip out of splice. Slide wires out of splice. Pull light out of housing and discard.
3. Push new light into housing (be careful not to dislodge seal). Slide one indicator light wire into each splice. Place clip into splice and press until flush with top of splice (vice or long-handled pliers required). Snap splice housing shut. Reassemble junction box cover and tighten screws to 2.3 to 2.8 Nm (20 to 25 in. lbs) torque.

JIC Valves (with 3, 4, or 5-pin connector)

NOTE: Refer to Decal placed on cover or Inside Junction Box of Pilot Operator for wiring configuration.



1. Loosen screws and remove junction box cover.
2. Unscrew wire nut from lamp leads and corresponding connector leads. Retain wire nuts.
3. If lamp contains a spring clip, (24VDC) use needle nose pliers to press together tangs on the spring clip holding the lamp to the cover. Slide spring clip off lamp body and lamp leads.
4. Gently pry up lamp and remove from cover. Discard lamp, o-ring seal, and spring clip.
5. Slide new o-ring over lamp body if necessary, and reinstall lamp into cover, pressing firmly to seat.
6. With needle nose pliers, depress tangs on the spring clip and slip over lamp leads and down onto lamp body until firmly contacting inside of cover. Lamp should not be loose.
7. If lamp does not contain a spring clip (120VAC) then pull light out of housing and discard.
8. Push new light into housing (be careful not to dislodge seal).
9. Reattach electrical lead wires from lamp and corresponding connector leads. Cap with wire nuts. Screw wire nuts down until all leads are secured and covered.
10. Reassemble junction box cover and tighten screws to 2.3 to 2.8 Nm (20 to 25 in. lbs) torque.

For units with DC indicator lamps red wire is (+) positive white wire is (-) negative.

CAUTION: DC solenoids with indicator lamps are polarity sensitive. Observe polarities indicated above.

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

Manual Override Replacement

Manual overrides may be replaced or field converted. Overrides of various styles may be interchanged as long as they are of the same functional type (normally open or normally closed). (Normally closed overrides are color-coded gold).

Non-Locking Normally Open	K162001
Locking Normally Open	K152003
Extended Locking Normally Open.....	K152006
Non-Locking Normally Closed.....	K162004
Locking Normally Closed.....	K152005
Extended Locking Normally Closed	K152007
Spring Return Locking Override	K15020002

Remove override and clean internal threads in housing. Apply pipe sealant sparingly to threads of override housing and assemble override to pilot valve housing.

NOTE: Non-locking overrides are held out by air pressure and may not extend until pressure is reapplied to the valve.

NOTE: Locking overrides should be in the out position for proper valve operation. With pressure applied use a flat head screw driver to press and rotate the plunger 90 degrees until the plunger locks in place.

Coil Chart

Voltage			Coil Number		
60 Hz	50 Hz	D.C.	Plug-In	19" Leads	72" Leads
12	-	-	K593052	K593007	K593178
24	-	6	K593048	K593003	K593179
-	24	-	K593061	K593015	K593181
-	-	12	K593055	K593010	K593182
-	36	-	K593062	K593016	K593183
-	-	24	K593060	K593014	K593184
-	-	48	K593074	K593028	K593185
120	110	-	K593125	K593025	K593186
240	220	-	K593081	K593035	K593187
-	230	-	K593079	-	-
-	240	-	-	K593033	K593188
-	-	90	-	K593020	K593189
-	-	115	-	K593041	K593190
-	380	-	-	K593038	K593191

NOTE: Units with multi-pin connectors should use 19" lead coils. These leads may be cut-to-length, using old coil for length measurements.



Pneumatic Division North America
Richland, MI 49083

Installation/Service Instructions: V-645P

P-Pilot Valves and Operators

ISSUED: May, 2001

Supersedes: November, 1998

ECN #9369 Rev. 3

WARNING

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

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

APPLICATION LIMITS

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

0 PSIG Minimum/Maximum pressures vary with model.
Take the 5th through 7th digits in the model number and then look up maximum rating in the following table.

Kxxx-xxxxx < Model Number
 └─ "C" – (Orifice/Function Code)

"C"	PSIG	Bar	kPA	"C"	PSIG	Bar	kPA
037	125	8.62	862	062	90	6.21	621
039	125	8.62	862	064	60	4.14	414
041	125	8.62	862	066	90	6.21	621
043	125	8.62	862	068	90	6.21	621
045	125	8.62	862	069	60	4.14	414
048	125	8.62	862	072	60	4.14	414
051	125	8.62	862	075	125	8.62	862
060	200	13.79	1379				

OPERATING TEMPERATURE RANGE

* Minimum: 0°F (-17°C)
Maximum: 100°F (37°C)

* In below-freezing ambient temperatures, it is important that a suitable lubricant be reasonably moisture-free.

Voltage Range: +10% to -25% of rating

WIRING INSTRUCTIONS

Connect the two wires to suitable supply voltage. Either may be "Hot".

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

PILOT VALVE REPLACEMENT

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

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

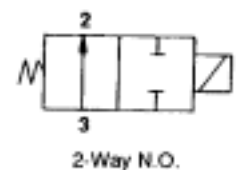
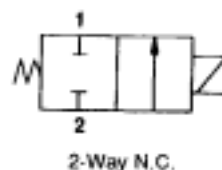
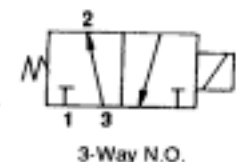
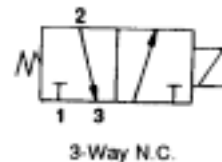
Life expectancy – Normal multi-million-cycle life expectancy of these valves is based on the use of properly filtered and lubricated air at room temperature. These valves are also designed to operate under non-lubricated conditions and will yield millions of maintenance free cycles.

Factory Pre-Lubrication – All valves are pre-lubricated at assembly with Sunaplex 781 or equivalent (Petroleum Base-Lithium Content) grease.

In-Service Lubrication is not required; however, if lubrication is to be used, F442 oil is recommended. This oil is specially formulated to provide peak performance and maximum service life from all air operated equipment. Otherwise, use a straight paraffin base mineral oil of viscosity 100-200 SSU @ 100°F and an aniline point greater than 200°F.

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

PORT IDENTIFICATION /CONNECTIONS



PORT IDENTIFICATION

N.C.	PORT 1	PORT 2	PORT 3
PRESSURE	3-Way Inlet	Cylinder	Exhaust
SERVICE	2-Way Outlet	Inlet	Plugged
VACUUM	3-Way Pump	Device	Open
SERVICE	2-Way Pump	Device	Plugged

N.C.	PORT 1	PORT 2	PORT 3
PRESSURE	3-Way Exhaust	Cylinder	Inlet
SERVICE	2-Way Plugged	Outlet	Inlet
VACUUM	3-Way Open	Device	Pump
SERVICE	2-Way Plugged	Device	Pump

PILOT VALVE REPLACEMENT

1. Loosen and remove (4) socket head capscrews and lockwashers from mounting feet.
2. Remove pilot valve and gasket.
3. Place new gasket and pilot valve on top of power valve or base, aligning edges of gasket with footprint of pilot valve.
4. Screw capscrews (with lockwashers) into power valve or base. Tighten capscrews to 40-50 in.-lbs by alternatively tightening screws in progressive steps.

SERVICE PROCEDURES (Use Kit No. K352064)

1. Loosen cover screws and remove cover and magnet bar. Remove and discard seals from magnet bar and underside of cover. Replace with new seals from kit.
2. Pull up on coil while pushing lead wires toward center of housing.
3. Remove sleeve assembly, plunger and spring. Discard plunger (retain spring). Remove and replace tetralseal in bottom of housing with new one from kit.
4. Pull top seat out of sleeve. Remove and discard o-rings from top seat. Clean top seat, sleeve, spring and seat in housing.
5. Lightly grease new o-rings from kit and assemble to top seat. Push top seat into sleeve. Slide spring onto new plunger and then plunger into sleeve.
6. Reassemble sleeve assembly and plunger into housing. Slide coil over sleeve assembly while lightly pulling on coil wires. Slide magnet bar over coil.
7. Reassemble top plate and cover. Tighten cover screws to 20-25 in.-lbs.

Coil Chart

Voltage			Coil Number	
60 Hz	50 Hz	D.C.	19" Leads	72" Leads
-	12	-	K593095	K593255
12	-	-	K593096	K593256
-	-	6	K593092	K593257
24	-	-	K593099	K593258
-	24	-	K593098	K593259
-	-	12	K593094	K593260
-	-	24	K593097	K593261
-	-	48	K593102	K593254
115	-	-	K593108	K593262
-	110	-	K593106	K593263
230	-	-	K593112	K593264
-	230	-	K593111	K593265
-	-	115	K593107	K583266

INDICATOR LIGHT REPLACEMENT (JIC Valves Only)

(Use part number H19102)

1. Loosen screws and remove junction box cover.
2. Snap open splice connectors and pry clip out of splice. Slide wires out of splice. Pull light out of housing and discard.
3. Push new light into housing (be careful not to dislodge seal). Slide one indicator light wire into each splice. Place clip into splice and press until flush with top of splice (vice or long-handled pliers required). Snap splice housing shut.
4. Reassemble junction box cover and tighten screws to 20 – 25 in.-lbs.

MANUAL OVERRIDE REPLACEMENT

Manual overrides may be replaced or field converted.

Non-Locking Normally Open.....K162001

Locking Normally Open.....K152003

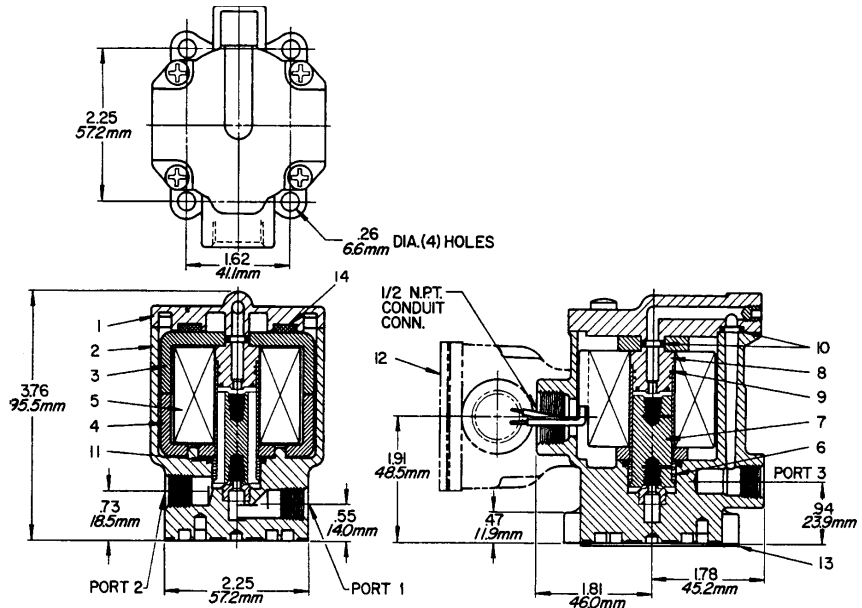
Extended Locking Normally Open.....K152006

Remove override and clean internal threads in housing. Apply pipe sealant sparingly to threads of override housing and assemble override to pilot valve housing.

NOTE: Non-locking overrides are held out by air pressure and may not extend until pressure is reapplied to the valve.

Item	Kit	Description	Item	Kit	Description
1		Cover Assembly	9	(1)	O-Ring (.489 ID X .070W)
2		Body Assembly	10	(1)	Tetralseal (Qty 2)
3		Magnet Bar	11	(1)	Tetralseal
4		Sleeve Assembly	12		Junction Box
5	(2)	Coil	13	(1)	Gasket
6		Spring	14		Shock Pad
7	(1)	Plunger	15	(1) (3)	O-Ring (.300 ID X .050W)
8		Top Seat			

- (1) Included in repair kit K352064.
- (2) See coil chart.
- (3) Not shown-used on override.



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 INSTRUCTION MANUALS THAT UTILIZE THESE PRODUCTS. CONTRACT YOUR LOCAL REPRESENTATIVE.



Pneumatic Division North America
8676 East M-89
Richland, MI 49083

Installation Instructions: V-648P
Time Delay Modules – K705 Series
ISSUED: November, 1998
Supersedes: K583-012, Jan., 1989
ECN #8980

INSTALLATION AND OPERATING INSTRUCTIONS FOR TIME DELAY MODULES

INSTALLATION

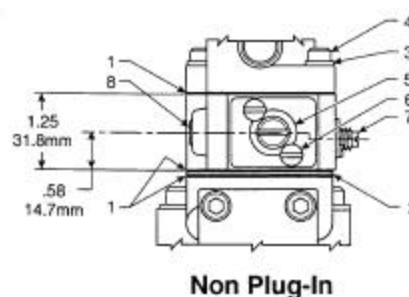
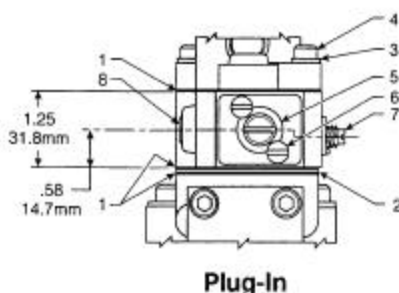
1. Remove pilot or remote adaptor from valve.
2. Place pilot valve gaskets (Item 1) on each side of brass plate (Item 2) and position on main valve. Align two small holes in main valve with holes in gaskets and plate. (Grease gaskets for best results.)
3. Place time delay module, open side down, on top of gaskets and plate. Position third gasket (Item 1) on top of time delay module with two small holes aligned with holes in gasket.
4. Replace pilot valve or remote adaptor on top of module and secure entire assembly using lock washers and cap screws provided. Tighten screws evenly (40-50 in.-lbs.).

SETTING DESIRED FUNCTION

1. First loosen locking screws (Item 6) about $\frac{1}{4}$ turn. If delay of valve action is desired after application of signal, set pointer on selector plate (Item 5) to "On-Delay". (Use pointer marked "Elect" when time delay module is used on solenoid-operated valve. Use pointer marked "Air" when time delay module is used with remote adaptor and normally closed remote pilot signal.)
2. To delay valve action after removal of signal, set pointer to "Off-Delay".
3. When pointer is set at "On-Off-Delay", valve action will be delayed after both application and removal of signal.
4. Be sure to lock the selector plate by retightening the two locking screws.

OPERATION

1. Check length of time delay by cycling valve with pilot and main valve supply set at desired operating pressures. If a longer delay is required, turn the metering screw (Item 7) in. To shorten delay, turn metering screw out.
2. To get accurate and repeatable timing cycles, the following conditions should be met:
 - (A) Use filtered air to the pilot valve or remote adaptor.
 - (B) All external leakage should be eliminated.
 - (C) Screws holding selector plate should be tight.
2. If extended time delay is required, remove the $\frac{1}{4}$ " N.P.T.F. pipe plug (Item 8) and pipe a small reservoir to the $\frac{1}{4}$ " N.P.T.F. port provided. A 2" long piece of $\frac{1}{4}$ " pipe installed in this port, with end capped, will approximately double the time range of the time delay module.





Pneumatic Division
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269-629-5000

PDNSG-1

Pneumatic Division Safety Guide

ISSUED: August 1, 2006

Supersedes: June 1, 2006

Safety Guide For Selecting And Using Pneumatic Division Products And Related Accessories

WARNING:

FAILURE OR IMPROPER SELECTION OR IMPROPER USE OF PNEUMATIC DIVISION PRODUCTS, ASSEMBLIES OR RELATED ITEMS ("PRODUCTS") CAN CAUSE DEATH, PERSONAL INJURY, AND PROPERTY DAMAGE. POSSIBLE CONSEQUENCES OF FAILURE OR IMPROPER SELECTION OR IMPROPER USE OF THESE PRODUCTS INCLUDE BUT ARE NOT LIMITED TO:

- Unintended or mistimed cycling or motion of machine members or failure to cycle
- Work pieces or component parts being thrown off at high speeds.
- Failure of a device to function properly for example, failure to clamp or unclamp an associated item or device.
- Explosion
- Suddenly moving or falling objects.
- Release of toxic or otherwise injurious liquids or gasses.

Before selecting or using any of these Products, it is important that you read and follow the instructions below.

1. GENERAL INSTRUCTIONS

- 1.1. Scope:** This safety guide is designed to cover general guidelines on the installation, use, and maintenance of Pneumatic Division Valves, FRLs (Filters, Pressure Regulators, and Lubricators), Vacuum products and related accessory components.
- 1.2. Fail-Safe:** Valves, FRLs, Vacuum products and their related components can and do fail without warning for many reasons. Design all systems and equipment in a fail-safe mode, so that failure of associated valves, FRLs or Vacuum products will not endanger persons or property.
- 1.3. Relevant International Standards:** For a good guide to the application of a broad spectrum of pneumatic fluid power devices see: ISO 4414:1998, Pneumatic Fluid Power – General Rules Relating to Systems. See www.iso.org for ordering information.
- 1.4. Distribution:** Provide a copy of this safety guide to each person that is responsible for selection, installation, or use of Valves, FRLs or Vacuum products. Do not select, or use Parker valves, FRLs or vacuum products without thoroughly reading and understanding this safety guide as well as the specific Parker publications for the products considered or selected.
- 1.5. User Responsibility:** Due to the wide variety of operating conditions and applications for valves, FRLs, and vacuum products Parker and its distributors do not represent or warrant that any particular valve, FRL or vacuum product is suitable for any specific end use system. This safety guide does not analyze all technical parameters that must be considered in selecting a product. The user, through its own analysis and testing, is solely responsible for:
 - Making the final selection of the appropriate valve, FRL, Vacuum component, or accessory.
 - Assuring that all user's performance, endurance, maintenance, safety, and warning requirements are met and that the application presents no health or safety hazards.
 - Complying with all existing warning labels and / or providing all appropriate health and safety warnings on the equipment on which the valves, FRLs or Vacuum products are used; and,
 - Assuring compliance with all applicable government and industry standards.
- 1.6. Safety Devices:** Safety devices should not be removed, or defeated.
- 1.7. Warning Labels:** Warning labels should not be removed, painted over or otherwise obscured.
- 1.8. Additional Questions:** Call the appropriate Parker technical service department if you have any questions or require any additional information. See the Parker publication for the product being considered or used, or call 1-800-CPARKER, or go to www.parker.com, for telephone numbers of the appropriate technical service department.

2. PRODUCT SELECTION INSTRUCTIONS

- 2.1. Flow Rate:** The flow rate requirements of a system are frequently the primary consideration when designing any pneumatic system. System components need to be able to provide adequate flow and pressure for the desired application.
- 2.2. Pressure Rating:** Never exceed the rated pressure of a product. Consult product labeling, Pneumatic Division catalogs or the instruction sheets supplied for maximum pressure ratings.
- 2.3. Temperature Rating:** Never exceed the temperature rating of a product. Excessive heat can shorten the life expectancy of a product and result in complete product failure.
- 2.4. Environment:** Many environmental conditions can affect the integrity and suitability of a product for a given application. Pneumatic Division products are designed for use in general purpose industrial applications. If these products are to be used in unusual circumstances such as direct sunlight and/or corrosive or caustic environments, such use can shorten the useful life and lead to premature failure of a product.
- 2.5. Lubrication and Compressor Carryover:** Some modern synthetic oils can and will attack nitrile seals. If there is any possibility of synthetic oils or greases migrating into the pneumatic components check for compatibility with the seal materials used. Consult the factory or product literature for materials of construction.
- 2.6. Polycarbonate Bowls and Sight Glasses:** To avoid potential polycarbonate bowl failures:
 - Do not locate polycarbonate bowls or sight glasses in areas where they could be subject to direct sunlight, impact blow, or temperatures outside of the rated range.
 - Do not expose or clean polycarbonate bowls with detergents, chlorinated hydro-carbons, ketones, esters or certain alcohols.
 - Do not use polycarbonate bowls or sight glasses in air systems where compressors are lubricated with fire resistant fluids such as phosphate ester and di-ester lubricants.

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

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

3. PRODUCT ASSEMBLY AND INSTALLATION INSTRUCTIONS

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

4. VALVE AND FRL MAINTENANCE AND REPLACEMENT INSTRUCTIONS

- 4.1. Maintenance:** Even with proper selection and installation, valve, FRL and vacuum products service life may be significantly reduced without a continuing maintenance program. The severity of the application, risk potential from a component failure, and experience with any known failures in the application or in similar applications should determine the frequency of inspections and the servicing or replacement of Pneumatic Division products so that products are replaced before any failure occurs. A maintenance program must be established and followed by the user and, at minimum, must include instructions 4.2 through 4.10.
- 4.2. Installation and Service Instructions:** Before attempting to service or replace any worn or damaged parts consult the appropriate Service Bulletin for the valve or FRL in question for the appropriate practices to service the unit in question. These Service and Installation Instructions are provided with every Parker valve and FRL sold, or are available by calling 1-800-CPARKER, or by accessing the Parker web site at www.parker.com.
- 4.3. Lockout / Tagout Procedures:** Be sure to follow all required lockout and tagout procedures when servicing equipment. For more information see: OSHA Standard – 29 CFR, Part 1910.147, Appendix A, The Control of Hazardous Energy – (Lockout / Tagout)
- 4.4. Visual Inspection:** Any of the following conditions requires immediate system shut down and replacement of worn or damaged components:
- Air leakage: Look and listen to see if there are any signs of visual damage to any of the components in the system. Leakage is an indication of worn or damaged components.
 - Damaged or degraded components: Look to see if there are any visible signs of wear or component degradation.
 - Kinked, crushed, or damaged hoses. Kinked hoses can result in restricted air flow and lead to unpredictable system behavior.
 - Any observed improper system or component function: Immediately shut down the system and correct malfunction.
 - Excessive dirt build-up: Dirt and clutter can mask potentially hazardous situations.

Caution: Leak detection solutions should be rinsed off after use.

- 4.5. Routine Maintenance Issues:**
- Remove excessive dirt, grime and clutter from work areas.
 - Make sure all required guards and shields are in place.
- 4.6. Functional Test:** Before initiating automatic operation, operate the system manually to make sure all required functions operate properly and safely.
- 4.7. Service or Replacement Intervals:** It is the user's responsibility to establish appropriate service intervals. Valves, FRLs and vacuum products contain components that age, harden, wear, and otherwise deteriorate over time. Environmental conditions can significantly accelerate this process. Valves, FRLs and vacuum components need to be serviced or replaced on routine intervals. Service intervals need to be established based on:
- Previous performance experiences.
 - Government and / or industrial standards.
 - When failures could result in unacceptable down time, equipment damage or personal injury risk.
- 4.8. Servicing or Replacing of any Worn or Damaged Parts:** To avoid unpredictable system behavior that can cause death, personal injury and property damage:
- Follow all government, state and local safety and servicing practices prior to service including but not limited to all OSHA Lockout Tagout procedures (OSHA Standard – 29 CFR, Part 1910.147, Appendix A, The Control of Hazardous Energy – Lockout / Tagout).
 - Disconnect electrical supply (when necessary) before installation, servicing, or conversion.
 - Disconnect air supply and depressurize all air lines connected to system and Pneumatic Division products before installation, service, or conversion.
 - Installation, servicing, and / or conversion of these products must be performed by knowledgeable personnel who understand how pneumatic products are to be applied.
 - After installation, servicing, or conversions air and electrical supplies (when necessary) should be connected and the product tested for proper function and leakage. If audible leakage is present, or if the product does not operate properly, do not put product or system into use.
 - Warnings and specifications on the product should not be covered or painted over. If masking is not possible, contact your local representative for replacement labels.
- 4.9. Putting Serviced System Back into Operation:** Follow the guidelines above and all relevant Installation and Maintenance Instructions supplied with the valve FRL or vacuum component to insure proper function of the system.